DRAINAGE REPORT
FOR
EMERALD BAY ESTATES
SEDGWICK COUNTY, KANSAS

CEDAR CREEK MARKETPLACE ADDITION

FEBRUARY 2006

Ruggles & Bohm P.A.
Engineering, Surveying, Land Planning

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924 N. Main
Wichita, Kansas 67203

MEMO

Date: Thursday, February 23, 2006

To: Scott Lindebak
City of Wichita
455 N. Main
Wichita, KS 67202

From: Alex M. Lane, P.E.

Project: Cedar Creek Marketplace

RB Project No.: 2728E

Other Project Reference No.:

Description:
- ☐ Confirmation
- ☒ Transmittal
- ☐ Transmittal under separate cover by

Purpose:
- ☐ Approval
- ☐ Review & comment
- ☒ Use
- ☐ Other :
- ☐ Distribution
- ☐ Information
- ☐ Record

Enclosures/Attachments:
- ☐ Prints
- ☒ Originals
- ☒ Diskettes containing:
- ☐ Other:
- ☐ Change Order
- ☐ Shop Drawings

Copies	Description
1	Drainage Plan

Remarks:

Copies to:

If checked below, please:
- ☐ Acknowledge receipt of enclosures
- ☐ Return enclosures to us.

Signed

If Enclosures are not as noted above, please inform us immediately

Phone (316) 264-8008 *Fax (316) 264-4621*

Drainage Plan – Cedar Creek Marketplace
Wichita, Kansas
February, 2006

Site Description

The project site is located in northeast Wichita at the southeast corner of Greenwich Road and the K-96 flyover. The site is approximately 33.5 acres in size and is currently in use as pastureland.

The eastern portion of the site is located within FEMA Flood Zone C, defined as areas outside the 500-year floodplain. A portion of FEMA Map Panel 2003210150A, dated June 3, 1986 is attached to this report.

From the ***SCS Soil Survey for Sedgwick County, Kansas, 1979***, the predominant soil groups are Ia, Gb and Ic all from hydrologic group D.

Existing Conditions

The site is split by a ridgeline running northeast to southwest creating two tributary areas. The westerly tributary area of approximately 21 acres drains northwesterly to the intersection of Greenwich road and K-96 Highway, including 3.8 acres off offsite drainage. The eastern tributary area of 17.3 acres drains to an existing pond which does provide some detention in the existing condition and then continues southerly to an additional pond and then to 21st street. Offsite areas of 7.7 acres to the southeast of the proposed project site and 120 acres to the northeast of K-96 Highway will drain onto the site and through the existing pond. Hydrologic information for the offsite area northeast of K-96 from the MKEC drainage plan for Greenwich Business Center dated January of 2006 was incorporated into the HEC-HMS model for the existing and proposed conditions. The existing pond elevation is controlled by a 12" PVC pipe and over tops the earthen dam when capacity of the pipe is exceeded.

Proposed Conditions

Detention storage analysis is performed using the U.S. Army Corps of Engineers HEC-HMS program, with the various input parameters described in this report. The design rainfall event (7.8 inches) is the 100-year, 24 hour storm as defined by U.S. Weather Bureau Technical Paper 40. The SCS Type II Rainfall distribution is used for the model. Localized drainage basins and conduit sizing shall be based upon the Rational Method. Times of concentration are calculated using the velocity method.

The method employed to maintain the proposed runoff at existing conditions in the west tributary area is to reduce the area draining to the northwest. In the proposed condition 11.8 acres will drain to the intersection of Greenwich and K-96, including 3.8 acres of offsite area. The area diverted from the west drainage area will be accepted into the detention pond in Area 2.

The eastern drainage area will contribute 25.1 acres to the detention pond while offsite areas are constant with 7.7acres from southeast of the project site and 120 acres from across K-96 Highway to the northeast.

The detention analysis demonstrated that the existing detention pond is not adequate to provide detention for the proposed project. Grading to increase storage capacity and a pond outlet of 2-24" culverts with a 15' broad crested weir are necessary to satisfy the drainage criteria of no increase in runoff from the existing condition in the 2-, 5-, and 100-year design storm. The outlet structure hydraulic calculations are shown in the table below.

Pond Outlet
Calculations

Cedar Creek Marketplace

15' Wide Broad Crested Weir
Use C from Handbook of Hydraulics, King and Brater

Broad Crested Weir Equation of Q = CLH**1.5

2 - 24" RCP Culverts

Elevation	H	D	H/D	Q
1368	0	2	. 0	0
1368.5	0.5	2	0.25	4.5
1369	1	2	0.5	9.0
1369.5	1.5	2	0.75	18.0
1370	2	2	1	28.0
1370.5	2.5	2	1.25	36.0
1371	3	2	1.5	42.0
1371.5	3.5	2	1.75	50.0
1372	4	2	2	60.0

Broadcrested Weir

Elevation	H	C	L	Q
1369	0	0	15	0
1369.5	0.5	2.9	15	15.38
1370	1	3.2	15	48
1370.5	1.5	3.31	15	91.213
1371	2	3.32	15	140.86
1371.5	2.5	3.32	15	196.85
1372	3	3.32	15	258.77

Q Total
0
4.5
9.0
33.4
76.0
127.2
182.9
246.9
318.8

CONCLUSIONS

The following table quantifies the results of the analysis in both existing and proposed conditions.

	Existing			Proposed		
Area	2-yr (cfs)	5-yr (cfs)	100-yr (cfs)	2-yr (cfs)	5-yr (cfs)	100-yr (cfs)
West	22.2	31.7	63.7	20.5	27.3	49.4
Pond	111.6	156.8	280.3	100.6	134.2	231.4

Pond summaries for the 2-, 5- and 100-year design storms are included as an attachment to this report. All buildings adjacent to the pond shall have a minimum pad elevation of 1372.4.

The road plans for Greenwich road show proposed storm sewer improvements at the southeast corner of Greenwich Road and K-96 Highway. It is necessary to ensure that the downstream system is sufficient to accept the proposed runoff. Using the Rational Equation, the proposed drainage patterns will result in runoff as follows;

A = 18.2 acres

$\underline{T_c}$ T_1 = Overland Flow, S=1.0% L=300', V=0.19 fps, 300'/0.19 fps = 26.3 min

T_2 = Grassed Waterway, L=1000', V=1.12 fps, 1000'/1.12 fps = 14.9 min.=> 41 min.

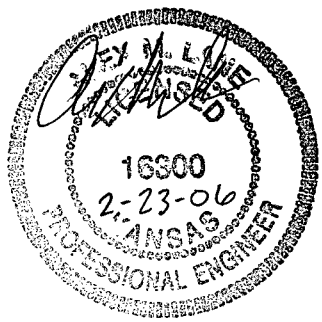
I_{100} = 4.60 in./hr.

Weighted C_{100} = Neighborhood Area Business = 0.80, C_{100} = Undeveloped area =0.59

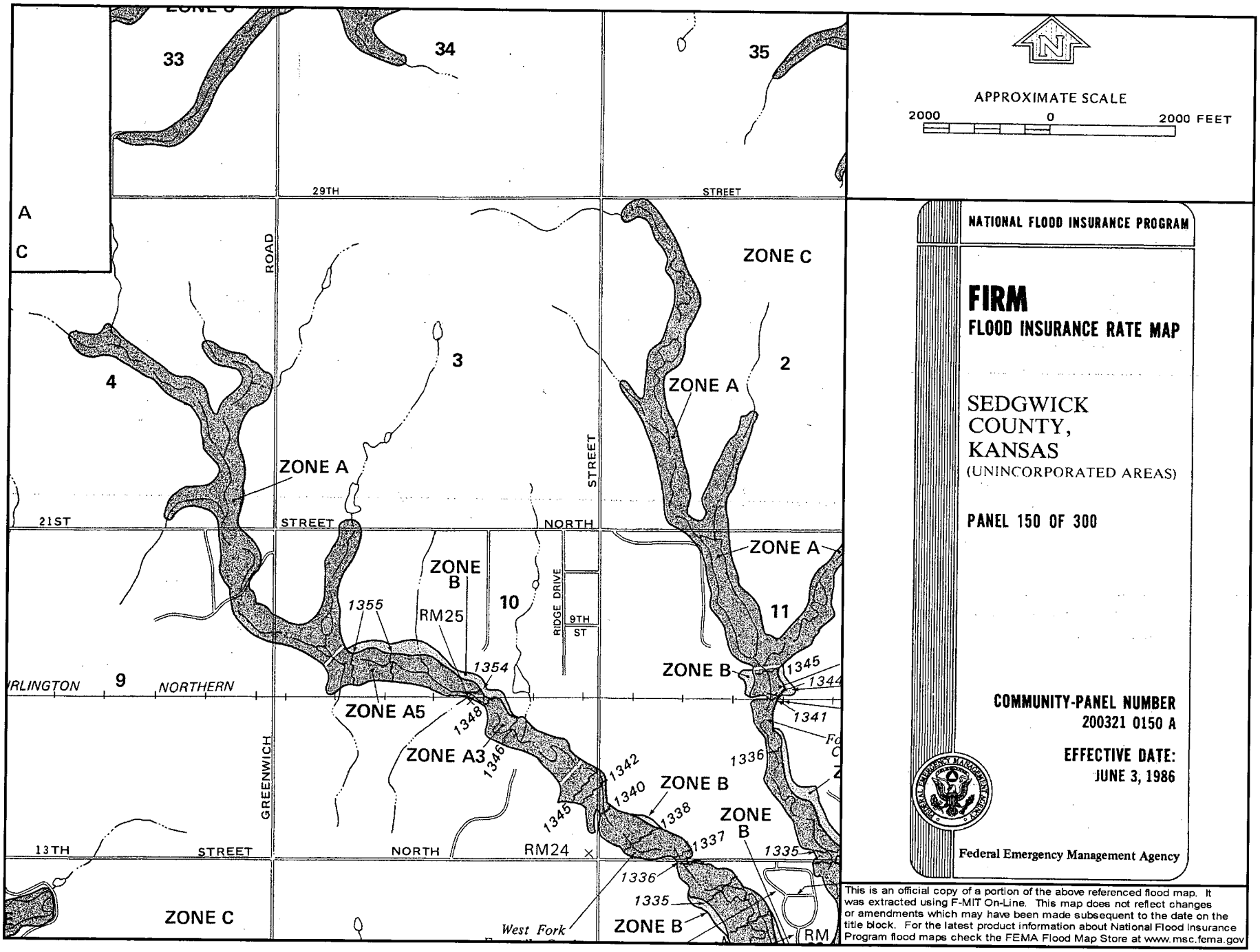
(0.8(11.8)+0.59(6.4)) / 18.2 = 0.73

$Q_{100} = C_{100}\ I_{100} A$ = (0.73)4.60*18.2 = 61.1 cfs

The Greenwich Road plans indicate a 5 s.f. RCPHE at a slope of 1.0% will be the limiting factor of the capacity of the proposed system and according to Manning's Equation is calculated to be 42.1 cfs. However, as demonstrated by the attached Stormcad output the capacity is greater when pressure flow is considered. The future system is shown to be adequate to accept and convey the proposed flows of 61.1 cfs from the project.

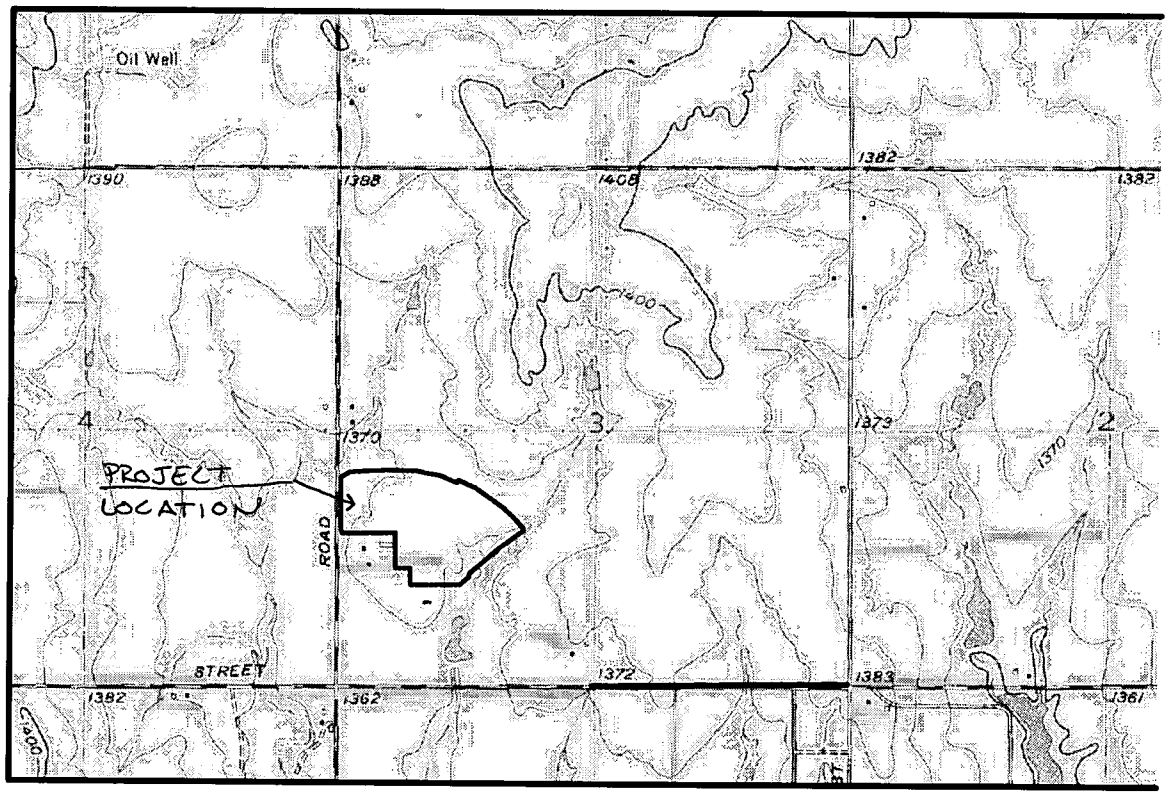


FEMA FLOOD
INSURANCE RATE MAP



This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

USGS MAP


Oil Well
1390
1388
1408
1382
1382
1400
4
3
2
1370
1373
1370
PROJECT
LOCATION
ROAD
STREET
1372
1383
1382
1362
1361
1400

N

1" = 2000'

HEC-HMS OUTPUT

DRAINAGE PLAN
CEDAR CREEK MARKETPLACE
Wichita, Sedgwick County, Kansas

K-96 HWY

PROPOSED STORM SEWER IMPROVEMENTS BY OTHERS, PART OF GREENWICH ROAD IMPROVEMENT PLANS

EXIST. 72"RCP

GREENWICH RD.

AREA 1
17.2 Ac.

OFFSITE
3.8 Ac.

AREA 2
20.0 Ac.

LOT 1

RESERVE "A"

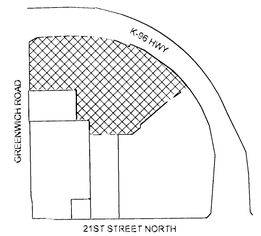
EXISTING POND
EXISTING POND
STATIC POOL: 1367.87
100 YEAR W.S. 1371.0
Q_{100} IN: 308.8 CFS
Q_{100} OUT: 280.3 CFS
PEAK STORAGE: 9.53 AC-FT.

EXISTING 12" PIPE
USFL (N)=1367.87
DSFL (S)=1366.76

120 Acres Offsite
Q_{100}=214 CFS

(2) EXISTING 18" RCP
USFL (NE)=1372.0
DSFL (SW)=1370.0

SCALE: 1"=100'



VICINITY MAP

DWG FILE: QLP
PROJECT NO. 2728P
JANUARY 28, 2006

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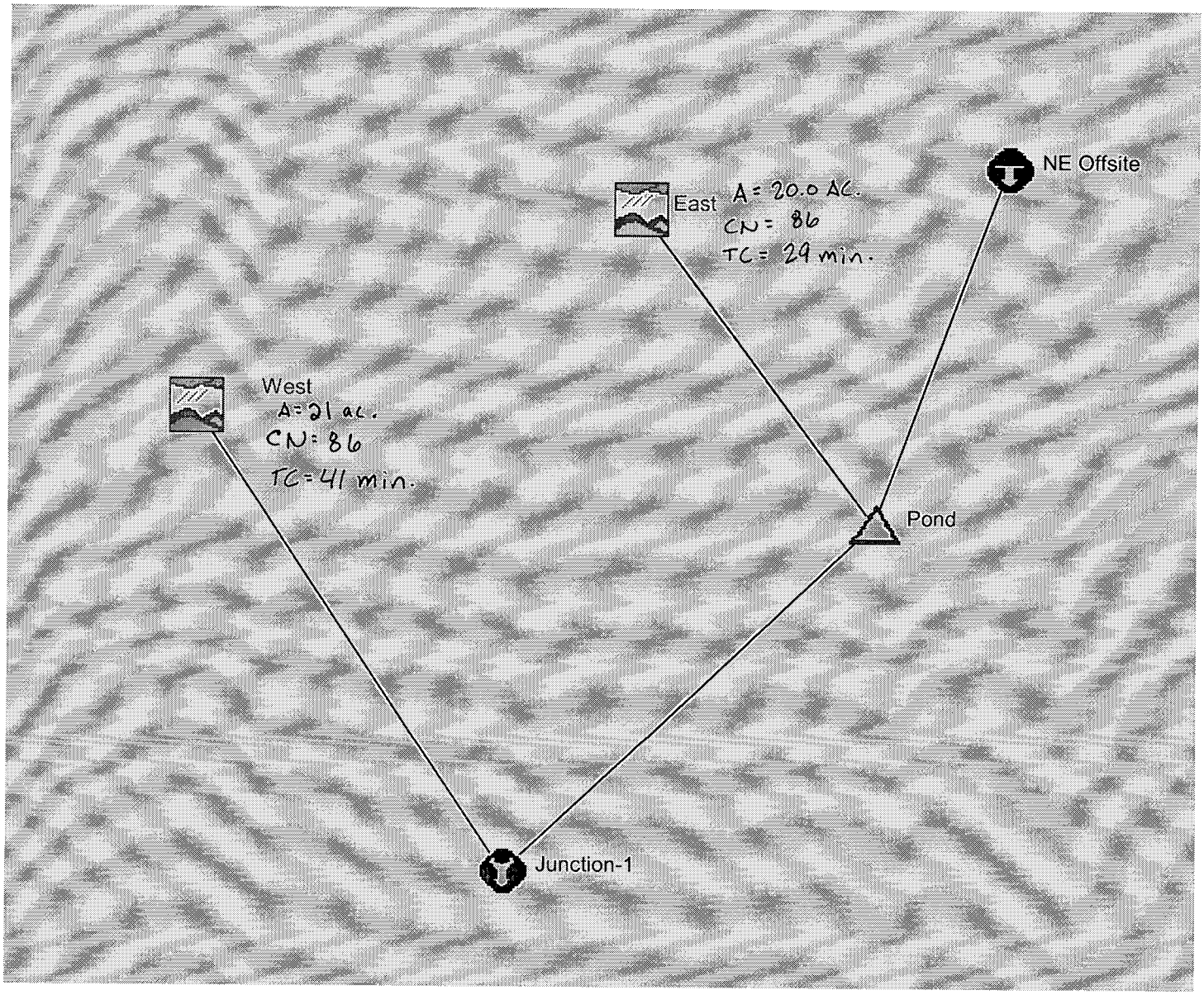
2-year Storm

HEC-HMS **Project: 2728P** **Basin Model: Existing**



HMS * Summary of Results for NE Offsite

Project : 2728P Run Name : Run 1

Start of Run	: 01Jan06 1200	Basin Model	: Existing
End of Run	: 02Jan06 1200	Met. Model	: 2-year
Execution Time	: 23Feb06 1123	Control Specs	: Control 1

Computed Results

Peak Discharge : 141.09 (cfs) Date/Time of Peak Discharge : 02 Jan 06 0015

Total Discharge : 3.87 (in)

HMS * Summary of Results for East

Project : 2728P Run Name : Run 1

Start of Run	: 01Jan06 1200	Basin Model	: Existing
End of Run	: 02Jan06 1200	Met. Model	: 2-year
Execution Time	: 23Feb06 1122	Control Specs	: Control 1

Computed Results

Peak Discharge	: 33.287 (cfs)	Date/Time of Peak Discharge	: 02 Jan 06 0020
Total Precipitation	: 3.50 (in)	Total Direct Runoff	: 2.08 (in)
Total Loss	: 1.40 (in)	Total Baseflow	: 0.00 (in)
Total Excess	: 2.10 (in)	Total Discharge	: 2.08 (in)

HMS * Summary of Results for Pond

Project : 2728P Run Name : Run 1

Start of Run	: 01Jan06 1200	Basin Model	: Existing
End of Run	: 02Jan06 1200	Met. Model	: 2-year
Execution Time	: 23Feb06 1122	Control Specs	: Control 1

Computed Results

Peak Inflow	: 146.69 (cfs)	Date/Time of Peak Inflow	: 02 Jan 06 0020
Peak Outflow	: 111.58 (cfs)	Date/Time of Peak Outflow	: 02 Jan 06 0045
Total Inflow	: 2.75 (in)	Peak Storage	: 6.4403(ac-ft)
Total Outflow	: 2.69 (in)	Peak Elevation	: 1370.2(ft)

HMS * Summary of Results for West

Project : 2728P Run Name : Run 1

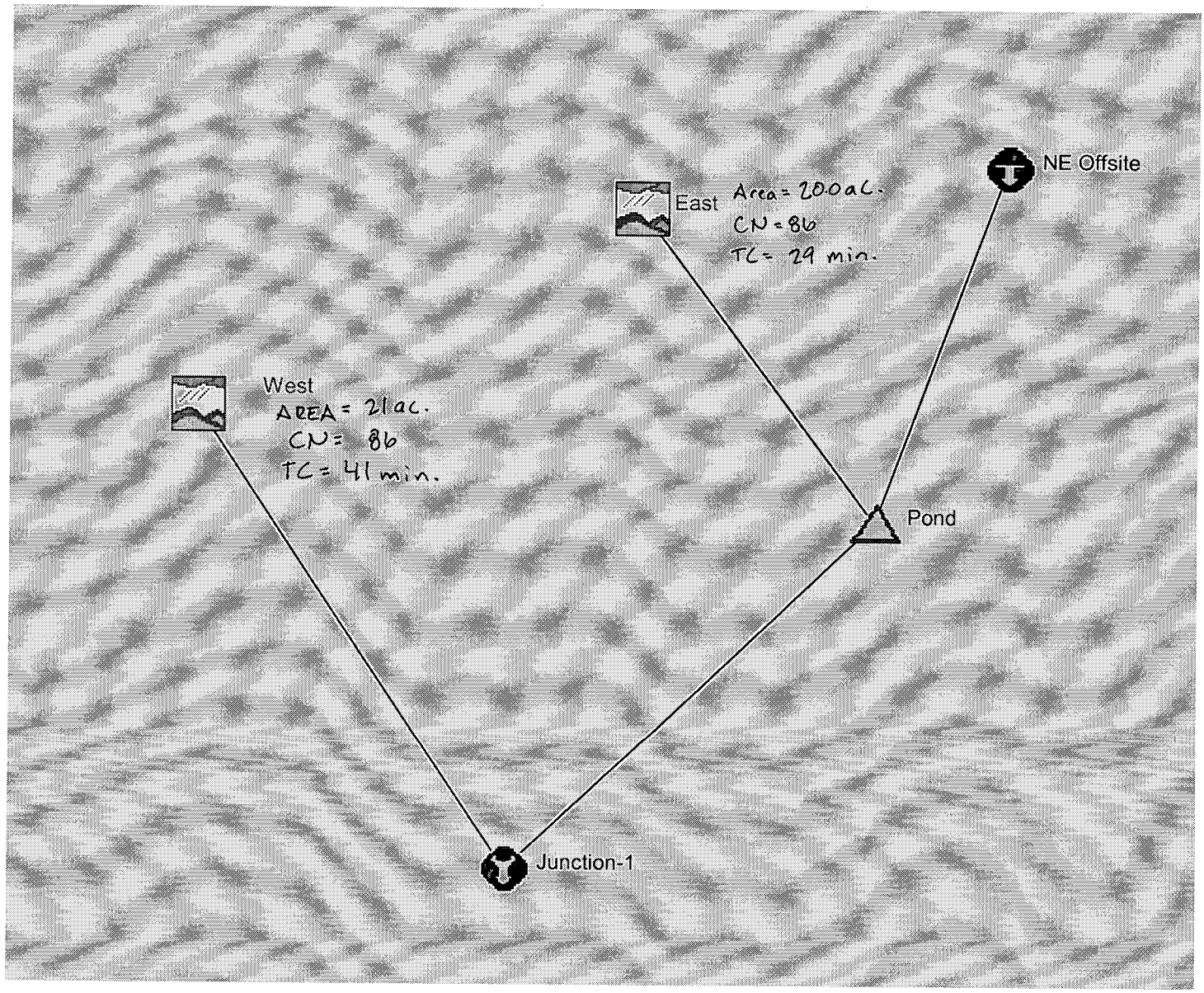
Start of Run	: 01Jan06 1200	Basin Model	: Existing
End of Run	: 02Jan06 1200	Met. Model	: 2-year
Execution Time	: 23Feb06 1122	Control Specs	: Control 1

Computed Results

Peak Discharge	: 22.166 (cfs)	Date/Time of Peak Discharge	: 02 Jan 06 0035
Total Precipitation	: 3.50 (in)	Total Direct Runoff	: 2.07 (in)
Total Loss	: 1.40 (in)	Total Baseflow	: 0.00 (in)
Total Excess	: 2.10 (in)	Total Discharge	: 2.07 (in)

5-year Storm

HEC-HMS **Project: 2728P** **Basin Model: Existing**



HMS * Summary of Results for NE Offsite

Project : 2728P Run Name : Run 3

Start of Run	: 01Jan06 1200	Basin Model	: Existing
End of Run	: 02Jan06 1200	Met. Model	: 5-yr
Execution Time	: 23Feb06 1128	Control Specs	: Control 1

Computed Results

Peak Discharge : 141.09 (cfs) Date/Time of Peak Discharge : 02 Jan 06 0015

Total Discharge : 3.87 (in)

HMS * Summary of Results for East

Project : 2728P Run Name : Run 3

Start of Run	: 01Jan06 1200	Basin Model	: Existing
End of Run	: 02Jan06 1200	Met. Model	: 5-yr
Execution Time	: 23Feb06 1128	Control Specs	: Control 1

Computed Results

Peak Discharge	: 47.662 (cfs)	Date/Time of Peak Discharge	: 02 Jan 06 0020
Total Precipitation	: 4.50 (in)	Total Direct Runoff	: 2.97 (in)
Total Loss	: 1.50 (in)	Total Baseflow	: 0.00 (in)
Total Excess	: 3.00 (in)	Total Discharge	: 2.97 (in)

HMS * Summary of Results for Pond

Project : 2728P Run Name : Run 3

Start of Run	: 01Jan06 1200	Basin Model	: Existing
End of Run	: 02Jan06 1200	Met. Model	: 5-yr
Execution Time	: 23Feb06 1128	Control Specs	: Control 1

Computed Results

Peak Inflow	: 188.38 (cfs)	Date/Time of Peak Inflow	: 02 Jan 06 0020
Peak Outflow	: 156.82 (cfs)	Date/Time of Peak Outflow	: 02 Jan 06 0040
Total Inflow	: 3.72 (in)	Peak Storage	: 7.2689(ac-ft)
Total Outflow	: 3.64 (in)	Peak Elevation	: 1370.4(ft)

HMS * Summary of Results for West

Project : 2728P Run Name : Run 3

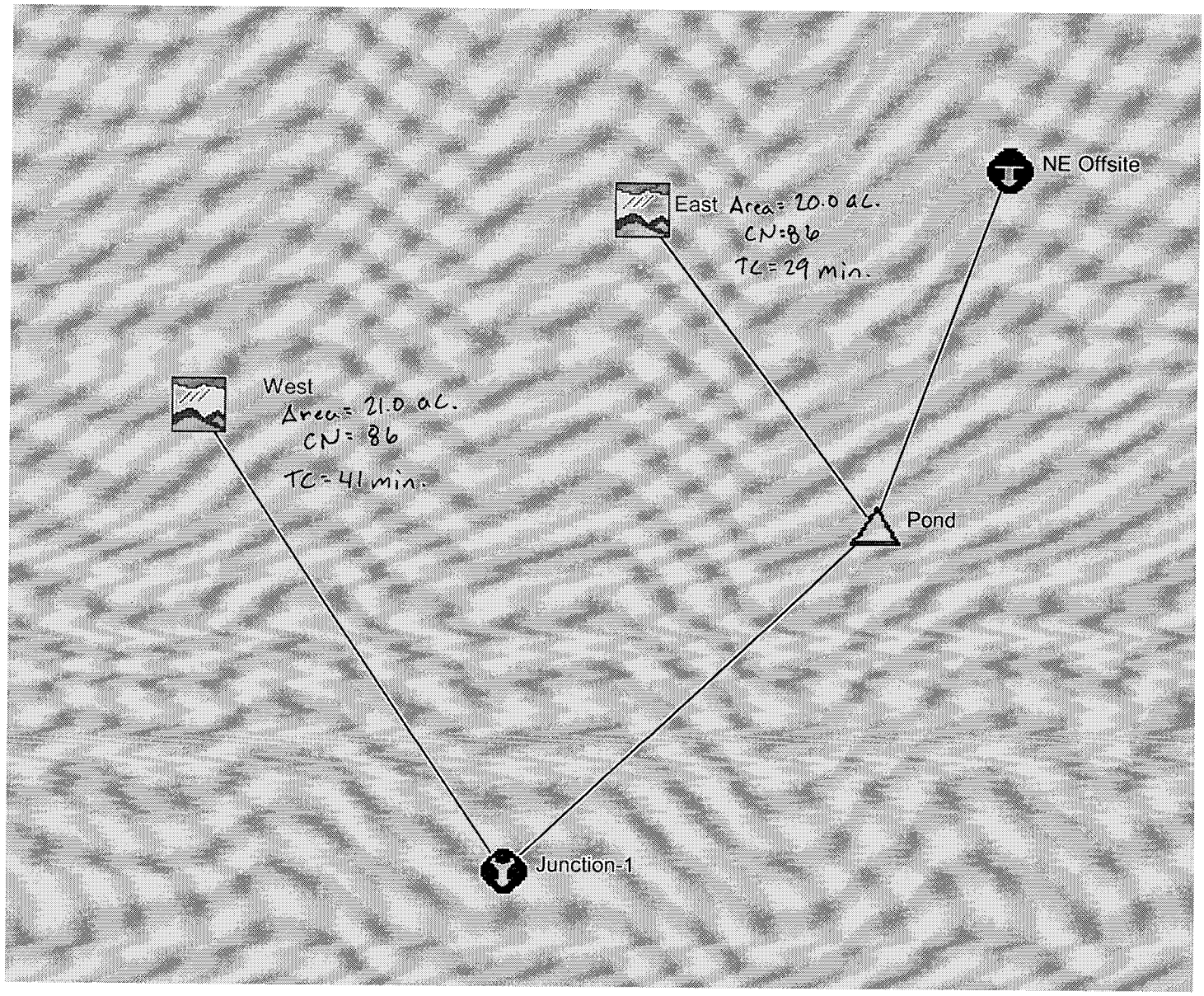
Start of Run	: 01Jan06 1200	Basin Model	: Existing
End of Run	: 02Jan06 1200	Met. Model	: 5-yr
Execution Time	: 23Feb06 1128	Control Specs	: Control 1

Computed Results

Peak Discharge	: 31.709 (cfs)	Date/Time of Peak Discharge	: 02 Jan 06 0035
Total Precipitation	: 4.50 (in)	Total Direct Runoff	: 2.96 (in)
Total Loss	: 1.50 (in)	Total Baseflow	: 0.00 (in)
Total Excess	: 3.00 (in)	Total Discharge	: 2.96 (in)

100-year Storm

HEC-HMS **Project: 2728P** **Basin Model: Existing**



HMS * Summary of Results for NE Offsite

Project : 2728P Run Name : Run 2

Start of Run	: 01Jan06 1200	Basin Model	: Existing
End of Run	: 02Jan06 1200	Met. Model	: 100-yr
Execution Time	: 23Feb06 1128	Control Specs	: Control 1

Computed Results

Peak Discharge : 214.00 (cfs) Date/Time of Peak Discharge : 02 Jan 06 0025

Total Discharge : 7.09 (in)

HMS * Summary of Results for East

Project : 2728P Run Name : Run 2

Start of Run	: 01Jan06 1200	Basin Model	: Existing
End of Run	: 02Jan06 1200	Met. Model	: 100-yr
Execution Time	: 23Feb06 1118	Control Specs	: Control 1

Computed Results

Peak Discharge	: 95.768 (cfs)	Date/Time of Peak Discharge	: 02 Jan 06 0020
Total Precipitation	: 7.80 (in)	Total Direct Runoff	: 6.08 (in)
Total Loss	: 1.66 (in)	Total Baseflow	: 0.00 (in)
Total Excess	: 6.14 (in)	Total Discharge	: 6.08 (in)

HMS * Summary of Results for Pond

Project : 2728P Run Name : Run 2

Start of Run	: 01Jan06 1200	Basin Model	: Existing
End of Run	: 02Jan06 1200	Met. Model	: 100-yr
Execution Time	: 23Feb06 1118	Control Specs	: Control 1

Computed Results

Peak Inflow	: 308.77 (cfs)	Date/Time of Peak Inflow	: 02 Jan 06 0020
Peak Outflow	: 280.34 (cfs)	Date/Time of Peak Outflow	: 02 Jan 06 0040
Total Inflow	: 6.92 (in)	Peak Storage	: 9.5308(ac-ft)
Total Outflow	: 6.79 (in)	Peak Elevation	: 1371.0(ft)

HMS * Summary of Results for West

Project : 2728P Run Name : Run 2

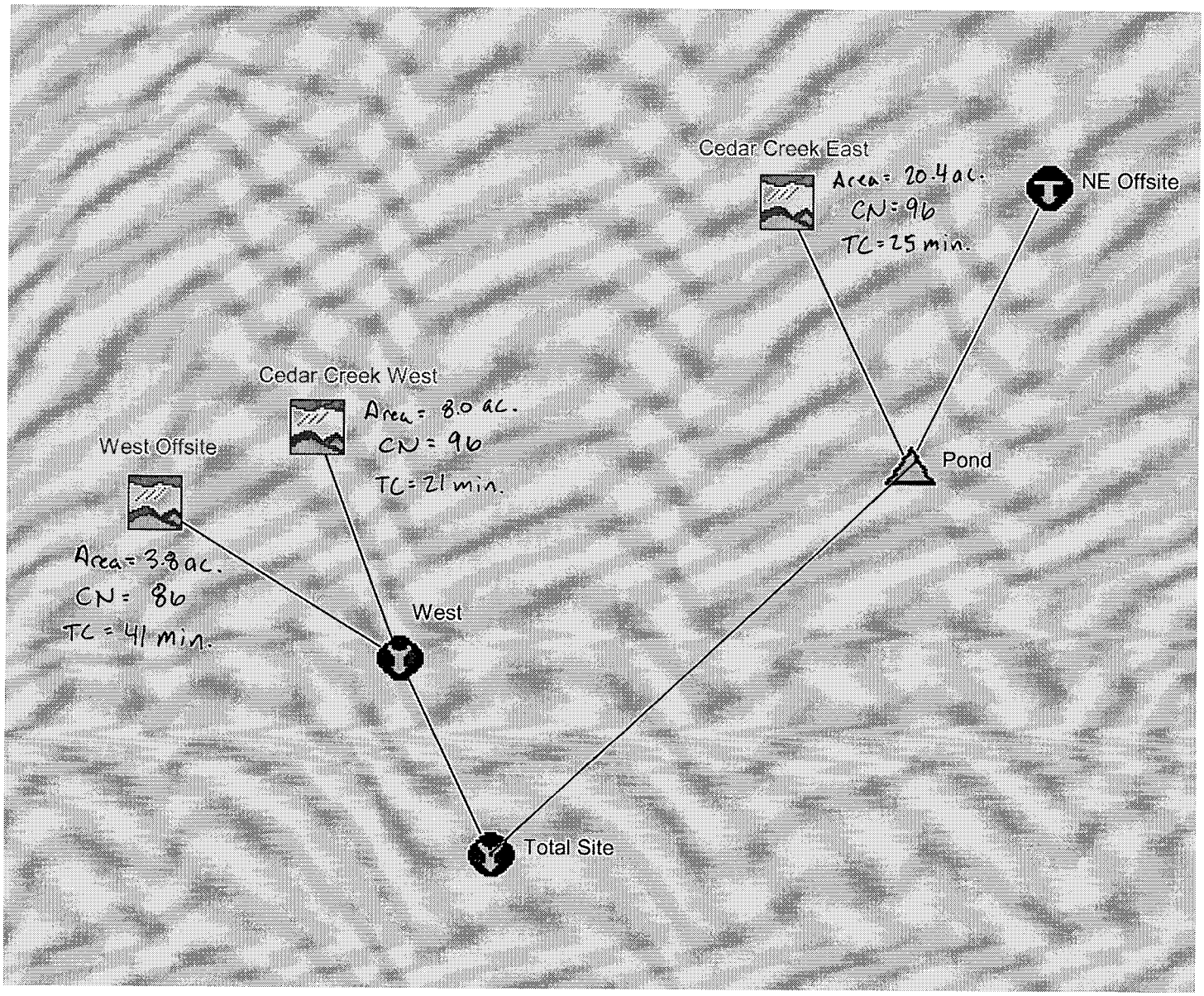
Start of Run	: 01Jan06 1200	Basin Model	: Existing
End of Run	: 02Jan06 1200	Met. Model	: 100-yr
Execution Time	: 23Feb06 1118	Control Specs	: Control 1

Computed Results

Peak Discharge	: 63.655 (cfs)	Date/Time of Peak Discharge	: 02 Jan 06 0035
Total Precipitation	: 7.80 (in)	Total Direct Runoff	: 6.06 (in)
Total Loss	: 1.66 (in)	Total Baseflow	: 0.00 (in)
Total Excess	: 6.14 (in)	Total Discharge	: 6.06 (in)

2-year Storm

HEC-HMS **Project: 2728P** **Basin Model: Proposed**



HMS * Summary of Results for NE Offsite

Project : 2728P Run Name : Run 4

Start of Run	: 01Jan06 1200	Basin Model	: Proposed
End of Run	: 02Jan06 1200	Met. Model	: 2-year
Execution Time	: 23Feb06 1133	Control Specs	: Control 1

Computed Results

Peak Discharge : 114.18 (cfs) Date/Time of Peak Discharge : 02 Jan 06 0015

Total Discharge : 2.89 (in)

HMS * Summary of Results for Cedar Creek East

Project : 2728P Run Name : Run 4

Start of Run	: 01Jan06 1200	Basin Model	: Proposed
End of Run	: 02Jan06 1200	Met. Model	: 2-year
Execution Time	: 23Feb06 1133	Control Specs	: Control 1

Computed Results

Peak Discharge	: 41.221 (cfs)	Date/Time of Peak Discharge	: 02 Jan 06 0015
Total Precipitation	: 3.50 (in)	Total Direct Runoff	: 3.02 (in)
Total Loss	: 0.45 (in)	Total Baseflow	: 0.00 (in)
Total Excess	: 3.05 (in)	Total Discharge	: 3.02 (in)

HMS * Summary of Results for Pond

Project : 2728P Run Name : Run 4

Start of Run	: 01Jan06 1200	Basin Model	: Proposed
End of Run	: 02Jan06 1200	Met. Model	: 2-year
Execution Time	: 23Feb06 1133	Control Specs	: Control 1

Computed Results

Peak Inflow	: 155.40 (cfs)	Date/Time of Peak Inflow	: 02 Jan 06 0015
Peak Outflow	: 100.64 (cfs)	Date/Time of Peak Outflow	: 02 Jan 06 0055
Total Inflow	: 2.91 (in)	Peak Storage	: 8.8251(ac-ft)
Total Outflow	: 2.63 (in)	Peak Elevation	: 1370.2(ft)

HMS * Summary of Results for Cedar Creek West

Project : 2728P Run Name : Run 4

Start of Run	: 01Jan06 1200	Basin Model	: Proposed
End of Run	: 02Jan06 1200	Met. Model	: 2-year
Execution Time	: 23Feb06 1133	Control Specs	: Control 1

Computed Results

Peak Discharge	: 17.735 (cfs)	Date/Time of Peak Discharge	: 02 Jan 06 0015
Total Precipitation	: 3.50 (in)	Total Direct Runoff	: 3.03 (in)
Total Loss	: 0.45 (in)	Total Baseflow	: 0.00 (in)
Total Excess	: 3.05 (in)	Total Discharge	: 3.03 (in)

HMS * Summary of Results for West Offsite

Project : 2728P Run Name : Run 4

Start of Run	: 01Jan06 1200	Basin Model	: Proposed
End of Run	: 02Jan06 1200	Met. Model	: 2-year
Execution Time	: 23Feb06 1133	Control Specs	: Control 1

Computed Results

Peak Discharge	: 4.0142 (cfs)	Date/Time of Peak Discharge	: 02 Jan 06 0035
Total Precipitation	: 3.50 (in)	Total Direct Runoff	: 2.07 (in)
Total Loss	: 1.40 (in)	Total Baseflow	: 0.00 (in)
Total Excess	: 2.10 (in)	Total Discharge	: 2.07 (in)

HMS * Summary of Results for West

Project : 2728P Run Name : Run 4

Start of Run	: 01Jan06 1200	Basin Model	: Proposed
End of Run	: 02Jan06 1200	Met. Model	: 2-year
Execution Time	: 23Feb06 1133	Control Specs	: Control 1

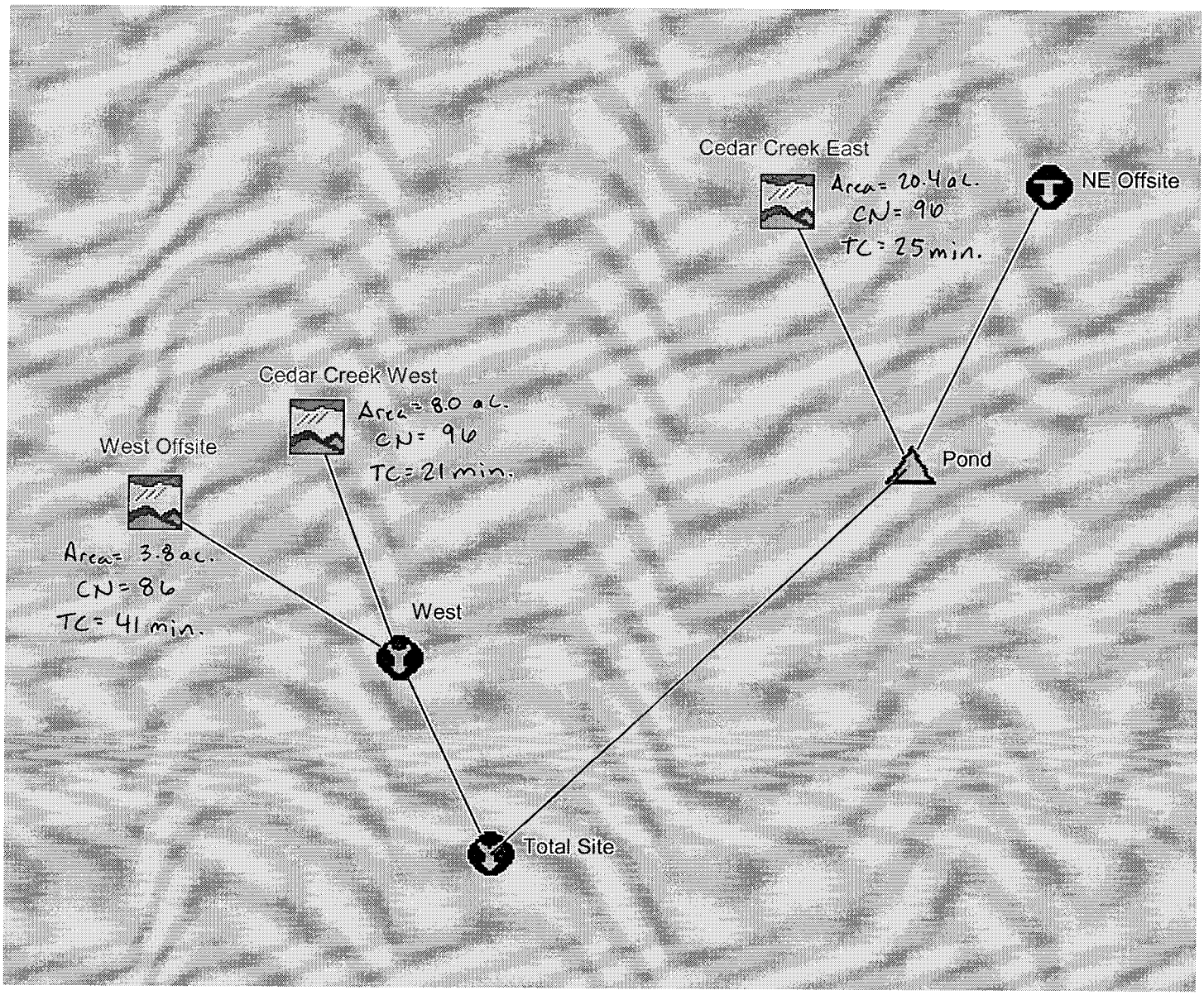
Computed Results

Peak Outflow : 20.549 (cfs) Date/Time of Peak Outflow : 02 Jan 06 0015

Total Outflow : 2.72 (in)

5-year Storm

HEC-HMS **Project: 2728P** **Basin Model: Proposed**



HMS * Summary of Results for NE Offsite

Project : 2728P Run Name : Run 5

Start of Run	: 01Jan06 1200	Basin Model	: Proposed
End of Run	: 02Jan06 1200	Met. Model	: 5-yr
Execution Time	: 23Feb06 1134	Control Specs	: Control 1

Computed Results

Peak Discharge : 141.09 (cfs) Date/Time of Peak Discharge : 02 Jan 06 0015

Total Discharge : 3.87 (in)

HMS * Summary of Results for Cedar Creek East

Project : 2728P Run Name : Run 5

Start of Run	: 01Jan06 1200	Basin Model	: Proposed
End of Run	: 02Jan06 1200	Met. Model	: 5-yr
Execution Time	: 23Feb06 1134	Control Specs	: Control 1

Computed Results

Peak Discharge	: 53.926 (cfs)	Date/Time of Peak Discharge	: 02 Jan 06 0015
Total Precipitation	: 4.50 (in)	Total Direct Runoff	: 4.01 (in)
Total Loss	: 0.46 (in)	Total Baseflow	: 0.00 (in)
Total Excess	: 4.04 (in)	Total Discharge	: 4.01 (in)

HMS * Summary of Results for Pond

Project : 2728P Run Name : Run 5

Start of Run	: 01Jan06 1200	Basin Model	: Proposed
End of Run	: 02Jan06 1200	Met. Model	: 5-yr
Execution Time	: 23Feb06 1134	Control Specs	: Control 1

Computed Results

Peak Inflow	: 195.02 (cfs)	Date/Time of Peak Inflow	: 02 Jan 06 0015
Peak Outflow	: 134.23 (cfs)	Date/Time of Peak Outflow	: 02 Jan 06 0050
Total Inflow	: 3.89 (in)	Peak Storage	: 10.343(ac-ft)
Total Outflow	: 3.59 (in)	Peak Elevation	: 1370.5(ft)

HMS * Summary of Results for Cedar Creek West

Project : 2728P Run Name : Run 5

Start of Run	: 01Jan06 1200	Basin Model	: Proposed
End of Run	: 02Jan06 1200	Met. Model	: 5-yr
Execution Time	: 23Feb06 1134	Control Specs	: Control 1

Computed Results

Peak Discharge	: 23.171 (cfs)	Date/Time of Peak Discharge	: 02 Jan 06 0015
Total Precipitation	: 4.50 (in)	Total Direct Runoff	: 4.01 (in)
Total Loss	: 0.46 (in)	Total Baseflow	: 0.00 (in)
Total Excess	: 4.04 (in)	Total Discharge	: 4.01 (in)

HMS * Summary of Results for West Offsite

Project : 2728P Run Name : Run 5

Start of Run	: 01Jan06 1200	Basin Model	: Proposed
End of Run	: 02Jan06 1200	Met. Model	: 5-yr
Execution Time	: 23Feb06 1134	Control Specs	: Control 1

Computed Results

Peak Discharge	: 5.7424 (cfs)	Date/Time of Peak Discharge	: 02 Jan 06 0035
Total Precipitation	: 4.50 (in)	Total Direct Runoff	: 2.96 (in)
Total Loss	: 1.50 (in)	Total Baseflow	: 0.00 (in)
Total Excess	: 3.00 (in)	Total Discharge	: 2.96 (in)

HMS * Summary of Results for West

Project : 2728P Run Name : Run 5

Start of Run	: 01Jan06 1200	Basin Model	: Proposed
End of Run	: 02Jan06 1200	Met. Model	: 5-yr
Execution Time	: 23Feb06 1134	Control Specs	: Control 1

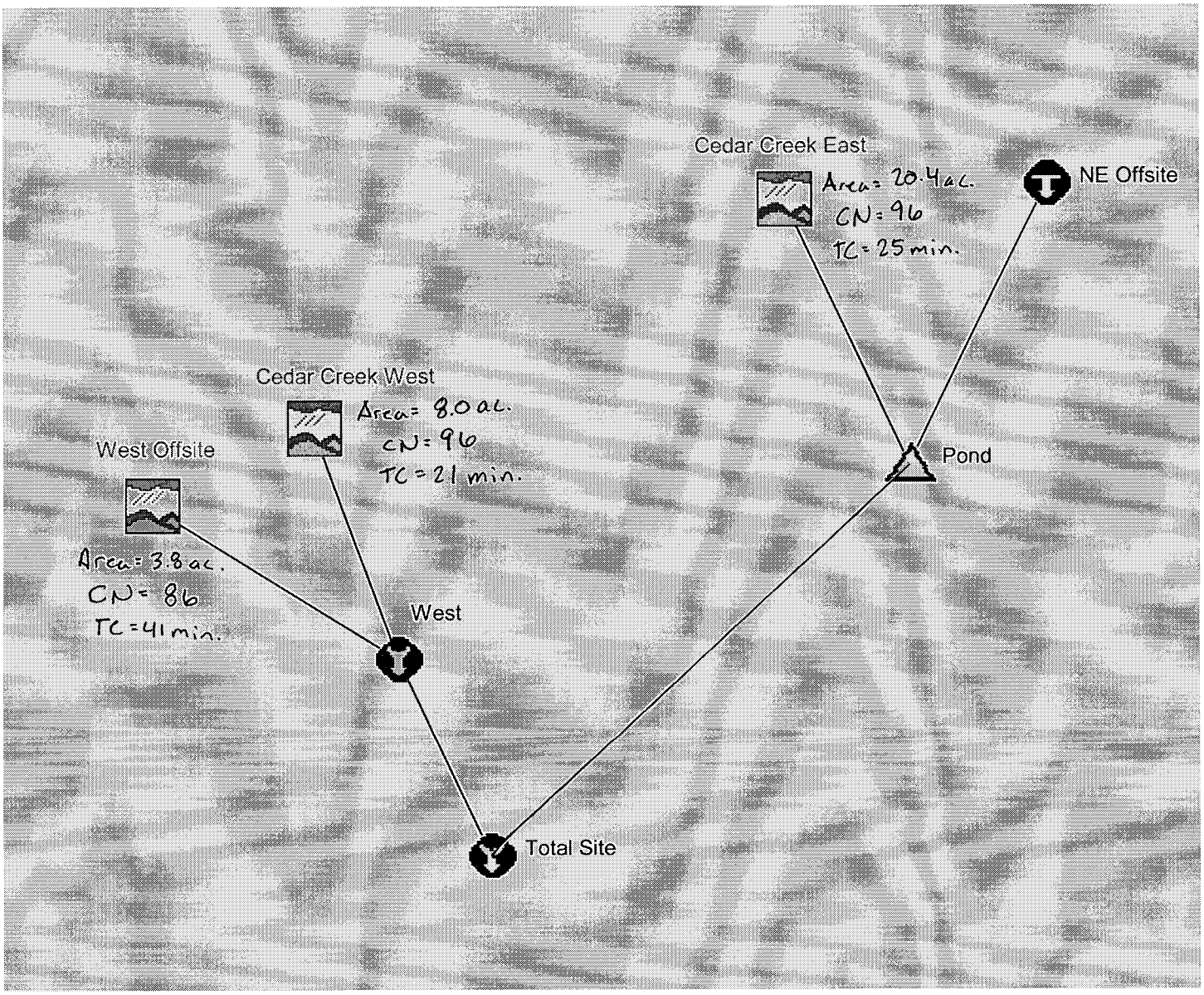
Computed Results

Peak Outflow : 27.283 (cfs) Date/Time of Peak Outflow : 02 Jan 06 0015

Total Outflow : 3.67 (in)

100-year Storm

HEC-HMS **Project: 2728P** **Basin Model: Proposed**



HMS * Summary of Results for NE Offsite

Project : 2728P Run Name : Run 6

Start of Run	: 01Jan06 1200	Basin Model	: Proposed
End of Run	: 02Jan06 1200	Met. Model	: 100-yr
Execution Time	: 23Feb06 1135	Control Specs	: Control 1

Computed Results

Peak Discharge : 214.00 (cfs) Date/Time of Peak Discharge : 02 Jan 06 0025

Total Discharge : 7.09 (in)

HMS * Summary of Results for Cedar Creek East

Project : 2728P Run Name : Run 6

Start of Run	: 01Jan06 1200	Basin Model	: Proposed
End of Run	: 02Jan06 1200	Met. Model	: 100-yr
Execution Time	: 23Feb06 1135	Control Specs	: Control 1

Computed Results

Peak Discharge	: 95.400 (cfs)	Date/Time of Peak Discharge	: 02 Jan 06 0015
Total Precipitation	: 7.80 (in)	Total Direct Runoff	: 7.27 (in)
Total Loss	: 0.48 (in)	Total Baseflow	: 0.00 (in)
Total Excess	: 7.32 (in)	Total Discharge	: 7.27 (in)

HMS * Summary of Results for Pond

Project : 2728P Run Name : Run 6

Start of Run	: 01Jan06 1200	Basin Model	: Proposed
End of Run	: 02Jan06 1200	Met. Model	: 100-yr
Execution Time	: 23Feb06 1135	Control Specs	: Control 1

Computed Results

Peak Inflow	: 306.51 (cfs)	Date/Time of Peak Inflow	: 02 Jan 06 0020
Peak Outflow	: 231.37 (cfs)	Date/Time of Peak Outflow	: 02 Jan 06 0055
Total Inflow	: 7.12 (in)	Peak Storage	: 14.535(ac-ft)
Total Outflow	: 6.78 (in)	Peak Elevation	: 1371.4(ft)

HMS * Summary of Results for Cedar Creek West

Project : 2728P Run Name : Run 6

Start of Run	: 01Jan06 1200	Basin Model	: Proposed
End of Run	: 02Jan06 1200	Met. Model	: 100-yr
Execution Time	: 23Feb06 1135	Control Specs	: Control 1

Computed Results

Peak Discharge	: 40.924 (cfs)	Date/Time of Peak Discharge	: 02 Jan 06 0015
Total Precipitation	: 7.80 (in)	Total Direct Runoff	: 7.28 (in)
Total Loss	: 0.48 (in)	Total Baseflow	: 0.00 (in)
Total Excess	: 7.32 (in)	Total Discharge	: 7.28 (in)

HMS * Summary of Results for West Offsite

Project : 2728P Run Name : Run 6

Start of Run	: 01Jan06 1200	Basin Model	: Proposed
End of Run	: 02Jan06 1200	Met. Model	: 100-yr
Execution Time	: 23Feb06 1135	Control Specs	: Control 1

Computed Results

Peak Discharge	: 11.528 (cfs)	Date/Time of Peak Discharge	: 02 Jan 06 0035
Total Precipitation	: 7.80 (in)	Total Direct Runoff	: 6.06 (in)
Total Loss	: 1.66 (in)	Total Baseflow	: 0.00 (in)
Total Excess	: 6.14 (in)	Total Discharge	: 6.06 (in)

HMS * Summary of Results for West

Project : 2728P Run Name : Run 6

Start of Run	: 01Jan06 1200	Basin Model	: Proposed
End of Run	: 02Jan06 1200	Met. Model	: 100-yr
Execution Time	: 23Feb06 1135	Control Specs	: Control 1

Computed Results

Peak Outflow : 49.445 (cfs) Date/Time of Peak Outflow : 02 Jan 06 0015

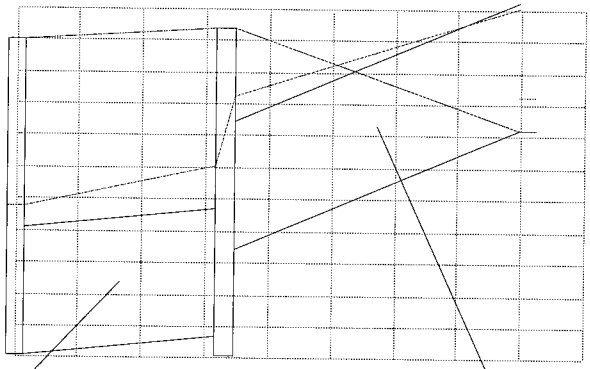
Total Outflow : 6.89 (in)

STORMCAD OUTPUT

Inlet: I-2
Rim: 1,368.20 ft
Sump: 1,363.04 ft

Inlet: I-1
Rim: 1,366.60 ft
Sump: 1,366.60 ft

Outlet: Outlet
Rim: 1,368.00 ft
Sump: 1,363.04 ft



Pipe: P-3
Up Invert: 1,363.36 ft
Dn Invert: 1,363.04 ft
Length: 33.00 ft
Size: 24x38 inch

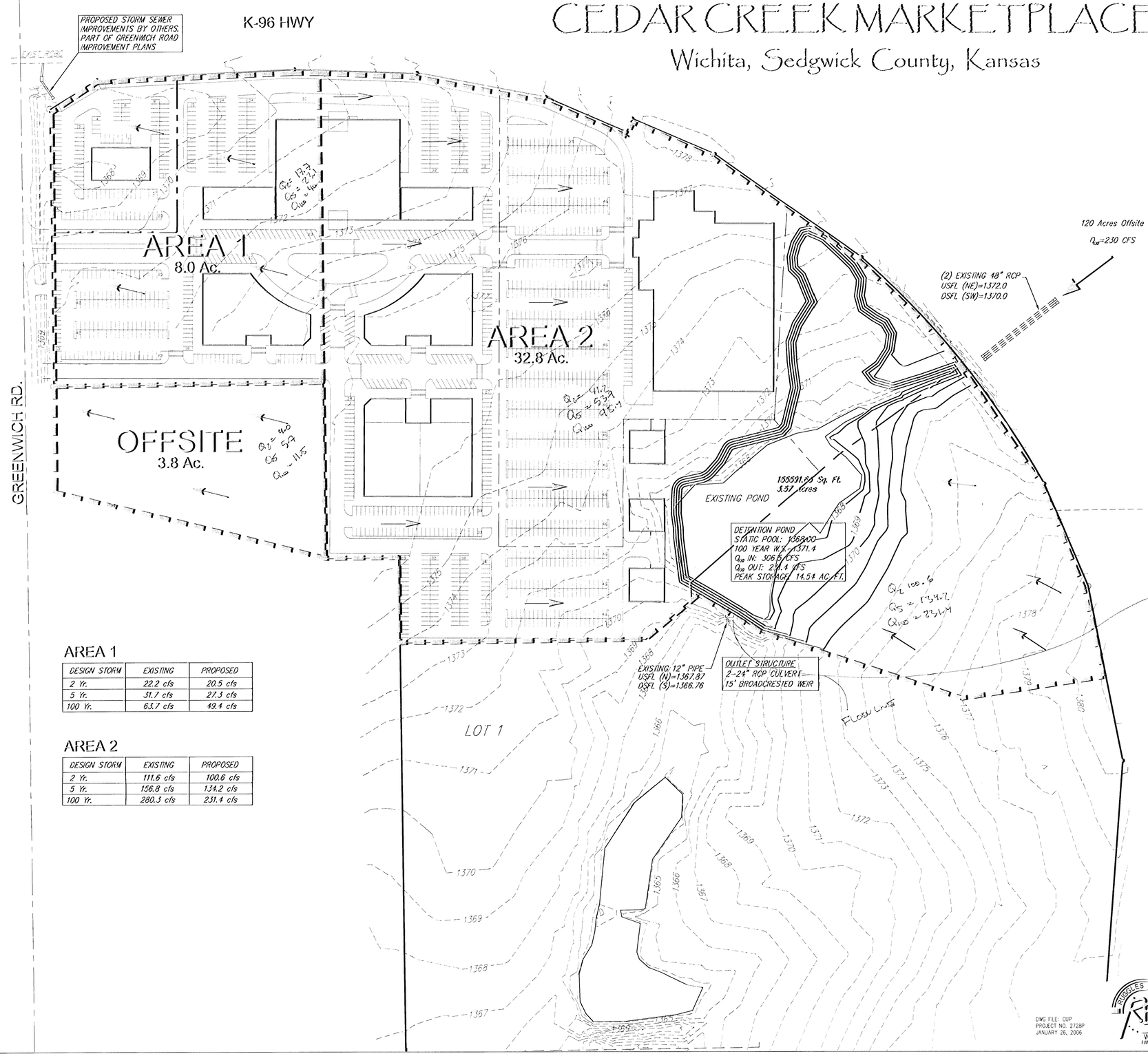
Pipe: P-1
Up Invert: 1,366.60 ft
Dn Invert: 1,364.72 ft
Length: 48.00 ft
Size: 24x38 inch

Node Report

Node	Inlet A (acres)	C	Up Flow Time (min)	Sys Flow Time (min)	Q (cfs)	Rim (ft)	Gr Elev (ft)	HGL In (ft)	HGL Out (ft)	Sump (ft)	Add. Q (cfs)	Known Flow (cfs)
I-1	0.00	0.00	0.00	0.00	61.10	1,366.60	1,366.60	1,367.13	1,367.13	1,366.60	0.00	61.10
I-2	0.00	0.00	0.07	0.07	61.10	1,368.20	1,368.20	1,367.13	1,366.01	1,363.04	0.00	61.10
Outlet	N/A	N/A	0.11	0.11	N/A	1,368.00	1,368.00	1,365.40	1,365.40	1,363.04	N/A	N/A

EXISTING
DRAINAGE PLAN

DRAINAGE PLAN
CEDAR CREEK MARKETPLACE
Wichita, Sedgwick County, Kansas

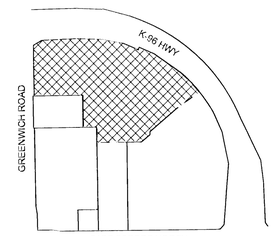


AREA 1

DESIGN STORM	EXISTING	PROPOSED
2 Yr.	22.2 cfs	20.5 cfs
5 Yr.	31.7 cfs	27.3 cfs
100 Yr.	63.7 cfs	49.4 cfs

AREA 2

DESIGN STORM	EXISTING	PROPOSED
2 Yr.	111.6 cfs	100.6 cfs
5 Yr.	156.8 cfs	134.2 cfs
100 Yr.	280.3 cfs	231.4 cfs



VICINITY MAP

DWG FILE: CUP
PROJECT NO. 2728P
JANUARY 26, 2006

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