HYDROLOGY E21/D23 MOUNTAIN RUN SHOPPING CENTER

E21-D23

MOUNTAIN RUN

SHOPPING CENTER

3 PLANS

INFORMATION SHEET

PROJECT TITLE Mountain Run Shopping Center TYPE OF SUBMITTAL Drainage Report

ZONE ATLAS PAGE NO. E-21, F-21 CITY ADDRESS

LEGAL DESCRIPTION 10.73 acre site of Tracts I & H, Academy Place Subdivision

ENGINEERING FIRM Bohannan–Huston, Inc. CONTACT Dave Millikan

ADDRESS 4125 Carlisle Blvd., NE PHONE 881-2000

OWNER The Dawn Company CONTACT Mr. Bob Spooner

ADDRESS 6401 Skillman, Suite 300 PHONE 214-[illegible]1500
Dallas, TX 75231

ARCHITECT R & A Architects CONTACT Hy Applebaum

ADDRESS 10101 Fondren, Suite 554 PHONE 713–981-7315
Houston, TX 77096

SURVEYOR Bohannan–Huston, Inc. CONTACT Dwain Weaver

ADDRESS 4125 Carlisle Blvd., NE PHONE 881-2000

CONTRACTOR N/A CONTACT

ADDRESS PHONE

DATE SUBMITTED 9-1-83

BY David M.Y. Millikan

RECEIVED
SEP 02 1983
ENGINEERING

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

October 6, 1983

Mr. David Millikan
Bohannan-Huston, Inc.
4125 Carlisle Blvd. N.E.
Albuquerque, N.M. 87107

RE: MOUNTAIN RUN SHOPPING CENTER DRAINAGE REPORT (E21-D23)

Dear Dave:

I have reviewed the above referenced report. The grading and drainage plan looks fine for the site. However, I am going to refer you to my comments regarding the drainage plan for Mountain Run Apartments in a letter dated September 28, 1983. I feel that the major issue that needs addressing and further analysis is the discharge from the entire site across Eubank Blvd. You are now combining the total discharge of about 140 cfs and shooting it across the street perpendicular to the traffic. You would also need to provide a concrete flowpath across Eubank Blvd. as per DPM and there is none indicated. Therefore this letter is transmitted to you in conjunction with my letter on the apartment site.

Should you have any questions or comments regarding this review, please contact me.

Yours truly,

Billy J. Goolsby P.E.

Billy J. Goolsby, P.E.
Civil Engineer/Hydrology

BJG/tsl

Attachment

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

FILE COPY

November 1, 1983

Mr. Brian Burnett
Bohannan-Huston, Inc.
4125 Carlisle Boulevard NE
Albuquerque, NM 87107

REF: MOUNTAIN RUN SHOPPING CENTER DRAINAGE REPORT (E21-D23)

Dear Mr. Burnett:

This letter is in conjunction with the apartment site response. This plan approval is contingent upon the approval by the Traffic Section for the flow discharged across Eubank Boulevard.

If you have any questions or comments concerning this matter, please contact me or Fred Aguirre at 766-7644.

Yours truly,

Billy J. Goolsby

Billy J. Goolsby, PE
Civil Engineer/Hydrology

BJG:mrk

BOHANNAN-HUSTON INC.

4125 Carlisle Blvd. NE Albuquerque, New Mexico 87107
(505) 881-2000

Transmittal

To: CITY HYDROLOGY
2ND + CENTRAL

Attention: FRED AGUIRRE OR BILLY GOOLSBY

- ☐ Parcel Post
- ☒ Messenger
- ☐ First Class
- ☐ UPS
- ☐ Express Mail
- ☐ Air Freight
- ☐ Bus
- ☐ _____

Date: 3/2/84 Our job number: 31867
Your job number: E21-D23

Job: MOUNTAIN RUN SHOPPING CENTER

We are enclosing:	For:
X PRINTS	YOUR APPROVAL

Comments: ENCLOSED IS A SET OF THE FINAL GRADING PLAN FOR MOUNTAIN RUN SHOPPING CENTER. PLEASE REVIEW IT IN LIGHT OF THE REVISION TO THE DRAINAGE REPORT YOU RECIEVED FEBRUARY 22ND. IF YOU HAVE ANY QUESTIONS PLEASE CALL.

By: DAVE WOODS thank you

Rec'd by: Cynthia Villarreal Date: 3/2/84

☒ Please Return Signed Yellow Copy

2/1/84

BOHANNAN-HUSTON INC.

4125 CARLISLE BLVD., N.E. ALBUQUERQUE, NEW MEXICO 87107 505 881-2000
6713 VISCOUNT BLVD., EL PASO, TEXAS 79925 915 778-4491
330 GARFIELD, SANTA FE, NEW MEXICO 87501 505 988-7671

November 14, 1983

Mr. Fred Aquirre
Assistant City Engineer/Hydrology
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

Re: Mountain Run Apartment Drainage Report (E21 - D22) and
Shopping Center Drainage Report (E21 - D23)

Dear Fred:

On Monday, November 7, 1983, Dwayne Sheppard, Bob Fosnaugh, Dave Harmon, Billy Goolsby, and you met with Dave Millikan to discuss the method of discharging storm water runoff into Eubank Boulevard adjacent to the above-referenced sites.

At that meeting it was agreed that discharge will be allowed to Eubank as stated in the reports if the following conditions are met:

a) Discharge from the 10-year storm and the 100-year storm shall be conveyed beneath the sidewalk.

b) The maximum depth of flow for runoff entering Eubank Boulevard is 0.3 feet.

c) The velocity times depth of flows entering the street shall not exceed 6.5.

We are in the process of finalizing the construction drawings and the grading plans. On the apartment site, we propose the 10-year flows to be discharged to the street through four curb outlets, as shown in my letter dated October 18, 1983. This results in a flowrate of 7 cfs per outlet. We estimate that the depth of flow will be 0.25' at a velocity of 6.1 fps. Sidewalk culverts will be constructed beneath the sidewalks to convey the additional flows due to a 100-year storm. The criteria stated in a) and b) above will be met for these additional flows.

PRINCIPALS
JERRY R. BOHANNAN, P.E. & L.S.
LARRY W. HUSTON
MICHIAL M. EMERY, P.E.

Discharges from the shopping center site will be released from the shopping center site in compliance with items a), b), and c) above.

We appreciate your cooperation in resolving this matter. If you have any comments or questions, please call Dave Millikan or me.

Sincerely yours,

Michial M. Emery, P.E.
Vice President

cc: Mr. Glen Gronnerud
Mr. Bob Spooner
Mr. Dwayne Sheppard
Mr. Bob Fosnaugh
Mr. Dave Harmon
Mr. Billy Goolsby

DMYM/rs
Job Nos. 3 154 3, 3 186 0

BOHANNAN-HUSTON INC.

4125 CARLISLE BLVD., N.E. ALBUQUERQUE, NEW MEXICO 87107 505 881-2000
6713 VISCOUNT BLVD. EL PASO, TEXAS 79925 915 778-4491
330 GARFIELD, SANTA FE, NEW MEXICO 87501 505 988-7671

November 29, 1983

Mr. Billy Goolsby
Civil Engineer - Hydrology
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

Re: Drainage and Grading Plan for Mountain Run Shopping Center (E21 — D23)

Dear Billy:

In order to ensure that the discharge from this site conforms to the requirements agreed upon (as outlined in my letter to you dated November 14, 1983), we have performed a more detailed analysis of the flows leaving this site after development.

In order to ensure compliance with the criteria outlined in my letter dated November 14, 1983, we propose the following method of discharging runoff from this site. The allowable peak discharge rate due to a 10-year storm is 17.2 cfs (see letter dated October 4, 1983).

The uncontrolled discharge rate from the site due to a 10-year storm is:

a) 15.5 cfs from the upper basin (Basin A)
b) 16.8 cfs from the lower basin (Basin B)

We propose rooftop detention within Basin B that will reduce the peak discharge rate to 12.0 cfs from this basin due to a 10-year storm. We also propose to limit the 10-year peak discharge rate from Basin A to 5.2 cfs. These controlled discharge rates result in on-site detention requirements as follows:

a) 5,112 cu.ft. on roofs in Basin B
b) 11,326 cu.ft. in pond in Basin A

Roof top ponding will be accomplished by designing the rundowns so that a limited number of rundowns operate during runoff from a 10-year storm. Additional rundowns will be provided which will only function when the volume of water on the roof exceeds the required detention volume of 5112 cu.ft.

RECEIVED
NOV 30 1983
ENGINEERING

PRINCIPALS
JERRY R. BOHANNAN, P.E. & L.S.
LARRY W. HUSTON
MICHIAL M. EMERY, P.E.

Runoff from Basin A will be routed through a detention pond which will limit the discharge to 5.2 cfs until the required detention volume of 11,326 cu.ft. is exceeded. Enclosed is a sketch showing the proposed pond in Basin A. All runoff from this basin will be collected in a storm drain inlet within the parking lot and conveyed to the pond. The storm drain will be sized to accept the flows generated by a 100-year storm. The 5.2 cfs will be discharged through an appropriately sized opening in the block retaining wall. The opening will discharge through a sidewalk culvert (as being used for the Mountain Run Apartments) to Eubank Boulevard. The overflow will discharge through three sidewalk culverts as shown on the enclosed sketch. Runoff entering Eubank at these locations will meet the criteria outlined in the November 14, 1983 letter. Since the depth within the pond exceeds 18", a 30" high wall will be placed along the public sidewalk along Eubank Boulevard. The pond is designed to retain nuisance flows.

Runoff in Basin B will be discharged through the drivepad at the southwest corner of the site. In order to prevent nuisance flows from entering Eubank, a trench drain will be installed to intercept these flows. The trench drain will discharge these flows into a small retention pond immediately south of this driveway. When the volume of the retention pond is exceeded, the runoff intercepted by the trench drain will be redirected back into the driveway. The trench drain has been designed to intercept nuisance flows only. This will prevent runoff from storms being unnecessarily circulated through the retention pond.

We are enclosing computation sheets which show the method used in determining detention pond volumes. Please review these along with the sketch of the detention pond in Basin A and the retention pond in Basin B.

A detailed grading plan will be submitted to you for approval prior to issuance of a building permit. The sidewalk culverts will be constructed along with the median improvements to Eubank Boulevard.

If you have any questions or comments, please contact Dave Millikan or me. We are proceeding with the assumption that the methods outlined in this report are acceptable.

Sincerely yours,

Michial M. Emery

Michial M. Emery, P.E.
Vice President

Enclosures

cc: Mr. Bob Spooner

DMYM/rms
Job No. 31860

RECEIVED

NOV 30 1983

ENGINEERING

RECEIVED
NOV 30 1983
ENGINEERING

PROJECT NAME Mountain Run Shopping Ctr.
PROJECT NO. 31860
SUBJECT

BASIN B - LOWER BASIN

$Q_{10} = 16.8$ cfs

$Vol_{10} = 0.66$ ac-ft

Provide roof detention

Area of roofs = 97586 sf = 2.24 ac

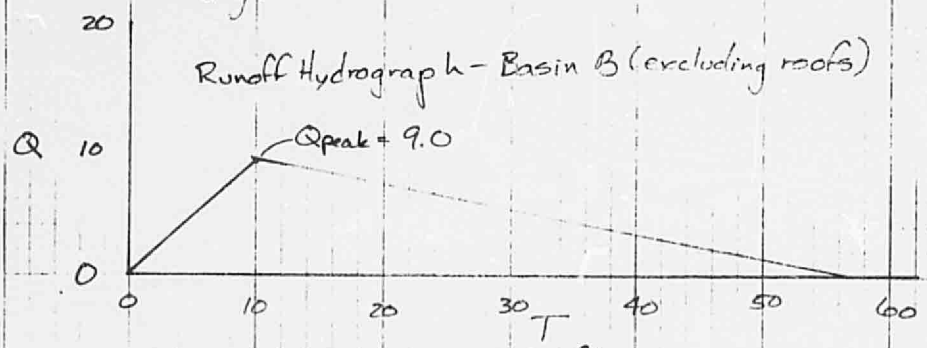
C = 1.0

Q_{10} (roofs) = 1.0 (3.5)(2.24) = 7.8 cfs

Vol_{10} (roofs) = 1.0 (2.5 x .657)(2.24) = 0.31 ac-ft

Limit roof runoff to 3.0 cfs

Peak Discharge = 16.8 − 7.8 + 3.0 = 12.0 cfs



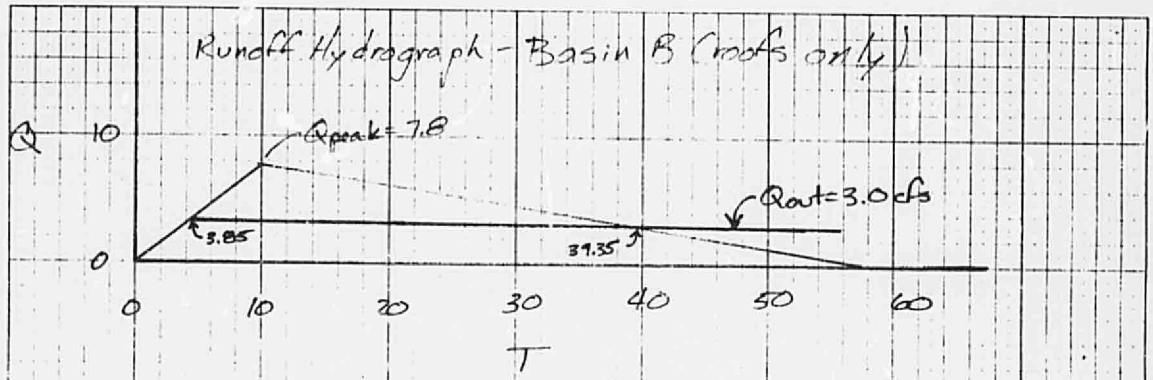
Vol = 0.66 − 0.31 = 0.35 ac-ft

T = 0.35 x 2 x 43560 ÷ 60 ÷ 9.0 = 56.5 min

PROJECT NAME Mountain Run Shopping Ctr.
PROJECT NO. 31860
SUBJECT

2

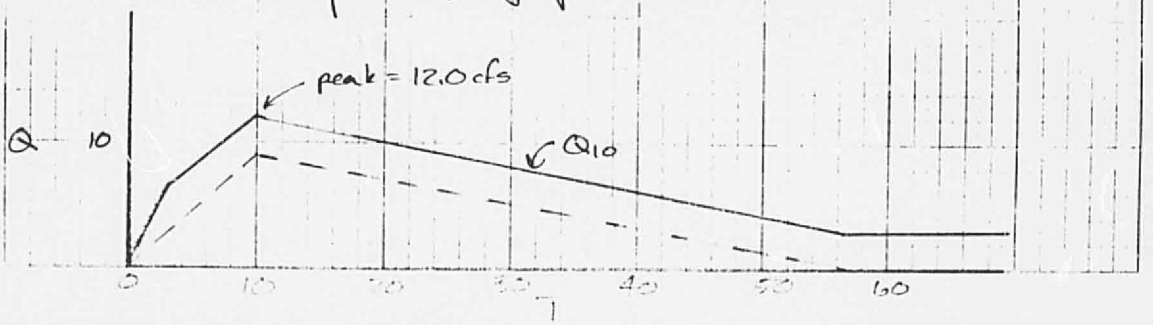
Runoff Hydrograph - Basin B (roofs only)



Vol = 0.31 ac-ft
T = 0.31 x 2 x 43560 ÷ 60 ÷ 7.8 = 57.7 min

Volume ponded on roof = (39.35 - 3.85) (7.8 - 3.0) x 60 ÷ 2 ÷ 43560
" = 0.12 ac-ft (5112 cu.ft)

Composite Hydrograph - Runoff (Basin B)



PROJECT NAME Mountain Run Shopping Ctr.
PROJECT NO. 51860
SUBJECT

BASIN A - Upper Basin

Q_{10} = 15.5 cfs

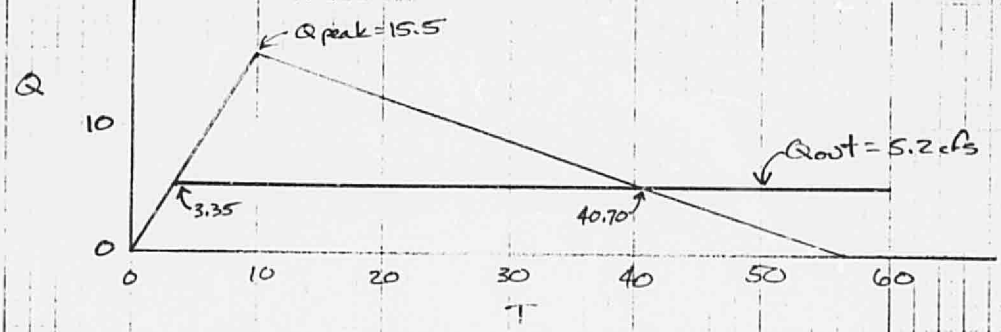
Vol_{10} = 0.60 ac-ft

Allowable runoff 10-yr = 17.2 cfs (see Oct. 4, 1983 letter, E-21, D-22)

Runoff from Basin B = 12.0

Allowable Discharge from Basin A = 17.2 - 12.0 = 5.2 cfs

Runoff Hydrograph - Basin A



T = 0.60 × 2 × 43560 ÷ 60 ÷ 15.5 = 56.2 min

Req'd Pond Vol = (40.70 - 3.35)(15.5 - 5.2) × 60 ÷ 2 ÷ 43560 = 0.26 ac-ft

0.26 ac-ft × 43560 = 11,326 cf

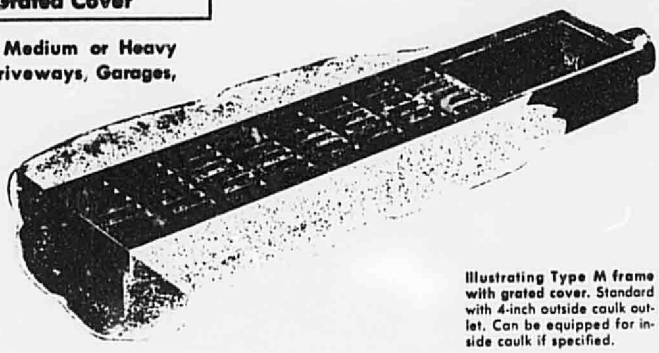
NEENAH FOUNDRY COMPANY

R-4995-B Series Type M Trench Frame with Solid or Grated Cover

Cast Iron Trench Assemblies — Medium or Heavy Duty — For Use in Sidewalks, Driveways, Garages, Loading Docks, etc.

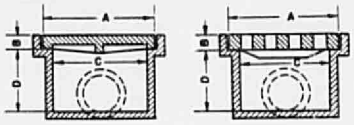
Read Carefully Before Ordering

Specify:
1. Complete catalog number.
2. Medium or heavy duty.
3. Overall length of cover required.
4. Lid solid, flat grated, lid for fill, or diagonally barred convex grate.
5. Location of outlet, side, bottom or end (give dimensional location and pipe size).
6. Whether one end or both ends are to be open or closed.

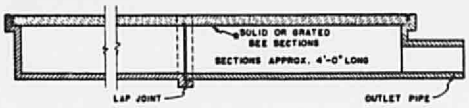


Illustrating Type M frame with grated cover. Standard with 4-inch outside caulk outlet. Can be equipped for inside caulk if specified.

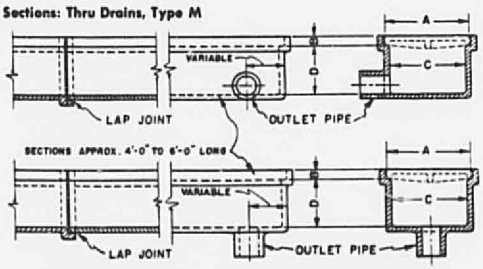
Trench covers are used over areas requiring long drainage assemblies. Can be supplied in a variety of sizes and lengths to meet special needs. For trenches of irregular pattern, arrangements can be made to furnish cover to fit.



Standard 4-inch outlet at end of drain. Special size outlets are available on special order. Side and bottom outlets optional and furnished only when specified.



Sections: Thru Drains, Type M



ALTERNATE SECTIONS — SIDE AND BOTTOM OUTLETS

Catalog No.	Description	Dimensions in inches A	B	C	D	Length
Standard Sizes	**Medium Duty**					
R-4995-A1	with grated cover	11½	¾	10	6¾	as ordered
R-4995-A2*	with grated cover	7	¾	5	4¾	as ordered
R-4995-B1	with solid cover	11½	¾	10	6¾	as ordered
R-4995-B2	with solid cover	7	¾	5	4¾	as ordered
Standard Sizes	**Heavy Duty**					
R-4996-A1	with grated cover	11½	1½	10	6	as ordered
R-4996-A2*	with grated cover	7	1¼	5	4¼	as ordered
R-4996-A3	with grated cover	11½	1½	10	12	as ordered
R-4996-B1	with solid cover	11½	1½	10	6	as ordered
R-4996-B2	with solid cover	7	1¼	5	4¼	as ordered
R-4996-B3	with solid cover	11½	1½	10	12	as ordered

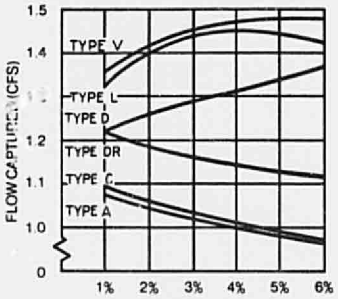
Above Standard Frames made in 4 ft. sections, covers 2 ft. lengths.
*Available with Type "B" grate only (see page 259).

Special Sizes	**Medium Duty**					
R-4997-A	with grated cover	9	1	8	6	as ordered
R-4997-B	with solid cover	9	1	8	6	as ordered
Special Sizes	**Heavy Duty**					
R-4998	with grated cover	24¼	3¼	20	4	as ordered

Above Special Frames and Grated Covers in 5 ft. sections.

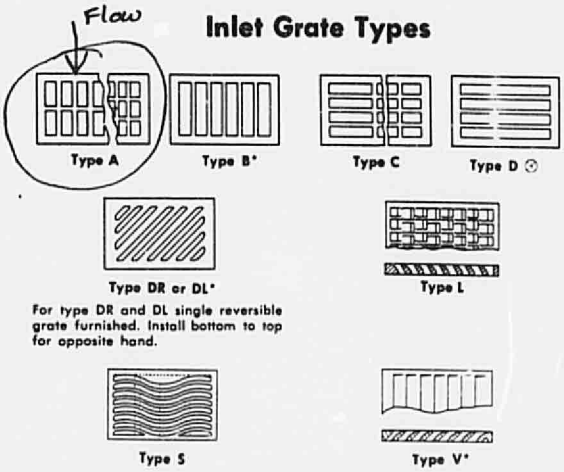
CATCH BASIN INLETS — HEAVY DUTY

CAPACITY COMPARISON OF GRATE TYPES



The above chart shows flume test results using 17" x 20" full size grates in the six types detailed top right. A constant transverse or gutter slope of 6% was used to contain more water over the grate. The gutter flow in the channel was set at 2 cfs. Note the improved performance of the Type "L" and "V" Vane Grates.

Inlet Grate Types



For type DR and DL single reversible grate furnished. Install bottom to top for opposite hand.

* Not considered bicycle-safe when used with curb plate in place of curb box.

⊗ Not recommended for bicycle traffic. For safety standards see pages 88 to 93.

Free open areas for most grates in this section are listed on pages 304-308.

Grate styles as shown above are available on many of the standard catch basin inlets shown on pages 94 to 148. Catch basin inlets which do not list any of the grates shown above as being available can be furnished on special order with the style you are interested in. Write for price to apply.

For special drainage applications under conditions of extreme loading and shock, we recommend grates of **DUCTILE IRON**, a material of high corrosion resistance but with the strength, toughness, ductility and wear resistance of steel. **DUCTILE IRON** offers increased drainage capacity without sacrificing strength. Any of the grates listed can be furnished in **DUCTILE IRON**. See complete specifications on page 6, or write for further information.

R-3010 Curb Inlet Frame, Grate, Curb Box

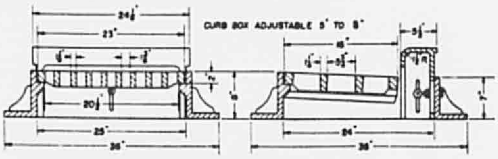
Heavy Duty

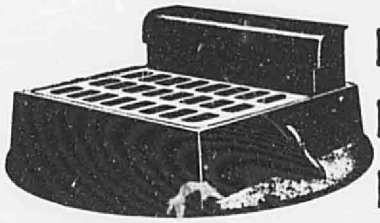
Total Weight 385 Pounds

Available with grate Type A, Type D ⊗ or Types DR or DL Reversible. Also available with curb boxes in open or barred style, 1½" vertical radius, Type D, semi-roll 3" radius or roll type 6" radius designs.

Specify:

1. Grate type, if other than standard type shown.
2. Curb box style, if other than standard style shown.





⊗ Not recommended for bicycle traffic. For safety standards see pages 88 to 93.

FILE COPY

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

January 10, 1984

Mr. Dave Millikan
Bohannan-Huston, Inc.
4125 Carlisle Boulevard NE
Albuquerque, NM 87107

REF: MOUNTAIN RUN SHOPPING CENTER DRAINAGE REPORT (E21-D23)

Dear Mr. Millikan:

I don't know specifically what I am to do with your latest submittal received December 15, 1983. As per our telephone conversation that same date, I am waiting for an update of the grading and drainage plan reflecting the modifications as we discussed, i.e., the 4" drain pipe, the weephole detail, etc. When I receive the updated, revised plan, I can issue an approval response.

Should you have any questions or comments concerning this matter, please contact me at 766-7644.

Yours truly,

Billy J. Goolsby

Billy J. Goolsby, PE
Civil Engineer/Hydrology

BJG:mrk

APPLICATION FOR SUBDIVISION AND/OR VACATION

INSTRUCTIONS

PRINT OR TYPE IN BLACK INK ONLY. Use additional sheets if necessary. The completed application is to be submitted to the Planning Division by the applicant or agent. Each application must be accompanied by the filing fee (checks are preferred and made payable to the City of Albuquerque). All attachments must be submitted with the application and, after folding, shall not exceed 8 1/2 x 14 inches. Additional information may be obtained from the Planning Division (505) 766-7422.

APPLICATION FOR:

SUBDIVISION

X Revised Site Development Plan
___ Sketch Plat
___ Preliminary Plat
___ Final Plat

VACATION

___ Public Right-of-Way
___ Private Way
___ Easement

1. APPLICANT INFORMATION

a. Applicant: DAWN COMPANY Telephone: (214) 788-0700
Mailing Address: 15301 Dallas Pkwy, Suite 850
Dallas, TX Zip Code: 75231
Applicant's Proprietary Interest in the Property: Owner

b. Agent (if any): Bohannan–Huston, Inc. Telephone: 881-2000
Mailing Address: 4125 Carlisle Blvd., NE
Albuquerque, NM Zip Code: 87107

c. Signature of applicant/agent: Bruce D Burnett Date: 2/15/84

2. LOCATION OF REQUEST

a. Street Address (if any): South Corner of Eubank and Juan Tabo

b. Legal Description of the Property:
(1) Lot(s)/Tract(s): Parcels I and II
(2) Block:
(3) Subdivision-Addition Name/MRGCD Map: Mountain Run Subdivision

c. Location of Property by Streets: South Corner of Eubank Boulevard and Juan Tabo
Boulevard

d. Uniform Property Code:

3. PROJECT DETAILS

a. Present Zoning: C-2 Proposed: C-2
b. Number of Lots Existing: 2 Proposed: 2
c. Number of Dwelling Units Existing: 0 Proposed: 0
d. Total Land Area Covered by Request: Acres: 10.6 ac Sq. Feet: 461,700

4. (VACATION ONLY) REASON FOR REQUEST Use Separate Sheet: Why should the vacation be granted?

5. ATTACHMENTS AS REQUIRED IN SUBDIVISION ORDINANCE See appropriate checklist(s)

PLANNING DIVISION INTERNAL USE ONLY

Cross-references: No. Signs Issued:
Application and Fee Received by: Date:
Fee Paid: Dollars $ Method of Payment: CREDIT:
TREASURER VALIDATION

MAP NO. DRB-83-489
HEARING DATE:
CASE NUMBER: S-SCS-SC-V

Distribution: Secretary-Orig./Case File
Applicant/Agent
Treasurer

Rev. 3/83

BOHANNAN-HUSTON INC.
4125 CARLISLE BLVD., N.E. ALBUQUERQUE, NEW MEXICO 87107 505 881-2000
6713 VISCOUNT BLVD., EL PASO, TEXAS 79925 915 778-4491
330 GARFIELD, SANTA FE, NEW MEXICO 87501 505 988-7671

February 13, 1984

Mr. Gene Mares
Principal Planner
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

Re: Mountain Run Shopping Center (DRB-83-489)

Dear Mr. Mares:

Enclosed are five (5) sets of the revised site plan for Mountain Run Shopping Center. The original site plan has already been approved by you but the developer has revised the building layout and drainage solution slightly.

The appearance and function of the project is substantially the same as the approved plan. We feel the revisions contained on this plan are net improvements to its overall function in the community.

Please schedule this submittal on the February 21, 1984 DRB Agenda. If you have any questions, please call Dave Woods or me.

Sincerely,

Michial M. Emery, P.E.
Vice President

Enclosures

cc: Mr. Bob Spooner

DWW/bl
Job No. 31866

PRINCIPALS
JERRY R. BOHANNAN, P.E. & L.S.
LARRY W. HUSTON
MICHIAL M. EMERY, P.E.

E21-D23

February 13, 1984

FILE W/ Rep. 82

Mr. Gene Mares
Principal Planner
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

Re: Mountain Run Shopping Center (DRB-83-489)

Dear Mr. Mares:

Enclosed are five (5) sets of the revised site plan for Mountain Run Shopping Center. The original site plan has already been approved by you but the developer has revised the building layout and drainage solution slightly.

The appearance and function of the project is substantially the same as the approved plan. We feel the revisions contained on this plan are net improvements to its overall function in the community.

Please schedule this submittal on the February 21, 1984 DRB Agenda. If you have any questions, please call Dave Woods or me.

Sincerely,

Michial M. Emery, P.E.
Vice President

Enclosures

cc: Mr. Bob Spooner

DWW/bl
Job No. 31866

GINA: To be scheduled for DRB on Feb. 28. as per Gene's direction. DAM

BOHANNAN-HUSTON INC.
4125 CARLISLE BLVD., N.E. ALBUQUERQUE, NEW MEXICO 87107 505 881-2000
6713 VISCOUNT BLVD. EL PASO, TEXAS 79925 915 778-4491
330 GARFIELD, SANTA FE, NEW MEXICO 87501 505 988-7671

PRINCIPALS
JERRY R. BOHANNAN, P.E. & L.S.
LARRY W. HUSTON
MICHIAL M. EMERY, P.E.

INFORMATION SHEET

PROJECT TITLE MOUNTAIN RUN SHOPPING CNTR TYPE OF SUBMITTAL FINAL GRADING PLAN

ZONE ATLAS PAGE NO. E-21 CITY ADDRESS EUBANK + JUAN TABO SOUTH CORNER

LEGAL DESCRIPTION PARCELS I II + III OF MOUNTAIN RUN SUBDIVISION

ENGINEERING FIRM BOHANNAN HUSTON INC CONTACT DAVE WOODS

ADDRESS 4125 CARLISLE NE PHONE 881 2000

OWNER DAWN CO. CONTACT BOB SPOONER

ADDRESS 15301 DALLAS PKWY, SUITE 850 DALLAS TX 75231 PHONE (214) 788-0700

ARCHITECT R+A ARCHITECTS CONTACT BOBBY KNOX

ADDRESS 10101 FONDREN, SUITE 544 HOUSTON TX 77096-4587 PHONE (713) 981-7315

SURVEYOR UNKNOWN CONTACT

ADDRESS PHONE

CONTRACTOR UNKNOWN CONTACT

ADDRESS PHONE

PRE-DESIGN MEETING:

___ YES
X NO
___ COPY OF CONFERENCE RECAP SHEET PROVIDED

PLEASE CHECK TYPE OF APPROVAL EXPECTED WITH THIS SUBMITTAL:

___ SKETCH PLAT APPROVAL
___ PRELIMINARY PLAT APPROVAL
___ SITE DEVELOPMENT PLAN APPROVAL
___ FINAL PLAT APPROVAL
___ BUILDING PERMIT APPROVAL
___ CERTIFICATE OF OCCUPANCY APPROVAL
___ ROUGH GRADING PERMIT APPROVAL
___ GRADING/PAVING PERMIT APPROVAL
X OTHER FINAL GRADING PLAN (SPECIFY)

DATE SUBMITTED: 3/2/84

BY: [signature]

HYDROLOGY

BOHANNAN-HUSTON INC.

4125 CARLISLE BLVD., N.E. ALBUQUERQUE, NEW MEXICO 87107 505 881-2000
6773 VISCOUNT BLVD., EL PASO, TEXAS 79925 915 778-4491
330 GARFIELD, SANTA FE, NEW MEXICO 87501 505 988-7671

February 21, 1984

Mr. Billy J. Goolsby
Civil Engineer/Hydrology
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

Re: Revisions to Drainage and Grading Plan for Mountain Run Shopping Center (E21-D23)

Dear Billy:

As you may be aware, a revised site development plan has been submitted to the DRB for the Mountain Run Shopping Center. For this reason, a revision to the previously approved Drainage and Grading Plan is required. The developer has also asked that we provide a plan which does not require detention of runoff on the roofs.

In order to accomplish this, an additional detention pond is being provided at the southeast corner of the site. Runoff from the upper portion of Basin B will be routed through this pond. The boundaries, ponding requirements, and discharge rates from Basin A will remain unchanged. The previously approved criteria for Basin B are as follows:

- Peak discharge of 12.0 cfs during storms up to, and including, the 10-year storm.
- Uncontrolled discharge from the site is acceptable for storms of greater than the 10-year event.

These criteria will be met by detaining the required volume of runoff to ensure that the peak discharge during the 10-year storm does not exceed 12.0 cfs. Once this volume has been ponded, any additional flows will be allowed to be discharged at an uncontrolled rate.

The uncontrolled 10-year runoff rate from the upper portion of Basin B is 8.8 cfs. The uncontrolled 10-year runoff rate from the lower portion of Basin B is 8.0 cfs (see enclosures). Therefore, if the runoff from the lower portion of Basin B is allowed to discharge at an uncontrolled rate, the peak discharge from the upper portion must be limited to 4.0 cfs during a 10-year storm.

RECEIVED
FEB 22 1984
HYDROLOGY SECTION

PRINCIPALS
JERRY R. BOHANNAN, P.E. & L.S.
LARRY W. HUSTON
MICHIAL M. EMERY, P.E.

Our computations (enclosed) indicate that the required volume of the detention pond must be 4536 cubic feet. Once this volume is exceeded, the runoff will not enter the pond and will discharge at an uncontrolled rate.

We have enclosed an updated copy of the Drainage and Grading Plan for your review. The revised plan is in compliance with previously approved criteria.

If you have any questions, feel free to contact David Woods or me.

Sincerely yours,

Michial M. Emery, P.E.
Vice President

Enclosures

cc: Mr. Bob Spooner
Mr. Bobby Knox

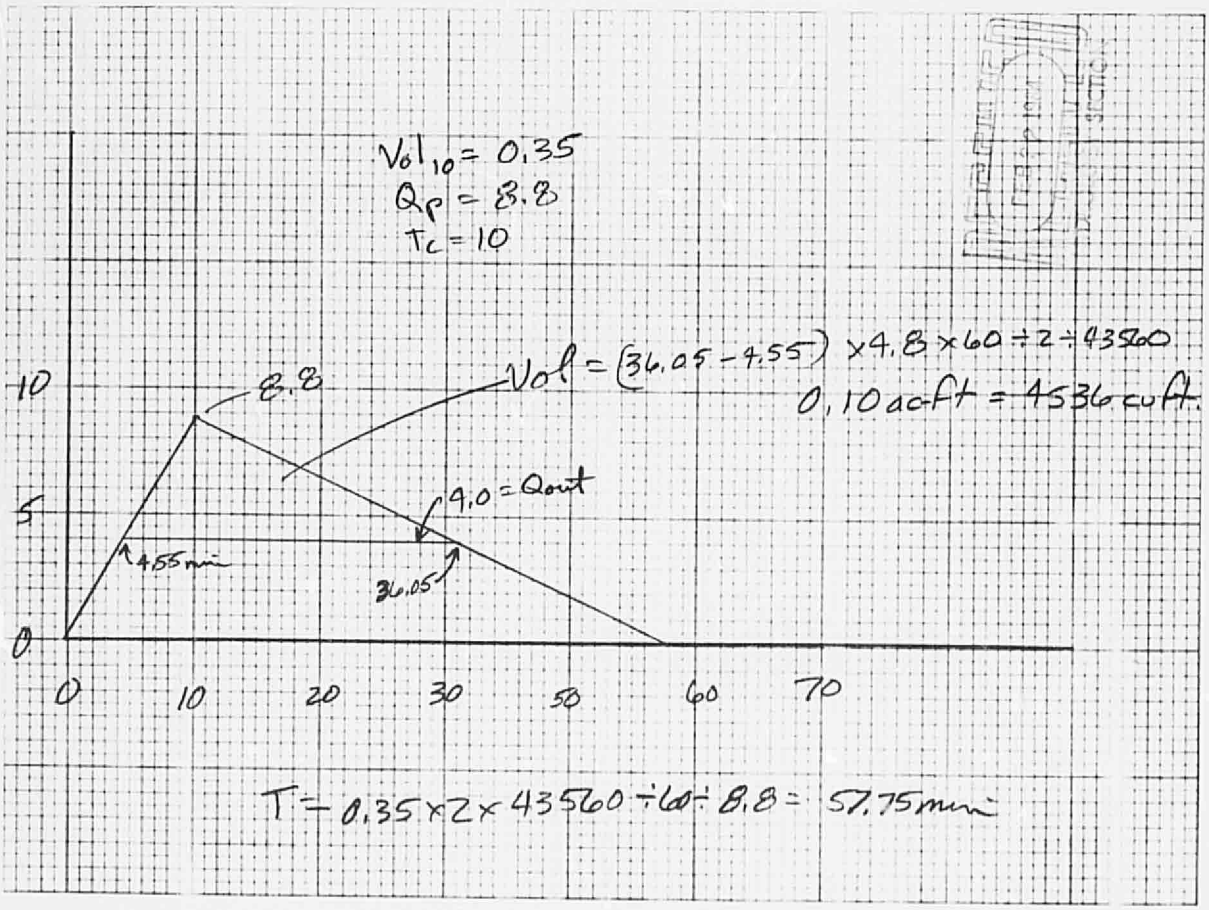
DWW/mw
Job No. 3 186 7

RECEIVED
FEB 22 1984
HYDROLOGY SECTION

$Vol_{10} = 0.35$

$Q_p = 8.8$

$T_c = 10$



$Vol = (36.05 - 4.55) \times 4.8 \times 60 \div 2 \div 43560$

$0.10\ ac\text{-}ft = 4536\ cu\ ft.$

$T = 0.35 \times 2 \times 43560 \div 60 \div 8.8 = 57.75\ min$

PROJECT NAME _____ SHEET _____ OF _____

PROJECT NO. _____ BY _____ DATE _____

SUBJECT _____ CH'D _____ DATE _____

Upper Portion Basin B

Area = 2.92 ac.
C = 0.86
I_{10} = 3.5 in/hr.
I_{100} = 5.3 in/hr.

Q_{10} = 8.8 cfs
Q_{100} = 13.3 cfs
$Vol._{10}$ = 0.35 ac-ft
$Vol._{100}$ = 0.52 ac-ft

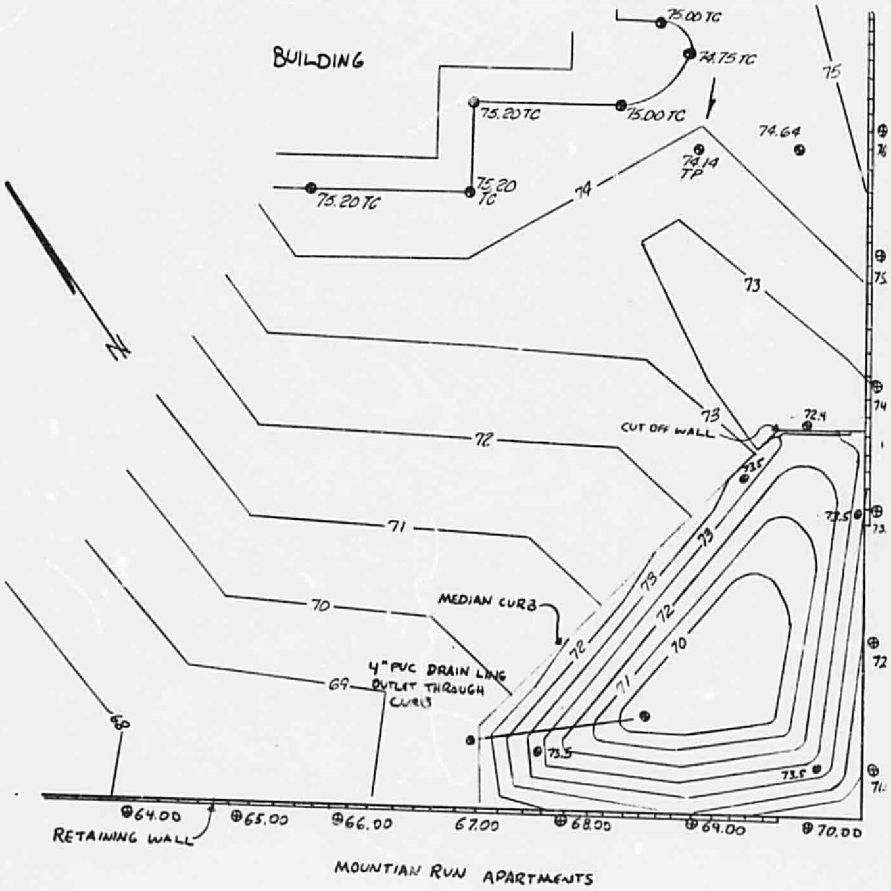
Lower Portion Basin B

Area = 2.66 ac.
C = 0.86

Q_{10} = 8.0 cfs
Q_{100} = 12.1 cfs
Vol_{10} = 0.31 ac-ft
Vol_{100} = 0.48 ac-ft

Uncontrolled Q_{10} from Lower Portion = 8.0
Allowable discharge from Upper Portion = 4.0
Combined 10 year discharge = 12.0 cfs

PROJECT NAME _____ SHEET ____ OF ____
PROJECT NO. _____ BY ____ DATE ____
SUBJECT _____ CH'D ____ DATE ____



FEB 2 1984
PROPERTY SECTION

Mountain Run Shopping Center
New Detention Pond

CITY OF ALBUQUERQUE

ALBUQUERQUE, NEW MEXICO

INTER-OFFICE CORRESPONDENCE July 17, 1984 REF. NO._____

TO: Fred Aguirre, Hydrology

FROM: Lenora Chavez, Assistant Zoning Enforcement Officer Lenora

SUBJECT: MOUNTAIN RUN SHOPPING CENTER - EUBANK/JUAN TABO, E-21

Complaints have been received in reference to the above mentioned new development. The new development is still under excavation at this time. The inquiries are regarding the drainage run off and the site grade elevation of the site.

A review of this development is requested by Hydrology in order to ensure compliance with the approved development plan. You assistance is greatly appreciated.

LC:oao
12090

RECEIVED
JUL 17 1984
HYDROLOGY SECTION

WESTERN TECHNOLOGIES INC.

3808 Academy Parkway North, N.E.
Albuquerque, New Mexico 87109
(505) 345-6586

LABORATORY REPORT

SOIL/AGGREGATE FIELD DENSITY TESTS

Client KNC Inc.
P.O. Box 14627
Albuquerque, New Mexico 87191
Attention: Tom Dawson

Job No.
Lab Invoice No. 32440132
Date Sept. 18, 1984
Reviewed By

Project Mountain Run Shopping Center
Location Juan Tabo and Eubank
Type of Material Soil
Source of Material Native
Moisture/Density Relationship D-1557 Meth. A

Authorized By Tom Dawson Date 9-17-84
Tested/Calc. By Andrew Cuaderes/WTI
Test Locations Designated By Contractor

Test No.	Date	Location of Test Hole	Elevation of Test Datum †
#1	9-17-84	Station 3+75 8" sanitary sewer - Mountain Run Apts.	98'

Test No.	Moisture Density Lab. No.	Optimum Moisture %	Max. Dry Density pcf	In-Place Characteristics		Relative Compaction %	Within Specs ?	Comments*
				Moisture %	Dry Density pcf			
#1	#6	8.6	132.0	8.3	127.0	96	Yes	4/11/15

*Comments
1. Subgrade
2. Subbase Fill
3. Base Course
4. Backfill
5. Pavement Area
6. Below Footing Bottom
7. Above Footing Bottom
8. 100% min. req'd.
9. 98% min. req'd.
10. 95% min. req'd.
11. 90% min. req'd.
12. 85% min. req'd.
13. _____
14. Tested D-1556/AASHTO T-217
15. Tested ASTM D-2922/D-3017
16. Tested ASTM D-2922/AASHTO T-217
17. Rock correction applied to maximum dry density. AASHTO T-224
18. Other _____
19. Test Locations on Accompanying Site Plan
20. Specifications Unknown

† Datum 100' = top of grade

Note: Tests reported herein are not part of a continuous monitoring program of compaction operations and accordingly apply only to the actual location tested.

Copies to:
2 - KNC
1 - Dawn Company
1 - City/Inspection
1 - City/Engineering

WESTERN TECHNOLOGIES INC.

3808 Academy Parkway North, N.E.
Albuquerque, New Mexico 87109
(505) 345-6586

LABORATORY REPORT

SOIL/AGGREGATE FIELD DENSITY TESTS

Client KNC Inc.
4001 Bogan Ave. NE
Albuquerque, New Mexico 87191
Attention: Tom Dawson

Job No.
Lab./Invoice No. 32440137
Date 9-20-84
Reviewed By

Project Mountain Run Shopping Center
Location Albuquerque, New Mexico
Type of Material Soil
Source of Material Native
Moisture/Density Relationship D-1557 Meth. A

Authorized By Tom Dawson Date 9-19-84
Tested/Calc. By Jim Dacy
Test Locations Designated By Client

Test No	Date	Location of Test Hole	Elevation of Test Datum †
1	9-19-84	Station 5+00 footing retaining wall east side	100
2	"	Safeway sewerline, waterline service SW side	96.8

Test No	Moisture Density Lab No	Optimum Moisture %	Max Dry Density pcf	In-Place Characteristics Moisture %	In-Place Characteristics Dry Density pcf	Relative Compaction %	Within Specs ?	Comments*
1		8.6	132.0	5.4	121.4	92	yes	1/11/15
2		8.6	132.0	4.7	130.7	99	yes	1/11/15

*Comments
1. Subgrade
2. Subbase Fill
3. Base Course
4. Backfill
5. Pavement Area
6. Below Footing Bottom
7. Above Footing Bottom
8. 100% min req'd
9. 98% min req'd
10. 95% min req'd
11. 90% min req'd
12. 85% min req'd
13. _____
14. Tested D-1556/AASHTO T-217
15. Tested ASTM D-2922/D-3017
16. Tested ASTM D-2922/AASHTO T-217
17. Rock correction applied to maximum dry density AASHTO T-224
18. Other _____
19. Test Locations on Accompanying Site Plan
20. Specifications Unknown

† Datum 100=finish subgrade

Note: Tests reported herein are not part of a continuous monitoring program of compaction operations and accordingly apply only to the actual location tested.

Copies to: KNC - 2
Dawn Company - 1
City of Albuq. Inspection - 1
City of Albuq. Engineering - 1

WESTERN TECHNOLOGIES INC.

3808 Academy Parkway North, N.E.
Albuquerque, New Mexico 87109
(505) 345-6586

LABORATORY REPORT

SOIL/AGGREGATE FIELD DENSITY TESTS

Client CHC Builders, Inc.
5 Post Oak Park
14th Floor
Houston, Texas 77027

Job No.
Lab./Invoice No. 32440138
Date 9-20-84
Reviewed By

Project Mountain Run Shopping Center
Location Albuquerque, New Mexico
Type of Material Soil
Source of Material Native
Moisture/Density Relationship D-1557 Meth A

Authorized By Keith Poitras Date 9-19-84
Tested/Calc By Jim Dacy
Test Locations Designated By Client

Test No.	Date	Location of Test Hole	Elevation of Test Datum †
1	9-19-84	Secondary access road 225' S from Juan Tabo	100
2	"	Secondary access road 175' S from Juan Tabo	100
3	"	Secondary acce s road 80' S from Juan Tabo	100
4	"	Secondary access road 15' S from Juan Tabo	100

Test No.	Moisture Density Lab No.	Optimum Moisture %	Max. Dry Density pcf	In Place Characteristics Moisture %	In Place Characteristics Dry Density pcf	Relative Compaction %	Within Specs ✓	Comments*
1		8.6	132.0	9.2	125.5	95	yes	1/5/10/15
2		8.6	132.0	8.9	124.8	95	yes	1/5/10/15
3	*	8.6	132.0	10.4	126.7	96	yes	1/5/10/15*
4		8.6	132.0	9.6	125.3	95	yes	1/5/10/15

*Comments
1. Subgrade
2. Subbase Fill
3. Base Course
4. Backfill
5. Pavement Area
6. Below Footing Bottom
7. Above Footing Bottom
8. 100% min req'd
9. 98% min req'd
10. 95% min req'd
11. 90% min req'd
12. 85% min req'd
13. ____
14. Tested D-1556 AASHTO T-217
15. Tested ASTM D-2922 D-3017
16. Tested ASTM D-2922 AASHTO T-217
17. Rock correction applied to maximum dry density AASHTO T-224
18. Other ____
19. Test Locations on Accompanying Site Plan
20. Specifications Unknown

†Datum 100=finish subgrade

Note: Tests reported herein are not part of a continuous monitoring program of compaction operations and accordingly apply only to the actual location tested.

Copies to CHC Builders - 2
Dawn Company - 1
City of Albuq. Inspection - 1
City of Albuq. Engineering - 1

From the desk of Gerald Roubal

11-11-85

TO: RICHARD DURAN , HYDROLOGY

RE: MOUNTAIN RUN SHOPPING CENTER

Building Permit 29183

As a follow up of the field crews surveying work of October 28, 1985, enclosed are the folowing revised Grading Plan sheets:

Sheet C-1
Sheet C-2

These sheets reflect the folowing changes:

Around Parcel III elevation changes
Behind Bldg A&B elevation changes
Retention Pond location change
Eliminate Grate & Straight walls behind Safeway.

Please proces so Certificate of Occupancy can be acquired.

THNAK YOU VERY MUCH.

Gerald

296-8777 for message.
293-1515

BOHANNAN-HUSTON INC.

MOUNTAIN RUN
SHOPPING CENTER
DRAINAGE REPORT

SEPTEMBER, 1983

DRAINAGE REPORT
FOR
MOUNTAIN RUN SHOPPING CENTER

SEPTEMBER, 1983

PREPARED FOR

THE DAWN COMPANY
6401 SKILLMAN, SUITE 300
DALLAS, TEXAS 75231

PREPARED BY

BOHANNAN–HUSTON, INC.
4125 CARLISLE BOULEVARD, N.E.
ALBUQUERQUE, NEW MEXICO 87107
505/881-2000

DAVID M.Y. MILLIKAN
NEW MEXICO
7547
REGISTERED PROFESSIONAL ENGINEER

DAVID M.Y. MILLIKAN, P.E.
N.M.P.E. NO. 7547

TABLE OF CONTENTS

	Page
INTRODUCTION	1
SITE LOCATION AND DESCRIPTION	1
METHOD OF ANALYSIS	1
EXISTING DRAINAGE CONDITIONS	2
DEVELOPED DRAINAGE CONDITIONS	2
EROSION CONTROL PLAN	3

FIGURES

Figure 1 – Vicinity Map
Figure 2 – Soils Map
Figure 3 – Flood Hazard Boundary Map

APPENDIX

PLATE

Plate 1 – Grading and Drainage Plan

INTRODUCTION

The 10.73 acre Mountain Run Shopping Center will be built at the intersection of Eubank and Juan Tabo Blvds. in the City of Albuquerque, New Mexico. The planned construction site is undeveloped in its present state.

The purpose of this report is to describe existing drainage conditions on and adjacent to the site, and to present a grading and drainage plan which provides a workable means for treating all flows impacting or generated on the site.

SITE LOCATION AND DESCRIPTION

The site is located at the southeast corner of Eubank and Juan Tabo Blvds. and is a portion of Tracts I and H of the Academy Place Subdivision. In addition to this commercial site, a 15.85 acre apartment complex, 1.0 acre bank site and a 2.30 acre restaurant site will also be located on Tracts I and H. Figure 1 is a vicinity map of the area.

The site slopes at approximately 3½% from northeast to southwest. Soils are classified as Embudo–Tijeras association (Etc) and Tijeras series (TgB). Embudo–Tijeras is described as level to moderately sloping, well drained loamy and gravelly soils. Tijeras is described as nearly level to gently sloping gravelly fine sandy loam. Both soil groups are classified as hydrologic soil type "B" by the U.S. Soil Conservation Service. Figure 2 is a copy of the soils map for the area.

METHOD OF ANALYSIS

All methods of analysis and computations are done in accordance with Chapter 22 of the City of Albuquerque's Development Process Manual (DPM). Allowable discharge rates and volumes were determined in accordance with the "Drainage Ordinance".

For existing condition calculations, a runoff coefficient of .34 is used (type "B" soil, 0% impervious). A runoff coefficient of 0.86 is used assuming the site to be 90% impervious when developed.

Rainfall intensity calculations are based on a 6 hr. rainfall volume of 2.5 in., (as obtained from Plate 22.2 D–1 of the DPM). For existing 10-year and 100-year rainfall intensity calculations, a time of concentration of 25.0 min. is used. For all developed condition calculations, rainfall intensity is found assuming the time of concentration to be 10.0 min. Time of concentration calculations are included in the Appendix.

The Rational Formula has been applied to determine 10-year and 100-year peak flow rates and runoff volumes.

EXISTING DRAINAGE CONDITIONS

Besides flows generated on site, the only flows which impact the shopping center site are generated on the remainder of Tracts I and H. A drainage report has been submitted for the remainder of Tracts I and H. It was titled Drainage and Grading Plan for Mountain Run Apartments, August, 1983. The Flood Hazard Boundary Map (Figure 3) indicates that flows in Juan Tabo and Eubank are contained within the street right-of-way.

Under present conditions, all of Tracts I and H including the commercial site drain to the southwest corner of the apartment complex. Therefore, flow rate and runoff volume values have been computed for all of Tracts I and H. The portion attributable to the shopping center site can be found by proportioning its area to the remainder of the 29.88 acre tract. The 10-year peak flow rate for the site is 8.8 cfs. The 100-year peak flow rate is 13.4 cfs. The 10-year and 100-year runoff volumes are 0.542 ac.-ft. and 0.827 ac.-ft., respectively. Computations are included in the Appendix.

DEVELOPED DRAINAGE CONDITIONS

All flows impacting the shopping center site will be generated on site. Adequate flow capacity has been provided through the site should flows generated on the adjacent restaurant site require conveyance through the shopping center site. Provisions were also made in the drainage report for the apartment complex to accept runoff from restaurant site. Therefore, upon development, runoff from the restaurant can be discharged at an uncontrolled rate to either the apartments or the shopping center.

Runoff from this site will be discharged to Eubank Blvd. The flows will be conveyed within Eubank Blvd. to Layton Avenue. From this point the flows are conveyed in Layton Avenue to the Bear Tributary Arroyo. Page 3 of the Appendix shows calculations determining the capacity of Layton Ave. It has been assumed that all basins which drain to Layton Avenue under present conditions will drain to Layton Avenue under developed conditions. The boundaries of this basin are shown on Figure 3. The capacity of Layton just upstream of the Bear Tributary Arroyo was calculated as 260 cfs. The peak flow rate in Layton was determined using appropriate runoff coefficients for the contributing basins (see sheet 4 of Appendix). The combined peak flow rate is estimated to be 183.9 cfs. This is less than the capacity of Layton, therefore, uncontrolled discharge from the site is allowable.

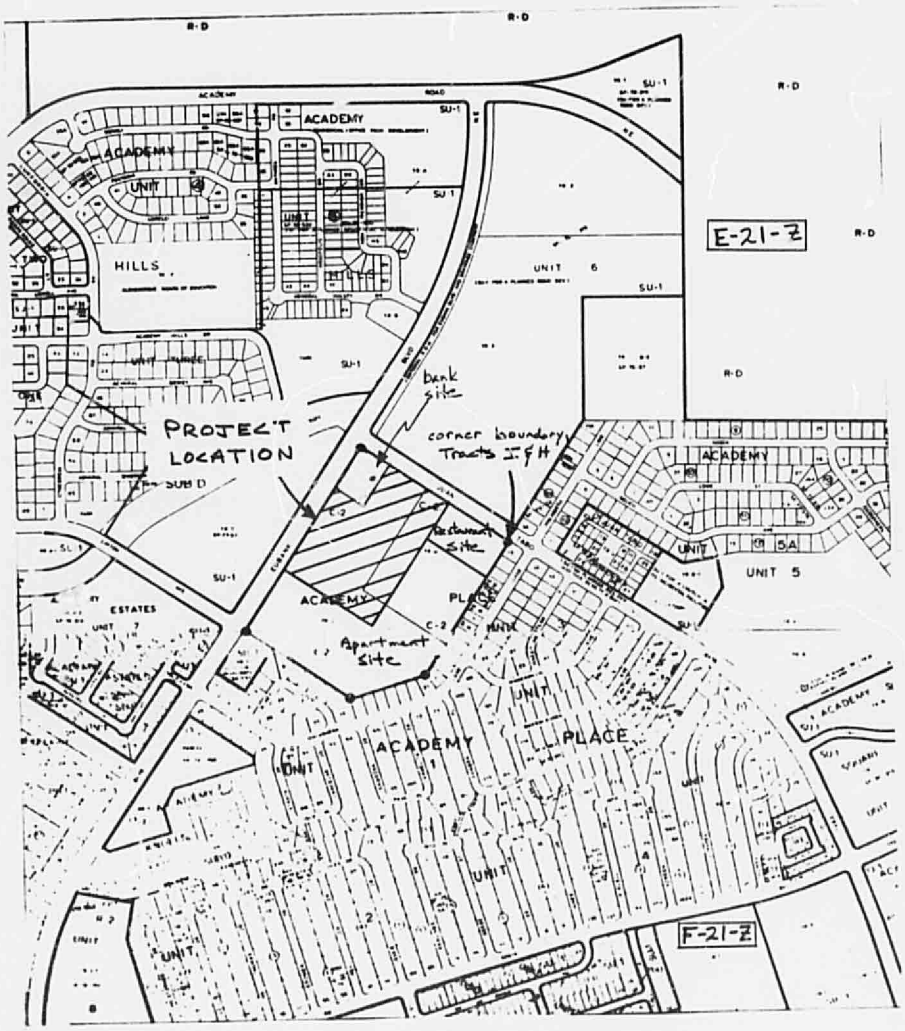
All runoff from the site will be discharged to Eubank at the southwest corner of the site. A small retention facility will be constructed between the most southwestern building on the site and Eubank to prevent nuisance flows from entering Eubank. This is in accordance with the "Drainage Ordinance". Flows which exceed the capacity of the small retention facility will be discharged over a turned weir at the end of the facility. They will be conveyed down Eubank and Layton to the Bear Tributary Arroyo. Based on a 100-year storm, a peak flow rate of approximately 49 cfs will be discharged from the site.

The Drainage and Grading Plan (Plate 1) indicates the drainage basins, flow directions and flow quantities (100-year storm) corresponding to the developed grading of the site. Page 2 of the Appendix shows individual basin flow rates and runoff volume values.

EROSION CONTROL PLAN

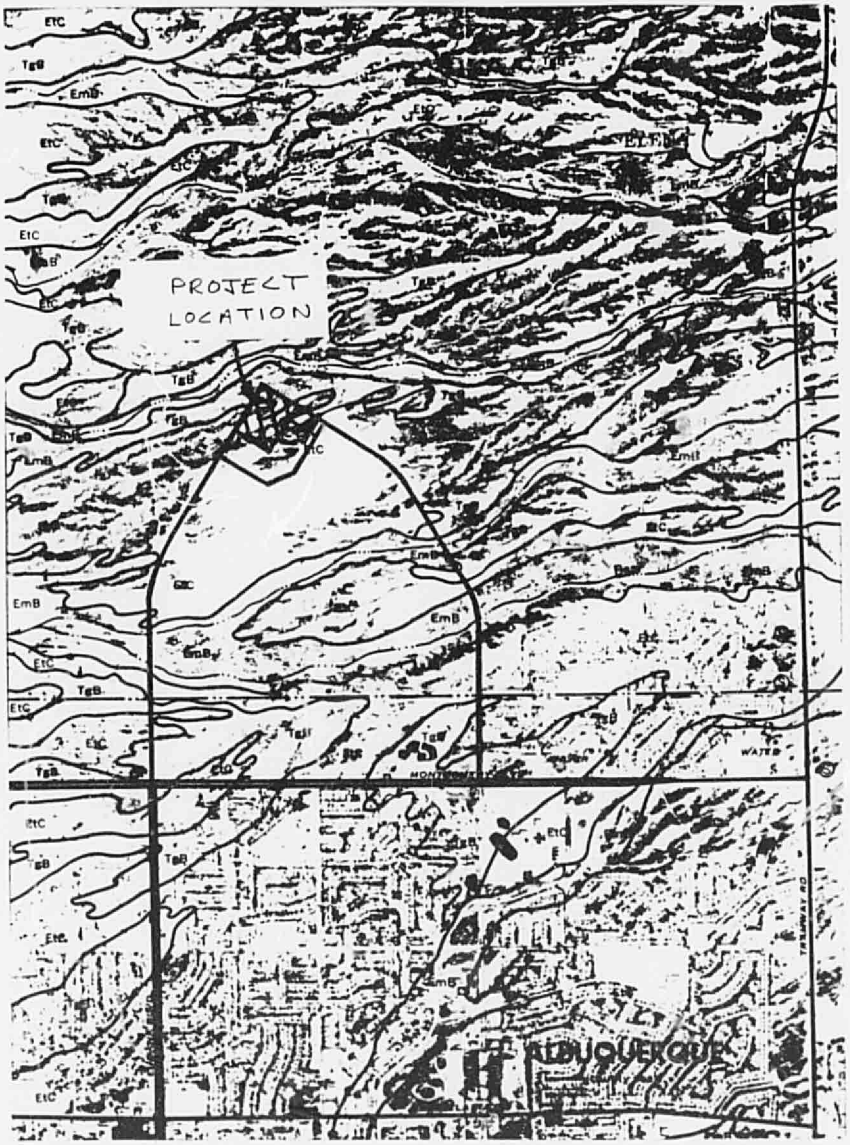
Slopes on the site at locations where there are concentrated flows are moderate (1%–7%). During the construction phase, erosion in these areas may occur. Upon completion of the rough grading on the site, provisions should be made to ensure that all runoff from the site goes through the small retention pond. This facility should trap any sediment before it leaves the site.

Upon completion of the paving and landscaping no erosion should occur in these areas. Slopes in landscaped areas are 3:1 or flatter. No concentrated flows are directed over these slopes. Therefore, erosion upon completion of the project should not occur.



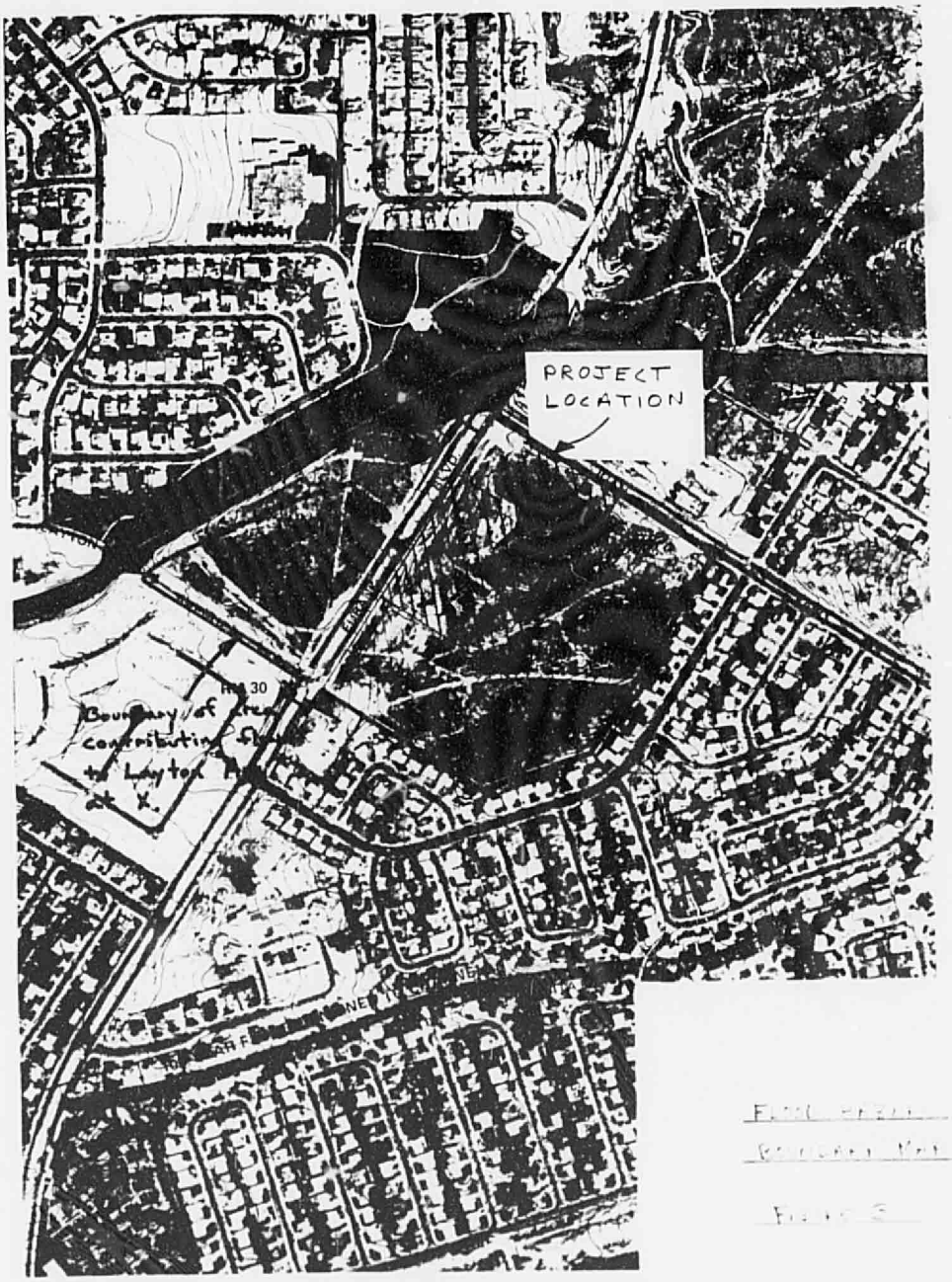
VICINITY MAP

FIGURE 1



SOILS MAP

FIGURE 2



Flood Hazard
Boundary Map

Figure 6

APPENDIX

TRACTS I & H, EXISTING DRAINAGE CONDITIONS

assume 0% imper. (C=.34, type "B" soil)
6-hr, 100-yr rainfall = 2.5"

Tracts I + H (total area):

$S = .033$ $A = 29.88$ ac

$V = 1.1$ ft/s $T_c = \frac{1650}{1.1(60)} = 25.0$ min

$I/C = 1.35$ in/hr

$I_{10} = (2.5 \times .657)(1.35) = 2.2$ in/hr

$I_{100} = (2.5)(1.35) = 3.4$ in/hr

$\therefore$ $Q_{10} = (.34)(2.2)(29.88) = 22.6$ cfs

$Q_{100} = (.34)(3.4)(29.88) = 34.3$ cfs

$V_{10} = (.34)(2.5 \times .657)(29.88)/12 = 1.39$ ac-ft

$V_{100} = (.34)(2.5)(29.88)/12 = 2.12$ ac-ft

Proportioning by area:

shopping center (includes 1.2 ac bank site) $= \frac{11.73}{29.88} \times 100 = 39\%$

apartment site $= \frac{15.85}{29.88} \times 100 = 53\%$

restaurant site $= \frac{2.30}{29.88} \times 100 = 8\%$

$\therefore$

	shopping center	apartment	restaurant
Q_{10} (cfs)	8.8	12.0	1.8
Q_{100} (cfs)	13.4	18.2	2.8
V_{10} (ac-ft)	0.542	0.737	0.111
V_{100} (ac-ft)	0.827	1.124	0.170

PROJECT NAME Mtn. Run Shop. Ctr. SHEET 1 OF 4
PROJECT NO. 31860 BY KJ DATE 8/22/83
SUBJECT Existing Drainage Calcs. CH'D DATE

Developed Drainage Conditions

assume 90% impervious (C = 0.86 for type "B" soil)
6-hr rainfall, 100-yr frequency = 2.5" (Plate 22.2 D-1 of DPM)

Basin A: (see Plate 1)

S = .035 ∴ V = 2.5 ft/s (Plate 22.2 B-1)

A = 5.15 ac

$T_c = \frac{L}{V(60)} = \frac{1180}{2.5(60)} = 7.8$ min → assume 10.0 min per DPM

I/6 = 2.11 in/hr (Plate 22.2 D-2)

$I_{10} = (2.11)(2.5 \times .657) = 3.5$ in/hr

$I_{100} = (2.11)(2.5) = 5.3$ in/hr

$Q_{10} = C I_{10} A = (0.86)(3.5)(5.15) =$ 15.5 cfs

$Q_{100} = C I_{100} A = (0.86)(5.3)(5.15) =$ 23.5 cfs

$V_{10} = (0.86)(2.5 \times .657)(5.15)/12 =$ 0.60 ac-ft

$V_{100} = (0.86)(2.5)(5.15)/12 =$ 0.92 ac-ft

Basin B:

A = 5.58 ac

assume T_c also equals 10.0 min, $I_{10} = 3.5$, $I_{100} = 5.3$

$Q_{10} = (0.86)(3.5)(5.58) =$ 16.8 cfs

$Q_{100} = (0.86)(5.3)(5.58) =$ 25.4 cfs

$V_{10} = (0.86)(2.5 \times .657)(5.58)/12 =$ 0.66 ac-ft

$V_{100} = (0.86)(2.5)(5.58)/12 =$ 1.00 ac-ft

PROJECT NAME Mtn. Run Shop Ctr. SHEET 3 OF 4

PROJECT NO. 31860 BY [illegible] DATE 9/83

SUBJECT Capacity of Layton Ave. CH'D ____ DATE ____

CAPACITY OF LAYTON AVE.

$$Q = \frac{1.486}{n} A R^{2/3} S^{1/2}$$

$n = .017$, $S = .0192$

$A_1 = \frac{1}{2}(.2)\left(\frac{.2}{\tan\theta}\right) = .780$

$A_2 = 30(.87 - .60) = 8.10$

$A_3 = \frac{1}{2}(.60)(30) = 9.00$

$17.88\ ft^2 \times 2 = 35.76\ ft^2 = A$

wetted perimeter

$P = [7.80 + .67 + 30.0]\,2$

$P = 76.94\ ft$

$\therefore R = A/P$

$R = \frac{35.76}{76.94} = .465$

$$Q = \frac{1.486}{.017}(35.76)(.465)^{2/3}(.0192)^{1/2}$$

$Q = 260\ cfs$ ← total street capacity

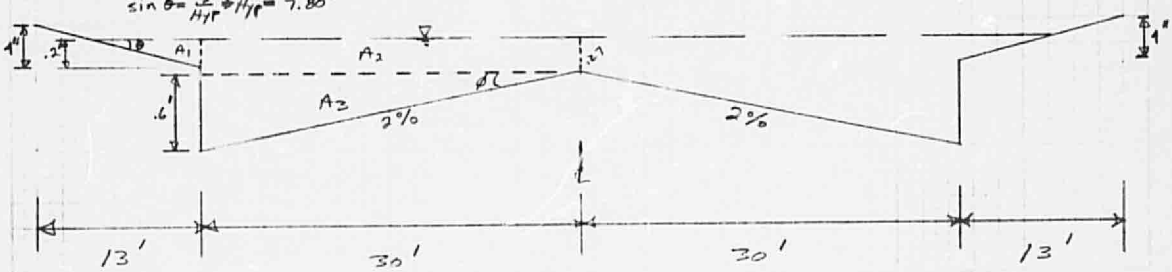
$\tan\alpha = \frac{.3333}{13}$

$\alpha = 1.4687 = \theta$

$\sin\theta = \frac{.2}{H_{YP}} \Rightarrow H_{YP} = 7.80'$

$\tan\phi = \frac{.6}{30} \Rightarrow \phi = 1.146$

$\sin\phi = \frac{.6}{H_{YP}} \Rightarrow H_{YP} \simeq 30.0'$



86' R/W

FLOWS IMPACTING LAYTON AVE. VS. CAPACITY OF LAYTON AVE.

Undevel. land bounded by Layton, Eubank and Bear Trib. -

$s = \frac{72.0 - 24.0}{1300} = .037$, $V = 1.2$

$T_c = \frac{1300}{1.2(60)} = 18.1$ $I/6 = 1.65$

$I_{100} = 2.5(1.65) = 4.1$ $Q_{100_{UD}} = (34)(4.1)(9.90) = \underline{13.8 \text{ cfs}}$

assume developed: $c = 0.82$, $T_c = 10.0$ min $Q_{100_D} = (.82)(5.3)(9.90) = \underline{\underline{43.0 \text{ cfs}}}$

On Eubank -

$s = \frac{78.5 - 42.7}{1200} = .030$ $V = 4.6$

$T_c = \cancel{4.35} \rightarrow 10.0$ $I/6 = 2.11$

$I_{100} = 2.5(2.11) = 5.3$ $Q_{100} = (.10)(5.3)(1.653) = \underline{8.8 \text{ cfs}}$

Shopping area (includes adjacent bank site) -

$Q_{100_{UD}} = \underline{13.4 \text{ cfs}}$ (see pg. 1 of Appendix)

assume developed: $c = 0.82$, $T_c = 10.0$ min

$Q_{100_D} = (.86)(5.3)(11.73) = \underline{\underline{53.5 \text{ cfs}}}$

Apartment site (from drainage report) -

$Q_{100_D} = \underline{\underline{78.61 \text{ cfs}}}$

$\therefore Q_{100\,(total)}$ when developed $= 183.9 < 260$ cfs ✓

therefore adequate capacity in Layton for uncontrolled discharge from all contributing basins.

PROJECT NAME _____ SHEET 4 OF 4

PROJECT NO. 31860 BY JA DATE 8/83

SUBJECT Flows Impacting Layton Ave CH'D _____ DATE _____