HYDROLOGY D23/D1 7 PLANS

D23/D1

7 Plans

SANDIA HEIGHTS
UNITS 9 & 10

Bernalillo County, New Mexico

Supplement
to
DRAINAGE REPORTS
for
SANDIA PEAK
TRAM COMPANY

JULY
1973

BOHANNAN WESTMAN HUSTON

BOHANNAN WESTMAN HUSTON & ASSOCIATES INC.
4125 CARLISLE BLVD., N.E.
ALBUQUERQUE, NEW MEXICO 87107
PHONE 505 345-2681

July 26, 1973

Sandia Peak Tram Company
Number 10 Tramway Loop
Albuquerque, New Mexico 87122

Gentlemen:

We are submitting this Supplement to our previous Drainage Reports on Units 9 and 10 of the Sandia Heights Subdivision in order to insure that these Reports are consistent with the concepts discussed after their submittal. Specifically, it has been suggested that a diversion berm be constructed to confine flows coming out of the Domingo Baca Canyon to a specific arroyo.

Plate 1 of this Supplemental Report shows the flows generated in the Domingo Baca Canyon for the Standard Project Flood, and the associated flood plain limits utilizing the concept of the diversion berm. Plates 2 and 3 show cross sectional views along section lines indicated on Plate 1.

Flows in the arroyos were derived from the Standard Project Flood occurring in the Domingo Baca Canyon above and east of the subject property. In addition to these flows, local runoff from and through the property were calculated based on a one hundred (100) year, six (6) hour storm. The Corp of Engineers "Hydrologic Data for Flood Plain Information Study, Albuquerque Arroyos Part IV, Area 1-11 was very instrumental in determining the flows. This study was developed for the Embudo Canyon area but the terrain is similar enough in the Domingo Baca Canyon to use the study for this area.

Flows for the smaller local arroyos as well as incremental flows through the property along the Domingo Baca Canyon arroyos were calculated using the Rational Runoff approach.

Flood plain boundaries were calculated using Mannings formula and the cross sectional geometry of the arroyos.

We sincerely hope that this Supplemental Report will clear up any uncertainties regarding the consistency of previous Drainage Reports. If there are any further questions please feel free to contact this office.

Very truly yours,

Michial M. Emery

Michial M. Emery, P.E.
Chief Engineer

MME/mna
Enclosure

STATE OF NEW MEXICO
MICHIAL M.
EMERY
No. 5194
REGISTERED PROFESSIONAL ENGINEER

SUPPLEMENT
TO
DRAINAGE REPORTS
FOR
UNITS 9 & 10
SANDIA HEIGHTS SUBDIVISION

ITEM	PLATE#
FLOOD PLAIN LAYOUT AND BERM PLAN VIEW	1
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ARROYO CROSS SECTIONS AND TYPICAL BERM SECTION	3

BOHANNAN WESTMAN HUSTON

D23-D1

SANDIA HEIGHTS
UNIT 9

Bernalillo County, New Mexico

DRAINAGE REPORT
for
SANDIA PEAK
TRAM COMPANY

MARCH
1973

ROHLMAN WESTMAN HUSTON

ENGINEERS & PHOTOGRAMMETRISTS

BOHANNAN WESTMAN HUSTON & ASSOCIATES INC.

4125 CARLISLE BLVD., N.E.
ALBUQUERQUE, NEW MEXICO 87107
PHONE 505 345-2681

26 April 1973

Sandia Peak Tram Company
Number 10 Tramway Loop
Albuquerque, New Mexico 87122

Gentlemen:

We are submitting this Drainage Report to you on Sandia Heights Subdivision covering the development of Unit 9. The control of the runoff shall comply with the requirements of the Albuquerque Metropolitan Arroyo Flood Control Authority and with present City of Albuquerque policies.

We appreciate this opportunity to serve you. If any questions develop, we will be available to assist in your response.

Very truly yours,

Raymond R. Gibson, PE & LS
Civil Engineering Manager

RRG/teg

Enclosure

DRAINAGE REPORT

FOR

UNIT 9

SANDIA HEIGHTS SUBDIVISION

BERNALILLO COUNTY, NEW MEXICO

APRIL 1973

PREPARED FOR:

SANDIA PEAK TRAM COMPANY

NUMBER 10 TRAMWAY LOOP

ALBUQUERQUE, NEW MEXICO 87122

BY

BOHANNAN WESTMAN HUSTON AND ASSOCIATES, INC.

4125 CARLISLE BLVD NE

ALBUQUERQUE, NEW MEXICO

Raymond R. Gibson, PE & LS
Civil Engineering Manager

REGISTERED PROFESSIONAL ENGINEER AND LAND SURVEYOR
NO. 3789
NEW MEXICO
RAYMOND R. GIBSON

DRAINAGE REPORT
FOR
UNIT 9
SANDIA HEIGHTS SUBDIVISION

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PLATE 1 - Location Map

PLATE 2 - Floof Plain Layout

PLATE 3 - Drainage Area vs. Maximum Discharge Chart

DRAINAGE REPORT

SANDIA HEIGHTS SUBDIVISION
UNIT 9

LOCATION AND DESCRIPTION

Unit 9 of the Sandia Heights Subdivision is located east of Tramway Boulevard and approximately two and one-half (2.5) miles north of Albuquerque City limits. Unit 9 will cover an area of 117 acres and will be developed as R-1 single family lots exclusively.

The land slopes across the property from east to west at around 5%. The grass cover is poor in the present undeveloped state.

At the present time water flows off the property by way of numerous small channels and overland flow, external drainage passes along the south boundary in a large arroyo which discharges several miles to the west in the north diversion channel.

DRAINAGE BEFORE DEVELOPMENT

Unit 9 is in an unusual drainage situation in that it lies within an alluvial fan formed by runoff from Domingo Baca Canyon. Water flows onto the property at a number of points on the east boundary of the property. (See Plate 2). It then crosses the property in definite flood plains to the west side of the property where it exits.

METHOD

The Corps of Engineers Hydrologic Data for Flood Plain Information Study, Albuquerque Arroyo Part IV, Area 1 covers the Embudito Canyon Area. Since this area resembles closely in terrain and drainage the Domingo Baca Canyon, it was used in compiling this report. Their Drainage area vs. maximum peak discharge curves (See Plate 3) were used to calculate Q for the different terrain were used. As was the practice in the Tramway Boulevard Corridor and Drainage Study. Bohannan Westman Huston & Associtcs, Inc., September 1972, amounts of water produced in the Canyon were taken for the Standard Project Flood. Runoff from the property itself was calculated for a 100 year, 6 hour storm as required by the AMAFCA. Flood plains were defined to accomodate the expected runoff through them.

DRAINAGE AFTER DEVELOPMENT

There is a note on the plats to the effect that no construction will be permitted that interfores with natural drainage channels. The intent of this subdivision is to keep the area as natural as possible. Lots are large and streets will be constructed to drain water to the side and into natural channels. It is felt that what ever slight increase in runoff there is from roofs and hard surface roads will be more than overcome by ponding and velocity reduction caused by minor landscaping; planted areas, new trees, graveled areas, etc.

It is felt that the only way to avoid possible future flooding of the property from runoff out of Domingo Baca Canyon is to leave natural flood plains unobstructed.

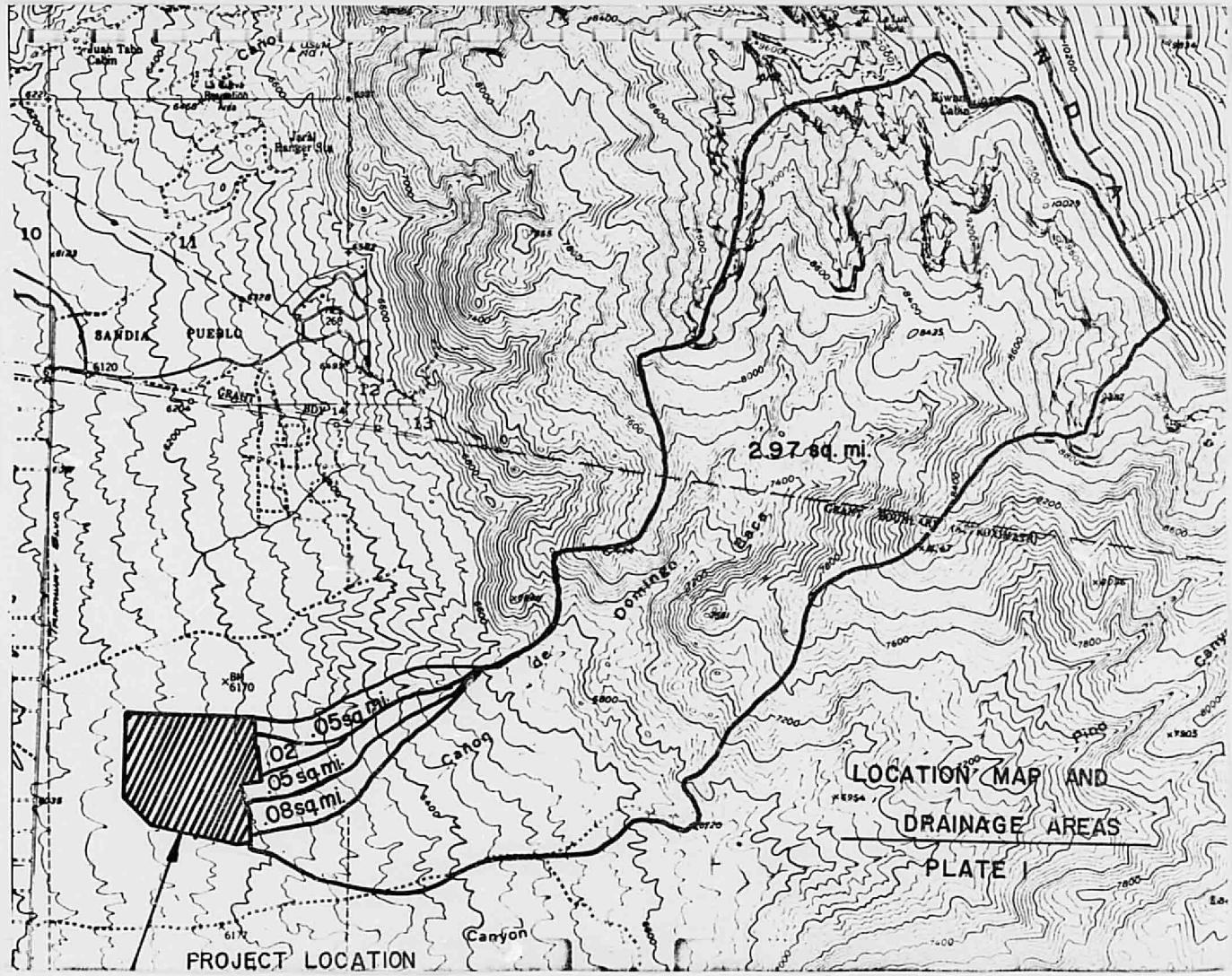
The major flood plan to the south will be designed to pass the Standard Project Flood when it is running full. Other channels will be designed to pass the 100 year, 6 hour storm.

CONCLUSIONS

Due to the size of the lots and the natural condition in which the land will be left it is felt no adverse increase in runoff will be created by the development in this area. It is also felt that if the non-obstruction of the floodways is required of individual lot developers and if the floodways are shown on the plat, there will be no damage done by water coming onto and through the property. With the recommendations made in this report, we feel the drainage plan for this property should be approved.

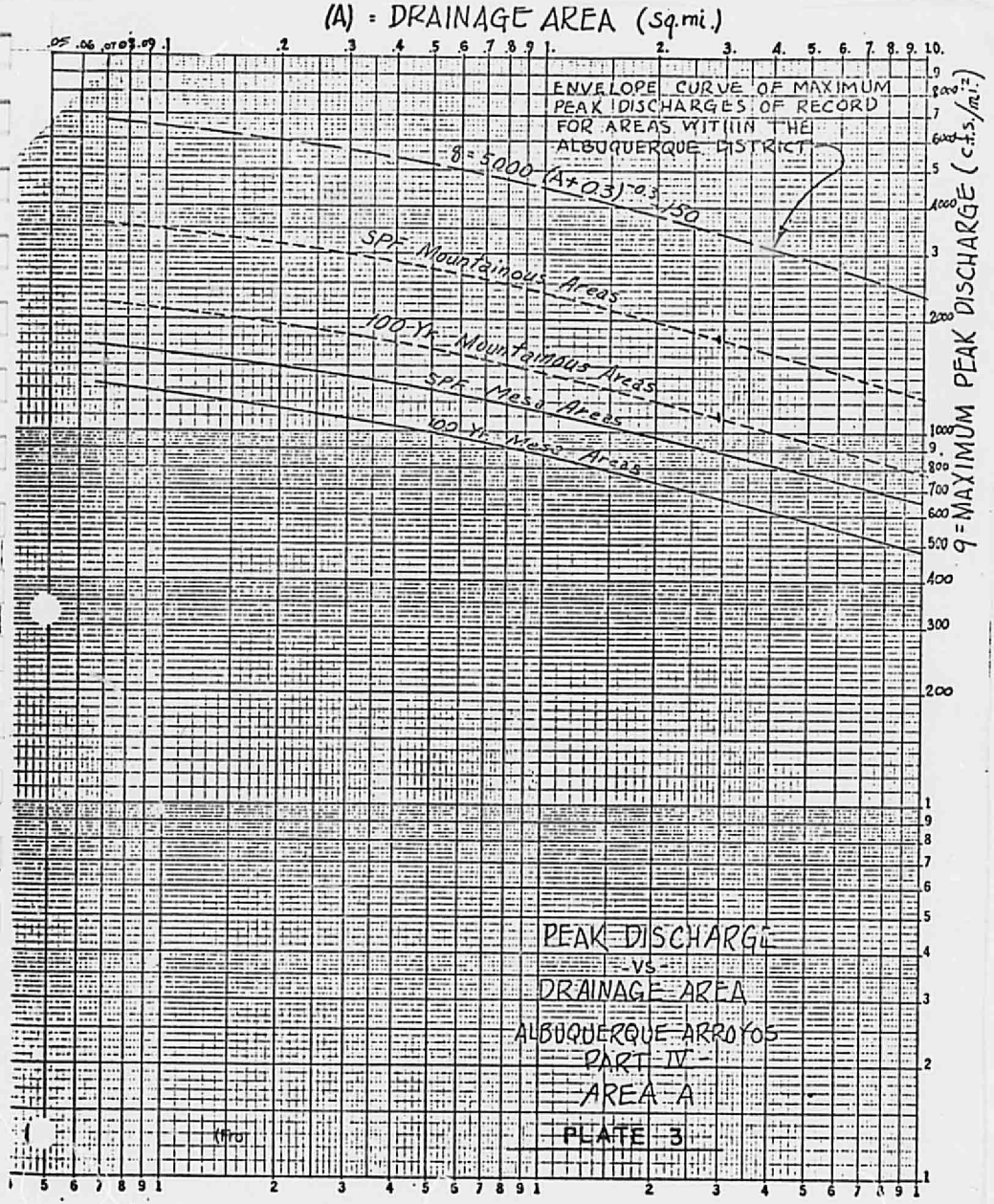
BIBILOGRAPHY

Department of the Army Corps of Engineers	Flood Plain Information Part I & IV 1971
King and Brater	Handbook of Hydraulics 1963
Gordon Herkenhoff and Associates for the City of Albuquerque	Master Plan of Drainage 1963
Bohannan Westman Huston and Associates, Inc.	Tramway Boulevard Corridor & Drainage Study 1972



LOCATION MAP AND DRAINAGE AREAS

PLATE I



(From Corp of Engineers Study)

EXHIBIT 3

BOHANNAN WESTMAN HUSTON

0243

SANDIA HEIGHTS
UNIT 10

Bernalillo County, New Mexico

DRAINAGE REPORT
for
SANDIA PEAK
TRAM COMPANY

JUNE
1973

BOHANNAN WESTMAN HUSTON

BOHANNAN WESTMAN HUSTON & ASSOCIATES INC.
ENGINEERS & PHOTOGRAMMETRISTS
4125 CARLISLE BLVD., N.E.
ALBUQUERQUE, NEW MEXICO 87107
PHONE 505 345-2681

11 June 1973

Sandis Peak Tram Company
Number 10 Tramway Loop
Albuquerque, New Mexico 87122

Gentlemen:

We are submitting this Drainage Report to you on Sandia Heights Subdivision covering the development of Unit 10. The control of the runoff shall comply with the requirements of the Albuquerque Metropolitan Arroyo Flood control Authority and with present City of Albuquerque policies.

We appreciate this opportunity to serve you. If any questions develop, we will be available to assist in your response.

Very truly yours,

Raymond R. Gibson, PE & LS
Civil Engineering Manager

RRG/dkw

enclosure

DRAINAGE REPORT

FOR

UNIT 10

SANDIA HEIGHTS SUBDIVISION

BERNALILLO COUNTY, NEW MEXICO

JUNE 1973

PREPARED FOR:

SANDIA PEAK TRAM COMPANY

NUMBER 10 TRAMWAY LOOP

ALBUQUERQUE, NEW MEXICO 87122

BY

BOHANNAN WESTMAN HUSTON AND ASSOCIATES, INC.

4125 CARLISLE BLVD. NE

ALBUQUERQUE, NEW MEXICO

REGISTERED PROFESSIONAL ENGINEER AND LAND SURVEYOR NO. 3789 NEW MEXICO RAYMOND R. GIBSON

Raymond R. Gibson, PE & LS
Civil Engineering Manager

DRAINAGE REPORT
FOR
UNIT 1C
SANDIA HEIGHTS SUBDIVISION

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PLATE 1 - Location Map

PLATE 2 - Drainage Area vs. Maximum Discharge Chart

PLATE 3 - Flood Plain Layout

PLATE 4 - ARROYO CROSS SECTIONS

PLATE 5 - ARROYO CROSS SECTIONS

DRAINAGE REPORT

SANDIA HEIGHTS SUBDIVISION
UNIT 10

LOCATION AND DESCRIPTION

Unit 10 of the Sandia Heights Subdivision is located east of Tramway Boulevard, approximately two and one-half (2-1/2) miles north of Albuquerque's City limits. It covers an area of 75 acres and is presently undeveloped. Plans call for developing Unit 10 exclusively as R-1 single family lots of approximately one acre or more each.

Unit 10 lies on an alluvial fan that extends westward from the Sandia Mountains. The land slopes at approximately 5% from east to west and has a moderate to poor grass cover.

DRAINAGE BEFORE DEVELOPMENT

Runoff from the Domingo Baca canyon formed the alluvial fan on which Unit 10 is located. The runoff flows across the property in an arroyo system that enters on the east and exits on the west. From there the arroyos extend on west to the northern diversion channel which is several miles away.

Water that falls on Unit 10 flows off via the arroyo from Domingo Baca Canyon and smaller arroyos that eventually tie into the Domingo Baca Arroyo. (See Plate 3).

METHOD

Flows in the arroyos were derived from the Standard Project Flood occurring in Domingo Baca Canyon above Unit 10 and a one hundred (100) year, six (6) hour storm falling on Unit 10. The Corp of Engineers "Hydrologic Data for Flood Plain Information Study, Albuquerque Arroyos Part IV, Area 1-11

was very instrumental in determining the flows. (See Plate 2) This study was developed for the Embudo Canyon area but the terrain is similar enough in the Domingo Baca Canyon to use it there.

The extent of the flows was calculated using Mannings formula and the cross sectional geometry of the arroyos. The flow boundaries are delineated on Plate 3 and cross sections are shown on plates 4 and 5.

DRAINAGE AFTER DEVELOPMENT

The intent of this subdivision is to keep the area as natural as possible. One of the main ways of doing this is to permit no construction that interferes with the natural drainage channels. There is a note to this effect on the plat of the area.

The lots and streets will be designed and constructed to drain into the natural arroyos, thus eliminating the need for storm sewers and other types of improved drainage structures and the high velocities and runoff rates they produce.

There is a tendency for streets and roofs to increase the runoff but this will be partially off set by ponding and longer retention times caused by minor landscaping, planted areas, graveled areas, ect. The flows from Unit 10 after development will not materially exceed the velocity or flow rate before development.

CONCLUSION

Leaving the flood ways completely open and in a natural state and extending their boundaries out far enough to carry flows produced by the Standard Project Flood falling in the Domingo Baca Canyon drainage area insures that the area will not be flooded by any rain that can reasonably be expected. The buffering effect of large lots, landscaping, and natural flood ways will insure that the flow rate and velocity of storm runoff will not be increased by development of the area. For these reasons it is felt that the drainage plan as presented in this report for Unit 10 should be approved.

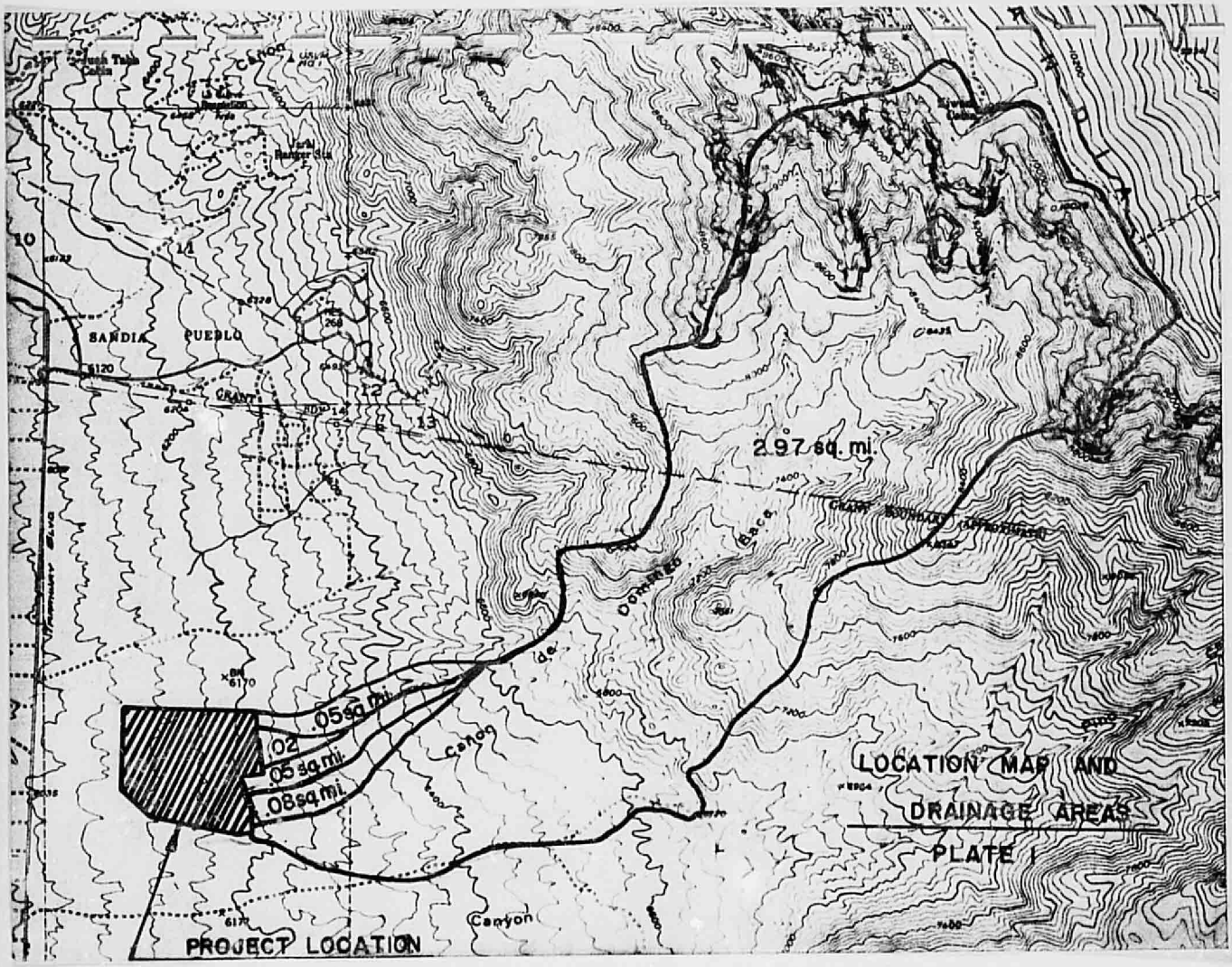
BIBILOGRAPHY

Department of the Army
Corps of Engineers — Flood Plain Information Part I & IV 1971

King and Brater — Handbook of Hydraulics 1963

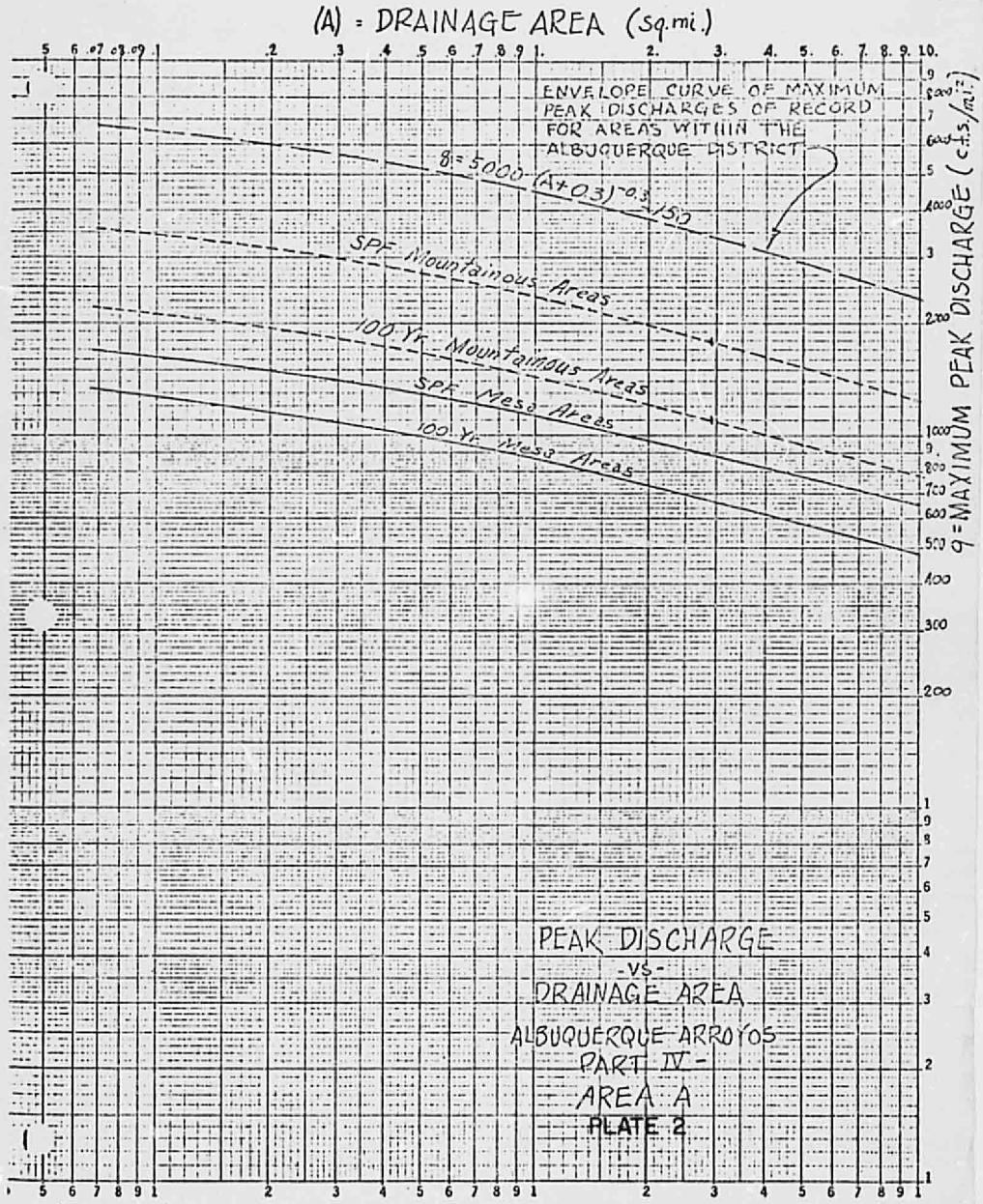
Gordon Herkenhoff and Associates for the City of Albuquerque — Master Plan of Drainage 1963

Bohannan Westman Huston and Associates, Inc. — Tramway Boulevard Corridor & Drainage Study 197[illegible]



LOCATION MAP AND DRAINAGE AREAS

PLATE I



(From Corp of Engineers Study)

BOHANNAN WESTMAN HUSTON