dallas water utilities
city of dallas
CWWCSA

Meeting Agenda

Meeting Date: 2-13-04; 9:00AM

Meeting Location: Addison

Attendees:
Randy Stalnaker, DWU
Mike Murphy, Addison
Wayne Hunter, MWH

comp. W.W. collection system assessment
Hydroworks model

Purpose of Meeting

Introduction to DWU CWWCSA tasks associated with Addison and to facilitate coordination between Addison and MWH in gathering information

Meeting Agenda

Agenda Item	Time
1. Introductions	5 Min
2. CWWCSA Overview-Stalnaker, Hunter 2a. Primary purpose of project, system interceptor analysis 2b. Interface with Addison ▫ Service area limits ▫ Location of interceptors relating to system ▫ Analysis of combined unmetered system flows ▫ System issues with I/I, oil&grease, quality parameters ▫ Review of standard contracts for service	10 Min
3. Coordination of information-All 3a. Service area limits 3b. Wastewater pipeline mapping 3c. Meters location 3d. Support for basis of flow determination 3e. System issues 3f. Prior studies 3g. Additional points of entry since Feb 1984 3h. Customer provide number/classing of accounts 3i. Customer provided winter month water data 3j. Customer provided wastewater master plan updates 3k. Reciprocal agreements for service 3l. Outflows reporting	40 Min
4. Identification of action items	
5. Addison questions and issues	

ammonia

6. Other issues	

TOWN OF
ADDISON

REPORT ON

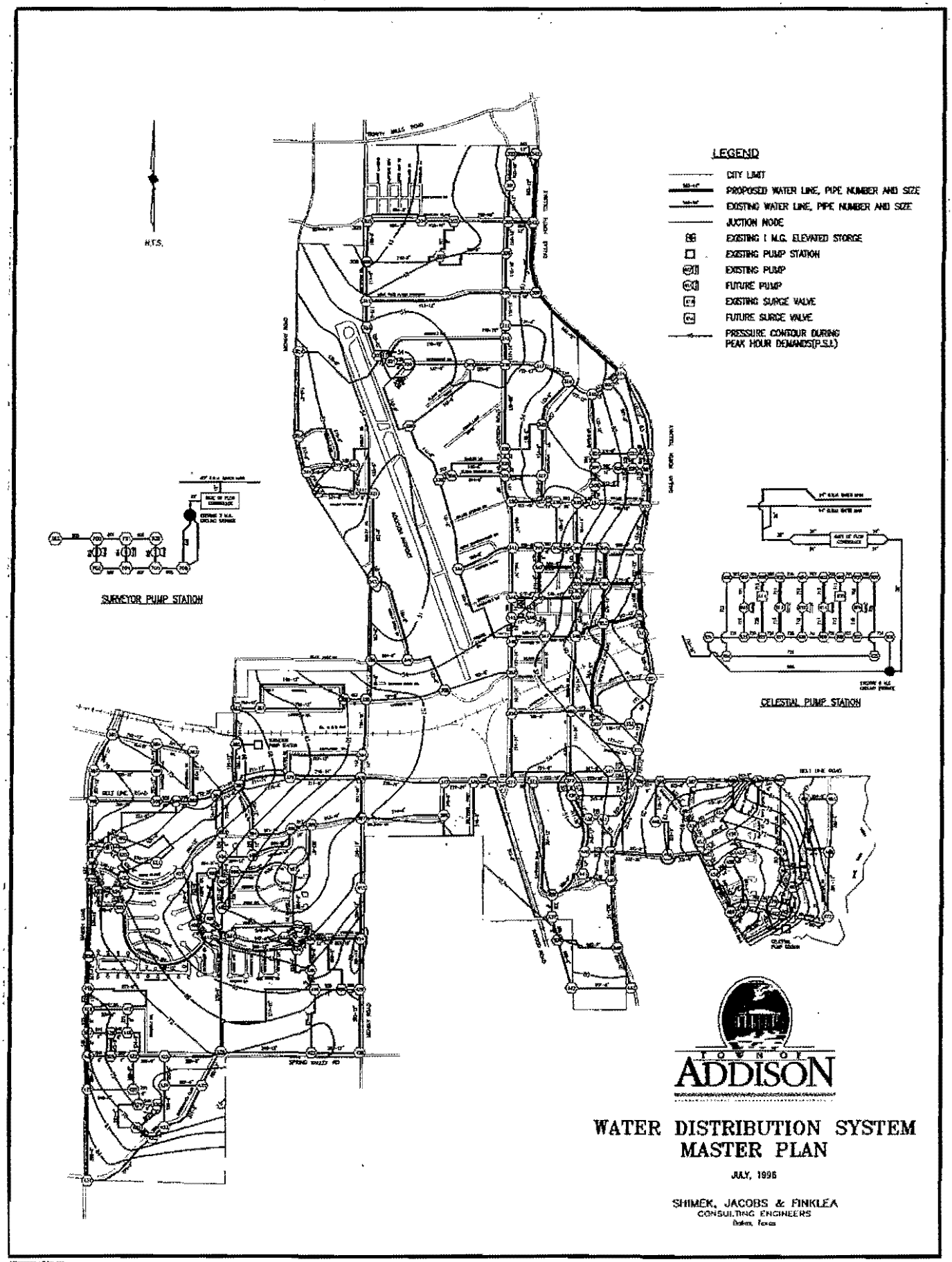
1996 WATER DISTRIBUTION SYSTEM

FINAL DRAFT

Prepared By

SHIMEK, JACOBS & FINKLEA
CONSULTING ENGINEERS
DALLAS, TEXAS

July, 1996


N.T.S.
LEGEND
CITY LIMIT
PROPOSED WATER LINE, PIPE NUMBER AND SIZE
EXISTING WATER LINE, PIPE NUMBER AND SIZE
JUCTION NODE
EXISTING 1 M.G. ELEVATED STORGE
EXISTING PUMP STATION
EXISTING PUMP
FUTURE PUMP
EXISTING SURGE VALVE
FUTURE SURGE VALVE
PRESSURE CONTOUR DURING PEAK HOUR DEMANDS(P.S.I.)
SURVEYOR PUMP STATION
CELESTIAL PUMP STATION
TOWN OF ADDISON
WATER DISTRIBUTION SYSTEM MASTER PLAN
JULY, 1996
SHIMEK, JACOBS & FINKLEA
CONSULTING ENGINEERS

SHIMEK, JACOBS & FINKLEA
CONSULTING ENGINEERS

8333 Douglas Avenue, #820 Dallas, Texas 75225-5816 Phone: (214) 361-7900 Fax: (214) 361-0204

ROSS L. JACOBS, P.E.
RONALD V. CONWAY, P.E.
JOHN W. BIRKHOFF, P.E.
JOE R. CARTER, P.E.
GARY C. HENDRICKS, P.E.

C. L. SHIMEK, P.E.
I. C. FINKLEA, P.E.

July 18, 1996

Mr. John Baumgartner, P.E.
Director of Public Works
Town of Addison
Post Office Box 144
Addison, Texas 75001-0144

Re: Water Distribution Analysis Report

Dear Mr. Baumgartner:

This report presents the results of our study of the Addison Water Distribution System and includes an improvement program. The analysis is based on land use assumptions and water demands at full development as now envisioned.

The system is essentially built-out and our task was to identify any weaknesses in the system. Overall the waterlines can supply the peak hour demands. The pump stations have pumps that make it difficult to meet varying demands in the system and modifications are recommended. Ground storage is adequate, but a deficiency is present in elevated storage to meet peak hour demands This deficiency can be overcome by pumpage, ground storage and emergency generation.

In addition to improvements to Celestial Pump Station to meet varying demands and to makeup elevated storage, it is recommended that the Surveyor Pump Station be shutdown or the pumps replaced to work in conjunction with the pumps at the Celestial Station. The Celestial Station has a dual supply from Dallas Water Utilities. This dual supply is fed from the Dallas Water Utilities Elm Fork and East Side Water Treatment Plants.

We are available to discuss any questions you may have with our findings or recommendations.

Sincerely,

John W. Birkhoff, P.E.

TOWN OF ADDISON, TEXAS
1996 WATER DISTRIBUTION SYSTEM REPORT

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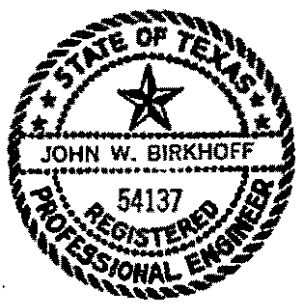


John W. Birkhoff
Texas P.E. No. 54137
Date: June 28, 1996

John W Birkhoff
6/28/96

1996 WATER DISTRIBUTION SYSTEM REPORT

GENERAL

This analysis and report covers the analysis of the existing water distribution system for the Town of Addison. Included is an improvement plan for the system and an overall master plan map. The water distribution system is near buildout conditions and this study is to confirm the adequacy of that system and to size future improvements.

DEFINITIONS

The design of the water distribution system involves various rates of water use which are, generally, referred to as water demand. The four most significant rates and a definition of each are:

1) Average Daily Demand: This rate is generally expressed in gallons per capita per day (gpcd) or in million gallons per day (MGD). When referred to as gallons per capita per day, it represents the average daily amount used per person during the entire year. When referred to as million gallons per day, it represents the average daily amount used by the entire City over a period of one year.

2) Maximum Daily Demand: This is the total amount of water used during the day of heaviest consumption in any given year and the minimum rate which the high service pumps must be capable of pumping. Water must be supplied to the pumps at this rate.

3) Maximum Hourly Demand: This is the rate at which water is drawn from the entire system during the hour of maximum consumption on the day of maximum demand. This rate is generally of a short duration and is most economically provided for by the use of elevated storage in addition to water supplied to the system by pumps. The distribution system, including storage and pumping capacity, must be able to satisfy this demand.

4) Minimum Hourly Demand: This is the rate at which water is drawn from the distribution system during the hour of minimum demand on the day of maximum demand. This demand rate is used in the water distribution analysis to determine the adequacies of the system to replenish elevated storage.

PLANNING AREA

The planning area for this report includes the entire area within the current Town limits and includes approximately 4-1/2 square miles. The existing Addison Airport remains as an airport in this analysis.

The following is a breakdown of land uses utilized in this report:

- High Density Single Family ..... 1,012 Lots
- Low Density Single Family ..... 89 Acres
- Apartments ..... 253.8 Acres
- Quorum Circle and Northern Undeveloped Areas ..... 274.6 Acres
- Tollway Corridor ..... 364.9 Acres
- Midway Road Office/Commercial ..... 81.5 Acres
- Commercial Retail ..... 456.5 Acres
- Industrial ..... 566 Acres
- School/Recreation Centers ..... 126 Acres

PROJECTED WATER USE

Hourly data from the summer of 1995 for pumpage and movement in elevated storage was utilized to determine when the maximum hourly demand occurred and the peaking factor between the maximum daily demand and the maximum hourly demand. The graphical representation for the peak day in 1995 is shown on Figures 1, 2 and 3. In addition, billing records were reviewed for August, 1995 for domestic and irrigation usage. Representative usage were formulated for various land uses and applied globally to that land use. Based on studies completed from records of 1980, the representative usage were adjusted to simulate a summer demand similar to the summer of 1980. The year 1980 was selected because demand far exceeded any that had been experienced in the past, largely because of the extremely hot summer weather. In fact, there were approximately 60 consecutive days in which the temperature equaled or exceeded 100° F.

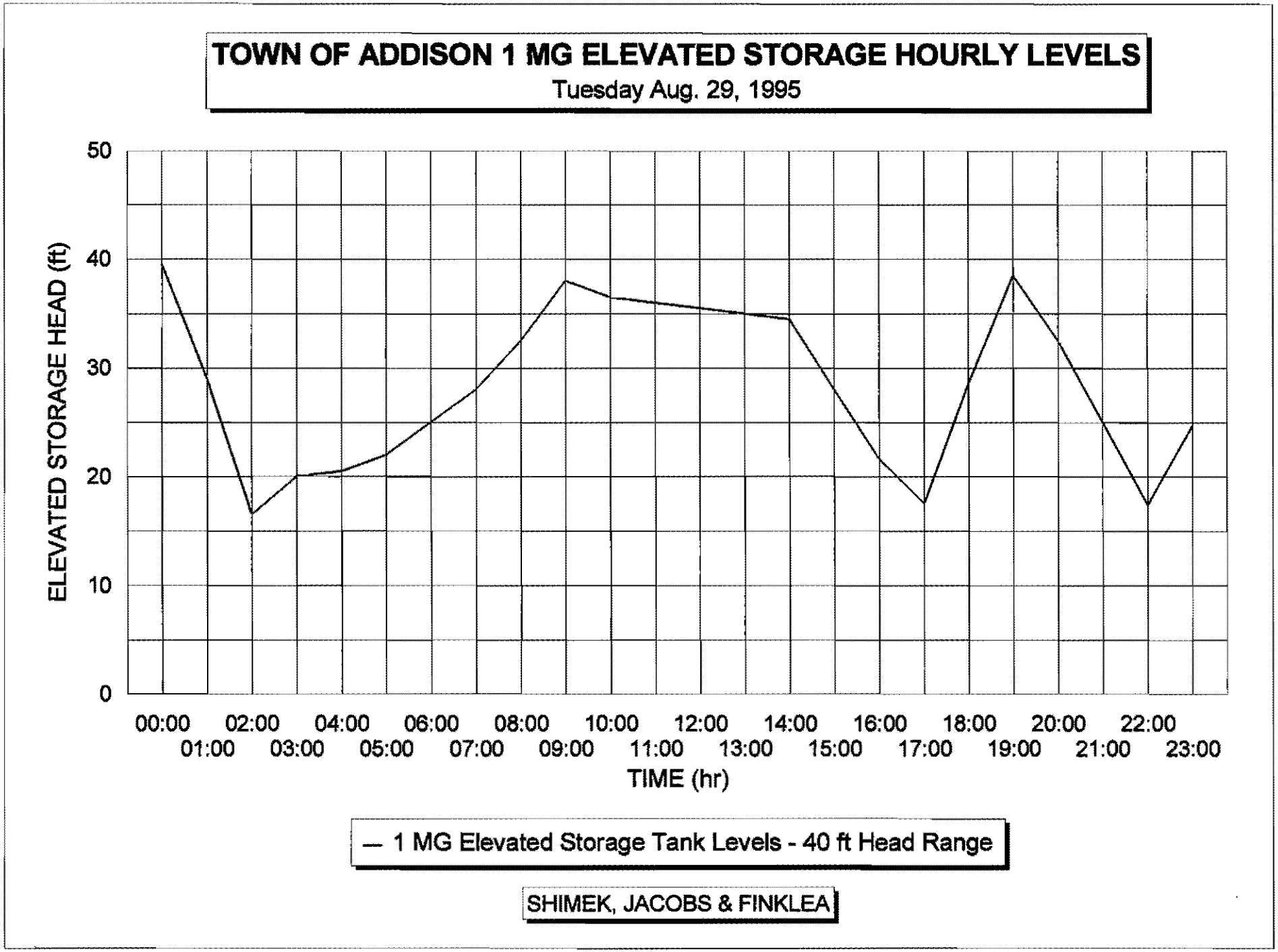

TOWN OF ADDISON 1 MG ELEVATED STORAGE HOURLY LEVELS
Tuesday Aug. 29, 1995
ELEVATED STORAGE HEAD (ft)
50
40
30
20
10
0
00:00
01:00
02:00
03:00
04:00
05:00
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
TIME (hr)
— 1 MG Elevated Storage Tank Levels - 40 ft Head Range
SHIMEK, JACOBS & FINKLEA

Figure 2

TABLE 2: DEMAND RESULTS : August 28 - August 29, 1995

DATE	Time (hr)	Total Hourly Pumpage (GAL)	Volume Into Elev. Storage (GAL)	Volume out of Elev. Storage (GAL)	Difference Between Vol. Into Elev. Stor. & Out of Elev Storage (GAL) ( ) Represents Refill Deficiency	Net System Demand (GAL)
Sunday, Aug. 27 1995	00:00	0.0	0.0	0.0		0.0
	01:00	0.0	(144,452.5)	0.0		(144,452.5)
	02:00	470,833.3	(80,251.5)	0.0		390,581.8
	03:00	462,500.0	0.0	32,101.0		494,601.0
	04:00	458,333.3	0.0	16,050.0		474,383.3
	05:00	441,666.7	0.0	38,520.7		480,187.4
	06:00	437,500.0	(70,621.2)	0.0		366,878.8
	07:00	429,166.7	(160,503.0)	0.0		268,663.7
	08:00	416,666.7	0.0	64,201.0		480,867.7
	09:00	0.0	0.0	102,722.2		102,722.2
	10:00	0.0	(54,571.7)	0.0		(54,571.7)
	11:00	0.0	(32,100.0)	0.0		(32,100.0)
	12:00	0.0	(22,470.7)	0.0		(22,470.7)
	13:00	0.0	(25,680.3)	0.0		(25,680.3)
	14:00	0.0	0.0	176,553.0		176,553.0
	15:00	475,000.0	0.0	221,493.9		696,493.9
	16:00	450,000.0	0.0	179,763.1		629,763.1
	17:00	425,000.0	(321,005.5)	0.0		103,994.5
	18:00	0.0	(240,754.5)	0.0		(240,754.5)
	19:00	0.0	(109,141.4)	0.0		(109,141.4)
	20:00	470,833.3	0.0	333,845.4		804,678.7
	21:00	458,333.3	0.0	224,704.0		683,037.3
	22:00	437,500.0	0.0	115,562.0		553,062.0
	23:00	437,500.0	(356,316.0)	16,050.0		81,184.0
Total		6,270,833.3	(1,617,868.3)	1,521,566.3	96,302.0	6,158,481.3
Monday, Aug. 28, 1995	00:00	429,166.7	(176,553.0)	0.0		252,613.7
	01:00	416,666.7	(144,452.5)	0.0		272,214.2
	02:00	0.0	0.0	433,357.5		433,357.5
	03:00	458,333.3	0.0	240,754.0		699,087.3
	04:00	458,333.3	(112,352.0)	0.0		345,981.3
	05:00	450,000.0	(22,470.0)	0.0		427,530.0
	06:00	437,500.0	(105,932.0)	0.0		331,568.0
	07:00	429,166.7	(128,402.0)	0.0		300,764.7
	08:00	416,666.7	(208,654.0)	0.0		208,012.7
	09:00	654,166.7	(89,881.3)	0.0		564,285.4
	10:00	229,166.7	0.0	218,283.8		447,450.5
	11:00	225,000.0	(3,210.1)	0.0		221,789.9
	12:00	220,833.3	(12,840.4)	0.0		207,992.9
	13:00	216,666.7	0.0	0.0		216,666.7
	14:00	470,833.3	0.0	304,955.5		775,788.8
	15:00	437,500.0	0.0	163,712.5		601,212.5
	16:00	429,166.7	(324,215.5)	0.0		104,951.2
	17:00	425,000.0	(353,106.0)	0.0		71,894.0
	18:00	0.0	0.0	134,822.2		134,822.2
	19:00	0.0	0.0	202,233.3		202,233.3
	20:00	0.0	0.0	176,553.5		176,553.5
	21:00	466,666.7	0.0	166,922.5		633,589.2
	22:00	441,666.7	(327,425.5)	0.0		114,241.2
	23:00	437,500.0	(192,603.5)	0.0		244,896.5
Total		6,150,000.0	(2,202,097.8)	2,041,594.8	160,503.0	7,989,497.0
Tuesday Aug. 29, 1995	00:00	420,833.3	(192,603.0)	0.0		228,230.3
	01:00	0.0	0.0	337,056.0		337,056.0
	02:00	479,166.7	0.0	401,063.5		880,230.2
	03:00	479,166.7	(112,158.5)	0.0		367,008.2
	04:00	475,000.0	(16,050.5)	0.0		458,949.5
	05:00	466,666.7	(48,150.5)	0.0		418,516.2
	06:00	456,333.3	(96,302.0)	0.0		362,031.3
	07:00	450,000.0	(96,302.0)	0.0		353,698.0
	08:00	670,833.3	(144,452.5)	0.0		526,380.8
	09:00	650,000.0	(176,552.5)	0.0		473,447.5
	10:00	225,000.0	0.0	48,150.5		273,150.5
	11:00	220,833.3	0.0	16,050.5		236,883.8
	12:00	216,666.7	0.0	16,050.0		232,716.7
	13:00	208,333.3	0.0	16,050.0		224,383.3
	14:00	208,333.3	0.0	16,050.5		224,383.8
	15:00	0.0	0.0	208,653.5		208,653.5
	16:00	0.0	0.0	205,444.0		205,444.0
	17:00	470,833.3	0.0	131,612.0		602,445.3
	18:00	458,333.3	(353,106.0)	0.0		105,227.3
	19:00	437,500.0	(321,005.5)	0.0		116,494.5
	20:00	416,666.7	0.0	192,603.0		609,269.7
	21:00	0.0	0.0	240,754.5		240,754.5
	22:00	0.0	0.0	243,964.0		243,964.0
	23:00	458,333.3	(234,334.0)	0.0		223,999.3
Total		7,870,833.3	(1,791,017.0)	2,073,502.0	(282,485.0)	8,153,318.3

Figure 3

The following demands are utilized in this report:

Land Use	Maximum Day	Maximum Hour
High Density Single Family (3.2 persons/unit)	350 gpcd	700 gpcd
Low Density Single Family (1.8 homes/acre)	500 gpcd	1,000 gpcd
Apartments	3,000 gpad	6,000 gpad
Quorum Circle & Northern Undeveloped Areas	5,000 gpad	10,000 gpad
Tollway Corridor	7,000 gpad	10,500 gpad
Midway Road Office/Commercial	3,000 gpad	4,500 gpad
Commercial Retail	3,000 gpad	4,500 gpad
Industrial	3,000 gpad	4,500 gpad
Schools/Recreation Centers	3,000 gpad	4,500 gpad

gpcd = gallons per capital per day
gpad = gallons per acre per day

The calculated demands for various land uses results in the following overall system demands:

Land Use	Maximum Day (MGD)	Maximum Hour (MGD)
High Density Single Family (3.2 persons/unit)	1.13	2.27
Low Density Single Family (1.8 homes/acre)	0.26	0.51
Apartments	0.76	1.52
Quorum Circle & Northern Undeveloped Areas	1.37	2.75
Tollway Corridor	2.55	3.83
Midway Road Office/Commercial	0.24	0.37
Commercial Retail	1.37	2.05
Industrial	1.70	2.55
Schools/Recreation Centers	0.36	0.57
	9.74 (mgd)	**16.42 (mgd)**

WATER SUPPLY

All treated water consumed in Addison is supplied by Dallas Water Utilities (DWU) at two delivery points within the Addison system. DWU's overall supply scheme includes an 84-inch transmission line between their Elm Fork Water Treatment Plant near I.H.-35 and Sandy Lake Road, and their East Side Water Plant near Forney, Texas. This 84-inch line feeds their Jim Miller and Beltwood Pump Stations. The Beltwood Pump Station is also feed through a 60-inch transmission line from the Elm Fork Plant. A schematic of this flow scheme is shown in Figure 4.

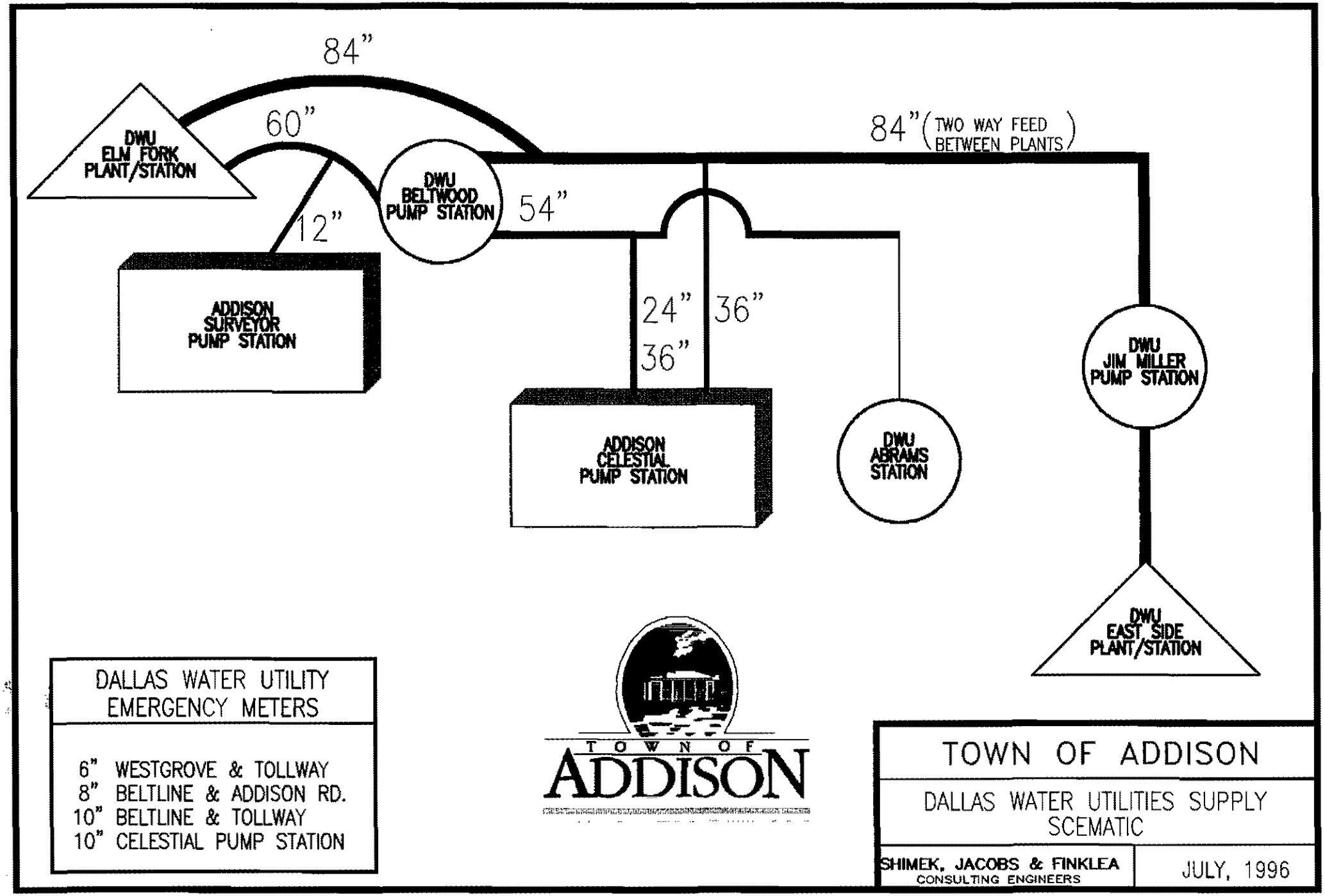
The Town's Surveyor Pump Station feeds from the 60-inch transmission line through a 12-inch line and a meter rated at 4 MGD. The 60-inch line is a one-way feed from the DWU Elm Fork Plant to the Beltwood Pump Station.

The Town's Celestial Pump Station has a dual feed from DWU. The primary feed is from the 84-inch transmission line through a 36-inch line and a meter rated at 20 MGD. The 84-inch line is a two way line so it can be feed from either the DWU Elm Fork or East Side Water Treatment Plant. A second feed to Celestial is from the DWU transmission line between their Beltwood Pump Station and their Abrams Road Pump Station. This transmission line is feed from the Elm Fork Plant. DWU has secondary power sources at the treatment plants and at the Beltwood and Jim Miller Pump Stations. This dual feed being feed from two water treatment plants appear to be highly reliable.

Further, the Town has four emergency meter locations from DWU. These meters are for emergency use and most likely can provide adequate pressure for a majority of the Town. Areas in far north Addison may experience poor pressure if allowed to float on DWU pressure. These meters are located at the following locations:

Location	Emergency Meter Connection Size (Inches)
Westgrove and Tollway	6"
Beltline Road and Addison Road	8"
Beltline Road and Tollway	10"
Celestial Pump Station	10"

Figure 4


84"
60"
84" (TWO WAY FEED BETWEEN PLANTS)
DWU ELM FORK PLANT/STATION
DWU BELTWOOD PUMP STATION
54"
12"
ADDISON SURVEYOR PUMP STATION
24"
36"
36"
ADDISON CELESTIAL PUMP STATION
DWU ABRAMS STATION
DWU JIM MILLER PUMP STATION
DWU EAST SIDE PLANT/STATION
DALLAS WATER UTILITY EMERGENCY METERS
6" WESTGROVE & TOLLWAY
8" BELTLINE & ADDISON RD.
10" BELTLINE & TOLLWAY
10" CELESTIAL PUMP STATION
TOWN OF ADDISON
TOWN OF ADDISON
DALLAS WATER UTILITIES SUPPLY SCEMATIC
SHIMEK, JACOBS & FINKLEA CONSULTING ENGINEERS
JULY, 1996

Dallas Water Utilities has projected the following delivery rate to the Town:

Year	Maximum Delivery Rate (MGD)
2000	7.63
2010	8.98
2020	9.87
2030	10.48
2040	10.89
2050	11.16

The delivery rate required for this system is the maximum daily demand rate which is 9.75 MGD at Buildout.

WATER DISTRIBUTION SYSTEM

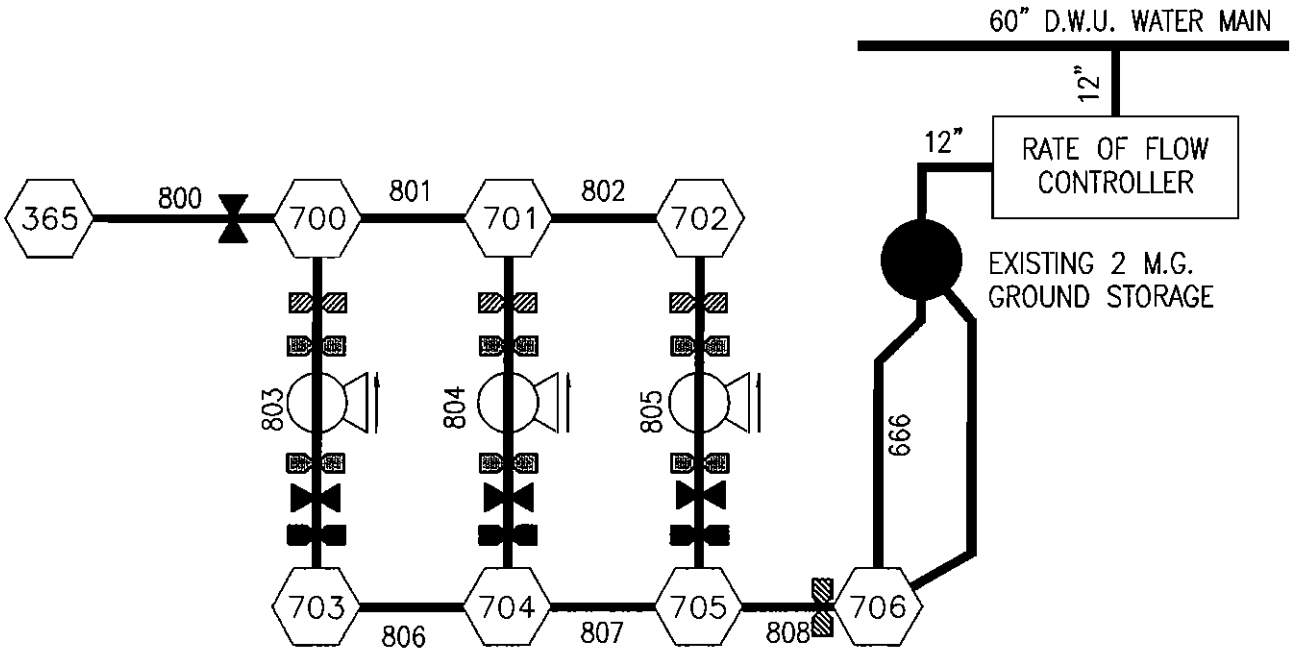
The analysis and design of the water distribution system has been based on the total water demand anticipated, as well as, the geographical distribution of this demand. The existing line sizes were reviewed and the proposed lines sized to deliver the maximum hourly demand in the system of 16.42 MGD and to refill the existing elevated storage tank during the minimum hourly demand. The analysis was based on the ultimate development of Addison. All existing lines are adequate to convey the maximum hourly demands.

1) **Surveyor Pump Station and Ground Storage Reservoir**

This facility is located on Surveyor Drive just north of Belt Line Road. Three high service pumps are located at this site along with one 2 million gallon prestressed concrete ground storage reservoir. Each pump is identical and have a rated capacity of approximately 5.5 MGD. This station is schematically shown in Figure 5. This station has a single supply from Dallas Water Utilities Transmission Line between their Elm Fork Treatment Plant and their Beltwood Station.

TOWN OF ADDISON

SCHEMATIC LAYOUT



LEGEND

- 90° BEND
- COUPLING
- PUMP CONTROL VALVE
- TEE (BRANCH & RUN)
- EXISTING PUMP

Figure 5

TOWN OF ADDISON	
SURVEYOR PUMP STATION	
SHIMEK, JACOBS & FINKLEA CONSULTING ENGINEERS	JULY, 1996

This station was turned off in the analysis, since the Celestial Station can meet the system demands and has a delivery rate from Dallas Water Utilities which better matches the pumps rated capacities.

It is our understanding that this station is operated only to turn over the water stored in the ground storage reservoir. To operate this station the Celestial Station must be off-line.

1 - 3 MGD
1 - 4.5 - 5 MGD

2) **Celestial Pump Station and Ground Storage Reservoir**

This facility is located in southeast Addison off of Celestial Drive. Currently three 9.5 MGD high service pumps are located at this site with two slots for future pumps. In addition, one 6 million gallon underground concrete ground storage reservoir is located at this site. The meter for the delivery from Dallas Water Utilities is sized for a delivery rate of 20 MGD. This station is schematically shown in Figure 6. This station has a dual supply from Dallas Water Utilities (DWU). One is from the DWU two-way 84-inch transmission line between their Elm Fork and East Side Water Treatment Plants. The second feed is from a transmission line, being fed from their Elm Fork Plant, between their Beltwood and Abrams Pump Stations.

This type of supply from DWU diminishes the importance of a backup at the Town's Surveyor Pump Station.

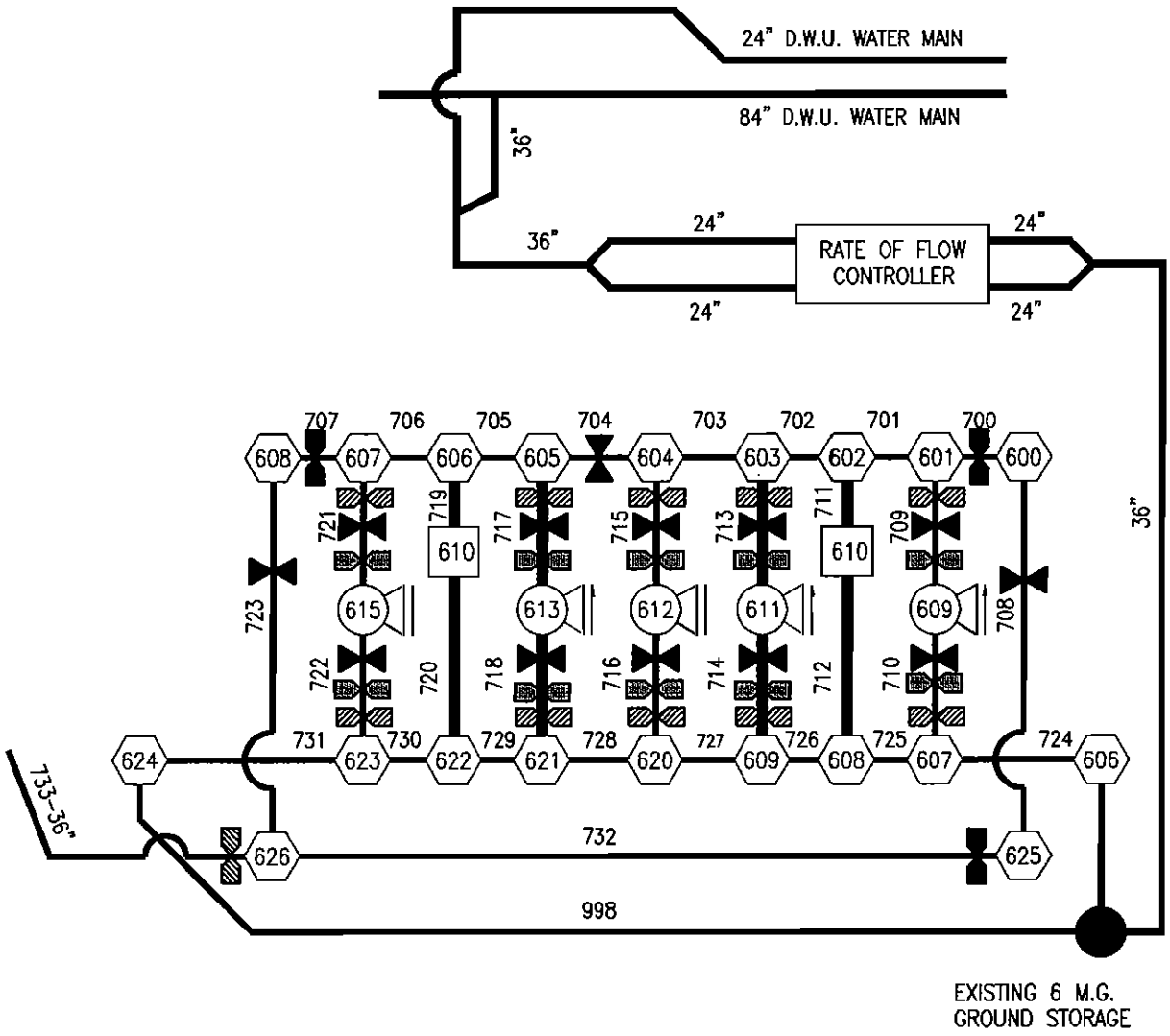
The supply at this site should be firmly secured at or above the Town's projected buildout maximum daily demand rate of 9.75 MGD.

The computer analysis and sizing of facilities to meet the maximum hourly demand was based on the Celestial Pump Station meeting the demands. The Surveyor Station was not operating in the model.

Further, the model was unable to effectively utilize the two pump stations running together. This occurrence was verified by actual operation of the system.

TOWN OF ADDISON

SCHEMATIC LAYOUT



LEGEND

- 90° BEND
- COUPLING
- PUMP CONTROL VALVE
- TEE (BRANCH & RUN)
- EXISTING PUMP
- FUTURE PUMP
- EXISTING SURGE VALVE
- FUTURE SURGE VALVE

Figure 6

TOWN OF ADDISON	
CELESTIAL PUMP STATION	
SHIMEK, JACOBS & FINKLEA CONSULTING ENGINEERS	JULY, 1996

GROUND STORAGE RESERVOIR

Ground storage within the system is necessary to provide a dependable supply during periods of high demand or equipment failure. The storage designed for this report matches the maximum daily demand rate.

The existing 6 million gallon ground storage reservoir can provide a supply rate to the pumps of approximately 24 MGD. The maximum daily demand is 9.75 MGD, leaving an excess in ground storage of approximately 14.25 MGD.

ELEVATED STORAGE TANKS

The volume of elevated storage required within a water distribution system is a function of the maximum daily demand (pumpage rate) and the maximum hourly demand rate. This volume will meet the peak hourly demands in the system. In addition, storage must meet the requirements of the State Board of Fire Insurance and the Texas Natural Resources Commission.

By designing this system to meet the maximum hourly demands, the volume of elevated storage required exceeds the minimums established by the State agencies. Previous studies of the operation of drawdown and refill rates of large capacity elevated storage tanks generally indicates for each one million gallon of storage available a rate of approximately four million gallons a day could be realized.

The difference in the maximum hourly demand and the maximum daily demand results in a rate of 6.67 MGD being required from elevated storage. The existing 1-million gallon elevated storage tank can only provide a rate of approximately 4 MGD leaving a deficit of 2.67 MGD.

This deficit of 2.67 MGD can be made up through the construction of a second elevated storage tank or can be made up through a combination of pumpage, ground storage and emergency generation.

WATER DISTRIBUTION SYSTEM IMPROVEMENTS - PLAN "A"

1) Negotiate with Dallas Water Utilities to secure a minimum delivery rate on the day maximum usage of 9.75 MGD at the Celestial Station.

2) Abandon the Surveyor Pump Station which has a maximum supply of 4 MGD and is fed from the Dallas Water Utilities Elm Fork Water Treatment Plant.

3) Construct improvements at the Celestial Pump Station to include a 3 MGD high service pump to replace elevated storage and a 1.5 to 3.0 MGD high service pump to meet low demands in the system. This station has a dual feed from Dallas Water Utilities from both the Elm Fork and East Side Water Treatment Plants.

   Opinion of Probable Cost $385,000.00

4) Construct emergency generators at the Celestial Pump Station to operate one 9.5 MGD high service pump. This will also operate the 3 MGD high service pump required to replace required elevated storage and provide a back-up power supply in the event of electrical service disruption. It also provides back-up to replace the Surveyor Pump Station.

   Opinion of Probable Cost $250,000.00

5) Install a computerized monitoring and control system to maximize the operation of the system, computer generate reports, and to generate hourly demand curves. All signals would be transmitted through radio waves.

   Opinion of Probable Cost $210,000.00

WATER DISTRIBUTION SYSTEM IMPROVEMENTS - PLAN "B"

1) Negotiate with Dallas Water Utilities to secure a minimum delivery rate on the day of maximum usage of 4 MGD at the Surveyor Pump Station and 5.75 MGD at the Celestial Pump Station.

2) Replace two of the high service pumps at the Surveyor Pump Station with two 4 MGD high service pumps.

   Opinion of Probable Cost $400,000.00

3) Add one 3 MGD high service pump at Celestial to replace required elevated storage. Add one 1.5 MGD high service pump to meet low demands in the system.

   Opinion of Probable Cost $385,000.00

4) Construct emergency generators at the Celestial Pump Station to operate one 9.5 MGD high service pump. This will also operate the 3 MGD high service pump required to replace required elevated storage and to provide a back-up power supply in the event of electrical service disruption. It also provide back-up to replace the Surveyor Pump Station.

   Opinion of Probable Cost $250,000.00

5) Install a computerized monitoring and control system to maximize the operation of the system, computer generate reports, and to generate hourly demand curves. All signals would be transmitted through radio waves.

   Opinion of Probable Cost $210,000.00

HYDRAULIC ANALYSIS

A computer assisted analysis was performed utilizing Cybernet computer software to aide in developing an overall system of water mains, storage facilities and pump stations to efficiently serve the entire city as development is now envisioned. The resulting plan is shown on the water distribution map outside this report. The master plan map shows the size and location of all existing and future feeder mains as well as elevated storage facilities. Also shown are reference numbers on all pipes and pipe intersections or nodes. These numbers refer to additional information contained in the computer printout. Two computer analyses were undertaken: One for the maximum hourly demand on the day of maximum demand and one for the minimum hourly demand on the day of maximum demand.

The hydraulic information shown on the computer printout are described as follows:

1) **Pipe Number** - number shown on system map for each section of pipe between nodes.

2) **Junction Node** - Pump Station, intersection of pipe, or water use point. The first node number indicates the flow entering a section of pipe, the second node number indicates flow leaving that section of pipe. A minus sign indicates the flow opposite of the node order.

3) **Length** - Distance between nodes in feet.

4) **Diameter** - Pipe diameter in inches.

5) **Roughness** - Coefficient of friction designated to the section of pipe.

6) **Boundary Node** - Pressure zone elevation based on U.S.C.&G.S. datum. Location of elevated storage tank.

7) **Demand** - Design flow at nodes in million gallons per day (MGD). A minus sign indicates flow into the system.

8) **Elevation** - Ground elevation at node based on U.S.C.&G.S. datum.

9) **Connecting Pipe** - Pipe number connecting to junction node.

10) **Flow Rate** - Rate of flow in pipe section in million gallons per day.

11) **Headloss** - Friction headloss in section of pipe, in feet.

12) **Velocity** - Velocity of flow in section of pipe in feet per second (fps).

13) **HL/1000** - Friction loss in feet per thousand feet of pipe.

14) **Grade Line** - Elevation of water surface at node based on U.S.C. & G.S. datum (hydraulic gradient).

15) **Pressure** - Pressure in pounds per square inch (psi) at the node.

TOWN OF ADDISON

777 SERVICE AREA

INPUT DATA

****
SUMMARY OF ORIGINAL DATA
****

CyberNet Version 2.18a. Copyright 1991,92 Haestad Methods Inc.
Run Description: MAXIMUM HOUR
Drawing: ADDSN_BO

REGULATING VALVE DATA

Valve Type	Position Junction	Controlled Pipe	Valve Setting
		(ft or mgd)	
PSV	610	711	872.50

PIPELINE DATA

STATUS CODE: XX -CLOSED PIPE BN -BOUNDARY NODE PU -PUMP LINE
CV -CHECK VALVE RV -REGULATING VALVE

PIPE NUMBER	NODE #1	NODE #2	LENGTH	DIAMETER	ROUGHNESS COEFF.	MINOR LOSS COEFF.	BND-HGL
100	301	300	598	10	115	0	0
101	302	301	692	16	125	0	0
102	303	302	1043	10	115	0	0
103	304	303	606	10	115	0	0
104	304	305	1153	8	110	0	0
105	305	304	1013	10	115	0	0
106	302	306	592	16	125	0	0
107	307	303	918	8	110	0	0
108	305	308	773	8	110	0	0
109	306	307	1620	8	110	0	0
110	307	308	1470	8	110	0	0
111	310	309	575	10	115	0	0
112	306	310	751	16	125	0	0
113	310	311	2646	12	120	0	0
114	311	308	741	8	110	0	0
115	310	312	673	16	125	0	0
116	312	313	189	16	125	0	0
117	313	318	495	16	125	0	0
118	321	313	2443	12	120	0	0
119	323	311	507	8	110	0	0
120	323	322	643	8	110	0	0
121	315	500	415	12	120	0	0
122	316	315	535	12	120	0	0
123	317	316	608	12	120	0	0
124	312	317	1329	6	110	0	0
125	318	317	655	12	120	0	0
126	319	318	677	8	110	0	0
127	320	319	1266	8	110	0	0
128	321	320	335	8	110	0	0
129	322	321	148	8	110	0	0
130	322	324	1991	8	110	0	0
131	314	503	1770	12	120	0	0
132	315	501	1225	10	115	0	0
133	325	316	982	8	110	0	0

PIPELINE DATA

STATUS CODE: XX -CLOSED PIPE BN -BOUNDARY NODE PU -PUMP LINE
CV -CHECK VALVE RV -REGULATING VALVE

PIPE NUMBER	NODE #1	NODE #2	LENGTH	DIAMETER	ROUGHNESS COEFF.	MINOR LOSS COEFF.	BND-HGL
134	325	327	965	8	110	0	0
135	337	327	497	8	110	0	0
136	339	325	1166	8	110	0	0
137	327	329	705	8	110	0	0
138	318	339	1589	20	125	0	0
139	339	328	278	20	125	0	0
140	329	328	229	20	125	0	0
141	338	329	518	20	125	0	0
142	319	326	1725	8	110	0	0
143	320	326	1630	8	110	0	0
144	326	330	1200	8	110	0	0
145	324	510	1597	8	110	0	0
146	328	509	1248	8	110	0	0
147	514	331	366	8	110	0	0
148	334	333	948	16	125	0	0
149	334	335	333	16	125	0	0
150	336	335	392	16	125	0	0
151	337	336	281	16	125	0	0
152	338	337	555	16	125	0	0
153	333	340	828	12	120	0	0
154	335	341	859	16	125	0	0
155	336	342	865	8	110	0	0
156	338	343	878	24	125	0	0
157	341	545	516	8	110	0	0
158	342	341	382.00	8	110	0	0
159	343	544	487	8	110	0	0
160	343	344	1128	8	110	0	0
161	330	344	1733	8	110	0	0
162	331	345	1668	8	110	0	0
163	341	549	399	20	125	0	0
164	343	546	897	24	125	0	0
165	344	348	2045	8	110	0	0
166	345	349	1790	8	110	0	0
167	345	350	1484	8	110	0	0

PIPELINE DATA

STATUS CODE: XX -CLOSED PIPE BN -BOUNDARY NODE PU -PUMP LINE
CV -CHECK VALVE RV -REGULATING VALVE

PIPE NUMBER	NODE #1	NODE #2	LENGTH	DIAMETER	ROUGHNESS COEFF.	MINOR LOSS COEFF.	BND-HGL
168	347	346	578	24	125	0	0
169	348	347	678	24	125	0	0
170 -BN	516	0	165	24	125	0	763.67
171	346	355	1417	24	125	0	0
172	348	357	586	24	125	0	0
173	351	352	890	10	115	0	0
174	352	363	858	12	120	0	0
175	354	351	1377	12	120	0	0
176	353	352	641	12	120	0	0
177	353	363	1153	12	120	0	0
178	354	353	128	12	120	0	0
179	355	354	486	12	120	0	0
180	356	355	1122	8	110	0	0
181	357	356	773	24	125	0	0
182	358	357	1330	8	110	0	0
183	358	349	1124	8	110	0	0
184	349	350	687	8	110	0	0
185	359	358	1507	8	110	0	0
186	359	350	798	8	110	0	0
187	360	359	411	8	110	0	0
188	361	360	2343	12	120	0	0
189	361	360	1763	12	120	0	0
190	362	361	454	12	120	0	0
191	365	362	682	12	120	0	0
192	363	370	641	12	120	0	0
193	355	372	1336	24	125	0	0
194	356	374	1288	24	125	0	0
195	364	359	1048	16	125	0	0
196	378	364	435	16	125	0	0
197	364	379	1805	12	120	0	0
198	365	380	789	24	125	0	0
199	365	380	851	12	120	0	0
200	383	382	913	12	120	0	0
201	383	384	694	12	120	0	0

PIPELINE DATA

STATUS CODE: XX -CLOSED PIPE BN -BOUNDARY NODE PU -PUMP LINE
CV -CHECK VALVE RV -REGULATING VALVE

PIPE NUMBER	NODE #1	NODE #2	LENGTH	DIAMETER	ROUGHNESS COEFF.	MINOR LOSS COEFF.	BND-HGL
202	384	385	854	12	120	0	0
203	386	388	592	12	120	0	0
204	384	386	485	12	120	0	0
205	386	387	1173	12	120	0	0
206	385	387	746	12	120	0	0
207	387	389	600	12	120	0	0
208	388	389	1202	20	125	0	0
209	519	382	260	20	120	0	0
210	382	381	479	20	120	0	0
211	381	380	452	24	125	0	0
212	380	381	440	8	110	0	0
213	380	379	1100	12	120	0	0
214	380	379	1019	24	125	0	0
215	380	379	980	8	110	0	0
216	379	378	1376	24	125	0	0
217	379	378	1362	8	110	0	0
218	377	378	1570	24	125	0	0
219	376	377	559	24	125	0	0
220	375	376	370	24	125	0	0
221	374	375	346	24	125	0	0
222	374	373	412	16	125	0	0
223	373	372	694	16	125	0	0
224	372	374	1200	8	110	0	0
225	372	371	1083	16	125	0	0
226	370	541	359	12	120	0	0
227	370	371	100	16	125	0	0
230	390	391	254	12	120	0	0
231	520	391	219	12	120	0	0
232	391	392	582	8	110	0	0
233	392	519	1756	8	110	0	0
234	381	393	783	12	120	0	0
235	381	393	760	8	110	0	0
236	394	380	974	12	120	0	0
237	378	397	760	16	125	0	0

PIPELINE DATA

STATUS CODE: XX -CLOSED PIPE BN -BOUNDARY NODE PU -PUMP LINE
CV -CHECK VALVE RV -REGULATING VALVE

PIPE NUMBER	NODE #1	NODE #2	LENGTH	DIAMETER	ROUGHNESS COEFF.	MINOR LOSS COEFF.	BND-HGL
238	399	400	638	12	120	0	0
239	400	401	1138	12	120	0	0
240	393	401	1174	12	120	0	0
241	395	394	738	10	115	0	0
242	396	395	398	10	115	0	0
243	397	396	957	10	115	0	0
244	398	397	1552	8	110	0	0
245	398	377	626	8	110	0	0
246	376	398	1945	8	110	0	0
247	526	415	608	12	120	0	0
248	411	525	2703	12	120	0	0
249	408	401	1110	8	110	0	0
250	411	408	296	8	110	0	0
251	409	408	167	8	110	0	0
252	402	409	1239	8	110	0	0
253	402	409	983	8	110	0	0
254	402	403	151	8	110	0	0
255	404	393	454	8	110	0	0
256	404	403	308	8	110	0	0
257	410	403	653	8	110	0	0
258	404	405	578	12	120	0	0
259	405	394	405	12	120	0	0
260	395	405	1031	8	110	0	0
261	406	410	815	8	110	0	0
262	407	406	1278	8	110	0	0
263	396	407	992	8	110	0	0
264	407	532	1133	8	110	0	0
265	531	409	562	8	110	0	0
266	534	411	1759	12	120	0	0
267	537	414	602	12	120	0	0
268	413	397	1309	16	125	0	0
269	414	413	955	12	120	0	0
270	410	424	2699	8	110	0	0
271	417	415	1855	8	110	0	0

PIPELINE DATA

STATUS CODE: XX -CLOSED PIPE BN -BOUNDARY NODE PU -PUMP LINE
CV -CHECK VALVE RV -REGULATING VALVE

PIPE NUMBER	NODE #1	NODE #2	LENGTH	DIAMETER	ROUGHNESS COEFF.	MINOR LOSS COEFF.	BND-HGL
272	416	415	390	12	120	0	0
273	527	416	440	8	110	0	0
274	417	416	727	6	110	0	0
275	418	417	440	6	110	0	0
276	422	418	745	8	110	0	0
277	419	424	2968	12	120	0	0
278	536	535	776	8	110	0	0
279	419	425	1470	8	110	0	0
280	538	420	251	12	120	0	0
281	414	420	759	12	120	0	0
282	420	426	1377	12	120	0	0
283	422	529	401	8	110	0	0
284	423	422	581	8	110	0	0
285	424	423	1066	8	110	0	0
286	425	424	1709	12	120	0	0
287	425	426	920	12	120	0	0
288	427	421	699	8	110	0	0
289	428	422	700	8	110	0	0
290	428	427	856	8	110	0	0
291	428	429	236	6	110	0	0
292	429	430	1413	6	110	0	0
293	530	430	679	6	110	0	0
294	430	432	152	6	110	0	0
295	434	423	546	8	110	0	0
296	434	433	778	8	110	0	0
297	434	435	701	8	110	0	0
298	431	427	1623	8	110	0	0
299	432	431	1515	8	110	0	0
300	432	433	310	8	110	0	0
301	435	433	1109	8	110	0	0
302	435	424	726	12	120	0	0
303	375	437	2978	8	110	0	0
304	373	436	2255	12	120	0	0
305	437	436	420	8	110	0	0

PIPELINE DATA

STATUS CODE: XX -CLOSED PIPE BN -BOUNDARY NODE PU -PUMP LINE
CV -CHECK VALVE RV -REGULATING VALVE

PIPE NUMBER	NODE #1	NODE #2	LENGTH	DIAMETER	ROUGHNESS COEFF.	MINOR LOSS COEFF.	BND-HGL
306	437	539	452	8	110	0	0
307	442	443	1119	8	110	0	0
308	436	441	768	8	110	0	0
309	438	372	385	36	130	0	0
310	438	372	258	12	120	0	0
311	440	438	1161	36	130	0	0
312	439	438	512	12	120	0	0
313	440	439	621	12	120	0	0
314	441	440	431	12	120	0	0
315	438	444	1030	8	110	0	0
316	439	445	276	12	120	0	0
317	446	440	480	36	130	0	0
318	441	447	555	12	120	0	0
319	444	371	251	8	110	0	0
320	445	444	923	8	110	0	0
321	446	445	682	8	110	0	0
322	447	446	542	12	120	0	0
323	447	540	1270	12	120	0	0
324	369	368	391	8	110	0	0
325	368	367	596	8	110	0	0
326	367	366	777	8	110	0	0
327	446	369	1452	8	110	0	0
328	448	368	801	12	120	0	0
329	449	448	851	8	110	0	0
330	446	449	1081	8	110	0	0
331	449	453	655	8	110	0	0
332	459	446	2189	36	130	0	0
333	368	450	794	12	120	0	0
334	367	450	623	8	110	0	0
335	450	451	400	12	120	0	0
336	451	452	144	12	120	0	0
337	454	451	565	12	120	0	0
338	454	452	715	8	110	0	0
339	366	454	848	8	110	0	0

PIPELINE DATA

STATUS CODE: XX -CLOSED PIPE BN -BOUNDARY NODE PU -PUMP LINE
CV -CHECK VALVE RV -REGULATING VALVE

PIPE NUMBER	NODE #1	NODE #2	LENGTH	DIAMETER	ROUGHNESS COEFF.	MINOR LOSS COEFF.	BND-HGL
340	366	455	430	8	110	0	0
341	460	455	452	6	110	0	0
342	452	453	206	12	120	0	0
343	453	459	499	12	120	0	0
345	455	456	1223	8	110	0	0
346	456	457	387	8	110	0	0
347	458	457	241	10	115	0	0
348	458	459	418	10	115	0	0
349	468	459	943	36	130	0	0
350	459	468	787	12	120	0	0
351	469	458	941	8	110	0	0
352	461	460	1319	6	110	0	0
353	462	461	405	8	110	0	0
354	464	463	511	8	110	0	0
355	465	464	1318	8	110	0	0
356	462	465	380	8	110	0	0
357	467	462	467	8	110	0	0
358	467	465	498	8	110	0	0
359	471	467	575	8	110	0	0
360	463	466	1002	8	110	0	0
361	466	472	1208	12	120	0	0
362	468	470	892	36	130	0	0
363	468	469	242	8	110	0	0
364	469	473	612	8	110	0	0
365	473	471	307	8	110	0	0
367	472	471	769	8	110	0	0
500	500	314	215	12	120	0	0
501	500	502	1557	8	110	0	0
502	502	501	706	8	110	0	0
503	502	503	290	8	110	0	0
504	501	504	141	10	115	0	0
505	502	506	188	8	110	0	0
506	503	507	189	8	110	0	0
507	505	504	498	12	120	0	0

PIPELINE DATA

STATUS CODE: XX -CLOSED PIPE BN -BOUNDARY NODE PU -PUMP LINE
CV -CHECK VALVE RV -REGULATING VALVE

PIPE NUMBER	NODE #1	NODE #2	LENGTH	DIAMETER	ROUGHNESS COEFF.	MINOR LOSS COEFF.	BND-HGL
508	505	506	220	12	120	0	0
509	506	507	274	12	120	0	0
510	504	508	439	10	115	0	0
511	508	334	263	10	115	0	0
512	505	508	878	8	110	0	0
513	507	333	702	12	120	0	0
514	329	509	1013	8	110	0	0
515	509	330	250	8	110	0	0
516	510	512	1356	8	110	0	0
517	510	511	700	8	110	0	0
518	511	332	437	8	110	0	0
519	511	512	591	8	110	0	0
520	513	512	322	8	110	0	0
521	332	514	691	8	110	0	0
522	513	514	533	8	110	0	0
523	331	513	1485	8	110	0	0
524	515	348	448	24	125	0	0
525	516	515	361	16	125	0	0
526	516	347	540	24	125	0	0
527	340	517	694	12	120	0	0
528	351	518	874	12	120	0	0
529	519	388	421	20	125	0	0
530	520	521	808	12	120	0	0
531	521	392	1599	8	110	0	0
532	400	520	659	8	110	0	0
533	522	399	147	16	125	0	0
534	522	523	415	8	110	0	0
535	523	525	655	8	110	0	0
536	523	524	335	8	110	0	0
537	524	400	281	12	120	0	0
538	524	525	193	12	120	0	0
539	526	522	1543	16	125	0	0
540	527	421	438	8	110	0	0
541	528	527	453	6	110	0	0

PIPELINE DATA

STATUS CODE: XX -CLOSED PIPE BN -BOUNDARY NODE PU -PUMP LINE
CV -CHECK VALVE RV -REGULATING VALVE

PIPE NUMBER	NODE #1	NODE #2	LENGTH	DIAMETER	ROUGHNESS COEFF.	MINOR LOSS COEFF.	BND-HGL
542	418	528	270	6	110	0	0
543	528	529	435	8	110	0	0
544	529	421	454	8	110	0	0
546	429	530	350	8	110	0	0
547	533	531	1246	8	110	0	0
548	531	532	1408	8	110	0	0
549	532	533	235	8	110	0	0
550	533	534	106	8	110	0	0
551	532	535	435	8	110	0	0
552	535	534	208	12	120	0	0
553	536	534	1050	8	110	0	0
554	536	419	176	8	110	0	0
555	419	538	698	12	120	0	0
556	537	538	1136	8	110	0	0
557	537	535	368	12	120	0	0
558	442	539	938	8	110	0	0
559	443	540	808	12	120	0	0
560	539	540	1202	8	110	0	0
561	372	541	754	8	110	0	0
562	300	542	467	12	120	0	0
563	542	543	1298	12	120	0	0
564	302	543	466	12	120	0	0
565	543	309	1354	12	120	0	0
566	309	314	2182	12	120	0	0
567	342	544	338	8	110	0	0
568	340	545	646	8	110	0	0
569	515	546	430	24	125	0	0
570	547	544	403	8	110	0	0
571	547	548	502	8	110	0	0
572	549	551	309	20	125	0	0
573	545	552	696	12	120	0	0
574	550	551	188	20	125	0	0
575	552	551	513	8	110	0	0
576	552	517	646	8	110	0	0

PIPELINE DATA

STATUS CODE: XX -CLOSED PIPE BN -BOUNDARY NODE PU -PUMP LINE
CV -CHECK VALVE RV -REGULATING VALVE

PIPE NUMBER	NODE #1	NODE #2	LENGTH	DIAMETER	ROUGHNESS COEFF.	MINOR LOSS COEFF.	BND-HGL
577	546	548	498	8	110	0	0
578	548	550	717	12	120	0	0
579	552	553	717	12	120	0	0
580	554	517	560	12	120	0	0
581	346	553	611	12	120	0	0
582	553	554	740	12	120	0	0
583	553	354	1729	12	120	0	0
584	554	518	338	12	120	0	0
585	547	549	712	8	110	0	0
700	600	601	12.5	30	130	0	50
701	601	602	6	30	130	0	0
702	602	603	6	30	130	0	0
703	603	604	12	30	130	0	0
704	604	605	12	30	130	10	0
705	605	606	6	30	130	0	0
706	606	607	6	30	130	0	0
707	607	608	12.5	30	130	0	50
708	625	600	53.5	30	130	10	0
709 -PU	609	601	11.5	20	130	12	60
710	609	617	23.5	24	130	12	10
711 -RV	602	610	58.3	12	130	0	0
712	610	618	3.2	12	130	0	0
713 -XXPU	611	603	11.5	20	130	12	60
714	611	619	23.5	24	130	12	10
715 -XXPU	612	604	11.5	20	130	12	60
716	612	620	23.5	24	130	12	10
717 -XXPU	613	605	11.5	20	130	12	60
718	613	621	23.5	24	130	12	10
719 -XX	606	614	58.3	12	130	0	0
720	614	622	3.2	12	130	0	0
721 -XXPU	615	607	11.5	20	130	12	60
722	615	623	23.5	24	130	12	10
723	608	626	53.5	30	130	10	0
724	617	616	32.5	42	130	0	0

PIPELINE DATA

STATUS CODE: XX -CLOSED PIPE BN -BOUNDARY NODE PU -PUMP LINE
CV -CHECK VALVE RV -REGULATING VALVE

PIPE NUMBER	NODE #1	NODE #2	LENGTH	DIAMETER	ROUGHNESS COEFF.	MINOR LOSS COEFF.	BND-HGL
725	617	618	6	42	130	0	0
726	618	619	6	42	130	0	0
727	619	620	12	42	130	0	0
728	620	621	12	42	130	0	0
729	621	622	6	42	130	0	0
730	622	623	6	42	130	0	0
731	623	624	22	42	130	0	0
732	626	625	73	30	130	0	50
733	470	626	432	36	130	1	80
734	470	473	30	12	120	0	0
800	365	700	35	24	130	10	0
801	700	701	15	24	130	0	0
802	701	702	15	24	130	0	0
803 -XXPU	703	700	15	12	130	12	90
804 -XXPU	704	701	15	12	130	12	90
805 -XXPU	705	702	15	12	130	12	90
806	703	704	15	24	130	0	0
807	704	705	15	24	130	0	0
808	706	705	14	24	130	1	80
858	346	550	772	20	125	0	0
997 -BN	616	0	45	42	130	0	591.09
998 -BN	624	0	173	42	130	0	591.09
999 -BN	706	0	56	30	130	0	641.67

PUMP DATA

THERE IS A PUMP IN LINE 709 DESCRIBED BY THE FOLLOWING DATA:

Head (ft)	Flow Rate (mgd)
280.00	0.00
180.00	9.50
120.00	12.67

THERE IS A PUMP IN LINE 713 DESCRIBED BY THE FOLLOWING DATA:

Head (ft)	Flow Rate (mgd)
280.00	0.00
180.00	9.50
120.00	12.67

THERE IS A PUMP IN LINE 715 DESCRIBED BY THE FOLLOWING DATA:

Head (ft)	Flow Rate (mgd)
280.00	0.00
180.00	9.50
120.00	12.67

THERE IS A PUMP IN LINE 717 DESCRIBED BY THE FOLLOWING DATA:

Head (ft)	Flow Rate (mgd)
280.00	0.00
180.00	9.50
120.00	12.67

PUMP DATA

THERE IS A PUMP IN LINE 721 DESCRIBED BY THE FOLLOWING DATA:

Head (ft)	Flow Rate (mgd)
280.00	0.00
180.00	9.50
120.00	12.67

THERE IS A PUMP IN LINE 803 DESCRIBED BY THE FOLLOWING DATA:

Head (ft)	Flow Rate (mgd)
278.00	0.00
197.00	5.50
155.00	6.62

THERE IS A PUMP IN LINE 804 DESCRIBED BY THE FOLLOWING DATA:

Head (ft)	Flow Rate (mgd)
278.00	0.00
197.00	5.54
155.00	6.62

THERE IS A PUMP IN LINE 805 DESCRIBED BY THE FOLLOWING DATA:

Head (ft)	Flow Rate (mgd)
278.00	0.00
197.00	5.54
155.00	6.62

JUNCTION NODE DATA

JUNCTION NUMBER	GDF #	JUNCTION TITLE	EXTERNAL DEMAND	JUNCTION ELEVATION	CONNECTING PIPES				
300	1		0.2	638	100	562			
301	1		0.23	639	100	101			
302	1		0.13	643	101	102	106	564	
303	1		0.06	648	102	103	107		
304	1		0.13	651	103	104	105		
305	1		0.11	661	104	105	108		
306	1		0.12	647	106	109	112		
307	1		0.18	647	107	109	110		
308	1		0.18	655	108	110	114		
309	1		0.09	638	111	565	566		
310	1		0.22	643	111	112	113	115	
311	1		0.17	646	113	114	119		
312	1		0.17	643	115	116	124		
313	1		0.05	644	116	117	118		
314	1		0.12	618	131	500	566		
315	1		0.19	623	121	122	132		
316	1		0.12	631	122	123	133		
317	1		0.1	640	123	124	125		
318	1		0.14	644	117	125	126	138	
319	1		0.09	642	126	127	142		
320	1		0.06	632	127	128	143		
321	1		0.07	632	118	128	129		
322	1		0.05	630	120	129	130		
323	1		0.1	639	119	120			
324	1		0.08	622	130	145			
325	1		0.09	629	133	134	136		
326	1		0.09	641	142	143	144		
327	1		0.07	634	134	135	137		
328	1		0.11	638	139	140	146		
329	1		0.08	638	137	140	141	514	
330	1		0.09	641	144	161	515		
331	1		0.09	639	147	162	523		
332	1		0.06	632	518	521			
333	1		0.08	616	148	153	513		
334	1		0.08	634	148	149	511		

JUNCTION NODE DATA

JUNCTION NUMBER	GDF #	JUNCTION TITLE	EXTERNAL DEMAND	JUNCTION ELEVATION	CONNECTING PIPES				
335	1		0.16	640	149	150	154		
336	1		0.09	642	150	151	155		
337	1		0.04	636	135	151	152		
338	1		0.07	638	141	152	156		
339	1		0.08	639	136	138	139		
340	1		0.08	613	153	527	568		
341	1		0.09	631	154	157	158	163	
342	1		0.05	640	155	158	567		
343	1		0.1	642	156	159	160	164	
344	1		0.08	641	160	161	165		
345	1		0.09	646	162	166	167		
346	1		0.15	621	168	171	581	858	
347	1		0.1	636	168	169	526		
348	1		0.12	637	165	169	172	524	
349	1		0.08	638	166	183	184		
350	1		0.06	631	167	184	186		
351	1		0.16	613	173	175	528		
352	1		0.09	621	173	174	176		
353	1		0.12	627	176	177	178		
354	1		0.12	623	175	178	179	583	
355	1		0.17	631	171	179	180	193	
356	1		0.12	630	180	181	194		
357	1		0.11	632	172	181	182		
358	1		0.11	627	182	183	185		
359	1		0.15	621	185	186	187	195	
360	1		0.11	617	187	188	189		
361	1		0.11	605	188	189	190		
362	1		0.11	604	190	191			
363	1		0.08	625	174	177	192		
364	1		0.12	620	195	196	197		
365	1	SURV. DISCH.	0	594.5	191	198	199	800	
366	1		0.03	622	326	339	340		
367	1		0.03	623	325	326	334		
368	1		0.05	625	324	325	328	333	
369	1		0.03	629	324	327			

JUNCTION NODE DATA

JUNCTION NUMBER	GDF #	JUNCTION TITLE	EXTERNAL DEMAND	JUNCTION ELEVATION	CONNECTING PIPES				
370	1		0.04	631	192	226	227		
371	1		0.02	631	225	227	319		
372	1		0.09	648	193	223	224	225	309
					310	561			
373	1		0.03	639	222	223	304		
374	1		0.07	633	194	221	222	224	
375	1		0.1	630	220	221	303		
376	1		0.11	627	219	220	246		
377	1		0.12	629	218	219	245		
378	1		0.12	626	196	216	217	218	237
379	1		0.08	607	197	213	214	215	216
					217				
380	1		0.08	595	198	199	211	212	213
					214	215	236		
381	1		0.05	588	210	211	212	234	235
382	1		0.05	581	200	209	210		
383	1		0.06	591	200	201			
384	1		0.07	586	201	202	204		
385	1		0.06	583	202	206			
386	1		0.06	581	203	204	205		
387	1		0.04	573	205	206	207		
388	1		0.06	578	203	208	529		
389	1		0.05	569	207	208			
390	1		0.04	578	230				
391	1		0.04	587	230	231	232		
392	1		0.03	582	232	233	531		
393	1		0.06	603	234	235	240	255	
394	1		0.06	611	236	241	259		
395	1		0.07	621	241	242	260		
396	1		0.09	626	242	243	263		
397	1		0.13	624	237	243	244	268	
398	1		0.09	628	244	245	246		
399	1		0.03	585	238	533			
400	1		0.14	593	238	239	532	537	
401	1		0.14	597	239	240	249		

JUNCTION NODE DATA

JUNCTION NUMBER	GDF #	JUNCTION TITLE	EXTERNAL DEMAND	JUNCTION ELEVATION	CONNECTING PIPES				
402	1		0.05	605	252	253	254		
403	1		0.1	609	254	256	257		
404	1		0.04	607	255	256	258		
405	1		0.04	615	258	259	260		
406	1		0.07	611	261	262			
407	1		0.11	634	262	263	264		
408	1		0.11	606	249	250	251		
409	1		0.04	609	251	252	253	265	
410	1		0.08	613	257	261	270		
411	1		0.37	607	248	250	266		
413	1		0.07	614	268	269			
414	1		0.05	588	267	269	281		
415	1		0.09	579	247	271	272		
416	1		0.03	570	272	273	274		
417	1		0.03	579	271	274	275		
418	1		0.03	584	275	276	542		
419	1		0.14	596	277	279	554	555	
420	1		0.06	592	280	281	282		
421	1		0.03	570	288	540	544		
422	1		0.05	580	276	283	284	289	
423	1		0.13	579	284	285	295		
424	1		0.2	585	270	277	285	286	302
425	1		0.12	577	279	286	287		
426	1		0.04	589	282	287			
427	1		0.07	563	288	290	298		
428	1		0.03	579	289	290	291		
429	1		0.04	579	291	292	546		
430	1		0.06	570	292	293	294		
431	1		0.12	547	298	299			
432	1		0.12	570	294	299	300		
433	1		0.1	572	296	300	301		
434	1		0.05	574	295	296	297		
435	1		0.12	571	297	301	302		
436	1		0.2	637	304	305	308		
437	1		0.21	631	303	305	306		

JUNCTION NODE DATA

JUNCTION NUMBER	GDF #	JUNCTION TITLE	EXTERNAL DEMAND	JUNCTION ELEVATION	CONNECTING PIPES				
438	1		0.06	648	309	310	311	312	315
439	1		0.11	644	312	313	316		
440	1		0.11	644	311	313	314	317	
441	1		0.11	641	308	314	318		
442	1		0.1	619	307	558			
443	1		0.1	623	307	559			
444	1		0.05	631	315	319	320		
445	1		0.04	639	316	320	321		
446	1		0.06	636	317	321	322	327	330
					332				
447	1		0.13	636	318	322	323		
448	1		0.04	620	328	329			
449	1		0.03	618	329	330	331		
450	1		0.03	610	333	334	335		
451	1		0.03	602	335	336	337		
452	1		0.03	602	336	338	342		
453	1		0.03	602	331	342	343		
454	1		0.02	597	337	338	339		
455	1		0.03	575	340	341	345		
456	1		0.05	601	345	346			
457	1		0.05	618	346	347			
458	1		0.05	617	347	348	351		
459	1		0.05	613	332	343	348	349	350
460	1		0.06	567	341	352			
461	1		0.06	603	352	353			
462	1		0.03	605	353	356	357		
463	1		0.06	556	354	360			
464	1		0.06	562	354	355			
465	1		0.03	578	355	356	358		
466	1		0.08	554	360	361			
467	1		0.03	592	357	358	359		
468	1		0.06	625	349	350	362	363	
469	1		0.06	621	351	363	364		
470	1	CELEST. DISC	0	599	362	733	734		
471	1		0.03	602	359	365	367		

JUNCTION NODE DATA

JUNCTION NUMBER	GDF #	JUNCTION TITLE	EXTERNAL DEMAND	JUNCTION ELEVATION	CONNECTING PIPES				
472	1		0.1	570	361	367			
473	1		0.02	599	364	365	734		
500	1		0.12	619	121	500	501		
501	1		0.11	626	132	502	504		
502	1		0.07	620	501	502	503	505	
503	1		0.07	619	131	503	506		
504	1		0.07	627	504	507	510		
505	1		0.03	622	507	508	512		
506	1		0.03	621	505	508	509		
507	1		0.03	616	506	509	513		
508	1		0.03	632	510	511	512		
509	1		0.08	640	146	514	515		
510	1		0.1	618	145	516	517		
511	1		0.04	616	517	518	519		
512	1		0.04	623	516	519	520		
513	1		0.04	627	520	522	523		
514	1		0.06	630	147	521	522		
515	1		0.04	638	524	525	569		
516	1	ADDISON 1-MG	0	637	170	525	526		
517	1		0.06	607	527	576	580		
518	1		0.12	602	528	584			
519	1		0.04	587	209	233	529		
520	1		0.04	589	231	530	532		
521	1		0.03	594	530	531			
522	1		0.02	583	533	534	539		
523	1		0.02	583	534	535	536		
524	1		0.09	588	536	537	538		
525	1		0.09	590	248	535	538		
526	1		0.08	582	247	539			
527	1		0.02	564	273	540	541		
528	1		0.03	579	541	542	543		
529	1		0.03	579	283	543	544		
530	1		0.04	580	293	546			
531	1		0.13	601	265	547	548		
532	1		0.16	619	264	548	549	551	

JUNCTION NODE DATA

JUNCTION NUMBER	GDF #	JUNCTION TITLE	EXTERNAL DEMAND	JUNCTION ELEVATION	CONNECTING PIPES				
533	1		0.13	616	547	549	550		
534	1		0.15	613	266	550	552	553	
535	1		0.05	611	278	551	552	557	
536	1		0.03	604	278	553	554		
537	1		0.05	607	267	556	557		
538	1		0.09	592	280	555	556		
539	1		0.11	631	306	558	560		
540	1		0.11	631	323	559	560		
541	1		0.04	638	226	561			
542	1		0.04	632	562	563			
543	1		0.08	639	563	564	565		
544	1		0.07	644	159	567	570		
545	1		0.09	620	157	568	573		
546	1		0.04	640	164	569	577		
547	1		0.05	644.5	570	571	585		
548	1		0.08	637.5	571	577	578		
549	1		0.05	631	163	572	585		
550	1		0.07	626	574	578	858		
551	1		0.06	628.5	572	574	575		
552	1		0.09	619	573	575	576	579	
553	1		0.09	612	579	581	582	583	
554	1		0.04	604	580	582	584		
600	1	CELEST. DISC	0	599	700	708			
601	1	CELEST. DISC	0	599	700	701	709		
602	1	CELEST. DISC	0	599	701	702	711		
603	1	CELEST. DISC	0	599	702	703	713		
604	1	CELEST. DISC	0	599	703	704	715		
605	1	CELEST. DISC	0	599	704	705	717		
606	1	CELEST. DISC	0	599	705	706	719		
607	1	CELEST. DISC	0	599	706	707	721		
608	1	CELEST. DISC	0	599	707	723			
609	1	CELEST. PUMP	0	572.5	709	710			
610	1	CEL. EXIST P	0	572.5	711	712			
611	1	CELEST. FUTU	0	572.5	713	714			
612	1	CELEST. PUMP	0	572.5	715	716			

JUNCTION NODE DATA

JUNCTION NUMBER	GDF #	JUNCTION TITLE	EXTERNAL DEMAND	JUNCTION ELEVATION	CONNECTING PIPES				
613	1	CELEST. FUTU	0	572.5	717	718			
614	1	CEL. FUTURE	0	572.5	719	720			
615	1	CELEST. PUMP	0	572.5	721	722			
616	1	6MG G.S. OUT	0	572.5	724	997			
617	1	CELEST. SUCT	0	572.5	710	724	725		
618	1	CELEST. SUCT	0	572.5	712	725	726		
619	1	CELEST. SUCT	0	572.5	714	726	727		
620	1	CELEST. SUCT	0	572.5	716	727	728		
621	1	CELEST. SUCT	0	572.5	718	728	729		
622	1	CELEST. SUCT	0	572.5	720	729	730		
623	1	CELEST. SUCT	0	572.5	722	730	731		
624	1	6MG G.S. OUT	0	572.5	731	998			
625	1	CELEST. DISC	0	599	708	732			
626	1	CELEST. DISC	0	599	723	732	733		
700	1	SURV. DISCH.	0	596.25	800	801	803		
701	1	SURVEYOR DIS	0	696.25	801	802	804		
702	1	SURV. DISCH.	0	696.25	802	805			
703	1	SURV. SUCT.	0	596	803	806			
704	1	SURV. DISCH.	0	596	804	806	807		
705	1	SURV. SUCT.	0	596	805	807	808		
706	1	SURV. SUCT.	0	596	808	999			

TOWN OF ADDISON

777 SERVICE AREA

MAXIMUM HOURLY DEMAND
ON
DAY OF MAXIMUM DEMAND

Cybernet version 2.18a. SN: 1132100118-1000

Extended Description:

MAXIMUM HOUR DEMAND ON THE DAY OF MAXIMUM DEMAND

ONE PUMP ON AT CELESTIAL PUMP STATION
NO PUMPS ON AT SURVEYOR PUMP STATION

UNITS SPECIFIED		
FLOWRATE	=	million gallons/day
HEAD (HGL)	=	feet
PRESSURE	=	psig

OUTPUT OPTION DATA

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

SYSTEM CONFIGURATION		
NUMBER OF PIPES	(p) =	397
NUMBER OF JUNCTION NODES	(j) =	262
NUMBER OF PRIMARY LOOPS	(l) =	132
NUMBER OF BOUNDARY NODE	(f) =	4
NUMBER OF SUPPLY ZONES	(z) =	1

****

SIMULATION RESULTS

****

The results are obtained after 13 trials with an accuracy = 0.00195
The regulating valves required 2 adjustments.

SIMULATION DESCRIPTION

CyberNet Version 2.18a. Copyright 1991,92 Haestad Methods Inc.
Run Description: MAXIMUM HOUR
Drawing: ADDSN_BO

PIPELINE RESULTS

PIPE NUMBER	NODE #1	NODE #2	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	LINE VELO.	HL/ 1000
100	301	300	0.09	0.03	0.00	0.00	0.26	0.05
101	302	301	0.32	0.03	0.00	0.00	0.36	0.04
102	303	302	-0.32	0.50	0.00	0.00	0.91	0.48
103	304	303	-0.20	0.12	0.00	0.00	0.57	0.20
104	304	305	0.02	0.01	0.00	0.00	0.10	0.01
105	305	304	-0.04	0.01	0.00	0.00	0.12	0.01
106	302	306	-0.65	0.09	0.00	0.00	0.72	0.15
107	307	303	-0.06	0.06	0.00	0.00	0.27	0.07
108	305	308	-0.04	0.03	0.00	0.00	0.18	0.03
109	306	307	0.16	0.66	0.00	0.00	0.69	0.41
110	307	308	0.04	0.04	0.00	0.00	0.16	0.03
111	310	309	-0.07	0.02	0.00	0.00	0.21	0.03
112	306	310	-0.92	0.22	0.00	0.00	1.02	0.29
113	310	311	0.33	0.52	0.00	0.00	0.66	0.20
114	311	308	0.18	0.40	0.00	0.00	0.80	0.54
115	310	312	-1.40	0.43	0.00	0.00	1.55	0.64
116	312	313	-1.49	0.13	0.00	0.00	1.65	0.71
117	313	318	-1.87	0.54	0.00	0.00	2.07	1.09
118	321	313	-0.33	0.47	0.00	0.00	0.65	0.19
119	323	311	0.02	0.00	0.00	0.00	0.09	0.01
120	323	322	-0.12	0.16	0.00	0.00	0.53	0.25
121	315	500	0.18	0.03	0.00	0.00	0.35	0.06
122	316	315	0.02	0.00	0.00	0.00	0.05	0.00
123	317	316	-0.07	0.01	0.00	0.00	0.13	0.01
124	312	317	-0.08	0.66	0.00	0.00	0.64	0.49
125	318	317	0.12	0.02	0.00	0.00	0.23	0.03
126	319	318	-0.19	0.40	0.00	0.00	0.84	0.59
127	320	319	-0.13	0.39	0.00	0.00	0.60	0.31
128	321	320	-0.20	0.22	0.00	0.00	0.90	0.66
129	322	321	-0.46	0.45	0.00	0.00	2.06	3.06
130	322	324	0.29	2.61	0.00	0.00	1.30	1.31
131	314	503	-0.43	0.57	0.00	0.00	0.86	0.32
132	315	501	-0.34	0.66	0.00	0.00	0.97	0.54
133	325	316	0.21	0.66	0.00	0.00	0.91	0.67
134	325	327	-0.19	0.56	0.00	0.00	0.84	0.58

PIPELINE RESULTS

PIPE NUMBER	NODE #1	NODE #2	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	LINE VELO.	HL/ 1000
135	337	327	0.24	0.44	0.00	0.00	1.06	0.89
136	339	325	0.10	0.22	0.00	0.00	0.46	0.19
137	327	329	-0.02	0.00	0.00	0.00	0.07	0.01
138	318	339	-2.32	0.87	0.00	0.00	1.65	0.55
139	339	328	-2.50	0.18	0.00	0.00	1.77	0.63
140	329	328	2.70	0.17	0.00	0.00	1.91	0.72
141	338	329	2.94	0.44	0.00	0.00	2.08	0.85
142	319	326	-0.03	0.04	0.00	0.00	0.15	0.02
143	320	326	-0.12	0.43	0.00	0.00	0.55	0.27
144	326	330	-0.25	1.13	0.00	0.00	1.09	0.94
145	324	510	0.22	1.19	0.00	0.00	0.96	0.75
146	328	509	0.09	0.17	0.00	0.00	0.39	0.14
147	514	331	-0.08	0.04	0.00	0.00	0.35	0.11
148	334	333	0.28	0.03	0.00	0.00	0.31	0.03
149	334	335	-0.96	0.11	0.00	0.00	1.07	0.32
150	336	335	-0.26	0.01	0.00	0.00	0.29	0.03
151	337	336	-0.32	0.01	0.00	0.00	0.36	0.04
152	338	337	-0.04	0.00	0.00	0.00	0.05	0.00
153	333	340	-0.57	0.44	0.00	0.00	1.12	0.53
154	335	341	-1.38	0.53	0.00	0.00	1.53	0.62
155	336	342	-0.15	0.35	0.00	0.00	0.69	0.40
156	338	343	-2.97	0.31	0.00	0.00	1.46	0.36
157	341	545	-0.06	0.03	0.00	0.00	0.26	0.07
158	342	341	-0.18	0.20	0.00	0.00	0.79	0.52
159	343	544	-0.08	0.05	0.00	0.00	0.33	0.11
160	343	344	0.11	0.24	0.00	0.00	0.49	0.21
161	330	344	-0.18	0.95	0.00	0.00	0.81	0.55
162	331	345	-0.20	1.08	0.00	0.00	0.89	0.65
163	341	549	-1.58	0.11	0.00	0.00	1.12	0.27
164	343	546	-3.11	0.35	0.00	0.00	1.53	0.39
165	344	348	-0.15	0.75	0.00	0.00	0.65	0.37
166	345	349	-0.14	0.57	0.00	0.00	0.61	0.32
167	345	350	-0.15	0.56	0.00	0.00	0.67	0.38
168	347	346	1.53	0.06	0.00	0.00	0.75	0.10
169	348	347	-4.21	0.46	0.00	0.00	2.07	0.68

PIPELINE RESULTS

PIPE NUMBER	NODE #1	NODE #2	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	LINE VELO.	HL/ 1000
170	516	0	-9.15	0.47	0.00	0.00	4.51	2.86
171	346	355	-1.41	0.13	0.00	0.00	0.70	0.09
172	348	357	4.15	0.39	0.00	0.00	2.04	0.66
173	351	352	-0.20	0.17	0.00	0.00	0.55	0.19
174	352	363	-0.27	0.11	0.00	0.00	0.53	0.13
175	354	351	0.26	0.17	0.00	0.00	0.51	0.12
176	353	352	0.02	0.00	0.00	0.00	0.03	0.00
177	353	363	-0.23	0.11	0.00	0.00	0.45	0.10
178	354	353	-0.09	0.00	0.00	0.00	0.18	0.02
179	355	354	0.54	0.24	0.00	0.00	1.07	0.48
180	356	355	-0.27	1.30	0.00	0.00	1.22	1.16
181	357	356	3.54	0.38	0.00	0.00	1.74	0.49
182	358	357	-0.50	4.70	0.00	0.00	2.22	3.53
183	358	349	0.24	1.02	0.00	0.00	1.07	0.91
184	349	350	0.02	0.01	0.00	0.00	0.10	0.01
185	359	358	-0.15	0.59	0.00	0.00	0.68	0.39
186	359	350	0.18	0.44	0.00	0.00	0.81	0.55
187	360	359	-0.29	0.53	0.00	0.00	1.29	1.29
188	361	360	-0.08	0.04	0.00	0.00	0.17	0.02
189	361	360	-0.10	0.04	0.00	0.00	0.19	0.02
190	362	361	-0.08	0.01	0.00	0.00	0.15	0.01
191	365	362	0.04	0.00	0.00	0.00	0.07	0.00
192	363	370	-0.57	0.34	0.00	0.00	1.13	0.53
193	355	372	-2.40	0.32	0.00	0.00	1.18	0.24
194	356	374	3.69	0.69	0.00	0.00	1.82	0.53
195	364	359	0.47	0.09	0.00	0.00	0.52	0.08
196	378	364	0.91	0.13	0.00	0.00	1.01	0.29
197	364	379	0.33	0.35	0.00	0.00	0.65	0.19
198	365	380	-0.03	0.00	0.00	0.00	0.02	0.00
199	365	380	0.00	0.00	0.00	0.00	0.01	0.00
200	383	382	-0.12	0.03	0.00	0.00	0.24	0.03
201	383	384	0.06	0.01	0.00	0.00	0.12	0.01
202	384	385	0.03	0.00	0.00	0.00	0.05	0.00
203	386	388	-0.09	0.01	0.00	0.00	0.18	0.02
204	384	386	-0.03	0.00	0.00	0.00	0.06	0.00

PIPELINE RESULTS

PIPE NUMBER	NODE #1	NODE #2	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	LINE VELO.	HL/ 1000
205	386	387	0.00	0.00	0.00	0.00	0.01	0.00
206	385	387	-0.04	0.00	0.00	0.00	0.08	0.00
207	387	389	-0.08	0.01	0.00	0.00	0.15	0.01
208	388	389	0.13	0.00	0.00	0.00	0.09	0.00
209	519	382	-0.71	0.02	0.00	0.00	0.50	0.07
210	382	381	-0.88	0.05	0.00	0.00	0.62	0.10
211	381	380	-2.23	0.09	0.00	0.00	1.10	0.21
212	380	381	0.11	0.09	0.00	0.00	0.49	0.22
213	380	379	-0.41	0.31	0.00	0.00	0.81	0.29
214	380	379	-2.75	0.31	0.00	0.00	1.35	0.31
215	380	379	-0.14	0.31	0.00	0.00	0.61	0.32
216	379	378	-2.91	0.47	0.00	0.00	1.43	0.34
217	379	378	-0.14	0.47	0.00	0.00	0.63	0.35
218	377	378	6.01	2.07	0.00	0.00	2.96	1.32
219	376	377	6.34	0.81	0.00	0.00	3.12	1.45
220	375	376	6.65	0.59	0.00	0.00	3.28	1.59
221	374	375	6.61	0.54	0.00	0.00	3.25	1.57
222	374	373	-2.62	0.84	0.00	0.00	2.90	2.03
223	373	372	-2.68	1.47	0.00	0.00	2.96	2.12
224	372	374	0.36	2.31	0.00	0.00	1.60	1.92
225	372	371	0.47	0.09	0.00	0.00	0.52	0.08
226	370	541	-0.04	0.00	0.00	0.00	0.09	0.00
227	370	371	-0.57	0.01	0.00	0.00	0.63	0.12
230	390	391	-0.04	0.00	0.00	0.00	0.07	0.00
231	520	391	-0.15	0.01	0.00	0.00	0.30	0.05
232	391	392	-0.23	0.48	0.00	0.00	1.01	0.83
233	392	519	-0.39	3.94	0.00	0.00	1.74	2.24
234	381	393	1.07	1.33	0.00	0.00	2.11	1.70
235	381	393	0.34	1.33	0.00	0.00	1.52	1.75
236	394	380	-0.83	1.04	0.00	0.00	1.64	1.07
237	378	397	1.93	0.88	0.00	0.00	2.14	1.16
238	399	400	-0.53	0.29	0.00	0.00	1.04	0.46
239	400	401	-0.83	1.20	0.00	0.00	1.63	1.05
240	393	401	1.20	2.45	0.00	0.00	2.36	2.09
241	395	394	-0.18	0.12	0.00	0.00	0.51	0.17

PIPELINE RESULTS

PIPE NUMBER	NODE #1	NODE #2	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	LINE VELO.	HL/ 1000
242	396	395	-0.04	0.00	0.00	0.00	0.11	0.01
243	397	396	0.51	1.07	0.00	0.00	1.44	1.12
244	398	397	0.33	2.49	0.00	0.00	1.45	1.60
245	398	377	-0.21	0.46	0.00	0.00	0.95	0.73
246	376	398	0.20	1.27	0.00	0.00	0.89	0.65
247	526	415	0.55	0.30	0.00	0.00	1.08	0.49
248	411	525	-0.01	0.00	0.00	0.00	0.03	0.00
249	408	401	-0.23	0.96	0.00	0.00	1.04	0.87
250	411	408	-0.26	0.31	0.00	0.00	1.16	1.06
251	409	408	0.14	0.05	0.00	0.00	0.61	0.32
252	402	409	0.17	0.57	0.00	0.00	0.74	0.46
253	402	409	0.19	0.57	0.00	0.00	0.84	0.58
254	402	403	-0.40	0.36	0.00	0.00	1.80	2.38
255	404	393	-0.16	0.20	0.00	0.00	0.72	0.43
256	404	403	0.74	2.23	0.00	0.00	3.28	7.24
257	410	403	-0.23	0.56	0.00	0.00	1.04	0.86
258	404	405	-0.62	0.36	0.00	0.00	1.22	0.62
259	405	394	-0.59	0.23	0.00	0.00	1.16	0.56
260	395	405	0.07	0.10	0.00	0.00	0.33	0.10
261	406	410	0.04	0.03	0.00	0.00	0.19	0.04
262	407	406	0.11	0.28	0.00	0.00	0.49	0.22
263	396	407	0.46	2.95	0.00	0.00	2.02	2.97
264	407	532	0.23	0.97	0.00	0.00	1.03	0.85
265	531	409	-0.18	0.29	0.00	0.00	0.79	0.52
266	534	411	0.09	0.03	0.00	0.00	0.18	0.02
267	537	414	-0.71	0.47	0.00	0.00	1.39	0.79
268	413	397	-1.62	1.10	0.00	0.00	1.80	0.84
269	414	413	-1.55	3.24	0.00	0.00	3.06	3.39
270	410	424	0.19	1.63	0.00	0.00	0.86	0.60
271	417	415	-0.10	0.30	0.00	0.00	0.42	0.16
272	416	415	-0.36	0.09	0.00	0.00	0.71	0.23
273	527	416	-0.27	0.51	0.00	0.00	1.22	1.15
274	417	416	-0.06	0.21	0.00	0.00	0.48	0.29
275	418	417	-0.12	0.47	0.00	0.00	0.97	1.07
276	422	418	-0.07	0.07	0.00	0.00	0.30	0.09

PIPELINE RESULTS

PIPE NUMBER	NODE #1	NODE #2	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	LINE VELO.	HL/ 1000
277	419	424	0.35	0.63	0.00	0.00	0.69	0.21
278	536	535	-0.13	0.23	0.00	0.00	0.58	0.29
279	419	425	0.11	0.30	0.00	0.00	0.47	0.20
280	538	420	-0.35	0.06	0.00	0.00	0.70	0.22
281	414	420	0.80	0.75	0.00	0.00	1.57	0.99
282	420	426	0.38	0.35	0.00	0.00	0.75	0.25
283	422	529	-0.04	0.02	0.00	0.00	0.19	0.04
284	423	422	0.07	0.05	0.00	0.00	0.31	0.09
285	424	423	0.19	0.63	0.00	0.00	0.85	0.59
286	425	424	0.33	0.33	0.00	0.00	0.66	0.20
287	425	426	-0.34	0.19	0.00	0.00	0.67	0.21
288	427	421	-0.14	0.24	0.00	0.00	0.62	0.34
289	428	422	-0.13	0.22	0.00	0.00	0.60	0.31
290	428	427	0.01	0.00	0.00	0.00	0.04	0.00
291	428	429	0.09	0.15	0.00	0.00	0.74	0.64
292	429	430	0.01	0.02	0.00	0.00	0.09	0.01
293	530	430	0.01	0.00	0.00	0.00	0.06	0.01
294	430	432	-0.04	0.02	0.00	0.00	0.31	0.13
295	434	423	0.00	0.00	0.00	0.00	0.02	0.00
296	434	433	0.13	0.22	0.00	0.00	0.56	0.28
297	434	435	-0.18	0.36	0.00	0.00	0.78	0.51
298	431	427	-0.08	0.20	0.00	0.00	0.36	0.12
299	432	431	0.04	0.05	0.00	0.00	0.18	0.03
300	432	433	-0.20	0.20	0.00	0.00	0.90	0.66
301	435	433	0.18	0.57	0.00	0.00	0.79	0.52
302	435	424	-0.48	0.28	0.00	0.00	0.94	0.38
303	375	437	-0.15	1.12	0.00	0.00	0.66	0.38
304	373	436	0.03	0.00	0.00	0.00	0.05	0.00
305	437	436	-0.19	0.26	0.00	0.00	0.86	0.61
306	437	539	-0.17	0.21	0.00	0.00	0.74	0.47
307	442	443	-0.18	0.58	0.00	0.00	0.79	0.52
308	436	441	-0.36	1.50	0.00	0.00	1.61	1.95
309	438	372	5.72	0.06	0.00	0.00	1.25	0.16
310	438	372	0.36	0.06	0.00	0.00	0.72	0.23
311	440	438	5.97	0.19	0.00	0.00	1.31	0.17

PIPELINE RESULTS

PIPE NUMBER	NODE #1	NODE #2	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	LINE VELO.	HL/ 1000
312	439	438	0.25	0.06	0.00	0.00	0.50	0.12
313	440	439	0.35	0.13	0.00	0.00	0.69	0.22
314	441	440	-0.57	0.23	0.00	0.00	1.12	0.53
315	438	444	0.07	0.09	0.00	0.00	0.30	0.09
316	439	445	-0.01	0.00	0.00	0.00	0.02	0.00
317	446	440	7.00	0.11	0.00	0.00	1.53	0.22
318	441	447	0.09	0.01	0.00	0.00	0.19	0.02
319	444	371	0.12	0.06	0.00	0.00	0.52	0.24
320	445	444	0.10	0.15	0.00	0.00	0.42	0.16
321	446	445	0.15	0.24	0.00	0.00	0.64	0.36
322	447	446	-0.63	0.35	0.00	0.00	1.24	0.64
323	447	540	0.60	0.73	0.00	0.00	1.18	0.58
324	369	368	-0.09	0.06	0.00	0.00	0.42	0.16
325	368	367	-0.02	0.01	0.00	0.00	0.10	0.01
326	367	366	0.00	0.00	0.00	0.00	0.01	0.00
327	446	369	-0.06	0.11	0.00	0.00	0.28	0.08
328	448	368	-0.04	0.00	0.00	0.00	0.08	0.00
329	449	448	0.00	0.00	0.00	0.00	0.02	0.00
330	446	449	-0.09	0.17	0.00	0.00	0.41	0.16
331	449	453	-0.12	0.17	0.00	0.00	0.54	0.26
332	459	446	7.68	0.58	0.00	0.00	1.68	0.27
333	368	450	-0.16	0.04	0.00	0.00	0.31	0.05
334	367	450	-0.05	0.03	0.00	0.00	0.23	0.05
335	450	451	-0.24	0.04	0.00	0.00	0.48	0.11
336	451	452	-0.32	0.03	0.00	0.00	0.63	0.18
337	454	451	-0.05	0.00	0.00	0.00	0.09	0.01
338	454	452	-0.04	0.03	0.00	0.00	0.20	0.04
339	366	454	-0.07	0.07	0.00	0.00	0.30	0.09
340	366	455	0.03	0.01	0.00	0.00	0.15	0.02
341	460	455	-0.10	0.33	0.00	0.00	0.80	0.74
342	452	453	-0.40	0.06	0.00	0.00	0.78	0.27
343	453	459	-0.55	0.25	0.00	0.00	1.08	0.50
345	455	456	-0.09	0.19	0.00	0.00	0.42	0.16
346	456	457	-0.15	0.14	0.00	0.00	0.65	0.36
347	458	457	0.20	0.05	0.00	0.00	0.57	0.20

PIPELINE RESULTS

PIPE NUMBER	NODE #1	NODE #2	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	LINE VELO.	HL/ 1000
348	458	459	-0.12	0.03	0.00	0.00	0.33	0.07
349	468	459	7.95	0.27	0.00	0.00	1.74	0.28
350	459	468	-0.45	0.27	0.00	0.00	0.89	0.34
351	469	458	0.14	0.30	0.00	0.00	0.60	0.31
352	461	460	-0.04	0.14	0.00	0.00	0.28	0.11
353	462	461	0.03	0.01	0.00	0.00	0.13	0.02
354	464	463	0.02	0.00	0.00	0.00	0.08	0.01
355	465	464	0.08	0.17	0.00	0.00	0.37	0.13
356	462	465	0.03	0.01	0.00	0.00	0.12	0.02
357	467	462	0.09	0.07	0.00	0.00	0.39	0.14
358	467	465	0.09	0.07	0.00	0.00	0.40	0.15
359	471	467	0.21	0.41	0.00	0.00	0.94	0.72
360	463	466	-0.04	0.04	0.00	0.00	0.19	0.04
361	466	472	-0.12	0.03	0.00	0.00	0.23	0.03
362	468	470	-8.49	0.29	0.00	0.00	1.86	0.32
363	468	469	0.03	0.00	0.00	0.00	0.13	0.02
364	469	473	-0.16	0.27	0.00	0.00	0.72	0.44
365	473	471	0.46	0.94	0.00	0.00	2.06	3.07
367	472	471	-0.22	0.59	0.00	0.00	0.97	0.77
500	500	314	0.22	0.02	0.00	0.00	0.43	0.09
501	500	502	-0.16	0.63	0.00	0.00	0.69	0.40
502	502	501	-0.06	0.05	0.00	0.00	0.28	0.08
503	502	503	0.13	0.08	0.00	0.00	0.57	0.29
504	501	504	-0.51	0.16	0.00	0.00	1.45	1.13
505	502	506	-0.29	0.24	0.00	0.00	1.28	1.27
506	503	507	-0.37	0.39	0.00	0.00	1.65	2.04
507	505	504	0.16	0.02	0.00	0.00	0.31	0.05
508	505	506	-0.04	0.00	0.00	0.00	0.08	0.00
509	506	507	-0.36	0.06	0.00	0.00	0.72	0.23
510	504	508	-0.42	0.35	0.00	0.00	1.20	0.81
511	508	334	-0.61	0.41	0.00	0.00	1.72	1.56
512	505	508	-0.15	0.33	0.00	0.00	0.66	0.38
513	507	333	-0.77	0.65	0.00	0.00	1.52	0.92
514	329	509	0.14	0.34	0.00	0.00	0.62	0.33
515	509	330	0.15	0.10	0.00	0.00	0.68	0.39

PIPELINE RESULTS

PIPE NUMBER	NODE #1	NODE #2	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	LINE VELO.	HL/ 1000
516	510	512	0.05	0.06	0.00	0.00	0.21	0.04
517	510	511	0.07	0.06	0.00	0.00	0.30	0.09
518	511	332	0.04	0.01	0.00	0.00	0.16	0.03
519	511	512	0.00	0.00	0.00	0.00	0.02	0.00
520	513	512	-0.01	0.00	0.00	0.00	0.04	0.00
521	332	514	-0.03	0.01	0.00	0.00	0.11	0.01
522	513	514	0.01	0.00	0.00	0.00	0.04	0.00
523	331	513	0.04	0.04	0.00	0.00	0.16	0.03
524	515	348	0.20	0.00	0.00	0.00	0.10	0.00
525	516	515	3.31	1.13	0.00	0.00	3.67	3.14
526	516	347	5.84	0.67	0.00	0.00	2.88	1.25
527	340	517	-0.49	0.27	0.00	0.00	0.96	0.39
528	351	518	0.30	0.14	0.00	0.00	0.58	0.16
529	519	388	0.28	0.00	0.00	0.00	0.20	0.01
530	520	521	-0.10	0.02	0.00	0.00	0.20	0.02
531	521	392	-0.13	0.47	0.00	0.00	0.58	0.30
532	400	520	-0.21	0.48	0.00	0.00	0.95	0.73
533	522	399	-0.50	0.01	0.00	0.00	0.55	0.09
534	522	523	-0.16	0.17	0.00	0.00	0.69	0.40
535	523	525	-0.07	0.06	0.00	0.00	0.31	0.09
536	523	524	-0.11	0.07	0.00	0.00	0.48	0.21
537	524	400	-0.37	0.07	0.00	0.00	0.73	0.24
538	524	525	0.17	0.01	0.00	0.00	0.34	0.06
539	526	522	-0.63	0.22	0.00	0.00	0.70	0.15
540	527	421	0.18	0.23	0.00	0.00	0.79	0.52
541	528	527	-0.07	0.19	0.00	0.00	0.59	0.42
542	418	528	0.02	0.01	0.00	0.00	0.18	0.05
543	528	529	0.07	0.04	0.00	0.00	0.30	0.09
544	529	421	-0.01	0.00	0.00	0.00	0.05	0.00
546	429	530	0.04	0.01	0.00	0.00	0.20	0.04
547	533	531	-0.04	0.04	0.00	0.00	0.18	0.03
548	531	532	0.01	0.00	0.00	0.00	0.05	0.00
549	532	533	0.10	0.04	0.00	0.00	0.43	0.17
550	533	534	0.01	0.00	0.00	0.00	0.04	0.00
551	532	535	-0.02	0.00	0.00	0.00	0.07	0.01

PIPELINE RESULTS

PIPE NUMBER	NODE #1	NODE #2	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	LINE VELO.	HL/ 1000
552	535	534	0.34	0.04	0.00	0.00	0.66	0.20
553	536	534	-0.10	0.18	0.00	0.00	0.44	0.18
554	536	419	0.20	0.12	0.00	0.00	0.91	0.67
555	419	538	-0.39	0.18	0.00	0.00	0.77	0.26
556	537	538	0.13	0.33	0.00	0.00	0.58	0.29
557	537	535	0.53	0.17	0.00	0.00	1.04	0.46
558	442	539	0.08	0.10	0.00	0.00	0.34	0.11
559	443	540	-0.28	0.12	0.00	0.00	0.55	0.14
560	539	540	-0.20	0.80	0.00	0.00	0.90	0.67
561	372	541	0.09	0.10	0.00	0.00	0.38	0.13
562	300	542	-0.11	0.01	0.00	0.00	0.22	0.03
563	542	543	-0.16	0.06	0.00	0.00	0.31	0.05
564	302	543	-0.13	0.02	0.00	0.00	0.26	0.03
565	543	309	-0.37	0.31	0.00	0.00	0.72	0.23
566	309	314	-0.54	1.03	0.00	0.00	1.05	0.47
567	342	544	-0.03	0.01	0.00	0.00	0.12	0.02
568	340	545	-0.16	0.26	0.00	0.00	0.69	0.41
569	515	546	3.07	0.16	0.00	0.00	1.51	0.38
570	547	544	0.17	0.20	0.00	0.00	0.76	0.49
571	547	548	-0.14	0.16	0.00	0.00	0.60	0.31
572	549	551	-1.72	0.10	0.00	0.00	1.22	0.32
573	545	552	-0.31	0.12	0.00	0.00	0.60	0.17
574	550	551	1.87	0.07	0.00	0.00	1.32	0.37
575	552	551	-0.08	0.07	0.00	0.00	0.37	0.13
576	552	517	0.10	0.11	0.00	0.00	0.42	0.16
577	546	548	-0.08	0.06	0.00	0.00	0.35	0.12
578	548	550	-0.29	0.11	0.00	0.00	0.58	0.16
579	552	553	-0.41	0.21	0.00	0.00	0.81	0.29
580	554	517	0.45	0.19	0.00	0.00	0.89	0.34
581	346	553	0.56	0.31	0.00	0.00	1.10	0.51
582	553	554	0.31	0.12	0.00	0.00	0.60	0.17
583	553	354	-0.25	0.20	0.00	0.00	0.50	0.12
584	554	518	-0.18	0.02	0.00	0.00	0.36	0.06
585	547	549	-0.09	0.10	0.00	0.00	0.40	0.14
700	600	601	-5.22	0.00	0.00	0.02	1.64	0.32

PIPELINE RESULTS

PIPE NUMBER	NODE #1	NODE #2	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	LINE VELO.	HL/ 1000
701	601	602	3.91	0.00	0.00	0.00	1.23	0.19
702	602	603	3.91	0.00	0.00	0.00	1.23	0.19
703	603	604	3.91	0.00	0.00	0.00	1.23	0.19
704	604	605	3.91	0.00	0.00	0.24	1.23	0.19
705	605	606	3.91	0.00	0.00	0.00	1.23	0.19
706	606	607	3.91	0.00	0.00	0.00	1.23	0.19
707	607	608	3.91	0.00	0.00	0.01	1.23	0.19
708	625	600	-5.22	0.02	0.00	0.42	1.64	0.32
709	609	601	9.13	0.07	186.25	8.20	6.48	6.45
710	609	617	-9.13	0.06	0.00	3.80	4.50	2.65
711	602	610						
712	610	618	0	0	0	0	0	0
713	611	603						
714	611	619	0	0	0	0	0	0
715	612	604						
716	612	620	0	0	0	0	0	0
717	613	605						
718	613	621	0	0	0	0	0	0
719	606	614						
720	614	622	0	0	0	0	0	0
721	615	607						
722	615	623	0	0	0	0	0	0
723	608	626	3.91	0.01	0	0.24	1.23	0.19
724	617	616	-5.94	0	0	0	0.96	0.08
725	617	618	-3.19	0	0	0	0.51	0.02
726	618	619	-3.19	0	0	0	0.51	0.02
727	619	620	-3.19	0	0	0	0.51	0.02
728	620	621	-3.19	0	0	0	0.51	0.02
729	621	622	-3.19	0	0	0	0.51	0.02
730	622	623	-3.19	0	0	0	0.51	0.02
731	623	624	-3.19	0	0	0	0.51	0.02
732	626	625	-5.22	0.02	0	0.02	1.64	0.32
733	470	626	-9.13	0.16	0	0.11	2	0.37
734	470	473	0.65	0.02	0	0	1.27	0.67
800	365	700	0	0	0	0	0	0

PIPELINE RESULTS

PIPE NUMBER	NODE #1	NODE #2	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	LINE VELO.	HL/ 1000
801	700	701	0	0	0	0	0	0
802	701	702	0	0	0	0	0	0
803	703	700						
804	704	701						
805	705	702						
806	703	704	0	0	0	0	0	0
807	704	705	0	0	0	0	0	0
808	706	705	0	0	0	0	0	0
858	346	550	2.23	0.39	0	0	1.58	0.51
997	616	0	-5.94	0	0	0	0.96	0.08
998	624	0	-3.19	0	0	0	0.51	0.02
999	706	0	0	0	0	0	0	0

JUNCTION NODE RESULTS

JUNCTION NUMBER	DEMAND TYPE	JUNCTION TITLE	EXTERNAL DEMAND	HYDRAULIC GRADE	JUNCTION ELEVATION	PRESSURE HEAD	JUNCTION PRESSURE
300	1		0.20	758.12	638.00	120.12	52.05
301	1		0.23	758.15	639.00	119.15	51.63
302	1		0.13	758.17	643.00	115.17	49.91
303	1		0.06	757.67	648.00	109.67	47.52
304	1		0.13	757.55	651.00	106.55	46.17
305	1		0.11	757.54	661.00	96.54	41.83
306	1		0.12	758.27	647.00	111.27	48.22
307	1		0.18	757.61	647.00	110.61	47.93
308	1		0.18	757.57	655.00	102.57	44.45
309	1		0.09	758.50	638.00	120.50	52.22
310	1		0.22	758.49	643.00	115.49	50.04
311	1		0.17	757.96	646.00	111.96	48.52
312	1		0.17	758.92	643.00	115.92	50.23
313	1		0.05	759.05	644.00	115.05	49.85
314	1		0.12	759.53	618.00	141.53	61.33
315	1		0.19	759.58	623.00	136.58	59.18
316	1		0.12	759.58	631.00	128.58	55.72
317	1		0.10	759.57	640.00	119.57	51.81
318	1		0.14	759.59	644.00	115.59	50.09
319	1		0.09	759.19	642.00	117.19	50.78
320	1		0.06	758.80	632.00	126.80	54.95
321	1		0.07	758.58	632.00	126.58	54.85
322	1		0.05	758.13	630.00	128.13	55.52
323	1		0.10	757.97	639.00	118.97	51.55
324	1		0.08	755.52	622.00	133.52	57.86
325	1		0.09	760.24	629.00	131.24	56.87
326	1		0.09	759.24	641.00	118.24	51.24
327	1		0.07	760.80	634.00	126.80	54.95
328	1		0.11	760.64	638.00	122.64	53.14
329	1		0.08	760.80	638.00	122.80	53.21
330	1		0.09	760.37	641.00	119.37	51.73
331	1		0.09	754.30	639.00	115.30	49.96
332	1		0.06	754.25	632.00	122.25	52.98
333	1		0.08	761.13	616.00	145.13	62.89
334	1		0.08	761.16	634.00	127.16	55.10

JUNCTION NODE RESULTS

JUNCTION NUMBER	DEMAND TYPE	JUNCTION TITLE	EXTERNAL DEMAND	HYDRAULIC GRADE	JUNCTION ELEVATION	PRESSURE HEAD	JUNCTION PRESSURE
335	1		0.16	761.26	640.00	121.26	52.55
336	1		0.09	761.25	642.00	119.25	51.68
337	1		0.04	761.24	636.00	125.24	54.27
338	1		0.07	761.24	638.00	123.24	53.40
339	1		0.08	760.46	639.00	121.46	52.63
340	1		0.08	761.56	613.00	148.56	64.38
341	1		0.09	761.80	631.00	130.80	56.68
342	1		0.05	761.60	640.00	121.60	52.69
343	1		0.10	761.55	642.00	119.55	51.81
344	1		0.08	761.31	641.00	120.31	52.14
345	1		0.09	755.39	646.00	109.39	47.40
346	1		0.15	762.46	621.00	141.46	61.30
347	1		0.10	762.52	636.00	126.52	54.83
348	1		0.12	762.06	637.00	125.06	54.19
349	1		0.08	755.96	638.00	117.96	51.11
350	1		0.06	755.95	631.00	124.95	54.14
351	1		0.16	762.19	613.00	149.19	64.65
352	1		0.09	762.36	621.00	141.36	61.25
353	1		0.12	762.36	627.00	135.36	58.66
354	1		0.12	762.36	623.00	139.36	60.39
355	1		0.17	762.59	631.00	131.59	57.02
356	1		0.12	761.29	630.00	131.29	56.89
357	1		0.11	761.67	632.00	129.67	56.19
358	1		0.11	756.98	627.00	129.98	56.32
359	1		0.15	756.38	621.00	135.38	58.67
360	1		0.11	755.85	617.00	138.85	60.17
361	1		0.11	755.82	605.00	150.82	65.35
362	1		0.11	755.81	604.00	151.81	65.78
363	1		0.08	762.47	625.00	137.47	59.57
364	1		0.12	756.47	620.00	136.47	59.14
365	1	SURV. DISCH.	0.00	755.81	594.50	161.31	69.90
366	1		0.03	763.46	622.00	141.46	61.30
367	1		0.03	763.46	623.00	140.46	60.86
368	1		0.05	763.45	625.00	138.45	59.99
369	1		0.03	763.39	629.00	134.39	58.23

JUNCTION NODE RESULTS

JUNCTION NUMBER	DEMAND TYPE	JUNCTION TITLE	EXTERNAL DEMAND	HYDRAULIC GRADE	JUNCTION ELEVATION	PRESSURE HEAD	JUNCTION PRESSURE
370	1		0.04	762.81	631.00	131.81	57.12
371	1		0.02	762.82	631.00	131.82	57.12
372	1		0.09	762.91	648.00	114.91	49.80
373	1		0.03	761.44	639.00	122.44	53.06
374	1		0.07	760.61	633.00	127.61	55.30
375	1		0.10	760.06	630.00	130.06	56.36
376	1		0.11	759.48	627.00	132.48	57.41
377	1		0.12	758.66	629.00	129.66	56.19
378	1		0.12	756.60	626.00	130.60	56.59
379	1		0.08	756.13	607.00	149.13	64.62
380	1		0.08	755.81	595.00	160.81	69.69
381	1		0.05	755.72	588.00	167.72	72.68
382	1		0.05	755.67	581.00	174.67	75.69
383	1		0.06	755.64	591.00	164.64	71.35
384	1		0.07	755.64	586.00	169.64	73.51
385	1		0.06	755.64	583.00	172.64	74.81
386	1		0.06	755.64	581.00	174.64	75.68
387	1		0.04	755.64	573.00	182.64	79.14
388	1		0.06	755.65	578.00	177.65	76.98
389	1		0.05	755.65	569.00	186.65	80.88
390	1		0.04	751.24	578.00	173.24	75.07
391	1		0.04	751.24	587.00	164.24	71.17
392	1		0.03	751.72	582.00	169.72	73.54
393	1		0.06	754.39	603.00	151.39	65.60
394	1		0.06	754.77	611.00	143.77	62.30
395	1		0.07	754.65	621.00	133.65	57.92
396	1		0.09	754.65	626.00	128.65	55.75
397	1		0.13	755.72	624.00	131.72	57.08
398	1		0.09	758.20	628.00	130.20	56.42
399	1		0.03	750.45	585.00	165.45	71.70
400	1		0.14	750.74	593.00	157.74	68.36
401	1		0.14	751.94	597.00	154.94	67.14
402	1		0.05	751.60	605.00	146.60	63.53
403	1		0.10	751.96	609.00	142.96	61.95
404	1		0.04	754.19	607.00	147.19	63.78

JUNCTION NODE RESULTS

JUNCTION NUMBER	DEMAND TYPE	JUNCTION TITLE	EXTERNAL DEMAND	HYDRAULIC GRADE	JUNCTION ELEVATION	PRESSURE HEAD	JUNCTION PRESSURE
405	1		0.04	754.55	615.00	139.55	60.47
406	1		0.07	751.43	611.00	140.43	60.85
407	1		0.11	751.70	634.00	117.70	51.00
408	1		0.11	750.98	606.00	144.98	62.82
409	1		0.04	751.03	609.00	142.03	61.55
410	1		0.08	751.40	613.00	138.40	59.97
411	1		0.37	750.66	607.00	143.66	62.25
413	1		0.07	754.62	614.00	140.62	60.93
414	1		0.05	751.38	588.00	163.38	70.80
415	1		0.09	749.92	579.00	170.92	74.06
416	1		0.03	749.83	570.00	179.83	77.93
417	1		0.03	749.62	579.00	170.62	73.93
418	1		0.03	749.14	584.00	165.14	71.56
419	1		0.14	750.39	596.00	154.39	66.90
420	1		0.06	750.63	592.00	158.63	68.74
421	1		0.03	749.10	570.00	179.10	77.61
422	1		0.05	749.08	580.00	169.08	73.27
423	1		0.13	749.13	579.00	170.13	73.72
424	1		0.20	749.77	585.00	164.77	71.40
425	1		0.12	750.10	577.00	173.10	75.01
426	1		0.04	750.29	589.00	161.29	69.89
427	1		0.07	748.86	563.00	185.86	80.54
428	1		0.03	748.86	579.00	169.86	73.61
429	1		0.04	748.71	579.00	169.71	73.54
430	1		0.06	748.69	570.00	178.69	77.43
431	1		0.12	748.66	547.00	201.66	87.39
432	1		0.12	748.71	570.00	178.71	77.44
433	1		0.10	748.92	572.00	176.92	76.66
434	1		0.05	749.13	574.00	175.13	75.89
435	1		0.12	749.49	571.00	178.49	77.35
436	1		0.20	761.44	637.00	124.44	53.92
437	1		0.21	761.18	631.00	130.18	56.41
438	1		0.06	762.97	648.00	114.97	49.82
439	1		0.11	763.03	644.00	119.03	51.58
440	1		0.11	763.17	644.00	119.17	51.64

JUNCTION NODE RESULTS

JUNCTION NUMBER	DEMAND TYPE	JUNCTION TITLE	EXTERNAL DEMAND	HYDRAULIC GRADE	JUNCTION ELEVATION	PRESSURE HEAD	JUNCTION PRESSURE
441	1		0.11	762.94	641.00	121.94	52.84
442	1		0.10	761.50	619.00	142.50	61.75
443	1		0.10	762.08	623.00	139.08	60.27
444	1		0.05	762.88	631.00	131.88	57.15
445	1		0.04	763.03	639.00	124.03	53.75
446	1		0.06	763.27	636.00	127.27	55.15
447	1		0.13	762.93	636.00	126.93	55.00
448	1		0.04	763.45	620.00	143.45	62.16
449	1		0.03	763.44	618.00	145.44	63.03
450	1		0.03	763.49	610.00	153.49	66.51
451	1		0.03	763.53	602.00	161.53	70.00
452	1		0.03	763.56	602.00	161.56	70.01
453	1		0.03	763.61	602.00	161.61	70.03
454	1		0.02	763.53	597.00	166.53	72.16
455	1		0.03	763.45	575.00	188.45	81.66
456	1		0.05	763.64	601.00	162.64	70.48
457	1		0.05	763.78	618.00	145.78	63.17
458	1		0.05	763.83	617.00	146.83	63.63
459	1		0.05	763.86	613.00	150.86	65.37
460	1		0.06	763.11	567.00	196.11	84.98
461	1		0.06	762.97	603.00	159.97	69.32
462	1		0.03	762.97	605.00	157.97	68.46
463	1		0.06	762.79	556.00	206.79	89.61
464	1		0.06	762.80	562.00	200.80	87.01
465	1		0.03	762.97	578.00	184.97	80.15
466	1		0.08	762.83	554.00	208.83	90.49
467	1		0.03	763.04	592.00	171.04	74.12
468	1		0.06	764.13	625.00	139.13	60.29
469	1		0.06	764.12	621.00	143.12	62.02
470	1	CELEST. DISC	0.00	764.41	599.00	165.41	71.68
471	1		0.03	763.45	602.00	161.45	69.96
472	1		0.10	762.86	570.00	192.86	83.57
473	1		0.02	764.39	599.00	165.39	71.67
500	1		0.12	759.55	619.00	140.55	60.90
501	1		0.11	760.23	626.00	134.23	58.17

JUNCTION NODE RESULTS

JUNCTION NUMBER	DEMAND TYPE	JUNCTION TITLE	EXTERNAL DEMAND	HYDRAULIC GRADE	JUNCTION ELEVATION	PRESSURE HEAD	JUNCTION PRESSURE
502	1		0.07	760.18	620.00	140.18	60.74
503	1		0.07	760.10	619.00	141.10	61.14
504	1		0.07	760.39	627.00	133.39	57.80
505	1		0.03	760.42	622.00	138.42	59.98
506	1		0.03	760.42	621.00	139.42	60.41
507	1		0.03	760.48	616.00	144.48	62.61
508	1		0.03	760.75	632.00	128.75	55.79
509	1		0.08	760.46	640.00	120.46	52.20
510	1		0.10	754.32	618.00	136.32	59.07
511	1		0.04	754.26	616.00	138.26	59.91
512	1		0.04	754.26	623.00	131.26	56.88
513	1		0.04	754.26	627.00	127.26	55.15
514	1		0.06	754.26	630.00	124.26	53.85
515	1		0.04	762.06	638.00	124.06	53.76
516	1	ADDISON 1-MG	0.00	763.20	637.00	126.20	54.69
517	1		0.06	761.84	607.00	154.84	67.10
518	1		0.12	762.05	602.00	160.05	69.35
519	1		0.04	755.65	587.00	168.65	73.08
520	1		0.04	751.23	589.00	162.23	70.30
521	1		0.03	751.24	594.00	157.24	68.14
522	1		0.02	750.44	583.00	167.44	72.56
523	1		0.02	750.61	583.00	167.61	72.63
524	1		0.09	750.68	588.00	162.68	70.49
525	1		0.09	750.67	590.00	160.67	69.62
526	1		0.08	750.22	582.00	168.22	72.89
527	1		0.02	749.32	564.00	185.32	80.31
528	1		0.03	749.13	579.00	170.13	73.72
529	1		0.03	749.09	579.00	170.09	73.71
530	1		0.04	748.70	580.00	168.70	73.10
531	1		0.13	750.74	601.00	149.74	64.89
532	1		0.16	750.74	619.00	131.74	57.09
533	1		0.13	750.70	616.00	134.70	58.37
534	1		0.15	750.70	613.00	137.70	59.67
535	1		0.05	750.74	611.00	139.74	60.55
536	1		0.03	750.51	604.00	146.51	63.49

JUNCTION NODE RESULTS

JUNCTION NUMBER	DEMAND TYPE	JUNCTION TITLE	EXTERNAL DEMAND	HYDRAULIC GRADE	JUNCTION ELEVATION	PRESSURE HEAD	JUNCTION PRESSURE
537	1		0.05	750.91	607.00	143.91	62.36
538	1		0.09	750.58	592.00	158.58	68.72
539	1		0.11	761.39	631.00	130.39	56.50
540	1		0.11	762.20	631.00	131.20	56.85
541	1		0.04	762.81	638.00	124.81	54.08
542	1		0.04	758.13	632.00	126.13	54.66
543	1		0.08	758.19	639.00	119.19	51.65
544	1		0.07	761.60	644.00	117.60	50.96
545	1		0.09	761.83	620.00	141.83	61.46
546	1		0.04	761.90	640.00	121.90	52.82
547	1		0.05	761.80	644.50	117.30	50.83
548	1		0.08	761.96	637.50	124.46	53.93
549	1		0.05	761.90	631.00	130.90	56.73
550	1		0.07	762.07	626.00	136.07	58.96
551	1		0.06	762.00	628.50	133.50	57.85
552	1		0.09	761.94	619.00	142.94	61.94
553	1		0.09	762.15	612.00	150.15	65.07
554	1		0.04	762.03	604.00	158.03	68.48
600	1	CELEST. DISC	0.00	765.17	599.00	166.17	72.01
601	1	CELEST. DISC	0.00	765.19	599.00	166.19	72.02
602	1	CELEST. DISC	0.00	765.19	599.00	166.19	72.02
603	1	CELEST. DISC	0.00	765.19	599.00	166.19	72.02
604	1	CELEST. DISC	0.00	765.19	599.00	166.19	72.01
605	1	CELEST. DISC	0.00	764.95	599.00	165.95	71.91
606	1	CELEST. DISC	0.00	764.95	599.00	165.95	71.91
607	1	CELEST. DISC	0.00	764.95	599.00	165.95	71.91
608	1	CELEST. DISC	0.00	764.93	599.00	165.93	71.90
609	1	CELEST. PUMP	0.00	587.22	572.50	14.72	6.38
610	1	CEL. EXIST P	0.00	591.08	572.50	18.58	8.05
611	1	CELEST. FUTU	0.00	591.08	572.50	18.58	8.05
612	1	CELEST. PUMP	0.00	591.08	572.50	18.58	8.05
613	1	CELEST. FUTU	0.00	591.08	572.50	18.58	8.05
614	1	CEL. FUTURE	0.00	591.09	572.50	18.59	8.05
615	1	CELEST. PUMP	0.00	591.09	572.50	18.59	8.05
616	1	6MG G.S. OUT	0.00	591.09	572.50	18.59	8.05

JUNCTION NODE RESULTS

JUNCTION NUMBER	DEMAND TYPE	JUNCTION TITLE	EXTERNAL DEMAND	HYDRAULIC GRADE	JUNCTION ELEVATION	PRESSURE HEAD	JUNCTION PRESSURE
617	1	CELEST. SUCT	0.00	591.08	572.50	18.58	8.05
618	1	CELEST. SUCT	0.00	591.08	572.50	18.58	8.05
619	1	CELEST. SUCT	0.00	591.08	572.50	18.58	8.05
620	1	CELEST. SUCT	0.00	591.08	572.50	18.58	8.05
621	1	CELEST. SUCT	0.00	591.08	572.50	18.58	8.05
622	1	CELEST. SUCT	0.00	591.09	572.50	18.59	8.05
623	1	CELEST. SUCT	0.00	591.09	572.50	18.59	8.05
624	1	6MG G.S. OUT	0.00	591.09	572.50	18.59	8.05
625	1	CELEST. DISC	0.00	764.73	599.00	165.73	71.82
626	1	CELEST. DISC	0.00	764.69	599.00	165.69	71.80
700	1	SURV. DISCH.	0.00	755.81	596.25	159.56	69.14
701	1	SURVEYOR DIS	0.00	755.81	696.25	59.56	25.81
702	1	SURV. DISCH.	0.00	755.81	696.25	59.56	25.81
703	1	SURV. SUCT.	0.00	641.67	596.00	45.67	19.79
704	1	SURV. DISCH.	0.00	641.67	596.00	45.67	19.79
705	1	SURV. SUCT.	0.00	641.67	596.00	45.67	19.79
706	1	SURV. SUCT.	0.00	641.67	596.00	45.67	19.79

REGULATING VALVE REPORT

Valve Type	Position Node	Controlled Pipe	Valve Setting	Valve Status	Upstream Grade	Downstream Grade	Through Flow
		(ft or mgd)			(ft)	(ft)	(mgd)
PSV	610	711	872.50	Closed	765.19	591.08	0.00

SUMMARY OF INFLOWS AND OUTFLOWS

(+) INFLOWS INTO THE SYSTEM FROM BOUNDARY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO BOUNDARY NODES

Pipe Number	Flow Rate (mgd)
170	9.15
997	5.94
998	3.19
999	0.00

NET SYSTEM I NFLOW	=	18.28
NET SYSTEM OUTFLO	=	0.00
NET SYSTEM DEMAN	=	18.28

****** CYBERNET SIMULATION COMPLETED ******

DATE: 7/05/1996
TIME: 16:56:29

TOWN OF ADDISON

777 SERVICE AREA

MINIMUM HOURLY DEMAND
ON
DAY OF MAXIMUM DEMAND

Cybernet version 2.18a. SN: 1132100118-1000

Extended Description:

MINIMUM HOUR DEMAND ON DAY OF MAXIMUM DEMAND

ONE PUMP ON AT CELESTIAL PUMP STATION
NO PUMPS ON AT SURVEYOR PUMP STATION

UNITS SPECIFIED		
FLOWRATE	=	million gallons/day
HEAD (HGL)	=	feet
PRESSURE	=	psig

OUTPUT OPTION DATA

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

SYSTEM CONFIGURATION		
NUMBER OF PIPES	(p) =	397
NUMBER OF JUNCTION NODES	(j) =	262
NUMBER OF PRIMARY LOOPS	(l) =	132
NUMBER OF BOUNDARY NODE	(f) =	4
NUMBER OF SUPPLY ZONES	(z) =	1

****

SIMULATION RESULTS

****

The results are obtained after 13 trials with an accuracy = 0.00058
The regulating valves required 2 adjustments.

SIMULATION DESCRIPTION

CyberNet Version 2.18a. Copyright 1991,92 Haestad Methods Inc.
Run Description: MINIMUM HOUR
Drawing: ADDSN_BO

PIPELINE RESULTS

PIPE NUMBER	NODE #1	NODE #2	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	LINE VELO.	HL/ 1000
100	301	300	0.01	0.00	0.00	0.00	0.04	0.00
101	302	301	0.05	0.00	0.00	0.00	0.06	0.00
102	303	302	-0.05	0.01	0.00	0.00	0.13	0.01
103	304	303	-0.03	0.00	0.00	0.00	0.08	0.01
104	304	305	0.00	0.00	0.00	0.00	0.01	0.00
105	305	304	-0.01	0.00	0.00	0.00	0.02	0.00
106	302	306	-0.10	0.00	0.00	0.00	0.11	0.00
107	307	303	-0.01	0.00	0.00	0.00	0.04	0.00
108	305	308	-0.01	0.00	0.00	0.00	0.03	0.00
109	306	307	0.02	0.02	0.00	0.00	0.10	0.01
110	307	308	0.00	0.00	0.00	0.00	0.02	0.00
111	310	309	-0.02	0.00	0.00	0.00	0.07	0.00
112	306	310	-0.14	0.01	0.00	0.00	0.15	0.01
113	310	311	0.04	0.01	0.00	0.00	0.09	0.00
114	311	308	0.03	0.01	0.00	0.00	0.13	0.02
115	310	312	-0.20	0.01	0.00	0.00	0.22	0.02
116	312	313	-0.21	0.00	0.00	0.00	0.23	0.02
117	313	318	-0.26	0.01	0.00	0.00	0.29	0.03
118	321	313	-0.04	0.01	0.00	0.00	0.08	0.00
119	323	311	0.01	0.00	0.00	0.00	0.05	0.00
120	323	322	-0.02	0.01	0.00	0.00	0.11	0.01
121	315	500	-0.02	0.00	0.00	0.00	0.04	0.00
122	316	315	-0.08	0.01	0.00	0.00	0.16	0.01
123	317	316	-0.08	0.01	0.00	0.00	0.15	0.01
124	312	317	-0.01	0.02	0.00	0.00	0.10	0.02
125	318	317	-0.05	0.00	0.00	0.00	0.10	0.01
126	319	318	-0.03	0.01	0.00	0.00	0.14	0.02
127	320	319	-0.02	0.01	0.00	0.00	0.07	0.01
128	321	320	-0.02	0.00	0.00	0.00	0.09	0.01
129	322	321	-0.05	0.01	0.00	0.00	0.22	0.05
130	322	324	0.02	0.01	0.00	0.00	0.08	0.01
131	314	503	-0.12	0.05	0.00	0.00	0.24	0.03
132	315	501	-0.10	0.06	0.00	0.00	0.27	0.05
133	325	316	0.01	0.00	0.00	0.00	0.06	0.00
134	325	327	-0.03	0.02	0.00	0.00	0.13	0.02

PIPELINE RESULTS

PIPE NUMBER	NODE #1	NODE #2	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	LINE VELO.	HL/ 1000
135	337	327	0.07	0.04	0.00	0.00	0.30	0.09
136	339	325	0.00	0.00	0.00	0.00	0.02	0.00
137	327	329	0.03	0.01	0.00	0.00	0.13	0.02
138	318	339	-0.26	0.02	0.00	0.00	0.19	0.01
139	339	328	-0.27	0.00	0.00	0.00	0.19	0.01
140	329	328	0.31	0.00	0.00	0.00	0.22	0.01
141	338	329	0.31	0.01	0.00	0.00	0.22	0.01
142	319	326	0.00	0.00	0.00	0.00	0.00	0.00
143	320	326	-0.01	0.01	0.00	0.00	0.06	0.00
144	326	330	-0.03	0.02	0.00	0.00	0.13	0.02
145	324	510	0.00	0.00	0.00	0.00	0.01	0.00
146	328	509	0.02	0.01	0.00	0.00	0.07	0.01
147	514	331	-0.04	0.01	0.00	0.00	0.16	0.03
148	334	333	-0.12	0.01	0.00	0.00	0.13	0.01
149	334	335	-0.03	0.00	0.00	0.00	0.04	0.00
150	336	335	-0.51	0.04	0.00	0.00	0.56	0.10
151	337	336	-0.55	0.03	0.00	0.00	0.61	0.11
152	338	337	-0.48	0.05	0.00	0.00	0.53	0.09
153	333	340	-0.33	0.15	0.00	0.00	0.64	0.19
154	335	341	-0.57	0.10	0.00	0.00	0.63	0.12
155	336	342	-0.06	0.06	0.00	0.00	0.27	0.07
156	338	343	0.16	0.00	0.00	0.00	0.08	0.00
157	341	545	-0.10	0.10	0.00	0.00	0.46	0.19
158	342	341	-0.11	0.08	0.00	0.00	0.49	0.21
159	343	544	-0.12	0.13	0.00	0.00	0.55	0.27
160	343	344	0.01	0.00	0.00	0.00	0.03	0.00
161	330	344	-0.02	0.02	0.00	0.00	0.09	0.01
162	331	345	-0.07	0.15	0.00	0.00	0.31	0.09
163	341	549	-0.59	0.02	0.00	0.00	0.42	0.04
164	343	546	0.26	0.00	0.00	0.00	0.13	0.00
165	344	348	-0.03	0.03	0.00	0.00	0.12	0.02
166	345	349	-0.04	0.05	0.00	0.00	0.16	0.03
167	345	350	-0.05	0.07	0.00	0.00	0.21	0.04
168	347	346	-3.65	0.30	0.00	0.00	1.80	0.52
169	348	347	0.63	0.01	0.00	0.00	0.31	0.02

PIPELINE RESULTS

PIPE NUMBER	NODE #1	NODE #2	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	LINE VELO.	HL/ 1000
170	516	0	6.03	0.22	0.00	0.00	2.97	1.32
171	346	355	-4.08	0.91	0.00	0.00	2.01	0.64
172	348	357	-2.04	0.10	0.00	0.00	1.00	0.18
173	351	352	-0.25	0.27	0.00	0.00	0.71	0.31
174	352	363	-0.42	0.26	0.00	0.00	0.83	0.30
175	354	351	0.27	0.19	0.00	0.00	0.54	0.14
176	353	352	-0.15	0.03	0.00	0.00	0.30	0.05
177	353	363	-0.38	0.29	0.00	0.00	0.75	0.25
178	354	353	-0.51	0.06	0.00	0.00	1.01	0.43
179	355	354	0.28	0.07	0.00	0.00	0.55	0.14
180	356	355	-0.23	0.96	0.00	0.00	1.03	0.85
181	357	356	-2.03	0.14	0.00	0.00	1.00	0.18
182	358	357	0.03	0.02	0.00	0.00	0.11	0.01
183	358	349	0.02	0.01	0.00	0.00	0.08	0.01
184	349	350	-0.03	0.01	0.00	0.00	0.14	0.02
185	359	358	0.06	0.12	0.00	0.00	0.28	0.08
186	359	350	0.09	0.11	0.00	0.00	0.39	0.14
187	360	359	-0.02	0.00	0.00	0.00	0.07	0.01
188	361	360	0.00	0.00	0.00	0.00	0.00	0.00
189	361	360	0.00	0.00	0.00	0.00	0.00	0.00
190	362	361	0.02	0.00	0.00	0.00	0.05	0.00
191	365	362	0.05	0.00	0.00	0.00	0.09	0.00
192	363	370	-0.82	0.66	0.00	0.00	1.61	1.03
193	355	372	-4.62	1.08	0.00	0.00	2.27	0.81
194	356	374	-1.81	0.18	0.00	0.00	0.89	0.14
195	364	359	0.19	0.02	0.00	0.00	0.22	0.02
196	378	364	0.25	0.01	0.00	0.00	0.28	0.03
197	364	379	0.03	0.01	0.00	0.00	0.07	0.00
198	365	380	-0.04	0.00	0.00	0.00	0.02	0.00
199	365	380	-0.01	0.00	0.00	0.00	0.01	0.00
200	383	382	-0.02	0.00	0.00	0.00	0.04	0.00
201	383	384	0.01	0.00	0.00	0.00	0.02	0.00
202	384	385	0.00	0.00	0.00	0.00	0.01	0.00
203	386	388	-0.02	0.00	0.00	0.00	0.03	0.00
204	384	386	-0.01	0.00	0.00	0.00	0.01	0.00

PIPELINE RESULTS

PIPE NUMBER	NODE #1	NODE #2	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	LINE VELO.	HL/ 1000
205	386	387	0.00	0.00	0.00	0.00	0.00	0.00
206	385	387	-0.01	0.00	0.00	0.00	0.01	0.00
207	387	389	-0.01	0.00	0.00	0.00	0.03	0.00
208	388	389	0.02	0.00	0.00	0.00	0.01	0.00
209	519	382	-0.11	0.00	0.00	0.00	0.08	0.00
210	382	381	-0.14	0.00	0.00	0.00	0.10	0.00
211	381	380	-0.33	0.00	0.00	0.00	0.16	0.01
212	380	381	0.02	0.00	0.00	0.00	0.07	0.01
213	380	379	-0.06	0.01	0.00	0.00	0.13	0.01
214	380	379	-0.43	0.01	0.00	0.00	0.21	0.01
215	380	379	-0.02	0.01	0.00	0.00	0.10	0.01
216	379	378	-0.48	0.02	0.00	0.00	0.23	0.01
217	379	378	-0.02	0.02	0.00	0.00	0.10	0.01
218	377	378	1.06	0.08	0.00	0.00	0.52	0.05
219	376	377	1.11	0.03	0.00	0.00	0.55	0.06
220	375	376	1.17	0.02	0.00	0.00	0.57	0.06
221	374	375	1.03	0.02	0.00	0.00	0.51	0.05
222	374	373	-2.54	0.79	0.00	0.00	2.81	1.92
223	373	372	-2.24	1.06	0.00	0.00	2.49	1.53
224	372	374	0.32	1.85	0.00	0.00	1.42	1.54
225	372	371	0.55	0.12	0.00	0.00	0.61	0.11
226	370	541	-0.09	0.01	0.00	0.00	0.19	0.02
227	370	371	-0.73	0.02	0.00	0.00	0.81	0.19
230	390	391	-0.01	0.00	0.00	0.00	0.01	0.00
231	520	391	-0.02	0.00	0.00	0.00	0.04	0.00
232	391	392	-0.03	0.01	0.00	0.00	0.14	0.02
233	392	519	-0.06	0.11	0.00	0.00	0.25	0.06
234	381	393	0.15	0.04	0.00	0.00	0.30	0.04
235	381	393	0.05	0.04	0.00	0.00	0.21	0.05
236	394	380	-0.12	0.03	0.00	0.00	0.23	0.03
237	378	397	0.28	0.03	0.00	0.00	0.31	0.03
238	399	400	-0.07	0.01	0.00	0.00	0.14	0.01
239	400	401	-0.12	0.03	0.00	0.00	0.23	0.03
240	393	401	0.17	0.06	0.00	0.00	0.33	0.05
241	395	394	-0.02	0.00	0.00	0.00	0.07	0.00

PIPELINE RESULTS

PIPE NUMBER	NODE #1	NODE #2	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	LINE VELO.	HL/ 1000
242	396	395	0.00	0.00	0.00	0.00	0.01	0.00
243	397	396	0.08	0.03	0.00	0.00	0.22	0.03
244	398	397	0.05	0.09	0.00	0.00	0.24	0.06
245	398	377	-0.04	0.02	0.00	0.00	0.16	0.03
246	376	398	0.03	0.05	0.00	0.00	0.15	0.03
247	526	415	0.08	0.01	0.00	0.00	0.15	0.01
248	411	525	-0.01	0.00	0.00	0.00	0.01	0.00
249	408	401	-0.03	0.02	0.00	0.00	0.14	0.02
250	411	408	-0.04	0.01	0.00	0.00	0.20	0.04
251	409	408	0.01	0.00	0.00	0.00	0.06	0.00
252	402	409	0.02	0.01	0.00	0.00	0.10	0.01
253	402	409	0.03	0.01	0.00	0.00	0.11	0.01
254	402	403	-0.05	0.01	0.00	0.00	0.24	0.06
255	404	393	-0.02	0.00	0.00	0.00	0.10	0.01
256	404	403	0.10	0.06	0.00	0.00	0.46	0.19
257	410	403	-0.03	0.02	0.00	0.00	0.15	0.02
258	404	405	-0.09	0.01	0.00	0.00	0.17	0.02
259	405	394	-0.08	0.01	0.00	0.00	0.16	0.01
260	395	405	0.01	0.00	0.00	0.00	0.05	0.00
261	406	410	0.01	0.00	0.00	0.00	0.03	0.00
262	407	406	0.02	0.01	0.00	0.00	0.07	0.01
263	396	407	0.06	0.08	0.00	0.00	0.29	0.08
264	407	532	0.03	0.03	0.00	0.00	0.15	0.02
265	531	409	-0.03	0.01	0.00	0.00	0.13	0.02
266	534	411	0.00	0.00	0.00	0.00	0.01	0.00
267	537	414	-0.10	0.01	0.00	0.00	0.19	0.02
268	413	397	-0.24	0.03	0.00	0.00	0.26	0.02
269	414	413	-0.23	0.09	0.00	0.00	0.44	0.09
270	410	424	0.03	0.05	0.00	0.00	0.13	0.02
271	417	415	-0.01	0.01	0.00	0.00	0.06	0.00
272	416	415	-0.05	0.00	0.00	0.00	0.10	0.01
273	527	416	-0.04	0.01	0.00	0.00	0.18	0.03
274	417	416	-0.01	0.01	0.00	0.00	0.07	0.01
275	418	417	-0.02	0.01	0.00	0.00	0.15	0.03
276	422	418	-0.01	0.00	0.00	0.00	0.05	0.00

PIPELINE RESULTS

PIPE NUMBER	NODE #1	NODE #2	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	LINE VELO.	HL/ 1000
277	419	424	0.05	0.02	0.00	0.00	0.10	0.01
278	536	535	-0.02	0.01	0.00	0.00	0.10	0.01
279	419	425	0.02	0.01	0.00	0.00	0.07	0.01
280	538	420	-0.05	0.00	0.00	0.00	0.10	0.01
281	414	420	0.12	0.02	0.00	0.00	0.24	0.03
282	420	426	0.06	0.01	0.00	0.00	0.11	0.01
283	422	529	-0.01	0.00	0.00	0.00	0.04	0.00
284	423	422	0.00	0.00	0.00	0.00	0.01	0.00
285	424	423	0.02	0.01	0.00	0.00	0.11	0.01
286	425	424	0.05	0.01	0.00	0.00	0.09	0.01
287	425	426	-0.05	0.01	0.00	0.00	0.10	0.01
288	427	421	-0.02	0.01	0.00	0.00	0.09	0.01
289	428	422	-0.02	0.01	0.00	0.00	0.08	0.01
290	428	427	0.00	0.00	0.00	0.00	0.01	0.00
291	428	429	0.01	0.00	0.00	0.00	0.10	0.01
292	429	430	0.00	0.00	0.00	0.00	0.02	0.00
293	530	430	0.00	0.00	0.00	0.00	0.02	0.00
294	430	432	0.00	0.00	0.00	0.00	0.03	0.00
295	434	423	0.00	0.00	0.00	0.00	0.00	0.00
296	434	433	0.02	0.01	0.00	0.00	0.08	0.01
297	434	435	-0.02	0.01	0.00	0.00	0.10	0.01
298	431	427	-0.01	0.01	0.00	0.00	0.05	0.00
299	432	431	0.01	0.00	0.00	0.00	0.02	0.00
300	432	433	-0.03	0.00	0.00	0.00	0.12	0.01
301	435	433	0.02	0.01	0.00	0.00	0.10	0.01
302	435	424	-0.06	0.01	0.00	0.00	0.13	0.01
303	375	437	-0.15	1.18	0.00	0.00	0.68	0.40
304	373	436	-0.30	0.36	0.00	0.00	0.59	0.16
305	437	436	0.03	0.01	0.00	0.00	0.15	0.03
306	437	539	-0.23	0.38	0.00	0.00	1.02	0.83
307	442	443	-0.12	0.27	0.00	0.00	0.52	0.24
308	436	441	-0.30	1.05	0.00	0.00	1.34	1.37
309	438	372	7.38	0.10	0.00	0.00	1.61	0.25
310	438	372	0.47	0.10	0.00	0.00	0.93	0.37
311	440	438	7.52	0.30	0.00	0.00	1.65	0.26

PIPELINE RESULTS

PIPE NUMBER	NODE #1	NODE #2	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	LINE VELO.	HL/ 1000
312	439	438	0.40	0.14	0.00	0.00	0.79	0.28
313	440	439	0.38	0.16	0.00	0.00	0.76	0.25
314	441	440	-0.22	0.04	0.00	0.00	0.44	0.09
315	438	444	0.07	0.09	0.00	0.00	0.30	0.08
316	439	445	-0.04	0.00	0.00	0.00	0.07	0.00
317	446	440	8.15	0.14	0.00	0.00	1.78	0.30
318	441	447	-0.10	0.01	0.00	0.00	0.19	0.02
319	444	371	0.18	0.13	0.00	0.00	0.79	0.52
320	445	444	0.12	0.23	0.00	0.00	0.53	0.25
321	446	445	0.16	0.30	0.00	0.00	0.72	0.44
322	447	446	-0.43	0.17	0.00	0.00	0.85	0.32
323	447	540	0.31	0.22	0.00	0.00	0.61	0.17
324	369	368	-0.14	0.12	0.00	0.00	0.60	0.32
325	368	367	-0.06	0.04	0.00	0.00	0.24	0.06
326	367	366	-0.05	0.04	0.00	0.00	0.22	0.05
327	446	369	-0.13	0.43	0.00	0.00	0.59	0.30
328	448	368	-0.07	0.01	0.00	0.00	0.13	0.01
329	449	448	-0.06	0.06	0.00	0.00	0.26	0.07
330	446	449	-0.17	0.49	0.00	0.00	0.73	0.45
331	449	453	-0.11	0.14	0.00	0.00	0.49	0.22
332	459	446	8.46	0.70	0.00	0.00	1.85	0.32
333	368	450	-0.15	0.04	0.00	0.00	0.30	0.05
334	367	450	-0.01	0.00	0.00	0.00	0.05	0.00
335	450	451	-0.17	0.02	0.00	0.00	0.33	0.06
336	451	452	-0.14	0.01	0.00	0.00	0.27	0.04
337	454	451	0.04	0.00	0.00	0.00	0.07	0.00
338	454	452	-0.01	0.00	0.00	0.00	0.07	0.01
339	366	454	0.02	0.01	0.00	0.00	0.11	0.01
340	366	455	-0.08	0.05	0.00	0.00	0.34	0.11
341	460	455	0.05	0.09	0.00	0.00	0.39	0.19
342	452	453	-0.16	0.01	0.00	0.00	0.31	0.05
343	453	459	-0.27	0.07	0.00	0.00	0.54	0.14
345	455	456	-0.03	0.02	0.00	0.00	0.14	0.02
346	456	457	-0.04	0.01	0.00	0.00	0.17	0.03
347	458	457	0.04	0.00	0.00	0.00	0.13	0.01

PIPELINE RESULTS

PIPE NUMBER	NODE #1	NODE #2	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	LINE VELO.	HL/ 1000
348	458	459	0.08	0.01	0.00	0.00	0.22	0.04
349	468	459	8.20	0.28	0.00	0.00	1.79	0.30
350	459	468	-0.46	0.28	0.00	0.00	0.91	0.36
351	469	458	0.13	0.27	0.00	0.00	0.58	0.29
352	461	460	0.06	0.34	0.00	0.00	0.45	0.26
353	462	461	0.07	0.03	0.00	0.00	0.29	0.08
354	464	463	-0.02	0.00	0.00	0.00	0.07	0.01
355	465	464	-0.01	0.00	0.00	0.00	0.04	0.00
356	462	465	-0.03	0.01	0.00	0.00	0.13	0.02
357	467	462	0.04	0.01	0.00	0.00	0.17	0.03
358	467	465	0.03	0.01	0.00	0.00	0.11	0.01
359	471	467	0.07	0.05	0.00	0.00	0.30	0.09
360	463	466	-0.02	0.01	0.00	0.00	0.11	0.01
361	466	472	-0.03	0.00	0.00	0.00	0.07	0.00
362	468	470	-8.64	0.30	0.00	0.00	1.89	0.33
363	468	469	-0.03	0.00	0.00	0.00	0.14	0.02
364	469	473	-0.17	0.29	0.00	0.00	0.75	0.47
365	473	471	0.12	0.08	0.00	0.00	0.54	0.25
367	472	471	-0.05	0.04	0.00	0.00	0.21	0.05
500	500	314	0.00	0.00	0.00	0.00	0.01	0.00
501	500	502	-0.04	0.06	0.00	0.00	0.19	0.04
502	502	501	-0.02	0.00	0.00	0.00	0.07	0.01
503	502	503	0.04	0.01	0.00	0.00	0.16	0.03
504	501	504	-0.13	0.01	0.00	0.00	0.37	0.09
505	502	506	-0.07	0.02	0.00	0.00	0.33	0.10
506	503	507	-0.10	0.03	0.00	0.00	0.43	0.17
507	505	504	0.04	0.00	0.00	0.00	0.08	0.00
508	505	506	-0.01	0.00	0.00	0.00	0.02	0.00
509	506	507	-0.09	0.00	0.00	0.00	0.18	0.02
510	504	508	-0.10	0.02	0.00	0.00	0.28	0.05
511	508	334	-0.14	0.03	0.00	0.00	0.39	0.10
512	505	508	-0.03	0.02	0.00	0.00	0.15	0.02
513	507	333	-0.19	0.05	0.00	0.00	0.38	0.07
514	329	509	0.02	0.01	0.00	0.00	0.09	0.01
515	509	330	0.02	0.00	0.00	0.00	0.11	0.01

PIPELINE RESULTS

PIPE NUMBER	NODE #1	NODE #2	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	LINE VELO.	HL/ 1000
516	510	512	-0.01	0.00	0.00	0.00	0.03	0.00
517	510	511	-0.01	0.00	0.00	0.00	0.04	0.00
518	511	332	-0.01	0.00	0.00	0.00	0.02	0.00
519	511	512	-0.01	0.00	0.00	0.00	0.03	0.00
520	513	512	0.02	0.00	0.00	0.00	0.09	0.01
521	332	514	-0.02	0.00	0.00	0.00	0.07	0.01
522	513	514	-0.01	0.00	0.00	0.00	0.04	0.00
523	331	513	0.02	0.01	0.00	0.00	0.08	0.01
524	515	348	-1.36	0.04	0.00	0.00	0.67	0.08
525	516	515	-1.76	0.35	0.00	0.00	1.95	0.98
526	516	347	-4.26	0.38	0.00	0.00	2.10	0.70
527	340	517	-0.28	0.10	0.00	0.00	0.55	0.14
528	351	518	0.50	0.36	0.00	0.00	0.98	0.41
529	519	388	0.05	0.00	0.00	0.00	0.03	0.00
530	520	521	-0.01	0.00	0.00	0.00	0.03	0.00
531	521	392	-0.02	0.01	0.00	0.00	0.08	0.01
532	400	520	-0.03	0.01	0.00	0.00	0.12	0.02
533	522	399	-0.07	0.00	0.00	0.00	0.08	0.00
534	522	523	-0.02	0.00	0.00	0.00	0.09	0.01
535	523	525	-0.01	0.00	0.00	0.00	0.04	0.00
536	523	524	-0.01	0.00	0.00	0.00	0.06	0.00
537	524	400	-0.05	0.00	0.00	0.00	0.10	0.01
538	524	525	0.03	0.00	0.00	0.00	0.05	0.00
539	526	522	-0.09	0.01	0.00	0.00	0.10	0.00
540	527	421	0.03	0.01	0.00	0.00	0.12	0.02
541	528	527	-0.01	0.01	0.00	0.00	0.09	0.01
542	418	528	0.00	0.00	0.00	0.00	0.02	0.00
543	528	529	0.01	0.00	0.00	0.00	0.05	0.00
544	529	421	0.00	0.00	0.00	0.00	0.01	0.00
546	429	530	0.01	0.00	0.00	0.00	0.03	0.00
547	533	531	-0.01	0.00	0.00	0.00	0.03	0.00
548	531	532	0.00	0.00	0.00	0.00	0.02	0.00
549	532	533	0.01	0.00	0.00	0.00	0.06	0.00
550	533	534	0.00	0.00	0.00	0.00	0.00	0.00
551	532	535	0.00	0.00	0.00	0.00	0.01	0.00

PIPELINE RESULTS

PIPE NUMBER	NODE #1	NODE #2	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	LINE VELO.	HL/ 1000
552	535	534	0.04	0.00	0.00	0.00	0.08	0.00
553	536	534	-0.02	0.01	0.00	0.00	0.08	0.01
554	536	419	0.04	0.00	0.00	0.00	0.16	0.03
555	419	538	-0.06	0.01	0.00	0.00	0.11	0.01
556	537	538	0.02	0.01	0.00	0.00	0.10	0.01
557	537	535	0.07	0.00	0.00	0.00	0.13	0.01
558	442	539	0.10	0.16	0.00	0.00	0.44	0.17
559	443	540	-0.14	0.03	0.00	0.00	0.27	0.04
560	539	540	-0.15	0.46	0.00	0.00	0.67	0.39
561	372	541	0.10	0.14	0.00	0.00	0.44	0.18
562	300	542	-0.02	0.00	0.00	0.00	0.03	0.00
563	542	543	-0.02	0.00	0.00	0.00	0.05	0.00
564	302	543	-0.02	0.00	0.00	0.00	0.04	0.00
565	543	309	-0.06	0.01	0.00	0.00	0.12	0.01
566	309	314	-0.10	0.05	0.00	0.00	0.20	0.02
567	342	544	0.04	0.01	0.00	0.00	0.19	0.04
568	340	545	-0.06	0.04	0.00	0.00	0.25	0.06
569	515	546	-0.41	0.00	0.00	0.00	0.20	0.01
570	547	544	0.09	0.06	0.00	0.00	0.40	0.15
571	547	548	-0.04	0.01	0.00	0.00	0.17	0.03
572	549	551	-0.65	0.02	0.00	0.00	0.46	0.05
573	545	552	-0.18	0.04	0.00	0.00	0.35	0.06
574	550	551	0.55	0.01	0.00	0.00	0.39	0.04
575	552	551	0.11	0.11	0.00	0.00	0.48	0.21
576	552	517	-0.04	0.02	0.00	0.00	0.16	0.03
577	546	548	-0.16	0.21	0.00	0.00	0.70	0.42
578	548	550	-0.21	0.06	0.00	0.00	0.41	0.08
579	552	553	-0.27	0.09	0.00	0.00	0.52	0.13
580	554	517	0.33	0.11	0.00	0.00	0.64	0.19
581	346	553	-0.36	0.14	0.00	0.00	0.71	0.22
582	553	554	-0.14	0.03	0.00	0.00	0.28	0.04
583	553	354	-0.49	0.70	0.00	0.00	0.97	0.41
584	554	518	-0.48	0.13	0.00	0.00	0.94	0.38
585	547	549	-0.06	0.05	0.00	0.00	0.27	0.07
700	600	601	-5.10	0.00	0.00	0.02	1.61	0.30

PIPELINE RESULTS

PIPE NUMBER	NODE #1	NODE #2	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	LINE VELO.	HL/ 1000
701	601	602	3.83	0.00	0.00	0.00	1.21	0.18
702	602	603	3.83	0.00	0.00	0.00	1.21	0.18
703	603	604	3.83	0.00	0.00	0.00	1.21	0.18
704	604	605	3.83	0.00	0.00	0.23	1.21	0.18
705	605	606	3.83	0.00	0.00	0.00	1.21	0.18
706	606	607	3.83	0.00	0.00	0.00	1.21	0.18
707	607	608	3.83	0.00	0.00	0.01	1.21	0.18
708	625	600	-5.10	0.02	0.00	0.40	1.61	0.30
709	609	601	8.93	0.07	189.63	7.84	6.33	6.18
710	609	617	-8.93	0.06	0.00	3.63	4.40	2.54
711	602	610						
712	610	618	0	0	0	0	0	0
713	611	603						
714	611	619	0	0	0	0	0	0
715	612	604						
716	612	620	0	0	0	0	0	0
717	613	605						
718	613	621	0	0	0	0	0	0
719	606	614						
720	614	622	0	0	0	0	0	0
721	615	607						
722	615	623	0	0	0	0	0	0
723	608	626	3.83	0.01	0	0.23	1.21	0.18
724	617	616	-5.79	0	0	0	0.93	0.07
725	617	618	-3.14	0	0	0	0.5	0.02
726	618	619	-3.14	0	0	0	0.5	0.02
727	619	620	-3.14	0	0	0	0.5	0.02
728	620	621	-3.14	0	0	0	0.5	0.02
729	621	622	-3.14	0	0	0	0.5	0.02
730	622	623	-3.14	0	0	0	0.5	0.02
731	623	624	-3.14	0	0	0	0.5	0.02
732	626	625	-5.1	0.02	0	0.02	1.61	0.3
733	470	626	-8.93	0.15	0	0.11	1.95	0.35
734	470	473	0.29	0	0	0	0.57	0.15
800	365	700	0	0	0	0	0	0

PIPELINE RESULTS

PIPE NUMBER	NODE #1	NODE #2	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	LINE VELO.	HL/ 1000
801	700	701	0	0	0	0	0	0
802	701	702	0	0	0	0	0	0
803	703	700						
804	704	701						
805	705	702						
806	703	704	0	0	0	0	0	0
807	704	705	0	0	0	0	0	0
808	706	705	0	0	0	0	0	0
858	346	550	0.77	0.05	0	0	0.54	0.07
997	616	0	-5.79	0	0	0	0.93	0.07
998	624	0	-3.14	0	0	0	0.5	0.02
999	706	0	0	0	0	0	0	0

JUNCTION NODE RESULTS

JUNCTION NUMBER	DEMAND TYPE	JUNCTION TITLE	EXTERNAL DEMAND	HYDRAULIC GRADE	JUNCTION ELEVATION	PRESSURE HEAD	JUNCTION PRESSURE
300	1		0.03	764.18	638.00	126.18	54.68
301	1		0.04	764.18	639.00	125.18	54.25
302	1		0.02	764.18	643.00	121.18	52.51
303	1		0.01	764.17	648.00	116.17	50.34
304	1		0.02	764.17	651.00	113.17	49.04
305	1		0.01	764.17	661.00	103.17	44.70
306	1		0.02	764.18	647.00	117.18	50.78
307	1		0.03	764.17	647.00	117.17	50.77
308	1		0.03	764.17	655.00	109.17	47.31
309	1		0.02	764.19	638.00	126.19	54.68
310	1		0.04	764.19	643.00	121.19	52.52
311	1		0.03	764.18	646.00	118.18	51.21
312	1		0.03	764.20	643.00	121.20	52.52
313	1		0.01	764.21	644.00	120.21	52.09
314	1		0.02	764.24	618.00	146.24	63.37
315	1		0.03	764.24	623.00	141.24	61.20
316	1		0.02	764.23	631.00	133.23	57.73
317	1		0.02	764.22	640.00	124.22	53.83
318	1		0.02	764.22	644.00	120.22	52.10
319	1		0.02	764.21	642.00	122.21	52.96
320	1		0.01	764.20	632.00	132.20	57.29
321	1		0.01	764.20	632.00	132.20	57.29
322	1		0.01	764.19	630.00	134.19	58.15
323	1		0.01	764.18	639.00	125.18	54.24
324	1		0.01	764.18	622.00	142.18	61.61
325	1		0.01	764.24	629.00	135.24	58.60
326	1		0.02	764.21	641.00	123.21	53.39
327	1		0.01	764.25	634.00	130.25	56.44
328	1		0.02	764.24	638.00	126.24	54.70
329	1		0.01	764.24	638.00	126.24	54.70
330	1		0.02	764.23	641.00	123.23	53.40
331	1		0.02	764.19	639.00	125.19	54.25
332	1		0.01	764.18	632.00	132.18	57.28
333	1		0.01	764.37	616.00	148.37	64.30
334	1		0.01	764.37	634.00	130.37	56.49

JUNCTION NODE RESULTS

JUNCTION NUMBER	DEMAND TYPE	JUNCTION TITLE	EXTERNAL DEMAND	HYDRAULIC GRADE	JUNCTION ELEVATION	PRESSURE HEAD	JUNCTION PRESSURE
335	1		0.03	764.37	640.00	124.37	53.89
336	1		0.01	764.33	642.00	122.33	53.01
337	1		0.00	764.30	636.00	128.30	55.60
338	1		0.01	764.25	638.00	126.25	54.71
339	1		0.01	764.24	639.00	125.24	54.27
340	1		0.01	764.53	613.00	151.53	65.66
341	1		0.01	764.47	631.00	133.47	57.84
342	1		0.01	764.39	640.00	124.39	53.90
343	1		0.02	764.25	642.00	122.25	52.97
344	1		0.01	764.25	641.00	123.25	53.41
345	1		0.01	764.34	646.00	118.34	51.28
346	1		0.02	764.57	621.00	143.57	62.21
347	1		0.01	764.26	636.00	128.26	55.58
348	1		0.02	764.28	637.00	127.28	55.15
349	1		0.01	764.39	638.00	126.39	54.77
350	1		0.01	764.41	631.00	133.41	57.81
351	1		0.03	765.22	613.00	152.22	65.96
352	1		0.02	765.49	621.00	144.49	62.61
353	1		0.02	765.46	627.00	138.46	60.00
354	1		0.02	765.41	623.00	142.41	61.71
355	1		0.03	765.47	631.00	134.47	58.27
356	1		0.02	764.52	630.00	134.52	58.29
357	1		0.02	764.38	632.00	132.38	57.37
358	1		0.02	764.40	627.00	137.40	59.54
359	1		0.03	764.52	621.00	143.52	62.19
360	1		0.02	764.52	617.00	147.52	63.92
361	1		0.02	764.52	605.00	159.52	69.12
362	1		0.02	764.52	604.00	160.52	69.56
363	1		0.01	765.75	625.00	140.75	60.99
364	1		0.02	764.53	620.00	144.53	62.63
365	1	SURV. DISCH.	0.00	764.52	594.50	170.02	73.67
366	1		0.00	767.72	622.00	145.72	63.14
367	1		0.00	767.68	623.00	144.68	62.69
368	1		0.01	767.64	625.00	142.64	61.81
369	1		0.00	767.52	629.00	138.52	60.03

JUNCTION NODE RESULTS

JUNCTION NUMBER	DEMAND TYPE	JUNCTION TITLE	EXTERNAL DEMAND	HYDRAULIC GRADE	JUNCTION ELEVATION	PRESSURE HEAD	JUNCTION PRESSURE
370	1		0.01	766.41	631.00	135.41	58.68
371	1		0.00	766.43	631.00	135.43	58.69
372	1		0.02	766.55	648.00	118.55	51.37
373	1		0.00	765.49	639.00	126.49	54.81
374	1		0.01	764.70	633.00	131.70	57.07
375	1		0.02	764.68	630.00	134.68	58.36
376	1		0.02	764.66	627.00	137.66	59.65
377	1		0.02	764.63	629.00	135.63	58.77
378	1		0.02	764.55	626.00	138.55	60.04
379	1		0.01	764.53	607.00	157.53	68.26
380	1		0.01	764.52	595.00	169.52	73.46
381	1		0.01	764.52	588.00	176.52	76.49
382	1		0.01	764.52	581.00	183.52	79.52
383	1		0.01	764.51	591.00	173.51	75.19
384	1		0.01	764.51	586.00	178.51	77.36
385	1		0.01	764.51	583.00	181.51	78.66
386	1		0.01	764.51	581.00	183.51	79.52
387	1		0.01	764.51	573.00	191.51	82.99
388	1		0.01	764.51	578.00	186.51	80.82
389	1		0.01	764.51	569.00	195.51	84.72
390	1		0.01	764.40	578.00	186.40	80.77
391	1		0.01	764.40	587.00	177.40	76.87
392	1		0.00	764.41	582.00	182.41	79.04
393	1		0.01	764.48	603.00	161.48	69.98
394	1		0.01	764.49	611.00	153.49	66.51
395	1		0.01	764.49	621.00	143.49	62.18
396	1		0.01	764.49	626.00	138.49	60.01
397	1		0.03	764.52	624.00	140.52	60.89
398	1		0.02	764.61	628.00	136.61	59.20
399	1		0.00	764.38	585.00	179.38	77.73
400	1		0.02	764.38	593.00	171.38	74.27
401	1		0.02	764.42	597.00	167.42	72.55
402	1		0.01	764.41	605.00	159.41	69.08
403	1		0.01	764.42	609.00	155.42	67.35
404	1		0.00	764.48	607.00	157.48	68.24

JUNCTION NODE RESULTS

JUNCTION NUMBER	DEMAND TYPE	JUNCTION TITLE	EXTERNAL DEMAND	HYDRAULIC GRADE	JUNCTION ELEVATION	PRESSURE HEAD	JUNCTION PRESSURE
405	1		0.00	764.49	615.00	149.49	64.78
406	1		0.01	764.40	611.00	153.40	66.47
407	1		0.02	764.41	634.00	130.41	56.51
408	1		0.00	764.39	606.00	158.39	68.64
409	1		0.00	764.39	609.00	155.39	67.34
410	1		0.01	764.40	613.00	151.40	65.61
411	1		0.05	764.38	607.00	157.38	68.20
413	1		0.01	764.49	614.00	150.49	65.21
414	1		0.01	764.40	588.00	176.40	76.44
415	1		0.01	764.36	579.00	185.36	80.32
416	1		0.00	764.36	570.00	194.36	84.22
417	1		0.00	764.35	579.00	185.35	80.32
418	1		0.00	764.34	584.00	180.34	78.15
419	1		0.03	764.37	596.00	168.37	72.96
420	1		0.01	764.38	592.00	172.38	74.70
421	1		0.00	764.34	570.00	194.34	84.21
422	1		0.01	764.34	580.00	184.34	79.88
423	1		0.02	764.34	579.00	185.34	80.31
424	1		0.04	764.35	585.00	179.35	77.72
425	1		0.02	764.36	577.00	187.36	81.19
426	1		0.01	764.37	589.00	175.37	75.99
427	1		0.01	764.33	563.00	201.33	87.24
428	1		0.00	764.33	579.00	185.33	80.31
429	1		0.00	764.33	579.00	185.33	80.31
430	1		0.01	764.33	570.00	194.33	84.21
431	1		0.02	764.33	547.00	217.33	94.17
432	1		0.02	764.33	570.00	194.33	84.21
433	1		0.01	764.33	572.00	192.33	83.34
434	1		0.00	764.34	574.00	190.34	82.48
435	1		0.02	764.35	571.00	193.35	83.78
436	1		0.04	765.85	637.00	128.85	55.84
437	1		0.04	765.86	631.00	134.86	58.44
438	1		0.01	766.65	648.00	118.65	51.41
439	1		0.02	766.79	644.00	122.79	53.21
440	1		0.02	766.94	644.00	122.94	53.28

JUNCTION NODE RESULTS

JUNCTION NUMBER	DEMAND TYPE	JUNCTION TITLE	EXTERNAL DEMAND	HYDRAULIC GRADE	JUNCTION ELEVATION	PRESSURE HEAD	JUNCTION PRESSURE
441	1		0.02	766.90	641.00	125.90	54.56
442	1		0.02	766.40	619.00	147.40	63.87
443	1		0.02	766.67	623.00	143.67	62.26
444	1		0.01	766.56	631.00	135.56	58.74
445	1		0.01	766.79	639.00	127.79	55.37
446	1		0.01	767.09	636.00	131.09	56.80
447	1		0.02	766.92	636.00	130.92	56.73
448	1		0.01	767.64	620.00	147.64	63.98
449	1		0.00	767.58	618.00	149.58	64.82
450	1		0.00	767.68	610.00	157.68	68.33
451	1		0.00	767.70	602.00	165.70	71.80
452	1		0.00	767.71	602.00	165.71	71.81
453	1		0.00	767.72	602.00	165.72	71.81
454	1		0.00	767.71	597.00	170.71	73.97
455	1		0.00	767.76	575.00	192.76	83.53
456	1		0.01	767.79	601.00	166.79	72.27
457	1		0.01	767.80	618.00	149.80	64.91
458	1		0.01	767.80	617.00	150.80	65.35
459	1		0.01	767.79	613.00	154.79	67.07
460	1		0.01	767.85	567.00	200.85	87.04
461	1		0.01	768.19	603.00	165.19	71.58
462	1		0.00	768.22	605.00	163.22	70.73
463	1		0.01	768.23	556.00	212.23	91.97
464	1		0.01	768.23	562.00	206.23	89.37
465	1		0.00	768.23	578.00	190.23	82.43
466	1		0.01	768.25	554.00	214.25	92.84
467	1		0.00	768.23	592.00	176.23	76.37
468	1		0.01	768.07	625.00	143.07	62.00
469	1		0.01	768.08	621.00	147.08	63.73
470	1	CELEST. DISC	0.00	768.37	599.00	169.37	73.39
471	1		0.00	768.29	602.00	166.29	72.06
472	1		0.01	768.25	570.00	198.25	85.91
473	1		0.00	768.36	599.00	169.36	73.39
500	1		0.02	764.24	619.00	145.24	62.94
501	1		0.02	764.30	626.00	138.30	59.93

JUNCTION NODE RESULTS

JUNCTION NUMBER	DEMAND TYPE	JUNCTION TITLE	EXTERNAL DEMAND	HYDRAULIC GRADE	JUNCTION ELEVATION	PRESSURE HEAD	JUNCTION PRESSURE
502	1		0.01	764.30	620.00	144.30	62.53
503	1		0.01	764.29	619.00	145.29	62.96
504	1		0.01	764.32	627.00	137.32	59.50
505	1		0.00	764.32	622.00	142.32	61.67
506	1		0.00	764.32	621.00	143.32	62.10
507	1		0.00	764.32	616.00	148.32	64.27
508	1		0.00	764.34	632.00	132.34	57.35
509	1		0.01	764.23	640.00	124.23	53.83
510	1		0.02	764.18	618.00	146.18	63.34
511	1		0.00	764.18	616.00	148.18	64.21
512	1		0.00	764.18	623.00	141.18	61.18
513	1		0.00	764.18	627.00	137.18	59.44
514	1		0.01	764.18	630.00	134.18	58.15
515	1		0.01	764.24	638.00	126.24	54.70
516	1	ADDISON 1-MG	0.00	763.89	637.00	126.89	54.98
517	1		0.01	764.63	607.00	157.63	68.31
518	1		0.02	764.86	602.00	162.86	70.57
519	1		0.01	764.51	587.00	177.51	76.92
520	1		0.01	764.40	589.00	175.40	76.00
521	1		0.00	764.40	594.00	170.40	73.84
522	1		0.00	764.38	583.00	181.38	78.60
523	1		0.00	764.38	583.00	181.38	78.60
524	1		0.01	764.38	588.00	176.38	76.43
525	1		0.01	764.38	590.00	174.38	75.57
526	1		0.01	764.37	582.00	182.37	79.03
527	1		0.00	764.35	564.00	200.35	86.82
528	1		0.00	764.34	579.00	185.34	80.31
529	1		0.00	764.34	579.00	185.34	80.31
530	1		0.00	764.33	580.00	184.33	79.88
531	1		0.02	764.38	601.00	163.38	70.80
532	1		0.02	764.38	619.00	145.38	63.00
533	1		0.02	764.38	616.00	148.38	64.30
534	1		0.02	764.38	613.00	151.38	65.60
535	1		0.01	764.38	611.00	153.38	66.47
536	1		0.00	764.38	604.00	160.38	69.50

JUNCTION NODE RESULTS

JUNCTION NUMBER	DEMAND TYPE	JUNCTION TITLE	EXTERNAL DEMAND	HYDRAULIC GRADE	JUNCTION ELEVATION	PRESSURE HEAD	JUNCTION PRESSURE
537	1		0.01	764.39	607.00	157.39	68.20
538	1		0.02	764.38	592.00	172.38	74.70
539	1		0.02	766.24	631.00	135.24	58.60
540	1		0.02	766.70	631.00	135.70	58.80
541	1		0.01	766.42	638.00	128.42	55.65
542	1		0.01	764.18	632.00	132.18	57.28
543	1		0.01	764.18	639.00	125.18	54.25
544	1		0.01	764.38	644.00	120.38	52.16
545	1		0.02	764.57	620.00	144.57	62.65
546	1		0.01	764.24	640.00	124.24	53.84
547	1		0.01	764.44	644.50	119.94	51.97
548	1		0.01	764.45	637.50	126.95	55.01
549	1		0.01	764.49	631.00	133.49	57.84
550	1		0.01	764.51	626.00	138.51	60.02
551	1		0.01	764.50	628.50	136.00	58.93
552	1		0.01	764.61	619.00	145.61	63.10
553	1		0.01	764.70	612.00	152.70	66.17
554	1		0.00	764.73	604.00	160.73	69.65
600	1	CELEST. DISC	0.00	769.09	599.00	170.09	73.70
601	1	CELEST. DISC	0.00	769.11	599.00	170.11	73.71
602	1	CELEST. DISC	0.00	769.11	599.00	170.11	73.71
603	1	CELEST. DISC	0.00	769.11	599.00	170.11	73.71
604	1	CELEST. DISC	0.00	769.11	599.00	170.11	73.71
605	1	CELEST. DISC	0.00	768.88	599.00	169.88	73.61
606	1	CELEST. DISC	0.00	768.88	599.00	169.88	73.61
607	1	CELEST. DISC	0.00	768.88	599.00	169.88	73.61
608	1	CELEST. DISC	0.00	768.86	599.00	169.86	73.61
609	1	CELEST. PUMP	0.00	587.39	572.50	14.89	6.45
610	1	CEL. EXIST P	0.00	591.08	572.50	18.58	8.05
611	1	CELEST. FUTU	0.00	591.08	572.50	18.58	8.05
612	1	CELEST. PUMP	0.00	591.08	572.50	18.58	8.05
613	1	CELEST. FUTU	0.00	591.09	572.50	18.59	8.05
614	1	CEL. FUTURE	0.00	591.09	572.50	18.59	8.05
615	1	CELEST. PUMP	0.00	591.09	572.50	18.59	8.05
616	1	6MG G.S. OUT	0.00	591.09	572.50	18.59	8.05

JUNCTION NODE RESULTS

JUNCTION NUMBER	DEMAND TYPE	JUNCTION TITLE	EXTERNAL DEMAND	HYDRAULIC GRADE	JUNCTION ELEVATION	PRESSURE HEAD	JUNCTION PRESSURE
617	1	CELEST. SUCT	0.00	591.08	572.50	18.58	8.05
618	1	CELEST. SUCT	0.00	591.08	572.50	18.58	8.05
619	1	CELEST. SUCT	0.00	591.08	572.50	18.58	8.05
620	1	CELEST. SUCT	0.00	591.08	572.50	18.58	8.05
621	1	CELEST. SUCT	0.00	591.09	572.50	18.59	8.05
622	1	CELEST. SUCT	0.00	591.09	572.50	18.59	8.05
623	1	CELEST. SUCT	0.00	591.09	572.50	18.59	8.05
624	1	6MG G.S. OUT	0.00	591.09	572.50	18.59	8.05
625	1	CELEST. DISC	0.00	768.67	599.00	169.67	73.52
626	1	CELEST. DISC	0.00	768.63	599.00	169.63	73.51
700	1	SURV. DISCH.	0.00	764.52	596.25	168.27	72.92
701	1	SURVEYOR DIS	0.00	764.52	696.25	68.27	29.58
702	1	SURV. DISCH.	0.00	764.52	696.25	68.27	29.58
703	1	SURV. SUCT.	0.00	641.67	596.00	45.67	19.79
704	1	SURV. DISCH.	0.00	641.67	596.00	45.67	19.79
705	1	SURV. SUCT.	0.00	641.67	596.00	45.67	19.79
706	1	SURV. SUCT.	0.00	641.67	596.00	45.67	19.79

REGULATING VALVE REPORT

Valve Type	Position Node	Controlled Pipe	Valve Setting	Valve Status	Upstream Grade	Downstream Grade	Through Flow
		(ft or mgd)			(ft)	(ft)	(mgd)
PSV	610	711	872.50	Closed	769.11	591.08	0.00

SUMMARY OF INFLOWS AND OUTFLOWS

(+) INFLOWS INTO THE SYSTEM FROM BOUNDARY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO BOUNDARY NODES

Pipe Number	Flow Rate (mgd)
170	(6.03)
997	5.79
998	3.14
999	0.00

NET SYSTEM INFLOW	=	8.93
NET SYSTEM OUTFLO	=	(6.03)
NET SYSTEM DEMAN	=	2.90

****** CYBERNET SIMULATION COMPLETED ******

DATE: 7/05/1996
TIME: 16:56:34

TOWN OF ADDISON, TEXAS

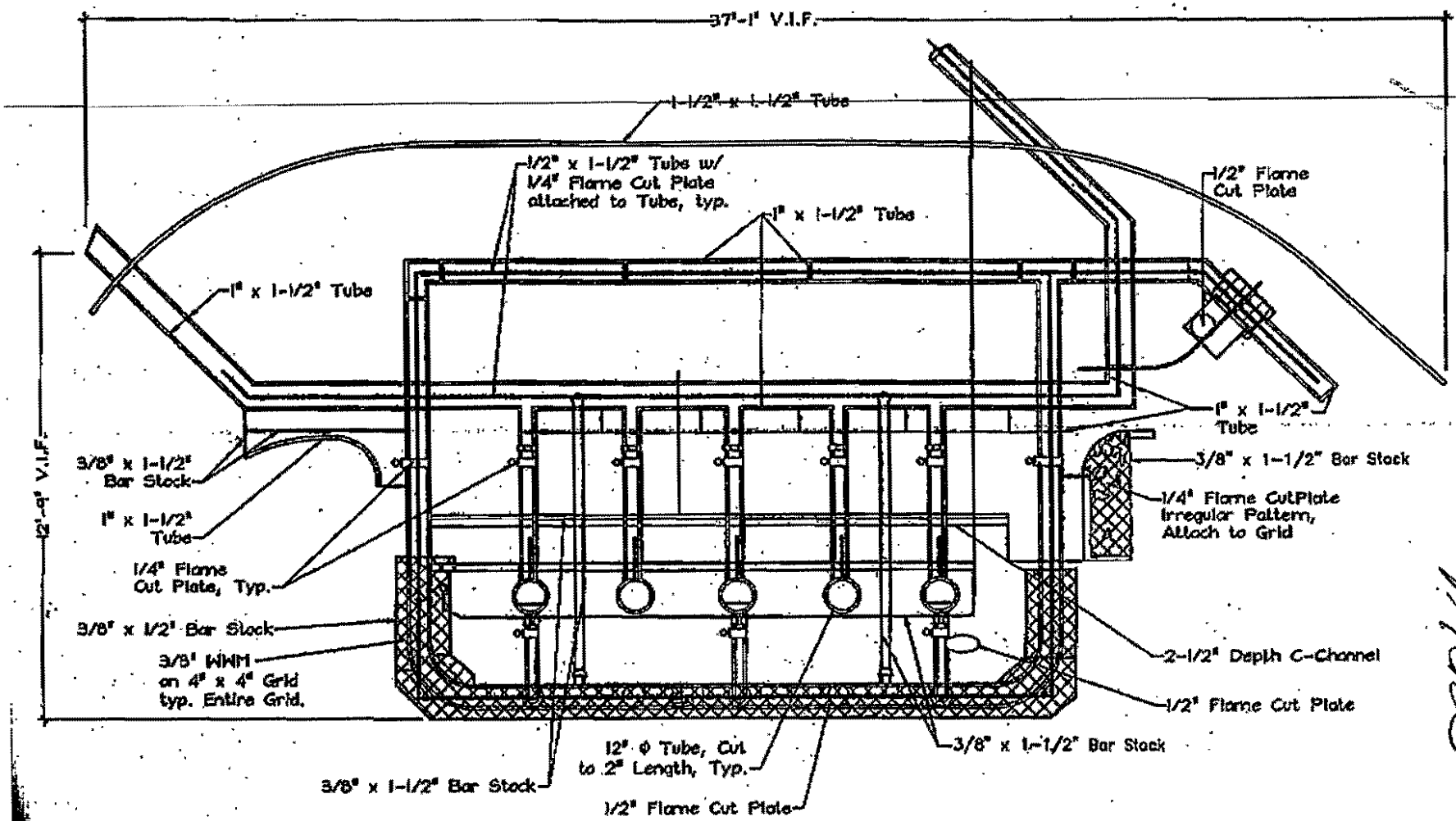
1996 WATER DISTRIBUTION REPORT

Prepared By

SHIMEK, JACOBS & FINKLEA
CONSULTING ENGINEERS

Celestial Pump Station

Ginn



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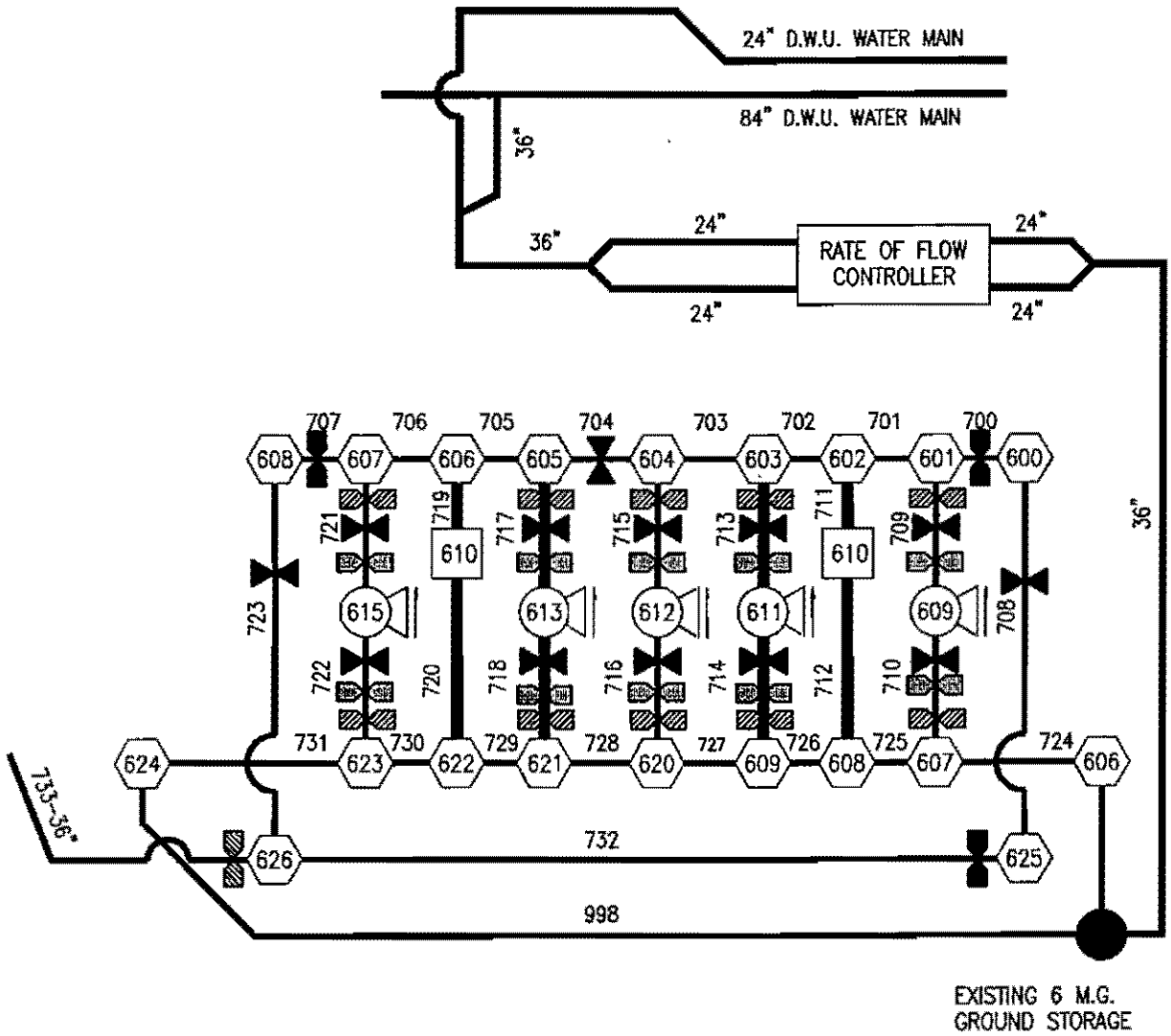
TOWN OF ADDISON

SCHEMATIC LAYOUT



EXISTING 6 M.G.
GROUND STORAGE

LEGEND

- 90° BEND
- COUPLING
- PUMP CONTROL VALVE
- TEE (BRANCH & RUN)
- EXISTING PUMP
- FUTURE PUMP
- EXISTING SURGE VALVE
- FUTURE SURGE VALVE

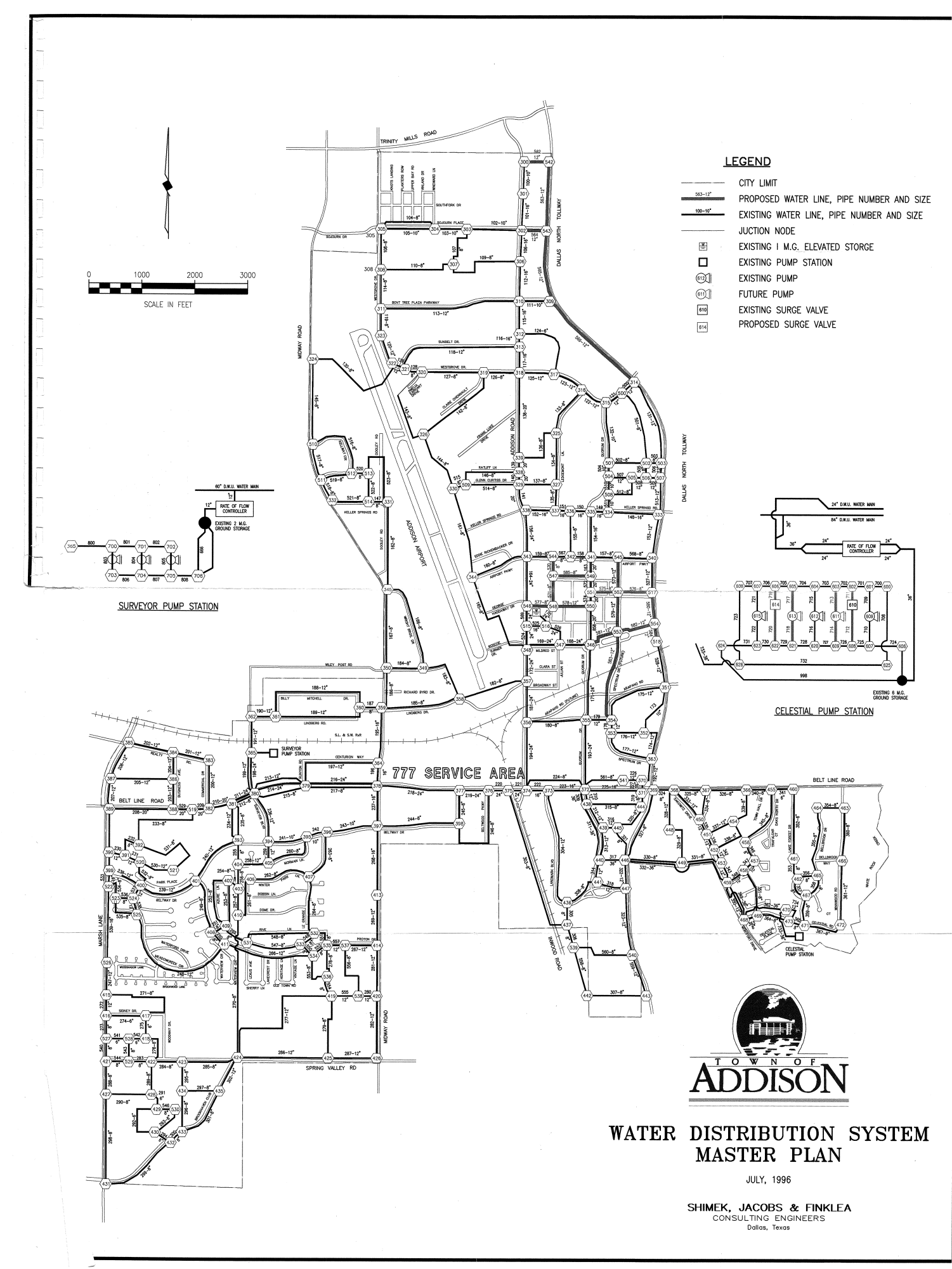
Figure 6

TOWN OF ADDISO

CELESTIAL PUMP STA

SHIMEK, JACOBS & FINKLEA CONSULTING ENGINEERS

JULY,



TOWN OF ADDISON

WATER DISTRIBUTION SYSTEM MASTER PLAN

JULY, 1996

SHIMEK, JACOBS & FINKLEA
CONSULTING ENGINEERS
Dallas, Texas

#R10-2

TOWN OF
ADDISON

REPORT ON

1996 WATER DISTRIBUTION SYSTEM

Prepared By

SHIMEK, JACOBS & FINKLEA
CONSULTING ENGINEERS
DALLAS, TEXAS

July, 1996

TOWN OF ADDISON, TEXAS
1996 WATER DISTRIBUTION SYSTEM REPORT

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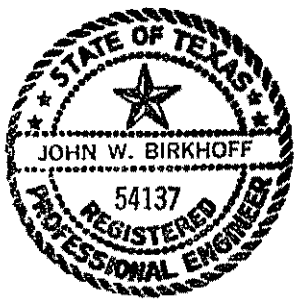
John W. Birkhoff
Texas P.E. No. 54137
Date: August 9, 1996



John W Birkhoff

8/9/96

1996 WATER DISTRIBUTION SYSTEM REPORT

GENERAL

This analysis and report covers the analysis of the existing water distribution system for the Town of Addison. Included is an improvement plan for the system and an overall master plan map. The water distribution system is near buildout conditions and this study is to confirm the adequacy of that system and to size future improvements.

DEFINITIONS

The design of the water distribution system involves various rates of water use which are, generally, referred to as water demand. The four most significant rates and a definition of each are:

1) Average Daily Demand: This rate is generally expressed in gallons per capita per day (gpcd) or in million gallons per day (MGD). When referred to as gallons per capita per day, it represents the average daily amount used per person during the entire year. When referred to as million gallons per day, it represents the average daily amount used by the entire City over a period of one year.

2) Maximum Daily Demand: This is the total amount of water used during the day of heaviest consumption in any given year and the minimum rate which the high service pumps must be capable of pumping. Water must be supplied to the pumps at this rate.

3) Maximum Hourly Demand: This is the rate at which water is drawn from the entire system during the hour of maximum consumption on the day of maximum demand. This rate is generally of a short duration and is most economically provided for by the use of elevated storage in addition to water supplied to the system by pumps. The distribution system, including storage and pumping capacity, must be able to satisfy this demand.

4) Minimum Hourly Demand: This is the rate at which water is drawn from the distribution system during the hour of minimum demand on the day of maximum demand. This demand rate is used in the water distribution analysis to determine the adequacies of the system to replenish elevated storage.

PLANNING AREA

The planning area for this report includes the entire area within the current Town limits and includes approximately 4-1/2 square miles. The existing Addison Airport remains as an airport in this analysis.

The following is a breakdown of land uses utilized in this report:

- High Density Single Family ..... 1,012 Lots
- Low Density Single Family ..... 89 Acres
- Apartments ..... 253.8 Acres
- Quorum Circle and Northern Undeveloped Areas ..... 274.6 Acres
- Tollway Corridor ..... 364.9 Acres
- Midway Road Office/Commercial ..... 81.5 Acres
- Commercial Retail ..... 456.5 Acres
- Industrial ..... 566 Acres
- School/Recreation Centers ..... 126 Acres

PROJECTED WATER USE

Hourly data from the summer of 1995 for pumpage and movement in elevated storage was utilized to determine when the maximum hourly demand occurred and the peaking factor between the maximum daily demand and the maximum hourly demand. The graphical representation for the peak day in 1995 is shown on Figures 1, 2 and 3. In addition, billing records were reviewed for August, 1995 for domestic and irrigation usage. Representative usage were formulated for various land uses and applied globally to that land use. Based on studies completed from records of 1980, the representative usage were adjusted to simulate a summer demand similar to the summer of 1980. The year 1980 was selected because demand far exceeded any that had been experienced in the past, largely because of the extremely hot summer weather. In fact, there were approximately 60 consecutive days in which the temperature equaled or exceeded 100° F.

The following demands are utilized in this report:

Land Use	Maximum Day	Maximum Hour
High Density Single Family (3.2 persons/unit)	350 gpcd	700 gpcd
Low Density Single Family (1.8 homes/acre)	500 gpcd	1,000 gpcd
Apartments	3,000 gpad	6,000 gpad
Quorum Circle & Northern Undeveloped Areas	5,000 gpad	10,000 gpad
Tollway Corridor	7,000 gpad	10,500 gpad
Midway Road Office/Commercial	3,000 gpad	4,500 gpad
Commercial Retail	3,000 gpad	4,500 gpad
Industrial	3,000 gpad	4,500 gpad
Schools/Recreation Centers	3,000 gpad	4,500 gpad

gpcd = gallons per capital per day
gpad = gallons per acre per day

The calculated demands for various land uses results in the following overall system demands:

Land Use	Maximum Day (MGD)	Maximum Hour (MGD)
High Density Single Family (3.2 persons/unit)	1.13	2.27
Low Density Single Family (1.8 homes/acre)	0.26	0.51
Apartments	0.76	1.52
Quorum Circle & Northern Undeveloped Areas	1.37	2.75
Tollway Corridor	2.55	3.83
Midway Road Office/Commercial	0.24	0.37
Commercial Retail	1.37	2.05
Industrial	1.70	2.55
Schools/Recreation Centers	0.36	0.57
	9.74 (mgd)	**16.42 (mgd)**

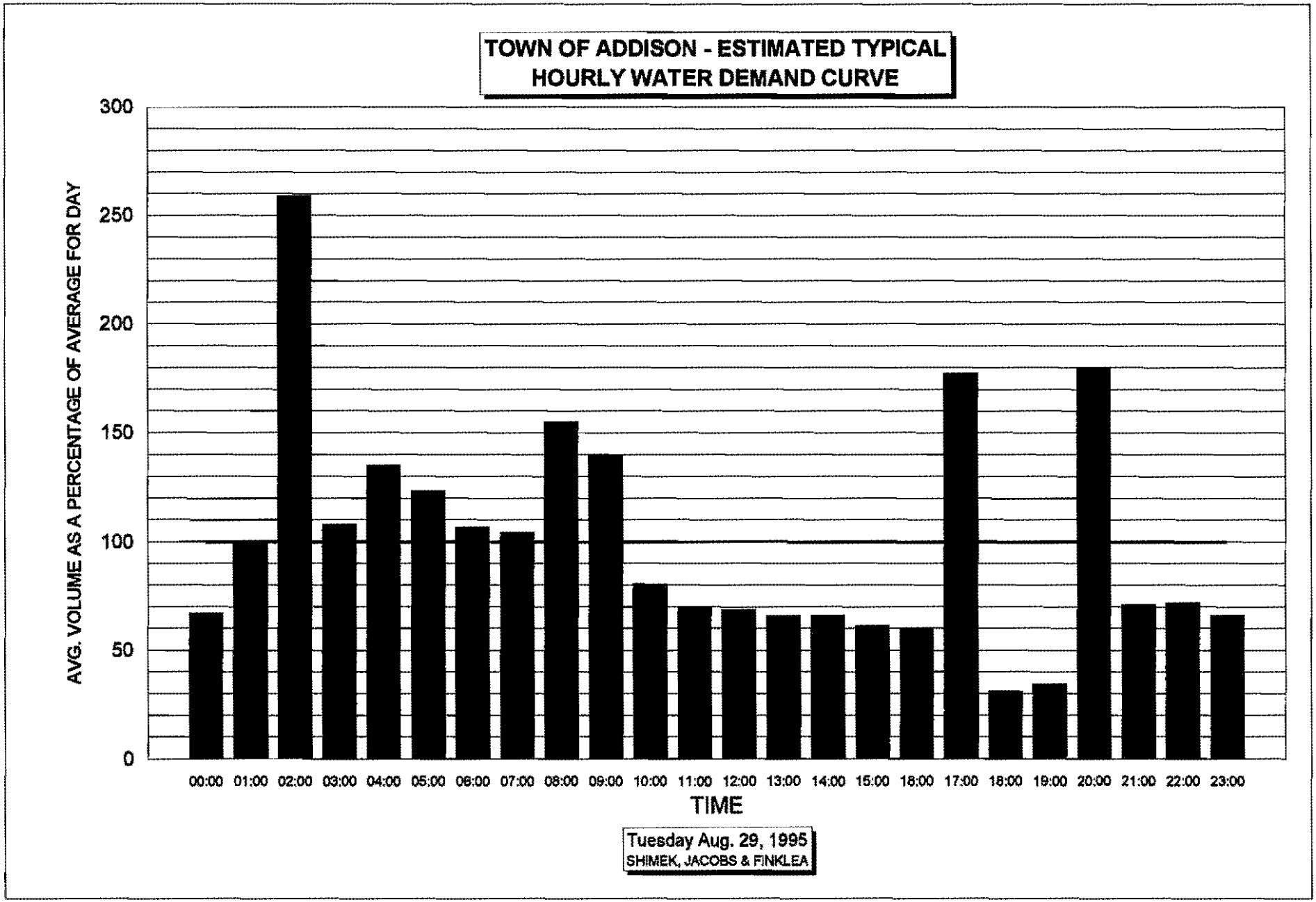

TOWN OF ADDISON - ESTIMATED TYPICAL HOURLY WATER DEMAND CURVE
AVG. VOLUME AS A PERCENTAGE OF AVERAGE FOR DAY
300
250
200
150
100
50
0
00:00 01:00 02:00 03:00 04:00 05:00 06:00 07:00 08:00 09:00 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00 18:00 19:00 20:00 21:00 22:00 23:00
TIME
Tuesday Aug. 29, 1995
SHIMEK, JACOBS & FINKLEA

Figure 1

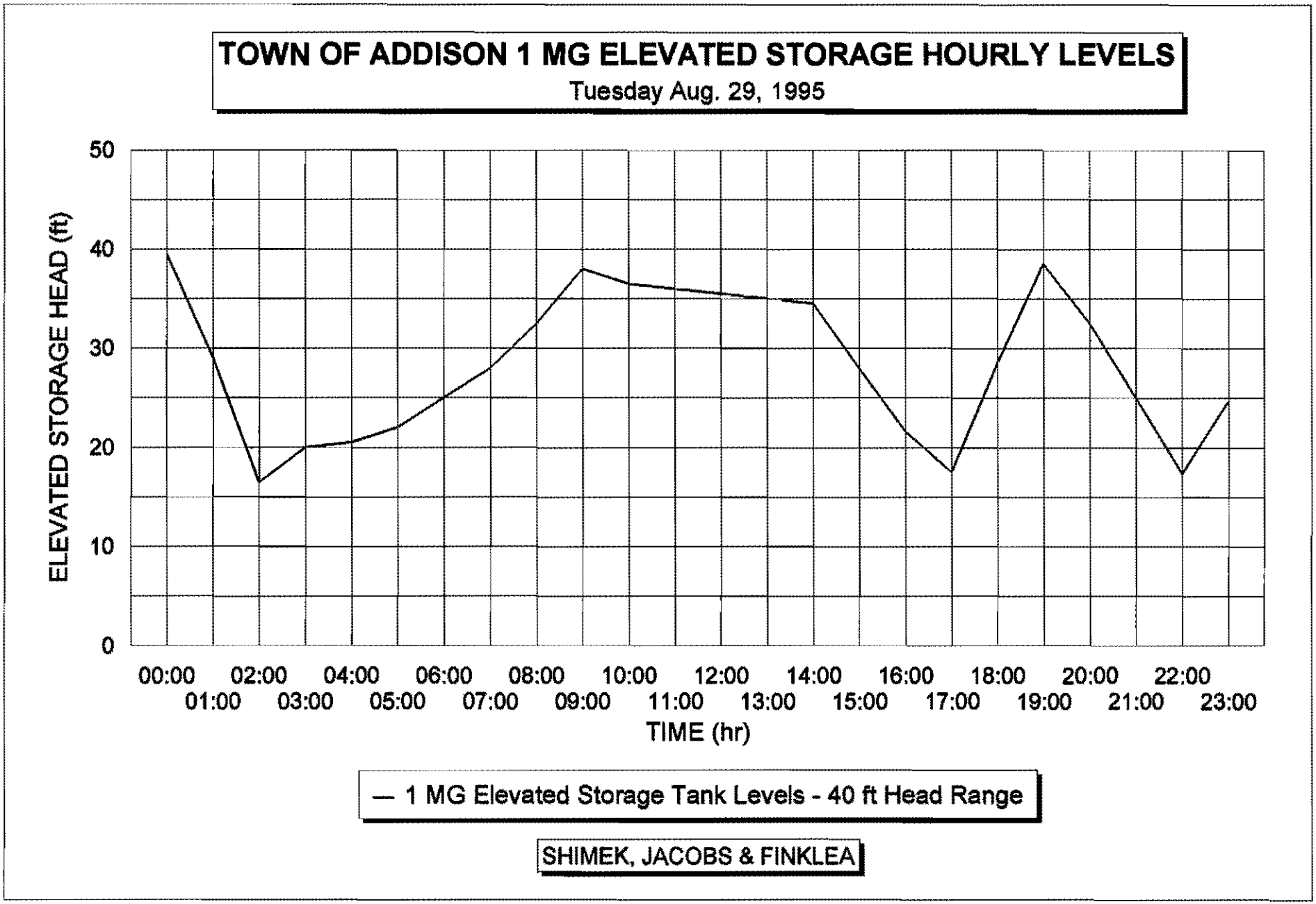

TOWN OF ADDISON 1 MG ELEVATED STORAGE HOURLY LEVELS
Tuesday Aug. 29, 1995
ELEVATED STORAGE HEAD (ft)
50
40
30
20
10
0
00:00
01:00
02:00
03:00
04:00
05:00
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
TIME (hr)
— 1 MG Elevated Storage Tank Levels - 40 ft Head Range
SHIMEK, JACOBS & FINKLEA

Figure 2

Hourly Demand Results For August 28 - August 29, 1995

DATE	Time (hr)	Total Hourly Pumpage (GAL)	Volume into Elev. Storage (GAL)	Volume out of Elev. Storage (GAL)	Difference Between Vol. into Elev. Stor. & Out of Elev Storage (GAL) ( ) Represents Refill Deficiency	Net System Demand (GAL)
Sunday, Aug. 27 1995	00:00	0.0	0.0	0.0		0.0
	01:00	0.0	(144,452.5)	0.0		(144,452.5)
	02:00	470,833.3	(80,251.5)	0.0		390,581.8
	03:00	462,500.0	0.0	32,101.0		494,601.0
	04:00	458,333.3	0.0	16,050.0		474,383.3
	05:00	441,666.7	0.0	38,520.7		480,187.4
	06:00	437,500.0	(70,621.2)	0.0		366,878.8
	07:00	429,166.7	(160,503.0)	0.0		268,663.7
	08:00	416,666.7	0.0	64,201.0		480,867.7
	09:00	0.0	0.0	102,722.2		102,722.2
	10:00	0.0	(54,571.7)	0.0		(54,571.7)
	11:00	0.0	(32,100.0)	0.0		(32,100.0)
	12:00	0.0	(22,470.7)	0.0		(22,470.7)
	13:00	0.0	(25,680.3)	0.0		(25,680.3)
	14:00	0.0	0.0	176,553.0		176,553.0
	15:00	475,000.0	0.0	221,493.9		696,493.9
	16:00	450,000.0	0.0	179,763.1		629,763.1
	17:00	425,000.0	(321,005.5)	0.0		103,994.5
	18:00	0.0	(240,754.5)	0.0		(240,754.5)
	19:00	0.0	(109,141.4)	0.0		(109,141.4)
	20:00	470,833.3	0.0	333,845.4		804,678.7
	21:00	458,333.3	0.0	224,704.0		683,037.3
	22:00	437,500.0	0.0	115,562.0		553,062.0
	23:00	437,500.0	(356,316.0)	16,050.0		81,184.0
Total		6,270,833.3	(1,617,868.3)	1,521,566.3	96,302.0	6,158,481.3
Monday, Aug. 28, 1995	00:00	429,166.7	(176,553.0)	0.0		252,613.7
	01:00	416,666.7	(144,452.5)	0.0		272,214.2
	02:00	0.0	0.0	433,357.5		433,357.5
	03:00	458,333.3	0.0	240,754.0		699,087.3
	04:00	458,333.3	(112,352.0)	0.0		345,981.3
	05:00	450,000.0	(22,470.0)	0.0		427,530.0
	06:00	437,500.0	(105,932.0)	0.0		331,568.0
	07:00	429,166.7	(128,402.0)	0.0		300,764.7
	08:00	416,666.7	(208,654.0)	0.0		208,012.7
	09:00	654,166.7	(89,881.3)	0.0		564,285.4
	10:00	229,166.7	0.0	218,283.8		447,450.5
	11:00	225,000.0	(3,210.1)	0.0		221,789.9
	12:00	220,833.3	(12,840.4)	0.0		207,992.9
	13:00	216,666.7	0.0	0.0		216,666.7
	14:00	470,833.3	0.0	304,955.5		775,788.8
	15:00	437,500.0	0.0	163,712.5		601,212.5
	16:00	429,166.7	(324,215.5)	0.0		104,951.2
	17:00	425,000.0	(353,106.0)	0.0		71,894.0
	18:00	0.0	0.0	134,822.2		134,822.2
	19:00	0.0	0.0	202,233.3		202,233.3
	20:00	0.0	0.0	176,553.5		176,553.5
	21:00	466,666.7	0.0	166,922.5		633,589.2
	22:00	441,666.7	(327,425.5)	0.0		114,241.2
	23:00	437,500.0	(192,603.5)	0.0		244,896.5
Total		8,150,000.0	(2,202,097.8)	2,041,594.8	160,503.0	7,989,497.0
Tuesday Aug. 29, 1995	00:00	420,833.3	(192,603.0)	0.0		228,230.3
	01:00	0.0	0.0	337,056.0		337,056.0
	02:00	479,166.7	0.0	401,063.5		880,230.2
	03:00	479,166.7	(112,158.5)	0.0		367,008.2
	04:00	475,000.0	(16,050.5)	0.0		458,949.5
	05:00	466,666.7	(48,150.5)	0.0		418,516.2
	06:00	458,333.3	(96,302.0)	0.0		362,031.3
	07:00	450,000.0	(96,302.0)	0.0		353,698.0
	08:00	670,833.3	(144,452.5)	0.0		526,380.8
	09:00	650,000.0	(176,552.5)	0.0		473,447.5
	10:00	225,000.0	0.0	48,150.5		273,150.5
	11:00	220,833.3	0.0	16,050.5		236,883.8
	12:00	216,666.7	0.0	16,050.0		232,716.7
	13:00	208,333.3	0.0	16,050.0		224,383.3
	14:00	208,333.3	0.0	16,050.5		224,383.8
	15:00	0.0	0.0	208,653.5		208,653.5
	16:00	0.0	0.0	205,444.0		205,444.0
	17:00	470,833.3	0.0	131,612.0		602,445.3
	18:00	458,333.3	(353,106.0)	0.0		105,227.3
	19:00	437,500.0	(321,005.5)	0.0		116,494.5
	20:00	416,666.7	0.0	192,603.0		609,269.7
	21:00	0.0	0.0	240,754.5		240,754.5
	22:00	0.0	0.0	243,964.0		243,964.0
	23:00	458,333.3	(234,334.0)	0.0		223,999.3
Total		7,870,833.3	(1,791,017.0)	2,073,502.0	(282,485.0)	8,153,318.3

Figure 3

WATER SUPPLY

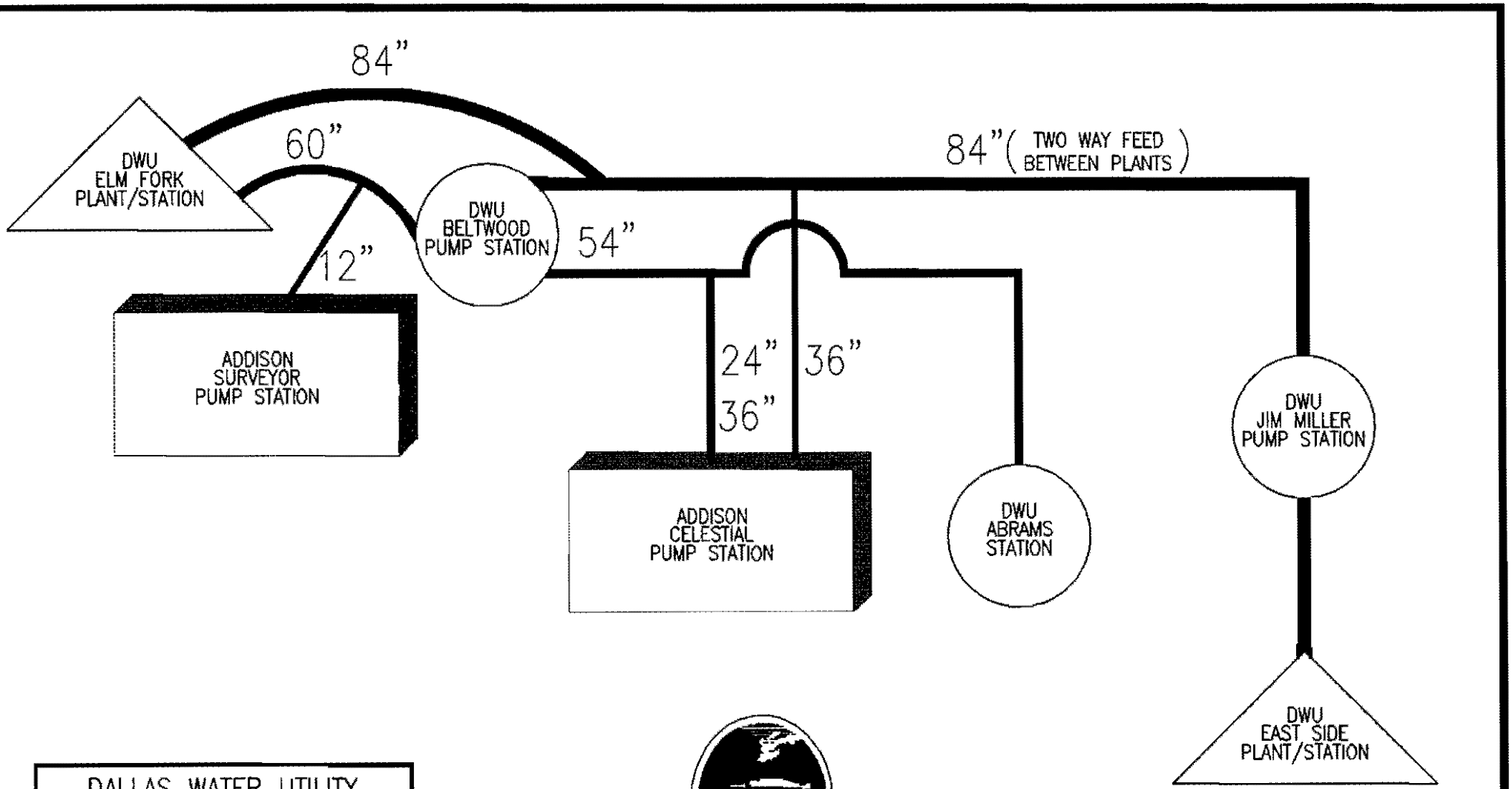
All treated water consumed in Addison is supplied by Dallas Water Utilities (DWU) at two delivery points within the Addison system. DWU's overall supply scheme includes an 84-inch transmission line between their Elm Fork Water Treatment Plant near I.H.-35 and Sandy Lake Road, and their East Side Water Plant near Forney, Texas. This 84-inch line feeds their Jim Miller and Beltwood Pump Stations. The Beltwood Pump Station is also feed through a 60-inch transmission line from the Elm Fork Plant. A schematic of this flow scheme is shown in Figure 4.

The Town's Surveyor Pump Station feeds from the 60-inch transmission line through a 12-inch line and a meter rated at 4 MGD. The 60-inch line is a one-way feed from the DWU Elm Fork Plant to the Beltwood Pump Station.

The Town's Celestial Pump Station has a dual feed from DWU. The primary feed is from the 84-inch transmission line through a 36-inch line and a meter rated at 20 MGD. The 84-inch line is a two way line so it can be supplied from either the DWU Elm Fork or East Side Water Treatment Plant. A second feed to Celestial is from the DWU transmission line between their Beltwood Pump Station and their Abrams Road Pump Station. This transmission line is supplied from the Elm Fork Plant. DWU has secondary power sources at the treatment plants and at the Beltwood and Jim Miller Pump Stations. This dual feed being supplied from two water treatment plants appears to be highly reliable.

Further, the Town has four emergency meter locations from DWU. These meters are for emergency use and most likely can provide adequate pressure for a majority of the Town. Areas in far north Addison may experience poor pressure if allowed to float on DWU pressure. These meters are located at the following locations:

Location	Emergency Meter Connection Size (Inches)
Westgrove and Tollway	6"
Beltline Road and Addison Road	8"
Beltline Road and Tollway	10"
Celestial Pump Station	10"



DALLAS WATER UTILITY EMERGENCY METERS
6" WESTGROVE & TOLLWAY
8" BELTLINE & ADDISON RD.
10" BELTLINE & TOLLWAY
10" CELESTIAL PUMP STATION

TOWN OF ADDISON

Figure 4

TOWN OF ADDISON

DALLAS WATER UTILITIES SUPPLY SCHEMATIC

SHIMEK, JACOBS & FINKLEA
CONSULTING ENGINEERS

JULY, 1996

Dallas Water Utilities has projected the following delivery rate to the Town:

Year	Maximum Delivery Rate (MGD)
2000	7.63
2010	8.98
2020	9.87
2030	10.48
2040	10.89
2050	11.16

The delivery rate required for this system is the maximum daily demand rate which is 9.75 MGD at Buildout.

WATER DISTRIBUTION SYSTEM

The analysis and design of the water distribution system has been based on the total water demand anticipated, as well as, the geographical distribution of this demand. The existing line sizes were reviewed and the proposed lines sized to deliver the maximum hourly demand in the system of 16.42 MGD and to refill the existing elevated storage tank during the minimum hourly demand. The analysis was based on the ultimate development of Addison. All existing lines are adequate to convey the maximum hourly demands.

1) Surveyor Pump Station and Ground Storage Reservoir

This facility is located on Surveyor Drive just north of Belt Line Road. Three high service pumps are located at this site along with one 2 million gallon prestressed concrete ground storage reservoir. Each pump is identical and has a rated capacity of approximately 5.5 MGD. This station is schematically shown in Figure 5. This station has a single supply from Dallas Water Utilities Transmission Line between their Elm Fork Treatment Plant and their Beltwood Station.

This station was turned off in the analysis, since the Celestial Station can meet the system demands and has a delivery rate from Dallas Water Utilities which better matches the pumps rated capacities.

It is our understanding that this station is operated only to turn over the water stored in the ground storage reservoir. To operate this station the Celestial Station must be off-line.

2) **Celestial Pump Station and Ground Storage Reservoir**

This facility is located in southeast Addison off of Celestial Drive. Currently three 9.5 MGD high service pumps are located at this site with two slots for future pumps. In addition, one 6 million gallon underground concrete ground storage reservoir is located at this site. The meter for the delivery from Dallas Water Utilities is sized for a delivery rate of 20 MGD. This station is schematically shown in Figure 6. This station has a dual supply from Dallas Water Utilities (DWU). One is from the DWU two-way 84-inch transmission line between their Elm Fork and East Side Water Treatment Plants. The second feed is from a transmission line, being fed from their Elm Fork Plant, between their Beltwood and Abrams Pump Stations.

This type of supply from DWU diminishes the importance of a backup at the Town's Surveyor Pump Station.

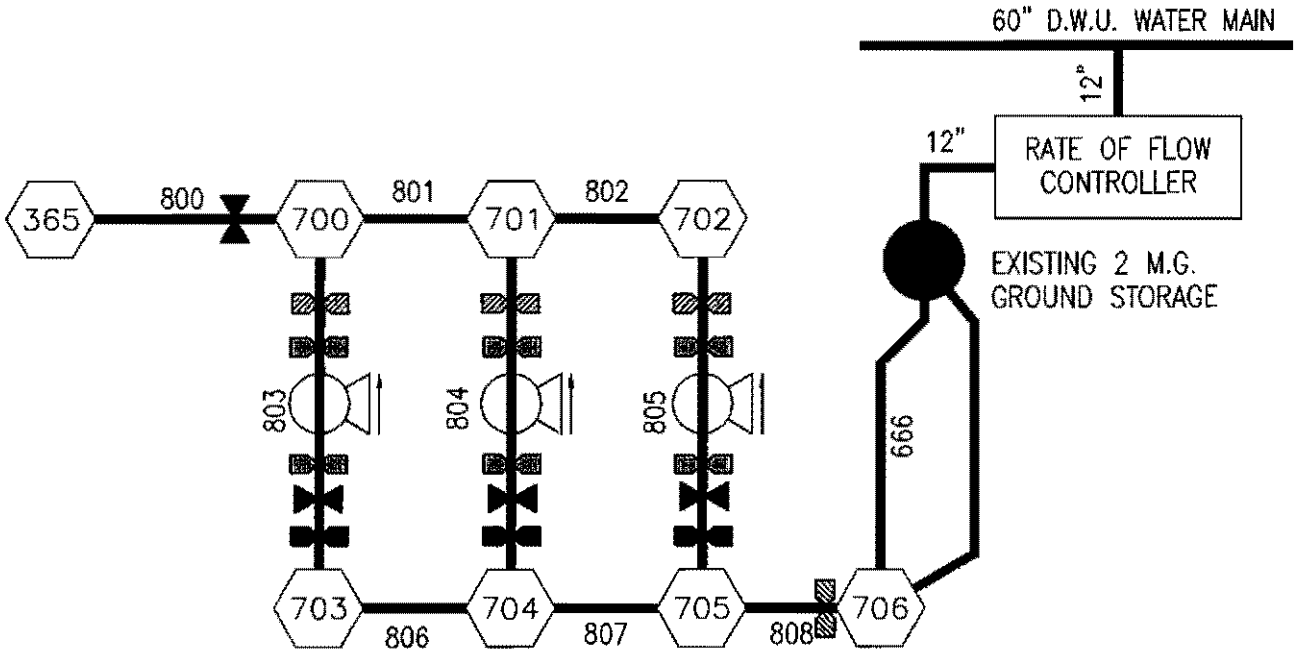
The supply at this site should be firmly secured at or above the Town's projected buildout maximum daily demand rate of 9.75 MGD.

The computer analysis and sizing of facilities to meet the maximum hourly demand was based on the Celestial Pump Station meeting the demands. The Surveyor Station was not operating in the model.

Further, the model was unable to effectively utilize the two pump stations running together. This occurrence was verified by actual operation of the system.

TOWN OF ADDISON

SCHEMATIC LAYOUT



LEGEND

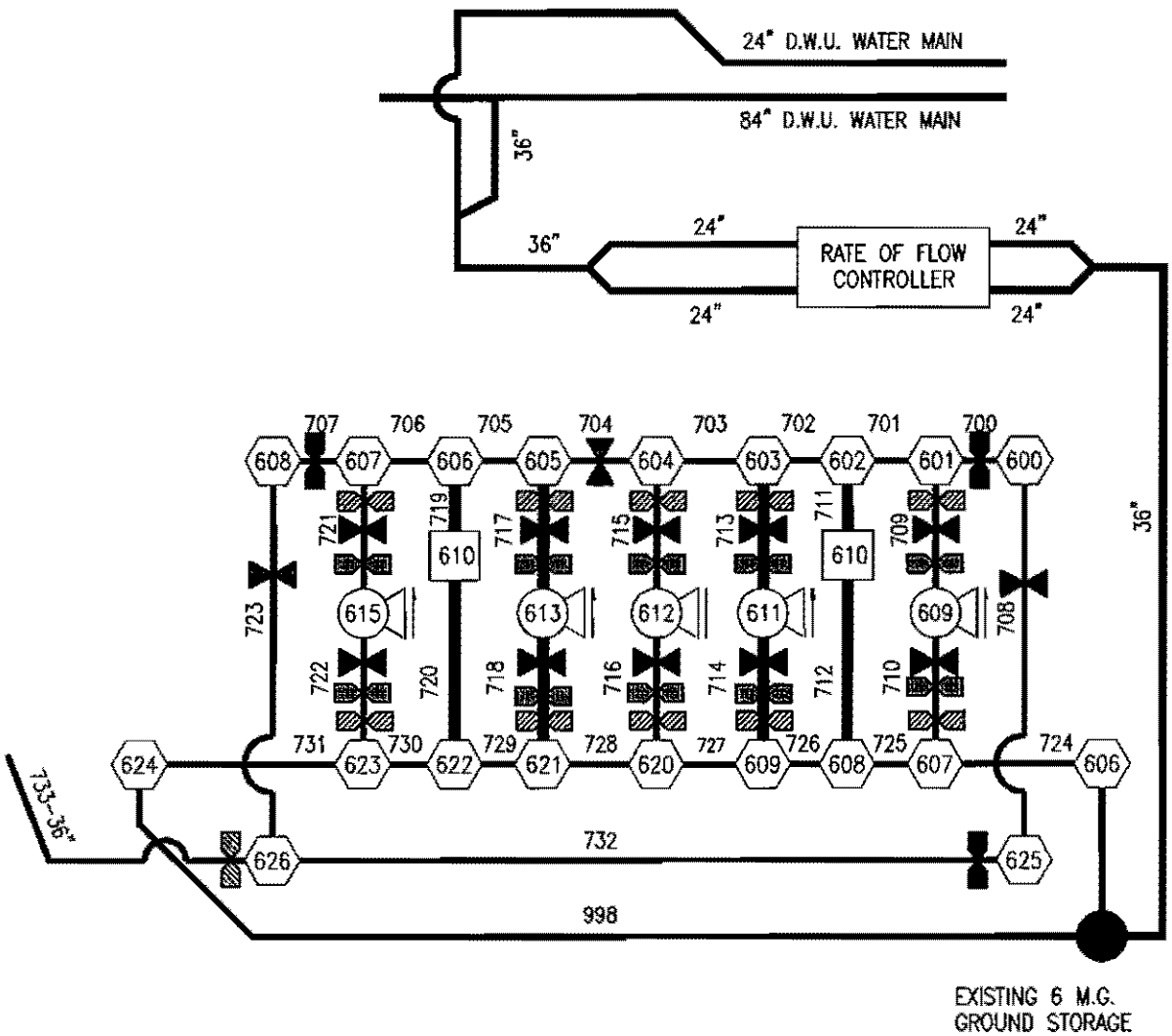
- 90° BEND
- COUPLING
- PUMP CONTROL VALVE
- TEE (BRANCH & RUN)
- EXISTING PUMP

Figure 5

TOWN OF ADDISON	
SURVEYOR PUMP STATION	
SHIMEK, JACOBS & FINKLEA CONSULTING ENGINEERS	JULY, 1996

TOWN OF ADDISON

SCHEMATIC LAYOUT



LEGEND

- 90° BEND
- COUPLING
- PUMP CONTROL VALVE
- TEE (BRANCH & RUN)
- EXISTING PUMP
- FUTURE PUMP
- EXISTING SURGE VALVE
- FUTURE SURGE VALVE

Figure 6

TOWN OF ADDISON

CELESTIAL PUMP STATION

SHIMEK, JACOBS & FINKLEA
CONSULTING ENGINEERS

JULY, 1996

GROUND STORAGE RESERVOIR

Ground storage within the system is necessary to provide a dependable supply during periods of high demand or equipment failure. The storage designed for this report matches the maximum daily demand rate.

The existing 6 million gallon ground storage reservoir can provide a supply rate to the pumps of approximately 24 MGD. The maximum daily demand is 9.75 MGD, leaving an excess in ground storage of approximately 14.25 MGD.

ELEVATED STORAGE TANKS

The volume of elevated storage required within a water distribution system is a function of the maximum daily demand (pumpage rate) and the maximum hourly demand rate. This volume will meet the peak hourly demands in the system. In addition, storage must meet the requirements of the State Board of Fire Insurance and the Texas Natural Resources Commission.

By designing this system to meet the maximum hourly demands, the volume of elevated storage required exceeds the minimums established by the State agencies. Previous studies of the operation of drawdown and refill rates of large capacity elevated storage tanks generally indicates for each one million gallon of storage available a rate of approximately four million gallons a day could be realized.

The difference in the maximum hourly demand and the maximum daily demand results in a rate of 6.67 MGD being required from elevated storage. The existing 1-million gallon elevated storage tank can only provide a rate of approximately 4 MGD leaving a deficit of 2.67 MGD.

This deficit of 2.67 MGD can be made up through the construction of a second elevated storage tank or can be made up through a combination of pumpage, ground storage and emergency generation.

WATER DISTRIBUTION SYSTEM IMPROVEMENTS - PLAN "/

1) Negotiate with Dallas Water Utilities to secure a minimum delivery usage of 9.75 MGD at the Celestial Station.

2) Abandon the Surveyor Pump Station which has a maximum supply of 4 MG... the Dallas Water Utilities Elm Fork Water Treatment Plant.

3) Construct improvements at the Celestial Pump Station to include a 3 MGD high service pump to replace elevated storage and a 1.5 to 3.0 MGD high service pump to meet low demands in the system. This station has a dual feed from Dallas Water Utilities from both the Elm Fork and East Side Water Treatment Plants.

   Opinion of Probable Cost $385,000.00

4) Construct emergency generators at the Celestial Pump Station to operate one 9.5 MGD high service pump. This will also operate the 3 MGD high service pump required to replace required elevated storage and provide a back-up power supply in the event of electrical service disruption. It also provides back-up to replace the Surveyor Pump Station.

   Opinion of Probable Cost $250,000.00

5) Install a computerized monitoring and control system to maximize the operation of the system, computer generate reports, and to generate hourly demand curves. All signals would be transmitted through radio waves.

   Opinion of Probable Cost $210,000.00

$845,000

WATER DISTRIBUTION SYSTEM IMPROVEMENTS - PLAN "B"

1) Negotiate with Dallas Water Utilities to secure a minimum delivery rate on the day of maximum usage of 4 MGD at the Surveyor Pump Station and 5.75 MGD at the Celestial Pump Station.

2) Replace two of the high service pumps at the Surveyor Pump Station with two 4 MGD high service pumps.

   Opinion of Probable Cost $400,000.00

3) Add one 3 MGD high service pump at Celestial to replace required elevated storage. Add one 1.5 MGD high service pump to meet low demands in the system.

   Opinion of Probable Cost $385,000.00

4) Construct emergency generators at the Celestial Pump Station to operate one 9.5 MGD high service pump. This will also operate the 3 MGD high service pump required to replace required elevated storage and to provide a back-up power supply in the event of electrical service disruption.

   Opinion of Probable Cost $250,000.00

5) Install a computerized monitoring and control system to maximize the operation of the system, computer generate reports, and to generate hourly demand curves. All signals would be transmitted through radio waves.

   Opinion of Probable Cost $210,000.00

1,245,000

HYDRAULIC ANALYSIS

A computer assisted analysis was performed utilizing Cybernet computer software to aide in developing an overall system of water mains, storage facilities and pump stations to efficiently serve the entire city as development is now envisioned. The resulting plan is shown on the water distribution map outside this report. The master plan map shows the size and location of all existing and future feeder mains as well as elevated storage facilities. Also shown are reference numbers on all pipes and pipe intersections or nodes. These numbers refer to additional information contained in the computer printout. Two computer analyses were undertaken: One for the maximum hourly demand on the day of maximum demand and one for the minimum hourly demand on the day of maximum demand.

The hydraulic information shown on the computer printout are described as follows:

1) **Pipe Number** - number shown on system map for each section of pipe between nodes.

2) **Junction Node** - Pump Station, intersection of pipe, or water use point. The first node number indicates the flow entering a section of pipe, the second node number indicates flow leaving that section of pipe. A minus sign indicates the flow opposite of the node order.

3) **Length** - Distance between nodes in feet.

4) **Diameter** - Pipe diameter in inches.

5) **Roughness** - Coefficient of friction designated to the section of pipe.

6) **Boundary Node** - Pressure zone elevation based on U.S.C.&G.S. datum. Location of elevated storage tank.

7) **Demand** - Design flow at nodes in million gallons per day (MGD). A minus sign indicates flow into the system.

8) **Elevation** - Ground elevation at node based on U.S.C.&G.S. datum.

9) **Connecting Pipe** - Pipe number connecting to junction node.

10) **Flow Rate** - Rate of flow in pipe section in million gallons per day.

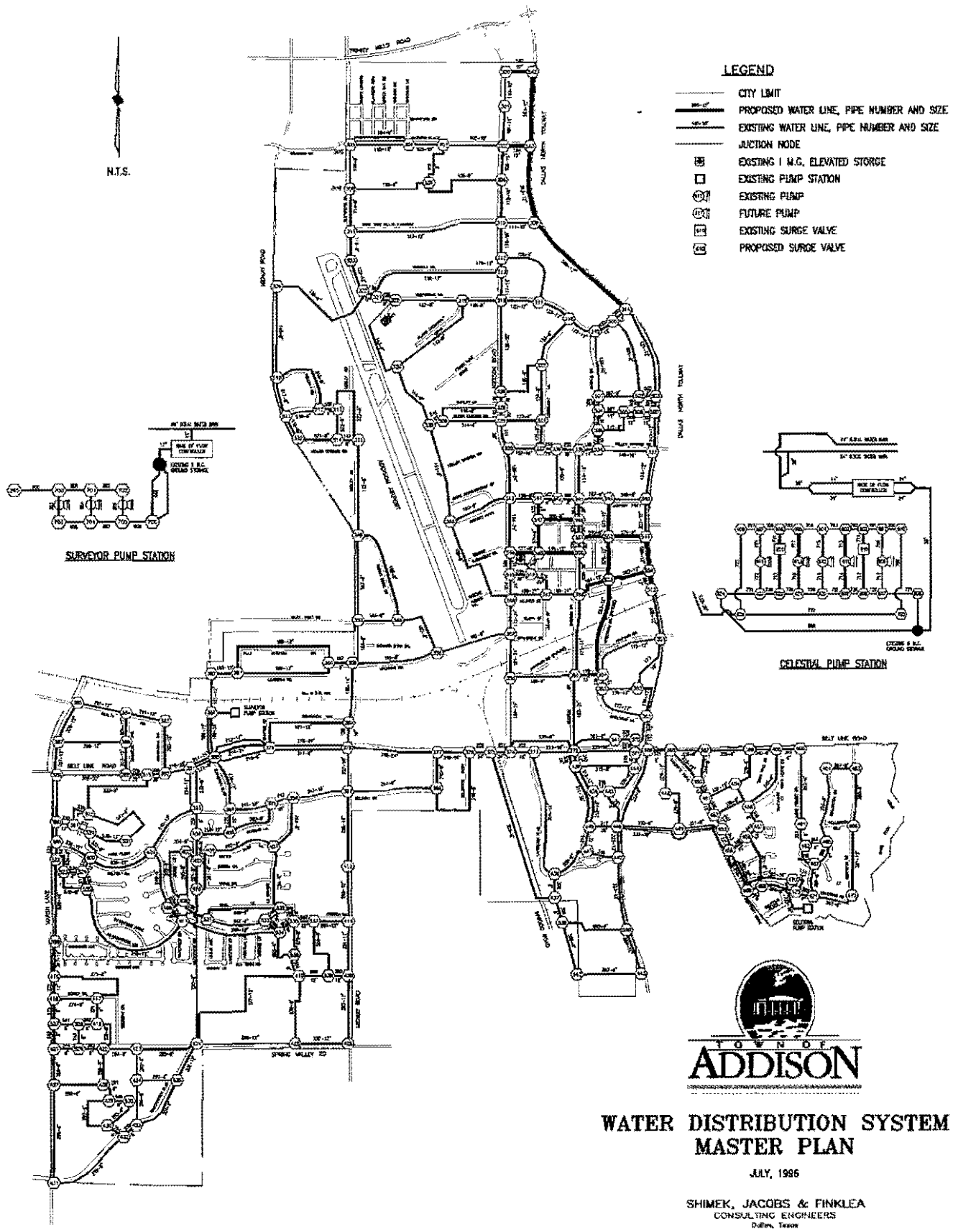
11) **Headloss** - Friction headloss in section of pipe, in feet.

12) **Velocity** - Velocity of flow in section of pipe in feet per second (fps).

13) **HL/1000** - Friction loss in feet per thousand feet of pipe.

14) **Grade Line** - Elevation of water surface at node based on U.S.C. & G.S. datum (hydraulic gradient).

15) **Pressure** - Pressure in pounds per square inch (psi) at the node.



WATER DISTRIBUTION SYSTEM MASTER PLAN

JULY, 1995

SHIMEK, JACOBS & FINKLEA
CONSULTING ENGINEERS
Dallas, Texas

TOWN OF ADDISON, TEXAS

1996 WATER DISTRIBUTION REPORT

Prepared By

SHIMEK, JACOBS & FINKLEA
CONSULTING ENGINEERS

cc: John Berkhoff
Mike Murphy

City of Dallas

May 28, 1999

Mr. John Baumgartner
Director of Public Works
Town of Addison
P.O. Box 9010
Addison, Texas 75011-9010

Dear Mr. Baumgartner:

As you may know, the City of Dallas Water Utilities Department (DWU) is in the process of updating the *Long Range Water Supply Plan, 1990-2050* (the Plan). This Plan studies water supply needs, resources, and potential water supply capital improvements through the year 2050. Part of the process of updating the Plan involves developing population and water demand projections for all current and potential wholesale customers in DWU's water service area. DWU staff and our consultant have developed population projections, water demand projections, and per capita demand projections for each current and potential wholesale customer. Copies of these projections for the Town of Addison are enclosed as follows:

- A table with year 1980, 1998, 2000, 2020, and 2050 population projections from past Plans and from this current Plan.
- A graphical representation of historical and projected populations for the Town of Addison using data from North Central Texas Council of Governments (NCTCOG), Texas Water Development Board (TWDB), DWU, Addison's information in response to our request for data, and this Plan's projections.
- A table with year 1990, 2000, 2010, 2020, and 2050 total water demand projections, with narrative, for the Town of Addison. Again, data from TWDB, DWU, past Plans and this Plan is included.
- A graphical representation of historical and projected per capita demand using DWU and TWDB data, and this Plan's recommendation for per capita demand.

This data represents DWU's and the consultant's effort to incorporate several different available projections and our current understanding of regional trends. We have scheduled a meeting on June 14, 1:00 p.m., in the conference room at your service center located at 16801 Westgrove to review this data and discuss any comments you may have. We look forward to meeting with you and receiving your input.

Sincerely,

Randy Stalnaker

Randy Stalnaker
Interim Manager
Wholesale Services Division

attachments
c: Larry Patterson, Assistant Director - Water Operations
Jennifer Cottingham, Project Manager - Water Facilities Project Management

Water Utilities Department
Wholesale Services • City Hall, 1500 Marilla, Room 4AN • Dallas, Texas 75201• 214/670-5888 • Fax 214/670-3154
A city utility providing regional water and wastewater services vital to public health and safety.

CITY OF DALLAS
WATER UTILITIES DEPARTMENT
LONG RANGE WATER SUPPLY PLAN UPDATE

TOWN OF ADDISON

POPULATION AND
WATER DEMAND
PROJECTIONS

May, 1999

TOWN OF ADDISON
POPULATION PROJECTIONS

Study	Year 1980	Year 1998	Year 2000	Year 2020	Year 2050
URS/FC, 1975	8,200	--	17,000	21,000	25,000
TCB, 1989	5,553	--	12,260	16,055	18,896
LRWSP, 1999	5,553	11,800	12,554	16,790	21,908

For the LRWSP, the estimated average annual changes in the City of Addison population are: 1980 to 2000 = 4.2 %, 2000 to 2020 = 1.5 %, and 2020 to 2050 = 0.9 %.

NOTES:

1. URS/FC, 1975 = URS/Forrest and Cotton, Inc., 1975. Long Range Water Supply Study. Dallas, Texas.

2. TCB, 1989 = Turner Collie & Braden, Inc., 1989. Long Range Water Supply Plan 1990-2050: To the City of Dallas, Texas, Dallas Water Utilities. Dallas, Texas.

3. LRWSP, 1999 = This Plan Update projections.

Historical and Projected Population Estimates
City of Addison

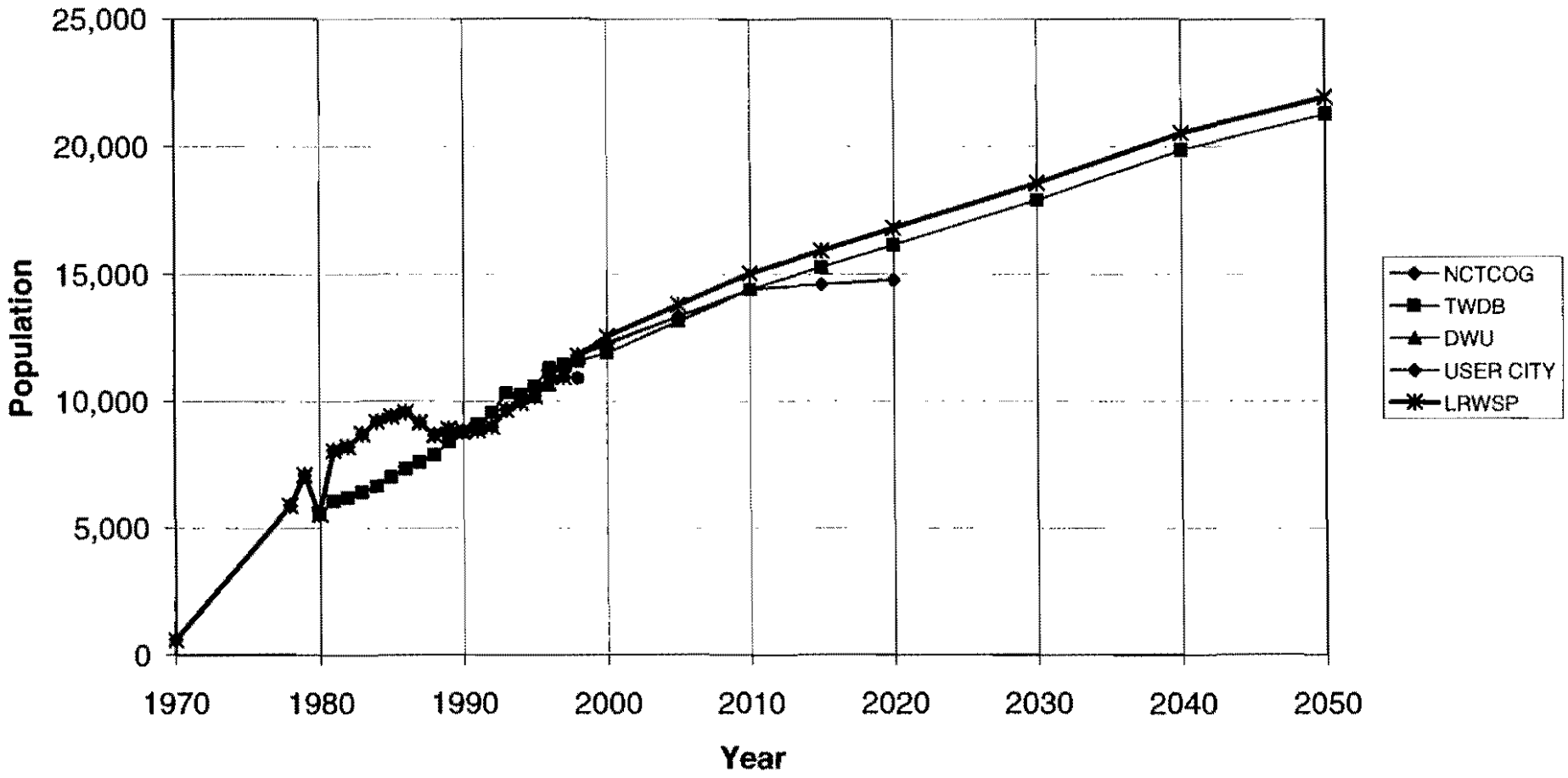


FIGURE 0-0

CITY OF DALLAS, WATER UTIILITIES DEPARTMENT
UPDATE TO DALLAS LONG RANGE WATER SUPPLY PLAN
HISTORICAL AND PROJECTED POPULATION ESTIMATES
CITY OF ADDISON, TEXAS

Wendy Lopez & Associates, Inc.
Engineering Environmental
Surveying Construction Services
Dallas, Texas

Chiang, Patel & Yerby, Inc.
Consulting Engineers Planners
Project Managers
Dallas, Texas

MARCH 1999

TOWN OF ADDISON
WATER DEMAND PROJECTIONS

Study & Area	Year 1990	Year 2000	Year 2010	Year 2020	Year 2050
TCB 1989, Planning Area	3.64	4.42	5.23	5.74	6.51
DWU 1997, Planning Area		5.26	6.13	6.66	8.12
TWDB 1999, Planning Area		5.26	6.13	6.66	8.12
LRWSP 1999, Planning Area		6.11	8.18	9.25	12.07
LRWSP 1999, DWU Supply		Same	Same	Same	Same

Addison receives all of its treated water from DWU. The recommended LRWSP projections for Addison are consistently higher than previous studies. This can be attributed to the higher gpcd value used in this report, based on a consistent long-term trend, as can be seen graphically in Appendix B2. Even though the 2050 projection is nearly 50% higher than the 1997 DWU report value, the difference is only approximately 4 mgd.

NOTES:

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2. DWU 1997 = City of Dallas internal projections.

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Ave water use
1997-98

5.34 mgd

Historical and Projected Per Capita Demand (GPCD)
Town of Addison

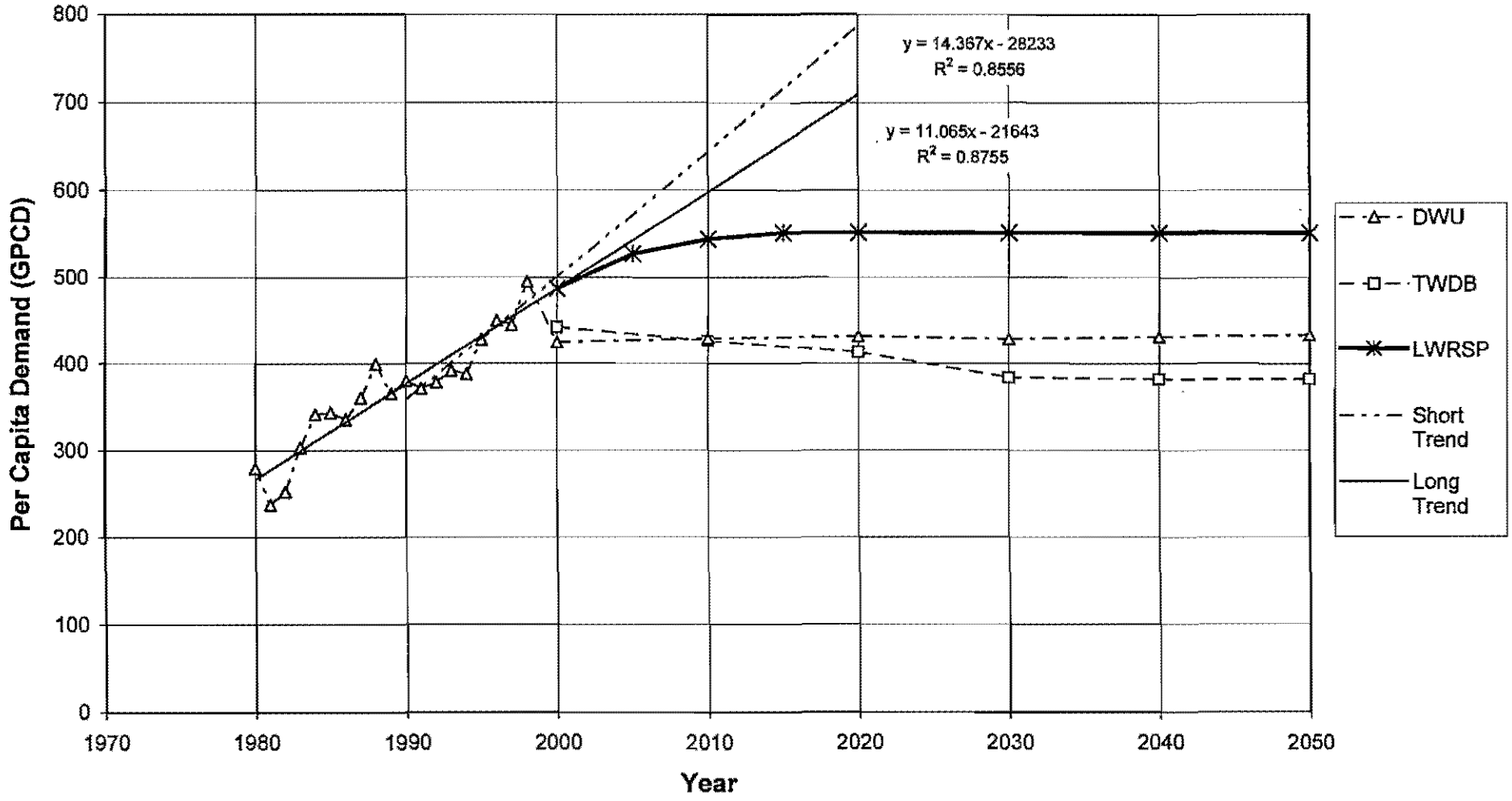

FIGURE B2-5

CITY OF DALLAS, WATER UTIILITIES DEPARTMENT
UPDATE TO DALLAS LONG RANGE WATER SUPPLY PLAN
HISTORIC AND PROJECTED PER CAPITA DEMAND (GPCD)
TOWN OF ADDISON

NDM NATHAN D. MAIER CONSULTING ENGINEERS, INC.
DALLAS, TEXAS

Chiang, Patel & Yerby, Inc.
Consulting Engineers Planners
Project Managers
Dallas, Texas

MARCH 1999

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LRWSP GPCD TBL AND GRAPH.xls; ADD

CITY OF DALLAS
WATER UTILITIES DEPARTMENT
LONG RANGE WATER SUPPLY PLAN UPDATE

TOWN OF ADDISON

POPULATION AND
WATER DEMAND
PROJECTIONS

May, 1999

TOWN OF ADDISON
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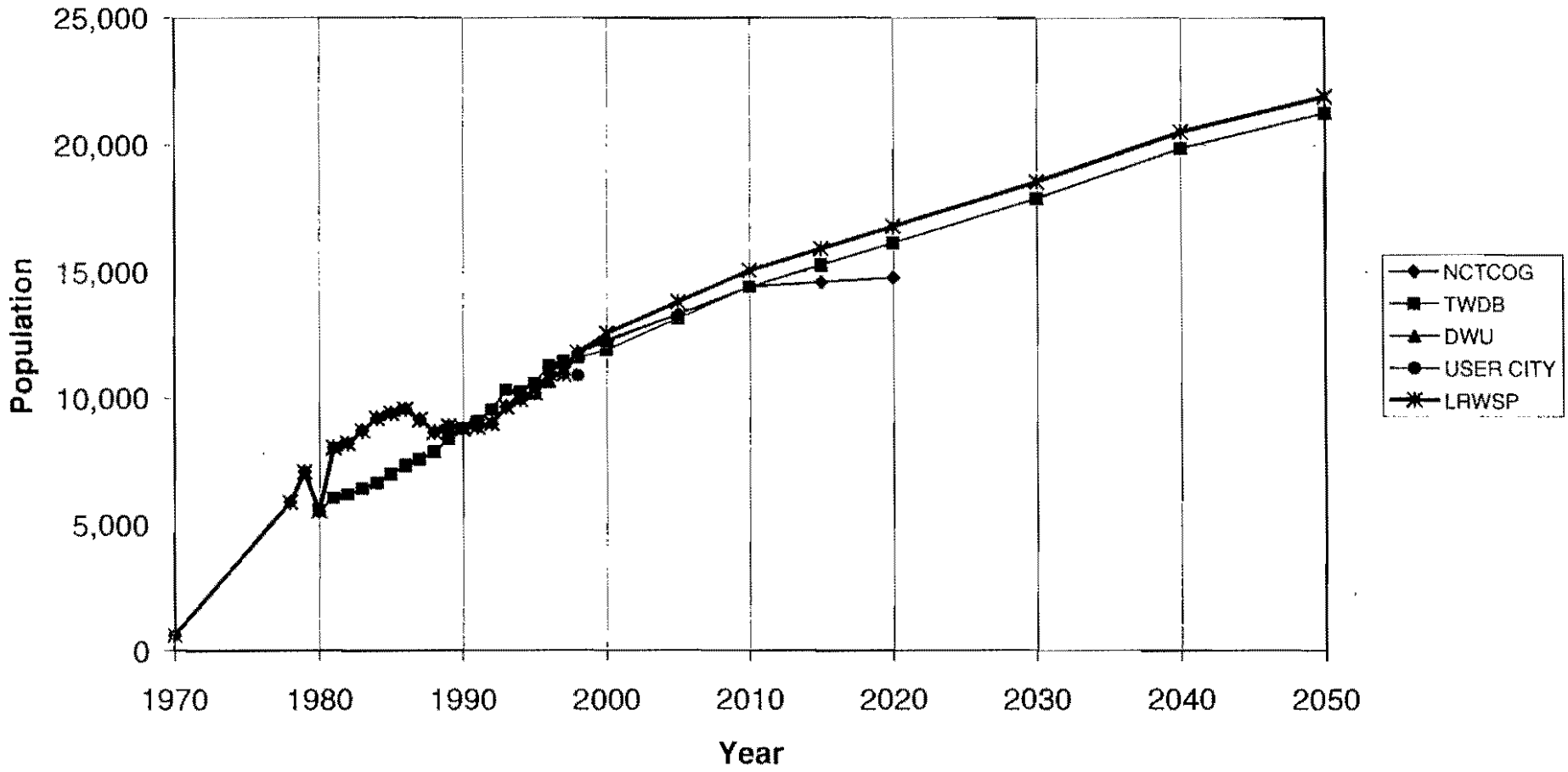
Historical and Projected Population Estimates
City of Addison



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HISTORICAL AND PROJECTED POPULATION ESTIMATES
CITY OF ADDISON, TEXAS

Wendy Lopez & Associates, Inc.
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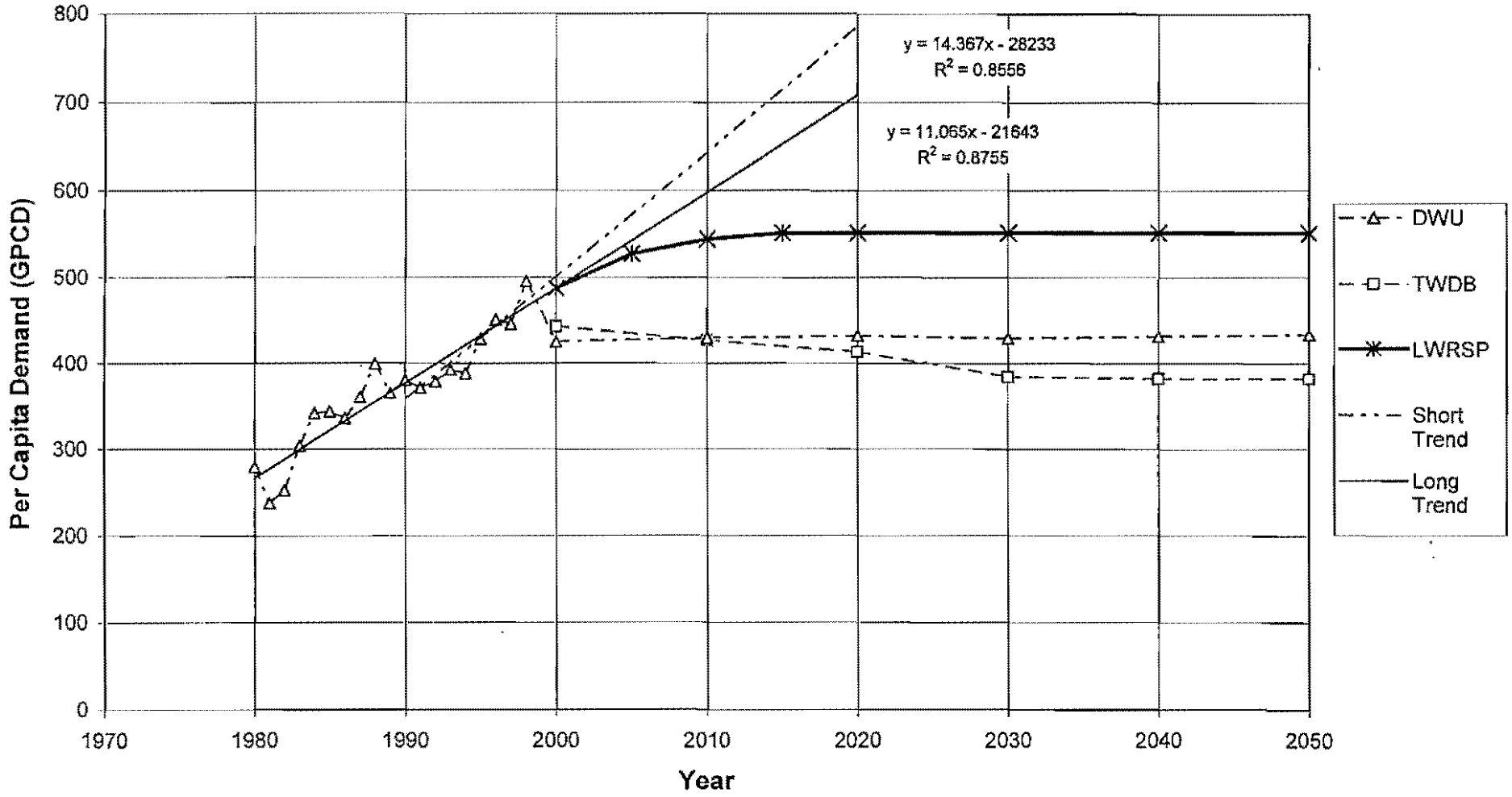
Historical and Projected Per Capita Demand (GPCD)
Town of Addison



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CITY OF DALLAS, WATER UTIILITIES DEPARTMENT
UPDATE TO DALLAS LONG RANGE WATER SUPPLY PLAN
HISTORIC AND PROJECTED PER CAPITA DEMAND (GPCD)
TOWN OF ADDISON

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Project Managers
Dallas, Texas

MARCH 1999

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LRWSP GPCD TBL AND GRAPH.xls: ADD

BL

SHIMEK, JACOBS & FINKLEA

CONSULTING ENGINEERS
8333 DOUGLAS AVENUE, #820
DALLAS, TEXAS 75225

Fax Number: (214) 361 – 0204

Phone Number: (214) 361 – 7900

Date: _____

Receiving Fax Number:

Time: _____

(____) 731 - 6693

Number of Pages Transmitted (including this one) 2

To: Mr. John Baumgaertner P.E.

Message: Storage Requirement Calculations

From: John W Burkhalter

If the number of pages called for are not received or are not clear please call (214) 361–7900.

Elevated Storage (Current 10 Million Gallons)

→ Method 1

Key Rate Fire Insurance

10 hour supply based on 130 Gallons / capita

Residential population +10% : 10,950 × 1.10 = 12,095

No of connections × 3.2 people per unit : 3098 × 3.2 = 9,914

$$12,095 \times \left(\frac{10 \text{ hr draw down}}{24 \text{ hr period}}\right)\left(\frac{130 \text{ gal.}}{\text{capita}}\right) = 652,938$$

→ Method 2

TNRCC Requirements

100 Gals per connection

$$\left(\frac{100 \text{ gals}}{}\right)\left(\frac{3098 \text{ connections}}{}\right) = 309,800 \text{ gallons}$$

← Method 3

Difference between Max Daily Demand (Average) and Max Hourly Demand.

18.28 MGD − 9.68 MGD = 8.6 MGD

Convert to MG ~ 8 MGD per hr. = 1 MG

2.15 MG → .51 MG

Ground storage 6 MG Celestial
2 MG Surveyor

→ Method 1
Key Rate Fire Insurance

130 gals/capita × 12,045 = 1.56 MG

→ Method 2
Treec Requirements

Total ground + Elevated 200 gallons per connection

200 gallons × 3098 = 620,000 gallons

→ Method 3
Match max daily demand

9.68 MGD ÷ 4 MGD/MG = 2.42 MG