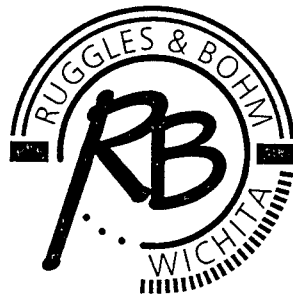


**DRAINAGE REPORT  
UNITED GOLF OF WICHITA  
PAR 3 GOLF COURSE**

**WICHITA, SEDGWICK COUNTY, KANSAS**

**APRIL 2002**



*Ruggles & Bohm, P.A.*  
Engineering, Surveying, Land Planning  
924 N. Main, Wichita, Kansas 67203  
(316) 264-8008 (316) 264-4621 Fax  
[www.rbkansas.com](http://www.rbkansas.com) [info@rbkansas.com](mailto:info@rbkansas.com)

**DRAINAGE REPORT  
UNITED GOLF OF WICHITA  
PAR 3 GOLF COURSE**

**APRIL 2002**

**INTRODUCTION**

This report contains drainage calculations and supporting documentation for a proposed golf course at Pawnee and 127<sup>th</sup> Street East. The studied site is an undeveloped 64.3 acre tract in the southwest ¼ of Section 35, Township 27 South, Range 2 East. The site is currently cultivated with tree rows along the perimeter. There is existing offsite drainage that enters the site from the west and south via existing swales.

The site will be developed as an eighteen hole golf course with a driving range and putting greens. A 2800 s.f. clubhouse and a parking lot with 78 parking stalls will be constructed on the site. Onsite detention will be provided by a series of ponds that will be constructed with the golf course. These ponds will serve as site amenities for the golf course as well. The southernmost pond will be used as a source of irrigation water for the golf course and as such, there will be significantly higher detention volume available due to drawdown for pumping. The drawdown effect was ignored for the analysis.

Additional piping has been provided to bring water from the east onsite areas to the main pond. These pipes are designed for small flows and it is assumed that any large flows would overflow the proposed swales and pond and continue in their normal flow paths to the east.

**HYDROLOGY**

Peak flow rates for flows were determined from a combination of the rational method and the HEC-HMS (HEC-1) Hydrology Program. Sizing of structures was done using the rational method. The ponds were designed using HEC-HMS. For the most part, detention on this site is not an issue since stormwater runoff should decrease as a result of the new construction. The curve numbers and runoff coefficients actually decrease when the land use is changing from cultivated to dense grass and pasture.

However, the site will accept runoff from the proposed subdivision that is adjacent to the site and as such, the ponds have been designed to detain that runoff to below predevelopment levels. Pond A and Pond E do not accept runoff from the proposed subdivision, and as such, no HEC analysis has been performed.

Based on the output from HEC-HMS, the North Basin will see a decrease from a pre-developed flow of 131.1 cfs to a post-developed flow of 106.0 cfs. A further constraint on the runoff from the north basin was the drainage plan for the Equestrian Estates Addition to the north. Based on that drainage plan, the proposed north facility would need a design release rate of 119.0 cfs. The proposed release rate of 106.0 cfs will meet that requirement. The South Basin will see a decrease from the pre-developed flow of 407.7 cfs to a post-developed runoff rate of 381.6 cfs. See the "Hydrology Data" section at the back of this report for output from the computer program.

Another factor of safety built into this analysis is the offsite runoff from south of Pawnee. A 28.7 acre area that has 104.1 cfs of runoff has been added to our analysis. The existing 24" RCP that runs under Pawnee does not have sufficient capacity to handle that flow and as such, an undetermined portion of that stormwater will spill to the east along the south ditch of Pawnee where it rejoins the runoff from the other areas studied in this report. The entire flow was included in our analysis, which should be conservative.

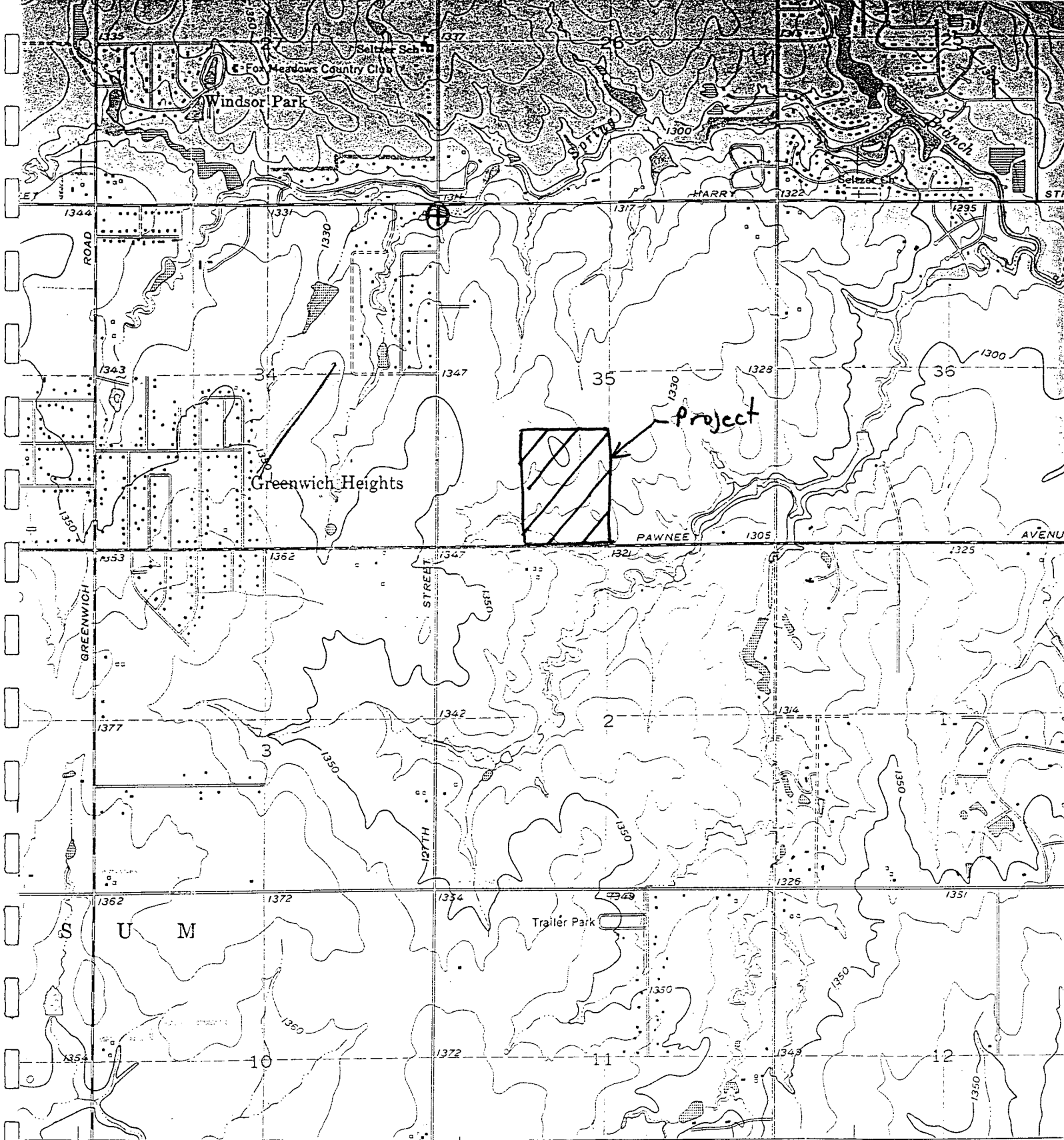
### HYDRAULICS

The hydraulics package included with Land Desktop 3 was used to determine the performance of detention outlet structures proposed with this project. Rock lined channels will connect Pond A to Pond B and will carry the flows from the three middle ponds to the main pond. A 20' X 2' concrete weir will provide flow control between Pond B and Pond C. A 24" RCP will provide outlet control of Pond C. A 40' X 3' concrete weir will be constructed to provide outlet control for Pond F. Four 36" RCP pipes will be utilized as outlet control on Pond D at the north end. The existing 4' X 6' RCBC under Pawnee is not sized for the 100 year storm and as such, should be replaced by Sedgwick County when demand warrants it.

### CONCLUSIONS

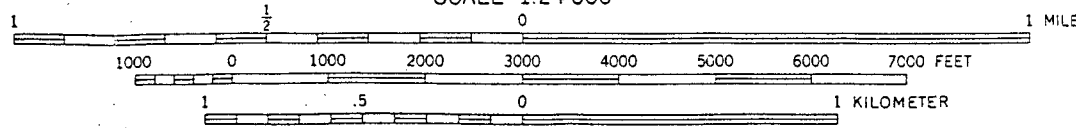
The detention ponds proposed for this project provide adequate detention to reduce stormwater runoff to below predevelopment levels. Stormwater runoff from the proposed residential subdivision can be released undetained into the proposed ponds as well. As mentioned in the body of the report, irrigation for the golf course will be provided from the ponds and as such, additional detention capacity will be available in most situations although that capacity has not been modeled for the purposes of this report.

The north basin's pond has been designed to exceed the detention requirements of the adjacent subdivision to the north as well. Final design of storm sewer and structures associated with the residential area that drains into the north pond will be done when the planning of the subdivision is nearing completion.



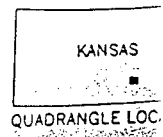
(ROSE HILL)  
6559 11 SW

SCALE 1:24 000



CONTOUR INTERVAL 10 FEET  
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS



### Hydrologic Data (All Basins)

Hydrologic Soil Group C-D

Assume dense grass/pasture for golf course and ¼ acre residential for offsite residential area.

### Tc Calculations

overland unconcentrated, 300' @ 1%, 300' @ 0.28 ft/s = 1071 sec

shallow concentrated (turf), 700' @ 1%, 700' @ 1.12 ft/s = 625 sec

channelized (turf), 1625' @ 1%, 1625 @ 3.0 ft/s = 542 sec

Total Tc = 1071 + 625 + 542 = 2238 sec = 37 minutes

### Curve Number Information

CN = 80 used for north areas that were Group D Soil

CN = 79 used for middle areas that were Group C and D Soil

CN = 78 used for north areas that were Group C Soil

CN = 91 used for residential areas

### Other Input Information

SCS Lag = 0.6 Tc = 0.6 (37) = 22.2 minutes

A 15 minute lag was assumed on all small basins

SCS Type II Storm, 7.80 inches

No baseflows were assumed for any channels.

### Runoff Summary

#### North Basin

Predeveloped runoff = 131.1 cfs

Developed runoff = 106.0 cfs OK

East Basin (Not studied)

South Basin

Predeveloped runoff = 407.7 cfs

Developed runoff = 381.6 cfs OK

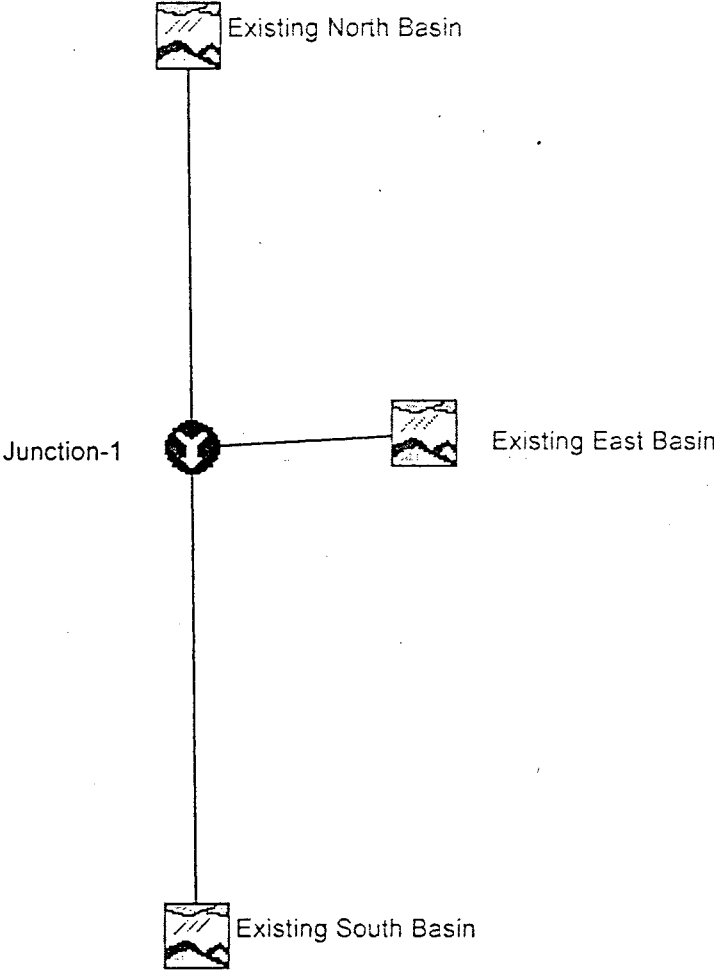
**Table 1.3 Runoff curve numbers for selected agricultural, suburban, and urban areas**

(Sources: TR 55, 1986, and Stormwater Management Manual, 1992)

Cover type and hydrologic condition.....	CNs for hydrologic soil group			
	A	B	C	D
<b>Curve Numbers for Pre-Development Conditions</b>				
<b>Pasture, grassland, or range-continuous forage for grazing:</b>				
Fair condition (ground cover 50% to 75% and not heavily grazed).....	49	69	79	84
Good condition (ground cover >75% and lightly or only occasionally grazed) .....	39	61	74	80
<b>Woods:</b>				
Fair (Woods are grazed but not burned, and some forest litter covers the soil). ....	36	60	73	79
Good (Woods are protected from grazing, and litter and brush adequately cover the soil) ..	30	55	70	77
<b>Curve Numbers for Post-Development Conditions</b>				
<b>Open space (lawns, parks, golf courses, cemeteries, landscaping, etc.)<sup>1</sup> .....</b>				
Fair condition (grass cover on 50% - 75% of the area).....	77	85	90	92
Good condition (grass cover on >75% of the area).....	68	80	86	90
<b>Impervious areas:</b>				
Open water bodies: lakes, wetlands, ponds etc.	100	100	100	100
Paved parking lots, roofs, driveways, etc. (excluding right-of-way) .....	98	98	98	98
<b>Streets and roads:</b>				
Paved.....	98	98	98	98
Gravel (including right-of-way) .....	76	85	89	91
Dirt (including right-of-way).....	72	82	87	89
<b>Pasture, grassland, or range-continuous forage for grazing:</b>				
Poor condition (ground cover <50% or heavily grazed with no mulch) .....	68	79	86	89
Fair condition (ground cover 50% to 75% and not heavily grazed).....	49	69	79	84
Good condition (ground cover >75% and lightly or only occasionally grazed) .....	39	61	74	80
<b>Woods:</b>				
Poor (Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning) .....	45	66	77	83
Fair (Woods are grazed but not burned, and some forest litter covers the soil).....	36	60	73	79
Good (Woods are protected from grazing, and litter and brush adequately cover the soil) ..	30	55	70	77
<b>Single family residential<sup>2</sup>:</b>	Should only be used for subdivisions > 50 acres	Average Percent impervious area <sup>2,3</sup>		
Dwelling Unit/Gross Acre				Separate curve number shall be selected for pervious & impervious portions of the site or basin
1.0 DU/GA .....		15		
1.5 DU/GA .....		20		
2.0 DU/GA .....		25		
2.5 DU/GA .....		30		
3.0 DU/GA .....		34		
3.5 DU/GA .....		38		
4.0 DU/GA .....		42		
4.5 DU/GA .....		46		
5.0 DU/GA .....		48		
5.5 DU/GA .....		50		
6.0 DU/GA .....		52		
6.5 DU/GA .....		54		
7.0 DU/GA .....		56		
7.5 DU/GA .....		58		
PUD's, condos, apartments, commercial businesses, industrial areas & subdivisions < 50 acres	%impervious must be computed	Separate curve numbers shall be selected for pervious and impervious portions of the site		

For a more detailed and complete description of land use curve numbers refer to chapter two (2) of the Soil Conservation Service's Technical Release No. 55, (210-VI-TR-55, Second Ed., June 1986).

<sup>1</sup> Composite CN's may be computed for other combinations of open space cover type.  
<sup>2</sup> Assumes roof and driveway runoff is directed into street/storm system.  
<sup>3</sup> Where roof runoff and drive runoff are infiltrated or dispersed according to the requirements in Chapter 2, the average percent impervious area may be adjusted in accordance with the procedure described under "Flow Credit for Roof Downspout Infiltration" and "Flow Credit for Roof Downspout Dispersion" in Chapter 2.



HMS \* Summary of Results for Existing North  
Basin

Project : Par 3 Golf            Run Name : Run 2

Start of Run : 01Feb02 0012    Basin Model : Existing Basin

End of Run : 02Feb02 0012    Met. Model : 100 year

Execution Time : 15Apr02 0745    Control Specs : Control 1

Computed Results

Peak Discharge : 131.07 (cfs),    Date/Time of Peak Discharge : 01 Feb 02 1224

Total Precipitation : 7.80 (in)    Total Direct Runoff : 5.40 (in)

Total Loss : 2.36 (in)    Total Baseflow : 0.00 (in)

Total Excess : 5.44 (in)    Total Discharge : 5.40 (in)

HMS \* Summary of Results for Existing East

Basin

Project : Par 3 Golf            Run Name : Run 2

Start of Run : 01Feb02 0012    Basin Model : Existing Basin

End of Run : 02Feb02 0012    Met. Model : 100 year

Execution Time : 15Apr02 0745    Control Specs : Control 1

Computed Results

Peak Discharge : 77.965 (cfs)    Date/Time of Peak Discharge : 01 Feb 02 1224

Total Precipitation : 7.80 (in)    Total Direct Runoff : 5.29 (in)

Total Loss : 2.48 (in)    Total Baseflow : 0.00 (in)

Total Excess : 5.32 (in)    Total Discharge : 5.29 (in)

HMS \* Summary of Results for Existing South  
Basin

Project : Par 3 Golf                      Run Name : Run 2

Start of Run : 01Feb02 0012    Basin Model : Existing Basin  
End of Run : 02Feb02 0012    Met. Model : 100 year  
Execution Time : 15Apr02 0745    Control Specs : Control 1

Computed Results

Peak Discharge	: 407.65 (cfs)	Date/Time of Peak Discharge	: 01 Feb 02 1234
Total Precipitation	: 7.80 (in)	Total Direct Runoff	: 5.15 (in)
Total Loss	: 2.59 (in)	Total Baseflow	: 0.00 (in)
Total Excess	: 5.21 (in)	Total Discharge	: 5.15 (in)

# Existing Basin Input

HMS Basin Model - Subbasin Editor

Help

Subbasin Name: Existing South Basin Area (sq. mi.) 0.18975

Description:

Loss Rate Transform Baseflow Method

Method: SCS Curve No.

Initial Loss (in): % Impervious: 0.0

SCS Curve No.: 78

OK Apply Cancel

Subbasin name

HMS Basin Model - Subbasin Editor

Help

Subbasin Name: Existing South Basin Area (sq. mi.) 0.18975

Description:

Loss Rate Transform Baseflow Method

Method: SCS

SCS Lag: 30.000000 Minutes

OK Apply Cancel

Subbasin name

# Existing Basin Input (Continued)

HMS Basin Model - Subbasin Editor

Help

Subbasin Name: Existing East Basin Area (sq. mi.) 0.0273

Description:

Loss Rate: Transform | Baseflow Method

Method: SCS Curve No.

Initial Loss (in): % Impervious: 0.0

SCS Curve No.: 79

OK Apply Cancel

Subbasin name

HMS Basin Model - Subbasin Editor

Help

Subbasin Name: Existing East Basin Area (sq. mi.) 0.0273

Description:

Loss Rate: Transform | Baseflow Method

Method: SCS

SCS Lag: 20.000000 Minutes

OK Apply Cancel

Subbasin name

# Existing Basin Input (Continued)

HMS - Basin Model - Subbasin Editor

Help

Subbasin Name: Existing North Basin Area (sq. mi.): 0.0450

Description:

Loss Rate: Transform | Baseflow Method

Method: SCS Curve No.

Initial Loss (in): % Impervious: 0.0

SCS Curve No.: 80

OK Apply Cancel

Subbasin name

HMS - Basin Model - Subbasin Editor

Help

Subbasin Name: Existing North Basin Area (sq. mi.): 0.0450

Description:

Loss Rate: Transform | Baseflow Method

Method: SCS

SCS Lag: 20.000000 Minutes

OK Apply Cancel

Subbasin name

# Storm and Control Data

**HMS - Meteorologic Model** [ - ] [ □ ] [ X ]

File Edit Help

Meteorologic Model: 100 year Subbasin List

Description: 100 year 24 hour for Wichita, Kansas

Precipitation | Evapotranspiration

Method: SCS Hypothetical Storm

Storm Selection: Type II

Storm Depth (in): 7.8

OK Apply Cancel

**HMS - Control Specifications** [ - ] [ □ ] [ X ]

File Help

Control Specs ID: Control 1

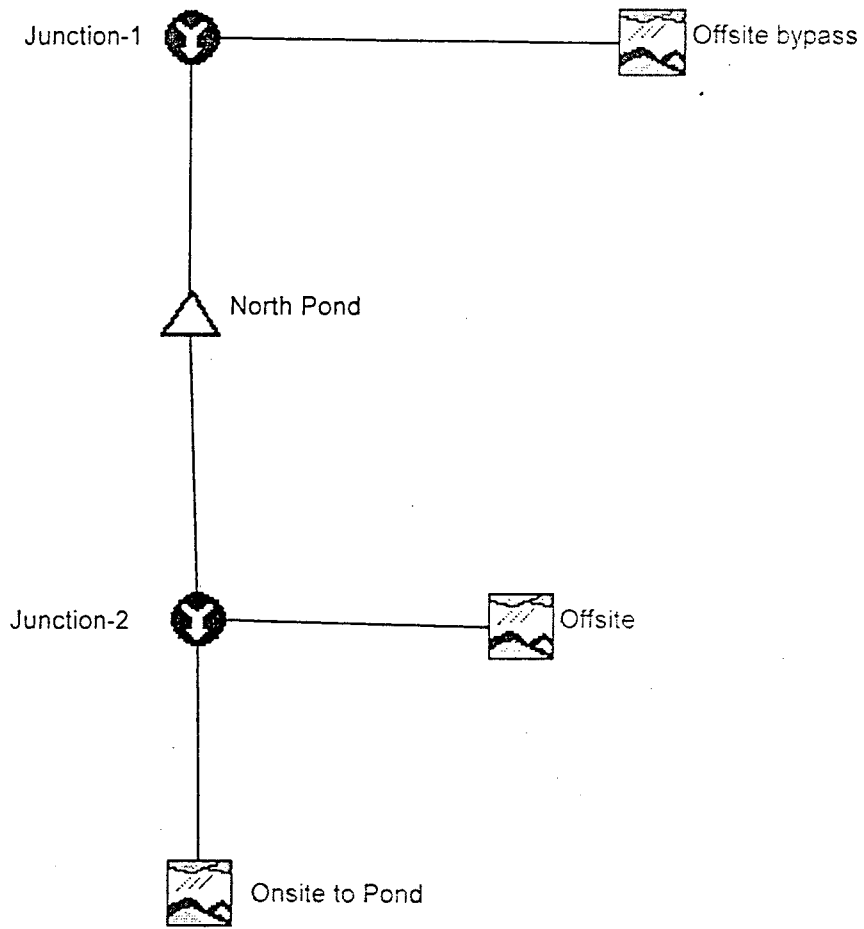
Description:

Starting Date: 01 Feb 2002 Starting Time: 00:12

Ending Date: 02 Feb 2002 Ending Time: 00:12

Time Interval: 2 Minutes

OK Apply Cancel



HMS \* Summary of Results for Junction-1

Project : Par 3 Golf                      Run Name : Run 1

Start of Run    : 01Feb02 0012    Basin Model    : North Pond Basin

End of Run      : 02Feb02 0012    Met. Model     : 100 year

Execution Time : 15Apr02 0807    Control Specs : Control 1

Computed Results

Peak Outflow : 106.03 (cfs)    Date/Time of Peak Outflow : 01 Feb 02 1230

Total Outflow : 6.27 (in)

HMS \* Summary of Results for Offsite bypass

Project : Par 3 Golf

Run Name : Run 1

Start of Run : 01Feb02 0012 Basin Model : North Pond Basin

End of Run : 02Feb02 0012 Met. Model : 100 year

Execution Time : 15Apr02 0807 Control Specs : Control 1

Computed Results

Peak Discharge : 14.446 (cfs) Date/Time of Peak Discharge : 01 Feb 02 1220

Total Precipitation : 7.80 (in) Total Direct Runoff : 6.49 (in)

Total Loss : 1.28 (in) Total Baseflow : 0.00 (in)

Total Excess : 6.52 (in) Total Discharge : 6.49 (in)

HMS \* Summary of Results for Junction-2

Project : Par 3 Golf

Run Name : Run 1

Start of Run : 01Feb02 0012 Basin Model : North Pond Basin

End of Run : 02Feb02 0012 Met. Model : 100 year

Execution Time : 15Apr02 0807 Control Specs : Control 1

Computed Results

Peak Outflow : 159.71 (cfs) Date/Time of Peak Outflow : 01 Feb 02 1220

Total Outflow : 6.22 (in)

HMS \* Summary of Results for Offsite

Project : Par 3 Golf

Run Name : Run 1

Start of Run : 01Feb02 0012 Basin Model : North Pond Babin

End of Run : 02Feb02 0012 Met. Model : 100 year

Execution Time : 15Apr02 0807 Control Specs : Control 1

Computed Results

Peak Discharge : 120.20 (cfs) Date/Time of Peak Discharge : 01 Feb 02 1220

Total Precipitation : 7.80 (in) Total Direct Runoff : 6.68 (in)

Total Loss : 1.10 (in) Total Baseflow : 0.00 (in)

Total Excess : 6.70 (in) Total Discharge : 6.68 (in)

HMS \* Summary of Results for Onsite to Pond

Project : Par 3 Golf

Run Name : Run 1

Start of Run : 01Feb02 0012 Basin Model : North Pond Basin

End of Run : 02Feb02 0012 Met. Model : 100 year

Execution Time : 15Apr02 0807 Control Specs : Control 1

Computed Results

Peak Discharge : 39.505 (cfs) Date/Time of Peak Discharge : 01 Feb 02 1220

Total Precipitation : 7.80 (in) Total Direct Runoff : 5.41 (in)

Total Loss : 2.36 (in) Total Baseflow : 0.00 (in)

Total Excess : 5.44 (in) Total Discharge : 5.41 (in)

# Proposed Pond Basin (North Pond)

HMS Basin Model Reservoir Routing

Edit File Help

Reservoir Name: North Pond

Description: ...

Input Options

- Storage - Outflow
- Elevation - Storage - Outflow
- Elevation - Area - Outflow

Initial: Inflow = Outflow

Elevation (ft)	Area (acres)	Outflow (cfs)
1332.0	1.42	0.0
1333.0	1.56	22.0
1334.0	1.71	79.0
1335.0	1.85	148.0
1336.0	2.01	215.0
1337.0	2.30	235.0

Graph

OK Apply Cancel

# North Basin Input

HMS - Basin Model - Subbasin Editor

Help

Subbasin Name:  Area (sq. mi.)

Description:

Loss Rate | Transform | Baseflow Method

Method:  ▾

Initial Loss (in.)  % Impervious:

SCS Curve No.:

Subbasin name

HMS - Basin Model - Subbasin Editor

Help

Subbasin Name:  Area (sq. mi.)

Description:

Loss Rate | Transform | Baseflow Method

Method:  ▾

Initial Loss (in.)  % Impervious:

SCS Curve No.:

Subbasin name

# North Basin Input (Continued)

HMS - Basin Model - Subbasin Editor

Help

Subbasin Name:  Area (sq. mi.)

Description:

Loss Rate:  Transform  Baseflow Method

Method:  ▾

Initial Loss (in):  % Impervious:

SCS Curve No.:

Subbasin description

HMS - Basin Model - Subbasin Editor

Help

Subbasin Name:  Area (sq. mi.)

Description:

Loss Rate:  Transform  Baseflow Method

Method:  ▾

SCS Lag:   ▾

Subbasin name

# North Basin Input (Continued)

HMS - Basin Model - Subbasin Editor

Help

Subbasin Name:  Area (sq. mi.):

Description:

Loss Rate | Transform | Baseflow Method

Method:  ▾

Initial Loss (in):  % Impervious:

SCS Curve No.:

Subbasin name

HMS - Basin Model - Subbasin Editor

Help

Subbasin Name:  Area (sq. mi.):

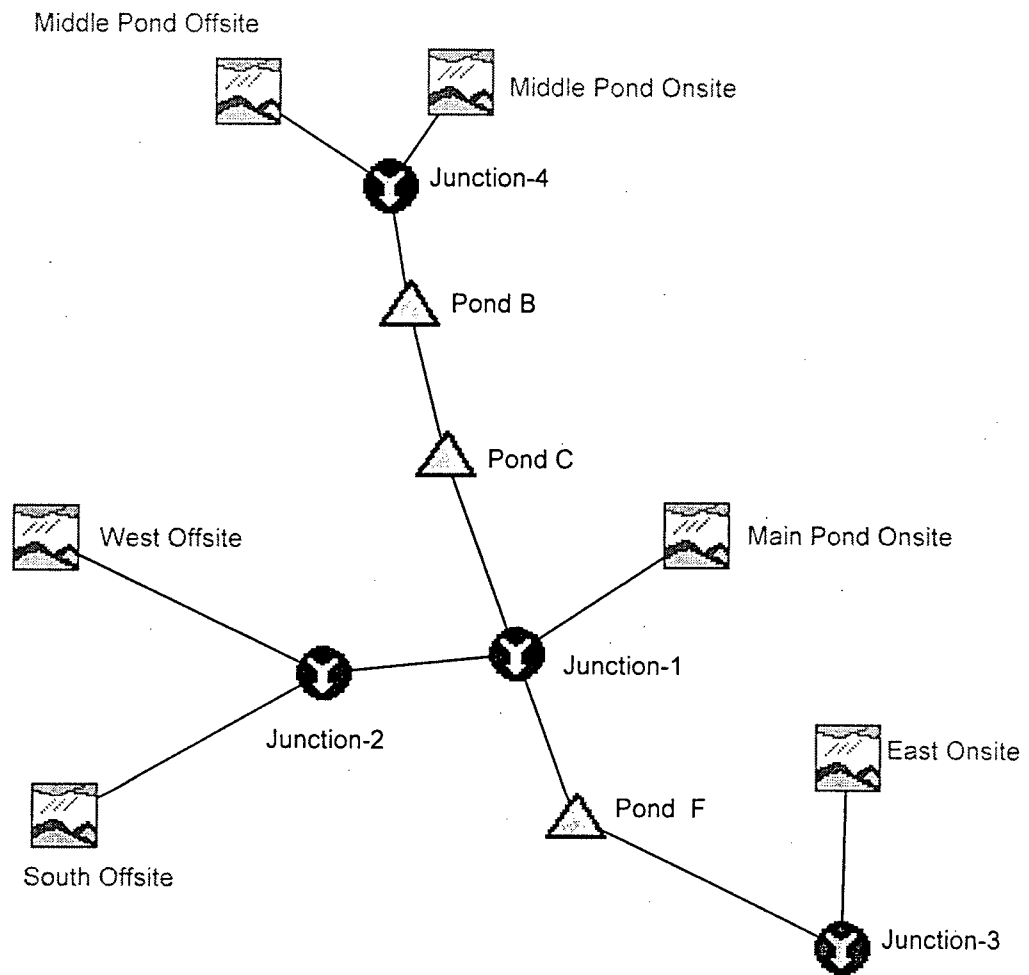
Description:

Loss Rate | Transform | Baseflow Method

Method:  ▾

SCS Lag:   ▾

Subbasin name



HMS \* Summary of Results for Junction-3

Project : Par 3 Golf            Run Name : Run 3

Start of Run : 01Feb02 0012    Basin Model : South Basin

End of Run : 02Feb02 0012    Met. Model : 100 year

Execution Time : 15Apr02 0814    Control Specs : Control 1

Computed Results

Peak Outflow : 381.58 (cfs)    Date/Time of Peak Outflow : 01 Feb 02 1234

Total Outflow : 4.96 (in)

HMS \* Summary of Results for Junction-1

Project : Par 3 Golf

Run Name : Run 3

Start of Run : 01Feb02 0012 Basin Model : South Basin

End of Run : 02Feb02 0012 Met. Model : 100 year

Execution Time : 15Apr02 0814 Control Specs : Control 1

Computed Results

Peak Outflow : 396.86 (cfs) Date/Time of Peak Outflow : 01 Feb 02 1228

Total Outflow : 4.98 (in)

HMS \* Summary of Results for Junction-2

Project : Far 3 Golf      Run Name : Run 3

Start of Run : 01Feb02 0012    Basin Model : South Basin  
End of Run : 02Feb02 0012    Met. Model : 100 year  
Execution Time : 15Apr02 0814    Control Specs : Control 1

Computed Results

Peak Outflow : 285.08 (cfs)    Date/Time of Peak Outflow : 01 Feb 02 1228  
Total Outflow : 4.94 (in)

HMS \* Summary of Results for Junction-4

Project : Par 3 Golf                      Run Name : Run 3

Start of Run : 01Feb02 0012    Basin Model : South Basin  
End of Run : 02Feb02 0012    Met. Model : 100 year  
Execution Time : 15Apr02 0814    Control Specs : Control 1

Computed Results

Peak Outflow : 43.191 (cfs)    Date/Time of Peak Outflow : 01 Feb 02 1216  
Total Outflow : 5.68 (in)

HMS \* Summary of Results for South Offsite

Project : Par 3 Golf                      Run Name : Run 3

Start of Run : 01Feb02 0012    Basin Model : South Basin

End of Run : 02Feb02 0012    Met. Model : 100 year

Execution Time : 15Apr02 0814    Control Specs : Control 1

Computed Results

Peak Discharge : 104.10 (cfs)    Date/Time of Peak Discharge : 01 Feb 02 1230

Total Precipitation : 7.80 (in)    Total Direct Runoff : 4.93 (in)

Total Loss : 2.82 (in)    Total Baseflow : 0.00 (in)

Total Excess : 4.98 (in)    Total Discharge : 4.93 (in)

HMS \* Summary of Results for Main Pond

Onsite

Project : Par 3 Golf                      Run Name : Run 3

Start of Run    : 01Feb02 0012    Basin Model    : South Basin

End of Run      : 02Feb02 0012    Met. Model    : 100 year

Execution Time : 15Apr02 0814    Control Specs : Control 1

Computed Results

Peak Discharge        : 98.001 (cfs)    Date/Time of Peak Discharge : 01 Feb 02 1226

Total Precipitation : 7.80 (in)            Total Direct Runoff : 4.94 (in)

Total Loss            : 2.82 (in)            Total Baseflow        : 0.00 (in)

Total Excess         : 4.98 (in)            Total Discharge       : 4.94 (in)

HMS \* Summary of Results for West Offsite

Project : Par 3 Golf

Run Name : Run 3

Start of Run : 01Feb02 0012 Basin Model : South Basin

End of Run : 02Feb02 0012 Met. Model : 100 year

Execution Time : 15Apr02 0814 Control Specs : Control 1

Computed Results

Peak Discharge	: 182.51 (cfs)	Date/Time of Peak Discharge	: 01 Feb 02 1226
Total Precipitation	: 7.80 (in)	Total Direct Runoff	: 4.94 (in)
Total Loss	: 2.82 (in)	Total Baseflow	: 0.00 (in)
Total Excess	: 4.98 (in)	Total Discharge	: 4.94 (in)

HMS \* Summary of Results for East Onsite

Project : Par 3 Golf      Run Name : Run 3

Start of Run : 01Feb02 0012    Basin Model : South Basin

End of Run : 02Feb02 0012    Met. Model : 100 year

Execution Time : 15Apr02 0814    Control Specs : Control 1

Computed Results

Peak Discharge : 71.312 (cfs)    Date/Time of Peak Discharge : 01 Feb 02 1220

Total Precipitation : 7.80 (in)    Total Direct Runoff : 4.95 (in)

Total Loss : 2.82 (in)    Total Baseflow : 0.00 (in)

Total Excess : 4.98 (in)    Total Discharge : 4.95 (in)

HMS \* Summary of Results for Middle Pond

Onsite

Project : Par 3 Golf            Run Name : Run 3

Start of Run    : 01Feb02 0012    Basin Model    : South Basin

End of Run     : 02Feb02 0012    Met. Model    : 100 year

Execution Time : 15Apr02 0814    Control Specs : Control 1

Computed Results

Peak Discharge        : 23.661 (cfs)    Date/Time of Peak Discharge : 01 Feb 02 1216

Total Precipitation : 7.80 (in)            Total Direct Runoff : 5.19 (in)

Total Loss            : 2.59 (in)            Total Baseflow        : 0.00 (in)

Total Excess         : 5.21 (in)            Total Discharge       : 5.19 (in)

HMS \* Summary of Results for Middle Pond  
Offsite

Project : Par 3 Golf                      Run Name : Run 3

Start of Run    : 01Feb02 0012    Basin Model    : South Basin  
End of Run      : 02Feb02 0012    Met. Model     : 100 year  
Execution Time : 15Apr02 0814    Control Specs : Control 1

Computed Results

Peak Discharge	: 19.530 (cfs)	Date/Time of Peak Discharge	: 01 Feb 02 1216
Total Precipitation	: 7.80 (in)	Total Direct Runoff	: 6.36 (in)
Total Loss	: 1.42 (in)	Total Baseflow	: 0.00 (in)
Total Excess	: 6.38 (in)	Total Discharge	: 6.36 (in)

HMS \* Summary of Results for Pond B

Project : Par 3 Golf            Run Name : Run 3

Start of Run : 01Feb02 0012    Basin Model : South Basin

End of Run : 02Feb02 0012    Met. Model : 100 year

Execution Time : 15Apr02 0814    Control Specs : Control 1

Computed Results

Peak Inflow : 43.191 (cfs)    Date/Time of Peak Inflow : 01 Feb 02 1216

Peak Outflow : 33.836 (cfs)    Date/Time of Peak Outflow : 01 Feb 02 1224

Total Inflow : 5.68 (in)    Peak Storage : 0.52146 (in)

Total Outflow : 5.66 (in)    Peak Elevation : 1342.7 (in)

HMS \* Summary of Results for Pond C

Project : Par 3 Golf

Run Name : Run 3

Start of Run : 01Feb02 0012 Basin Model : South Basin

End of Run : 02Feb02 0012 Met. Model : 100 year

Execution Time : 15Apr02 0814 Control Specs : Control 1

Computed Results

Peak Inflow : 33.836 (cfs) Date/Time of Peak Inflow : 01 Feb 02 1224

Peak Outflow : 17.300 (cfs) Date/Time of Peak Outflow : 01 Feb 02 1242

Total Inflow : 5.66 (in) Peak Storage : 0.80791 (in)

Total Outflow : 5.61 (in) Peak Elevation : 1338.9 (in)

HMS \* Summary of Results for Pond F

Project : Par 3 Golf      Run Name : Run 3

Start of Run : 01Feb02 0012    Basin Model : South Basin

End of Run : 02Feb02 0012    Met. Model : 100 year

Execution Time : 15Apr02 0814    Control Specs : Control 1

Computed Results

Peak Inflow : 396.86 (cfs)    Date/Time of Peak Inflow : 01 Feb 02 1228

Peak Outflow : 347.03 (cfs)    Date/Time of Peak Outflow : 01 Feb 02 1236

Total Inflow : 4.98 (in)      Peak Storage : 5.2651 (in)

Total Outflow : 4.96 (in)      Peak Elevation : 1330.0 (in)

# Proposed Ponds (South Pond Basin)

HMS Basin Model Reservoir Routing

Edit File Help

Reservoir Name: Pond B

Description: [ ]

Input Options:

- Storage - Outflow
- Elevation - Storage - Outflow
- Elevation - Area - Outflow

Initial: Inflow = Outflow

Elevation (ft)	Area (acres)	Outflow (cfs)
1342.0	0.74	0.0
1342.5	0.80	21.0
1343.0	0.86	60.0
1344.0	0.98	170.0

Graph

OK Apply Cancel

HMS Basin Model Reservoir Routing

Edit File Help

Reservoir Name: Pond C

Description:

- Input Options
- Storage - Outflow
  - Elevation - Storage - Outflow
  - Elevation - Area - Outflow

Initial: Inflow = Outflow

Elevation (ft)	Area (acres)	Outflow (cfs)
1338.0	0.86	0.0
1339.0	1.01	20.0
1340.0	1.16	39.0

Graph

OK

Apply

Cancel

HMS • Basin Model • Reservoir Routing

Edit File Help

Reservoir Name: Pond F

Description: [ ]

Input Options

- Storage - Outflow
- Elevation - Storage - Outflow
- Elevation - Area - Outflow

Initial: Inflow = Outflow

Elevation (ft)	Area (acres)	Outflow (cfs)
1328.0	2.34	0.0
1329.0	2.61	120.0
1330.0	2.81	339.0
1331.0	3.01	624.0

Graph

OK

Apply

Cancel

# South Basin Input

HMS - Basin Model - Subbasin Editor

Help

Subbasin Name: South Offsite Area (sq. mi.): 0.04484

Description: Offsite Drainage from south of Pawnee

Loss Rate Transform Baseflow Method

Method: SCS Curve No.

Initial Loss (in): % Impervious: 0.0

SCS Curve No.: 7B

OK Apply Cancel

Subbasin name

HMS - Basin Model - Subbasin Editor

Help

Subbasin Name: South Offsite Area (sq. mi.): 0.04484

Description: Offsite Drainage from south of Pawnee

Loss Rate Transform Baseflow Method

Method: SCS

SCS Lag: 25.000000 Minutes

OK Apply Cancel

Subbasin name

# South Basin Input (Continued)

HMS Basin Model Subbasin Editor

Subbasin Name: West Offsite Area (sq. mi.) 0.0723

Description:

Loss Rate Transform Baseflow Method

Method: SCS Curve No.

Initial Loss (in): % Impervious: 0.0

SCS Curve No.: 76

OK Apply Cancel

Subbasin name

HMS Basin Model Subbasin Editor

Subbasin Name: West Offsite Area (sq. mi.) 0.0723

Description:

Loss Rate Transform Baseflow Method

Method: SCS

SCS Lag: 22.000000 Minutes

OK Apply Cancel

Subbasin name

# South Basin Input (Continued)

HMS - Basin Model - Subbasin Editor

Help

Subbasin Name: Middle Pond Offsite Area (sq. mi.) 0.00466

Description:

Loss Rate Transform Baseline Method

Method: SCS Curve No.

Initial Loss (in): % Impervious: 40

SCS Curve No.: 80

OK Apply Cancel

Subbasin name

HMS - Basin Model - Subbasin Editor

Help

Subbasin Name: Middle Pond Offsite Area (sq. mi.) 0.00466

Description:

Loss Rate Transform Baseline Method

Method: SCS

SCS Lag: 12.000000 Minutes

OK Apply Cancel

Subbasin name

# South Basin Input (Continued)

HMS - Basin Model - Subbasin Editor

Help

Subbasin Name: Middle Pond Onsite Area (sq. mi.) 0.00642

Description: Onsite Drainage into middle pond

Loss Rate Transform Baseflow Method

Method: SCS Curve No.

Initial Loss (in): % Impervious: 0.0

SCS Curve No.: 78

OK Apply Cancel

Subbasin name

HMS - Basin Model - Subbasin Editor

Help

Subbasin Name: Middle Pond Onsite Area (sq. mi.) 0.00642

Description: Onsite Drainage into middle pond

Loss Rate Transform Baseflow Method

Method: SCS

SCS Lag: 12.000000 Minutes

OK Apply Cancel

Subbasin name

# South Basin Input (Continued)

HMS - Basin Model - Subbasin Editor

Help

Subbasin Name:  Area (sq. mi.)

Description:

Loss Rate:  Transform  Baseflow Method

Method:  ▾

Initial Loss (in):  % Impervious:

SCS Curve No.:

Subbasin name

HMS - Basin Model - Subbasin Editor

Help

Subbasin Name:  Area (sq. mi.)

Description:

Loss Rate:  Transform  Baseflow Method

Method:  ▾

SCS Lag:   ▾

Subbasin name

# South Basin Input (Continued)

HMS \* Basin Model \* Subbasin Editor

Help

Subbasin Name: East Onsite Area (sq. mi.) 0.0225

Description:

Loss Rate: Transform | Baseflow Method

Method: SCS Curve No.

Initial Loss (in): % Impervious: 0.0

SCS Curve No.: 76

OK Apply Cancel

Subbasin name

HMS \* Basin Model \* Subbasin Editor

Help

Subbasin Name: East Onsite Area (sq. mi.) 0.0225

Description:

Loss Rate: Transform | Baseflow Method

Method: SCS

SCS Lag: 15.000000 Minutes

OK Apply Cancel

Subbasin name

Existing 6' x 4' RCBC (under Pawnee)

#Units=Flowrate,cfs,Elevation,ft,Elevation,ft,Elevation,ft

#	Flowrate	Outlet Elev	Inlet Elev	Cntrl Elev
#-----		-----	-----	-----
	20.0000,	1320.3290,	1319.4051,	1320.3290
	40.0000,	1320.5239,	1320.0666,	1320.5239
	60.0000,	1324.7407,	1322.5365,	1324.7407
	80.0000,	1325.1019,	1322.6554,	1325.1019
	100.0000,	0.0000,	1322.7959,	1322.7959
	120.0000,	0.0000,	1322.9579,	1322.9579
	140.0000,	0.0000,	1323.1415,	1323.1415
	160.0000,	0.0000,	1323.3468,	1323.3468
	180.0000,	0.0000,	1323.7805,	1323.7805
	200.0000,	0.0000,	1324.2230,	1324.2230 ← over topping
	220.0000,	0.0000,	1324.7845,	1324.7845
	240.0000,	0.0000,	1325.3994,	1325.3994
	260.0000,	0.0000,	1326.0678,	1326.0678
	280.0000,	0.0000,	1326.7897,	1326.7897
	300.0000,	0.0000,	1327.5650,	1327.5650

24" RCP's under entrance  
tmp#10.txt

Culvert Calculator

Entered Data:

Shape ..... Circular  
Number of Barrels ..... 2  
Solving for ..... Headwater  
Chart Number ..... 1  
Scale Number ..... 1  
Chart Description ..... CONCRETE PIPE CULVERT; NO BEVELED RING ENTRANCE  
Scale Description ..... SQUARE EDGE ENTRANCE WITH HEADWALL  
Overtopping ..... Off  
Flowrate ..... 43.9000 cfs  
Manning's n ..... 0.0130  
Roadway Elevation ..... 1324.0000 ft  
Inlet Elevation ..... 1320.7000 ft  
Outlet Elevation ..... 1320.3900 ft  
Diameter ..... 24.0000 in  
Length ..... 48.0000 ft  
Entrance Loss ..... 0.0000  
Tailwater ..... 0.6498 ft

Computed Results:

Headwater ..... 1323.9764 ft Inlet Control  
Slope ..... 0.0065 ft/ft  
Velocity ..... 6.9869 fps

DIS- HEAD- INLET OUTLET

CHARGE WATER CONTROL CONTROL FLOW NORMAL CRITICAL OUTLET TAILWATER  
Flow ELEV. DEPTH DEPTH TYPE DEPTH DEPTH VEL. DEPTH VEL. DEPTH  
cfs ft ft ft in in fps ft fps ft

10.00	1322.39	1.69	1.53	NA	12.67	13.58	5.94	1.06	2.20	0.45
20.00	1323.65	2.95	2.93	NA	24.00	24.00	6.37	2.00	2.64	0.62

40' Weir  
~~imp#145T~~

### Weir Calculator

#### Given Input Data:

Weir Type ..... Rectangular  
Equation ..... Suppressed  
Solving for ..... Flowrate  
Depth of Flow ..... 24.0000 in  
Coefficient ..... 0.6500  
Height ..... 36.0000 in

#### Computed Results:

Flowrate ..... 393.2734 cfs  
Full Flow ..... 722.4894 cfs  
Velocity ..... 4.9159 fps  
Width ..... 480.0000 in  
Area ..... 120.0000 ft<sup>2</sup>  
Perimeter ..... 552.0000 in  
Wet Perimeter ..... 528.0000 in  
Wet Area ..... 80.0000 ft<sup>2</sup>  
Percent Full ..... 66.6667 %

20' weir  
~~trap #12 EXT~~

### Weir Calculator

#### Given Input Data:

Weir Type ..... Rectangular  
Equation ..... Suppressed  
Solving for ..... Flowrate  
Depth of Flow ..... 12.0000 in  
Coefficient ..... 0.6500  
Height ..... 24.0000 in

#### Computed Results:

Flowrate ..... 69.5216 cfs  
Full Flow ..... 196.6367 cfs  
Velocity ..... 3.4761 fps  
Width ..... 240.0000 in  
Area ..... 40.0000 ft<sup>2</sup>  
Perimeter ..... 288.0000 in  
Wet Perimeter ..... 264.0000 in  
Wet Area ..... 20.0000 ft<sup>2</sup>  
Percent Full ..... 50.0000 %

April 8, 2002

Mr. Shawn Howell  
Bureau of Water  
Kansas Dept. of Health and Environment  
Forbes Field, Building 283  
Topeka, KS 66620-0001

Re: Stormwater Pollution Prevention Plan  
United Golf of Wichita – Par 3 Golf Course  
Wichita, Kansas

Dear Mr. Howell:

Enclosed find completed Notice of Intent (NOI) For Stormwater Runoff from Construction Activities forms and a copy of the SWPPP with accompanying Site Plan, both signed by the owner.

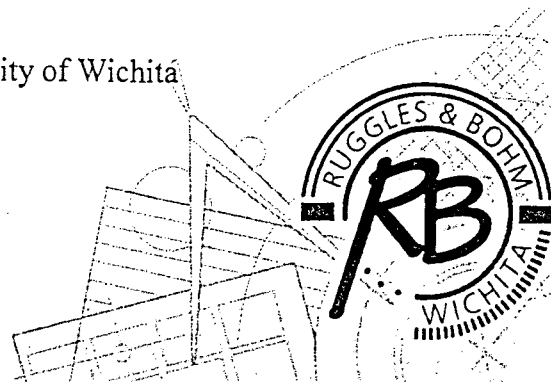
The site consists of 62.0 acres that will be developed as a golf course. The site is located in Sedgwick County at the northeast corner of Pawnee and 127<sup>th</sup> Street East. See the enclosed plan sheet for the site location. The impervious area of the site will increase from 0% (0.0 acres) to 2% (1.0 acres) with construction of this project. Soil type is Irwin, hydrologic group D.

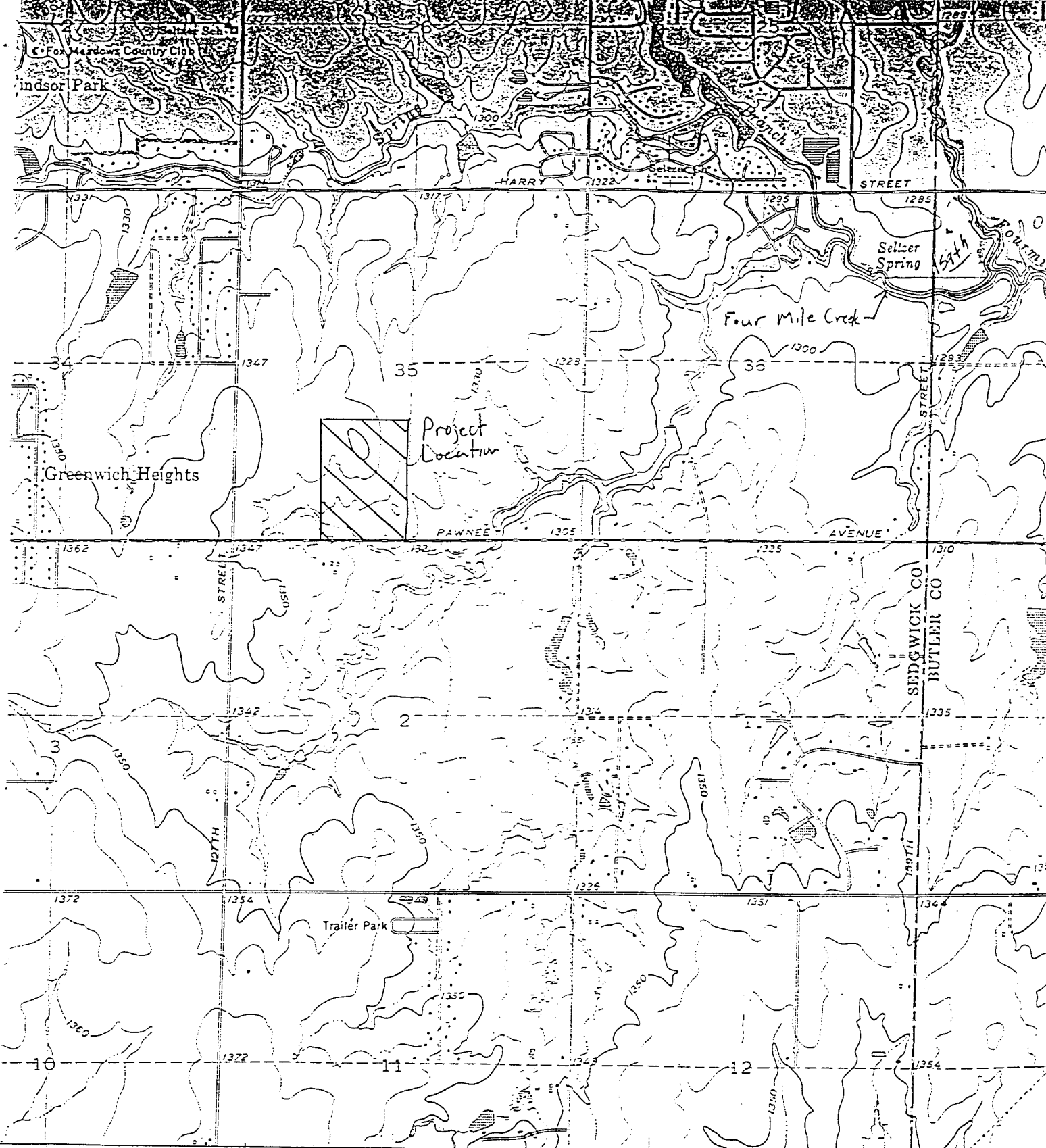
Silt fences and temporary seeding during construction will control erosion and sedimentation. The south detention pond will act as a sediment basin during construction. Earth dikes will accomplish spill control. Permanent grass seeding and maintenance of planting areas will control erosion after construction.

Sincerely,

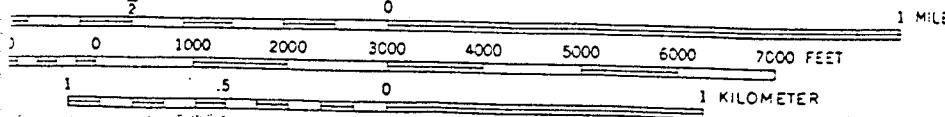
  
Kenneth W. Lee, P.E.

cc w/encl.: Christopher Carrier, P.E. Stormwater Manager, City of Wichita



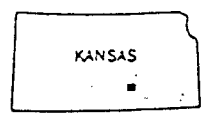


(ROSE HILL)  
6559 11 SW  
SCALE 1:24 000



CONTOUR INTERVAL 10 FEET  
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Primary  
hard sur  
Seconda  
hard sur



QUADRANGLE LOCATION



See Attached Sheet for Instructions

NOTICE OF INTENT (NOI)
For Stormwater Runoff from Construction Activities
Authorized by a Kansas Water Pollution Control General Permit
Under the National Pollutant Discharge Elimination System

Submission of this Notice of Intent constitutes notice that the party identified in Section I of this form requests authorization for coverage under the Kansas Water Pollution Control general permit, or KDHE authorized successors, issued for stormwater runoff from construction activities in the State of Kansas. Becoming a permittee obligates the discharger to comply with the terms and conditions of the general permit. Completion of this NOI does not provide automatic coverage under the general permit. Coverage is provided and discharge permitted when the Kansas Department of Health and Environment (KDHE) authorizes the NOI. A signed and dated copy of the authorized NOI will be provided to the owner or operator. Upon authorization of the NOI, a Kansas permit number and a Federal permit number will be assigned to the construction project. ONLY COMPLETE APPLICATIONS ACCOMPANIED BY THE \$60 ANNUAL PERMIT FEE WILL BE PROCESSED. KDHE WILL NOTIFY APPLICANTS WHOSE APPLICATIONS ARE INCOMPLETE, DEFICIENT, OR DENIED. Please Print or Type.

I. OWNER OR OPERATOR ADDRESS & RECORD LOCATION INFORMATION

Owner or Operator's Name: United Golf of Wichita

Owner's Contact Name: Gene Vitarelli

Company Name: United Golf of Wichita

Company Name: United Golf of Wichita

Owner or Operator's Phone: (316) 688-5717

Contact Phone: (316) 688-5717

Mailing Address: 1822 S. Longfellow, Suite 10

Mailing Address: same

City: Wichita State: KS Zip Code: 67207

City: - State: - Zip Code: -

Will permit records be located on site? [X] Y; [ ] N

If not, provide an address where records will be kept:

Company Name: United Golf of Wichita

Street Address: Pawnee + 127th

Mailing Address:

City: Wichita State: KS Zip Code: 67230

City: State: Zip Code:

II. SITE INFORMATION

A. LOCATION

Project Name: Par 3 Golf Course

On-Site Contact Name: Gene Vitarelli

Street Address: N/A

Company Name: United Golf of Wichita

City: Wichita State: KS Zip Code: 67230

Contact Phone: (316) 688-5717

Physical Location: Pawnee + 127th St E

Mailing Address: 1822 S. Longfellow, Suite 10

City: Wichita State: KS Zip Code: 67207

QTR SE, 35, 27 South, 2 Range

County: Sedgwick

For Official Use Only:

Table with columns: Received, Paid, Authorized, Date, Initials, Check No, Reviewer, Secretary, Kansas Department of Health and Environment, Date, KS Permit No. S, Federal Permit No. KS

To receive a hard copy of the general permit information packet check yes: [ ] Y; [ ] N

**B. EXISTING CONDITIONS/USES**

Is any part of the project located on Indian lands?  Y;  N

If yes, contact EPA regarding discharging stormwater runoff from construction activities on Indian lands.

If site runoff goes into a Municipal Separate Storm Sewer System; Owner/Operator's Name: \_\_\_\_\_

Name of the first receiving water; stream; or lake: Four mile creek River Basin: Walnut

Are there any known soil contamination areas which will be disturbed by the construction activity?  Y;  N

Are contaminated soils or hazardous wastes present on the site:  Y;  N

Are there any surface water intakes for public drinking water supplies located within 1/2 mile of the site discharge points?  Y;  N

Are there any known historical or archeological sites present within the site boundary?  Y;  N

Are any threatened or endangered species known to be present within the site boundary or in the receiving water body?  Y;  N

If yes, list species and describe habitat location in relation to project location: \_\_\_\_\_

Are any Critical Water Quality Management Areas, Special Aquatic Life Use Waters, or Outstanding National Resource Waters located within 1/2 mile of the site boundary?  Y;  N

**C. PROJECT DESCRIPTION**

Project Description: Golf course with 18 holes, several lakes, and associated features.

Anticipated Start Date: June 2002 and Completion Date: October 2003

Estimated area to be disturbed: 61.9 Acres Total area of the site: 62.0 Acres

Do you plan to disturb ten or more acres that are within a common drainage area?  Y;  N

If yes, will a sedimentation basin be installed in that drainage area?  Y;  N

If not, on a separate sheet, explain what similarly effective erosion and sediment control measures that will be implemented in lieu of a sedimentation basin.

**D. EROSION CONTROL PLAN AND BEST MANAGEMENT PRACTICES**

Attach a site plan showing the erosion control measures and the locations of stormwater management or pollution control features including BMPs. Incorporate details and notes as necessary to describe the erosion control plans and BMPs.

Attach a description of the best management practices which will be utilized to control erosion, sedimentation and other pollutants in stormwater runoff during construction. Include a description of applicable local erosion and sediment control requirements.

Describe the BMPs which will be permanent stormwater management or pollution control features. Include a description of applicable local stormwater pollution control requirements for permanent stormwater management features.

Summarize the sequence of major soil disturbing activities and the corresponding erosion control measures or BMPs.

**E. AREA MAP**

Attach a topographic map showing the project location and significant features in the surrounding area.

**III. ANNUAL FEE**

Enclose a check for the first year of the annual permit fee specified in K.A.R. 28-16-56 et seq. as amended. Make the check payable to "KDHE". Per K.A.R. 28-16-56, as amended, the current annual permit fee for this general permit is \$60. An annual bill will be sent to the contact person requesting a permit fee until such time as the permit holder submits a Notice of Termination (NOT).

Name of Project: Par 3 Golf Course

Notice of Intent (NOI)

IV. APPLICANT CERTIFICATIONS

I, the undersigned, certify that a Stormwater Pollution Prevention Plan will be or has been developed for the construction site listed in Section II of this NOI. I further certify that the plan will be implemented at the time construction begins, and, as required by the NPDES general permit for Stormwater Runoff from Construction Activity, will revise the SWP2 plan if necessary.

I understand that continued coverage under the NPDES general permit for Stormwater Runoff from Construction Activities is contingent upon maintaining eligibility as provided for in the requirements and conditions of the general permit, and paying the annual fee.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Eugene Vitarelli  
Signature

4-9-02  
Date

Eugene Vitarelli (Vice President)  
Name and Official Title (Please Print)

**STORMWATER POLLUTION PREVENTION PLAN  
FOR IMPROVEMENT OF  
PAR 3 GOLF COURSE**

SITE DESCRIPTION	
<b>Project Name and Location:</b>	United Golf of Wichita Par 3 Golf Course Pawnee and 127 <sup>th</sup> Street East
<b>Owner Name and Address:</b>	United Golf of Wichita 1822 S. Longfellow, Suite 10 Wichita, Kansas 67207
<b>Description:</b> This project will consist of construction of a golf course, club house and driving range.  Soil Disturbing activities will include: installing two stabilized construction entrances and other erosion and sediment controls: grading; excavation for utilities and building foundations; and preparation for final planting and seeding.	
<b>Runoff Coefficient:</b>	The final coefficient of runoff for the site will be $c = 0.65$
<b>Site Area:</b>	The site covers approximately 62.1 acres, 61.9 acres of which will be disturbed by construction activities.
<b>Sequence of Major Activities</b>	
The order of activities for each lot as it is improved will be as follows:	
<ol style="list-style-type: none"> <li>1. Install stabilized construction entrances.</li> <li>2. Construct earth dike around spill control area and install sediment controls.</li> <li>3. Pile topsoil.</li> <li>4. Clear and rough grade site.</li> <li>5. Stabilize denuded areas and stockpiles within 14 days of last construction activity in that area.</li> <li>6. Install utilities and storm sewer.</li> <li>7. Complete site grading.</li> <li>8. Construct club house.</li> </ol>	<ol style="list-style-type: none"> <li>9. Complete paving parking lot.</li> <li>10. Install permanent seeding and plantings.</li> <li>11. Remove accumulated sediment.</li> <li>12. When all construction activity is complete and the site is stabilized, remove sediment controls and re-seed and areas disturbed by their removal.</li> </ol>
The entire site drains through storm sewers and open channels into an existing drainageway that drains into a tributary of Fourmile Creek, a tributary of the Walnut River.	
CONTROLS	
Erosion and Sediment Controls	
Stabilization Practices	
<p><u>Temporary stabilization</u> - Top soil stock piles and disturbed portions of the site where construction activity temporarily ceases for at least 28 days will be stabilized with temporary seed and mulch no later than 21 days from the last construction activity in that area. The temporary seed shall be Rye or other approved seed mix. Prior to seeding, fertilizer shall be applied to each area being stabilized. After seeding, each area shall be mulched with straw.</p> <p><u>Permanent Stabilization</u> - Disturbed portions of the site where construction activities permanently cease shall be stabilized with permanent seed no later than 14 days after the last construction activity. The permanent seed shall be tall fescue or other approved seed mix. Prior to seeding, fertilizer shall be applied to each area being stabilized. After seeding, each area shall be mulched with straw.</p>	

## CONTROLS (Continued)

### Structural Practices

Sediment controls will be constructed at all drive entrances.

Earth dikes will be constructed across all drive entrances where drainage to street may occur. Site grading shall prevent water from exiting the site along the rest of the perimeter when possible. Silt fence or other approved linear sediment barrier will be installed where offsite flow is likely to occur.

An earth dike will be constructed around the spill control area to be constructed.

### Storm Water Management

Storm sewer and open channels will provide storm water drainage after development.

## OTHER CONTROLS

### Waste Disposal:

#### Waste Materials

All waste materials will be collected and stored in a metal dumpster rented from a licensed solid waste management company. The dumpster will meet all City and State solid waste management regulations. All trash and construction debris from the site will be deposited in the dumpster. The dumpster will be emptied a minimum of twice per week or more often if necessary, and the trash will be hauled to a licensed solid waste collection site. No construction waste will be buried onsite. All personnel will be instructed regarding the correct procedure for waste disposal. The Contractor's superintendent will be responsible for seeing that these procedures are followed.

#### Hazardous Waste

All hazardous waste materials will be disposed of in the manner specified by local or State regulations or by the manufacturer. Site personnel will be instructed in these practices and the Contractor's superintendent will be responsible for seeing that these procedures are followed.

#### Sanitary Waste

All sanitary waste will be collected from the portable units a minimum of once per week by a licensed sanitary waste management contractor, as required by local regulation.

### Offsite Vehicle Tracking:

A stabilized construction entrance will be provided to help reduce vehicle tracking of sediments. The paved streets adjacent to the site entrances will be cleaned as necessary to remove any excess mud, dirt, or rock tracked from the site.

## TIMING OF CONTROLS/MEASURES

As indicated in the Sequence of Major Activities, the earth dike, stabilized construction entrance and sediment controls will be constructed prior to clearing or grading of any other portions of the site. Areas where construction activity temporarily ceases for more than 28 days will be stabilized with a temporary seed and mulch within 21 days of the last disturbance. Once construction activity ceases permanently in an area, that area will be stabilized with permanent seed and mulch. After the entire site is stabilized, the accumulated sediment will be removed from the sediment controls and the earth dike will be removed.

## INVENTORY FOR POLLUTION PREVENTION PLAN

The materials or substances listed below are expected to be present onsite during construction:

- Concrete
- Detergents
- Paints (enamel and latex)
- Metal Studs
- Concrete
- Tar
- Fertilizers
- Petroleum Based Products
- Cleaning Solvents
- Wood
- Masonry Block
- Roofing Shingles
- Other Common Non-hazardous building materials

## SPILL PREVENTION

### Material Management Practices

The following are the material management practices that will be used to reduce the risk of spills or other accidental exposure of materials and substances to storm water runoff.

#### Good Housekeeping:

The following good housekeeping practices will be followed onsite during the construction project:

- An effort will be made to store only enough products required to do the job.
- All materials stored onsite will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.
- Products will be kept in their original containers with the original manufacturer's label.
- Substances will not be mixed with one another unless recommended by the manufacturer.
- Whenever possible, all of a product will be used up before disposing of the container.
- Manufacturer's recommendations for proper use and disposal will be followed.
- The site superintendent will inspect daily to ensure proper use and disposal of materials onsite.

#### Hazardous Products:

These practices are used to reduce the risks associated with hazardous materials:

- Products will be kept in original containers unless they are not resealable
- Original labels and material safety data will be retained; they contain important product information
- If surplus product must be disposed of, manufacturers' or local and State recommended methods for proper disposal will be followed.

## SPILL PREVENTION (Continued)

### Product Specific Practices

The following product specific practices will be followed onsite:

#### Petroleum Products:

All onsite vehicles will be monitored for leaks and receive regular preventative maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers, which are clearly labeled. Any asphalt substances used onsite will be applied according to the manufacturer's recommendation.

#### Fertilizers:

Fertilizers used will be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer will be worked into the soil to limit exposure to storm water. Storage will be in a covered shed. The contents of any partially used bags of fertilizer will be transferred to a sealable plastic bin to avoid spills.

#### Paints:

All containers will be tightly sealed and stored when not required for use. Excess paint will not be discharged to the storm sewer system but will be properly disposed of according to the manufacturer's instructions or State and local regulations.

#### Concrete Trucks:

Concrete trucks will not be allowed to wash out or discharge surplus concrete or drum wash water on the site except in designated areas.

### Spill Control Practices

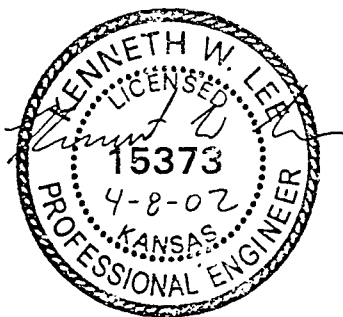
In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices will be followed for spill prevention and cleanup:

- Manufacturers' recommended methods for spill cleanup will be clearly posted and site personnel will be made aware of the procedures and the location of the information and cleanup supplies.
- Materials and equipment necessary for spill cleanup will be kept in the material storage area onsite. Equipment and materials will include but not be limited to brooms, dustpans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, and plastic and metal trash containers specifically for this purpose.
- All spills will be cleaned up immediately after discovery.
- The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
- Spills of toxic or hazardous material will be reported to the appropriate State or local government agency, regardless of the size.
- The spill prevention plan will be adjusted to include measures to prevent this type of spill from reoccurring and how to clean up the spill if there is another one. A description of the spill, what caused it, and the cleanup measures will also be included.
- The Contractor's superintendent will be the spill prevention and cleanup coordinator. He will designate at least three other site personnel who will receive spill prevention and cleanup training. These individuals will each become responsible for a particular phase of prevention and cleanup. The names of responsible spill personnel will be posted in the material storage area and in the office trailer onsite.

**POLLUTION PREVENTION PLAN CERTIFICATION**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signed: *Kenneth W. Lee*  
 Kenneth W. Lee, P.E.  
 Project Engineer  
 Ruggles & Bohm, P.A.

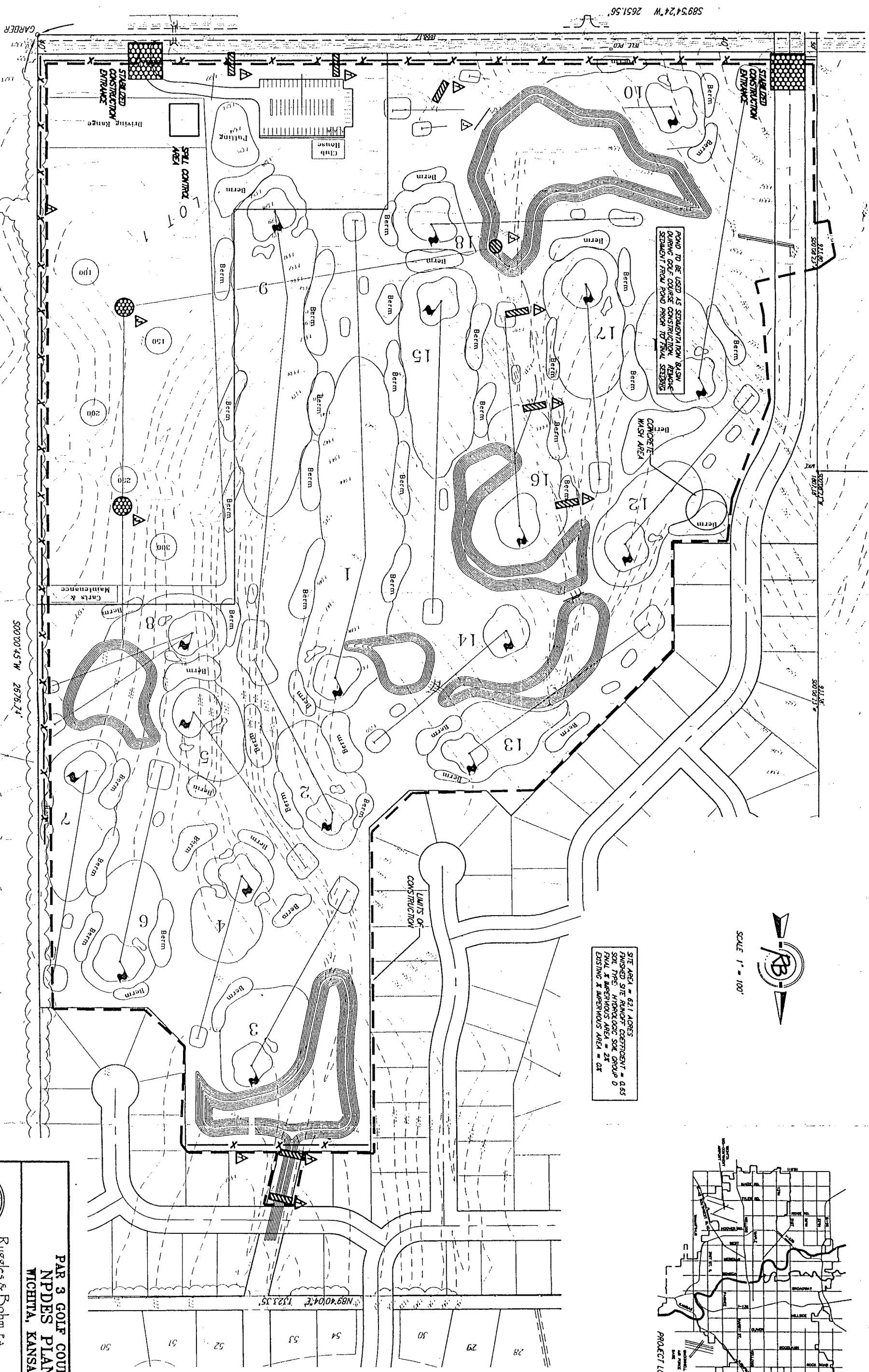


Date: 4-8-02

**CONTRACTOR'S CERTIFICATION**

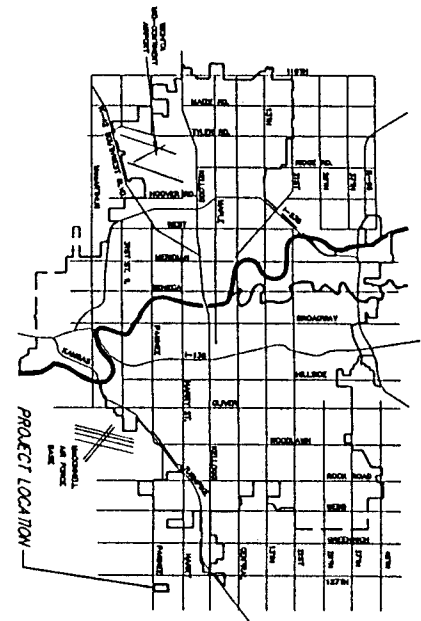
I certify under penalty of law that I understand the terms and conditions of the general National Pollutant Discharge Elimination System (NPDES) permit that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification.

Signature	For	Responsible for
<p><u><i>[Signature]</i></u>                      Contractor's Representative                      Date: <u>4-9-02</u></p>	<p>United Golf of                      Wichita, INC.</p>	



SITE AREA = 421.40MS  
 FINISHED SITE MANHOLE COEFFICIENT = 0.65  
 POND & WASHBASIN AREA = 25' DIA. D  
 EXISTING & PROPOSED AREA = 25' DIA.

SCALE 1" = 100'



▲ LIMITS OF CONSTRUCTION  
 ▲ LIMITS OF CONSTRUCTION  
 ▲ OUTLETS PROTECTED BY 8'-0" DIA.

**PAR 3 GOLF COURSE  
 NPDES PLAN  
 MICHTA, KANSAS**

**Ruggles & Bohm, P.A.**  
 Engineering, Surveying, Land Planning  
 912 North Main, #1202  
 (316) 264-8828  
 www.rugglesandbohm.com  
 Email: info@rugglesandbohm.com

PROJECT NO. 01-00000000  
 DATE: APR. 8, 2002

NO.	DATE	DESCRIPTION	BY	CHK.
1	APR. 8, 2002	ISSUED FOR PERMITS	JK	JK