

WARE MALCOMB

ARCHITECTURE

INTERIORS

BRANDING

PLANNING

CIVIL ENGINEERING

BUILDING MEASUREMENT

February 7th, 2024

City of Louisville Department of Public Works
749 Main Street
Louisville, CO 80027

To whom it may concern,

This letter is written to describe the final drainage patterns that are proposed for the Centennial Valley Parcel L, Lot 5, Filing No. 1 site to be in conformance with the existing drainage patterns for the Lowe's of Louisville (formerly Eagle Hardware and Garden). This renovation proposes a truck dock to be constructed at the southwest corner of the building for the use of future tenants. This truck dock will drop the elevation at the building to 4' below the existing finished floor elevation. There is an existing area inlet that serves this portion of the site that will need to be removed and replaced with another inlet 4' below the existing location. The tributary area for this inlet will remain the same and there are no anticipated adverse effects for the new inlet location and elevation for the existing storm infrastructure that serves this site.

Basin A1 is comprised of the southwestern truck dock area as well as the southwestern access to the site. This basin is not changing from the historical drainage patterns and is just altering the inlet that serves the area. This existing inlet (as well as the 8" PVC that serves the inlet) will be removed and replaced with a matching inlet that is dropped 4' so that it can collect all storm runoff that drains into the bottom of the proposed truck dock area. There is ample coverage over the existing storm main that conveys flow from the existing inlet to make this proposed connection. The tributary area to this inlet is approximately 0.66 acres and has an imperviousness of 78%. The anticipated storm runoff to be captured by this inlet is 2.3 and 4.9 cfs in the 5-year and 100-year storm events respectively. Water quality and detention of this basin will still be provided by the existing pond at the southeast corner of the property. Analysis of the proposed inlet and the tributary area has been included with this conformance letter.

NOTE: Preliminary Drainage Letter approval is required prior to Civil Plan Approval.

Should you have any questions or comments, please feel free to contact me at (303) 561-3333.

Sincerely,

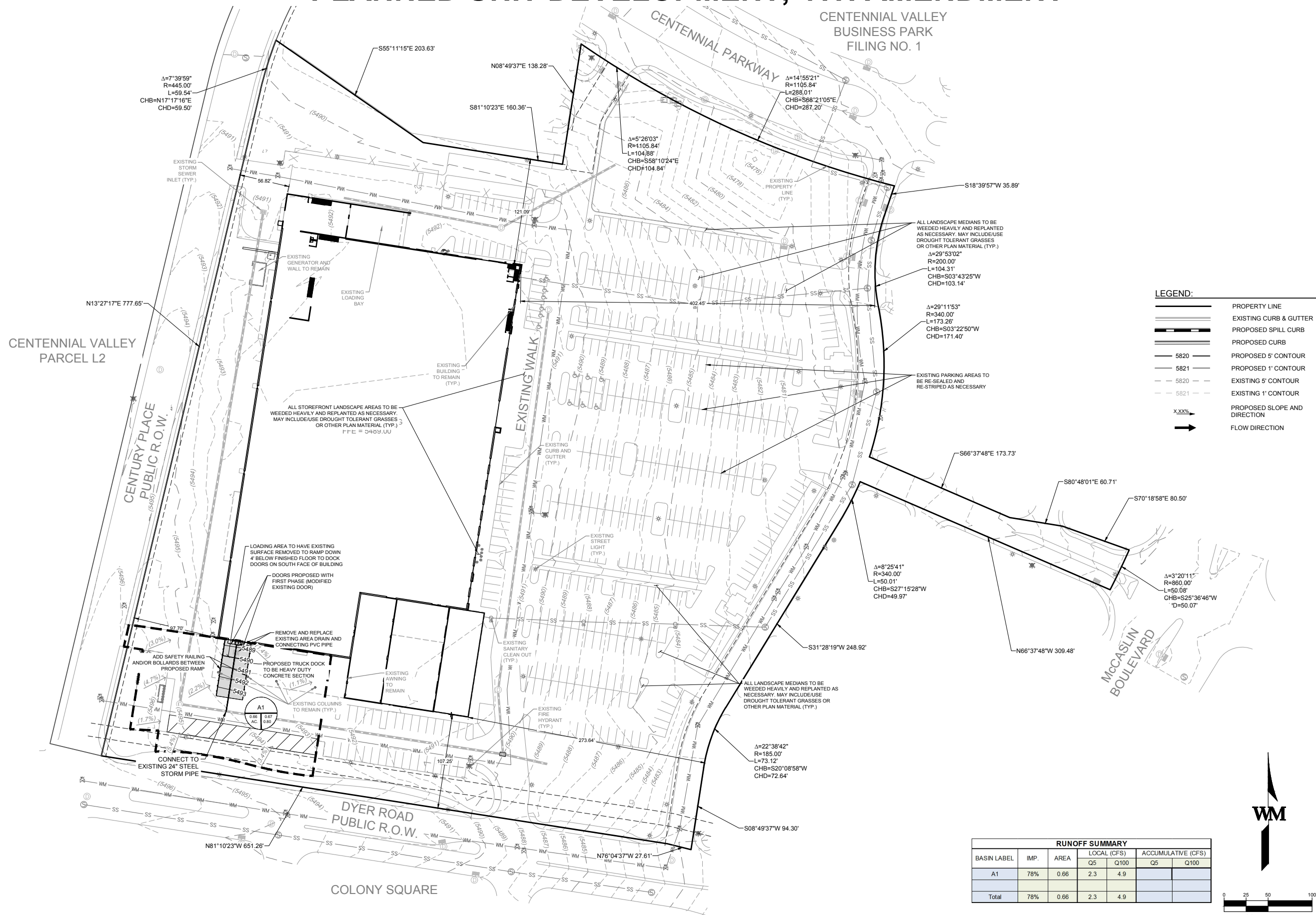
Ware Malcomb

Chris Strawn
Principal

Re: Jesse Carano – jcarano@waremalcomb.com

CENTENNIAL VALLEY PARCEL L, LOT 5, FILING NO. 1

PLANNED UNIT DEVELOPMENT, 4TH AMENDMENT



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WARE MALCOMB
LEADING DESIGN FOR COMMERCIAL REAL ESTATE

FOR AND ON BEHALF
OF WARE MALCOMB

1171 DILLON ROAD RENOVATION
SCHEMATIC DESIGN
DRAINAGE PLAN

NO.	DATE	REMARKS

JOB NO.:	DEN23-0061
PA / PM:	JKC
DESIGNED:	SWL
DATE:	01/22/2024
PLOT DATE:	03/12/24

SHEET
DR01
Sheet 01 of

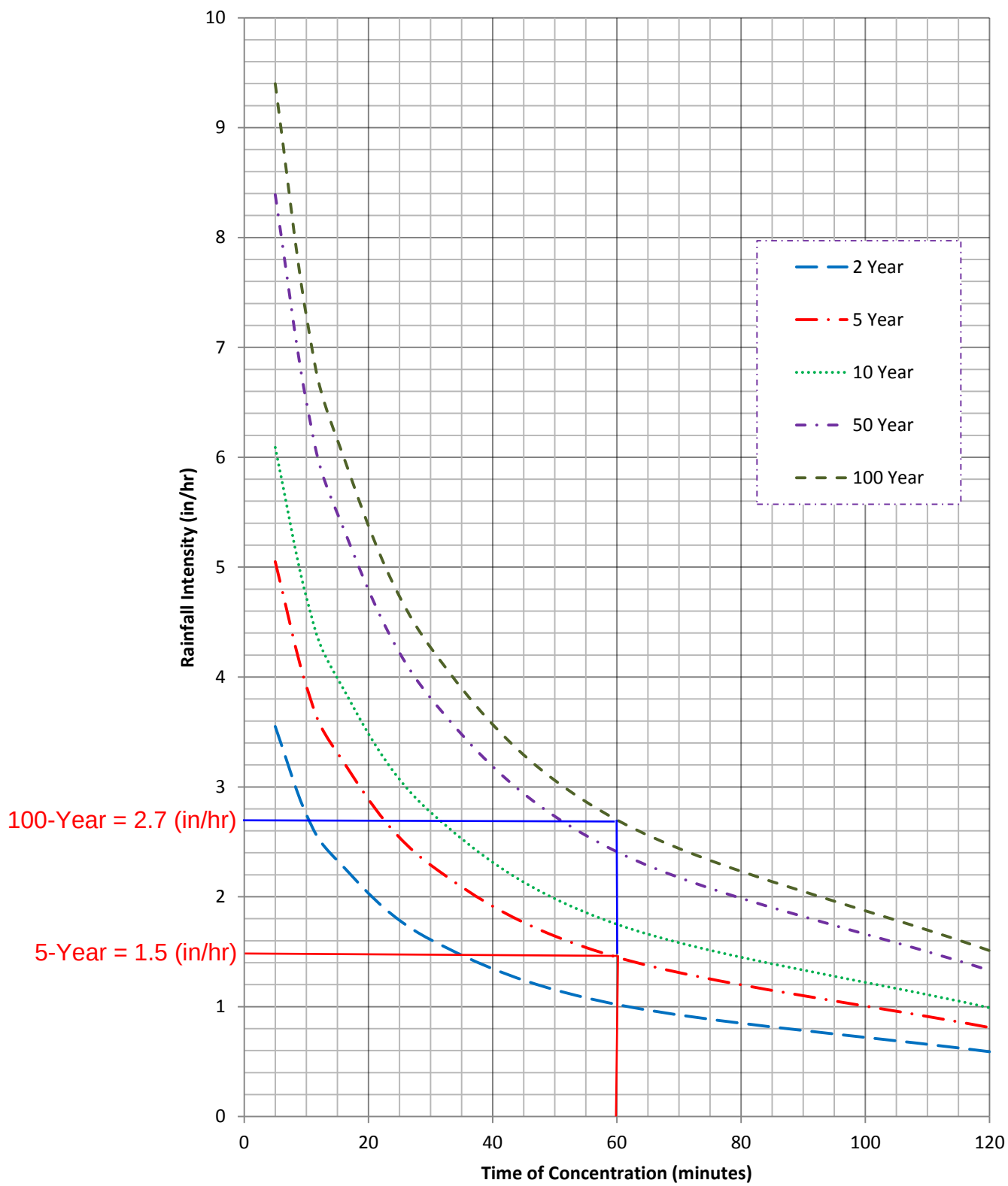


Figure 4.1 – Intensity-Duration-Frequency Curves for Louisville

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Concrete	100%
Asphalt	100%
Lawn	2%
Roof	90%

Existing	2%
Land Use 6	0%
Land Use 7	0%
Land Use 8	0%

- = FORMULA CELLS
- = USER INPUT CELLS

[illegible]

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Calculated By: SWL

Date: 1/19/2024

STANDARD FORM SF-2
TIME OF CONCENTRATION SUMMARY

Project: Lowes Remodel

Job No.: DEN23-0061

Checked By: xxxxxxxxxx

SUB-BASIN DATA				INITIAL/OVERLAND TIME (t _i)			TRAVEL TIME (t _t)					t _c CHECK (URBANIZED BASINS)				FINAL t _c	REMARKS
Basin	i	C _s	AREA	LENGTH	SLOPE	t _i	LENGTH	Cv	SLOPE	VEL.	t _t	COMP.	TOT. LENGTH	S _o	tc (Equation 6-5)		
(1)	(2)	(3)	Ac (4)	Ft (5)	% (6)	Min (7)	Ft (8)		% (9)	FPS (10)	Min (11)	t _c (12)	Ft (13)	% (14)	Min (15)	Min (16)	
A1	0.78	0.67	0.66	50	5.4	3.13	100	20	2.2	2.97	0.56	3.7	70	4.49	13.1	5.00	

Equation 6-3 $t_i = ((0.395(1.1 - C_s) \text{SQRT}(L)) / (S_o^{0.33}))$

Equation 6-5 $t_c = (26 - 17i) + (L_i / (60(14i + 9) \text{SQRT}(S_o)))$

= FORMULA CELLS
 = USER INPUT CELLS

NRCS Conveyance Factor K Table - Cv Value	
Heavy Meadow	2.5
Tillage/Field	5
Short Pasture and Lawns	7
Nearly Bare Ground	10
Grassed Waterway	15
Paved Areas and Shallow Paved Swales	20

Calculated By: SWL
 Date: 1/19/2024
 Checked By: xxxxxxxxxx
 5-Year
 1-hour rainfall= 1.50

STANDARD FORM SF-3
 STORM DRAINAGE SYSTEM DESIGN
 (RATIONAL METHOD PROCEDURE)

Project: Lowes Remodel
 Job No.: DEN23-0061
 Design Storm: 5-Year

= FORMULA CELLS
 = USER INPUT CELLS

BASIN	DIRECT RUNOFF								TOTAL RUNOFF				STREET		PIPE			LENGTH (FT)	VELOCITY (FPS)	t _t (MIN)	REMARKS
	DESIGN POINT	AREA DESIGN	AREA (AC)	RUNOFF COEFF	t _c (MIN)	C * A (AC)	I (IN/HR)	Q (CFS)	t _c (MIN)	S (C * A) (CA)	I (IN/HR)	Q (CFS)	SLOPE (%)	STREET FLOW	DESIGN FLOW (CFS)	SLOPE (%)	PIPE DIAM. (IN.)				
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
A1			0.66	0.67	5.0	0.44	5.09	2.3													

Calculated By: SWL
Date: 1/19/2024
Checked By: xxxxxxxxxx
100-Year
1-hour rainfall= 2.70

STANDARD FORM SF-3
STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

Project: Lowes Remodel
Job No.: DEN23-0061
Design Storm: 100-Year

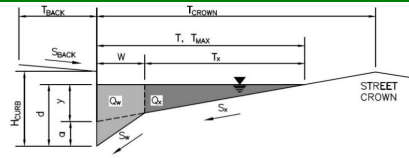
= FORMULA CELLS
= USER INPUT CELLS

BASIN	DIRECT RUNOFF								TOTAL RUNOFF				STREET		PIPE			LENGTH (FT)	VELOCITY (FPS)	t _t (MIN)	REMARKS
	DESIGN POINT	AREA DESIGN	AREA (AC)	RUNOFF COEFF	t _c (MIN)	C * A (AC)	I (IN/HR)	Q (CFS)	t _c (MIN)	S (C * A) (CA)	I (IN/HR)	Q (CFS)	SLOPE (%)	STREET FLOW	DESIGN FLOW (CFS)	SLOPE (%)	PIPE DIAM. (IN.)				
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
A1			0.66	0.80	5.0	0.53	9.16	4.9													

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

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

Project:

Inlet ID: **Basin A1****Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

T_{BACK}	=	60.0	ft
S_{BACK}	=	0.060	ft/ft
n_{BACK}	=	0.012	

H_{CURB}	=	0.00	inches
T_{CROWN}	=	60.0	ft
W	=	3.00	ft
S_x	=	0.060	ft/ft
S_w	=	0.083	ft/ft
S_o	=	0.000	ft/ft
n_{STREET}	=	0.012	

Max. Allowable Spread for Minor & Major Storm

	Minor Storm	Major Storm	
T_{MAX}	60.0	60.0	ft
d_{MAX}	7.0	12.0	inches

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Check boxes are not applicable in SUMP conditions

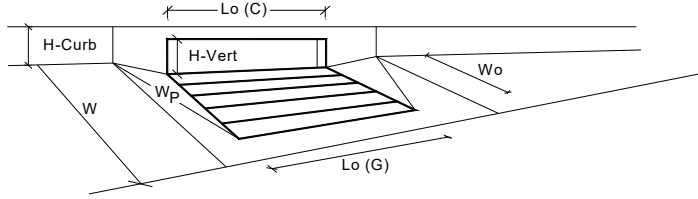
MINOR STORM Allowable Capacity is not applicable to Sump Condition

MAJOR STORM Allowable Capacity is not applicable to Sump Condition

	Minor Storm	Major Storm	
Q_{allow}	SUMP	SUMP	cfs

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.03 (August 2023)



Design Information (Input)		MINOR		MAJOR	
Type of Inlet	CDOT Type C Grate	Type =	CDOT Type C Grate		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	0.00	0.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	7.0	12.0	inches
Grate Information			MINOR	MAJOR	☐ Override Depths
Length of a Unit Grate		$L_o (G)$ =	2.92	2.92	feet
Width of a Unit Grate		W_o =	2.92	2.92	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)		A_{ratio} =	0.70	0.70	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		$C_f (G)$ =	0.50	0.50	
Grate Weir Coefficient (typical value 2.15 - 3.60)		$C_w (G)$ =	2.41	2.41	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		$C_o (G)$ =	0.67	0.67	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		$L_o (C)$ =	N/A	N/A	feet
Height of Vertical Curb Opening in Inches		H_{vert} =	N/A	N/A	inches
Height of Curb Orifice Throat in Inches		H_{throat} =	N/A	N/A	inches
Angle of Throat		Theta =	N/A	N/A	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	N/A	N/A	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		$C_f (C)$ =	N/A	N/A	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		$C_w (C)$ =	N/A	N/A	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		$C_o (C)$ =	N/A	N/A	
Low Head Performance Reduction (Calculated)			MINOR	MAJOR	
Depth for Grate Midwidth		d_{Grate} =	0.46	0.88	ft
Depth for Curb Opening Weir Equation		d_{Curb} =	N/A	N/A	ft
Grated Inlet Performance Reduction Factor for Long Inlets		RF_{Grate} =	N/A	N/A	
Curb Opening Performance Reduction Factor for Long Inlets		RF_{Curb} =	N/A	N/A	
Combination Inlet Performance Reduction Factor for Long Inlets		$RF_{Combination}$ =	N/A	N/A	
Total Inlet Interception Capacity (assumes clogged condition)			MINOR	MAJOR	
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)		Q_s =	2.8	7.3	cfs
		$Q_{PEAK REQUIRED}$ =	2.3	4.9	cfs