



Water Conservation and Emergency Water Management Plan

Introduction

This document outlines the Water Conservation and Emergency Water Management Plan for the City of Lewisville, Texas, as approved by the Lewisville City Council on August 30, 1999 and revisions to the plan were approved on August 5, 2002 and on October 17, 2005. The plan is divided into two sections: (1) Water Conservation and (2) Emergency Water Management. The objective of the conservation program is to identify strategies for controlling the consumption of water, for reducing the loss or waste of water, for maintaining or improving the efficiency in the use of water, for increasing the recycling and reuse of water and for preventing the pollution of water. The emergency water management section addresses procedures for voluntary and mandatory actions to be put into effect to temporarily reduce the demand placed upon the City's water supply system during a water shortage due to drought or other water supply emergency. Drought contingency procedures include conservation measures, but may also include prohibition of certain water uses. This plan has been developed to meet the requirements of Texas Administrative Code Title 30, Environmental Quality, Chapter 288, Subchapter A (Water Conservation Plans) and Subchapter B (Drought Contingency Plans).

The City of Lewisville's 2001 Water Master Plan found that additional water supplies would be needed to satisfy projected growth. Recent water conservation efforts have focused on public awareness initiatives. The Five Year Strategic Plan on Water Conservation defines water conservation goals for Fiscal Years 2005 – 2009 and presents recommended measures and budgetary efforts to achieve these goals.

Planning Area and Project Description

The planning area is the total area within the current city limits of Lewisville, which is approximately 42.3 square miles. The project is the total water system owned and

operated by the City of Lewisville, which distributes potable water to all water customers within the planning area. Currently, the population of the service area is approximately 87,841.

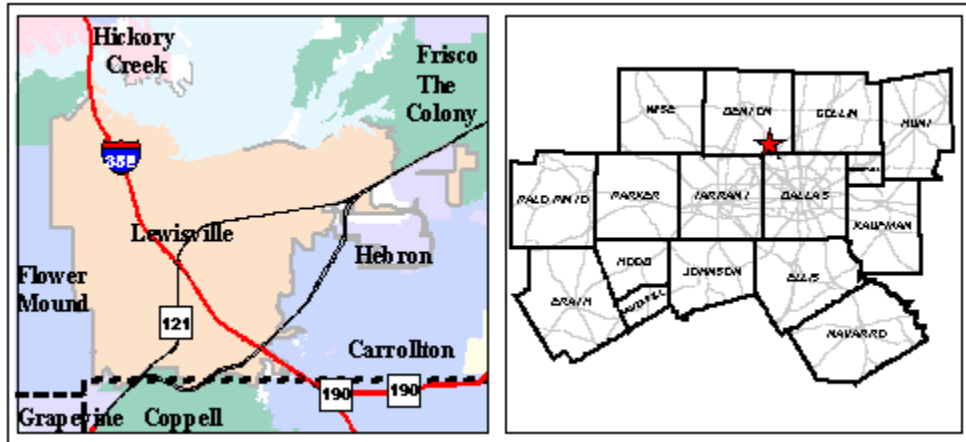


Figure 1: City of Lewisville Location Map NTCOG

WATER CONSERVATION PLAN

Program Goals

The objectives of the Water Conservation Plan are (1) to control consumption of water by educating the citizens of Lewisville about conservation practices through an aggressive public information program and (2) to maintain system controls and procedures that will minimize water loss. Many communities throughout the United States have used conservation measures to successfully cope with various water and wastewater problems. While Lewisville has an adequate supply of water and has not experienced water shortages in the past, municipal governments have an environmental obligation to seek ways to conserve the water supply, and this Plan defines the methods the City intends to use to fulfill that obligation.

Effective October 7, 2004, Title 30 Chapter 288 of the Texas Administrative Code (TAC) entitled Water Conservation Plans, Drought Contingency Plans, Guidelines and Requirements requires the submission and implementation of a water conservation plan

meeting the requirements of Subchapter A of Chapter 288 (Ref. 6). The requirements for the plans are:

- **Utility Profile:** The regulation requires specific information regarding population and customer data, water use data, water supply system data, and wastewater system data.
- **Goals:** Beginning May 1, 2005, specific quantified five-year and ten-year targets for water savings to include goals for water loss programs and goals for municipal use, in GPCD are required.
- **Accurate Metering Devices:** The Texas Commission on Environmental Quality (TCEQ) requires metering devices with an accuracy of plus or minus 5 percent for measuring water diverted from source supply.
- **Universal Metering, Testing, Repair, and Replacement:** The TCEQ requires that there be a program for universal metering of both customer and public uses of water, for meter testing and repair, and for periodic meter replacement.
- **Non-Promotional Rate Structure:** Chapter 288 requires a water rate structure that is not “promotional,” i.e., rates that discourage increased water usage such as increasing block instead of volume discounts.
- **Leak Detection, Repair, and Control of Unaccounted for Water:** Measures to determine and control unaccounted for water are required. These measures may include periodic visual inspections along distribution lines, and periodic audits of the water system for illegal connections or abandoned services.
- **Continuing Public Education Program:** TCEQ requires a continuing public education and information program for water conservation.
- **Reservoir Systems Operational Plan:** This requirement is to provide a coordinated operational structure for operation of reservoirs owned by the water supply entity within a common water shed or river basin in order to optimize available water supplies.
- **A Means to Implementation and Enforcement:** A means to implement and enforce the water conservation plan, evidenced by an ordinance, resolution, or tariff and a description of the authority by which the conservation plan is enforced is required in the regulations.
- **Coordination with Regional Water Planning Groups:** The water conservation plan should document the coordination with the Regional Water

Planning Group for the service area of the public water supplier to demonstrate consistency with the appropriate approved regional water plan.

- **Additional Conservation Strategies:** Strategies not previously referred to include adoption of ordinances, plumbing codes or rules requiring water-conserving fixtures in existing structures; reuse and/or recycling of wastewater and/or graywater; a program for pressure control and/or reduction in distribution system and/or customer connections; a program and/or ordinance(s) for landscape water management; a method for monitoring the effectiveness and efficiency of the water conservation plan.
- **Update of the Plan:** The public water supplier must review and update its water conservation plan, as necessary, based on an assessment of previous five-year and ten-year targets and any other new or updated information.

These plan requirements are detailed as Plan Elements and discussed below.

Conservation Plan Process

The Water Conservation Plan was developed through a comprehensive approach that included review of numerous water conservation programs, data, literature, state regulations, and the Dallas Water Utilities (DWU) Conservation Plan. As a contracted customer city of Dallas Water Utilities, Lewisville is required to incorporate into its' plan like goals and measures supported in the City of Dallas conservation plan. Development of the Water Conservation Plan was also coordinated with conservation planning efforts of the Region C Water Planning Group. Water usage data was reviewed to identify areas to apply conservation efforts. Numerous water conservation strategies were reviewed and evaluated based on their effectiveness and feasibility to implement during the five-year period.

Plan Elements

Water conservation methods are typically divided into two categories: demand management methods and supply management methods. Demand management methods deal with water use on the downstream side of the customer meter and provide education and incentives to manage water use by the customer. This method of conservation may result in a decrease in water revenues due to decreases in purchased water. Supply management methods deal with the water system upstream of the customer meter and seek to improve efficiency and reduce waste within the production, treatment, and distribution system. Supply management results in decreased costs to the City as water losses in the system are reduced. The City of Lewisville uses a combination of these methods in its Water Conservation Plan.

Element 1: City of Lewisville Water Profile

The following information has been incorporated from the Texas Commission on Environmental Quality's Utility Profile and Water Conservation Plan Requirements for Municipal Water Use by Public Water Suppliers (TCEQ Report 10218).

POPULATION AND CUSTOMER DATA

A. Population and Service Area Data

1. A copy of the City of Lewisville's service area is provided as **Attachment 1**.
2. Service area size (square miles) 42.3 square miles
3. Current population of service area: 87,841
4. Current population served:
 - a. Water 87,841
 - b. Wastewater 87,841 & Castle Hills (4205)
5. Population served by water utility for the previous five years
6. Projected population for service area in the following decades:

Year	Population	Year	Population
2004	87,841	2010	105,690
2003	83,855	2020	132,412
2002	80,750	2030	152,002
2001	80,609	2040	165,316
2000	78,150	2050	175,002

7. Source/method for the calculation of current and projected population:

Texas Water Development Board: 2006 Regional Water Plan, NCTCOG, and City Population Projections for 2000-2006.

B. Active Connections

1. Current number of active connections. Multi-family service is counted as Residential _____ or Commercial. ✓

Treated water users:	Metered	Not-metered	Total
Residential	17,195		17,195
Commercial	2,251		2,251
Industrial	18		18
Other (Irrigation)	893		893

2. List the net number of new connections per year for most recent three years:

Year	2004	2003	2002
Residential	168	176	205
Commercial	35	227	147
Industrial	9	-2	-1

meter reading is also compared with the DWU raw water meter readings both daily and monthly. Master meters are also located on the treated water supply lines from DWU. These meters belong to the City of Lewisville and are supported by redundant readings from DWU meters at the point of sale.

2. Amount of water use (in 1,000 gal.) delivered (sold) as recorded by the following account types for the past five years.

Year	Residential	Commercial	Industrial	Wholesale	Sold
2004	1,593,939	2,130,628	42,008	0	3,766,575
2003	1,870,883	2,368,658	33,198	0	4,272,739
2002	1,802,910	2,285,911	31,730	0	4,120,551
2001	1,770,110	2,318,884	33,514	0	4,122,508
2000	1,865,489	2,429,474	43,383	0	4,338,347

3. Previous five years records for water loss (the difference between water diverted (or treated) and water delivered (or sold)).

Year	Amount (gal.)	%
2004	696,311,000	15.6
2003	583,690,972	11.8
2002	551,825,012	11.8
2001	431,840,500	9.4
2000	442,340,000	9.2

4. Municipal water use for previous five years:

Year	Population	Total Water Diverted or Pumped for Treatment (1,000gal.)
2004	87,841	4,462,886
2003	83,855	4,950,110
2002	80,750	4,677,176
2001	80,609	4,593,592
2000	78,150	4,780,687

Projected Water Demands

Year	Population	Households	Total Water Diverted or Pumped for Treatment (acft.)
2005	87,841	34,294	17,690
2006	88,760	34,631	18,319
2007	89,679	34,969	18,948
2008	90,598	35,307	19,578
2009	91,517	35,643	20,207
2010	92,437	35,982	20,836
2011	93,060	36,239	21,318
2012	93,683	36,496	21,800
2013	94,306	36,754	22,282
2014	94,930	37,010	22,764
2015	95,554	37,269	23,246

Population and Household projections are based on Texas Water Development Board projections for 2005, 2010 and 2015; the projects for interim years are interpolations. At this time, the TWDB projections appear to present a realistic forecast of future population and water use. Based on the land use for the City of Lewisville, of the total 26,996 acres, 10,671 or 41% remain undeveloped. This data has been summarized from the 2000 North Central Texas Council of Governments Land Use Inventory.

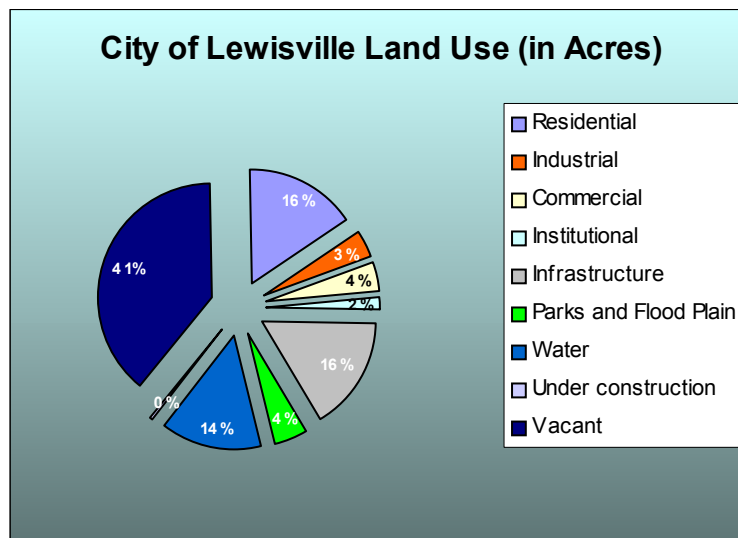


Figure 2: City of Lewisville 2000 Land Usage

Actual water demands will depend upon the type of economic development within these undeveloped sectors. In addition, the City of Lewisville has annexed additional properties within the eastern corridor of State HWY121. The addition of these properties and their potential development will also impact future water demands. Proposed conservation efforts could allay some future water demands.

WATER SUPPLY SYSTEM DATA

The City of Lewisville water system consists of a water supply reservoir, water treatment facilities, distribution and collection systems, and wastewater treatment plant. The City of Lewisville also participates in reuse of treated wastewater from the City of Lewisville’s Wastewater Treatment Plant.

A. Water Supply Sources

The City of Lewisville supplies water to residents and commercial/industrial users through both treated water purchased from Dallas Water Utilities (DWU) at two connection points and treated water from the City of Lewisville’s C. R. Feaster Water Treatment Plant. The City of Lewisville has a contract with DWU to purchase water from Lewisville Lake, a surface water reservoir, for treatment at the Feaster Water Treatment Plant. DWU maintains water rights for Lewisville Lake.

Current water supply sources and the amounts authorized with each:

	Source	Amount Authorized
Surface Water:	Lewisville Lake	Unlimited acre-feet
Groundwater:	NA	acre-feet
Contracts:	Dallas Water Utilities	102.5 acre-feet
Other:	NA	acre-feet

B. Treatment and Distribution System

The City of Lewisville's treated water distribution system contains approximately 350 miles of pipe. The treated water system continues to expand into the eastern areas of the City's jurisdiction. Attachment 2 shows the Water System layout. The existing distribution system is evaluated and upgraded at consistent intervals.

1. Design daily capacity of system: 38.8 MGD, (an additional 15 MGD is in design)
2. Storage Capacity: Elevated: 6.5 MGD Ground: 10 MGD
3. If surface water, do you recycle filter backwash to the head of the plant?
Yes No . If yes, approximately 0.3 MGD

The water storage system includes six ground storage reservoirs. Three reservoirs are located at the Feaster Water Treatment Plant; two have a capacity of 2 MG and the third has a capacity of 1 MG. Three additional ground storage reservoirs are available in the distribution system. The two ground storage tanks at Eastside Pump station have capacity of 1 and 2 MG. A third ground storage tank is located at the Southside Pump station and has a capacity of 2 MG. Elevated storage tanks are positioned strategically throughout the distribution system to provide adequate pressure and storage. One elevated storage tank is located within the 740 pressure zone and has a capacity of 2 MG. The remaining elevated storage tanks throughout the 692.5 pressure zone, have the following capacities: 0.5, 1.5, and 2.5 MG. Two new elevated storage tanks are proposed in the near future. The Bellaire tank will replace the existing tank on Garden Ridge Blvd. The capacity of this new tank is 1 MG; it is projected to be in service by the fall of 2005. An additional 1 MG tank will be constructed in the eastern area of Lewisville within the next eighteen months.

C. Water Treatment Plant

The Feaster Water Treatment Plant, System Number 0610004, has a TCEQ approved firm design treatment capacity of 18 MGD with a filter design

capacity of 20.4 MGD. The plant is located in the northeast section of Lewisville approximately one mile from Lewisville Lake. The Water Treatment Plant is served by two intake structures located on Lewisville Lake. The original intake structure has a capacity of 35.8 MGD. The new intake structure, constructed in 2000, is a joint project with Upper Trinity Regional Water District (UTRWD). Lewisville's portion of the structure has a firm capacity of 38.5 MGD. The Water Treatment Plant has a firm pumping capacity over 50 MGD into two pressure zones. The Northside Pump Station, capable of 19 MGD, services the northwestern area of Lewisville located within the 740-pressure zone. The High Service Pump Station has a pump capacity of 32 MGD and services the remainder of Lewisville through the 692.5-pressure zone.

D. Treated Water Storage and Distribution System

The City of Lewisville's water storage system includes six ground storage reservoirs and four elevated storage tanks. Three ground storage reservoirs with a total capacity of 5 MG are located at the Feaster Water Treatment Plant; and three ground storage reservoirs are located in the distribution system. There are two ground storage reservoirs at Eastside Pump station with a capacity of 1 and 2 MG and a 2 MG ground storage reservoir located at the Southside Pump station. The four elevated storage tanks are positioned strategically throughout the distribution system to provide adequate pressure and storage. One elevated storage tank is located within the 740-pressure zone and has a capacity of 2 MG. The remaining elevated storage tanks throughout the 692.5-pressure zone, have capacities of: 0.5, 1.5, and 2.5 MG. Two, new elevated storage tanks are proposed in the near future. The Bellaire tank will replace the existing tank on Garden Ridge. The capacity of this new tank is 1 MG; it is projected to be in service by the fall of 2005.

WASTEWATER SYSTEM DATA

The City of Lewisville owns and operates the Prairie Creek Wastewater Treatment Plant under TPDES Permit Number 10662-001. Attachment 3 contains a map of the Prairie Creek Wastewater Treatment Plant and discharge location. The wastewater treatment plant services the City of Lewisville and the ETJ area of Castle Hills with a design capacity currently under expansion to 15 MGD. Completion of this expansion is planned in 2006.

1. Design capacity of wastewater treatment plant(s): 12* MGD

* Currently under 3MGD expansion for 15 MGD capacity to be complete in 2006.

2. Is treated effluent used for irrigation on-site ✓ offsite ✓,
plant wash down ✓, or chlorination/dechlorination ✓
If yes, approximately 18,000,000 gallons per month.

Features of the treatment plant are described as existing and with proposed expansion in parentheses. The plant contains three (five) Fine Screen Units which remove primary solids, followed by two Grit Units. Flow from the Grit Units divide into separate smaller plants that contain Five (Six) Aeration Basins, two Trickling Filters and six (seven) Final Clarifiers. Flows recombine after secondary treatment and proceed through four (five) sand filters and disinfection. Final discharge from the treatment enters Prairie Creek, which then flows to the Elm Fork Trinity River, below Lewisville Lake in Segment Number 0822 of the Trinity River Basin. Average daily flows from the WWTP are currently over 9 MGD, including reuse, which averages less than 1 MGD annually.

Sludge from the WWTP is processed through Aerobic Digestion, solids dewatering and final disposal; approximately 3000 dry tons of sludge are disposed of annually in DFW Landfill, a local Type 1 landfill.

1. Percent of water service area served by wastewater system: 98%
2. Monthly volume treated for previous three years (in 1,000 gallons).

Year	2002	2003	2004
January	228,593	234,896	272,095
February	219,294	239,586	282,184
March	259,730	253,779	277,010
April	273,033	230,227	250,101
May	265,744	251,437	261,358
June	227,890	257,973	331,205
July	238,396	221,710	276,726
August	217,364	238,136	292,581
September	211,785	249,606	263,107
October	271,304	245,570	288,910
November	226,073	272,730	313,883
December	267,049	247,683	273,653
Total	2,906,255	2,943,333	3,382,813

Element 2: Conservation Goals

Information on future population and water demand forecasts, as well as the present and anticipated capacity of the City of Lewisville’s water supply, treatment and distribution system were reviewed as part of the planning process. The most recent long-term population forecasts by the Texas Water Development Board (TWDB) projected sustained growth and water demand.

Table 1: City of Lewisville Population and Household Projections (Texas Water Development Board)

Population

2000	2005	2010	2015	2020	2025	2030
78,360	87,841	92,437	95,554	96,844	105,444	111,168

Households

2000	2005	2010	2015	2020	2025	2030
30,689	34,294	35,982	37,269	37,748	41,076	43,232

The Texas Water Development Board completed the updating of their population projections for Region C in July 2004, using U.S. Census data to project the Lewisville population. These projections can be found in Table 2 below.

Table 2: City of Lewisville 2000 Census and Population Projections (Texas Water Development Board)

Texas Water Development Board Population Projections							
	2000 Census	2010	2020	2030	2040	2050	2060
Lewisville	77,737	105,690	132,412	152,002	165,316	175,002	185,002
Increase Above Census	-	27,953	54,675	74,265	87,579	97,265	107,265

Additionally, TWDB provides water demand projections for regional planning efforts based on historical per capita consumption projection. Table 3 shows TWDB water demand projections for the City of Lewisville.

Table 3: City of Lewisville Water Demand Projections (Texas Water Development Board)

Texas Water Development Board Per Capita Consumption Projections						
2000	2010	2020	2030	2040	2050	2060
14,542	20,837	25,660	29,286	31,666	33,325	35,230

In 2004, the City of Lewisville provided over 3.8 billion gallons of water to approximately 33,969 City of Lewisville accounts. Of these accounts, over forty-one percent were classified as Residential; twenty three percent were Multi-Family, thirty five percent were Commercial/Institutional and one percent was Industrial. The Texas Legislature’s Water Conservation Implementation Task Force recommended standard methodologies for calculating Total Gallons per Capita per Day (GPCD) and residential GPCD. Using this methodology, total GPCD (including unbilled) for the City of Lewisville ranged from 138 to 158 GPCD for the period 2002 through 2004. Residential (single family plus multi-family) for the same period was 164 GPCD.

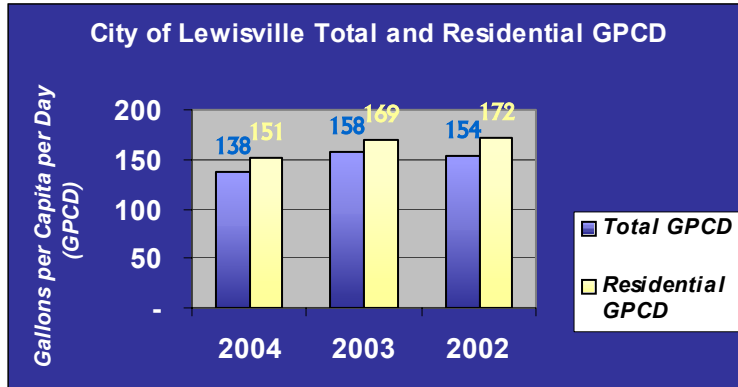


Figure 4: City of Lewisville Total and Residential GPCD

Table 4: City of Lewisville Total Gallons per Capita Day and Residential

Fiscal Year	Population	Total GPCD	Total GPCD Less Unbilled	Residential GPCD
2000	78,150	165	152	*
2001	80,609	153	141	*
2002	80,750	154	140	172
2003	83,855	158	143	169
2004	87,841	138	114	151

*Not available

The total gallons per capita per day (GPCD) has been used to measure water demands specific to the population. The total GPCD is the total amount of water diverted and/or pumped for potable use divided by the total population.

$$\text{Total GPCD} = \frac{\text{Annual total treated water pumped} - \text{Annual unbilled water}}{365 \times \text{Population}}$$

The Total GPCD averaged 154 for the period 2000-2004. The residential GPCD includes both residential and multi-family consumption. The Total Residential GPCD averaged 164 for the period 2002-2004.

$$\text{Residential GPCD} = \frac{(\text{Residential Class Water Use}) + (\text{Multi Family Water Use})}{365 \times \text{Population}}$$

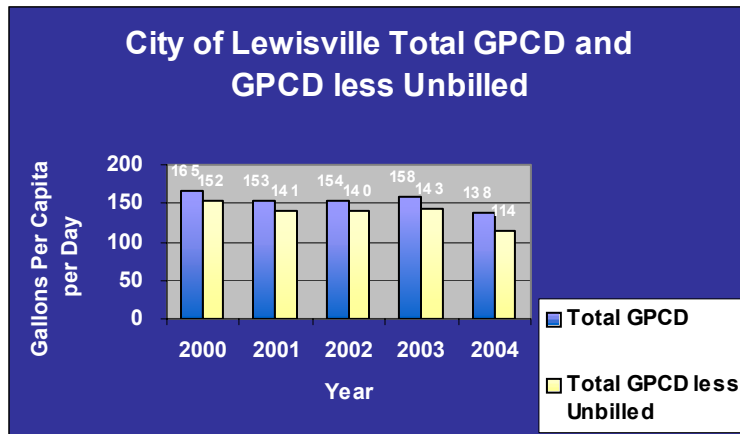


Figure 5: City of Lewisville Total GPCD and Total GPCD less Unbilled

Seasonal Water Use Patterns

Seasonal water use provided important information for planning for water treatment and treated water distribution capacity. Comparison of Winter/Summer demands identifies potential water use savings from landscape irrigation and outdoor use.

Seasonal use patterns were examined for residential and large industrial and commercial customers to determine peak seasonal use patterns. For the period FY2002 through FY2004, the summer to winter water use ratio was used as an indicator of seasonal peak demands. Comparison of summer to winter water use also provides an estimate of outdoor use. For residential water users, the summer to winter ratio averaged approximately 1.5 for Fiscal Year (FY) 01 through FY 04. Summer to winter ratios for large industrial and commercial customers averaged 1.1, but vary significantly based upon business type.

The City of Lewisville proposes to implement new conservation strategies that are outlined in Element 10 of this plan. The goal will be to meet an Annual Gallons per Capita per Day Average of 150. These projections can be found in Table 5 below. Water Savings were determined using the difference in projected water usage determined from

the Texas Water Development Board figures from the targeted 150 Gallons per Capita Day.

Table 5: City of Lewisville Projected Water Savings in Acre Feet with 155 Gallons per Capita Day

Year	Population	Gallons Diverted Based on TWDB Projections	Gallons Diverted at Projected 150 GPCD	Water Savings in acre feet
2005	87,841	5,764,304,190	4,809,294,750	2931
2006	88,760	5,969,264,469	4,859,610,000	3405
2007	89,679	6,174,224,748	4,909,925,250	3880
2008	90,598	6,379,510,878	4,960,240,500	4356
2009	91,517	6,584,471,157	5,010,555,750	4830
2010	92,437	6,789,431,436	5,060,925,750	5305
2011	93,060	6,946,491,618	5,095,035,000	5682
2012	93,683	7,103,551,800	5,129,144,250	6059
2013	94,306	7,260,611,982	5,163,253,500	6437
2014	94,930	7,417,672,164	5,197,417,500	6814
2015	95,554	7,574,732,346	5,231,581,500	7191

Long Range Water Planning Efforts

The City of Lewisville regularly conducts water master planning efforts to evaluate and plan for future water service needs. The 2001 Master Plan concluded that additional sources of water must be procured to meet future water needs. Capital Improvement Plans developed based on the City’s master plan include the procurement of additional treated water supply and future expansion of the City of Lewisville’s current Feaster Water Treatment Plant.

Future Water Supply Sources

A project is under design to provide an additional 15 MGD treated water from DWU. The project includes a pipeline, water pump station, and ground storage tank. The supply line is a joint project with the cities of Lewisville, Carrollton, and The Colony. The City’s Master Plan shows a build out of 124,000 with a demand capacity of 69 MGD. The addition of this new water source will leave 16 MGD to be obtained through future plant expansion or treated water projects.

Element 3: Accurate Metering Devices:

As per Texas Commission on Environmental Quality (TCEQ) requirements metering devices are tested and calibrated for accuracy. Raw water meters, and treated water meters from the point of diversion from DWU are calibrated semi-annually to within +/- 5% accuracy. In addition, Dallas Water Utilities maintains meters in close proximity to the City of Lewisville meters, providing redundant flow recordings that allow comparison of flow readings, early detection of errant recordings, leaks, and/or meter inaccuracies.

Element 4: Universal Metering, Testing, Repair, and Replacement:

The City of Lewisville’s current meter program provides universal metering of both customer and public uses of water and a regularly scheduled maintenance program of meter testing, repair, and replacement. Temporary meters are required on all construction projects including City projects. The City has implemented a meter change out program to replace commercial meters (1 1/2-inch and 2-inch) with high efficiency single jet meters. Water provided to the system is also metered and each meter is calibrated and certified accurate to within +/-5% semi-annually.

Element 5: Non-Promotional Rate Structure:

The City of Lewisville currently has a rate structure comprised of a monthly minimum based on the meter size and then a flat rate for each 1,000 gallons, above the first 2,000 gallons. The rates are shown in the table below. The City annually reviews water rate structures to ensure that the prevailing rates encourage water conservation while covering the total cost of service and minimizing adverse impacts.

Table 6: City of Lewisville Water Rates

City of Lewisville 2005 Water Rates	
Meter size	Base cost for first 2,000 gallons
5/8 inch	\$12.20
3/4 inch	\$12.20
1 inch	\$17.60
1-1/2 inch	\$32.96
2 inch	\$54.48
3 inch	\$116.00

4 inch	\$202.08
6 inch	\$448.16
8 inch	\$792.64
10 inch	\$235.52
All consumption over 2,000 gallons is \$2.64/1,000 gallons	

Element 6: Leak Detection, Repair, and Control of Unaccounted for Water:

The City of Lewisville’s leak detection, location, and repair programs have been employed for several years to identify distribution system losses and control unaccounted for water. The City employs periodic visual inspections along distribution lines, including routine aerial inspections, listening equipment for leak detection regularly used when exercising of valves and flushing of hydrants, and periodic audits of the water system for illegal connections or abandoned services. The City currently has practices in place to control system pressure. Pressure checks are made on fire hydrants during flushing and routine exercising. Additionally, booster pump station and elevated tank pressures are continuously monitored via telemetry throughout the city.

Element 7: Continuing Public Education Program:

The City recognizes that water conservation significantly benefits individuals and communities in terms of long-term availability and costs. The most readily available and lowest cost method of promoting water conservation is to inform retail water users about ways to save water in homes and businesses, in landscaping and lawn uses, and in recreational uses. The City currently provides the information to retail customers in the following manner:

- Provide conservation suggestions to all residential, commercial, and industrial water customers.
- Water conservation pamphlets, containing information on the *Water Conservation and Emergency Water Management Plan* have been mailed out to all water customers. Additionally, this information is available at kiosks throughout City facilities, including the atrium of City Hall Annex, City Hall and in the Public Library.

- Conservation information is distributed at City events and environmental program functions that involve the general public.
- Public media campaigns that broadcast conservation tips on the City cable channel and radio station.
- Conservation tips and information on the *Water Conservation and Emergency Water Management Plan* are available on the City web page and in newsletters.
- The City promotes conservation awareness as part of its participation in annual National Drinking Water Awareness Week programs by hosting poster contests and creating informational display boards.

Element 8: Implementation and Enforcement

The Mayor, Mayor Pro Tem, City Manager, or City Manager’s duly appointed representative will act as the Administrator of the Water Conservation and Emergency Water Management Plan. The Administrator will oversee the execution and implementation of all elements of the Plan and will be responsible for seeing that adequate records are kept for program verification. A copy of the City of Lewisville’s Ordinance is included in Appendix A.

Element 9: Coordination with Regional Water Planning Groups:

The City of Lewisville is located in both Dallas and Denton Counties and is part of the Region C Water Planning Group. Lewisville receives all of its water from Dallas Water Utilities, which is one of the five major water providers identified in the Region C Plan. A copy of the City of Lewisville’s Water Conservation and Emergency Water Management Plan has been submitted to Dallas Water Utilities and the Region C Water Planning Group.

Element 10: Water Conservation Strategies

Various water conservation strategies were examined and considered during this process. These strategies were the result of numerous resources, including state agency directives,

regional water planning groups, water conservation literature, water conservation programs used by other municipalities, and the city's existing water conservation plan.

The City of Lewisville has had a water conservation program since 1999. Prior to that time a drought contingency plan was in place. The City's current conservation program consists of public awareness and education programs; leak detection and repair; evaluation of unaccounted for water; meter testing, repair and replacement program, non-promotional rate structure, Water Conservation Plan and Emergency Water Management Ordinance, and enforcement capabilities.

Water conservation strategies currently employed include the following:

- Utility water conservation workforce
- Universal meter testing, repair and replacement
- Leak detection, repair, and control of unaccounted for water
- Public awareness and education campaign
- Means of implementation and enforcement of water conservation ordinances
- Coordination with regional water planning groups
- Record Management system
- Reuse Water Planning
- Adoption of updated plumbing code
- Distribution system pressure control program

The Texas Water Conservation Implementation Task Force developed a "Best Management Practices Guide" which provided recommended conservation measures. These best management practices (BMP's) are divided into three groups: Municipal, agricultural, and industrial. Both municipal and industrial BMP's were evaluated based on the water usage within the City of Lewisville. In addition to the TWDB's BMP's, the City of Lewisville evaluated conservation strategies introduced in the 2006 Region C Water Plan. Water conservation strategies identified from the BMPS were compiled. Each strategy has been identified for potential implementation during the next five-year period.

The following were considered for implementation during the 2005-2009 period.

- ✘ Water conservation pricing

- × Expanded school and public education programs
- × Water surveys for single-family and multi-family customers
- × Landscape irrigation conservation and incentives
- × Park and athletic field conservation
- × Golf course conservation
- × Expanded reuse program
- × Industrial water audits
- × Industrial water waste reduction
- × Industrial water conservation/pollution prevention programs (P2)
- × Industrial alternative sources and reuse of process water
- × Industrial landscape

Benefits of implementing identified strategies exist, beyond meeting mandated water conservation requirements from the TCEQ. Conservation strategies will extend the life of the distribution system; prolong capital improvements and the need to procure additional treated water source, and lower the operating cost of the distribution system and peak demands. Water conservation strategies were collected from various sources that included DWU, literature, planning groups and other municipalities. Strategies were reviewed based on the ability of implementation and benefit in reduced water consumption.

Recommended Water Conservation Strategies

The Water Conservation Plan, currently in effect, recommends continued conservation efforts. Conservation strategies presently used by Lewisville and those that are recommended for implementation over the five-year planning period are shown in the table below, Table 6: Water Conservation Strategies. Other strategies that may be implemented after 2009 are also included in this table.

Table 7: City of Lewisville Water Conservation Strategies

Water Conservation Strategies		
Strategy	Recommended 2005-2009	Recommended after 2009
Water conservation staff	✓	✓
Universal meter testing, repair and replacement	✓	✓
Leak detection, repair, and control of unaccounted for water	✓	✓
Public awareness and education campaign	✓	✓
Means of implementation and enforcement of water conservation ordinances	✓	✓

Coordination with regional water planning groups	✓	✓
Record Management system	✓	✓
Reuse Water Planning	✓	✓
Adoption of updated plumbing code	✓	✓
Distribution system pressure control program	✓	✓
Water surveys for single and multi family customers	✓	✓
Landscape irrigation conservation and incentives		✓
Water wise landscape design program	✓	✓
Park conservation	✓	✓
Water audit	✓	✓
Reuse options	✓	✓

✓ Currently employed strategy ✓ Implementation in 2005-2009 ✓ Implementation after 2009

Recommended Actions

Recommendation 1: Funding of Conservation Programs and Resources

Continued support of Water Conservation Programs and efforts will allow the coordination of conservation efforts and targeted programs to enhance existing educational efforts, special partnerships and audits. New public awareness and education efforts will be implemented over the five-year period.

Public Awareness and School Education Programs

The City of Lewisville currently sponsors a poster contest, provides conservation materials through water bill inserts, and provides conservation information through the City’s website. Expanding the awareness and educational programs could produce between 1 to 5 percent savings. It is estimated that water savings from expanding this program will increase water savings by 2% of total water use in FY 2009. The City of Lewisville presently spends \$0.14 per capita on public awareness, and is projected to spend up to \$0.24 per capital during the next five years. Using the projected water savings, the cost of this measure will provide between 173 and 867 acre-feet in 2005 and 404 per acre-feet in 2009.

Recommendation 2: Evaluation of Current Water Loss

Further evaluation of the current water losses will include the review and enhancement of the following programs:

- metering programs to measure and account for the amount of water diverted and customer sales;
- meter testing, repair, and replacement programs;
- leak detection programs, repair, and water loss accounting for the water transmission, delivery, and distribution system in order to control unaccounted-for uses of water, and
- measures to determine and control unaccounted-for uses of water.

Additional information and records will be reviewed to evaluate current water use practices for residential, commercial and industrial users.

Customer Water Use Audits

A customer water use audit could be combined with the current resident survey to provide information on customer seasonal water usage and (normal) practices. In addition, targeting of high water use customers would provide further information on their irrigation practices. This could also provide the opportunity to introduce landscape irrigation conservation and water conservation awareness programs to multi-family complexes, which constitute the largest water users within the City of Lewisville.

Additional information on industrial and commercial water usage could be obtained through separate surveys or other instruments. This information could be combined with current Pollution Prevention (P2) efforts and existing programs that obtain information from industrial and commercial users. This could provide the opportunity to introduce landscape irrigation conservation and water conservation awareness programs to more than one third of the current water users.

Recommendation 3: Promote “WaterWise” Landscapes

City-hosted environmental and conservation events often provide literature and resources on the use of “*WaterWise*” landscapes that promote the use of native

and heat tolerant plantings. The introduction of xeriscape principles using native vegetation or replacing grass turf with native turf can be expanded to additional city owned locations such as libraries, fire stations, parks, and other city facilities. These areas may be used as demonstration sites in addition to parks and other city properties with high public visibility.

Recommendation 4: Review and revise current Water Rates, City Ordinances, Enforcement, Codes and Standards to ensure water conservation is promoted.

The review and revision of current city ordinances, rates and standards will be conducted to uphold conservation efforts. The addition of ordinances and rates that discourage wasteful water use will be proposed.

Water Conservation Pricing

Introduction of water conservation pricing could decrease residential water usage by as much as 2% or 110 acre-feet with a 10% increase in residential water rates. This measure will require consideration and rate analysis during the five-year planning period with projected implementation by FY 2008. The goal of water conservation pricing is to send the appropriate signal to customers to reduce discretionary water use. Evaluation and consideration will be given to seasonal rate structures, rates based on individual water budgets and tiered residential rate structures. The revenue reduced would be in direct proportion to the amount of water saved. Consideration may also be given to installing separate meters for industrial and commercial customers and high water use single and multi-family residential accounts to separate indoor and outdoor uses.

Prohibition of Wasting Water / Lawn and Landscape Irrigation Ordinance

Implementation of this water conservation strategy would be combined with public information efforts to discourage inefficient water use and reduce water waste. Estimated water savings from this strategy could be as much as 5% of summer outdoor usage. This measure would require some administrative and

enforcement costs initially pending consumer awareness of the new program. The estimated water savings for this measure would be 129 acre-feet per year.

Recommendation 5: Expand Conservation/Reuse Programs

Since 1997, the City has provided treated wastewater effluent from Lewisville's Wastewater Treatment Plant to Upper Trinity Regional Water District for irrigation of golf courses and landscaped areas. Lewisville has an ongoing program to maintain the meters to measure this effluent. The City currently supports reuse efforts through the Upper Trinity Regional Water District to Castle Hill's golf course. Additional reuse opportunities and programs are currently under consideration. The City submitted a 210 Notification and application for additional future reuse options to the Texas Commission on Environmental Quality in 2004. Opportunities exist to provide reuse water to additional golf courses, parks and athletic fields, which would offset current potable water demands.

Park and Athletic Field and Golf Course Conservation

This water conservation strategy could reduce peak demand and water usage. This conservation strategy would promote rational water use comparable to those practices required of residential customers. Consideration will be given to reusing treated wastewater for some applications where feasible. These conservation efforts could produce between 15 and 75 acre-feet per year.

Recommended Five-Year Implementation Schedule

An implementation schedule for the water goals described in this plan are proposed to be initiated over the five-year period for FY's 2005 through 2009. These proposed or revised programs are listed below.

Action 1: Funding of Conservation Programs and Resources

Existing Efforts:

- Maintain conservation programs and resources

New Efforts

- Evaluate current programs

Action 2: Evaluation of Current Water Loss

Existing Efforts:

- Collect and evaluate water data

New Efforts

- Evaluate water data to assess the accuracy of current water records and water conservation programs.

Action 3: Promote “WaterWise” Landscapes

Existing Efforts:

- Promote “*WaterWise*” Landscapes at Environmental and City events.

New Efforts

- *None*

Action 4: Review/revise current Water Rates, City Ordinances, Enforcement, Codes and Standards, to ensure water conservation is promoted.

Existing Efforts:

- Review current Conservation Plan and Ordinance for necessary revisions.

New Efforts

- Evaluate current Ordinances, Codes and Standards, for conflicting provisions that do not promote water conservation.

Action 5: Expand Conservation/Reuse Programs

Existing Efforts:

- Complete application process for identified projects

New Efforts:

- Continue review of potential reuse opportunities

FY 2006

Action 1: Funding of Conservation Programs and Resources

Existing Efforts:

- Maintain conservation programs and resources
- Evaluation of current program effectiveness

New Efforts

- Develop new conservation educational programs and resources
- Enhance partnerships to promote Conservation Awareness

Action 2: Evaluation of Current Water Loss

Existing Efforts:

- Collect and evaluate water data
- Assess the effectiveness of water conservation programs.

New Efforts

- Evaluate leak detection, metering and replacement programs to assess the program effectiveness and accuracy.

Action 3: Promote “WaterWise” Landscapes

Existing Efforts:

- Promote “WaterWise” Landscapes at Environmental and City events.

New Efforts

- Coordinate with Parks Department and Community Development to identify existing and proposed landscapes for conversion to “WaterWise” landscapes.

Action 4: Review/revise current Water Rates, City Ordinances, Enforcement, Codes and Standards, to ensure water conservation is promoted.

Existing Efforts:

- Continue to review current Conservation Plan and Ordinance for necessary revisions.
- Continue to evaluate ordinances, codes and standards

New Efforts

- Modify City Ordinances, Rates, Codes and Standards to promote conservation efforts and adequate enforcement.

Action 5: Expand Conservation/Reuse Programs

Existing Efforts:

- Complete identified reuse project.

New Efforts:

- Identify and evaluate new reuse projects

FY 2007

Action 1: Funding of Conservation Programs and Resources

Existing Efforts:

- Maintain conservation programs and resources
- Continue conservation educational programs
- Continue to enhance partnerships to promote Conservation Awareness

New Efforts

- Develop Water Conservation Awards programs

Action 2: Evaluation of Current Water Loss

Existing Efforts:

- Collect and evaluate water data
- Assess the effectiveness of water conservation programs.

- Continue to evaluate leak detection, metering and replacement programs to assess the program effectiveness and accuracy.

New Efforts

- Conduct Customer Water Use Surveys

Action 3: Promote “WaterWise” Landscapes

Existing Efforts:

- Promote “*WaterWise*” Landscapes at Environmental and City events.
- Continue to identify existing and proposed landscapes for conversion to “*WaterWise*” landscapes.

New Efforts

- Enhance partnerships to promote “*WaterWise*” landscapes

Action 4: Review/revise current Water Rates, City Ordinances, Enforcement, Codes and Standards, to ensure water conservation is promoted.

Existing Efforts:

- Continue to review current Conservation Plan and Ordinance for necessary revisions.
- Continue to evaluate ordinances, codes and standards

New Efforts

- Increase enforcement efforts.

Action 5: Expand Conservation/Reuse Programs

Existing Efforts:

- Continue to identify potential reuse opportunities

New Efforts

- Continue implementation of identified potential reuse opportunities

FY 2008

Action 1: Funding of Conservation Programs and Resources

Existing Efforts:

- Maintain conservation programs and resources
- Continue conservation educational programs
- Enhance partnerships to promote Conservation Awareness
- Continue water conservation awards programs

New Efforts

- Develop Industrial/Commercial Conservation Awareness Program
- Evaluate on-going programs for effectiveness

Action 2: Evaluation of Current Water Loss

Existing Efforts:

- Collect and evaluate water data
- Assess the effectiveness of water conservation programs.
- Continue to assess leak detection, metering and replacement programs.

New Efforts

- Conduct Water System Analysis

Action 3: Promote “WaterWise” Landscapes

Existing Efforts:

- Promote “*WaterWise*” Landscapes at Environmental and City events.
- Continue to identify proposed landscapes for conversion to “*WaterWise*” landscapes.
- Continue to enhance partnerships to promote “*WaterWise*” landscapes

New Efforts

- Develop General Development Ordinance that promotes “WaterWise” landscapes.

Action 4: Review/revise current Water Rates, City Ordinances, Enforcement, Codes and Standards, to ensure water conservation is promoted.

Existing Efforts:

- Continue to review current Conservation Plan and Ordinance for necessary revisions.
- Continue to evaluate ordinances, codes and standards
- Continue enforcement efforts

New Efforts

- Consider additional ordinances, codes that promote water conservation.

Action 5: Expand Conservation/Reuse Programs

- Continue implementation of identified potential reuse opportunities

FY 2009

Action 1: Funding of Conservation Programs and Resources

Existing Efforts:

- Maintain conservation programs and resources
- Continue conservation educational programs
- Continue partnerships to promote Conservation Awareness
- Continue water conservation awards programs
- Continue Industrial/Commercial Conservation Awareness Program

New Efforts

- Evaluate on-going programs for effectiveness
- Develop water conservation awards programs

Action 2: Evaluation of Current Water Loss

Existing Efforts:

- Collect and evaluate water data
- Assess the effectiveness of water conservation programs.
- Continue to assess leak detection, metering and replacement programs.

New Efforts

- Implement actions identified in Water System Analysis

Action 3: Promote “WaterWise” Landscapes

Existing Efforts:

- Promote “*WaterWise*” Landscapes at Environmental and City events.
- Continue to identify proposed landscapes for conversion to “*WaterWise*” landscapes.
- Continue to enhance partnerships to promote “*WaterWise*” landscapes.

New Efforts

- *None*

Action 4: Review/revise current Water Rates, City Ordinances, Enforcement, Codes and Standards, to ensure water conservation is promoted.

Existing Efforts:

- Continue to review current Conservation Plan and Ordinance for necessary revisions.
- Continue to evaluate ordinances, codes and standards
- Continue enforcement efforts

New Efforts

- Consider additional ordinances, codes that promote water

conservation.

Action 5: Expand Conservation/Reuse Programs

- Continue implementation of identified potential reuse opportunities

Element 12: Update of the Plan:

The City of Lewisville will review and update its Water Conservation Plan, as necessary, based on an assessment of previous five-year and ten-year targets and any other new or updated information. New strategies that are identified for potential implementation during the five-year and ten-year target periods may be added to the existing conservation strategies, or modification of existing strategies may be performed based on the evaluation and assessment of the outcome of these strategies.



Emergency Water Management Plan

Title 30 Chapter 288 of the Texas Administrative Code (TAC) entitled Water Conservation Plans, Drought Contingency Plans, Guidelines and Requirements, Subchapter B requires the submission and implementation of a drought contingency plan that meets the following minimum requirements for retail public water suppliers:

- **Public Participation:** Preparation of the plan should include provisions for informing the public and providing opportunity for public input.
- **Public Education:** The plan should include provisions for continuing public education and information regarding the drought contingency plan.
- **Coordination with Regional Planning Groups:** Coordination with the Regional Water Planning Group must be documented to ensure consistency with the appropriate regional water plans.
- **Information to be Monitored:** A description of the information to be monitored, criteria for initiation and termination of drought response stages, and an explanation of the rationale for triggering such criteria must be included in the plan.
- **Drought or Emergency Stages:** The plan must respond to a reduction in available water supply up to the drought of record, water production or distribution system limitations, supply source contamination, or system outage due to the failure or damage of major water system components.
- **Targets:** The plan should include specific, quantified targets for water use reductions to be achieved during periods of water shortage or drought.
- **Water Supply or Water Demand Management Measures:** Measures should include at a minimum, the curtailment of non-essential water uses and utilization of alternative water sources.
- **Procedures:** The plan must include procedures for initiation and termination of drought response stages and notification to the public.
- **Variances:** The plan must include procedures for granting variances to the plan.

- **Notification of TCEQ:** The water supplier shall notify the TCEQ Executive Director within five business days of any mandatory provisions of the drought contingency plan.
- **Enforcement:** The plan must include procedures for enforcement of mandatory water use restrictions, including specification of penalties
- **Update of Plan:** The plan shall be reviewed and updated at least every five years.

EMERGENCY WATER MANAGEMENT PLAN

Program Goal

Drought or a number of other uncontrollable circumstances can disrupt normal availability of the City's water supply. Even though the City may have an adequate water supply; the supply could become contaminated; a disaster could destroy the supply; or system treatment, storage, or distribution failures could present the City with an emergency demand management situation. The Emergency Water Management Plan is designed to provide procedures to respond to these emergencies.

Plan Elements

It is important to distinguish emergency demand management planning from water conservation planning. While water conservation involves implementing permanent water use efficiency or reuse practices, emergency plans establish temporary methods or techniques to be used only as long as an emergency exists. The drought contingency measures included in the Plan may be implemented as precautionary measures to avoid or minimize the impact of drought-related water shortages or other emergencies. The City of Lewisville's emergency plan includes the following elements:

- ◆ Triggering conditions signaling the start of an emergency period
- ◆ Demand management response stages
- ◆ Initiation, implementation, and termination procedures
- ◆ Public information and education procedures

- ◆ Enforcement process
- ◆ Alternative Water Source
- ◆ Coordination with Regional Water Planning Groups

Triggering Conditions

The City of Lewisville purchases water from Dallas Water Utilities (DWU) through raw and treated water contracts. Provisions within these contracts require the City of Lewisville to implement the Emergency Water Management Plan when Dallas implements similar measures. The City of Lewisville will coordinate with DWU to establish appropriate water restrictions when the water supply will be affected. The conditions, which can trigger implementation of demand management measures, include diminished Lewisville Lake pool elevations, depletion of potable water storage, and equipment failures which affect the ability of the system to maintain required water pressure. These criteria are specifically defined in Appendix B of this document.

Demand Management Responses

Contingent upon the severity of the triggering conditions, the Plan calls for three phases of response to emergency demand situations. The first stage is identified as a "Water Watch" and calls for voluntary water conservation and increased public education. The Target for this first stage is to achieve a voluntary 1 percent reduction in total gallons per capita per day (GPCD). The second stage escalates to a "Water Emergency" which imposes restrictions that prohibit certain water uses and limits other uses to specified hours and days, and provides for a temporary increase in retail water rates for water use in excess of 6,000 gallons per month. The Target for the second stage of this plan is to achieve a 5 percent reduction in total gallons per capita per day (GPCD). In the third stage, a "Water Crisis" is declared and additional restrictions are imposed that prohibit all landscape watering, allow the City Manager to require reduced consumption by commercial water users, and provide for a temporary increase in retail water rates for water use in excess of 6,000 gallons per month. The Target for this third stage of the plan is to achieve a 15 percent reduction in total gallons per capita per day (GPCD). These

target stages are comparable measures as those introduced by DWU in their Drought Contingency Plan. The response stages are fully described in Appendix B of this Plan.

Initiation, Implementation, and Termination Procedures

The Mayor, Mayor Pro Tem, City Manager, or City Manager's duly appointed representative, serves as Administrator of this plan, and is authorized to declare an emergency exists and require the implementation of measures prescribed in this plan. The Public Services Director shall advise the Administrator that urgent water conditions exist, and the Administrator shall order implementation of the appropriate stage of the plan. The order will be immediately communicated to the public by way of the City cable channel, web site, media news release, or whatever means are available and appropriate for the response required.

Declaration of any stage of the Emergency Water Management Plan can be effective for up to sixty (60) days from the date of announcement. Upon recommendation of the Public Services Director, the Administrator may upgrade or downgrade the stage of emergency when conditions triggering the emergency change. The City Council may extend the duration of the emergency order for an additional length of time not to exceed one hundred twenty (120) days at each stage of emergency. When conditions triggering the emergency no longer exist, the Administrator may terminate the order through public announcement by way of the City cable channel, web site, media news release, or other means as deemed appropriate by the Administrator.

Variations

Variations to the Emergency Water Management Ordinance may be granted only when an applicant can demonstrate extreme hardship or other severe conditions. Variations must be approved by the Administrator and the City Attorney after the applicant has signed a compliance agreement, which permits water use in a specific amount and manner.

Public Information and Education Procedures

As indicated in the previous section, public notification of implementation of the Emergency Water Management Plan will be made through the City cable channel, web site, media news release, or other means deemed appropriate by the Administrator. During the emergency response period, the public will receive regular updates through local newspapers and cable channel regarding the status of the water emergency. Additionally, as a component of the Water Conservation Plan, the purpose and stages of the Emergency Water Management Plan will be communicated to the public through the distribution of various printed materials.

Enforcement

All water users are expected to comply with the restrictions imposed by implementation of this Plan. A person commits an offense if he or she knowingly makes, causes, or permits use of water contrary to the demand management measures implemented. Any person who violates or fails to comply with any provision of the emergency measures shall be guilty of a misdemeanor, and upon conviction thereof in the Municipal Court of Lewisville, Texas, shall be subject to a fine of not more than \$500 for each offense. Each day such offense is continued, shall constitute a new and separate offense. During the period that the Plan is operative, the Administrator may grant exemptions in special cases where a water user can demonstrate extreme hardship or need relating to his/her health, safety, or welfare.

All City employees shall assist as needed in notification and enforcement of the Emergency Water Management Plan. The Police Department is authorized to enforce the penalties as described above upon violation of the emergency measures.

Alternative Water Source

The City of Lewisville, by contract, has access to an unlimited amount of untreated water from Lewisville Lake with the only restriction being availability. In the event of a

drought that would deplete Lewisville Lake, the City of Lewisville would make necessary arrangements for trucking in water.

Coordination with Regional Water Planning Groups

The City of Lewisville is located in both Dallas and Denton Counties and is part of the Region C Water Planning Group. Lewisville receives all of its water from Dallas Water Utilities, which is one of the five major water providers identified in the Region C Plan. A copy of the City of Lewisville's Water Conservation and Emergency Water Management Plan has been submitted to Dallas Water Utilities.