

DRAINAGE REPORT
for

Multi-Specialty Clinic
2901 Transport St. S.E.

Prepared by:

Tierra West, LLC
5571 Midway Park Place NE
Albuquerque, New Mexico 87109

July 2, 2015

I certify that this report was prepared under my supervision, and I am a registered professional engineer in the State of New Mexico in good standing.

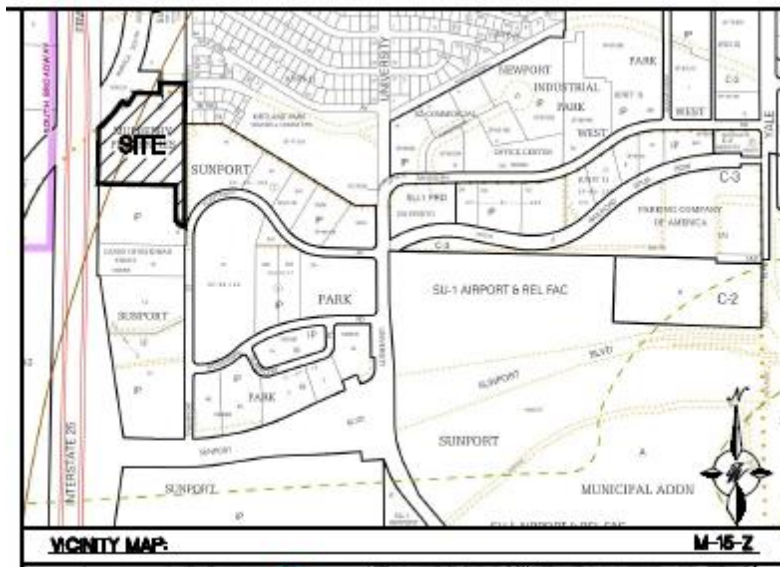
Ronald R. Bohannon, PE

DRAINAGE MANAGEMENT PLAN

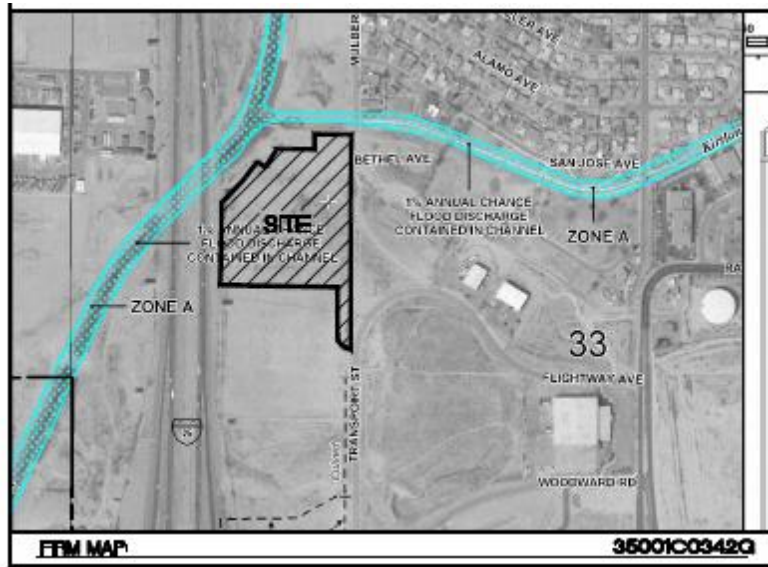
Introduction

The purpose of this submittal is to provide a conceptual drainage management plan for EPC approval of the Site Plan for Building Permit for the Multi-Specialty Clinic to be located at 2901 Transport Street, S.E. This project site lies within an 8.3 acre area previously designated as Phase 2 of the Capstone Student Housing and will consist of a 90,000 square foot two-story building along with associated parking and landscape areas. As shown in the vicinity map below, the site is located at the northeast corner of I-25 and Sunport Boulevard SE. The site lies within Precipitation Zone 2 according to Section 22.2 of the DPM. As shown in the FEMA Flood Map on page 2, the site lies outside any flood hazard zone.

Vicinity Map



FEMA FIRMap



Pre-Developed Conditions

A portion of this site was previously a landfill for construction debris (mainly concrete and asphalt) and has subsequently been mass graded to fill the site to the current grades. Some construction debris remains and this project will mitigate the soil, which includes removal of the deleterious material below grade to an average depth of approximately 30 feet and then fill the site back to grade with engineered fill.

The site topography slopes generally from east to west and is covered with very limited natural vegetation. Per the attached Pre-Developed Conditions Basin Map, the site consists of a total of 2 distinct basins within the subject property, while flows from the Capstone Phase I project are routed through the property to an existing 24" CMP discharging into the AMAFCA South Diversion Channel. The Capstone Phase I project incorporated detention basins to attenuate the flows into the existing 24" CMP due to capacity limitations, however, the South Diversion Channel has adequate capacity for free discharge, per correspondence dated June 25, 2013, attached. The adjacent property to the east (Basin EX B-2) flows into an existing storm drain which discharges into the South Diversion Channel.

The proposed development will encompass portions of Basin B-2 and Basin C-1 as designated in the Drainage Management Plan for Capstone Student Housing report, attached for reference.

Post-Developed Conditions

The proposed project currently consists only of what had been designed as Capstone Phase 2 and contains approximately 8.3 acres. The first phase corresponds with the newly developed Capstone Student Housing, and the third phase will be left undeveloped at this time and a separate drainage management plan will be required prior to development of that areas. Per the attached Post-Developed Conditions Basin Map, the site will consist of 2 basins onsite.

The proposed grading and drainage plan is configured to accept flows from Capstone Phase I via an existing 36-inch RCP into a detention pond within Basin D-2 with additional capacity sized to retain the first-flush. This pond will discharge via a proposed 36-inch storm drain pipe which will also collect drainage from a second pond which accepts flows from Basin D-1 and then discharge directly into the South Diversion Channel near the outlet of the existing 24-inch CMP which will be abandoned. The pond on Basin D-1 will also be configured to retain the necessary first-flush volume.

Refer to Appendix C for preliminary pond sizing calculations. Additional detail for the proposed ponds will be provided in the future Building Permit and Grading Permit approval requests.

Conclusion

This Drainage Management Plan provides for grading and drainage elements which are capable of safely conveying the 100-Yr, 6-Hr storm and which meet City requirements, as well as meeting the water quality requirements. With this submittal, we request Drainage Report and Grading Plan approvals for the Site Plan for Building Permit application.

DPM Weighted E Method

Precipitation Zone 2

MULTI-SPECIALTY CLINIC

2901 Transport St, SE

TWLLC/JH, PE2-Jul-15

Existing Conditions

Basin Descriptions												100-Year, 6-Hr			10-Year, 6-Hr		
Basin ID	Area (sf)	Area (acres)	Area (sq miles)	Treatment A		Treatment B		Treatment C		Treatment D		Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs	Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs
				%	(acres)	%	(acres)	%	(acres)	%	(acres)						
B-1	475,425.00	10.91	0.01705	0%	0	0%	0.000	15%	1.637138	85%	9.277	1.972	1.793	48.74	1.217	1.107	31.93
Ex-B2	183,206.00	4.21	0.00657	0%	0	0%	0.000	100%	4.205831	0%	0.000	1.130	0.396	13.21	0.520	0.182	7.19
Ex-B3	307,640.00	7.06	0.01104	0%	0	0%	0.000	100%	7.062443	0%	0.000	1.130	0.665	22.18	0.520	0.306	12.08
Ex-C	131,863.00	3.03	0.00473	0%	0	0%	0.000	100%	3.027158	0%	0.000	1.130	0.285	9.51	0.520	0.131	5.18
Total	1,098,134.00	25.210	0.03939										3.139	93.63		1.726	56.37

Notes:

Developed Conditions

Basin Descriptions												100-Year, 6-Hr			10-Year, 6-Hr		
Basin ID	Area (sf)	Area (acres)	Area (sq miles)	Treatment A		Treatment B		Treatment C		Treatment D		Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs	Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs
				%	(acres)	%	(acres)	%	(acres)	%	(acres)						
D-1	232,936.00	5.35	0.00836	0%	0	0%	0.000	15%	0.802121	85%	4.545	1.972	0.879	23.88	1.217	0.542	15.64
D-2	155,279.00	3.56	0.00557	0%	0	0%	0.000	15%	0.534707	85%	3.030	1.972	0.586	15.92	1.217	0.362	10.43
C-1A	35,532.00	0.82	0.00127	0%	0	0%	0.000	79%	0.644405	21%	0.171	1.338	0.091	2.83	0.692	0.047	1.64
B-1	475,425.00	10.91	0.01705	0%	0	0%	0.000	15%	1.637138	85%	9.277	1.972	1.793	48.74	1.217	1.107	31.93
B-2A	183,206.00	4.21	0.00657	0%	0	0%	0.000	100%	4.205831	0%	0.000	1.130	0.396	13.21	0.520	0.182	7.19
	35,532.00	0.82	0.00127	0%	0	0%	0.000	79%	0.644405	21%	0.171	1.338	0.091	2.83	0.692	0.047	1.64
Total	1,117,910.00	25.664	0.04010										3.835	107.41		2.287	68.47

Notes:

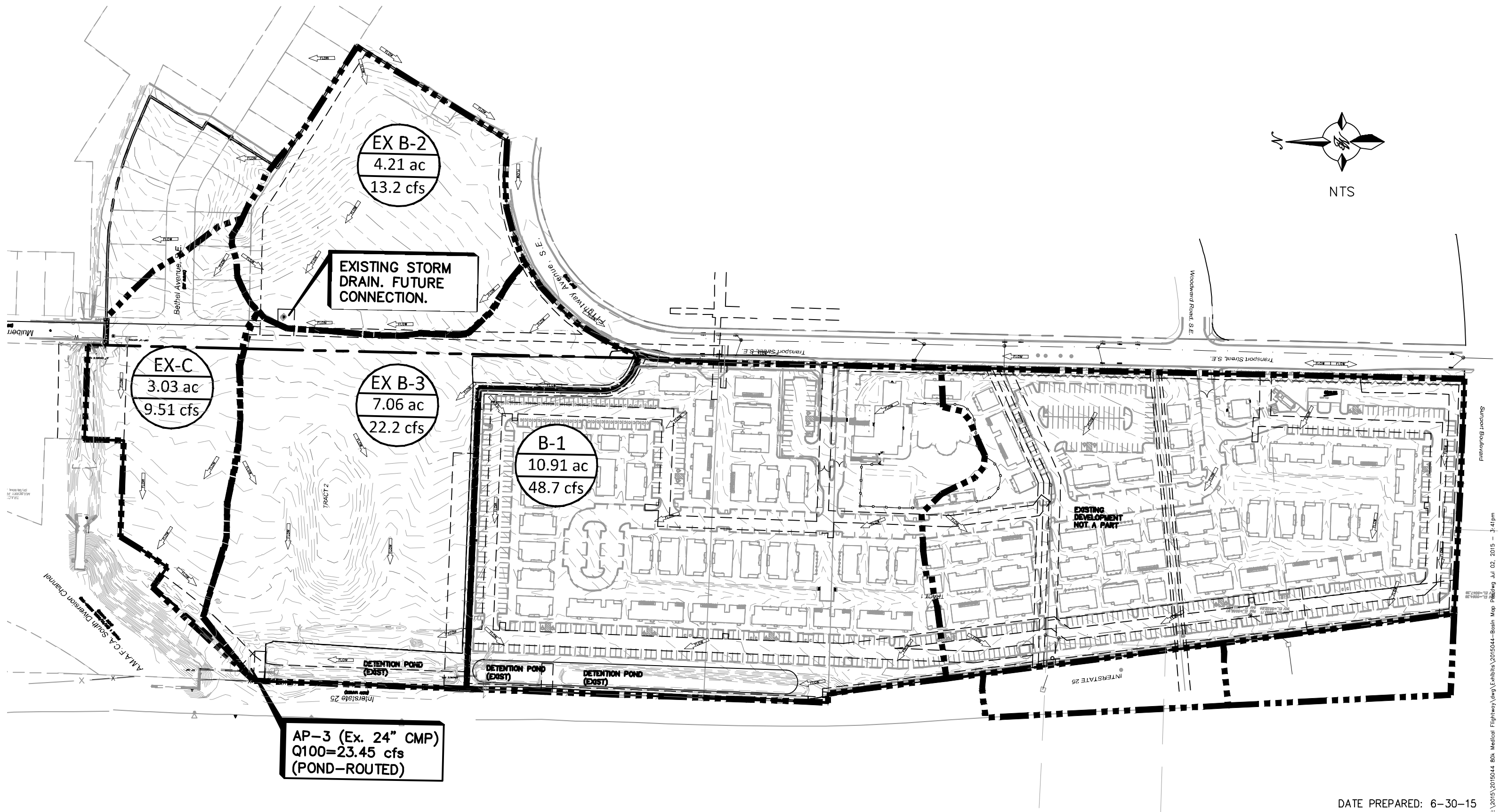
Equations:

Weighted E = E_a*A_a + E_b*A_b + E_c*A_c + E_d*A_d / (Total Area)

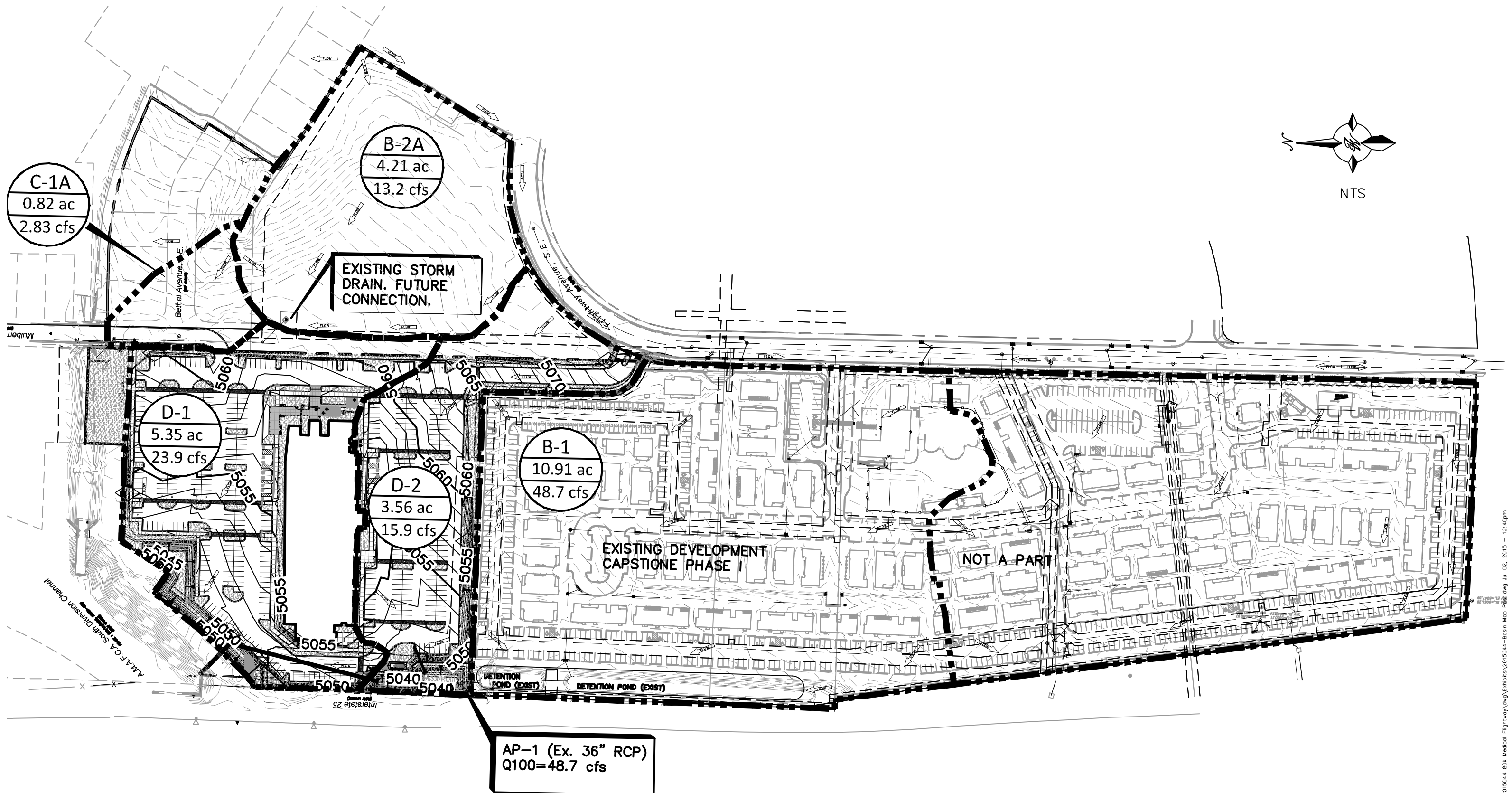
Volume = Weighted D * Total Area

Flow = Q_a * A_a + Q_b * A_b + Q_c * A_c + Q_d * A_d

MULTI-SPECIALTY CLINIC PRE-DEVELOPED BASIN MAP



MULTI-SPECIALTY CLINIC POST-DEVELOPED BASIN MAP



POND 1 VOLUME CALCULATIONS

ELEVATION (ft)	AREA (sf)	VOLUME (cf)	CUMULATIVE VOLUME (cf)
5037	953	0	0
5038	1650	1301.5	1302
5039	2675	2162.5	3464

POND 2 VOLUME CALCULATIONS

ELEVATION (ft)	AREA (sf)	VOLUME (cf)	CUMULATIVE VOLUME (cf)
5045	1735	0	0
5046	2584	2159.5	2159.5
5047	4271	3427.5	5587

TOTAL VOLUME PROVIDED: 9051

VOLUME REQUIRED:

IMPERVIOUS AREA: 285,900 sf

VOLUME REQUIRED= $(0.44-0.1)/12=$ **8100 cf**

OK

36-inch Capacity Check

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Diameter	3.00	ft
Discharge	65.00	ft ³ /s

Results

Normal Depth	2.39	ft
Flow Area	6.05	ft ²
Wetted Perimeter	6.63	ft
Hydraulic Radius	0.91	ft
Top Width	2.41	ft
Critical Depth	2.59	ft
Percent Full	79.8	%
Critical Slope	0.00877	ft/ft
Velocity	10.75	ft/s
Velocity Head	1.80	ft
Specific Energy	4.19	ft
Froude Number	1.20	
Maximum Discharge	71.74	ft ³ /s
Discharge Full	66.69	ft ³ /s
Slope Full	0.00950	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	79.76	%
Downstream Velocity	Infinity	ft/s

Tim Eichenberg, Chairman
Danny Hernandez, Vice Chairman
Bruce M. Thomson, Secretary-Treasurer
Ronald D. Brown, Assistant Secretary-Treasurer
Daniel F. Lyon, Director

Jerry M. Lovato, P.E.
Executive Engineer



**Albuquerque
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Arroyo
Flood
Control
Authority**

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Website: www.amafca.org

Mr. Jeff Wooten, P.E., LEED AP
Tierra West, LLC
5571 Midway Park Pl. NE
Albuquerque, NM 87109

June 25, 2013

Via E-mail

Re: Drainage Management Plan for Capstone Student Housing,
Engineer's Stamp Dated June 14, 2013

Dear Mr. Wooten:

AMAFCA approves Development Review Board action for Preliminary and Final Plat for the referenced plan. AMAFCA will sign the Final Plat. I have reviewed the drainage report and have the following comments:

1. AMAFCA recently completed a re-study of the South Diversion Channel (SDC) which indicated freeboard deficiency for the 100-year flow in certain sections. The section by Capstone does have adequate capacity, so free discharge is allowed.
2. For the Phase 1 development, some type of onsite water quality treatment will be required prior to Basin A-1 discharge to the existing 48-inch storm drain which outfalls to the SDC. This can be in the form of bio-swales, hooded, sock or similar inserts for the inlets or a water quality manhole on the storm drain.
3. The detention ponds and discharge through the existing 24-inch CMP will be acceptable for Basin B-1. However, a debris fence, similar to the photo attached to the email, will be required in the downstream pond prior to the 24-inch pipe opening.
4. Basin C-1 direct discharge to the Kirtland Channel is acceptable for Phase 1. Future development will require a controlled discharge with water quality treatment measures.
5. Basin B-2 discharge to the 24-inch CMP is acceptable for Phase 1; however, future phases of development will require a new reinforced pipe outfall to the SDC with water quality. The design will require review by the U.S. Army of Corps of Engineers.

I do not require a revised drainage report at this time, but I do request a letter response to these comments for my file. These items must be taken into consideration for Site Plan for Building Permit approval. If you have any questions, please call me at 884-2215.

Sincerely,
AMAFCA

Lynn M. Mazur, P.E., C.F.M.
Development Review Engineer

C: Curtis Cherne, City Hydrology