October 3, 2022

Mr. Brad Boland
Town of Castle Rock
175 Kellogg Court
Castle Rock, Colorado 80109

RE: Concept Utility Letter
PDP 21-0005
Alexander Way
IMEG #20002764.00

Dear Brad:

This letter is provided as the Concept Utility Letter in support of the proposed development submitted as Alexander Way.
The project is located in the north half of Section 26 T7S R67W 6th PM and is currently unplatted land. The property is bounded on the east by the Diamond Ridge subdivision, on the south by the Cooper Hook subdivision and on the west by the Silver Heights subdivision. The property ownership is divided into two parcels submitted as a single project with the north half owned by Tierra Investors LLC and the southern portion owned by 455 Alexander LLC. The owners are the developer for the property. IMEG is the consulting engineer providing civil engineering services.

The proposed Alexander Way Subdivision is located in the north half of Section 26, Township 7 South, Range 67 west of the 6th Principal Meridian in Douglas County, Colorado. The property is centrally located and includes portions of the NE ¼ and the NW ¼ of Section 26. The overall project boundary encompasses approximately 77.96 acres.

Development of the project includes 55 single-family detached lots ranging from a half-acre to nearly one acre in size. Additionally, there are 22 duplex units proposed for the southwest corner of the site with access to Brewer Court. Single family and duplex development account for one Single Family Equivalent (SFE) per dwelling unitor 77 SFE's in total.

The northern portion of the property is in the Silver Heights Water and Sanitation District. Representatives of the project have met with the district representatives, and they have indicated that they would not object to allowing the property to develop within the Town of Castle Rock. Sewer service for the development will be served with main line collecting effluent from the property in Brewer Court. Grading for the project is such that standard depth can be maintained for the sewer system

collecting flows and draining south. The total 77 SFE's represents a sufficiently small flow that the downstream capacity of the existing sewer system will not be adversely affected.

The property is in the Metzler North Blue zone with an 8-inch water stub-out located at the north end of Brewer Court. A 12" main is located at the east end of the improved road section for Alexander Place. This project is being developed in coordination with the with the Cooper Hook Lot 4 property immediately south of the project. As such, a coordinated access and water connection location is proposed approximately 700 feet east of Brewer Court. This configuration optimizes the use of both properties and provides water distribution looping for fire suppression and water quality.

A hydraulic analysis is provided to illustrate the system performance under Peak Hour conditions and two fire flow scenarios where hydrants are operated at design fire flow at the north and south cul-de-sacs in the proposed development. Design flows are based on 400 gpd per dwelling unit and a 1500 gpm fire flow assuming application of flow at various locations on the site.

Minimum performance requirements are presented in the table below:

Event	Parameter	Criteria	Model
Peak Hour	Velocity	10 fps max	0.75 fps
	Pressure	35 psi min	41 psi
Fire Hydrant 1	Velocity	15 fps max	9.92 fps
	Pressure	20 psi min	25 psi
Fire Hydrant 10	Velocity	15 fps max	9.92 fps
	Pressure	20 psi min	11 psi

Table assumes that Pipe P-9 is closed during the peak event.

The hydraulic model is based on a series of assumptions that will be further evaluated with subsequent design phases for the development. The Town has indicated that the project is in the Metzler Blue zone which has operating pressure controlled by PRV's between elevations 6476 feet and 6456 feet as the operational hydraulic conditions. As part of the at the Towns evaluation of this conceptual report, they have also requested that the model be evaluated using a more conservative Hazen Williams coefficient at 120 results in increased friction losses in the pipe. The net result is that the deliverable pressure at hydrant 10 fails to model at the minimum deliverable pressure.
Depending upon actual field conditions and calibration of the model, there may be opportunities to address the pressure at hydrant 10 with a combination of on site and/or offsite system upgrades. These alternatives will be evaluated with the subsequent development phases of the project in conjunction with the Town.

Design flows are based on 400 gpd per dwelling unit and a 1500 gpm fire flow assuming application of flow at various locations on the site.

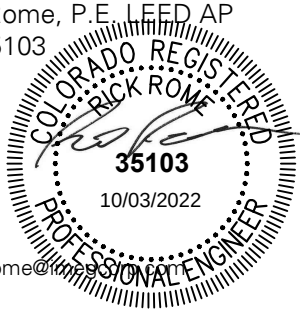
The proposed water system will be extended within dedicated rights of way creating two loops serving the development with a dead-end stub located at the north end of Brewer Court. The site configuration at the north end of Brewer Court is designed to allow for a future water extension that may serve as a secondary supply for Silver Heights subdivision. Any agreements between the Town and the Silver Heights Metropolitan District will occur at such time as the connection is negotiated between the two parties. The design of the Alexander Way subdivision preserves the ability for a future connection without mandating it as part of the proposed development. The proposed development area is entirely within the Metzler North Blue zone hydraulic elevation range.

This project includes a Water Efficiency Plan (WEP) that is presented independently of this report.

Existing sanitary sewer is provided in an 8" stub at the end of the Brewer Court improved segment. This system drains south and west through the Cooper Hook development to the Town's larger wastewater collection and conveyance system.

The proposed sanitary sewer extension will include a single point of connection at Brewer Court and extended within proposed rights of way for single family residential service and the live work product in the southwest corner of the project. Development of the water and sewer infrastructure necessary to serve the project will be the responsibility of the developer/owner.

Rick Rome, P.E. LEED AP
CO 35103



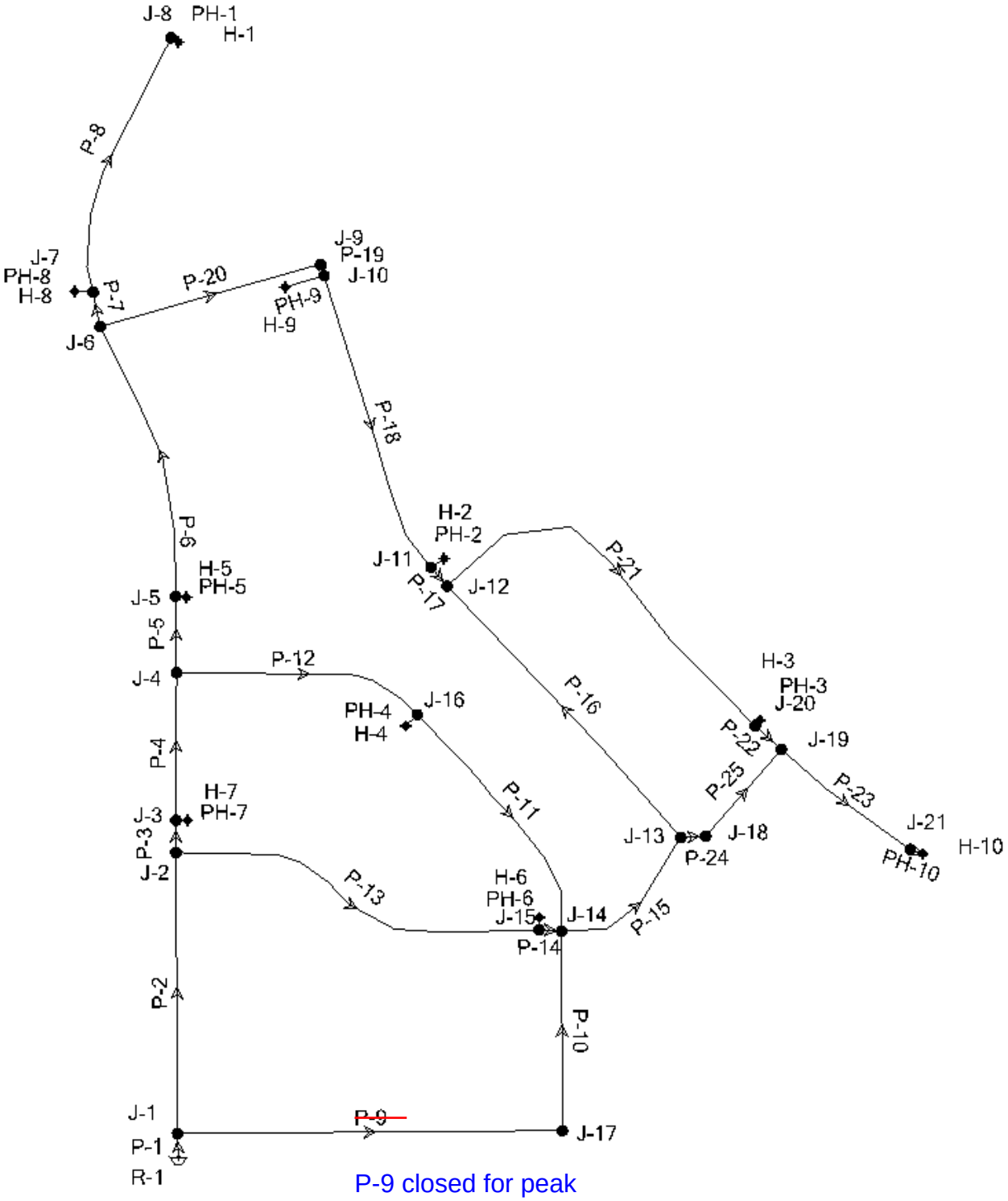
rick.a.rome@imegcorp.com

RAR

Alexander Way

Scenario: Peak Hour Flow

Active Scenario: Peak Hour Flow



P-9 closed for peak flow evaluations

WATER DEMAND CALCULATION ALEXANDER WAY SUBDIVISION				
JUNCTION NO. FROM WATERGEMS	DU	ADD	MDD	PEAK HOUR DEMAND
J-2	12	3.3 gpm	8.3 gpm	18.3 gpm
J-4	5	1.4 gpm	3.5 gpm	7.6 gpm
J-5	6	1.7 gpm	4.2 gpm	9.2 gpm
J-6	3	0.8 gpm	2.1 gpm	4.6 gpm
J-8	6	1.7 gpm	4.2 gpm	9.2 gpm
J-9	4	1.1 gpm	2.8 gpm	6.1 gpm
J-12	8	2.2 gpm	5.6 gpm	12.2 gpm
J-13	6	1.7 gpm	4.2 gpm	9.2 gpm
J-14	13	3.6 gpm	9.0 gpm	19.9 gpm
J-19	7	1.9 gpm	4.9 gpm	10.7 gpm
J-21	7	1.9 gpm	4.9 gpm	10.7 gpm
Total	77			

Single Family and Duplex Demand	400	gpd per du
	0.278	gpm per du
Average Daily Demand (ADD)	2.5	Peak Factor
Max Daily Demand (MDD)	5.5	Peak Factor

Alexander Way
FlexTable: Junction Table
Active Scenario: PH @ 6456

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
J-1	6,198.61	0	111	6,455.98
J-2	6,247.74	18	90	6,455.76
J-3	6,251.95	0	88	6,455.75
J-4	6,274.90	5	78	6,455.72
J-5	6,295.90	9	69	6,455.72
J-6	6,304.28	8	66	6,455.70
J-7	6,305.25	0	65	6,455.70
J-8	6,316.88	9	60	6,455.70
J-9	6,360.04	6	41	6,455.70
J-10	6,359.31	0	42	6,455.70
J-11	6,339.62	0	50	6,455.70
J-12	6,338.47	12	51	6,455.70
J-13	6,299.91	9	67	6,455.70
J-14	6,281.58	20	75	6,455.71
J-15	6,280.15	0	76	6,455.72
J-16	6,298.29	0	68	6,455.72
J-17	6,265.00	0	83	6,455.71
J-18	6,296.95	0	69	6,455.70
J-19	6,351.85	11	45	6,455.70
J-20	6,352.67	0	45	6,455.70
J-21	6,360.52	11	41	6,455.70

Alexander Way

FlexTable: Pipe Table

Active Scenario: PH @ 6456

Label	Length (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
P-9	731	J-17	J-1	8.0	PVC	120.0	(N/A)	(N/A)	(N/A)
PH-8	35	J-7	H-8	6.0	Ductile Iron	120.0	0	0.00	0.000
P-10	379	J-14	J-17	8.0	PVC	120.0	0	0.00	0.000
PH-9	77	J-10	H-9	6.0	Ductile Iron	120.0	0	0.00	0.000
PH-2	30	J-11	H-2	6.0	Ductile Iron	120.0	0	0.00	0.000
PH-7	21	J-3	H-7	6.0	Ductile Iron	120.0	0	0.00	0.000
PH-6	24	J-15	H-6	6.0	Ductile Iron	120.0	0	0.00	0.000
PH-10	24	J-21	H-10	6.0	Ductile Iron	120.0	0	0.00	0.000
PH-5	21	J-5	H-5	6.0	Ductile Iron	120.0	0	0.00	0.000
PH-1	16	J-8	H-1	6.0	Ductile Iron	120.0	0	0.00	0.000
PH-3	14	J-20	H-3	6.0	Ductile Iron	120.0	0	0.00	0.000
PH-4	31	J-16	H-4	6.0	Ductile Iron	120.0	0	0.00	0.000
P-22	67	J-20	J-19	8.0	PVC	120.0	4	0.02	0.000
P-21	790	J-12	J-20	8.0	PVC	120.0	4	0.02	0.000
P-17	46	J-11	J-12	8.0	PVC	120.0	6	0.04	0.000
P-18	595	J-10	J-11	8.0	PVC	120.0	6	0.04	0.000
P-19	22	J-9	J-10	8.0	PVC	120.0	6	0.04	0.000
P-7	67	J-7	J-6	8.0	PVC	120.0	-9	0.06	0.000
P-8	519	J-8	J-7	8.0	PVC	120.0	-9	0.06	0.000
P-16	652	J-13	J-12	8.0	PVC	120.0	10	0.06	0.000
P-23	311	J-19	J-21	8.0	PVC	120.0	11	0.07	0.000
P-20	437	J-6	J-9	8.0	PVC	120.0	12	0.08	0.000
P-11	510	J-16	J-14	8.0	PVC	120.0	15	0.10	0.000
P-12	482	J-4	J-16	8.0	PVC	120.0	15	0.10	0.000
P-24	47	J-13	J-18	8.0	PVC	120.0	18	0.11	0.000
P-25	219	J-18	J-19	8.0	PVC	120.0	18	0.11	0.000
P-6	540	J-6	J-5	8.0	PVC	120.0	-29	0.18	0.000
P-15	314	J-14	J-13	8.0	PVC	120.0	37	0.24	0.000
P-5	145	J-5	J-4	8.0	PVC	120.0	-38	0.24	0.000
P-14	43	J-15	J-14	8.0	PVC	120.0	42	0.27	0.000
P-13	735	J-2	J-15	8.0	PVC	120.0	42	0.27	0.000
P-4	280	J-4	J-3	8.0	PVC	120.0	-58	0.37	0.000
P-3	61	J-3	J-2	8.0	PVC	120.0	-58	0.37	0.000
P-1	52	R-1	J-1	8.0	PVC	120.0	118	0.75	0.000
P-2	534	J-1	J-2	8.0	PVC	120.0	118	0.75	0.000

Alexander Way

FlexTable: Hydrant Table

Active Scenario: MDD + H1 at 6456

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
H-1	6,317.12	1,500	37	6,403.72
H-2	6,339.86	0	39	6,429.43
H-3	6,352.85	0	34	6,430.50
H-4	6,298.44	0	58	6,432.57
H-5	6,295.99	0	58	6,430.76
H-6	6,280.31	0	66	6,432.80
H-7	6,254.80	0	78	6,436.08
H-8	6,305.60	0	50	6,422.11
H-9	6,360.42	0	29	6,426.41
H-10	6,361.57	0	30	6,430.57

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FlexTable: Junction Table
Active Scenario: MDD + H1 at 6456

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
J-1	6,198.61	0	110	6,452.92
J-2	6,247.74	8	78	6,427.35
J-3	6,251.95	0	75	6,426.19
J-4	6,274.90	2	63	6,420.88
J-5	6,295.90	4	53	6,418.15
J-6	6,304.28	4	45	6,408.08
J-7	6,305.25	0	43	6,405.07
J-8	6,316.88	4	28	6,381.64
J-9	6,360.04	3	22	6,411.41
J-10	6,359.31	0	23	6,411.58
J-11	6,339.62	0	33	6,416.14
J-12	6,338.47	6	34	6,416.49
J-13	6,299.91	4	51	6,418.32
J-14	6,281.58	9	60	6,420.88
J-15	6,280.15	0	61	6,421.23
J-16	6,298.29	0	53	6,420.88
J-17	6,265.00	0	67	6,420.88
J-18	6,296.95	0	52	6,418.24
J-19	6,351.85	5	29	6,417.86
J-20	6,352.67	0	28	6,417.76
J-21	6,360.52	5	25	6,417.86

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FlexTable: Pipe Table

Active Scenario: MDD + H1 at 6456

Label	Length (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
P-9	731	J-17	J-1	8.0	PVC	120.0	(N/A)	(N/A)	(N/A)
PH-5	21	J-5	H-5	6.0	Ductile Iron	120.0	0	0.00	0.000
P-10	379	J-14	J-17	8.0	PVC	120.0	0	0.00	0.000
PH-3	14	J-20	H-3	6.0	Ductile Iron	120.0	0	0.00	0.000
PH-6	24	J-15	H-6	6.0	Ductile Iron	120.0	0	0.00	0.000
PH-2	30	J-11	H-2	6.0	Ductile Iron	120.0	0	0.00	0.000
PH-4	31	J-16	H-4	6.0	Ductile Iron	120.0	0	0.00	0.000
PH-9	77	J-10	H-9	6.0	Ductile Iron	120.0	0	0.00	0.000
PH-1	16	J-8	H-1	6.0	Ductile Iron	120.0	1,500	17.02	0.182
PH-7	21	J-3	H-7	6.0	Ductile Iron	120.0	0	0.00	0.000
PH-8	35	J-7	H-8	6.0	Ductile Iron	120.0	0	0.00	0.000
P-8	519	J-8	J-7	8.0	PVC	120.0	-1,504	9.60	0.045
P-7	67	J-7	J-6	8.0	PVC	120.0	-1,504	9.60	0.045
P-16	652	J-13	J-12	8.0	PVC	120.0	336	2.14	0.003
P-11	510	J-16	J-14	8.0	PVC	120.0	3	0.02	0.000
P-12	482	J-4	J-16	8.0	PVC	120.0	3	0.02	0.000
P-17	46	J-11	J-12	8.0	PVC	120.0	-578	3.69	0.008
P-18	595	J-10	J-11	8.0	PVC	120.0	-578	3.69	0.008
P-19	22	J-9	J-10	8.0	PVC	120.0	-578	3.69	0.008
P-20	437	J-6	J-9	8.0	PVC	120.0	-575	3.67	0.008
P-6	540	J-6	J-5	8.0	PVC	120.0	-933	5.95	0.019
P-5	145	J-5	J-4	8.0	PVC	120.0	-937	5.98	0.019
P-22	67	J-20	J-19	8.0	PVC	120.0	-248	1.58	0.002
P-21	790	J-12	J-20	8.0	PVC	120.0	-248	1.58	0.002
P-14	43	J-15	J-14	8.0	PVC	120.0	604	3.85	0.008
P-13	735	J-2	J-15	8.0	PVC	120.0	604	3.85	0.008
P-4	280	J-4	J-3	8.0	PVC	120.0	-942	6.01	0.019
P-3	61	J-3	J-2	8.0	PVC	120.0	-942	6.01	0.019
P-24	47	J-13	J-18	8.0	PVC	120.0	258	1.64	0.002
P-25	219	J-18	J-19	8.0	PVC	120.0	258	1.64	0.002
P-15	314	J-14	J-13	8.0	PVC	120.0	597	3.81	0.008
P-23	311	J-19	J-21	8.0	PVC	120.0	5	0.03	0.000
P-1	52	R-1	J-1	8.0	PVC	120.0	1,554	9.92	0.059
P-2	534	J-1	J-2	8.0	PVC	120.0	1,554	9.92	0.048
PH-10	24	J-21	H-10	6.0	Ductile Iron	120.0	0	0.00	0.000

Alexander Way
FlexTable: Hydrant Table
Active Scenario: MDD + H10 at 6456

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
H-1	6,317.12	0	44	6,418.00
H-2	6,339.86	0	31	6,412.12
H-3	6,352.85	0	23	6,406.83
H-4	6,298.44	0	53	6,420.52
H-5	6,295.99	0	54	6,421.13
H-6	6,280.31	0	60	6,419.44
H-7	6,254.80	0	74	6,426.39
H-8	6,305.60	0	49	6,418.00
H-9	6,360.42	0	24	6,415.43
H-10	6,361.57	1,500	11	6,387.90

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FlexTable: Junction Table
Active Scenario: MDD + H10 at 6456

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
J-1	6,198.61	0	110	6,452.92
J-2	6,247.74	8	78	6,427.35
J-3	6,251.95	0	75	6,426.39
J-4	6,274.90	2	64	6,421.98
J-5	6,295.90	4	54	6,421.13
J-6	6,304.28	4	49	6,418.00
J-7	6,305.25	0	49	6,418.00
J-8	6,316.88	4	44	6,418.00
J-9	6,360.04	3	24	6,415.55
J-10	6,359.31	0	24	6,415.43
J-11	6,339.62	0	31	6,412.12
J-12	6,338.47	6	32	6,411.87
J-13	6,299.91	4	48	6,411.91
J-14	6,281.58	9	59	6,418.98
J-15	6,280.15	0	60	6,419.44
J-16	6,298.29	0	53	6,420.52
J-17	6,265.00	0	67	6,418.98
J-18	6,296.95	0	49	6,410.93
J-19	6,351.85	5	24	6,406.41
J-20	6,352.67	0	23	6,406.83
J-21	6,360.52	5	14	6,392.36

Alexander Way

FlexTable: Pipe Table

Active Scenario: MDD + H10 at 6456

Label	Length (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
P-9	731	J-17	J-1	8.0	PVC	120.0	(N/A)	(N/A)	(N/A)
PH-5	21	J-5	H-5	6.0	Ductile Iron	120.0	0	0.00	0.000
P-10	379	J-14	J-17	8.0	PVC	120.0	0	0.00	0.000
PH-3	14	J-20	H-3	6.0	Ductile Iron	120.0	0	0.00	0.000
PH-6	24	J-15	H-6	6.0	Ductile Iron	120.0	0	0.00	0.000
PH-2	30	J-11	H-2	6.0	Ductile Iron	120.0	0	0.00	0.000
PH-4	31	J-16	H-4	6.0	Ductile Iron	120.0	0	0.00	0.000
PH-9	77	J-10	H-9	6.0	Ductile Iron	120.0	0	0.00	0.000
PH-1	16	J-8	H-1	6.0	Ductile Iron	120.0	0	0.00	0.000
PH-7	21	J-3	H-7	6.0	Ductile Iron	120.0	0	0.00	0.000
PH-8	35	J-7	H-8	6.0	Ductile Iron	120.0	0	0.00	0.000
P-8	519	J-8	J-7	8.0	PVC	120.0	-4	0.03	0.000
P-7	67	J-7	J-6	8.0	PVC	120.0	-4	0.03	0.000
P-16	652	J-13	J-12	8.0	PVC	120.0	43	0.28	0.000
P-11	510	J-16	J-14	8.0	PVC	120.0	349	2.23	0.003
P-12	482	J-4	J-16	8.0	PVC	120.0	349	2.23	0.003
P-17	46	J-11	J-12	8.0	PVC	120.0	485	3.10	0.006
P-18	595	J-10	J-11	8.0	PVC	120.0	485	3.10	0.006
P-19	22	J-9	J-10	8.0	PVC	120.0	485	3.10	0.006
P-20	437	J-6	J-9	8.0	PVC	120.0	488	3.12	0.006
P-6	540	J-6	J-5	8.0	PVC	120.0	-496	3.16	0.006
P-5	145	J-5	J-4	8.0	PVC	120.0	-500	3.19	0.006
P-22	67	J-20	J-19	8.0	PVC	120.0	523	3.34	0.006
P-21	790	J-12	J-20	8.0	PVC	120.0	523	3.34	0.006
P-14	43	J-15	J-14	8.0	PVC	120.0	694	4.43	0.011
P-13	735	J-2	J-15	8.0	PVC	120.0	694	4.43	0.011
P-4	280	J-4	J-3	8.0	PVC	120.0	-852	5.44	0.016
P-3	61	J-3	J-2	8.0	PVC	120.0	-852	5.44	0.016
P-24	47	J-13	J-18	8.0	PVC	120.0	987	6.30	0.021
P-25	219	J-18	J-19	8.0	PVC	120.0	987	6.30	0.021
P-15	314	J-14	J-13	8.0	PVC	120.0	1,034	6.60	0.023
P-23	311	J-19	J-21	8.0	PVC	120.0	1,505	9.61	0.045
P-1	52	R-1	J-1	8.0	PVC	120.0	1,554	9.92	0.059
P-2	534	J-1	J-2	8.0	PVC	120.0	1,554	9.92	0.048
PH-10	24	J-21	H-10	6.0	Ductile Iron	120.0	1,500	17.02	0.182