NORTHWEST CHRISTIAN CHURCH ADDITION
SEDGWICK COUNTY, KANSAS

HYDROLOGY EVALUATION

MOEHRING & ASSOCIATES
CONSULTING ENGINEERS
WICHITA
JUNE 1992

18 May 1992

NORTHWEST CHRISTIAN CHURCH ADDITION
DRAINAGE CONCEPT

The area being platted is located in the S.E. 1/4 of Section 6, Twp. 27 S., Rg. 1 W. of the 6th P.M., Sedgwick County, Kansas, lying North of 21st St. N., approximately 1/4 mile West of Maize Road.

Exclusive of 21st St. right-of-way, the area being platted and evaluated for changes in surface water run-off, is 10.0 acres.

Presently, the slope of this land is from West to East, and virtually 100% of the surface water run-off is toward privately held property, to the East. (See Preliminary Plat - Exhibit "A")

The South 265.11 feet of the property adjacent on the East, is Lot 4, Block 1 in Cranmer Addition. A small part of that Lot drains South to 21st St., and the remainder drains North and East, discharging into an existing drainage swale which lies North of, and generally parallel to, the North line of Lots 4, 3 and 2 in Block 1 of Cranmer Addition.

This drainage swale flows from West to East, and continues East through a platted drainage easement that is 65 feet in width and adjacent to the South line of Lot 1, Block 1 of Cranmer Addition. The swale eventually discharges into an existing 9'x 3' reinforced concrete box culvert under Maize Road.

While this drainage swale is not presently of major proportions, it does serve as the only positive drainage outlet for abutting lands, as well as the proposed plat to the West.

Presently, at the West end of the swale near the proposed plat of Northwest Christian Church Addition, the average bottom width of the swale is approximately 8 feet and only a foot in depth. The available gradient, over to the RCBC under Maize Rd., is 0.0014 ft/ft, resulting in a flow capacity of approximately 15 cubic feet per second.

Along the South property line of the land being platted, the present ground elevation is lower than the flow line elevation of the North ditch of 21st Street. Also, the back slope of the ditch was constructed to an elevation approximately two (2) feet higher than the ditch flowline, presumably to contain ditch flow within the R/W. For all practical purposes, this precludes surface water drainage from the property into the roadside ditch, under present conditions. It is not realistic to assume that storm water sewers will be available to this site within the foreseeable future, and this report will not evaluate the 2 yr. or 5 yr. rainfall event.

It does appear that on-site detention will be the most feasible method of controlling surface water runoff, especially with the limited existing channel capacity and gradients, downstream.

INITIAL DATA - The following basic data will be used for the analysis of 100 yr. peak discharge for both present and developed conditions.

The SCS Soils Maps for Sedgwick County, indicate the existence of the following hydrologic soil groups:

Vanoss (Vb)	- Group B -	6 Acres	= 60% of total area
Waurika (Wb)	- Group D -	3 Acres	= 30% of total area
Tabler (Ta)	- Group D -	1 Acre	= 10% of total area

Under present conditions the land use is agricultural, with all 10 Acres in small grain (wheat), straight row cultivation.

Under developed conditions, the land will be the site for a church, with attendant walks, paved parking and drives, covering a total of 4.71 Ac., upon full development. The balance of 5.29 acres, will be lawns. (See the enclosed Architectural Site Plan - Eshibit "B")

The peak discharge determinations will be by the Rational Method, utilizing the 100 yr. rainfall values and the corresponding 100 yr. Rational "C" values as contained in the City of Wichita "Drainage Policy".

Overland flow time will be calculated by the Kinematic Wave formula, and the shallow concentrated flow time will be determined by the SCS method as contained in TR-55.

The time of concentration (Tc) will be the sum of the overland flow time and the shallow concentrated flow time.

TIME OF CONCENTRATION - (Tc) - Pre-developed

OVERLAND FLOW TIME (To)

$$To = (0.93)\ L^{0.6} \times n^{0.6} / i^{0.4} \times S^{0.3} \quad \text{(Kinematic)}$$

Where, L = 585 ft.; n = 0.06; S = H/L = 3.1/585 = 0.0053
$L^{0.6} = 45.7397$; $n^{0.6} = 0.1849$; $S^{0.3} = 0.2076$

$$To = 37.8866 / i^{0.4}$$

Then, assume i = 6.9 in/hr in the above equation; and To = 17.5

From I-D-F table, for To = 17.5 ; i = 6.92 in/hr
(This is in close agreement with the assumed i)

Therefore; To = 17.5 minutes

SHALLOW CONCENTRATED FLOW (Tsc)

$V = 16.1345 \times S^{0.5}$ (Unpaved surfaces) per SCS TR-55

Where, $S = 0.001$; $S^{0.5} = 0.0316$

Then, V = 0.51 fps, over a flow length of 330 feet

and, Tsc = 330/ 0.51 x 60 = 10.8 minutes

Then, Tc = To + Tsc = 17.5 + 10.8 = 28.3 minutes

Use Tc = 28 minutes & i = 5.59 in/hr (100 yr)

WEIGHTED RATIONAL "C" VALUES - 100 yr. - Pre-developed

Area	HSG	Land Use	Rational "C"	% Total Area	Product (C x %)
6 Ac.	B	Cultivated, Wheat	.33	60	0.198
4 Ac.	D	Cultivated, Wheat	.59	40	0.236
				Total = Weighted "C" =	0.434

TIME OF CONCENTRATION - Tc - Post-Developed

The travel time for 50 feet of overland flow = 6 minutes.

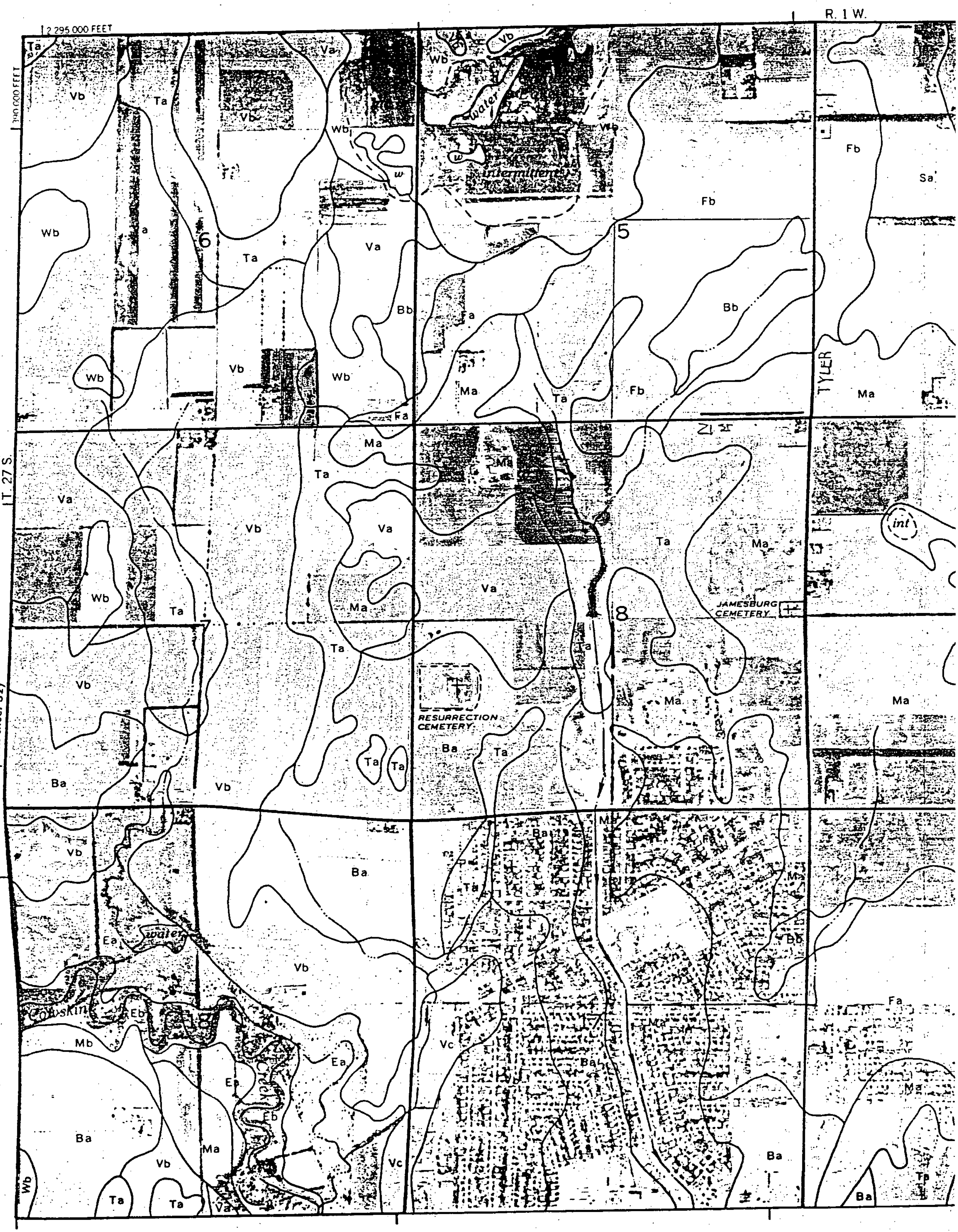
The proposed gradient for gutter flow = 0.34%, and with a flow depth of 6 inches, the velocity is 2.2 fps, over a flow length of 760 feet to a proposed detention basin, giving a travel time of 5.76 minutes.

The time of concentration is then 6 + 5.76 = 11.76 minutes . This is less than the minimum 15 minutes: Then, use Tc = 15 minutes, with i = 7.37 in/hr . (Post-Developed Conditions)

WEIGHTED RATIONAL "C" VALUES - 100 yr. - Post-Developed

Area	Land Use	Rational "C"	% Total Area	Product (C x %)
1.24 Ac.	Building Roof	.93	12.4	0.1153
3.47 Ac.	Paved & Walks	.89	34.7	0.3088
4.13 Ac.	Lawns - B Soil	.37	41.3	0.1528
1.16 Ac.	Lawns - D Soil	.63	11.6	0.0731
			Total = Weighted "C" =	0.6500

The following computer print out Pages C-1 and C-2 are computations of the Pre-Developed and Post-Developed Peak Discharges, determined by the Rational Method.


R. 1 W.
2 295 000 FEET
290 000 FEET
T. 27 S.
(Joins sheet 32)
6
5
8
water
intermittent
TYLER
JAMESBURG CEMETERY
RESURRECTION CEMETERY
Cowskin
Creek
int
Ta
Vb
Va
Wb
Fb
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Vc
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Quick TR-55 Ver.5.43 S/N:1240540379
Executed: 11:27:49 05-30-1992

NORTHWEST CHRISTIAN CHURCH
PRE-DEVELOPED CONDITIONS

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 100 years
'C' adjustment, k = 1
Adj. 'C' = Wtd.'C' x 1

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
SM GRAIN "B"								
	0.330	6.00						
SM GRAIN "D"								
	0.590	4.00						
			25.80	0.434	0.434	5.820	10.00	25.26

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NORTHWEST CHRISTIAN CHURCH
POST-DEVELOPED CONDITIONS

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 100 years
'C' adjustment, k = 1
Adj. 'C' = Wtd.'C' x 1

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
PAVED	0.890	3.47						
LAWN "B"	0.370	4.13						
LAWN "D"	0.630	1.16						
BLDG ROOF	0.930	1.24						
			15.00	0.650	0.650	7.370	10.00	47.91

From the preceding calculations, it can be seen that the Post-developed peak discharge will be approximately 190% greater than for existing conditions of runoff. To reduce the Post-Developed runoff to less than that for existing conditions, we have outlined a potential detention pond, from which available storage can be determined.

On the enclosed Architectural Site Plan, we have indicated tentative spot elevations to establish a finished floor elevation for the building, and also to indicate a possible grading plan for the paved drives and parking areas that will convey runoff to a proposed detention pond. To minimize fill requirements, the gradients used for the grading plan of the paved areas are 0.34% which are minimal, and will require the use of curb & gutter and valley gutter sections.

These elevations are subject to modifications at the time of preparation of construction plans for the various development phases as the Church grows, but in any case, the ability to successfully convey surface water runoff from the impervious surfaces to the detention facility is essential to this or any future grading plan.

From the rough grading plan, it becomes apparent that a large amount of "fill" will be required for site development, and since the cost of fill material produced off-site and hauled-in is 3 to 5 times greater than for fill material produced on-site, the detention pond as proposed will be larger than necessary to reduce runoff to that of existing conditions.

COMPUTATION PROCEDURE -

A. - The first evaluation of the proposed detention pond will estimate the required storage, for a given allowable peak outflow, by overlaying an approximated outflow hydrograph with a Modified (Rational) inflow hydrograph, and computing the area (volume) formed between the two curves. The approximated outflow peaks at the point where it crosses the recession leg on the hydrograph computed for *storm duration, Td.* The program converges within +/- one minute of the storm duration that results in the maximum required storage for the given allowable peak outflow

The following computer page C-3 is the graphical summary for the maximum required storage, estimated by this program to be 1.054 Ac.-ft., with a storm duration of 54 minutes. The hydrograph for the 100 yr. is computed and is displayed on Page C-4.

Page C-5 is the pond volume determination, based upon a planimeter survey of the proposed detention pond. Pages C-6, C-7 and C-8 are computations to produce a rating table for the pond outlet structure, assumed to be 1 - 15" R.C.P., and Page C-9 is the computation of an outflow rating table from preceding files.

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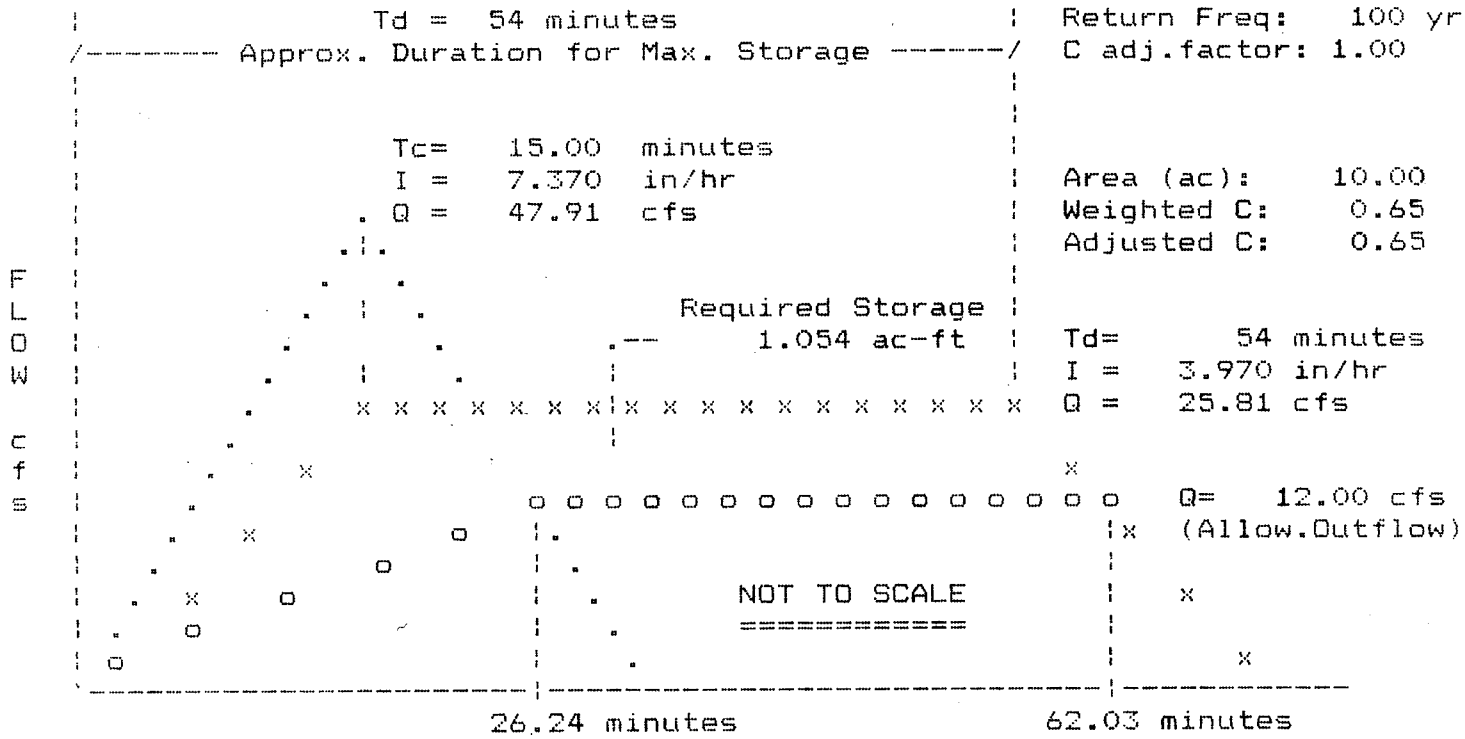
MODIFIED RATIONAL METHOD
----- Graphical Summary for Maximum Required Storage ----

First peak outflow point assumed to occur at Tc hydrograph recession leg.

NORTHWEST CHRISTIAN CHURCH
POST-DEVELOPED CONDITIONS

RETURN FREQUENCY: 100 yr	Allowable Outflow: 12.00 cfs
'C' Adjustment: 1.000	Required Storage: 1.054 ac-ft
Peak Inflow: 25.81 cfs	Inflow .HYD stored: CHURC100.HYD



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NORTHWEST CHRISTIAN CHURCH
POST-DEVELOPED CONDITIONS

**** Modified Rational Hydrograph *****
Weighted C = 0.650 Area= 10.000 acres Tc = 15.00 minutes

Adjusted C = 0.650 Td= 54.00 min. I= 3.97 in/hr Qp= 25.81 cfs

RETURN FREQUENCY: 100 year storm Adj.factor = 1.00
Output file: CHURC100.HYD

HYDROGRAPH FOR MAXIMUM STORAGE
For the 100 Year Storm

Time Hours	Time increment = 0.283 Hours Time on left represents time for first Q in each row.				
0.250	25.81	25.81	25.81	5.16	0.00

POND-2 Version: 5.14
S/N: 1220510530

NORTHWEST CHRISTIAN CHURCH
POND VOLUMES

CALCULATED 05-30-1992 11:30:46
DISK FILE: C:\PONDPACK\CHURCH .VOL

Planimeter scale: 1 inch = 100 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	* Volume (acre-ft)	Volume Sum (acre-ft)
48.40	3.59	0.82	0.00	0.00	0.00
49.00	3.78	0.87	2.54	0.51	0.51
50.00	4.10	0.94	2.71	0.90	1.41
51.00	4.43	1.02	2.93	0.98	2.39
52.00	4.77	1.10	3.17	1.06	3.45
		Elevations With Areas Interpolated From The Closest Two Planimeter Readings			
50.50	-----	0.98	2.88	0.48	1.89
50.60	-----	0.99	2.89	0.58	1.99
50.70	-----	0.99	2.90	0.68	2.09
50.72	-----	0.99	2.90	0.70	2.11
50.75	-----	1.00	2.91	0.73	2.14

$$IA = (sq.rt(Area1) + ((Ei-E1)/(E2-E1))*(sq.rt(Area2)-sq.rt(Area1)))^2$$

where: E1, E2 = Closest two elevations with planimeter data
Ei = Elevation at which to interpolate area
Area1,Area2 = Areas computed for E1, E2, respectively
IA = Interpolated area for Ei

* Incremental volume computed by the Conic Method for Reservoir Volumes.

$$Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))$$

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

Outlet Structure File: CHURCH .STR

POND-2 Version: 5.14 S/N: 1220510530
Date Executed: Time Executed:

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NORTHWEST CHRISTIAN CHURCH
STRUCTURE ANALYSIS USING 1-15" RCP

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>>>>>> Structure No. 1 <<<<<<
(Input Data)

CULVERT-CR
Circular Culvert (With Inlet Control)

E1 elev.(ft)?	48.4
E2 elev.(ft)?	52.001
Diam. (ft)?	1.25
Inv. el.(ft)?	48.40
Slope (ft/ft)?	0.004
T1 ratio?	
T2 ratio?	
K Coeff.?	0.0098
M Coeff.?	2.0
c Coeff.?	0.0398
Y Coeff.?	0.67
Form 1 or 2?	1
Slope factor?	-0.5

Outlet Structure File: CHURCH .STR

POND-2 Version: 5.14 S/N: 1220510530
Date Executed: Time Executed:

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NORTHWEST CHRISTIAN CHURCH
STRUCTURE ANALYSIS USING 1-15" RCP

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Outflow Rating Table for Structure #1
CULVERT-CR Circular Culvert (With Inlet Control)

***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation Messages
48.40	0.0	No headwater
48.90	0.9	Equ.1: HW =.5 dc=.361 Ac=.294
49.40	2.9	Equ.1: HW =1.0 dc=.68 Ac=.682
49.90	5.0	Transition: HW =1.5
50.40	6.6	Submerged: HW =2.0
50.72	7.5	Submerged: HW =2.32
50.90	7.9	Submerged: HW =2.5
51.40	9.1	Submerged: HW =3.0
51.90	10.0	Submerged: HW =3.5
52.00	10.2	Submerged: HW =3.6

Used Unsubmerged Equ. Form (1) for elev. less than 49.85 ft.
Used Submerged Equation for elevations greater than 50.03 ft
HW=Headwater (ft) dc=Critical depth (ft) Ac=Area (sq.ft) at dc

Transition flows interpolated from the following values:
E1=49.85 ft; Q1=4.8 cfs; Dc=.89 ft; E2=50.03 ft; Q2=5.49 cfs

Outlet Structure File: CHURCH .STR

POND-2 Version: 5.14 S/N: 1220510530
Date Executed: Time Executed:

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NORTHWEST CHRISTIAN CHURCH
STRUCTURE ANALYSIS USING 1-15" RCP

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***** COMPOSITE OUTFLOW SUMMARY ****

Elevation (ft)	Q (cfs)	Contributing Structures
48.40	0.0	1
48.90	0.9	1
49.40	2.9	1
49.90	5.0	1
50.40	6.6	1
50.72	7.5	1
50.90	7.9	1
51.40	9.1	1
51.90	10.0	1
52.00	10.2	1

Outlet Structure File: CHURCH .STR

POND-2 Version: 5.14 S/N: 1220510530
Date Executed: Time Executed:

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NORTHWEST CHRISTIAN CHURCH
STRUCTURE ANALYSIS USING 1-15" RCP

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Outlet Structure File: C:\PONDPACK\CHURCH .STR
Planimeter Input File: C:\PONDPACK\CHURCH .VOL
Rating Table Output File: C:\PONDPACK\CHURCH .PND

Min. Elev.(ft) = 48.4 Max. Elev.(ft) = 52 Incr.(ft) = .5

Additional elevations (ft) to be included in table:
* *
50.72

****
SYSTEM CONNECTIVITY
****

Structure	No.	Q Table		Q Table
CULVERT-CR	1		->	1

Outflow rating table summary was stored in file:
C:\PONDPACK\CHURCH .PND

Computer Pages C-10 thru C-12, are the computations routing the inflow hydrograph through the pond and outlet structure to determine the peak outflow, peak elevation and corresponding storage requirements. Page C-13 is a graphic representation of the routing.

By this method, the summary of routing computations is as follows:

Peak Inflow	= 25.81 cfs
Peak Outflow	= 5.20 cfs
Peak Elevation	= 49.96 ft
Max.Req'd Storage	= 1.38 Ac.-Ft.

To confirm these results, an alternate method will be evaluated.

This method computes an inflow hydrograph by using a dimensionless hydrograph template which has values for T/Tc vs. Q/Qp. The ratios of T/Tc and Q/Qp are based upon the S.C.S Ratios contained in Table 3-7, Pg. 3-45, in Manual # 1, per City of Wichita "Drainage Policy", and were entered into the "Q/Qp HYDROGRAPH" program.

Computer Page C-14 introduces Rational Method computations into the program and computes hydrograph ordinates on Page C-15. The graphic plot of the Q/Qp Inflow Hydrograph is on Page C-16

Computer print out Pages C-17 thru C-19, are computations routing the Q/Qp inflow hydrograph through the pond and outlet structure, to determine the peak outflow, peak elevation and corresponding storage volume. Page C-20 is the graphic representation of the flood routing.

By this method, the summary of routing computations is as follows:

Peak Inflow	= 47.91 cfs
Peak Outflow	= 4.17 cfs
Peak Elevation	= 49.70 ft.
Max. Req'd. Storage	= 1.14 Ac. Ft

SUMMARY -

The results obtained by the two different methods of evaluating the outflow and storage requirements for the proposed detention pond, are in very close agreement. Using the larger value of 5.20 cfs as the peak outflow for the 100 yr. event, this amounts to only 82% of the peak discharge for the 2 yr. event, under pre-developed conditions.

From this evaluation, it is apparent that a very substantial reduction in runoff can be achieved by the construction of detention facilities as proposed by this study. The proposed improvement would also prove beneficial to the lands downstream, particularly in light of the limited capacity of the existing drainage outlet.

Particularly with the need for a large volume of "fill" material, that will be required for site development, serious consideration should be given to the construction of this detention facility as a combination detention/retention pond.

Respectfully Submitted,

MOEHRING & ASSOCIATES
CONSULTING ENGINEERS

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* NORTHWEST CHRISTIAN CHURCH *
* STRUCTURE ANALYSIS USING 1-15" RCP *
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Inflow Hydrograph: C:\PONDPACK\CHURC100.HYD
Rating Table file: C:\PONDPACK\CHURCH .PND

----INITIAL CONDITIONS----
Elevation = 48.40 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)
48.40	0.0	0.000
48.90	0.9	0.421
49.40	2.9	0.860
49.90	5.0	1.318
50.40	6.6	1.794
50.72	7.5	2.108
50.90	7.9	2.289
51.40	9.1	2.803
51.90	10.0	3.336
52.00	10.2	3.445

INTERMEDIATE ROUTING COMPUTATIONS

2S/t (cfs)	2S/t + O (cfs)
0.0	0.0
36.0	36.9
73.5	76.4
112.6	117.6
153.2	159.8
180.1	187.6
195.5	203.4
239.4	248.5
285.0	295.0
294.3	304.5

Time increment (t) = 0.283 hrs.

POND-2 Version: 5.14 S/N: 1220510530
EXECUTED: 05-30-1992 11:33:41

Pond File: C:\PONDPACK\CHURCH .PND
Inflow Hydrograph: C:\PONDPACK\CHURC100.HYD
Outflow Hydrograph: C:\PONDPACK\OUT .HYD

INFLOW HYDROGRAPH

TIME (hrs)	INFLOW (cfs)
0.250	25.81
0.533	25.81
0.817	25.81
1.100	5.16
1.383	0.00

ROUTING COMPUTATIONS

I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
-----	0.0	0.0	0.00	48.40
51.6	48.3	51.6	1.65	49.09
51.6	91.7	99.9	4.10	49.69
31.0	112.3	122.7	5.20	49.96
5.2	107.5	117.5	5.00	49.90

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: C:\PONDPACK\CHURCH .PND
Inflow Hydrograph: C:\PONDPACK\CHURC100.HYD
Outflow Hydrograph: C:\PONDPACK\OUT .HYD

Starting Pond W.S. Elevation = 48.40 ft

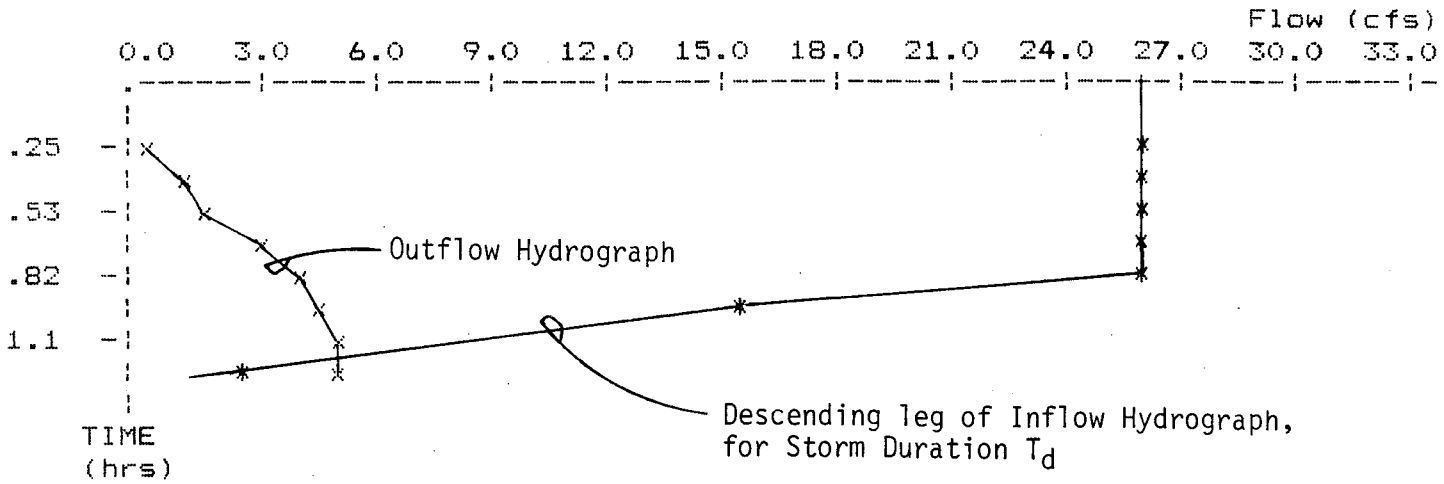
***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow	=	25.81 cfs
Peak Outflow	=	5.20 cfs
Peak Elevation	=	49.96 ft

***** Summary of Approximate Peak Storage *****

Initial Storage	=	0.00 ac-ft
Peak Storage From Storm	=	1.38 ac-ft
Total Storage in Pond	=	1.38 ac-ft

Warning: Inflow hydrograph truncated on left side.



* File: C:\PONDPACK\CHURC100.HYD Qmax = 25.8 cfs
× File: C:\PONDPACK\OUT .HYD Qmax = 5.2 cfs

NORTHWEST CHRISTIAN CHURCH
Q/QP HYDROGRAPH
POST DEVELOPED CONDITIONS

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 100 years
'C' adjustment, k = 1
Adj. 'C' = Wtd.'C' x 1

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
PAVED	0.890	3.47						
LAWN "B"	0.370	4.13						
LAWN "D"	0.630	1.16						
BLDG ROOF	0.930	1.24						
			15.00	0.650	0.650	7.370	10.00	47.91

Quick TR-55 Ver.5.43 S/N:1240540379
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NORTHWEST CHRISTIAN CHURCH
Q/QP HYDROGRAPH
POST DEVELOPED CONDITIONS

**** Rational Method Hydrograph Using Q/Qp Template *****
Weighted C = 0.650 Area= 10.000 acres Tc = 15.00 minutes

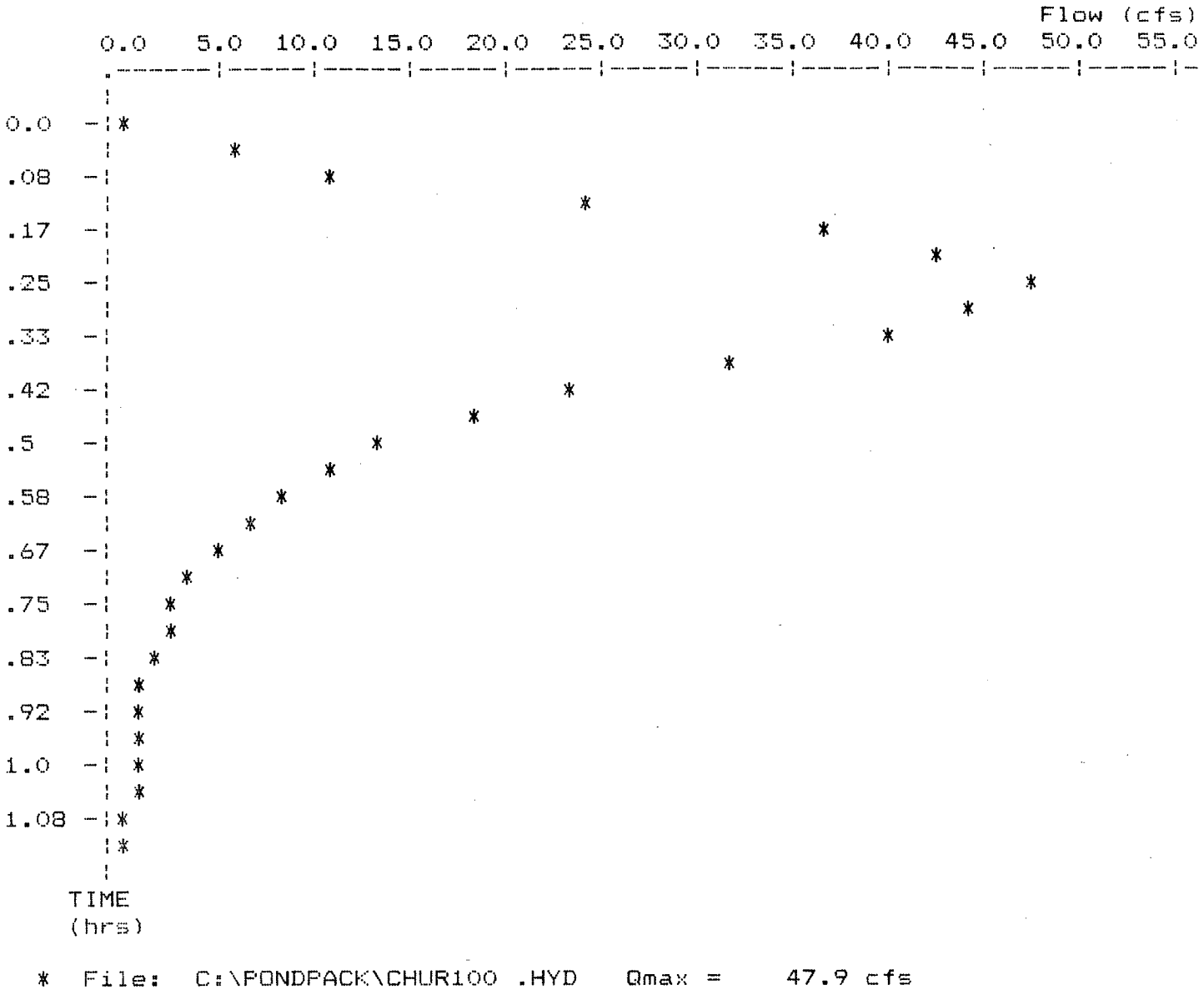
Adjusted C = 0.650 Tc= 15.00 min. I= 7.37 in/hr Qp= 47.91 cfs

RETURN FREQUENCY: 100 year storm Adj.factor = 1.00
Q/Qp Template: IDF Output file: CHUR100 .HYD

HYDROGRAPH ORDINATES (cfs)
Time increment = 0.083 Hours
Time on left represents time for first Q in each row.

Time Hours							
0.000	0.00	11.02	36.73	47.91	39.92	23.63	13.41
0.583	8.00	4.65	2.63	1.56	0.91	0.53	0.34
1.167	0.16	0.00					

Quick TR-55 Version: 5.43 S/N: 1240540379
Plotted: 05-30-1992 11:38:31



* File: C:\PONDPACK\CHUR100 .HYD Qmax = 47.9 cfs

POND-2 Version: 5.14 S/N: 1220510530
EXECUTED: 05-30-1992 11:39:52

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* NORTHWEST CHRISTIAN CHURCH *
* STRUCTURE ANALYSIS USING 1-15" RCP *
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Inflow Hydrograph: C:\PONDPACK\CHUR100 .HYD
Rating Table file: C:\PONDPACK\CHURCH .PND

----INITIAL CONDITIONS----
Elevation = 48.40 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)
48.40	0.0	0.000
48.90	0.9	0.421
49.40	2.9	0.860
49.90	5.0	1.318
50.40	6.6	1.794
50.72	7.5	2.108
50.90	7.9	2.289
51.40	9.1	2.803
51.90	10.0	3.336
52.00	10.2	3.445

INTERMEDIATE ROUTING COMPUTATIONS

2S/t (cfs)	2S/t + O (cfs)
0.0	0.0
122.3	123.2
249.9	252.8
382.7	387.7
520.9	527.5
612.2	619.7
664.6	672.5
813.9	823.0
968.9	978.9
1000.6	1010.8

Time increment (t) = 0.083 hrs.

POND-2 Version: 5.14 S/N: 1220510530
EXECUTED: 05-30-1992 11:39:52

Pond File: C:\PONDPACK\CHURCH .PND
Inflow Hydrograph: C:\PONDPACK\CHUR100 .HYD
Outflow Hydrograph: C:\PONDPACK\OUT .HYD

INFLOW HYDROGRAPH / ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.000	0.00	-----	0.0	0.0	0.00	48.40
0.083	11.02	11.0	10.9	11.0	0.08	48.44
0.167	36.73	47.8	57.8	58.6	0.43	48.64
0.250	47.91	84.6	140.0	142.4	1.20	48.97
0.333	39.92	87.8	222.8	227.8	2.52	49.30
0.417	23.63	63.6	279.5	286.4	3.42	49.52
0.500	13.41	37.0	308.8	316.5	3.89	49.64
0.583	8.00	21.4	322.0	330.2	4.10	49.69
0.667	4.65	12.7	326.3	334.6	4.17	49.70
0.750	2.63	7.3	325.2	333.5	4.16	49.70
0.833	1.56	4.2	321.2	329.4	4.09	49.68
0.917	0.91	2.5	315.7	323.7	4.00	49.66
1.000	0.53	1.4	309.3	317.1	3.90	49.64
1.083	0.34	0.9	302.6	310.2	3.79	49.61
1.167	0.16	0.5	295.7	303.1	3.68	49.59
1.250	0.00	0.2	288.8	295.9	3.57	49.56

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: C:\PONDPACK\CHURCH .PND
Inflow Hydrograph: C:\PONDPACK\CHUR100 .HYD
Outflow Hydrograph: C:\PONDPACK\OUT .HYD

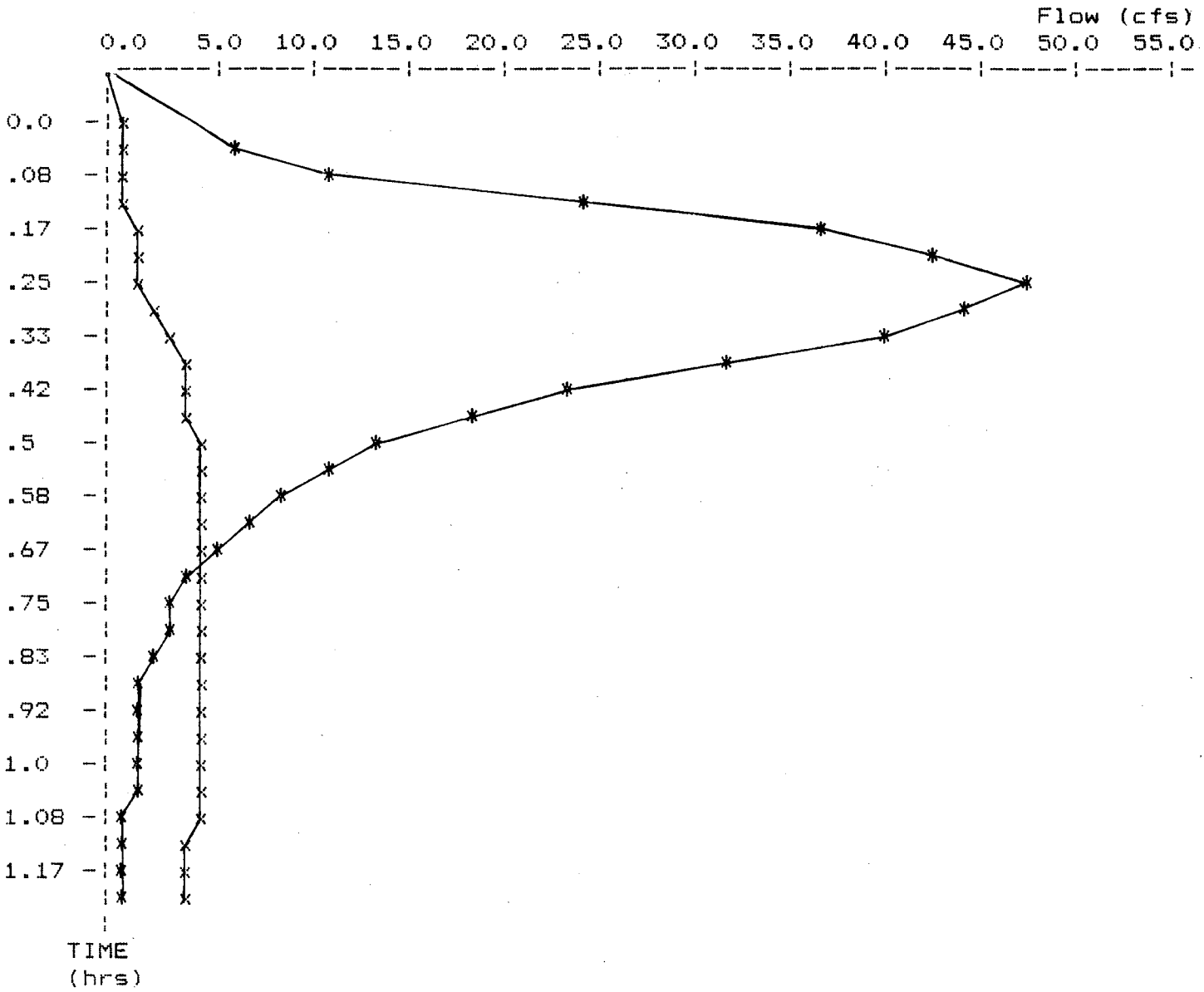
Starting Pond W.S. Elevation = 48.40 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow	=	47.91 cfs
Peak Outflow	=	4.17 cfs
Peak Elevation	=	49.70 ft

***** Summary of Approximate Peak Storage *****

Initial Storage	=	0.00 ac-ft
Peak Storage From Storm	=	1.14 ac-ft
Total Storage in Pond	=	1.14 ac-ft



* File: C:\PONDPACK\CHUR100 .HYD Qmax = 47.9 cfs
x File: C:\PONDPACK\OUT .HYD Qmax = 4.2 cfs