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STORM DRAINAGE STUDY
RELATIVE TO THE CONSTRUCTION OF
ALBUQUERQUE NATIONAL BANK
SILVER MOTORBANK
ALBUQUERQUE, NEW MEXICO

DECEMBER 1978

Boyle Engineering Corporation

STORM DRAINAGE STUDY
RELATIVE TO THE CONSTRUCTION OF
ALBUQUERQUE NATIONAL BANK
SILVER MOTORBANK
ALBUQUERQUE, NEW MEXICO

DECEMBER 1978

Boyle Engineering Corporation

consulting engineers

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115 Amherst S.E.
Albuquerque, New Mexico 87106

December 28, 1978

ATTENTION: Mr. Bob Moraga

DRAINAGE REPORT: ALBUQUERQUE NATIONAL BANK - SILVER MOTORBANK

Transmitted herewith is the report of studies conducted by this firm relative to storm runoff drainage considerations relative to the proposed development of the subject project.

The criteria and methods of analysis conform to standards of the Albuquerque Metropolitan Arroyo Flood Control Authority, and the City of Albuquerque, New Mexico.

We will be happy to answer any questions you may have about the conclusions and recommendations of this report.

BOYLE ENGINEERING CORPORATION

Victor J. Chavez

Victor J. Chavez, P.E.
Senior Civil Engineer

VJC:crm
encl:

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STORM DRAINAGE STUDY
RELATIVE TO THE CONSTRUCTION OF
ALBUQUERQUE NATIONAL BANK
SILVER MOTORBANK
ALBUQUERQUE, NEW MEXICO

I. PURPOSE:

The purpose of this report is to convey design parameters and storm runoff data relative to the construction of the Albuquerque National Bank, Silver Motorbank. Development plans outlined in this report are intended to maintain existing runoff conditions in the event of a 100-year storm as required in A.M.A.F.C.A. Resolution 1972-2.

II. SCOPE:

This report is limited to an investigation of the proposed development as outlined on sheet A-1 of the Appendix and its effect on existing storm runoff patterns and quantities. Methods incorporated are as promulgated by the Drainage Engineer of the City of Albuquerque. Design data is outlined in previous watershed studies referenced later in this report. Design parameters outlined in this report apply to the Nothernmost 225 feet of Block 26, Valley View Addition and are not intended for use elsewhere.

III. DRAINAGE CRITERIA:

(A) General: Resolution No. 1972-2, Albuquerque Metropolitan Arroyo Flood Control Authority.

(B) Project Storm: 100 year intensity: frequency duration as shown on the Curves, Chart 1, "1963 Master Plan of Drainage for the City of Albuquerque and Environs", as prepared by Gordon Herkenhoff and Associates, Inc., Consulting Engineers.

IV. LOCATION AND EXISTING CONDITIONS:

The site is located at the Southeast corner of the intersection of Silver and Adams S.E. The legal description is Lots 1 through 9 and 28 through 36 of Block 26, Valley View Addition, Albuquerque, New Mexico.

Total area of the site is 56,250 ft.^{2} or approximately 1.2913 Ac. The site is undeveloped at this time with a sparse grass cover. Soils underlying the site consists of products of the weathering of the Sandia Mountains and are of decomposed granite and limestone origin. Slopes on the site are characteristic of Albuquerque's Southeast Heights with a gentle slope to the Northwest. A small portion of the surrounding lots are developed with light commercial establishments. Runoff from these lots is transported by the fully developed streets in the area. North-South streets in the vicinity of Block 26 are sloped to carry runoff to either Central or Zuni. As a result of these existing slopes, runoff from areas immediately upstream of the site are prevented from entering the site. Jefferson Street S.E., which slopes to the North from the center of Block 26 with slopes varying from .0022 to .0106 has carrying capacities between 34.7 cfs and 77.2 cfs. Assuming that the entire area of Block 25 will contribute flow to Jefferson, the peak runoff will be approximately 10.2 cfs. It is apparent then that Jefferson has the capacity to divert the flow from upstream areas much as each North-South street east of the site.

Silver Avenue S.E. has an average slope of .009 and a capacity of 71 cfs. Each of the streets east of the site and intersecting Silver Avenue drain to the north. Each street acts to divert flows from Silver and it is not anticipated that the capacity of Silver will be exceeded causing overflows onto the site.

Existing conditions to the west and south drain away from the site and it can be concluded that flows from upstream areas will not enter the site.

V. PROPOSED CONDITIONS:

Development plans call for the construction of a motorbank with associated parking, driveway and landscaped areas. Twenty-five percent of the developed area will be landscaped, ten percent will be roof area and sixty-five

percent will be parking or sidewalks. The resulting coefficient of runoff is 0.81. The increased runoff will be handled by grading the lot to drain to a pond at the northwest corner of the site. The pond will be located in a landscaped area which will allow for disposal through percolation and evaporation. Overflow from the pond will be controlled by the existing top of curb elevations adjacent to the pond. Six inch curb will be installed along the south boundary of the site to direct local flows to Adams St. S.E. and thence to Silver Avenue which is the existing outlet for flows from the areas immediately adjacent to the south boundary. Flows to the ponding area will be from roofs and parking areas which will minimize both erosion and siltation. Some siltation will result from windblown dust and sand until adjacent areas have been developed but the amounts should be negligible.

VI. CONCLUSIONS AND RECOMMENDATIONS:

On the basis of the study of this report, the following recommendations are proposed:

1. Provide a six-inch curb along the south boundary line to prevent local flows from entering the southwest corner of the site.
2. Grade the site to direct on-site runoff to the northwest corner of the site.
3. Provide a minimum of 4651 $ft.^3$ of ponding volume for disposal through percolation and evaporation.
4. Provide city standard driveway pads to prevent runoff on Jefferson Street from entering the site.

Provided the above listed recommendations are implemented prior to or concurrent with the development of the property, it is concluded that

the proposed development will not create a flood hazard to surrounding properties, nor will the property itself be in danger of flooding.

Respectfully submitted:

BOYLE ENGINEERING CORPORATION

Victor J. Chavez

Victor J. Chavez, P.E.
New Mexico Registration No. 5713

VICTOR J CHAVEZ
STATE OF
NO. 5713
NEW MEXICO
REGISTERED PROFESSIONAL ENGINEER

APPENDIX

SITE CONDITIONS:

Area = 56250 ft.^{2} = 1.2913 Ac.

Slope = 1.16% to the Northwest

Length = 230'

Time of Concentration = tc = 13.5 min.

Rainfall Intensity = i = 189/tc + 25 = 189/13.5 + 25 = 4.91 in/hr.

EXISTING CONDITIONS:

Q = C i A

Q = .4 (4.91) (1.2913) = 2.54 cfs.

Vol. = .4 $(\frac{2.4}{12})$ (56,250) = 4500 ft.^{3}

PROPOSED CONDITIONS:

Determine future runoff coefficient

Landscaped Area = .4 (.3205) = .1282

Roof Area = .95 (.1292) = .1227

Paved Area = .95 (.8416) = .7995

1.0504

Coeff. = 1.0504/1.2913 = .8134

Q = .8134 (4.91) (1.2913) = 5.16 cfs.

Vol. = .8134 $(2.4/12)$ (56250) = 9151 ft.^{3}

Vol. of Retention Pond Required = 9151-4500 = 4651 ft.^{3}

Area Contributing to Pond = 30,776 ft.^{2} = .7065 Ac.

Coeff. = [28048 (.95) + 2728 (.4)] ÷ 30,776 = .9012

Vol. to Pond = .9012 $(\frac{2.4}{12})$ (30,776) = 5547 ft.^{3}

Runoff from Site including effects of ponding

Area = 25474 ft.^{2} = .585 Ac.

Coeff. = [13960 (.4) + 14240 (.95)] ÷ 28200 = .68

Q = .68 (.585) (4.91) = 1.95 cfs. < 2.54: o.k.

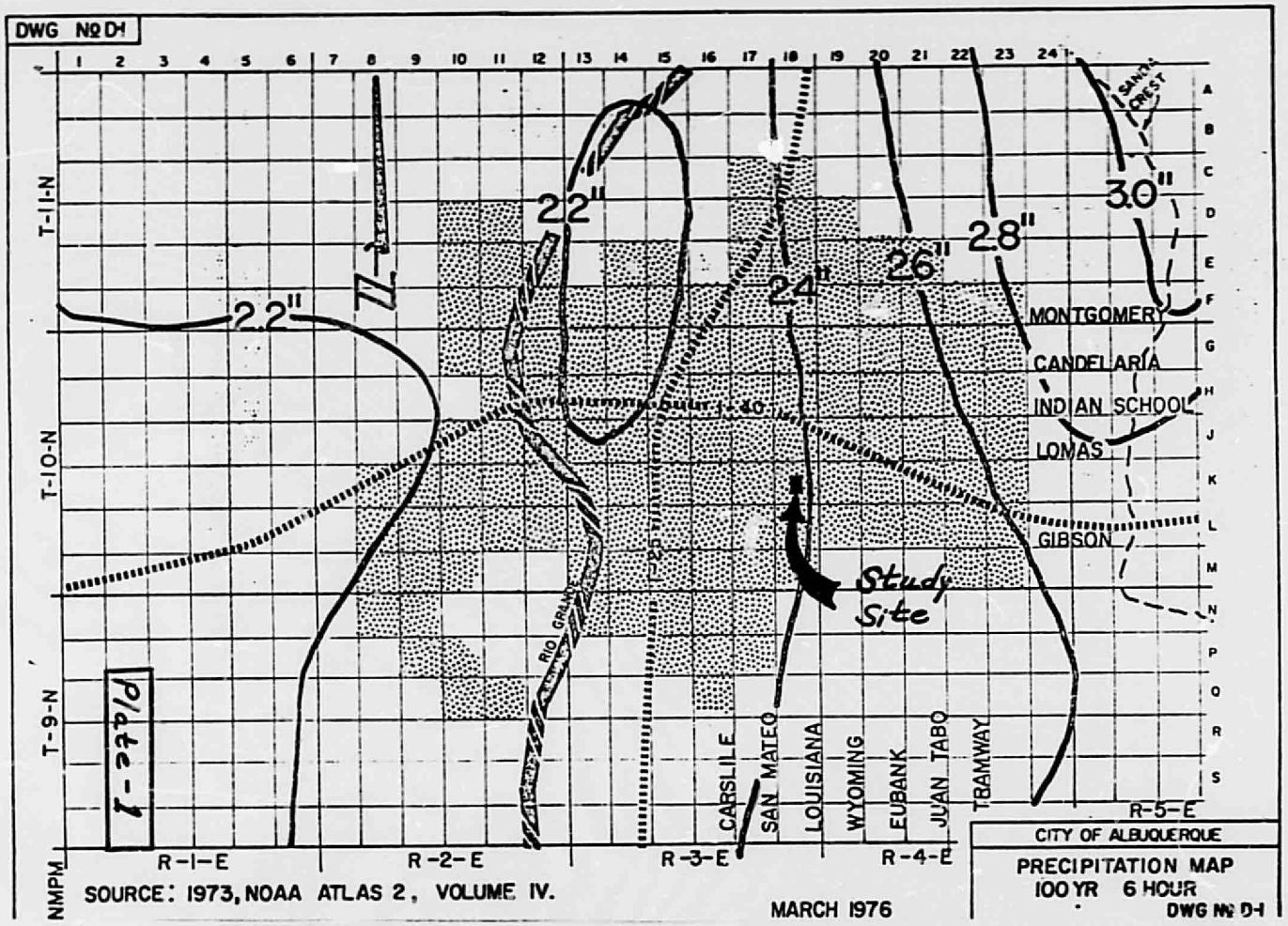
Vol. = .68 (25,474) $\left(\frac{2.4}{12}\right)$ = 3464 ft. <4500: o.k.

Determine Volume of Pond with overflow at 36.5 feet.

Area of 36.5' Contour = 3820 ft.^{2}

Area of 34.0' Contour = 620 ft.^{2}

Vol. of Pond = $\left[\frac{3820 + 620}{2}\right]$ 2.5 = 5550 ft.^{3}


DWG Nº D-1
T-11-N
T-10-N
T-9-N
NMPM
R-1-E
R-2-E
R-3-E
R-4-E
R-5-E
2.2"
2.2"
2.2"
2.4"
2.6"
2.8"
3.0"
MONTGOMERY
CANDELARIA
INDIAN SCHOOL
LOMAS
GIBSON
Study Site
CARSLILE
SAN MATEO
LOUISIANA
WYOMING
EUBANK
JUAN TABO
TRAMWAY
SANDIA CREST
RIO GRANDE
Plate-1
SOURCE: 1973, NOAA ATLAS 2, VOLUME IV.
MARCH 1976
CITY OF ALBUQUERQUE
PRECIPITATION MAP
100 YR 6 HOUR
DWG Nº D-1

DRAINAGE — RUNOFF — I

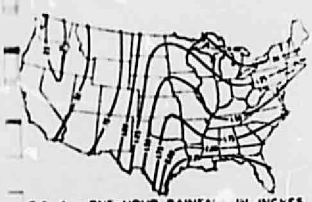


FIG A. - ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 2 YEARS.

FIG B. - ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 10 YEARS.

FIG C. - ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 50 YEARS.

FIG D. - ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 5 YEARS.

FIG E. - ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 25 YEARS.

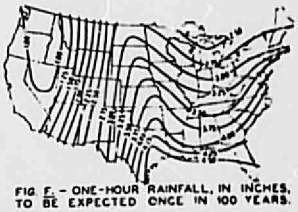


FIG F. - ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 100 YEARS.

* COMPUTATION OF i IN RATIONAL FORMULA.

EXAMPLE: Assume expectancy period = 5 years, See Fig. D assume locality, find 1 hour intensity = 1.75 in. per hour.

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

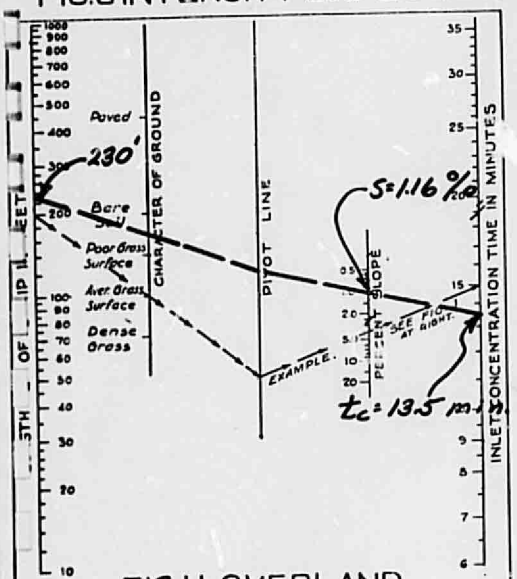


FIG. H-OVERLAND FLOW TIME.

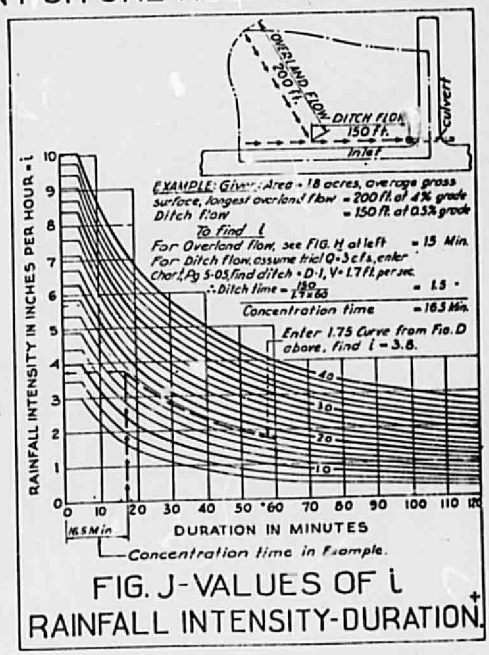
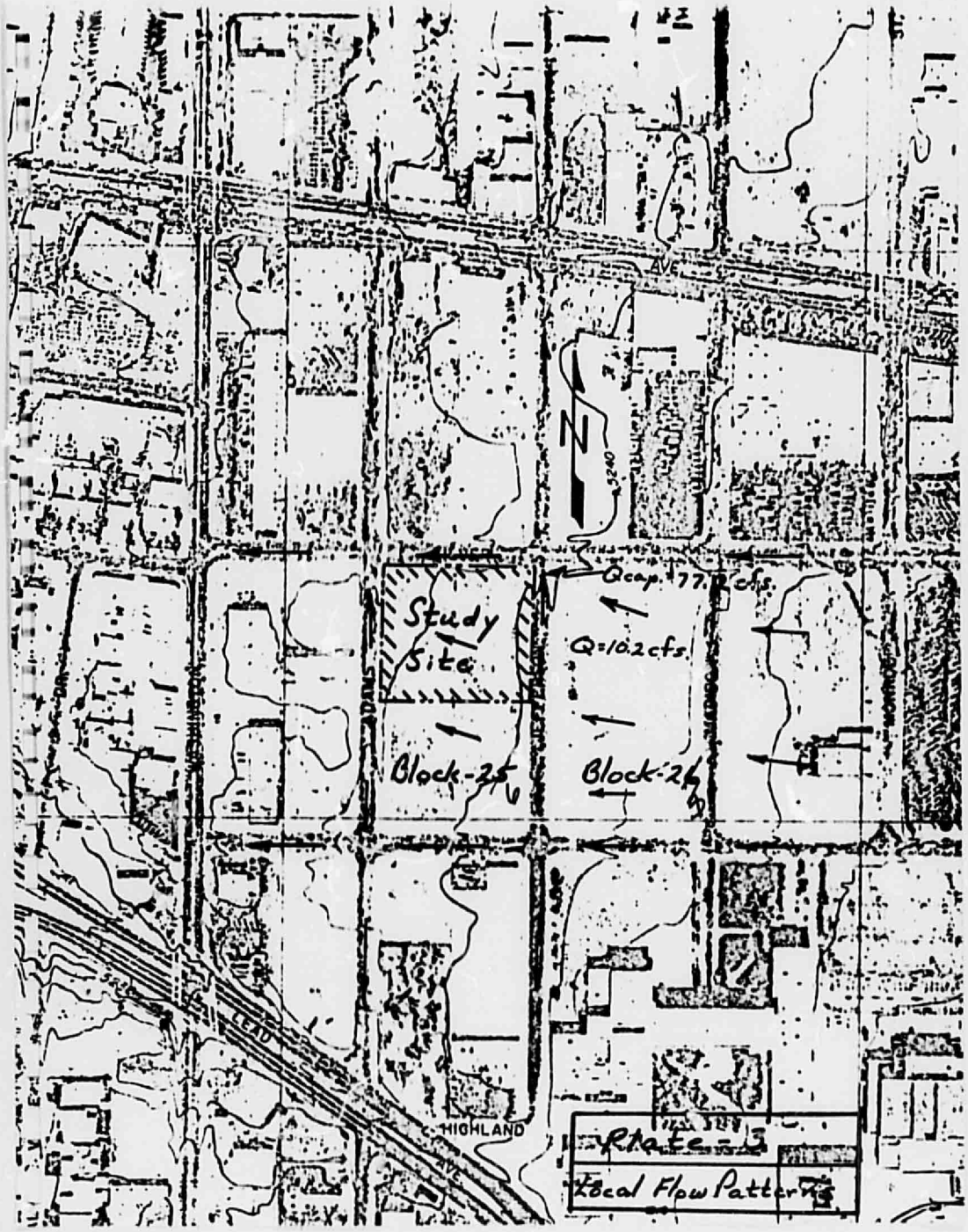


FIG. J-VALUES OF i RAINFALL INTENSITY-DURATION.†

* Reproduced from Miscellaneous Publication No 204, U.S. Dept. of Agriculture, by David L. Yarnell.

† Reproduced from Engineering Manual of the War Department; Part XIII Chap I Dec 45

Plate-2


Qcap. 77.8 cfs.
Study Site
Q=10.2cfs.
Block-25
Block-26
HIGHLAND
Rate-5
Local Flow Patterns