ERRATA
JULY 2004

DRAINAGE REPORT

FOR

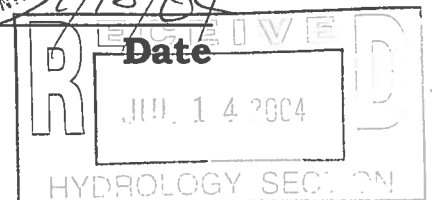# THE RESERVE AT THE TRAILS

A SINGLE-FAMILY
RESIDENTIAL SUBDIVISION

ALBUQUERQUE, NEW MEXICO
APRIL 2004

Prepared by:

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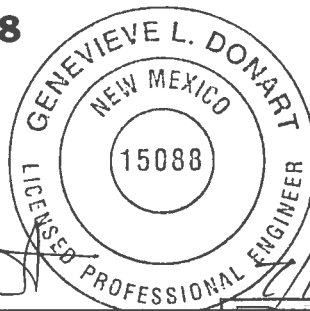
Genevieve L. Donart
Genevieve L. Donart, PE

7/13/04
Date

IV. PROPOSED CONDITIONS

Most of The Reserve at the Trails is contained within Basin G of the BHI Study. The northern row of lots that faces Tree Line Ave and the south half of Tree Line Ave (Basins F10 & F11) drain to Basin F of the BHI Study. No flows from Rainbow Blvd. enter the site. Proposed flows for individual sub-basins are determined based on an area percentage of the overall Basin G and Basin F flows. The overall Basin G has an area of 34.1 acres and a fully-developed 100-year flow of 113.2 cfs. This plan develops 46.4% (15.8 acres) of the 34.1 acres. The overall Basin F has an area of 96.5 acres and a fully-developed 100-year flow of 319.7 cfs. This plan develops 3.6% (3.5 acres) of the 96.5 acres. See the Proposed Runoff Calculations in Appendix A.

This report divides Basins F and G into sub-basins. (See the Proposed Basin Map in Appendix D.) Drainage basin boundaries were determined based on the grades established in the Grading & Drainage Plan, and by street flow capacity and storm drain requirements. (See the Grading & Drainage Plans in Appendix E and Street Flow Capacity Calculations in Appendix B.) Grading was strongly affected by the subsurface basalt layer, as well as sewer and storm drain bury depths.

Proposed flows from Basins G1 through G9 are directed east through a storm drain system from Hallston Trail to Pond G. The storm drain system is sized to also carry future developed flows from the adjacent portions of Woodmont Rd. (See the HydraFlow Storm Drain Calculations and Inlet Capacity Calculations in Appendix C.)

Proposed flows from Basins F10 and F11 are directed to Tree Line Ave, where they are captured by inlets that drain to the system as part of the Taos at the Trails subdivision. This storm system also outlets to Pond G.

Pond G was sized as a detention facility at 8.9 Ac-ft by the BHI Study, but the downstream storm drain and pond system required to discharge stormwater from the Pond is not yet designed or constructed. The pond acts as a retention pond until such time as the downstream improvements are constructed. This report sizes the pond at 3.55 Ac-ft to accept the volume of a 100-year, 10-day storm for the developed flows from this project, which is less than the 8.9 Ac-ft required for the final detention pond size. (See the Volume Calculations for Proposed Conditions in Appendix A.) A Covenant & Agreement will be required for this pond.
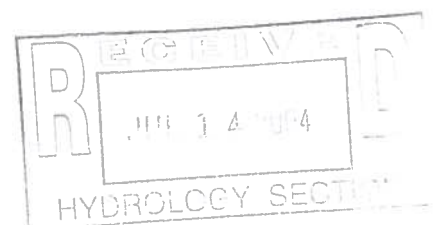
V. SUMMARY & CONCLUSIONS

Based on information in previous sections, it is recommended that the following items be constructed with The Reserve at the Trails:

1. Mountable curb on Winncrest Trail, Winterset Trail, and the portions of Crosswinds Trail west of Lot 40 and Glyndon Trail west of Lot 67.
2. Standard curb on Woodmont Rd, Tree Line Avenue, Hallston Trail, and the portions of Crosswinds Trail east of Lot 41 and Glyndon Trail east of Lot 68.
3. 2 type 'A' single-grate storm inlets at the east end of Crosswinds Trail.
4. 2 type 'C' double-grate sump inlets at the low point in Hallston Trail north of the intersection with Crosswinds Trail.
5. 2 type 'C' single-grate sump inlets at the low point in Woodmont Rd.
6. 1 type 'A' single-grate storm inlet and 1 type 'C' double-grate inlet at the east end of the adjacent portion of Tree Line Ave that connects to a storm drain manhole designed as part of Taos at the Trails.
7. Storm drain as shown on the Grading & Drainage Plan.
8. A temporary retention pond east of the project with appropriate Covenant & Agreements and temporary drainage easement.

APPENDIX A

Runoff & Volume Calculations

PROPOSED RUNOFF CALCULATIONS FOR
THE RESERVE AT THE TRAILS*

BASIN ID	AREA (Ac)	AREA (mi^2)	% AREA OF TOTAL BASIN G	Q_{100} (Calc'd by %)
TOTAL Q100 BASIN G* =	113.2			
TOTAL AREA BASIN G* =	34.1			
Proposed Reserve at the Trails in Basin G				
G1	1.8414	0.0029	5.4%	6.11
G2	1.0852	0.0017	3.2%	3.60
G3	1.8757	0.0029	5.5%	6.23
G4	1.2863	0.0020	3.8%	4.27
G5	2.2240	0.0035	6.5%	7.38
G6	1.0768	0.0017	3.2%	3.57
G7	3.4780	0.0055	10.2%	11.55
G8	0.7540	0.0012	2.2%	2.50
G9	2.2000	0.0046	6.5%	7.30
	15.8215	0.0260	46.4%	**52.52**

BASIN ID	AREA (Ac)	AREA (mi^2)	% AREA OF TOTAL BASIN F	Q_{100} (Calc'd by %)
TOTAL Q100 BASIN F* =	319.7			
TOTAL AREA BASIN F* =	96.5			
Proposed Reserve at the Trails in Basin F				
F10	3.0120	0.0042	3.1%	9.98
F11	0.4880	0.0042	0.5%	1.62
	3.5000	0.0085	3.6%	**11.60**

TOTAL AREA =	**19.3215**		**TOTAL FLOW =**	**64.12**

* Q_{100} quantities and basin areas based on a percentage of the
flows calculated for Basins F & G in the "Master Drainage Study
for The Trails Subdivision" dated 12/10/03 prepared by
Bohannan-Huston, Inc.

VOLUME CALCULATIONS FOR DEVELOPED CONDITIONS (V_{100})

100-YEAR, 6-HOUR STORM

Per the City of Albuquerque D.P.M. Section 22.2

PROJECT NAME: Reserve at the Trails

JOB NUMBER: 1325

E_{360} EXCESS PRECIPITATION (in.)

PRECIP ZONE	A	B	C	D
1	0.44	0.67	0.99	1.97
2	0.53	0.78	1.13	2.12
3	0.66	0.92	1.29	2.36
4	0.80	1.08	1.46	2.64

% LAND TREATMENTS

	TREAT TYPE 1	TREAT TYPE 2	TREAT TYPE 3	TREAT TYPE 4
A	0	0	0	0
B	25	25	25	0
C	25	25	25	0
D	50	50	50	0
∑% =	100	100	100	0

PRECIPITATION ZONE: 1

TREATMENT TYPE 1

BASIN #	A_TOTAL	LAND TREATMENT AREAS (Ac) A_A	A_B	A_C	A_D	V_{100} (Ac-ft)	V_{100} (cu.ft.)	REMARKS
G1	1.8414	0	0.46	0.46	0.92	0.2148	9358.0	
G2	1.0852	0	0.27	0.27	0.54	0.1266	5515.0	
G3	1.8757	0	0.47	0.47	0.94	0.2188	9532.3	
G4	1.2863	0	0.32	0.32	0.64	0.1501	6537.0	
G5	2.224	0	0.56	0.56	1.11	0.2595	11302.4	
G6	1.0768	0	0.27	0.27	0.54	0.1256	5472.3	
G7	3.478	0	0.87	0.87	1.74	0.4058	17675.2	
G8	0.754	0	0.19	0.19	0.38	0.0880	3831.8	
G9	2.200	0	0.55	0.55	1.10	0.2567	11180.4	
F10	3.012	0	0.75	0.75	1.51	0.3514	15307.0	
F11	0.488	0	0.12	0.12	0.24	0.0569	2480.0	
	19.3214				9.66	2.2542	98191.4	

RETENTION POND VOLUMES
FOR 100-YEAR, 10-DAY STORM

PROJECT NAME: **Reserve at the Trails**
JOB NUMBER: 1325

POND G

P_{360} =	2.25 in	(from Fig. C-2, COA DPM)
P_{1440} =	2.72 in	(from Fig. C-3, COA DPM)

V_{360} =	2.25 Ac-ft	(from Volume calcs)
A_D =	9.66 Ac	

$P_{10day} = 10 - [24.9/(P_{1440})^{1.4}]$

P_{10day} = 3.865165 in

$V_{10day} = V_{360} + A_D(P_{10day} - P_{360})/12$

V_{10day} = 3.5502 Ac-ft   => 154647 cu. ft.

APPENDIX B

Street Flow Capacity

THE RESERVE AT THE TRAILS

STREET FLOW DEPTH SUMMARY

STREET	LOCATION	STREET WIDTH	CURB TYPE	SLOPE (ft/ft)	Q_{100} (cfs)	DEPTH (ft)
GLYNDON TR	AP1	28' F-F	MTBL	0.0650	6.1	0.17
GLYNDON TR	AP2	28' F-F	MTBL	0.0400	9.7	0.22
GLYNDON TR	AP3	28' F-F	STD	0.0400	15.9	0.34
HALLSTON TR	AP4	28' F-F	STD	0.0050	32.2	0.59
WINNCREST TR	AP5	28' F-F	MTBL	0.0050	7.4	0.29
CROSSWINDS TR	AP5	28' F-F	MTBL	0.0400	7.4	0.20
CROSSWINDS TR	AP6	28' F-F	MTBL	0.0400	11	0.23
CROSSWINDS TR	AP7	28' F-F	STD	0.0247	22.6	0.41
WOODMONT RD	AP8	76' F-F	STD	0.0050	7.3	0.37
TREE LINE AVE	AP9	48' F-F	STD	0.0564	20	0.35
TREE LINE AVE	AP10	48' F-F	STD	0.0072	7.2	0.35

3.7 CFS NORTH SIDE
10 CFS SOUTH SIDE
3.6 CFS SOUTH SIDE

Storm Drain Inlet Table

Inlet ID	Q Upstream (cfs)	Street Grade (%)	Flow Depth (ft)	Inlet Type	Inlet Capacity (cfs)	Q Downstream (cfs)
1 & 2--Crosswinds @ Hallston	22.6	2.47	0.41	'A'	2 @ 6.5 **	9.6
3 & 4--Hallston	32.2	Low Pt	0.59	DBL 'C'	2 @ 16.2 *	0
5 & 6--Woodmont Road (Inlet 6 on south side--future)	7.3 (3.7 north side 3.7 south side--future)	Low Pt	0.37	SGL 'C'	1 @ 3.7 * 1 future @ 3.7 *	0
7--Tree Line West inlet	10	5.64	0.35	'A'	1 @ 6.4 **	3.6
8--Tree Line East inlet	3.6	0.72	0.35	DBL 'C'	1 @ 5.0 **	0

* See Sump Inlet Calculations
** Capacity from COA DPM Plate 22.3 D-5

7/8/2004

SUMP INLET CALCULATIONS

GRATE OPEN AREA:
(per COA std dwg #2220, single grate)

GROSS AREA FOR ONE GRATE =	(25 in/12)(40 in/12) =	6.94 SF
LESS BEARING BARS =	(0.5 in/12)(3.33 ft)(13) =	1.80 SF
LESS CROSS BARS =	(0.5 in/12)(7)[(25 in/12)-(13)(0.5 in/12)] =	0.45 SF

NET GRATE OPEN AREA =   **4.69 SF**

GRATE OPEN AREA (assuming 50% clogging factor) =   *2.35 SF*

ORIFICE EQUATION:

$$Q = CA(2gh)^{1/2}$$

Where:

$C =$ 0.67
$A =$ 2.35 ft^2
$g =$ 32.2 ft/sec^2
$h =$ height of the water surface above the grate

CAPACITY CALCULATIONS:

INLET # 3 & 4
LOCATION: Hallston Trail

$h =$ 0.67 ft
$Q_{(capacity)} =$ 10.32 cfs   REQUIRED Q = 16.2 cfs

NUMBER OF GRATES REQUIRED =   2

INLET #   5 & 6 (6=future)
LOCATION: Woodmont Rd

$h =$ 0.67 ft
$Q_{(capacity)} =$ 10.32 cfs   REQUIRED Q = 3.7 cfs

NUMBER OF GRATES REQUIRED =   1