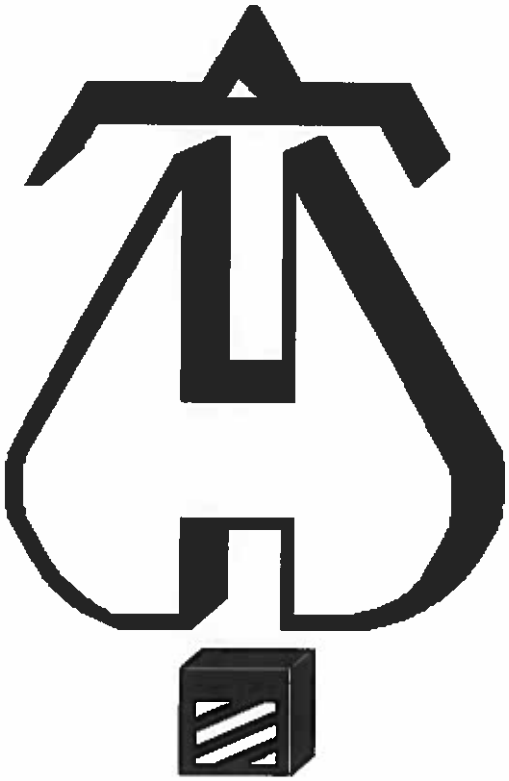


. . . **Fire Protection by Computer Design**

EASTERN FIRE PROTECTION
AUBURN, ME
207-784-1507

| | | |
|---|---|---|
| Job Name | : | UNE ALUMNI HALL RENOVATIONS |
| Drawing | : | 2 OF 2 |
| Location | : | PORTLAND, MAINE |
| Remote Area | : | ATTIC EXISTING |
| Contract | : | AU-5342-15 |
| Data File | : | 5342 UNE ALUMNI HALL ATTIC EXISTING.WXF |

***HYDRAULIC CALCULATIONS***
***for***

***Project name:*** UNE ALUMNI HALL RENOVATIONS
***Location:*** PORTLAND, MAINE
***Drawing no:*** 2 OF 2
***Date:*** 11-12-15

***Design***

***Remote area number:*** ATTIC EXISTING
***Remote area location:*** ATTIC EXISTING
***Occupancy classification:*** LIGHT HAZARD
***Density:*** .1 - Gpm/SqFt
***Area of application:*** 2425 - SqFt
***Coverage per sprinkler:*** 120 - SqFt
***Type of sprinklers calculated:*** RELIABLE FIFR K5.6 UPRIGHT
***No. of sprinklers calculated:*** 47
***In-rack demand:*** - GPM
***Hose streams:*** 100 - GPM
***Total water required (including hose streams):*** 625.631 - GPM @ 47.449 - Psi
***Type of system:*** DRY
***Volume of dry or preaction system:*** 148 - Gal

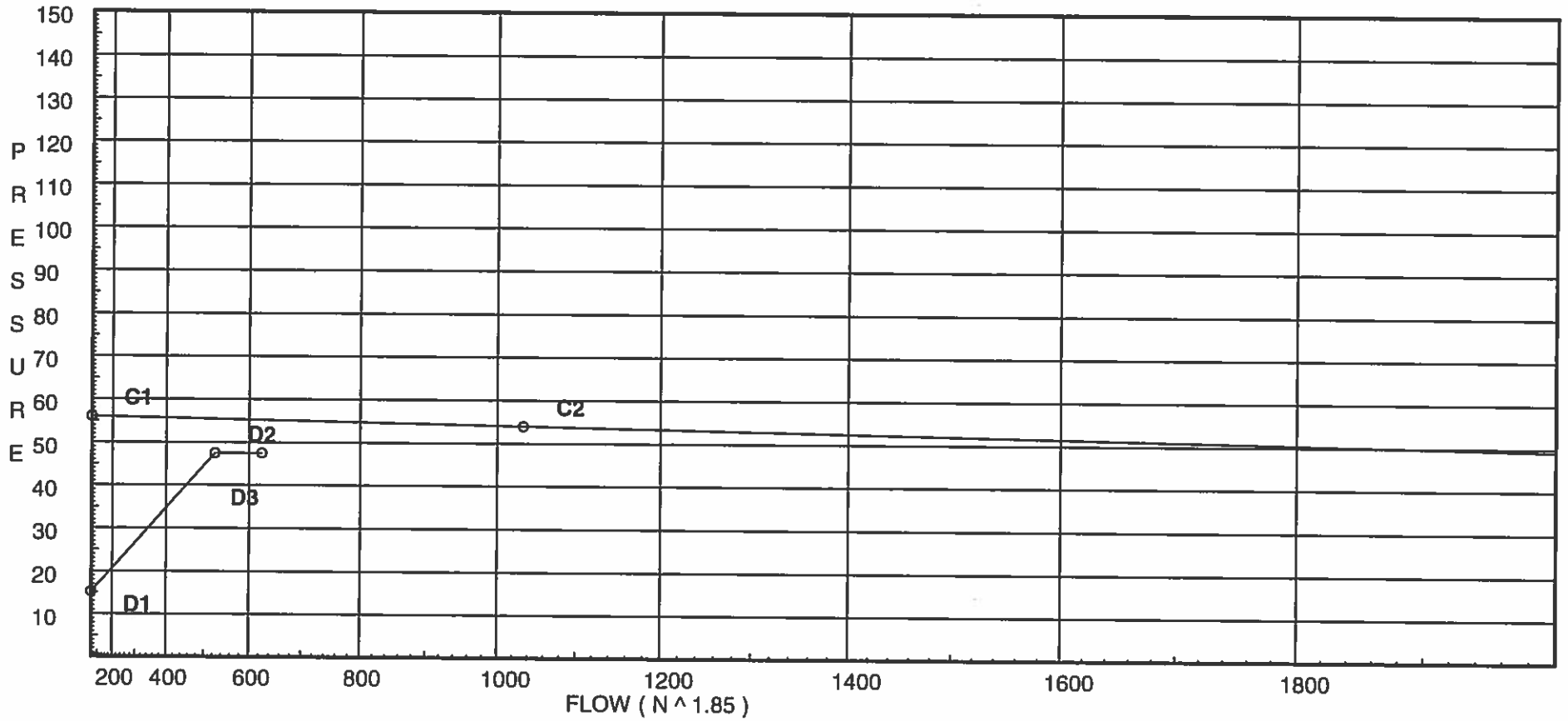
***Water supply information***

***Date:*** 06-06-2012
***Location:*** SEE PLOT PLAN DWG 1 OF 2
***Source:*** PORTLAND WATER DISTRICT

***Name of contractor:*** EASTERN FIRE PROTECTION
***Address:*** AUBURN, ME
***Phone number:*** 207-784-1507
***Name of designer:*** GRD
***Authority having jurisdiction:*** MAINE STATE FIRE MARSHAL
***Notes: (Include peaking information or gridded systems here.)***

City Water Supply:
C1 - Static Pressure : 56
C2 - Residual Pressure: 54
C2 - Residual Flow : 1034

Demand:
D1 - Elevation : 15.158
D2 - System Flow : 525.631
D2 - System Pressure : 47.449
Hose ( Demand ) : 100
D3 - System Demand : 625.631
Safety Margin : 7.761



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 |
| Dge | Dry Gem DPV-1 | | | | | | | 2.2 | 4.9 | | 8.9 | | 22 | | | | | | | | |
| 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 |
| I | 90' Grvd-Vic Elbow #10 | 0 | 0 | 2 | 3 | 4 | 3.5 | 6 | 5 | 8 | 7 | 8.5 | 10 | 13 | 17 | 20 | 23 | 25 | 33 | 36 | 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 |
| Zma | Maxim M200 Horz Butt | 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.

## SUPPLY ANALYSIS

| Node at Source | Static Pressure | Residual Pressure | Flow | Available Pressure | Total Demand | Required Pressure |
|---|---|---|---|---|---|---|
| TEST | 56.0 | 54 | 1034.0 | 55.21 | 625.63 | 47.449 |

## NODE ANALYSIS

| Node Tag | Elevation | Node Type | Pressure at Node | Discharge at Node | Notes |
|---|---|---|---|---|---|
| SP01 | 0.0 | 5.6 | 7.0 | 14.82 | |
| 400 | 130.0 | 5.6 | 7.67 | 15.51 | |
| 401 | 130.0 | 5.6 | 7.7 | 15.54 | |
| 402 | 130.0 | 5.6 | 7.87 | 15.71 | |
| 403 | 130.0 | 5.6 | 8.09 | 15.93 | |
| 404 | 130.0 | 5.6 | 8.48 | 16.31 | |
| 405 | 130.0 | 5.6 | 7.0 | 14.82 | |
| 406 | 130.0 | 5.6 | 7.03 | 14.84 | |
| 407 | 130.0 | 5.6 | 7.18 | 15.01 | |
| 408 | 130.0 | 5.6 | 7.39 | 15.22 | |
| 409 | 130.0 | 5.6 | 7.75 | 15.58 | |
| 410 | 130.0 | 5.6 | 8.29 | 16.13 | |
| 411 | 130.0 | | 9.43 | | |
| 412 | 137.0 | 5.6 | 7.8 | 15.64 | |
| 413 | 137.0 | 5.6 | 7.83 | 15.67 | |
| 414 | 137.0 | 5.6 | 7.94 | 15.78 | |
| 415 | 137.0 | 5.6 | 8.09 | 15.93 | |
| 416 | 137.0 | 5.6 | 8.12 | 15.96 | |
| 417 | 137.0 | | 8.29 | | |
| 420 | 130.0 | 5.6 | 10.26 | 17.94 | |
| 421 | 130.0 | 5.6 | 10.3 | 17.97 | |
| 422 | 130.0 | 5.6 | 10.52 | 18.16 | |
| 423 | 130.0 | 5.6 | 10.85 | 18.45 | |
| 424 | 130.0 | 5.6 | 11.29 | 18.82 | |
| 425 | 138.0 | 5.6 | 7.69 | 15.53 | |
| 426 | 138.0 | 5.42 | 7.56 | 14.89 | K=K @ EQ01 |
| 427 | 138.0 | | 8.15 | | |
| 428 | 138.0 | 5.6 | 7.91 | 15.75 | |
| 429 | 138.0 | | 8.8 | | |
| 430 | 130.0 | 5.6 | 10.42 | 18.08 | |
| 431 | 130.0 | 5.6 | 10.46 | 18.11 | |
| 432 | 130.0 | 5.6 | 10.68 | 18.3 | |
| 433 | 130.0 | 5.6 | 10.97 | 18.55 | |
| 434 | 130.0 | 5.6 | 11.42 | 18.92 | |
| 435 | 138.0 | 5.6 | 7.86 | 15.7 | |
| 436 | 138.0 | 5.42 | 7.67 | 15.01 | K=K @ EQ01 |
| 437 | 138.0 | | 8.27 | | |
| 438 | 138.0 | 5.6 | 8.04 | 15.88 | |
| 439 | 138.0 | | 8.94 | | |

***NODE ANALYSIS (cont.)***

| *Node Tag* | *Elevation* | *Node Type* | *Pressure at Node* | *Discharge at Node* | *Notes* |
|---|---|---|---|---|---|
| 460 | 128.0 | | 13.35 | | |
| 461 | 128.0 | | 13.48 | | |
| 462 | 128.0 | | 13.79 | | |
| 463 | 128.0 | | 13.8 | | |
| 464 | 128.0 | | 13.95 | | |
| 465 | 128.0 | | 13.94 | | |
| 466 | 128.0 | | 13.95 | | |
| 467 | 128.0 | | 14.11 | | |
| 475 | 130.0 | | 15.86 | | |
| 175 | 112.0 | | 24.83 | | |
| 075 | 96.5 | | 35.52 | | |
| DPV | 95.0 | | 36.61 | | |
| BOR1 | 93.0 | | 38.17 | | |
| BFP | 92.0 | | 38.97 | | |
| BASE | 92.0 | | 42.45 | | |
| UG1 | 95.0 | | 41.84 | 100.0 | |
| TEST | 95.0 | | 47.45 | | |

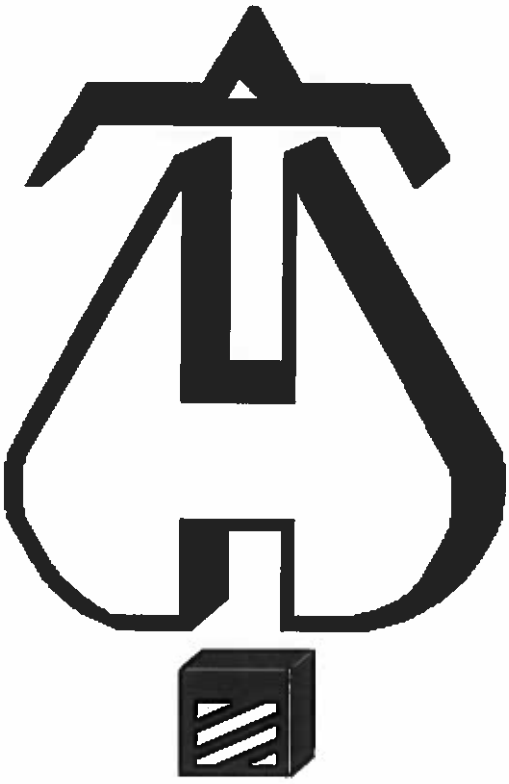
| Node1 to Node2 | Elev1 Elev2 | K Fact | Qa Qt | Nom Act | Fitting or Eqv. | Ln. | Pipe Ftng's Total | CFact Pf/Ft | Pt Pe Pf | ******* | Notes | ****** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SP01 | 0 | 5.60 | 14.82 | 1 | T | 3.568 | 1.000 | 100 | 7.000 | | | |
| to | | | | | | 0.0 | 3.568 | | 0.0 | | | |
| EQ01 | 0 | | 14.82 | 1.049 | | 0.0 | 4.568 | 0.1046 | 0.478 | Vel = 5.50 | | |
| | | | 0.0 | | | | | | | | | |
| EQ01 | | | 14.82 | | | | | | 7.478 | K Factor = 5.42 | | |
| 400 | 130 | 5.60 | 15.51 | 2 | | 0.0 | 7.000 | 100 | 7.669 | | | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | | | |
| 401 | 130 | | 15.51 | 2.067 | | 0.0 | 7.000 | 0.0041 | 0.029 | Vel = 1.48 | | |
| 401 | 130 | 5.60 | 15.54 | 2 | E | 3.568 | 7.500 | 100 | 7.698 | | | |
| to | | | | | | 0.0 | 3.568 | | 0.0 | | | |
| 402 | 130 | | 31.05 | 2.067 | | 0.0 | 11.068 | 0.0152 | 0.168 | Vel = 2.97 | | |
| 402 | 130 | 5.60 | 15.70 | 2 | | 0.0 | 7.000 | 100 | 7.866 | | | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | | | |
| 403 | 130 | | 46.75 | 2.067 | | 0.0 | 7.000 | 0.0321 | 0.225 | Vel = 4.47 | | |
| 403 | 130 | 5.60 | 15.93 | 2 | | 0.0 | 7.000 | 100 | 8.091 | | | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | | | |
| 404 | 130 | | 62.68 | 2.067 | | 0.0 | 7.000 | 0.0556 | 0.389 | Vel = 5.99 | | |
| 404 | 130 | 5.60 | 16.31 | 2 | T | 7.137 | 4.000 | 100 | 8.480 | | | |
| to | | | | | | 0.0 | 7.137 | | 0.0 | | | |
| 411 | 130 | | 78.99 | 2.067 | | 0.0 | 11.137 | 0.0850 | 0.947 | Vel = 7.55 | | |
| | | | 0.0 | | | | | | | | | |
| 411 | | | 78.99 | | | | | | 9.427 | K Factor = 25.73 | | |
| 405 | 130 | 5.60 | 14.82 | 2 | | 0.0 | 7.000 | 100 | 7.000 | | | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | | | |
| 406 | 130 | | 14.82 | 2.067 | | 0.0 | 7.000 | 0.0039 | 0.027 | Vel = 1.42 | | |
| 406 | 130 | 5.60 | 14.84 | 2 | E | 3.568 | 7.500 | 100 | 7.027 | | | |
| to | | | | | | 0.0 | 3.568 | | 0.0 | | | |
| 407 | 130 | | 29.66 | 2.067 | | 0.0 | 11.068 | 0.0139 | 0.154 | Vel = 2.84 | | |
| 407 | 130 | 5.60 | 15.01 | 2 | | 0.0 | 7.000 | 100 | 7.181 | | | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | | | |
| 408 | 130 | | 44.67 | 2.067 | | 0.0 | 7.000 | 0.0296 | 0.207 | Vel = 4.27 | | |
| 408 | 130 | 5.60 | 15.22 | 2 | | 0.0 | 7.000 | 100 | 7.388 | | | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | | | |
| 409 | 130 | | 59.89 | 2.067 | | 0.0 | 7.000 | 0.0510 | 0.357 | Vel = 5.73 | | |
| 409 | 130 | 5.60 | 15.58 | 2 | | 0.0 | 7.000 | 100 | 7.745 | | | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | | | |
| 410 | 130 | | 75.47 | 2.067 | | 0.0 | 7.000 | 0.0783 | 0.548 | Vel = 7.22 | | |
| 410 | 130 | 5.60 | 16.13 | 2 | T | 7.137 | 3.000 | 100 | 8.293 | | | |
| to | | | | | | 0.0 | 7.137 | | 0.0 | | | |
| 411 | 130 | | 91.6 | 2.067 | | 0.0 | 10.137 | 0.1119 | 1.134 | Vel = 8.76 | | |
| 411 | 130 | | 78.99 | 2 | T | 7.137 | 1.500 | 100 | 9.427 | | | |
| to | | | | | | 0.0 | 7.137 | | 0.866 | | | |
| 460 | 128 | | 170.59 | 2.067 | | 0.0 | 8.637 | 0.3537 | 3.055 | Vel = 16.31 | | |
| | | | 0.0 | | | | | | | | | |
| 460 | | | 170.59 | | | | | | 13.348 | K Factor = 46.69 | | |

| 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 ****** |
|---|---|---|---|---|---|---|---|---|---|---|
| 412 | 137 | 5.60 | 15.64 | 2 | | 0.0 | 7.000 | 100 | 7.805 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 413 | 137 | | 15.64 | 2.067 | | 0.0 | 7.000 | 0.0041 | 0.029 | Vel = 1.50 |
| 413 | 137 | 5.60 | 15.68 | 2 | | 0.0 | 7.000 | 100 | 7.834 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 414 | 137 | | 31.32 | 2.067 | | 0.0 | 7.000 | 0.0154 | 0.108 | Vel = 2.99 |
| 414 | 137 | 5.60 | 15.78 | 2 | T | 7.137 | 3.500 | 100 | 7.942 | |
| to | | | | | | 0.0 | 7.137 | | 0.0 | |
| 417 | 137 | | 47.1 | 2.067 | | 0.0 | 10.637 | 0.0327 | 0.348 | Vel = 4.50 |
| | | | 0.0 | | | | | | | |
| 417 | | | 47.10 | | | | | | 8.290 | K Factor = 16.36 |
| 415 | 137 | 5.60 | 15.93 | 2 | | 0.0 | 7.000 | 100 | 8.090 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 416 | 137 | | 15.93 | 2.067 | | 0.0 | 7.000 | 0.0044 | 0.031 | Vel = 1.52 |
| 416 | 137 | 5.60 | 15.96 | 2 | T | 7.137 | 3.500 | 100 | 8.121 | |
| to | | | | | | 0.0 | 7.137 | | 0.0 | |
| 417 | 137 | | 31.89 | 2.067 | | 0.0 | 10.637 | 0.0159 | 0.169 | Vel = 3.05 |
| 417 | 137 | | 47.10 | 2 | T | 7.137 | 8.000 | 100 | 8.290 | |
| to | | | | | | 0.0 | 7.137 | | 3.898 | |
| 461 | 128 | | 78.99 | 2.067 | | 0.0 | 15.137 | 0.0851 | 1.288 | Vel = 7.55 |
| | | | 0.0 | | | | | | | |
| 461 | | | 78.99 | | | | | | 13.476 | K Factor = 21.52 |
| 420 | 130 | 5.60 | 17.94 | 2 | | 0.0 | 7.000 | 100 | 10.258 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 421 | 130 | | 17.94 | 2.067 | | 0.0 | 7.000 | 0.0056 | 0.039 | Vel = 1.72 |
| 421 | 130 | 5.60 | 17.97 | 2 | E | 3.568 | 7.500 | 100 | 10.297 | |
| to | | | | | | 0.0 | 3.568 | | 0.0 | |
| 422 | 130 | | 35.91 | 2.067 | | 0.0 | 11.068 | 0.0198 | 0.219 | Vel = 3.43 |
| 422 | 130 | 5.60 | 18.16 | 2 | | 0.0 | 8.000 | 100 | 10.516 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 423 | 130 | | 54.07 | 2.067 | | 0.0 | 8.000 | 0.0421 | 0.337 | Vel = 5.17 |
| 423 | 130 | 5.60 | 18.44 | 2 | | 0.0 | 6.000 | 100 | 10.853 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 424 | 130 | | 72.51 | 2.067 | | 0.0 | 6.000 | 0.0727 | 0.436 | Vel = 6.93 |
| 424 | 130 | 5.60 | 18.82 | 2 | E | 3.568 | 4.000 | 100 | 11.289 | |
| to | | | | | T | 7.137 | 10.705 | | 0.866 | |
| 462 | 128 | | 91.33 | 2.067 | | 0.0 | 14.705 | 0.1113 | 1.637 | Vel = 8.73 |
| | | | 0.0 | | | | | | | |
| 462 | | | 91.33 | | | | | | 13.792 | K Factor = 24.59 |
| 425 | 138 | 5.60 | 15.53 | 1 | | 0.0 | 4.000 | 100 | 7.688 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 427 | 138 | | 15.53 | 1.049 | | 0.0 | 4.000 | 0.1142 | 0.457 | Vel = 5.77 |
| | | | 0.0 | | | | | | | |
| 427 | | | 15.53 | | | | | | 8.145 | K Factor = 5.44 |
| 426 | 138 | 5.42 | 14.89 | 1 | T | 3.568 | 2.000 | 100 | 7.557 | K = K @ EQ01 |
| to | | | | | | 0.0 | 3.568 | | 0.0 | |
| 427 | 138 | | 14.89 | 1.049 | | 0.0 | 5.568 | 0.1056 | 0.588 | Vel = 5.53 |

| 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 ****** |
|---|---|---|---|---|---|---|---|---|---|---|
| 427 | 138 | | 15.53 | 1.25 | T | 4.282 | 2.000 | 100 | 8.145 | |
| to | | | | | | 0.0 | 4.282 | | 0.0 | |
| 429 | 138 | | 30.42 | 1.38 | | 0.0 | 6.282 | 0.1043 | 0.655 | Vel = 6.53 |
| | | | 0.0 | | | | | | | |
| 429 | | | 30.42 | | | | | | 8.800 | K Factor = 10.25 |
| 428 | 138 | 5.60 | 15.75 | 1 | T | 3.568 | 4.000 | 100 | 7.912 | |
| to | | | | | | 0.0 | 3.568 | | 0.0 | |
| 429 | 138 | | 15.75 | 1.049 | | 0.0 | 7.568 | 0.1173 | 0.888 | Vel = 5.85 |
| 429 | 138 | | 30.42 | 2 | E | 3.568 | 10.500 | 100 | 8.800 | |
| to | | | | | T | 7.137 | 10.705 | | 4.331 | |
| 463 | 128 | | 46.17 | 2.067 | | 0.0 | 21.205 | 0.0315 | 0.668 | Vel = 4.41 |
| | | | 0.0 | | | | | | | |
| 463 | | | 46.17 | | | | | | 13.799 | K Factor = 12.43 |
| 430 | 130 | 5.60 | 18.08 | 2 | | 0.0 | 7.000 | 100 | 10.424 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 431 | 130 | | 18.08 | 2.067 | | 0.0 | 7.000 | 0.0056 | 0.039 | Vel = 1.73 |
| 431 | 130 | 5.60 | 18.11 | 2 | E | 3.568 | 7.000 | 100 | 10.463 | |
| to | | | | | | 0.0 | 3.568 | | 0.0 | |
| 432 | 130 | | 36.19 | 2.067 | | 0.0 | 10.568 | 0.0201 | 0.212 | Vel = 3.46 |
| 432 | 130 | 5.60 | 18.30 | 2 | | 0.0 | 7.000 | 100 | 10.675 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 433 | 130 | | 54.49 | 2.067 | | 0.0 | 7.000 | 0.0429 | 0.300 | Vel = 5.21 |
| 433 | 130 | 5.60 | 18.55 | 2 | | 0.0 | 6.000 | 100 | 10.975 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 434 | 130 | | 73.04 | 2.067 | | 0.0 | 6.000 | 0.0737 | 0.442 | Vel = 6.98 |
| 434 | 130 | 5.60 | 18.92 | 2 | E | 3.568 | 4.000 | 100 | 11.417 | |
| to | | | | | T | 7.137 | 10.705 | | 0.866 | |
| 465 | 128 | | 91.96 | 2.067 | | 0.0 | 14.705 | 0.1128 | 1.658 | Vel = 8.79 |
| | | | 0.0 | | | | | | | |
| 465 | | | 91.96 | | | | | | 13.941 | K Factor = 24.63 |
| 435 | 138 | 5.60 | 15.70 | 1 | | 0.0 | 3.500 | 100 | 7.863 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 437 | 138 | | 15.7 | 1.049 | | 0.0 | 3.500 | 0.1166 | 0.408 | Vel = 5.83 |
| | | | 0.0 | | | | | | | |
| 437 | | | 15.70 | | | | | | 8.271 | K Factor = 5.46 |
| 436 | 138 | 5.42 | 15.01 | 1 | T | 3.568 | 2.000 | 100 | 7.674 | K = K @ EQ01 |
| to | | | | | | 0.0 | 3.568 | | 0.0 | |
| 437 | 138 | | 15.01 | 1.049 | | 0.0 | 5.568 | 0.1072 | 0.597 | Vel = 5.57 |
| 437 | 138 | | 15.70 | 1.25 | T | 4.282 | 2.000 | 100 | 8.271 | |
| to | | | | | | 0.0 | 4.282 | | 0.0 | |
| 439 | 138 | | 30.71 | 1.38 | | 0.0 | 6.282 | 0.1060 | 0.666 | Vel = 6.59 |
| | | | 0.0 | | | | | | | |
| 439 | | | 30.71 | | | | | | 8.937 | K Factor = 10.27 |
| 438 | 138 | 5.60 | 15.88 | 1 | T | 3.568 | 4.000 | 100 | 8.037 | |
| to | | | | | | 0.0 | 3.568 | | 0.0 | |
| 439 | 138 | | 15.88 | 1.049 | | 0.0 | 7.568 | 0.1189 | 0.900 | Vel = 5.90 |

| 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 ****** |
|---|---|---|---|---|---|---|---|---|---|---|
| 439 | 138 | | 30.71 | 2 | E | 3.568 | 10.500 | 100 | 8.937 | |
| to | | | | | T | 7.137 | 10.705 | | 4.331 | |
| 466 | 128 | | 46.59 | 2.067 | | 0.0 | 21.205 | 0.0321 | 0.680 | Vel = 4.45 |
| | | | 0.0 | | | | | | | |
| 466 | | | 46.59 | | | | | | 13.948 | K Factor = 12.47 |
| 460 | 128 | | 170.59 | 4 | | 0.0 | 12.250 | 100 | 13.348 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 461 | 128 | | 170.59 | 4.26 | | 0.0 | 12.250 | 0.0104 | 0.128 | Vel = 3.84 |
| 461 | 128 | | 78.99 | 4 | T | 18.795 | 3.500 | 100 | 13.476 | |
| to | | | | | | 0.0 | 18.795 | | 0.0 | |
| 464 | 128 | | 249.58 | 4.26 | | 0.0 | 22.295 | 0.0211 | 0.471 | Vel = 5.62 |
| | | | 0.0 | | | | | | | |
| 464 | | | 249.58 | | | | | | 13.947 | K Factor = 66.83 |
| 462 | 128 | | 91.33 | 4 | | 0.0 | 2.000 | 100 | 13.792 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 463 | 128 | | 91.33 | 4.26 | | 0.0 | 2.000 | 0.0035 | 0.007 | Vel = 2.06 |
| 463 | 128 | | 46.17 | 4 | I | 6.578 | 14.500 | 100 | 13.799 | |
| to | | | | | | 0.0 | 6.578 | | 0.0 | |
| 464 | 128 | | 137.5 | 4.26 | | 0.0 | 21.078 | 0.0070 | 0.148 | Vel = 3.10 |
| 464 | 128 | | 249.58 | 4 | | 0.0 | 3.500 | 100 | 13.947 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 467 | 128 | | 387.08 | 4.26 | | 0.0 | 3.500 | 0.0474 | 0.166 | Vel = 8.71 |
| | | | 0.0 | | | | | | | |
| 467 | | | 387.08 | | | | | | 14.113 | K Factor = 103.04 |
| 465 | 128 | | 91.96 | 4 | | 0.0 | 2.000 | 100 | 13.941 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 466 | 128 | | 91.96 | 4.26 | | 0.0 | 2.000 | 0.0035 | 0.007 | Vel = 2.07 |
| 466 | 128 | | 46.59 | 4 | T | 18.795 | 4.500 | 100 | 13.948 | |
| to | | | | | | 0.0 | 18.795 | | 0.0 | |
| 467 | 128 | | 138.55 | 4.26 | | 0.0 | 23.295 | 0.0071 | 0.165 | Vel = 3.12 |
| 467 | 128 | | 387.08 | 4 | 3I | 19.734 | 11.500 | 100 | 14.113 | |
| to | | | | | | 0.0 | 19.735 | | -0.866 | |
| 475 | 130 | | 525.63 | 4.26 | | 0.0 | 31.235 | 0.0838 | 2.617 | Vel = 11.83 |
| 475 | 130 | | 0.0 | 4 | | 0.0 | 14.000 | 100 | 15.864 | |
| to | | | | | | 0.0 | 0.0 | | 7.796 | |
| 175 | 112 | | 525.63 | 4.26 | | 0.0 | 14.000 | 0.0838 | 1.173 | Vel = 11.83 |
| 175 | 112 | | 0.0 | 4 | 2I | 13.156 | 15.500 | 100 | 24.833 | |
| to | | | | | T | 18.795 | 31.952 | | 6.713 | |
| 075 | 96.500 | | 525.63 | 4.26 | | 0.0 | 47.452 | 0.0838 | 3.976 | Vel = 11.83 |
| 075 | 96.500 | | 0.0 | 6 | 2I | 17.947 | 19.000 | 100 | 35.522 | |
| to | | | | | | 0.0 | 17.947 | | 0.650 | |
| DPV | 95 | | 525.63 | 6.357 | | 0.0 | 36.947 | 0.0119 | 0.440 | Vel = 5.31 |
| DPV | 95 | | 0.0 | 6 | Dge | 27.661 | 3.000 | 120 | 36.612 | |
| to | | | | | B | 12.573 | 77.954 | | 0.866 | |
| BOR1 | 93 | | 525.63 | 6.357 | T | 37.72 | 80.954 | 0.0085 | 0.689 | Vel = 5.31 |

| 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 ****** |
|---|---|---|---|---|---|---|---|---|---|---|
| BOR1 | 93 | | 0.0 | 6 | 3l | 37.72 | 6.000 | 120 | 38.167 | |
| to | | | | | | 0.0 | 37.720 | | 0.433 | |
| BFP | 92 | | 525.63 | 6.357 | | 0.0 | 43.720 | 0.0085 | 0.373 | Vel = 5.31 |
| BFP | 92 | | 0.0 | 6 | 2l | 25.147 | 15.000 | 120 | 38.973 | |
| to | | | | | Zma | 0.0 | 25.147 | | 3.136 | * * Fixed Loss = 3.136 |
| BASE | 92 | | 525.63 | 6.357 | | 0.0 | 40.147 | 0.0085 | 0.341 | Vel = 5.31 |
| BASE | 92 | | 0.0 | 6 | E | 20.084 | 25.000 | 140 | 42.450 | |
| to | | | | | T | 43.037 | 67.425 | | -1.299 | |
| UG1 | 95 | | 525.63 | 6.16 | G | 4.304 | 92.425 | 0.0075 | 0.689 | Vel = 5.66 |
| UG1 | 95 | H100 | 100.00 | 6 | 2T | 86.075 | 450.000 | 140 | 41.840 | |
| to | | | | | 2G | 8.607 | 94.682 | | 0.0 | |
| TEST | 95 | | 625.63 | 6.16 | | 0.0 | 544.682 | 0.0103 | 5.609 | Vel = 6.74 |
| | | | 0.0 | | | | | | | |
| TEST | | | 625.63 | | | | | | 47.449 | K Factor = 90.82 |



. . . **Fire Protection by Computer Design**

EASTERN FIRE PROTECTION
AUBURN, ME
207-784-1507

| | | |
|---|---|---|
| Job Name | : | UNE ALUMNI HALL RENOVATIONS |
| Drawing | : | 2 OF 2 |
| Location | : | PORTLAND, MAINE |
| Remote Area | : | ATTIC NEW |
| Contract | : | AU-5342-15 |
| Data File | : | 5342 UNE ALUMNI HALL ATTIC NEW.WXF |

***HYDRAULIC CALCULATIONS***
***for***

***Project name:*** UNE ALUMNI HALL RENOVATIONS
***Location:*** PORTLAND, MAINE
***Drawing no:*** 2 OF 2
***Date:*** 11-12-15

***Design***

***Remote area number:*** ATTIC NEW
***Remote area location:*** ATTIC NEW
***Occupancy classification:*** LIGHT HAZARD
***Density:*** .1 - Gpm/SqFt
***Area of application:*** 1275 - SqFt
***Coverage per sprinkler:*** 120 - SqFt
***Type of sprinklers calculated:*** RELIABLE FIFR K5.6 UPRIGHT
***No. of sprinklers calculated:*** 13
***In-rack demand:*** - GPM
***Hose streams:*** 100 - GPM
***Total water required (including hose streams):*** 331.524 - GPM @ 51.199 - Psi
***Type of system:*** WET
***Volume of dry or preaction system:*** N/A - Gal

***Water supply information***

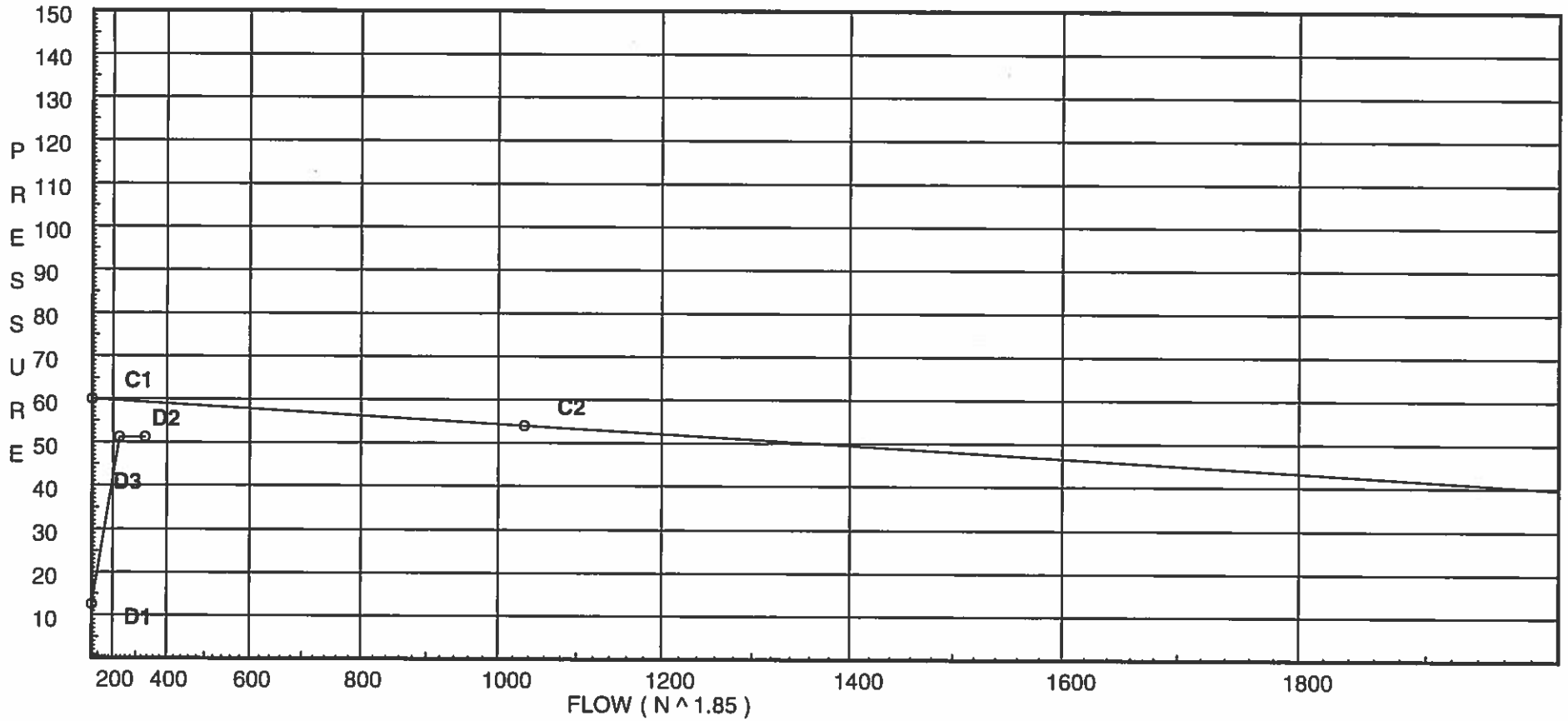
***Date:*** 06-06-12
***Location:*** SEE PLOT PLAN
***Source:*** PORTLAND WATER DISTRICT

***Name of contractor:*** EASTERN FIRE PROTECTION
***Address:*** AUBURN, ME
***Phone number:*** 207-784-1507
***Name of designer:*** GRD
***Authority having jurisdiction:*** MAINE STATE FIRE MARSHAL
***Notes: (Include peaking information or gridded systems here.)***

City Water Supply:
- C1 - Static Pressure : 60
- C2 - Residual Pressure: 54
- C2 - Residual Flow : 1034

Demand:

| | |
|---|---|
| D1 - Elevation | : 12.560 |
| D2 - System Flow | : 231.524 |
| D2 - System Pressure | : 51.199 |
| Hose ( Demand ) | : 100 |
| D3 - System Demand | : 331.524 |
| Safety Margin | : 8.070 |



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 |
| I | 90' Grvd-Vic Elbow #10 | 0 | 0 | 2 | 3 | 4 | 3.5 | 6 | 5 | 8 | 7 | 8.5 | 10 | 13 | 17 | 20 | 23 | 25 | 33 | 36 | 40 |
| 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 |
| Zma | Maxim M200 Horz Butt | 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.

## SUPPLY ANALYSIS

| Node at Source | Static Pressure | Residual Pressure | Flow | Available Pressure | Total Demand | Required Pressure |
|---|---|---|---|---|---|---|
| TEST | 60.0 | 54 | 1034.0 | 59.268 | 331.52 | 51.199 |

## NODE ANALYSIS

| Node Tag | Elevation | Node Type | Pressure at Node | Discharge at Node | Notes |
|---|---|---|---|---|---|
| 300 | 116.5 | 5.6 | 9.85 | 17.58 | |
| 301 | 116.5 | 5.6 | 9.95 | 17.67 | |
| 302 | 116.5 | 5.6 | 10.32 | 17.99 | |
| 303 | 116.5 | 5.6 | 11.11 | 18.67 | |
| 304 | 116.5 | 5.6 | 12.73 | 19.98 | |
| 305 | 116.5 | 5.6 | 12.85 | 20.08 | |
| 354 | 0.0 | | 63.92 | | |
| 306 | 124.0 | 5.6 | 7.0 | 14.82 | |
| 307 | 124.0 | 5.6 | 7.07 | 14.89 | |
| 308 | 124.0 | 5.6 | 7.34 | 15.17 | |
| 309 | 124.0 | 5.6 | 7.92 | 15.76 | |
| 310 | 124.0 | 5.6 | 9.09 | 16.89 | |
| 311 | 124.0 | 5.6 | 9.19 | 16.98 | |
| 352 | 124.0 | | 9.63 | | |
| 312 | 116.5 | 5.6 | 20.03 | 25.06 | |
| 350 | 116.5 | | 20.36 | | |
| 351 | 114.0 | | 21.7 | | |
| 355 | 114.0 | | 18.71 | | |
| 353 | 114.0 | | 19.16 | | |
| 356 | 114.0 | | 21.75 | | |
| 357 | 114.0 | | 22.86 | | |
| 174 | 112.0 | | 24.13 | | |
| 175 | 96.5 | | 35.38 | | |
| 076 | 96.5 | | 36.13 | | |
| TOR2 | 96.5 | | 39.12 | | |
| BOR2 | 93.0 | | 44.62 | | |
| BFP | 92.0 | | 45.13 | | |
| BASE | 92.0 | | 50.61 | | |
| UG1 | 95.0 | | 49.47 | 100.0 | |
| TEST | 95.0 | | 51.2 | | |

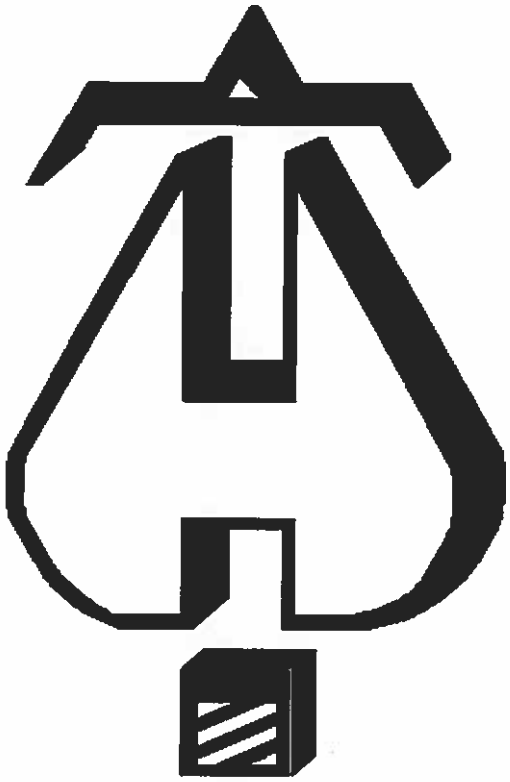
| Node1 to Node2 | Elev1 Elev2 | K Fact | Qa Qt | Nom Act | Fitting or Eqv. | Ln. | Pipe Ftng's Total | CFact Pf/Ft | Pt Pe Pf | ******* Notes ****** |
|---|---|---|---|---|---|---|---|---|---|---|
| 300 | 116.500 | 5.60 | 17.58 | 1.5 | | 0.0 | 8.000 | 120 | 9.851 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 301 | 116.500 | | 17.58 | 1.61 | | 0.0 | 8.000 | 0.0127 | 0.102 | Vel = 2.77 |
| 301 | 116.500 | 5.60 | 17.66 | 1.5 | | 0.0 | 8.000 | 120 | 9.953 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 302 | 116.500 | | 35.24 | 1.61 | | 0.0 | 8.000 | 0.0460 | 0.368 | Vel = 5.55 |
| 302 | 116.500 | 5.60 | 17.99 | 1.5 | | 0.0 | 8.000 | 120 | 10.321 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 303 | 116.500 | | 53.23 | 1.61 | | 0.0 | 8.000 | 0.0989 | 0.791 | Vel = 8.39 |
| 303 | 116.500 | 5.60 | 18.67 | 1.5 | T | 8.0 | 5.625 | 120 | 11.112 | |
| to | | | | | | 0.0 | 8.000 | | 50.456 | |
| 354 | 0 | | 71.9 | 1.61 | | 0.0 | 13.625 | 0.1723 | 2.348 | Vel = 11.33 |
| | | | 0.0 | | | | | | | |
| 354 | | | 71.90 | | | | | | 63.916 | K Factor = 8.99 |
| 304 | 116.500 | 5.60 | 19.98 | 1.5 | | 0.0 | 8.000 | 120 | 12.725 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 305 | 116.500 | | 19.98 | 1.61 | | 0.0 | 8.000 | 0.0161 | 0.129 | Vel = 3.15 |
| 305 | 116.500 | 5.60 | 20.07 | 1.5 | T | 8.0 | 2.375 | 120 | 12.854 | |
| to | | | | | | 0.0 | 8.000 | | 50.456 | |
| 354 | 0 | | 40.05 | 1.61 | | 0.0 | 10.375 | 0.0584 | 0.606 | Vel = 6.31 |
| 354 | 0 | | 71.91 | 1.5 | T | 8.0 | 2.667 | 120 | 63.916 | |
| to | | | | | | 0.0 | 8.000 | | -49.373 | |
| 355 | 114 | | 111.96 | 1.61 | | 0.0 | 10.667 | 0.3909 | 4.170 | Vel = 17.64 |
| | | | 0.0 | | | | | | | |
| 355 | | | 111.96 | | | | | | 18.713 | K Factor = 25.88 |
| 306 | 124 | 5.60 | 14.82 | 1.5 | | 0.0 | 8.000 | 120 | 7.000 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 307 | 124 | | 14.82 | 1.61 | | 0.0 | 8.000 | 0.0092 | 0.074 | Vel = 2.34 |
| 307 | 124 | 5.60 | 14.89 | 1.5 | | 0.0 | 8.000 | 120 | 7.074 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 308 | 124 | | 29.71 | 1.61 | | 0.0 | 8.000 | 0.0336 | 0.269 | Vel = 4.68 |
| 308 | 124 | 5.60 | 15.18 | 1.5 | | 0.0 | 8.000 | 120 | 7.343 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 309 | 124 | | 44.89 | 1.61 | | 0.0 | 8.000 | 0.0721 | 0.577 | Vel = 7.07 |
| 309 | 124 | 5.60 | 15.75 | 1.5 | T | 8.0 | 5.625 | 120 | 7.920 | |
| to | | | | | | 0.0 | 8.000 | | 0.0 | |
| 352 | 124 | | 60.64 | 1.61 | | 0.0 | 13.625 | 0.1257 | 1.713 | Vel = 9.56 |
| | | | 0.0 | | | | | | | |
| 352 | | | 60.64 | | | | | | 9.633 | K Factor = 19.54 |
| 310 | 124 | 5.60 | 16.89 | 1.5 | | 0.0 | 8.000 | 120 | 9.095 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 311 | 124 | | 16.89 | 1.61 | | 0.0 | 8.000 | 0.0118 | 0.094 | Vel = 2.66 |
| 311 | 124 | 5.60 | 16.97 | 1.5 | T | 8.0 | 2.375 | 120 | 9.189 | |
| to | | | | | | 0.0 | 8.000 | | 0.0 | |
| 352 | 124 | | 33.86 | 1.61 | | 0.0 | 10.375 | 0.0428 | 0.444 | Vel = 5.34 |

| 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 ****** |
|---|---|---|---|---|---|---|---|---|---|---|
| 352 | 124 | | 60.65 | 1.5 | T | 8.0 | 10.170 | 120 | 9.633 | |
| to | | | | | | 0.0 | 8.000 | | 4.331 | |
| 353 | 114 | | 94.51 | 1.61 | | 0.0 | 18.170 | 0.2858 | 5.193 | Vel = 14.89 |
| | | | 0.0 | | | | | | | |
| 353 | | | 94.51 | | | | | | 19.157 | K Factor = 21.59 |
| 312 | 116.500 | 5.60 | 25.06 | 1.5 | T | 8.0 | 5.625 | 120 | 20.026 | |
| to | | | | | | 0.0 | 8.000 | | 0.0 | |
| 350 | 116.500 | | 25.06 | 1.61 | | 0.0 | 13.625 | 0.0245 | 0.334 | Vel = 3.95 |
| 350 | 116.500 | | 0.0 | 1.5 | T | 8.0 | 2.667 | 120 | 20.360 | |
| to | | | | | | 0.0 | 8.000 | | 1.083 | |
| 351 | 114 | | 25.06 | 1.61 | | 0.0 | 10.667 | 0.0245 | 0.261 | Vel = 3.95 |
| | | | 0.0 | | | | | | | |
| 351 | | | 25.06 | | | | | | 21.704 | K Factor = 5.38 |
| 351 | 114 | | 25.06 | 2.5 | T | 16.474 | 4.500 | 120 | 21.704 | |
| to | | | | | | 0.0 | 16.474 | | 0.0 | |
| 356 | 114 | | 25.06 | 2.635 | | 0.0 | 20.974 | 0.0022 | 0.047 | Vel = 1.47 |
| | | | 0.0 | | | | | | | |
| 356 | | | 25.06 | | | | | | 21.751 | K Factor = 5.37 |
| 355 | 114 | | 111.96 | 2.5 | | 0.0 | 12.500 | 120 | 18.713 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 353 | 114 | | 111.96 | 2.635 | | 0.0 | 12.500 | 0.0355 | 0.444 | Vel = 6.59 |
| 353 | 114 | | 94.50 | 2.5 | T | 16.474 | 7.080 | 120 | 19.157 | |
| to | | | | | | 0.0 | 16.474 | | 0.0 | |
| 356 | 114 | | 206.46 | 2.635 | | 0.0 | 23.554 | 0.1101 | 2.594 | Vel = 12.15 |
| 356 | 114 | | 25.06 | 3 | I | 6.72 | 16.250 | 120 | 21.751 | |
| to | | | | | | 0.0 | 6.720 | | 0.0 | |
| 357 | 114 | | 231.52 | 3.26 | | 0.0 | 22.970 | 0.0483 | 1.109 | Vel = 8.90 |
| 357 | 114 | | 0.0 | 3 | I | 6.72 | 1.667 | 120 | 22.860 | |
| to | | | | | | 0.0 | 6.720 | | 0.866 | |
| 174 | 112 | | 231.52 | 3.26 | | 0.0 | 8.387 | 0.0483 | 0.405 | Vel = 8.90 |
| 174 | 112 | | 0.0 | 3 | 4I | 26.879 | 47.000 | 120 | 24.131 | |
| to | | | | | T | 20.159 | 47.038 | | 6.713 | |
| 175 | 96.500 | | 231.52 | 3.26 | | 0.0 | 94.038 | 0.0483 | 4.540 | Vel = 8.90 |
| 175 | 96.500 | | 0.0 | 3 | | 0.0 | 15.500 | 120 | 35.384 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 076 | 96.500 | | 231.52 | 3.26 | | 0.0 | 15.500 | 0.0483 | 0.749 | Vel = 8.90 |
| 076 | 96.500 | | 0.0 | 3 | 3I | 20.159 | 21.500 | 120 | 36.133 | |
| to | | | | | T | 20.159 | 40.318 | | 0.0 | |
| TOR2 | 96.500 | | 231.52 | 3.26 | | 0.0 | 61.818 | 0.0483 | 2.985 | Vel = 8.90 |
| TOR2 | 96.500 | | 0.0 | 4 | S | 28.968 | 4.000 | 120 | 39.118 | |
| to | | | | | B | 15.8 | 71.102 | | 4.516 | * * Fixed Loss = 3 |
| BOR2 | 93 | | 231.52 | 4.26 | T | 26.334 | 75.102 | 0.0131 | 0.985 | Vel = 5.21 |
| | | | | | Fsp | 0.0 | | | | |
| BOR2 | 93 | | 0.0 | 6 | 3I | 37.72 | 4.000 | 120 | 44.619 | |
| to | | | | | | 0.0 | 37.720 | | 0.433 | |
| BFP | 92 | | 231.52 | 6.357 | | 0.0 | 41.720 | 0.0019 | 0.078 | Vel = 2.34 |

EASTERN FIRE PROTECTION
UNE ALUMNI HALL RENOVATIONS



| 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 ****** |
|---|---|---|---|---|---|---|---|---|---|---|
| BFP | 92 | | 0.0 | 6 | 2I | 25.147 | 15.000 | 120 | 45.130 | |
| to | | | | | Zma | 0.0 | 25.147 | | 5.410 | * * Fixed Loss = 5.41 |
| BASE | 92 | | 231.52 | 6.357 | | 0.0 | 40.147 | 0.0018 | 0.074 | Vel = 2.34 |
| BASE | 92 | | 0.0 | 6 | E | 20.084 | 25.000 | 140 | 50.614 | |
| to | | | | | T | 43.037 | 67.425 | | -1.299 | |
| UG1 | 95 | | 231.52 | 6.16 | G | 4.304 | 92.425 | 0.0016 | 0.151 | Vel = 2.49 |
| UG1 | 95 | H100 | 100.00 | 6 | 2T | 86.075 | 450.000 | 140 | 49.466 | |
| to | | | | | 2G | 8.607 | 94.682 | | 0.0 | |
| TEST | 95 | | 331.52 | 6.16 | | 0.0 | 544.682 | 0.0032 | 1.733 | Vel = 3.57 |
| | | | 0.0 | | | | | | | |
| TEST | | | 331.52 | | | | | | 51.199 | K Factor = 46.33 |



. . . **Fire Protection by Computer Design**

EASTERN FIRE PROTECTION
AUBURN, ME
207-784-1507

| | | |
|---|---|---|
| Job Name | : | UNE ALUMNI HALL RENOVATIONS |
| Drawing | : | 2 OF 2 |
| Location | : | PORTLAND, MAINE |
| Remote Area | : | 2ND FLOOR |
| Contract | : | AU-5342-15 |
| Data File | : | 5342 UNE ALUMNI SECOND FLOOR WET SYSTEM.WXF |

***HYDRAULIC CALCULATIONS***
***for***

***Project name:*** UNE ALUMNI HALL RENOVATIONS
***Location:*** PORTLAND, MAINE
***Drawing no:*** 2 OF 2
***Date:*** 11-12-15

***Design***

***Remote area number:*** 2ND FLOOR
***Remote area location:*** 2ND FLOOR
***Occupancy classification:*** LIGHT HAZARD
***Density:*** .10 - Gpm/SqFt
***Area of application:*** 910 - SqFt
***Coverage per sprinkler:*** 196 - SqFt
***Type of sprinklers calculated:*** RELIABLE F1FR K5.6 UPRIGHT
***No. of sprinklers calculated:*** 8
***In-rack demand:*** - GPM
***Hose streams:*** 100 - GPM
***Total water required (including hose streams):*** 273.295 - GPM @ 48.807 - Psi
***Type of system:*** WET
***Volume of dry or preaction system:*** - Gal

***Water supply information***

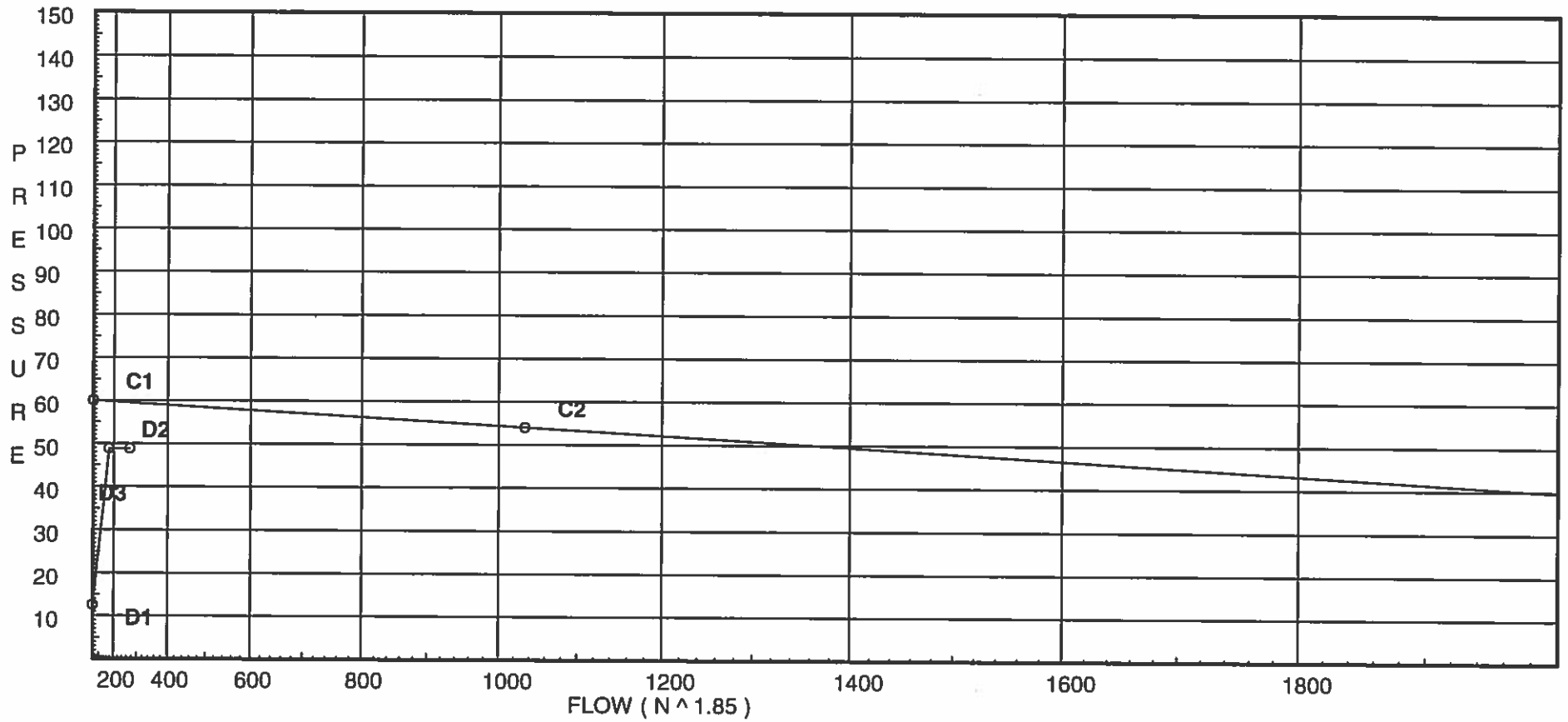
***Date:*** 06-06-12
***Location:*** SEE PLOT PLAN DWG 1 OF 2
***Source:*** PORTLAND WATER DISTRICT

***Name of contractor:*** EASTERN FIRE PROTECTION
***Address:*** AUBURN, ME
***Phone number:*** 207-784-1507
***Name of designer:*** GRD
***Authority having jurisdiction:*** MAINE STATE FIRE MARSHAL
***Notes: (Include peaking information or gridded systems here.)***

City Water Supply:
- C1 - Static Pressure : 60
- C2 - Residual Pressure: 54
- C2 - Residual Flow : 1034

Demand:

| | |
|---|---|
| D1 - Elevation | : 12.560 |
| D2 - System Flow | : 173.295 |
| D2 - System Pressure | : 48.807 |
| Hose ( Demand ) | : 100 |
| D3 - System Demand | : 273.295 |
| Safety Margin | : 10.682 |



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 |
| I | 90' Grvd-Vic Elbow #10 | 0 | 0 | 2 | 3 | 4 | 3.5 | 6 | 5 | 8 | 7 | 8.5 | 10 | 13 | 17 | 20 | 23 | 25 | 33 | 36 | 40 |
| 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 | | | | | | | | | | | | | | | | | | | |

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.

## SUPPLY ANALYSIS

| Node at Source | Static Pressure | Residual Pressure | Flow | Available Pressure | Total Demand | Required Pressure |
|---|---|---|---|---|---|---|
| TEST | 60.0 | 54 | 1034.0 | 59.488 | 273.3 | 48.807 |

## NODE ANALYSIS

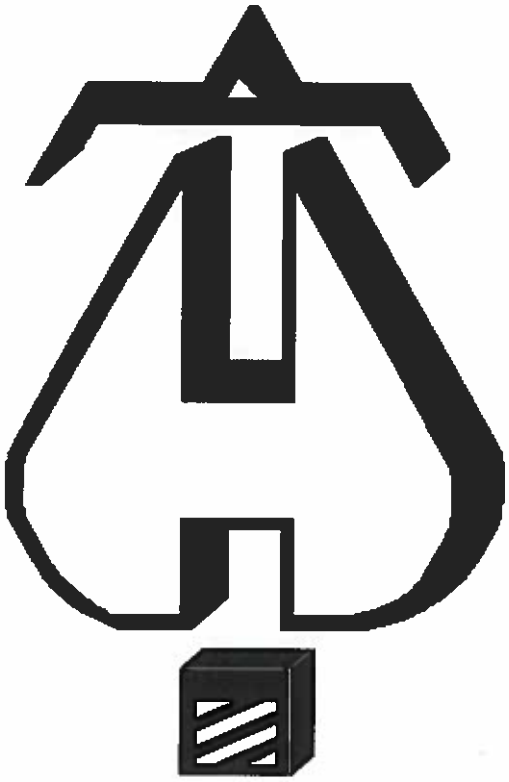
| Node Tag | Elevation | Node Type | Pressure at Node | Discharge at Node | Notes |
|---|---|---|---|---|---|
| DP01 | 0.0 | 5.6 | 12.25 | 19.6 | |
| DP02 | 0.0 | 5.6 | 12.25 | 19.6 | |
| 200 | 124.0 | 5.44 | 17.45 | 22.71 | K=K @ EQ01 |
| 201 | 124.0 | 5.52 | 16.52 | 22.42 | K=K @ EQ02 |
| 202 | 124.0 | | 17.8 | | |
| 203 | 124.0 | 5.44 | 17.93 | 23.02 | K=K @ EQ01 |
| 204 | 124.0 | 5.44 | 19.59 | 24.06 | K=K @ EQ01 |
| 207 | 124.0 | 5.44 | 13.19 | 19.74 | K=K @ EQ01 |
| 208 | 124.0 | 5.44 | 13.59 | 20.04 | K=K @ EQ01 |
| 209 | 124.0 | 5.52 | 12.63 | 19.6 | K=K @ EQ02 |
| 210 | 124.0 | | 13.71 | | |
| 211 | 124.0 | 5.44 | 15.95 | 21.71 | K=K @ EQ01 |
| 205 | 124.0 | | 20.06 | | |
| 212 | 124.0 | | 20.4 | | |
| 215 | 124.0 | | 23.88 | | |
| 276 | 124.0 | | 24.39 | | |
| 076 | 96.5 | | 37.08 | | |
| TOR2 | 96.5 | | 38.83 | | |
| BOR2 | 93.0 | | 43.92 | | |
| BFP | 92.0 | | 44.4 | | |
| BASE | 92.0 | | 48.61 | | |
| UG1 | 95.0 | | 47.39 | 100.0 | |
| TEST | 95.0 | | 48.81 | | |

| 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 ******* |
|---|---|---|---|---|---|---|---|---|---|---|
| DP01 | 0 | 5.60 | 19.60 | 1 | T | 5.0 | 1.000 | 120 | 12.250 | |
| to | | | | | | 0.0 | 5.000 | | 0.0 | |
| EQ01 | 0 | | 19.6 | 1.049 | | 0.0 | 6.000 | 0.1253 | 0.752 | Vel = 7.28 |
| | | | 0.0 | | | | | | | |
| EQ01 | | | 19.60 | | | | | | 13.002 | K Factor = 5.44 |
| DP02 | 0 | 5.60 | 19.60 | 1 | E | 2.0 | 1.000 | 120 | 12.250 | |
| to | | | | | | 0.0 | 2.000 | | 0.0 | |
| EQ02 | 0 | | 19.6 | 1.049 | | 0.0 | 3.000 | 0.1253 | 0.376 | Vel = 7.28 |
| | | | 0.0 | | | | | | | |
| EQ02 | | | 19.60 | | | | | | 12.626 | K Factor = 5.52 |
| 200 | 124 | 5.44 | 22.71 | 1.25 | | 0.0 | 10.000 | 120 | 17.455 | K = K @ EQ01 |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 202 | 124 | | 22.71 | 1.442 | | 0.0 | 10.000 | 0.0349 | 0.349 | Vel = 4.46 |
| | | | 0.0 | | | | | | | |
| 202 | | | 22.71 | | | | | | 17.804 | K Factor = 5.38 |
| 201 | 124 | 5.52 | 22.42 | 1 | T | 5.0 | 3.000 | 120 | 16.518 | K = K @ EQ02 |
| to | | | | | | 0.0 | 5.000 | | 0.0 | |
| 202 | 124 | | 22.42 | 1.049 | | 0.0 | 8.000 | 0.1608 | 1.286 | Vel = 8.32 |
| 202 | 124 | | 22.71 | 1.25 | | 0.0 | 1.000 | 120 | 17.804 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 203 | 124 | | 45.13 | 1.442 | | 0.0 | 1.000 | 0.1250 | 0.125 | Vel = 8.87 |
| 203 | 124 | 5.44 | 23.01 | 1.25 | | 0.0 | 8.000 | 120 | 17.929 | K = K @ EQ01 |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 205 | 124 | | 68.14 | 1.442 | | 0.0 | 8.000 | 0.2669 | 2.135 | Vel = 13.39 |
| | | | 0.0 | | | | | | | |
| 205 | | | 68.14 | | | | | | 20.064 | K Factor = 15.21 |
| 204 | 124 | 5.44 | 24.06 | 1.25 | T | 6.0 | 3.750 | 120 | 19.594 | K = K @ EQ01 |
| to | | | | | | 0.0 | 6.000 | | 0.0 | |
| 205 | 124 | | 24.06 | 1.38 | | 0.0 | 9.750 | 0.0482 | 0.470 | Vel = 5.16 |
| | | | 0.0 | | | | | | | |
| 205 | | | 24.06 | | | | | | 20.064 | K Factor = 5.37 |
| 207 | 124 | 5.44 | 19.74 | 1.25 | | 0.0 | 12.000 | 120 | 13.190 | K = K @ EQ01 |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 208 | 124 | | 19.74 | 1.38 | | 0.0 | 12.000 | 0.0333 | 0.400 | Vel = 4.23 |
| 208 | 124 | 5.44 | 20.04 | 1.25 | | 0.0 | 1.000 | 120 | 13.590 | K = K @ EQ01 |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 210 | 124 | | 39.78 | 1.38 | | 0.0 | 1.000 | 0.1220 | 0.122 | Vel = 8.53 |
| | | | 0.0 | | | | | | | |
| 210 | | | 39.78 | | | | | | 13.712 | K Factor = 10.74 |
| 209 | 124 | 5.52 | 19.60 | 1 | T | 5.0 | 3.667 | 120 | 12.626 | K = K @ EQ02 |
| to | | | | | | 0.0 | 5.000 | | 0.0 | |
| 210 | 124 | | 19.6 | 1.049 | | 0.0 | 8.667 | 0.1253 | 1.086 | Vel = 7.28 |
| 210 | 124 | | 39.78 | 1.25 | | 0.0 | 8.750 | 120 | 13.712 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 211 | 124 | | 59.38 | 1.38 | | 0.0 | 8.750 | 0.2563 | 2.243 | Vel = 12.74 |

EASTERN FIRE PROTECTION
UNE ALUMNI HALL RENOVATIONS



| 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 ****** |
|---|---|---|---|---|---|---|---|---|---|---|
| 211 | 124 | 5.44 | 21.71 | 1.25 | T | 6.0 | 3.750 | 120 | 15.955 | K = K @ EQ01 |
| to | | | | | | 0.0 | 6.000 | | 0.0 | |
| 212 | 124 | | 81.09 | 1.38 | | 0.0 | 9.750 | 0.4561 | 4.447 | Vel = 17.39 |
| | | | 0.0 | | | | | | | |
| 212 | | | 81.09 | | | | | | 20.402 | K Factor = 17.95 |
| 205 | 124 | | 92.20 | 2.5 | | 0.0 | 13.625 | 120 | 20.064 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 212 | 124 | | 92.2 | 2.635 | | 0.0 | 13.625 | 0.0248 | 0.338 | Vel = 5.42 |
| 212 | 124 | | 81.10 | 2.5 | T | 16.474 | 27.250 | 120 | 20.402 | |
| to | | | | | | 0.0 | 16.474 | | 0.0 | |
| 215 | 124 | | 173.3 | 2.635 | | 0.0 | 43.724 | 0.0796 | 3.482 | Vel = 10.20 |
| 215 | 124 | | 0.0 | 3 | I | 6.72 | 11.250 | 120 | 23.884 | |
| to | | | | | | 0.0 | 6.720 | | 0.0 | |
| 276 | 124 | | 173.3 | 3.26 | | 0.0 | 17.970 | 0.0283 | 0.508 | Vel = 6.66 |
| 276 | 124 | | 0.0 | 3 | | 0.0 | 27.667 | 120 | 24.392 | |
| to | | | | | | 0.0 | 0.0 | | 11.910 | |
| 076 | 96.500 | | 173.3 | 3.26 | | 0.0 | 27.667 | 0.0283 | 0.782 | Vel = 6.66 |
| 076 | 96.500 | | 0.0 | 3 | 3I | 20.159 | 21.500 | 120 | 37.084 | |
| to | | | | | T | 20.159 | 40.318 | | 0.0 | |
| TOR2 | 96.500 | | 173.3 | 3.26 | | 0.0 | 61.818 | 0.0282 | 1.746 | Vel = 6.66 |
| TOR2 | 96.500 | | 0.0 | 4 | S | 28.968 | 4.000 | 120 | 38.830 | |
| to | | | | | B | 15.8 | 71.102 | | 4.516 | * * Fixed Loss = 3 |
| BOR2 | 93 | | 173.3 | 4.26 | T | 26.334 | 75.102 | 0.0077 | 0.577 | Vel = 3.90 |
| | | | | | Fsp | 0.0 | | | | |
| BOR2 | 93 | | 0.0 | 6 | 3I | 37.72 | 4.000 | 120 | 43.923 | |
| to | | | | | | 0.0 | 37.720 | | 0.433 | |
| BFP | 92 | | 173.3 | 6.357 | | 0.0 | 41.720 | 0.0011 | 0.045 | Vel = 1.75 |
| BFP | 92 | | 0.0 | 6 | 2I | 25.147 | 15.000 | 120 | 44.401 | |
| to | | | | | Zca | 0.0 | 25.147 | | 4.160 | * * Fixed Loss = 4.16 |
| BASE | 92 | | 173.3 | 6.357 | | 0.0 | 40.147 | 0.0011 | 0.044 | Vel = 1.75 |
| BASE | 92 | | 0.0 | 6 | E | 20.084 | 25.000 | 140 | 48.605 | |
| to | | | | | T | 43.037 | 67.425 | | -1.299 | |
| UG1 | 95 | | 173.3 | 6.16 | G | 4.304 | 92.425 | 0.0010 | 0.088 | Vel = 1.87 |
| UG1 | 95 | H100 | 100.00 | 6 | 2T | 86.075 | 540.000 | 140 | 47.394 | |
| to | | | | | 2G | 8.607 | 94.682 | | 0.0 | |
| TEST | 95 | | 273.3 | 6.16 | | 0.0 | 634.682 | 0.0022 | 1.413 | Vel = 2.94 |
| | | | 0.0 | | | | | | | |
| TEST | | | 273.30 | | | | | | 48.807 | K Factor = 39.12 |



. . . **Fire Protection by Computer Design**

EASTERN FIRE PROTECTION
AUBURN, ME
207-784-1507

| | | |
|---|---|---|
| Job Name | : | UNE ALUMNI HALL RENOVATIONS |
| Drawing | : | 1 OF 2 |
| Location | : | PORTLAND, MAINE |
| Remote Area | : | LOWER LEVEL |
| Contract | : | AU-5342-15 |
| Data File | : | 5342 UNE ALUMNI HALL LOWER LEVEL EXISTING.WXF |

***HYDRAULIC CALCULATIONS***
***for***

***Project name:*** UNE ALUMNI HALL RENOVATIONS
***Location:*** PORTLAND, MAINE
***Drawing no:*** 1 OF 2
***Date:*** 11-12-15

***Design***

***Remote area number:*** LOWER LEVEL
***Remote area location:*** LOWER LEVEL
***Occupancy classification:*** ORDINARY HAZARD GROUP I
***Density:*** .15 - Gpm/SqFt
***Area of application:*** 1090 - SqFt
***Coverage per sprinkler:*** 120 - SqFt
***Type of sprinklers calculated:*** RELIABLE FIFR K5.6 UPRIGHT
***No. of sprinklers calculated:*** 14
***In-rack demand:*** - GPM
***Hose streams:*** 250 - GPM
***Total water required (including hose streams):*** 517.951 - GPM @ 35.186 - Psi
***Type of system:*** WET
***Volume of dry or preaction system:*** N/A - Gal

***Water supply information***

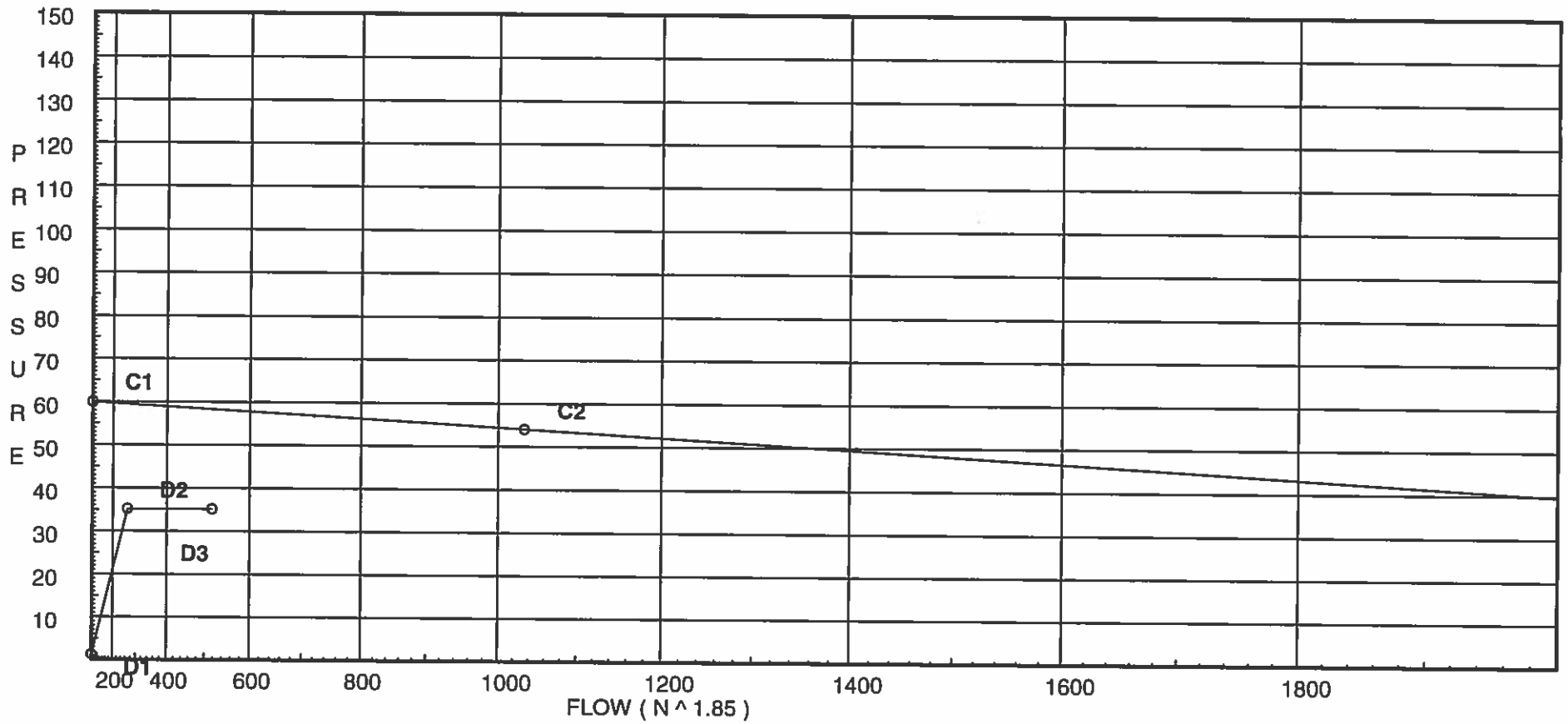
***Date:*** 06-06-12
***Location:*** SEE PLOT PLAN
***Source:*** PORTLAND WATER DISTRICT

***Name of contractor:*** EASTERN FIRE PROTECTION
***Address:*** AUBURN, ME
***Phone number:*** 207-784-1507
***Name of designer:*** GRD
***Authority having jurisdiction:*** MAINE STATE FIRE MARSHAL
***Notes: (Include peaking information or gridded systems here.)***

City Water Supply:
- C1 - Static Pressure : 60
- C2 - Residual Pressure: 54
- C2 - Residual Flow : 1034

Demand:

| | |
|---|---|
| D1 - Elevation | : 1.299 |
| D2 - System Flow | : 267.951 |
| D2 - System Pressure | : 35.186 |
| Hose ( Demand ) | : 250 |
| D3 - System Demand | : 517.951 |
| Safety Margin | : 23.144 |



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 |
| I | 90' Grvd-Vic Elbow #10 | 0 | 0 | 2 | 3 | 4 | 3.5 | 6 | 5 | 8 | 7 | 8.5 | 10 | 13 | 17 | 20 | 23 | 25 | 33 | 36 | 40 |
| 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 |
| Zma | Maxim M200 Horz Butt | 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.

## SUPPLY ANALYSIS

| Node at Source | Static Pressure | Residual Pressure | Flow | Available Pressure | Total Demand | Required Pressure |
|---|---|---|---|---|---|---|
| TEST | 60.0 | 54 | 1034.0 | 58.33 | 517.95 | 35.186 |

## NODE ANALYSIS

| Node Tag | Elevation | Node Type | Pressure at Node | Discharge at Node | Notes |
|---|---|---|---|---|---|
| 1 | 98.0 | 5.6 | 10.8 | 18.4 | |
| 2 | 98.0 | 5.6 | 10.58 | 18.21 | |
| 3 | 98.0 | 5.6 | 11.51 | 18.99 | |
| 4 | 98.0 | | 12.53 | | |
| 6 | 98.0 | 5.6 | 11.64 | 19.1 | |
| 7 | 98.0 | 5.6 | 12.41 | 19.73 | |
| 8 | 98.0 | | 13.49 | | |
| 10 | 98.0 | 5.6 | 10.94 | 18.52 | |
| 11 | 98.0 | 5.6 | 10.33 | 18.0 | |
| 12 | 98.0 | 5.6 | 11.67 | 19.13 | |
| 13 | 98.0 | | 12.69 | | |
| 15 | 98.0 | 5.6 | 10.81 | 18.41 | |
| 16 | 98.0 | 5.6 | 11.7 | 19.16 | |
| 17 | 98.0 | 5.6 | 10.92 | 18.5 | |
| 18 | 98.0 | 5.6 | 11.93 | 19.35 | |
| 20 | 98.0 | | 12.94 | | |
| 21 | 98.0 | 5.6 | 13.74 | 20.76 | |
| 22 | 98.0 | 5.6 | 14.99 | 21.68 | |
| 50 | 96.0 | | 15.21 | | |
| 51 | 96.0 | | 15.29 | | |
| 52 | 96.0 | | 15.38 | | |
| 53 | 96.0 | | 16.99 | | |
| 54 | 96.0 | | 17.64 | | |
| 55 | 96.0 | | 17.78 | | |
| TOR2 | 96.5 | | 20.87 | | |
| BOR2 | 93.0 | | 26.68 | | |
| BFP | 92.0 | | 27.21 | | |
| BASE | 92.0 | | 32.33 | | |
| UG1 | 95.0 | | 31.23 | 250.0 | |
| TEST | 95.0 | | 35.19 | | |

| 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 ****** |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 98 | 5.60 | 18.40 | 1 | T | 5.0 | 10.500 | 120 | 10.801 | |
| to | | | | | | 0.0 | 5.000 | | 0.0 | |
| 4 | 98 | | 18.4 | 1.049 | | 0.0 | 15.500 | 0.1115 | 1.729 | Vel = 6.83 |
| | | | 0.0 | | | | | | | |
| 4 | | | 18.40 | | | | | | 12.530 | K Factor = 5.20 |
| 2 | 98 | 5.60 | 18.21 | 1 | 2E | 4.0 | 4.500 | 120 | 10.575 | |
| to | | | | | | 0.0 | 4.000 | | 0.0 | |
| 3 | 98 | | 18.21 | 1.049 | | 0.0 | 8.500 | 0.1094 | 0.930 | Vel = 6.76 |
| 3 | 98 | 5.60 | 19.00 | 1.25 | T | 6.0 | 3.500 | 120 | 11.505 | |
| to | | | | | | 0.0 | 6.000 | | 0.0 | |
| 4 | 98 | | 37.21 | 1.38 | | 0.0 | 9.500 | 0.1079 | 1.025 | Vel = 7.98 |
| 4 | 98 | | 18.40 | 1.25 | T | 6.0 | 2.000 | 120 | 12.530 | |
| to | | | | | | 0.0 | 6.000 | | 0.866 | |
| 50 | 96 | | 55.61 | 1.38 | | 0.0 | 8.000 | 0.2270 | 1.816 | Vel = 11.93 |
| | | | 0.0 | | | | | | | |
| 50 | | | 55.61 | | | | | | 15.212 | K Factor = 14.26 |
| 6 | 98 | 5.60 | 19.10 | 1 | T | 5.0 | 10.500 | 120 | 11.638 | |
| to | | | | | | 0.0 | 5.000 | | 0.0 | |
| 8 | 98 | | 19.1 | 1.049 | | 0.0 | 15.500 | 0.1195 | 1.853 | Vel = 7.09 |
| | | | 0.0 | | | | | | | |
| 8 | | | 19.10 | | | | | | 13.491 | K Factor = 5.20 |
| 7 | 98 | 5.60 | 19.73 | 1 | T | 5.0 | 3.500 | 120 | 12.413 | |
| to | | | | | | 0.0 | 5.000 | | 0.0 | |
| 8 | 98 | | 19.73 | 1.049 | | 0.0 | 8.500 | 0.1268 | 1.078 | Vel = 7.32 |
| 8 | 98 | | 19.10 | 1.25 | T | 6.0 | 2.000 | 120 | 13.491 | |
| to | | | | | | 0.0 | 6.000 | | 0.866 | |
| 51 | 96 | | 38.83 | 1.38 | | 0.0 | 8.000 | 0.1169 | 0.935 | Vel = 8.33 |
| | | | 0.0 | | | | | | | |
| 51 | | | 38.83 | | | | | | 15.292 | K Factor = 9.93 |
| 10 | 98 | 5.60 | 18.52 | 1 | T | 5.0 | 10.500 | 120 | 10.941 | |
| to | | | | | | 0.0 | 5.000 | | 0.0 | |
| 13 | 98 | | 18.52 | 1.049 | | 0.0 | 15.500 | 0.1130 | 1.751 | Vel = 6.88 |
| | | | 0.0 | | | | | | | |
| 13 | | | 18.52 | | | | | | 12.692 | K Factor = 5.20 |
| 11 | 98 | 5.60 | 18.00 | 1 | 3E | 6.0 | 6.500 | 120 | 10.332 | |
| to | | | | | | 0.0 | 6.000 | | 0.0 | |
| 12 | 98 | | 18.0 | 1.049 | | 0.0 | 12.500 | 0.1070 | 1.338 | Vel = 6.68 |
| 12 | 98 | 5.60 | 19.13 | 1.25 | T | 6.0 | 3.500 | 120 | 11.670 | |
| to | | | | | | 0.0 | 6.000 | | 0.0 | |
| 13 | 98 | | 37.13 | 1.38 | | 0.0 | 9.500 | 0.1076 | 1.022 | Vel = 7.96 |
| 13 | 98 | | 18.52 | 1.25 | T | 6.0 | 2.000 | 120 | 12.692 | |
| to | | | | | | 0.0 | 6.000 | | 0.866 | |
| 52 | 96 | | 55.65 | 1.38 | | 0.0 | 8.000 | 0.2272 | 1.818 | Vel = 11.94 |
| | | | 0.0 | | | | | | | |
| 52 | | | 55.65 | | | | | | 15.376 | K Factor = 14.19 |

| 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 ****** |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 98 | 5.60 | 18.41 | 1 | | 0.0 | 8.000 | 120 | 10.807 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 16 | 98 | | 18.41 | 1.049 | | 0.0 | 8.000 | 0.1116 | 0.893 | Vel = 6.83 |
| 16 | 98 | 5.60 | 19.15 | 1.25 | T | 6.0 | 5.250 | 120 | 11.700 | |
| to | | | | | | 0.0 | 6.000 | | 0.0 | |
| 20 | 98 | | 37.56 | 1.38 | | 0.0 | 11.250 | 0.1099 | 1.236 | Vel = 8.06 |
| | | | 0.0 | | | | | | | |
| 20 | | | 37.56 | | | | | | 12.936 | K Factor = 10.44 |
| 17 | 98 | 5.60 | 18.50 | 1 | | 0.0 | 9.000 | 120 | 10.919 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 18 | 98 | | 18.5 | 1.049 | | 0.0 | 9.000 | 0.1128 | 1.015 | Vel = 6.87 |
| 18 | 98 | 5.60 | 19.35 | 1.25 | T | 6.0 | 3.000 | 120 | 11.934 | |
| to | | | | | | 0.0 | 6.000 | | 0.0 | |
| 20 | 98 | | 37.85 | 1.38 | | 0.0 | 9.000 | 0.1113 | 1.002 | Vel = 8.12 |
| 20 | 98 | | 37.57 | 1.25 | T | 6.0 | 2.000 | 120 | 12.936 | |
| to | | | | | | 0.0 | 6.000 | | 0.866 | |
| 53 | 96 | | 75.42 | 1.38 | | 0.0 | 8.000 | 0.3989 | 3.191 | Vel = 16.18 |
| | | | 0.0 | | | | | | | |
| 53 | | | 75.42 | | | | | | 16.993 | K Factor = 18.30 |
| 21 | 98 | 5.60 | 20.76 | 1 | | 0.0 | 9.000 | 120 | 13.737 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 22 | 98 | | 20.76 | 1.049 | | 0.0 | 9.000 | 0.1393 | 1.254 | Vel = 7.71 |
| 22 | 98 | 5.60 | 21.68 | 1.25 | E | 3.0 | 5.000 | 120 | 14.991 | |
| to | | | | | T | 6.0 | 9.000 | | 0.866 | |
| 55 | 96 | | 42.44 | 1.38 | | 0.0 | 14.000 | 0.1377 | 1.928 | Vel = 9.10 |
| | | | 0.0 | | | | | | | |
| 55 | | | 42.44 | | | | | | 17.785 | K Factor = 10.06 |
| 50 | 96 | | 55.61 | 2.5 | | 0.0 | 8.170 | 120 | 15.212 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 51 | 96 | | 55.61 | 2.635 | | 0.0 | 8.170 | 0.0098 | 0.080 | Vel = 3.27 |
| 51 | 96 | | 38.83 | 2.5 | | 0.0 | 3.250 | 120 | 15.292 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 52 | 96 | | 94.44 | 2.635 | | 0.0 | 3.250 | 0.0258 | 0.084 | Vel = 5.56 |
| 52 | 96 | | 55.66 | 2.5 | 2I | 16.474 | 10.000 | 120 | 15.376 | |
| to | | | | | | 0.0 | 16.474 | | 0.0 | |
| 53 | 96 | | 150.1 | 2.635 | | 0.0 | 26.474 | 0.0611 | 1.617 | Vel = 8.83 |
| 53 | 96 | | 75.41 | 2.5 | | 0.0 | 5.000 | 120 | 16.993 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 54 | 96 | | 225.51 | 2.635 | | 0.0 | 5.000 | 0.1296 | 0.648 | Vel = 13.27 |
| 54 | 96 | | 0.0 | 3 | | 0.0 | 3.125 | 120 | 17.641 | |
| to | | | | | | 0.0 | 0.0 | | 0.0 | |
| 55 | 96 | | 225.51 | 3.26 | | 0.0 | 3.125 | 0.0461 | 0.144 | Vel = 8.67 |
| 55 | 96 | | 42.44 | 3 | 3I | 20.159 | 32.000 | 120 | 17.785 | |
| to | | | | | | 0.0 | 20.159 | | -0.217 | |
| TOR2 | 96.500 | | 267.95 | 3.26 | | 0.0 | 52.159 | 0.0633 | 3.300 | Vel = 10.30 |

EASTERN FIRE PROTECTION
UNE ALUMNI HALL RENOVATIONS



| 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 ****** |
|---|---|---|---|---|---|---|---|---|---|---|
| TOR2 | 96.500 | | 0.0 | 4 | S | 28.968 | 4.000 | 120 | 20.868 | |
| to | | | | | B | 15.8 | 71.102 | | 4.516 | * * Fixed Loss = 3 |
| BOR2 | 93 | | 267.95 | 4.26 | T | 26.334 | 75.102 | 0.0172 | 1.291 | Vel = 6.03 |
| | | | | | Fsp | 0.0 | | | | |
| BOR2 | 93 | | 0.0 | 6 | 3l | 37.72 | 4.000 | 120 | 26.675 | |
| to | | | | | | 0.0 | 37.720 | | 0.433 | |
| BFP | 92 | | 267.95 | 6.357 | | 0.0 | 41.720 | 0.0024 | 0.102 | Vel = 2.71 |
| BFP | 92 | | 0.0 | 6 | 2l | 25.147 | 15.000 | 120 | 27.210 | |
| to | | | | | Zma | 0.0 | 25.147 | | 5.024 | * * Fixed Loss = 5.024 |
| BASE | 92 | | 267.95 | 6.357 | | 0.0 | 40.147 | 0.0024 | 0.098 | Vel = 2.71 |
| BASE | 92 | | 0.0 | 6 | E | 20.084 | 25.000 | 140 | 32.332 | |
| to | | | | | T | 43.037 | 67.425 | | -1.299 | |
| UG1 | 95 | | 267.95 | 6.16 | G | 4.304 | 92.425 | 0.0021 | 0.198 | Vel = 2.88 |
| UG1 | 95 | H250 | 250.00 | 6 | 2T | 86.075 | 450.000 | 140 | 31.231 | |
| to | | | | | 2G | 8.607 | 94.682 | | 0.0 | |
| TEST | 95 | | 517.95 | 6.16 | | 0.0 | 544.682 | 0.0073 | 3.955 | Vel = 5.58 |
| | | | 0.0 | | | | | | | |
| TEST | | | 517.95 | | | | | | 35.186 | K Factor = 87.32 |