

1.0 GENERAL SPECIFICATIONS

- 1.1. BEFORE SUBMITTING TENDER FOR THIS WORK, EXAMINE THE SITE, LOCAL SERVICES AND LOCAL CONDITIONS, PROJECT DRAWINGS, LOCATION OF EXISTING EQUIPMENT AND SPACE ALLOWANCES TO ASCERTAIN THAT THE WORK CAN BE SATISFACTORILY CARRIED OUT AS SHOWN ON THESE DRAWINGS AND AS HEREIN SPECIFIED.
- 1.2. THESE DRAWINGS ARE FOR PERMIT, AND FOR PRICING, AND MUST BE ADHERED TO FOR INSTALLATION. IF CONTRACTOR WISHES TO ALTER DRAWINGS, THEN CONTRACTOR IS RESPONSIBLE FOR OBTAINING RE-APPROVALS.
- 1.3. CONTRACTOR TO SUPPLY AND INSTALL A COMPLETE AND FULLY OPERATIONAL AUTOMATIC SPRINKLER SYSTEM AS SHOWN ON THE DRAWINGS AND AS INDICATED IN THE SPECIFICATIONS AND CONFORMING TO N.F.P.A. REQUIREMENTS, O.B.C. REQUIREMENTS AND THE REQUIREMENTS OF THE LOCAL AUTHORITIES.
- 1.4. ALL WORK SHALL BE DONE IN ACCORDANCE WITH ALL CODES, STANDARDS BY-LAWS AND AUTHORITIES HAVING JURISDICTION.
- 1.5. ALL MATERIALS USED IN THE INSTALLATION OF THE SPRINKLER SYSTEM SHALL LISTED.
- 1.6. PROVIDE SPARE SPRINKLER HEADS AND WRENCH IN A METAL CABINET, MOUNTED ON THE WALL NEAR THE MAIN SPRINKLER VALVE HEADER. AMOUNT AS PER N.F.P.A. STANDARD # 13.
- 1.7. UPON COMPLETION OF THE INSTALLATION, THE CONTRACTOR SHALL TEST THE SYSTEM AND SUBMIT TO THE ENGINEER COMPLETED CONTRACTORS TEST CERTIFICATES STATING THAT THE SYSTEMS HAVE BEEN INSTALLED, TESTED AND APPROVED BY THE AUTHORITIES HAVING JURISDICTION IN ACCORDANCE WITH N.F.P.A.#13, LATEST EDITION.
- 1.8. RECORD AS-BUILT" DRAWINGS: BE RESPONSIBLE FOR CLEARLY MARKING, AS THE JOB PROGRESSES, ALL CHANGES AND DEVIATIONS FROM THE ROUTING OF SERVICES AND THE LOCATION OF EQUIPMENT SHOWN ON THE CONTRACT DOCUMENTS ON A BOUND SET OF WHITE PRINTS. KEEP THE PRINTS AVAILABLE AT THE SITE FOR PERIODIC INSPECTION THROUGHOUT THE DURATION OF THE WORK. NOTE THAT MARKED-UP WHITE PRINTS SHALL INCORPORATE ALL REVISIONS MADE BY CHANGE ORDERS, ADDENDA, FIELD INSTRUCTION. ETC. HAND THE AS-BUILT DRAWINGS TO THE ENGINEER AT THE END OF THE PROJECT.
- 1.9. THE DRAWINGS AND SPECIFICATIONS ARE INTENDED TO BE CO-OPERATIVE, PERFORM ALL WORK WHICH IS SHOWN, SPECIFIED OR REASONABLY IMPLIED ON THE DRAWINGS, BUT NOT MENTIONED IN THE SPECIFICATIONS OR VICE-VERSA, AS THOUGH FULLY COVERED BY BOTH.
- 1.10. THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR THE LAYOUT OF WORK AND FOR ANY DAMAGE CAUSED TO THE PROPERTY OF THE OWNER OR OTHER TRADES THROUGH THE IMPROPER LOCATION OF MATERIALS, EQUIPMENT, OR CARRYING OUT OF THE WORK.

1.12.PROVIDE PIPE HANGERS OR SUPPORTS ON ALL PIPING. TRAPEZE HANGER ARE TO BE PROVIDED AS REQUIRED

1.13.NO INSTALLATION SHALL BE CONCEALED OR RENDERED INACCESSIBLE BY DRYWALL, BOARDING OR OTHER BUILDING CONSTRUCTION, UNTIL IT HAS BEEN INSPECTED BY THE ENGINEER AND LOCAL AUTHORITIES HAVING JURISDICTION AND FOUND TO CONFORM TO CONTRACT DOCUMENT AND REGULATIONS. WHEN REQUESTING AN INSPECTION, THE CONTRACTOR SHALL PROVIDE A MINIMUM OF THREE (3) WORKING DAYS NOTICE IN ADVANCE.

1.14.EXACT LOCATION AND ELEVATION OF PIPING TO BE DETERMINED BY CONTRACTOR TO SUIT SITE CONDITIONS.

1.15.CONTRACTOR TO CO-ORDINATE LOCATION OF SPRINKLERS WITH RESPECT TO OBSTRUCTIONS IN ACCORDANCE WITH NFPA 13

1.16. MINIMUM WALL THICKNESS OF SPRINKLER PIPING TO BE EQUIVALENT TO SCHEDULE 10S.

ALL DRY SYSTEM PIPING IS REQUIRED TO BE GALVANIZED

1.17. CONTRACTOR TO INCLUDE FOR AN ADDITIONAL SPRINKLERS FOR BELOW OBSTRUCTIONS

1.18.A COPY OF N.F.P.A STANDARD #25 IS TO BE PROVIDED AND LEFT IN A VISIBLE LOCATION IN THE SPRINKLER ROOM

1.19. PROVIDE PRODUCT DATA SHEETS FPR ALL MATERIAL BEING PROPOSED FOR THE INSTALLATION

1.20.CONTRACTOR MAY USE 1 INCH DIA. FLEXIBLE DROPS WITH A MAXIMUM LENGTH OF 4 FEET WITH A MAXIMUM OF 4, 90 DEGREE BENDS. FLEXIBLE PIPING IF USED IS TO BE STAINLESS STEEL WITH BRAIDED CONNECTION, SINGLE PIECE WELDED CONSTRUCTION WITH NO O-RINGS OR GASKETS, ULC LISTED AND FM APPROVED.

2.0 DESIGN SPECIFICATIONS

THE DESIGN, INSTALLATION, AND COMMISSIONING OF THE FIRE SPRINKLER AND FIRE STANDPIPE SYSTEMS ARE TO BE IN A ACCORDANCE WITH NFPA 13 (2013), AND THE ONTARIO BUILDING CODE (2012),

2.1. THE FIRE SPRINKLER SYSTEM IS TO BE INSTALLED IN ACCORDANCE WITH DRAWINGS:

- FP-1 FIRE SPRINKLER GENERAL NOTES SITE PLAN & DETAILS
FP-2 FIRE PROTECTION PLAN - BASEMENT LEVEL SPRINKLER PLAN
FP-3 FIRE PROTECTION PLAN - GROUND FLOOR SPRINKLER PLAN
FP-4 FIRE PROTECTION PLAN - ATTIC FLOOR SPRINKLER PLAN

2.2. THE FIRE PROTECTION SYSTEM IS CALCULATED IN ACCORDANCE WITH THE REQUIREMENTS OF NFPA 13

MECHANICAL / ELECTRICAL ROOMS - DESIGN AND CALCULATION IN ACCORDANCE WITH NFPA 13 STANDARD FOR ORDINARY HAZARD GROUP 1 OCCUPANCIES CALCULATED AT A DENSITY OF 0.15 GPM/SQ FT OVER 1500 SQ FT + 250 GPM HOSE ALLOWANCE.

OFFICES, VISITORS CENTRE, ACTIVITY ROOMS AND SIMILAR OCCUPANCIES - DESIGNED AND CALCULATED IN ACCORDANCE WITH THE PROVISIONS OF NFPA 13 FOR LIGHT HAZARD OCCUPANCIES. DENSITY OF 0.1 GPM/SQ FT OVER 900 SQ FT.

ATTIC - DESIGNED IN ACCORDANCE WITH NFPA 13 STANDARD FOR LIGHT HAZARD OCCUPANCIES AT A DENSITY OF 0.1 GPM/SQ OVER 2535 sq ft. (INCREASED 30% FOR ROOF SLOPE & 30% FOR DRY SYSTEM)

2.3. PIPING "C FACTORS" USED IN CALCULATIONS ARE IN ACCORDANCE WITH NFPA 13 AS FOLLOWS:

STEEL PIPE - WET SYSTEMS - C=120
STEEL PIPE - DRY SYSTEMS - C=100

3.0 WATER SUPPLY DATA

DATE: MAY 2ND 2023
TIME: 9:30AM
TEST BY: BRUCE FIRE ENGINEERING
STATIC PRESSURE: 67 PSI
RESIDUAL 1: 712 GPM @ 32 PSI
RESIDUAL 2: 950 GPM @ 20 PSI

Table 9.2.2.1(c) Maximum Distance Between Hangers (ft-in.) 2013 EDITION

	1	1½	2	2½	3	3½	4	5	6	8
Nominal Pipe Size (in.)										
Steel pipe except threaded lightweight	N/A	12-0	12-0	15-0	15-0	15-0	15-0	15-0	15-0	15-0
Copper tube	8-0	8-0	10-0	10-0	12-0	12-0	15-0	15-0	15-0	15-0
CPVC	5-8	8-0	8-8	7-0	8-0	9-0	10-0	N/A	N/A	N/A
Ductile iron pipe	N/A	N/A	N/A	N/A	N/A	N/A	15-0	N/A	15-0	15-0

HANGER SPACING DETAIL

N.T.S.

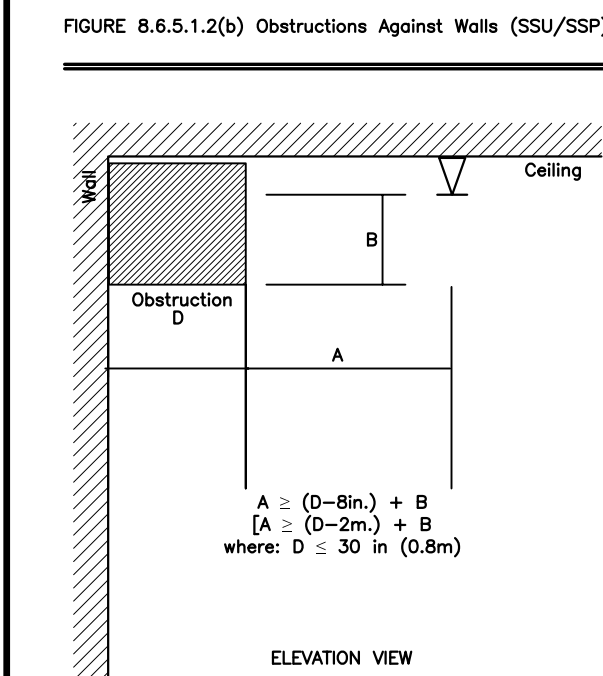
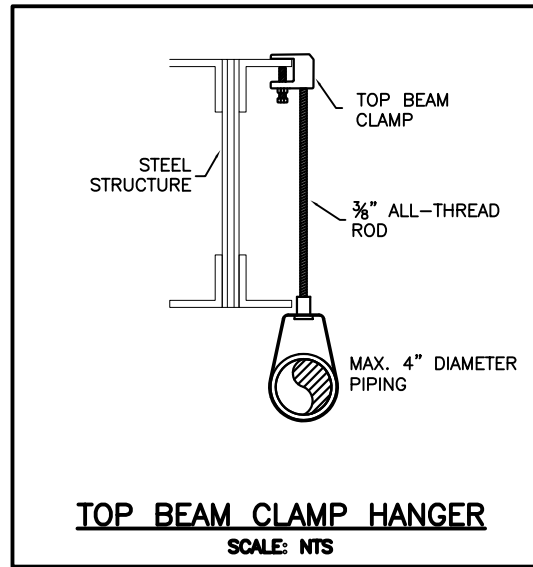
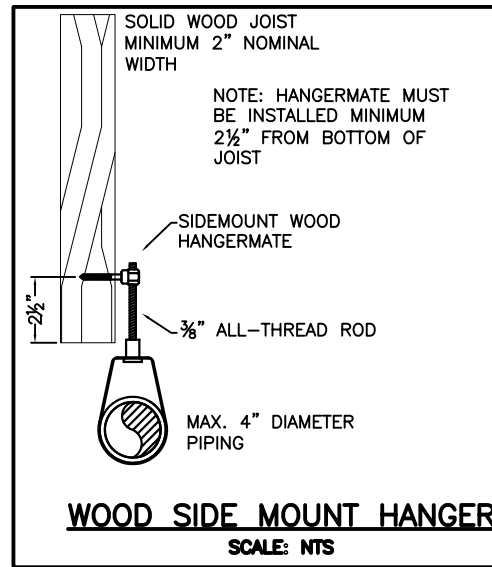
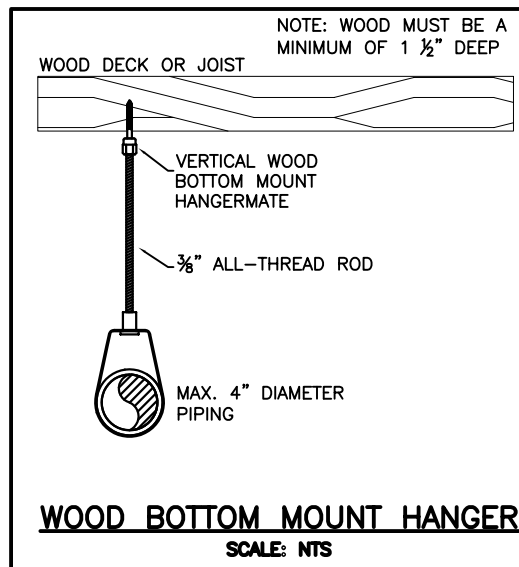
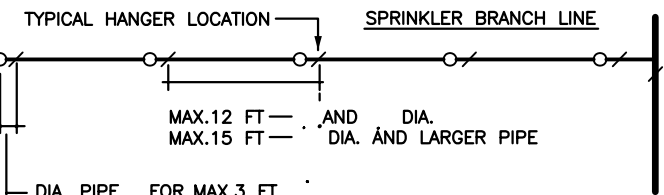
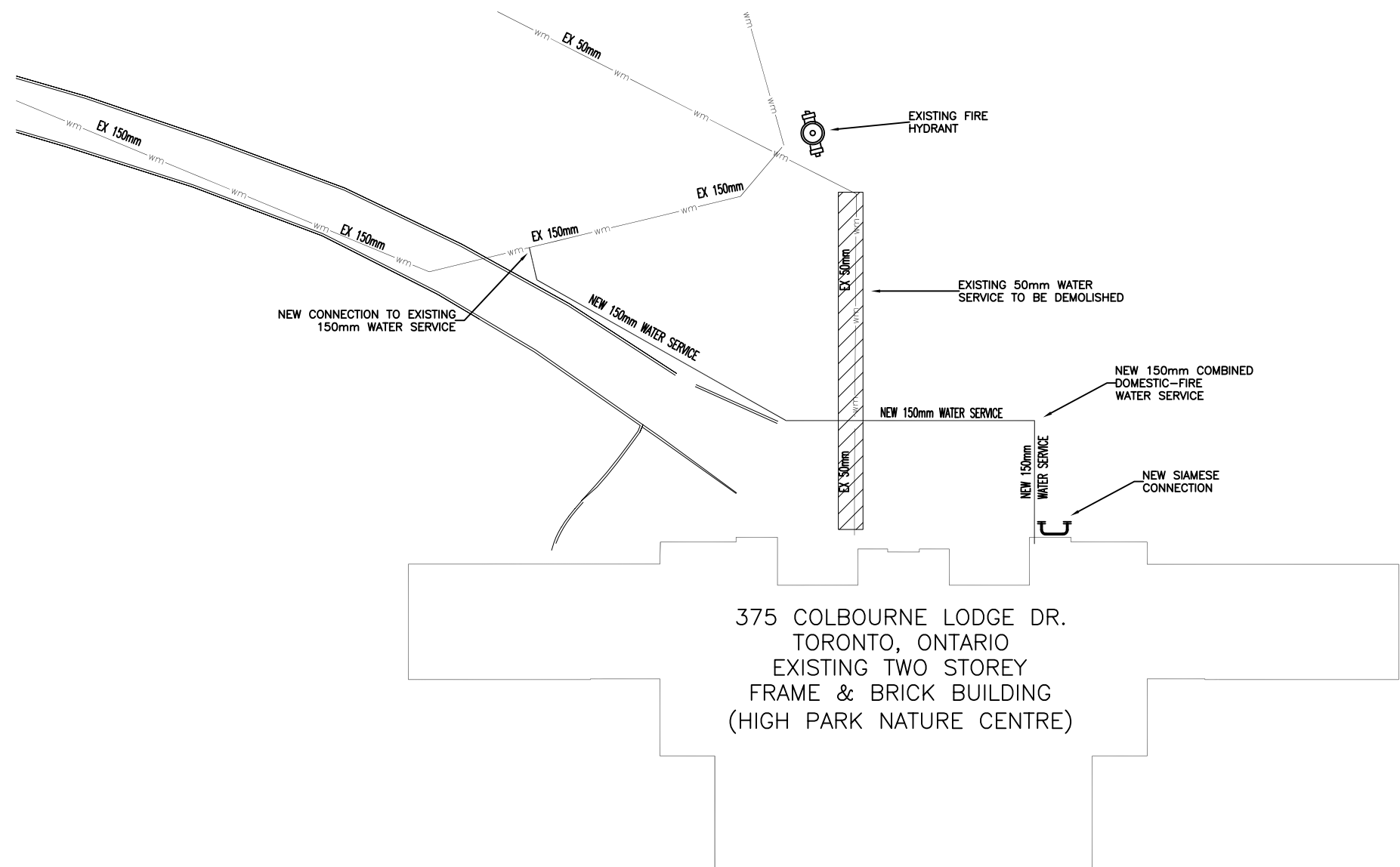
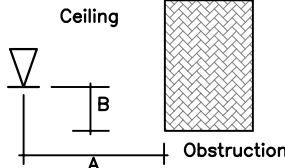


Table 8.6.5.1.2 Positioning of Sprinklers to Avoid Obstructions to Discharge (SSU/SSP)

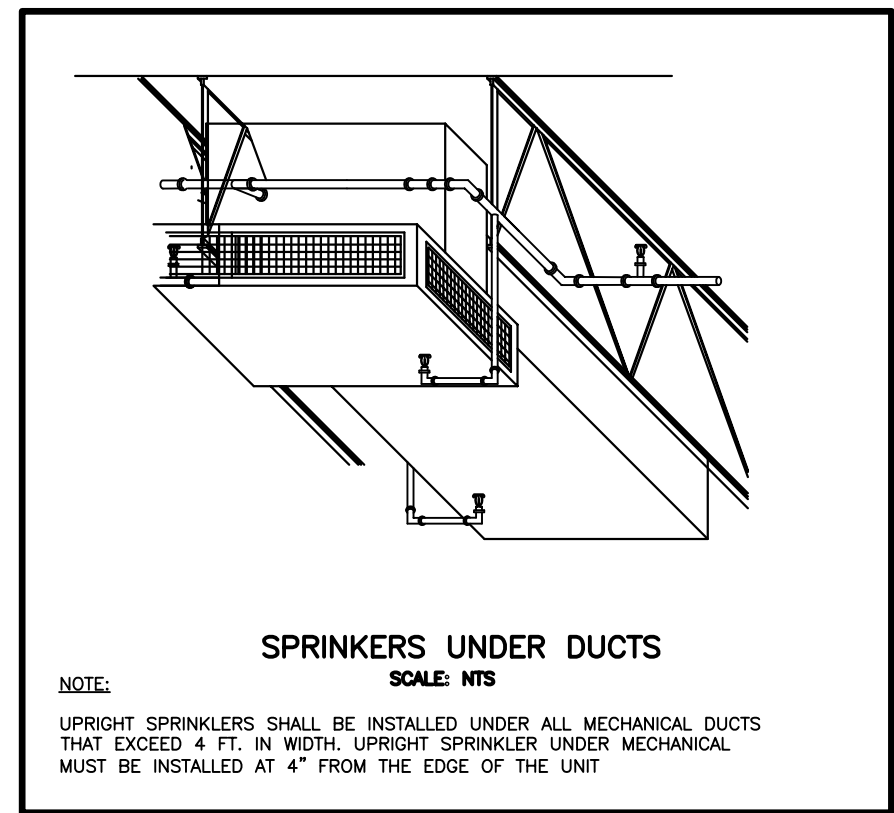
Distance from Sprinkler to Side of Obstruction (A)	Maximum Allowable Distance of Deflector above Bottom of Obstruction (B) Min.(mm)X
Less than 1 ft	0
1 ft to less than 1 ft 6 in.	2 1/2 (65)
1 ft 6 in. to less than 2 ft	3 1/2 (90)
2 ft to less than 2 ft 6 in.	5 1/2 (140)
2 ft 6 in. to less than 3 ft	7 1/2 (190)
3 ft to less than 3 ft 6 in.	9 1/2 (240)
3 ft 6 in. to less than 4 ft	12 (300)
4 ft to less than 4 ft 6 in.	14 (350)
4 ft 6 in. to less than 5 ft	16 1/2 (420)
5 ft to less than 5 ft 6 in.	18 (450)
5 ft 6 in. to less than 6 ft	20 (510)
6 ft to less than 6 ft 6 in.	24 (600)
6 ft 6 in. to less than 7 ft	30 (750)
7 ft to less than 7 ft 6 in.	35 (875)

FIGURE 8.6.5.12(c) Positioning of Sprinkler to Avoid Obstructions to Discharge (SSU/SSP)



SITE PLAN

SCALE: 1/32" = 1'-0"



Volume of System

Diameter (in)	Volume (gal)	Approx. Len (ft)
1	.74	15
1 1/2	35.20	306
2 1/2	19.68	70
4	131.81	178
Total	187.43	

LEGEND

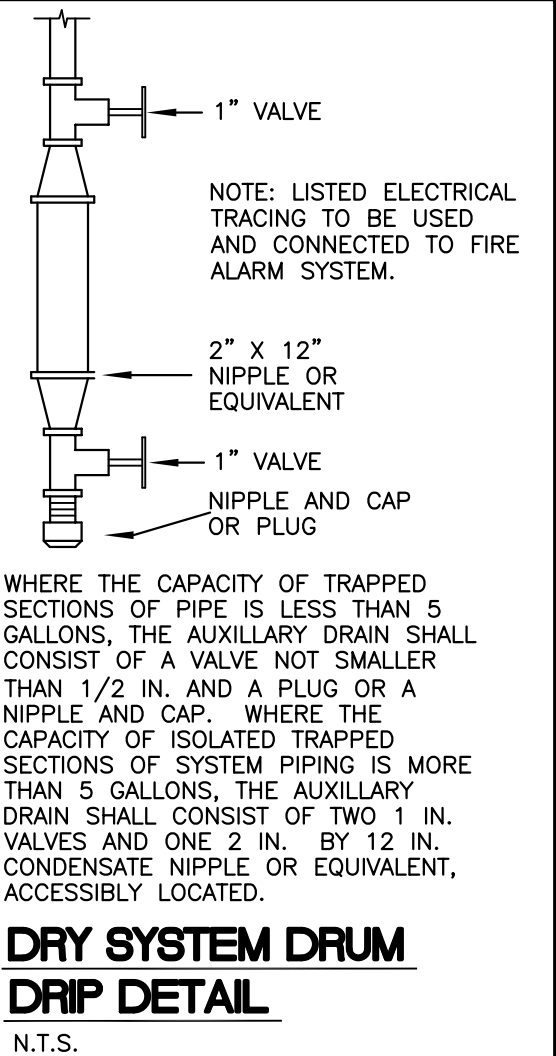
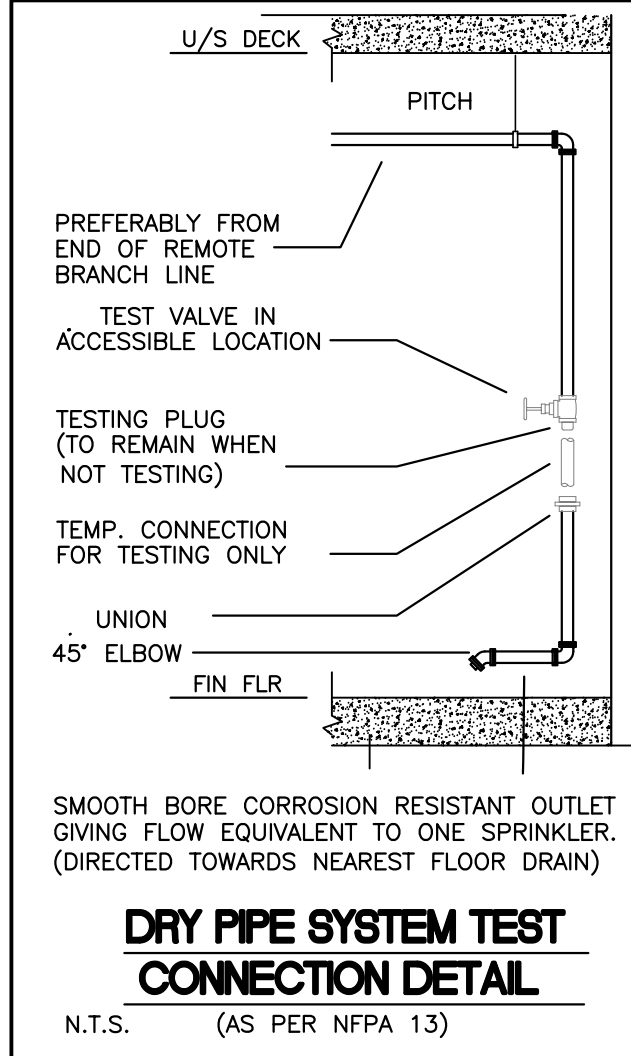
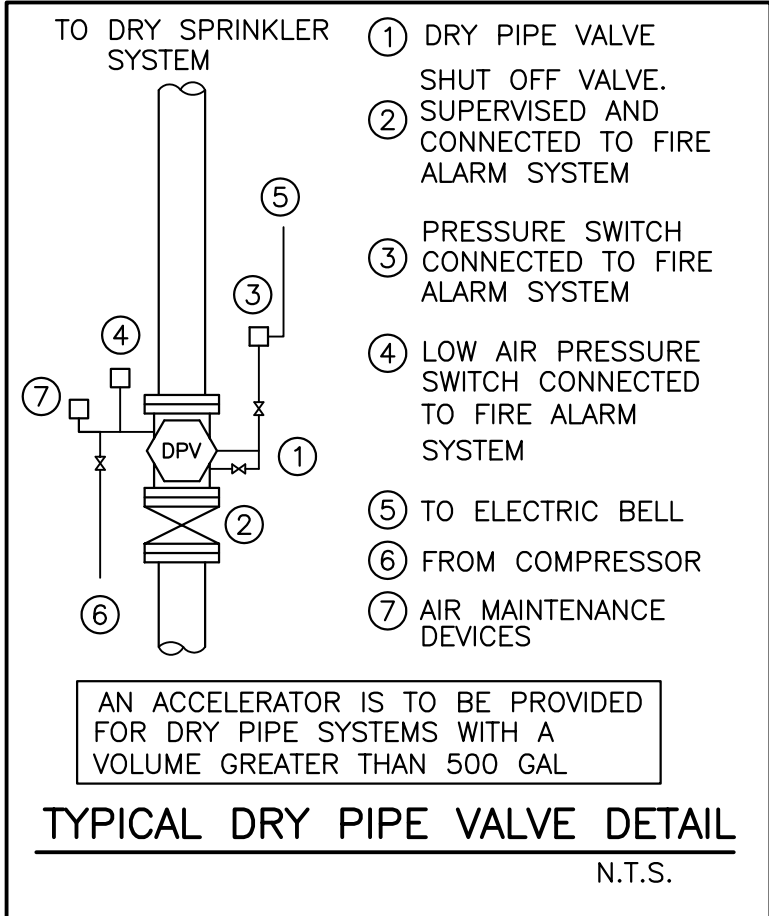
- EXISTING DOUBLE CHECK VALVE ASSEMBLY
- EXISTING SAME SIZE CONNECTION
- DRY PIPE VALVE WITH PRESSURE SWITCHES
- ISOLATION VALVE WITH TAMPER SWITCH
- SWING CHECK VALVE
- FLOW SWITCH
- TEST AND DRAIN VALVE
- AIR COMPRESSOR (120V 1/3 HP) SINGLE PHASE
- WET SPRINKLER RISER (SHOWN IN PLAN VIEW)

SPRINKLER ALARM ZONE SCHEDULE

DEVICE NUMBER	SERVICE
FS-01	BASEMENT SPRINKLER FLOW SWITCH
FS-02	GROUND FLOOR SPRINKLER FLOW SWITCH
PS-01	DRY LOW AIR PRESSURE PS
PS-02	DRY WATER FLOW PS
SV-01	BACKFLOW SUCTION
SV-02	BACKFLOW DISCHARGE
SV-03	BASEMENT SPRINKLER CONTROL VALVE
SV-04	GROUND FLOOR SPRINKLER CONTROL VALVE
SV-05	DRY SYSTEM CONTROL VALVE

RISER SCHEMATIC

SCALE: NTS



HEAD COUNT

S/R=STANDARD RESPONSE Q/R=QUICK RESPONSE ○ C/W GUARD		
○	200'F STANDARD COVERAGE Q/R UPRIGHT (K=5.6) 1/2" NPT	22
●	155'F STANDARD COVERAGE Q/R CONCEALED PENDENT (K=5.6) 1/2" NPT	44
○	200'F STANDARD COVERAGE Q/R UPRIGHT (K=4.2) 1/2" NPT	132
◄	200'F STANDARD COVERAGE Q/R HSW (K=5.6) 1/2" NPT	24

NOTES

- CONTRACTOR MUST CHECK AND VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME, REPORTING ANY DISCREPANCIES TO THE OWNER, BEFORE TENDER CLOSING.
- LATEST APPROVED DRAWINGS ONLY TO BE USED FOR CONSTRUCTION.
- THIS DRAWING ASSOCIATED CALCULATIONS AND SPECIFICATIONS ARE THE PROPERTY OF THE DESIGNER AND MUST BE RETURNED AT THE COMPLETION OF THE WORK OR UPON REQUEST.
- DIMENSIONS TAKE PRECEDENT OVER SCALE.
- CONTRACTOR IS TO NOTIFY NORRIS FIRE CONSULTING PRIOR TO STARTING CONSTRUCTION AND PROVIDE A PROJECT SCHEDULE SO THAT WE CAN DETERMINE OUR SITE INSPECTION FREQUENCY. FAILURE TO NOTIFY NORRIS FIRE CONSULTING OF THE COMMENCEMENT OF CONSTRUCTION AND FAILURE TO PROVIDE A CONSTRUCTION SCHEDULE MAY REQUIRE CONCEALED ELEMENTS TO BE EXPOSED AT THE COST OF THE CONTRACTOR. CONSTRUCTION SCHEDULE CAN BE SENT TO CONTACT@NORRISFC.COM
- OWNER (OR OTHERS) TO PROVIDE ADEQUATE HEAT IN ALL AREAS OF BUILDING SUBJECT TO FREEZING THAT ARE PROTECTED BY A WET TYPE SPRINKLER SYSTEM.
- ANY FIRE STOPPING, ACOUSTIC SEALANT AND MATERIALS USED IN THIS PROJECT WHICH COME IN CONTACT WITH CPVC SPRINKLER PIPING IS TO BE COMPATIBLE WITH CPVC PIPING.

SUBMITTALS

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NORRIS FIRE CONSULTING

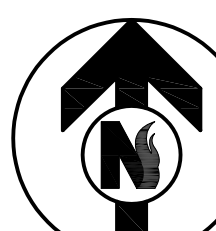
Norris Fire Consulting Inc

Smoke Control / Sprinkler / Fire Alarm / Code /

4840 Clements Road, Suite 202, Pickering, ON L1W 3Y2
Tel: (905) 669-9554; www.norrisfireconsulting.com

Learn + Grow + Inspire + Execute

PROJECT NORTH



Professional Engineers Ontario Limited Engineering Licensee

Name: M B J Norris

Number: 100228627

Limitations: Specifying and reviewing of fire protection and fire alarm systems as per CBC, CPCC and NFPA (13, 14, 17A, 17B, 22, 24, 26, 70, 101, 201 & 5000)

Association of Professional Engineers of Ontario JAN 6 2025

HIGH PARK VISITOR AND NATURE CENTRE

375 COLBOURNE LODGE DR.
TORONTO ON M6R 2Z3

DRAWING TITLE

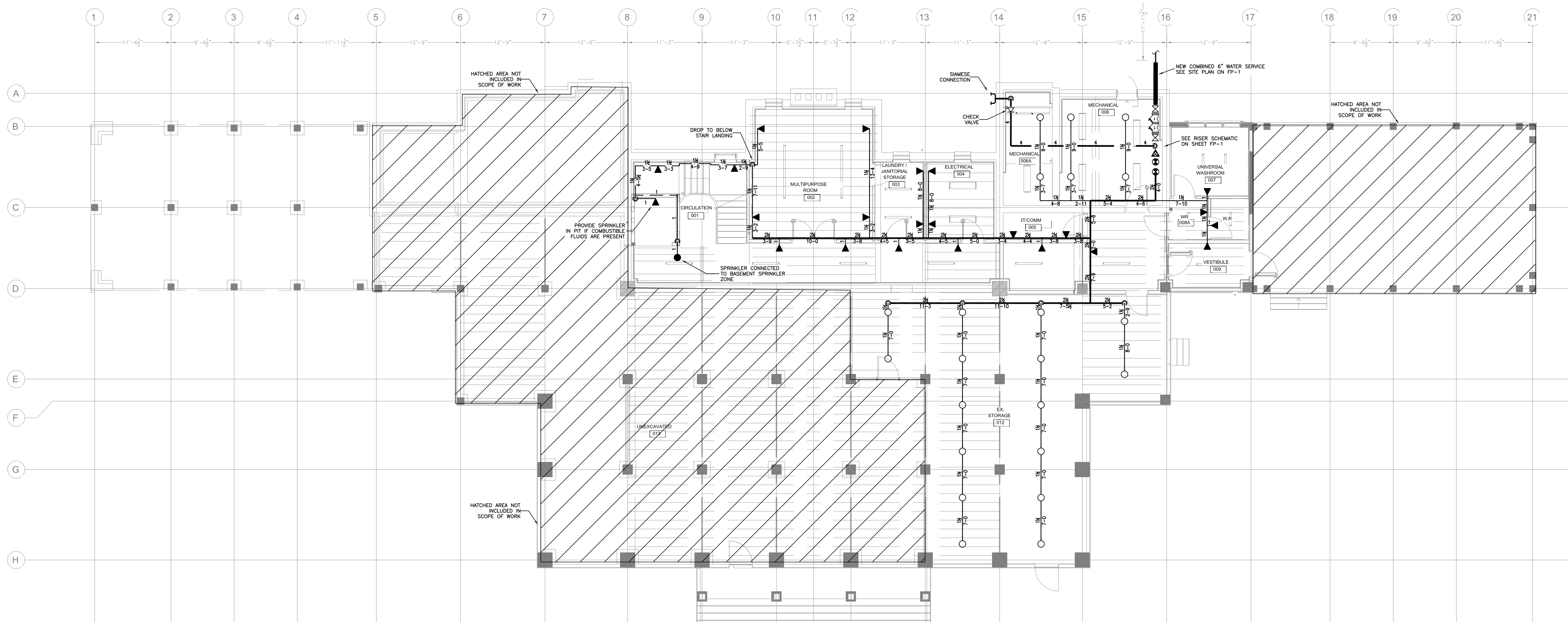
FIRE PROTECTION SYSTEM
GENERAL NOTES, SITE
PLAN, & DETAILS

JOB. NO. 24-0243

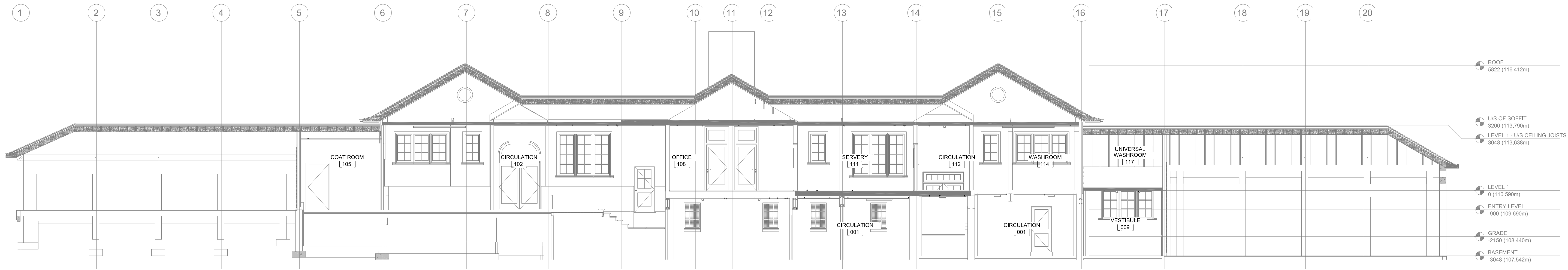
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DRAWN BY: MT CHECKED BY: MBN

SHEET FP-1



BASEMENT PLAN
SCALE: 1/8" = 1'-0"



CROSS SECTION
SCALE: 1/8" = 1'-0"

HEAD COUNT		
S/R=STANDARD RESPONSE Q/R=QUICK RESPONSE C/W GUARD		
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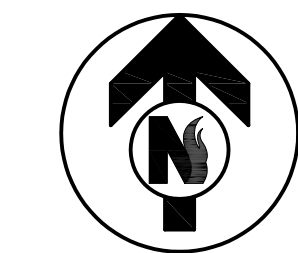
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4	JAN 6/2025	RE-ISSUED FOR PERMIT	MT	MBN



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Smoke Control / Sprinkler / Fire Alarm / Code /
4840 Clements Road, Suite 202, Pickering, ON L1W 3Y2
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Number: 100229827
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Association of Professional Engineers of Ontario
[Signature] JAN 6 2025

HIGH PARK VISITOR AND NATURE CENTRE

376 COLBOURNE LODGE DR.
TORONTO ON M6R 2Z3

DRAWING TITLE

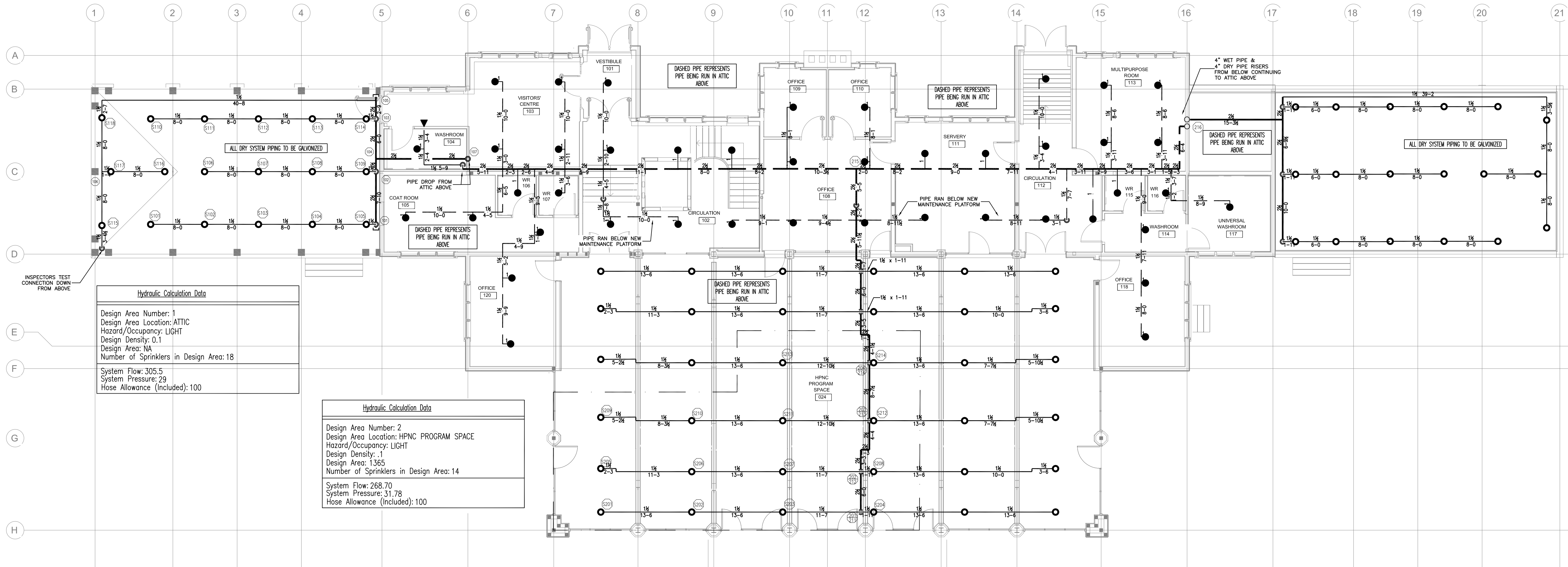
FIRE PROTECTION SYSTEM
BASEMENT

JOB. NO. 24-0243

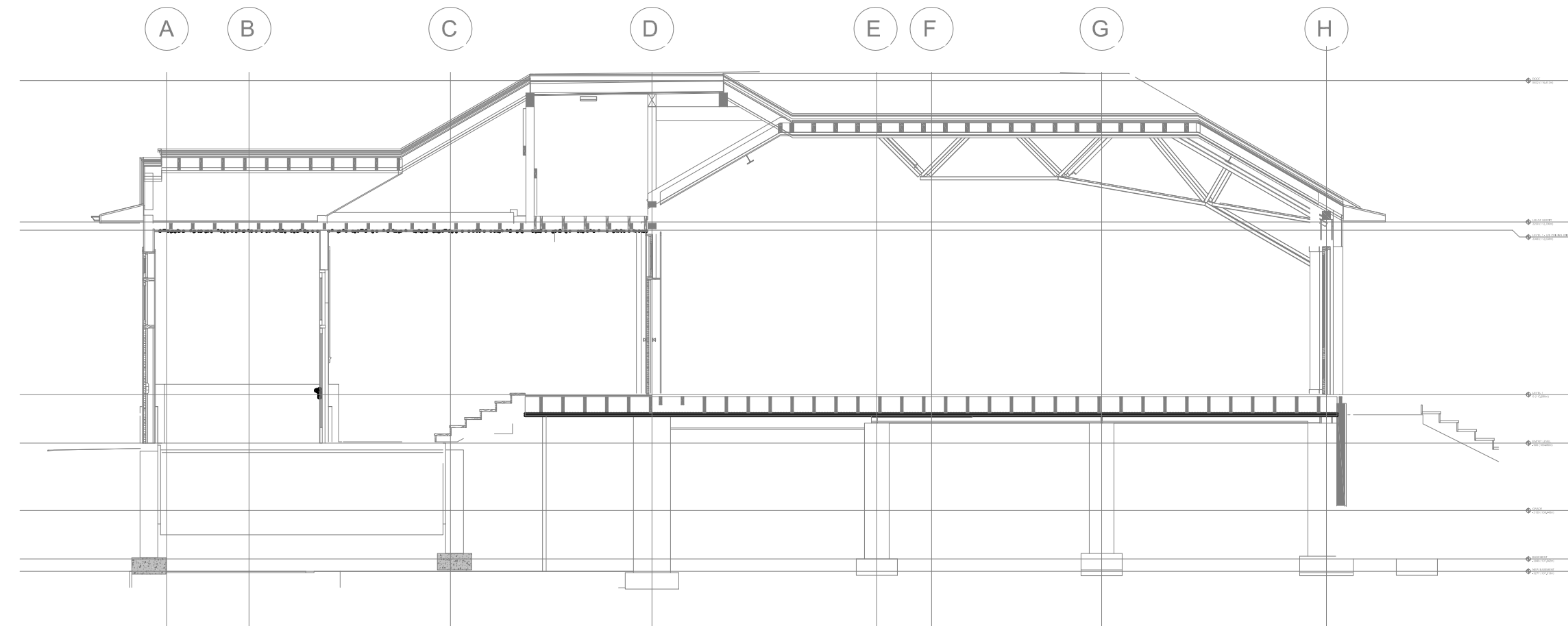
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SHEET
OF 4
FP-2



GROUND FLOOR
SCALE: 1/8" = 1'-0"



CROSS SECTION
SCALE: 1/8" = 1'-0"

HEAD COUNT		
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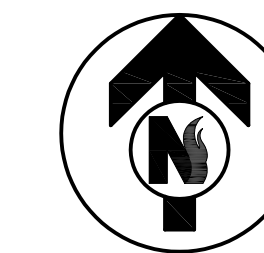
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(13, 14, 17A, 20, 22, 24, 30, 70, 101, 2001 & 5000)

Association of Professional Engineers of Ontario
JAN 6 2025

HIGH PARK VISITOR
AND NATURE CENTRE

376 COLBOURNE LODGE DR.
TORONTO ON M6R 2Z3

DRAWING TITLE

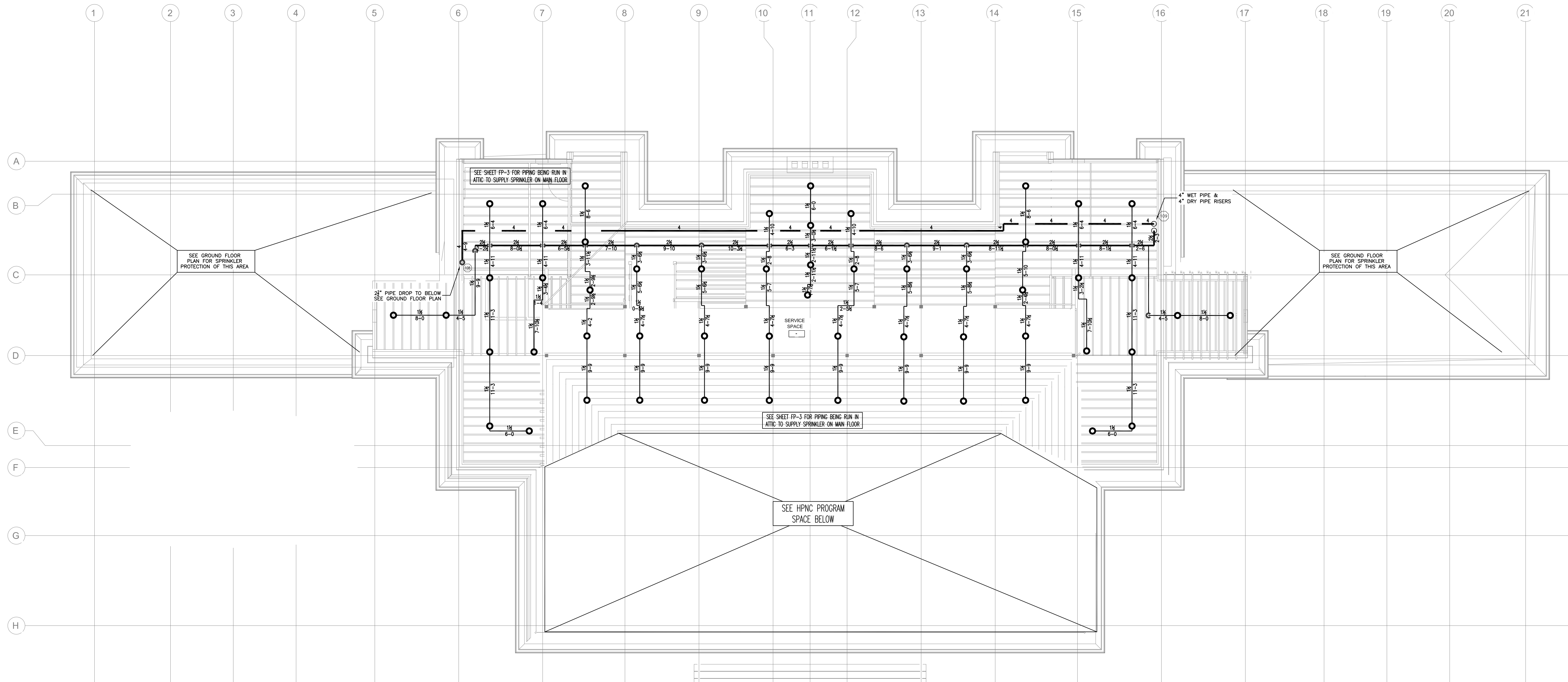
FIRE PROTECTION SYSTEM
MAIN FLOOR

JOB. NO. 24-0243

SCALE: 1/8" = 1'-0"

DRAWN BY: MT CHECKED BY: MBN

SHEET
FP-3



ATTIC LEVEL
SCALE: 1/8" = 1'-0"

HEAD COUNT		
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Association of Professional Engineers of Ontario
 JAN 6 2025

HIGH PARK VISITOR AND NATURE CENTRE

376 COLBOURNE LODGE DR.
TORONTO ON M6R 2Z3

DRAWING TITLE	
FIRE PROTECTION SYSTEM ATTIC LEVEL	
JOB. NO.	24-0243
SCALE:	1/8" = 1'-0"
DRAWN BY:	CHECKED BY:
MT	MBN
SHEET	FP-4
OF 4	



Professional Engineers
Ontario

Limited Engineering Licensee

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Association of Professional Engineers of Ontario

JAN 6 2025

A handwritten signature in black ink, appearing to read 'M B J Norris'.

Job Name	: HIGH PARK VISITOR AND NATURE CENTRE
Drawing	: FP-4
Location	: 375 COLBOURNE LODGE DRIVE
Remote Area	: 1
Contract	: 24-0243
Data File	: HIGH PARK Area 1 rev 2.WXF

HYDRAULIC CALCULATIONS
for

JOB NAME HIGH PARK VISITOR AND NATURE CENTRE
Location 375 COLBOURNE LODGE DRIVE
Drawing # FP-4
Contract # 24-0243
Date DEC 7 '24

DESIGN

Remote area # 1
Remote area location ATTIC
Occupancy classification LIGHT
Density 0.1 - Gpm/SqFt
Area of application NA - SqFt
Coverage/sprinkler 120 - SqFt
Type of sprinkler calculated Q.R K=4.2
Sprinklers calculated 18
In-rack demand NA - GPM
Hose streams 100 - GPM
Total water required (including hose streams) 305.457 - GPM @ 28.938 - Psi
Type of system DRY
Volume of system (dry or pre-action) 190 - Gal

WATER SUPPLY INFORMATION

Test date MAY 2 2023
Location HYDRANT ON SITE
Source of info HYDRANT FLOW TEST

CONTRACTOR INFO NORRIS FIRE CONSULTING
Address 1840 CLEMENTS RD SUITE 202 / PICKERING ON
Phone # 905 669 5154
Name of designer M.T
Authority having jurisdiction CITY OF TORONTO
NOTES:

text1(35) - invisible

Water Supply Curve

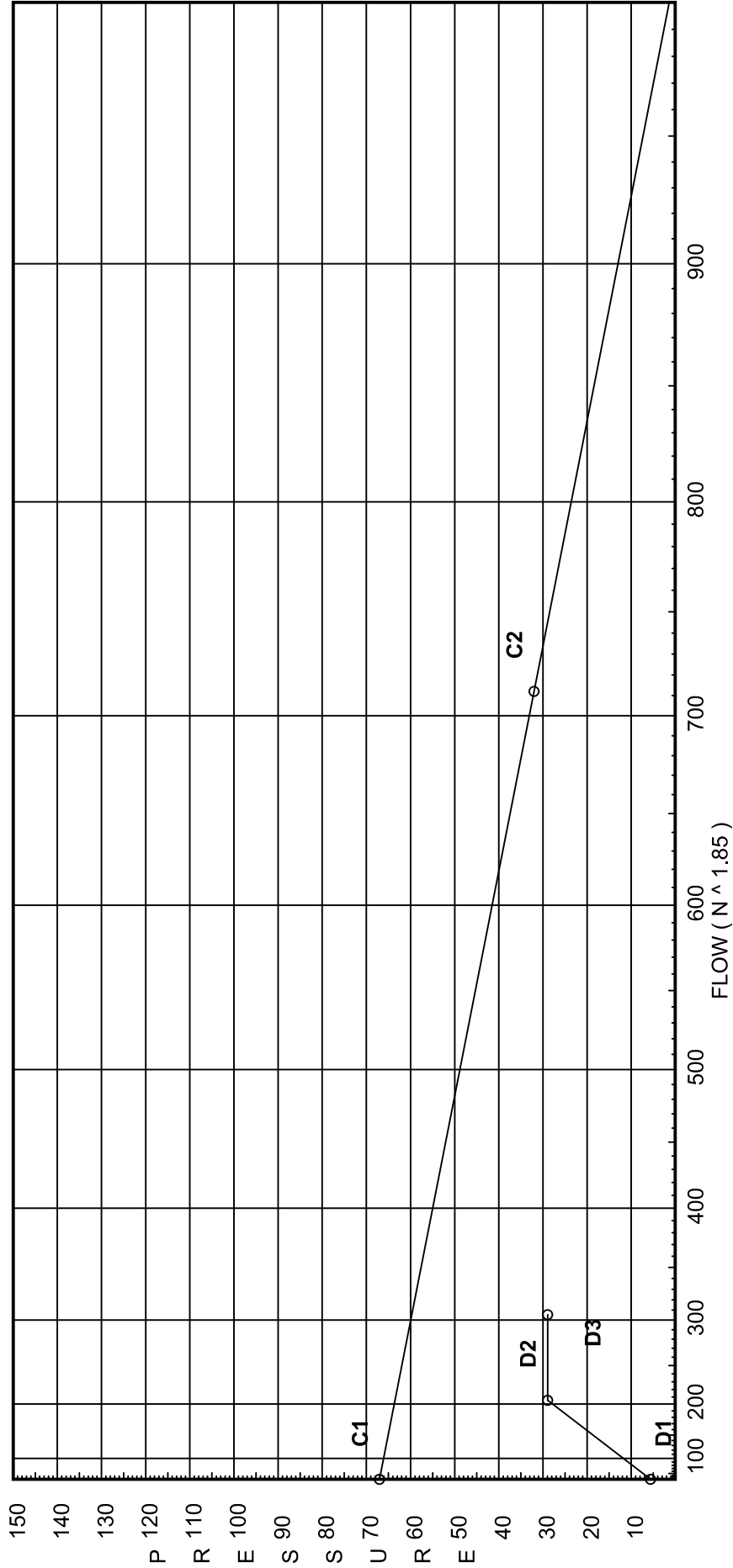
NORRIS FIRE CONSULTING
HIGH PARK VISITOR AND NATURE CENTRE

City Water Supply:

C1 - Static Pressure : 67
C2 - Residual Pressure: 32
C2 - Residual Flow : 712

Demand:

D1 - Elevation : 5.630
D2 - System Flow : 205.457
D2 - System Pressure : 28.938
Hose (Demand) : 100
D3 - System Demand : 305.457
Safety Margin : 30.748



Fittings Used Summary

NORRIS FIRE CONSULTING
HIGH PARK VISITOR AND NATURE CENTRE

Fitting Legend Abbrev. Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
B NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
D Dry Rel D								28		28		47								
E NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
G NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
L NFPA 13 Long Turn Elbow	0.5	1	2	2	2	3	4	5	5	6	8	9	13	16	18	24	27	30	34	40
T NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
Zwh Watts 757DCDA Horiz	Fitting generates a Fixed Loss Based on Flow																			

Units Summary

Diameter Units	Inches
Length Units	Feet
Flow Units	US Gallons per Minute
Pressure Units	Pounds per Square Inch

Note: Fitting Legend provides equivalent pipe lengths for fittings types of various diameters. Equivalent lengths shown are standard for actual diameters of Sched 40 pipe and CFactors of 120 except as noted with *. The fittings marked with a * show equivalent lengths values supplied by manufacturers based on specific pipe diameters and CFactors and they require no adjustment. All values for fittings not marked with a * will be adjusted in the calculation for CFactors of other than 120 and diameters other than Sched 40 per NFPA. The diameter modification was turned off by the operator when the job was calculated.

Flow Summary - NFPA

NORRIS FIRE CONSULTING
HIGH PARK VISITOR AND NATURE CENTRE

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SUPPLY ANALYSIS

<i>Node at Source</i>	<i>Static Pressure</i>	<i>Residual Pressure</i>	<i>Flow</i>	<i>Available Pressure</i>	<i>Total Demand</i>	<i>Required Pressure</i>
HYD	67.0	32	712.0	59.686	305.46	28.938

NODE ANALYSIS

<i>Node Tag</i>	<i>Elevation</i>	<i>Node Type</i>	<i>Pressure at Node</i>	<i>Discharge at Node</i>	<i>Notes</i>	
S101	9.5	4.2	7.82	11.75	0.1	100
S102	9.5	4.2	7.88	11.79	0.1	100
S103	9.5	4.2	8.07	11.93	0.1	100
S104	9.5	4.2	8.5	12.24	0.1	100
S105	9.5	4.2	9.23	12.76	0.1	100
S106	12.5	4.2	7.71	11.66	0.1	100
S107	12.5	4.2	7.77	11.7	0.1	100
S108	12.5	4.2	7.96	11.85	0.1	100
S109	12.5	4.2	8.38	12.16	0.1	100
S110	9.5	4.2	8.31	12.11	0.1	100
S111	9.5	4.2	8.37	12.15	0.1	100
S112	9.5	4.2	8.58	12.3	0.1	100
S113	9.5	4.2	9.02	12.62	0.1	100
S114	9.5	4.2	9.8	13.15	0.1	100
S115	9.5	4.2	8.67	12.37	0.1	100
S116	13.0	4.2	7.0	11.11	0.1	100
S117	11.0	4.2	7.92	11.82	0.1	100
106	9.5		8.74			
S118	9.5		8.81			
105	9.5		11.51			
103	9.5		11.53			
101	9.5		10.86			
102	9.5		10.99			
104	9.5		13.76			
107	9.5		16.47			
108	14.0		15.87			
109	14.0		17.81			
ATC	14.0		18.07			
FLG	-6.0		31.35			
HYD	0.0		28.94	100.0		

Final Calculations : Hazen-Williams

NORRIS FIRE CONSULTING
HIGH PARK VISITOR AND NATURE CENTRE

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Equiv Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
*EQUIVALENT K'S											
S101 to S102	9.500 9.500	4.20	11.75	1.5		8.000	100	7.821 0.0			
			11.75	1.682		8.000	0.0068	0.054	Vel =	1.70	
S102 to S103	9.500 9.500	4.20	11.78	1.5		8.000	100	7.875 0.0			
			23.53	1.682		8.000	0.0248	0.198	Vel =	3.40	
S103 to S104	9.500 9.500	4.20	11.94	1.5		8.000	100	8.073 0.0			
			35.47	1.682		8.000	0.0528	0.422	Vel =	5.12	
S104 to S105	9.500 9.500	4.20	12.24	1.5		8.000	100	8.495 0.0			
			47.71	1.682		8.000	0.0914	0.731	Vel =	6.89	
S105 to 101	9.500 9.500	4.20	12.75	1.5	E T	2.855 5.71	3.000 8.565	100	9.226 0.0		
			60.46	1.682		11.565	0.1416	1.638	Vel =	8.73	
101			0.0 60.46					10.864	K Factor =	18.34	
S106 to S107	12.500 12.500	4.20	11.66	1.5		8.000	100	7.712 0.0			
			11.66	1.682		8.000	0.0068	0.054	Vel =	1.68	
S107 to S108	12.500 12.500	4.20	11.71	1.5		8.000	100	7.766 0.0			
			23.37	1.682		8.000	0.0244	0.195	Vel =	3.37	
S108 to S109	12.500 12.500	4.20	11.85	1.5		8.000	100	7.961 0.0			
			35.22	1.682		8.000	0.0521	0.417	Vel =	5.09	
S109 to 102	12.500 9.500	4.20	12.16	1.5	E T	2.855 5.71	6.000 8.565	100	8.378 1.299		
			47.38	1.682		14.565	0.0902	1.314	Vel =	6.84	
102			0.0 47.38					10.991	K Factor =	14.29	
S110 to S111	9.500 9.500	4.20	12.11	1.5		8.000	100	8.309 0.0			
			12.11	1.682		8.000	0.0072	0.058	Vel =	1.75	
S111 to S112	9.500 9.500	4.20	12.15	1.5		8.000	100	8.367 0.0			
			24.26	1.682		8.000	0.0261	0.209	Vel =	3.50	
S112 to S113	9.500 9.500	4.20	12.30	1.5		8.000	100	8.576 0.0			
			36.56	1.682		8.000	0.0559	0.447	Vel =	5.28	
S113 to S114	9.500 9.500	4.20	12.61	1.5		8.000	100	9.023 0.0			
			49.17	1.682		8.000	0.0966	0.773	Vel =	7.10	
S114 to 103	9.500 9.500	4.20	13.15	1.5	E T	2.855 5.71	3.000 8.565	100	9.796 0.0		
			62.32	1.682		11.565	0.1498	1.732	Vel =	9.00	
			0.0								

Final Calculations : Hazen-Williams

NORRIS FIRE CONSULTING
HIGH PARK VISITOR AND NATURE CENTRE

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Equiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
103			62.32						11.528		K Factor = 18.35	
S115 to 106	9.500 9.500	4.20	12.37	1.5			8.000	100	8.675 0.0		Vel = 1.79	
106			0.0 12.37						8.735		K Factor = 4.19	
S116 to S117	13 11	4.20	11.11	1.5			8.000	100	7.000 0.866		Vel = 1.60	
S117 to 106	11 9.500	4.20	11.82	1.5	T	5.71	1.500 5.710 7.210	100	7.916 0.650		Vel = 3.31	
106 to S118	9.500 9.500		12.37	1.5			1.500	100	8.735 0.0		Vel = 5.10	
S118 to 105	9.500 9.500		0.0	1.5	E T	2.855 5.71	43.000 8.565 51.565	100	8.814 0.0		Vel = 5.10	
105 to 103	9.500 9.500		0.0	2.5			2.750	100	11.512 0.0		Vel = 2.08	
103 to 104	9.500 9.500		170.16	2.5	T	8.564	6.000 8.564 14.564	100	11.528 0.0		Vel = 12.09	
104			0.0 205.46						13.755		K Factor = 55.40	
101 to 102	9.500 9.500		60.46	2.5			8.000	100	10.864 0.0		Vel = 3.56	
102 to 103	9.500 9.500		60.46	2.635			8.000	0.0159	0.127		Vel = 6.34	
102 to 103	9.500 9.500		47.38	2.5	T	8.564	3.000 8.564 11.564	100	10.991 0.0		Vel = 6.34	
103			0.0 107.84						11.528		K Factor = 31.76	
104 to 107	9.500 9.500		205.46	2.5	E	4.282	13.500 4.282 17.782	100	13.755 0.0		Vel = 12.09	
107 to 108	9.500 14		0.0	2.5	E	4.282	4.500 4.282 8.782	100	16.474 -1.949		Vel = 12.09	
108 to 109	14 14		0.0	4	E T	7.137 14.274	110.000 21.411 131.411	100	15.868 0.0		Vel = 4.62	
109 to ATC	14 14		0.0	4	T	14.274	3.470 14.274 17.744	100	17.805 0.0		Vel = 4.62	
ATC to FLG	14 -6		0.0	4	D B Zwh	19.984 8.564 0.0	20.000 28.548 48.548	100	18.067 12.566 0.715		* * Fixed Loss = 3.904 Vel = 4.62	

Final Calculations : Hazen-Williams

NORRIS FIRE CONSULTING
HIGH PARK VISITOR AND NATURE CENTRE

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Date DEC 7 '24

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
FLG to HYD	-6 0		0.0 205.46	6 6.09	4L T G	54.398 45.332 4.533	50.000 104.263 154.263	150 0.0012	31.348 -2.599 0.189		Vel = 2.26	
			100.00								Qa = 100.00	
HYD			305.46						28.938		K Factor = 56.78	



Professional Engineers
Ontario

Limited Engineering Licensee

Name: M B J Norris

Number: 100229827

Limitations: Specifying and reviewing of fire protection
and fire alarm systems as per OBC, OFC and NFPA

(13, 14, 17A, 20, 22, 24, 30, 70, 101, 2001 & 5000)

Association of Professional Engineers of Ontario

JAN 6 2025

A handwritten signature in black ink, appearing to read 'M B J Norris'.

Job Name	: HIGH PARK VISITOR AND NATURE CENTRE
Drawing	: FP-4
Location	: 375 COLBOURNE LODGE DRIVE
Remote Area	: 1
Contract	: 24-0243
Data File	: HIGH PARK Area 1 rev 2.WXF

HYDRAULIC CALCULATIONS
for

JOB NAME HIGH PARK VISITOR AND NATURE CENTRE
Location 375 COLBOURNE LODGE DRIVE
Drawing # FP-4
Contract # 24-0243
Date DEC 7 '24

DESIGN

Remote area # 1
Remote area location ATTIC
Occupancy classification LIGHT
Density 0.1 - Gpm/SqFt
Area of application NA - SqFt
Coverage/sprinkler 120 - SqFt
Type of sprinkler calculated Q.R K=4.2
Sprinklers calculated 18
In-rack demand NA - GPM
Hose streams 100 - GPM
Total water required (including hose streams) 305.457 - GPM @ 28.938 - Psi
Type of system DRY
Volume of system (dry or pre-action) 190 - Gal

WATER SUPPLY INFORMATION

Test date MAY 2 2023
Location HYDRANT ON SITE
Source of info HYDRANT FLOW TEST

CONTRACTOR INFO NORRIS FIRE CONSULTING
Address 1840 CLEMENTS RD SUITE 202 / PICKERING ON
Phone # 905 669 5154
Name of designer M.T
Authority having jurisdiction CITY OF TORONTO
NOTES:

text1(35) - invisible

Water Supply Curve

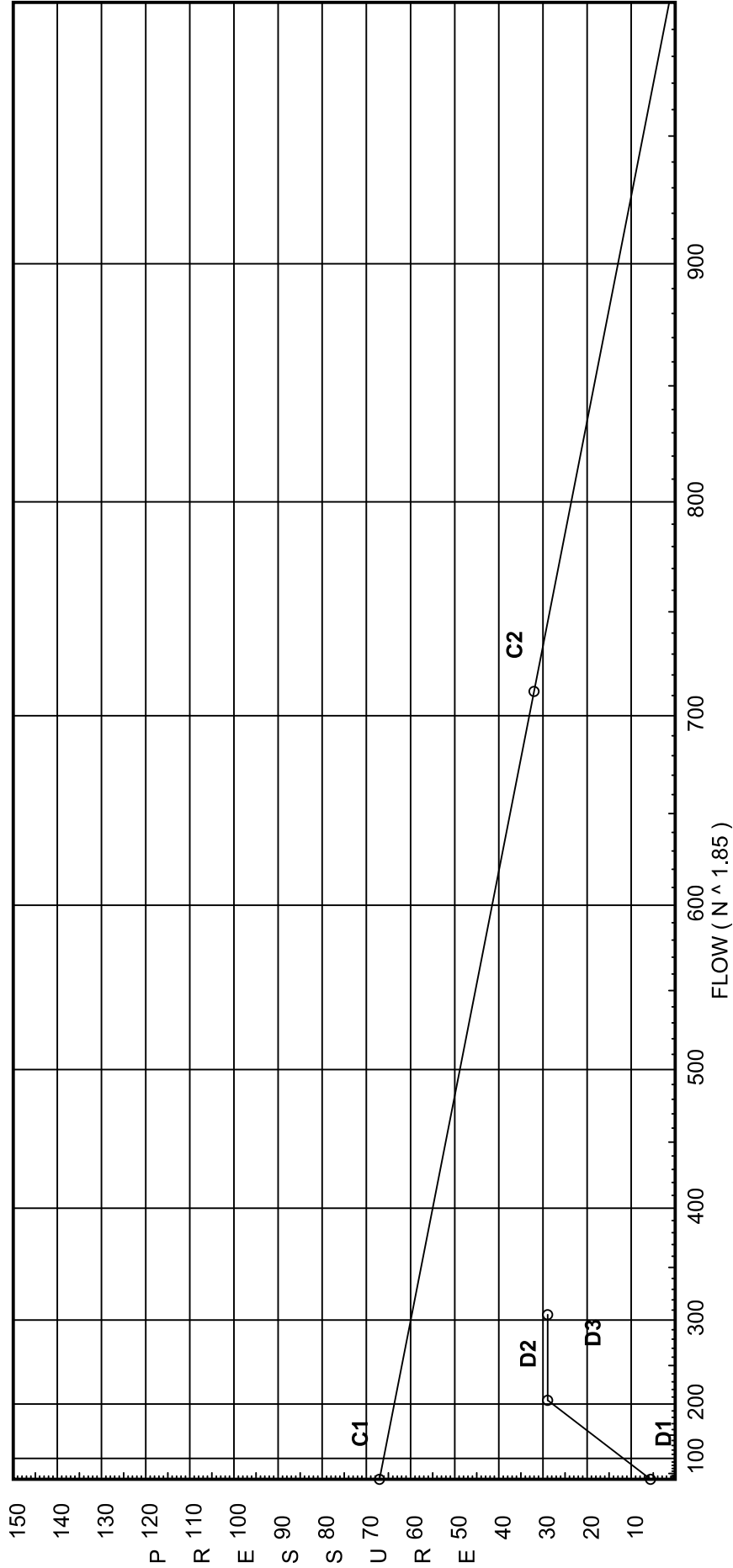
NORRIS FIRE CONSULTING
HIGH PARK VISITOR AND NATURE CENTRE

City Water Supply:

C1 - Static Pressure : 67
C2 - Residual Pressure: 32
C2 - Residual Flow : 712

Demand:

D1 - Elevation : 5.630
D2 - System Flow : 205.457
D2 - System Pressure : 28.938
Hose (Demand) : 100
D3 - System Demand : 305.457
Safety Margin : 30.748



Fittings Used Summary

NORRIS FIRE CONSULTING
HIGH PARK VISITOR AND NATURE CENTRE

Fitting Legend Abbrev. Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
B NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
D Dry Rel D								28		28		47								
E NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
G NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
L NFPA 13 Long Turn Elbow	0.5	1	2	2	2	3	4	5	5	6	8	9	13	16	18	24	27	30	34	40
T NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
Zwh Watts 757DCDA Horiz	Fitting generates a Fixed Loss Based on Flow																			

Units Summary

Diameter Units	Inches
Length Units	Feet
Flow Units	US Gallons per Minute
Pressure Units	Pounds per Square Inch

Note: Fitting Legend provides equivalent pipe lengths for fittings types of various diameters. Equivalent lengths shown are standard for actual diameters of Sched 40 pipe and CFactors of 120 except as noted with *. The fittings marked with a * show equivalent lengths values supplied by manufacturers based on specific pipe diameters and CFactors and they require no adjustment. All values for fittings not marked with a * will be adjusted in the calculation for CFactors of other than 120 and diameters other than Sched 40 per NFPA. The diameter modification was turned off by the operator when the job was calculated.

Flow Summary - NFPA

NORRIS FIRE CONSULTING
HIGH PARK VISITOR AND NATURE CENTRE

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SUPPLY ANALYSIS

<i>Node at Source</i>	<i>Static Pressure</i>	<i>Residual Pressure</i>	<i>Flow</i>	<i>Available Pressure</i>	<i>Total Demand</i>	<i>Required Pressure</i>
HYD	67.0	32	712.0	59.686	305.46	28.938

NODE ANALYSIS

<i>Node Tag</i>	<i>Elevation</i>	<i>Node Type</i>	<i>Pressure at Node</i>	<i>Discharge at Node</i>	<i>Notes</i>	
S101	9.5	4.2	7.82	11.75	0.1	100
S102	9.5	4.2	7.88	11.79	0.1	100
S103	9.5	4.2	8.07	11.93	0.1	100
S104	9.5	4.2	8.5	12.24	0.1	100
S105	9.5	4.2	9.23	12.76	0.1	100
S106	12.5	4.2	7.71	11.66	0.1	100
S107	12.5	4.2	7.77	11.7	0.1	100
S108	12.5	4.2	7.96	11.85	0.1	100
S109	12.5	4.2	8.38	12.16	0.1	100
S110	9.5	4.2	8.31	12.11	0.1	100
S111	9.5	4.2	8.37	12.15	0.1	100
S112	9.5	4.2	8.58	12.3	0.1	100
S113	9.5	4.2	9.02	12.62	0.1	100
S114	9.5	4.2	9.8	13.15	0.1	100
S115	9.5	4.2	8.67	12.37	0.1	100
S116	13.0	4.2	7.0	11.11	0.1	100
S117	11.0	4.2	7.92	11.82	0.1	100
106	9.5		8.74			
S118	9.5		8.81			
105	9.5		11.51			
103	9.5		11.53			
101	9.5		10.86			
102	9.5		10.99			
104	9.5		13.76			
107	9.5		16.47			
108	14.0		15.87			
109	14.0		17.81			
ATC	14.0		18.07			
FLG	-6.0		31.35			
HYD	0.0		28.94	100.0		

Final Calculations : Hazen-Williams

NORRIS FIRE CONSULTING
HIGH PARK VISITOR AND NATURE CENTRE

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Equiv Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
*EQUIVALENT K'S											
S101 to S102	9.500 9.500	4.20	11.75 11.75	1.5 1.682		8.000 8.000	100 0.0068	7.821 0.054		Vel = 1.70	
S102 to S103	9.500 9.500	4.20	11.78 23.53	1.5 1.682		8.000 8.000	100 0.0248	7.875 0.198		Vel = 3.40	
S103 to S104	9.500 9.500	4.20	11.94 35.47	1.5 1.682		8.000 8.000	100 0.0528	8.073 0.422		Vel = 5.12	
S104 to S105	9.500 9.500	4.20	12.24 47.71	1.5 1.682		8.000 8.000	100 0.0914	8.495 0.731		Vel = 6.89	
S105 to 101	9.500 9.500	4.20	12.75 60.46	1.5 1.682	E T 2.855 5.71	3.000 8.565 11.565	100 0.1416	9.226 0.0 1.638		Vel = 8.73	
101			0.0 60.46					10.864		K Factor = 18.34	
S106 to S107	12.500 12.500	4.20	11.66 11.66	1.5 1.682		8.000 8.000	100 0.0068	7.712 0.054		Vel = 1.68	
S107 to S108	12.500 12.500	4.20	11.71 23.37	1.5 1.682		8.000 8.000	100 0.0244	7.766 0.195		Vel = 3.37	
S108 to S109	12.500 12.500	4.20	11.85 35.22	1.5 1.682		8.000 8.000	100 0.0521	7.961 0.417		Vel = 5.09	
S109 to 102	12.500 9.500	4.20	12.16 47.38	1.5 1.682	E T 2.855 5.71	6.000 8.565 14.565	100 0.0902	8.378 1.299 1.314		Vel = 6.84	
102			0.0 47.38					10.991		K Factor = 14.29	
S110 to S111	9.500 9.500	4.20	12.11 12.11	1.5 1.682		8.000 8.000	100 0.0072	8.309 0.058		Vel = 1.75	
S111 to S112	9.500 9.500	4.20	12.15 24.26	1.5 1.682		8.000 8.000	100 0.0261	8.367 0.209		Vel = 3.50	
S112 to S113	9.500 9.500	4.20	12.30 36.56	1.5 1.682		8.000 8.000	100 0.0559	8.576 0.447		Vel = 5.28	
S113 to S114	9.500 9.500	4.20	12.61 49.17	1.5 1.682		8.000 8.000	100 0.0966	9.023 0.773		Vel = 7.10	
S114 to 103	9.500 9.500	4.20	13.15 62.32	1.5 1.682	E T 2.855 5.71	3.000 8.565 11.565	100 0.1498	9.796 0.0 1.732		Vel = 9.00	
103			0.0								

Final Calculations : Hazen-Williams

NORRIS FIRE CONSULTING
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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Equiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
103			62.32						11.528		K Factor = 18.35	
S115 to 106	9.500 9.500	4.20	12.37	1.5			8.000	100	8.675 0.0		Vel = 1.79	
106			0.0 12.37						8.735		K Factor = 4.19	
S116 to S117	13 11	4.20	11.11	1.5			8.000	100	7.000 0.866		Vel = 1.60	
S117 to 106	11 9.500	4.20	11.82	1.5	T	5.71	1.500 5.710 7.210	100	7.916 0.650		Vel = 3.31	
106 to S118	9.500 9.500		12.37	1.5			1.500	100	8.735 0.0		Vel = 5.10	
S118 to 105	9.500 9.500		0.0	1.5	E T	2.855 5.71	43.000 8.565 51.565	100	8.814 0.0		Vel = 5.10	
105 to 103	9.500 9.500		0.0	2.5			2.750	100	11.512 0.0		Vel = 2.08	
103 to 104	9.500 9.500		170.16	2.5	T	8.564	6.000 8.564 14.564	100	11.528 0.0		Vel = 12.09	
104			0.0 205.46						13.755		K Factor = 55.40	
101 to 102	9.500 9.500		60.46	2.5			8.000	100	10.864 0.0		Vel = 3.56	
102 to 103	9.500 9.500		47.38	2.5	T	8.564	3.000 8.564 11.564	100	10.991 0.0		Vel = 6.34	
103			0.0 107.84						11.528		K Factor = 31.76	
104 to 107	9.500 9.500		205.46	2.5	E	4.282	13.500 4.282 17.782	100	13.755 0.0		Vel = 12.09	
107 to 108	9.500 14		0.0	2.5	E	4.282	4.500 4.282 8.782	100	16.474 -1.949		Vel = 12.09	
108 to 109	14 14		0.0	4	E T	7.137 14.274	110.000 21.411 131.411	100	15.868 0.0		Vel = 4.62	
109 to ATC	14 14		0.0	4	T	14.274	3.470 14.274 17.744	100	17.805 0.0		Vel = 4.62	
ATC to FLG	14 -6		0.0	4	D B Zwh	19.984 8.564 0.0	20.000 28.548 48.548	100	18.067 12.566 0.715		* * Fixed Loss = 3.904 Vel = 4.62	

Final Calculations : Hazen-Williams

NORRIS FIRE CONSULTING
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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
FLG to HYD	-6 0		0.0 205.46	6 6.09	4L T G	54.398 45.332 4.533	50.000 104.263 154.263	150 0.0012	31.348 -2.599 0.189		Vel = 2.26	
			100.00								Qa = 100.00	
HYD			305.46						28.938		K Factor = 56.78	