

Topography by Martinez/Naylor & Associates, February, 1986

BENCHMARK: ACS 2-G12, located at the southeast corner of the intersection of Campbell Road with Rio Grande Boulevard (destroyed after 1986 topography, use TBM as shown on plan) Alternative BM is 7-G12, located on the southwest corner of the same intersection.

#### LEGAL DESCRIPTION

LOTS 1 THROUGH 9, COTTONWOODS SUBDIVISION, SECTION 1, T. 10 N., R. 4 E., NMPM BERNALILLO COUNTY, NEW MEXICO  
(Legal description before replat: Tract 4A-1, Alvarado Gardens Addition)



G-13-Z

CAMPBELL RD NW

TBM 4962.85

MH RIM

30' - 12" RCP

SEE NOTE P AND POND DRAIN DETAIL, SHEET 2

INV 60.75

15" CMP

4' WIDE P.C.C. SIDEWALK

EXISTING SIDEWALK

WALL OR FENCE

WALL OR FENCE

WALL OR FENCE

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#### LEGEND

	Existing	Proposed
Spot Elevation	64.25	64.25
Top of Curb	TC	TC
Flow Line Invert	FL	FL
Finished Floor Elevation	FFE	FFE
Contour Line	64	64
Property Line		
Lot Number		5
Structure		
Curb and Gutter		
Driveway		
DRAIN BASIN BOUNDARY		

I Certify that the construction as shown on this drawing reflects the as-built conditions of the work and that the construction is in substantial compliance with the design as approved on FEB 4 1997 by the City of Albuquerque for Grading and Drainage Plan Number G-13-Z. As-built elevations are as noted.

MARVIN R. KORTUM  
NMPE 6519

DATE  
JUL 23 1998



#### NOTES

A West entrance, see details, sheet 2, and drawings 2426, private entrance details, and 2441, wheel chair ramp, City of Albuquerque Standard Specifications for Public Works.

B East entrance, see details, sheet 2, and drawings 2426, private entrance details, and 2441, wheel chair ramp, City of Albuquerque Standard Specifications for Public Works.

C Street section according to drawing 2406, City of Albuquerque Standard Specifications for Public Works, with estate type mountable curb.

D Driveways and garage aprons may be surfaced with gravel or with impervious surface. Runoff estimates are based on impervious surfaces.

E House dimensions and locations as shown are general. Locations shown on lot lines are zero setback for each side of lot line. See Architectural Plans for details.

F Elevations of building pads are based on slab on grade housing. Building pad elevations as constructed (Finished Floor Elevations) may be higher than shown. Auxiliary impervious areas, such as patios, garden paths, gazebos, etc. may be placed at elevations which will be flooded during heavy precipitation, thus not decreasing the ponding capacity.

G Quantitative earthwork estimates should be based on more detailed topographic cross sections of the work area.

H Privacy fences or walls may be constructed on the east and south subdivision property lines. Fences or walls shall not prevent cross flow runoff from the adjacent property.

J All cut and fill slopes and constructed drainage swales are to be provided with an erosion control surface by developer/owner. Coverings may be turf, rock, terraced with garden walls or timbers or similar according to the landscape plan. Erosion control may be provided by seeding with a native grass mixture as follows:

Common name	Genus-species	Pounds/Acre
"Palma"	Oryzopsis	
Indian rice grass	Hymenoides	2.0
"Viva"	Gallata grass	2.0
"Niner"	Sideoates Gramma	2.0
"Hatchita"	Blue Gramma	3.0
Sand dropseed (NM Region)	Sporobolus Cryptandrus	1.0
Four-wing Saltbrush	Atriplex Canescens	1.0

The seed will be spread on loose surface soil, raked or worked into the soil about one-half inch, and a straw mulch or a mulch mat placed over the seed to prevent erosion. The seeded area is to be watered daily until a turf is established.

K Landscaped, garden or orchard area.

L Additional fill may be placed around the perimeter foundation wall up to a height of 8 inches below the sill plate. All fill so placed shall have a minimum slope of 5% away from the building, and a maximum slope of 1 vertical to 3 horizontal (1:3). Berms may be placed higher on walls if walls are designed with appropriate water proofing and as retaining walls. All foundation footings will be designed to permit ponding adjacent to foundations as may occur during heavy precipitation.

M All cut and fill slopes shall be 3 horizontal to 1 vertical, except that slopes no more than 3 feet in elevation difference may be 2 horizontal to 1 vertical if the surface is covered with 2" to 6" angular cobbles or other erosion protection.

N Each lot shall grant an easement for the collection and passage of runoff flows (see plat).

P Pond drain into the storm drain in Campbell Road right-of-way. See detail, sheet 2.

EXHIBIT A  
DRAINAGE  
COVENANT

REVISED HOUSE PAD OUTLINE, LOTS 7 & 8 MR. KORTUM JULY 21, 1998

CARTER KORTUM SEP 22 1997

ADD CHANGE THIS SHEET AND DETAILS 5/12/97

ADD BASIN DETAILS MRK FEB 3 1997

ADD LEGEND, REVISED NOTES MRK JAN 28 1997

PRELIMINARY MRK JAN 13 1997

APPROVAL, REVISIONS BY DATE

MARVIN R. KORTUM, P.E.  
Civil Engineering  
NM PE 6519  
1605 Speakman Drive, S.E.  
Albuquerque, New Mexico 87123  
(505) 299-0774

GRADING AND DRAINAGE PLAN  
COTTONWOODS SUBDIVISION

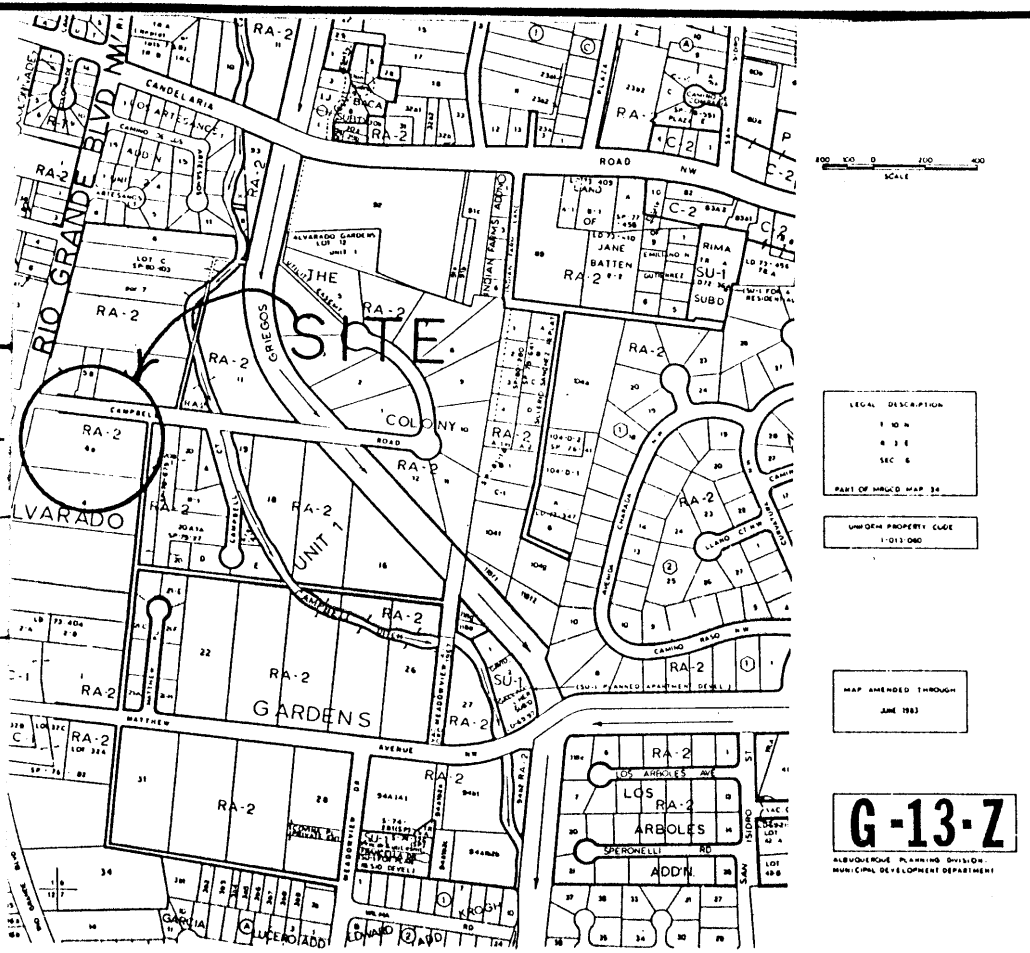
PROJECT NO. G13/D18, DRB96-584 MAP NO. SHEET OF G-13 1 3



Topography by Martinez/Naylor & Associates, February, 1986

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(Legal description before replat: Tract 4A-1, Alvarado Gardens Addition)



G-13-7

LEGEND	Existing	Proposed
Spot Elevation	x 63.2	• 64.25
Top of Curb	TC 63.2	TC
Flow Line Invert	FL 63.2	FL
Finished Floor Elevation	FFE 63.2	FFE
Contour Line	--- 49.12 ---	--- 64 ---
Property Line	--- 5 ---	--- 5 ---
Lot Number		5
Structure		
Curb and Gutter		
Driveway		
DRAIN BASIN BOUNDARY		

I Certify that the construction as shown on this drawing reflects the s-built conditions of the work and that the construction is in substantial compliance with the design as approved on FEB 4 1997 by the City of Albuquerque for Grading and Drainage Plan Number G13/D18. As-built elevations are as noted.

MARVIN R. KORTUM  
NMP 6519  
DATE 5/23/1997



NOTES

- A West entrance, see details, sheet 2, and drawings 2426, private entrance details, and 2441, wheel chair ramp, City of Albuquerque Standard Specifications for Public Works.
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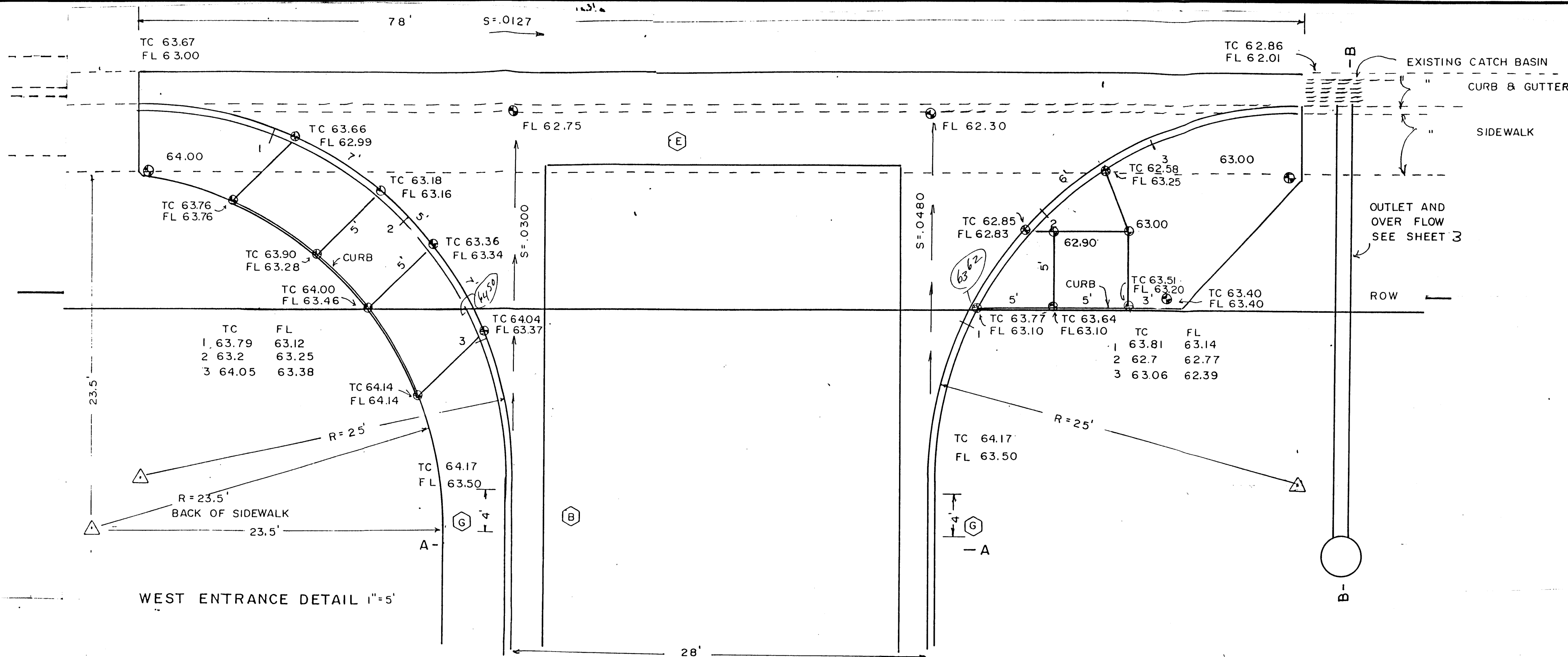
EXHIBIT A  
DRAINAGE  
COVENANT

CHANGE THIS SHEET	5/23/1997	MRK	FEB 3 1997
ADD BASIN DETAILS		MRK	JAN 28, 1997
ADD LEGEND, REVISED NOTES		MRK	JAN 13, 1997
PRELIMINARY		MRK	
APPROVAL, REVISIONS		BY	DATE

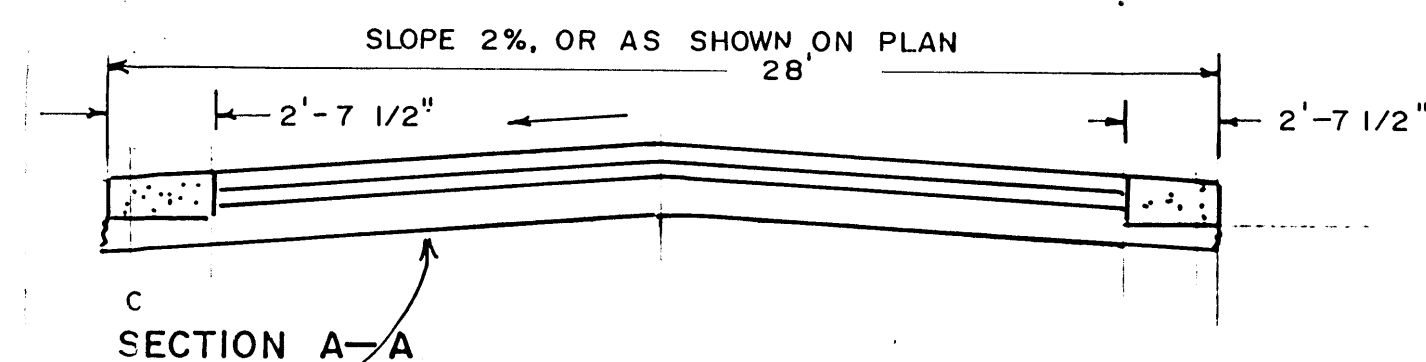
MARVIN R. KORTUM, P.E.  
Civil Engineering  
NM PE 6519  
1605 Speakman Drive, S.E.  
Albuquerque, New Mexico 87123  
(505) 299-0774

GRADING AND DRAINAGE PLAN  
COTTONWOODS SUBDIVISION

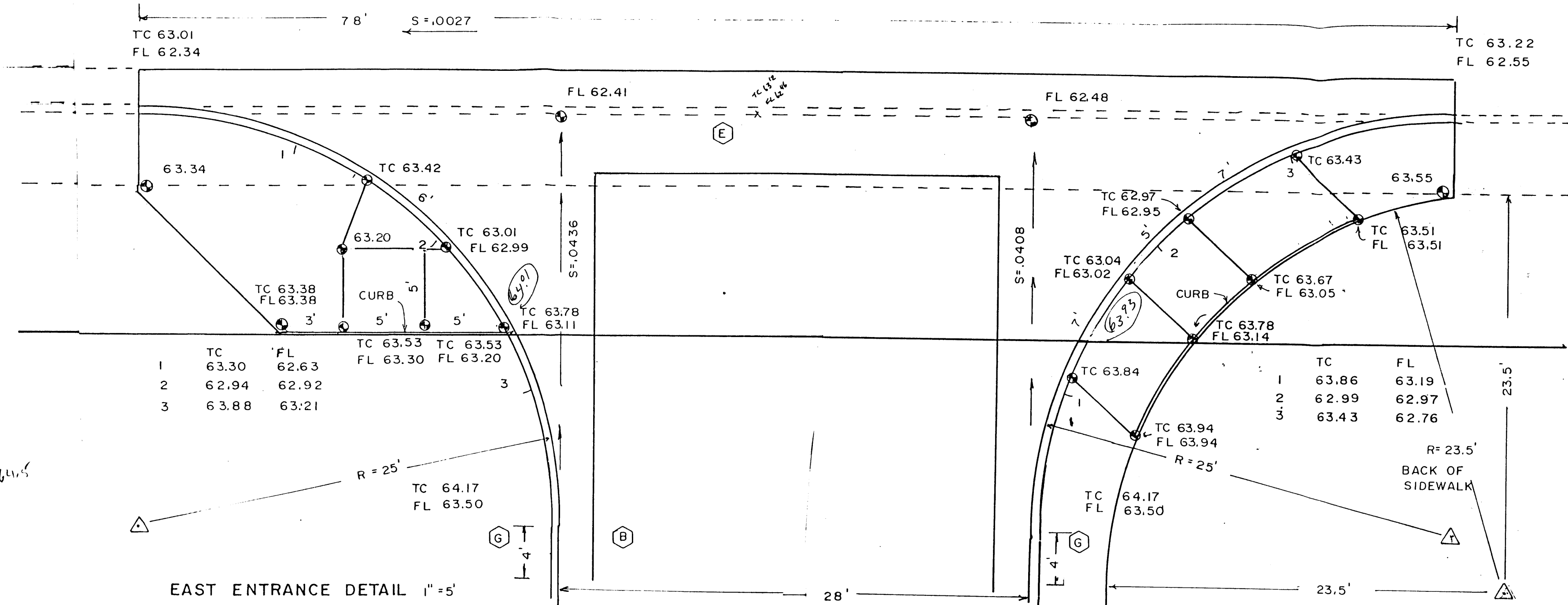
RECEIVED  
SEP 24 1997  
HYDROLOGY SECTION  
PROJECT NO. G13/D18, DRB96-584  
MAP NO. G-13  
SHEET OF 13



WEST ENTRANCE DETAIL 1"=5'



SECTION A-A



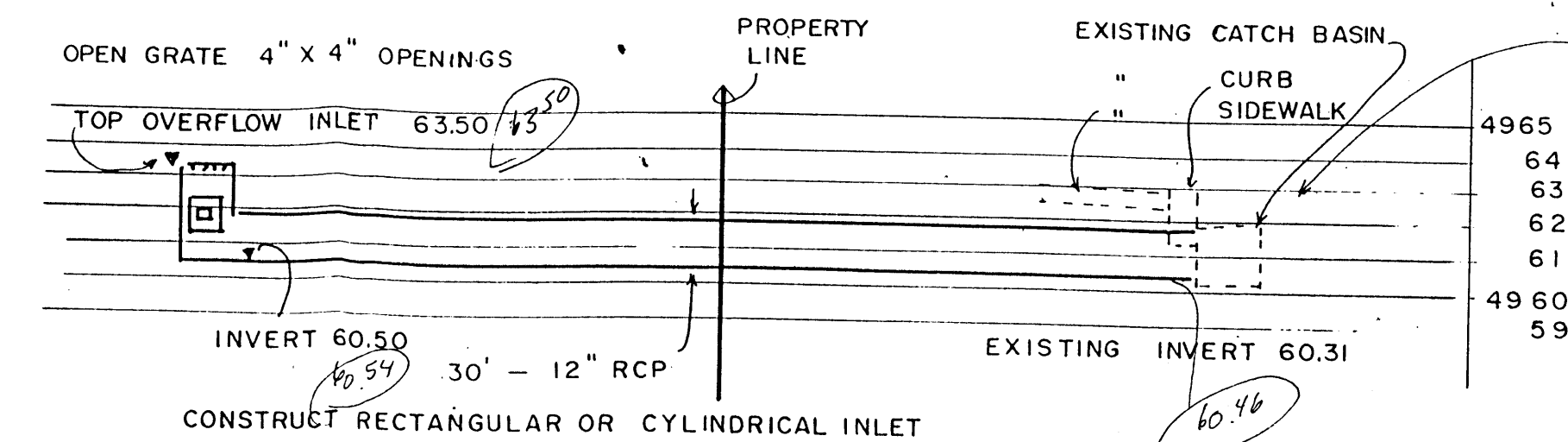
EAST ENTRANCE DETAIL 1"=5'

I Certify that the construction as shown on this drawing reflects the as-built conditions of the work and that the construction is in substantial compliance with the design as approved on FCR 4 1997 by the City of Albuquerque for Grading and Drainage Plan Number 613/1018. As-built elevations are as noted.

Marvin R. Kortum  
NMPE 6519  
Date 5/23/1997



- CUT HOLE IN EXISTING CATCH BASIN
- INSERT 12" RCP
- GROUT CONNECTION WITH EXPANDING GROUT



SECTION B-B

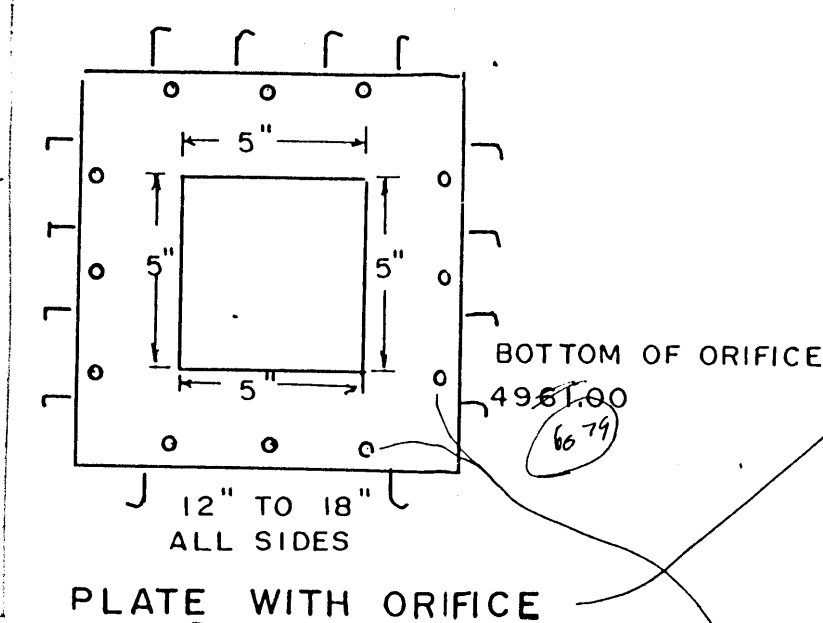
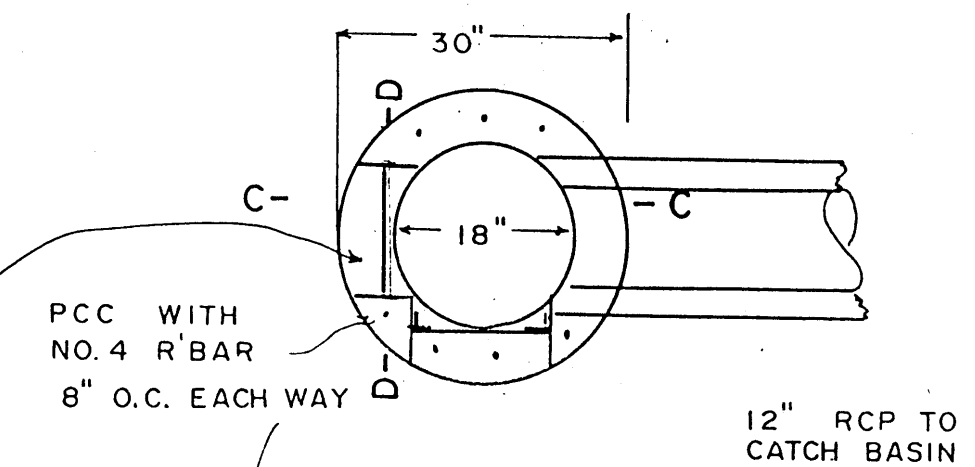
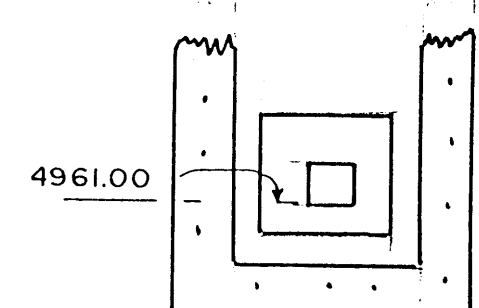


PLATE WITH ORIFICE



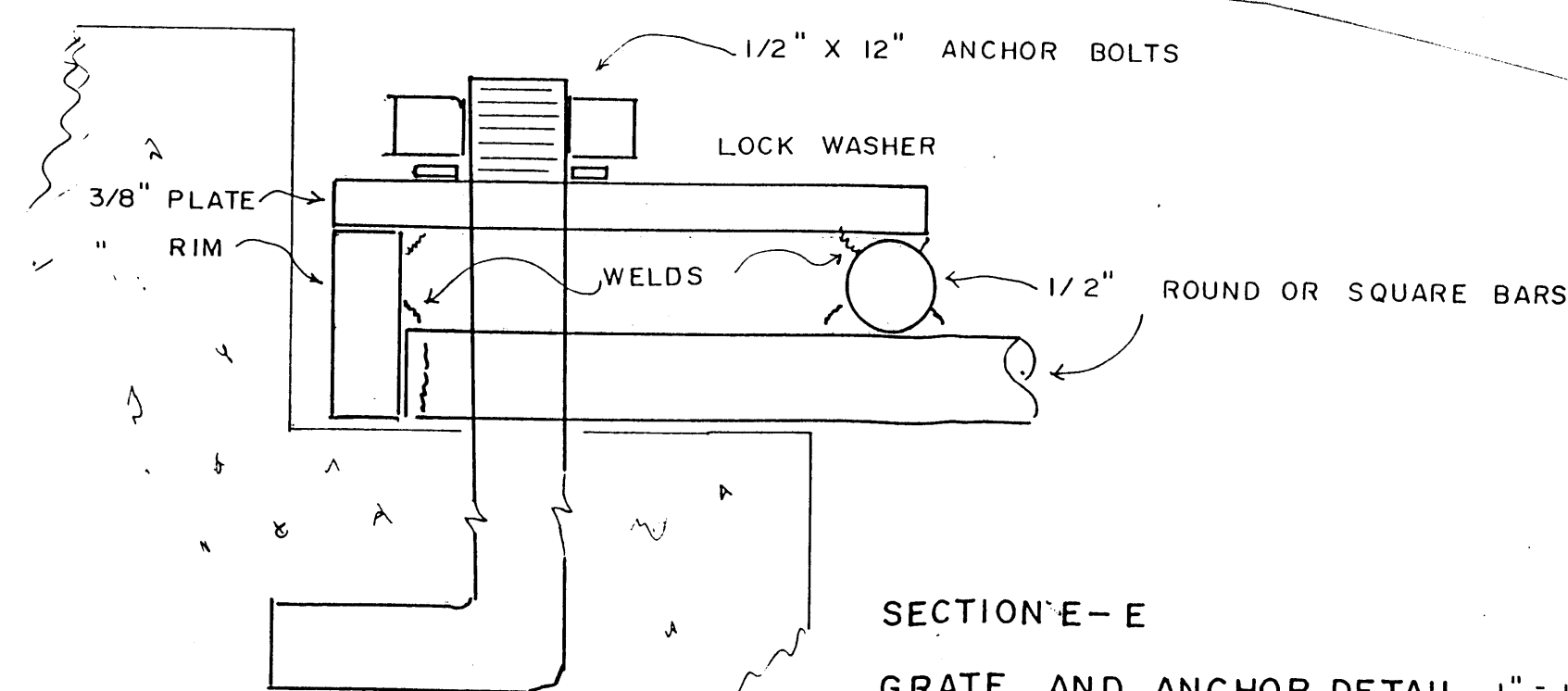
SECTION C-C



SECTION D-D

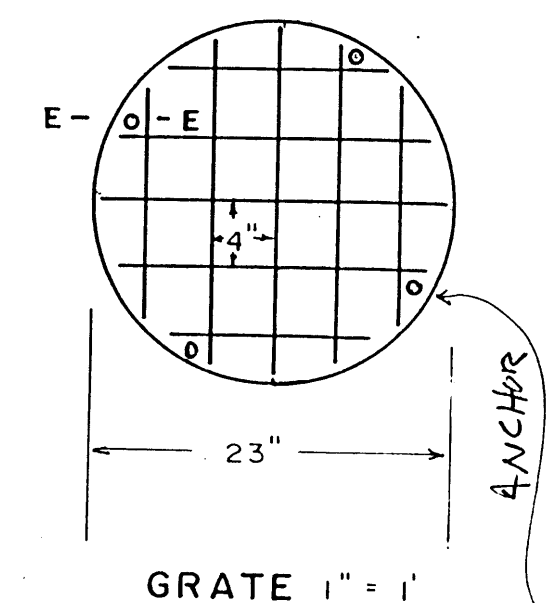
INLET DETAIL 1"=2'

FRAME ANCHOR DETAIL 1"=1'



SECTION E-E

GRATE AND ANCHOR DETAIL 1"=1'



GRATE 1"=1'

EXHIBIT B  
DRAINAGE  
COVENANT

<p>CERTIFICATE</p> <p>ADD DETAILS TO EXISTING OUTLET</p> <p>JUN 28 1997</p> <p>MARVIN R. KORTUM</p> <p>NEW MEXICO</p> <p>REGISTERED PROFESSIONAL ENGINEER</p> <p>6519</p>		<p>SUP 23 1997</p> <p>MARVIN R. KORTUM</p> <p>Civil Engineering</p> <p>NM PE 6519</p> <p>1605 Speakman Drive, S.E.</p> <p>Albuquerque, New Mexico 87123</p> <p>(505) 299-0774</p>	
<p>GRADING AND DRAINAGE PLAN</p> <p>COTTONWOODS SUBDIVISION</p>			
<p>PROJECT NO.</p> <p>G13/D18</p> <p>DRB 96-584</p>		<p>MAP NO.</p> <p>G-13</p> <p>SHEET OF</p> <p>2 3</p>	



**PURPOSE:**

The purpose of this grading and drainage plan is to obtain approval for a subdivision for residential houses on Lots 1 through 9, Cottonwoods Subdivision.

**DISCUSSION:**

A. The site of the proposed 2.2802 acre subdivision is within the historic floodplain of the Rio Grande. Recent use of the land has been as an irrigated field and possibly residences. The west side and part of the north side of the site are bordered by the Rio Grande Boulevard and Campbell Road, both paved streets with curbs and gutters. The east side was at one time bordered by a local lateral, an irrigation ditch, and the field was leveled to permit flood irrigation of the field. The irrigation ditch no longer exists, and residential houses have been built along the east side. The area south of the property is partially developed with old residential buildings and unused vacant property.

B. The site is located in the southeast quadrant of the intersection of Campbell Road and Rio Grande Boulevard. Surface flow within the paved street surfaces runs from north to south on Rio Grande Boulevard, and from east to west on Campbell Road. Surface runoff on Rio Grande Boulevard will flow west at the intersection with Campbell Road, there being no water block at the west curb line. The crown of Rio Grande Boulevard provides a diversion for low flows from crossing west to east within the Rio Grande Boulevard right-of-way. Flows along the east side of Rio Grande Boulevard are also collected in a subsurface storm drain system, the storm drain being of relatively small capacity, a 24" pipe. Runoff along Rio Grande Boulevard does not appear to be a hazard to the site for runoff equal to the 100 year storm. Runoff along Campbell Road is from east to west. There is a runoff collection point in Campbell Road directly north of the Cottonwoods Subdivision, with two catch basins feeding into a subsurface storm drain (18" pipe) which is connected to the Rio Grande storm drains. Flows excess to the capacity of the Campbell Road 18" storm drain would pond within the Campbell Road right-of-way to a depth of about 4964.5, at which time they would flow out over the surface onto Rio Grande Boulevard (flow line inverts at Campbell Road and Rio Grande intersection are 64.17 and 64.59). Presently flow into the Cottonwoods site is prevented by a berm along the property line, the berm top elevation being about 64.5 at the lowest points. The surrounding properties to the north and east are developed with residential single family residences, and some irrigated yards, so significant increase in runoff along Campbell Road is not anticipated. Presently outflow from the site will be generally south, across private property, until the flow enters the Matthew Street or Rio Grande right-of-way.

C. The subdivision site is located within Zone B of the Flood Insurance Rate Map (Reference D), which is that area between limits of the 100-year and 500-year flood, or certain areas subject to 100-year flooding with average depths less than one (1) foot, or where the contributing area is less than one square mile, or areas protected by levees from the base flood. In the event of a catastrophic flood, the houses within the proposed subdivision are protected up to a water elevation of about 4965.

D. From the above descriptions, it is concluded that there is little danger of large uncontrolled flows into the Cottonwoods subdivision area for storms of the 100 year storm magnitude. To provide protection equal to that which presently exists, the berm and water block which presently exists along the north side of the property will be preserved.

E. The proposed development of the subdivision will entail very little change to the surface. The house pads will be raised to be one foot or more above the adjacent lot terrain. A shallow pond will be established along the west and east portions of the subdivision, an outflow into the storm drain system within Campbell Road. Due to present limited capacity of the Campbell Road-Rio Grande Boulevard storm drain system, the outflow from the Cottonwoods ponds shall be controlled, with no flows greater than about 1.25 CFS for the 100 year storm. Table A estimates the total 100 year, 6 hour runoff for the subdivision. Table A-1 provides a estimate of the runoff in which the ponds are considered as saturated, with no percolation, the ponds being considered essentially as impervious areas. Table B shows an estimate of the ponding capacity, with about 38000 CF capacity, which will safely hold the estimated 15000 CF from the 10 year storm, without considering the trickle outflow. The excess capacity will partially be used by having landscaping within the ponds, with small hills and berms. All of the lot used for ponding may be used for landscaping and gardening. For storms or precipitation much larger than that which can be retained within the subdivision, the outflow will be through the fence or wall along the south of the subdivision. Grading as proposed will not alter downstream flow basins.

**SOILS:**

Soils on the subdivision are identified by reference C as Gila clay loam (Gc). The soils are suited for residential buildings and associated infrastructure. The soils have moderate to low strength for streets, so imported material may be required for streets and driveways. Soils may be susceptible to consolidation, particularly when wetted, so care must be taken to direct runoff and landscape watering away from building foundations. The surface soils of the subdivision do provide for percolation of the ponded runoff, but no credit is taken for the percolation in determining the required pond sizes.

**CONCLUSIONS:**

A. The proposed construction is not within a designated 100 year floodplain.

B. Construction as proposed will not increase the hazard from flooding to downstream facilities.

C. The proposed grading and construction will protect the property from any off-site or on-site runoff.

**REFERENCES:**

A. Standard Specifications for Public Works Construction, City of Albuquerque.

B. Section 22.2, Hydrology, of the Development Process Manual, Volume 2, Design Criteria, for the City of Albuquerque...Bernalillo County...AMAFCA, January 1993.

C. Soil Survey of Bernalillo County and Parts of Sandoval and Valencia Counties, New Mexico, USDA-SCS.

D. Flood Insurance Rate Map, City of Albuquerque, Bernalillo County, Federal Emergency Management Agency, Panel 22 of 50, effective date: October 14, 1983.

**RUNOFF FOR COTTONWOODS SUBDIVISION  
JANUARY 13, 1997**

**TABLE A**

Runoff Estimate: For On-site Basin of 2.2802 acres, including interior street right-of-way

Runoff Factors Zone 2			CURRENT USE				PROPOSED USE			
Land use	Peak	Total	Area Percent	Peak Runoff	Total Runoff		Area Percent	Peak Runoff	Total Runoff	
	CFS/acre	inches	SF	CFS	CF		SF	CFS	CF	
1 A	1.56	0.53	99325.58	100.0	3.6	4386.9	0.00	0.0	0.0	0.0
2 B	2.28	0.78	0.00	0.0	0.0	0.0	45000.00	45.3	2.4	2925.0
3 C	3.14	1.13	0.00	0.0	0.0	0.0	4325.58	4.4	0.3	407.3
4 D	4.70	2.12	0.00	0.0	0.0	0.0	50000.00	50.3	5.4	8833.3
TOTALS			99325.58	100.000	3.6	4386.9	99325.58	100.000	8.1	12165.7
			2.2802 acre				2.2802 acre			

**TABLE A-1**

Runoff Estimate: For On-site Basin of 2.2802 acres, including interior street right-of-way (consider pond surface area as impervious for purpose of estimating required pond volume)

Runoff Factors Zone 2			CURRENT USE				PROPOSED USE			
Land use	Peak	Total	Area Percent	Peak Runoff	Total Runoff		Area Percent	Peak Runoff	Total Runoff	
	CFS/acre	inches	SF	CFS	CF		SF	CFS	CF	
1 A	1.56	0.53	99325.58	100.0	3.6	4386.9	0.00	0.0	0.0	0.0
2 B	2.28	0.78	0.00	0.0	0.0	0.0	20000.00	20.1	1.0	1300.0
3 C	3.14	1.13	0.00	0.0	0.0	0.0	4325.58	4.4	0.3	407.3
4 D	4.70	2.12	0.00	0.0	0.0	0.0	75000.00	75.5	8.1	13250.0
TOTALS			99325.58	100.000	3.6	4386.9	99325.58	100.000	9.5	14957.3
			2.2802 acre				2.2802 acre			

**NOTES:**

- Runoff factors from Section 22.2, DPM, January, 1993
- Land use descriptions: A. Uncompacted soil  
B. Lawn, shrubs  
C. Compacted soil  
D. Impervious areas
- Peak runoff = Area (acres) x factor (CFS/acre) = CFS
- Total runoff = Area (SF) x factor (inches) / 12 (inches / foot) = CF
- Peak and total runoff is based on 6 hour, 100 year frequency storm

**TABLE B**

POND CONFIGURATION AND SIZES, COTTONWOODS SUBDIVISION, RIO GRANDE BOULEVARD AND CAMPBELL ROAD, NW, ALBUQUERQUE, NM. JANUARY 13, 1997

**GRADING AND DRAINAGE PLAN FOR 2.2802 ACRE**

Volume of ponds: V=volume of pyramid for end sections plus volume of prism for mid section.  
(4/3)(Area of top surface + Area of bottom + square root of At x Ab) x cross section area of prism x length  
Side slope: feet horizontal to feet vertical

	depth d (ft)	side slope (ft/ft)	Top dimensions		Bottom dimensions		Capacity V (CF)	Area SF	
			length lt (ft)	width wt (ft)	length lb (ft)	width wb			
POND A									
BELOW 63.5	2	20	180	100	100	20	17866.7	18000	
BELOW 63.0	1.5	20	140	70	80	10	7050.0	9800	
POND B									
BELOW 63.5	2	10	160	60	120	20	11466.7	9600	
BELOW 63.0	1.5	10	150	50	120	20	7200.0	7500	
POND C									
BELOW 63.5	1.5	10	180	50	150	20	8775.0	9000	
BELOW 63.0	1	10	190	40	170	20	5433.3	7600	
TOTALS							BELOW 63.5 BELOW 63.0	38108.3 19683.3	36600 24900

**TABLE C**  
**ORIFICE DISCHARGE CAPACITY**  
JANUARY 13, 1997

Orifice discharge based on formula,  $Q=CA(2gH)^{.5}$ , (Handbook of Applied Hydrology, Chow, 7.44) where  $C=.61$ ,  $A$ =area of orifice, and  $H$ =difference in elevation between upstream and downstream, and  $S$ =side of square orifice. Orifice shall be cut in .25 inch thick plate.

Pond surface elevation	H FT	S IN	A SF	C	Q CFS
4961.25	0.25	5	0.1736	0.61	0.42
4961.50	0.50	5	0.1736	0.61	0.60
4961.75	0.75	5	0.1736	0.61	0.74
4962.00	1.00	5	0.1736	0.61	0.85
4962.25	1.25	5	0.1736	0.61	0.95
4962.50	1.50	5	0.1736	0.61	1.04
4962.75	1.75	5	0.1736	0.61	1.12
4963.00	2.00	5	0.1736	0.61	1.20
4963.25	2.25	5	0.1736	0.61	1.27
4963.50	2.50	5	0.1736	0.61	1.29



Copied from Floodway Map, City of Albuquerque, Bernalillo County, Federal Emergency Management Agency, Panel 22 of 50, date of photography, October 8, 1980. 1-500

NO CHANGE THIS SHEET, ADD DETAILS SHEET 162 MARCH 1997



MARVIN R. KORTUM, P.E.  
Civil Engineering  
NM PE 6519

1605 Speakman Drive, S.E.  
Albuquerque, New Mexico 87123  
(505) 299-0774

GRADING AND DRAINAGE PLAN  
COTTONWOODS SUBDIVISION

G13/D18  
DRB 96-584

G-13 3 3