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Land Use Assumptions

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Deep Roots. Broad Wings. Bright Future.

City of Lewisville, Texas

July 16, 2018

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1. PURPOSE

Chapter 395 of the Texas Local Government Code prescribes the process by which cities in Texas must formulate impact fees. An initial step in the update process is the establishment of land use assumptions that address growth and development for a ten-year planning period (TLGC Section 395.001(5)) for the years 2017-2027. These land use assumptions, which also include population and employment projections, will become the basis for the preparation of impact fee capital improvement plans for water, wastewater, and roadway facilities.

To assist the City of Lewisville in determining the need and timing of capital improvements to serve future development, a reasonable estimation of future growth is required. The purpose of this report is to formulate growth and development projections based upon assumptions pertaining to the type, location, quantity and timing of various future land uses within the community and to establish and document the methodology used for preparing the growth and land use assumptions.

Land Use Assumptions Report Elements

This report contains the following components:

- **Study Area Analysis -** Explanation of data collection zones (traffic survey zones), and division of the City into impact fee service areas for roadway, water and wastewater facilities.
- **Methodology -** Explanation of the general methodology used to prepare the land use assumptions.
- **Base Year Data Analysis** - Historical population trends for Lewisville and information on population, employment, and land use for Lewisville as of 2017.
- **Ten-Year Growth Assumptions** - Population and employment growth assumptions for ten years by Traffic Survey Zone (TSZ).
- **Build out** – Calculation of ultimate capacity for population and employment
- **Summary** - Brief synopsis of the land use assumptions report.

2. STUDY AREA AND DATA FORMAT

Data collection zones used for land use assumptions are based upon small geographic areas known as traffic survey zones (TSZs). These zones, established by the North Central Texas Council of Governments (NCTCOG), cover the Metropolitan Planning Organization's planning area and serve as the basis for socio-demographic data used in the regional travel forecast model. The TSZs were originally formulated on the basis of homogeneity and traffic generation potential using major arterials, creeks, railroad lines and other physical boundaries for delineation.

Study Area

The study area for this report covers the City Limits and ETJ. The City Limits is the boundary for both water and wastewater service area. In order to provide greater flexibility of the use of this report, two sets of analyses are conducted here; one for the City Limits and the ETJ, and one for the City Limits only.

Study Area 1	City Limits and ETJ
Study Area 2	City Limits only

Figures 1 illustrates the study areas (City Limits and ETJ) and **Figure 2** illustrates the TSZ boundaries. **Figure 3** and **Figure 4** shows the water and wastewater service area.

Figure 1: Lewisville City Limits and ETJ
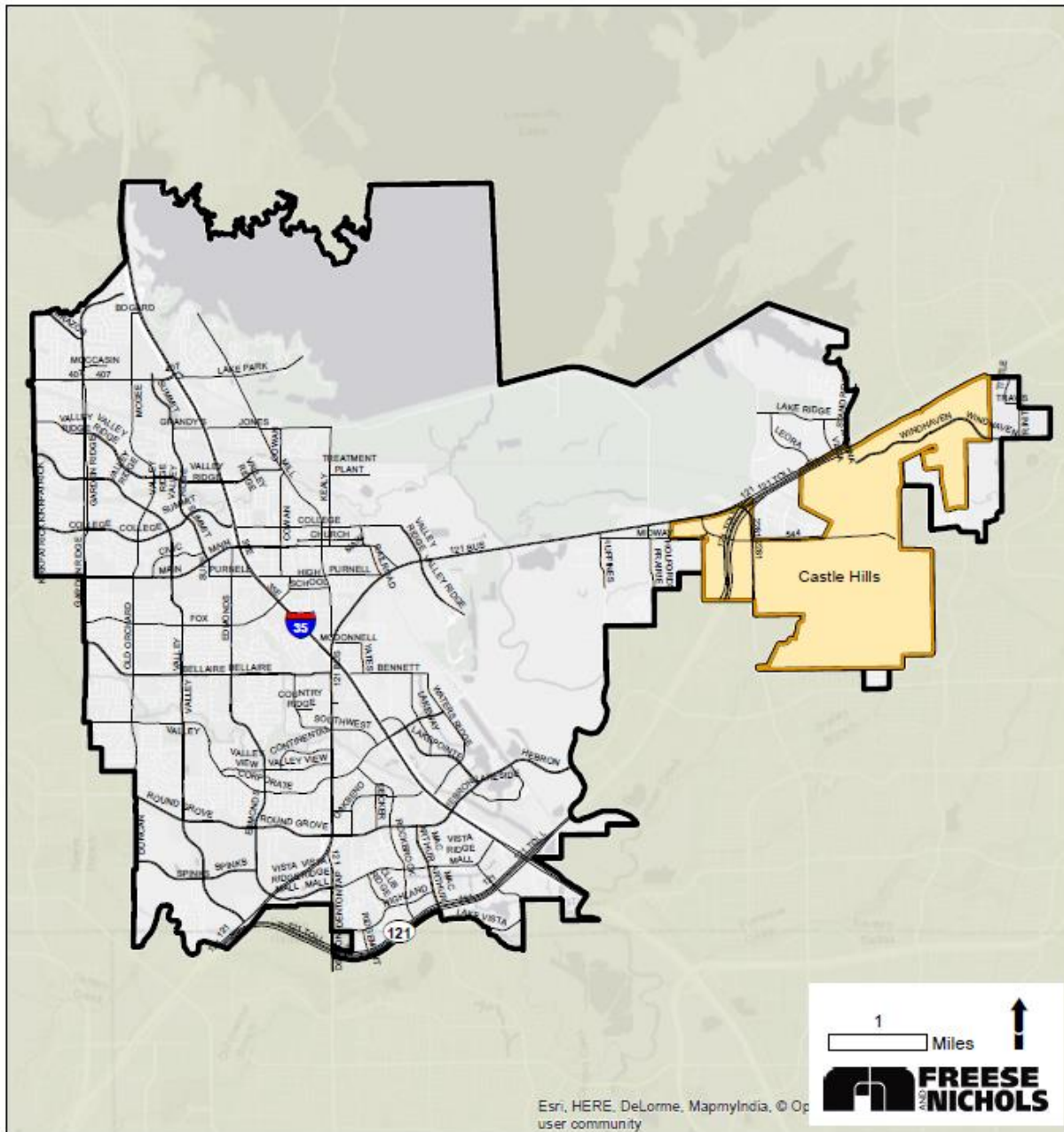
City Limits and ETJ Map

City Limits

ETJ

Figure 2: Lewisville City Limits and ETJ with TSZ Boundaries

TSZ Boundary Map

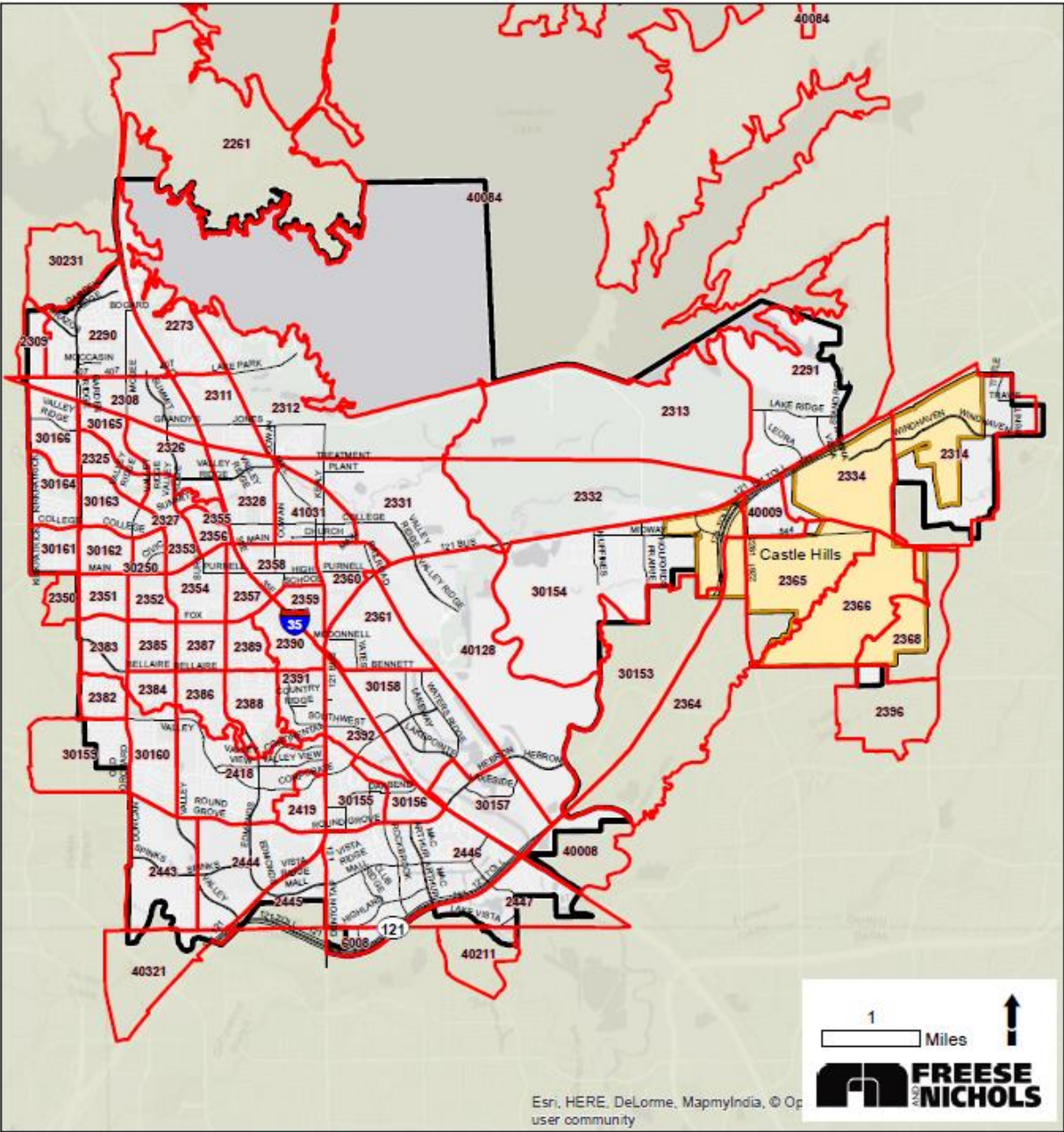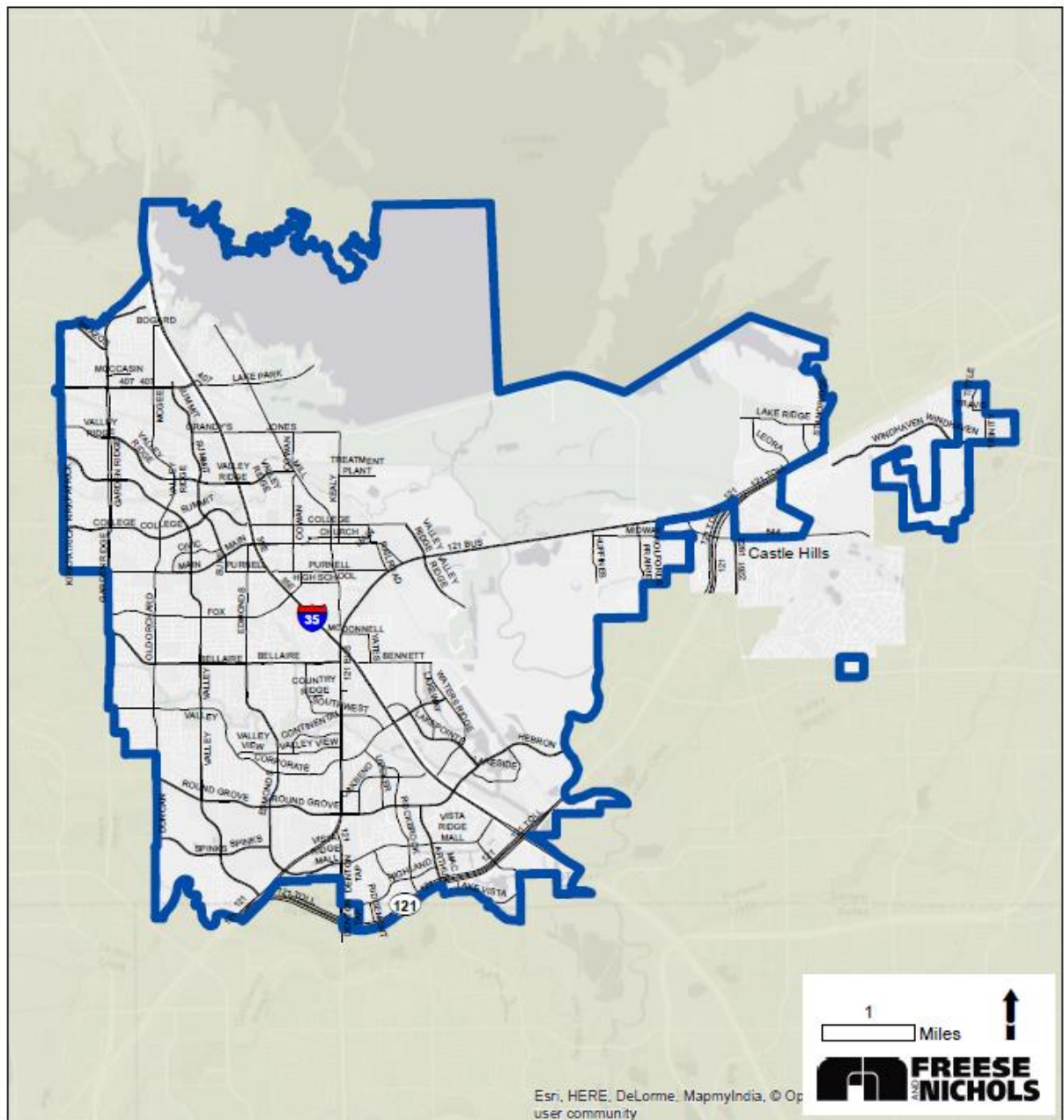- TSZ Boundaries
- City Limits
- ETJ

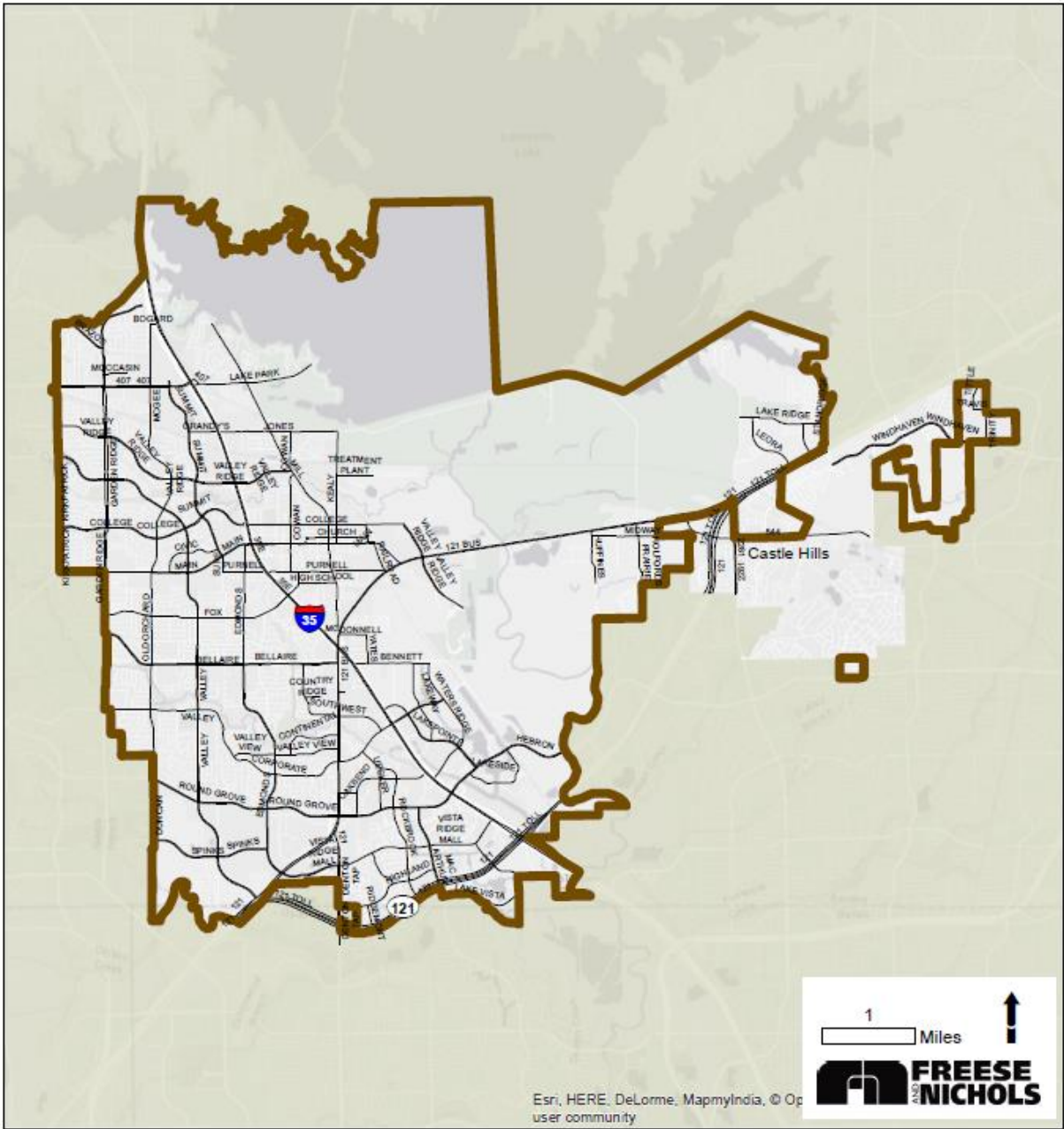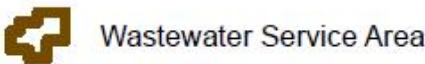*Figure 3: Lewisville Water Service Area*

Water Service Area

 Water Service Area

Figure 4: Lewisville Wastewater Service Area

Wastewater Service Area

Wastewater Service Area

Data Format

The existing database and the future projections were formulated according to the following format and categories:

Study Area Correlates to the City Limits and ETJ.

Traffic Survey Zone (TSZ) Geographic areas established by the NCTCOG Traffic Model that are used for data collection purposes and termed TSZs within this report.

Population (2017) Existing population for the base year (2017).

Population (2027) Projected population by service zone for the year 2027 (ten-year growth projections).

Employment (2017, 2027) Employment data is aggregated to three employment sectors and include: Basic, Retail and Service. The following details which North American Industry Classification System (NAICS) codes fall within each of the three sectors.

- Basic (#210000 to #422999) -- Land use activities that produce goods and services such as those that are exported outside the local economy; manufacturing, construction, transportation, wholesale trade, warehousing and other industrial uses.

- Retail (#440000 to #454390) -- Land use activities which provide for the retail sale of goods that primarily serve households and whose location choice is oriented toward the household sector such as grocery stores, restaurants, etc.

- Service (#520000 to #928199) -- Land use activities which provide personal and professional services such as financial, insurance, government, and other professional and administrative offices.

The NCTCOG prepares employment estimates at the TSZ level and therefore, minimal adjustments are needed.

3. METHODOLOGY

Based upon the growth assumptions and the capital improvements needed to support growth, it is possible to develop an impact fee structure that fairly allocates improvement costs to growth areas in relation to their impact upon the entire infrastructure system. The data in this report has been formulated using reasonable and generally accepted planning principles for the preparation of impact fee systems in Texas.

These land use assumptions and future growth projections take into consideration several factors influencing development patterns, including the following:

- The character, type, density, and quantity of existing development,
- Anticipated future land use derived from the City's current land use trend, Lewisville 2025 (the City's Comprehensive Plan) and Small Area Plans
- Availability of land for future expansion
- Current and historical growth trends of population and development within the City,
- Location and configuration of vacant land, and
- Known or anticipated development projects as defined by City Staff.

A series of work tasks were undertaken in the development of this report and are described below:

Step 1: Scope of the Study and Data Collection

A kick-off meeting was held between FNI and the City Staff to discuss the general methodological approach in the study. Data from NCTCOG was used as an initial database for this study. Population and Employment Data for 2017 by TSZ were collected.
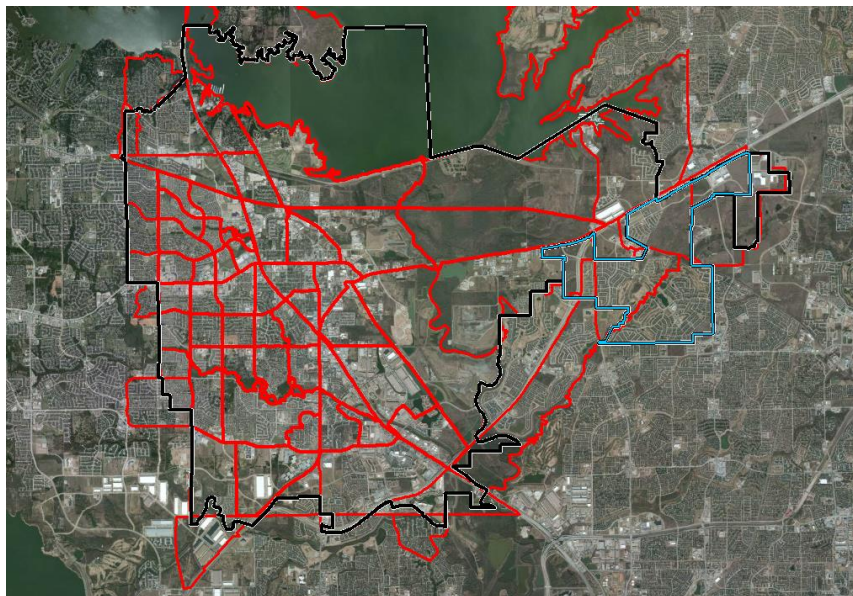
Study Area with TSZ Boundaries

Step 2: Estimation of 2017 Population and Employment

Although TSZs were as a basis for the data analysis purpose, it is important to note that TSZ boundaries do not follow the City Limits in some locations. In order to calculate data for the study area, 2017 population and employment data for each TSZ was reviewed and adjustments were made where necessary. For example, a TSZ that is geographically located completely within the study area (which in this case are the City Limits and ETJ), the base 2017 population and employment estimates were kept the same as received from NCTCOG. However, instances where only a certain portion of a TSZ was located within the study area, detailed spatial and geographical analysis of that TSZ was conducted to adjust 2017 population and employment numbers. The 2017 total population and employment numbers were calculated by aggregating the numbers of all applicable TSZs.

TSZ Completely within the Study Area   *TSZ partially within the Study Area*

Step 3: Estimation of 2027 Population and Employment

Each TSZ was evaluated from the perspective of its current development condition and anticipated future development trends. In general, past growth rates and the anticipated development trends were analyzed. Aerial images were used extensively to gain proper understanding of the future development potential for each TSZ. For example, for a TSZ that is built-out and no redevelopment projects are anticipated for that TSZ, the 2017 numbers remained the same for 2027. On the other hand, for a TSZ that was only partially developed or completely vacant, the City's anticipated future land use pattern was analyzed for that area to determine what type of development that TSZ was likely to host by 2027 and population and employment for 2027 were calculated based on that analysis. The City has also adopted Special Area Plans in certain portions of the City such as the I-35 Corridor Identity Plan and the Old Town TOD Plan. Where it was anticipated that redevelopment would occur within portions of the study area, adjustments were also made. The 2027 total population and employment numbers were calculated by aggregating the numbers for all applicable TSZs.

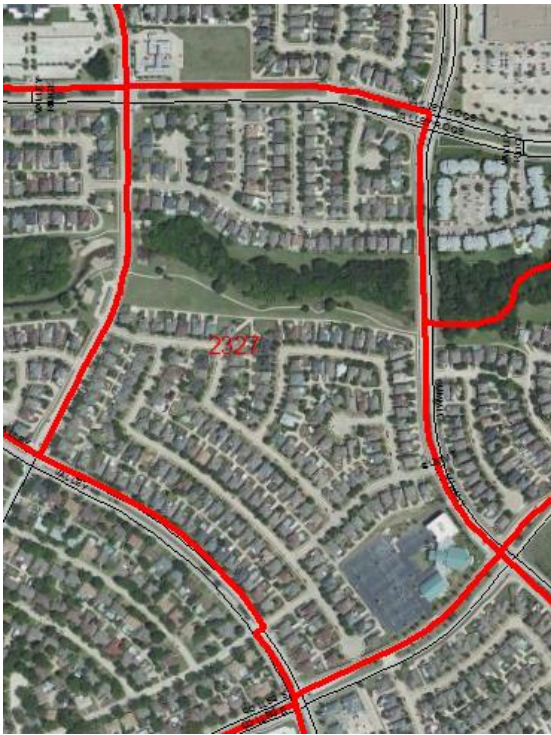*TSZ Completely Built-out*   *TSZ with Vacant Land*

<u>Step 4: Build-out Population and Employment</u>

The residential and non-residential vacant acreages were calculated for the study area. The build-out population was calculated by taking the vacant residential areas and multiplying by the approximated dwelling units per acre, persons per household and occupancy rates to calculate how many new residents the vacant residential acreages can accommodate. New residents were added to the existing population (2017 population) to calculate the build-out population. The additional employment was calculated by deriving a ratio between the existing developed non-residential acreages and corresponding employment and then applying the ratio to the vacant non-residential acreages. New employment was added to the existing employment (2017 employment) to calculate the build-out employment.

4. BASELINE ANALYSIS

This section documents the City's historical growth trends and data used to derive the 2017 base year population estimate for the City of Lewisville. This "benchmark" information provides a starting basis of data for the ten-year growth assumptions that will be presented within the following section.

Historical Growth

A City's past growth rates are often the best indicator of future growth rates. **Table 1** and **Table 2** show Lewisville's population, numerical change, and Compound Annual Growth Rate (CAGR) of recent years and by decade.

Analysis of growth rates since 1970 reveals Lewisville to have experienced phenomenal growth. However, the growth rate has been significantly decreasing every decade since 1980. The 45-year CAGR is 5.4%.

Table 1: Population Trend by Decade (City Limits only)

Year	Population	Population Change	Percent Change	CAGR
1970	9,264	-	-	
1980	24,273	15,009	162.0%	
1990	46,418	22,145	91.2%	
2000	77,737	31,319	67.5%	5.4%
2010	95,290	17,553	22.6%	
2015*	99,480	4,190	4.4%	

Source: Lewisville 2025 Vision
*2015 Data is from NCTCOG Population Estimate

Lewisville has grown at a moderate pace from 2011 and 2017, indicating that natural growth may become slower in the next few years. Growth rate of 4% between the years of 2016 and 2017 is the highest in the recent years. Between 2011 and 2017, the CAGR was 1.5%.

Table 2: Population Trend in Recent Years (City Limits only)

Year	Population	Population Change	Percent Change	CAGR
2011	95,430	-		
2012	96,000	570	0.6%	
2013	97,860	1,860	1.9%	
2014	98,330	470	0.5%	1.5%
2015	99,480	1,150	1.2%	
2016	100,400	920	0.9%	
2017*	104,390	3,990	4%	

Source: NCTCOG Population Estimate
*2017 Population Data is derived from TSZ Calculation

Projections for 2027: Multiple Scenarios

Based on the growth trends in Lewisville in recent years, a series of projections using 2017 as a base year have been calculated for both Study Area 1 (City Limits and ETJ) and Study Area 2 (City Limits only) in order to work as a basis for the Land Use Assumption process:

Table 3: Growth Projection Scenarios (City Limits and ETJ)

1%		1.5%		2%	
Year	Population	Year	Population	Year	Population
2017	120,624	2017	120,624	2017	120,624
2018	121,830	2018	122,433	2018	123,036
2019	123,049	2019	124,270	2019	125,497
2020	124,279	2020	126,134	2020	128,007
2021	125,522	2021	128,026	2021	130,567
2022	126,777	2022	129,946	2022	133,179
2023	128,045	2023	131,896	2023	135,842
2024	129,325	2024	133,874	2024	138,559
2025	130,619	2025	135,882	2025	141,330
2026	131,925	2026	137,920	2026	144,157
2027	133,244	2027	139,989	2027	147,040

Table 4: Growth Projection Scenarios (City Limits only)

1%		1.5%		2%	
Year	Population	Year	Population	Year	Population
2017	104,390	2017	104,390	2017	104,390
2018	105,434	2018	105,956	2018	106,478
2019	106,488	2019	107,545	2019	108,607
2020	107,553	2020	109,158	2020	110,780
2021	108,629	2021	110,796	2021	112,995
2022	109,715	2022	112,458	2022	115,255
2023	110,812	2023	114,145	2023	117,560
2024	111,920	2024	115,857	2024	119,911
2025	113,039	2025	117,595	2025	122,310
2026	114,170	2026	119,358	2026	124,756
2027	115,312	2027	121,149	2027	127,251

It was determined, based upon past and anticipated development patterns that an approximate of 2% CAGR would be a realistic assumption for future population growth within Lewisville City Limits.

2017 Population and Employment in Land Use Assumptions Process

For the land use assumptions process, 2017 base population and employment data was calculated using and adjusting data from the North Central Texas Council of Governments (NCTCOG). This information provided a breakout of population and employment by traffic survey zone (TSZ) for 2017. It is important to note that the TSZs do not follow City limits in some locations, so adjustments were made based on the locations of existing land uses and upon the percentage of each TSZ located within the study areas. For detailed description of the methodology, please see Section 3. Methodology.

Table 5: 2017 Estimates (City Limits and ETJ)

2017 Population & Employment	
Population	120,624
Housing Units	42,473
Total Employment	68,515
Basic Employment	*13,911*
Retail Employment	*8,262*
Service Employment	*46,342*
Source: Freese and Nichols, Inc.	

Table 6: 2017 Estimates (City Limits only)

2017 Population & Employment	
Population	104,390
Housing Units	36,757
Total Employment	67,754
Basic Employment	*13,868*
Retail Employment	*7,923*
Service Employment	*45,963*
Source: Freese and Nichols, Inc.	

5. TEN-YEAR POPULATION AND EMPLOYMENT

Projected growth has been characterized in two forms: population and employment. A series of assumptions were made to arrive at reasonable growth rates for population and employment. The following assumptions were made as a basis from which ten-year projections could be initiated.

- Future land uses will occur based on similar trends of the past and will conform with the anticipated future development and redevelopment opportunities as forecasted in the Comprehensive Plan and Small Area Plans, and
- The City will be able to finance the necessary improvements to accommodate continued growth.

For description of the projection methodology, please see *Section 3. Methodology*.

A large scale multi-family and mixed-use development is anticipated to be completed by 2027 in the Castle Hills area. This development attributes to a large growth in the ETJ area. Although a 2% CAGR has been identified to be the anticipated level of growth within the City Limits, a higher CAGR for the combined area of the City Limits and ETJ is estimated based on the large-scale development in the ETJ.

Table 7: 2027 Land Use Assumptions

Ten-Year Population and Employment Projections						
	2017			2027		
	Units	**Population**	**Employment**	**Units**	**Population**	**Employment**
City Limits and ETJ	42,473	120,624	68,515	53,825	152,864	81,313
City Limits only	36,757	104,390	67,754	44,493	126,362	75,987

Table 8: Numerical Changes and Percent Changes

Growth from 2017 to 2027						
	Units Added	**Units Pct. Change**	**Population Added**	**Population Pct. Change**	**Employment Added**	**Employment Pct. Change**
City Limits and ETJ	11,352	2.40%	32,240	2.40%	12,798	1.73%
City Limits only	7,736	1.93%	21,972	1.93%	8,233	1.15%

Table 9: Employment Breakdown 2027

Employment Breakdown for 2027			
	Basic	**Retail**	**Service**
City Limits and ETJ	16,646	9,484	55,183
City Limits only	15,556	8,863	51,568

6. BUILD-OUT POPULATION AND EMPLOYMENT

Build-out population and employment has been calculated using residential and non-residential vacant acreages and vacant lots to determine the ultimate number of new residents and new employments the study areas can add and then combining the results with the 2017 population and employment estimates. It should be noted that the numbers for the build-out population and employment are different than the 2027 estimates as the study area is not going to be completely build-out by 2027.

Build-out Population

Calculation of Build-out Population for Study Area 1 (City Limits and ETJ)	
2017 Population Estimates in City Limits and ETJ	120,624
New Residents in City Limits	31,043
New Residents in ETJ	11,495
Build-out Population in City Limits and ETJ	*163,162*

Calculation of Build-out Population for Study Area 2 (City Limits only)	
2017 Population Estimates in City Limits	104,390
New Residents in City Limits	31,043
Build-out Population in City Limits	*135,433*

Build-out Employment

Calculation of Build-out Employment for Study Area 1 (City Limits and ETJ)		Build-out Employment Breakdown	
2017 Employment Estimates in City Limits and ETJ	68,515		
New Employment in City Limits	23,863	Basic	20,307
New Employment in ETJ	6,815	Retail	11,569
		Service	67,317
Build-out Employment in City Limits and ETJ	*99,193*		

Calculation of Build-out Employment for Study Area 2 (City Limits only)		Build-out Employment Breakdown	
2017 Employment Estimates in City Limits	67,754		
New Employment in City Limits	23,863	Basic	18,756
		Retail	10,686
Build-out Employment in City Limits	*91,617*	Service	62,175

Castle Hills

The ETJ consists of the Castle Hills area which is currently undergoing large scale residential and nonresidential development. These existing and upcoming developments in the Castle Hills area have been incorporated in the land use assumption process. It has been assumed residential developments in Castle Hills will be approximately built-out by 2027 but it will take more years for office, retail and commercial developments in Castle Hills to be built-out.

Castle Hills Population Summary	Castle Hills Employment Summary
2017 Population = 15,091 2027 Population = 26,003 Build-out Population = 26,215	2017 Employment = 761 2027 Employment = 5,316 Build-out Employment = 5,875
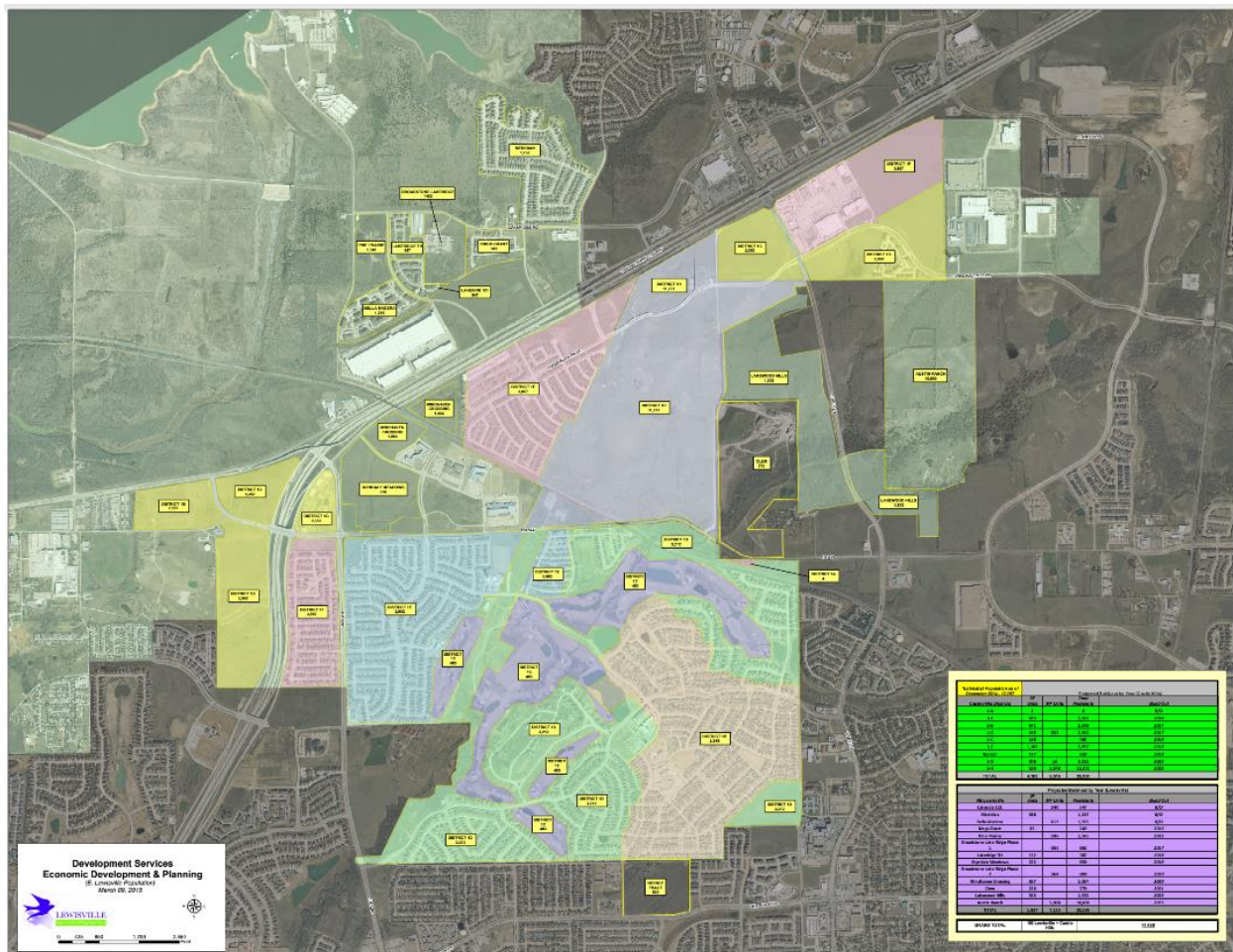
7. SUMMARY

- The existing 2017 population for the City Limits and ETJ is approximately 120,000 while the 2017 population Lewisville City Limits is approximately 104,000.

- The existing 2017 employment for the City Limits and ETJ is over 68,500 while the 2017 employment for Lewisville City Limits is approximately 67,700.

- The ten-year (2027) population growth projection for the City Limits and ETJ is approximately 153,000 with a CAGR of 2.4% while the 2027 population for Lewisville City Limits is approximately 126,000 using a CAGR of 1.93%.

- The ten-year (2027) employment growth projection for the City Limits and ETJ is approximately 81,000 while the 2027 employment for Lewisville City Limits is approximately 76,000.

- Build-out population is approximately 163,000 for the City Limits and ETJ and approximately 135,000 for City Limits only.

- Build-out employment is approximately 99,000 for the City Limits and ETJ and approximately 91,000 for City Limits only.

- Details of the 2017 and 2027 demographics by TSZs are attached.

APPENDICES

Population and Employment Estimates by TSZ (City Limits and ETJ)

TSZ	2017 Population Estimate	2017 Employment Estimate	2027 Population Estimate	2027 Employment Estimate	Build-out Population
40084	0	0	0	0	0
30161	1,594	148	1,594	148	1,594
30164	1,771	185	1,771	185	1,771
2383	2,478	417	2,478	417	2,478
2351	1,130	737	1,130	745	1,130
2385	1,465	168	1,465	170	1,465
2384	801	444	801	445	801
30162	1,268	629	1,268	629	1,268
30250	2,272	910	2,272	912	2,272
2352	1,045	737	1,045	737	1,045
2387	3,300	75	3,300	75	3,300
2354	1,988	1,097	1,988	1,097	1,988
2386	1,462	273	1,462	295	1,462
2418	6,674	1,179	6,830	1,306	6,830
2388	2,201	444	2,201	444	2,201
2391	3,695	370	3,695	370	3,695
30160	2,343	514	2,343	514	2,343
2389	1,142	222	1,142	222	1,142
2390	1,982	737	2,224	737	2,224
2353	258	810	295	875	295
2356	355	1,179	467	1,452	467
2357	843	737	843	750	843
2444	852	1,479	852	1,754	852
30155	3,791	1,034	4,281	1,064	4,281
2392	4,470	1,921	4,470	2,319	4,470
30156	2,113	1,917	2,113	1,917	2,113
30157	2,260	2,360	4,394	2,854	4,394
2312	1,937	941	1,937	941	1,937
2328	940	1,131	940	1,521	940
2311	1,139	629	1,139	678	1,139
2358	861	1,770	1,101	1,770	1,101
41031	707	3,025	2,278	3,825	4,191
2419	2,326	296	2,326	296	2,326
2359	565	1,039	565	1,201	565
2360	957	1,928	1,048	2,212	1,048
2331	0	1,070	144	1,470	2,180

TSZ	2017 Population Estimate	2017 Employment Estimate	2027 Population Estimate	2027 Employment Estimate	Build-out Population
30158	568	10,162	568	10,170	568
2361	576	1,097	576	1,697	576
2332	0	0	0	0	0
30165	1,113	296	1,113	310	1,113
30163	2,783	382	2,783	382	2,783
2325	1,138	326	1,138	326	1,138
2326	1,915	2,495	1,915	2,603	1,915
2327	640	69	640	69	640
2355	277	222	277	231	277
2382	1,772	148	1,772	148	1,772
2446	8,245	11,380	9,429	11,396	9,429
2273	1,262	359	2,001	464	2,001
2445	78	1,867	78	2,237	78
2308	1,690	500	4,352	679	7,472
40128	1,181	1,951	1,181	2,261	1,181
6008	630	0	630	0	630
2447	0	1,832	0	2,032	0
40008	0	0	0	0	0
30154	2,100	732	2,650	5,122	2,650
40009	677	0	1,618	203	1,618
2313	780	0	780	0	780
2291	2,105	48	2,825	549	2,825
30153	0	0	0	0	0
2364	1,324	0	1,324	7	1,324
2365	3,497	61	3,497	68	3,497
2334	2,861	215	9,057	497	10,775
2314	1,852	514	13,794	1,151	14,611
40321	502	0	502	59	502
30159	2,151	27	2,151	27	2,151
2443	2,042	296	2,042	589	2,042
2290	3,955	629	6,044	1,336	6,738
30166	2,794	148	2,794	148	2,794
2309	932	185	932	185	932
40211	0	6	0	6	0
2366	3,600	10	3,600	8	3,600
2396	750	0	750	0	750
2368	1,849	6	1,849	6	1,849
Total	**120,624**	**68,515**	**152,864**	**81,313**	**163,162**

Population and Employment Estimates by TSZ (City Limits only)

TSZ	2017 Population Estimate	2017 Employment Estimate	2027 Population Estimate	2027 Employment Estimate	Build-out Population
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2354	1,988	1,097	1,988	1,097	1,988
2386	1,462	273	1,462	295	1,462
2418	6,674	1,179	6,830	1,306	6,830
2388	2,201	444	2,201	444	2,201
2391	4,194	370	3,695	370	3,695
30160	2,343	514	2,343	514	2,343
2389	1,142	222	1,142	222	1,142
2390	1,982	737	2,224	737	2,224
2353	258	810	295	875	295
2356	355	1,179	467	1,452	467
2357	843	737	843	750	843
2444	852	1,479	852	1,754	852
30155	3,791	1,034	4,281	1,064	4,281
2392	4,470	1,921	4,470	2,319	4,470
30156	2,113	1,917	2,113	1,917	2,113
30157	2,260	2,360	4,394	2,854	4,394
2312	1,937	941	1,937	941	1,937
2328	940	1,131	940	1,521	940
2311	1,139	629	1,139	678	1,139
2358	861	1,770	1,101	1,770	1,101
41031	707	3,025	2,278	3,825	4,191
2419	2,326	296	2,326	296	2,326
2359	565	1,039	565	1,201	565
2360	957	1,928	1,048	2,212	1,048
2331	0	1,070	144	1,470	2,180
30158	568	10,162	568	10,170	568
2361	576	1,097	576	1,697	576

TSZ	2017 Population Estimate	2017 Employment Estimate	2027 Population Estimate	2027 Employment Estimate	Build-out Population
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2325	1,138	326	1,138	326	1,138
2326	1,915	2,495	1,915	2,603	1,915
2327	640	69	640	69	640
2355	277	222	277	231	277
2382	1,772	148	1,772	148	1,772
2446	8,245	11,380	9,429	11,396	9,429
2273	1,262	359	2,001	464	2,001
2445	78	1,867	78	2,237	78
2308	1,690	500	4,352	679	7,472
40128	1,181	1,951	1,181	2,261	1,181
6008	630	0	630	0	630
2447	0	1,832	0	2,032	0
40008	0	0	0	0	0
30154	350	732	350	1,232	350
40009	677	0	1,618	203	1,618
2313	780	0	780	0	780
2291	2,105	48	2,825	549	2,825
30153	0	0	0	0	0
2314	0	45	8,919	301	10,227
40321	502	0	502	59	502
30159	2,151	27	2,151	27	2,151
2443	2,042	296	2,042	589	2,042
2290	3,955	629	6,044	1,336	6,738
30166	2,794	148	2,794	148	2,794
2309	932	185	932	185	932
2396	750	0	750	0	750
40211	0	6	0	6	0
Total	104,390	67,754	126,362	75,987	135,433