HYDROLOGY F11/D4 SIX PLANS

F 11/D4

6 PLANS

RICHARD E. LEONARD
EXECUTIVE ENGINEER

B. H. SWINBURNE, CHAIRMAN
WILLIAM V. HEREFORD, VICE-CHAIRMAN
FRANCES McCOY, SECRETARY-TREASURER
R. WARD HUNNICUTT, DIRECTOR
KLESTON LAWS, DIRECTOR

Albuquerque
Metropolitan
Arroyo
Flood
Control
Authority

2600 PROSPECT AVE., N.E.
P. O. BOX 25851 - ALBUQUERQUE, N. M. 87125
TELEPHONE 884-2215

F-11-D4

RECEIVED
JAN 16 1984
CITY ENGINEER

January 11, 1984

Mr. Carl Tebbens
MSM-SP Group
2601 Wyoming Blvd., NE, Suite F
Albuquerque, NM 87112

SUBJECT: La Mariposa South Drainage

Dear Carl:

Please refer to the attached letter and zone atlas sheet.

This channel empties into our San Antonio Channel, but we do not have a copy of the easement in our files.

We would appreciate your sending us a copy for our record.

Sincerely,

Dan Sabo

Dan Sabo
Drainage Engineer

ic
Encls.

cc: Fred Aguirre

MEURER, SERAFINI AND MEURER, INC.
CONSULTING ENGINEERS • SURVEYORS • PLANNERS
2601 WYOMING BLVD., N.E., SUITE F • ALBUQUERQUE, NEW MEXICO 87112 • (505) 292-1936

December 4, 1979

Mr. Bruno Conegliano
Chief Hydrologist
City of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico

RE: La Mariposa South Drainage,
Job No. 81-1-0191

Dear Bruno:

This letter is sent in order to obtain your approval of the solution that Mr. Tom DiRito and myself presented to you concerning the La Mariposa South Subdivision. We are asking for approval of the following concept:

The La Mariposa South Subdivision is presently discharging approximately 12-13 cfs from the southeast corner of the subdivision. This discharge is presently eroding a defined channel at the point of discharge. We propose to direct this discharge to the San Antonio Arroyo by constructing a channel through the property to the south of the San Antonio Arroyo. The channel shall be of earthen structure in most places, however wherever erosion may occur, rip-rap or other suitable anti-erosion material will be used. Prior to construction, a drainage easement through the property to the south will be obtained.

This concept shall be employed as a temporary measure to prevent the erosion that is now existing. The design and construction of this project shall follow the City of Albuquerque and AMAFCA Guidelines and Standards.

If you approve of this "concept", please indicate so by signing below and returning a copy to me.

Thank you for your time and consideration in this matter.

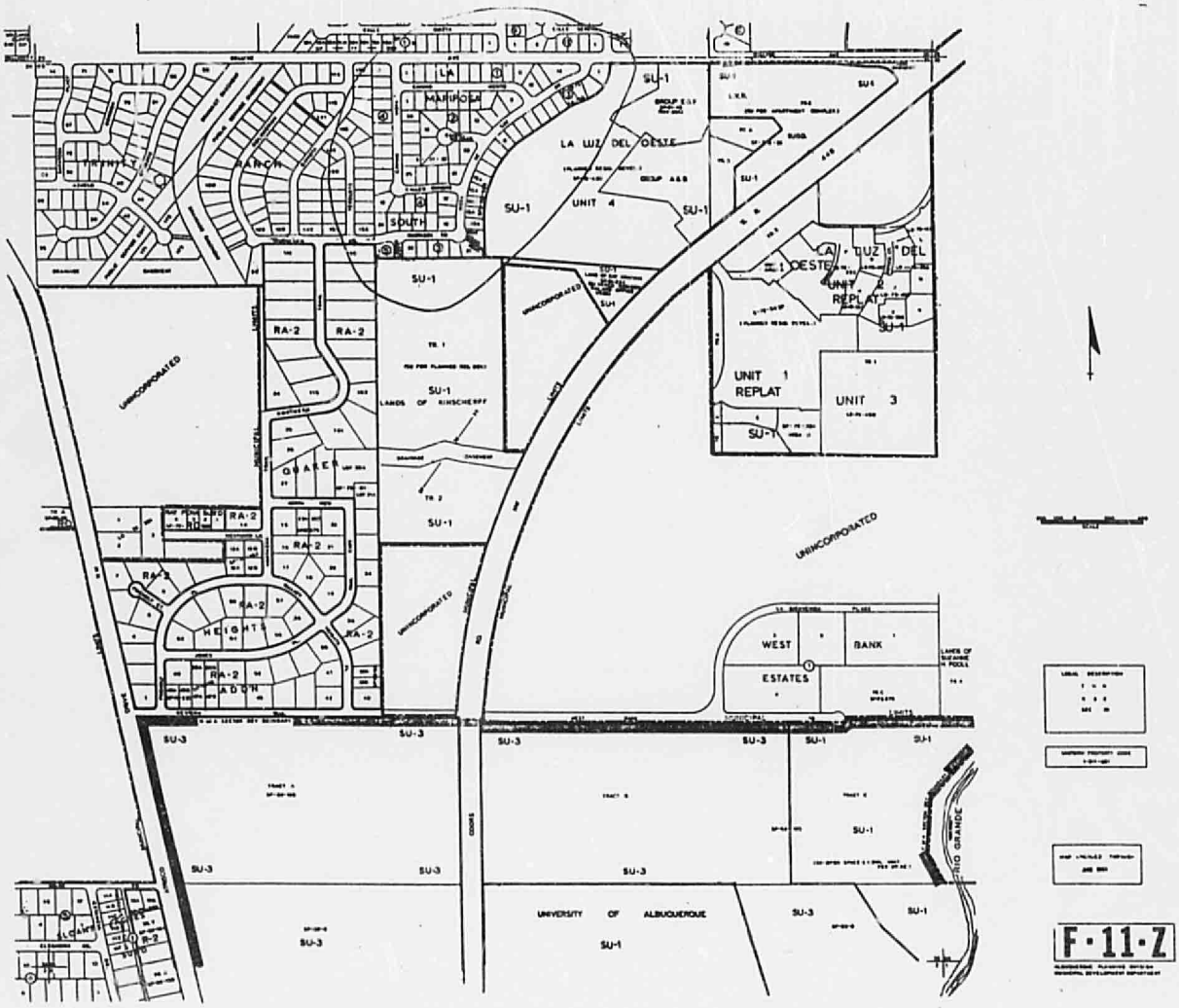
Sincerely,

MEURER, SERAFINI AND MEURER, INC.

James Blackwell, P.E.
Land Development, Department Head

CITY OF ALBUQUERQUE

Bruno Conegliano
Assistant City Engineer


LA MANCHA
SOUTH
RANCH
LA LUZ DEL OESTE
UNIT 4
SU-1
SU-3
RA-2
UNCORPORATED
LANDS OF KINSCHERFF
OSAGE
HEIGHTS
ADDN
LA LUZ DEL OESTE
UNIT 2
REPLAT
UNIT 1
REPLAT
UNIT 3
WEST
BANK
ESTATES
UNIVERSITY OF ALBUQUERQUE
RIO GRANDE
F·11·Z

Mariposa file

RICHARD E. LEONARD
EXECUTIVE ENGINEER

B. F. SWINBURNE, CHAIRMAN
WILLIAM H. HIREFORD, VICE-CHAIRMAN
FRANCES McCOY, SECRETARY-TREASURER
VERNON DOAK, DIRECTOR
KEESTON LAWS, DIRECTOR

Albuquerque
Metropolitan
Arroyo
Flood
Control
Authority
2600 PROSPECT AVE. N.E.
P. O. BOX 25851 - ALBUQUERQUE, N. M. 87125
TELEPHONE 344-3516

RECEIVED
FEB 04 1980
CITY ENGINEER

January 31, 1980

Mr. Richard Heller
City Engineer
Albuquerque, NM

Dear Mr. Heller:

The purpose of this letter is to establish responsibilities for conveying drainage into the San Antonio-Mariposa-Boca Negra Project.

Prior to completion of any reach of the project, AMAFCA will accept responsibility for rundowns on our ROW. Developers will be responsible for coordinating their plans with our Engineer, Fred Denney and Associates. After completion, developers must provide rundown as approved by AMAFCA.

Sincerely,

Richard E. Leonard

Richard E. Leonard
Executive Engineer

ic
cc: B. Conegliano
L. Gross
Bo Johnson
J. Bordenave
J. Leverton
R. Graham

RSH		ADM	
HRO		SUR	
CDS		COUN	
DES		SEC	
INSP		FILE	

cc: P. Sheppard
B. Kiehl

Route to Bruno

DALE BELLAMAH CORPORATION

Land Division

RECEIVED
AUG 01 1978
CITY ENGINEER'S

July 27, 1978

Mr. Val Valdez
Property Management Division
City of Albuquerque
P. O. Box 1293
Albuquerque, New Mexico 87103

Dear Val:

Enclosed please find a grant of easement for maintenance of the La Mariposa north deversion channel as requested by Bruno Canigliano, the Assistant City Engineer for Hydrology.

This easement allows the City to maintain as necessary the channel which is being constructed in conjunction with the High Range at Taylor Ranch II development.

Please have this agreement filed and send a copy to both Bruno and myself.

Thank you for your cooperation.

Very truly yours,

AMBELL, A Partnership
DALE BELLAMAH LAND CO., INC., A Partner

Donald F. Greene

Donald F. Greene
Development Engineer

DFG/csh

Enclosure

6400 Uptown Boulevard, NE • P.O. Box 3325 • Albuquerque, New Mexico 87190 • (505) 883-3000

FOR DRAINAGE DITCH
MAINTENANCE ROAD

THIS IDENTURE made and executed 31st day of March, 1978, by and between AMBELL, A Partnership, DALE BELLAMAH LAND CO., INC., A Partner of Albuquerque, New Mexico, hereinafter call the Grantor and THE CITY OF ALBUQUERQUE, NEW MEXICO, a municipal corporation, hereinafter called Grantee.

WITNESSETH, that for good and valuable consideration the receipt of which is hereby acknowledged the Grantors have this day bargained and sold by these presents do sell, convey and deliver unto the City of Albuquerque a permanent easement for access to the Drainage Structure to be constructed adjacent to said easement including the right to enter upon the real estate hereinafter described at any time that it may see fit and construct, maintain and repair, the drainage ditch road, across, through, and under the lands hereinafter described and the further right to remove trees, bushes, undergrowth and obstructions interfering with the location, construction and maintenance of said drainage ditch road. Provided, however, Grantors reserve to themselves, their successors and assigns the right to use said easement for utilities, parking and other such uses as shall not unreasonably interfere with uses of Grantee provided for herein.

The land affected by the grant of this easement is located in the City of Albuquerque, County of Bernalillo and State of New Mexico and is a 10 foot wide easement more particularly described as follows:

Beginning at the S.W. corner and point of beginning of the easement herein described, said point also being on the north right-of-way line of Tesuque Drive and the S.E. boundary corner of THE HIGH RANGE AT TAYLOR RANCH II, whence the South 1/4 corner of Section 23, Township 11 North, Range 2 East, N.M.P.M., County of Bernalillo, State of New Mexico, bears S 27°08'06" E, 2,292.53 feet; thence N 20°00'00" E, 251.00 feet along the east line of the above mentioned boundary (said boundary also being the east line of a 100.00 foot wide drainage right-of-way) to a point of curvature; thence 495.31 feet along the arc of a curve to the left having a radius of 718.45 feet through a central angle of 39°30'00" to a point of tangency; thence N 19°30'00" W, 655.32 feet to a point of curvature; thence 159.93 feet along the arc of a curve to the right having a radius of 1089.36 feet through a central angle of 08°24'42" to the northwest corner of the easement herein described; thence leaving said east boundary and right-of-way line S 72°15'54" E, 11.43 feet to the northeast corner of the easement herein described; thence 152.95 feet along the arc of a curve to the left having a radius of 1079.36 feet through a central angle of 08°07'08" to a point of tangency; thence S 19°30'00" E, 655.32 feet to a point of curvature; thence 502.20 feet along the arc of a curve to the right having a radius of 728.45 feet through a central angle of 39°30'00" to a point of tangency; thence S 20°00'00" W, 251.00 feet to the southeast corner of the easement herein described; thence N 70°00'00" W 10.00 feet along the north right-of-way of TESUQUE DRIVE to the southwest corner, and point of beginning of the easement herein set forth, and containing 0.35847 acres, more or less.

As part of the consideration for this grant, the Grantors do hereby release any and all claims for damages for whatsoever cause incidental to the exercise of the rights herein granted provided, however, that the Grantee agrees to save Grantors harmless from any and all liability that may arise as a result of the construction and use of the easement for the purposes set forth.

Said easement is subject to, and in conjunction with, other grants of easements heretofore granted over the above described real estate.

IN WITNESS WHEREOF, the parties have set their hands and seals this 31st day of March, 1978.

AMBELL, A Partnership
DALE BELLAMAH LAND CO., INC., A Partner

ATTEST:

D. E. Boyle, President

Connie L. Deiley, Secretary

STATE OF NEW MEXICO)
COUNTY OF BERNALILLO) ss.

The foregoing instrument was acknowledged before me this 31st day of March, 1978, by D. E. Boyle, President of DALE BELLAMAH LAND CO., INC., a New Mexico Corporation on behalf of said corporation.

Debbie L. Webster
Notary Public

My commission expires:

12/30/81

OFFICIAL SEAL
Signature Debbie L. Webster
DEBBIE L. WEBSTER
NOTARY PUBLIC - NEW MEXICO
Notary Bond Filed with Secretary of State
My Commission Expires: 12/30/81

INTER-OFFICE MEMORANDUM
MUNICIPAL DEVELOPMENT DEPARTMENT

ADMINISTRATION

- ☐ Administration
- ☐ Capital Implementation
- ☐ Code Administration
- ☒ Engineering
- ☐ Information
- ☐ Planning
- ☐ Renewal & Rehabilitation
- ☐ Other

ATTENTION:

For Your:
- ☐ Approval
- ☐ Circulation
- ☒ Comment & Return
- ☐ Files
- ☐ Handling
- ☐ Information
- ☐ Investigation & Report
- ☐ Signature

Response Requested by:

REMARKS:

we send attachment when we receive it

To Bruno 9/27/79

Please investigate and report to Dick Ryf.

RECEIVED
SEP 25 1979
CITY ENGINEER

Date ☐ ☐ S.F.
Director
Municipal Development

SEP 24 1979

LAW OFFICES OF
SUTIN, THAYER & BROWNE
A PROFESSIONAL CORPORATION

PAUL G. BARDACKE
GRAHAM BROWNE
STEPHEN CHARNAS
JAMES C. COMPTON, JR.
RICHARD M. DALY
GERALD T. E. GONZÁLEZ
W. PATRICK HARMAN
JAY D. HERTZ
ROBERT G. HEYMAN
ALLAN J. HISEY
DONALD L. JONES
FRANKLIN JONES
MARY E. McDONALD
IRWIN S. MOISE
STEVEN K. MOISE
KESTER L. OMAN
LAFEL E. OMAN
ROBERT PAMPELL
CHARLES P. PRICE III
KEVIN V. REILLY
HENRY M. RIVERA
DONALD M. SALAZAR
RAYMOND W. SCHOWERS
ALISON K. SCHULER
RONALD SEGEL
JONATHAN B. SUTIN
MICHAEL G. SUTIN
NORMAN S. THAYER
RICHARD L. C. VIRTUE
ROBERT J. WERNER
MARIANNE WOODARD
JOHN W. ZAVITZ

ALBUQUERQUE OFFICE
FIRST PLAZA
POST OFFICE BOX 1945
ALBUQUERQUE, NEW MEXICO 87103
505-842-6200

SANTA FE OFFICE
200 FIRST NORTHERN PLAZA EAST
POST OFFICE BOX 2187
SANTA FE, NEW MEXICO 87501
505-988-5521

September 20, 1979

Gerald D. Davenport
Director of Municipal Development
P. O. Box 1293
Albuquerque, New Mexico 87103

Dear Mr. Davenport:

Our client is Ray A. Graham III, who owns property in Albuquerque which abuts the east side of Coors Boulevard at the intersection of both Coors and Dellyne and Coors and Montano. On August 22, 1979, we gave the State Highway Department written notice that the drainage works being constructed in the State Highway Department right-of-way on Coors Boulevard in the vicinity of Dellyne and in the vicinity of Montano would modify the drainage patterns in those areas in ways that would seriously damage Mr. Graham.

The State Highway Department responded by letter dated September 4, 1979, (copy enclosed) advising that it has "dual jurisdiction in this area with the City of Albuquerque" thus suggesting that the City shares responsibility in this matter.

Please advise us of the City's position.

Mr. Graham disagrees with many of the assumptions as to facts expressed and implied in the Highway Department's letter.

Very truly yours,

SUTIN, THAYER & BROWNE
A Professional Corporation

By Stephen Charnas
Stephen Charnas

SC:dh
Enclosure

cc: Mr. Ray A. Graham III

SEP 27 1979

RECEIVED

SEP 27 1979

CITY ENGINEER

STEPHEN CHARNAS
ATTORNEY AT LAW

SUTIN, THAYER & BROWNE
A PROFESSIONAL CORPORATION
505-842-8200

FIRST PLAZA
POST OFFICE BOX 1945
ALBUQUERQUE, NEW MEXICO 87103

To Mr Gerald D. Davenport Date September 24, 1979

Subject Our Letter of September 20, 1979 re: Ray Graham III - drainage problem

We are using this informal note, rather than a formal letter, to give you quicker service.

_____ The enclosed material is for your information.

_____ Message:

We want to apologize for neglecting to include the "enclosure" and are sending it to you now.

Copy: R. S. Heller ✓
City Engineer
w/attach.

Brandy Turner
Legal Assistant

STATE OF NEW MEXICO
HIGHWAY DEPARTMENT

BRUCE KING
GOVERNOR

COMMISSION

Jim Denison
Chairman, Hobbs

James W. Chaney
Vice-Chairman, Moriarty

Albert N. Sanchez
Secretary, Santa Rosa

Paul Rader
Member, Mesilla

Julian Garcia
Member, Albuquerque

DEPARTMENT

Chief Highway Administrator
Fred L. O'Cheskey

General Office
P.O. Box 1149
Santa Fe, NM 87503
505-983-0100

District One Office
P.O. Box 231
Deming, NM 88030
505-546-2603

District Two Office
P.O. Box 1457
Roswell, NM 88201
505-622-8441

District Three Office
P.O. Box 3708-Station D
Albuquerque, NM 87110
505-821-4651

District Four Office
P.O. Box 30
Las Vegas, NM 87701
505-425-7527

District Five Office
P.O. Box 4127-Coronado Sta.
Santa Fe, NM 87503
505-983-0221

AN EQUAL
OPPORTUNITY
EMPLOYER

September 4, 1979

Sutin, Thayer & Browne
A Professional Corporation
P. O. Box 2187
Santa Fe, New Mexico 87501

Attention: Mr. Stephen Charnas

Re: SP-M-400(200) Coors Road

Gentlemen:

Reference your letter of August 22, 1979, about drainage on Coors Road in the vicinity of Dellyne and Montano intersections.

Please be advised that the present contract work is utilizing the original drainage crossings which were located originally in natural waterways and we believe that the drainage patterns after work completion will be substantially the same as before.

We are aware of the downstream property owners' wishes, but we also must advise you that there is dual jurisdiction in this area with the City of Albuquerque. Further, if the upstream flow of Dellyne was diverted across Coors to the east, the existing structures would have to remain in place to properly drain the roadside.

Please feel free to call upon us if you have any further questions.

Sincerely,

Fred L. O'Cheskey
Chief Highway Administrator

FLO:sd

cc: Carl Serna, Director
Project Development
District 3
Legal Division

LA LUZ DEL SOL

JUNE 28, 1979

RECEIVED
JUN 29 1979
CITY ENGINEER

F11-04

MR. BRUNO CONEGLIANO
CITY ENGINEERING OFFICE
POST OFFICE BOX 1293
ALBUQUERQUE, NEW MEXICO 87103

DEAR MR. CONEGLIANO:

I AM WRITING IN RESPONSE TO OUR MEETING LAST WEEK WITH CITY ATTORNEY JOHN MEYER AND OUR ENGINEER JAKE BORDENAVE.

AS WE DISCUSSED, THE LAND I OWN BELOW LA MARIPOSA SOUTH IS ERODING AS A RESULT OF DRAINAGE WITH WATER PERMITTED TO BE DUMPED AT THE SOUTHERLY POINT OF DUERKSEN AND VISTA DE LUZ STREETS. THIS DRAINAGE DIVERSION CHANNEL CAUSES WATER TO PASS FROM THE IMMEDIATE ADJACENT PROPERTY OWNED BY WILLIAM BATES ONTO MY LAND. A RECENT LETTER (COPY ENCLOSED) SENT TO US FROM THE BELLAMAH ORGANIZATION BY THEIR ENGINEERS MEURER AND SERAFINI INCORRECTLY STATES THAT THIS WATER "FLOWS DIRECTLY SOUTH TO THE SAN ANTONIO ARROYO". WE WOULD APPRECIATE KNOWING WHAT YOUR OFFICE WOULD REQUIRE TO ADEQUATELY CONTROL THIS RUN OFF.

WE ALSO DISCUSSED THE PROBLEMS OF NEW AND EXCESSIVE WATER RUN OFF AT THE POINTS OF DELLYNE AND MONTANO ROADS AS IT CROSSES COORS. OUR CONTENTION IS THAT THE WATER FROM THE UPHILL DEVELOPMENT OF TAYLOR RANCH FAR EXCEEDS THE HISTORIC FLOWS ON A YEARLY BASIS AND LIMITS THE USE OF MY PROPERTY DUE TO FLOODING AND EROSION. WE WOULD APPRECIATE YOUR DESIGN OPINIONS FOR A SOLUTION WHICH IGHT CONSIDER USING THE MONTANO RIGHT-OF-WAY AND THE OLD DELLYNE ROAD BED EAST OF COORS.

WE LOOK FORWARD TO HEARING FROM YOU AT YOUR EARLIEST CONQENIENCE.

CORDIALLY,

RAY A. GRAHAM III

RAG:LC
ENCLOSURE (1)

OVENWEST CORPORATION ONE LOOP ONE NW ALBUQUERQUE, NEW MEXICO 87120 (505) 898-5600

MEURER, SERAFINI AND MEURER, INC.
CONSULTING ENGINEERS • SURVEYORS • PLANNERS
2601 WYOMING BLVD., N.E., SUITE F • ALBUQUERQUE, NEW MEXICO 87112 • (505) 292-1936

December 4, 1979

F11-D4

Mr. Bruno Conegliano
Chief Hydrologist
City of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico

RE: La Mariposa South Drainage,
Job No. 81-1-0191

Dear Bruno:

This letter is sent in order to obtain your approval of the solution that Mr. Tom DiRito and myself presented to you concerning the La Mariposa South Subdivision. We are asking for approval of the following concept:

The La Mariposa South Subdivision is presently discharging approximately 12-13 cfs from the southeast corner of the subdivision. This discharge is presently eroding a defined channel at the point of discharge. We propose to direct this discharge to the San Antonio Arroyo by constructing a channel through the property to the south of the San Antonio Arroyo. The channel shall be of earthen structure in most places, however wherever erosion may occur, rip-rap or other suitable anti-erosion material will be used. Prior to construction, a drainage easement through the property to the south will be obtained.

This concept shall be employed as a temporary measure to prevent the erosion that is now existing. The design and construction of this project shall follow the City of Albuquerque and AMAFCA Guidelines and Standards.

If you approve of this "concept", please indicate so by signing below and returning a copy to me.

Thank you for your time and consideration in this matter.

Sincerely,

MEURER, SERAFINI AND MEURER, INC.

James Blackwell, P.E.
Land Development, Department Head

CITY OF ALBUQUERQUE

Bruno Conegliano
Assistant City Engineer

SUMMARY & CONCLUSIONS

BOCA NEGRA AND MARIPOSA

DRAINAGE STUDY

Storm waters falling on the Boca Negra and Mariposa Drainage basins need to be collected, routed and directed into the Rio Grande River.

Three alternatives are apparent and are presented visually on the following plates.

ALTERNATE I: (MATOTAN REPORT)

PLAN

(SEE FOLLOWING ALTERNATE I PLAN)

A. Collect and route water in:

a)	Boca Negra Diversion	1,324 cfs	Sec. A-A & B-B
b)	Mariposa Channel West	564 cfs	Sec. C-C
c)	Mariposa Diversion	1,193 cfs	Sec. D-D
d)*	Arroyo de San Antonio	12,900 cfs	Sec. E-E

B. Utilize a 34 acre foot natural empoundment as a sedimentation basin.

COST

Total Cost of Construction	$4,272,000
* Arroyo de San Antonio additional Improvements	550,321
TOTAL COST - ALTERNATE I	$4,822,321

*NOTE: In order to properly compare each alternate from a common datum and because we believe that it is good engineering, we propose that the entire length of the Arroyo de San Antonio be improved with a concrete lining (see Section E-E), due to excessive velocities and scour. This cost is added to the Matotan Estimate (+$550,321).

ESTIMATED COST OF ALTERNATE I

(From Matotan's Study)

1. Arroyo de San Antonio	$ 1,080,000
2. Boca Negra Diversion	1,680,000
3. Mariposa Diversion w/San Antonio change	405,000
4. Mariposa West	395,000
Total	$ 3,560,000
20% Engineering and Contingencies	712,000
TOTAL COST OF CONSTRUCTION	$ 4,272,000

NOTES:

1. Items 1,2 and 4 are Matotan's Estimate updated to reflect 1977 prices.
2. Item 3 includes additional cost of construction of San Antonio due to construction in the area since Matotan's Report.
3. Cost of right-of-way has not been included in any item.

ALTERNATE II:

PLAN

(SEE FOLLOWING ALTERNATE II PLAN)

A. Collect and route water as follows:

a) East from Boca Negra through "Mariposa Diversion Channel West" to an enlarged empoundment noted as "Mariposa Sedimentation Basin" 296 acre feet. Sec. D-D

b) From Sedimentation Basin to Arroyo de San Antonio. Q = 1900 cfs. Sec. E-E

c) Along Atrisco Road - "Boca Negra Diversion". Q = 1324 cfs. Sec. A-A

d) Arroyo de San Antonio to the Rio Grande. Q = 5000 cfs. Sec. F-F

COST

Total Cost of Construction	$3,983,520
TOTAL COST - ALTERNATE II	$3,983,520

ESTIMATED QUANTITIES AND COST OF ALTERNATE II

A tabulation of estimated quantities and cost of each portion of the system are listed below:

I. Boca Negra: 1700 cfs.

1.	Earthwork (cut)	63,000 CY @ $1.20/CY	$ 75,600
2.	Gabion Drop Structures	6,000 CY @ $50/CY	300,000
3.	Miscellaneous Rip-Rap	150 CY @ $60/CY	9,000
		Sub Total	$ 384,600

II. Mariposa System: 2892 cfs/800 cfs.

1.	Earthwork (cut)	360,000 CY @ $1.20/CY	$ 432,000
2.	Gabion Drop Structures	8,000 CY @ $50/CY	400,000
3.	Miscellaneous Rip-Rap	1,000 CY @ $60/CY	60,000
4.	Concrete Channel Lining	23,000 SY @ $10.50/SY	241,500
5.	Spillway Treatment	1,500 CY @ $15/CY	22,500
6.	Montano Road Crossing	6 Barrel 5'x5' box culvert	23,000
		Sub Total	$1,179,000

III. San Antonio Arroyo: 5000 cfs.

1.	Earthwork (cut)	65,000 CY @ $1.20/CY	$ 78,000
2.	Gabion Drop Structures	17,500 CY @ $50/CY	875,000
3.	Concrete Channel Lining	50,000 SY @ $10.50/SY	525,000
4.	Atrisco Crossing	4 Barrel 12'x10' box culvert	74,000
5.	Northern Crossing	4 Barrel 12'x10' box culvert	88,000
6.	Coors Crossing	4 Barrel 12'x10' box culvert	116,000
		Sub Total	$1,756,000

Grand Total	$3,319,600
20% Engineering and Contingencies	663,920
TOTAL COST OF CONSTRUCTION	$3,983,520

NOTE:

Cost of right-of-way has not been included in any item.

ALTERNATE III:

PLAN

(SEE FOLLOWING ALTERNATE III PLAN)

A. Collect and route water as follows:

a) East from Boca Negra through "Mariposa Diversion Channel West" to an enlarged empoundment noted as "Mariposa Sedimentation Basin" 450 acre feet. Sec. D-D

b) From Sedimentation Basin, through three 60" RCPs 1840' long, to and under Montano Road to the Arroyo de San Antonio. Q = 800 cfs. Sec. H-H

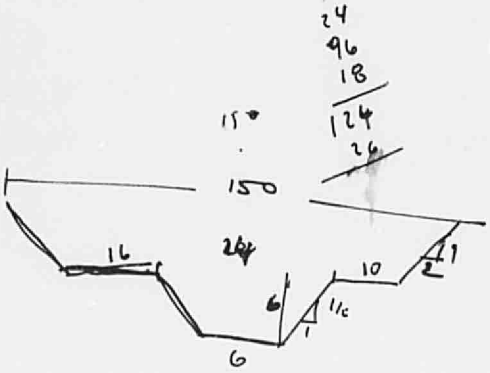
c) Along Atrisco Road - "Boca Negra Diversion". Q = 1324 cfs. Sec. A-A

d) Arroyo de San Antonio to the Rio Grande. Q = 3900 cfs. Sec. F-F

COST

Total Cost of Construction	$4,095,600
TOTAL COST - ALTERNATE III	$4,095,600

0.00131



90

ESTIMATED QUANTITIES AND COST OF ALTERNATE III

A tabulation of estimated quantities and cost of each portion of the system are listed below:

I. Boca Negra: 1700 cfs.

1.	Earthwork (cut)	63,000 CY @ $1.20/CY	$ 75,600
2.	Gabion Drop Structures	6,000 CY @ $50/CY	300,000
3.	Miscellaneous Rip-Rap	200 CY @ $60/CY	12,000
		Sub Total	$ 387,600

II. Mariposa System: 2892 cfs/800 cfs.

1.	Earthwork (cut)	573,000 CY @ $1.20/CY	$ 687,600
2.	Gabion Drop Structures	8,000 CY @ $50/CY	400,000
3.	Miscellaneous Rip-Rap	1,200 CY @ $60/CY	72,000
4.	60" RCP	5,520 LF @ $90/LF	496,800
		Sub Total	$1,656,400

III. San Antonio Arroyo: 3900 cfs.

1.	Earthwork (cut)	180,000 CY @ $1.20/CY	$ 216,000
2.	Gabion Drop Structures	17,500 CY @ $50/CY	875,000
3.	Atrisco Crossing	4 Barrel 12'x10' box Culvert	74,000
4.	Northern Crossing	4 Barrel 12'x10' box Culvert	88,000
5.	Coors Crossing	4 Barrel 12'x10' box culvert	116,000
		Sub Total	$1,369,000

Grand Total	$3,413,000
20% Engineering and Contingencies	682,600
TOTAL COST OF CONSTRUCTION	$4,095,600

NOTE:

Cost of right-of-way has not been included in any item.

CITY OF ALBUQUERQUE
STATE OF NEW MEXICO

RECEIVED
AUG 07 1978
CITY ENGINEERS

C O P Y

August 4, 1978

Mr. Donald F. Greene
Development Engineer
Dale Bellamah Corporation
6400 Uptown Blvd. N.E.
P.O. Box 3325
Albuquerque, N.M. 87109

Re: Grant of Easement for Drainage Ditch Maintenance
Road La Mariposa North Division Channel

Dear Mr. Greene:

As per your letter of July 27, 1978, in regard to the above captioned, enclosed herewith is a recorded copy of the easement.

Bruno will be sent a copy with a carbon of this letter.

We trust this meets with your approval and thank you for your cooperation.

Sincerely,

O. Val Valdez

O. Val Valdez,
City Real Estate Office

OV/mjc
Encl: 1

cc: Bruno Conegliano, Asst. City Engineer for
Hydrology, Public Works Department

78 55764

GRANT OF EASEMENT
FOR DRAINAGE DITCH
MAINTENANCE ROAD

THIS IDENTURE made and executed 31st day of March, 1978, by and between AMBELL, A Partnership, DALE BELLAMAH LAND CO., INC., A Partner of Albuquerque, New Mexico, hereinafter call the Grantor and THE CITY OF ALBUQUERQUE, NEW MEXICO, a municipal corporation, hereinafter called Grantee.

WITNESSETH, that for good and valuable consideration the receipt of which is hereby acknowledged the Grantors have this day bargained and sold by these presents do sell, convey and deliver unto the City of Albuquerque a permanent easement for access to the Drainage Structure to be constructed adjacent to said easement including the right to enter upon the real estate hereinafter described at any time that it may see fit and construct, maintain and repair, the drainage ditch road, across, through, and under the lands hereinafter described and the further right to remove trees, bushes, undergrowth and obstructions interfering with the location, construction and maintenance of said drainage ditch road. Provided, however, Grantors reserve to themselves, their successors and assigns the right to use said easement for utilities, parking and other such uses as shall not unreasonably interfere with uses of Grantee provided for herein.

The land affected by the grant of this easement is located in the City of Albuquerque, County of Bernalillo and State of New Mexico and is a 10 foot wide easement more particularly described as follows:

Beginning at the S.W. corner and point of beginning of the easement herein described, said point also being on the north right-of-way line of Tesuque Drive and the S.E. boundary corner of THE HIGH RANGE AT TAYLOR RANCH II, whence the South 1/4 corner of Section 23, Township 11 North, Range 2 East, N.M.P.M., County of Bernalillo, State of New Mexico, bears S 27°08'06" E, 2,292.53 feet; thence N 20°00'00" E, 251.00 feet along the east line of the above mentioned boundary (said boundary also being the east line of a 100.00 foot wide drainage right-of-way) to a point of curvature; thence 495.31 feet along the arc of a curve to the left having a radius of 718.45 feet through a central angle of 39°30'00" to a point of tangency; thence N 19°30'00" W, 655.32 feet to a point of curvature; thence 159.93 feet along the arc of a curve to the right having a radius of 1089.36 feet through a central angle of 08°24'42" to the northwest corner of the easement herein described; thence leaving said east boundary and right-of-way line S 72°15'54" E, 11.43 feet to the northeast corner of the easement herein described; thence 152.95 feet along the arc of a curve to the left having a radius of 1079.36 feet through a central angle of 08°07'08" to a point of tangency; thence S 19°30'00" E, 655.32 feet to a point of curvature; thence 502.20 feet along the arc of a curve to the right having a radius of 728.45 feet through a central angle of 39°30'00" to a point of tangency; thence S 20°00'00" W, 251.00 feet to the southeast corner of the easement herein described; thence N 70°00'00" W 10.00 feet along the north right-of-way of TESUQUE DRIVE to the southwest corner, and point of beginning of the easement herein set forth, and containing 0.35847 acres, more or less.

As part of the consideration for this grant, the Grantors do hereby release any and all claims for damages for whatsoever cause incidental to the exercise of the rights herein granted provided, however, that the Grantee agrees to save Grantors harmless from any and all liability that may arise as a result of the construction and use of the easement for the purposes set forth.

Said easement is subject to, and in conjunction with, other grants of easements heretofore granted over the above described real estate.

IN WITNESS WHEREOF, the parties have set their hands and seals this 31st day of March, 1978.

AMBELL, A Partnership
DALE BELLAMAH LAND CO., INC., A Partner

ATTEST:

D. E. Boyle
D. E. Boyle, President

Connie L. Deiley
Connie L. Deiley, Secretary

STATE OF NEW MEXICO)
COUNTY OF BERNALILLO) ss.

The foregoing instrument was acknowledged before me this 31st day of March, 1978, by D. E. Boyle, President of DALE BELLAMAH LAND CO., INC., a New Mexico Corporation on behalf of said corporation.

Debbie L. Webster
Notary Public

My commission expires:

12/30/81

OFFICIAL SEAL
Signature Debbie L. Webster
DEBBIE L. WEBSTER
NOTARY PUBLIC - NEW MEXICO
Notary Bond Filed with Secretary of State
My Commission Expires: 12/30/81

STATE OF NEW MEXICO
COUNTY OF BERNALILLO
FILED FOR RECORD

JUL 31 10 05 AM 1978
Misc BK 627 PG 163-164
EMMA C. GONZALES
CO. CLERK & RECORDER
Gurule DEPUTY

MEURER, SERAFINI AND MEURER, INC.
CONSULTING ENGINEERS • SURVEYORS • PLANNERS
2601 WYOMING BLVD., N.E., SUITE F • ALBUQUERQUE, NEW MEXICO 87110 • (505) 292-1936

November 15, 1977

RECEIVED
NOV 17 1977
CITY ENGINEERS

Mr. Bruno Conegliano
City of Albuquerque
Department of Public Works
Engineering Division
P. O. Box 1293
Albuquerque, New Mexico 87103

Re: Dellyne Avenue Paving Improvements

Dear Bruno:

Following are our calculations of the capacity of the twin 30" R.C.P. culverts crossing Coors Road approximately 1,000 feet north of the intersection with Dellyne Avenue:

Area Designation	Area Acres	Runoff Coef.	% of Total Area	Comp. Coef.
O.S.1	19.7	0.45	19.6%	0.09
O.S.2*	64.0	0.45	63.7%	0.29
Dellyne	16.8	0.78	16.7%	0.13
	100.5			0.51

*Area north of Dellyne Avenue and east of College Heights which drains to subject structure.

As the computed composite runoff coefficient has been previously weighted for the 100 year frequency storm, the adjustment for 5 to 10 year frequency produces 0.41.

The time of concentration was further re-evaluated in light of the lower flows and found to be 27 minutes.

$$I_{10} = \frac{122}{28+23} = 2.39$$

Therefore:

$$Q_{10} = 0.41 \times 2.39 \times 100.5 = 98.5$$

Although at present the structure is somewhat silted and in need of maintenance, it was determined that a HW/D ratio of 2.0 is available thus providing approximately 95 cfs. It is, therefore, our opinion that the subject structure does have the 10 year underflow capacity requested in your letter of November 2, 1977.

The final engineering drawings have been revised to provide for the direct flow of waters in Dellyne to the bar ditch via a temporary run-down and after processing by the design engineer will be on your desk for signature. I trust the above calculations and revisions now bring this project into conformance with your wishes and your approval will be forthcoming.

Very truly yours,

MEURER, SERAFINI, AND MEURER, INC.

Thomas J. Hladik

TJH:dw

cc: Mr. Don Greene

MEURER, SERAFINI AND MEURER, INC.

CONSULTING ENGINEERS • SURVEYORS • PLANNERS

2601 WYOMING BLVD., N.E., SUITE F • ALBUQUERQUE, NEW MEXICO 87110 • (505) 292-1936

Bruno filing

RECEIVED
OCT 13 1977
CITY ENGINEERS

October 10, 1977

City of Albuquerque
Engineering Division
P. O. Box 1293
Albuquerque, New Mexico

Attention: Mr. V. M. Kimmick, City Engineer
Mr. Bruno Conegliano, Asst. City Engr., Hydrology

Re: Dellyne Avenue Paving Improvements

Gentlemen:

Accompanying this letter are calculations and plan of the storm flows being conveyed by Dellyne Avenue east of the La Mariposa Channel. Reference material for this submittal includes the various drainage reports for the platted areas, AMAFCA topo maps, and previously approved grading plans.

In keeping with some of the thrust of the AMAFCA Task Force on Drainage Policy, I have run parallel computations on the basis of composite runoff coefficients and impervious area peaking.

It is our opinion that the 100-year discharge (60.6 c.f.s.) should be placed on Coors Road and therein flow in its historical course. It is further recommended that the flows adjacent to Coors Road be conveyed under Dellyne Avenue by two twenty-seven inch (27") pipe culverts with flared end sections and appropriate channel modifications to insure proper entrance and exit of storm flows.

It is realized that Coors Road will inevitably be substantially improved in the future and the management of storm flows along the west side of this road will have to be considered at the time a definitive improvement plan is developed.

I trust the above information and attached data will aid in your review of the above plans. If you have any questions, please do not hesitate to call.

Very truly yours,

MEURER, SERAFINI AND MEURER, INC.

Thomas J. Hanek

Thomas J. Hanek

cc: Mr. Don Greene

I, John Kinscherff, being owner of that property south of and adjacent to that certain subdivision known as La Mariposa South, hereby give permission to AMBELL to permit 6 c.f.s. (based on the 100-year storm) in addition to the 6 c.f.s. that naturally occurs to be placed on my property.

John Kinscherff

Mr. John E. Kinscherff
Box 26
Nebo, IL 62355

Joseph E. Shipley
c/o AMBELL
P.O. BOX 3325
6400 Uptown Blvd NE
Albuquerque, NM 87110

Genge/Murray-McCormick
2601 Wyoming Blvd., N.E. Suite F
Albuquerque, N.M. 87110/505 292-1936
Engineering · Surveying · Planning
Tucson · Phoenix · Denver · Pueblo

July 15, 1977

RECEIVED
JUL 15 1977
CITY ENGINEERS

Mr. V. M. Kimmick, City Engineer
City of Albuquerque
Department of Public Works
P. O. Box 1293
Albuquerque, New Mexico 87103

Re: Paving Improvements, Dellyne Avenue N.W.

Dear Kim:

Just a note to confirm your direction regarding the Dellyne Avenue crossing of the proposed La Mariposa Channel. In conformance with our past phone conversation, we will design a temporary "dip section" with a 10 year frequency storm to flow via culvert and the greater flows to top the pavement. Further, that the City of Albuquerque will provide the permanent crossing structure which is to pass the 100 year storm and is to be included in a future bond program.

Very truly yours,

GENGE/MURRAY-McCORMICK, INC.

Thomas J. Hrack

TJH:dw

cc: Bob Fosnaugh
Bruno Conegliano
Q. R. Kielich
Don Greene

Genge/Murray-McCormick
2601 Wyoming Blvd., N.E. Suite F
Albuquerque, N.M. 87110/505-292-1936
Engineering · Surveying · Planning
Tucson · Phoenix · Denver · Pueblo

July 15, 1977

RECEIVED
JUL 15 1977
CITY ENGINEERS

Mr. V. M. Kimmick, City Engineer
City of Albuquerque
Department of Public Works
P. O. Box 1293
Albuquerque, New Mexico 87103

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Very truly yours,

GENGE/MURRAY-McCORMICK, INC.

Thomas J. Hauck

TJH:dw

cc: Bob Fosnaugh
Bruno Conegliano
Q. R. Kielich
Don Greene

LETTER OF TRANSMITTAL

Genge/Murray-McCormick
2601 Wyoming Blvd., N.E. Suite F
Albuquerque, N.M. 87110/505 292-1936

Bruce

Date May 26, 1977

To Mr. V. M. Kimmick, City Engineer
City of Albuquerque
P. O. Box 1293
Albuquerque, New Mexico 87103

RECEIVED
MAY 26 1977
CITY ENGINEERS

Attn.

Re: La Mariposa South Drainage Study

Comments: Attached herewith are two copies of the Drainage Report for La Mariposa South.

Enclosures:

Quantity	Type of Enclosure and Description
2 Ea.	Drainage Reports - La Mariposa South

Signed: F. Krum

Copy to:

If enclosures are not as noted, kindly notify us at once.

DRAINAGE REPORT

LA MARIPOSA SOUTH

ALBUQUERQUE, NEW MEXICO

MURRAY-McCORMICK, INC.
ENVIRONMENTAL DESIGN

ECOSYSTEMS ANALYSIS · PLANNING · LAND SURVEYS · ENGINEERING

2601 WYOMING BLVD., NE. SUITE F / ALBUQUERQUE, N.M. 87110 / 505-292-1936

DRAINAGE REPORT

LA MARIPOSA SOUTH

ALBUQUERQUE, NEW MEXICO

Prepared For

AMBELL
6400 Uptown Boulevard N.E.
Albuquerque, New Mexico

Prepared By

Genge/Murray-McCormick, Inc.
2601 Wyoming N.E.
Albuquerque, New Mexico
(505) 292-1936

May 1977

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ESTIMATED RUNOFF DEVELOPED STATE	3
EXPLANATION OF RESULTS	4
RECOMMENDATIONS	5

APPENDIX

Appendix 1	Composite Runoff Coefficient
Appendix 2	Ponding Requirement
Appendix 3	Runoff Computations
Appendix 4	Frequency Factor
Figure I-A	Developed Drainage Conditions
Figure I-B	Undeveloped Drainage Conditions
Figure II	Typical Lot Drainage
Figure III	Time of Concentration of Small Drainage Basins
Figure IV	Intensity Duration Frequency Curves
Figure V	Overland Flow Time
Figure VI	Velocities for Method of Estimating Tc

DRAINAGE REPORT

LA MARIPOSA SOUTH

GENERAL

This report presents the data, analysis, and calculations resulting from the drainage study of the proposed single family subdivision named "La Mariposa South." It is situated within Section 35, Township 11 North, Range 2 East, N.M.P.M.

The property encompasses 23.12 acres and is subdivided into 94 (65' x 110' typical size) single family lots. More precise information concerning lot and street configuration can be found in Figure 1-A.

The soil at the site is generally comprised of eolin sand. The natural ground slopes from northwest to southeast with one major depression and few high spots. Ground cover consists mainly of rabbit brush, yucca, and cactus. It is intended that the cut and fill grading will intercept the minor flow patterns and allow the runoff to be conveyed in the streets or to backyard ponds.

The site is surrounded by unimproved land on all sides except the north which is bounded by Dellyne Avenue N.W., and La Mariposa Unit 1-C Subdivision.

Offsite flows from the north and west are intercepted and directed away from the project site by La Mariposa channel leaving the site free from offsite flows.

DESIGN CRITERIA

In analyzing the storm runoff, the Rational Formula, $Q = CIA\,C_f$, is used.[1].

Where:

Q = Runoff quantity in cubic feet/second.

A = Contributing area in acres.

C_f = Frequency factor for Rational Formula.

I = Intensity in inches/hour for a duration equal to the time of accumulation (duration) measured in minutes and obtained from Figure IV, Intensity Duration Frequency Curves, Albuquerque Area 1961. (Note: Where a Time of Concentration [Tc] is less than ten minutes from Figure III, the intensity value derived from a Tc equal to ten minutes is employed.)

C = Runoff Coefficient (No Unit). This coefficient represents the integrated effects of infiltration, detention storage, evaporation, retention, flow routing, and interception which all affect the time distribution and peak rate of runoff.

ESTIMATED RUNOFF UNDEVELOPED STATE

Drainage within the boundary of the site is basically overland flow with some small swales and one major sump draining 2.32 acres. There are no offsite flows entering the site.

The total runoff in the undeveloped site forms the basis for comparison with the flow in the developed state.

1. See Bibliography, Item (2), Paragraph 3.7, Appendix-4.

TABLE 1
RUNOFF BEFORE DEVELOPMENT - ONSITE

Area Designation	Area Ac.	Length Ft.	Slope %	Tc Min.	I_{100} yr. in./hr.	C[2].	Q C.F.S.
A-1	4.6	400	1.25	25.0	3.78	0.38	6.61
A-2	2-6	350	1.14	23.5	3.90	0.38	3.85
A-3	1.2	300	0.70	25.0	3.78	0.38	1.72
A-4	4.0	500	0.50	28.0	3.57	0.38	5.43
A-5	2.7	625	0.50	32.0	3.32	0.38	3.41
A-6	4.3	220	3.18	12.0	4.02	0.38	6.57
A-7	0.8	300	0.50	24.0	3.86	0.38	1.17
A-8	0.6	100	1.00	15.0	4.73	0.38	1.08
A-1 - A-8	20.8	625	0.5	32.0	3.32	0.38	26.3

NOTE: The sum of the acreage does not equal 23.12 acres because 2.32 acres discharge flows into a sump in the northwest corner of the property.

ESTIMATED RUNOFF DEVELOPED STATE

As development occurs, the area of impervious surfaces increases and thereby the amount of runoff also increases. To offset this increase, onsite restrictions of flows must be incorporated into the development. While this can take different forms, the most practical solution for this type of development is to utilize on-lot ponding. The contributing area to the backyard ponding includes the backyard, side yard, and in a majority of cases, one-half of the roof area due to the popularity of the pitched roof concept. The area drained to the street includes the front yard, driveway, sidewalk-parkway areas, and one-half the roof area. This approach will satisfy AMAFCA's requirement that the runoff rate from the developed tract will not exceed the runoff rate from the tract in its natural state.

2. See Appendix-1.

The runoff coefficients, prior to the C_f adjustment, for various surfaces are as follows:

Streets, Walks and Drives	C = 0.80
Roofs	C = 0.80
Lawns, Sandy Soil (Average - 2 to 7%)	C = 0.12

TABLE 2[3].

RUNOFF IN DEVELOPED STATE

Drainage Basin	Area Ac.	C[3].	$I_{100\ year}$ In./Hr.	Q C.F.S.
A-1	2.41	0.66	3.78	6.0
A-2	1.50	0.66	3.90	3.9
A-3	1.50	0.63	4.58	4.3
A-1 - A-3	5.41	0.65	3.61	12.7
B-1	1.97	0.66	4.07	5.3
B-2	1.22	0.66	4.83	3.9
B-3	2.51	0.61	4.06	6.2
B-1 - B-3	5.7	0.64	3.62	13.2
C-1	0.28	0.66	5.25	1.0
A-1 - C-1	11.39	0.65	3.61	26.7

EXPLANATION OF RESULTS

Runoff Before Development leaving the Site:	26.3 C.F.S.
Runoff After Development leaving the Site:	26.7 C.F.S.

3. See Appendix-3.

The net runoff result is a minor increase of 0.4 C.F.S., from the undeveloped state to developed state which will not affect the downstream facilities.

In the developed state, no offsite flows contribute to the site. Street carrying capacities are adequate enough to handle 100-year storm runoff. Runoffs from the north are intercepted by La Mariposa Unit 1 and Unit 1-C, and diverted toward La Mariposa channel.

Onsite flows from Areas A-1, A-2, and A-3 are diverted into a proposed drainage easement located between Lots 20 and 21, Block 3. A concrete lined drainage channel shall be constructed in this easement to carry 12.7 C.F.S. (See Section A-A, Figure 1-A.) Onsite flows from Areas C-1 and B-1, B-2 and B-3 shall drain onto Dellyne Avenue N.W.

Ponding areas, where called for in backyards, would be best situated toward the rear of the yard. There should be a minimum of a five foot buffer zone between the rear property lines and the edge of the pond. This buffer will protect any walls which might be constructed. In no case should ponded waters be allowed to stand against the wall.

RECOMMENDATIONS

The following is a summary of the recommendations which must be incorporated in the construction drawings and field inspections at the time of construction:

1. The lots shown as ponded should be graded to store water in the rear yard.

2. Ponds should average 6" deep and the minimum surface area should not be less than 15% of the total area which is drained into the pond.

3. Flows within the streets of the development are distributed enough so that no one street assumes a critical burden in carrying capacities. However, no street should be graded at less than 0.4% slope in order to insure adequate carrying capacities.

4. Flows from Areas A-1, A-2, and A-3 (12.7 C.F.S.) shall follow street patterns and discharge south via a 10' wide drainage channel located between Lots 20 and 21, Block 3 (See Fig. 1-A).

5. Runoff from Areas B-1, B-2, and B-3 (13.2 C.F.S.) shall follow street patterns and drain onto Dellyne Avenue N.W. This will be further carried east on Dellyne Avenue N.W.

6. Flows from Area C-1 (1.0 C.F.S.) shall discharge on Dellyne Avenue N.W., and further carried west on Dellyne Avenue N.W. Eventually this flow will discharge into La Mariposa channel.

Respectfully submitted,

Carl A. Tebbens
N.M.P.E. No. 6309

CARL A. TEBBENS
6309
NEW MEXICO
REGISTERED PROFESSIONAL ENGINEER

BIBLIOGRAPHY OF REFERENCES

(1) Herkenhoff, Gordon & Associates, "Master Plan of Drainage City of Albuquerque, New Mexico and Environs, 1963". Albuquerque; Gordon Herkenhoff & Associates, Consulting Engineers.

(2) Wright-McLaughlin Engineers, "Urban Storm Drainage Criteria Manual, Volume 1", Denver, Colorado: Wright-McLaughlin Engineers, 1969.

(3) U.S. Department of Commerce, "Technical Paper, No. 40, Rainfall Frequency Atlas of the United States", Washington, D.C., U.S. Government Printing Office, 1963.

APPENDIX-1

COMPOSITE RUNOFF COEFFICIENTS

Undeveloped Land

$C = 0.30^{1.} \times 1.25^{2.} = 0.38$

Developed Land

Typical Lot Area

Gross Area		23.12	Ac.
Less: Area in Streets	5.12 Ac.		
Area in Lots		18.0	Ac.
Average Lot Area (94 Lots)		8,300	Sq.Ft.
Typical Lot Width		65	Ft.

Ponded Lots

C = 0.80	Streets & Walk Area	20x65	1,300	Sq.Ft.
	Roof Area	20x50	1,000	Sq.Ft.
	Driveway	30x15	450	Sq.Ft.
	Total Impervious Area		2,750	Sq.Ft.
C = 0.12	Front and Side Yards	65x50	3,250	Sq.Ft.
	Less Roof Area	20x50	-1,000	Sq.Ft.
	Less Driveway	30x15	-450	Sq.Ft.
	Total Pervious Area		1,800	Sq.Ft.

Impervious Area	2,750 Sq.Ft.	60.4% @ 0.80	0.48
Pervious Area	1,800 Sq.Ft.	39.6% @ 0.12	0.05
Total Area	4,550 Sq.Ft.	100%	0.53

Composite Runoff Coefficient - $C \times C_f = 0.53 \times 1.25 = \underline{0.66}$

1. See Bibliography, Item (1) Table XII
2. See Bibliography, Item (2) Article 3.7, Appendix-4

Non-Ponded Lots

C = 0.80	Streets & Walk Area	20x65	1,300 Sq.Ft.
	Roof Area	50x40	2,000 Sq.Ft.
	Driveway	30x15	450 Sq.Ft.
	Total Impervious Area		3,750 Sq.Ft.
C = 0.12	Total Lot Area (Average)		8,300 Sq.Ft.
	Less Roof Area		-2,000 Sq.Ft.
	Less Driveway		-450 Sq.Ft.
	Total Pervious Area		5,850 Sq.Ft.

Impervious Area	3,750 Sq.Ft.	39.1% @ 0.80	0.31
Pervious Area	5,850 Sq.Ft.	60.9% @ 0.12	0.07
Total Area	9,600 Sq.Ft.	100%	0.38

Composite Runoff Coefficient - $C \times C_f = 0.38 \times 1.25 = 0.48$

APPENDIX-2

Ponding Requirements

Average Lot Area		8,300 Sq.Ft.
1/2 Roof Area	20x50	1,000 Sq.Ft.
Patio Area	10x10	100 Sq.Ft.
Rear Lawn Area		3,125 Sq.Ft.
Total Area Draining to Pond		4,225 Sq.Ft.

Runoff Coefficient

Impervious Area:

$$C = 0.80 \frac{1100}{4225} = 0.21$$

Pervious Area:

$$C = 0.12 \frac{3125}{4225} = \frac{0.09}{0.30}$$

$$C \times C_f = 0.30 \times 1.25 = 0.38$$

Pond Volume Requirements:

100 year 6-hour precipitation = 2.2 inch

Volume = Runoff Coefficient x Area x Precipitation

$V = 2.2/12 \times 0.38 \times 4225 = 295$ ft.^{3}

Depth of Pond 0.50 ft. (6")

Minimum Area of Pond = 590 ft.^{2}

Pond area as a percentage of area drained - 14.2% Use 15%

$V = 15.0 \times 4225 \times 0.5 = 357$ ft^3 area of pond = 317 ft.^{2} @ 0.5' deep.

SUBDIVISION LAMATRIPOSA SOUTH
LOCATION ALBUQUERQUE, N.M.
JOB NO.
DESIGN STORM 100 YR. RECURRENCE INTERVAL
MAJOR STORM 100 YR.
COMPUTATIONS BY _____ DATE _____

APPENDIX -3

RUNOFF COMPUTATIONS
(Rational Method)

Area Designation	A (Acres)	c	c_f	$\bar{c}$ = (c x c_f)	A·$\bar{c}$	ΣA·$\bar{c}$	tc (min)	I (in/hr)	Q = (ΣA·$\bar{c}$) x I cfs	Street capacity cfs	Flow in Pipe cfs	Pipe Dia. in.	Slope %	Length ft.	VEL V fps	Δt (min)	
A-1	2.41	0.53	1.25	0.66	1.59	1.59	25	3.78	6.0	56	–	–	0.5	1200	1.34	15	Ponded Lot @ 0.53
A-2	1.5	0.53	1.25	0.66	0.99	0.99	23.5	3.90	3.9	50	–	–	0.4	965	1.19	13.5	Ponded Lot @ 0.53
A-3	1.5	0.41 0.09	1.25	0.63	0.95	0.95	16.3	4.58	4.3	74	–	–	0.7	560	1.57	6.3	76.92% P @ 0.5 23.08% NP @ 0.3
A-1 → A-3	5.41	0.5 0.02	1.25	0.65	3.52	3.52	27.4	3.61	12.7	50	–	–	0.4	1240	1.19	17.4	93.47% P @ 0.5 6.53% NP @ 0.3
B-1	1.97	0.53	1.25	0.66	1.30	1.30	21.4	4.07	5.3	50	–	–	0.4	816	1.19	11.4	Ponded Lots @ 0.53
B-2	1.22	0.53	1.25	0.66	0.81	0.81	14.1	4.83	3.9	50	–	–	0.4	295	1.19	4.1	Ponded Lot @ 0.53
B-3	2.51	0.41 0.08	1.25	0.61	1.53	1.53	21.5	4.06	6.2	50	–	–	0.4	815	1.19	11.4	77.77% P @ 0.5 22.23% NP @ 0
B-1 → B-3	5.7	0.48 0.03	1.25	0.64	3.65	3.65	27.2	3.62	13.2	50	–	–	0.4	1230	1.19	17.2	91.30% P @ 0.5 8.70% NP @ 0.
C-1	0.28	0.53	1.25	0.66	0.18	0.18	11.0	5.25	1.0	100	–	–	1.62	130	2.4	1.0	Ponded Lot @ 0.53
A-1 → C-1	11.39	0.49 0.03	1.25	0.65	7.40	7.40	27.4	3.61	26.7	50	–	–	0.4	1240	1.19	17.4	92.55% P @ 0.5 7.45% NP @ 0.2
											–	–					

3.6 Continued

TABLE 3-2 (8)

RATIONAL METHOD RUNOFF COEFFICIENTS FOR COMPOSITE ANALYSIS

Character of Surface	Runoff Coefficients
Streets:	
Asphaltic	0.70 to 0.95
Concrete	0.80 to 0.95
Drives and Walks	0.75 to 0.85
Roofs	0.75 to 0.95
Lawns, Sandy Soil:	
Flat, 2%	0.05 to 0.10
Average, 2 to 7%	0.10 to 0.15
Steep, 7%	0.15 to 0.20
Lawns, Heavy Soil:	
Flat, 2%	0.15 to 0.20
Average, 2 to 7%	0.20 to 0.25
Steep, 7%	0.25 to 0.35

The coefficients in these two tabulations are applicable for storms of 5-year to 10-year frequencies. Less frequent higher-intensity storms will require modification of the coefficient because infiltration and other losses have a proportionally smaller effect on runoff, as given in the following section.

3.7 Adjustment for Infrequent Storms

The adjustment of the Rational Method for use with major storms can be made by multiplying the right side of the Rational Formula by a frequency factor C_f, which is used to account for antecedent precipitation conditions. The Rational Formula now becomes:

$$Q = CIAC_f \qquad (3\text{-}2)$$

The following table of C_f values can be used. The product of C times C_f should not exceed 1.0.

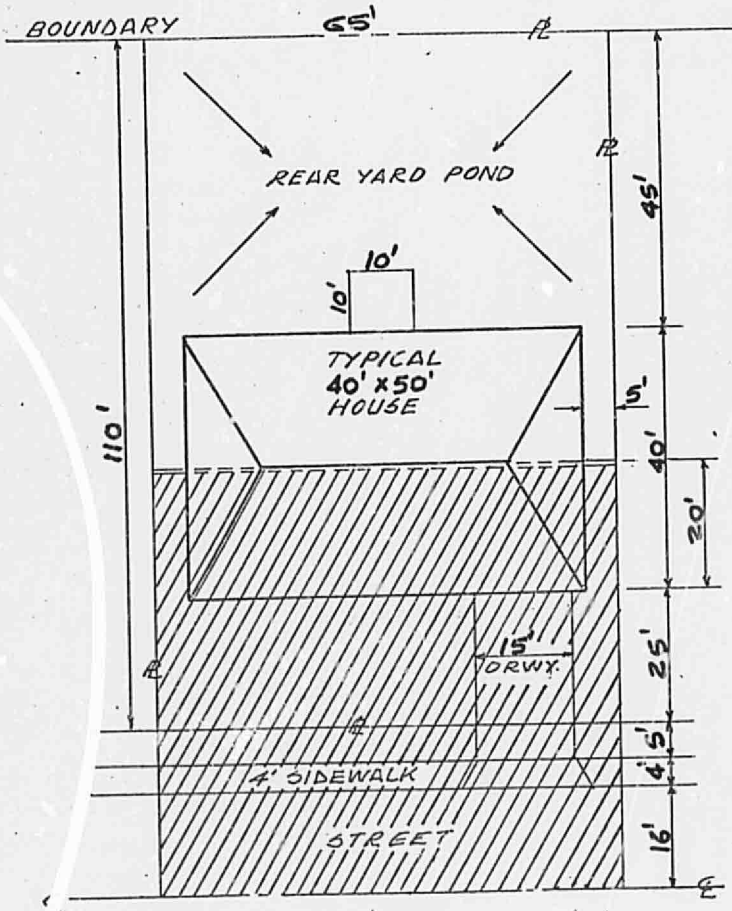
1-15-69

3.7 Continued

TABLE 3-3

FREQUENCY FACTORS FOR RATIONAL FORMULA

Recurrence Interval (years)	C_f
2 to 10	1.0
25	1.1
50	1.2
100	1.25



NOTE: REFER APPENDIX FOR CALCULATION

AREA DRAINED TO STREET

FIGURE II

TYPICAL LOT DRAINAGE

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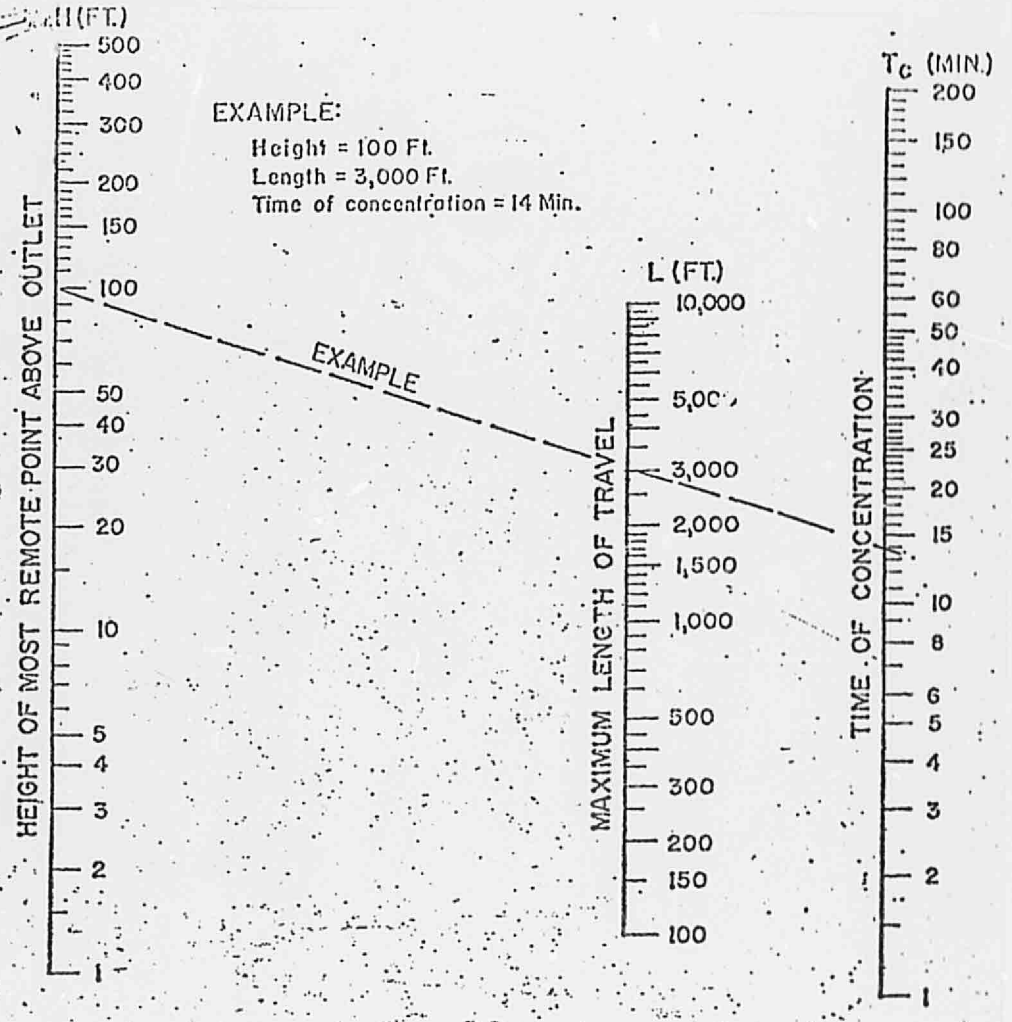

Based on study by P. Z. Kirpich,
Civil Engineering, Vol. 10, No. 6, June 1940, p. 332

TIME OF CONCENTRATION OF SMALL DRAINAGE BASINS

Reprinted from "Design of Roadside Drainage Channels - Hydraulic Engineering Circular No. 6", April 1962, U. S. Dept.

FIG. III

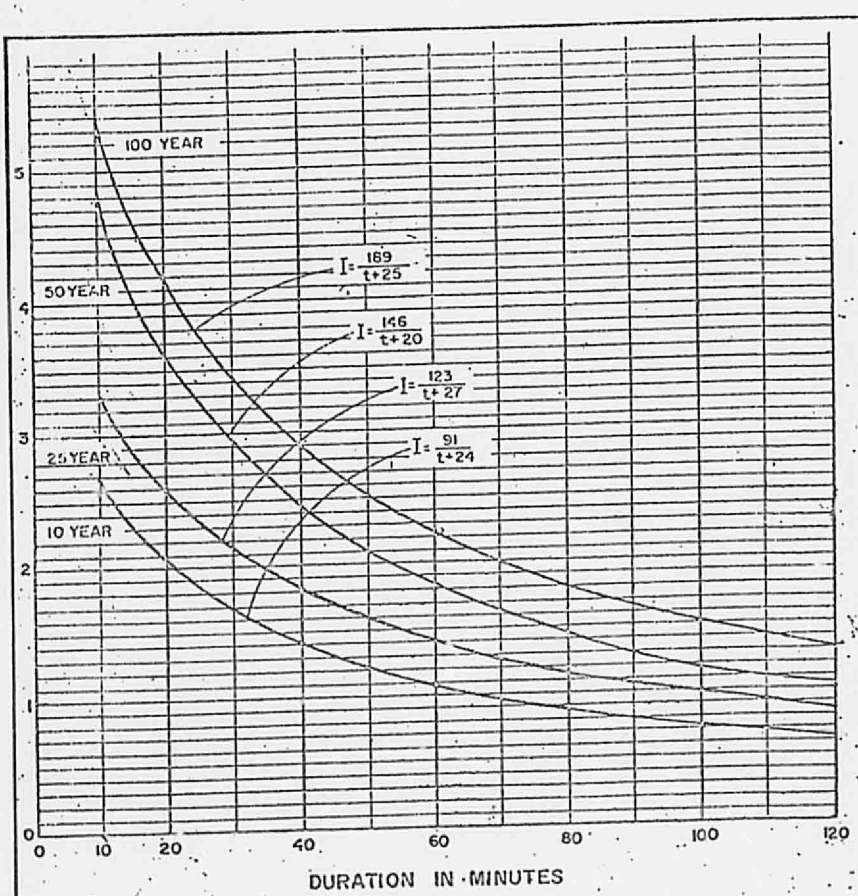

FIGURE - IV

MASTER PLAN OF DRAINAGE
CITY OF ALBUQUERQUE - NEW MEXICO
AND ENVIRONS

INTENSITY DURATION
FREQUENCY CURVES

(ALBUQUERQUE AREA - 1961)

GORDON HERKENHOFF & ASSOC
CONSULTING ENGINEERS

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FIG.G-INTENSITY EXPECTATION FOR ONE-HOUR RAINFALL.*

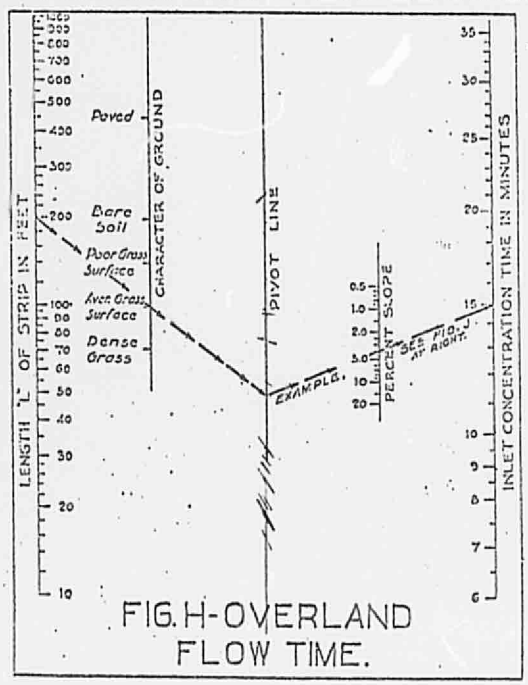

FIG. H-OVERLAND FLOW TIME.

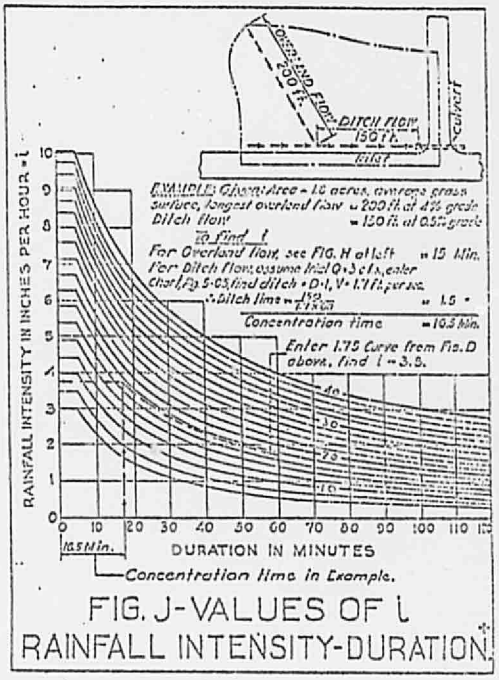

FIG. J-VALUES OF i RAINFALL INTENSITY-DURATION.†

*Reproduced from Miscellaneous Publication No. 204, U.S. Dept. of Agriculture, by David L. Yarnell.
†Adapted from Engineering Manual of the War Department; Part XIII, Chap. 1, Dec. '45.

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FIGURE V

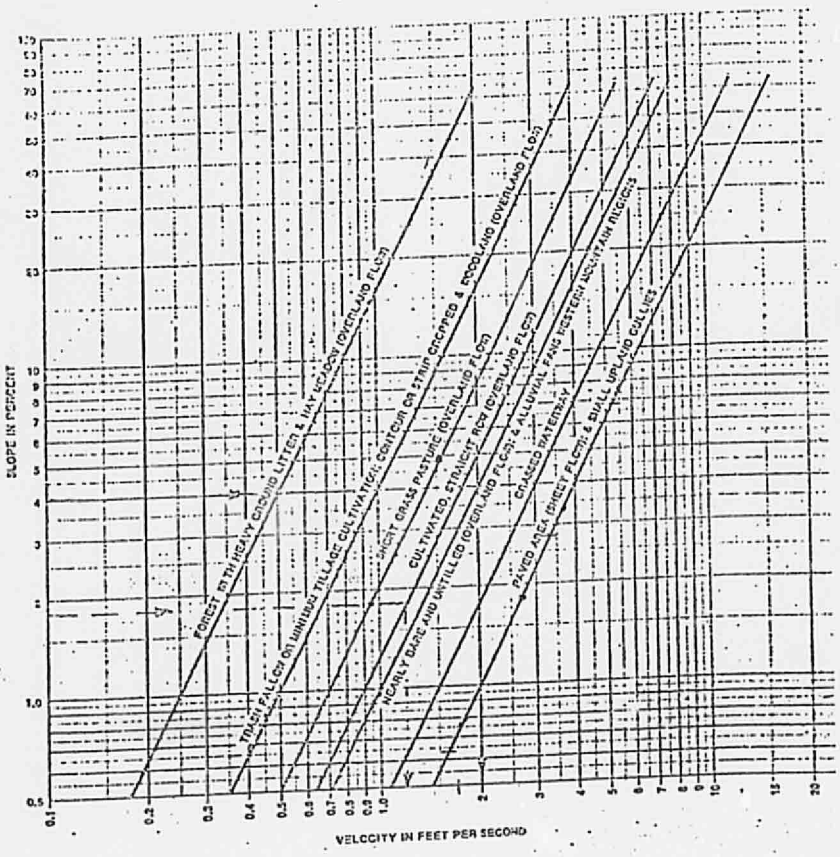

FIGURE VI

Velocities for upland method of estimating T_c

1843