

December 20, 2024

Chris Bostic, P.E.
Kimley-Horn
421 Fayetteville St, Suite 600
Raleigh, NC 27601

Subject: Southern Crossings Blvd, Holly Springs
Fire-Flow Analysis

Dear Mr. Bostic,

Per North Carolina Fire Code (NCFC), Section 507.3, a fire-flow analysis is required for verification that minimum Needed Fire-Flow can be supplied by the existing/new hydrants in the vicinity of the building to supply the fire-fighting efforts.

2018 NCFC Section 507.3 states "Fire-flow requirements for buildings or portions of buildings and facilities shall be determined by the ISO Fire Suppression Rating Schedule, NFPA 1142 or other approved method." The Town of Holly Springs utilizes the Engineering Design and Construction Standards (ED&CS) in determining minimum fire-flow requirements for buildings.

This fire-flow analysis addresses the Southern Crossing project, which includes the construction of one proposed building reported to be 66,398 square feet and of Type V-A construction located at Southern Crossings Blvd, Holly Springs, North Carolina.

Per ED&CS Section 6.02E(3),

"The minimum fire-flow and flow duration for buildings other than one- and two-family dwellings shall be as specified in tables E1 and E3, but no less than 1,500 gallons per minute at 25 psi."

Table E1 of ED&CS requires a building reported to be 66,398 square feet of Type V-A construction to have a fire-flow of at least 4,750 gpm for 4 hours (see Attachment A). However, as the building is to be sprinklered throughout with an NFPA 13 sprinkler system, the required fire-flow is able to be reduced by 75% (or minimum of 1,500 gpm), reducing the minimum required fire-flow to 1,500 gpm minimum for 4 hours. This fire-flow is required to be at a residual pressure of at least 25 psi and be supplied from fire hydrants within 600' of the building's perimeter (per NCFC 507.5.1).

A fire hydrant flow test was completed on December 12, 2024 by EPM, Inc. The results are attached

(see Attachment B). Using this flow test information, a hydraulic calculation was developed (see Attachment C). The hydraulic calculation demonstrates that the Needed Fire-Flow of 1,500 gpm and the estimated peak domestic demand of 28 gpm (see Attachment D) can be flowed from one hydrant with a margin of 27.0 psi at 25 psi residual pressure.

Given the above, the water supply is **adequate** to meet the Needed Fire-Flow for this project.

Please let us know if you have any questions or comments.

Sincerely,

James D. Amy, Jr., P.E.
Senior Technical Manager
EPM, Inc.



Attachment A – ED&CS Mark-up
Attachment B – Fire Hydrant Flow Test Report
Attachment C – Hydraulic Calculation
Attachment D – Domestic Demand Calculation

Locator devices as manufactured by 3M Corporation shall be placed directly on top of distribution water mains along major thoroughfares and cross-country installations (and as otherwise directed by the Executive Director of Utilities and Infrastructure Services) at 100 foot intervals and turns/bends. Locator tape shall also be required to be installed at 2 feet above the pipe.

All construction relating to the utility improvements which will be maintained by the Town must be performed by a contractor licensed in North Carolina. Proof of licensure will be required at the Project Preconstruction Meeting. Operation of existing valves and fire hydrants shall be by Town staff only.

Any connection to the 30 inch water main on Piney Grove Wilbon Road must be regional in nature and subject to hydraulic studies to confirm adequate pressure can be maintained in the system.

6.02 FIRE HYDRANTS (Public and Private)

A. Location

All fire hydrants shall be installed on a minimum 6-inch waterline with minimum of 20' width easement including 5 feet beyond fire hydrant. Only 1 fire hydrant may be installed on a dead end 6-inch line. There shall be at least 1 fire hydrant at each street intersection located in accordance with the Standard Detail section of these Standards (TOHS Detail HS613). Each fire hydrant shall have a valve on the hydrant service leg, located within 2 feet of tee on the main line.

No building lot shall be more than 350' from fire hydrant.

In residential areas, the maximum distance between fire hydrants, measured along street centerlines, shall be 500 feet. In residential areas, the minimum fire flow shall be 1000 gpm with a minimum system pressure of 25 psi for 1 hour.

In business, office and institutional, and industrial districts, the maximum distance between hydrants, measured along street centerline, shall be 300 feet. When business, office and institutional, and industrial intersections are not more than 450 feet apart, no hydrant is required between intersections. **The minimum fire flow in these areas shall be 1500 gpm with a minimum system pressure of 25 psi for 2 hours.**

The minimum number of fire hydrants available to a building shall not be less than that listed in Table A1. The number of fire hydrants available to a complex or

Fire-flow and flow durations for dwellings having a fire-flow calculation area in excess of 3,601 square feet and greater shall not be less than specified in tables E1 and E2 at 25psi.

2. Buildings other than one- and two-family dwellings.

The minimum fire-flow and flow duration for buildings other than one-and two-family dwellings shall be as specified in tables E1 and E3, but no less than 1,500 gallons per minute at 25psi.

3. Water supply for buildings equipped with an automatic sprinkler system.

For building equipped with an approved automatic sprinkler system, the water supply shall be capable of providing the greater of:

1. The automatic sprinkler system demand, including hose stream allowance.
2. The required fire-flow.

Table E1
MINIMUM REQUIRED FIRE-FLOW AND FLOW DURATION FOR BUILDINGS
(Appendix B of the 2018 NC Fire Prevention Code)

FIRE-FLOW CALCULATION AREA (square feet)					FIRE-FLOW (gallons per minute) ¹	FLOW DURATION (hours)
Type 1A and 1B ²	Type IIA and IIIA ^a	Type IV and V-A ^a	Type IIB and IIIB ^a	Type V-B ^a		
0-22,700	0-12,700	0-8,200	0-5,900	0-3,600	1,500	2
22,701-30,200	12,701-17,000	8,201-10,900	5,901-7,900	3,601-4,800	1,750	
30,201-38,700	17,001-21,800	10,901-12,900	7,901-9,800	4,801-6,200	2,000	
38,701-48,300	21,801-24,200	12,901-17,400	9,801-12,600	6,201-7,700	2,250	
48,301-59,000	24,201-33,200	17,401-21,300	12,601-15,400	7,701-9,400	2,500	
59,001-70,900	33,201-39,700	21,301-25,500	15,401-18,400	9,401-11,300	2,750	
70,901-83,700	39,701-47,100	25,501-30,100	18,401-21,800	11,301-13,400	3,000	3
83,701-97,700	47,101-54,900	30,101-35,200	21,801-25,900	13,401-15,600	3,250	
97,701-112,700	54,901-63,400	35,201-40,600	25,901-29,300	15,601-18,000	3,500	
112,701-128,700	63,401-72,400	40,601-46,400	29,301-33,500	18,001-20,600	3,750	4
128,701-145,900	72,401-82,100	46,401-52,500	33,501-37,900	20,601-23,300	4,000	
145,901-164,200	82,101-92,400	52,501-59,100	37,901-42,700	23,301-26,300	4,250	
164,201-183,400	92,401-103,100	59,101-66,000	42,701-47,700	26,301-29,300	4,500	
183,401-203,701	103,101-114,600	66,001-73,300	47,701-53,000	29,301-32,600	4,750	
203,701-225,201	114,601-126,700	73,301-81,100	53,001-58,600	32,601-36,000	5,000	
225,201-247,700	126,701-139,400	81,101-89,200	58,601-65,400	36,001-39,600	5,250	
247,701-271,200	139,401-152,600	89,201-97,700	65,401-70,600	39,601-43,400	5,500	
271,201-295,900	152,601-166,500	97,701-106,500	70,601-77,000	43,401-47,400	5,750	
295,901-Greater	166,501-Greater	106,501-115,800	77,001-83,700	47,401-51,500	6,000	
—	—	115,801-125,500	83,701-90,600	51,501-55,700	6,250	
—	—	125,501-135,500	90,601-97,900	55,701-60,200	6,500	
—	—	135,501-145,800	97,901-106,800	60,201-64,800	6,750	
—	—	145,801-156,700	106,801-113,200	64,801-69,600	7,000	
—	—	156,701-167,900	113,201-121,300	69,601-74,600	7,250	
—	—	167,901-179,400	121,301-129,600	74,601-79,800	7,500	
—	—	179,401-191,400	129,601-138,300	79,801-85,100	7,750	
—	—	191,401-Greater	138,301-Greater	85,101-Greater	8,000	

- a. Types of construction are based on the NC Building Code
b. Fire-Flow is measured at 25 psi residual pressure.

Table E2
REQUIRED FIRE-FLOW FOR ONE-AND TWO-FAMILY DWELLINGS

FIRE-FLOW CALCULATION AREA (square feet)	AUTOMATIC SPRINKLER SYSTEM (Design Standard)	MINIMUM FIRE- FLOW (gallons per minute)	FLOW DURATION (hours)
0-3,600	No automatic sprinkler system	1,000	1
3,601 and greater	No automatic sprinkler system	Value in Table E1	Duration in Table E1 at the required fire-flow rate
0-3,600	Section 903.3.1.3 of the NC Fire Code Section P2904 of the NC Residential Code	1,000	Duration in Table E1 at the required fire-flow rate
3601 and greater	Section 903.3.1.3 of the NC Fire Code Section P2904 of the NC Residential Code	1/2 value in Table E1 but no less than 1,000	1

6.03 VALVES AND APPURTENANCES

A. Location

Table E3

REQUIRED FIRE -FLOW FOR BUILDINGS OTHER THAN ONE-TWO FAMILY DWELLINGS

Automatic Sprinkler System (Design Standard)	MINIMUM FIRE-FLOW (gallons per minute)	FLOW DURATION (hours)
No automatic sprinkler system	Value in Table E1	Duration in Table E1
Section 903.3.1.1 of the NC Fire Code	25% of the value in Table E1 but no less than 1,500	Duration in Table E1 at the reduced flow rate
Section 903.3.1.2 of the NC Fire Code	25% of the value in Table E1 but no less than 1,500	Duration in Table E1 at the reduced flow rate

4,750 GPM x 0.25 = 1,188 GPM
NEEDED FIRE FLOW = 1,500 GPM



TEST LOCATION

Address/Location Description Southern Crossings Blvd, Holly Springs
 Test hydrant Facility ID WHYD see Page 2
 Flow hydrant Facility ID WHYD see Page 2

APPLICATION INFORMATION

Name Kimley-Horn
 Address 421 Fayetteville Street Suite 600, Raleigh, NC 27601
 Contact Person Chris Bostic, PE Phone (919) 653-2927
 Email Chris.Bostic@kimley-horn.com

SYSTEM INFORMATION

Test Date 12/12/2024 Time of Test 10:04 AM
 Nearest Elevated Tank Avent Ferry Tank Test Hydrant Elevation +/- 446'
 Main Size 12"
 Tank Hydraulic Grade 580.5' Use 20ft below pressure zone (tank overflow) for design*
 Pump Info N/A Theoretical Pressure 58.2 psi

RESULTS

Static Pressure 59.3 psi Number of Outlets Flowing 2
 Residual Pressure 57.4 psi Flow Hydrant Discharge Pressure 18, 19 psi
 Outlet Diameter 2 1/2 inches Volume of Discharge 699 + 718 = 1,417 gpm
 Orifice Coefficient 1.38 Water usage during test _____ Total Gal

Test Completed by: Mauricio Nandin and Michael Williams Testing Equipment HydroFlow Hose Monster
 Testing Company: Engineering Planning and Management (Make and Model)
 Checked by: _____ SEAL (if applicable)

Date _____

Notes: _____

Please attach the following supporting documentation to this form;
 Labeled map of location of test identifying test hydrant and flow hydrant
 Calculation demonstrating how the discharge flow was determined
 Calculation demonstrating the available fire flow at a residual pressure of 20 psi
 Printout of any recorded data supporting the static and residual pressure at the test hydrant.
 Printout of any recorded data supporting the discharge pressure of the flow hydrant.
 See NFPA 291 for additional information about completing fire hydrant flow tests

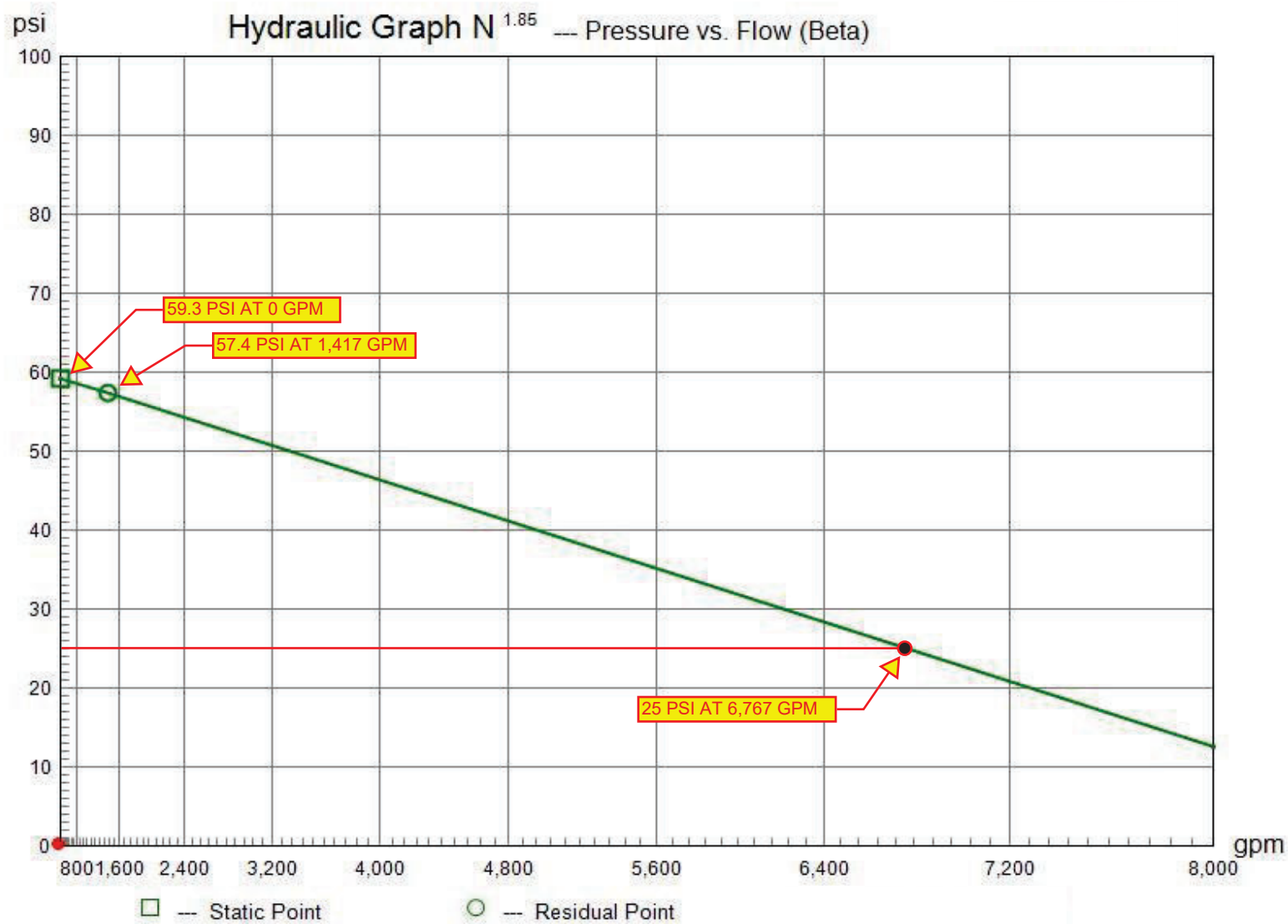
*To maintain system water quality, storage tanks may be maintained as low as 20' below overflow.



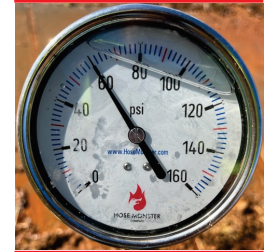
updated November 2021

Southern Crossings Blvd, Holly Springs NC

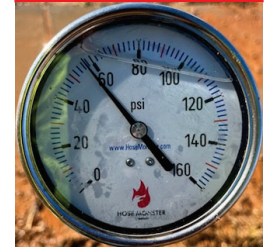




STATIC PRESSURE:
59.3 PSI



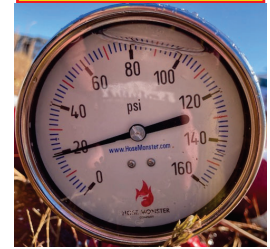
RESIDUAL PRESSURE:
57.4 PSI



FLOW:
18 PSI PITOT



FLOW:
19 PSI PITOT



2"
PITOTLESS NOZZLE™
 PN2THD
FLOW CHART

10 - 40 PSI			41 - 70 PSI			Key Flow Test Points		
2 1/2" Hose Monster Model II			2 1/2" Hose Monster Model II			2 1/2" Hose Monster Model II		
Open Atmosphere			Open Atmosphere			Open Atmosphere		
PSI	GPM	GPM	PSI	GPM	GPM	GPM	PSI	PSI
10	521	529	41	1055	1071	500	9.5	9.1
11	547	555	42	1068	1084	562.5	11.7	11.3
12	571	579	43	1081	1096	750	20.7	20.1
13	594	603	44	1093	1109	1000	36.8	35.8
14	617	626	45	1106	1122	1125	46.6	45.3
15	638	648	46	1118	1134	1500	82.8	80.5
16	659	669	47	1130	1146			
17	679	689	48	1142	1158			
18	699	709	49	1154	1170			
19	718	729	50	1165	1182			
20	737	748	51	1177	1194			
21	755	766	52	1188	1206			
22	773	784	53	1200	1217			
23	790	802	54	1211	1229			
24	807	819	55	1222	1240			
25	824	836	56	1233	1251			
26	840	853	57	1244	1262			
27	856	869	58	1255	1273			
28	872	885	59	1266	1284			
29	887	900	60	1277	1295			
30	903	916	61	1287	1306			
31	918	931	62	1298	1317			
32	932	946	63	1308	1327			
33	947	960	64	1318	1338			
34	961	975	65	1329	1348			
35	975	989	66	1339	1358			
36	989	1003	67	1349	1369			
37	1002	1017	68	1359	1379			
38	1016	1031	69	1369	1389			
39	1029	1044	70	1379	1399			
40	1042	1057						

The readings on this chart are based on which device the Pitotless Nozzle is connected to.
 It is the user's responsibility to verify that the correct chart and column is being used.

- **2 1/2" Hose Monster Model II or Flusher with flow splitter (HM2H, HM2HF).** Use this column if the Pitotless Nozzle is connected to the 2 1/2" Hose Monster or Flusher. The built-in pitot or flow splitter must be installed for accuracy. If you do not have the built-in pitot or flow splitter, please contact us.
- **Open Atmosphere.** Use this column when the Pitotless Nozzle is connected directly to a test header or hydrant flowing openly to atmosphere.

This chart is FM Approved for flow rate accuracy. Please call us or instruct the Authority Having Jurisdiction to call us if there are any questions.
 Additional copies of flow charts are available at:
www.hosemonster.com/literature.html



MANUFACTURED BY:
 Hydro Flow Products, Inc.
 888.202.9987 TOLL FREE
 847.434.0073 FAX
 Service@FlowTest.com EMAIL
www.HoseMonster.com

U. S. Patent # 6,874,375

Updated Jun. 2015



Pitotless Nozzle™ Threaded

INSTRUCTIONS

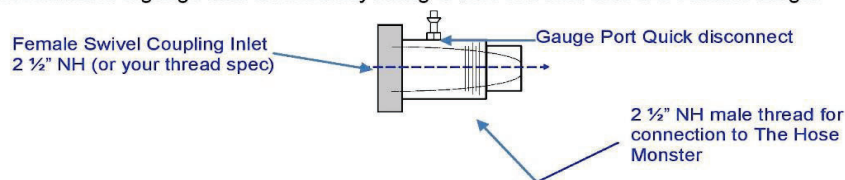
US Patent 6,874,375

The Pitotless Nozzle Threaded (PN#THD) must be used with the 2 ½" Hose Monster Model II (HM2H, HM2HF) or attached directly to a hydrant or test header valve discharging into open atmosphere. *Note: If you intend to use the Pitotless Nozzle with the Little Hose Monster (HML), then a Pitotless Nozzle Grooved (PN#GRV) is required. Do not use the Pitotless Nozzle Threaded (PN#THD) with the Little Hose Monster. Call us if you are considering a configuration not listed here.*

SETUP

The gauge connection on the Pitotless Nozzle is a factory-installed male end of a quick disconnect coupling. One female counterpart is included and additional ones can be purchased separately. Attach the female end of the quick disconnect coupling directly to the gauge or remote reader adapter and use the quick disconnect feature to attach and remove. Do not remove the male quick disconnect from the Pitotless Nozzle as it will damage the threads on the Pitotless Nozzle.

We recommend a gauge with an accuracy rating of ½% or better and of a suitable range.



Using the Pitotless Nozzle with the 2 ½" Hose Monster® or Flusher

Insert the male outlet end of the Pitotless Nozzle into the swivel coupling of the Hose Monster. Hand-tighten plus about a quarter turn using a common rocker lug spanner wrench on the swivel coupling and a hole type spanner wrench (WSPA104) for a holdback. Attach the male end of a hose into the swivel coupling on the Pitotless Nozzle, hand-tighten plus about a quarter turn using spanner wrenches. The pitot/flow splitter must be installed on either unit in order to collect accurate flow rates.

If using the Pitotless Nozzle without the Hose Monster

The Pitotless Nozzle must be attached securely to a pump test header valve or hydrant. Secure the female swivel coupling of the Pitotless Nozzle directly to a hydrant nozzle or test header valve. The Pitotless Nozzle points in the direction the water will flow. Clear water discharge path.

Flow Charts

Pitotless Nozzle flow charts must be used to determine discharge flow rate. The use of flow charts of a different device or size will result in incorrect readings. Within the flow chart is a column for "2 ½" Hose Monster Model II" and for "Open Atmosphere". Use the "2 ½" Hose Monster Model II" flows if the Pitotless Nozzle is attached to a 2 ½" Hose Monster Model II. Use the "Open Atmosphere" flows if the Pitotless Nozzle is attached directly on a hydrant or test header valve discharging out into the open. Flow charts are provided with the Pitotless Nozzle and additional copies are available on our website at

www.HoseMonster.com/literature.html

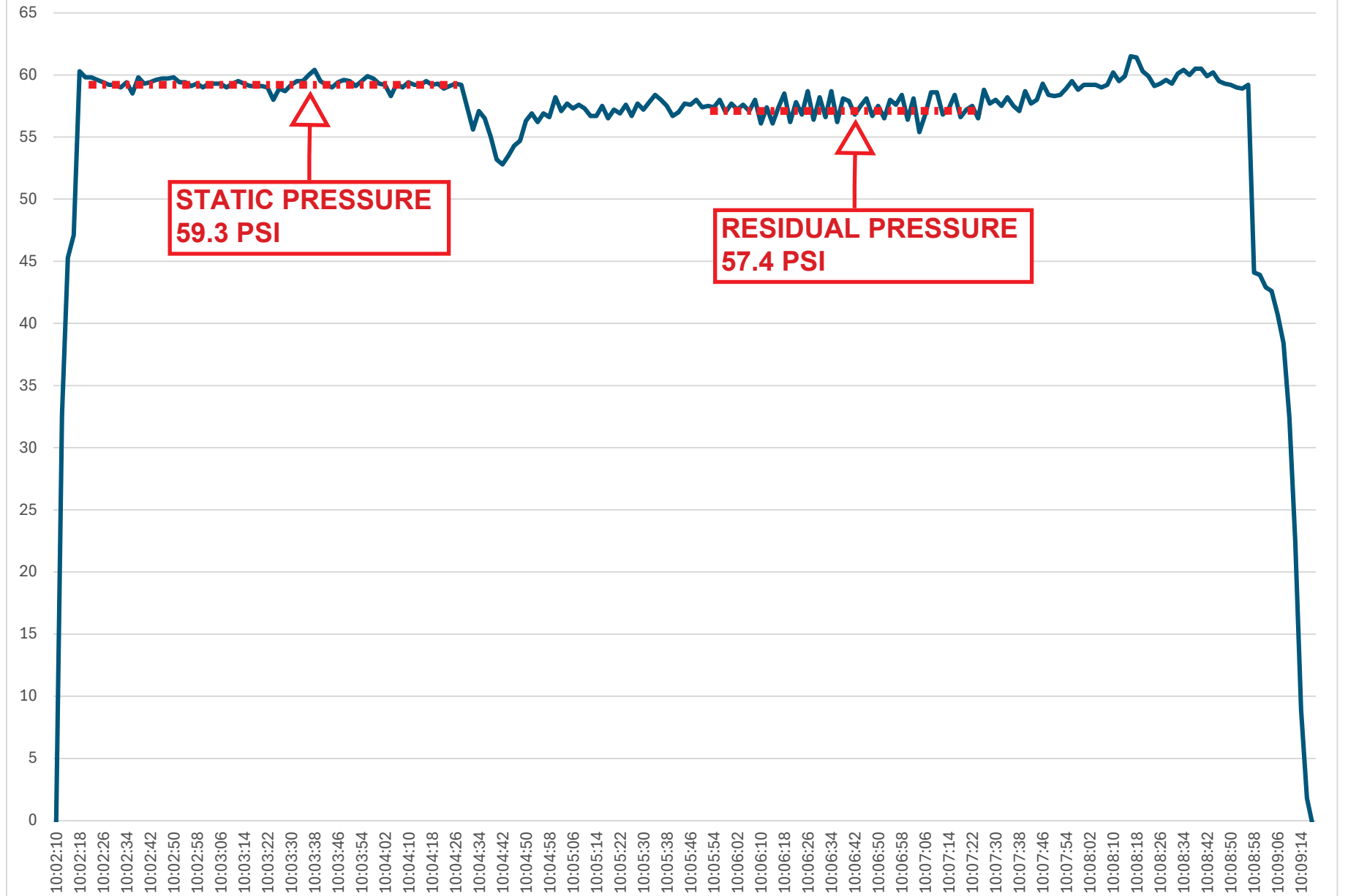
WARNING:

- **Do not** attach the Pitotless Nozzle to the end of a hose unless the Hose Monster is attached to it or unless it is permanently secured.
- **Do not** attach a hose to the male outlet end of the Pitotless Nozzle under any circumstance. The resulting backpressure will distort flow rate measurement.
- **Do not** remove the quick disconnect gauge port fitting. The aluminum threads will be damaged. Contact Hydro Flow Products directly for any repairs.



MANUFACTURED BY:
Hydro Flow Products, Inc.
(888) 202-9987 Toll Free
(847) 434-0073 Fax
Service@FlowTest.com
www.HoseMonster.com

Southern Crossing Blvd, Holly Springs





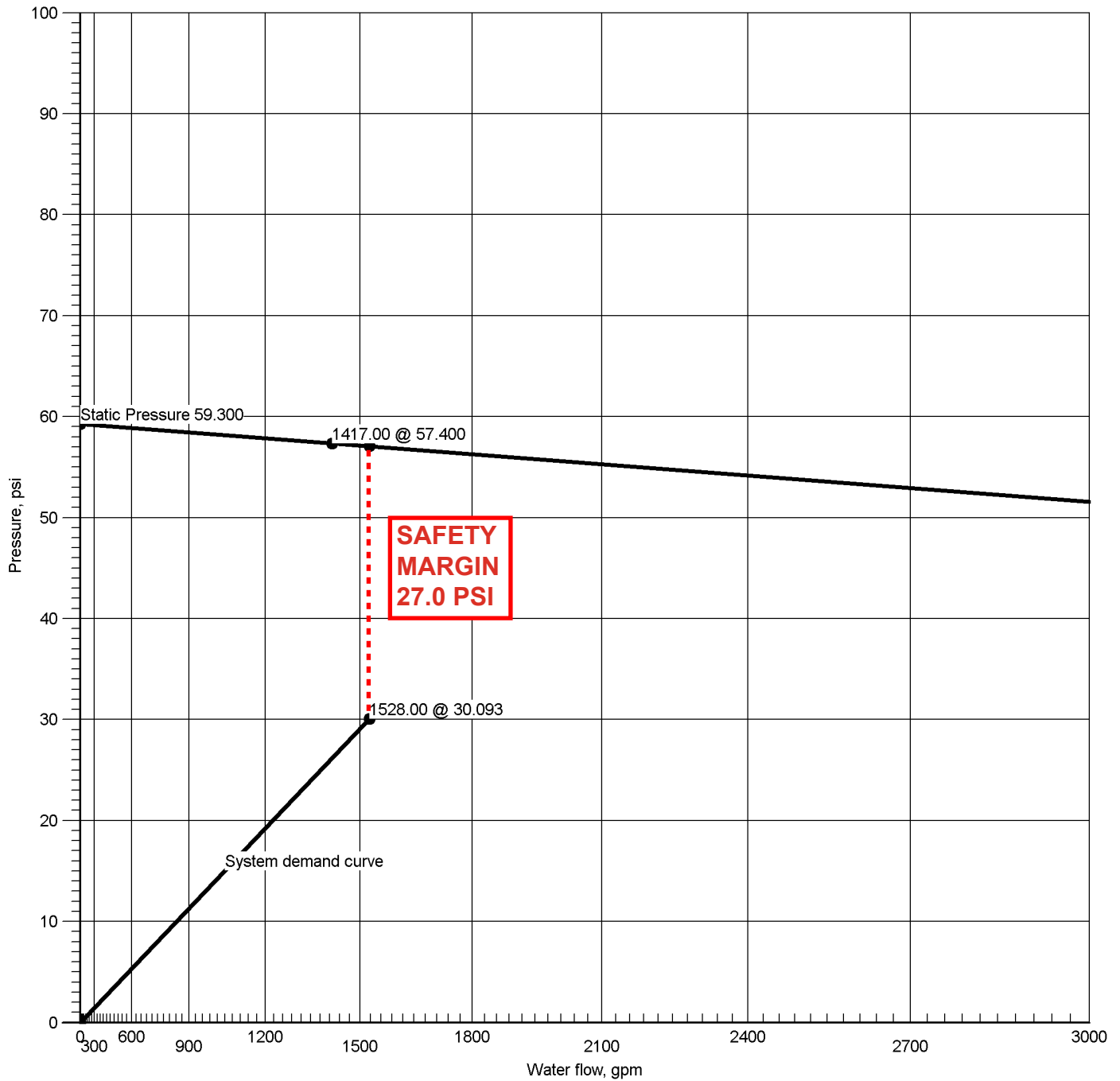
Hydraulic Summary

ATTACHMENT C
7 PAGES

Job											
Job Number					Designer						
Job Name:					State Certification/License Number						
Address 1					AHJ						
Address 2					Job Site/Building						
Address 3					Drawing Name Southern Crossings - FFA.cad						
System					Remote Area(s)						
Most Demanding Sprinkler Data K-Factor at					Occupancy NA			Job Suffix Manually Flowing			
Hose Allowance At Source 0.00					Density NA			Area of Application NA			
Additional Hose Supplies Node Hydrant At Node 3 Hydrant At Node 17					Number Of Sprinklers Calculated 0			Number Of Nozzles Calculated 0			
Flow(gpm) 1500.00 NFF 28.00 Domestic					Coverage Per Sprinkler NA			AutoPeak Results: Pressure For Remote Area(s) Adjacent To Most Remote Area			
Total Hose Streams 1528.00											
System Flow Demand 1528.00			Total Water Required (Including Hose Allowance) 1528.00								
Maximum Pressure Unbalance In Loops 0.000											
Maximum Velocity Above Ground 16.80 between nodes 4 and 3											
Maximum Velocity Under Ground											
Volume capacity of Wet Pipes 6338.13 gal			Volume capacity of Dry Pipes								
Supplies											
Node	Name	Hose Flow (gpm)	Static (psi)	Residual (psi)	@	Flow (gpm)	Available (psi)	@	Total Demand (gpm)	Required (psi)	Safety Margin (psi)
1	Water Supply		59.300	57.400		1417.00	57.116		1528.00	30.093	27.022
Contractor											
Contractor Number		Contact Name			Contact Title						
Name of Contractor:					Phone			Extension			
Address 1					FAX						
Address 2					E-mail						
Address 3					Web-Site						



Water Supply at Node 1



Hydraulic Graph

Water Supply at Node 1

Static Pressure
59.300

Residual Pressure
57.400 @ 1417.00

Available Pressure at System Demand
57.116 @ 1528.00

Required Pressure at System Demand
30.093 @ 1528.00

Required Pressure at System Demand (Including Hose Allowance at Source)
30.093 @ 1528.00

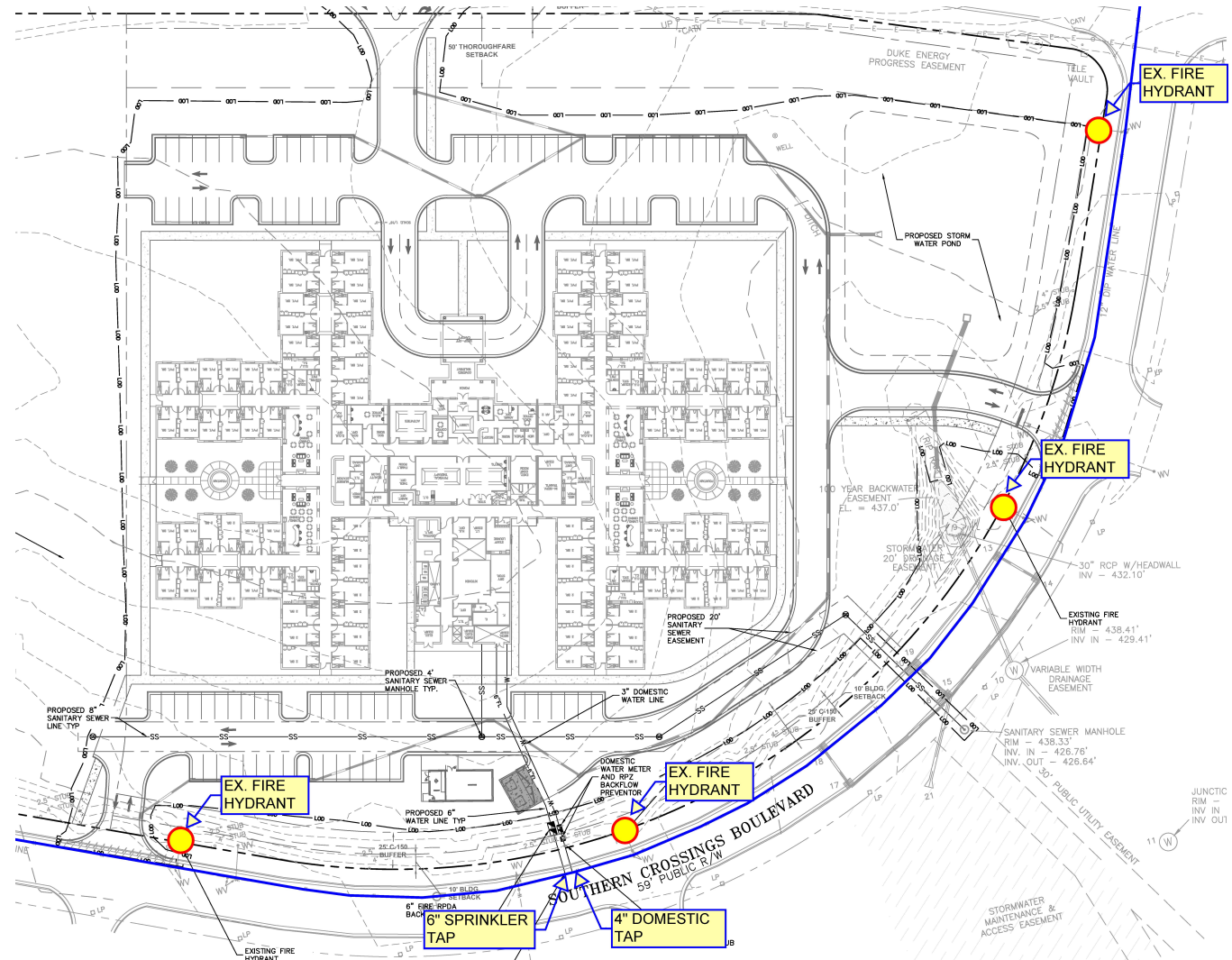


Summary Of Outflowing Devices

Job Number: 1
Report Description:

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)		
Hydrant	3	1500.00	1500.00	300	25.000		
Hydrant	17	28.00	28.00	5.6	28.081		

➔ Most Demanding Sprinkler Data





Node Analysis

Job Number: 1
Report Description:

Node	Elevation(Foot)	Fittings	Pressure(psi)	Discharge(gpm)	
1	446'-0	S, T(89'-5)	30.093	1528.00	
3	446'-0	Hyd(-25.000)	25.000	1500.00	
17	447'-0	Hyd(-25.000)	28.081	28.00	
4	446'-0	T(89'-5)	25.917		
20	447'-0	T(89'-5)	28.081		



Hydraulic Analysis

Job Number: 1
Report Description:

Pipe Type	Diameter	Flow	Velocity	HWC	Friction Loss	Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Eq. Length	Summary
Upstream					Fittings	Total Length	
Route 1							
CM	6.0400	1500.00	16.80	140	0.057137	16'-0½	Pf 0.917
3	446'-0	1500.00		25.000	Hydrant,		Pe
4	446'-0			25.917		16'-0½	Pv
BL	12.2200	1500.00	4.10	140	0.001847	671'-4½	Pf 2.597
4	446'-0			25.917	T(89'-5)	734'-8	Pe -0.434
20	447'-0			28.081	2C(89'-5), 5T(89'-5), EE(19'-4½)	1406'-0½	Pv
BL	12.2200	1528.00	4.18	140	0.001912	269'-11½	Pf 1.579
20	447'-0	28.00		28.081	T(89'-5), Flow (q) from Route 2	555'-10	Pe 0.434
1	446'-0			30.093	5T(89'-5), EE(19'-4½), S	825'-9½	Pv
		0.00			Hose Allowance At Source		
1		1528.00					
Route 2							
CM	6.0400	28.00	0.31	140	0.000036	10'-2½	Pf 0.000
17	447'-0	28.00		28.081	Hydrant,		Pe
20	447'-0			28.081		10'-2½	Pv
Equivalent Pipe Lengths of Valves and Fittings (C=120 only)				C Value Multiplier			
$\left(\frac{\text{Actual Inside Diameter}}{\text{Schedule 40 Steel Pipe Inside Diameter}} \right)^{4.87} = \text{Factor}$				Value Of C	100	130	140
				Multiplying Factor	0.713	1.16	1.33



Hydraulic Analysis

Job Number: 1
Report Description:

Pipe Type	Diameter	Flow	Velocity	HWC	Friction Loss	Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Eq. Length	Summary
Upstream					Fittings	Total Length	

Pipe Type Legend	
AO	Arm-Over
BL	Branch Line
CM	Cross Main
DN	Drain
DR	Drop
DY	Dynamic
FM	Feed Main
FR	Feed Riser
MS	Miscellaneous
OR	Outrigger
RN	Riser Nipple
SN	Swing Nipple
SP	Sprig
ST	Stand Pipe
UG	Underground

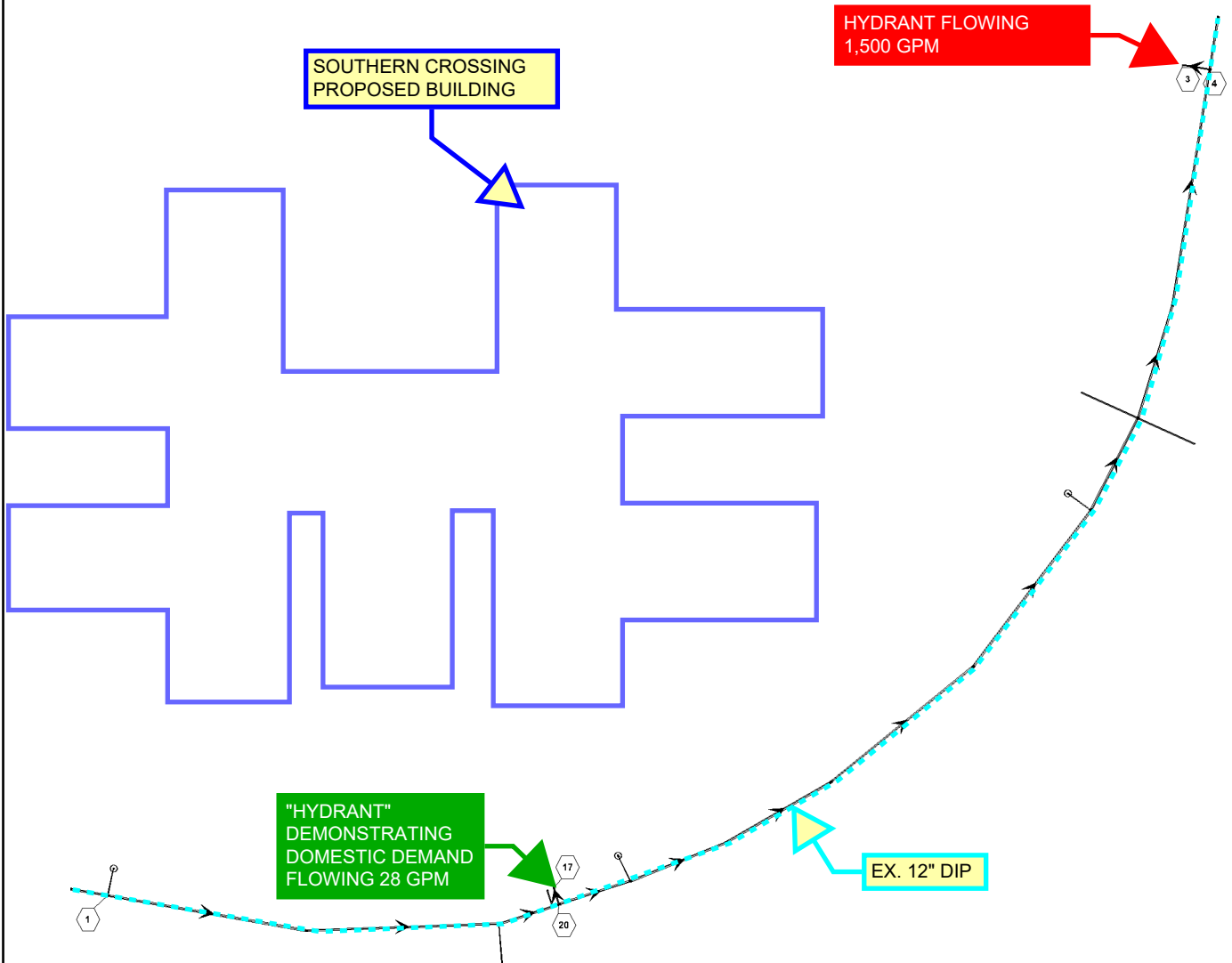
Units Legend	
Diameter	Inch
Elevation	Foot
Flow	gpm
Discharge	gpm
Velocity	fps
Pressure	psi
Length	Foot
Friction Loss	psi/Foot
HWC	Hazen-Williams Constant
Pt	Total pressure at a point in a pipe
Pn	Normal pressure at a point in a pipe
Pf	Pressure loss due to friction between points
Pe	Pressure due to elevation difference between indicated points
Pv	Velocity pressure at a point in a pipe

Fittings Legend	
ALV	Alarm Valve
AngV	Angle Valve
b	Bushing
BaV	Ball Valve
BFP	Backflow Preventer
BV	Butterfly Valve
C	Cross Flow Turn 90°
cplg	Coupling
Cr	Cross Run
CV	Check Valve
DeV	Deluge Valve
DPV	Dry Pipe Valve
E	90° Elbow
EE	45° Elbow
Ee1	11¼° Elbow
Ee2	22½° Elbow
f	Flow Device
fd	Flex Drop
FDC	Fire Department Connection
fE	90° FireLock(TM) Elbow
fEE	45° FireLock(TM) Elbow
flg	Flange
FN	Floating Node
fT	FireLock(TM) Tee
g	Gauge
GloV	Globe Valve
GV	Gate Valve
Ho	Hose
Hose	Hose
HV	Hose Valve
Hyd	Hydrant
LtE	Long Turn Elbow
mecT	Mechanical Tee
Noz	Nozzle
P1	Pump In
P2	Pump Out
PIV	Post Indicating Valve
PO	Pipe Outlet
PrV	Pressure Relief Valve
PRV	Pressure Reducing Valve
red	Reducer/Adapter
S	Supply
sCV	Swing Check Valve
SFx	Seismic Flex
Spr	Sprinkler
St	Strainer
T	Tee Flow Turn 90°
Tr	Tee Run
U	Union
WirF	Wirsbo
WMV	Water Meter Valve
Z	Cap



Flow Diagram (Top View)

Job Number: 1
Report Description:



Water Demand Calculator (WDC v2.1)

PROJECT NAME :
Click for Drop-down Menu →

Total Number of Apartments in the Building →
Total Apartments in this Calculation →

Thursday, December 19, 2024
1:44 PM

FIXTURE GROUPS		FIXTURE	ENTER TOTAL NUMBER OF FIXTURES	PROBABILITY OF USE (%)	ENTER FIXTURE FLOW RATE (GPM)	MAXIMUM RECOMMENDED FIXTURE FLOW RATE (GPM)
Bathroom Fixtures	1	Bathtub (no Shower)	0	0.39	5.5	5.5
	2	Bidet	0	0.55	2.0	2.0
	3	Combination Bath/Shower	92	1.43	5.5	5.5
	4	Faucet, Lavatory	98	1.12	1.5	1.5
	5	Shower, per head (no Bathtub)	1	0.95	2.0	2.0
	6	Water Closet, 1.28 GPF Gravity Tank	98	0.55	3.0	3.0
Kitchen Fixtures	7	Dishwasher	1	0.32	1.3	1.3
	8	Faucet, Kitchen Sink	2	1.12	2.2	2.2
Laundry Room Fixtures	9	Clothes Washer	3	1.35	3.5	3.5
	10	Faucet, Laundry	4	1.12	2.0	2.0
Bar/Prep Fixtures	11	Faucet, Bar Sink	0	1.12	1.5	1.5
Other Fixtures	12	Fixture 1	0	0.00	0.0	6.0
	13	Fixture 2	0	0.00	0.0	6.0
	14	Fixture 3	0	0.00	0.0	6.0

COMPUTED RESULTS
FOR
PEAK PERIOD CONDITIONS

Total No. of Fixtures in Calculation
n = 299

99th Percentile Demand Flow
Q = 27.4 GPM

Hunter Number
H(n,p) = 3.07

Stagnation Probability
Pr[Zero Demand] = 5%

Round up to
nearest
whole
number (28
gpm)

DOWNLOAD
RESULT

RESET
WDC

↓ Select Units for Water Demand ↓
GPM LPM LPS

RUN
WDC