



. . . Fire Protection by Computer Design

Dean & Allyn, Inc.
116 Lewiston Road
Gray, ME 04039
(207) 657-5646

Job Name : C171418 1576 Forest Ave
Drawing : 2 of 2
Location : 1576 Forest Avenue
Remote Area : Area 4
Contract : C171418
Data File : Wet System - Area 4.WXF

HYDRAULIC CALCULATIONS
for

Project name: Moran's Market Renovations
Location: 1576 Forest Avenue
Drawing no: 2 of 2
Date: 11/14/2017

Design

Remote area number: Area 4
Remote area location: Third Floor Residential
Occupancy classification: Residential
Density: 0.05 - Gpm/SqFt
Area of application: 4 Heads - SqFt
Coverage per sprinkler: 225 - SqFt
Type of sprinklers calculated: Reliable Res 44 LL
No. of sprinklers calculated: 4
In-rack demand: - GPM
Hose streams: 100 - GPM
Total water required (including hose streams): 169.286 - GPM @ 55.292 - Psi
Type of system: Wet
Volume of dry or preaction system: N/A - Gal

Water supply information

Date: 10/14/2016
Location: Forest Avenue - Hydrant #01652
Source: Portland Water District

Name of contractor: Dean & Allyn, Inc.
Address: 116 Lewiston Road / / Gray, ME 04039
Phone number: (207) 657-5646
Name of designer: Chris Stewart
Authority having jurisdiction:
Notes: (Include peaking information or gridded systems here.)

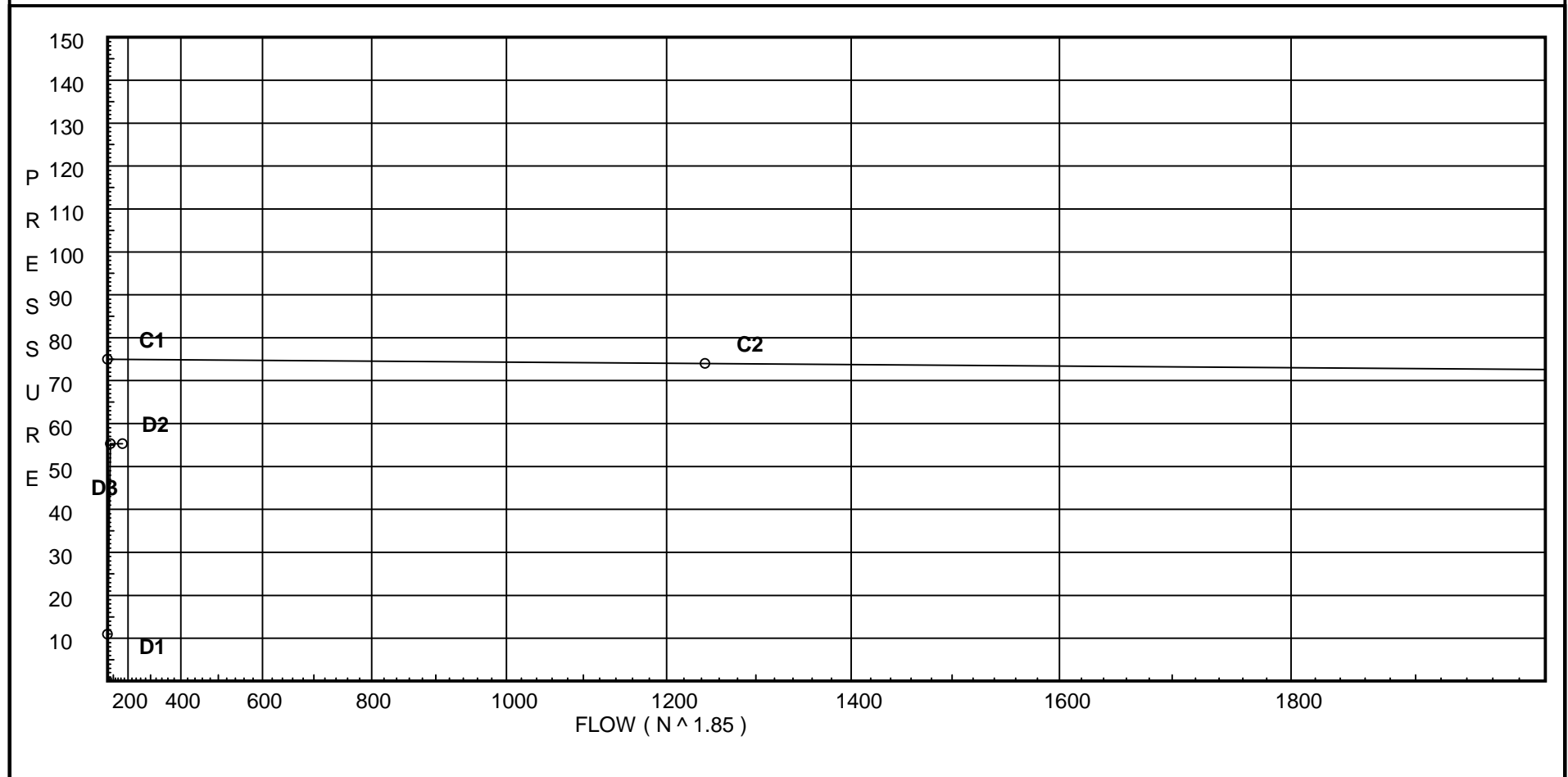
Water Supply Curve C

Dean & Allyn, Inc.
C171418 1576 Forest Ave

Page 2
Date 11/14/2017

City Water Supply:
C1 - Static Pressure : 75
C2 - Residual Pressure: 74
C2 - Residual Flow : 1244

Demand:
D1 - Elevation : 10.953
D2 - System Flow : 69.286
D2 - System Pressure : 55.292
Hose (Demand) : 100
D3 - System Demand : 169.286
Safety Margin : 19.683



Fittings Used Summary

Dean & Allyn, Inc.
C171418 1576 Forest Ave

Page 3
Date 11/14/2017

Fitting Legend

| Abbrev. | Name | ½ | ¾ | 1 | 1¼ | 1½ | 2 | 2½ | 3 | 3½ | 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 |
| 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 |
| Fsp | Flow Switch Potter VSR | Fitting generates a Fixed Loss Based on Flow | | | | | | | | | | | | | | | | | | | |
| 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 |
| S | NFPA 13 Swing Check | 0 | 0 | 5 | 7 | 9 | 11 | 14 | 16 | 19 | 22 | 27 | 32 | 45 | 55 | 65 | | | | | |
| 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 |
| Zca | Colt C200 Horz Butt | Fitting generates a Fixed Loss Based on Flow | | | | | | | | | | | | | | | | | | | |

Unit 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.

Pressure / Flow Summary - STANDARD

Dean & Allyn, Inc.
C171418 1576 Forest Ave

Page 4
Date 11/14/2017

| Node No. | Elevation | K-Fact | Pt Actual | Pn | Flow Actual | Density | Area | Press Req. |
|----------|-----------|--------|-----------|----|-------------|---------|------|------------|
| 300 | 32.79 | 4.4 | 13.3 | na | 16.05 | 0.05 | 320 | 13.3 |
| 301 | 32.79 | 4.9 | 13.07 | na | 17.71 | 0.05 | 340 | 12.0 |
| 30 | 32.79 | | 14.68 | na | | | | |
| 302 | 32.79 | 4.4 | 15.14 | na | 17.12 | 0.05 | 320 | 13.3 |
| 303 | 32.79 | 4.4 | 17.5 | na | 18.41 | 0.05 | 320 | 13.3 |
| 31 | 32.79 | | 18.15 | na | | | | |
| 32 | 32.79 | | 21.45 | na | | | | |
| TR1 | 5.0 | | 47.15 | na | | | | |
| BR1 | 1.5 | | 51.77 | na | | | | |
| FF | 1.5 | | 57.87 | na | | | | |
| UG1 | 1.5 | | 57.89 | na | | | | |
| TEST | 7.5 | | 55.29 | na | 100.0 | | | |

The maximum velocity is 10.92 and it occurs in the pipe between nodes 31 and 32

EOD

Dean & Allyn, Inc.
C171418 1576 Forest Ave

Page 5
Date 11/14/2017

| Node1 to Node2 | Elev1 Elev2 | K Fact | Qa Qt | Nom Act | Fitting or Eqv. | Ln. | Pipe Ftng's Total | CFact Pf/Ft | Pt Pe Pf | ***** | Notes | ***** |
|----------------------|------------------|-----------|------------------|--------------|-----------------------|---------------------------------|-------------------------------|----------------|----------------------------|-------|-------|------------------------------------|
| 300 to 30 | 32.790 32.790 | 4.40 | 16.05 16.05 | 1 1.049 | T | 5.0 0.0 0.0 | 10.920 5.000 15.920 | 120 0.0866 | 13.300 0.0 1.378 | | | Vel = 5.96 |
| 30 | | | 0.0 16.05 | | | | | | 14.678 | | | K Factor = 4.19 |
| 301 to 30 | 32.790 32.790 | 4.90 | 17.71 17.71 | 1 1.049 | T | 5.0 0.0 0.0 | 10.500 5.000 15.500 | 120 0.1039 | 13.067 0.0 1.611 | | | Vel = 6.57 |
| 30 to 302 | 32.790 32.790 | | 16.05 33.76 | 1.25 1.38 | | 0.0 0.0 0.0 | 5.080 0.0 5.080 | 120 0.0902 | 14.678 0.0 0.458 | | | Vel = 7.24 |
| 302 to 31 | 32.790 32.790 | 4.40 | 17.12 50.88 | 1.5 1.61 | 4E | 16.0 0.0 0.0 | 17.160 16.000 33.160 | 120 0.0909 | 15.136 0.0 3.014 | | | Vel = 8.02 |
| 31 | | | 0.0 50.88 | | | | | | 18.150 | | | K Factor = 11.94 |
| 303 to 31 | 32.790 32.790 | 4.40 | 18.41 18.41 | 1 1.049 | T | 5.0 0.0 0.0 | 0.790 5.000 5.790 | 120 0.1116 | 17.504 0.0 0.646 | | | Vel = 6.83 |
| 31 to 32 | 32.790 32.790 | | 50.88 69.29 | 1.5 1.61 | E T | 4.0 8.0 0.0 | 8.500 12.000 20.500 | 120 0.1609 | 18.150 0.0 3.299 | | | Vel = 10.92 |
| 32 to TR1 | 32.790 5 | | 0.0 69.29 | 2 2.067 | 23E 4T | 115.0 40.0 0.0 | 131.750 155.000 286.750 | 120 0.0477 | 21.449 12.036 13.666 | | | Vel = 6.62 |
| TR1 to BR1 | 5 1.500 | | 0.0 69.29 | 4 4.26 | B S T Fsp | 15.8 28.968 26.334 0.0 | 5.000 71.102 76.102 | 120 0.0014 | 47.151 4.516 0.107 | | | * Fixed Loss = 3 Vel = 1.56 |
| BR1 to FF | 1.500 1.500 | | 0.0 69.29 | 6 6.357 | 2E Zca | 35.205 0.0 0.0 | 8.000 35.205 43.205 | 120 0.0002 | 51.774 6.089 0.009 | | | * Fixed Loss = 6.089 Vel = 0.70 |
| FF to UG1 | 1.500 1.500 | | 0.0 69.29 | 6 6.16 | E T | 20.084 43.037 0.0 | 40.000 63.121 103.121 | 140 0.0002 | 57.872 0.0 0.018 | | | Vel = 0.75 |
| UG1 to TEST | 1.500 7.500 | | 0.0 69.29 | 16 16.41 | E T G | 82.4 166.859 16.48 | 175.000 265.740 440.740 | 140 0 | 57.890 -2.599 0.001 | | | Vel = 0.11 |
| TEST | | | 100.00 169.29 | | | | | | 55.292 | | | Qa = 100.00 K Factor = 22.77 |