



March 20, 2019

Paint Brush Hills Metropolitan District
9985 Towner Avenue
Falcon, CO 80831

RE: Drainage

Update to be more descriptive. Example: Drainage Memo for PBHMD Pump House within Paint Brush Hills Filing 13C Tract A.

To Whom It May Concern:

The Paint Brush Hills Metropolitan District (PBHMD) is located in Peyton, Colorado in unincorporated El Paso County. This drainage conformance letter pertains to the PBHMD project called the Pump House (Site) and is located north of Jaggar Way, just west of Beckham St. within the Paint Brush Hills Filing No. 13.

The Site is located in the NW ¼, Section 25, Township 12 South, Range 65 West of the 6th PM, County of El Paso, State of Colorado.

The Site was previously studied for drainage improvements as a part of the Final Drainage Report for Paint Brush Hills – Phase 2 (Filing No. 13) which was prepared in October 2005 and with a latest revision date of June 2008. This site includes a small area in the northern portion of the Paint Brush Hills Filing 13C, Tract A, and crosses Parcel B of the Paint Brush Hills Metropolitan Exemption Plat and in general drains north to south. This area is within sub basins “U” and “N” of the Filing No. 13 Final Drainage Report.

The Filing No. 13 phase 2 site is planned for a single family home development with over 550 homes (in the 2,000+ square foot range), a 10 acre elementary school site, a 6 acre community commercial site and 44 acres of trails and open space. The Filing 13 site has provided for regional detention and water quality for the overall site development.

The PBHMD – Pump House is approximately 24’ x 20’ within the Single Family development and has a total square footage of approximately 480 square feet with its respective access driveway. The driveway includes a 6” vertical curb to contain the runoff and convey it to Jaggar Way, similar to how a side lot swale of a “Type A” residential lot would drain to the front of the property. This is in conformance to the proposed drainage concept for sub basin “N” and “U” of the Filing 13 Final Drainage Report. The area of imperviousness for the site is the pump house roof at 480 SF, asphalt 4210 SF, concrete curb, gutter and sidewalk 1498 SF, for a total of 6188 SF of Imperviousness. The lots surrounding the pump house site average approximately 9,971 SF, which if we use this average size lot along with 6188 SF of impervious area, calculates to 62% impervious. 62% impervious then translates to a C5 of 0.48 and a C100 of 0.59, which is less than the assumed C factors of 0.55 and 0.65 respectively for basin “N” of the Filing 13 Report.

Due to the minimal amount of imperviousness created by the proposed Pump House and associated access drive, it would have less impact than a 2,000 SF house with associated driveway, within the same planned residential filing. Therefore, the proposed Pump House development would be within the parameters which were planned for with the development of the Paint Brush Hills, Filing 13

Paint Brush Hills Metropolitan District

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project. Development of the proposed Pump House will not have any adverse drainage effects on any of the adjacent property and will not require any additional detention or water quality facilities.

If you have any questions or concerns with drainage concepts associated with this proposed construction, please contact me at 303-293-8107.

Sincerely,

Douglas J Richter, PE



Provide PE Stamp
with signature.



**FINAL DRAINAGE REPORT
FOR
PAINT BRUSH HILLS – PHASE 2
(FILING NO. 13)**

**OCTOBER 2005
REVISED MARCH 2006
REVISED JULY 2006
REVISED JUNE 2008**

PREPARED FOR:

**SIX NINETY-NINE PROPERTIES, LLC.
545 E. PIKES PEAK AVENUE
SUITE 207
COLORADO SPRINGS, CO 80903
(719) 328-1672**

PREPARED BY:

**CLASSIC CONSULTING ENGINEERS & SURVEYORS, LLC
6385 CORPORATE DRIVE, SUITE 101
COLORADO SPRINGS, CO 80919
(719) 785-0790**

2053.21

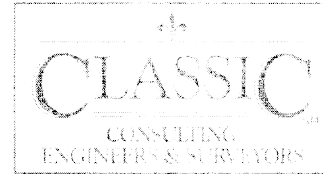
RECEIVED

JUL 17 2008

EPC DEVELOPMENT SERVICES

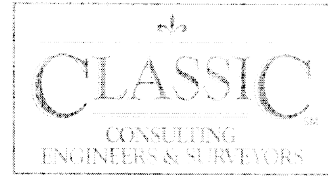
FOR REVIEW PURPOSES ONLY

JUL 11 2008



Basins T, O1 and O3 are tributary to the sump condition at Design Points 12 ($Q_5 = 2$ cfs and $Q_{100} = 5$ cfs) and 13 ($Q_5 = 13$ cfs and $Q_{100} = 27$ cfs). At these locations a 4' Type R sump inlet and a 12' Type R sump inlet will be installed to collect both the 5-year and 100-year developed flows, respectively. These collected flows are conveyed via a 30" RCP storm sewer and then combined with the Design Point 11 flows mentioned earlier. A 36" RCP storm sewer conveys the total flow south towards the natural channel. The emergency overflow route at this location is 1.0' maximum ponding and then spill over the highpoint and around the corner in a southerly direction. Basin O2 is tributary to the proposed 12' Type R at-grade inlet at Design Point 14A ($Q_5 = 8$ cfs and $Q_{100} = 17$ cfs). This facility will capture $Q_5 = 6$ cfs and $Q_{100} = 10$ cfs. The flow-by ($Q_5 = 2$ cfs and $Q_{100} = 7$ cfs), along with the developed flow from Basins P1, P3 and N will then travel towards the sump condition at Design Points 14 ($Q_5 = 12$ cfs and $Q_{100} = 28$ cfs) and 15 ($Q_5 = 8$ cfs and $Q_{100} = 17$ cfs). At these locations a 12' Type R sump inlet and a 6' Type R sump inlet will be installed to collect both the 5-year and 100-year developed flows, respectively. These collected flows are conveyed via a 36" RCP storm sewer and then combined with the previously mentioned flows within the 36" RCP storm sewer from Design Points 12 and 13. Once combined, a 48" RCP storm sewer conveys the total flow southwest towards the channel. A rip-rap dissipater will be installed to minimize sediment transfer and erosion. The emergency overflow route at this location is via a natural swale between two lots within a drainage easement and then directly into the channel.

Basins P2 and Q are tributary to the sump condition at Design Points 16 ($Q_5 = 6$ cfs and $Q_{100} = 12$ cfs) and 17 ($Q_5 = 2$ cfs and $Q_{100} = 3$ cfs). At these locations 4' Type R sump inlets will be installed to collect both the 5-year and 100-year developed flows. These collected flows are then conveyed via a 24" RCP storm sewer south towards Design Point 18. At Design Point 18 ($Q_5 = 12$ cfs and $Q_{100} = 26$ cfs) a 12' Type R sump inlet will completely accept both the 5-year and 100-year developed flows. These collected flows will then combine with the flows from Design Points 16 and 17 and are conveyed via a 30" RCP storm sewer directly into the existing pond B1. A rip-rap dissipater will be installed to minimize erosion. The emergency overflow route at this location is 1.0' maximum ponding and then spill over the curb and directly into the existing



REFERENCES

1. City of Colorado Springs/County of El Paso Drainage Criteria Manual, dated October 1991.
2. Soil Survey of El Paso County Area, Colorado Soil Conservation Service, June 1981.
3. "Master Development Drainage Plan, Falcon Hills Development," by Kiowa Engineering Corporation, May 2002.
4. "Preliminary Drainage Report for Falcon Hills," by Classic Consulting Engineers and Surveyors, approved November 2002.
5. "Final Drainage Report for Paint Brush Hills Filing Nos. 10, 11 &12," by Classic Consulting Engineers and Surveyors, approved July 2003.
6. "Preliminary Drainage Report for Paint Brush Hills – Phase 2", by Classic Consulting Engineers and Surveyors, approved January 2005.
7. "Drainage Report for Paint Brush Hills Filing No. 3," by Berge-Brewer & Assoc., Inc., April 1983.
8. "Falcon Area Drainage Basin Planning Study – Preliminary Design Report", by URS, October 2001.
9. "Final Drainage Study and Erosion Control Plan for Paint Brush Hills Filing No. 9," by Martin/Martin, Inc., approved September 2000.

JOB NAME: PAINT BRUSH HILLS - PHASE 2 (FILING NO. 13)
 JOB NUMBER: 2053.21
 DATE: 06/10/08
 CALCULATED BY: MAW

FINAL DRAINAGE REPORT ~ BASIN RUNOFF COEFFICIENT SUMMARY

BASIN	TOTAL AREA (AC)		IMPERVIOUS AREA / STREETS		LANDSCAPE/UNDEVELOPED AREAS		WEIGHTED		WEIGHTED CA	
	AREA (AC)	C(5)	AREA (AC)	C(5)	AREA (AC)	C(5)	C(5)	C(100)	CA(5)	CA(100)
A	0.52	0.90	0.42	0.90	0.10	0.35	0.45	0.85	0.41	0.44
B1	5.03	0.90	0.00	0.90	5.03	0.50	0.60	0.60	2.52	3.02
B2	1.26	0.90	0.00	0.90	1.26	0.50	0.60	0.60	0.63	0.76
C1	3.85	0.90	0.00	0.90	3.85	0.50	0.60	0.60	1.93	2.31
C2	4.28	0.90	0.00	0.90	4.28	0.50	0.60	0.60	2.14	2.57
D1	5.17	0.90	0.00	0.90	5.17	0.50	0.60	0.60	2.59	3.10
D2	2.67	0.90	0.00	0.90	2.67	0.50	0.60	0.60	1.34	1.60
E	4.48	0.90	0.00	0.90	4.48	0.50	0.60	0.60	2.24	2.69
F	4.34	0.90	0.00	0.90	4.34	0.50	0.60	0.60	2.17	2.60
G	2.61	0.90	2.10	0.90	0.51	0.35	0.45	0.85	2.07	2.22
H	1.32	0.90	0.00	0.90	1.32	0.48	0.58	0.58	0.63	0.77
I	3.70	0.90	0.00	0.90	3.70	0.35	0.45	0.45	1.30	1.67
J	3.87	0.90	0.00	0.90	3.87	0.50	0.60	0.60	1.94	2.32
K	0.96	0.90	0.65	0.90	0.31	0.55	0.65	0.85	0.76	0.82
L	4.36	0.90	0.00	0.90	4.36	0.55	0.65	0.65	2.40	2.83
M	0.12	0.90	0.08	0.90	0.05	0.55	0.65	0.84	0.09	0.10
N	4.85	0.90	0.00	0.90	4.85	0.55	0.65	0.65	2.67	3.15
O1	6.23	0.90	0.00	0.90	6.23	0.55	0.65	0.65	3.43	4.05
O2	4.78	0.90	0.00	0.90	4.78	0.55	0.65	0.65	2.63	3.11
O3	1.02	0.90	0.00	0.90	1.02	0.55	0.65	0.65	0.56	0.66
P1	3.64	0.90	0.00	0.90	3.64	0.55	0.65	0.65	2.00	2.37
P2	3.15	0.90	0.00	0.90	3.15	0.55	0.65	0.65	1.73	2.05
P3	2.26	0.90	0.00	0.90	2.26	0.55	0.65	0.65	1.24	1.47
Q	0.73	0.90	0.00	0.90	0.73	0.55	0.65	0.65	0.40	0.47
R1	4.94	0.90	0.00	0.90	4.94	0.55	0.65	0.65	2.72	3.21
R2	2.11	0.90	0.00	0.90	2.11	0.55	0.65	0.65	1.16	1.37
S	5.95	0.80	5.95	0.80	0.00	0.35	0.45	0.90	4.76	5.36
T	0.75	0.90	0.62	0.90	0.13	0.35	0.45	0.86	0.60	0.65
U	18.11	0.90	0.00	0.90	18.11	0.25	0.35	0.35	4.53	6.34

JOB NAME: PAINT BRUSH HILLS - PHASE 2 (FILING NO. 13)

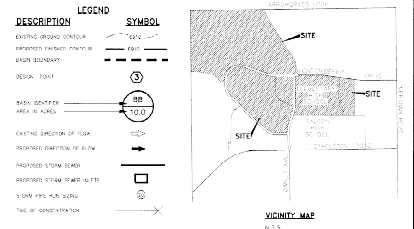
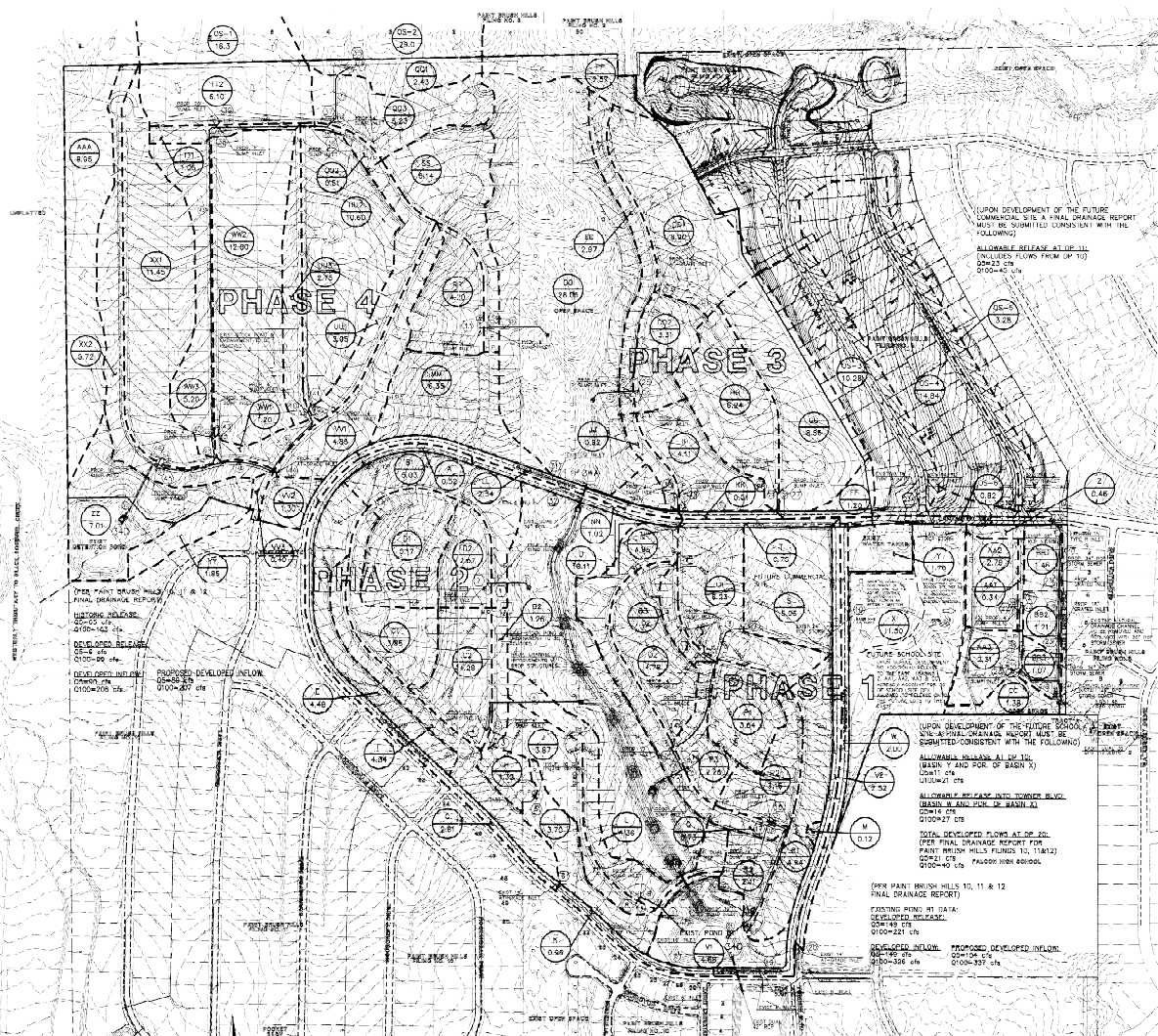
JOB NUMBER: 2053.21

DATE: 06/10/08

CALC'D BY: MAW

FINAL DRAINAGE REPORT ~ BASIN RUNOFF SUMMARY

BASIN	WEIGHTED		OVERLAND			STREET / CHANNEL FLOW				TOTAL FLOWS					
	CA(5)	CA(100)	C(5)	Length (ft)	Height (ft)	Tc (min)	Length (ft)	Slope (%)	Velocity (fps)	Tc (min)	TOTAL (min)	I(5) (in/hr)	I(100) (in/hr)	Q(5) (cfs)	Q(100) (cfs)
A	0.41	0.44	0.25	20	1	4.2	550	4.0%	7.0	1.3	5.5	4.98	8.86	2	4
B1	2.52	3.02	0.25	150	3	15.5	900	2.7%	5.8	2.6	18.1	3.17	5.63	8	17
B2	0.63	0.76	0.25	60	1.2	9.8	750	1.5%	4.3	2.9	12.7	3.72	6.62	2	5
C1	1.93	2.31	0.25	120	2.4	13.9	250	1.2%	3.8	1.1	14.9	3.47	6.17	7	14
C2	2.14	2.57	0.25	150	3	15.5	750	1.5%	4.3	2.9	18.4	3.14	5.59	7	14
D1	2.59	3.10	0.25	150	3	15.5	600	1.2%	3.8	2.6	18.1	3.17	5.63	8	17
D2	1.34	1.60	0.25	150	3	15.5	200	1.5%	4.3	0.8	16.3	3.33	5.93	4	9
E	2.24	2.69	0.25	150	3	15.5	380	3.4%	6.5	1.0	16.5	3.32	5.89	7	16
F	2.17	2.60	0.25	200	11	12.8					12.8	3.71	6.60	8	17
G	2.07	2.22	0.25	20	1	4.2	2650	5.0%	7.8	5.6	9.8	4.13	7.34	9	16
H	0.63	0.77	0.25	100	3	11.1	100	3.0%	6.1	0.3	11.3	3.91	6.94	2	5
I	1.30	1.67	0.25	500	18	23.3					23.3	2.79	4.95	4	8
J	1.94	2.32	0.25	300	8	19.9	550	1.5%	4.3	2.1	22.1	2.87	5.10	6	12
K	0.76	0.82	0.25	20	1	4.2	700	3.0%	6.1	1.9	6.1	4.84	8.60	4	7
L	2.40	2.83	0.25	300	8	19.9	550	1.5%	4.3	2.1	22.1	2.87	5.10	7	14
M	0.09	0.10	0.25								5.0	5.10	9.07	0.47	0.91
N	2.67	3.15	0.25	150	3	15.5	900	1.5%	4.3	3.5	19.0	3.09	5.50	8	17
O1	3.43	4.05	0.25	150	3	15.5	500	1.5%	4.3	1.9	17.4	3.23	5.74	11	23
O2	2.63	3.11	0.25	150	3	15.5	900	1.5%	4.3	3.5	19.0	3.09	5.50	8	17
O3	0.56	0.66	0.25	60	1.2	9.8	400	2.8%	5.9	1.1	10.9	3.96	7.04	2	5



PIPE RUN SIZES

PIPE RUN	SIZE	PIPE RUN	SIZE	PIPE RUN	SIZE	PIPE RUN	SIZE
1	24" RCP	17	18" RCP	33	18" RCP	49	18" RCP
2	30" RCP	18	18" RCP	34	18" RCP	50	18" RCP
3	30" RCP	19	18" RCP	35	18" RCP	51	18" RCP
4	18" RCP	20	18" RCP	36	18" RCP	52	18" RCP
5	18" RCP	21	18" RCP	37	18" RCP	53	18" RCP
6	18" RCP	22	18" RCP	38	18" RCP	54	18" RCP
7	18" RCP	23	18" RCP	39	18" RCP	55	18" RCP
8	18" RCP	24	18" RCP	40	18" RCP	56	18" RCP
9	18" RCP	25	18" RCP	41	18" RCP	57	18" RCP
10	18" RCP	26	18" RCP	42	18" RCP	58	18" RCP
11	18" RCP	27	18" RCP	43	18" RCP	59	18" RCP
12	18" RCP	28	18" RCP	44	18" RCP	60	18" RCP
13	18" RCP	29	18" RCP	45	18" RCP	61	18" RCP
14	18" RCP	30	18" RCP	46	18" RCP	62	18" RCP
15	18" RCP	31	18" RCP	47	18" RCP	63	18" RCP
16	18" RCP	32	18" RCP	48	18" RCP	64	18" RCP

DESIGN POINT FLOW AND INLET SIZE

DESIGN POINT	FLOW	INLET SIZE	DESIGN POINT	FLOW	INLET SIZE
1	2.0 CFS	4" PIPE	17	1.0 CFS	4" PIPE
2	1.5 CFS	4" PIPE	18	1.0 CFS	4" PIPE
3	1.0 CFS	4" PIPE	19	1.0 CFS	4" PIPE
4	1.0 CFS	4" PIPE	20	1.0 CFS	4" PIPE
5	1.0 CFS	4" PIPE	21	1.0 CFS	4" PIPE
6	1.0 CFS	4" PIPE	22	1.0 CFS	4" PIPE
7	1.0 CFS	4" PIPE	23	1.0 CFS	4" PIPE
8	1.0 CFS	4" PIPE	24	1.0 CFS	4" PIPE
9	1.0 CFS	4" PIPE	25	1.0 CFS	4" PIPE
10	1.0 CFS	4" PIPE	26	1.0 CFS	4" PIPE
11	1.0 CFS	4" PIPE	27	1.0 CFS	4" PIPE
12	1.0 CFS	4" PIPE	28	1.0 CFS	4" PIPE
13	1.0 CFS	4" PIPE	29	1.0 CFS	4" PIPE
14	1.0 CFS	4" PIPE	30	1.0 CFS	4" PIPE
15	1.0 CFS	4" PIPE	31	1.0 CFS	4" PIPE
16	1.0 CFS	4" PIPE	32	1.0 CFS	4" PIPE
17	1.0 CFS	4" PIPE	33	1.0 CFS	4" PIPE
18	1.0 CFS	4" PIPE	34	1.0 CFS	4" PIPE
19	1.0 CFS	4" PIPE	35	1.0 CFS	4" PIPE
20	1.0 CFS	4" PIPE	36	1.0 CFS	4" PIPE
21	1.0 CFS	4" PIPE	37	1.0 CFS	4" PIPE
22	1.0 CFS	4" PIPE	38	1.0 CFS	4" PIPE
23	1.0 CFS	4" PIPE	39	1.0 CFS	4" PIPE
24	1.0 CFS	4" PIPE	40	1.0 CFS	4" PIPE
25	1.0 CFS	4" PIPE	41	1.0 CFS	4" PIPE
26	1.0 CFS	4" PIPE	42	1.0 CFS	4" PIPE
27	1.0 CFS	4" PIPE	43	1.0 CFS	4" PIPE
28	1.0 CFS	4" PIPE	44	1.0 CFS	4" PIPE
29	1.0 CFS	4" PIPE	45	1.0 CFS	4" PIPE
30	1.0 CFS	4" PIPE	46	1.0 CFS	4" PIPE
31	1.0 CFS	4" PIPE	47	1.0 CFS	4" PIPE
32	1.0 CFS	4" PIPE	48	1.0 CFS	4" PIPE
33	1.0 CFS	4" PIPE	49	1.0 CFS	4" PIPE
34	1.0 CFS	4" PIPE	50	1.0 CFS	4" PIPE
35	1.0 CFS	4" PIPE	51	1.0 CFS	4" PIPE
36	1.0 CFS	4" PIPE	52	1.0 CFS	4" PIPE
37	1.0 CFS	4" PIPE	53	1.0 CFS	4" PIPE
38	1.0 CFS	4" PIPE	54	1.0 CFS	4" PIPE
39	1.0 CFS	4" PIPE	55	1.0 CFS	4" PIPE
40	1.0 CFS	4" PIPE	56	1.0 CFS	4" PIPE
41	1.0 CFS	4" PIPE	57	1.0 CFS	4" PIPE
42	1.0 CFS	4" PIPE	58	1.0 CFS	4" PIPE
43	1.0 CFS	4" PIPE	59	1.0 CFS	4" PIPE
44	1.0 CFS	4" PIPE	60	1.0 CFS	4" PIPE
45	1.0 CFS	4" PIPE	61	1.0 CFS	4" PIPE
46	1.0 CFS	4" PIPE	62	1.0 CFS	4" PIPE
47	1.0 CFS	4" PIPE	63	1.0 CFS	4" PIPE
48	1.0 CFS	4" PIPE	64	1.0 CFS	4" PIPE

NOTES:
 1. SEE EXISTING SURVEY DATA.
 2. SEE EXISTING PLAN FOR APPROPRIATE GRADING INFORMATION.
 3. SCALE: 1" = 200'

FLOOD PLAIN STATEMENT:
 THE LOCATION OF EXISTING INTERMEDIATE CANALS ARE SHOWN BY DASHED LINES. THESE CANALS ARE NOT SHOWN ON THIS PLAN. THE LOCATION OF EXISTING INTERMEDIATE CANALS ARE SHOWN BY DASHED LINES. THESE CANALS ARE NOT SHOWN ON THIS PLAN. THE LOCATION OF EXISTING INTERMEDIATE CANALS ARE SHOWN BY DASHED LINES. THESE CANALS ARE NOT SHOWN ON THIS PLAN.

AS WEAPONS ENGINEERING, P.C. 4100-922-1987 11000 W. 10TH AVENUE, SUITE 100 DENVER, CO 80202	NO. REVISION 1. REVISION: SEE EXISTING SURVEY DATA 2. REVISION: PER COUNTY 7-NOV-00 COMMENTS	DATE 7/15/00 8/23/00	REVIEW PREPARED BY: SEE EXISTING SURVEY DATA. ALL IN REPLY OF PUBLIC CONSULTANTS COMMENTS AND SURVEY DATA.
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PAINT BRUSH HILLS - PHASE 2
 (PLING NO. 13)
 FINAL DRAINAGE REPORT
 PROPOSED CONDITIONS DRAINAGE MAP

CLASSIC CONSULTING ENGINEERS & SURVEYORS

DESIGNED BY: [] SCALE: []
 DRAWN BY: []
 CHECKED BY: []
 DATE: []

Markup Summary

dsdlaforce (2)



Subject: Callout
Page Label: 1
Author: dsdlaforce
Date: 5/6/2019 1:49:29 PM
Color: ■

Update to be more descriptive. Example:
Drainage Memo for PBHMD Pump House within
Paint Brush Hills Filing 13C Tract A.



Subject: Callout
Page Label: 2
Author: dsdlaforce
Date: 5/6/2019 1:49:57 PM
Color: ■

Provide PE Stamp with signature.