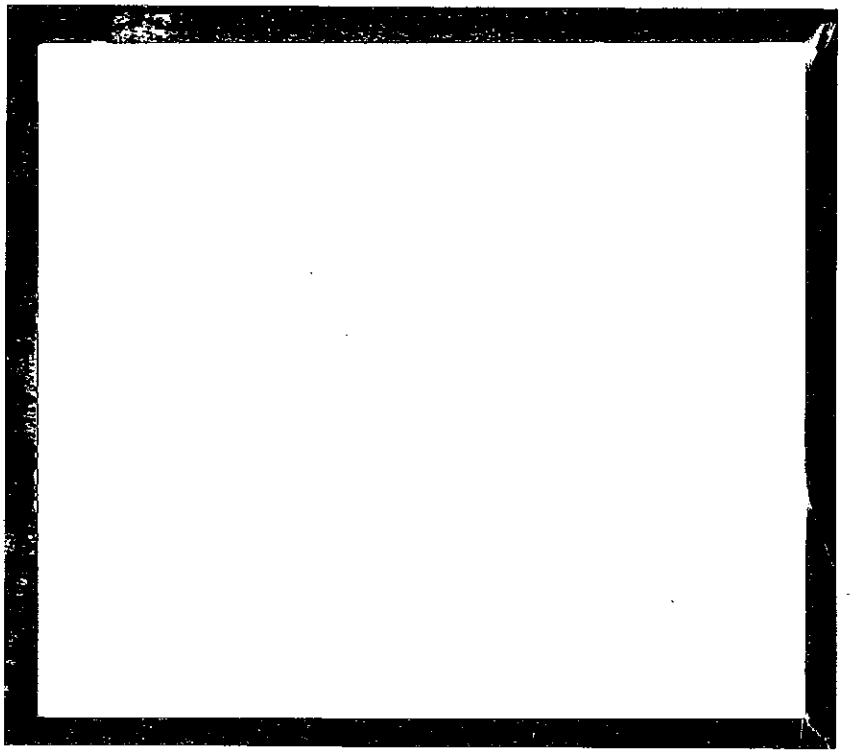

Approved 2/5/79
subject to State Highway Approval

Drexel, Barrell & Co.

SURVEYORS • ENGINEERING CONSULTANTS

1425 PEARL ST. BOULDER, COLO. 80302 TELEPHONE 442-4338

DRAINAGE REPORT
of
Areas draining to a low point at State Highway 115 at the approximate center Section 31, T14S, R66W, Colorado Springs, Colorado

for

GATES LAND COMPANY

MDDP - Broadmoor Ridge (Filings 2&3)
- Villa Pourtales
- Broadmoor Mesa, Flg. 1

Prepared by:
DREXEL, BARRELL & CO.

January 15, 1979

CERTIFICATIONS

I, Barbara N. Weiss , a registered engineer in the State of Colorado, hereby certify that the attached drainage plan and report for drainage to a low point at Highway 115 ,were prepared under my direction and supervision and are correct to the best of my knowledge and belief. I further certify that said drainage report is in accordance with all City of Colorado Springs ordinances, specifications, and criteria to the best of my knowledge.

BARBARA NAN WEISS REGISTERED 19477 PROFESSIONAL ENGINEER STATE OF COLORADO

The developer has read and will comply with all of the requirements specified in this drainage report as approved by the City Engineer.

By
Robert F. Svejkovsky
Director of Engineering

DRAINAGE REPORT

Areas draining to a low point at State Highway 115 at the approximate center, Section 31, T14S, R66W

This drainage report covers approximately 72 acres located in the W½ of Section 31, T14S, R66W, in the City of Colorado Springs, El Paso County, in the State of Colorado. This area is tributary to a low point on the west side of Colorado State Highway 115 situated near the center of Section 31. A report for two new areas, Villa Pourtales (area = 10.9 acres), and Sellon Office Park, (area = 4.7 acres) is also provided in this report. These two areas are located directly west and adjacent to Highway 115. A storm sewer must be sized from Shoreham Circle and Broadmoor Valley Road to an existing sewer at the east right-of=way of Highway 115.

This report is a part of a master report prepared by Hartzell-Pfeiffenberger dated August 1969 for a Drainage Basin II. Also contained in this report is a drainage study for Broadmoor Mesa First Filing. Part of this filing is tributary to the point in question. Because flows determined in these reports were calculated by different criteria (prior to 1977), the flows were revised in this report to meet current requirements. This report is also a part of an existing drainage report for Broadmoor Mesa Single Family Filing #3 which was superceded by Broadmoor Ridge Filing No. 2, both of which were prepared by Drexel, Barrell & Co. The drainage study for Broadmoor Ridge Filing No. 2 should be reviewed in conjunction with this report as detail information from this tributary area will not be repeated in this report.

The modified SCS methodology was used for this study. Hydrologic soil groups, as shown on the drainage plan were supplied by the Colorado Springs office of the soil Conservation Services. All other inputs to this methodology have been taken from the City of Colorado Springs Runoff Criteria Manual, March 1977. The design storm is 5 year frequency.

Existing and proposed areas of development including Broadmoor Ridge Filing No. 2 and unplatted area, Broadmoor Mesa Single Family Filing #1 and #3, and Sierra Vista Estates, are all tributary to existing inlets at Shoreham Circle and Broadmoor Valley Road. An existing 42" storm sewer was provided at this point for future storm drainage to the east, but calculations using 1978 standards show a 30" R.C.P. is adequate to carry flow generated by the above mentioned areas. A six (6) foot diameter manhole will be provided at the end of the existing 42" R.C.P. to transition to a 30" R.C.P. which continues east to the low point.

Two areas adjacent to Highway 115 are also tributary to the low point. Villa Pourtales contributes most of its acreage to the low point. A small percentage flows east and ultimately south, and Clubhouse Road will drain to the south. All drainage from Sellon Office Park is also directed to the low point. Two manholes with grated inlets over the 30" R.C.P. at and hear the low point will be provided to collect flow from these three (3) areas. The existing 24" C.M.P. under Highway 115 can be abandoned if so desired. The 30" R.C.P. will be jacked and bored under State Highway 115 to an existing manhole on the east side of the highway. An existing 54" R.C.P. flows east from the existing manhole.

E-2076

RECEIVED

MAR 2 - 1979

DREXEL, BARRELL & Co.

March 1, 1979

Gates Land Company
155 West Lake Ave.
Colorado Springs, CO 80906

Attention: Robert F. Svejovsky

Dear Sirs:

On February 14, 1979, your consulting engineer Drexel, Barrell and Company, sent to this office plans for a storm sewer through Sellon Office Park. These plans were on Job No. E-2076 dated October 5, 1978.

The plans proposed that a 30" RCP be jacked under S.H. 115 south of the intersection with Cheyenne Mountain Blvd. We have reviewed and do approve of the plan as shown.

Work necessary to install this culvert will not interfere or otherwise endanger traffic on S.H. 115. Any R.O.W. fencing removed because of this construction will be replaced, and any disturbed areas will be re-seeded, all at no expense to the Colorado Department of Highways.

Please notify Resident Engineer Vic Anders at 634-2323, and Foreman Dick Poyner at 576-1868 before beginning any work within the highway right-of-way.

Very truly yours,

E. N. HAASE
Chief Engineer

By _____
H. W. HARRIS
District Engineer

HWH:RQB:ss
cc: Drexel, Barrell & Co.
✓Attn: B. Weiss
1425 Pearl St., Boulder, CO 80302

E. N. Haase
Harris/Sollee
J. L. Pim
V. D. Anders
R. E. Richards (with copy of plans)
R. Poyner
Brown/Annand/Mueller

An estimated construction cost, calculations, vicinity map, and drainage plan follows this narrative.

Respectfully submitted,

Barbara N Weiss

Barbara N. Weiss
P.E. 15471

COST ESTIMATE

837 l.f. 30" R.C.P. -	$20,925.00
1 - 45° bend for 30" R.C.P. -	300.00
3 - manholes or catch basins -	4,800.00
1 - connection to existing manhole -	600.00
100 feet bore and jack pipe under highway -	10,000.00
Total -	$36,625.00

Project: Sellon Office Park | Job No: E-2076

Client: Gates | By: BMW | Date: 2/12/79

Area draining to low pnt @ 115
from Sellon Office Park & S½ Cheyenne Mnt. Blvd

A = 4.7 Ac
hydrologic soil group = B
CN = 92 (for business & commercial area)
Q = 1.33 in
Tc = 14 min = .23 hr
qp = 1000 csm/in
$q = qpAQ = \frac{1000 \times 4.7}{640} \times 1.33 = 9.8$ cfs
tp = D/2 + .6 tc = 3 + .6(.23) = 3.14 hr = 188 min
tb = 2.67 tp = 502.7 min

Project: Villa Pourtales | Job No: E-2076

Client: Gates | By: BMW | Date: 2/13/79

- Area draining to low point @ 115 K.

A = 8.8 Ac
hydrologic soil group = B
CN = 92 (business & commercial area)
Q = 1.33 in
Tc = 19 min = .32 hr
qp = 900 csm/in
$q = qpAQ = 900 \frac{\times 8.8}{640} \times 1.33 = 16.5$ cfs
tp = D/2 + .6 tc = 3 + .6(.32) = 3.19 hr = 192 min
tb = 2.67 tp = 511 min

- Area draining to S.E. corner site L

A = .7 Ac
hydrologic soil group = B
CN = 92 (business & commercial)
Q = 1.33 in
Tc = 10 min = .17 hr
qp = 1200 csm/in
$q = qpAQ = \frac{1200 (.7)}{640} (1.33) = 1.7$ cfs
tp = D/2 + .6 tc = 3 + .6(.17) = 3.102 hr = 186 min tb = 497 min

- Area from Clubhouse R.O.W. M

A = .7 Ac
hydrologic soil group B
CN = .75(98) + .25(61) = 89
Q = 1.11 in
Tc = 5 min < .1 hr
qp = 1280 csm/in
$q = qpAQ = 1280 \frac{\times .7}{640} \times 1.11 = 1.5$ cfs

Project: Broadmoor Mesa S.F #1 and SE 1/2 Broadmoor Valley Rd | Job No: E-2076

Client: Gates redo for 1977 on (originally done prior to 1977) | By: BNW | Date: Jan. 14, 1979

- Area to NW inlet @ Broadmoor Valley Rd & Shorehom Circle G

A = 2.1 Ac

Hydrologic soil factor B

CN = $\{.75(.5)(98) + .25(5)(61) + 78(1.6)\}/2.1 = 81$

Q = .66 in

Tc = 11 min = .18 hr

qp = 1100 csm/in

tp = D/2 + .6tc = 3 + .6(.18) = 3.108 hr = 186 min

tb = 2.67 tp = 498 min

$q = qpAQ = \frac{1100(2.1)}{640} .66 = 3.6$ cfs

- Area S & E 1/2 Broadmoor Valley Road to catch basin E. side Broadmoor Valley Rd & Shorehom Circle H

A = 1.1 Ac

hydrologic soil factor B

CN = 89 (see sht 3 clubhouse road)

Q = 1.11 in

Tc = .08 hr → .1 hr

qp = 1280 csm/in

$q = qpAQ = \frac{1280(1.1)}{640} = 2.4$ cfs

tp = D/2 + .6tc

= 3 + .6(1) = 3.06 hr = 184 min

tb = 2.67 tp = 490 min

Project: Combined hydrographs to low point
Job Nº: E-2067
Client: Gates
By: BNW
Date: Jan. 16, 1979