

Hydrology Calculations

The following calculations are based on Albuquerque Development Process Manual, Section 22.2

MAA Scenario Runoff Rate:

Treatment Type Areas
 $Area_A = 0$ ac $Area_B = 0.3233$ ac $Area_C = 0.1940$ ac $Area_D = 0.7759$ ac

Peak Discharge values based on Zone 3 from Table A-9

$Q_A = 1.87$ cfs/ac $Q_B = 2.60$ cfs/ac $Q_C = 3.45$ cfs/ac $Q_D = 5.02$ cfs/ac

Peak Discharge calculation for a 100-yr, 24-hr storm event from equation A-10

$Q_p = Q_A + Area_A + Q_B + Area_B + Q_C + Area_C + Q_D + Area_D = 5.4$ cfs

Proposed Conditions Runoff Rate:

Treatment Type Areas
 $Area_A = 0$ ac $Area_B = 0.0706$ ac $Area_C = 0.0706$ ac $Area_D = 0.9955$ ac

Peak Discharge values based on Zone 3 from Table A-9

$Q_A = 1.87$ cfs/ac $Q_B = 2.60$ cfs/ac $Q_C = 3.45$ cfs/ac $Q_D = 5.02$ cfs/ac

Peak Discharge calculation for a 100-yr, 24-hr storm event from equation A-10

$Q_p = Q_A + Area_A + Q_B + Area_B + Q_C + Area_C + Q_D + Area_D = 5.4$ cfs

Water Quality:

$V_{WQ} = Area_D + 0.34" = 1239$ ft³

Water Quality Pond A

Elev.	Area (Sq. Ft.)	Vol (Cu. Ft.)	Cum. (Cu. Ft.)
5306.0	34	0	0
5307.0	148	91	91
5307.5	226	93	184

Water Quality Pond B

Elev.	Area (Sq. Ft.)	Vol (Cu. Ft.)	Cum. (Cu. Ft.)
5305.5	35	0	0
5306.0	86	30	30
5307.0	243	164	194
5307.5	345	147	341

Total Water Quality Volume = 1239 ft³

Water Quality Pond C

Elev.	Area (Sq. Ft.)	Vol (Cu. Ft.)	Cum. (Cu. Ft.)
5306.0	18	0	0
5307.0	125	71	71
5307.5	204	82	153

Water Quality Pond D

Elev.	Area (Sq. Ft.)	Vol (Cu. Ft.)	Cum. (Cu. Ft.)
5310.00	19	0	0
5311.0	108	63	63
5312.0	267	188	251
5312.85	461	310	560

SIDEWALK CULVERT

Rectangular Channel

Input
Flow 5.4 cfs
Slope 0.0238 ft/ft
Manning's n 0.013
Base Width 1.5 ft
Right Side Slope 0:1
Left Side Slope 0:1

Output
Depth 0.468 ft
Flow Area 0.702 sf
Velocity 7.89 fps
Velocity Head 0.920 ft
Top Width 1.50 ft
Froude Number 1.98
Critical Depth 0.739 ft
Critical Slope 0.00680 ft/ft

12" ADS PIPE

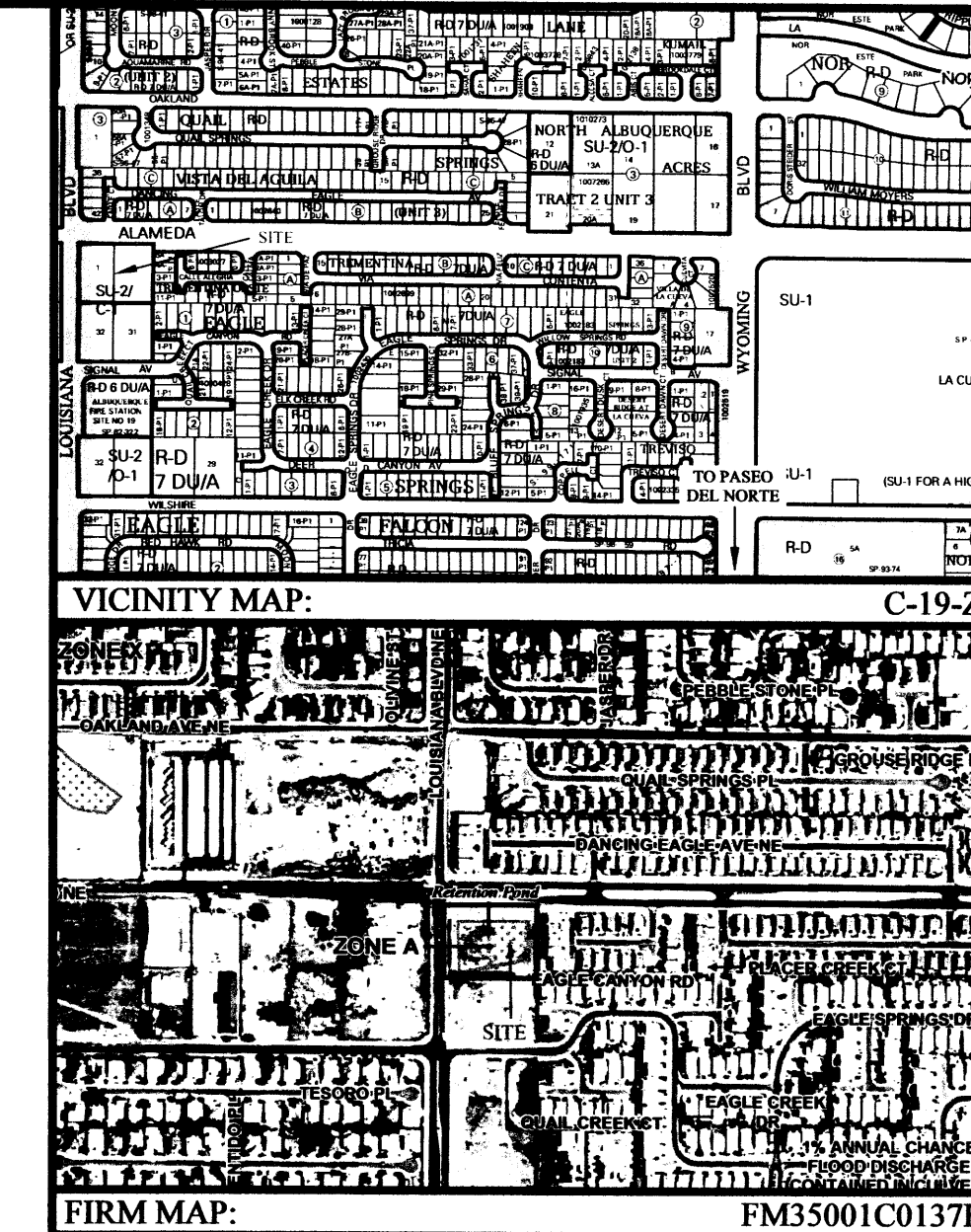
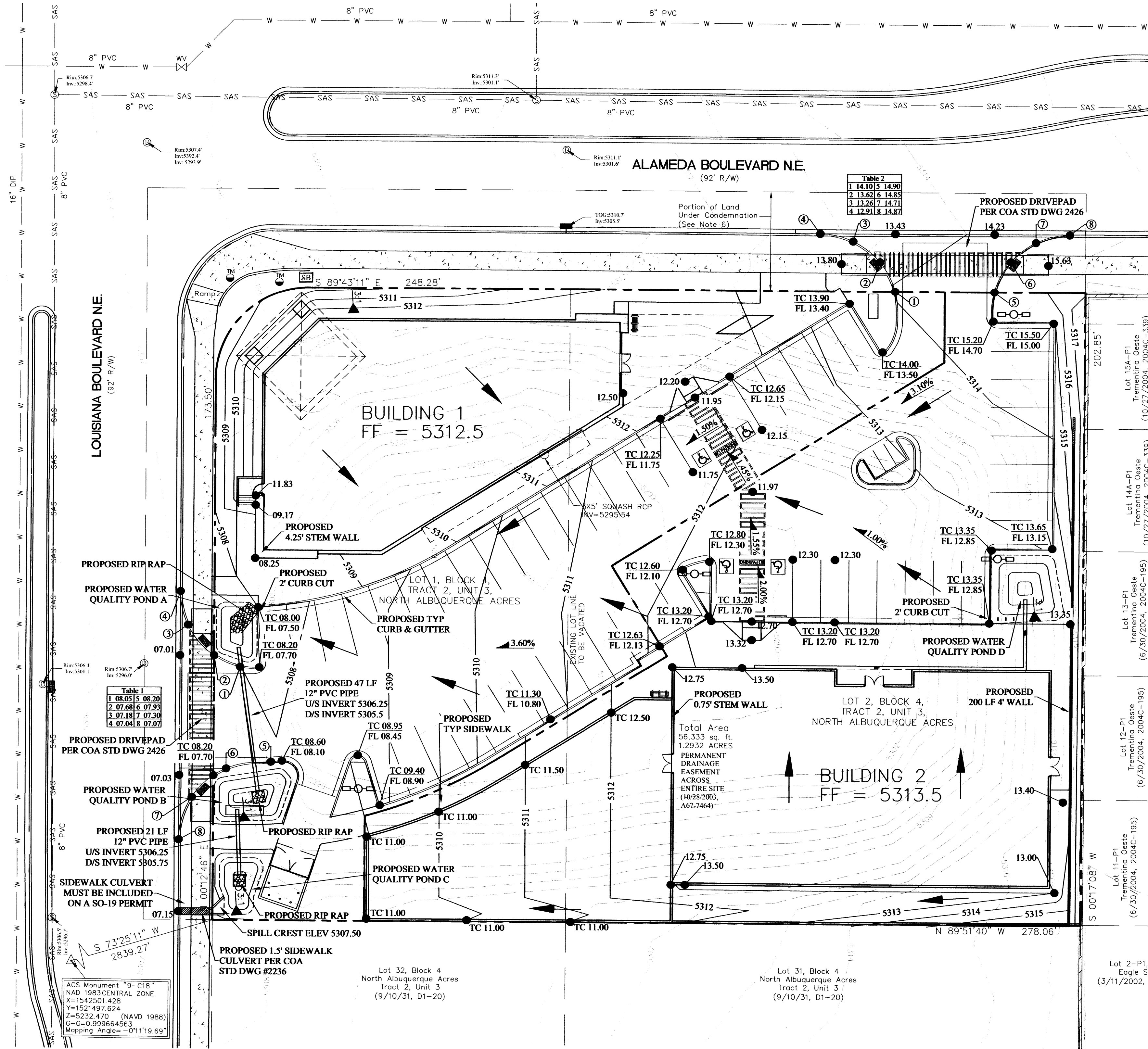
Circular Channel

Input
Flow 5.4 cfs
Slope 0.015 ft/ft
Manning's n 0.011
Diameter 12 in

Output
Depth 0.870 ft
Flow Area 0.726 sf
Velocity 7.44 fps
Velocity Head 0.861 ft
Top Width 0.672 ft
Froude Number 1.26
Critical Depth 0.935 ft
Critical Slope 0.0142 ft/ft

LEGEND

- SANITARY SEWER MANHOLE
- WATER VALVE
- STORM DRAIN MANHOLE
- TRAFFIC MAST
- SIGNAL BOX
- INLET GRATE
- EXISTING CONTOURS
- PROPOSED CONTOURS
- PROPOSED SPOT ELEVATIONS



Background

Lots 1 & 2 account for approximately 1.3 acres in Block 4, Tract 2, Unit 3 of North Albuquerque Acres in Bernalillo County, New Mexico. These lots are located on the southeast corner of the intersection of Alameda Boulevard and Louisiana Boulevard. The site has been previously developed to serve as a drainage pond to relieve Alameda Boulevard of excess runoff. Due to recent roadway and storm drain improvements along Alameda Boulevard, the existing pond can be eliminated per the Drainage report for the Alameda Widening Project (TEC, January 2012). Storm water from the site is restricted by the North Albuquerque Acres Drainage Plan to 5.4 cfs.

Methodology

Hydrology calculations for the properties are performed in accordance with the Albuquerque DPM Section 22.2 using the Rational Method to calculate peak flow rates to insure all flow paths are sufficient to carry flows to the water quality ponding located on-site. The water quality ponding volume required was calculated by multiplying the impervious area onsite by the first flush runoff value of 0.34". The hydrology and hydraulic calculations can be found on this sheet.

Existing Conditions

The existing site is a detention pond with 3:1 (H:V) slopes, a bottom elevation of 5297, and maximum spill crest elevation of 5307. There is a 3x5' squash reinforced concrete pipe with an invert of 5295.54 located at the bottom of the pond. Lots 1 & 2 do not appear to be receiving additional surface runoff from adjacent lands.

Proposed Conditions

The Alameda storm drain system has been constructed to convey the runoff previously held by the existing detention pond west to the San Pedro storm drain. Therefore, the existing detention pond is no longer needed per the report referenced above.

The Hydrology Report for North Albuquerque Acres by Resource Technology, Inc. in November 1998 is used to determine the allowable discharge from the site. The subject property is located in subbasin 117.4 per this report. Table B-3 on page Appendix - 19 assigns future conditions land treatment types as 0% A, 25% B, 15% C, and 60% D for this subbasin. The allowable discharge using the Rational Method and the assigned treatment types above is 5.4 cfs. The calculation is shown on the left side of this sheet.

It is proposed that the site, in general, drains from east to west toward Louisiana Boulevard. The small amount of runoff from the area south of Building 2 and the play area west of Building 2 are contained within the play area, which has a permeable surface and is recessed approximately 1'. Accordingly, this area is removed from the subbasin area for the 100 year storm water runoff. Under proposed conditions, the remainder of the site generates 5.4 cfs. See Hydrology Calculations on the left side of this sheet. Therefore, no detention ponding is required to reduce the flow rate. Runoff from the entire site enters into Pond A through a 2' curb cut located at the southwest corner of Building 1. Water then enters a 12" pipe transferring runoff from Pond A to Pond B. There is another 12" pipe that connects Pond B to Pond C. Manning's calculations for both pipes can be found on the left side of this sheet. Once a maximum water surface elevation of 5307.5 is reached, runoff begins to spill into a sidewalk culvert located at the southwest corner of the site. The Manning's calculation for the sidewalk culvert can be found on the left side of this sheet. From there water enters the storm drain system through a grate located in the median in Louisiana Boulevard.

Before Building 2 drains across the site, runoff is routed through Pond D. Once the pond has filled to a maximum water surface elevation of 5312.85, the pond discharges through a 2' curb cut into the parking lot. Pond rating curves for all ponds can be seen on the left side of this sheet. The total provided water quality pond volume for the site is 1239 cubic feet. The required volume is 1239 cubic feet. See the calculation on the left side of this sheet.

RESPEC
WATER & NATURAL RESOURCES

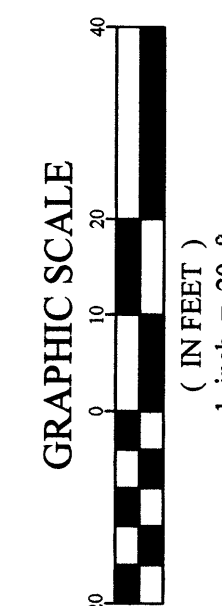
6808 ACADAMY PARKWAY
ALBUQUERQUE, NM 87109
PHONE: 505.253.9810

REVISION	
DESIGNED	HWF
DRAWN	JWS
CHECKED	HWF
DATE	11/14/2016

LEGAL DESCRIPTION:
PORTIONS OF LOTS 1 & 2,
BLOCK 4, TRACT 2, UNIT 3
OF NORTH ALBUQUERQUE
ACRES IN BERNALILLO
COUNTY, NEW MEXICO

ALAMEDA & LOUISIANA
COMMERCIAL DEVELOPMENT

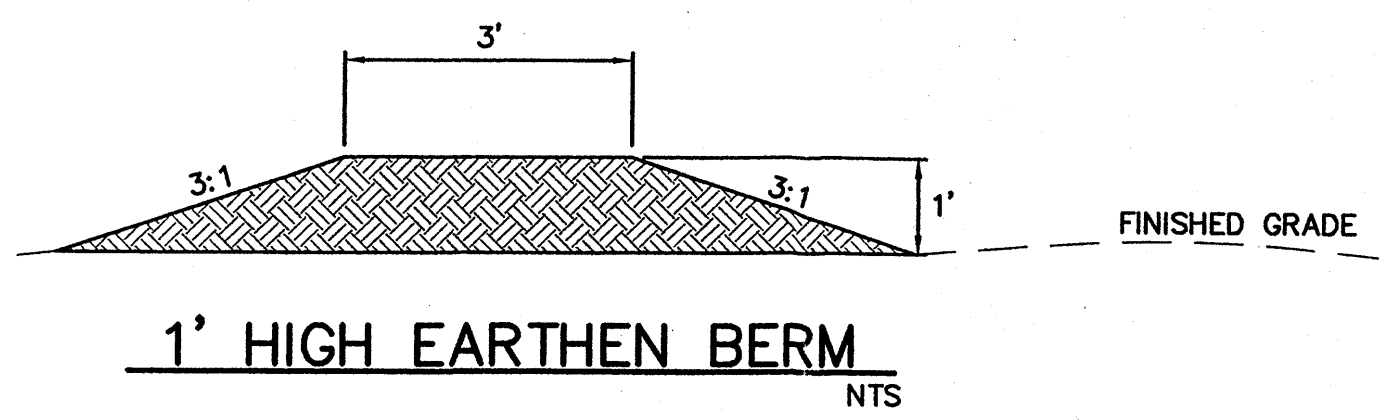
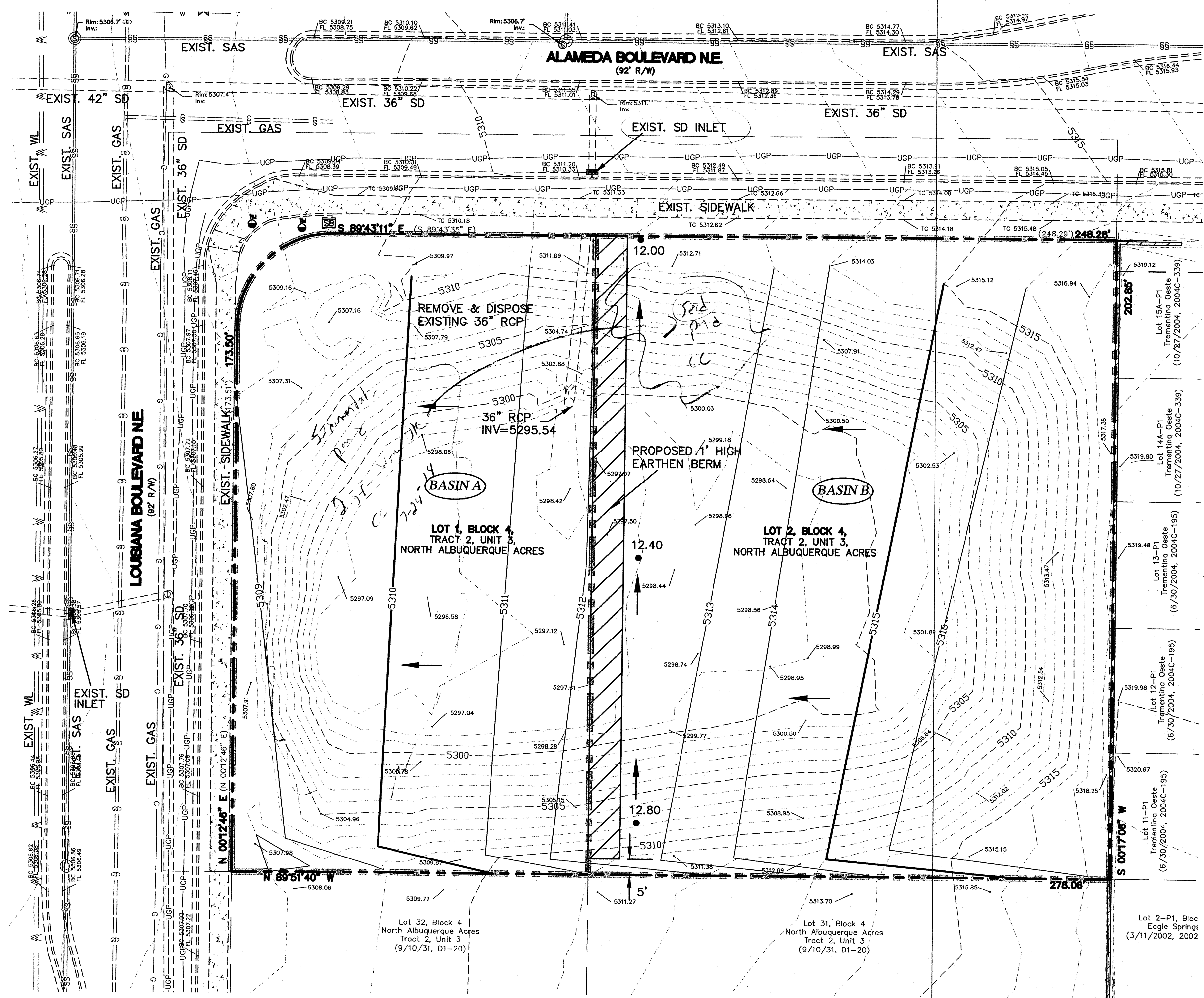
GRADING & DRAINAGE PLAN



SHEET NUMBER:

ISSUED FOR DRB
SITE PLAN

C-1



100-YEAR HYDROLOGIC CALCULATIONS											
BASIN #	AREA (acre)	LAND TREATMENT				WEIGHTED E (in)	100-YEAR PRECIPITATION				
		A (%)	B (%)	C (%)	D (%)		V (6-hr) (acre-ft)	V (6-hr) (cu-ft)	V(24-hr) (acre-ft)	V(24-hr) (cu-ft)	Q (cfs)
EXISTING CONDITIONS											
BASIN A	0.5232	100.00	0.00	0.00	0.00	0.66	0.03	1,253	0.03	1,253	0.98
BASIN B	0.7700	100.00	0.00	0.00	0.00	0.66	0.04	1,845	0.04	1,845	1.44
TOTAL RUNOFF	1.29						0.07	3,098	0.07	3,098	2.42
PROPOSED CONDITIONS											
BASIN A	0.5232	0.00	0.00	100.00	0.00	1.29	0.06	2,450	0.06	2,450	1.81
BASIN B	0.7700	0.00	0.00	100.00	0.00	1.29	0.08	3,606	0.08	3,606	2.66
TOTAL RUNOFF	1.29						0.14	6,056	0.14	6,056	4.46
EXCESS PRECIP.		0.66	0.92	1.29	2.36	E (in)					
PEAK DISCHARGE		1.87	2.6	3.45	5.02	Q (cfs)					
WEIGHTED E (in) = (E ·)(%)A + (E ·)(%)B + (E ·)(%)C + (E ·)(%)D							ZONE = 3				
V ··· (acre-ft) = (WEIGHTED E)(AREA)/12							P ··· (in.) = 2.60				
V ····· (acre-ft) = V ··· + (A ·)(P ····· - P ···)/12							P ····· (in.) = 3.10				
Q (cfs) = (Q ·)(A ·) + (Q ·)(A ·) + (Q ·)(A ·) + (Q ·)(A ·)							P ····· (in.) = 4.90				

note: As built for Alameda

DRAINAGE PLAN:

LEGAL DESCRIPTION: LOTS 1 AND 2, BLOCK 4, NAA TRACT 2, UNIT 3

SITE AREA: 1.2932 ACRES

FLOOD HAZARD STATEMENT: F.E.M.A. FLOODWAY BOUNDARY AND FLOODWAY MAP DATED AUGUST 16, 2012 (PANEL NO. 35001C0137H) INDICATES A FLOOD HAZARD ZONE A WITH A 1% ANNUAL CHANCE FLOOD DISCHARGE CONTAINED IN THE POND.

LOCATION AND DESCRIPTION: THE LOTS ARE LOCATED ON THE SOUTHEAST CORNER OF ALAMEDA BOULEVARD AND LOUISIANA BOULEVARD. THERE IS CURRENTLY A RETENTION POND ON THE SITE.

EXISTING DRAINAGE CONDITIONS:

THE DRAINAGE ANALYSIS FOR THIS SITE IS IN ACCORDANCE WITH THE CITY OF ALBUQUERQUE DEVELOPMENT PROCESS MANUAL SECTION 22.2, HYDROLOGY. THE PROPERTY IS LOCATED IN ZONE 3. THE 100-YEAR, 6-HOUR STORM IS 2.60 INCHES.

THE SITE CURRENTLY DRAINS FROM EAST TO WEST TO THE EXISTING RETENTION POND THAT WAS CONSTRUCTED TO RETAIN RUNOFF FROM SUBDIVISIONS TO THE EAST AND NORTH. CURRENTLY THERE ARE NO OFFSITE FLOWS REACHING THE SITE.

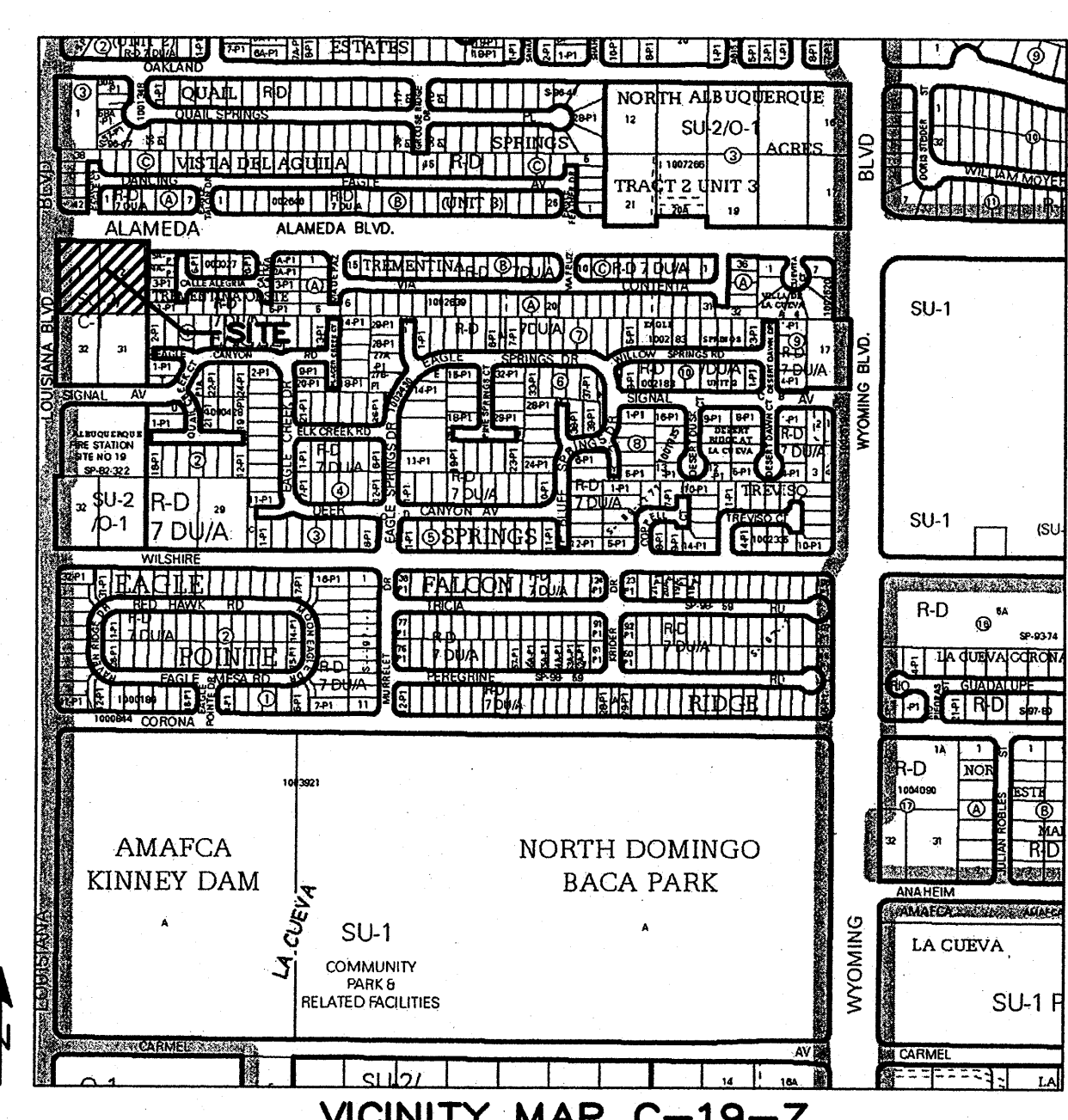
DEVELOPED DRAINAGE CONDITIONS:

THE PURPOSE OF THIS GRADING PLAN IS TO FILL IN THE RETENTION POND NOW THAT THE ALAMEDA STORM DRAIN SYSTEM HAS BEEN CONSTRUCTED TO CONVEY THE RUNOFF TO THE WEST TO THE SAN PEDRO STORM DRAIN. THEREFORE THE RETENTION POND THAT USED TO RETAIN THIS RUNOFF IS NO LONGER NEEDED. THE SITE WILL NOT BE DEVELOPED AT THIS TIME, BUT IT COULD BE DEVELOPED IN THE NEAR FUTURE.

THE SITE HAS BEEN DIVIDED INTO TWO DRAINAGE BASINS THAT COINCIDE WITH THE LOT LINES. RUNOFF FROM OFFSITE BASIN A (LOT 1) WILL DRAIN FROM EAST TO WEST TO LOUISIANA BOULEVARD TO BE COLLECTED IN THE STORM DRAIN SYSTEM IN LOUISIANA. WHEREAS, RUNOFF FROM BASIN B (LOT 2) WILL DRAIN FROM SOUTHEAST TO NORTHWEST DRAINING TO ALAMEDA BOULEVARD TO BE COLLECTED IN THE ALAMEDA STORM DRAIN SYSTEM. A ONE-FOOT HIGH BERM WILL BE CONSTRUCTED ALONG THE WESTERN BOUNDARY OF BASIN B TO DIVERT THE RUNOFF TO ALAMEDA. A TOTAL OF 4.46 CFS WILL DISCHARGE TO LOUISIANA AND ALAMEDA, WHICH IS LESS THAN THE 5.20 CFS IS ALLOWABLE TO BE DISCHARGED TO BE COLLECTED BY THE ALAMEDA STORM DRAIN SYSTEM ACCORDING TO THE ALAMEDA BOULEVARD DRAINAGE PLAN.

NOTE:

ONCE GRADING IS COMPLETE ALL DISTURBED AREAS WILL BE SEEDED.



LEGEND

- 73.00' SPOT ELEVATIONS
- EXIST. MAJOR CONTOURS
- EXIST. MINOR CONTOURS
- FLOW DIRECTION
- PROPOSED EASEMENT
- BOUNDARY
- PROPOSED EARTHEN BERM
- PROPOSED BASIN BOUNDARY
- DRAINAGE BASIN NUMBER

GRAPHIC SCALE

(IN FEET)
1 inch = 20 ft.

RECEIVED
JUL 24 2014
LAND DEVELOPMENT SECTION

Thompson Engineering Consultants, Inc.

PROJECT: **LOTS 1 AND 2, BLOCK 4, TRACT 2, UNIT 3, NORTH ALBUQUERQUE ACRES**

DATE: **7/15/2014**

HORIZ. SCALE: **1" = 20'**

VERT. SCALE: **1" = 10'**

CITY/COUNTY REVIEW

DEPARTMENT	DATE
WASTEWATER MGMT. DIV.	
WATER SERVICES	
SUBDIVISION ENG.	
STREETS	
TRAFFIC	

SHEET No. **1 OF 1**