

August 17, 2011

Shahab Biazar, P. E.
Hydrology Section
City of Albuquerque
P. O. Box 1293
Albuquerque, NM 87103

Re: Taos Unit 1 at the Trails Unit 2, DRB 1008798, CPN#730077 (C9/D1C)

Dear Shabab:

This letter is an addendum to the previously approved drainage report for Taos at the Trails. The purpose of this addendum is to revise the street flow and inlet capacity analyses for Mission Ridge Drive and Kayser Mill Road based on the vertical design of these streets in the public work order plans. The approved drainage report assumes no flow enters Mission Ridge Drive from Kayser Mill Road. The street design does not have a water block on Mission Ridge Drive preventing water from entering from Kayser Mill Road.

The flow in Kayser Mill Road at the intersection with Mission Ridge Drive is approximately 16 cfs. The roadway half width would carry approximately 8 cfs. It is estimated that 4 cfs would turn the corner and head into Mission Ridge Drive. The additional of 4 cfs has no negative impact on the street capacity or the storm drain design for Mission Ridge Drive.

The updated analyses are shown in blue on the original submittal. Attached for your review and approval are the revised street capacity analyses for Kayser Mill Road and Mission Ridge Drive, the revised inlet capacity analysis for Mission Ridge Drive, and the revised HGL calculation for the Mission Ridge Drive storm drain system.

If you have any questions or require further information, please feel free to contact me.

Sincerely,



Scott J. Steffen, P.E.
Vice President
Community Development and Planning Group

Enclosures

Engineering ▲
Spatial Data ▲
Advanced Technologies ▲

std - 0.75%.txt

MANNING'S N = 0.017 SLOPE = 0.008

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	0.9	5.0	11.5	0.1	9.0	37.7	0.7
2.0	8.9	0.7	6.0	23.5	0.4	10.0	38.1	0.7
3.0	9.3	0.7	7.0	35.5	0.1	11.0	47.0	0.9
4.0	9.5	0.0	8.0	37.5	0.0			

WSEL FT.	DEPTH INC	FLOW AREA SQ. FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOTAL ENERGY (FT)
0.025	0.025	0.010	0.004	0.822	0.394	1.702	0.027
0.050	0.050	0.039	0.024	1.645	0.626	2.484	0.056
0.075	0.075	0.088	0.072	2.467	0.820	3.266	0.085
0.100	0.100	0.156	0.155	3.290	0.993	4.048	0.115
0.125	0.125	0.244	0.282	4.112	1.153	4.830	0.146
0.150	0.150	0.366	0.414	6.318	1.133	6.996	0.170
0.175	0.175	0.549	0.650	8.870	1.184	9.509	0.197
0.200	0.200	0.795	1.019	11.423	1.281	12.021	0.226
0.225	0.225	1.104	1.539	13.975	1.394	14.534	0.255
0.250	0.250	1.476	2.232	16.527	1.512	17.047	0.286
0.275	0.275	1.910	3.119	19.079	1.632	19.560	0.316
0.300	0.300	2.408	4.218	21.631	1.752	22.072	0.348
0.325	0.325	2.968	5.549	24.183	1.870	24.585	0.379
0.350	0.350	3.591	7.130	26.735	1.985	27.098	0.411
0.375	0.375	4.276	9.078	28.787	2.123	29.110	0.445
0.400	0.400	4.981	11.693	28.839	2.348	29.123	0.486
0.425	0.425	5.686	14.563	28.890	2.561	29.136	0.527
0.450	0.450	6.391	17.677	28.942	2.766	29.148	0.569
0.475	0.475	7.097	21.024	28.993	2.962	29.161	0.611
0.500	0.500	7.803	24.596	29.045	3.152	29.174	0.655
0.525	0.525	8.510	28.385	29.097	3.335	29.186	0.698
0.550	0.550	9.217	32.383	29.148	3.514	29.199	0.742
0.575	0.575	9.924	36.586	29.200	3.687	29.212	0.786
0.600	0.600	10.631	40.987	29.251	3.855	29.224	0.831
0.625	0.625	11.339	45.582	29.303	4.020	29.237	0.876
0.650	0.650	12.047	50.365	29.354	4.181	29.250	0.922
0.675	0.675	12.757	54.744	29.889	4.291	29.753	0.961
0.700	0.700	13.536	56.259	33.273	4.156	32.217	0.969
0.725	0.725	14.372	59.278	35.737	4.124	34.681	0.990
0.750	0.750	15.270	62.726	38.202	4.108	37.144	1.012
0.775	0.775	16.229	66.597	40.666	4.103	39.608	1.037
0.800	0.800	17.250	70.889	43.131	4.109	42.072	1.063
0.825	0.825	18.333	75.605	45.595	4.124	44.536	1.090

#1

KAYSER MILL ROAD

5/16/08 CFS $\approx$ EOL $\approx$ 0.55' $\angle$ 0.85' $\checkmark$ ok

$\sim$ 4 cfs FROM SOUTH SIDE OF ROAD ENTERS
MISSION RIDGE DRIVE

Std - 0.5%.txt

MANNING'S N = 0.017 SLOPE = 0.005

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	0.9	5.0	11.5	0.1	9.0	37.7	0.7
2.0	8.9	0.7	6.0	23.5	0.4	10.0	38.1	0.7
3.0	9.3	0.7	7.0	35.5	0.1	11.0	47.0	0.9
4.0	9.5	0.0	8.0	37.5	0.0			

WSEL FT.	DEPTH INC	FLOW AREA SQ. FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOTAL ENERGY (FT)
0.025	0.025	0.010	0.003	0.822	0.322	1.702	0.027
0.050	0.050	0.039	0.020	1.645	0.511	2.484	0.054
0.075	0.075	0.088	0.059	2.467	0.670	3.266	0.082
0.100	0.100	0.156	0.127	3.290	0.811	4.048	0.110
0.125	0.125	0.244	0.230	4.112	0.941	4.830	0.139
0.150	0.150	0.366	0.338	6.318	0.925	6.996	0.163
0.175	0.175	0.549	0.531	8.870	0.967	9.509	0.190
0.200	0.200	0.795	0.832	11.423	1.046	12.021	0.217
0.225	0.225	1.104	1.257	13.975	1.138	14.534	0.245
0.250	0.250	1.476	1.823	16.527	1.235	17.047	0.274
0.275	0.275	1.910	2.546	19.079	1.333	19.560	0.303
0.300	0.300	2.408	3.444	21.631	1.430	22.072	0.332
0.325	0.325	2.968	4.531	24.183	1.526	24.585	0.361
0.350	0.350	3.591	5.822	26.735	1.621	27.098	0.391
0.375	0.375	4.276	7.412	28.787	1.734	29.110	0.422
0.400	0.400	4.981	9.547	28.839	1.917	29.123	0.457
0.425	0.425	5.686	11.891	28.890	2.091	29.136	0.493
0.450	0.450	6.391	14.433	28.942	2.258	29.148	0.529
0.475	0.475	7.097	17.166	28.993	2.419	29.161	0.566
0.500	0.500	7.803	20.082	29.045	2.574	29.174	0.603
0.525	0.525	8.510	23.176	29.097	2.723	29.186	0.640
0.550	0.550	9.217	26.441	29.148	2.869	29.199	0.678
0.575	0.575	9.924	29.873	29.200	3.010	29.212	0.716
0.600	0.600	10.631	33.466	29.251	3.148	29.224	0.754
0.625	0.625	11.339	37.217	29.303	3.282	29.237	0.793
0.650	0.650	12.047	41.123	29.354	3.413	29.250	0.831
0.675	0.675	12.757	44.698	29.889	3.504	29.753	0.866
0.700	0.700	13.536	45.935	33.273	3.394	32.217	0.879
0.725	0.725	14.372	48.400	35.737	3.368	34.681	0.901
0.750	0.750	15.270	51.215	38.202	3.354	37.144	0.925
0.775	0.775	16.229	54.376	40.666	3.350	39.608	0.950
0.800	0.800	17.250	57.881	43.131	3.355	42.072	0.975
0.825	0.825	18.333	61.731	45.595	3.367	44.536	1.001

(#2)

KAYSER MILL ROAD

18.06 cfs $\Rightarrow$ EGL $\approx$ 0.58' < 0.85' ✓ OK

- 4 cfs TO MISSION RIDGE DR

14.06 cfs EGL $\approx$ 0.53' < 0.75' $\therefore$ OK

Std - 0.5%.txt

MANNING'S N = 0.017 SLOPE = 0.005

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4.0	9.5	0.0	8.0	37.5	0.0			

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0.075	0.075	0.088	0.059	2.467	0.670	3.266	0.082
0.100	0.100	0.156	0.127	3.290	0.811	4.048	0.110
0.125	0.125	0.244	0.230	4.112	0.941	4.830	0.139
0.150	0.150	0.366	0.338	6.318	0.925	6.996	0.163
0.175	0.175	0.549	0.531	8.870	0.967	9.509	0.190
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0.775	0.775	16.229	54.376	40.666	3.350	39.608	0.950
0.800	0.800	17.250	57.881	43.131	3.355	42.072	0.975
0.825	0.825	18.333	61.731	45.595	3.367	44.536	1.001

#14 Mission Bridge DR (NORTH OF CP)

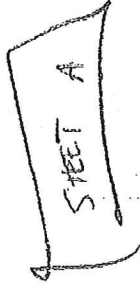
≈ 5.68 CFS → EGL ≈ 0.39' < 0.85' ✓ OK

+ 4 CFS FROM KAYSER MILL

9.68 CFS EGL ≈ 0.46' < 0.85' ∴ OK

SEE SHEET A FOR
INLET ANALYSIS

Type "A" Double-Mission Ridge



ANALYSIS OF AN INLET IN A SUMP CONDITION -

Mission Ridge LP

INLET TYPE: Double Grate Type "A" with curb opening wings on both sides on inlet.

WEIR: $Q = C * L * H^{1.5}$

Wing opening

$C = 3.0$

$L = 4.0$ ft

$Q = 3.0(4.0)H^{1.5} = 12.0H^{1.5}$

Grate opening

$C = 3.0$

$L(2.67) = 8.01$ ft

$Q = 3.0(8.01)H^{1.5} = 24.03H^{1.5}$

ORIFICE: $Q = C * A * (2 * G * H)^{0.5}$

Grate opening

$C = 0.6$

$A(2.0 \text{ sf}) = 2.0$ sf

$Q = 4.194 * (64.4 * H)^{0.5} = 1.2 * (64.4 * H)^{0.5}$

	WS ELEVATION	HEIGHT ABOVE INLET	Q (CFS)		Q (CFS)		Q (CFS)		TOTAL Q (CFS)	COMMENTS:
			WEIR	"A" OPENING	WEIR	DOUBLE GRATE	ORIFICE DOUBLE GRATE			
~FL @ INLET	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Flow at double "A" inlet w/ two wing openings	
	0.10	0.10	0.38	0.38	0.85	12.47	1.61	1.61	Weir controls on grate analysis	
	0.20	0.20	1.07	1.07	2.40	17.64	4.55	4.55		
	0.30	0.30	1.97	1.97	4.41	21.60	8.35	8.35		
	0.40	0.40	3.04	3.04	6.78	24.94	12.86	12.86	Q(100 yr) = 11.69 cfs is provided at this depth	
	0.50	0.50	4.24	4.24	9.48	27.88	17.97	17.97	Q(100 yr) = 13.69 cfs	
	0.60	0.60	5.58	5.58	12.46	30.55	23.62	23.62	Q(2x100 yr) = 23.38 cfs is provided at this depth	
TOP OF CURB	0.70	0.70	7.03	7.03	15.71	32.99	29.76	29.76	Q(2x100 yr) = 27.38 cfs is provided at this depth	
	0.80	0.80	8.59	8.59	19.19	35.27	36.36	36.36	At this depth	
	0.90	0.90	10.25	10.25	22.90	37.41	43.39	43.39	Depth	
ROW LIMIT	1.00	1.00	12.00	12.00	26.82	39.43	50.82	50.82		

NOTE:

The total runoff intercepted by the inlet at the low point in the road is:

$Q_r(100) = 2 * [(runoff of the wing opening) + (the lesser of the weir or orifice amount taken by the double grate)]$.

THE 100 YR STORM EVENT = 11.69 CFS at the sump condition

THE 2 x 100 YR STORM EVENT = 23.38 CFS at the sump condition

27.38

TOTAL FLOW @ LP = 23.38 cfs / 2 INLETS = 11.69 cfs

+ 4 cfs FROM KAYSER MILL

27.38 cfs / 2 = 13.69 cfs



30' 25' 20' 15' 10' 5' 0' 5' 10' 15' 20' 25' 30'



STREET CAPACITY TAOS at the TRAILS SUBDIVISION

Mission Ridge Storm Drain HGL.txt

InRoads Storm & Sanitary Design Log

Drainage File: P:\20110333\CDP\Control\Utilities\20110333 sd.sdb

Design File: P:\20110333\CDP\CONTROL\UTILITIES\UTIL SDB WORKING.DWG

Display Log: P:\20110333\CDP\CONTROL\UTILITIES\design.log

Date: Wednesday, August 17, 2011 14:48:44

HGL/EGL Computations:

Struct_ID	D (in)	Q (cfs)	L (ft)	V (ft/s)	d (ft)	dc (ft)	V ² /2g (ft)	sf (ft/ft)	pn_soffit (ft)	EGLdn (ft)	HGLdn (ft)	Tot_Loss (ft)	EGLup (ft)	HGLup (ft)	Rim_Elev. (ft)
Outfall															
EXSDP01	30	38.38	46.27	7.82	-	-	0.95	0.0088	5410.01	5414.80	5413.85	0.41	5415.21	5414.26	-
SDWH1	-	-	-	-	-	-	-	-	-	5415.21	5414.26	0.82	5416.03	5415.08	5416.34
SDP6	36	38.38	18.43	5.43	-	-	0.46	0.0033	5411.06	5416.03	5415.08	0.06	5416.09	5415.63	-
SDWH2	-	-	-	-	-	-	-	-	-	5416.09	5415.63	0.27	5416.36	5415.90	5416.82
SDP5	36	38.38	109.34	5.43	-	-	0.46	0.0033	5414.00	5416.36	5415.90	0.36	5416.72	5416.26	-
IN1	-	-	-	-	-	-	-	-	-	5416.72	5416.26	0.06	5416.78	5416.32	5418.08
P0	30	24.86	21.23	5.06	-	-	0.40	0.0037	5415.15	5416.78	5416.32	0.08	5416.86	5416.46	-
SDWH5	-	-	-	-	-	-	-	-	-	5416.86	5416.46	0.07	5416.92	5416.52	5418.23
SDP4	24	13.52	7.26	4.30	-	-	0.29	0.0036	5415.42	5416.92	5416.52	0.03	5416.95	5416.66	-
IN2	-	-	-	-	-	-	-	-	-	5416.95	5416.66	-	5416.95	5416.66	5418.08
New Branch															
SDWH5	-	-	-	-	-	-	-	-	-	5416.86	5416.46	-	5416.86	5416.46	-
SDP3	24	11.34	65.13	3.61	-	-	0.20	0.0025	5415.42	5416.99	5416.60	0.14	5417.16	5416.96	5418.23
SDWH3	-	-	-	-	-	-	-	-	-	5417.16	5416.96	0.21	5417.37	5417.17	5418.53
SDP2	24	11.34	51.69	3.61	-	-	0.20	0.0025	5416.12	5417.37	5417.17	0.13	5417.50	5417.30	-
IN3	-	-	-	-	-	-	-	-	-	5417.50	5417.30	0.18	5417.68	5417.48	5418.60
SDP1	18	5.67	24.54	3.21	-	-	0.16	0.0029	5416.51	5417.68	5417.48	0.07	5417.75	5417.59	-
IN4	-	-	-	-	-	-	-	-	-	5417.75	5417.59	-	5417.75	5417.59	5418.69

Table B:

LOSSES	Str_ID	Hf	Hb	Hstr	Hc	He	Hj	Total	- Loss_Coefficients Dstr	Ko	CD	Cd	Cq	Cp	Cb	K
Outfall																
EXSDP01	0.41	-	-	-	-	-	-	0.41	-	-	-	-	-	-	-	-
SDWH1	-	-	-	-	-	-	-	0.82	6.30	0.994	1.000	0.870	1.000	1.000	1.000	0.865
SDP6	0.06	-	-	0.82	-	-	-	0.06	-	-	-	-	-	-	-	-
SDWH2	-	-	-	0.27	-	-	-	0.36	4.23	0.952	1.000	0.614	1.000	1.000	1.000	0.585
SDP5	0.36	-	-	-	-	-	-	0.06	-	-	-	-	-	-	-	-
IN1	-	-	-	0.06	-	-	-	0.06	4.21	0.220	1.000	0.613	1.000	1.000	1.000	0.135
P0	0.08	-	-	-	-	-	-	0.07	-	-	-	-	-	-	-	-
SDWH5	-	-	-	0.07	-	-	-	0.03	3.64	0.172	1.000	0.626	1.545	1.000	1.000	0.166
SDP4	0.03	-	-	-	-	-	-	0.03	-	-	-	-	-	-	-	-
IN2	-	-	-	-	-	-	-	-	2.58	-	-	-	-	-	-	-
New Branch																
SDWH5	-	-	-	-	-	-	-	0.14	-	-	-	-	-	-	-	-
SDP3	0.16	-	-	0.14	-	-	-	0.16	3.64	1.502	1.000	0.626	0.367	1.000	1.000	0.345
SDWH3	-	-	-	-	-	-	-	0.21	-	-	-	-	-	-	-	-
SDP2	0.13	-	-	0.21	-	-	-	0.13	2.93	1.650	1.000	0.629	1.000	1.000	1.000	1.038
IN3	-	-	-	0.18	-	-	-	0.18	2.79	1.480	1.000	0.610	1.000	1.000	1.000	0.903