
**LOON CALL MARKDALE DEVELOPMENT
MUNICIPALITY OF GREY HIGHLANDS
ADDENDUM #1- FUNCTIONAL SERVICING REPORT**



Prepared by:

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TABLE OF CONTENTS

1.0 INTRODUCTION.....	1
1.1 Background.....	1
1.2 Purpose and Scope	1
2.0 PROPOSED DEVELOPMENT.....	1
3.0 WATERMAIN.....	2
3.1 Existing Infrastructure	2
3.2 Proposed Servicing Strategy	3
4.0 SANITARY SEWERS	4
4.1 Existing Infrastructure	4
4.2 Proposed Servicing Strategy	5
5.0 SUMMARY AND CONCLUSIONS.....	6

APPENDICES

Appendix A – Water Testing and Modelling

Appendix B – Sanitary Calculation

1.0 INTRODUCTION

1.1 Background

GH1 Development Inc. (the Developer) is proposing to develop a residential subdivision on a property located at the north-west end of the community of Markdale, known as 775309 Highway 10, in the Municipality of Grey Highlands, County of Grey. The property is approximately 35.36 ha and is legally described as Part Lots 95, 96 and 97, Concession 1, Northeast of the Toronto Sydenham Road.

The property is bounded by Provincial Highway #10 and vacant agricultural land to the south-west, community residential development to the south-east, an existing river (Rocky Saugeen) to the north-west, beyond which are existing agricultural uses, and to the north-east an open space (golf course) use.

1.2 Purpose and Scope

Pinestone Engineering Ltd (PEL) was retained by the Developer to prepare a Functional Servicing Report (FSR) in support of official plan and zoning by-law amendments as well as a proposed draft plan of subdivision. This brief is an addendum to the originally submitted FSR of October 2021 and further describes the proposed watermain servicing within the site and the proposed sanitary sewer crossing Highway 10 for the development.

2.0 PROPOSED DEVELOPMENT

The proposed residential subdivision includes a mix of single detached units and row townhouses. The development is proposed to be constructed in phases, with the phases to be determined by ease of extension of municipal servicing, vehicular site access, connectivity, and market demand.

The developer is proposing a “flex” zoning which would allow the mix of unit types as market conditions dictate. The current development plan contemplates a total of 469 residential units on 469 freehold lots.

3.0 WATERMAIN

3.1 Existing Infrastructure

There is an existing 150mm PVC watermain extending through the adjacent subdivision along Stan Baker Blvd to the property boundary at the northeast quadrant of the subject site. There is also an existing 150mm watermain along Margaret Elizabeth Avenue which is available to be extended into the subject property.

Flow test data for the 150mm dia. Watermain on Stan Baker Blvd and Margaret Elizabeth avenue was provided by Vipond as listed in Table 1 and Table 2 below (a copy is included in Appendix A):

**Table 1
Stan Baker Blvd Hydrant Flow Test Data**

Static Pressure:	60 PSI					
Test No.	No. of Nozzles	Nozzle Dia. (Inches)	Discharge Co-efficient	Residual Pressure (PSI)	Pitot Pressure (PSI)	Discharge (U.S.GPM)
1	1	1.75	0.995	55	44	591
2	1	2.5	0.90	51	24	826
3	2	2.5	0.90	44	16	1350

**Table 2
Margaret Elizabeth Avenue Hydrant Flow Test Data**

Static Pressure:	60 PSI					
Test No.	No. of Nozzles	Nozzle Dia. (Inches)	Discharge Co-efficient	Residual Pressure (PSI)	Pitot Pressure (PSI)	Discharge (U.S.GPM)
1	1	1.75	0.995	52	38	549
2	1	2.5	0.90	55	18	716
3	2	2.5	0.90	51	14	1262

3.2 Proposed Servicing Strategy

Water servicing for the proposed subdivision development will initially be provided through the extension of the existing 150mm dia. watermain on Stan Baker Boulevard at the east side of the subject site. The internal watermains will be looped back to the existing watermain on Margaret Elizabeth Avenue in later phases of the development.

Each unit (single detached and row townhouse) will be serviced by a 25mm dia. polyethylene water service from the internal watermains located within the internal subdivision roads in a location conforming with the Municipal Road standard.

Depth of bury will be 1.8m minimum and pipe embedment and backfill will be in accordance with OPSD 802.010. A minimum 2.5m horizontal or 0.5m vertical pipe separation will be maintained between sanitary sewers and watermains. The water service plan is illustrated on Figure 6 and Drawing WTM-1.

Water servicing within the development boundary will be municipally owned and maintained and an MOECP approval will be required. The new system will be designed and constructed in accordance with the Municipality of Grey Highland's engineering standards and current MOECP standards.

The maximum day and peak hourly water demand calculations were based on the following criteria:

- average per capita flow of 375 litres/day
- a population density of at 3.5 persons/unit
- Maximum day flow factor of 2.75 and Peaking factor of 4.13 as per MOE Guidelines

Based on the criteria listed above and a maximum total of 469 residential units, the average day and maximum day flow is 7.12 L/sec and 19.59 L/sec respectively. Public hydrants will provide fire protection for the proposed development.

System pressures were verified using the KYPIPE computer model to satisfy the conditions of peak hour, maximum day and maximum day plus fire. Two scenarios were modelled: Phases 1-3, and the ultimate build-out. Simulation results are tabulated in Tables 3 and 4 below along with the preferred pressure ranges as indicated in the MOE's Guide to Drinking Water Systems.

**Table 3
Phases 1-3 KYPIPE Model Results**

Scenario	Water Demand Input (L/sec)	Minimum Pressure (kPa)	Preferred Pressure Range (kPa)
Peak Hour	12.17	420.95	350-480
Average Day	2.95	425.39	350-480
Maximum Day + Fire	53.10	287.32	>=140

LOON CALL MARKDALE DEVELOPMENT – GREY HIGHLANDS

ADDENDUM #1 - FUNCTIONAL SERVICING REPORT

Simulations show a residual pressure of approximately 420.0 kPa (60 psi) occurs under peak hour and maximum day scenarios, and the residual fire pressure is 287.3 kPa (41 psi).

Table 4
Ultimate Build-out KYPIPE Model Results

Scenario	Water Demand Input (L/sec)	Minimum Pressure (kPa)	Preferred Pressure Range (kPa)
Peak Hour	29.42	417.74	350-480
Average Day	7.12	439.53	350-480
Maximum Day + Fire	79.59	342.79	>=140

Simulations show a residual pressure of approximately 417.0 kPa (60 psi) occurs under peak hour and maximum day scenarios, and the residual fire pressure is 342.8 kPa (50 psi). Water demand calculation and modelling is included in Appendix A.

4.0 SANITARY SEWERS

4.1 Existing Infrastructure

Municipal sanitary sewers were installed along Stan Baker Blvd east of the subject property as part of the Stonebrook Development. The sanitary sewer main currently terminates near the eastern limit of the subject site. The existing sanitary invert at this proposed connection point is 415.31m ASL.

There is also an existing municipal sanitary lagoon to the south side of Highway 10, approximately 600m from the roadway. The lagoon has a registered easement for vehicular access via a gravel driveway from Highway #10. The current water surface elevation in the lagoon is 405.05m ASL, which is approximately 5m lower than the highway and the south-west corner of the development, allowing a gravity connection to the lagoon. Some adjustments to the existing built driveway access within the easement to the lagoon will be required to provide sufficient cover to the sewer outlet in isolated locations. A preliminary profile for the sewer extension to the lagoon was included in Appendix F of the original FSR.

The new gravity sewer discharging to the existing lagoon can also benefit a future service connection for the Chapman's property located south of Highway 10 across of the LCDG proposed subdivision. Approvals have been obtained from the Chapman's in that regard.

The Municipality of Grey Highlands has previously confirmed that the existing sanitary collection system was designed to accommodate development on the subject property.

4.2 Proposed Servicing Strategy

The proposed site development will be serviced by gravity sanitary sewers installed within the proposed municipal roads within the subdivision. The proposed peak sanitary design flow for the development were calculated using the following design criteria per MOECP:

- 0.0052 L/c/s for average residential flow for new development
- 3.5 people per unit
- Residential peaking factor using the Harmon Formula

The proposed peak design flow for the build out of the subdivision was determined to be 40.39 L/sec. based on 469 lots.

Two sanitary outlets are proposed. Based on the proposed draft plan, 179 lots are proposed to discharge to the existing sanitary sewer on Stan Baker Drive on the east side of the site (producing a peak flow of 15.92 L/sec). The remaining 290 lots are proposed to discharge through a new sanitary sewer across and under Hwy 10 and to the existing municipal lagoon south of the site (producing a peak flow of 25.06 L/sec).

A preliminary review of the proposed Chapman's sewage catchment area and flow estimate was undertaken and completed. The proposed gravity sewer crossing Highway 10 from the LCDG proposed subdivision will be installed along the existing access easement located to the northwest side of the Chapman's property. 290 LCDG units will discharge to this location. Two scenarios for the future development of the Chapman's lands have been considered with flows to be added to LCDG's sanitary discharge as follows:

1. Scenario 1: highway commercial land of 4.0ha along Highway 10 and 15.75ha of light industrial land at the rear. The total sanitary discharge for this scenario is 46.33 l/s where a pipe size of 300mm diameter at 0.4% slope will provide capacity of 61 l/sec.
2. Scenario 2: highway commercial land of 4.0ha along Highway 10 and 15.75ha of residential land at the rear. The total sanitary discharge for this scenario is 81.90 l/s with the residential flows estimated at 20 units/acre. A pipe size of 375mm diameter at 0.4% slope will provide capacity of 110 litre/sec, therefore okay.

The above noted analysis shows that, for worst case scenario, a pipe size of 375mm can serve the sanitary discharge for the LCDG's subdivision as proposed and the future development of the Chapman's lands

A copy of the preliminary sanitary sewer design sheet is included in Appendix B.

Sanitary servicing within the development will be municipally owned and maintained, and an MOECP Environmental Compliance Approval will be required. The new sewer system will be constructed in accordance with the Municipality of Grey Highlands' engineering standards and current MECP standards.

5.0 SUMMARY AND CONCLUSIONS

The findings of this report are summarized as follows:

- The existing 150mm dia. watermain on Stan Baker Blvd and Margaret Elizabeth Avenue can meet the MOECP requirements for domestic pressures and meet the demands under maximum day plus fire.
- The existing watermain on Margaret Elizabeth Ave. and at the north end of the adjacent Stonebrook Developments on Stan Baker Blvd. site will be extended to provide service for the development.
- New watermain will be extended through the subject site in phases to service the full build out of the site. Sizing of the internal watermain will be 150mm dia.
- A 375mm dia. sanitary sewer will be constructed from the existing lagoon crossing Highway #10 to the southwest quadrant of LCDG subject site, to provide service to the western portion of the site and the Chapman's potential future developments. Also, a 200mm dia. sanitary sewer will be extended from the existing sanitary MH located at the north side of the adjacent subdivision to the east side of the subject site, to provide service to the eastern portion of the site. The entire site will be able to discharge by gravity and no pump stations will be required

It is recommended that:

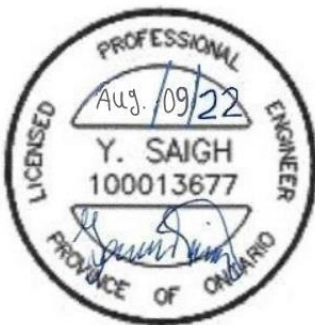
- 1) This report and drawings be submitted to the Municipality of Grey Highlands to support planning approvals for the development.

All of which is respectfully submitted.

PINESTONE ENGINEERING LTD.



Yousef Saigh, P.Eng.
Project Manager



APPENDIX A

Water Testing and Modelling

FLOW TEST RESULTS



DATE : JUNE 30, 2022 TIME : 9:00 AM

LOCATION : STAN BAKER BLVD

MARKDALE

ONTARIO

TEST BY : LEN.K-ETHAN.B



STATIC PRESSURE : 60 PSI

TEST NO.	NO. OF NOZZLES	NOZZLE DIAMETER (INCHES)	DISCHARGE CO-EFFICIENT	RESIDUAL PRESSURE (PSI)	PITOT PRESSURE (PSI)	DISCHARGE (U.S.GPM)
1	1	1-3/4	0.995	55	44	591
2	1	2-1/2	0.9	51	24	826
3	2	2-1/2	0.9	44	16	1350



STAN BAKER BLVD

MARKDALE

ONTARIO

BY : LEN.K/ETHAN.B

OFFICE : BARRIE

TEST BY : VIPOND & PUC

DATE : JUNE 30, 2022

STATIC:

60 PSI

RESIDUAL:

55 PSI

FLOW:

@ 591 GPM

TEST#1

@

TEST#2

@

TEST#3

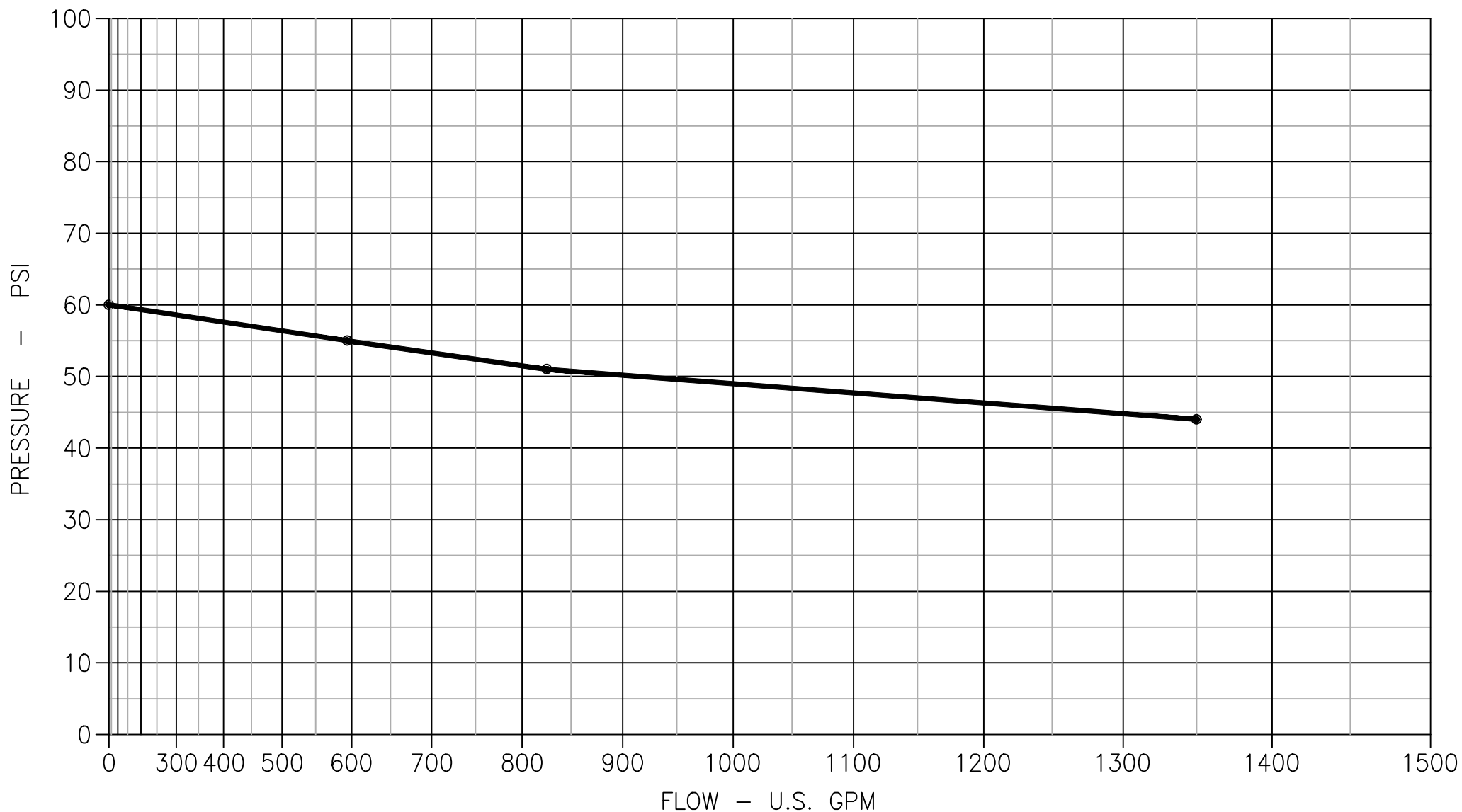
@

51 PSI

826 GPM

44 PSI

1350 GPM



FLOW TEST RESULTS



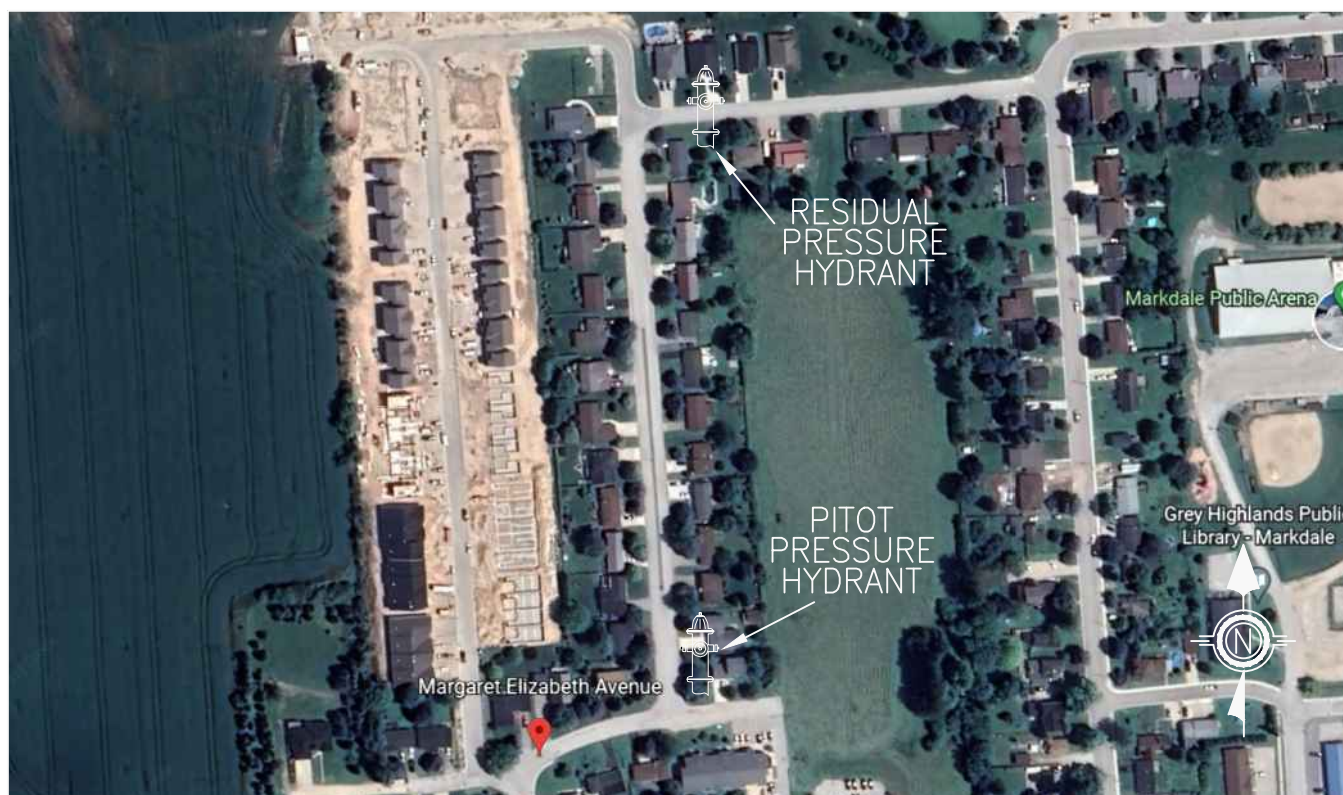
DATE : JUNE 30, 2022 TIME : 9:00 AM

LOCATION : MARGARET ELIZABETH

MARKDALE

ONTARIO

TEST BY : LEN.K-ETHAN.B



STATIC PRESSURE : 60 PSI

TEST NO.	NO. OF NOZZLES	NOZZLE DIAMETER (INCHES)	DISCHARGE CO-EFFICIENT	RESIDUAL PRESSURE (PSI)	PITOT PRESSURE (PSI)	DISCHARGE (U.S.GPM)
1	1	1-3/4	0.995	52	38	549
2	1	2-1/2	0.9	55	18	716
3	2	2-1/2	0.9	51	14	1262



MARGARET ELIZABETH

MARKDALE

ONTARIO

BY : LEN.K/ETHAN.B

OFFICE : BARRIE

TEST BY : VIPOND & PUC

DATE : JUNE 30, 2022

STATIC:

60 PSI

RESIDUAL:

TEST#1

52 PSI

@

FLOW:

549 GPM

TEST#2

55 PSI

@

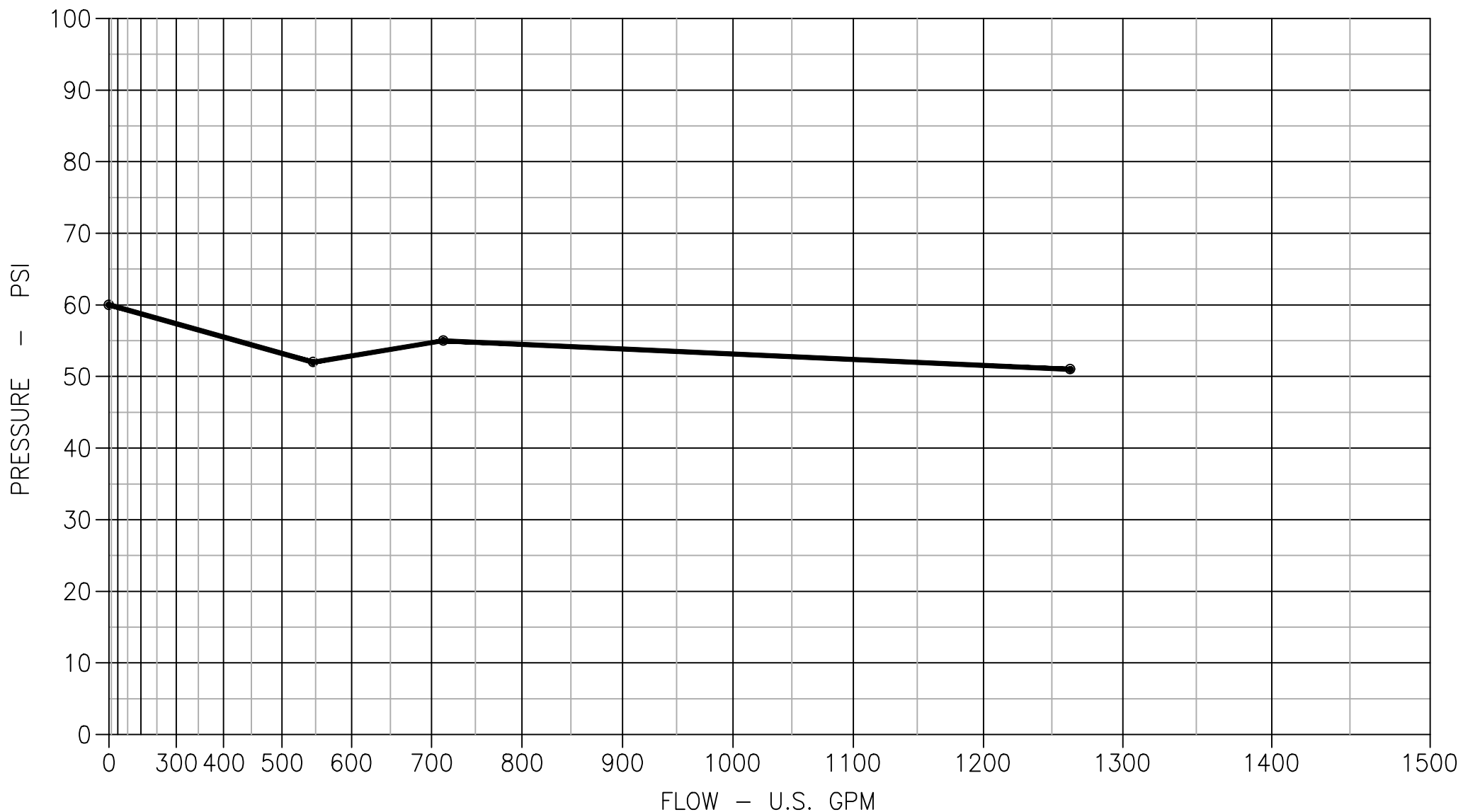
716 GPM

TEST#3

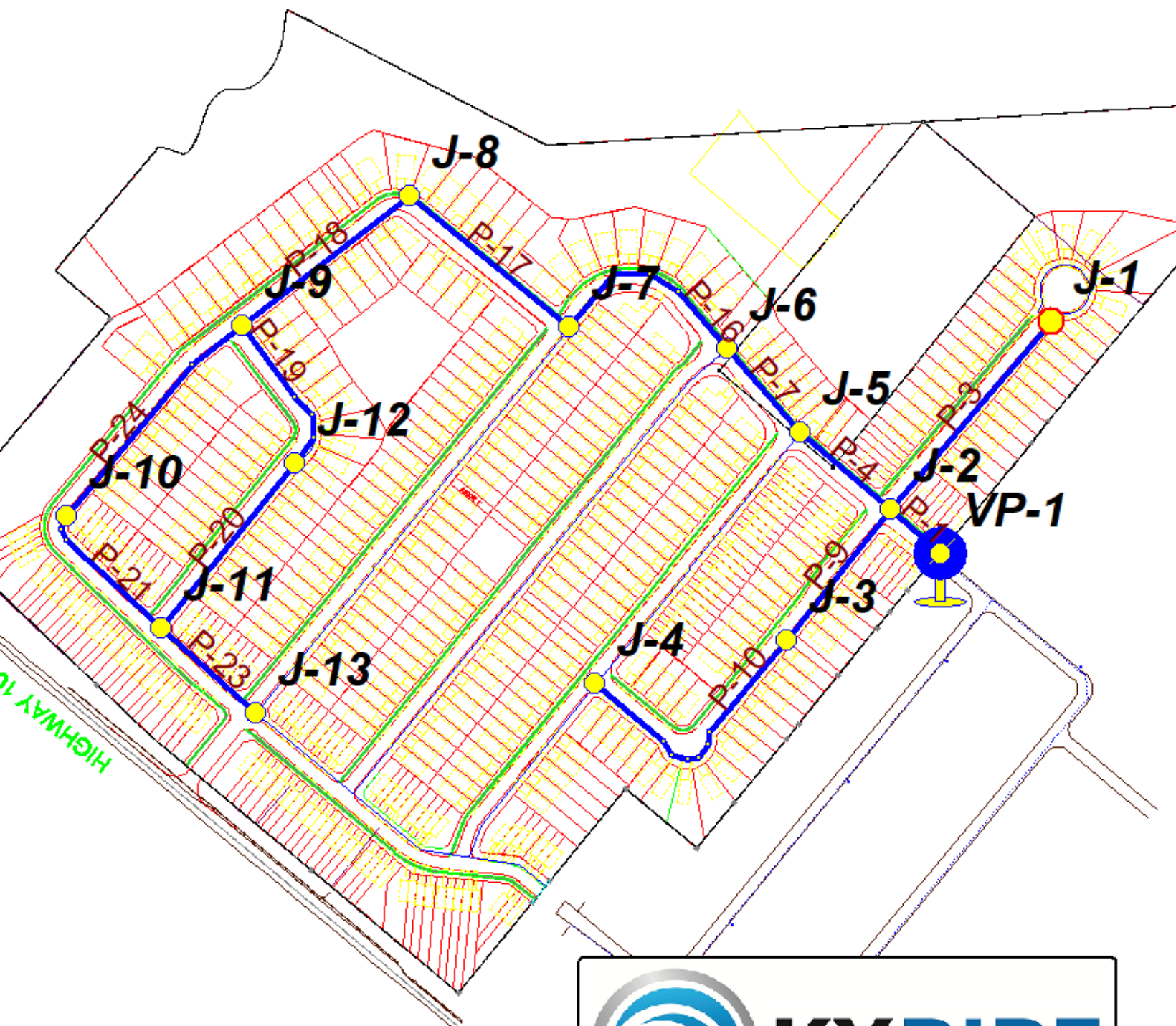
51 PSI

@

1262 GPM



Markdale Phase 1-3



KYPIPE

0

300



**PHASE 1-3 - MARKDALE DEVELOPMENT
WATERMAIN NETWORK ANALYSIS**

File: 20-11524
Date: 2022-07-13

NODE	PIPE ELEVATION (m)	STATIC HEAD (m)	TOTAL HEAD (m)	# of Units	POPULATION	WATER DEMAND			Size (mm)
						AVE DAY (L/S)	MAX DAY (L/S)	PEAK HOURLY (L/S)	
VP1	420.43	42.20	462.63	0	0	0.00	0.00	0.00	150
VP2	425.50	42.20	467.70	0	0	0.00	0.00	0.00	150
J1	420.00	N/A	N/A	34	119	0.52	1.42	2.13	150
J2	419.00	N/A	N/A	24	84	0.36	1.00	1.51	150
J3	419.75	N/A	N/A	38	133	0.58	1.59	2.38	150
J4	420.00	N/A	N/A	0	0	0.00	0.00	0.00	150
J5	418.80	N/A	N/A	0	0	0.00	0.00	0.00	150
J6	419.50	N/A	N/A	0	0	0.00	0.00	0.00	150
J7	418.00	N/A	N/A	0	0	0.00	0.00	0.00	150
J8	416.50	N/A	N/A	0	0	0.00	0.00	0.00	150
J9	415.15	N/A	N/A	16	56	0.24	0.67	1.00	150
J10	413.00	N/A	N/A	18	63	0.27	0.75	1.13	150
J11	415.00	N/A	N/A	45	157.5	0.68	1.88	2.82	150
J12	415.70	N/A	N/A	19	66.5	0.29	0.79	1.19	150
J13	416.50	N/A	N/A	0	0	0.00	0.00	0.00	150
	TOTALS			194.00	679.00	2.95	8.10	12.17	

Notes:

- 1) Water demands based on 3.5 people per unit at 375 litres/person/day
- 2) Max day factor = 2.75 and peaking factor = 4.13 as per MOE Guidelines
- 3) Fire demand of 45L/s used at J1

Average Day (Phases 1-3)

```

* * * * * K Y P I P E * * * * *
*
* Pipe Network Modeling Software
*
* CopyRighted by KYPIPE LLC (www.kypipe.com)
* Version: 8.014 01/11/2016
* Serial #: 8-10075593
* Interface: Classic
* Licensed for Pipe2008
*
* * * * *

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Date & Time: Thu Jul 14 10:43:05 2022

Master File : z:\project documents\l1524m markdale\kypipe\avg_ph123.KYP\avg_ph123.P2K

```

*****
S U M M A R Y   O F   O R I G I N A L   D A T A
*****

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U N I T S S P E C I F I E D

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FLOWRATE ..... = liters/second
HEAD (HGL) ..... = meters
PRESSURE ..... = kpa

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P I P E L I N E D A T A

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	N O D E N A M E S #1 #2		L E N G T H (m)	D I A M E T E R (mm)	R O U G H N E S S C O E F F .	M I N O R L O S S C O E F F .
P-1	VP-1	J-2	48.02	150.00	140.0000	0.00
P-3	J-2	J-1	176.50	150.00	140.0000	0.00
P-4	J-2	J-5	84.79	150.00	140.0000	0.00
P-7	J-5	J-6	78.69	150.00	140.0000	0.00
P-9	J-3	J-2	118.36	150.00	140.0000	0.00
P-10	J-4	J-3	200.96	150.00	140.0000	0.00
P-16	J-7	J-6	152.13	150.00	140.0000	0.00
P-17	J-7	J-8	146.92	150.00	140.0000	0.00
P-18	J-8	J-9	151.21	150.00	140.0000	0.00
P-19	J-9	J-12	119.79	150.00	140.0000	0.00
P-20	J-12	J-11	151.79	150.00	140.0000	0.00
P-21	J-11	J-10	110.82	150.00	140.0000	0.00
P-23	J-11	J-13	90.09	150.00	140.0000	0.00
P-24	J-10	J-9	185.31	150.00	140.0000	0.00

P U M P / L O S S E L E M E N T D A T A

THERE IS A DEVICE AT NODE VP-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (m)	FLOWRATE (l/s)	EFFICIENCY (%)
42.98	0.00	75.00
31.73	85.17	75.00
2.37	170.34	75.00

N O D E D A T A

N O D E N A M E	N O D E T I T L E	E X T E R N A L D E M A N D (l/s)	J U N C T I O N E L E V A T I O N (m)	E X T E R N A L G R A D E (m)
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Average Day (Phases 1-3)

J-1	0.52	420.00	
J-2	0.36	419.00	
J-3	0.58	419.75	
J-4	0.00	420.00	
J-5	0.00	418.80	
J-6	0.00	419.50	
J-7	0.00	418.00	
J-8	0.00	416.50	
J-9	0.24	415.15	
J-10	0.27	413.00	
J-11	0.68	415.00	
J-12	0.29	415.70	
J-13	0.00	416.50	
VP-1	----	420.43	420.43

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

MAXIMUM AND MINIMUM PRESSURES	=	5
MAXIMUM AND MINIMUM VELOCITIES	=	5
MAXIMUM AND MINIMUM HEAD LOSS/1000	=	5

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES	(P) =	14
NUMBER OF END NODES	(J) =	13
NUMBER OF PRIMARY LOOPS	(L) =	1
NUMBER OF SUPPLY NODES	(F) =	1
NUMBER OF SUPPLY ZONES	(Z) =	1

Case: 0

RESULTS OBTAINED AFTER 9 TRIALS: ACCURACY = 0.17509E-04

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	N O D E N U M B E R S		F L O W R A T E	H E A D L O S S	M I N O R L O S S	L I N E V E L O .	H L + M L / 1000	H L / 1000
	#1	#2	lps	m	m	m/s	m/m	m/m
P-1	VP-1	J-2	2.94	0.01	0.00	0.17	0.24	0.24
P-3	J-2	J-1	0.52	0.00	0.00	0.03	0.01	0.01
P-4	J-2	J-5	1.48	0.01	0.00	0.08	0.07	0.07
P-7	J-5	J-6	1.48	0.01	0.00	0.08	0.07	0.07
P-9	J-3	J-2	-0.58	0.00	0.00	0.03	0.01	0.01
P-10	J-4	J-3	0.00	0.00	0.00	0.00	0.00	0.00
P-16	J-7	J-6	-1.48	0.01	0.00	0.08	0.07	0.07
P-17	J-7	J-8	1.48	0.01	0.00	0.08	0.07	0.07
P-18	J-8	J-9	1.48	0.01	0.00	0.08	0.07	0.07
P-19	J-9	J-12	0.66	0.00	0.00	0.04	0.02	0.02
P-20	J-12	J-11	0.37	0.00	0.00	0.02	0.01	0.01
P-21	J-11	J-10	-0.31	0.00	0.00	0.02	0.00	0.00
P-23	J-11	J-13	0.00	0.00	0.00	0.00	0.00	0.00
P-24	J-10	J-9	-0.58	0.00	0.00	0.03	0.01	0.01

P U M P / L O S S E L E M E N T R E S U L T S

Average Day (Phases 1-3)

NAME	FLOWRATE lps	INLET HEAD m	OUTLET HEAD m	PUMP HEAD m	EFFIC- ENCY %	USEFUL POWER kW	INCREMTL COST \$	TOTAL COST \$	#PUMPS PARALLEL	#PUMPS SERIES	NPSH Avail. m
VP-1	2.94	0.00	42.96	43.0	75.00	0.	0.0	0.0	**	**	10.1

N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND lps	HYDRAULIC GRADE m	NODE ELEVATION m	PRESSURE HEAD m	NODE PRESSURE kPa
J-1		0.52	463.38	420.00	43.38	425.39
J-2		0.36	463.38	419.00	44.38	435.21
J-3		0.58	463.38	419.75	43.63	427.84
J-4		0.00	463.38	420.00	43.38	425.39
J-5		0.00	463.37	418.80	44.57	437.12
J-6		0.00	463.37	419.50	43.87	430.20
J-7		0.00	463.36	418.00	45.36	444.81
J-8		0.00	463.35	416.50	46.85	459.43
J-9		0.24	463.34	415.15	48.19	472.56
J-10		0.27	463.34	413.00	50.34	493.63
J-11		0.68	463.34	415.00	48.34	474.01
J-12		0.29	463.34	415.70	47.64	467.15
J-13		0.00	463.34	416.50	46.84	459.30
VP-1		----	463.39	420.43	42.96	421.30

M A X I M U M A N D M I N I M U M V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES kPa	JUNCTION NUMBER	MINIMUM PRESSURES kPa
J-10	493.63	VP-1	421.30
J-11	474.01	J-1	425.39
J-9	472.56	J-4	425.39
J-12	467.15	J-3	427.84
J-8	459.43	J-6	430.20

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (m/s)	PIPE NUMBER	MINIMUM VELOCITY (m/s)
P-1	0.17	P-21	0.02
P-4	0.08	P-20	0.02
P-7	0.08	P-3	0.03
P-16	0.08	P-24	0.03
P-17	0.08	P-9	0.03

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (m/m)	PIPE NUMBER	MINIMUM HL+ML/1000 (m/m)
P-1	0.24	P-21	0.00
P-4	0.07	P-20	0.01
P-18	0.07	P-3	0.01
P-7	0.07	P-24	0.01
P-16	0.07	P-9	0.01

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000	PIPE NUMBER	MINIMUM HL/1000
----------------	--------------------	----------------	--------------------

Average Day (Phases 1-3)

	(m/m)		(m/m)
P-1	0.24	P-21	0.00
P-4	0.07	P-20	0.01
P-18	0.07	P-3	0.01
P-7	0.07	P-24	0.01
P-16	0.07	P-9	0.01

SUMMARY OF INFLOWS AND OUTFLOWS

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
 (-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE lps	NODE TITLE
VP-1	2.94	
NET SYSTEM INFLOW =	2.94	
NET SYSTEM OUTFLOW =	0.00	
NET SYSTEM DEMAND =	2.94	

***** HYDRAULIC ANALYSIS COMPLETED *****

Peak Hourly (Phases 1-3)

```

* * * * * K Y P I P E * * * * *
*
* Pipe Network Modeling Software
*
* Copyrighted by KYPIPE LLC (www.kypipe.com)
* Version: 8.014 01/11/2016
* Serial #: 8-10075593
* Interface: Classic
* Licensed for Pipe2008
*
* * * * *

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Date & Time: Thu Jul 14 10:54:16 2022

Master File : z:\project documents\l1524m markdale\kypipe\peak_ph123.KYP\peak_ph123.P2K

***** SUMMARY OF ORIGINAL DATA *****

U N I T S S P E C I F I E D

FLOWRATE = liters/second
HEAD (HGL) = meters
PRESSURE = kpa

P I P E L I N E D A T A

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	N O D E N A M E S		L E N G T H (m)	D I A M E T E R (mm)	R O U G H N E S S C O E F F .	M I N O R L O S S C O E F F .
	#1	#2				
P-1	VP-1	J-2	48.02	150.00	140.0000	0.00
P-3	J-2	J-1	176.50	150.00	140.0000	0.00
P-4	J-2	J-5	84.79	150.00	140.0000	0.00
P-7	J-5	J-6	78.69	150.00	140.0000	0.00
P-9	J-3	J-2	118.36	150.00	140.0000	0.00
P-10	J-4	J-3	200.96	150.00	140.0000	0.00
P-16	J-7	J-6	152.13	150.00	140.0000	0.00
P-17	J-7	J-8	146.92	150.00	140.0000	0.00
P-18	J-8	J-9	151.21	150.00	140.0000	0.00
P-19	J-9	J-12	119.79	150.00	140.0000	0.00
P-20	J-12	J-11	151.79	150.00	140.0000	0.00
P-21	J-11	J-10	110.82	150.00	140.0000	0.00
P-23	J-11	J-13	90.09	150.00	140.0000	0.00
P-24	J-10	J-9	185.31	150.00	140.0000	0.00

P U M P / L O S S E L E M E N T D A T A

THERE IS A DEVICE AT NODE VP-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (m)	FLOWRATE (l/s)	EFFICIENCY (%)
42.98	0.00	75.00
31.73	85.17	75.00
2.37	170.34	75.00

N O D E D A T A

N O D E N A M E	N O D E T I T L E	E X T E R N A L D E M A N D (l/s)	J U N C T I O N E L E V A T I O N (m)	E X T E R N A L G R A D E (m)
--------------------	----------------------	---	---	-------------------------------------

Peak Hourly (Phases 1-3)

J-1	2.13	420.00
J-2	1.51	419.00
J-3	2.38	419.75
J-4	0.00	420.00
J-5	0.00	418.80
J-6	0.00	419.50
J-7	0.00	418.00
J-8	0.00	416.50
J-9	1.00	415.15
J-10	1.13	413.00
J-11	2.82	415.00
J-12	1.19	415.70
J-13	0.00	416.50
VP-1	----	420.43

OUTPUT OPTION DATA

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

MAXIMUM AND MINIMUM PRESSURES	=	5
MAXIMUM AND MINIMUM VELOCITIES	=	5
MAXIMUM AND MINIMUM HEAD LOSS/1000	=	5

SYSTEM CONFIGURATION

NUMBER OF PIPES	(P) =	14
NUMBER OF END NODES	(J) =	13
NUMBER OF PRIMARY LOOPS	(L) =	1
NUMBER OF SUPPLY NODES	(F) =	1
NUMBER OF SUPPLY ZONES	(Z) =	1

Case: 0

RESULTS OBTAINED AFTER 8 TRIALS: ACCURACY = 0.68997E-07

SIMULATION DESCRIPTION (LABEL)

PIPELINE RESULTS

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1 #2		FLOWRATE lbs	HEAD LOSS m	MINOR LOSS m	LINE VELO. m/s	HL+ML/ 1000 m/m	HL/ 1000 m/m
P-1	VP-1	J-2	12.16	0.16	0.00	0.69	3.31	3.31
P-3	J-2	J-1	2.13	0.02	0.00	0.12	0.13	0.13
P-4	J-2	J-5	6.14	0.08	0.00	0.35	0.93	0.93
P-7	J-5	J-6	6.14	0.07	0.00	0.35	0.93	0.93
P-9	J-3	J-2	-2.38	0.02	0.00	0.13	0.16	0.16
P-10	J-4	J-3	0.00	0.00	0.00	0.00	0.00	0.00
P-16	J-7	J-6	-6.14	0.14	0.00	0.35	0.93	0.93
P-17	J-7	J-8	6.14	0.14	0.00	0.35	0.93	0.93
P-18	J-8	J-9	6.14	0.14	0.00	0.35	0.93	0.93
P-19	J-9	J-12	2.74	0.03	0.00	0.15	0.21	0.21
P-20	J-12	J-11	1.55	0.01	0.00	0.09	0.07	0.07
P-21	J-11	J-10	-1.27	0.01	0.00	0.07	0.05	0.05
P-23	J-11	J-13	0.00	0.00	0.00	0.00	0.00	0.00
P-24	J-10	J-9	-2.40	0.03	0.00	0.14	0.16	0.16

PUMP/LOSS ELEMENT RESULTS

Peak Hourly (Phases 1-3)

NAME	FLOWRATE lps	INLET HEAD m	OUTLET HEAD m	PUMP HEAD m	EFFIC- ENCY %	USEFUL POWER kW	INCREMENTAL COST \$	TOTAL COST \$	#PUMPS PARALLEL	#PUMPS SERIES	NPSH Avail. m
VP-1	12.16	0.00	42.68	42.7	75.00	0.	0.0	0.0	**	**	10.1

N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND lps	HYDRAULIC GRADE m	NODE ELEVATION m	PRESSURE HEAD m	NODE PRESSURE kPa
J-1		2.13	462.92	420.00	42.92	420.95
J-2		1.51	462.95	419.00	43.95	430.98
J-3		2.38	462.93	419.75	43.18	423.44
J-4		0.00	462.93	420.00	42.93	420.99
J-5		0.00	462.87	418.80	44.07	432.17
J-6		0.00	462.79	419.50	43.29	424.58
J-7		0.00	462.65	418.00	44.65	437.90
J-8		0.00	462.52	416.50	46.02	451.26
J-9		1.00	462.37	415.15	47.22	463.11
J-10		1.13	462.34	413.00	49.34	483.90
J-11		2.82	462.34	415.00	47.34	464.23
J-12		1.19	462.35	415.70	46.65	457.48
J-13		0.00	462.34	416.50	45.84	449.52
VP-1		----	463.11	420.43	42.68	418.52

M A X I M U M A N D M I N I M U M V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES kPa	JUNCTION NUMBER	MINIMUM PRESSURES kPa
J-10	483.90	VP-1	418.52
J-11	464.23	J-1	420.95
J-9	463.11	J-4	420.99
J-12	457.48	J-3	423.44
J-8	451.26	J-6	424.58

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (m/s)	PIPE NUMBER	MINIMUM VELOCITY (m/s)
P-1	0.69	P-21	0.07
P-4	0.35	P-20	0.09
P-7	0.35	P-3	0.12
P-16	0.35	P-9	0.13
P-17	0.35	P-24	0.14

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (m/m)	PIPE NUMBER	MINIMUM HL+ML/1000 (m/m)
P-1	3.31	P-21	0.05
P-4	0.93	P-20	0.07
P-7	0.93	P-3	0.13
P-18	0.93	P-9	0.16
P-17	0.93	P-24	0.16

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000	PIPE NUMBER	MINIMUM HL/1000
----------------	--------------------	----------------	--------------------

Peak Hourly (Phases 1-3)

	(m/m)		(m/m)
P-1	3.31	P-21	0.05
P-4	0.93	P-20	0.07
P-7	0.93	P-3	0.13
P-18	0.93	P-9	0.16
P-17	0.93	P-24	0.16

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
 (-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE lps	NODE TITLE
VP-1	12.16	
NET SYSTEM INFLOW =	12.16	
NET SYSTEM OUTFLOW =	0.00	
NET SYSTEM DEMAND =	12.16	

***** HYDRAULIC ANALYSIS COMPLETED *****

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* * * * * K Y P I P E * * * * *
*
* Pipe Network Modeling Software
*
* CopyRighted by KYPIPE LLC (www.kypipe.com)
* Version: 8.014 01/11/2016
* Serial #: 8-10075593
* Interface: Classic
* Licensed for Pipe2008
*
* * * * *

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Date & Time: Thu Jul 14 10:35:00 2022

Master File : z:\project documents\l1524m markdale\kypipe\maxday_ph123.KYP\maxday_ph123.P2K

 SUMMARY OF ORIGINAL DATA

U N I T S S P E C I F I E D

FLOWRATE = liters/second
 HEAD (HGL) = meters
 PRESSURE = kpa

P I P E L I N E D A T A

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	N O D E N A M E S #1 #2	LENGTH (m)	DIAMETER (mm)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-1	VP-1 J-2	48.02	150.00	140.0000	0.00
P-3	J-2 J-1	176.50	150.00	140.0000	0.00
P-4	J-2 J-5	84.79	150.00	140.0000	0.00
P-7	J-5 J-6	78.69	150.00	140.0000	0.00
P-9	J-3 J-2	118.36	150.00	140.0000	0.00
P-10	J-4 J-3	200.96	150.00	140.0000	0.00
P-16	J-7 J-6	152.13	150.00	140.0000	0.00
P-17	J-7 J-8	146.92	150.00	140.0000	0.00
P-18	J-8 J-9	151.21	150.00	140.0000	0.00
P-19	J-9 J-12	119.79	150.00	140.0000	0.00
P-20	J-12 J-11	151.79	150.00	140.0000	0.00
P-21	J-11 J-10	110.82	150.00	140.0000	0.00
P-23	J-11 J-13	90.09	150.00	140.0000	0.00
P-24	J-10 J-9	185.31	150.00	140.0000	0.00

P U M P / L O S S E L E M E N T D A T A

THERE IS A DEVICE AT NODE VP-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (m)	FLOWRATE (l/s)	EFFICIENCY (%)
42.98	0.00	75.00
31.73	85.17	75.00
2.37	170.34	75.00

N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (l/s)	JUNCTION ELEVATION (m)	EXTERNAL GRADE (m)
--------------	---------------	-----------------------------	------------------------------	--------------------------

Max Day (Phases 1-3)

J-1	1.42	420.00
J-2	1.00	419.00
J-3	1.59	419.75
J-4	0.00	420.00
J-5	0.00	418.80
J-6	0.00	419.50
J-7	0.00	418.00
J-8	0.00	416.50
J-9	0.67	415.15
J-10	0.75	413.00
J-11	1.88	415.00
J-12	0.79	415.70
J-13	0.00	416.50
VP-1	----	420.43

OUTPUT OPTION DATA

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

MAXIMUM AND MINIMUM PRESSURES	=	5
MAXIMUM AND MINIMUM VELOCITIES	=	5
MAXIMUM AND MINIMUM HEAD LOSS/1000	=	5

SYSTEM CONFIGURATION

NUMBER OF PIPES	(P) =	14
NUMBER OF END NODES	(J) =	13
NUMBER OF PRIMARY LOOPS	(L) =	1
NUMBER OF SUPPLY NODES	(F) =	1
NUMBER OF SUPPLY ZONES	(Z) =	1

Case: 0

RESULTS OBTAINED AFTER 8 TRIALS: ACCURACY = 0.71206E-06

SIMULATION DESCRIPTION (LABEL)

PIPELINE RESULTS

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS		FLOWRATE	HEAD LOSS	MINOR LOSS	LINE VELO.	HL+ML/ 1000	HL/ 1000
	#1	#2	lbs	m	m	m/s	m/m	m/m
P-1	VP-1	J-2	8.10	0.07	0.00	0.46	1.56	1.56
P-3	J-2	J-1	1.42	0.01	0.00	0.08	0.06	0.06
P-4	J-2	J-5	4.09	0.04	0.00	0.23	0.44	0.44
P-7	J-5	J-6	4.09	0.03	0.00	0.23	0.44	0.44
P-9	J-3	J-2	-1.59	0.01	0.00	0.09	0.08	0.08
P-10	J-4	J-3	0.00	0.00	0.00	0.00	0.00	0.00
P-16	J-7	J-6	-4.09	0.07	0.00	0.23	0.44	0.44
P-17	J-7	J-8	4.09	0.06	0.00	0.23	0.44	0.44
P-18	J-8	J-9	4.09	0.07	0.00	0.23	0.44	0.44
P-19	J-9	J-12	1.82	0.01	0.00	0.10	0.10	0.10
P-20	J-12	J-11	1.03	0.01	0.00	0.06	0.03	0.03
P-21	J-11	J-10	-0.85	0.00	0.00	0.05	0.02	0.02
P-23	J-11	J-13	0.00	0.00	0.00	0.00	0.00	0.00
P-24	J-10	J-9	-1.60	0.01	0.00	0.09	0.08	0.08

PUMP/LOSS ELEMENT RESULTS

Max Day (Phases 1-3)

NAME	FLOWRATE lps	INLET HEAD m	OUTLET HEAD m	PUMP HEAD m	EFFIC- ENCY %	USEFUL POWER kW	INCREMTL COST \$	TOTAL COST \$	#PUMPS PARALLEL	#PUMPS SERIES	NPSH Avail. m
VP-1	8.10	0.00	42.84	42.8	75.00	0.	0.0	0.0	**	**	10.1

N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND lps	HYDRAULIC GRADE m	NODE ELEVATION m	PRESSURE HEAD m	NODE PRESSURE kPa
J-1		1.42	463.18	420.00	43.18	423.48
J-2		1.00	463.19	419.00	44.19	433.39
J-3		1.59	463.18	419.75	43.43	425.95
J-4		0.00	463.18	420.00	43.18	423.50
J-5		0.00	463.16	418.80	44.36	434.99
J-6		0.00	463.12	419.50	43.62	427.78
J-7		0.00	463.05	418.00	45.05	441.84
J-8		0.00	462.99	416.50	46.49	455.91
J-9		0.67	462.92	415.15	47.77	468.50
J-10		0.75	462.91	413.00	49.91	489.44
J-11		1.88	462.91	415.00	47.91	469.80
J-12		0.79	462.91	415.70	47.21	462.99
J-13		0.00	462.91	416.50	46.41	455.09
VP-1		----	463.27	420.43	42.84	420.10

M A X I M U M A N D M I N I M U M V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES kPa	JUNCTION NUMBER	MINIMUM PRESSURES kPa
J-10	489.44	VP-1	420.10
J-11	469.80	J-1	423.48
J-9	468.50	J-4	423.50
J-12	462.99	J-3	425.95
J-8	455.91	J-6	427.78

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (m/s)	PIPE NUMBER	MINIMUM VELOCITY (m/s)
P-1	0.46	P-21	0.05
P-4	0.23	P-20	0.06
P-7	0.23	P-3	0.08
P-16	0.23	P-9	0.09
P-17	0.23	P-24	0.09

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (m/m)	PIPE NUMBER	MINIMUM HL+ML/1000 (m/m)
P-1	1.56	P-21	0.02
P-18	0.44	P-20	0.03
P-4	0.44	P-3	0.06
P-16	0.44	P-9	0.08
P-17	0.44	P-24	0.08

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000	PIPE NUMBER	MINIMUM HL/1000
----------------	--------------------	----------------	--------------------

Max Day (Phases 1-3)

	(m/m)		(m/m)
P-1	1.56	P-21	0.02
P-18	0.44	P-20	0.03
P-4	0.44	P-3	0.06
P-16	0.44	P-9	0.08
P-17	0.44	P-24	0.08

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
 (-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE lps	NODE TITLE
VP-1	8.10	
NET SYSTEM INFLOW =	8.10	
NET SYSTEM OUTFLOW =	0.00	
NET SYSTEM DEMAND =	8.10	

***** HYDRAULIC ANALYSIS COMPLETED *****

Max Day Fire (Phases 1-3)

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* * * * * K Y P I P E * * * * *
*
* Pipe Network Modeling Software
*
* CopyRighted by KYPIPE LLC (www.kypipe.com)
* Version: 8.014 01/11/2016
* Serial #: 8-10075593
* Interface: Classic
* Licensed for Pipe2008
*
* * * * *

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Date & Time: Thu Jul 14 10:38:33 2022

Master File : z:\project documents\l1524m markdale\kypipe\maxday_ph123.KYP\maxday_ph123.P2K

***** SUMMARY OF ORIGINAL DATA *****

UNITS SPECIFIED

FLOWRATE = liters/second
HEAD (HGL) = meters
PRESSURE = kpa

PIPELINE DATA

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NAMES #1 #2	LENGTH (m)	DIAMETER (mm)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-1	VP-1 J-2	48.02	150.00	140.0000	0.00
P-3	J-2 J-1	176.50	150.00	140.0000	0.00
P-4	J-2 J-5	84.79	150.00	140.0000	0.00
P-7	J-5 J-6	78.69	150.00	140.0000	0.00
P-9	J-3 J-2	118.36	150.00	140.0000	0.00
P-10	J-4 J-3	200.96	150.00	140.0000	0.00
P-16	J-7 J-6	152.13	150.00	140.0000	0.00
P-17	J-7 J-8	146.92	150.00	140.0000	0.00
P-18	J-8 J-9	151.21	150.00	140.0000	0.00
P-19	J-9 J-12	119.79	150.00	140.0000	0.00
P-20	J-12 J-11	151.79	150.00	140.0000	0.00
P-21	J-11 J-10	110.82	150.00	140.0000	0.00
P-23	J-11 J-13	90.09	150.00	140.0000	0.00
P-24	J-10 J-9	185.31	150.00	140.0000	0.00

PUMP/LOSS ELEMENT DATA

THERE IS A DEVICE AT NODE VP-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (m)	FLOWRATE (l/s)	EFFICIENCY (%)
42.98	0.00	75.00
31.73	85.17	75.00
2.37	170.34	75.00

NODE DATA

NODE NAME	NODE TITLE	EXTERNAL DEMAND (l/s)	JUNCTION ELEVATION (m)	EXTERNAL GRADE (m)
--------------	---------------	-----------------------------	------------------------------	--------------------------

Max Day Fire (Phases 1-3)

J-1	46.42	420.00	
J-2	1.00	419.00	
J-3	1.59	419.75	
J-4	0.00	420.00	
J-5	0.00	418.80	
J-6	0.00	419.50	
J-7	0.00	418.00	
J-8	0.00	416.50	
J-9	0.67	415.15	
J-10	0.75	413.00	
J-11	1.88	415.00	
J-12	0.79	415.70	
J-13	0.00	416.50	
VP-1	----	420.43	420.43

OUTPUT OPTION DATA

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT
MAXIMUM AND MINIMUM PRESSURES = 5
MAXIMUM AND MINIMUM VELOCITIES = 5
MAXIMUM AND MINIMUM HEAD LOSS/1000 = 5

SYSTEM CONFIGURATION

NUMBER OF PIPES(P) = 14
NUMBER OF END NODES(J) = 13
NUMBER OF PRIMARY LOOPS(L) = 1
NUMBER OF SUPPLY NODES(F) = 1
NUMBER OF SUPPLY ZONES(Z) = 1

Case: 0

RESULTS OBTAINED AFTER 8 TRIALS: ACCURACY = 0.17790E-06

SIMULATION DESCRIPTION (LABEL)

PIPELINE RESULTS

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1 #2		FLOWRATE lbs	HEAD LOSS m	MINOR LOSS m	LINE VELO. m/s	HL+ML/ 1000 m/m	HL/ 1000 m/m
P-1	VP-1	J-2	53.10	2.44	0.00	3.00	50.78	50.78
P-3	J-2	J-1	46.42	6.99	0.00	2.63	39.58	39.58
P-4	J-2	J-5	4.09	0.04	0.00	0.23	0.44	0.44
P-7	J-5	J-6	4.09	0.03	0.00	0.23	0.44	0.44
P-9	J-3	J-2	-1.59	0.01	0.00	0.09	0.08	0.08
P-10	J-4	J-3	0.00	0.00	0.00	0.00	0.00	0.00
P-16	J-7	J-6	-4.09	0.07	0.00	0.23	0.44	0.44
P-17	J-7	J-8	4.09	0.06	0.00	0.23	0.44	0.44
P-18	J-8	J-9	4.09	0.07	0.00	0.23	0.44	0.44
P-19	J-9	J-12	1.82	0.01	0.00	0.10	0.10	0.10
P-20	J-12	J-11	1.03	0.01	0.00	0.06	0.03	0.03
P-21	J-11	J-10	-0.85	0.00	0.00	0.05	0.02	0.02
P-23	J-11	J-13	0.00	0.00	0.00	0.00	0.00	0.00
P-24	J-10	J-9	-1.60	0.01	0.00	0.09	0.08	0.08

PUMP/LOSS ELEMENT RESULTS

Max Day Fire (Phases 1-3)

NAME	FLOWRATE lps	INLET HEAD m	OUTLET HEAD m	PUMP HEAD m	EFFIC- ENCY %	USEFUL POWER kW	INCREMTL COST \$	TOTAL COST \$	#PUMPS PARALLEL	#PUMPS SERIES	NPSH Avail. m
VP-1	53.10	0.00	38.29	38.3	75.00	0.	0.0	0.0	**	**	10.1

N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND lps	HYDRAULIC GRADE m	NODE ELEVATION m	PRESSURE HEAD m	NODE PRESSURE kPa
J-1		46.42	449.30	420.00	29.30	287.32
J-2		1.00	456.29	419.00	37.29	365.65
J-3		1.59	456.28	419.75	36.53	358.20
J-4		0.00	456.28	420.00	36.28	355.75
J-5		0.00	456.25	418.80	37.45	367.24
J-6		0.00	456.21	419.50	36.71	360.04
J-7		0.00	456.15	418.00	38.15	374.09
J-8		0.00	456.08	416.50	39.58	388.17
J-9		0.67	456.02	415.15	40.87	400.75
J-10		0.75	456.00	413.00	43.00	421.70
J-11		1.88	456.00	415.00	41.00	402.06
J-12		0.79	456.00	415.70	40.30	395.24
J-13		0.00	456.00	416.50	39.50	387.35
VP-1		----	458.72	420.43	38.29	375.53

M A X I M U M A N D M I N I M U M V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES kPa	JUNCTION NUMBER	MINIMUM PRESSURES kPa
J-10	421.70	J-1	287.32
J-11	402.06	J-4	355.75
J-9	400.75	J-3	358.20
J-12	395.24	J-6	360.04
J-8	388.17	J-2	365.65

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (m/s)	PIPE NUMBER	MINIMUM VELOCITY (m/s)
P-1	3.00	P-21	0.05
P-3	2.63	P-20	0.06
P-4	0.23	P-9	0.09
P-7	0.23	P-24	0.09
P-16	0.23	P-19	0.10

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (m/m)	PIPE NUMBER	MINIMUM HL+ML/1000 (m/m)
P-1	50.78	P-21	0.02
P-3	39.58	P-20	0.03
P-18	0.44	P-9	0.08
P-4	0.44	P-24	0.08
P-16	0.44	P-19	0.10

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000	PIPE NUMBER	MINIMUM HL/1000
----------------	--------------------	----------------	--------------------

Max Day Fire (Phases 1-3)

	(m/m)		(m/m)
P-1	50.78	P-21	0.02
P-3	39.58	P-20	0.03
P-18	0.44	P-9	0.08
P-4	0.44	P-24	0.08
P-16	0.44	P-19	0.10

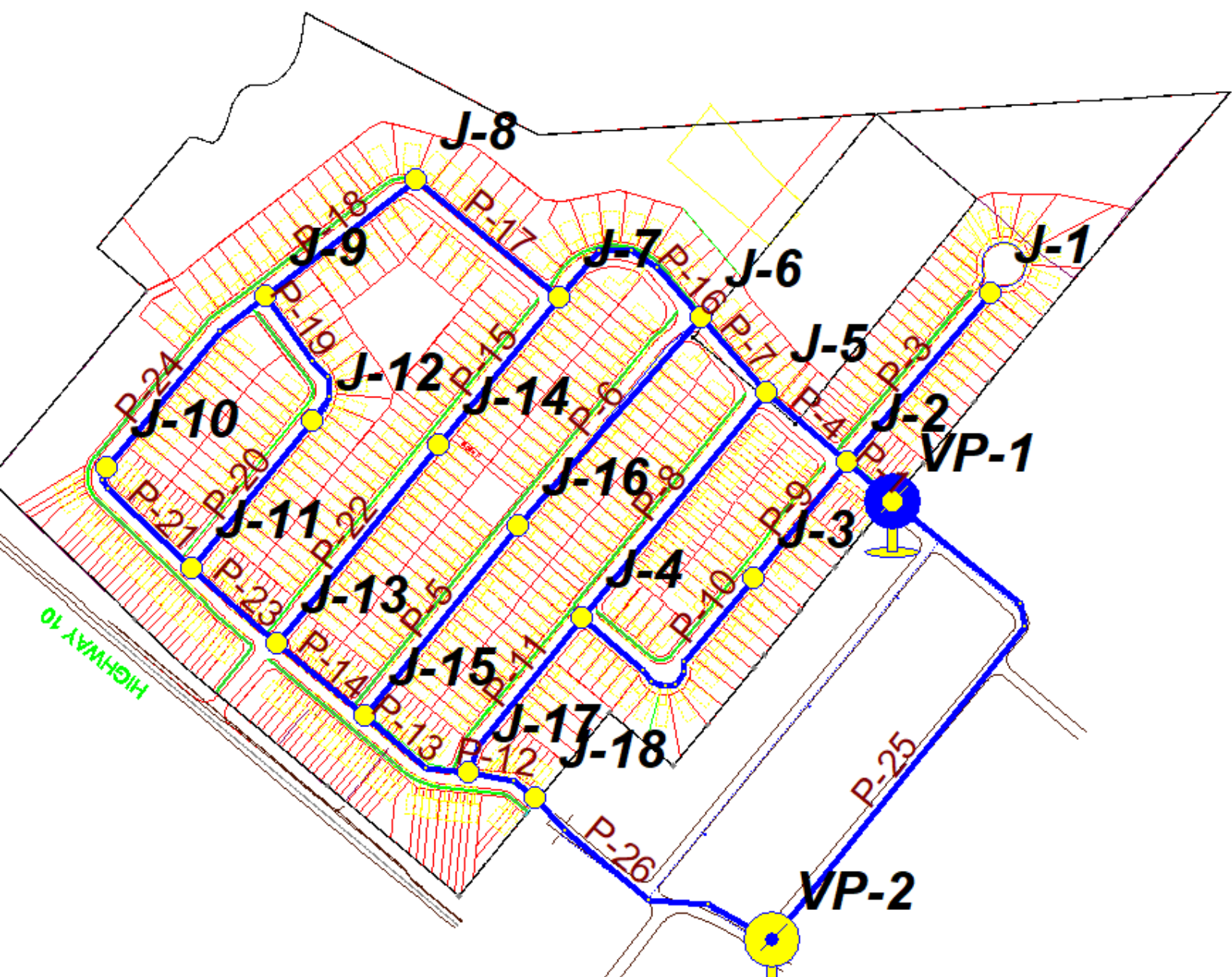
SUMMARY OF INFLOWS AND OUTFLOWS

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
 (-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE lps	NODE TITLE
VP-1	53.10	
NET SYSTEM INFLOW =	53.10	
NET SYSTEM OUTFLOW =	0.00	
NET SYSTEM DEMAND =	53.10	

***** HYDRAULIC ANALYSIS COMPLETED *****

Markdale Ultimate Build-out



KYPIPE

0

400



**ULTIMATE BUILDOUT - MARKDALE DEVELOPMENT
WATERMAIN NETWORK ANALYSIS**

File: 20-11524
Date: 2022-07-13

NODE	PIPE ELEVATION (m)	STATIC HEAD (m)	TOTAL HEAD (m)	# of Units	POPULATION	WATER DEMAND			Size (mm)
						AVE DAY (L/S)	MAX DAY (L/S)	PEAK HOURLY (L/S)	
VP1	420.43	42.20	462.63	0	0	0.00	0.00	0.00	150
VP2	425.50	42.20	467.70	0	0	0.00	0.00	0.00	150
J1	420.00	N/A	N/A	34	119	0.52	1.42	2.13	150
J2	419.00	N/A	N/A	24	84	0.36	1.00	1.51	150
J3	419.75	N/A	N/A	38	133	0.58	1.59	2.38	150
J4	420.00	N/A	N/A	32	112	0.49	1.34	2.01	150
J5	418.80	N/A	N/A	33	115.5	0.50	1.38	2.07	150
J6	419.50	N/A	N/A	21	73.5	0.32	0.88	1.32	150
J7	418.00	N/A	N/A	22	77	0.33	0.92	1.38	150
J8	416.50	N/A	N/A	26	91	0.39	1.09	1.63	150
J9	415.15	N/A	N/A	16	56	0.24	0.67	1.00	150
J10	413.00	N/A	N/A	18	63	0.27	0.75	1.13	150
J11	415.00	N/A	N/A	45	157.5	0.68	1.88	2.82	150
J12	415.70	N/A	N/A	19	66.5	0.29	0.79	1.19	150
J13	416.50	N/A	N/A	18	63	0.27	0.75	1.13	150
J14	417.30	N/A	N/A	41	143.5	0.62	1.71	2.57	150
J15	417.70	N/A	N/A	27	94.5	0.41	1.13	1.69	150
J16	417.70	N/A	N/A	33	115.5	0.50	1.38	2.07	150
J17	421.00	N/A	N/A	12	42	0.18	0.50	0.75	150
J18	423.50	N/A	N/A	10	35	0.15	0.42	0.63	150
	TOTALS			469.00	1,641.50	7.12	19.59	29.42	

Notes:

- 1) Water demands based on 3.5 people per unit at 375 litres/person/day
- 2) Max day factor = 2.75 and peaking factor = 4.13 as per MOE Guidelines
- 3) Fire demand of 60L/s used at J18

Average Day (Ultimate Build-out)

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* * * * * K Y P I P E * * * * *
*
* Pipe Network Modeling Software
*
* CopyRighted by KYPIPE LLC (www.kypipe.com)
* Version: 8.014 01/11/2016
* Serial #: 8-10075593
* Interface: Classic
* Licensed for Pipe2008
*
* * * * *

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Date & Time: Thu Jul 14 10:07:10 2022

Master File : z:\project documents\l1524m markdale\kypipe\avg_ult.KYP\avg_ult.P2K

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*****
S U M M A R Y   O F   O R I G I N A L   D A T A
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U N I T S S P E C I F I E D

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FLOWRATE ..... = liters/second
HEAD (HGL) ..... = meters
PRESSURE ..... = kpa

```

P I P E L I N E D A T A

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	N O D E N A M E S #1 #2	L E N G T H (m)	D I A M E T E R (mm)	R O U G H N E S S C O E F F .	M I N O R L O S S C O E F F .
P-1	VP-1 J-2	48.02	150.00	140.0000	0.00
P-3	J-2 J-1	176.50	150.00	140.0000	0.00
P-4	J-2 J-5	84.79	150.00	140.0000	0.00
P-5	J-16 J-15	193.47	150.00	140.0000	0.00
P-6	J-6 J-16	219.93	150.00	140.0000	0.00
P-7	J-5 J-6	78.69	150.00	140.0000	0.00
P-8	J-5 J-4	231.74	150.00	140.0000	0.00
P-9	J-3 J-2	118.36	150.00	140.0000	0.00
P-10	J-4 J-3	200.96	150.00	140.0000	0.00
P-11	J-4 J-17	152.52	150.00	140.0000	0.00
P-12	J-17 J-18	58.11	150.00	140.0000	0.00
P-13	J-17 J-15	97.91	150.00	140.0000	0.00
P-14	J-15 J-13	90.15	150.00	140.0000	0.00
P-15	J-14 J-7	150.95	150.00	140.0000	0.00
P-16	J-7 J-6	152.13	150.00	140.0000	0.00
P-17	J-7 J-8	146.92	150.00	140.0000	0.00
P-18	J-8 J-9	151.21	150.00	140.0000	0.00
P-19	J-9 J-12	119.79	150.00	140.0000	0.00
P-20	J-12 J-11	151.79	150.00	140.0000	0.00
P-21	J-11 J-10	110.82	150.00	140.0000	0.00
P-22	J-13 J-14	203.77	150.00	140.0000	0.00
P-23	J-11 J-13	90.09	150.00	140.0000	0.00
P-24	J-10 J-9	185.31	150.00	140.0000	0.00
P-25	VP-2 VP-1	466.46	150.00	140.0000	0.00
P-26	J-18 VP-2	226.87	150.00	140.0000	0.00

P U M P / L O S S E L E M E N T D A T A

THERE IS A DEVICE AT NODE VP-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (m)	FLOWRATE (l/s)	EFFICIENCY (%)
42.98	0.00	75.00
31.73	85.17	75.00

Average Day (Ultimate Build-out)

2.37 170.34 75.00

THERE IS A DEVICE AT NODE VP-2 DESCRIBED BY THE FOLLOWING DATA: (ID= 2)

HEAD (m)	FLOWRATE (l/s)	EFFICIENCY (%)
42.98	0.00	75.00
36.66	79.62	75.00
20.14	159.24	75.00

N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (l/s)	JUNCTION ELEVATION (m)	EXTERNAL GRADE (m)
J-1		0.52	420.00	
J-2		0.36	419.00	
J-3		0.58	419.75	
J-4		0.49	420.00	
J-5		0.32	418.80	
J-6		0.32	419.50	
J-7		0.33	418.00	
J-8		0.39	416.50	
J-9		0.24	415.15	
J-10		0.27	413.00	
J-11		0.68	415.00	
J-12		0.29	415.70	
J-13		0.27	416.50	
J-14		0.62	417.30	
J-15		0.41	417.70	
J-16		0.50	417.70	
J-17		0.18	421.00	
J-18		0.15	423.50	
VP-1		----	420.43	420.43
VP-2		----	425.50	425.50

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

MAXIMUM AND MINIMUM PRESSURES	=	5
MAXIMUM AND MINIMUM VELOCITIES	=	5
MAXIMUM AND MINIMUM HEAD LOSS/1000	=	5

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES	(P) =	25
NUMBER OF END NODES	(J) =	18
NUMBER OF PRIMARY LOOPS	(L) =	6
NUMBER OF SUPPLY NODES	(F) =	2
NUMBER OF SUPPLY ZONES	(Z) =	1

Case: 0

RESULTS OBTAINED AFTER 21 TRIALS: ACCURACY = 0.61304E-06

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

P I P E L I N E R E S U L T S

Average Day (Ultimate Build-out)

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	N O D E N U M B E R S		FLOWRATE	HEAD	MINOR	LINE	HL+ML/	HL/
	#1	#2	lps	LOSS m	LOSS m	VELO. m/s	1000 m/m	1000 m/m
P-1	VP-1	J-2	2.94	0.01	0.00	0.17	0.24	0.24
P-3	J-2	J-1	0.52	0.00	0.00	0.03	0.01	0.01
P-4	J-2	J-5	1.44	0.01	0.00	0.08	0.06	0.06
P-5	J-16	J-15	-0.33	0.00	0.00	0.02	0.00	0.00
P-6	J-6	J-16	0.17	0.00	0.00	0.01	0.00	0.00
P-7	J-5	J-6	1.82	0.01	0.00	0.10	0.10	0.10
P-8	J-5	J-4	-0.70	0.00	0.00	0.04	0.02	0.02
P-9	J-3	J-2	-0.62	0.00	0.00	0.03	0.01	0.01
P-10	J-4	J-3	-0.04	0.00	0.00	0.00	0.00	0.00
P-11	J-4	J-17	-1.15	0.01	0.00	0.07	0.04	0.04
P-12	J-17	J-18	-3.83	0.02	0.00	0.22	0.39	0.39
P-13	J-17	J-15	2.50	0.02	0.00	0.14	0.18	0.18
P-14	J-15	J-13	1.76	0.01	0.00	0.10	0.09	0.09
P-15	J-14	J-7	-0.26	0.00	0.00	0.01	0.00	0.00
P-16	J-7	J-6	-1.33	0.01	0.00	0.08	0.05	0.05
P-17	J-7	J-8	0.74	0.00	0.00	0.04	0.02	0.02
P-18	J-8	J-9	0.35	0.00	0.00	0.02	0.00	0.00
P-19	J-9	J-12	0.08	0.00	0.00	0.00	0.00	0.00
P-20	J-12	J-11	-0.21	0.00	0.00	0.01	0.00	0.00
P-21	J-11	J-10	0.24	0.00	0.00	0.01	0.00	0.00
P-22	J-13	J-14	0.36	0.00	0.00	0.02	0.00	0.00
P-23	J-11	J-13	-1.13	0.00	0.00	0.06	0.04	0.04
P-24	J-10	J-9	-0.03	0.00	0.00	0.00	0.00	0.00
P-25	VP-2	VP-1	2.94	0.11	0.00	0.17	0.24	0.24
P-26	J-18	VP-2	-3.98	0.10	0.00	0.23	0.42	0.42

P U M P / L O S S E L E M E N T R E S U L T S

NAME	FLOWRATE lps	INLET HEAD m	OUTLET HEAD m	PUMP HEAD m	EFFIC- ENCY %	USEFUL POWER kW	INCREMTL COST \$	TOTAL COST \$	#PUMPS PARALLEL	#PUMPS SERIES	NPSH Avail. m
Device "VP-1" is closed											
VP-1	0.00	0.00	47.87	0.0	75.00	0.	0.0	0.0	**	**	10.1
VP-2	6.92	0.00	42.91	42.9	75.00	0.	0.0	0.0	**	**	10.1

N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND lps	HYDRAULIC GRADE m	NODE ELEVATION m	PRESSURE HEAD m	NODE PRESSURE kPa
J-1		0.52	468.29	420.00	48.29	473.56
J-2		0.36	468.29	419.00	49.29	483.39
J-3		0.58	468.29	419.75	48.54	476.02
J-4		0.49	468.29	420.00	48.29	473.56
J-5		0.32	468.29	418.80	49.49	485.29
J-6		0.32	468.28	419.50	48.78	478.35
J-7		0.33	468.27	418.00	50.27	492.98
J-8		0.39	468.27	416.50	51.77	507.67
J-9		0.24	468.27	415.15	53.12	520.90
J-10		0.27	468.27	413.00	55.27	541.98
J-11		0.68	468.27	415.00	53.27	522.37
J-12		0.29	468.27	415.70	52.57	515.50
J-13		0.27	468.27	416.50	51.77	507.70
J-14		0.62	468.27	417.30	50.97	499.84
J-15		0.41	468.28	417.70	50.58	496.01
J-16		0.50	468.28	417.70	50.58	496.00
J-17		0.18	468.30	421.00	47.30	463.82
J-18		0.15	468.32	423.50	44.82	439.53
VP-1		----	468.30	420.43	47.87	469.47
VP-2		----	468.41	425.50	42.91	420.84

M A X I M U M A N D M I N I M U M V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES kPa	JUNCTION NUMBER	MINIMUM PRESSURES kPa
J-10	541.98	VP-2	420.84
J-11	522.37	J-18	439.53
J-9	520.90	J-17	463.82
J-12	515.50	VP-1	469.47
J-13	507.70	J-1	473.56

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (m/s)	PIPE NUMBER	MINIMUM VELOCITY (m/s)
P-26	0.23	P-24	0.00
P-12	0.22	P-10	0.00
P-1	0.17	P-19	0.00
P-25	0.17	P-6	0.01
P-13	0.14	P-20	0.01

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (m/m)	PIPE NUMBER	MINIMUM HL+ML/1000 (m/m)
P-26	0.42	P-24	0.00
P-12	0.39	P-10	0.00
P-1	0.24	P-19	0.00
P-25	0.24	P-6	0.00
P-13	0.18	P-20	0.00

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (m/m)	PIPE NUMBER	MINIMUM HL/1000 (m/m)
P-26	0.42	P-24	0.00
P-12	0.39	P-10	0.00
P-1	0.24	P-19	0.00
P-25	0.24	P-6	0.00
P-13	0.18	P-20	0.00

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
 (-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE lps	NODE TITLE
VP-2	6.92	
NET SYSTEM INFLOW =	6.92	
NET SYSTEM OUTFLOW =	0.00	
NET SYSTEM DEMAND =	6.92	

***** HYDRAULIC ANALYSIS COMPLETED *****

Peak Hourly (Ultimate Build-out)

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* * * * * K Y P I P E * * * * *
*
* Pipe Network Modeling Software
*
* CopyRighted by KYPIPE LLC (www.kypipe.com)
* Version: 8.014 01/11/2016
* Serial #: 8-10075593
* Interface: Classic
* Licensed for Pipe2008
*
* * * * *

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Date & Time: Thu Jul 14 10:14:38 2022

Master File : z:\project documents\l1524m markdale\kypipe\peak_ult.KYP\peak_ult.P2K

***** S U M M A R Y O F O R I G I N A L D A T A *****

U N I T S S P E C I F I E D

FLOWRATE = liters/second
HEAD (HGL) = meters
PRESSURE = kpa

P I P E L I N E D A T A

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	N O D E N A M E S #1 #2		L E N G T H (m)	D I A M E T E R (mm)	R O U G H N E S S C O E F F .	M I N O R L O S S C O E F F .
P-1	VP-1	J-2	48.02	150.00	140.0000	0.00
P-3	J-2	J-1	176.50	150.00	140.0000	0.00
P-4	J-2	J-5	84.79	150.00	140.0000	0.00
P-5	J-16	J-15	193.47	150.00	140.0000	0.00
P-6	J-6	J-16	219.93	150.00	140.0000	0.00
P-7	J-5	J-6	78.69	150.00	140.0000	0.00
P-8	J-5	J-4	231.74	150.00	140.0000	0.00
P-9	J-3	J-2	118.36	150.00	140.0000	0.00
P-10	J-4	J-3	200.96	150.00	140.0000	0.00
P-11	J-4	J-17	152.52	150.00	140.0000	0.00
P-12	J-17	J-18	58.11	150.00	140.0000	0.00
P-13	J-17	J-15	97.91	150.00	140.0000	0.00
P-14	J-15	J-13	90.15	150.00	140.0000	0.00
P-15	J-14	J-7	150.95	150.00	140.0000	0.00
P-16	J-7	J-6	152.13	150.00	140.0000	0.00
P-17	J-7	J-8	146.92	150.00	140.0000	0.00
P-18	J-8	J-9	151.21	150.00	140.0000	0.00
P-19	J-9	J-12	119.79	150.00	140.0000	0.00
P-20	J-12	J-11	151.79	150.00	140.0000	0.00
P-21	J-11	J-10	110.82	150.00	140.0000	0.00
P-22	J-13	J-14	203.77	150.00	140.0000	0.00
P-23	J-11	J-13	90.09	150.00	140.0000	0.00
P-24	J-10	J-9	185.31	150.00	140.0000	0.00
P-25	VP-2	VP-1	466.46	150.00	140.0000	0.00
P-26	J-18	VP-2	226.87	150.00	140.0000	0.00

P U M P / L O S S E L E M E N T D A T A

THERE IS A DEVICE AT NODE VP-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (m)	FLOWRATE (l/s)	EFFICIENCY (%)
42.98	0.00	75.00
31.73	85.17	75.00

Peak Hourly (Ultimate Build-out)

2.37 170.34 75.00

THERE IS A DEVICE AT NODE VP-2 DESCRIBED BY THE FOLLOWING DATA: (ID= 2)

HEAD (m)	FLOWRATE (l/s)	EFFICIENCY (%)
42.98	0.00	75.00
36.66	79.62	75.00
20.14	159.24	75.00

N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (l/s)	JUNCTION ELEVATION (m)	EXTERNAL GRADE (m)
J-1		2.13	420.00	
J-2		1.51	419.00	
J-3		2.38	419.75	
J-4		2.01	420.00	
J-5		2.07	418.80	
J-6		1.32	419.50	
J-7		1.38	418.00	
J-8		1.63	416.50	
J-9		1.00	415.15	
J-10		1.13	413.00	
J-11		2.82	415.00	
J-12		1.19	415.70	
J-13		1.13	416.50	
J-14		2.57	417.30	
J-15		1.69	417.70	
J-16		2.07	417.70	
J-17		0.75	421.00	
J-18		0.63	423.50	
VP-1		----	420.43	420.43
VP-2		----	425.50	425.50

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

MAXIMUM AND MINIMUM PRESSURES	=	5
MAXIMUM AND MINIMUM VELOCITIES	=	5
MAXIMUM AND MINIMUM HEAD LOSS/1000	=	5

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES	(P) =	25
NUMBER OF END NODES	(J) =	18
NUMBER OF PRIMARY LOOPS	(L) =	6
NUMBER OF SUPPLY NODES	(F) =	2
NUMBER OF SUPPLY ZONES	(Z) =	1

Case: 0

RESULTS OBTAINED AFTER 21 TRIALS: ACCURACY = 0.34337E-06

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

P I P E L I N E R E S U L T S

Peak Hourly (Ultimate Build-out)

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	N O D E N U M B E R S		F L O W R A T E lps	H E A D L O S S m	M I N O R L O S S m	L I N E V E L O . m/s	H L + M L / 1000 m/m	H L / 1000 m/m
	#1	#2						
P-1	VP-1	J-2	12.49	0.17	0.00	0.71	3.48	3.48
P-3	J-2	J-1	2.13	0.02	0.00	0.12	0.13	0.13
P-4	J-2	J-5	6.31	0.08	0.00	0.36	0.98	0.98
P-5	J-16	J-15	-1.51	0.01	0.00	0.09	0.07	0.07
P-6	J-6	J-16	0.56	0.00	0.00	0.03	0.01	0.01
P-7	J-5	J-6	7.36	0.10	0.00	0.42	1.31	1.31
P-8	J-5	J-4	-3.12	0.06	0.00	0.18	0.27	0.27
P-9	J-3	J-2	-2.54	0.02	0.00	0.14	0.18	0.18
P-10	J-4	J-3	-0.16	0.00	0.00	0.01	0.00	0.00
P-11	J-4	J-17	-4.97	0.10	0.00	0.28	0.63	0.63
P-12	J-17	J-18	-16.29	0.33	0.00	0.92	5.69	5.69
P-13	J-17	J-15	10.57	0.25	0.00	0.60	2.55	2.55
P-14	J-15	J-13	7.36	0.12	0.00	0.42	1.31	1.31
P-15	J-14	J-7	-1.06	0.01	0.00	0.06	0.04	0.04
P-16	J-7	J-6	-5.49	0.12	0.00	0.31	0.76	0.76
P-17	J-7	J-8	3.04	0.04	0.00	0.17	0.25	0.25
P-18	J-8	J-9	1.41	0.01	0.00	0.08	0.06	0.06
P-19	J-9	J-12	0.30	0.00	0.00	0.02	0.00	0.00
P-20	J-12	J-11	-0.89	0.00	0.00	0.05	0.03	0.03
P-21	J-11	J-10	1.01	0.00	0.00	0.06	0.03	0.03
P-22	J-13	J-14	1.51	0.01	0.00	0.09	0.07	0.07
P-23	J-11	J-13	-4.73	0.05	0.00	0.27	0.58	0.58
P-24	J-10	J-9	-0.12	0.00	0.00	0.01	0.00	0.00
P-25	VP-2	VP-1	12.49	1.62	0.00	0.71	3.48	3.48
P-26	J-18	VP-2	-16.92	1.39	0.00	0.96	6.11	6.11

P U M P / L O S S E L E M E N T R E S U L T S

N A M E	F L O W R A T E lps	I N L E T H E A D m	O U T L E T H E A D m	P U M P H E A D m	E F F I C - E N C Y %	U S E F U L P O W E R kW	I N C R E M T L C O S T \$	T O T A L C O S T \$	# P U M P S P A R A L L E L	# P U M P S S E R I E S	N P S H A v a i l . m
Device "VP-1" is closed											
VP-1	0.00	0.00	45.43	0.0	75.00	0.	0.0	0.0	**	**	10.1
VP-2	29.41	0.00	41.98	42.0	75.00	0.	0.0	0.0	**	**	10.1

N O D E R E S U L T S

N O D E N A M E	N O D E T I T L E	E X T E R N A L D E M A N D lps	H Y D R A U L I C G R A D E m	N O D E E L E V A T I O N m	P R E S S U R E H E A D m	N O D E P R E S S U R E kPa
J-1		2.13	465.67	420.00	45.67	447.86
J-2		1.51	465.69	419.00	46.69	457.89
J-3		2.38	465.67	419.75	45.92	450.32
J-4		2.01	465.67	420.00	45.67	447.87
J-5		2.07	465.61	418.80	46.81	459.03
J-6		1.32	465.51	419.50	46.01	451.16
J-7		1.38	465.39	418.00	47.39	464.74
J-8		1.63	465.35	416.50	48.85	479.08
J-9		1.00	465.34	415.15	50.19	492.23
J-10		1.13	465.34	413.00	52.34	513.31
J-11		2.82	465.35	415.00	50.35	493.73
J-12		1.19	465.34	415.70	49.64	486.83
J-13		1.13	465.40	416.50	48.90	479.53
J-14		2.57	465.38	417.30	48.08	471.55
J-15		1.69	465.52	417.70	47.82	468.92
J-16		2.07	465.50	417.70	47.80	468.79
J-17		0.75	465.77	421.00	44.77	439.01
J-18		0.63	466.10	423.50	42.60	417.74
VP-1		----	465.86	420.43	45.43	445.51
VP-2		----	467.48	425.50	41.98	411.71

MAXIMUM AND MINIMUM VALUES

PRESSURES

JUNCTION NUMBER	MAXIMUM PRESSURES kPa	JUNCTION NUMBER	MINIMUM PRESSURES kPa
J-10	513.31	VP-2	411.71
J-11	493.73	J-18	417.74
J-9	492.23	J-17	439.01
J-12	486.83	VP-1	445.51
J-13	479.53	J-1	447.86

VELOCITIES

PIPE NUMBER	MAXIMUM VELOCITY (m/s)	PIPE NUMBER	MINIMUM VELOCITY (m/s)
P-26	0.96	P-24	0.01
P-12	0.92	P-10	0.01
P-1	0.71	P-19	0.02
P-25	0.71	P-6	0.03
P-13	0.60	P-20	0.05

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (m/m)	PIPE NUMBER	MINIMUM HL+ML/1000 (m/m)
P-26	6.11	P-24	0.00
P-12	5.69	P-10	0.00
P-1	3.48	P-19	0.00
P-25	3.48	P-6	0.01
P-13	2.55	P-20	0.03

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (m/m)	PIPE NUMBER	MINIMUM HL/1000 (m/m)
P-26	6.11	P-24	0.00
P-12	5.69	P-10	0.00
P-1	3.48	P-19	0.00
P-25	3.48	P-6	0.01
P-13	2.55	P-20	0.03

SUMMARY OF INFLOWS AND OUTFLOWS

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
 (-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE lps	NODE TITLE
VP-2	29.41	
NET SYSTEM INFLOW =	29.41	
NET SYSTEM OUTFLOW =	0.00	
NET SYSTEM DEMAND =	29.41	

***** HYDRAULIC ANALYSIS COMPLETED *****

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* * * * * K Y P I P E * * * * *
*
* Pipe Network Modeling Software
*
* CopyRighted by KYPIPE LLC (www.kypipe.com)
* Version: 8.014 01/11/2016
* Serial #: 8-10075593
* Interface: Classic
* Licensed for Pipe2008
*
* * * * *

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Date & Time: Thu Jul 14 10:19:36 2022

Master File : z:\project documents\l1524m markdale\kypipe\maxday_ult.KYP\maxday_ult.P2K

 SUMMARY OF ORIGINAL DATA

U N I T S S P E C I F I E D

FLOWRATE = liters/second
 HEAD (HGL) = meters
 PRESSURE = kpa

P I P E L I N E D A T A

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	N O D E N A M E S #1 #2	L E N G T H (m)	D I A M E T E R (mm)	R O U G H N E S S C O E F F .	M I N O R L O S S C O E F F .
P-1	VP-1 J-2	48.02	150.00	140.0000	0.00
P-3	J-2 J-1	176.50	150.00	140.0000	0.00
P-4	J-2 J-5	84.79	150.00	140.0000	0.00
P-5	J-16 J-15	193.47	150.00	140.0000	0.00
P-6	J-6 J-16	219.93	150.00	140.0000	0.00
P-7	J-5 J-6	78.69	150.00	140.0000	0.00
P-8	J-5 J-4	231.74	150.00	140.0000	0.00
P-9	J-3 J-2	118.36	150.00	140.0000	0.00
P-10	J-4 J-3	200.96	150.00	140.0000	0.00
P-11	J-4 J-17	152.52	150.00	140.0000	0.00
P-12	J-17 J-18	58.11	150.00	140.0000	0.00
P-13	J-17 J-15	97.91	150.00	140.0000	0.00
P-14	J-15 J-13	90.15	150.00	140.0000	0.00
P-15	J-14 J-7	150.95	150.00	140.0000	0.00
P-16	J-7 J-6	152.13	150.00	140.0000	0.00
P-17	J-7 J-8	146.92	150.00	140.0000	0.00
P-18	J-8 J-9	151.21	150.00	140.0000	0.00
P-19	J-9 J-12	119.79	150.00	140.0000	0.00
P-20	J-12 J-11	151.79	150.00	140.0000	0.00
P-21	J-11 J-10	110.82	150.00	140.0000	0.00
P-22	J-13 J-14	203.77	150.00	140.0000	0.00
P-23	J-11 J-13	90.09	150.00	140.0000	0.00
P-24	J-10 J-9	185.31	150.00	140.0000	0.00
P-25	VP-2 VP-1	466.46	150.00	140.0000	0.00
P-26	J-18 VP-2	226.87	150.00	140.0000	0.00

P U M P / L O S S E L E M E N T D A T A

THERE IS A DEVICE AT NODE VP-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (m)	FLOWRATE (l/s)	EFFICIENCY (%)
42.98	0.00	75.00
31.73	85.17	75.00

Max Day (Ultimate Build-out)

2.37 170.34 75.00

THERE IS A DEVICE AT NODE VP-2 DESCRIBED BY THE FOLLOWING DATA: (ID= 2)

HEAD (m)	FLOWRATE (l/s)	EFFICIENCY (%)
42.98	0.00	75.00
36.66	79.62	75.00
20.14	159.24	75.00

N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (l/s)	JUNCTION ELEVATION (m)	EXTERNAL GRADE (m)
J-1		1.42	420.00	
J-2		1.00	419.00	
J-3		1.59	419.75	
J-4		1.34	420.00	
J-5		1.38	418.80	
J-6		0.88	419.50	
J-7		0.92	418.00	
J-8		1.09	416.50	
J-9		0.67	415.15	
J-10		0.75	413.00	
J-11		1.88	415.00	
J-12		0.79	415.70	
J-13		0.75	416.50	
J-14		1.71	417.30	
J-15		1.13	417.70	
J-16		1.38	417.70	
J-17		0.50	421.00	
J-18		0.42	423.50	
VP-1		----	420.43	420.43
VP-2		----	425.50	425.50

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

MAXIMUM AND MINIMUM PRESSURES	=	5
MAXIMUM AND MINIMUM VELOCITIES	=	5
MAXIMUM AND MINIMUM HEAD LOSS/1000	=	5

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES	(P) =	25
NUMBER OF END NODES	(J) =	18
NUMBER OF PRIMARY LOOPS	(L) =	6
NUMBER OF SUPPLY NODES	(F) =	2
NUMBER OF SUPPLY ZONES	(Z) =	1

Case: 0

RESULTS OBTAINED AFTER 21 TRIALS: ACCURACY = 0.93264E-04

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

P I P E L I N E R E S U L T S

Pipe2010 Analysis Report

Max Day (Ultimate Build-out)

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	N O D E N U M B E R S		FLOWRATE	HEAD	MINOR	LINE	HL+ML/ 1000	HL/ 1000
	#1	#2	lps	LOSS m	LOSS m	VELO. m/s	m/m	m/m
P-1	VP-1	J-2	8.32	0.08	0.00	0.47	1.64	1.64
P-3	J-2	J-1	1.42	0.01	0.00	0.08	0.06	0.06
P-4	J-2	J-5	4.21	0.04	0.00	0.24	0.46	0.46
P-5	J-16	J-15	-1.01	0.01	0.00	0.06	0.03	0.03
P-6	J-6	J-16	0.37	0.00	0.00	0.02	0.01	0.01
P-7	J-5	J-6	4.91	0.05	0.00	0.28	0.62	0.62
P-8	J-5	J-4	-2.08	0.03	0.00	0.12	0.13	0.13
P-9	J-3	J-2	-1.69	0.01	0.00	0.10	0.09	0.09
P-10	J-4	J-3	-0.10	0.00	0.00	0.01	0.00	0.00
P-11	J-4	J-17	-3.31	0.05	0.00	0.19	0.30	0.30
P-12	J-17	J-18	-10.86	0.16	0.00	0.61	2.68	2.68
P-13	J-17	J-15	7.04	0.12	0.00	0.40	1.20	1.20
P-14	J-15	J-13	4.90	0.06	0.00	0.28	0.62	0.62
P-15	J-14	J-7	-0.71	0.00	0.00	0.04	0.02	0.02
P-16	J-7	J-6	-3.66	0.05	0.00	0.21	0.36	0.36
P-17	J-7	J-8	2.03	0.02	0.00	0.11	0.12	0.12
P-18	J-8	J-9	0.94	0.00	0.00	0.05	0.03	0.03
P-19	J-9	J-12	0.20	0.00	0.00	0.01	0.00	0.00
P-20	J-12	J-11	-0.59	0.00	0.00	0.03	0.01	0.01
P-21	J-11	J-10	0.68	0.00	0.00	0.04	0.02	0.02
P-22	J-13	J-14	1.00	0.01	0.00	0.06	0.03	0.03
P-23	J-11	J-13	-3.15	0.02	0.00	0.18	0.27	0.27
P-24	J-10	J-9	-0.07	0.00	0.00	0.00	0.00	0.00
P-25	VP-2	VP-1	8.32	0.77	0.00	0.47	1.64	1.64
P-26	J-18	VP-2	-11.28	0.65	0.00	0.64	2.88	2.88

P U M P / L O S S E L E M E N T R E S U L T S

NAME	FLOWRATE lps	INLET HEAD m	OUTLET HEAD m	PUMP HEAD m	EFFIC- ENCY %	USEFUL POWER kW	INCREMTL COST \$	TOTAL COST \$	#PUMPS PARALLEL	#PUMPS SERIES	NPSH Avail. m
Device "VP-1" is closed											
VP-1	0.00	0.00	46.82	0.0	75.00	0.	0.0	0.0	**	**	10.1
VP-2	19.60	0.00	42.51	42.5	75.00	0.	0.0	0.0	**	**	10.1

N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND lps	HYDRAULIC GRADE m	NODE ELEVATION m	PRESSURE HEAD m	NODE PRESSURE kPa
J-1		1.42	467.16	420.00	47.16	462.44
J-2		1.00	467.17	419.00	48.17	472.35
J-3		1.59	467.16	419.75	47.41	464.90
J-4		1.34	467.16	420.00	47.16	462.44
J-5		1.38	467.13	418.80	48.33	473.93
J-6		0.88	467.08	419.50	47.58	466.59
J-7		0.92	467.02	418.00	49.02	480.76
J-8		1.09	467.01	416.50	50.51	495.30
J-9		0.67	467.00	415.15	51.85	508.50
J-10		0.75	467.00	413.00	54.00	529.58
J-11		1.88	467.00	415.00	52.00	509.98
J-12		0.79	467.00	415.70	51.30	503.10
J-13		0.75	467.03	416.50	50.53	495.51
J-14		1.71	467.02	417.30	49.72	487.60
J-15		1.13	467.08	417.70	49.38	484.29
J-16		1.38	467.08	417.70	49.38	484.23
J-17		0.50	467.20	421.00	46.20	453.08
J-18		0.42	467.36	423.50	43.86	430.10
VP-1		----	467.25	420.43	46.82	459.10
VP-2		----	468.01	425.50	42.51	416.89

MAXIMUM AND MINIMUM VALUES

PRESSURES

JUNCTION NUMBER	MAXIMUM PRESSURES kPa	JUNCTION NUMBER	MINIMUM PRESSURES kPa
J-10	529.58	VP-2	416.89
J-11	509.98	J-18	430.10
J-9	508.50	J-17	453.08
J-12	503.10	VP-1	459.10
J-13	495.51	J-1	462.44

VELOCITIES

PIPE NUMBER	MAXIMUM VELOCITY (m/s)	PIPE NUMBER	MINIMUM VELOCITY (m/s)
P-26	0.64	P-24	0.00
P-12	0.61	P-10	0.01
P-1	0.47	P-19	0.01
P-25	0.47	P-6	0.02
P-13	0.40	P-20	0.03

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (m/m)	PIPE NUMBER	MINIMUM HL+ML/1000 (m/m)
P-26	2.88	P-24	0.00
P-12	2.68	P-10	0.00
P-1	1.64	P-19	0.00
P-25	1.64	P-6	0.01
P-13	1.20	P-20	0.01

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (m/m)	PIPE NUMBER	MINIMUM HL/1000 (m/m)
P-26	2.88	P-24	0.00
P-12	2.68	P-10	0.00
P-1	1.64	P-19	0.00
P-25	1.64	P-6	0.01
P-13	1.20	P-20	0.01

SUMMARY OF INFLOWS AND OUTFLOWS

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
 (-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE lps	NODE TITLE
VP-2	19.60	
NET SYSTEM INFLOW =	19.60	
NET SYSTEM OUTFLOW =	0.00	
NET SYSTEM DEMAND =	19.60	

***** HYDRAULIC ANALYSIS COMPLETED *****

Max Day Fire(Ultimate Build-out)

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* * * * * K Y P I P E * * * * *
*
* Pipe Network Modeling Software
*
* CopyRighted by KYPIPE LLC (www.kypipe.com)
* Version: 8.014 01/11/2016
* Serial #: 8-10075593
* Interface: Classic
* Licensed for Pipe2008
*
* * * * *

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Date & Time: Thu Jul 14 10:21:30 2022

Master File : z:\project documents\l1524m markdale\kypipe\maxday_ult.KYP\maxday_ult.P2K

***** SUMMARY OF ORIGINAL DATA *****

U N I T S S P E C I F I E D

FLOWRATE = liters/second
HEAD (HGL) = meters
PRESSURE = kpa

P I P E L I N E D A T A

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	N O D E N A M E S #1 #2		L E N G T H (m)	D I A M E T E R (mm)	R O U G H N E S S C O E F F .	M I N O R L O S S C O E F F .
P-1	VP-1	J-2	48.02	150.00	140.0000	0.00
P-3	J-2	J-1	176.50	150.00	140.0000	0.00
P-4	J-2	J-5	84.79	150.00	140.0000	0.00
P-5	J-16	J-15	193.47	150.00	140.0000	0.00
P-6	J-6	J-16	219.93	150.00	140.0000	0.00
P-7	J-5	J-6	78.69	150.00	140.0000	0.00
P-8	J-5	J-4	231.74	150.00	140.0000	0.00
P-9	J-3	J-2	118.36	150.00	140.0000	0.00
P-10	J-4	J-3	200.96	150.00	140.0000	0.00
P-11	J-4	J-17	152.52	150.00	140.0000	0.00
P-12	J-17	J-18	58.11	150.00	140.0000	0.00
P-13	J-17	J-15	97.91	150.00	140.0000	0.00
P-14	J-15	J-13	90.15	150.00	140.0000	0.00
P-15	J-14	J-7	150.95	150.00	140.0000	0.00
P-16	J-7	J-6	152.13	150.00	140.0000	0.00
P-17	J-7	J-8	146.92	150.00	140.0000	0.00
P-18	J-8	J-9	151.21	150.00	140.0000	0.00
P-19	J-9	J-12	119.79	150.00	140.0000	0.00
P-20	J-12	J-11	151.79	150.00	140.0000	0.00
P-21	J-11	J-10	110.82	150.00	140.0000	0.00
P-22	J-13	J-14	203.77	150.00	140.0000	0.00
P-23	J-11	J-13	90.09	150.00	140.0000	0.00
P-24	J-10	J-9	185.31	150.00	140.0000	0.00
P-25	VP-2	VP-1	466.46	150.00	140.0000	0.00
P-26	J-18	VP-2	226.87	150.00	140.0000	0.00

P U M P / L O S S E L E M E N T D A T A

THERE IS A DEVICE AT NODE VP-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (m)	FLOWRATE (l/s)	EFFICIENCY (%)
42.98	0.00	75.00
31.73	85.17	75.00

Max Day Fire(Ultimate Build-out)

2.37 170.34 75.00

THERE IS A DEVICE AT NODE VP-2 DESCRIBED BY THE FOLLOWING DATA: (ID= 2)

HEAD (m)	FLOWRATE (l/s)	EFFICIENCY (%)
42.98	0.00	75.00
36.66	79.62	75.00
20.14	159.24	75.00

N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (l/s)	JUNCTION ELEVATION (m)	EXTERNAL GRADE (m)
J-1		1.42	420.00	
J-2		1.00	419.00	
J-3		1.59	419.75	
J-4		1.34	420.00	
J-5		1.38	418.80	
J-6		0.88	419.50	
J-7		0.92	418.00	
J-8		1.09	416.50	
J-9		0.67	415.15	
J-10		0.75	413.00	
J-11		1.88	415.00	
J-12		0.79	415.70	
J-13		0.75	416.50	
J-14		1.71	417.30	
J-15		1.13	417.70	
J-16		1.38	417.70	
J-17		0.50	421.00	
J-18		60.42	423.50	
VP-1		----	420.43	420.43
VP-2		----	425.50	425.50

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

MAXIMUM AND MINIMUM PRESSURES	=	5
MAXIMUM AND MINIMUM VELOCITIES	=	5
MAXIMUM AND MINIMUM HEAD LOSS/1000	=	5

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES	(P) =	25
NUMBER OF END NODES	(J) =	18
NUMBER OF PRIMARY LOOPS	(L) =	6
NUMBER OF SUPPLY NODES	(F) =	2
NUMBER OF SUPPLY ZONES	(Z) =	1

Case: 0

RESULTS OBTAINED AFTER 9 TRIALS: ACCURACY = 0.33098E-06

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

P I P E L I N E R E S U L T S

Max Day Fire(Ultimate Build-out)

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	N O D E N U M B E R S		FLOWRATE	HEAD	MINOR	LINE	HL+ML/	HL/
	#1	#2	lps	LOSS m	LOSS m	VELO. m/s	1000 m/m	1000 m/m
P-1	VP-1	J-2	39.97	1.44	0.00	2.26	30.01	30.01
P-3	J-2	J-1	1.42	0.01	0.00	0.08	0.06	0.06
P-4	J-2	J-5	23.90	0.98	0.00	1.35	11.57	11.57
P-5	J-16	J-15	5.68	0.16	0.00	0.32	0.81	0.81
P-6	J-6	J-16	7.06	0.27	0.00	0.40	1.21	1.21
P-7	J-5	J-6	17.30	0.50	0.00	0.98	6.36	6.36
P-8	J-5	J-4	5.22	0.16	0.00	0.30	0.69	0.69
P-9	J-3	J-2	-13.65	0.49	0.00	0.77	4.10	4.10
P-10	J-4	J-3	-12.06	0.66	0.00	0.68	3.26	3.26
P-11	J-4	J-17	15.94	0.83	0.00	0.90	5.47	5.47
P-12	J-17	J-18	20.79	0.52	0.00	1.18	8.94	8.94
P-13	J-17	J-15	-5.35	0.07	0.00	0.30	0.72	0.72
P-14	J-15	J-13	-0.80	0.00	0.00	0.05	0.02	0.02
P-15	J-14	J-7	-4.28	0.07	0.00	0.24	0.48	0.48
P-16	J-7	J-6	-9.36	0.31	0.00	0.53	2.04	2.04
P-17	J-7	J-8	4.16	0.07	0.00	0.24	0.45	0.45
P-18	J-8	J-9	3.07	0.04	0.00	0.17	0.26	0.26
P-19	J-9	J-12	1.30	0.01	0.00	0.07	0.05	0.05
P-20	J-12	J-11	0.51	0.00	0.00	0.03	0.01	0.01
P-21	J-11	J-10	-0.35	0.00	0.00	0.02	0.00	0.00
P-22	J-13	J-14	-2.57	0.04	0.00	0.15	0.19	0.19
P-23	J-11	J-13	-1.02	0.00	0.00	0.06	0.03	0.03
P-24	J-10	J-9	-1.10	0.01	0.00	0.06	0.04	0.04
P-25	VP-2	VP-1	16.65	2.76	0.00	0.94	5.93	5.93
P-26	J-18	VP-2	-39.63	6.70	0.00	2.24	29.53	29.53

P U M P / L O S S E L E M E N T R E S U L T S

NAME	FLOWRATE lps	INLET HEAD m	OUTLET HEAD m	PUMP HEAD m	EFFIC- ENCY %	USEFUL POWER kW	INCREMTL COST \$	TOTAL COST \$	#PUMPS PARALLEL	#PUMPS SERIES	NPSH Avail. m
VP-1	23.32	0.00	41.96	42.0	75.00	0.	0.0	0.0	**	**	10.1
VP-2	56.28	0.00	39.65	39.7	75.00	0.	0.0	0.0	**	**	10.1

N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND lps	HYDRAULIC GRADE m	NODE ELEVATION m	PRESSURE HEAD m	NODE PRESSURE kPa
J-1		1.42	460.94	420.00	40.94	401.48
J-2		1.00	460.95	419.00	41.95	411.39
J-3		1.59	460.46	419.75	40.71	399.27
J-4		1.34	459.81	420.00	39.81	390.39
J-5		1.38	459.97	418.80	41.17	403.73
J-6		0.88	459.47	419.50	39.97	391.95
J-7		0.92	459.16	418.00	41.16	403.62
J-8		1.09	459.09	416.50	42.59	417.68
J-9		0.67	459.05	415.15	43.90	430.53
J-10		0.75	459.04	413.00	46.04	451.55
J-11		1.88	459.04	415.00	44.04	431.93
J-12		0.79	459.05	415.70	43.35	425.08
J-13		0.75	459.05	416.50	42.55	417.25
J-14		1.71	459.09	417.30	41.79	409.78
J-15		1.13	459.05	417.70	41.35	405.46
J-16		1.38	459.20	417.70	41.50	407.00
J-17		0.50	458.97	421.00	37.97	372.40
J-18		60.42	458.45	423.50	34.95	342.79
VP-1		----	462.39	420.43	41.96	411.50
VP-2		----	465.15	425.50	39.65	388.88

M A X I M U M A N D M I N I M U M V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES kPa	JUNCTION NUMBER	MINIMUM PRESSURES kPa
J-10	451.55	J-18	342.79
J-11	431.93	J-17	372.40
J-9	430.53	VP-2	388.88
J-12	425.08	J-4	390.39
J-8	417.68	J-6	391.95

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (m/s)	PIPE NUMBER	MINIMUM VELOCITY (m/s)
P-1	2.26	P-21	0.02
P-26	2.24	P-20	0.03
P-4	1.35	P-14	0.05
P-12	1.18	P-23	0.06
P-7	0.98	P-24	0.06

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (m/m)	PIPE NUMBER	MINIMUM HL+ML/1000 (m/m)
P-1	30.01	P-21	0.00
P-26	29.53	P-20	0.01
P-4	11.57	P-14	0.02
P-12	8.94	P-23	0.03
P-7	6.36	P-24	0.04

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (m/m)	PIPE NUMBER	MINIMUM HL/1000 (m/m)
P-1	30.01	P-21	0.00
P-26	29.53	P-20	0.01
P-4	11.57	P-14	0.02
P-12	8.94	P-23	0.03
P-7	6.36	P-24	0.04

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
 (-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE lps	NODE TITLE
VP-1	23.32	
VP-2	56.28	

NET SYSTEM INFLOW = 79.60
 NET SYSTEM OUTFLOW = 0.00
 NET SYSTEM DEMAND = 79.60

***** HYDRAULIC ANALYSIS COMPLETED *****

APPENDIX B

Sanitary Calculation

Proposed SAN
Sewer

Highway 10

Highway Commercial, 100m depth,
4.0ha.

Area=15.75ha.
Scenario 1: Light
Industrial
Scenario 2:
Residential at
20units / acre

ANALYSIS FOR ADDING
CHAPMAN'S SEWAGE TO
LC'S PROPOSED GRAVITY
FLOWS

INCLUDES MATERIAL © 2020

