

REPORT ON
WATER DISTRIBUTION SYSTEM ANALYSIS
FOR
SOUTHBOROUGH, MASSACHUSETTS

January 31, 1996

H₂O ENGINEERING CONSULTING ASSOCIATES, INC.

H₂O Engineering Consulting Associates, Inc.

水利工程顧問

223 Middlesex Turnpike Burlington, MA 01803
Telephone (617) 270-6611, 270-7046 Fax (617) 270-6828

January 30, 1996

Mr. John W. Boland
Director
Department of Public Work
114 Cordaville Road
Southborough, MA 01772

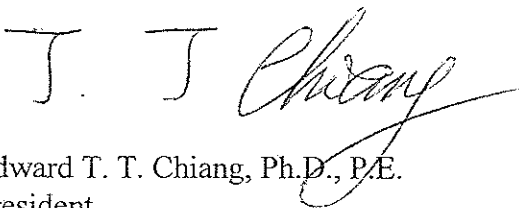
Dear Mr. Boland:

In accordance with our agreement, H₂O Engineering Consulting Associates, Inc., is pleased to submit the attached report entitled, "Water Distribution System Analysis for the Town of Southborough, Massachusetts". This report includes the evaluation of existing system facilities, estimates of existing and projected future system requirements, and recommendations relative to system improvements.

The report contains a Water System Master Plan and three Phases of recommendations for the Town to improve the existing distribution system to meet the requirements. The cost estimations for Phase I and Phase II improvement are also included in the report.

H₂O Engineering Consulting Associates, Inc. appreciates the opportunity to serve the Town of Southborough. We would like to thank Mr. Donald Buzzel for his assistance in providing data and information relative to the water system and its operations.

Very truly yours,



Edward T. T. Chiang, Ph.D., P.E.
President

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	EXISTING WATER SUPPLY SYSTEM	2
	A. General	2
	B. Sources of Water Supply and Pumping Facilities	2
	C. Storage Facilities	4
	D. Distribution System	5
III.	POPULATION	7
	A. General	7
	B. Population Projection	7
IV.	WATER DEMAND	10
	A. General	10
	B. Projected Future Demand	17
	C. Fire Flow Demand	20
V.	SYSTEM ANALYSIS	22
	A. General	22
	B. System Analysis	23
VI.	WATER SYSTEM MASTER PLAN	30
	A. General	30
	B. Source of Supply and Pumping Facilities	31
	C. Storage Facilities	31
	D. Distribution System Improvement	33
	E. Water Quality	35
VII.	RECOMMENDATION AND COST ESTIMATES	37
	A. General Recommendations	37
	B. Specific Recommended Improvements	38
	C. Cost Estimation	43

APPENDICES

I. INTRODUCTION

The Eastern Massachusetts Town of Southborough is surrounded by the Towns of Framingham and Ashland to the East, Hopkinton to the South, Westborough to the West and Marlborough to the North. Southborough is ideally situated between the City of Boston and Worcester, with the Worcester Turnpike (Route 9) and the Massachusetts Turnpike (Route 90) passing through the Town. These points would suggest the Town of Southborough have the potential for expansion in the future.

Previous water distribution system studies have been conducted in 1988 and 1972, and Master Plans recommended for the Town. These Master Plans were based on the earlier records, utilizing the estimated growth patterns for the 1960's and 1970's. The current criteria has changed immensely. A multitude of variables require reevaluation to correspond with the current conditions.

II. EXISTING WATER SUPPLY SYSTEM

A. General

The majority of the Town of Southborough's Water Distribution System was built in the 1960's. Between the 1960's and the present additional loops and improvements have been gradually added to the system. In addition to the distribution water mains, the system includes two pump stations, two stand pipes and one reservoir. The present system satisfies the domestic water demands of the Town.

B. Sources of Water Supply and Pumping Facilities

The Town of Southborough obtains its water from the Massachusetts Water Resources Authority's (MWRA) Hultman Aqueduct. The quantity of water withdrawn has been governed by contract between the Town of Southborough and MWRA which is renewed periodically. Water is introduced into the distribution system through two Town own pump stations, the Boland Pumps Station and the Hosmer Pump Station. The following are brief descriptions of these two pump stations.

1. The Boland Pump Station is located Northwest of the Town, off Northborough Road. This pump station has two 50-horse power Fairbank Morse pumps and has a capacity of 1,100 gallons per minute (gpm). It supplies the water for the West and Southwest areas of the Town and fills the Tara Reservoir. (See Table 1)
2. The Arthur L. Hosmer Pump Station is located Northeast of the Town. This pump station was built in 1977. This pump station connects to Shaft N° 3 of the MWRA Hultman Aqueduct. It is equipped with two 60-horse power Marthon Electric pumps with a capacity of approximately 1,000 gallons per minute (gpm). This pump station serves the remaining sections of Town and fills Clear Pond and the Oak Hill Stand Pipe. (See Table 1)

Table 1 - Existing Water Sources, Southborough, MA

Pump Station	BOLAND	HOSMER
Location	Northborough Road	Shaft N° 3, MWRA Hultman Pressure Aqueduct
Source	MWRA transmission line	MWRA transmission line
N° of Pumps	2	2
Capacity & Head	Pump No. 1 - 550 gpm @ 3560 rpm, TDH 275 ft Pump No. 2 - 550 gpm @ 3500 rpm, TDH 245 ft	Pump No. 1 - 600 gpm @ 1750 rpm, TDH 250 ft Pump No. 2 - 400 gpm @ 3500 rpm, TDH 250 ft

Source: Town of Southborough, MA

In addition to the MWRA water source, some areas of the Town of Southborough rely on private wells. These private well users have no connection to the Town's water system; however, there is potential for future connections. For this purpose, some locations have been scaled up the demand in the computer model to represent these likely future connections.

The MWRA is planning to build a new major water transmission tunnel through the Town of Southborough. It is our understanding that the MWRA will provide shafts for the Town to tie into this transmission tunnel as a water supply source. Prior to Southborough's connection to the MWRA's new transmission tunnel, it is advisable that the Town conducts another system analysis to ensure the adequacy of these new connections.

C. Storage Facilities

The Town of Southborough utilize the following three water storage facilities, the Tara Reservoir, the Clear Hill Stand Pipe and the Oak Hill Stand Pipe. The total storage capacity of these facilities is 2 million gallons. The Tara Reservoir has the highest overflow elevation. A physical description of the three(3) storage facilities followings:

1. The Tara Reservoir is on Tara Road in the Northwest section of the Town. It is about 7,500 feet South of the Boland Pump Station. This reservoir has the overflow elevation at 515.0 feet USGS mean sea level and an approximate storage capacity of 1.3 million gallons. All water mains connecting from the Boland Pump Station to the Tara Reservoir are 12" pipes
2. The Clear Hill Stand Pipe, located about 4,700 feet Northwest of Hosmer Pump Station, is connected to the pump station by 10" and 12" pipes. Its overflow elevation is 493.3 USGS mean sea level and the storage capacity is about 0.46 million gallons.
3. The Oak Hill Stand Pipe is located about 8,000 feet South of Hosmer Pump Station. This stand pipe is filled by the Hosmer Pump Station through the watermains on Central Street and Oak Hill Road. This watermain which fills Hosmer Pump Station was upgraded to a 12-inch main at the end of 1993, except for a small section of old 8-inch pipe crossing the railroad. The Oak Hill Stand Pipe's capacity is about 0.28 million gallons with an overflow at 492.7 USGS mean sea level. Due to its limited storage capacity, this stand pipe will only help the water demand in the local area.

Prior to 1990, the water distribution system had a small elevated tank at Atwood Street. This tank had a storage capacity of 150,000 gallons. The Water Division removed this tank in 1990 because it was not cost effective to maintain such an old, small elevated tank.

Table 2 contains the physical data on these existing storage facilities:

Table 2 - Existing Storage Data

Name	Tara Reservoir	Clear Hill Stand Pipe	Oak Hill Stand Pipe
Diameter (ft)	67	40	25
Height (ft)	48	42.5	75
Capacity (gallons)	1,300,000	400,000	275,000
Overflow Elevation (USGS)	515	493	493
Base Elevation (USGS)	467	451	418
High Water Elevation (USGS)	489	489.5	480
High Water Level Capacity (gallons)	595,000	362,000	264,000
Telemeter Gradient	486.7 feet	486.6 feet	487 feet
Maintained Available	515,000 gallons	334,000 gallons	253,000 gallons
Normal Daily Min.	12 feet 325,000 gallons	28.5 feet 268,000 gallons	62 feet 227,000 gallons

* Source: Town of Southborough, MA

D. Distribution System

Southborough's water distribution system has more than 60 miles of pipeline in the system. The sizes range from 6 to 16 inches in diameter and the pipe materials include unlined cast iron, cement-lined cast iron, ductile iron and polyvinyl chloride. Geographically the Southborough distribution system can be separated into three sections by using Routes 9 and 90 as dividers; North, Middle and South. Both the Boland and Hosmer Pump Stations are located in the north and raise the system pressure in that section. In the North Section the water is introduced into the system in the north and

flows South.

1. The Northern Section, north of Route 9, includes Southborough's downtown area which includes more than half the service area of the Town. Although the Sudbury Reservoir occupies approximately 1/5 of the area in this section, it has the highest demand in the distribution system. There are one reservoir, one standpipe and two pump stations in this section; therefore, the water service to this Northern Section is adequate.
2. The Middle Section includes the area between Routes 9 and 90. It has two high ground areas, e.g., Fair View Hill on the West and Oak Hill on the East. The low area is a valley in the vicinity of Cordaville Road. The Oak Hill Stand Pipe feeds the Easterly high point. The Tara Reservoir feeds the Westerly high point. The water pressure and volume of flow in this section of the Town are marginally adequate.
3. The Southern Section, South of the Massachusetts Turnpike (Route 90), is the furthest area from the storage facilities and pump stations. The Town's distribution system map indicates only three 8-inch water mains cross Route 90 and continuing to the South. It appears that Route 90 becomes a bottleneck in serving the Southern Section of Town.

The Town of Southborough has more than its share of Main Highways, Railroads, large storage reservoirs and aqueducts crossing through the Town. It is difficult and costly to manage a complex water supply network like this. Some of the problems in this system include undersized pipes running under railroads, Massachusetts Turnpike, Route 9. Because of their location the pipes referenced here are costly to replace, besides the cost, it is difficult to obtain the permits required to install these new pipes. There were many dead ends found in the system, and most of them are difficult to eliminate.

III. POPULATION

A. General

Although the Town of Southborough's potential of expansion is great, the past growth pattern was rather moderate. Certain variables affected the population's growth such as economic development, industrial presence, available land, etc. The Town's population history between 1975 and 1994 is listed in Table 3. Between 1975 and 1985 the population of Southborough has growing slowly with no significant changes and experienced some negative growth from 1978 to 1985. From 1985 to 1994, the population increased steadily with a short no growth period from 1989 to 1991.

B. Population Projection

In order to analyze this system for future water consumption, the future population of the Town of Southborough must be established for the target year. Based on the Town's population history, a projection, (see Figure 1), has been established using the target year of 2010. The trend pattern for the next five years, 1996 to 2000, seems compatible with the previous five years. The projected average population for the year 2010 is approximately 7,450, which is about a 6.8% increase from 1994.

Table 3 - Population of Town of Southborough, MA

Year	Population
1975	6,326
1976	6,324
1977	6,377
1978	6,299
1979	6,389
1980	6,412
1981	6,421
1982	6,392
1983	6,429
1984	6,405
1985	6,334
1986	6,431
1987	6,444
1988	6,534
1989	6,636
1990	6,628
1991	6,657
1992	6,783
1993	6,893
1994	6,972

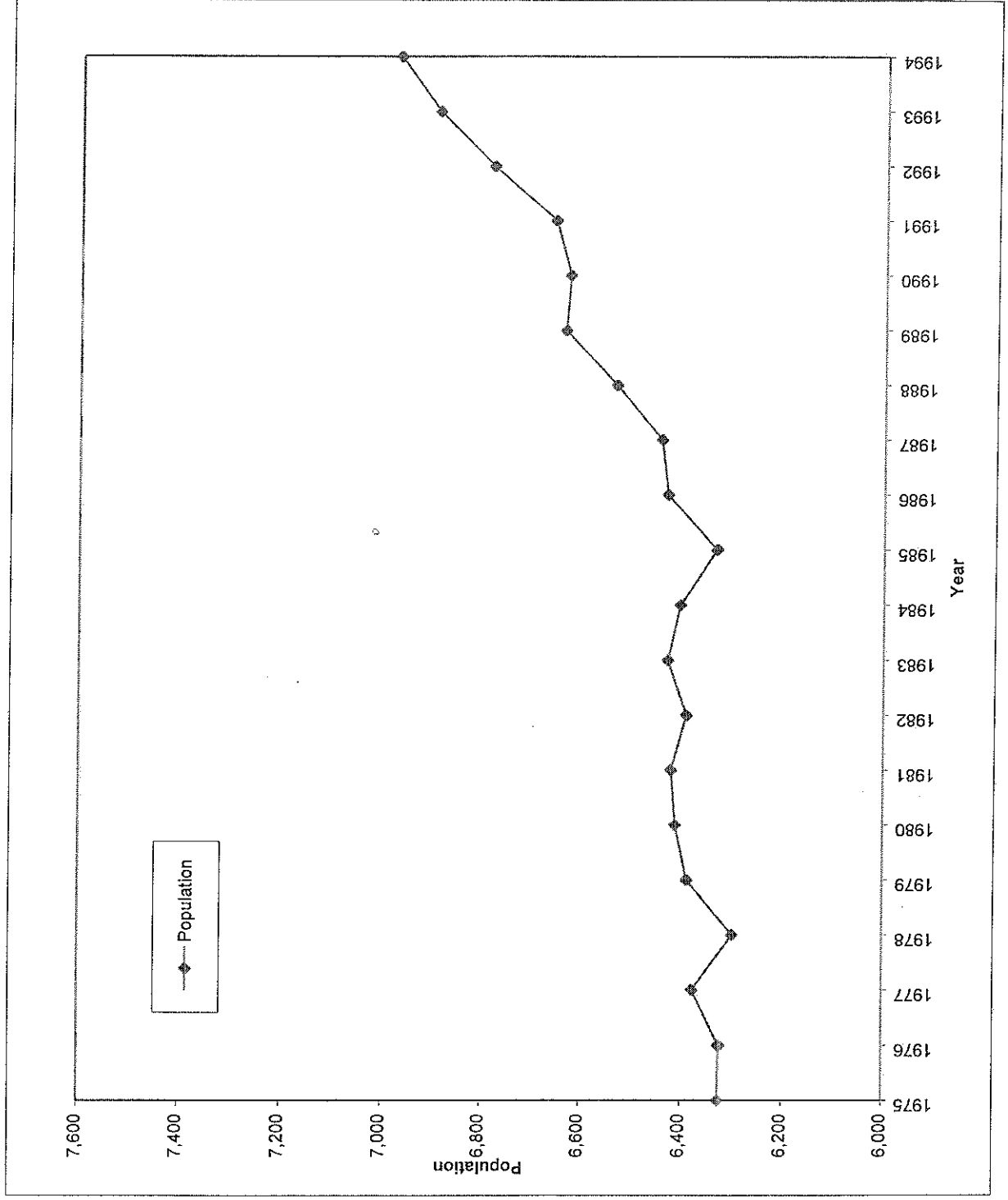
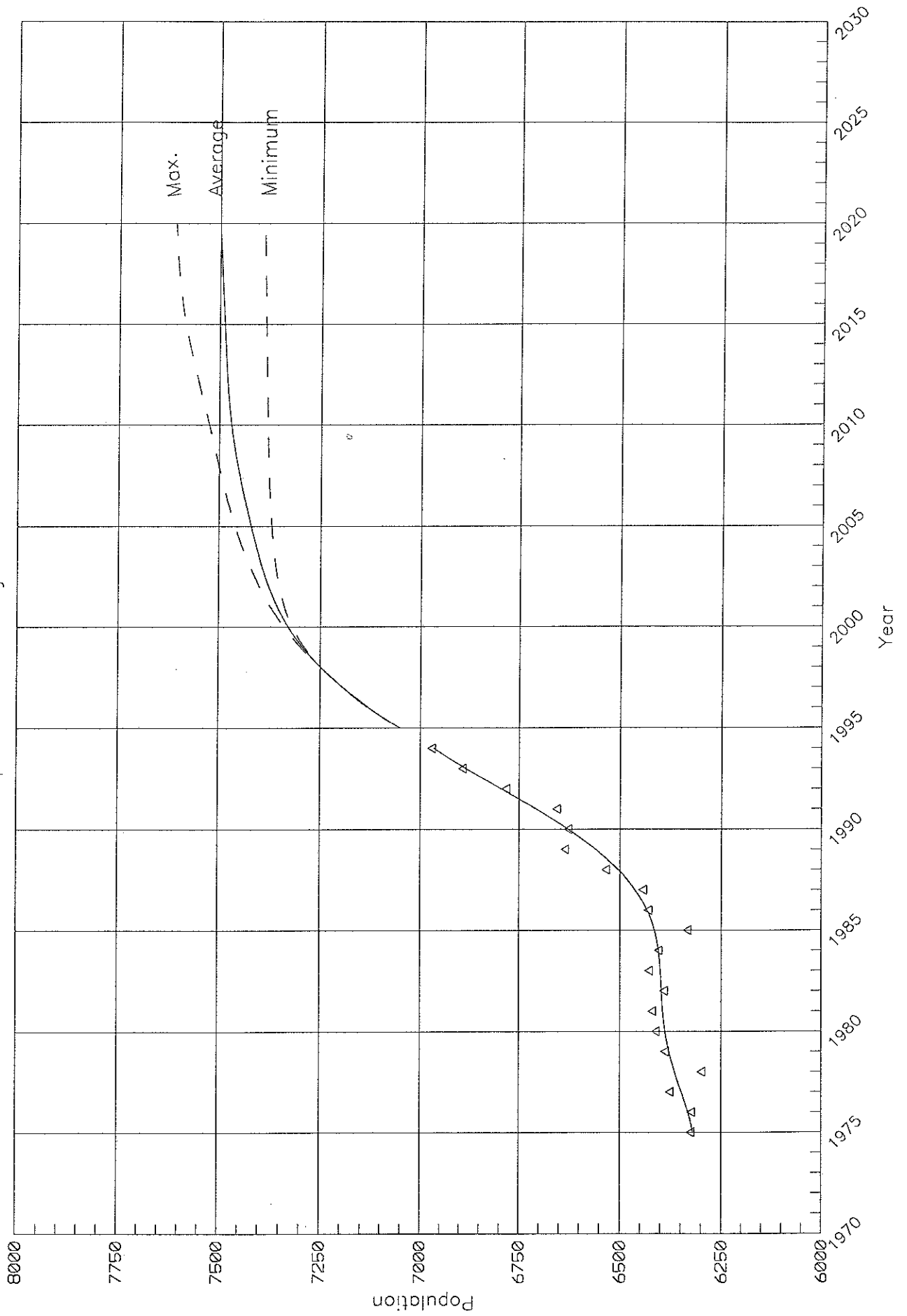


Figure 1: Town of Southborough
Population Projection



IV. WATER DEMAND

A. General

Water demand is the sum of water consumed by metered customers and the un-metered water used or lost through the water distribution system, such as fire protection, hydrant flushing and testing, and leakage. In the Town of Southborough there are two major types of metered water consumers; domestic and commercial. Within a community, the domestic use of water will vary depending on lot size, water cost, family income and the adequacy of the distribution system. The amount of water consumed by commercial users is dependent upon the type of business.

The Town of Southborough's water source is metered from the MWRA's Hultman Aqueduct. Therefore, the total water demand in this system study is based on the total metered water volume from the Town's pump stations.

Table 4 lists the historical records of the monthly volumes of water pumped out from MWRA's aqueducts for the past five years. Table 5 shows the history of the maximum daily demand. Table 6 shows the historical records of the maximum weekly demand. The numbers clearly show that the demands are increasing yearly. The increases are not only due to an increase of the population, but also an increase in the per capita consumption. The demand increase per person has been primarily caused by the ever increasing use of such water dependent appliances as washing machines, automatic dishwashing machines, garbage disposal units, automatic lawn sprinklers and backyard swimming pools.

Table 4, Monthly Pumpage from MWRA Aqueducts, Town of Southborough, MA

	P.S. Boland	P.S. Hosmer	Total
Jan-90	16,323,000	558,000	16,881,000
Feb-90	15,018,000	27,000	15,045,000
Mar-90	15,889,000	216,000	16,105,000
Apr-90	16,996,000	89,000	17,085,000
May-90	13,075,000	6,228,000	19,303,000
Jun-90	22,464,000	3,915,000	26,379,000
Jul-90	27,023,000	2,694,000	29,717,000
Aug-90	21,225,000	2,909,000	24,134,000
Sep-90	20,083,000	1,767,000	21,850,000
Oct-90	17,393,000	1,915,000	19,308,000
Nov-90	15,064,000	2,966,000	18,030,000
Dec-90	7,207,000	9,416,000	16,623,000
Jan-91	9,907,000	7,204,000	17,111,000
Feb-91	9,312,000	5,587,000	14,899,000
Mar-91	3,388,000	12,349,000	15,737,000
Apr-91	10,550,000	7,510,000	18,060,000
May-91	14,269,000	10,508,000	24,777,000
Jun-91	20,802,000	10,411,000	31,213,000
Jul-91	21,967,000	10,028,000	31,995,000
Aug-91	22,027,000	5,660,000	27,687,000
Sep-91	11,523,000	9,922,000	21,445,000
Oct-91	9,912,000	9,954,000	19,866,000
Nov-91	10,114,000	7,105,000	17,219,000
Dec-91	11,069,000	6,931,000	18,000,000
Jan-92	13,490,000	5,590,000	19,080,000
Feb-92	6,706,000	9,650,000	16,356,000
Mar-92	9,464,000	8,459,000	17,923,000
Apr-92	10,034,000	8,594,000	18,628,000
May-92	11,679,000	11,232,000	22,911,000
Jun-92	12,901,000	11,053,000	23,954,000
Jul-92	16,783,000	7,106,000	23,889,000
Aug-92	11,793,000	9,188,000	20,981,000
Sep-92	10,866,000	8,024,000	18,890,000
Oct-92	9,161,000	8,898,000	18,059,000
Nov-92	9,506,000	7,703,000	17,209,000

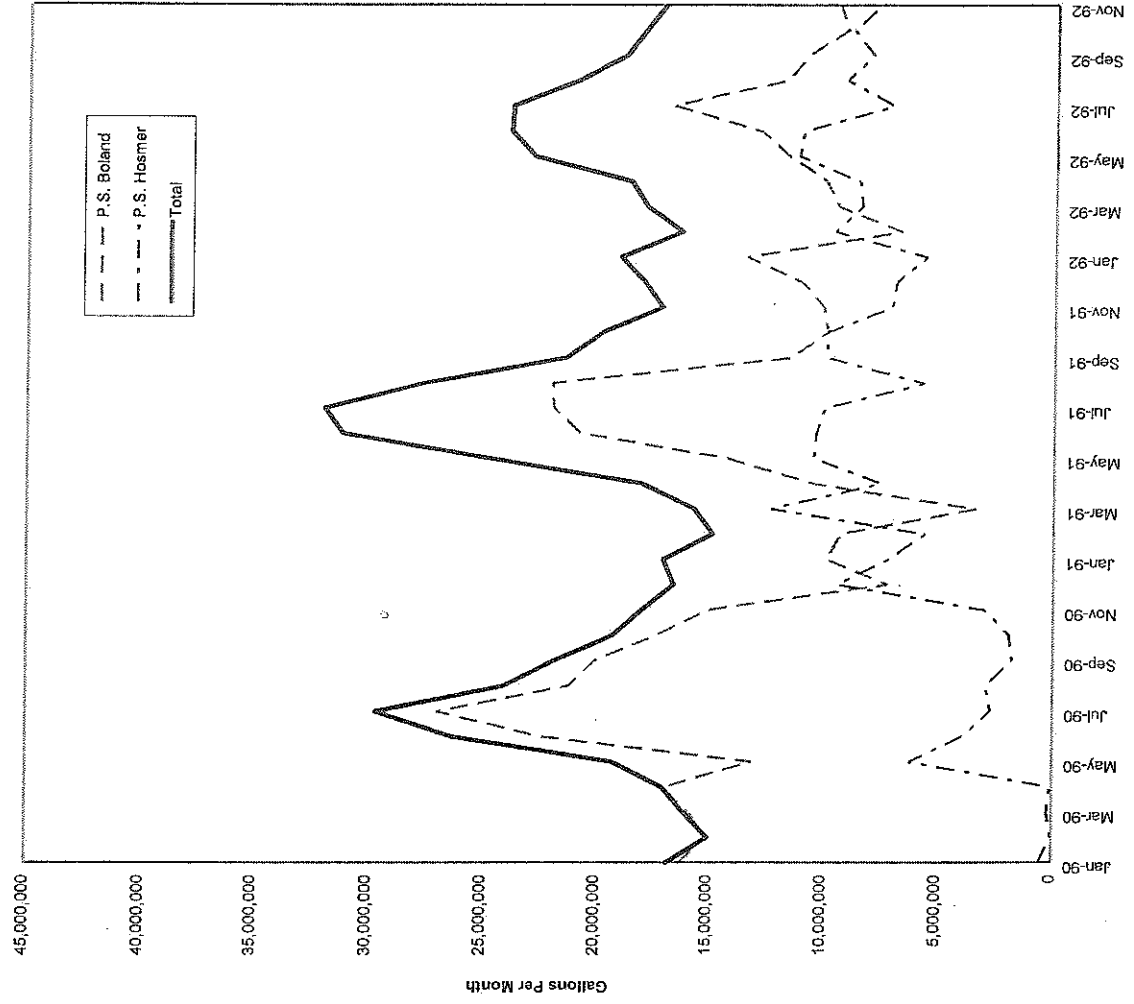


Table 4, Monthly Pumpage from MWRA Aqueducts, Town of Southborough, MA

	P.S. Boland	P.S. Hosmer	Total
Dec-92	8,754,000	6,800,000	15,554,000
Jan-93	8,286,000	6,480,000	14,766,000
Feb-93	8,443,000	4,592,000	13,035,000
Mar-93	8,465,000	5,795,000	14,260,000
Apr-93	10,433,000	6,359,000	16,792,000
May-93	11,526,000	10,800,000	22,326,000
Jun-93	16,319,000	12,914,000	29,233,000
Jul-93	28,202,000	8,352,000	36,554,000
Aug-93	23,807,000	6,422,000	30,229,000
Sep-93	13,691,000	7,920,000	21,611,000
Oct-93	11,116,000	7,175,000	18,291,000
Nov-93	10,101,000	5,896,000	15,997,000
Dec-93	8,591,000	7,270,000	15,861,000
Jan-94	9,708,000	7,441,000	17,149,000
Feb-94	8,290,000	7,774,000	16,064,000
Mar-94	8,687,000	7,827,000	16,514,000
Apr-94	11,039,000	8,519,000	19,558,000
May-94	11,929,000	10,957,000	22,886,000
Jun-94	23,819,000	12,157,000	35,976,000
Jul-94	28,549,000	8,957,000	37,506,000
Aug-94	24,156,000	6,285,000	30,441,000
Sep-94	22,646,000	3,950,000	26,596,000
Oct-94			
Nov-94			
Dec-94			
Jan-95	13,781,000	3,748,000	17,529,000
Feb-95	11,921,000	4,037,000	15,958,000
Mar-95	13,954,000	3,577,000	17,531,000
Apr-95	14,590,000	6,497,000	21,087,000
May-95	12,021,000	13,517,000	25,538,000
Jun-95	11,087,000	20,988,000	32,075,000
Jul-95	14,429,000	24,316,000	38,745,000
Aug-95	14,762,000	26,353,000	41,115,000
Sep-95	13,173,000	21,350,000	34,523,000

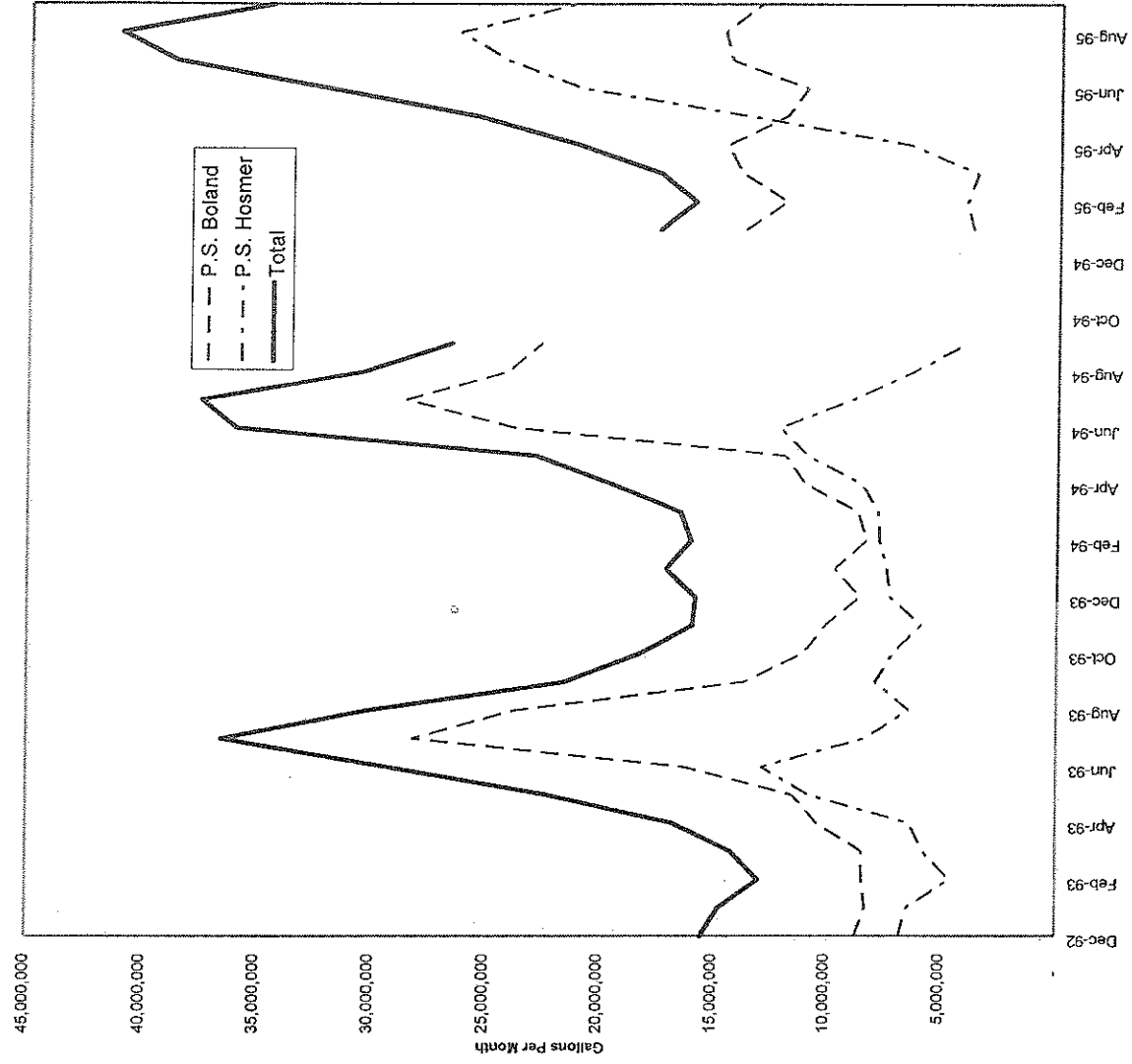


Table 5, Maximum Day Pumpage, Town of Southborough, MA

	Max. Day Pumpage
Jan-90	847,000
Feb-90	763,000
Mar-90	737,000
Apr-90	925,000
May-90	1,136,000
Jun-90	1,550,000
Jul-90	1,561,000
Aug-90	1,648,000
Sep-90	988,000
Oct-90	996,000
Nov-90	1,299,000
Dec-90	1,752,000
Jan-91	760,000
Feb-91	662,000
Mar-91	596,000
Apr-91	1,174,000
May-91	1,155,000
Jun-91	1,625,000
Jul-91	1,433,000
Aug-91	1,099,000
Sep-91	960,000
Oct-91	1,045,000
Nov-91	789,000
Dec-91	910,000
Jan-92	855,000
Feb-92	712,000
Mar-92	765,000
Apr-92	1,056,000
May-92	1,251,000
Jun-92	1,382,000
Jul-92	1,203,000
Aug-92	905,000
Sep-92	1,000,000
Oct-92	1,057,000
Nov-92	1,120,000
Dec-92	1,186,000

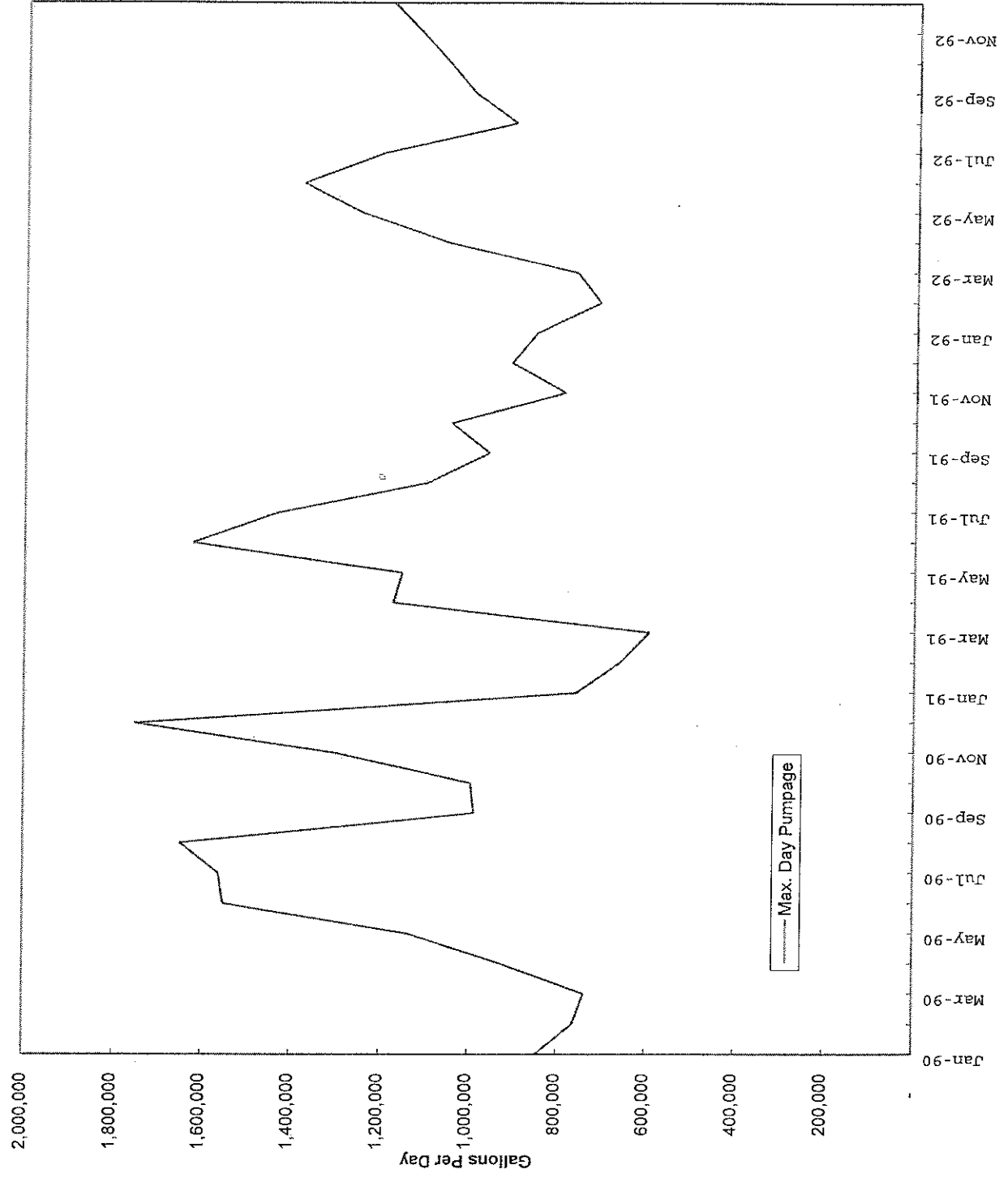


Table 5, Maximum Day Pumpage, Town of Southborough, MA

	Max. Day Pumpage
Jan-90	847,000
Feb-90	763,000
Mar-90	737,000
Apr-90	925,000
May-90	1,136,000
Jun-90	1,550,000
Jul-90	1,561,000
Aug-90	1,648,000
Sep-90	988,000
Oct-90	996,000
Nov-90	1,299,000
Dec-90	1,752,000
Jan-91	760,000
Feb-91	662,000
Mar-91	596,000
Apr-91	1,174,000
May-91	1,155,000
Jun-91	1,625,000
Jul-91	1,433,000
Aug-91	1,099,000
Sep-91	960,000
Oct-91	1,045,000
Nov-91	789,000
Dec-91	910,000
Jan-92	855,000
Feb-92	712,000
Mar-92	765,000
Apr-92	1,056,000
May-92	1,251,000
Jun-92	1,382,000
Jul-92	1,203,000
Aug-92	905,000
Sep-92	1,000,000
Oct-92	1,057,000
Nov-92	1,120,000
Dec-92	1,186,000

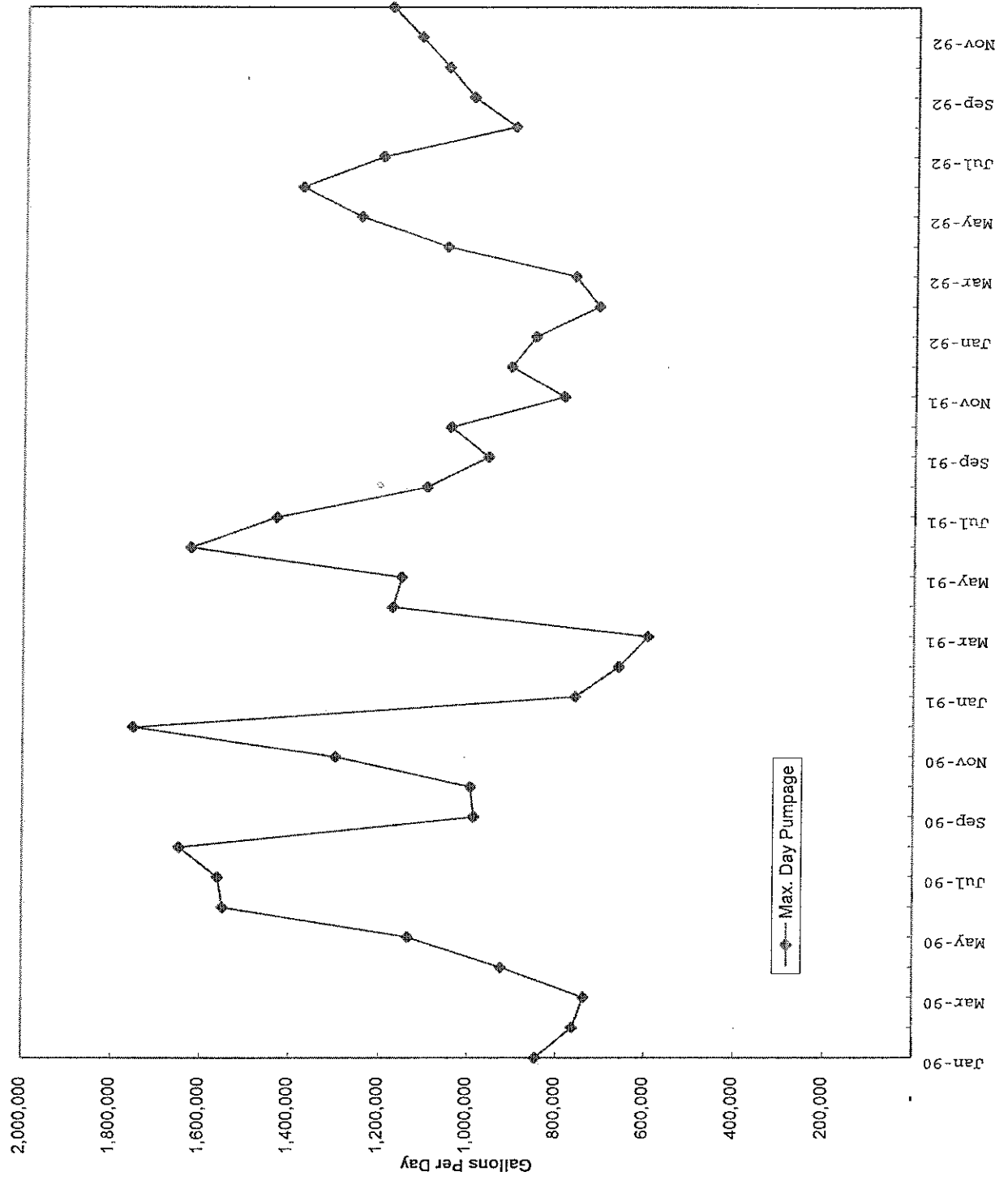


Table 6: Maximum Week Pumpage, Town of Southborough, MA

	Max. Week Pumpage
Jan-90	3,944,000
Feb-90	3,940,000
Mar-90	3,820,000
Apr-90	4,493,000
May-90	4,995,000
Jun-90	6,893,000
Jul-90	7,980,000
Aug-90	6,623,000
Sep-90	5,478,000
Oct-90	4,943,000
Nov-90	5,168,000
Dec-90	3,840,000
Jan-91	4,067,000
Feb-91	3,917,000
Mar-91	3,589,000
Apr-91	4,279,000
May-91	6,611,000
Jun-91	8,202,000
Jul-91	8,810,000
Aug-91	6,588,000
Sep-91	5,541,000
Oct-91	5,147,000
Nov-91	4,107,000
Dec-91	4,215,000
Jan-92	4,849,000
Feb-92	4,009,000
Mar-92	4,215,000
Apr-92	4,713,000
May-92	6,154,000
Jun-92	6,323,000
Jul-92	5,659,000
Aug-92	5,314,000
Sep-92	4,584,000
Oct-92	2,962,000
Nov-92	4,105,000

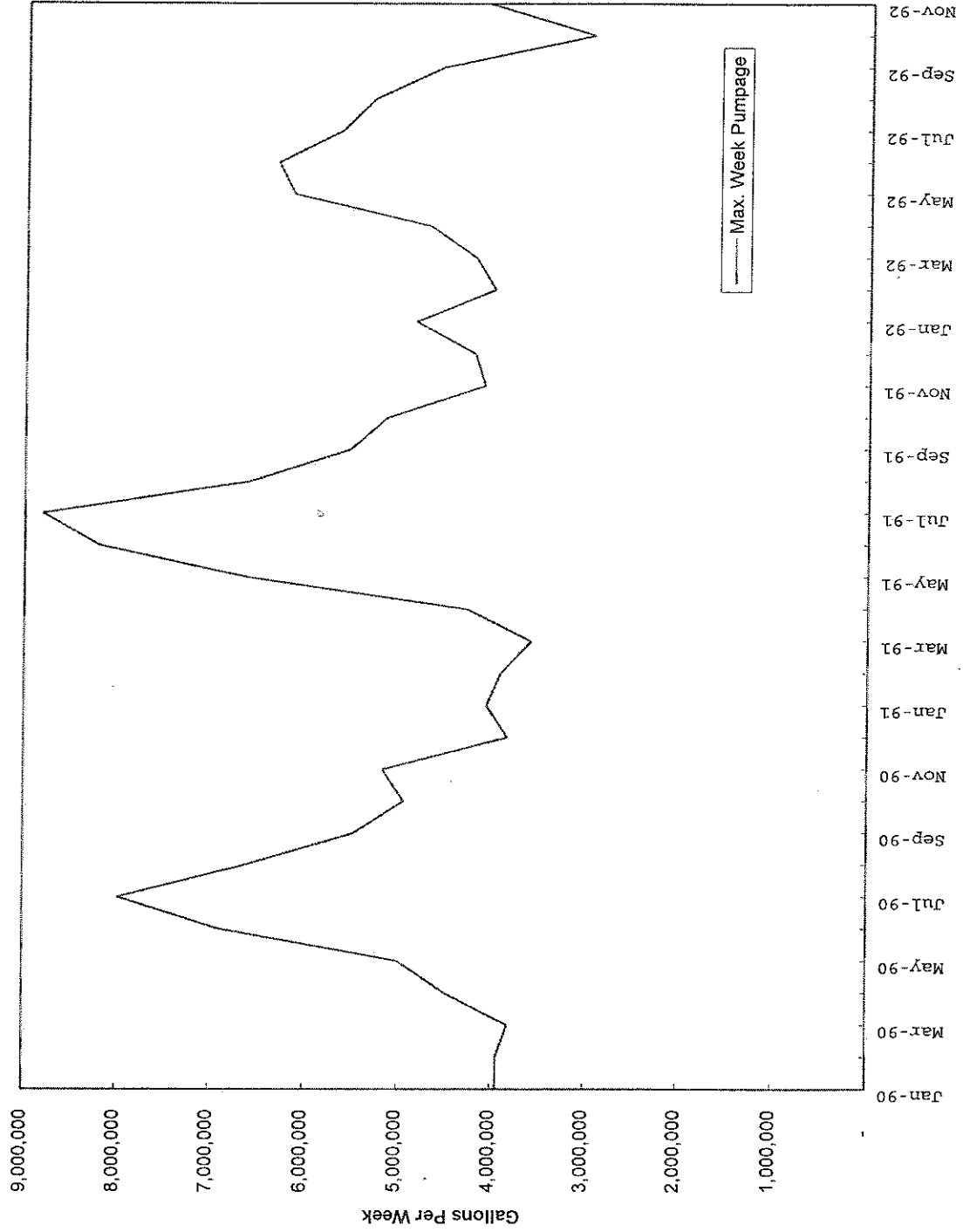
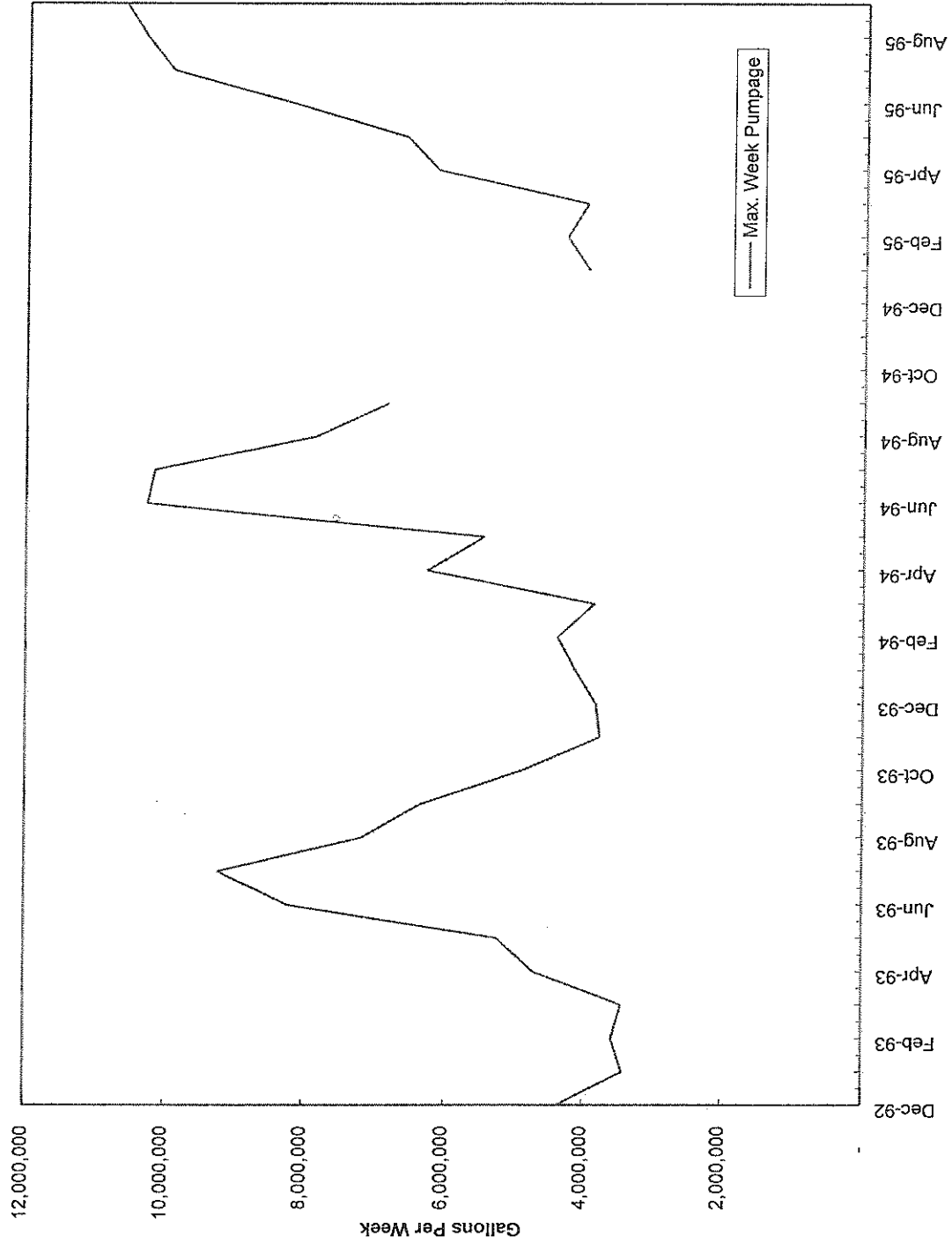


Table 6: Maximum Week Pumpage, Town of Southborough, MA

	Max. Week Pumpage
Dec-92	4,376,000
Jan-93	3,423,000
Feb-93	3,580,000
Mar-93	3,438,000
Apr-93	4,718,000
May-93	5,244,000
Jun-93	8,214,000
Jul-93	9,219,000
Aug-93	7,178,000
Sep-93	6,346,000
Oct-93	4,913,000
Nov-93	3,779,000
Dec-93	3,835,000
Jan-94	4,135,000
Feb-94	4,395,000
Mar-94	3,862,000
Apr-94	6,267,000
May-94	5,461,000
Jun-94	10,265,000
Jul-94	10,159,000
Aug-94	7,855,000
Sep-94	6,828,000
Oct-94	
Nov-94	
Dec-94	
Jan-95	3,970,000
Feb-95	4,295,000
Mar-95	4,003,000
Apr-95	6,152,000
May-95	6,604,000
Jun-95	8,195,000
Jul-95	9,931,000
Aug-95	10,315,000
Sep-95	10,623,000



B. Projected Future Demand

In determining the future demand of the Town's system, the linear regression method was used to help project the water demand trend. After organizing the raw data, the trend curves for the maximum monthly and maximum daily demands were established (Figures 2 & Figure 3). The maximum monthly demand in the five year history was 41,115,000 gallons on August 1995. The projected maximum monthly demand for the year 2000 is about 44,000,000 gallons per month. The increase is about 7%. The maximum daily demand in the five year history was 1,975,000 per day in July 1995. The projected maximum daily demand for the year of 2000 is about 2,300,000 per day. The increase is about 16.5%. These projected demands will be applied in the computer model of the distribution system to determine recommended the future system improvements.

It should be pointed out that future demands depend on many variables, such as zoning, land availability and economic development. It should be noted that any change to the above variables will affect the projected demands. Therefore, upgrading the model periodically is recommended.

Figure 2: Trend of Maximum day Demand, Town of Southborough, MA

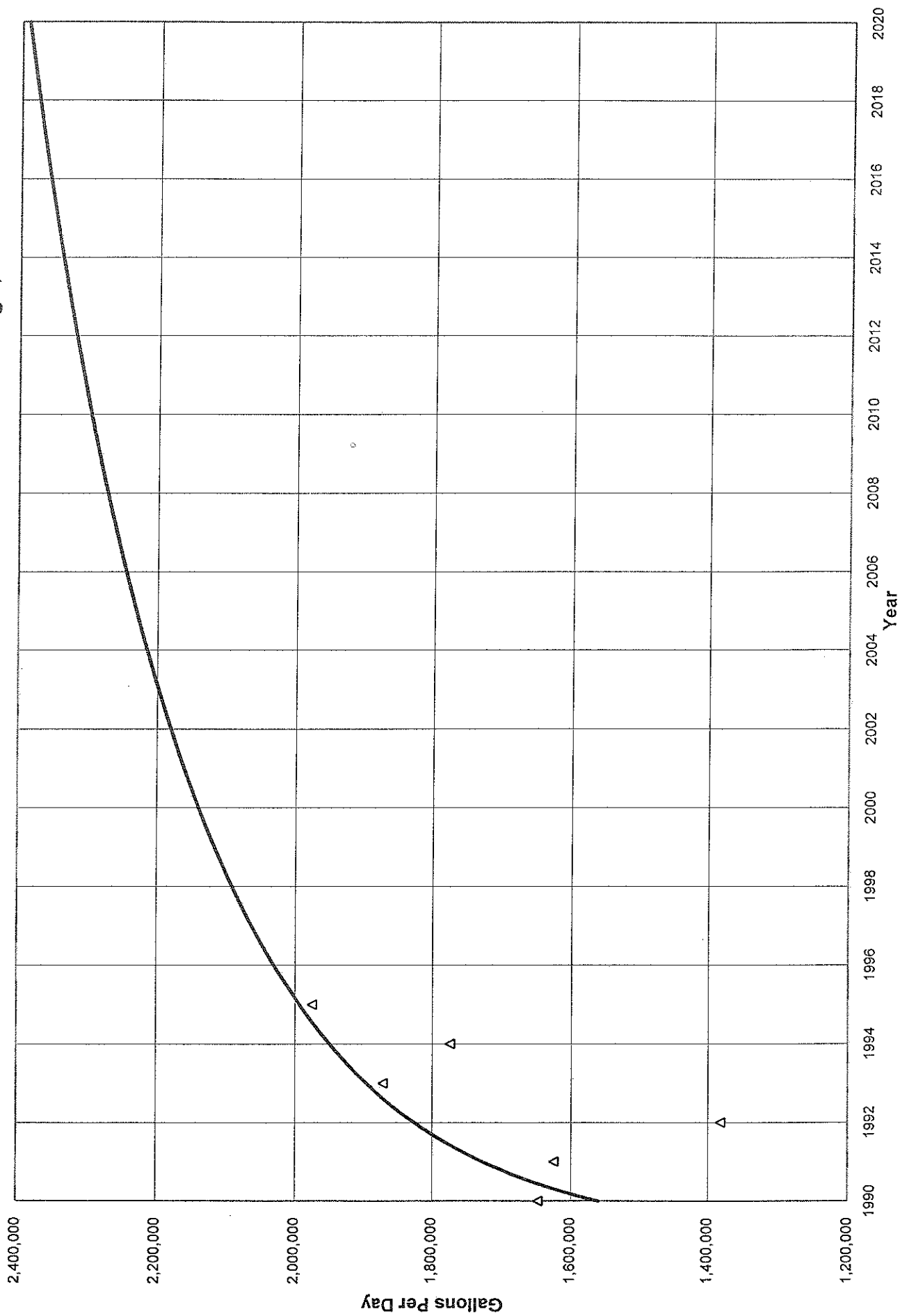
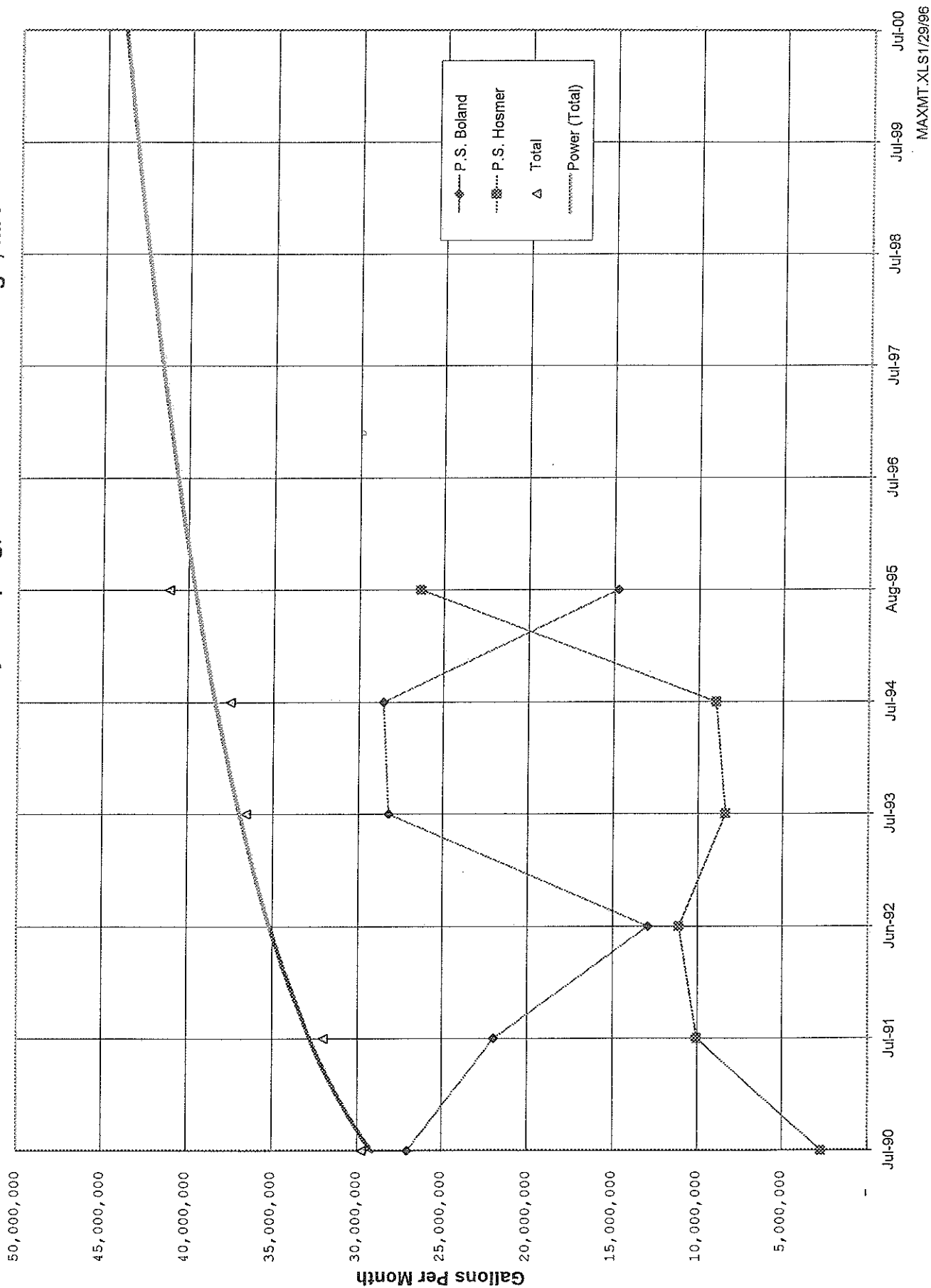


Figure 3: Trend of Maximum Monthly Pumping, Town of Southborough, MA



C. Fire Flow Demand

The Insurance Service Office (ISO), formerly called the Fire Underwriter, has adopted new standards for determining required fire flows and durations. These new standards call for increased available flow rates with shorter duration as compared to the old standards. Therefore, the total required usable system storage is approximately the same, but the distribution system carrying capacity must be greater.

Based on the building density, size and building materials, the typical single family residential areas of the Town would require no more than 1,000 gallons per minute (gpm) fire flow. Areas where multi family dwellings, schools, shopping malls and industries are located would need fire flow of about 2,500 - 3,500 gpm.

In March 1990, the ISO conducted several fire flow tests within the Town of Southborough and set the fire flow requirement. Table 7 shows the test results. Four locations (Tests 4, 5, 8 & 10) found the test flow under the required flow. All other locations had acceptable test flows.

The ISO flow testing showed the maximum available fire flow around the Parkerville Road area was about 3,000 gallons per minute in steady state (see Hydrant Flow Data Summary Table, Test N° 12 & N° 11). At the time of the test, the Atwood Elevated Tank was still in service. It should be noted that the fire flow test was done in a very short time period. With the limited storage capacity of the Atwood Elevated Tank, the fire flow would empty this tank in less than one hour. The system model's fire flow is 3,500 gallons per minute at a pressure of 20 psi for 3 hours, followed by 2,000 gallons per minute for the next 3 hours. This demand is much higher than the existing system can provide and creates a critical condition for the existing system.

Table 7 - Hydrant Flow Data Summary for Town Of Southborough
 Conducted by ISO Commercial Risk Services, Inc.

City Southborough State MA Zip 01772 Witnessed by A. Lagadinos Date 3-0-00

TEST NO.	TYPE DIST.	TEST LOCATION	SERVICE	FLOW-GPM			PRESSURE PSI		FLOW AT 20 PSI		REMARKS
				INDIVIDUAL HYDRANTS	TOTAL		STATIC	RESID.	NEEDED	AVAIL.	
1	Res	Presidential & Sears	Main	1140			48	30	500	1400	
2	Res	Maple Crest Dr.	"	1570			80	42	750	2000	
3	Comm	Main St. at Fay School	"	2050			76	55	3000	3500	
4	Comm	150 Cordaville Rd	"	1380			96	73	3000	2700	
5	Comm	Cor. Rte 9 & Willow St	"	1200			90	22	3500	1200	
6	Comm	337 Turnpike Rd-Rt 9	"	2060			66	55	2500	4500	
7	Res	Lynnbrook at CUL DE SAC	"	2820			86	75	500	7400	
8	Comm	Neary School-Front Yard	"	1690			90	34	3000	1900	
9	Comm	21 Boston Rd.	"	2150			78	48	1500	3100	
10	Comm	17 Oregon Rd.	"	1280			60	8	1250	1100	
11	Comm	Parkerville Rd.near Gilmore	"	1160			80	62	2250	2200	
12	Res	151 Southville Rd	"	1980			92	58	750	3000	
13	Comm	Southville Rd.at North St	"	1950			102	50	2250	2500	
14	Comm	10 Southville Rd.	"	2220			105	48	1250	2800	

THE ABOVE LISTED NEEDED FIRE FLOWS ARE FOR INSURANCE RATING PURPOSES ONLY AND ARE NOT INTENDED TO PREDICT THE MAXIMUM AMOUNT OF WATER REQUIRED FOR A LARGE SCALE FIRE CONDITION. THE AVAILABLE FLOWS ONLY INDICATE THE CONDITIONS THAT EXISTED AT THE TIME AND AT THE LOCATION WHERE TESTS WERE WITNESSED.

* Comm = Commercial; Res = Residential.

** Needed is the rate of flow for a specific duration for a full credit condition. Needed Fire Flows greater than 3,500 gpm are not considered in determining the classification of the city when using the Fire Suppression Rating Schedule.

V. SYSTEM ANALYSIS

A. General

The purpose of a distribution system analysis is to evaluate the adequacy of the system's pipe network, storage facilities, sources supply and pumping capacities under present and projected future water demand conditions along with assessing the adequacy of fire protection.

The computer analysis of the existing water system and evaluation of proposed improvements in Southborough, Massachusetts, was accomplished by means of a high speed digital computer. The computer programs used were the Hardy Cross Method of distribution analysis and the Newton Raphson iteration technique. To put the water system on the computer, the distribution system was schematically drawn to include all water mains that transmitted significant quantities of water. Ideally, for this analysis, 6-inch diameter water mains and larger were included.

The Schematic diagram of the distribution system used in the computer analysis is shown in Appendix. The circles represent nodes. Nodes are located at significant points of water consumption, where pipes change in diameter, or intersect. Consumption demands were set for each node based on the building type and density in the vicinity of each node.

Simulating the present system by means of a mathematical model was necessary to evaluate the present and determine the proposed water distribution system. The proper boundary conditions such as the system demands, sources of supply, pipe characteristic (length, size, and "C"-value), water levels in the storage tanks were entered into the computer model.

After inputting the boundary conditions into the computer model, actual system operating data were used for the model's calibration. The distribution system model should be calibrated over a range of system operating conditions to insure that the computer model response closely matches the actual system response. Field fire flow test data including pressure, pumping flow data, and storage tank

water levels were utilized in the model calibration.

Once the water distribution system model was calibrated, the future demands were placed into the computer model to analyze the steady state condition of the system, and the requirements to meet these demands were determined from the program output.

Conditions that might develop throughout the water distribution system were analyzed by superimposing required fire flows on projected maximum system demands with elongated time. This dynamic analysis was done by assigning required pressure (20 psi) to a node at a particular location and checking for the adequacy of the flow rate along the time variation at that location. Water levels in storage facilities were adjusted along the time variation. As a result, the analysis presents the system adequacy for the specified location with the variation of the available flow along the time, and the water levels in the tanks fluctuating throughout the simulated period. This data was analyzed to determine the capacity of the system to meet the projected future demands and was also used to recommend proposed improvements.

B. System Analysis

Generally, the existing system can provide a marginally adequate service to meet maximum daily demand. Some areas were found to have low service pressure due to the high ground elevation, such as Atwood Street, Harris Road, Richard Road, High Ridge Street and Fairview Drive. The Southborough Water Supply System has been designed to serve the areas where the ground elevations are lower than elevation 400 (U.S.G.S.). Any location where the ground elevation is between 400 and 430 would experience lower service pressure. The areas where the ground elevation is higher than 430 would experience unacceptable low pressures. Some areas located between elevation 300 and 400 would encounter pressure problem during fire fighting if the pipe line is undersized.

In the Northern Section, North of Route 9, Clear Hill Stand Pipe and Hosmer Pump Station are

capable of providing adequate service to this portion except for the high ground areas. However, in March 1990, ISO made a flow test at the intersection of Route 9 and Willow Street and found the available flow was 1,200 gpm where 3,500 gpm is required. The computer model shows that the available fire flow is about 1,280 gpm at 20 psi. This low flow is due to the undersized 6-inch diameter water mains along Route 9 which restricted the flow rate. There are two approaches to improve the flow rate at this location, one is to replace the existing 6-inch diameter watermain along Route 9 from Oak Hill Road to Willow Street. However, the cost to install a new watermain on Route 9 is expensive. The other approach is to install a 12-inch diameter watermain from Maple Street to Brook Lane. This approach may be to install the watermain directly or in conjunction with the nearby subdivision in the future. Table 8 shows the computer dynamic analysis results for the available fire flow at 20 psi of pressure with different alternatives at the intersection of Route 9 and Willow Street.

**Table 8 - Available Fire Flow from Dynamic Analysis
For the Willow St. Improvement**

Description	At the Beginning of fire flow	At the End of 3 Hours of fire flow
Existing condition	1,410 gpm	1,280 gpm
Replace the 6" pipe along Route 9 w/12" pipe	5,300 gpm	3,100 gpm
Install 12" pipe from Maple Street to Brook Land	4,900 gpm	2,650 gpm

In the Middle Section, the ground elevation at both the East and West areas are high. Fortunately, the West area is not far away from the Tara Reservoir and the Boland Pump Station, and the East area has the Oak Hill Stand Pipe. Both areas are able to maintain the reasonably adequate water service. Along Parkerville Road area where the ground elevation is below 390 the distribution system can maintain adequate service.

The Southern Section, South of Route 90, is at the end of the distribution system. The water system has no problem providing maximum daily demand, but can only provide approximately 1,600 gpm of fire flow. Fire flow test conducted at the Finn School, at the intersection of Parkerville Road and Richard Road indicates that the available flow is about 1,600 gpm at 20 psi. The computer model confirms that the available fire flow on average is less than 1,600 gpm. Computer model indicates that the high head loss is caused by the undersized pipes crossing the bottle neck at Route 90. In order to convey adequate water to this part of Town in a timely manner, the distribution system needs to be improved.

There are two improvement approaches to consider. The first approach is to provide appropriate water storage near the Southern Section to shorten the water transmission distance. The second approach is to replace the existing water mains with adequate size pipe. After studying and testing a number of alternatives, the best option has been determined and divided into two Phases to complete this improvement. The first Phase is to install a water tank on Fairview Hill at the end of Skylar Drive and also improve some pipes on Parkville Road (between Fairview Drive and Richards Road). The second Phase is to install new pipes along Parkville Road (between Richards Road and Southville Road) and connect the pipes between Oak Hill Road and Oregon Road.

Table 9 lists the available flows with 20 psi of pressure at the Finn School from the dynamic analyses for the first Phase and second Phase.

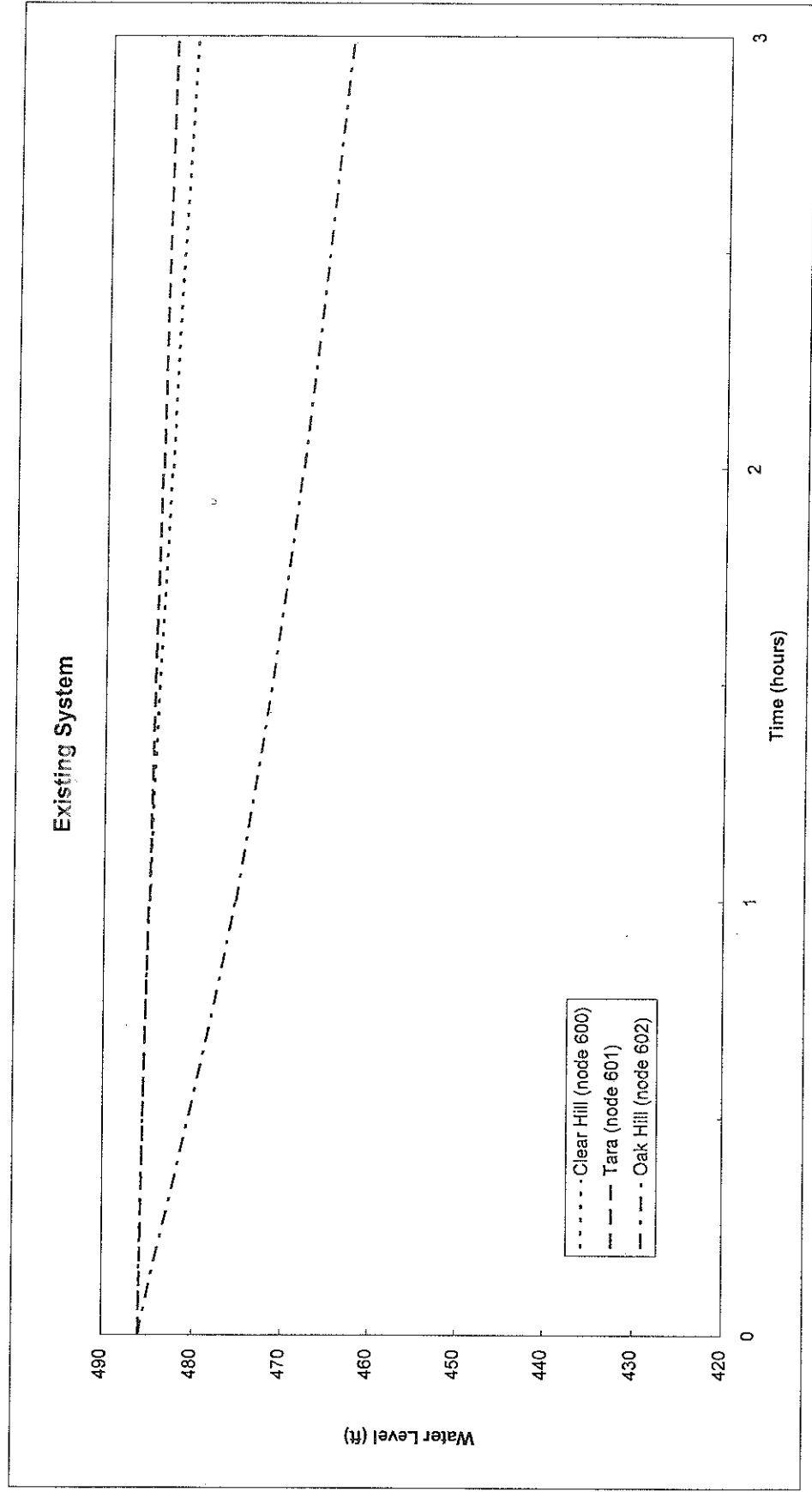
**Table 9 - Available Fire Flow from Dynamic Analysis
For the Southern Portion Improvement**

Description	At the Beginning of Fire Flow	At the End of 3 Hours of Fire Flow
Existing	1,800 gpm	1,710 gpm
Phase I	2,870 gpm	2,690 gpm
Phase II	3,780 gpm	3,330 gpm

The information for the variation of water level in the storage tanks verses the time during the dynamic test is also shown in next page. The available flows listed in the table above were based on the configuration of different Phases. These proposed phases are optimized to improve the existing system. However, each Phase will only work if all the improvements are completed. If the proposed Phase only completed partially, the improvement to the system will not be adequate.

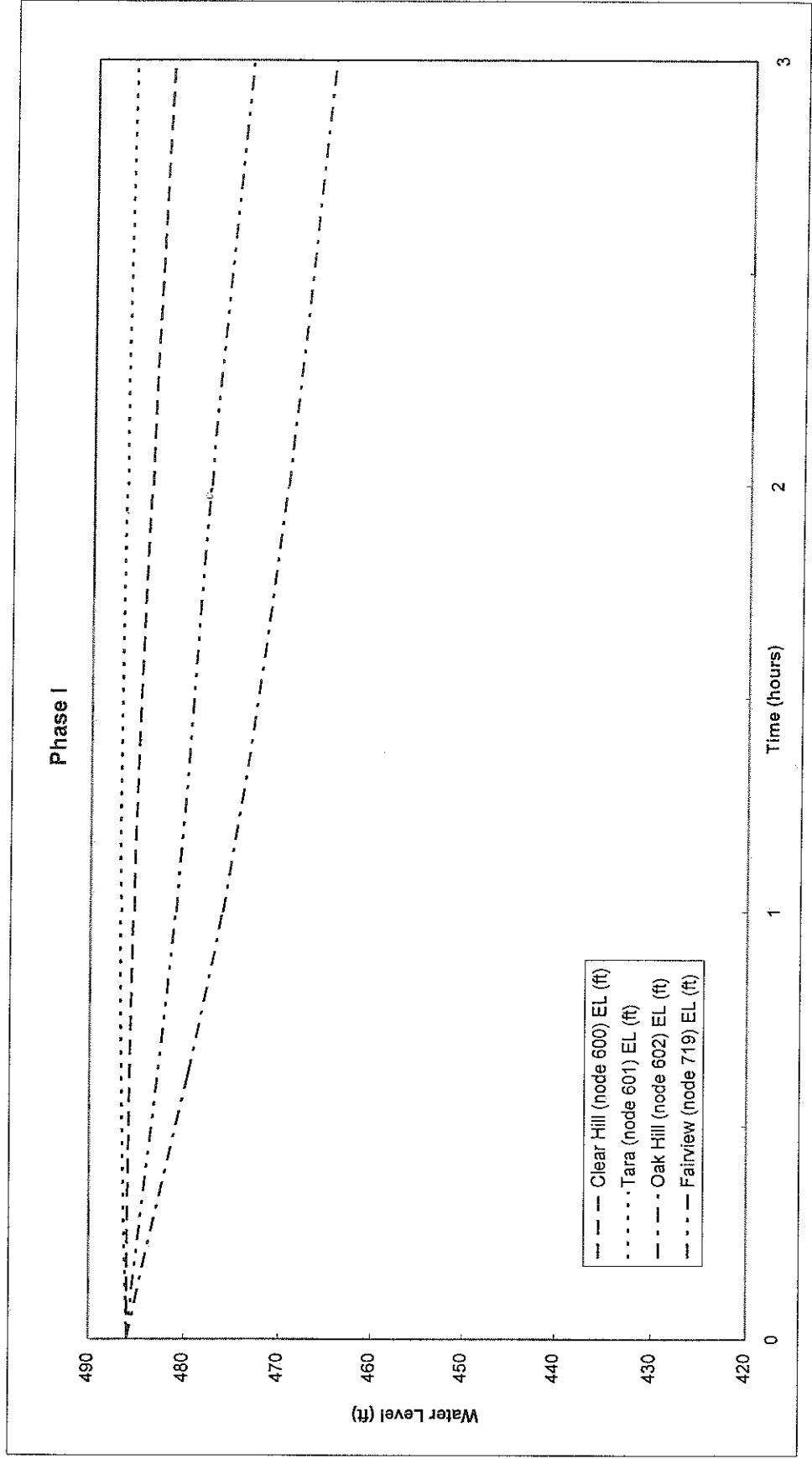
Existing System

Time	Clear Hill (node 600)		Tara (node 601)		Oak Hill (node 602)	
(Hour)	EL (ft)	Q (gpm)	EL (ft)	Q (gpm)	EL (ft)	Q (gpm)
0		486		486		
1	484.89	173.9	484.96	455.7	475.27	656.7
2	482.83	322.7	483.88	475.6	467.95	447.8
3	480.41	379.5	482.73	504.7	462.6	327.6



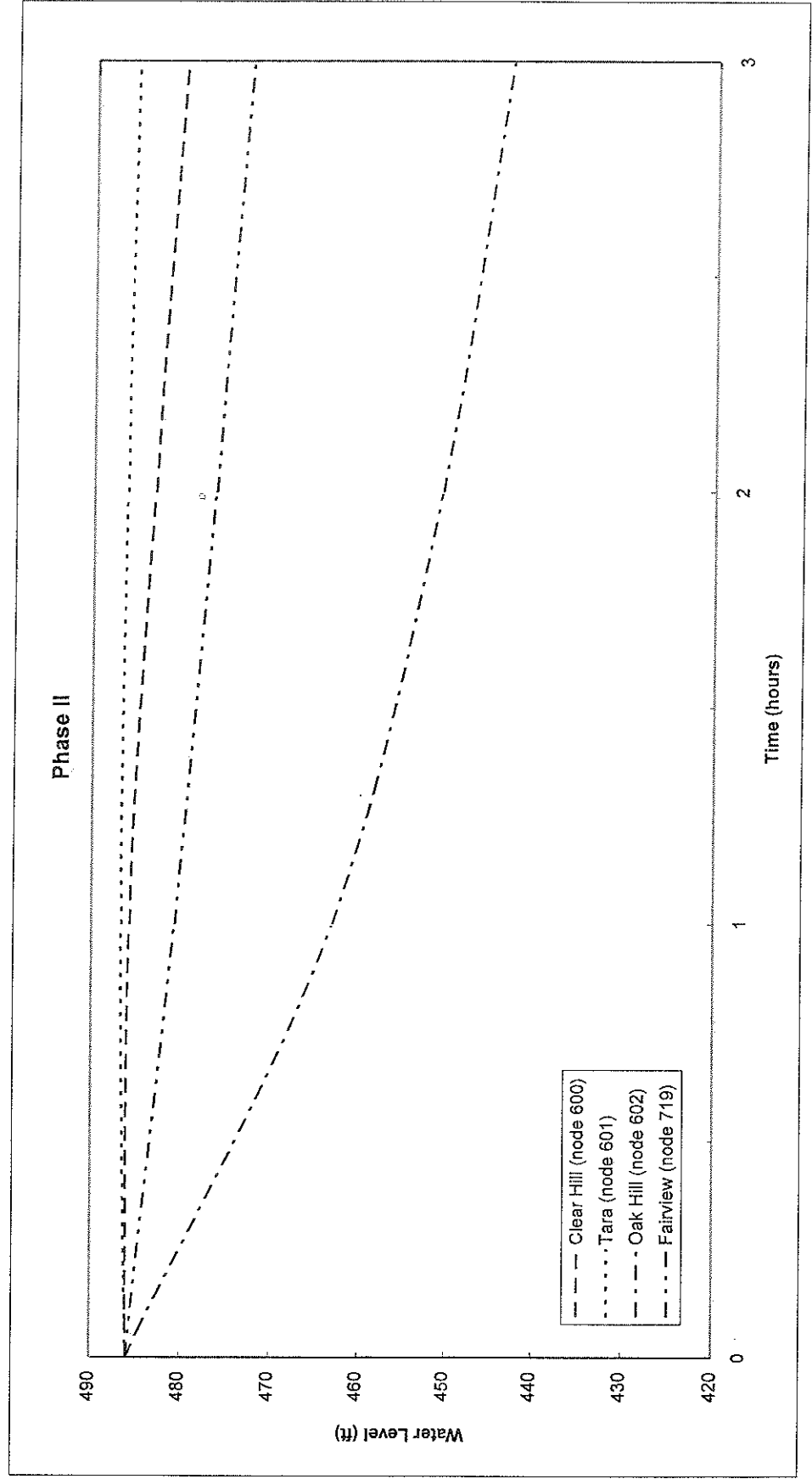
Phase I

Time (Hour)	Clear Hill (node 600)	Tara (node 601)	Oak Hill (node 602)	Fairview (node 719)
	EL (ft)	EL (ft)	EL (ft)	EL (ft)
0	486	486	486	486
1	485.43	486.73	476.06	480.96
2	483.85	486.52	469.47	477.63
3	481.86	485.89	464.71	473.59
				1360



Phase II

Time (Hour)	Clear Hill (node 600)		Tara (node 601)		Oak Hill (node 602)		Fairview (node 719)	
	EL (ft)	Q (gpm)	EL (ft)	Q (gpm)	EL (ft)	Q (gpm)	EL (ft)	Q (gpm)
0		486		486		486		486
1	485.7	35	486.65	-286.2	463.01	1406.7	480.64	2119.8
2	483.09	40.8	486.2	198.5	450.65	756.4	476.35	1694.5
3	479.83	510.3	485.22	431.1	442.79	481.2	472.53	1509.1



VI. Water System Master Plan

A. General

Due to the several major highways, a railroad and a large water supply aqueduct and a reservoir located in the Town, and ground elevations varying throughout the Town, it is difficult and costly to develop a water supply system which would provide adequate supply at sufficient pressure.

The recommended Master Plan in this Report is intended to provide a feasible and practical development of the water distribution system considering the Town of Southborough's existing system capabilities. In general, the following criteria were considered in the Master Plan Development:

1. Maximum utilization of existing water distribution system and storage facilities.
2. Location and sizing of the required reinforcing mains throughout the Town to minimize construction costs, avoid paralleling large size mains and avoiding constructing in "high" value streets.

The Master Plan was designed based on projections of future growth under current zoning. The Town should, however, review their demands and distribution system periodically to allow for any unusual growth patterns or demands placed on the system. Minor modifications may be required due to some unforeseen events, such as a new residential complex, a high water consumer or construction of an industrial complex in the remote areas of the system.

The design of the system to satisfy future demands concentrated on the major mains and major improvements involving large expenditures of time and money and require other than Town labor. As for minor improvements, these will be covered under the section of general recommendations which will be discussed later in this Report.

B. Source of Supply and Pumping Facilities

The Town of Southborough's source of water supply is from the MWRA Hultman Aqueduct. The present contract between Southborough and the MWRA expires in January, 1997. Based on the present contract, Southborough is allotted two million gallons per day by the MWRA. According to our projections, this two million gallon per day flow rate is adequate to meet Southborough's maximum daily demand through the year 1996. After that, the projected maximum daily demand would exceed the above limit. It is strongly recommended that Southborough negotiate future MWRA contract requesting the 2.0 MGD limit be increased to a higher limit, preferable 3.0 MGD including obtaining water from a neighboring MWRA community.

The capacity of the two existing pumping stations can adequately handle a flow rate of about 3.0 MGD. Considering the old age of each pumping station, we strongly recommend the equipment in each station be thoroughly inspected, repaired and/or replaced, including chlorinators, pumps and motors.

wasn't there some \$ already allotted for this?

C. Storage Facilities

The storage facilities within a water system are one of the most essential elements of a water supply distribution system. The purpose of water storage in a distribution system is to increase the capacity and efficiency of the water system as follows:

1. Provide adequate flow for fighting fires
2. Meet maximum and peak hourly demand variations
3. Provide more uniform pressures within the system 24 hours a day
4. Provide water to meet system demands at emergency conditions such as mechanical failure, periodic maintenance of pumping facilities or water main breaks
5. Provide a safety outlet in the system to attenuate the effects of pressure surges known

as water hammer

The primary purpose of storage is to provide a source of pressure and standby supply that will result in a more balanced system pressure and in an equalization of system supply and demand. Storage “rides” on the hydraulic gradient of the distribution systems so power outages do not affect the immediate ability of the storage facilities to supply the water distribution system.

In addition, if a system had no storage, the water supply pumping facilities would have to be capable of supplying the maximum, instantaneous rate of consumption, regardless of how infrequent this rate occurred.

The required storage volume of a water supply system can be analyzed in detail based on the hourly demand variation of a maximum daily demand for determination of the equalization storage requirements; and based on maximum fire flow requirements to determine the required fire flow storage. However, it is quite difficult to determine the required emergency storage which varies with the type of emergency.

It is a “rule of thumb” that a system should have a usable storage equal to or greater than its maximum daily demand, especially for small systems. The Town’s projected maximum daily demand is about 2.3 MGD for the year 2010. The existing usable storage is only 1.0 MGD. This is approximately 1.3 MGD less than the 2.3 MGD of usable storage required. This emphasizes the need for additional storage in Southborough.

To increase the storage capacity, H₂O Engineering Consulting Associates, Inc., recommends the following items:

1. Increase the storage capacity within the existing system by creating a high pressure zone. This can be accomplished by boosting the water level in the Tara Hill Reservoir up to elevation 514± feet USGS. Boosting the water level in the Tara Hill

Reservoir up to elevation 514± feet USGS will create a higher pressure zone which requires pressure reducing valves to be installed at locations where the high-low pressure areas of the system are tied together. Also, modifying the existing telemetry system to raise the working pressure of the other two storage facilities from elevation 488± to 492± USGS. This would increase the usable storage capacity within the existing system by about 750,000 gallons.

2. Construct a new one million gallon storage facility which would provide at least 800,000 gallons of usable storage.

D. Distribution System Improvement

The existing Southborough Water Supply System is a one pressure zone system. It's hydraulic gradients are limited by the storage facility's overflow elevations. The overflow elevations of the storage facilities, except for the Tara Hill Reservoir, are about 493 feet USGS. The Tara Hill Reservoir has an overflow at elevation 515 feet USGS. Using the overflow elevations of the storage facilities, the required service pressure and the approximate highest service elevation in the system can be determined.

The Massachusetts Department of Environmental Protection (DEP) Guidelines for Public Water Systems recommends a minimum service pressure of 35 pounds per square inch (psi). Under the current one pressure zone system, any area in the Town of Southborough higher than elevation 413 would not have the recommended minimum service pressure of 35 psi. If pipeline head losses are considered, areas which the system can provide 35 psi would have a ground elevation below 410 feet USGS. However, based on USGS topo maps, areas of the Town higher than 410 feet elevation represent approximately nine (9%) percent of the total land area, with the majority of the high areas located on the Tara Hill Reservoir, Fairview Hill and Pine Hill areas.

The Tara Hill Reservoir has an overflow elevation of 515 feet USGS. Full utilization of the Tara

Hill Reservoir would help to provide adequate service pressure for areas with ground elevation between 410 to 430 feet USGS. This would require separating the Southborough Water Supply System into two pressure zones. The high pressure zone would be controlled by the Tara Hill Reservoir and the lower pressure zone would be limited by Oak Hill and Clear Hill Storage Tanks. Pressure reducing valves must be installed at the connections between these two zone. During 1995, the two-zone system was established by closing some valves. This establishment improved the service to higher areas.

The two zone system will minimize the pressure problem at the Tara Hill Reservoir area. Fairview Hill contains the majority of high ground and requires higher pressures. The improvement on the Tara Hill Reservoir will also improve pressure on Fairview Hill but is less significant due to head loss between the two areas.

To minimize low pressure problems on the Fairview Hill area, we recommend construction of a storage facility on Fairview Hill along with related pipeline improvements. This storage facility should have a minimum capacity of 1.0 MG with an overflow elevation 515 feet USGS.

Presently, the Pine Hill Area, located North of the Sudbury Reservoir, is not being served by Southborough's Water System. To serve this area would require the installation of a long pipeline from Old Boston Road to the Pine Hill Area. Also, this line must pass through the MWRA facility below the Sudbury Reservoir. Therefore, obtaining an easement would be extremely difficult and construction economically unrealistic.

When the Pine Hill Area begins developing, it appears more feasible to obtain water from the Town of Framingham's high service area. Framingham's high service zone has one pumping station (Grove Street P.S.) a one million gallon prestressed concrete tank along with an old 300,000 gallon steel tank which may be out of service. The supply of Framingham's high service system is limited by the Grove Street Pump Station's one million gallon per day pumping capacity. Therefore, a small storage facility may be needed for this area; however, we recommend that the system storage

capacity and the pipe line be evaluated when this area begins developing.

Another area that requires immediate attention is the section located South of the Massachusetts Turnpike. Although this area has adequate domestic supply, the system can not provide adequate fire flow to areas such as the Finn School area and Parkerville Road due to the lack of transmission mains under the Massachusetts Turnpike, as previously discussed. It is recommended that transmission mains be installed under the Mass Turnpike to serve this South Section.

There are other areas do not have adequate fire flow rates as required by ISO due to dead ends or undersized pipes . Improvements should be made as financial conditions and time permit. For example, to improve the inadequate pressure and flow at the intersection of Route 9 and Willow Street, a 12" diameter pipe is needed along Route 9 to increase the existing available average fire flow from 1,350 gpm to more than 4,000 gpm. However, the installation of a water main along Route 9 would not be permitted by the State Highway Department for at least five years following it's last resurfacing. Installation of a water main along Route 9 would be financially detrimental other than installations along other Town roads.

E. Water Quality

The quality of water from the Quabbin and Wachusett Reservoirs meets or exceed present EPA and DEP drinking water standards except for bacteria and corrosiveness. The low pH, alkalinity and hardness point to the problem of corrosion.

Because raw water quality meets most DEP and EPA drinking water standards, it is not surprising that past treatment was limited to disinfection in Southborough. Aggressive water corrodes distribution system piping and plumbing leaching these pipe materials into the water supply. This results in increasing the concentrations of these metals above drinking water standards. Currently, the MWRA has contracted for a corrosion study which may rectify this problem with corrosion control facilities installed at the Shaft C area. Southborough is located very close to the possible

MWRA Corrosion Control Facility. Therefore, corrosion treatment for the Southborough Water Supply may not be required. Also, the MWRA will likely construct a water treatment plant at Shaft C area. This new plant is expected to solve the corrosion problem for all MWRA communities. Therefore, we recommend that Southborough take no immediate action for corrosion control, but wait for the MWRA progress before discussing further actions.

VII. Recommendations and Cost Estimates

A. General Recommendations

The water system improvements discussed below are general in nature and in some cases may be performed by the Town's own labor force. The suggested improvements described below should be conducted on a continual basis and should be included in design considerations for future system growth.

Where future extension of the water distribution system is contemplated or when existing lines are being replaced, consideration should be given to its effect on the over all water distribution system. Extensions should be made to create looped connections and with pipe sizes to carry required domestic and fire flows for future demands.

It should become standard practice, within the Town, that all water mains serving hydrants should be a minimum of 8" in diameter, unless the water main is in a residential district and would not exceed 600 feet in length, then 6" diameter pipe would be permissible.

It is recommended that in the future, any new development should submit the following to the Town's Water Department for reviewing to determine the effect on the water system:

1. Plans of subdivisions should be submitted to the Town for review and approval.
2. Record plans should be submitted to the Water Department for all projects affecting the water system.
3. Large projects such as condominiums, industries, etc., should be investigated with respect to fire flow requirements, prior to approval.

B. Specific Recommended Improvements

As a result of the computer model analysis of the Southborough Water System, it was determined that the distribution system can adequately meet consumer demands except for a few high elevation areas, but can not satisfy required fire flow demands in most cases. Among the reasons for this are the undersized and limited number of transmission mains within the Town, along with many "dead-end" areas which result in a lack of necessary reinforcing "loops" within the system. Another major problem is the low pressures existing in the sections of Southborough which are at high elevations.

To overcome the low pressure problem on those areas with high ground elevation, it is recommended that the water system be separated into high and low service areas. The approximate boundary of the two pressure zones are shown on Plan C. The two zone recommendation and several other recommended system improvements will minimize the pressure problem in the high ground areas, but will not eliminate them completely. There are some undeveloped areas which are economically infeasible to supply at present. This condition should be considered carefully before developing those areas. Therefore, several solutions are presented to further minimize the pressure problems in high ground areas:

1. Prohibit all developments above elevation 410 feet USGS in the low service zone, and above elevation 430 feet USGS in the proposed high service zone.
2. Require developers to construct necessary water tanks and booster systems to provide required pressure in the high elevation areas.

*Could we
get planning
to approve this
is it a table*

The above facts led to the compilation of a series of proposed improvements which have been broken into three phases. Phase I involves all measures that should be take immediately to improve the water system and completed by the year 2000. Phase II improvements should be considered presently and completed by the year 2005. Phase III improvements would depend upon the progress

of land development, which timing would be difficult to predict. Some items may be developed in the near future and some items may be developed in the more distant future.

Phase I

1. Separating the system into two pressure zone systems by installing pressure regulated valves at the following streets:
 - a. An 8" diameter PRV installed on the 10" diameter main along Main Street at the East side of the intersection of Deerfoot Road and Main Street, using the existing 10" diameter line as a bypass. *DONE*
 - b. A 6" diameter PRV installed on Mt. Vickery Road near Cordaville Road. *DONE*
 - c. A 10" diameter PRV installed on the proposed 12" diameter main along Parkerville Road near the Massachusetts Turnpike. The existing 8" diameter main can be shut off by connected to the proposed new 12" diameter transmission main on both sides of the PRV. *DONE*
2. Construction of a storage tank and associated pipes: *NOT*
 - a. Construct a water storage tank at the end of Skylar Drive with a minimum storage volume of 1.0 MG.
 - b. Install 200 feet of 16" diameter water main to connect the proposed water tank and the existing water main at Skylar Drive.
 - c. Install 1,200 feet of 12" diameter water main parallel to the existing 8" diameter water main along Saren Stone Way and Skylar Drive to Summit Road.

- d. Install 3,200 feet of 12" diameter water main on Parkerville Road from Fairview Drive to Richards Road. This 12" diameter main along Parkerville Road must be extended in Phase II.

Phase II

1. Install 2,300 feet of 12" diameter pipe on Flagg Road and Peach Tree Lane to connect the existing 12" diameter main on Love Lane and Paper Street.
2. Extend the 12" diameter main along Parkerville Road both ways, from Richards Road to Southville and from Fairview Drive to Skylar Drive.
3. Install 1,100 feet of 12" diameter pipe along Skylar Drive.
4. Install a 12" diameter water main from the existing 12" diameter water main at Oak Hill Drive along Walnut Drive connecting to an existing 12" diameter water main under the Massachusetts Turnpike continue along Cart Path or an easement to Oregon Road, then along Edgewood Road to connect to the existing 12" diameter main at Adams Circle. The route of this main may vary somewhat depending upon the possible subdivision of the land between the Massachusetts Turnpike and Oregon Road; and between Oregon Road and Edgewood Road.

Phase III

The recommendations in this phase include pipes that shall form an efficient transmission looping system for the Town of Southborough. Many of these pipes depend upon future subdivisions. However, each subdivision is responsible for installing the proper size water mains through the subdivision to abutting lands.

1. Any new street without a loop and longer than 1,500 feet, such as streets which may end at wetlands, State and Interstate Highways, and water bodies, which are difficult to loop should install 12" diameter water mains for adequate fire flow. (e.g., avoid undersized piping - 6" diameter pipe along Middle Road North of the Worcester Turnpike to the Sudbury Reservoir). In future development, North of Knox Street, a minimum of 8" diameter looping from Parkerville Road to Middle Road should be installed to provide adequate fire flow to Middle Road.
2. Areas North of Fisher Road, during development, a 12" diameter main will be required. It is recommended to have a 12" diameter loop back to Jericho Hill Road. Dead ends in this area should be avoided.

3. West of Sears Road, North of Main Street, East of Chestnut Hill Road and South of the Hultman Aqueduct easement, a 12" diameter pipe along Chestnut Hill Road along with a 12" diameter loop to the existing 10" diameter main at Wyndemere Drive should be installed. The water main along Sears Road should also be 12" diameter in size with a Pressure Regulator Valve and Chamber.
4. During development of the Pine Hill area, purchasing water from the Town of Framingham's high service zone would be the most feasible supply solution. However, since Framingham's high service system supply is limited by Grove Street Pumping Station, Framingham may not be willing to sell water to the Town of Southborough.

Another option is to purchase water from Framingham's low service zone at Pine Hill Road and Waveney Road intersection area. In this case, a booster pumping station may need to be constructed.

The third option is to obtain an easement from the Town of Framingham to install a 12" diameter pipe along Pleasant Street and Pine Hill Road from the existing 12" diameter main at Boston Road in (Southborough) to the Pine Hill area. The cost for this long pipe is infeasible. Pipe size at the Pine Hill area should have a 12" diameter loop with 8" diameter sub-loops. No 6" diameter pipes should be used due to the high ground elevation. A storage tank may be required if this area becomes fully developed.

C. COST ESTIMATION

The cost estimate for Phase I and II is based on the current cost estimation. This does not include the cost of land acquisition, right of way, appraisal and survey, site preparation, or new access roads in case of the new purchase of land is required. This is a preliminary estimation for alternative comparison only.

Phase I: New Water Storage Tank at the End of Skylab Drive and installing new 12-inch diameter pipes along Parkerville Toad

Total length of 12" diameter pipe:	4,570 ft	\$280,100
Total length of 16" diameter pipe:	200 ft	\$14,800
New Tank*:	1.0 million gal.	\$478,500
Installing 3 PRVs		\$38,500
Site Preparation for Tank and access road and control valves		\$200,000
Total		\$1,011,900

(*): The cost estimate for the tank was quoted by the New England Tank System for Aquastrore(R) Glass-fused-to-Steel Tank. The Cost did not include land purchase and permits.

Phase II: Adding New Pipes along Parkerville Road and Others

Total length of 12" diameter pipe:	16,860 ft	\$1,033,500
Total		\$1,033,500

APPENDICES

COMPUTER PRINTOUT

**FIRE FLOW W/
EXISTING SYSTEM**

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, EXISTING SYSTEM) FILE:TEST.DAT

INITIAL TIME..... TZERO = 0.00
TIME INCREMENT..... DELT = 1.00
FINAL TIME..... TFINAL = 3.00

***** TANK LEVEL ADJUSTMENT FACTORS:

TANK AT NODE 600	VOL PER UNIT ELEV. =	1257	FT.**3/(FT. ELEV.)
TANK AT NODE 601	VOL PER UNIT ELEV. =	3526	FT.**3/(FT. ELEV.)
TANK AT NODE 602	VOL PER UNIT ELEV. =	491	FT.**3/(FT. ELEV.)

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, EXISTING SYSTEM) FILE:TEST.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
1	2	1	975	8	100	9.62	0.01	0.01	0.06
2	3	2	1100	12	100	13.61	0.00	0.00	0.04
3	4	3	1900	12	100	23.23	0.01	0.00	0.07
4	4	5	1200	12	100	31.81	0.01	0.01	0.09
5	5	2	1500	12	100	5.63	0.00	0.00	0.02
6	6	4	430	12	100	59.81	0.01	0.02	0.17
7	7	6	1750	12	110	1061.82	6.76	3.86	3.01
8	500	7	800	12	110	1069.15	3.13	3.91	3.03
9	500	8	850	12	110	30.85	0.00	0.01	0.09
10	8	9	400	12	100	4.67	0.00	0.00	0.01
11	9	10	300	12	100	4.67	0.00	0.00	0.01
12	6	11	1950	12	110	997.24	6.71	3.44	2.83
13	11	12	2200	12	110	380.85	1.27	0.58	1.08
14	12	13	750	12	110	376.09	0.42	0.57	1.07
15	13	14	2000	12	110	371.32	1.10	0.55	1.05
16	14	15	1950	10	100	4.76	0.00	0.00	0.02
17	14	30	1400	10	100	359.87	2.11	1.51	1.47
18	34	156	800	6	120	40.76	0.18	0.23	0.46
30	30	31	1500	10	90	201.29	0.94	0.63	0.82
PRV (180.00)							0.00		Open
31	31	32	520	8	100	41.19	0.04	0.08	0.26
32	32	33	800	8	100	15.40	0.01	0.01	0.10
33	32	33	450	8	100	21.02	0.01	0.02	0.13
34	31	34	500	10	90	155.33	0.19	0.39	0.63
35	33	34	700	6	100	31.66	0.14	0.20	0.36
36	34	35	500	10	90	136.61	0.15	0.31	0.56
37	35	36	320	10	90	129.92	0.09	0.28	0.53
38	36	37	550	10	90	148.28	0.20	0.36	0.61
39	156	36	1800	8	100	25.05	0.06	0.03	0.16
40	37	38	1350	10	110	140.08	0.30	0.22	0.57
41	38	39	400	10	110	152.42	0.10	0.26	0.62
42	72	38 CV	1000	8	110	21.59	0.02	0.02	0.14 Open
43	39	40	1650	10	110	125.28	0.30	0.18	0.51
44	39	73	850	8	110	8.81	0.00	0.00	0.06
45	40	41	1350	12	110	128.21	0.10	0.08	0.36
46	51	40	350	6	90	8.47	0.01	0.02	0.10
47	41	42	450	12	110	119.90	0.03	0.07	0.34
48	42	43	1100	12	110	72.39	0.03	0.03	0.21
49	43	44	250	12	110	16.36	0.00	0.00	0.05
50	43	46	2200	8	110	10.51	0.01	0.01	0.07
51	44	45	750	12	110	6.18	0.00	0.00	0.02
52	44	45	2500	10	110	2.00	0.00	0.00	0.01
53	46	47	1650	8	110	2.33	0.00	0.00	0.01
54	48	47	3300	12	110	5.86	0.00	0.00	0.02
55	43	48	1500	12	110	37.21	0.01	0.01	0.11
56	48	49	500	12	110	23.17	0.00	0.00	0.07
57	49	50	1050	12	110	14.63	0.00	0.00	0.04
58	49	50	1350	8	110	4.40	0.00	0.00	0.03
59	51	52	1200	6	100	13.85	0.05	0.04	0.16
60	42	62	600	8	120	31.81	0.02	0.04	0.20
61	62	49	2100	8	120	16.10	0.02	0.01	0.10
64	49	50	1500	8	120	4.53	0.00	0.00	0.03
70	37	70	500	10	90	3.44	0.00	0.00	0.01

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, EXISTING SYSTEM) FILE:TEST.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
71	71	70	600	10	90	3.42	0.00	0.00	0.01
72	71	72	1950	8	90	50.28	0.28	0.14	0.32
73	75	71	600	10	90	312.69	0.85	1.41	1.28
74	72	73	750	6	90	25.92	0.13	0.17	0.29
75	73	74	600	6	90	31.96	0.15	0.25	0.36
76	74	51	700	6	90	27.87	0.14	0.19	0.32
77	78	75	2900	10	100	64.48	0.18	0.06	0.26
78	76	75	150	10	90	178.91	0.08	0.50	0.73
79	76	77	900	6	100	13.85	0.04	0.04	0.16
80	90	76	650	12	120	143.76	0.05	0.08	0.41
81	78	79	2160	8	100	13.90	0.02	0.01	0.09
82	600	78	800	10	90	106.09	0.15	0.19	0.43
83	79	84	450	6	90	11.30	0.02	0.04	0.13
84	79	83	300	8	100	21.68	0.01	0.02	0.14
85	84	80	650	12	110	4.44	0.00	0.00	0.01
86	83	80	650	8	100	16.14	0.01	0.01	0.10
87	80	81	750	8	100	13.72	0.01	0.01	0.09
88	81	82	1600	6	100	6.86	0.02	0.01	0.08
89	85	79	550	8	100	25.95	0.02	0.03	0.17
90	86	85	2050	10	100	41.65	0.06	0.03	0.17
91	86	88	250	8	90	36.02	0.02	0.08	0.23
92	88	87	1300	8	90	12.78	0.01	0.01	0.08
93	88	89	2400	8	90	9.38	0.02	0.01	0.06
94	87	89	250	8	90	4.47	0.00	0.00	0.03
95	93	86	3500	10	100	91.53	0.42	0.12	0.37
96	600	91	1200	10	110	67.77	0.07	0.06	0.28
97	92	90	600	12	120	150.25	0.05	0.09	0.43
98	91	92	1950	10	110	58.15	0.08	0.04	0.24
99	93	92	900	8	90	101.72	0.47	0.52	0.65
100	93	95	400	8	110	4.76	0.00	0.00	0.03
101	94	93	1080	10	110	202.78	0.47	0.44	0.83
102	96	94	1800	12	110	499.52	1.72	0.96	1.42
103	501	96	2560	12	110	1000.00	8.85	3.46	2.84
104	96	97	450	6	110	45.04	0.15	0.32	0.51
105	97	98	900	6	110	39.27	0.23	0.25	0.45
106	96	94	1800	8	90	140.70	1.72	0.96	0.90
119	601	123	100	12	100	455.66	0.10	0.96	1.29
120	121	120	2200	12	100	715.69	4.88	2.22	2.03
121	123	121	1200	12	110	547.99	1.36	1.13	1.55
122	124	123	800	12	110	97.09	0.04	0.05	0.28
123	122	121	500	8	120	172.47	0.41	0.82	1.10
124	124	122	1150	8	120	177.23	0.99	0.86	1.13
125	125	124	600	12	110	279.09	0.20	0.33	0.79
126	125	142	1100	8	100	175.80	1.31	1.19	1.12
127	120	126	550	12	100	713.76	1.21	2.21	2.02
128	127	125	350	12	100	338.40	0.19	0.55	0.96
129	128	127	1800	12	110	606.86	2.47	1.37	1.72
130	11	128	1800	12	110	611.63	2.50	1.39	1.74
131	127	129	1360	8	100	144.28	1.12	0.82	0.92
132	129	130	800	8	100	14.39	0.01	0.01	0.09
133	129	131	1200	8	100	125.13	0.76	0.63	0.80
134	131	132	1250	8	120	6.69	0.00	0.00	0.04

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, EXISTING SYSTEM) FILE:TEST.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
135	133	131	1200	8	100	17.90	0.02	0.02	0.11
136	134	133	800	8	100	27.52	0.03	0.04	0.18
137	134	135	400	8	100	119.61	0.23	0.58	0.76
138	135	136	500	8	100	114.84	0.27	0.54	0.73
139	30	134	2080	8	100	151.89	1.88	0.91	0.97
140	131	136	650	8	100	131.57	0.45	0.69	0.84
141	136	137	1120	8	100	241.65	2.40	2.14	1.54
143	139	138	1350	8	120	11.00	0.01	0.00	0.07
144	140	139	300	12	120	22.17	0.00	0.00	0.06
145	126	141	600	12	100	382.72	0.42	0.70	1.09
146	141	157	1600	12	100	289.68	0.67	0.42	0.82
147	141	140	2100	12	110	318.64	0.87	0.42	0.90
148	143	141	400	12	100	230.18	0.11	0.27	0.65
149	126	143	280	12	100	490.92	0.31	1.10	1.39
150	140	145	1750	12	110	797.18	3.98	2.27	2.26
151	147	146	250	8	100	146.82	0.21	0.85	0.94
152	147	148	1400	8	100	19.64	0.03	0.02	0.13
153	148	149	350	6	100	39.95	0.11	0.31	0.45
154	149	146	1250	8	100	35.18	0.08	0.06	0.22
155	150	147	500	8	100	91.76	0.18	0.36	0.59
156	155	147	1700	6	100	82.49	2.02	1.19	0.94
157	137	155	1100	6	100	236.89	9.22	8.38	2.69
158	155	158	850	8	120	149.82	0.54	0.63	0.96
159	154	150	950	8	100	142.95	0.77	0.81	0.91
160	150	151	1450	8	100	44.31	0.13	0.09	0.28
161	151	152	500	6	100	4.76	0.00	0.01	0.05
162	152	153	1000	6	100	1.92	0.00	0.00	0.02
163	151	148	400	6	100	29.93	0.07	0.18	0.34
164	142	126	1400	6	100	170.57	6.38	4.56	1.94
165	157	140	500	12	100	289.68	0.21	0.42	0.82
166	127	125	350	8	100	116.49	0.19	0.55	0.74
167	158	154	850	8	120	149.82	0.54	0.63	0.96
170	171	170	2180	8	120	430.57	9.71	4.45	2.75
171	171	172	300	8	100	5.77	0.00	0.00	0.04
172	173	171	1250	8	100	440.19	8.13	6.50	2.81
173	94	173	2600	8	120	262.62	4.63	1.78	1.68
174	174	173	900	8	100	182.33	1.14	1.27	1.16
175	175	174	600	8	100	83.02	0.18	0.30	0.53
176	178	174	800	8	100	103.16	0.35	0.44	0.66
177	176	175	550	8	100	87.78	0.18	0.33	0.56
178	176	177	220	8	100	14.66	0.00	0.01	0.09
179	180	176	550	8	100	107.21	0.26	0.48	0.68
180	71	178	1650	8	100	132.54	1.16	0.70	0.85
181	177	178	250	8	100	9.89	0.00	0.01	0.06
183	71	179	1450	8	110	119.58	0.71	0.49	0.76
184	179	180	350	8	100	114.81	0.19	0.54	0.73
185	180	181	400	8	100	2.84	0.00	0.00	0.02
186	183	182	250	8	110	77.35	0.05	0.22	0.49
187	182	184	500	8	110	75.43	0.10	0.21	0.48
188	94	183	280	8	90	171.98	0.39	1.39	1.10
189	183	184	380	8	90	89.86	0.16	0.42	0.57
190	184	185	250	8	90	160.52	0.31	1.22	1.02

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, EXISTING SYSTEM) FILE:TEST.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
191	185	75	1100	8	110	83.14	0.27	0.25	0.53
192	185	186	600	8	100	72.61	0.14	0.23	0.46
193	186	76	400	8	100	57.32	0.06	0.15	0.37
194	186	187	450	6	100	7.59	0.01	0.01	0.09
195	187	90	300	6	100	1.82	0.00	0.00	0.02
196	190	279	700	8	110	23.55	0.02	0.02	0.15
198	190	170	1300	8	100	143.84	1.07	0.82	0.92
199	191	190	2400	8	100	170.23	2.69	1.12	1.09
200	192	191	800	8	60	292.16	6.27	7.84	1.86
201	196	191	650	8	60	513.90	14.49	22.30	3.28
202	193	192	250	6	60	296.92	8.20	32.78	3.37
203	194	193	150	12	120	73.65	0.00	0.02	0.21
204	193	204	2560	10	100	51.14	0.10	0.04	0.21
205	194	195	1280	8	60	8.29	0.01	0.01	0.05
206	196	194	850	12	120	86.70	0.03	0.03	0.25
207	196	195	550	6	60	11.06	0.04	0.07	0.13
208	280	196	1000	12	120	616.42	1.20	1.20	1.75
209	197	193	650	12	120	280.19	0.18	0.28	0.79
210	198	197	1100	8	90	285.96	3.91	3.55	1.83
212	96	198	450	8	90	311.89	1.88	4.17	1.99
213	198	199	800	8	100	4.76	0.00	0.00	0.03
214	198	200	200	8	100	11.55	0.00	0.01	0.07
215	200	201	1050	10	100	1.92	0.00	0.00	0.01
216	195	202	1250	6	60	15.50	0.17	0.14	0.18
217	202	203	200	6	60	8.99	0.01	0.05	0.10
218	202	206	450	12	110	1.92	0.00	0.00	0.01
219	204	203	350	6	60	21.52	0.09	0.25	0.24
220	203	205	450	12	110	2.84	0.00	0.00	0.01
222	204	207	450	6	60	29.62	0.21	0.46	0.34
223	207	208	2100	8	110	15.24	0.02	0.01	0.10
224	208	209	1800	8	110	10.47	0.01	0.01	0.07
250	126	230	500	12	100	5.92	0.00	0.00	0.02
251	230	231	500	12	110	2.99	0.00	0.00	0.01
252	143	233	500	12	100	246.36	0.15	0.31	0.70
253	233	232	350	12	120	237.15	0.07	0.20	0.67
254	232	234	1200	12	120	225.01	0.22	0.19	0.64
255	232	235	200	8	120	9.21	0.00	0.00	0.06
256	234	140	3100	12	120	215.80	0.53	0.17	0.61
257	145	236	450	12	110	794.43	1.02	2.26	2.25
258	236	237	700	12	110	791.38	1.57	2.24	2.25
259	237	146	1400	12	110	274.54	0.44	0.32	0.78
260	237	238	1350	8	110	511.92	9.73	7.21	3.27
261	239	238	900	8	110	100.11	0.32	0.35	0.64
262	146	239	1300	8	100	454.62	8.97	6.90	2.90
263	239	240	1800	8	100	349.53	7.63	4.24	2.23
264	238	241	1150	10	100	607.04	4.57	3.98	2.48
265	245	240	500	10	100	594.84	1.91	3.83	2.43
266	240	246	650	8	100	941.32	17.26	26.56	6.01
267	241	242	1100	10	110	164.40	0.33	0.30	0.67
268	241	245	380	10	100	439.59	0.83	2.19	1.80
269	242	243	700	10	110	161.35	0.20	0.29	0.66
270	243	245	1100	10	110	158.30	0.30	0.28	0.65

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, EXISTING SYSTEM) FILE:TEST.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
271	246	247	1520	8	100	852.62	33.61	22.11	5.44
272	246	250	1440	8	100	76.13	0.36	0.25	0.49
273	247	300	1050	8	100	841.13	22.64	21.56	5.37
			PRV (205.00)			0.00			Open
274	247	248	1600	6	100	7.39	0.02	0.01	0.08
275	248	249	1250	12	110	3.69	0.00	0.00	0.01
276	250	251	2560	6	100	71.20	2.32	0.90	0.81
			PRV (197.00)			0.00			Open
277	251	252	550	8	100	10.73	0.00	0.01	0.07
278	251	255	1900	8	100	616.95	23.08	12.15	3.94
279	252	253	750	8	110	4.11	0.00	0.00	0.03
280	252	254	200	8	100	2.99	0.00	0.00	0.02
282	255	256	600	8	100	408.67	3.40	5.67	2.61
283	255	257	1000	8	100	205.29	1.58	1.58	1.31
284	257	256	1200	8	100	200.36	1.82	1.51	1.28
285	256	320	1650	8	100	606.05	19.39	11.75	3.87
300	270	251	2350	8	100	560.12	23.87	10.16	3.58
301	170	270	650	8	100	571.57	6.85	10.54	3.65
302	270	271	950	6	100	6.69	0.01	0.01	0.08
303	273	272	1350	8	110	0.41	0.00	0.00	0.00
304	274	272	950	8	110	4.35	0.00	0.00	0.03
305	274	273	550	8	110	5.18	0.00	0.00	0.03
306	275	274	450	8	110	14.29	0.00	0.01	0.09
307	276	275	800	8	110	19.06	0.01	0.02	0.12
308	276	354	300	8	100	598.62	3.45	11.49	3.82
309	277	276	1360	8	100	622.44	16.79	12.35	3.97
310	278	277	3000	8	120	627.21	26.80	8.93	4.00
311	191	278	1200	8	120	631.06	10.84	9.04	4.03
312	282	280	1050	12	120	621.92	1.28	1.22	1.76
313	282	283	550	6	100	14.29	0.03	0.05	0.16
314	283	284	1100	6	100	4.67	0.01	0.01	0.05
315	282	285	950	8	90	15.71	0.02	0.02	0.10
316	602	282	700	12	120	656.69	0.95	1.35	1.86
350	300	301	500	8	100	63.53	0.09	0.18	0.41
351	301	302	850	8	100	58.95	0.13	0.16	0.38
352	302	303	700	6	100	4.71	0.00	0.01	0.05
353	302	304	1000	8	100	49.52	0.11	0.11	0.32
354	304	305	500	8	100	10.33	0.00	0.01	0.07
355	304	307	500	6	100	13.78	0.02	0.04	0.16
356	304	309	950	8	100	9.96	0.01	0.01	0.06
357	305	306	305	6	100	5.61	0.00	0.01	0.06
358	307	308	600	6	100	6.82	0.01	0.01	0.08
359	304	310	1100	8	120	11.53	0.01	0.01	0.07
360	309	310	200	8	100	4.30	0.00	0.00	0.03
361	310	311	950	8	100	11.13	0.01	0.01	0.07
362	311	312	1200	8	100	396.61	6.43	5.36	2.53
364	312	313	1000	6	100	246.94	9.05	9.05	2.80
365	312	315	300	8	100	138.67	0.23	0.77	0.89
366	314	313	300	8	100	811.06	6.05	20.16	5.18
367	315	314	1000	8	100	277.74	2.77	2.77	1.77
368	317	314	300	8	100	536.11	2.81	9.36	3.42
369	316	315	300	8	100	141.85	0.24	0.80	0.91
370	316	317	950	8	100	69.20	0.20	0.21	0.44
371	318	316	300	8	100	213.83	0.51	1.71	1.36

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, EXISTING SYSTEM) FILE:TEST.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
372	319	317	300	8	100	469.69	2.20	7.33	3.00
373	319	318	850	8	100	216.62	1.49	1.75	1.38
374	320	319	1000	8	110	688.64	12.48	12.48	4.40
375	320	321	1400	8	100	38.91	0.10	0.07	0.25
376	321	322	800	8	100	275.48	2.18	2.73	1.76
377	322	323	400	8	110	183.44	0.43	1.08	1.17
378	322	325	250	8	100	88.26	0.08	0.33	0.56
379	323	324	280	8	100	181.11	0.35	1.26	1.16
380	325	324	400	8	100	216.62	0.70	1.75	1.38
381	324	326	300	8	100	394.90	1.59	5.32	2.52
382	327	325	210	8	100	132.13	0.15	0.70	0.84
385	300	313	950	8	100	731.78	15.83	16.66	4.67
386	326	311	650	8	100	391.13	3.39	5.22	2.50
392	361	391	50	8	100	25.52	0.00	0.03	0.16
394	391	374	1000	12	120	25.52	0.00	0.00	0.07
400	350	320	1250	8	100	124.78	0.79	0.63	0.80
401	356	321	1250	12	110	240.34	0.31	0.25	0.68
402	351	350	510	8	100	575.27	5.44	10.67	3.67
403	350	356	750	12	110	445.78	0.58	0.77	1.26
404	353	351	350	8	100	428.02	2.16	6.17	2.73
405	352	351	900	8	100	151.97	0.82	0.91	0.97
406	353	352	1400	8	100	156.69	1.34	0.96	1.00
407	354	353	1260	8	100	589.42	14.06	11.16	3.76
408	354	355	960	8	90	9.20	0.01	0.01	0.06
409	356	357	1050	8	110	200.72	1.34	1.27	1.28
410	357	358	200	8	110	141.64	0.13	0.67	0.90
411	357	364	1250	8	110	55.31	0.15	0.12	0.35
412	358	359	1650	8	110	79.62	0.38	0.23	0.51
413	359	327	800	8	100	134.47	0.58	0.72	0.86
414	358	360	750	8	100	62.02	0.13	0.17	0.40
415	361	359	800	8	100	62.17	0.14	0.17	0.40
416	360	361	250	8	90	92.97	0.11	0.44	0.59
417	362	360	1050	8	120	35.67	0.05	0.04	0.23
418	361	374	1800	6	90	2.81	0.00	0.00	0.03
419	363	362	750	8	120	41.16	0.04	0.06	0.26
420	364	365	500	8	120	21.63	0.01	0.02	0.14
421	364	363	900	8	120	28.97	0.03	0.03	0.18
422	365	363	1650	8	120	16.91	0.02	0.01	0.11
423	367	366	750	12	120	3.68	0.00	0.00	0.01
424	370	367	600	12	120	7.69	0.00	0.00	0.02
425	367	368	1350	12	120	0.28	0.00	0.00	0.00
426	369	368	500	12	120	3.00	0.00	0.00	0.01
427	370	369	1450	8	120	1.16	0.00	0.00	0.01
428	372	369	450	12	120	4.62	0.00	0.00	0.01
429	371	370	500	12	120	11.68	0.00	0.00	0.03
430	374	371	600	12	120	14.46	0.00	0.00	0.04
431	373	372	850	12	120	8.30	0.00	0.00	0.02
432	374	373	1250	12	120	11.09	0.00	0.00	0.03

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, EXISTING SYSTEM) FILE:TEST.DAT

NODE NO	COORDINATES			GRADIENT RESULTS			BOUNDARY SPEC		Q(GPM)	TYPE
	X(FT)	Y(FT)	Z(FT)	HG(FT)	P(FT)	P(PSI)				
1	0	0	375	497.98	122.98	53.24	9.62	BQ	9.62	0.00
2	0	0	341	497.99	156.99	67.96	9.62	BQ	9.62	0.00
3	0	0	272	497.99	225.99	97.83	9.62	BQ	9.62	0.00
4	0	0	270	498.00	228.00	98.70	4.76	BQ	4.76	0.00
5	0	0	285	497.99	212.99	92.20	26.18	BQ	26.18	0.00
6	0	0	275	498.01	223.01	96.54	4.76	BQ	4.76	0.00
7	0	0	272	504.76	232.76	100.76	7.33	BQ	7.33	0.00
8	0	0	270	507.89	237.89	102.98	26.18	BQ	26.18	0.00
9	0	0	270	507.89	237.89	102.98				0.00
10	0	0	270	507.89	237.89	102.98	4.67	BQ	4.67	0.00
11	0	0	290	491.30	201.30	87.14	4.76	BQ	4.76	0.00
12	0	0	275	490.03	215.03	93.09	4.76	BQ	4.76	0.00
13	0	0	295	489.60	194.60	84.24	4.76	BQ	4.76	0.00
14	0	0	295	488.50	193.50	83.77	6.69	BQ	6.69	0.00
15	0	0	277	488.50	211.50	91.56	4.76	BQ	4.76	0.00
30	0	0	270	486.39	216.39	93.67	6.69	BQ	6.69	0.00
31	0	0	310	485.45	175.45	75.95	4.76	BQ	4.76	0.00
32	0	0	340	485.41	145.41	62.95	4.76	BQ	4.76	0.00
33	0	0	335	485.40	150.40	65.11	4.76	BQ	4.76	0.00
34	0	0	315	485.25	170.25	73.70	9.62	BQ	9.62	0.00
35	0	0	315	485.10	170.10	73.64	6.69	BQ	6.69	0.00
36	0	0	310	485.01	175.01	75.76	6.69	BQ	6.69	0.00
37	0	0	306	484.82	178.82	77.41	4.77	BQ	4.76	0.00
38	0	0	325	484.52	159.52	69.06	9.25	BQ	9.25	0.00
39	0	0	328	484.42	156.42	67.71	18.33	BQ	18.33	0.00
40	0	0	335	484.12	149.12	64.55	5.54	BQ	5.54	0.00
41	0	0	410	484.02	74.02	32.04	8.31	BQ	8.31	0.00
42	0	0	410	483.99	73.99	32.03	15.71	BQ	15.71	0.00
43	0	0	370	483.96	113.96	49.33	8.31	BQ	8.31	0.00
44	0	0	385	483.96	98.96	42.84	8.18	BQ	8.18	0.00
45	0	0	375	483.96	108.96	47.17	8.18	BQ	8.18	0.00
46	0	0	300	483.94	183.94	79.63	8.18	BQ	8.18	0.00
47	0	0	300	483.94	183.94	79.63	8.18	BQ	8.18	0.00
48	0	0	310	483.94	173.94	75.30	8.18	BQ	8.18	0.00
49	0	0	295	483.94	188.94	81.79	15.71	BQ	15.71	0.00
50	0	0	275	483.94	208.94	90.45	23.56	BQ	23.56	0.00
51	0	0	335	484.13	149.13	64.56	5.54	BQ	5.54	0.00
52	0	0	270	484.08	214.08	92.67	13.85	BQ	13.85	0.00
62	0	0	350	483.96	133.96	57.99	15.71	BQ	15.71	0.00
70	0	0	315	484.82	169.82	73.51	6.86	BQ	6.86	0.00
71	0	0	315	484.82	169.82	73.51	6.86	BQ	6.86	0.00
72	0	0	320	484.54	164.54	71.23	2.77	BQ	2.77	0.00
73	0	0	325	484.41	159.41	69.01	2.77	BQ	2.77	0.00
74	0	0	330	484.26	154.26	66.78	4.09	BQ	4.09	0.00
75	0	0	300	485.67	185.67	80.37	13.85	BQ	13.85	0.00
76	0	0	300	485.74	185.74	80.41	8.31	BQ	8.31	0.00
77	0	0	330	485.70	155.70	67.40	13.85	BQ	13.85	0.00
78	0	0	330	485.85	155.85	67.47	27.71	BQ	27.71	0.00
79	0	0	285	485.82	200.82	86.94	6.86	BQ	6.86	0.00
80	0	0	275	485.81	210.81	91.26	6.86	BQ	6.86	0.00
81	0	0	265	485.80	220.80	95.58	6.86	BQ	6.86	0.00
82	0	0	265	485.78	220.78	95.58	6.86	BQ	6.86	0.00

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, EXISTING SYSTEM) FILE:TEST.DAT

NODE NO	COORDINATES			GRADIENT RESULTS			BOUNDARY SPEC			
	X(FT)	Y(FT)	Z(FT)	HG(FT)	P(FT)	P(Psi)	Q(GPM)	TYPE		
83	0	0	275	485.82	210.82	91.26	5.54	BQ	5.54	0.00
84	0	0	295	485.81	190.81	82.60	6.86	BQ	6.86	0.00
85	0	0	270	485.84	215.84	93.44	15.71	BQ	15.71	0.00
86	0	0	295	485.90	190.90	82.64	13.85	BQ	13.85	0.00
87	0	0	290	485.87	195.87	84.79	8.31	BQ	8.31	0.00
88	0	0	295	485.88	190.88	82.63	13.85	BQ	13.85	0.00
89	0	0	260	485.87	225.87	97.78	13.85	BQ	13.85	0.00
90	0	0	325	485.79	160.79	69.61	8.31	BQ	8.31	0.00
91	0	0	350	485.93	135.93	58.84	9.62	BQ	9.62	0.00
92	0	0	287	485.85	198.85	86.08	9.62	BQ	9.62	0.00
93	0	0	282	486.32	204.32	88.45	4.76	BQ	4.76	0.00
94	0	0	335	486.79	151.79	65.71	2.84	BQ	2.84	0.00
95	0	0	320	486.32	166.32	72.00	4.76	BQ	4.76	0.00
96	0	0	260	488.51	228.51	98.92	2.84	BQ	2.84	0.00
97	0	0	270	488.37	218.37	94.53	5.77	BQ	5.77	0.00
98	0	0	285	488.14	203.14	87.94	39.27	BQ	39.27	0.00
120	0	0	390	479.66	89.66	38.81	1.92	BQ	1.92	0.00
121	0	0	450	484.54	34.54	14.95	4.76	BQ	4.76	0.00
122	0	0	450	484.95	34.95	15.13	4.76	BQ	4.76	0.00
123	0	0	410	485.90	75.90	32.86	4.76	BQ	4.76	0.00
124	0	0	385	485.94	100.94	43.70	4.76	BQ	4.76	0.00
125	0	0	337	486.14	149.14	64.56				0.00
126	0	0	355	478.45	123.45	53.44	4.76	BQ	4.76	0.00
127	0	0	335	486.33	151.33	65.51	7.70	BQ	7.70	0.00
128	0	0	335	488.80	153.80	66.58	4.76	BQ	4.76	0.00
129	0	0	270	485.21	215.21	93.16	4.76	BQ	4.76	0.00
130	0	0	285	485.20	200.20	86.67	14.39	BQ	14.39	0.00
131	0	0	325	484.45	159.45	69.03	4.76	BQ	4.76	0.00
132	0	0	330	484.45	154.45	66.86	6.69	BQ	6.69	0.00
133	0	0	350	484.47	134.47	58.21	9.62	BQ	9.62	0.00
134	0	0	312	484.50	172.50	74.68	4.76	BQ	4.76	0.00
135	0	0	310	484.27	174.27	75.44	4.76	BQ	4.76	0.00
136	0	0	305	484.00	179.00	77.49	4.76	BQ	4.76	0.00
137	0	0	295	481.60	186.60	80.78	4.76	BQ	4.76	0.00
138	0	0	320	477.15	157.15	68.03	11.00	BQ	11.00	0.00
139	0	0	320	477.15	157.15	68.03	11.18	BQ	11.18	0.00
140	0	0	320	477.15	157.15	68.03	4.76	BQ	4.76	0.00
141	0	0	340	478.03	138.03	59.75	4.58	BQ	4.58	0.00
142	0	0	345	484.83	139.83	60.53	5.24	BQ	5.24	0.00
143	0	0	355	478.14	123.14	53.31	14.39	BQ	14.39	0.00
145	0	0	345	473.18	128.18	55.49	2.75	BQ	2.75	0.00
146	0	0	296	470.15	174.15	75.39	1.92	BQ	1.92	0.00
147	0	0	290	470.37	180.37	78.08	7.79	BQ	7.79	0.00
148	0	0	266	470.34	204.34	88.46	9.62	BQ	9.62	0.00
149	0	0	262	470.23	208.23	90.14	4.76	BQ	4.76	0.00
150	0	0	285	470.54	185.54	80.32	6.87	BQ	6.87	0.00
151	0	0	295	470.41	175.41	75.94	9.62	BQ	9.62	0.00
152	0	0	285	470.41	185.41	80.26	2.84	BQ	2.84	0.00
153	0	0	260	470.41	210.41	91.08	1.92	BQ	1.92	0.00
154	0	0	290	471.31	181.31	78.49	6.87	BQ	6.87	0.00
155	0	0	295	472.39	177.39	76.79	4.58	BQ	4.58	0.00
156	0	0	265	485.07	220.07	95.27	15.71	BQ	15.71	0.00

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, EXISTING SYSTEM) FILE:TEST.DAT

NODE NO	COORDINATES			GRADIENT RESULTS			BOUNDARY SPEC	
	X(FT)	Y(FT)	Z(FT)	HG(FT)	P(FT)	P(PSI)	Q(GPM)	TYPE
157	0	0	325	477.36	152.36	65.96		0.00
158	0	0	275	471.85	196.85	85.22		0.00
170	0	0	259	464.33	205.33	88.89	2.84 BQ	0.00
171	0	0	265	474.03	209.03	90.49	3.85 BQ	0.00
172	0	0	305	474.03	169.03	73.17	5.77 BQ	0.00
173	0	0	265	482.16	217.16	94.01	4.76 BQ	0.00
174	0	0	280	483.30	203.30	88.01	3.85 BQ	0.00
175	0	0	270	483.48	213.48	92.41	4.76 BQ	0.00
176	0	0	275	483.66	208.66	90.33	4.76 BQ	0.00
177	0	0	285	483.66	198.66	86.00	4.76 BQ	0.00
178	0	0	305	483.66	178.66	77.34	39.27 BQ	0.00
179	0	0	280	484.11	204.11	88.36	4.76 BQ	0.00
180	0	0	280	483.92	203.92	88.28	4.76 BQ	0.00
181	0	0	290	483.92	193.92	83.95	2.84 BQ	0.00
182	0	0	280	486.35	206.35	89.33	1.92 BQ	0.00
183	0	0	290	486.40	196.40	85.02	4.76 BQ	0.00
184	0	0	305	486.24	181.24	78.46	4.76 BQ	0.00
185	0	0	305	485.94	180.94	78.33	4.76 BQ	0.00
186	0	0	325	485.80	160.80	69.61	7.70 BQ	0.00
187	0	0	325	485.79	160.79	69.61	5.77 BQ	0.00
190	0	0	365	465.39	100.39	43.46	2.84 BQ	0.00
191	0	0	275	468.08	193.08	83.58	4.76 BQ	0.00
192	0	0	265	474.35	209.35	90.63	4.76 BQ	0.00
193	0	0	285	482.54	197.54	85.52	5.77 BQ	0.00
194	0	0	295	482.55	187.55	81.19	4.76 BQ	0.00
195	0	0	295	482.53	187.53	81.18	3.85 BQ	0.00
196	0	0	285	482.57	197.57	85.53	4.76 BQ	0.00
197	0	0	265	482.72	217.72	94.25	5.77 BQ	0.00
198	0	0	280	486.63	206.63	89.45	9.62 BQ	0.00
199	0	0	265	486.63	221.63	95.94	4.76 BQ	0.00
200	0	0	280	486.63	206.63	89.45	9.62 BQ	0.00
201	0	0	360	486.63	126.63	54.82	1.92 BQ	0.00
202	0	0	280	482.36	202.36	87.60	4.58 BQ	0.00
203	0	0	275	482.35	207.35	89.76	27.67 BQ	0.00
204	0	0	249	482.44	233.44	101.06		0.00
205	0	0	280	482.35	202.35	87.60	2.84 BQ	0.00
206	0	0	280	482.36	202.36	87.60	1.92 BQ	0.00
207	0	0	230	482.23	252.23	109.19	14.39 BQ	0.00
208	0	0	215	482.21	267.21	115.67	4.76 BQ	0.00
209	0	0	200	482.20	282.20	122.16	10.47 BQ	0.00
230	0	0	377	478.44	101.44	43.92	2.93 BQ	0.00
231	0	0	380	478.44	98.44	42.62	2.99 BQ	0.00
232	0	0	320	477.91	157.91	68.36	2.93 BQ	0.00
233	0	0	325	477.98	152.98	66.23	9.21 BQ	0.00
234	0	0	380	477.69	97.69	42.29	9.21 BQ	0.00
235	0	0	360	477.91	117.91	51.04	9.21 BQ	0.00
236	0	0	350	472.16	122.16	52.88	3.05 BQ	0.00
237	0	0	270	470.60	200.60	86.84	4.93 BQ	0.00
238	0	0	400	460.87	60.87	26.35	4.98 BQ	0.00
239	0	0	325	461.18	136.18	58.95	4.98 BQ	0.00
240	0	0	325	453.55	128.55	55.65	3.05 BQ	0.00
241	0	0	370	456.29	86.29	37.36	3.05 BQ	0.00

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, EXISTING SYSTEM) FILE:TEST.DAT

NODE NO	COORDINATES			GRADIENT RESULTS			BOUNDARY SPEC		Q(GPM)	TYPE
	X(FT)	Y(FT)	Z(FT)	HG(FT)	P(FT)	P(Psi)				
242	0	0	415	455.97	40.97	17.74	3.05	BQ	3.05	0.00
243	0	0	420	455.77	35.77	15.48	3.05	BQ	3.05	0.00
245	0	0	355	455.46	100.46	43.49	3.05	BQ	3.05	0.00
246	0	0	324	436.28	112.28	48.61	12.57	BQ	12.57	0.00
247	0	0	305	402.67	97.67	42.28	4.11	BQ	4.11	0.00
248	0	0	330	402.65	72.65	31.45	3.69	BQ	3.69	0.00
249	0	0	330	402.65	72.65	31.45	3.69	BQ	3.69	0.00
250	0	0	306	435.92	129.92	56.24	4.93	BQ	4.93	0.00
251	0	0	293	433.61	140.61	60.87	3.64	BQ	3.64	0.00
252	0	0	275	433.60	158.60	68.66	3.64	BQ	3.64	0.00
253	0	0	285	433.60	148.60	64.33	4.11	BQ	4.11	0.00
254	0	0	270	433.60	163.60	70.82	2.99	BQ	2.99	0.00
255	0	0	295	410.53	115.53	50.01	2.99	BQ	2.99	0.00
256	0	0	295	407.13	112.13	48.54	2.99	BQ	2.99	0.00
257	0	0	290	408.94	118.94	51.49	4.93	BQ	4.93	0.00
270	0	0	276	457.47	181.47	78.56	4.76	BQ	4.76	0.00
271	0	0	320	457.46	137.46	59.51	6.69	BQ	6.69	0.00
272	0	0	350	413.62	63.62	27.54	4.76	BQ	4.76	0.00
273	0	0	370	413.62	43.62	18.88	4.76	BQ	4.76	0.00
274	0	0	350	413.62	63.62	27.54	4.76	BQ	4.76	0.00
275	0	0	330	413.62	83.62	36.20	4.76	BQ	4.76	0.00
276	0	0	320	413.64	93.64	40.53	4.76	BQ	4.76	0.00
277	0	0	340	430.43	90.43	39.15	4.76	BQ	4.76	0.00
278	0	0	315	457.23	142.23	61.57	3.85	BQ	3.85	0.00
279	0	0	270	465.37	195.37	84.58	23.55	BQ	23.55	0.00
280	0	0	280	483.77	203.77	88.21	5.50	BQ	5.50	0.00
282	0	0	410	485.05	75.05	32.49	4.76	BQ	4.76	0.00
283	0	0	415	485.03	70.03	30.32	9.62	BQ	9.62	0.00
284	0	0	400	485.02	85.02	36.81	4.67	BQ	4.67	0.00
285	0	0	400	485.04	85.04	36.81	15.71	BQ	15.71	0.00
300	0	0	285	380.03	95.03	41.14	45.82	BQ	45.81	0.00
301	0	0	285	379.94	94.94	41.10	4.58	BQ	4.58	0.00
302	0	0	275	379.81	104.81	45.37	4.71	BQ	4.71	0.00
303	0	0	280	379.80	99.80	43.20	4.71	BQ	4.71	0.00
304	0	0	264	379.69	115.69	50.08	3.92	BQ	3.91	0.02
305	0	0	265	379.69	114.69	49.65	4.71	BQ	4.71	0.00
306	0	0	280	379.69	99.69	43.15	5.61	BQ	5.61	0.00
307	0	0	260	379.67	119.67	51.81	6.96	BQ	6.96	0.00
308	0	0	255	379.66	124.66	53.97	6.82	BQ	6.82	0.00
309	0	0	280	379.69	99.69	43.15	5.65	BQ	5.66	0.00
310	0	0	280	379.69	99.69	43.15	4.70	BQ	4.71	-0.01
311	0	0	300	379.68	79.68	34.49	5.66	BQ	5.66	0.00
312	0	0	370	373.25	3.25	1.41	11.00	BQ	11.00	0.00
313	0	0	318	364.20	46.20	20.00	1789.78	BH		
314	0	0	315	370.25	55.25	23.92	2.78	BQ	2.78	0.00
315	0	0	368	373.02	5.02	2.17	2.78	BQ	2.78	0.00
316	0	0	340	373.26	33.26	14.40	2.78	BQ	2.78	0.00
317	0	0	300	373.06	73.06	31.63	2.78	BQ	2.78	0.00
318	0	0	310	373.77	63.77	27.61	2.78	BQ	2.78	0.00
319	0	0	287	375.26	88.26	38.21	2.33	BQ	2.33	0.00
320	0	0	271	387.74	116.74	50.54	3.28	BQ	3.28	0.00
321	0	0	262	387.63	125.63	54.39	3.77	BQ	3.77	0.00

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, EXISTING SYSTEM) FILE:TEST.DAT

NODE NO	COORDINATES			GRADIENT RESULTS			BOUNDARY SPEC		Q(GPM)	TYPE
	X(FT)	Y(FT)	Z(FT)	HG(FT)	P(FT)	P(Psi)				
322	0	0	255	385.45	130.45	56.47	3.77	BQ	3.77	0.00
323	0	0	265	385.02	120.02	51.96	2.33	BQ	2.33	0.00
324	0	0	265	384.67	119.67	51.80	2.83	BQ	2.83	0.00
325	0	0	255	385.37	130.37	56.44	3.77	BQ	3.77	0.00
326	0	0	265	383.07	118.07	51.11	3.77	BQ	3.77	0.00
327	0	0	255	385.52	130.52	56.50	2.33	BQ	2.33	0.00
350	0	0	305	388.52	83.52	36.16	4.71	BQ	4.71	0.00
351	0	0	315	393.97	78.97	34.18	4.71	BQ	4.71	0.00
352	0	0	300	394.78	94.78	41.03	4.71	BQ	4.71	0.00
353	0	0	320	396.13	76.13	32.95	4.71	BQ	4.71	0.00
354	0	0	320	410.19	90.19	39.04				0.00
355	0	0	345	410.18	65.18	28.22	9.20	BQ	9.20	0.00
356	0	0	285	387.94	102.94	44.56	4.71	BQ	4.71	0.00
357	0	0	295	386.61	91.61	39.66	3.77	BQ	3.77	0.00
358	0	0	297	386.47	89.47	38.73				0.00
359	0	0	260	386.09	126.09	54.59	7.33	BQ	7.33	0.00
360	0	0	270	386.34	116.34	50.37	4.71	BQ	4.71	0.00
361	0	0	250	386.23	136.23	58.98	2.47	BQ	2.47	0.00
362	0	0	250	386.39	136.39	59.04	5.50	BQ	5.50	0.00
363	0	0	280	386.43	106.43	46.07	4.71	BQ	4.71	0.00
364	0	0	300	386.46	86.46	37.43	4.71	BQ	4.71	0.00
365	0	0	295	386.45	91.45	39.59	4.71	BQ	4.71	0.00
366	0	0	320	386.23	66.23	28.67	3.68	BQ	3.68	0.00
367	0	0	285	386.23	101.23	43.82	3.73	BQ	3.73	0.00
368	0	0	320	386.23	66.23	28.67	3.28	BQ	3.28	0.00
369	0	0	285	386.23	101.23	43.82	2.78	BQ	2.78	0.00
370	0	0	250	386.23	136.23	58.97	2.83	BQ	2.83	0.00
371	0	0	245	386.23	141.23	61.14	2.78	BQ	2.78	0.00
372	0	0	260	386.23	126.23	54.64	3.68	BQ	3.68	0.00
373	0	0	240	386.23	146.23	63.30	2.78	BQ	2.78	0.00
374	0	0	245	386.23	141.23	61.14	2.78	BQ	2.78	0.00
391	0	0	250	386.23	136.23	58.97				0.00
500	0	0	290	507.89	217.89	94.33	-1100.00	BQ	-1100.00	0.00
501	0	0	260	497.36	237.36	102.75	-1000.00	BQ	-1000.00	0.00
600	0	0	451	486.00	35.00	15.15	-173.86	BEL		
601	0	0	467	486.00	19.00	8.23	-455.66	BEL		
602	0	0	418	486.00	68.00	29.44	-656.69	BEL		

TOTAL SYSTEM Q = 3386.21 Total BQ (pos) = 1596.43 Total BQ (neg) = -2100.00

0.00 0.02

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, EXISTING SYSTEM) FILE:TEST.DAT

TANK LEVEL ADJUSTMENTS, TIME = 1.00

TANK	NODE	LINE	TYPE	FROM	TO	ELEV. T= 0.00	FLOW(GPM)	DELTA ELEV.	ELEV. T= 1.00
1	600	82	PIPE	600	78	486.0 FT	106.1	-0.7 FT	
		96	PIPE	600	91	486.0 FT	67.8	-0.4 FT	484.89 FT
2	601	119	PIPE	601	123	486.0 FT	455.7	-1.0 FT	484.96 FT
3	602	316	PIPE	602	282	486.0 FT	656.7	-10.7 FT	475.27 FT

TANK LEVEL ADJUSTMENTS, TIME = 2.00

TANK	NODE	LINE	TYPE	FROM	TO	ELEV. T= 1.00	FLOW(GPM)	DELTA ELEV.	ELEV. T= 2.00
1	600	82	PIPE	600	78	484.9 FT	181.5	-1.2 FT	482.83 FT
		96	PIPE	600	91	484.9 FT	141.2	-0.9 FT	
2	601	119	PIPE	601	123	485.0 FT	475.6	-1.1 FT	483.88 FT
3	602	316	PIPE	602	282	475.3 FT	447.8	-7.3 FT	467.95 FT

TANK LEVEL ADJUSTMENTS, TIME = 3.00

TANK	NODE	LINE	TYPE	FROM	TO	ELEV. T= 2.00	FLOW(GPM)	DELTA ELEV.	ELEV. T= 3.00
1	600	82	PIPE	600	78	482.8 FT	210.9	-1.3 FT	
		96	PIPE	600	91	482.8 FT	168.6	-1.1 FT	480.41 FT
2	601	119	PIPE	601	123	483.9 FT	504.7	-1.1 FT	482.73 FT
3	602	316	PIPE	602	282	468.0 FT	327.6	-5.4 FT	462.60 FT

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, EXISTING SYSTEM) FILE:TEST.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
1	2	1	975	8	100	9.62	0.01	0.01	0.06
2	3	2	1100	12	100	13.61	0.00	0.00	0.04
3	4	3	1900	12	100	23.23	0.01	0.00	0.07
4	4	5	1200	12	100	31.81	0.01	0.01	0.09
5	5	2	1500	12	100	5.63	0.00	0.00	0.02
6	6	4	430	12	100	59.81	0.01	0.02	0.17
7	7	6	1750	12	110	1061.82	6.76	3.86	3.01
8	500	7	800	12	110	1069.15	3.13	3.91	3.03
9	500	8	850	12	110	30.85	0.00	0.01	0.09
10	8	9	400	12	100	4.67	0.00	0.00	0.01
11	9	10	300	12	100	4.67	0.00	0.00	0.01
12	6	11	1950	12	110	997.24	6.71	3.44	2.83
13	11	12	2200	12	110	418.41	1.51	0.69	1.19
14	12	13	750	12	110	413.65	0.51	0.67	1.17
15	13	14	2000	12	110	408.89	1.32	0.66	1.16
16	14	15	1950	10	100	4.76	0.00	0.00	0.02
17	14	30	1400	10	100	397.43	2.54	1.81	1.62
18	34	156	800	6	120	55.37	0.32	0.41	0.63
30	30	31	1500	10	90	271.56	1.63	1.09	1.11
PRV (180.00)							0.00		Open
31	31	32	520	8	100	53.67	0.07	0.13	0.34
32	32	33	800	8	100	20.68	0.02	0.02	0.13
33	32	33	450	8	100	28.22	0.02	0.04	0.18
34	31	34	500	10	90	213.13	0.35	0.70	0.87
35	33	34	700	6	100	44.14	0.26	0.37	0.50
36	34	35	500	10	90	192.27	0.29	0.57	0.79
37	35	36	320	10	90	185.58	0.17	0.54	0.76
38	36	37	550	10	90	218.56	0.40	0.73	0.89
39	156	36	1800	8	100	39.66	0.14	0.08	0.25
40	37	38	1350	10	110	145.62	0.32	0.24	0.59
41	38	39	400	10	110	153.12	0.10	0.26	0.63
42	72	38 CV	1000	8	110	16.76	0.01	0.01	0.11 Open
43	39	40	1650	10	110	125.30	0.30	0.18	0.51
44	39	73	850	8	110	9.49	0.00	0.00	0.06
45	40	41	1350	12	110	128.21	0.10	0.08	0.36
46	51	40	350	6	90	8.45	0.01	0.02	0.10
47	41	42	450	12	110	119.90	0.03	0.07	0.34
48	42	43	1100	12	110	72.39	0.03	0.03	0.21
49	43	44	250	12	110	16.36	0.00	0.00	0.05
50	43	46	2200	8	110	10.51	0.01	0.01	0.07
51	44	45	750	12	110	6.18	0.00	0.00	0.02
52	44	45	2500	10	110	2.00	0.00	0.00	0.01
53	46	47	1650	8	110	2.33	0.00	0.00	0.01
54	48	47	3300	12	110	5.86	0.00	0.00	0.02
55	43	48	1500	12	110	37.21	0.01	0.01	0.11
56	48	49	500	12	110	23.17	0.00	0.00	0.07
57	49	50	1050	12	110	14.63	0.00	0.00	0.04
58	49	50	1350	8	110	4.40	0.00	0.00	0.03
59	51	52	1200	6	100	13.85	0.05	0.04	0.16
60	42	62	600	8	120	31.81	0.02	0.04	0.20
61	62	49	2100	8	120	16.10	0.02	0.01	0.10
64	49	50	1500	8	120	4.53	0.00	0.00	0.03
70	37	70	500	10	90	68.17	0.04	0.08	0.28

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, EXISTING SYSTEM) FILE:TEST.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
71	70	71	600	10	90	61.31	0.04	0.07	0.25
72	71	72	1950	8	90	44.75	0.22	0.11	0.29
73	75	71	600	10	90	290.63	0.74	1.24	1.19
74	72	73	750	6	90	25.22	0.12	0.16	0.29
75	73	74	600	6	90	31.94	0.15	0.25	0.36
76	74	51	700	6	90	27.85	0.14	0.19	0.32
77	78	75	2900	10	100	122.47	0.59	0.21	0.50
78	76	75	150	10	90	142.73	0.05	0.33	0.58
79	76	77	900	6	100	13.85	0.04	0.04	0.16
80	90	76	650	12	120	143.05	0.05	0.08	0.41
81	78	79	2160	8	100	69.49	0.46	0.21	0.44
82	600	78	800	10	90	219.66	0.59	0.74	0.90
83	79	84	450	6	90	11.30	0.02	0.04	0.13
84	79	83	300	8	100	21.68	0.01	0.02	0.14
85	84	80	650	12	110	4.44	0.00	0.00	0.01
86	83	80	650	8	100	16.14	0.01	0.01	0.10
87	80	81	750	8	100	13.72	0.01	0.01	0.09
88	81	82	1600	6	100	6.86	0.02	0.01	0.08
89	79	85	550	8	100	29.64	0.02	0.04	0.19
90	85	86	2050	10	100	13.93	0.01	0.00	0.06
91	86	88	250	8	90	36.02	0.02	0.08	0.23
92	88	87	1300	8	90	12.78	0.01	0.01	0.08
93	88	89	2400	8	90	9.38	0.02	0.01	0.06
94	87	89	250	8	90	4.47	0.00	0.00	0.03
95	93	86	3500	10	100	35.95	0.07	0.02	0.15
96	600	91	1200	10	110	177.81	0.41	0.34	0.73
97	92	90	600	12	120	170.50	0.07	0.11	0.48
98	91	92	1950	10	110	168.19	0.60	0.31	0.69
99	93	92	900	8	90	11.93	0.01	0.01	0.08
100	93	95	400	8	110	4.76	0.00	0.00	0.03
101	94	93	1080	10	110	57.41	0.05	0.04	0.23
102	96	94	1800	12	110	313.76	0.73	0.40	0.89
103	501	96	2560	12	110	1000.00	8.85	3.46	2.84
104	96	97	450	6	110	45.04	0.15	0.32	0.51
105	97	98	900	6	110	39.27	0.23	0.25	0.45
106	96	94	1800	8	90	88.38	0.73	0.40	0.56
119	601	123	100	12	100	532.70	0.13	1.28	1.51
120	121	120	2200	12	100	725.99	5.01	2.28	2.06
121	123	121	1200	12	110	557.52	1.41	1.17	1.58
122	124	123	800	12	110	29.58	0.00	0.01	0.08
123	122	121	500	8	120	173.24	0.41	0.82	1.11
124	124	122	1150	8	120	178.00	1.00	0.87	1.14
125	125	124	600	12	110	212.35	0.12	0.20	0.60
126	125	142	1100	8	100	176.97	1.32	1.20	1.13
127	120	126	550	12	100	724.07	1.25	2.27	2.05
128	127	125	350	12	100	289.62	0.15	0.42	0.82
129	128	127	1800	12	110	569.30	2.19	1.22	1.62
130	11	128	1800	12	110	574.06	2.23	1.24	1.63
131	127	129	1360	8	100	172.28	1.56	1.14	1.10
132	129	130	800	8	100	14.39	0.01	0.01	0.09
133	129	131	1200	8	100	153.13	1.10	0.92	0.98
134	131	132	1250	8	120	6.69	0.00	0.00	0.04

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, EXISTING SYSTEM) FILE:TEST.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
135	131	133	1200	8	100	8.69	0.01	0.00	0.06
136	134	133	800	8	100	0.93	0.00	0.00	0.01
137	134	135	400	8	100	113.49	0.21	0.53	0.72
138	135	136	500	8	100	108.73	0.24	0.49	0.69
139	30	134	2080	8	100	119.19	1.20	0.58	0.76
140	131	136	650	8	100	132.98	0.46	0.71	0.85
141	136	137	1120	8	100	236.95	2.31	2.06	1.51
143	139	138	1350	8	120	11.00	0.01	0.00	0.07
144	140	139	300	12	120	22.17	0.00	0.00	0.06
145	126	141	600	12	100	387.82	0.43	0.71	1.10
146	141	157	1600	12	100	293.67	0.68	0.43	0.83
147	141	140	2100	12	110	323.03	0.90	0.43	0.92
148	143	141	400	12	100	233.46	0.11	0.28	0.66
149	126	143	280	12	100	497.29	0.32	1.13	1.41
150	140	145	1750	12	110	808.65	4.08	2.33	2.29
151	147	146	250	8	100	143.15	0.20	0.81	0.91
152	147	148	1400	8	100	19.43	0.03	0.02	0.12
153	148	149	350	6	100	38.91	0.10	0.30	0.44
154	149	146	1250	8	100	34.15	0.07	0.06	0.22
155	150	147	500	8	100	89.59	0.17	0.34	0.57
156	155	147	1700	6	100	80.78	1.94	1.14	0.92
157	137	155	1100	6	100	232.18	8.88	8.07	2.63
158	155	158	850	8	120	146.82	0.52	0.61	0.94
159	154	150	950	8	100	139.95	0.74	0.78	0.89
160	150	151	1450	8	100	43.49	0.13	0.09	0.28
161	151	152	500	6	100	4.76	0.00	0.01	0.05
162	152	153	1000	6	100	1.92	0.00	0.00	0.02
163	151	148	400	6	100	29.10	0.07	0.17	0.33
164	142	126	1400	6	100	171.74	6.47	4.62	1.95
165	157	140	500	12	100	293.67	0.21	0.43	0.83
166	127	125	350	8	100	99.70	0.15	0.42	0.64
167	158	154	850	8	120	146.82	0.52	0.61	0.94
170	171	170	2180	8	120	486.37	12.16	5.58	3.10
171	171	172	300	8	100	5.77	0.00	0.00	0.04
172	173	171	1250	8	100	495.99	10.14	8.11	3.17
173	94	173	2600	8	120	270.20	4.88	1.88	1.72
174	174	173	900	8	100	230.55	1.77	1.96	1.47
175	175	174	600	8	100	104.75	0.27	0.46	0.67
176	178	174	800	8	100	129.64	0.54	0.68	0.83
177	176	175	550	8	100	109.52	0.27	0.49	0.70
178	176	177	220	8	100	15.43	0.00	0.01	0.10
179	180	176	550	8	100	129.72	0.37	0.68	0.83
180	71	178	1650	8	100	158.25	1.61	0.98	1.01
181	177	178	250	8	100	10.67	0.00	0.01	0.07
183	71	179	1450	8	110	142.09	0.97	0.67	0.91
184	179	180	350	8	100	137.32	0.26	0.75	0.88
185	180	181	400	8	100	2.84	0.00	0.00	0.02
186	183	182	250	8	110	31.37	0.01	0.04	0.20
187	182	184	500	8	110	29.44	0.02	0.04	0.19
188	94	183	280	8	90	71.68	0.08	0.27	0.46
189	183	184	380	8	90	35.55	0.03	0.07	0.23
190	184	185	250	8	90	60.23	0.05	0.20	0.38

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, EXISTING SYSTEM) FILE:TEST.DAT

PIPE	FROM	TO	L(FT) D(IN) C			Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
191	185	75	1100	8	110	39.28	0.07	0.06	0.25
192	185	186	600	8	100	16.19	0.01	0.01	0.10
193	186	76	400	8	100	21.86	0.01	0.03	0.14
194	187	186	450	6	100	13.37	0.02	0.04	0.15
195	90	187	300	6	100	19.14	0.02	0.08	0.22
196	190	279	700	8	110	23.55	0.02	0.02	0.15
198	190	170	1300	8	100	31.14	0.06	0.05	0.20
199	191	190	2400	8	100	57.53	0.36	0.15	0.37
200	192	191	800	8	60	232.89	4.12	5.15	1.49
201	196	191	650	8	60	406.77	9.40	14.46	2.60
202	193	192	250	6	60	237.66	5.43	21.70	2.70
203	193	194	150	12	120	220.24	0.03	0.18	0.62
204	193	204	2560	10	100	54.61	0.12	0.05	0.22
205	194	195	1280	8	60	23.72	0.10	0.07	0.15
206	194	196	850	12	120	191.75	0.12	0.14	0.54
207	195	196	550	6	60	7.84	0.02	0.04	0.09
208	280	196	1000	12	120	211.95	0.17	0.17	0.60
209	197	193	650	12	120	518.28	0.57	0.87	1.47
210	198	197	1100	8	90	524.05	12.00	10.91	3.35
212	96	198	450	8	90	549.98	5.37	11.93	3.51
213	198	199	800	8	100	4.76	0.00	0.00	0.03
214	198	200	200	8	100	11.55	0.00	0.01	0.07
215	200	201	1050	10	100	1.92	0.00	0.00	0.01
216	195	202	1250	6	60	12.03	0.11	0.09	0.14
217	202	203	200	6	60	5.52	0.00	0.02	0.06
218	202	206	450	12	110	1.92	0.00	0.00	0.01
219	204	203	350	6	60	24.99	0.12	0.34	0.28
220	203	205	450	12	110	2.84	0.00	0.00	0.01
222	204	207	450	6	60	29.62	0.21	0.46	0.34
223	207	208	2100	8	110	15.24	0.02	0.01	0.10
224	208	209	1800	8	110	10.47	0.01	0.01	0.07
250	126	230	500	12	100	5.92	0.00	0.00	0.02
251	230	231	500	12	110	2.99	0.00	0.00	0.01
252	143	233	500	12	100	249.45	0.16	0.32	0.71
253	233	232	350	12	120	240.24	0.07	0.21	0.68
254	232	234	1200	12	120	228.10	0.23	0.19	0.65
255	232	235	200	8	120	9.21	0.00	0.00	0.06
256	234	140	3100	12	120	218.90	0.55	0.18	0.62
257	145	236	450	12	110	805.91	1.04	2.32	2.29
258	236	237	700	12	110	802.86	1.61	2.30	2.28
259	237	146	1400	12	110	282.20	0.46	0.33	0.80
260	237	238	1350	8	110	515.72	9.86	7.31	3.29
261	239	238	900	8	110	100.60	0.32	0.35	0.64
262	146	239	1300	8	100	457.58	9.08	6.98	2.92
263	239	240	1800	8	100	351.99	7.73	4.30	2.25
264	238	241	1150	10	100	611.34	4.63	4.03	2.50
265	245	240	500	10	100	599.14	1.94	3.88	2.45
266	240	246	650	8	100	948.08	17.50	26.92	6.05
267	241	242	1100	10	110	165.56	0.33	0.30	0.68
268	241	245	380	10	100	442.74	0.84	2.22	1.81
269	242	243	700	10	110	162.51	0.20	0.29	0.66
270	243	245	1100	10	110	159.46	0.31	0.28	0.65

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, EXISTING SYSTEM) FILE:TEST.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
271	246	247	1520	8	100	829.99	31.98	21.04	5.30
272	246	250	1440	8	100	105.53	0.66	0.46	0.67
273	247	300	1050	8	100	818.49	21.53	20.50	5.22
			PRV (205.00)			0.00			Open
274	247	248	1600	6	100	7.39	0.02	0.01	0.08
275	248	249	1250	12	110	3.69	0.00	0.00	0.01
276	250	251	2560	6	100	100.61	4.39	1.72	1.14
			PRV (197.00)			0.00			Open
277	251	252	550	8	100	10.73	0.00	0.01	0.07
278	251	255	1900	8	100	589.45	21.21	11.16	3.76
279	252	253	750	8	110	4.11	0.00	0.00	0.03
280	252	254	200	8	100	2.99	0.00	0.00	0.02
282	255	256	600	8	100	390.29	3.12	5.20	2.49
283	255	257	1000	8	100	196.17	1.46	1.46	1.25
284	257	256	1200	8	100	191.25	1.67	1.39	1.22
285	256	320	1650	8	100	578.54	17.79	10.78	3.69
300	270	251	2350	8	100	503.21	19.57	8.33	3.21
301	170	270	650	8	100	514.67	5.64	8.68	3.29
302	270	271	950	6	100	6.69	0.01	0.01	0.08
303	273	272	1350	8	110	0.41	0.00	0.00	0.00
304	274	272	950	8	110	4.35	0.00	0.00	0.03
305	274	273	550	8	110	5.18	0.00	0.00	0.03
306	275	274	450	8	110	14.29	0.00	0.01	0.09
307	276	275	800	8	110	19.06	0.01	0.02	0.12
308	276	354	300	8	100	544.93	2.90	9.65	3.48
309	277	276	1360	8	100	568.75	14.21	10.45	3.63
310	278	277	3000	8	120	573.52	22.71	7.57	3.66
311	191	278	1200	8	120	577.37	9.20	7.66	3.69
312	282	280	1050	12	120	217.44	0.18	0.17	0.62
313	282	283	550	6	100	14.29	0.03	0.05	0.16
314	283	284	1100	6	100	4.67	0.01	0.01	0.05
315	282	285	950	8	90	15.71	0.02	0.02	0.10
316	602	282	700	12	120	252.21	0.16	0.23	0.72
350	300	301	500	8	100	77.35	0.13	0.26	0.49
351	301	302	850	8	100	72.77	0.20	0.23	0.46
352	302	303	700	6	100	4.71	0.00	0.01	0.05
353	302	304	1000	8	100	63.34	0.18	0.18	0.40
354	304	305	500	8	100	10.33	0.00	0.01	0.07
355	304	307	500	6	100	13.78	0.02	0.04	0.16
356	304	309	950	8	100	16.32	0.01	0.01	0.10
357	305	306	305	6	100	5.61	0.00	0.01	0.06
358	307	308	600	6	100	6.82	0.01	0.01	0.08
359	304	310	1100	8	120	19.00	0.02	0.01	0.12
360	309	310	200	8	100	10.66	0.00	0.01	0.07
361	310	311	950	8	100	24.95	0.03	0.03	0.16
362	311	312	1200	8	100	375.86	5.82	4.85	2.40
364	312	313	1000	6	100	231.47	8.03	8.03	2.63
365	312	315	300	8	100	133.40	0.21	0.71	0.85
366	314	313	300	8	100	759.15	5.35	17.83	4.85
367	315	314	1000	8	100	260.58	2.46	2.46	1.66
368	317	314	300	8	100	501.36	2.48	8.27	3.20
369	316	315	300	8	100	129.97	0.20	0.68	0.83
370	316	317	950	8	100	66.06	0.18	0.19	0.42
371	318	316	300	8	100	198.82	0.45	1.49	1.27

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, EXISTING SYSTEM) FILE:TEST.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
372	319	317	300	8	100	438.08	1.93	6.44	2.80
373	319	318	850	8	100	201.60	1.30	1.53	1.29
374	320	319	1000	8	110	642.01	10.96	10.96	4.10
375	320	321	1400	8	100	42.95	0.12	0.09	0.27
376	321	322	800	8	100	254.43	1.88	2.36	1.62
377	322	323	400	8	110	167.91	0.37	0.91	1.07
378	322	325	250	8	100	82.74	0.07	0.29	0.53
379	323	324	280	8	100	165.58	0.30	1.06	1.06
380	325	324	400	8	100	197.59	0.59	1.47	1.26
381	324	326	300	8	100	360.34	1.35	4.49	2.30
382	327	325	210	8	100	118.62	0.12	0.57	0.76
385	300	313	950	8	100	695.33	14.40	15.16	4.44
386	326	311	650	8	100	356.57	2.86	4.40	2.28
392	361	391	50	8	100	25.52	0.00	0.03	0.16
394	391	374	1000	12	120	25.52	0.00	0.00	0.07
400	350	320	1250	8	100	109.69	0.62	0.50	0.70
401	356	321	1250	12	110	215.25	0.25	0.20	0.61
402	351	350	510	8	100	521.58	4.54	8.90	3.33
403	350	356	750	12	110	407.18	0.49	0.65	1.16
404	353	351	350	8	100	388.59	1.81	5.16	2.48
405	352	351	900	8	100	137.71	0.68	0.76	0.88
406	353	352	1400	8	100	142.42	1.13	0.80	0.91
407	354	353	1260	8	100	535.73	11.78	9.35	3.42
408	354	355	960	8	90	9.20	0.01	0.01	0.06
409	356	357	1050	8	110	187.21	1.17	1.12	1.20
410	357	358	200	8	110	131.29	0.12	0.58	0.84
411	357	364	1250	8	110	52.15	0.13	0.10	0.33
412	358	359	1650	8	110	73.02	0.32	0.20	0.47
413	359	327	800	8	100	120.95	0.48	0.59	0.77
414	358	360	750	8	100	58.27	0.12	0.15	0.37
415	361	359	800	8	100	55.26	0.11	0.14	0.35
416	360	361	250	8	90	86.06	0.10	0.38	0.55
417	362	360	1050	8	120	32.51	0.04	0.04	0.21
418	361	374	1800	6	90	2.81	0.00	0.00	0.03
419	363	362	750	8	120	38.00	0.04	0.05	0.24
420	364	365	500	8	120	20.41	0.01	0.02	0.13
421	364	363	900	8	120	27.03	0.02	0.03	0.17
422	365	363	1650	8	120	15.69	0.02	0.01	0.10
423	367	366	750	12	120	3.68	0.00	0.00	0.01
424	370	367	600	12	120	7.69	0.00	0.00	0.02
425	367	368	1350	12	120	0.28	0.00	0.00	0.00
426	369	368	500	12	120	3.00	0.00	0.00	0.01
427	370	369	1450	8	120	1.16	0.00	0.00	0.01
428	372	369	450	12	120	4.62	0.00	0.00	0.01
429	371	370	500	12	120	11.68	0.00	0.00	0.03
430	374	371	600	12	120	14.46	0.00	0.00	0.04
431	373	372	850	12	120	8.30	0.00	0.00	0.02
432	374	373	1250	12	120	11.09	0.00	0.00	0.03

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, EXISTING SYSTEM) FILE:TEST.DAT

NODE NO	COORDINATES			GRADIENT RESULTS			BOUNDARY SPEC			
	X(FT)	Y(FT)	Z(FT)	HG(FT)	P(FT)	P(Psi)	Q(GPM)	TYPE		
1	0	0	375	493.97	118.97	51.50	9.62	BQ	9.62	0.00
2	0	0	341	493.98	152.98	66.22	9.62	BQ	9.62	0.00
3	0	0	272	493.98	221.98	96.09	9.62	BQ	9.62	0.00
4	0	0	270	493.98	223.98	96.96	4.76	BQ	4.76	0.00
5	0	0	285	493.98	208.98	90.47	26.18	BQ	26.18	0.00
6	0	0	275	493.99	218.99	94.80	4.76	BQ	4.76	0.00
7	0	0	272	500.75	228.75	99.03	7.33	BQ	7.33	0.00
8	0	0	270	503.88	233.88	101.25	26.18	BQ	26.18	0.00
9	0	0	270	503.88	233.88	101.25				0.00
10	0	0	270	503.88	233.88	101.25	4.67	BQ	4.67	0.00
11	0	0	290	487.29	197.29	85.41	4.76	BQ	4.76	0.00
12	0	0	275	485.77	210.77	91.24	4.76	BQ	4.76	0.00
13	0	0	295	485.27	190.27	82.37	4.76	BQ	4.76	0.00
14	0	0	295	483.95	188.95	81.80	6.69	BQ	6.69	0.00
15	0	0	277	483.95	206.95	89.59	4.76	BQ	4.76	0.00
30	0	0	270	481.41	211.41	91.52	6.69	BQ	6.69	0.00
31	0	0	310	479.78	169.78	73.50	4.76	BQ	4.76	0.00
32	0	0	340	479.71	139.71	60.48	4.76	BQ	4.76	0.00
33	0	0	335	479.69	144.69	62.64	4.76	BQ	4.76	0.00
34	0	0	315	479.43	164.43	71.18	9.62	BQ	9.62	0.00
35	0	0	315	479.14	164.14	71.06	6.69	BQ	6.69	0.00
36	0	0	310	478.97	168.97	73.15	6.69	BQ	6.69	0.00
37	0	0	306	478.57	172.57	74.70	4.76	BQ	4.76	0.00
38	0	0	325	478.25	153.25	66.34	9.25	BQ	9.25	0.00
39	0	0	328	478.14	150.14	65.00	18.33	BQ	18.33	0.00
40	0	0	335	477.85	142.85	61.84	5.54	BQ	5.54	0.00
41	0	0	410	477.74	67.74	29.33	8.31	BQ	8.31	0.00
42	0	0	410	477.71	67.71	29.31	15.71	BQ	15.71	0.00
43	0	0	370	477.68	107.68	46.62	8.31	BQ	8.31	0.00
44	0	0	385	477.68	92.68	40.12	8.18	BQ	8.18	0.00
45	0	0	375	477.68	102.68	44.45	8.18	BQ	8.18	0.00
46	0	0	300	477.67	177.67	76.91	8.18	BQ	8.18	0.00
47	0	0	300	477.67	177.67	76.91	8.18	BQ	8.18	0.00
48	0	0	310	477.67	167.67	72.58	8.18	BQ	8.18	0.00
49	0	0	295	477.67	182.67	79.08	15.71	BQ	15.71	0.00
50	0	0	275	477.67	202.67	87.74	23.56	BQ	23.56	0.00
51	0	0	335	477.85	142.85	61.84	5.54	BQ	5.54	0.00
52	0	0	270	477.80	207.80	89.96	13.85	BQ	13.85	0.00
62	0	0	350	477.69	127.69	55.28	15.71	BQ	15.71	0.00
70	0	0	315	478.52	163.52	70.79	6.86	BQ	6.86	0.00
71	0	0	315	478.48	163.48	70.77	6.86	BQ	6.86	0.00
72	0	0	320	478.26	158.26	68.51	2.77	BQ	2.77	0.00
73	0	0	325	478.14	153.14	66.29	2.77	BQ	2.77	0.00
74	0	0	330	477.99	147.99	64.06	4.09	BQ	4.09	0.00
75	0	0	300	479.22	179.22	77.59	13.85	BQ	13.85	0.00
76	0	0	300	479.27	179.27	77.61	8.31	BQ	8.31	0.00
77	0	0	330	479.23	149.23	64.60	13.85	BQ	13.85	0.00
78	0	0	330	479.82	149.82	64.86	27.71	BQ	27.71	0.00
79	0	0	285	479.36	194.36	84.14	6.86	BQ	6.86	0.00
80	0	0	275	479.34	204.34	88.46	6.86	BQ	6.86	0.00
81	0	0	265	479.33	214.33	92.79	6.86	BQ	6.86	0.00
82	0	0	265	479.32	214.32	92.78	6.86	BQ	6.86	0.00

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, EXISTING SYSTEM) FILE:TEST.DAT

NODE NO	COORDINATES			GRADIENT RESULTS			BOUNDARY SPEC			
	X(FT)	Y(FT)	Z(FT)	HG(FT)	P(FT)	P(Psi)	Q(GPM)	TYPE		
83	0	0	275	479.35	204.35	88.46	5.54	BQ	5.54	0.00
84	0	0	295	479.34	184.34	79.80	6.86	BQ	6.86	0.00
85	0	0	270	479.34	209.34	90.62	15.71	BQ	15.71	0.00
86	0	0	295	479.33	184.33	79.80	13.85	BQ	13.85	0.00
87	0	0	290	479.29	189.29	81.95	8.31	BQ	8.31	0.00
88	0	0	295	479.31	184.31	79.79	13.85	BQ	13.85	0.00
89	0	0	260	479.29	219.29	94.93	13.85	BQ	13.85	0.00
90	0	0	325	479.33	154.33	66.81	8.31	BQ	8.31	0.00
91	0	0	350	480.00	130.00	56.28	9.62	BQ	9.62	0.00
92	0	0	287	479.39	192.39	83.29	9.62	BQ	9.62	0.00
93	0	0	282	479.40	197.40	85.46	4.76	BQ	4.76	0.00
94	0	0	335	479.45	144.45	62.53	2.84	BQ	2.84	0.00
95	0	0	320	479.40	159.40	69.00	4.76	BQ	4.76	0.00
96	0	0	260	480.17	220.17	95.31	2.84	BQ	2.84	0.00
97	0	0	270	480.03	210.03	90.92	5.77	BQ	5.77	0.00
98	0	0	285	479.80	194.80	84.33	39.27	BQ	39.27	0.00
120	0	0	390	476.19	86.19	37.31	1.92	BQ	1.92	0.00
121	0	0	450	481.20	31.20	13.51	4.76	BQ	4.76	0.00
122	0	0	450	481.61	31.61	13.68	4.76	BQ	4.76	0.00
123	0	0	410	482.60	72.60	31.43	4.76	BQ	4.76	0.00
124	0	0	385	482.61	97.61	42.25	4.76	BQ	4.76	0.00
125	0	0	337	482.73	145.73	63.08				0.00
126	0	0	355	474.94	119.94	51.92	4.76	BQ	4.76	0.00
127	0	0	335	482.87	147.87	64.01	7.70	BQ	7.70	0.00
128	0	0	335	485.06	150.06	64.96	4.76	BQ	4.76	0.00
129	0	0	270	481.32	211.32	91.48	4.76	BQ	4.76	0.00
130	0	0	285	481.31	196.31	84.98	14.39	BQ	14.39	0.00
131	0	0	325	480.21	155.21	67.19	4.76	BQ	4.76	0.00
132	0	0	330	480.21	150.21	65.03	6.69	BQ	6.69	0.00
133	0	0	350	480.21	130.21	56.37	9.62	BQ	9.62	0.00
134	0	0	312	480.21	168.21	72.82	4.76	BQ	4.76	0.00
135	0	0	310	480.00	170.00	73.59	4.76	BQ	4.76	0.00
136	0	0	305	479.75	174.75	75.65	4.76	BQ	4.76	0.00
137	0	0	295	477.44	182.44	78.98	4.76	BQ	4.76	0.00
138	0	0	320	473.61	153.61	66.50	11.00	BQ	11.00	0.00
139	0	0	320	473.61	153.61	66.50	11.18	BQ	11.18	0.00
140	0	0	320	473.61	153.61	66.50	4.76	BQ	4.76	0.00
141	0	0	340	474.51	134.51	58.23	4.58	BQ	4.58	0.00
142	0	0	345	481.40	136.40	59.05	5.24	BQ	5.24	0.00
143	0	0	355	474.62	119.62	51.78	14.39	BQ	14.39	0.00
145	0	0	345	469.53	124.53	53.91	2.75	BQ	2.75	0.00
146	0	0	296	466.41	170.41	73.77	1.92	BQ	1.92	0.00
147	0	0	290	466.62	176.62	76.46	7.79	BQ	7.79	0.00
148	0	0	266	466.59	200.59	86.84	9.62	BQ	9.62	0.00
149	0	0	262	466.49	204.49	88.52	4.76	BQ	4.76	0.00
150	0	0	285	466.79	181.79	78.70	6.87	BQ	6.87	0.00
151	0	0	295	466.66	171.66	74.31	9.62	BQ	9.62	0.00
152	0	0	285	466.66	181.66	78.64	2.84	BQ	2.84	0.00
153	0	0	260	466.65	206.65	89.46	1.92	BQ	1.92	0.00
154	0	0	290	467.53	177.53	76.85	6.87	BQ	6.87	0.00
155	0	0	295	468.56	173.56	75.13	4.58	BQ	4.58	0.00
156	0	0	265	479.10	214.10	92.69	15.71	BQ	15.71	0.00

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, EXISTING SYSTEM) FILE:TEST.DAT

NODE NO	COORDINATES			GRADIENT RESULTS			BOUNDARY SPEC	
	X(FT)	Y(FT)	Z(FT)	HG(FT)	P(FT)	P(PSI)	Q(GPM)	TYPE
157	0	0	325	473.83	148.83	64.43		0.00
158	0	0	275	468.04	193.04	83.57		0.00
170	0	0	259	452.27	193.27	83.66	2.84 BQ	2.84 0.00
171	0	0	265	464.43	199.43	86.33	3.85 BQ	3.85 0.00
172	0	0	305	464.43	159.43	69.02	5.77 BQ	5.77 0.00
173	0	0	265	474.56	209.56	90.72	4.76 BQ	4.76 0.00
174	0	0	280	476.33	196.33	84.99	3.85 BQ	3.85 0.00
175	0	0	270	476.60	206.60	89.44	4.76 BQ	4.76 0.00
176	0	0	275	476.87	201.87	87.39	4.76 BQ	4.76 0.00
177	0	0	285	476.87	191.87	83.06	4.76 BQ	4.76 0.00
178	0	0	305	476.87	171.87	74.40	39.27 BQ	39.27 0.00
179	0	0	280	477.51	197.51	85.50	4.76 BQ	4.76 0.00
180	0	0	280	477.25	197.25	85.39	4.76 BQ	4.76 0.00
181	0	0	290	477.25	187.25	81.06	2.84 BQ	2.84 0.00
182	0	0	280	479.36	199.36	86.30	1.92 BQ	1.92 0.00
183	0	0	290	479.37	189.37	81.98	4.76 BQ	4.76 0.00
184	0	0	305	479.34	174.34	75.47	4.76 BQ	4.76 0.00
185	0	0	305	479.29	174.29	75.45	4.76 BQ	4.76 0.00
186	0	0	325	479.28	154.28	66.79	7.70 BQ	7.70 0.00
187	0	0	325	479.30	154.30	66.80	5.77 BQ	5.77 0.00
190	0	0	365	452.33	87.33	37.80	2.84 BQ	2.84 0.00
191	0	0	275	452.69	177.69	76.92	4.76 BQ	4.76 0.00
192	0	0	265	456.81	191.81	83.03	4.76 BQ	4.76 0.00
193	0	0	285	462.23	177.23	76.72	5.77 BQ	5.77 0.00
194	0	0	295	462.21	167.21	72.38	4.76 BQ	4.76 0.00
195	0	0	295	462.11	167.11	72.34	3.85 BQ	3.85 0.00
196	0	0	285	462.09	177.09	76.66	4.76 BQ	4.76 0.00
197	0	0	265	462.80	197.80	85.63	5.77 BQ	5.77 0.00
198	0	0	280	474.80	194.80	84.33	9.62 BQ	9.62 0.00
199	0	0	265	474.80	209.80	90.82	4.76 BQ	4.76 0.00
200	0	0	280	474.80	194.80	84.33	9.62 BQ	9.62 0.00
201	0	0	360	474.80	114.80	49.70	1.92 BQ	1.92 0.00
202	0	0	280	462.00	182.00	78.79	4.58 BQ	4.58 0.00
203	0	0	275	462.00	187.00	80.95	27.67 BQ	27.67 0.00
204	0	0	249	462.12	213.12	92.26		0.00
205	0	0	280	462.00	182.00	78.79	2.84 BQ	2.84 0.00
206	0	0	280	462.00	182.00	78.79	1.92 BQ	1.92 0.00
207	0	0	230	461.91	231.91	100.39	14.39 BQ	14.39 0.00
208	0	0	215	461.89	246.89	106.88	4.76 BQ	4.76 0.00
209	0	0	200	461.88	261.88	113.37	10.47 BQ	10.47 0.00
230	0	0	377	474.94	97.94	42.40	2.93 BQ	2.93 0.00
231	0	0	380	474.94	94.94	41.10	2.99 BQ	2.99 0.00
232	0	0	320	474.39	154.39	66.84	2.93 BQ	2.93 0.00
233	0	0	325	474.46	149.46	64.70	9.21 BQ	9.21 0.00
234	0	0	380	474.16	94.16	40.76	9.21 BQ	9.21 0.00
235	0	0	360	474.39	114.39	49.52	9.21 BQ	9.21 0.00
236	0	0	350	468.49	118.49	51.29	3.05 BQ	3.05 0.00
237	0	0	270	466.88	196.88	85.23	4.93 BQ	4.93 0.00
238	0	0	400	457.02	57.02	24.68	4.98 BQ	4.98 0.00
239	0	0	325	457.33	132.33	57.29	4.98 BQ	4.98 0.00
240	0	0	325	449.60	124.60	53.94	3.05 BQ	3.05 0.00
241	0	0	370	452.38	82.38	35.66	3.05 BQ	3.05 0.00

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, EXISTING SYSTEM) FILE:TEST.DAT

NODE NO	COORDINATES			GRADIENT RESULTS			BOUNDARY SPEC		Q(GPM)	TYPE
	X(FT)	Y(FT)	Z(FT)	HG(FT)	P(FT)	P(PSI)				
242	0	0	415	452.05	37.05	16.04	3.05	BQ	3.05	0.00
243	0	0	420	451.85	31.85	13.79	3.05	BQ	3.05	0.00
245	0	0	355	451.54	96.54	41.79	3.05	BQ	3.05	0.00
246	0	0	324	432.11	108.11	46.80	12.57	BQ	12.57	0.00
247	0	0	305	400.13	95.13	41.18	4.11	BQ	4.11	0.00
248	0	0	330	400.11	70.11	30.35	3.69	BQ	3.69	0.00
249	0	0	330	400.11	70.11	30.35	3.69	BQ	3.69	0.00
250	0	0	306	431.44	125.44	54.30	4.93	BQ	4.93	0.00
251	0	0	293	427.05	134.05	58.03	3.64	BQ	3.64	0.00
252	0	0	275	427.05	152.05	65.82	3.64	BQ	3.64	0.00
253	0	0	285	427.04	142.04	61.49	4.11	BQ	4.11	0.00
254	0	0	270	427.05	157.05	67.98	2.99	BQ	2.99	0.00
255	0	0	295	405.84	110.84	47.98	2.99	BQ	2.99	0.00
256	0	0	295	402.72	107.72	46.63	2.99	BQ	2.99	0.00
257	0	0	290	404.38	114.38	49.52	4.93	BQ	4.93	0.00
270	0	0	276	446.62	170.62	73.86	4.76	BQ	4.76	0.00
271	0	0	320	446.61	126.61	54.81	6.69	BQ	6.69	0.00
272	0	0	350	406.55	56.55	24.48	4.76	BQ	4.76	0.00
273	0	0	370	406.55	36.55	15.82	4.76	BQ	4.76	0.00
274	0	0	350	406.55	56.55	24.48	4.76	BQ	4.76	0.00
275	0	0	330	406.56	76.56	33.14	4.76	BQ	4.76	0.00
276	0	0	320	406.57	86.57	37.48	4.76	BQ	4.76	0.00
277	0	0	340	420.78	80.78	34.97	4.76	BQ	4.76	0.00
278	0	0	315	443.49	128.49	55.62	3.85	BQ	3.85	0.00
279	0	0	270	452.31	182.31	78.92	23.55	BQ	23.55	0.00
280	0	0	280	462.26	182.26	78.90	5.50	BQ	5.50	0.00
282	0	0	410	462.44	52.44	22.70	4.76	BQ	4.76	0.00
283	0	0	415	462.41	47.41	20.53	9.62	BQ	9.62	0.00
284	0	0	400	462.41	62.41	27.02	4.67	BQ	4.67	0.00
285	0	0	400	462.42	62.42	27.02	15.71	BQ	15.71	0.00
300	0	0	285	378.60	93.60	40.52	45.82	BQ	45.81	0.00
301	0	0	285	378.47	93.47	40.46	4.58	BQ	4.58	0.00
302	0	0	275	378.27	103.27	44.71	4.71	BQ	4.71	0.00
303	0	0	280	378.27	98.27	42.54	4.71	BQ	4.71	0.00
304	0	0	264	378.09	114.09	49.39	3.91	BQ	3.91	0.00
305	0	0	265	378.09	113.09	48.96	4.71	BQ	4.71	0.00
306	0	0	280	378.09	98.09	42.46	5.61	BQ	5.61	0.00
307	0	0	260	378.07	118.07	51.11	6.96	BQ	6.96	0.00
308	0	0	255	378.07	123.07	53.27	6.82	BQ	6.82	0.00
309	0	0	280	378.08	98.08	42.46	5.66	BQ	5.66	0.00
310	0	0	280	378.08	98.08	42.46	4.71	BQ	4.71	0.00
311	0	0	300	378.05	78.05	33.79	5.66	BQ	5.66	0.00
312	0	0	370	372.23	2.23	0.96	11.00	BQ	11.00	0.00
313	0	0	318	364.20	46.20	20.00	1685.95	BH		
314	0	0	315	369.55	54.55	23.61	2.78	BQ	2.78	0.00
315	0	0	368	372.01	4.01	1.74	2.78	BQ	2.78	0.00
316	0	0	340	372.22	32.22	13.95	2.78	BQ	2.78	0.00
317	0	0	300	372.03	72.03	31.18	2.78	BQ	2.78	0.00
318	0	0	310	372.66	62.66	27.13	2.78	BQ	2.78	0.00
319	0	0	287	373.96	86.96	37.65	2.33	BQ	2.33	0.00
320	0	0	271	384.93	113.93	49.32	3.28	BQ	3.28	0.00
321	0	0	262	384.80	122.80	53.16	3.77	BQ	3.77	0.00

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, EXISTING SYSTEM) FILE:TEST.DAT

NODE NO	COORDINATES			GRADIENT RESULTS			BOUNDARY SPEC		Q(GPM)	TYPE
	X(FT)	Y(FT)	Z(FT)	HG(FT)	P(FT)	P(PSI)				
322	0	0	255	382.92	127.92	55.38	3.77	BQ	3.77	0.00
323	0	0	265	382.55	117.55	50.89	2.33	BQ	2.33	0.00
324	0	0	265	382.26	117.26	50.76	2.83	BQ	2.83	0.00
325	0	0	255	382.84	127.84	55.34	3.77	BQ	3.77	0.00
326	0	0	265	380.91	115.91	50.18	3.77	BQ	3.77	0.00
327	0	0	255	382.97	127.97	55.40	2.33	BQ	2.33	0.00
350	0	0	305	385.55	80.55	34.87	4.71	BQ	4.71	0.00
351	0	0	315	390.08	75.08	32.50	4.71	BQ	4.71	0.00
352	0	0	300	390.76	90.76	39.29	4.71	BQ	4.71	0.00
353	0	0	320	391.89	71.89	31.12	4.71	BQ	4.71	0.00
354	0	0	320	403.67	83.67	36.22				0.00
355	0	0	345	403.67	58.67	25.40	9.20	BQ	9.20	0.00
356	0	0	285	385.05	100.05	43.31	4.71	BQ	4.71	0.00
357	0	0	295	383.88	88.88	38.48	3.77	BQ	3.77	0.00
358	0	0	297	383.76	86.76	37.56				0.00
359	0	0	260	383.44	123.44	53.44	7.33	BQ	7.33	0.00
360	0	0	270	383.65	113.65	49.20	4.71	BQ	4.71	0.00
361	0	0	250	383.55	133.55	57.81	2.47	BQ	2.47	0.00
362	0	0	250	383.69	133.69	57.87	5.50	BQ	5.50	0.00
363	0	0	280	383.72	103.72	44.90	4.71	BQ	4.71	0.00
364	0	0	300	383.75	83.75	36.25	4.71	BQ	4.71	0.00
365	0	0	295	383.74	88.74	38.42	4.71	BQ	4.71	0.00
366	0	0	320	383.55	63.55	27.51	3.68	BQ	3.68	0.00
367	0	0	285	383.55	98.55	42.66	3.73	BQ	3.73	0.00
368	0	0	320	383.55	63.55	27.51	3.28	BQ	3.28	0.00
369	0	0	285	383.55	98.55	42.66	2.78	BQ	2.78	0.00
370	0	0	250	383.55	133.55	57.81	2.83	BQ	2.83	0.00
371	0	0	245	383.55	138.55	59.98	2.78	BQ	2.78	0.00
372	0	0	260	383.55	123.55	53.48	3.68	BQ	3.68	0.00
373	0	0	240	383.55	143.55	62.14	2.78	BQ	2.78	0.00
374	0	0	245	383.55	138.55	59.98	2.78	BQ	2.78	0.00
391	0	0	250	383.55	133.55	57.81				0.00
500	0	0	290	503.88	213.88	92.59	-1100.00	BQ	-1100.00	0.00
501	0	0	260	489.02	229.02	99.14	-1000.00	BQ	-1000.00	0.00
600	0	0	451	480.41	29.41	12.73	-397.47	BEL		
601	0	0	467	482.73	15.73	6.81	-532.70	BEL		
602	0	0	418	462.60	44.60	19.31	-252.21	BEL		

TOTAL SYSTEM Q = 3282.38 Total BQ (pos) = 1596.43 Total BQ (neg) = -2100.00

0.00 0.00

COMPUTER PRINTOUT

PHASE I IMPROVEMENT

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE I) FILE: I.DAT

INITIAL TIME..... TZERO = 0.00
TIME INCREMENT..... DELT = 1.00
FINAL TIME..... TFINAL = 3.00

***** TANK LEVEL ADJUSTMENT FACTORS:

TANK AT NODE 600	VOL PER UNIT ELEV. =	1257	FT.**3/(FT. ELEV.)
TANK AT NODE 601	VOL PER UNIT ELEV. =	3526	FT.**3/(FT. ELEV.)
TANK AT NODE 602	VOL PER UNIT ELEV. =	491	FT.**3/(FT. ELEV.)
TANK AT NODE 719	VOL PER UNIT ELEV. =	3171	FT.**3/(FT. ELEV.)

***** TANK OVERFLOW/EMPTY LIMITS:

TANK AT NODE 719	OVERFLOW =	489.00 FT	EMPTY =	450.0 FT
------------------	------------	-----------	---------	----------

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE I) FILE: I.DAT

PIPE	FROM	TO	L(FT) D(IN) C			Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
1	2	1	975	8	100	9.62	0.01	0.01	0.06
2	3	2	1100	12	100	13.61	0.00	0.00	0.04
3	4	3	1900	12	100	23.23	0.01	0.00	0.07
4	4	5	1200	12	100	31.81	0.01	0.01	0.09
5	5	2	1500	12	100	5.63	0.00	0.00	0.02
6	6	4	430	12	100	59.81	0.01	0.02	0.17
7	7	6	1750	12	110	1061.82	6.76	3.86	3.01
8	500	7	800	12	110	1069.15	3.13	3.91	3.03
9	500	8	850	12	110	30.85	0.00	0.01	0.09
10	8	9	400	12	100	4.67	0.00	0.00	0.01
11	9	10	300	12	100	4.67	0.00	0.00	0.01
12	6	11	1950	12	110	997.25	6.71	3.44	2.83
13	11	12	2200	12	110	369.62	1.20	0.55	1.05
14	12	13	750	12	110	364.85	0.40	0.53	1.04
15	13	14	2000	12	110	360.09	1.04	0.52	1.02
16	14	15	1950	10	100	4.76	0.00	0.00	0.02
17	14	30	1400	10	100	348.63	1.99	1.42	1.42
18	34	156	800	6	120	51.48	0.28	0.35	0.58
30	30	31	1500	10	90	252.81	1.43	0.95	1.03
PRV (180.00)							0.00		Open
31	31	32	520	8	100	50.34	0.06	0.12	0.32
32	32	33	800	8	100	19.28	0.02	0.02	0.12
33	32	33	450	8	100	26.30	0.02	0.04	0.17
34	31	34	500	10	90	197.71	0.30	0.61	0.81
35	33	34	700	6	100	40.81	0.23	0.32	0.46
36	34	35	500	10	90	177.41	0.25	0.50	0.72
37	35	36	320	10	90	170.72	0.15	0.46	0.70
38	36	37	550	10	90	199.81	0.34	0.62	0.82
39	156	36	1800	8	100	35.77	0.11	0.06	0.23
40	37	38	1350	10	110	143.26	0.31	0.23	0.59
41	38	39	400	10	110	152.83	0.10	0.26	0.62
42	72	38 CV	1000	8	110	18.83	0.02	0.02	0.12 Open
43	39	40	1650	10	110	125.29	0.30	0.18	0.51
44	39	73	850	8	110	9.21	0.00	0.00	0.06
45	40	41	1350	12	110	128.21	0.10	0.08	0.36
46	51	40	350	6	90	8.46	0.01	0.02	0.10
47	41	42	450	12	110	119.90	0.03	0.07	0.34
48	42	43	1100	12	110	72.39	0.03	0.03	0.21
49	43	44	250	12	110	16.36	0.00	0.00	0.05
50	43	46	2200	8	110	10.51	0.01	0.01	0.07
51	44	45	750	12	110	6.18	0.00	0.00	0.02
52	44	45	2500	10	110	2.00	0.00	0.00	0.01
53	46	47	1650	8	110	2.33	0.00	0.00	0.01
54	48	47	3300	12	110	5.86	0.00	0.00	0.02
55	43	48	1500	12	110	37.21	0.01	0.01	0.11
56	48	49	500	12	110	23.17	0.00	0.00	0.07
57	49	50	1050	12	110	14.63	0.00	0.00	0.04
58	49	50	1350	8	110	4.40	0.00	0.00	0.03
59	51	52	1200	6	100	13.85	0.05	0.04	0.16
60	42	62	600	8	120	31.81	0.02	0.04	0.20
61	62	49	2100	8	120	16.10	0.02	0.01	0.10
64	49	50	1500	8	120	4.53	0.00	0.00	0.03
70	37	70	500	10	90	51.79	0.03	0.05	0.21

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE I) FILE: I.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
71	70	71	600	10	90	44.93	0.02	0.04	0.18
72	71	72	1950	8	90	47.11	0.25	0.13	0.30
73	75	71	600	10	90	249.30	0.56	0.93	1.02
74	72	73	750	6	90	25.51	0.12	0.16	0.29
75	73	74	600	6	90	31.95	0.15	0.25	0.36
76	74	51	700	6	90	27.86	0.14	0.19	0.32
77	78	75	2900	10	100	34.68	0.06	0.02	0.14
78	76	75	150	10	90	145.51	0.05	0.34	0.59
79	76	77	900	6	100	13.85	0.04	0.04	0.16
80	90	76	650	12	120	110.71	0.03	0.05	0.31
81	78	79	2160	8	100	6.23	0.01	0.00	0.04
82	600	78	800	10	90	68.61	0.07	0.09	0.28
83	79	84	450	6	90	11.30	0.02	0.04	0.13
84	79	83	300	8	100	21.68	0.01	0.02	0.14
85	84	80	650	12	110	4.44	0.00	0.00	0.01
86	83	80	650	8	100	16.14	0.01	0.01	0.10
87	80	81	750	8	100	13.72	0.01	0.01	0.09
88	81	82	1600	6	100	6.86	0.02	0.01	0.08
89	85	79	550	8	100	33.62	0.03	0.06	0.21
90	86	85	2050	10	100	49.33	0.08	0.04	0.20
91	86	88	250	8	90	36.02	0.02	0.08	0.23
92	88	87	1300	8	90	12.78	0.01	0.01	0.08
93	88	89	2400	8	90	9.38	0.02	0.01	0.06
94	87	89	250	8	90	4.47	0.00	0.00	0.03
95	93	86	3500	10	100	99.21	0.49	0.14	0.41
96	600	91	1200	10	110	20.98	0.01	0.01	0.09
97	92	90	600	12	120	110.40	0.03	0.05	0.31
98	91	92	1950	10	110	11.36	0.00	0.00	0.05
99	93	92	900	8	90	108.66	0.53	0.59	0.69
100	93	95	400	8	110	4.76	0.00	0.00	0.03
101	94	93	1080	10	110	217.40	0.54	0.50	0.89
102	96	94	1800	12	110	503.40	1.75	0.97	1.43
103	501	96	2560	12	110	1000.00	8.85	3.46	2.84
104	96	97	450	6	110	45.04	0.15	0.32	0.51
105	97	98	900	6	110	39.27	0.23	0.25	0.45
106	96	94	1800	8	90	141.79	1.75	0.97	0.91
119	123	601	100	12	100	318.79	0.05	0.50	0.90
120	121	120	2200	12	100	146.71	0.26	0.12	0.42
121	123	121	1200	12	110	56.10	0.02	0.02	0.16
122	124	123	800	12	110	379.67	0.46	0.58	1.08
123	122	121	500	8	120	95.35	0.14	0.27	0.61
124	124	122	1150	8	120	100.12	0.34	0.30	0.64
125	125	124	600	12	110	484.56	0.54	0.90	1.37
126	125	142	1100	8	100	71.22	0.25	0.22	0.45
127	120	126	550	12	100	144.78	0.06	0.12	0.41
128	127	125	350	12	100	413.45	0.28	0.80	1.17
129	128	127	1800	12	110	618.10	2.55	1.42	1.75
130	11	128	1800	12	110	622.86	2.59	1.44	1.77
131	127	129	1360	8	100	54.63	0.19	0.14	0.35
132	129	130	800	8	100	14.39	0.01	0.01	0.09
133	129	131	1200	8	100	35.48	0.07	0.06	0.23
134	131	132	1250	8	120	6.69	0.00	0.00	0.04

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE I) FILE: I.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
135	133	131	1200	8	100	19.33	0.02	0.02	0.12
136	134	133	800	8	100	28.95	0.03	0.04	0.18
137	134	135	400	8	100	55.42	0.06	0.14	0.35
138	135	136	500	8	100	50.66	0.06	0.12	0.32
139	30	134	2080	8	100	89.13	0.70	0.34	0.57
140	131	136	650	8	100	43.35	0.06	0.09	0.28
141	136	137	1120	8	100	89.24	0.38	0.34	0.57
143	139	138	1350	8	120	11.00	0.01	0.00	0.07
144	140	139	300	12	120	22.17	0.00	0.00	0.06
145	126	141	600	12	100	83.98	0.03	0.04	0.24
146	141	157	1600	12	100	55.67	0.03	0.02	0.16
147	141	140	2100	12	110	61.24	0.04	0.02	0.17
148	143	141	400	12	100	37.52	0.00	0.01	0.11
149	126	143	280	12	100	116.10	0.02	0.08	0.33
150	140	145	1750	12	110	123.62	0.13	0.07	0.35
151	147	146	250	8	100	30.37	0.01	0.05	0.19
152	147	148	1400	8	100	11.23	0.01	0.01	0.07
153	148	149	350	6	100	3.98	0.00	0.00	0.05
154	146	149	1250	8	100	0.78	0.00	0.00	0.00
155	150	147	500	8	100	22.10	0.01	0.03	0.14
156	155	147	1700	6	100	27.29	0.26	0.15	0.31
157	137	155	1100	6	100	84.48	1.37	1.24	0.96
158	155	158	850	8	120	52.61	0.08	0.09	0.34
159	154	150	950	8	100	45.74	0.09	0.10	0.29
160	150	151	1450	8	100	16.76	0.02	0.02	0.11
161	151	152	500	6	100	4.76	0.00	0.01	0.05
162	152	153	1000	6	100	1.92	0.00	0.00	0.02
163	151	148	400	6	100	2.37	0.00	0.00	0.03
164	142	126	1400	6	100	65.98	1.10	0.79	0.75
165	157	140	500	12	100	55.67	0.01	0.02	0.16
166	127	125	350	8	100	142.33	0.28	0.80	0.91
167	158	154	850	8	120	52.61	0.08	0.09	0.34
170	171	170	2180	8	120	402.80	8.58	3.93	2.57
171	171	172	300	8	100	5.77	0.00	0.00	0.04
172	173	171	1250	8	100	412.42	7.20	5.76	2.63
173	94	173	2600	8	120	246.71	4.13	1.59	1.57
174	174	173	900	8	100	170.47	1.01	1.12	1.09
175	175	174	600	8	100	77.68	0.16	0.26	0.50
176	178	174	800	8	100	96.64	0.31	0.39	0.62
177	176	175	550	8	100	82.44	0.16	0.29	0.53
178	176	177	220	8	100	14.47	0.00	0.01	0.09
179	180	176	550	8	100	101.67	0.24	0.43	0.65
180	71	178	1650	8	100	126.21	1.06	0.64	0.81
181	177	178	250	8	100	9.70	0.00	0.01	0.06
183	71	179	1450	8	110	114.04	0.65	0.45	0.73
184	179	180	350	8	100	109.28	0.17	0.49	0.70
185	180	181	400	8	100	2.84	0.00	0.00	0.02
186	183	182	250	8	110	80.23	0.06	0.23	0.51
187	182	184	500	8	110	78.30	0.11	0.22	0.50
188	94	183	280	8	90	178.24	0.41	1.48	1.14
189	183	184	380	8	90	93.25	0.17	0.45	0.60
190	184	185	250	8	90	166.79	0.33	1.31	1.06

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE I) FILE: I.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
191	185	75	1100	8	110	82.97	0.27	0.25	0.53
192	185	186	600	8	100	79.05	0.16	0.27	0.50
193	186	76	400	8	100	56.97	0.06	0.15	0.36
194	186	187	450	6	100	14.39	0.02	0.05	0.16
195	187	90	300	6	100	8.61	0.01	0.02	0.10
196	190	279	700	8	110	23.55	0.02	0.02	0.15
198	190	170	1300	8	100	128.29	0.86	0.66	0.82
199	191	190	2400	8	100	154.68	2.25	0.94	0.99
200	192	191	800	8	60	272.83	5.52	6.90	1.74
201	196	191	650	8	60	480.11	12.78	19.66	3.06
202	193	192	250	6	60	277.59	7.23	28.94	3.15
203	194	193	150	12	120	59.38	0.00	0.02	0.17
204	193	204	2560	10	100	51.24	0.10	0.04	0.21
205	194	195	1280	8	60	8.97	0.02	0.01	0.06
206	196	194	850	12	120	73.12	0.02	0.02	0.21
207	196	195	550	6	60	10.28	0.04	0.06	0.12
208	280	196	1000	12	120	568.27	1.03	1.03	1.61
209	197	193	650	12	120	275.22	0.18	0.27	0.78
210	198	197	1100	8	90	280.99	3.79	3.44	1.79
212	96	198	450	8	90	306.92	1.82	4.05	1.96
213	198	199	800	8	100	4.76	0.00	0.00	0.03
214	198	200	200	8	100	11.55	0.00	0.01	0.07
215	200	201	1050	10	100	1.92	0.00	0.00	0.01
216	195	202	1250	6	60	15.40	0.17	0.14	0.17
217	202	203	200	6	60	8.89	0.01	0.05	0.10
218	202	206	450	12	110	1.92	0.00	0.00	0.01
219	204	203	350	6	60	21.62	0.09	0.26	0.25
220	203	205	450	12	110	2.84	0.00	0.00	0.01
222	204	207	450	6	60	29.62	0.21	0.46	0.34
223	207	208	2100	8	110	15.24	0.02	0.01	0.10
224	208	209	1800	8	110	10.47	0.01	0.01	0.07
250	126	230	500	12	100	5.92	0.00	0.00	0.02
251	230	231	500	12	110	2.99	0.00	0.00	0.01
252	143	233	500	12	100	64.20	0.01	0.03	0.18
253	233	232	350	12	120	54.99	0.00	0.01	0.16
254	232	234	1200	12	120	42.85	0.01	0.01	0.12
255	232	235	200	8	120	9.21	0.00	0.00	0.06
256	234	140	3100	12	120	33.64	0.02	0.01	0.10
257	145	236	450	12	110	120.87	0.03	0.07	0.34
258	236	237	700	12	110	117.82	0.05	0.07	0.33
259	237	146	1400	12	110	273.08	0.44	0.31	0.77
260	238	237	1350	12	130	160.18	0.12	0.09	0.45
261	238	239	900	8	110	431.51	4.73	5.25	2.75
262	146	239	1300	8	100	300.74	4.17	3.21	1.92
263	239	240	1800	8	100	727.26	29.65	16.47	4.64
264	238	241	1150	10	100	1394.52	21.33	18.55	5.70
265	245	240	500	10	100	1382.32	9.13	18.25	5.65
266	240	246	650	12	130	2106.53	6.55	10.08	5.98
267	241	242	1100	10	110	375.87	1.51	1.37	1.54
268	241	245	380	10	100	1015.60	3.92	10.31	4.15
269	242	243	700	10	110	372.82	0.95	1.35	1.52
270	243	245	1100	10	110	369.77	1.46	1.33	1.51

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE I) FILE: I.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
271	246	247	1520	12	130	2000.99	13.93	9.16	5.68
272	246	250	1440	8	100	92.98	0.53	0.37	0.59
273	247	300	1050	12	130	1989.50	9.52	9.07	5.64
PRV (205.00)							0.00		Open
274	247	248	1600	6	100	7.39	0.02	0.01	0.08
275	248	249	1250	12	110	3.69	0.00	0.00	0.01
276	250	251	2560	6	100	88.05	3.43	1.34	1.00
PRV (197.00)							0.00		Open
277	251	252	550	8	100	10.73	0.00	0.01	0.07
278	251	255	1900	8	100	590.48	21.28	11.20	3.77
279	252	253	750	8	110	4.11	0.00	0.00	0.03
280	252	254	200	8	100	2.99	0.00	0.00	0.02
282	255	256	600	8	100	390.97	3.13	5.22	2.50
283	255	257	1000	8	100	196.51	1.46	1.46	1.25
284	257	256	1200	8	100	191.59	1.67	1.39	1.22
285	256	320	1650	8	100	579.57	17.85	10.82	3.70
300	270	251	2350	8	100	516.79	20.56	8.75	3.30
301	170	270	650	8	100	528.25	5.92	9.11	3.37
302	270	271	950	6	100	6.69	0.01	0.01	0.08
303	273	272	1350	8	110	0.41	0.00	0.00	0.00
304	274	272	950	8	110	4.35	0.00	0.00	0.03
305	274	273	550	8	110	5.18	0.00	0.00	0.03
306	275	274	450	8	110	14.29	0.00	0.01	0.09
307	276	275	800	8	110	19.06	0.01	0.02	0.12
308	276	354	300	8	100	561.05	3.06	10.19	3.58
309	277	276	1360	8	100	584.88	14.96	11.00	3.73
310	278	277	3000	8	120	589.64	23.91	7.97	3.76
311	191	278	1200	8	120	593.49	9.68	8.07	3.79
312	282	280	1050	12	120	573.77	1.10	1.05	1.63
313	282	283	550	6	100	14.29	0.03	0.05	0.16
314	283	284	1100	6	100	4.67	0.01	0.01	0.05
315	282	285	950	8	90	15.71	0.02	0.02	0.10
316	602	282	700	12	120	608.53	0.82	1.17	1.73
350	300	301	500	8	100	482.39	3.85	7.70	3.08
351	301	302	850	8	100	477.81	6.43	7.57	3.05
352	302	303	700	6	100	4.71	0.00	0.01	0.05
353	302	304	1000	8	100	468.38	7.29	7.29	2.99
354	304	305	500	8	100	10.33	0.00	0.01	0.07
355	304	307	500	6	100	13.78	0.02	0.04	0.16
356	304	309	950	8	100	198.09	1.41	1.48	1.26
357	305	306	305	6	100	5.61	0.00	0.01	0.06
358	307	308	600	6	100	6.82	0.01	0.01	0.08
359	304	310	1100	8	120	242.28	1.69	1.53	1.55
360	309	310	200	8	100	192.43	0.28	1.40	1.23
361	310	311	950	8	100	429.99	5.91	6.22	2.74
362	311	312	1200	8	100	640.42	15.62	13.02	4.09
364	312	313	1000	6	100	337.96	16.18	16.18	3.84
365	312	315	300	8	100	291.46	0.91	3.03	1.86
366	314	313	300	8	100	1074.85	10.19	33.96	6.86
367	315	314	1000	8	100	385.37	5.08	5.08	2.46
368	317	314	300	8	100	692.26	4.51	15.03	4.42
369	316	315	300	8	100	96.69	0.12	0.39	0.62
370	316	317	950	8	100	134.67	0.69	0.73	0.86
371	318	316	300	8	100	234.15	0.61	2.02	1.49

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE I) FILE: I.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
372	319	317	300	8	100	560.38	3.05	10.16	3.58
373	319	318	850	8	100	236.93	1.75	2.06	1.51
374	320	319	1000	8	110	799.65	16.46	16.46	5.10
375	321	320	1400	8	100	74.69	0.34	0.24	0.48
376	321	322	800	8	100	161.15	0.81	1.01	1.03
377	322	323	400	8	110	103.93	0.15	0.38	0.66
378	322	325	250	8	100	53.45	0.03	0.13	0.34
379	323	324	280	8	100	101.60	0.12	0.43	0.65
380	325	324	400	8	100	121.08	0.24	0.60	0.77
381	324	326	300	8	100	219.85	0.54	1.80	1.40
382	327	325	210	8	100	71.40	0.05	0.22	0.46
385	300	313	950	8	100	1461.29	56.97	59.97	9.33
386	326	311	650	8	100	216.08	1.13	1.74	1.38
392	361	391	50	8	100	25.52	0.00	0.03	0.16
394	391	374	1000	12	120	25.52	0.00	0.00	0.07
400	350	320	1250	8	100	148.66	1.09	0.87	0.95
401	356	321	1250	12	110	239.62	0.31	0.25	0.68
402	351	350	510	8	100	537.70	4.80	9.42	3.43
403	350	356	750	12	110	384.33	0.44	0.59	1.09
404	353	351	350	8	100	400.43	1.91	5.46	2.56
405	352	351	900	8	100	141.99	0.72	0.80	0.91
406	353	352	1400	8	100	146.70	1.19	0.85	0.94
407	354	353	1260	8	100	551.85	12.45	9.88	3.52
408	354	355	960	8	90	9.20	0.01	0.01	0.06
409	356	357	1050	8	110	140.00	0.69	0.65	0.89
410	357	358	200	8	110	95.22	0.06	0.32	0.61
411	357	364	1250	8	110	41.01	0.08	0.07	0.26
412	358	359	1650	8	110	50.20	0.16	0.10	0.32
413	359	327	800	8	100	73.74	0.19	0.24	0.47
414	358	360	750	8	100	45.02	0.07	0.10	0.29
415	361	359	800	8	100	30.87	0.04	0.05	0.20
416	360	361	250	8	90	61.67	0.05	0.21	0.39
417	362	360	1050	8	120	21.37	0.02	0.02	0.14
418	361	374	1800	6	90	2.81	0.00	0.00	0.03
419	363	362	750	8	120	26.87	0.02	0.03	0.17
420	364	365	500	8	120	16.10	0.01	0.01	0.10
421	364	363	900	8	120	20.19	0.01	0.02	0.13
422	365	363	1650	8	120	11.39	0.01	0.01	0.07
423	367	366	750	12	120	3.68	0.00	0.00	0.01
424	370	367	600	12	120	7.69	0.00	0.00	0.02
425	367	368	1350	12	120	0.28	0.00	0.00	0.00
426	369	368	500	12	120	3.00	0.00	0.00	0.01
427	370	369	1450	8	120	1.16	0.00	0.00	0.01
428	372	369	450	12	120	4.62	0.00	0.00	0.01
429	371	370	500	12	120	11.68	0.00	0.00	0.03
430	374	371	600	12	120	14.46	0.00	0.00	0.04
431	373	372	850	12	120	8.30	0.00	0.00	0.02
432	374	373	1250	12	120	11.09	0.00	0.00	0.03
700	719	238	200	16	130	1991.19	0.45	2.24	3.18

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE I) FILE: I.DAT

NODE NO	COORDINATES			GRADIENT RESULTS			BOUNDARY SPEC		Q(GPM)	TYPE		
	X(FT)	Y(FT)	Z(FT)	HG(FT)	P(FT)	P(Psi)						
1	0	0	375	499.16	124.16	53.75			9.62	BQ	9.62	0.00
2	0	0	341	499.16	158.16	68.47			9.62	BQ	9.62	0.00
3	0	0	272	499.16	227.16	98.34			9.62	BQ	9.62	0.00
4	0	0	270	499.17	229.17	99.21			4.76	BQ	4.76	0.00
5	0	0	285	499.16	214.16	92.71			26.18	BQ	26.18	0.00
6	0	0	275	499.18	224.18	97.05			4.76	BQ	4.76	-0.01
7	0	0	272	505.94	233.94	101.27			7.33	BQ	7.33	0.00
8	0	0	270	509.06	239.06	103.49			26.18	BQ	26.18	0.00
9	0	0	270	509.06	239.06	103.49						0.00
10	0	0	270	509.06	239.06	103.49			4.67	BQ	4.67	0.00
11	0	0	290	492.47	202.47	87.65			4.77	BQ	4.76	0.01
12	0	0	275	491.27	216.27	93.62			4.76	BQ	4.76	0.00
13	0	0	295	490.87	195.87	84.79			4.76	BQ	4.76	0.00
14	0	0	295	489.83	194.83	84.34			6.69	BQ	6.69	0.00
15	0	0	277	489.83	212.83	92.13			4.76	BQ	4.76	0.00
30	0	0	270	487.83	217.83	94.30			6.69	BQ	6.69	0.00
31	0	0	310	486.40	176.40	76.36			4.76	BQ	4.76	0.00
32	0	0	340	486.34	146.34	63.35			4.76	BQ	4.76	0.00
33	0	0	335	486.33	151.33	65.51			4.76	BQ	4.76	0.00
34	0	0	315	486.10	171.10	74.07			9.62	BQ	9.62	0.00
35	0	0	315	485.85	170.85	73.96			6.69	BQ	6.69	0.00
36	0	0	310	485.70	175.70	76.06			6.69	BQ	6.69	0.00
37	0	0	306	485.36	179.37	77.65			4.76	BQ	4.76	0.00
38	0	0	325	485.05	160.05	69.29			9.25	BQ	9.25	0.00
39	0	0	328	484.95	156.95	67.94			18.33	BQ	18.33	0.00
40	0	0	335	484.66	149.66	64.79			5.54	BQ	5.54	0.00
41	0	0	410	484.55	74.55	32.27			8.31	BQ	8.31	0.00
42	0	0	410	484.52	74.52	32.26			15.71	BQ	15.71	0.00
43	0	0	370	484.49	114.49	49.56			8.31	BQ	8.31	0.00
44	0	0	385	484.49	99.49	43.07			8.18	BQ	8.18	0.00
45	0	0	375	484.49	109.49	47.40			8.18	BQ	8.18	0.00
46	0	0	300	484.48	184.48	79.86			8.18	BQ	8.18	0.00
47	0	0	300	484.48	184.48	79.86			8.18	BQ	8.18	0.00
48	0	0	310	484.48	174.48	75.53			8.18	BQ	8.18	0.00
49	0	0	295	484.48	189.48	82.02			15.71	BQ	15.71	0.00
50	0	0	275	484.48	209.48	90.68			23.56	BQ	23.56	0.00
51	0	0	335	484.66	149.66	64.79			5.54	BQ	5.54	0.00
52	0	0	270	484.61	214.61	92.90			13.85	BQ	13.85	0.00
62	0	0	350	484.50	134.50	58.22			15.71	BQ	15.71	0.00
70	0	0	315	485.34	170.34	73.74			6.86	BQ	6.86	0.00
71	0	0	315	485.32	170.32	73.73			6.86	BQ	6.86	0.00
72	0	0	320	485.07	165.07	71.46			2.77	BQ	2.77	0.00
73	0	0	325	484.95	159.95	69.24			2.77	BQ	2.77	0.00
74	0	0	330	484.80	154.80	67.01			4.09	BQ	4.09	0.00
75	0	0	300	485.87	185.87	80.46			13.85	BQ	13.85	0.00
76	0	0	300	485.93	185.93	80.49			8.31	BQ	8.31	0.00
77	0	0	330	485.89	155.89	67.48			13.85	BQ	13.85	0.00
78	0	0	330	485.93	155.93	67.50			27.71	BQ	27.71	0.00
79	0	0	285	485.93	200.93	86.98			6.86	BQ	6.86	0.00
80	0	0	275	485.91	210.91	91.30			6.86	BQ	6.86	0.00
81	0	0	265	485.90	220.90	95.63			6.86	BQ	6.86	0.00
82	0	0	265	485.88	220.88	95.62			6.86	BQ	6.86	0.00

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE I) FILE: I.DAT

NODE NO	COORDINATES			GRADIENT RESULTS			BOUNDARY SPEC		Q(GPM)	TYPE
	X(FT)	Y(FT)	Z(FT)	HG(FT)	P(FT)	P(Psi)				
83	0	0	275	485.92	210.92	91.31		5.54	BQ	5.54 0.00
84	0	0	295	485.91	190.91	82.64		6.86	BQ	6.86 0.00
85	0	0	270	485.96	215.96	93.49		15.71	BQ	15.71 0.00
86	0	0	295	486.04	191.04	82.70		13.85	BQ	13.85 0.00
87	0	0	290	486.00	196.00	84.85		8.31	BQ	8.31 0.00
88	0	0	295	486.02	191.02	82.69		13.85	BQ	13.85 0.00
89	0	0	260	486.00	226.00	97.84		13.85	BQ	13.85 0.00
90	0	0	325	485.96	160.96	69.68		8.31	BQ	8.31 0.00
91	0	0	350	485.99	135.99	58.87		9.62	BQ	9.62 0.00
92	0	0	287	485.99	198.99	86.14		9.62	BQ	9.62 0.00
93	0	0	282	486.52	204.52	88.54		4.76	BQ	4.76 0.00
94	0	0	335	487.06	152.06	65.83		2.84	BQ	2.84 0.00
95	0	0	320	486.52	166.52	72.09		4.76	BQ	4.76 0.00
96	0	0	260	488.80	228.80	99.05		2.84	BQ	2.84 0.00
97	0	0	270	488.66	218.66	94.66		5.77	BQ	5.77 0.00
98	0	0	285	488.43	203.43	88.07		39.27	BQ	39.27 0.00
120	0	0	390	485.77	95.77	41.46		1.92	BQ	1.92 0.00
121	0	0	450	486.03	36.03	15.60		4.75	BQ	4.76 -0.02
122	0	0	450	486.17	36.17	15.66		4.76	BQ	4.76 0.00
123	0	0	410	486.05	76.05	32.92		4.78	BQ	4.76 0.02
124	0	0	385	486.51	101.51	43.94		4.76	BQ	4.76 0.00
125	0	0	337	487.05	150.05	64.96				0.00
126	0	0	355	485.71	130.71	56.58		4.76	BQ	4.76 0.00
127	0	0	335	487.33	152.33	65.94		7.70	BQ	7.70 0.00
128	0	0	335	489.89	154.89	67.05		4.76	BQ	4.76 0.00
129	0	0	270	487.15	217.15	94.00		4.76	BQ	4.76 0.00
130	0	0	285	487.14	202.14	87.51		14.39	BQ	14.39 0.00
131	0	0	325	487.07	162.07	70.16		4.76	BQ	4.76 0.00
132	0	0	330	487.07	157.07	68.00		6.69	BQ	6.69 0.00
133	0	0	350	487.10	137.10	59.35		9.62	BQ	9.62 0.00
134	0	0	312	487.13	175.13	75.81		4.76	BQ	4.76 0.00
135	0	0	310	487.08	177.08	76.66		4.76	BQ	4.76 0.00
136	0	0	305	487.02	182.02	78.79		4.76	BQ	4.76 0.00
137	0	0	295	486.64	191.64	82.96		4.76	BQ	4.76 0.00
138	0	0	320	485.63	165.63	71.70		11.00	BQ	11.00 0.00
139	0	0	320	485.64	165.64	71.71		11.18	BQ	11.18 0.00
140	0	0	320	485.64	165.64	71.71		4.76	BQ	4.76 0.00
141	0	0	340	485.68	145.68	63.07		4.58	BQ	4.58 0.00
142	0	0	345	486.81	141.81	61.39		5.24	BQ	5.24 0.00
143	0	0	355	485.69	130.69	56.57		14.39	BQ	14.39 0.00
145	0	0	345	485.51	140.51	60.83		2.75	BQ	2.75 0.00
146	0	0	296	485.00	189.00	81.82		1.92	BQ	1.92 0.00
147	0	0	290	485.01	195.01	84.42		7.79	BQ	7.79 0.00
148	0	0	266	485.00	219.00	94.81		9.62	BQ	9.62 0.00
149	0	0	262	485.00	223.00	96.54		4.76	BQ	4.76 0.00
150	0	0	285	485.02	200.02	86.59		6.87	BQ	6.87 0.00
151	0	0	295	485.00	190.00	82.25		9.62	BQ	9.62 0.00
152	0	0	285	485.00	200.00	86.58		2.84	BQ	2.84 0.00
153	0	0	260	485.00	225.00	97.40		1.92	BQ	1.92 0.00
154	0	0	290	485.12	195.12	84.47		6.87	BQ	6.87 0.00
155	0	0	295	485.27	190.27	82.37		4.58	BQ	4.58 0.00
156	0	0	265	485.82	220.82	95.59		15.71	BQ	15.71 0.00

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE I) FILE: I.DAT

NODE NO	COORDINATES			GRADIENT RESULTS			BOUNDARY SPEC	
	X(FT)	Y(FT)	Z(FT)	HG(FT)	P(FT)	P(PSI)	Q(GPM)	TYPE
157	0	0	325	485.65	160.65	69.55		0.00
158	0	0	275	485.19	210.19	90.99		0.00
170	0	0	259	467.15	208.15	90.11	2.84 BQ	0.00
171	0	0	265	475.73	210.73	91.22	3.85 BQ	0.00
172	0	0	305	475.73	170.73	73.91	5.77 BQ	0.00
173	0	0	265	482.93	217.93	94.34	4.76 BQ	0.00
174	0	0	280	483.94	203.94	88.29	3.85 BQ	0.00
175	0	0	270	484.10	214.10	92.68	4.76 BQ	0.00
176	0	0	275	484.26	209.26	90.59	4.76 BQ	0.00
177	0	0	285	484.26	199.26	86.26	4.76 BQ	0.00
178	0	0	305	484.26	179.26	77.60	39.27 BQ	0.00
179	0	0	280	484.67	204.67	88.60	4.76 BQ	0.00
180	0	0	280	484.50	204.50	88.53	4.76 BQ	0.00
181	0	0	290	484.50	194.50	84.20	2.84 BQ	0.00
182	0	0	280	486.59	206.59	89.43	1.92 BQ	0.00
183	0	0	290	486.64	196.64	85.13	4.76 BQ	0.00
184	0	0	305	486.47	181.47	78.56	4.76 BQ	0.00
185	0	0	305	486.15	181.15	78.42	4.76 BQ	0.00
186	0	0	325	485.98	160.98	69.69	7.70 BQ	0.00
187	0	0	325	485.96	160.96	69.68	5.77 BQ	0.00
190	0	0	365	468.01	103.01	44.59	2.84 BQ	0.00
191	0	0	275	470.26	195.26	84.53	4.76 BQ	0.00
192	0	0	265	475.79	210.79	91.25	4.76 BQ	0.00
193	0	0	285	483.02	198.02	85.72	5.77 BQ	0.00
194	0	0	295	483.02	188.02	81.39	4.76 BQ	0.00
195	0	0	295	483.01	188.01	81.39	3.85 BQ	0.00
196	0	0	285	483.04	198.04	85.73	4.76 BQ	0.00
197	0	0	265	483.20	218.20	94.46	5.77 BQ	0.00
198	0	0	280	486.98	206.98	89.60	9.62 BQ	0.00
199	0	0	265	486.98	221.98	96.09	4.76 BQ	0.00
200	0	0	280	486.98	206.98	89.60	9.62 BQ	0.00
201	0	0	360	486.98	126.98	54.97	1.92 BQ	0.00
202	0	0	280	482.84	202.84	87.81	4.58 BQ	0.00
203	0	0	275	482.83	207.83	89.97	27.67 BQ	0.00
204	0	0	249	482.92	233.92	101.26		0.00
205	0	0	280	482.83	202.83	87.80	2.84 BQ	0.00
206	0	0	280	482.84	202.84	87.81	1.92 BQ	0.00
207	0	0	230	482.71	252.71	109.40	14.39 BQ	0.00
208	0	0	215	482.69	267.69	115.88	4.76 BQ	0.00
209	0	0	200	482.68	282.68	122.37	10.47 BQ	0.00
230	0	0	377	485.71	108.71	47.06	2.93 BQ	0.00
231	0	0	380	485.71	105.71	45.76	2.99 BQ	0.00
232	0	0	320	485.67	165.67	71.72	2.93 BQ	0.00
233	0	0	325	485.67	160.67	69.56	9.21 BQ	0.00
234	0	0	380	485.66	105.66	45.74	9.21 BQ	0.00
235	0	0	360	485.67	125.67	54.40	9.21 BQ	0.00
236	0	0	350	485.48	135.48	58.65	3.05 BQ	0.00
237	0	0	270	485.44	215.44	93.26	4.93 BQ	0.00
238	0	0	400	485.55	85.55	37.04	4.98 BQ	0.00
239	0	0	325	480.83	155.83	67.46	4.98 BQ	0.00
240	0	0	325	451.18	126.18	54.62	3.05 BQ	0.00
241	0	0	370	464.22	94.22	40.79	3.05 BQ	0.00

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE I) FILE: I.DAT

NODE NO	COORDINATES			GRADIENT RESULTS			BOUNDARY SPEC		Q(GPM)	TYPE
	X(FT)	Y(FT)	Z(FT)	HG(FT)	P(FT)	P(Psi)				
242	0	0	415	462.71	47.71	20.65	3.05	BQ	3.05	0.00
243	0	0	420	461.77	41.77	18.08	3.05	BQ	3.05	0.00
245	0	0	355	460.30	105.30	45.58	3.05	BQ	3.05	0.00
246	0	0	324	444.62	120.62	52.22	12.57	BQ	12.57	0.00
247	0	0	305	430.69	125.69	54.41	4.11	BQ	4.11	0.00
248	0	0	330	430.67	100.67	43.58	3.69	BQ	3.69	0.00
249	0	0	330	430.67	100.67	43.58	3.69	BQ	3.69	0.00
250	0	0	306	444.10	138.10	59.78	4.93	BQ	4.93	0.00
251	0	0	293	440.67	147.67	63.93	3.64	BQ	3.64	0.00
252	0	0	275	440.66	165.66	71.72	3.64	BQ	3.64	0.00
253	0	0	285	440.66	155.66	67.39	4.11	BQ	4.11	0.00
254	0	0	270	440.66	170.66	73.88	2.99	BQ	2.99	0.00
255	0	0	295	419.39	124.39	53.85	2.99	BQ	2.99	0.00
256	0	0	295	416.26	121.26	52.49	2.99	BQ	2.99	0.00
257	0	0	290	417.93	127.93	55.38	4.93	BQ	4.93	0.00
270	0	0	276	461.23	185.23	80.19	4.76	BQ	4.76	0.00
271	0	0	320	461.22	141.22	61.13	6.69	BQ	6.69	0.00
272	0	0	350	421.69	71.69	31.04	4.76	BQ	4.76	0.00
273	0	0	370	421.69	51.69	22.38	4.76	BQ	4.76	0.00
274	0	0	350	421.69	71.69	31.04	4.76	BQ	4.76	0.00
275	0	0	330	421.70	91.70	39.70	4.76	BQ	4.76	0.00
276	0	0	320	421.71	101.71	44.03	4.76	BQ	4.76	0.00
277	0	0	340	436.68	96.68	41.85	4.77	BQ	4.76	0.00
278	0	0	315	460.58	145.58	63.02	3.85	BQ	3.85	0.00
279	0	0	270	468.00	198.00	85.71	23.55	BQ	23.55	0.00
280	0	0	280	484.08	204.08	88.34	5.50	BQ	5.50	0.00
282	0	0	410	485.18	75.18	32.55	4.76	BQ	4.76	0.00
283	0	0	415	485.15	70.15	30.37	9.62	BQ	9.62	0.00
284	0	0	400	485.15	85.15	36.86	4.67	BQ	4.67	0.00
285	0	0	400	485.16	85.16	36.87	15.71	BQ	15.71	0.00
300	0	0	285	421.17	136.17	58.95	45.81	BQ	45.81	0.00
301	0	0	285	417.32	132.32	57.28	4.58	BQ	4.58	0.00
302	0	0	275	410.89	135.89	58.83	4.71	BQ	4.71	0.00
303	0	0	280	410.89	130.89	56.66	4.71	BQ	4.71	0.00
304	0	0	264	403.60	139.60	60.43	3.91	BQ	3.91	0.00
305	0	0	265	403.60	138.60	60.00	4.71	BQ	4.71	0.00
306	0	0	280	403.59	123.59	53.50	5.61	BQ	5.61	0.00
307	0	0	260	403.58	143.58	62.15	6.96	BQ	6.96	0.00
308	0	0	255	403.57	148.57	64.32	6.82	BQ	6.82	0.00
309	0	0	280	402.19	122.19	52.90	5.66	BQ	5.66	0.00
310	0	0	280	401.91	121.91	52.77	4.71	BQ	4.71	0.00
311	0	0	300	396.00	96.00	41.56	5.66	BQ	5.66	0.00
312	0	0	370	380.38	10.38	4.49	11.00	BQ	11.00	0.00
313	0	0	318	364.20	46.20	20.00	2874.10	BH		
314	0	0	315	374.39	59.39	25.71	2.78	BQ	2.78	0.00
315	0	0	368	379.47	11.47	4.96	2.78	BQ	2.78	0.00
316	0	0	340	379.59	39.59	17.14	2.78	BQ	2.78	0.00
317	0	0	300	378.90	78.90	34.15	2.78	BQ	2.78	0.00
318	0	0	310	380.19	70.19	30.39	2.78	BQ	2.78	0.00
319	0	0	287	381.95	94.95	41.10	2.33	BQ	2.33	0.00
320	0	0	271	398.41	127.41	55.15	3.28	BQ	3.28	0.00
321	0	0	262	398.75	136.75	59.20	3.77	BQ	3.77	0.00

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE I) FILE: I.DAT

NODE NO	COORDINATES			GRADIENT RESULTS			BOUNDARY SPEC		Q(GPM)	TYPE
	X(FT)	Y(FT)	Z(FT)	HG(FT)	P(FT)	P(Psi)				
322	0	0	255	397.94	142.94	61.88	3.77	BQ	3.77	0.00
323	0	0	265	397.79	132.79	57.48	2.33	BQ	2.33	0.00
324	0	0	265	397.67	132.67	57.43	2.83	BQ	2.83	0.00
325	0	0	255	397.91	142.91	61.86	3.77	BQ	3.77	0.00
326	0	0	265	397.13	132.13	57.20	3.77	BQ	3.77	0.00
327	0	0	255	397.95	142.95	61.88	2.33	BQ	2.33	0.00
350	0	0	305	399.49	94.49	40.91	4.71	BQ	4.71	0.00
351	0	0	315	404.30	89.30	38.66	4.71	BQ	4.71	0.00
352	0	0	300	405.02	105.02	45.46	4.71	BQ	4.71	0.00
353	0	0	320	406.21	86.21	37.32	4.71	BQ	4.71	0.00
354	0	0	320	418.66	98.66	42.71				0.00
355	0	0	345	418.65	73.65	31.88	9.20	BQ	9.20	0.00
356	0	0	285	399.05	114.05	49.37	4.71	BQ	4.71	0.00
357	0	0	295	398.37	103.37	44.75	3.77	BQ	3.77	0.00
358	0	0	297	398.30	101.30	43.85				0.00
359	0	0	260	398.14	138.14	59.80	7.33	BQ	7.33	0.00
360	0	0	270	398.23	128.23	55.51	4.71	BQ	4.71	0.00
361	0	0	250	398.18	148.18	64.15	2.47	BQ	2.47	0.00
362	0	0	250	398.25	148.25	64.18	5.50	BQ	5.50	0.00
363	0	0	280	398.27	118.27	51.20	4.71	BQ	4.71	0.00
364	0	0	300	398.28	98.28	42.55	4.71	BQ	4.71	0.00
365	0	0	295	398.28	103.28	44.71	4.71	BQ	4.71	0.00
366	0	0	320	398.17	78.17	33.84	3.68	BQ	3.68	0.00
367	0	0	285	398.17	113.17	48.99	3.73	BQ	3.73	0.00
368	0	0	320	398.17	78.17	33.84	3.28	BQ	3.28	0.00
369	0	0	285	398.17	113.17	48.99	2.78	BQ	2.78	0.00
370	0	0	250	398.17	148.17	64.14	2.83	BQ	2.83	0.00
371	0	0	245	398.17	153.17	66.31	2.78	BQ	2.78	0.00
372	0	0	260	398.17	138.17	59.82	3.68	BQ	3.68	0.00
373	0	0	240	398.17	158.17	68.47	2.78	BQ	2.78	0.00
374	0	0	245	398.18	153.18	66.31	2.78	BQ	2.78	0.00
391	0	0	250	398.18	148.18	64.15				0.00
500	0	0	290	509.07	219.07	94.83	-1100.00	BQ	-1100.00	0.00
501	0	0	260	497.65	237.65	102.88	-1000.00	BQ	-1000.00	0.00
600	0	0	451	486.00	35.00	15.15	-89.59	BEL		
601	0	0	467	486.00	19.00	8.23	318.79	BEL		
602	0	0	418	486.00	68.00	29.44	-608.53	BEL		
719	0	0	450	486.00	36.00	15.58	-1991.19	BEL		

TOTAL SYSTEM Q = 4789.32 Total BQ (pos) = 1596.43 Total BQ (neg) = -2100.00

0.00 0.02

TANK LEVEL ADJUSTMENTS, TIME = 1.00

TANK	NODE	LINE	TYPE	FROM	TO	ELEV. T= 0.00	FLOW(GPM)	DELTA ELEV.	ELEV. T= 1.00
1	600	82	PIPE	600	78	486.0 FT	68.6	-0.4 FT	485.43 FT
		96	PIPE	600	91	486.0 FT	21.0	-0.1 FT	
2	601	119	PIPE	123	601	486.0 FT	318.8	0.7 FT	486.73 FT
3	602	316	PIPE	602	282	486.0 FT	608.5	-9.9 FT	476.06 FT
4	719	700	PIPE	719	238	486.0 FT	1991.2	-5.0 FT	480.96 FT

TANK LEVEL ADJUSTMENTS, TIME = 2.00

TANK	NODE	LINE	TYPE	FROM	TO	ELEV. T= 1.00	FLOW(GPM)	DELTA ELEV.	ELEV. T= 2.00
1	600	82	PIPE	600	78	485.4 FT	142.7	-0.9 FT	483.85 FT
		96	PIPE	600	91	485.4 FT	104.8	-0.7 FT	
2	601	119	PIPE	123	601	486.7 FT	-92.2	-0.2 FT	486.52 FT
3	602	316	PIPE	602	282	476.1 FT	403.4	-6.6 FT	469.47 FT
4	719	700	PIPE	719	238	481.0 FT	1553.8	-3.9 FT	477.03 FT

TANK LEVEL ADJUSTMENTS, TIME = 3.00

TANK	NODE	LINE	TYPE	FROM	TO	ELEV. T= 2.00	FLOW(GPM)	DELTA ELEV.	ELEV. T= 3.00
1	600	82	PIPE	600	78	483.8 FT	175.3	-1.1 FT	
		96	PIPE	600	91	483.8 FT	136.0	-0.9 FT	481.86 FT
2	601	119	PIPE	123	601	486.5 FT	-275.0	-0.6 FT	485.89 FT
3	602	316	PIPE	602	282	469.5 FT	291.0	-4.8 FT	464.71 FT
4	719	700	PIPE	719	238	477.0 FT	1360.3	-3.4 FT	473.59 FT

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE I) FILE: I.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
1	2	1	975	8	100	9.62	0.01	0.01	0.06
2	3	2	1100	12	100	13.61	0.00	0.00	0.04
3	4	3	1900	12	100	23.23	0.01	0.00	0.07
4	4	5	1200	12	100	31.81	0.01	0.01	0.09
5	5	2	1500	12	100	5.63	0.00	0.00	0.02
6	6	4	430	12	100	59.81	0.01	0.02	0.17
7	7	6	1750	12	110	1061.82	6.76	3.86	3.01
8	500	7	800	12	110	1069.15	3.13	3.91	3.03
9	500	8	850	12	110	30.85	0.00	0.01	0.09
10	8	9	400	12	100	4.67	0.00	0.00	0.01
11	9	10	300	12	100	4.67	0.00	0.00	0.01
12	6	11	1950	12	110	997.24	6.71	3.44	2.83
13	11	12	2200	12	110	425.85	1.56	0.71	1.21
14	12	13	750	12	110	421.09	0.52	0.70	1.19
15	13	14	2000	12	110	416.32	1.36	0.68	1.18
16	14	15	1950	10	100	4.76	0.00	0.00	0.02
17	14	30	1400	10	100	404.87	2.63	1.88	1.65
18	34	156	800	6	120	63.61	0.42	0.52	0.72
30	30	31	1500	10	90	311.40	2.11	1.40	1.27
PRV (180.00)							0.00		Open
31	31	32	520	8	100	60.73	0.09	0.17	0.39
32	32	33	800	8	100	23.67	0.02	0.03	0.15
33	32	33	450	8	100	32.30	0.02	0.05	0.21
34	31	34	500	10	90	245.90	0.45	0.91	1.00
35	33	34	700	6	100	51.21	0.34	0.49	0.58
36	34	35	500	10	90	223.87	0.38	0.76	0.91
37	35	36	320	10	90	217.18	0.23	0.72	0.89
38	36	37	550	10	90	258.40	0.55	0.99	1.06
39	156	36	1800	8	100	47.91	0.19	0.11	0.31
40	37	38	1350	10	110	152.54	0.35	0.26	0.62
41	38	39	400	10	110	153.81	0.10	0.26	0.63
42	72	38 CV	1000	8	110	10.53	0.01	0.01	0.07 Open
43	39	40	1650	10	110	125.32	0.30	0.18	0.51
44	39	73	850	8	110	10.16	0.00	0.01	0.06
45	40	41	1350	12	110	128.21	0.10	0.08	0.36
46	51	40	350	6	90	8.43	0.01	0.02	0.10
47	41	42	450	12	110	119.90	0.03	0.07	0.34
48	42	43	1100	12	110	72.39	0.03	0.03	0.21
49	43	44	250	12	110	16.36	0.00	0.00	0.05
50	43	46	2200	8	110	10.51	0.01	0.01	0.07
51	44	45	750	12	110	6.18	0.00	0.00	0.02
52	44	45	2500	10	110	2.00	0.00	0.00	0.01
53	46	47	1650	8	110	2.33	0.00	0.00	0.01
54	48	47	3300	12	110	5.86	0.00	0.00	0.02
55	43	48	1500	12	110	37.21	0.01	0.01	0.11
56	48	49	500	12	110	23.17	0.00	0.00	0.07
57	49	50	1050	12	110	14.63	0.00	0.00	0.04
58	49	50	1350	8	110	4.40	0.00	0.00	0.03
59	51	52	1200	6	100	13.85	0.05	0.04	0.16
60	42	62	600	8	120	31.81	0.02	0.04	0.20
61	62	49	2100	8	120	16.10	0.02	0.01	0.10
64	49	50	1500	8	120	4.53	0.00	0.00	0.03
70	37	70	500	10	90	101.10	0.09	0.17	0.41

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE I) FILE: I.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
71	70	71	600	10	90	94.24	0.09	0.15	0.38
72	71	72	1950	8	90	37.83	0.16	0.08	0.24
73	75	71	600	10	90	246.46	0.55	0.91	1.01
74	72	73	750	6	90	24.53	0.11	0.15	0.28
75	73	74	600	6	90	31.92	0.15	0.25	0.36
76	74	51	700	6	90	27.83	0.14	0.19	0.32
77	78	75	2900	10	100	99.82	0.41	0.14	0.41
78	76	75	150	10	90	123.61	0.04	0.25	0.50
79	76	77	900	6	100	13.85	0.04	0.04	0.16
80	90	76	650	12	120	123.39	0.04	0.06	0.35
81	78	79	2160	8	100	60.56	0.36	0.17	0.39
82	600	78	800	10	90	188.08	0.44	0.55	0.77
83	79	84	450	6	90	11.30	0.02	0.04	0.13
84	79	83	300	8	100	21.68	0.01	0.02	0.14
85	84	80	650	12	110	4.44	0.00	0.00	0.01
86	83	80	650	8	100	16.14	0.01	0.01	0.10
87	80	81	750	8	100	13.72	0.01	0.01	0.09
88	81	82	1600	6	100	6.86	0.02	0.01	0.08
89	79	85	550	8	100	20.71	0.01	0.02	0.13
90	85	86	2050	10	100	5.00	0.00	0.00	0.02
91	86	88	250	8	90	36.02	0.02	0.08	0.23
92	88	87	1300	8	90	12.78	0.01	0.01	0.08
93	88	89	2400	8	90	9.38	0.02	0.01	0.06
94	87	89	250	8	90	4.47	0.00	0.00	0.03
95	93	86	3500	10	100	44.87	0.11	0.03	0.18
96	600	91	1200	10	110	148.69	0.30	0.25	0.61
97	92	90	600	12	120	147.94	0.05	0.09	0.42
98	91	92	1950	10	110	139.07	0.42	0.22	0.57
99	93	92	900	8	90	18.50	0.02	0.02	0.12
100	93	95	400	8	110	4.76	0.00	0.00	0.03
101	94	93	1080	10	110	72.90	0.07	0.07	0.30
102	96	94	1800	12	110	319.09	0.75	0.42	0.91
103	501	96	2560	12	110	1000.00	8.85	3.46	2.84
104	96	97	450	6	110	45.04	0.15	0.32	0.51
105	97	98	900	6	110	39.27	0.23	0.25	0.45
106	96	94	1800	8	90	89.88	0.75	0.42	0.57
119	601	123	100	12	100	399.58	0.08	0.75	1.13
120	121	120	2200	12	100	618.54	3.73	1.69	1.75
121	123	121	1200	12	110	474.59	1.04	0.87	1.35
122	124	123	800	12	110	79.78	0.03	0.03	0.23
123	122	121	500	8	120	148.72	0.31	0.62	0.95
124	124	122	1150	8	120	153.48	0.76	0.66	0.98
125	125	124	600	12	110	238.02	0.15	0.24	0.68
126	125	142	1100	8	100	152.49	1.00	0.91	0.97
127	120	126	550	12	100	616.62	0.93	1.68	1.75
128	127	125	350	12	100	290.51	0.15	0.42	0.82
129	128	127	1800	12	110	561.86	2.14	1.19	1.59
130	11	128	1800	12	110	566.63	2.17	1.21	1.61
131	127	129	1360	8	100	163.65	1.41	1.04	1.04
132	129	130	800	8	100	14.39	0.01	0.01	0.09
133	129	131	1200	8	100	144.50	0.99	0.83	0.92
134	131	132	1250	8	120	6.69	0.00	0.00	0.04

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE I) FILE: I.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
135	131	133	1200	8	100	20.16	0.03	0.02	0.13
136	133	134	800	8	100	10.54	0.01	0.01	0.07
137	134	135	400	8	100	92.55	0.14	0.36	0.59
138	135	136	500	8	100	87.79	0.16	0.33	0.56
139	30	134	2080	8	100	86.78	0.67	0.32	0.55
140	131	136	650	8	100	112.89	0.34	0.52	0.72
141	136	137	1120	8	100	195.91	1.63	1.45	1.25
143	139	138	1350	8	120	11.00	0.01	0.00	0.07
144	140	139	300	12	120	22.17	0.00	0.00	0.06
145	126	141	600	12	100	329.21	0.32	0.53	0.93
146	141	157	1600	12	100	247.78	0.50	0.31	0.70
147	141	140	2100	12	110	272.56	0.65	0.31	0.77
148	143	141	400	12	100	195.71	0.08	0.20	0.56
149	126	143	280	12	100	423.97	0.24	0.84	1.20
150	140	145	1750	12	110	676.73	2.93	1.68	1.92
151	147	146	250	8	100	111.17	0.13	0.51	0.71
152	147	148	1400	8	100	17.60	0.02	0.02	0.11
153	148	149	350	6	100	29.85	0.06	0.18	0.34
154	149	146	1250	8	100	25.09	0.04	0.03	0.16
155	150	147	500	8	100	70.66	0.11	0.22	0.45
156	155	147	1700	6	100	65.89	1.33	0.78	0.75
157	137	155	1100	6	100	191.15	6.19	5.63	2.17
158	155	158	850	8	120	120.67	0.36	0.42	0.77
159	154	150	950	8	100	113.80	0.50	0.53	0.73
160	150	151	1450	8	100	36.26	0.09	0.06	0.23
161	151	152	500	6	100	4.76	0.00	0.01	0.05
162	152	153	1000	6	100	1.92	0.00	0.00	0.02
163	151	148	400	6	100	21.88	0.04	0.10	0.25
164	142	126	1400	6	100	147.26	4.86	3.47	1.67
165	157	140	500	12	100	247.78	0.16	0.31	0.70
166	127	125	350	8	100	100.01	0.15	0.42	0.64
167	158	154	850	8	120	120.67	0.36	0.42	0.77
170	171	170	2180	8	120	472.34	11.52	5.28	3.02
171	171	172	300	8	100	5.77	0.00	0.00	0.04
172	173	171	1250	8	100	481.96	9.61	7.69	3.08
173	94	173	2600	8	120	260.49	4.56	1.76	1.66
174	174	173	900	8	100	226.23	1.71	1.89	1.44
175	175	174	600	8	100	102.81	0.26	0.44	0.66
176	178	174	800	8	100	127.27	0.52	0.65	0.81
177	176	175	550	8	100	107.57	0.26	0.48	0.69
178	176	177	220	8	100	15.36	0.00	0.01	0.10
179	180	176	550	8	100	127.70	0.36	0.66	0.82
180	71	178	1650	8	100	155.94	1.57	0.95	1.00
181	177	178	250	8	100	10.60	0.00	0.01	0.07
183	71	179	1450	8	110	140.07	0.95	0.65	0.89
184	179	180	350	8	100	135.30	0.26	0.73	0.86
185	180	181	400	8	100	2.84	0.00	0.00	0.02
186	183	182	250	8	110	31.85	0.01	0.04	0.20
187	182	184	500	8	110	29.92	0.02	0.04	0.19
188	94	183	280	8	90	72.73	0.08	0.28	0.46
189	183	184	380	8	90	36.11	0.03	0.08	0.23
190	184	185	250	8	90	61.27	0.05	0.21	0.39

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE I) FILE: I.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
191	185	75	1100	8	110	36.89	0.06	0.06	0.24
192	185	186	600	8	100	19.62	0.01	0.02	0.13
193	186	76	400	8	100	22.38	0.01	0.03	0.14
194	187	186	450	6	100	10.46	0.01	0.03	0.12
195	90	187	300	6	100	16.24	0.02	0.06	0.18
196	190	279	700	8	110	23.55	0.02	0.02	0.15
198	190	170	1300	8	100	24.52	0.04	0.03	0.16
199	191	190	2400	8	100	50.91	0.29	0.12	0.32
200	192	191	800	8	60	220.02	3.71	4.63	1.40
201	196	191	650	8	60	384.01	8.45	13.00	2.45
202	193	192	250	6	60	224.78	4.89	19.58	2.55
203	193	194	150	12	120	226.14	0.03	0.19	0.64
204	193	204	2560	10	100	54.76	0.12	0.05	0.22
205	194	195	1280	8	60	24.15	0.10	0.08	0.15
206	194	196	850	12	120	197.22	0.12	0.15	0.56
207	195	196	550	6	60	8.42	0.02	0.04	0.10
208	280	196	1000	12	120	183.13	0.13	0.13	0.52
209	197	193	650	12	120	511.45	0.55	0.85	1.45
210	198	197	1100	8	90	517.22	11.72	10.65	3.30
212	96	198	450	8	90	543.15	5.25	11.66	3.47
213	198	199	800	8	100	4.76	0.00	0.00	0.03
214	198	200	200	8	100	11.55	0.00	0.01	0.07
215	200	201	1050	10	100	1.92	0.00	0.00	0.01
216	195	202	1250	6	60	11.88	0.11	0.08	0.13
217	202	203	200	6	60	5.38	0.00	0.02	0.06
218	202	206	450	12	110	1.92	0.00	0.00	0.01
219	204	203	350	6	60	25.14	0.12	0.34	0.29
220	203	205	450	12	110	2.84	0.00	0.00	0.01
222	204	207	450	6	60	29.62	0.21	0.46	0.34
223	207	208	2100	8	110	15.24	0.02	0.01	0.10
224	208	209	1800	8	110	10.47	0.01	0.01	0.07
250	126	230	500	12	100	5.92	0.00	0.00	0.02
251	230	231	500	12	110	2.99	0.00	0.00	0.01
252	143	233	500	12	100	213.87	0.12	0.24	0.61
253	233	232	350	12	120	204.67	0.05	0.16	0.58
254	232	234	1200	12	120	192.53	0.17	0.14	0.55
255	232	235	200	8	120	9.21	0.00	0.00	0.06
256	234	140	3100	12	120	183.32	0.39	0.13	0.52
257	145	236	450	12	110	673.98	0.75	1.66	1.91
258	236	237	700	12	110	670.93	1.16	1.65	1.90
259	237	146	1400	12	110	180.23	0.20	0.14	0.51
260	237	238	1350	12	130	485.77	0.90	0.67	1.38
261	238	239	900	8	110	385.69	3.84	4.27	2.46
262	146	239	1300	8	100	314.57	4.54	3.49	2.01
263	239	240	1800	8	100	695.27	27.28	15.16	4.44
264	238	241	1150	10	100	1321.74	19.32	16.80	5.40
265	245	240	500	10	100	1309.54	8.26	16.51	5.35
266	240	246	650	12	130	2001.76	5.96	9.17	5.68
267	241	242	1100	10	110	356.32	1.37	1.24	1.46
268	241	245	380	10	100	962.37	3.55	9.33	3.93
269	242	243	700	10	110	353.27	0.86	1.22	1.44
270	243	245	1100	10	110	350.22	1.32	1.20	1.43

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE I) FILE: I.DAT

PIPE	FROM	TO	L(FT) D(IN) C			Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
271	246	247	1520	12	130	1894.08	12.58	8.28	5.37
272	246	250	1440	8	100	95.11	0.55	0.38	0.61
273	247	300	1050	12	130	1882.59	8.59	8.19	5.34
			PRV (205.00)				0.00		Open
274	247	248	1600	6	100	7.39	0.02	0.01	0.08
275	248	249	1250	12	110	3.69	0.00	0.00	0.01
276	250	251	2560	6	100	90.19	3.59	1.40	1.02
			PRV (197.00)				0.00		Open
277	251	252	550	8	100	10.73	0.00	0.01	0.07
278	251	255	1900	8	100	558.39	19.19	10.10	3.56
279	252	253	750	8	110	4.11	0.00	0.00	0.03
280	252	254	200	8	100	2.99	0.00	0.00	0.02
282	255	256	600	8	100	369.52	2.82	4.70	2.36
283	255	257	1000	8	100	185.88	1.32	1.32	1.19
284	257	256	1200	8	100	180.95	1.50	1.25	1.16
285	256	320	1650	8	100	547.48	16.06	9.74	3.49
300	270	251	2350	8	100	482.56	18.11	7.71	3.08
301	170	270	650	8	100	494.02	5.23	8.05	3.15
302	270	271	950	6	100	6.69	0.01	0.01	0.08
303	273	272	1350	8	110	0.41	0.00	0.00	0.00
304	274	272	950	8	110	4.35	0.00	0.00	0.03
305	274	273	550	8	110	5.18	0.00	0.00	0.03
306	275	274	450	8	110	14.29	0.00	0.01	0.09
307	276	275	800	8	110	19.06	0.01	0.02	0.12
308	276	354	300	8	100	515.91	2.62	8.72	3.29
309	277	276	1360	8	100	539.73	12.90	9.48	3.45
310	278	277	3000	8	120	544.50	20.63	6.88	3.48
311	191	278	1200	8	120	548.34	8.36	6.97	3.50
312	282	280	1050	12	120	188.63	0.14	0.13	0.54
313	282	283	550	6	100	14.29	0.03	0.05	0.16
314	283	284	1100	6	100	4.67	0.01	0.01	0.05
315	282	285	950	8	90	15.71	0.02	0.02	0.10
316	602	282	700	12	120	223.39	0.13	0.18	0.63
350	300	301	500	8	100	461.04	3.54	7.08	2.94
351	301	302	850	8	100	456.46	5.91	6.95	2.91
352	302	303	700	6	100	4.71	0.00	0.01	0.05
353	302	304	1000	8	100	447.03	6.69	6.69	2.85
354	304	305	500	8	100	10.33	0.00	0.01	0.07
355	304	307	500	6	100	13.78	0.02	0.04	0.16
356	304	309	950	8	100	188.51	1.28	1.35	1.20
357	305	306	305	6	100	5.61	0.00	0.01	0.06
358	307	308	600	6	100	6.82	0.01	0.01	0.08
359	304	310	1100	8	120	230.51	1.54	1.40	1.47
360	309	310	200	8	100	182.85	0.26	1.28	1.17
361	310	311	950	8	100	408.64	5.38	5.66	2.61
362	311	312	1200	8	100	597.47	13.74	11.45	3.81
364	312	313	1000	6	100	314.45	14.16	14.16	3.57
365	312	315	300	8	100	272.02	0.80	2.67	1.74
366	314	313	300	8	100	999.77	8.91	29.70	6.38
367	315	314	1000	8	100	358.60	4.45	4.45	2.29
368	317	314	300	8	100	643.96	3.94	13.15	4.11
369	316	315	300	8	100	89.36	0.10	0.34	0.57
370	316	317	950	8	100	125.44	0.60	0.64	0.80
371	318	316	300	8	100	217.59	0.53	1.76	1.39

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE I) FILE: I.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
372	319	317	300	8	100	521.29	2.67	8.89	3.33
373	319	318	850	8	100	220.37	1.53	1.81	1.41
374	320	319	1000	8	110	744.00	14.40	14.40	4.75
375	321	320	1400	8	100	65.48	0.27	0.19	0.42
376	321	322	800	8	100	148.66	0.70	0.87	0.95
377	322	323	400	8	110	94.32	0.13	0.31	0.60
378	322	325	250	8	100	50.56	0.03	0.12	0.32
379	323	324	280	8	100	91.99	0.10	0.36	0.59
380	325	324	400	8	100	109.10	0.20	0.49	0.70
381	324	326	300	8	100	198.26	0.45	1.48	1.27
382	327	325	210	8	100	62.31	0.04	0.17	0.40
385	300	313	950	8	100	1375.74	50.95	53.63	8.78
386	326	311	650	8	100	194.49	0.93	1.43	1.24
392	361	391	50	8	100	25.52	0.00	0.03	0.16
394	391	374	1000	12	120	25.52	0.00	0.00	0.07
400	350	320	1250	8	100	134.32	0.90	0.72	0.86
401	356	321	1250	12	110	217.91	0.26	0.21	0.62
402	351	350	510	8	100	492.56	4.08	8.01	3.14
403	350	356	750	12	110	353.52	0.38	0.50	1.00
404	353	351	350	8	100	367.28	1.63	4.65	2.34
405	352	351	900	8	100	129.99	0.61	0.68	0.83
406	353	352	1400	8	100	134.71	1.02	0.73	0.86
407	354	353	1260	8	100	506.70	10.63	8.44	3.23
408	354	355	960	8	90	9.20	0.01	0.01	0.06
409	356	357	1050	8	110	130.90	0.61	0.58	0.84
410	357	358	200	8	110	88.30	0.06	0.28	0.56
411	357	364	1250	8	110	38.83	0.08	0.06	0.25
412	358	359	1650	8	110	45.88	0.14	0.08	0.29
413	359	327	800	8	100	64.64	0.15	0.19	0.41
414	358	360	750	8	100	42.42	0.06	0.09	0.27
415	361	359	800	8	100	26.10	0.03	0.03	0.17
416	360	361	250	8	90	56.90	0.04	0.18	0.36
417	362	360	1050	8	120	19.19	0.01	0.01	0.12
418	361	374	1800	6	90	2.81	0.00	0.00	0.03
419	363	362	750	8	120	24.69	0.02	0.02	0.16
420	364	365	500	8	120	15.26	0.00	0.01	0.10
421	364	363	900	8	120	18.86	0.01	0.01	0.12
422	365	363	1650	8	120	10.54	0.01	0.00	0.07
423	367	366	750	12	120	3.68	0.00	0.00	0.01
424	370	367	600	12	120	7.69	0.00	0.00	0.02
425	367	368	1350	12	120	0.28	0.00	0.00	0.00
426	369	368	500	12	120	3.00	0.00	0.00	0.01
427	370	369	1450	8	120	1.16	0.00	0.00	0.01
428	372	369	450	12	120	4.62	0.00	0.00	0.01
429	371	370	500	12	120	11.68	0.00	0.00	0.03
430	374	371	600	12	120	14.46	0.00	0.00	0.04
431	373	372	850	12	120	8.30	0.00	0.00	0.02
432	374	373	1250	12	120	11.09	0.00	0.00	0.03
700	719	238	200	16	130	1226.64	0.18	0.91	1.96

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE I) FILE: I.DAT

NODE NO	COORDINATES			GRADIENT RESULTS			BOUNDARY SPEC			
	X(FT)	Y(FT)	Z(FT)	HG(FT)	P(FT)	P(PSI)	Q(GPM)	TYPE		
1	0	0	375	497.12	122.12	52.87	9.62	BQ	9.62	0.00
2	0	0	341	497.13	156.13	67.59	9.62	BQ	9.62	0.00
3	0	0	272	497.13	225.13	97.46	9.62	BQ	9.62	0.00
4	0	0	270	497.14	227.14	98.33	4.76	BQ	4.76	0.00
5	0	0	285	497.13	212.13	91.83	26.18	BQ	26.18	0.00
6	0	0	275	497.15	222.15	96.17	4.76	BQ	4.76	0.00
7	0	0	272	503.91	231.91	100.39	7.33	BQ	7.33	0.00
8	0	0	270	507.03	237.03	102.61	26.18	BQ	26.18	0.00
9	0	0	270	507.03	237.03	102.61				0.00
10	0	0	270	507.03	237.03	102.61	4.67	BQ	4.67	0.00
11	0	0	290	490.44	200.44	86.77	4.76	BQ	4.76	0.00
12	0	0	275	488.88	213.88	92.59	4.76	BQ	4.76	0.00
13	0	0	295	488.36	193.36	83.70	4.76	BQ	4.76	0.00
14	0	0	295	486.99	191.99	83.11	6.69	BQ	6.69	0.00
15	0	0	277	486.99	209.99	90.91	4.76	BQ	4.76	0.00
30	0	0	270	484.36	214.36	92.80	6.69	BQ	6.69	0.00
31	0	0	310	482.26	172.26	74.57	4.76	BQ	4.76	0.00
32	0	0	340	482.17	142.17	61.55	4.76	BQ	4.76	0.00
33	0	0	335	482.15	147.15	63.70	4.76	BQ	4.76	0.00
34	0	0	315	481.80	166.80	72.21	9.62	BQ	9.62	0.00
35	0	0	315	481.42	166.42	72.04	6.69	BQ	6.69	0.00
36	0	0	310	481.19	171.19	74.11	6.69	BQ	6.69	0.00
37	0	0	306	480.65	174.65	75.60	4.76	BQ	4.76	0.00
38	0	0	325	480.30	155.30	67.23	9.25	BQ	9.25	0.00
39	0	0	328	480.19	152.19	65.88	18.33	BQ	18.33	0.00
40	0	0	335	479.90	144.90	62.73	5.54	BQ	5.54	0.00
41	0	0	410	479.79	69.79	30.21	8.31	BQ	8.31	0.00
42	0	0	410	479.76	69.76	30.20	15.71	BQ	15.71	0.00
43	0	0	370	479.73	109.73	47.50	8.31	BQ	8.31	0.00
44	0	0	385	479.73	94.73	41.01	8.18	BQ	8.18	0.00
45	0	0	375	479.73	104.73	45.34	8.18	BQ	8.18	0.00
46	0	0	300	479.72	179.72	77.80	8.18	BQ	8.18	0.00
47	0	0	300	479.72	179.72	77.80	8.18	BQ	8.18	0.00
48	0	0	310	479.72	169.72	73.47	8.18	BQ	8.18	0.00
49	0	0	295	479.72	184.72	79.96	15.71	BQ	15.71	0.00
50	0	0	275	479.72	204.72	88.62	23.56	BQ	23.56	0.00
51	0	0	335	479.90	144.90	62.73	5.54	BQ	5.54	0.00
52	0	0	270	479.85	209.85	90.84	13.85	BQ	13.85	0.00
62	0	0	350	479.74	129.74	56.16	15.71	BQ	15.71	0.00
70	0	0	315	480.56	165.56	71.67	6.86	BQ	6.86	0.00
71	0	0	315	480.47	165.47	71.63	6.86	BQ	6.86	0.00
72	0	0	320	480.30	160.30	69.39	2.77	BQ	2.77	0.00
73	0	0	325	480.19	155.19	67.18	2.77	BQ	2.77	0.00
74	0	0	330	480.04	150.04	64.95	4.09	BQ	4.09	0.00
75	0	0	300	481.01	181.01	78.36	13.85	BQ	13.85	0.00
76	0	0	300	481.05	181.05	78.38	8.31	BQ	8.31	0.00
77	0	0	330	481.01	151.01	65.37	13.85	BQ	13.85	0.00
78	0	0	330	481.42	151.42	65.55	27.71	BQ	27.71	0.00
79	0	0	285	481.06	196.06	84.88	6.86	BQ	6.86	0.00
80	0	0	275	481.05	206.05	89.20	6.86	BQ	6.86	0.00
81	0	0	265	481.04	216.04	93.52	6.86	BQ	6.86	0.00
82	0	0	265	481.02	216.02	93.51	6.86	BQ	6.86	0.00

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE I) FILE: I.DAT

NODE NO	COORDINATES			GRADIENT RESULTS			BOUNDARY SPEC		Q(GPM)	TYPE
	X(FT)	Y(FT)	Z(FT)	HG(FT)	P(FT)	P(PSI)				
83	0	0	275	481.06	206.06	89.20		5.54	BQ	5.54 0.00
84	0	0	295	481.05	186.05	80.54		6.86	BQ	6.86 0.00
85	0	0	270	481.05	211.05	91.36		15.71	BQ	15.71 0.00
86	0	0	295	481.05	186.05	80.54		13.85	BQ	13.85 0.00
87	0	0	290	481.02	191.02	82.69		8.31	BQ	8.31 0.00
88	0	0	295	481.03	186.03	80.53		13.85	BQ	13.85 0.00
89	0	0	260	481.02	221.02	95.68		13.85	BQ	13.85 0.00
90	0	0	325	481.09	156.09	67.57		8.31	BQ	8.31 0.00
91	0	0	350	481.57	131.57	56.95		9.62	BQ	9.62 0.00
92	0	0	287	481.14	194.14	84.04		9.62	BQ	9.62 0.00
93	0	0	282	481.16	199.16	86.22		4.76	BQ	4.76 0.00
94	0	0	335	481.23	146.23	63.30		2.84	BQ	2.84 0.00
95	0	0	320	481.16	161.16	69.77		4.76	BQ	4.76 0.00
96	0	0	260	481.98	221.98	96.10		2.84	BQ	2.84 0.00
97	0	0	270	481.84	211.84	91.70		5.77	BQ	5.77 0.00
98	0	0	285	481.61	196.61	85.11		39.27	BQ	39.27 0.00
120	0	0	390	481.04	91.04	39.41		1.92	BQ	1.92 0.00
121	0	0	450	484.77	34.77	15.05		4.76	BQ	4.76 0.00
122	0	0	450	485.08	35.08	15.19		4.76	BQ	4.76 0.00
123	0	0	410	485.81	75.81	32.82		4.76	BQ	4.76 0.00
124	0	0	385	485.84	100.84	43.65		4.76	BQ	4.76 0.00
125	0	0	337	485.99	148.99	64.50				0.00
126	0	0	355	480.12	125.12	54.16		4.76	BQ	4.76 0.00
127	0	0	335	486.13	151.13	65.42		7.70	BQ	7.70 0.00
128	0	0	335	488.27	153.27	66.35		4.76	BQ	4.76 0.00
129	0	0	270	484.72	214.72	92.95		4.76	BQ	4.76 0.00
130	0	0	285	484.71	199.71	86.45		14.39	BQ	14.39 0.00
131	0	0	325	483.73	158.73	68.71		4.76	BQ	4.76 0.00
132	0	0	330	483.72	153.72	66.55		6.69	BQ	6.69 0.00
133	0	0	350	483.70	133.70	57.88		9.62	BQ	9.62 0.00
134	0	0	312	483.69	171.69	74.33		4.76	BQ	4.76 0.00
135	0	0	310	483.55	173.55	75.13		4.76	BQ	4.76 0.00
136	0	0	305	483.39	178.39	77.22		4.76	BQ	4.76 0.00
137	0	0	295	481.76	186.76	80.85		4.76	BQ	4.76 0.00
138	0	0	320	479.14	159.14	68.89		11.00	BQ	11.00 0.00
139	0	0	320	479.15	159.15	68.89		11.18	BQ	11.18 0.00
140	0	0	320	479.15	159.15	68.90		4.76	BQ	4.76 0.00
141	0	0	340	479.80	139.80	60.52		4.58	BQ	4.58 0.00
142	0	0	345	484.98	139.98	60.60		5.24	BQ	5.24 0.00
143	0	0	355	479.88	124.88	54.06		14.39	BQ	14.39 0.00
145	0	0	345	476.21	131.21	56.80		2.75	BQ	2.75 0.00
146	0	0	296	474.11	178.11	77.10		1.92	BQ	1.92 0.00
147	0	0	290	474.23	184.23	79.75		7.79	BQ	7.79 0.00
148	0	0	266	474.21	208.21	90.13		9.62	BQ	9.62 0.00
149	0	0	262	474.15	212.15	91.84		4.76	BQ	4.76 0.00
150	0	0	285	474.34	189.34	81.97		6.87	BQ	6.87 0.00
151	0	0	295	474.25	179.25	77.60		9.62	BQ	9.62 0.00
152	0	0	285	474.25	189.25	81.93		2.84	BQ	2.84 0.00
153	0	0	260	474.25	214.25	92.75		1.92	BQ	1.92 0.00
154	0	0	290	474.85	184.85	80.02		6.87	BQ	6.87 0.00
155	0	0	295	475.57	180.57	78.17		4.58	BQ	4.58 0.00
156	0	0	265	481.38	216.38	93.67		15.71	BQ	15.71 0.00

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE I) FILE: I.DAT

NODE NO	COORDINATES			GRADIENT RESULTS			BOUNDARY SPEC	
	X(FT)	Y(FT)	Z(FT)	HG(FT)	P(FT)	P(PSI)	Q(GPM)	TYPE
157	0	0	325	479.30	154.30	66.80		0.00
158	0	0	275	475.21	200.21	86.67		0.00
170	0	0	259	455.54	196.54	85.08	2.84	BQ 0.00
171	0	0	265	467.06	202.06	87.47	3.85	BQ 0.00
172	0	0	305	467.06	162.06	70.15	5.77	BQ 0.00
173	0	0	265	476.67	211.67	91.63	4.76	BQ 0.00
174	0	0	280	478.37	198.37	85.88	3.85	BQ 0.00
175	0	0	270	478.64	208.64	90.32	4.76	BQ 0.00
176	0	0	275	478.90	203.90	88.27	4.76	BQ 0.00
177	0	0	285	478.90	193.90	83.94	4.76	BQ 0.00
178	0	0	305	478.90	173.90	75.28	39.27	BQ 0.00
179	0	0	280	479.52	199.52	86.37	4.76	BQ 0.00
180	0	0	280	479.26	199.26	86.26	4.76	BQ 0.00
181	0	0	290	479.26	189.26	81.93	2.84	BQ 0.00
182	0	0	280	481.14	201.14	87.07	1.92	BQ 0.00
183	0	0	290	481.15	191.15	82.75	4.76	BQ 0.00
184	0	0	305	481.12	176.12	76.24	4.76	BQ 0.00
185	0	0	305	481.07	176.07	76.22	4.76	BQ 0.00
186	0	0	325	481.06	156.06	67.56	7.70	BQ 0.00
187	0	0	325	481.07	156.07	67.56	5.77	BQ 0.00
190	0	0	365	455.58	90.58	39.21	2.84	BQ 0.00
191	0	0	275	455.86	180.86	78.30	4.76	BQ 0.00
192	0	0	265	459.57	194.57	84.23	4.76	BQ 0.00
193	0	0	285	464.47	179.47	77.69	5.77	BQ 0.00
194	0	0	295	464.44	169.44	73.35	4.76	BQ 0.00
195	0	0	295	464.34	169.34	73.31	3.85	BQ 0.00
196	0	0	285	464.31	179.31	77.63	4.76	BQ 0.00
197	0	0	265	465.02	200.02	86.59	5.77	BQ 0.00
198	0	0	280	476.74	196.74	85.17	9.62	BQ 0.00
199	0	0	265	476.73	211.73	91.66	4.76	BQ 0.00
200	0	0	280	476.73	196.73	85.17	9.62	BQ 0.00
201	0	0	360	476.73	116.73	50.53	1.92	BQ 0.00
202	0	0	280	464.23	184.23	79.75	4.58	BQ 0.00
203	0	0	275	464.23	189.23	81.92	27.67	BQ 0.00
204	0	0	249	464.35	215.35	93.22		0.00
205	0	0	280	464.23	184.23	79.75	2.84	BQ 0.00
206	0	0	280	464.23	184.23	79.75	1.92	BQ 0.00
207	0	0	230	464.14	234.14	101.36	14.39	BQ 0.00
208	0	0	215	464.12	249.12	107.84	4.76	BQ 0.00
209	0	0	200	464.11	264.11	114.33	10.47	BQ 0.00
230	0	0	377	480.12	103.12	44.64	2.93	BQ 0.00
231	0	0	380	480.12	100.12	43.34	2.99	BQ 0.00
232	0	0	320	479.71	159.71	69.14	2.93	BQ 0.00
233	0	0	325	479.76	154.76	67.00	9.21	BQ 0.00
234	0	0	380	479.54	99.54	43.09	9.21	BQ 0.00
235	0	0	360	479.71	119.71	51.82	9.21	BQ 0.00
236	0	0	350	475.46	125.46	54.31	3.05	BQ 0.00
237	0	0	270	474.31	204.31	88.45	4.93	BQ 0.00
238	0	0	400	473.41	73.41	31.78	4.98	BQ 0.00
239	0	0	325	469.57	144.57	62.58	4.98	BQ 0.00
240	0	0	325	442.29	117.29	50.78	3.05	BQ 0.00
241	0	0	370	454.09	84.09	36.40	3.05	BQ 0.00

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE I) FILE: I.DAT

NODE NO	COORDINATES			GRADIENT RESULTS			BOUNDARY SPEC		Q(GPM)	TYPE
	X(FT)	Y(FT)	Z(FT)	HG(FT)	P(FT)	P(Psi)				
242	0	0	415	452.73	37.73	16.33	3.05	BQ	3.05	0.00
243	0	0	420	451.87	31.87	13.80	3.05	BQ	3.05	0.00
245	0	0	355	450.55	95.55	41.36	3.05	BQ	3.05	0.00
246	0	0	324	436.33	112.33	48.63	12.57	BQ	12.57	0.00
247	0	0	305	423.75	118.75	51.41	4.10	BQ	4.11	0.00
248	0	0	330	423.72	93.72	40.57	3.69	BQ	3.69	0.00
249	0	0	330	423.72	93.72	40.57	3.69	BQ	3.69	0.00
250	0	0	306	435.78	129.78	56.18	4.93	BQ	4.93	0.00
251	0	0	293	432.19	139.19	60.26	3.64	BQ	3.64	0.00
252	0	0	275	432.19	157.19	68.05	3.64	BQ	3.64	0.00
253	0	0	285	432.19	147.19	63.72	4.11	BQ	4.11	0.00
254	0	0	270	432.19	162.19	70.21	2.99	BQ	2.99	0.00
255	0	0	295	413.01	118.01	51.09	2.99	BQ	2.99	0.00
256	0	0	295	410.19	115.19	49.86	2.99	BQ	2.99	0.00
257	0	0	290	411.69	121.69	52.68	4.93	BQ	4.93	0.00
270	0	0	276	450.30	174.30	75.46	4.76	BQ	4.76	0.00
271	0	0	320	450.29	130.29	56.40	6.69	BQ	6.69	0.00
272	0	0	350	413.96	63.96	27.69	4.76	BQ	4.76	0.00
273	0	0	370	413.96	43.96	19.03	4.76	BQ	4.76	0.00
274	0	0	350	413.96	63.96	27.69	4.76	BQ	4.76	0.00
275	0	0	330	413.97	83.97	36.35	4.76	BQ	4.76	0.00
276	0	0	320	413.98	93.98	40.68	4.76	BQ	4.76	0.00
277	0	0	340	426.88	86.88	37.61	4.76	BQ	4.76	0.00
278	0	0	315	447.50	132.50	57.36	3.85	BQ	3.85	0.00
279	0	0	270	455.56	185.56	80.33	23.55	BQ	23.55	0.00
280	0	0	280	464.44	184.44	79.84	5.50	BQ	5.50	0.00
282	0	0	410	464.58	54.58	23.63	4.76	BQ	4.76	0.00
283	0	0	415	464.56	49.56	21.45	9.62	BQ	9.62	0.00
284	0	0	400	464.55	64.55	27.94	4.67	BQ	4.67	0.00
285	0	0	400	464.57	64.57	27.95	15.71	BQ	15.71	0.00
300	0	0	285	415.15	130.15	56.34	45.81	BQ	45.81	0.00
301	0	0	285	411.61	126.61	54.81	4.58	BQ	4.58	0.00
302	0	0	275	405.70	130.70	56.58	4.71	BQ	4.71	0.00
303	0	0	280	405.70	125.70	54.41	4.71	BQ	4.71	0.00
304	0	0	264	399.01	135.01	58.45	3.91	BQ	3.91	0.00
305	0	0	265	399.01	134.01	58.01	4.71	BQ	4.71	0.00
306	0	0	280	399.01	119.01	51.52	5.61	BQ	5.61	0.00
307	0	0	260	398.99	138.99	60.17	6.96	BQ	6.96	0.00
308	0	0	255	398.98	143.98	62.33	6.82	BQ	6.82	0.00
309	0	0	280	397.73	117.73	50.96	5.66	BQ	5.66	0.00
310	0	0	280	397.47	117.47	50.85	4.71	BQ	4.71	0.00
311	0	0	300	392.09	92.09	39.87	5.66	BQ	5.66	0.00
312	0	0	370	378.36	8.36	3.62	11.00	BQ	11.00	0.00
313	0	0	318	364.20	46.20	20.00	2689.96	BH		
314	0	0	315	373.11	58.11	25.16	2.78	BQ	2.78	0.00
315	0	0	368	377.56	9.56	4.14	2.78	BQ	2.78	0.00
316	0	0	340	377.66	37.66	16.30	2.78	BQ	2.78	0.00
317	0	0	300	377.05	77.05	33.36	2.78	BQ	2.78	0.00
318	0	0	310	378.19	68.19	29.52	2.78	BQ	2.78	0.00
319	0	0	287	379.72	92.72	40.14	2.33	BQ	2.33	0.00
320	0	0	271	394.12	123.12	53.30	3.28	BQ	3.28	0.00
321	0	0	262	394.39	132.39	57.31	3.77	BQ	3.77	0.00

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE I) FILE: I.DAT

NODE NO	COORDINATES			GRADIENT RESULTS			BOUNDARY SPEC		Q(GPM)	TYPE
	X(FT)	Y(FT)	Z(FT)	HG(FT)	P(FT)	P(PSI)				
322	0	0	255	393.69	138.69	60.04	3.77	BQ	3.77	0.00
323	0	0	265	393.57	128.57	55.66	2.33	BQ	2.33	0.00
324	0	0	265	393.47	128.47	55.61	2.83	BQ	2.83	0.00
325	0	0	255	393.66	138.66	60.03	3.77	BQ	3.77	0.00
326	0	0	265	393.02	128.02	55.42	3.77	BQ	3.77	0.00
327	0	0	255	393.70	138.70	60.04	2.33	BQ	2.33	0.00
350	0	0	305	395.02	90.02	38.97	4.71	BQ	4.71	0.00
351	0	0	315	399.11	84.11	36.41	4.71	BQ	4.71	0.00
352	0	0	300	399.72	99.72	43.17	4.71	BQ	4.71	0.00
353	0	0	320	400.73	80.73	34.95	4.71	BQ	4.71	0.00
354	0	0	320	411.36	91.36	39.55				0.00
355	0	0	345	411.36	66.36	28.73	9.20	BQ	9.20	0.00
356	0	0	285	394.65	109.65	47.47	4.71	BQ	4.71	0.00
357	0	0	295	394.04	99.04	42.87	3.77	BQ	3.77	0.00
358	0	0	297	393.99	96.99	41.99				0.00
359	0	0	260	393.85	133.85	57.94	7.33	BQ	7.33	0.00
360	0	0	270	393.92	123.92	53.65	4.71	BQ	4.71	0.00
361	0	0	250	393.88	143.88	62.28	2.47	BQ	2.47	0.00
362	0	0	250	393.94	143.94	62.31	5.50	BQ	5.50	0.00
363	0	0	280	393.95	113.95	49.33	4.71	BQ	4.71	0.00
364	0	0	300	393.97	93.97	40.68	4.71	BQ	4.71	0.00
365	0	0	295	393.96	98.96	42.84	4.71	BQ	4.71	0.00
366	0	0	320	393.87	73.87	31.98	3.68	BQ	3.68	0.00
367	0	0	285	393.87	108.87	47.13	3.73	BQ	3.73	0.00
368	0	0	320	393.87	73.87	31.98	3.28	BQ	3.28	0.00
369	0	0	285	393.87	108.87	47.13	2.78	BQ	2.78	0.00
370	0	0	250	393.87	143.87	62.28	2.83	BQ	2.83	0.00
371	0	0	245	393.87	148.87	64.45	2.78	BQ	2.78	0.00
372	0	0	260	393.87	133.87	57.95	3.68	BQ	3.68	0.00
373	0	0	240	393.87	153.87	66.61	2.78	BQ	2.78	0.00
374	0	0	245	393.87	148.87	64.45	2.78	BQ	2.78	0.00
391	0	0	250	393.88	143.88	62.28				0.00
500	0	0	290	507.04	217.04	93.96	-1100.00	BQ	-1100.00	0.00
501	0	0	260	490.83	230.83	99.93	-1000.00	BQ	-1000.00	0.00
600	0	0	451	481.86	30.86	13.36	-336.77	BEL		
601	0	0	467	485.89	18.89	8.18	-399.58	BEL		
602	0	0	418	464.71	46.71	20.22	-223.39	BEL		
719	0	0	450	473.59	23.59	10.21	-1226.64	BEL		

TOTAL SYSTEM Q = 4286.39 Total BQ (pos) = 1596.43 Total BQ (neg) = -2100.00

0.00 0.00

COMPUTER PRINTOUT

PHASE II IMPROVEMENT

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE II) FILE: II.DAT

INITIAL TIME..... TZERO = 0.00
 TIME INCREMENT..... DELT = 1.00
 FINAL TIME..... TFINAL = 3.00

***** TANK LEVEL ADJUSTMENT FACTORS:

TANK AT NODE 600	VOL PER UNIT ELEV. =	1257	FT.**3/(FT. ELEV.)
TANK AT NODE 601	VOL PER UNIT ELEV. =	3526	FT.**3/(FT. ELEV.)
TANK AT NODE 602	VOL PER UNIT ELEV. =	491	FT.**3/(FT. ELEV.)
TANK AT NODE 719	VOL PER UNIT ELEV. =	3171	FT.**3/(FT. ELEV.)

***** TANK OVERFLOW/EMPTY LIMITS:

TANK AT NODE 719	OVERFLOW =	489.00 FT	EMPTY =	450.0 FT
------------------	------------	-----------	---------	----------

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE II) FILE: II.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
1	2	1	975	8	100	9.62	0.01	0.01	0.06
2	3	2	1100	12	100	13.61	0.00	0.00	0.04
3	4	3	1900	12	100	23.23	0.01	0.00	0.07
4	4	5	1200	12	100	31.81	0.01	0.01	0.09
5	5	2	1500	12	100	5.63	0.00	0.00	0.02
6	6	4	430	12	100	59.81	0.01	0.02	0.17
7	7	6	1750	12	110	1061.82	6.76	3.86	3.01
8	500	7	800	12	110	1069.15	3.13	3.91	3.03
9	500	8	850	12	110	30.85	0.00	0.01	0.09
10	8	9	400	12	100	4.67	0.00	0.00	0.01
11	9	10	300	12	100	4.67	0.00	0.00	0.01
12	6	11	1950	12	110	997.24	6.71	3.44	2.83
13	11	12	2200	12	110	361.70	1.16	0.53	1.03
14	12	13	750	12	110	356.93	0.38	0.51	1.01
15	13	14	2000	12	110	352.17	1.00	0.50	1.00
16	14	15	1950	10	100	4.76	0.00	0.00	0.02
17	14	30	1400	10	100	340.71	1.91	1.36	1.39
18	34	156	800	6	120	47.59	0.24	0.31	0.54
30	30	31	1500	10	90	234.05	1.24	0.83	0.96
PRV (180.00)							0.00		Open
31	31	32	520	8	100	47.01	0.05	0.10	0.30
32	32	33	800	8	100	17.87	0.01	0.02	0.11
33	32	33	450	8	100	24.38	0.01	0.03	0.16
34	31	34	500	10	90	182.28	0.26	0.52	0.74
35	33	34	700	6	100	37.48	0.19	0.28	0.43
36	34	35	500	10	90	162.55	0.21	0.42	0.66
37	35	36	320	10	90	155.86	0.12	0.39	0.64
38	36	37	550	10	90	181.05	0.28	0.51	0.74
39	156	36	1800	8	100	31.88	0.09	0.05	0.20
40	37	38	1350	10	110	141.49	0.30	0.22	0.58
41	38	39	400	10	110	152.61	0.10	0.26	0.62
42	72	38 CV	1000	8	110	20.37	0.02	0.02	0.13 Open
43	39	40	1650	10	110	125.29	0.30	0.18	0.51
44	39	73	850	8	110	8.99	0.00	0.00	0.06
45	40	41	1350	12	110	128.21	0.10	0.08	0.36
46	51	40	350	6	90	8.47	0.01	0.02	0.10
47	41	42	450	12	110	119.90	0.03	0.07	0.34
48	42	43	1100	12	110	72.39	0.03	0.03	0.21
49	43	44	250	12	110	16.36	0.00	0.00	0.05
50	43	46	2200	8	110	10.51	0.01	0.01	0.07
51	44	45	750	12	110	6.18	0.00	0.00	0.02
52	44	45	2500	10	110	2.00	0.00	0.00	0.01
53	46	47	1650	8	110	2.33	0.00	0.00	0.01
54	48	47	3300	12	110	5.86	0.00	0.00	0.02
55	43	48	1500	12	110	37.21	0.01	0.01	0.11
56	48	49	500	12	110	23.17	0.00	0.00	0.07
57	49	50	1050	12	110	14.63	0.00	0.00	0.04
58	49	50	1350	8	110	4.40	0.00	0.00	0.03
59	51	52	1200	6	100	13.85	0.05	0.04	0.16
60	42	62	600	8	120	31.81	0.02	0.04	0.20
61	62	49	2100	8	120	16.10	0.02	0.01	0.10
64	49	50	1500	8	120	4.53	0.00	0.00	0.03
70	37	70	500	10	90	34.80	0.01	0.02	0.14

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE II) FILE: II.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
71	70	71	600	10	90	27.93	0.01	0.02	0.11
72	71	72	1950	8	90	48.88	0.26	0.13	0.31
73	75	71	600	10	90	207.98	0.40	0.66	0.85
74	72	73	750	6	90	25.73	0.13	0.17	0.29
75	73	74	600	6	90	31.96	0.15	0.25	0.36
76	74	51	700	6	90	27.87	0.14	0.19	0.32
77	78	75	2900	10	100	18.09	0.02	0.01	0.07
78	76	75	150	10	90	120.32	0.04	0.24	0.49
79	76	77	900	6	100	13.85	0.04	0.04	0.16
80	90	76	650	12	120	84.64	0.02	0.03	0.24
81	78	79	2160	8	100	3.00	0.00	0.00	0.02
82	600	78	800	10	90	48.80	0.04	0.05	0.20
83	79	84	450	6	90	11.30	0.02	0.04	0.13
84	79	83	300	8	100	21.68	0.01	0.02	0.14
85	84	80	650	12	110	4.44	0.00	0.00	0.01
86	83	80	650	8	100	16.14	0.01	0.01	0.10
87	80	81	750	8	100	13.72	0.01	0.01	0.09
88	81	82	1600	6	100	6.86	0.02	0.01	0.08
89	85	79	550	8	100	36.85	0.04	0.07	0.24
90	86	85	2050	10	100	52.56	0.09	0.04	0.21
91	86	88	250	8	90	36.02	0.02	0.08	0.23
92	88	87	1300	8	90	12.78	0.01	0.01	0.08
93	88	89	2400	8	90	9.38	0.02	0.01	0.06
94	87	89	250	8	90	4.47	0.00	0.00	0.03
95	93	86	3500	10	100	102.44	0.52	0.15	0.42
96	91	600	1200	10	110	13.77	0.00	0.00	0.06
97	92	90	600	12	120	81.02	0.02	0.03	0.23
98	92	91	1950	10	110	23.39	0.02	0.01	0.10
99	93	92	900	8	90	114.03	0.58	0.65	0.73
100	93	95	400	8	110	4.76	0.00	0.00	0.03
101	94	93	1080	10	110	225.99	0.58	0.53	0.92
102	96	94	1800	12	110	478.72	1.59	0.88	1.36
103	501	96	2560	12	110	1000.00	8.85	3.46	2.84
104	96	97	450	6	110	45.04	0.15	0.32	0.51
105	97	98	900	6	110	39.27	0.23	0.25	0.45
106	96	94	1800	8	90	134.84	1.59	0.88	0.86
119	123	601	100	12	100	286.16	0.04	0.41	0.81
120	121	120	2200	12	100	79.90	0.08	0.04	0.23
121	123	121	1200	12	110	10.59	0.00	0.00	0.03
122	124	123	800	12	110	302.07	0.30	0.38	0.86
123	122	121	500	8	120	73.52	0.08	0.17	0.47
124	124	122	1150	8	120	78.28	0.22	0.19	0.50
125	125	124	600	12	110	385.12	0.35	0.59	1.09
126	125	142	1100	8	100	53.51	0.14	0.13	0.34
127	120	126	550	12	100	77.97	0.02	0.04	0.22
128	127	125	350	12	100	326.30	0.18	0.52	0.93
129	128	127	1800	12	110	626.02	2.61	1.45	1.78
130	11	128	1800	12	110	630.78	2.65	1.47	1.79
131	127	129	1360	12	130	179.69	0.14	0.11	0.51
132	129	130	800	8	100	14.39	0.01	0.01	0.09
133	129	131	1200	8	100	13.51	0.01	0.01	0.09
134	131	132	1250	8	120	6.69	0.00	0.00	0.04

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE II) FILE: II.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
135	133	131	1200	8	100	27.39	0.05	0.04	0.17
136	134	133	800	8	100	37.01	0.05	0.07	0.24
137	134	135	400	8	100	58.20	0.06	0.15	0.37
138	135	136	500	8	100	53.44	0.07	0.13	0.34
139	30	134	2080	8	100	99.97	0.87	0.42	0.64
140	131	136	650	8	100	29.44	0.03	0.04	0.19
141	136	137	1120	8	100	78.11	0.30	0.26	0.50
143	138	139	1350	8	120	136.04	0.71	0.53	0.87
144	139	140	300	12	120	124.86	0.02	0.06	0.35
145	126	141	600	12	100	47.36	0.01	0.01	0.13
146	141	157	1600	12	100	26.69	0.01	0.01	0.08
147	141	140	2100	12	110	29.36	0.01	0.01	0.08
148	143	141	400	12	100	13.27	0.00	0.00	0.04
149	126	143	280	12	100	68.20	0.01	0.03	0.19
150	140	145	1750	12	110	186.14	0.27	0.15	0.53
151	147	146	250	8	100	22.87	0.01	0.03	0.15
152	147	148	1400	8	100	10.05	0.01	0.01	0.06
153	148	149	350	6	100	0.35	0.00	0.00	0.00
154	146	149	1250	8	100	4.41	0.00	0.00	0.03
155	150	147	500	8	100	17.42	0.01	0.02	0.11
156	155	147	1700	6	100	23.29	0.19	0.11	0.26
157	137	155	1100	6	100	73.35	1.05	0.96	0.83
158	155	158	850	8	120	45.48	0.06	0.07	0.29
159	154	150	950	8	100	38.60	0.07	0.07	0.25
160	150	151	1450	8	100	14.31	0.02	0.01	0.09
161	151	152	500	6	100	4.76	0.00	0.01	0.05
162	152	153	1000	6	100	1.92	0.00	0.00	0.02
163	148	151	400	6	100	0.08	0.00	0.00	0.00
164	142	126	1400	6	100	48.27	0.62	0.44	0.55
165	157	140	500	12	100	26.69	0.00	0.01	0.08
166	127	125	350	8	100	112.33	0.18	0.52	0.72
167	158	154	850	8	120	45.48	0.06	0.07	0.29
170	171	170	2180	8	120	297.84	4.90	2.25	1.90
171	171	172	300	8	100	5.77	0.00	0.00	0.04
172	173	171	1250	8	100	307.46	4.18	3.34	1.96
173	94	173	2600	8	120	201.83	2.85	1.09	1.29
174	174	173	900	8	100	110.39	0.45	0.50	0.70
175	175	174	600	8	100	50.63	0.07	0.12	0.32
176	178	174	800	8	100	63.62	0.14	0.18	0.41
177	176	175	550	8	100	55.39	0.08	0.14	0.35
178	176	177	220	8	100	13.46	0.00	0.01	0.09
179	180	176	550	8	100	73.61	0.13	0.24	0.47
180	71	178	1650	8	100	94.19	0.62	0.37	0.60
181	177	178	250	8	100	8.69	0.00	0.00	0.06
183	71	179	1450	8	110	85.98	0.38	0.26	0.55
184	179	180	350	8	100	81.22	0.10	0.28	0.52
185	180	181	400	8	100	2.84	0.00	0.00	0.02
186	183	182	250	8	110	82.36	0.06	0.24	0.53
187	182	184	500	8	110	80.44	0.12	0.23	0.51
188	94	183	280	8	90	182.90	0.44	1.55	1.17
189	183	184	380	8	90	95.77	0.18	0.47	0.61
190	184	185	250	8	90	171.44	0.34	1.38	1.09

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE II) FILE: II.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
191	185	75	1100	8	110	83.42	0.28	0.25	0.53
192	185	186	600	8	100	83.26	0.18	0.30	0.53
193	186	76	400	8	100	57.84	0.06	0.15	0.37
194	186	187	450	6	100	17.71	0.03	0.07	0.20
195	187	90	300	6	100	11.94	0.01	0.03	0.14
196	190	279	700	8	110	23.55	0.02	0.02	0.15
198	190	170	1300	8	100	88.07	0.43	0.33	0.56
199	191	190	2400	8	100	114.46	1.29	0.54	0.73
200	192	191	800	8	60	159.66	2.05	2.56	1.02
201	196	191	650	8	60	281.95	4.77	7.34	1.80
202	193	192	250	6	60	164.42	2.74	10.97	1.87
203	193	194	150	12	120	84.79	0.00	0.03	0.24
204	193	204	2560	10	100	51.86	0.11	0.04	0.21
205	194	195	1280	8	60	12.65	0.03	0.02	0.08
206	194	196	850	12	120	67.38	0.02	0.02	0.19
207	196	195	550	6	60	5.97	0.01	0.02	0.07
208	280	196	1000	12	120	225.31	0.19	0.19	0.64
209	197	193	650	12	120	306.85	0.21	0.33	0.87
210	198	197	1100	8	90	312.63	4.61	4.19	2.00
212	96	198	450	8	90	338.56	2.19	4.86	2.16
213	198	199	800	8	100	4.76	0.00	0.00	0.03
214	198	200	200	8	100	11.55	0.00	0.01	0.07
215	200	201	1050	10	100	1.92	0.00	0.00	0.01
216	195	202	1250	6	60	14.78	0.16	0.13	0.17
217	202	203	200	6	60	8.27	0.01	0.04	0.09
218	202	206	450	12	110	1.92	0.00	0.00	0.01
219	204	203	350	6	60	22.24	0.09	0.27	0.25
220	203	205	450	12	110	2.84	0.00	0.00	0.01
222	204	207	450	6	60	29.62	0.21	0.46	0.34
223	207	208	2100	8	110	15.24	0.02	0.01	0.10
224	208	209	1800	8	110	10.47	0.01	0.01	0.07
250	126	230	500	12	100	5.92	0.00	0.00	0.02
251	230	231	500	12	110	2.99	0.00	0.00	0.01
252	143	233	500	12	100	40.54	0.01	0.01	0.12
253	233	232	350	12	120	31.34	0.00	0.00	0.09
254	232	234	1200	12	120	19.20	0.00	0.00	0.05
255	232	235	200	8	120	9.21	0.00	0.00	0.06
256	234	140	3100	12	120	9.98	0.00	0.00	0.03
257	145	236	450	12	110	183.38	0.07	0.15	0.52
258	236	237	700	12	110	180.33	0.10	0.14	0.51
259	237	146	1400	12	110	235.87	0.33	0.24	0.67
260	238	237	1350	12	130	60.47	0.02	0.01	0.17
261	238	239	900	12	130	1234.00	3.37	3.74	3.50
262	146	239	1300	8	100	252.41	3.02	2.32	1.61
263	239	240	1800	12	130	1481.42	9.45	5.25	4.20
264	238	241	1150	10	100	820.39	7.99	6.95	3.35
265	245	240	500	10	100	808.20	3.38	6.76	3.30
266	240	246	650	12	130	2286.57	7.63	11.73	6.49
267	241	242	1100	10	110	221.70	0.57	0.52	0.91
268	241	245	380	10	100	595.65	1.46	3.84	2.43
269	242	243	700	10	110	218.65	0.35	0.50	0.89
270	243	245	1100	10	110	215.60	0.54	0.49	0.88

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE II) FILE: II.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
271	246	247	1520	12	130	2177.77	16.29	10.72	6.18
272	246	250	1440	8	100	96.23	0.56	0.39	0.61
273	247	300	1050	12	130	2166.27	11.15	10.62	6.15
			PRV	(	205.00)		0.00		Open
274	247	248	1600	6	100	7.39	0.02	0.01	0.08
275	248	249	1250	12	110	3.69	0.00	0.00	0.01
276	250	251	2560	6	100	91.31	3.67	1.43	1.04
			PRV	(	197.00)		0.00		Open
277	251	252	550	8	100	10.73	0.00	0.01	0.07
278	251	255	1900	8	100	448.56	12.79	6.73	2.86
279	252	253	750	8	110	4.11	0.00	0.00	0.03
280	252	254	200	8	100	2.99	0.00	0.00	0.02
282	255	256	600	8	100	296.10	1.87	3.12	1.89
283	255	257	1000	8	100	149.47	0.88	0.88	0.95
284	257	256	1200	8	100	144.54	0.99	0.83	0.92
285	256	320	1650	8	100	437.65	10.61	6.43	2.79
300	270	251	2350	8	100	371.62	11.16	4.75	2.37
301	170	270	650	8	100	383.07	3.27	5.03	2.45
302	270	271	950	6	100	6.69	0.01	0.01	0.08
303	273	272	1350	8	110	0.41	0.00	0.00	0.00
304	274	272	950	8	110	4.35	0.00	0.00	0.03
305	274	273	550	8	110	5.18	0.00	0.00	0.03
306	275	274	450	8	110	14.29	0.00	0.01	0.09
307	276	275	800	8	110	19.06	0.01	0.02	0.12
308	276	354	300	8	100	289.95	0.90	3.00	1.85
309	277	276	1360	8	100	313.77	4.72	3.47	2.00
310	278	277	3000	8	120	318.53	7.64	2.55	2.03
311	191	278	1200	8	120	322.38	3.13	2.61	2.06
312	282	280	1050	12	120	230.81	0.20	0.19	0.65
313	282	283	550	12	130	1155.41	1.82	3.31	3.28
314	283	284	1100	12	130	1145.79	3.59	3.26	3.25
315	282	285	950	8	90	15.71	0.02	0.02	0.10
316	602	282	700	12	120	1406.69	3.87	5.53	3.99
350	300	301	500	12	130	444.85	0.28	0.57	1.26
351	301	302	850	12	130	440.27	0.47	0.56	1.25
352	302	303	700	6	100	4.71	0.00	0.01	0.05
353	302	304	1000	12	130	430.84	0.53	0.53	1.22
354	304	305	500	8	100	10.33	0.00	0.01	0.07
355	304	307	500	6	100	13.78	0.02	0.04	0.16
356	304	309	950	8	100	181.24	1.19	1.26	1.16
357	305	306	305	6	100	5.61	0.00	0.01	0.06
358	307	308	600	6	100	6.82	0.01	0.01	0.08
359	304	310	1100	8	120	221.58	1.43	1.30	1.41
360	309	310	200	8	100	175.59	0.24	1.19	1.12
361	310	311	950	8	100	392.45	4.99	5.26	2.51
362	311	312	1200	8	100	942.48	31.95	26.62	6.02
364	312	313	1000	6	100	502.71	33.75	33.75	5.70
365	312	315	300	8	100	428.77	1.86	6.19	2.74
366	314	313	300	8	100	1600.65	21.30	70.99	10.22
367	315	314	1000	8	100	573.03	10.59	10.59	3.66
368	317	314	300	8	100	1030.40	9.42	31.40	6.58
369	316	315	300	8	100	147.04	0.26	0.85	0.94
370	316	317	950	8	100	199.73	1.43	1.50	1.27
371	318	316	300	8	100	349.55	1.27	4.24	2.23

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE II) FILE: II.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
372	319	317	300	8	100	833.46	6.36	21.20	5.32
373	319	318	850	8	100	352.34	3.66	4.30	2.25
374	320	319	1000	8	110	1188.13	34.27	34.27	7.58
375	321	320	1400	8	100	346.50	5.84	4.17	2.21
376	321	322	800	8	100	139.50	0.62	0.77	0.89
377	322	323	400	8	110	243.73	0.73	1.82	1.56
378	325	322	250	8	100	108.00	0.12	0.48	0.69
379	323	324	280	8	100	241.39	0.60	2.14	1.54
380	325	324	400	8	100	320.89	1.45	3.62	2.05
381	324	326	300	8	100	559.46	3.04	10.13	3.57
382	327	325	210	8	100	432.66	1.32	6.30	2.76
385	300	313	950	8	100	1675.61	73.41	77.27	10.70
386	326	311	650	8	100	555.69	6.51	10.01	3.55
392	391	361	50	8	100	774.75	0.93	18.52	4.95
394	374	391	1000	12	120	774.75	1.83	1.83	2.20
400	350	320	1250	8	100	407.26	7.04	5.63	2.60
401	356	321	1250	12	110	489.77	1.15	0.92	1.39
402	351	350	510	8	100	519.41	4.50	8.83	3.32
403	350	356	750	12	110	107.44	0.04	0.06	0.30
404	353	351	350	8	100	387.00	1.79	5.12	2.47
405	352	351	900	8	100	137.13	0.67	0.75	0.88
406	353	352	1400	8	100	141.84	1.12	0.80	0.91
407	354	353	1260	8	100	533.55	11.70	9.28	3.41
408	355	354	960	8	90	243.61	2.54	2.64	1.55
409	357	356	1050	8	110	387.05	4.51	4.29	2.47
410	358	357	200	8	110	242.63	0.36	1.81	1.55
411	364	357	1250	8	110	148.18	0.91	0.73	0.95
412	358	359	1650	8	110	41.02	0.11	0.07	0.26
413	359	327	800	8	100	435.00	5.09	6.36	2.78
414	360	358	750	8	100	283.65	2.16	2.88	1.81
415	361	359	800	8	100	401.31	4.38	5.48	2.56
416	361	360	250	8	90	456.19	2.11	8.44	2.91
417	360	362	1050	8	120	167.83	0.82	0.78	1.07
418	374	361	1800	6	90	85.22	2.76	1.53	0.97
419	362	363	750	8	120	162.33	0.55	0.73	1.04
420	365	364	500	8	120	56.55	0.05	0.10	0.36
421	363	364	900	8	120	96.34	0.25	0.28	0.61
422	363	365	1650	8	120	61.27	0.20	0.12	0.39
423	367	366	750	12	120	3.68	0.00	0.00	0.01
424	367	370	600	12	120	369.29	0.28	0.46	1.05
425	368	367	1350	12	120	376.69	0.65	0.48	1.07
426	368	369	500	12	120	508.33	0.42	0.84	1.44
427	369	370	1450	8	120	109.35	0.51	0.35	0.70
428	369	372	450	12	120	396.20	0.24	0.53	1.12
429	370	371	500	12	120	475.81	0.37	0.74	1.35
430	371	374	600	12	120	473.02	0.44	0.74	1.34
431	372	373	850	12	120	392.52	0.44	0.52	1.11
432	373	374	1250	12	120	389.73	0.64	0.51	1.11
700	719	238	200	16	130	2119.85	0.50	2.51	3.38
701	129	138	1200	12	130	147.04	0.09	0.07	0.42
801	284	801	700	12	130	1141.11	2.27	3.24	3.24
802	801	355	3500	12	130	1141.11	11.34	3.24	3.24

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE II) FILE: II.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
803	355	368	3400	12	130	888.30	6.93	2.04	2.52

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE II) FILE: II.DAT

NODE NO	COORDINATES			GRADIENT RESULTS			BOUNDARY SPEC		Q(GPM)	TYPE		
	X(FT)	Y(FT)	Z(FT)	HG(FT)	P(FT)	P(Psi)						
1	0	0	375	498.82	123.82	53.60			9.62	BQ	9.62	0.00
2	0	0	341	498.83	157.83	68.32			9.62	BQ	9.62	0.00
3	0	0	272	498.83	226.83	98.19			9.62	BQ	9.62	0.00
4	0	0	270	498.84	228.84	99.06			4.76	BQ	4.76	0.00
5	0	0	285	498.83	213.83	92.57			26.18	BQ	26.18	0.00
6	0	0	275	498.85	223.85	96.90			4.77	BQ	4.76	0.00
7	0	0	272	505.61	233.61	101.13			7.33	BQ	7.33	0.00
8	0	0	270	508.73	238.73	103.35			26.18	BQ	26.18	0.00
9	0	0	270	508.73	238.73	103.35						0.00
10	0	0	270	508.73	238.73	103.35			4.67	BQ	4.67	0.00
11	0	0	290	492.14	202.14	87.51			4.76	BQ	4.76	0.00
12	0	0	275	490.98	215.98	93.50			4.76	BQ	4.76	0.00
13	0	0	295	490.60	195.60	84.68			4.76	BQ	4.76	0.00
14	0	0	295	489.60	194.60	84.24			6.69	BQ	6.69	0.00
15	0	0	277	489.60	212.60	92.03			4.76	BQ	4.76	0.00
30	0	0	270	487.69	217.69	94.24			6.69	BQ	6.69	0.00
31	0	0	310	486.45	176.45	76.38			4.76	BQ	4.76	0.00
32	0	0	340	486.39	146.39	63.37			4.76	BQ	4.76	0.00
33	0	0	335	486.38	151.38	65.53			4.76	BQ	4.76	0.00
34	0	0	315	486.19	171.19	74.11			9.62	BQ	9.62	0.00
35	0	0	315	485.98	170.98	74.02			6.69	BQ	6.69	0.00
36	0	0	310	485.85	175.85	76.13			6.69	BQ	6.69	0.00
37	0	0	306	485.57	179.57	77.74			4.76	BQ	4.76	0.00
38	0	0	325	485.27	160.27	69.38			9.25	BQ	9.25	0.00
39	0	0	328	485.16	157.16	68.04			18.33	BQ	18.33	0.00
40	0	0	335	484.87	149.87	64.88			5.54	BQ	5.54	0.00
41	0	0	410	484.76	74.76	32.36			8.31	BQ	8.31	0.00
42	0	0	410	484.73	74.73	32.35			15.71	BQ	15.71	0.00
43	0	0	370	484.70	114.70	49.65			8.31	BQ	8.31	0.00
44	0	0	385	484.70	99.70	43.16			8.18	BQ	8.18	0.00
45	0	0	375	484.70	109.70	47.49			8.18	BQ	8.18	0.00
46	0	0	300	484.69	184.69	79.95			8.18	BQ	8.18	0.00
47	0	0	300	484.69	184.69	79.95			8.18	BQ	8.18	0.00
48	0	0	310	484.69	174.69	75.62			8.18	BQ	8.18	0.00
49	0	0	295	484.69	189.69	82.12			15.71	BQ	15.71	0.00
50	0	0	275	484.69	209.69	90.77			23.56	BQ	23.56	0.00
51	0	0	335	484.87	149.87	64.88			5.54	BQ	5.54	0.00
52	0	0	270	484.82	214.82	93.00			13.85	BQ	13.85	0.00
62	0	0	350	484.71	134.71	58.32			15.71	BQ	15.71	0.00
70	0	0	315	485.56	170.56	73.83			6.86	BQ	6.86	0.00
71	0	0	315	485.55	170.55	73.83			6.86	BQ	6.86	0.00
72	0	0	320	485.28	165.28	71.55			2.77	BQ	2.77	0.00
73	0	0	325	485.16	160.16	69.33			2.77	BQ	2.77	0.00
74	0	0	330	485.01	155.01	67.10			4.09	BQ	4.09	0.00
75	0	0	300	485.95	185.95	80.50			13.85	BQ	13.85	0.00
76	0	0	300	485.98	185.98	80.51			8.31	BQ	8.31	0.00
77	0	0	330	485.94	155.94	67.51			13.85	BQ	13.85	0.00
78	0	0	330	485.96	155.96	67.52			27.71	BQ	27.71	0.00
79	0	0	285	485.96	200.96	87.00			6.86	BQ	6.86	0.00
80	0	0	275	485.95	210.95	91.32			6.86	BQ	6.86	0.00
81	0	0	265	485.94	220.94	95.64			6.86	BQ	6.86	0.00
82	0	0	265	485.92	220.92	95.64			6.86	BQ	6.86	0.00

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE II) FILE: II.DAT

NODE NO	COORDINATES			GRADIENT RESULTS			BOUNDARY SPEC			
	X(FT)	Y(FT)	Z(FT)	HG(FT)	P(FT)	P(Psi)	Q(GPM)	TYPE		
83	0	0	275	485.95	210.95	91.32	5.54	BQ	5.54	0.00
84	0	0	295	485.95	190.95	82.66	6.86	BQ	6.86	0.00
85	0	0	270	486.00	216.00	93.51	15.71	BQ	15.71	0.00
86	0	0	295	486.09	191.09	82.72	13.85	BQ	13.85	0.00
87	0	0	290	486.05	196.05	84.87	8.31	BQ	8.31	0.00
88	0	0	295	486.07	191.07	82.71	13.85	BQ	13.85	0.00
89	0	0	260	486.05	226.05	97.86	13.85	BQ	13.85	0.00
90	0	0	325	486.00	161.00	69.70	8.31	BQ	8.31	0.00
91	0	0	350	486.00	136.00	58.88	9.62	BQ	9.62	0.00
92	0	0	287	486.02	199.02	86.16	9.62	BQ	9.62	0.00
93	0	0	282	486.60	204.60	88.57	4.76	BQ	4.76	0.00
94	0	0	335	487.18	152.18	65.88	2.84	BQ	2.84	0.00
95	0	0	320	486.60	166.60	72.12	4.76	BQ	4.76	0.00
96	0	0	260	488.77	228.77	99.03	2.84	BQ	2.84	0.00
97	0	0	270	488.62	218.62	94.64	5.77	BQ	5.77	0.00
98	0	0	285	488.40	203.40	88.05	39.27	BQ	39.27	0.00
120	0	0	390	485.96	95.96	41.54	1.92	BQ	1.92	0.00
121	0	0	450	486.04	36.04	15.60	4.21	BQ	4.76	-0.55
122	0	0	450	486.12	36.12	15.64	4.76	BQ	4.76	0.00
123	0	0	410	486.04	76.04	32.92	5.32	BQ	4.76	0.55
124	0	0	385	486.34	101.34	43.87	4.77	BQ	4.76	0.00
125	0	0	337	486.70	149.70	64.80				0.00
126	0	0	355	485.94	130.94	56.68	4.76	BQ	4.76	0.00
127	0	0	335	486.88	151.88	65.75	7.70	BQ	7.70	0.00
128	0	0	335	489.49	154.49	66.88	4.76	BQ	4.76	0.00
129	0	0	270	486.73	216.73	93.82	4.76	BQ	4.76	0.00
130	0	0	285	486.72	201.72	87.33	14.39	BQ	14.39	0.00
131	0	0	325	486.72	161.72	70.01	4.76	BQ	4.76	0.00
132	0	0	330	486.72	156.72	67.84	6.69	BQ	6.69	0.00
133	0	0	350	486.77	136.77	59.21	9.62	BQ	9.62	0.00
134	0	0	312	486.82	174.82	75.68	4.76	BQ	4.76	0.00
135	0	0	310	486.76	176.76	76.52	4.76	BQ	4.76	0.00
136	0	0	305	486.69	181.69	78.66	4.76	BQ	4.76	0.00
137	0	0	295	486.40	191.40	82.86	4.77	BQ	4.76	0.00
138	0	0	320	486.65	166.65	72.14	11.00	BQ	11.00	0.00
139	0	0	320	485.93	165.93	71.83	11.18	BQ	11.18	0.00
140	0	0	320	485.92	165.92	71.83	4.75	BQ	4.76	-0.01
141	0	0	340	485.93	145.93	63.17	4.58	BQ	4.58	0.00
142	0	0	345	486.55	141.55	61.28	5.24	BQ	5.24	0.00
143	0	0	355	485.93	130.93	56.68	14.39	BQ	14.39	0.00
145	0	0	345	485.65	140.65	60.89	2.76	BQ	2.75	0.01
146	0	0	296	485.15	189.15	81.88	1.92	BQ	1.92	0.00
147	0	0	290	485.15	195.15	84.48	7.79	BQ	7.79	0.00
148	0	0	266	485.14	219.14	94.87	9.62	BQ	9.62	0.00
149	0	0	262	485.14	223.14	96.60	4.76	BQ	4.76	0.00
150	0	0	285	485.16	200.16	86.65	6.87	BQ	6.87	0.00
151	0	0	295	485.14	190.14	82.31	9.62	BQ	9.62	0.00
152	0	0	285	485.14	200.14	86.64	2.84	BQ	2.84	0.00
153	0	0	260	485.14	225.14	97.46	1.92	BQ	1.92	0.00
154	0	0	290	485.23	195.23	84.51	6.87	BQ	6.87	0.00
155	0	0	295	485.35	190.35	82.40	4.58	BQ	4.58	0.00
156	0	0	265	485.94	220.94	95.65	15.71	BQ	15.71	0.00

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE II) FILE: II.DAT

NODE NO	COORDINATES			GRADIENT RESULTS			BOUNDARY SPEC		
	X(FT)	Y(FT)	Z(FT)	HG(FT)	P(FT)	P(PSI)	Q(GPM)	TYPE	
157	0	0	325	485.92	160.92	69.66			0.00
158	0	0	275	485.29	210.29	91.03			0.00
170	0	0	259	475.25	216.25	93.61	2.84	BQ	2.84 0.00
171	0	0	265	480.15	215.15	93.14	3.85	BQ	3.85 0.00
172	0	0	305	480.15	175.15	75.82	5.77	BQ	5.77 0.00
173	0	0	265	484.33	219.33	94.95	4.76	BQ	4.76 0.00
174	0	0	280	484.79	204.79	88.65	3.85	BQ	3.85 0.00
175	0	0	270	484.86	214.86	93.01	4.76	BQ	4.76 0.00
176	0	0	275	484.93	209.93	90.88	4.76	BQ	4.76 0.00
177	0	0	285	484.93	199.93	86.55	4.76	BQ	4.76 0.00
178	0	0	305	484.93	179.93	77.89	39.27	BQ	39.27 0.00
179	0	0	280	485.16	205.16	88.82	4.76	BQ	4.76 0.00
180	0	0	280	485.06	205.06	88.77	4.76	BQ	4.76 0.00
181	0	0	290	485.06	195.06	84.44	2.84	BQ	2.84 0.00
182	0	0	280	486.68	206.68	89.47	1.92	BQ	1.92 0.00
183	0	0	290	486.74	196.74	85.17	4.76	BQ	4.76 0.00
184	0	0	305	486.57	181.57	78.60	4.76	BQ	4.76 0.00
185	0	0	305	486.22	181.22	78.45	4.76	BQ	4.76 0.00
186	0	0	325	486.04	161.04	69.72	7.70	BQ	7.70 0.00
187	0	0	325	486.01	161.01	69.70	5.77	BQ	5.77 0.00
190	0	0	365	475.68	110.68	47.91	2.84	BQ	2.84 0.00
191	0	0	275	476.97	201.97	87.43	4.76	BQ	4.76 0.00
192	0	0	265	479.01	214.01	92.65	4.76	BQ	4.76 0.00
193	0	0	285	481.76	196.76	85.18	5.77	BQ	5.77 0.00
194	0	0	295	481.75	186.75	80.85	4.76	BQ	4.76 0.00
195	0	0	295	481.72	186.72	80.83	3.85	BQ	3.85 0.00
196	0	0	285	481.74	196.74	85.17	4.76	BQ	4.76 0.00
197	0	0	265	481.97	216.97	93.93	5.77	BQ	5.77 0.00
198	0	0	280	486.58	206.58	89.43	9.62	BQ	9.62 0.00
199	0	0	265	486.58	221.58	95.92	4.76	BQ	4.76 0.00
200	0	0	280	486.58	206.58	89.43	9.62	BQ	9.62 0.00
201	0	0	360	486.58	126.58	54.80	1.92	BQ	1.92 0.00
202	0	0	280	481.56	201.56	87.26	4.58	BQ	4.58 0.00
203	0	0	275	481.56	206.56	89.42	27.67	BQ	27.67 0.00
204	0	0	249	481.65	232.65	100.71			0.00
205	0	0	280	481.56	201.56	87.25	2.84	BQ	2.84 0.00
206	0	0	280	481.56	201.56	87.26	1.92	BQ	1.92 0.00
207	0	0	230	481.44	251.44	108.85	14.39	BQ	14.39 0.00
208	0	0	215	481.42	266.42	115.33	4.76	BQ	4.76 0.00
209	0	0	200	481.41	281.41	121.82	10.47	BQ	10.47 0.00
230	0	0	377	485.93	108.94	47.16	2.93	BQ	2.93 0.00
231	0	0	380	485.93	105.93	45.86	2.99	BQ	2.99 0.00
232	0	0	320	485.92	165.92	71.83	2.93	BQ	2.93 0.00
233	0	0	325	485.92	160.92	69.66	9.21	BQ	9.21 0.00
234	0	0	380	485.92	105.92	45.85	9.21	BQ	9.21 0.01
235	0	0	360	485.92	125.92	54.51	9.21	BQ	9.21 0.00
236	0	0	350	485.58	135.58	58.69	3.05	BQ	3.05 0.00
237	0	0	270	485.48	215.48	93.28	4.93	BQ	4.93 0.00
238	0	0	400	485.50	85.50	37.01	4.98	BQ	4.98 0.00
239	0	0	325	482.13	157.13	68.02	4.98	BQ	4.98 0.00
240	0	0	325	472.67	147.67	63.93	3.05	BQ	3.05 0.00
241	0	0	370	477.51	107.51	46.54	3.05	BQ	3.05 0.00

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE II) FILE: II.DAT

NODE NO	COORDINATES			GRADIENT RESULTS			BOUNDARY SPEC		Q(GPM)	TYPE	
	X(FT)	Y(FT)	Z(FT)	HG(FT)	P(FT)	P(PSI)					
242	0	0	415	476.94	61.94	26.82	3.05	BQ		3.05	0.00
243	0	0	420	476.59	56.59	24.50	3.05	BQ		3.05	0.00
245	0	0	355	476.05	121.05	52.40	3.05	BQ		3.05	0.00
246	0	0	324	465.05	141.05	61.06	12.57	BQ		12.57	0.00
247	0	0	305	448.75	143.75	62.23	4.11	BQ	PRV Open	4.11	0.00
248	0	0	330	448.73	118.73	51.40	3.69	BQ		3.69	0.00
249	0	0	330	448.73	118.73	51.40	3.69	BQ		3.69	0.00
250	0	0	306	464.49	158.49	68.61	4.93	BQ	PRV Open	4.93	0.00
251	0	0	293	460.82	167.82	72.65	3.64	BQ	PRV Open	3.64	0.00
252	0	0	275	460.81	185.81	80.44	3.64	BQ		3.64	0.00
253	0	0	285	460.81	175.81	76.11	4.11	BQ		4.11	0.00
254	0	0	270	460.81	190.81	82.60	2.99	BQ		2.99	0.00
255	0	0	295	448.03	153.03	66.25	2.99	BQ		2.99	0.00
256	0	0	295	446.16	151.16	65.44	2.99	BQ		2.99	0.00
257	0	0	290	447.15	157.15	68.03	4.93	BQ		4.93	0.00
270	0	0	276	471.98	195.98	84.84	4.76	BQ		4.76	0.00
271	0	0	320	471.97	151.97	65.79	6.69	BQ		6.69	0.00
272	0	0	350	461.46	111.46	48.25	4.76	BQ		4.76	0.00
273	0	0	370	461.46	91.46	39.59	4.76	BQ		4.76	0.00
274	0	0	350	461.46	111.46	48.25	4.76	BQ		4.76	0.00
275	0	0	330	461.46	131.46	56.91	4.76	BQ		4.76	0.00
276	0	0	320	461.47	141.47	61.24	4.76	BQ		4.76	0.00
277	0	0	340	466.20	126.20	54.63	4.76	BQ		4.76	0.00
278	0	0	315	473.84	158.84	68.76	3.85	BQ		3.85	0.00
279	0	0	270	475.66	205.66	89.03	23.55	BQ		23.55	0.00
280	0	0	280	481.92	201.92	87.41	5.50	BQ		5.50	0.00
282	0	0	410	482.13	72.13	31.22	4.76	BQ		4.76	0.00
283	0	0	415	480.30	65.30	28.27	9.62	BQ		9.62	0.00
284	0	0	400	476.71	76.71	33.21	4.67	BQ		4.67	0.00
285	0	0	400	482.11	82.11	35.55	15.71	BQ		15.71	0.00
300	0	0	285	437.61	152.61	66.06	45.81	BQ	PRV Open	45.81	0.00
301	0	0	285	437.32	152.32	65.94	4.58	BQ		4.58	0.00
302	0	0	275	436.85	161.85	70.07	4.71	BQ		4.71	0.00
303	0	0	280	436.85	156.85	67.90	4.71	BQ		4.71	0.00
304	0	0	264	436.32	172.32	74.60	3.91	BQ		3.91	0.00
305	0	0	265	436.32	171.32	74.16	4.71	BQ		4.71	0.00
306	0	0	280	436.31	156.31	67.67	5.61	BQ		5.61	0.00
307	0	0	260	436.30	176.30	76.32	6.96	BQ		6.96	0.00
308	0	0	255	436.29	181.29	78.48	6.82	BQ		6.82	0.00
309	0	0	280	435.13	155.13	67.15	5.66	BQ		5.66	0.00
310	0	0	280	434.89	154.89	67.05	4.71	BQ		4.71	0.00
311	0	0	300	429.90	129.90	56.23	5.66	BQ		5.66	0.00
312	0	0	370	397.95	27.95	12.10	11.00	BQ		11.00	0.00
313	0	0	318	364.20	46.20	20.00	3778.97	BH			
314	0	0	315	385.50	70.50	30.52	2.78	BQ		2.78	0.00
315	0	0	368	396.09	28.09	12.16	2.78	BQ		2.78	0.00
316	0	0	340	396.35	56.35	24.39	2.78	BQ		2.78	0.00
317	0	0	300	394.92	94.92	41.09	2.78	BQ		2.78	0.00
318	0	0	310	397.62	87.62	37.93	2.78	BQ		2.78	0.00
319	0	0	287	401.28	114.28	49.47	2.33	BQ		2.33	0.00
320	0	0	271	435.55	164.55	71.23	3.28	BQ		3.28	0.00
321	0	0	262	441.39	179.39	77.66	3.77	BQ		3.77	0.00

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE II) FILE: II.DAT

NODE NO	COORDINATES			GRADIENT RESULTS			BOUNDARY SPEC		Q(GPM)	TYPE
	X(FT)	Y(FT)	Z(FT)	HG(FT)	P(FT)	P(Psi)				
322	0	0	255	440.77	185.77	80.42	3.77	BQ	3.77	0.00
323	0	0	265	440.04	175.04	75.77	2.33	BQ	2.33	0.00
324	0	0	265	439.44	174.44	75.52	2.83	BQ	2.83	0.00
325	0	0	255	440.89	185.89	80.47	3.77	BQ	3.77	0.00
326	0	0	265	436.40	171.40	74.20	3.77	BQ	3.77	0.00
327	0	0	255	442.21	187.21	81.04	2.33	BQ	2.33	0.00
350	0	0	305	442.58	137.58	59.56	4.71	BQ	4.71	0.00
351	0	0	315	447.09	132.09	57.18	4.71	BQ	4.71	0.00
352	0	0	300	447.76	147.76	63.97	4.71	BQ	4.71	0.00
353	0	0	320	448.88	128.88	55.79	4.71	BQ	4.71	0.00
354	0	0	320	460.57	140.57	60.85				0.00
355	0	0	345	463.11	118.11	51.13	9.20	BQ	9.20	0.00
356	0	0	285	442.54	157.54	68.20	4.71	BQ	4.71	0.00
357	0	0	295	447.05	152.05	65.82	3.77	BQ	3.77	0.00
358	0	0	297	447.41	150.41	65.11				0.00
359	0	0	260	447.30	187.30	81.08	7.33	BQ	7.33	0.00
360	0	0	270	449.57	179.57	77.74	4.71	BQ	4.71	0.00
361	0	0	250	451.68	201.68	87.31	2.47	BQ	2.47	0.00
362	0	0	250	448.75	198.75	86.04	5.50	BQ	5.50	0.00
363	0	0	280	448.21	168.21	72.82	4.71	BQ	4.71	0.00
364	0	0	300	447.95	147.95	64.05	4.71	BQ	4.71	0.00
365	0	0	295	448.01	153.01	66.24	4.71	BQ	4.71	0.00
366	0	0	320	455.53	135.53	58.67	3.68	BQ	3.68	0.00
367	0	0	285	455.53	170.53	73.82	3.73	BQ	3.73	0.00
368	0	0	320	456.18	136.18	58.95	3.28	BQ	3.28	0.00
369	0	0	285	455.76	170.76	73.92	2.78	BQ	2.78	0.00
370	0	0	250	455.25	205.25	88.85	2.83	BQ	2.83	0.00
371	0	0	245	454.88	209.88	90.86	2.78	BQ	2.78	0.00
372	0	0	260	455.53	195.53	84.64	3.68	BQ	3.68	0.00
373	0	0	240	455.08	215.08	93.11	2.78	BQ	2.78	0.00
374	0	0	245	454.44	209.44	90.67	2.78	BQ	2.78	0.00
391	0	0	250	452.61	202.61	87.71				0.00
500	0	0	290	508.73	218.73	94.69	-1100.00	BQ	-1100.00	0.00
501	0	0	260	497.62	237.62	102.86	-1000.00	BQ	-1000.00	0.00
600	0	0	451	486.00	35.00	15.15	-35.03	BEL		
601	0	0	467	486.00	19.00	8.23	286.16	BEL		
602	0	0	418	486.00	68.00	29.44	-1406.69	BEL		
719	0	0	450	486.00	36.00	15.58	-2119.85	BEL		
801	0	0	0	474.45	474.45	205.39				0.00

TOTAL SYSTEM Q = 5661.56 Total BQ (pos) = 1596.43 Total BQ (neg) = -2100.00

0.00 -0.55

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE II) FILE: II.DAT

TANK LEVEL ADJUSTMENTS, TIME = 1.00

TANK	NODE	LINE	TYPE	FROM	TO	ELEV. T= 0.00	FLOW(GPM)	DELTA ELEV.	ELEV. T= 1.00
1	600	82	PIPE	600	78	486.0 FT	48.8	-0.3 FT	485.78 FT
		96	PIPE	91	600	486.0 FT	13.8	0.1 FT	
2	601	119	PIPE	123	601	486.0 FT	286.2	0.7 FT	486.65 FT
3	602	316	PIPE	602	282	486.0 FT	1406.7	-23.0 FT	463.01 FT
4	719	700	PIPE	719	238	486.0 FT	2119.8	-5.4 FT	480.64 FT

TANK LEVEL ADJUSTMENTS, TIME = 2.00

TANK	NODE	LINE	TYPE	FROM	TO	ELEV. T= 1.00	FLOW(GPM)	DELTA ELEV.	ELEV. T= 2.00
1	600	82	PIPE	600	78	485.8 FT	231.0	-1.5 FT	483.09 FT
		96	PIPE	91	600	485.8 FT	-190.2	-1.2 FT	
2	601	119	PIPE	123	601	486.7 FT	-198.5	-0.5 FT	486.20 FT
3	602	316	PIPE	602	282	463.0 FT	756.4	-12.4 FT	450.65 FT
4	719	700	PIPE	719	238	480.6 FT	1694.5	-4.3 FT	476.35 FT

TANK LEVEL ADJUSTMENTS, TIME = 3.00

TANK	NODE	LINE	TYPE	FROM	TO	ELEV. T= 2.00	FLOW(GPM)	DELTA ELEV.	ELEV. T= 3.00
1	600	82	PIPE	600	78	483.1 FT	277.3	-1.8 FT	479.83 FT
		96	PIPE	91	600	483.1 FT	-233.0	-1.5 FT	
2	601	119	PIPE	123	601	486.2 FT	-431.1	-1.0 FT	485.22 FT
3	602	316	PIPE	602	282	450.7 FT	481.2	-7.9 FT	442.79 FT
4	719	700	PIPE	719	238	476.4 FT	1509.1	-3.8 FT	472.53 FT

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE II) FILE: II.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
1	2	1	975	8	100	9.62	0.01	0.01	0.06
2	3	2	1100	12	100	13.61	0.00	0.00	0.04
3	4	3	1900	12	100	23.23	0.01	0.00	0.07
4	4	5	1200	12	100	31.81	0.01	0.01	0.09
5	5	2	1500	12	100	5.63	0.00	0.00	0.02
6	6	4	430	12	100	59.81	0.01	0.02	0.17
7	7	6	1750	12	110	1061.82	6.76	3.86	3.01
8	500	7	800	12	110	1069.15	3.13	3.91	3.03
9	500	8	850	12	110	30.85	0.00	0.01	0.09
10	8	9	400	12	100	4.67	0.00	0.00	0.01
11	9	10	300	12	100	4.67	0.00	0.00	0.01
12	6	11	1950	12	110	997.24	6.71	3.44	2.83
13	11	12	2200	12	110	437.57	1.65	0.75	1.24
14	12	13	750	12	110	432.81	0.55	0.73	1.23
15	13	14	2000	12	110	428.04	1.44	0.72	1.21
16	14	15	1950	10	100	4.76	0.00	0.00	0.02
17	14	30	1400	10	100	416.59	2.77	1.98	1.70
18	34	156	800	6	120	73.66	0.55	0.69	0.84
30	30	31	1500	10	90	360.05	2.76	1.84	1.47
			PRV (180.00)			0.00	Open		
31	31	32	520	8	100	69.36	0.11	0.21	0.44
32	32	33	800	8	100	27.32	0.03	0.04	0.17
33	32	33	450	8	100	37.28	0.03	0.07	0.24
34	31	34	500	10	90	285.92	0.60	1.20	1.17
35	33	34	700	6	100	59.83	0.46	0.66	0.68
36	34	35	500	10	90	262.47	0.51	1.02	1.07
37	35	36	320	10	90	255.78	0.31	0.98	1.04
38	36	37	550	10	90	307.05	0.75	1.37	1.25
39	156	36	1800	8	100	57.95	0.27	0.15	0.37
40	37	38	1350	10	110	164.29	0.40	0.30	0.67
41	38	39	400	10	110	155.04	0.11	0.27	0.63
42	72	38 CV	1000	8	110	-0.01	Clsd		
43	39	40	1650	10	110	125.37	0.30	0.18	0.51
44	39	73	850	8	110	11.34	0.01	0.01	0.07
45	40	41	1350	12	110	128.21	0.10	0.08	0.36
46	51	40	350	6	90	8.39	0.01	0.02	0.10
47	41	42	450	12	110	119.90	0.03	0.07	0.34
48	42	43	1100	12	110	72.39	0.03	0.03	0.21
49	43	44	250	12	110	16.36	0.00	0.00	0.05
50	43	46	2200	8	110	10.51	0.01	0.01	0.07
51	44	45	750	12	110	6.18	0.00	0.00	0.02
52	44	45	2500	10	110	2.00	0.00	0.00	0.01
53	46	47	1650	8	110	2.33	0.00	0.00	0.01
54	48	47	3300	12	110	5.86	0.00	0.00	0.02
55	43	48	1500	12	110	37.21	0.01	0.01	0.11
56	48	49	500	12	110	23.17	0.00	0.00	0.07
57	49	50	1050	12	110	14.63	0.00	0.00	0.04
58	49	50	1350	8	110	4.40	0.00	0.00	0.03
59	51	52	1200	6	100	13.85	0.05	0.04	0.16
60	42	62	600	8	120	31.81	0.02	0.04	0.20
61	62	49	2100	8	120	16.10	0.02	0.01	0.10
64	49	50	1500	8	120	4.53	0.00	0.00	0.03
70	37	70	500	10	90	137.99	0.16	0.31	0.56

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE II) FILE: II.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
71	70	71	600	10	90	131.13	0.17	0.28	0.54
72	71	72	1950	8	90	26.08	0.08	0.04	0.17
73	75	71	600	10	90	221.09	0.45	0.74	0.90
74	72	73	750	6	90	23.30	0.10	0.14	0.26
75	73	74	600	6	90	31.88	0.15	0.25	0.36
76	74	51	700	6	90	27.79	0.13	0.19	0.32
77	78	75	2900	10	100	161.58	0.99	0.34	0.66
78	76	75	150	10	90	90.79	0.02	0.14	0.37
79	76	77	900	6	100	13.85	0.04	0.04	0.16
80	90	76	650	12	120	134.52	0.05	0.07	0.38
81	78	79	2160	8	100	99.14	0.89	0.41	0.63
82	600	78	800	10	90	288.44	0.97	1.22	1.18
83	79	84	450	6	90	11.30	0.02	0.04	0.13
84	79	83	300	8	100	21.68	0.01	0.02	0.14
85	84	80	650	12	110	4.44	0.00	0.00	0.01
86	83	80	650	8	100	16.14	0.01	0.01	0.10
87	80	81	750	8	100	13.72	0.01	0.01	0.09
88	81	82	1600	6	100	6.86	0.02	0.01	0.08
89	79	85	550	8	100	59.30	0.09	0.16	0.38
90	85	86	2050	10	100	43.59	0.06	0.03	0.18
91	86	88	250	8	90	36.02	0.02	0.08	0.23
92	88	87	1300	8	90	12.78	0.01	0.01	0.08
93	88	89	2400	8	90	9.38	0.02	0.01	0.06
94	87	89	250	8	90	4.47	0.00	0.00	0.03
95	93	86	3500	10	100	6.29	0.00	0.00	0.03
96	600	91	1200	10	110	242.81	0.73	0.61	0.99
97	92	90	600	12	120	164.68	0.06	0.10	0.47
98	91	92	1950	10	110	233.19	1.11	0.57	0.95
99	92	93	900	8	90	58.89	0.17	0.19	0.38
100	93	95	400	8	110	4.76	0.00	0.00	0.03
101	93	94	1080	10	110	43.07	0.03	0.02	0.18
102	96	94	1800	12	110	154.47	0.20	0.11	0.44
103	501	96	2560	12	110	1000.00	8.85	3.46	2.84
104	96	97	450	6	110	45.04	0.15	0.32	0.51
105	97	98	900	6	110	39.27	0.23	0.25	0.45
106	96	94	1800	8	90	43.51	0.20	0.11	0.28
119	601	123	100	12	100	584.41	0.15	1.52	1.66
120	121	120	2200	12	100	493.47	2.45	1.11	1.40
121	123	121	1200	12	110	390.31	0.73	0.61	1.11
122	123	124	800	12	110	189.34	0.13	0.16	0.54
123	122	121	500	8	120	107.93	0.17	0.34	0.69
124	124	122	1150	8	120	112.70	0.43	0.37	0.72
125	124	125	600	12	110	71.87	0.02	0.03	0.20
126	125	142	1100	8	100	118.92	0.63	0.58	0.76
127	120	126	550	12	100	491.55	0.61	1.11	1.39
128	127	125	350	12	100	35.00	0.00	0.01	0.10
129	128	127	1800	12	110	550.14	2.06	1.14	1.56
130	11	128	1800	12	110	554.91	2.09	1.16	1.57
131	127	129	1360	12	130	495.40	0.94	0.69	1.41
132	129	130	800	8	100	14.39	0.01	0.01	0.09
133	129	131	1200	8	100	174.41	1.40	1.17	1.11
134	131	132	1250	8	120	6.69	0.00	0.00	0.04

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE II) FILE: II.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
135	131	133	1200	8	100	43.33	0.11	0.09	0.28
136	133	134	800	8	100	33.71	0.04	0.06	0.22
137	134	135	400	8	100	78.80	0.11	0.27	0.50
138	135	136	500	8	100	74.04	0.12	0.24	0.47
139	30	134	2080	8	100	49.85	0.24	0.12	0.32
140	131	136	650	8	100	119.62	0.38	0.58	0.76
141	136	137	1120	8	100	188.89	1.52	1.36	1.21
143	138	139	1350	8	120	290.84	2.91	2.15	1.86
144	139	140	300	12	120	279.66	0.08	0.28	0.79
145	126	141	600	12	100	258.75	0.20	0.34	0.73
146	141	157	1600	12	100	192.62	0.31	0.20	0.55
147	141	140	2100	12	110	211.88	0.41	0.20	0.60
148	143	141	400	12	100	150.33	0.05	0.12	0.43
149	126	143	280	12	100	335.79	0.15	0.55	0.95
150	140	145	1750	12	110	819.92	4.19	2.39	2.33
151	147	146	250	8	100	105.71	0.12	0.46	0.67
152	147	148	1400	8	100	17.28	0.02	0.02	0.11
153	148	149	350	6	100	28.29	0.06	0.16	0.32
154	149	146	1250	8	100	23.53	0.04	0.03	0.15
155	150	147	500	8	100	67.43	0.10	0.20	0.43
156	155	147	1700	6	100	63.35	1.24	0.73	0.72
157	137	155	1100	6	100	184.13	5.78	5.25	2.09
158	155	158	850	8	120	116.20	0.33	0.39	0.74
159	154	150	950	8	100	109.33	0.47	0.49	0.70
160	150	151	1450	8	100	35.03	0.09	0.06	0.22
161	151	152	500	6	100	4.76	0.00	0.01	0.05
162	152	153	1000	6	100	1.92	0.00	0.00	0.02
163	151	148	400	6	100	20.64	0.04	0.09	0.23
164	142	126	1400	6	100	113.68	3.01	2.15	1.29
165	157	140	500	12	100	192.62	0.10	0.20	0.55
166	127	125	350	8	100	12.05	0.00	0.01	0.08
167	158	154	850	8	120	116.20	0.33	0.39	0.74
170	171	170	2180	8	120	504.48	13.01	5.97	3.22
171	171	172	300	8	100	5.77	0.00	0.00	0.04
172	173	171	1250	8	100	514.10	10.83	8.67	3.28
173	94	173	2600	8	120	269.37	4.86	1.87	1.72
174	174	173	900	8	100	249.50	2.04	2.27	1.59
175	175	174	600	8	100	113.30	0.32	0.53	0.72
176	178	174	800	8	100	140.05	0.62	0.78	0.89
177	176	175	550	8	100	118.06	0.31	0.57	0.75
178	176	177	220	8	100	15.73	0.00	0.01	0.10
179	180	176	550	8	100	138.56	0.42	0.76	0.88
180	71	178	1650	8	100	168.35	1.81	1.10	1.07
181	177	178	250	8	100	10.97	0.00	0.01	0.07
183	71	179	1450	8	110	150.93	1.09	0.75	0.96
184	179	180	350	8	100	146.17	0.30	0.84	0.93
185	180	181	400	8	100	2.84	0.00	0.00	0.02
186	182	183	250	8	110	15.76	0.00	0.01	0.10
187	184	182	500	8	110	17.69	0.01	0.01	0.11
188	183	94	280	8	90	31.15	0.02	0.06	0.20
189	184	183	380	8	90	20.16	0.01	0.03	0.13
190	185	184	250	8	90	42.61	0.03	0.10	0.27

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE II) FILE: II.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
191	75	185	1100	8	110	17.43	0.02	0.01	0.11
192	186	185	600	8	100	29.95	0.03	0.04	0.19
193	76	186	400	8	100	21.56	0.01	0.02	0.14
194	187	186	450	6	100	16.08	0.03	0.06	0.18
195	90	187	300	6	100	21.85	0.03	0.10	0.25
196	190	279	700	8	110	23.55	0.02	0.02	0.15
198	170	190	1300	8	100	203.58	2.03	1.56	1.30
199	190	191	2400	8	100	177.19	2.89	1.21	1.13
200	192	191	800	8	60	69.11	0.43	0.54	0.44
201	196	191	650	8	60	41.64	0.14	0.21	0.27
202	193	192	250	6	60	73.88	0.62	2.49	0.84
203	193	194	150	12	120	574.48	0.16	1.05	1.63
204	193	204	2560	10	100	68.30	0.18	0.07	0.28
205	194	195	1280	8	60	43.48	0.29	0.23	0.28
206	194	196	850	12	120	526.24	0.76	0.90	1.49
207	195	196	550	6	60	41.29	0.47	0.85	0.47
208	196	280	1000	12	120	521.12	0.88	0.88	1.48
209	197	193	650	12	120	722.43	1.05	1.61	2.05
210	198	197	1100	8	90	728.20	22.08	20.07	4.65
212	96	198	450	8	90	754.13	9.64	21.41	4.81
213	198	199	800	8	100	4.76	0.00	0.00	0.03
214	198	200	200	8	100	11.55	0.00	0.01	0.07
215	200	201	1050	10	100	1.92	0.00	0.00	0.01
216	202	195	1250	6	60	1.66	0.00	0.00	0.02
217	203	202	200	6	60	8.17	0.01	0.04	0.09
218	202	206	450	12	110	1.92	0.00	0.00	0.01
219	204	203	350	6	60	38.68	0.26	0.75	0.44
220	203	205	450	12	110	2.84	0.00	0.00	0.01
222	204	207	450	6	60	29.62	0.21	0.46	0.34
223	207	208	2100	8	110	15.24	0.02	0.01	0.10
224	208	209	1800	8	110	10.47	0.01	0.01	0.07
250	126	230	500	12	100	5.92	0.00	0.00	0.02
251	230	231	500	12	110	2.99	0.00	0.00	0.01
252	143	233	500	12	100	171.08	0.08	0.16	0.49
253	233	232	350	12	120	161.87	0.04	0.10	0.46
254	232	234	1200	12	120	149.73	0.10	0.09	0.42
255	232	235	200	8	120	9.21	0.00	0.00	0.06
256	234	140	3100	12	120	140.52	0.24	0.08	0.40
257	145	236	450	12	110	817.18	1.07	2.38	2.32
258	236	237	700	12	110	814.13	1.65	2.36	2.31
259	237	146	1400	12	110	181.13	0.20	0.15	0.51
260	237	238	1350	12	130	628.07	1.45	1.07	1.78
261	238	239	900	12	130	1186.06	3.13	3.48	3.36
262	146	239	1300	8	100	308.45	4.37	3.36	1.97
263	239	240	1800	12	130	1489.53	9.55	5.31	4.23
264	238	241	1150	10	100	815.49	7.90	6.87	3.33
265	245	240	500	10	100	803.29	3.34	6.68	3.28
266	240	246	650	12	130	2289.77	7.65	11.76	6.50
267	241	242	1100	10	110	220.38	0.56	0.51	0.90
268	241	245	380	10	100	592.06	1.44	3.80	2.42
269	242	243	700	10	110	217.33	0.35	0.50	0.89
270	243	245	1100	10	110	214.28	0.53	0.48	0.88

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE II) FILE: II.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
271	246	247	1520	12	130	2112.61	15.40	10.13	5.99
272	246	250	1440	8	100	164.59	1.51	1.05	1.05
273	247	300	1050	12	130	2101.12	10.53	10.03	5.96
			PRV (205.00)				0.00		Open
274	247	248	1600	6	100	7.39	0.02	0.01	0.08
275	248	249	1250	12	110	3.69	0.00	0.00	0.01
276	250	251	2560	6	100	159.66	10.33	4.03	1.81
			PRV (197.00)				0.00		Open
277	251	252	550	8	100	10.73	0.00	0.01	0.07
278	251	255	1900	8	100	431.90	11.92	6.28	2.76
279	252	253	750	8	110	4.11	0.00	0.00	0.03
280	252	254	200	8	100	2.99	0.00	0.00	0.02
282	255	256	600	8	100	284.96	1.74	2.91	1.82
283	255	257	1000	8	100	143.95	0.82	0.82	0.92
284	257	256	1200	8	100	139.02	0.92	0.77	0.89
285	256	320	1650	8	100	420.99	9.88	5.99	2.69
300	270	251	2350	8	100	286.61	6.90	2.94	1.83
301	170	270	650	8	100	298.06	2.05	3.16	1.90
302	270	271	950	6	100	6.69	0.01	0.01	0.08
303	273	272	1350	8	110	0.41	0.00	0.00	0.00
304	274	272	950	8	110	4.35	0.00	0.00	0.03
305	274	273	550	8	110	5.18	0.00	0.00	0.03
306	275	274	450	8	110	14.29	0.00	0.01	0.09
307	276	275	800	8	110	19.06	0.01	0.02	0.12
308	276	354	300	8	100	250.74	0.69	2.29	1.60
309	277	276	1360	8	100	274.56	3.69	2.71	1.75
310	278	277	3000	8	120	279.33	5.99	2.00	1.78
311	191	278	1200	8	120	283.18	2.46	2.05	1.81
312	280	282	1050	12	120	515.62	0.91	0.86	1.46
313	282	283	550	12	130	827.19	0.98	1.79	2.35
314	283	284	1100	12	130	817.57	1.92	1.75	2.32
315	282	285	950	8	90	15.71	0.02	0.02	0.10
316	602	282	700	12	120	332.04	0.27	0.38	0.94
350	300	301	500	12	130	527.83	0.39	0.78	1.50
351	301	302	850	12	130	523.25	0.65	0.76	1.48
352	302	303	700	6	100	4.71	0.00	0.01	0.05
353	302	304	1000	12	130	513.82	0.74	0.74	1.46
354	304	305	500	8	100	10.33	0.00	0.01	0.07
355	304	307	500	6	100	13.78	0.02	0.04	0.16
356	304	309	950	8	100	218.47	1.69	1.78	1.39
357	305	306	305	6	100	5.61	0.00	0.01	0.06
358	307	308	600	6	100	6.82	0.01	0.01	0.08
359	304	310	1100	8	120	267.33	2.03	1.84	1.71
360	309	310	200	8	100	212.81	0.34	1.69	1.36
361	310	311	950	8	100	475.43	7.12	7.50	3.03
362	311	312	1200	8	100	832.24	25.37	21.14	5.31
364	312	313	1000	6	100	432.52	25.55	25.55	4.91
365	312	315	300	8	100	388.72	1.55	5.16	2.48
366	314	313	300	8	100	1369.73	15.96	53.20	8.74
367	315	314	1000	8	100	493.61	8.04	8.04	3.15
368	317	314	300	8	100	878.90	7.02	23.39	5.61
369	316	315	300	8	100	107.68	0.14	0.48	0.69
370	316	317	950	8	100	178.67	1.16	1.22	1.14
371	318	316	300	8	100	289.14	0.90	2.98	1.85

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE II) FILE: II.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
372	319	317	300	8	100	703.01	4.64	15.47	4.49
373	319	318	850	8	100	291.92	2.58	3.04	1.86
374	320	319	1000	8	110	997.27	24.78	24.78	6.37
375	321	320	1400	8	100	268.58	3.65	2.60	1.71
376	321	322	800	8	100	73.72	0.19	0.24	0.47
377	322	323	400	8	110	158.37	0.33	0.82	1.01
378	325	322	250	8	100	88.43	0.08	0.33	0.56
379	323	324	280	8	100	156.04	0.27	0.95	1.00
380	325	324	400	8	100	213.03	0.68	1.70	1.36
381	324	326	300	8	100	366.24	1.39	4.62	2.34
382	327	325	210	8	100	305.23	0.69	3.30	1.95
385	300	313	950	8	100	1527.48	61.84	65.10	9.75
386	326	311	650	8	100	362.47	2.95	4.54	2.31
392	391	361	50	8	100	564.44	0.52	10.30	3.60
394	374	391	1000	12	120	564.44	1.02	1.02	1.60
400	350	320	1250	8	100	310.97	4.27	3.42	1.98
401	356	321	1250	12	110	346.07	0.61	0.48	0.98
402	351	350	510	8	100	385.43	2.59	5.08	2.46
403	350	356	750	12	110	69.75	0.02	0.02	0.20
404	353	351	350	8	100	288.62	1.04	2.97	1.84
405	352	351	900	8	100	101.53	0.39	0.43	0.65
406	353	352	1400	8	100	106.24	0.65	0.47	0.68
407	354	353	1260	8	100	399.57	6.85	5.43	2.55
408	355	354	960	8	90	148.83	1.02	1.06	0.95
409	357	356	1050	8	110	281.04	2.49	2.37	1.79
410	358	357	200	8	110	180.15	0.21	1.04	1.15
411	364	357	1250	8	110	104.66	0.48	0.38	0.67
412	358	359	1650	8	110	24.54	0.04	0.03	0.16
413	359	327	800	8	100	307.56	2.68	3.35	1.96
414	360	358	750	8	100	204.69	1.18	1.57	1.31
415	361	359	800	8	100	290.35	2.41	3.01	1.85
416	361	360	250	8	90	333.70	1.18	4.73	2.13
417	360	362	1050	8	120	124.30	0.47	0.45	0.79
418	374	361	1800	6	90	62.08	1.54	0.85	0.70
419	362	363	750	8	120	118.80	0.31	0.41	0.76
420	365	364	500	8	120	39.81	0.03	0.05	0.25
421	363	364	900	8	120	69.56	0.14	0.15	0.44
422	363	365	1650	8	120	44.52	0.11	0.07	0.28
423	367	366	750	12	120	3.68	0.00	0.00	0.01
424	367	370	600	12	120	270.09	0.16	0.26	0.77
425	368	367	1350	12	120	277.50	0.37	0.27	0.79
426	368	369	500	12	120	374.08	0.24	0.48	1.06
427	369	370	1450	8	120	80.31	0.29	0.20	0.51
428	369	372	450	12	120	290.99	0.13	0.30	0.83
429	370	371	500	12	120	347.57	0.21	0.42	0.99
430	371	374	600	12	120	344.79	0.25	0.41	0.98
431	372	373	850	12	120	287.31	0.25	0.29	0.82
432	373	374	1250	12	120	284.52	0.36	0.29	0.81
700	719	238	200	16	130	1378.46	0.23	1.13	2.20
701	129	138	1200	12	130	301.84	0.33	0.28	0.86
801	284	801	700	12	130	812.89	1.21	1.73	2.31
802	801	355	3500	12	130	812.89	6.05	1.73	2.31

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE II) FILE: II.DAT

PIPE	FROM	TO	L(FT)	D(IN)	C	Q(GPM)	H1-H2(FT)	HL/1000L	V,FPS
803	355	368	3400	12	130	654.86	3.94	1.16	1.86

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE II) FILE: II.DAT

NODE NO	COORDINATES			GRADIENT RESULTS			BOUNDARY SPEC			
	X(FT)	Y(FT)	Z(FT)	HG(FT)	P(FT)	P(Psi)	Q(GPM)	TYPE		
1	0	0	375	495.75	120.75	52.27	9.62	BQ	9.62	0.00
2	0	0	341	495.76	154.76	67.00	9.62	BQ	9.62	0.00
3	0	0	272	495.76	223.76	96.87	9.62	BQ	9.62	0.00
4	0	0	270	495.77	225.77	97.74	4.76	BQ	4.76	0.00
5	0	0	285	495.76	210.76	91.24	26.18	BQ	26.18	0.00
6	0	0	275	495.78	220.78	95.58	4.76	BQ	4.76	0.00
7	0	0	272	502.54	230.54	99.80	7.33	BQ	7.33	0.00
8	0	0	270	505.66	235.66	102.02	26.18	BQ	26.18	0.00
9	0	0	270	505.66	235.66	102.02				0.00
10	0	0	270	505.66	235.66	102.02	4.67	BQ	4.67	0.00
11	0	0	290	489.07	199.07	86.18	4.76	BQ	4.76	0.00
12	0	0	275	487.43	212.43	91.96	4.76	BQ	4.76	0.00
13	0	0	295	486.88	191.88	83.06	4.76	BQ	4.76	0.00
14	0	0	295	485.44	190.44	82.44	6.69	BQ	6.69	0.00
15	0	0	277	485.44	208.44	90.23	4.76	BQ	4.76	0.00
30	0	0	270	482.67	212.67	92.07	6.69	BQ	6.69	0.00
31	0	0	310	479.92	169.92	73.56	4.76	BQ	4.76	0.00
32	0	0	340	479.80	139.80	60.52	4.76	BQ	4.76	0.00
33	0	0	335	479.77	144.77	62.67	4.76	BQ	4.76	0.00
34	0	0	315	479.32	164.32	71.13	9.62	BQ	9.62	0.00
35	0	0	315	478.80	163.80	70.91	6.69	BQ	6.69	0.00
36	0	0	310	478.49	168.49	72.94	6.69	BQ	6.69	0.00
37	0	0	306	477.74	171.74	74.35	4.76	BQ	4.76	0.00
38	0	0	325	477.34	152.34	65.95	9.25	BQ	9.25	0.00
39	0	0	328	477.23	149.23	64.60	18.33	BQ	18.33	0.00
40	0	0	335	476.94	141.94	61.44	5.54	BQ	5.54	0.00
41	0	0	410	476.83	66.83	28.93	8.31	BQ	8.31	0.00
42	0	0	410	476.80	66.80	28.92	15.71	BQ	15.71	0.00
43	0	0	370	476.77	106.77	46.22	8.31	BQ	8.31	0.00
44	0	0	385	476.77	91.77	39.73	8.18	BQ	8.18	0.00
45	0	0	375	476.77	101.77	44.06	8.18	BQ	8.18	0.00
46	0	0	300	476.76	176.76	76.52	8.18	BQ	8.18	0.00
47	0	0	300	476.76	176.76	76.52	8.18	BQ	8.18	0.00
48	0	0	310	476.76	166.76	72.19	8.18	BQ	8.18	0.00
49	0	0	295	476.76	181.76	78.68	15.71	BQ	15.71	0.00
50	0	0	275	476.76	201.76	87.34	23.56	BQ	23.56	0.00
51	0	0	335	476.94	141.94	61.45	5.54	BQ	5.54	0.00
52	0	0	270	476.89	206.89	89.56	13.85	BQ	13.85	0.00
62	0	0	350	476.78	126.78	54.88	15.71	BQ	15.71	0.00
70	0	0	315	477.58	162.58	70.38	6.86	BQ	6.86	0.00
71	0	0	315	477.41	162.41	70.31	6.86	BQ	6.86	0.00
72	0	0	320	477.33	157.33	68.11	2.77	BQ	2.77	0.00
73	0	0	325	477.23	152.23	65.90	2.77	BQ	2.77	0.00
74	0	0	330	477.08	147.08	63.67	4.09	BQ	4.09	0.00
75	0	0	300	477.86	177.86	77.00	13.85	BQ	13.85	0.00
76	0	0	300	477.88	177.88	77.01	8.31	BQ	8.31	0.00
77	0	0	330	477.84	147.84	64.00	13.85	BQ	13.85	0.00
78	0	0	330	478.86	148.86	64.44	27.71	BQ	27.71	0.00
79	0	0	285	477.97	192.97	83.54	6.86	BQ	6.86	0.00
80	0	0	275	477.95	202.95	87.86	6.86	BQ	6.86	0.00
81	0	0	265	477.94	212.94	92.18	6.86	BQ	6.86	0.00
82	0	0	265	477.92	212.92	92.17	6.86	BQ	6.86	0.00

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE II) FILE: II.DAT

NODE NO	COORDINATES			GRADIENT RESULTS			BOUNDARY SPEC			
	X(FT)	Y(FT)	Z(FT)	HG(FT)	P(FT)	P(Psi)	Q(GPM)	TYPE		
83	0	0	275	477.96	202.96	87.86	5.54	BQ	5.54	0.00
84	0	0	295	477.95	182.95	79.20	6.86	BQ	6.86	0.00
85	0	0	270	477.88	207.88	89.99	15.71	BQ	15.71	0.00
86	0	0	295	477.82	182.82	79.14	13.85	BQ	13.85	0.00
87	0	0	290	477.78	187.78	81.29	8.31	BQ	8.31	0.00
88	0	0	295	477.80	182.80	79.13	13.85	BQ	13.85	0.00
89	0	0	260	477.78	217.78	94.28	13.85	BQ	13.85	0.00
90	0	0	325	477.93	152.93	66.20	8.31	BQ	8.31	0.00
91	0	0	350	479.10	129.10	55.89	9.62	BQ	9.62	0.00
92	0	0	287	477.99	190.99	82.68	9.62	BQ	9.62	0.00
93	0	0	282	477.82	195.82	84.77	4.76	BQ	4.76	0.00
94	0	0	335	477.79	142.79	61.82	2.84	BQ	2.84	0.00
95	0	0	320	477.82	157.82	68.32	4.76	BQ	4.76	0.00
96	0	0	260	477.99	217.99	94.37	2.84	BQ	2.84	0.00
97	0	0	270	477.84	207.84	89.98	5.77	BQ	5.77	0.00
98	0	0	285	477.62	192.62	83.38	39.27	BQ	39.27	0.00
120	0	0	390	481.89	91.89	39.78	1.92	BQ	1.92	0.00
121	0	0	450	484.34	34.34	14.87	4.76	BQ	4.76	0.00
122	0	0	450	484.51	34.51	14.94	4.76	BQ	4.76	0.00
123	0	0	410	485.07	75.07	32.50	4.76	BQ	4.76	0.00
124	0	0	385	484.94	99.94	43.26	4.76	BQ	4.76	0.00
125	0	0	337	484.92	147.92	64.04				0.00
126	0	0	355	481.28	126.28	54.67	4.76	BQ	4.76	0.00
127	0	0	335	484.93	149.93	64.90	7.70	BQ	7.70	0.00
128	0	0	335	486.98	151.98	65.79	4.76	BQ	4.76	0.00
129	0	0	270	483.99	213.99	92.63	4.76	BQ	4.76	0.00
130	0	0	285	483.98	198.98	86.14	14.39	BQ	14.39	0.00
131	0	0	325	482.58	157.58	68.22	4.76	BQ	4.76	0.00
132	0	0	330	482.58	152.58	66.05	6.69	BQ	6.69	0.00
133	0	0	350	482.48	132.48	57.35	9.62	BQ	9.62	0.00
134	0	0	312	482.43	170.43	73.78	4.76	BQ	4.76	0.00
135	0	0	310	482.32	172.32	74.60	4.76	BQ	4.76	0.00
136	0	0	305	482.20	177.20	76.71	4.76	BQ	4.76	0.00
137	0	0	295	480.68	185.68	80.38	4.76	BQ	4.76	0.00
138	0	0	320	483.66	163.66	70.85	11.00	BQ	11.00	0.00
139	0	0	320	480.75	160.75	69.59	11.18	BQ	11.18	0.00
140	0	0	320	480.67	160.67	69.55	4.76	BQ	4.76	0.00
141	0	0	340	481.08	141.08	61.07	4.58	BQ	4.58	0.00
142	0	0	345	484.29	139.29	60.30	5.24	BQ	5.24	0.00
143	0	0	355	481.13	126.13	54.60	14.39	BQ	14.39	0.00
145	0	0	345	476.48	131.48	56.92	2.75	BQ	2.75	0.00
146	0	0	296	473.55	177.55	76.86	1.92	BQ	1.92	0.00
147	0	0	290	473.67	183.67	79.51	7.79	BQ	7.79	0.00
148	0	0	266	473.64	207.64	89.89	9.62	BQ	9.62	0.00
149	0	0	262	473.59	211.59	91.60	4.76	BQ	4.76	0.00
150	0	0	285	473.77	188.77	81.72	6.87	BQ	6.87	0.00
151	0	0	295	473.68	178.68	77.35	9.62	BQ	9.62	0.00
152	0	0	285	473.68	188.68	81.68	2.84	BQ	2.84	0.00
153	0	0	260	473.68	213.68	92.50	1.92	BQ	1.92	0.00
154	0	0	290	474.24	184.24	79.76	6.87	BQ	6.87	0.00
155	0	0	295	474.90	179.90	77.88	4.58	BQ	4.58	0.00
156	0	0	265	478.77	213.77	92.54	15.71	BQ	15.71	0.00

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE II) FILE: II.DAT

NODE NO	COORDINATES			GRADIENT RESULTS			BOUNDARY SPEC		
	X(FT)	Y(FT)	Z(FT)	HG(FT)	P(FT)	P(Psi)	Q(GPM)	TYPE	
157	0	0	325	480.76	155.76	67.43			0.00
158	0	0	275	474.57	199.57	86.39			0.00
170	0	0	259	449.09	190.09	82.29	2.84	BQ	0.00
171	0	0	265	462.11	197.11	85.33	3.85	BQ	0.00
172	0	0	305	462.10	157.10	68.01	5.77	BQ	0.00
173	0	0	265	472.94	207.94	90.02	4.76	BQ	0.00
174	0	0	280	474.98	194.98	84.41	3.85	BQ	0.00
175	0	0	270	475.30	205.30	88.87	4.76	BQ	0.00
176	0	0	275	475.61	200.61	86.84	4.76	BQ	0.00
177	0	0	285	475.61	190.61	82.51	4.76	BQ	0.00
178	0	0	305	475.61	170.61	73.86	39.27	BQ	0.00
179	0	0	280	476.33	196.33	84.99	4.76	BQ	0.00
180	0	0	280	476.03	196.03	84.86	4.76	BQ	0.00
181	0	0	290	476.03	186.03	80.53	2.84	BQ	0.00
182	0	0	280	477.81	197.81	85.63	1.92	BQ	0.00
183	0	0	290	477.81	187.81	81.30	4.76	BQ	0.00
184	0	0	305	477.82	172.82	74.81	4.76	BQ	0.00
185	0	0	305	477.85	172.85	74.83	4.76	BQ	0.00
186	0	0	325	477.87	152.87	66.18	7.70	BQ	0.00
187	0	0	325	477.90	152.90	66.19	5.77	BQ	0.00
190	0	0	365	447.07	82.07	35.53	2.84	BQ	0.00
191	0	0	275	444.17	169.17	73.23	4.76	BQ	0.00
192	0	0	265	444.61	179.61	77.75	4.76	BQ	0.00
193	0	0	285	445.23	160.23	69.36	5.77	BQ	0.00
194	0	0	295	445.07	150.07	64.97	4.76	BQ	0.00
195	0	0	295	444.78	149.78	64.84	3.85	BQ	0.00
196	0	0	285	444.31	159.31	68.97	4.76	BQ	0.00
197	0	0	265	446.28	181.28	78.48	5.77	BQ	0.00
198	0	0	280	468.35	188.35	81.54	9.62	BQ	0.00
199	0	0	265	468.35	203.35	88.03	4.76	BQ	0.00
200	0	0	280	468.35	188.35	81.54	9.62	BQ	0.00
201	0	0	360	468.35	108.35	46.91	1.92	BQ	0.00
202	0	0	280	444.78	164.78	71.33	4.58	BQ	0.00
203	0	0	275	444.79	169.79	73.50	27.67	BQ	0.00
204	0	0	249	445.05	196.05	84.87			0.00
205	0	0	280	444.79	164.79	71.34	2.84	BQ	0.00
206	0	0	280	444.78	164.78	71.33	1.92	BQ	0.00
207	0	0	230	444.85	214.85	93.01	14.39	BQ	0.00
208	0	0	215	444.82	229.82	99.49	4.76	BQ	0.00
209	0	0	200	444.81	244.81	105.98	10.47	BQ	0.00
230	0	0	377	481.28	104.28	45.14	2.93	BQ	0.00
231	0	0	380	481.28	101.28	43.84	2.99	BQ	0.00
232	0	0	320	481.01	161.01	69.70	2.93	BQ	0.00
233	0	0	325	481.05	156.05	67.55	9.21	BQ	0.00
234	0	0	380	480.91	100.91	43.68	9.21	BQ	0.00
235	0	0	360	481.01	121.01	52.39	9.21	BQ	0.00
236	0	0	350	475.41	125.41	54.29	3.05	BQ	0.00
237	0	0	270	473.75	203.75	88.21	4.93	BQ	0.00
238	0	0	400	472.31	72.31	31.30	4.98	BQ	0.00
239	0	0	325	469.18	144.18	62.41	4.98	BQ	0.00
240	0	0	325	459.63	134.63	58.28	3.05	BQ	0.00
241	0	0	370	464.41	94.41	40.87	3.05	BQ	0.00

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE II) FILE: II.DAT

NODE NO	COORDINATES			GRADIENT RESULTS			BOUNDARY SPEC				
	X(FT)	Y(FT)	Z(FT)	HG(FT)	P(FT)	P(PSI)	Q(GPM)	TYPE			
242	0	0	415	463.85	48.85	21.15	3.05	BQ		3.05	0.00
243	0	0	420	463.50	43.50	18.83	3.05	BQ		3.05	0.00
245	0	0	355	462.97	107.97	46.74	3.05	BQ		3.05	0.00
246	0	0	324	451.98	127.98	55.40	12.57	BQ		12.57	0.00
247	0	0	305	436.58	131.58	56.96	4.11	BQ	PRV Open	4.11	0.00
248	0	0	330	436.56	106.56	46.13	3.69	BQ		3.69	0.00
249	0	0	330	436.56	106.56	46.13	3.69	BQ		3.69	0.00
250	0	0	306	450.47	144.47	62.54	4.93	BQ	PRV Open	4.93	0.00
251	0	0	293	440.14	147.14	63.70	3.64	BQ	PRV Open	3.64	0.00
252	0	0	275	440.13	165.13	71.49	3.64	BQ		3.64	0.00
253	0	0	285	440.13	155.13	67.16	4.11	BQ		4.11	0.00
254	0	0	270	440.13	170.13	73.65	2.99	BQ		2.99	0.00
255	0	0	295	428.21	133.21	57.67	2.99	BQ		2.99	0.00
256	0	0	295	426.47	131.47	56.91	2.99	BQ		2.99	0.00
257	0	0	290	427.39	137.39	59.48	4.93	BQ		4.93	0.00
270	0	0	276	447.04	171.04	74.04	4.76	BQ		4.76	0.00
271	0	0	320	447.03	127.03	54.99	6.69	BQ		6.69	0.00
272	0	0	350	432.01	82.01	35.50	4.76	BQ		4.76	0.00
273	0	0	370	432.01	62.01	26.85	4.76	BQ		4.76	0.00
274	0	0	350	432.01	82.01	35.50	4.76	BQ		4.76	0.00
275	0	0	330	432.02	102.02	44.16	4.76	BQ		4.76	0.00
276	0	0	320	432.03	112.03	48.50	4.76	BQ		4.76	0.00
277	0	0	340	435.72	95.72	41.44	4.76	BQ		4.76	0.00
278	0	0	315	441.71	126.71	54.85	3.85	BQ		3.85	0.00
279	0	0	270	447.05	177.05	76.64	23.55	BQ		23.55	0.00
280	0	0	280	443.43	163.43	70.75	5.50	BQ		5.50	0.00
282	0	0	410	442.52	32.52	14.08	4.76	BQ		4.76	0.00
283	0	0	415	441.54	26.54	11.49	9.62	BQ		9.62	0.00
284	0	0	400	439.62	39.62	17.15	4.67	BQ		4.67	0.00
285	0	0	400	442.51	42.51	18.40	15.71	BQ		15.71	0.00
300	0	0	285	426.04	141.04	61.06	45.81	BQ	PRV Open	45.81	0.00
301	0	0	285	425.66	140.66	60.89	4.58	BQ		4.58	0.00
302	0	0	275	425.01	150.01	64.94	4.71	BQ		4.71	0.00
303	0	0	280	425.00	145.00	62.77	4.71	BQ		4.71	0.00
304	0	0	264	424.27	160.27	69.38	3.91	BQ		3.91	0.00
305	0	0	265	424.26	159.26	68.95	4.71	BQ		4.71	0.00
306	0	0	280	424.26	144.26	62.45	5.61	BQ		5.61	0.00
307	0	0	260	424.25	164.25	71.10	6.96	BQ		6.96	0.00
308	0	0	255	424.24	169.24	73.26	6.82	BQ		6.82	0.00
309	0	0	280	422.58	142.58	61.72	5.66	BQ		5.66	0.00
310	0	0	280	422.24	142.24	61.58	4.71	BQ		4.71	0.00
311	0	0	300	415.12	115.12	49.84	5.66	BQ		5.66	0.00
312	0	0	370	389.75	19.75	8.55	11.00	BQ		11.00	0.00
313	0	0	318	364.20	46.20	20.00	3329.74	BH			
314	0	0	315	380.16	65.16	28.21	2.78	BQ		2.78	0.00
315	0	0	368	388.20	20.20	8.74	2.78	BQ		2.78	0.00
316	0	0	340	388.34	48.34	20.93	2.78	BQ		2.78	0.00
317	0	0	300	387.18	87.18	37.74	2.78	BQ		2.78	0.00
318	0	0	310	389.24	79.24	34.30	2.78	BQ		2.78	0.00
319	0	0	287	391.82	104.82	45.38	2.33	BQ		2.33	0.00
320	0	0	271	416.59	145.59	63.03	3.28	BQ		3.28	0.00
321	0	0	262	420.24	158.24	68.50	3.77	BQ		3.77	0.00

JOB : SOUTHBOROUGH, MA (FUTURE MAX. DAY DEMAND, PHASE II) FILE: II.DAT

NODE NO	COORDINATES			GRADIENT RESULTS			BOUNDARY SPEC		Q(GPM)	TYPE
	X(FT)	Y(FT)	Z(FT)	HG(FT)	P(FT)	P(Psi)				
322	0	0	255	420.05	165.05	71.45	3.77	BQ	3.77	0.00
323	0	0	265	419.72	154.72	66.98	2.33	BQ	2.33	0.00
324	0	0	265	419.45	154.45	66.86	2.83	BQ	2.83	0.00
325	0	0	255	420.13	165.13	71.49	3.77	BQ	3.77	0.00
326	0	0	265	418.07	153.07	66.26	3.77	BQ	3.77	0.00
327	0	0	255	420.83	165.83	71.79	2.33	BQ	2.33	0.00
350	0	0	305	420.86	115.86	50.16	4.71	BQ	4.71	0.00
351	0	0	315	423.46	108.46	46.95	4.71	BQ	4.71	0.00
352	0	0	300	423.84	123.84	53.61	4.71	BQ	4.71	0.00
353	0	0	320	424.50	104.50	45.24	4.71	BQ	4.71	0.00
354	0	0	320	431.34	111.34	48.20				0.00
355	0	0	345	432.36	87.36	37.82	9.20	BQ	9.20	0.00
356	0	0	285	420.85	135.85	58.81	4.71	BQ	4.71	0.00
357	0	0	295	423.34	128.34	55.56	3.77	BQ	3.77	0.00
358	0	0	297	423.55	126.55	54.78				0.00
359	0	0	260	423.50	163.50	70.78	7.33	BQ	7.33	0.00
360	0	0	270	424.73	154.73	66.98	4.71	BQ	4.71	0.00
361	0	0	250	425.91	175.91	76.15	2.47	BQ	2.47	0.00
362	0	0	250	424.26	174.26	75.44	5.50	BQ	5.50	0.00
363	0	0	280	423.95	143.95	62.32	4.71	BQ	4.71	0.00
364	0	0	300	423.81	123.81	53.60	4.71	BQ	4.71	0.00
365	0	0	295	423.84	128.84	55.78	4.71	BQ	4.71	0.00
366	0	0	320	428.05	108.05	46.78	3.68	BQ	3.68	0.00
367	0	0	285	428.05	143.05	61.93	3.73	BQ	3.73	0.00
368	0	0	320	428.42	108.42	46.94	3.28	BQ	3.28	0.00
369	0	0	285	428.19	143.19	61.99	2.78	BQ	2.78	0.00
370	0	0	250	427.90	177.90	77.01	2.83	BQ	2.83	0.00
371	0	0	245	427.69	182.69	79.09	2.78	BQ	2.78	0.00
372	0	0	260	428.05	168.05	72.75	3.68	BQ	3.68	0.00
373	0	0	240	427.80	187.80	81.30	2.78	BQ	2.78	0.00
374	0	0	245	427.44	182.44	78.98	2.78	BQ	2.78	0.00
391	0	0	250	426.42	176.42	76.37				0.00
500	0	0	290	505.67	215.67	93.36	-1100.00	BQ	-1100.00	0.00
501	0	0	260	486.84	226.84	98.20	-1000.00	BQ	-1000.00	0.00
600	0	0	451	479.83	28.83	12.48	-531.25	BEL		
601	0	0	467	485.22	18.22	7.89	-584.41	BEL		
602	0	0	418	442.79	24.79	10.73	-332.04	BEL		
719	0	0	450	472.53	22.53	9.76	-1378.46	BEL		
801	0	0	0	438.41	438.41	189.79				0.00

TOTAL SYSTEM Q = 4926.16 Total BQ (pos) = 1596.43 Total BQ (neg) = -2100.00

0.00 0.00

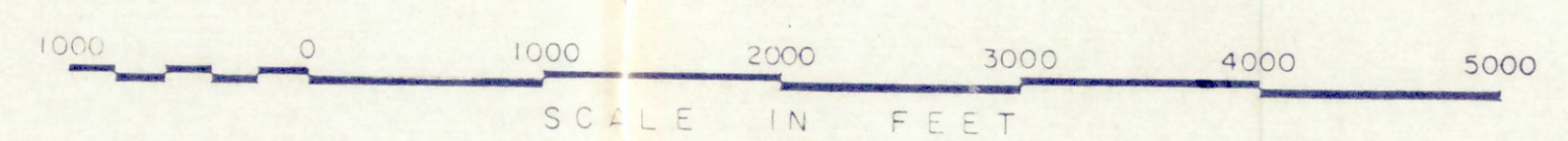
SYSTEM MAP



LEGEND

- STORAGE TANK
- PUMPING STATION
- ◐ PRV
- EXISTING PIPELINE
- PHASE I
- PHASE II

WATER SYSTEM SOUTHBOROUGH, MASS.



H₂O ENGINEERING CONSULTING ASSOC., INC.
BURLINGTON, MASS.

NODE MAP



60

STORAGE TANK

50

PUMPING STATION

2

PIPELINE NUMBER

11

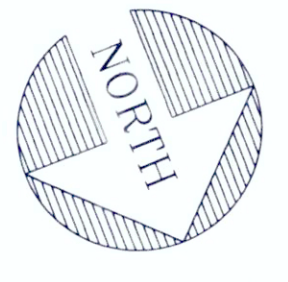
SCHEMATIC OF NODES

4

AND PIPELINE

2

AND PIPELINE



DEPARTMENT OF PUBLIC WORKS

WATER DIVISION

SOUTHBOROUGH - MASSACHUSETTS

WATER DISTRIBUTION SYSTEM

STUDY

SCHEMATIC DIAGRAM

H₂O ENGINEERING CONSULTING ASSOC. INC.

223 MIDDLESEX TURNPIKE

BURLINGTON, MA 01803

DESIGNED BY

DRAWN BY

CHECKED BY

PROJECT NO.

SCALE

DATE

OCT 1994