

THE PURPOSE OF THIS DRAINAGE STUDY IS TO ESTABLISH AN APPROVED MASTER DRAINAGE PLAN FOR NORTH ANDALUCIA TRACTS 14 AND TRACTS 12 BOSQUE SCHOOL. IN ORDER TO ACCOMPLISH THIS OBJECTIVE, THIS PLAN ANALYZES THE CURRENT AND PROPOSED FLOWS TO THE EXISTING BOSQUE SCHOOL POND 'A' AND POND 'B'. THE BOSQUE SCHOOL TRACT IS A 23.1 ACRE SITE LOCATED SOUTHEAST OF THE COORS BOULEVARD AND MONTANO ROAD INTERSECTION IN ALBUQUERQUE, NEW MEXICO (ZONE ATLAS PAGES 5F-12). IT HAS A FLAT TERRAIN WITH LOCALIZED DEPRESSIONS. A PORTION ALONG THE EAST BOUNDARY OF THE SITE IS HEAVILY VEGETATED WITH SALT CEDAR, COTTONWOOD, AND VARIOUS OTHER BOSQUE TYPE SPECIES.

THERE HAVE BEEN SEVERAL PREVIOUS DRAINAGE STUDIES PREPARED FOR THIS SITE, WITH DIFFERENT ASSUMPTIONS THAT COULD POTENTIALLY IMPACT THIS SITE. IN 1999, A DRAINAGE PLAN WAS PREPARED FOR THE BOSQUE SCHOOL BY CHAVEZ-GRIEVES CONSULTING ENGINEERS AND IN 2001, A MASTER DRAINAGE REPORT FOR THE LANDS OF RAY A. GRAHAM III WAS PREPARED BY BORDENAVE DESIGNS. THESE TWO STUDIES HAVE BEEN UTILIZED IN PREPARING THIS CURRENT STUDY FOR BOTH THE BOSQUE PREPARATORY SCHOOL AND NORTH ANDALUCIA.

TRACTS 2-A & 2-B ARE WITHIN ZONE 'X' ON FEMA FIRM MAP NO. 35001C0118G. THIS MEANS THESE TRACTS ARE ONE OF THE FOLLOWING CONDITIONS:

- WITHIN THE 500 YEAR FLOODPLAIN (0.2% ANNUAL CHANCE)
- WITHIN AN AREA OF 1% ANNUAL CHANCE FLOOD WITH AVERAGE DEPTHS OF LESS THAN 1 FOOT OR A DRAINAGE AREA LESS THAN 1 SQUARE MILE
- PROTECTED BY LEVEES FROM THE 1% ANNUAL CHANCE FLOOD

THE LOWER CORRALES RIVERSIDE DRAIN EXTENSION BOUNDS THIS SITE TO THE EAST. THE DITCH BANK ALONG THE EAST PROPERTY LINE HAS HISTORICALLY BEEN HIGHER THEN EXISTING GRADES TO THE WEST, AND THE HISTORIC RUNOFF FROM THIS AREA WAS RETAINED AGAINST THIS BANK.

THE EXISTING RETENTION POND (IDENTIFIED ON THIS PLAN AT POND 'B') LOCATED ON THE BOSQUE SCHOOL TRACT HAS A CAPACITY OF 19.6 ACRE-Feet (BASED ON THE SURVEY PROVIDED BY PRECISION SURVEY DATED 05/14/12), BOTTOM ELEVATION BEING 4973.00 AND TOP ELEVATION 4977.20.

PREVIOUSLY, IT WAS ANTICIPATED (BORDENAVE DESIGNS STUDY) THAT THE DRAINAGE FROM ALL OF BASIN 'B' (SEE DRAINAGE CALCULATIONS AND PLAN) WERE TO BE DIVERTED BY THE DEVELOPERS OF BASIN 'B' BY INSTALLING A ROAD AND DIVERSION CHANNEL SO THAT FLOWS WOULD NOT DRAIN ONTO THE BOSQUE SCHOOL TRACT. THESE FLOWS WOULD THEN HAVE TO BE DIVERTED OVER THE LOWER CORRALES RIVERSIDE DRAIN BY THE USE OF A FLUME CROSSING INTO THE RIO GRANDE BOSQUE ON THE EAST SIDE OF THIS DEVELOPMENT.

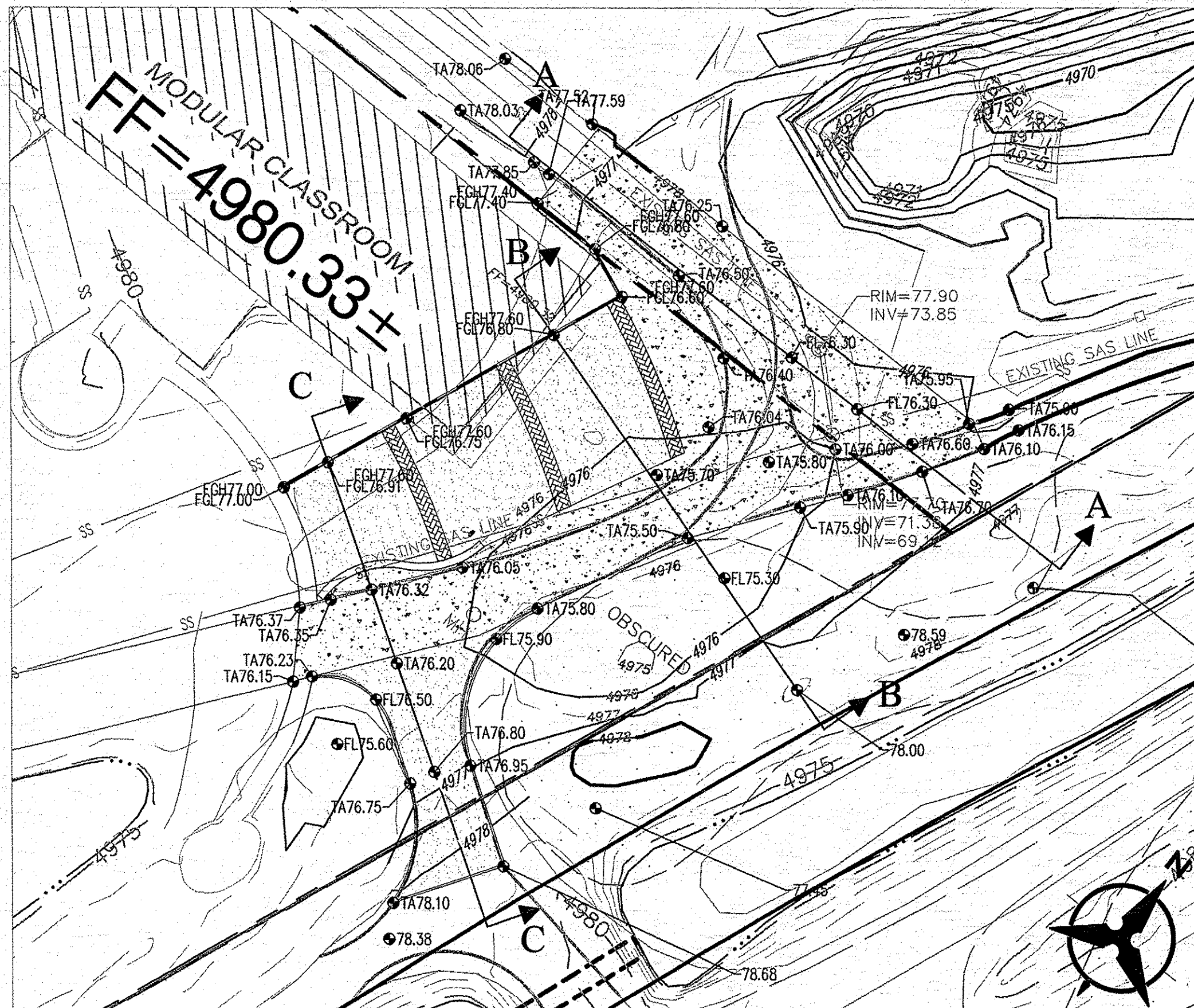
IT HAS SINCE BEEN DETERMINED THAT THE EASTERN SIDE OF BASIN 'B-1' HAS RESTRICTIONS THAT PREVENT DEVELOPMENT ON THE PROPERTY. THIS PROPERTY IS TO PERMANENTLY REMAIN 'OPEN SPACE'. IT IS THEREFORE UNLIKELY THAT THE ROADWAY, DIVERSION CHANNEL, AND FLUME CROSSING WILL EVER BE CONSTRUCTED, WHICH REQUIRES FLOWS FROM BASIN 'B' TO PERMANENTLY DRAIN ONTO THE BOSQUE SCHOOL TRACT.

PER THE DRAINAGE CALCULATIONS ON THIS SHEET, THE DRAINAGE VOLUME DISCHARGED TO POND 'B' IN 100-YEAR, 10-DAY STORM EVENT FROM ALL OF POND 'A' AND BASIN 'C' IS 12.46 AC-FT. THE ACTUAL VOLUME OF THE POND (AS DESCRIBED ABOVE) IS 21.87 AC-FT AT ELEVATION 77.40. IT SHOULD BE NOTED THAT BASIN 'B' HAS A HISTORIC (UNDEVELOPED/CURRENT) DISCHARGE VOLUME (100YR-10DAY) OF 0.32 AC-FT WHICH WILL BE ALLOWED TO CONTINUE TO BE ACCEPTED BY POND 'B'. THE SITE, UPON DEVELOPMENT, MUST RETAIN THE DIFFERENCE BETWEEN THE HISTORIC VOLUME AND THE DEVELOPED 100-YEAR, 10-DAY VOLUME, WHICH EQUATES TO APPROXIMATELY 1.65 AC-FT, OR OTHER SOLUTIONS AS ACCEPTED BY COA HYDROLOGY DEPARTMENT.

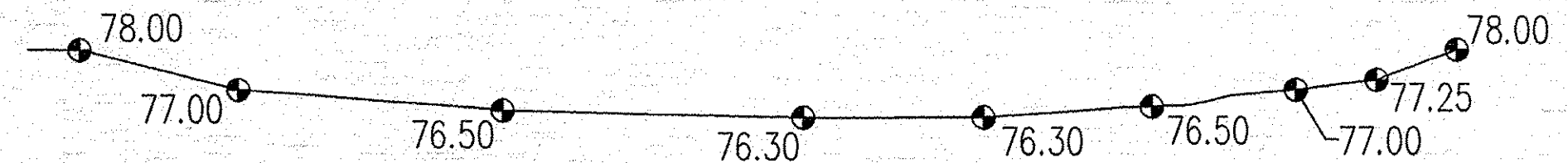
NORTH ANDALUCIA, WHICH DRAINS TO POND 'A', HAS A REQUIRED POND VOLUME OF 15.05 ACRE-FEET. POND 'A' & 'B' WILL BE TREATED AS ONE RETENTION POND WITH OVERFLOW FROM 'A' TO 'B' IN THE LARGER STORM EVENTS. POND 'A' WILL BE RE-GRADED TO ACQUIRE THE NECESSARY RETENTION VOLUME FOR THE 100-YEAR, 10-DAY STORM EVENT. THE TOTAL REQUIRED VOLUME (FOR THE 100-YEAR, 10-DAY EVENT) FOR ALL OF BASINS 'A', 'B', AND 'C' IS 27.8 ACRE-FEET. THE TOTAL VOLUME PROVIDED FROM PONDS 'A' AND 'B' IS 30.6 ACRE-FEET (AT ELEVATION 77.40), WHICH EXCEEDS THE REQUIRED 100-YEAR, 10-DAY VOLUME BY 2.8 AC-FT.

THE SPILLWAY FROM POND 'A' TO POND 'B' HAS BEEN SIZED SUCH THAT A MINIMUM OF 256 CFS CAN OVERFLOW FROM POND 'A' TO POND 'B'. THIS IS THE 100-YEAR, SIX HOUR PEAK FLOW RATE FROM BASINS 'A-1' THROUGH 'A-4' TO POND 'A'. PLEASE SEE WEIR CALCULATIONS AND CROSS SECTION, SHEET C001. THIS WILL REQUIRE SOME REGRADING IN THIS AREA TO ACHIEVE THE REQUIRED WEIR SECTIONS.

THE LOWER BUILDINGS OF THE BOSQUE SCHOOL ARE CURRENTLY SET AT A FINISHED FLOOR ELEVATION OF 4978.20, WHICH IS 1.0 FOOT ABOVE THE MAX WATER SURFACE ELEVATION FOR PONDS 'A' & 'B' IN THE 100-YEAR, 10-DAY STORM. THAT ELEVATION IS ALSO 0.8' ABOVE THE BANK OF THE RIVERSIDE DRAIN EXTENSION. IN THE EVENT OF A STORM LARGER THAN THE 100-YEAR, 10-DAY STORM, THE EXCESS FLOWS WILL OVERFLOW INTO THE RIVERSIDE DRAIN EXTENSION PRIOR TO FLOODING THE BUILDINGS.

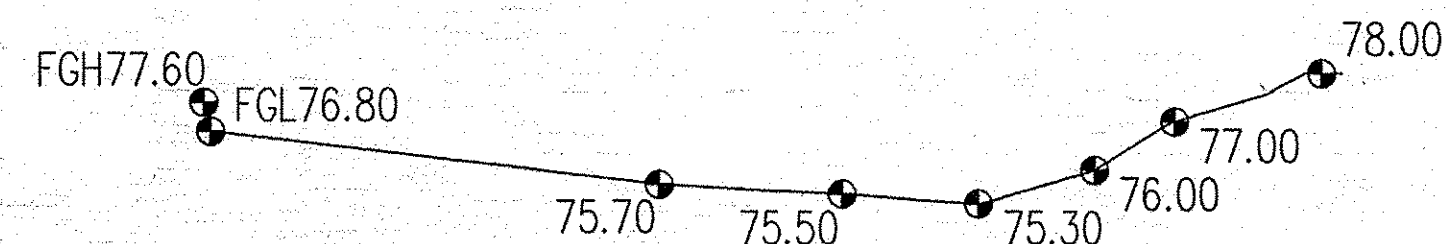


D OVERFLOW AREA ENLARGED GRADING DETAIL
SCALE: 1" = 30'



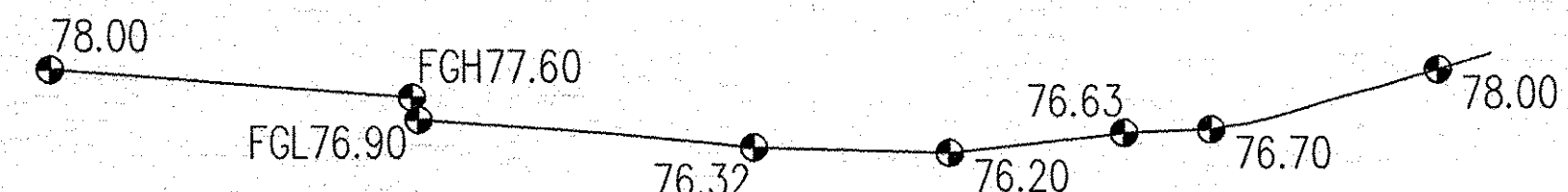
WSEL (FT)	DEPTH (FT)	FLOW AREA (SQ. FT.)	FLOW RATE (CFS)	FLOW VEL (FPS)	TOPWID + OBSTRUCTIONS
76.30	0.00	0.00	0.00	0.00	0.00
76.40	0.10	3.76	2.96	0.79	52.39
76.50	0.20	10.48	11.22	1.07	82.01
76.60	0.30	19.19	25.21	1.31	92.32
76.70	0.40	28.94	44.19	1.53	102.63
76.80	0.50	39.72	68.01	1.71	112.94
76.90	0.60	51.53	96.67	1.88	123.25
77.00	0.70	64.37	130.29	2.02	133.56
77.10	0.80	78.03	168.81	2.16	139.62
77.20	0.90	92.29	211.99	2.30	145.68
77.30	1.00	107.13	259.72	2.42	150.38

A WEIR SECTION A-A
N.T.S.



WSEL (FT)	DEPTH (FT)	FLOW AREA (SQ. FT.)	FLOW RATE (CFS)	FLOW VEL (FPS)	TOPWID + OBSTRUCTIONS
75.30	0.00	0.00	0.00	0.00	0.00
75.40	0.10	0.44	0.30	0.68	8.85
75.50	0.20	1.77	1.71	0.97	17.69
75.60	0.30	4.03	4.74	1.18	27.54
75.70	0.40	7.28	9.86	1.36	37.39
75.80	0.50	11.33	17.30	1.53	43.68
75.90	0.60	16.01	27.05	1.69	49.97
76.00	0.70	21.33	39.19	1.84	56.26
76.10	0.80	27.22	53.79	1.98	61.65
76.20	0.90	33.65	70.89	2.11	67.03
76.30	1.00	40.63	90.54	2.23	72.41
76.40	1.10	48.14	112.82	2.34	77.80
76.50	1.20	56.19	137.81	2.45	83.18
76.60	1.30	64.77	165.57	2.56	88.56
76.70	1.40	73.90	196.20	2.66	93.95
76.80	1.50	83.56	229.76	2.75	99.33
76.90	1.60	93.54	266.18	2.85	100.17
77.00	1.70	103.60	305.12	2.95	101.01
77.10	1.80	113.77	346.41	3.05	102.55
77.20	1.90	124.11	390.03	3.14	104.09
77.30	2.00	134.59	435.90	3.24	105.63

B WEIR SECTION B-B
N.T.S.



WSEL (FT)	DEPTH (FT)	FLOW AREA (SQ. FT.)	FLOW RATE (CFS)	FLOW VEL (FPS)	TOPWID + OBSTRUCTIONS
76.20	0.00	0.00	0.00	0.00	0.00
76.30	0.10	1.104	0.754	0.683	22.085
76.40	0.20	4.052	4.044	0.998	35.057
76.50	0.30	8.093	10.067	1.244	45.749
76.60	0.40	13.202	19.032	1.442	56.442
76.70	0.50	19.599	31.337	1.599	73.352
76.80	0.60	27.342	47.626	1.742	81.521
76.90	0.70	35.903	67.693	1.885	89.691
77.00	0.80	44.967	91.323	2.031	91.586
77.10	0.90	54.22	118.025	2.177	93.482
77.20	1.00	63.663	147.553	2.318	95.377
77.30	1.10	73.296	179.759	2.453	97.272
77.40	1.20	83.118	214.539	2.581	99.168
77.50	1.30	93.462	252.047	2.697	107.72
77.55	1.35	98.955	272.006	2.749	111.996

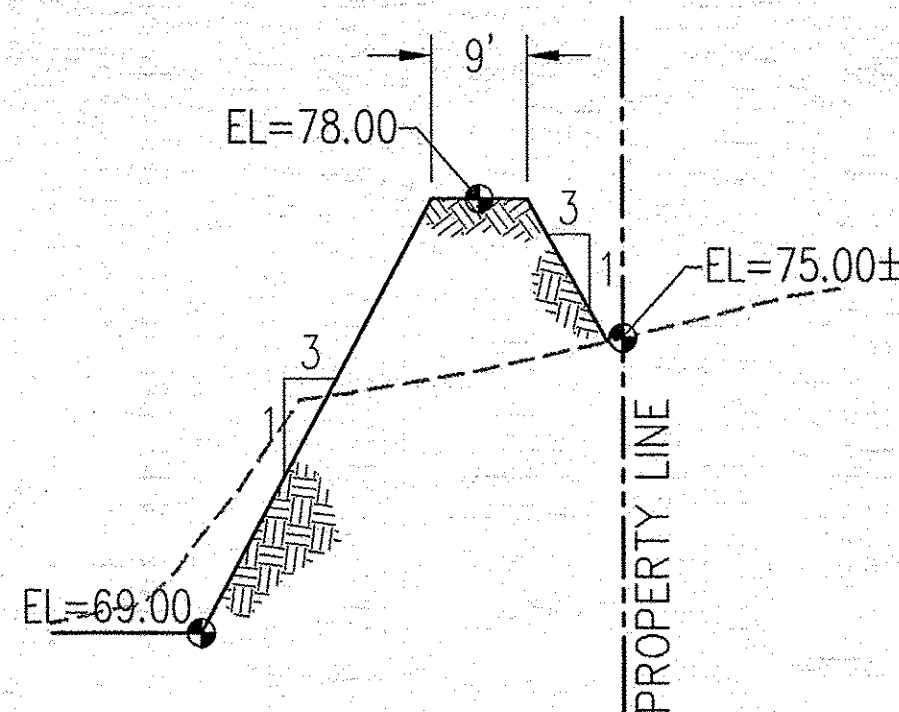
C WEIR SECTION C-C
N.T.S.

COMBINED POND STORAGE VOLUME						
ELEVATION	POND 'A' VOLUME		POND 'B' VOLUME		COMBINED VOLUME	
	(CF)	(AC-FT)	(CF)	(AC-FT)	(CF)	(AC-FT)
4969	0.00	0.00			0	0.00
4970	21373.82	0.49			21374	0.49
4971	47878.92	1.10			47879	1.10
4972	79614.93	1.83			79615	1.83
4973	116564.32	2.68	360.78	0.01	116925	2.68
4974	160170.11	3.68	8584.09	0.20	168754	3.87
4975	210358.35	4.83	94956.76	2.18	305315	7.01
4976	271824.60	6.24	379597.31	8.71	651422	14.95
4977	349516.03	8.02	764884.83	17.56	1114401	25.58
4977.1	358369.21	8.23	809060.36	18.57	1167430	26.80
4977.2	367346.11	8.43	854072.60	19.61	1221419	28.04
4977.3	376428.60	8.64	899904.88	20.66	1276333	29.30
4977.4	385622.06	8.85	946550.20	21.73	1332172	30.58

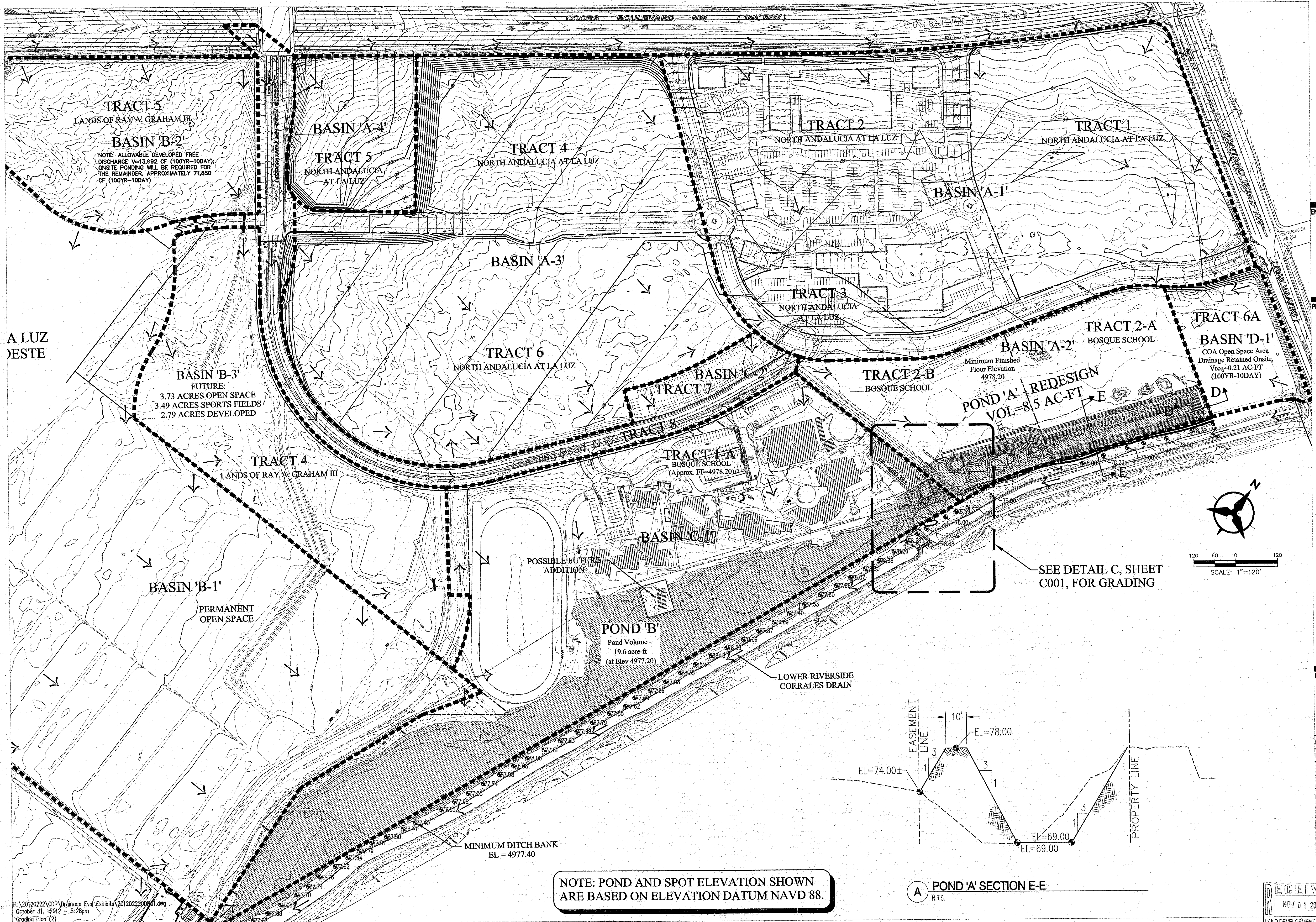
← 100 YEAR, 10 DAY MWSEL

← MINIMUM DITCH BANK ELEVATION

BOSQUE SCHOOL DRAINAGE STUDY (PROPOSED CONDITIONS)											
This table is based on the DPM Section 22.2, Zone:1											
BASIN	Area	Area	Land Treatment Percentages				Runoff Rate	Q(100)	WT E	V(100) _{6 HOUR}	V(100) _{10 DAY}
ID	(SQ. FT)	(AC.)	A	B	C	D	(cfs/ac.)	(cfs)	(inches)	(ACRE-FT)	(ACRE-FT)
BASIN 'A-1' (COMMERCIAL)	1206201	27.69	0.0%	5.0%	10.0%	85.0%	4.10	113.61	1.81	4.17	7.05
BASIN 'A-2' (SCHOOL)	384897	8.84	0.0%	35.0%	35.0%	30.0%	3.03	26.74	1.17	0.86	1.19
BASIN 'A-3' (MULTIFAMILY)	1106819	25.41	0.0%	5.0%	22.0%	73.0%	3.92	99.68	1.69	3.58	5.85
BASIN 'A-4' (BANK)	157588	3.62	0.0%	0.0%	10.0%	90.0%	4.22	15.27	1.87	0.56	0.96
							TOTAL (POND 'A')	255.30		9.17	15.05
BASIN 'D-1' (COA OPEN SPACE)	108063	2.48	55.0%	25.0%	10.0%	10.0%	1.94	4.82	0.71	0.15	0.18
BASIN 'B-1'	3010221	69.11	67.0%	7.0%	3.1%	22.9%	2.10	144.85	0.82	4.74	6.68
BASIN 'B-2'	379540	8.71	100.0%	0.0%	0.0%	0.0%	1.29	11.24	0.44	0.32	0.32
BASIN 'B-3'											
OPEN SPACE	162580	3.73	75.0%	25.0%	0.0%	0.0%	1.48	5.51	0.50	0.15	0.15
SPORTS FIELDS	152234	3.49	0.0%	87.0%	0.0%	13.0%	2.33	8.16	0.84	0.24	0.30
DEVELOPED	121689	2.79	0.0%	0.0%	10.0%	90.0%	4.22	11.79	1.87	0.44	0.74
									TOTAL 'B-3'	0.83	1.20
									TOTAL 'B'	5.90	8.20
BASIN 'C-1' (BOSQUE SCHOOL)	1005137	23.07	0.0%	44.0%	25.5%	30.5%	2.96	68.25	1.15	2.21	3.07
BASIN 'C-2' (ROADS)	237079	5.44	0.0%	0.0%	10.0%	90.0%	4.22	22.97	1.87	0.85	1.45
									TOTAL 'C'	3.06	4.52
							TOTAL POND 'B'	272.76		8.95	12.72
							TOTAL POND 'A' AND 'B'			18.13	27.77
Notes:											
BASIN 'A-1' TO 'A-4' CALCULATIONS BY BOHANNAN HUSTON.											
BASIN 'D-1' 100YR-10DAY VOLUME IS TO BE RETAINED ONSITE.											
BASINS 'B-1' TAKEN FROM MASTER DRAINAGE REPORT FOR LANDS OF RAY A. GRAHAM III BY BORDENAVE DESIGNS, SEPT 9, 2001											
BASIN 'B-2' TO RETAIN 1.65 AC-FT (71,850 CF) ON SITE, 0.32 AC-FT (13,992 CF) ALLOWABLE FREE DISCHARGE TO POND 'B'											
BASIN 'B-3' CALCULATIONS BY BOHANNAN HUSTON.											
BASINS 'C-1' (BOSQUE SCHOOL) TAKEN FROM DRAINAGE PLAN BY CHAVEZ-GRIEVES CONSULTING ENGINEERS, APRIL 30, 1999.											
BASINS 'C-2' CALCULATIONS BY BOHANNAN HUSTON.											



E POND 'A' SECTION D-D
N.T.S.



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ENGINEER

PROJECT

Bosque School Drainage Study
SEC Coors and Montano
Albuquerque, New Mexico

REVISIONS	
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△	
△	
DRAWN BY BHW	
REVIEWED BY JLM	
DATE 08/29/2012	
PROJECT NO. 20120222	
DRAWING NAME	
FINAL DRAINAGE PLAN	

SHEET NO.
C002
OF
LAND DEVELOPMENT SECTION
E12-DOISA 2/2

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October 31, 2012 5:28pm
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