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STORMWATER DETENTION ANALYSIS
 PREPARED BY: BAX ENGINEERING CO., INC.
DETENTION BASIN "B"
HOMEFIELD MANOR VILLAGE N - O'FALLON
 BAX PROJECT NO. 98-10001N
 October 27, 1999 - revised March 8, 2000

INTRODUCTION:

This tract of land is presently an undeveloped site located in the City of O'Fallon, Missouri. The proposed Village N, consisting of 24.8 acres of the 103.4 acre Homefield tract will be developed into single-family residential lots. A lake will be constructed along the east boundary of the tract. The storage volume and outflow rates shall be proportioned to insure that the peak rate of runoff leaving the tract under post-developed conditions is less than or equal to the peak rate of runoff under pre-developed conditions for the 2, 15, and 25 year-20 minute design storm. The wet-basin was also analyzed for the 100 year frequency - 20 minute duration design storm. All or part of Villages J, L, N and part of the recreational area are served by the lake. Two other dry-basins are proposed for the residential portion of this tract and will be analyzed, in conjunction with this wet-basin, with submittals for future villages.

GENERAL SITE DATA AND RUNOFF CALCULATIONS:

The pre-developed P.I. factors to be used for the analysis are:

- 2 year - 0-5% impervious 1.15 cfs/ac.
- 15 year - 0-5% impervious 1.87 cfs/ac.
- 25 year - 0-5% impervious 2.31 cfs/ac.
- 100 year - 0-5% impervious 2.95 cfs/ac.



The post-developed P.I. factors to be used for the analysis are:

- 2 year - ±05% impervious 1.15 cfs/ac.
- 15 year - ±05% impervious 1.87 cfs/ac.
- 25 year - ±05% impervious 2.31 cfs/ac.
- 100 year - ±05% impervious 2.95 cfs/ac.

- 2 year - ±52% impervious 1.76 cfs/ac.
- 15 year - ±52% impervious 2.90 cfs/ac.
- 25 year - ±52% impervious 3.58 cfs/ac.
- 100 year - ±52% impervious 4.58 cfs/ac.

SOCCER AND BALLFIELD AREA

RESIDENTIAL AREA

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2 year - ±100% impervious	2.39 cfs/ac.	SCHOOL AREA
15 year - ±100% impervious	3.85 cfs/ac.	
25 year - ±100% impervious	4.75 cfs/ac.	
100 year - ±100% impervious	6.08 cfs/ac.	

TIME OF CONCENTRATION:

Of the inflows to the basin, the most remote point lies to the northeast near lot 23J. Flows will travel approximately 220 feet overland to AI 629, then 850 feet via stormpipe to the detention basin. Time of concentration is estimated as follows:

T(overland): L = 220 feet
Elevation difference = 522 - 520 = 2 feet
T(overland) = 6.0 minutes: See figure 1

T(stormpipe): L = 1340 feet
1340 / 7 fps = 3.2 minutes

Total 9.2 min Use 9 min.

REQUIRED ATTENUATION

= [Developed area x PI(post)] - [Pre-developed area x PI(pre)]

$$\begin{aligned} (2 \text{ yr}) & \quad [\quad 4.07 \quad \times \quad 1.15 \quad] \\ & \quad + [\quad 29.95 \quad \times \quad 1.76 \quad] \\ & \quad + [\quad 8.79 \quad \times \quad 2.39 \quad] - [\quad 34.38 \quad \times \quad 1.15 \quad] = \quad 38.86 \text{ cfs} \\ (15 \text{ yr}) & \quad [\quad 4.07 \quad \times \quad 1.87 \quad] \\ & \quad + [\quad 29.95 \quad \times \quad 2.90 \quad] \\ & \quad + [\quad 8.79 \quad \times \quad 3.85 \quad] - [\quad 34.38 \quad \times \quad 1.87 \quad] = \quad 64.02 \text{ cfs} \\ (25 \text{ yr}) & \quad [\quad 4.07 \quad \times \quad 2.31 \quad] \\ & \quad + [\quad 29.95 \quad \times \quad 3.58 \quad] \\ & \quad + [\quad 8.79 \quad \times \quad 4.75 \quad] - [\quad 34.38 \quad \times \quad 2.31 \quad] = \quad 78.96 \text{ cfs} \end{aligned}$$



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BASIN PEAK INFLOWS:

Inflows to the basin have been estimated from the drainage area map.

SOCCER AND BALLFIELD AREA = 4.07 Ac.
 RESIDENTIAL AREA = 29.45 Ac.
 SCHOOL AREA = 8.79 Ac.

25 year-20 minute storm
 4.07 Ac. x 2.31 cfs/Ac. 9.40 cfs
 29.45 Ac. x 3.58 cfs/Ac. 105.43 cfs
 8.79 Ac. x 4.75 cfs/Ac. 41.75 cfs
 total 156.59 cfs

2 year-20 minute storm: 77.52 cfs
 15 year-20 minute storm: 126.86 cfs
 100 year-20 minute storm: 200.33 cfs

ALLOWABLE OUTFLOWS:

Allowable outflows were determined by subtracting the required attenuation from the basin inflows.

STORM	INFLOW		REQUIRED.		ALLOWABLE
20-min	cfs		ATTENUATION		OUTFLOW
			cfs		cfs
2 year	77.52	-	38.86	=	38.66
15 year	126.86	-	64.02	=	62.84
25 year	156.59	-	78.96	=	77.63



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STORM ROUTING CALCULATIONS AND RESULTS:

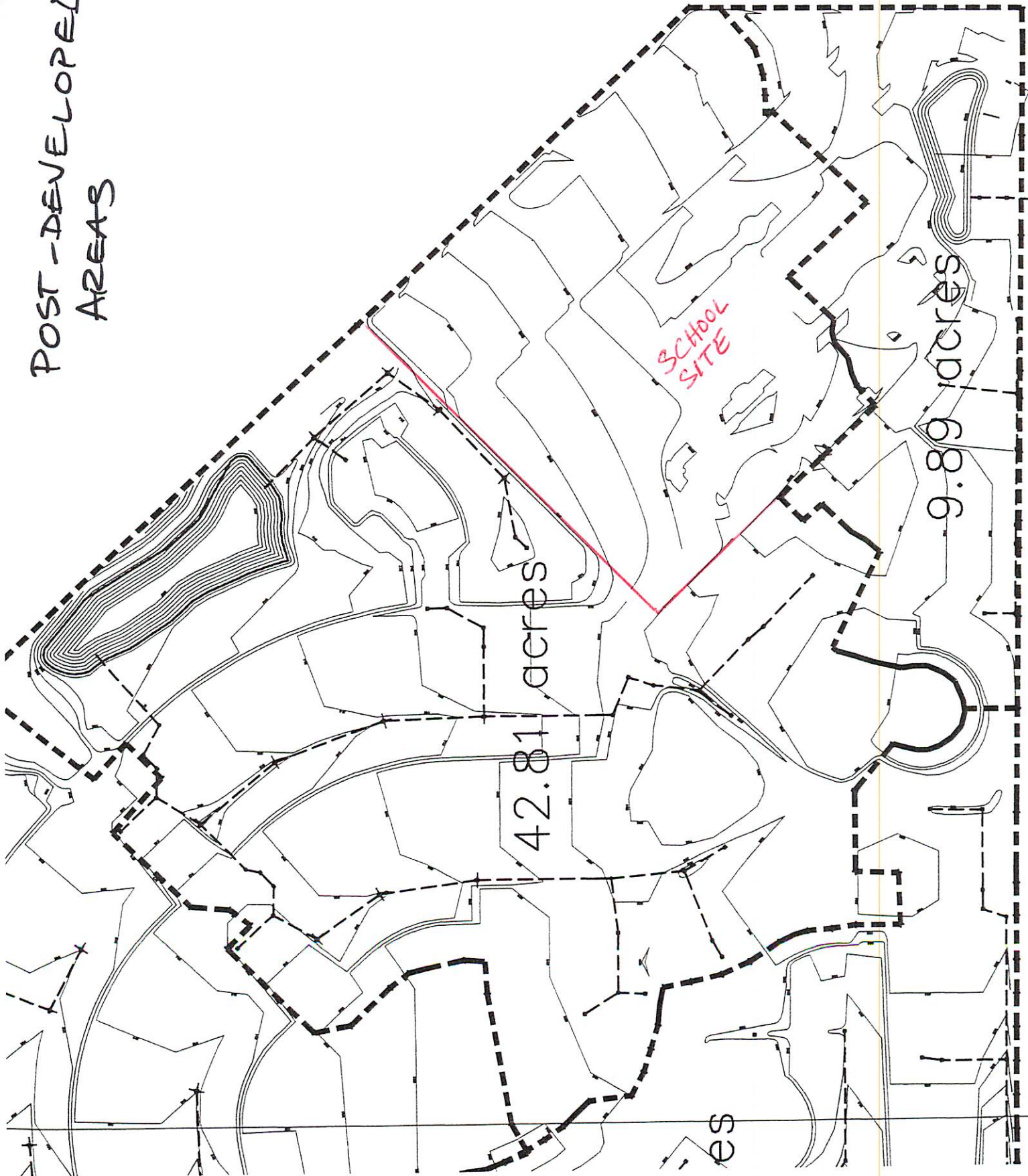
A computer program was used in routing the 2, 15, and 25 year-20 minute storm through the basin. As found in the routing calculations, the results are as follows:

20 MIN STORM	ALLOWABLE RELEASE RATE	CALCULATED RELEASE RATE	PEAK ELEVATION
2 YR	38.66	32.02 cfs	500.32
15 YR	62.84	59.60 cfs	501.00
25 YR	77.63	77.26 cfs	501.38
100 YR	-	109.86 cfs	501.89

SUMMARY

25 year-20min H.W.	501.38
100 year-20min H.W.	501.89
60" standpipe top	501.5
7.5' slot to top of structure	499.0
Top Of Berm	504.00

POST-DEVELOPED
AREAS



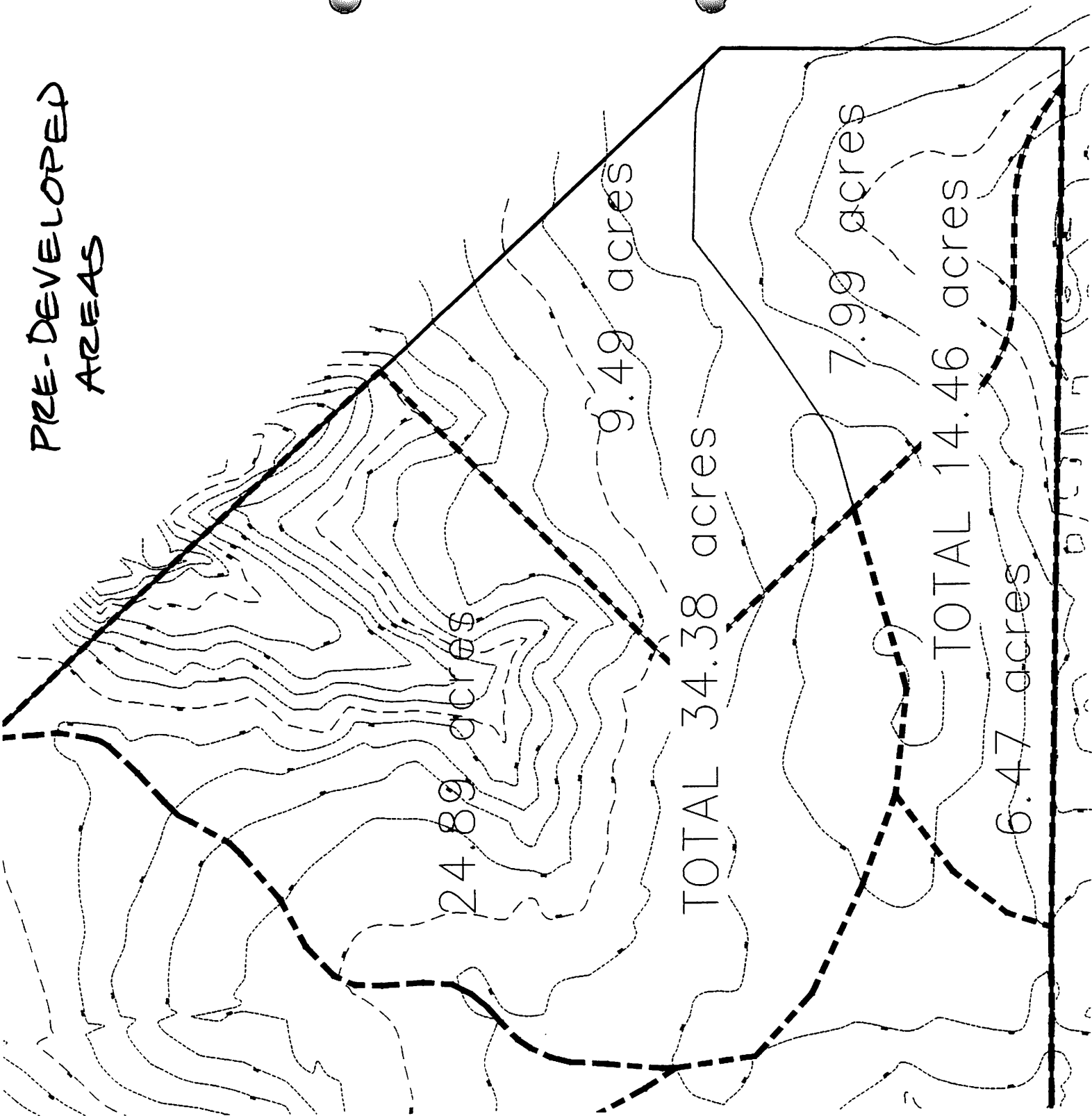
SCHOOL
SITE

42.81 acres

9.89 acres

es

PRE-DEVELOPED
AREAS



24.89 acres

9.49 acres

7.99 acres

6.47 acres

TOTAL 34.38 acres

TOTAL 14.46 acres

07/23/14