

CITY OF ALBUQUERQUE



February 2, 2010

Jennifer Flor, PE
Wilson & Company
2600 American Rd, SE, Ste. 100
Rio Rancho, NM 87124

Re: West Mesa HS Drainage Master Plan
Engineer Stamp 1-13-09 (J10/D5)

Dear Ms. Flor,

Based upon information provided in your submittal dated 1-13-10, the above referenced plan is approved as a master plan for the above mentioned site. All projects should adhere to this plan or this plan must be amended accordingly.

If you have any questions, you can contact me at 924-3986.

Sincerely,

Bradley L. Bingham
Bradley L. Bingham, PE

Principal Engineer, Planning Dept.
Development and Building Services

PO Box 1293

Albuquerque

C: file

NM 87103

www.cabq.gov



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January 13, 2010

Brad Bingham, P.E.
City of Albuquerque
Planning Department
600 2nd Street NW
Albuquerque, NM 87103

Re: West Mesa HS Drainage Master Plan Comments Dated December 10, 2009

Dear Mr. Bingham,

This letter is in response to the comments dated December 10, 2009 for the West Mesa High School Drainage Master Plan stamped 12-07-09. The comments and the responses are shown below:

Comment 1: "Please provide calculations for all proposed 18" pipe. I cannot find the proposed 24" storm drain."

Response: A hydraulic model using Hydraflow Storm Sewers was developed and is submitted with this response to show that the proposed storm drain is able to convey the flows from the site. Also, 24", 30" and 36" pipe is needed and is identified on the revised Grading and Drainage Master Plan.

Comment 2: "There should be no Land Treatment 'A' analyzed since this site is developed. Sports areas should be a 'B' and the area with bare dirt should be a 'C' since it has probably been compacted by human use over the years."

Response: All land treatments have been revised incorporating Comment 2. Land treatments were also updated using the latest aerial imagery which resulted in some increase in impervious area. The original and revised land treatments are shown in the following table:

Land Treatment	Basin 100		Basin 101		Basin 102		Basin 103		Basin 104	
	Original	Revised	Original	Revised	Original	Revised	Original	Revised	Original	Revised
A	0	0	5	0	5	0	5	0	0	0
B	0	0	0	0	10	0	10	10	45	5
C	5	5	0	0	0	0	0	0	10	45
D	95	95	95	100	85	100	85	90	55	50

Land Treatment	Basin 105		Basin 106		Basin 107		Basin 108		Basin 109	
	Original	Revised	Original	Revised	Original	Revised	Original	Revised	Original	Revised
A	15	0	35	0	35	0	70	0	75	0
B	0	0	15	5	15	5	25	65	15	35
C	0	15	5	10	5	10	0	15	5	40
D	85	85	45	85	45	85	5	20	5	25



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Land Treatment	Basin 110		Basin 111		Basin 112		Basin 113	
	Original	Revised	Original	Revised	Original	Revised	Original	Revised
A	90	0	75	0	95	0	95	0
B	0	15	15	45	0	80	0	75
C	5	80	5	50	0	0	0	0
D	5	5	5	5	5	20	5	25

Due to the increase in flows, an analysis of the outflow pipes to the West Mesa Diversion was performed to determine if the outflow pipes could convey the flow. Culvertmaster was used to determine the maximum capacity of the 24" connections to the storm drain. The flows were then routed through the pipe in AHYMO. The 24" pipes are unable to convey the entire flow from the site and ponding will occur. A stage-storage-discharge curve was developed using the elevation and volume of the onsite ponds and the allowable discharge for the 24" pipes. AHYMO results show that ponding will occur, but is contained within the existing ponds.

Comment 3: "I do not find evidence of the 4 foot deep ditch routing basin 102 to the inlet in basin 108 nor the 3 foot ditch routing basin 104 thru basin 105."

Response: The ditches do not exist on the site and were removed from the model. Also, all routing of the basins was removed from the model because the small travel times did not reduce the peak flows noticeably. The flows from the AHYMO model were then input into the Hydraflow hydraulic model as described in Comment 1.

Comment 4: "In the AHYMO run, you have basin 104 routed thru 105 in a 3 foot channel twice yet you propose an 18" pipe? Please explain."

Response: The 3 foot channel was removed from the model and the flows were input into the Hydraflow hydraulic model to determine pipe size. All proposed pipe sizes are shown on the revised Grading and Drainage Master Plan.

Comment 5: "Does basin 106 go through basin 109 or basin 108? The AHYMO run says 109 but the basin map doesn't agree."

Response: A proposed pipe was added to the master plan to capture flows in from basins 101, 102 and 106. The flows are then piped through basin 108 as shown on the revised Grading and Drainage Master Plan.

Comment 6: "Please label all storm drain, inlets, etc., and provide all important information regarding slope, inverts or other design or capacity factors. Are any of these items needing maintenance or upsizing?"

Response: The Master Plan has been updated with all requested information. The text of the report has also been updated to reflect the revised conditions and results. Since all the storm drain is proposed, no upsizing of the pipes is needed at this time.



A revised Grading and Drainage Master Plan has been submitted in addition to the revised AHYMO model input, output and summary. Hydraulic model results are included to show that the proposed storm drain is able to convey the calculated flows from the site.

If you have any questions or need any more information for your review, please contact me at 505-948-5129.

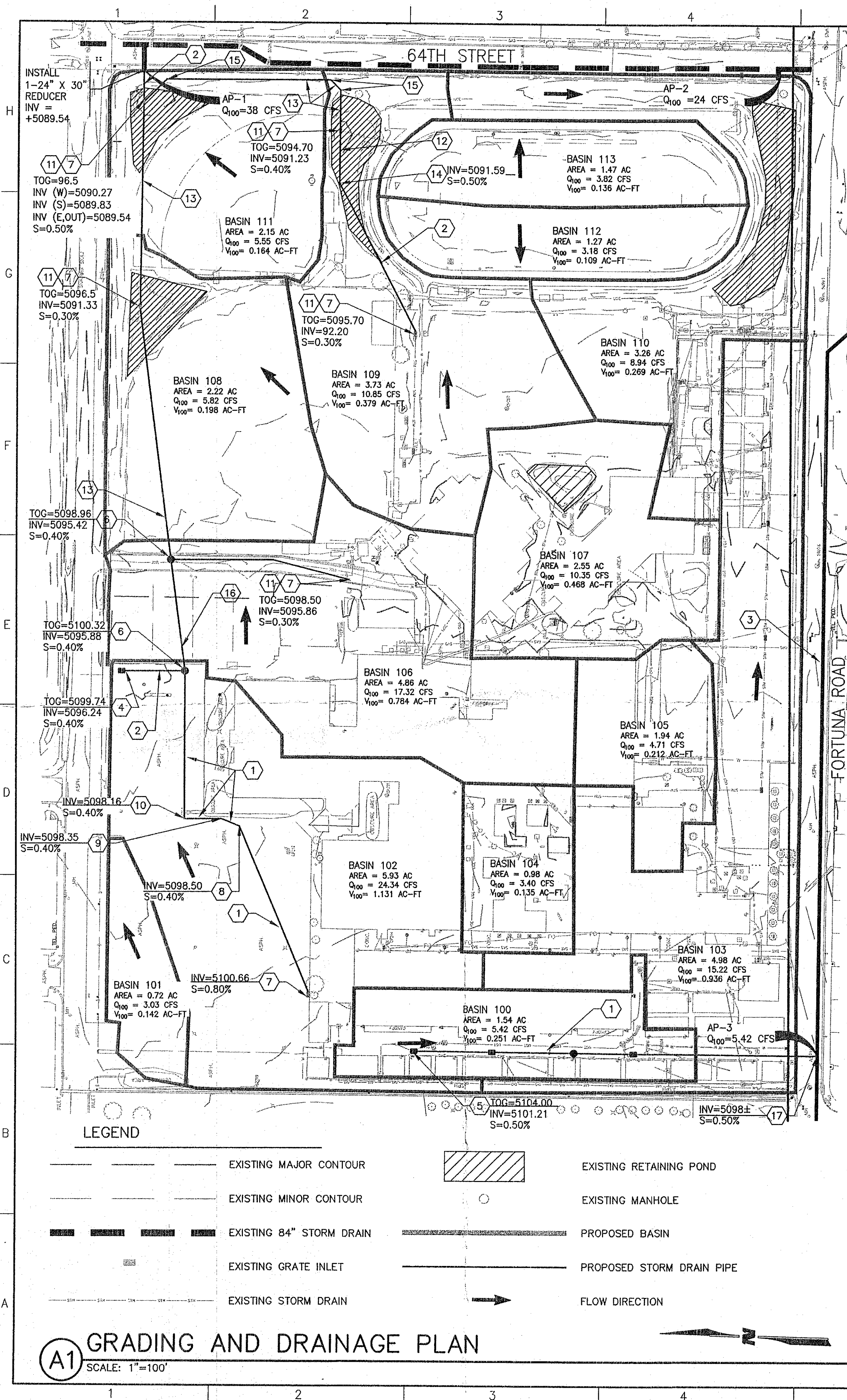
Sincerely,

A handwritten signature in blue ink, appearing to read "Jennifer Flor".

Jennifer Flor, P.E.
Project Manager
Wilson & Company

CC: Project File

M:\NDS\09-600-038-00\CADD\SHEETS\04_G&D\96038_GD_DA.dwg 1/13/2010 6:55:51 AM MST



Site Location & Project Description: West Mesa High School is a 40.0 acre property located in northwest Albuquerque, NM, bordered by 72nd Street to the west, Glenrio Road to the north, Fortuna Road to the south, and 64th Street to the east. The basis of this analysis is the West Mesa Diversion Project by Smith Engineering Co. (hereafter, Reference 1). The goal of this project is to alleviate drainage deficiencies throughout the campus. This project will be carried out in separate phases of construction. One phase will connect existing retention ponds to the existing West Mesa Diversion COA storm drain system, alleviating deficiencies on the east side of the WMHS campus. Another phase will alleviate deficiencies on the west side of the campus by constructing new storm drain pipe and inlets and connecting to a proposed storm drain in Fortuna Road. The intent of this plan is to obtain approval for this updated Drainage Master Plan.

Methodology: The AHYMO computer program was used to calculate design flows. This software adheres to Section 22.2 of the City of Albuquerque DPM. The 100-year, 24-hour and 100-year, 6-hour storm event were the design storms computed for the improvements. The site is located in Precipitation Zone 1, west of the Rio Grande, as designated in Table A-1. All basins were delineated using AutoCAD software to determine areas. AHYMO input files have been submitted as an appendix to this drainage report.

Existing Conditions: The existing topography of the site slopes generally to the east at slopes of approximately 0.5%, with some areas of local ponding. The site also contains concrete and asphalt site work from the existing school facility. Runoff from Basins 103, 104, 105, 110, 112 and 113 discharge to an existing storm drain system which connects to the West Mesa Diversion storm drain at the southeast corner of the site. Existing slopes are such that significant nuisance ponding occurs throughout the site. Basins 101 and 102 surface flow to the northeast corner of the existing parking lot and ponds within the parking lot. Basin 106 flows to existing drywell inlets located in the drive aisle. Runoff from Basins 108, 109 and 111 is collected in existing drywell inlets located at low points of existing ponds. The onsite ponds are sized appropriately for existing conditions (see Hydraulic Analysis below). Offsite runoff from the east is not an issue due to existing curb and gutter on 64th Street. All other flows surrounding the site drain away from the site. Runoff from Basin 100 discharges south into Fortuna Road.

Proposed Conditions: Under proposed conditions the existing ponds (in Basins 108, 109, & 111) will be connected to the COA storm drain constructed in the West Mesa Diversion project. Existing drainage infrastructure affected by improvements will be removed and replaced as appropriate.

Runoff from Basin 100 will leave the site by a connection to the proposed Fortuna Road storm drain that outfalls into the Cedar Ridge Detention Pond. The Fortuna Road storm drain is anticipated construction date is the summer of 2010.

Hydrologic Analysis: Existing and proposed flows are computed using AHYMO. Land treatment values, drainage lengths and basin boundaries are unchanged from existing to proposed conditions. The model included with this report contains the proposed routing of flows to the outlet points at the north and south connections to the West Mesa Diversion storm drain and the connection to the Fortuna Road storm drain.

Hydraulic Analysis: The flows that reach the West Mesa Diversion storm drain in Fortuna Road are limited to the capacity of the existing and proposed connections to that storm drain. A 24" RCP is proposed at the north connection and a 24" RCP is at the existing south connection. The "ROUTE RESERVOIR" command was used in the AHYMO model to route flows from the site through the pipes. The discharge rating curve through the pipes was calculated using the Culvertmaster program with inlet controlled flows (results are included in the appendix to this report). An elevation-storage curve was developed using the ponds that exist onsite. When the inflow to the pipe exceeds the capacity of the pipe, then the water will back up into the inlets and existing ponds. The results from the AHYMO routing show that the overflow can be contained within the existing ponds onsite. Additionally, mapping in Reference 1 shows the north connection from West Mesa High School discharging 35 cfs and the south connection discharging 40 cfs. The results from the AHYMO model show a maximum discharge of 38 cfs at the north connection and 24 cfs at the south connection. The two connections combined result in 62 cfs into the West Mesa Diversion, which is less than the 75 cfs shown in Reference 1.

The results from AHYMO were input into Hydrflow Storm Sewers for the proposed storm drain to determine pipe sizes and slopes. The storm sewers model is included as an appendix to this report.

Conclusion: Project improvements are such that land treatments will not be affected. Existing ponds are sized appropriately to handle the existing flows until the connection to the West Mesa Diversion Project. Future development will need to accommodate the ponding area. Per meetings with the City of Albuquerque and Smith Engineering, the Fortuna Road storm drain will be designed to be able to accept the flow from Basin 100.

AHYMO PROGRAM SUMMARY TABLE (AHYMO.97) - VERSION: 1997.02 - RUN DATE (MONDAY) 01/12/2010
INPUT FILE = M:\NDS\096038-00\DATA\CA\CAHYMO\WMS20-1.DAT USER NO. = AHYMO-C-9803-01UNMLB-AH

FROM TO	PEAK RUNOFF	TIME TO CFS	PAGE
HYDROGRAPH ID	AREA	DISCHARGE	VOLUME
COMMAND	IDENTIFICATION	NO. NO.	(SQ MI) (CFS) (AC-FT) (INCHES) (HOURS) ACRE

*S EXISTING & PROPOSED CONDITION MODELS FOR WMHS DRAINAGE IMPROVEMENTS
*S BASINS AREAS DO NOT CHANGE FROM THE EXISTING TO PROPOSED CONDITION
*S POND AREAS ARE NAMED FOR THE BASINS IN WHICH THEY ARE LOCATED

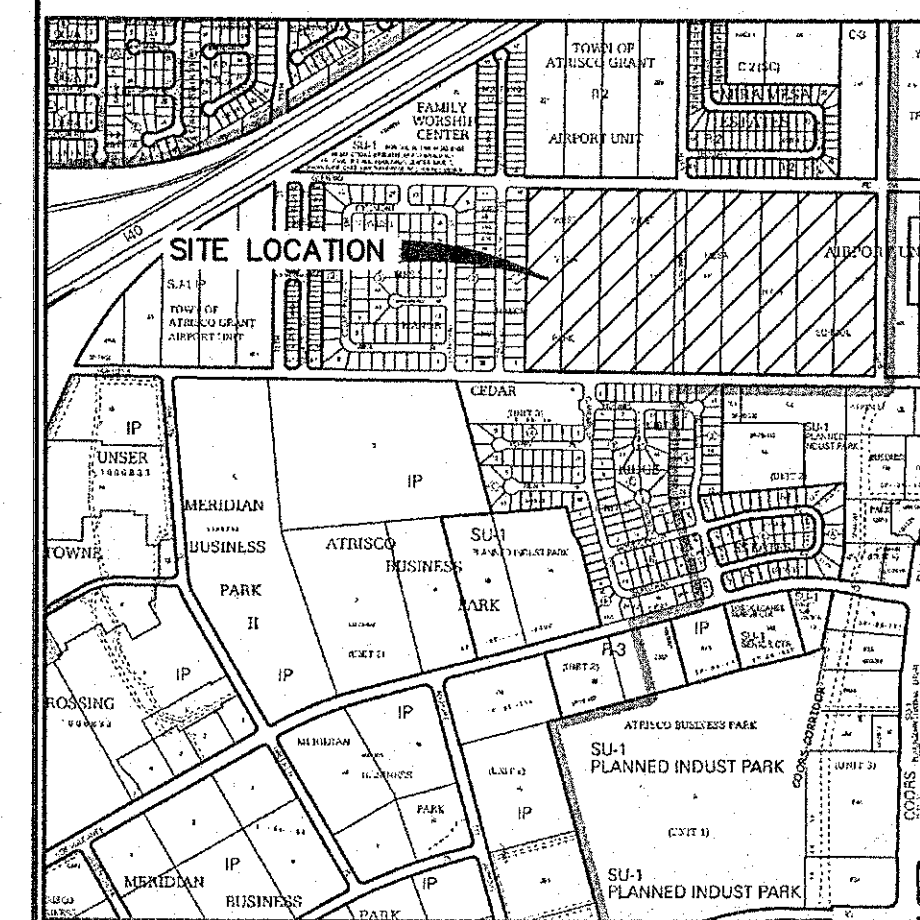
START	LOCATION	DEFAULT	TIME
*S	*S 100 YEAR 24HR STORM	RAINFALL TYPE=2	RAIN24= 2.660
*S	*S 100 YEAR 6HR STORM		

COMMAND	HYDROGRAPH IDENTIFICATION	FROM TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO CFS (HOURS)	PAGE
*S BASINS CONTRIBUTING TO NORTH CONNECTION OF 84" SD IN 64TH	COMPUTE NM HYD	101.00	1	00010	3.03	142	2.42724	1.500
ADD HYD	COMPUTE NM HYD	102.00	2	00900	24.34	1131	2.35553	1.500
COMPUTE NM HYD	103.00	18.2	3	01010	27.38	1273	2.36228	1.500
ADD HYD	COMPUTE NM HYD	106.00	4	00670	17.32	784	2.19371	1.500
ADD HYD	COMPUTE NM HYD	106.10	38.4	5	01680	44.70	2.057	2.29564
COMPUTE NM HYD	108.00	6	00350	5.82	198	1.06084	1.500	2.600
ADD HYD	COMPUTE NM HYD	108.10	68.5	7	02030	50.52	2.255	2.08272
COMPUTE NM HYD	109.00	10	00600	10.85	379	1.22620	1.500	3.922
COMPUTE NM HYD	111.00	9	00340	5.55	164	0.90383	1.500	2.552
ADD HYD	COMPUTE NM HYD	111.10	98.8	10	00920	16.40	543	1.10701
ADD HYD	COMPUTE NM HYD	111.20	11	02950	66.92	2.798	1.77843	1.500
ROUTE RESERVOIR	COMPUTE NM HYD	11	30	02950	37.51	2.811	1.78695	1.650
*S BASINS CONTRIBUTING TO POND 107	COMPUTE NM HYD	107.00	12	00400	10.35	468	2.19371	1.500
*S BASINS CONTRIBUTING TO SOUTH CONNECTION TO 84" SD IN 64TH	COMPUTE NM HYD	103.00	13	00780	15.22	936	2.25115	1.600
COMPUTE NM HYD	104.00	14	00150	3.40	135	1.69063	1.500	3.543
ADD HYD	COMPUTE NM HYD	103.10	138.14	15	00930	17.59	1.072	2.16066
COMPUTE NM HYD	105.00	16	00180	4.71	212	2.21212	1.500	4.092
ADD HYD	COMPUTE NM HYD	103.20	158.16	17	01110	21.08	1.284	2.16898
COMPUTE NM HYD	110.00	18	00500	8.94	269	1.00737	1.500	2.793
ADD HYD	COMPUTE NM HYD	110.10	188.17	19	01610	29.25	1.553	1.80822
ROUTE RESERVOIR	COMPUTE NM HYD	112.00	20	00200	3.18	109	1.01853	1.500
ADD HYD	COMPUTE NM HYD	112.10	608.20	21	01810	25.97	1.661	1.72095
COMPUTE NM HYD	113.00	22	00230	3.82	136	1.10658	1.500	2.395
ADD HYD	COMPUTE NM HYD	218.22	23	02040	29.48	1.797	1.65167	1.500
*S BASINS CONTRIBUTING TO FORTUNA ROAD RUNOFF	COMPUTE NM HYD	100.00	24	00200	5.42	251	2.35553	1.500
FINISH								

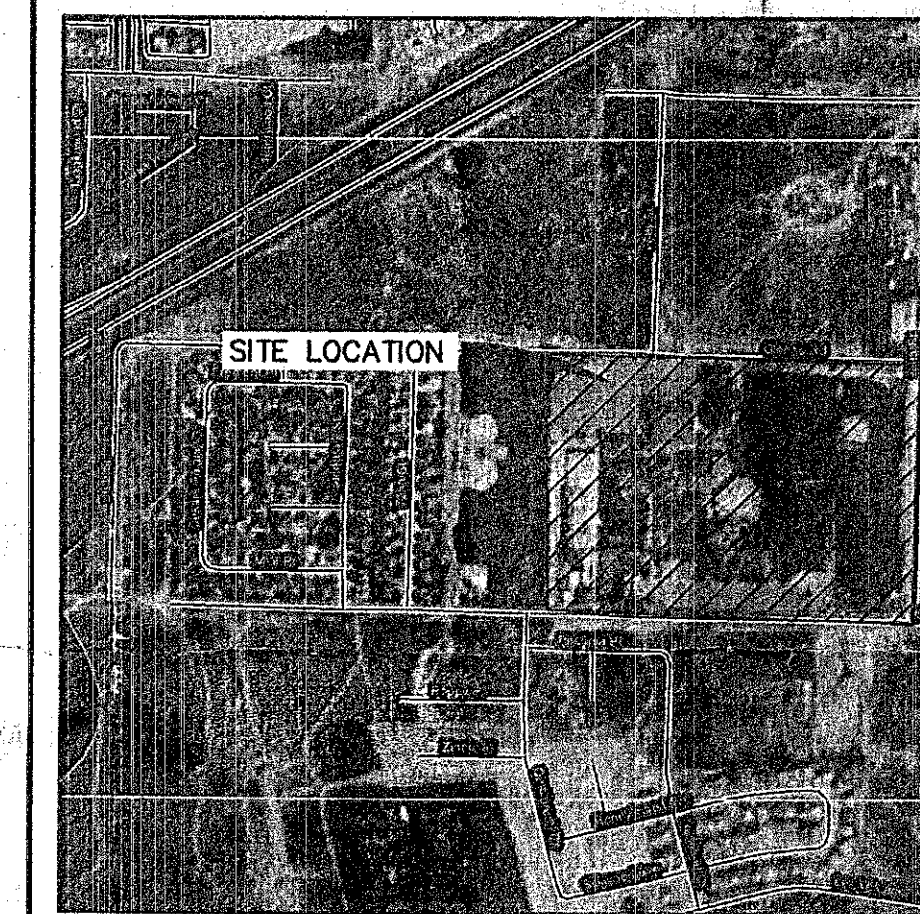
PROJECT BENCHMARK
ACS STATION "17-J11" SET FLUSH IN SIDEWALK, NNE QUADRANT OF COORS AND FORTUNA ROAD NW, 0.5' EAST OF THE BACK OF CURB AND APPROX. 4 FEET WEST OF A TRAFFIC LIGHT POLE
ELEVATION = 5098.437 ft. MSLD 1929

SURVEY INFO
MAPPING AND TOPOGRAPHIC SURVEY PERFORMED BY WILSON & COMPANY, INC., ENGINEERS & ARCHITECTS
MAPPING - SALINAS, KANSAS OFFICE
TOPO - ALBUQUERQUE, NM OFFICE

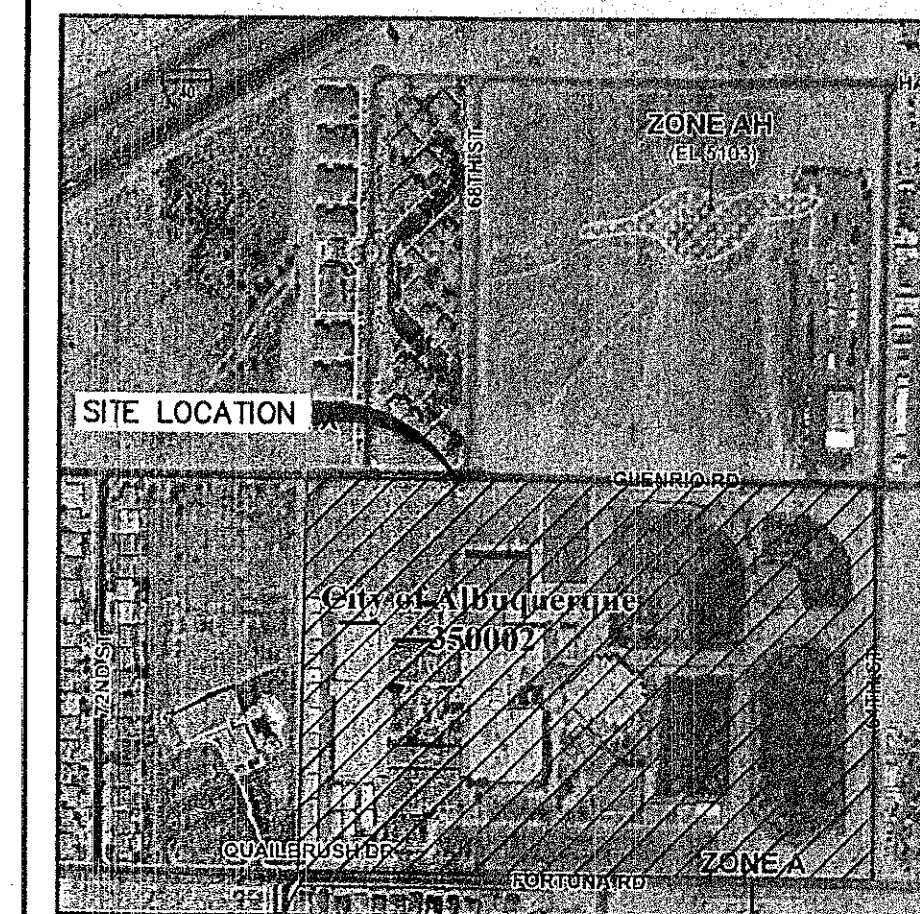
NOTES
THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL THE UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED, ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM THE INFORMATION AVAILABLE. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES, EXCEPT AS NOTED.



LOCATION
ZONE ATLAS MAP NO. J-10



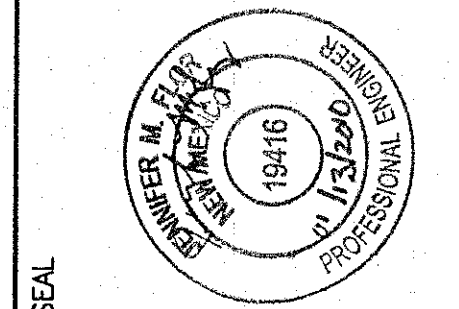
SOILS MAP
REFERENCE:
[HTTP://WEBSOILSURVEY.NRCS.USDA.GOV](http://websoilsurvey.nrcs.usda.gov)



FLOOD INSURANCE RATE MAP
REFERENCE: FLOOD INSURANCE STUDY
PANEL 356 - MAP# 35001C0327G

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CONSULTANTS



PROJECT NAME
ALBUQUERQUE PUBLIC SCHOOLS
WEST MESA HIGH SCHOOL
STORM DRAIN IMPROVEMENTS
6701 FORTUNA RD NW
ALBUQUERQUE, NM 87121

PROJECT NO.	DESIGNED BY:	JMF
DRAWN BY:	AJM	
CHECKED BY:	MJI	
DATE:		
SHEET TITLE		
SHEET NO.		

DRAINAGE
MASTER
PLAN

SHEET NO:

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SECTION