

COTTONWOOD CORNERS

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**HYDROLOGY & HYDRAULIC
REPORT for
COTTONWOOD CORNERS
SHOPPING CENTER**
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Prepared For:

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HYDROLOGY & HYDRAULIC REPORT

REPORT DATED MARCH 11, 1996

HYDROLOGY & HYDRAULIC REPORT

PURPOSE:

The purpose of this hydrology report is to provide a hydrologic basis for the design of the drainage facilities for the Cottonwood Corners Project. The study assesses the impact of the proposed Cottonwood Corners development on the off-site drainage systems. The report also analyzes the volume and discharge from the on-site detention basins shown on the grading plan and hydrology map.

EXISTING REPORTS:

Easterling Associates prepared a Drainage Management Plan, dated 7-30-94, which included the project area as well as surrounding areas. In that report, Easterling recommended limiting the discharges from the project site. Following is a summary of their analysis:

AREA 0-1A-1 and 0-2A-1
59.3 Acres
Peak 100 discharge = 197.2 cfs
(3.33 cfs/ac)
Release rate = 40.8 cfs
(.69 cfs/ac)

METHOD OF ANALYSIS:

The drainage criteria used in this report are based on 1991, Section 22.2, Volume 2 Development Process Manual Drainage Criteria. Hydrologic modeling utilizes the AMAFCA version of the AHYMO. The WSPG hydraulic program is used to analyze the hydraulic characteristics of the outlet pipes. The outflow calculations are used to calculate the depths of flow for various flow rates. Head loss at the inlet is calculated based on the velocity calculated for the outlet pipe. The pipe discharge information is then used to determine maximum release rate for the project site.

SYSTEM MODELING:

AMAFCA's version of AHYMO is used to analyze this project. A Type 2, 24-hour rainfall distribution is used with a DT=0.05 hours.

CHANNEL PORTION:

Tracts O-1A-1 and O-1A-2 of Seven Bar Ranch (59.3 acres) do not drain to the storm drain system in Ellison Road, but rather drain to three 30-inch by 42-inch arch-pipe cmps under NM 528 which in turn drains to the stilling basin at the upstream end of Cabezon Channel through a temporary concrete lined trapezoidal channel. SAD No. 223 proposes to construct a retaining wall along the south side of the existing channel to provide at least 2 feet of freeboard.

LOCATION OF DETENTION BASINS:

This hydrology report uses a storm drain and detention basin system to limit the discharge from the site to those levels allowed by the Drainage Management Plan. The location and configuration of the detention basins are shown on the grading plan and hydrology map and have sufficient volumes to provide the necessary on-site storage.

SEDIMENT CONTROL:

The detention basins have been designed to remove the majority of the sediment from flows generated on the undeveloped area before they are discharged to the storm drain system. These basins were designed under the assumption that sediment accumulation will be removed annually and after major storms. The sediment storage volume provided is equal to the average annual sediment yield plus the sediment yield from the 100 year storm. If sediment is removed as previously described, the basins will always have volume available to function properly in the 100 year storm.

SUMMARY OF RESULTS:

TEMPORARY UPPER RESERVOIR (RES-101A)

Area 101A	12.8 ac
Peak inflow	52.4 cfs
Outflow	6.9 cfs
Storage	1.4 ac-ft
Depth in Basin	3.3 ft (WS≈5043.3)

TEMPORARY UPPER RESERVOIR (RES-102A)

Area 101A	12.8 ac
Peak inflow	52.0 cfs
Outflow	6.9 cfs
Storage	1.4 ac-ft
Depth in Basin	3.3 ft (WS≈5039.3)

LOWER PORTION OF SITE

Area 2 =	33.7 ac
Peak inflow	112 cfs

ACTUAL RELEASE RATE =39.3cfs

DISCUSSION OF ANALYSIS:

PEAK FLOW RATES:

The storm drain and detention basin system have been designed to reduce peak flow rates to less than the established allowable flow rates from the Drainage Management Plan (SAD No. 223). Peak flow rates and volumes for the 100-year storm are summarized in the AHYMO report that is included in the appendix.

CONCLUSION:

All drainage facilities have been designed in accordance with the hydrologic methods of AMAFCA'S version of AHYMO. The grading and drainage plan address the drainage constraints of the SAD No.223 Drainage Management Plan by limiting the discharge from the project tributary to the 3-30X48 CMPAs to 40.8 cfs.

COTTON WOOD CORNERS

RAINFALL :

100 YEAR , 24 HOUR RAINFALL

SEE FIGURES C-1, C-2, & C-3

LOCATION: PAGES A-3, A-14, B-13, & B-14 OF THE
ALBUQUERQUE/BERNALILLO COUNTY ZONE ATLAS

$$P_{60} = 1.95 \text{ inches}$$

$$P_{360} = 2.20 \text{ inches}$$

$$P_{1440} = 2.66 \text{ inches}$$

$$DT = 3 \text{ min.} = 0.05 \text{ Hours}$$

$$\text{Time of Concentration} = 6 \text{ minutes}$$

$$T_p = \frac{2}{3} T_c = 4 \text{ minutes} = 0.06666 \text{ Hours}$$

NOTE: T_p used in this report is 3 min, = 0.13333 Hours
 AS THE MINIMUM TO BE USED PER PAGE C-22,
 SUB HEADING 2b OF DPM SECTION 22.2 DATED JAN. 1993.

TREATMENT : D = 70% , B = 10% (COMMERCIAL)