

DRAINAGE REPORT

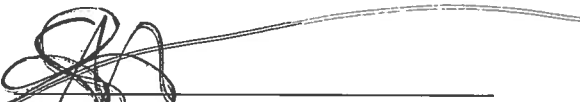
for

**TRACT 6 OF THE TRAILS UNIT II
(SANTA FE AT THE TRAILS UNIT II)
Albuquerque, New Mexico**

JULY 2005

I, Steve J. Salazar, do hereby certify that this report was prepared by me or under my direction and that I am a duly registered Professional Engineer under the laws of the State of New Mexico.





Steve J. Salazar, P.E.
NM No. 16241

7/7/05

Date

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(Located in Pockets)

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Introduction

Wilson & Company prepared this drainage report under contract to Longford Homes. The document provides a basis for the design of storm water conveyance systems within Tract 6 of the Trails Unit II (subject property). The objective of this report is to analyze the hydrologic characteristics associated with the existing and developed conditions.

Tract 6 of the Trails Unit II is a single-family subdivision with 94 total lots within The Trails master planned community. The "Master Drainage Study for The Trails Subdivision", dated December 2003, prepared by Bohannon-Huston, Inc (BHI Study) outlines the major drainage requirements for the entire Trails development. This covers a large area surrounding the subject property. The master planned area will drain through a series of detention ponds to the southeast corner of the Trails project to reduce flows. As established in the "Amendment to The Trails Subdivision Master Drainage Study", dated May 5, 2004 and prepared by Wilson & Company, a future storm drain system (currently under design, COA#761281) is scheduled to carry developed flows from the southeast corner of the Trails south to the Boca Negra Detention Dam. Wilson & Company has revised the BHI Study as the project progresses to more accurately model the drainage conditions. This revised Drainage Master Plan is included in this report as Plate 2 (also referred to as the Overall Pond Grading & Drainage Plan for Future Developed Conditions). The Drainage Master Plan establishes revised Basin, Pond and Hydrologic summary data. Tract 6 of the Trails Unit II drains to Pond G as outlined in the Drainage Master Plan.

Project Description

The proposed development is located within the city limits of Albuquerque, New Mexico. The subject property consists of approximately 19.2 acres of undeveloped land on the west side of Albuquerque, south of Ventana Ranch subdivision. The Trails Subdivision is located on Albuquerque's Northwest Mesa, west of Universe Boulevard and south of Paseo Del Norte. The subject property is bound by Oakridge Street to the east, Woodmont Avenue to the south, The Reserve at the Trails to the west, and Tract 4 at the Trails Unit II to the north. See Exhibit A, Vicinity Map.

There are currently 5 other tracts within the Trails Subdivision that are developed or under construction - Santa Fe at the Trails, Taos at the Trails, Heritage at the Trails Units I and II, and The Reserve at the Trails. The Trails Unit II (COA #730084) is also currently under construction, which includes the development of Woodmont Avenue, Oakridge Street, Rainbow Boulevard, Paseo Del Norte and Universe Boulevard within the boundaries of The Trails Unit II. Also included is the construction of all major drainage facilities necessary for the development of The Trails Unit II, including facilities within Tract 6.

C-9-Z. See Exhibit C for site location on this Zone Atlas Sheet. Tract 6 of Trails Unit II is currently zoned R-D. No portion of Tract 6 lies within the 100-year flood zone based on FIRM Map #35001C0111D dated September 20, 1996. See Exhibit B for site location on the Flood Insurance Rate Map.

Existing Conditions

Tract 6 of Trails Unit II consists of approximately 19.2 acres of undeveloped land on the west side of Albuquerque, south of Ventana Ranch subdivision. Currently, the site is located in a local depression with slopes ranging from 0% to 5% and is covered with native grasses, scrub brush, and exposed basaltic ridges. The soils are classified as Alemeda Sandy Loam (AmB) for slopes based on sheet 10 of Soil survey of Bernalillo County. See Exhibit D for site location on the Soils map. A shallow basaltic layer runs subsurface of the natural grade, and varies in depth from 0 ft to 9 ft. Offsite flows from Taos and The Reserve to the west are currently collected by storm drain and conveyed to Pond G (currently under construction), which acts as a retention pond in the existing conditions. Offsite flows from Tract 4 to the north will pond within Tract 4 due to the development of The Trails Unit II storm drain system, which will create a berm along future Treeline Avenue (currently under construction).

Developed Conditions

(Refer to Plates 1 & 2 – Interim and Developed Conditions)

The developed site will consist of 94 lots of single-family housing. Most of the Tract 6 of Trails Unit II is contained within Basin G of the Drainage Master Plan. The northern row of lots that faces Tree line Ave and the south half of Tree Line Ave are part of Basin F of the Drainage Master Plan. 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 31.9 acres and a fully developed 100-year flow of 106 cfs. This plan develops 54.7% (17.46 acres) of the total 31.9 acres. The overall Basin F has an area of 82.9 acres and a fully developed 100-year flow of 275 cfs. This plan and the offsite improvements for Tree Line Ave develop 2.1% (1.74 acres) of the total 82.9 acres.

This report divides the proposed development into sub-basins. (See the proposed Basin Map in Plate 4). 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 Plate 3 and Street Flow Capacity Calculations in Appendix C). Grading was affected mostly by the grading of Pond G and the storm drain design per The Trails Unit II Construction Plans.

Proposed flows from Sub-Basins 2 through 5 are directed through a storm drain system to Pond G. Proposed flows from Sub-Basin 1 and portions of Oakridge Street is directed through a storm drain system to Pond F. (See the HydraFlow Storm Drain Calculations and Inlet Capacity Calculations in Appendix D).

In the interim, Pond G will be plugged to retain upstream flows. According to the Trails Unit II Construction Plans, Pond E, Pond G and Pond K are to be plugged to act as retention ponds. Due to the interim conditions analysis for this report, it is recommended that Pond F and Pond D also be plugged to prevent flooding within Tract 6. With these two ponds plugged, all Ponds within The Trails Unit II safely retain the 100-year, 10 day event, with the exception of Pond D. In this extreme event, a runoff volume of 1.8 AC-FT from Pond D will safely be conveyed into the natural depression within Tract 4. A volume of 5.64 AC-FT will be retained in Pond G. See Plate 1, Overall Pond Grading & Drainage Plan - Interim Conditions for summary tables. See Appendix A for AHYMO input and output. See Appendix E for 10-day volume calculations.

In the future developed conditions, all ponds will be detention surge ponds. Upstream flows from Santa Fe and Taos at the Trails will be routed through Pond F, and then conveyed through Pond G. Flows from The Reserve at the Trails will flow directly through Pond G. According to the Drainage Master Plan, Pond G will be a surge detention facility with 4.9 Ac-ft of maximum storage, and a storage capacity of 7.49 AC-FT. According to the "Amendment to the Trails Subdivision Master Drainage Study", a maximum of flowrate of 200 cfs is allowed from the Trails Subdivision. According to the revised Drainage Master Plan, a maximum flowrate of 198 cfs will enter the Universe Blvd. storm drain system to the Boca Negra Dam. See Plate 2 for the Overall Pond Grading & Drainage Plan for Developed Conditions.

Once the storm drain from The Trails to the Boca Negra Detention Dam is completed, all of the plugs in the ponds within The Trails Unit II can be removed, creating detention facilities and eliminating the need to retain runoff from the Trails.

The hydrologic analysis for the interim and developed condition was completed using the Arid Lands Hydrologic Model (AHYMO) Version 1997.02. The 100-year 24-hour return frequency storm was used as the basis of analysis. (See Appendices A & B for input and output data). Methodology outlined in Section 22.2 of the City of Albuquerque Development Process Manual was also incorporated into this analysis. Street flows have been evaluated using Flow Master by Haested Methods. Street flows were analyzed for the use of roll type curb where capacities permitted. Inlets are located to prevent exceeding the street flow capacities per the DPM. See Appendix C for street capacity analysis. Storm Drain design and analysis was performed using *Hydraflow*. See Appendix D for *Hydraflow* output.

Grading Plan

The Tract 6 of Trails Unit II Grading Plan is attached as Plate 3. It illustrates the overall grading concept for the Tract 6 of Trails Unit 2 well as the proposed storm drain.

Conclusion

The analysis performed for this report demonstrates that the proposed system of streets and storm drainage improvements will safely convey and retain fully the 100-year storm runoff from the offsite and the onsite basins contributing to the site development. Wilson & Company recommends that the proposed storm drain system undergo regular maintenance activities. This should include removing debris from grate inlets, as well as removing sediment buildup within the pipe system. The Future area contributing flow to the Tract 6 storm drainage system should be analyzed in greater detail at the time of development to ensure that the runoff is within the constraints of this design.

Per The Trails Unit II Construction Plans, plugs at Pond E, Pond G and Pond K are scheduled to be installed. As a result of the interim conditions analysis, Wilson & Company recommends also installing temporary plugs at Pond D and Pond F to retain runoff from the 100-year, 10-day event, until the Universe storm drain to the Boca Negra Detention Dam is constructed.

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) -
INPUT FILE = TRAILS.WPD

- VERSION: 1997.02c

RUN DATE (MON/DAY/YR) =06/28/2005
USER NO. = AHYMO-C-9803c01UNNLIB-AH

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1	NOTATION
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*S THE TRAILS OVERALL DRAINAGE - INTERIM CONDITIONS

*SUMMARY 1 MID. B. PIEDRAS- DEV CONDS WITH BULK - MODIFIED 7/95

START RAINFALL TYPE= 2

SEDIMENT BULK

S

TIME= .00
RAIN24= 2.660
PK BF = 1.00

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*****
*****
***** COMPUTE ONSITE BASINS FROM THE TRAILS SUBDIVISION*****
*****
COMPUTE NM HYD OFFSITE1 - 50 .19980 38.48 4.588 .43051 2.050 .301 PER IMP= .00
*S BASIN A IS CURRENTLY 0% DEVELOPED
COMPUTE NM HYD BASIN.A - 20 .10480 86.57 2.406 .43051 1.500 1.291 PER IMP= .00
*S BASIN D IS CURRENTLY 73% DEVELOPED
COMPUTE NM HYD BASIN.D - 25 .09110 122.40 6.205 1.27718 1.550 2.099 PER IMP= 36.50
*S BASIN C IS CURRENTLY 0% DEVELOPED
COMPUTE NM HYD BASIN.C - 20 .02110 17.06 .484 .43051 1.500 1.263 PER IMP= .00
*S BASIN F IS CURRENTLY 55% DEVELOPED
COMPUTE NM HYD BASIN.F - 20 .12960 196.82 7.347 1.06295 1.500 2.373 PER IMP= 27.50
*S WITH TRACT 6 IMPROVEMENTS, BASIN G IS CURRENTLY 100% DEVELOPED
COMPUTE NM HYD BASIN.G - 20 .04990 105.96 4.292 1.61257 1.500 3.318 PER IMP= 50.00
COMPUTE NM HYD OFFSITE2 - 55 .08050 14.42 1.848 .43051 2.050 .280 PER IMP= .00
*S BASIN B IS CURRENTLY 0% DEVELOPED
COMPUTE NM HYD BASIN.B - 30 .03910 31.61 .898 .43051 1.500 1.263 PER IMP= .00
*S BASIN E IS CURRENTLY 22% DEVELOPED
COMPUTE NM HYD BASIN.E - 30 .12060 132.88 4.377 .68044 1.500 1.722 PER IMP= 11.00
*S BASIN H IS CURRENTLY 16% DEVELOPED
COMPUTE NM HYD BASIN.H - 20 .03110 28.24 1.015 .61193 1.550 1.419 PER IMP= 8.00
*S BASIN I IS CURRENTLY 4% DEVELOPED
COMPUTE NM HYD BASIN.I - 20 .02770 19.34 .703 .47583 1.550 1.091 PER IMP= 2.00
*S BASIN J IS CURRENTLY 15% DEVELOPED
COMPUTE NM HYD BASIN.J - 80 .05140 34.57 1.647 .60067 1.600 1.051 PER IMP= 7.50
ROUTE RESERVOIR POND.J 80 90 .05140 9.86 1.647 .60066 2.050 .300 AC-FT= .863
*S BASIN K IS CURRENTLY 14% DEVELOPED
COMPUTE NM HYD BASIN.K - 85 .07050 55.37 2.215 .58923 1.550 1.227 PER IMP= 7.00
*****
*****
*****RUNOFF FROM THE TRAILS IS CONVEYED TO THE BOCA NEGRA DETENTION FACILITY
*****VIA UNIVERSE SD PER "AMENDMENT TO THE TRAILS SUBDIVISION MASTER DRAINAGE S
*****DATED MAY 5, 2004 BY WILSON & CO.
*****
*****END OF THE TRAILS DRAINAGE ANALYSIS
FINISH
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