HYDROLOGY H15/D9 9 PLANS

H15/D9

9 PLANS

September 12, 1978

City Engineer
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

ATTENTION: Mr. Dwayne Sheppard

REFERENCE: Broadbent Business Center, Phase II

Gentlemen:

Dan Armstrong, the contractor for the expansion of the Broadbent Business Center, asked me to relay the following data to you concerning the channel located south of the project. Mr. Kielich of your Design Section supplied the estimated flow rate of 900 cfs that could be experienced in the channel. Based upon the topo for the grading plan, the channel section has a 20' bottom width, average 4:1 S:S, and a channel grade line of 1%. Using an "N" value of 0.030, the depth of flow = 3.2', flow cross section= 105.1 ft.^{2}, velocity of flow = 8.6'/sec.

Respectfully,

Christopher L. Weiss

Christopher L. Weiss, P.E., for
CHAMBERS, CAMPBELL, ISAACSON & CHAPLIN, INC.

CLW:dd

cc: Dan Armstrong

Chambers, Campbell, Isaacson, Chaplin, inc.
architects engineers planners 3500 indian school road ne albuquerque new mexico 87106 505-266-5521

WILSON & COMPANY
ENGINEERS & ARCHITECTS
P.O. BOX 3305
1921 SAN PEDRO N.E. ■ ALBUQUERQUE, NEW MEXICO 87110
505 255-4350
ENGINEERS
ARCHITECTS
PLANNERS

Mail file
Broadbent Business Park

RECEIVED
JUN 24 1977
CITY ENGINEERS

June 23, 1977

Mr. Bruno Conegliano
Assistant City Engineer-Hydrology
City of Albuquerque
P. O. Box 1293
Albuquerque, NM 87103

Re: Broadbent Business Park Drainage Report

Dear Mr. Conegliano:

In reply to your letter dated June 16, 1977, please be advised that all three provisions have been complied with.

Very truly yours,
WILSON & COMPANY

Robert F. Sykes, P.E.

-sp

WILSON & COMPANY
ENGINEERS & ARCHITECTS
1921 SAN PEDRO N.E. ▪ P.O. BOX 3305 ALBUQUERQUE, NEW MEXICO 87110
505 255-4950
ENGINEERS
ARCHITECTS
PLANNERS

RECEIVED
JUN 24 1977
CITY ENGINEERS

June 23, 1977

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City of Albuquerque
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Robert F. Sykes, P.E.

-sp

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

MAYOR
Harry E. Kinney

CHIEF
ADMINISTRATIVE OFFICER
Frank A. Kleinhenz

drainage file

June 16, 1977

Mr. Robert F. Sykes
Wilson & Company
1321 San Pedro
Albuquerque, New Mexico 87110

Re: Broadbent Business Park Drainage Report

Dear Mr. Sykes:

In reply to your letter dated June 8, 1977, please be advised that the original drainage plan with the amendments submitted, is acceptable provided that:

1. Additional protection be established on the bank opposite to the outfall point of the pipe.

2. The last section of pipe be corregated metal pipe asphalt coated.

3. The alignment of said last segment be rotated 30° in a down stream direction.

If there are any questions, please do not hesitate to contact me.

Very truly yours,

Bruno Conegliano

Bruno Conegliano
Assistant City Engineer-Hydrology

BC/kr

cc - V. M. Kimmick, City Engineer
Drainage File

WILSON & COMPANY
ENGINEERS & ARCHITECTS
1921 SAN PEDRO N.E. ■ P.O. BOX 9305 ALBUQUERQUE, NEW MEXICO 87110
505 255-4250
ENGINEERS
ARCHITECTS
PLANNERS

June 8, 1977

Mr. Bruno Conegliano
Assistant City Engineer-Hydrology
City of Albuquerque
P. O. Box 1293
Albuquerque, NM 87103

Re: Broadbent Business Center

Dear Mr. Conegliano:

In response to your letter dated 10 May 1977, we have the following wish to amend the original drainage report as follows:

1. We will provide an interceptor ditch and dike along the north side of the property until such time the proposed access road is constructed. The anticipated runoff from the undeveloped area to the northeast is 8.3 c.f.s.

2. The Broadbent Development Co. does not have control of the land thru which the existing channel has been constructed. This property belongs to the Menaul School. If Broadbent decides to develop the property adjacent to the Channel, they will be glad to provide the City with the necessary easements.

3. Broadbent will obtain easements from Menaul School to construct the storm sewer from their property to the drainage ditch. This would be a private storm sewer and would not be the City's responsibility to maintain the storm sewer.

4. We have enclosed the following information for your review:

   a. Site Grading Plan
   b. Utility Layout Plan Including Storm Sewer
   c. Storm Sewer Profile Sheet
   d. Calculation For Offsite Drainage

Please let us know if you need additional information.

Very truly yours,
WILSON & COMPANY

Robert F. Sykes, P.E.

Enclosures

-sp

WILSON & COMPANY
ENGINEERS & ARCHITECTS

P.O. BOX 3805

1321 SAN PEDRO N.E. ▪ ALBUQUERQUE, NEW MEXICO 87110

505 255-4250

ENGINEERS
ARCHITECTS
PLANNERS

June 8, 1977

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Assistant City Engineer-Hydrology
City of Albuquerque
P. O. Box 1293
Albuquerque, NM 87103

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WILSON & COMPANY

Robert F. Sykes, P.E.

Enclosures

-sp

WILSON & COMPANY
ENGINEERS & ARCHITECTS
BOX 3308
ALBUQUERQUE
NEW MEXICO

COMP.
CK.
DATE 8 June 1977

LOC. Albuquerque FILE 77-
PROJ. Broadbent SHEET 1
SUBJ. Offsite Drain. OF 1

Offsite Area

$$A = \frac{700 \times 700}{2} \div \frac{1}{43560} = 5.62 \text{ Ac.}$$

$$t_c = \left(980 \text{ ft} \times \frac{1}{1.1 \text{ ft/sec}} \times \frac{1}{60 \text{ sec/min}}\right) + 5 = 19.8 \text{ min}$$

$$i_{100} = \frac{189}{t_c + 25} = \frac{189}{19.8 + 25} = \frac{189}{44.8} = 4.22$$

$$C = .35$$

$$Q_{100} = CIA = .35 \times 4.22 \times 5.62 = 8.30 \text{ cfs}$$

WILSON & COMPANY
ENGINEERS & ARCHITECTS
P.O. BOX 2205
1921 SAN PEDRO N.E. ■ ALBUQUERQUE, NEW MEXICO 87110
505 255-4350
ENGINEERS
ARCHITECTS
PLANNERS

June 8, 1977

Mr. Bruno Conegliano
Assistant City Engineer-Hydrology
City of Albuquerque
P. O. Box 1293
Albuquerque, NM 87103

Re: Broadbent Business Center

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Very truly yours,
WILSON & COMPANY

Robert F. Sykes, P.E.

Enclosures

-sp

THIS DOCUMENT IS THE BEST POSSIBLE REPRODUCTION DUE TO THE POOR QUALITY OF THE ORIGINAL DOCUMENT

WILSON & COMPANY
ENGINEERS & ARCHITECTS
BOX 3308
ALBUQUERQUE
NEW MEXICO

COMP.
CK.
DATE 8 June 1977

LOC. Albuquerque FILE 77-
PROJ. Broadbent SHEET 1
SUBJ. Offsite Drain. OF 1

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SEND WHITE & PINK COPIES INTACT. WHITE COPY WILL BE RETURNED WITH REPLY.

31981

REPLY-MEMO RM-87

TO
Bruno Cangliano
City of Alb.
P.O. Box 1293
City 87103

FROM
CHAMBERS — CAMPBELL — ISAACSON — CHAPLIN, INC.
ARCHITECTS — ENGINEERS — PLANNERS
3500 Indian School Rd., N.E. Albuquerque, New Mexico 87106
Telephone (Area 505) 266-5521

SUBJECT Broadbent Business Center

DATE 6/6/78

MESSAGE:
Returned in your file copy of Broadbent Business Center, Phase I.

Thank you

Jim Isaacson

ORIGINATOR-DO NOT WRITE BELOW THIS LINE REPLY TO → SIGNED

REPLY

DATE SIGNED

SEND PARTS 1 AND 3 INTACT-PART 1 WILL BE RETURNED WITH REPLY

RM-87

RETURN TO ORIGINATOR

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

MAYOR
Harry E. Kinney

CHIEF
ADMINISTRATIVE OFFICER
Frank A. Kleinhenz

May 10, 1977

Mr. Rex Eberline
Wilson & Company
Engineers & Architects
P.O. Box 3305
Albuquerque, New Mexico 87110

Dear Mr. Eberline:

I have reviewed the plan for Broadbend Business Center, and while I am in general concurrence with the method employed to drain the property, I have several reservations regarding the overall scope of the development.

In the first place, I cannot agree with assumption that the flow from the northeast will be intercepted by the street along the north side of Phase I development and by the existing frontage road. Since the City has no information regarding such a proposal nor any indication by the developer about the time of execution of the interceptor street, an independent mode of conveyance or additional capacity in the storm sewer needs to be provided.

Secondly, the existing channel to the south has exceeded the bounds of the right-of-way and additional right-of-way must be provided (including some protective and maintenance berm) or a storm sewer of sufficient capacity (a 100-year storm) needs to be installed to replace the channel.

Thirdly, a drainage easement needs to be described over a proposed storm sewer for maintenance and protection purposes. For my purpose, I will need a preliminary profile of the storm sewer together with some details of the erosion control facilities proposed at the outfall. I am somewhat concerned that the rip-rap shown on the plans may not be sufficient to protect the opposite bank, given the high outfall velocity of the runoff.

I would also strongly recommend that a protective swale be built on the top of the bank to intercept the surface runoff and convey it into the storm sewer through an appropriate inlet.

If you need to discuss the matter further, do not hesitate to contact me.

Very truly yours,

Bruno Conegliano
Assist. City Engineer-Hydrology

BC/kr

cc - Jim Smith AMAFCA
V. M. Kimmick
Drainage File

WILSON & COMPANY
ENGINEERS & ARCHITECTS
P.O. BOX 3305
1921 SAN PEDRO N.E. ■ ALBUQUERQUE, NEW MEXICO 87110
505 255-4250
ENGINEERS
ARCHITECTS
PLANNERS

Bruno — Sir

April 5, 1977

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

RECEIVED
APR 06 1977
CITY ENGINEERS

Re: Broadbent Business Center
Drainage Report

Dear Mr. Kimmick:

Enclosed are two copies of the Broadbent Business Center Drainage Report for your review and approval if found satisfactory.

Please feel free to give us a call if you have any questions. We appreciate your prompt attention to this matter.

Very truly yours,
WILSON & COMPANY

Robert F. Sykes, P.E.

cc: Mr. Ron Jenson
Broadbent Development Co.

Mr. Royce A. Berg
Leason F. Pomeroy Northwest

Enclosures

-sp

ENGINEER'S DRAINAGE REPORT

FOR

BROADBENT BUSINESS CENTER

ON

WEST I-025 FRONTAGE ROAD

BETWEEN MENAUL BLVD.

&

CANDELARIA BLVD. NE

ALBUQUERQUE, NEW MEXICO

REGISTERED PROFESSIONAL ENGINEER
STATE OF
NO.
4591
NEW MEXICO
ROBERT F. SYKES

WILSON & COMPANY
ENGINEERS & ARCHITECTS
1321 SAN PEDRO DR. NE
ALBUQUERQUE, NEW MEXICO

APRIL 1977

(77-508)

WILSON & COMPANY
ENGINEERS
ARCHITECTS

ENGINEER'S DRAINAGE REPORT

FOR

BROADBENT BUSINESS CENTER

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 it with the amount of run-off that can be expected from the property when it is fully developed as a office-warehouse and business complex. Then discuss what measures will be taken to handle the run-off property when it is developed.

CLIMATOLOGICAL INFORMATION: 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

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 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 located east of the Menaul School Detention Pond and north of the detention pond inlet ditch. The City used a run-off factor of 0.90 for this area when they sized the Menaul Detention Pond; therefore we recommend that the run-off from the developed property be discharged to the inlet ditch as quickly as possible.

It has been assumed the flow from the northeast will be intercepted by the proposed street along the north side of Phase I development and by the existing Frontage Road.

The Phase I has been divided into three drainage areas. The run-off from each area will be directed to a Single Type "C" inlet and then discharged to a storm drain system that will discharge to the open ditch that empties into the detention pond.

The discharge velocity will be reduced by use of a dissipator or rip-rap at the outlet structure.

The run-off calculations and a drainage map with contours are attached to this report.

H-15-Z

BROADBENT DEVELOPMENT
LOCATION MAP

COMP. RFS

CK.

DATE 28 March 1977

WILSON & COMPANY
ENGINEERS & ARCHITECTS
BOX 3305
ALBUQUERQUE
NEW MEXICO

LOC. Albuquerque FILE 77-508

PROJ. Broadbent SHEET 1

SUBJ. Drainage Rept. OF

Phase I
Area = 5.27 Ac Undeveloped C = 0.35 Developed C = 0.95
Assume Time Of Concentration = 5 min.

Flow Undeveloped (100 yr)
$Q = CiA \quad i_{100} = \frac{189}{t_c + 25} = \frac{189}{30} = 6.30$

$Q_{100} = (.35)(6.30)(5.27) = 11.62$ cfs

Flow Developed
$Q = CiA$
$Q_{100} = (.95)(6.30)(5.27) = 31.54$ cfs

100 yr. Design Storm The Peak Rate of Run-off is increased 19.92 cfs

Assume The Following

1. Flow from northeast will be intercepted by proposed street along north side of Phase I and by the existing Frontage Road
2. City will allow immediate discharge to existing ditch
3. Use C = 0.95 for developed property
4. Use $i_{100} = \frac{189}{t_c + 25}$ (Albuquerque Master Drainage Plan)

DRAINAGE AREA NO. 1

Area = 58' x 460' = 26680 ft² = 0.61 Ac
t_c = 5 min $\quad i_{100} = \frac{189}{t_c + 25} = 6.30$

C = 0.95
$Q_{100} = CiA = (.95)(6.30)(0.61) = 3.65$ cfs

COMP. RFS
CK.
DATE 28 March 1977

WILSON & COMPANY
ENGINEERS & ARCHITECTS
BOX 3305
ALBUQUERQUE
NEW MEXICO

LOC. Albuquerque FILE 77-508
PROJ. Broadbent SHEET 2
SUBJ. Drainage Report OF

Check Capacity of City Alb. Single "C" Inlet.

Grate Capacity = (3)(Perimeter Grate)$(h)^{3/2}$

$h = 6" = 0.50'$ Per = 2(3.33+2.08) = 10.82 ft

$Q_{GRATE} = (3)(10.82)(.5)^{3/2} = 11.48$ cfs

Curb Opening Capacity = $(C)(A)(2gh)^{1/2}$

C = 0.60
A = Area Opening = (.5)(3) = 1.5 ft²
g = 32.16
h = head top water to ℄ opening = 7¾" = 0.65'

$Q_{CURB\ OPEN} = (.6)(1.5)(2 \cdot 32.16 \cdot 0.65)^{1/2} = 5.82$ cfs

TOTAL CAPACITY = 11.48 + 5.82 = 17.30 cfs

∴ 18" Pipe @ Min Grade 1% Assume (.50) head

$Q\ Cap = Av = (.75)^2(\pi)\left(\frac{1.486}{.013}\right)\left(\frac{.75}{2}\right)^{2/3}(.01)^{1/2}$

$Q_{cap} = (1.77)(114.31)(.52)(.10) = 10.5$

15" Pipe @ Minimum Grade 1% Assume (.50) head

$Q\ cap = (.625)^2(\pi)\left(\frac{1.486}{.013}\right)\left(\frac{.625}{2}\right)^{2/3}(.01)^{1/2}$

$Q_{cap} = (1.23)(114.31)(.46)(.10) = 6.47$ cfs ← Use

DRAINAGE AREA NO. 2
Area = 77,560 sq ft = 1.78 Ac
t_c = 5 min i_{100} = 6.30
C = 0.95

$Q_{100} = CiA = (.95)(6.30)(1.78) = 10.65$ cfs

Use Single "C" Inlet Capacity = 17.3 cfs

Discharge Pipe Q_T = 3.65 + 10.65 = 14.30 cfs

WILSON & COMPANY
ENGINEERS & ARCHITECTS
BOX 3305
ALBUQUERQUE
NEW MEXICO

COMP. RFS
CK.
DATE 28 March 1977

LOC. Albuquerque FILE 77-508
PROJ. Broadbent SHEET 3
SUBJ. Drainage Report OF

Try 18" ϕ pipe @ minimum grade = 1.36%

$Q_{cap} = Av = (.75)^2(\pi)\left(\frac{1.486}{.013}\right)\left(\frac{.75}{2}\right)^{2/3}(.0136)^{1/2}$

$Q_{cap} = (1.77)(114.31)(.57)(.12) = 12.63\,cfs$ ← NOT ADEQUATE

Try 24" ϕ pipe @ minimum grade = 1.36%

$Q_{cap} = Av = (1)^2(\pi)\left(\frac{1.486}{.013}\right)\left(\frac{1}{2}\right)^{2/3}(.0136)^{1/2}$

$Q_{cap} = (3.14)(114.31)(.63)(.12) = 27.14\,cfs$ ← USE

DRAINAGE AREA No 3
AREA = 125,500 Sqft = 2.88 Ac
t_c = 5 min i_{100} = 6.30
C = 0.95

$Q = CiA = (.95)(6.30)(2.88) = 17.24\,cfs$

Use Single C Inlet Cap = 17.3 cfs ← Use

Outlet Pipe
Total Flow = Q_T = 3.65 + 10.65 + 17.24 = 31.54 cfs

Try 24" ϕ pipe @ minimum grade = 2.00% Head = 0.8'

$Q_{cap} = (1)^2(\pi)\left(\frac{1.486}{.013}\right)\left(\frac{1}{2}\right)^{2/3}(.02)^{1/2}$

$Q_{cap} = (3.14)(114.31)(.63)(.14) = 31.66\,cfs$ ← Use

WILSON & COMPANY
ENGINEERS & ARCHITECTS
BOX 3305
ALBUQUERQUE
NEW MEXICO

COMP.
CK.
DATE 8 June 1977

LOC. Albuquerque FILE 77-
PROJ. Broadbent SHEET 1
SUBJ. Offsite Drain. OF 1

Offsite Area

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