

DRAINAGE INFORMATION SHEET

PROJECT TITLE: LOT 7-A, BLK 1) SANTILLA PLACE ZONE ATLAS/DRNG. FILE #: K-18 / 061

DRB #: 92-441 EPC #: N/A WORK ORDER #: N/A

LEGAL DESCRIPTION: LOT 7A, BLK 1 - SANTILLA PLACE SUB'D

CITY ADDRESS: _____

ENGINEERING FIRM: Ryals Engineering CONTACT: Bob Ryals

ADDRESS: 4929 Idlewild PHONE: 265-8267

OWNER: Waugreens CONTACT: _____

ADDRESS: _____ PHONE: _____

ARCHITECT: Deaton - Rainhart CONTACT: George Rainhart

ADDRESS: _____ PHONE: 828-9611

SURVEYOR: N/A CONTACT: _____

ADDRESS: _____ PHONE: _____

CONTRACTOR: N/A CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

- ☐ DRAINAGE REPORT
- ☒ DRAINAGE PLAN
- ☐ CONCEPTUAL GRADING & DRAINAGE PLAN
- ☐ GRADING PLAN
- ☐ EROSION CONTROL PLAN
- ☐ ENGINEER'S CERTIFICATION
- ☐ OTHER

PRE-DESIGN MEETING:

- ☐ YES
- ☐ NO
- ☐ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

- ☐ SKETCH PLAT APPROVAL
- ☐ PRELIMINARY PLAT APPROVAL
- ☐ S. DEV. PLAN FOR SUB'D. APPROVAL
- ☐ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
- ☐ SECTOR PLAN APPROVAL
- ☐ FINAL PLAT APPROVAL
- ☐ FOUNDATION PERMIT APPROVAL
- ☐ BUILDING PERMIT APPROVAL
- ☒ CERTIFICATE OF OCCUPANCY APPROVAL
- ☐ GRADING PERMIT APPROVAL
- ☐ PAVING PERMIT APPROVAL
- ☐ S.A.D. DRAINAGE REPORT
- ☐ DRAINAGE REQUIREMENTS
- ☐ OTHER _____ (SPECIFY)

DATE SUBMITTED: 8/25/93

BY: R. Ryals

7614

PIPE CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

DODSON HYDROCARC

Culvert Diameter (feet) .83
FHWA Chart Number (1,2 or 3) 1
Scale Number on Chart (Type of Culvert Entrance) 1
Manning's Roughness Coefficient (n-value) .013
Entrance Loss Coefficient of Culvert Opening .5
Culvert Length (feet) 160
Culvert Slope (feet per foot) .008

WALGREENS
CENTRAL SAN PEDRO

5/27/93

*** RESULTS ***

Flow Rate Tailwater ..Headwater (ft).. Normal Critical Depth at Outlet
(cfs) Depth(ft) In.Ctrl. Out.Ctrl. Depth(ft) Depth(ft) Outlet(ft) Vel.(fps)
1.83 0.40 1.03 0.84 0.64 0.61 0.64 4.10

Enter Flow Rate and Tailwater, or Press the <Esc> Key to End

PIPE CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

Culvert Diameter (feet) .83
FHWA Chart Number (1,2 or 3) 1
Scale Number on Chart (Type of Culvert Entrance) 2
Manning's Roughness Coefficient (n-value) .013
Entrance Loss Coefficient of Culvert Opening .2
Culvert Length (feet) 160
Culvert Slope (feet per foot) .008

10"
— normal concrete
— bell end upstream in head wall
— PVC, poss can serve
— because of bell end in upstream head wall

*** RESULTS ***

Flow Rate Tailwater ..Headwater (ft).. Normal Critical Depth at Outlet
(cfs) Depth(ft) In.Ctrl. Out.Ctrl. Depth(ft) Depth(ft) Outlet(ft) Vel.(fps)
Error in reading value for Flow Rate
Range of Allowable Values: 0.0001 to 1000000.0000
1.83 0.40 0.99 0.79 0.64 0.61 0.64 4.10

$$86.26 + 160 \times .008 = 87.54 = \text{invert}$$

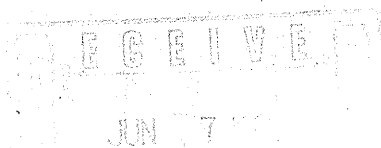
$$87.54 + 0.99 = 88.53 =$$

inlet control 100% W

$$\frac{V^2}{2g} = 0.26' = EV$$

$$ES = .64 + .26 = .90$$

Enter Flow Rate and Tailwater, or Press the <Esc> Key to End



file=mantrap (Manning's equation for normal flow in trapezoidal channels)
 b=bottom width (=0 for triangles), m=sideslope H:V (=0 for rectangles)
 P=wetted perimeter; R=A/P; Q=flow(cfs); Ev=velocity energy; Fr=Froude no.
 Es=specific energy= $y+v^2/2g$; Ms=specific momentum= $Q^2/gA+\bar{y}A$

COMMENT

COMMENT WALGREEN'S CENTRAL & SAN PEDRO, SW CULVERT & JUNCTION BOX @ NW CORNER

COMMENT ASSUME NORMAL DEPTH $n = 0.013$ CONCRETE PER DPM

05/27/93 10:46 AM

n	0.0130	0.0130	0.0130	0.0130	0.0130	0.0130
S	0.0200	0.0150	0.0200	0.0150	0.0200	0.0150
M1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
M2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
B	1.0000	1.0000	1.5000	1.5000	2.0000	2.0000
Y	0.3322	0.3685	0.2366	0.2606	0.1915	0.2097
T	1.0000	1.0000	1.5000	1.5000	2.0000	2.0000
A	0.3322	0.3685	0.3550	0.3909	0.3830	0.4194
P	1.6644	1.7369	1.9733	2.0212	2.3830	2.4194
R	0.1996	0.2121	0.1799	0.1934	0.1607	0.1733
Q	1.833914	1.834749	1.82849	1.830095	1.830451	1.8251646
V	5.5209	4.9796	5.1513	4.6819	4.7789	4.3522
Ev	0.4737	0.3854	0.4124	0.3407	0.3550	0.2944
Es	0.8059	0.7538	0.6491	0.6013	0.5465	0.5041
Fr (Y)	1.6889	1.4464	1.8670	1.6170	1.9253	1.6757
Fr (A/T)	1.6889	1.4464	1.8670	1.6170	1.9253	1.6757
Ms	0.37	0.35	0.33	0.32	0.31	0.29

FILE=DPMHYD40.W01

ALBUQUERQUE, NM, DPM (8/91) CRITERIA - SIMPLE PROCEDURE FOR <= 40 ACRES

PX100-6 = PRECIPITATION EXCESS FROM 100-YEAR 6-HOUR STORM

VOL10D = VOLUME OF RUNOFF FROM 100-YEAR 10-DAY STORM

TRTMT CLASS A=UNDISTURBED, B=LAWNS, C=UNPAVED ROADS, D=ROOFS,PAVEMENT: SEE DPM P 22.5-5

***** PROJECT INFO *****

WALGREENS @ CENTRAL & SAN PEDRO

PROPOSED CONDITIONS AREA LESS THAN EXISTING CONDITIONS AREA BY AMOUNT OF

NON-CONTRIBUTING LANDSCAPING = 6871 SF

05/27/93 03:00 PM

EXIST CONDITONS, DRAIN TO CENTRAL

TRTMT CLASS	AREA SQUARE FEET	AREA ACRES	PX100-6 IN/AC	QP100-6 CFS/AC	QP100-6 CFS	VOL6HR AC-FT	VOL1D AC-FT	VOL4D AC-FT	VOL10D AC-FT
A	0.00	0.00	0.66	1.87	0.000	0.000	0.000	0.000	0.000
B	392.00	0.01	0.92	2.60	0.023	0.001	0.001	0.001	0.001
C	0.00	0.00	1.29	3.45	0.000	0.000	0.000	0.000	0.000
D	16404.00	0.38	2.36	5.02	1.890	0.074	0.090	0.116	0.146
TOTAL	16796.00	0.39			1.914	0.075	0.090	0.117	0.147
					CU FT	3256	3940	5102	6400

EXISTING CONDITIONS, DRAIN TO CAGUA

TRTMT CLASS	AREA SQUARE FEET	AREA ACRES	PX100-6 IN/AC	QP100-6 CFS/AC	QP100-6 CFS	VOL6HR AC-FT	VOL1D AC-FT	VOL4D AC-FT	VOL10D AC-FT
A	0.00	0.00	0.66	1.87	0.000	0.000	0.000	0.000	0.000
B	0.00	0.00	0.92	2.60	0.000	0.000	0.000	0.000	0.000
C	0.00	0.00	1.29	3.45	0.000	0.000	0.000	0.000	0.000
D	30707.00	0.70	2.36	5.02	3.539	0.139	0.168	0.218	0.274
TOTAL	30707.00	0.70			3.539	0.139	0.168	0.218	0.274
					CU FT	6039	7319	9494	11925

EXISTING CONDITIONS, DRAIN TO SAN PEDRO

TRTMT CLASS	AREA SQUARE FEET	AREA ACRES	PX100-6 IN/AC	QP100-6 CFS/AC	QP100-6 CFS	VOL6HR AC-FT	VOL1D AC-FT	VOL4D AC-FT	VOL10D AC-FT
A	0.00	0.00	0.66	1.87	0.000	0.000	0.000	0.000	0.000
B	0.00	0.00	0.92	2.60	0.000	0.000	0.000	0.000	0.000
C	0.00	0.00	1.29	3.45	0.000	0.000	0.000	0.000	0.000
D	11099.00	0.25	2.36	5.02	1.279	0.050	0.061	0.079	0.099
TOTAL	11099.00	0.25			1.279	0.050	0.061	0.079	0.099
					CU FT	2183	2645	3431	4310

58602.00 TOTAL EXISTING CONDITIONS 6.73 0.26 0.32 0.41 0.52
CU FT 11478 13903 18027 22635

JUN 7

FILE=DPMHYD40.WQ1

ALBUQUERQUE, NM, DPM (8/91) CRITERIA - SIMPLE PROCEDURE FOR <= 40 ACRES

PX100-6 = PRECIPITATION EXCESS FROM 100-YEAR 6-HOUR STORM

VOL10D = VOLUME OF RUNOFF FROM 100-YEAR 10-DAY STORM

TRTMT CLASS A=UNDISTURBED, B=LAWNS, C=UNPAVED ROADS, D=ROOFS,PAVEMENT: SEE DPM P 22.5-5

***** PROJECT INFO *****

WALGREENS @ CENTRAL & SAN PEDRO

PROPOSED CONDITIONS AREA LESS THAN EXISTING CONDITIONS AREA BY AMOUNT OF
NON-CONTRIBUTING LANDSCAPING = 6871 SF

RAIN ZONE 3 SEE DPM P 22.2-2

100-YEAR PRECIPITATION (P) DEPTHS, INCHES

1 HR	6 HR	24 HR	4 DAY	10 DAY
2.14	2.60	3.10	3.95	4.90

05/27/93 03:00 PM PROPOSED CONDITONS, DRAIN TO CENTRAL

TRTMT CLASS	AREA SQUARE FEET	AREA ACRES	PX100-6 IN/AC	QP100-6 CFS/AC	QP100-6 CFS	VOL6HR AC-FT	VOL1D AC-FT	VOL4D AC-FT	VOL10D AC-FT
A	0.00	0.00	0.66	1.87	0.000	0.000	0.000	0.000	0.000
B	0.00	0.00	0.92	2.60	0.000	0.000	0.000	0.000	0.000
C	0.00	0.00	1.29	3.45	0.000	0.000	0.000	0.000	0.000
D	17009.00	0.39	2.36	5.02	1.960	0.077	0.093	0.121	0.152
TOTAL	17009.00	0.39			1.960	0.077	0.093	0.121	0.152
					CU FT	3345	4054	5259	6605

PROPOSED CONDITIONS, DRAIN TO CAGUA VIA PIPE

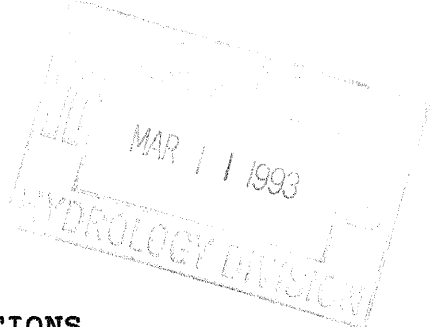
TRTMT CLASS	AREA SQUARE FEET	AREA ACRES	PX100-6 IN/AC	QP100-6 CFS/AC	QP100-6 CFS	VOL6HR AC-FT	VOL1D AC-FT	VOL4D AC-FT	VOL10D AC-FT
A	0.00	0.00	0.66	1.87	0.000	0.000	0.000	0.000	0.000
B	1218.00	0.03	0.92	2.60	0.073	0.002	0.002	0.002	0.002
C	0.00	0.00	1.29	3.45	0.000	0.000	0.000	0.000	0.000
D	15259.00	0.35	2.36	5.02	1.758	0.069	0.083	0.108	0.136
TOTAL	16477.00	0.38			1.831	0.071	0.086	0.110	0.138
					CU FT	3094	3730	4811	6019

PROPOSED CONDITIONS, DRAIN TO CAGUA FROM BLDG & SWALE

TRTMT CLASS	AREA SQUARE FEET	AREA ACRES	PX100-6 IN/AC	QP100-6 CFS/AC	QP100-6 CFS	VOL6HR AC-FT	VOL1D AC-FT	VOL4D AC-FT	VOL10D AC-FT
A	0.00	0.00	0.66	1.87	0.000	0.000	0.000	0.000	0.000
B	1538.00	0.04	0.92	2.60	0.092	0.003	0.003	0.003	0.003
C	0.00	0.00	1.29	3.45	0.000	0.000	0.000	0.000	0.000
D	14807.00	0.34	2.36	5.02	1.706	0.067	0.081	0.105	0.132
TOTAL	16345.00	0.38			1.798	0.070	0.084	0.108	0.135
					CU FT	3030	3647	4696	5868

PROPOSED CONDITIONS, MISC PAVING AT NW & NE ENTRANCES NOT COUNTED ABOVE

D	1900.00	0.04	2.36	5.02	0.219	0.009	0.010	0.013	0.017
51731.00	TOTAL PROPOSED CONDITIONS				5.81	0.23	0.27	0.35	0.44
					CU FT	9843	11884	15353	19230



ONSITE HYDROLOGY CALCULATIONS
NWC CENTRAL AND SAN PEDRO
ALBUQUERQUE, NEW MEXICO

LEGAL DESCRIPTION: Lot 7-A, BLOCK 1 SANTILLA PLACE

FLOOD ZONE: AO - FIRM MAP #35002 0030 C

SITE DESCRIPTION: THE SITE IS PRESENTLY AN ABANDONED GAS SERVICE STATION SITE LOCATED ON THE NORTHWEST CORNER OF SAN PEDRO AND CENTRAL. THE SITE IS ALMOST TOTALLY ASPHALT PAVED AND DRAINS FREELY IN ALL DIRECTIONS TO CENTRAL, SAN PEDRO AND CAGUA STREETS. SEE ATTACHED TOPOGRAPHIC SURVEY.

PROPOSED IMPROVEMENTS: IT IS PROPOSED TO CONSTRUCT A WALGREENS STORE WITH PAVED PARKING AND LANDSCAPING.

DESIGN CRITERIA: SINCE THE FIRM MAPS INDICATE THAT THE CAGUA STREET RIGHT OF WAY LOCATED WEST OF THE SITE IS WITHIN THE AO FLOOD ZONE THE FINISHED FLOOR ELEVATIONS SHALL BE SET A MINIMUM OF 2 FEET ABOVE THE HIGHEST ADJACENT CURB FLOW LINE ELEVATION.

HYDROLOGY METHOD: AHYMO COMPUTER PROGRAM, AMAFCA HYDROLOGIC MODEL

REFERENCE: ALBUQUERQUE DPM SECTION 22.2 (AUGUST, 1991)

HYDROLOGIC PARAMETERS:

1. RAINFALL - 100 YR 6 HR DURATION = 2.32 INCHES (NOAA ATLAS 2)
2. LAND TREATMENTS
 - A) HISTORICAL: NATURAL, AREA= 56789 SF =1.3037AC=.00204 SQ MI
 - B) EXISTING : BLDG. AND PAVED AREA = 56397 S.F. = .0020 SQ MI
LANDSCAPED AREAS, AREA = 392 SF =.00001 SQ MI
TOTAL AREA =56789 SF = .00204 SQ MI
 - C) PROPOSED : BLDG. AND PAVED AREAS = 49530 S.F. = .00178 SQ MI
LANDSCAPED AREAS = 7256 SF = .00026 SQ MI
3. TIME OF CONCENTRATION = 12 MIN.
4. RUNOFF VOLUME AND PEAK DISCHARGE:
 - A) HISTORICAL:
VOLUME (100 YR 6 HR FROM AHYMO) = .572 IN =56789 CF
PEAK DISCHARGE (100 YR 6 HR FROM AHYMO) = 2.06 CFS
 - B) EXISTING:
VOLUME (100 YR 6 HR FROM AHYMO) = 2.07 IN=9823 CF
PEAK DISCHARGE (100 YR 6 HR FROM AHYMO) = 6.14 CFS
 - C) PROPOSED:
VOLUME (100 YR 6 HR FROM AHYMO) = 1.91 IN = 9073 CF
PEAK DISCHARGE = 5.74 CFS

5. CONCLUSION: THE PROPOSED PLAN PROVIDES FOR THE FREE DRAINAGE OF THE PARKING LOT TO CAGUA STREET VIA THE DRIVE PADS AND THE DISCHARGE OF ROOF DRAINS TO A LANDSCAPED AREA LOCATED WEST OF THE BUILDING WHICH OUTFALLS VIA A SIDEWALK CULVERT TO CAGUA. LANDSCAPED AREAS HAVE BEEN PROVIDED WITH 6" INVERTS DRAINING AWAY FROM SIDEWALKS. DUE TO THE REDUCTION IN RUNOFF VOLUME AND DISCHARGE RATE FROM EXISTING TO PROPOSED CONDITIONS AND DUE TO THE CITY'S PLANS FOR DOWN STREAM DRAINAGE IMPROVEMENTS THE PROPOSED PLAN WILL IMPROVE EXISTING CONDITIONS.

BOX CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

March 10, 1993
WALGREENS
SAN PEDRO / CENTRAL
SIDEWALK CULVERT ANALYSIS

PROGRAM INPUT DATA:

DESCRIPTION	VALUE
Culvert Span (Width of Opening) (feet).....	2.00
Culvert Rise (Height of Opening) (feet).....	0.67
FHWA Chart Number (8,9,10,11,12 or 13).....	10
Scale Number on Chart (Type of Culvert Entrance).....	1
Manning's Roughness Coefficient (n-value).....	0.0150
Entrance Loss Coefficient of Culvert Opening.....	0.50
Culvert Length (feet).....	6.0
Culvert Slope (feet per foot).....	0.0180

PROGRAM RESULTS:

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater (ft) Inlet Control	Headwater (ft) Outlet Control	Normal Depth (ft)	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
1.0	0.50	0.32	0.41	0.15	0.20	0.50	1.00
1.3	0.50	0.38	0.42	0.17	0.23	0.50	1.25
1.5	0.50	0.43	0.43	0.19	0.26	0.50	1.50
1.6	0.50	0.44	0.43	0.20	0.27	0.20	4.03
1.7	0.50	0.46	0.43	0.20	0.28	0.20	4.10
1.8	0.50	0.47	0.44	0.21	0.29	0.21	4.16

BOX CULVERT ANALYSIS COMPUTER PROGRAM Version 1.6 Copyright (c) 1986
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AHYMO PROGRAM (AHYMO392) - AMAFCA VERSION OF HYMO - MARCH, 1992
 RUN DATE (MON/DAY/YR) = 03/10/1993
 START TIME (HR:MIN:SEC) = 08:46:50 USER NO.= RYALS_NM.I01
 INPUT FILE = WALGREEN.DAT

* WALGREENS
 * SAN PEDRO / CENTRAL
 * HISTORICAL ON SITE ANALYSIS

* THIS HYDROGRAPH IS THE UNDEVELOPED AREA OF 1.3037 ACRES PERVIOUS
 * LAND TREATMENT.
 * THIS ANALYSIS IS DONE USING A 6-HOUR RAINFALL DISTRIBUTION BASED ON
 * NOAA ATLAS 2 WITH PEAK INTENSITY AT 1.4 HOURS (APPENDIX A). THE TIME OF
 * CONCENTRATION IS 12 MINUTES. INITIAL ABSTRACTION AND INFILTRATION ARE
 * FROM TABLES 6 AND 7 RESPESTIVELY. RAINFALL VALUES FOR P60, P360
 * AND P1440 ARE FROM FIGURES FIGURES D,E & F DPM SECTION 22.2, 8-91.

START TIME=0.00

PUNCH CODE=0 PRINT LINES=-2

LAND FACTORS TYPE=1
 TREATMENT A IA=0.40 INF=2.10
 TREATMENT B IA=0.32 INF=1.63
 TREATMENT C IA=0.25 INF=1.15
 TREATMENT D IA=0.10 INF=0.04

RAINFALL TYPE=1
 RAIN QUARTER=0.00 RAIN ONE=2.02 RAIN SIX=2.32
 RAIN DAY=0.00 DT=0.033333 HRS

COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40

DT =	.033333 HOURS	END TIME =	5.999940 HOURS
.0000	.0013	.0025	.0038
.0094	.0108	.0124	.0139
.0205	.0223	.0241	.0260
.0343	.0365	.0389	.0413
.0524	.0555	.0588	.0644
.1212	.1684	.2362	.3288
1.0344	1.2524	1.3437	1.4207
1.6623	1.7121	1.7588	1.8027
1.9555	1.9887	2.0203	2.0503
2.0960	2.1012	2.1061	2.1108
2.1277	2.1316	2.1354	2.1390
2.1524	2.1556	2.1586	2.1616
2.1729	2.1756	2.1782	2.1807
2.1905	2.1928	2.1951	2.1974
2.2060	2.2081	2.2101	2.2122
2.2199	2.2218	2.2237	2.2255
2.2326	2.2343	2.2360	2.2377
2.2443	2.2459	2.2474	2.2490
2.2551	2.2565	2.2580	2.2595
2.2651	2.2665	2.2679	2.2693
2.2746	2.2759	2.2772	2.2785
2.2835	2.2847	2.2860	2.2872
2.2920	2.2931	2.2943	2.2954
2.3000	2.3011	2.3022	2.3033
2.3076	2.3087	2.3098	2.3108
2.3150	2.3160	2.3170	2.3180
			2.3190
			2.3200

COMPUTE NM HYD

ID=1 HYD NO=101.20 DA=0.00204 SQ MI
PER A=100.00 PER B=0.00 PER C=0.00 PER D=0.00
TP=-0.13333 MASS RAINFALL=-1

K = .179996HR TP = .133330HR K/TP RATIO = 1.350000 SHAPE CONSTANT, N
UNIT PEAK = 3.8787 CFS UNIT VOLUME = .9952 B = 253.50 P60 = 2
AREA = .002040 SQ MI IA = .40000 INCHES INF = 2.10000 INCHES PER HOU
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD

ID=1 CODE=1

PARTIAL HYDROGRAPH 101.20

RUNOFF VOLUME = .57166 INCHES = .0622 ACRE-FEET
PEAK DISCHARGE RATE = 2.06 CFS AT 1.500 HOURS BASIN AREA = .0020 SQ. MI.

FINISH

NORMAL PROGRAM FINISH

END TIME (HR:MIN:SEC) = 08:46:51

AHYMO PROGRAM (AHYMO392) - AMAFCA VERSION OF HYMO - MARCH, 1992
 RUN DATE (MON/DAY/YR) = 03/10/1993
 START TIME (HR:MIN:SEC) = 09:06:39 USER NO.= RYALS_NM.I01
 INPUT FILE = WALGREN1.DAT

* WALGREENS
 * SAN PEDRO / CENTRAL
 * EXISTING DEVELOPED ON SITE ANALYSIS
 *
 * THIS HYDROGRAPH IS THE EXISTING DEVELOPED AREA OF 1.3037 ACRES COMPOSITE
 * LAND TREATMENT.
 * THIS ANALYSIS IS DONE USING A 6-HOUR RAINFALL DISTRIBUTION BASED ON
 * NOAA ATLAS 2 WITH PEAK INTENSITY AT 1.4 HOURS (APPENDIX A). THE TIME OF
 * CONCENTRATION IS 12 MINUTES. INITIAL ABSTRACTION AND INFILTRATION ARE
 * FROM TABLES 6 AND 7 RESPECTIVELY. RAINFALL VALUES FOR P60, P360
 * AND P1440 ARE FROM FIGURES D, E & F DPM SECTION 22.2, 8-91.

START TIME=0.00

PUNCH CODE=0 PRINT LINES=-2

LAND FACTORS

TYPE=1
 TREATMENT A IA=0.40 INF=2.10
 TREATMENT B IA=0.32 INF=1.63
 TREATMENT C IA=0.25 INF=1.15
 TREATMENT D IA=0.10 INF=0.04

RAINFALL

TYPE=1
 RAIN QUARTER=0.00 RAIN ONE=2.02 RAIN SIX=2.32
 RAIN DAY=0.00 DT=0.033333 HRS

COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 H
 DT = .033333 HOURS END TIME = 5.999940 HOURS

.0000	.0013	.0025	.0038	.0052	.0065	.0079
.0094	.0108	.0124	.0139	.0155	.0171	.0188
.0205	.0223	.0241	.0260	.0280	.0300	.0321
.0343	.0365	.0389	.0413	.0439	.0466	.0494
.0524	.0555	.0588	.0644	.0704	.0767	.0905
.1212	.1684	.2362	.3288	.4505	.6056	.7987
1.0344	1.2524	1.3437	1.4207	1.4892	1.5516	1.6090
1.6623	1.7121	1.7588	1.8027	1.8441	1.8833	1.9203
1.9555	1.9887	2.0203	2.0503	2.0788	2.0849	2.0906
2.0960	2.1012	2.1061	2.1108	2.1153	2.1196	2.1237
2.1277	2.1316	2.1354	2.1390	2.1425	2.1459	2.1492
2.1524	2.1556	2.1586	2.1616	2.1645	2.1674	2.1702
2.1729	2.1756	2.1782	2.1807	2.1832	2.1857	2.1881
2.1905	2.1928	2.1951	2.1974	2.1996	2.2018	2.2039
2.2060	2.2081	2.2101	2.2122	2.2141	2.2161	2.2180
2.2199	2.2218	2.2237	2.2255	2.2273	2.2291	2.2309
2.2326	2.2343	2.2360	2.2377	2.2394	2.2410	2.2427
2.2443	2.2459	2.2474	2.2490	2.2505	2.2521	2.2536
2.2551	2.2565	2.2580	2.2595	2.2609	2.2623	2.2637
2.2651	2.2665	2.2679	2.2693	2.2706	2.2719	2.2733
2.2746	2.2759	2.2772	2.2785	2.2797	2.2810	2.2823
2.2835	2.2847	2.2860	2.2872	2.2884	2.2896	2.2908
2.2920	2.2931	2.2943	2.2954	2.2966	2.2977	2.2989
2.3000	2.3011	2.3022	2.3033	2.3044	2.3055	2.3066
2.3076	2.3087	2.3098	2.3108	2.3119	2.3129	2.3139
2.3150	2.3160	2.3170	2.3180	2.3190	2.3200	

COMPUTE NM HYD

ID=1 HYD NO=101.20 DA=0.00204 SQ MI
PER A=0.00 PER B=1.00 PER C=0.00 PER D=99.00
TP=-0.13333 MASS RAINFALL=-1

K = .072665HR TP = .133330HR K/TP RATIO = .545000 SHAPE CONSTANT, N =
UNIT PEAK = 7.9717 CFS UNIT VOLUME = .9980 B = 526.28 P60 = 2.0
AREA = .002020 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .154545HR TP = .133330HR K/TP RATIO = 1.159116 SHAPE CONSTANT, N =
UNIT PEAK = .43836E-01CFS UNIT VOLUME = .8665 B = 286.50 P60 = 2.0
AREA = .000020 SQ MI IA = .30000 INCHES INF = 1.63000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD

ID=1 CODE=1

PARTIAL HYDROGRAPH 101.20

RUNOFF VOLUME = 2.07296 INCHES = .2255 ACRE-FEET
PEAK DISCHARGE RATE = 6.14 CFS AT 1.500 HOURS BASIN AREA = .0020 SQ. MI.

FINISH

NORMAL PROGRAM FINISH

END TIME (HR:MIN:SEC) = 09:06:40

AHYMO PROGRAM (AHYMO392) - AMAFCA VERSION OF HYMO - MARCH, 1992
 RUN DATE (MON/DAY/YR) = 03/10/1993
 START TIME (HR:MIN:SEC) = 09:25:57 USER NO.= RYALS_NM.I01
 INPUT FILE = WALGREN2.DAT

* WALGREENS
 * SAN PEDRO / CENTRAL
 * PROPOSED DEVELOPED ON SITE ANALYSIS
 *
 * THIS HYDROGRAPH IS THE PROPOSED DEVELOPED AREA OF 1.3037 ACRES COMPOSITE
 * LAND TREATMENT.
 * THIS ANALYSIS IS DONE USING A 6-HOUR RAINFALL DISTRIBUTION BASED ON
 * NOAA ATLAS 2 WITH PEAK INTENSITY AT 1.4 HOURS (APPENDIX A).THE TIME OF
 * CONCENTRATION IS 12 MINUTES. INITIAL ABSTRACTION AND INFILTRATION ARE
 * FROM TABLES 6 AND 7 RESPESTIVELY. RAINFALL VALUES FOR P60, P360
 * AND P1440 ARE FROM FIGURES FIGURES D,E &F DPM SECTION 22.2, 8-91.

START TIME=0.00

PUNCH CODE=0 PRINT LINES=-2

LAND FACTORS

TYPE=1
 TREATMENT A IA=0.40 INF=2.10
 TREATMENT B IA=0.32 INF=1.63
 TREATMENT C IA=0.25 INF=1.15
 TREATMENT D IA=0.10 INF=0.04

RAINFALL

TYPE=1
 RAIN QUARTER=0.00 RAIN ONE=2.02 RAIN SIX=2.32
 RAIN DAY=0.00 DT=0.033333 HRS

COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 H
 DT = .033333 HOURS END TIME = 5.999940 HOURS

.0000	.0013	.0025	.0038	.0052	.0065	.0079
.0094	.0108	.0124	.0139	.0155	.0171	.0188
.0205	.0223	.0241	.0260	.0280	.0300	.0321
.0343	.0365	.0389	.0413	.0439	.0466	.0494
.0524	.0555	.0588	.0644	.0704	.0767	.0905
.1212	.1684	.2362	.3288	.4505	.6056	.7987
1.0344	1.2524	1.3437	1.4207	1.4892	1.5516	1.6090
1.6623	1.7121	1.7588	1.8027	1.8441	1.8833	1.9203
1.9555	1.9887	2.0203	2.0503	2.0788	2.0849	2.0906
2.0960	2.1012	2.1061	2.1108	2.1153	2.1196	2.1237
2.1277	2.1316	2.1354	2.1390	2.1425	2.1459	2.1492
2.1524	2.1556	2.1586	2.1616	2.1645	2.1674	2.1702
2.1729	2.1756	2.1782	2.1807	2.1832	2.1857	2.1881
2.1905	2.1928	2.1951	2.1974	2.1996	2.2018	2.2039
2.2060	2.2081	2.2101	2.2122	2.2141	2.2161	2.2180
2.2199	2.2218	2.2237	2.2255	2.2273	2.2291	2.2309
2.2326	2.2343	2.2360	2.2377	2.2394	2.2410	2.2427
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2.2746	2.2759	2.2772	2.2785	2.2797	2.2810	2.2823
2.2835	2.2847	2.2860	2.2872	2.2884	2.2896	2.2908
2.2920	2.2931	2.2943	2.2954	2.2966	2.2977	2.2989
2.3000	2.3011	2.3022	2.3033	2.3044	2.3055	2.3066
2.3076	2.3087	2.3098	2.3108	2.3119	2.3129	2.3139
2.3150	2.3160	2.3170	2.3180	2.3190	2.3200	

COMPUTE NM HYD

ID=1 HYD NO=101.20 DA=0.00204 SQ MI
PER A=0.00 PER B=12.78 PER C=0.00 PER D=87.22
TP=-0.13333 MASS RAINFALL=-1

K = .072665HR TP = .133330HR K/TP RATIO = .545000 SHAPE CONSTANT, N =
UNIT PEAK = 7.0231 CFS UNIT VOLUME = .9978 B = 526.28 P60 = 2.0
AREA = .001779 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .154545HR TP = .133330HR K/TP RATIO = 1.159116 SHAPE CONSTANT, N =
UNIT PEAK = .56022 CFS UNIT VOLUME = .9743 B = 286.50 P60 = 2.0
AREA = .000261 SQ MI IA = .32000 INCHES INF = 1.63000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD

ID=1 CODE=1

PARTIAL HYDROGRAPH 101.20

RUNOFF VOLUME = 1.91441 INCHES = .2083 ACRE-FEET
PEAK DISCHARGE RATE = 5.74 CFS AT 1.500 HOURS BASIN AREA = .0020 SQ. MI.

FINISH

NORMAL PROGRAM FINISH

END TIME (HR:MIN:SEC) = 09:25:57

WALGREENS
SAN PEDRO / CENTRAL
SIDE WALK CULVERT BASIN

THIS HYDROGRAPH IS THE SUBBASIN OUTFALLING TO SIDEWALK CUVERT WHICH INCLUDES THE ROOF AREA AND LANDSCAPED AREA ON WEST SIDE OF BLDG. THIS ANALYSIS IS DONE USING A 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 WITH PEAK INTENSITY AT 1.4 HOURS (APPENDIX A). THE TIME OF CONCENTRATION IS 12 MINUTES. INITIAL ABSTRACTION AND INFILTRATION ARE FROM TABLES 6 AND 7 RESPECTIVELY. RAINFALL VALUES FOR P60, P360 AND P1440 ARE FROM FIGURES FIGURES D,E & F DPM SECTION 22.2, 8-91.

LAND FACTORS	TYPE=1		
TREATMENT A	IA=0.40	INF=2.10	
TREATMENT B	IA=0.32	INF=1.63	
TREATMENT C	IA=0.25	INF=1.15	
TREATMENT D	IA=0.10	INF=0.04	

COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 H						
DT = .033333 HOURS			END TIME = 5.999940 HOURS			
.0000	.0013	.0025	.0038	.0052	.0065	.0079
.0094	.0108	.0124	.0139	.0155	.0171	.0188
.0205	.0223	.0241	.0260	.0280	.0300	.0321
.0343	.0365	.0389	.0413	.0439	.0466	.0494
.0524	.0555	.0588	.0644	.0704	.0767	.0905
.1212	.1684	.2362	.3288	.4505	.6056	.7987
1.0344	1.2524	1.3437	1.4207	1.4892	1.5516	1.6090
1.6623	1.7121	1.7588	1.8027	1.8441	1.8833	1.9203
1.9555	1.9887	2.0203	2.0503	2.0788	2.0849	2.0906
2.0960	2.1012	2.1061	2.1108	2.1153	2.1196	2.1237
2.1277	2.1316	2.1354	2.1390	2.1425	2.1459	2.1492
2.1524	2.1556	2.1586	2.1616	2.1645	2.1674	2.1702
2.1729	2.1756	2.1782	2.1807	2.1832	2.1857	2.1881
2.1905	2.1928	2.1951	2.1974	2.1996	2.2018	2.2039
2.2060	2.2081	2.2101	2.2122	2.2141	2.2161	2.2180
2.2199	2.2218	2.2237	2.2255	2.2273	2.2291	2.2309
2.2326	2.2343	2.2360	2.2377	2.2394	2.2410	2.2427
2.2443	2.2459	2.2474	2.2490	2.2505	2.2521	2.2536
2.2551	2.2565	2.2580	2.2595	2.2609	2.2623	2.2637
2.2651	2.2665	2.2679	2.2693	2.2706	2.2719	2.2733
2.2746	2.2759	2.2772	2.2785	2.2797	2.2810	2.2823
2.2835	2.2847	2.2860	2.2872	2.2884	2.2896	2.2908
2.2920	2.2931	2.2943	2.2954	2.2966	2.2977	2.2989
2.3000	2.3011	2.3022	2.3033	2.3044	2.3055	2.3066
2.3076	2.3087	2.3098	2.3108	2.3119	2.3129	2.3139
2.3150	2.3160	2.3170	2.3180	2.3190	2.3200	

COMPUTE NM HYD

ID=1 HYD NO=101.20 DA=0.00058 SQ MI
PER A=0.00 PER B=9.37 PER C=0.00 PER D=90.63
TP=-0.13333 MASS RAINFALL=-1

K = .072665HR TP = .133330HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.
UNIT PEAK = 2.0748 CFS UNIT VOLUME = .9941 B = 526.28 P60 = 2.0200
AREA = .000526 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .154545HR TP = .133330HR K/TP RATIO = 1.159116 SHAPE CONSTANT, N = 3.
UNIT PEAK = .11678 CFS UNIT VOLUME = .8758 B = 286.50 P60 = 2.0200
AREA = .000054 SQ MI IA = .32000 INCHES INF = 1.63000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD

ID=1 CODE=1

PARTIAL HYDROGRAPH 101.20

RUNOFF VOLUME = 1.96030 INCHES = .0606 ACRE-FEET
PEAK DISCHARGE RATE = 1.68 CFS AT 1.500 HOURS BASIN AREA = .0006 SQ. MI.

FINISH

NORMAL PROGRAM FINISH

END TIME (HR:MIN:SEC) = 10:35:17

March 10, 1993
WALGREENS
SAN PEDRO / CENTRAL
SIDEWALK CULVERT ANALYSIS

PROGRAM INPUT DATA:

DESCRIPTION	VALUE
Culvert Span (Width of Opening) (feet).....	2.00
Culvert Rise (Height of Opening) (feet).....	0.67
FHWA Chart Number (8,9,10,11,12 or 13).....	10
Scale Number on Chart (Type of Culvert Entrance).....	1
Manning's Roughness Coefficient (n-value).....	0.0150
Entrance Loss Coefficient of Culvert Opening.....	0.50
Culvert Length (feet).....	6.0
Culvert Slope (feet per foot).....	0.0180

PROGRAM RESULTS:

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater Inlet Control	Headwater Outlet Control	Normal Depth (ft)	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
1.0	0.50	0.32	0.41	0.15	0.20	0.50	1.00
1.3	0.50	0.38	0.42	0.17	0.23	0.50	1.25
1.5	0.50	0.43	0.43	0.19	0.26	0.50	1.50
1.6	0.50	0.44	0.43	0.20	0.27	0.20	4.03
1.7	0.50	0.46	0.43	0.20	0.28	0.20	4.10
1.8	0.50	0.47	0.44	0.21	0.29	0.21	4.16

BOX CULVERT ANALYSIS COMPUTER PROGRAM Version 1.6 Copyright (c) 1986
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City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

August 26, 1993

Bob Ryals, P.E.
Ryals Engineering
4929 Idlewilde SE
Albuquerque, N.M. 87108

RE: ENGINEER'S CERTIFICATION FOR SANTILLA PLACE (K-18/D61)
ENGINEER'S STAMP DATED 8/20/93; RECEIVED AUGUST 26, 1993
FOR CERTIFICATE OF OCCUPANCY RELEASE

Dear Mr. Ryals:

Based on the information included in the submittal referenced above, City Hydrology RELEASES the Certificate of Occupancy for this project.

If I can be of further assistance, You may contact me at 768-2727.

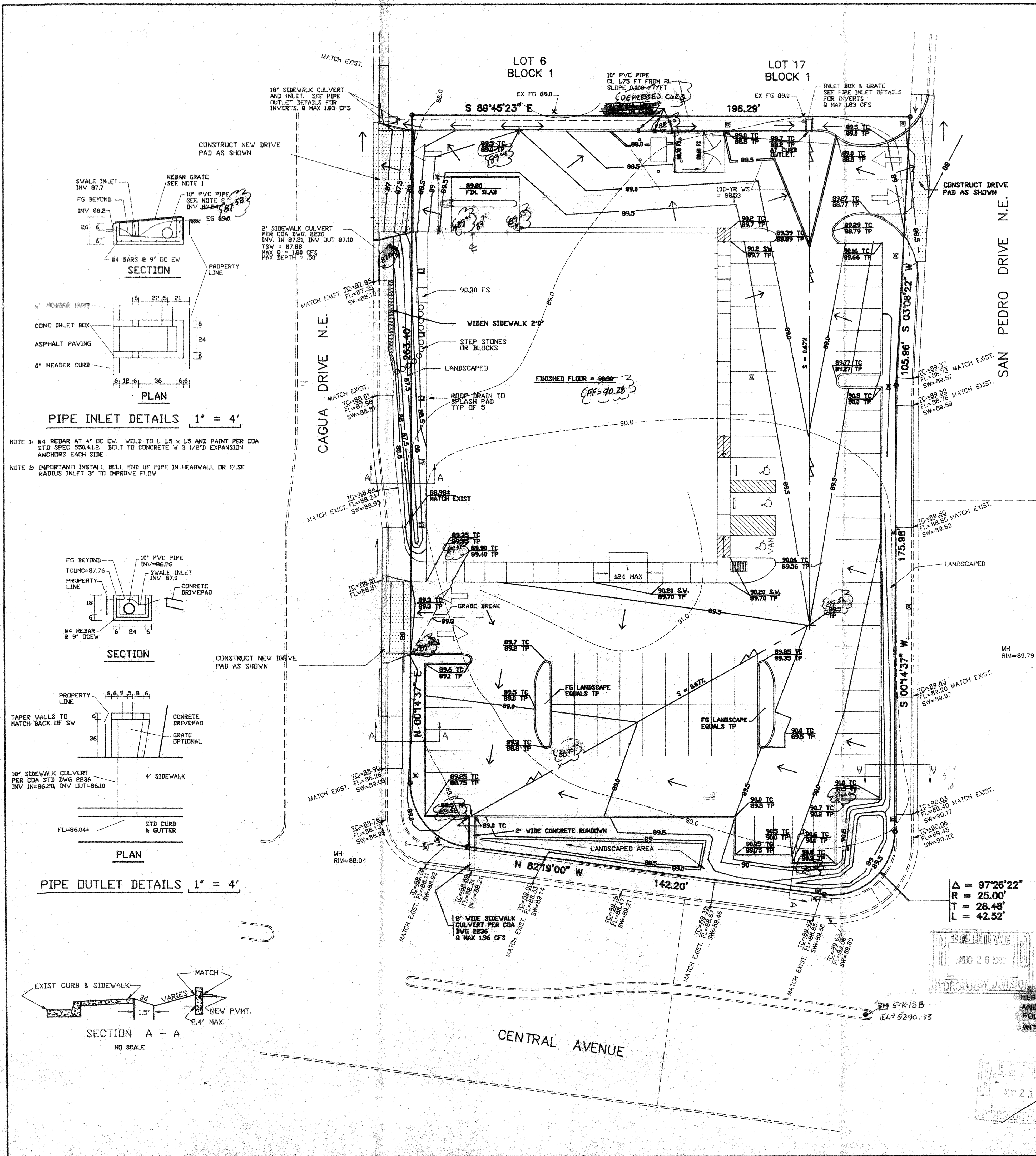
Sincerely,

John P. Curtin, P.E.
Civil Engineer/Hydrology

xc: Alan Martinez

WPHYD+7614;jpc

PUBLIC WORKS DEPARTMENT



LEGEND

TC TOP OF CURB
 TP TOP OF PAVEMENT
 SW SIDEWALK
 FS FINISH SURFACE
 X WATER VALVE
 W WATER METER
 F FIRE HYDRANT
 T TRAFFIC SIGNAL
 □ TRAFFIC CONTROL BOX
 — 0.0 — NEW CONTOURS
 - 0.0 - EXISTING CONTOURS
 → FLOW DIRECTION
 ——— NEW CURB AND GUTTER
 - - - - - EXISTING CURB AND GUTTER

NOTICE TO CONTRACTOR

1. An excavation/construction permit will be required before starting any work within City right-of-way. An approved copy of these plans must be submitted at the time of application for this permit.
2. All work detailed on these plans to be performed, except as otherwise stated or provided herein, shall be constructed in accordance with the City of Albuquerque Standard Specifications for Public Works Construction - 1986.
3. Two working days prior to any excavation, contractor must contact Line Locating Service-260-1990-for location of existing utilities.
4. Prior to construction, the contractor shall excavate and verify the horizontal and vertical locations of all obstructions. Should a conflict exist, the contractor shall notify the Engineer so that the conflict can be resolved with a minimum amount of delay.
5. Backfill compaction shall be according to residential street use for work onsite. Backfill for work within City right-of-way shall be according to arterial street use.
6. Maintenance of these facilities shall be the responsibility of the Owner of the property served.

NOTE: AS CONSTRUCTED SPOT ELEVATIONS ARE SHOWN CLOUDED.

HYDROLOGY CALCULATIONS & RESULTS

1. METHODOLOGY: CITY OF ALBUQUERQUE METHOD FOR AREAS <= 40 ACRES ALBUQUERQUE DPM SECTION 22.2 (AUGUST, 1991)
2. NOTES: * HYDROLOGIC CALCULATIONS INCLUDE SOME AREA WITHIN THE PUBLIC R.O.W. HYDROLOGY AREA = 58602 SF, PLAT AREA = 56789 SF +/- * SEE DRAINAGE FILE FOR DETAILS & INDIVIDUAL BASINS
3. RAINFALL ZONE = 3; 100-YR 6-HR DURATION RAIN = 2.80 IN (TABLE 2)
4. LAND TREATMENTS USED & PEAK RUNOFF RATES (TABLE 9)
 B = LANDSCAPING Op = 2.60 CFS/AC
 D = ROOFS, CONCRETE, PAVING Op = 5.02 CFS/AC
5. TREATMENT B, SF EXISTING 392
 TREATMENT D, SF 58,210
 NON-CONTRIBUTING, SF -0-
 Peak, cfs 6.73
 VOLUME, CU FT 11,478
 (VOLUME, AC FT 0.26)
6. CONCLUSION: DUE TO THE REDUCTION IN RUNOFF VOLUME AND DISCHARGE RATE FROM EXISTING TO PROPOSED CONDITIONS THE PROPOSED PLAN WILL IMPROVE ON EXISTING CONDITIONS. THE CITY ALSO PLANS DRAINAGE IMPROVEMENTS IN THIS AREA.

VICINITY MAP K-18 NTS

ONSITE HYDROLOGY FOR
 WALGREENS STORE
 CENTRAL AND SAN PEDRO ALBUQUERQUE, NEW MEXICO

LEGAL DESCRIPTION: Lot 7-A, BLOCK 1 SANTILLA PLACE

FLOOD ZONE: AO-1, B: FIRM MAP #35002 0030 C: SEE BELOW FOR MORE.

SITE DESCRIPTION: THE SITE IS PRESENTLY AN ABANDONED GASOLINE SERVICE STATION SITE LOCATED ON THE NORTHWEST CORNER OF SAN PEDRO AND CENTRAL. THE SITE IS ALMOST TOTALLY ASPHALT PAVED AND DRAINS DIRECTLY IN ALL DIRECTIONS TO CENTRAL, SAN PEDRO, AND CAGUA STREETS. SEE ATTACHED TOPOGRAPHIC SURVEY.

PROPOSED IMPROVEMENTS: IT IS PROPOSED TO DEMOLISH ALL EXISTING STRUCTURES AND PAVING, REGRADE THE SITE, AND CONSTRUCT A WALGREENS STORE WITH PAVED PARKING AND LANDSCAPING. THE PROPOSED DRAINAGE PLAN USES FREE DISCHARGE AND MOST RUNOFF FLOWS TO CENTRAL AVENUE OR NORTH ON CAGUA, AS UNDER EXISTING CONDITIONS.

FLOOD ZONE: CENTRAL AVENUE TO THE SOUTH OF THE SITE IS WITHIN AN AO-1 FLOOD ZONE AND THE SITE, INCLUDING CAGUA ST. ON THE WEST AND SAN PEDRO AVE. ON THE EAST, IS WITHIN A B ("500-YEAR") ZONE. FINISHED FLOOR OF THE BUILDING HAS BEEN SET A MINIMUM OF 1.63 FEET ABOVE THE HIGHEST ADJACENT FLOW LINE ELEVATION IN CENTRAL AVE. INSPECTION OF EXISTING GRADES IN THE ADJACENT STREETS SHOWS THAT FLOW IN CENTRAL AVE. NEAR THE SITE WOULD NOT RUN 1 FOOT DEEP BUT WOULD SPREAD OUT IN SHALLOWER FLOW DOWN SIDE STREETS. THE CITY OF ALBUQUERQUE IS CURRENTLY PLANNING STORM SEWER IMPROVEMENTS TO RELIEVE FLOODING IN THIS AREA.

CALCULATIONS BASED ON EXISTING CONDITIONS TOPOGRAPHY AND ON PROPOSED GRADING INDICATE THAT RUNOFF REACHING THE CENTRAL AVE. FLOOD ZONE REMAINS ESSENTIALLY UNCHANGED - 1.96 CFS PEAK PROPOSED COMPARED TO 1.91 CFS EXISTING. SEE DRAINAGE REPORT FOR DETAILS. MORE ACCURATE "EXISTING" TOPOGRAPHY MIGHT REDUCE OR REVERSE THE DIFFERENCE. IT IS FELT THAT THE SMALL CALCULATED CHANGE DOES NOT REPRESENT A PROBLEM, ESPECIALLY GIVEN THE OVERALL REDUCTION IN RUNOFF OF APPROXIMATELY 14% - SEE BELOW.

REVISIONS

NO.	DATE	BY	DESCRIPTION	CONST.
#1	5-21-93	RC	Rev. GRADING PLAN	

RYALS ENGINEERING, CIVIL ENGINEERING
 4929 Idlewild SE, Albuquerque NM (505) 265-8267

DE LA TORRE - RAINHART, ARCHITECTURE
 7801 Academy Rd. NE Bldg 2, Suite 200, Albuquerque NM (505) 828-9611

**CITY OF ALBUQUERQUE
 PUBLIC WORKS DEPARTMENT
 ENGINEERING GROUP**

TITLE: GRADING AND DRAINAGE PLAN FOR
 WALGREENS STORE NWC CENTRAL & SAN PEDRO

APPROVALS	ENGINEER	DATE	APPROVALS	ENGINEER	DATE
HYDROLOGY					
INSPECTION					
A.C.E./FIELD					

PERMIT NO. **MAP NO.** K-18 **SHEET** 1 (C-3) **OF** 1