# AGENDA

**CITY COUNCIL WORK SESSION**
**City of Garland**
**Work Session Room, City Hall**
**200 North Fifth Street, Garland, Texas**
**March 5, 2012**
**5:00 p.m.**

**Executive Session**

1. **Discussions or deliberations regarding commercial or financial information that the City has received from a business prospect that the City seeks to have locate, stay, or expand in or near the territory of the City and with which the City is conducting economic development negotiations; or to deliberate the offer of a financial or other incentive to a business prospect of the sort described in this provision. Sec. 551.087, TEX. GOV'T CODE.**

   a. **Kraft Economic Incentive Program**

**DEFINITIONS:**

**Written Briefing: Items that generally do not require a presentation or discussion by the staff or Council. On these items the staff is seeking direction from the Council or providing information in a written format.**

**Verbal Briefing: These items do not require written background information or are an update on items previously discussed by the Council.**

**Regular Item: These items generally require discussion between the Council and staff, boards, commissions, or consultants. These items are often accompanied by a formal presentation followed by discussion.**

**[Public comment will not be accepted during Work Session unless Council determines otherwise.]**

**NOTICE:** The City Council may recess from the open session and convene in a closed executive session if the discussion of any of the listed agenda items concerns one or more of the following matters:

(1) Pending/contemplated litigation, settlement offer(s), and matters concerning privileged and unprivileged client information deemed confidential by Rule 1.05 of the Texas Disciplinary Rules of Professional Conduct. Sec. 551.071, TEX. GOV'T CODE.

(2) The purchase, exchange, lease or value of real property, if the deliberation in an open meeting would have a detrimental effect on the position of the City in negotiations with a third person. Sec. 551.072, TEX. GOV'T CODE.

(3) A contract for a prospective gift or donation to the City, if the deliberation in an open meeting would have a detrimental effect on the position of the City in negotiations with a third person. Sec. 551.073, TEX. GOV'T CODE.

(4) Personnel matters involving the appointment, employment, evaluation, reassignment, duties, discipline or dismissal of a public officer or employee or to hear a complaint against an officer or employee. Sec. 551.074, TEX. GOV'T CODE.

(5) The deployment, or specific occasions for implementation of security personnel or devices. Sec. 551.076, TEX. GOV'T CODE.

(6) Discussions or deliberations regarding commercial or financial information that the City has received from a business prospect that the City seeks to have locate, stay, or expand in or near the territory of the City and with which the City is conducting economic development negotiations; or to deliberate the offer of a financial or other incentive to a business prospect of the sort described in this provision. Sec. 551.087, TEX. GOV'T CODE.

(7) Discussions, deliberations, votes, or other final action on matters related to the City's competitive activity, including information that would, if disclosed, give advantage to competitors or prospective competitors and is reasonably related to one or more of the following categories of information:

- generation unit specific and portfolio fixed and variable costs, including forecasts of those costs, capital improvement plans for generation units, and generation unit operating characteristics and outage scheduling;
- bidding and pricing information for purchased power, generation and fuel, and Electric Reliability Council of Texas bids, prices, offers, and related services and strategies;
- effective fuel and purchased power agreements and fuel transportation arrangements and contracts;
- risk management information, contracts, and strategies, including fuel hedging and storage;
- plans, studies, proposals, and analyses for system improvements, additions, or sales, other than transmission and distribution system improvements inside the service area for which the public power utility is the sole certificated retail provider; and
- customer billing, contract, and usage information, electric power pricing information, system load characteristics, and electric power marketing analyses and strategies. Sec. 551.086; TEX. GOV'T CODE; Sec. 552.133, TEX. GOV'T CODE]

## (6:00) 1. Written Briefings:

### a. Salvia Ordinance

*At the February 20, 2012 Work Session, the Public Safety Committee made a recommendation to prohibit the sale of salvia in the City of Garland. Council is requested to consider amending Chapter 26, "Police – Miscellaneous Provision and Offenses" of the Code of Ordinances by adding a new section, Sec. 26.13, titled "Prohibition of the Sale of Salvia."*

### b. Police Officer Injury Leave Extension

*During the past year, Officer Mindy Staggs sustained multiple injuries while on duty and performing her duties as a Garland Police Officer. Officer Staggs is not yet able to return to work after receiving multiple procedures and/or treatments. Further medical treatment is required. In accordance with Section 143.073 of the Texas Local Government Code (Municipal Civil Service for Firefighters and Police Officers), Council is requested to consider extending Officer Staggs' injury leave, at full pay, for another year. This item is scheduled for formal consideration at the March 6, 2012 Regular Meeting.*

### c. Victim Assistance Advocate Program

*Council is requested to consider accepting a grant for the continuance of the Victim Assistance Advocate program within the Police Department. Funding for this grant is provided by Victims of Criminal Acts of 1984. This item is scheduled for formal consideration at the March 6, 2012 Regular Meeting.*

### d. Sale of City Property

*Council is requested to consider the abandonment and sale of 236 square feet of excess alley right-of-way located at the rear of 505 W. State Street to Sarah L. Stafford, Marion Gene Garvin, and Teena Cato Garvin for $708. If Council concurs, this item will be scheduled for formal consideration at the March 20, 2012 Regular Meeting.*

**e. Hazard Mitigation Action Plan**

*Council is requested to consider adopting the local Hazard Mitigation Action Plan. This plan was developed to implement hazard mitigation activities that will result in a more sustainable community by saving lives and properties from disaster situations. This plan will also allow the City of Garland to become eligible for grant funded mitigation projects that are not currently available. If Council concurs, this item will be scheduled for formal consideration at the March 20, 2012 Regular Meeting.*

**f. Recyclables Processing and Marketing Agreement**

*Council is requested to consider authorizing a Recyclables Processing and Marketing Agreement with Allied Waste Systems, Inc. dba Allied Waste Services of Plano to transport, process, and sell single stream recyclable materials. If Council concurs, this item will be scheduled for formal consideration at the March 20, 2012 Regular Meeting.*

| Item | Key Person |
|---|---|

**(6:15) 2. Verbal Briefings:**

**a. Community Multicultural Commission Update** **Wilson**

*Members of the Community Multicultural Commission will update Council on the upcoming "We the People" Conference which will be held in conjunction with the Healthy Living Expo on September 22, 2012. The event will also recognize the 10th anniversary of the Community Multicultural Commission.*

**b. Tax Abatement – Advanced Pharmacy** **Glenn**

*Advanced Pharmacy is considering opening a 10,000 square feet new service center in Garland, bringing $1 million in new equipment and $1 million in taxable inventory. Initially, 30 jobs will be created and 10 potential jobs within 5 years. The investment will bring over $14,000 to the City annually. The Garland Economic Development*

*Partnership Steering Committee recommends that Council provide the following to Advanced Pharmacy:*

- *General support for the project.*
- *Support of a 50% City tax abatement on business personal property value and inventory value on this new investment for 5 years (total of $35,230).*
- *Support of extending two additional years of 50% City tax abatement when 10 additional jobs (total of 40 jobs) are created within the first 5 years (total of $14,092).*

**c. Downtown Square Project Update** **Montgomery**

*The consultant team of David Baldwin, Dave Retzsch, and Nancy McCoy will update Council on the alternative designs for the Downtown Square and the results of the public meetings held to review these designs.*

**d. Administrative Services Committee Report** **Jeffus**

*Council Member Larry Jeffus, chair of the Administrative Services Committee, will provide a committee report on the following item:*

- *Drought Contingency Plan Restrictions*

**e. Texas Water Smart Coalition** **Mayor**

*At the request of Mayor Ronald Jones, Council will be briefed on the Texas Water Smart Coalition. The proposed program is a group conservation effort and is supported by the State Agricultural Commissioner.*

**(9:00) 3. Regular Items:**

**a. Automated and Manual Collection Single Stream Recycling Programs** **Banks**

*Environmental Waste Services (EWS) will be phasing in an Automated Collection Single Stream Recycling Program for 8,133 customers in designated areas throughout the City. Under this program, residents can recycle more commodities and place these*

*items in 95-gallon containers that will be serviced by automated recycling collection vehicles. In addition, EWS will initiate a Manual Collection Single Stream Recycling Program for all other customers not part of the first phase of the Automated Collection Single Stream Recycling Program. Customers will continue to use their 18-gallon recycling red bin(s) and, if needed, use plastic bags to accommodate any overflow of additional recycling commodities.*

**b. Lump Sum Payment** **Dollar**

*Due to the economic downturn, the City has been unable to budget for base salary increases since fiscal year 2009. To help offset a portion of the impact this has had on City employees, an up to three-percent one-time, lump sum payment is being proposed.*

**(10:00)4. Discuss Appointments to Boards and Commissions** **Council**

- *Marisol Trevizo – Civil Service Commission (Dollar)*
- *Dwight Vincent Harry – Parks and Recreation Board (Mayor)*
- *Eric Dean Stuyvesant – South Garland TIF (Edwards)*
- *John David O'Hara – Plan Commission (Jeffus)*

**5. Consider the Consent Agenda** **Council**

*A member of the City Council may ask that an item on the consent agenda for the next regular meeting be pulled from the consent agenda and considered separate from the other consent agenda items. No substantive discussion of that item will take place at this time.*

**6. Announce Future Agenda Items** **Council**

*A member of the City Council, with a second by another member, or the Mayor alone, may ask that an item be placed on a future agenda of the City Council or a committee of the City Council. No substantive discussion of that item will take place at this time.*

**(10:15) 7. Adjourn** **Council**

**(Estimated time to consider)**

# Policy Report

**Report No: 2012-2011**
**Agenda Item: WS-1a**
**Meeting: Work Session**
**Date: March 5, 2012**

## SALVIA ORDINANCE

### ISSUE

Council is requested to amend Chapter 26, "Police – Miscellaneous Provision and Offenses" of the Code Of Ordinances of the City of Garland by adding a new section, Sec. 26.13, titled, "Prohibition of the sale of Salvia".

### OPTIONS

1. Approve the addition of a new section, Sec. 26.13, titled Prohibition of the sale of salvia, to Chapter 26 of the Code of Ordinances of the City of Garland.
2. Take no action

### RECOMMENDATION

The Public Safety Committee and Staff recommend that Council approve the addition of a new section, Sec. 26.13, to Chapter 26 of the Code of Ordinances of the City of Garland to prohibit the sale of salvia in the City of Garland.

### COUNCIL GOAL

Safe, Family-Friendly Neighborhoods

### BACKGROUND

Salvia Divinorum is a plant which when ingested can have an hallucinogenic effect on an individual. Salvia is used as an alternative that mimics the effects of illegal controlled substances. Currently, there is no state or federal law that prohibits the sale of Salvia Divinorum or Salvinorin A to another person. Recognizing the risk posed to public heath and safety, adoption of this new section, Sec.26.13 of the Code of Ordinances of the City of Garland will provide a necessary tool to combat the increasing popularity of this substance.

**ATTACHMENTS**

Proposed Ordinance prohibiting the sale of Salvia Divinorum, Salvinorin A, or a product containing Salvia Divinorum or Salvinorin A to another person.

| Submitted By: | Approved By: |
| --- | --- |
| M. L. Bates<br>Chief of Police | William E. Dollar<br>City Manager |
| Date: February 27, 2012 | Date: February 27, 2012 |

# - DRAFT -

## For Discussion Purposes Only

**ORDINANCE NO.**

**AN ORDINANCE AMENDING CHAPTER 26, "POLICE–MISCELLANEOUS PROVISIONS AND OFFENSES", OF THE CODE OF ORDINANCES OF THE CITY OF GARLAND, TEXAS; PROVIDING A PENALTY UNDER THE PROVISIONS OF SEC. 10.05 OF THE CODE OF ORDINANCES OF THE CITY OF GARLAND, TEXAS; PROVIDING A SAVINGS CLAUSE AND A SEVERABILITY CLAUSE; AND PROVIDING AN EFFECTIVE DATE.**

**BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF GARLAND, TEXAS:**

**Section 1**

That Chapter 26, "Police - Miscellaneous Provisions and Offenses", of the Code of Ordinances of the City of Garland, Texas, is hereby amended by adding a new section, Sec. 26.13, to read as follows:

"**Sec. 26.13 Prohibition of the sale of salvia**

(A) A person commits an offense if the person, with criminal negligence, sells, delivers, or causes to be sold or delivered salvia divinorum, Salvinorin A or a product containing salvia divinorum or Salvinorin A to another person.

(B) A person commits an offense if the person possesses with intent to sell or deliver to another person for sale salvia divinorum, Salvinorin A or a product containing salvia divinorum or Salvinorin A."

**Section 2**

That a violation of any provision of this Ordinance shall be a misdemeanor punishable in accordance with Sec. 10.05 of the Code of Ordinances of the City of Garland, Texas.

**Section 3**

That 26, "Police - Miscellaneous Provisions and Offenses", of the Code of Ordinances of the City of Garland, Texas, as amended, shall be and remain in full force and effect save and except as amended by this Ordinance.

**Section 4**

# - DRAFT -

## For Discussion Purposes Only

That the terms and provisions of this Ordinance are severable and are governed by Sec. 10.06 of the Code of Ordinances of the City of Garland, Texas.

**Section 5**

That this Ordinance shall be and become effective immediately upon and after its passage and approval.

**PASSED AND APPROVED** this the _____ day of _____, 2012.

**CITY OF GARLAND, TEXAS**

_____
Mayor

**ATTEST:**

_____
City Secretary

# Policy Report

**Report No: 2012-2012**
**Agenda Item: WS-1b**
**Meeting: Work Session**
**Date: March 5, 2012**

## POLICE OFFICER INJURY LEAVE EXTENSION

### ISSUE

During the past year, Officer Mindy Staggs sustained multiple injuries while on-duty and performing her duties as a Garland Police Officer. The officer is not yet able to return to work after multiple medical procedures and/or treatments. Further medical treatment is required.

Section 143.073 of the Texas Local Government Code (Municipal Civil Service for Firefighters and Police Officers) specifies that a police officer may be on a leave of absence for a line of duty injury and that the leave, if necessary, shall continue for at least one year. At the end of one year, the municipality's governing body may extend the line of duty injury leave at full or reduced pay. A copy of Section 143.073 is set forth below.

### OPTIONS

1. Extend Officer Staggs' injury leave at full pay.
2. Extend Officer Staggs' injury leave at reduced pay.
3. Do not extend Officer Staggs' injury leave.

### RECOMMENDATION

Chief Bates recommends that Officer Staggs' injury leave be extended, at full pay, for another year (Option #1).

### COUNCIL GOAL

Consistent Delivery of Reliable City Services

### BACKGROUND

On March 22, 2011, Officer Mindy Staggs suffered multiple injuries while fulfilling her duties as a Garland Police Officer. While investigating a domestic disturbance, Officer Staggs contacted the adult male suspect who was seated in the driver's seat in a motor vehicle. As Officer Staggs attempted to remove the suspect from the vehicle, he began

to flee from the officer and began dragging her for a short distance from his vehicle before knocking her to the ground. The suspect led other officers on a high-speed pursuit before eventually being apprehended. Officer Staggs has been undergoing medical treatment and procedures since that time. Subsequently, Officer Staggs has been off of work as a direct result of the work-related injury.

## CONSIDERATION

Section 143.073 of the Texas Local Government Code (Municipal Civil Service for Firefighters and Police Officers) addresses police officer line of duty injuries and reads as follows:

> § 143.073. LINE OF DUTY ILLNESS OR INJURY LEAVE OF ABSENCE. (a) A municipality shall provide to a fire fighter or police officer a leave of absence for an illness or injury related to the person's line of duty. The leave is with full pay for a period commensurate with the nature of the line of duty illness or injury. If necessary, the leave shall continue for at least one year.
> (b) At the end of the one-year period, the municipality's governing body may extend the line of duty illness or injury leave at full or reduced pay. If the fire fighter's or police officer's leave is not extended or the person's salary is reduced below 60 percent of the person's regular monthly salary, and the person is a member of a pension fund, the person may retire on pension until able to return to duty.
> (c) If pension benefits are not available to a fire fighter or police officer who is temporarily disabled by a line of duty injury or illness and if the year at full pay and any extensions granted by the governing body have expired, the fire fighter or police officer may use accumulated sick leave, vacation time, and other accrued benefits before the person is placed on temporary leave.
> (d) If a fire fighter or police officer is temporarily disabled by an injury or illness that is not related to the person's line of duty, the person may use all sick leave, vacation time, and other accumulated time before the person is placed on temporary leave.
> (e) After recovery from a temporary disability, a fire fighter or police officer shall be reinstated at the same rank and with the same seniority the person had before going on temporary leave. Another fire fighter or police officer may voluntarily do the work of an injured fire fighter or police officer until the person returns to duty.
>
> Acts 1987, 70th Leg., ch. 149, § 1, eff. Sept. 1, 1987. Amended by Acts 2001, 77th Leg., ch. 683, § 1, eff. Sept. 1, 2001.

## ATTACHMENTS

None

Submitted By:

Mitchel L. Bates
Chief of Police

Date: February 28, 2012

Approved By:

William E. Dollar
City Manager

Date: February 28, 2012

# Policy Report

**Report No: 2012-2013**
**Agenda Item: WS-1c**
**Meeting: Work Session**
**Date: March 5, 2012**

## VICTIM ASSISTANCE ADVOCATE PROGRAM

**ISSUE:**

Council is requested to consider accepting a grant for the continuance of the Victim Assistance Advocate program within the Police Department. Funding for this grant is provided by Victim's of Crime Act of 1984 (VOCA).

**OPTIONS:**

1. Approve the Police Department to accept the Victim's of Crime Act (VOCA) grant funding for the Victim Assistance Advocate position.

2. Do not approve pursuing grant funding for Victim Assistance Advocate position.

**RECOMMENDATION:**

Staff recommends approving the Police Department to pursue the "Victim's of Crime Act (VOCA)" grant funding for the Victim Assistance Advocate position. This item is scheduled for formal consideration at the March 6, 2012.

**COUNCIL GOAL**

Consistent Delivery of Reliable City Services

**BACKGROUND:**

Victims of crime often find themselves beset with the intricacies of the criminal justice system. They are unaware that they have access to resources for assistance. In 2011, 21,700 incident reports were completed by the Garland Police Department; of those, 6,131 received the assistance of the Garland Police Department crime victim advocate. The crime victim advocate serves as a liaison, assisting victims of violent crime and domestic abuse in navigating the legal system and by referring them to the appropriate agencies for further assistance. These services to crime victims include assisting in the development of safety plans, helping to understand and work within the judicial system and the provision of information regarding crime victim compensation.

This is not a new position request. This is an existing position currently funded by the American Recovery and Reinvestment Act of 2009 (ARRA) and has been previously been funded through the Victim's of Crime Act (VOCA).

**CONSIDERATION:**

If approved, the Garland Police Department will apply for a one-year grant of $51,498.00 to fund the Victim Assistance Advocate position. The grant funding would begin in September of 2012 upon expiration of the current grant. This grant has a 20% matching component which will be met through in-kind volunteer hours.

**ATTACHMENTS**

None

| Submitted By: | Approved By: |
|---|---|
| Mitchel L. Bates<br>Chief of Police | William E. Dollar<br>City Manager |
| Date: February 28, 2012 | Date: February 28, 2012 |

# Policy Report

**Report No: 2012-2014**
**Agenda Item: WS-1d**
**Meeting: Work Session**
**Date: March 5, 2012**

## SALE OF CITY PROPERTY TO SARAH L. STAFFORD, MARION GENE GARVIN AND TEENA CATO GARVIN

### ISSUE

Consider the abandonment and sale of 236 square feet of excess alley right-of-way lot located at the rear of 505 W. State St., in the City of Garland to Sarah L. Stafford, Marion Gene Garvin and Teena Cato Garvin for $708.

### OPTIONS

1. Approve the abandonment and sale.
2. Do not approve the abandonment and sale.

### RECOMMENDATION

Abandon and sell the subject property to Sarah L. Stafford, Marion Gene Garvin and Teena Cato Garvin. If Council concurs with this recommendation, staff will submit a resolution for consideration at the March 20, 2012 Regular Meeting.

### COUNCIL GOAL

Sustainable Quality Development and Redevelopment
Financially Stable Government with Tax Base that Supports Community Needs

### BACKGROUND

1. On March 17, 1904, acquired the property located at the rear of 505 W. State St. as right-of-way for an alley.

2. As a part of the renovation project of 217 N. Fifth St. (old police bldg.), a replat of part of the block was done, leaving this portion of the alley as excess right-of-way.

3. In January 2012, the property owner approached the City about the possible sale of the right-of-way.

**CONSIDERATION**

1. Selling the excess right-of-way would help facilitate a replat of the rest of the block and clean up the patchwork of property and lot lines. It would also make future projects and real estate matters less complicated.

2. The property is only usable by Sarah Stafford.

**ATTACHMENTS**

1. Exhibit of the property
2. Proposed Deed Without Warranty.

Submitted By:

Michael Polocek,
Director of Engineering
Engineering Department

Date: February 27, 2012

Approved By:

William E. Dollar
City Manager

Date: February 27, 2012

# EXHIBIT A

## 236-SF TRACT OF LAND
## IN LOT 6, BLOCK 12
## THE ORIGINAL TOWN OF DUCK CREEK
## JOEL CRUMPACKER SURVEY, ABSTRACT NO. 328
## CITY OF GARLAND, DALLAS COUNTY, TEXAS

BEING a 236-square-foot tract of land in the Joel Crumpacker Survey, Abstract No. 328, City of Garland, Dallas County, Texas, and being part of Lot 6, Block 12, of the Original Town of Duck Creek according to the plat thereof recorded in Volume 82, at Page 352 of the Deed Records of Dallas County, Texas and also being part of that certain tract of land described in the deed dated the 17th day of March, 1904, from John J. Jones to the Town of Garland and recorded in Volume 356, at Page 333 of the Deed Records of Dallas County, Texas (hereafter referred to as the alley tract), said 236-square-foot tract being more particularly described as follows:

COMMENCING at a 3-1/2-inch brass disc having coordinates of:
X = 2,540,256.96 feet
Y = 7,020,324.01 feet
and stamped "HISTORIC DOWNTOWN 2009 GARLAND 5TH ST. CROSSING NO. 2 SURVEY MARKER"
Found marking the intersection of the northerly right-of-way line of State Street with the westerly right-of-way line of 5th Street and being the southeast corner of Lot 10, Block 12, of the aforementioned Original Town of Duck Creek and also marking the southeast corner of the tract of land described on page 335 of the deed dated the 1st day of June, 1952, from Evelyn Gatewood to the City of Garland and recorded in Volume 3744, at Page 334 of the Deed Records of Dallas County, Texas (hereafter referred to as the City of Garland Tract);

THENCE N 00°33'02"W with the easterly right-of-way line of 5th Street for a distance of 131.42 feet (called 130 feet) to an X cut in the pavement marking the northeast corner of said City of Garland Tract having coordinates of:
X = 2,540,255.70 feet
Y = 7,020,455.40 feet;

THENCE S 89°31'14"W with the southerly line of the alley tract and with the northerly line of said City of Garland Tract and passing through an existing brick building for a distance of 47.46 feet (called 47.5 feet) to the northwest corner of said City of Garland Tract the same being the northeast corner of a tract of land described in the deed dated the 27th day of December, 1999, from Jim Stafford and Associates , Inc. to Sarah L. Stafford and recorded in Volume 99028, at Page 729 of the Deed Records of Dallas County, Texas, said point being the POINT OF BEGINNING of the 236-square foot tract herein described and having coordinates of:
X = 2,540,208.25 feet
Y = 7,020,455.01 feet;

THENCE S 89°31'14"W continuing with the southerly line of said alley tract and with the northerly line the Sarah Stafford tract for a distance of 31.62 feet (called 32 ½ feet) to the southwest corner of said alley tract and the northwest corner of said Sarah Stafford tract;

THENCE N 00°33'14"W with westerly line of said alley tract for a distance of 7.47 feet to a punch mark in a 2-1/2-inch aluminum disc in concrete stamped "R-DELTA ENGINEERS 101550-00" recovered;

THENCE N 89°30'40"E for a distance of 31.60 feet to a 100d nail recovered with a washer stamped R.P.L.S. #4184;

THENCE S 00°41'33"E for a distance of 7.47 feet to the PLACE OF BEGINNING and containing 236 square feet of land.

A graphical exhibit of even date accompanies this description.

The coordinates and bearings shown hereon are NAD83 (CORS 96, EPOCH 2002) tied to the Texas Coordinate System of 1983, North Central Zone (4202), established from a 1-hour static GPS observation processed through the National Geodetic Survey (NGS) On-line Positioning User System (OPUS). The convergence angle at the P.O.B. of the subject tract is +1 degree 00 minutes 58 seconds. All distances are reported as horizontal surface measurements with a combined factor of 0.999849175.

STATE OF TEXAS
REGISTERED
WAYNE C. TERRY
4184
PROFESSIONAL
LAND SURVEYOR

Wayne C. Terry
December 16, 2011

Sheet 1 of 2

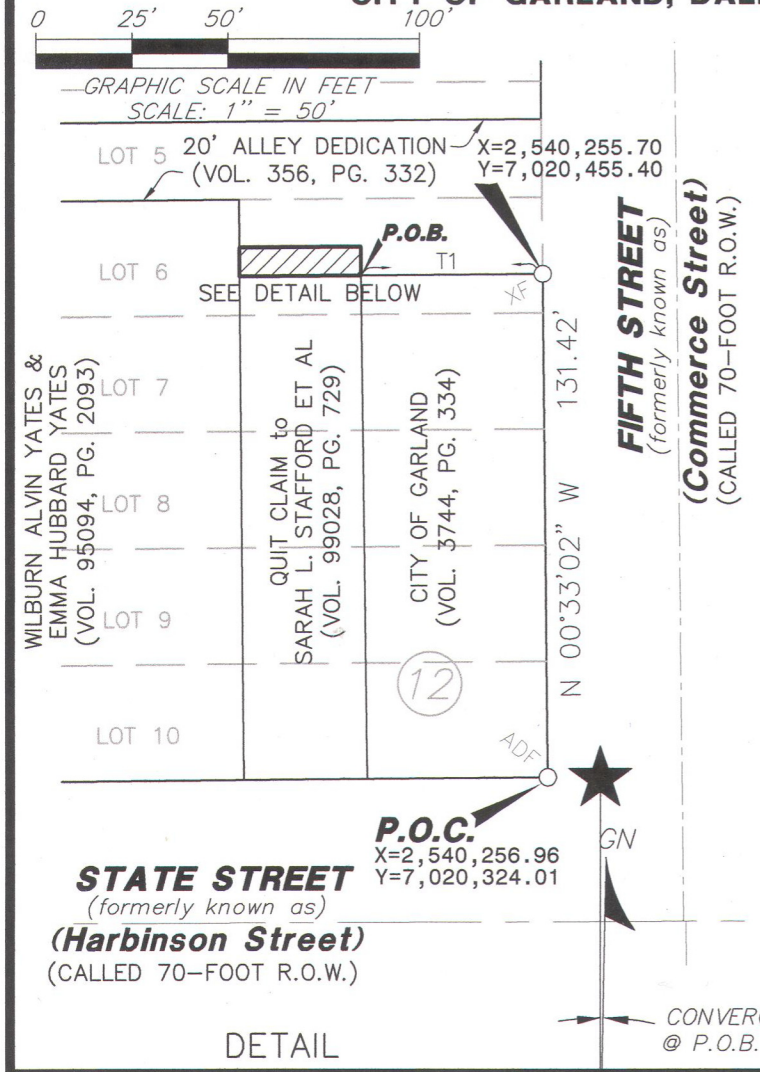
| 236-SF TRACT | |
|---|---|
| DEC 2011 | Project No.: 1919-10 |

R-DELTA ENGINEERS, INC.

ENGINEERS · LAND PLANNERS · LAND SURVEYORS
618 MAIN STREET GARLAND, TEXAS 75040
Tel (972) 494-5031 On the Web at www.rdelta.com

# EXHIBIT A

## 236-SF TRACT OF LAND
## IN LOT 6, BLOCK 12
## THE ORIGINAL TOWN OF DUCK CREEK
## JOEL CRUMPACKER SURVEY, ABSTRACT NO. 328
## CITY OF GARLAND, DALLAS COUNTY, TEXAS




A DESCRIPTION OF EVEN DATE ACCOMPANIES THIS EXHIBIT.

COORDINATES AND BEARINGS SHOWN HEREON ARE NAD83 (CORS 96, EPOCH 2002) TIED TO THE TEXAS COORDINATE SYSTEM OF 1983, NORTH CENTRAL ZONE (4202), ESTABLISHED FROM A 1-HOUR STATIC GPS OBSERVATION PROCESSED THROUGH THE NATIONAL GEODETIC SURVEY (NGS) ON-LINE POSITIONING USER SYSTEM (OPUS). THE CONVERGENCE ANGLE AT THE P.O.B. OF THE SUBJECT TRACT IS +1 DEGREE 00 MINUTES 58 SECONDS. ALL DISTANCES ARE REPORTED AS HORIZONTAL SURFACE MEASUREMENTS WITH A COMBINED FACTOR OF 0.999849175.

ADF – 3-1/2-inch ALUMINUM DISK STAMPED "HISTORIC DOWNTOWN 2009 GARLAND 5th ST. CROSSING NO. 2 SURVEY MARKER"

ADR – 2-1/2-inch ALUMINUM DISK IN CONCRETE STAMPED "R-DELTA ENGINEERS 101550-00" RECOVERED

D.R.D.C.T. – DEED RECORDS OF DALLAS COUNTY, TEXAS

R.O.W. – RIGHT OF WAY

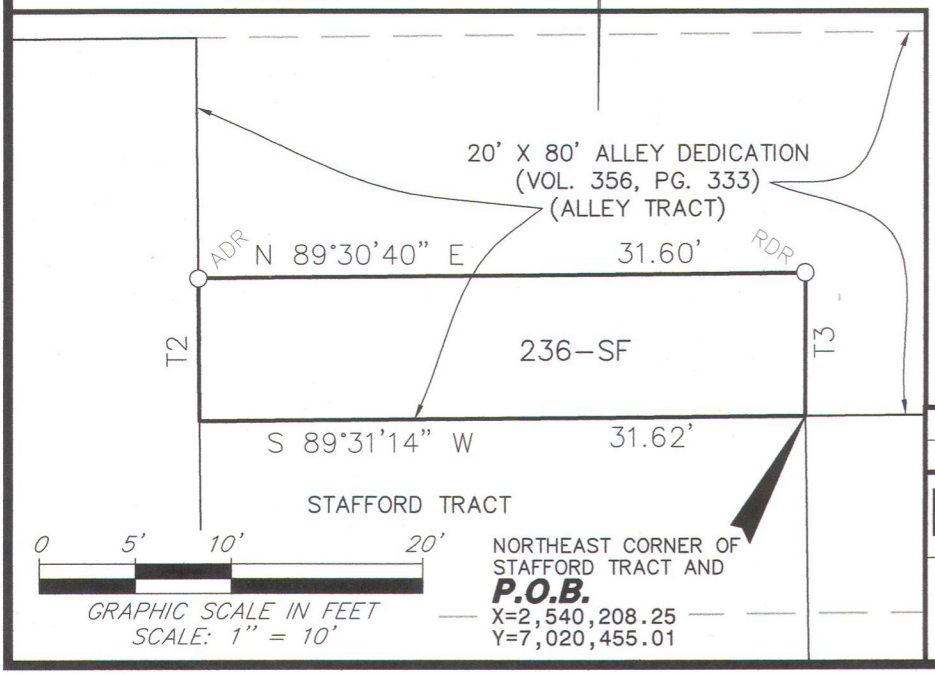
RDR – 100d NAIL WITH A WASHER STAMPED "R.P.L.S. 4184" RECOVERED

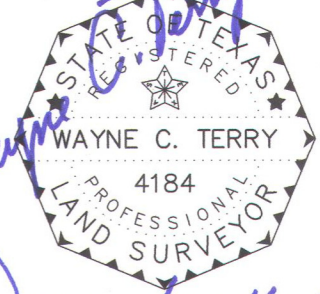
SF – SQUARE FEET

XF – X FOUND

| LINE TABLE | | |
|---|---|---|
| LINE | BEARING | DIST. |
| T1 | S 89°31'14" W | 47.46' |
| T2 | N 00°33'14" W | 7.47' |
| T3 | S 00°41'33" E | 7.47' |

DETAIL




Wayne C. Terry

December 16, 2011

Sheet 2 of 2

**236-SF TRACT**

DEC 2011 | Project No.: 1919-10

R-DELTA ENGINEERS, INC.

ENGINEERS · LAND PLANNERS · LAND SURVEYORS

618 MAIN STREET GARLAND, TEXAS 75040

Tel (972) 494-5031 On the Web at www.rdelta.com

# Policy Report

**Report No: 2012-2015**
**Agenda Item: WS-1e**
**Meeting: Work Session**
**Date: March 5, 2012**

## HAZARD MITIGATION ACTION PLAN

### ISSUE

Council is requested to consider adoption of the local Hazard Mitigation Action Plan. This plan was developed to implement hazard mitigation activities that will result in a more sustainable community by saving lives and properties from disaster situations. This plan will also allow the City of Garland to become eligible for grant funded mitigation projects that are not currently available.

### OPTIONS

1. Adopt the Hazard Mitigation Action Plan
2. Reject the Hazard Mitigation Action Plan

### RECOMMENDATION

Staff recommends "Option 1," adopting the Hazard Mitigation Action Plan. If Council concurs, this item will be scheduled for formal consideration at the March 20, 2012 Regular Meeting.

### COUNCIL GOAL

Implementation of mitigation projects that will provide a safer community to live in while reducing the amount of money spent responding and recovering from potential disasters. Adoption of the plan will also secure eligibility for mitigation grant funding.

### BACKGROUND

State, Indian Tribal, and local governments are required to develop a hazard mitigation plan as a condition for receiving certain types of non-emergency disaster assistance, including funding for mitigation projects. The Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288), as amended by the Disaster Mitigation Act of 2000, provides the legal basis for State, local, and Indian Tribal governments to undertake a risk-based approach to reducing risks from natural hazards through mitigation planning.

In September of 2010 the Office of Emergency Management brought together a group of local stakeholders and experts to form the local Hazard Mitigation Team. The

purpose of the Hazard Mitigation Team was to develop a hazard mitigation plan for the City of Garland according to guidance set forth by the Federal Emergency Management Agency and Texas Division of Emergency Management.

The Hazard Mitigation Action Plan that was developed provides a better understanding to local officials and citizens on what hazards are present within the community, how those hazards might affect the community, and proposed strategies to minimize the risk of identified hazards.

The plan was reviewed and approved by both the Federal Emergency Management Agency and Texas Division of Emergency Management, pending adoption by the local government.

**CONSIDERATION**

Adoption of the Hazard Mitigation Action Plan would make the City of Garland eligible to apply federal mitigation funding to prevent disasters within the local community.

Election not to adopt the Hazard Mitigation Action Plan would prevent the City of Garland from applying for grant funding for disaster mitigation projects.

**ATTACHMENT**

- City of Garland Hazard Mitigation Action Plan

| Submitted By: | Approved By: |
|---|---|
| Mollie Gilmore Rivas<br>Office of Emergency Management | William E. Dollar<br>City Manager |
| Date: February 22, 2012 | Date: February 28, 2012 |

# City of Garland Hazard Mitigation Action Plan

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# Chapter One: Purpose and Organization

## 1.1 Purpose

The City of Garland Hazard Mitigation Action Plan (HazMAP) is designed to meet the planning requirements set forth by the Texas Division of Emergency Management (TDEM), and the planning requirements set forth by the Federal Emergency Management Agency (FEMA). Local governments are required to develop a hazard mitigation plan as a condition for receiving certain types of non-emergency disaster assistance, including funding for mitigation projects. The Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288), as amended by the Disaster Mitigation Act (DMA) of 2000, provides the legal basis for State, local, and Indian Tribal governments to undertake a risk-based approach to reducing risks from hazards through mitigation planning. The requirements and procedures for State, Tribal and Local Mitigation Plans are found in the Code of Federal Regulations (CFR) at Title 44, Chapter 1, Part 201 (44 CFR Part 201). Attachment 1 is reserved for the City Council Resolution, formally adopting the City of Garland Hazard Mitigation Action Plan.

## 1.2 Organization

The City of Garland Hazard Mitigation Plan is divided into six sections. Each of the sections is designed to address the planning requirements set forth by state and federal agencies tasked with oversight of DMA 2000. The City of Garland Hazard Mitigation Plan sections are identified below:

| | |
|---|---|
| **Chapter One:** | **Purpose and Organization** |
| **Chapter Two:** | **The Planning Process** |
| **Chapter Three:** | **Community Profile** |
| **Chapter Four:** | **Hazard Identification and Risk Assessment** |
| **Chapter Five:** | **Mitigation Strategy** |
| **Chapter Six:** | **Plan Maintenance** |

Chapter one describes the purpose and authority of the Hazard Mitigation Action Plan and its organization.

Chapter two provides a description of the planning process that the city followed to prepare the Hazard Mitigation Action Plan.

Chapter three describes the profile of the City of Garland and is a helpful tool in understanding how to best mitigate local hazards.

Chapter four is a hazard analysis and risk assessment. It contains a complete description of each hazard the City of Garland is at risk to and the possible effects of those hazards.

Chapter five outlines the mitigation goals and objectives for the City of Garland, and mitigation actions for the hazards analyzed in the risk assessment.

Chapter six describes the plan maintenance process for how the plan will be monitored, analyzed, and updated.

## 2.1 Documentation of the Planning Process

The City of Garland Local Hazard Mitigation Action Plan was developed in accordance with Federal Emergency Management Agency and Texas Division of Emergency Management standards and regulations. The mitigation planning process followed established guidelines published by the Federal Emergency Management Agency. The Planning Process was divided into four (4) phases as depicted in Figure 2-1, below.

Figure 2-1
Mitigation Planning Process

*Source: Federal Emergency Management Agency*

### Resources and Planning Officials Involved

Several City of Garland planning and reference documents as well as state and federal documents established a foundation for which the Hazard Mitigation Plan was built upon. Reference documents to the Hazard Mitigation Plan include the following:

- City of Garland Envision Garland, Texas: 2030 Comprehensive Plan was used in order to gain a perspective of future development of the City of Garland. These plans helped to establish mitigation goals in accordance with the future of the community, and assisted in determining what effect future developments might have on the community's level of vulnerability.
- City of Garland Capital Improvement Plan was analyzed by the HMT to determine which projects, of those being considered by local departments, would reduce vulnerability to local hazards.
- City of Garland Comprehensive Emergency Management Plan (Annex P) was developed by the HMT in accordance with the local HazMAP and identifies the roles of the HMC, HMT, and future mitigation planning processes.
- City of Garland Floodplain Mitigation Plan was reviewed by the HMT to coordinate the mitigation goals and actions of each plan.
- City of Garland Residential and Commercial Building Requirements were used to determine any shortfalls in local building codes that may be increasing vulnerability to hazards.

- Dallas County Flood Insurance Study and FIRMs were analyzed by the local floodplain manager, a member of the HMT, and incorporated into mitigation actions to decrease vulnerability in the most flood prone areas of the community.
- FEMA Local Hazard Mitigation Action Planning Guidance
- FEMA State and Local Mitigation Planning How-to Guides were used by the HMC in order to establish a thorough planning process for the HMT in the development of the HazMAP.
- Garland Chamber of Commerce City Profile 2010 was used by the HMT as a reference in creating a community profile, and giving planners an idea of how this information would play a part in hazard vulnerability and mitigation actions.
- National Flood Insurance Program Repetitive Loss List was used to target which areas of the City of Garland had suffered the most flood losses. This gave planners a better idea for which areas to center mitigation actions.
- State of Texas Hazard Mitigation Action Plan helped the HMT determine what priorities the local HazMAP should focus on. Hazards outlined within the state plan were analyzed within the local plan.
- Collin County Hazard Mitigation Action Plan was used as a reference in order to coordinate mitigation goals and planning amongst nearby jurisdictions.
- Dallas County Hazard Mitigation Action Plan was used as a reference in order to coordinate mitigation goals and planning amongst nearby jurisdictions.
- Denton County Hazard Mitigation Action Plan was used as a reference in order to coordinate mitigation goals and planning amongst nearby jurisdictions.
- Tarrant County Hazard Mitigation Action Plan was used as a reference in order to coordinate mitigation goals and planning amongst nearby jurisdictions.

At the onset of the planning process, numerous organizations and interested parties were invited to participate in the Hazard Mitigation Action Plan efforts. These partners included local, regional, state, and federal governmental agencies; private citizens; and community based associations. Involving a variety of planning partners helped ensure a strong foundation for the Hazard Mitigation Action Plan. The primary working group involved in the plans creation was a newly formed group of community stakeholders. This working group was named the City of Garland Hazard Mitigation Team (HMT).

Members of the Hazard Mitigation Team were chosen by the Emergency Management Specialist, serving as the Hazard Mitigation Coordinator (HMC) for the jurisdiction. The Hazard Mitigation Coordinator serves as the leader of the Hazard Mitigation Team and the liaison between the local government and the State of Texas for hazard mitigation activities. After reviewing local stakeholders, the City of Garland Office of Emergency Management determined a number of departments who took part in mitigation activities within their current position, had experience in organizing the public, or would be beneficial to the planning team in other various aspects. These departments were contacted and asked to participate as part of the Hazard Mitigation Team. The Hazard Mitigation Team consists of the following members:

- Scott Greeson - Dallas County Emergency Management Planning Section Chief
- Mollie Rivas - Garland Emergency Management Coordinator
- Ben Williamson - Garland Emergency Management Planner
- Sean Taylor - Garland Emergency Management Specialist (Local HMC)
- Don Hart - Garland Metropolitan Medical Response System Coordinator
- Thom Guillory - Garland Engineering Administrator
- Carl Coan - Garland Fire Department Assistant Fire Chief
- Raymond Knight - Garland Fire Department Assistant Fire Chief
- Lyle Jenkins - Garland Floodplain Manager
- John Atkins - Garland Police Department SWAT Captain
- John Fowler - Garland Power and Light Planning Coordinator
- Robert Ashcraft - Garland Water Department Field Operations Administrator

At the onset of the project the Office of Emergency Management held individual interviews with local departments in order to establish a better knowledge of the hazards each department was most involved and concerned with. The meetings were followed with meetings of the entire Hazard Mitigation Team, where risks were assessed and mitigation goals and actions were created. Risks to be are focused on within the plan were chosen by the Hazard Mitigation Team. This was done by determining what risks local departments felt most vulnerable to, what risks the public felt the most vulnerable to through survey, and studying historical data within the region.

Actions chosen to mitigate each hazard within the jurisdiction were chosen by a number of ways. The HMC began by researching the mitigation actions of surrounding jurisdictions and seeking advice on how it has been a benefit to their jurisdiction. Case studies were also referred to in determining the effectiveness of potential projects. Once the HMC had developed a number of potential mitigations actions, a cost benefit analysis was developed for each individual project. Those projects that would be the most cost effective were prioritized higher than those that had less benefit. Actions that served to mitigate a hazard that was determined to be of higher risk to the community were also given a higher priority.

Many local and regional contacts were also important in the planning process by providing information to the Hazard Mitigation Team. Some of these contacts include the Garland Health Department, Garland Fleet Services, Garland Parks and Recreation, State of Texas Mitigation Officer, American Red Cross, and other regional personnel. These contacts served as assisting agencies to the Hazard Mitigation Team by providing information on actions they currently take to mitigate local hazards and giving their unique advice on mitigation actions they would like to see implemented within the community.

During the planning process various groups were contacted in order to ensure a diverse and knowledgeable planning team within the local area. The neighboring communities of

Dallas, Mesquite, Sachse, and Rowlett were reached out to during the 2010 Dallas County SKYWARN conference, along with other interested parties. Here members of each community were given the opportunity to participate in mitigation surveys, and received information on Garland's intent to develop a Hazard Mitigation Action Plan. Dallas County was also involved in the planning process, having a member of their County Department of Homeland Security serve as a member of the HMT. Agencies that were beneficial to the planning process were the North Central Texas Council of Government and the State of Texas who served the HMT with valuable planning guidance. Students at the University of North Texas, serving as interns for the City of Garland Office of Emergency Management reviewed the plan in order to involve academic institutions within the region. Businesses were involved with the HazMAP planning process by providing the HMT with a community profile through the Garland Chamber of Commerce. The American Red Cross served as a non-profit advisor to the HMT in correspondence with the City's local Shelter and Mass Care Plan. Members of the American Red Cross surveyed recreation centers used as local disaster shelters and provided information on how to provide more sustainable and disaster resistant shelters to the community. This advice was incorporated into the mitigation actions portion of this plan. Actions included upgrades to sustainability in extreme heat events, winter storms, and more.

## Public Involvement

The City of Garland incorporated several methods of involving the public the Hazard Mitigation Action Plan. These methods included surveys, local website updates, and opportunity for public review/comment.

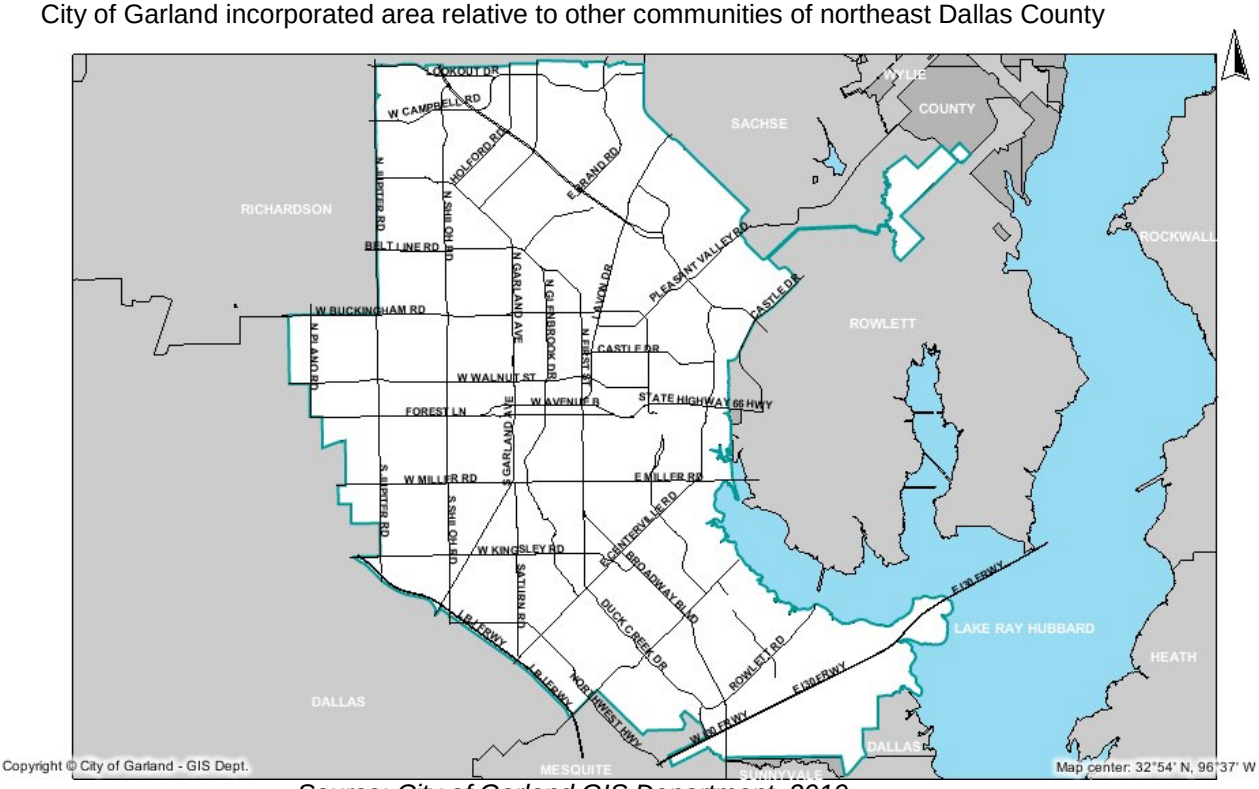
On February 19, 2011 the City of Garland hosted the Dallas County SKYWARN conference where the Office of Emergency Management distributed hazard mitigation surveys. Members of the public were able to fill out the allocated surveys and help the planning team better understand what threatens the community and create mitigation project ideas. An example of this survey is included in Attachment 2, along with other public involvement materials that were posted on the local website in Attachment 3. Throughout the process of creating the Hazard Mitigation Action Plan updates were made to the City of Garland Office of Emergency Management website (www.garland-oem.com). The information posted on the website provided detailed mitigation actions citizens can take in order to protect themselves from relevant hazards. The website also houses valuable information on the warning systems provided by the City of Garland to keep citizens aware of hazards and their occurrences.

At the conclusion of the draft Hazard Mitigation Action Plan, and prior to the plan being adopted it was placed at the public library for public review on 04/13/2011. The opportunity for public review and comment at the library was beneficial to the Hazard Mitigation Team by allowing for input of the public. It also allowed for citizens to bring up any needed changes that were not previously addressed.

## 3.1 Geography

The planning area for the Hazard Mitigation Action Plan includes the City of Garland incorporated areas, which is the white section in figure 3-1. The City of Garland is primarily located in northeast Dallas County, although a small portion of the city extends into Collin County. Garland shares common boundaries with the cities of Dallas, Richardson, Mesquite, Rowlett, Sachse, and Sunnyvale. The City of Garland covers a land area of 57.1 square miles, six percent of the total area of Dallas County. Figure 3-1 highlights the City of Garland relative to other communities of northeast Dallas County.

Figure 3-1
City of Garland incorporated area relative to other communities of northeast Dallas County




*Source: City of Garland GIS Department, 2010*

## 3.2 Population

The City of Garland, like many other Dallas-Fort Worth communities, continues to grow significantly. The population was 180,650 residents in 1980. The City of Garland is the second largest city in Dallas County, and is home to an estimated 228,858 residents. Figure 3-2 represents the City of Garland's population change from 1980-2009.

Figure 3-2
The City of Garland's population change from 1980-2009

| Year | 1980 | 1990 | 2000 | 2009 |
|---|---|---|---|---|
| Population | 138,857 | 180,650 | 215,768 | 228,858 |

*Source: Garland Chamber of Commerce, 2010 Garland Profile*

## 3.3 Community Features and Special Considerations

### Building Stock

In order to establish an accurate inventory of the types of buildings within the City of Garland, the Dallas County Appraisal District Estimated Values Report for the City of Garland will be used. Figure 4-4 shows amount of parcels, estimated market value, and taxable value for commercial property, business personal property (B.P.P), residential property, and the combined totals for all three separate categories.

Figure 4-4
Summary of Certified Estimated Values Report (EVR) – July 16, 2010 for tax year 2010

| Type of Building | Parcels | Market Value | Taxable Value |
|---|---|---|---|
| Commercial | 4,636 | $3,632,638,890 | $2,813,995,703 |
| B.P.P. | 5,508 | $1,692,084,480 | $1,431,765,755 |
| Residential | 64,325 | $7,189,739,690 | $6,106,309,377 |
| Grand Total | 74,469 | $12,514,463,060 | $10,352,070,835 |

*Source: Dallas Central Appraisal District (DCAD)*

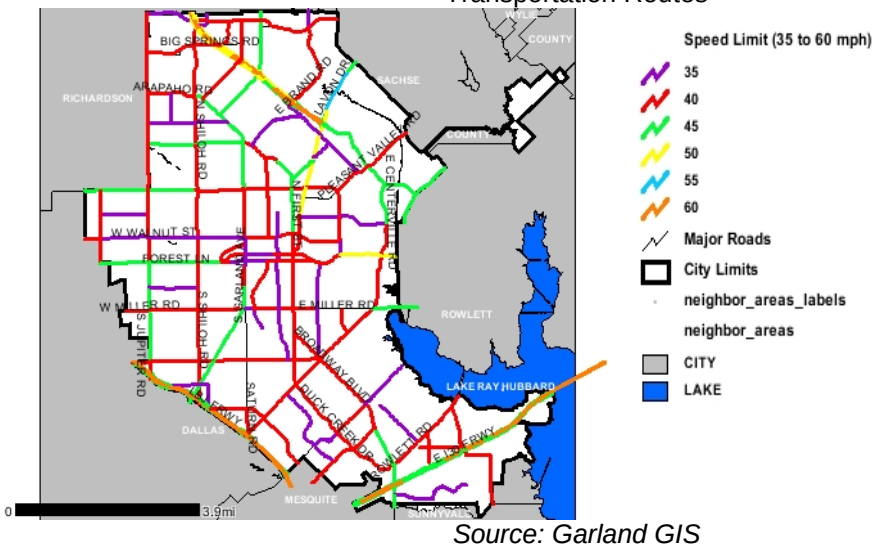
### Transportation Systems

The City of Garland offers many transportation opportunities. Active transportation options include: the Dallas Area Rapid Transit (DART) light rail system, railroads, highways, and a heliport.

Highways and thoroughfares include Five (5) highway systems, Lyndon Baines Johnson (LBJ) Freeway (IH-635), President George Bush Turnpike (SH 190), IH-30, and State Highways 78 and 66 serve the City of Garland. LBJ Freeway, IH-30, State Highway 66, and the President George Bush Turnpike travel primarily east to west routes. State Highway 78 travels primarily a north to south route.

In addition to the highway routes that pass through the city, several major transportation arteries cross through the city as well. Figure 4-5-1 identifies the transportation routes and speed limits on those routes

Figure 4-5-1
Transportation Routes

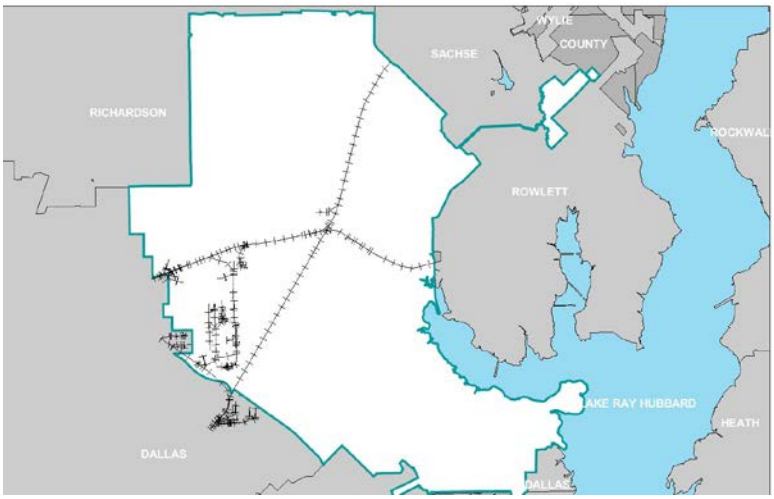



*Source: Garland GIS*

Three freight rail lines serve the City of Garland. Union Pacific, Dallas Garland and Northeastern Railroad (DGNR) and Kansas City Southern Railroads all pass through the city limits. The rail system travels in a primarily north to south route through the city. Figure 4-5-2 depicts the rail systems in Garland.

The freight rail lines intersect with the DART passenger light rail system in central Garland. The DART light rail system is a public transportation system that links downtown Garland to the rest of the Dallas-Fort Worth area.

Figure 4-5-2
Railroads




*Source: Garland GIS*

The City of Garland is also home to a heliport. The Garland Heliport is a public heliport located within the city limits. The Garland Heliport opened in 1989 and is owned by the City of Garland, which, since 1993, has contracted with Sky Helicopters to manage the facility. The heliport operates as both a commercial entity and flight school.

## Lifeline Utility Systems

The City of Garland owns and operates two state-of-the-art advanced biological wastewater treatment facilities. Wastewater is collected for each facility in two separate drainage basins, the Duck Creek Basin and the Rowlett Creek Basin. Wastewater is then received and treated at two separate facilities, the Rowlett Creek and Duck Creek Wastewater Treatment Centers. The Duck Creek Treatment Plant receives wastewater from the west side of Garland, and from portions of the cities of Dallas and Richardson and the City of Sunnyvale. The Rowlett Creek Treatment Plant serves the east side of Garland including the cities of Rowlett and Sachse.

Since 1923, the City of Garland has been providing electric service to its citizens through Garland Power & Light (GP&L), a locally owned and controlled not-for-profit municipal utility. With nearly 68,000 customers, GP&L is the third largest municipal utility in Texas and the 41st largest in the nation.

Garland Power & Light has two gas-fired generating plants, which combine to produce 603 megawatts of generation capacity. In addition, Garland is partners in the Texas Municipal Power Agency which operates the 462 megawatt coal-fired Gibbons Creek Power Plant. Garland's electric distribution system has 1,007 miles of overhead lines and 1,000 miles of underground lines. Its transmission system consists of 23 substations and 133 miles of transmission lines. Garland's peak load for 2009 was 479 megawatts, with annual operating revenues of more than 231 million dollars.

## Economic Elements

The labor force within the City of Garland stands at 110,508 according to the Texas Workforce Commission (06/2010). The unemployment rate for the City for 2010 is 8.6%. The Garland Independent School District is the largest employer within the city, employing 7,200. The top ten major employers are listed in Figure 4-5-3.

Figure 4-5-3
Top Ten Major Employers

| | |
|---|---|
| Garland Independent School District | 7,200 |
| Raytheon | 3,500 |
| City of Garland | 2,500 |
| Wal-Mart Supercenters (3) | 1,250 |
| Baylor Medical Center Garland | 1,200 |
| International/SST Truck | 800 |
| Kingsley Tools | 550 |

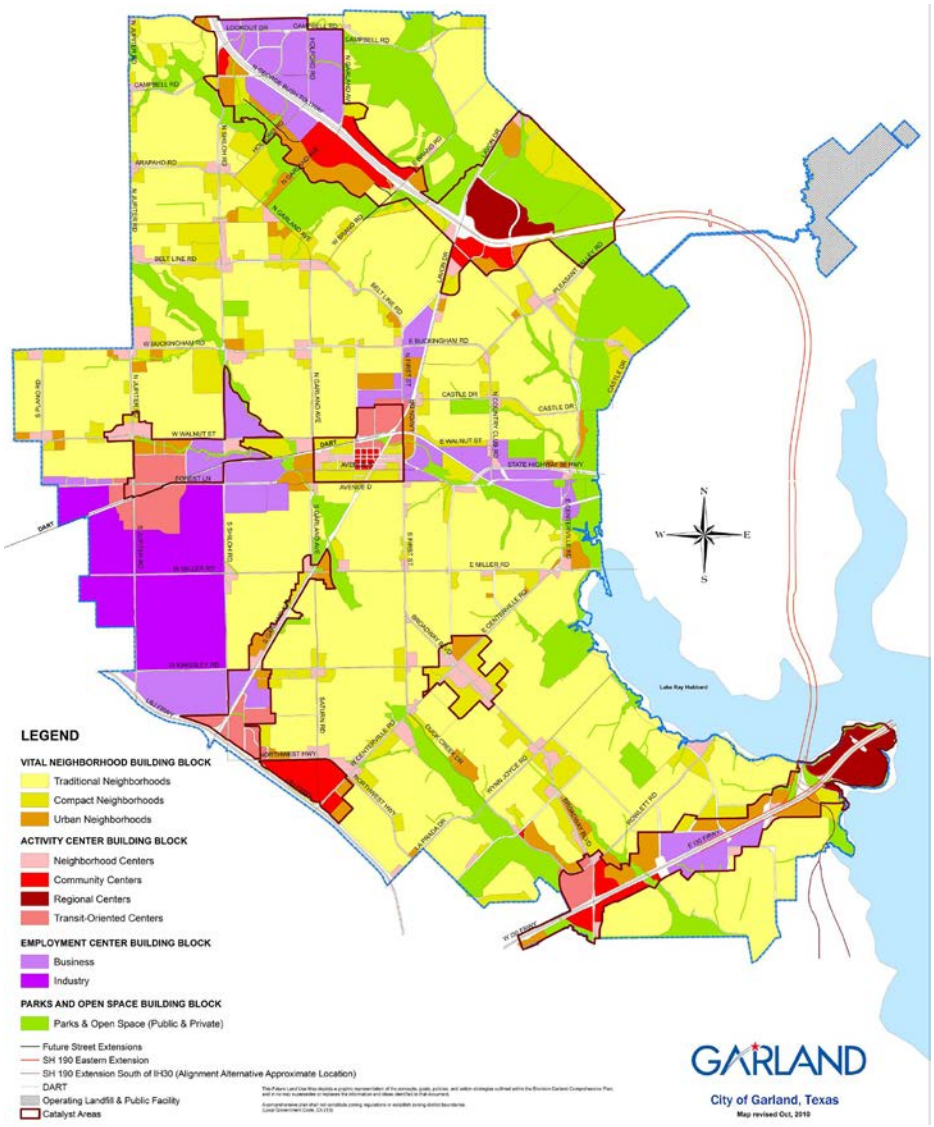
| | |
|---|---|
| US Food Service | 500 |
| Atlas Copco | 420 |
| Hatco (Resistol) | 386 |

*Source: 2010 Garland Chamber of Commerce – Garland Profile, 2010*

## Future Development Consideration

The City of Garland is legally required to have and maintain a comprehensive plan. Garland's first comprehensive plan was developed in the 1960s. The most recent plan was initially developed in the 1980s and has been periodically updated. Envision Garland is the next comprehensive plan that addresses the community's future through 2030.

Figure 4-5-4
Envision Garland




*Source: Envision Garland, 2011*

## 4.1 Identifying Hazards

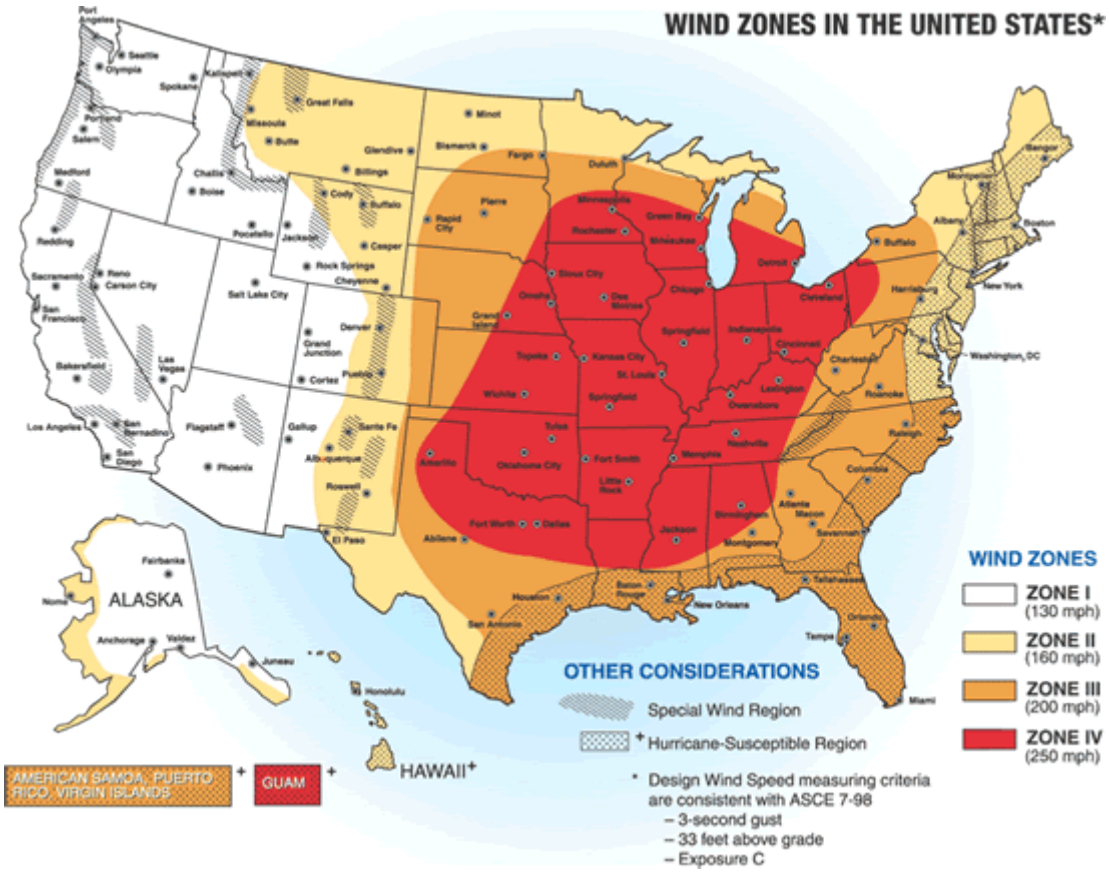
The City of Garland Hazard Mitigation Team has identified the following hazards as having the potential to cause damages within the City of Garland. Below is a brief description of each hazard identified.

### 4.1.1 Tornado

Description

A tornado is defined as a rapidly rotating vortex or funnel of air extending ground ward from a cumulonimbus cloud. Most of the time, vortices remain suspended in the atmosphere. Spawned from powerful thunderstorms, tornadoes can cause fatalities and devastate neighborhoods in seconds. A tornado appears as a rotating, funnel-shaped cloud that extends from a thunderstorm to the ground with whirling winds that can reach 300 miles per hour. Damage paths can be in excess of one mile wide and 50 miles long. According to Figure 4-1-1 The City of Garland falls within wind zone IV, which is associated with 250-mph wind speeds.

Figure 4-1-1




*Source: FEMA.GOV*

### 4.1.2 Flood

Description

Floods are the most prevalent hazards in the United States. A flood is defined as a temporary covering by water of land not normally covered by water. There are several different types of floods. Most communities experience only a few of them. Floods generally occur in three ways: slow-onset floods, rapid-onset floods, and flash floods.

Slow-Onset Floods usually last for a relatively longer period; it may last for one or more weeks, or even months. As this kind of flood last for a long period, it can lead to lose of stock, damage to agricultural products, roads and rail links.

Rapid-Onset Floods last for a relatively shorter period; they usually last for one or two days only. Although this kind of flood lasts for a shorter period, it can cause more damages and pose a greater risk to life and property as people usually have less time to take preventative action during rapid-onset floods.

Flash Floods may occur within minutes or a few hours after heavy rainfall, tropical storm, failure of dams or levees or releases of ice jams. And it causes the greatest damages to society. These are particularly dangerous in urban areas. As more farmlands and wooded areas are converted to urban and suburban areas, the amount of surface area available for water infiltration into the soils decreases. Home sites, parking lots, buildings, and roadways all decrease the surface area of soil on Earth's surface. According to the National Weather Service, about 10% of the land in the United States is paved roads. Because of the entire pavement, water is redirected into sewage and storm drain systems. In addition to the increase in urban structures, there is a resultant decrease in vegetation. Trees, shrubs, and grasses cannot take away some of the water that enters into an area as a result of the water cycle.

### 4.1.3 Winter Storms

Description

Winter Storms originate as mid-latitude depressions or cyclonic weather systems, sometimes following the path of the jet stream. A winter storm or blizzard, combines heavy snowfall, high winds, extreme cold, and ice storms. Many winter depressions give rise to exceptionally heavy rain and widespread flooding and conditions worsen if the precipitation falls in the form of snow. The winter storm season varies widely, depending on latitude, altitude, and proximity to moderating influences.

### 4.1.4 Hailstorm

Description

A hailstorm is an outgrowth of a severe thunderstorm in which balls or irregularly shaped lumps of ice greater than 0.75 inches in diameter fall with rain. Early in the developmental stages of a hailstorm, ice crystals form within a low-pressure front due to warm air rising rapidly into the upper atmosphere and the subsequent cooling of the air mass. Frozen droplets gradually accumulate on the ice crystals until, having developed sufficient weight, they fall as precipitation.

The size of hailstones is a direct function of the severity and size of the storm. High velocity updraft winds are required to keep hail in suspension in thunderclouds. The strength of the updraft is a function of the intensity of heating at the Earth's surface. Higher temperature gradients relative to elevations above the surface result in increased suspension time and hailstone size.

### 4.1.5 Extreme Heat

Description

Severe, excessive summer heat is characterized by a combination of exceptionally high temperatures and humidity. When these conditions persist over a period of time, it is called a heat wave. Although heat can damage buildings and facilities, it presents a more significant threat to the safety and welfare of citizens. The major human risks associated with severe summer heat include: heat cramps; sunburn; dehydration; fatigue; heat exhaustion; and even heat stroke. The most vulnerable population to heat casualties are children and the elderly or infirmed, who frequently live on low fixed incomes and cannot afford to run air conditioning on a regular basis. This population is sometimes isolated, with no immediate family or friends to look out for their well being.

### 4.1.6 Drought

Description

Drought is a period of time without substantial rainfall that persists from one year to the next. Drought is a normal part of virtually all climatic regions, including areas with high and low average rainfall. Drought is the consequence of anticipated natural precipitation reduction over an extended period of time, usually a season or more in length. Droughts can be classified as meteorological, hydrologic, agricultural, and socioeconomic.

Droughts are one of the most complex natural hazards as it is difficult to determine their precise beginning or end. In addition, droughts can lead to other hazards such as extreme heat and wildfires. Their impact on wildlife and area farming is enormous, often killing crops, grazing land, edible plants and even in severe cases, trees.

### 4.1.7 Windstorm

Description

A windstorm is a wind that is strong enough to cause at least light damage to trees and buildings and may or may not be accompanied by precipitation. Wind speeds during a windstorm typically exceed thirty-four miles per hour. Wind damage can be attributed to gusts (short bursts of high-speed winds) or longer periods of stronger sustained winds. Although tornadoes and tropical cyclones also produce wind damage, they are usually classified separately.

Straight-line winds are often responsible for most of the wind damage associated with a thunderstorm. These winds are often confused with tornadoes because of similar damage and wind speeds. However, the strong and gusty winds associated with straight-line winds blow roughly in a straight line unlike the rotating winds of a tornado. Downbursts or micro bursts are examples of damaging straight-line winds. A downburst is a small area of rapidly descending rain and rain-cooled air beneath a thunderstorm that produces a violent, localized downdraft covering 2.5 miles or less. Wind speeds in some of the stronger downbursts can reach 100 to 150 miles per hour, which is similar to that of a strong tornado. The winds produced from a downburst often occur in one direction, and the worst damage is usually on the forward side of the downburst. High Winds affect the entire planning area equally.

### 4.1.8 Hazardous Materials

Description

Hazardous materials are chemical substances that can create a threat to the environment or health if released or misused. Typically, these chemicals are in the form of explosives, flammable and combustible substances, poisons, and radioactive materials.

Hazardous materials are shipped daily along highways, railroads, waterways, and pipelines. The greatest risk of a hazardous materials release involves the transport of these substances, although chemical accidents in plants and natural hazards are risks, as well. Types of releases include: air emissions; discharges into water; discharges as outflows from outfalls, runoff, or contaminated groundwater; discharges into land; solid waste disposal in onsite landfills; injections into underground wells; and transfers of waste to facilities for treatment or storage, namely sewer treatment plants.

Depending on the form and type of hazardous material, results of exposure can result in death, serious injury, or long-lasting health effects to humans as a result of inhalation, ingestion, or direct contact with the skin. Hazardous materials can also damage building, homes, and property, and involve drastic effects to terrestrial and aquatic plants and wildlife.

## 4.2 Profiling Hazards

Within the following section is a profile of each hazard identified by the City of Garland Hazard Mitigation Team as having the potential to cause damage to the jurisdiction. The profile includes a description of the hazard based on geographic area affected, extent of potential hazards, previous occurrences of each hazard, and the probability of those hazards occurring in the future.

### 4.2.1 Tornado

Location

Due to the unpredictable nature of tornadoes, it is impossible to determine the exact area of their future occurrences. The entire planning area, the City of Garland, is equally subject to tornadoes.

Extent

The extent of a tornado can be determined by the Enhanced Fujita Scale (Figure 4-2-1-A). Following is a description of damage extents, which can be referred to the EF Scale. The Enhance Fujita Scale rates tornadoes within the United States by estimating the amount of damage they cause. Following are definitions of intensity, as related to the extent of damage, in order to gain a better understanding of the possible magnitude of tornado events.

**EF0 Gale intensity**- Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.

**EF1 Weak intensity**- Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.

**EF2Strong intensity**- Roofs torn off well constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.

**EF3 Severe intensity**- Entire stories of well constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.

**EF4 Devastating intensity**- Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.

**EF5 Incredible intensity**- Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (109 yd); high-rise buildings have significant structural deformation.

Figure 4-2-1-A

| ENHANCED FUJITA SCALE | |
|---|---|
| EF0 (Gale) | 65-85 mph \| 3-second gusts |
| EF1 (Weak) | 86-110 mph \| 3-second gusts |
| EF2 (Strong) | 111-135 mph \| 3-second gusts |
| EF3 (Severe) | 136-165 mph \| 3-second gusts |
| EF4 (Devastating) | 166-200 mph \| 3-second gusts |
| EF5 (Incredible) | over 200 mph \| 3-second gusts |

*Source: dlg.galileo.usg.edu/tornado/exhibit/*

## Previous Occurrences

The following table shows previous tornado occurrence data according to the National Climatic Data Center reported for all of Dallas County, Texas between 10/1/1950 and 08/31/2010. All data provided by the National Climatic Data Center has been included. The belief is that hazards do not stay within jurisdictional boundaries and thus it is important to be aware of occurrences that have impacted neighboring jurisdictions to further assess the City of Garland's risks.

The magnitude of previous occurrences is gauged based on the original Fujita Scale which was decommissioned on February 1, 2007 in favor of the more accurate Enhanced Fujita Scale, which replaces it. None of the tornadoes recorded on or before January 31, 2007 will be re-categorized. Therefore maintaining the Fujita scale will be necessary when referring to previous events. Figure 4-2-1-B shows the original Fujita Scale.

Figure 4-2-1-B

| SCALE | WIND SPEED | POSSIBLE DAMAGE |
|---|---|---|
| F0 | 40-72 mph | Light damage: Branches broken off trees; minor roof damage |
| F1 | 73-112 mph | Moderate damage: Trees snapped; mobile home pushed off foundations; roofs damaged |
| F2 | 133-157 mph | Considerable damage: Mobile homes demolished; trees uprooted; strong built homes unroofed |
| F3 | 158-206 mph | Severe damage: Trains overturned; cars lifted off the ground; strong built homes have outside walls blown away |
| F4 | 207-260 mph | Devastating damage: Houses leveled leaving piles of debris; cars thrown 300 yards or more in the air |
| F5 | 261-318 mph | Incredible damage: Strongly built homes completely blown away; automobile-sized missiles generated |

*Source: dlg.galileo.usg.edu/tornado/exhibit/*

**83 TORNADO(s) were reported in Dallas County, Texas between 01/01/1950 and 08/31/2010.**

**Mag:** Magnitude **Dth:** Deaths **Inj:** Injuries **PrD:** Property Damage **CrD:** Crop Damage

| Location or County | Date | Time | Type | Mag | Dth | Inj | PrD | CrD |
|---|---|---|---|---|---|---|---|---|
| 1 Dallas | 03/02/1952 | 2200 | Tornado | F0 | 0 | 0 | 3K | 0 |
| 2 Dallas | 04/02/1957 | 1630 | Tornado | F3 | 10 | 200 | 2.5M | 0 |
| 3 Dallas | 04/03/1957 | 1050 | Tornado | F0 | 0 | 0 | 0K | 0 |
| 4 Dallas | 04/20/1957 | 0020 | Tornado | F0 | 0 | 0 | 0K | 0 |
| 5 Dallas | 06/12/1957 | 0810 | Tornado | F3 | 0 | 0 | 3K | 0 |
| 6 Dallas | 08/12/1958 | 1435 | Tornado | F2 | 0 | 0 | 3K | 0 |
| 7 Dallas | 10/04/1959 | 0600 | Tornado | F3 | 0 | 0 | 250K | 0 |
| 8 Dallas | 05/05/1960 | 2200 | Tornado | F0 | 0 | 0 | 0K | 0 |
| 9 Dallas | 05/05/1960 | 2237 | Tornado | F0 | 0 | 0 | 3K | 0 |
| 10 Dallas | 04/11/1961 | 1655 | Tornado | F2 | 0 | 3 | 25K | 0 |
| 11 Dallas | 05/27/1963 | 1900 | Tornado | F0 | 0 | 0 | 0K | 0 |
| 12 Dallas | 05/29/1963 | 1800 | Tornado | F0 | 0 | 0 | 0K | 0 |
| 13 Dallas | 09/05/1963 | 1331 | Tornado | F0 | 0 | 0 | 0K | 0 |
| 14 Dallas | 05/23/1966 | 1430 | Tornado | F2 | 0 | 0 | 25K | 0 |
| 15 Dallas | 03/26/1967 | 0500 | Tornado | F0 | 0 | 0 | 0K | 0 |
| 16 Dallas | 05/13/1968 | 0242 | Tornado | F1 | 0 | 0 | 0K | 0 |
| 17 Dallas | 05/25/1968 | 2100 | Tornado | F0 | 0 | 1 | 25K | 0 |
| 18 Dallas | 05/08/1969 | 1524 | Tornado | F0 | 0 | 0 | 0K | 0 |
| 19 Dallas | 10/12/1969 | 0650 | Tornado | F3 | 0 | 2 | 3K | 0 |
| 20 Dallas | 04/25/1970 | 0500 | Tornado | F2 | 0 | 12 | 2.5M | 0 |
| 21 Dallas | 02/18/1971 | 1720 | Tornado | F1 | 0 | 0 | 3K | 0 |
| 22 Dallas | 10/19/1971 | 2037 | Tornado | F1 | 0 | 2 | 250K | 0 |
| 23 Dallas | 12/14/1971 | 1730 | Tornado | F1 | 0 | 1 | 2.5M | 0 |
| 24 Dallas | 12/14/1971 | 1800 | Tornado | F1 | 0 | 0 | 250K | 0 |
| 25 Dallas | 12/14/1971 | 1800 | Tornado | F1 | 0 | 1 | 25K | 0 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 26 Dallas | 12/14/1971 | 1815 | Tornado | F2 | 0 | 4 | 2.5M | 0 |
| 27 Dallas | 12/14/1971 | 1830 | Tornado | F1 | 0 | 4 | 2.5M | 0 |
| 28 Dallas | 11/12/1972 | 2130 | Tornado | F1 | 0 | 0 | 25K | 0 |
| 29 Dallas | 11/12/1972 | 2150 | Tornado | F1 | 0 | 0 | 250K | 0 |
| 30 Dallas | 05/01/1973 | 1345 | Tornado | F1 | 0 | 0 | 25K | 0 |
| 31 Dallas | 04/11/1974 | 0510 | Tornado | F2 | 0 | 0 | 250K | 0 |
| 32 Dallas | 06/12/1974 | 0515 | Tornado | F0 | 0 | 0 | 0K | 0 |
| 33 Dallas | 06/08/1975 | 1826 | Tornado | F0 | 0 | 0 | 0K | 0 |
| 34 Dallas | 07/25/1975 | 1110 | Tornado | F0 | 0 | 0 | 0K | 0 |
| 35 Dallas | 03/26/1976 | 1430 | Tornado | F1 | 0 | 0 | 0K | 0 |
| 36 Dallas | 05/26/1976 | 1625 | Tornado | F3 | 0 | 1 | 2.5M | 0 |
| 37 Dallas | 07/04/1976 | 2000 | Tornado | F0 | 0 | 0 | 3K | 0 |
| 38 Dallas | 04/20/1977 | 0055 | Tornado | F2 | 0 | 0 | 25K | 0 |
| 39 Dallas | 05/03/1979 | 1030 | Tornado | F1 | 0 | 0 | 25K | 0 |
| 40 Dallas | 05/03/1979 | 1048 | Tornado | F1 | 0 | 0 | 25K | 0 |
| 41 Dallas | 05/03/1979 | 1305 | Tornado | F2 | 0 | 5 | 25.0M | 0 |
| 42 Dallas | 05/03/1979 | 1325 | Tornado | F0 | 0 | 0 | 0K | 0 |
| 43 Dallas | 05/08/1981 | 2020 | Tornado | F2 | 0 | 0 | 25K | 0 |
| 44 Dallas | 10/13/1981 | 1340 | Tornado | F1 | 0 | 0 | 0K | 0 |
| 45 Dallas | 03/14/1982 | 0725 | Tornado | F1 | 0 | 0 | 250K | 0 |
| 46 Dallas | 04/16/1982 | 1650 | Tornado | F0 | 0 | 0 | 0K | 0 |
| 47 Dallas | 05/11/1982 | 2015 | Tornado | F1 | 0 | 1 | 250K | 0 |
| 48 Dallas | 03/23/1984 | 1645 | Tornado | F1 | 0 | 0 | 25K | 0 |
| 49 Dallas | 12/13/1984 | 0945 | Tornado | F3 | 0 | 0 | 25.0M | 0 |
| 50 Dallas | 12/13/1984 | 0951 | Tornado | F3 | 0 | 28 | 25.0M | 0 |
| 51 Dallas | 05/13/1985 | 1042 | Tornado | F2 | 0 | 16 | 2.5M | 0 |
| 52 Dallas | 03/16/1987 | 1340 | Tornado | F0 | 0 | 0 | 0K | 0 |
| 53 Dallas | 01/19/1990 | 1130 | Tornado | F2 | 0 | 1 | 2.5M | 0 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 54 Dallas | 10/07/1992 | 1612 | Tornado | F0 | 0 | 0 | 3K | 0 |
| 55 Sachse | 05/09/1993 | 1230 | Tornado | F1 | 0 | 1 | 5.0M | 0 |
| 56 Cedar Hill | 04/25/1994 | 1950 | Tornado | F0 | 0 | 0 | 50K | 0 |
| 57 De Soto | 04/25/1994 | 2000 | Tornado | F2 | 0 | 7 | 50.0M | 0 |
| 58 Lancaster To | 04/25/1994 | 2030 | Tornado | F4 | 3 | 48 | 500K | 0 |
| 59 Mesquite | 04/29/1994 | 0115 | Tornado | F0 | 0 | 0 | 0 | 0 |
| 60 Dallas | 10/21/1994 | 1456 | Tornado | F0 | 0 | 0 | 0 | 0 |
| 61 Lancaster | 10/21/1994 | 1550 | Tornado | F0 | 0 | 0 | 0 | 0 |
| 62 Lancaster | 10/21/1994 | 1612 | Tornado | F0 | 0 | 0 | 0 | 0 |
| 63 Balch Springs | 10/21/1994 | 1700 | Tornado | F0 | 0 | 0 | 0 | 0 |
| 64 Dallas | 03/25/1995 | 1745 | Tornado | F0 | 0 | 0 | 0 | 0 |
| 65 Seagoville | 04/19/1995 | 1420 | Tornado | F0 | 0 | 0 | 0 | 0 |
| 66 Dallas | 04/19/1995 | 2002 | Tornado | F1 | 0 | 8 | 6.0M | 0 |
| 67 De Soto | 01/17/1996 | 2233 | Tornado | F1 | 0 | 1 | 750K | 0 |
| 68 Lancaster | 01/17/1996 | 2240 | Tornado | F2 | 0 | 0 | 750K | 0 |
| 69 Lancaster | 01/17/1996 | 2242 | Tornado | F1 | 0 | 0 | 0 | 0 |
| 70 Lancaster | 01/17/1996 | 2243 | Tornado | F1 | 0 | 0 | 0 | 0 |
| 71 Lancaster | 01/17/1996 | 2247 | Tornado | F0 | 0 | 0 | 0 | 0 |
| 72 Lancaster | 01/17/1996 | 2247 | Tornado | F0 | 0 | 0 | 0 | 0 |
| 73 Seagoville | 01/17/1996 | 2250 | Tornado | F1 | 0 | 0 | 0 | 0 |
| 74 Dallas | 10/21/1996 | 0835 | Tornado | F1 | 0 | 7 | 3.0M | 0 |
| 75 Mesquite | 10/21/1996 | 0845 | Tornado | F0 | 0 | 1 | 120K | 0 |
| 76 Grand Prairie | 03/28/2000 | 0715 | Tornado | F2 | 0 | 0 | 0 | 0 |
| 77 Wilmer | 03/28/2000 | 1955 | Tornado | F0 | 0 | 0 | 0 | 0 |
| 78 Carrollton | 09/05/2001 | 1325 | Tornado | F1 | 0 | 0 | 125K | 0 |
| 79 Irving | 04/05/2003 | 0821 | Tornado | F0 | 0 | 0 | 1K | 0 |
| 80 Cedar Hill | 04/25/2005 | 1535 | Tornado | F0 | 0 | 0 | 0 | 0 |
| 81 Dallas | 04/13/2007 | 1800 | Tornado | F0 | 0 | 0 | 50K | 0K |

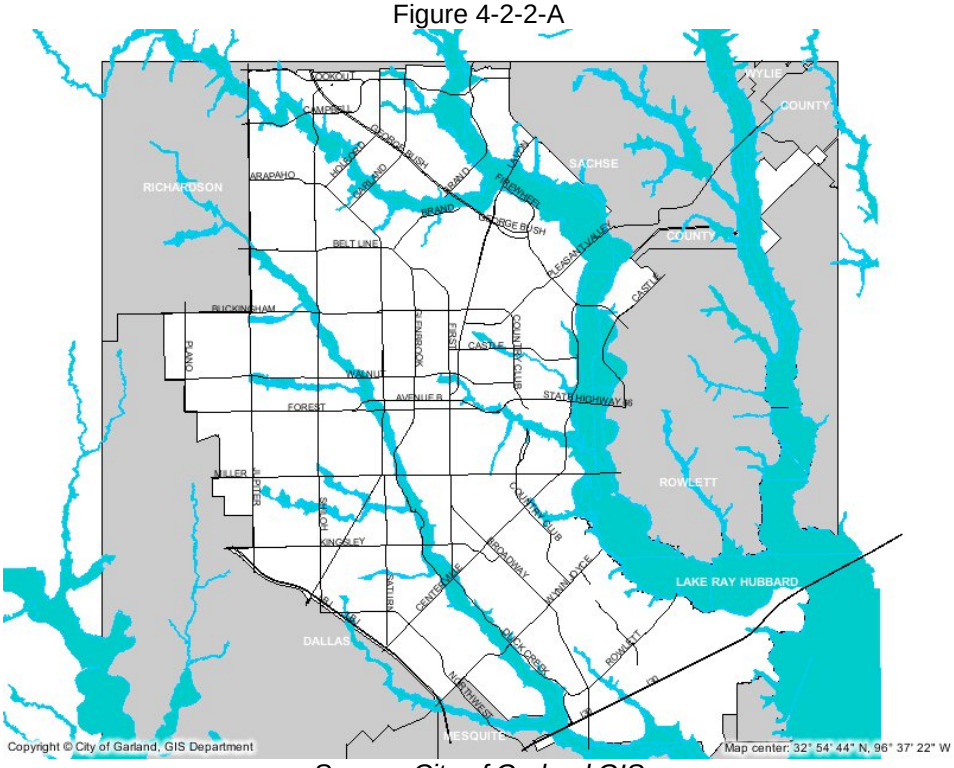
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 82 Cedar Hill | 06/26/2007 | 1700 | Tornado | F0 | 0 | 0 | 60K | 0K |
| 83 De Soto | 04/10/2008 | 0300 | Tornado | F0 | 0 | 0 | 1.0M | 0K |
| | | | | TOTALS: | 13 | 355 | 164.452M | 0 |

## 4.2.2 Flood

### Location

Figure 4-2-2-A shows the City of Garland in relation the 100 and 500 year floodplains. The City of Garland has an aggressive floodplain management program. All new development projects are reviewed for compliance with the flood prevention ordinance. We have constructed large and small improvement projects to reduce the risk to life and property from flood events. Flooding risks were significantly reduced for hundreds of homes and businesses in central and southern Garland along Duck Creek by the construction of a major channel widening projects performed in conjunction with the U.S. Army Corps of Engineers in the late 1990s.

Figure 4-2-2-A




*Source: City of Garland GIS*

**Note: FEMA-issued Flood Insurance Rate Maps should be used for detailed floodplain determinations.**

### Extent

Flood extents are determined by Federal Emergency Management Agency (FEMA) flood zone designations. Flood zones are geographic areas that the FEMA has defined according to varying levels of flood risk. These zones are depicted on a community's Flood Insurance Rate Map (FIRM) or Flood Hazard Boundary Map. Each zone reflects the severity or type of flooding in the area. Figure 4-2-2-B, shown below, gives a description of each flood zone.

Figure 4-2-2-B

**Moderate to Low Risk Areas**

| Zone | Description |
|---|---|
| B and X (Shaded) | Area of moderate flood hazard, usually the area between the limits of the 100-year and 500-year floods. B Zones are also used to designate base floodplains of lesser hazards, such as areas protected by levees from 100-year flood, or shallow flooding areas with average depths of less than one foot or drainage areas less than 1 sq. mi. |
| C and X (Unshaded) | Area of minimal flood hazard, usually depicted on FIRMs as above the 500-year flood level. Zone C may have ponding and local drainage problems that don't warrant a detailed study or designation as base floodplain. Zone X is the area determined to be outside the 500-year flood and protected by levee from 100-year flood. |

**High Risk Areas**

| Zone | Description |
|---|---|
| A | Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones. |
| AE | The base floodplain where base flood elevations are provided. AE Zones are now used on new format FIRMs instead of A1-A30 Zones. |
| A1-30 | These are known as numbered A Zones (e.g., A7 or A14). This is the base floodplain where the FIRM shows a BFE (old format). |
| AH | Areas with a 1% annual chance of shallow flooding, usually in the form of a pond, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones. |
| AO | River or stream flood hazard areas, and areas with a 1% or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Average flood depths are shown within these zones. |
| AR | Areas with a temporarily increased flood risk due to the building or restoration of a flood control system (such as a levee or a dam). Mandatory flood insurance purchase requirements will apply, but rates will not exceed the rates for unnumbered A zones if the structure is built or restored in compliance with Zone AR floodplain management regulations. |
| A99 | Areas with a 1% annual chance of flooding that will be protected by a Federal flood control system where construction has reached specified legal requirements. No depths or base flood elevations are shown within these zones. |

**High Risk – Coastal Areas**

| Zone | Description |
|---|---|
| V | Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. No base flood elevations are shown within these zones. |
| VE, V1-30 | Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones. |

**Undetermined Risk Areas**

| Zone | Description |
|---|---|
| D | Areas with possible but undetermined flood hazards. No flood hazard analysis has been conducted. Insurance rates are commensurate with the uncertainty of the risk. |

*Source: FEMA Map Service Center*
*http://www.msc.fema.gov/webapp/wcs/stores/servlet/info?storeId=10001&catalogId=10001&langId=-1&content=floodZones&title=FEMA%20Flood%20Zone%20Designations*

## Previous Occurrences

The following table shows previous flood occurrence data according to the National Climatic Data Center reported for all of Dallas County, Texas between 01/1/1993 and 08/31/2010. All data provided by the National Climatic Data Center has been included. The belief is that hazards do not stay within jurisdictional boundaries and thus it is important to be aware of occurrences that have impacted neighboring jurisdictions.

**160 FLOOD event(s) were reported in Dallas County, Texas between 01/01/1993 and 08/31/2010.**

**Mag:** Magnitude **Dth:** Deaths **Inj:** Injuries **PrD:** Property Damage **CrD:** Crop Damage

| Location or County | Date | Time | Type | Mag | Dth | Inj | PrD | CrD |
|---|---|---|---|---|---|---|---|---|
| 1 Dallas | 10/19/1993 | 1830 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 2 Northeast Dallas | 04/25/1994 | 1929 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 3 Carrollton | 07/10/1994 | 2100 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 4 Coppell | 07/10/1994 | 2100 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 5 Mesquite | 07/10/1994 | 2100 | Flash Flood | N/A | 0 | 0 | 50K | 0 |
| 6 Dallas | 07/10/1994 | 2210 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 7 Garland | 07/10/1994 | 2210 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 8 Se Portion | 07/11/1994 | 0200 | Flash Flood | N/A | 0 | 0 | 50K | 0 |
| 9 Richardson | 08/07/1994 | 1331 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 10 Dallas | 10/07/1994 | 1600 | Flash Flood | N/A | 1 | 0 | 0 | 0 |
| 11 Garland | 10/21/1994 | 0745 | Flash Flood | N/A | 0 | 0 | 50K | 0 |
| 12 DALLAS | 10/21/1994 | 1609 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 13 Balch Springs | 10/21/1994 | 1700 | Flash Flood | N/A | 1 | 0 | 0 | 0 |
| 14 Balch Springs | 10/21/1994 | 1722 | Flash Flood | N/A | 1 | 0 | 500K | 0 |
| 15 DALLAS | 03/13/1995 | 0408 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 16 Dallas | 03/13/1995 | 0417 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 17 DALLAS | 03/13/1995 | 0637 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 18 DALLAS | 03/13/1995 | 0730 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 19 Dallas | 05/05/1995 | 1940 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 20 Grand Prairie | 05/05/1995 | 1950 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 21 Dallas | 05/05/1995 | 2000 | Flash Flood | N/A | 16 | 2 | 0 | 0 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 22 Garland | 05/05/1995 | 2000 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 23 Dallas | 05/07/1995 | 2232 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 24 Dallas | 05/08/1995 | 0330 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 25 Dallas | 07/05/1995 | 0400 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 26 Dallas | 08/01/1995 | 0815 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 27 Dallas | 08/31/1996 | 1600 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 28 Dallas | 10/21/1996 | 1203 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 29 Grand Prairie | 10/21/1996 | 1220 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 30 Grand Prairie | 10/27/1996 | 2010 | Flash Flood | N/A | 0 | 0 | 4K | 0 |
| 31 Dallas | 10/27/1996 | 2217 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 32 Garland | 11/24/1996 | 0310 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 33 Mesquite | 11/24/1996 | 0325 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 34 Garland | 11/24/1996 | 0335 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 35 Seagoville | 02/12/1997 | 1250 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 36 Mesquite | 02/19/1997 | 0143 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 37 Dallas | 02/19/1997 | 0305 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 38 Dallas | 02/19/1997 | 0710 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 39 Dallas | 04/04/1997 | 1015 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 40 Dallas | 04/04/1997 | 1115 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 41 Dallas | 05/19/1997 | 0705 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 42 Dallas | 06/17/1997 | 0130 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 43 Oak Cliff | 06/26/1997 | 1500 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 44 Wilmer | 06/26/1997 | 1530 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 45 Dallas | 10/23/1997 | 1040 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 46 Dallas | 10/23/1997 | 1110 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 47 Dallas | 12/20/1997 | 1915 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 48 Dallas | 12/20/1997 | 2000 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 49 Irving | 01/04/1998 | 1700 | Flash Flood | N/A | 1 | 0 | 0 | 0 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 50 Dallas | 01/04/1998 | 1741 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 51 Dallas | 01/04/1998 | 2323 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 52 Dallas | 05/27/1998 | 0225 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 53 Mesquite | 09/16/1998 | 0620 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 54 Garland | 09/16/1998 | 0650 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 55 Garland | 12/04/1998 | 0015 | Flash Flood | N/A | 1 | 0 | 0 | 0 |
| 56 Garland | 12/04/1998 | 0030 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 57 Dallas | 03/11/1999 | 0950 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 58 Dallas | 04/26/1999 | 0745 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 59 Grand Prairie | 05/17/1999 | 1613 | Flash Flood | N/A | 0 | 1 | 10K | 0 |
| 60 Wilmer | 05/17/1999 | 1635 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 61 Rowlett | 05/17/1999 | 1700 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 62 Dallas | 05/26/1999 | 0538 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 63 Dallas | 05/26/1999 | 1130 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 64 Richardson | 06/08/1999 | 1945 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 65 Richardson | 06/10/1999 | 1800 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 66 Richardson | 06/12/1999 | 1410 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 67 Grand Prairie | 07/10/1999 | 1208 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 68 Dallas | 07/10/1999 | 1230 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 69 Dallas | 12/11/1999 | 2150 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 70 Dallas | 12/12/1999 | 0025 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 71 Dallas | 03/28/2000 | 2030 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 72 Grand Prairie | 05/03/2000 | 1730 | Flash Flood | N/A | 0 | 0 | 15K | 0 |
| 73 Lancaster | 06/04/2000 | 1030 | Flash Flood | N/A | 0 | 0 | 25K | 0 |
| 74 De Soto | 06/04/2000 | 1036 | Flash Flood | N/A | 0 | 0 | 25K | 0 |
| 75 Sachse | 06/11/2000 | 1330 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 76 Dallas | 06/11/2000 | 1147 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 77 Garland | 06/11/2000 | 1215 | Flash Flood | N/A | 0 | 0 | 0 | 0 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 78 Dallas | 06/14/2000 | 2200 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 79 Dallas | 06/21/2000 | 2026 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 80 Dallas | 02/16/2001 | 0125 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 81 Dallas | 02/16/2001 | 0349 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 82 Dallas | 02/27/2001 | 1720 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 83 Mesquite | 03/11/2001 | 1600 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 84 Dallas | 03/12/2001 | 1245 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 85 Dallas | 05/06/2001 | 0125 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 86 Dallas | 06/30/2001 | 0755 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 87 Mesquite | 06/30/2001 | 0758 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 88 Grand Prairie | 07/01/2001 | 0745 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 89 Cedar Hill | 08/31/2001 | 1335 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 90 Duncanville | 08/31/2001 | 1335 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 91 Dallas | 12/16/2001 | 0930 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 92 Dallas | 03/19/2002 | 2000 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 93 Dallas | 03/30/2002 | 0335 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 94 Mesquite | 03/30/2002 | 0335 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 95 Mesquite | 03/30/2002 | 0407 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 96 Garland | 04/07/2002 | 2230 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 97 Garland | 10/18/2002 | 2015 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 98 Dallas | 10/18/2002 | 2015 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 99 Dallas | 12/30/2002 | 1522 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 100 Dallas | 05/25/2003 | 0040 | Flash Flood | N/A | 0 | 0 | 25K | 0 |
| 101 Dallas | 09/18/2003 | 1554 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 102 Dallas | 06/09/2004 | 1630 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 103 Lancaster | 06/28/2004 | 0915 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 104 Dallas | 07/28/2004 | 2200 | Flash Flood | N/A | 0 | 0 | 3.0M | 0 |
| 105 Lancaster | 07/28/2004 | 2200 | Flash Flood | N/A | 0 | 0 | 17.0M | 0 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 106 Garland | 01/03/2005 | 1830 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 107 Mesquite | 01/12/2005 | 1630 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 108 Hutchins | 01/12/2005 | 1700 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 109 TXZ119 | 07/01/2005 | 1154 | Flood | N/A | 0 | 0 | 0 | 0 |
| 110 Richardson | 07/15/2005 | 1715 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 111 Dallas | 08/08/2005 | 1437 | Flash Flood | N/A | 0 | 0 | 0 | 0 |
| 112 Countywide | 03/19/2006 | 1300 | Flash Flood | N/A | 1 | 0 | 300K | 0 |
| 113 TXZ119 - 135 | 03/19/2006 | 0919 | Flood | N/A | 0 | 0 | 0 | 0 |
| 114 Irving | 10/16/2006 | 0345 | Flash Flood | N/A | 0 | 0 | 0K | 0K |
| 115 Grand Prairie | 03/13/2007 | 1638 | Flash Flood | N/A | 0 | 1 | 10K | 0K |
| 116 De Soto | 03/30/2007 | 2130 | Flash Flood | N/A | 0 | 0 | 0K | 0K |
| 117 Addison | 04/03/2007 | 1904 | Flash Flood | N/A | 0 | 0 | 0K | 0K |
| 118 East Dallas | 05/24/2007 | 1530 | Flash Flood | N/A | 0 | 0 | 0K | 0K |
| 119 Dallas Love Fld | 05/30/2007 | 0946 | Flash Flood | N/A | 0 | 0 | 3K | 0K |
| 120 Duncanville | 06/13/2007 | 1430 | Flash Flood | N/A | 0 | 0 | 0K | 0K |
| 121 Garland | 06/26/2007 | 1525 | Flash Flood | N/A | 1 | 0 | 0K | 0K |
| 122 Duncanville | 06/26/2007 | 1730 | Flash Flood | N/A | 0 | 0 | 1K | 0K |
| 123 Garland | 06/27/2007 | 1740 | Flash Flood | N/A | 0 | 0 | 0K | 0K |
| 124 Dallas | 07/02/2007 | 1330 | Flood | N/A | 0 | 0 | 0K | 0K |
| 125 Dallas | 07/03/2007 | 0842 | Flash Flood | N/A | 0 | 0 | 10K | 0K |
| 126 Richardson | 08/01/2007 | 1700 | Flash Flood | N/A | 0 | 0 | 0K | 0K |
| 127 Lancaster | 09/05/2007 | 0600 | Flash Flood | N/A | 0 | 0 | 25K | 0K |
| 128 Balch Spgs | 09/05/2007 | 0900 | Flood | N/A | 0 | 0 | 0K | 0K |
| 129 Garland | 09/09/2007 | 1330 | Flash Flood | N/A | 0 | 0 | 25K | 0K |
| 130 Irving | 09/10/2007 | 0810 | Flash Flood | N/A | 0 | 0 | 0K | 0K |
| 131 Dallas | 10/15/2007 | 0700 | Flash Flood | N/A | 0 | 0 | 20K | 0K |
| 132 Dallas | 03/18/2008 | 1200 | Flash Flood | N/A | 1 | 0 | 150K | 0K |
| 133 Garland | 03/18/2008 | 1359 | Flash Flood | N/A | 0 | 0 | 15K | 0K |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 134 Liggett | 04/17/2008 | 2014 | Flash Flood | N/A | 0 | 0 | 0K | 0K |
| 135 Highland Park | 04/17/2008 | 2044 | Flash Flood | N/A | 0 | 0 | 0K | 0K |
| 136 Wheatland Area | 08/20/2008 | 0100 | Flash Flood | N/A | 0 | 0 | 0K | 0K |
| 137 New Hope | 08/20/2008 | 0200 | Flood | N/A | 0 | 0 | 0K | 0K |
| 138 Duncanville | 05/02/2009 | 1748 | Flash Flood | N/A | 0 | 0 | 2K | 0K |
| 139 Balch Spgs | 05/02/2009 | 2020 | Flash Flood | N/A | 0 | 0 | 7K | 0K |
| 140 Farmers Branch | 05/02/2009 | 2200 | Flash Flood | N/A | 0 | 0 | 5K | 0K |
| 141 Alpha | 05/02/2009 | 2233 | Flash Flood | N/A | 0 | 0 | 7K | 0K |
| 142 Coppell | 06/11/2009 | 0500 | Flash Flood | N/A | 0 | 0 | 50K | 0K |
| 143 (dal)love Fld Dallas | 06/11/2009 | 0645 | Flash Flood | N/A | 0 | 0 | 750K | 0K |
| 144 Bouchard | 06/11/2009 | 0709 | Flash Flood | N/A | 0 | 0 | 200K | 0K |
| 145 Eagle Ford | 06/11/2009 | 0800 | Flash Flood | N/A | 0 | 0 | 20K | 0K |
| 146 Elam | 06/11/2009 | 0804 | Flash Flood | N/A | 0 | 0 | 70K | 0K |
| 147 Highland Park | 06/11/2009 | 0847 | Flash Flood | N/A | 0 | 0 | 10K | 0K |
| 148 Dallas | 06/11/2009 | 0855 | Flash Flood | N/A | 0 | 0 | 15K | 0K |
| 149 (dal)love Fld Dallas | 06/11/2009 | 0900 | Flash Flood | N/A | 0 | 0 | 30K | 0K |
| 150 Gribble | 06/11/2009 | 0908 | Flash Flood | N/A | 0 | 0 | 15K | 0K |
| 151 Sunnyvale | 06/11/2009 | 0930 | Flash Flood | N/A | 0 | 0 | 200K | 0K |
| 152 Hensley Fld Arpt | 06/11/2009 | 1012 | Flash Flood | N/A | 0 | 0 | 7K | 0K |
| 153 Eagle Ford | 06/11/2009 | 1033 | Flash Flood | N/A | 0 | 0 | 75K | 0K |
| 154 Highland Park | 07/30/2009 | 0515 | Flash Flood | N/A | 0 | 0 | 20K | 0K |
| 155 Oak Cliff | 09/11/2009 | 2100 | Flash Flood | N/A | 0 | 0 | 30K | 0K |
| 156 Mountain Creek Lake | 09/11/2009 | 2108 | Flash Flood | N/A | 0 | 0 | 1K | 0K |
| 157 Rowlett | 09/13/2009 | 0200 | Flash Flood | N/A | 0 | 0 | 150K | 0K |
| 158 Rowlett | 09/13/2009 | 1310 | Flood | N/A | 0 | 0 | 0K | 0K |
| 159 Alpha | 10/09/2009 | 0530 | Flash Flood | N/A | 0 | 0 | 0K | 0K |
| 160 Sachse | 10/09/2009 | 0830 | Flash Flood | N/A | 0 | 0 | 1K | 0K |
| | | | | TOTALS: | 24 | 4 | 22.977M | 0 |

### 4.2.3 Winter Storms

#### Location

Due to the unpredictable nature of winter storms, it is impossible to determine the exact area of their future occurrences. The entire planning area, the City of Garland, is equally subject to winter storms.

#### Extent

Figure 4-2-3 shows the NWS Wind-chill Temperature (WCT) index uses advances in science, technology, and computer modeling to provide an accurate, understandable, and useful formula for calculating the dangers from winter winds and freezing temperatures. The index:

- Calculates wind speed at an average height of five feet, typical height of an adult human face, based on readings from the national standard height of 33 feet, typical height of an anemometer
- Is based on a human face model
- Incorporates heat transfer theory, heat loss from the body to its surroundings, during cold and breezy/windy days
- Lowers the calm wind threshold to 3 mph
- Uses a consistent standard for skin tissue resistance
- Assumes no impact from the sun (i.e., clear night sky).

Figure 4-2-3

**NWS Windchill Chart**

| Wind (mph) \ Temperature (°F) | Calm | 40 | 35 | 30 | 25 | 20 | 15 | 10 | 5 | 0 | -5 | -10 | -15 | -20 | -25 | -30 | -35 | -40 | -45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | | 36 | 31 | 25 | 19 | 13 | 7 | 1 | -5 | -11 | -16 | -22 | -28 | -34 | -40 | -46 | -52 | -57 | -63 |
| 10 | | 34 | 27 | 21 | 15 | 9 | 3 | -4 | -10 | -16 | -22 | -28 | -35 | -41 | -47 | -53 | -59 | -66 | -72 |
| 15 | | 32 | 25 | 19 | 13 | 6 | 0 | -7 | -13 | -19 | -26 | -32 | -39 | -45 | -51 | -58 | -64 | -71 | -77 |
| 20 | | 30 | 24 | 17 | 11 | 4 | -2 | -9 | -15 | -22 | -29 | -35 | -42 | -48 | -55 | -61 | -68 | -74 | -81 |
| 25 | | 29 | 23 | 16 | 9 | 3 | -4 | -11 | -17 | -24 | -31 | -37 | -44 | -51 | -58 | -64 | -71 | -78 | -84 |
| 30 | | 28 | 22 | 15 | 8 | 1 | -5 | -12 | -19 | -26 | -33 | -39 | -46 | -53 | -60 | -67 | -73 | -80 | -87 |
| 35 | | 28 | 21 | 14 | 7 | 0 | -7 | -14 | -21 | -27 | -34 | -41 | -48 | -55 | -62 | -69 | -76 | -82 | -89 |
| 40 | | 27 | 20 | 13 | 6 | -1 | -8 | -15 | -22 | -29 | -36 | -43 | -50 | -57 | -64 | -71 | -78 | -84 | -91 |
| 45 | | 26 | 19 | 12 | 5 | -2 | -9 | -16 | -23 | -30 | -37 | -44 | -51 | -58 | -65 | -72 | -79 | -86 | -93 |
| 50 | | 26 | 19 | 12 | 4 | -3 | -10 | -17 | -24 | -31 | -38 | -45 | -52 | -60 | -67 | -74 | -81 | -88 | -95 |
| 55 | | 25 | 18 | 11 | 4 | -3 | -11 | -18 | -25 | -32 | -39 | -46 | -54 | -61 | -68 | -75 | -82 | -89 | -97 |
| 60 | | 25 | 17 | 10 | 3 | -4 | -11 | -19 | -26 | -33 | -40 | -48 | -55 | -62 | -69 | -76 | -84 | -91 | -98 |

Frostbite Times: 30 minutes, 10 minutes, 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph) *Effective 11/01/01*

*Source: The National Weather Service*

#### Previous Occurrences

The following table shows previous hailstorm occurrence data according to the National Climatic Data Center reported for all of Dallas County, Texas between 10/1/1950 and

08/31/2010. All data provided by the National Climatic Data Center has been included. The belief is that hazards do not stay within jurisdictional boundaries and thus it is important to be aware of occurrences that have impacted neighboring jurisdictions.

**24 SNOW & ICE event(s) were reported in Dallas County, Texas between 01/01/1950 and 09/30/2010.**

**Mag**: Magnitude **Dth**: Deaths **Inj**: Injuries **PrD**: Property Damage **CrD**: Crop Damage

| Location or County | Date | Time | Type | Mag | Dth | Inj | PrD | CrD |
|---|---|---|---|---|---|---|---|---|
| 1 County Wide | 02/09/1994 | 0000 | Ice Storm | N/A | 0 | 0 | 50.0M | 0 |
| 2 County Wide | 02/01/1996 | 0800 | Heavy Snow | N/A | 0 | 0 | 0 | 0 |
| 3 County Wide | 11/24/1996 | 0200 | Winter Storm | N/A | 0 | 0 | 0 | 0 |
| 4 County Wide | 01/06/1997 | 1200 | Heavy Snow | N/A | 0 | 0 | 0 | 0 |
| 5 County Wide | 12/22/1998 | 0000 | Ice Storm | N/A | 6 | 0 | 0 | 0 |
| 6 County Wide | 01/25/2000 | 0000 | Winter Storm | N/A | 4 | 0 | 0 | 0 |
| 7 County Wide | 12/12/2000 | 1800 | Winter Storm | N/A | 0 | 0 | 0 | 0 |
| 8 County Wide | 12/25/2000 | 0000 | Winter Storm | N/A | 0 | 0 | 0 | 0 |
| 9 County Wide | 12/31/2000 | 0000 | Winter Storm | N/A | 0 | 0 | 0 | 0 |
| 10 County Wide | 01/01/2001 | 0000 | Heavy Snow | N/A | 0 | 0 | 0 | 0 |
| 11 County Wide | 11/27/2001 | 1230 | Ice Storm | N/A | 0 | 0 | 0 | 0 |
| 12 County Wide | 02/05/2002 | 0500 | Winter Storm | N/A | 0 | 0 | 0 | 0 |
| 13 County Wide | 03/02/2002 | 0215 | Winter Storm | N/A | 0 | 0 | 0 | 0 |
| 14 County Wide | 02/24/2003 | 1120 | Winter Storm | N/A | 0 | 0 | 15.0M | 0 |
| 15 County Wide | 02/14/2004 | 0100 | Heavy Snow | N/A | 0 | 0 | 0 | 0 |
| 16 County Wide | 12/22/2004 | 1201 | Winter Weather/mix | N/A | 0 | 0 | 0 | 0 |
| 17 County Wide | 12/07/2005 | 0700 | Winter Storm | N/A | 0 | 0 | 0 | 0 |
| 18 County Wide | 02/18/2006 | 0330 | Winter Weather/mix | N/A | 0 | 0 | 0 | 0 |
| 19 County Wide | 12/15/2008 | 1700 | Winter Weather | N/A | 0 | 0 | 0K | 0K |
| 20 County Wide | 12/23/2008 | 0600 | Winter Weather | N/A | 0 | 0 | 0K | 0K |
| 21 County Wide | 12/24/2009 | 1130 | Winter Weather | N/A | 0 | 0 | 250K | 0K |
| 22 County Wide | 01/07/2010 | 0330 | Winter Weather | N/A | 0 | 0 | 700K | 0K |
| 23 County Wide | 02/11/2010 | 0330 | Heavy Snow | N/A | 0 | 0 | 16.0M | 0K |
| 24 County Wide | 03/20/2010 | 1745 | Winter Weather | N/A | 0 | 0 | 100K | 0K |
| | | | | TOTALS: | 10 | 0 | 82.050M | 0 |

### 4.2.4 Hailstorm

Location

Due to the unpredictable nature of hailstorms, it is impossible to determine the exact area of their future occurrences. The entire planning area, the City of Garland, is equally subject to hailstorms.

Extent

Figure 4-2-4 shows the Combined NOAA/TORRO Hailstorm Intensity Scales. The Hailstorm Intensity Scale is representative of the damage from hail storms this community has experienced in the past and will likely experience in the future. The Hailstorm Intensity Scale allows planners to gauge past damage and mitigate for future expected damage.

Figure 4-2-4
**Combined NOAA/TORRO Hailstorm Intensity Scales**

| Size Code | Intensity Category | Typical Hail Diameter (inches) | Approximate Size | Typical Damage Impacts |
|---|---|---|---|---|
| **H0** | Hard Hail | up to 0.33 | Pea | No damage |
| **H1** | Potentially Damaging | 0.33-0.60 | Marble or Mothball | Slight damage to plants, crops |
| **H2** | Potentially Damaging | 0.60-0.80 | Dime or grape | Significant damage to fruit, crops, vegetation |
| **H3** | Severe | 0.80-1.20 | Nickel to Quarter | Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored |
| **H4** | Severe | 1.2-1.6 | Half Dollar to Ping Pong Ball | Widespread glass damage, vehicle bodywork damage |
| **H5** | Destructive | 1.6-2.0 | Silver dollar to Golf Ball | Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries |
| **H6** | Destructive | 2.0-2.4 | Lime or Egg | Aircraft bodywork dented, brick walls pitted |
| **H7** | Very destructive | 2.4-3.0 | Tennis ball | Severe roof damage, risk of serious injuries |
| **H8** | Very destructive | 3.0-3.5 | Baseball to Orange | Severe damage to aircraft bodywork |
| **H9** | Super Hailstorms | 3.5-4.0 | Grapefruit | Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open |
| **H10** | Super Hailstorms | 4+ | Softball and up | Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open |

*Source: North Central Texas Council of Governments*

## Previous Occurrences

The following table shows previous hailstorm occurrence data according to the National Climatic Data Center reported for all of Dallas County, Texas between 10/1/1950 and 08/31/2010. All data provided by the National Climatic Data Center has been included. The belief is that hazards do not stay within jurisdictional boundaries and thus it is important to be aware of occurrences that have impacted neighboring jurisdictions to further assess the City of Garland's risks.

**488 HAIL event(s) were reported in Dallas County, Texas between 01/01/1950 and 08/31/2010.**

**Mag**: Magnitude **Dth**: Deaths **Inj**: Injuries **PrD**: Property Damage **CrD**: Crop Damage

| | Location or County | Date | Time | Type | Mag | Dth | Inj | PrD | CrD |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Dallas | 03/31/1955 | 1725 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 2 | Dallas | 05/15/1955 | 1650 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 3 | Dallas | 02/14/1956 | 2300 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 4 | Dallas | 04/14/1956 | 2000 | Hail | 2.00 in. | 0 | 0 | 0 | 0 |
| 5 | Dallas | 04/25/1958 | 2100 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 6 | Dallas | 03/10/1959 | 1840 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 7 | Dallas | 03/25/1959 | 1800 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 8 | Dallas | 06/01/1959 | 1530 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 9 | Dallas | 06/01/1959 | 1558 | Hail | 1.50 in. | 0 | 0 | 0 | 0 |
| 10 | Dallas | 06/01/1959 | 1755 | Hail | 2.00 in. | 0 | 0 | 0 | 0 |
| 11 | Dallas | 04/14/1960 | 1640 | Hail | 2.75 in. | 0 | 0 | 0 | 0 |
| 12 | Dallas | 04/14/1960 | 1854 | Hail | 1.25 in. | 0 | 0 | 0 | 0 |
| 13 | Dallas | 05/25/1960 | 1803 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 14 | Dallas | 05/25/1960 | 1900 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 15 | Dallas | 03/05/1961 | 2100 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 16 | Dallas | 03/26/1961 | 1600 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 17 | Dallas | 03/26/1961 | 1650 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 18 | Dallas | 03/28/1961 | 1710 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 19 | Dallas | 03/28/1961 | 1715 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 20 | Dallas | 03/28/1961 | 1720 | Hail | 3.50 in. | 0 | 0 | 0 | 0 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 21 | Dallas | 03/28/1961 | 1800 | Hail | 1.50 in. | 0 | 0 | 0 | 0 |
| 22 | Dallas | 05/22/1961 | 2300 | Hail | 3.00 in. | 0 | 0 | 0 | 0 |
| 23 | Dallas | 07/02/1961 | 0700 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 24 | Dallas | 07/02/1961 | 0700 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 25 | Dallas | 04/10/1962 | 1830 | Hail | 2.75 in. | 0 | 0 | 0 | 0 |
| 26 | Dallas | 04/10/1962 | 1855 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 27 | Dallas | 04/10/1962 | 1900 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 28 | Dallas | 04/30/1962 | 1400 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 29 | Dallas | 04/30/1962 | 1410 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 30 | Dallas | 05/31/1962 | 1900 | Hail | 1.50 in. | 0 | 0 | 0 | 0 |
| 31 | Dallas | 04/22/1963 | 1845 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 32 | Dallas | 04/28/1963 | 1130 | Hail | 1.50 in. | 0 | 0 | 0 | 0 |
| 33 | Dallas | 04/28/1963 | 1745 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 34 | Dallas | 05/27/1963 | 1610 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 35 | Dallas | 04/21/1964 | 1505 | Hail | 2.50 in. | 0 | 0 | 0 | 0 |
| 36 | Dallas | 04/24/1964 | 1900 | Hail | 1.25 in. | 0 | 0 | 0 | 0 |
| 37 | Dallas | 05/27/1965 | 2010 | Hail | 2.75 in. | 0 | 0 | 0 | 0 |
| 38 | Dallas | 04/28/1966 | 0158 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 39 | Dallas | 05/23/1966 | 1430 | Hail | 2.00 in. | 0 | 0 | 0 | 0 |
| 40 | Dallas | 04/27/1968 | 1940 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 41 | Dallas | 04/28/1968 | 1725 | Hail | 1.50 in. | 0 | 0 | 0 | 0 |
| 42 | Dallas | 04/28/1968 | 1725 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 43 | Dallas | 04/28/1968 | 1725 | Hail | 2.00 in. | 0 | 0 | 0 | 0 |
| 44 | Dallas | 08/13/1968 | 1630 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 45 | Dallas | 05/06/1969 | 1930 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 46 | Dallas | 10/26/1970 | 1900 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 47 | Dallas | 04/22/1971 | 1817 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 48 | Dallas | 05/06/1971 | 1715 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 49 | Dallas | 05/06/1971 | 1756 | Hail | 2.75 in. | 0 | 0 | 0 | 0 |
| 50 | Dallas | 03/24/1972 | 0145 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 51 | Dallas | 03/26/1972 | 1630 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 52 | Dallas | 04/14/1972 | 0905 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 53 | Dallas | 05/16/1972 | 1700 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 54 | Dallas | 06/21/1972 | 1130 | Hail | 0.53 in. | 0 | 0 | 0 | 0 |
| 55 | Dallas | 05/01/1973 | 0820 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 56 | Dallas | 05/01/1973 | 1426 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 57 | Dallas | 05/25/1973 | 0945 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 58 | Dallas | 08/28/1973 | 2240 | Hail | 2.00 in. | 0 | 0 | 0 | 0 |
| 59 | Dallas | 04/13/1974 | 1730 | Hail | 3.00 in. | 0 | 0 | 0 | 0 |
| 60 | Dallas | 06/07/1974 | 0800 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 61 | Dallas | 08/12/1974 | 2030 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 62 | Dallas | 05/06/1975 | 1645 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 63 | Dallas | 05/06/1975 | 1720 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 64 | Dallas | 03/26/1976 | 1408 | Hail | 2.00 in. | 0 | 0 | 0 | 0 |
| 65 | Dallas | 03/26/1976 | 1420 | Hail | 2.00 in. | 0 | 0 | 0 | 0 |
| 66 | Dallas | 05/06/1976 | 0300 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 67 | Dallas | 05/23/1976 | 1950 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 68 | Dallas | 05/23/1976 | 2015 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 69 | Dallas | 05/23/1976 | 2050 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 70 | Dallas | 05/26/1976 | 1551 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 71 | Dallas | 05/26/1976 | 1614 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 72 | Dallas | 05/26/1976 | 1623 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 73 | Dallas | 05/26/1976 | 1630 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 74 | Dallas | 05/26/1976 | 1645 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 75 | Dallas | 05/26/1976 | 1654 | Hail | 3.00 in. | 0 | 0 | 0 | 0 |
| 76 | Dallas | 05/26/1976 | 1726 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 77 | Dallas | 09/07/1977 | 1510 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 78 | Dallas | 05/01/1978 | 1808 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 79 | Dallas | 05/01/1978 | 1850 | Hail | 2.50 in. | 0 | 0 | 0 | 0 |
| 80 | Dallas | 05/01/1978 | 2000 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 81 | Dallas | 05/11/1978 | 1650 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 82 | Dallas | 05/11/1978 | 1715 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 83 | Dallas | 04/28/1979 | 1915 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 84 | Dallas | 05/01/1979 | 2155 | Hail | 1.50 in. | 0 | 0 | 0 | 0 |
| 85 | Dallas | 05/03/1979 | 1006 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 86 | Dallas | 05/03/1979 | 1011 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 87 | Dallas | 05/03/1979 | 1033 | Hail | 2.75 in. | 0 | 0 | 0 | 0 |
| 88 | Dallas | 05/03/1979 | 1420 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 89 | Dallas | 08/22/1979 | 1705 | Hail | 1.50 in. | 0 | 0 | 0 | 0 |
| 90 | Dallas | 11/19/1979 | 2200 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 91 | Dallas | 04/07/1980 | 1540 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 92 | Dallas | 04/24/1980 | 2030 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 93 | Dallas | 05/01/1981 | 0225 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 94 | Dallas | 05/08/1981 | 2015 | Hail | 2.75 in. | 0 | 0 | 0 | 0 |
| 95 | Dallas | 05/16/1981 | 0700 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 96 | Dallas | 04/02/1982 | 0800 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 97 | Dallas | 04/02/1982 | 0805 | Hail | 2.75 in. | 0 | 0 | 0 | 0 |
| 98 | Dallas | 04/02/1982 | 0810 | Hail | 2.75 in. | 0 | 0 | 0 | 0 |
| 99 | Dallas | 04/19/1982 | 1820 | Hail | 2.75 in. | 0 | 0 | 0 | 0 |
| 100 | Dallas | 04/19/1982 | 1835 | Hail | 2.75 in. | 0 | 0 | 0 | 0 |
| 101 | Dallas | 05/11/1982 | 2000 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 102 | Dallas | 05/14/1982 | 1725 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 103 | Dallas | 07/27/1982 | 1320 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 104 | Dallas | 01/31/1983 | 1100 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |

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|---|---|---|---|---|---|---|---|---|
| 105 Dallas | 04/22/1983 | 1855 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 106 Dallas | 04/22/1983 | 1955 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 107 Dallas | 05/19/1983 | 1950 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 108 Dallas | 06/05/1983 | 2251 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 109 Dallas | 09/01/1983 | 0030 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 110 Dallas | 11/19/1983 | 0615 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 111 Dallas | 11/19/1983 | 0630 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 112 Dallas | 11/19/1983 | 0645 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 113 Dallas | 11/19/1983 | 0655 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 114 Dallas | 02/11/1984 | 1945 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 115 Dallas | 02/11/1984 | 2000 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 116 Dallas | 03/18/1984 | 1745 | Hail | 2.75 in. | 0 | 0 | 0 | 0 |
| 117 Dallas | 03/18/1984 | 1835 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 118 Dallas | 03/26/1984 | 2350 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 119 Dallas | 03/27/1984 | 0032 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 120 Dallas | 04/20/1984 | 1940 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 121 Dallas | 10/18/1984 | 1415 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 122 Dallas | 04/21/1985 | 1835 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 123 Dallas | 04/27/1985 | 2045 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 124 Dallas | 05/20/1985 | 0005 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 125 Dallas | 02/05/1986 | 1440 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 126 Dallas | 03/13/1986 | 0030 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 127 Dallas | 04/04/1986 | 1515 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 128 Dallas | 04/04/1986 | 1530 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 129 Dallas | 04/04/1986 | 1540 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 130 Dallas | 04/04/1986 | 1605 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 131 Dallas | 04/04/1986 | 1606 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 132 Dallas | 04/04/1986 | 1650 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |

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|---|---|---|---|---|---|---|---|---|
| 133 Dallas | 04/04/1986 | 1828 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 134 Dallas | 04/12/1986 | 0055 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 135 Dallas | 04/12/1986 | 0111 | Hail | 4.50 in. | 0 | 0 | 0 | 0 |
| 136 Dallas | 04/12/1986 | 0118 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 137 Dallas | 04/11/1987 | 1711 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 138 Dallas | 05/03/1987 | 1922 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 139 Dallas | 05/03/1987 | 1950 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 140 Dallas | 05/19/1987 | 1813 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 141 Dallas | 05/19/1987 | 1815 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 142 Dallas | 05/19/1987 | 1833 | Hail | 0.88 in. | 0 | 0 | 0 | 0 |
| 143 Dallas | 06/17/1987 | 1800 | Hail | 0.88 in. | 0 | 0 | 0 | 0 |
| 144 Dallas | 06/23/1987 | 1944 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 145 Dallas | 03/11/1988 | 1858 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 146 Dallas | 03/11/1988 | 1930 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 147 Dallas | 03/11/1988 | 1939 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 148 Dallas | 03/11/1988 | 1955 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 149 Dallas | 03/24/1988 | 2113 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 150 Dallas | 03/24/1988 | 2156 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 151 Dallas | 03/24/1988 | 2207 | Hail | 1.25 in. | 0 | 0 | 0 | 0 |
| 152 Dallas | 03/29/1988 | 0827 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 153 Dallas | 04/01/1988 | 1330 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 154 Dallas | 04/01/1988 | 1345 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 155 Dallas | 04/01/1988 | 1402 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 156 Dallas | 04/01/1988 | 1406 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 157 Dallas | 05/20/1988 | 1445 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 158 Dallas | 07/03/1988 | 1400 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 159 Dallas | 10/01/1988 | 1752 | Hail | 0.88 in. | 0 | 0 | 0 | 0 |
| 160 Dallas | 11/15/1988 | 1520 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |

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|---|---|---|---|---|---|---|---|---|
| 161 Dallas | 11/15/1988 | 1601 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 162 Dallas | 11/15/1988 | 1655 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 163 Dallas | 11/25/1988 | 1645 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 164 Dallas | 04/28/1989 | 1950 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 165 Dallas | 04/28/1989 | 2010 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 166 Dallas | 04/28/1989 | 2030 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 167 Dallas | 04/28/1989 | 2040 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 168 Dallas | 05/03/1989 | 0530 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 169 Dallas | 05/16/1989 | 1615 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 170 Dallas | 05/16/1989 | 1645 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 171 Dallas | 05/16/1989 | 1652 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 172 Dallas | 05/16/1989 | 1805 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 173 Dallas | 06/07/1989 | 0514 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 174 Dallas | 06/07/1989 | 0525 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 175 Dallas | 08/06/1989 | 1428 | Hail | 0.88 in. | 0 | 0 | 0 | 0 |
| 176 Dallas | 04/05/1990 | 2100 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 177 Dallas | 04/15/1990 | 2228 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 178 Dallas | 04/27/1990 | 1608 | Hail | 0.88 in. | 0 | 0 | 0 | 0 |
| 179 Dallas | 06/01/1990 | 1304 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 180 Dallas | 06/03/1990 | 1421 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 181 Dallas | 03/22/1991 | 0602 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 182 Dallas | 04/11/1991 | 2120 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 183 Dallas | 04/18/1991 | 1653 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 184 Dallas | 04/18/1991 | 1712 | Hail | 2.00 in. | 0 | 0 | 0 | 0 |
| 185 Dallas | 04/18/1991 | 1751 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 186 Dallas | 04/24/1991 | 2010 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 187 Dallas | 04/28/1991 | 1315 | Hail | 2.75 in. | 0 | 0 | 0 | 0 |
| 188 Dallas | 06/05/1991 | 1506 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |

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|---|---|---|---|---|---|---|---|---|
| 189 Dallas | 06/22/1991 | 1837 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 190 Dallas | 10/26/1991 | 0202 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 191 Dallas | 03/04/1992 | 1850 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 192 Dallas | 03/24/1992 | 1915 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 193 Dallas | 03/24/1992 | 1937 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 194 Dallas | 03/24/1992 | 2050 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 195 Dallas | 04/28/1992 | 2240 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 196 Dallas | 05/11/1992 | 1735 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 197 Dallas | 05/11/1992 | 1735 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 198 Dallas | 05/11/1992 | 1750 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 199 Dallas | 05/14/1992 | 0933 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 200 Dallas | 05/14/1992 | 1008 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 201 Dallas | 05/14/1992 | 1030 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 202 Dallas | 05/14/1992 | 1036 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 203 Dallas | 05/14/1992 | 1052 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 204 Dallas | 05/14/1992 | 1150 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 205 Dallas | 06/01/1992 | 1735 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 206 Dallas | 06/01/1992 | 1915 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 207 Dallas | 06/25/1992 | 0510 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 208 Dallas | 06/25/1992 | 2216 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 209 Dallas | 06/25/1992 | 2238 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 210 Dallas | 06/25/1992 | 2242 | Hail | 2.00 in. | 0 | 0 | 0 | 0 |
| 211 Dallas | 06/25/1992 | 2243 | Hail | 3.00 in. | 0 | 0 | 0 | 0 |
| 212 Dallas | 06/25/1992 | 2245 | Hail | 3.00 in. | 0 | 0 | 0 | 0 |
| 213 Dallas | 06/26/1992 | 0245 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 214 Dallas | 08/02/1992 | 1625 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 215 Dallas | 10/07/1992 | 1615 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 216 Dallas | 10/15/1992 | 1855 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |

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|---|---|---|---|---|---|---|---|---|
| 217 Dallas | 10/15/1992 | 1932 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 218 Dallas | 10/15/1992 | 1940 | Hail | 0.88 in. | 0 | 0 | 0 | 0 |
| 219 Dallas | 10/15/1992 | 2010 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 220 Dallas | 10/15/1992 | 2028 | Hail | 1.50 in. | 0 | 0 | 0 | 0 |
| 221 Dallas | 11/01/1992 | 0044 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 222 University Park | 04/19/1993 | 1800 | Hail | 1.50 in. | 0 | 0 | 0 | 0 |
| 223 Eastern Portion | 04/19/1993 | 1820 | Hail | 2.00 in. | 0 | 0 | 0 | 0 |
| 224 Dallas | 04/19/1993 | 1835 | Hail | 0.88 in. | 0 | 0 | 0 | 0 |
| 225 Southern Dallas | 04/19/1993 | 1900 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 226 Wilmer | 04/19/1993 | 1905 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 227 Hutchins | 04/19/1993 | 1915 | Hail | 1.50 in. | 0 | 0 | 0 | 0 |
| 228 Dallas | 09/20/1993 | 1755 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 229 Bonham | 10/02/1993 | 1445 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 230 Dallas | 10/02/1993 | 1718 | Hail | 1.75 in. | 0 | 0 | 50K | 0 |
| 231 Highland Park | 10/02/1993 | 1725 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 232 Love Field | 10/02/1993 | 1727 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 233 Southeast Dallas | 10/02/1993 | 1745 | Hail | 1.50 in. | 0 | 0 | 0 | 0 |
| 234 Duncanville | 10/17/1993 | 2215 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 235 Dallas | 10/17/1993 | 2225 | Hail | 1.50 in. | 0 | 0 | 0 | 0 |
| 236 Joe Pool Lake | 10/17/1993 | 2225 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 237 Desoto | 10/17/1993 | 2242 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 238 Lancaster | 10/17/1993 | 2254 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 239 Segoville | 10/17/1993 | 2301 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 240 Duncanville | 10/18/1993 | 0006 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 241 Cedar Hill | 10/18/1993 | 0010 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 242 Desoto | 10/18/1993 | 0020 | Hail | 2.00 in. | 0 | 0 | 0 | 0 |
| 243 Desoto | 10/18/1993 | 0030 | Hail | 1.50 in. | 0 | 0 | 0 | 0 |
| 244 Lancaster | 10/18/1993 | 0030 | Hail | 2.00 in. | 0 | 0 | 0 | 0 |

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|---|---|---|---|---|---|---|---|---|
| 245 Dallas | 10/18/1993 | 2038 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 246 Richardson | 10/18/1993 | 2104 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 247 Lancaster | 04/11/1994 | 1337 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 248 Pleasant Grove | 04/22/1994 | 1615 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 249 Grand Prairie | 04/22/1994 | 1620 | Hail | 0.88 in. | 0 | 0 | 0 | 0 |
| 250 Farmers Branch | 04/25/1994 | 1825 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 251 Addison | 04/25/1994 | 1835 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 252 North Dallas | 04/25/1994 | 1845 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 253 Richardson | 04/25/1994 | 1845 | Hail | 0.88 in. | 0 | 0 | 0 | 0 |
| 254 Richardson | 04/25/1994 | 1848 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 255 White Rock Lake | 04/25/1994 | 1858 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 256 Grand Prairie | 04/25/1994 | 1917 | Hail | 2.75 in. | 0 | 0 | 0 | 0 |
| 257 Cedar Hill | 04/25/1994 | 1940 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 258 Duncanville | 04/25/1994 | 2010 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 259 South Dallas | 04/25/1994 | 2010 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 260 Redbird Airport | 04/25/1994 | 2025 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 261 West Lancaster | 04/25/1994 | 2034 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 262 Cedar Hill | 04/29/1994 | 0040 | Hail | 0.88 in. | 0 | 0 | 0 | 0 |
| 263 Lancaster | 04/29/1994 | 0054 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 264 Northeast Lancaster | 04/29/1994 | 0115 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 265 Balch Springs | 04/29/1994 | 0120 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 266 Combine | 04/29/1994 | 1915 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 267 Cedar Hill | 05/02/1994 | 1317 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 268 Dallas | 05/02/1994 | 1332 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 269 White Rock Lake | 05/02/1994 | 1339 | Hail | 1.50 in. | 0 | 0 | 0 | 0 |
| 270 Garland | 05/02/1994 | 1346 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 271 Irving | 05/14/1994 | 1830 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 272 Farmers Branch | 05/14/1994 | 1900 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 273 Farmers Branch | 05/14/1994 | 1910 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 274 D/fw Airport | 05/14/1994 | 1925 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 275 Farmers Branch | 05/14/1994 | 1925 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 276 Irving | 05/14/1994 | 1930 | Hail | 0.88 in. | 0 | 0 | 0 | 0 |
| 277 Richardson | 08/07/1994 | 1326 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 278 DALLAS | 08/07/1994 | 1340 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 279 Garland | 08/07/1994 | 1340 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 280 Coppell | 10/21/1994 | 1244 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 281 Garland | 10/21/1994 | 1429 | Hail | 2.00 in. | 0 | 0 | 0 | 0 |
| 282 Se Dallas | 10/21/1994 | 1535 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 283 Mesquite | 10/21/1994 | 1541 | Hail | 2.00 in. | 0 | 0 | 0 | 0 |
| 284 Mesquite | 10/21/1994 | 1608 | Hail | 2.00 in. | 0 | 0 | 0 | 0 |
| 285 Seagoville | 10/21/1994 | 1610 | Hail | 2.75 in. | 0 | 0 | 0 | 0 |
| 286 Dallas | 10/21/1994 | 1627 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 287 Garland | 11/03/1994 | 1528 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 288 Cedar Hill | 01/18/1995 | 0345 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 289 Cedar Hill | 03/06/1995 | 2115 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 290 Mesquite | 03/06/1995 | 2200 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 291 South Dallas | 03/06/1995 | 2215 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 292 East Dallas | 03/06/1995 | 2235 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 293 Northeast Dallas | 03/06/1995 | 2240 | Hail | 1.50 in. | 0 | 0 | 0 | 0 |
| 294 Duncanville | 03/25/1995 | 1752 | Hail | 1.75 in. | 0 | 0 | 10.0M | 0 |
| 295 South Dallas | 03/25/1995 | 1758 | Hail | 1.75 in. | 0 | 0 | 10.0M | 0 |
| 296 Dallas | 03/25/1995 | 1814 | Hail | 2.00 in. | 0 | 0 | 20.0M | 0 |
| 297 Mesquite | 03/25/1995 | 1830 | Hail | 2.75 in. | 0 | 0 | 20.0M | 0 |
| 298 Garland | 03/25/1995 | 1835 | Hail | 1.75 in. | 0 | 0 | 10.0M | 0 |
| 299 Northeast Dallas | 03/25/1995 | 1855 | Hail | 1.75 in. | 0 | 0 | 10.0M | 0 |
| 300 De Soto | 04/10/1995 | 1136 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |

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|---|---|---|---|---|---|---|---|---|
| 301 Hutchins | 04/10/1995 | 1325 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 302 Seagoville | 04/19/1995 | 1420 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 303 Dallas | 04/19/1995 | 2020 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 304 Dallas | 04/22/1995 | 1515 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 305 Coppell | 04/26/1995 | 1835 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 306 Rowlett | 04/29/1995 | 2045 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 307 DALLAS | 04/29/1995 | 2104 | Hail | 1.50 in. | 0 | 0 | 0 | 0 |
| 308 Grand Prairie | 04/29/1995 | 2114 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 309 Cedar Hill | 04/29/1995 | 2125 | Hail | 2.00 in. | 0 | 0 | 0 | 0 |
| 310 Cedar Hill | 04/29/1995 | 2133 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 311 Northwest Dallas | 05/05/1995 | 1920 | Hail | 2.00 in. | 0 | 0 | 0 | 0 |
| 312 Farmers Branch | 05/24/1995 | 1627 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 313 Dallas | 05/24/1995 | 1630 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 314 Richardson | 02/27/1996 | 0842 | Hail | 0.88 in. | 0 | 0 | 0 | 0 |
| 315 Coppell | 03/24/1996 | 1442 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 316 Farmers Branch | 03/24/1996 | 1457 | Hail | 1.50 in. | 0 | 0 | 0 | 0 |
| 317 Coppell | 03/24/1996 | 1515 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 318 Coppell | 03/24/1996 | 1524 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 319 Cedar Hill | 04/12/1996 | 1647 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 320 Dallas | 04/12/1996 | 1708 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 321 Dallas | 04/12/1996 | 1713 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 322 De Soto | 04/12/1996 | 1715 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 323 Garland | 04/12/1996 | 1720 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 324 Lancaster | 04/12/1996 | 1723 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 325 Duncanville | 04/19/1996 | 1420 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 326 Dallas | 04/19/1996 | 1425 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 327 Dallas | 05/10/1996 | 2211 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 328 Grand Prairie | 05/28/1996 | 1642 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 329 Grand Prairie | 05/28/1996 | 1650 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 330 Dallas | 05/28/1996 | 1653 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 331 Dallas | 05/28/1996 | 1705 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 332 Richardson | 05/28/1996 | 1720 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 333 Garland | 05/28/1996 | 1735 | Hail | 1.50 in. | 0 | 0 | 0 | 0 |
| 334 Richardson | 05/28/1996 | 1737 | Hail | 2.00 in. | 0 | 0 | 0 | 0 |
| 335 Dallas | 06/01/1996 | 1039 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 336 Coppell | 06/06/1996 | 2201 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 337 Garland | 06/15/1996 | 1538 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 338 Dallas | 06/17/1996 | 1805 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 339 Seagoville | 06/17/1996 | 1237 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 340 Farmers Branch | 07/09/1996 | 0205 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 341 Coppell | 10/21/1996 | 1427 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 342 Carrollton | 10/21/1996 | 1430 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 343 Lancaster | 10/21/1996 | 2110 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 344 Lancaster | 10/21/1996 | 2112 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 345 Irving | 10/21/1996 | 1027 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 346 Coppell | 10/21/1996 | 1030 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 347 Addison | 10/21/1996 | 1043 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 348 Irving | 10/21/1996 | 1043 | Hail | 1.50 in. | 0 | 0 | 0 | 0 |
| 349 Cedar Hill | 10/21/1996 | 1140 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 350 Dallas | 10/21/1996 | 1230 | Hail | 2.00 in. | 0 | 0 | 0 | 0 |
| 351 Irving | 10/21/1996 | 1230 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 352 Dallas | 10/21/1996 | 1240 | Hail | 1.50 in. | 0 | 0 | 0 | 0 |
| 353 Dallas | 04/22/1997 | 0358 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 354 Richardson | 06/09/1997 | 2103 | Hail | 2.00 in. | 0 | 0 | 0 | 0 |
| 355 Coppell | 06/16/1997 | 1840 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 356 Grapevine | 06/16/1997 | 1920 | Hail | 0.88 in. | 0 | 0 | 0 | 0 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 357 Grand Prairie | 06/16/1997 | 2237 | Hail | 0.88 in. | 0 | 0 | 0 | 0 |
| 358 Cedar Hill | 06/16/1997 | 2239 | Hail | 2.00 in. | 0 | 0 | 0 | 0 |
| 359 De Soto | 06/16/1997 | 2257 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 360 Duncanville | 06/16/1997 | 2324 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 361 Dallas | 12/23/1997 | 1348 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 362 Garland | 01/21/1998 | 1605 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 363 Richardson | 01/21/1998 | 1610 | Hail | 1.50 in. | 0 | 0 | 0 | 0 |
| 364 Duncanville | 03/19/1998 | 0120 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 365 Seagoville | 04/08/1998 | 0200 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 366 Garland | 04/08/1998 | 0210 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 367 Dallas | 05/02/1998 | 2117 | Hail | 2.00 in. | 0 | 0 | 0 | 0 |
| 368 Dallas | 05/02/1998 | 2117 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 369 Dallas | 05/02/1998 | 2120 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 370 Garland | 05/02/1998 | 2140 | Hail | 2.00 in. | 0 | 0 | 0 | 0 |
| 371 Carrollton | 05/08/1998 | 2111 | Hail | 0.88 in. | 0 | 0 | 0 | 0 |
| 372 East Dallas | 03/24/1999 | 2155 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 373 Cedar Hill | 05/04/1999 | 1311 | Hail | 3.00 in. | 0 | 0 | 0 | 0 |
| 374 Grand Prairie | 05/04/1999 | 1336 | Hail | 1.25 in. | 0 | 0 | 0 | 0 |
| 375 De Soto | 05/04/1999 | 1338 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 376 Dallas | 05/04/1999 | 1346 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 377 Dallas | 05/04/1999 | 1405 | Hail | 0.88 in. | 0 | 0 | 0 | 0 |
| 378 Grapevine | 05/11/1999 | 1955 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 379 Dallas | 05/17/1999 | 1550 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 380 Wilmer | 05/17/1999 | 1635 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 381 Irving | 05/17/1999 | 1135 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 382 Sachse | 05/25/1999 | 1804 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 383 Dallas | 05/25/1999 | 2100 | Hail | 1.25 in. | 0 | 0 | 0 | 0 |
| 384 Irving | 09/25/1999 | 1754 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 385 Grand Prairie | 09/25/1999 | 1819 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 386 Duncanville | 09/25/1999 | 1936 | Hail | 2.00 in. | 0 | 0 | 0 | 0 |
| 387 (rbd)redbird Arpt Da | 11/22/1999 | 1843 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 388 Dallas | 11/22/1999 | 1850 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 389 Duncanville | 02/25/2000 | 2206 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 390 East Dallas | 02/25/2000 | 2216 | Hail | 3.50 in. | 0 | 0 | 20.0M | 0 |
| 391 Garland | 02/25/2000 | 2227 | Hail | 3.75 in. | 0 | 0 | 0 | 0 |
| 392 Dallas | 03/16/2000 | 2041 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 393 Dallas | 03/16/2000 | 2056 | Hail | 1.25 in. | 0 | 0 | 0 | 0 |
| 394 Highland Park | 03/16/2000 | 2058 | Hail | 1.50 in. | 0 | 0 | 0 | 0 |
| 395 Richardson | 03/16/2000 | 2106 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 396 Irving | 03/28/2000 | 1920 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 397 Irving | 04/15/2000 | 2330 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 398 Dallas | 04/15/2000 | 2344 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 399 Seagoville | 05/02/2000 | 2125 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 400 Irving | 05/03/2000 | 1701 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 401 Duncanville | 05/03/2000 | 1729 | Hail | 1.25 in. | 0 | 0 | 0 | 0 |
| 402 Duncanville | 05/03/2000 | 1741 | Hail | 1.25 in. | 0 | 0 | 0 | 0 |
| 403 Cedar Hill | 05/03/2000 | 2220 | Hail | 3.00 in. | 0 | 0 | 0 | 0 |
| 404 Dallas | 05/27/2000 | 1642 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 405 Highland Park | 02/27/2001 | 0240 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 406 Dallas | 02/28/2001 | 1243 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 407 Richardson | 03/11/2001 | 1415 | Hail | 0.88 in. | 0 | 0 | 0 | 0 |
| 408 Cedar Hill | 05/06/2001 | 1757 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 409 Addison | 05/06/2001 | 1758 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 410 Rowlett | 05/06/2001 | 1930 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 411 Rowlett | 06/29/2001 | 1810 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 412 Garland | 06/29/2001 | 1905 | Hail | 2.00 in. | 0 | 0 | 0 | 0 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 413 Dallas | 04/16/2002 | 1745 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 414 Dallas-ft Worth Intl | 04/16/2002 | 1752 | Hail | 1.50 in. | 0 | 0 | 0 | 0 |
| 415 Dallas | 04/16/2002 | 1805 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 416 Dallas Love Fld | 04/16/2002 | 1805 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 417 Garland | 07/12/2002 | 1645 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 418 Dallas-ft Worth Intl | 04/05/2003 | 2015 | Hail | 1.75 in. | 0 | 0 | 750K | 0 |
| 419 Dallas | 04/05/2003 | 2020 | Hail | 2.75 in. | 0 | 0 | 0 | 0 |
| 420 Irving | 04/05/2003 | 2027 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 421 Dallas | 04/05/2003 | 2117 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 422 Irving | 04/05/2003 | 2120 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 423 Dallas | 04/05/2003 | 2126 | Hail | 1.50 in. | 0 | 0 | 0 | 0 |
| 424 Sachse | 04/05/2003 | 2150 | Hail | 1.25 in. | 0 | 0 | 0 | 0 |
| 425 Cedar Hill | 05/01/2003 | 1536 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 426 Cedar Hill | 05/01/2003 | 1555 | Hail | 2.00 in. | 0 | 0 | 0 | 0 |
| 427 Dallas | 05/13/2003 | 0735 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 428 Garland | 05/24/2003 | 2331 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 429 Dallas | 05/25/2003 | 0001 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 430 Dallas Love Fld | 07/10/2003 | 1943 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 431 Highland Park | 07/10/2003 | 1956 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 432 University Park | 07/10/2003 | 1958 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 433 Duncanville | 04/30/2004 | 2019 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 434 Dallas | 04/30/2004 | 2050 | Hail | 2.00 in. | 0 | 0 | 0 | 0 |
| 435 De Soto | 04/30/2004 | 2116 | Hail | 0.88 in. | 0 | 0 | 0 | 0 |
| 436 Dallas | 06/01/2004 | 2020 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 437 Garland | 06/05/2004 | 1740 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 438 Balch Springs | 06/19/2004 | 1402 | Hail | 0.88 in. | 0 | 0 | 0 | 0 |
| 439 Dallas | 07/07/2004 | 1331 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 440 Mesquite | 07/28/2004 | 1802 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 441 Mesquite | 07/28/2004 | 1905 | Hail | 1.75 in. | 0 | 0 | 0 | 0 |
| 442 Coppell | 10/30/2004 | 2220 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 443 Mesquite | 01/12/2005 | 1700 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 444 Dallas | 04/05/2005 | 1600 | Hail | 2.00 in. | 0 | 0 | 0 | 0 |
| 445 Dallas | 04/05/2005 | 1700 | Hail | 1.50 in. | 0 | 0 | 0 | 0 |
| 446 Duncanville | 04/05/2005 | 1705 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 447 Dallas | 04/05/2005 | 0522 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 448 Garland | 04/05/2005 | 0536 | Hail | 1.50 in. | 0 | 0 | 0 | 0 |
| 449 Addison | 06/05/2005 | 0512 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 450 Dallas | 07/11/2005 | 0430 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 451 Dallas | 07/15/2005 | 0420 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 452 Coppell | 09/15/2005 | 0230 | Hail | 0.75 in. | 0 | 0 | 0 | 0 |
| 453 Mesquite | 09/28/2005 | 0745 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 454 Irving | 05/29/2006 | 0110 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 455 Dallas | 07/01/2006 | 0705 | Hail | 1.00 in. | 0 | 0 | 0 | 0 |
| 456 Richardson | 04/03/2007 | 1755 | Hail | 0.75 in. | 0 | 0 | 0K | 0K |
| 457 Coppell | 04/03/2007 | 1825 | Hail | 0.88 in. | 0 | 0 | 0K | 0K |
| 458 Dallas | 04/13/2007 | 1745 | Hail | 1.75 in. | 0 | 0 | 10K | 0K |
| 459 Coppell | 05/03/2007 | 1736 | Hail | 0.75 in. | 0 | 0 | 0K | 0K |
| 460 Mesquite | 05/14/2007 | 1740 | Hail | 0.75 in. | 0 | 0 | 0K | 0K |
| 461 Dallas | 05/24/2007 | 1513 | Hail | 0.88 in. | 0 | 0 | 0K | 0K |
| 462 Grand Prairie | 06/04/2007 | 1605 | Hail | 0.75 in. | 0 | 0 | 0K | 0K |
| 463 Grand Prairie | 06/04/2007 | 1623 | Hail | 1.00 in. | 0 | 0 | 0K | 0K |
| 464 Duncanville | 02/05/2008 | 1336 | Hail | 0.75 in. | 0 | 0 | 0K | 0K |
| 465 Garland | 02/05/2008 | 1400 | Hail | 1.00 in. | 0 | 0 | 0K | 0K |
| 466 Dallas | 02/05/2008 | 1405 | Hail | 1.75 in. | 0 | 0 | 5K | 0K |
| 467 Mesquite | 02/05/2008 | 1412 | Hail | 1.75 in. | 0 | 0 | 5K | 0K |
| 468 Farmers Branch | 04/08/2008 | 2318 | Hail | 0.75 in. | 0 | 0 | 0K | 0K |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 469 Cedar Hill | 04/17/2008 | 2031 | Hail | 1.00 in. | 0 | 0 | 0K | 0K |
| 470 Coppell | 03/30/2009 | 2155 | Hail | 0.75 in. | 0 | 0 | 0K | 0K |
| 471 Gribble | 03/30/2009 | 2203 | Hail | 0.88 in. | 0 | 0 | 0K | 0K |
| 472 Addison | 03/30/2009 | 2213 | Hail | 0.75 in. | 0 | 0 | 0K | 0K |
| 473 Coppell | 05/03/2009 | 0245 | Hail | 0.75 in. | 0 | 0 | 0K | 0K |
| 474 Hutchins | 05/04/2009 | 1653 | Hail | 0.88 in. | 0 | 0 | 0K | 0K |
| 475 Farmers Branch | 06/11/2009 | 0606 | Hail | 0.88 in. | 0 | 0 | 0K | 0K |
| 476 Highland Park | 07/08/2009 | 1657 | Hail | 1.75 in. | 0 | 0 | 10K | 0K |
| 477 Dallas | 07/08/2009 | 1709 | Hail | 1.00 in. | 0 | 0 | 0K | 0K |
| 478 De Soto | 07/08/2009 | 1727 | Hail | 1.25 in. | 0 | 0 | 0K | 0K |
| 479 De Soto Carroll Arpt | 07/08/2009 | 1728 | Hail | 1.00 in. | 0 | 0 | 0K | 0K |
| 480 Garland | 07/19/2009 | 1344 | Hail | 1.75 in. | 0 | 0 | 5K | 0K |
| 481 Sachse | 07/19/2009 | 1347 | Hail | 1.00 in. | 0 | 0 | 0K | 0K |
| 482 Garland | 07/19/2009 | 1357 | Hail | 1.00 in. | 0 | 0 | 0K | 0K |
| 483 Irving | 03/10/2010 | 1023 | Hail | 1.00 in. | 0 | 0 | 0K | 0K |
| 484 Sowers | 03/10/2010 | 1023 | Hail | 1.50 in. | 0 | 0 | 0K | 0K |
| 485 Richardson | 03/10/2010 | 1045 | Hail | 0.88 in. | 0 | 0 | 0K | 0K |
| 486 Seagoville | 05/17/2010 | 1410 | Hail | 1.75 in. | 0 | 0 | 20K | 0K |
| 487 Cockrell Hill | 05/20/2010 | 1155 | Hail | 1.75 in. | 0 | 0 | 10K | 0K |
| 488 Seagoville | 05/20/2010 | 1310 | Hail | 1.00 in. | 0 | 0 | 0K | 0K |
| | | | | TOTALS: | 0 | 0 | 100.865M | 0 |

## 4.2.5 Extreme Heat

### Location

Due to the unpredictable nature of extreme heat, it is impossible to determine the exact area of their future occurrences. The entire planning area, the City of Garland, is equally subject to extreme heat. Figure

### Extent

The danger of extreme heat is gauged by using the Extreme Heat Index (Figure 4-2-5). The Heat Index, as seen below, displays the relative danger in regards to Air Temperature and Relative Humidity.

Figure 4-2-5
Extreme Heat Index

**Temperature (F)**

| Relative Humidity (%) | 80 | 82 | 84 | 86 | 88 | 90 | 92 | 94 | 96 | 98 | 100 | 102 | 104 | 106 | 108 | 110 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40 | 80 | 81 | 83 | 85 | 88 | 91 | 94 | 97 | 101 | 105 | 109 | 114 | 119 | 124 | 130 | 136 |
| 45 | 80 | 82 | 84 | 87 | 89 | 93 | 96 | 100 | 104 | 109 | 113 | 119 | 124 | 130 | 137 | |
| 50 | 81 | 83 | 85 | 88 | 91 | 95 | 99 | 103 | 108 | 113 | 117 | 124 | 131 | 137 | | |
| 55 | 81 | 84 | 86 | 89 | 93 | 97 | 101 | 106 | 112 | 117 | 124 | 130 | 137 | | | |
| 60 | 82 | 84 | 88 | 91 | 95 | 100 | 105 | 110 | 116 | 123 | 129 | 137 | | | | |
| 65 | 82 | 85 | 89 | 93 | 98 | 103 | 108 | 114 | 121 | 128 | 136 | | | | | |
| 70 | 83 | 86 | 90 | 95 | 100 | 105 | 112 | 119 | 126 | 134 | | | | | | |
| 75 | 84 | 88 | 92 | 97 | 103 | 109 | 116 | 124 | 132 | | | | | | | |
| 80 | 84 | 89 | 94 | 100 | 106 | 113 | 121 | 129 | | | | | | | | |
| 85 | 85 | 90 | 96 | 102 | 110 | 117 | 126 | 135 | | | | | | | | |
| 90 | 86 | 91 | 98 | 105 | 113 | 122 | 131 | | | | | | | | | |
| 95 | 86 | 93 | 100 | 108 | 117 | 127 | | | | | | | | | | |
| 100 | 87 | 95 | 103 | 112 | 121 | 132 | | | | | | | | | | |

Caution | Extreme Caution | Danger | Extreme Danger

*Source: http://www.nc-climate.ncsu.edu/images/climate/heat_index.jpg*

### Previous Occurrences

The following table shows previous extreme heat occurrence data according to the National Climatic Data Center reported for all of Dallas County, Texas between 10/1/1950 and 08/31/2010. All data provided by the National Climatic Data Center has been included. The belief is that hazards do not stay within jurisdictional boundaries and thus it is important to be aware of occurrences that have impacted neighboring jurisdictions to further assess the City of Garland's risks.

**19 Heat Excessive Heat event(s) were reported in Dallas County, Texas between 01/01/1950 and 08/31/2010.**

**Mag:** Magnitude **Dth:** Deaths **Inj**: Injuries **PrD:** Property Damage **CrD:** Crop Damage

| Location or County | Date | Time | Type | Mag | Dth | Inj | PrD | CrD |
|---|---|---|---|---|---|---|---|---|
| 1 County Wide | 07/01/1996 | 0000 | Excessive Heat | N/A | 2 | 0 | 0 | 0 |
| 2 County Wide | 07/19/1997 | 1800 | Excessive Heat | N/A | 2 | 0 | 0 | 0 |
| 3 County Wide | 06/01/1998 | 1300 | Excessive Heat | N/A | 2 | 0 | 0 | 0 |
| 4 County Wide | 07/01/1998 | 0000 | Excessive Heat | N/A | 32 | 0 | 0 | 0 |
| 5 County Wide | 08/03/1998 | 1600 | Excessive Heat | N/A | 5 | 0 | 0 | 0 |
| 6 County Wide | 08/01/1999 | 0000 | Excessive Heat | N/A | 3 | 0 | 0 | 0 |
| 7 County Wide | 07/01/2000 | 0000 | Excessive Heat | N/A | 8 | 0 | 0 | 0 |
| 8 County Wide | 08/01/2000 | 0000 | Excessive Heat | N/A | 5 | 0 | 0 | 0 |
| 9 County Wide | 09/01/2000 | 0000 | Excessive Heat | N/A | 5 | 0 | 0 | 0 |
| 10 County Wide | 07/14/2006 | 1000 | Excessive Heat | N/A | 1 | 0 | 0 | 0 |
| 11 County Wide | 07/27/2006 | 1500 | Excessive Heat | N/A | 1 | 0 | 0 | 0 |
| 12 County Wide | 08/10/2006 | 1200 | Excessive Heat | N/A | 0 | 0 | 0 | 0 |
| 13 County Wide | 08/13/2007 | 1000 | Excessive Heat | N/A | 1 | 0 | 0K | 0K |
| 14 County Wide | 07/23/2008 | 1500 | Excessive Heat | N/A | 1 | 0 | 0K | 0K |
| 15 County Wide | 07/28/2008 | 1500 | Excessive Heat | N/A | 2 | 0 | 0K | 0K |
| 16 County Wide | 08/01/2008 | 2000 | Excessive Heat | N/A | 4 | 0 | 0K | 0K |
| 17 County Wide | 06/23/2009 | 1700 | Excessive Heat | N/A | 1 | 0 | 0K | 0K |
| 18 County Wide | 04/29/2010 | 1230 | Excessive Heat | N/A | 0 | 0 | 0K | 0K |
| 19 County Wide | 06/20/2010 | 0000 | Excessive Heat | N/A | 1 | 0 | 0K | 0K |
| | | | | TOTALS: | 76 | 0 | 0 | 0 |

### 4.2.6 Drought

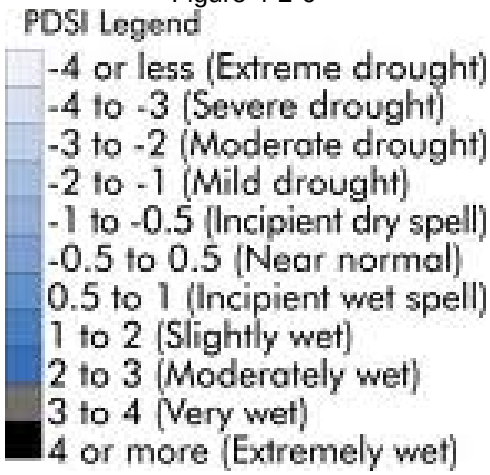
#### Location

Due to the unpredictable nature of a drought, it is impossible to determine the exact area of their future occurrences. The entire planning area, the City of Garland, is equally subject to drought.

#### Extent

The extent of drought periods is measured using the Palmer Drought Severity Index (Figure 4-2-6). The Palmer Index was developed 1965 and is primarily an index of meteorological drought, but it also takes into account hydrologic factors such as precipitation, evaporation, and soil moisture The Palmer Index is standardized to local climate, so it can be applied to any part of the country to demonstrate relative drought or rainfall conditions.

Figure 4-2-6




*Source: http://www.twdb.state.tx.us/publications/newsletters/WaterforTexas/wftsummer03/drought%20indices.htm*

#### Previous Occurrences

The following table shows previous drought occurrence data according to the National Climatic Data Center reported for all of Dallas County, Texas between 10/1/1950 and 08/31/2010. All data provided by the National Climatic Data Center has been included. The belief is that hazards do not stay within jurisdictional boundaries and thus it is important to be aware of occurrences that have impacted neighboring jurisdictions to further assess the City of Garland's risks.

**23 DROUGHT event(s) were reported in Dallas County, Texas between 01/01/1950 and 08/31/2010.**

**Mag:** Magnitude **Dth:** Deaths **Inj:** Injuries **PrD:** Property Damage **CrD:** Crop Damage

| Location or County | Date | Time | Type | Mag | Dth | Inj | PrD | CrD |
|---|---|---|---|---|---|---|---|---|
| 1 TXZ119 | 05/01/1996 | 0800 | Drought | N/A | 0 | 0 | 0 | 0 |
| 2 TXZ091>095 - 098>107 - 115>123 - 129>135 - 141>148 - 156>162 - 174>175 | 08/01/1996 | 0000 | Drought | N/A | 0 | 0 | 0 | 0 |
| 3 TXZ091>095 - 100>107 - 115>123 - 129>135 - 141>148 - 156>162 - 174>175 | 07/01/1998 | 0000 | Drought | N/A | 0 | 0 | 0 | 0K |
| 4 TXZ091>095 - 098>107 - 115>123 - 129>135 - 141>148 - 156>162 - 174>175 | 08/01/2000 | 0000 | Drought | N/A | 0 | 0 | 0 | 0 |
| 5 TXZ091>095 - 098>107 - 115>123 - 129>135 - 141>148 - 156>162 - 174>175 | 09/01/2000 | 0000 | Drought | N/A | 0 | 0 | 0 | 0 |
| 6 TXZ091>095 - 101>107 - 118>120 - 123 | 06/01/2005 | 0000 | Drought | N/A | 0 | 0 | 0 | 60.0M |
| 7 TXZ091>095 - 100>107 - 115>123 - 129>135 - 141 - 143>148 - 159 - 161 | 07/01/2005 | 0000 | Drought | N/A | 0 | 0 | 0 | 60.0M |
| 8 TXZ092>095 - 102>107 - 117>123 - 131>134 | 08/01/2005 | 0000 | Drought | N/A | 0 | 0 | 0 | 60.0M |
| 9 TXZ091>095 - 100>107 - 115>123 - 131>134 | 09/01/2005 | 0000 | Drought | N/A | 0 | 0 | 0 | 60.0M |
| 10 TXZ091>095 - 100>107 - 115>123 - 131>134 | 10/01/2005 | 0000 | Drought | N/A | 0 | 0 | 0 | 60.0M |
| 11 TXZ091>095 - 100>107 - 115>123 - 129>135 - 141>148 - 156>162 - 174>175 | 11/01/2005 | 0000 | Drought | N/A | 0 | 0 | 0 | 120.0M |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 12 TXZ091>095 - 100>107 - 115>122 - 129>135 - 141>148 - 156>162 - 174>175 | 12/01/2005 | 0000 | Drought | N/A | 0 | 0 | 0 | 120.0M |
| 13 TXZ091>095 - 100>107 - 115>123 - 129>135 - 141>148 - 156>162 - 174>175 | 01/01/2006 | 0000 | Drought | N/A | 0 | 0 | 0 | 1.0B |
| 14 TXZ091>095 - 100>107 - 115>123 - 129>135 - 141>148 - 156>162 - 174>175 | 02/01/2006 | 0000 | Drought | N/A | 0 | 0 | 0 | 300.0M |
| 15 TXZ091>095 - 100>107 - 115>123 - 129>135 - 141>148 - 156>162 - 174>175 | 03/01/2006 | 0000 | Drought | N/A | 0 | 0 | 0 | 200.0M |
| 16 TXZ091>095 - 100>107 - 115>120 - 129>134 - 141>145 - 156>157 - 159 | 04/01/2006 | 0000 | Drought | N/A | 0 | 0 | 100.0M | 0 |
| 17 TXZ091>095 - 100>107 - 115>120 - 129>134 - 141>145 - 156>157 - 159 | 05/01/2006 | 0000 | Drought | N/A | 0 | 0 | 0 | 100.0M |
| 18 TXZ092>095 - 102>107 - 116>123 - 130>135 - 143>148 - 157>162 - 174>175 | 06/06/2006 | 0000 | Drought | N/A | 0 | 0 | 0 | 100.0M |
| 19 TXZ091>095 - 100>107 - 115>123 - 129>135 - 141>148 - 156>162 - 174>175 | 07/01/2006 | 0000 | Drought | N/A | 0 | 0 | 0 | 100.0M |
| 20 TXZ091>095 - 100>107 - 115>123 - 129>135 - 141>142 - 142>148 - 157>162 - 174>175 | 08/01/2006 | 0000 | Drought | N/A | 0 | 0 | 0 | 100.0M |
| 21 TXZ091>095 - | 09/01/2006 | 0000 | Drought | N/A | 0 | 0 | 0 | 80.0M |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 100>107 - 115>123 - 129>135 - 141>148 - 156>162 - 174>175 | | | | | | | | |
| 22 TXZ091>095 - 102>107 - 117>123 - 130>135 - 144>148 - 159 | 10/01/2006 | 0000 | Drought | N/A | 0 | 0 | 500K | 500K |
| 23 TXZ091>095 - 100>107 - 115>123 - 129>135 - 141>148 - 156>162 - 174 | 11/01/2006 | 0000 | Drought | N/A | 0 | 0 | 0K | 800K |
| | | | | TOTALS: | 0 | 0 | 100.500M | 2.521B |

### 4.2.7 Windstorm

#### Location

Due to the unpredictable nature of windstorms, it is impossible to determine the exact area of their future occurrences. The entire planning area, the City of Garland, is equally subject to windstorms.

#### Extent

Figure 4-2-7 shows The Beaufort Wind Scale. The Beaufort Wind Scale is representative of the damage from high winds this community may endure. The Beaufort Wind Scale allows planners in the community to assess historical data and mitigate for future events.

Figure 4-2-3

| Beaufort Force | Speed (mph) | Wind Description - State of Sea - Effects on Land |
|---|---|---|
| 0 | Less 1 | Calm - Mirror-like - Smoke rises vertically |
| 1 | 1-3 | Light - Air Ripples look like scales; No crests of foam - Smoke drift shows direction of wind, but wind vanes do not |
| 2 | 4-7 | Light Breeze - Small but pronounced wavelets; Crests do not break - Wind vanes move; Leaves rustle; You can feel wind on the face |
| 3 | 8-12 | Gentle Breeze - Large Wavelets; Crests break; Glassy foam; A few whitecaps - Leaves and small twigs move constantly; Small, light flags are extended |
| 4 | 13-18 | Moderate Breeze - Longer waves; Whitecaps - Wind lifts dust and loose paper; Small branches move |
| 5 | 19-24 | Fresh Breeze - Moderate, long waves; Many whitecaps; Some spray - Small trees with leaves begin to move |
| 6 | 25-31 | Strong Breeze - Some large waves; Crests of white foam; Spray - Large branches move; Telegraph wires whistle; Hard to hold umbrellas |
| 7 | 32-38 | Near Gale - White foam from breaking waves blows in streaks with the wind - Whole trees move; Resistance felt walking into wind |
| 8 | 39-46 | Gale - Waves high and moderately long; Crests break into spin drift, blowing foam in well marked streaks - Twigs and small branches break off trees; Difficult to walk |
| 9 | 47-54 | Strong Gale - High waves with wave crests that tumble; Dense streaks of foam in wind; Poor visibility from spray - Slight structural damage |
| 10 | 55-63 | Storm - Very high waves with long, curling crests; Sea surface appears white from blowing foam; Heavy tumbling of sea; Poor visibility - Trees broken or uprooted; Considerable structural damage |
| 11 | 64-73 | Violent Storm - Waves high enough to hide small and medium sized ships; Sea covered with patches of white foam; Edges of wave crests blown into froth; Poor visibility - Seldom experienced inland; Considerable structural damage |
| 12 | >74 | Hurricane - Sea white with spray. Foam and spray render visibility almost non-existent - Widespread damage. Very rarely experienced on land. |

*Source: http://www.westcovina.org/images/depts/f/14f.gif*

#### Previous Occurrences

The following table shows previous windstorm occurrence data according to the National Climatic Data Center reported for all of Dallas County, Texas between 10/1/1950 and 08/31/2010. All data provided by the National Climatic Data Center has been included. The belief is that hazards do not stay within jurisdictional boundaries and thus it is

important to be aware of occurrences that have impacted neighboring jurisdictions to further assess the City of Garland's risks.

**4 HIGH WINDS** event(s) **were reported in Dallas County, Texas between 01/01/1950 and 08/31/2010.**

**Mag:** Magnitude **Dth:** Deaths **Inj:** Injuries **PrD:** Property Damage **CrD:** Crop Damage

| Location or County | Date | Time | Type | Mag | Dth | Inj | PrD | CrD |
|---|---|---|---|---|---|---|---|---|
| 1 Carrollton | 05/05/1993 | 1330 | High Winds | 0 kts. | 0 | 0 | 50K | 0 |
| 2 TXZ119 | 09/26/1996 | 1125 | High Wind | 0 kts. | 0 | 0 | 0 | 0 |
| 3 TXZ091>095 - 100 - 102>105 - 116 - 118>119 - 129 - 132 - 134>135 - 144 - 156 | 02/24/2007 | 1200 | High Wind | 50 kts. | 0 | 2 | 225K | 0K |
| 4 TXZ093 - 105 - 116 - 119 - 122 - 146 - 148 | 01/29/2008 | 1000 | High Wind | 35 kts. | 0 | 0 | 200K | 0K |
| | | | | TOTALS: | 0 | 2 | 475K | 0 |

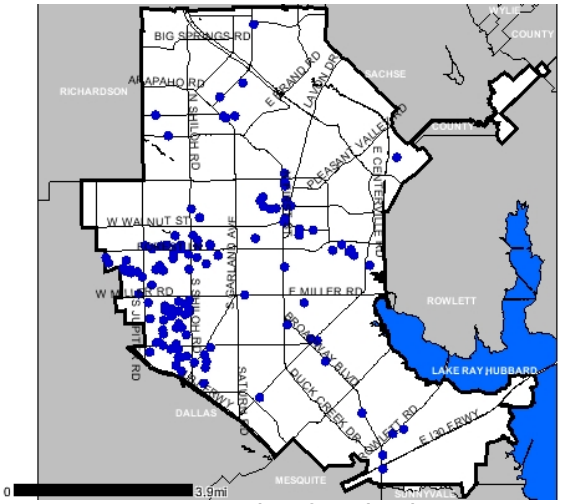
## 4.2.8 Hazardous Materials

### Location

Hazardous Materials are commonly used, transported and produced in Garland; hence hazardous materials incidents may occur as a result of natural disasters, human error or accident. Location for hazardous materials is dependent upon size, type, and location of incident. The entire jurisdiction is vulnerable to hazardous materials, however there are some regions of the City of Garland that are more prone to the hazard as they store and transport such materials.

The City of Garland has several facilities that store hazardous chemicals in reportable quantities. Figure 4-2-8-A identifies the Tier II facilities that report storage of hazardous materials in Garland.

Figure 4-2-8-A
Tier II Facilities

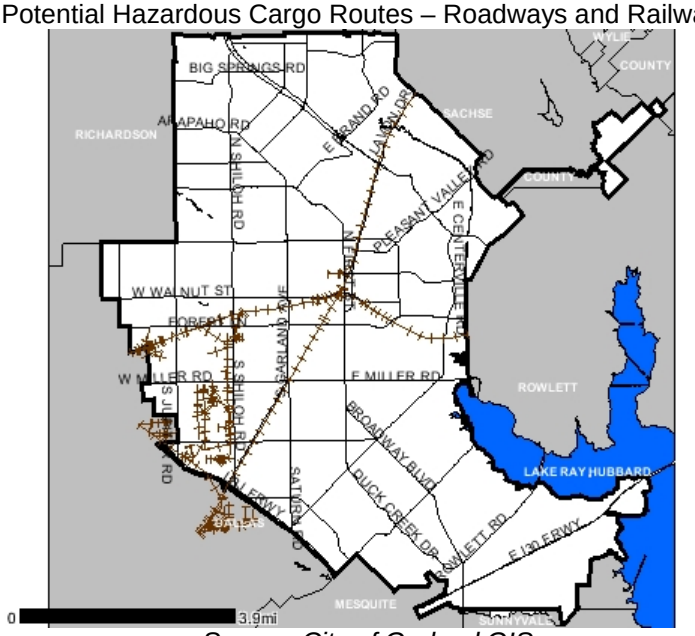



*Source: City of Garland GIS*

The existence of fixed hazardous materials facilities in Garland provide the potential for an episodic toxic air release hazard to the citizens located in the vulnerable zone of each fixed hazardous materials facility. In the event of a release, protective action recommendations in the vulnerable zone would be encouraged.

Hazardous materials are continuously being stored, handled and transported in and through the City of Garland. This presents an ever-present potential for a hazardous materials spill or accident. An accident may involve the transportation system. IH-635, which runs along the southern border of the city, has been declared a hazardous cargo route. Hazardous materials are also carried on the rail system throughout the city. Figure 4-2-8-B illustrates the major thoroughfares in Garland and their relationship to the rail system that may carry hazardous materials.

Figure 4-2-8-B
Potential Hazardous Cargo Routes – Roadways and Railways




*Source: City of Garland GIS*

## Extent

The extent of a hazardous material release will depend on whether it is from a mobile or fixed site and the size of impact. The range of intensity will vary greatly depending on the circumstances. These factors and conditions include the material, toxicity, duration of the release and environmental conditions such as the wind and precipitation.

## Previous Occurrences

The following list shows all hazardous materials incidents responded to by the City of Garland within Dallas County. Previous events data for hazardous materials have been provided by the City of Garland Health Department.

**19 HAZARDOUS MATERIALS event(s) were responded to by the City of Garland Health Department in Dallas County, Texas between 01/01/2005 and 08/31/2010.**
**Mag**: Magnitude **Dth**: Deaths **Inj**: Injuries **PrD**: Property Damage **CrD**: Crop Damage

| Location or County | Date | Time | Type | Mag | Dth | Inj | PrD | CrD |
|---|---|---|---|---|---|---|---|---|
| 1 Wylie | 11/22/2005 | N/A | Hazardous Materials | N/A | 0 | 0 | 0 | 0 |
| 2 Richland | 12/22/2005 | N/A | Hazardous Materials | N/A | 0 | 0 | 0 | 0 |
| 3 Lake Highland | 05/16/2006 | N/A | Hazardous Materials | N/A | 0 | 0 | 0 | 0 |
| 4 Rowlett | 07/14/2006 | N/A | Hazardous Materials | N/A | 0 | 0 | 0 | 0 |
| 5 University Park | 01/26/2007 | N/A | Hazardous Materials | N/A | 0 | 0 | 0 | 0 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 6 | Mesquite | 02/09/2007 | N/A | Hazardous Materials | N/A | 0 | 0 | 0 | 0 |
| 7 | Garland | 03/24/2007 | N/A | Hazardous Materials | N/A | 0 | 0 | 0 | 0 |
| 8 | Dallas | 03/26/2007 | N/A | Hazardous Materials | N/A | 0 | 0 | 0 | 0 |
| 9 | Wylie | 10/24/2007 | N/A | Hazardous Materials | N/A | 0 | 0 | 0 | 0 |
| 10 | Garland | 09/12/2008 | N/A | Hazardous Materials | N/A | 0 | 0 | 0 | 0 |
| 11 | Garland | 02/17/2009 | N/A | Hazardous Materials | N/A | 0 | 0 | 0 | 0 |
| 12 | Garland | 05/25/2009 | N/A | Hazardous Materials | N/A | 0 | 0 | 0 | 0 |
| 13 | Wylie | 06/26/2009 | N/A | Hazardous Materials | N/A | 0 | 0 | 0 | 0 |
| 14 | Garland | 11/10/2009 | N/A | Hazardous Materials | N/A | 0 | 0 | 0 | 0 |
| 15 | Sachse | 04/06/2010 | N/A | Hazardous Materials | N/A | 0 | 0 | 0 | 0 |
| 16 | Garland | 04/12/2010 | N/A | Hazardous Materials | N/A | 0 | 0 | 0 | 0 |
| 17 | Garland | 07/13/2010 | N/A | Hazardous Materials | N/A | 0 | 0 | 0 | 0 |
| 18 | Garland | 08/06/2010 | N/A | Hazardous Materials | N/A | 0 | 0 | 0 | 0 |
| 19 | Garland | 08/11/2010 | N/A | Hazardous Materials | N/A | 0 | 0 | 0 | 0 |

## 4.3 Assessing Vulnerability: Overview

The City of Garland Hazard Mitigation Team (HMT) addressed the local jurisdiction's vulnerability to each hazard identified within the Hazard Mitigation Action Plan. The level of vulnerability to each hazard is described in terms of probability of future events, summary of vulnerability, and the impact each hazard would have on the community. This data is a summary which was derived from local plans, past disaster research, and hazard profiles. Figure 4-3 contains and explanation of terms used to describe the City of Garland's vulnerability. Figure 4-4 shows all hazards, and their determined occurrence, vulnerability, impact, and extent.

Figure 4-3

| | |
|---|---|
| **Occurrence** | |
| **Highly Likely** | Probable in next year |
| **Likely** | Probable in next 3 years |
| **Occasional** | Possible in next 5 years |
| **Unlikely** | Possible in next 10 years |
| **Vulnerability** | |
| **Very High Risk** | Location includes known hazard areas; Hazard is very possible and very probable. Ability to cause Substantial or major impact. |
| **High Risk** | Location includes areas that have previously experienced impact; Hazard is possible and probable. Ability to cause substantial or major impact. |
| **Moderate Risk** | Location includes areas that have a low frequency of historical occurrences; Hazard is possible, but not probable. Expected to have a minor or limited impact. |
| **Minimal Risk** | Location includes areas with no history of occurrence; Hazard is possible, but not very probable. Expected to have a minor or limited impact. |
| **Impact** | |
| **Substantial** | Many deaths, shutdown of facilities for 30 days, 50% of properties destroyed |
| **Major** | Injuries result in permanent disability, shutdown of facilities for 2 weeks, 25% of properties destroyed |
| **Minor** | Injuries do not result in permanent disability, shutdown of facilities up to 1 week, 10% of properties destroyed |
| **Limited** | Injuries are treatable with first aid, facilities shut down 24 hours or less, less than 10% of properties destroyed |
| **Extent** | |
| **High** | Major extent, potential maximum or near the top category for the hazard (Ex. EF5 Tornado) |
| **Medium** | Medium extent, between major and minor events (Ex. EF2-EF3 Tornado) |
| **Low** | Minor extent, (Ex. EF0 Tornado) |

Figure 4-4
All Hazards Summary

| Tornado | | Flood | |
|---|---|---|---|
| Occurrence: | **Occasional** | Occurrence: | **Likely** |
| Vulnerability: | **High Risk** | Vulnerability: | **High Risk** |
| Impact: | **Major** | Impact: | **Limited** |
| Extent | **High** | Extent | **Low** |
| **Winter Storm** | | **Hailstorm** | |
| Occurrence: | **Likely** | Occurrence: | **Highly Likely** |
| Vulnerability: | **High Risk** | Vulnerability: | **High Risk** |
| Impact: | **Minor** | Impact: | **Minor** |
| Extent | **Low** | Extent | **Low** |
| **Extreme Heat** | | **Drought** | |
| Occurrence: | **Highly Likely** | Occurrence: | **Occasional** |
| Vulnerability: | **Moderate Risk** | Vulnerability: | **High Risk** |
| Impact: | **Limited** | Impact: | **Major** |
| Extent | **Medium** | Extent | **Medium** |
| **Windstorm** | | **Hazardous Materials** | |
| Occurrence: | **Likely** | Occurrence: | **Likely** |
| Vulnerability: | **Moderate Risk** | Vulnerability: | **High Risk** |
| Impact: | **Minor** | Impact: | **Minor** |
| Extent | **Medium** | Extent | **Low** |

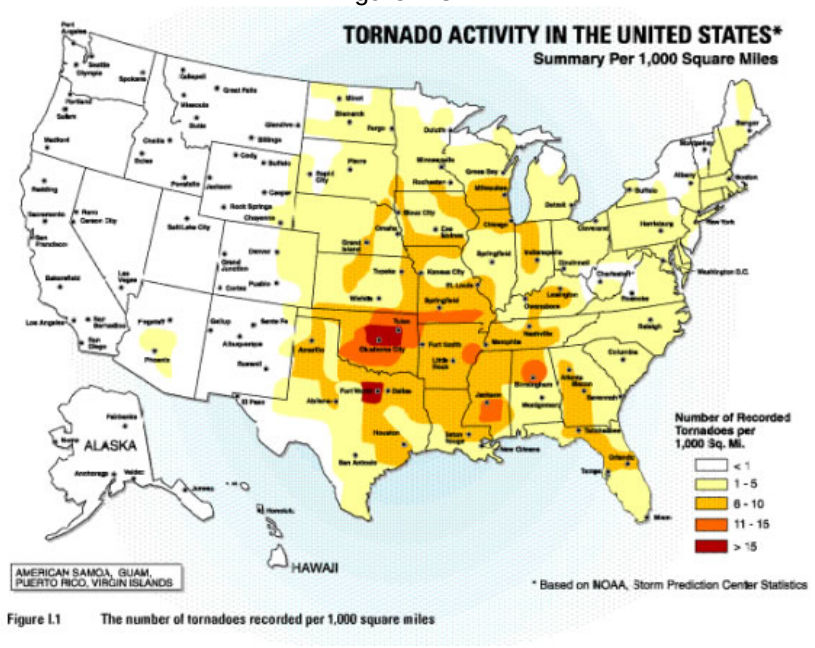
### 4.3.1 Tornado

| | |
|---|---|
| Occurrence: | **Occasional** |
| Vulnerability: | **High Risk** |
| Impact: | **Major** |
| Extent: | **High** |

#### Probability of Future Events

The City of Garland Hazard Mitigation Team has determined from historical data that the jurisdiction will occasionally be struck by a tornado event. Previous historical data shows a total of eighty three tornados have occurred within the Dallas County since 1950. The City of Garland is equally vulnerable to tornadoes throughout the entire jurisdiction. Because the City of Garland lies in "Tornado Alley", it has a high vulnerability of tornado events. According to the map below (Figure 4-3-1) developed by the Storm Prediction Center at the National Oceanic and Atmospheric Administration (NOAA), the North Central Texas area is only one of two hot spots in the entire United States where there have been more than 15 recorded tornadoes per 1,000 square miles.

Figure 4-3-1




*Source: National Oceanic and Atmospheric Administration, Storm Prediction Center*

#### Summary of Vulnerability

The summary of vulnerability to hazards has been drawn by the planning team by analyzing their previous extents, occurrences, and impacts within the local region. The

entire planning area is equally vulnerable to tornados. An incredible tornado event is capable of producing winds that can reach 300 miles per hour. Damage paths can be in excess of one mile wide and 50 miles long. The Hazard Mitigation Team has determined that the City of Garland is at high risk to tornados due to the number of previous occurrences combined with the impacts of those occurrences. The average monetary loss per tornado to strike within the planning area has cost roughly $2,000,000 each. This is considered to be a major impact.

Impact on Community/Extent Mitigated

A future event is capable of doing significant damage to the community as the city is the second largest in Dallas County with over 220,000 residents. Infrastructure within the region is also for the most part built out. This makes warning time a great concern. The large population of citizens and infrastructure would have little time to react to such an event. A tornado of medium extent (EF2-EF3) would be capable of doing great damage in such a heavily populated area.

The previously cited 83 tornado events have caused 13 deaths, 355 injuries, and an estimated $164,452,000 dollars in damage. Of those 83 tornados 21 have been a magnitude EF2-EF3 tornado with an average estimate of $6,731,000 dollars worth of damage each. The City of Garland will mitigate to the extent of an EF4 tornado, as it is expected that one will occur within the community. Previously, in 1994, an EF4 tornado struck within the neighboring community of Lancaster. This tornado caused $500,000 worth of damage.

### 4.3.2 Flood

| Occurrence: | **Likely** |
|---|---|
| Vulnerability: | **High Risk** |
| Impact: | **Limited** |
| Extent: | **Low** |

Probability of Future Events

The City of Garland is subject to flooding from Duck Creek, Rowlett Creek, Spring Creek, Mills Branch, and numerous other streams. The area is subject to intense local thunderstorms of short duration and general storms extending over periods of several days. The area is subject to intense local thunderstorms of short duration and general storms extending over periods of several days. Flooding results primarily from stream overflow caused by rainfall runoff, ponding, and sheet flow. Most of the flooding events occur in the spring and summer months. However, severe flooding can be produced by rainfall events at any time. The large amount of previous flood loss gives indication that the possibility of flooding is likely to occur again. Flood events however have been greatly reduced within the city due to a large amount of capital improvement projects. Large flooding events have not occurred since the early 1990's, however they are still

very possible given the amount of waterways surrounding and passing through the City of Garland. Historical flood data documents twenty four flood events in Dallas County since 1993, which is averaged out to be more than one flood every year.

## Summary of Vulnerability

The summary of vulnerability to hazards has been drawn by the planning team by analyzing their previous extents, occurrences, and impacts within the local region.
The principal flood problem in the City of Garland is the low-lying area adjacent to Duck Creek. Damaging flood events occurred on Duck Creek in 1949, 1957, 1962, 1966, 1969, 1971, 1977, 1981, 1989, 1990, and 1991. These floods caused considerable damage and loss of lives. The flood occurring April of 1990 was the greatest event since the flood of 1949. Damages from the flood in April of 1990 totaled approximately $7.6 million. More than 300 homes, duplexes, multi-family units and businesses were damaged. The flood in April of 1990 is the greatest flood event in Garland since homes and businesses have been constructed along Duck Creek. The April 1990 flood was estimated at about a 40-year frequency event. In April 1991, flooding damages totaled $3.5 million. More than 100 homes, duplexes, multi-family units and businesses were damaged in this flood event.

The Duck Creek watershed is approximately 96 percent developed with only a small portion of the watershed available for future development. The US Army Corps of Engineers (USACE) considers existing and future urbanization conditions to remain the same for the Duck Creek basin.

Following the flooding events of 1990 and 1991, the City of Garland partnered with the USACE to complete a channel improvement project for Duck Creek. This project was substantially complete in 1998; as a result, the base flood elevation was lowered to a level where 514 structures have the lowest floor situated above the base flood elevation. The Letter of Map Revision (LOMR) indicating this change was finalized on February 5, 2003. Since this improvement to the Duck Creek, flood events have lowered dramatically.

## Impact on Community/Extent Mitigated

A flood of the same magnitude as that of the 1991 Duck Creek flooding event would cause significantly less damage than it did in 1991. The mitigation enhancements to the city and an aggressive floodplain management program have lessened the impact a flood event would be capable of producing to the community. For this reason any flooding event within the City of Garland is expected to have a limited impact on the community. Very few homes and businesses lie within the floodplain. As previously stated in the "Summary of Vulnerability", the City of Garland has taken an aggressive approach at mitigating structures within flood prone areas. Certain areas of Duck Creek have however been measured to produce excess amounts of water in roadways after one foot of flooding. For this reason flooding for the City of Garland will continue to be mitigated at depths of one foot."

### 4.3.3 Winter Storms

| | |
|---|---|
| Occurrence: | **Likely** |
| Vulnerability: | **High Risk** |
| Impact: | **Minor** |
| Extent: | **Low** |

#### Probability of Future Events

The occurrence of winter storms within the City of Garland is a likely occurrence, in a damage producing fashion. The climate of the Dallas/Fort Worth area is classified as humid subtropical. Mild winters and hot summers best characterize the climate. The region is also considered continental with a broad annual temperature range. The average winter temperature ranges from a high of 64°F to a low of 33°F. Periods of extreme cold are typically short lived. As seen in historical data, previously shown in the plan, the region is generally subject to about two or three freezing periods per year, although very few of these are significant winter storms.

#### Summary of Vulnerability

The summary of vulnerability to hazards has been drawn by the planning team by analyzing their previous extents, occurrences, and impacts within the local region. The entire planning area is equally vulnerable to winter storms. The Garland Hazard Mitigation Team has determined that the city is at high risk of severe winter storms. The biggest concern to the planning area is maintaining power to structures, as winter weather may cause disruptions. Also a concern is the inexperience the regions citizens have preparing for and mitigating cold weather. Previous events have shown the ability for a winter storm to cause over $1,000,000 dollars. Although this has been rare, it is considered to be a major impact. In the winter storms of February 2011, for which dollar losses have not yet been determined, the City of Garland was forced to shut down some city facilities due to road conditions. This has been a determining factor in helping the planning team to determine the community to be at high risk to winter storms.

#### Impact on Community/Extent Mitigated

The City of Garland is generally unaccustomed to snow, ice, and freezing temperatures. Once in a while, cold air penetrates south across Texas into the Gulf of Mexico. Temperatures fall below freezing killing tender vegetation, such as flowering plants and the citrus fruit crop. Wet snow and ice rapidly accumulate on trees with leaves, causing the branches to snap under the load. Motorists are generally unaccustomed to driving on slick roads and accidents increase. Some buildings are poorly insulated or lack heat altogether. While snowstorms are not frequent in Texas, ice storms create dangerous driving conditions, freeze pipes, and down power lines.

The biggest concern with a winter storm in the City of Garland is the previously stated nature of citizens being unaccustomed to severe winters. This brings up safety concerns,

as some will not know how to properly deal with large amounts of snow and ice. As seen in previous data only three historical events have caused over a $1,000,000 dollars of damage to Dallas County. Compared to the infrastructure and population to the region this is a relatively small number. Only two cited historical events produced any deaths. The City will mitigate winter storms by implementing mitigation actions such as sanding of roadways and opening warming centers to the public in temperatures below freezing. We expect to experience a range of freezing temperatures from thirty-two to one degrees Fahrenheit and we will mitigate winter storms up to thirty-two degrees.

### 4.3.4 Hailstorm

| | |
|---|---|
| Occurrence: | **Highly Likely** |
| Vulnerability: | **High Risk** |
| Impact: | **Minor** |
| Extent: | **Low** |

#### Probability of Future Events

The possibility of a hail occurrence is certain to happen every year based on historical data. Since 1950 there have been 488 hail events within Dallas County, based on occurrences from the National Climatic Data Center. This is an estimated average of eight hailstorms every year within the county. Hail events are very frequent in Garland, as the North Central Texas region is frequented by severe weather in the spring through summer months.

#### Summary of Vulnerability

The summary of vulnerability to hazards has been drawn by the planning team by analyzing their previous extents, occurrences, and impacts within the local region. The entire planning area is equally vulnerable to hailstorms. In order to impact the community a hail event would have to produce large sizes of hail, which are capable of property destruction. The City of Garland is at high risk to hailstorms. Property damages from a hailstorm could be significant, should a storm produce large sized hail, over a long period of time. This is however very rare compared to how often hail is seen in the area. The average hailstorm to strike the planning area, according to previous events, has caused an estimated $205,000 dollars in damages. Because of their high occurrence relative to the average cost of each storm, the community is determined to be at high risk to hailstorms.

#### Impact on Community/Extent Mitigated

The impact of hailstorms on the City of Garland would be minor relative to their occurrence which is very frequent. The majority of damages to the community would be the result of property damages. Broken windows, damaged vehicles, and roofing of structures are all subject to damage from a severe hailstorm. The city is located in a very urbanized region making the loss of crops a minimal concern. Of the 488 hail events in Dallas County there have been zero reported deaths, according to NOAA historical data. Since 1955 Dallas County has experienced over $100,000,000 dollars lost to hailstorms. The City of Garland will attempt to mitigate any hail that is determined to be H1 or greater according to the extent scale from page 4-21 of this plan. H1 hail is defined by the extent scale as being “potentially damaging”, therefore our goal will be to eliminate the risk of any damages cause by hailstorms.

### 4.3.5 Extreme Heat

| | |
|---|---|
| Occurrence: | **Highly Likely** |
| Vulnerability: | **Moderate Risk** |
| Impact: | **Limited** |
| Extent: | **Medium** |

#### Probability of Future Events

It is highly likely that the City of Garland will see extreme heat events every year. Temperatures remain warm throughout the summer months, and are relatively warmer throughout the year than other areas of the country. The occurrence of extreme heat events is highly likely within the area given the humidity levels and high summer temperatures. Since 1996 there have been 19 reported occurrences of excessive heat, and an average of more than one event every year.

#### Summary of Vulnerability

The summary of vulnerability to hazards has been drawn by the planning team by analyzing their previous extents, occurrences, and impacts within the local region. The entire planning area is equally vulnerable to extreme heat events. The community is of moderate risk to an extreme heat event. Although heat events are very common to the area, they cause little damage to structures. The main concern with an extreme heat event is that it leads to other hazards, such as drought and dust storms. The City of Garland is accustomed to long periods of hot weather, as local summer temperatures often reach one hundred degrees or more. Structure damage from extreme heat is not likely. The most vulnerable structures to extreme heat are underground water pipes, vulnerable to rupture, and city streets which may be damaged under heat stress. The impact of excessive heat has been determined to be limited as monetary losses due to heat are unavailable. Most of the financial impact of excessive heat is attributed to droughts which tend to occur simultaneously.

#### Impact on Community/Extent Mitigated

The major human risks associated with severe summer heat include heatstroke, heat exhaustion, heat syncope, and heat cramps. Most at risk are outdoor laborers, the elderly, children, and people in poor physical health. The effects of severe summer heat are always more pronounced in urbanized areas than in rural areas. Within the urbanized area of North Central Texas, including the City of Garland, the problem is exacerbated by what is known as the heat island effect. The concrete and metal infrastructure absorbs radiant heat energy from the sun during the day and radiates that heat energy during the night. This cyclical process essentially “traps” the heat in the urbanized area and makes it as much as 10°F warmer than the surrounding land. Since 1996 there have been over seventy deaths from excessive heat in Dallas County. The City of Garland will continue to mitigate to any level of heat that requires at least a caution warning, as outlined by the extent scale on page 4-40, which can be as low as temperatures of eighty degrees

combined with as little as 40% relative humidity. This will be done by establishing future mitigation projects to mitigate such hazards along with continuing already outlined policies such as: cooling centers, monitoring of streets by city personnel, and providing water to city employees who are required to work outside.

### 4.3.6 Drought

| | |
|---|---|
| Occurrence: | **Occasional** |
| Vulnerability: | **High Risk** |
| Impact: | **Major** |
| Extent: | **Medium** |

#### Probability of Future Events

Based on historical data the City of Garland Hazard Mitigation team has determined Garland is subject to occasional drought events. Drought events are not expected to occur every year, but are prevalent enough to be of a concern to planners. They have been deemed as an occasional threat to the jurisdiction.

#### Summary of Vulnerability

The summary of vulnerability to hazards has been drawn by the planning team by analyzing their previous extents, occurrences, and impacts within the local region. The entire planning area is equally vulnerable to drought. Drought is of high risk to the community, as it is an capable of having a major impact on the city due to the small amount of crops which tend to be the largest monetary setbacks to drought. Since 1996 droughts have cause over $100,000,000 dollars in structural damage. A strict water conservation program goes into effect within the City of Garland as soon as signs of drought are viewed as a possibility making the community much safer to the effects of drought.

#### Impact on Community/Extent Mitigated

The impact of a drought within the City of Garland is expected to be of major impact. The major damages associated with droughts are typically on crops and livestock; however Garland is a more urbanized area. The city contains very little agricultural land or livestock to cause major agricultural disruptions due to these types of losses. For Garland, the financial burden of droughts is on structures. The primary causes for structural damage associated with drought are foundation issues and soil degradation resulting in structural repairs. Since 1996 droughts have cause over $100,000,000 dollars in structural damage. The extent of a drought in the Garland area is expected to be moderate, considering the severity of previous occurrences. Page 4-42 of this plan outlines the extent scale for determining the severity of drought conditions. The City will mitigate to any conditions that are considered to be of mild drought extents by enforcing water restrictions and water conservation policies. Mild droughts, as defined by Figure 4-2-6, are considered to be with a PDSI of -2 to -1.

### 4.3.7 Windstorm

| | |
|---|---|
| Occurrence: | **Likely** |
| Vulnerability: | **Moderate Risk** |
| Impact: | **Minor** |
| Extent: | **Medium** |

#### Probability of Future Events

The Hazard Mitigation Team expects that it is likely for the City of Garland will be affected by windstorms. Between 1996 and 2010 there were four high wind events documented by the National Climatic Data Center. This translates to an event approximately every three and a half years.

#### Summary of Vulnerability

The summary of vulnerability to hazards has been drawn by the planning team by analyzing their previous extents, occurrences, and impacts within the local region. The entire planning area is equally vulnerable to windstorms. The likely nature of a wind event is a concern, yet the expectation for a limited impact gives planners the determination that the City of Garland is at moderate risk to windstorms. The most damaging wind event, according to previous occurrences, cost $225,000 dollars in damages. This is considered to be a minor impact.

#### Impact on Community/Extent Mitigated

Based on previous occurrences the average cost for all wind events has been $118,750 dollars per event. The surrounding region has experienced one windstorm of a “Beaufort Force 9” on The Beaufort Wind Scale. This wind event was estimated to be a 50 knot wind, which cost $225,000 dollars and resulted in two injuries. For this reason the planning team expects a windstorm to have a minor impact on the community, and will mitigate to a “Beaufort Force 9” level of wind.

### 4.3.8 Hazardous Materials

| | |
|---|---|
| Occurrence: | **Likely** |
| Vulnerability: | **High Risk** |
| Impact: | **Minor** |
| Extent: | **Low** |

#### Probability of Future Events

Occurrence of future hazardous materials events is likely, as the City of Garland Department of Health responds to multiple events every year. Since 2005 the Health Department has responded to nineteen hazardous materials incidents within Dallas County, with nine of these occurring in the City of Garland. The same amount of events is expected to continue for the City of Garland. The amounts of facilities containing hazardous materials within the City of Garland (Figure 4-2-A) also give reason to expect future incidents.

#### Summary of Vulnerability

The summary of vulnerability to hazards has been drawn by the planning team by analyzing their previous extents, occurrences, and impacts within the local region. Because of the frequency of events and the potential economic impact it has been determined that the City of Garland is at high risk to hazardous materials events.

#### Impact on Community/Extent Mitigated

Based on available information the City of Garland Hazard Mitigation Team has determined the impact of hazardous materials events to the jurisdiction to be minor. The major concern of impact concerning hazardous materials events to the City of Garland is the economy. The amount of cargo routes within the jurisdiction, and facilities housing hazardous materials give the community a greater chance of being adversely impacted by a hazardous materials event. The City of Garland has many businesses which rely on hazardous materials in order to stay profitable, directly affecting the shape of the local economy. The extent to which the release of hazardous materials will be mitigated will vary by substance. First responders with the City of Garland Health and Fire Departments will respond to hazardous materials events in accordance with the "Emergency Response Guidebook". This book established guidelines for potential hazards of various hazardous materials, public safety of hazardous materials, and emergency response guidance for these materials. Extreme caution will also be taken by Fire Department personnel to inspect and enforce regulations on facilities that process and materials that could be hazardous to the public or the environment.

## 4.4 Assessing Vulnerability: Addressing Repetitive Loss Properties

The Federal Emergency Management Agency (FEMA) produces statistics on community flood losses. Losses are determined by claims made to the National Flood Insurance Program (NFIP). The following section is an assessment of claims to the NFIP, and properties within the City of Garland which are designated as repetitive loss structures.

### 4.4.1 National Flood Insurance Program Overview

NFIP Summary

Nearly 20,000 communities across the United States and its territories participate in the NFIP by adopting and enforcing floodplain management ordinances. In exchange, the NFIP makes federally backed flood insurance available to homeowners, renters, and business owners in these communities. Participation in the NFIP is voluntary.

Flood insurance is designed to provide an alternative to disaster assistance to reduce the costs of repairing damage to buildings and their contents caused by floods. Flood damage is reduced by nearly $1 billion a year through communities implementing sound floodplain management requirements and property owners purchasing of flood insurance. Additionally, buildings constructed in compliance with NFIP building standards suffer approximately 80 percent less damage annually than those not built in compliance.

Local Participation in the NFIP

The City of Garland enrolled in the NFIP Emergency Program on August 8, 1970 and the Regular Program on April 16, 1971, based on TCEQ records. As of September, 2010 the City of Garland had 503 active flood insurance polices within the community. Between January 1, 1978 and November 30, 2010 the City of Garland has had 368 total flood losses, valued at roughly $6.5 million dollars worth of damage. Figure 4-4-1 shows all flood losses for the City of Garland. The City of Garland will continue to comply with the NFIP by implementing mitigation projects that reduce flooding within the local community. Such actions as outlined in this plan, beginning on page 5-4 include: stream and channel improvements (Stream 2C3 and Channel 2C4) by widening of the channel, Keen Branch Channel improvements, and improvements to drainage and storm sewer system as outlined by Flooding Action #3 to increase drainage capacity of the Country Club Estates Storm Sewer.

Figure 4-4-1

| Federal Emergency Management Agency Loss Statistics from Jan 1, 1978 through 11/30/2010 | | | | | |
|---|---|---|---|---|---|
| Community | Total Losses | Closed Losses | Open Losses | CWOP Losses | **Total Payments** |
| **City of Garland** | **368** | **305** | **0** | **63** | **6,507,602.73** |

*Source: http://bsa.nfipstat.com/reports/1040.htm*

FEMA has published Flood Insurance Rate Maps (FIRMs) graphically showing the extents of approximately 2,400 acres of 100-year floodplains primarily along Duck Creek, Rowlett Creek, Spring Creek, and their tributaries. The 100-year floodplain (also

called the Special Flood Hazard Area (SFHA)) is the area projected to be inundated by a flood that has a one percent (1%) chance of occurring in any given 12 month period. Most of the floodplain properties along the major creeks are dedicated for conveying floodwaters and preserving wildlife habitat areas. Passive recreational and park uses are encouraged while encroachments and obstructions are prohibited.

The City of Garland participates in the NFIP's Community Ratings System (CRS). According to FEMA the CRS "is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements". CRS takes into account a City's actions to reduce flood losses, facilitate insurance ratings, and promote awareness of flood insurance in order to establish discounted flood insurance rates within the community. The City of Garland is considered a class 7 CRS community, which results in a 15% discount on flood insurance.

### Repetitive Loss Properties

The National Flood Insurance Reform Act of 2004 recognized repetitive loss as a significant problem and defined severe repetitive loss as:

- Four or more paid flood losses of more than $1,000 each; or
- Two paid flood losses within a 10-year period that, in the aggregate, equal or exceed the current value of the insured property; or
- Three or more paid losses that, in the aggregate, equal or exceed the current value of the insured property.

Figure 4-4-2 provides a summary of residential and commercial repetitive flood insurance claims for individual streets in Garland that include repetitive loss properties. Address data about individual sites is omitted for reasons of confidentiality. The loss history includes all flood claims paid on an insured property, regardless of any change of ownership, since the building's construction or back to 1978 if the building was constructed prior to 1978. The history includes the number of repetitive loss properties on each street, average total amount paid to each structure, date of the last loss, and the average estimated structure value (Dallas Central Appraisal District 01/27/2010). Only two of these structures have been commercial properties. Both of the commercial properties are on the same street, and have combined for a total of 16 flood losses.

Following the flooding events of 1990 and 1991, the City of Garland partnered with the USACE to complete a channel improvement project for Duck Creek. This project was substantially complete in 1998; as a result, the base flood elevation was lowered to a level where 514 structures have the lowest floor situated above the base flood elevation. The Letter of Map Revision (LOMR) indicating this change was finalized on February 5, 2003.

Figure 4-4-2
City of Garland Repetitive Loss Properties

| Street Name | Number of Properties with Losses | Total Number of Losses | Date of Last Loss | Average Amount Paid Per Structure | Average Structure Value |
|---|---|---|---|---|---|
| Glenbrook DR | 24 | 78 | 9/10/2007 | $105,223.88 | $146,544.81 |
| Ridgedale DR | 13 | 32 | 3/19/2006 | $81,330.96 | $156,344.29 |
| Forest LN | 3 | 7 | 10/21/1994 | $57,938.14 | $269,333.33 |
| Rock Creek | 3 | 6 | 4/12/1991 | $35,177.48 | $138,866.67 |
| Ranier Cir | 3 | 6 | 4/11/1991 | $34,047.75 | $108,573.33 |
| *Pleasant Valley RD | 2 | 16 | 3/18/2008 | $218,739.30 | $71,160.00 |
| University DR | 2 | 5 | 4/12/1991 | $10,848.80 | $145,610.00 |
| Frances DR | 1 | 2 | 4/11/1991 | $25,616.67 | $96,580.00 |
| ST George | 1 | 2 | 4/15/1990 | $5,721.97 | $98,730.00 |
| W Centerville RD | 1 | 4 | 6/11/2000 | $30,761.74 | $140,500.00 |
| Iriquois | 1 | 2 | 5/5/1995 | $7,233.95 | $119,590.00 |
| Carroll DR | 1 | 5 | 6/21/2000 | $51,770.75 | $234,170.00 |
| Brookview | 1 | 2 | 4/11/1991 | $16,393.64 | $67,000.00 |

*Source: FEMA – Garland Repetitive Loss Properties 08-31-2009*
**Indicates Commercial Property*

## 5.1 Local Hazard Mitigation Goals and Objectives

The City of Garland has identified several mitigation goals to help direct mitigation planning efforts within the community. These goals identify areas to which specific mitigation actions should be directed. They were developed to reduce or avoid vulnerabilities to identified hazards. Implementation of the following goals and objectives will help the community to reduce or eliminate the loss of life and property from a variety of hazards.

### 5.1.1 Protect Public Health and Safety

Objectives:

- Increase the capabilities of warning citizens of imminent hazards.
- Ensure that local shelters are adequate and efficient to house disaster victims.
- Reduce amount of first response calls though mitigation activities.

### 5.1.2 Protect New and Existing Structures

Objectives:

- Ensure National Flood Insurance Program compliance, and create more aggressive floodplain mitigation tactics.
- Reduce the amount of repetitive loss properties in the community.
- Implement training activities and regulations that provide the community with more resilient infrastructure.
- Improve mitigation activities at local government facilities and efficiency of departments in hazardous situations.

### 5.1.3 Heighten Public Awareness and Support for Hazard Mitigation

Objectives:

- Implement strategies for the public to apply mitigation within their own household.
- Encourage public involvement in the emergency management process.
- Continue to assess and understand hazards to the community.

## 5.2 Identification, Analysis, and Implementation of Mitigation Actions

The City of Garland Hazard Mitigation Team identified the following mitigation actions in order to reduce the impact of local hazards. Each mitigation action was developed in conjunction with local mitigation goals and objectives. The mitigation actions identified below are organized by hazard. The actions are described along with the benefits of each action, the estimated cost, the organization responsible for completing the action, effect on new and existing structures, timeline, and the potential funding sources.

### 5.2.1 Tornado and Windstorm Combined Mitigation Actions

| ***Tornado/Windstorm Action #1*** |
|---|
| **Title: Implementation of the "Texas Individual Saferoom Rebate Program"**<br>**Description:**<br>• **The "Texas Individual Saferoom Rebate Program" will reimburse a homeowner or developer for ½ of the cost to install an individual saferoom in an existing or planned home, up to a cap of $3,000. Individuals may not apply directly to the State; their city or county must apply for funds on their behalf.**<br>**Hazard(s) Addressed: Tornado/Windstorm**<br>**Goals and objectives addressed: 5.1.1, 5.1.2, and 5.1.3**<br>**Lead Office: Emergency Management**<br>**Funding Source(s): Hazard Mitigation Grant Program (HMGP) or Pre-Disaster Mitigation (PDM)**<br>**Effect on New Structures: Improved safety for new structures participating in the program**<br>**Effect on Existing Structures: Improved safety for existing structures participating in the program**<br>**Timeline for Completion: To be determined upon receipt of funding**<br>**Costs (Estimated): ½ of the cost to install an individual saferoom in an existing or planned home, up to a cap of $3,000** |
| **Cost Effectiveness: Implementation of this program would save lives in the event of a tornado. The amount of lives saved would increase with the amount of participating citizens** |

| *Tornado/Windstorm Action #2* |
|---|
| **Title: Building Code Monitoring and Assessment**<br>**Description:**<br>• **Mitigate wind related hazards by adopting and implementing new building codes which in order to enhance tornado and wind resistance of structures within the community**<br>**Hazard(s) Addressed: Windstorm and Tornado**<br>**Goals and objectives addressed: 5.1.1 and 5.1.2**<br>**Lead Office: Building Inspections**<br>**Funding Source(s): General Fund**<br>**Effect on New Structures: New structures would be less vulnerable to windstorms and tornados**<br>**Effect on Existing Structures: Existing structures would be less vulnerable to windstorms and tornados**<br>**Timeline for Completion: Ongoing**<br>**Costs (Estimated): Staff Time** |
| **Cost Effectiveness: The City of Garland would limit reconstruction costs at a low price, by implementing more strict building codes** |

| *Tornado/Windstorm Action #3* |
|---|
| Title: **All-Hazards NOAA Weather Radio Distribution**<br>Description:<br>• **Purchase of cache of All-Hazards NOAA Weather Radios and accessories to accommodate those with functional access needs to be distributed to the most vulnerable populations to allow those citizens to receive timely alerts about potentially dangerous winds in time to seek shelter.**<br>Hazard(s) Addressed: **Tornado/Windstorm, Flooding, Hailstorm, Hazardous Materials**<br>Goals and objectives addressed: **5.1.1 and 5.1.3**<br>Lead Office: **Office of Emergency Management**<br>Funding Source(s): **General budget funds; Mitigation grant funding**<br>Effect on New Structures: **None**<br>Effect on Existing Structures: **None**<br>Timeline for Completion: **Within 6 months of funding**<br>Costs (Estimated): **$50,000** |
| Cost Effectiveness: **The City of Garland would reduce the amount of lives lost due to severe weather along with property as citizens would have advanced warning to take protective actions** |

## 5.2.2 Flooding Mitigation Actions

| *Flooding Action #1* |
|---|
| **Title: Increased Flood Hazard Warning Capabilities**<br>**Description:**<br>• **Installation of approximately eight flood sirens and sensors at strategic locations along Duck Creek to warn citizens in the event of a serious flood incident, allowing evacuation from homes and businesses.**<br>• **Volunteer emergency response teams would be able to block roads that are flooded; preventing citizens from driving through hazardous areas.**<br>• **This system could be expanded to other locations of the city as conditions warrant.**<br>**Hazard(s) Addressed: Flooding**<br>**Goals and objectives addressed: 5.1.1 and 5.1.2**<br>**Lead Office: Engineering**<br>**Funding Source(s): Mitigation grant funding**<br>**Effect on New Structures: New structures built along Duck Creek would have ample warning to prepare for a flood event.**<br>**Effect on Existing Structures: Existing structures built along Duck Creek would have ample warning to prepare for a flood event.**<br>**Timeline for Completion: Within 6 months of receiving funding.**<br>**Costs (Estimated): $100,000** |
| **Cost Effectiveness: Home and business owners would save money on flood losses** |

| *Flooding Action # 2 (NFIP)* |
|---|
| **Title: Stream 2C3 and 2C4 Channel Improvements**<br>**Description:**<br>• **Improvements/widening of the channels of streams 2C3 and 2C4 in Garland to reduce flooding risks to residents and businesses along said streams.**<br>**Hazard(s) Addressed: Flooding**<br>**Goals and objectives addressed: 5.1.1 and 5.1.2**<br>**Lead Office: Engineering**<br>**Funding Source(s): To be proposed in a future budget; Mitigation grant funding**<br>**Effect on New Structures: Flood losses would be reduced in any new structures along the stream.**<br>**Effect on Existing Structures: Flood losses would be reduced in any existing structures along the stream.**<br>**Timeline for Completion: To be determined upon receipt of funding.**<br>**Costs (Estimated): $9,207,500.00** |
| **Cost Effectiveness: Homeowners along affected stream would save money on flood insurance premiums and possibly see an improvement in property values. Less insurance payments would be required under NFIP.** |

| *Flooding Action # 3(NFIP)* |
|---|
| **Title: Country Club Estates Storm Sewer Improvements**<br>**Description:**<br>• **Storm sewer and channel improvements to increase their drainage capacity**<br>**Hazard(s) Addressed: Flooding**<br>**Goals and objectives addressed: 5.1.1 and 5.1.2**<br>**Lead Office: Engineering**<br>**Funding Source(s): To be proposed in a future budget; Mitigation grant funding**<br>**Effect on New Structures: Elimination of some known cases of homes that are subject to Code "A" internal flooding; also, reduction of Code "C" bank erosion in new structures built in the Country Club Estates neighborhood.**<br>**Effect on Existing Structures: Elimination of some known cases of homes that are subject to Code "A" internal flooding; also, reduction of Code "C" bank erosion in existing structures in the Country Club Estates neighborhood.**<br>**Timeline for Completion: To be determined upon receipt of funding.**<br>**Costs (Estimated): $1,122,500.00** |
| **Cost Effectiveness: Homeowners in the Country Club Estates neighborhood would see a reduction or elimination of flood loss. Garland would reduce money spent on bank erosion repairs.** |

| *Flooding Action #4 (NFIP)* |
|---|
| **Title: Keen Branch Channel Improvements**<br>**Description:**<br>• **Channelization improvements to Keen Branch**<br>**Hazard(s) Addressed: Flooding**<br>**Goals and objectives addressed: 5.1.1 and 5.1.2**<br>**Lead Office: Engineering**<br>**Funding Source(s): To be proposed in a future budget; Mitigation grant funding**<br>**Effect on New Structures: New structures built along Keen Branch would be less vulnerable to flood hazards**<br>**Effect on Existing Structures: Existing structures along Keen Branch would be less vulnerable to flood hazards**<br>**Timeline for Completion: To be determined upon receipt of funding**<br>**Costs (Estimated): $7,073,750.00** |
| **Cost Effectiveness: Project would reduce flood claims to residential flood losses in structures along Keen Branch** |

### 5.2.3 Winter Storm Mitigation Actions

| *Winter Storm Action #1* |
|---|
| **Title: Recreation Center Generators**<br>**Description:**<br>• **Attainment of generators at all city recreation centers in order to provide more resilient warming centers in winter weather conditions**<br>• **Power loss is often one of the results of winter storms; generators would maintain energy for these facilities, which these city uses as local warming centers and community shelters**<br>**Hazard(s) Addressed: Winter Storms**<br>**Goals and objectives addressed: 5.1.1 and 5.1.2**<br>**Lead Office: Parks and Recreation**<br>**Funding Source(s): Mitigation grant funding**<br>**Effect on New Structures: None**<br>**Effect on Existing Structures: Existing recreation centers will have power backup to serve as more sustainable warming centers and shelters to local citizens**<br>**Timeline for Completion: To be determined upon receipt of funding**<br>**Costs (Estimated): $10,000.00** |
| **Cost Effectiveness: Generators at the community recreation centers would provide more sustainable warming centers and shelters for citizens and result in lives saved, as people will have a safe place to stay out of the freezing weather. The city will save money by sending less first responders on calls related to winter storms** |

| *Winter Storm Action #2* |
|---|
| **Title: Fleet Services Continuity of Operations**<br>**Description:**<br>• **Acquisition of generators at the two main City of Garland fuel sources, 2343 Forest LN and Gasoline Alley, and a new mobile fuel truck for emergency operations**<br>• **Generators and a new fuel truck would ensure continuity of operations in a winter storm event as fuel would remain available to city vehicles**<br>**Hazard(s) Addressed: Winter Storm**<br>**Goals and objectives addressed: 5.1.2**<br>**Lead Office: Fleet Services**<br>**Funding Source(s): Mitigation grant funding**<br>**Effect on New Structures: New structures would have improved capabilities and continuity of operations due to fuel accessibility**<br>**Effect on Existing Structures: Existing structures would have improved capabilities and continuity of operations due to fuel accessibility**<br>**Timeline for Completion: To be determined upon receipt of funding**<br>**Costs (Estimated): $45,000.00** |
| **Cost Effectiveness: The City of Garland would save money in time lost as Fleet** |

| |
|---|
| **services would be able to maintain operations throughout all city departments. First responders would more effectively respond to the hazard, which would also minimize time lost to winter storm occurrences** |

| *Winter Storm Action #3* |
|---|
| Title: **Establishment of Local Cooling and Warming Centers**<br>Description:<br>• **Enacting a local policy that will pre-determine local facilities such as recreation centers as areas where the public can go to avoid winter storms and extreme heat**<br>Hazard(s) Addressed: **Winter Storm and Extreme Heat**<br>Goals and objectives addressed: **5.1.1**<br>Lead Office: **Parks and Recreation**<br>Funding Source(s): **General Funds**<br>Effect on New Structures: **None**<br>Effect on Existing Structures: **None**<br>Timeline for Completion: **Within 6 months**<br>Costs (Estimated): **Staff time** |
| Cost Effectiveness: **The project would be cost effective, as it will result in less deaths by providing shelter from hazards to citizens** |

| *Winter Storm Action #4* |
|---|
| Title: **Extreme Temperature Outreach**<br>Description:<br>• **Develop and implement an outreach campaign aimed at vulnerable populations during extreme temperatures**<br>Hazard(s) Addressed: **Winter Storm and Extreme Heat**<br>Goals and objectives addressed: **5.1.1. and 5.1.3**<br>Lead Office: **Emergency Management**<br>Funding Source(s): **Mitigation grants and general funds**<br>Effect on New Structures: **None**<br>Effect on Existing Structures: **None**<br>Timeline for Completion: **Within 6 months of funding**<br>Costs (Estimated): **$5000 for cost of supplies and staff time required for campaign** |
| Cost Effectiveness: **Local citizens would be encouraged to implement mitigation techniques which would increase the amount of money saved in extreme temperatures. This project would also be effective in saving lives of those vulnerable to extreme temperatures.** |

### 5.2.4 Hailstorm Mitigation Actions

| *Hailstorm Action #1* |
|---|
| **Title: All Hazards National Weather Radio**<br>**Description:**<br>• **Distribute All Hazards Nation Weather Service Radios to all city facilities**<br>**Hazard(s) Addressed: All Hazards with Emphasis on Hail and Severe Weather**<br>**Goals and objectives addressed: 5.1.1 and 5.1.3**<br>**Lead Office: Emergency Management**<br>**Funding Source(s): General Fund**<br>**Effect on New Structures: None**<br>**Effect on Existing Structures: None**<br>**Timeline for Completion: 2012**<br>**Costs (Estimated): $2,295.00 for 100** |
| **Cost Effectiveness: The project would be cost effective, as it will result in less deaths due to having better warning for disasters** |

| *Hailstorm Action #2* |
|---|
| **Title: Hailstorm Public Awareness Campaign**<br>**Description:**<br>• **Increase public awareness for the amount of damage caused by hailstorms and how citizens can better mitigate their homes from this hazard thru the use of appropriate roofing and building supplies, insurance, and personal preparation.**<br>**Hazard(s) Addressed: Hailstorms**<br>**Goals and objectives addressed: 5.1.1 and 5.1.3**<br>**Lead Office: Emergency Management**<br>**Funding Source(s): General Fund**<br>**Effect on New Structures: Citizens would be encouraged to develop new structures that are more sustainable un the event of a hailstorm**<br>**Effect on Existing Structures: Citizens would be encouraged to ensure that existing structures that are more sustainable un the event of a hailstorm**<br>**Timeline for Completion: 2013**<br>**Costs (Estimated): $2500.00** |
| **Cost Effectiveness: This project would be very cost effective as citizens would be informed to preform hailstorm mitigation techniques at little cost to the local government.** |

| *Hailstorm Action #3* |
|---|
| Title: **Outdoor Warning System**<br>Description:<br>• **Installation of an audible, outdoor warning system throughout the City of Garland that provides early warning to residents to seek shelter immediately due to an impending threat**<br>Hazard(s) Addressed: **Tornado, Flooding, Hailstorm, Hazardous Materials**<br>Goals and objectives addressed: **5.1.1 and 5.1.3**<br>Lead Office: **Telecommunications**<br>Funding Source(s): **Capital Improvement Project funding; Mitigation grant funding**<br>Effect on New Structures: **None**<br>Effect on Existing Structures: **None**<br>Timeline for Completion: **Within one year of funding**<br>Costs (Estimated): **$1,200,000** |
| Cost Effectiveness: **The City of Garland would reduce the amount of lives lost due to severe weather along with property as citizens would have advanced warning to take protective actions** |

### 5.2.5 Extreme Heat Mitigation Actions

| ***Extreme Heat Action #1*** |
|---|
| **Title: Misting Stations at Local Recreation Centers**<br>**Description:**<br>• **Purchase and installation of six outdoor misting stations, one for each community recreation center.**<br>• **Each misting station is composed of six, 30" oscillating fans. These fans are mounted to the top of building walls.**<br>**Hazard(s) Addressed: Extreme Heat**<br>**Goals and objectives addressed: 5.1.1**<br>**Lead Office: Parks and Recreation**<br>**Funding Source(s): General fund; Mitigation grant funding**<br>**Effect on New Structures: None**<br>**Effect on Existing Structures: None**<br>**Timeline for Completion: To be determined upon receipt of funding**<br>**Costs (Estimated): $5,475.00 Each; $32,850.00 Total** |
| **Cost Effectiveness: Misting stations would be the protect citizens from extreme heat events. Fewer lives would be lost to the heat, and there would be decreases in medical runs pertaining to heat hazards.** |

| *Extreme Heat Action # 2* |
|---|
| **Title: Extreme Heat Preparedness Campaign**<br>**Description:**<br>• **Implement an aggressive public awareness campaign concerning extreme heat and how to mitigate heat within the household**<br>**Hazard(s) Addressed: Extreme Heat**<br>**Goals and objectives addressed: 5.1.3**<br>**Lead Office: Emergency Management**<br>**Funding Source(s): General Fund**<br>**Effect on New Structures: Campaign could impact new structures by providing more heat resistant homes within the community**<br>**Effect on Existing Structures: Campaign could impact existing structures by providing more heat resistant homes within the community**<br>**Timeline for Completion: 2012**<br>**Costs (Estimated): Staff Time** |
| **Cost Effectiveness: Helping the public to mitigate heat within their household would result in fewer deaths do to heat hazards, and money saved on responses to health issues related to extreme heat** |

| *Extreme Heat Action #3* |
|---|
| Title: **Air Conditioner Purchase Rebate Program**<br>Description:<br>• **Establishment of a program that will provide a rebate to local citizens who purchase an A/C system within their home if they did not previously have a working system**<br>Hazard(s) Addressed: **Extreme Heat**<br>Goals and objectives addressed: **5.1.1 and 5.1.3**<br>Lead Office: **Emergency Management**<br>Funding Source(s): **Mitigation grant funds**<br>Effect on New Structures: **None**<br>Effect on Existing Structures: **None**<br>Timeline for Completion: **To be determined upon receipt of funding**<br>Costs (Estimated): **The cost of paying rebates which would be a pre-determined percentage of the cost to the purchaser** |
| Cost Effectiveness: **This project would save lives that could potentially be lost due to extreme heat hazards.** |

5.2.6 Drought Mitigation Actions

| *Drought Action #1* |
| --- |
| **Title: West Pressure Plan Improvements**<br>**Description:**<br>• **This project incorporates a phased approach to add additional capacity to the West Pressure Plane of the water distribution system. Phase one includes the expansion and rehabilitation of Wallace Pump Station and the construction of a new 24-inch transmission line**<br>• **In Phase two, a 2.5-million-gallon elevated storage tank will be constructed in the southwest portion of Garland**<br>• **The final phase will provide an additional 3.5 million gallons of ground storage**<br>**Hazard(s) Addressed: Drought**<br>**Goals and objectives addressed: 5.1.2**<br>**Lead Office: Water**<br>**Funding Source(s): Capital Improvement Plan - $4,050,000.00; Potential mitigation grant funding - $17,574,000.00**<br>**Effect on New Structures: New structures would have more access to water in a drought event**<br>**Effect on Existing Structures: Existing structures would have more access to water in a drought event**<br>**Timeline for Completion: 2016**<br>**Costs (Estimated): $21,624,000.00** |
| **Cost Effectiveness: Minimal impact due to offsetting pumping costs by reducing pumping from Apallo and Northside Pump Stations. Residents of the southern portion of Garland will be less vulnerable to water shortages in a drought** |

| *Drought Action #2* |
| --- |
| **Title: East Zone Water Tower**<br>**Description:**<br>• **Design and construction of a new elevated water storage tank and associated piping in the East Pressure Plane in order to provide peak-hour pressures to the southern portion of Garland and enhance off-peak service and fire protection**<br>**Hazard(s) Addressed: Drought**<br>**Goals and objectives addressed: 5.1.2**<br>**Lead Office: Water**<br>**Funding Source(s): To be proposed in a future budget; Mitigation grant funding**<br>**Effect on New Structures: New structures would have more access to water in a drought event**<br>**Effect on Existing Structures: Existing structures would have more access to water in a drought event**<br>**Timeline for Completion: 2016**<br>**Costs (Estimated): $7,000,000.00** |
| **Cost Effectiveness: Minor impact on the city's operating budget due to additional facility maintenance costs. Residents of the southern portion of Garland will be less vulnerable to water shortages in a drought** |

| *Drought Action #3* |
| --- |
| Title: **Implementation of Water Restrictions**<br>Description:<br>• **Implementing and enforcing more aggressive water restrictions within the community in order to reduce the losses associated with droughts**<br>Hazard(s) Addressed: **Drought**<br>Goals and objectives addressed: **5.1.1**<br>Lead Office: **Water**<br>Funding Source(s): **General Fund**<br>Effect on New Structures: **Damage to future structures due to drought conditions would be limited**<br>Effect on Existing Structures: **Damage to existing structures due to drought conditions would be limited**<br>Timeline for Completion: **Ongoing**<br>Costs (Estimated): **Staff time** |
| Cost Effectiveness: **This project would save the city money by reducing the amount of losses due to drought conditions** |

| *Drought Action #4* |
|---|
| Title: **Native Landscaping Development**<br>Description:<br>• **Encouraging local citizens and departments to use landscaping that is natural to the area when they are to undertake a landscaping project**<br>Hazard(s) Addressed: **Drought**<br>Goals and objectives addressed: **5.1.2 and 5.1.3**<br>Lead Office: **Parks and Recreation**<br>Funding Source(s): **General fund**<br>Effect on New Structures: **None**<br>Effect on Existing Structures: **None**<br>Timeline for Completion: **2013**<br>Costs (Estimated): **Staff time** |
| Cost Effectiveness: **This project would save the city money by reducing the amount of losses due to drought conditions** |

### 5.2.7 Hazardous Materials Mitigation Actions

| ***Hazardous Materials Action #1*** |
|---|
| **Title: Advanced Hazardous Materials Training**<br>**Description:**<br>• **Have Emergency Management staff attend training through the Pipeline Safety Office of Training and Qualifications, in order to develop more thorough plans for hazardous materials**<br>**Hazard(s) Addressed: Hazardous Materials**<br>**Goals and objectives addressed: 5.1.3**<br>**Lead Office: Emergency Management**<br>**Funding Source(s): General Fund**<br>**Effect on New Structures: Advanced hazardous materials (Haz-Mat) training could result in a more organized Haz-Mat response, preventing damage to new structures**<br>**Effect on Existing Structures: Advanced hazardous materials (Haz-Mat) training could result in a more organized Haz-Mat response, preventing damage to existing structures**<br>**Timeline for Completion: 2012**<br>**Costs (Estimated): Staff time** |
| **Cost Effectiveness: Training costs are provided to Garland emergency management employees as no cost, which makes this project very cost effective** |

| *Hazardous Materials Action #2* |
|---|
| **Title: Hazardous Materials Flood Protection**<br>**Description:**<br>• **Identify hazardous materials facilities that exist in the floodplain**<br>• **Encourage mitigation/protection measures**<br>• **Help facilities to prepare plans for flood events**<br>**Hazard(s) Addressed: Hazardous Materials**<br>**Goals and objectives addressed: 5.1.2**<br>**Lead Office: Emergency Management**<br>**Funding Source(s): General Fund**<br>**Effect on New Structures: New structures will be more protected from the release of hazardous materials due to flooding**<br>**Effect on Existing Structures: Existing structures will be more protected from the release of hazardous materials due to flooding**<br>**Timeline for Completion: 2013**<br>**Costs (Estimated): Staff time** |
| **Cost Effectiveness: Preventing a flood hazard from escalating into a hazardous materials release would save money for hazardous materials facilities, and the City of Garland as there would be less response to hazardous materials incidents** |

### 5.2.8 All Hazards Mitigation Actions

| *All Hazards Action #1* |
|---|
| **Title: Rapid First Response Communications**<br>**Description:**<br>• **Outsource mission-critical paging to a company that utilizes more advanced technology that focuses on rapid and accurate delivery of text messages during emergency operations**<br>**Hazard(s) Addressed: All Hazards**<br>**Goals and objectives addressed: 5.1.1**<br>**Lead Office: Police**<br>**Funding Source(s): General revenue fund; Narcotics seizure; General budget fund; Mitigation grant funding**<br>**Effect on New Structures: None**<br>**Effect on Existing Structures: None**<br>**Timeline for Completion: To be determined upon receipt of funding**<br>**Costs (Estimated): $40,000.00** |
| **Cost Effectiveness: Financial benefits would be related to Police Officer and Fire Fighter safety. A delayed or failed message could result in incomplete notification of key personnel that compromises the integrity of the team.** |

## 5.3 Benefit-Cost Review and Prioritizing Mitigation Actions

The City of Garland Hazard Mitigation Team prioritized mitigation activities using the STAPLEE Method, per Federal Emergency Management Agency (FEMA) recommendations. STAPLEE is a benefit-cost review tool and includes considerations for Social, Technical, Administrative, Political, Legal, and Environmental and Economic issues. Each of these items is assigned a positive or negative value. Projects that score the highest are considered being the most effective, and their funding is most justified. A lower score indicates that several obstacles exist that would prevent the proposed project from being completed. Most mitigation strategies have at least one obstacle and, very frequently, this obstacle is economic. Part of putting the mitigation strategies in a prioritized list is being able to justify the need for a project should funding become available.

| City of Garland STAPLEE Action Evaluation and Prioritization Table | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mitigation Actions | **STAPLEE** Criteria Considerations **+1** Favorable **-1** Less Favorable **N** Not Applicable | | | | | | | | | | | | | | | | | | | | | | |
| | **S**ocial | | **T**echnical | | | **A**dministrative | | | **P**olitical | | | **L**egal | | | **E**conomic | | | | **E**nvironmental | | | | |
| | Community Acceptance | Effect on Segment of Population | Technically Feasible | Long-Term Solution | Secondary Impacts | Staffing | Funding Allocation | Maintenance/Operations | Political Support | Local Champion | Public Support | State Authority | Existing Local Authority | Potential Legal Changes | Benefit of Action | Cost of Action | Contributes to Economic Goals | Outside Funding Required | Effect on Land/Water | Consistent with Federal Laws | Effect on HAZMAT Waste Sites | Matches Environmental Goals | **Total Prioritization Score** |
| Tornado/Windstorm Action #1 | + | + | + | + | N | + | + | + | + | N | + | + | + | N | + | + | N | - | N | + | N | + | 14 |
| Tornado/Windstorm Action #2 | + | N | + | - | + | + | + | - | N | N | N | N | N | + | + | + | N | + | N | N | N | N | 07 |
| Tornado/Windstorm Action #3 | + | + | + | N | + | + | + | + | + | N | + | + | + | N | + | + | N | - | N | N | N | N | 12 |
| Flooding Action #1 | + | + | + | N | + | + | - | - | + | N | + | N | N | N | + | + | - | - | N | N | + | N | 06 |
| Flooding Action #2 | + | + | + | N | + | + | - | - | + | N | + | N | N | N | + | - | N | - | + | N | + | N | 06 |
| Flooding Action #3 | + | + | + | + | + | + | - | + | + | N | + | N | N | N | + | + | N | - | + | N | + | + | 12 |
| Flooding Action #4 | + | + | + | + | + | + | - | + | + | N | + | N | N | N | + | - | N | - | + | N | + | N | 09 |
| Winter Storm Action #1 | + | + | + | - | + | + | - | - | + | N | + | + | + | N | + | + | N | - | N | N | N | N | 07 |
| Winter Storm Action #2 | + | + | + | - | + | + | - | - | + | N | + | + | + | N | + | + | N | - | N | N | N | N | 07 |
| Winter Storm Action #3 | + | + | + | - | + | + | + | - | + | N | + | + | + | N | + | + | N | + | N | N | N | N | 11 |
| Winter Storm Action #4 | + | + | + | - | + | - | - | + | + | N | + | + | + | N | + | + | N | - | N | N | N | N | 07 |
| Hailstorm Action #1 | + | N | + | - | + | + | + | + | + | N | + | + | + | N | + | + | - | + | N | N | N | N | 11 |
| Hailstorm Action #2 | + | + | + | - | + | + | + | + | + | N | + | + | + | + | + | + | - | + | N | + | N | N | 14 |
| Hailstorm Action #3 | + | + | + | N | + | + | - | - | N | N | + | + | + | N | + | - | N | - | N | N | + | N | 06 |
| Extreme Heat Action #1 | + | + | + | - | N | + | - | - | + | N | + | N | + | N | + | + | - | + | N | N | N | N | 06 |
| Extreme Heat Action #2 | + | N | + | - | N | + | + | + | + | N | + | + | + | N | + | + | N | + | N | N | N | N | 11 |
| Extreme Heat Action #3 | + | + | - | - | + | + | - | + | N | N | + | + | + | N | + | - | N | - | N | N | N | N | 04 |

| | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Drought Action #1 | + | + | + | + | N | + | - | - | + | N | + | N | N | N | + | - | N | - | + | N | N | N | 05 |
| Drought Action #2 | + | + | + | + | N | + | - | - | + | N | + | N | N | N | + | - | N | - | + | N | N | N | 05 |
| Drought Action #3 | N | + | + | - | N | + | + | + | N | N | N | + | + | N | + | + | N | + | + | N | N | + | 10 |
| Drought Action #4 | + | + | + | - | + | + | + | + | N | N | + | + | + | N | + | + | N | + | + | N | N | + | 14 |
| Hazardous Materials Action #1 | + | N | + | - | + | + | + | + | + | N | + | + | + | N | + | + | N | + | N | N | + | N | 13 |
| Hazardous Materials Action #2 | + | + | + | - | + | + | + | + | + | N | + | + | + | N | + | + | + | + | N | N | + | N | 15 |
| All Hazards Action #1 | + | N | + | - | + | + | - | - | + | N | + | N | N | N | + | + | N | - | N | N | N | N | 04 |

## 6.1 Monitoring, Evaluating, and Updating the Plan

The City of Garland Hazard Mitigation Plan will be reviewed annually within its five year life cycle by the Hazard Mitigation Team in order to determine whether or not any changes need to be made. The plan will also be reviewed after any major disaster within the community. The Hazard Mitigation Team will be responsible with assessing progress in mitigation techniques that were implemented by the plan, changes in land development, and how improvements could be made to the local jurisdictions overall mitigation strategy. All plan updates will be made and the plan will be resubmitted for approval any time there are significant changes, or within five years from the date of Federal Emergency Management Agency approval.

Following each update to the Hazard Mitigation Action Plan the City of Garland Office of Emergency Management will generate a report that details each update that has been made to the plan. This report will also track any meetings, activities, and other processes used for the purpose of the plan update.

## 6.2 Incorporation into Existing Planning Mechanisms

Integration of the Hazard Mitigation Action Plan into other existing planning mechanisms will take place through coordinating the plan with Annex P of the local Basic Emergency Management Plan, and by monitoring the relationship between the Capital Improvement Plan and mitigation goals. The Envision Garland Plan for future development will also be considered in order to undertake mitigation actions that are coordinated with considerations for future development.

Annex P was used to outline the composition of the Hazard Mitigation Team, along with their responsibilities. This annex also includes standard operating procedures for assessing mitigation techniques before and after a disaster.

The Capital Improvement Plan is important to mitigation planning by allowing mitigation planners to determine what projects are being sought out by local departments. This was incorporated into the mitigation actions within the HazMAP. Projects that did not receive full funding, but would be very effective in mitigating hazards were outlined within this plan to ensure that they would receive attention in the future.

The future development plan, Envision Garland, was incorporated into the risk assessment of the HazMAP by helping planners to determine what threats my increase or decrease due to plans for future development. This allows the local government to consider the safety of the community when determining future building projects. This plan also helped in developing the community profile by assessing population statistics and trends in hazard prone areas.

The local government will also ensure that the Hazard Mitigation Action Plan is used in the development of other plans and is incorporated into existing and future planning by looking for opportunities where components of the HazMAP (including the mitigation

strategy) can be integrated into other plans and studies. The HazMAP will be consulted in future development plans in order to determine whether outlined mitigation actions could be incorporated into future developments. The HazMAP will also service as the basis for the creation of a thorough Hazardous Materials risk assessment for the jurisdiction and local first responders. The plan will also be incorporated into the City of Garland Comprehensive Emergency Management Plan as individual annexes are reviewed. This will be accomplished by determining whether components of the HazMAPs risk assessment, community profile, or mitigation actions could provide information to the individual annexes that would ensure a more comprehensive planning process.

### 6.3 Continued Public Involvement

In order to maintain public involvement in mitigation planning The City of Garland Hazard Mitigation team will continue to seek the input of the community stakeholders who are not a part of the planning team. A copy of the Local Hazard Mitigation Action Plan will be kept at the public library for public review and commenting. The public will also be continuously engaged through a number of various tasks completed by the City of Garland Office of Emergency Management. Methods may include, but are not limited to: hazard surveys, public speaking opportunities, community preparedness campaigns, and seasonal preparedness updates on the departmental website website. The public will be notified of their opportunity to participate and how they can help in future mitigation plans by taking out advertisements in the local newspaper, handing out fliers at public events, and announcements through locally used social media.

# City of Garland Hazard Survey

The City of Garland needs your help. The Office of Emergency Management is currently in the process of creating the city's Hazard Mitigation Action Plan (HazMAP). This plan is being developed in order to decrease our community's vulnerability to disasters. Your participation in this survey is important to help us to identify our risks to the community and to determine how best to eliminate or reduces those risks.

1. What neighborhood/area do you live in? _____.

2. Have you ever experienced or been impacted by a disaster?
   □ Yes (please explain) _____.
   □ No

3. How concerned are you about the possibility of our community being impacted by a disaster?
   □ Extremely Concerned □ Somewhat Concerned □ Not Concerned

4. Please select the three hazards that pose the greatest threat to your neighborhood:
   □ Drought □ Erosion □ Extreme Heat □ Flood □ Hail □ Hazardous Materials

   □ Landslide □ Lightning □ Major Urban Fire □ Severe Winter Storm □ Terrorism □ Tornado

   □ Wildfire □ Other (please explain) _____.

5. Is there another hazard not listed in this survey that you think is a wide scale threat to your community?
   □ Yes (please explain) _____.
   □ No

6. Is your home located in a floodplain?
   □ Yes
   □ No
   □ I don't know

7. Do you have flood insurance?
   □ Yes
   □ No (please explain reason) _____.
   □ I don't know

8. Are you interested in making your home or neighborhood more resistant to disasters?
   □ Yes
   □ No

9. What actions, if any, have you taken to make your home or neighborhood more resistant to hazards?

Attachment 2

10. In your opinion, what are some steps your local government could take to reduce or eliminate the risk of future hazard damages in your community?

11. A number of community-wide activities can reduce our risk from hazards. In general, these activities fall into one of the following six broad categories. Please tell us how important you think each one is for your community to consider pursuing.

**Prevention -** Administrative or regulatory actions that influence the way land is developed and buildings are built. Examples include planning and zoning, building codes, open space preservation, and floodplain regulations.

□ Very Important □ Somewhat Important □ Not Important

**Property Protection -** Actions that involve the modification of existing buildings to protect them from a hazard or removal from the hazard area. Examples include acquisition, relocation, elevation, structural retrofits, and storm shutters.

□ Very Important □ Somewhat Important □ Not Important

**Natural Resource Protection -** Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems. Examples include: floodplain protection, habitat preservation, slope stabilization, riparian buffers, and forest management.

□ Very Important □ Somewhat Important □ Not Important

**Structural Projects -** Actions intended to lessen the impact of a hazard by modifying the natural progression of the hazard. Examples include dams, levees, seawalls, detention/retention basins, channel modification, retaining walls and storm sewers.

□ Very Important □ Somewhat Important □ Not Important

**Emergency Services -** Actions that protect people and property during and immediately after a hazard event. Examples include warning systems, evacuation planning, emergency response training, and protection of critical emergency facilities or systems.

□ Very Important □ Somewhat Important □ Not Important

**Public Education and Awareness -** Actions to inform citizens about hazards and the techniques they can use to protect themselves and their property. Examples include outreach projects, school education programs, library materials and demonstration events.

□ Very Important □ Somewhat Important □ Not Important

Please help us by completing this survey and returning it to:
**City of Garland Department of Emergency Management**
**Mailing Address: P.O. Box 469002, Garland, TX 75046**
**Physical Address: 1490 SH 66, Garland, TX 75040**
**Surveys can also be faxed to: 972-781-7288**
Please contact Sean Taylor at staylor@ci.garland.tx.us with any questions.

# Are you ready for extreme heat?

The City of Garland Office of Emergency Management would like to make sure that you are aware of the problems associated with extreme heat. Heat can affect anyone, although young children, elderly, and people with health problems are most likely to be affected. Some individuals may be more susceptible to heat sickness than others. Therefore, it is important for everyone to be prepared for heat emergencies.

Heat wave is a prolonged period of excessive heat and humidity. The National Weather Service (NWS) increases public alerts during periods of excessive heat. If a heat wave is predicted or happening there are several steps that an individual can take to lessen the effects of extreme heat on the body.

First, slow down. Avoid strenuous activities. If you must do strenuous activity, do it during the coolest part of the day, typically between 4:00 am and 7:00 am.

Second, stay indoors as much as possible. If air conditioning is not available, stay on the lowest floor, out of the sunshine. Try to go to a public building with air conditioning for several hours each day. Remember that electric fans do not cool the air, but they do help sweat evaporate, which cools your body.

Third, wear lightweight, light-colored clothing. Light colors will reflect away some of the sun's energy.

Fourth, drink plenty of water regularly and often. Your body needs water to help keep cool. Drink plenty, even if you do not feel thirsty. Water is the safest liquid to drink during heat emergencies. Avoid drinks with alcohol or caffeine in them. They can make you feel good initially, but these beverages increase the effect of heat on your body.

Finally, eat small meals and eat more often. Avoid foods that are high in protein, which increases metabolic heat. Avoid using salt tablets unless directed to do so by a physician.

Talk with your family members about what to do during heat emergencies. Complete your family disaster plan and disaster supplies kit. Deciding what to do before a disaster or emergency strikes is your best defense.

For more information on emergency management topics, please visit the City of Garland website at www.ci.garland.tx.us

# Hazard Mitigation Action Plan

The City of Garland needs your help. The Department of Emergency Management is currently in the process of creating the city's Hazard Mitigation Action Plan (HazMAP), per Federal Emergency Management Agency requirements. This plan is developed in order to decrease the community's vulnerability to disasters. Your participation in the planning process is important to help us to identify the risks to the community, and determine how we can eliminate or reduces those risks. Hazard mitigation planning is the process State, local, and tribal governments use to identify risks and vulnerabilities associated with natural disasters, and develop long-term strategies for protecting people and property in future hazard events. The process results in a mitigation plan that offers a strategy for breaking the cycle of disaster damage, reconstruction, and repeated damage, and a framework for developing feasible and cost-effective mitigation projects. Find further information on FEMA's Hazard Mitigation Planning Resources page.

In order to prevent disaster losses, individuals should make sure that they are implementing mitigation activities in their own homes. A study by the National Institute of Building Sciences found every dollar spent on mitigation saves four dollars in cleanup, recovery, and rebuilding costs. For more information on activities that protect your property from disasters please visit the FEMA website.

The Office of Emergency Management also encourages businesses, organizations, and individuals to take part in the prevention of disasters. Recommendations on what should be included in the community's mitigation plan are always welcome, and can be directed to Sean Taylor as staylor@ci.garland.tx.us. These recommendations may include, but are not limited to: known hazard areas within the community, specific hazard vulnerabilities, and actions to prevent disasters.

Tornado Safety for Texans

Tornadoes can occur at any time of the year in Texas, but they are most likely to occur in the spring and summer. The City of Garland Office of Emergency Management and the Texas Division of Emergency Management urges citizens to learn what to do when a tornado is sighted. The most important rule is to ***get low and stay low***. The following are tornado safety tips:

- Seek shelter in an interior room on the lowest floor of the home, such as a bathroom, closet, or room without windows.
- Go to an interior room or hallway on the lowest floor of the office building, or to the designated shelter area.
- Leave your mobile home and take shelter in a nearby building. If no building is nearby, lie flat in a ditch or ravine.
- Never stay inside a car. Leave the car and lie flat in a ditch or a ravine. If a building is nearby, take shelter inside. Never try to outrun a tornado in your car.
- At school, follow plans and go to a designated shelter area, usually, the school's interior hallway on the lowest floor. Stay out of auditorium, gyms, and other areas with wide free-span roofs. If you are in a portable or manufactured building, go to a nearby permanent structure, or take cover outside on low, protected ground.
- Go to the interior rooms and halls on the lowest floor of a shopping center. Do not leave the shopping center to get in your car.
- If you are in open country, take cover on low, protected ground.
- Avoid areas near exterior glass or doors, areas along exterior walls, or rooms with wide expanse roofs.
- Learn the difference between a Tornado Watch and a Tornado Warning. A Tornado Watch means watch the sky. A Tornado Warning means a tornado is on the ground and you must seek shelter immediately.

For more information on Tornado Safety, contact the City of Garland Office of Emergency Management at 972-205-2605 or visit our website at www.ci.garland.tx.us

# Being Prepared for Winter Weather and Freezing

With the arrival of the winter season it is important to remember how to stay safe in the cold weather. Freezing temperatures bring many hazards such as hypothermia, frost bite, vehicle accidents, and many more. The City of Garland and FEMA have some great information on how to stay prepared.

Inside the home:

Listen to your radio, television, or NOAA Weather Radio for weather reports and emergency information.

Eat regularly and drink ample fluids**.**

Keep your house at a warm and comfortable level in order to keep yourself safe, and keep your pipes from freezing.

Maintain ventilation when using kerosene heaters to avoid build-up of toxic fumes. Refuel kerosene heaters outside and keep them at least three feet from flammable objects.

Outdoors:

Salt the sidewalk and driveway in front of your home in order to prevent slip and fall accidents.

Wear warm clothing, and keep your face covered to protect sensitive areas. Keep dry and change out wet clothing to prevent a loss of body heat.

Watch for signs of frostbite. These include loss of feeling and white or pale appearance in extremities such as fingers, toes, ear lobes, and the tip of the nose. If symptoms are detected, get medical help immediately.

Watch for signs of hypothermia. These include uncontrollable shivering, memory loss, disorientation, incoherence, slurred speech, drowsiness, and apparent exhaustion.

Drive only if it is absolutely necessary. If you must drive, consider the following:

Travel in the day, don't travel alone, and keep others informed of your schedule.

Stay on main roads; avoid back road shortcuts.

If a blizzard traps you in the car:

Pack an emergency supply kit in your car including blankets, food, water, and lights.

Pull off the highway. Turn on hazard lights and hang a distress flag from the radio antenna or window.

Remain in your vehicle where rescuers are most likely to find you.

Run the engine and heater about 10 minutes each hour to keep warm. When the engine is running, open a downwind window slightly for ventilation and periodically clear snow from the exhaust pipe. This will protect you from possible carbon monoxide poisoning.

In extreme cold, use road maps, seat covers, and floor mats for insulation. Huddle with passengers and use your coat for a blanket.

Drink fluids to avoid dehydration.

Be careful not to waste battery power. Balance electrical energy needs - the use of lights, heat, and radio - with supply.

Turn on the inside light at night so work crews or rescuers can see you.

Leave the car and proceed on foot - if necessary - once the blizzard passes.

# Policy Report

**Report No: 2011-2016**
**Agenda Item: WS-1f**
**Meeting: Work Session**
**Date: March 5, 2012**

## REQUESTING AUTHORIZATION TO ENTER INTO RECYCLABLES PROCESSING AND MARKETING AGREEMENT

### ISSUE

Staff is requesting Council approval to enter into a Recyclables Processing and Marketing Agreement with Allied Waste Systems, Inc. d/b/a Allied Waste Services of Plano to transport, process and sell single stream recyclable materials.

### OPTIONS

A. Authorize City Manager or designee to enter into a Recyclables Processing and Marketing Agreement with Allied Waste Systems Inc. d/b/a Allied Waste Services of Plano.
B. Take no action

### RECOMMENDATION

Staff is recommending that Council authorize the City Manager or designee enter into a Recyclables Processing and Marketing Agreement with Allied Waste Systems d/b/a Allied Waste Services of Plano. If Council concurs, this item will be scheduled for formal consideration at the March 20, 2012 Regular Meeting.

### COUNCIL GOAL

Consistent Delivery of Reliable City Services

### BACKGROUND

EWS sought requests for proposals from vendors to transport, process and sell recyclable commodities from the following recycling programs:

- Residential Curbside Recycling
- Drop-Off Recycling Center
- Commercial Recycling
- Workplace Recycling

Six (6) vendors responded to the request for proposals announcement.

At the April 4, 2011 Council Work Session Meeting, Staff recommended and Council approved the selection of Allied Waste Systems, Inc. d/b/a Allied Waste Services of Plano to transport, process and sell single stream recyclable materials generated from the EWS recycling programs. Also, at this Work Session Council granted approval to Staff to begin negotiations with this vendor.

Staff has concluded the negotiations with Allied Waste Systems, Inc. d/b/a Allied Waste Systems, Inc. and developed a final Recyclables Processing and Marketing Agreement. This agreement is for one year with four renewal year options, provides for revenue sharing arrangement whereby the EWS will receive eighty percent (80%) of gross revenue derived from the sale of recyclable materials, allows EWS to add more commodities to the recycling collection stream, including plastics #3 - #5 and #7 and contains other significant terms.

## ATTACHMENTS

1. **Attachment A:** Summary of significant terms/points: Recyclables Processing and Marketing Agreement
2. **Attachment B:** Recyclables Processing and Marketing Agreement document

Submitted By:

Lonnie R. Banks
Managing Director
Environmental Waste Services

Date: February 28, 2012

Approved By:

William E. Dollar
City Manager

Date: February 28, 2012

# ATTACHMENT A

## Summary of Significant Terms/Points:
## Recyclables Processing and Marketing Agreement

| | | |
|---|---|---|
| **1** | Estimated Annual Revenue to City of Garland | $324,073 |
| **2** | Term | Contract term is 1 year with 4 renewal options |
| **3** | Termination | Either party may terminate for cause upon event of default which remains uncured for 30 days after notice of default |
| **4** | Revenue Sharing as a Percentage of Gross Revenues | Contractor will pay City 80% of Gross Revenues derived from the sale of Recyclables (less the processing fee) and Contractor will receive 20% of Gross Revenues |
| **5** | Processing Fee | City will pay processing fee of $60.00 per ton. If processing fee is ever greater than the 80% Gross Revenues for the sale of Recyclables, City will owe no processing fee for that month |
| **6** | Public Awareness Fee | To assist with CITY's recycling education program, Contractor will pay CITY $12,000 within 30 days of contract execution and annually thereafter upon any renewal |

**ATTACHMENT B**

**RECYCLABLES PROCESSING**
**AND MARKETING AGREEMENT**

THIS AGREEMENT is made as of the _____ day of _____, 2012, (the "Effective Date") by and between the City of Garland, Texas (hereinafter the "CITY") and Allied Waste Systems, Inc. d/b/a, Allied Waste Services of Plano, (hereinafter "Contractor") (collectively the "Parties"), for the transporting, processing and sale of single-stream recyclable material.

WITNESSETH:

**WHEREAS**, the CITY has determined to initiate a single-stream recycling program for recyclable materials collected by the CITY; and

**WHEREAS**, the CITY issued Request for Proposal # 363-10 ("RFP") to select a contractor for the transporting, processing and marketing of recovered materials collected by the CITY from its Residential Recycling Program, Drop-Off Recycling Center, and City Workplace Recycling Program and Commercial Recycling Program; and

**WHEREAS**, Contractor submitted a bid under Proposal # 363-10 ("RFP") for the aforesaid services; and

**WHEREAS**, after evaluation of all submitted proposals, and negotiation with Contractor, the CITY desires to retain Contractor to render services under the terms and conditions set forth in this Agreement;

**NOW, THEREFORE**, for and in consideration of the mutual promises contained herein, the CITY and Contractor agree as follows:

1. Definitions.

(a) Applicable Law means all Federal, State, and local laws, regulations, rules, orders, judgments, decrees, permits, approvals, or other requirements of any governmental agency having jurisdiction over the processing, transportation, and disposal of solid waste, Recyclables, and other materials covered by this Agreement that are in force on the Effective Date and as they may be enacted, issued or amended during the initial or any subsequent Term.

(b) Commercial Establishment means any non-Residential location from which the Recyclables are collected by the CITY.

(c) CITY means the City of Garland, Texas.

(d) CITY Locations means the Drop-Off Recycling Center located at 1426 Commerce Street, Garland, Texas.

(e) Contractor means Allied Waste Systems, Inc. d/b/a, Allied Waste Services of Plano.

(f) Contractor Locations means Contractor's recycling processing facility located at 4200 E. 14th Street, Plano, Texas, or its backup facility located at 4050 Investment Drive, Dallas, Texas.

(g) Effective Date means the date Contractor is to begin providing services required by this Agreement.

(h) Gross Revenues means all revenue, without deduction, which is derived, directly or indirectly by Contractor, from or in connection with the marketing and sale of Recyclables obtained from the CITY pursuant to this Agreement.

(i) Recyclables means metal (aluminum, steel and bi-metal) cans; plastics #1 – 7, glass, newspaper, telephone books, inserts and magazines, chipboard, cardboard and small cardboard boxes.

(j) Recycle or Recycling means transforming or remanufacturing waste materials into usable or marketable materials for use other than incineration (including incineration for energy recovery) or other methods of disposal.

(k) Recycling Processing Facility means the processing facility owned and operated by the Contractor where Recyclables are processed, sorted or separated for the purpose of recovering recyclable materials, located at 4200 E. 14th Street, Plano, Texas, or its backup facility at 4050 Investment Drive, Dallas, Texas.

(l) Residuals or "Residue" means Recyclables, non-recyclables or solid waste remaining after processing which the Contractor cannot recycle, or which is too small to be effectively recovered through mechanical and/or manual methods. The parties shall conduct an initial audit of a sample of recovered materials received by Contractor to determine the amount of Residuals present in the audit sample. That amount, expressed as percentage, shall be used for purposes of calculation of the Residual portion of Recyclables received by Contractor during the first quarter of the Agreement. Quarterly audits will be performed thereafter in the same manner to establish the percentage applicable in succeeding quarters.

(m) Excluded Waste. Excluded Waste is all Hazardous Waste, Special Waste and any otherwise regulated waste.

(n) Hazardous Waste. Hazardous Waste is a form of Excluded Waste and is defined as any radioactive, volatile, corrosive, highly flammable, explosive, biomedical, infectious, biohazardous, toxic or listed or characteristic Hazardous Waste as defined by federal, state, provincial or local law or any otherwise regulated waste. Hazardous Waste shall include, but not be limited to, any amount of waste listed or characterized as hazardous by the United States Environmental Protection Agency or any state agency pursuant to the Resource Conservation and Recovery Act of 1976, as amended, and including future amendments thereto, and any other Applicable Law.

(o) Special Waste. Special Waste shall mean a form of Excluded Waste and should be defined as non-hazardous, solid waste that is subject to additional governmental regulations or special handling requirements in collection, transportation, processing

or disposal as a result of the characteristics of, or processes which generate such waste. Special Waste includes, but is not limited to:

a. waste iron from a commercial or industrial activity;

b. waste generated by an industrial process or a pollution control process;

c. waste which contains free liquids;

d. waste which contains residue and debris from the cleanup of a spill of petroleum, chemical or commercial products or wastes, or contaminated residuals;

e. articles from the cleanup of a facility which generates, stores, treats, recycles or disposes of chemical substances, commercial products or wastes;

f. wastes which are nonhazardous as a result of proper treatment pursuant to Subtitle C of the Resource Conservation and Recovery Act of 1976 ("RCRA");

g. asbestos containing or asbestos bearing material that has been properly secured under existing federal, state, provincial and local laws, rules and regulations;

h. containers that once contained hazardous substances, chemicals, or insecticides so long as such containers are "empty" as defined by RCRA;

i. municipal or commercial solid waste that has come into contact with any of the foregoing;

j. filter cake sludge wastes from waste water treatment processes;

k. wastes containing any regulated polychlorinated biphenyls; and,

l. ash, sludge, tires and powders.

(p) CITY's Duty. CITY shall be obligated for the Term of this Agreement to allow Contractor access to the CITY Locations in order to load and transport Recyclables for transfer to Contractor Locations to be processed and marketed by Contractor in accordance with this Agreement. While Contractor shall have exclusive rights to all materials collected in connection with this Agreement, the CITY is under no obligation regarding the quantity or composition of the Recyclables, and makes no guarantee to Contractor of any minimum or maximum tonnage of Recyclables. CITY shall not knowingly deposit any waste that it knows to be Excluded Waste in any Contractor collection equipment or at any place for Contractor collection or disposal.

(q) Right of Refusal. Contractor has the right to refuse any load containing Excluded Waste. If CITY's Excluded Waste is collected into Contractor's vehicles or deposited into a Contractor landfill, Contractor will give CITY telephonic notice thereof and a reasonable opportunity, which shall not be less than twenty-four (24) hours, to remove and dispose of such Excluded Waste. If CITY elects to remove and dispose of such Excluded Waste, it shall do so within such time period and

under the conditions as Contractor reasonably deems necessary or appropriate in connection with the operation of its vehicles or the landfill, including the preservation of the health and safety of employees. If, after electing to do so, CITY does not remove the Excluded Waste within such time period, Contractor may remove and dispose of such Excluded Waste without further notice to CITY, and CITY shall pay the direct costs incurred by Contractor due to removal, remediation, handling, transportation, delivery and disposal of such Excluded Waste. Notwithstanding the foregoing, no notice shall be required by Contractor to CITY for Contractor to dispose of Excluded Waste in emergency situations where in Contractor's reasonable judgment a delay in such disposal could constitute a hazard to the vehicles, the Landfill, or any person on, about or near the premises. In addition to the foregoing, CITY agrees to promptly pay (within fifteen (15) days after date of Contractor's invoice) for all fines, penalties and similar assessments made against Contractor as a result of such Excluded Waste being deposited into Contractor's vehicles, or delivered and/or disposed of at a Contractor landfill.

2. Contractor Services.

2.1 Collection, Transportation, Processing and Marketing.

During the Term of this Agreement, the Contractor shall provide the labor and equipment necessary to load and transport recovered materials and Recyclables from the CITY Locations to Contractor Locations and shall process and market such recovered materials and Recyclables collected by the CITY from its Residential Recycling Program, Drop-Off Recycling Center, City Workplace Recycling Program and Commercial Recycling Program, as more particularly described on **Attachment A** to **Exhibit C** attached hereto; provided, however, that the CITY may, in its discretion, elect to deliver some or all of the volume of recovered materials and Recyclables it collects from its recycling programs directly to Contractor's Recycling Processing Facility for drop off and processing and, in the case of recovered materials and Recyclables collected by the CITY from its Commercial Recycling Program, shall collect and deliver such recovered materials and Recyclables directly to Contractor at the Recycling Processing Facility.

2.2 Contractor General Responsibilities.

2.2.1 The Contractor shall provide all technical and professional expertise, knowledge, management, and other resources required for accomplishing all aspects of the tasks and associated activities required under this Agreement.

2.2.2 Contractor shall furnish, at no charge to the CITY, the number of receiver boxes and compactors necessary to accommodate the volume of recyclable material collected at the CITY Locations prior to transport to the Recycling Processing Facility; provided, however, that Contractor shall never provide less than five (5) receiver boxes and one (1) compactor. Contractor shall deliver the receiver boxes and containers to the CITY Locations, and shall have the sole responsibility for transporting the recovered materials and Recyclables from the CITY Locations.

2.3 Disposition of Residual Materials.

Contractor shall be responsible for segregating any Residuals or non-processable materials from the materials it collects from the CITY. Residual materials shall be

transferred for disposal by Contractor to a certified/licensed landfill and disposed of at Contractor's expense.

2.4 Hours of Operation.

Contractor shall provide the services contemplated under this Agreement between the hours of 7:00 a.m. and 7:00 p.m., Monday through Friday; provided, however, that Contractor shall not be obligated to provide service on any day the CITY does not provide collection service.

2.5 Truck Turn-Around Time.

Contractor's Recycling Processing Facility shall be equipped and operated in a manner that CITY trucks delivering recyclable materials can be unloaded and exit the facility no later than twenty (20) minutes after the initial weigh-in of the truck, except in the case of circumstances beyond Contractor's control.

2.6 Public Awareness Program Fee.

Contractor shall assist the CITY in its program to educate the public regarding its recycling program and to encourage its use by paying the CITY twelve thousand dollars ($12,000.00) within thirty (30) days after the execution of this Agreement, and annually thereafter on the anniversary date upon any extension of the Agreement.

3. Term. Unless earlier terminated pursuant to Section 13 of this Agreement, the term of this Agreement shall commence on the Effective Date, and shall remain in full force for a period of one (1) year from the Effective Date (the "Term"). At the mutual option of the CITY and Contractor, the term of this Agreement may be extended for up to four additional one (1) year periods upon the same terms and conditions upon written agreement to so extend the Agreement no later than one hundred twenty (120) days prior to the end of the initial or any extended period hereunder. The Processing Fee shall be increased upon any extension of the Agreement based upon the percentage change in the U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W) for the Dallas-Forth Worth statistical area that occurred during the previous calendar year, provided, however that the increase shall never exceed four percent (4%). The new Processing Fee shall continue until again adjusted.

4. Title.

Title to all recovered materials and Recyclables shall pass to Contractor at the time Contractor takes possession of the waste at CITY Locations, or when delivered by the CITY to Contractor at the Recycling Processing Facility. Title to any Excluded Waste shall not pass to Contractor at any time. Deposit of any Excluded Waste at any Contractor landfill shall not be deemed to vest Title to any Excluded Waste in Contractor. In the event Title to Excluded Waste is deemed vested in Contractor, Contractor shall have the right to revoke acceptance of such waste at any time such waste is discovered to be Excluded Waste.

5. Compensation to Contractor.

5.1 Revenue Sharing as a Percentage of Gross Revenues.

In consideration of the Recyclables provided by the CITY to Contractor for subsequent processing and sale, Contractor shall pay CITY eighty percent (80%) of Gross Revenues derived from the sale of Recyclables. Contractor shall receive twenty percent (20%) of such Gross Revenues. For purposes of calculation of gross revenues from the sale of Recyclables under this Agreement, gross revenues from the sale of ONP shall be determined based upon the High SW Board Market (OMB) pricing for ONP #8; provided, however, that the price shall never be less than $45.00 per ton.

5.2 Processing Fee.

The CITY shall pay Contractor a processing fee of sixty dollars ($60.00) per ton; provided, however, that the processing fee shall not be owed for any month in which the CITY's portion of the Gross Revenues from the sale of Recyclables for that period is less than the Processing Fee for that month. In such event, Contractor shall owe no fee to the CITY for Recyclables received from the CITY for that period.

5.3 Fuel/Transportation Fee.

The CITY will pay Contractor a fuel/transportation fee of one thousand dollars ($1,000.00) per month during the Term or any extension of this Agreement; provided, however, that no such fee shall be due for any month when the average weekly price per gallon of diesel fuel for that month, as reflected in the U.S. Energy Information Administration's Weekly Retail On-Highway Diesel Prices listing (http://tonto.eia.dow.gov/oog/info/whop/diesel (Gulf Coast)), was less than three dollars ($3.00) per gallon.

5.4 Calculation and Processing of Payments.

Contractor shall remit any payment due the CITY within thirty (30) days after the end of each month. The payment shall be accompanied by a report satisfactory to the CITY reflecting in detail how the payment was calculated. Payment of the CITY's portion of Gross Revenues shall be net of the Processing Fee and Fuel/Transportation Fee, when applicable. If the CITY's portion of the Gross Revenues for any month is less than the Processing Fee and the Fuel/Transportation Fee, when applicable, Contractor shall submit an invoice to the CITY along with the report requesting payment from the CITY for the Fuel/Transportation Fee. CITY shall pay Contractor within thirty (30) days after receipt of the invoice.

6. Reporting Requirements.

Contractor shall maintain a CITY-approved electronic database for reporting purposes. Contractor shall provide the CITY with a monthly report of the previous month's activities by the tenth ($10^{th}$) business day of each month. Contractor shall provide an annual report of activities within sixty (60) days of the end of the completed fiscal year of the CITY (ending September 30). Each monthly report shall be in a form satisfactory to the CITY and shall, at a minimum, contain the following:

- date, truck number, ticket number and inbound and outbound weights;

- daily and monthly total of recyclable materials processed by commodity type;
- proof of current market pricing and gross revenues from the sale of recyclables

7. Audits.

a) Quarterly Audit by Contractor. On a quarterly basis, at no additional charge to the CITY, Contractor shall conduct an audit to demonstrate the residual rate of materials received at the Recycling Processing Facility. Dates for audits will be mutually agreed upon by the parties and a representative of the CITY shall be present during the audit. Contractor shall provide the CITY a written audit report of findings regarding the level of residuals within ten (10) days of the completion of the audit.

b) CITY Right to Audit Books and Records. Contractor shall keep true, complete, and accurate books and records relating to the performance of its obligations under this Agreement. CITY shall have the right, upon reasonable notice and during business hours, to audit those books and records and to obtain copies of those books and records at the expense of the CITY. Contractor agrees to provide reasonable assistance to the CITY during any audit conducted under the Agreement, including answering questions and providing any requested records or information, within thirty (30) days of having received a written request. The cost of an audit pursuant to this section shall be borne by the CITY, unless the audit reveals an underpayment of payments due in excess of two percent (2%), in which case Contractor shall pay for the actual, reasonable and necessary cost of the audit.

8 Performance Standard; Permits.

(a) Standard. Contractor represents and warrants that Contractor Service will be fully and timely performed in a good and workmanlike manner in accordance with generally accepted industry standards and practices and this Agreement, and in compliance with all Applicable Law. Contractor reserves the right to decline to perform Contractor Services it cannot perform in a lawful manner or without risk of harm to human health, safety or the environment beyond those risks inherent in providing the services contemplated by this Agreement.

(b) Permits. Contractor warrants that Contractor or any affiliate performing Contractor Services has all necessary permits to perform Contractor Service. If requested by CITY, Contractor shall provide CITY with copies or evidence of the federal, state or local permits applicable to Contractor Service. CITY may, upon reasonable notice and during business hours, inspect facilities or transportation equipment utilized by Contractor in connection with its performance under this Agreement.

(c) CITY Compliance. CITY shall at all times comply with all the applicable laws relating to the Contractor Services under this Agreement.

9. Access. Each CITY Location shall provide unobstructed access to Contractor Services equipment on the scheduled collection day(s). If the equipment is inaccessible so that the regularly scheduled pick-up cannot be made, Contractor will promptly notify the CITY

and afford the CITY Location a reasonable opportunity to provide the required access; however, Contractor reserves the right to charge an additional fee for any additional collection services required by CITY Location's failure to provide such access.

10. Damage to Pavement. Each CITY Location shall be responsible for any damage to its pavement, curbing or other driving surfaces resulting from the weight of vehicles used in providing Contractor services.

11. Insurance. The Contractor shall procure and maintain for the duration of the Agreement such types and limits of insurance as more particularly described on **Exhibit A** attached hereto.

12. **Indemnification.**

**(a) By Contractor. Contractor agrees to indemnify, defend and hold harmless CITY, its officers, directors, employees, agents, affiliates, parent, subsidiaries, successors and assigns from and against any and all claims, counterclaims, suits, demands, actions, causes of action, damages, setoffs, liens, attachments, judgments, debts, expenses or other liabilities of whatsoever kind or nature, to the extent alleged and resulting from the negligence or willful misconduct of Contractor and its subsidiaries and affiliates, and their employees, agents and servants in the performance of Contractor Service, or the breach of this Agreement by Contractor.**

13. Termination.

(a) For Cause. Either party may terminate this Agreement for cause upon an event of default by the other party which remains uncured thirty (30) days after receipt of written notice of the default from the non-defaulting party.

(b) Event of Default. An event of default is a party's breach of a material provision of the Agreement.

(c) Termination for Non-Payment. Notwithstanding the foregoing, and solely with respect to CITY's default in payment, Contractor may terminate this Agreement after ten (10) days written notice and demand for payment.

14. Affiliates. Contractor may provide Contractor Service through any of its affiliates, provided that Contractor shall remain responsible for the performance of all such services and obligations in accordance with this Agreement.

15. Assignment and Benefit. Neither party shall have the right to assign that party's interest in this Agreement without the prior written consent of the other party, provided that such consent shall not be unreasonably withheld, delayed or modified by party giving such consent.

16. Relationship of Parties; No Third-Party Beneficiaries. Nothing contained in this Agreement shall be deemed or construed by the parties hereto or by any third party to create the relationship of principal and agent or of partnership or of joint venture or of any association whatsoever between the parties, it being expressly understood and agreed

that no provision contained in this Agreement nor any act or acts of the parties hereto shall be deemed to create any relationship between the parties other than the relationship of independent parties contracting with each other solely for the purpose of effecting the provisions of this Agreement. There are no third-party beneficiaries to this Agreement and no third-party beneficiaries are intended by implication or otherwise.

17. Confidential Information. CITY and Contractor will not, without the prior written consent of the other, either (a) disclose the other's proprietary or commercially sensitive information ("Confidential Information") to anyone other than those officers, employees, agents, or subcontractors who need to know it in connection with performance of this Agreement and have agreed to be bound by these obligations of confidentiality or (b) use the other's Confidential Information for any purpose other than performance of this Agreement. For purposes of this Agreement, all data, maps, reports, drawings, specifications, records, technical information, and computer programs/software concerning CITY's operations, processes or equipment which are provided by CITY or acquired or handled by Contractor in connection with this Agreement shall be deemed Confidential Information of CITY. Similarly, all data, maps, reports, drawings, specifications, records, technical information, information relating to Contractor's employees, information relating to Contractor's safety and accident prevention programs, information about Contractor's accident and safety record, Contractor's personnel policies or procedures, and computer program/software concerning its operations, processes or equipment which are provided by Contractor or acquired or handled by CITY in connection with this Agreement shall be deemed Confidential Information of Contractor. Notwithstanding the foregoing, no Recyclables transported or processed under the Agreement shall be considered as Confidential Information, or this Agreement or any of its attachments or exhibits. The parties recognize and agree that Agreement is subject to the Texas Public Information Act (Chapter 552, Texas Government Code)("TPIA"), and that TPIA shall control to the extent of any conflict between the Agreement and TPIA.

18. Notices. Any and all notices required hereunder shall be in writing, addressed and sent U.S. Certified or Registered Mail, Return Receipt Requested, postage prepaid or by personal delivery (including by express mail or facsimile) to the parties at their addresses (and facsimile number) shown below:

| | |
|---|---|
| Contractor: Allied Waste Services<br>4200 E. 14th Street<br>Plano, Texas 75074 | CITY: City of Garland<br>P.O Box 469002<br>Garland, TX 75046-9002 |
| Attention: General Manager | Attention: Director of Environmental Waste Services |
| Facsimile No.: 972-881-9077 | Facsimile No.: 972-205-3434 |

All notices shall be deemed delivered on the date of their deposit in the U.S. Mail or any reputable nationally recognized express courier service, or where personally delivered, on the date of delivery.

19. Force Majeure. Neither Contractor nor CITY shall be liable for damages for its failure to perform due to contingencies beyond its control including but not limited to strikes, riots, flooding, terrorism, fires or acts of God. No contingency under this section shall excuse CITY from its obligation to make prompt payment of monies due and owing for services rendered.

20. Waiver. Failure or delay on the part of either party to exercise any right, power, privilege or remedy under this Agreement shall not constitute a waiver thereof. No modification or waiver by either party of any provision shall be deemed to have been made unless made in writing.

21. Governing Law. This Agreement and all of the transactions contemplated herein shall be governed by and construed in accordance with the laws of the State of Texas without regard to conflict of laws. The provisions and obligations of this Agreement are performable in Dallas County, Texas such that exclusive venue for any action arising out of this Agreement shall be in Dallas County, Texas.

22. Severability. If any provision of this Agreement is or becomes or is deemed invalid, illegal or unenforceable under Applicable Law, such provision will be deemed amended to the extent necessary to conform to Applicable Laws, or, if it cannot be so amended without materially altering the intention of the parties, it will be stricken, and the remainder of this Agreement will remain in full force and effect.

23. Contract Documents. The Contract Documents shall include the following documents, and this Agreement does hereby expressly incorporate same herein as fully as if set forth verbatim in this Agreement:

    a. Exhibit A – Insurance Requirements
    b. Exhibit B– Request For Proposal # 363-10 (“RFP”)
    c. Exhibit D– Contractor’s Proposal dated September 24, 2010
    d. This Instrument
    e. Any addenda or changes to the foregoing documents agreed to by the parties hereto

24. Entire Agreement; Conflicting provisions. This Agreement together with any Exhibits and formal amendments thereto, signed by the parties, represents the entire agreement between the parties and supersedes all previous agreements or negotiations on the subject matter herein, whether written or oral, and shall not be modified or amended except by written agreement duly executed by the undersigned parties. To the extent that there is any conflict between the provisions of this Agreement and the other Contract Documents, the provisions of this Agreement shall prevail.

25. Non-Collusion. Contractor represents and warrants that Contractor has not given, made, promised or paid, nor offered to give, make, promise or pay any gift, bonus, commission, money or other consideration to any person as an inducement to or in order to obtain the work to be provided to the CITY under this Agreement. Contractor further agrees that it shall not accept any gift, bonus, commission, money, or other consideration from any person (other than from the CITY under this Agreement) for any of the services performed by it under or related to this Agreement. If any such gift, bonus, commission, money, or other consideration is received by or offered to Contractor, Contractor shall immediately report that fact to the CITY and, at the sole option of the CITY, the CITY may elect to accept the

consideration for itself or to take the value of such consideration as a credit against the compensation otherwise owing to Contractor under this Agreement.

26. Binding Effect. Except as limited herein, the terms and provisions of this Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective heirs, devisees, personal and legal representatives, successors and assigns.

27. Counterparts. This Agreement may be executed in multiple counterparts, each of which shall be deemed an original, and all of which shall constitute but one and the same instrument.

28. Exhibits. All exhibits to this Agreement are incorporated herein by reference for all purposes wherever reference is made to the same.

29. Disclosure of Business Relationships/Affiliations. Conflict of Interest Questionnaire. Contractor represents that it is in compliance with the applicable filing and disclosure requirements of Chapter 176 of the Texas Local Government Code.

Execution page follows.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement to be effective as of the date above.

**The City of Garland, Texas**

By: _____
Name/Title: _____
Date: _____
("CITY")

**Allied Waste Systems, Inc.**
**d/b/a, Allied Waste Services of Plano**

By: _____
Name/Title: _____
Date: _____
("Contractor")

# City Council Item Summary Sheet

☒ **Work Session**

☐ **Agenda Item**

**Date:** **March 5, 2012**

## Community Multicultural Commission Update

**Summary of Request/Problem**

Members of the Community Multicultural Commission will update Council on the upcoming "We the People" Conference which will be held in conjunction with the Healthy Living Expo on September 22, 2012. The event will also recognize the 10th anniversary of the Community Multicultural Commission.

**Recommendation/Action Requested and Justification**

Council discussion.

| **Submitted By:** | **Approved By:** |
|---|---|
| **Priscilla Wilson**<br>**Senior Managing Director** | **William E. Dollar**<br>**City Manager** |

# City Council Item Summary Sheet

☒ **Work Session**

☐ **Agenda Item**

**Date:** **March 5, 2012**

## Tax Abatement – Advanced Pharmacy

**Summary of Request/Problem**

Advanced Pharmacy is considering opening a 10,000 square feet new service center in Garland, bringing $1 million in new equipment and $1 million in taxable inventory. Initially, 30 jobs will be created and 10 potential jobs within 5 years. The investment will bring over $14,000 to the City annually.

The Garland Economic Development Partnership Steering Committee recommends that Council provide the following to Advanced Pharmacy:

- General support for the project.
- Support of a 50% City tax abatement on business personal property value and inventory value on this new investment for 5 years (total of $35,230).
- Support of extending two additional years of 50% City tax abatement when 10 extra jobs (total of 40 jobs) are created within the first 5 years (total of $14,092).

**Recommendation/Action Requested and Justification**

Council discussion.

| **Submitted By:** | **Approved By:** |
|---|---|
| **Martin E. Glenn**<br>**Deputy City Manager** | **William E. Dollar**<br>**City Manager** |

GARLAND
TEXAS MADE HERE

GARLAND ECONOMIC DEVELOPMENT PARTNERSHIP

CITY OF GARLAND • GARLAND CHAMBER OF COMMERCE • G.I.S.D.

# GARLAND ECONOMIC DEVELOPMENT STEERING COMMITTEE

Project Recommendation to the Garland City Council

*January 26. 2012*

## Project: Advanced Pharmacy

Advanced Pharmacy was founded in 2002 and is headquartered in Houston, Texas. It delivers top-quality, cost-effective and regulatory-compliant pharmaceutical services. The company is engaged in the retail sale of prescription drugs, proprietary drugs and non-prescription drugs. The three main service lines include 1) PassPort – an automated and remotely monitored medication dispensing center, 2) AP OnCall – a trained team of software specialists and systems technicians providing electronic and visual monitoring in-house, and 3) AP MedManager – an integrated information management and reporting system designed to track and predict medication utilization trends, physician prescribing patterns, and formulary compliance.

Advanced Pharmacy is looking to open a 10,000 s.f. new service center in Garland bringing $1 million in new equipment and $1 million in taxable inventory. It will also create 30 jobs initially and 10 potential jobs within 5 years. The investment will bring over $14,000 to the City annually. We are competing with two states; Pennsylvania and Maryland, which are proposing aggressive incentives.

The GEDP's EDSC recommends to the Garland City Council the following:

- General support for the project
- Support of a 50% City Tax Abatement on Business Personal Property Value and Inventory Value on this new investment for 5 years (total of $35,230)
- Support of extending two additional years of 50% City Tax Abatement when 10 extra jobs (total of 40 jobs) are created within first 5 years (total of $14,092)

***Committee Member Attendees**: Mayor Ron Jones, City Council Rick Williams, City Council Lori Dodson, City Manager Bill Dollar, GISD Secretary Dr. Tommy Reed, GISD Trustee Keith Montgomery, Chamber Chair Mark King, Chamber CEO Paul Mayer*
**** Approved unanimously***

520 N. Glenbrook Dr.
Garland, Tx 75040-5041
972-272-7551 o
972-276-9261 f

# ECONOMIC IMPACT ANALYSIS

## Advanced Pharmacy

| ECONOMIC IMPACTS: | Full-time jobs | Annual Payroll | RE Value | BPP Value | Taxable Inventory Value | Sales Tax | GP&L (KWH/yr) | Points |
|---|---|---|---|---|---|---|---|---|
| **2350 Crist Road** | 30 | $1,950,000 | $0 | $1,000,000 | $ 1,000,000 | $0 | 0 | |
| **Total Points:** | 3 | 20 | 0 | 0 | 0 | 0 | - | **23** |
| | | **(Ave. Salary $65,000)** | | | | | | |

| | |
|---|---|
| **City Property Tax Revenue** | |
| Property Tax Revenue | $ - |
| BPP Tax Revenue | $ 7,046 |
| Inventory Tax Revenue | $ 7,046 |
| **City Sales Tax** | $ - |
| **Total City Tax Revenues** | **$ 14,092** |

*Minimum of 100 points generally required for tax abatement consideration

**Staff recommendation:**
**50% abatement on total tax for 5 years (bonus two additional years if 40 jobs are created)**

| BPP & Inventory Tax | 50% Abatement | **5 years total** | 7 years total (when 40 jobs are created) |
|---|---|---|---|
| $ 14,092 | $ 7,046 | **$ 35,230** | $ 49,322 ($14,092 more) |

** All abatement will be subject to the performance

# City Council Item Summary Sheet

☒ **Work Session**

☐ **Agenda Item**

**Date:** **March 5, 2012**

## Downtown Square Project Update

| **Summary of Request/Problem** |
|---|
| The consultant team of David Baldwin, Dave Retzsch and Nancy McCoy will update the Council on the alternative designs for the Downtown Square and the results of the public meetings held to review these designs. |

| **Recommendation/Action Requested and Justification** |
|---|
| No action needed; this is an informational update only. |

| **Submitted By:** | **Approved By:** |
|---|---|
| **Neil Montgomery**<br>**Planning Director** | **William E. Dollar**<br>**City Manager** |

# City Council Item Summary Sheet

☒ **Work Session**

☐ **Agenda Item**

**Date:** **March 5, 2012**

## Administrative Services Committee Report

**Summary of Request/Problem**

Council Member Larry Jeffus, chair of the Administrative Services Committee, will provide a committee report on the following item:

- Drought Contingency Plan Restrictions

**Recommendation/Action Requested and Justification**

Council discussion.

| **Submitted By:** | **Approved By:**<br><br>**William E. Dollar**<br>**City Manager** |
|---|---|

# Proposed Changes to the Drought Contingency Response Plan
# March 5, 2012

## Definitions

- Remove references to 'Designated Watering Days' and even-odd addresses
- Enhance definition of 'Landscaped Area'
- Include definition of 'Lawn'
- Substitute and enhance definition of 'Drip Irrigation' for 'Subsurface Irrigation'

## Drought response stages:

Stage 1

- No reference to designated watering days. General conservation and awareness is encouraged.

Stage 2

- Twice a week lawn watering with hose-end and automatic sprinklers on Tuesdays and Saturdays only.
- *Watering allowed anytime for landscape, foundations, and trees with hand-held hose, soaker hose, or drip irrigation.*

Stage 3

- April – October: once a week lawn watering with hose-end and automatic sprinklers on Saturdays only.
- November – March: once every other lawn week watering with hose-end and automatic sprinklers on Saturdays only. Every other week schedule tied to EWS Recycle schedule.
- *Watering allowed anytime for landscape, foundations, and trees with hand-held hose, soaker hose, or drip irrigation.*

Stage 4

- No lawn watering with hose-end or automatic sprinklers.
- *Watering allowed up to 2 hours per day for landscape, foundation, and trees with hand-held hose, soaker hose, or drip irrigation.*

**ORDINANCE NO.**

**AN ORDINANCE AMENDING CHAPTER 51, "GENERAL UTILITY PROVISIONS", OF THE CODE OF ORDINANCES OF THE CITY OF GARLAND, TEXAS; PROVIDING A PENALTY CLAUSE, A SAVINGS CLAUSE, AND A SEVERABILITY CLAUSE; AND PROVISING AN EFFECTIVE DATE.**

**NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF GARLAND, TEXAS:**

**SECTION 1**

That Chapter 51, "General Utility Provisions", of the Code of Ordinances of the City of Garland, Texas, is hereby amended by amending Article VI to read as follows:

**"ARTICLE VI. DROUGHT CONTINGENCY PLAN**

**Sec. 51.90 Declaration of policy, purpose, and intent**

(A) In order to conserve the available water supply in times of drought and emergency; maintain supplies for domestic water use, sanitation, and fire protection; protect and preserve public health, welfare, and safety; minimize the adverse impacts of a water supply shortage; and minimize the adverse impacts of emergency water supply conditions, the following regulations and restrictions on the delivery and consumption of water are hereby adopted.

(B) Water uses regulated or prohibited under this drought contingency plan (the "plan") are considered to be nonessential and the continuation of such uses during times of a water shortage or other water supply emergency are deemed to constitute a waste of water that will subject offenders to both civil and criminal fines and penalties.

**Sec. 51.91 Definitions**

In this article:

(1) *Aesthetic water use* means water use for ornamental or decorative purposes such as fountains, reflecting pools, and water gardens.

(2) *Commercial and institutional water use* means water use that is integral to the operations of commercial and institutional establishments such as retail businesses, hotels and motels, restaurants, and office buildings.

(3) *Conservation* means those practices, techniques, and technologies that reduce the consumption of water, reduce the loss or waste of water, improve efficiency in the use of water or increase the recycling and reuse of water so

that an adequate supply of water is conserved and made available for future or alternative uses.

(4) *Customer* means any person (as that term is defined in section 10.03 of this Code) using or receiving water supplied by the City.

(5) *Director* means the Managing Director of Water, Wastewater, and Water Recycling of the City, his or her designee, or such other individual to whom the City Manager has appointed the duties and authority under this article.

(6) *Domestic water use* means water use for personal, household or sanitary purposes, such as drinking, bathing, heating, cooking, or sanitation, or for cleaning a residence, business, industry, or institution.

(7) *Industrial water use* means the use of water in processes designed to convert materials of lower value into forms having greater usability and value.

(8) *Landscaped areas* mean areas of decorative plantings of vegetation generally consisting of shrubs, vines, groundcovers, trees, ornamental trees, and decorative grass species, that are planted to improve aesthetic qualities or natural beauty of a site and/or to stabilize the soil conditions, thereby minimizing water runoff. These areas may also include vegetation planted in containers intended to supplement or highlight areas of the landscape or garden.

(9) *Landscape irrigation use* means water used for the irrigation and maintenance of landscaped areas, whether publicly or privately owned, including residential and commercial lawns, gardens, golf courses, parks, and rights-of way and medians.

(10) *Lawns* mean an open area covered by closely mown and cultivated perennial turf grass.

(11) *Soaker hose* is a type of water hose made of porous material that allows water to seep out of the hose without spraying water into the air.

(12) *Drip Irrigation (also known as Microirrigation)* means the application of small quantities of water as drops, small streams or miniature sprays through emitters of applicators placed along a water delivery line. The drip method encompasses a number of systems or concepts such as bubbler, dripper, trickle, line source mist or miniature spray.

**Sec. 51.92 Triggering criteria for initiation and termination of drought response stages**

(A) The director shall monitor water supply or demand conditions on a daily basis and will determine when conditions warrant the initiation or termination of any stage of the plan. The director shall endeavor to provide public notification of the initiation or termination of a drought response stage by means of publication of notices in a newspaper of general circulation in the City, the "City Press", and the City's internet website, by posting notices on the City's public access CATV channel, through customer mailings, and by posting signs in City buildings. The director shall endeavor to notify North Texas Municipal Water District ("NTMWD") by telephone and a follow-up letter, e-mail, or fax when a drought stage is initiated. The director shall notify the executive director of the TCEQ within 5 business days when any mandatory provisions of the drought contingency plan are activated.

(B) When the director determines that a water shortage or water supply emergency requires activation of the plan, the provisions of the plan shall go into effect immediately upon the first publication of notice and shall remain in effect until terminated by the director.

(C) The director may order the termination of a drought response stage or water emergency when the conditions for termination are met or at his discretion. The director may decide not to order the termination of a drought response stage or water emergency even though the conditions for termination of the stage are met. Factors which could influence such a decision include, but are not limited to, the time of the year, weather conditions, or the anticipation of potential changed conditions that warrant the continuation of the drought stage. The director shall endeavor to take the following actions when a drought stage is terminated:

(1) Notify the public by means of publication of notices in a newspaper of general circulation in the City; publication in the "City press"; posting notices on the City's internet website and on the City's public access CATV channel; through customer mailings, and by posting signs in City buildings.

(2) Notify the NTMWD by telephone with a follow-up letter, e-mail, or fax.

(3) Notify the executive director of the TCEQ within five (5) business days that activated mandatory provisions of the drought contingency plan are terminated.

(D) Depending on the circumstances prevailing at the time of the plan is put into effect, the director may determine that a water shortage or other water supply emergency exists under one of the following stages:

(1) <u>Stage 1-mild water shortage conditions</u>.

(a) <u>Requirements for initiation</u>. The director may initiate voluntary water conservation efforts applicable to a stage 1 water shortage when:

(i) The City's wholesale water provider, North Texas Municipal Water District (NTMWD), notifies the director of delivery or source shortages, requests initiation of stage 1 of the plan, and the director concurs;

(ii) Total daily water demand equals 90 percent of the amount that can be delivered to customers for three consecutive days;

(iii) Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate;

(iv) Supply source becomes contaminated;

(v) Water system is unable to deliver water due to the failure or damage of major water system components; or

(vi) The water system experiences continually falling treated water reservoir levels that do not refill above 80 percent overnight.

(b) Requirements for termination. Stage 1 may be rescinded when all of the above-listed triggering events have ceased to exist for a period of three consecutive days and the director authorizes the termination of stage 1.

(2) Stage 2-moderate water shortage conditions.

(a) Requirements for initiation. The director may initiate restrictions on certain nonessential water uses applicable to a stage 2 water shortage when:

(i) The City's wholesale water provider, NTMWD, notifies the director of delivery or source shortages, requests initiation of stage 2 of the plan, and the director concurs;

(ii) Total daily water demand exceeds 95 percent of the amount that can be delivered to customers for three consecutive days;

(iii) Water demand for all or part of the delivery system equals delivery capacity because delivery capacity is inadequate;

(iv) Supply source becomes contaminated;

(v) Water system is unable to deliver water due to the failure or damage of major water system components; or

(vi) The water system experiences continually falling treated water reservoir levels that do not refill above 65 percent overnight.

(b) Requirements of termination. Stage 2 may be rescinded when all of the above-listed triggering events have ceased to exist for a period of three consecutive days and the director authorizes the termination of stage 2. Upon termination of stage 2, stage 1 becomes operative until terminated by the director.

(3) Stage 3-severe water shortage conditions.

(a) Requirements for initiation. The director may initiate restrictions on certain nonessential water uses applicable to a stage 3 water shortage when:

(i) The City's wholesale water provider, NTMWD, notifies the director of delivery or source shortages, requests initiation of stage 3 of the plan, and the director concurs;

(ii) Total daily water demand exceeds 98 percent of the amount that can be delivered to customers for three consecutive days;

(iii) Water demand for all or part of the delivery system exceeds delivery capacity because delivery capacity is inadequate;

(iv) Supply source becomes contaminated;

(v) Water system is unable to deliver water due to the failure or damage of major water system components; or

(vi) Continually falling treated water reservoir levels that do not refill above 50 percent overnight are experienced.

(b) Requirements of termination. Stage 3 may be rescinded when all of the above-listed triggering events have ceased to exist for a period of three consecutive days and the director authorizes termination of stage 3. Upon termination of stage 3, stage 2 becomes operative until terminated by the director.

(4) Stage 4-emergency water shortage conditions.

(a) Requirements for initiation. The director may initiate restrictions on certain nonessential water uses applicable to a stage 4 water shortage when:

(i) The City's wholesale water provider, NTMWD, notifies the director of delivery or source shortages, requests initiation of stage 4 of the plan, and the director concurs;

(ii) Total daily water demand exceeds the amount that can be delivered to customers;

(iii) Water demand for all or part of the delivery system seriously exceeds delivery capacity because delivery capacity is inadequate;

(iv) Supply source becomes contaminated;

(v) Water supply system is unable to deliver water due to the failure or damage of major water system components; or

(vi) The water system experiences continually falling treated water reservoir levels that do not refill above 20 percent overnight.

(b) Requirements of termination. Stage 4 may be rescinded when all of the above-listed triggering events have ceased to exist for a period of three consecutive days and the director authorizes termination of stage 4. Upon termination of stage 4, stage 3 becomes operative until terminated by the director.

**Sec. 51.93 Drought stage responses**

Based upon an analysis of water supply and demand conditions and in accordance with the triggering criteria set forth above, the director may implement the following responses as appropriate to the water shortage or water emergency being experienced.

(1) Stage 1 - Mild water shortage requirements. Stage 1 is intended to raise public awareness of potential drought problems. The goal for water use reduction under stage 1 is a two percent (2%) reduction in the use that would have occurred in the absence of drought contingency measures. During a stage 1 shortage:

(a) Customers will be requested to voluntarily practice water conservation and to minimize or discontinue water use for nonessential purposes.

(b) The City will, in the manner it deems necessary and appropriate, endeavor to:

(i) Increase public education efforts on ways to reduce water use, which may include bulletins posted in public buildings,

information posted on the City's website, and inserts included in utility bills.

(ii) Coordinate with major water users and work with them to achieve voluntary water use reductions.

(iii) Intensify efforts on leak detection and repair.

(iv) Reduce nonessential city government water use. (Examples include street cleaning, vehicle washing, operation of ornamental fountains, etc.)

(v) Reduce City government water use for landscape irrigation.

(vi) Initiate engineering studies to evaluate alternatives should drought conditions worsen.

(2) Stage 2 - Moderate water shortage requirements. The goal for water use reduction under stage 2 is a five percent (5%) reduction in the use that would have occurred in the absence of drought contingency measures. During a stage 2 shortage:

(a) The City may continue or initiate any actions available under Stage 1.

(b) The City will, in the manner it deems necessary and appropriate, endeavor to:

(i) Accelerate public education efforts on ways to reduce water use.

(ii) Halt nonessential city government water use.

(iii) Encourage the public to wait until the current drought or emergency situation has passed before establishing new landscaping.

(iv) The City will, in the manner it deems necessary and appropriate, endeavor to implement viable alternative supply strategies.

(v) Allow irrigation as follows:

- Irrigation of landscape areas, foundations, trees and lawns with hose-end sprinklers or automatic irrigation systems is prohibited except on Tuesdays and Saturdays. An exception

is allowed for lawns and landscape associated with new construction that may be watered as necessary for 30 days from the date of certificate of occupancy.

- Irrigation of landscape areas, foundations, and trees are allowed on any day provided it is accomplished using a hand-held hose, a soaker hose, or a drip irrigation system.
- The City may water parks, sports fields, landscaped and lawn areas of medians and parkways, or other municipal facilities throughout the week in a manner that achieves the equivalent of two water days and as approved by the Director.

(vi) Prohibit planting of cool season grasses (such as rye grass or other similar grasses) that intensify cool season water requirements, except where establishment of vegetation is required by TCEQ for stormwater permits on new construction.

(3) Stage 3 - Severe water shortage requirements. The goal for water use reduction under stage 3 is a reduction of ten percent (10%) in the use that would have occurred in the absence of drought contingency measures. During a stage 3 shortage:

(a) The City will endeavor to continue or initiate actions available under stages 1 and 2.

(b) The City will, in the manner it deems necessary and appropriate, endeavor to implement viable alternative water supply strategies.

(c) The operation of any ornamental fountain or pond for aesthetic or scenic purposes, if it uses potable water, is prohibited except when necessary to support aquatic life.

(d) The use of water to wash down sidewalks, walkways, driveways, parking lots, tennis courts, or other hard surfaces areas is prohibited. Use of water for dust control on construction projects is permitted to the extent allowed or required by law or regulation.

(e) Use of water to wash any vehicle, including without limitation a motor vehicle, motorcycle, boat, trailer, or airplane, is prohibited unless the source of water is equipped with a positive shut-off control device that will stop the flow of water when that flow is not needed to rinse the vehicle being washed.

(f) Use of water in such a manner as to allow runoff or other waste is prohibited. Water run-off is excessive when it extends for a distance greater than ten (10) feet from the property's boundary lines; onto an

adjacent property; or ten (10) feet past the targeted irrigation area for commercial sites. Excessive water run-off will be cause for termination of water service.

(g) Irrigation is allowed as follows:

- Irrigation of landscape areas, foundations, trees and lawns with hose-end sprinklers or automatic irrigation systems is limited to once per week on Saturdays only between April 1 and October 31 of each year; and from November 1 to March 31 the irrigation of landscaped areas, foundations, trees and lawns is limited to once every two weeks on Saturdays. The alternating Saturday irrigation for each property will be based on the property's location within the City's Every-Other-Week Waste Recycling Schedule, or any other equitable schedule as determined by the Director.
- The City may water parks, sports fields, landscaped and lawn areas of medians and parkways, or other municipal facilities throughout the week (April – Oct) or every other week (Nov – March) in a manner that achieves the equivalent of one water day as approved by the Director.
- Irrigation of landscaped areas, trees, or foundations is permitted at any time if it is done by means of a hand-held hose, soaker hoses, or by drip irrigation.
- Golf courses may water fairways on designated watering days only, but may water greens and tee boxes as necessary. Athletic fields may be watered as necessary to insure the safety and well-being of the public.
- Landscape established to meet TCEQ Storm Water Permit Requirements may be watered once daily for thirty (30) days after planting before 10:00 a.m. and after 6:00 p.m.
- Irrigation systems may be turned on, for ten (10) minutes per station, to test and repair the system and insure proper operation.

(h) Existing swimming pools, wading pools, hot tubs or spa-type pools may not be drained and refilled; provided however that water may be added to swimming pools to replace losses during normal use or may be refilled immediately after repair by a commercial pool company.

(i) Prohibit hydroseeding, hydromulching, and sprigging, except where establishment of vegetation is required by TCEQ for storm water permits on new construction.

(4) Stage 4 - Emergency water shortage requirements. The goal for water use reduction under stage 4 is a reduction of whatever amount is deemed

necessary under the circumstances to accomplish objectives of this article. During a stage 4 shortage:

(a) The City may continue or initiate any actions available under stages 1, 2, and 3.

(b) The City will, in the manner it deems necessary and appropriate, endeavor to implement viable alternative water supply strategies.

(c) Use of water to wash any vehicle, including without limitation a motor vehicle, motorcycle, boat, trailer, or airplane, is prohibited unless for health, sanitation or safety reasons and for essential governmental purposes.

(d) Irrigation of landscape areas, foundations, trees and lawns with hose-end sprinklers or automatic irrigation systems is prohibited. Landscape areas, foundations, and trees may be watered for up to 2 hours on any day by a hand-held hose, a soaker hose, or a drip irrigation system. Athletic fields may be watered as necessary to insure the safety and well being of the public.

(e) Permitting of private pools is prohibited. Pools already permitted may be completed and filled with water. Existing private and public pools may add water to maintain pool levels but may not be drained and refilled.

(f) The establishment of new landscaping is prohibited. Landscape established to meet TCEQ stormwater permit requirements may be watered once daily for thirty (30) days after planting before 10:00 a.m. and after 6:00 p.m.

(g) Prohibit golf course watering with treated water except for greens and tee boxes.

(h) Require all commercial uses to reduce water use by a percentage established by the City Manager or his designee.

**Sec. 51.94 Water rationing surcharges**

Surcharges on water consumption may be imposed and collected during any drought stage approved by the Council.

**Sec. 51.95 Enforcement**

Water use restrictions imposed in stage 2, 3 and 4 drought stages may be enforced as follows:

(1) Upon the first or a subsequent violation, a customer may be issued a citation, with minimum and maximum fines as established by ordinance.

(2) Upon the second or a subsequent violation, the City may cut off water service to the customer. Services discontinued pursuant to this subsection will be restored only upon payment of a reconnection charge as set forth in section 50.30(D)(1)(b) of this Code.

(3) Any person in apparent control of the premises where a violation occurs or originates is presumed to be the violator, and proof that the violation occurred on the person's premises constitutes a rebuttal presumption that the person in apparent control of the property committed the violation. Parents are presumed to be responsible for violations of their minor children and proof that a violation, committed by a child, occurred on the premises under the parent's control constitutes a rebuttal presumption that the parent committed the violation. The presumption may be rebutted by proof that the parent had previously directed the child not to use the water as it was used in violation of the plan and that the parent could not have reasonably known of the violation.

**Sec. 51.96 Variances**

(A) The director may, in writing, grant a temporary variance of existing water uses otherwise prohibited under the plan if the director determines that the failure to grant such a variance would cause an emergency condition adversely affecting the public health, safety or welfare, or the person requesting the variance would suffer an undue hardship and the person demonstrates that:

(1) Compliance with the plan cannot be technically accomplished during the duration of the water supply shortage or other condition for which the plan is in effect; or

(2) Alternative methods can be implemented which will achieve a similar level of reduction in water use.

(B) A petition for a variance must include the following:

(1) The name and address of petitioners;

(2) The purpose of the intended water use;

(3) The specific requirement of the plan from which the petitioner is requesting relief;

(4) A detailed statement as to how the specific requirement creates a hardship unique to the petitioner or adversely affects the petitioner, and a

statement as to what damage or harm will occur to the petitioner or others if the petitioner complies with this article;

(5) A description of the relief requested;

(6) The period of time for which the variance is sought; and

(7) A description of what alternative water use restrictions or other measures the petitioner is taking or proposes to take in order to meet the intent of this plan.

(C) Unless waived or modified in writing by the director, a variance granted under this section shall include a timetable for compliance and shall contain a condition terminating the variance if the petitioner fails to meet a specified requirement of the variance.

(D) A variance expires when the plan is no longer in effect. No variance will be retroactive or otherwise justify any violation of this plan that occurs prior to the issuance of the variance.

**Sec. 51.97 Provisions to inform the public and opportunity for public comment**

The City will provide the opportunity for public input in the development of this drought contingency plan by the following means:

(1) Providing written notice of the proposed plan and opportunity to comment on the plan by newspaper, posted notice and notice on the City's website.

(2) Making the draft plan available on the City's website.

(3) Providing the draft plan to anyone requesting a copy.

(4) Holding a public meeting to give the public the opportunity to provide input on the plan. The meeting will be held at a time and location convenient to the public.

**Sec. 51.98 Provisions for continuing public education and information**

(A) The City will inform and educate the public about the drought contingency plan by the following means:

(1) Preparing a bulletin describing the plan and making it available at City Hall and other appropriate locations.

(2) Making the plan available to the public through the City's website.

(3) Including information about the drought contingency plan on the City's website.

(4) Notifying local organizations, schools, and civic groups that staff are available to make presentations on the drought contingency plan (usually in conjunction with presentations on water conservation programs).

(B) At any time the drought contingency plan is activated or the drought stage changes, the City will notify local media of the issues, the drought response stage, and the specific actions required of the public. The information will also be publicized on the City's website. Billing inserts will also be used as appropriate.

**Sec. 51.99 Coordination with the regional water planning group**

A letter will be sent to the chair of the region C water planning group with a copy of this drought contingency plan. The city will also send a copy of this drought contingency plan to NTMWD.

**Sec. 51.99.1 Review and update of drought contingency plan**

As required by TCEQ rules, the City will review and update the drought contingency plan every five years. The plan will be updated as appropriate based on new or updated information."

**SECTION 2**

That a violation of any provision of this Ordinance shall be a misdemeanor punishable in accordance with Sec. 10.05 of the Code of Ordnances of the City of Garland, Texas. The City's authority to seek injunctive or other civil relief available under the law is not limited by this section.

**SECTION 3**

That Chapter 51, "General Utility Provisions", of the Code of Ordinances of the City of Garland, Texas, as amended, shall be and remain in full force and effect save and except as amended by this Ordinance.

**SECTION 4**

That terms and provisions of this Ordinance are severable and are governed by Sec. 10.06 of the Code of Ordinances of the City of Garland, Texas.

**SECTION 5**

The City Manager or his designee is hereby directed to file a copy of the Plan and this Ordinance with the TCEQ in accordance with Title 30, Chapter 288 of the Texas Administrative Code.

**SECTION 6**

That this Ordinance shall be and become effective immediately upon and after its passage and approval.

**PASSED AND APPROVED** this the _____ day of _____, 2012.

**CITY OF GARLAND, TEXAS**

_____

Mayor

**ATTEST:**

_____

City Secretary

# City Council Item Summary Sheet

☒ **Work Session**

☐ **Agenda Item**

**Date:** **March 5, 2012**

## Texas Water Smart Coalition

| **Summary of Request/Problem** |
|---|
| At the request of Mayor Ron Jones, Council will be briefed on the Texas Water Smart Coalition. The proposed program is a group conservation effort and is supported by the State Agricultural Commissioner. |

| **Recommendation/Action Requested and Justification** |
|---|
| Council discussion. |

| **Submitted By:** | **Approved By:**<br><br>**William E. Dollar**<br>**City Manager** |
|---|---|

# Policy Report

**Report No: 2012-2017**
**Agenda Item: WS-3a**
**Meeting: Work Session**
**Date: March 5, 2012**

## AUTOMATED AND MANUAL COLLECTION SINGLE STREAM RECYCLING PROGRAMS

### ISSUE

Environmental Waste Services (EWS) will be phasing in an Automated Collection Single Stream Recycling Program for 8,133 customers in designated areas throughout the city. Under this program, residents can recycle more commodities and place these items in 95-gallon containers that will be serviced by automated recycling collection vehicles.

In addition EWS will initiate Manual Collection Single Stream Recycling for all other customers not part of the first phase of Automated Collection Single Stream Recycling Program. Customers will continue to use their 18-gallon recycling red bin(s) and if needed, use plastic bags to accommodate any overflow of additional recycling commodities.

The implementation of Automated and Manual Collection Single Stream Recycling Programs will begin May 15-18.

### RECOMMENDATION

- For informational purposes only.

### COUNCIL GOAL

- Consistent Delivery of Reliable City Services

### BACKGROUND

Garland has a lower recycling participation rate than other cities within the Dallas/Fort Worth Metropolitan area, due in part to our dual stream recycling collection process and customers' lack of sufficient space in 18-gallon red bins to store recyclables. Customers are asking for our program to move to single stream recycling and to have a larger storage container. Allowing customers to recycle a higher volume of commodities using 95-gallon containers will increase household participation and route tonnage.

EWS projects a 25% increase in recycling tonnage by implementing Automated and Manual Collection Single Stream Recycling Programs.

## Automated Collection Single Stream Recycling

EWS used the following criteria to select eight (8) areas to begin the first implementation phase of Automated Collection Single Stream Recycling:

- Recycling participation (Percent of residents recycling per route)
- Tonnage collection (Number of tons of recyclable materials collected per route)
- Route Day & Week (One route selected per day for each recycling week),
- Designed complete routes (To reduce duplication of efforts to collect both automated and manual single stream recycling in the same area)
- Major intersection dividing lines (To minimize confusion in neighborhoods, major intersections were used as dividing lines rather than residential streets)

Future implementation phases for Automated Collection Single Stream Recycling will be developed based on:

- A 5 year phased implementation plan (This schedule can be adjusted through funding availability)
- Scheduled replacement of existing manual loading recycling vehicles with automated collection vehicles
- To fully implement this program citywide will require the purchase of 54,800 additional containers at an approximate cost of $2,801,924.

Also, EWS is also proposing to implement a Manual Collection Single Stream Recycling Program for customers who are not in the Phase 1 Automated Collection Single Recycling Program areas. This collection approach will be used until Automated Single Stream Recycling is fully implemented citywide.

## Manual Collection Single Stream Recycling

Customers who are not part of the Phase 1 Automated Collection Single Stream Recycling areas will continue to use 18-gallon red bins along with plastic bags, if needed, to accommodate any overflow of additional recyclable commodities. Manual Collection Single Stream Recycling set-out guidelines will be established for the type of items that should be placed in plastic bags and red bins by customers. EWS will recommend that customers place aluminum and steel cans, plastic containers, small cardboard boxes, chipboard and aerosol cans in plastic bags and place newspapers, magazines, cardboard boxes, glass and other commodities in the red bins. EWS will employ, if needed, temporary laborers to assist Equipment Operators with anticipated increased household participation rates and route tonnage.

**Automated and Manual Collection Single Stream Recycling Commodities**

Automated and Manual Single Stream Recycling Collection Programs will allow customers to begin recycling a wider range of commodities such as plastics #1 - #5 and #7, aluminum and steel cans, chipboard (cracker, cereal boxes), newspapers, magazines, junk mail, office paper, paper grocery bags, small flattened cardboard boxes, empty aerosol cans and glass bottles and jars.

## ATTACHMENTS

1. **Attachment A**: Eight (8) Automated Collection Single Stream Recycling Phase 1 Areas: Number of Households

2. **Attachment B**: Eight (8) Automated Collection Single Stream Recycling Phase 1 Areas: Detail Maps

Submitted By:

Lonnie R. Banks
Managing Director
Environmental Waste Services

Date: February 28, 2012

Approved By:

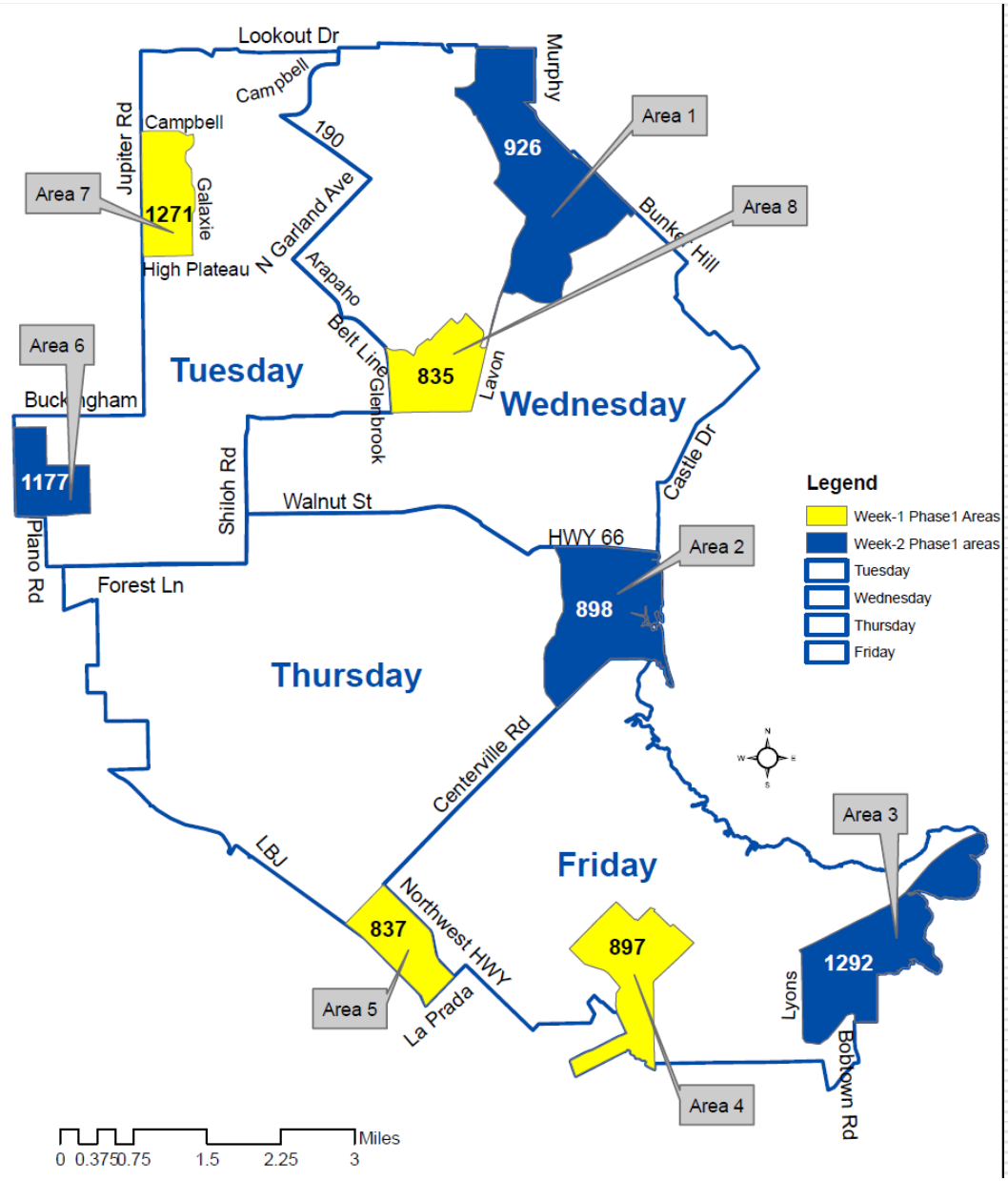
William E. Dollar
City Manager

Date: February 28, 2012

# Attachment A

# Eight (8) Automated Collection
# Single Stream Recycling
# Phase 1 Areas
# Number of Households

# Eight (8) Automated Collection Single Stream Recycling Phase 1 Areas Number of Households

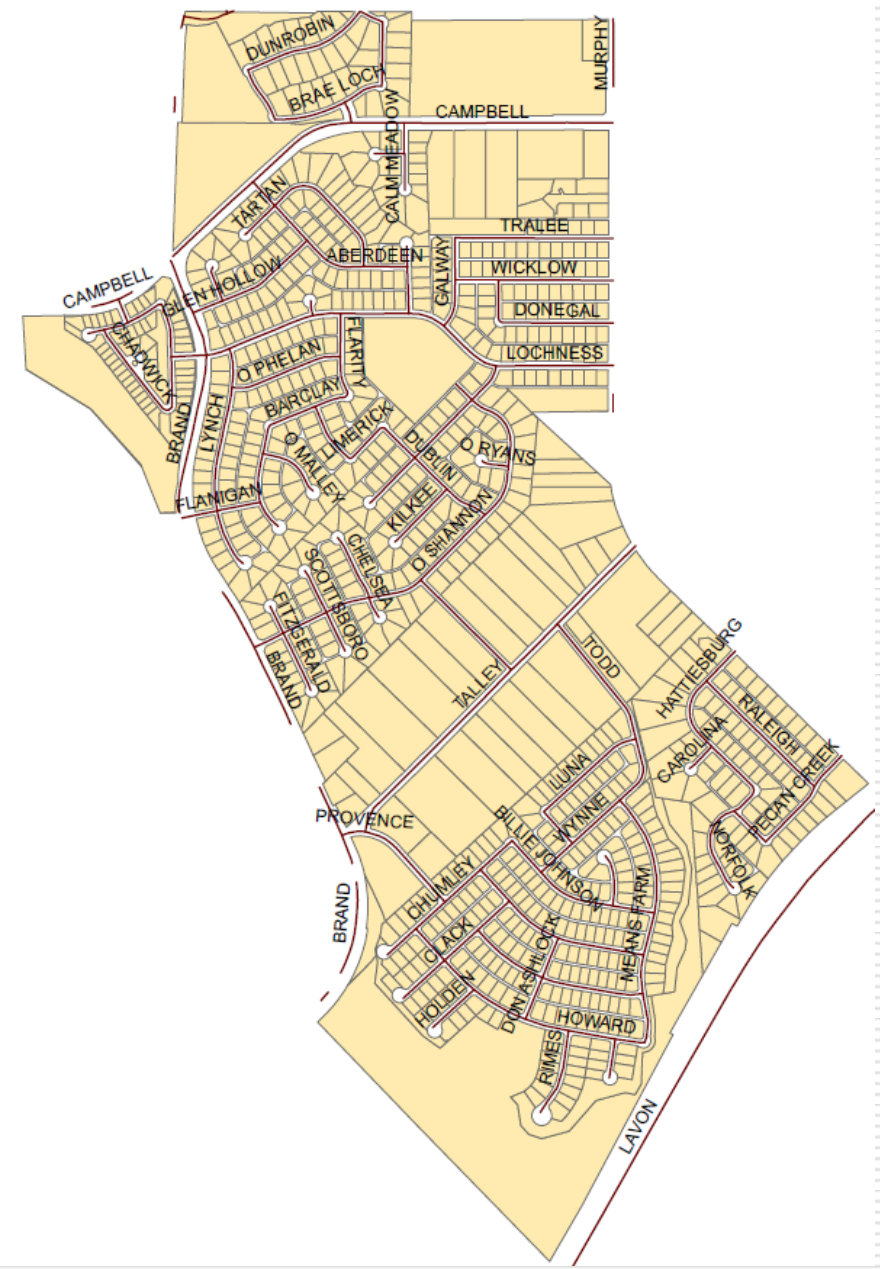


# Attachment B

# Eight (8) Automated Collection Single Stream Recycling Phase 1 Areas Detail Maps

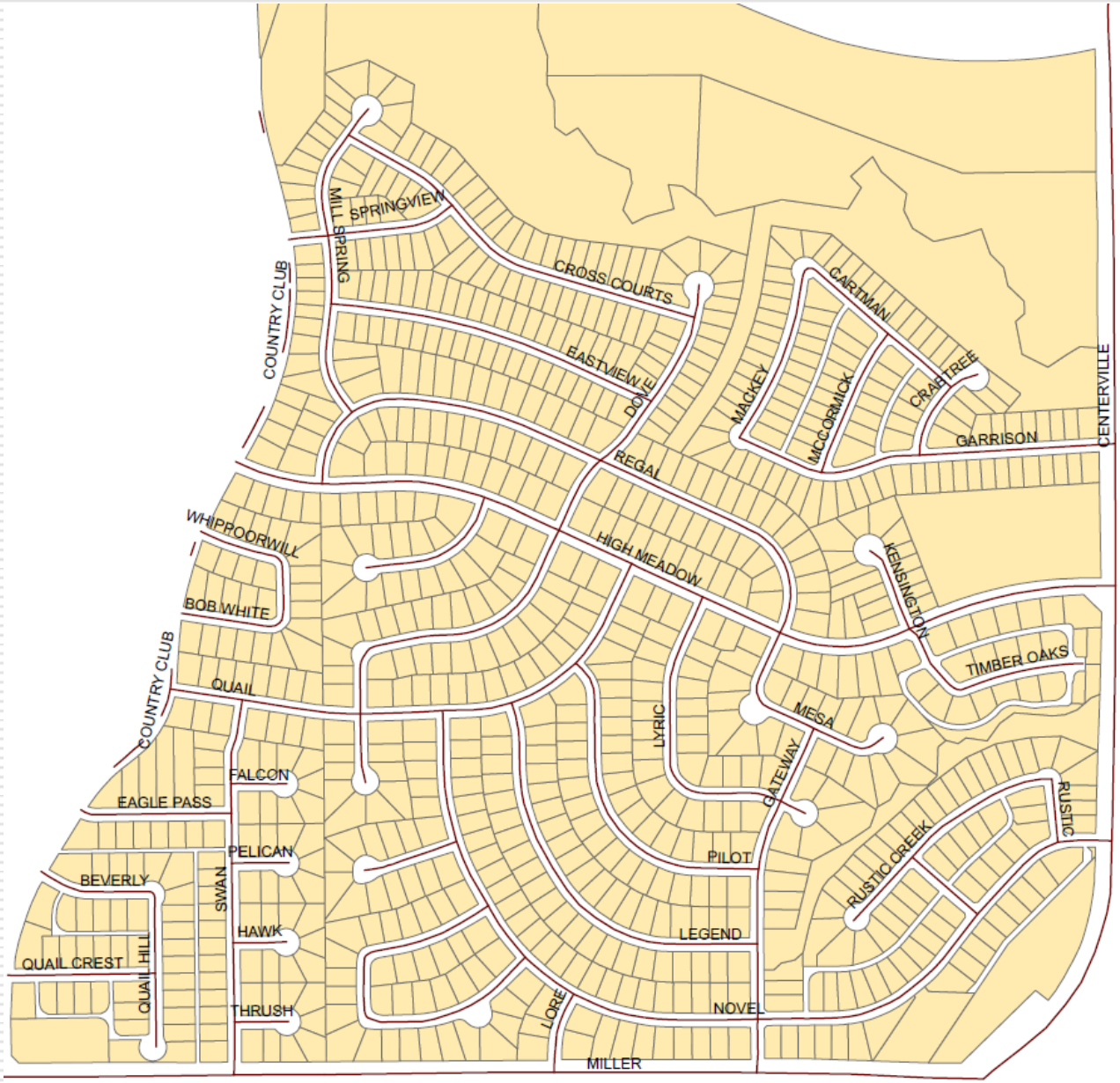
# Area 1

- 926 Homes
- 61% Participation Rate
- 5.39 Tons Collected per Week



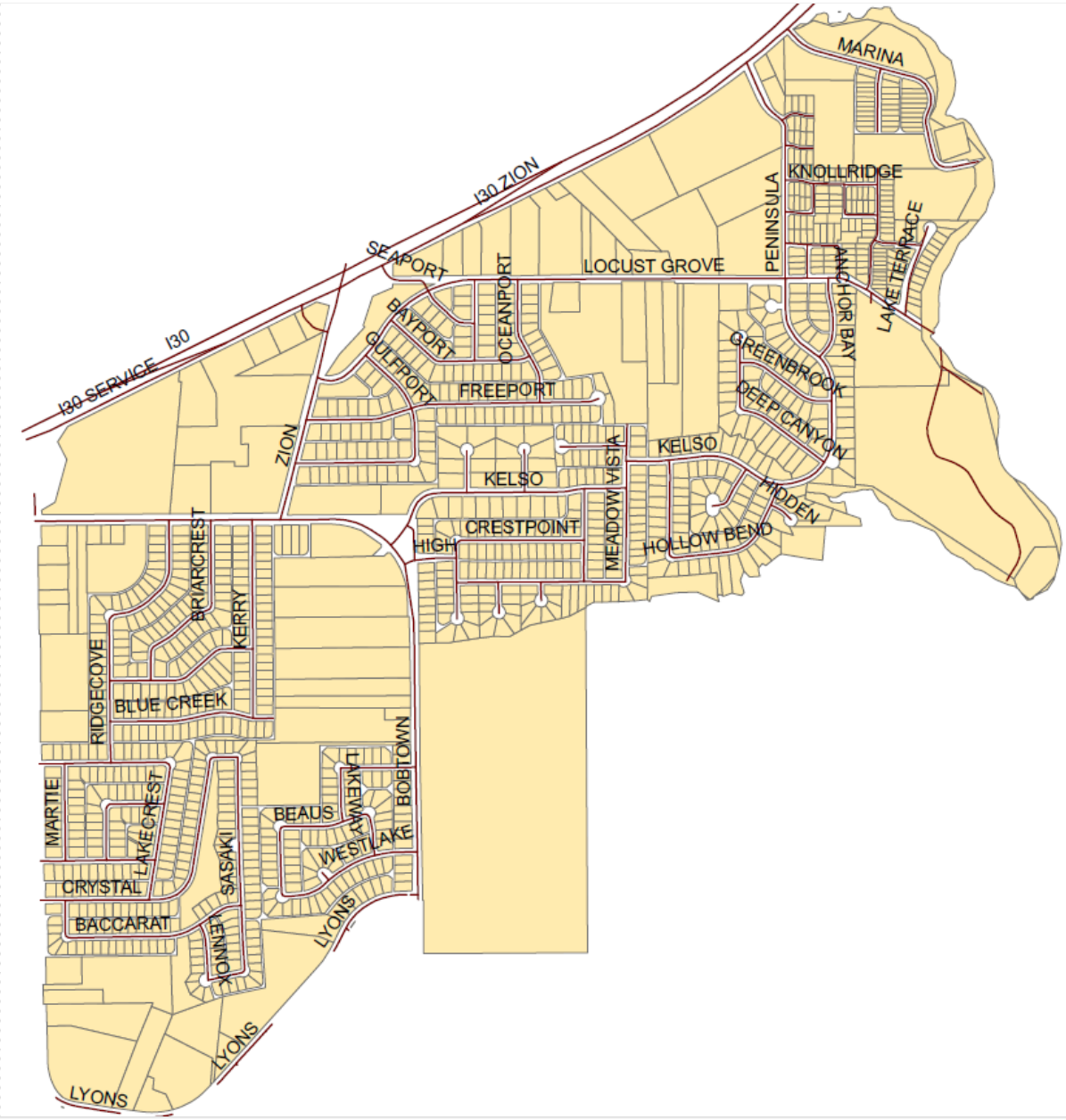
# Area 2

- 898 Homes
- 36% Participation Rate
- 2.04 Tons Collected per Week



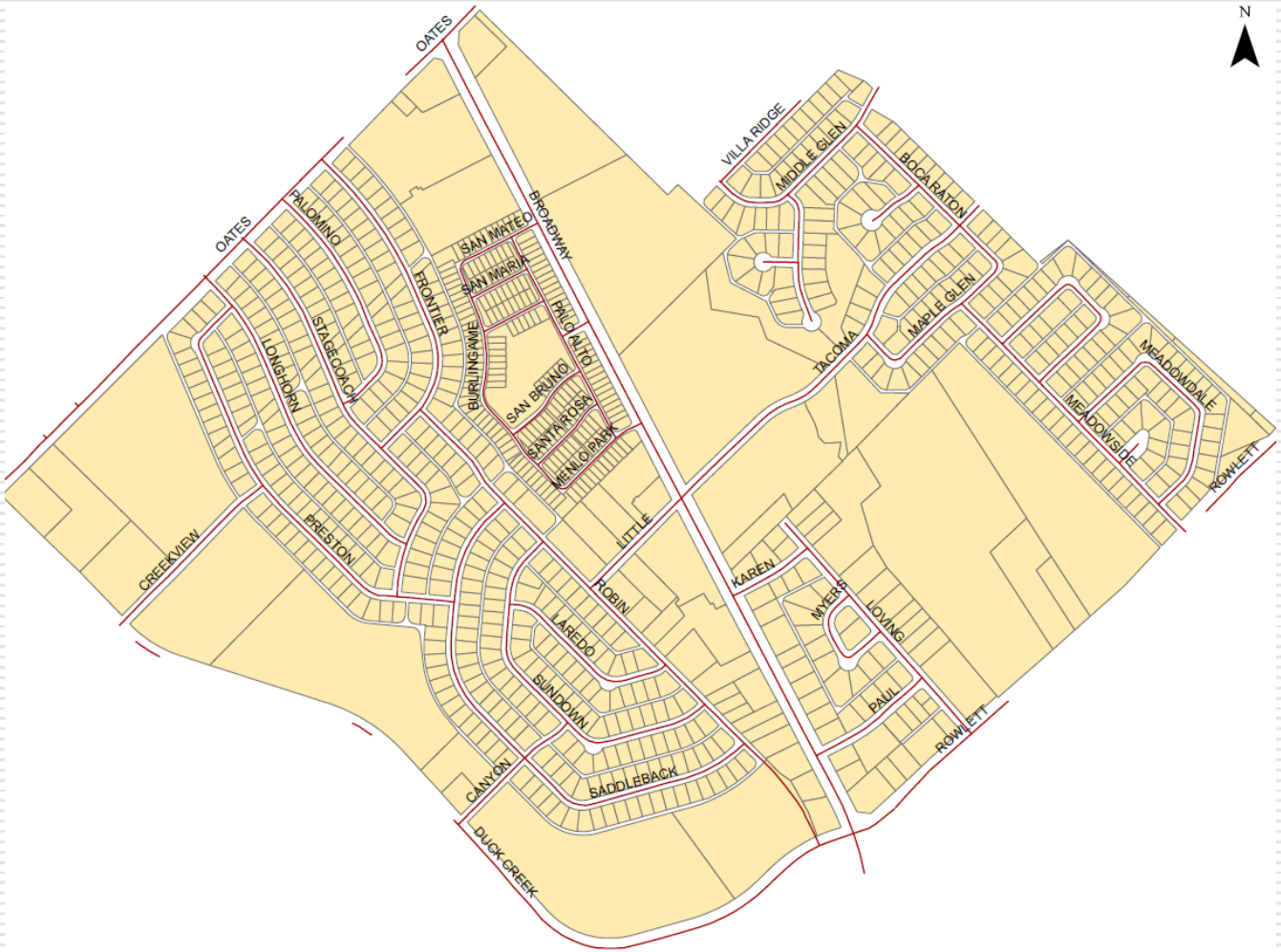
# Area 3

- 1292 Homes
- 42% Participation Rate
- 3.17 Tons Collected per Week



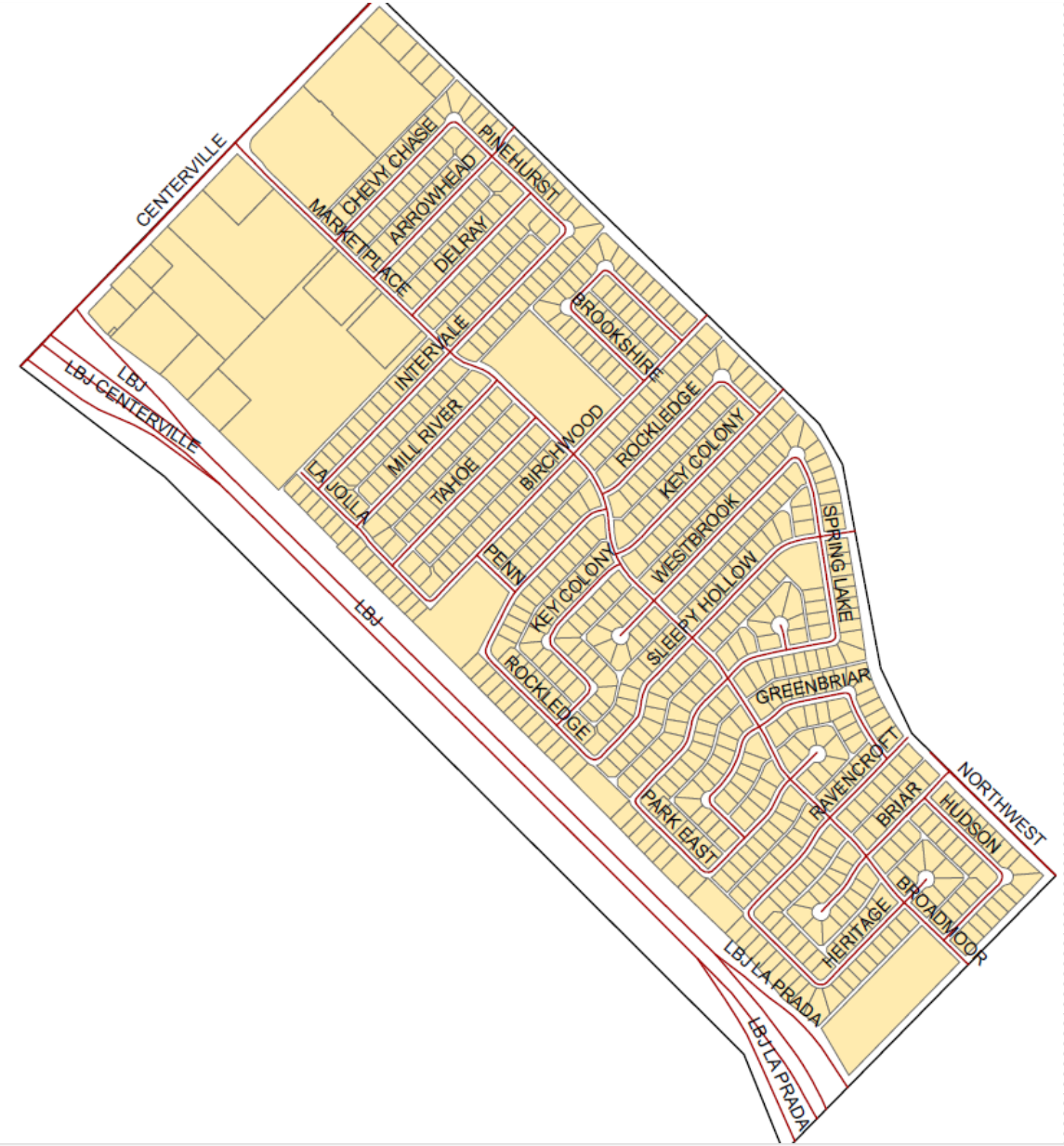
# Area 4

- 897 Homes
- 37% Participation Rate
- 2.36 Tons Collected per Week



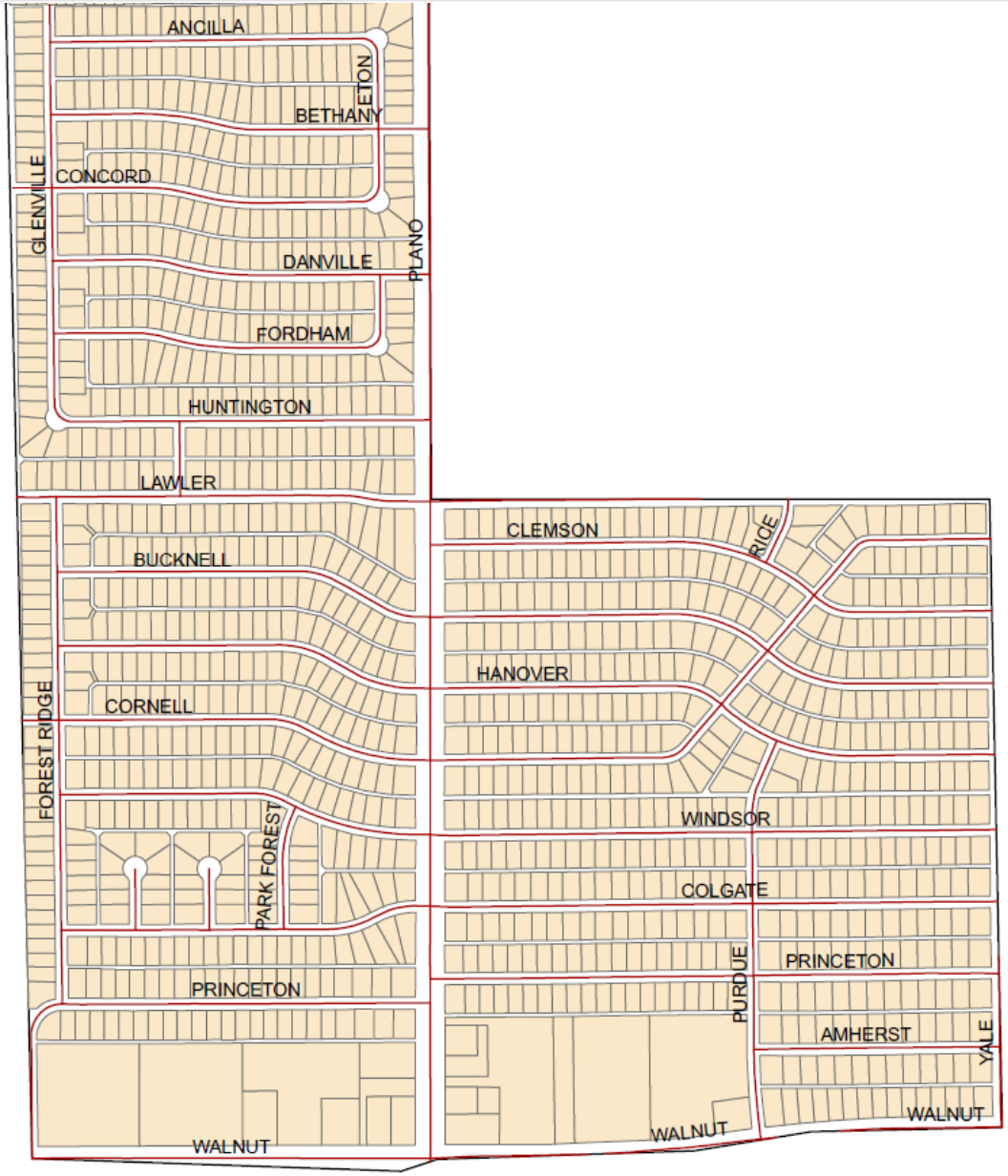
# Area 5

- 837 Homes
- 37% Participation Rate
- 2.53 Tons Collected per Week



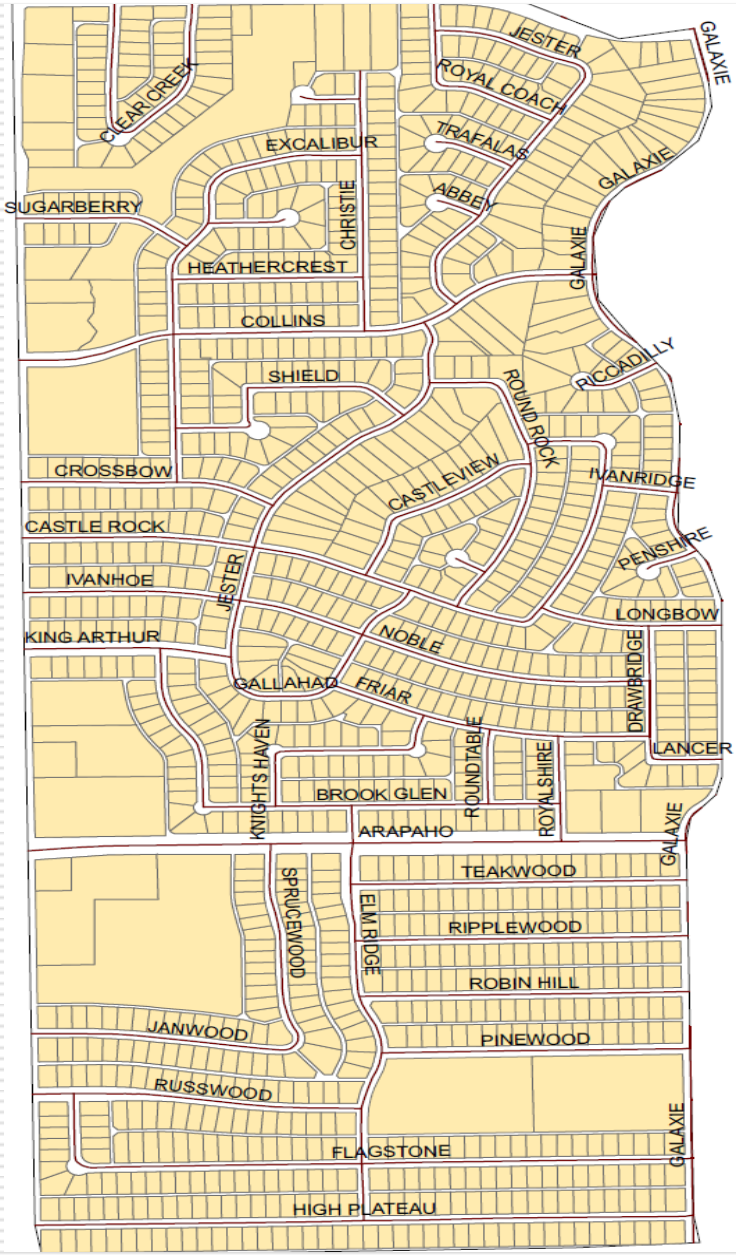
# Area 6

- 1177 Homes
- 33% Participation Rate
- 1.83 Tons Collected per Week



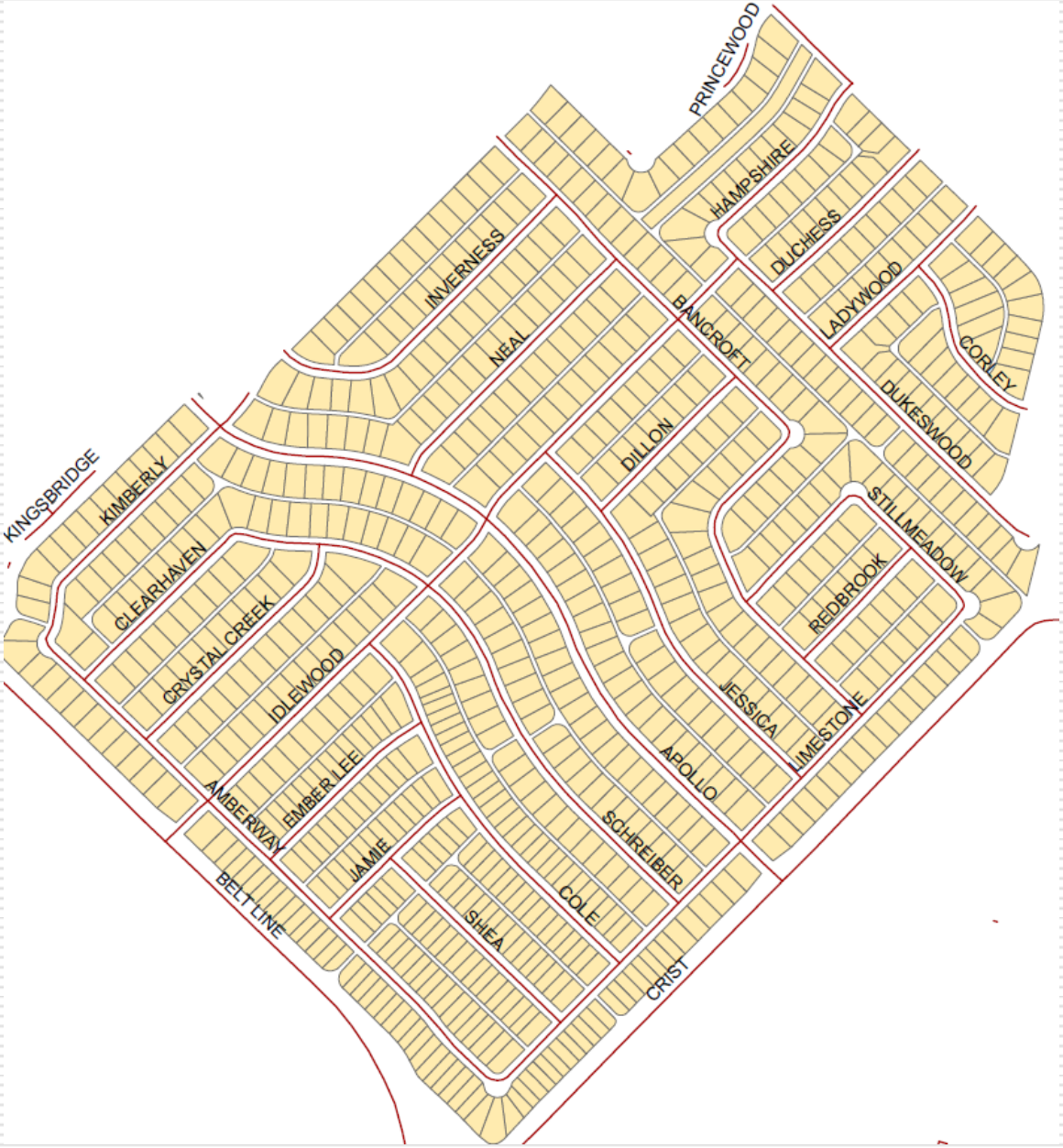
# Area 7

- 1271 Homes
- 55 % Participation Rate
- 2.85 Tons Collected per Week



# Area 8

- 835 Homes
- 41% Participation Rate
- 2.12 Tons Collected per Week



# Policy Report

**Report No: 2012-2018**
**Agenda Item: WS-3b**
**Meeting: Work Session**
**Date: March 5, 2012**

## Employee Lump Sum Payment

### ISSUE

Due to the economic downturn, the City has been unable to fund base salary increases since the 2008-2009 fiscal year. To help offset a portion of the impact this has had on City employees, a lump sum payment of up to three-percent is being proposed.

### OPTIONS

(1) Approve a one-time, lump sum payment of up to 3%.
(2) Approve a one-time, lump sum payment for an amount less than 3%.
(3) Do not approve.

### RECOMMENDATION

Option (1) Approve a one-time, lump sum payment of 3%.

### COUNCIL GOAL

Financially Stable Government with Tax Base that Supports Community Needs
Consistent Delivery of Reliable City Services

### BACKGROUND

The last increase in base pay was awarded in 2008-09. In the 2009-10 Budget, employee base pay was actually reduced by 1.15%. The following year, 2010-11, the 1.15% was reinstated. No changes in employee base compensation were budgeted for 2011-12. While many of Garland's competing cities followed similar compensation policies during the first few years of the economic downturn, all but Garland provided some form of compensation adjustment for 2011-12.

It is recommended that a one-time, lump sum payment be made to all eligible full-time and part-time employees based on their last three years of service to the City. The following schedule outlines the proposed lump sum amounts:

1. Employed the last three years – Hired December 31, 2008 or earlier - 3% of annual base salary

2. Employed the last two years – Hired January 1, 2009 through December 31, 2009 - 2% of annual base salary

3. Employed for one year – Hired January 1, 2010 through December 31, 2010 - 1% of annual base salary

Employees currently on a Performance Improvement Plan (PIP) would receive 1% less than the recommended lump sum percentage above.

## CONSIDERATION

The proposed lump sum payment would amount to $2,150,169 in General Fund, including associated taxes and benefit costs. Citywide for all funds, the amount is $3,561,014. Funding for the proposed payment is available due to better than anticipated 2010-11 year-end results and reserve balances in excess of amounts required to meet Council policy. A Budget Amendment appropriating the funds for lump sum increases has been placed on the Regular Agenda for March 6th, for Council consideration.

If approved, lump sum payments would be issued to eligible employees during the first week of April 2012.

## ATTACHMENT

Pay provisions of area Metroplex cities for the last three fiscal years.

Submitted By:

William E. Dollar
City Manager

Date: February 29, 2012

# Metro Salary Increase Update
## 2/22/2012

| City | 2009-2010 | | | 2010-2011 | | | 2011-2012 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | GS Pay Increase | GS Struct Adj | CS Struc Adj | GS Pay Increase | GS Struct Adj | CS Struct Adj | GS Pay Increase | GS Struct Adj | CS Struct Adj | Eff Date | 2012 Notes |
| Arlington | 0% | 0% | 0% | 0% | 0% | 0% | 4% (LS) | 2% | 2% | 11/17/2012 | 4% lump sum |
| Carrollton | 0% | 0% | 4% | 0% | 0% | 0% | 1.5% (ATB) | 1.5% | 0% | 1/1/2012 | 1.5% pay increase ATB |
| Dallas | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | | *See footnote |
| Fort Worth | 0% | 0% | 3% | 0% | 0% | 2% | 3% (ATB) | 3% | 2% | 9/24/2011 | 3% ATB GS; 3.25% Police; 2% Fire |
| Frisco | 3% | 0% | 0% | 3% (LS) | 0% | 0% | 3% (LS) | 0% | 0% | 10/1/2011 | up to 3% lump sum based on performance |
| Garland | -1.15% | 0% | -1.15% | 1.15% | 0% | 1.15% | 0% | 0% | 0% | | 0% |
| Grand Prairie | $1,500 (LS) | 0% | $1,500 (LS) | $1,500 (LS) | 0% | $1,500 (LS) | 3% | 0% | 3% | 10/8/2011 | 3% for satisfactory performance |
| Irving | 3.5% | 3.5% | 1% | 3.5% | 3.5% | 0% | 3.5% | 0% | 0% | 10/1/2012 | 3.5% increase if salary not at max |
| McKinney | 0% | 0% | 0% | 0% | 0% | 0% | 2% (ATB) | 0% | 0% | 10/1/2011 | 2% pay increase ATB; min of $1K; max of $2K |
| Mesquite | 3% | 0% | 3% | 0% | 0% | 0% | 3% | 0% | 0% | 10/1/2011<br>1/1/2012 | On anniv. date: <$35K recvs 4%<br>>$35K recvs 2%<br>CS recvs 2% |
| Plano | 0% | 0% | 0% | 0% | 0% | 0% | 2% (ATB) | 2% | 2% | 10/1/2011 | 2% pay increase ATB |
| Richardson (step) | 0.0% | 0% | 0% | 0.0% | 0% | 0% | 2% | 2% | 2% | 10/1/2011 | 2.5 - 5% merit depending on step at anniv date |

GS = General Schedule
CS = Civil Service

LS = Lump Sum
ATB = Across the Board

* In FY 2010-2011 Dallas assigned 8 furlough days; for FY 2011-2012 Dallas reduced to 5 furlough days resulting in 1.15% pay increase over previous year.