B13/D5

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B13/D5

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FILE COPY

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

KEN SCHULTZ
MAYOR

September 27, 1989

Ted Green, P.E.
Bohannan-Huston, Inc.
7500 Jefferson St. N.E.
Albuquerque, New Mexico 87109

RE: DRAINAGE REPORT FOR COORS BYPASS FROM 1/2 MILE WEST OF COORS TO NM 528, SUBMITTED SEPTEMBER 8, 1989 FOR WORK ORDER

Dear Mr. Green:

I have reviewed your submittal, referred to above, and forward the following comments and observations:

1. A detailed drainage basin boundary map is needed to identify all flow rates for your proposed storm drain lines. To include the background for your runoff estimates, e.g., the coefficient of runoff for the rational method, the SCS curve number used for the volume calculations, and any routing calculations which might have an attenuating effect on the peak flows.

2. Please provide construction drawings and volume calculations for the proposed pond in the open space to the east of the High School. Since public waters will be discharging into this pond, a work order will be required, and the pond will have to be built to city standards.

3. The outfall for the storm drain north of Ellison Drive will require a drainage easement to NMSH 528 right of way, as do the easements for the two ponds immediately downstream: the one controlling flows to the Highway 528 crossing, and the one controlling flows to the Cabezon Channel entrance. Since public waters will be discharging into a conveyance system to the ponds, a work order will be required and the ponds will have to be built to City Standards.

PUBLIC WORKS DEPARTMENT

Walter H. Nickerson, Jr., P.E.
Assistant Director Public Works

ENGINEERING GROUP

Telephone (505) 768-2500

AN EQUAL OPPORTUNITY EMPLOYER

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4. Attached for your review is a letter from our office to Chuck Easterling regarding comments for the conceptual drainage plan for the 7-Bar Area, please check if any of these comments are applicable to your construction plans including any offsite basins. To date we have not received a response from Chuck Easterling concerning these comments.

5. Please do not mark up the bluelines with flowrates or other information. For your resubmittal, this information should be on the originals, this also includes your stamp on the blueline. The purpose of this request, is to insure permanent record keeping of this information for use by others.

If you should have any questions regarding the disapproval of this plan because a lack of information, please feel free to call me at 768-2650.

Cordially Yours,

Gilbert Aldaz, P.E. & L.S.
Civil Engineer/ Hydrology

GA/bsj
(WP+1314)

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ENGINEERS ARCHITECTS PHOTOGRAMMETRISTS

BOHANNAN-HUSTON INC.

COURTYARD I, 7500 JEFFERSON STREET N.E. ALBUQUERQUE, NM 87109
TEL. (505) 823-1000 FAX (505) 821-0892

RECEIVED
SEP 0 8 1989
HYDROLOGY SECTION

September 6, 1989

Mr. Fred Aguirre
Hydrology Development
P.O. Box 1293
Albuquerque, NM 87103

RE: Drainage Report
Coors Bypass

Dear Mr. Aguirre:

Enclosed is the Drainage Report for the subject project and the corresponding drainage information sheet. I am also forwarding a copy to Mr. Cliff Anderson of AMAFCA.

Please review the Report and advise, feel free to contact me if you have any questions.

Sincerely,

Ted Green

Ted Green, PE
BOHANNAN-HUSTON, INC.

Encl

PRINCIPALS
LARRY W. HUSTON
MICHAL M. EMERY, P.E.
ANDRES ARAGON VIAMONTE
BRIAN G. BURNETT, P.E.

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B13/D6

DRAINAGE INFORMATION SHEET

PROJECT TITLE: Coors Bypass ZONE ATLAS/DRNG. FILE #: ~~A-14, B-14~~

LEGAL DESCRIPTION: N/A

CITY ADDRESS: Coors Bypass - from ½ mile west of Coors to NM 528

ENGINEERING FIRM: Bohannan-Huston, Inc. Courtyard I CONTACT: Ted Green

ADDRESS: 7500 Jefferson St., N.E. Albuquerque, NM 87109 PHONE: (505) 823-1000, Ext. 322

OWNER: ABQ Development Corp. CONTACT: Jay Chester

ADDRESS: P.O. Box 25625 Albuquerque, NM 87125 PHONE: (505) 242-3330

ARCHITECT: N/A CONTACT:

ADDRESS: PHONE:

SURVEYOR: Hugg Surveying Co. CONTACT: Garry Hugg

ADDRESS: 4100 Southern Blvd., S.E. Rio Rancho, NM 87124 PHONE: (505) 892-8800

CONTRACTOR: N/A CONTACT:

ADDRESS: PHONE:

PRE-DESIGN MEETING:

X YES Consistent w/7-Bar Drainage Management Plan

____ NO

____ COPY OF CONFERENCE RECAP SHEET PROVIDED

DRB NO. 89-194,89-204

EPC NO. N/A

PROJECT NO.

RECEIVED SEP 6 1989 HYDROLOGY SECTION

TYPE OF SUBMITTAL:

X DRAINAGE REPORT

____ DRAINAGE PLAN

____ CONCEPTUAL GRADING & DRAIN. PLAN

____ GRADING PLAN

____ EROSION CONTROL PLAN

____ ENGINEER'S CERTIFICATION

CHECK TYPE OF APPROVAL SOUGHT:

____ SKETCH PLAT APPROVAL

____ PRELIMINARY PLAT APPROVAL

____ SITE DEVELOPMENT PLAN APPROVAL

____ FINAL PLAT APPROVAL

____ BUILDING PERMIT APPROVAL

____ FOUNDATION PERMIT APPROVAL

____ CERTIFICATE OF OCCUPANCY APPROVAL

____ ROUGH GRADING PERMIT APPROVAL

____ GRADING/PAVING PERMIT APPROVAL

X OTHER ROADWAY WORK ORDER (SPECIFY)

RECEIVED SEP 1 - 1989 HYDROLOGY SECTION

DATE SUBMITTED: Sept. 6, 1989

BY: Ted Green

Ted Green

Rev. 11/84

25×

0000 0000 1287

X.C.

City of Albuquerque
P.O. BOX 293 ALBUQUERQUE, NEW MEXICO 87103

HYDROLOGY SECTION
123 Central NW, Albuquerque, NM 87102
(505) 766-7644

October 21, 1986

Brian Burnett, P.E.
Bohannan-Huston, Inc.
7500 Jefferson Street, NE
Albuquerque, New Mexico 87109

RE: DRAINAGE REPORT SUBMITTAL OF THE COORS BY-PASS ROAD STORM DRAIN, RECEIVED OCTOBER 9, 1986 FOR PRELIMINARY PLAT APPROVAL FOR TRACTS N-1A AND N-1B SEVEN BAR RANCH (B-13/D5)

Dear Brian:

I have reviewed the above referenced submittal, dated October 9, 1986, and have the following comments to be addressed before review can continue:

1. I made a run of our storm drain pressure flow program to verify your HGL results of the Coors By-pass storm drain, and found our results to be substantially different. The DPM requires that storm drains be designed for full pipe flow, and use mannings equation to calculate friction losses. Also, your head loss results shown for manholes are not consistant with the formula in the DPM. With our difference in the HGL at station 49 + 28 being 12.0 feet due to friction losses alone, a reanalysis is appropriate.

2. Provide street flow calculations for Eagle Ranch Road and Coors By-Pass Road to show that one driving lane is free of water during the 10 year storm, as required by the Drainage Ordinance, since these roads are classified as Arterial thoroughfares.

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3. Revise the storm drain calculations as required since you show conflicting introduced flow rates at Station 44 + 20 between the storm drain and inlet design tables.

If you have any questions, call me at 768-2650.

Cordially,

Roger A. Green, PE

Roger A. Green, P.E.
C.E./Hydrology Section

cc: Andre Houle, DRC
Tom Isaacson, Isaacson & Arfman
Dan Sabo, AMAFCA

RAG/bsj

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FILE COPY

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

HYDROLOGY SECTION
123 Central NW, Albuquerque, NM 87102
(505) 768-7644

November 10, 1986

Brian Burnett, P.E.
Bohannan-Huston, Inc.
7500 Jefferson Street, NE
Albuquerque, New Mexico 87109

RE: REVISED DRAINAGE REPORT SUBMITTAL OF THE COORS BY-PASS ROAD STORM DRAIN, RECEIVED NOVEMBER 5, 1986 FOR PRELIMINARY PLAT APPROVAL FOR TRACTS N-1A AND N-1B SEVEN BAR RANCH (B-13/D5)

Dear Brian:

The above referenced submittal, dated November 5, 1986, is approved for Preliminary Plat approval and Infrastructure Listing sign-off by the City Engineer at the DRB.

Construction drawings submitted to the DRC will also required AMAFCA's sign-off for the storm drain outlet into the Calabacillas Arroyo.

Before Final Plat sign-off by the City Engineer, an executed Subdivision Improvements Agreement is required.

If you have any questions, call me at 768-2650.

Cordially,

Roger A. Green, PE

Roger A. Green, P.E.
C.E./Hydrology Section

cc: Andre Houle, DRC
Dan Sabo, AMAFCA
John Black, 7-Bar Land & Cattle Co.

RAG/bsj

25×

0000 0000 1290

R. GREEN
11/10/86

CODRS 2V-PASS STORM DRAIN

# CALC	NODE 1	NODE 2	ELEV	D1	D2	D	A	V1	V2	K	LENGTH	DELTA	HV	K
1.000	1.000	1.000	29.520	42.000	0.000	138.000	9.621	14.364	0.000	0.000	0.000	0.000	3.204	0.013
2.000	1.000	2.000	30.580	42.000	0.000	138.000	9.621	0.000	0.000	1006.097	75.960	0.000	3.204	0.013
3.000	1.000	2.000	30.580	42.000	0.000	138.000	9.621	14.364	0.000	0.000	0.000	0.000	3.204	0.013
4.000	2.000	3.000	34.350	42.000	0.000	126.700	9.621	0.000	0.000	1006.097	269.000	0.000	2.693	0.013
5.000	2.000	3.000	34.350	42.000	0.000	126.700	9.621	13.169	0.000	0.000	0.000	0.000	2.693	0.013
6.000	3.000	4.000	39.680	42.000	0.000	114.500	9.621	0.000	0.000	1006.097	393.990	0.000	2.199	0.013
7.000	3.000	4.000	39.680	42.000	0.000	114.500	9.621	11.901	0.000	0.000	0.000	0.000	2.199	0.013
8.000	4.000	5.000	42.290	42.000	0.000	108.300	9.621	0.000	0.000	1006.097	186.130	0.000	1.968	0.013
9.000	4.000	5.000	42.290	42.000	0.000	108.300	9.621	11.056	0.000	0.000	0.000	0.000	1.968	0.013
10.000	5.000	6.000	46.090	42.000	0.000	102.000	9.621	0.000	0.000	1006.097	271.200	0.000	1.745	0.013
11.000	5.000	6.000	46.090	42.000	0.000	102.000	9.621	10.582	0.000	0.000	0.000	0.000	1.745	0.013
12.000	6.000	7.000	49.750	42.000	0.000	102.000	9.621	0.000	0.000	1006.097	261.200	0.000	1.745	0.013
13.000	6.000	7.000	49.750	42.000	0.000	102.000	9.621	10.582	0.000	0.000	0.000	0.000	1.745	0.013
14.000	7.000	8.000	56.050	36.000	0.000	60.100	7.069	0.000	0.000	666.983	450.000	0.000	1.123	0.013
15.000	7.000	8.000	56.050	36.000	0.000	60.100	7.069	8.502	0.000	0.000	0.000	0.000	1.123	0.013
16.000	8.000	9.000	59.520	30.000	0.000	53.600	4.909	0.000	0.000	410.171	248.050	0.000	1.851	0.013
17.000	8.000	9.000	59.520	30.000	0.000	53.600	4.909	10.913	0.000	0.000	0.000	0.000	1.851	0.013
18.000	9.000	10.000	62.490	30.000	0.000	40.000	4.909	0.000	0.000	410.171	211.950	0.000	1.031	0.013
19.000	9.000	10.000	62.490	30.000	0.000	40.000	4.909	8.149	0.000	0.000	0.000	0.000	1.031	0.013

From 24" RCP Print Out

CODE	NODE	FS	FRIC L	MANH L	BEND L	EXP L	JUNC L	ANG L	CONT L	INLT L	TRANS L	TOT L	HGL	EGL
0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	36.013	39.217
1.000	2.000	0.019	1.433	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.433	37.446	40.650
2.000	2.000	0.000	0.000	0.160	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.593	37.626	40.810
1.000	3.000	0.016	4.266	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5.859	42.384	45.076
2.000	3.000	0.000	0.000	0.135	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5.994	42.518	45.211
1.000	4.000	0.013	4.933	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	10.927	47.945	50.144
2.000	4.000	0.000	0.000	0.110	0.000	0.000	0.000	0.000	0.000	0.000	0.000	11.037	48.055	50.254
1.000	5.000	0.012	2.157	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	13.194	50.444	52.411
2.000	5.000	0.000	0.000	0.098	0.000	0.000	0.000	0.000	0.000	0.000	0.000	13.293	50.542	52.509
1.000	6.000	0.018	2.787	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	16.080	53.552	55.297
2.000	6.000	0.000	0.000	0.087	0.000	0.000	0.000	0.000	0.000	0.000	0.000	16.167	53.639	55.384
1.000	7.000	0.010	2.685	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	18.852	56.324	58.069
2.000	7.000	0.000	0.000	0.087	0.000	0.000	0.000	0.000	0.000	0.000	0.000	18.939	56.411	58.156
1.000	8.000	0.008	3.654	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	22.593	60.687	61.810
2.000	8.000	0.000	0.000	0.056	0.000	0.000	0.000	0.000	0.000	0.000	0.000	22.649	60.743	61.866
1.000	9.000	0.017	4.236	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	26.885	64.250	66.102
2.000	9.000	0.000	0.000	0.093	0.000	0.000	0.000	0.000	0.000	0.000	0.000	26.977	64.343	66.194
1.000	10.000	0.010	2.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	28.993	67.179	68.210
2.000	10.000	0.000	0.000	0.052	0.000	0.000	0.000	0.000	0.000	0.000	0.000	29.045	67.231	68.262

- 27.045
38.186

CODES

1 - PIPE SECTION 2 - MANHOLE 3 - PIPE-BEND 4 - EXPANSION 5 - JUNCTION
6 - ANGLE - POINT 7 - CONTRACTION 8 - INLETS 9 - TRANSITIONS

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ENGINEERS ARCHITECTS PHOTOGRAMMETRISTS

BOHANNAN-HUSTON INC.

COURTYARD I, 7500 JEFFERSON STREET N.E. ALBUQUERQUE, NEW MEXICO 87109 (505) 823-1000
UNIVERSITY PLAZA, SUITE 104, 330 GARFIELD SANTA FE, NEW MEXICO 87501 (505) 988-7671
6713 VISCOUNT BLVD EL PASO, TEXAS 79925 (915) 778-4491

November 5, 1986

RECEIVED
NOV 05 1986
HYDROLOGY SECTION

Roger A. Green, P.E.
City of Albuquerque
Hydrology Section
P.O. Box 1293
Albuquerque, NM 87103

Re: Drainage Report for V.T., Inc. Off-Site Drainage Infrastructure Design

Dear Roger:

At the DRB meeting on November 4, 1986, Bob Fosnaugh and Fred Aguirre discussed the street classification for Eagle Ranch Road. Bob indicated that the road is collector status, not a minor arterial as we had thought.

Please note the effect this decision has on the above referenced drainage report. As a collector, Eagle Ranch Road no longer needs to preserve one land free of water during the 10-year storm. We can therefore maintain our present calculations without a need for a variance from DPM criteria.

We believe that all outstanding concerns have been addressed at this time. Obtaining an approval letter for preliminary plat by next Tuesday, November 11, 1986 would be most helpful. If you have any questions concerning this issue, please feel free to contact me.

Truly yours,

Brian G. Burnett, P.E.
Vice President

cc: Mr. Cecil Van Tuyl
Mr. Bill Dean
Mr. John Myers
Mr. John Black
Mr. John Salazar
Ms. Karen Marcotte
Mr. Matt Spangler
Ms. Joan Hill
Mr. Jorge de la Torre
Mr. Chuck Easterling
Mr. Tom Isaacson
Mr. Dale Dekker
Mr. Garry Hugg

BGB/mls
Job No. 6 308 3

PRINCIPALS
LARRY W. HUSTON
MICHAL M. EMERY, P.E.
DANA C. WOOD, P.E.
ANDRES ARAGON VIAMONTE
DARRELL L. WADE, P.E.
JAMES V. DOMENICK, P.E.
BRIAN G. BURNETT, P.E.

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ENGINEERS ARCHITECTS PHOTOGRAMMETRISTS

BOHANNAN-HUSTON INC.

COURTYARD I 7500 JEFFERSON STREET N.E. ALBUQUERQUE, NEW MEXICO 87109 (505) 823-1000
UNIVERSITY PLAZA SUITE 104 330 GARFIELD SANTA FE, NEW MEXICO 87501 (505) 988-7671
6713 VISCOUNT BLVD EL PASO, TEXAS 79925 (915) 778-4491

Will Bnto review sheet morning

November 3, 1986

RECEIVED
NOV 0 1986
HYDROLOGY SECTION

Roger A. Green, P.E.
City of Albuquerque
Hydrology Section
123 Central N.W.
Albuquerque, NM 87102

Re: Drainage Report for V.T., Inc. Off-Site Drainage Infrastructure Design

Dear Roger:

Enclosed, for your review, is a resubmittal of the above referenced drainage report. We have made the following changes as per your comments in your October 21, 1986 letter:

1. We have changed methods in analyzing the pipe flow. We are now using the Manning Equation as stipulated in the DPM in lieu of the Hazen-Williams equation that we previously used with our in-house program.

2. Included in the report is a half-section sketch of the By-Pass Road showing one lane free of water during the 10-year storm.

   It is impossible to preserve one lane free of water on Eagle Ranch Road while having a flow depth of 0.5 feet. We are currently requesting a written variance to this criteria from the City Engineer. Therefore, our previous calculations for this section stand.

3. We have revised the storm drain table to concur with the inlet design table.

It should be noted that Plates 8 and 9 have been revised to show the new pipe sizes. All other plates have remained unaltered.

PRINCIPALS
LARRY W. HUSTON
MICHIAL M. EMERY, P.E.
DANA C. WOOD, P.E.
ANDRES ARAGON-VIAMONTE
DARRELL L. WADE, P.E.
JAMES V. DOMENICK, P.E.
BRIAN G. BURNETT, P.E.

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If you have any questions, please feel free to call.

Truly yours,

Brian G. Burnett, P.E.
Vice President

Enclosure

cc: Mr. Cecil Van Tuyl
Mr. Bill Dean
Mr. John Myers
Mr. John Black
Mr. John Salazar
Ms. Karen Marcotte
Mr. Matt Spangler
Ms. Joan Hill
Mr. Jorge de la Torre
Mr. Chuck Easterling
Mr. Tom Isaacson
Mr. Dale Dekker
Mr. Garry Hugg

BGB/mls
Job No. 6 308 5

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DRAINAGE INFORMATION SHEET

B13/D5

PROJECT TITLE: V.T., Inc. Offsite Drainage Infrastructure Design ZONE ATLAS/DRNG FILE #: A13/A14 B13/B14

LEGAL DESCRIPTION: NA

CITY ADDRESS: NA

ENGINEERING FIRM: Bohannan - Huston Inc. CONTACT: Brian Burnett

ADDRESS: 7500 Jefferson N.E. Albuquerque, NM 87109 PHONE: 823-1000

OWNER: T-Bar Land and Cattle Company CONTACT: John Black

ADDRESS 3615 Rio Rancho NW. Albuquerque, NM 87048 PHONE: 897-7227

ARCHITECT: CONTACT:

ADDRESS: PHONE:

SURVEYOR: CONTACT:

ADDRESS: PHONE:

CONTRACTOR: CONTACT:

ADDRESS: PHONE:

PRE-DESIGN MEETING:

X YES

___ NO

___ COPY OF CONFERENCE RECAP SHEET PROVIDED

DRB NO.

EPC NO.

PROJECT NO.

RECEIVED NOV 07 1986 HYDROLOGY SECTION

TYPE OF SUBMITTAL:

X DRAINAGE REPORT

___ DRAINAGE PLAN

___ CONCEPTUAL GRADING & DRAIN. PLAN

___ GRADING PLAN

___ EROSION CONTROL PLAN

___ ENGINEER'S CERTIFICATION

CHECK TYPE OF APPROVAL SOUGHT:

___ SKETCH PLAT APPROVAL

X PRELIMINARY PLAT APPROVAL

___ SITE DEVELOPMENT PLAN APPROVAL

___ FINAL PLAT APPROVAL

___ BUILDING PERMIT APPROVAL

___ FOUNDATION PERMIT APPROVAL

___ CERTIFICATE OF OCCUPANCY APPROVAL

___ ROUGH GRADING PERMIT APPROVAL

___ GRADING/PAVING PERMIT APPROVAL

OTHER _____ (SPECIFY)

DATE SUBMITTED: 11/3/86

BY: Brian Burnett

Rev. 11/84

25 X

0000 0000 1295

CODRS BY-PASS STORM DRAIN

K. GREEN

# CALC	NODE 1	NODE 2	ELEV	D1	D2	Q	A	V1	V2	K	LENGTH	DELTA	HV	n
1.000	2574.040	2574.040	29.520	42.000	0.000	138.300	9.621	14.375	0.000	0.000	0.000	0.000	3.209	0.000
2.000	2574.040	2650.000	30.580	42.000	0.000	138.300	9.621	0.000	0.000	1006.097	75.960	0.000	3.209	0.013
3.000	2574.040	2650.000	30.580	42.000	0.000	138.300	9.621	14.375	0.000	0.000	0.000	0.000	3.209	0.013
4.000	2650.000	2919.000	34.350	42.000	0.000	116.800	9.621	0.000	0.000	1006.097	269.000	0.000	2.288	0.013
5.000	2650.000	2919.000	34.350	42.000	0.000	116.800	9.621	12.140	0.000	0.000	0.000	0.000	2.288	0.013
6.000	2919.000	3207.550	38.390	42.000	0.000	104.600	9.621	0.000	0.000	1006.097	288.550	0.000	1.835	0.013
7.000	2919.000	3207.550	38.390	42.000	0.000	104.600	9.621	10.872	0.000	0.000	0.000	0.000	1.835	0.013
8.000	3207.550	3496.130	42.430	36.000	0.000	104.600	7.069	0.000	0.000	666.983	288.580	[illegible]	3.400	0.013
9.000	3207.550	3496.130	42.430	36.000	0.000	104.600	7.069	14.798	0.000	0.000	0.000	[illegible]	3.400	0.013
10.000	3496.130	3757.330	46.080	36.000	0.000	98.300	7.069	0.000	0.000	666.983	261.200	[illegible]	3.003	0.013
11.000	3496.130	3757.330	46.080	36.000	0.000	98.300	7.069	13.907	0.000	0.000	0.000	0.000	3.003	0.013
12.000	3757.330	4018.530	49.740	36.000	0.000	98.300	7.069	0.000	0.000	666.983	261.200	0.000	3.003	0.013
13.000	3757.330	4018.530	49.740	36.000	0.000	98.300	7.069	13.907	0.000	0.000	0.000	0.000	3.003	0.013
14.000	4018.530	4468.530	56.040	30.000	0.000	60.600	4.909	0.000	0.000	410.171	450.000	0.000	2.367	0.013
15.000	4018.530	4468.530	56.040	30.000	0.000	60.600	4.909	12.345	0.000	0.000	0.000	0.000	2.367	0.013
16.000	4468.530	4723.460	59.610	30.000	0.000	53.600	4.909	0.000	0.000	410.171	254.930	0.000	1.851	0.013
17.000	4468.530	4723.460	59.610	30.000	0.000	53.600	4.909	10.919	0.000	0.000	0.000	0.000	1.851	0.013
18.000	4723.460	4928.530	62.480	30.000	0.000	40.000	4.909	0.000	0.000	410.171	205.070	0.000	1.031	0.013
19.000	4723.460	4928.530	62.480	30.000	0.000	40.000	4.909	8.149	0.000	0.000	0.000	0.000	1.031	0.013

CODE	NODE	FS	FRIC L	MANH L	BEND L	EXP L	JUNC L	ANG L	CONT L	INLT L	TRANS L	TOT L	HGL	EGL
0.000	2574.040	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	35.013	39.222
1.000	2650.000	0.019	1.435	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.435	37.448	40.657
2.000	2650.000	0.000	0.000	0.160	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.596	37.609	40.817
1.000	2919.000	0.013	3.625	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5.221	42.154	44.443
2.000	2919.000	0.000	0.000	0.114	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5.336	42.269	44.557
1.000	3207.550	0.011	3.119	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	8.455	45.841	47.676
2.000	3207.550	0.000	0.000	0.092	0.000	0.000	0.000	0.000	0.000	0.000	0.000	8.546	45.932	47.768
1.000	3496.130	0.025	7.097	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	15.644	51.465	54.865
2.000	3496.130	0.000	0.000	0.170	0.000	0.000	0.000	0.000	0.000	0.000	0.000	15.814	51.635	55.035
1.000	3757.330	0.022	5.673	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	21.487	57.706	60.709
2.000	3757.330	0.000	0.000	0.150	0.000	0.000	0.000	0.000	0.000	0.000	0.000	21.637	57.856	60.859
1.000	4018.530	0.022	5.673	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	27.311	63.529	66.532
2.000	4018.530	0.000	0.000	0.150	0.000	0.000	0.000	0.000	0.000	0.000	0.000	27.461	63.680	66.683
1.000	4468.530	0.022	9.823	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	37.284	74.139	76.505
2.000	4468.530	0.000	0.000	0.118	0.000	0.000	0.000	0.000	0.000	0.000	0.000	37.402	74.257	76.623
1.000	4723.460	0.017	4.353	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	41.755	79.125	80.977
2.000	4723.460	0.000	0.000	0.093	0.000	0.000	0.000	0.000	0.000	0.000	0.000	41.848	79.218	81.069
1.000	4928.530	0.010	1.950	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	43.798	81.989	83.020
2.000	4928.530	0.000	0.000	0.052	0.000	0.000	0.000	0.000	0.000	0.000	0.000	43.850	82.040	83.071

CODES

1 - PIPE SECTION 2 - MANHOLE 3 - PIPE-BEND 4 - EXPANSION 5 - JUNCTION
6 - ANGLE - POINT 7 - CONTRACTION 8 - INLETS 9 - TRANSITIONS

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84" RCP OUTLET

# CALC	NODE 1	NODE 2	ELEV	D1	D2	Q	A	V1	V2	K	LENGTH	DELTA	HV	n
1.000	122.930	122.930	27.000	84.000	0.000	300.000	38.485	7.795	0.000	0.000	0.000	0.000	0.944	0.000
2.000	122.930	158.930	27.070	84.000	0.000	300.000	38.485	0.000	0.000	6388.314	36.000	0.000	0.944	0.013
3.000	122.930	158.930	27.070	84.000	0.000	300.000	38.485	7.795	0.000	0.000	0.000	0.000	0.944	0.013
4.000	122.930	158.930	27.070	84.000	0.000	300.000	38.485	7.795	0.000	6388.314	4.000	45.000	0.944	0.013
5.000	158.930	198.930	27.150	84.000	0.000	300.000	38.485	0.000	0.000	6388.314	40.000	0.000	0.944	0.013
6.000	158.930	198.930	27.150	84.000	0.000	300.000	38.485	7.795	0.000	0.000	0.000	0.000	0.944	0.013
7.000	158.930	198.930	27.150	84.000	0.000	300.000	38.485	7.795	0.000	6388.314	4.000	45.000	0.944	0.013
8.000	198.930	~~513.930~~	27.770	84.000	0.000	300.000	38.485	0.000	0.000	6388.314	307.220 ✓	0.000	0.944	0.013
9.000	198.930	~~513.930~~	27.770	84.000	84.000	300.000	38.485	4.202	7.795	0.000	4.000	0.000	0.274	0.013
		506.15												

CODE	NODE	FS	FRIC L	MANH L	BEND L	EXP L	JUNC L	ANG L	CONT L	INLT L	TRANS L	TOT L	HGL	EGL
0.000	122.930	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	34.000	34.944
1.000	158.930	0.002	0.079	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.079	34.079	35.023
2.000	158.930	0.000	0.000	0.047	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.127	34.127	35.070
3.000	158.930	0.002	0.009	0.000	0.167	0.000	0.000	0.000	0.000	0.000	0.000	0.302	34.302	35.246
1.000	198.930	0.002	0.088	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.390	34.390	35.334
2.000	198.930	0.000	0.000	0.047	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.438	34.438	35.381
3.000	198.930	0.002	0.009	0.000	0.167	0.000	0.000	0.000	0.000	0.000	0.000	0.613	34.613	35.557
1.000	513.930	0.002	0.678	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.291	35.291	36.234
5.000	513.930	0.001	0.006	0.000	0.000	0.000	0.053	0.000	0.000	0.000	0.000	1.344	36.013	36.287

CODES

1 - PIPE SECTION 2 - MANHOLE 3 - PIPE-BEND 4 - EXPANSION 5 - JUNCTION
6 - ANGLE - POINT 7 - CONTRACTION 8 - INLETS 9 - TRANSITIONS

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FILE COPY

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

HYDROLOGY SECTION
123 Central NW, Albuquerque, NM 87102
(505) 766-7644

October 21, 1986

Brian Burnett, P.E.
Bohannan-Huston, Inc.
7500 Jefferson Street, NE
Albuquerque, New Mexico 87109

RE: DRAINAGE REPORT SUBMITTAL OF THE COORS BY-PASS ROAD STORM DRAIN, RECEIVED OCTOBER 9, 1986 FOR PRELIMINARY PLAT APPROVAL FOR TRACTS N-1A AND N-1B SEVEN BAR RANCH (B-13/D5)

Dear Brian:

I have reviewed the above referenced submittal, dated October 9, 1986, and have the following comments to be addressed before review can continue:

1. I made a run of our storm drain pressure flow program to verify your HGL results of the Coors By-pass storm drain, and found our results to be substantially different. The DPM requires that storm drains be designed for full pipe flow, and use mannings equation to calculate friction losses. Also, your head loss results shown for manholes are not consistant with the formula in the DPM. With our difference in the HGL at station 49 + 28 being 12.0 feet due to friction losses alone, a reanalysis is appropriate.

2. Provide street flow calculations for Eagle Ranch Road and Coors By-Pass Road to show that one driving lane is free of water during the 10 year storm, as required by the Drainage Ordinance, since these roads are classified as Arterial thoroughfares.

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3. Revise the storm drain calculations as required since you show conflicting introduced flow rates at Station 44 + 20 between the storm drain and inlet design tables.

If you have any questions, call me at 768-2650.

Cordially,

Roger A. Green, PE

Roger A. Green, P.E.
C.E./Hydrology Section

cc: Andre Houle, DRC
Tom Isaacson, Isaacson & Arfman
Dan Sabo, AMAFCA

RAG/bsj

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ENGINEERS ARCHITECTS PHOTOGRAMMETRI

BOHANNAN-HUSTON INC.

COURTYARD I 7500 JEFFERSON STREET, N.E. ALBUQUERQUE, NEW MEXICO 87109 (505) 823-1000
UNIVERSITY PLAZA, SUITE 104, 330 GARFIELD SANTA FE, NEW MEXICO 87501 (505) 988-7671
6713 VISCOUNT BLVD EL PASO, TEXAS 79925 (915) 778-4491

October 9, 1986

RECEIVED
OCT 09 1986
HYDROLOGY SECTION

Mr. Fred Aguirre
City of Albuquerque
Hydrology Department
P.O. Box 1293
Albuquerque, NM 87103

Re: Drainage Report Submittal for V.T., Inc. Offsite Drainage Infrastructure Design

Dear Fred:

Enclosed for your review is a copy of the referenced report. As we have discussed on previous occasions, this report represents the third submittal in a series of documents relating to the auto park site and surrounding watershed. The other two reports, a conceptual plan for the 40-acre auto park site and an amendment to the "7-Bar Drainage Management Plan", have already been submitted for review under separate cover. The fourth document, a detailed grading and drainage plan for the projects first phase, will be submitted after general concepts are approved. As the report states in the Summary Section, we are most interested in seeing the review process go smoothly. Therefore, I would be most happy to meet with your staff at any time to discuss the report. Please call if you have any questions.

Truly yours,

Brian G. Burnett

Brian G. Burnett, P.E.
Vice President

Enclosure

cc: Mr. Cecil Van Tuyl
Mr. Bill Dean
Mr. John Myers (w/copy)
Mr. John Black
Mr. John Salazar
Ms. Karen Marcotte
Mr. Matt Spangler
Ms. Joan Hill (w/copy)
Mr. Jorge de la Torre
Mr. Chuck Easterling (w/copy)
Mr. Tom Isaacson (w/copy)
Mr. Dale Dekker
Mr. Garry Hugg

BGB/mls
Job No. 6 308 5

PRINCIPALS
LARRY W. HUSTON
MICHAL M. EMERY, P.E.
DANA C. WOOD, P.E.
ANDRES ARAGON-VIAMONTE
DARRELL L. WADE, P.E.
JAMES V. DOMENICK, P.E.
BRIAN G. BURNETT, P.E.

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DRAINAGE INFORMATION SHEET

B13/D5

PROJECT TITLE: Drainage Report for V.T., Inc. Offsite Drainage Infrastructure Design

ZONE ATLAS/DRNG. FILE #: A13/A14 B13/B14

LEGAL DESCRIPTION:

CITY ADDRESS:

ENGINEERING FIRM: Bohannan-Huston, Inc. 7500 Jefferson N.E.,

CONTACT: Brian Burnett

ADDRESS: 7500 Jefferson N.E. Albuquerque, NM 87109

PHONE: 823-1000

OWNER: 7-Bar Land and Cattle Company

CONTACT: John Black

ADDRESS: 3615 Rio Rancho N.W. Albuquerque, NM 87048

PHONE: 897-7227

ARCHITECT:

CONTACT:

ADDRESS:

PHONE:

SURVEYOR:

CONTACT:

ADDRESS:

PHONE:

CONTRACTOR:

CONTACT:

ADDRESS:

PHONE:

RECEIVED OCT 09 1986 HYDROLOGY SECTION

PRE-DESIGN MEETING:

X YES

___ NO

___ COPY OF CONFERENCE RECAP SHEET PROVIDED

DRB NO.

EPC NO.

PROJ. NO.

TYPE OF SUBMITTAL:

X DRAINAGE REPORT

___ DRAINAGE PLAN

___ CONCEPTUAL GRADING & DRAINAGE PLAN

___ GRADING PLAN

___ EROSION CONTROL PLAN

___ ENGINEER'S CERTIFICATION

CHECK TYPE OF APPROVAL SOUGHT:

___ SKETCH PLAT APPROVAL

X PRELIMINARY PLAT APPROVAL

___ SITE DEVELOPMENT PLAN APPROVAL

___ FINAL PLAT APPROVAL

___ BUILDING PERMIT APPROVAL

___ FOUNDATION PERMIT APPROVAL

___ CERTIFICATE OF OCCUPANCY APPROVAL

___ ROUGH GRADING PERMIT APPROVAL

___ GRADING/PAVING PERMIT APPROVAL

___ OTHER _____ (SPECIFY)

DATE SUBMITTED: 10/9/86

BY: Brian Burnett

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DRAINAGE REPORT
FOR
V.T., INC.
OFFSITE DRAINAGE INFRASTRUCTURE
DESIGN

PREPARED FOR
V. T., INC.
8500 W. 63RD, SUITE 200
SHAWNEE, KANSAS 66201

PREPARED BY:

BOHANNAN-HUSTON, INC.
7500 JEFFERSON N.E.
ALBUQUERQUE, NM 87109

October 1986

Job No. 6 308 5

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C. RUNOFF ANALYSIS..... 2
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H. 84" RCP OUTFALL ANALYSIS..... 7
I. DRAINAGE FOR TEMPORARY ROADWAY CONNECTIONS..... 8
J. EROSION CONTROL..... 8
K. LANDSCAPING..... 8
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FIGURES

1 - LOCATION MAP
2 - SHOPPING CENTER RUNOFF ANALYSIS
3 - BY-PASS ROAD "C" VALUE
4 - SKETCH HALF SECTION BY-PASS ROAD

TABLES

1 - PRESSURE FLOW CALCULATIONS

PLATES
(In Rear Pocket)

1 - RUNOFF ANALYSIS SHEET
2 - BY-PASS ROAD CONSTRUCTION - PHASE 1
3 - BY-PASS ROAD CONSTRUCTION - PHASE 2
4 - BY-PASS ROAD CONSTRUCTION - PHASE 3
5 - BY-PASS ROAD GRADE - STATION 57+00
6 - STORM DRAIN PROFILE
7 - STORM DRAIN PROFILE
8 - STORM DRAIN PROFILE
9 - STORM DRAIN PROFILE
10- 84" RCP PLAN SHEET
11- 84" RCP DETAIL SHEET

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A. INTRODUCTION

Over the past several months, detailed design work has been conducted for the off-site infrastructure necessary to support a proposed 40 acre auto park development. This parcel, located west of Coors Boulevard and north of the Calabacillas Arroyo, will be constructed in phases, with the first installment consisting of approximately 10 acres west of Coors Boulevard. Council approval for the zoning over the entire 40 acres was granted on October 6, 1986. A request for site plan approval of the first phase will be heard at EPC in November 1986.

This analysis summarizes a collaborative effort between Bohannan-Huston, Inc. and Isaacson-Arfman, P.A. Isaacson Arfman, P.A. has prepared and submitted for review a conceptual drainage plan for the 40 acre site. The flowrates utilized in the design of the major infrastructure reflect these rates and are discussed in more detail in Section C.

The detailed drainage report also reflects modifications made to the "7-Bar Drainage Management Plan". This plan, which was approved in 1985, has been amended to highlight conditions that will be reflected during the construction of the major infrastructure. The amendment has been submitted under separate cover for review.

This report will investigate in detail the following topics:

a. Site location and general topographic information

b. Flowrate analysis of runoff impacting the system

c. Phasing explanation of temporary and permanent roadway improvements

d. Runoff criteria for Eagle Ranch Road

e. Runoff criteria for the By-Pass Road

f. Storm drain calculations for the major storm drain line

g. Analysis of 84" RCP outfall at Calabacillas Arroyo

h. An overview of drainage for the proposed temporary roadway connections

i. Erosion control measures

j. Landscaping in By-Pass Road right-of-way

k. Report summary.

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B. SITE LOCATION AND DESCRIPTION

The 40 acre parcel is located directly west of Coors Boulevard and north of the Calabacillas Arroyo (see Figure 1). The west property boundary will be located approximately 2400' west of Coors Boulevard. The site's northern boundary will be the south right-of-way line of the proposed Coors By-Pass Road. Eagle Ranch Road bisects the property approximately in half.

The first phase of the development will consist of approximately 10 acres directly west of Coors Boulevard. The remainder of the site will be constructed in various tract configurations over the coming years.

The Flood Insurance Study Maps do not identify a 100-year floodplain impacting the property. The SCS soil type for the area is classification "A".

A majority of the property drains to the northeast away from the Calabacillas Arroyo. This topographic trend dictates that a storm drain system be provided in the By-Pass Road to convey runoff back to the arroyo.

C. RUNOFF ANALYSIS

This section will overview the runoff analysis utilized to guide design. Please refer to Plat 1 in the rear pocket for a graphical representation of the proposed runoff conditions.

The rates generated from the auto park were obtained from the conceptual plan prepared by Isaacson-Arfman, P.A. (submitted to City Hydrology under separate cover). As the various parcels develop, on-site runoff must be detained to those levels indicated in the conceptual plan.

In general, a majority of the runoff from the auto park site will be directed into a storm drain system located in the By-Pass Road. The hydraulics of this system are covered in Section G. The outfall for the entire system is a 84" RCP, located upstream of the existing arch culverts on the Calabacillas Arroyo at Coors Boulevard.

The exception to this general drainage pattern from the auto park is that a portion of the site directly adjacent to the outfall will free discharge into the outfall pipe. Due primarily to the delayed timing of the peak from the shopping center site to the north, this direct discharge approach does not impact the capacity of the system.

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As mentioned above, the 80-acre shopping center will also utilize this system for conveyance of developed runoff to the Calabacillas Arroyo. A free discharge concept has been envisioned for this site and the By-Pass Road storm sewer system has been sized accordingly. Figure 2 depicts the site and provides the justification for the flowrate anticipated from the shopping center.

The storm drain system has been extended past Eagle Ranch Road to allow Tract L to discharge into the system. A 40 cfs discharge rate has been established for this parcel.

Street capacities of the Eagle Ranch Road and By-Pass Road will be addressed in Sections E and F, respectively.

D. ROADWAY PHASING PLAN

Improvements to the By-Pass Road will be carried out in phases. The phasing scheme outlined here has been closely coordinated with the City Traffic Engineer. Plates 2 - 4 should be referenced for a graphical representation of the three phases. Outlined below is a description of each phase:

Phase 1 - A 3-lane temporary connection, approximately 600' in length, will be provided from Coors Boulevard. This temporary facility will then tie to a permanent two-lane section of the By-Pass Road. The outside two lanes will be constructed along with the concrete curb and gutter and a 6' sidewalk. This permanent facility will run along the remaining frontage of the auto park property, including that west side of Eagle Ranch Road. Although not shown on the sheet, a temporary 2-lane roadway will be constructed to Ellison Road. Eagle Ranch Road, to the Calabacillas Arroyo, will be constructed to full sections in this phase.

Phase 2 - Phase 2 of the By-Pass Road facility will probably be constructed when the shopping center develops or development demands to the west necessitate a larger facility. Plate 3 identifies this T-intersection approach. The temporary connection to Ellison will remain in place until such time that it is deemed necessary to upgrade the facility.

Phase 3 - Phase 3 eliminates the T-intersection approach. A flyover lane for southbound traffic will be constructed over the Calabacillas Arroyo. Currently, the City and State are reviewing preliminary plans for this flyover facility.

Specific drainage conditions relating to the phases will be addressed in Section F.

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E. EAGLE RANCH ROAD ANALYSIS

Eagle Ranch Road is classified as an arterial thoroughfare; therefore street capacity requirements apply as dictated by the DPM and Drainage Ordinance. Approximately 850' of roadway will drain towards the By-Pass Road. As profiled from the Calabacillas Arroyo southward, the street slopes at approximately 1% for 550 feet. The remainder of the street slopes at approximately a 0.5% slope into the By-Pass Road intersection.

The 100-year flowrate in each side of the street is 3.5 cfs. This rate is figured on a road length of 850', 86' right-of-way width, an intensity value of 4.65 in/hr, and a "C" value of 0.9. As indicat ed in Plate 1, 12.9 cfs will be directed to Eagle Ranch Road in the 100-year storm. Therefore, 16.4 cfs will be flowing along the west side of the street, while 3.5 cfs will be flowing down the east side. Current criteria dictates that the curb depth during the 10-year storm should not exceed 0.5'. Utilizing 10.5 cfs for the 10-year flow in the west side of the street, DPM Plate 22.3 D-4 has been referenced to evaluate street capacity. Based on an 0.5' curb depth and a slope of 0.5%, the chart reveals that a capacity of 10 cfs can be maintained. Therefore, the anticipated 10year flow can be adequately conveyed. "A" and "B" type inlets will be placed on the west side to collect the 100-year flows before reaching the By-Pass Road Intersection. A "C" inlet will be placed on the east side.

Upon checking the design of Eagle Ranch Road for compliance with the DPM criteria, a conflict within the criteria was disclosed. The DPM states that during the 10-year flow, a flow of 0.5 feet can be maintained. It also states that one lane free of water must be preserved. These standards are in conflict when the arterial section has but two lanes in each direction.

We have been in contact with City personnel about the possibility of waiving the requirements of having one lane free of water. We will follow this course and will request a written variance from the City Engineer on this issue. Therefore, our calculations on this section will stand as is. See Letter Dated 11/5/86

F. BY-PASS ROAD ANALYSIS

As with Eagle Ranch Road, a street capacity analysis must be made for the By-Pass road. Figure 3 depicts the proposed cross-section for the 156' right-of-way. Also included is an analysis which computes the composite "C" factor for the cross-section. This 0.64 value is utilized in computing runoff rates in the By-Pass Road.

A drainage divide in the roadway occurs at Station 57+00 of the By-Pass Road. Plate 5 reflects this divide. North of the divide, the roadway will drain towards the Highway 528 culvert outfall system. Because to this grade break, the capacity analysis is based on that runoff impacting the facility from Station 57+00 to the east.

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As the By-Pass Road approaches Coors Boulevard, the grade changes from approximately 1% to 0.6%. Therefore, the critical reach for the street's capacity during the 10-year storm is in this reach. As per the Drainage Ordinance, the 10-year design storm should not exceed 0.5' measured at the curb line. From DPM Plate 22.3 D-4, approximately 11 cfs can be carried on each side of the street at a 0.6% slope.

By rearranging the Rational Formula (Q = CIA), a length of roadway that meets the 0.5' curb line depth criteria can be computed. Looking at one half of the street, the following analysis is generated:

$$A = [156 \times L \text{ (length)}/2$$
$$C = .64$$
$$I_{10} = 3.06 = (4.65 \times .657)$$
$$Q = CIA = CI \left[\frac{156xL}{2}\right]$$

From Station 57+00 to Station 26+50 the length is 3050', which is less than the 3140' value obtained by solving for L in the above equation. Therefore, it can be assumed that the 10-year street capacity can be met as long as the flows do not exceed 11 cfs on each side.

Recognizing that Coors Boulevard has limited capacity at it's intersection with the By-Pass Road, the storm system will be designed to collect the 100-year flows. This analysis is covered in more detail in Section G.

G. STORM DRAIN CALCULATIONS

This section will outline in detail the storm drain sizing required for the main line system in the By-Pass Road. Plates 6 - 9 are preliminary plan and profile sheets of the system.

The following chart summarizes the flowrates and storm sewer sizes. Please refer also to Plate 1 while reviewing this material. It should be noted that the system is viewed from a total build-out phase for the By-Pass Road (Phase II construction).

From Station	To Station	Flowrate/ Description	Slope	Flowrate Summation at Down-stream Sta.	Proposed Storm Sewer Size
49+29	47+28	40 cfs/Basin L Flowrate	0.014	40.0	30"
	47+28	13.6 cfs introduced from Basin A		53.6	30"

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47+28	44+70		.014	53.6	30"
	44+70	6.5 cfs introduced from street	0.014	60.1	30"
44+70	40+18		.014	60.1	36"
	40+18	13.8 cfs introduced from Basin B		73.9	36"
	40+18	19.9 cfs introduced from Eagle Ranch Rd.	.014	93.8	36"
	40+18	8.2 introduced from from street	.014	102.0	36"
40+18	34+96		0.014	102.0	42"
	34+96	6.3 cfs introduced from Auto Park	.014	108.3	42"
34+96	32+07		.014	108.3	42"
	32+07	6.2 cfs introduced from street	.014	114.5	42"
32+07	29+19		.014	114.5	42"
	29+19	12.2 cfs introduced from Auto Park	0.014	126.7	42"
29+19	26+50	11.5 cfs introduced from street (3.5 cfs south side/8.0 cfs north side)	.014	138.2	42"
26+50	25+74		.014	138.2	42"

The following table summarizes the inlets to be constructed to collect required flows:

Station	Flowrate Collected (cfs)	Slope of Street	Depth in Street (from Plate 22.3 D-4)	Type Selected	DPM Reference (Plate)
44+70	6.5	.0115	0.4'	Type "C"	22.3 D-6

25×10

0000 0000 1309

Station	Flowrate Collected (cfs)	Slope of Street	Depth in Street (from Plate 22.3 D-4)	Type Selected	DPM Reference (Plate)
40+18 Eagle Ranch Rd.	16.4 (west side)	.005	0.6'	1-Type "A" 1-Type "C"	22.3 D-5
40+18	8.2 (north side)	.0139	0.4'	1-Type "C"	22.3 D-5
40+18 Eagle Ranch Rd.	3.5 (east side)	.005	0.35'	Type "C"	22.3 D-5
32+07	6.5	.006	0.4	Double "C"	22.3 D-6
26+50	3.5 (south side)	.006	0.35	Type "C"	22.2 D-5
	8.0 (north side)	.006	0.5	1-Type "C"	22.2 D-5

It should be noted that the inlets at Station 26+50 are future connections when the By-Pass Road is widened. Also, due to super-elevation along the roadway, inlets must be placed to reflect this cross-slope.

H. 84" RCP OUTFALL ANALYSIS

As stated previously, the outfall for runoff from the By-Pass Road system and the proposed regional shopping center will be an 84" RCP. The alignment at the Calabacillas Arroyo is shown on Plate 6. Plate 10 identifies at a 1" = 10' scale the location of the outfall.

The design of the outlet structure will be identical to that utilized in the Eagle Ranch 60" RCP system upstream of the site. The structure will simply be modified to reflect the larger pipe size. The angle of which flows are introduced to the arroyo also matches the upstream system. Plate II identifies details of the structure.

Several discussions with the City and AMAFCA have taken place regarding the outfall structure. At these meetings, the proposal was to utilize this type of system was approved in concept.

The use of manholes at each bend has also been discussed with Mr. John Kelly of City Drainage Maintenance and Mr. Andre Houle, DRC Chairman. Mr. Kelly and Mr. Houle also agreed that this concept was acceptable.

25×

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The total capacity of the 84" RCP at a 0.002 slope is approximately 300 cfs based on a pipe full analysis. This capacity matches the 137 cfs generated in the By-Pass Road system and the 167 cfs generated from the shopping center.

I. DRAINAGE FOR TEMPORARY ROADWAY CONNECTIONS

Runoff from the temporary connection at Coors Boulevard will flow to the north and south into existing bar ditches. Runoff flowing south will enter the arroyo through an existing culvert. This pipe can can be seen on any of the phasing diagrams (Plates 2 - 4).

The alignment of temporary connection to Ellison Road will attempt to follow existing ground. The roadway at approximately Station 57+00 will be provided with a 24" RCP culvert to convey upstream runoff. The intersection at Ellison Road will be provided with a culvert to convey runoff along the existing bar ditch.

Due to time constraints, the final design of these structures is about a week away. It is recognized that justification and design for the facilities must be provided prior to final approval.

J. EROSION CONTROL

In an effort to minimize runoff impact from upstream undeveloped parcels, we are proposing that temporary berms be placed directly west of Eagle Ranch Road and at the Tract L/Auto Park boundary. These berms would be several feet in height and would eliminate dirt from being washed into the street. Due to the high infiltration capacity of the soils in this area, it does not appear that the ponded runoff would create a nuisance condition. Upon development of each tract, the berms would be eliminated. These berms were conceptually shown on Plate 1. The final design will provide details on their construction.

K. LANDSCAPING

The architectural firm of del la Torre and Rainhart is currently in the process of preparing landscaping plans for the By-Pass Road right-of-way section behind the back of curb and the proposed median section. These plans will be processed for review when the final plans are being reviewed at DRC.

L. SUMMARY

This report has attempted to outline in detailed terms the criteria utilized to guide final design of the auto park infrastructure. Recognizing the accelerated time schedule of the entire project, the designer stands ready to discuss any questions that may arise from the review of the report.

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0000 0000 1311

FIGURES

25×10

0000 0000 1312

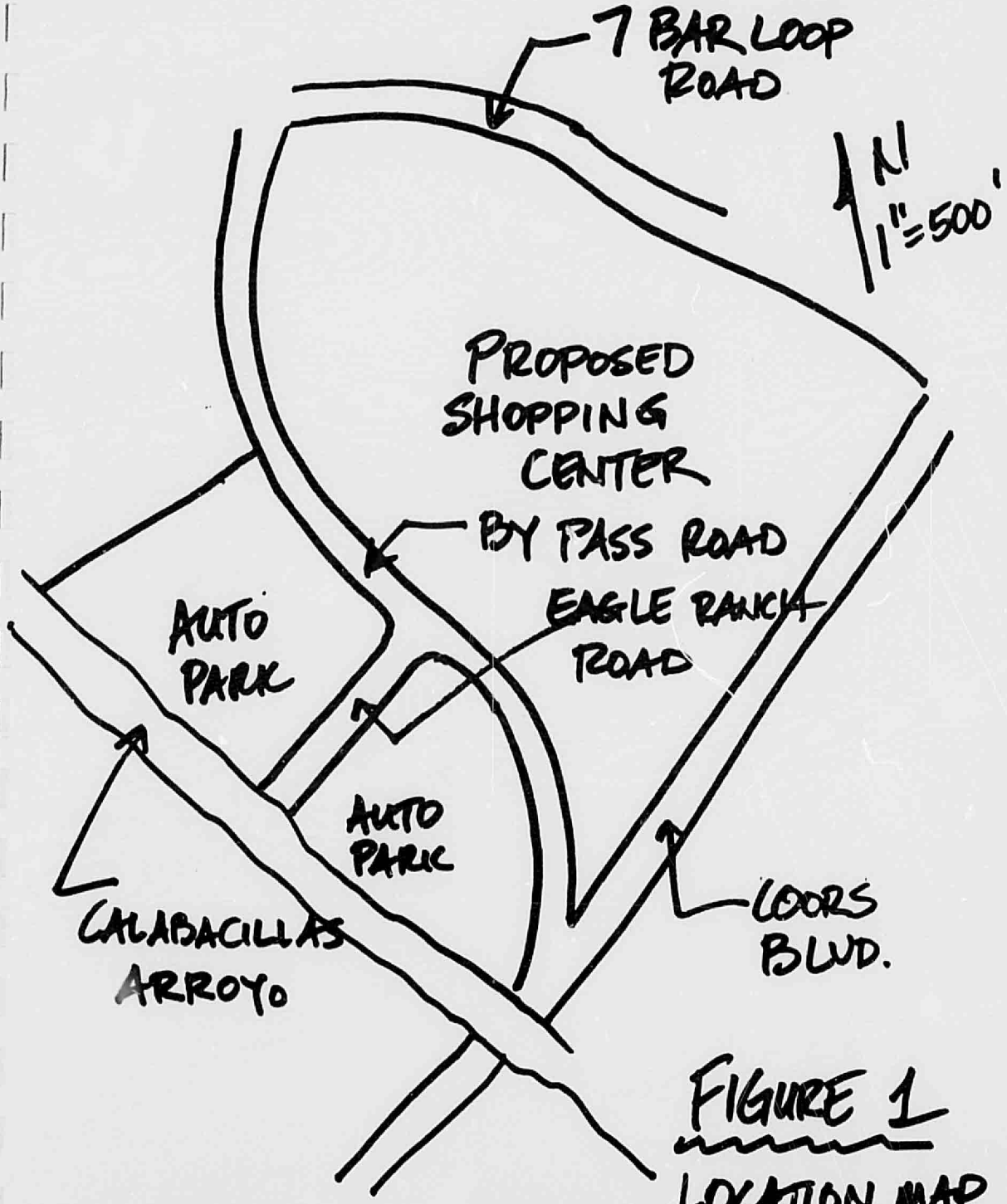


FIGURE 1
LOCATION MAP

25×

0000 0000 13 13

LONGEST REACH = 3500'

$$\text{SLOPE} = \frac{5066-5043}{3500} = .0066$$

$$T_c = \frac{.0078(3500)^{.77}}{(.0066)^{.385}} = 28.9 \text{ MIN.}$$

$$I_{100} = 2.2(28.9)^{-.51}(6.84) = 2.7$$

% Imp = 75% % Pervious = 25%

$$C_{comp} = (.75)(.95) + (.25)(.25) = 0.77$$

$$Q_{100} = (.77)(2.7)(80) = 167 \text{ CFS}$$

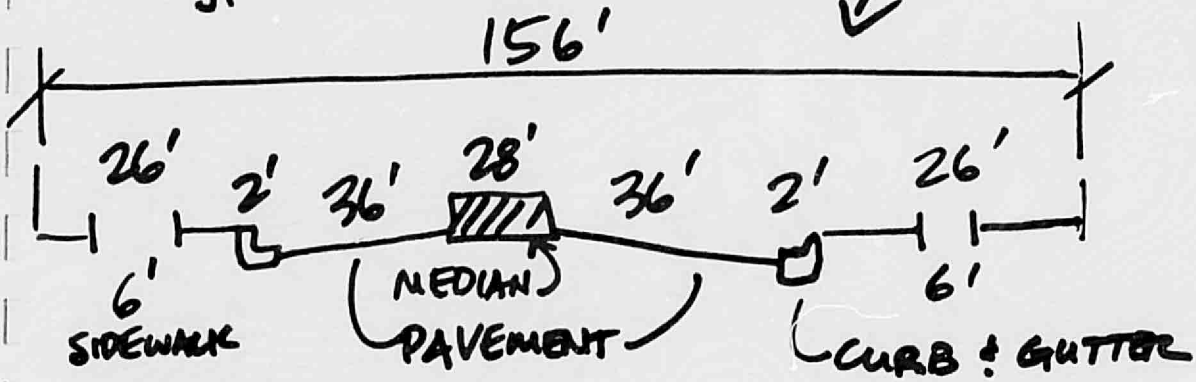
FIGURE 2

SHOPPING CENTER RUNOFF ANALYSIS

0000 0000 1314

BY-PASS ROAD 'C' VALUE

Typical Cross-Section



ASSUMPTIONS:

1. MEDIAN AND OUTSIDE 26' AREAS WILL BE LANDSCAPED
2. 6' SIDEWALK EACH SIDE
3. 6 DRIVING LANES (TOTAL)

LF IMPERVIOUS : 88'
LF PERVIOUS : 68'
} 156'

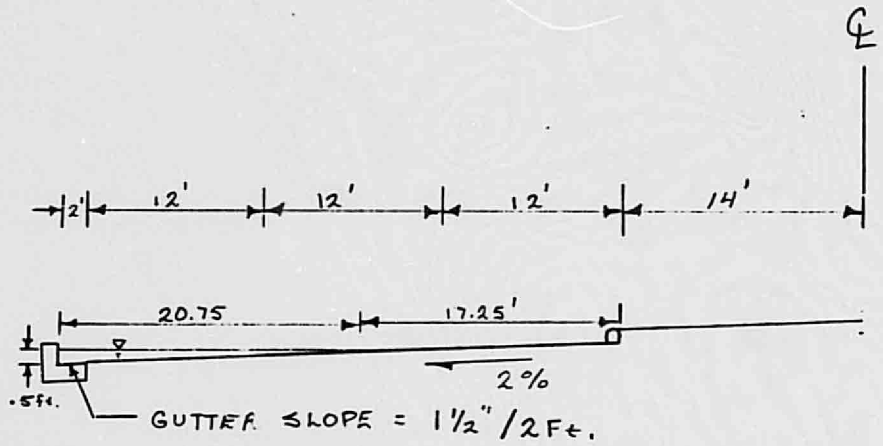
$$C_{COMP} = \left(\frac{88}{156} \times .95^{*}\right) + \left(\frac{68}{156} \times .25^{*}\right)$$

$$= 0.64$$

* 'C' VALUES OBTAINED FROM RECENT DPM UPDATE

FIGURE 3
BY-PASS ROAD 'C' VALUE

25×



HALF SECTION BY-PASS ROAD

25X

0000 0000 1316

TABLE

25×10

SUMMARY OF HYDRAULIC CALCULATIONS

FULL CLOSED CONDUIT DESIGN

Calc. by _____ Chk. by _____ Project: _____ Lines: _____ Freq: _____ Yr.

Proj. No. _____ Date _____ Sheet ____ of ____

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
	STRUCTURE	STATION	S.D TYPE SIZE	Q	A	V	K	S_f	L	Δ	LOSSES H_f	H_o	H_j	H_T	H_{bend}	H_{misc}	ΣH_L	E.G.	h_v	H.G.	
1		1+22.93	84"	300	38.48	7.8		.002	36.0		.07.0	.13	.17		.05		.25			34.0	A
2		1+58.93	84"	300	38.48	7.8		.002	40.0		.08	.13	.17		.05		.26			34.25	1A
3		1+98.93	84"	300	38.48	7.8		.002	307.22		.61		-.59				.02			34.51	2A
4		506.15																		34.53	3A
5																					4A
6		25+74.09	42"	138.2	9.62	14.4		.019	75.96		1.44	1.43			.16	.16	1.16			34.53	5A
7		26+50	42"	126.7	9.62	13.2		.016	269.0		4.30	4.27			.14	.14	4.44			36.13	6A
8		29+19	42"	114.5	9.62	11.9		.013	381.0		4.95	4.93			.11	.11	5.06			40.57	7A
9		33+00	42"	108.3	9.62	11.3		.012	186.13		2.23	2.16			.10	.10	2.33			45.63	8A
10		34+86.13	42"	102.0	9.62	10.6		.010	271.2		2.71	2.79			.09	.09	2.80			47.96	9A
11		37+57.33	42"	102.0	9.62	10.6		.010	261.2		2.61	2.68			.09	.09	2.70			50.76	10A
12		40+18.53	36"	60.1	7.07	6.2		.008	450.0		3.60	3.65			.03	.06	3.63			53.46	11A
13		44+68.53	30"	53.6	4.91	5.6		.017	248.05		4.22	4.24			.02	.09	4.24			57.00	12A
14		47+16.58	30"	40.0	4.91	4.2		.010	211.95		2.12	2.02			.01	.05	2.13			61.33	13A
15		49+28.53																		63.46	14A
16																					15A
17																					16A
18																					17A
19																					18A
20																					19A
																					20A
											28.94	.26	-.59		.25		29.46				
																	29.045				

NOTES:

36.013 - City
- 34.53 - BH.
1.483' difference

67.23
63.46
3.77
34.53
38.30

34.53
29.46
63.99

25 X 10

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COORS BYPASS ROAD
PRELIMINARY
DRAINAGE REPORT

PREPARED FOR:

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(505) 823-1000

AUGUST, 1989

JOB NO. 89133.16

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ENGINEERS ARCHITECTS PHOTOGRAMMETRISTS

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I, Ted F. Green, a registered Professional Engineer, do hereby certify that this report was prepared under my supervision.

TED F. GREEN
NEW MEXICO
10146
REGISTERED PROFESSIONAL ENGINEER
9/14/89

RECEIVED
SEP 14 1989
HYDROLOGY SECTION

Ted F. Green, P.E., No. 10146

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25×

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CATCH BASIN HEAD CHECK..... TABLE 5

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STA. 56+00 TO STA. 68+00..... FIGURE 3
STA. 68+00 TO STA. 80+00..... FIGURE 4
STA. 80+00 TO STA. 92+00..... FIGURE 5

SUMMARY OF HYDRAULIC CALCULATIONS
LINE "B"..... TABLE 6
LINE "C"..... TABLE 7

25×10

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DESIGN CONCEPT:

The drainage concept used for this project is twofold:

(1) To intercept roadway flows generated on the Coors Bypass Roadway South of Ellison and discharge those flows through a storm drain system to a proposed detention pond in the open space area located east of Cibola High School and West of the Bypass. Also, to intercept roadway flows generated on the Bypass North of Ellison and combine them with the detention pond discharge and the discharge from two catch basins that pick up runoff at the West leg of the Ellison/Bypass intersection. This combined flow will then be conveyed through a storm drain system to a detention pond in tract O-2 (reference Figure 1 in the Appendix).

Pond next to School site?

The majority of the on-site roadway flows would eventually reach a low area in a sag vertical curve just to the North of the proposed Ellison Drive / Coors Bypass Road Intersection if not for the catch basin interception. Large scale ponding at the intersection or large flows crossing the intersection could pose a traffic hazard. This possible hazard makes it prudent to intercept the vast majority of the roadway runoff before it reaches the intersection.

(2) To convey future off-site flows from proposed detention ponds located in areas adjacent to the roadway as indicated by the 7-Bar Drainage Management Plan (Figure 1). This is accomplished with short storm drain stub-out pipes provided from the roadway storm drain to the R.O.W. The Management Plan was the basis for the offsite flowrates used in the Storm Drain Design.

25×10

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PROPOSED DRAINAGE FACILITIES:

The Albuquerque Development Process Manual was used for all Hydraulic and Hydrology Calculations.

Single "A" catch basins were used upstream of other adjacent basins to extract debris from the runoff before it was intercepted by other catch basins and discharged to the storm drain.

Single "D" catch basins were used adjacent to the mountable median curb & gutter due to the short curb height.

All design calculations are tabulated in the Appendix of this report.

The tables and figures included in the Appendix are:

HYDROLOGY:

FIGURE 1 **7-BAR DRAINAGE MANAGEMENT PLAN:**
INDICATES FLOWRATES, EXISTING & PROPOSED STORM DRAINS, PONDING REQUIREMENTS, POND RELEASE RATES, POND LOCATIONS & TRACT DESIGNATIONS FOR Part of the 7-Bar Area.

TABLE 1 **ROADWAY DRAINAGE BASIN HYDROLOGY:**
Determination of peak flow rates generated by the drainage basin that is upstream of each catch basin.

STORM DRAIN HYDRAULICS TABLES:

TABLE 2 **STREET HYDRAULICS:**
Determination of depth of flow at the curb face of each basin. This table also indicates the number of open lanes at each catch basin. The flow parameters were determined using the " Manning " equation.

TABLE 3 **CATCH BASIN CAPACITIES:**
This table is a listing of values obtained from plates 22.3 D-5 & D-6.

TABLE 4 **CONNECTOR PIPE DESIGN:**
Design of the 18" RCP connector pipes and the corresponding catch basin depths.

25×10

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TABLE 5 **CATCH BASIN HEAD CHECK:**
Checks to see if there is sufficient head depth to maintain the required flow rate within the connector pipe and to insure the water surface of the main storm drain does not emerge from the catch basins. The head difference tabulated includes the standard 0.5' freeboard. Any head difference greater than 0.00' meets the requirement.

?

STORM DRAIN PLAN & PROFILE:

FIGURES 2-5 PLAN & PROFILE SHEETS:

All on-site and off-site flows are included with the proposed storm drain plan & profile and the hydraulic grade line profile are indicated on these figures. All catch basins and connector pipes are also included in these Figures.

SUMMARY OF HYDRAULIC CALCULATIONS:

TABLES 6 & 7 LINES "B" & "C":
Hydraulic Grade line calculations for lines "B" & "C" are tabulated here. Because line "A" is not flowing full it is not included in this format. Also note that where the flow becomes unsealed the water surface elevation indicated in figures 2-5 is not what is shown in table 6 & 7 as the tables does not apply to this flow condition.

25×

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APPENDIX

25×10

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HYDROLOGY

25×

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DRAINAGE BASIN HYDROLOGY

P10= 1.45 "
P100= 2.20 " (- *

BASIN No.	OFFSET	Area acre	"C"	High Elev. ft.	Low Elev. ft.	Diff. Elev. ft.	Path Length ft.	Basin Slope ft/ft	Tc min.	I(10) in./hr	I(100) in./hr	Q(10) cfs	Q(100) cfs
North of Ellison													
9250.00	Lt.	1.52	0.95	5118	5067	51	1002	0.051	10	3.06	4.65	4.4	6.7
8862.00	Lt.	1.46	0.95	5069	5052	17	834	0.020	10	3.06	4.65	4.2	6.4
8316.00	Rt.												
9252.00	Rt.	0.87	0.95	5118	5068	50	1001	0.050	10	3.06	4.65	2.5	3.8
8864.00	Rt.	0.45	0.95	5069	5053	16	701	0.023	10	3.06	4.65	1.3	2.0
8316.00	Rt.												
South of 7Bar Loop													
5035.00	Lt.	0.61	0.95	5073	5069	4	701	0.006	10	3.06	4.65	1.8	2.7
5075.00	Rt.	1.06	0.95	5073	5068	5	703	0.007	10	3.06	4.65	3.1	4.7
South of 7Bar Loop to South of Ellison													
6075.00	Lt.	0.59	0.95	5073	5064	9	685	0.013	10	3.06	4.65	1.7	2.6
7238.00	Lt.	1.56	0.95	5065	5056	9	1116	0.008	10	3.06	4.65	4.5	6.9
7538.00	Lt.												
7800.00	Lt.												
6035.00	Rt.	0.74	0.95	5073	5064	9	610	0.015	10	3.06	4.65	2.1	3.3
7579.73	Rt.	1.93	0.95	5065	5054	11	1516	0.007	15	2.52	3.83	4.6	7.0
7604.93	Rt.												
7725.00	Rt.												
7750.00	Rt.												
West of Ellison													
8003.00	Lt.	-	-	-	-	-	-	-	-	-	-	*	3.1
8006.00	Lt.												
8043.00	Lt.	-	-	-	-	-	-	-	-	-	-	*	3.1
8043.12	Lt.												

* FLOW RATES BY OTHERS

TABLE 1

25×10

0000 0000 1327

STORM DRAIN HYDRAULICS TABLES

25×10

0000 0000 1328

STREET HYDRAULICS

100yr
n= 0.017 (0.87'

± 0.000

BASIN OFFSET Station	Street Grade ft/ft	Cross Slope ft/ft	Q100 Street cfs	Depth @ F.C. ft	Xsection Area ft²	Whetted Perimeter ft	Hydraulic Radius "R" ft	Vman fps	Vcon fps	Vdiff fps	Width of Lanes ft	Width of Water Surf. ft	Clear Lane Width ft	No. of Open Lanes ea	Factor Check Depth x Vel. ft4/sec
North of Ellison															
9250.00 Lt.	0.0413	0.0200	6.7	0.248	1.540	12.66	0.122	4.360	4.360	0.000	36.0	12.4	23.6	2.0	1.1
8862.00 Lt.	0.0250	0.0120	10.5	0.266	2.946	22.42	0.131	3.569	3.569	0.000	36.0	22.2	13.8	1.2	0.9
8316.00 Rt.	0.0000	0.0200	7.9	0.398	3.960	20.30	0.195	0.000	1.999	1.999	68.0	19.9	48.1	4.0	0.0
9250.00 Rt.	0.0413	0.0200	3.8	0.201	1.014	10.27	0.099	3.791	3.791	0.000	36.0	10.1	25.9	2.2	0.8
8864.00 Rt.	0.0227	0.0120	4.2	0.192	1.530	16.16	0.095	2.733	2.733	0.000	36.0	16.0	20.0	1.7	0.5
8316.00 Rt.	0.0000	0.0200	2.9	0.138	0.477	7.05	0.068	0.000	6.143	6.143	36.0	6.9	29.1	2.4	0.0
South of 7Bar Loop															
5035.00 Lt.	0.0050	0.0200	2.7	0.262	1.714	13.36	0.128	1.572	1.572	0.000	36.0	13.1	22.9	1.9	0.4
5075.00 Rt.	0.0050	0.0200	4.7	0.322	2.595	16.43	0.158	1.805	1.805	0.000	36.0	16.1	19.9	1.7	0.6
North of 7Bar Loop															
South of Ellison															
6075.00 Lt.	0.0133	0.0200	2.6	0.215	1.159	10.98	0.106	2.250	2.250	0.000	36.0	10.8	25.2	2.1	0.5
7238.00 Lt.	0.0050	0.0200	8.4	0.401	4.021	20.45	0.197	2.089	2.089	0.000	36.0	20.1	15.9	1.3	0.8
7538.00 Lt.	0.0000	0.0079	5.6	0.213	2.864	27.14	0.106	0.000	1.955	1.955	36.0	26.9	9.1	0.8	0.0
7800.00 Lt.	0.0000	0.0200	1.0	0.100	0.251	5.11	0.049	0.000	3.988	3.988	36.0	5.0	31.0	2.6	0.0
6035.00 Rt.	0.0133	0.0200	3.3	0.234	1.373	11.95	0.115	2.381	2.381	0.000	36.0	11.7	24.3	2.0	0.6
7579.73 Rt.	0.0050	0.0200	9.1	0.413	4.268	21.07	0.203	2.131	2.131	0.000	36.0	20.7	15.3	1.3	0.9
7604.93 Rt.	0.0050	0.0200	6.0	0.353	3.123	18.02	0.173	1.920	1.920	0.000	36.0	17.7	18.3	1.5	0.7
7725.00 Rt.	0.0050	0.0200	3.7	0.296	2.194	15.11	0.145	1.707	1.707	0.000	72.0	14.8	57.2	4.8	0.5
7775.00 Rt.	0.0050	0.0200	2.3	0.249	1.545	12.68	0.122	1.518	1.518	0.000	72.0	12.4	59.6	5.0	0.4
West of Ellison															
8003.00 Lt.	0.0200	0.0050	3.1	0.126	1.590	25.34	0.063	1.950	1.950	0.000	75.0	25.2	49.8	4.1	0.2
8006.00 Lt.	0.0200	0.0050	2.1	0.109	1.187	21.90	0.054	1.769	1.769	0.000	75.0	21.8	53.2	4.4	0.2
8043.00 Lt.	0.0200	0.0050	3.1	0.126	1.590	25.34	0.063	1.950	1.950	0.000	36.0	25.2	10.8	0.9	0.2
8043.12 Lt.	0.0200	0.0050	2.1	0.109	1.187	21.90	0.054	1.769	1.769	0.000	36.0	21.8	14.2	1.2	0.2

TABLE 2

25×10

0000 0000 1329

CATCH BASIN CAPACITIES

PL 22.3 D-5 PL 22.3 D-5 PL 22.3 D-6

BASIN Station	OFFSET	Q100 ONSITE cfs	Depth @ F.C. ft	Street Grade ft/ft	# each	SINGLE "A" cfs	# each	SINGLE "C" cfs	# each	DOUBLE "C" cfs	# each	SINGLE "D" cfs	OFFSITE cfs	CONNECTOR TOTAL cfs	REMAINDER cfs
North of Ellison															
9250.00	Lt.	6.7	0.25	0.0413	1	2.65								2.65	4.06
8862.00	Lt.	10.5	0.27	0.0250	1	2.60								2.60	7.91
8316.00	Rt.	7.9	0.40	0.0000							1	7.91	*	10.84	0.01
9252.00	Rt.	3.8	0.20	0.0413							1	1.65		1.65	2.19
8864.00	Rt.	4.2	0.19	0.0227							1	1.25		1.25	2.93
8316.00	Rt.	2.9	0.14	0.0000					1	2.93				2.93	0.00
South of 78ar Loop															
5035.00	Lt.	2.7	0.26	0.0050							1	1.30		1.30	1.39
5075.00	Rt.	4.7	0.32	0.0050	1	1.90								1.90	2.78
South of 78ar Loop to South of Ellison															
6075.00	Lt.	2.6	0.22	0.0133							1	1.10		1.10	1.51
7238.00	Lt.	8.4	0.40	0.0050	1	2.80								2.80	5.60
7538.00	Lt.	5.6	0.21	0.0000					1	5.59				5.59	0.01
7800.00	Lt.	1.0	0.10	0.0000							1	1.00		1.00	0.00
6035.00	Rt.	3.3	0.23	0.0133	1	1.20								1.20	2.07
7579.73	Rt.	9.1	0.41	0.0050	1	3.10								3.10	5.99
7604.93	Rt.	6.0	0.35	0.0050					1	2.25				5.35	3.74
7725.00	Rt.	3.7	0.30	0.0050					1	1.40				1.40	2.34
7750.00	Rt.	2.3	0.25	0.0050					1	0.90				2.30	1.44
West of Ellison															
8003.00	Lt.	3.1	0.13	0.0200	1	1.00								1.00	2.10
8006.00	Lt.	2.1	0.11	0.0200					1	1.00				1.00	1.10
8043.00	Lt.	3.1	0.13	0.0200	1	1.00								1.00	2.10
8043.12	Lt.	2.1	0.11	0.0200					1	1.00				1.00	1.10
				TOTALS:		8		0		7		6		21	

* HAS ADD'L. 2.93 CFS FROM 83+16 Rt.

TABLE 3

25×10

B13/D5

0000 0000 1330

CONNECTOR PIPE DESIGN

NOTE: A MINIMUM "V" DISTANCE OF 4' SHOULD BE USED TO MEET STD DWG. CRITERIA/COVER REQUIREMENTS !
THE REQ'D. "V" OR 4' SHOULD BE USED, WHICHEVER IS GREATER !

BASIN OFFSET Station	Mainline Station	CONNECTOR TOTAL cfs	B.C. ELEV. ft	Dia. Connector inches	Area ft²	V fps	V²/2g ft	REQ'D. "V" Depth ft	Upstream Connector Inlet	Downstream Connector Inlet	Lateral Offset from Mainline	Lateral Length ft	Connector Slope ft/ft
North of Ellison													
9250.00 Lt.	9218.00	2.7	69.84	18	1.77	1.5	0.03	2.87	65.84	60.06	32.00	45.25	0.128
8862.00 Lt.	8830.00	2.6	57.58	18	1.77	1.5	0.03	2.87	53.58	50.49	32.00	45.25	0.068
8316.00 Rt.	8341.00	10.8	52.67	18	1.77	6.1	0.58	3.36	45.00	41.38	25.00	35.36	0.102
9252.00 Rt.	9218.00	1.7	71.00	18	1.77	0.9	0.01	2.68	67.08	60.06	34.00	48.08	0.146
8864.00 Rt.	8830.00	1.3	57.92	18	1.77	0.7	0.01	2.67	54.77	50.49	34.00	48.08	0.089
8316.00 Rt.	8316.00	2.9	51.82	18	1.77	1.7	0.04	2.88	47.90	45.00	47.00	47.00	0.062
South of 7Bar Loop													
5035.00 Lt.	5021.00	1.3	70.16	18	1.77	0.7	0.01	2.67	66.16	64.00	14.00	24.41	0.088
5075.00 Rt.	5023.00	1.9	69.25	18	1.77	1.1	0.02	2.85	65.25	64.00	52.00	79.40	0.016
South of 7Bar Loop to South of Ellison													
6075.00 Lt.	6100.00	1.1	68.53	18	1.77	0.6	0.01	2.84	64.53	61.29	24.00	34.66	0.093
7238.00 Lt.	7300.00	2.8	56.73	18	1.77	1.6	0.04	2.88	52.73	49.95	62.00	87.68	0.032
7538.00 Lt.	7600.00	5.6	56.32	18	1.77	3.2	0.16	3.02	52.32	47.95	62.00	87.68	0.050
7800.00 Lt.	7750.00	1.0	55.53	18	1.77	0.6	0.00	2.84	51.53	46.23	50.00	70.71	0.075
6035.00 Rt.	6100.00	1.2	67.67	18	1.77	0.7	0.01	2.84	63.67	61.29	52.00	84.50	0.028
7579.73 Rt.	7604.93	3.1	55.37	18	1.77	1.8	0.05	2.89	51.37	50.53	25.00	25.00	0.034
7604.93 Rt.	7656.00	5.4	55.17	18	1.77	3.0	0.14	3.00	50.53	47.73	51.07	72.22	0.039
7725.00 Rt.	7750.00	1.4	54.52	18	1.77	0.8	0.01	2.84	50.52	49.57	25.00	25.00	0.038
7750.00 Rt.	7898.00	2.3	54.39	18	1.77	1.3	0.03	2.86	49.57	46.23	148.00	148.00	0.023
West of Ellison													
8003.00 Lt.	8043.12	1.0	56.15	18	1.77	0.6	0.00	2.84	51.15	42.75	40.46	40.46	0.208
8006.00 Lt.	8003.00	1.0	55.65	18	1.77	0.6	0.00	2.84	51.65	51.15	25.00	25.00	0.020
8043.00 Lt.	8051.00	1.0	56.92	18	1.77	0.6	0.00	2.84	52.92	52.42	25.00	25.00	0.020
8051.00 Lt.	8055.47	1.0	56.00	18	1.77	0.6	0.00	2.84	52.42	42.66	34.56	34.56	0.282

TABLE 4

25×10

0000 0000 1331

CATCH BASIN HEAD CHECK

BASIN Station	OFFSET	STREET FL ft	MAINLINE HGL ft	> 0.00 Head Diff. ft
North of Ellison				
9250.00	Lt.	69.17	60.44	8.23
8862.00	Lt.	56.91	54.45	1.96
8316.00	Rt.	52.17	48.81	2.86
9252.00	Rt.	70.50	60.44	9.56
8864.00	Rt.	57.42	54.47	2.45
8316.00	Rt.	51.15	48.81	1.84
South of 7Bar Loop				
5035.00	Lt.	69.66	65.46	3.70
5075.00	Rt.	68.58	65.46	2.62
South of 7Bar Loop to South of Ellison				
6075.00	Lt.	68.03	61.52	6.01
7238.00	Lt.	56.06	53.27	2.29
7538.00	Lt.	55.65	51.95	3.20
7800.00	Lt.	55.03	49.89	4.64
6035.00	Rt.	67.00	61.52	4.98
7579.73	Rt.	54.70	51.78	2.42
7604.93	Rt.	54.50	51.78	2.22
7725.00	Rt.	53.85	50.38	2.97
7750.00	Rt.	53.72	50.38	2.84
West of Ellison				
8003.00	Lt.	55.65	49.74	5.41
8006.00	Lt.	55.15	49.73	4.92
8043.00	Lt.	56.25	49.61	6.14
8051.00	Lt.	55.33	49.52	5.31

TABLE 5

25×

0000 0000 1332

STORM DRAIN PLAN & PROFILE

25×10

0000 0000 1333

SUMMARY OF HYDRAULIC CALCULATIONS

25×10

0000 0000 1334

PROJECT: COO

1	2		21	22
STATION	STRUCT.		VELOCITY HEAD hv	H.G.L.
85+54	LINE "B"		0.73	47.56
84+80	JUNC. LINE "C"		0.73	48.18
84+28	MANHOLE		0.38	48.50
83+41	JUNCTION		0.38	48.77
81+50	MANHOLE		0.18	49.03
80+55.47	JUNCTION		0.37	49.50
80+43.12	JUNCTION		0.31	49.61
79+66.16	INLET/POND		0.26	49.85
77+77	OUTLET/POND		0.26	50.00
77+50	JUNCTION		0.51	50.30
76+56	MH/JUNCTION		0.43	51.00
76+00	JUNCTION		0.65	51.69
73+00	MH/JUNCTION		0.34	53.09
69+75	MANHOLE		0.23	54.03
66+50	MANHOLE		0.23	54.94
63+42	MH/JUNCTION		0.23	56.04
61+00	MANHOLE		0.01	56.07

REMARKS: Los Angeles Me OF THE DETENTION POND
hj=delta y + h 5050.00

25×10

0000 0000 1335

Correction

25×10

0000 0000 1336

SUMMARY OF HYDRAULIC CALCULATIONS

CLOSED CONDUIT

By: Ted Green
Date: 8/30/1989
Sheet: 1 OF 1

PROJECT: COORS BYPASS STORM DRAIN

LINE: LINE B'

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
										JUNCTION		LOSSES									
STATION	STRUCT.	D (in)	Q (cfs)	A (ft)	V (fps)	K	Sf (ft/ft)	L	Delta Angle (degrees)	D	ANGLE	hf	hb	hj	hmh	ht	hmisc	htotal	E.G.L.	VELOCITY HEAD hv	H.G.L.
85+54	LINE "B"																		48.29	0.73	47.56
		48	86.1	12.6	6.85	1436	0.0036	105	45	30	45	0.38	0.21	0.00	0.04	0.00		0.62			
84+80	JUNC. LINE "C"																		48.90	0.73	48.18
		36	34.8	7.1	4.92	667	0.0027	74	45	1	0	0.20	0.11	0.00	0.02	0.00		0.33			
84+28	MANHOLE																		48.88	0.38	48.50
		36	34.8	7.1	4.92	667	0.0027	87	0	18	45	0.24	0.00	0.03	0.00	0.00		0.27			
83+41	JUNCTION																		49.15	0.38	48.77
		36	24.0	7.1	3.40	667	0.0013	191	0	1	0	0.25	0.00	0.00	0.01	0.00		0.26			
81+50	MANHOLE																		49.20	0.18	49.03
		30	24.0	4.9	4.89	410	0.0034	119	0	18	45	0.41	0.00	0.07	0.00	0.00		0.47			
80+55.47	JUNCTION																		49.87	0.37	49.50
		30	22.0	4.9	4.48	410	0.0029	16	0	18	45	0.05	0.00	0.06	0.00	0.00		0.11			
80+43.12	JUNCTION																		49.92	0.31	49.61
		30	20.0	4.9	4.07	410	0.0024	97	0	1	0	0.23	0.00	0.00	0.01	0.00		0.24			
79+66.16	INLET/POND																		50.11	0.26	49.85
		30	20.0	4.9	4.07	410	0.0024	15	45	18	45	0.04	0.04	0.00	0.00	0.00		0.07			
77+77	OUTLET/POND																		50.26	0.26	50.00
		30	28.2	4.9	5.74	410	0.0047	38	0	18	45	0.18	0.00	0.10	0.03	0.00		0.30			
77+50	JUNCTION																		50.81	0.51	50.30
		30	25.8	4.9	5.26	410	0.0040	133	0	18	45	0.53	0.00	0.15	0.02	0.00		0.69			
76+56	MH/JUNCTION																		51.42	0.43	51.00
		24	20.4	3.1	6.49	226	0.0081	56	0	18	45	0.46	0.00	0.24	0.00	0.00		0.69			
76+00	JUNCTION																		52.35	0.65	51.69
		24	14.8	3.1	4.71	226	0.0043	300	0	18	45	1.28	0.00	0.11	0.01	0.00		1.40			
73+00	MH/JUNCTION																		53.44	0.34	53.09
		24	12.0	3.1	3.82	226	0.0028	325	0	1	0	0.91	0.00	0.00	0.02	0.00		0.93			
69+75	MANHOLE																		54.25	0.23	54.03
		24	12.0	3.1	3.82	226	0.0028	325	0	1	0	0.91	0.00	0.00	0.00	0.00		0.91			
66+50	MANHOLE																		55.17	0.23	54.94
		24	12.0	3.1	3.82	226	0.0028	308	0	24	90	0.87	0.00	0.22	0.01	0.00		1.10			
63+42	MH/JUNCTION																		56.27	0.23	56.04
		24	2.0	3.1	0.64	226	0.0001	242	0	1	0	0.02	0.00	0.00	0.01	0.00		0.03			
61+00	MANHOLE																		56.08	0.01	56.07

REMARKS: Los Angeles Method used for calculation of junction loss.
hj=delta y + hv1 - hv2 where delta y is defined by the Thompson Equation

MANNINGS 0.013

CULVERT MATERIAL: RCP

NOTE: THE 100YR WATER SURFACE ELEVATION OF THE DETENTION POND THAT THIS LINE DISCHARGES TO IS : 5050.00

TABLE 6

25×10 32×10 25×10

SUMMARY OF HYDRAULIC CALCULATIONS

CLOSED CONDUIT

By: Ted Green
Date: 8/30/09
Sheet: 1 OF 1

PROJECT: COORS BYPASS STORM DRAIN

LINE: "C"

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
										JUNCTION		LOSSES									
STATION	STRUCT.	D (in)	Q (cfs)	A (ft)	V (fps)	K	Sf (ft/ft)	L	Delta Angle (degrees)	D	ANGLE	hf	hb	hj	hmh	ht	hmisc	htotal	E.G.L.	VELOCITY HEAD hv	H.G.L.
	LINE "C"																				
		36	34.8	7.1	4.92														48.56	0.38	48.18
84+80	JUNCT/LINE "B"																				
		30	51.3	4.9	10.45	410	0.0156	60	45	18	45	0.94	0.48	0.46	0.08	0.00		1.96	51.84	1.70	50.14
85+00	JUNCT/MH																				
		30	43.3	4.9	8.82	410	0.0111	330	0	18	45	3.68	0.00	0.31	0.00	0.00		3.98	55.34	1.21	54.13
88+30	JUNCTION																				
		30	40.9	4.9	8.33	410	0.0099	290	45	24	45	2.88	0.15	0.00	0.05	0.00		3.09	58.30	1.09	57.22
91+20	JUNCT/MH																				
		24	4.4	3.1	1.40	226	0.0004	88	0	18	45	0.03	0.00	0.01	0.00	0.00		0.05	57.29	0.03	57.26
92+18	JUNCT/MH																				
		18	1.7	1.8	0.96	105	0.0003	48	0	1	0	0.01	ERR	ERR	ERR	ERR		ERR			

REMARKS: Los Angeles Method used for calculation of junction losses.
hj=delta y + hv1 -f hv2 where delta v is defined by the Thompson Equation.

MANNINGS 0.013

CULVERT MATERIAL: RCP

NOTE: THE 100YR WATER SURFACE ELEVATION OF THE DETENTION POND THAT DISCHARGES INTO THIS LINE IS: 5050.00

TABLE 7

25×10 32×10 25×10

0000 0000 1338

PLANS/PLATS ON FILE

FILE DESC: B13/D5

PLANS/PLATS 16

25×10

0000 0000 1339