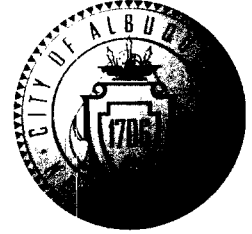


CITY OF ALBUQUERQUE



November 9, 2009

Lawrence D. Read, P.E.
Larry Read & Associates, Inc
2430 Midtown Suite C
Albuquerque, NM 87107

**Re: APD 6th Area Command, 10400 Cibola Loop NW, Grading and Drainage
Plan and Drainage Report**

Engineer's Stamp date 11-9-09 (A13/D020)

Dear Mr. Read,

Based upon the information provided in your submittal received 11-9-09, the above referenced plan is approved for Building Permit and SO 19 Permit. Please attach a copy of this approved plan to the construction sets prior to sign-off by Hydrology.

A separate permit (SO 19) is required for construction within City ROW. A copy of this approval letter must be on hand when applying for the excavation/barricading permit. If there is a Work Order associated with this project, this work is to be included in the Work Order.

To obtain a temporary or permanent CO, Engineer Certification of the Grading Plan per the DPM is required and the storm drain work in the City ROW must be inspected and accepted. Please contact Duane Schmitz, 235-8016, to schedule an inspection.

This project requires a National Pollutant Discharge Elimination System (NPDES) permit for storm water discharge

If you have any questions, you can contact me at 924-3695.

Sincerely,

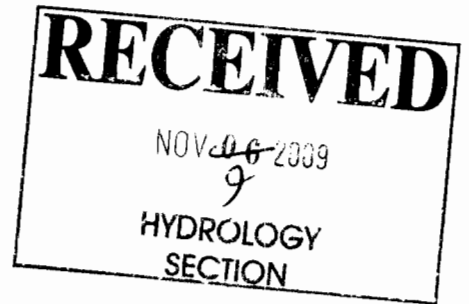
Curtis A. Cherne, P.E.
Senior Engineer, Planning Dept.
Development and Building Services

C: file
Antoinette Baldonado, Excavation and Barricading
Duane Schmitz, Street/Storm Drain Maintenance
Kathy Verhage, DMD

Drainage Report
for
Albuquerque Police Department
6th Area Command Center
Albuquerque, New Mexico

July 31, 2009

Rev. November 2009



Prepared by
Larry D. Read, P.E.
2430 Midtown Place, NE Suite C
Albuquerque, New Mexico 87107
(505) 237-8421

Drainage Report
for
Albuquerque Police Department
6th Area Command Center
Albuquerque, New Mexico

July 31, 2009 (Rev. November 2009)

LOCATION & DESCRIPTION

The proposed site is a 3.4 acre parcel located on the north side of Ellison Drive NW and on the west side of Cibola Loop SW. The site was partially developed in 2008 when the Albuquerque Police Department developed the south portion (Phase I) of the site with a small paved parking area and temporary building. The balance of the site (Phase II) is currently undeveloped.

The Albuquerque Police Department is proposing to construct a 20,900 square foot command center (Phase II) on the site. Along with the building, there will be approximately 67,300 square feet of paved parking and concrete sidewalks. The balance of the site will be landscaping once the new facility is operational and the temporary building removed.

FLOODPLAIN STATUS

This project, as shown on FEMA Flood Insurance Rate Map Panel 35001C0108 G, September 26, 2008, shows that this site is in a Zone X, areas of 100-year flooding with average depths of less than 1 foot or with drainage areas of less than 1 square mile.

METHODOLOGY

The hydrology for this project was analyzed using the Quick Calculation Method presented in the June 1997 release of the City of Albuquerque Development Process Manual, Section 22.2.

EXISTING DRAINAGE

The Phase I development of this project installed additional storm inlets in Cibola Loop and a new area storm inlet behind the curb (and path) at the southeast corner of the site. The predominant slope on the site (historical and current) is sheet flow from the northwest corner of the site toward the southeast corner of the site. The placement of the area drain on the southeast corner of the site intercepts almost all the existing sheet flow and conveys it to the existing storm drain system in Ellison.

The site has some impacts from runoff generated off-site. Along the west property line, the predominant flow is almost parallel to the property line so only minor flows enter the site. When this offsite parcel is developed, the runoff can easily be directed south to Ellison thus eliminating this minor cross lot flow. The flow from the parcel to the north generally flows toward the south southeast within a depression near the center of the north property line. When this offsite parcel is developed, the runoff can be directed westward to Cibola Loop on the adjacent parcel such that it eliminates any impact to this site.

The runoff from this site historically crossed the intersection on Cibola Loop and Ellison in a southeasterly direction, followed the south curb on Ellison to the east where it collected in a large detention pond on the Cibola High School site.

PROPOSED CONDITIONS

The proposed Phase II development on this site will generate runoff in excess of the allowed discharge from the parcels in this area. In order to reduce peak discharge rates, we have proposed a 19,600 cubic foot detention pond on the south end of the property. In addition to main pond, we have proposed 1,976 cubic feet of connected small "landscaping" in the parking medians throughout the parking lot and 270 feet of 18" storm drain line containing up to 451 cubic feet. The landscape ponds function as both retention and detention ponds. They each have a standpipe overflow set such that the lower portion of the pond functions as a retention pond while the area above the rim of the standpipe serves as a detention pond. The discharge from the small ponds and the main pond is controlled using an orifice plate over the end of the existing 12" diameter lateral (installed in Phase I) that connects from the main pond to the area inlet (Phase I) constructed on the southeast corner. In addition to this main discharge, a portion of the roof will discharge through a cistern located on the east side of the building. The excess discharge from the cistern will go through a series of boulder check dams and sidewalk culvert into Cibola Loop.

To address the flow from the parcel north of the site, we are proposing to intercept the flow with a 3' wide concrete channel just inside the north wall. We have proposed leaving openings in the wall (blocks left out) to allow the flow into the site. Once inside the site, the runoff is channeled east into a small plunge pool (de-silting pond) located in the northeast corner of the site. A rock lined swale will discharge the flow to the drive pad where it will be discharged to Cibola Loop

where the existing storm drain and convey it away from this site.

The proposed grading and drainage facilities will assure no impact to adjacent parcels from the development of this site.

The ponding proposed serves to not only mitigate the peak discharge but to help clear the discharge of sediment by allowing it to stand and settle in the pond before it exits the site. This has been proposed since the facility is seeking a LEED Silver Certification.

The total site discharge will be 3.64 cfs. Part of the flow (1.56 cfs) will discharge directly offsite from the drive pads, southeastern parking area, and narrow landscaped areas adjacent to Cibola Loop and Ellison Drive (Basins B3, B4, and B6). The remainder of the flow (2.08 cfs) will discharge to the existing COA storm drain inlet located at the southeastern corner of the site via the new retention/detention pond (Basins B1 and B2) The orifice plate on the discharge line from the pond will limit flows from the pond to 1.92 cfs. The cistern and rock check dams located on the east side of the site will retain all of the flows coming from a portion of the roofed area and the landscaped area along the eastern side of the new building (Basin B5).

Although the discharge planned for this site exceeds the master drainage study (2.15 cfs per SAD 223 Master Drainage Plan) we believe there are several mitigating circumstances that should be considered. First, the regional pond on the Cibola High School site is significantly oversized (per Brad Bingham, PE, COA). Secondly, we have installed one onsite storm inlet in the southeast corner of the site and one new inlet on Cibola Loop near the north end of the site that will reduce stormwater flows in the streets by taking the runoff directly into the storm drain system. And finally, we are near the bottom of the basin so our discharge will be thru the storm drain system before the peak flows from the upper end of the basin can flow this far down in the basin.

Note that the existing temporary building is sited in the middle of the proposed main pond. APD needs this facility to remain in operation until the new facility is operational. To accomplish the ongoing operational need of APD and be able to meet the requirements of this drainage study, we anticipate requesting a Temporary Certificate of Occupancy for a period of as long as 90-days to provide time to APD to move into the new facility, remove the existing temporary building from the site, and finish construction of the pond.

100-YEAR HYDROLOGIC CALCULATIONS

BASIN #	DISCHARGE POINT (SEE G&D PLAN)	BASIN AREA		LAND TREATMENT				WEIGHTED E (in)	V (6-hr) (acre-ft)	V (6-hr) (cu-ft)	V(24 hour) (acre-ft)	V(24 hour) (cu-ft)	Q (cfs)	Q Adjusted w/ orifice plate (P12) & Pond Volumes (cfs)
		(sq. ft.)	(acre)	A (%)	B (%)	C (%)	D (%)							
PROPOSED CONDITIONS														
B1-1	P1	3,492	0.08	0.00	4.07	0.00	95.93	1.92	0.013	558	0.015	653	0.34	
B1-2	P2	9,592	0.22	0.00	2.52	0.00	97.48	1.548	0.036	1,548	0.042	1,813	0.95	
B1-3	P3	19,457	0.45	0.00	1.37	0.00	98.63	1.95	0.073	3,165	0.085	3,709	1.94	
B1-4	P4	3,033	0.07	0.00	10.79	0.00	89.21	1.83	0.011	462	0.012	539	0.29	
B1-5	P5	2,448	0.06	0.00	2.66	0.00	97.34	1.94	0.009	395	0.011	462	0.24	
B1-6	P6	5,968	0.14	0.00	1.09	0.00	98.91	1.96	0.022	973	0.026	1,140	0.60	
B1-7	P7	4,845	0.11	0.00	1.34	0.00	98.66	1.95	0.018	788	0.021	924	0.48	
B1-8	P8	5,049	0.12	0.00	1.29	0.00	98.71	1.95	0.019	822	0.022	963	0.50	
B1-9	P9	3,862	0.09	0.00	7.56	0.00	92.44	1.87	0.014	602	0.016	704	0.37	
B1-10	P10	3,467	0.08	0.00	8.80	0.00	91.20	1.86	0.012	536	0.014	626	0.33	
B1-11	P11	7,751	0.18	0.00	1.82	0.00	98.18	1.95	0.029	1,257	0.034	1,473	0.77	
B1-12	P12	24,108	0.55	0.00	0.00	0.00	100.00	1.97	0.091	3,958	0.107	4,641	2.42	
B1-13	P12	10,288	0.24	0.00	0.00	0.00	100.00	1.97	0.039	1,589	0.045	1,980	1.03	
TOTAL B1	1	103,360	2.37	See Above				25.05	0.385	16,754	0.451	19,627	10.26	Limit of orifice plate in Pond 12
B2	1	1,944	0.04	0.00	27.50	15.00	57.50	1.47	0.005	237	0.006	269	0.16	0.16
Total Q to Existing Storm Drain 10.42 2.08														
B3	2	5,680	0.13	0.00	0.00	23.50	76.50	1.74	0.019	823	0.022	947	0.52	0.52
B4	3	11,750	0.27	0.00	87.00	0.00	13.00	0.84	0.019	822	0.020	865	0.63	0.63
B5	4	19,711	0.45	0.00	30.00	12.00	* 58.00	1.46	0.055	2,402	0.063	2,726	1.58	0.00 100% of flow is retained in cistern & rock check dams
B6	5	2,353	0.05	0.00	43.00	5.00	51.00	1.92	0.013	558	0.014	592	0.18	0.18
B7	6	2,800	0.06	0.00	11.00	41.00	48.00	1.92	0.013	558	0.014	596	0.22	0.22
Total Q Directly to Offsite 3.13 1.56														
TOTAL ALL BASINS		147,598	3.4						0.509	22,154	0.588	25,621	13.55	3.64
		EXCESS PRECIP. PEAK DISCHARGE												
				0.44	0.67	0.99	1.97	E _i (in)						
				1.29	2.03	2.87	4.37	Q _p (cfs)						

D E (in) = (E_a)(%A_a) + (E_b)(%B) + (E_c)(%C) + (E_d)(%D)

V_{surr} (acre-ft) = (WEIGHTED E)/(AREA)/12

V_{total} (acre-ft) = V_{surr} + (A_b)(P_{total} - P_{rwh})/12

S = ((Q_{oa})(A_a) + (Q_{ob})(A_b) + (Q_{oc})(A_c) + (Q_{od})(A_d))

ZONE = 1

P_{rwh} (ft.) = 2.01

P_{surr} (ft.) = 2.35

P_{total} (ft.) = 3.30

POND #	POND AREA (sq. ft.)	POND VOLUME (cu. ft.)
P1	284.25	142
P2	484.3	242
P3	533.2	267
P4	654.6	327
P5	130	65
P6	130	65
P7	130	65
P8	130	65
P9	583.58	292
P10	610	305
P11	281.4	141
P12	10,819	19,588
MAIN SD		451

TOTAL 14,770 22,014

Orifice Flow Equation = $CA(2gh)^{1/2}$

C	D(in)	A (sf)	h (ft)	Q(cfs)
0.6	7.5	0.31	0.50	0.64
0.6	7.5	0.31	1.00	1.22
0.6	7.5	0.31	1.50	1.61
0.6	7.5	0.31	2.00	1.92
0.6	7.5	0.31	2.50	2.18
0.6	7.5	0.31	3.00	2.42
0.6	7.5	0.31	3.50	2.64
0.6	7.5	0.31	4.00	2.84

Area = $(\pi D^2)/4$ for pipe