CONTOUR
DESIGN COLLECTIVE

Geovanny R District Manager

1.11.2024

Morrison Creek Water & Sanitation Metropolitan District

24490 Uncompahgre Rd,

Oak Creek, CO 80467

RE: Tailwaters Project Estimated Water & Sewer Demands

This memo summarizes the findings of an analysis of the potable water and sewer demands for a new project located in the north Stagecoach area, on a nearly 90-acre parcel located to the east of the intersection of CR 16 and CR 18A. The applicant (Tailwaters at Stagecoach LLC) is proposing to develop the Site with a mix of 200 residential units, a small neighborhood commercial area, and the necessary infrastructure improvements required to serve the development (the "Project"). The Project represents a carefully designed new neighborhood located in Stagecoach, a central location in Routt County, Colorado.

Potable Water Demand and Storage

In order to extend potable service to the Project, the existing waterline currently in the vicinity of Snowbird Lane and CR 16 will be extended to the site by the Applicant to provide potable water to the Site. Future expansion by the District from the intersection of CR 16 and CR18A may be possible. Based on discussions and preliminary plans completed by the District, a new potable water storage tank will be constructed to the south of the Site near the intersection of CR 16 and Snowbird Trail on a lot owned by the District. The Applicant will extend a new water main from this area to and throughout the Project site.

Contour established the following recommended planning values based on current unit consumption rates reported by the District and other high-mountain communities as well as consideration of how water use in new development might compare to that within the existing District boundaries, the potential impacts of a warming climate, trends in non-revenue water percentage with new development, etc. The result was planning values of 88 gpcd (gallons/capita/day) utilizing an average of 2.3 people/unit, provides an estimated residential demand of 202 gpd. Based on a unit distribution as shown in Table 1 below, the Project will contain 200 residential units and approximately 12,000 s.f. of commercial area.

Using a peak factor of 1.7, Table 2 shows the average demand and peak day demand for the Project as well as associated storage requirements. Fire flow requirements have been provided by Oak Creek Fire District Chief Brady Glauthier, using your guideline of approximately 1,500 sqft per unit, two story, exposures within 50 ft, and Type V construction the required number of gallons with a required flow rate of 500 gpm would be 73,317.86 gallons. There is an additional 50% requirement for contingency/reserve (36,658.93) resulting in a total amount of water that needs to be stored for fire suppression of 109,976.79 gallons.

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Table 1 - Project Unit Details

Site	Est Bedrooms	unit count	unit size	Total Unit (s.f.)
Phase 1		**31**		
Townhome	3	20	1500	30,000
Small Hse	3	11	1800	19,800
Phase 2		**39**		
Duplex	2	14	900	12,600
Med Hse	3	21	2000	42,000
Large Hse	4	4	2500	10,000
Phase 3 / Phase 4		**40**		
Large Hse	4	20	2500	50,000
Townhome	3	20	1500	30,000
Phase 5 / Phase 7		**85**		
Med Hse	3	33	2000	66,000
Duplex	3	52	1700	88,400
Phase 6		**9**		
Commercial	0	4	3000	12,000
Apartment	1	5	800	4,000
TOTAL All PHASEs		**200**		**364,800**

Table 2 - Water Production and Storage

Tailwaters Development **Project Water Demand Calculations**	
Total Water Demand	
Residential (SFE)	200
Person per SFE	2.3
Residential (Population)	460
Residential Use (gpd/SFE)	202
Residential Use (gpcd)	88
Residential Demand (gpd)	**40,480**
Commercial (Sq. Ft.)	12,000
Commercial Use (0.6 SFE/1,000 sq.ft.)	7.2
Industrial (Sq. Ft.)	0
Industrial Use (0.4 SFE/1,000 sq. ft.)	0
Commercial and Industrial Use (gpd/SFE)	202
Commercial and Industrial Demand (gpd)	**1,457**
Average Demand w/ UAW (gpd)	**41,937**
Peak Day Factor	1.7
Peak Day Demand (gpd)	**72,450**
Equilization Storage (85 gal/unit)	**17,595**
Fire Flows	
Residential Rate (gpm)	500
50% Cotingency	
Total (Gallons)	**109,977**
Water Storage	
Total (Gallons)	**200,022**
Notes: *1 - UAW: Unaccounted for water* *2 - RFWSD Water Standards include UAW* *3 - REC UAW is 10%*	

Sewer Capacity Requirements

An existing sewer main runs through the site, the project will connect directly to this main in multiple locations. The District has indicated that the wastewater treatment system, which is currently being upgrade, currently has and will have adequate capacity to accommodate the Project. In order to mitigate impacts from the Project, the Applicant or homeowners within the Project will pay sewer taps fees during the individual unit permit and approval stage.

Based on information provided by the District, the average flow rate to the plant is approximately 150 gpd per residential unit which is lower than the design value being used. For planning purposes, a conservative design flow rate of 202 gpd per residential unit will be used. The following table and chart provide average and peak flow rates as well as estimated hourly and equalization storage requirements for the Project.

Table 3 - Wastewater Flow Calculations

Tailwaters Development **Project Wastewater Flow Calculations**	
Residential (Units)	200
Person per Unit	2.30
Residential (Population)	460
Residential Use (gpd/unit)	202
Residential Use (gpcd)	88
Residential Demand (gpd)	**40,480**
Commercial (Sq. Ft.)	12,000
Commercial Use (0.6 SFE/1,000 sq.ft.)	7
Industrial (Sq. Ft.)	0
Industrial Use (0.4 SFE/1,000 sq. ft.)	0
Commercial and Industrial Use (gpd/SFE)	202
Commercial and Industrial Demand (gpd)	**1,457**
Average Flow with I/I (gpd)	**41,937**
Peak Month Factor	1.5
Peak Month Flow (gpd)	**62,906**
Peak Factor	5
Peak Flow (gpd)	**209,686**
Wastewater Treatment Plant Capacity	
Peak Month Flow (Nominal Capacity) (gpd)	**62,906**

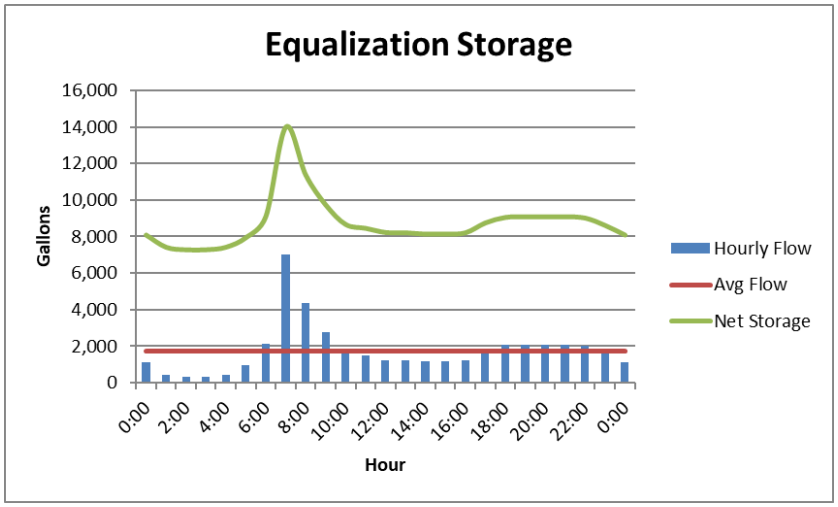

Figure 1 - Equalization Storage

DESIGN CRITERIA

Single Family Equivalents (SFE) - 2.3 People per Unit

Single Family Homes - 1 SFE Plus 0.3 SFE per 1,000 SF
Dwelling Unit - 1 SFE
Commercial - 0.6 SFE per 1,000 SF

Projected SFEs in Tailwaters Project - 207 SFEs

Peak Factor Calculation

Peak Flow = Average Monthly Flow X Peak Factor
Peak Factor = 3.65/(Average Monthly Flow In MGD)^0.167
Peak Factor ≤ 5.0
Average Monthly Flow - Based on Maximum Occupancy

Average Wastewater Flow - 95% of Indoor Water Demand

I/I Estimated at 10% of Average Daily Flow

Unidentified Flows Estimated at 5% of Average Daily Flow

Projected Average Flow - 41,854 gpd
Projected Peak Flow - 209,272 gpd

PROPERTY BOUNDARY (PROJECT LIMITS)

(E) 20' MCWS DISTRICT SEWER MAIN EASEMENT (TYP)

MH-X3
MH-X4
MH-X5
MH-D1
MH-D2
MH-D3
MH-D4
MH-F1
MH-F2
MH-A15
MH-F3
MH-F4
MH11
MH-A14
MH-F5
MH-X6
MH10
MH-F6
MH-F7
MH-A13
MH9

SEWER CONNECTION

ALL SEWER MAINS ARE EITHER 6" OR 8" SDR35 PVC – SEE MR1, MR2 AND SR1 THROUGH SR4 FOR DESIGN DETAILS.

SEWER OUTFALL TO EXIST. DISTRICT MH10

DESIGN POINT 1
Average Flow w/ I/I (gpd) - 9,695
Peak Flow (gpd) - 48,473

DP 1A / 20 — Prop. Corresponding Design Point
DP 1A / 20 — Single Family Equiv. (SFE)
DP 1B / 34

CR18A
PARAPET DR
TAILWATERS BLVD
EDDY CIR

PROPERTY BOUNDARY (PROJECT LIMITS)

UTILITY SYMBOLS

SS	PROP. WATER MAIN
SS	PROP. SEWER MAIN
UT	UNDERGROUND COMM.
UE	UNDERGROUND ELEC.
OE	OVERHEAD ELEC.
ST	CULVERT
	FIRE HYDRANT
	WATER VALVE
SS	SANITARY SEWER MANHOLE
CB	STORM SEWER CATCH BASIN
	LIGHT POLE
PP	ELEC. POLE
E	ELEC. METER
E	ELEC. MANHOLE
T	TELE. RISER/BOX
T	TELE. MANHOLE
HH	COMM. HANDHOLE

N

100' 0 100' 200'
SCALE IN FEET
HORZ: 1"= 100'
VERT: 1"= N/A

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PLOTTED BY: SAM OTERO
PLOT STYLE: 8140CAD_MSTANDARD.CTB

OWNER:

TAILWATERS AT STAGECOACH, LLC

PLANNER:

CONTOUR DESIGN COLLECTIVE
164 Railroad Ave
Minturn, CO 81645
(970) 239-1485

ARCHITECT:

LANDSCAPE ARCHITECT:

NOT FOR CONSTRUCTION

ENGINNER:

NKE 7638 S Crocker Ct
Littleton, CO 80120
(970) 445-8810

COLORADO REGISTERED
WILLIAM S. OTERO
32163
01/10/24
PROFESSIONAL ENGINEER

ISSUE	DATE	DESCRIPTION
0	01/10/24	PRELIMINARY PLAN SUBMISSION

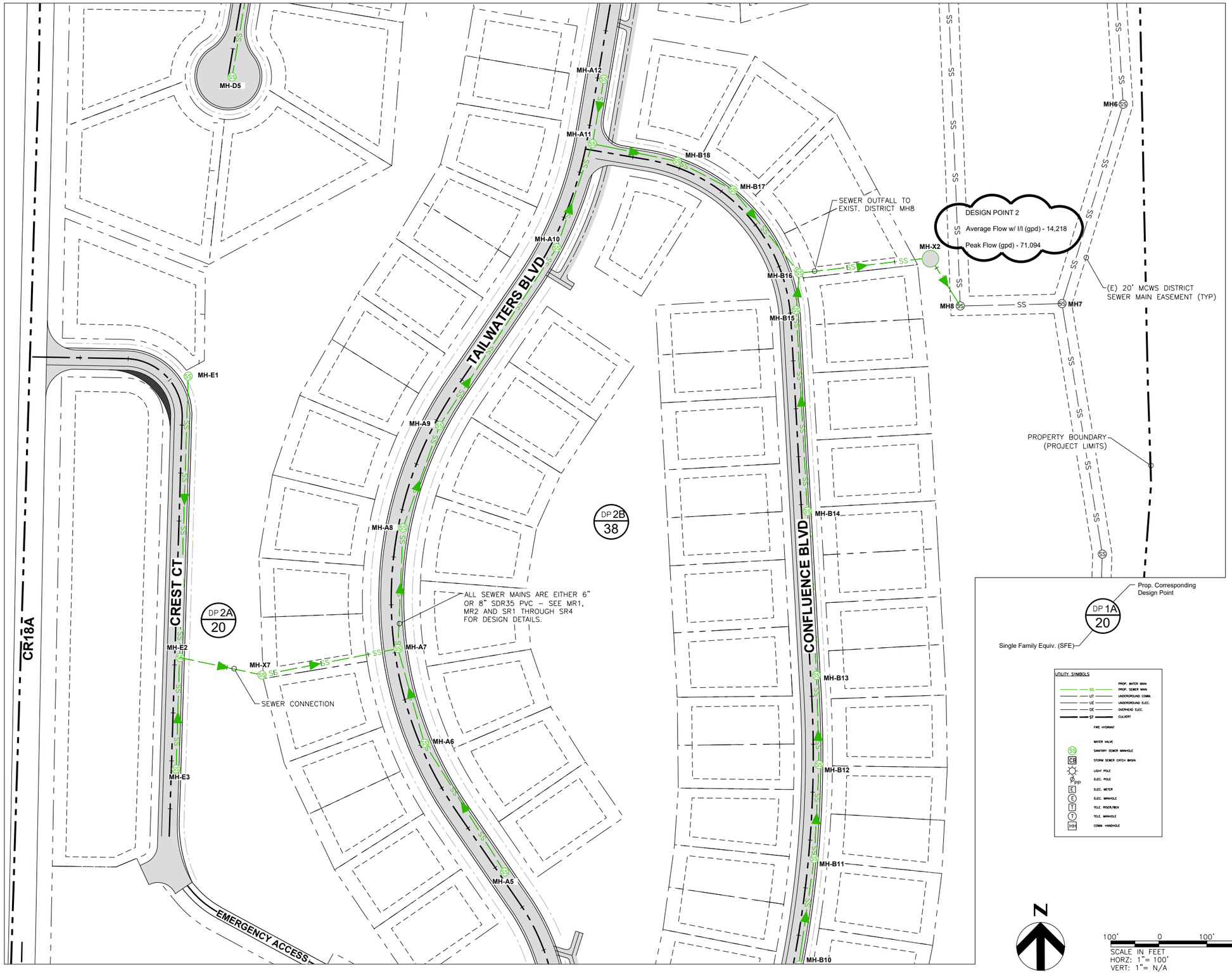
DRAWN BY: S. OTERO

SHEET TITLE:

PROJECTED SEWER FLOW MAP

SHEET NUMBER:

SW1



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DRAWN BY: S. OTERO

SHEET TITLE:

PROJECTED SEWER FLOW MAP

SHEET NUMBER:

SW2

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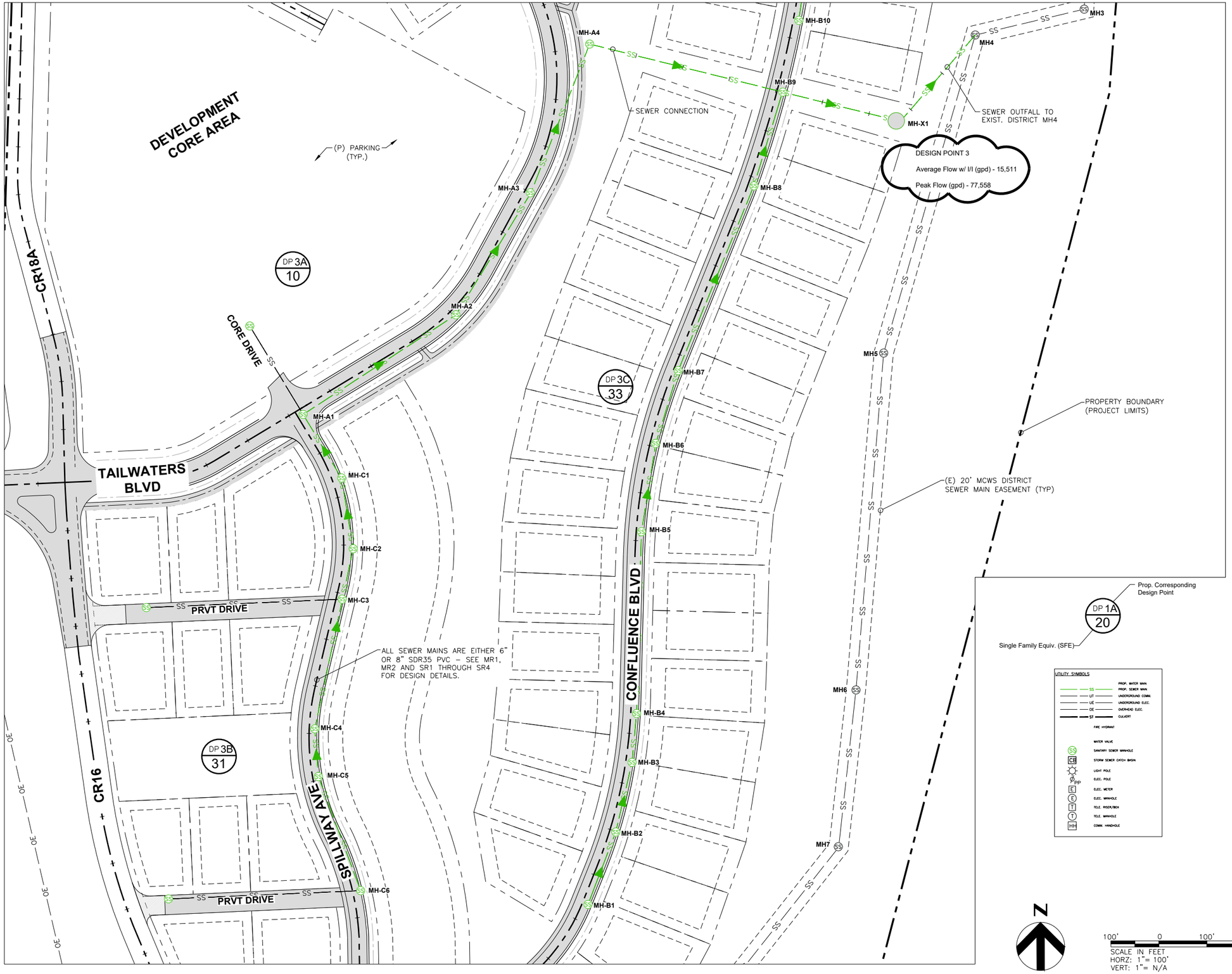
PLOTTED BY: SAM OTERO
PLOT STYLE: 8140CAD_MSTANDARD.CTB



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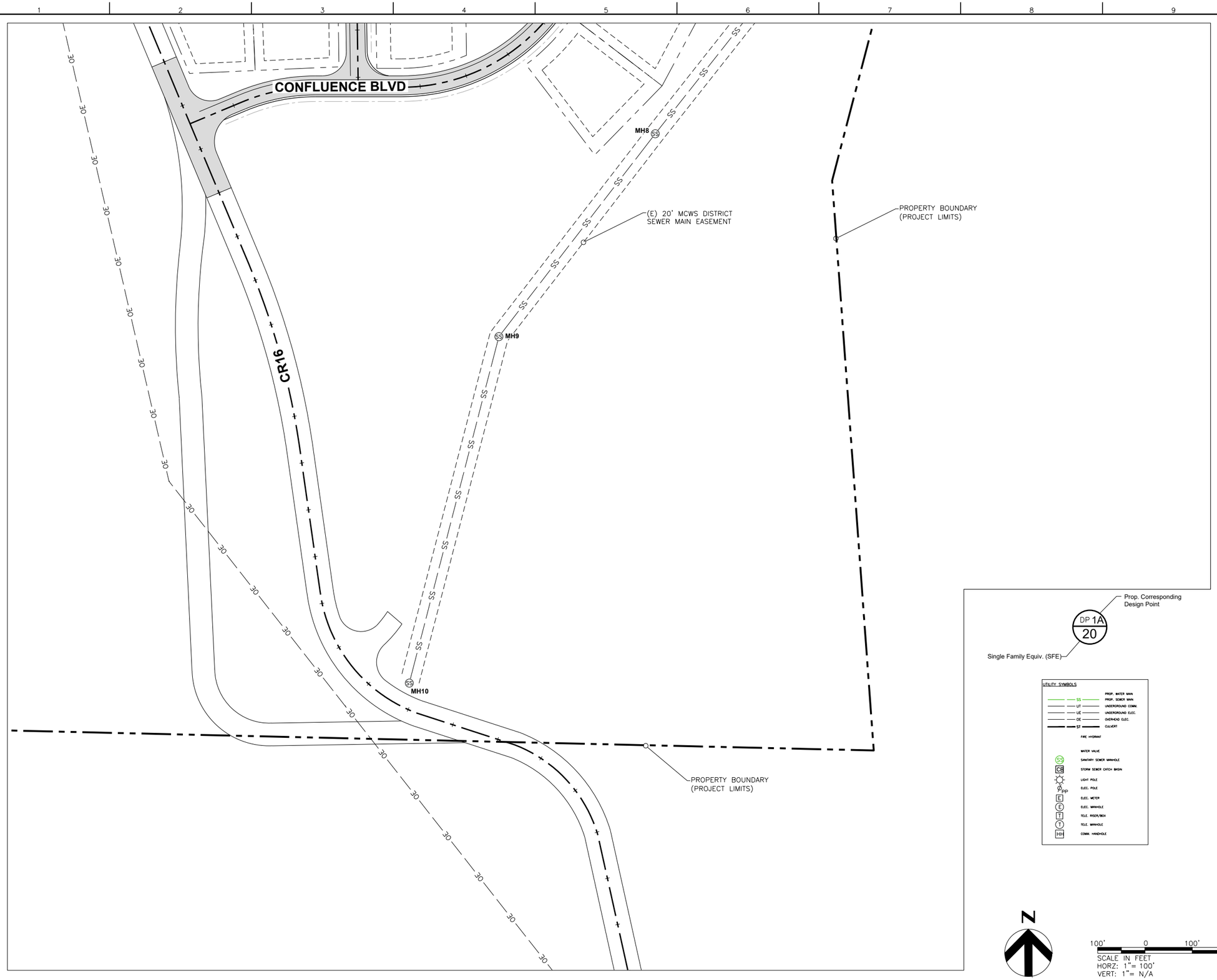
PROJECTED SEWER FLOW MAP

SHEET NUMBER:

SW2



DP 1A / 20
Prop. Corresponding Design Point
Single Family Equiv. (SFE)

UTILITY SYMBOLS

SS	PROP. WATER MAIN
SS	PROP. SEWER MAIN
UT	UNDERGROUND COMM.
UE	UNDERGROUND ELEC.
OE	OVERHEAD ELEC.
ST	CULVERT
	FIRE HYDRANT
	WATER VALVE
SS	SANITARY SEWER MANHOLE
CB	STORM SEWER CATCH BASIN
	LIGHT POLE
PP	ELEC. POLE
E	ELEC. METER
E	ELEC. MANHOLE
T	TELE. RISER/BOX
T	TELE. MANHOLE
HH	COMM. HANDHOLE

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100' 0 100' 200'
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HORZ: 1"= 100'
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PROFESSIONAL ENGINEER

ISSUE	DATE	DESCRIPTION
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DRAWN BY: S. OTERO

SHEET TITLE:

PROJECTED SEWER FLOW MAP

SHEET NUMBER:

SW4

DESIGN CRITERIA: PROJECT: **Tailwaters Development**
1. n = 0.013
2. Datum = NAD83 CALC. BY: W. Sam Otero, P.E.

MH #	Design Flow (q)	Length (L)	Slope (S)	Diameter		Area (A)	Full Flow		Hydraulic Ratios			Partial Velocity (v)	Critical Depth (d_c)	Depth of Flow (d)	Elev. Drop	Invert Elev.		Rim Elev	MH Depth
							Q	Vel (V)	q/Q	d/D	v/V					Inv In	Inv Out		
	cfs	ft	%	in	ft	sf	cfs	fps				fps	ft	ft	ft	ft	ft	ft	ft
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
MH-A1																	7325.5	7334.0	9.0
MH-A2	0.07	184.2	2.0%	8	0.67	0.35	0.17	0.49	0.39	0.14	4.93	2.40	0.12	0.09	3.68	7321.9	7321.8	7330.3	9.0
MH-A3	0.07	175.8	4.4%	8	0.67	0.35	0.25	0.72	0.26	0.11	4.38	3.17	0.12	0.08	7.74	7314.4	7314.3	7322.8	9.0
MH-A4	0.07	165.2	6.0%	8	0.67	0.35	0.29	0.84	0.22	0.11	4.18	3.53	0.12	0.07	9.91	7304.5	7304.4	7314.5	10.5
MH-B9	0.07	266.2	7.0%	8	0.67	0.35	0.32	0.91	0.22	0.10	4.09	3.73	0.12	0.07	18.63	7290.2	7290.1	7301.5	12.0
MH-A5																	7299.8	7308.3	9.0
MH-A6	0.01	155.5	5.1%	6	0.50	0.20	0.13	0.64	0.04	0.11	3.00	1.93	0.04	0.03	7.93	7292.0	7291.9	7300.4	9.0
MH-A7	0.04	101.8	2.7%	8	0.67	0.35	0.20	0.57	0.20	0.17	3.99	2.26	0.09	0.07	2.75	7289.0	7288.9	7297.4	9.0
MH-A8	0.05	122.5	2.0%	8	0.67	0.35	0.17	0.49	0.26	0.23	4.46	2.17	0.10	0.08	2.45	7286.8	7286.7	7295.2	9.0
MH-A9	0.05	113.2	1.7%	8	0.67	0.35	0.16	0.45	0.32	0.27	4.57	2.05	0.10	0.08	1.92	7284.4	7284.3	7295.6	12.0
MH-A10	0.06	219.4	2.0%	8	0.67	0.35	0.17	0.49	0.32	0.30	4.71	2.30	0.11	0.09	4.39	7280	7279.9	7293.9	14.5
MH-A11	0.07	108.7	2.0%	8	0.67	0.35	0.17	0.49	0.41	0.32	4.93	2.40	0.12	0.09	2.17	7277.8	7277.7	7293.1	16.0
MH-A12																	7283.0	7291.5	9.0
MH-A11	0.01	68.2	9.5%	6	0.50	0.20	0.17	0.88	0.06	0.18	2.73	2.40	0.05	0.03	6.48	7277.8	7277.7	7293.1	16.0
MH-A13																	7283.0	7291.5	9.0
MH-A14	0.01	315.9	2.0%	6	0.50	0.20	0.08	0.40	0.13	0.08	3.46	1.39	0.05	0.04	6.32	7276.8	7276.7	7285.2	9.0
MH-A15	0.015	260.9	2.7%	6	0.50	0.20	0.09	0.47	0.16	0.09	3.74	1.75	0.05	0.04	7.04	7270.0	7269.9	7281.0	12.0
MH-B1																	7330.0	7338.5	9.0
MH-B2	0.015	76.8	6.8%	8	0.67	0.35	0.31	0.90	0.05	0.05	2.57	2.31	0.05	0.03	5.22	7324.9	7324.8	7333.3	9.0
MH-B3	0.020	71.1	6.6%	8	0.67	0.35	0.31	0.89	0.06	0.06	2.82	2.50	0.06	0.04	4.69	7320.2	7320.1	7328.6	9.0
MH-B4	0.025	43.8	6.5%	8	0.67	0.35	0.31	0.88	0.08	0.06	3.03	2.66	0.07	0.04	2.85	7317.4	7317.3	7325.8	9.0
MH-B5	0.030	191.2	4.1%	8	0.67	0.35	0.24	0.70	0.12	0.08	3.43	2.40	0.08	0.05	7.84	7309.1	7309.0	7317.5	9.0
MH-B6	0.035	97.7	3.5%	8	0.67	0.35	0.22	0.64	0.16	0.09	3.68	2.37	0.08	0.06	3.42	7317.1	7317.0	7325.5	9.0
MH-B7	0.040	75.8	3.5%	8	0.67	0.35	0.22	0.64	0.18	0.09	3.84	2.47	0.09	0.06	2.65	7314.4	7314.3	7322.8	9.0

DESIGN CRITERIA: PROJECT: **Tailwaters Development**
1. n = 0.013
2. Datum = NAD83 CALC. BY: W. Sam Otero, P.E.

MH #	Design Flow (q)	Length (L)	Slope (S)	Diameter		Area (A)	Full Flow		Hydraulic Ratios			Partial Velocity (v)	Critical Depth (d_c)	Depth of Flow (d)	Elev. Drop	Invert Elev.		Rim Elev	MH Depth
							Q	Vel (V)	q/Q	d/D	v/V					Inv In	Inv Out		
	cfs	ft	%	in	ft	sf	cfs	fps				fps	ft	ft	ft	ft	ft	ft	ft
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
MH-B8	0.045	205.2	3.4%	8	0.67	0.35	0.22	0.64	0.20	0.10	3.99	2.54	0.10	0.07	6.98	7296.6	7296.5	7305.0	9.0
MH-B9	0.050	97.6	6.0%	8	0.67	0.35	0.29	0.84	0.17	0.09	3.78	3.19	0.10	0.06	5.86	7290.2	7290.1	7301.5	12.0
MH-X1	0.120	120.0	9.0%	8	0.67	0.35	0.36	1.03	0.33	0.04	2.31	2.39	0.16	0.03	10.80	7255.2	7255.1	7264.2	9.5
EX. MH4	0.120	120.3	8.0%	8	0.67	0.35	0.34	0.97	0.35	0.04	2.35	2.29	0.16	0.03	9.62	7270	7265.4	7278.5	13.5
DESIGN POINT 3																			
MH-B10																	7290.1	7298.6	9.0
MH-B11	0.015	105.6	3.4%	6	0.50	0.20	0.10	0.52	0.15	0.06	3.72	1.95	0.05	0.04	3.59	7286.6	7286.5	7295.0	9.0
MH-B12	0.020	99.6	3.5%	8	0.67	0.35	0.22	0.64	0.09	0.07	3.11	2.00	0.06	0.04	3.49	7283.1	7283.0	7291.5	9.0
MH-B13	0.025	83.8	3.5%	8	0.67	0.35	0.22	0.64	0.11	0.07	3.33	2.14	0.07	0.05	2.93	7280.3	7280.2	7288.7	9.0
MH-B14	0.030	166.4	3.4%	8	0.67	0.35	0.22	0.64	0.14	0.08	3.53	2.24	0.08	0.05	5.66	7274.6	7274.5	7283.0	9.0
MH-B15	0.035	208.4	2.0%	8	0.67	0.35	0.17	0.49	0.21	0.10	4.06	1.98	0.08	0.07	4.17	7270.7	7270.6	7280.6	10.5
MH-B16	0.040	33.7	5.4%	8	0.67	0.35	0.28	0.80	0.14	0.08	3.59	2.88	0.09	0.06	1.82	7268.9	7268.8	7280.9	12.5
MH-X2	0.110	125.3	10.9%	8	0.67	0.35	0.40	1.14	0.28	0.11	4.38	4.99	0.15	0.08	13.66	7255.2	7255.1	7264.2	9.5
EX. MH8	0.110	136.7	6.0%	8	0.67	0.35	0.29	0.84	0.37	0.13	4.79	4.05	0.15	0.09	8.20	7247.1	7247.0	7255	8.5
DESIGN POINT 2																			
MH-A11																	7277.8	7293	16.0
MH-B18	0.07	83.6	2.0%	8	0.67	0.35	0.17	0.49	0.41	0.14		2.40	0.12	0.09	1.67	7283.1	7283.0	7291.5	9.0
MH-B17	0.07	64	2.0%	8	0.67	0.35	0.17	0.49	0.41	0.14		2.40	0.12	0.09	1.28	7275.1	7275.0	7290.0	15.5
MH-B16	0.07	108.6	6.3%	8	0.67	0.35	0.30	0.86	0.23	0.10		3.59	0.12	0.07	6.84	7268.9	7268.8	7280.9	12.5
MH-C6																	7341.7	7350.2	9.0
MH-C5	0.02	124.7	3.5%	6	0.50	0.20	0.10	0.53	0.19	0.10	3.92	2.09	0.07	0.05	4.36	7337.7	7337.6	7346.1	9.0
MH-C4	0.02	47.2	3.5%	6	0.50	0.20	0.10	0.53	0.19	0.10	3.92	2.09	0.07	0.05	1.65	7337.7	7337.6	7346.1	9.0
MH-C3	0.03	136.0	3.6%	8	0.67	0.35	0.23	0.65	0.13	0.08	3.50	2.29	0.08	0.05	4.90	7335.7	7335.6	7344.1	9.0
MH-C2	0.035	46	3.0%	8	0.67	0.35	0.21	0.60	0.17	0.09	3.77	2.25	0.08	0.06	1.38	7337.7	7337.6	7346.1	9.0
MH-C1	0.04	72.4	3.0%	8	0.67	0.35	0.21	0.60	0.19	0.10	3.92	2.34	0.09	0.06	2.17	7337.7	7337.6	7346.1	9.0

DESIGN CRITERIA: PROJECT: **Tailwaters Development**
1. n = 0.013
2. Datum = NAD83 CALC. BY: W. Sam Otero, P.E.

MH #	Design Flow (q)	Length (L)	Slope (S)	Diameter		Area (A)	Full Flow		Hydraulic Ratios			Partial Velocity (v)	Critical Depth (d_c)	Depth of Flow (d)	Elev. Drop	Invert Elev.		Rim Elev	MH Depth
							Q	Vel (V)	q/Q	d/D	v/V					Inv In	Inv Out		
	cfs	ft	%	in	ft	sf	cfs	fps				fps	ft	ft	ft	ft	ft	ft	ft
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
MH-A1	0.05	71.9	2.0%	8	0.67	0.35	0.17	0.49	0.29	0.12	4.46	2.17	0.10	0.08	1.44	7325.5	7325.4	7333.9	9.0
MH-D5																	7344.2	7352.7	9.0
MH-D4	0.01	259.5	5.5%	6	0.50	0.20	0.13	0.67	0.08	0.06	2.85	1.90	0.05	0.03	14.27	7330.3	7330.2	7338.7	9.0
MH-D3	0.015	199.8	6.7%	6	0.50	0.20	0.14	0.74	0.10	0.07	3.26	2.40	0.06	0.07	13.39	7316.9	7316.8	7325.3	9.0
MH-D2	0.02	233.1	3.1%	6	0.50	0.20	0.10	0.50	0.20	0.10	3.99	2.00	0.07	0.05	7.23	7309.7	7309.6	7318.1	9.0
MH-D1	0.025	79.8	5.2%	6	0.50	0.20	0.13	0.65	0.20	0.10	3.95	2.56	0.08	0.05	4.15	7305.5	7305.4	7316.2	11.5
MH-X3	0.03	136.5	7.6%	8	0.67	0.35	0.33	0.95	0.09	0.07	3.13	2.97	0.08	0.04	10.37	7295.4	7295.3	7305.7	11.0
MH-X4	0.03	84.3	8.9%	8	0.67	0.35	0.36	1.03	0.08	0.06	3.05	3.14	0.08	0.04	7.50	7288.0	7287.9	7298.2	11.0
MH-X5	0.03	88.0	3.0%	8	0.67	0.35	0.21	0.60	0.14	0.08	3.60	2.15	0.08	0.06	2.64	7285.4	7285.3	7296.0	11.5
MH-F1	0.03	153.7	8.1%	8	0.67	0.35	0.34	0.98	0.09	0.07	3.10	3.04	0.08	0.04	12.45	7273.2	7273.1	7281.0	8.5
MH-E1																	7322.1	7322.0	7330.5	9.0
MH-E2	0.015	282.6	2.1%	6	0.50	0.20	0.08	0.41	0.19	0.09	3.88	1.60	0.06	0.05	5.93	7316.1	7316.0	7332.0	16.5
MH-X7	0.03	86.1	14.6%	8	0.67	0.35	0.46	1.32	0.07	0.06	2.83	3.73	0.08	0.04	12.57	7304.0	7299.5	7308	9.0
MH-A7	0.03	141.5	7.5%	8	0.67	0.35	0.33	0.94	0.09	0.07	3.13	2.96	0.08	0.04	10.61	7289.0	7288.9	7297.4	9.0
MH-E2	0.015	115.5	6.5%	6	0.50	0.20	0.14	0.73	0.11	0.07	3.27	2.37	0.06	0.04	7.51	7316.1	7316.0	7332.0	16.5
MH-E3																	7323.6	7323.5	7332.0	9.0
MH-F1																	7273.2	7273.1	7281.0	8.5
MH-F2	0.035	55	2.0%	6	0.50	0.20	0.08	0.40	0.44	0.14	5.04	2.03	0.09	0.07	1.10	7272.1	7272.0	7281.0	9.5
MH-A15	0.035	106.1	2.0%	6	0.50	0.20	0.08	0.40	0.44	0.14	5.04	2.03	0.09	0.07	2.12	7270.0	7269.9	7281.1	12.0
MH-F3	0.05	130.8	2.0%	8	0.67	0.35	0.17	0.49	0.29	0.12	4.46	2.17	0.10	0.08	2.62	7267.4	7267.3	7278.3	11.5
MH-F4	0.055	33.1	2.0%	8	0.67	0.35	0.17	0.49	0.32	0.12	4.59	2.24	0.11	0.08	0.66	7266.7	7266.6	7277.6	11.5
MH-F5	0.06	252.5	2.0%	8	0.67	0.35	0.17	0.49	0.35	0.13	4.71	2.30	0.11	0.09	5.05	7261.6	7261.5	7272.0	11.0
MH-X6	0.075	116.9	11.4%	8	0.67	0.35	0.41	1.16	0.18	0.09	3.88	4.51	0.12	0.06	13.33	7248.6	7248.5	7257.2	9.5
EX. MH10	0.075	50	11.6%	8	0.67	0.35	0.41	1.17	0.18	0.09	3.87	4.54	0.12	0.06	5.80	7245.7	7242.5	7252.5	10.5
DESIGN POINT 1																			

DESIGN CRITERIA: PROJECT: **Tailwaters Development**
1. n = 0.013
2. Datum = NAD83 CALC. BY: W. Sam Otero, P.E.

MH #	Design Flow (q)	Length (L)	Slope (S)	Diameter		Area (A)	Full Flow		Hydraulic Ratios			Partial Velocity (v)	Critical Depth (d_c)	Depth of Flow (d)	Elev. Drop	Invert Elev.		Rim Elev	MH Depth
							Q	Vel (V)	q/Q	d/D	v/V					Inv In	Inv Out		
	cfs	ft	%	in	ft	sf	cfs	fps				fps	ft	ft	ft	ft	ft	ft	ft
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
MH-F7																	7275.9	7284.4	9.0
MH-F6	0.01	43.7	7.5%	6	0.50	0.20	0.15	0.78	0.07	0.06	2.83	2.21	0.05	0.03	3.28	7272.7	7272.6	7281.1	9.0
MH-F5	0.015	215.7	5.1%	6	0.50	0.20	0.13	0.64	0.12	0.08	3.40	2.18	0.06	0.04	11.00	7261.6	7261.5	7272.0	11.0

OWNER:

TAILWATERS AT STAGECOACH, LLC

PLANNER:

CONTOUR DESIGN COLLECTIVE
164 Railroad Ave
Minturn, CO 81645
(970) 239-1485

ARCHITECT:

LANDSCAPE ARCHITECT:

NOT FOR CONSTRUCTION

ENGINNER:

NKE 7638 S Crocker Ct
Littleton, CO 80120
(970) 445-8810

COLORADO REGISTERED PROFESSIONAL ENGINEER
William S Otero
32163
01/10/24

ISSUE	DATE	DESCRIPTION
0	01/10/24	PRELIMINARY PLAN SUBMISSION

DRAWN BY: S. OTERO

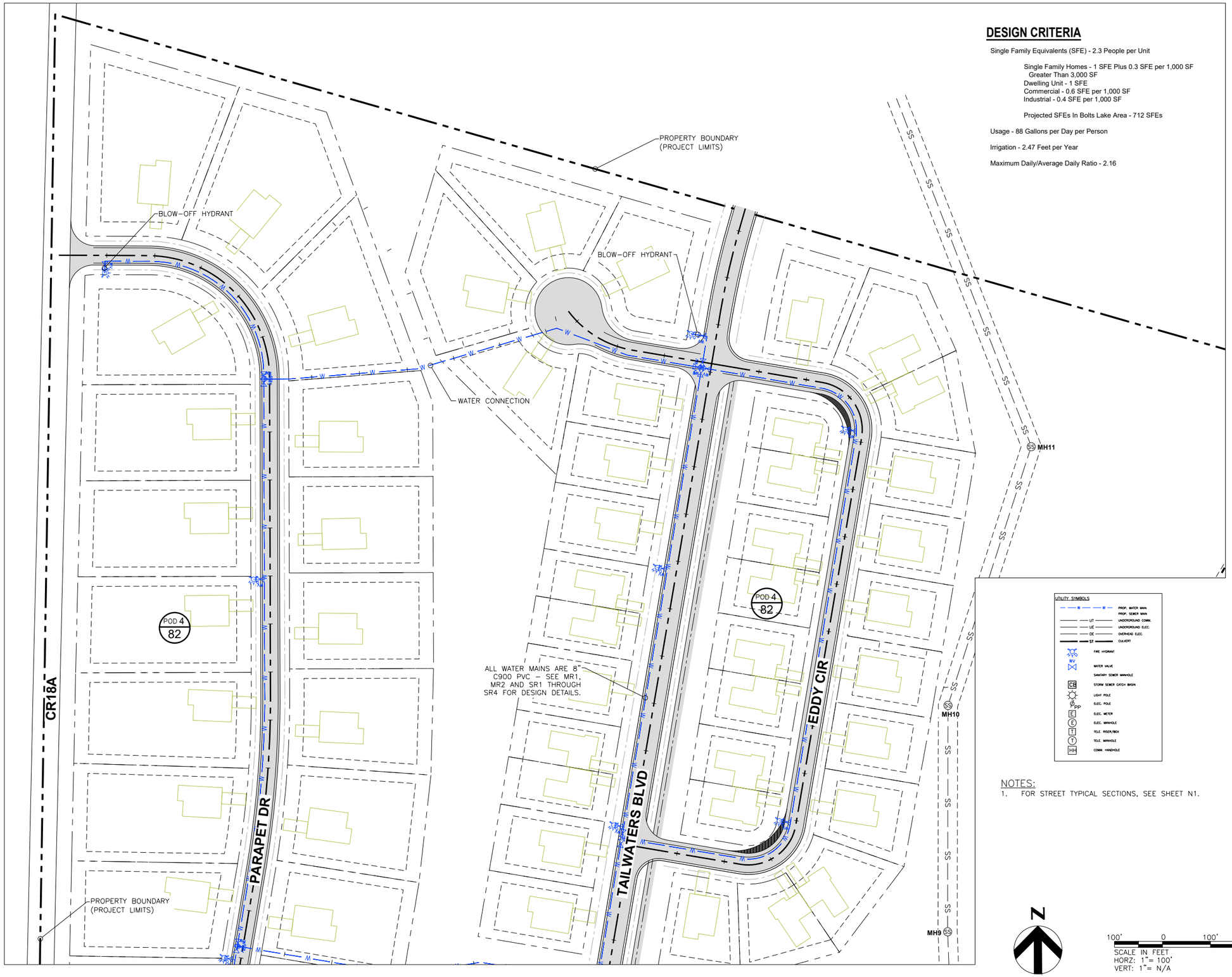
SHEET TITLE:

PROJECTED SEWER COMPUTATIONS

SHEET NUMBER:

SW5

FILE NAME: N:\PROJECTS\BATTLE MOUNTAIN\STAGECOACH\MASTER PLANS\TAILWATERS_SEWER_CALCS.DWG
PLOT DATE/TIME: 1/8/2024 9:10 AM
PLOTTED BY: SAM OTERO
PLOT STYLE: 8140CAD_WSTANDARD.CTB



DESIGN CRITERIA

Single Family Equivalents (SFE) - 2.3 People per Unit

Single Family Homes - 1 SFE Plus 0.3 SFE per 1,000 SF Greater Than 3,000 SF
Dwelling Unit - 1 SFE
Commercial - 0.6 SFE per 1,000 SF
Industrial - 0.4 SFE per 1,000 SF

Projected SFEs In Bolts Lake Area - 712 SFEs

Usage - 88 Gallons per Day per Person

Irrigation - 2.47 Feet per Year

Maximum Daily/Average Daily Ratio - 2.16

UTILITY SYMBOLS

- PROP. WATER MAIN
- PROP. SEWER MAIN
- UT — UNDERGROUND COMM.
- UE — UNDERGROUND ELEC.
- OE — OVERHEAD ELEC.
- ST — CULVERT
- FIRE HYDRANT
- WV — WATER VALVE
- SANITARY SEWER MANHOLE
- CB — STORM SEWER CATCH BASIN
- LIGHT POLE
- ELEC. POLE
- E — ELEC. METER
- E — ELEC. MANHOLE
- T — TELE. RISER/BOX
- T — TELE. MANHOLE
- HH — COMM. HANDHOLE

NOTES:

1. FOR STREET TYPICAL SECTIONS, SEE SHEET N1.

N

100' 0 100' 200'
SCALE IN FEET
HORZ: 1"= 100'
VERT: 1"= N/A

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COLORADO REGISTERED WILLIAM S OTERO 32163 01/10/24 PROFESSIONAL ENGINEER

ISSUE	DATE	DESCRIPTION
0	01/10/24	PRELIMINARY PLAN SUBMISSION

DRAWN BY: S. OTERO

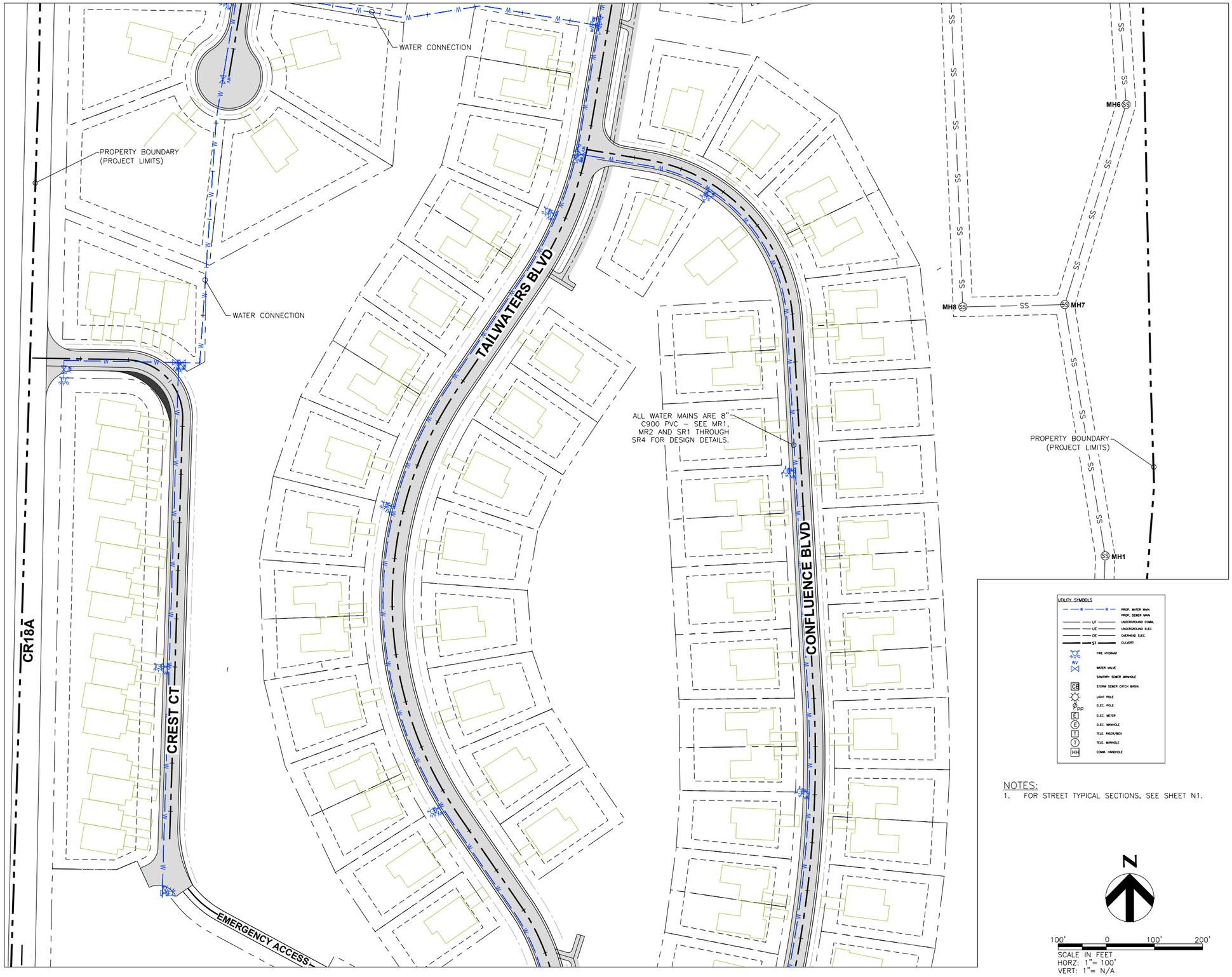
SHEET TITLE:

PROPJECT SITE PLAN (NORTH)

SHEET NUMBER:

SP1

FILE NAME: N:\PROJECTS\BATTLE MOUNTAIN\STAGECOACH\MASTER PLANS\TAILWATERS_WATER_CALCS.DWG
PLOT DATE/TIME: 1/8/2024 9:16 AM
PLOTTED BY: SAM OTERO
PLOT STYLE: 8140CAD_MSTANDARD.CTB



NOTES:

1. FOR STREET TYPICAL SECTIONS, SEE SHEET N1.

N

100' 0 100' 200'

SCALE IN FEET
HORZ: 1"= 100'
VERT: 1"= N/A

FILE NAME: N:\PROJECTS\BATTLE MOUNTAIN\STAGECOACH\MASTER PLANS\TAILWATERS_WATER_CALCS.DWG
PLOT DATE/TIME: 1/8/2024 9:16 AM
PLOTTED BY: SAM OTERO
PLOT STYLE: 8140CAD_MSTANDARD.CTB

OWNER:

TAILWATERS AT STAGECOACH, LLC

PLANNER:

CONTOUR DESIGN COLLECTIVE
164 Railroad Ave
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ARCHITECT:

LANDSCAPE ARCHITECT:

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COLORADO REGISTERED WILLIAM S OTERO 32163 01/10/24 PROFESSIONAL ENGINEER

ISSUE	DATE	DESCRIPTION
0	01/10/24	PRELIMINARY PLAN SUBMISSION

DRAWN BY: S. OTERO

SHEET TITLE:

PROJECT SITE PLAN (NORTH CENTRAL)

SHEET NUMBER:

SP2

DEVELOPMENT CORE AREA

(P) PARKING (TYP.)

CR18A

CORE DRIVE

TAILWATERS BLVD

BLOW-OFF HYDRANT

ALL WATER MAINS ARE 8" C900 PVC – SEE MR1, MR2 AND SR1 THROUGH SR4 FOR DESIGN DETAILS.

PRVT DRIVE

CR16

SPILLWAY AVE

CONFLUENCE BLVD

MCWS DISTRICT WATER MAIN IS 10" C900 PVC – SEE CR16 PLAN AND PROFILES FOR DESIGN DETAILS.

30' 30' 30'

MH3 MH4 MH5 MH6 MH7

PROPERTY BOUNDARY (PROJECT LIMITS)

UTILITY SYMBOLS

- PROP. WATER MAIN
- PROP. SEWER MAIN
- UT — UNDERGROUND COMM.
- UE — UNDERGROUND ELEC.
- OE — OVERHEAD ELEC.
- ST — CULVERT
- FIRE HYDRANT
- WATER VALVE
- SANITARY SEWER MANHOLE
- CB — STORM SEWER CATCH BASIN
- LIGHT POLE
- ELEC. POLE
- E — ELEC. METER
- E — ELEC. MANHOLE
- T — TELE. RISER/BOX
- T — TELE. MANHOLE
- HH — COMM. HANDHOLE

NOTES:

1. FOR STREET TYPICAL SECTIONS, SEE SHEET N1.

N

100' 0 100' 200'

SCALE IN FEET
HORZ: 1"= 100'
VERT: 1"= N/A

FILE NAME: N:\PROJECTS\BATTLE MOUNTAIN\STAGECOACH\MASTER PLANS\TAILWATERS_WATER_CALCS.DWG
PLOT DATE/TIME: 1/8/2024 9:16 AM
PLOTTED BY: SAM OTERO
PLOT STYLE: 8140CAD_MSTANDARD.CTB

OWNER:

TAILWATERS AT STAGECOACH, LLC

PLANNER:

CONTOUR DESIGN COLLECTIVE
164 Railroad Ave
Minturn, CO 81645
(970) 239-1485

ARCHITECT:

LANDSCAPE ARCHITECT:

NOT FOR CONSTRUCTION

ENGINNER:

NKE
7638 S Crocker Ct
Littleton, CO 80120
(970) 445-8810

COLORADO REGISTERED WILLIAM S. OTERO 32163 01/10/24 PROFESSIONAL ENGINEER

ISSUE	DATE	DESCRIPTION
0	01/10/24	PRELIMINARY PLAN SUBMISSION

DRAWN BY: S. OTERO

SHEET TITLE:

PROJECT SITE PLAN (SOUTH CENTRAL)

SHEET NUMBER:

SP3

CONFLUENCE BLVD

CR16

ALL WATER MAINS ARE 8" C900 PVC – SEE MR1, MR2 AND SR1 THROUGH SR4 FOR DESIGN DETAILS.

MCWS DISTRICT WATER MAIN IS 10" C900 PVC – SEE CR16 PLAN AND PROFILES FOR DESIGN DETAILS.

MH8

MH9

MH10

PROPERTY BOUNDARY (PROJECT LIMITS)

PROPERTY BOUNDARY (PROJECT LIMITS)

UTILITY SYMBOLS

- PROP. WATER MAIN
- PROP. SEWER MAIN
- UT — UNDERGROUND COMM.
- UE — UNDERGROUND ELEC.
- OE — OVERHEAD ELEC.
- ST — CULVERT
- FIRE HYDRANT
- WV — WATER VALVE
- SANITARY SEWER MANHOLE
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- ELEC. POLE
- E — ELEC. METER
- E — ELEC. MANHOLE
- T — TELE. RISER/BOX
- T — TELE. MANHOLE
- HH — COMM. HANDHOLE

NOTES:

1. FOR STREET TYPICAL SECTIONS, SEE SHEET N1.

N

100' 0 100' 200'

SCALE IN FEET
HORZ: 1"= 100'
VERT: 1"= N/A

FILE NAME: N:\PROJECTS\BATTLE MOUNTAIN\STAGECOACH\MASTER PLANS\TAILWATERS_WATER_CALCS.DWG
PLOT DATE/TIME: 1/8/2024 9:16 AM
PLOTTED BY: SAM OTERO
PLOT STYLE: 8140CAD_MSTANDARD.CTB

OWNER:

TAILWATERS AT STAGECOACH, LLC

PLANNER:

164 Railroad Ave
Minturn, CO 81645
(970) 239-1485
CONTOUR DESIGN COLLECTIVE

ARCHITECT:

LANDSCAPE ARCHITECT:

NOT FOR CONSTRUCTION

ENGINNER:

NKE 7638 S Crocker Ct
Littleton, CO 80120
(970) 445-8810

COLORADO REGISTERED WILLIAM S OTERO 32163 01/10/24 PROFESSIONAL ENGINEER

ISSUE	DATE	DESCRIPTION
0	01/10/24	PRELIMINARY PLAN SUBMISSION

DRAWN BY: S. OTERO

SHEET TITLE:

PROJECT SITE PLAN (SOUTH)

SHEET NUMBER:

SP4