G21/D10

1 PLAN

WILSON & COMPANY
ENGINEERS & ARCHITECTS

P.O. BOX 3805

1921 SAN PEDRO N.E. ■ ALBUQUERQUE, NEW MEXICO 87110

505 255-4350

ENGINEERS
ARCHITECTS
PLANNERS

May 9, 1977

RECEIVED
MAY 10 1977
CITY ENGINEERS

Mr. V. M. Kimmick, City Engineer
City of Albuquerque
P. O. Box 1293
Albuquerque, NM 87103

Re: Drainage Report - Lake & Racquet Apartments
Located at Northwest Corner of Candelaria
Boulevard and Jane Place NE

Dear Mr. Kimmick:

Enclosed are two copies of the Engineer's Drainage Report for the proposed Lake & Racquet Apartment Complex located at the northwest corner of Candelaria Boulevard and Jane Place NE.

We will be glad to discuss the report with you or Mr. Conegliano.

Very truly yours,
WILSON & COMPANY

for Robert F. Sykes, P.E.

cc: Mr. Bob Davis
(With Enclosure)

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ENGINEER'S DRAINAGE REPORT

FOR

LAKE & RACQUET APARTMENTS

AT

NORTHWEST CORNER

OF

CANDELARIA BLVD. & JANE PLACE NE

ALBUQUERQUE, NEW MEXICO

WILSON & COMPANY
ENGINEERS ARCHITECTS
ALBUQUERQUE NEW MEXICO

MAY 1977

ENGINEER'S DRAINAGE REPORT
for
LAKE & RACQUET APARTMENTS
at
NORTHWEST CORNER
of
CANDELARIA BLVD. & JANE PLACE NE
ALBUQUERQUE, NEW MEXICO

PURPOSE: The purpose of this report is to analyze the amount of run-off that is being discharged from the property in its undeveloped state and compare that amount with the amount of run-off that will be discharged from the property when it is developed as an apartment complex. Then discuss the amount of run-off as it effects the overall drainage policy of the City of Albuquerque.

REFERENCES: A 100 year design frequency has been used to calculate the flow. The City of Albuquerque has adopted a drainage master plan which presents the following formula for calculating the probable intensity of rainfall for 100 year design storm:

$$i_{100} = \frac{189}{t_c + 25}$$

i_{100} = Rainfall intensity inches per hour

t_c = Time of concentration in minutes

Figure 2-3 "Velocities for Upland Method of Estimating t_c" from the U.S. Department of Agriculture, Soil Conservation Service publication Peak Rates of Discharge For Small Watersheds, Chapter 2, Revised 10/73 for New Mexico, Engineer Field Manual For Conservation Practices was used to determine anticipated velocity of the run-off.

The "Study Of The Embudo Arroyo System And Its Tributaries", 1976, prepared for the City of Albuquerque by Bohannan, Westman, Huston and Associates was used to determine the improvements required for the Embudito Arroyo that adjoins the project site.

RUN-OFF CALCULATION: The Rational Method was used to calculate the run-off from the study area. The Rational Formula is:

$Q = CiA$

Q = Quantity of run-off in cubic feet per second

C = Coefficient of run-off expressed in a ratio of rainfall to run-off

i = Rainfall intensity expressed in inches per hour

A - Drainage area expressed in acres

DISCUSSION: The project site is bounded on the south by Candelaria Blvd., on the east by Jane Place NE and on the north and west by the Embudito Arroyo. The site contains 7.31 acres and has a calculated 100 year run-off of 11.3 cfs as undeveloped property and a 100 year run-off of 29.7 cfs when developed as proposed in this report.

Since the project is immediately adjacent to the Embudito Arroyo and the majority of the run-off may be discharged directly to the Embudito Arroyo it is recommended that all the run-off be discharged immediately and not add to the peak flow conditions.

The Bohannan study recommends that the portion of the Embudito Arroyo that abuts the project site be paved with concrete. The paved section recommended has a 10 foot bottom with 1.5 to side slopes for height of 7 feet. The design flow given in the report is 1700 cfs and a velocity of 31.6 feet per second. City policy states that the developer shall be responsible for the cost of construction of paved channels when the peak run-off from a project storm is less than 2000 cfs.

G-21-Z

LOCATION MAP
LAKE & RACQUETEAPTS

COMP RFS

CK

DATE 3 March 1977

WILSON & COMPANY
ENGINEERS & ARCHITECTS
BOX 3305
ALBUQUERQUE
NEW MEXICO

LOC. Albuquerque FILE 77-502
PROJ. Lake & Racquet-II SHEET 1
SUBJ. Drainage Report OF 3

DRAINAGE AREA 1

Area = 23,950 ft^2 = 0.55 Ac

$s = \frac{1.5'}{200'} = .0075$ L = 200'

* V = 1.75 ft/sec

$t_c = \left(\frac{200}{1.75} \times \frac{1}{60}\right) + 5 = 6.9 min$ (5min for saturation)

$i_{100} = \frac{189}{t_c + 25} = \frac{189}{6.9+25} = 5.92$

C = 0.95 (100% Paving)

$Q_{100} = CiA = .95 \times 5.92 \times .55 = 3.09$ cfs

DRAINAGE AREA 2

Area = 72,090 ft^2 = 1.66 Ac

slope = $\frac{14}{470} = .0298$ L = 470'

* V = 3.5 ft/sec

$t_c = \left(\frac{470}{3.5} \times \frac{1}{60}\right) + 5 = 7.2$ min (5min for saturation)

$i_{100} = \frac{189}{t_c + 25} = \frac{189}{7.2+25} = 5.87$

$C = (.51)(.95) + (.49)(.35) = .48 + .17 = .65$

$Q_{100} = CiA = .65 \times 5.87 \times 1.66 = 6.33$ cfs

* Fig 2-3 SCS Engineering Field Manual - "Peak Rates of Discharge For Small Watersheds"

DRAINAGE AREA 3

Area = 38,470 ft^2 = 0.88 Ac.

$S = \frac{8'}{350'} = .0229$ L = 350'

* V = 3 ft/sec

$t_c = \left(\frac{350}{3} \times \frac{1}{60}\right) + 5 = 6.94$ min (5 min for saturation)

$i_{100} = \frac{189}{t_c + 25} = \frac{189}{6.94 + 25} = 5.92$

$C = (.69)(.95) + (.31)(.35) = .66 + .11 = .77$

$Q_{100} = CiA = .77 \times 5.92 \times .88 = 4.01$ cfs

DRAINAGE AREA 4

Area = 82,950 ft^2 = 1.90 Ac.

$S = \frac{8'}{370'} = .0216$ L = 370'

* V = 2.95 ft/sec

$t_c = \left(\frac{370}{2.95} \times \frac{1}{60}\right) + 5 = 7.09$ min (5 min for saturation

$i_{100} = \frac{189}{t_c + 25} = \frac{189}{7.09 + 25} = 5.89$

$C = (.51)(.95) + (.49)(.35) = .48 + .17 = .65$

$Q = CiA = (.65)(5.89)(1.90) = 7.27$ cfs

COMP RFS

CK.

DATE 3 March 1977

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LOC. Albuquerque FILE 77-502

PROJ. Lake & Racquet II SHEET 3

SUBJ. Drainage Report OF 3

DRAINAGE AREA 5

Area = 101,120 ft^2 = 2.32 Ac.

$S = \frac{19}{880} = .0216$ L = 880'

* V = 2.95 ft/sec

$t_c = \left(\frac{880}{2.95} \times \frac{1}{60}\right) + 5 = 9.97 \text{ min}$ (5 min. for saturation)

$i_{100} = \frac{189}{t_c + 25} = \frac{189}{9.97 + 25} = 5.40$

$C = (.61)(.95) + (.39)(.35) = .58 + .14 = .72$

$Q = CiA = (.72)(5.40)(2.32) = 9.02$ cfs

$Q_T = 3.09 + 6.33 + 4.01 + 7.27 + 9.02 = 29.72$ cfs.

RUN-OFF - UNDEVELOPED

A = 7.31 Ac

$S = \frac{35}{1325} = .0264$ L = 1325'

* V = 1.70 ft sec

$t_c = \left(\frac{1325}{1.70} \times \frac{1}{60}\right) + 5 = 17.99$ min (5 min for saturation)

$i_{100} = \frac{189}{17.99 + 25} = 4.40$

C = 0.35

$Q_{100} = CiA = (.35)(4.4)(7.51) = 11.26$ cfs

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