MASTER DRAINAGE STUDY
FOR
SUNRISE DEVELOPMENT

PREPARED BY:

K L H ENGINEERING CONSULTANTS, INC.
206-208 Sutton Lane
Colorado Springs, CO 80907
KLH # 83 554 00

April, 1984

SCOPE AND PURPOSE:

This report is intended to furnish the basis for an overall plan for sizing the required drainage facilities within the proposed Sunrise Development. This study will provide information on total flows, approximate sizing and general location for the required facilities. This plan should be used as a guide for drainage facilities required, and 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.

GENERAL:

This study area is contained almost entirely within the Cottonwood Creek Drainage Basin with a small portion (2.0%) being in the Templeton Gap Drainage Basin. Sunrise Development is located in Sections 13 and 14, Township 13 South, Range 66 West of the 6th P.M.. 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.

Sunrise Development consists of approximately 282 acres. The development will accommodate single family dwelling units with approximately 6% of this area being park space and open space.

SOILS TYPES:

Soils located within this development and the external tributary drainage area consist of the following: 1). Blakeland Sandy Loam; S.C.S. Soils Number 8 and Hydrologic Soil Group A; 2). Bresser Sandy Loam; S.C.S. Soils Number 13 and Hydrologic Soil Group B; 3). Stapleton-Bernal Sandy Loam; S.C.S. Soils Number 85 and Hydrologic Soil Group B; 4). Truckton Loamy Sand; S.C.S. Soils Number 95 and Hydrologic Soil Group B; 5). Truckton Sandy Loam; S.C.S. Soils Number 97 and Hydrologic Soil Group B. S.C.S. Soils Map numbers 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 and outlined in the manual for "Determination of Storm Runoff Criteria" by the City of Colorado Springs, March 1977. 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..

A weighted curve number was utilized using the respective area of streets, residential lots, parks, etc. and soil type.

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.

TRIBUTARY DRAINAGE:

Sub-basins A-1 and A-22 will drain into this development across Templeton Gap Road as pipeflow. These flows will be carried across this development as pipeflow. See drainage calculations for these sub-basins (at back of this report) for estimated land uses and handling of runoff flows.

INTERNAL DRAINAGE:

Basins A, B, C and D are shown on the enclosed drainage plan. The proposed streets are of the same configuration as shown on the Sunrise Development Plan. The routing of flows are in conformance with the proposed grading plan. The 5 year and 100 year flows are shown on the drainage plan for each sub-basin as well as the accumulative flows. The accumulative flows are based on a runoff calculation for all sub-basins tributary to an accumulative flow design point. These accumulative flows are smaller than the arithmetically added flows because of a longer time of concentration.

Flow from Basin D will outlet onto a rip-rap pad then flow North in "Nor'wood Trail" drainage way. Flows to "Nor'wood Trail" have been reduced by carrying some of the historic tributary flow in the streets to Rangewood Drive. This will help preserve the natural integrity of "Nor'wood Trail".

Flow from Basin C will flow offsite, as pipe flow and street flow, in Rangewood Drive. This flow will outlet onto a rip-rap pad, temporarily, until the extension of Rangewood Drive and the storm drain.

Basins A and B will discharge onto a temporary rip-rap pad and flow in the natural drainage way to Cottonwood Creek. This discharge flows across lands owned entirely by Nor'wood Development Corporation except for Lot 12, Templeton Gap Heights. Presently, Nor'wood Development Corporation has said Lot 12 under contract for purchase. Upon ownership of Lot 12, Nor'wood Development Corporation will accept the increased flows due to Sunrise Development.

PROPOSED DRAINAGE FACILITIES:

The proposed drainage facilities for Basins A, B, C and D are shown on the enclosed drainage plan. Upon final platting (and preparation of final drainage reports) of specific parcels within the Sunrise Development 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 Bow River Drive* and Tanner Trail** have been sized to carry the bulk of the 5 year storm as pipeflow, 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 these systems 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. At the point where Bandanna Drive crosses the greenbelt, the street will be in a sump and pool approximately 0.9 feet above the top of the curb (during the 100 year storm). The runoff will then flow overland into the proposed concrete channel. 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, B and C will discharge onto temporary rip-rap pads to slow and break-up the flow. This rip-rap will be removed upon extension of the proposed facilities in this report. Rip-rap at the outfall of Basin D will be permanent and therefore reimburseable.

* This system also includes portions of Sea Breeze Drive and Templeton Gap Road.

** This system also includes portions of Oakwood Drive and Bandanna Drive.

DRAINAGE FACILITIES COST ESTIMATE:

18" R.C.P.	600 L.F.	@ $	23./L.F.	=	$ 13,800.
21" R.C.P.	1890 L.F.	@ $	30./L.F.	=	56,700.
24" R.C.P.	300 L.F.	@ $	35./L.F.	=	10,500.
27" R.C.P.	910 L.F.	@ $	40./L.F.	=	36,400.
30" R.C.P.	30 L.F.	@ $	42./L.F.	=	1,260.
36" R.C.P.	1310 L.F.	@ $	50./L.F.	=	65,500.
42" R.C.P.	2030 L.F.	@ $	63./L.F.	=	127,890.
48" R.C.P.	1280 L.F.	@ $	74./L.F.	=	94,720.
Trap. Channel b=5',z=1.5,d=4.2'	440 L.F.	@ $	93./L.F.	=	40,920.
Trap. Channel b=1',z=1,d=2'	30 L.F.	@ $	21./L.F.	=	630.
Manholes	20 Each	@	$1000./Ea.	=	20,000.
6' D-10R	10 Each	@	$1800./Ea.	=	18,000.
8' D-10R	18 Each	@	$2200./Ea.	=	39,600.
14' D-10R	3 Each	@	$3500./Ea.	=	10,500.
2'x2' Area Drain	1 Each	@	$ 800./Ea.	=	800.
Curb Inlet	1 Each	@	$1500./Ea.	=	1,500.
Curb Outlet	1 Each	@	$1500./Ea.	=	1,500.
Rip-Rap	20 C.Y.	@ $	45./C.Y.	=	900.
					$ 541,120.
10% Engineering & Contingency				=	54,112.
TOTAL				=	$ 595,232.

DRAINAGE AND BRIDGE FEES:

The Drainage and Bridge Fees required will depend upon the size of the individual parcels platted and the date of platting. An estimate of the fees required is given below:

Approximate 1984 Drainage Fee:

Cottonwood Creek Drainage Basin 276 ac. @ $2987. per acre	=	$ 824,412.
Templeton Gap Drainage Basin 6 ac. @ $2320. per acre	=	$ 13,920.
TOTAL	=	$ 838,332.

Approximate 1984 Bridge Fee:

Cottonwood Creek Drainage Basin 276 ac. @ $137. per acre	=	$ 37,812.
Templeton Gap Drainage Basin 6 ac. @ $ 26. per acre	=	$ 156.
TOTAL	=	$ 37,968.

DRAINAGE REPORT STATEMENTS

Engineer's Statement:

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 10929 PROFESSIONAL ENGINEER STATE OF COLORADO

Name

Developer's Statement:

The developer has read and will comply with all of the requirements specified in this drainage report.

Norwood Development Corp
Business Name

By: Kurt A Bates

Title: Pres

Address: 4179 Sinton Rd
Co Springs Co 80907

City of Colorado Springs:

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

City Engineer *

5/23/84
Date

Conditions: * Subject to:

(1) Norwood ownership of Lot 12 Templeton Gap Heights and a copy of proof of ownership transmitted to this office.
(2) El Paso County review of this report.
(3) Letter of credit to include channel extension through Lot 12 Templeton Gap Heights.

BASIN

Sunr A- 1

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
37.1		RESIDENTIAL 1/5Ac	A	65	40.2	2615.5
37.1		RESIDENTIAL 1 Ac	A	51	40.2	2052.2
4.3		COMMERTIAL	A	81	4.7	377.8
13.7		STREETS & WALKS	A	98	14.9	1456.2
92.2	.144				100.0	6501.6

WEIGHTED CN = 65.0

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
OVERLAND	200	12	.033			
STREET	1000	61	.043			
PIPE	1000	10	.036			
	2200	83	.112	.16	1240	29.2 (5yr FLOW)
				.75		134.5 (100yr FLOW)

BASIN

Sunr A- 2

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
11.6		RESIDENTIAL 1/5Ac	A	65	84.7	5503.6
2.1		STREETS & WALKS	A	98	15.3	1502.2
13.7	.021				100.0	7005.8

WEIGHTED CN = 70.1

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
STREET	1700	39	.157			
	1700	39	.157	.28	1140	6.9 (5yr FLOW)
				1.01		24.7 (100yr FLOW)

BASIN

Sunr A- 3

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
9.4		RESIDENTIAL 1/5Ac	A	65	84.7	5504.5
1.7		STREETS & WALKS	A	98	15.3	1500.9
11.1	.017				100.0	7005.4

WEIGHTED CN = 70.1

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
OVERLAND	350	5	.081			
STREET	570	7	.072			
	920	16	.153	.28	1140	5.6 (5yr FLOW)
				1.01		20.0 (100yr FLOW)

BASIN

Sunr A- 4

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
5.4		RESIDENTIAL 1/5Ac	A	65	84.4	5484.4
1.0		STREETS & WALKS	A	98	15.6	1531.3
6.4	.010				100.0	7015.6

WEIGHTED CN = 70.2

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
STREET	1210	34	.102			
	1210	34	.102	.28	1270	3.6 (5yr FLOW)
				1.02		12.9 (100yr FLOW)

BASIN

Sunr A- 5

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
3.0		RESIDENTIAL 1/5Ac	A	65	52.6	3421.1
1.8		RESIDENTIAL 1/5Ac	B	78	31.6	2463.2
.9		STREETS & WALKS	A	98	15.8	1547.4
5.7	.009				100.0	7431.6

WEIGHTED CN = 74.3

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
STREET	950	25	.081			
	950	25	.081	.41	1300	4.7 (5yr FLOW)
				1.26		14.6 (100yr FLOW)

BASIN

Sunr A- 6

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
7.5		RESIDENTIAL 1/5Ac	A	65	68.2	4431.8
2.2		PARK	A	39	20.0	780.0
1.3		STREETS & WALKS	A	98	11.8	1158.2
11.0	.017				100.0	6370.0

WEIGHTED CN = 63.7

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
OVERLAND	210	7	.032			
STREET	960	23	.086			
	1170	30	.118	.14	122(	2.9 (5yr FLOW)
				.69		14.5 (100yr FLOW)

BASIN

Sunr A- 7

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
3.1		RESIDENTIAL 1/5Ac	B	78	83.8	6535.1	
.6		STREETS & WALKS	B	98	16.2	1589.2	
3.7	.006				100.0	8124.3	WEIGHTED CN = 81.2

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
OVERLAND	170	6	.036			
STREET	900	6	.132			
	1070	12	.168	.68	1120	4.4 (5yr FLOW)
				1.73		11.2 (100yr FLOW)

BASIN

Sunr A- 8

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
4.7		RESIDENTIAL 1/5Ac	B	78	85.5	6665.5	
.8		STREETS & WALKS	B	98	14.5	1425.5	
5.5	.009				100.0	8090.9	WEIGHTED CN = 80.9

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
OVERLAND	270	4	.088			
STREET	560	20	.042			
	830	24	.130	.66	1190	6.8 (5yr FLOW)
				1.70		17.4 (100yr FLOW)

BASIN

Sunr A- 9

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
1.3		RESIDENTIAL 1/5Ac	A	65	21.3	1385.2	
4.0		RESIDENTIAL 1/5Ac	B	78	65.6	5114.8	
.8		STREETS & WALKS	B	98	13.1	1285.2	
6.1	.010				100.0	7785.2	WEIGHTED CN = 77.9

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
STREET	1120	6	.173			
	1120	6	.173	.54	1110	5.7 (5yr FLOW)
				1.49		15.7 (100yr FLOW)

BASIN

Sunr A-10

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
1.0		RESIDENTIAL 1/5Ac	B	78	15.9	1238.1
4.4		RESIDENTIAL 1/5Ac	A	65	69.8	4539.7
.9		STREETS & WALKS	A	98	14.3	1400.0
6.3	.010				100.0	7177.8

WEIGHTED CN = 71.9

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
STREET	1410	34	.079			
	1410	34	.079	.33	1300	4.2 (5yr FLOW)
				1.11		14.2 (100yr FLOW)

BASIN

Sunr A-11

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
6.4		RESIDENTIAL 1/5Ac	A	65	85.3	5546.7
1.1		STREETS & WALKS	A	98	14.7	1437.3
7.5	.012				100.0	6984.0

WEIGHTED CN = 69.8

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
STREET	1400	38	.078			
	1400	38	.078	.28	1300	4.2 (5yr FLOW)
				1.00		15.2 (100yr FLOW)

BASIN

Sunr A-12

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
.7		RESIDENTIAL 1/5Ac	B	78	17.5	1365.0
2.7		RESIDENTIAL 1/5Ac	A	65	67.5	4387.5
.6		STREETS & WALKS	A	98	15.0	1470.0
4.0	.006				100.0	7222.5

WEIGHTED CN = 72.2

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
OVERLAND	110	2	.032			
STREET	660	8	.083			
	770	10	.115	.34	1230	2.6 (5yr FLOW)
				1.13		8.7 (100yr FLOW)

BASIN

Sunr A-13

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
8.8		RESIDENTIAL 1/5Ac	B	78	85.4	6664.1
1.5		STREETS & WALKS	B	98	14.6	1427.2
10.3	.016				100.0	8091.3

WEIGHTED CN = 80.9

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
STREET	1510	39	.099			
	1510	39	.099	.66	1280	13.7 (5yr FLOW)
				1.70		35.1 (100yr FLOW)

BASIN

Sunr A-14

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
4.9		RESIDENTIAL 1/5Ac	B	78	86.0	6705.3
.8		STREETS & WALKS	B	98	14.0	1375.4
5.7	.009				100.0	8080.7

WEIGHTED CN = 80.8

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
STREET	720	10	.042			
	720	10	.042	.66	1300	7.6 (5yr FLOW)
				1.69		19.6 (100yr FLOW)

BASIN

Sunr A-15

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
3.5		RESIDENTIAL 1/5Ac	B	78	85.4	6658.5
.6		STREETS & WALKS	B	98	14.6	1434.1
4.1	.006				100.0	8092.7

WEIGHTED CN = 80.9

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
OVERLAND	110	10	.015			
STREET	550	9	.032			
	660	19	.047	.67	1300	5.5 (5yr FLOW)
				1.70		14.2 (100yr FLOW)

BASIN

Sunr A-16

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
6.0		RESIDENTIAL 1/5Ac	B	78	84.5	6591.5	
1.1		STREETS & WALKS	B	98	15.5	1518.3	
7.1	.011				100.0	8109.9	WEIGHTED CN = 81.1

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
OVERLAND	190	16	.026				
STREET	1040	29	.081				
	1230	45	.107	.67	1250		9.3 (5yr FLOW)
				1.72			23.8 (100yr FLOW)

BASIN

Sunr A-17

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
4.3		RESIDENTIAL 1/5Ac	B	78	84.3	6576.5	
.8		STREETS & WALKS	B	98	15.7	1537.3	
5.1	.008				100.0	8113.7	WEIGHTED CN = 81.1

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
OVERLAND	110	3	.026				
STREET	600	38	.033				
	710	41	.059	.68	1300		7.0 (5yr FLOW)
				1.72			17.8 (100yr FLOW)

BASIN

Sunr A-18

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
5.7		RESIDENTIAL 1/5Ac	B	78	85.1	6635.8	
1.0		STREETS & WALKS	B	98	14.9	1462.7	
6.7	.010				100.0	8098.5	WEIGHTED CN = 81.0

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
OVERLAND	100	11	.012				
STREET	960	31	.074				
	1060	42	.086	.67	1300		9.1 (5yr FLOW)
				1.71			23.2 (100yr FLOW)

BASIN

Sunr A-19

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
16.4		P.U.D.	B	85	100.0	8500.0
16.4	.026				100.0	8500.0

WEIGHTED CN = 85.0

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
SHEET	1180	30	.106			
	1180	30	.106	.87	1250	27.8 (5yr FLOW)
				2.02		64.6 (100yr FLOW)

BASIN

Sunr A-20

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
.2		RESIDENTIAL 1/5Ac	A	65	2.6	166.7
5.0		RESIDENTIAL 1/5Ac	B	78	64.1	5000.0
2.6		STREETS & WALKS	B	98	33.3	3266.7
7.8	.012				100.0	8433.3

WEIGHTED CN = 84.3

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
OVERLAND	180	9	.031			
STREET	2010	27	.124			
	2190	36	.155	.83	1140	11.6 (5yr FLOW)
				1.96		27.3 (100yr FLOW)

BASIN

Sunr A-21

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
2.6		STREETS & WALKS	B	98	100.0	9800.0
2.6	.004				100.0	9800.0

WEIGHTED CN = 98.0

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
STREET	1860	24	.115			
	1860	24	.115	1.87	1230	9.4 (5yr FLOW)
				3.27		16.3 (100yr FLOW)

BASIN

Sunr A-22

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
19.8		RESIDENTIAL 1/4Ac	B	75	65.3	4901.0
6.0		RESIDENTIAL 1/4Ac	A	61	19.8	1207.9
4.5		STREETS & WALKS	A	98	14.9	1455.4
30.3	.047				100.0	7564.4

WEIGHTED CN = 75.6

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
OVERLAND	200	10	.035				
STREET	1200	24	.090				
PIPE	900	52	.035				
	2300	86	.160	.45	1130	24.3	(5yr FLOW)
				1.34		71.8	(100yr FLOW)

BASIN

Sunr A-23

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
10.1		P.U.D.	B	85	100.0	8500.0
10.1	.016				100.0	8500.0

WEIGHTED CN = 85.0

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
SHEET	600	24	.042				
STREET	670	11	.053				
	1270	35	.095	.87	1290	17.7	(5yr FLOW)
				2.02		41.0	(100yr FLOW)

BASIN

Sunr A-24

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
5.2		P.U.D.	B	85	41.6	3536.0
6.0		COMMERTIAL	B	92	48.0	4416.0
1.3		STREETS & WALKS	B	98	10.4	1019.2
12.5	.020				100.0	8971.2

WEIGHTED CN = 89.7

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
SHEET	900	37	.061				
	900	37	.061	1.16	1300	29.4	(5yr FLOW)
				2.42		61.5	(100yr FLOW)

BASIN

Sunr A-25

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
6.0		RESIDENTIAL 1/5Ac	A	65	43.5	2826.1
5.7		RESIDENTIAL 1/5Ac	B	78	41.3	3221.7
2.1		STREETS & WALKS	B	98	15.2	1491.3
13.8	.022				100.0	7539.1

WEIGHTED CN = 75.4

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
STREET	1820	44	.082			
	1820	44	.082	.44	1300	12.5 (5yr FLOW)
				1.33		37.2 (100yr FLOW)

BASIN

Sunr A-26

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
1.3		RESIDENTIAL 1/5Ac	A	65	11.7	761.3
8.1		RESIDENTIAL 1/5Ac	B	78	73.0	5691.9
1.7		STREETS & WALKS	B	98	15.3	1500.9
11.1	.017				100.0	7954.1

WEIGHTED CN = 79.5

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
STREET	1250	31	.074			
	1250	31	.074	.60	1300	13.6 (5yr FLOW)
				1.60		36.2 (100yr FLOW)

BASIN

Sunr A-27

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
4.3		RESIDENTIAL 1/5Ac	A	65	54.4	3538.0
2.4		RESIDENTIAL 1/5Ac	B	78	30.4	2369.6
1.2		STREETS & WALKS	B	98	15.2	1488.6
7.9	.012				100.0	7396.2

WEIGHTED CN = 74.0

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
OVERLAND	125	8	.018			
STREET	1380	42	.057			
	1505	50	.075	.40	1300	6.4 (5yr FLOW)
				1.24		19.9 (100yr FLOW)

BASIN

Sunr A-28

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
3.9		RESIDENTIAL 1/5Ac	A	65	84.8	5510.9
.7		STREETS & WALKS	A	98	15.2	1491.3
4.6	.007				100.0	7002.2

WEIGHTED CN = 70.0

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
OVERLAND	180	17	.023			
STREET	800	6	.066			
	980	23	.089	.28	1300	2.6 (5yr FLOW)
				1.01		9.4 (100yr FLOW)

BASIN

Sunr A-29

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
5.8		RESIDENTIAL 1/5Ac	A	65	44.6	2900.0
6.1		PARK	A	39	46.9	1830.0
1.1		PARK	B	61	8.5	516.2
13.0	.020				100.0	5246.2

WEIGHTED CN = 52.5

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
PIPE	640	19	.044			
CHANNEL	1480	40	.061			
	2120	59	.105	.01	1260	.2 (5yr FLOW)
				.26		6.8 (100yr FLOW)

BASIN

Sunr A-30

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
1.6		RESIDENTIAL 1/5Ac	A	65	45.7	2971.4
1.9		PARK	A	39	54.3	2117.1
3.5	.005				100.0	5088.6

WEIGHTED CN = 50.9

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
CHANNEL	480	8	.020			
	480	8	.020	.00	1300	.0 (5yr FLOW)
				.22		1.6 (100yr FLOW)

BASINS

Sunr A- 1 ,2

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
37.1		RESIDENTIAL 1 Ac	A	51	35.0	1786.7	
48.7		RESIDENTIAL 1/5Ac	A	65	46.0	2989.1	
4.3		COMMERTIAL	A	81	4.1	328.9	
15.8		STREETS & WALKS	A	98	14.9	1462.1	
105.9	.165				100.0	6566.9	WEIGHTED CN = 65.7

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
OVERLAND	200	12	.033				
STREET	1000	61	.043				
PIPE	1250	15	.045				
	2450	88	.121	.18	1210	35.4	(5yr FLOW)
				.78		157.0	(100yr FLOW)

BASINS

Sunr A- 1 ,2 ,4 ,5

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
37.1		RESIDENTIAL 1 Ac	A	51	31.4	1603.5	
57.1		RESIDENTIAL 1/5Ac	A	65	48.4	3145.3	
1.8		RESIDENTIAL 1/5Ac	B	78	1.5	119.0	
4.3		COMMERTIAL	A	81	3.6	295.2	
17.7		STREETS & WALKS	A	98	15.0	1470.0	
118.0	.184				100.0	6633.0	WEIGHTED CN = 66.3

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
OVERLAND	200	12	.033				
STREET	1000	61	.043				
PIPE	1760	25	.053				
	2960	98	.129	.19	1190	41.9	(5yr FLOW)
				.82		179.2	(100yr FLOW)

BASINS

Sunr A- 1 ,2 ,4 ,5 ,3 ,6

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
37.1		RESIDENTIAL 1 Ac	A	51	26.5	1350.5	
74.0		RESIDENTIAL 1/5Ac	A	65	52.8	3433.3	
1.8		RESIDENTIAL 1/5Ac	B	78	1.3	100.2	
4.3		COMMERTIAL	A	81	3.1	248.6	
2.2		PARK	A	39	1.6	61.2	
20.7		STREETS & WALKS	A	98	14.8	1448.0	
140.1	.219				100.0	6641.8	WEIGHTED CN = 66.4

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
OVERLAND	200	12	.033				
STREET	1000	61	.043				
PIPE	1940	28	.058				
	3140	101	.134	.19	1180	49.8	(5yr FLOW)
				.82		212.1	(100yr FLOW)

BASINS

Sunr A- 1 ,2 ,4 ,5 ,3 ,6 ,7 ,9

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
37.1		RESIDENTIAL 1 Ac	A	51	24.7	1262.2	
75.3		RESIDENTIAL 1/5Ac	A	65	50.2	3265.2	
8.9		RESIDENTIAL 1/5Ac	B	78	5.9	463.1	
4.3		COMMERTIAL	A	81	2.9	232.4	
2.2		PARK	A	39	1.5	57.2	
20.7		STREETS & WALKS	A	98	13.8	1353.3	
1.4		STREETS & WALKS	B	98	.9	91.5	
149.9	.234				100.0	6724.9	WEIGHTED CN = 67.2

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
OVERLAND	200	12	.033				
STREET	1000	61	.043				
PIPE	2880	33	.101				
	4080	106	.177	.21	1100	54.5	(5yr FLOW)
				.86		222.3	(100yr FLOW)

BASINS

Sunr A- 1 ,2 ,3 ,4 ,5 ,6 ,7 ,8 ,9

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
37.1		RESIDENTIAL 1 Ac	A	51	23.9	1217.6	
75.3		RESIDENTIAL 1/5Ac	A	65	48.5	3149.6	
13.6		RESIDENTIAL 1/5Ac	B	78	8.8	682.6	
4.3		COMMERTIAL	A	81	2.8	224.1	
2.2		PARK	A	39	1.4	55.2	
20.7		STREETS & WALKS	A	98	13.3	1305.4	
2.2		STREETS & WALKS	B	98	1.4	138.7	
155.4	.243				100.0	6773.3	WEIGHTED CN = 67.7

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
OVERLAND	200	12	.033				
STREET	1000	61	.043				
PIPE	2880	33	.101				
	4080	106	.177	.22	1100	59.5 (5yr FLOW)	
				.89		237.0 (100yr FLOW)	

BASINS

Sunr A- 1 ,2 ,3 ,4 ,5 ,6 ,7 ,8 ,9 ,10

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
37.1		RESIDENTIAL 1 Ac	A	51	22.9	1170.1	
79.7		RESIDENTIAL 1/5Ac	A	65	49.3	3203.8	
14.6		RESIDENTIAL 1/5Ac	B	78	9.0	704.3	
4.3		COMMERTIAL	A	81	2.7	215.4	
2.2		PARK	A	39	1.4	53.1	
21.6		STREETS & WALKS	A	98	13.4	1309.1	
2.2		STREETS & WALKS	B	98	1.4	133.3	
161.7	.253				100.0	6789.1	WEIGHTED CN = 67.9

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
OVERLAND	200	12	.033				
STREET	1000	61	.043				
PIPE	3080	34	.108				
	4280	107	.184	.23	1090	62.3 (5yr FLOW)	
				.90		246.6 (100yr FLOW)	

BASINS

Sunr A- 1 ,2 ,3 ,4 ,5 ,6 ,7 ,8 ,9 ,10,11,12

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
37.1		RESIDENTIAL 1 Ac	A	51	21.4	1092.4
88.8		RESIDENTIAL 1/5Ac	A	65	51.3	3332.6
15.3		RESIDENTIAL 1/5Ac	B	78	8.8	689.0
4.3		COMMERTIAL	A	81	2.5	201.1
2.2		PARK	A	39	1.3	49.5
23.3		STREETS & WALKS	A	98	13.5	1318.4
2.2		STREETS & WALKS	B	98	1.3	124.5
173.2	.271				100.0	6807.5

WEIGHTED CN = 68.1

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
OVERLAND	200	12	.033			
STREET	1000	61	.043			
PIPE	3900	39	.143			
	5100	112	.219	.23	1030	64.3 (5yr FLOW)
				.91		252.3 (100yr FLOW)

BASINS

Sunr A- 13,14

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
13.7		RESIDENTIAL 1/5Ac	B	78	85.6	6678.8	
2.3		STREETS & WALKS	B	98	14.4	1408.8	
16.0	.025				100.0	8087.5	WEIGHTED CN = 80.9

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
STREET	2210	52	.142				
	2210	52	.142	.66	1170	19.4	(5yr FLOW)
				1.70		49.7	(100yr FLOW)

BASINS

Sunr A- 13,14,15

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
17.2		RESIDENTIAL 1/5Ac	B	78	85.6	6674.6	
2.9		STREETS & WALKS	B	98	14.4	1413.9	
20.1	.031				100.0	8088.6	WEIGHTED CN = 80.9

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
STREET	2490	53	.156				
	2490	53	.156	.66	1140	23.8	(5yr FLOW)
				1.70		60.9	(100yr FLOW)

BASINS

Sunr A- 13,14,15,16

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
23.2		RESIDENTIAL 1/5Ac	B	78	85.3	6652.9	
4.0		STREETS & WALKS	B	98	14.7	1441.2	
27.2	.043				100.0	8094.1	WEIGHTED CN = 80.9

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
STREET	2180	67	.163				
PIPE	120	1	.005				
	2300	68	.168	.67	1120	31.7	(5yr FLOW)
				1.70		81.1	(100yr FLOW)

BASINS

Sunr A- 13,14,15,16,20

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
.2		RESIDENTIAL 1/5Ac	A	65	.6	37.1	
28.2		RESIDENTIAL 1/5Ac	B	78	80.6	6284.6	
6.6		STREETS & WALKS	B	98	18.9	1848.0	
35.0	.055				100.0	8169.7	WEIGHTED CN = 81.7

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
STREET	2810	67	.163				
PIPE	340	4	.010				
	3150	71	.173	.70	1110	42.6	(5yr FLOW)
				1.76		106.8	(100yr FLOW)

SUNRISE DEVELOPMENT - MASTER DRAINAGE STUDY MARCH 1984

BASINS

Sunr A- 17,18,19

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
16.4		P.U.D.	B	85	58.2	4943.3	
10.0		RESIDENTIAL 1/5Ac	B	78	35.5	2766.0	
1.8		STREETS & WALKS	B	98	6.4	625.5	
28.2	.044				100.0	8334.8	WEIGHTED CN = 83.3

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
SHEET	1180	30	.106				
	1180	30	.106	.78	1250	43.1	(5yr FLOW)
				1.89		103.8	(100yr FLOW)

BASINS

Sunr A- 13,14,15,16,17,18,19,20

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
16.4		P.U.D.	B	85	25.9	2205.7
.2		RESIDENTIAL 1/5Ac	A	65	.3	20.6
38.2		RESIDENTIAL 1/5Ac	B	78	60.4	4714.6
8.4		STREETS & WALKS	B	98	13.3	1302.5
63.2	.099				100.0	8243.4

WEIGHTED CN = 82.4

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
STREET	2810	67	.163			
PIPE	340	4	.010			
	3150	71	.173	.74	1110	80.7 (5yr FLOW)
				1.82		199.0 (100yr FLOW)

BASINS

Sunr A- 23,24

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
15.3		P.U.D.	B	85	67.7	5754.4
6.0		COMMERTIAL	B	92	26.5	2442.5
1.3		STREETS & WALKS	B	98	5.8	563.7
22.6	.035				100.0	8760.6

WEIGHTED CN = 87.6

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
SHEET	600	24	.042			
STREET	670	11	.053			
	1270	35	.095	1.02	1290	46.5 (5yr FLOW)
				2.23		101.8 (100yr FLOW)

BASINS

Sunr A- 13,14,15,16,17,18,19,20,21,23,24

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
31.7		P.U.D.	B	85	35.9	3048.1	
.2		RESIDENTIAL 1/5Ac	A	65	.2	14.7	
38.2		RESIDENTIAL 1/5Ac	B	78	43.2	3370.6	
6.0		COMMERTIAL	B	92	6.8	624.4	
12.3		STREETS & WALKS	B	98	13.9	1363.6	
88.4	.138				100.0	8421.4	WEIGHTED CN = 84.2

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
STREET	2810	67	.163				
PIPE	910	13	.023				
	3720	80	.186	.83	1090	124.5 (5yr FLOW)	
				1.95		294.1 (100yr FLOW)	

BASINS

Sunr A- 13,14,15,16,17,18,19,20,21,23,24,25,26

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
31.7		P.U.D.	B	85	28.0	2378.2	
7.5		RESIDENTIAL 1/5Ac	A	65	6.6	430.3	
52.0		RESIDENTIAL 1/5Ac	B	78	45.9	3579.9	
6.0		COMMERTIAL	B	92	5.3	487.2	
16.1		STREETS & WALKS	B	98	14.2	1392.6	
113.3	.177				100.0	8268.1	WEIGHTED CN = 82.7

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
STREET	2810	67	.163				
PIPE	1820	36	.038				
	4630	103	.201	.75	1070	141.8 (5yr FLOW)	
				1.83		347.4 (100yr FLOW)	

BASINS

Sunr A- 13,14,15,16,17,18,19,20,21,23,24,25,26,22

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
31.7		P.U.D.	B	85	22.1	1876.4	
7.5		RESIDENTIAL 1/5Ac	A	65	5.2	339.5	
52.0		RESIDENTIAL 1/5Ac	B	78	36.2	2824.5	
6.0		RESIDENTIAL 1/4Ac	A	61	4.2	254.9	
19.8		RESIDENTIAL 1/4Ac	B	75	13.8	1034.1	
6.0		COMMERTIAL	B	92	4.2	384.4	
4.5		STREETS & WALKS	A	98	3.1	307.1	
16.1		STREETS & WALKS	B	98	11.2	1098.7	
143.6	.224				100.0	8119.6	WEIGHTED CN = 81.2

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
STREET	2810	67	.163				
PIPE	2220	40	.048				
	5030	107	.211	.68	1050	159.7 (5yr FLOW)	
				1.72		405.9 (100yr FLOW)	

BASINS

Sunr A- 27,28

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
8.2		RESIDENTIAL 1/5Ac	A	65	65.6	4264.0	
2.4		RESIDENTIAL 1/5Ac	B	78	19.2	1497.6	
.7		STREETS & WALKS	A	98	5.6	548.8	
1.2		STREETS & WALKS	B	98	9.6	940.8	
12.5	.020				100.0	7251.2	WEIGHTED CN = 72.5

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
OVERLAND	125	8	.018				
STREET	1620	47	.067				
	1745	55	.085	.35	1300	8.9 (5yr FLOW)	
				1.15		29.2 (100yr FLOW)	

BASINS

Sunr A- 1 ,2 ,3 ,4 ,5 ,6 ,7 ,8 ,9 ,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
37.1		RESIDENTIAL 1 Ac	A	51	10.8	552.8	
31.7		P.U.D.	B	85	9.3	787.2	
110.3		RESIDENTIAL 1/5Ac	A	65	32.2	2094.5	
69.7		RESIDENTIAL 1/5Ac	B	78	20.4	1588.3	
6.0		RESIDENTIAL 1/4Ac	A	61	1.8	106.9	
19.8		RESIDENTIAL 1/4Ac	B	75	5.8	433.8	
4.3		COMMERTIAL	A	81	1.3	101.8	
6.0		COMMERTIAL	B	92	1.8	161.3	
8.3		PARK	A	39	2.4	94.6	
1.1		PARK	B	61	.3	19.6	
28.5		STREETS & WALKS	A	98	8.3	816.0	
19.5		STREETS & WALKS	B	98	5.7	558.3	
342.3	.535				100.0	7314.9	WEIGHTED CN = 73.1

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
STREET	2810	67	.163				
PIPE	2820	48	.061				
	5630	115	.224	.37	1030	204.0	(5yr FLOW)
				1.19		654.7	(100yr FLOW)

BASINS

SunrA

SunrAB- 1 ,2 ,3 ,4 ,5 ,6 ,7 ,8 ,9 ,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,~~31,32,33,34~~

SunrB

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
37.1		RESIDENTIAL 1 Ac	A	51	9.9	503.9
6.4		P.U.D.	A	77	1.7	131.2
31.7		P.U.D.	B	85	8.4	717.6
125.5		RESIDENTIAL 1/5Ac	A	65	33.4	2172.4
75.0		RESIDENTIAL 1/5Ac	B	78	20.0	1557.9
6.0		RESIDENTIAL 1/4Ac	A	61	1.6	97.5
19.8		RESIDENTIAL 1/4Ac	B	75	5.3	395.5
4.3		COMMERTIAL	A	81	1.1	92.8
6.0		COMMERTIAL	B	92	1.6	147.0
10.2		PARK	A	39	2.7	105.9
1.1		PARK	B	61	.3	17.9
31.8		STREETS & WALKS	A	98	8.5	829.9
20.6		STREETS & WALKS	B	98	5.5	537.6
375.5	.587				100.0	7307.1

WEIGHTED CN = 73.1

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
STREET	2810	67	.163				
PIPE	2810	48	.061				
CHANNEL	440	6	.007				
	6060	121	.231	.37	1010	218.1	(5yr FLOW)
				1.18		701.6	(100yr FLOW)

BASIN

Sunr B- 1

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
.6		RESIDENTIAL 1/5Ac	A	65	8.6	557.1
5.3		RESIDENTIAL 1/5Ac	B	78	75.7	5905.7
1.1		STREETS & WALKS	B	98	15.7	1540.0
7.0	.011				100.0	8002.9

WEIGHTED CN = 80.0

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
OVERLAND	130	4	.030			
STREET	750	21	.074			
	880	25	.104	.63	1260	8.6 (5yr FLOW)
				1.64		22.6 (100yr FLOW)

BASIN

Sunr B- 2

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
5.4		RESIDENTIAL 1/5Ac	A	65	85.7	5571.4
.9		STREETS & WALKS	A	98	14.3	1400.0
6.3	.010				100.0	6971.4

WEIGHTED CN = 69.7

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
OVERLAND	200	4	.056			
STREET	1250	42	.097			
	1450	46	.153	.27	1140	3.1 (5yr FLOW)
				.99		11.1 (100yr FLOW)

BASIN

Sunr B- 3

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
5.8		RESIDENTIAL 1/5Ac	A	65	85.3	5544.1
1.0		STREETS & WALKS	A	98	14.7	1441.2
6.8	.011				100.0	6985.3

WEIGHTED CN = 69.9

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
STREET	1160	43	.083			
	1160	43	.083	.28	1300	3.8 (5yr FLOW)
				1.00		13.8 (100yr FLOW)

BASIN

Sunr B- 4

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
6.4		P.U.D.	A	77	66.7	5133.3
1.8		RESIDENTIAL 1/5Ac	A	65	18.8	1218.8
1.4		STREETS & WALKS	A	98	14.6	1429.2
9.6	.015				100.0	7781.3

WEIGHTED CN = 77.8

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
SHEET	330	16	.061			
STREET	1000	46	.067			
	1330	62	.128	.53	1200	9.6 (5yr FLOW)
				1.48		26.7 (100yr FLOW)

BASINS

Sunr B- 1 ,2 ,3 ,4

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
6.4		P.U.D.	A	77	21.5	1659.3	
13.6		RESIDENTIAL 1/5Ac	A	65	45.8	2976.4	
5.3		RESIDENTIAL 1/5Ac	B	78	17.8	1391.9	
3.3		STREETS & WALKS	A	98	11.1	1088.9	
1.1		STREETS & WALKS	B	98	3.7	363.0	
29.7	.046				100.0	7479.5	WEIGHTED CN = 74.8

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
OVERLAND	130	4	.030				
STREET	2010	67	.108				
	2140	71	.138	.42	1170	23.0	(5yr FLOW)
				1.29		70.0	(100yr FLOW)

BASIN

Sunr C- 1

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
9.3		RESIDENTIAL 1/5Ac	B	78	84.5	6594.5	
1.7		STREETS & WALKS	B	98	15.5	1514.5	
11.0	.017				100.0	8109.1	WEIGHTED CN = 81.1

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
OVERLAND	220	24	.010				
STREET	1835	45	.164				
	2055	69	.174	.67	1110	12.8 (5yr FLOW)	
				1.72		32.7 (100yr FLOW)	

BASIN

Sunr C- 2

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
5.5		RESIDENTIAL 1/5Ac	B	78	84.6	6600.0	
1.0		STREETS & WALKS	B	98	15.4	1507.7	
6.5	.010				100.0	8107.7	WEIGHTED CN = 81.1

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
OVERLAND	200	19	.025				
STREET	1100	35	.087				
	1300	54	.112	.67	1240	8.5 (5yr FLOW)	
				1.71		21.6 (100yr FLOW)	

BASIN

Sunr C- 3

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
2.2		RESIDENTIAL 1/5Ac	B	78	84.6	6600.0	
.4		STREETS & WALKS	B	98	15.4	1507.7	
2.6	.004				100.0	8107.7	WEIGHTED CN = 81.1

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
STREET	780	43	.047				
	780	43	.047	.67	1300	3.6 (5yr FLOW)	
				1.71		9.1 (100yr FLOW)	

BASIN

Sunr C- 4

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
4.3		RESIDENTIAL 1/5Ac	B	78	51.8	4041.0	
2.8		PARK	B	61	33.7	2057.8	
1.2		STREETS & WALKS	B	98	14.5	1416.9	
8.3	.013				100.0	7515.7	WEIGHTED CN = 75.2

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
OVERLAND	350	12	.075				
STREET	610	13	.057				
	960	25	.132	.44	1190	6.7 (5yr FLOW)	
				1.31		20.2 (100yr FLOW)	

BASIN

Sunr C- 5

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
8.9		RESIDENTIAL 1/5Ac	B	78	84.8	6611.4	
1.6		STREETS & WALKS	B	98	15.2	1493.3	
10.5	.016				100.0	8104.8	WEIGHTED CN = 81.0

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
STREET	1790	67	.128				
	1790	67	.128	.67	1200	13.2 (5yr FLOW)	
				1.71		33.7 (100yr FLOW)	

BASIN

Sunr C- 6

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
1.0		RESIDENTIAL 1/5Ac	A	65	16.9	1101.7	
4.0		RESIDENTIAL 1/5Ac	B	78	67.8	5288.1	
.9		STREETS & WALKS	B	98	15.3	1494.9	
5.9	.009				100.0	7884.7	WEIGHTED CN = 78.8

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
STREET	1450	68	.109				
	1450	68	.109	.58	1250	6.6 (5yr FLOW)	
				1.56		17.9 (100yr FLOW)	

BASIN

Sunr C- 7

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
3.1		COMMERTIAL	A	89	42.5	3779.5	
4.2		COMMERTIAL	B	92	57.5	5293.2	
7.3	.011				100.0	9072.6	WEIGHTED CN = 90.7

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
SHEET	350	10	.030				
STREET	810	49	.047				
	1160	59	.077	1.23	1300	18.3	(5yr FLOW)
				2.52		37.3	(100yr FLOW)

BASINS

Sunr C- 2 ,3

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
7.7		RESIDENTIAL 1/5Ac	B	78	84.6	6600.0	
1.4		STREETS & WALKS	B	98	15.4	1507.7	
9.1	.014				100.0	8107.7	WEIGHTED CN = 81.1

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
OVERLAND	200	19	.025				
STREET	1100	35	.087				
	1300	54	.112	.67	1240	11.9 (5yr FLOW)	
				1.71		30.2 (100yr FLOW)	

BASINS

Sunr C- 1 ,2 ,3

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
17.0		RESIDENTIAL 1/5Ac	B	78	84.6	6597.0	
3.1		STREETS & WALKS	B	98	15.4	1511.4	
20.1	.031				100.0	8108.5	WEIGHTED CN = 81.1

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
OVERLAND	220	24	.010				
STREET	2035	46	.164				
	2255	70	.174	.67	1110	23.5 (5yr FLOW)	
				1.71		59.8 (100yr FLOW)	

BASINS

Sunr C- 1 ,2 ,3 ,4 ,5

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
30.2		RESIDENTIAL 1/5Ac	B	78	77.6	6055.5	
2.8		PARK	B	61	7.2	439.1	
5.9		STREETS & WALKS	B	98	15.2	1486.4	
38.9	.061				100.0	7981.0	WEIGHTED CN = 79.8

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
OVERLAND	220	24	.010				
STREET	2450	86	.179				
	2670	110	.189	.62	1090	40.8 (5yr FLOW)	
				1.62		107.5 (100yr FLOW)	

BASINS

Sunr C- 1 ,2 ,3 ,4 ,5 ,6

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
1.0		RESIDENTIAL 1/5Ac	A	65	2.2	145.1
34.2		RESIDENTIAL 1/5Ac	B	78	76.3	5954.5
2.8		PARK	B	61	6.3	381.3
6.8		STREETS & WALKS	B	98	15.2	1487.5
44.8	.070				100.0	7968.3

WEIGHTED CN = 79.7

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
OVERLAND	220	24	.010				
STREET	2650	90	.194				
	2870	114	.204	.61	1060	45.3	(5yr FLOW)
				1.61		119.7	(100yr FLOW)

BASINS

Sunr C- 1 ,2 ,3 ,4 ,5 ,6 ,7

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN
1.0		RESIDENTIAL 1/5Ac	A	65	1.9	124.8
34.2		RESIDENTIAL 1/5Ac	B	78	65.6	5120.2
3.1		COMMERTIAL	A	89	6.0	529.6
4.2		COMMERTIAL	B	92	8.1	741.7
2.8		PARK	B	61	5.4	327.8
6.8		STREETS & WALKS	B	98	13.1	1279.1
52.1	.081				100.0	8123.0

WEIGHTED CN = 81.2

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
OVERLAND	220	24	.010				
STREET	2650	90	.194				
	2870	114	.204	.68	1060	58.6	(5yr FLOW)
				1.73		148.9	(100yr FLOW)

SUNRISE DEVELOPMENT - MASTER DRAINAGE STUDY MARCH 1984

BASIN

Sunr D- 1

ACREAGE	SQ.MI.	LAND USE	SOIL	CN	%	% x CN	
9.2		RESIDENTIAL 1/5Ac	B	78	73.6	5740.8	
1.7		PARK	B	69	13.6	938.4	
1.6		STREETS & WALKS	B	98	12.8	1254.4	
12.5	.020				100.0	7933.6	WEIGHTED CN = 79.3

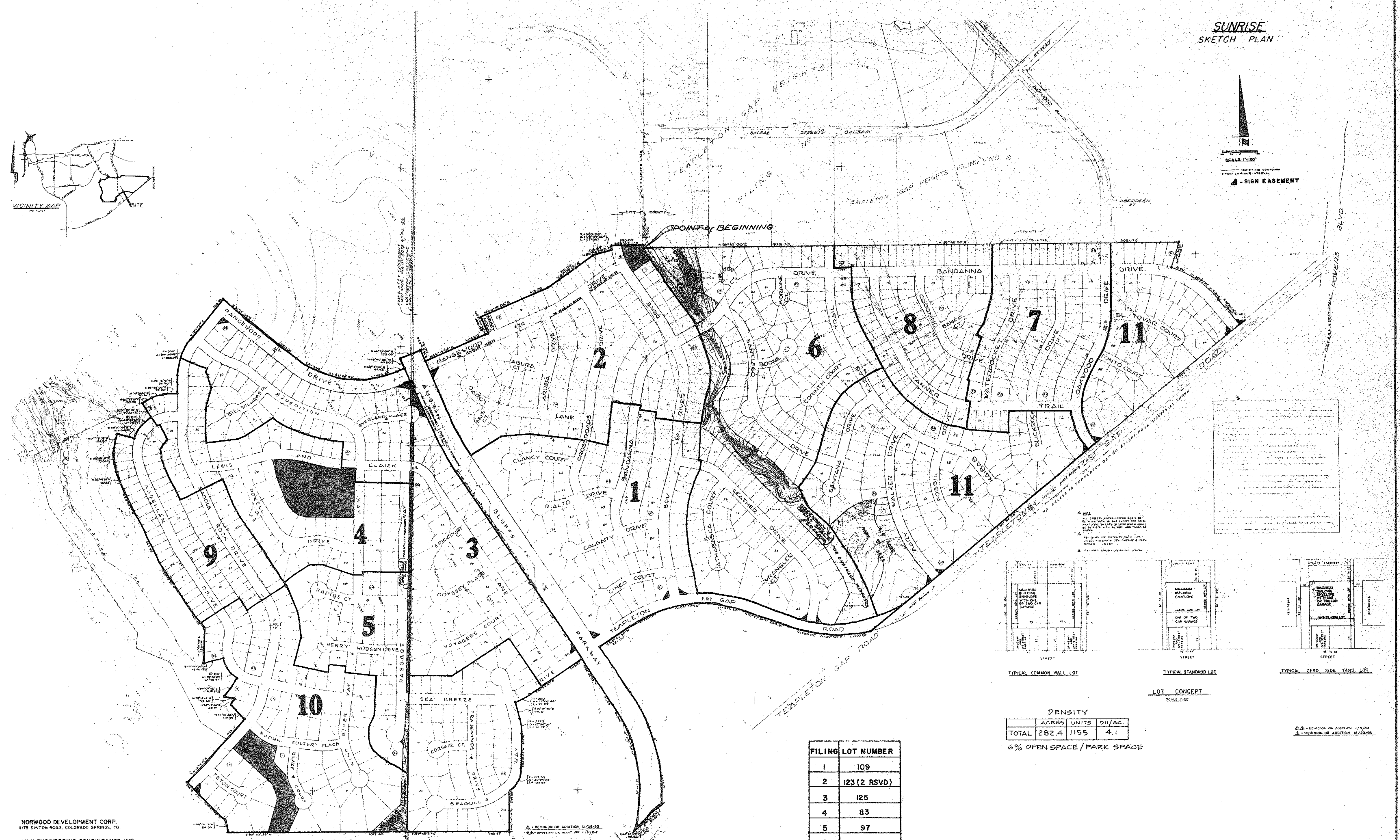
FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)	
OVERLAND	110	9	.015				
STREET	970	43	.075				
PIPE	120	13	.002				
	1200	65	.092	.60	1300	15.1	(5yr FLOW)
				1.59		40.4	(100yr FLOW)


SUNRISE
DRAINAGE PLAN
MARCH 1984
SCALE 1"=100'
EXISTING CONTOURS
2 FOOT CONTOUR INTERVAL
LEGEND:
5 YEAR SUB-BASIN FLOW, cfs
100 YEAR SUB-BASIN FLOW, cfs
5 YEAR ACCUMULATIVE FLOW, cfs
100 YEAR ACCUMULATIVE FLOW, cfs
SUB-BASIN DESIGNATION
S.C.S. SOILS MAP NUMBER
TEMPLETON GAP HEIGHTS FILING No 2
TEMPLETON GAP HEIGHTS FILING NO. 2
BALSAM STREET
OAKWOOD BLVD.
STREET
ABERDEEN ST.
CITY LIMITS LINE
CITY
COUNTY
N 89° 42' 00" E
3051.70'
NOT PLATTED
BANDANNA
DRIVE
MORAINE CT.
TRAIL
COCONINO
BANFF CT.
EL TOVAR COURT
TONTO
BOONE CT.
SANTA
RANGEWOOD
ABBEY ROAD
POWERS BLVD.
"POWERS NORTH TRAIL"
ROAD
GREENBELT
SHEET NO. 1

LEGEND:
5 YEAR SUB-BASIN FLOW, cfs
100 YEAR SUB-BASIN FLOW, cfs
5 YEAR ACCUMULATIVE FLOW, cfs
100 YEAR ACCUMULATIVE FLOW, cfs
SUB-BASIN DESIGNATION
S.C.S. SOILS MAP NUMBER
NOTE:
ALL STREETS SHOWN HEREON SHALL BE 60' R.O.W. WITH 36' MAT EXCEPT FOR THOSE THAT HAVE 20 LOTS OR LESS WHICH SHALL BE 55' R.O.W. WITH 34' MAT, AND THOSE AS SHOWN.
CITY LIMITS LINE
N 89° 42' 00" E
3051.70'
BANDANNA DRIVE
COCONINO
BANFF CT.
WATERPOCKET DRIVE
EL TOVAR COURT
TONTO COURT
OAKWOOD
TANNER TRAIL
SLICKROCK
KAIBAB
FOSSIL DRIVE
WALKER DRIVE
NARY
SANTANA DRIVE
CORINTH COURT
BOONE CT.
SANTIAGO DRIVE
MORAINE CT.
DUBLOON CT.
GREENBELT & OPEN SPACE FOR DRAINAGE PURPOSES
PARK AREA
4.4 ACRE
LEATHER DRIVE
ATHABASCA COURT
WRANGLER CT.
BOW RIVER DRIVE
BANDANNA DRIVE
CROSSROADS
CLANCY COURT
RIALTO DRIVE
CALGARY DRIVE
CINCO COURT
ARUBA DRIVE
ABURA CT.
DARCY LANE
SEIS CT.
RANGEWOOD DRIVE
AUSTIN BLUFFS PARKWAY
TEMPLETON GAP ROAD
NO ACCESS TO TEMPLETON GAP RD EXCEPT FROM STREETS AS SHOWN
TEMPLETON HEIGHTS SUBDIVISION
POWERS BLVD.
ABERDEEN ST.
SAND CREEK
COTTONWOOD CREEK
DRAINAGE BASIN
NOT PLATTED
SEE SHEET NO. 1
A
B
VICINITY MAP
NO SCALE
SITE
NORWOOD DEVELOPMENT CORP.
4179 SINTON ROAD, COLORADO SPRINGS, CO.
KLH ENGINEERING CONSULTANTS, INC.
206-210 SUTTON LANE, COLORADO SPRINGS, CO.
SHEET 2 of 2

MAY 25 1984

SUNRISE
SKETCH PLAN



DENSITY

	ACRES	UNITS	DU/AC.
TOTAL	282.4	1155	4.1

6% OPEN SPACE / PARK SPACE

FILING	LOT NUMBER
1	109
2	123 (2 RSVD)
3	125
4	83
5	97
6	144
7	84
8	87
9	80
10	85
11	145
TOTAL	1162 (2 RSVD)

NORWOOD DEVELOPMENT CORP.
4179 SINTON ROAD, COLORADO SPRINGS, CO.

KLH ENGINEERING CONSULTANTS, INC.
206 - 210 SUTTON LANE, COLORADO SPRINGS, CO.

JN 83 554 00