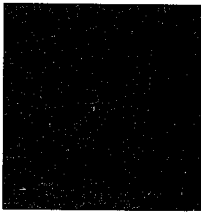


PROFESSIONAL
ENGINEERING
CONSULTANTS
PROFESSIONAL ASSOCIATION



STORM WATER

DRAIN NO. 106

DESIGN COMPUTATIONS

303 S. TOPEKA
WICHITA, KANSAS 67202
(316) 262-2691
FAX (316) 262-3003



Date 8-8-89 Page 1 of 1
Project Tollgrass East 3rd Addition
Item Drainage Plan - Introduction

The proposed Tollgrass East 3rd Addition is the final segment of development within the Tollgrass East community. The original Tollgrass East Preliminary Plat was submitted to the City by Bill Yung Design in 1986. Tollgrass East 3rd consists of the eastern portion of the original preliminary plat.

The proposed detention pond located north of the north line of Tollgrass East 3rd will accept drainage from parts of Tollgrass East 1st Add, Tollgrass East 3rd Addition, future Tollgrass East Business Park (C.U.P. now being prepared by Bill Yung Design), and an undeveloped tract owned by the Wichita Airport Authority located south of Jabara Airport. The proposed discharge from the detention pond will approximate the undeveloped runoff from the basin. It will discharge into the southwesterly ditch of the proposed K-96 Bypass now being designed by PEC.

Worksheet 2: Runoff curve number and runoff

Project Tallgrass East 3rd Add By CMB Date 8.3.89

Location SEC 4, T27S, R2E Checked BdB Date 8-8-89

Circle one: Present Developed

1. Runoff curve number (CN)

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN ^{1/}			Area <input type="checkbox"/> acres <input type="checkbox"/> mi ² <input checked="" type="checkbox"/> %	Product of CN x area
		Table 2-2	Fig. 2-3	Fig. 2-4		
Ce C	Pasture ; Fair	79 ✓			10	790
Ma B	" "	69 ✓			10	690
Gb, Rd, Ta, Ia D	" "	84 ✓			80	6,720
Totals =					100	8200 ✓

^{1/} Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{8200}{100} = \underline{82}$; Use CN = 82 ✓

2. Runoff

Frequency yr
 Rainfall, P (24-hour) in
 Runoff, Q in
 (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

Storm #1	Storm #2	Storm #3
10	100	
5.3	7.8	
3.2	5.6	

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Tellgrass East 3rd. Add By CSB Date _____

Location _____ Checked BdB Date 8-8-89

Circle one: Present Developed _____

Circle one: T_c T_t through subarea _____

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

- | | |
|---------------------------------------------------------------------------|------------|
| | Segment ID |
| 1. Surface description (table 3-1) | |
| 2. Manning's roughness coeff., n (table 3-1) .. | |
| 3. Flow length, L (total L \leq 300 ft) | ft |
| 4. Two-yr 24-hr rainfall, P_2 | in |
| 5. Land slope, s | ft/ft |
| 6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T_t | hr |

Short Grass	
0.15 ✓	
300	
3.5	
0.02 ✓	
0.376	+
	=
0.376	✓

Shallow concentrated flow

- | | |
|--------------------------------------------------|------------|
| | Segment ID |
| 7. Surface description (paved or unpaved) | |
| 8. Flow length, L | ft |
| 9. Watercourse slope, s | ft/ft |
| 10. Average velocity, V (figure 3-1) | ft/s |
| 11. $T_t = \frac{L}{3600 V}$ Compute T_t | hr |

Unpaved	
800	
0.016	
2	
0.111	+
	=
0.111	✓

Channel flow

- | | |
|----------------------------------------------------------------------------------|-----------------|
| | Segment ID |
| 12. Cross sectional flow area, a | ft ² |
| 13. Wetted perimeter, p_w | ft |
| 14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r | ft |
| 15. Channel slope, s | ft/ft |
| 16. Manning's roughness coeff., n | |
| 17. $v = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V | ft/s |
| 18. Flow length, L | ft |
| 19. $T_t = \frac{L}{3600 V}$ Compute T_t | hr |
| 20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) | hr |

3	Assumed ✓
2000	
0.185	+
	=
0.185	✓
0.672	✓

40 min

Worksheet 4: Graphical Peak Discharge method

Project Tallgrass East 3rd Add By CSB Date _____

Location _____ Checked BdB Date 8-8-89

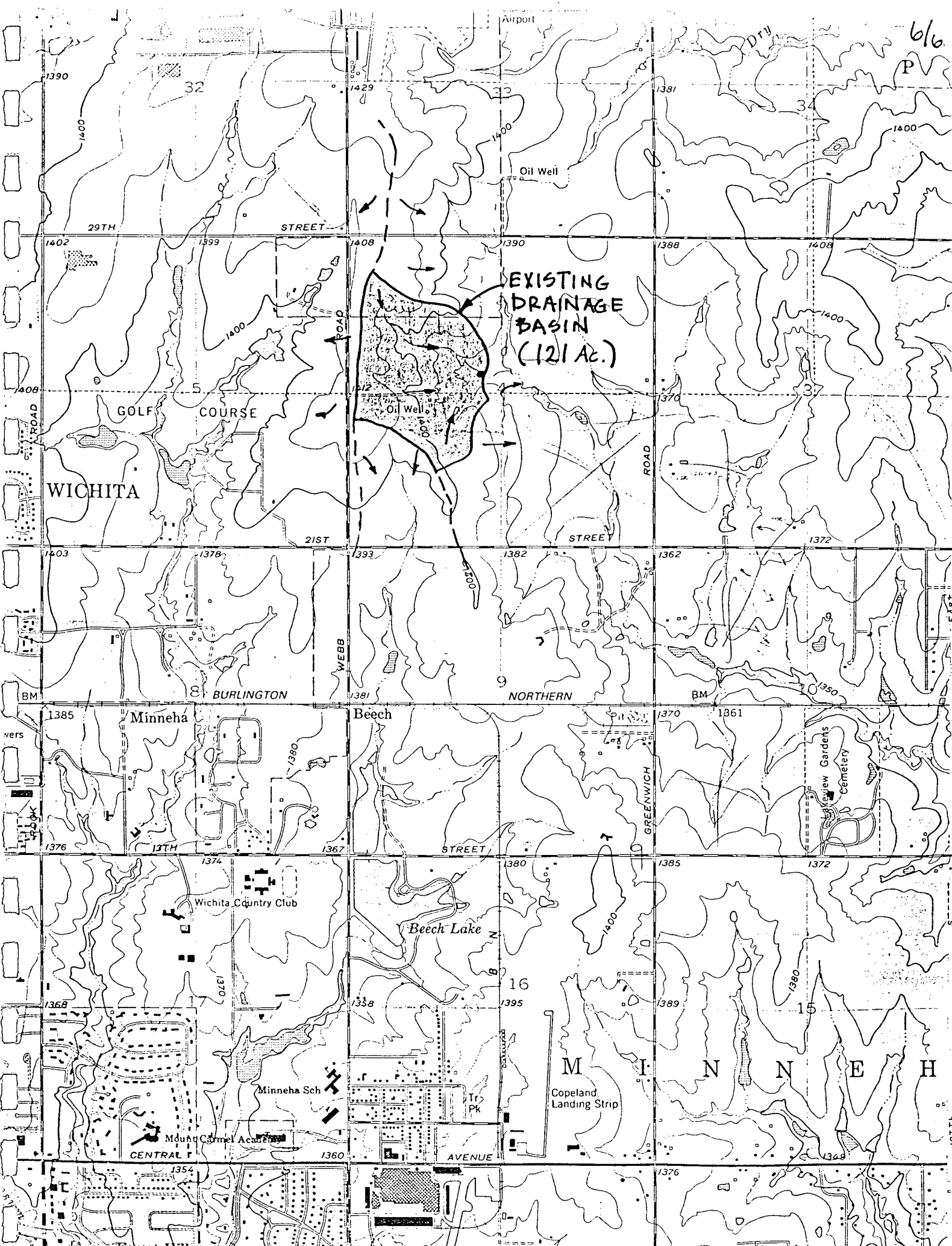
Circle one: Present Developed _____

1. Data:

Drainage area $A_m = \underline{0.1906}$ mi² (acres/640) 122Ac.
 Runoff curve number CN = 82 (From worksheet 2)
 Time of concentration .. $T_c = \underline{0.672}$ hr (From worksheet 3)
 Rainfall distribution type = II (I, IA, II, III)
 Pond and swamp areas spread throughout watershed = 0 percent of A_m (____ acres or mi² covered)

	Storm #1	Storm #2	Storm #3
2. Frequency yr	10	100	
3. Rainfall, P (24-hour) in	5.3	7.8	
4. Initial abstraction, I_a in (Use CN with table 4-1.)	0.439	0.439	
5. Compute I_a/P	0.083	0.056	
6. Unit peak discharge, q_u csm/in (Use T_c and I_a/P with exhibit 4- <u>II</u>)	450	450	
7. Runoff, Q in (From worksheet 2).	3.2	5.6	
8. Pond and swamp adjustment factor, F_p (Use percent pond and swamp area with table 4-2. Factor is 1.0 for zero percent pond and swamp area.)	1.0	1.0	
9. Peak discharge, q_p cfs (Where $q_p = q_u A_m Q F_p$)	274	480	

6/6
P



EXISTING
DRAINAGE
BASIN
(121 AC.)

WICHITA

GOLF COURSE

Minneha

Beech

Beech Lake

Minneha Sch

Mount Carmel Academy

Copeland
Landing Strip

Eastview Gardens
Cemetery

M I N N E H A

Worksheet 2: Runoff curve number and runoff

Project Tallgrass East 3rd Add By CSB Date 8-4-89
 Location 4.275.2E Checked BdB Date 8-8-89

Circle one: Present Developed

1. Runoff curve number (CN)

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN ^{1/}			Area <input checked="" type="checkbox"/> acres <input type="checkbox"/> mi ² <input type="checkbox"/> %	Product of CN x area
		Table 2-2	Fig. 2-3	Fig. 2-4		
D	Residential 1/4 Ac. Lots	87			58.8	5,115.6
B	Residential 1/4 Ac. Lots	75			10.6	795.0
D	Multi-Fam.	92			20.0	1,840.0
C	Multi-Fam.	85			4.9	416.5
D	Commercial	95			16.9	1,605.5
C	Commercial	94			11.0	1,034.0
D	Ag (Pasture) - Airport Prop.	89			3.8	338.2
C	Ag (Pasture) - Airport Prop.	86			2.0	172.0
B	Pond Area - Open Space	79			4.2	331.8
Totals =					132.2	11,648.6

^{1/} Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{11,648.6}{132.2} = 88.1$; Use CN = 88

2. Runoff

Frequency yr
 Rainfall, P (24-hour) in
 Runoff, Q in
 (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

Storm #1	Storm #2	Storm #3
10	100	
5.3	7.8	
3.9	6.4	

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Tallgrass East 3rd By CSB Date _____

Location A-276-2E Checked BdB Date _____

Circle one: Present Developed

Circle one: T_c T_t through subarea

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T _c only)	Segment ID		
1. Surface description (table 3-1)			
2. Manning's roughness coeff., n (table 3-1) ..			
3. Flow length, L (total L < 300 ft)	ft		
4. Two-yr 24-hr rainfall, P ₂	in		
5. Land slope, s	ft/ft		
6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T _t	hr		
		+	=

Shallow concentrated flow	Segment ID		
7. Surface description (paved or unpaved)			
8. Flow length, L	ft		
9. Watercourse slope, s	ft/ft		
10. Average velocity, V (figure 3-1)	ft/s		
11. $T_t = \frac{L}{3600 V}$ Compute T _t	hr		
		+	=

Channel flow	Segment ID		
12. Cross sectional flow area, a	ft ²		
13. Wetted perimeter, p _w	ft		
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r	ft		
15. Channel slope, s	ft/ft		
16. Manning's roughness coeff., n			
17. $v = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V	ft/s		
18. Flow length, L	ft		
19. $T_t = \frac{L}{3600 v}$ Compute T _t	hr		
		+	=

20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)

0.25 Assum
(15 min.)

3/22

Worksheet 4: Graphical Peak Discharge method

Project Tallgrass East 3rd Add By CSP Date 8.4.89

Location 4-27S-2E Checked BdB Date _____

Circle one: Present Developed

1. Data:

- Drainage area $A_m = \underline{0.207}$ mi^2 (acres/640)
- Runoff curve number CN = 88 (From worksheet 2)
- Time of concentration .. $T_c = \underline{0.25}$ hr (From worksheet 3)
- Rainfall distribution type = II (I, IA, II, III)
- Pond and swamp areas spread throughout watershed = 0 percent of A_m (____ acres or mi^2 covered)

2. Frequency yr

3. Rainfall, P (24-hour) in

4. Initial abstraction, I_a in
(Use CN with table 4-1.)

5. Compute I_a/P

6. Unit peak discharge, q_u csm/in
(Use T_c and I_a/P with exhibit 4-II)

7. Runoff, Q in
(From worksheet 2).

8. Pond and swamp adjustment factor, F_p
(Use percent pond and swamp area with table 4-2. Factor is 1.0 for zero percent pond and swamp area.)

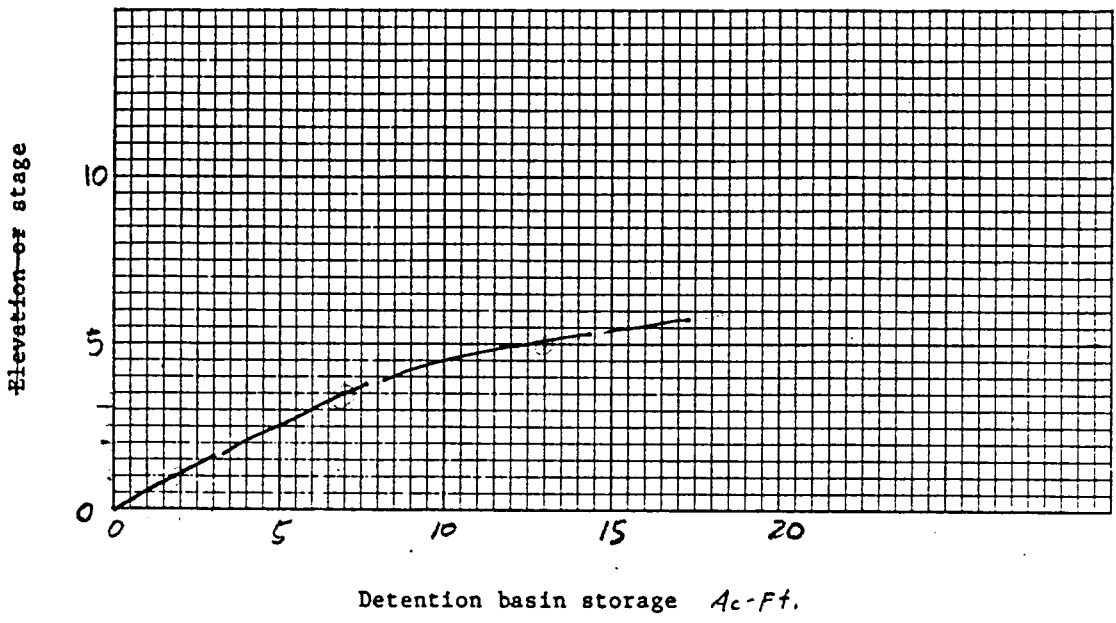
9. Peak discharge, q_p cfs
(Where $q_p = q_u A_m Q F_p$)

	Storm #1	Storm #2	Storm #3
2. Frequency	10	100	
3. Rainfall, P (24-hour)	5.3	7.8	
4. Initial abstraction, I_a	0.273	0.273	
5. Compute I_a/P	0.057	0.035	
6. Unit peak discharge, q_u	730	730	
7. Runoff, Q	3.9	6.4	
8. Pond and swamp adjustment factor, F_p	1.0	1.0	
9. Peak discharge, q_p	589	967	

6/22

Worksheet 6a: Detention basin storage, peak outflow discharge (q_0) known

Project Tollgrass East 3rd By CSM Date 8.4.89
 Location _____ Checked _____ Date _____
 Circle one: Present Developed



- | | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Data:
 Drainage area $A_m = \underline{0.207}$ mi²
 Rainfall distribution
 type (I, IA, II, III) = <u>II</u></p> | <p>6. $\frac{V_s}{V_r}$ 0.33 0.32
 (Use $\frac{q_0}{q_1}$ with figure 6-1)</p> | | |
| <table border="1" style="margin-left: auto; margin-right: auto; text-align: center;"> <tr> <td style="padding: 2px;">1st
stage</td> <td style="padding: 2px;">2nd
stage</td> </tr> </table> <p>2. Frequency yr 10 100</p> | 1st
stage | 2nd
stage | <p>7. Runoff, Q in 3.9 6.4
 (From worksheet 2)</p> |
| 1st
stage | 2nd
stage | | |
| <p>3. Peak inflow discharge, q_1 cfs 589 967
 (From worksheet 4 or 5b)</p> | <p>8. Runoff volume, V_r ac-ft 43.1 70.7
 ($V_r = QA_m 53.33$)</p> | | |
| <p>4. Peak outflow discharge, q_0 cfs 224 393
 ^{1/}</p> | <p>9. Storage volume, V_s ac-ft 14.2 22.6
 $(V_s = V_r (\frac{V_s}{V_r}))$</p> | | |
| <p>5. Compute $\frac{q_0}{q_1}$ 0.380 0.406</p> | <p>10. Maximum stage, E_{max} 5.3 7±
 (From plot)</p> | | |

^{1/} 2nd stage q_0 includes 1st stage q_0 .
 = Pre-Developed Q's ($\frac{99}{121}$) (pro-rate of area portion will be intercepted by K-96 + discharges downstream)

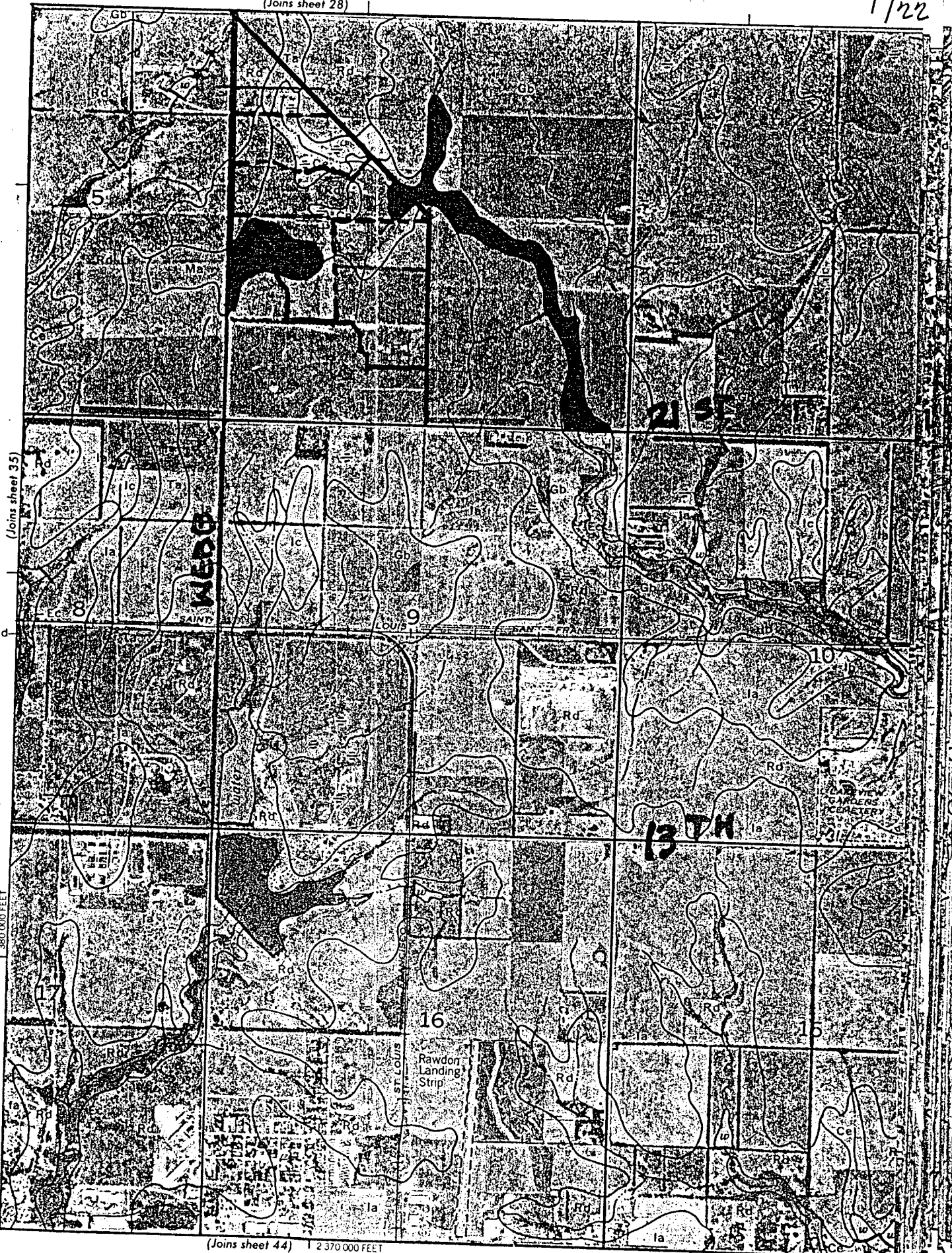
7/22

36

(Joins sheet 28)



1 Mile
5000 Feet

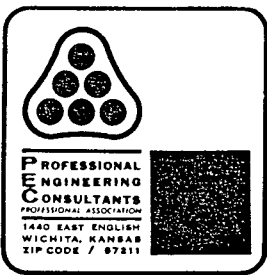


(Joins sheet 35)

Scale - 1:20000

380 000 FEET

(Joins sheet 44) 2 370 000 FEET

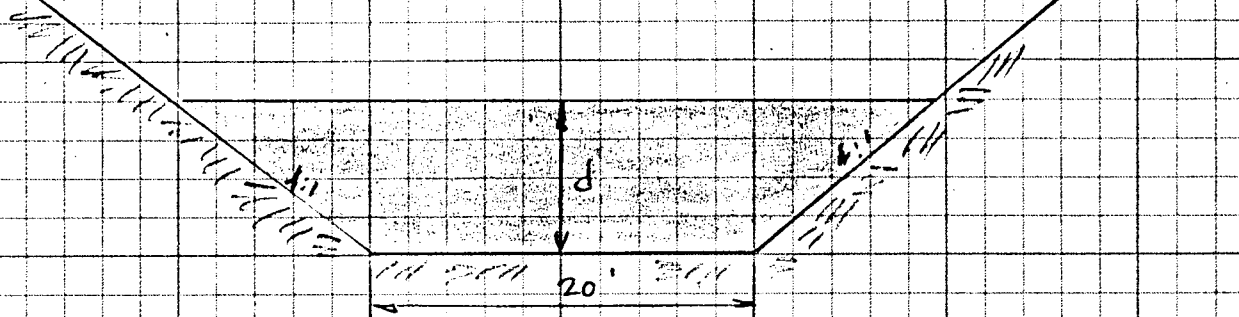


Date 8.11.89 Page 8 of 22

Project Tallgrass East 3rd Add

Item Drainage Point

Check Capacity of K-96 ditch
 & Determine Weir Elev.



$Q = 393$ cfs (outflow from pond)

$Q = \frac{1.486}{n} A R^{2/3} S^{1/2}$

$393 = \frac{1.486}{0.035} A R^{2/3} (0.007)^{1/2}$

$393 = 42.757 A R^{2/3} 0.0837$

$A R^{2/3} = 110.64$

<u>d</u>	<u>A</u>	<u>P</u>	<u>R</u>	<u>R^{2/3}</u>	<u>A R^{2/3}</u>
2.0'	56.00	36.49	1.535	1.330	74.50
2.5'	75.00	40.62	1.847	1.505	112.89 ← USE
2.4'	71.04	39.79	1.785	1.472	104.55

$d = 2.5'$ $V = Q/A = 393/75 = 5.24$ (OK - Riprap lined)

Weir Elev = $\#$ Ditch + 2.5' = 189.5 + 2.5 = 192.0

∴ Static Pool = 192.0



Date 8.7.89 Page 9 of 22

Project TGE 3rd.

Item STAGE-DISCHARGE

WEIR = 12'

WEIR = 20'

WEIR = 15'

$$Q = CLH^{3/2}$$

$$Q = 3.0 \times 12 \times H^{3/2}$$

$$Q = 36 H^{3/2}$$

$$Q = CLH^{3/2}$$

$$Q = 3.0 \times 20 \times H^{3/2}$$

$$Q = 60 H^{3/2}$$

$$Q = CLH^{1.5}$$

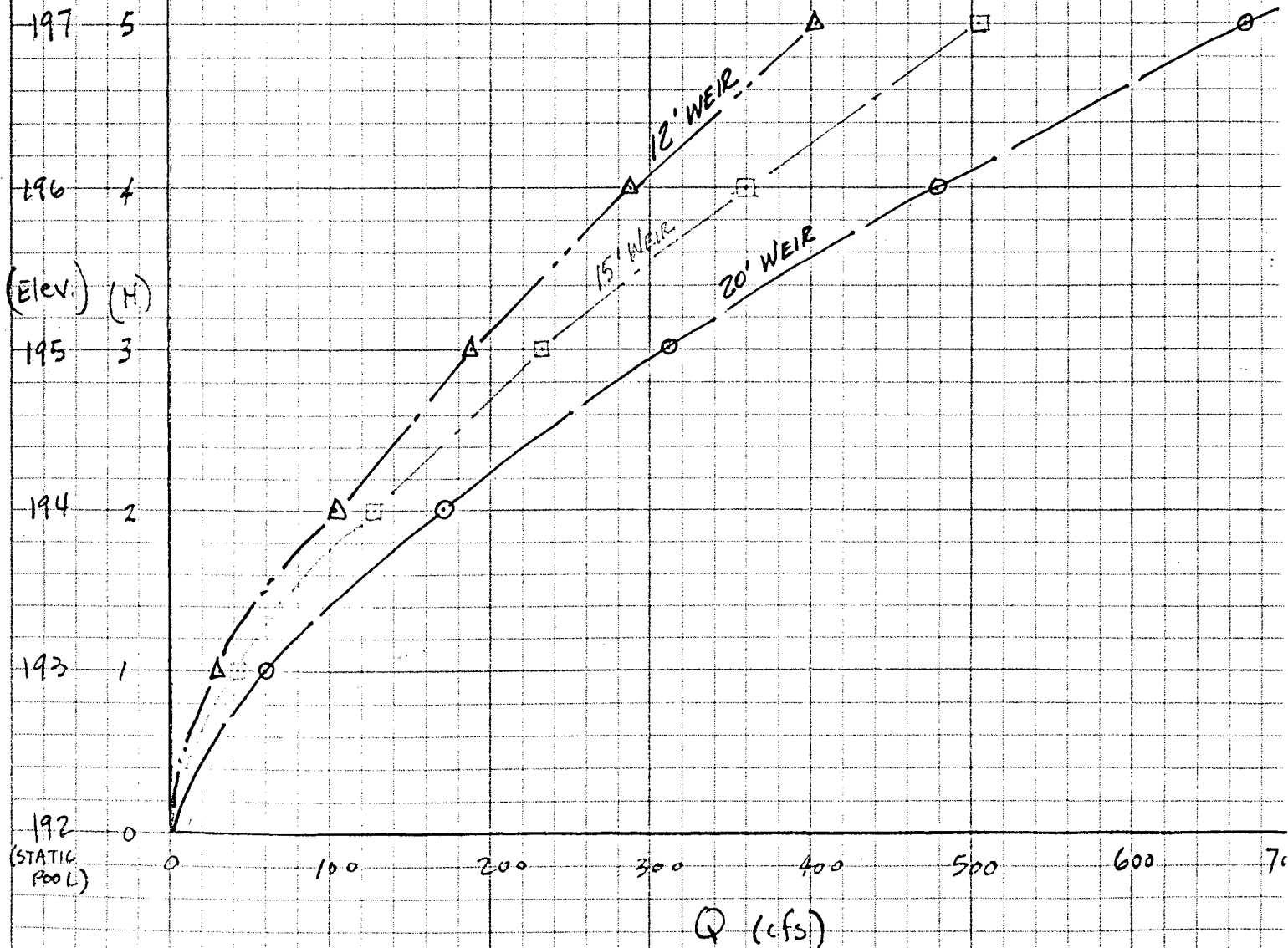
$$Q = 3.0 \times 15 \times H^{3/2}$$

$$Q = 45 H^{3/2}$$

H	Q
1.0	36
2.0	102
3.0	187
4.0	288
5.0	402

H	Q
1.0	60
2.0	170
3.0	312
4.0	480
5.0	671

H	Q
1.0	45
2.0	127
3.0	234
4.0	360
5.0	503





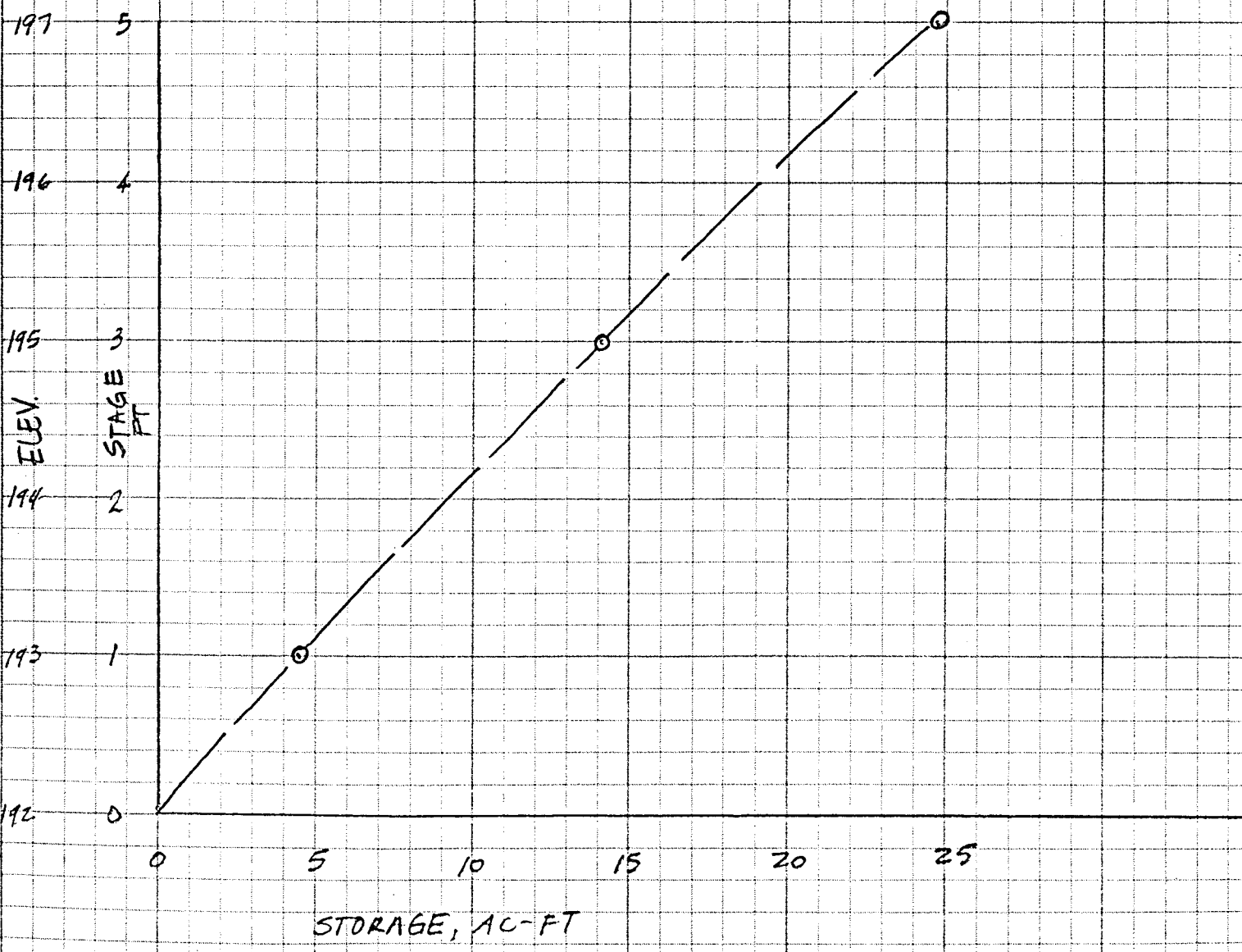
Date 8.11.89 Page 10 of 22

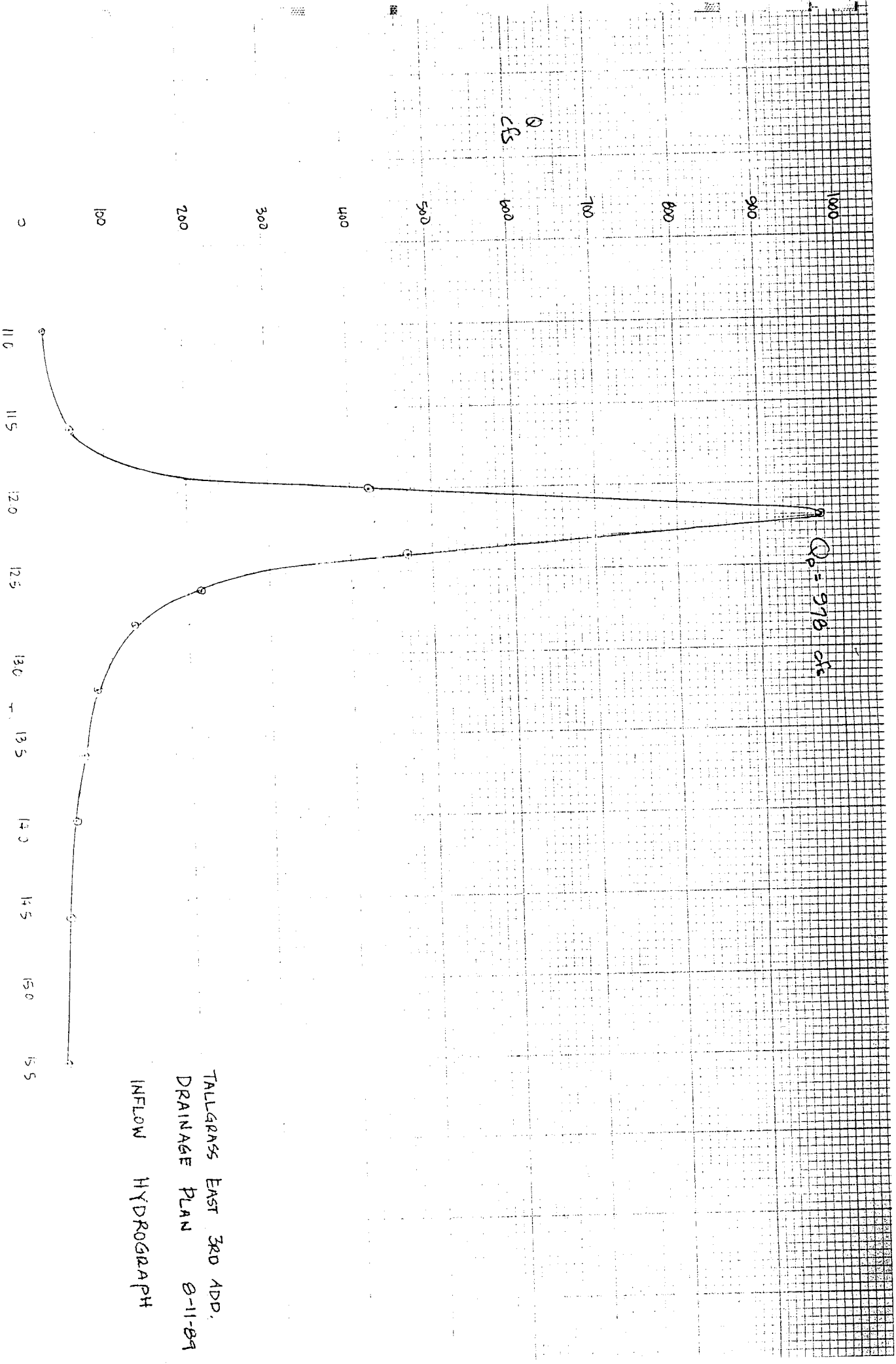
Project Tallgrass East 3rd Addition

Item Drainage Plan Detention Pond

Stage - Storage

	<u>ELEV</u>	<u>STAGE</u>	<u>AREA</u> <u>SF</u>	<u>AREA</u> <u>AC</u>	<u>Δ d</u> <u>FT</u>	<u>Δ Vol</u> <u>Ac-Ft</u>	<u>Σ Vol</u> <u>Ac-Ft</u>
STATIC POOL	192	0.0	188,620	4.33	0.0	0.0	0.0
	193	1.0	199,060	4.57	1.0	4.45	4.45
	195	3.0	220,420	5.06	2.0	9.62	14.07
	197	5.0	243,060	5.58	2.0	10.64	24.71





TALLGRASS EAST 3RD ADD.
 DRAINAGE PLAN 8-11-89
 INFLOW HYDROGRAPH

```
*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* FEBRUARY 1981
* REVISED 02 AUG 88
*
* RUN DATE 08/10/1989 TIME 18:54:41
*
*****
```

```
*****
*
* U.S. ARMY CORPS OF ENGINEERS
* THE HYDROLOGIC ENGINEERING CENTER
* 609 SECOND STREET
* DAVIS, CALIFORNIA 95616
* (916) 551-1748
*
*****
```

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X X XXXXXX XXXX X
X X X X X XX
X X X X X X
XXXXXX XXXX X XXXX X
X X X X X X
X X X X X X
X X XXXXXX XXXX XXX

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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE. THE DEFINITION OF -AMSK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
 NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
 DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
 KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

NOTE: AFTER COMPLETION OF THIS COMPUTER RUN,
 THE STATIC POOL WAS LOWERED FROM 193.0 TO 192.0
 ∴ DWS ALSO WAS REDUCED FROM 197.95 TO 196.95
 STORAGE REMAINED UNCHANGED
 DISCHARGE BASED ON 12' WEIR

12/22

HEC-1 INPUT

PAGE 1

```

LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
1         ID  TALLGRASS EAST 3RD ADD'N DRAINAGE PLAN
2         ID  PEC PROJECT NO 36-89294-2051
3         ID  STAGE STORAGE ANALYSIS --- 100 YR
4         ID  PROFESSIONAL ENGINEERING CONSULTANTS, P.A.
5         ID  COMPUTED BY M.W.BERRY, P.E. 08/10/89
6         ID  FILENAME="A:TGRASSE3.HEC"  DISKNAME="MWB01"

*** LIST ***

7         *DIAGRAM
8         IT  15 10AUG89  1000  0 10AUG89  1630
          IO   0   2   0

9         KK  INFLO  INFLOW HYDROGRAPH FOR DEVELOPED CONDITIONS
10        BA  0.207
11        IN  15 10AUG89  1045
12        QI  20   30   35   50   90  425  975  280  150  105
13        QI  80   70   60   55   50   47   44   41   39   38
14        QI  37   36   35   34

15        KK  POND1
16        RS  1   ELEV  193.0  0
17        SA  4.33  4.57  5.06  5.58
18        SE  193.0 194.0 196.0 198.0
19        SQ  0   36  102  187  288  402
20        SE  193.0 194.0 195.0 196.0 197.0 198.0
21        ZZ
    
```

13/22

SCHMATIC DIAGRAM OF STREAM NETWORK

INPUT			
LINE	(V) ROUTING	(-->)	DIVERSION OR PUMP FLOW
NO.	(.) CONNECTOR	(<--)	RETURN OF DIVERTED OR PUMPED FLOW
9	INFLO		
	V		
	V		
15	POND1		

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

14/22

```

*****
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* FEBRUARY 1981 *
* REVISED 02 AUG 88 *
* RUN DATE 08/10/1989 TIME 18:54:41 *
*****

```

```

*****
* U.S. ARMY CORPS OF ENGINEERS *
* THE HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET *
* DAVIS, CALIFORNIA 95616 *
* (916) 551-1748 *
*****

```

```

TALLGRASS EAST 3RD ADD'N DRAINAGE PLAN
PEC PROJECT NO 36-89294-2051
STAGE STORAGE ANALYSIS --- 100 YR
PROFESSIONAL ENGINEERING CONSULTANTS, P.A.
COMPUTED BY M.W.BERRY, P.E. 08/10/89
FILENAME="A:TGRASSE3.HEC" DISKNAME="MWB01"

```

```

8 IO OUTPUT CONTROL VARIABLES
   IPRNT 0 PRINT CONTROL
   IPLOT 2 PLOT CONTROL
   QSCAL 0. HYDROGRAPH PLOT SCALE

```

```

IT HYDROGRAPH TIME DATA
   NMIN 15 MINUTES IN COMPUTATION INTERVAL
   IDATE 10AUG89 STARTING DATE
   ITIME 1000 STARTING TIME
   NQ 27 NUMBER OF HYDROGRAPH ORDINATES
   NDDATE 10AUG89 ENDING DATE
   NDTIME 1630 ENDING TIME
   ICENT 19 CENTURY MARK

COMPUTATION INTERVAL .25 HOURS
TOTAL TIME BASE 6.50 HOURS

```

```

ENGLISH UNITS
DRAINAGE AREA SQUARE MILES
PRECIPITATION DEPTH INCHES
LENGTH, ELEVATION FEET
FLOW CUBIC FEET PER SECOND
STORAGE VOLUME ACRE-FEET
SURFACE AREA ACRES
TEMPERATURE DEGREES FAHRENHEIT

```

```

*****
* INFL * INFLOW HYDROGRAPH FOR DEVELOPED CONDITIONS
*****

```

```

11 IN TIME DATA FOR INPUT TIME SERIES
   JXMIN 15 TIME INTERVAL IN MINUTES
   JXDATE 10AUG89 STARTING DATE
   JXTIME 1045 STARTING TIME

```

SUBBASIN RUNOFF DATA

```

10 BA SUBBASIN CHARACTERISTICS
   TAREA .21 SUBBASIN AREA

```

HYDROGRAPH AT STATION INFLO

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
10	AUG	1000	1	20.	10	AUG	1145	8	90.	10	AUG	1330	15	70.	10	AUG	1515	22	39.
10	AUG	1015	2	20.	10	AUG	1200	9	425.	10	AUG	1345	16	60.	10	AUG	1530	23	38.

15/22

10 AUG 1030	3	20.	*	10 AUG 1215	10	975.	*	10 AUG 1400	17	55.	*	10 AUG 1545	24	37.
10 AUG 1045	4	20.	*	10 AUG 1230	11	280.	*	10 AUG 1415	18	50.	*	10 AUG 1600	25	36.
10 AUG 1100	5	30.	*	10 AUG 1245	12	150.	*	10 AUG 1430	19	47.	*	10 AUG 1615	26	35.
10 AUG 1115	6	35.	*	10 AUG 1300	13	105.	*	10 AUG 1445	20	44.	*	10 AUG 1630	27	34.
10 AUG 1130	7	50.	*	10 AUG 1315	14	80.	*	10 AUG 1500	21	41.	*			

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	6.50-HR
975.	2.25	117.	110.	110.	110.
		(INCHES) 5.276	5.351	5.351	5.351
		(AC-FT) 58.	59.	59.	59.
CUMULATIVE AREA =		.21 SQ MI			

16/22

		STATION INFLO												
		(0) OUTFLOW												
DAHRMN PER		0.	100.	200.	300.	400.	500.	600.	700.	800.	900.	1000.	0.	0.
101000	1.	0												
101015	2.	0												
101030	3.	0												
101045	4.	0												
101100	5.	0												
101115	6.	0												
101130	7.	0												
101145	8.	0												
101200	9.					0								
101215	10.											0		
101230	11.				0									
101245	12.			0										
101300	13.		0											
101315	14.		0											
101330	15.		0											
101345	16.		0											
101400	17.		0											
101415	18.		0											
101430	19.		0											
101445	20.		0											
101500	21.		0											
101515	22.		0											
101530	23.		0											
101545	24.		0											
101600	25.		0											
101615	26.		0											
101630	27.	0												

17/22

*** **

 * *
 15 KK * POND1 *
 * *

HYDROGRAPH ROUTING DATA

16 RS	STORAGE ROUTING					
	NSTPS	1	NUMBER OF SUBREACHES			
	ITYP		ELEV TYPE OF INITIAL CONDITION			
	RSVRC	193.00	INITIAL CONDITION			
	X	.00	WORKING R AND D COEFFICIENT			
17 SA	AREA	4.3	4.6	5.1	5.6	
18 SE	ELEVATION	193.00	194.00	196.00	198.00	
19 SQ	DISCHARGE	0.	36.	102.	187.	288. 402.
20 SE	ELEVATION	193.00	194.00	195.00	196.00	197.00 198.00

COMPUTED STORAGE-ELEVATION DATA

STORAGE	.00	4.45	14.08	24.71
ELEVATION	193.00	194.00	196.00	198.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	4.45	9.14	14.08	19.26	24.71
OUTFLOW	.00	36.00	102.00	187.00	288.00	402.00
ELEVATION	193.00	194.00	195.00	196.00	197.00	198.00

HYDROGRAPH AT STATION POND1

HYDROGRAPH AT STATION POND1																						

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE

10	AUG	1000	1	0.	.0	193.0	*	10	AUG	1215	10	270.	18.3	196.8	*	10	AUG	1430	19	83.	7.8	194.7
10	AUG	1015	2	3.	.4	193.1	*	10	AUG	1230	11	396.	24.4	197.9	*	10	AUG	1445	20	73.	7.1	194.6
10	AUG	1030	3	6.	.7	193.2	*	10	AUG	1245	12	332.	21.4	197.4	*	10	AUG	1500	21	66.	6.5	194.4
10	AUG	1045	4	8.	1.0	193.2	*	10	AUG	1300	13	261.	17.9	196.7	*	10	AUG	1515	22	59.	6.1	194.3
10	AUG	1100	5	11.	1.3	193.3	*	10	AUG	1315	14	204.	15.0	196.2	*	10	AUG	1530	23	54.	5.7	194.3
10	AUG	1115	6	14.	1.7	193.4	*	10	AUG	1330	15	164.	12.7	195.7	*	10	AUG	1545	24	50.	5.4	194.2
10	AUG	1130	7	18.	2.3	193.5	*	10	AUG	1345	16	134.	11.0	195.4	*	10	AUG	1600	25	46.	5.2	194.2
10	AUG	1145	8	26.	3.3	193.7	*	10	AUG	1400	17	111.	9.6	195.1	*	10	AUG	1615	26	44.	5.0	194.1
10	AUG	1200	9	79.	7.5	194.6	*	10	AUG	1415	18	95.	8.6	194.9	*	10	AUG	1630	27	41.	4.8	194.1

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	6.50-HR
+	(CFS)	(HR)				
+	396.	2.50	(CFS)			
			109.	101.	101.	101.
			(INCHES)	4.902	4.914	4.914
			(AC-FT)	54.	54.	54.
PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
			6-HR	24-HR	72-HR	6.50-HR
+	(AC-FT)	(HR)				
+	24.	2.50	9.	8.	8.	8.
PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	6.50-HR
+	(FEET)	(HR)				
+	197.95	2.50	194.85	194.71	194.71	194.71

18/22

CUMULATIVE AREA = .21 SQ MI

19/22

DAHRMN PER	(I) INFLOW, (O) OUTFLOW					STATION	POND1	(S) STORAGE				
	0.	200.	400.	600.	800.	1000.	0.	0.	0.	0.	0.	0.
	0.	0.	0.	0.	0.	0.	0.	10.	20.	30.	0.	0.
101000	10I	.	.	.	.	.	S	.	.	.	.	.
101015	20I	.	.	.	.	.	S	.	.	.	.	.
101030	30I	.	.	.	.	.	S	.	.	.	.	.
101045	40I	.	.	.	.	.	S	.	.	.	.	.
101100	5.0I	.	.	.	.	.	S	.	.	.	.	.
101115	6.0I	.	.	.	.	.	S	.	.	.	.	.
101130	7.0 I	.	.	.	.	.	S	.	.	.	.	.
101145	8.0 I	.	.	.	.	.	S	.	.	.	.	.
101200	9. 0	.	.	I	.	.	S	.	.	.	.	.
101215	10.	.	0	.	.	I.	.	S	.	.	.	.
101230	11.	.	I	0	.	.	.	S	.	.	S	.
101245	12.	.	I	0	.	.	.	S	.	.	.	.
101300	13. I	.	0	.	.	.	.	S	.	.	.	.
101315	14. I	0	.	.	.	.	.	S	.	.	.	.
101330	15. I	0	.	.	.	.	.	S	.	.	.	.
101345	16. I	0	.	.	.	.	.	S	.	.	.	.
101400	17. I	0	.	.	.	.	.	S	.	.	.	.
101415	18. I	0	.	.	.	.	.	S	.	.	.	.
101430	19. I	0	.	.	.	.	.	S	.	.	.	.
101445	20. I	0	.	.	.	.	.	S	.	.	.	.
101500	21. IO	.	.	.	.	.	S	.	.	.	.	.
101515	22. IO	.	.	.	.	.	S	.	.	.	.	.
101530	23. IO	.	.	.	.	.	S	.	.	.	.	.
101545	24. I	.	.	.	.	.	S	.	.	.	.	.
101600	25. I	.	.	.	.	.	S	.	.	.	.	.
101615	26. I	.	.	.	.	.	S	.	.	.	.	.
101630	27.-I	.	.	.	.	.	S	.	.	.	.	.

20/22

21/22

RUNOFF SUMMARY
 FLOW IN CUBIC FEET PER SECOND
 TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
				6-HOUR	24-HOUR	72-HOUR			
HYDROGRAPH AT									
+	INFLO	975.	2.25	117.	110.	110.	.21		
+	ROUTED TO								
+	POND1	396.	2.50	109.	101.	101.	.21		
								197.95	2.50

197.95
 196.95

*** NORMAL END OF HEC-1 ***

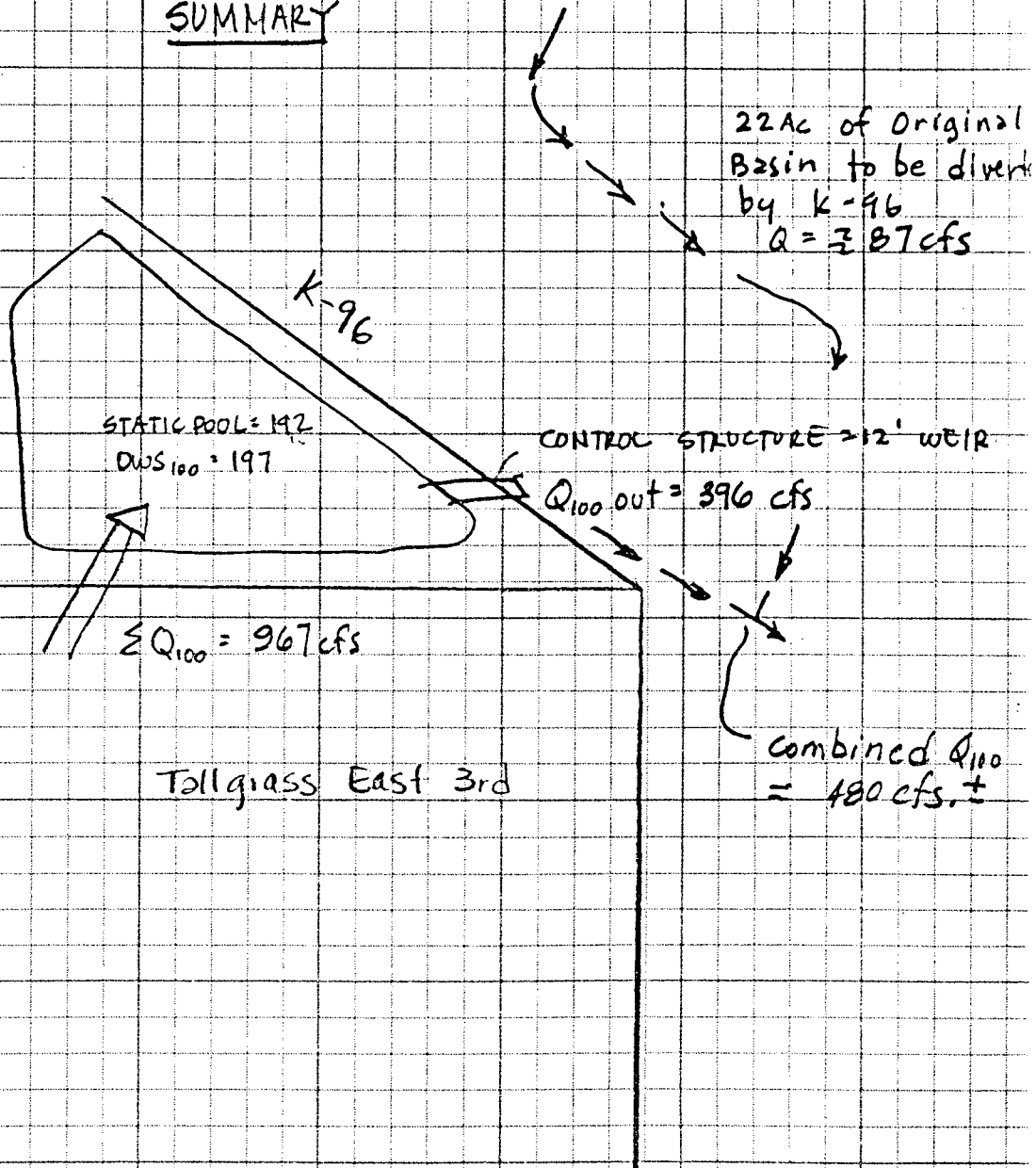


Date 8-11-89 Page 22 of 22

Project Tollgrass East 3rd Add.

Item Drainage Plan

SUMMARY



```

*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* FEBRUARY 1981 *
* REVISED 02 AUG 88 *
*
* RUN DATE 06/27/1994 TIME 08:42:51 *
*
*****

```

```

*****
*
* U.S. ARMY CORPS OF ENGINEERS *
* THE HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET *
* DAVIS, CALIFORNIA 95616 *
* (916) 551-1748 *
*
*****

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X X XXXXXX XXXX X
X X X X X XX
X X X X X
XXXXXX XXXX X XXXX X
X X X X X
X X X X X
X X XXXXXX XXXX XXX

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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
 THE DEFINITION OF -AMSK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
 NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
 DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
 KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE	(V) ROUTING	(--->) DIVERSION OR PUMP FLOW
NO.	(.) CONNECTOR	(<---) RETURN OF DIVERTED OR PUMPED FLOW
9	1 V	
19	POND1	

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```

*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* FEBRUARY 1981
* REVISED 02 AUG 88
*
* RUN DATE 06/27/1994 TIME 08:42:51
*
*****

```

```

*****
*
* U.S. ARMY CORPS OF ENGINEERS
* THE HYDROLOGIC ENGINEERING CENTER
* 609 SECOND STREET
* DAVIS, CALIFORNIA 95616
* (916) 551-1748
*
*****

```

DRAINAGE COMP FOR STORM WATER DRAIN NO 106
 KANSAS SURGERY & RECOVERY CENTER ADDITION
 PROFESSIONAL ENGINEERING CONSULTANTS, P. A.
 MWB 6/27/94

```

7 IO      OUTPUT CONTROL VARIABLES
          IPRNT      0 PRINT CONTROL
          IPLOT      0 PLOT CONTROL
          QSCAL      0. HYDROGRAPH PLOT SCALE

IT        HYDROGRAPH TIME DATA
          NMIN       6 MINUTES IN COMPUTATION INTERVAL
          IDATE      29SEP93 STARTING DATE
          ITIME      0600 STARTING TIME
          NQ         181 NUMBER OF HYDROGRAPH ORDINATES
          NDDATE     30SEP93 ENDING DATE
          NDTIME     0000 ENDING TIME
          ICENT      19 CENTURY MARK

          COMPUTATION INTERVAL .10 HOURS
          TOTAL TIME BASE 18.00 HOURS

```

```

ENGLISH UNITS
DRAINAGE AREA      SQUARE MILES
PRECIPITATION DEPTH INCHES
LENGTH, ELEVATION FEET
FLOW               CUBIC FEET PER SECOND
STORAGE VOLUME    ACRE-FEET
SURFACE AREA      ACRES
TEMPERATURE        DEGREES FAHRENHEIT

```

```

JP        MULTI-PLAN OPTION
          NPLAN      1 NUMBER OF PLANS

```

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JR        MULTI-RATIO OPTION
          RATIOS OF RUNOFF
          1.00

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*****
*
*
* 9 KK      1
*
*****

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*** **

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10 KP     PLAN 1 FOR STATION 1

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6 IN      TIME DATA FOR INPUT TIME SERIES
          JXMIN      30 TIME INTERVAL IN MINUTES
          JXDATE     29SEP93 STARTING DATE
          JXTIME     600 STARTING TIME

```

SUBBASIN RUNOFF DATA

```

11 BA     SUBBASIN CHARACTERISTICS
          TAREA      .21 SUBBASIN AREA

```

PRECIPITATION DATA

29 SEP 0924	35	.03	.02	.01	13.	*	29 SEP 1830	126	.02	.00	.01	20.
29 SEP 0930	36	.03	.02	.01	14.	*	29 SEP 1836	127	.02	.00	.01	20.
29 SEP 0936	37	.03	.02	.01	15.	*	29 SEP 1842	128	.02	.00	.01	20.
29 SEP 0942	38	.03	.02	.01	16.	*	29 SEP 1848	129	.02	.00	.01	20.
29 SEP 0948	39	.03	.02	.01	18.	*	29 SEP 1854	130	.02	.00	.01	20.
29 SEP 0954	40	.03	.02	.01	19.	*	29 SEP 1900	131	.02	.00	.01	20.
29 SEP 1000	41	.03	.02	.02	19.	*	29 SEP 1906	132	.02	.00	.01	20.
29 SEP 1006	42	.04	.02	.02	21.	*	29 SEP 1912	133	.02	.00	.01	20.
29 SEP 1012	43	.04	.02	.02	24.	*	29 SEP 1918	134	.02	.00	.01	20.
29 SEP 1018	44	.04	.02	.02	26.	*	29 SEP 1924	135	.02	.00	.01	20.
29 SEP 1024	45	.04	.02	.02	28.	*	29 SEP 1930	136	.02	.00	.01	20.
29 SEP 1030	46	.04	.02	.02	29.	*	29 SEP 1936	137	.02	.00	.01	20.
29 SEP 1036	47	.05	.02	.03	32.	*	29 SEP 1942	138	.02	.00	.01	20.
29 SEP 1042	48	.05	.02	.03	37.	*	29 SEP 1948	139	.02	.00	.01	20.
29 SEP 1048	49	.05	.02	.03	41.	*	29 SEP 1954	140	.02	.00	.01	20.
29 SEP 1054	50	.05	.02	.03	43.	*	29 SEP 2000	141	.02	.00	.01	20.
29 SEP 1100	51	.05	.02	.04	45.	*	29 SEP 2006	142	.01	.00	.01	19.
29 SEP 1106	52	.08	.03	.06	51.	*	29 SEP 2012	143	.01	.00	.01	16.
29 SEP 1112	53	.08	.02	.06	62.	*	29 SEP 2018	144	.01	.00	.01	14.
29 SEP 1118	54	.08	.02	.06	71.	*	29 SEP 2024	145	.01	.00	.01	14.
29 SEP 1124	55	.08	.02	.06	76.	*	29 SEP 2030	146	.01	.00	.01	13.
29 SEP 1130	56	.08	.02	.06	79.	*	29 SEP 2036	147	.01	.00	.01	13.
29 SEP 1136	57	.64	.12	.52	189.	*	29 SEP 2042	148	.01	.00	.01	13.
29 SEP 1142	58	.64	.08	.56	431.	*	29 SEP 2048	149	.01	.00	.01	13.
29 SEP 1148	59	.64	.06	.58	614.	*	29 SEP 2054	150	.01	.00	.01	13.
29 SEP 1154	60	.64	.05	.60	707.	*	29 SEP 2100	151	.01	.00	.01	13.
29 SEP 1200	61	.64	.04	.61	759.	*	29 SEP 2106	152	.01	.00	.01	13.
29 SEP 1206	62	.12	.01	.12	672.	*	29 SEP 2112	153	.01	.00	.01	13.
29 SEP 1212	63	.12	.01	.12	438.	*	29 SEP 2118	154	.01	.00	.01	13.
29 SEP 1218	64	.12	.01	.12	276.	*	29 SEP 2124	155	.01	.00	.01	13.
29 SEP 1224	65	.12	.01	.12	210.	*	29 SEP 2130	156	.01	.00	.01	13.
29 SEP 1230	66	.12	.01	.12	179.	*	29 SEP 2136	157	.01	.00	.01	13.
29 SEP 1236	67	.06	.00	.06	152.	*	29 SEP 2142	158	.01	.00	.01	13.
29 SEP 1242	68	.06	.00	.06	118.	*	29 SEP 2148	159	.01	.00	.01	13.
29 SEP 1248	69	.06	.00	.06	96.	*	29 SEP 2154	160	.01	.00	.01	13.
29 SEP 1254	70	.06	.00	.06	87.	*	29 SEP 2200	161	.01	.00	.01	13.
29 SEP 1300	71	.06	.00	.06	83.	*	29 SEP 2206	162	.01	.00	.01	13.
29 SEP 1306	72	.05	.00	.04	78.	*	29 SEP 2212	163	.01	.00	.01	13.
29 SEP 1312	73	.05	.00	.04	69.	*	29 SEP 2218	164	.01	.00	.01	13.
29 SEP 1318	74	.05	.00	.04	63.	*	29 SEP 2224	165	.01	.00	.01	13.
29 SEP 1324	75	.05	.00	.04	61.	*	29 SEP 2230	166	.01	.00	.01	13.
29 SEP 1330	76	.05	.00	.04	60.	*	29 SEP 2236	167	.01	.00	.01	13.
29 SEP 1336	77	.04	.00	.03	57.	*	29 SEP 2242	168	.01	.00	.01	13.
29 SEP 1342	78	.04	.00	.03	52.	*	29 SEP 2248	169	.01	.00	.01	13.
29 SEP 1348	79	.04	.00	.03	48.	*	29 SEP 2254	170	.01	.00	.01	13.
29 SEP 1354	80	.04	.00	.03	47.	*	29 SEP 2300	171	.01	.00	.01	13.
29 SEP 1400	81	.04	.00	.03	46.	*	29 SEP 2306	172	.01	.00	.01	13.
29 SEP 1406	82	.03	.00	.02	44.	*	29 SEP 2312	173	.01	.00	.01	13.
29 SEP 1412	83	.03	.00	.02	39.	*	29 SEP 2318	174	.01	.00	.01	13.
29 SEP 1418	84	.03	.00	.02	35.	*	29 SEP 2324	175	.01	.00	.01	13.
29 SEP 1424	85	.03	.00	.02	34.	*	29 SEP 2330	176	.01	.00	.01	13.
29 SEP 1430	86	.03	.00	.02	33.	*	29 SEP 2336	177	.01	.00	.01	13.
29 SEP 1436	87	.03	.00	.02	33.	*	29 SEP 2342	178	.01	.00	.01	13.
29 SEP 1442	88	.03	.00	.02	33.	*	29 SEP 2348	179	.01	.00	.01	13.
29 SEP 1448	89	.03	.00	.02	33.	*	29 SEP 2354	180	.01	.00	.01	13.
29 SEP 1454	90	.03	.00	.02	33.	*	30 SEP 0000	181	.01	.00	.01	13.
29 SEP 1500	91	.03	.00	.02	33.	*						

TOTAL RAINFALL = 7.80, TOTAL LOSS = 1.43, TOTAL EXCESS = 6.37

PEAK FLOW + (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	18.00-HR
		(CFS)			
+ 759.	6.00	116.	47.	47.	47.
		(INCHES)	5.201	6.352	6.352
		(AC-FT)	57.	70.	70.

CUMULATIVE AREA = .21 SQ MI

HYDROGRAPH AT STATION 1
PLAN 1, RATIO = 1.00

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*
29	SEP	0600	1	0.	*	29	SEP	1036	47	32.	*	29	SEP	1512	93	33.	*	29	SEP	1948	139	20.	*
29	SEP	0606	2	0.	*	29	SEP	1042	48	37.	*	29	SEP	1518	94	33.	*	29	SEP	1954	140	20.	*
29	SEP	0612	3	0.	*	29	SEP	1048	49	41.	*	29	SEP	1524	95	33.	*	29	SEP	2000	141	20.	*
29	SEP	0618	4	0.	*	29	SEP	1054	50	43.	*	29	SEP	1530	96	33.	*	29	SEP	2006	142	19.	*
29	SEP	0624	5	0.	*	29	SEP	1100	51	45.	*	29	SEP	1536	97	33.	*	29	SEP	2012	143	16.	*
29	SEP	0630	6	0.	*	29	SEP	1106	52	51.	*	29	SEP	1542	98	33.	*	29	SEP	2018	144	14.	*
29	SEP	0636	7	0.	*	29	SEP	1112	53	62.	*	29	SEP	1548	99	33.	*	29	SEP	2024	145	14.	*
29	SEP	0642	8	0.	*	29	SEP	1118	54	71.	*	29	SEP	1554	100	33.	*	29	SEP	2030	146	13.	*
29	SEP	0648	9	0.	*	29	SEP	1124	55	76.	*	29	SEP	1600	101	33.	*	29	SEP	2036	147	13.	*
29	SEP	0654	10	0.	*	29	SEP	1130	56	79.	*	29	SEP	1606	102	31.	*	29	SEP	2042	148	13.	*
29	SEP	0700	11	0.	*	29	SEP	1136	57	189.	*	29	SEP	1612	103	27.	*	29	SEP	2048	149	13.	*
29	SEP	0706	12	0.	*	29	SEP	1142	58	431.	*	29	SEP	1618	104	24.	*	29	SEP	2054	150	13.	*
29	SEP	0712	13	0.	*	29	SEP	1148	59	614.	*	29	SEP	1624	105	23.	*	29	SEP	2100	151	13.	*
29	SEP	0718	14	0.	*	29	SEP	1154	60	707.	*	29	SEP	1630	106	22.	*	29	SEP	2106	152	13.	*
29	SEP	0724	15	0.	*	29	SEP	1200	61	759.	*	29	SEP	1636	107	22.	*	29	SEP	2112	153	13.	*
29	SEP	0730	16	0.	*	29	SEP	1206	62	672.	*	29	SEP	1642	108	22.	*	29	SEP	2118	154	13.	*
29	SEP	0736	17	0.	*	29	SEP	1212	63	438.	*	29	SEP	1648	109	22.	*	29	SEP	2124	155	13.	*
29	SEP	0742	18	0.	*	29	SEP	1218	64	276.	*	29	SEP	1654	110	22.	*	29	SEP	2130	156	13.	*
29	SEP	0748	19	0.	*	29	SEP	1224	65	210.	*	29	SEP	1700	111	22.	*	29	SEP	2136	157	13.	*
29	SEP	0754	20	1.	*	29	SEP	1230	66	179.	*	29	SEP	1706	112	22.	*	29	SEP	2142	158	13.	*
29	SEP	0800	21	1.	*	29	SEP	1236	67	152.	*	29	SEP	1712	113	22.	*	29	SEP	2148	159	13.	*
29	SEP	0806	22	2.	*	29	SEP	1242	68	118.	*	29	SEP	1718	114	22.	*	29	SEP	2154	160	13.	*
29	SEP	0812	23	2.	*	29	SEP	1248	69	96.	*	29	SEP	1724	115	22.	*	29	SEP	2200	161	13.	*
29	SEP	0818	24	3.	*	29	SEP	1254	70	87.	*	29	SEP	1730	116	22.	*	29	SEP	2206	162	13.	*
29	SEP	0824	25	4.	*	29	SEP	1300	71	83.	*	29	SEP	1736	117	20.	*	29	SEP	2212	163	13.	*
29	SEP	0830	26	5.	*	29	SEP	1306	72	78.	*	29	SEP	1742	118	17.	*	29	SEP	2218	164	13.	*
29	SEP	0836	27	6.	*	29	SEP	1312	73	69.	*	29	SEP	1748	119	15.	*	29	SEP	2224	165	13.	*
29	SEP	0842	28	7.	*	29	SEP	1318	74	63.	*	29	SEP	1754	120	14.	*	29	SEP	2230	166	13.	*
29	SEP	0848	29	7.	*	29	SEP	1324	75	61.	*	29	SEP	1800	121	14.	*	29	SEP	2236	167	13.	*
29	SEP	0854	30	8.	*	29	SEP	1330	76	60.	*	29	SEP	1806	122	15.	*	29	SEP	2242	168	13.	*
29	SEP	0900	31	9.	*	29	SEP	1336	77	57.	*	29	SEP	1812	123	17.	*	29	SEP	2248	169	13.	*
29	SEP	0906	32	10.	*	29	SEP	1342	78	52.	*	29	SEP	1818	124	19.	*	29	SEP	2254	170	13.	*
29	SEP	0912	33	11.	*	29	SEP	1348	79	48.	*	29	SEP	1824	125	19.	*	29	SEP	2300	171	13.	*
29	SEP	0918	34	12.	*	29	SEP	1354	80	47.	*	29	SEP	1830	126	20.	*	29	SEP	2306	172	13.	*
29	SEP	0924	35	13.	*	29	SEP	1400	81	46.	*	29	SEP	1836	127	20.	*	29	SEP	2312	173	13.	*
29	SEP	0930	36	14.	*	29	SEP	1406	82	44.	*	29	SEP	1842	128	20.	*	29	SEP	2318	174	13.	*
29	SEP	0936	37	15.	*	29	SEP	1412	83	39.	*	29	SEP	1848	129	20.	*	29	SEP	2324	175	13.	*
29	SEP	0942	38	16.	*	29	SEP	1418	84	35.	*	29	SEP	1854	130	20.	*	29	SEP	2330	176	13.	*
29	SEP	0948	39	18.	*	29	SEP	1424	85	34.	*	29	SEP	1900	131	20.	*	29	SEP	2336	177	13.	*
29	SEP	0954	40	19.	*	29	SEP	1430	86	33.	*	29	SEP	1906	132	20.	*	29	SEP	2342	178	13.	*
29	SEP	1000	41	19.	*	29	SEP	1436	87	33.	*	29	SEP	1912	133	20.	*	29	SEP	2348	179	13.	*
29	SEP	1006	42	21.	*	29	SEP	1442	88	33.	*	29	SEP	1918	134	20.	*	29	SEP	2354	180	13.	*
29	SEP	1012	43	24.	*	29	SEP	1448	89	33.	*	29	SEP	1924	135	20.	*	30	SEP	0000	181	13.	*
29	SEP	1018	44	26.	*	29	SEP	1454	90	33.	*	29	SEP	1930	136	20.	*						*
29	SEP	1024	45	28.	*	29	SEP	1500	91	33.	*	29	SEP	1936	137	20.	*						*
29	SEP	1030	46	29.	*	29	SEP	1506	92	33.	*	29	SEP	1942	138	20.	*						*

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	18.00-HR
+	(CFS)				
+	759.	116.	47.	47.	47.
	(HR)				
	6.00	5.201	6.352	6.352	6.352
	(INCHES)				
	(AC-FT)	57.	70.	70.	70.

CUMULATIVE AREA = .21 SQ MI

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 19 KK * POND1 *
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20 KP PLAN 1 FOR STATION POND1
 HYDROGRAPH ROUTING DATA

21 RS	STORAGE ROUTING								
	NSTPS	1	NUMBER OF SUBREACHES						
	ITYP	ELEV	TYPE OF INITIAL CONDITION						
	RSVRIC	189.50	INITIAL CONDITION						
	X	.00	WORKING R AND D COEFFICIENT						
22 SA	AREA	.2	.6	1.3	2.2	3.5	4.7	5.7	6.4
23 SE	ELEVATION	190.00	191.00	192.00	193.00	194.00	195.00	196.00	197.00
24 SQ	DISCHARGE	20.	60.	100.	165.	240.	320.	390.	460.
25 SE	ELEVATION	190.00	191.00	192.00	193.00	194.00	195.00	196.00	197.00

COMPUTED STORAGE-ELEVATION DATA

STORAGE	.00	.37	1.26	2.97	5.81	9.91	15.13	21.21
ELEVATION	190.00	191.00	192.00	193.00	194.00	195.00	196.00	197.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.37	1.26	2.97	5.81	9.91	15.13	21.21
OUTFLOW	20.00	60.00	100.00	165.00	240.00	320.00	390.00	460.00
ELEVATION	190.00	191.00	192.00	193.00	194.00	195.00	196.00	197.00

HYDROGRAPH AT STATION POND1
PLAN 1, RATIO = 1.00

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
29	SEP	0600	1	20.	.0	190.0	29	SEP	1206	62	387.	14.9	196.0	29	SEP	1812	123	20.	-.1	190.0
29	SEP	0606	2	20.	-.1	190.0	29	SEP	1212	63	403.	16.2	196.2	29	SEP	1818	124	20.	-.1	190.0
29	SEP	0612	3	20.	-.1	190.0	29	SEP	1218	64	399.	15.9	196.1	29	SEP	1824	125	20.	-.1	190.0
29	SEP	0618	4	20.	-.1	190.0	29	SEP	1224	65	383.	14.6	195.9	29	SEP	1830	126	20.	-.1	190.0
29	SEP	0624	5	20.	-.1	190.0	29	SEP	1230	66	364.	13.2	195.6	29	SEP	1836	127	20.	-.1	190.0
29	SEP	0630	6	20.	-.1	190.0	29	SEP	1236	67	343.	11.6	195.3	29	SEP	1842	128	20.	-.1	190.0
29	SEP	0636	7	20.	-.1	190.0	29	SEP	1242	68	321.	10.0	195.0	29	SEP	1848	129	20.	-.1	190.0
29	SEP	0642	8	20.	-.1	190.0	29	SEP	1248	69	290.	8.4	194.6	29	SEP	1854	130	20.	-.1	190.0
29	SEP	0648	9	20.	-.1	190.0	29	SEP	1254	70	260.	6.8	194.2	29	SEP	1900	131	20.	-.1	190.0
29	SEP	0654	10	20.	-.1	190.0	29	SEP	1300	71	232.	5.5	193.9	29	SEP	1906	132	20.	-.1	190.0
29	SEP	0700	11	20.	-.1	190.0	29	SEP	1306	72	202.	4.4	193.5	29	SEP	1912	133	20.	-.1	190.0
29	SEP	0706	12	20.	-.1	190.0	29	SEP	1312	73	177.	3.4	193.2	29	SEP	1918	134	20.	-.1	190.0
29	SEP	0712	13	20.	-.1	190.0	29	SEP	1318	74	151.	2.6	192.8	29	SEP	1924	135	20.	-.1	190.0
29	SEP	0718	14	20.	-.1	190.0	29	SEP	1324	75	127.	2.0	192.4	29	SEP	1930	136	20.	-.1	190.0
29	SEP	0724	15	20.	-.1	190.0	29	SEP	1330	76	109.	1.5	192.1	29	SEP	1936	137	20.	-.1	190.0
29	SEP	0730	16	20.	-.1	190.0	29	SEP	1336	77	94.	1.1	191.9	29	SEP	1942	138	20.	-.1	190.0
29	SEP	0736	17	20.	-.1	190.0	29	SEP	1342	78	82.	.9	191.5	29	SEP	1948	139	20.	-.1	190.0
29	SEP	0742	18	20.	-.1	190.0	29	SEP	1348	79	72.	.6	191.3	29	SEP	1954	140	20.	-.1	190.0
29	SEP	0748	19	20.	-.1	190.0	29	SEP	1354	80	64.	.5	191.1	29	SEP	2000	141	20.	-.1	190.0
29	SEP	0754	20	20.	-.1	190.0	29	SEP	1400	81	58.	.3	190.9	29	SEP	2006	142	20.	-.1	190.0
29	SEP	0800	21	20.	-.1	190.0	29	SEP	1406	82	50.	.3	190.7	29	SEP	2012	143	20.	-.1	190.0
29	SEP	0806	22	20.	-.1	190.0	29	SEP	1412	83	45.	.2	190.6	29	SEP	2018	144	20.	-.1	190.0
29	SEP	0812	23	20.	-.1	190.0	29	SEP	1418	84	40.	.2	190.5	29	SEP	2024	145	20.	-.1	190.0
29	SEP	0818	24	20.	-.1	190.0	29	SEP	1424	85	37.	.2	190.4	29	SEP	2030	146	20.	-.1	190.0
29	SEP	0824	25	20.	-.1	190.0	29	SEP	1430	86	35.	.1	190.4	29	SEP	2036	147	20.	-.1	190.0
29	SEP	0830	26	20.	-.1	190.0	29	SEP	1436	87	34.	.1	190.3	29	SEP	2042	148	20.	-.1	190.0
29	SEP	0836	27	20.	-.1	190.0	29	SEP	1442	88	33.	.1	190.3	29	SEP	2048	149	20.	-.1	190.0
29	SEP	0842	28	20.	-.1	190.0	29	SEP	1448	89	33.	.1	190.3	29	SEP	2054	150	20.	-.1	190.0
29	SEP	0848	29	20.	-.1	190.0	29	SEP	1454	90	33.	.1	190.3	29	SEP	2100	151	20.	-.1	190.0
29	SEP	0854	30	20.	-.1	190.0	29	SEP	1500	91	33.	.1	190.3	29	SEP	2106	152	20.	-.1	190.0
29	SEP	0900	31	20.	-.1	190.0	29	SEP	1506	92	33.	.1	190.3	29	SEP	2112	153	20.	-.1	190.0
29	SEP	0906	32	20.	-.1	190.0	29	SEP	1512	93	33.	.1	190.3	29	SEP	2118	154	20.	-.1	190.0
29	SEP	0912	33	20.	-.1	190.0	29	SEP	1518	94	33.	.1	190.3	29	SEP	2124	155	20.	-.1	190.0
29	SEP	0918	34	20.	-.1	190.0	29	SEP	1524	95	33.	.1	190.3	29	SEP	2130	156	20.	-.1	190.0
29	SEP	0924	35	20.	-.1	190.0	29	SEP	1530	96	33.	.1	190.3	29	SEP	2136	157	20.	-.1	190.0
29	SEP	0930	36	20.	-.1	190.0	29	SEP	1536	97	33.	.1	190.3	29	SEP	2142	158	20.	-.1	190.0
29	SEP	0936	37	20.	-.1	190.0	29	SEP	1542	98	33.	.1	190.3	29	SEP	2148	159	20.	-.1	190.0
29	SEP	0942	38	20.	-.1	190.0	29	SEP	1548	99	33.	.1	190.3	29	SEP	2154	160	20.	-.1	190.0
29	SEP	0948	39	20.	-.1	190.0	29	SEP	1554	100	33.	.1	190.3	29	SEP	2200	161	20.	-.1	190.0
29	SEP	0954	40	20.	-.1	190.0	29	SEP	1600	101	33.	.1	190.3	29	SEP	2206	162	20.	-.1	190.0
29	SEP	1000	41	20.	-.1	190.0	29	SEP	1606	102	32.	.1	190.3	29	SEP	2212	163	20.	-.1	190.0
29	SEP	1006	42	20.	-.1	190.0	29	SEP	1612	103	30.	.1	190.3	29	SEP	2218	164	20.	-.1	190.0
29	SEP	1012	43	20.	-.1	190.0	29	SEP	1618	104	27.	.1	190.2	29	SEP	2224	165	20.	-.1	190.0
29	SEP	1018	44	20.	-.0	190.0	29	SEP	1624	105	25.	.0	190.1	29	SEP	2230	166	20.	-.1	190.0

29 SEP 1024	45	23.	.0	190.1	*	29 SEP 1630	106	24.	.0	190.1	*	29 SEP 2236	167	20.	-.1	190.0
29 SEP 1030	46	26.	.1	190.2	*	29 SEP 1636	107	23.	.0	190.1	*	29 SEP 2242	168	20.	-.1	190.0
29 SEP 1036	47	29.	.1	190.2	*	29 SEP 1642	108	22.	.0	190.1	*	29 SEP 2248	169	20.	-.1	190.0
29 SEP 1042	48	32.	.1	190.3	*	29 SEP 1648	109	22.	.0	190.1	*	29 SEP 2254	170	20.	-.1	190.0
29 SEP 1048	49	37.	.2	190.4	*	29 SEP 1654	110	22.	.0	190.1	*	29 SEP 2300	171	20.	-.1	190.0
29 SEP 1054	50	40.	.2	190.5	*	29 SEP 1700	111	22.	.0	190.1	*	29 SEP 2306	172	20.	-.1	190.0
29 SEP 1100	51	43.	.2	190.6	*	29 SEP 1706	112	22.	.0	190.1	*	29 SEP 2312	173	20.	-.1	190.0
29 SEP 1106	52	46.	.2	190.6	*	29 SEP 1712	113	22.	.0	190.1	*	29 SEP 2318	174	20.	-.1	190.0
29 SEP 1112	53	53.	.3	190.8	*	29 SEP 1718	114	22.	.0	190.1	*	29 SEP 2324	175	20.	-.1	190.0
29 SEP 1118	54	61.	.4	191.0	*	29 SEP 1724	115	22.	.0	190.1	*	29 SEP 2330	176	20.	-.1	190.0
29 SEP 1124	55	65.	.5	191.1	*	29 SEP 1730	116	22.	.0	190.1	*	29 SEP 2336	177	20.	-.1	190.0
29 SEP 1130	56	69.	.6	191.2	*	29 SEP 1736	117	22.	.0	190.0	*	29 SEP 2342	178	20.	-.1	190.0
29 SEP 1136	57	89.	1.0	191.7	*	29 SEP 1742	118	20.	.0	190.0	*	29 SEP 2348	179	20.	-.1	190.0
29 SEP 1142	58	151.	2.6	192.8	*	29 SEP 1748	119	20.	-.0	190.0	*	29 SEP 2354	180	20.	-.1	190.0
29 SEP 1148	59	228.	5.3	193.8	*	29 SEP 1754	120	20.	-.1	190.0	*	30 SEP 0000	181	20.	-.1	190.0
29 SEP 1154	60	295.	8.6	194.7	*	29 SEP 1800	121	20.	-.1	190.0	*					
29 SEP 1200	61	348.	12.0	195.4	*	29 SEP 1806	122	20.	-.1	190.0	*					

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	18.00-HR
+ (CFS)	(HR)				
+ 403.	6.20	116.	52.	52.	52.
	(CFS)				
	(INCHES)	5.196	7.016	7.016	7.016
	(AC-FT)	57.	77.	77.	77.
PEAK STORAGE		MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	18.00-HR
+ (AC-FT)	(HR)				
16.	6.20	3.	1.	1.	1.
PEAK STAGE		MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	18.00-HR
+ (FEET)	(HR)				
196.18	6.20	191.79	190.60	190.60	190.60
CUMULATIVE AREA =		.21 SQ MI			

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS	
				RATIO 1	
				1.00	
HYDROGRAPH AT					
+	1	.21	1	FLOW	759.
				TIME	6.00
ROUTED TO					
+	POND1	.21	1	FLOW	403.
				TIME	6.20
				** PEAK STAGES IN FEET **	
			1	STAGE	196.18
				TIME	6.20

*** NORMAL END OF HEC-1 ***