April 11, 2022

Mr. Gilbert LaForce
El Paso County
2880 International Cir., Suite 110
Colorado Springs, CO 80910

PCD File # CDR-22-002

Dear Gilbert:

DRAINAGE LETTER – JUDGE ORR ROAD RV PARK & STORAGE

THIS DRAINAGE LETTER is to Certify that the Approved Final Drainage Report for the Judge Orr Road RV Park & Storage Development prepared by Associated Design Professionals, Inc. included the area involved in the extension of Range Flower Way. The area included in the Range Flower Way drainage area was delineated as Sub-basin A2A and contained 2.58 acres. The flows from this basin produced 5.7 cfs for the 5-year storm and 12.0 cfs for the 100-year storm. These flows will be intercepted by two 5' D10R inlets which connect to the 24" RCP which flows east to the approved detention basin.

I hereby Certify that there are no changes to these flows from the date of the approved report to the development of the roadway improvement plans.

Please call me if you have questions.

Sincerely,

Michael A. Bartusek, PE
Project Engineer

W3925.-Judge Orr Rd RV Park & Storage

121 S. TEJON ST.
SUITE 1110
COLORADO SPRINGS, CO 80903
719.283-7671

respec.com

Needs signatures and stamp

RESPEC

ENGINEER'S STATEMENT:
The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the County for drainage reports, and said report is in conformity with the master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

_____

Michael A. Bartusek, P.E. #23329

DEVELOPER'S STATEMENT:

I, the Developer, have read and will comply with all of the requirements specified in this drainage report and plan.

By: _____

Teddy McDonald

Title: Owner

Address: McDonald Paving & Chip Sealing
3507 N. El Paso St.
Colorado Springs, CO 80907

El Paso County

Filed in accordance the El Paso County Land Development Code, Drainage Criteria Manual Volumes 1 and 2, and the Engineering Criteria Manual, as amended.

_____ _____

Jennifer Irvine, County Engineer/ECM Administrator Date

Conditions:

JUDGE ORR ROAD RV PARK & STORAGE DEVELOPMENT

C FACTOR CALCULATION SHEET

RUNOFF COEFICIENT

TYPE A/B SOILS

LAND USE	5 YR	100 YR	IMPERV. %
UNDEV	0.08	0.35	0
LOOSE GRAVEL	0.59	0.7	80
GRAVEL ROADS	0.59	0.7	80
GRAVEL RV PARKING PAD	0.59	0.7	80
PAVED ROADS/BUILDINGS	0.9	0.96	100

Historic Conditions

AREA DESIG.	TOTAL AREA (acre)	SURFACE CONDITION AREAS: GRASSED SURFACE	LOOSE GRAVEL	GRAVEL ROADS	BUILDINGS OR PAVED ROADS	CALCULATED C: 5 YR	100 YR
A1	11.75	11.75	0.00	0.00	0.00	**0.08**	**0.35**
A2	20.75	20.60	0.00	0.10	0.05	**0.08**	**0.35**
A3	4.36	3.91	0.00	0.35	0.10	**0.14**	**0.39**
	36.86	36.26	0.00	0.45	0.15	0.09	0.36
% Impervious		0%	80%	80%	100%		
Imp x A		0	0	0.36	0.15		
Total I x A	0.51						
Total Imp	0.51/36.86 = 1.4%						
B	0.87	0.87	0.00	0.00	0.00	**0.08**	**0.35**
OS1	7.81	7.19	0.00	0.00	0.62	**0.15**	**0.40**
OS2	36.41	35.96	0.00	0.00	0.45	**0.09**	**0.36**
OS3	27.21	From Heagler DBPS				**0.30**	**0.60**
OS4	13.73	12.37	0.00	0.00	1.36	**0.16**	**0.41**
OS5	0.71	0.42	0.00	0.00	0.29	**0.41**	**0.60**

Developed Conditions							
	TOTAL	SURFACE CONDITION AREAS				CALCULATED C	
AREA	AREA	GRASSED SURFACE	LOOSE GRAVEL	GRAVEL RV PARKING	PAVED ROADS	5	100
DESIG.	(acre)					YR	YR
A1	8.30	0.61	7.69	0.00	0.00	**0.55**	**0.67**
A2A	2.58	0.86	0.00	0.00	1.72	**0.63**	**0.76**
A3	6.85	3.88	0.00	1.15	1.82	**0.38**	**0.57**
A4	11.92	9.18	0.00	1.49	1.25	**0.23**	**0.46**
Total @Pond	29.65	14.53	7.69	2.64	4.79	**0.39**	**0.57**
A2B	0.70	0.16	0.00	0.00	0.54	**0.71**	**0.82**
A5	1.80	1.72	0.00	0.00	0.08	**0.08**	**0.38**
% Impervious		0%	80%	80%	100%		
Imp x A		0	6.15	2.11	4.79		
Total I x A	13.05						
Total Imp	13.05/29.65 = 44.0%						
B	0.87	0.87	0.00	0.00	0.00	**0.08**	**0.35**
OS1	7.81	7.19	0.00	0.00	0.62	**0.15**	**0.40**
OS2	42.70	19.20	0.00	0.00	23.50	**0.53**	**0.69**
OS3	27.21	From Heagler DBPS				**0.30**	**0.60**
OS4	4.18	2.82	0.00	0.00	1.36	**0.35**	**0.55**
OS5	0.70	0.42	0.00	0.00	0.28	**0.41**	**0.59**
Pond 1							
% Impervious							
	TOTAL	GRASSED	NEIGHBORHOOD				
	AREA	SURFACE	COMMERCIAL				
OS1	7.81	7.81					
OS2	42.70	1.65	41.05				
	50.51	9.46	41.05				
% Impervious		0%	70%				
Imp x A		0	28.74				
Total I x A	28.74						
Total Imp	28.74/50.51 = 56.9%						

JUDGE ORR ROAD RV PARK & STORAGE DEVELOPMENT
PROJ. #160301
DRAINAGE CALCULATION SHEET
file:judge orr rv1 dr
07/17/19

AREA DESIG.	AREA (acre)	C5 (5 yr)	C100 (100 yr)	C5 X A	C100 X A	Initial Tci L (ft)	Initial Tci Slope (%)	Initial Tci ti (min)	Travel Time L (ft)	Travel Time Slope (%)	Travel Time V (fps)	Travel Time Tt (min)	TC (min)	I5 (in/hr)	I100 (in/hr)	Q5 (cfs)	Q100 (cfs)	length L (feet)	vel. V (fps)	t (min)	AREA DESIG.
EXISTING CONDITIONS																					
A1	11.75	0.08	0.35	0.94	4.11	200	2.00	21.46	1150	1.90	2.10	9.13	30.59	2.29	4.00	2.15	16.47				A1
OS1	7.81	0.15	0.40	1.17	3.12	150	2.00	17.31	600	1.18	2.35	4.26	21.56	2.80	4.89	3.28	15.27	450	4.50	1.67	OS1
OS2	22.10	0.09	0.36	1.99	7.96	150	2.00	18.40	1400	1.20	1.20	19.44	37.85	2.01	3.52	4.00	27.97				OS2
DP1	29.91			3.16	11.08								37.85	2.01	3.52	6.36	38.95	1250	2.10	9.92	DP1
A2	17.47	0.08	0.35	1.40	6.11	250	3.20	20.55	1400	1.90	2.10	11.11	31.66	2.25	3.92	3.14	23.98				A2
DP2	47.38			4.56	17.19								47.77	1.73	3.03	7.91	52.10				DP2
OS3	27.21	0.30	0.60	8.16	16.33	250	2.00	18.82	1570	2.90	1.80	14.54	33.35	2.18	3.80	17.76	62.04	1800	4.00	7.50	OS3
OS4	25.14	0.16	0.41	4.02	10.31	250	2.00	22.11	1800	1.00	2.00	15.00	37.11	2.04	3.56	8.20	36.68				OS4
DP3	52.35			12.19	26.63								37.11	2.04	3.56	24.83	94.79	1050	2.25	7.78	DP3
A3	2.80	0.14	0.39	0.39	1.09	100	2.00	14.28	1050	1.23	2.25	7.78	22.06	2.76	4.83	1.08	5.27				A3
OS5	0.82	0.41	0.60	0.34	0.49	10	2.00	3.25	1050	1.23	2.25	7.78	11.02	3.89	6.79	1.31	3.34				OS5
DP4	55.97			12.91	28.22								44.89	1.81	3.15	23.32	89.02				DP4
DP5	115.10			18.41	49.52								44.89	1.81	3.15	33.25	156.23				DP5
B	0.87	0.08	0.35	0.07	0.30	80	2.00	13.57	650	1.30	2.30	4.71	18.28	3.05	5.34	0.21	1.62				B
DEVELOPED CONDITIONS																					
OS1	7.81	0.15	0.40	1.17	3.12	150	2.00	17.31	600	1.18	2.35	4.26	21.56	2.80	4.89	3.28	15.27	450	4.50	1.67	OS1
OS2	22.10	0.09	0.36	1.99	7.96	150	2.00	18.40	1400	1.20	1.20	19.44	37.85	2.01	3.52	4.00	27.97				OS2
DP1	29.91			3.16	11.08								37.85	2.01	3.52	6.36	38.95	1594	10.00	2.66	DP1
A1	8.30	0.56	0.68	4.65	5.64	100	2.00	8.03	1150	1.50	1.20	15.97	24.01	2.64	4.61	12.26	26.00	650	1.20	9.03	A1
A2A	2.58	0.63	0.76	1.63	1.96	35	2.00	4.14	700	1.50	1.20	9.72	13.86	3.50	6.12	5.69	12.00	675	1.20	9.38	A2A
A3	6.85	0.38	0.57	2.60	3.90	100	2.00	10.71	950	1.50	1.20	13.19	23.91	2.64	4.62	6.88	18.03				A3
DP2	9.43			4.23	5.87								23.91	2.64	4.62	11.18	27.08	230	1.20	3.19	DP2
A4	11.92	0.39	0.57	4.65	6.79	100	2.00	10.56	1100	1.50	1.20	15.28	25.84	2.53	4.42	11.76	30.02				A4
DP3	29.65			13.53	18.30								33.03	2.19	3.82	29.60	69.97	150	5.00	0.50	DP3
DPD2	29.65			0.23	8.93	*Adjusted C Factor for Detention Basin							33.03	2.19	3.82	0.50	33.70				DPD2
DP4	59.56			3.39	20.01								40.50	1.93	3.37	6.54	67.41				DP4
OS3	27.21	0.30	0.60	8.16	16.33	250	2.00	18.82	1570	2.90	1.80	14.54	33.35	2.18	3.80	17.76	62.04	1800	4.00	7.50	OS3
OS4	25.14	0.16	0.41	4.02	10.31	250	2.00	22.11	1800	1.00	2.00	15.00	37.11	2.04	3.56	8.20	36.68				OS4

DP5	52.35			12.19	26.63								37.11	2.04	3.56	24.83	94.79	1050	2.25	7.78	DP5
A2B	0.69	0.71	0.82	0.49	0.57	35	2.00	3.43	200	1.50	1.20	2.78	6.21	4.84	8.46	2.37	4.79	110	1.20	1.53	A2B
A5	1.80	0.08	0.38	0.14	0.68	180	2.00	20.36	1050	1.23	2.25	7.78	28.14	2.41	4.21	0.35	2.88				A5
OS5	0.70	0.41	0.59	0.29	0.42	10	2.00	3.26	1300	1.23	2.25	9.63	12.89	3.62	6.33	1.04	2.63				OS5
DP6	55.54			12.62	27.73								44.89	1.81	3.15	22.78	87.49				DP6
DP7	115.10			16.00	47.74								44.89	1.81	3.15	28.90	150.61				DP7
B	0.87	0.08	0.35	0.07	0.30	80	2.00	13.57	650	1.30	2.30	4.71	18.28	3.05	5.34	0.21	1.62				B
	* C Factor Adjusted to Model Flows from Detention Model into Rational Method Design																				

DITCH CAPACITY CALCULATION SHEET

Swale Location	Q5 cfs	Q100 cfs	S %	B ft	n	Z	D ft	d100 ft	V fps	Froude #	Riprap Size ft	Riprap Size_in
Swale A	6.4	39.0	1.00	4.00	0.035	3:1	3.00	1.30	3.70	0.71		
Swale B	3.0	10.0	1.00	0.00	0.035	3:1	1.50	1.10	2.75	0.65		
Swale C	12.3	26.0	1.40	0.00	0.035	3:1, 1%	1.00	0.50	2.00	0.71		
Swale D	12.3	26.0	1.50	0.00	0.035	3:1	2.00	1.50	4.10	0.84		
Swale E	11.1	27.1	1.40	4.00	0.035	0.42	1.00	0.80	3.00	0.78		
Swale F	11.8	30.0	1.50	0.00	0.015	56:1	0.25	0.3*	3.10	1.52	asphalt road	
								*d5				
Judge Orr Rd												
Ditch G	24.8	94.8	1.60	4.00	0.035	3:1/4:1	2.00	1.70	5.50	0.94		
Ditch H	22.8	87.5	1.60	4.00	0.035	3:1/4:1	2.50	1.70	5.40	0.93		
Spillwy K	24.6*	73.0*	5.00	40.00	0.040	3:1	2.00	0.40	4.40	1.25	0.20	Use 12"
	*Undetained Flows from UD-Det											
Spillway												
Swale L	36.1*	109.0*	0.30	10.00	0.040	3:1	3.00	2.30	2.80	0.38	0.38	Use 12"
	*Undetained Flows from UD-Det+ Storm Sewer Flows											
Exist Swale At												
E PL Line	6.5*	67.4*	1.70	8.00	0.040	8:1	6.00	1.10	3.80	0.80		
	*Detained Flows + Storm Sewer Flows											
*Swale 300'												
E of PL	28.9	150.6	1.70	8.00	0.040	8:1	6.00	1.60	4.70	0.85		
	*From Spreadsheet											
*Det Breach												
Flow	---	199.5	1.70	8.00	0.040	8:1	6.00	1.80	5.10	0.86		

*Flows from the development travel within a natural swale covered with rangeland grasses. No downstream manmade facilities exist.

STORM SEWER HYDRAULIC GRADELINE CALCULATION SHEET

Location	Pipe Size	Slope %	Q5	Q100	Pipe Cap	Critical d	Invert	Q/D^1.5	Yt	Riprap Size	Riprap Used
DPD1	30"	1.3	6.4	39.0	54.5	2.3	6855.5	9.9	0.68	Type L*	Type M
A2A	24"	0.4	5.7	12.0	15.4	1.24	6856.0	4.2	0.8	Type L*	Type M
DP2	24"	5.7	11.2	27.1	58.1	1.82	6842.1				
DP5	(3)38"x24"	1.0	24.8	94.8	44	1.36	6855.4	8.0	0.68	Type L*	Type M
DP6	(3)38"x24"	1.0	22.8	87.5	44	1.36	6841.6	7.4	0.68	Type L*	Type M

* Per Figure 5-7

FOREBAY CALCULATIONS

Total for Basin

2% OF WQV

0.02 X 0.470 = 0.0094 AF = 409 CF

Total Flows at Forebays = 83.1 CFS (Without Time of Concentration Adjustment)

At Swale D-D

Flow at Swale D-D = 26.0 CFS

Forebay Size = (26.0/83.1)x409 = 128 CF

FOREBAY NOTCH CALCULATIONS

0.02 OF 100YR FLOW

0.02 X 26 = 0.52 CFS

W =Q/(D^1.5XC)

W=0.52/(1X3.0)=0.17 FT

At DP2

Flow at DP2 = 27.1 CFS

Forebay Size = (27.1/83.8)x409 = 133 CF

0.02 OF 100YR FLOW

0.02 X 27.1 = 0.54 CFS

W =Q/(D^1.5XC)

W=0.54/(1X3.0)=0.18 FT

At Sub-Basin A4

Flow at Sub-Basin A4 = 30.0 CFS

Forebay Size = (30.0/83.1)x409 = 148 CF

0.02 OF 100YR FLOW

0.02 X 30.0 = 0.60 CFS

W =Q/(D^1.5XC)

W=0.60/(1X3.0)=0.20 FT

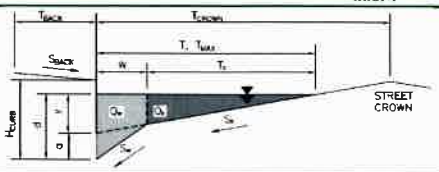
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Judge Orr Rd RV & Storage

Inlet ID: Inlet 1



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	5.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.015	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	40.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.100	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.015	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Warning 02 Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	12.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

Maximum Capacity for 1/2 Street based On Allowable Spread

		Minor Storm	Major Storm	
Water Depth without Gutter Depression (Eq. ST-2)	y =	4.32	4.32	inches
Vertical Depth between Gutter Lip and Gutter Flowline (usually 2")	d_C =	2.4	2.4	inches
Gutter Depression (d_C - (W * S_x * 12))	a =	1.92	1.92	inches
Water Depth at Gutter Flowline	d =	6.24	6.24	inches
Allowable Spread for Discharge outside the Gutter Section W (T - W)	T_X =	16.0	16.0	ft
Gutter Flow to Design Flow Ratio by FHWA HEC-22 method (Eq. ST-7)	E_O =	0.346	0.346	
Discharge outside the Gutter Section W, carried in Section T_X	Q_X =	0.0	0.0	cfs
Discharge within the Gutter Section W (Q_T - Q_X)	Q_W =	0.0	0.0	cfs
Discharge Behind the Curb (e.g., sidewalk, driveways, & lawns)	Q_{BACK} =	0.0	0.0	cfs
Maximum Flow Based On Allowable Spread	Q_T =	SUMP	SUMP	cfs
Flow Velocity within the Gutter Section	V =	0.0	0.0	fps
V*d Product: Flow Velocity times Gutter Flowline Depth	V*d =	0.0	0.0	

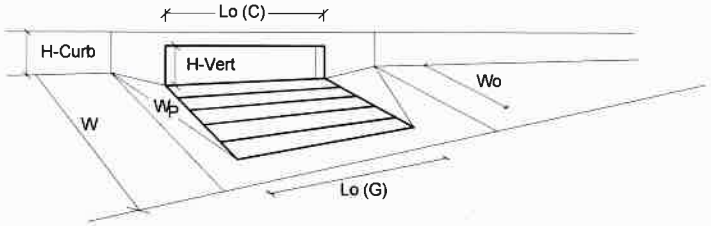
Maximum Capacity for 1/2 Street based on Allowable Depth

		Minor Storm	Major Storm	
Theoretical Water Spread	T_{TH} =	42.0	42.0	ft
Theoretical Spread for Discharge outside the Gutter Section W (T - W)	$T_{X\,TH}$ =	40.0	40.0	ft
Gutter Flow to Design Flow Ratio by FHWA HEC-22 method (Eq. ST-7)	E_O =	0.140	0.140	
Theoretical Discharge outside the Gutter Section W, carried in Section $T_{X\,TH}$	$Q_{X\,TH}$ =	0.0	0.0	cfs
Actual Discharge outside the Gutter Section W, (limited by distance T_{CROWN})	Q_X =	0.0	0.0	cfs
Discharge within the Gutter Section W (Q_d - Q_X)	Q_W =	0.0	0.0	cfs
Discharge Behind the Curb (e.g., sidewalk, driveways, & lawns)	Q_{BACK} =	0.0	0.0	cfs
Total Discharge for Major & Minor Storm (Pre-Safety Factor)	Q =	0.0	0.0	cfs
Average Flow Velocity Within the Gutter Section	V =	0.0	0.0	fps
V*d Product: Flow Velocity Times Gutter Flowline Depth	V*d =	0.0	0.0	
Slope-Based Depth Safety Reduction Factor for Major & Minor (d ≥ 6") Storm	R =	SUMP	SUMP	
Max Flow Based on Allowable Depth (Safety Factor Applied)	Q_d =	SUMP	SUMP	cfs
Resultant Flow Depth at Gutter Flowline (Safety Factor Applied)	d =			inches
Resultant Flow Depth at Street Crown (Safety Factor Applied)	d_{CROWN} =			inches

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	SUMP	SUMP	cfs

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	Colorado Springs D-10-R		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	4.00	4.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	8.0	8.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	8.00	8.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	8.00	8.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	81.00	81.00	degrees
Warning 1 Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	0.83	0.83	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Grate Flow Analysis (Calculated)		MINOR	MAJOR	
Clogging Coefficient for Multiple Units	Coef =	N/A	N/A	
Clogging Factor for Multiple Units	Clog =	N/A	N/A	
Grate Capacity as a Weir (based on Modified HEC22 Method)		MINOR	MAJOR	
Interception without Clogging	Q_{wi} =	N/A	N/A	cfs
Interception with Clogging	Q_{wa} =	N/A	N/A	cfs
Grate Capacity as a Orifice (based on Modified HEC22 Method)		MINOR	MAJOR	
Interception without Clogging	Q_{oi} =	N/A	N/A	cfs
Interception with Clogging	Q_{oa} =	N/A	N/A	cfs
Grate Capacity as Mixed Flow		MINOR	MAJOR	
Interception without Clogging	Q_{mi} =	N/A	N/A	cfs
Interception with Clogging	Q_{ma} =	N/A	N/A	cfs
Resulting Grate Capacity (assumes clogged condition)	Q_{Grate} =	N/A	N/A	cfs
Curb Opening Flow Analysis (Calculated)		MINOR	MAJOR	
Clogging Coefficient for Multiple Units	Coef =	1.00	1.00	
Clogging Factor for Multiple Units	Clog =	0.10	0.10	
Curb Opening as a Weir (based on Modified HEC22 Method)		MINOR	MAJOR	
Interception without Clogging	Q_{wi} =	9.9	9.9	cfs
Interception with Clogging	Q_{wa} =	8.9	8.9	cfs
Curb Opening as an Orifice (based on Modified HEC22 Method)		MINOR	MAJOR	
Interception without Clogging	Q_{oi} =	14.7	14.7	cfs
Interception with Clogging	Q_{oa} =	13.2	13.2	cfs
Curb Opening Capacity as Mixed Flow		MINOR	MAJOR	
Interception without Clogging	Q_{mi} =	11.2	11.2	cfs
Interception with Clogging	Q_{ma} =	10.1	10.1	cfs
Resulting Curb Opening Capacity (assumes clogged condition)	Q_{Curb} =	8.9	8.9	cfs
Resultant Street Conditions		MINOR	MAJOR	
Total Inlet Length	L =	5.00	5.00	feet
Resultant Street Flow Spread (based on street geometry from above)	T =	25.3	25.3	ft
Resultant Flow Depth at Street Crown	d_{CROWN} =	0.0	0.0	inches
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.47	0.47	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	1.00	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	8.9	8.9	cfs
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	2.9	6.0	cfs

Warning 1: Dimension entered is not a typical dimension for inlet type specified.

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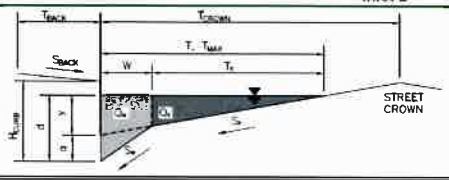
ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Judge Orr Rd RV & Storage

Inlet ID: Inlet 2



Gutter Geometry (Enter data in the blue cells)

	Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	18.0	ft
	Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Warning 01	Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.035	
	Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
	Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
	Gutter Width	W =	2.00	ft
	Street Transverse Slope	S_x =	0.020	ft/ft
	Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_w =	0.083	ft/ft
	Street Longitudinal Slope - Enter 0 for sump condition	S_o =	0.000	ft/ft
	Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.015	

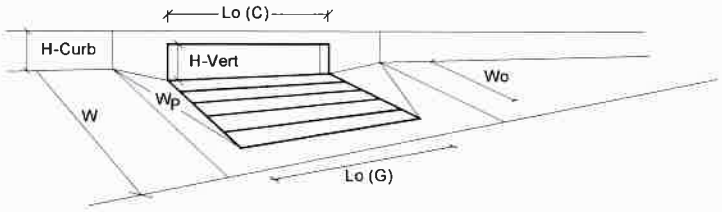
			Minor Storm	Major Storm	
	Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Warning 02	Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	12.0	12.0	inches
	Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	SUMP	SUMP	cfs

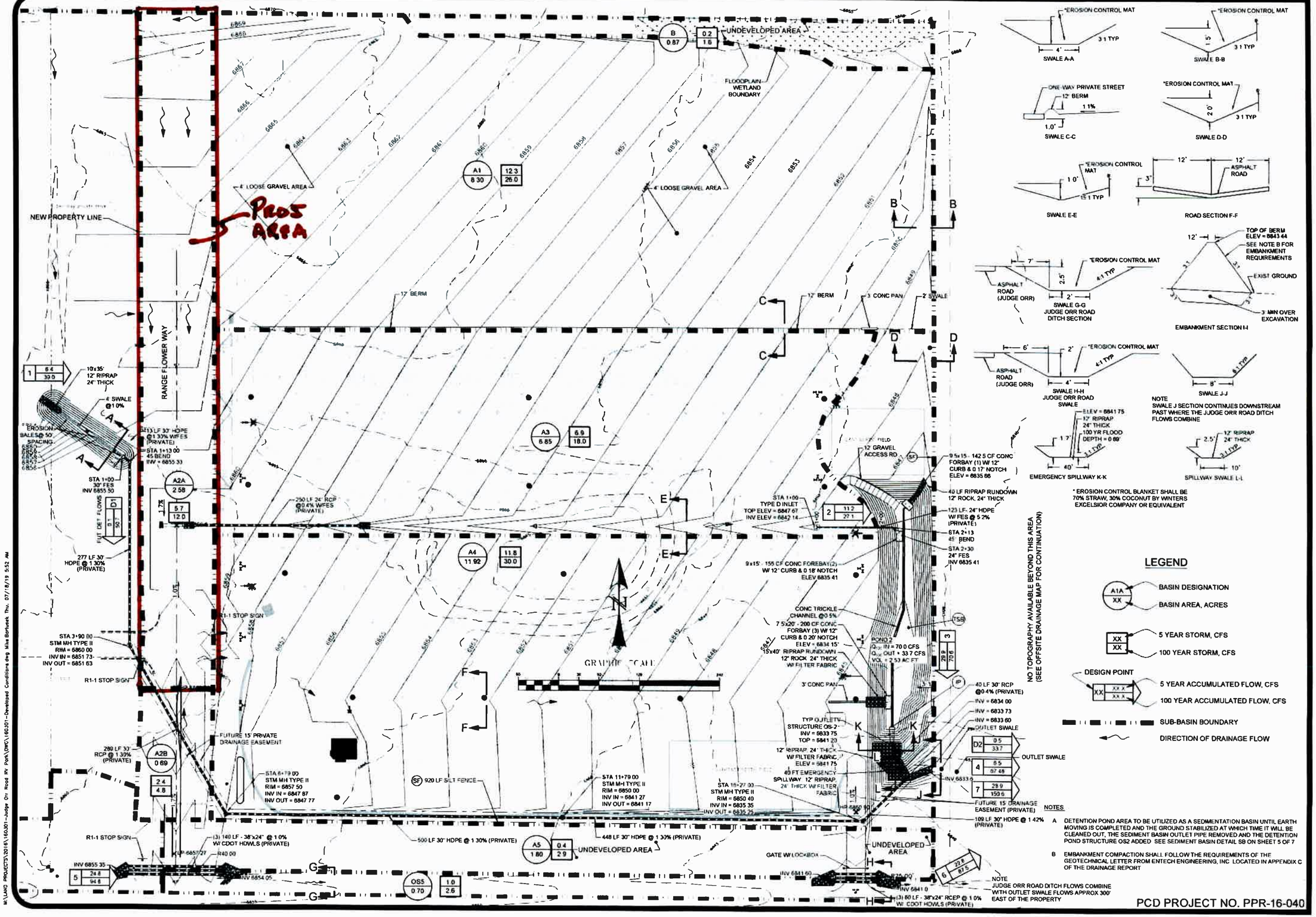
Warning 01: Manning's n-value does not meet the USDCM recommended design range.

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)	Colorado Springs D-10-R			
Type of Inlet	Type =	MINOR: Colorado Springs D-10-R	MAJOR: Colorado Springs D-10-R	
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	4.00	4.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	8.0	8.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	8.00	8.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	8.00	8.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	81.00	81.00	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.50	0.50	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	1.00	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	9.9	9.9	cfs
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	2.9	6.0	cfs



M:\LAND PROJECTS\2016\16GJ01--Judge Orr Road RV Park\DWG\16GJ01--Developed Conditions dwg Mike Bortscheller Thu, 07/18/19 5:52 AM

DESIGNED BY MAB
PROJECT ENGINEER MAB
PROJECT MANAGER MAB
SCALE HORZ 1" = 80' VERT NA
DATE 07/18/19
JOB NO 16GJ01
CAD FILE NO 16GJ01-Dev Cond
DRAWN BY HJC

PREPARED BY:

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Colorado Springs, CO 80918
(719) 260-5312
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NO | DATE | REVISION | BY

JUDGE ORR ROAD RV PARK & STORAGE

COLORADO SPRINGS, COLORADO

DRAINAGE - DEVELOPED CONDITIONS

SHEET 3 of 3