

REVISED  
MASTER DRAINAGE STUDY  
FOR  
NORWOOD PHASE I

PREPARED BY:

K L H ENGINEERING CONSULTANTS, INC.  
724 South Tejon Street  
Colorado Springs, CO 80903  
81 015 11

March, 1983

**RECEIVED**

APR 27 1983

8:00

**PUBLIC WORKS  
ENGINEERING**

#### SCOPE AND PURPOSE:

A Master Drainage Study for the Norwood Phase I area was completed and submitted to the City in May of 1982. That Master Drainage Study was prepared by Weiss Consulting Engineers, and has been used as a guide in the preparation of drainage reports for specific subdivision filings within the Master Study area (such as Northwind Filing Nos. 1 and 2, and Greenbriar Park Filing No. 1). The Master Study prepared by Weiss divided the Norwood Phase I area into three main basins, designated as Basins A, B and C. The purpose of this "revised" Master Drainage Study, prepared by KLH Engineering Consultants, Inc., is to re-examine some of the flows expected, and size drainage facilities required throughout Basins A and B, based upon the revised flow quantities expected. This revised study is similar in purpose to the Weiss' study, in the respect that it is intended to be used as a guide for drainage facilities required, but not as an inflexible design. A more detailed examination of proposed drainage facilities will be made in the drainage reports for each of the individual filings, as they are platted.

Runoff flows in Basin C of the Weiss Report were not examined as part of this revised study. This study will assume that the preliminary sizing of drainage facilities in Basin C will be as described in the Weiss Report.

#### GENERAL:

The study area falls completely within the Cottonwood Creek Drainage Basin. The reader is referred to "Engineering Study of Cottonwood Creek Drainage Basin" prepared by Lincoln DeVore in August of 1979. This drainage study is in compliance with the Cottonwood Creek Master Drainage Report.

The Norwood Phase I area consists of approximately 275 acres. The development will accommodate single family dwelling units and some P.U.D. areas.

A portion of the Norwood Phase I area has been platted. These platted areas are Northwind Subdivision Filing No. 1, Northwind Subdivision Filing No. 2, and Greenbriar Park Subdivision Filing No. 1. These platted areas are shown on the Drainage Plan.

#### SOILS TYPES:

Soils located within the development and the exterior tributary drainage area consist of soils in the Hydrologic Soil Groups A, B and D. SCS soils map symbols are shown on the Drainage Plan.

#### METHOD OF COMPUTATIONS:

Runoff quantities are calculated using the Modified SCS Methodology as approved by the City of Colorado Springs Engineering Division. Runoff from both 5 year and 100 year storms were computed.

Per City of Colorado Springs Criteria, all drainage structures have been sized for the 5 year storm for peak 100 year flows less than 500 c.f.s., and for the 100 year storm for peak flows in excess of 500 c.f.s..

#### RUNOFF FLOWS:

Peak runoff flows calculated for both 5 year and 100 year storm events are shown on the Drainage Plan. This includes peak flows from the individual sub-basins, and accumulative flows, as the runoff proceeds downstream. Runoff calculations are included at the end of this report.

#### PROPOSED DRAINAGE FACILITIES:

The proposed drainage facilities for Basins A and B are shown on the attached Drainage Plan. It is assumed that the proposed drainage facilities for Basin C are as shown in the Weiss Master Drainage Study. Upon final platting (and preparation of final drainage reports) of specific parcels within the Norwood Phase I area, it may be necessary to slightly alter the pipe sizes and/or inlets shown on the Drainage Plan, to accommodate final street grades, etc..

Vertical curb and gutter will be required at several locations to convey street flows. These locations are shown and described on the Drainage Plan. The exact extent and limits where vertical curb is required shall be determined in the final drainage reports for each specific filing.

Per City of Colorado Springs Criteria, drainage facilities along the entire length of Northwind Drive have been sized to carry the bulk of the 5 year storm as pipe flow, with street flows being limited to the values given in the street capacity charts published in "City of Colorado Springs Determination of Storm Runoff Criteria". In all cases, the street flows along Northwind Drive will be well within these limits for the five year storm. For storm events larger than the five year storm, the street flows may exceed the carrying capacity of the vertical curb and gutter. The City of Colorado Springs Drainage Criteria required only that runoff flows from the five year storm event be considered when the estimated flow from the 100 year storm is less than 500 c.f.s.. Flow values for the 100 year storm were also considered, however, to determine what would happen to the street flows during the 100 year storm event. Through the flattest section of Northwind Drive ( $S=0.77\%$ ) it is anticipated that the street flows during the 100 year storm will be approximately 0.7 feet above the top of the curb. The grading plan for this area will be done in a manner such that the house pad elevations will be sufficiently high to prevent flooding of the houses during the 100 year storm.

Runoff flows from Basins A and B discharge from the Development, at two points on its Northern boundary. Rip-rap shall be placed at these two points to protect the embankment at the outfall locations.

DRAINAGE FACILITIES COST ESTIMATE:

A preliminary cost estimate of drainage facilities required in the Norwood Phase I area is given below. This includes the estimated cost of facilities proposed in Basins A and B, and also those facilities proposed in Basin C, (in the Weiss report).

COST ESTIMATE

660 L.F. of 18" R.C.P.	@ \$ 23./L.F.	= \$ 15,180.
740 L.F. of 21" R.C.P.	@ \$ 26./L.F.	= \$ 19,240.
420 L.F. of 24" R.C.P.	@ \$ 30./L.F.	= \$ 12,600.
180 L.F. of 27" R.C.P.	@ \$ 38./L.F.	= \$ 6,840.
2860 L.F. of 36" R.C.P.	@ \$ 45./L.F.	= \$128,700.
2040 L.F. of 42" R.C.P.	@ \$ 55./L.F.	= \$112,200.
1970 L.F. of 48" R.C.P.	@ \$ 65./L.F.	= \$128,050.
24 Manholes	@ \$ 800./Ea.	= \$ 19,200.
2 4' D-10R	@ \$1500./Ea.	= \$ 3,000.
10 6' D-10R	@ \$1800./Ea.	= \$ 18,000.
19 8' D-10R	@ \$2200./Ea.	= \$ 41,800.
17 10' D-10R	@ \$2500./Ea.	= \$ 42,500.
1 16' D-10R	@ \$4000./Ea.	= \$ 4,000.
140 L.F. of Conc. Chl.	@ \$ 40./L.F.	= \$ 5,600.
120 L.F. of Conc. Chl.	@ \$ 28./L.F.	= \$ 3,360.
2 Curb Outlets	@ \$1500./Ea.	= \$ 3,000.
		<u>\$563,270.</u>
Engineering and Contingency		= <u>\$ 56,330.</u>
	TOTAL	\$619,600.

DRAINAGE AND BRIDGE FEES:

The drainage and bridge fees required will be dependent upon the size of the specific parcels platted, and the date of platting. An estimate of the fees required is given below, applying the 1983 Cottonwood Creek drainage and bridge fees to the approximate acreage within the Norwood Phase I area.

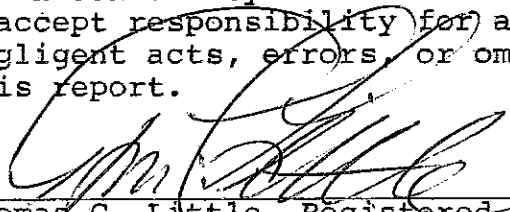
Approximate Drainage Fee:  
275 ac. @ \$2728. per ac. = \$750,200.

Approximate Bridge Fee :  
275 ac. @ \$ 125. per ac. = \$ 34,375.

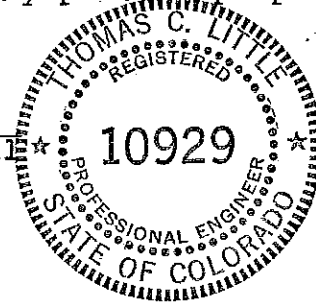
CERTIFICATION AND APPROVALS:

Registered Engineer

I, Thomas C. Little, a registered engineer in the State of Colorado, hereby certify that the attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the City for drainage reports and said report is in conformity with the master plan of the drainage basin. I accept responsibility for any liability caused by the negligent acts, errors, or omissions on my part in preparing this report.



Thomas C. Little, Registered Professional Engineer, 10929



Developer

The developer has read and will comply with all of the requirements specified in the drainage report, as filed by the City Engineer.

*Norwood Development Corp*  
By: *Kent A. Peter*

Title: *Pres*

REVIEWED:

City of Colorado Springs, Department of Public Works

\_\_\_\_\_  
Date

Comments:

Filed in accordance with Section 15-3-906 of the Code of the City of Colorado Springs, 1980, as

*Chayr Hayes* 5/12/83  
City Engineer Date

*Subject to permanent easements within future Park land use outfall drainage facilities.*

DRAINAGE CALCULATIONS

BASIN	ACREAGE	SQ. MI.	LAND USE	%	CN	% x CN	RUNOFF Q (IN.)	L (FT.)	H (FT.)	FLOW TYPE	t <sub>c</sub> (hrs.)	q <sub>p</sub> CSM/In.	q (cfs)
AO	11.5	.021	Park	85.2	84	7156	.93 (5yr) 2.10 (100yr)	450	48	Overland	.057	1300	25.5 (5yr) 57.7 (100)
	2.0		S&W	14.8	98	1452		430	13	Gutter	.012		
	13.5							74	1	Pipe Flow	.002		
					100.0	86.1		8608	954	62			
AO,1	11.5	.032	Park	56.4	84	4735	.930 2.10	105	5	Channel	.005	1230	36.4 82.5
	5.9		SF 1/5Ac (2A/80)	28.9	84	2429		730	6	Gutter	.038		
	3.0		S&W	14.7	98	1441							
	20.4			100.0	86.1	8605		1789	73		.114		
AO,1, 7,8	11.5	.061	Park	29.7	84	2496	.800 1.91	920	27	Gutter	.026	1180	56.9 136
	5.9		SF 1/5Ac (2A/80)	15.3	84	1281							
	15.6		SF 1/5Ac (B)	40.3	78	3144							
	5.7		S&W	14.7	98	1443							
38.7		100.0	83.6	8364	2709	100		.140					
AO thru A8	11.5	.107	Park	16.8	84	1412	.739 1.82	160	8	Gutter	.003	1160	91.6 226
	5.9		SF 1/5Ac (2A/80)	8.6	84	725		130	1	Pipe Flow	.004		
	40.9		SF 1/5Ac (B)	59.8	78	4664							
	10.1		S&W	14.8	98	1447							
68.4		100.0	82.5	8248	2999	109		.149					
AO thru A9	11.5	.114	Park	15.7	84	1321	.734 1.81	610	18	Pipe Flow	.012	1140	95.6 236
	5.9		SF 1/5Ac (2A/80)	8.1	84	678							
	44.9		SF 1/5Ac (B)	61.4	78	4791							
	10.8		S&W	14.8	98	1448							
73.1		100.0	82.4	8238	3609	127		.161					
AO thru 11,13	11.5	.160	Park	11.3	84	945	.832 1.96	800	46	Pipe Flow	.011	1110	148 348
	5.9		SF 1/5Ac (2A/80)	5.8	84	485							
	44.9		SF 1/5Ac (B)	43.9	78	3427							
	7.7		SF 1/5Ac (D)	7.5	89	671							
	7.5		SF 1/5Ac (4B/80)	7.3	85	624							
	9.0		PUD (5B/50)	8.8	88	775							
15.7	S&W	15.4	98	1506									
102.2		100.0	84.3	8433	4409	173		.172					

DRAINAGE CALCULATIONS

BASIN	ACREAGE	SQ. MI.	LAND USE	%	CN	% x CN	RUNOFF Q (IN.)	L (FT.)	H (FT.)	FLOW TYPE	tc (hrs.)	qp CSM/In.	q (cfs)
A	11.5		Park	10.0	84	838		480	17	Pipe Flow	.008		
thru	5.9		SF 1/5Ac ( $\frac{.2A}{.8D}$ )	5.1	84	430							
14	44.9		SF 1/5Ac (B)	38.9	78	3037							
	18.8		SF 1/5Ac (D)	16.3	89	1451							
	7.5		SF 1/5Ac ( $\frac{.4B}{.6D}$ )	6.5	85	553							
	9.0		PUD ( $\frac{.5B}{.5D}$ )	7.8	88	687							
	17.7		S&W	15.4	98	1504	.869 (5yr)						171 (5yr)
	115.3	.180		100.0	85.0	8500	2.02 (100yr)	4889	190		.180	1090	396 (100)
A	11.5		Park	8.5	84	716		1000	47	Pipe Flow	.013		
thru	5.9		SF 1/5Ac ( $\frac{.2A}{.8D}$ )	4.4	84	367							
16	44.9		SF 1/5Ac (B)	33.3	78	2594							
	34.3		SF 1/5Ac (D)	25.4	89	2261							
	7.5		SF 1/5Ac ( $\frac{.4B}{.6D}$ )	5.6	85	472							
	9.0		PUD ( $\frac{.5B}{.5D}$ )	6.6	88	587							
	21.9		S&W	16.2	98	1590	.918						207
	135.0	.211		100.0	85.9	8587	2.09	5889	237		.193	1070	471
A0	11.5		Park	85.2	84	7155				Overland			
	2.0		S&W	14.8	98	1451	.930			Gutter			25.5
	13.0	.021		100.0	86.1	8607	2.10			Pipe Flow		1300	57.7
A1	5.9		SF 1/5Ac ( $\frac{.2A}{.8D}$ )	85.5	84	7182				Channel			
	1.0		S&W	14.5	98	1420	.927			Gutter		1300	13.0
	6.9	.011		100.0	86.0	8602	2.10						29.4
A2	6.8		SF 1/5Ac (B)	85.0	78	6630	.669			Gutter			10.9
	1.2		S&W	15.0	98	1470	1.71					1300	27.8
	8.0	.013		100.0	81.0	8100							
A3	6.7		SF 1/5Ac (B)	84.8	78	6615				Gutter			10.8
	1.2		S&W	15.2	98	1488	.671					1300	27.5
	7.9	.012		100.0	81.0	8103	1.71						

DRAINAGE CALCULATIONS

<u>BASIN</u>	<u>ACREAGE</u>	<u>SQ.MI.</u>	<u>LAND USE</u>	<u>%</u>	<u>CN</u>	<u>% x CN</u>	<u>RUNOFF Q(IN.)</u>	<u>L (FT.)</u>	<u>H (FT.)</u>	<u>FLOW TYPE</u>	<u>tc (hrs.)</u>	<u>qp CSM/In.</u>	<u>q (cfs)</u>
A4	3.4 <u>.6</u> 4.0	.006	SF 1/5Ac(B) S&W	85.0 <u>15.0</u> 100.0	78 98 <u>81.0</u>	6630 <u>1470</u> 8100	.669(5yr) <u>1.71</u> (100yr)			Gutter	1300		5.4(5yr) 13.9(100)
A5	4.3 <u>.7</u> 5.0	.008	SF 1/5Ac(B) S&W	86.0 <u>14.0</u> 100.0	78 98 <u>80.8</u>	6708 <u>1372</u> 8080	.660 <u>1.69</u>			Gutter	1300		6.70 17.2
A6	4.1 <u>.7</u> 4.8	.008	SF 1/5Ac(B) S&W	85.4 <u>14.6</u> 100.0	78 98 <u>80.9</u>	6662 <u>1429</u> 8091	.665 <u>1.70</u>			Gutter Pipe Flow	1300		6.5 16.6
A7 -7-	4.6 <u>.8</u> 5.4	.008	SF 1/5Ac(B) S&W	85.2 <u>14.8</u> 100.0	78 98 <u>81.0</u>	6644 <u>1451</u> 8096	.667 <u>1.71</u>			Gutter	1300		7.3 18.7
A8	11.0 <u>1.9</u> 12.9	.020	SF 1/5Ac(B) S&W	85.3 <u>14.7</u> 100.0	78 98 <u>80.9</u>	6651 <u>1443</u> 8094	.667 <u>1.70</u>			Gutter	1300		17.5 44.7
A9	4.0 <u>.7</u> 4.7	.007	SF 1/5Ac(B) S&W	85.1 <u>14.9</u> 100.0	78 98 <u>81.0</u>	6638 <u>1459</u> 8097	.668 <u>1.71</u>			Gutter	1300		6.4 16.3
A10	7.7 <u>1.3</u> 9.0	.014	SF 1/5Ac(D) S&W	85.6 <u>14.4</u> 100.0	89 98 <u>90.3</u>	7614 <u>1415</u> 9030	1.20 <u>2.48</u>			Gutter	1300		22.0 45.8
A11	9.0 <u>2.3</u> 11.3	.018	PUD ( <sup>SB</sup> / <sub>50</sub> ) S&W	79.6 <u>20.4</u> 100.0	88 98 <u>90.0</u>	7008 <u>1994</u> 9003	1.18 <u>2.45</u>			Gutter	1300		27.1 56.3



DRAINAGE CALCULATIONS

BASIN	ACREAGE	SQ.MI.	LAND USE	%	CN	% x CN	RUNOFF Q (IN.)	L (FT.)	H (FT.)	FLOW TYPE	t <sub>c</sub> (hrs.)	q <sub>p</sub> CSM/In.)	q (cfs)
A12	7.3	.013	SF 1/5Ac(D)	84.9	89	7554	1.21(5yr) 2.48(100yr)			Gutter		1300	21.1(5y) 43.3(10)
	1.3		S&W	15.1	98	1482							
	8.6			100.0	90.4	9036							
A13	7.5	.014	SF 1/5Ac( <sup>48</sup> / <sub>60</sub> )	85.2	85	7244	.980 2.18			Gutter		1300	17.5 38.9
	1.3		S&W	14.8	98	1447							
	8.8			100.0	86.9	8691							
A14	3.8	.007	SF 1/5Ac(D)	84.4	89	7515	1.21 2.48			Gutter		1300	11.0 22.7
	.7		S&W	15.6	98	1525							
	4.5			100.0	90.4	9040							
A15	9.8	.018	SF 1/5Ac(D)	85.2	89	7585	1.20 2.47			Gutter		1300	28.1 57.9
	1.7		S&W	14.8	98	1448							
	11.5			100.0	90.3	9033							
A16	5.7	.013	SF 1/5Ac(D)	69.5	89	6187	1.31 2.61			Gutter		1300	21.8 43.5
	2.5		S&W	30.5	98	2987							
	8.2			100.0	91.7	9174							
BO,3, 4,5	19.3	.053	SF 1/5Ac	57.0	89	5037	1.34 2.65	480 800 840 2120	25 5 77 107	Gutter Gutter Pipe Flow	.030 .139 .015 .184	1090	77.6 154
	4.5		PUD	13.0	92	1214							
	10.3		S&W	30.0	98	2960							
	34.1			100.0	92.1	9211							
BO,2 3,4,5, 6,9	24.4	.079	SF 1/5Ac	48.0	89	4383	1.34 2.65	230  2350	12  119	Pipe Flow	.004  .188	1030	114 227
	13.0		PUD	26.0	92	2359							
	13.3		S&W	26.0	98	2570							
	50.7			100.0	92.1	9212							



DRAINAGE CALCULATIONS

BASIN	ACREAGE	SQ.MI.	LAND USE	%	CN	% x CN	RUNOFF Q(IN.)	L (FT.)	H (FT.)	FLOW TYPE	tc (hrs.)	qp CSM/In.)	q (cfs)
B0 thru 23	79.3 22.3 <u>27.1</u> 128.7	.201	SF 1/5Ac PUD S&W	61.6 17.3 <u>21.1</u> 100.0	89 92 <u>98</u> 91.4	5484 1594 <u>2064</u> 9142	1.28 (5yr) <u>2.58 (100yr)</u>	5580 <u>225</u>		Pipe Flow	.009 <u>.235</u>	1000	258. (5yr) 519. (100)
B0	5.9 <u>5.9</u>	.009	S&W	100.0 <u>100.0</u>	98 <u>98.0</u>	9800 9800	1.87 3.27			Gutter	.169	1120	19.3 33.7
B1	11.1 2.0 <u>13.1</u>	.020	SF 1/5Ac S&W	84.7 <u>15.3</u> 100.0	89 <u>98</u> 90.4	7541 <u>1496</u> 9037	1.21 <u>2.48</u>			Gutter		1300	32.1 66.1
B2	2.6 .5 <u>3.1</u>	.005	SF 1/5Ac S&W	83.9 <u>16.1</u> 100.0	89 <u>98</u> 90.5	7464 <u>1580</u> 9045	1.21 <u>2.49</u>			Gutter		1300	7.6 15.7
B3	5.6 3.5 <u>1.8</u> 10.9	.017	SF 1/5Ac PUD S&W	51.4 32.1 <u>16.5</u> 100.0	89 92 <u>98</u> 91.4	4572 2954 <u>1618</u> 9144	1.28 <u>2.58</u>			Gutter		1300	28.4 57.2
B4	4.1 1.0 .9 <u>6.0</u>	.009	SF 1/5Ac PUD S&W	68.3 16.7 <u>15.0</u> 100.0	89 92 <u>98</u> 90.9	6081 1533 <u>1470</u> 9085	1.24 <u>2.53</u>			Gutter		1300	15.1 30.8
B5	9.6 <u>1.7</u> 11.3	.018	SF 1/5Ac S&W	85.0 <u>15.0</u> 100.0	89 <u>98</u> 90.4	7561 <u>1474</u> 9035	1.20 <u>2.48</u>			Gutter		1300	27.7 56.9

DRAINAGE CALCULATIONS

BASIN	ACREAGE	SQ.MI.	LAND USE	%	CN	% x CN	RUNOFF Q(IN.)	L (FT.)	H (FT.)	FLOW TYPE	tc (hrs.)	qp CSM/In.)	q (cfs)
B6	6.1	.012	PUD	80.3	92	7384	1.42 (5yr) 2.75 (100yr)			Gutter	1300		21.9 (5y) 42.5 (100y)
	<u>1.5</u>		S&W	<u>19.7</u>	<u>98</u>	<u>1934</u>							
	7.6			100.0	93.2	9318							
B7	1.6	.003	SF 1/5Ac	84.2	89	7494	1.21 2.49			Gutter	1300		4.7 9.6
	<u>.3</u>		S&W	<u>15.8</u>	<u>98</u>	<u>1547</u>							
	1.9			100.0	90.4	9042							
B8	6.3	.012	SF 1/5Ac	85.1	89	7577	1.20 2.48			Gutter	1300		18.1 37.3
	<u>1.1</u>		S&W	<u>14.9</u>	<u>98</u>	<u>1456</u>							
	7.4			100.0	90.3	9033							
B9	2.5	.009	SF 1/5Ac	42.4	89	3771	1.31 2.61			Gutter	1300		15.7 13.3
	2.4		PUD	40.7	92	3742							
	<u>1.0</u>		S&W	<u>16.9</u>	<u>98</u>	<u>1661</u>							
	5.9			100.0	91.7	9174							
B10	5.9	.011	SF 1/5Ac	85.5	89	7610	1.20 2.48			Gutter	1300		16.8 34.7
	<u>1.0</u>		S&W	<u>14.5</u>	<u>98</u>	<u>1470</u>							
	6.9			100.0	90.3	9030							
B11	8.0	.015	SF 1/5Ac	85.1	89	7574	1.20 2.48			Gutter	1300		23.0 47.3
	<u>1.4</u>		S&W	<u>14.9</u>	<u>98</u>	<u>1459</u>							
	9.4			100.0	90.3	9034							
B12	1.8	.003	SF 1/5Ac	85.7	89	7628	1.20 2.47			Gutter	1300		5.12 10.55
	<u>.3</u>		S&W	<u>14.3</u>	<u>98</u>	<u>1400</u>							
	2.1			100.0	90.3	9028							
B13	3.9	.007	SF 1/5Ac	84.8	89	7545	1.21 2.48			Gutter	1300		11.3 23.2
	<u>.7</u>		S&W	<u>15.2</u>	<u>98</u>	<u>1491</u>							
	4.6			100.0	90.4	9037							

DRAINAGE CALCULATIONS

<u>BASIN</u>	<u>ACREAGE</u>	<u>SQ.MI.</u>	<u>LAND USE</u>	<u>%</u>	<u>CN</u>	<u>% x CN</u>	<u>RUNOFF Q(IN.)</u>	<u>L (FT.)</u>	<u>H (FT.)</u>	<u>FLOW TYPE</u>	<u>tc (hrs.)</u>	<u>qp CSM/In.</u>	<u>q (cfs)</u>
B14	.9		SF 1/5Ac	50.0	89	4450				Gutter	1300		
	.9		S&W	50.0	98	4900	1.45 (5yr)						5.3 (5yr)
	<u>1.8</u>	.003		100.0	93.5	9350	2.78 (100yr)						10.2 (100yr)
B15	1.3		SF 1/5Ac	50.0	89	4450				Gutter	1300		
	1.3		S&W	50.0	98	4900	1.45						7.6
	<u>2.6</u>	.004		100.0	93.5	9350	2.78						14.7
B16	2.7		SF 1/5Ac	84.4	89	7509				Gutter	1300		
	.5		S&W	15.6	98	1531	1.21						7.9
	<u>3.2</u>	.005		100.0	90.4	9040	2.49						16.2
B17	3.2		SF 1/5Ac	84.2	89	7494				Gutter	1300		
	.6		S&W	15.8	98	1547	1.21						9.3
	<u>3.8</u>	.006		100.0	90.4	9042	2.49						19.2
B18	3.0		SF 1/5Ac	85.7	89	7628				Gutter	1300		
	.5		S&W	14.3	98	1400	1.12						8.5
	<u>3.5</u>	.006		100.0	90.3	9028	2.47						17.6
B19	5.5		PUD	79.7	92	7333				Gutter	1300		
	1.4		S&W	20.3	98	1988	1.42						20.0
	<u>6.9</u>	.011		100.0	93.2	9321	2.76						38.6
B20	1.6		SF 1/5Ac	84.2	89	7494				Gutter	1300		
	.3		S&W	15.8	98	1547	1.21						4.7
	<u>1.9</u>	.003		100.0	90.4	9042	2.49						9.6
B21	2.0		PUD	80.0	92	7360				Gutter	1300		
	.5		S&W	20.0	98	1960	1.42						7.2
	<u>2.5</u>	.004		100.0	93.2	9320	2.75						14.0

DRAINAGE CALCULATIONS

<u>BASIN</u>	<u>ACREAGE</u>	<u>SQ.MI.</u>	<u>LAND USE</u>	<u>%</u>	<u>CN</u>	<u>% x CN</u>	<u>RUNOFF Q(IN.)</u>	<u>L (FT.)</u>	<u>H (FT.)</u>	<u>FLOW TYPE</u>	<u>tc (hrs.)</u>	<u>qp CSM/In.</u>	<u>q (cfs)</u>
B22	1.8	.003	PUD	81.8	92	7527				Gutter	1300		
	.4		S&W	18.2	98	1781	1.41(5yr)						
	2.2			100.0	93.1	9308	2.74(100yr)						
B23	3.6	.007	SF 1/5Ac	85.7	89	7628				Gutter	1300		
	.6		S&W	14.3	98	1400	1.12						
	4.2			100.0	90.3	9028	2.47						