

01/13/2023

Town of Parker
20120 E. Mainstreet
Parker, CO 80138

RE: Land of Sushi – Crown Point Filing #1, Lot 4E, Drainage Conformance Letter

To Whom It May Concern,

The purpose of this letter is to show that the proposed development of the Land of Sushi on Lot 4E of Crown Point Filing #1 conforms to the requirements of the “*Phase III Drainage Study for Boondocks Entertainment Facility*” prepared by MM&D Engineering dated December 21, 2014.

Based on the “*Phase III Drainage Study for Boondocks Entertainment Facility*” Lot 4E is fully or partially apart of the following drainage Basins: A11, A12, A13, A14, A15, A16 & B1 which contains 1.08 acres of Lot 4E. This area is the part of lot that will be developed with this project. Basin A, along with the other Basins comprising the Crown Point Filing #1 development, eventually drain to a 42” storm line that crosses 18800 Rd. per the Crown Point Filing 1 14th Amendment drainage report. All flows and water quality/detention have been accommodated with the design of Crown point Filing 1.

The proposed OS1 Basin correlates to Basin B1 from the “*Phase III Drainage Study for Boondocks Entertainment Facility*”. All flows will continue to Cottonwood Dr and 18800DFR where it is captured by a 10’ Type R inlet at the intersection of Cottonwood Dr. and 18800 Rd.

The assumed flows from the developed lot for a 5-year and 100-year storm are 2.9 cfs and 7.1 cfs respectively.

The calculations for post-development Basin A (Lot 4E) for both the 5-year and 100-year storm are attached as part of Appendix A at the end of this letter. *Phase III Drainage Study for Boondocks Entertainment Facility* drainage map and calculation for Basin A are included in Appendix D. Inlet capacities are included in Appendix B.

The Land of Sushi site was broken into six on-site sub-basins as follows and as shown on the Drainage Map included in Appendix C:

- Basin A1 (0.15 ac, 90% impervious) – Building roof area collected by roof drain system and connected to proposed storm line
- Basin A2 (0.40 ac, 87.9% impervious) – Contains eastern portion of the site which includes drive aisle and parking. Flows are captured by proposed Combo Type 13 inlet.
- Basin A4 (0.16 ac, 90% impervious) – Contains drive aisle, parking, and sidewalk south of the proposed building. Flows are captured by proposed Combo Type 13 inlet.
- Basin A5 (0.04 ac, 90% impervious) – Contains parking south of the proposed drive aisle. Flows will pass through a curb cut and will be captured by an existing 5’ CDOT Type ‘R’ Inlet.
- Basin A6 (0.04 ac, 90% impervious) – Contains parking south of the proposed drive aisle. Flows will pass through a curb cut and will be captured by an existing 10’ CDOT Type ‘R’ Inlet.



Land of Sushi - Crown Point Filing #1
Drainage Conformance Letter
01/13/2023

The actual design for Lot 4E is 1.08 acres which slightly differs from the Phase III Drainage Study as the proposed site is more refined. The approximate site imperviousness of 68% is less than the anticipated 70.6% imperviousness from the Phase III Drainage Study. Therefore, the Land of Sushi project follows the Final Drainage Report and there should be no adverse effects on the downstream system.

Sincerely,
GALLOWAY

Matthew Pepin
Civil Project Engineer

Appendices:

Appendix A – Hydrologic & Hydraulic Computations

Appendix B – Inlet Calcs

Appendix C – Drainage Map

Appendix D – Excerpts from “*Phase III Drainage Study for Boondocks Entertainment Facility*”

Appendix A: Hydrologic & Hydraulic Computations

BASIN SUMMARY TABLE						
Tributary Sub-basin	Area (acres)	C ₅	C ₁₀₀	t _c (min)	Q ₅ (cfs)	Q ₁₀₀ (cfs)
A1	0.15	0.77	0.85	5.00	0.5	1.1
A2	0.40	0.75	0.84	6.04	1.3	2.8
A4	0.16	0.77	0.85	5.00	0.6	1.2
A5	0.04	0.77	0.85	5.00	0.1	0.3
A6	0.04	0.77	0.85	5.00	0.1	0.3
OS1	0.06	0.41	0.67	5.00	0.1	0.4
OS2	0.20	0.05	0.49	5.00	0.0	0.9
OS3	0.03	0.05	0.49	5.00	0.0	0.1
Total On-Site	0.79	0.61	0.68		2.2	5.7
Total Site	1.08	0.64	0.82		2.9	7.1

COMPOSITE % IMPERVIOUS CALCULATIONS

Subdivision: Land of Sushi
 Location: CO, Parker

Project Name: Land of Sushi
 Project No.: LOS01
 Calculated By: MJP
 Checked By: SMB
 Date: 1/13/22

Basin ID	Total Area (ac)	Sidewalks and Drives			Lawns			Roofs			Basins Total Weighted % Imp.
		% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	
A1	0.15	90	0.00	0.0	2	0.00	0.0	90	0.15	90.00	90.0
A2	0.40	90	0.39	87.8	2	0.01	0.1	90	0.00	0.00	87.9
A4	0.16	90	0.16	90.0	2	0.00	0.0	90	0.00	0.00	90.0
A5	0.04	90	0.04	90.0	2	0.00	0.0	90	0.00	0.00	90.0
A6	0.04	90	0.04	90.0	2	0.00	0.0	90	0.00	0.00	90.0
OS1	0.06	90	0.03	45.0	2	0.03	1.0	90	0.00	0.00	46.0
OS2	0.20	90	0.00	0.0	2	0.20	2.0	90	0.00	0.00	2.0
OS3	0.03	90	0.00	0.0	2	0.03	2.0	90	0.00	0.00	2.0
Total	1.08	90	0.66	55.0	2	0.27	0.5	90	0.15	12.50	68.0

STANDARD FORM SF-2
TIME OF CONCENTRATION

Subdivision: Land of Sushi
Location: CO, Parker

Project Name: Land of Sushi
Project No.: LOS01
Calculated By: MJP
Checked By: SMB
Date: 1/13/22

SUB-BASIN DATA						INITIAL/OVERLAND (T _i)			TRAVEL TIME (T _t)					T _c CHECK (URBANIZED BASINS)			FINAL
BASIN ID	D.A. (AC)	Hydrologic Soils Group	Impervious (%)	C ₁₀₀	C ₅	L (FT)	S (%)	T _i (MIN)	L (FT)	S (%)	C _v	VEL. (FPS)	T _t (MIN)	COMP. T _c (MIN)	TOTAL LENGTH (FT)	Urbanized T _c (MIN)	T _c (MIN)
A1	0.15	C	90.0	0.85	0.77	30	2.0	2.6	0	0.8	20.0	1.7	0.0	2.6	30.0	10.2	5.0
A2	0.40	C	87.9	0.84	0.75	120	2.0	5.6	50	0.8	20.0	1.8	0.5	6.0	170.0	10.9	6.0
A4	0.16	C	90.0	0.85	0.77	50	1.2	4.0	60	0.8	20.0	1.8	0.6	4.6	110.0	10.6	5.0
A5	0.04	C	90.0	0.85	0.77	25	3.0	2.1	80	1.0	20.0	2.0	0.7	2.8	105.0	10.6	5.0
A6	0.04	C	90.0	0.85	0.77	25	3.0	2.1	80	1.0	20.0	2.0	0.7	2.8	105.0	10.6	5.0
OS1	0.06	C	46.0	0.67	0.41	30	6.0	3.8	45	2.0	20.0	2.8	0.3	4.1	75.0	10.4	5.0
OS2	0.20	C	2.0	0.49	0.05	40	20.0	4.5	0	1.0	20.0	2.0	0.0	4.5	40.0	10.2	5.0
OS3	0.03	C	2.0	0.49	0.05	10	25.0	2.1	0	1.0	20.0	2.0	0.0	2.1	10.0	10.1	5.0

NOTES:

$T_i = (0.395 * (1.1 - C_5) * L^{0.5}) / (S^{0.33})$, S in ft/ft

$T_i = L / 60V$ (Velocity From Fig. 501)

Velocity $V = C_v * S^{0.5}$, S in ft/ft

$T_c \text{ Check} = 10 + L / 180$

For Urbanized basins a minimum T_c of 5.0 minutes is required.

For non-urbanized basins a minimum T_c of 10.0 minutes is required

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

Subdivision: Land of Sushi
Location: CO, Parker
Design Storm: 5-Year

Project Name: Land of Sushi
Project No.: LOS01
Calculated By: MJP
Checked By: SMB
Date: 1/13/22

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	Tt (min)	
	1	A1	0.15	0.77	5.0	0.12	4.71	0.6													Total Flow to Roof Leaders
	2	A2	0.40	0.75	6.0	0.30	4.47	1.3													Total flow captured by Proposed Type 13 Inlet
	4	A4	0.16	0.77	5.0	0.12	4.71	0.6													Total flow captured by Proposed Type 13 Inlet
	5	A5	0.04	0.77	5.0	0.03	4.71	0.1													Total flow to existing 5' Type R inlet
	6	A6	0.04	0.77	5.0	0.03	4.71	0.1													Total flow to existing 10' Type R inlet
	7	OS1	0.06	0.41	5.0	0.02	4.71	0.1													Sheet flow to existing access drive
	8	OS2	0.20	0.05	5.0	0.01	4.71	0.0													Sheet flow to Cottonwood Dr.
	9	OS3	0.03	0.05	5.0	0.00	4.71	0.0													Sheet flow to E470 ROW



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

Subdivision: Land of Sushi _____
 Location: CO, Parker _____
 Design Storm: 100-Year _____

Project Name: Land of Sushi _____
 Project No.: LOS01 _____
 Calculated By: MJP _____
 Checked By: SMB _____
 Date: 1/13/22 _____

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C* A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C* A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	Tt (min)	
	1	A1	0.15	0.85	5.0	0.13	8.82	1.1													Total Flow to Roof Leaders
	2	A2	0.40	0.84	6.0	0.34	8.37	2.8													Total flow captured by Proposed Type 13 Inlet
	4	A4	0.16	0.85	5.0	0.14	8.82	1.2													Total flow captured by Proposed Type 13 Inlet
	5	A5	0.04	0.85	5.0	0.03	8.82	0.3													Total flow to existing 5' Type R Inlet
	6	A6	0.04	0.85	5.0	0.03	8.82	0.3													Total flow to existing 10' Type R Inlet
	7	OS1	0.06	0.67	5.0	0.04	8.82	0.4													Sheet flow to existing access drive
	8	OS2	0.20	0.49	5.0	0.10	8.82	0.9													Sheet flow to Cottonwood Dr.
	9	OS3	0.03	0.49	5.0	0.01	8.82	0.1													Sheet flow to E470 ROW



Appendix B: Inlet Calcs

INLET MANAGEMENT

Worksheet Protected

INLET NAME	Basin A2 DP2	Basin A4 DP4	Basin A5
Site Type (Urban or Rural)	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET
Hydraulic Condition	In Sump	In Sump	In Sump
Inlet Type	CDOT/Denver 13 Combination	CDOT/Denver 13 Combination	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows			
Minor Q_{known} (cfs)	1.3	0.6	2.1
Major Q_{known} (cfs)	2.7	1.2	4.4

Bypass (Carry-Over) Flow from Upstream Inlets must be organized from upstream (left) to downstream (right) in order for bypass flows to be linked.			
Receive Bypass Flow from:	No Bypass Flow Received	No Bypass Flow Received	No Bypass Flow Received
Minor Bypass Flow Received, Q_b (cfs)		0.0	0.0
Major Bypass Flow Received, Q_b (cfs)		0.0	0.0

Watershed Characteristics			
Subcatchment Area (acres)			
Percent Impervious			
NRCS Soil Type			

Watershed Profile			
Overland Slope (ft/ft)			
Overland Length (ft)			
Channel Slope (ft/ft)			
Channel Length (ft)			

Minor Storm Rainfall Input			
Design Storm Return Period, T_r (years)			
One-Hour Precipitation, P_1 (inches)			

Major Storm Rainfall Input			
Design Storm Return Period, T_r (years)			
One-Hour Precipitation, P_1 (inches)			

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	1.3	0.6	2.1
Major Total Design Peak Flow, Q (cfs)	2.7	1.2	4.4
Minor Flow Bypassed Downstream, Q_b (cfs)	N/A	N/A	N/A
Major Flow Bypassed Downstream, Q_b (cfs)	N/A	N/A	N/A

INLET MANAGEMENT

Worksheet Protected

INLET NAME	Basin A6
Site Type (Urban or Rural)	URBAN
Inlet Application (Street or Area)	STREET
Hydraulic Condition	In Sump
Inlet Type	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows	
Minor Q_{known} (cfs)	2.0
Major Q_{known} (cfs)	4.2
Bypass (Carry-Over) Flow from Upstream	
Receive Bypass Flow from:	No Bypass Flow Received
Minor Bypass Flow Received, Q_b (cfs)	0.0
Major Bypass Flow Received, Q_b (cfs)	0.0
Watershed Characteristics	
Subcatchment Area (acres)	
Percent Impervious	
NRCS Soil Type	
Watershed Profile	
Overland Slope (ft/ft)	
Overland Length (ft)	
Channel Slope (ft/ft)	
Channel Length (ft)	
Minor Storm Rainfall Input	
Design Storm Return Period, T_r (years)	
One-Hour Precipitation, P_1 (inches)	
Major Storm Rainfall Input	
Design Storm Return Period, T_r (years)	
One-Hour Precipitation, P_1 (inches)	

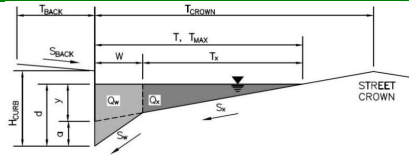
CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	2.0
Major Total Design Peak Flow, Q (cfs)	4.2
Minor Flow Bypassed Downstream, Q_b (cfs)	N/A
Major Flow Bypassed Downstream, Q_b (cfs)	N/A

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

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

Project: LOS01_Land of Sushi
 Inlet ID: Basin A2 | DP2



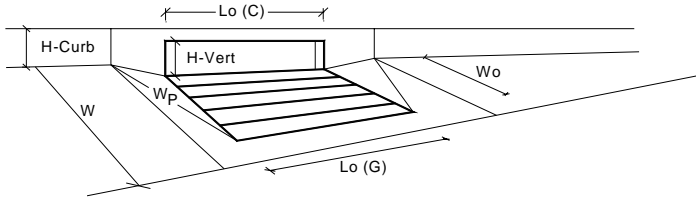
Gutter Geometry:					
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = 5.0$ ft				
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	$S_{BACK} = 0.020$ ft/ft				
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	$n_{BACK} = 0.035$				
Height of Curb at Gutter Flow Line	$H_{CURB} = 6.00$ inches				
Distance from Curb Face to Street Crown	$T_{CROWN} = 14.0$ 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	$S_0 = 0.000$ ft/ft				
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = 0.016$				
Max. Allowable Spread for Minor & Major Storm	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Minor Storm</td> <td style="padding: 2px;">Major Storm</td> </tr> <tr> <td style="padding: 2px;">$T_{MAX} = 14.0$</td> <td style="padding: 2px;">14.0</td> </tr> </table> ft	Minor Storm	Major Storm	$T_{MAX} = 14.0$	14.0
Minor Storm	Major Storm				
$T_{MAX} = 14.0$	14.0				
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Minor Storm</td> <td style="padding: 2px;">Major Storm</td> </tr> <tr> <td style="padding: 2px;">$d_{MAX} = 6.0$</td> <td style="padding: 2px;">7.2</td> </tr> </table> inches	Minor Storm	Major Storm	$d_{MAX} = 6.0$	7.2
Minor Storm	Major Storm				
$d_{MAX} = 6.0$	7.2				
Check boxes are not applicable in SUMP conditions	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;"><input type="checkbox"/></td> <td style="padding: 2px;"><input type="checkbox"/></td> </tr> </table>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>				
MINOR STORM Allowable Capacity is not applicable to Sump Condition					
MAJOR STORM Allowable Capacity is not applicable to Sump Condition					
Overall Allowable Capacity	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Minor Storm</td> <td style="padding: 2px;">Major Storm</td> </tr> <tr> <td style="padding: 2px;">$Q_{allow} =$ SUMP</td> <td style="padding: 2px;">SUMP</td> </tr> </table> cfs	Minor Storm	Major Storm	$Q_{allow} =$ SUMP	SUMP
Minor Storm	Major Storm				
$Q_{allow} =$ SUMP	SUMP				

Warning 01

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

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.02 (August 2022)

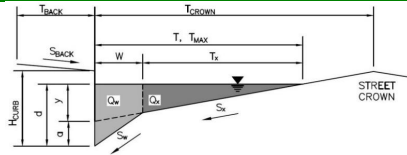


Design Information (Input)	MINOR	MAJOR	
Type of Inlet	CDOT/Denver 13 Combination		
Local Depression (additional to continuous gutter depression 'a' from above)	2.00	2.00	inches
Number of Unit Inlets (Grate or Curb Opening)	1	1	
Water Depth at Flowline (outside of local depression)	4.9	7.2	inches
Grate Information			
Length of a Unit Grate	3.00	3.00	feet
Width of a Unit Grate	1.73	1.73	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)	0.43	0.43	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	0.50	0.50	
Grate Weir Coefficient (typical value 2.15 - 3.60)	3.30	3.30	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	0.60	0.60	
Curb Opening Information			
Length of a Unit Curb Opening	3.00	3.00	feet
Height of Vertical Curb Opening in Inches	6.50	6.50	inches
Height of Curb Orifice Throat in Inches	5.25	5.25	inches
Angle of Throat (see USDCM Figure ST-5)	0.00	0.00	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	3.70	3.70	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	0.66	0.66	
Low Head Performance Reduction (Calculated)			
Depth for Grate Midwidth	0.43	0.62	ft
Depth for Curb Opening Weir Equation	0.24	0.43	ft
Grated Inlet Performance Reduction Factor for Long Inlets	0.76	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	N/A	N/A	
Combination Inlet Performance Reduction Factor for Long Inlets	0.76	1.00	
Total Inlet Interception Capacity (assumes clogged condition)			
Total Inlet Interception Capacity	2.8	6.8	cfs
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	1.3	2.7	cfs

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

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

Project: LOS01_Land of Sushi
 Inlet ID: Basin A4 | DP4



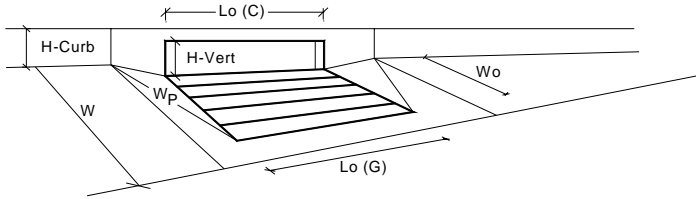
Gutter Geometry:					
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = 5.0$ ft				
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	$S_{BACK} = 0.020$ ft/ft				
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	$n_{BACK} = 0.035$				
Height of Curb at Gutter Flow Line	$H_{CURB} = 6.00$ inches				
Distance from Curb Face to Street Crown	$T_{CROWN} = 32.0$ 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	$S_0 = 0.000$ ft/ft				
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = 0.016$				
Max. Allowable Spread for Minor & Major Storm	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <th style="padding: 2px 5px;">Minor Storm</th> <th style="padding: 2px 5px;">Major Storm</th> </tr> <tr> <td style="text-align: center; padding: 2px 5px;">32.0</td> <td style="text-align: center; padding: 2px 5px;">32.0</td> </tr> </table> ft	Minor Storm	Major Storm	32.0	32.0
Minor Storm	Major Storm				
32.0	32.0				
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <th style="padding: 2px 5px;">Minor Storm</th> <th style="padding: 2px 5px;">Major Storm</th> </tr> <tr> <td style="text-align: center; padding: 2px 5px;">6.0</td> <td style="text-align: center; padding: 2px 5px;">7.2</td> </tr> </table> inches	Minor Storm	Major Storm	6.0	7.2
Minor Storm	Major Storm				
6.0	7.2				
Check boxes are not applicable in SUMP conditions	<table style="display: inline-table; border-collapse: collapse;"> <tr> <td style="text-align: center; padding: 0 10px;"><input type="checkbox"/></td> <td style="text-align: center; padding: 0 10px;"><input type="checkbox"/></td> </tr> </table>	<input type="checkbox"/>	<input type="checkbox"/>		
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MINOR STORM Allowable Capacity is not applicable to Sump Condition					
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Minor Storm	Major Storm				
SUMP	SUMP				

Warning 01

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

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.02 (August 2022)

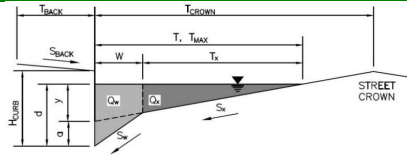


Design Information (Input)	MINOR	MAJOR	
Type of Inlet	CDOT/Denver 13 Combination		
Local Depression (additional to continuous gutter depression 'a' from above)	2.00	2.00	inches
Number of Unit Inlets (Grate or Curb Opening)	1	1	
Water Depth at Flowline (outside of local depression)	4.9	7.2	inches
Grate Information	MINOR	MAJOR	<input checked="" type="checkbox"/> Override Depths
Length of a Unit Grate	3.00	3.00	feet
Width of a Unit Grate	1.73	1.73	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)	0.43	0.43	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	0.50	0.50	
Grate Weir Coefficient (typical value 2.15 - 3.60)	3.30	3.30	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	0.60	0.60	
Curb Opening Information	MINOR	MAJOR	
Length of a Unit Curb Opening	3.00	3.00	feet
Height of Vertical Curb Opening in Inches	6.50	6.50	inches
Height of Curb Orifice Throat in Inches	5.25	5.25	inches
Angle of Throat (see USDCM Figure ST-5)	0.00	0.00	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	3.70	3.70	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	0.66	0.66	
Low Head Performance Reduction (Calculated)	MINOR	MAJOR	
Depth for Grate Midwidth	0.43	0.62	ft
Depth for Curb Opening Weir Equation	0.24	0.43	ft
Grated Inlet Performance Reduction Factor for Long Inlets	0.77	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	N/A	N/A	
Combination Inlet Performance Reduction Factor for Long Inlets	0.77	1.00	
Total Inlet Interception Capacity (assumes clogged condition)	MINOR	MAJOR	
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	2.8	6.8	cfs
Q _{PEAK REQUIRED}	0.6	1.2	cfs

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

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

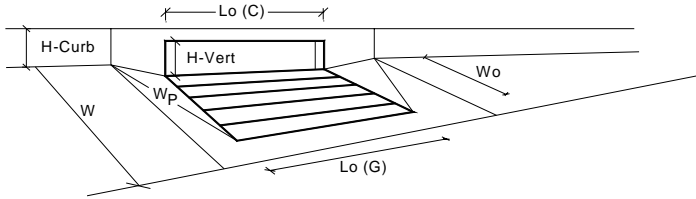
Project: LOS01_Land of Sushi
 Inlet ID: Basin A5



Gutter Geometry:									
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = $ <input style="width: 50px; text-align: center;" type="text" value="5.0"/> ft								
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	$S_{BACK} = $ <input style="width: 50px; text-align: center;" type="text" value="0.020"/> ft/ft								
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	$n_{BACK} = $ <input style="width: 50px; text-align: center;" type="text" value="0.013"/>								
Height of Curb at Gutter Flow Line	$H_{CURB} = $ <input style="width: 50px; text-align: center;" type="text" value="6.00"/> inches								
Distance from Curb Face to Street Crown	$T_{CROWN} = $ <input style="width: 50px; text-align: center;" type="text" value="40.0"/> ft								
Gutter Width	$W = $ <input style="width: 50px; text-align: center;" type="text" value="2.00"/> ft								
Street Transverse Slope	$S_x = $ <input style="width: 50px; text-align: center;" type="text" value="0.020"/> ft/ft								
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	$S_w = $ <input style="width: 50px; text-align: center;" type="text" value="0.083"/> ft/ft								
Street Longitudinal Slope - Enter 0 for sump condition	$S_0 = $ <input style="width: 50px; text-align: center;" type="text" value="0.000"/> ft/ft								
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = $ <input style="width: 50px; text-align: center;" type="text" value="0.016"/>								
Max. Allowable Spread for Minor & Major Storm	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; border: none;">$T_{MAX} =$</td> <td style="text-align: center; border: none;"><input style="width: 50px; text-align: center;" type="text" value="40.0"/></td> <td style="text-align: center; border: none;"><input style="width: 50px; text-align: center;" type="text" value="40.0"/></td> <td style="text-align: center; border: none;">ft</td> </tr> <tr> <td style="border: none;"></td> <td style="text-align: center; border: none;"><input style="width: 50px; text-align: center;" type="text" value="6.0"/></td> <td style="text-align: center; border: none;"><input style="width: 50px; text-align: center;" type="text" value="7.2"/></td> <td style="text-align: center; border: none;">inches</td> </tr> </table>	$T_{MAX} = $	<input style="width: 50px; text-align: center;" type="text" value="40.0"/>	<input style="width: 50px; text-align: center;" type="text" value="40.0"/>	ft		<input style="width: 50px; text-align: center;" type="text" value="6.0"/>	<input style="width: 50px; text-align: center;" type="text" value="7.2"/>	inches
$T_{MAX} = $	<input style="width: 50px; text-align: center;" type="text" value="40.0"/>	<input style="width: 50px; text-align: center;" type="text" value="40.0"/>	ft						
	<input style="width: 50px; text-align: center;" type="text" value="6.0"/>	<input style="width: 50px; text-align: center;" type="text" value="7.2"/>	inches						
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm									
Check boxes are not applicable in SUMP conditions	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; border: none;"><input type="checkbox"/></td> <td style="text-align: center; border: none;"><input type="checkbox"/></td> </tr> </table>	<input type="checkbox"/>	<input type="checkbox"/>						
<input type="checkbox"/>	<input type="checkbox"/>								
MINOR STORM Allowable Capacity is not applicable to Sump Condition									
MAJOR STORM Allowable Capacity is not applicable to Sump Condition									
$Q_{allow} = $	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; border: none;"><input style="width: 50px; text-align: center;" type="text" value="SUMP"/></td> <td style="text-align: center; border: none;"><input style="width: 50px; text-align: center;" type="text" value="SUMP"/></td> <td style="text-align: center; border: none;">cfs</td> </tr> </table>	<input style="width: 50px; text-align: center;" type="text" value="SUMP"/>	<input style="width: 50px; text-align: center;" type="text" value="SUMP"/>	cfs					
<input style="width: 50px; text-align: center;" type="text" value="SUMP"/>	<input style="width: 50px; text-align: center;" type="text" value="SUMP"/>	cfs							

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.02 (August 2022)

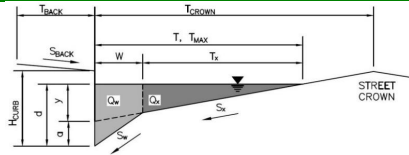


Design Information (Input)	MINOR	MAJOR	
Type of Inlet	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	1	1	
Water Depth at Flowline (outside of local depression)	6.0	7.2	inches
Grate Information			
Length of a Unit Grate	N/A	N/A	feet
Width of a Unit Grate	N/A	N/A	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	N/A	N/A	
Curb Opening Information			
Length of a Unit Curb Opening	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	0.67	0.67	
<input checked="" type="checkbox"/> Override Depths			
Low Head Performance Reduction (Calculated)			
Depth for Grate Midwidth	N/A	N/A	ft
Depth for Curb Opening Weir Equation	0.33	0.43	ft
Grated Inlet Performance Reduction Factor for Long Inlets	N/A	N/A	
Curb Opening Performance Reduction Factor for Long Inlets	1.00	1.00	
Combination Inlet Performance Reduction Factor for Long Inlets	N/A	N/A	
Total Inlet Interception Capacity (assumes clogged condition)			
Total Inlet Interception Capacity	5.4	8.0	cfs
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	2.1	4.4	cfs

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

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

Project: LOS01_Land of Sushi
 Inlet ID: Basin A6



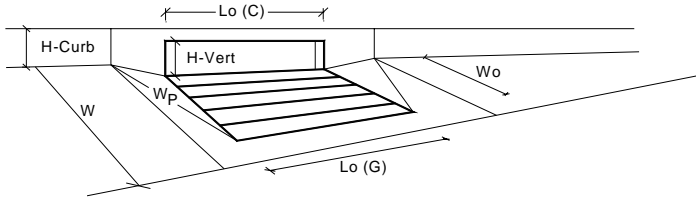
Gutter Geometry:					
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = 5.0$ ft				
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	$S_{BACK} = 0.020$ ft/ft				
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	$n_{BACK} = 0.035$				
Height of Curb at Gutter Flow Line	$H_{CURB} = 6.00$ inches				
Distance from Curb Face to Street Crown	$T_{CROWN} = 28.0$ 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	$S_0 = 0.000$ ft/ft				
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = 0.016$				
Max. Allowable Spread for Minor & Major Storm	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <th style="padding: 2px;">Minor Storm</th> <th style="padding: 2px;">Major Storm</th> </tr> <tr> <td style="text-align: center; padding: 2px;">28.0</td> <td style="text-align: center; padding: 2px;">28.0</td> </tr> </table> ft	Minor Storm	Major Storm	28.0	28.0
Minor Storm	Major Storm				
28.0	28.0				
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <th style="padding: 2px;">Minor Storm</th> <th style="padding: 2px;">Major Storm</th> </tr> <tr> <td style="text-align: center; padding: 2px;">6.0</td> <td style="text-align: center; padding: 2px;">7.2</td> </tr> </table> inches	Minor Storm	Major Storm	6.0	7.2
Minor Storm	Major Storm				
6.0	7.2				
Check boxes are not applicable in SUMP conditions	<table style="display: inline-table; border-collapse: collapse;"> <tr> <td style="text-align: center; padding: 2px;"><input type="checkbox"/></td> <td style="text-align: center; padding: 2px;"><input type="checkbox"/></td> </tr> </table>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>				
MINOR STORM Allowable Capacity is not applicable to Sump Condition					
MAJOR STORM Allowable Capacity is not applicable to Sump Condition					
$Q_{allow} =$	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <th style="padding: 2px;">Minor Storm</th> <th style="padding: 2px;">Major Storm</th> </tr> <tr> <td style="text-align: center; padding: 2px;">SUMP</td> <td style="text-align: center; padding: 2px;">SUMP</td> </tr> </table> cfs	Minor Storm	Major Storm	SUMP	SUMP
Minor Storm	Major Storm				
SUMP	SUMP				

Warning 01

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

INLET IN A SUMP OR SAG LOCATION

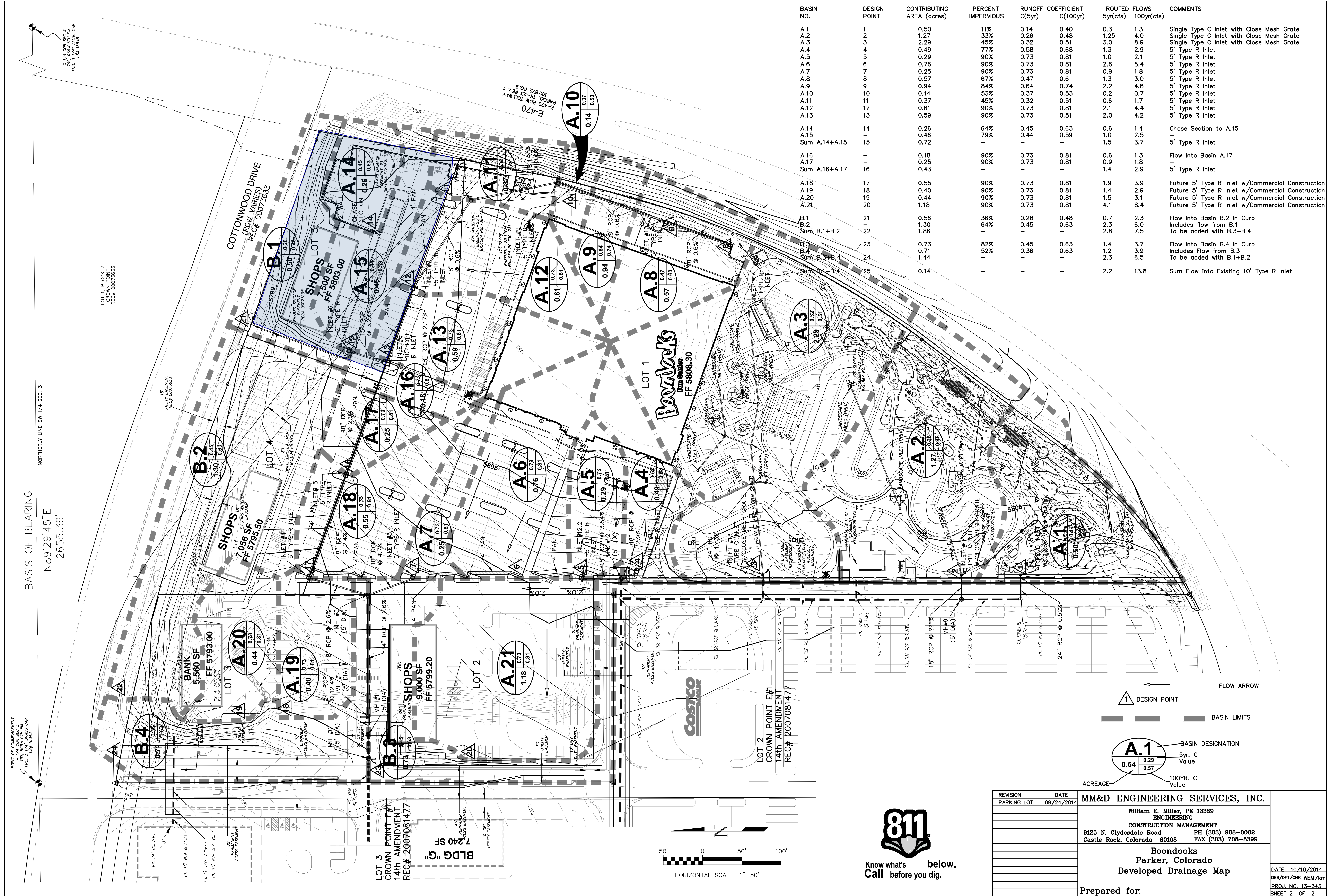
MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	MINOR	MAJOR	
Type of Inlet	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	2	2	
Water Depth at Flowline (outside of local depression)	6.0	7.2	inches
Grate Information			
Length of a Unit Grate	N/A	N/A	feet
Width of a Unit Grate	N/A	N/A	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	N/A	N/A	
Curb Opening Information			
Length of a Unit Curb Opening	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	0.67	0.67	
Low Head Performance Reduction (Calculated)			
Depth for Grate Midwidth	N/A	N/A	ft
Depth for Curb Opening Weir Equation	0.33	0.43	ft
Grated Inlet Performance Reduction Factor for Long Inlets	N/A	N/A	
Curb Opening Performance Reduction Factor for Long Inlets	0.93	1.00	
Combination Inlet Performance Reduction Factor for Long Inlets	N/A	N/A	
Total Inlet Interception Capacity (assumes clogged condition)			
Total Inlet Interception Capacity	8.3	13.1	cfs
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	2.0	4.2	cfs

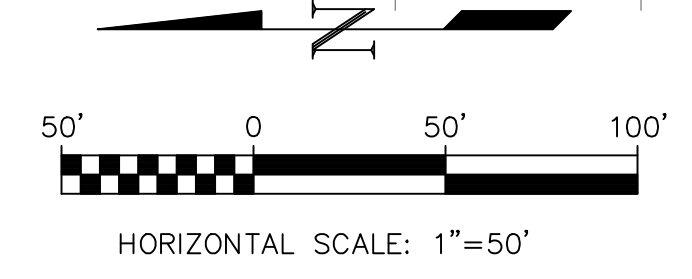
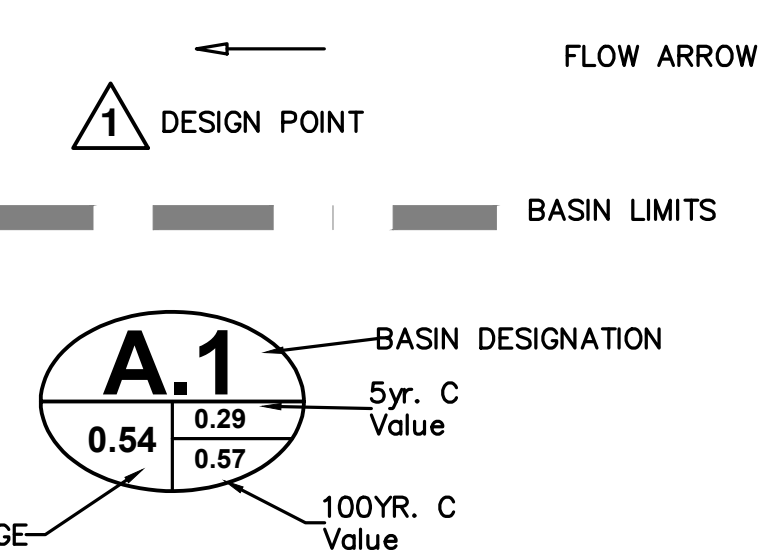
Appendix C: Drainage Map

Appendix D: Excerpts from “*Phase III Drainage Study for Boondocks Entertainment Facility*”



BASIN NO.	DESIGN POINT	CONTRIBUTING AREA (acres)	PERCENT IMPERVIOUS	RUNOFF COEFFICIENT C(5yr)	COEFFICIENT C(100yr)	ROUTED FLOWS 5yr(cfs)	FLOWS 100yr(cfs)	COMMENTS
A.1	1	0.50	11%	0.14	0.40	0.3	1.3	Single Type C Inlet with Close Mesh Grate
A.2	2	1.27	33%	0.26	0.48	1.25	4.0	Single Type C Inlet with Close Mesh Grate
A.3	3	2.29	45%	0.32	0.51	3.0	8.9	Single Type C Inlet with Close Mesh Grate
A.4	4	0.49	77%	0.58	0.68	1.3	2.9	5' Type R Inlet
A.5	5	0.29	90%	0.73	0.81	1.0	2.1	5' Type R Inlet
A.6	6	0.76	90%	0.73	0.81	2.6	5.4	5' Type R Inlet
A.7	7	0.25	90%	0.73	0.81	0.9	1.8	5' Type R Inlet
A.8	8	0.57	67%	0.47	0.6	1.3	3.0	5' Type R Inlet
A.9	9	0.94	84%	0.64	0.74	2.2	4.8	5' Type R Inlet
A.10	10	0.14	53%	0.37	0.53	0.2	0.7	5' Type R Inlet
A.11	11	0.37	45%	0.32	0.51	0.6	1.7	5' Type R Inlet
A.12	12	0.61	90%	0.73	0.81	2.1	4.4	5' Type R Inlet
A.13	13	0.59	90%	0.73	0.81	2.0	4.2	5' Type R Inlet
A.14	14	0.26	64%	0.45	0.63	0.6	1.4	Chase Section to A.15
A.15	15	0.46	79%	0.44	0.59	1.0	2.5	-
Sum A.14+A.15	15	0.72	-	-	-	1.5	3.7	5' Type R Inlet
A.16	16	0.18	90%	0.73	0.81	0.6	1.3	Flow into Basin A.17
A.17	17	0.25	90%	0.73	0.81	0.9	1.8	-
Sum A.16+A.17	16	0.43	-	-	-	1.4	2.9	5' Type R Inlet
A.18	18	0.55	90%	0.73	0.81	1.9	3.9	Future 5' Type R Inlet w/Commercial Construction
A.19	19	0.40	90%	0.73	0.81	1.4	2.9	Future 5' Type R Inlet w/Commercial Construction
A.20	20	0.44	90%	0.73	0.81	1.5	3.1	Future 5' Type R Inlet w/Commercial Construction
A.21	21	1.18	90%	0.73	0.81	4.1	8.4	Future 5' Type R Inlet w/Commercial Construction
B.1	21	0.56	36%	0.28	0.48	0.7	2.3	Flow into Basin B.2 in Curb
B.2	22	1.30	64%	0.45	0.63	2.3	6.0	Includes flow from B.1
Sum B.1+B.2	22	1.86	-	-	-	2.8	7.5	To be added with B.3+B.4
B.3	23	0.73	82%	0.45	0.63	1.4	3.7	Flow into Basin B.4 in Curb
B.4	24	0.71	52%	0.36	0.63	1.2	3.9	Includes Flow from B.3
Sum B.3+B.4	24	1.44	-	-	-	2.3	6.5	To be added with B.1+B.2
Sum B.1-B.4	25	0.14	-	-	-	2.2	13.8	Sum Flow into Existing 10' Type R Inlet

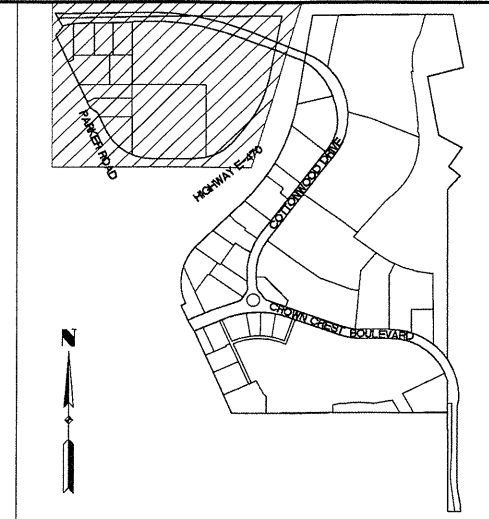
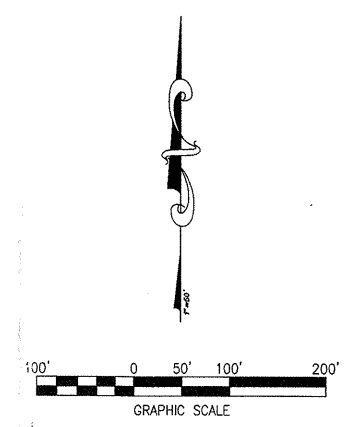
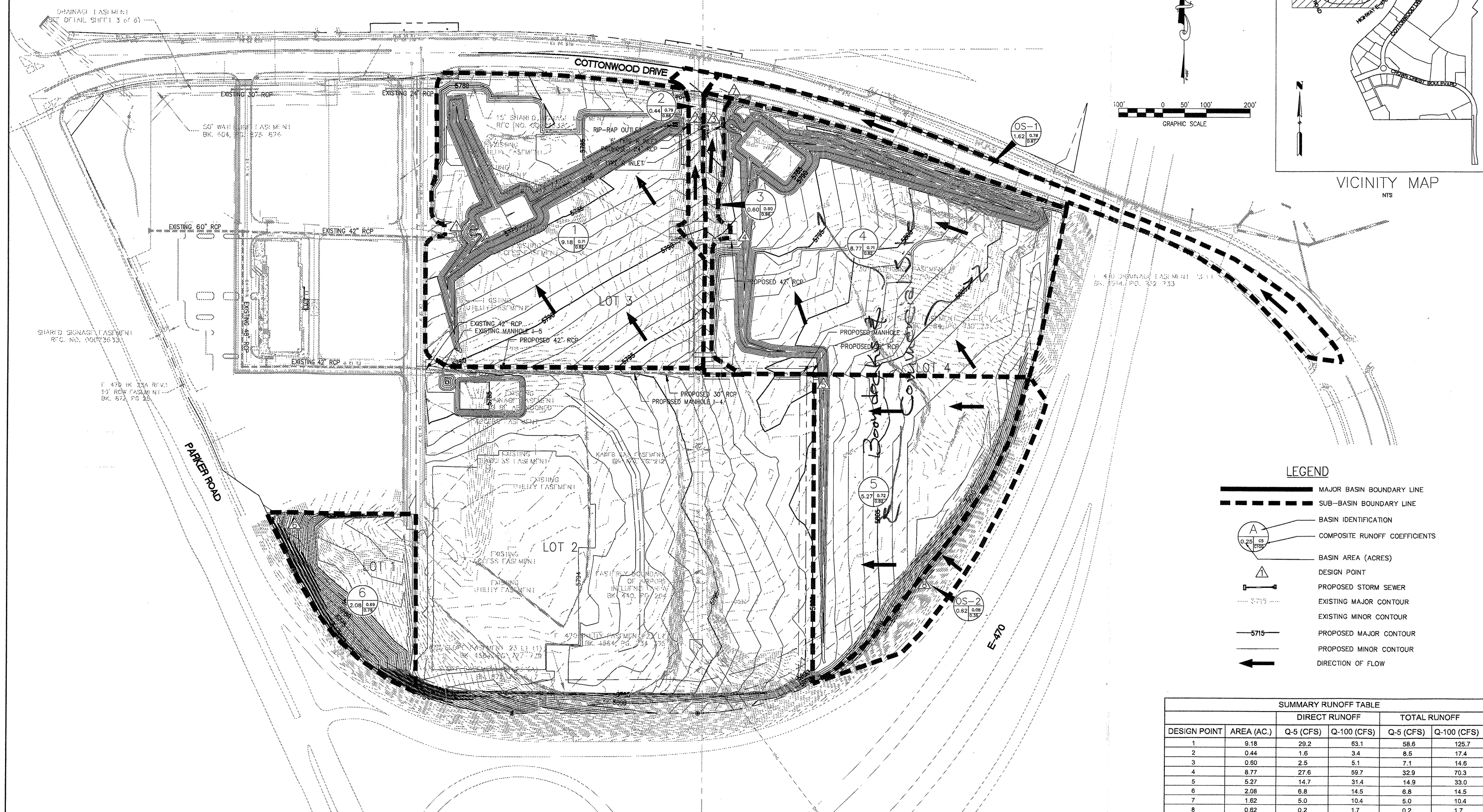
NORTHERLY LINE SW 1/4 SEC. 3
 N89°29'45"E
 2655.36'



811
 Know what's below.
 Call before you dig.

REVISION	DATE	MM&D ENGINEERING SERVICES, INC.
PARKING LOT	09/24/2014	
		William E. Miller, PE 13389 ENGINEERING
		CONSTRUCTION MANAGEMENT
		9125 N. Clydesdale Road PH (303) 908-0062
		Castle Rock, Colorado 80108 FAX (303) 708-8399
		Boondocks Parker, Colorado Developed Drainage Map
Prepared for:		

DATE 10/10/2014
 DES/DT/CHK WEM/km
 PROJ. NO. 13-343
 SHEET 2 OF 2



VICINITY MAP
NTS

- LEGEND**
- MAJOR BASIN BOUNDARY LINE
 - SUB-BASIN BOUNDARY LINE
 - BASIN IDENTIFICATION
 - COMPOSITE RUNOFF COEFFICIENTS
 - BASIN AREA (ACRES)
 - DESIGN POINT
 - PROPOSED STORM SEWER
 - EXISTING MAJOR CONTOUR
 - EXISTING MINOR CONTOUR
 - PROPOSED MAJOR CONTOUR
 - PROPOSED MINOR CONTOUR
 - DIRECTION OF FLOW

SUMMARY RUNOFF TABLE

DESIGN POINT	AREA (AC.)	DIRECT RUNOFF		TOTAL RUNOFF	
		Q-5 (CFS)	Q-100 (CFS)	Q-5 (CFS)	Q-100 (CFS)
1	9.18	29.2	63.1	58.6	125.7
2	0.44	1.6	3.4	8.5	17.4
3	0.60	2.5	5.1	7.1	14.6
4	8.77	27.6	59.7	32.9	70.3
5	5.27	14.7	31.4	14.9	33.0
6	2.08	6.8	14.5	6.8	14.5
7	1.62	5.0	10.4	5.0	10.4
8	0.62	0.2	1.7	0.2	1.7

1	PER TOWN OF PARKER COMMENTS	7-20-07	SPH	BJP
REV	REVISION DESCRIPTION	DATE	CHANGED BY	CHECKED BY

MERRICK
Engineers & Architects

2450 S. Peoria St., Aurora CO 80014, Phone 303/781-0741

TIM LEONARD
MAIL: P.O. BOX 1175 KITTREDGE, CO 80457
DELIVERIES: 27905 MEADOW DR., STE. 11
EVERGREEN, CO 80439
PHONE: (303) 674-7856
FAX: (303) 674-2254

MERRICK	SIGNATURE	DATE
DRAWN	CAW	07/20/07
DESIGNED	CAW	07/20/07
QC REVIEW	GAC	07/20/07
APPROVED	BJP	07/20/07
CLIENT	SIGNATURE	DATE
REVIEW		
APPROVED		
CAD FILE NAME	3841-DRN	

TODAY CROWN POINT
CROWN POINT #1, 14111 AMTNDMNT
PARKTR, COLORADO

CLIENT PROJECT NO.
MERRICK PROJECT NO. 030-3841

SCALE: 1" = 100'

TITLE:
**14TH AMENDMENT
CONSTRUCTION PLANS
DRAINAGE MAP
FUTURE**

REVISION: DRAWING NO. LATEST DATE: SHEET NO.
07/20/07

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