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City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103



MAYOR
KEN SCHULTZ

CHIEF
ADMINISTRATIVE OFFICER
GENE ROMO

DEPUTY CAO
DEVELOPMENT & ENTERPRISE SERVICES
LARRY LARRANAGA

DEPUTY CAO
PUBLIC SERVICES
DAN WEAKS

June 15, 1988

Jeff Mortensen, P.E.
Jeff Mortensen & Associates, Inc.
811 Dallas, NE
Albuquerque, New Mexico 87110

RE: ENGINEER'S CERTIFICATION OF ACADEMY OFFICE PARK,
EROSION CONTROL PLAN, RECEIVED JUNE 1, 1988 FOR
CERTIFICATE OF OCCUPANCY APPROVAL (E-18/D17)

Dear Mr. Mortensen:

Based upon your Engineer's Certification of the above referenced project, dated June 1, 1988, Certificates of Occupancy may be released by Hydrology for buildings draining to the area covered by this Erosion Control Plan.

If phasing continues, then revisions to this Erosion Control Plan may be required with each phase. The owner is expected to maintain these erosion control measures until the site is completely developed or the plan is revised.

If you have any questions, call me at 768-2650.

Cordially,

Roger A. Green, PE
Roger A. Green, P.E.
C.E./Hydrology Section

xc Richard L. Duran, Drainage Inspector
Skip Hines, Hines Corporation

RAG/bsj

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City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

Ken Schultz
Mayor

UTILITY DEVELOPMENT DIVISION
HYDROLOGY SECTION
(505) 768-2650

August 31, 1987

Peter Lujan
Tom Mann & Associates, Inc.
811 Dallas, NE
Albuquerque, New Mexico 87110

RE: EROSION CONTROL PLAN SUBMITTAL OF AUGUST 7, 1987 FOR
CERTIFICATE OF OCCUPANCY APPROVAL, PHASE I (E-18/D17)

Dear Peter:

The above referenced submittal dated August 7, 1987, is approved. After the contractor has completed grading and construction in accordance with this approved plan, the Certificate of Occupancy may be signed-off by Hydrology for the buildings construction.

If you have any questions, call me at 768-2650.

Cordially,

Roger A. Green, P.E.
C.E./Hydrology Section

xc: Skip Hines, Hines Corporation
12800 Lomas Blvd., NE 87112

RAG/bsj

PUBLIC WORKS DEPARTMENT

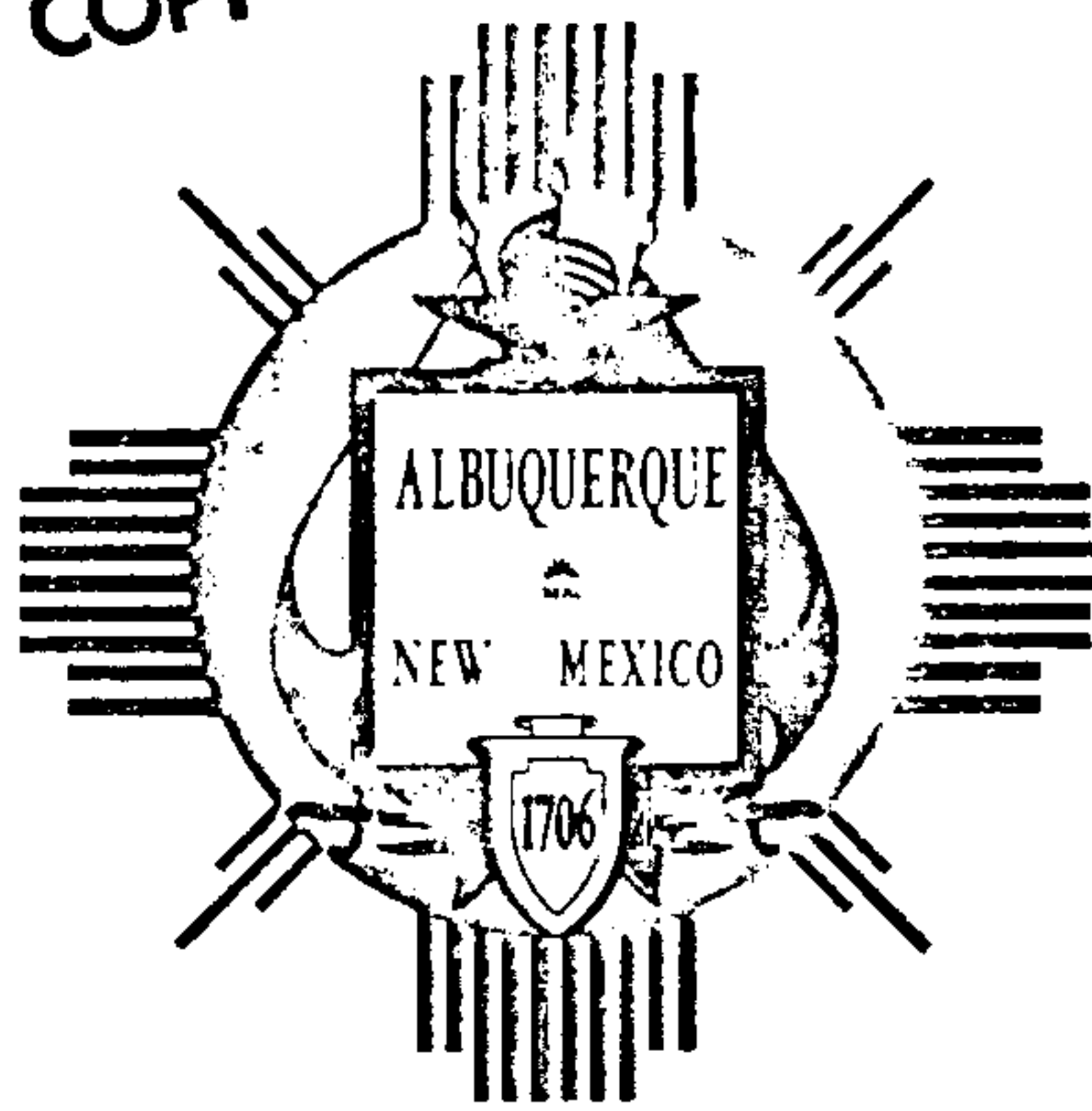
Walter Nickerson, P.E., City Engineer

ENGINEERING GROUP

Telephone (505) 768-2500

AN EQUAL OPPORTUNITY EMPLOYER

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City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

DESIGN HYDROLOGY SECTION
123 Central NW, Albuquerque, NM 87102
(505) 766-7644

May 28, 1986

Mike Kibbee
DMJM
5700 Harper Drive, NE Suite 280
Albuquerque, New Mexico 87109

RE: AS-BUILT RETAINING WALL PLANS OF ACADEMY ACRES, UNIT 10,
RECEIVED MAY 22, 1986 FOR FINAL PLAT APPROVAL (E-18/D17)

Dear Mike:

The above referenced submittal showing the as-built ground elevations on each side of retaining walls is acceptable as justification for the as-built wall lengths and height.

Final Plat is approved for sign-off by the City Engineer.

If you have any questions, call me at 766-7644.

Cordially,

A handwritten signature in black ink that reads 'Roger A. Green, PE'. The signature is written in a cursive style.

Roger A. Green, P.E.
C.E./Hydrology Section

cc: Ken Tekin, Academy Partnership

RAG/bsj

MUNICIPAL DEVELOPMENT DEPARTMENT

~~ALBUQUERQUE, NEW MEXICO CITY ENGINEER~~

ENGINEERING DIVISION

Telephone (505) 766-7467

AN EQUAL OPPORTUNITY EMPLOYER

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City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

DESIGN HYDROLOGY SECTION
123 Central NW, Albuquerque, NM 87102
(505) 766-7644

May 5, 1986

Jean J. Bordenave, P.E.
DMJM
5700 Harper Drive, NE Suite 280
Albuquerque, New Mexico 87109

RE: REVISED GRADING PLAN OF ACADEMY ACRES, UNIT 10
OFFICE AREA, RECEIVED JANUARY 22, 1986 FOR BUILDING PERMIT
APPROVAL (E-18/D17)

Dear Jake:

The above referenced submittal revised January 21, 1986, is approved for Building Permit.

Include this approved Grading Plan and approved permits to construct the sidewalk culverts within public Right-of-Ways, with the construction sets for sign-off.

If you have any questions, call me at 766-7644.

Cordially,

Roger A. Green, P.E.
C.E./Hydrology Section

cc: Ken Tekin,
Tekin/Hines

RAG/bsj

ENGINEERING DIVISION

Telephone (505) 766-7467

AN EQUAL OPPORTUNITY EMPLOYER

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City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

DESIGN HYDROLOGY SECTION
123 Central NW, Albuquerque, NM 87102
(505) 766-7644

April 1, 1986

Jean J. Bordenave, P.E.
DMJM
5700 Harper Drive, NE Suite 280
Albuquerque, New Mexico 87109

RE: REVISED GRADING PLAN OF ACADEMY ACRES ; UNIT 10, LOT 58,
BLOCK 1 (E-18/D17) RECEIVED MARCH 25, 1986

Dear Mr. Bordenave:

The above referenced submittal, revised March 25, 1986, is approved.

If you have any questions, call me at 766-7644.

Cordially,

Roger A. Green, P.E.
C.E./Design Hydrology

RAG/bsj

MUNICIPAL DEVELOPMENT DEPARTMENT

C. Dwayne Sheppard, P.E., City Engineer

ENGINEERING DIVISION

Telephone (505) 766-7467

AN EQUAL OPPORTUNITY EMPLOYER



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

DESIGN HYDROLOGY SECTION
123 Central NW, Albuquerque, NM 87102
(505) 766-7644

April 19, 1984

Mr. Dennis Lorenz
Espey, Huston & Associates, Inc.
4801 Indian School Road NE Suite 204
Albuquerque, NM 87110

REF: DRAINAGE REPORT FOR ARROYO VISTA APARTMENTS (E18-D37) RECEIVED
APRIL 12, 1984

Dear Dennis:

The above referenced submittal is approved for drainage.

It is understood that a detailed grading plan will be forthcoming to this office for review and approval prior to release of a building permit.

This detailed grading plan is to have sufficient contours and or spot elevations to show that the proposed drainage scheme will work. Also, to be provided are the hydraulic data, profiles, details and etc., for the swales, curb-cuts, outlet pipes and any other structures pertinent to the drainage scheme and development of this site. The engineer's stamp, signature and date will be required along with a vicinity map and legend on this future submittal.

Prior to issuance of the building permit, the subdivision agreement (if applicable) and the appropriate "Construction Within Public R/W" documents will need to be approved.

Should you have any questions, please call me at 766-7644.

Sincerely,

Billy J. Goolsby, PE
City/County Flood Plain Admin.

BJG:mrk

MUNICIPAL DEVELOPMENT DEPARTMENT

C. Dwayne Sheppard, P.E., City Engineer

ENGINEERING DIVISION

Telephone (505) 766-7467

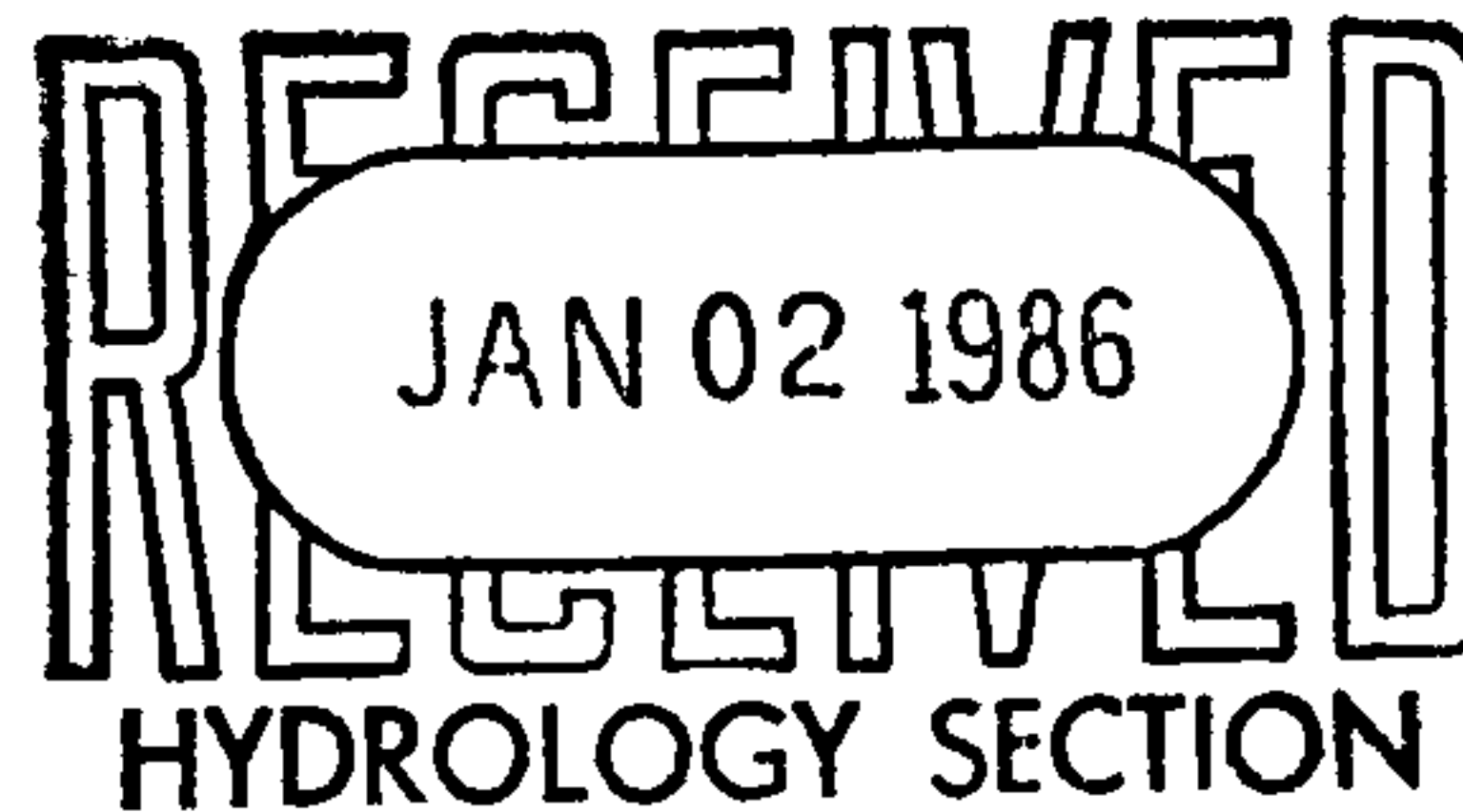
AN EQUAL OPPORTUNITY EMPLOYER

D R A I N A G E R E P O R T

F O R

A C A D E M Y A C R E S

U N I T 1 0



PREPARED FOR: TEKIN/HINES, INC.
 3900 EUBANK, N.E.
 SUITE 17-N
 ALBUQUERQUE, NM 87111
 (505) 298-1854

PREPARED BY: DMJM
 5700 HARPER DRIVE, N.E.
 SUITE 280
 ALBUQUERQUE, NM 87109
 (505) 822-7955



PURPOSE

The purpose of this report is to present the method of for controlling surface runoff from the proposed development in a manner which is acceptable to the City of Albuquerque and the Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA). The plan determines the excess runoff resulting from 100-year/6-hour and 10-year/6-hour frequency storms falling within the project site and contributing drainage basins under existing and developed conditions.

In addition, the purpose of this plan is to ensure the developer the project site will be protected from storm runoff and that the project will not increase the flooding potential to adjacent properties and downstream areas.

LOCATION AND DESCRIPTION

The proposed development is located on Academy Road, N. E., just east of Burlison Drive, N. E., and west of Truchas Drive, N. E. The site is more particularly described as Academy Acres, Unit 10, Tracts "B" and "C." The Vicinity Map (Figure 1) graphically depicts the location of the site.

The site is approximately 30.9 acres in size and is presently undeveloped. The natural topography slopes from east to west at approximately three (3%) percent. The major soil present within the project site is Embudo-Tijeras complex (Figure 2). This complex is about fifty (50%) percent Embudo gravelly fine sandy loam and about thirty-five (35%) percent Tijeras gravelly fine sandy loam. Included in this unit are areas of Tesajo, Millett and Wink soils which make up the remaining fifteen (15%) percent. On this soil complex, the runoff potential is medium and the hazard of water erosion is moderate. The USDA Soil Conservation Service has classified this unit as a type "B" soil.

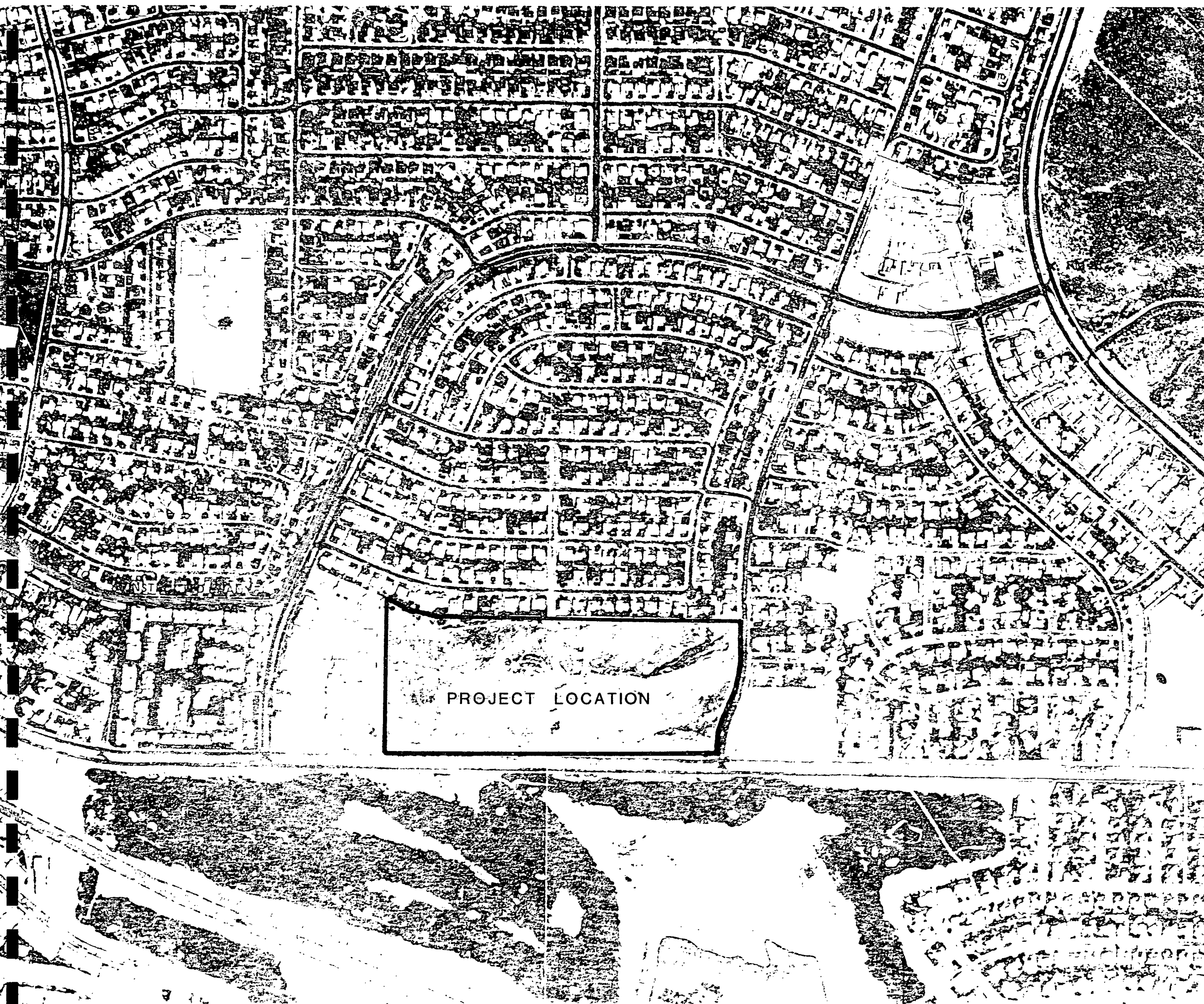
EXISTING DRAINAGE CONDITIONS

The project site is currently undeveloped. Areas to the north and west are developed. The site is bounded on the east by Truchas Drive, N. E. and on the south by Academy Road, N. E. Ruby Street bisects the project site into Tract "B" on the west and Tract "C" on the east. Ruby Street, N. E. has been vacated by V85-53.

where is this? Blue line in pocket.

Figure 3 illustrates the existing on-site and off-site drainage basins affecting the site. No on-site flows enter the site as existing streets and developments divert all off-site runoff. The site has two (2) sub-basins. Sub-area "1" drains approximately 15.5 cfs through the existing drainage easement located at the northwest corner of the site. This discharge is allowed as per the approved drainage plan prepared by Goldberg-Mann & Associates for Academy Ridge, 1978. Sub-area "2" discharges approximately 33.3 cfs into Academy Road, N. E. Run-off is then conveyed via street flow to a transverse drop inlet located downstream in Academy Road, N. E. The drop inlet discharges into the Bear Arroyo. (See E18-D17 for Academy Road/Inlet hydraulics). ✓

As shown by Figure 4 (FHBM Plate 17), this site does not lie within a designated flood hazard zone.



SCALE 1"=500'
500 0 500

NATIONAL FLOOD INSURANCE PROGE

FLOODWAY
FLOOD BOUNDARY AND
FLOODWAY MAP

CITY OF
ALBUQUERQUE,
NEW MEXICO
BERNALILLO COUNTY

PANEL 17 OF 50

FIGURE 3

COMMUNITY-PANEL NUMBER
350002 00
EFFECTIVE DATE
OCTOBER 14, 1965



Federal Emergency Management Agency

PROPOSED DRAINAGE CONDITIONS

The proposed drainage plan (4 sheets in Pocket 2) shows the following:

1. Onsite drainage basins,
2. developed 10-yr. and 100-yr. peak flow rates,
3. existing and proposed contours, at one foot intervals,
4. existing and proposed curb elevations,
5. proposed swale elevations,
6. proposed drainage structures, and
7. proposed streets, buildings, parking areas, and landscaped areas.

The site development plan has been reviewed and approved by EPC and reviewed by DRB. The proposed development is composed of a single public street providing access to 100 townhouse units and private parking and access ways providing service to approximately 200,000 square feet of office space.

PROPOSED DRAINAGE CONDITIONS (continued)

All residential units (except 4 lots in the northwest corner) are graded to provide direct discharge to the proposed public street. The 4 lots in the northwest corner will have a split drainage with the front and side yards draining to the street and the rear yards having cross lot drainage via a swale in a private drainage easement thence through a dedicated (public) and constructed drainage easement in the adjoining subdivision to a public street.

Academy Ridge

where?

*check
flat
OK*

The office area is graded to direct discharge via paved access ways and gravel filled, plastic lined swales to curb openings or sidewalk culverts in Academy Road.

*Concrete
on plans.*

Grading configurations will required retaining walls as indicated on the grading plans.

Erosion control will be provided by berms as shown on the grading plans.

CONCLUSIONS

1. All criteria established by the Drainage Ordinance have been met.
2. The site is not located in a designated flood hazard area.
3. Runoff from the site does not contribute to an offsite designated flood hazard area.
4. The increase in Academy Road peak flow (approximately 5 cfs) is less than the probable error in calculation and will have a negligible effect on the water depth at the curb.
5. No onsite detention is required.
6. No offsite construction of drainage structures is required.

DMJM/AHA ALBUQUERQUE	PROJECT	ACADEMY ACRES	PROJECT NO.	4668-02-01	PAGE	01
		UNIT 10	BY:	JJB	DATE:	9/85
SUBJECT Office Area						

RUNOFF SOURCE

RECEIVED
DEC 12 1985
HYDROLOGY SECTION

SOURCE	BASIN AREA (S.F.)						
	A	B	C	D	E	F	G
roof	41,425	60,525	38,050	31,425	34,800	22,200	14,200
walk	1,080	5,250	4,860	4,225	4,995	3,925	1,175
parking	5,640	61,542	55,888	50,868	55,625	34,863	9,295
landscape	38,166	69,567	43,540	24,630	48,019	26,969	21,594
Σ	86,311	196,336	142,338	111,148	143,439	87,957	46,264

using the following coefficients: roof = 0.95 ✓
walk = 1.00 ✓
parking = 0.95 ✓
landscape = 0.25

results in the following effective areas

SOURCE	BASIN AREA (S.F.)						
	A	B	C	D	E	F	G
roof	39,354	57,499	36,148	29,854	33,060	21,090	13,490
walk	1,080	5,250	4,860	4,225	4,995	3,925	1,175
parking	5,358	58,465	53,094	48,325	52,844	33,120	8,830
landscape	9,542	17,392	10,885	6,158	12,005	6,742	5,399
Σ	55,334	133,606	104,987	88,562	102,904	64,877	28,894
C(effective)	0.64	0.71	0.74	0.80	0.72	0.74	0.62

RUNOFF RATES

Basin A

the basin has a total length of approx. 1,200 feet and an elevation difference of 20 feet and a grade of 1.7%. The swale will have a narrow concrete section to provide positive drainage and the rest of swale will have a sod surface.

$$t_c = 0.0078 \frac{1200^{0.77}}{0.017^{0.385}}$$

DMJM/AHA ALBUQUERQUE	PROJECT ACADEMY ACRES Unit 10	PROJECT NO. 4668-02-01	PAGE 02
		BY: JJB	
SUBJECT Office Area			

RUNOFF RATES (cont.)

Basin A (cont.)

$$v = \frac{1200}{(8.8)(60)} = 2.3 \text{ fps} < 3 \text{ fps} \text{ however } 8.8 < 10 \text{ min}$$

∴ no justification required

$$\text{intensity} = (6.84)(10^{-0.51})^{T_c} (2.3) \quad \text{DPM 22.2 D-1 \& D-2}$$

$$= 4.86 \text{ in/hr}$$

$$Q = c i A$$

$$Q_{100} = (4.86)(55,334/43,560) = 6.2 \text{ cfs} \checkmark$$

$$Q_{10} = Q_{100} (0.657) = 4.1 \text{ cfs} \quad \text{DPM 22.2 D-1}$$

Basin B

the basin has a total length of approx. 1,740 feet and an elevation difference of 38.8 feet and a grade of 2.2%. The upper basin will have a narrow concrete swale in a sod section and the lower basin will through the parking lot.

$$t_c = 0.0078 \frac{1,740^{0.77}}{0.022^{0.385}} = 10.6 \text{ min}$$

$$v = \frac{1740}{(10.6)(60)} = 2.7 \text{ fps} < 3 \text{ fps} \text{ however } v = 3 \text{ fps}$$

will cause t_c to be less than 10 min. ∴ no justification required.

$$\text{intensity} = (6.84)(10.6^{-0.51})(2.3)$$

$$= 4.72 \text{ in/hr}$$

$$Q_{100} = (4.72)(138,606/43,560) = 15.0 \text{ cfs} \checkmark$$

$$Q_{10} = Q_{100} (0.657) = 9.9 \text{ cfs}$$

Basin C

the basin has a total length of approx. 620 feet and an elevation difference of 20.0 feet and a grade of 3.2%. The swale is all within the parking lot.

DMJM/AHA ALBUQUERQUE	PROJECT ACADEMY ACRES UNIT 10	PROJECT NO. 4668-02-01	PAGE 03
		BY: JJB	DATE: 9/85
SUBJECT Office Area			

RUNOFF RATES (cont.)

Basin C (cont.)

$$t_c = 0.0078 \frac{620^{0.77}}{0.032^{0.385}} = 4.1 \text{ min use 10}$$

$$v = \frac{620}{(4.1)(60)} = 2.5 \text{ fps} < 3 \text{ fps} \quad 4.1 < 10 \text{ min. } \therefore \text{no justification required}$$

intensity = 4.86 in/hr (from Basin A)

$$Q_{100} = (4.86)(104,987/43,560) = 11.7 \text{ cfs} \checkmark$$

$$Q_{10} = (0.657)(Q_{100}) = 7.7 \text{ cfs}$$

Basin D

the basin has a total length of approx. 970 feet and an elevation difference of 236 feet, and a grade of 2.4%. The swale is all within the parking lot.

$$t_c = 0.0078 \frac{970^{0.77}}{0.024^{0.385}} = 6.5 \text{ min use 10}$$

$$v = \frac{970}{(6.5)(60)} = 2.5 \text{ fps} < 3 \text{ fps} \quad 6.5 < 10 \text{ min } \therefore \text{no justification required.}$$

intensity = 4.86 in/hr (from Basin A)

$$Q_{100} = (4.86)(88,562/43,560) = 9.9 \text{ cfs} \checkmark$$

$$Q_{10} = (0.657)(Q_{100}) = 6.5 \text{ cfs}$$

Basin E

the basin has a total length of approx 693 feet and an elevation difference of 16.6 feet and a grade of 2.4%. The swale is all within the parking lot.

$$t_c = 0.0078 \frac{693^{0.77}}{0.024^{0.385}} = 5.0 \text{ min, use 10}$$

$$v = \frac{693}{(5)(60)} = 2.3 \text{ fps} \quad (\text{see Basin D component})$$

DMJM/AHA ALBUQUERQUE	PROJECT	ACADEMY ACRES UNIT 10	PROJECT NO.	PAGE 04
			4668-02-01	
SUBJECT	Office Area		BY: JJB	DATE: 9/85

RUNOFF RATES (cont.)

Basin E (cont.)

intensity = 4.86 in/hr (from Basin A)

$$Q_{100} = (4.86)(102,904/43560) = 11.5 \text{ cfs} \checkmark$$

$$Q_{10} = (0.657)(Q_{100}) = 7.5 \text{ cfs}$$

Basin F

the basin has a total length of approx. 750 feet and an elevation difference of 18.7 feet and a grade of 2.5%. The swale is all within the parking lot.

$$t_c = 0.0078 \frac{750^{0.77}}{0.025^{0.385}} = 5.3 \text{ min} \quad \text{use 10}$$

$$v = \frac{750}{(5.3)(60)} = 2.4 \text{ fps} \quad (\text{See Basin D comment})$$

intensity = 4.86 in/hr (from Basin A)

$$Q_{100} = (4.86)(64877/43560) = 7.2 \text{ cfs} \checkmark$$

$$Q_{10} = (0.657)(Q_{100}) = 4.8 \text{ cfs}$$

Basin G

the basin has a total length of approx. 580 feet and an elevation difference of 14.7 feet and a grade of 2.5%. The upper basin swale is in the parking lot and the lower basin thru a narrow concrete swale in a sod section.

$$t_c = 0.0078 \frac{580^{0.77}}{0.025^{0.385}} = 4.3 \text{ min} \quad \text{use 10}$$

$$v = \frac{580}{(4.3)(60)} = 2.2 \text{ fps} \quad (\text{See Basin D comment})$$

intensity = 4.86 in/hr (from Basin A)

$$Q_{100} = (4.86)(28,894/43560) = 3.2 \text{ cfs} \checkmark$$

$$Q_{10} = (0.657)(Q_{100}) = 2.1 \text{ cfs}$$

DMJM/AHA ALBUQUERQUE	PROJECT	ACADEMY ACRES	PROJECT NO	4668-02-01	PAGE	01
		UNIT 10	BY:	JJB	DATE:	9/85
SUBJECT Office Areas						

RUNOFF SOURCE

SOURCE	BASIN AREA (S.F.)						
	A	B	C	D	E	F	G
roof	41,425	60,525	38,050	31,425	34,800	22,200	14,200
walk	1,030	5,250	4,860	4,225	4,995	3,925	1,175
parking	5,640	61,542	55,888	50,863	55,625	34,863	9,295
landscape	38,166	69,567	43,540	24,630	48,019	26,969	21,594
Σ	86,311	196,336	142,338	111,148	143,439	87,957	46,264

using the following coefficients: roof = 0.95
walk = 1.00
parking = 0.95
landscape = 0.25

results in the following effective areas

SOURCE	BASIN AREA (S.F.)						
	A	B	C	D	E	F	G
roof	39,354	57,499	36,148	29,854	33,060	21,090	13,490
walk	1,030	5,250	4,860	4,225	4,995	3,925	1,175
parking	5,358	58,465	53,094	48,325	52,844	33,120	8,830
landscape	9,542	17,392	10,885	6,158	12,005	6,742	5,399
Σ	55,384	133,606	104,987	88,562	102,904	64,877	28,894
C	0.64	0.71	0.74	0.33	0.72	0.74	0.62

RUNOFF RATES

Basin A

the basin has a total length of approx. 1200 feet and an elevation difference of 20 feet and a grade of 1.7%. The swale will have a narrow concrete section to provide positive drainage and the rest of swale will have a 3' x 3' curb.

$$T_c = 0.0078 \frac{1200^{0.77}}{0.017^{0.85}}$$

DPM 122 p 3
DPM 122 p 1

DMJM/AHA ALBUQUERQUE	PROJECT ACADEMY ACRES Unit 10	PROJECT NO. 4668-02-01	PAGE 02
		BY: JJB	DATE: 9/85
SUBJECT Office Area			

RUNOFF RATES (cont.)

Basin A (cont.)

$$v = \frac{1200}{(8.8)(60)} = 2.3 \text{ fps} < 3 \text{ fps} \text{ however } 8.8 < 10 \text{ min}$$

∴ no justification required

$$\text{intensity} = (6.84)(10^{-0.51})(2.3) \quad \text{DPM 22.2 D-1 \& D-2}$$

$$= 4.86 \text{ in/hr}$$

$$Q_{100} = (4.86)(55,334/43,560) = 6.2 \text{ cfs}$$

$$Q_{10} = Q_{100}(0.657) = 4.1 \text{ cfs} \quad \text{DPM 22.2 D-1}$$

Basin B

the basin has a total length of approx. 1,740 feet and an elevation difference of 38.8 feet and a grade of 2.2%. The upper basin will have a narrow concrete swale in a sod section and the lower basin will through the parking lot.

$$t_c = 0.0078 \frac{1,740^{0.77}}{0.022^{0.385}} = 10.6 \text{ min}$$

$$v = \frac{1740}{(10.6)(60)} = 2.7 \text{ fps} < 3 \text{ fps} \text{ however } v = 3 \text{ fps}$$

will cause t_c to be less than 10 min. ∴ no justification required.

$$\text{intensity} = (6.84)(10.6^{-0.51})(2.3)$$

$$= 4.72 \text{ in/hr}$$

$$Q_{100} = (4.72)(138,606/43,560) = 15.0 \text{ cfs}$$

$$Q_{10} = Q_{100}(0.657) = 9.9 \text{ cfs}$$

Basin C

the basin has a total length of approx. 620 feet and an elevation difference of 20.0 feet and a grade of 3.2%. The swale is all within the parking lot.

DMJM / AHA ALBUQUERQUE	PROJECT ACADEMY ACRES UNIT 10	PROJECT NO 4668-02-01	PAGE 03
		BY: JJB	DATE: 9/85
SUBJECT Office Area			

RUNOFF RATES (cont.)

Basin C (cont.)

$$t_c = 0.0078 \frac{620^{0.77}}{0.032^{0.385}} = 4.1 \text{ min use } 10$$

$$v = \frac{620}{(4.1)(60)} = 2.5 \text{ fps} < 3 \text{ fps} \quad 4.1 < 10 \text{ min. } \therefore \text{no justification required}$$

intensity = 4.86 in/hr (from Basin A)

$$Q_{100} = (4.86)(104,987/43,560) = 11.7 \text{ cfs}$$

$$Q_{10} = (0.657)(Q_{100}) = 7.7 \text{ cfs}$$

Basin D

the basin has a total length of approx. 970 feet and an elevation difference of 23.6 feet and a grade of 2.4%. The swale is all within the parking lot.

$$t_c = 0.0078 \frac{970^{0.77}}{0.024^{0.385}} = 6.5 \text{ min use } 10$$

$$v = \frac{970}{(6.5)(60)} = 2.5 \text{ fps} < 3 \text{ fps} \quad 6.5 < 10 \text{ min } \therefore \text{no justification required.}$$

intensity = 4.86 in/hr (from Basin A)

$$Q_{100} = (4.86)(88,562/43,560) = 9.9 \text{ cfs}$$

$$Q_{10} = (0.657)(Q_{100}) = 6.5 \text{ cfs}$$

Basin E

the basin has a total length of approx 693 feet and an elevation difference of 16.6 feet and a grade of 2.4%. The swale is all within the parking lot.

$$t_c = 0.0078 \frac{693^{0.77}}{0.024^{0.385}} = 5.0 \text{ min, use } 10$$

$$v = \frac{693}{(5.0)(60)} = 2.3 \text{ fps} \quad \text{Basin E (cont.)}$$

DMJM/AHA ALBUQUERQUE	PROJECT ACADEMY ACRES UNIT 10	PROJECT NO 4668-02-01	PAGE 04
		BY: JJB	DATE: 9/85
SUBJECT Office Area			

RUNOFF RATES (cont.)

Basin E (cont.)

intensity = 4.86 in/hr (from Basin A)

$$Q_{100} = (4.86)(102,904/43560) = 11.5 \text{ cfs}$$

$$Q_{10} = (0.657)(Q_{100}) = 7.5 \text{ cfs}$$

Basin F

the basin has a total length of approx. 750 feet and an elevation difference of 18.7 feet and a grade of 2.5%. The swale is all within the parking lot.

$$t_c = 0.0078 \frac{750^{0.77}}{0.025^{0.385}} = 5.3 \text{ min} \quad \text{use 10}$$

$$v = \frac{750}{(5.3)(60)} = 2.4 \text{ fps} \quad (\text{See Basin D comment})$$

intensity = 4.86 in/hr (from Basin A)

$$Q_{100} = (4.86)(64877/43560) = 7.2 \text{ cfs}$$

$$Q_{10} = (0.657)(Q_{100}) = 4.8 \text{ cfs}$$

Basin G

the basin has a total length of approx. 580 feet and an elevation difference of 14.7 feet and a grade of 2.5%. The upper basin swale is in the parking lot and the lower basin thru a narrow concrete swale in a sod section.

$$t_c = 0.0078 \frac{580^{0.77}}{0.025^{0.385}} = 4.3 \text{ min} \quad \text{use 10}$$

$$v = \frac{580}{(4.3)(60)} = 2.2 \text{ fps} \quad (\text{See Basin D comment})$$

intensity = 4.86 in/hr (from Basin A)

$$Q_{100} = (4.86)(28,894/43560) = 3.2 \text{ cfs}$$

$$Q_{10} = (0.657)(Q_{100}) = 2.1 \text{ cfs}$$

FACILITY HYDRAULICS

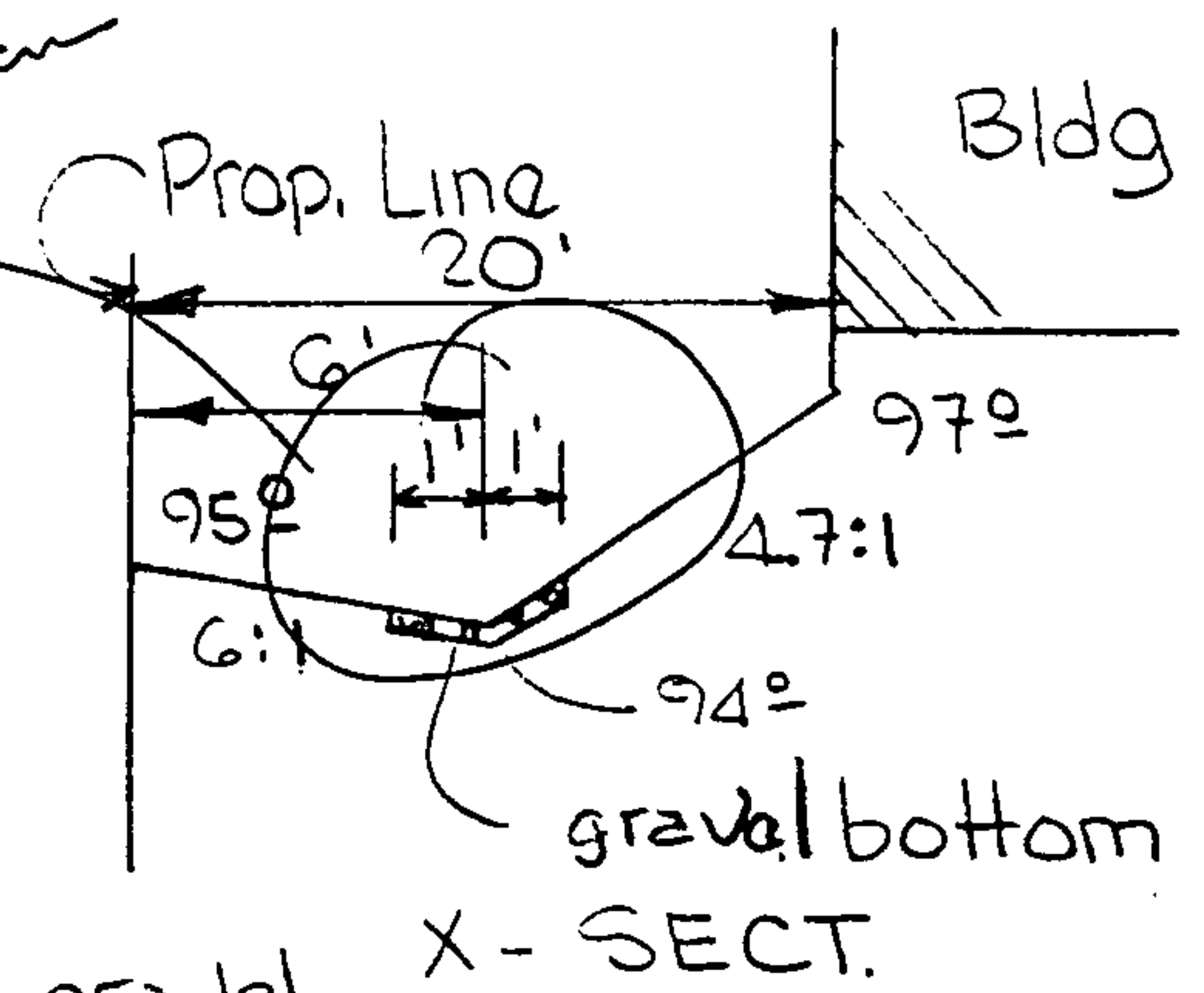
BASIN A ✓

Swale

$Q = 6.2 \text{ cfs}$
 $S = 0.0088\%$
 $n = 0.025 \text{ (DPM 22.3 B-1)}$

$d = 0.66 \text{ ft}$ $d_c = 0.61$
 $v = 2.64 \text{ fps}$ non erosive in gravel

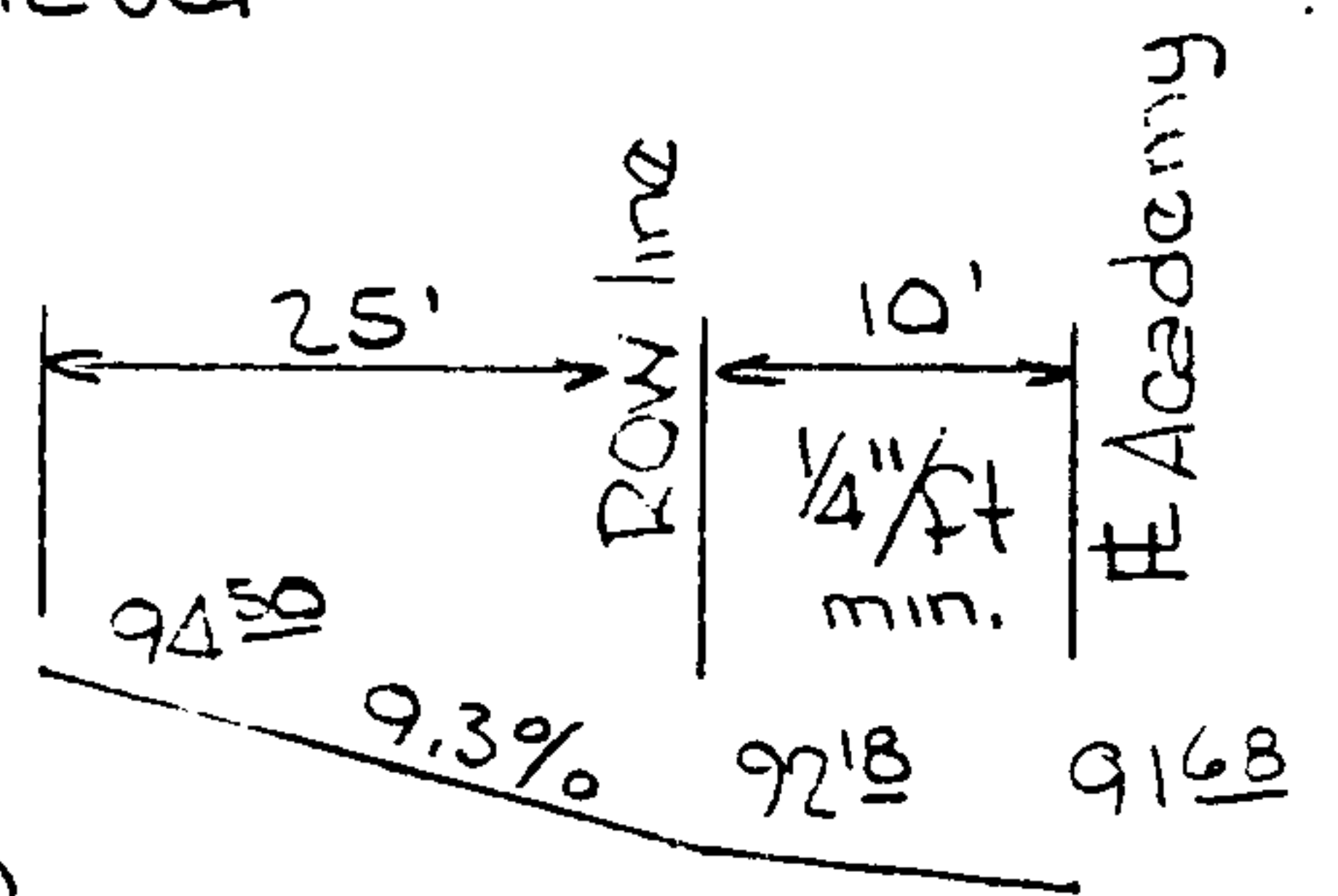
18" concrete on plan



Sidewalk Culvert & Approach

$Q_{100} = 6.2 \text{ cfs}$
 Transition from 2' wide concrete v swale matching gravel @ top to rect. channel matching sidewalk culvert @ bott.

width 2



acceleration = $g \cos \theta = 2.98 \text{ ft/sec/sec}$

and velocity at sidewalk culvert = $v = 12.49 \text{ fps}$

requiring a sidewalk culvert width = $w = 6.2 / (12.49)(0.5)$
 use single 1'-0" wide sidewalk culvert

$Q = AV$
 $A = w \times 0.5$
 $2Q = wV$

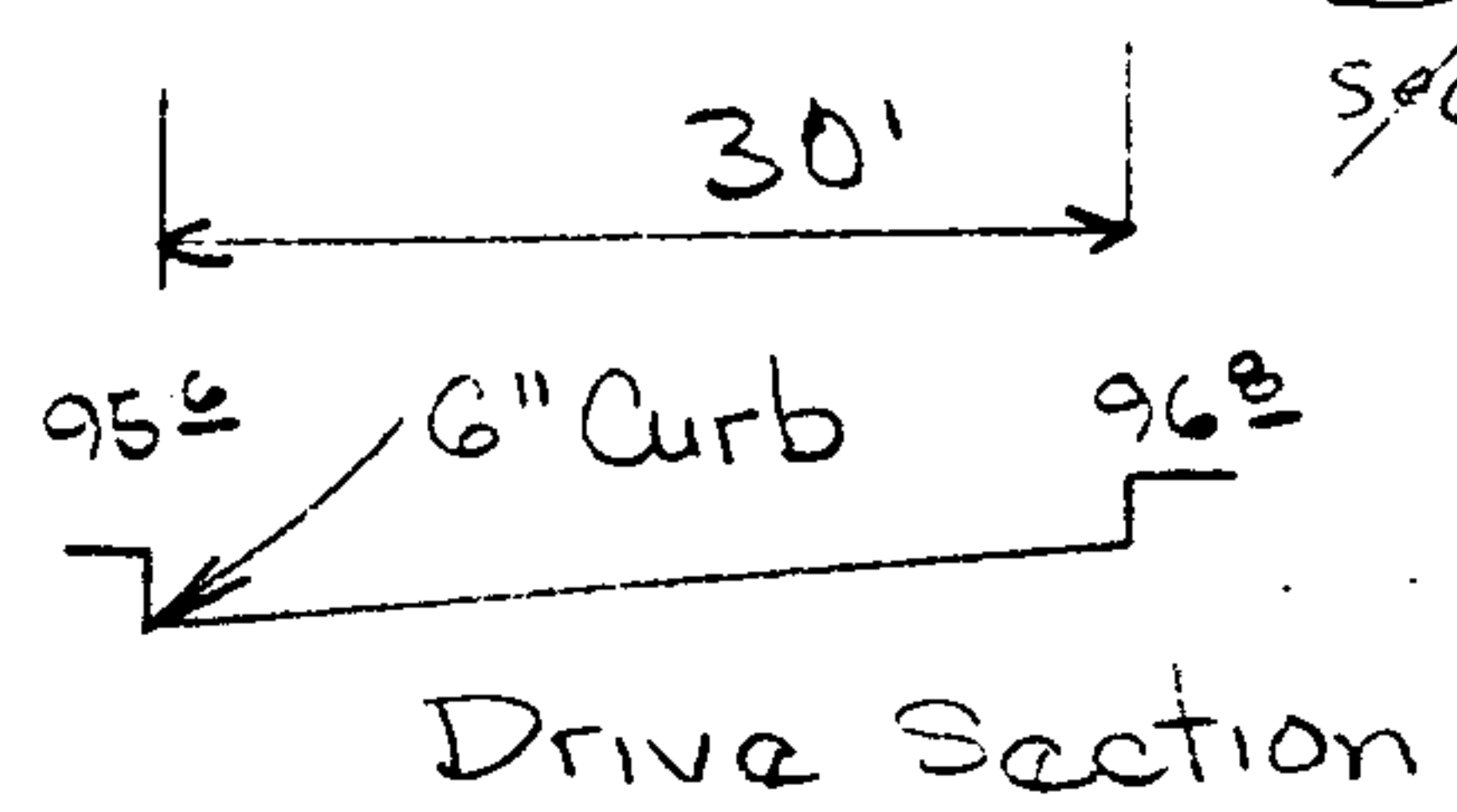
BASIN B ✓

Driveway

$Q = 15.0 \text{ cfs}$
 $S = 0.028\%$
 $n = 0.021$

$d = 0.51 \text{ ft}$
 $v = 4.63 \text{ fps}$

≈ 0.5' curb height

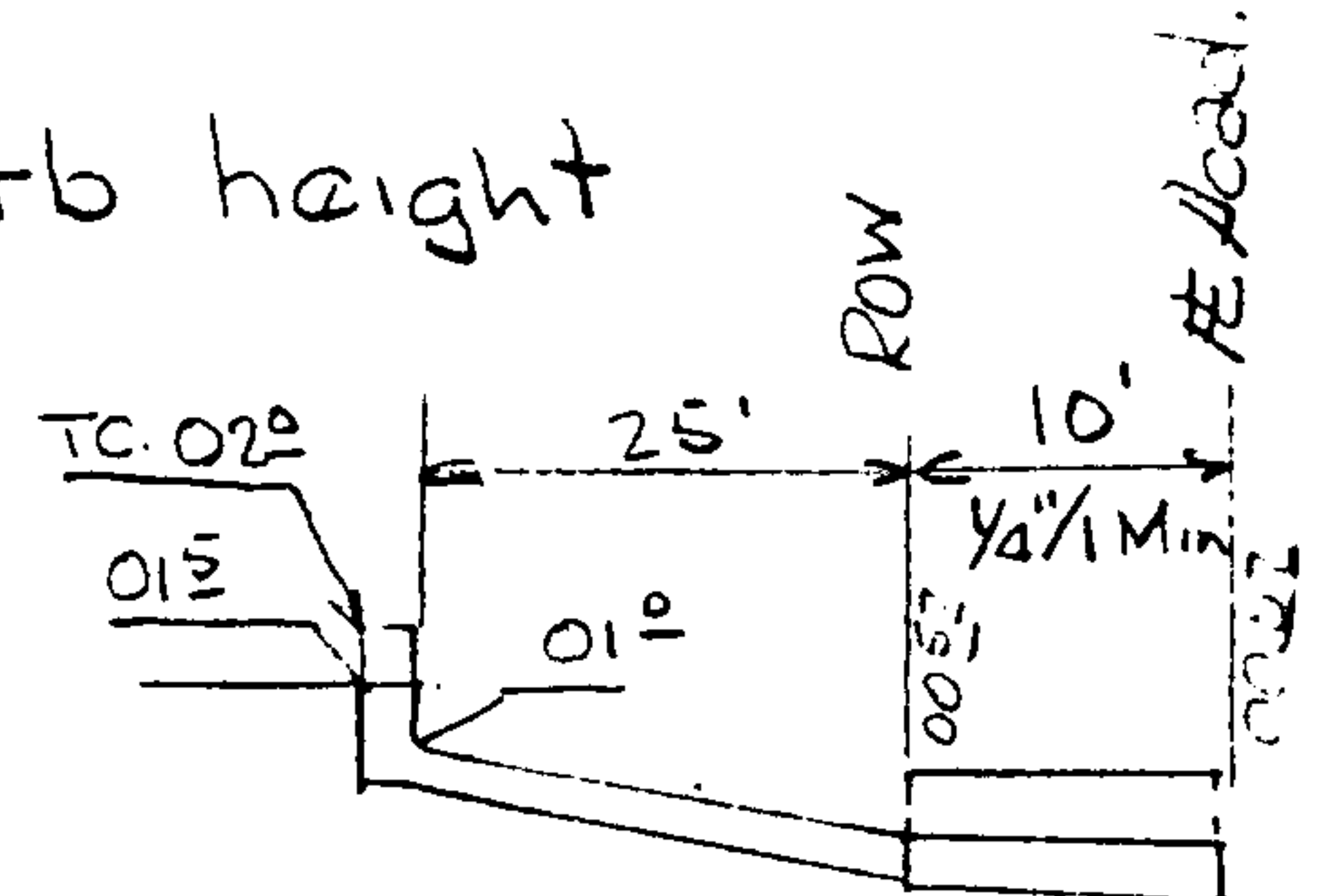


BASIN C ✓

Rundown & Sidewalk Culvert

$Q = 11.7 \text{ cfs}$

@ Rundown Entrance use $d_c \approx 0.5 \text{ ft}$



\therefore rundown width = 6'
 $d = 0.49 \text{ ft}$ $v = 2.28 \text{ fps}$

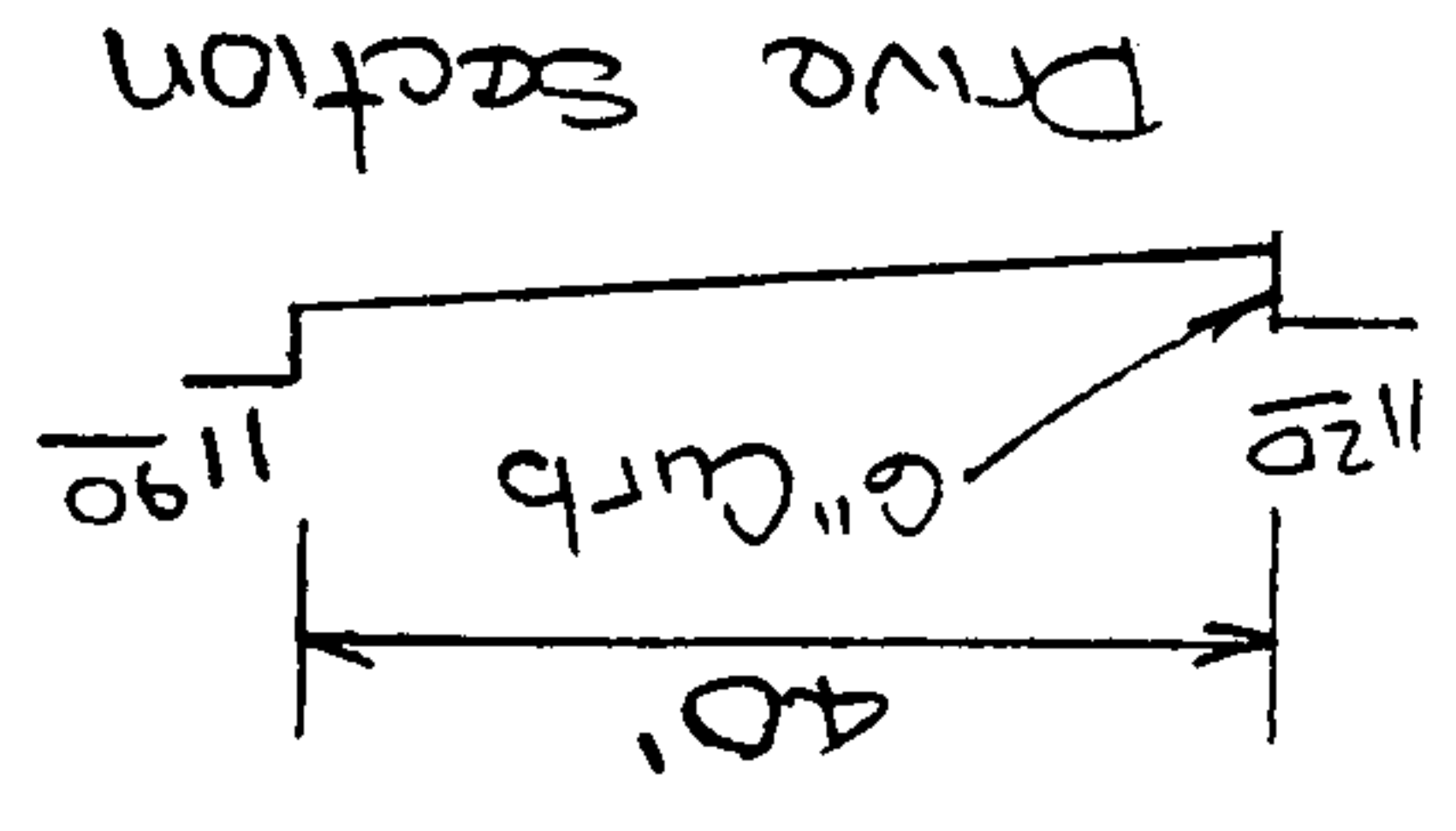
SUBJECT Office Area		PROJECT DMJM/AHA	
UNIT 10		PROJECT ACADEMY Acres	
BY: JBR	DATE: 9/85	PROJECT NO. 4668-02-01	PAGE 06 / 6

BASIN C (cont.)

the flow will accelerate down the runderon
 acceleration = $g \cos \theta$
 = 0.61 ft/sec/sec
 such that at the sidewalk culvert the velocity
 $v = 6.81 \text{ fps}$ by iteration
 and assuming 6 inch high sidewalk culvert
 the required width is
 $w = 11.7 / (6.81)(0.5) = 3.43 \text{ ft}$
 use dbl sidewalk culvert 1'9" each barrel

BASIN D

Driveway
 $Q = 9.9 \text{ cfs}$
 $s = 0.027 \frac{1}{2}$
 $n = 0.021$
 $d = 0.32 \text{ ft}$
 $v = 3.39 \text{ fps}$



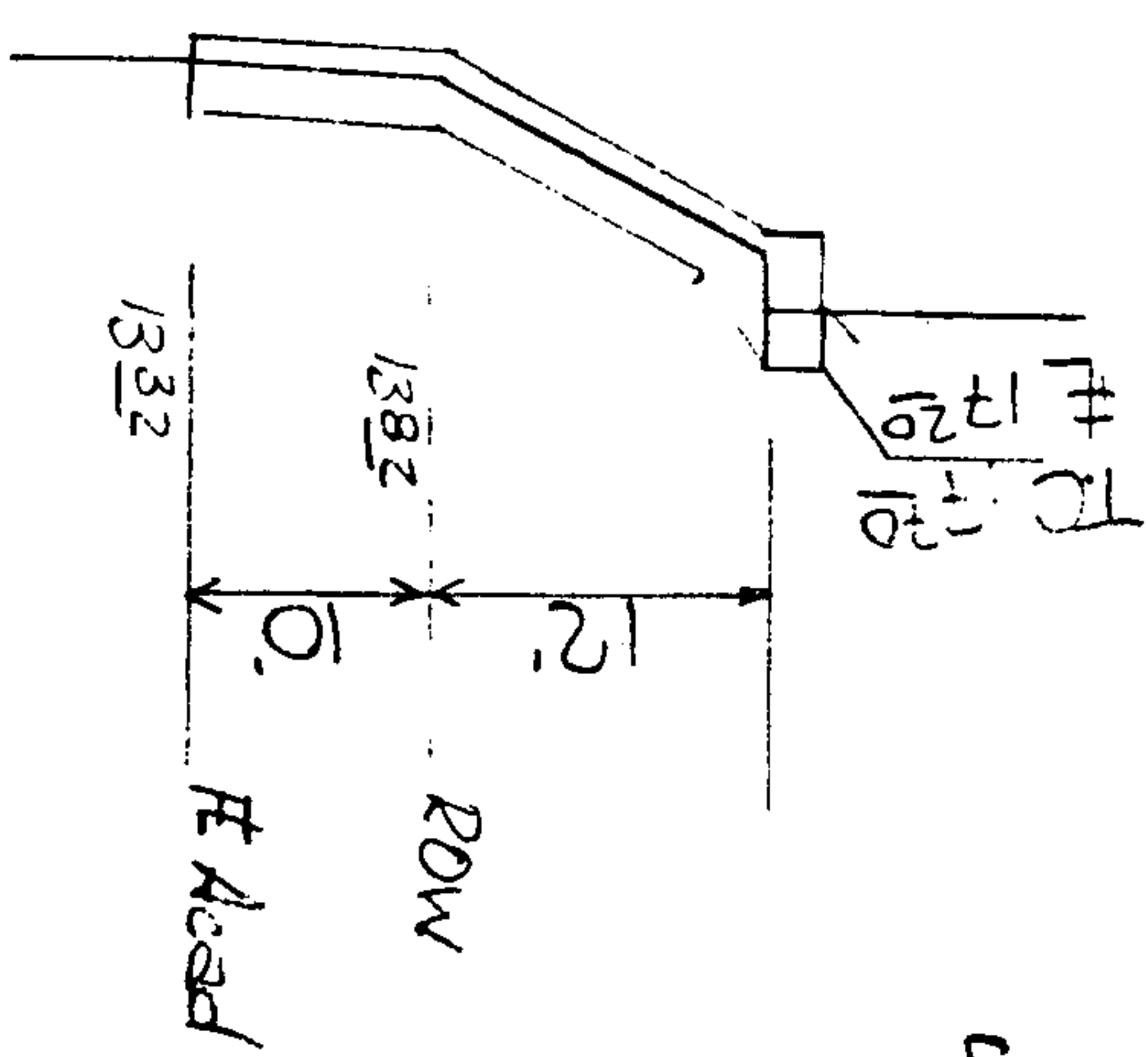
7.05' curb height

BASIN E

$v = 3.39 \text{ fps}$
 $d = 0.32 \text{ ft}$

Runderon of Sidewalk Culvert

$Q = 11.5 \text{ cfs}$
 @ Runderon Entrance use deas



$d_c = 0.49 \text{ ft}$, $v = 3.91 \text{ ft/sec}$

the flow will accelerate down the runderon
 acceleration = $g \cos \theta$
 = 8.73 ft/sec/sec
 such that at the sidewalk culvert the velocity
 $v = 14.99 \text{ fps}$ by iteration

at a section 6 inch high sidewalk culvert
 width = $11.5 / (0.5)(14.99) = 1.53$
 use 2' sidewalk = 2' sidewalk culvert.

DMJM/AHA ALBUQUERQUE	PROJECT ACADEMY ACRES UNIT 10	PROJECT NO 4668-02-01	PAGE 07
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SUBJECT Office Area			

BASIN F ✓

Rundown & Sidewalk Culvert

$Q = 7.2 \text{ cfs}$

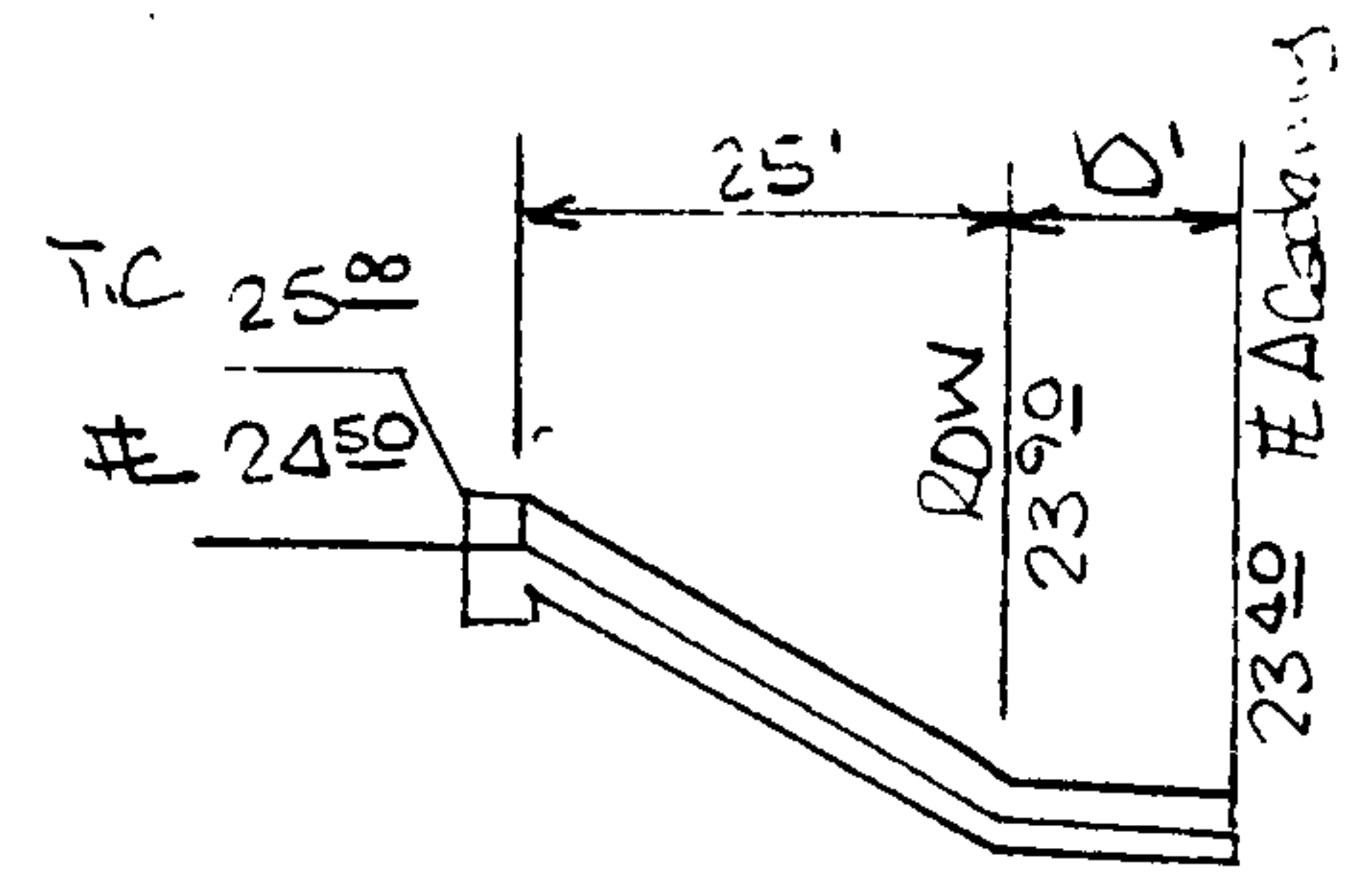
@ Rundown entrance use $d_c \approx 0.5$
 \therefore width = 5 ft.

$d_c = 0.44 \text{ ft}$, $v = 3.77 \text{ fps}$

the flow will accelerate down the rundown
 acceleration = $g \cos \theta$
 $= 0.77 \text{ ft/sec/sec}$

such that at the sidewalk culvert the velocity
 $v = 7.26 \text{ fps}$ by iteration

and assuming a 6 inch high sidewalk culvert
 $\text{width} = 7.2 / (7.26)(0.5) = 1.98 \text{ ft}$
 use single 2'0" wide sidewalk culvert



BASIN G ✓

Swale & Sidewalk Culvert.

$Q = 3.2 \text{ cfs}$

Gravel Swale w/ 10:1 sideslopes

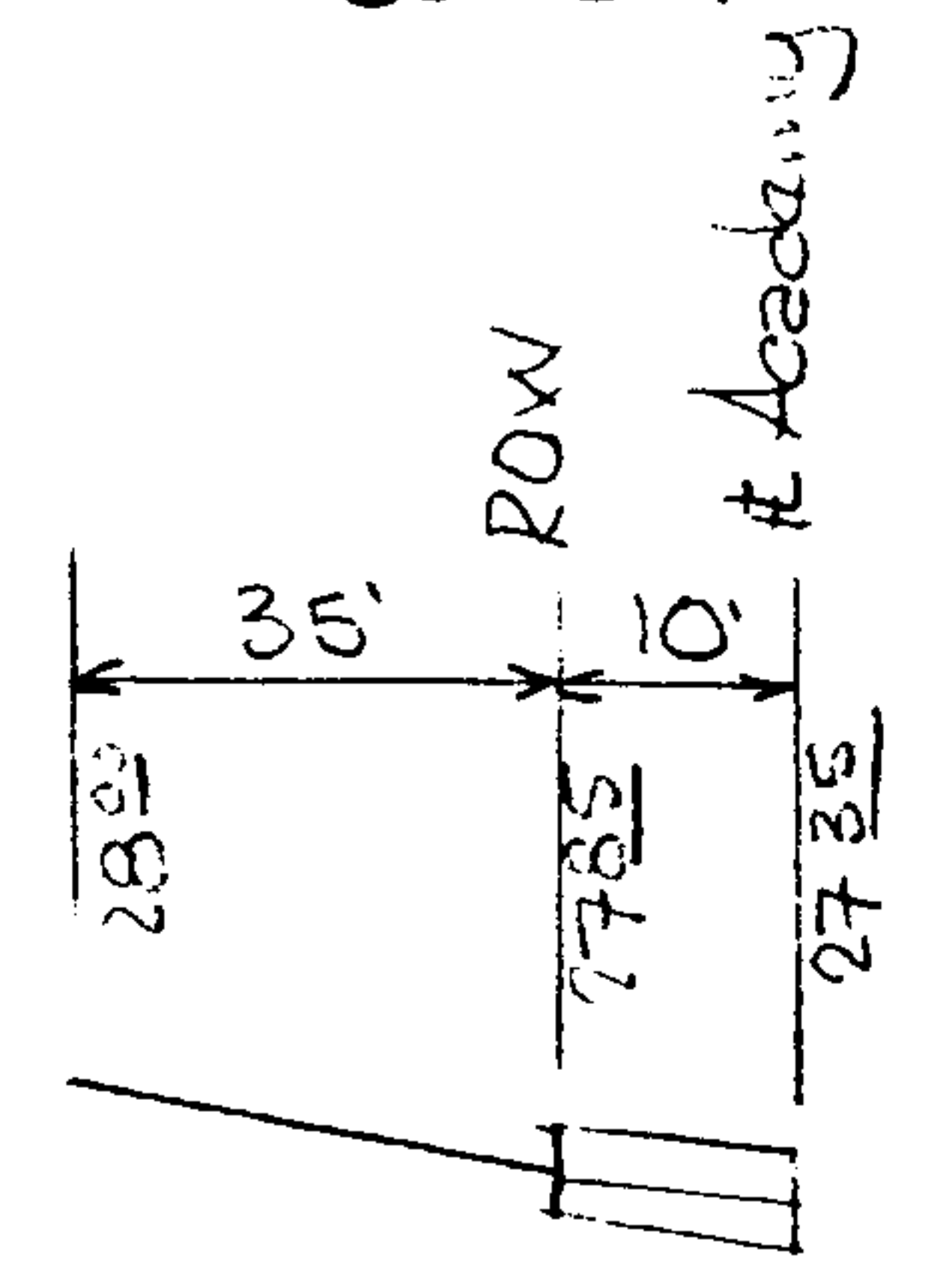
$s = 0.0042\%$

$n = 0.030$

$d = 0.5 \text{ ft}$

$v = 1.27 \text{ fps}$ non erosive

assuming a 6" high sidewalk culvert
 $\text{width} = 3.2 / (1.27)(0.50)^{1.5}$
 $= 3.48 \text{ ft}$
 use dbl 1'9" sidewalk culvert



DMJM/AHA ALBUQUERQUE	PROJECT ACADEMY ACRES Unit 10	PROJECT NO 4668-02-01	PAGE 21
		BY: JJB	DATE: 9/85
SUBJECT Residential Area			

RUNOFF SOURCE

General Data.

House area = 1250 s.f. C = 0.95
 Garage = 400 s.f. C = 0.95
 Driveway = 423 s.f. C = 1.00

walk = 8 s.f./ft C = 1.00
 parkway = 9 s.f./ft C = 0.40
 street = 33 s.f./ft C = 0.95

all remaining area shall be considered as yard with a runoff coefficient of 0.40 (0.25 for grassed area, 0.50 for bare earth and 0.70 for southwest landscape).

Basin Data

BASIN	SOURCE AREA (S.F.)						
	Roof	Drive	Walk	Prkwy	Street	Yard	Total
1	69,300	17,766	7846	8827	32366	87517	223,622
2	44,550	11,421	6327	7117	26097	77452	172,964
3	51,150	13,113	5320	5985	21945	64682	162,195

using the coefficients listed under basin data results in the following effective Areas

BASIN	SOURCE AREA (S.F.)							C
	Roof	Drive	Walk	Prkwy	Street	Yard	Total	
1	65835	17766	7846	3531	30748	35007	160733	0.72
2	42323	11421	2327	2847	24792	30981	118691	0.69
3	48592	13113	5320	2394	20848	25873	116141	0.72

RUNOFF RATES

Basin 1

the basin has a length of 80 feet of earth with a slope of 0.5% and lengths of 400, 200 and 309 feet of street at slopes of 2.8%, 3.8% and 2.5% respectively

$$t_c = 80/0.4 + 400/4.5 + 200/5.2 + 309/4.2 \quad \text{DPM 22.2 B-1 \& B-2}$$

$$= 401 \text{ sec} = 6.7 \text{ min} \quad \text{use 10 min DPM 22.2 B.1}$$

$$\text{intensity} = (6.84)(10^{-0.51})(2.3) \quad \text{DPM 22.2 D-1 \& D-2}$$

$$= 4.86 \text{ in/hr}$$

$$Q_{100} = (4.86)(160733/43560) = 17.9 \text{ cfs} \checkmark$$

$$\text{slope} = 0.025 \%$$

$$V_{100} = 3.8 \text{ ft/sec} \quad \text{DPM 22.3 D-1}$$

$$d_{100} = 0.37 \text{ ft} \quad \text{DPM 22.3 D-1}$$

$$Q_{10} = (0.657)(Q_{100}) = 11.8 \text{ cfs}$$

$$V_{10} = 3.4 \text{ fps}$$

$$d_{10} = 0.33 \text{ ft} \checkmark$$

$$d \cdot V_{10} = 1.1 < 6.5 \text{ ft}^2/\text{sec} \quad \text{DPM 22.3 E.4}$$

T intersection - check jump

$$F_1 = 1.10$$

$$\therefore d_2 = (1.1)(.37) = 0.41' < 0.87' \checkmark \quad \text{DPM 22.3 E.5 \& E-1}$$

$$\& L = (0)(.37) = 0 < 32' \checkmark \quad \text{DPM 22.3 E.5 \& E-2}$$

use manhole and

Basin 2 + 1

the basin has a length of 80 feet of earth with a slope of 0.5% and lengths of 400, 200, 309, 157, 604 \& 55 of street at slopes of 2.8%, 3.8%, 2.5%, 2.3%, 3.0% \& 0.9% respectively

RUNOFF RATES (Cont.)Basin 2+1 (cont.)

$$t_c = 401 + 157/4.1 + 604/5.0 + 55/2.6 = 581 \text{ sec} = 9.7 \text{ min}$$

USE 10 min.

intensity = 4.86 in/hr from Basin 1

$$Q_{100} = (4.86)(160,733 + 118,691)/43560 = 31.2 \text{ cfs}$$

$$\text{slope} = 0.9\%$$

$$V_{100} = 3.4 \text{ fps}$$

$$d_{100} = 0.52 \text{ ft}$$

$$Q_{10} = Q_{100} (0.657) = 20.5 \text{ cfs}$$

$$V_{10} = 3.0 \text{ fps}$$

$$d_{10} = 0.46 \text{ ft}$$

$$d \cdot V_{10} = 1.4 < 6.5 \text{ ft}^2/\text{sec}$$

all supercritical \therefore no jump

check superelevation

$$s = (3.4)^2 (16) / (32.2)(75) = 0.07 \text{ ft}$$

DPM 22.3 C.3

$$\text{max. depth} = 0.52 + 0.07 = 0.59 \text{ ft} < 0.87 \text{ ft} \checkmark$$

use standard curb

Basin 3+2+1

the basin has a length as defined in basin 2+1 plus 655 feet of street at a slope of 0.9%

$$t_c = 581 + 655/2.6 = 833 \text{ sec} = 14 \text{ min}$$

$$\text{intensity} = 6.84 (14^{-0.51}) (2.3) = 4.10 \text{ in/hr}$$

DPM 22.2 D-1 & D-2

$$Q_{100} = (4.10)(160,733 + 118,691 + 116,141)/43560$$

$$= 37.2 \text{ cfs} \checkmark$$

$$\text{slope} = 0.9\%$$

$$V_{100} = 3.6 \text{ fps}$$

use Standard Curb

$$d_{100} = 0.55 \text{ ft}$$

DMJM/AHA ALBUQUERQUE	PROJECT ACADEMY ACRES UNIT 10	PROJECT NO. 4668-02-01	PAGE RA
		BY: JJB	DATE: 9/85
SUBJECT Residential Area			

RUNOFF RATES (cont.)

Basin 3+2+1 (cont.)

$$Q_{10} = Q_{100} (0.657) = 24.4 \text{ cfs}$$

$$V_{10} = 3.1 \text{ fps}$$

$$d_{10} = 0.48 \text{ ft.}$$

$$d \cdot V_{10} = 1.5 < 6.5 \text{ ft}^2/\text{sec}$$

41/12

22.2

HYDROGRAPH COMPUTATION WORKSHEET

DATE 9/85
COMPUTED BY JJB
CHECK BY _____

PROJECT ACADEMY ACRES UNIT 10

BASIN LOCATION 3+2+1

ANALYSIS POINT # ACADEMY @ INLET

(DR. AREA) A = _____ ACRES

T_c 14 MIN

POINT RAINFALL — IN. FROM PLATE 22.2 D-1

CN = — FROM PLATES 22.2 C-2, 22.2 C-3

RUNOFF VOLUME R = — IN. FROM PLATE 22.2 C-4

COMPUTED T_p = 14 MIN. $T_p = T_c$
(Rounded to even minute)

$q_p = \frac{45.4A}{T_p} = \underline{\quad\quad}$ CFS./INCH OF RUNOFF

$(R \times q_p) = Q_{peak} = \underline{37.2}$ CFS

$t(\text{COLUMN}) = (t/T_p) \quad t = T_p(t/T_p)$

$y = \frac{Q}{Q_{peak}} \quad Q = y(Q_{peak})$

	(t/T _p)	Basin t (min.)	y	Q (cfs)	Inlet t (min)
1	0	0	0	0	7
2	.1	1	.03	1.1	8
3	.2	3	.10	3.7	10
4	.3	4	.190	7.1	11
5	.4	6	.310	11.5	13
6	.5	7	.470	17.5	14
7	.6	8	.660	24.6	15
8	.7	10	.820	30.5	17
9	.8	11	.930	34.6	18
10	.9	13	.990	36.8	20
11	1.0	14	1.00	37.2	21
12	1.1	15	.990	36.8	22
13	1.2	17	.930	34.6	24
14	1.3	18	.860	32.0	25
15	1.4	20	.780	29.0	27
16	1.5	21	.680	25.3	28
17	1.6	22	.560	20.8	29
18	1.7	24	.460	17.1	31
19	1.8	25	.390	14.5	32
20	1.9	27	.330	12.3	34
21	2.0	28	.280	10.4	35
22	2.2	31	.207	7.7	38
23	2.4	34	.147	5.5	41
24	2.6	36	.107	4.0	43
25	2.8	39	.077	2.9	46
26	3.0	42	.055	2.0	49
27	3.2	45	.040	1.5	52
28	3.4	48	.029	1.1	55
29	3.6	50	.021	0.8	57
30	3.8	53	.015	0.6	60
31	4.0	56	.011	0.4	63
32	4.5	63	.005	0.2	70
33	5.0	70	.000	0.0	77

T_c = TIME OF CONCENTRATION
14 min from R-3 of these computations

LAG TIME (for site runoff to traverse Academy to Inlet)

distance = 765 ft

slope = 2.012%

velocity = 4.6 fps from DPM 22.2 B-2

lag time = distance / velocity
= 7 min.

PLATE 22.2 F-1

HYDROGRAPH COMPUTATION WORKSHEET

DATE 9/85
 COMPUTED BY JJB
 CHECK BY _____

PROJECT ACADEMY ACRES UNIT 10

BASIN LOCATION A+B

ANALYSIS POINT # ACADEMY RD @ INLET

(DR. AREA) A = 6.5 ACRES

T_c 10 MIN

POINT RAINFALL - IN. FROM PLATE 22.2 D-1

CN = - FROM PLATES 22.2 C-2, 22.2 C-3

RUNOFF VOLUME R = - IN. FROM PLATE 22.2 C-4

COMPUTED T_p = - MIN. T_p = T_c
 (Rounded to even minute)

q_p = $\frac{45.4A}{T_p}$ = - CFS./INCH OF RUNOFF

(R x q_p) = Q_{peak} = 21.2 CFS

t (COLUMN) = (t/T_p) t = T_p(t/T_p)

y = $\frac{Q}{Q_{peak}}$ Q = y(Q_{peak})

	(t/T _p)	Basin t (min.)	y	Q (cfs)	Inlet t (min.)
1	0	0	0	0	9
2	.1	1.0	.03	.6	10.0
3	.2	2.0	.10	2.1	11.0
4	.3	3.0	.190	4.0	12.0
5	.4	4.0	.310	6.6	13.0
6	.5	5.0	.470	10.0	14.0
7	.6	6.0	.660	14.0	15.0
8	.7	7.0	.820	17.4	16.0
9	.8	8.0	.930	19.7	17.0
10	.9	9.0	.990	21.0	18.0
11	1.0	10.0	1.00	21.2	19.0
12	1.1	11.0	.990	21.0	20.0
13	1.2	12.0	.930	19.7	21.0
14	1.3	13.0	.860	18.2	22.0
15	1.4	14.0	.780	16.5	23.0
16	1.5	15.0	.680	14.4	24.0
17	1.6	16.0	.550	11.9	25.0
18	1.7	17.0	.400	8.5	26.0
19	1.8	18.0	.390	8.3	27.0
20	1.9	19.0	.330	7.0	28.0
21	2.0	20.0	.280	5.9	29.0
22	2.2	22.0	.207	4.4	31.0
23	2.4	24.0	.147	3.1	33.0
24	2.5	25.0	.107	2.3	35.0
25	2.6	26.0	.077	1.6	37.0
26	3.0	30.0	.055	1.2	39.0
27	3.2	32.0	.040	.9	41.0
28	3.4	34.0	.029	.6	43.0
29	3.5	35.0	.021	.5	45.0
30	3.8	38.0	.015	.3	47.0
31	4.0	40.0	.011	.2	49.0
32	4.5	45.0	.005	.1	51.0
33	5.0	50.0	.000	.0	59.0

T_c = Time of Concentration

= 10 min from O1 & O2 of these computations

LAG TIME (for site runoff to traverse Academy to inlet)

distance = 2073 ft

slope = 222 %

velocity = 4.0 fps from FORM 22.2B-7

lag time = distance / velocity

= 8.6 min

HYDROGRAPH COMPUTATION WORKSHEET

DATE 9/85
 COMPUTED BY JJB
 CHECK BY _____

PROJECT ACADEMY ACRES UNIT 10
 BASIN LOCATION C
 ANALYSIS POINT # ACADEMY RD @ INLET
 (DR. AREA) A = 3.3 ACRES
 T_c 10 MIN
 POINT RAINFALL - IN. FROM PLATE 22.2 D-1
 CN = - FROM PLATES 22.2 C-2, 22.2 C-3
 RUNOFF VOLUME R = - IN. FROM PLATE 22.2 C-4
 COMPUTED T_p = - MIN. T_p = T_c
 (Rounded to even minute)
 $q_p = \frac{45.4A}{T_p} = \text{--- CFS./INCH OF RUNOFF}$
 (R x q_p) = Q_{peak} = 11.7 CFS
 $t(\text{COLUMN}) = (t/T_p) \quad t = T_p(t/T_p)$
 $y = \frac{Q}{Q_{peak}} \quad Q = y(Q_{peak})$

	(t/T _p)	Basin t (min.)	y	Q (cfs)	Inlet t (min.)
1	0	0	0	0	10
2	.1	1.0	.03	.4	11.0
3	.2	2.0	.10	1.2	12.0
4	.3	3.0	.190	2.2	13.0
5	.4	4.0	.310	3.6	14.0
6	.5	5.0	.470	5.5	15.0
7	.6	6.0	.660	7.7	16.0
8	.7	7.0	.820	9.6	17.0
9	.8	8.0	.930	10.9	18.0
10	.9	9.0	.990	11.9	19.0
11	1.0	10.0	1.00	11.7	20.0
12	1.1	11.0	.990	11.9	21.0
13	1.2	12.0	.930	10.9	22.0
14	1.3	13.0	.860	10.1	23.0
15	1.4	14.0	.780	9.1	24.0
16	1.5	15.0	.680	8.0	25.0
17	1.6	16.0	.560	6.6	26.0
18	1.7	17.0	.460	5.4	27.0
19	1.8	18.0	.390	4.6	28.0
20	1.9	19.0	.330	3.9	29.0
21	2.0	20.0	.280	3.3	30.0
22	2.2	22.0	.207	2.4	32.0
23	2.4	24.0	.147	1.7	34.0
24	2.6	26.0	.107	1.3	36.0
25	2.8	28.0	.077	.9	38.0
26	3.0	30.0	.055	.6	40.0
27	3.2	32.0	.040	.5	42.0
28	3.4	34.0	.029	.3	44.0
29	3.5	36.0	.021	.3	46.0
30	3.3	39.0	.015	.2	48.0
31	4.0	40.0	.011	.1	50.0
32	4.5	45.0	.005	.1	55.0
33	5.0	50.0	.000	.0	60.0

T_c = Time of Concentration

- 10 min from page 03 of these computations

LAG TIME (for site runoff to traverse Academy to inlet)

distance = 2320 ft

slope = 2.022%

velocity = 4.0 fps from DFM 22.2B-2 PLATE 22.2 F-1

lagtime = distance / velocity

= 9.6 min

HYDROGRAPH COMPUTATION WORKSHEET

DATE 9/85
 COMPUTED BY JJB
 CHECK BY _____

PROJECT ACADEMY ACRES UNIT 10
 BASIN LOCATION D+E
 ANALYSIS POINT # ACADEMY RD @ INLET
 (DR. AREA) A = 5.8 ACRES
 T_c 10 MIN
 POINT RAINFALL - IN. FROM PLATE 22.2 D-1
 CN = - FROM PLATES 22.2 C-2, 22.2 C-3
 RUNOFF VOLUME R = - IN. FROM PLATE 22.2 C-4
 COMPUTED T_p = - MIN. $T_p = T_c$
 (Rounded to even minute)
 $q_p = \frac{45.4A}{T_p} =$ - CFS./INCH OF RUNOFF
 $(R \times q_p) = Q_{peak} =$ 21.4 CFS
 t (COLUMN) = (t/T_p) $t = T_p(t/T_p)$
 $y = \frac{Q}{Q_{peak}}$ $Q = y(Q_{peak})$

	(t/T_p)	Basin t (min.)	y	Q (cfs)	Inlet t (min.)
1	0	0	0	0	12
2	.1	1.0	.03	.6	13.0
3	.2	2.0	.10	2.1	14.0
4	.3	3.0	.190	4.1	15.0
5	.4	4.0	.310	6.6	16.0
6	.5	5.0	.470	10.1	17.0
7	.6	6.0	.660	14.1	18.0
8	.7	7.0	.820	17.6	19.0
9	.8	8.0	.930	20.0	20.0
10	.9	9.0	.990	21.2	21.0
11	1.0	10.0	1.00	21.4	22.0
12	1.1	11.0	.990	21.2	23.0
13	1.2	12.0	.930	20.0	24.0
14	1.3	13.0	.860	18.4	25.0
15	1.4	14.0	.780	16.7	26.0
16	1.5	15.0	.680	14.6	27.0
17	1.6	16.0	.560	12.0	28.0
18	1.7	17.0	.460	9.8	29.0
19	1.8	18.0	.390	8.4	30.0
20	1.9	19.0	.330	7.1	31.0
21	2.0	20.0	.280	6.0	32.0
22	2.2	22.0	.207	4.4	34.0
23	2.4	24.0	.147	3.2	36.0
24	2.6	26.0	.107	2.2	38.0
25	2.8	28.0	.077	1.7	40.0
26	3.0	30.0	.055	1.2	42.0
27	3.2	32.0	.040	.9	44.0
28	3.4	34.0	.029	.6	46.0
29	3.6	36.0	.021	.5	48.0
30	3.8	38.0	.015	.3	50.0
31	4.0	40.0	.011	.2	52.0
32	4.5	45.0	.005	.1	57.0
33	5.0	50.0	.000	.0	62.0

T_c = Time of Concentration

- 10 min from page 03 of these computations

LAG TIME (for site runoff to traverse Academy to inlet)

distance = 2790 ft

slope = 2.022%

velocity = 4.0 fps from TRM 22.2 B-7 PLATE 22.2 F-1

lag time = distance / velocity

= 11.6 min.

HYDROGRAPH COMPUTATION WORKSHEET

DATE 9/85
 COMPUTED BY JJB
 CHECK BY _____

PROJECT ACADEMY ACRES UNIT 10
 BASIN LOCATION F + G
 ANALYSIS POINT # ACADEMY RD @ INLET
 (DR. AREA) A = 3.1 ACRES
 T_c 10 MIN
 POINT RAINFALL - IN. FROM PLATE 22.2 D-1
 CN = - FROM PLATES 22.2 C-2, 22.2 C-3
 RUNOFF VOLUME R = - IN. FROM PLATE 22.2 C-4
 COMPUTED T_p = - MIN. $T_p = T_c$
 (Rounded to even minute)
 $q_p = \frac{45.4A}{T_p} =$ - CFS./INCH OF RUNOFF
 $(R \times q_p) = Q_{peak} =$ 10.4 CFS
 $t(\text{COLUMN}) = (t/T_p) \quad t = T_p(t/T_p)$
 $y = \frac{Q}{Q_{peak}} \quad Q = y(Q_{peak})$

	(t/T _p)	Basin t (min.)	y	Q (cfs)	Inlet t (min.)
1	0	0	0	0	15
2	.1	1.0	.03	.3	16.0
3	.2	2.0	.10	1.0	17.0
4	.3	3.0	.190	2.0	18.0
5	.4	4.0	.310	3.2	19.0
6	.5	5.0	.470	4.9	20.0
7	.6	6.0	.660	6.9	21.0
8	.7	7.0	.820	8.5	22.0
9	.8	8.0	.930	9.7	23.0
10	.9	9.0	.990	10.3	24.0
11	1.0	10.0	1.00	10.4	25.0
12	1.1	11.0	.990	10.3	26.0
13	1.2	12.0	.930	9.7	27.0
14	1.3	13.0	.860	8.9	28.0
15	1.4	14.0	.780	8.1	29.0
16	1.5	15.0	.680	7.0	30.0
17	1.6	16.0	.560	5.8	31.0
18	1.7	17.0	.430	4.8	32.0
19	1.8	18.0	.390	4.1	33.0
20	1.9	19.0	.330	3.4	34.0
21	2.0	20.0	.280	2.9	35.0
22	2.2	22.0	.207	2.2	37.0
23	2.4	24.0	.147	1.5	39.0
24	2.6	26.0	.107	1.1	41.0
25	2.8	28.0	.077	.8	43.0
26	3.0	30.0	.055	.6	45.0
27	3.2	32.0	.040	.4	47.0
28	3.4	34.0	.029	.3	49.0
29	3.5	36.0	.021	.2	51.0
30	3.8	38.0	.015	.2	53.0
31	4.0	40.0	.011	.1	55.0
32	4.5	45.0	.005	.1	60.0
33	5.0	50.0	.000	.0	65.0

T_c = Time of Concentration

- 10 min from page 04 of these computations

LAG TIME (for site runoff to traverse Academy to inlet)

distance = 3480 ft

slope = 2.022%

velocity = 4.0 fps From DPM 22.2B-7. PLATE 22.2 F-1

lagtime = distance / velocity

= 14.5 min.

HYDROGRAPH COMPUTATION WORKSHEET

DATE 9/85
 COMPUTED BY JJB
 CHECK BY _____

PROJECT ACADEMY ACRES UNIT 10
 BASIN LOCATION EXISTING ONSITE
 ANALYSIS POINT # ACADEMY RD @ INLET
 (DR. AREA) A = 22.1 ACRES
 T_c 20 MIN
 POINT RAINFALL 2.3 IN. FROM PLATE 22.2 D-1
 CN = 70 FROM PLATES 22.2 C-2, 22.2 C-3
 RUNOFF VOLUME R = 0.4 IN. FROM PLATE 22.2 C-4
 COMPUTED T_p = 20 MIN. $T_p = T_c$
 (Rounded to even minute)
 $q_p = \frac{45.4A}{T_p} = \frac{50.2}{20}$ CFS./INCH OF RUNOFF
 $(R \times q_p) = Q_{peak} = \frac{20.1}{1}$ CFS
 $t(\text{COLUMN}) = (t/T_p) \quad t = T_p(t/T_p)$
 $y = \frac{Q}{Q_{peak}} \quad Q = y(Q_{peak})$

	(t/T _p)	Basin t (min.)	y	Q (cfs)	Inlet t (min.)
1	0	0	0	0	9
2	.1	2	.03	0.6	11
3	.2	4	.10	2.0	13
4	.3	6	.190	3.8	15
5	.4	8	.310	6.2	17
6	.5	10	.470	9.4	19
7	.6	12	.660	13.3	21
8	.7	14	.820	16.5	23
9	.8	16	.930	18.7	25
10	.9	18	.990	19.9	27
11	1.0	20	1.00	20.1	29
12	1.1	22	.990	19.9	31
13	1.2	24	.930	18.7	33
14	1.3	26	.860	17.2	35
15	1.4	28	.780	15.7	37
16	1.5	30	.680	13.7	39
17	1.6	32	.560	11.3	41
18	1.7	34	.460	9.2	43
19	1.8	36	.390	7.8	45
20	1.9	38	.330	6.6	47
21	2.0	40	.280	5.6	49
22	2.2	44	.207	4.2	53
23	2.4	48	.147	3.0	57
24	2.6	52	.107	2.2	61
25	2.8	56	.077	1.5	65
26	3.0	60	.055	1.1	69
27	3.2	64	.040	0.8	73
28	3.4	68	.029	0.6	77
29	3.6	72	.021	0.4	81
30	3.8	76	.015	0.3	85
31	4.0	80	.011	0.2	89
32	4.5	90	.005	0.1	99
33	5.0	100	.000	0	109

T_c = Time of Concentration

= 20 min from DPM 22.2 B-1

distance = 1300 ft, slope = 0.029 %, velocity = 1.1 fps

LAG TIME (for site runoff to traverse Academy to inlet)

distance = 2165 ft

slope = 0.022 %

velocity = 4.0 fps from DPM 22.2 B-2 PLATE 22.2 F-1

lagtime = distance / velocity

= 9 min.

DMJM/AHA

PROJECT

ACADEMY ACRES

PROJECT NO.

4668-02-01

PAGE

A7/18

ALBUQUERQUE

UNIT 10

BY:

JB

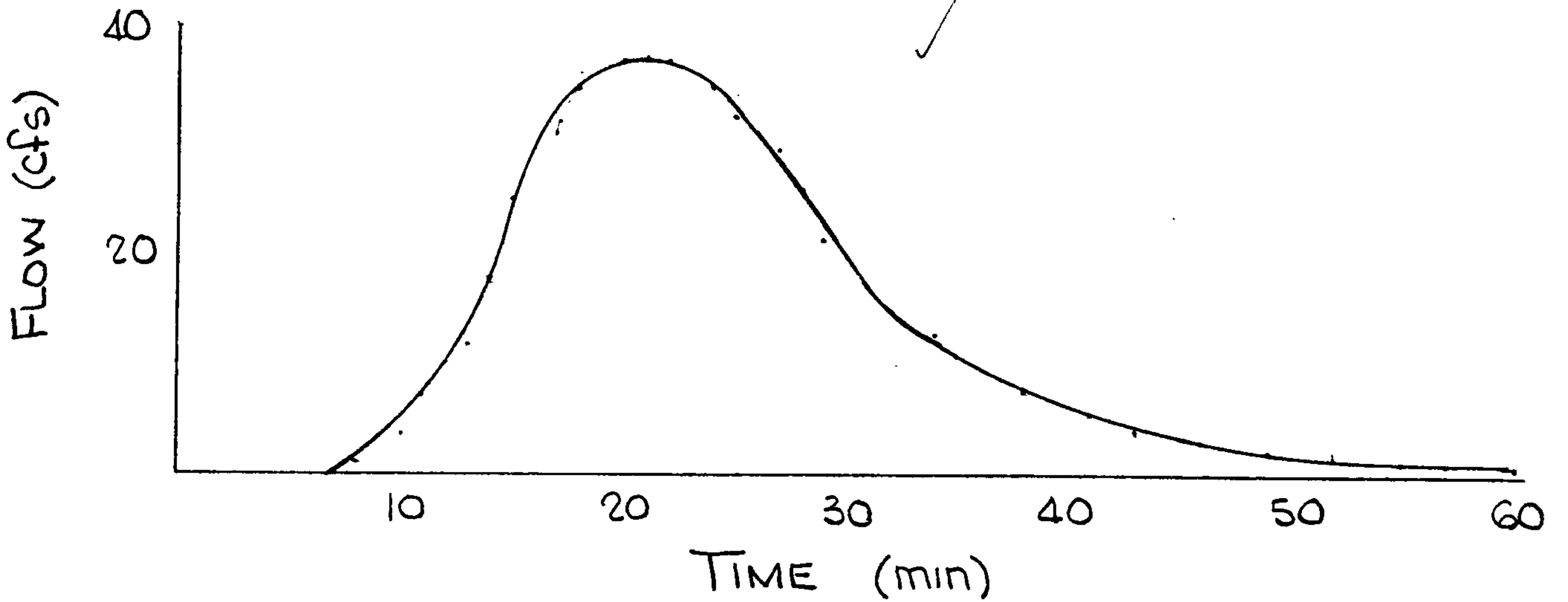
DATE:

9/85

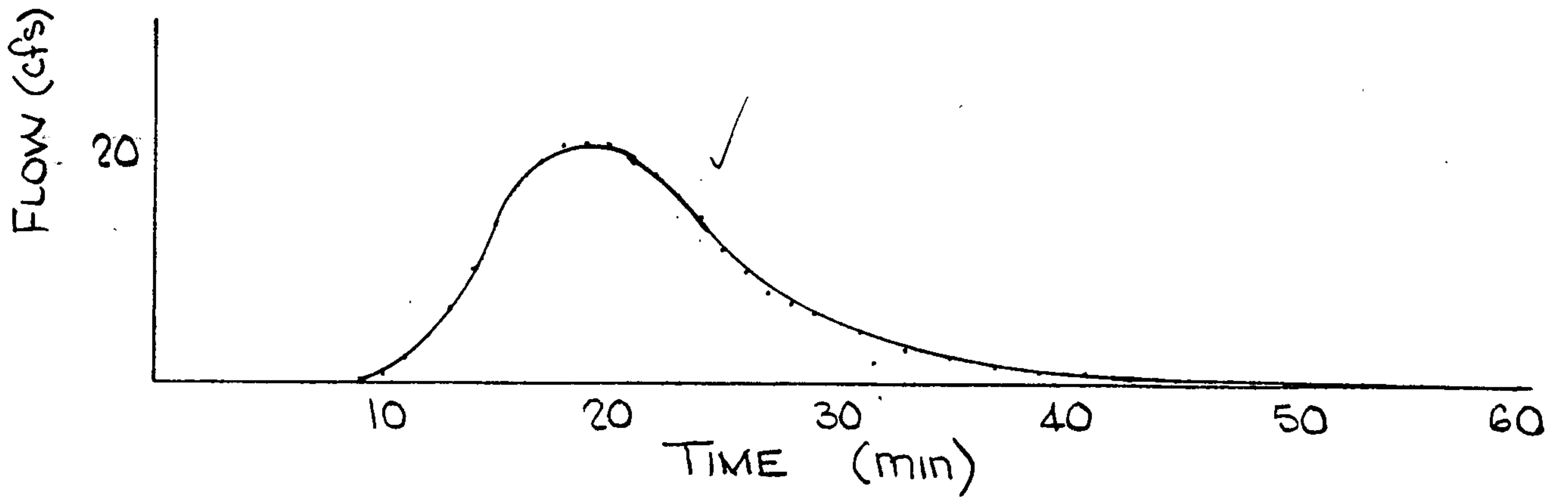
SUBJECT

Academy Road

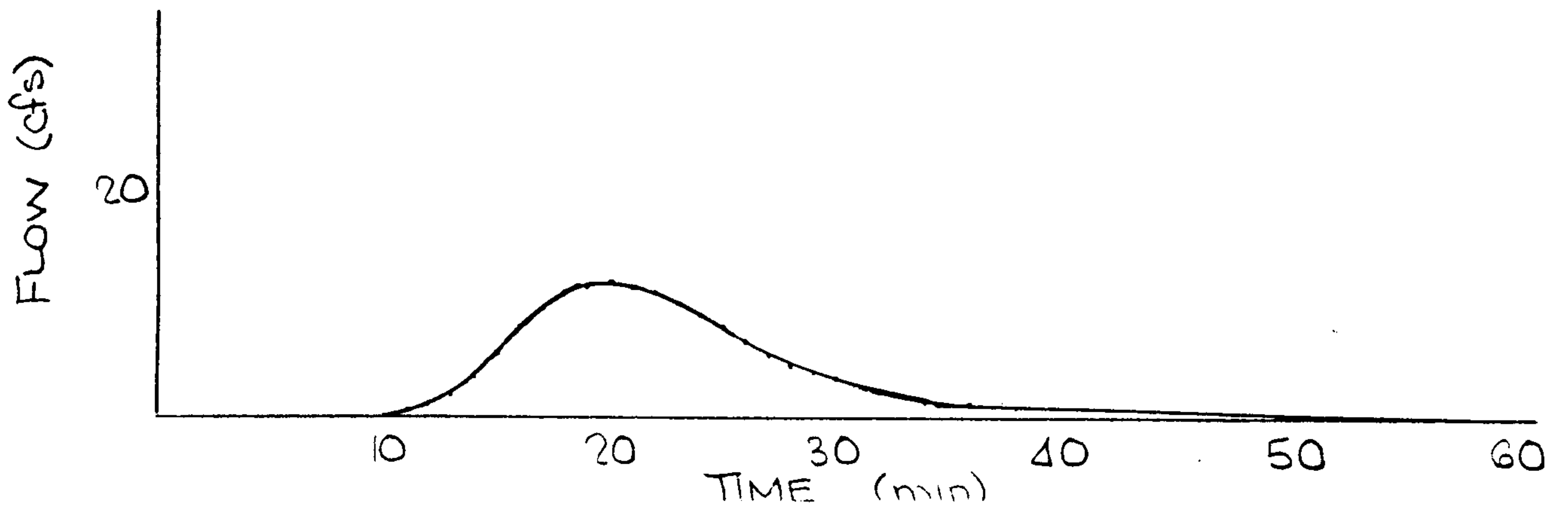
HYDROGRAPH 3+2+1 @ INLET



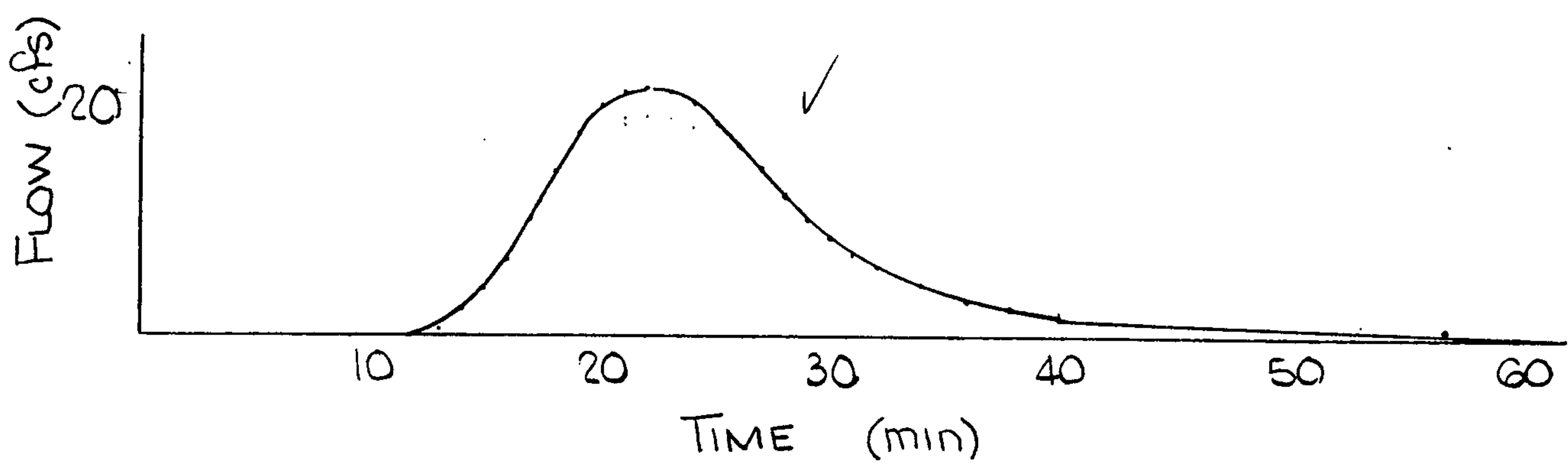
HYDROGRAPH A+B @ INLET



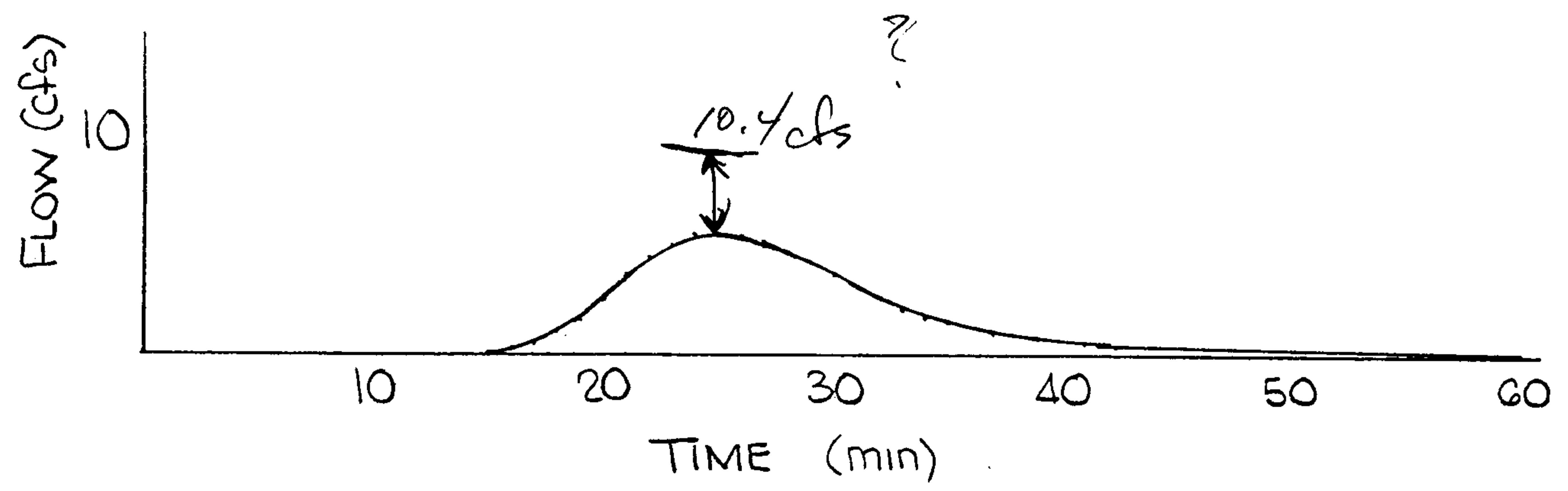
HYDROGRAPH C @ INLET



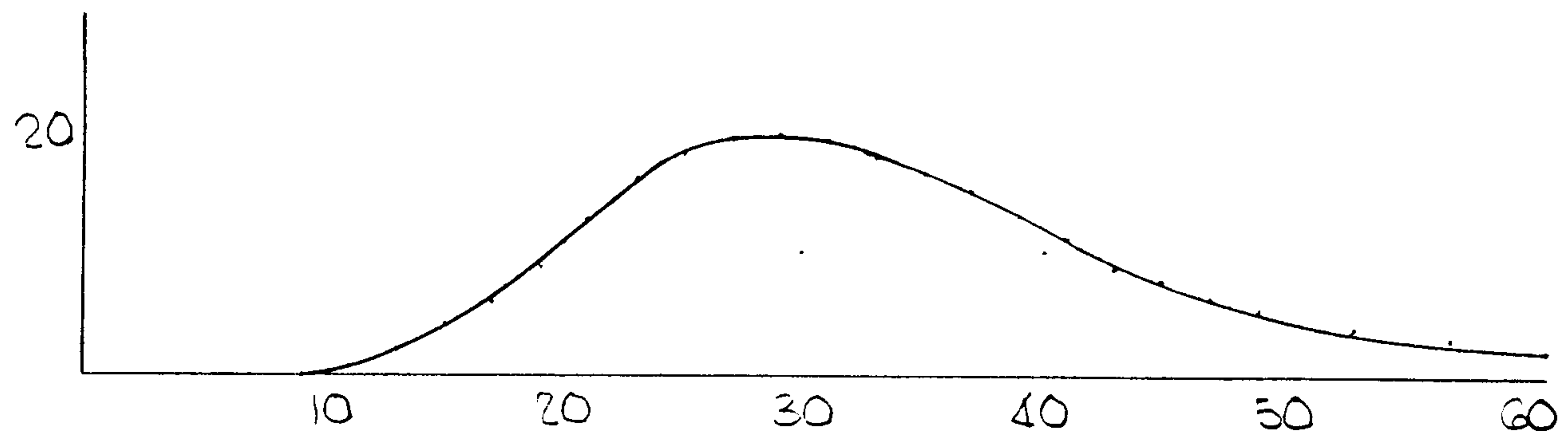
HYDROGRAPH D+E @ INLET



HYDROGRAPH F+G @ INLET



HYDROGRAPH EXISTING ONSITE



DMJM/AHA

ALBUQUERQUE

PROJECT

ACADEMY ACRES
UNIT 10

PROJECT NO.

4668-02-01

PAGE

A9/
20

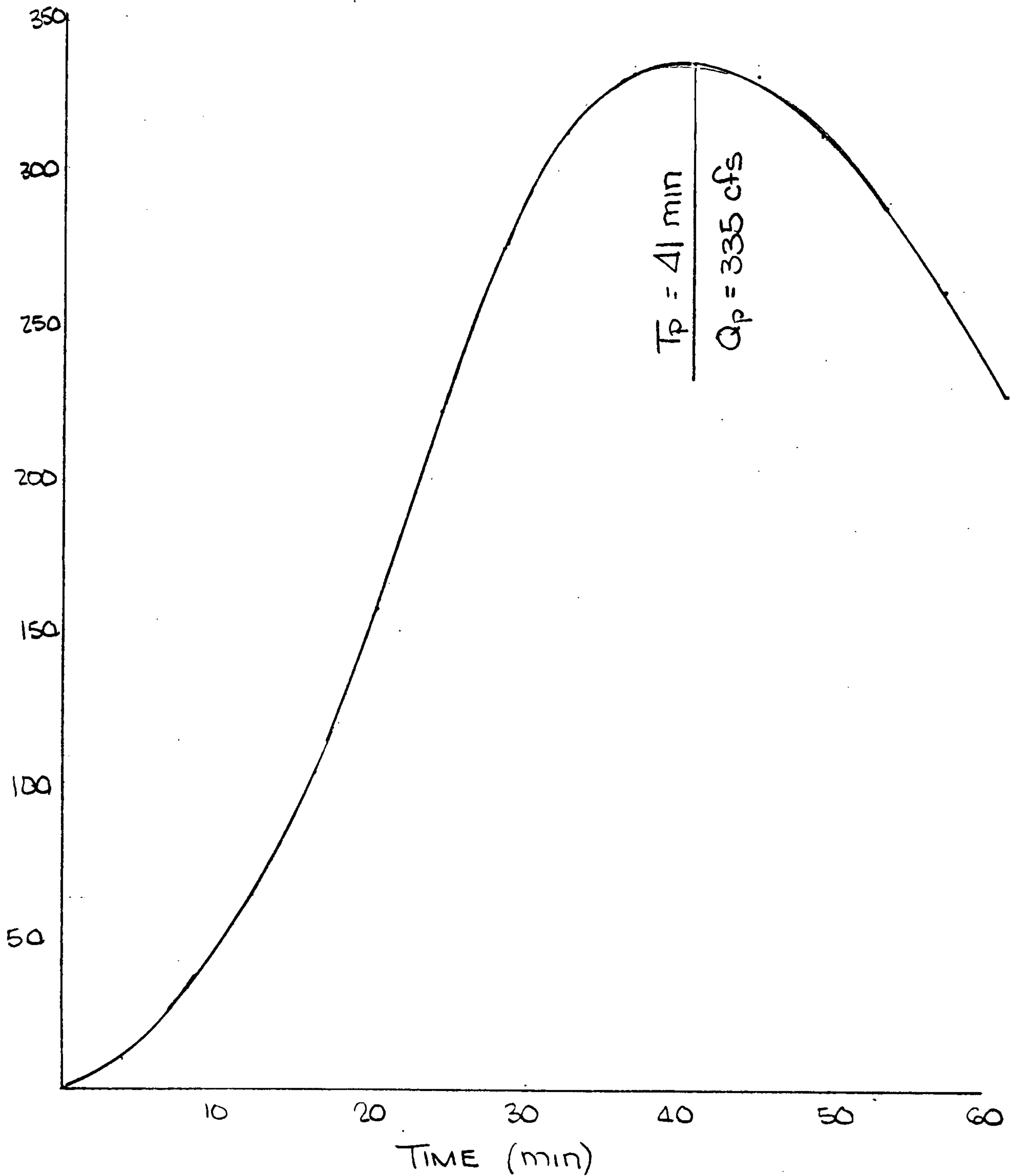
BY:
JJB

DATE:
9/85

SUBJECT

Academy Acres

HYDROGRAPH @ INLET - EXISTING *



* Data Prepared by Espey, Huston & Assoc., Inc
Mar 2, 1984. Approved by City of Albuquerque
Mar. 13, 1984

DMJM/AHA

PROJECT

ACADEMY ACRES

PROJECT NO.

4668-02-01

PAGE

A10/

ALBUQUERQUE

UNIT 10

BY:

JB

DATE:

9/85

/21

SUBJECT

Academy Road

HYDROGRAPH @ INLET - EXISTING

Time (min)	Basin Flows (cfs)		
	Offsite*	Onsite	TOTAL
2	5	0	5
4	10	0	10
6	20	0	20
8	32	0	32
10	46	0	46
12	62	1	63
14	78	3	81
16	98	5	103
18	123	8	131
20	152	11	163
22	182	14	196
24	212	18	230
26	242	19	261
28	267	20	287
30	290	20	310
32	308	19	327
34	320	18	338
36	328	16	344
38	333	14	347
40	335	12	347
42	335	10	345
44	331	9	340
46	326	7	333
48	319	6	325
50	309	5	314

* Data prepared by Espey, Huston & Assoc., Inc. Mar. 2, 1984. Approved by City of Albuquerque Mar. 13, 1984.

DMJM/AHA

PROJECT

ACADEMY ACRES

PROJECT NO.

4668-02-01

PAGE

ALBUQUERQUE

UNIT 10

BY:

JB

DATE:

9/85

All

/22

SUBJECT

Academy Road

HYDROGRAPH @ INLET - PROPOSED

TIME (min)	BASIN FLOWS (cfs)						Total.
	Offsite*	3+2+1	A+B	C	D+E	F+G	
2	5	0	0	0	0	0	5
4	10	0	0	0	0	0	10
6	20	0	0	0	0	0	20
8	32	2	0	0	0	0	34
10	46	5	1	0	0	0	52
12	62	10	4	1	0	0	77
14	78	17	10	4	2	0	111
16	98	29	17	8	7	0	159
18	123	35	21	11	14	2	206
20	152	37	21	12	20	5	247
22	182	37	18	11	21	8	277
24	212	35	14	9	20	10	300
26	242	31	10	7	17	10	317
28	267	25	7	5	12	9	325
30	290	20	5	4	9	7	335
32	308	15	4	3	6	5	341
34	320	12	3	2	4	4	345
36	328	10	2	2	3	3	348
38	333	8	2	1	2	2	348
40	335	6	1	1	2	2	347
42	335	5	1	1	1	1	344
44	331	4	1	1	1	1	339
46	326	3	1	0	1	1	332
48	319	2	0	0	1	1	323
50	309	2	0	0	0	0	311

* Data prepared by Espey, Huston & Assoc., Inc
 Mar. 2, 1984. Approved by City of Albuquerque
 Mar. 13, 1984.

DMJM/AHA

ALBUQUERQUE

PROJECT

ACADEMY ACRES

UNIT 10

PROJECT NO.

4668-02-01

PAGE

A12/

23

BY:

JJB

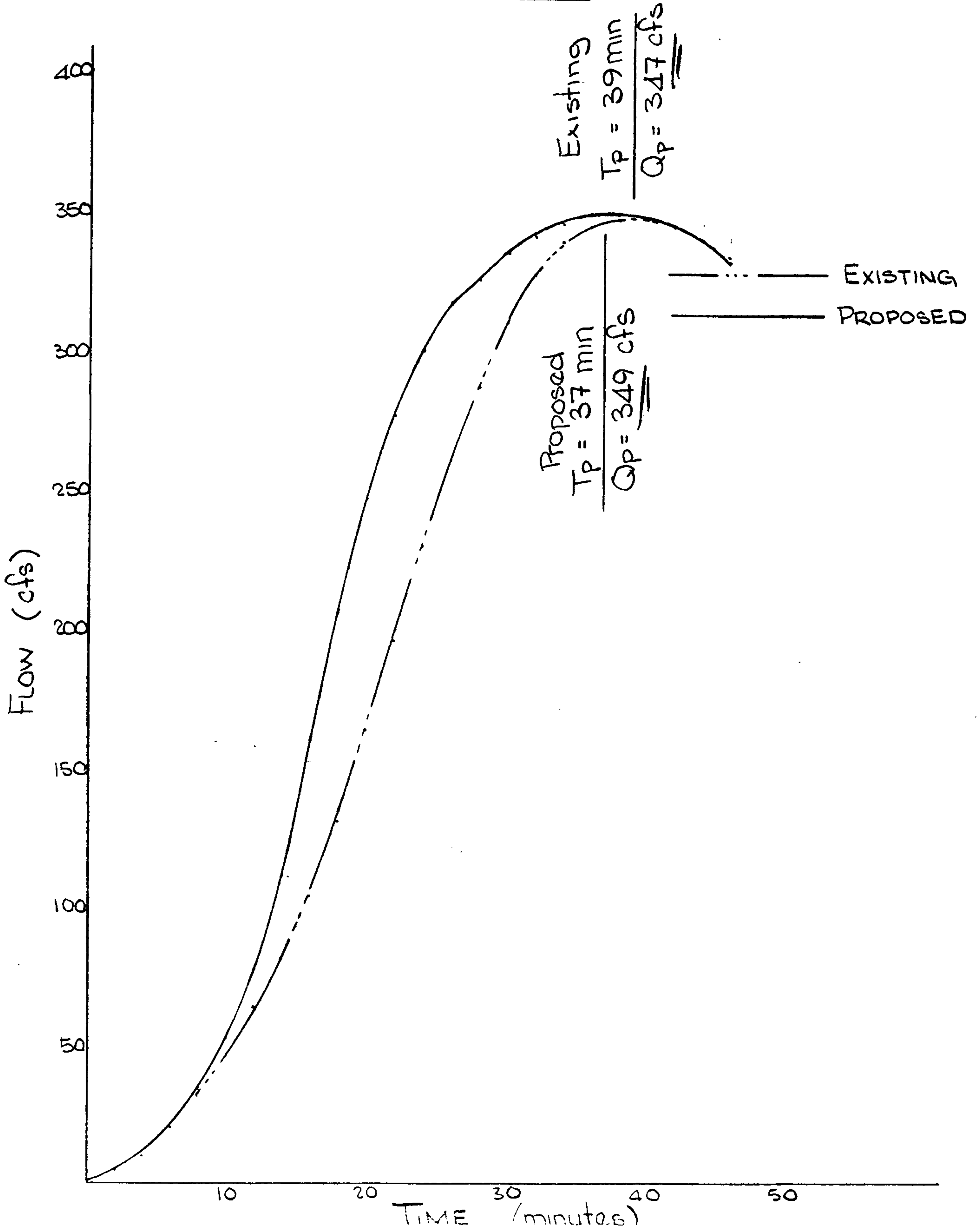
DATE:

9/85

SUBJECT

Academy Road

HYDROGRAPH @ INLET - DEVELOPED



FILE COPY



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

KEN SCHULTZ MAYOR **CLARENCE V. LITHGOW** CHIEF ADMINISTRATIVE OFFICER **DAN WEAKS** DEPUTY CAO PUBLIC SERVICES **FRED E. MONDRAGON** DEPUTY CAO DEVELOPMENT & ENTERPRISE SERVICES

April 21, 1989

Jeff Mortensen, P.E.
Jeff Mortensen & Associates, Inc.
811 Dallas, NE
Albuquerque, New Mexico 87110

RE: DRAINAGE PLAN FOR BUILDING #6755 @ ACADEMY OFFICE PARK
(E-18/D17) ENGINEER'S STAMP DATED APRIL 13, 1989

Dear Mr. Mortensen:

Based on the information provided on your submittal of April 14, 1989, the above referenced plan is approved for Building Permit.

Please attach a copy of this plan to the construction sets prior to sign-off by Hydrology.

If I can be of further assistance, please feel free to call me at 768-2650.

Cordially,

Bernie J. Montoya
Bernie J. Montoya, C.E.
Engineering Assistant

BJM/bsj
(WP+352)



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

April 11, 1989

Jeff Mortensen, P.E.
Jeff Mortensen & Associates, Inc.
811 Dallas, NE
Albuquerque, New Mexico 87110

RE: DRAINAGE PLAN FOR BUILDING #6747 @ ACADEMY OFFICE PARK
(E-18/D17) ENGINEER'S STAMP DATED MARCH 27, 1989


Dear Mr. Mortensen:

Based on the information provided on your submittal of March 28, 1989,
the above referenced plan is approved for Building Permit.

Please attach a copy of this plan to the construction sets prior to
sign-off by Hydrology.

If I can be of further assistance, please feel free to call me at
768-2650.

Cordially,


Bernie J. Montoya, C.E.
Engineering Assistant

BJM/bsj
(WP+352)

FILE COPY



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

April 11, 1989

Jeff Mortensen, P.E.
Jeff Mortensen & Associates, Inc.
811 Dallas, NE
Albuquerque, New Mexico 87110

RE: DRAINAGE PLAN FOR BUILDING #6747 @ ACADEMY OFFICE PARK
(E-18/D17) ENGINEER'S STAMP DATED MARCH 27, 1989


Dear Mr. Mortensen:

Based on the information provided on your submittal of March 28, 1989,
the above referenced plan is approved for Building Permit.

Please attach a copy of this plan to the construction sets prior to
sign-off by Hydrology.

If I can be of further assistance, please feel free to call me at
768-2650.

Cordially,


Bernie J. Montoya, C.E.
Engineering Assistant

BJM/bsj
(WP+352)

FILE COPY

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103



KEN SCHULTZ
MAYOR

April 3, 1989

Jeff Mortensen, P.E.
Jeff Mortensen & Associates, Inc.
811 Dallas, NE
Albuquerque, New Mexico 87110

RE: DRAINAGE PLAN FOR BUILDING #6757 @ ACADEMY OFFICE PARK
(E-18/D17) ENGINEER'S STAMP DATED MARCH 24, 1989

Dear Mr. Mortensen:

Based on the information provided on your submittal of March 27, 1989,
the above referenced plan is approved for Building Permit.

Please attach a copy of this plan to the construction sets prior to
sign-off by Hydrology.

If I can be of further assistance, please feel free to call me at
768-2650.

Cordially,

Bernie J. Montoya
Bernie J. Montoya, C.E.
Engineering Assistant

BJM/bsj
(WP+352)

Greiner

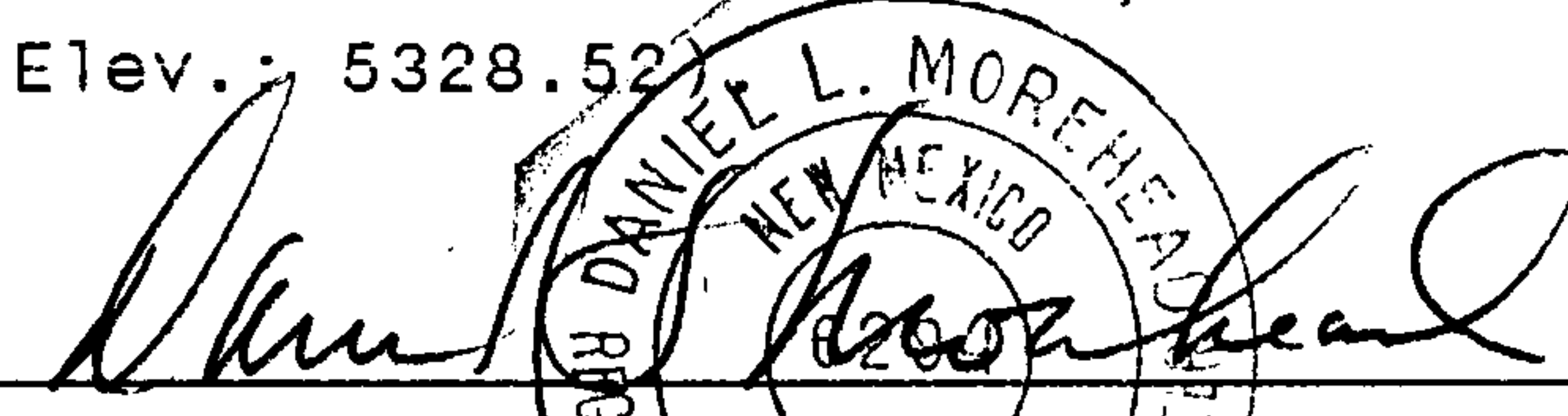
Greiner, Inc.
5971 Jefferson Blvd., N.E.
Suite 101
Albuquerque, New Mexico 87109
(505) 345-3999
FAX: (505) 345-8393

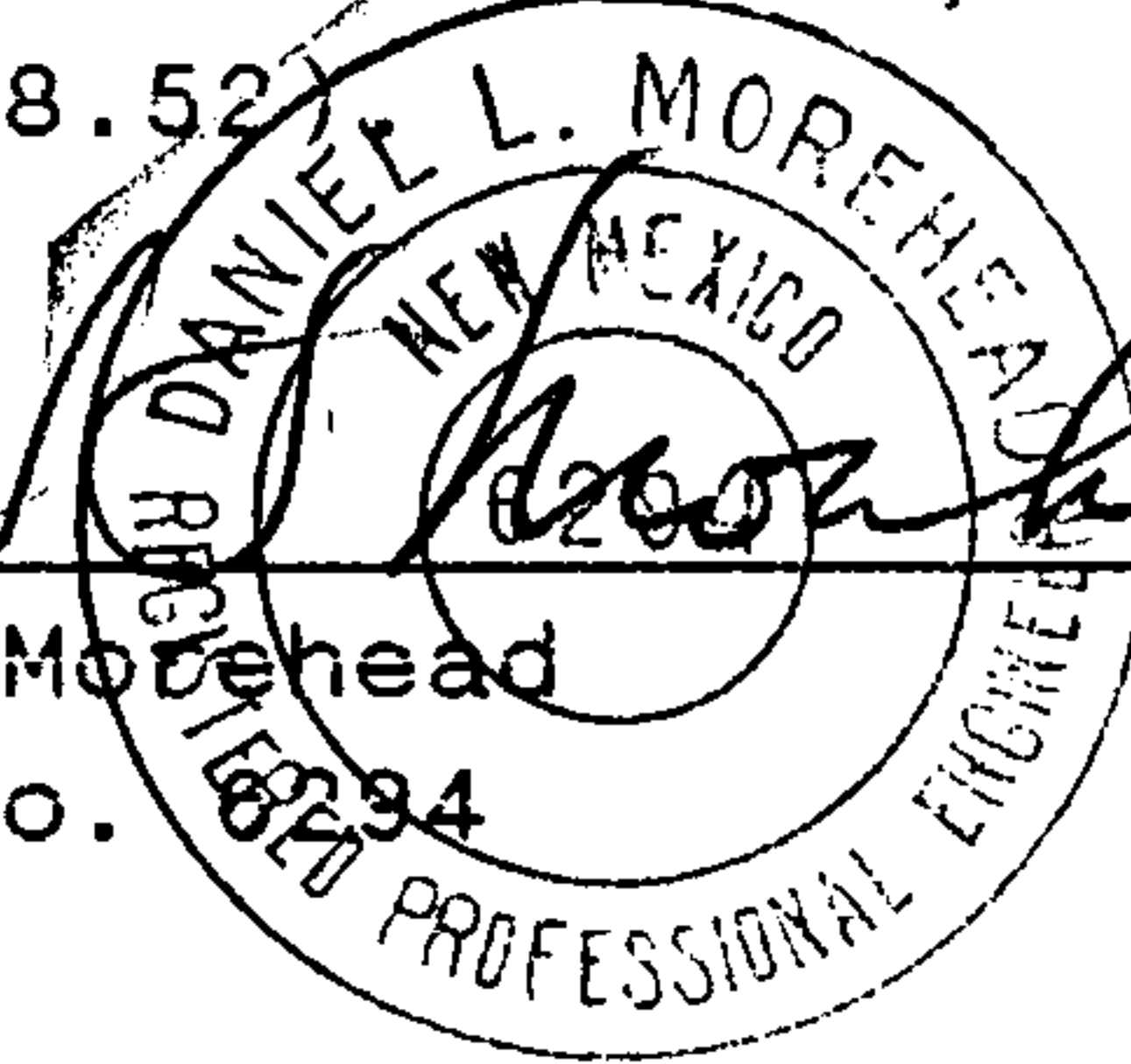
E 18 p 17

RECEIVED
OCT 23 1989
HYDROLOGY SECTION

TO WHOM IT MAY CONCERN:

I, Daniel L. Morehead, New Mexico Professional Engineer No. 6294, do hereby certify that the finish floor elevation of 6757 Academy Rd., N.E. is 5324.70 based upon a level loop performed on October 4, 1989 from ACSM Benchmark "1-F19A" (Elev.: 5328.52)


Daniel L. Morehead
N.M.P.E. No. 6294



10-17-89

Date

E 1181017

D69
1837

011189

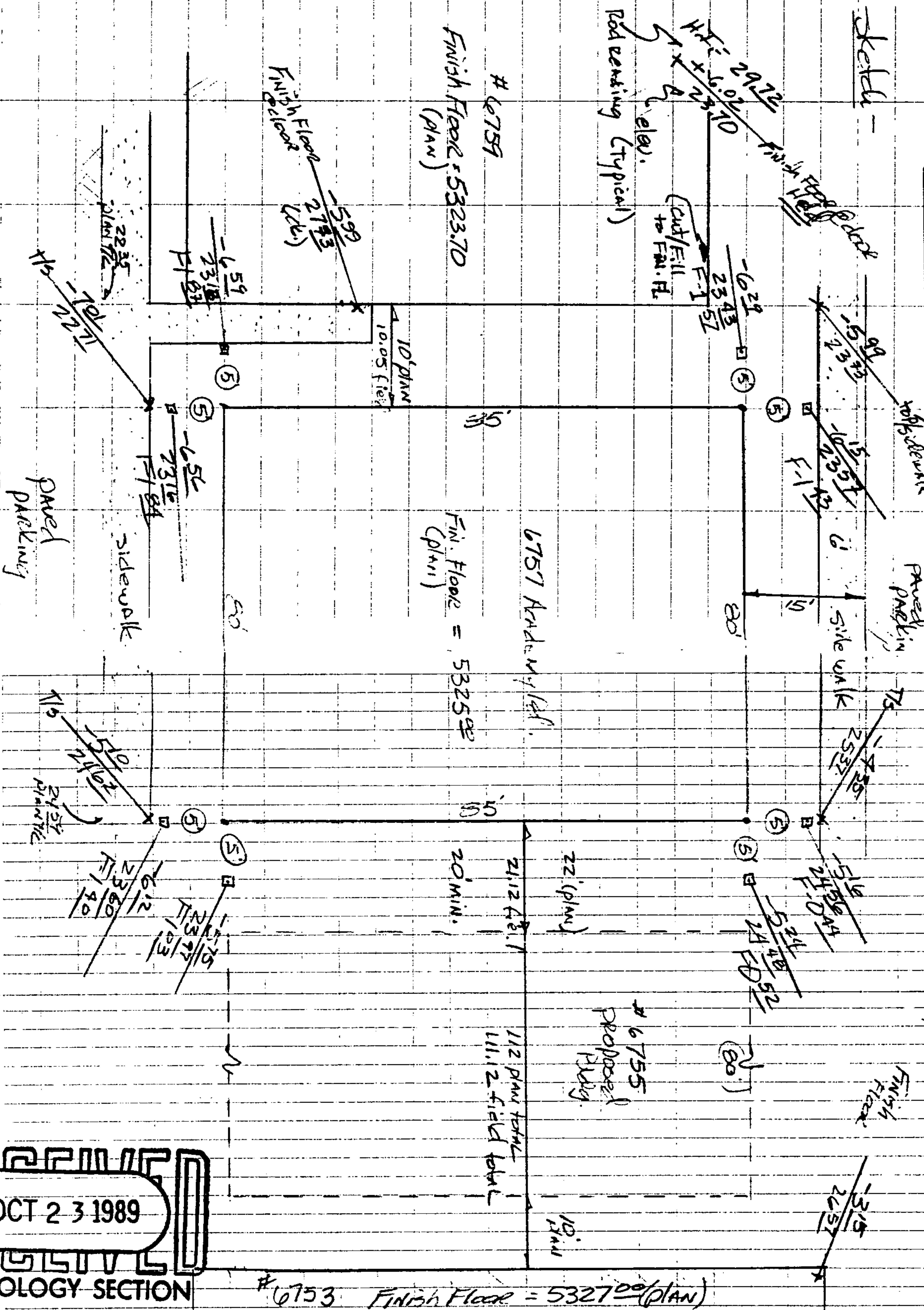
Academy Office Plaza
Foundation Layout

R. A. Smith DPT
R. Morris P

6757 Academy Pl. N.E.

Sketch -

Fin. Floor = 5323.70
Rod setting (typical)



OCT 23 1989
HYDROLOGY SECTION

#6753 Finish Floor = 5327.00 (plan)

ACADEMY ACRES
TN:

WEDNESDAY, OCT 4, 1989

NELSON
VASSQUEZ

WILDMA-2
25' GLASS

CHECK FOR FINISH FLOOR ELEV

75°F
0.2216

RECEIVED
OCT 23 1989
HYDROLOGY SECTION

STA	+	H.I.	-	ELEV.
B.M.	2.27	330.79		328.52
I.P.	6.11	330.81	6.09	324.70
I.P.	6.69	328.17	9.33	321.48
I.P.	4.70	328.39	4.48	323.69
	2.7		3.69	324.70
I.P.	5.46	330.88	2.97	325.412
B.M.			2.34	328.54
				V. 328.52
				V. 0.02

ACS 1-F194

F.F. @ EAST END OF BLDG 6757 @ POOR "C"

T.C. @ P.C.

F.F. @ NORTH END OF BLDG. 6757

F.F. @ NORTH END OF BLDG. 6757 @ DOOR "E"

TOP OF SEWER C/O OUT.

REGISTRATION
 OCT 23 1989
HYDROLOGY SECTION



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

KEN SCHULTZ
MAYOR

CLARENCE V. LITHGOW
CHIEF
ADMINISTRATIVE OFFICER

DAN WEAKS
DEPUTY CAO
PUBLIC SERVICES

FRED E. MONDRAGON
DEPUTY CAO
DEVELOPMENT & ENTERPRISE SERVICES

March 3, 1989

Jeff Mortensen, P.E.
Jeff Mortensen & Associates, Inc.
811 Dallas, NE
Albuquerque, New Mexico 87110

RE: DRAINAGE PLAN FOR BUILDING #6753 @ ACADEMY OFFICE PARK
(E-18/D17) ENGINEER'S STAMP DATED FEBRUARY 24, 1989

Dear Mr. Mortensen:

Based on the information provided on your submittal of February 24, 1989, the above referenced plan is approved for Building Permit.

Please attach a copy of this plan to the construction sets prior to sign-off by Hydrology.

If I can be of further assistance, please feel free to call me at 768-2650.

Cordially,

Bernie J. Montoya
Bernie J. Montoya, C.E.
Engineering Assistant

BJM/bsj
(WP+352)

FILE COPY



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

KEN SCHULTZ
MAYOR

CLARENCE V. LITHGOW
CHIEF
ADMINISTRATIVE OFFICER

DAN WEAKS
DEPUTY CAO
PUBLIC SERVICES

FRED E. MONDRAGON
DEPUTY CAO
DEVELOPMENT & ENTERPRISE SERVICES

February 9, 1989

Jeff Mortensen, P.E.
Jeff Mortensen & Associates, Inc.
811 Dallas, NE
Albuquerque, New Mexico 87110

RE: DRAINAGE PLAN FOR BUILDING #6753 @ ACADEMY OFFICE PARK
(E-18/D17) ENGINEER'S STAMP DATED FEBRUARY 3, 1989

Dear Mr. Mortensen:

Based on the information provided on your submittal of February 7, 1989,
the above referenced plan is approved for Building Permit.

Please attach a copy of this plan to the construction sets prior to
sign-off by Hydrology.

If I can be of further assistance, please feel free to call me at
768-2650.

Cordially,

Bernie J. Montoya
Bernie J. Montoya, C.E.
Engineering Assistant

BJM/bsj
(WP+352)



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

KEN SCHULTZ
MAYOR

CLARENCE V. LITHGOW
CHIEF
ADMINISTRATIVE OFFICER

DAN WEAKS
DEPUTY CAO
PUBLIC SERVICES

FRED E. MONDRAGON
DEPUTY CAO
DEVELOPMENT & ENTERPRISE SERVICES

February 9, 1989

Jeff Mortensen, P.E.
Jeff Mortensen & Associates, Inc.
811 Dallas, NE
Albuquerque, New Mexico 87110

RE: DRAINAGE PLAN FOR BUILDING #6759 @ ACADEMY OFFICE PARK
(E-18/D17) ENGINEER'S STAMP DATED FEBRUARY 3, 1989

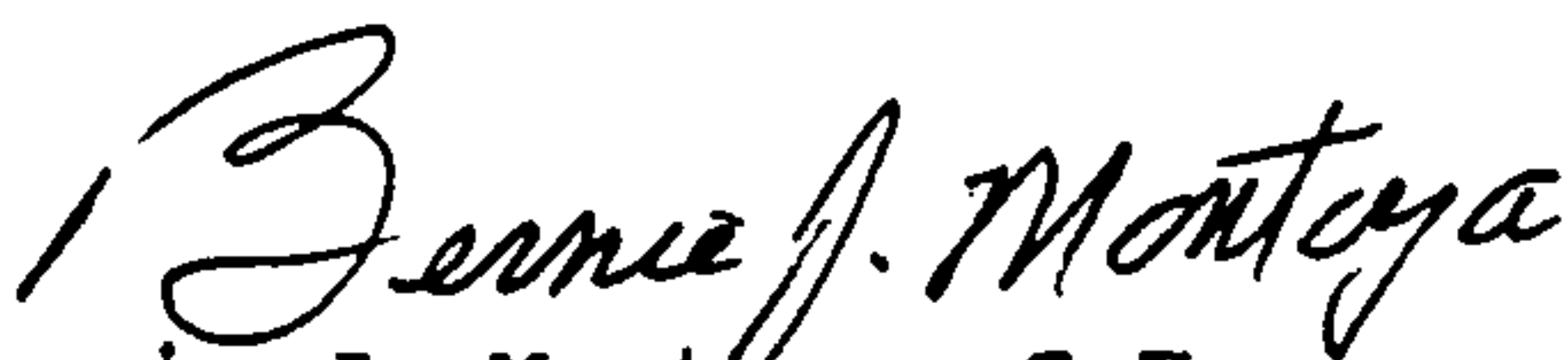
Dear Mr. Mortensen:

Based on the information provided on your submittal of February 3, 1989, the above referenced plan is approved for Certificate of Occupancy release.

Please advise your client that once field corrections are completed per the revised plan and my telephone conversation with Mr. Hines, he must call for a reinspection of the site.

If I can be of further assistance, please feel free to call me at 768-2650.

Cordially,


Bernie J. Montoya, C.E.
Engineering Assistant

BJM/bsj
(WP+352)