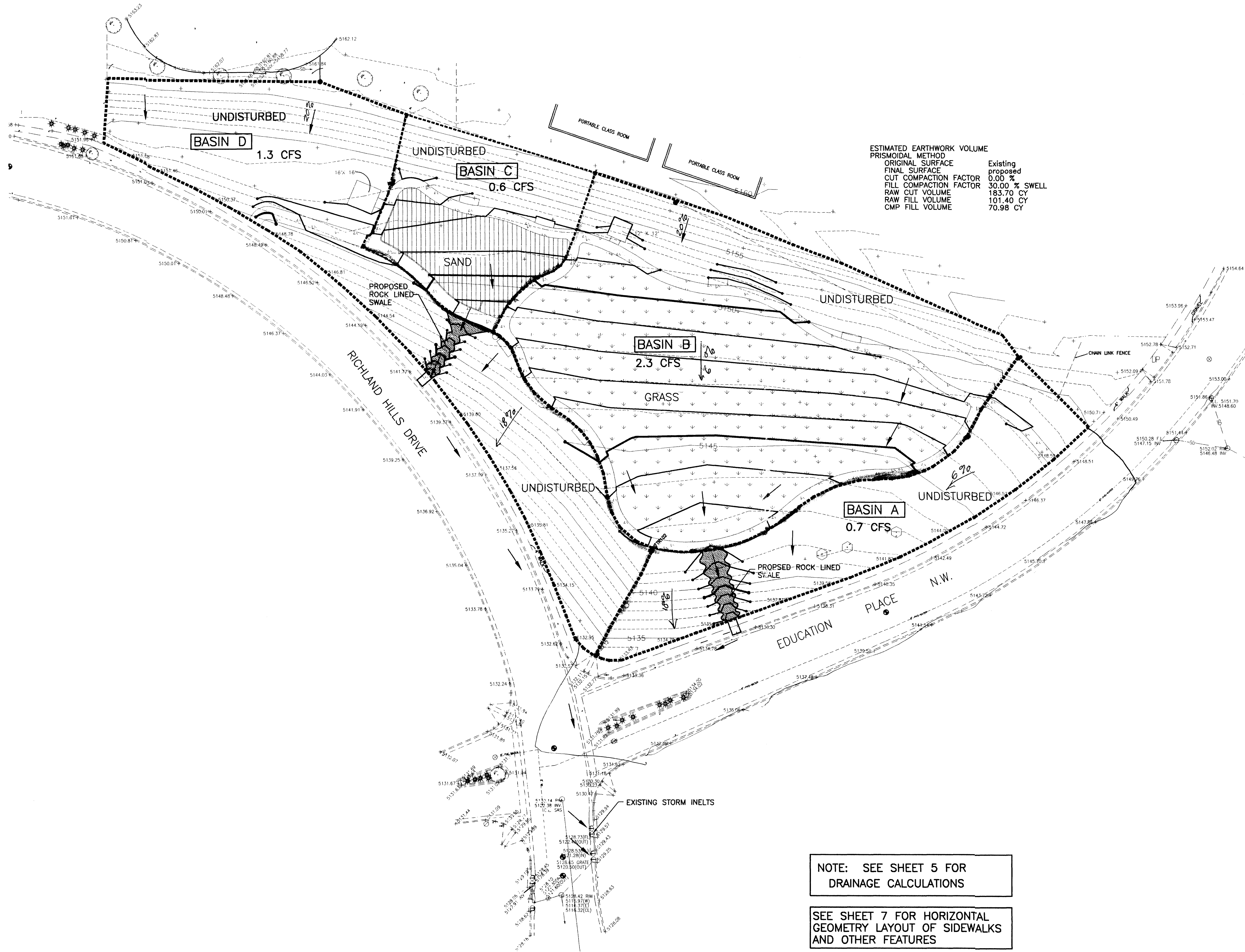
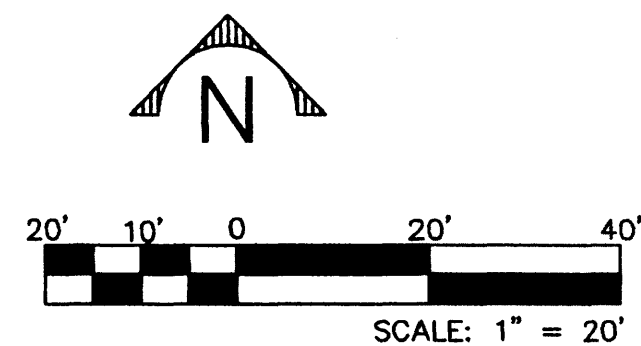




ESTIMATED EARTHWORK VOLUME PRISMOIDAL METHOD	
ORIGINAL SURFACE	Existing
FINAL SURFACE	proposed
CUT COMPACTION FACTOR	0.00 %
FILL COMPACTION FACTOR	30.00 % SWELL
RAW CUT VOLUME	183.70 CY
RAW FILL VOLUME	101.40 CY
CMP FILL VOLUME	70.98 CY



PROJECT NO. 198634
Smith Engineering Company
A Full Service Engineering Company
4800 Olympic Boulevard, S.E. Suite 1000 Albuquerque, New Mexico 87110

CITY OF ALBUQUERQUE CAPITAL IMPLEMENTATION PROGRAM LANDSCAPE ARCHITECTURE AND CONSTRUCTION SERVICES	
TITLE: RICHLAND HILLS PARK IMPROVEMENTS PROJECT	
CONCEPTUAL GRADING AND DRAINAGE PLAN	
Design Review Committee	City Engineer Approval
Last Design Update	
City Project No. 566371	Zone Map No. C-12-Z
Sheet 4 of 15	

						ENGINEERS SEAL		SURVEY INFORMATION		BENCH MARKS		AS BUILT INFORMATION			
								FIELD NOTES		MONUMENT IS A 1.75" ALUMINUM DISK, STAMPED "ACS BM-2-C12" AND IS EXPOSED TO TOP OF CONCRETE CURB, ON THE S.W. CURB RETURN AT THE INTERSECTION OF PARADISE HILLS BLVD. AND DAWENPORT ST. N.W.		CONTRACTOR			
REMARKS		NO.		DATE		BY		DATE		WORKS		DATE			
DESIGN								CREW: MMR, DS, AG.		DATE		SIGNED BY		DATE	
												ACCEPTANCE BY		DATE	
												VERIFICATION BY		DATE	
												DRAWINGS		DATE	
												BY			
												MICRO-FILM INFORMATION			
DESIGNED BY R.J.D.		DATE Feb., 1999										RECORDED BY		DATE	
DRAWN BY R.J.D.		DATE Feb., 1999										NO.			
CHECKED BY P.J.C.		DATE Feb., 1999													

RICHLAND HILLS DRIVE DRAINAGE CALCULATIONS

Note: all TC's are assumed to be 12 minutes

PROJECT NAME = RICHLAND HILLS PARK PROJECT														
HYDROLOGIC CALCULATIONS (for small watersheds < 40 acres (per DPM Section 22))														
Precipitation Zone = 1														
Table A-9 (DPM) Peak Discharge (cfs/acre)														
FORMULA : Total Qp (cfs) = QpA*Aa+QpB*Ba+QpC*Ca+QpD*Da -- Note - "a" = area in acres														
EXISTING CONDITIONS														
Basin & Condition or Analysis Point	Return Period 6-hr.	Qp per Land Treatment Type (cfs/acre)	and		Land Treatment Type (acres)		and		Land Treatment Type (acres)		Total Area (ac)	Total Qp (cfs)		
		QpA	A	A	QpB	B	B	QpC	C	C	QpD	D	D	
		(ac)	(%)	(%)	(ac)	(%)	(%)	(ac)	(%)	(%)	(ac)	(%)	(%)	
ENTIRE SITE	100	1.29	0.0000	0.0	2.03	2.2200	100.0	2.87	0.0000	0.0	4.37	0.0000	0.0	2.2200
ENTIRE SITE	10	0.24	0.0000	0.0	0.76	2.2200	100.0	1.49	0.0000	0.0	2.89	0.0000	0.0	2.2200
DEVELOPED CONDITIONS														
Basin & Condition or Analysis Point	Return Period 6-hr.	Qp per Land Treatment Type (cfs/acre)	and		Land Treatment Type (acres)		and		Land Treatment Type (acres)		Total Area (ac)	Total Qp (cfs)		
		QpA	A	A	QpB	B	B	QpC	C	C	QpD	D	D	
		(ac)	(%)	(%)	(ac)	(%)	(%)	(ac)	(%)	(%)	(ac)	(%)	(%)	
A	100	1.29	0.0000	0.0	2.03	0.3385	28.7	2.87	0.0000	0.0	4.37	0.0052	0.3	0.3437
A	10	0.24	0.0000	0.0	0.76	0.3385	98.5	1.49	0.0000	0.0	2.89	0.0052	1.5	0.3437
Basin & Condition or Analysis Point	Return Period 6-hr.	Qp per Land Treatment Type (cfs/acre)	and		Land Treatment Type (acres)		and		Land Treatment Type (acres)		Total Area (ac)	Total Qp (cfs)		
		QpA	A	A	QpB	B	B	QpC	C	C	QpD	D	D	
		(ac)	(%)	(%)	(ac)	(%)	(%)	(ac)	(%)	(%)	(ac)	(%)	(%)	
B	100	1.29	0.0000	0.0	2.03	0.8944	89.4	2.87	0.0000	0.0	4.37	0.1056	10.6	1.0000
B	10	0.24	0.0000	0.0	0.76	0.8944	89.4	1.49	0.0000	0.0	2.89	0.1056	10.6	1.0000
Basin & Condition or Analysis Point	Return Period 6-hr.	Qp per Land Treatment Type (cfs/acre)	and		Land Treatment Type (acres)		and		Land Treatment Type (acres)		Total Area (ac)	Total Qp (cfs)		
		QpA	A	A	QpB	B	B	QpC	C	C	QpD	D	D	
		(ac)	(%)	(%)	(ac)	(%)	(%)	(ac)	(%)	(%)	(ac)	(%)	(%)	
C	100	1.29	0.0000	0.0	2.03	0.2145	28.7	2.87	0.0000	0.0	4.37	0.0426	4.3	0.2571
C	10	0.24	0.0000	0.0	0.76	0.2145	83.4	1.49	0.0000	0.0	2.89	0.0426	16.6	0.2571
Basin & Condition or Analysis Point	Return Period 6-hr.	Qp per Land Treatment Type (cfs/acre)	and		Land Treatment Type (acres)		and		Land Treatment Type (acres)		Total Area (ac)	Total Qp (cfs)		
		QpA	A	A	QpB	B	B	QpC	C	C	QpD	D	D	
		(ac)	(%)	(%)	(ac)	(%)	(%)	(ac)	(%)	(%)	(ac)	(%)	(%)	
D	100	1.29	0.0000	0.0	2.03	0.5959	59.6	2.87	0.0000	0.0	4.37	0.0212	2.2	0.6171
D	10	0.24	0.0000	0.0	0.76	0.5959	96.6	1.49	0.0000	0.0	2.89	0.0212	3.4	0.6171
TOTAL 100 YEAR											2.2	2.2	2.1	
TOTAL 10 YEAR											2.2	2.2	2.1	

PROJECT NAME = RICHLAND HILLS PARK PROJECT													
HYDROLOGIC CALCULATIONS (for small watersheds < 40 acres (per DPM Section 22))													
Precipitation Zone = 1													
Table A-8 (DPM) Excess Precipitation - E - (in.)													
EXISTING FOR ENTIRE SITE													
FORMULAS: Weighted E (in.) = EaA*Aa+EaB*Ba+EaC*Ca+EaD*De / (total area "a") -- Note - "a" = area in acres													
Total Runoff Volume (ac-ft) = Weighted E (in.) * (total area "a") / (12 in./ft)													
Basin & Condition or Analysis Point													
Return Period 6-hr.													
Rainfall Excess -E-per Land Treatment Type (inches) and Land Treatment Type (acres)													
EaA A A EaB B B EaC C C EaD D D													
(ac) (%) (ac) (%) (ac) (%) (ac) (%) (ac) (%)													
100 0.44 0.0000 0.0 0.67 2.2000 100.0 0.99 0.0000 0.0 1.97 0.0000 0.0 0.67													
10 0.08 0.0000 0.0 0.22 2.2000 100.0 0.44 0.0000 0.0 1.24 0.0000 0.0 0.22													
Table A-8 (DPM) Excess Precipitation - E - (in.)													
DEVELOPED FOR ENTIRE SITE													
FORMULAS: Weighted E (in.) = EaA*Aa+EaB*Ba+EaC*Ca+EaD*De / (total area "a") -- Note - "a" = area in acres													
Total Runoff Volume (ac-ft) = Weighted E (in.) * (total area "a") / (12 in./ft)													
Basin & Condition or Analysis Point													
Return Period 6-hr.													
Rainfall Excess -E-per Land Treatment Type (inches) and Land Treatment Type (acres)													
EaA A A EaB B B EaC C C EaD D D													
(ac) (%) (ac) (%) (ac) (%) (ac) (%) (ac) (%)													
100 0.44 0.0000 0.0 0.67 2.0429 100.0 0.99 0.0000 0.0 1.97 0.1746 0.77													
10 0.08 0.0000 0.0 0.22 2.0429 92.1 0.44 0.0000 0.0 1.24 0.1746 7.9													

Sum of the SubBasins

RICHLAND HILLS PARK DRAINAGE ANALYSIS

Richland Hills Park is located on a 2.2 +/- acre parcel of undeveloped land located in the northwest section of Albuquerque. The southern section of the park is at the intersection of Education Place NW and Richland Hills Drive, and is approximately 3/4 mile north of Paseo Del Norte. Access to the park will be off of Richland Hills Drive and off of Education Place. The soils at this site are classified as an MWA (Madurez Series - Wink association). This soil is a fine sandy loam found on slopes from 1 to 8%. The local climate in this area is considered semiarid and is hot and dry with an average annual rainfall of 8". The project site is classified as zone X on the flood insurance Rate map firm #35001c0116d).

PREVIOUS MASTER DRAINAGE PLAN

The master drainage plan for the subdivision is titled "Drainage Report for Richland Hills Unit 1 (Map #C-12). Community Sciences Corporation, October 1993 (Revised March 1994), James D. Hughes PE. The following information is a summary of the drainage information for the park as provided in that report.

Basin 112 is designated park area and these flows were considered in Richland Hills Road NW and Extension of Education Place NW design. Basin 112 is shown to free discharge into Education Place (Plate 2). Flows from Education Place combine with flows from Richland Hills Rd NW at their intersection, and continue southerly on Richland Hills Rd NW. Just south of the intersection of the two streets, a Type Double A single throat and Type Double C are located on both sides of Richland Hills Rd NW.

Basin 112 Data and Qp 100-yr.:
Area = 0.0044 sq. mi., (2.816 acres), Tc=12 min. Land Treatments % (A=0%, B=80%, C=0%, D=20%),
Qp100-yr = 7.17 cfs

HYDROLOGIC ANALYSIS

The City of Albuquerque's Development Process Manual (DPM) Section 22.2 was used to compute the 100 -year 6-hour peak flows and runoff volumes for the onsite basins. Precipitation is in zone 1 along with tables A-8 and A-9 were used for these calculations. The park was divided into 8 sub-basins based on developed runoff patterns. The existing condition flows were computed for comparison purposes only. There are no offsite flows entering the site for either existing or developed conditions.

A Existing Conditions - Onsite

There is no off-site drainage flows entering the park site. The existing site is undeveloped and is vegetated with native grasses and sage brush. The grades on the site, from the existing side walk on Richland Hills Drive are approximately 25% or 1 to 4% slopes. The slopes are less severe- 1:14 or about 7% - towards the north. The entire 2.2 acres was analyzed as one basin to calculate the existing 100 and 10 year peak discharge and excess precipitation. Please refer to the tables on this sheet. The existing 100 Q = 4.5 cfs. The existing excess precipitation is 123 acre-ft.

There are no existing drainage improvements on the site.

B DEVELOPED CONDITIONS

The developed park will have paved impermeable areas including concrete sidewalks covered shelters, drip irrigated landscaped areas for native shrubs and trees, irrigated grass areas and a sand area for a children's playground.

Basin A shall remain relatively undisturbed. 98.5% of the area is assigned to land treatment type B, 1.5% of the area is assigned to land treatment type D which is the new sidewalk coming into the park from Education Place. An estimated 0.7 cfs will flow onto education place from this basin.

Basin B is 89.4% irrigated grass and 10.6% concrete sidewalks and shelter pads. Land treatment B was used for the grass and land treatment D for the sidewalks. The proposed sidewalks on the perimeter of this basin shall have a 2% cross slope directed to towards the interior of the park. This will eliminate developed impermeable surface flows from eroding the existing slopes leading to Richland Hills Drive and Education Place. Basin B runoff will all be directed to the south end of the basin. At this location, the side walk slopes shall be transitioned to empty into a rock lined swale that will take the flow down to a new sidewalk culvert across the existing sidewalk on Education Place. An estimated 2.3 cfs will drain from this basin to Education Place.

Basin C encompasses the sand play area, concrete sidewalk, and the undisturbed slopes on the north side of the basin. 83.4% of the area is assigned to land treatment B and 16.6% to land treatment D. An estimated 0.9 cfs will drain from Basin C and shall be directed to the south end of the basin where the sidewalk shall transition to a 2% cross slope into a new rock lined swale that will take the flow down to a new sidewalk culvert built across the existing 4' wide sidewalk on Richland Hills Drive.

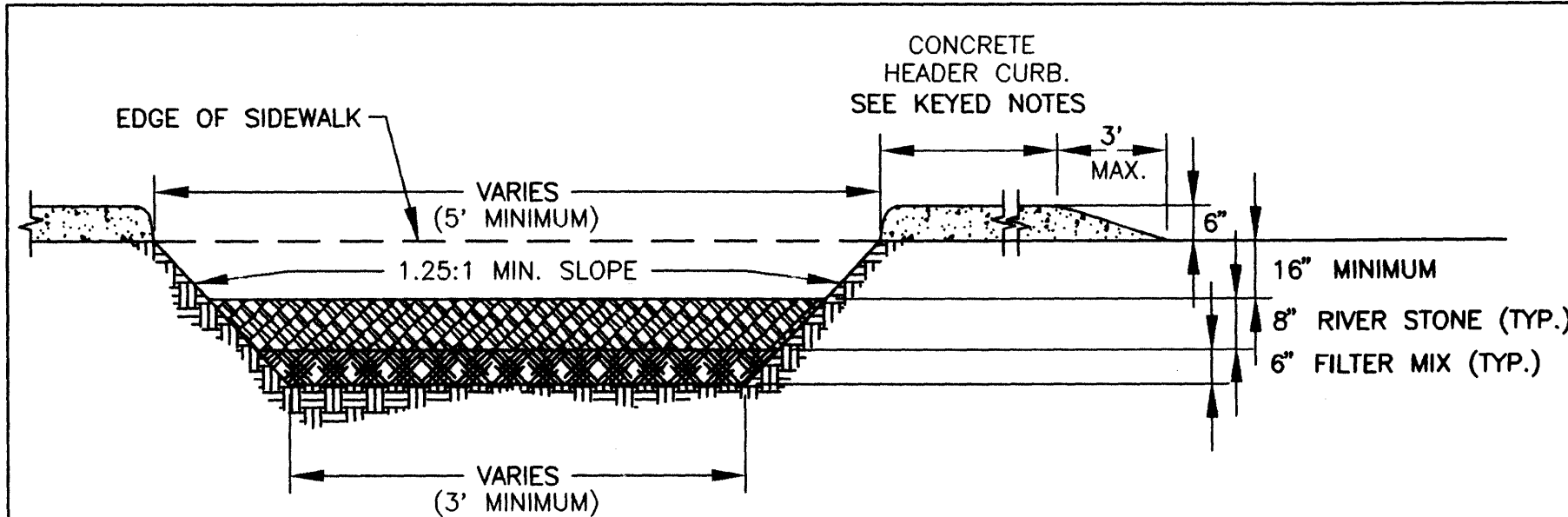
Basin D remains, for the most part, undeveloped. 96.6% of the area remains in land treatment B with 3.4% in land treatment D. An estimated 0.9 cfs will sheet flow out onto Richland Hills Drive.

Due to the very small Q's involved with this park, the hydrologic calculations on the swale and sidewalk culverts are not shown.

SUMMARY

The allowable volume as stated in the master drainage study is 7.1 cfs. The proposed calculated discharge of 4.9 cfs is 2.2 cfs less than the allowable. No detention facilities should be required on this park site.

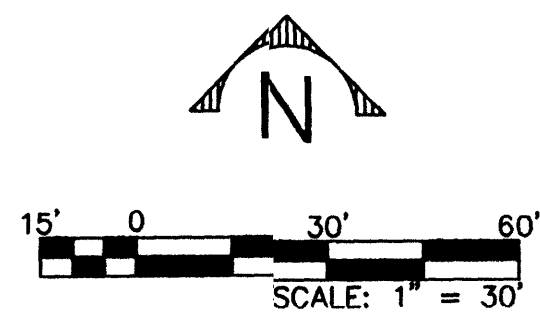
		PROJECT NO. 198634	
Smith Engineering Company		A Full Service Engineering Company	
CITY OF ALBUQUERQUE CAPITAL IMPLEMENTATION PROGRAM LANDSCAPE ARCHITECTURE AND CONSTRUCTION SERVICES			
TITLE: RICHLAND HILLS PARK IMPROVEMENTS PROJECT			
DRAINAGE CALCULATIONS AND ANALYSIS			
Design Review Committee	City Engineer Approval	Unit / Day / Yr.	Unit / Day / Yr.
City Project No. 566371	Zone Map No. C-12-Z	Sheet 5	Of 15



RUNDOWN CAPACITY CALCULATION

SOUTHWEST RUNDOWN
AVAILABLE CAPACITY = 66.73 CFS
FLOW AREA = 6.6 SQUARE FEET
WETTED PERIMETER = 7.33 FT
TOP WIDTH = 6.05 FT
SLOPE = 0.130 FT/FT
REQUIRED CAPACITY = 2.3 CFS

SOUTHWEST RUNDOWN
 AVAILABLE CAPACITY = 7.17 CFS
 FLOW AREA = 0.50 SQUARE FEET
 WETTED PERIMETER = 2.00 FT
 TOP WIDTH = 1.00 FT
 SLOPE = 0.100 FT/FT
 REQUIRED CAPACITY = 2.3 CFS

[illegible]

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CITY OF ALBUQUERQUE
CAPITAL IMPLEMENTATION PROGRAM
LANDSCAPE ARCHITECTURE AND CONSTRUCTION SERVICES

TITLE: RICHLAND HILLS PARK IMPROVEMENTS PROJECT
GRADING AND DRAINAGE PLAN

Design Review Committee	City Engineer Approval	Last Design Update	Mo. / Day / Yr.	Mo. / Day / Yr.			
City Project No.	566371	Zone Map No.	C-12-Z	Sheet	6	Of	15

