
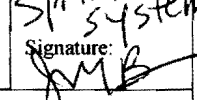


PERMIT ISSUED
 FEB 14 2011

Job No: 2011-01-290-FAFS	Date Applied: 1/18/2011	CBL: 014 - - K - 008 - 001 - - - - -	
Location of Construction: 13 EMERSON	Owner Name: MUNJOY COMMONS LP AVESTA	Owner Address: 307 CUMBERLAND AVE PORTLAND, ME - MAINE 04101	LANE
Business Name:	Contractor Name: Eastern Fire Protection Co., Inc, Eastern Fire Protection Co., Inc	Contractor Address: P.O Box 1390 AUBURNMAINE04211	Phone: 8014
Lessee/Buyer's Name:	Phone:	Permit Type: Fire Sprinkler - Fire Sprinkler - 1 & 2 Family	Zone: R-6
Past Use: 22 Residential Units	Proposed Use: 22 Residential Units	Cost of Work: 40000.00	CEO District:
		Fire Dept: <input checked="" type="checkbox"/> Approved w/conditions <input type="checkbox"/> Denied <input type="checkbox"/> N/A Signature: 	Inspection: Use Group: R-2 Type: Sprinkler system Signature: 
Proposed Project Description: 13 Emerson Multi-Family - Fire Sprinkler		Pedestrian Activities District (P.A.D.)	

Permit Taken By:	Zoning Approval		
1. This permit application does not preclude the Applicant(s) from meeting applicable State and Federal Rules. 2. Building Permits do not include plumbing, septic or electrical work. 3. Building permits are void if work is not started within six (6) months of the date of issuance. False informatin may invalidate a building permit and stop all work.	Special Zone or Reviews <input type="checkbox"/> Shoreland <input type="checkbox"/> Wetlands <input type="checkbox"/> Flood Zone <input type="checkbox"/> Subdivision <input type="checkbox"/> Site Plan <input type="checkbox"/> Maj <input type="checkbox"/> Min <input type="checkbox"/> MM Date: 1/20/11 Ok w/ conditions <i>AKU</i>	Zoning Appeal <input type="checkbox"/> Variance <input type="checkbox"/> Miscellaneous <input type="checkbox"/> Conditional Use <input type="checkbox"/> Interpretation <input type="checkbox"/> Approved <input type="checkbox"/> Denied Date:	Historic Preservation <input type="checkbox"/> Not in Dist or Landmark <input type="checkbox"/> Does not Require Review <input type="checkbox"/> Requires Review <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/Conditions <input type="checkbox"/> Denied Date:

CERTIFICATION

I hereby certify that I am the owner of record of the named property, or that the proposed work is authorized by the owner of record and that I have been authorized by the owner to make this application as his authorized agent and I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in the appication is issued, I certify that the code official's authorized representative shall have the authority to enter all areas covered by such permit at any reasonable hour to enforce the provision of the code(s) applicable to such permit.

SIGNATURE OF APPLICANT	ADDRESS	DATE	PHONE
RESPONSIBLE PERSON IN CHARGE OF WORK, TITLE	DATE	PHON	



EASTERN FIRE PROTECTION

P.O. Box 1390
Kittyhawk Ave.
Auburn, ME 04210

PH # (207) 784-1507
FAX # (207) 782-0566

LETTER OF TRANSMITTAL

DATE	1-11-11	JOB NO.	A04521
ATTENTION	Plans Review		
RE:	Emerson School Apartments		

TO Building Inspections, Portland City Hall
3rd Floor, 389 Congress Street
Portland, Maine 04101

WE ARE SENDING YOU Attached Under separate cover via _____ the following items:

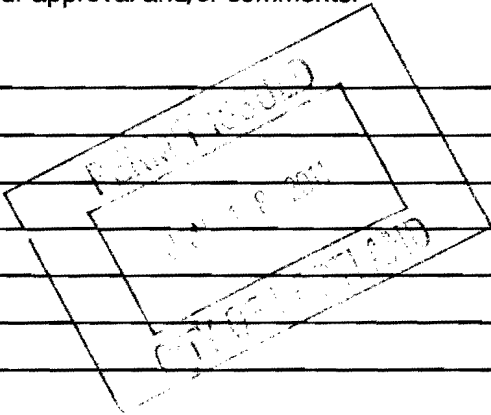
- Shop drawings
- Descriptive data
- Hydraulic calculations
- Copy of letter
- Literature
- Check & Permit App

QUANTITY	DRAWING NO.	DATE	DESCRIPTION	STATUS
1	1 of 2	1-11-11	Shop Drawing	C/E
1	2 of 2	1-11-11	Shop Drawing	C/E
1			Hydraulic Calculations (4)	C/E
1			Permit App	E
1			Check # 415.00	E

- Status code
- A. Approved
 - B. Approved as noted
 - C. Submitted for approval
 - D. Corrected & resubmitted
 - E. For your files
 - F. Refer to remarks

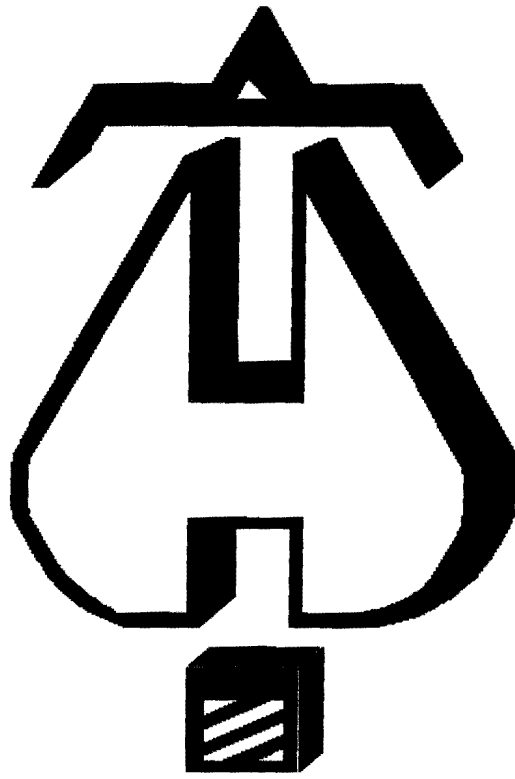
Please return written notification ~~copies each~~ indicating your approval and/or comments.

REMARKS _____



COPY TO State Fire Marshal, Allied Cook, File **SIGNED** Daniel R. G. Pierre

If enclosures are not as noted, kindly notify us at once



... Fire Protection by Computer Design

EASTERN FIRE PROTECTION
170 KITTYHAWK AVE.
AUBURN, MAINE 04210
207-784-1507

Job Name : EMERSON SCHOOL APARTMENTS THIRD FLOOR CALC
Drawing :
Location : 13 EMERSON STREET, PORTLAND, MAINE
Remote Area : WET
Contract : AU-4521-10
Data File : 4521MUNJOYEMERSON3RDFLR.WXF

HYDRAULIC DESIGN INFORMATION SHEET

Name - EMERSON SCHOOL APARTMENTS 3RD FLOOR CALC Date - 1/11/11
Location - 13 EMERSON STREET, PORTLAND, MAINE
Building - System No. - WET
Contractor - EASTERN FIRE PROTECTION Contract No. - AU-4521-10
Calculated By - DRS Drawing No. - 2 OF 2
Construction: (X) Combustible () Non-Combustible Ceiling Height 7'-8"
OCCUPANCY - RESIDENTIAL

S Type of Calculation: ()NFPA 13 Residential (X)NFPA 13R ()NFPA 13D
Y Number of Sprinklers Flowing: ()1 ()2 (X)4 ()
S ()Other
T ()Specific Ruling Made by Date

E
M Listed Flow at Start Point - 16 Gpm System Type
Listed Pres. at Start Point - 14.5 Psi (X) Wet () Dry
D MAXIMUM LISTED SPACING 16 x 16 () Deluge () PreAction
E Domestic Flow Added - Gpm Sprinkler or Nozzle
S Additional Flow Added - Gpm Make TYCO Model LF-II
I Elevation at Highest Outlet - 134.5Feet Size 1/2 K-Factor 4.2
G Note: Temperature Rating 155
N

Calculation Gpm Required 71.1 Psi Required 66.7 At Test
Summary C-Factor Used: Overhead 120 Underground 140

W Water Flow Test: Pump Data: Tank or Reservoir:
A Date of Test - 7/26/06 Rated Cap. Cap.
T Time of Test - @ Psi Elev.
E Static (Psi) - 72 Elev.
R Residual (Psi) - 68 Other Well
Flow (Gpm) - 903 Proof Flow Gpm
S Elevation - 68.125

P Location: CORNER OF MORNING AND TURNER STREETS

P Source of Information: PORTLAND WATER DISTRICT

L
Y

BUILDING PERMIT INSPECTION PROCEDURES

Please call 874-8703 or 874-8693 (ONLY)

or email: buildinginspections@portlandmaine.gov

With the issuance of this permit, the owner, builder or their designee is required to provide adequate notice to the city of Portland Inspections Services for the following inspections. Appointments must be requested 48 to 72 hours in advance of the required inspection. The inspection date will need to be confirmed by this office.

- **Please read the conditions of approval that is attached to this permit!! Contact this office if you have any questions.**
- **Permits expire in 6 months. If the project is not started or ceases for 6 months.**
- **If the inspection requirements are not followed as stated below additional fees may be incurred due to the issuance of a "Stop Work Order" and subsequent release to continue.**

1. Close In Plumbing
2. Final at completion of work

The project cannot move to the next phase prior to the required inspection and approval to continue, REGARDLESS OF THE NOTICE OF CIRCUMSTANCES.

IF THE PERMIT REQUIRES A CERTIFICATE OF OCCUPANCY, IT MUST BE PAID FOR AND ISSUED TO THE OWNER OR DESIGNEE BEFORE THE SPACE MAY BE OCCUPIED.



PORTLAND MAINE

Strengthening a Remarkable City, Building a Community for Life • www.portlandmaine.gov

Director of Planning and Urban Development
Penny St. Louis Littell

Job ID: 2011-01-290-FAFS

Located At: 13 EMERSON

CBL014 - - K - 008 - 001 - - - -

Conditions of Approval:

Zoning

1. This permit is being approved on the basis of plans submitted. Any deviations shall require a separate approval before starting that work.
2. This property shall remain a twenty-two (22) family dwelling. Any change of use shall require a separate permit application for review and approval.

Fire

1. Sprinkler protection shall be maintained.
2. Where the system is to be shut down for maintenance or repair, the system shall be checked at the end of each day to insure the system has been placed back in service.
3. The sprinkler system shall be installed in accordance with NFPA 13.
4. Application requires State Fire Marshal approval.
5. The Fire Department will require Knox locking caps on all Fire Department Connections on the exterior of the building.
6. Installation of a sprinkler or fire alarm system requires a Knox Box to be installed per city ordinance.
7. Fire department connection type and location shall be approved in writing by fire prevention bureau.
8. The Fire alarm and Sprinkler systems shall be reviewed by a licensed contractor[s] for code compliance. Compliance letters are required.

Building

1. Sprinkler systems to be designed and installed per IBC 2009 standards Sec. 903.3



**PORTLAND FIRE DEPARTMENT
Sprinkler Plan Review Request Form**

CBL#: 14-K8 Date: _____

Fire Marshal's Permit No: _____

Address of Property where Alarm System will be Installed: Emerson School Apartments
13 Emerson Street
 Property Owner: Avesta, Munjoy Commons Phone No: (207) 553-7780
 Owner's Address: 307 Cumberland Ave Fax No: _____
Portland, ME 04101 Email: _____
 Contractor Name: Eastern Fire Protection Phone: (207) 784-1507
 Address: 170 Kittyhawk Ave Fax No: _____
Auburn, ME 04210 Email: _____

Type of System: 13 13D 13R Life Safety
System Design: Wet Dry Pre-Action Deluge

Number and Location of Zones: One Zone Tenant Fit-up

System Monitoring: Water Flow Tamper Low Air

All sprinkler plans must be reviewed and approved by the State Fire Marshal prior to submission to the Portland Fire Department.
 All sprinkler systems must meet or exceed the requirements of NFPA and the Portland Fire Department Sprinkler Ordinance, Chapter 305.

Sprinkler plans, including all applicable hydraulic calculations, must be submitted 10 days prior to scheduled meeting.

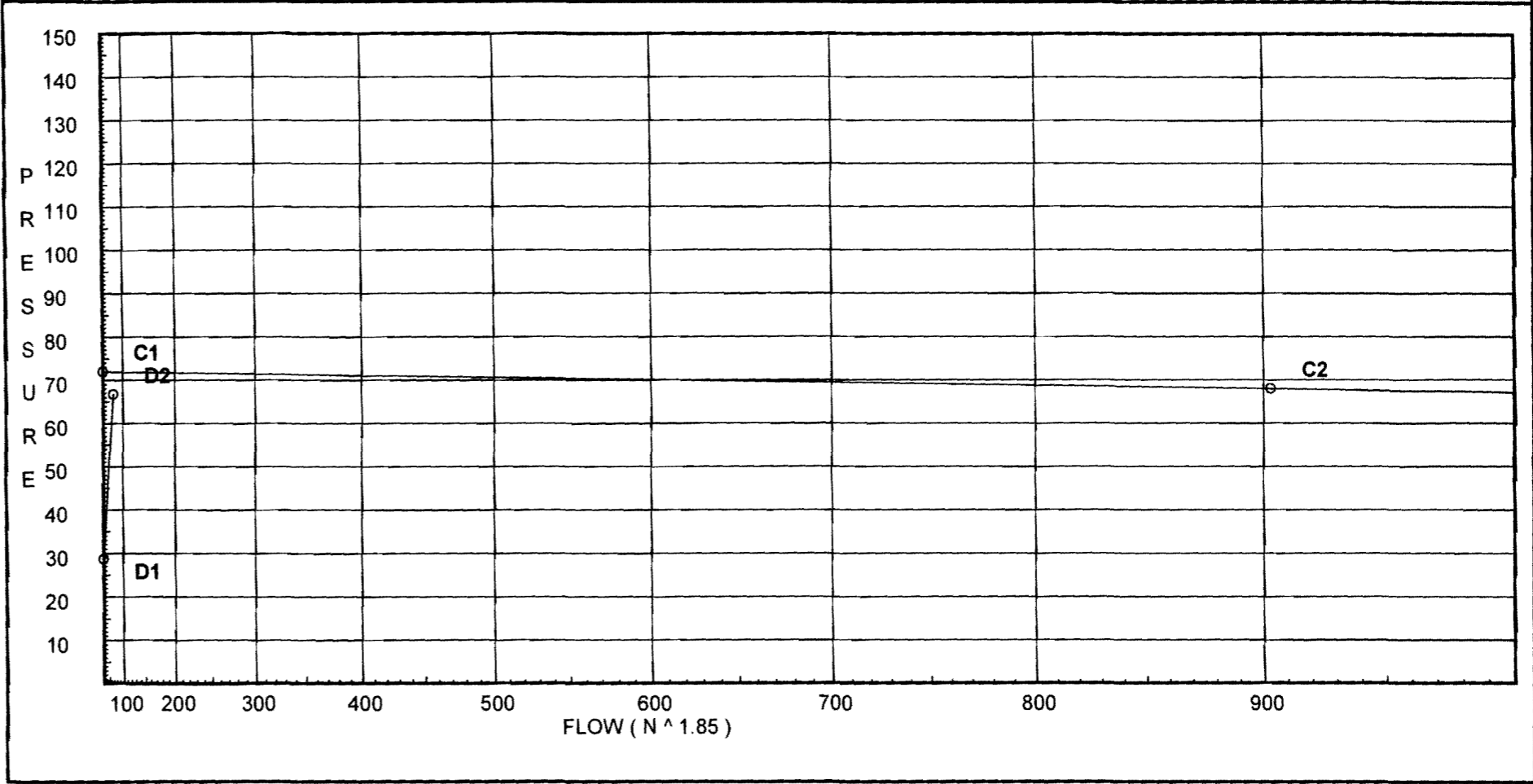
Fire Department Use Only

Applicant: _____ Date: _____
 Fire Chief: _____ Date: _____
 FD HTE #: _____

Water Supply Curve (C)

EASTERN FIRE PROTECTION
EMERSON SCHOOL APARTMENTS THIRD FLOOR CALC

City Water Supply:	Demand:
C1 - Static Pressure : 72	D1 - Elevation : 28.747
C2 - Residual Pressure: 68	D2 - System Flow : 71.086
C2 - Residual Flow : 903	D2 - System Pressure : 66.744
	Hose (Demand) :
	D3 - System Demand : 71.086
	Safety Margin : 5.220



Fittings Used Summary

**EASTERN FIRE PROTECTION
EMERSON SCHOOL APARTMENTS THIRD FLOOR CALC**

**Page 3
Date**

Fitting Legend		½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24	
Abbrev.	Name																					
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	
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	72.0	68	903.0	71.964	71.09	66.744

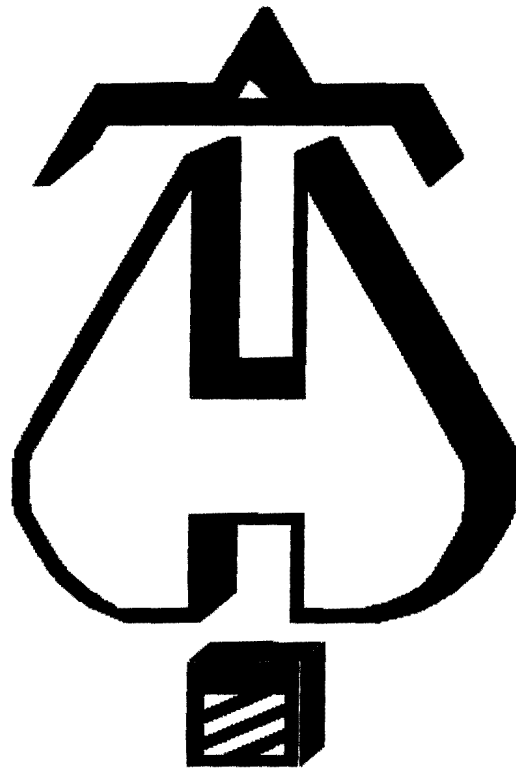
NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
DRP1	0.0	4.9	7.0	12.96	
S1	134.5	4.2	14.62	16.06	
S2	134.5	4.2	14.5	15.99	
S2A	134.5		15.58		
S3	134.5	4.2	16.24	16.92	
SA	134.5		17.38		
SB	134.5		19.09		
SC	122.67		25.56		
SD	122.67		30.31		
SE	109.0		37.39		
SF	97.17		43.86		
D	97.17		44.68		
E	97.17		45.69		
F	97.17		45.89		
G	97.17		46.09		
S4	134.5	4.2	27.71	22.11	
S4A	134.5		29.08		
S4B	134.5		29.32		
RG	134.5		29.6		
RH	134.5		29.69		
RI	122.67		34.9		
RJ	122.67		34.96		
RK	109.0		40.91		
RL	97.84		45.77		
H	97.17		46.15		
I	97.17		46.19		
J	96.0		46.8		
TOR	95.17		47.22		
BFP	94.76		47.46		
BASE	93.92		55.53		
CRE	88.92		57.72		
TEST	68.125		66.74		

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	*****
DRP1 to LIN1	0 0	4.90	12.96 12.96	1 1.049	1T	5.0 0.0 0.0	0.830 5.000 5.830	120 0.0583	7.000 0.0 0.340			Vel = 4.81
LIN1			0.0 12.96						7.340		K Factor = 4.78	
S1 to S2A	134.500 134.500	4.20	16.06 16.06	1 1.049	1E	2.0 0.0 0.0	9.040 2.000 11.040	120 0.0867	14.622 0.0 0.957			Vel = 5.96
S2A			0.0 16.06						15.579		K Factor = 4.07	
S2 to S2A	134.500 134.500	4.20	15.99 15.99	1 1.049	1T	5.0 0.0 0.0	7.540 5.000 12.540	120 0.0860	14.500 0.0 1.079			Vel = 5.94
S2A to SA	134.500 134.500		16.06 32.05	1 1.049	1T	5.0 0.0 0.0	0.790 5.000 5.790	120 0.3114	15.579 0.0 1.803			Vel = 11.90
SA			0.0 32.05						17.382		K Factor = 7.69	
S3 to SA	134.500 134.500	4.20	16.92 16.92	1 1.049	1T	5.0 0.0 0.0	7.000 5.000 12.000	120 0.0955	16.236 0.0 1.146			Vel = 6.28
SA to SB	134.500 134.500		32.06 48.98	1.5	2E	8.0 0.0 0.0	12.170 8.000 20.170	120 0.0847	17.382 0.0 1.709			Vel = 7.72
SB to SC	134.500 122.670		0.0 48.98	1.5	1E	4.0 0.0 0.0	11.830 4.000 15.830	120 0.0846	19.091 5.124 1.340			Vel = 7.72
SC to SD	122.670 122.670		0.0 48.98	1.5	2E 2T	8.0 16.0 0.0	32.170 24.000 56.170	120 0.0847	25.555 0.0 4.758			Vel = 7.72
SD to SE	122.670 109		0.0 48.98	1.5		0.0 0.0 0.0	13.670 0.0 13.670	120 0.0847	30.313 5.920 1.158			Vel = 7.72
SE to SF	109 97.170		0.0 48.98	1.5	1E	4.0 0.0 0.0	11.830 4.000 15.830	120 0.0846	37.391 5.124 1.340			Vel = 7.72
SF to D	97.170 97.170		0.0 48.98	1.5	1T	8.0 0.0 0.0	1.790 8.000 9.790	120 0.0848	43.855 0.0 0.830			Vel = 7.72
D to E	97.170 97.170		0.0 48.98	2 2.067	2E 1T	10.0 10.0 0.0	20.000 20.000 40.000	120 0.0251	44.685 0.0 1.003			Vel = 4.68
E to F	97.170 97.170		0.0 48.98	2.5		0.0 0.0 0.0	19.290 0.0 19.290	120 0.0106	45.688 0.0 0.204			Vel = 3.28
F to G	97.170 97.170		0.0 48.98	3 3.068	1E 1T	7.0 15.0 0.0	32.375 22.000 54.375	120 0.0037	45.892 0.0 0.199			Vel = 2.13

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	*****
G to H	97.170 97.170		0.0 48.98	4 4.026	2T 0.0 0.0	40.0 0.0 61.500	120 0.0010	46.091 0.0 0.060			Vel = 1.23
H			0.0 48.98					46.151		K Factor = 7.21	
S4 to S4A	134.500 134.500	4.20	22.11 22.11	1 1.049	1T 0.0 0.0	5.0 0.0 8.710	120 0.1566	27.713 0.0 1.364			Vel = 8.21
S4A to S4B	134.500 134.500		0.0 22.11	1.5 1.61	1T 0.0 0.0	8.0 0.0 12.460	120 0.0195	29.077 0.0 0.243			Vel = 3.48
S4B to RG	134.500 134.500		0.0 22.11	1.5 1.61	1T 0.0 0.0	8.0 0.0 14.375	120 0.0194	29.320 0.0 0.279			Vel = 3.48
RG to RH	134.500 134.500		0.0 22.11	2 2.157	1T 0.0 0.0	12.307 0.0 18.887	120 0.0047	29.599 0.0 0.089			Vel = 1.94
RH to RI	134.500 122.670		0.0 22.11	2 2.157	1E 0.0 0.0	6.153 0.0 17.983	120 0.0046	29.688 5.124 0.083			Vel = 1.94
RI to RJ	122.670 122.670		0.0 22.11	2 2.157	1T 0.0 0.0	12.307 0.0 14.137	120 0.0047	34.895 0.0 0.067			Vel = 1.94
RJ to RK	122.670 109		0.0 22.11	2.5 2.635		0.0 0.0 13.670	120 0.0018	34.962 5.920 0.024			Vel = 1.30
RK to RL	109 97.840		0.0 22.11	2.5 2.635	1E 0.0 0.0	8.237 0.0 19.407	120 0.0018	40.906 4.833 0.035			Vel = 1.30
RL to H	97.840 97.170		0.0 22.11	2.5 2.635	1E 2T 0.0	8.237 32.948 41.185 49.265	120 0.0018	45.774 0.290 0.087			Vel = 1.30
H to I	97.170 97.170		48.98 71.09	4 4.26	2L 0.0 0.0	15.8 0.0 23.925	120 0.0015	46.151 0.0 0.035			Vel = 1.60
I to J	97.170 96		0.0 71.09	4 4.26	3L 1T 0.0	23.701 26.334 50.035 70.705	120 0.0015	46.186 0.507 0.104			Vel = 1.60
J to TOR	96 95.170		0.0 71.09	4 4.26	3L 0.0 0.0	23.701 0.0 40.326	120 0.0015	46.797 0.359 0.060			Vel = 1.60
TOR to BFP	95.170 94.760		0.0 71.09	4 4.26	5L 0.0 0.0	39.501 0.0 47.091	120 0.0015	47.216 0.178 0.070			Vel = 1.60
BFP to BASE	94.760 93.920		0.0 71.09	4 4.26	2L 1Zca 0.0	15.8 0.0 20.050	120 0.0014	47.464 8.036 0.029		* Fixed loss = 7.672	Vel = 1.60
BASE to CRE	93.920 88.920		0.0 71.09	5 5.295	3L 0.0 0.0	30.316 0.0 40.691	120 0.0005	55.529 2.166 0.021			Vel = 1.04

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	*****
CRE to TEST	88.920 68.125		0.0 71.09	6 6.16	2L 1G 1T	25.822 4.304 43.037	45.000 73.163 118.163	140 0.0002	57.716 9.006 0.022		Vel = 0.77	
TEST			0.0 71.09						66.744		K Factor = 8.70	



... Fire Protection by Computer Design

EASTERN FIRE PROTECTION
170 KITTYHAWK AVE.
AUBURN, MAINE 04210
207-784-1507

Job Name : EMERSON SCHOOL APARTMENTS FOURTH FLOOR CALC
Drawing :
Location : 13 EMERSON STREET, PORTLAND, MAINE
Remote Area : WET
Contract : AU-4521-10
Data File : 4521MUNJOYEMERSON4THFLR.WXF

HYDRAULIC DESIGN INFORMATION SHEET

Name - EMERSON SCHOOL APARTMENTS 4TH FLOOR CALC Date - 1/11/11
Location - 13 EMERSON STREET, PORTLAND, MAINE
Building - System No. - WET
Contractor - EASTERN FIRE PROTECTION Contract No. - AU-4521-10
Calculated By - DRS Drawing No. - 2 OF 2
Construction: (X) Combustible () Non-Combustible Ceiling Height 7'-11"
OCCUPANCY - RESIDENTIAL

S Type of Calculation: ()NFPA 13 Residential (X)NFPA 13R ()NFPA 13D
Y Number of Sprinklers Flowing: ()1 ()2 (X)4 ()
S ()Other
T ()Specific Ruling Made by Date
E
M Listed Flow at Start Point - 13 Gpm System Type
Listed Pres. at Start Point - 7 Psi (X) Wet () Dry
D MAXIMUM LISTED SPACING 16 x 16 () Deluge () PreAction
E Domestic Flow Added - Gpm Sprinkler or Nozzle
S Additional Flow Added - Gpm Make TYCO Model LF-II
I Elevation at Highest Outlet - 144 Feet Size 1/2 K-Factor 4.9
G Note: Temperature Rating 155
N

Calculation Gpm Required 59.3 Psi Required 66.8 At Test
Summary C-Factor Used: Overhead 120 Underground 140

W Water Flow Test: Pump Data: Tank or Reservoir:
A Date of Test - 7/26/06 Rated Cap. Cap.
T Time of Test - @ Psi Elev.
E Static (Psi) - 72 Elev.
R Residual (Psi) - 68 Other Well
S Flow (Gpm) - 903 Proof Flow Gpm
Elevation - 68.125

P Location: CORNER OF MORNING AND TURNER STREETS

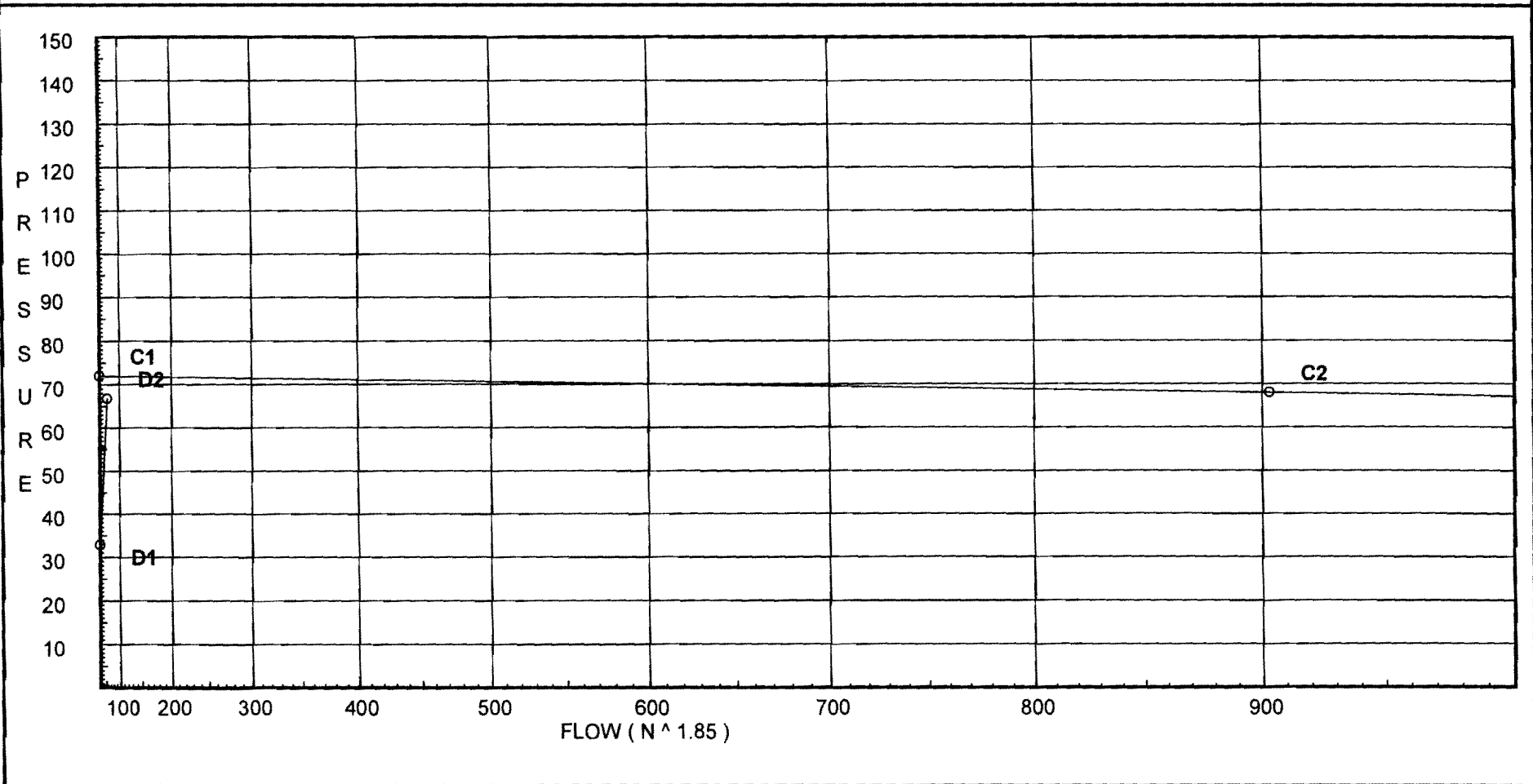
P Source of Information: PORTLAND WATER DISTRICT

L
Y

Water Supply Curve (C)

EASTERN FIRE PROTECTION
EMERSON SCHOOL APARTMENTS FOURTH FLOOR CALC

City Water Supply:		Demand:	
C1 - Static Pressure	: 72	D1 - Elevation	: 32.861
C2 - Residual Pressure	: 68	D2 - System Flow	: 59.316
C2 - Residual Flow	: 903	D2 - System Pressure	: 66.805
		Hose (Demand)	: _____
		D3 - System Demand	: 59.316
		Safety Margin	: 5.169



Fittings Used Summary

**EASTERN FIRE PROTECTION
EMERSON SCHOOL APARTMENTS FOURTH FLOOR CALC**

Page 3
Date

Fitting Legend		½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24	
Abbrev.	Name																					
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	
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	
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

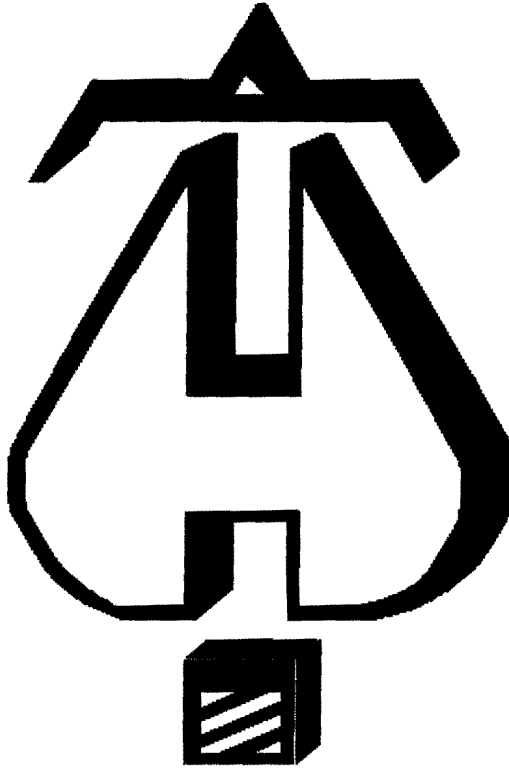
<i>Node at Source</i>	<i>Static Pressure</i>	<i>Residual Pressure</i>	<i>Flow</i>	<i>Available Pressure</i>	<i>Total Demand</i>	<i>Required Pressure</i>
TEST	72.0	68	903.0	71.974	59.32	66.805

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>
DRP1	0.0	4.9	7.0	12.96	
R1	144.0	4.79	11.19	16.01	K=K @ LIN1
RA	143.83		13.19		
R2	144.0	4.79	7.34	12.96	K=K @ LIN1
R3	144.0	4.79	8.25	13.74	K=K @ LIN1
RB	143.83		13.28		
R4	144.0	4.79	12.04	16.6	K=K @ LIN1
RC	143.83		13.99		
RD	143.83		16.01		
RE	135.34		21.42		
RF	134.5		23.42		
RG	134.5		24.69		
RH	134.5		25.24		
RI	122.67		30.89		
RJ	122.67		31.3		
RK	109.0		37.37		
RL	97.84		42.41		
H	97.17		43.24		
I	97.17		43.27		
J	96.0		43.85		
TOR	95.17		44.25		
BFP	94.76		47.48		
BASE	93.92		55.6		
CRE	88.92		57.78		
TEST	68.125		66.81		

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	*****
DRP1 to LIN1	0 0	4.90	12.96 12.96	1 1.049	1T	5.0 0.0 0.0	0.830 5.000 5.830	120 0.0583	7.000 0.0 0.340			Vel = 4.81
LIN1			0.0 12.96						7.340		K Factor = 4.78	
R1 to RA	144 143.830	4.79	16.01 16.01	1 1.049	1T	5.0 0.0 0.0	17.330 5.000 22.330	120 0.0862	11.191 0.074 1.924		K = K @ LIN1	Vel = 5.94
RA to RB	143.830 143.830		0.0 16.01	1.5 1.61		0.0 0.0 0.0	8.670 0.0 8.670	120 0.0107	13.189 0.0 0.093			Vel = 2.52
RB			0.0 16.01						13.282		K Factor = 4.39	
R2 to R3	144 144	4.79	12.96 12.96	1 1.049	1E	2.0 0.0 0.0	13.540 2.000 15.540	120 0.0584	7.340 0.0 0.907		K = K @ LIN1	Vel = 4.81
R3 to RB	144 143.830	4.79	13.75 26.71	1 1.049	1T	5.0 0.0 0.0	17.330 5.000 22.330	120 0.2222	8.247 0.074 4.961		K = K @ LIN1	Vel = 9.92
RB to RC	143.830 143.830		16.00 42.71	1.5 1.61		0.0 0.0 0.0	10.790 0.0 10.790	120 0.0657	13.282 0.0 0.709			Vel = 6.73
RC			0.0 42.71						13.991		K Factor = 11.42	
R4 to RC	144 143.830	4.79	16.60 16.6	1 1.049	1T	5.0 0.0 0.0	15.370 5.000 20.370	120 0.0922	12.039 0.074 1.878		K = K @ LIN1	Vel = 6.16
RC to RD	143.830 143.830		42.72 59.32	1.5 1.61	1T	8.0 0.0 0.0	8.750 8.000 16.750	120 0.1207	13.991 0.0 2.022			Vel = 9.35
RD to RE	143.830 135.340		0.0 59.32	1.5 1.61	1E	4.0 0.0 0.0	10.330 4.000 14.330	120 0.1207	16.013 3.677 1.730			Vel = 9.35
RE to RF	135.340 134.500		0.0 59.32	1.5 1.61	1E 1T	4.0 8.0 0.0	1.580 12.000 13.580	120 0.1208	21.420 0.364 1.640			Vel = 9.35
RF to RG	134.500 134.500		0.0 59.32	1.5 1.61	1T	8.0 0.0 0.0	2.500 8.000 10.500	120 0.1207	23.424 0.0 1.267			Vel = 9.35
RG to RH	134.500 134.500		0.0 59.32	2 2.157	1T	12.307 0.0 0.0	6.580 12.307 18.887	120 0.0291	24.691 0.0 0.549			Vel = 5.21
RH to RI	134.500 122.670		0.0 59.32	2 2.157	1E	6.153 0.0 0.0	11.830 6.153 17.983	120 0.0290	25.240 5.124 0.522			Vel = 5.21
RI to RJ	122.670 122.670		0.0 59.32	2 2.157	1T	12.307 0.0 0.0	1.830 12.307 14.137	120 0.0291	30.886 0.0 0.411			Vel = 5.21

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	*****
RJ to RK	122.670 109		0.0 59.32	2.5 2.635		0.0 0.0 13.670	120 0.0110	31.297 5.920 0.150		Vel = 3.49	
RK to RL	109 97.840		0.0 59.32	2.5 2.635	1E 0.0	8.237 8.237 11.170	120 0.0110	37.367 4.833 0.213		Vel = 3.49	
RL to H	97.840 97.170		0.0 59.32	2.5 2.635	1E 2T 8.237	8.080 32.948 41.185	120 0.0110	42.413 0.290 0.540		Vel = 3.49	
H to I	97.170 97.170		0.0 59.32	4 4.26	2L 0.0	15.8 8.125 15.800	120 0.0010	43.243 0.0 0.025		Vel = 1.34	
I to J	97.170 96		0.0 59.32	4 4.26	3L 1T 23.701	20.670 26.334 50.035	120 0.0011	43.268 0.507 0.075		Vel = 1.34	
J to TOR	96 95.170		0.0 59.32	4 4.26	3L 0.0	23.701 16.625 23.701	120 0.0011	43.850 0.359 0.043		Vel = 1.34	
TOR to BFP	95.170 94.760		0.0 59.32	4 4.26	5L 1Fsp 39.501	7.590 0.0 39.501	120 0.0010	44.252 3.178 0.049		* Fixed loss = 3 Vel = 1.34	
BFP to BASE	94.760 93.920		0.0 59.32	4 4.26	2L 1Zca 15.8	4.250 0.0 15.800	120 0.0010	47.479 8.103 0.021		* Fixed loss = 7.739 Vel = 1.34	
BASE to CRE	93.920 88.920		0.0 59.32	5 5.295	3L 0.0	30.316 10.375 30.316	120 0.0004	55.603 2.166 0.015		Vel = 0.86	
CRE to TEST	88.920 68.125		0.0 59.32	6 6.16	2L 1G 25.822	45.000 4.304 73.163	140 0.0001	57.784 9.006 0.015		Vel = 0.64	
TEST			0.0 59.32					66.805		K Factor = 7.26	



... Fire Protection by Computer Design

EASTERN FIRE PROTECTION
170 KITTYHAWK AVE.
AUBURN, MAINE 04210
207-784-1507

Job Name : EMERSON SCHOOL APARTMENTS SECOND FLOOR CALC
Drawing :
Location : 13 EMERSON STREET, PORTLAND, MAINE
Remote Area : WET
Contract : AU-4521-10
Data File : 4521MUNJOYEMERSON2NDFLR.WXF

HYDRAULIC DESIGN INFORMATION SHEET

Name - EMERSON SCHOOL APARTMENTS 2ND FLOOR CALC Date - 1/11/11
Location - 13 EMERSON STREET, PORTLAND, MAINE
Building - System No. - WET
Contractor - EASTERN FIRE PROTECTION Contract No. - AU-4521-10
Calculated By - DRS Drawing No. - 1 OF 2
Construction: (X) Combustible () Non-Combustible Ceiling Height 8'-0"
OCCUPANCY - RESIDENTIAL

S Type of Calculation: ()NFPA 13 Residential (X)NFPA 13R ()NFPA 13D
Y Number of Sprinklers Flowing: ()1 ()2 ()4 (X)3
S ()Other
T ()Specific Ruling Made by Date
E
M Listed Flow at Start Point - 19 Gpm System Type
Listed Pres. at Start Point - 20.5 Psi (X) Wet () Dry
D MAXIMUM LISTED SPACING 16 x 18 () Deluge () PreAction
E Domestic Flow Added - Gpm Sprinkler or Nozzle
S Additional Flow Added - Gpm Make TYCO Model LF-II
I Elevation at Highest Outlet - 125.17Feet Size 1/2 K-Factor 4.2
G Note: Temperature Rating 155
N

Calculation Summary Gpm Required 65.6 C-Factor Used: Psi Required 64 Overhead 120 At Test Underground 140

W Water Flow Test: Pump Data: Tank or Reservoir:
A Date of Test - 7/26/06 Rated Cap. Cap.
T Time of Test - @ Psi Elev.
E Static (Psi) - 72 Elev.
R Residual (Psi) - 68 Other Well
Flow (Gpm) - 903 Proof Flow Gpm
S Elevation - 68.125

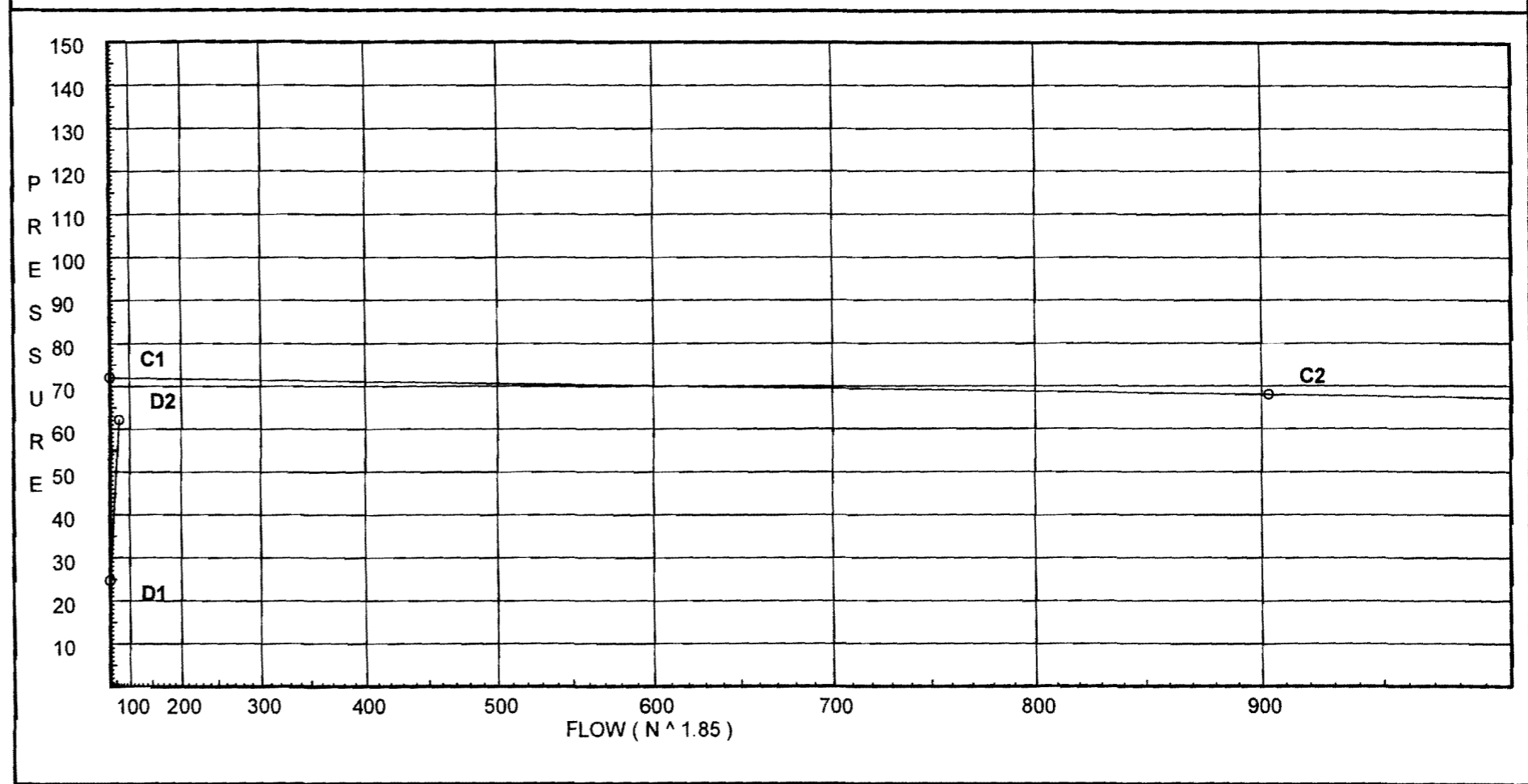
P Location: CORNER OF MORNING AND TURNER STREETS

L Source of Information: PORTLAND WATER DISTRICT
Y

Water Supply Curve (C)

EASTERN FIRE PROTECTION
EMERSON SCHOOL APARTMENTS SECOND FLOOR CALC

City Water Supply:		Demand:	
C1 - Static Pressure	: 72	D1 - Elevation	: 24.706
C2 - Residual Pressure	: 68	D2 - System Flow	: 66.21
C2 - Residual Flow	: 903	D2 - System Pressure	: 62.177
		Hose (Demand)	: _____
		D3 - System Demand	: 66.21
		Safety Margin	: 9.791



Fittings Used Summary

**EASTERN FIRE PROTECTION
EMERSON SCHOOL APARTMENTS SECOND FLOOR CALC**

Page 3
Date

Fitting Legend		½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
Abbrev.	Name																				
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	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
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

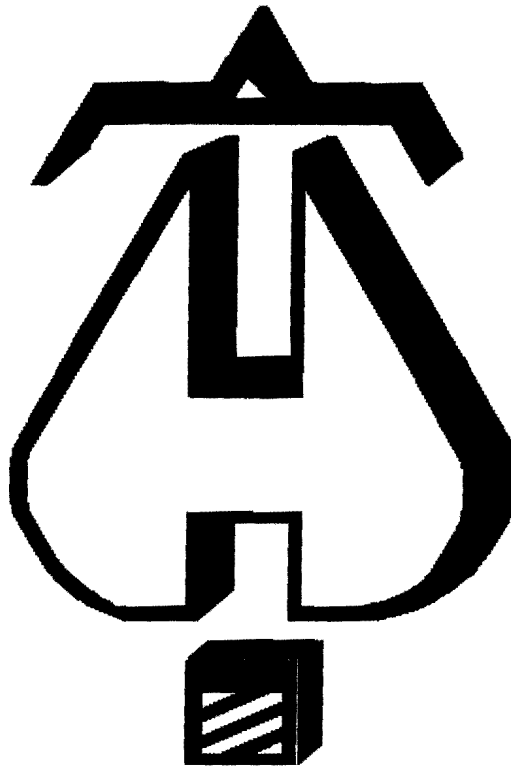
<i>Node at Source</i>	<i>Static Pressure</i>	<i>Residual Pressure</i>	<i>Flow</i>	<i>Available Pressure</i>	<i>Total Demand</i>	<i>Required Pressure</i>
TEST	72.0	68	903.0	71.968	66.21	62.177

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>
DRP1	0.0	4.9	7.0	12.96	
P1	125.17	4.2	20.5	19.02	
P2	121.84	4.79	23.47	23.18	K=K @ LIN1
P3	121.84	4.79	25.18	24.01	K=K @ LIN1
PA	122.67		25.19		
PB	122.67		25.45		
PC	109.0		33.4		
PD	97.17		41.45		
G	97.17		41.49		
H	97.17		41.6		
I	97.17		41.63		
J	96.0		42.23		
TOR	95.17		42.64		
BFP	94.76		42.88		
BASE	93.92		50.97		
CRE	88.92		53.15		
TEST	68.125		62.18		

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	*****
DRP1 to LIN1	0 0	4.90	12.96 12.96	1 1.049	1T 5.0 0.0	0.830 5.000 5.830	120 0.0583	7.000 0.0 0.340			Vel = 4.81
LIN1			0.0 12.96					7.340			K Factor = 4.78
P1 to P2	125.170 121.840	4.20	19.02 19.02	1 1.049	2E 4.0 0.0	8.875 4.000 12.875	120 0.1185	20.500 1.442 1.526			Vel = 7.06
P2 to PB	121.840 122.670	4.79	23.18 42.2	1.25 1.38	1E 3.0 6.0 1T	8.210 9.000 17.210	120 0.1362	23.468 -0.359 2.344			K = K @ LIN1 Vel = 9.05
PB			0.0 42.20					25.453			K Factor = 8.36
P3 to PA	121.840 122.670	4.79	24.01 24.01	1.5 1.61	1T 8.0 0.0	8.375 8.000 16.375	120 0.0227	25.182 -0.359 0.371			K = K @ LIN1 Vel = 3.78
PA to PB	122.670 122.670		0.0 24.01	1.5 1.61	1T 8.0 0.0	3.460 8.000 11.460	120 0.0226	25.194 0.0 0.259			Vel = 3.78
PB to PC	122.670 109		42.20 66.21	1.5 1.61	0.0 0.0 0.0	13.670 0.0 13.670	120 0.1480	25.453 5.920 2.023			Vel = 10.43
PC to PD	109 97.170		0.0 66.21	1.5 1.61	1T 8.0 0.0	11.830 8.000 19.830	120 0.1480	33.396 5.124 2.934			Vel = 10.43
PD to G	97.170 97.170		0.0 66.21	3 3.068	0.0 0.0 0.0	6.330 0.0 6.330	120 0.0063	41.454 0.0 0.040			Vel = 2.87
G to H	97.170 97.170		0.0 66.21	4 4.026	2T 40.0 0.0	21.500 40.000 61.500	120 0.0017	41.494 0.0 0.105			Vel = 1.67
H to I	97.170 97.170		0.0 66.21	4 4.26	2L 15.8 0.0	8.125 15.800 23.925	120 0.0013	41.599 0.0 0.031			Vel = 1.49
I to J	97.170 96		0.0 66.21	4 4.26	3L 23.701 26.334 1T	20.670 50.035 70.705	120 0.0013	41.630 0.507 0.091			Vel = 1.49
J to TOR	96 95.170		0.0 66.21	4 4.26	3L 23.701 0.0	16.625 23.701 40.326	120 0.0013	42.228 0.359 0.053			Vel = 1.49
TOR to BFP	95.170 94.760		0.0 66.21	4 4.26	5L 39.501 0.0	7.590 39.501 47.091	120 0.0013	42.640 0.178 0.060			Vel = 1.49
BFP to BASE	94.760 93.920		0.0 66.21	4 4.26	2L 15.8 1Zca 0.0	4.250 15.800 20.050	120 0.0013	42.878 8.064 0.026			* Fixed loss = 7.7 Vel = 1.49
BASE to CRE	93.920 88.920		0.0 66.21	5 5.295	3L 30.316 0.0	10.375 30.316 40.691	120 0.0004	50.968 2.166 0.018			Vel = 0.96

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	*****
CRE to TEST	88.920 68.125		0.0 66.21	6 6.16	2L 1G 1T	25.822 4.304 43.037	45.000 73.163 118.163	140 0.0002	53.152 9.006 0.019	Vel = 0.71	
TEST			0.0 66.21						62.177	K Factor = 8.40	



... Fire Protection by Computer Design

EASTERN FIRE PROTECTION
170 KITTYHAWK AVE.
AUBURN, MAINE 04210
207-784-1507

Job Name : EMERSON SCHOOL APARTMENTS BASEMENT CALC
Drawing : 1 OF 2
Location : 13 EMERSON STREET, PORTLAND, MAINE
Remote Area :
Contract : AU-4521-10
Data File : 4521MUNJOYEMERSONBASEMENT.WXF

HYDRAULIC CALCULATIONS
for

Project name: EMERSON SCHOOL APARTMENTS BASEMENT CALC
Location: 13 EMERSON STREET, PORTLAND, MAINE
Drawing no: 1 OF 2
Date: 1/11/11

Design

Remote area number:
Remote area location: BASEMENT BOILER ROOM
Occupancy classification: ORDINARY HAZARD I
Density: .15 - Gpm/SqFt
Area of application: 920 - SqFt
Coverage per sprinkler: 128 - SqFt
Type of sprinklers calculated: TYCO, UPRIGHT, TY-FRB, 5.6K, 155 DEG
No. of sprinklers calculated: 13
In-rack demand: - GPM
Hose streams: - GPM
Total water required (including hose streams): 278.3 - GPM @ 57.9 - Psi
Type of system: WET
Volume of dry or preaction system: - Gal

Water supply information

Date: 7/26/06
Location: CORNER OF TURNER AND MORNING STREETS
Source: PORTLAND WATER DISTRICT

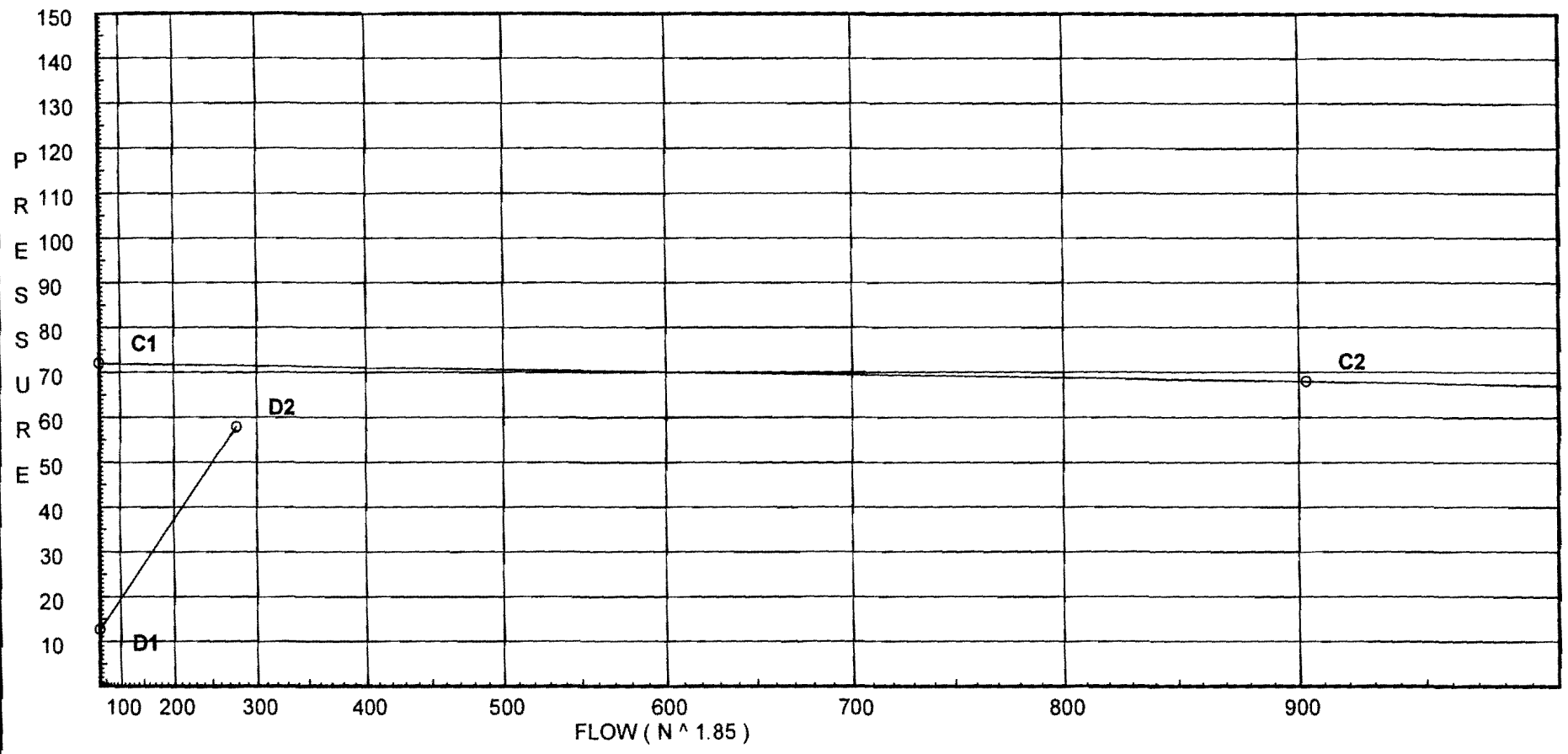
Name of contractor: EASTERN FIRE PROTECTION
Address: 170 KITTYHAWK AVE. / / AUBURN, MAINE 04210
Phone number: 207-784-1507
Name of designer: DRS
Authority having jurisdiction: PORTLAND FIRE DEPARTMENT
Notes: (Include peaking information or gridded systems here.) REMOTE AREA REDUCED PER NFPA #13, SECTION 11.2.3.2.3.1

Water Supply Curve (C)

EASTERN FIRE PROTECTION
EMERSON SCHOOL APARTMENTS BASEMENT CALC

City Water Supply:
C1 - Static Pressure : 72
C2 - Residual Pressure: 68
C2 - Residual Flow : 903

Demand:
D1 - Elevation : 12.579
D2 - System Flow : 278.256
D2 - System Pressure : 57.878
Hose (Demand) :
D3 - System Demand : 278.256
Safety Margin : 13.669



Fittings Used Summary

EASTERN FIRE PROTECTION
EMERSON SCHOOL APARTMENTS BASEMENT CALC

Page 3
Date

Fitting Legend		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	
Abbrev.	Name																					
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	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	
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

<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>
TEST	72.0	68	903.0	71.547	278.26	57.878

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>
SPG1	0.0	5.6	7.0	14.82	
1	97.17	5.6	14.35	21.21	
2	97.17	5.6	15.95	22.36	
3	97.17	5.6	17.54	23.45	
A	97.17		21.22		
4	97.17	5.45	21.27	25.13	K=K @ LIN1
5	97.17	5.6	11.76	19.2	
6	97.17	5.6	13.08	20.25	
7	97.17	5.6	18.11	23.83	
B	97.17		21.43		
8	97.17	5.45	21.66	25.36	K=K @ LIN1
9	94.17	5.6	10.51	18.15	
10	94.17	5.6	11.59	19.07	
10A	94.17		14.67		
11	94.17	5.6	10.81	18.41	
12	94.17	5.6	11.92	19.34	
12A	94.17		15.08		
13	94.17	5.6	16.12	22.48	
13A	94.17		17.23		
C	94.17		18.59		
D	97.17		20.62		
E	97.17		24.2		
F	97.17		29.27		
G	97.17		34.23		
H	97.17		35.72		
I	97.17		36.16		
J	96.0		37.97		
TOR	95.17		39.07		
BFP	94.76		40.12		
BASE	93.92		46.17		
CRE	88.92		48.6		
TEST	68.125		57.88		

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	*****
SPG1 to LIN1	0 0	5.60	14.82 14.82	1 1.049	1T	5.0 0.0	0.250 5.000	120	7.000 0.0			
LIN1			0.0 14.82						7.392		K Factor = 5.45	
1 to 2	97.170 97.170	5.60	21.21 21.21	1 1.049		0.0 0.0	11.000 0.0	120	14.350 0.0			Vel = 7.87
2 to 3	97.170 97.170	5.60	22.37 43.58	1.25 1.38		0.0 0.0	11.000 0.0	120	15.946 0.0			Vel = 9.35
3 to A	97.170 97.170	5.60	23.45 67.03	1.25 1.38	1T	6.0 0.0	5.500 6.000	120	17.536 0.0			Vel = 14.38
A to 4	97.170 97.170		0.0 67.03	2.5 2.469		0.0 0.0	2.580 0.0	120	21.223 0.0			Vel = 4.49
4 to B	97.170 97.170	5.45	25.13 92.16	2.5 2.469		0.0 0.0	4.625 0.0	120	21.272 0.0		K = K @ LIN1	Vel = 6.18
B			0.0 92.16						21.429		K Factor = 19.91	
5 to 6	97.170 97.170	5.60	19.20 19.2	1 1.049		0.0 0.0	11.000 0.0	120	11.755 0.0			Vel = 7.13
6 to 7	97.170 97.170	5.60	20.26 39.46	1 1.049		0.0 0.0	11.000 0.0	120	13.082 0.0			Vel = 14.65
7 to B	97.170 97.170	5.60	23.83 63.29	1.25 1.38	1T	6.0 0.0	5.500 6.000	120	18.114 0.0			Vel = 13.58
B to 8	97.170 97.170		92.16 155.45	2.5 2.469		0.0 0.0	2.580 0.0	120	21.429 0.0			Vel = 10.42
8 to E	97.170 97.170	5.45	25.36 180.81	2.5 2.469	2E	12.0 0.0	9.500 12.000	120	21.660 0.0		K = K @ LIN1	Vel = 12.12
E			0.0 180.81						24.203		K Factor = 36.75	
9 to 10	94.170 94.170	5.60	18.15 18.15	1 1.049		0.0 0.0	10.000 0.0	120	10.506 0.0			Vel = 6.74
10 to 10A	94.170 94.170	5.60	19.07 37.22	1 1.049	1T	5.0 0.0	2.500 5.000	120	11.594 0.0			Vel = 13.82
10A to 12A	94.170 94.170		0.0 37.22	1.5 1.61		0.0 0.0	8.000 0.0	120	14.674 0.0			Vel = 5.87

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	*****
12A			0.0 37.22						15.081		K Factor = 9.58	
11 to 12	94.170 94.170	5.60	18.41	1		0.0 0.0	10.000 0.0	120	10.805 0.0			
12 to 12A	94.170 94.170	5.60	18.41 19.33	1.049	1T	0.0 5.0	10.000 2.500	0.1116 120	1.116 11.921		Vel = 6.83	
12A to 12A	94.170 94.170		37.74	1.049		0.0	7.500	0.4213	3.160		Vel = 14.01	
12A to 13A	94.170 94.170		37.22	1.5	1E	4.0 0.0	7.540 4.000	120	15.081 0.0			
13A			0.0 74.96						17.230		K Factor = 18.06	
13 to 13A	94.170 94.170	5.60	22.48	1.049	1T	0.0 0.0	1.875 5.000	120	16.119 0.0			
13A to C	94.170 94.170		74.97	1.5	1E	4.0 0.0	0.500 4.000	120	17.230 0.0			
C to D	94.170 97.170		0.0	2.067	3E	15.0 0.0	22.170 15.000	120	18.590 -1.299		Vel = 15.36	
D to E	97.170 97.170		0.0	2.067	2E 1T	10.0 10.0	20.000 20.000	120	20.620 0.0		Vel = 9.32	
E to F	97.170 97.170		180.81	2.5		0.0 0.0	19.290 0.0	120	24.203 0.0			
F to G	97.170 97.170		278.26	2.469		0.0	19.290	0.2626	5.066		Vel = 18.65	
G to H	97.170 97.170		0.0	3.068	1E 1T	7.0 15.0	32.375 22.000	120	29.269 0.0		Vel = 12.08	
H to I	97.170 97.170		0.0	4.026	2T	40.0 0.0	21.500 40.000	120	34.227 0.0		Vel = 7.01	
I to J	97.170 96		0.0	4.26	3L 1T	23.701 26.334	20.670 50.035	120	36.160 0.507			
J to TOR	96 95.170		278.26	4.26		0.0	70.705	0.0184	1.304		Vel = 6.26	
TOR to BFP	95.170 94.760		0.0	4.26	3L	23.701 0.0	16.625 23.701	120	37.971 0.359			
BFP to BASE	94.760 93.920		278.26	4.26	5L 2L 1Zca	39.501 0.0 15.8	7.590 39.501 4.250	120	39.074 0.178 40.119		Vel = 6.26	
						0.0	15.800		5.685		* Fixed loss = 5.321	
						0.0	20.050	0.0185	0.370		Vel = 6.26	

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	*****
BASE to CRE	93.920 88.920		0.0 278.26	5 5.295	3L	30.316 0.0	10.375 30.316	120 0.0064	46.174 2.166		Vel = 4.05	
CRE to TEST	88.920 68.125		0.0 278.26	6 6.16	2L 1G 1T	25.822 4.304 43.037	45.000 73.163 118.163	140 0.0023	48.600 9.006		Vel = 3.00	
TEST			0.0 278.26						57.878		K Factor = 36.58	