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April 26, 2023

Michael Grabczyk
20120 E. Mainstreet
Parker, CO 80138

RE: In-N-Out Burger – Parker Rd & Pine Ln - Drainage Conformance Letter

Dear Michael,

This Drainage Conformance Letter has been prepared for the proposed In-N-Out Burger Restaurant located at the southwest corner of Parker Rd and Pine Lane on Lot 1 of Parker and Pine Filing No. 1, in Parker, CO. The purpose of this letter is to show that the proposed development conforms to the Storm Drainage and Environmental Criteria Manual for the Town of Parker and the Parker & Pine Retail Final Drainage Report Version 1 prepared by Kimley Horn dated November 2019 (herein referred to as FDR)

The project consists of Lot 1 or Parker & Pine Filing No. 1, located in the Southwest Quarter of Section 10, Township 6 South, Range 66 West of the 6th Principal Meridian, Town of Parker, County of Douglas, State of Colorado. The site is bounded by South Parker Road (State Highway No. 83) to the east, Pine Lane to north, undeveloped commercial lots to the west and southwest, and a Murphy Oil fuel center to the southeast. The site is currently vacant.

The existing site generally slopes to the southwest. In the existing conditions sheet flow overland to an existing private access road, with various inlets along the roadway to collect runoff. The existing underground storm drain system conveys stormwater to an existing public detention pond located southwest of Parker and Pine Filing No. 2, which ultimately discharges into Baldwin Gulch. The proposed Site occupies approximately 1.67 acres of vacant land covered mostly by native grasses and weeds. An on-site storm sewer system is proposed to convey stormwater to the southwest corner of the site where it will connect to an existing storm drain stub which has been sized to receive flows from the developed property. Inlet capacity calculations are included with this memo (Attachment A). runoff from the site is then conveyed offsite to the existing detention facility.

The project site was studied in the Parker & Pine Retail Final Drainage Report Version 1 prepared by Kimley Horn dated November 2019. Per said report, this site lies within Basin 3.0. The impervious percentage assigned to this basin was 85%. The impervious percentage for the proposed Site is calculated to be 68%. Since the proposed development is below the 85% imperviousness estimated by the Parker & Pine Final Drainage Report Version 1, the existing drainage facilities should be sufficient to safely convey the runoff from the proposed Site and not negatively impact adjacent properties.

Sincerely,
GALLOWAY

Phil Dalrymple, PE
Civil Engineering Project Manager
PhilDalrymple@GallowayUS.com



APPENDIX A

Exhibits & Figures

VICINITY MAP



APPENDIX B
Hydrologic Computations

| BASIN SUMMARY TABLE | | | | | | |
|---------------------|--------------|----------------|------------------|----------------------|----------------------|------------------------|
| Tributary Sub-basin | Area (acres) | C ₅ | C ₁₀₀ | t _c (min) | Q ₅ (cfs) | Q ₁₀₀ (cfs) |
| A1 | 0.24 | 0.34 | 0.63 | 5.00 | 0.3 | 1.3 |
| A2 | 0.42 | 0.35 | 0.63 | 5.00 | 0.5 | 2.3 |
| A3 | 0.80 | 0.72 | 0.82 | 5.65 | 1.9 | 5.6 |
| R1 | 0.14 | 0.76 | 0.84 | 5.00 | 0.4 | 1.0 |
| OS1 | 0.05 | 0.52 | 0.72 | 5.00 | 0.1 | 0.3 |
| OS2 | 0.22 | 0.72 | 0.82 | 5.00 | 0.5 | 1.6 |

COMPOSITE % IMPERVIOUS CALCULATIONS

Subdivision: Parker & Pine Filing No. 1 Lot 1
Location: CO, Parker

Project Name: In-N-Out Parker
Project No.: INO000014.20
Calculated By: EKM
Checked By: PJD
Date: 12/6/22

| Basin ID | Total Area (ac) | Paved Roads | | | Lawns | | | Roofs | | | Basins Total Weighted % Imp. |
|----------|-----------------|-------------|-----------|-----------------|--------|-----------|-----------------|--------|-----------|-----------------|---------------------------------|
| | | % Imp. | Area (ac) | Weighted % Imp. | % Imp. | Area (ac) | Weighted % Imp. | % Imp. | Area (ac) | Weighted % Imp. | |
| A1 | 0.24 | 100 | 0.10 | 42.0 | 2 | 0.14 | 1.2 | 90 | 0.00 | 0.00 | 43.2 |
| A2 | 0.42 | 100 | 0.13 | 31.1 | 2 | 0.24 | 1.1 | 90 | 0.05 | 11.40 | 43.6 |
| A3 | 0.80 | 100 | 0.63 | 78.7 | 2 | 0.12 | 0.3 | 90 | 0.05 | 6.00 | 85.0 |
| R1 | 0.14 | 100 | 0.00 | 0.00 | 2 | 0.00 | 0.00 | 90 | 0.14 | 90.00 | 90.00 |
| OS1 | 0.05 | 100 | 0.03 | 61.9 | 2 | 0.02 | 0.8 | 90 | 0.00 | 0.00 | 62.7 |
| OS2 | 0.22 | 100 | 0.19 | 84.7 | 2 | 0.03 | 0.3 | 90 | 0.00 | 0.00 | 85.0 |
| Onsite: | 1.60 | 100 | 0.86 | 53.8 | 2 | 0.49 | 0.6 | 90 | 0.25 | 13.80 | 68.2 |
| Total: | 1.87 | 100 | 1.08 | 57.7 | 2 | 0.55 | 0.6 | 90 | 0.25 | 11.80 | 70.1 |

**STANDARD FORM SF-2
TIME OF CONCENTRATION**

Subdivision: Parker & Pine Filing No. 1 Lot 1
Location: CO, Parker

Project Name: In-N-Out Parker
Project No.: INO000014.20
Calculated By: EKM
Checked By: PJD
Date: 12/6/22

| SUB-BASIN | | | | | | INITIAL/OVERLAND | | | TRAVEL TIME | | | | | T _c CHECK | | | FINAL |
|-----------|-----------|------------------------|----------------|------------------|----------------|-------------------|-------|----------------------|-------------------|-------|----------------|------------|----------------------|----------------------------|-------------------|--------------------------------|----------------------|
| DATA | | | | | | (T _i) | | | (T _t) | | | | | (URBANIZED BASINS) | | | |
| 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 | 0.24 | B | 43.2 | 0.63 | 0.34 | 30 | 25.0 | 2.6 | 110 | 1.0 | 20.0 | 2.0 | 0.9 | 3.5 | 140.0 | 10.8 | 5.0 |
| A2 | 0.42 | B | 43.6 | 0.63 | 0.35 | 30 | 25.0 | 2.6 | 270 | 1.0 | 20.0 | 2.0 | 2.3 | 4.8 | 300.0 | 11.7 | 5.0 |
| A3 | 0.80 | B | 85.0 | 0.82 | 0.72 | 100 | 2.5 | 5.1 | 100 | 2.5 | 20.0 | 3.2 | 0.5 | 5.7 | 200.0 | 11.1 | 5.7 |
| R1 | 0.14 | B | 90.0 | 0.84 | 0.76 | 65 | 2.0 | 4.0 | 0 | 1.0 | 20.0 | 2.0 | 0.0 | 4.0 | 65.0 | 10.4 | 5.0 |
| OS1 | 0.05 | B | 62.7 | 0.72 | 0.52 | 20 | 2.0 | 3.8 | 100 | 2.5 | 20.0 | 3.2 | 0.5 | 4.3 | 120.0 | 10.7 | 5.0 |
| OS2 | 0.22 | B | 85.0 | 0.82 | 0.72 | 45 | 2.0 | 3.7 | 165 | 2.0 | 20.0 | 2.8 | 1.0 | 4.7 | 210.0 | 11.2 | 5.0 |

NOTES:

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

$T_t = L / 60V$ (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: Parker & Pine Filing No. 1 Lot 1
Location: CO, Parker
Design Storm: 2-Year

Project Name: In-N-Out Parker
Project No.: IN0000014.20
Calculated By: EKM
Checked By: PJD
Date: 12/6/22

| 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 _d (cfs) | Tc (min) | C* A (Ac) | I (in/hr) | Q _d (cfs) | Slope (%) | Street Flow (cfs) | Design Flow (cfs) | Slope (%) | Pipe Size (inches) | Length (ft) | Velocity (fps) | Tt (min) | |
| | 1 | A1 | 0.24 | 0.34 | 5.0 | 0.08 | 3.36 | 0.3 | | | | 0.3 | | | | | | | | | Proposed 5' Type R Inlet |
| | 2 | A2 | 0.42 | 0.35 | 5.0 | 0.15 | 3.36 | 0.5 | | | | 0.5 | | | | | | | | | Proposed Single Type 13 Combo Inlet |
| | J1 | R1 | 0.14 | 0.76 | 5.0 | 0.11 | 3.36 | 0.4 | 5.0 | 0.34 | 3.36 | 1.1 | | | | | | | | | Roof Drains Proposed Manhole |
| | 3 | A3 | 0.80 | 0.72 | 5.7 | 0.58 | 3.25 | 1.9 | 5.7 | 0.92 | 3.25 | 3.0 | | | | | | | | | Proposed 5' Type R Inlet |
| | E1 | OS2 | 0.22 | 0.72 | 5.0 | 0.16 | 3.36 | 0.5 | 5.0 | 1.08 | 3.36 | 3.6 | | | | | | | | | Runoff from Lot 5 Existing Manhole |
| | O1 | OS1 | 0.05 | 0.52 | 5.0 | 0.03 | 3.36 | 0.1 | | | | 0.1 | | | | | | | | | Offsite runoff |
| | | | | | | | | | | | | | | | | | | | | | |

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

Subdivision: Parker & Pine Filing No. 1 Lot 1
Location: CO, Parker
Design Storm: 100-Year

Project Name: In-N-Out Parker
Project No.: INO00014.20
Calculated By: EKM
Checked By: PJD
Date: 12/6/22

| 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 | 0.24 | 0.63 | 5.0 | 0.15 | 8.82 | 1.3 | | | | | 1.3 | | | | | | | | Proposed 5' Type R Inlet |
| | 2 | A2 | 0.42 | 0.63 | 5.0 | 0.26 | 8.82 | 2.3 | | | | | 2.3 | | | | | | | | Proposed Single Type 13 Combo Inlet |
| | J1 | R1 | 0.14 | 0.84 | 5.0 | 0.12 | 8.82 | 1.1 | | | | | | | | | | | | | Roof Drains Proposed Manhole |
| | 3 | A3 | 0.80 | 0.82 | 5.7 | 0.66 | 8.53 | 5.6 | 5.0 | 0.53 | 8.82 | 4.7 | | | | | | | | | Proposed 5' Type R Inlet |
| | E1 | OS2 | 0.22 | 0.82 | 5.0 | 0.18 | 8.82 | 1.6 | 5.7 | 1.19 | 8.53 | 10.2 | | | | | | | | | Runoff from Lot 5 Existing Manhole |
| | O1 | OS1 | 0.05 | 0.72 | 5.0 | 0.04 | 8.82 | 0.4 | | | | 0.4 | | | | | | | | | Offsite runoff |
| | | | | | | | | | | | | | | | | | | | | | |

IN-N-Out Parker, CO
April 26, 2023

APPENDIX C

Hydraulic Computations

INLET MANAGEMENT

Worksheet Protected

| INLET NAME | SDIN B1 (Basin A1) | SDIN C1 (Basin A2) | SDIN A1 (Basin A3) |
|------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| 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 Type R Curb Opening | CDOT/Denver 13 Combination | CDOT Type R Curb Opening |

USER-DEFINED INPUT

User-Defined Design Flows

| | | | |
|-------------------------|-----|-----|-----|
| Minor Q_{Known} (cfs) | 0.3 | 0.5 | 1.9 |
| Major Q_{Known} (cfs) | 1.3 | 2.3 | 5.6 |

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 | 0.0 |
| Major Bypass Flow Received, Q_b (cfs) | 0.0 | 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

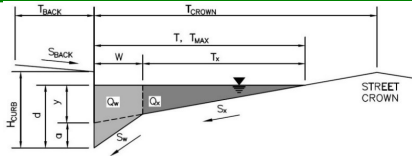
| | | | |
|---|------------|------------|------------|
| Minor Total Design Peak Flow, Q (cfs) | 0.3 | 0.5 | 1.9 |
| Major Total Design Peak Flow, Q (cfs) | 1.3 | 2.3 | 5.6 |
| Minor Flow Bypassed Downstream, Q_b (cfs) | N/A | N/A | N/A |
| Major Flow Bypassed Downstream, Q_b (cfs) | N/A | N/A | N/A |

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

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

Project:

Inlet ID: SDIN B1 (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)

$T_{BACK} = 2.0$ ft
 $S_{BACK} = 0.100$ ft/ft
 $n_{BACK} = 0.020$

$H_{CURB} = 6.00$ inches
 $T_{CROWN} = 30.0$ ft
 $W = 1.50$ ft
 $S_X = 0.017$ ft/ft
 $S_W = 0.017$ ft/ft
 $S_O = 0.000$ ft/ft
 $n_{STREET} = 0.012$

Max. Allowable Spread for Minor & Major Storm
 Max. Allowable Depth at Gutter Flowline for Minor & Major Storm
 Check boxes are not applicable in SUMP conditions

| | Minor Storm | Major Storm | |
|-------------|--------------------------|--------------------------|--------|
| $T_{MAX} =$ | 30.0 | 30.0 | ft |
| $d_{MAX} =$ | 3.5 | 3.5 | inches |
| | <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

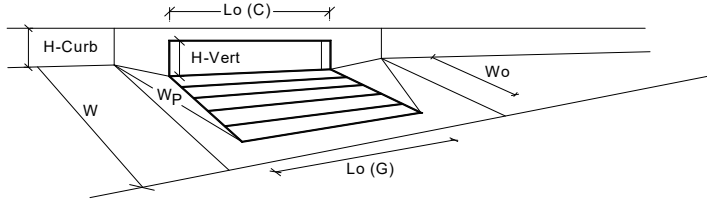
$Q_{allow} =$

| | |
|-------------|-------------|
| Minor Storm | Major Storm |
| SUMP | SUMP |

 cfs

INLET IN A SUMP OR SAG LOCATION

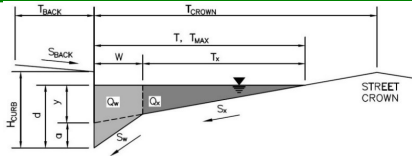
MHFD-Inlet, Version 5.02 (August 2022)



| 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) | 3.5 | 3.5 | 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) | 1.50 | 1.50 | 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 | 0.27 | 0.27 | ft |
| Grated Inlet Performance Reduction Factor for Long Inlets | N/A | N/A | |
| Curb Opening Performance Reduction Factor for Long Inlets | 0.99 | 0.99 | |
| Combination Inlet Performance Reduction Factor for Long Inlets | N/A | N/A | |
| Total Inlet Interception Capacity (assumes clogged condition) | 3.4 | 3.4 | cfs |
| Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak) | 0.3 | 1.3 | cfs |

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)
 (Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:
Inlet ID: SDIN C1 (Basin A2)



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)

$T_{BACK} = 5.0$ ft
 $S_{BACK} = 0.180$ ft/ft
 $n_{BACK} = 0.020$

$H_{CURB} = 6.00$ inches
 $T_{CROWN} = 25.0$ ft
 $W = 2.00$ ft
 $S_X = 0.020$ ft/ft
 $S_Y = 0.020$ ft/ft
 $S_O = 0.000$ ft/ft
 $n_{STREET} = 0.012$

Max. Allowable Spread for Minor & Major Storm
 Max. Allowable Depth at Gutter Flowline for Minor & Major Storm
 Check boxes are not applicable in SUMP conditions

| | Minor Storm | Major Storm | |
|-----------|--------------------------|--------------------------|--------|
| T_{MAX} | 15.0 | 15.0 | ft |
| d_{MAX} | 6.0 | 6.0 | inches |
| | <input type="checkbox"/> | <input type="checkbox"/> | |

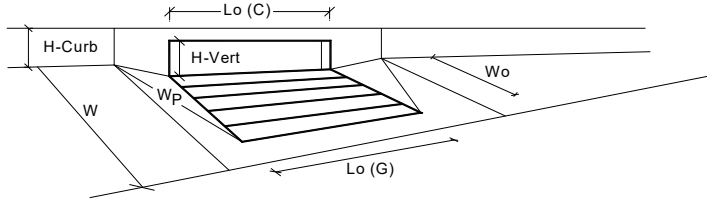
MINOR STORM Allowable Capacity is not applicable to Sump Condition
 MAJOR STORM Allowable Capacity is not applicable to Sump Condition

$Q_{allow} =$

| Minor Storm | Major Storm | |
|-------------|-------------|-----|
| SUMP | SUMP | cfs |

INLET IN A SUMP OR SAG LOCATION

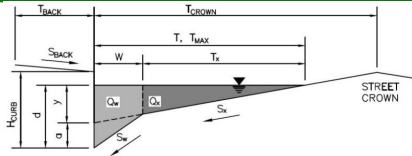
MHFD-Inlet, Version 5.02 (August 2022)



| Design Information (Input) | MINOR | MAJOR | |
|--|----------------------------|------------|------------|
| Type of Inlet | CDOT/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) | 2 | 2 | |
| Water Depth at Flowline (outside of local depression) | 3.6 | 3.6 | 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 | 0.38 | 0.38 | ft |
| Depth for Curb Opening Weir Equation | 0.26 | 0.26 | ft |
| Grated Inlet Performance Reduction Factor for Long Inlets | 0.42 | 0.42 | |
| Curb Opening Performance Reduction Factor for Long Inlets | N/A | N/A | |
| Combination Inlet Performance Reduction Factor for Long Inlets | 0.42 | 0.42 | |
| Total Inlet Interception Capacity (assumes clogged condition) | | | |
| Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak) | 2.6 | 2.6 | cfs |
| Q PEAK REQUIRED = | 0.5 | 2.3 | cfs |

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)
 (Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

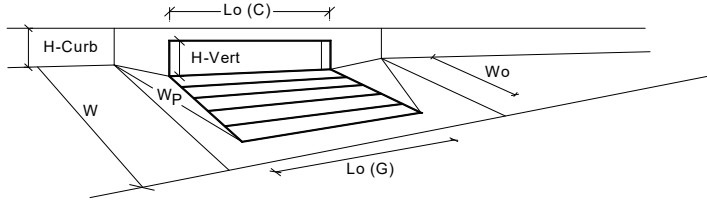
Project:
Inlet ID: SDIN A1 (Basin A3)



| | |
|--|---|
| Gutter Geometry: | |
| Maximum Allowable Width for Spread Behind Curb | $T_{BACK} = 20.0$ 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) | $n_{BACK} = 0.020$ |
| 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 | $W = 1.50$ ft |
| Street Transverse Slope | $S_X = 0.030$ ft/ft |
| Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft) | $S_W = 0.030$ 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) | $n_{STREET} = 0.012$ |
| Max. Allowable Spread for Minor & Major Storm | $T_{MAX} = \begin{matrix} \text{Minor Storm} & \text{Major Storm} \\ 28.0 & 28.0 \end{matrix}$ ft |
| Max. Allowable Depth at Gutter Flowline for Minor & Major Storm | $d_{MAX} = \begin{matrix} \text{Minor Storm} & \text{Major Storm} \\ 6.0 & 6.0 \end{matrix}$ inches |
| Check boxes are not applicable in SUMP conditions | <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} = | SUMP SUMP cfs |

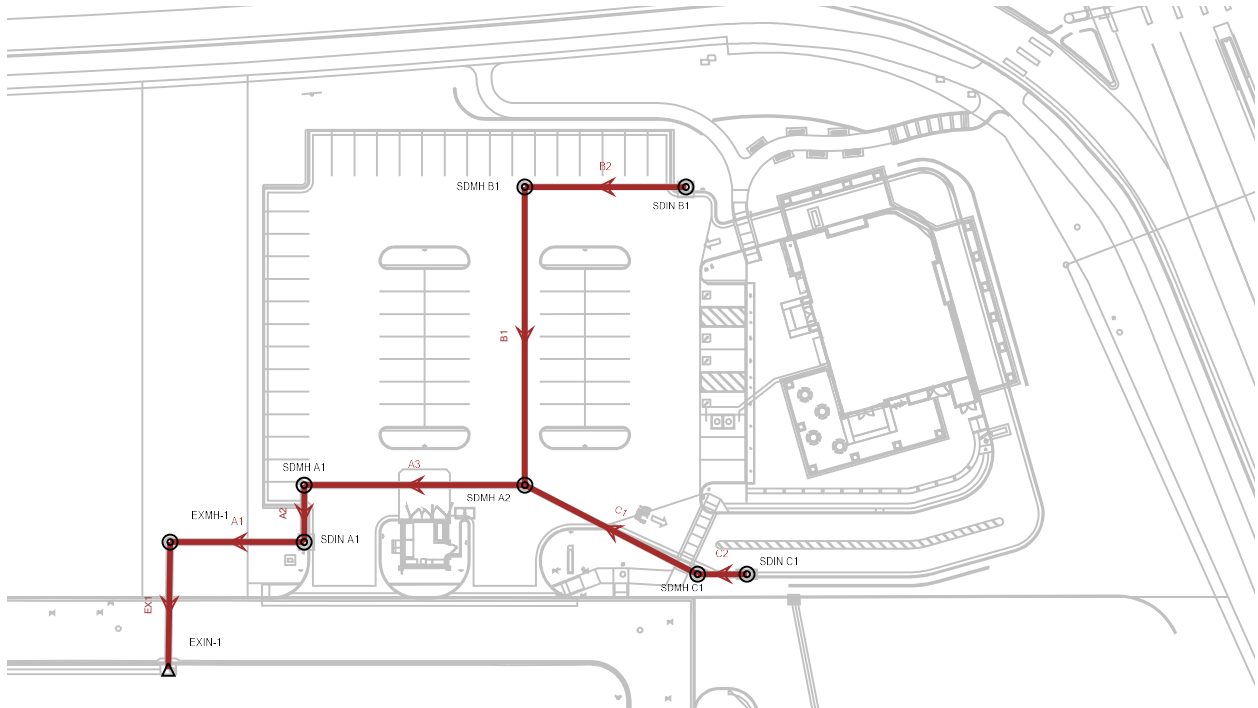
INLET IN A SUMP OR SAG LOCATION

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 | 6.0 | 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) | 1.50 | 1.50 | 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 | 0.46 | 0.46 | 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) | 7.6 | 7.6 | cfs |
| Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak) | 1.9 | 5.6 | cfs |

Scenario: 100-Year
Active Scenario: 100-Year



Scenario: 5-Year
 Current Time Step: 0.000Hr
 FlexTable: Conduit Table

| Label | Start Node | Stop Node | Invert (Start) (ft) | Invert (Stop) (ft) | Hydraulic Grade Line (Out) (ft) | Hydraulic Grade Line (In) (ft) | Flow (cfs) | Velocity (ft/s) | Length (User Defined) (ft) | Slope (Calculated) (ft/ft) | Section Type | Diameter (in) | Material | Manning's n | Capacity (Full Flow) (cfs) | Depth (Normal) (ft) |
|-------|------------|-----------|---------------------|--------------------|---------------------------------|--------------------------------|------------|-----------------|----------------------------|----------------------------|--------------|---------------|----------|-------------|----------------------------|---------------------|
| A1 | SDIN A1 | EXMH-1 | 5,790.29 | 5,789.70 | 5,790.43 | 5,790.89 | 3.00 | 5.18 | 53.4 | 0.011 | Circle | 24.0 | Concrete | 0.013 | 23.77 | 0.48 |
| A2 | SDMH A1 | SDIN A1 | 5,791.04 | 5,790.79 | 5,791.18 | 5,791.43 | 1.10 | 3.88 | 24.6 | 0.010 | Circle | 18.0 | Concrete | 0.013 | 10.60 | 0.33 |
| A3 | SDMH A2 | SDMH A1 | 5,792.31 | 5,791.34 | 5,791.66 | 5,792.70 | 1.10 | 3.99 | 88.1 | 0.011 | Circle | 18.0 | Concrete | 0.013 | 11.02 | 0.32 |
| B1 | SDMH B1 | SDMH A2 | 5,795.19 | 5,792.81 | 5,792.98 | 5,795.42 | 0.30 | 3.54 | 117.2 | 0.020 | Circle | 12.0 | Concrete | 0.013 | 5.08 | 0.16 |
| B2 | SDIN B1 | SDMH B1 | 5,796.77 | 5,795.49 | 5,795.66 | 5,797.00 | 0.30 | 3.52 | 64.2 | 0.020 | Circle | 12.0 | Concrete | 0.013 | 5.03 | 0.17 |
| C1 | SDMH C1 | SDMH A2 | 5,793.66 | 5,792.81 | 5,793.06 | 5,793.95 | 0.50 | 3.29 | 78.4 | 0.011 | Circle | 12.0 | Concrete | 0.013 | 3.71 | 0.25 |
| C2 | SDIN C1 | SDMH C1 | 5,794.08 | 5,793.86 | 5,794.11 | 5,794.37 | 0.50 | 3.33 | 19.7 | 0.011 | Circle | 12.0 | Concrete | 0.013 | 3.77 | 0.25 |
| EX1 | EXMH-1 | EXIN-1 | 5,789.40 | 5,788.60 | 5,789.85 | 5,790.06 | 3.60 | 6.19 | 50.8 | 0.016 | Circle | 24.0 | Concrete | 0.013 | 28.38 | 0.48 |

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Scenario: 5-Year
Current Time Step: 0.000Hr
FlexTable: Manhole Table

| Label | Elevation (Rim) (ft) | Elevation (Invert in 1) (ft) | Elevation (Invert in 2) (ft) | Elevation (Invert Out) (ft) | Flow (Total Out) (cfs) | Hydraulic Grade Line (Out) (ft) | Hydraulic Grade Line (In) (ft) | Structure Type | Diameter (in) | Width (ft) | Length (ft) | Headloss Method | Notes |
|---------|----------------------|------------------------------|------------------------------|-----------------------------|------------------------|---------------------------------|--------------------------------|--------------------|---------------|------------|-------------|-----------------|--|
| EXMH-1 | 5,803.10 | 5,789.70 | (N/A) | 5,789.40 | 3.60 | 5,790.06 | 5,790.43 | Circular Structure | 72.0 | - | - | Standard | EX SDMH (PRIVATE) |
| SDIN A1 | 5,801.48 | 5,790.79 | (N/A) | 5,790.29 | 3.00 | 5,790.89 | 5,791.18 | Box Structure | - | 3.00 | 5.00 | Standard | 5' TYPE R INLETIN SUMP (PRIVATE) |
| SDIN B1 | 5,805.98 | (N/A) | (N/A) | 5,796.77 | 0.30 | 5,797.00 | 5,797.00 | Box Structure | - | 3.00 | 5.00 | Standard | 5' TYPE R INLETIN SUMP (PRIVATE) |
| SDIN C1 | 5,804.89 | (N/A) | (N/A) | 5,794.08 | 0.50 | 5,794.37 | 5,794.37 | Box Structure | - | 2.00 | 8.33 | Standard | DOUBLE TYPE 13 COMBO INLET IN SUMP (PRIVATE) |
| SDMH A1 | 5,802.06 | 5,791.34 | (N/A) | 5,791.04 | 1.10 | 5,791.43 | 5,791.62 | Circular Structure | 72.0 | - | - | Standard | MH-ECCENTRIC (6' %%c) |
| SDMH A2 | 5,803.52 | 5,792.81 | 5,792.81 | 5,792.31 | 1.10 | 5,792.70 | 5,792.86 | Circular Structure | 48.0 | - | - | Standard | MH-ECCENTRIC (4' %%c) |
| SDMH B1 | 5,805.86 | 5,795.49 | (N/A) | 5,795.19 | 0.30 | 5,795.42 | 5,795.52 | Circular Structure | 48.0 | - | - | Standard | MH-ECCENTRIC (4' %%c) |
| SDMH C1 | 5,805.46 | 5,793.86 | (N/A) | 5,793.66 | 0.50 | 5,793.95 | 5,794.00 | Circular Structure | 48.0 | - | - | Standard | MH-ECCENTRIC (4' %%c) |

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Scenario: 5-Year
Current Time Step: 0.000Hr
FlexTable: Outfall Table

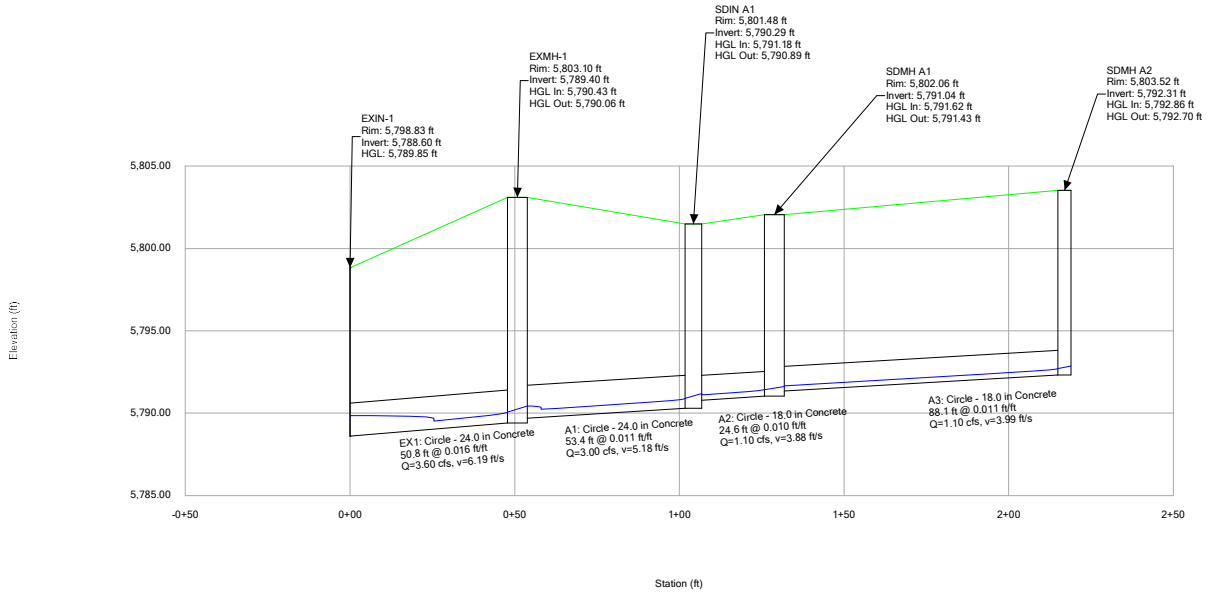
| Label | Elevation (Rim) (ft) | Elevation (Invert) (ft) | Boundary Condition Type | Elevation (User Defined Tailwater) (ft) | Hydraulic Grade (ft) | Flow (Total Out) (cfs) |
|--------|----------------------|-------------------------|-------------------------|---|----------------------|------------------------|
| EXIN-1 | 5,798.83 | 5,788.60 | User Defined Tailwater | 5,789.85 | 5,789.85 | 3.60 |

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Profile Report

Engineering Profile - Profile A (INO014_StormCAD.stsw)

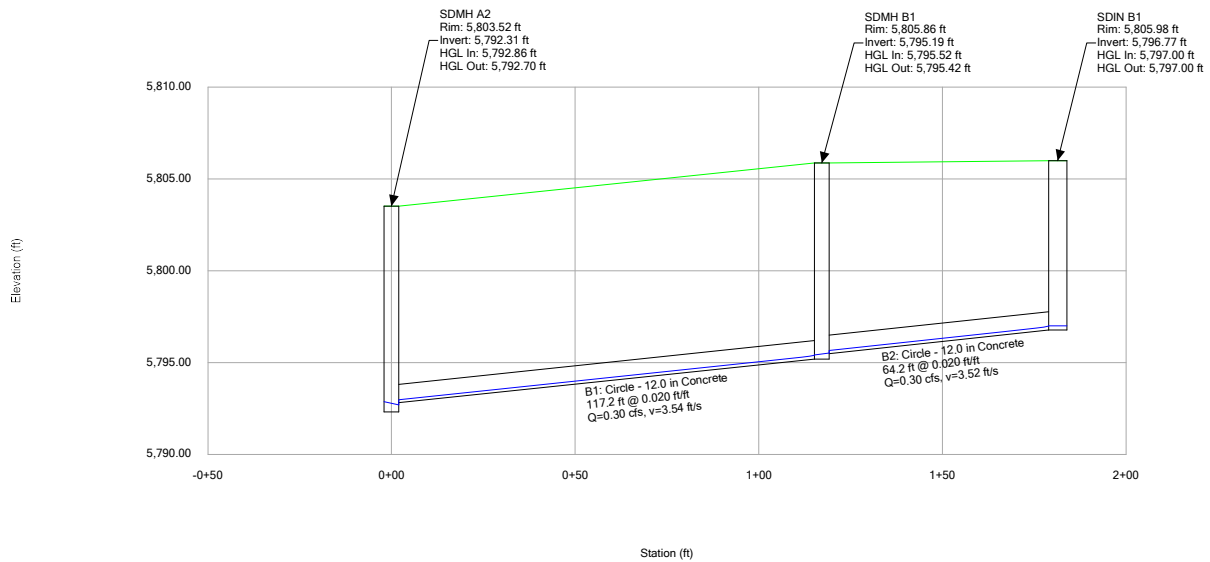
Active Scenario: 5-Year



Profile Report

Engineering Profile - Profile B (INO014_StormCAD.stsw)

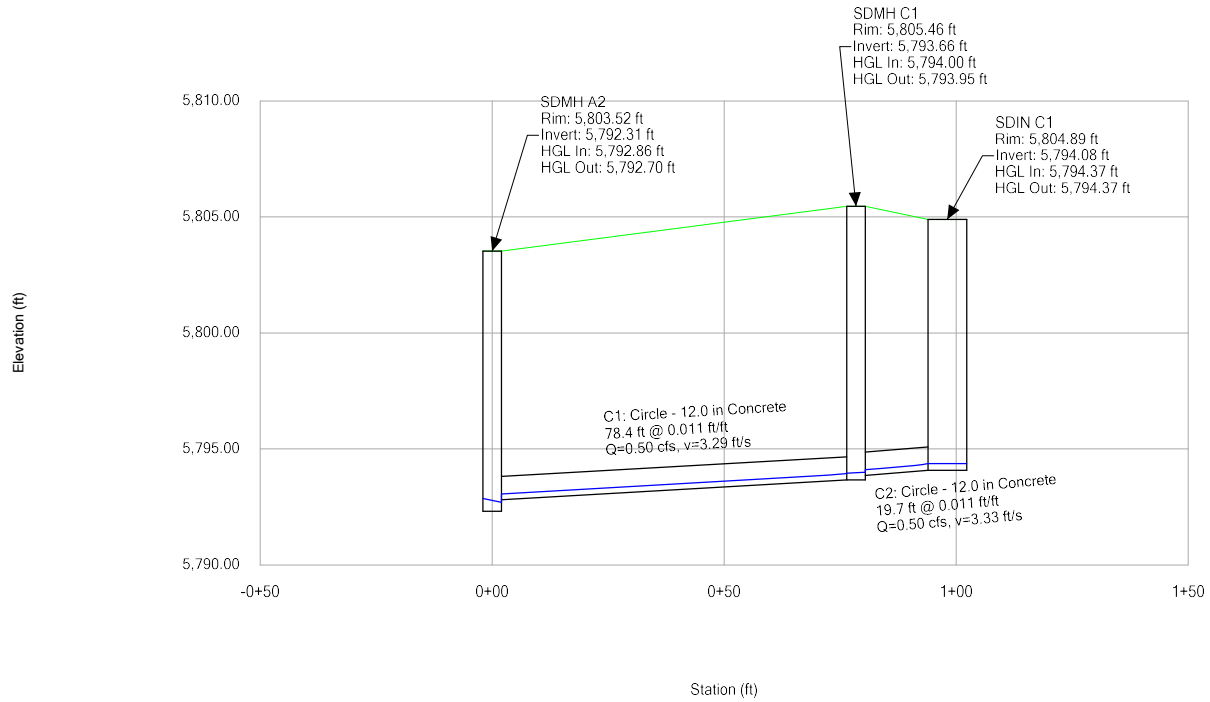
Active Scenario: 5-Year



Profile Report

Engineering Profile - Profile C (INO014_StormCAD.stsw)

Active Scenario: 5-Year



Scenario: 100-Year
 Current Time Step: 0.000Hr
 FlexTable: Conduit Table

| Label | Start Node | Stop Node | Invert (Start) (ft) | Invert (Stop) (ft) | Hydraulic Grade Line (Out) (ft) | Hydraulic Grade Line (In) (ft) | Flow (cfs) | Velocity (ft/s) | Length (User Defined) (ft) | Slope (Calculated) (ft/ft) | Section Type | Diameter (in) | Material | Manning's n | Capacity (Full Flow) (cfs) | Depth (Normal) (ft) |
|-------|------------|-----------|---------------------|--------------------|---------------------------------|--------------------------------|------------|-----------------|----------------------------|----------------------------|--------------|---------------|----------|-------------|----------------------------|---------------------|
| A1 | SDIN A1 | EXMH-1 | 5,790.29 | 5,789.70 | 5,791.46 | 5,791.43 | 10.20 | 7.28 | 53.4 | 0.011 | Circle | 24.0 | Concrete | 0.013 | 23.77 | 0.92 |
| A2 | SDMH A1 | SDIN A1 | 5,791.04 | 5,790.79 | 5,792.05 | 5,792.02 | 4.70 | 5.82 | 24.6 | 0.010 | Circle | 18.0 | Concrete | 0.013 | 10.60 | 0.70 |
| A3 | SDMH A2 | SDMH A1 | 5,792.31 | 5,791.34 | 5,792.32 | 5,793.14 | 4.70 | 5.99 | 88.1 | 0.011 | Circle | 18.0 | Concrete | 0.013 | 11.02 | 0.68 |
| B1 | SDMH B1 | SDMH A2 | 5,795.19 | 5,792.81 | 5,793.54 | 5,795.67 | 1.30 | 5.41 | 117.2 | 0.020 | Circle | 12.0 | Concrete | 0.013 | 5.08 | 0.35 |
| B2 | SDIN B1 | SDMH B1 | 5,796.77 | 5,795.49 | 5,795.84 | 5,797.25 | 1.30 | 5.37 | 64.2 | 0.020 | Circle | 12.0 | Concrete | 0.013 | 5.03 | 0.35 |
| C1 | SDMH C1 | SDMH A2 | 5,793.66 | 5,792.81 | 5,793.54 | 5,794.31 | 2.30 | 4.97 | 78.4 | 0.011 | Circle | 12.0 | Concrete | 0.013 | 3.71 | 0.57 |
| C2 | SDIN C1 | SDMH C1 | 5,794.08 | 5,793.86 | 5,794.43 | 5,794.73 | 2.30 | 5.03 | 19.7 | 0.011 | Circle | 12.0 | Concrete | 0.013 | 3.77 | 0.56 |
| EX1 | EXMH-1 | EXIN-1 | 5,789.40 | 5,788.60 | 5,790.21 | 5,790.65 | 12.10 | 8.67 | 50.8 | 0.016 | Circle | 24.0 | Concrete | 0.013 | 28.38 | 0.91 |

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Scenario: 100-Year
 Current Time Step: 0.000Hr
 FlexTable: Manhole Table

| Label | Elevation (Rim) (ft) | Elevation (Invert in 1) (ft) | Elevation (Invert in 2) (ft) | Elevation (Invert Out) (ft) | Flow (Total Out) (cfs) | Hydraulic Grade Line (Out) (ft) | Hydraulic Grade Line (In) (ft) | Structure Type | Diameter (in) | Width (ft) | Length (ft) | Headloss Method | Notes |
|---------|----------------------|------------------------------|------------------------------|-----------------------------|------------------------|---------------------------------|--------------------------------|--------------------|---------------|------------|-------------|-----------------|--|
| EXMH-1 | 5,803.10 | 5,789.70 | (N/A) | 5,789.40 | 12.10 | 5,790.65 | 5,791.46 | Circular Structure | 72.0 | - | - | Standard | EX SDMH (PRIVATE) |
| SDIN A1 | 5,801.65 | 5,790.79 | (N/A) | 5,790.29 | 10.20 | 5,791.43 | 5,792.05 | Box Structure | - | 3.00 | 5.00 | Standard | 5' TYPE R INLETIN SUMP (PRIVATE) |
| SDIN B1 | 5,805.98 | (N/A) | (N/A) | 5,796.77 | 1.30 | 5,797.25 | 5,797.25 | Box Structure | - | 3.00 | 5.00 | Standard | 5' TYPE R INLETIN SUMP (PRIVATE) |
| SDIN C1 | 5,804.89 | (N/A) | (N/A) | 5,794.08 | 2.30 | 5,794.73 | 5,794.73 | Box Structure | - | 2.00 | 8.33 | Standard | DOUBLE TYPE 13 COMBO INLET IN SUMP (PRIVATE) |
| SDMH A1 | 5,802.03 | 5,791.34 | (N/A) | 5,791.04 | 4.70 | 5,792.01 | 5,792.32 | Circular Structure | 72.0 | - | - | Standard | MH-ECCENTRIC (6' %%c) |
| SDMH A2 | 5,803.67 | 5,792.81 | 5,792.81 | 5,792.31 | 4.70 | 5,793.14 | 5,793.54 | Circular Structure | 48.0 | - | - | Standard | MH-ECCENTRIC (4' %%c) |
| SDMH B1 | 5,805.87 | 5,795.49 | (N/A) | 5,795.19 | 1.30 | 5,795.67 | 5,795.92 | Circular Structure | 48.0 | - | - | Standard | MH-ECCENTRIC (4' %%c) |
| SDMH C1 | 5,805.46 | 5,793.86 | (N/A) | 5,793.66 | 2.30 | 5,794.31 | 5,794.42 | Circular Structure | 48.0 | - | - | Standard | MH-ECCENTRIC (4' %%c) |

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Scenario: 100-Year
Current Time Step: 0.000Hr
FlexTable: Outfall Table

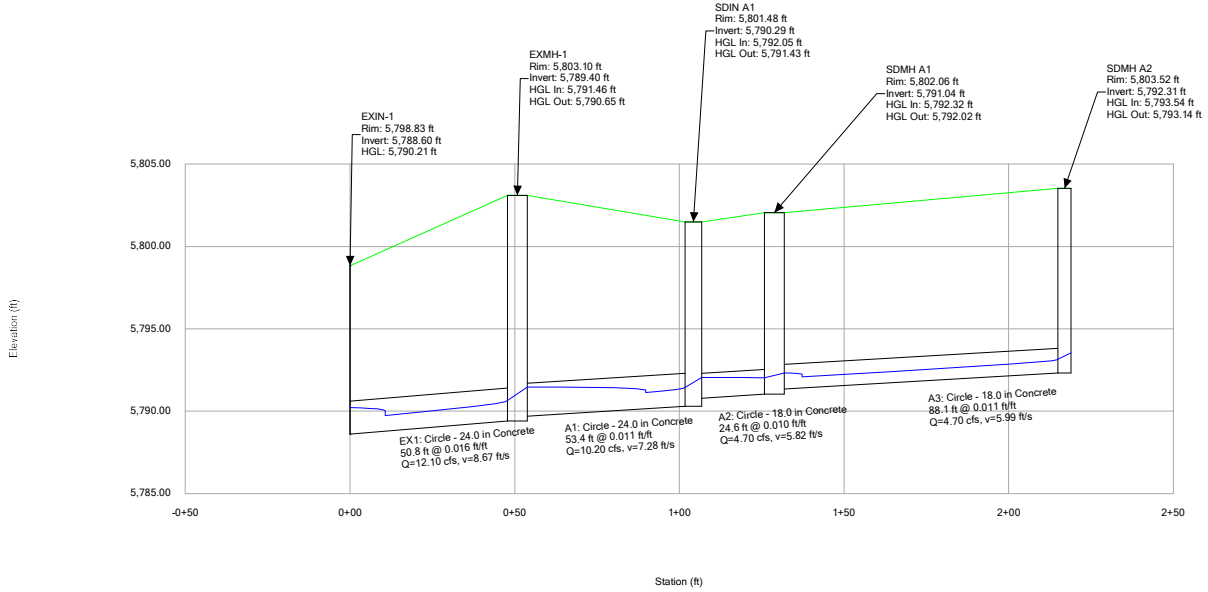
| Label | Elevation (Rim) (ft) | Elevation (Invert) (ft) | Boundary Condition Type | Elevation (User Defined Tailwater) (ft) | Hydraulic Grade (ft) | Flow (Total Out) (cfs) |
|--------|----------------------|-------------------------|-------------------------|---|----------------------|------------------------|
| EXIN-1 | 5,798.83 | 5,788.60 | User Defined Tailwater | 5,790.21 | 5,790.21 | 12.10 |

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Profile Report

Engineering Profile - Profile A (INO014_StormCAD.stsw)

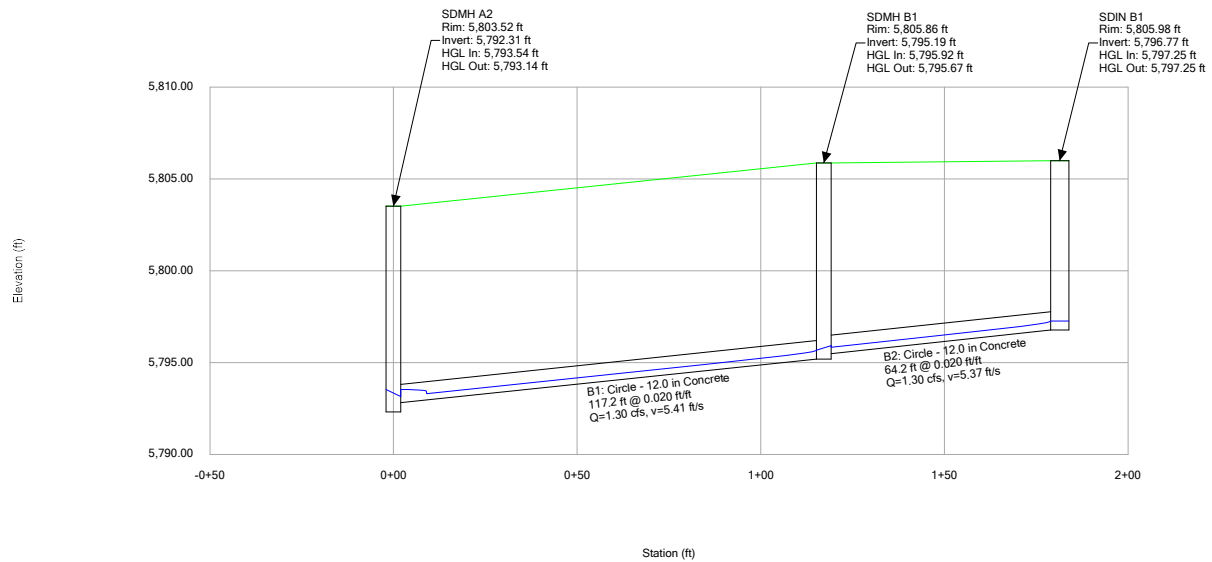
Active Scenario: 100-Year



Profile Report

Engineering Profile - Profile B (INO014_StormCAD.stsw)

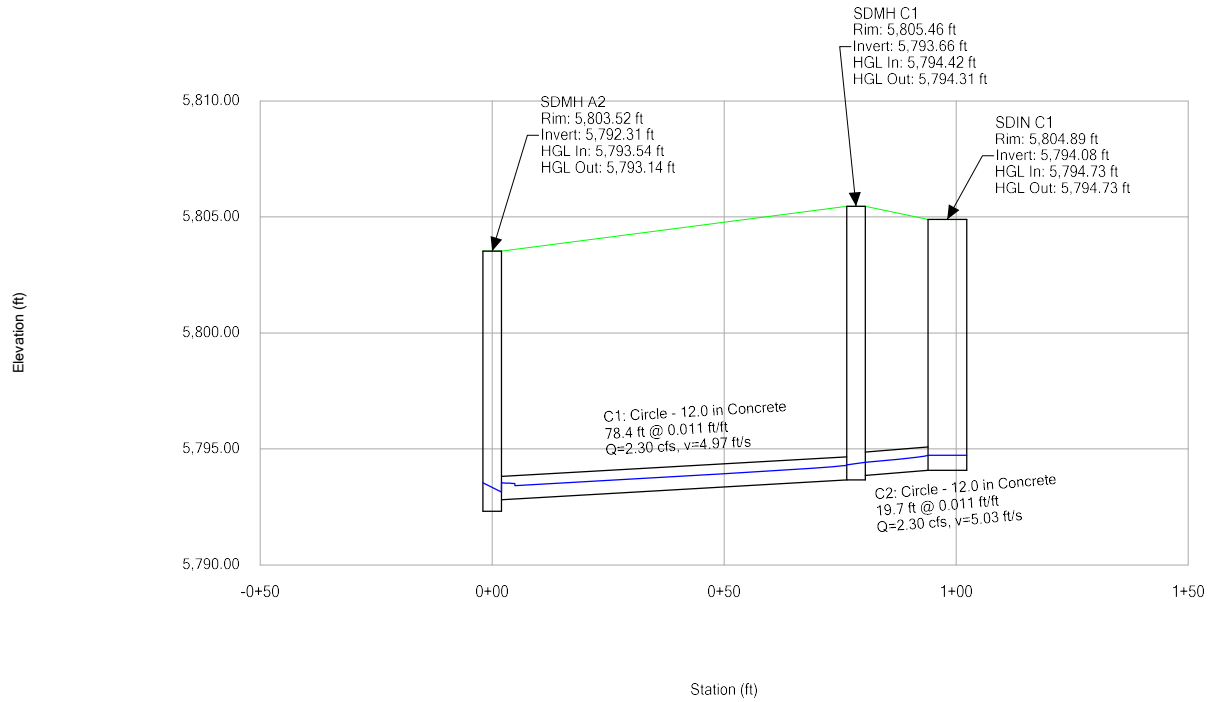
Active Scenario: 100-Year



Profile Report

Engineering Profile - Profile C (INO014_StormCAD.stsw)

Active Scenario: 100-Year



APPENDIX D

Excerpts from Parker & Pine Retail Final Drainage Report



Town of Parker

Parker Auto Plaza Filing No. 1

Lot 1, Block 3

Parker & Pine Retail
Final Drainage Report

NOVEMBER 2019 | VERSION 1

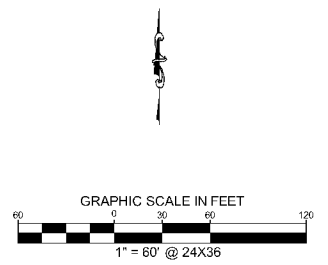
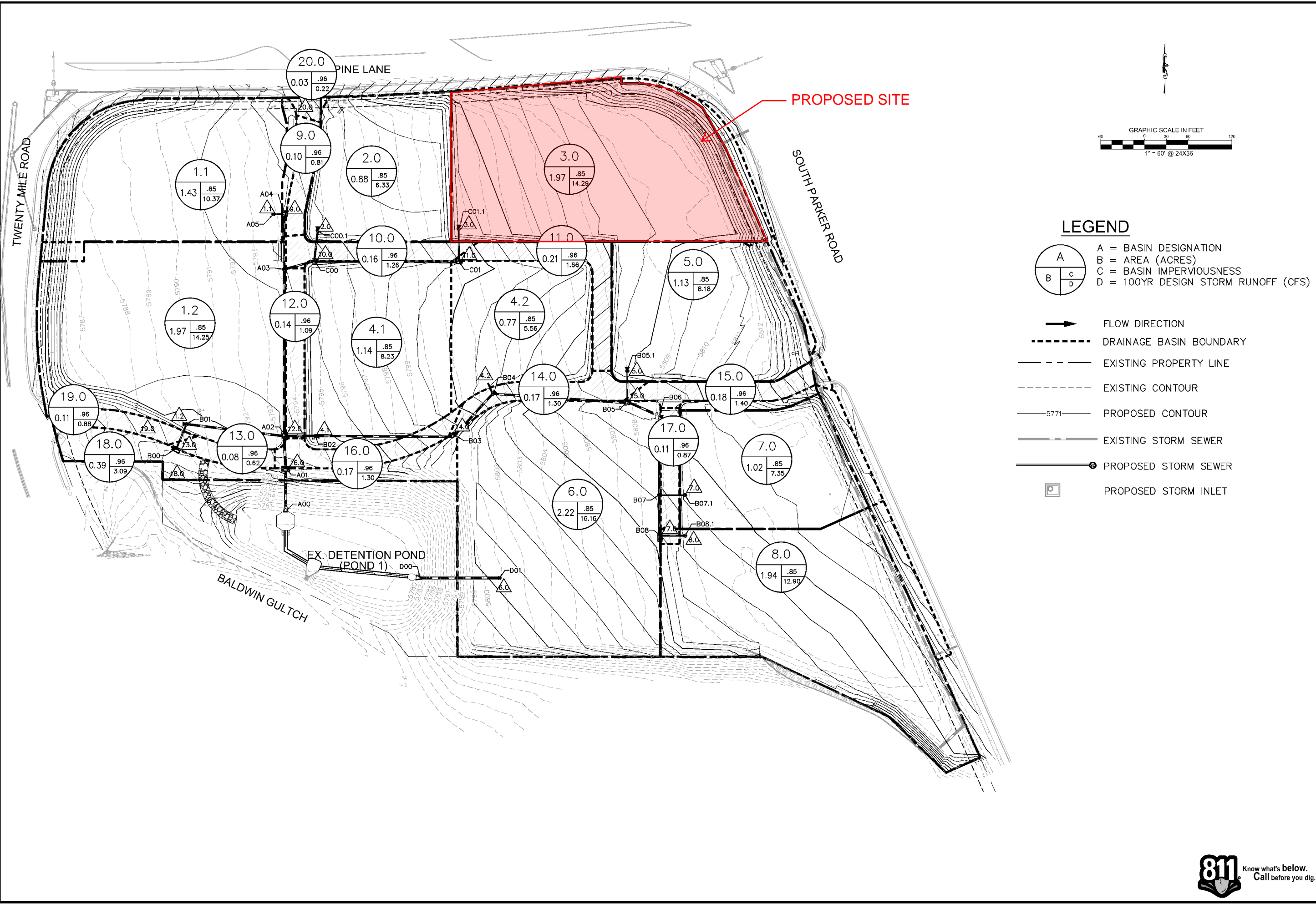
Prepared By:

Kimley»»Horn

4582 South Ulster Street, Suite 1500

Denver, CO 80237

K:\DEN_Civil\096502001 - Mixed Use Parker Rd\CADD\PlanSheets\096502001DRM.dwg - Zematlis, Even 10/5/2019 10:57 AM
 THIS DOCUMENT, TOGETHER WITH THE CONCEPTS AND DESIGNS PRESENTED HEREIN, IS AN INSTRUMENT OF SERVICE AS DEFINED IN THE PROFESSIONAL ENGINEERING AND ARCHITECTURE ACT, AND SHALL BE WITHOUT LIABILITY TO KIMLEY-HORN AND ASSOCIATES, INC.



- LEGEND**
- | |
|---|
| A |
| B |
| C |
| D |

 A = BASIN DESIGNATION
 - B = AREA (ACRES)
 - C = BASIN IMPERVIOUSNESS
 - D = 100YR DESIGN STORM RUNOFF (CFS)
 - FLOW DIRECTION
 - DRAINAGE BASIN BOUNDARY
 - EXISTING PROPERTY LINE
 - EXISTING CONTOUR
 - PROPOSED CONTOUR
 - EXISTING STORM SEWER
 - PROPOSED STORM SEWER
 - PROPOSED STORM INLET

| NO. | REVISION | BY | DATE | APPR. |
|-----|----------|----|------|-------|
| | | | | |

Kimley»Horn
 2019 KIMLEY-HORN AND ASSOCIATES, INC.
 1080 South U.S. Hwy. 1500
 Denver, Colorado 80237 (303) 728-3700

DESIGNED BY: DLS
 DRAWN BY: ECZ
 CHECKED BY: DLS
 DATE: 11/11/19

PARKER & PINE
 PARKER, CO
 CONSTRUCTION DOCUMENTS
PRELIMINARY DRAINAGE AREA MAP

PRELIMINARY
 FOR REVIEW ONLY
 NOT FOR
 CONSTRUCTION
Kimley»Horn
 Kimley-Horn and Associates, Inc.

PROJECT NO.
 096502001
 DRAWING NAME
 096502001DRM
DRAINAGE



5-Year Design Storm Runoff Calculations
(Rational Method Procedure)

| BASIN INFORMATION | | | | DIRECT RUNOFF | | | | TOTAL RUNOFF | | | | REMARKS |
|-------------------|-------------|---------|--------------|---------------|-------|---------|-------|--------------|-----------|---------|-------|---------|
| DESIGN POINT | DRAIN BASIN | AREA Ac | RUNOFF COEFF | T(c) Min | C x A | I In/Hr | Q CFS | T(c) Min | SUM C x A | I In/Hr | Q CFS | |
| 1 | 1.1 | 1.43 | 0.73 | 5.0 | 1.05 | 4.71 | 4.93 | 5.0 | 1.05 | 4.7 | 4.93 | |
| 1 | 1.2 | 1.97 | 0.73 | 5.0 | 1.44 | 4.71 | 6.77 | 5.0 | 2.5 | 4.7 | 11.71 | |
| 1 | 2.0 | 0.88 | 0.73 | 5.0 | 0.64 | 4.71 | 3.00 | 5.0 | 3.1 | 4.7 | 14.71 | |
| 1 | 3.0 | 1.97 | 0.73 | 5.0 | 1.44 | 4.71 | 6.80 | 5.0 | 4.6 | 4.7 | 21.50 | |
| 1 | 4.1 | 1.14 | 0.73 | 5.0 | 0.83 | 4.71 | 3.91 | 5.0 | 5.4 | 4.7 | 25.42 | |
| 1 | 4.2 | 0.77 | 0.73 | 5.0 | 0.56 | 4.71 | 2.65 | 5.0 | 6.0 | 4.7 | 28.07 | |
| 1 | 5.0 | 1.13 | 0.73 | 5.0 | 0.83 | 4.71 | 3.89 | 5.0 | 6.8 | 4.7 | 31.96 | |
| 1 | 6.0 | 2.22 | 0.73 | 5.0 | 1.62 | 4.71 | 7.62 | 5.0 | 8.4 | 4.7 | 39.58 | |
| 1 | 7.0 | 1.02 | 0.73 | 5.0 | 0.74 | 4.71 | 3.48 | 5.0 | 9.1 | 4.7 | 43.06 | |
| 1 | 8.0 | 1.94 | 0.73 | 6.8 | 1.41 | 4.34 | 6.13 | 5.0 | 10.5 | 4.7 | 49.72 | |
| 1 | 9.0 | 0.10 | 0.86 | 5.0 | 0.09 | 4.71 | 0.42 | 5.0 | 10.6 | 4.7 | 50.14 | |
| 1 | 10.0 | 0.16 | 0.86 | 5.0 | 0.14 | 4.71 | 0.65 | 5.0 | 10.8 | 4.7 | 50.79 | |
| 1 | 11.0 | 0.21 | 0.86 | 5.0 | 0.18 | 4.71 | 0.86 | 5.0 | 11.0 | 4.7 | 51.64 | |
| 1 | 12.0 | 0.14 | 0.86 | 5.0 | 0.12 | 4.71 | 0.57 | 5.0 | 11.1 | 4.7 | 52.21 | |
| 1 | 13.0 | 0.08 | 0.86 | 5.0 | 0.07 | 4.71 | 0.32 | 5.0 | 11.1 | 4.7 | 52.53 | |
| 1 | 14.0 | 0.17 | 0.86 | 5.0 | 0.14 | 4.71 | 0.67 | 5.0 | 11.3 | 4.7 | 53.20 | |
| 1 | 15.0 | 0.18 | 0.86 | 5.0 | 0.15 | 4.71 | 0.72 | 5.0 | 11.4 | 4.7 | 53.92 | |
| 1 | 16.0 | 0.17 | 0.86 | 5.0 | 0.14 | 4.71 | 0.67 | 5.0 | 11.6 | 4.7 | 54.60 | |
| 1 | 17.0 | 0.11 | 0.86 | 5.0 | 0.10 | 4.71 | 0.45 | 5.0 | 11.7 | 4.7 | 55.05 | |
| 1 | 18.0 | 0.39 | 0.86 | 5.0 | 0.34 | 4.71 | 1.59 | 5.0 | 12.0 | 4.7 | 56.64 | |
| 1 | 19.0 | 0.11 | 0.86 | 5.0 | 0.10 | 4.71 | 0.45 | 5.0 | 12.1 | 4.7 | 57.10 | |
| 1 | 20.0 | 0.03 | 0.86 | 5.0 | 0.02 | 4.71 | 0.11 | 5.0 | 12.1 | 4.7 | 57.21 | |

100-Year Design Storm Runoff Calculations
(Rational Method Procedure)

| BASIN INFORMATION | | | | DIRECT RUNOFF | | | | TOTAL RUNOFF | | | | REMARKS |
|-------------------|-------------|---------|--------------|---------------|-------|---------|-------|--------------|-----------|---------|--------|---------|
| DESIGN POINT | DRAIN BASIN | AREA Ac | RUNOFF COEFF | T(c) Min | C x A | I In/Hr | Q CFS | T(c) Min | SUM C x A | I In/Hr | Q CFS | |
| 1 | 1.1 | 1.43 | 0.82 | 5.0 | 1.18 | 8.82 | 10.37 | 5.0 | 1.18 | 8.8 | 10.37 | |
| 1 | 1.2 | 1.97 | 0.82 | 5.0 | 1.62 | 8.82 | 14.25 | 5.0 | 2.8 | 8.8 | 24.62 | |
| 1 | 2.0 | 0.88 | 0.82 | 5.0 | 0.72 | 8.82 | 6.33 | 5.0 | 3.5 | 8.8 | 30.95 | |
| 1 | 3.0 | 1.97 | 0.82 | 5.0 | 1.62 | 8.82 | 14.29 | 5.0 | 5.1 | 8.8 | 45.24 | |
| 1 | 4.1 | 1.14 | 0.82 | 5.0 | 0.93 | 8.82 | 8.23 | 5.0 | 6.1 | 8.8 | 53.46 | |
| 1 | 4.2 | 0.77 | 0.82 | 5.0 | 0.631 | 8.82 | 5.56 | 5.0 | 6.7 | 8.8 | 59.03 | |
| 1 | 5.0 | 1.13 | 0.82 | 5.0 | 0.928 | 8.82 | 8.18 | 5.0 | 7.6 | 8.8 | 67.21 | |
| 1 | 6.0 | 2.22 | 0.82 | 5.0 | 1.822 | 8.82 | 16.06 | 5.0 | 9.4 | 8.8 | 83.27 | |
| 1 | 7.0 | 1.02 | 0.82 | 5.0 | 0.834 | 8.82 | 7.35 | 5.0 | 10.3 | 8.8 | 90.63 | |
| 1 | 8.0 | 1.94 | 0.82 | 6.8 | 1.589 | 8.12 | 12.90 | 5.0 | 11.9 | 8.8 | 104.64 | |
| 1 | 9.0 | 0.10 | 0.89 | 5.0 | 0.091 | 8.82 | 0.81 | 5.0 | 12.0 | 8.8 | 105.44 | |
| 1 | 10.0 | 0.16 | 0.89 | 5.0 | 0.143 | 8.82 | 1.26 | 5.0 | 12.1 | 8.8 | 106.70 | |
| 1 | 11.0 | 0.21 | 0.89 | 5.0 | 0.188 | 8.82 | 1.66 | 5.0 | 12.3 | 8.8 | 108.36 | |
| 1 | 12.0 | 0.14 | 0.89 | 5.0 | 0.124 | 8.82 | 1.09 | 5.0 | 12.4 | 8.8 | 109.46 | |
| 1 | 13.0 | 0.08 | 0.89 | 5.0 | 0.071 | 8.82 | 0.62 | 5.0 | 12.5 | 8.8 | 110.08 | |
| 1 | 14.0 | 0.17 | 0.89 | 5.0 | 0.147 | 8.82 | 1.30 | 5.0 | 12.6 | 8.8 | 111.38 | |
| 1 | 15.0 | 0.18 | 0.89 | 5.0 | 0.158 | 8.82 | 1.40 | 5.0 | 12.8 | 8.8 | 112.78 | |
| 1 | 16.0 | 0.17 | 0.89 | 5.0 | 0.148 | 8.82 | 1.30 | 5.0 | 12.9 | 8.8 | 114.08 | |
| 1 | 17.0 | 0.11 | 0.89 | 5.0 | 0.099 | 8.82 | 0.87 | 5.0 | 13.0 | 8.8 | 114.95 | |
| 1 | 18.0 | 0.39 | 0.89 | 5.0 | 0.350 | 8.82 | 3.09 | 5.0 | 13.4 | 8.8 | 118.04 | |
| 1 | 19.0 | 0.11 | 0.89 | 5.0 | 0.100 | 8.82 | 0.88 | 5.0 | 13.5 | 8.8 | 118.92 | |
| 1 | 20.0 | 0.03 | 0.89 | 5.0 | 0.025 | 8.82 | 0.22 | 5.0 | 13.5 | 8.8 | 119.14 | |

APPENDIX E
Proposed Drainage Map

