Capital Improvements Element

City of Fayetteville Impact Fee Program

Including the following public facility categories:

Fire Protection
Police Services
Parks and Recreation
Road Improvements

Revised Draft June 26, 2018

ROSS+associates
urban planning & plan implementation

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Introduction

The purpose of a Capital Improvements Element (CIE) is to establish where and when certain new capital facilities will be provided within a jurisdiction and the extent to which they may be financed through an impact fee program. This Capital Improvements Element addresses parks & recreation, fire protection, law enforcement and road improvements.

As required by the Georgia Development Impact Fee Act ("State Act" of "DIFA"), and defined by the Department of Community Affairs in its *Development Impact Fee Compliance Requirements*, the CIE must include the following for each capital facility category for which an impact fee will be charged:

- a **projection of needs** for the planning period—2017 to 2040;
- the designation of **service areas**—the geographic area in which a defined set of public facilities provide service to development within the area;
- the designation of **levels of service** (LOS)—the service level that is being and/or will be provided;
- a **schedule of improvements** listing impact fee related projects and costs for the twenty-year planning period;
- a description of **funding sources** for the twenty-year planning period;
- The calculation of the **cost impact** of new development, credits, and impact fees; and
- A schedule of **maximum impact fees** that could be adopted, by land use category.

Impact Fees Authorized

Impact fees are authorized in Georgia pursuant to O.C.G.A. §36-71-1 et seq., the *Georgia Development Impact Fee Act* (DIFA), and are administered by the Georgia Department of Community Affairs under Chapter 110-12-2, *Development Impact Fee Compliance Requirements*, of the Georgia Administrative Code. Under DIFA, the City can collect money from new development based on that development's proportionate share—the 'fair share'—of the cost to provide the facilities needed specifically to serve new development. This includes the categories of public safety and parks. Revenue for such facilities can be produced from new development in two ways: through future taxes paid by the homes and businesses that growth creates, and through an impact fee assessed as new development occurs.

Categories for Assessment of Impact Fees

To assist in paying for the high costs of expanding public facilities and services to meet the needs of projected growth and to ensure that new development pays a reasonable share of the costs of public facilities, Fayetteville is updating its impact fees for parks, roads and public safety facilities (fire and police). The sections in this Methodology Report provide population and employment forecasts and detailed information regarding the inventory of current facilities, the level of service, and detailed calculations of the impact cost for the specific public facilities.

The following table shows the facility categories that are eligible for impact fee funding under Georgia law and that are considered in this report. The service area for each public facility category—that is, the geographical area served by the facility category—is also given, along with what the level of service standard, to be established for each facility category, is based.

Overview of Impact Fee Program - Facilities

	Fire Protection	Police Services	Parks and Recreation	Road Improvements
Eligible Facilities	Fire stations and fire apparatus (vehicles)	Occupied Facility space	Park acres, recreation components and trails	Road projects that increase capacity
Service Area	Citywide	Citywide	Citywide	Citywide
Level of Service Standard Based on …	Square footage and number of vehicles per day/night population	Square footage of facilities per day/night population	Number of acres, components and trails per dwelling unit	Percent of future traffic generated by new growth
Historic Funding Source(s)	Impact Fees and General Fund	Impact Fees and General Fund	Impact Fees and General Fund	Impact Fees and General Fund

Terms used in **Overview Table**:

Eligible Facilities under the State Act are limited to capital items having a life expectancy of at least ten years, such as land, buildings and certain vehicles. Impact fees cannot be used for the maintenance, supplies, personnel salaries, or other operational costs, or for short-term capital items such as computers, furniture or most automobiles. None of these costs are included in the impact fee system.

Service Areas are the geographic areas that the facilities serve, and the areas within which the impact fee can be collected. Monies collected in a service area for a particular category may only be spent for that purpose, and only for projects that serve that service area.

Level of Service Standards are critical to determining new development's fair share of the costs. The same standards must be applied to existing development as well as new to assure that each is paying only for the facilities that serve it. New development cannot be required to pay for facilities at a higher standard than that available to existing residents and businesses, nor to subsidize existing facility deficiencies.

Funding Sources include both impact fee collections and General Fund tax collections, depending on the proportion of impact fee eligibility. Impact fees will be used to fund all or a portion of eligible impact fee costs. Tax collections include the City's normal annual property tax levy and any special levies for debt instruments (such as bonds) that are intended to provide funding for impact fee projects in whole or in part; the General Fund may be used also as an interim source pending reimbursement from impact fee collections. SPLOST funds may be applied as a primary source of partial funding in accordance with an approved SPLOST program, which is established with each new SPLOST authorization and is not an historically consistent source.

Editorial Conventions

This report observes the following conventions:

The capitalized word 'City' applies to the government of Fayetteville, the City Council or any of its departments or officials, as appropriate to the context. An example is "the City has adopted an impact fee ordinance".

The lower case word 'city' refers to the geographical area of Fayetteville, as in "the population of the city has grown".

The same conventions are applied to the words 'County' and 'county', 'State' and 'state'.

Single quote marks (' and ') are used to highlight a word or phrase that has a particular meaning or refers to a heading in a table.

Double quote marks (" and ") are used to set off a word or phrase that is a direct quote taken from another source, such as a passage or requirement copied directly from a law or report.

Numbers shown on tables are often rounded from the actual calculation of the figures for clarity, but the actual calculated number of decimal points is retained within the table for accuracy and further calculations.

Forecasts

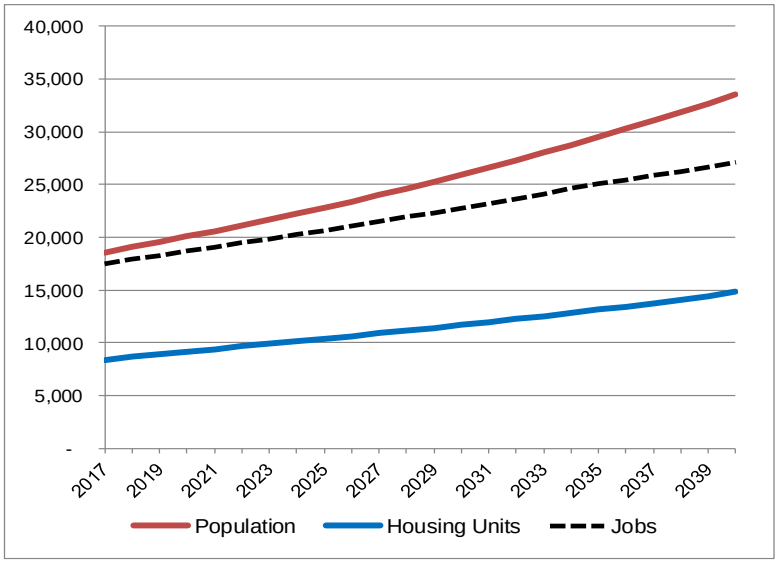
In order to accurately calculate the demand for future services for Fayetteville, new growth and development must be quantified in future projections. These projections include forecasts for population, households, housing units, and employment to the year 2040. These projections provide the base-line conditions from which the current (2017) Level of Service calculations are produced. Also, projections are combined to produce what is known as 'day/night population.' This is a method that combines resident population and employees in a service area to produce an accurate picture of the total number of persons that rely on certain 24-hour services, such as fire protection. The projections used for each public facility category are specified in each public facility chapter.

Overview

Continuing past trends, Fayetteville is expected to grow at a steady pace with regard to population and housing. Over the coming twenty-two years, the city is expected to another 15,000 residents and 6,400 housing units, increasing by almost 81% and over 76%, respectively. Employment in Fayetteville is also expected to grow, attracting about 9,600 new jobs by 2040 (a 55% increase).

Forecasts of Future Growth

Year	Population	Housing Units	Jobs
2017	18,574	8,409	17,500
2018	19,057	8,661	17,895
2019	19,554	8,909	18,284
2020	20,063	9,158	18,677
2021	20,585	9,410	19,074
2022	21,121	9,656	19,466
2023	21,672	9,901	19,860
2024	22,236	10,148	20,257
2025	22,815	10,397	20,659
2026	23,409	10,650	21,068
2027	24,019	10,907	21,484
2028	24,644	11,170	21,907
2029	25,286	11,435	22,337
2030	25,945	11,703	22,770
2031	26,621	11,976	23,212
2032	27,314	12,254	23,665
2033	28,025	12,538	24,126
2034	28,755	12,828	24,596
2035	29,504	13,124	25,077
2036	30,272	13,430	25,444
2037	31,061	13,753	25,832
2038	31,870	14,089	26,238
2039	32,700	14,440	26,661
2040	33,551	14,806	27,104



	Population	Housing Units	Jobs
2017	18,574	8,409	17,500
2040	33,551	14,806	27,104
Increase	14,978	6,397	9,604
Percent	80.6%	76.1%	54.9%

Accurate projections of population, households, housing units, and employment are important in that:

- Population data and forecasts are used to establish current and future demand for services standards where the Level of Service (LOS) is per capita based.

- Household data and forecasts are used to forecast future growth in the number of housing units.
- Housing unit data and forecasts relate to certain service demands that are household based, such as parks, and are used to calculate impact costs when the cost is assessed when a building permit is issued. The number of households—defined as *occupied* housing units—is always smaller than the supply of available housing units. Over time, however, each housing unit is expected to become occupied by a household, even though the unit may become vacant during future re-sales or turnovers.
- Employment forecasts are refined to reflect 'value added' employment figures. This reflects an exclusion of jobs considered to be transitory or non-site specific in nature.
- 'Value added' employment data is combined with population data to produce 'day/night population' figures. These figures represent the total number of persons receiving services, both in their homes and in their businesses, particularly from 24-hour operations such as fire protection and law enforcement.

Population and Housing Unit Forecasts

Table 1 presents the forecasts for population for each year from 2017 to 2040 and provides the forecasts for housing units over the same period. The figures shown are, in essence, mid-year estimates reflecting Census Bureau practice. In other words, the increase in population between 2017 and 2040 would actually be from July 1, 2017 to July 1, 2040. For a more detailed description of the methodologies considered in preparing population, household and housing unit forecasts, see the Appendix to this report.

Table 1: Population and Housing Unit Forecasts

Year	County Population	Fayetteville Population
2017	114,352	18,574
2018	115,625	19,057
2019	116,913	19,554
2020	118,215	20,063
2021	119,531	20,585
2022	120,862	21,121
2023	122,208	21,672
2024	123,569	22,236
2025	124,944	22,815
2026	126,336	23,409
2027	127,742	24,019
2028	129,165	24,644
2029	130,603	25,286
2030	132,057	25,945
2031	133,528	26,621
2032	135,015	27,314
2033	136,518	28,025
2034	138,038	28,755
2035	139,575	29,504
2036	141,129	30,272
2037	142,701	31,061
2038	144,290	31,870
2039	145,896	32,700
2040	147,521	33,551

Source:
ROSS+associates, based on projection of 2000-2016 Census Population Estimates, using a Growth Trend regression

Year	Fayetteville Households	Housing Units
2017	7,829	8,409
2018	8,072	8,661
2019	8,312	8,909
2020	8,554	9,158
2021	8,798	9,410
2022	9,038	9,656
2023	9,277	9,901
2024	9,518	10,148
2025	9,762	10,397
2026	10,010	10,650
2027	10,263	10,907
2028	10,521	11,170
2029	10,782	11,435
2030	11,046	11,703
2031	11,316	11,976
2032	11,591	12,254
2033	11,872	12,538
2034	12,159	12,828
2035	12,452	13,124
2036	12,756	13,430
2037	13,076	13,753
2038	13,410	14,089
2039	13,758	14,440
2040	14,121	14,806

Source:
ROSS+associates, based on 2010 average population-per-household figures and Woods & Poole projections, and 2000-2010 housing occupancy rates.

Employment Forecasts

Table 2 shows the forecasts for employment growth countywide and in Fayetteville, from 2017 to 2040. The employment figures for Fayetteville are based on the city's proportional share of total county employment in 2010. This forecast method is used in that it is expected that Fayetteville will continue to be the major center of employment in the county into the future.

In Table 2 the total employment figures are refined to produce what is referred to as 'value added' jobs. 'Value added' jobs is a refinement that excludes any employment that is considered to be transitory in nature, such as agricultural and construction employment. This is done to better measure the services being provided by the City, which in this report will be measured and, ultimately, assessed based on structures. Transitory employment does not require a structure to be built to house the employment, and so does not come under the assessment of impact fees.

Table 2: Employment Forecasts

Year	Total County	Value-Added Jobs*	Fayetteville Jobs
2017	64,679	59,797	17,500
2018	65,509	60,578	17,895
2019	66,325	61,347	18,284
2020	67,149	62,125	18,677
2021	67,978	62,911	19,074
2022	68,819	63,706	19,466
2023	69,672	64,516	19,860
2024	70,527	65,332	20,257
2025	71,389	66,161	20,659
2026	72,257	66,999	21,068
2027	73,136	67,853	21,484
2028	74,021	68,717	21,907
2029	74,917	69,594	22,337
2030	75,819	70,477	22,770
2031	76,735	71,378	23,212
2032	77,674	72,301	23,665
2033	78,628	73,241	24,126
2034	79,599	74,197	24,596
2035	80,593	75,176	25,077
2036	80,603	75,239	25,444
2037	80,628	75,315	25,832
2038	80,667	75,403	26,238
2039	80,713	75,497	26,661
2040	80,776	75,605	27,104

* Total employment, less farm, forestry and construction workers
Source:
Woods & Poole employment forecasts adjusted to the countywide Growth Trend population regression, allocated to Fayetteville based on 2010 census commuting data, and averaged between the city's 2010 percentage of the county and the jobs-per-household ratios projected to 2040.

A more detailed description of the methodologies considered in preparing the employment forecasts is found in the Appendix to this report.

Service Area Projections

In Table 3 the service area forecasts are presented for a single citywide service area measured in two ways: citywide housing units (which quantifies Parks and Recreation service demands), and citywide day/night population (Police and Fire).

The day/night population calculation is a combination of the population projections and future employment information. The use of day/night population in impact cost and impact fee calculations is based upon the clear rational nexus between persons and services demanded.

The day/night population is used to determine Level of Service standards for facilities that serve both the resident population and business employment. The fire department, for instance, protects one's house from fire whether or not they are at home, and protects stores and offices whether or not they are open for business. Thus, this 'day/night' population is a measure of the total services demanded of a 24-hour service provider facility and a fair way to allocate the costs of such a facility among all of the beneficiaries.

The figures on Table 3 are the figures that will be used in subsequent public facility category chapters to calculate impact costs and fees.

Table 3: Service Area Forecasts

Year	Housing Units (Parks)	Day/Night Population (Fire, Police)
2017	8,409	36,074
2018	8,661	36,952
2019	8,909	37,838
2020	9,158	38,739
2021	9,410	39,659
2022	9,656	40,587
2023	9,901	41,532
2024	10,148	42,492
2025	10,397	43,474
2026	10,650	44,477
2027	10,907	45,502
2028	11,170	46,551
2029	11,435	47,623
2030	11,703	48,714
2031	11,976	49,833
2032	12,254	50,978
2033	12,538	52,151
2034	12,828	53,351
2035	13,124	54,581
2036	13,430	55,716
2037	13,753	56,892
2038	14,089	58,107
2039	14,440	59,360
2040	14,806	60,655
Net Increase:	**6,397**	**24,581**

Day/Night population is the combination of residents and "value added" employment.

Fire Protection

Introduction

Fire protection is provided by the City Fire Department throughout the entire city. The capital value of fire protection is based upon fire stations, administrative office space, and fire apparatus.

Table 4 shows the Department's current inventory of 'system improvements' (fire stations and fire apparatus having a useful life of 10 years or more). In addition, system improvements are listed that are proposed to serve the growing city for the next 22 years to 2040.

Table 4: Fire Protection System Improvements

System Improvement	Description	Square Feet or # Vehicles
Existing System Improvements		
Fire Stations		
Station 91/HQ	95 Johnson Avenue	9,987
Station 92	124 Pavilion Parkway	5,920
	Total Existing Floor Area	**15,907**
*Fire Apparatus**		
Engine 91	Pumper	1
Engine 92	Pumper	1
Engine 93	Pumper	1
Tower 91	Aerial	1
Rescue 9	Support	1
Tactical Unit 9	Support	1
	Total Existing Vehicles	**6**
Planned System Improvements		
Fire Stations		
Station 93	Veterans Parkway	14,997
Station 91 Expansion	Johnson Avenue	1,254
Station 94	Rewine Road	4,846
	Total Planned Floor Area	**21,097**
*Fire Apparatus**		
Quint	Aerial	1
Engine	Support	1
Engine	Support	1
Engine	Support	1
	Total Planned Vehicles	**4**
Total Existing and Future System		
	Total Floor Area	**37,004**
	Total Vehicles	**10**

* Vehicles having a service life of 10 years or more.

Currently, fire protection is provided by facilities with a combined square footage of 15,907, utilizing a total of 6 Fire Department vehicles. Future proposals to provide adequate fire protection services citywide include 2 new fire stations, the expansion of Station 91 into space vacated by another City depertment, and 4 new vehicles.

Service Area

The Fire Department operates as a coordinated system, with each station backing up the other stations in the system. The backing up of another station is not a rare event; it is the essence of good fire protection planning. All stations do not serve the same types of land uses, nor do they all have the same apparatus. It is the strategic placement of personnel and equipment that is the backbone of good fire protection. Any new station would relieve some of the demand on the other stations. Since the stations would continue to operate as 'backups' to the other stations, everyone in the city would benefit by the construction of the new station since it would reduce the 'backup' times the station nearest to them would be less available.

For these reasons the entire city is considered a single service area for the provision of fire protection because all residents and employees within this area have equal access to the benefits of the program.

Level of Service

The level of service for fire protection in Fayetteville is measured in terms of number of Fire Department vehicles (engines, tankers, etc.), and the number of square feet of fire station/administrative space, per day/night population in the service area. Day/night population is used as a measure in that fire protection is a 24-hour service provided continuously to both residences and businesses in the service area.

Table 5: Level of Service Calculations: Current and Future

Facility	Service Population	Level of Service
Existing Square Feet	**2017 Day/Night Population**	**Square Feet per 2017 Day/Night Population**
15,907	36,074	0.440961
Existing Vehicles	**2017 Day/Night Population**	**Vehicles per 2017 Day/Night Population**
6	36,074	0.000166
Future System: Floor Area	**2040 Day/Night Population**	**Square Feet per 2040 Day/Night Population**
37,004	60,655	0.610073
Future System: Vehicles	**2040 Day/Night Population**	**Vehicles per 2040 Day/Night Population**
10	60,655	0.000165

Table 5 presents the calculation of the Level of Service (LOS) for both the current inventory of facilities and vehicles, and for the system as proposed to serve the city over the next 22 years and to maintain the City's excellent ISO rating.

For reasons that will be explained below, the LOS figures based on the future 2040 day night population are recommended as the adopted Level of Service.

Forecasts for Service Area

Future Demand

The applicable Level of Service standards from Table 5 are multiplied by the forecasted day/night population increases to produce the expected future demand in Table 6.

The 'day/night population increase' figures are taken from Table 3.

Table 6: Future Demand Calculation

Level of Service	Future Population	New Growth Demand
Square Feet per 2017 Day/Night Population	**Day/Night Population Increase (2017-40)**	**Net New Square Feet Demanded**
0.4410	24,581	10,839
Vehicles per 2017 Day/Night Population	**Day/Night Population Increase (2017-40)**	**Net New Vehicles Demanded***
0.000166	24,581	4.09
Square Feet per 2040 Day/Night Population	**Day/Night Population Increase (2017-40)**	**Net New Square Feet Demanded**
0.610073	24,581	14,997
Vehicles per 2040 Day/Night Population	**Day/Night Population Increase (2017-40)**	**Net New Vehicles Demanded***
0.000165	24,581	4.05

* Only 4 vehicles are being added to the inventory, all of which will be 100% eligible for impact fee funding.

Following the format of Table 5, Table 6 calculates the demand for future facilities to serve new growth and development for both the 'current' LOS and for the system as proposed for the future.

A total of 21,097 square feet of new space is proposed to provide full service in the city in the future (to be located in two new stations and the expansion of one existing station), while maintaining and possibly improving the city's ISO rating for all its residents and businesses now and in the future. Using the future-system approach to determine new growth demand, only 14,997 square feet new station space is impact fee eligible. Thus, of the total space proposed, only 14,997 can be supported with impact fee funding (71.09% of the total proposed), leaving the remaining square feet (28.91%) to be funded through alternate means.

Note that, because only 'whole' vehicles can be purchased, only 4 new vehicles would need to be added to the inventory (slightly less than are 'technically' demanded by new growth—whether to meet the current LOS calculations or to meet the demands for the future system). Thus, since only 4 new vehicles need to be acquired to cover expansion of the fleet to meet the needs of future growth and development, all of the vehicles would be 100% impact fee eligible.

Future Costs

This Section examines both the total cost of the increased facility floor area and number of fire apparatus needed to provide the proposed fire system of the future, and the extent to which these costs are impact fee-eligible.

Table 7: Future System Improvement Costs

Year	Fire Stations			Vehicles		
	Facility	Square Feet	2017 Cost*	Type	Number	2017 Cost*
2016		-	$ -	Quint **	1	$ 989,414
2017		-	-		-	-
2018	Station 93	14,997	6,180,414	Engine	1	600,000
2019	Station 91***	1,254	123,519		-	-
2020		-	-		-	-
2021		-	-		-	-
2022		-	-		-	-
2023		-	-		-	-
2024		-	-		-	-
2025		-	-		-	-
2026	Station 94	4,846	1,997,085	Engine	2	1,200,000
2027		-	-		-	-
2028		-	-		-	-
2029		-	-		-	-
2030		-	-		-	-
2031		-	-		-	-
2032		-	-		-	-
2033		-	-		-	-
2034		-	-		-	-
2035		-	-		-	-
2036		-	-		-	-
2037		-	-		-	-
2038		-	-		-	-
2039		-	-		-	-
2040		-	-		-	-

* Facility cost is based on $412.11 per square foot for site work, construction, design and furnishings. (Source: Average per square foot cost of 3 similar stations from *Green Building Square Foot Costbook* , 2017 and 2018 editions, BNi Publications, Inc.).

** Vehicle cost is estimated using current prevailing rates for similar vehicles. The Quint was purchased in 2016 with short-term financing, and is included in the impact fee calculations for recoupment and future debt service.

*** Cost of revovation of space in Station 91 for Fire Department previously occupied by the Building Permit Department, estimated at $98.50 per square foot.

The facility and fire apparatus system improvements on Table 7 are based on the City's desire to increase fire protection services in a balanced way to appropriately serve all residents and businesses in the city in 2040. The proposed system improvements are listed on Table 4, and are 'scheduled' for construction or acquisition in the appropriate years (in order to enable Net Present Value calculations based on the 2017 cost estimates shown).

Estimated improvement costs (in 2017 dollars) are based on the following:

- For new facility space: Recent construction costs averaging $412.11 per square foot in other communities are used, which is all inclusive of a complete facility from site work to furnishings.

- For fire apparatus: Estimates are based on prevailing costs of similar vehicles for a quint (aerial) and engine equipped to City specifications.

The total cost figures from Table 7 are then converted to 'impact fee eligible' costs (in 2017 dollars) based on the percentage that each improvement is impact fee eligible. As noted above, all of the fire trucks are 100% eligible under the adopted LOS. Of the 14,997 square feet that is impact fee eligible, A portion (12,570 square feet) is allocated to new Station 93, all 1,254 square feet are covered for the Station 91 expansion, and the remaining square feet is allocated to the new Station 94. These calculations are shown on Table 8.

Table 8: Impact Fee Cost Calculations

Year	Costs in 2017 Dollars					Net Present Value**
	Fire Station Costs	% Impact Fee Eligible*	Vehicle Costs	% Impact Fee Eligible	Total Impact Fee Eligible	
2016	$ -		$ 989,414.38	100.0%	$ 989,414.38	$ 1,005,779.06
2017	-					
2018	6,180,414.00	83.8%	600,000.00	100.0%	5,780,414.00	5,844,199.13
2019	123,519.00	100.0%	-		123,519.00	126,247.08
2020	-		-		-	-
2021	-		-		-	-
2022	-		-		-	-
2023	-		-		-	-
2024	-		-		-	-
2025	-		-		-	-
2026	1,997,085.00	43.9%	1,200,000.00	100.0%	2,076,481.10	2,296,882.95
2027	-		-		-	-
2028	-		-		-	-
2029	-		-		-	-
2030	-		-		-	-
2031	-		-		-	-
2032	-		-		-	-
2033	-		-		-	-
2034	-		-		-	-
2035	-		-		-	-
2036	-		-		-	-
2037	-		-		-	-
2038	-		-		-	-
2039	-		-		-	-
2040	-		-		-	-
	$ 8,301,018.00	**71.1%**	**$ 2,789,414.38**	**100.0%**	**$ 8,969,828.48**	**$ 9,273,108.22**

* Eligibility percentage reflects the application of funding from alternate, non-impact fee sources.
** Net Present Value = 2017 cost estimate for fire stations inflated to target year using the ENR Building Cost Index (BCI), and the Consumer Price Index (CPI) for vehicles. Expenditures after 2017 reduced to 2017 NPV using the Discount Rate.

The Net Present Value of the cost estimates for new fire stations are calculated by increasing the current (2017) estimated construction costs using the Engineering News Record's 10-year average building cost inflation (BCI) rate, and then discounting this future amount back using the Net discount Rate. For non-construction improvements (fire vehicles), the currently estimated costs are inflated to their target years using the 10-year average CPI and then reduced using the Net Discount Rate to produce the Net Present Value. (The approaches to calculating NPV are explained in detail in the Cost Adjustments and Credits Chapter of this report.)

Police Services

Introduction

The Fayetteville Police Department provides primary law enforcement throughout the city. Through a variety of active law enforcement, community outreach and educational programs, the Police Department serves the entire population and all businesses within the city.

Service Area

The city is considered a single service area for the provision of primary law enforcement services because all residents and employees in the city have equal access to the benefits of the program.

Level of Service

The level of service for Police Department services in Fayetteville is measured in terms of the number of square feet of occupied facility space, the amount of land devoted to outdoor parking and storage, and the number of major vehicles (such as the Mobile Command Unit), per day/night population in the service area. Table 9 presents a current inventory of facility space, land and major vehicles. Day/night population is used as a measure in that Police Department provides its law enforcement services to both residences and businesses in the service area on a 24-hour basis.

Table 9: Police Services System Inventory

System Improvement	Quantity
Buildings	
Police Headquarters	18,288
Evidence Storage	695
Detention Space	160
Garage Area	800
Total Floor Area (square feet)	**19,943**
*Major Vehicles**	
Mobile Command Unit	**1**

* Vehicles having a service life of 10 years or more.

Table 10: Current Level of Service Calculation

Facility	Service Population	Level of Service
Existing Square Feet	**2017 Day/Night Population**	**Square Feet per 2017 Day/Night Population**
19,943	36,074	0.552843
Existing Major Vehicles	**2017 Day/Night Population**	**Major Vehicles per 2017 Day/Night Population**
1	36,074	0.00002772

Table 10 presents the calculation of the current Level of Service (LOS) standards for police service system improvements in the city. The inventory of each category is divided by the current day/night population to obtain the LOS per person enjoyed throughout the city.

Forecasts for Service Area

Table 11: Future Demand Calculation

Level of Service	Future Population	New Growth Demand

Square Feet per 2017 Day/Night Population	Day/Night Population Increase (2017-40)	Total Square Feet for New Growth
0.552843	24,581	13,590

Major Vehicles per 2017 Day/Night Population	Day/Night Population Increase (2017-40)	Net New Vehicles Demanded*
0.00002772	24,581	0.681427

* One (whole) major vehicle can be added, which will be 68.1427% eliginle for impact fee funding.

Future Demand

For the purposes of impact fee calculations the City has determined that a level of service, based on the current LOS, would be appropriate to serve the future service area population.

In Table 11**, t**he facility space, land and major vehicle LOS standards from Table 10 are next multiplied by the forecasted citywide day/night population increase to produce the expected demand that future growth and development will place on the city.

Table 12: Future System Improvement Costs

Year	Facility	Buildings		Major Vehicles	
		Square Feet	2018 Cost	Number	2018 Cost
2017					
2018	Crime Scene Vehicle			1	$ 100,000
2019					
2020					
2021	Office space expansion*	6,218	$ 600,000		
2022					
2023					
2024					
2025					
2026					
2027	Expansion**	7,372	$3,040,950		
2028					
2029					
2030					
2031					
2032					
2033					
2034					
2035					
2036					
2037					
2038					
2039					
2040					
		13,590	$3,640,950	1	$ 100,000

* Cost of revovation of space previously occupied by the Municipal Court.
** Construction cost fo new buildings is estimated at $412.50 per square foot for construction, including 10% for design.

Table 12 provides current cost estimates (in 2017 dollars) of new system improvements that are proposed to address future needs.

Estimated improvement costs (in 2017 dollars) are based on the following:

- For new facility space: Prevailing construction costs averaging $412.50 per square foot are used, based on construction costs of $375 per square foot plus 10% ($37.50) for design.
- For major vehicles, the cost is specifically based on the type of vehicle that is needed—a Crime Scene Unit—and the price is an estimate of current, prevailing costs for such a vehicle meeting Fayetteville specifications.

Carry-Over Project Costs

A new Police Headquarters building was built by the City in

2006, the cost of which was included in the 2007 CIE Amendment for impact fee collection. At that time, the project was determined to be 38.11% impact fee eligible and the net project cost was included in the City's impact fee calculations. To date, the full amount of the impact fee eligible cost has not been spent, leaving a net amount for future growth and development.

Table 13 shows the original cost of the project, the percent impact fee eligible and the resulting 'impact fee cost'. Subtracting out the amount of previously collected impact fees expended on the project, almost $1.486 million (in 2006 dollars) remains. In 2017 dollars, using the CPI inflation rate to determine the current value of the remainder, almost $1.818 million can be collected in impact fees to fully fund new growth's share of the project.[1]

Table 13: Carry-Over Police Services Projects

Project Description	Total City Cost*	% Impact Fee Eligible	Impact Fee Cost	Impact Fees Expended**	Remaining City Cost	Year of Completion	Net Present Value***
Police Headquarters	$ 6,746,135.00	38.11%	$ 2,570,889.04	$ 1,085,180.88	$ 1,485,708.16	2006	$ 1,817,803.74
	$ 6,746,135.00		$ 2,570,889.04	$ 1,085,180.88	$ 1,485,708.16		$ 1,817,803.74

* Original cost of project.
** Impact fees collected through FY 2017 (ended July 31) and expended on project.
*** Net Present Value = cost in year expended, inflated to 2017 using the Consumer Price Index.

Future Costs

In addition to the carry-over project discussed above, the costs of new facility floor area and the number of major vehicles proposed to serve future growth and development to 2040 are transferred from Table 12 to Table 14, including the years in which the various improvements are anticipated to be needed.

The LOS demand for future major vehicles calls for only a portion of a vehicle. Because only 'whole' vehicles can be purchased, one new vehicle is proposed to be purchased but only a portion would be impact fee-eligible and subject to impact fee collections from new growth. Thus, while 1 major vehicle is needed to be acquired to address the needs of future growth and development, it will not be 100% impact fee eligible. The vehicle will, however, provide service to growth beyond 2040, and can be funded through a future extension of the City's impact fee program at that time.

The total cost figures are then aggregated to produce the 'total impact fee eligible' dollars on the table, based on the percentage that each improvement is impact fee eligible. (Note that only a portion of the major vehicle is impact fee eligible, as discussed above.) These impact fee eligible costs, which are shown in current (2017) dollars, are then converted to their Net Present Values based on the year in which they are scheduled.

Calculation of the Net Present Value for the headquarters building was described above and shown on Table 13. The Net Present Values for new building construction are calculated by increasing the current (2017) estimated construction costs using the Engineering News Record's 10-year average building cost inflation (BCI) rate, and then discounting this future amount back to 2017 dollars using the Net Discount Rate. For non-construction improvements (such as land and major vehicles) the

[1] Note that impact fees previously collected from 'past' new growth and still on hand will be credited against the total cost of eligible impact fee projects that can be collected from future growth.

currently estimated cost is inflated to its target year using the 10-year average CPI and then reduced using the Net Discount Rate to produce the Net Present Value. (The approaches to calculating NPV are explained in detail in the Cost Adjustments and Credits Chapter of this report.)

Table 14: Project Costs to Meet Future Demand

Year	Costs in 2017 Dollars					Net Present Value*
	Building Costs	% Impact Fee Eligible	Major Vehicle Cost	% Impact Fee Eligible	Total Impact Fee Eligible	
Carry-Over Project (Headquarters)						
2006	$ 6,746,135.00	38.11%			$1,485,708.16	$1,817,803.74
Future System Improvements						
2017	$ -					
2018	-		$ 100,000.00	68.1%	$ 68,142.74	$ 68,925.18
2019	-		-		-	-
2020			-		-	-
2021	600,000.00	100.00%	-		600,000.00	626,796.27
2022	-		-		-	-
2023	-		-		-	-
2024	-		-		-	-
2025	-		-		-	-
2026	-		-		-	-
2027	3,040,950.00	100.00%	-		3,040,950.00	3,391,932.23
2028	-		-		-	-
2029	-		-		-	-
2030	-		-		-	-
2031	-		-		-	-
2032	-		-		-	-
2033	-		-		-	-
2034	-		-		-	-
2035	-		-		-	-
2036	-		-		-	-
2037	-		-		-	-
2038	-		-		-	-
2039	-		-		-	-
2040	-		-		-	-
	$ 10,387,085.00		**$ 100,000.00**		**$5,194,800.91**	**$5,905,457.42**

* Net Present Value = 2017 cost estimate for buildings inflated to target year using the ENR Building Cost Index (BCI), and the Consumer Price Index (CPI) for vehicles, all reduced to NPV using the Discount Rate.

Parks and Recreation Services

Introduction

Public recreational opportunities are available in Fayetteville through a number of parks facilities maintained by the City's Public Services Department. Demand for recreational facilities is almost exclusively related to the city's resident population. Businesses make some incidental use of public parks for office events, company softball leagues, etc., but the use is minimal compared to that of the families and individuals who live in the city. Thus, the parks and recreation impact fee is limited to future residential growth.

The City's facilities focus on limited and specialized recreational opportunities because its residents also have access to Fayette County parks and recreational programs and facilities, relieving the City from having to provide such major improvements such as ball fields, tennis and basketball courts.

Service Area

The parks and recreation facilities maintained by the City are operated as a citywide system. Facilities are provided equally to all residents, and collectively cover a wide range of recreational opportunities, from leisure and picnicking, to programs and performances at the City Amphitheater, to walking or biking on various trails. Thus, the entire city is considered a single service area for parks and recreation services provided by the City.

Level of Service

The determination of Level of Service (LOS) standards for park lands and for recreational components such as playgrounds and trails begins with an inventory of existing City facilities.

Table 15: Current Inventory of Park Acres

Facility	Park Acreage
Parks	
Jack Day Park	0.25
Burch Park	17.89
Jeff Davis Park	1.03
Patriot Park	7.00
Church Street Park	2.57
Total Park Acres	**28.74**
Conservation Area	
The Ridge	308.00
Total Conservation Acres	**308.00**
Total Acres	**336.7**

Table 15 shows the current inventory of park and conservation lands controlled by the City, while Table 16 includes a listing of current recreational facilities and trails.

Table 16 also provides calculations of the current Level of Service based on the inventory of lands and facilities in the city. For recreational lands, the LOS is based on the current number of housing units in the city, yielding the number of acres provided for each housing unit.

For recreational facilities, the number of components currently available for each type is divided by the number of housing units, as are the number of miles of trails, resulting in the number of components and trail miles per housing unit in the city.

Table 16: Current Level of Service Calculations

Facility	Service Parameters	Level of Service
Existing Park Acreage	**Existing Housing Units (2017)**	**Park Acres per Housing Unit**
28.7	8,409	0.003418
Existing Conservation Acreage	**Existing Housing Units (2017)**	**Conservation Acres per Housing Unit**
308.0	8,409	0.036627
Component Type	**Current Inventory (2017)**	**Components per Housing Unit**
Recreation Facilities		
Picnic Pavillion	1	0.000119
Playground	1	0.000119
Gazebo	1	0.000119
Amphitheater	1	0.000119
Concession Building	1	0.000119
Community Building	1	0.000119
Splash Pad	0	n/a
Restrooms	1	0.000119
Trails (miles):		
Redwine Multi-Use Path	2.68	
Patriot Park Walking Trail	4.00	
Lester Road Multi-Use Path	1.13	
Total Trail Miles	7.81	0.000929

* Includes multi-purpose, walking, and jogging trails.

Note that the categories of components shown in this table are not necessarily the only component types that are or will be provided to City residents in the future.

Forecasts for Service Area

Future Demand

Applying the City's current Level of Service standards to the number of housing units that are projected for the city by 2040 results in figures that establish the maximum number of acres, recreation components and trail miles that could be included in an impact fee program. These maximums are shown on Table 17.

Table 17: Future Demand Maximums

Level of Service	Future Service Parameters	New Growth Demand
Park Acres per Housing Unit	**Number of New Housing Units (2017-40)**	**Acres Demanded by New Growth**
0.003418	6,397	21.86
Conservation Acres per Housing Unit	**Number of New Housing Units (2017-40)**	**Acres Demanded by New Growth**
0.036627	6,397	234.31
Components per Housing Unit	**New Components Demanded (2017-2040)**	
Recreation Facilities		
0.000119	0.7607	Picnic Pavillion
0.000119	0.7607	Playground
0.000119	0.7607	Gazebo
0.000119	0.7607	Amphitheater
0.000119	0.7607	Concession Building
0.000119	0.7607	Community Building
n/a	0.4321	Splash Pad**
0.000119	0.7607	Restrooms
Trails (miles)*		
0.000929	5.9413	Total Trail Miles

* Includes multi-purpose, walking, and jogging trails.
** New Splash Pad will serve both the existing households and the future households proportionally (56.79% and 43.21% respectively).

The 'new growth demand' figures are determined by multiplying the Level of Service standard for each item times the number of housing units anticipated to be added to the city between 2017 and 2040. The 'new housing units' figure is the citywide increase taken from Table 3: Service Area Forecasts.

System Improvements Proposed

Within the context of the maximum acres of land, recreation facilities and trail miles that the City could authorize, there are specific plans for future system improvements to accommodate both

existing and future residents. These plans address the specialized nature of the City's particular needs while recognizing the availability of the broader range of recreational opportunities provided to city residents by the County parks and recreation system.

Table 18 presents the City's proposed system improvements that will serve its future growth and development. The first column of the table shows all system categories and the maximum number of acres, components and trail miles that could be justified to serve new growth.

Table 18: Costs of Future Park Improvements

Improvement Type	Units Justified to Serve New Growth	Units to be Added (2018-2040)	Cost per Unit	Gross Cost	% for New Growth	Net Cost to New Growth
New Park Lands						
Park Acres	21.86	8.00	$ 330,000	$ 2,640,000.00	100.0%	$ 2,640,000.00
Conservation Acres	234.31	0.00	n/a		100.0%	$ -
Subtotal Land	*256.17*	*8.00*	*$ 330,000*	*$ 2,640,000.00*	*100.0%*	*$ 2,640,000.00*
New Recreation Facilities						
Picnic Pavillion*	0.7607	1	$ 24,000	$ 24,000.00	76.07%	$ 18,256.80
Playground (Tot Lot)*	0.7607	1	$ 10,000	$ 10,000.00	76.07%	$ 7,607.00
Gazebo*	0.7607	1	$ 10,000	$ 10,000.00	76.07%	$ 7,607.00
Amphitheater	0.7607	0	n/a			$ -
Concession Building	0.7607	0	n/a			$ -
Community Building**	0.7607	1	$ 1,433,400	$ 1,433,400.00	76.07%	$ 1,090,387.38
Splash Pad***	0.4321	1	$ 500,000	$ 500,000.00	43.21%	$ 216,027.29
Restrooms	0.7607	0	n/a			$ -
Other Improvements 1****	n/a	1	$ 188,600	$ 188,600.00	76.07%	$ 143,468.02
Other Improvements 2****	n/a	1	$ 93,000	$ 93,000.00	76.07%	$ 70,745.10
Subtotal Rec Facilities		*7*	*$ 2,259,000*	*$ 2,259,000.00*	*76.07%*	*$ 1,554,098.59*
New Trails						
The Ridge Trails 1	1.307	1.307	Project Cost =	$ 3,600.00	100.0%	$ 3,600.00
The Ridge Trails 2	0.492	0.492	Project Cost =	$ 10,400.00	100.0%	$ 10,400.00
The Ridge Boardwalk	0.189	0.189	Project Cost =	$ 200,800.00	100.0%	$ 200,800.00
Other Trails*****	3.953	3.953	$ 21,120	$ 83,480.26	100.0%	$ 83,480.26
Subtotal Trail Miles	*5.941*	*5.941*		*$ 298,280.26*	100.0%	*$ 298,280.26*
				$ 5,197,280.26		**$ 4,492,378.84**

NOTE: Cost estimates are based on known or comparable facility costs.
* Facility is located within The Ridge recreation development.
** Estimated 6,000 square feet at $238.90/sf (Source: Green Building Square Foot Costbook, 2017 Ed., BNI Publications, Inc.)
*** Cost of new splash pad to be split between existing and future residents proportionally, since none currently exist.
****Development costs for The Ridge (P.K. Dixon Property) not included above or for trails, below, by Phase (1 or 2).
***** Cost estimates are based on budget estimates for The Ridge recreation development for those trails noted; cost of other trails (shown per mile) based on $4 per foot.

Adding to past park land acquisitions, the City intends to purchase land for a new City Hall, including 8 acres that will be set aside as a park, and where a new community building and splash pad will also be located. On the other hand, there is no need to provide a second amphitheater (along with its concession building and restrooms), even though partial funding of such a facility could be included in an impact fee program. Thus, no 'units to be added' are shown for these three potential

system improvements and therefore no costs to be collected from future growth. The City has, however, included a number of recreational facilities and trails as part of development of The Ridge project (i.e., the former P.K. Dixon property previously acquired).

Because one cannot construct a portion of a facility, but must construct only 'whole' numbers of facility types, the 'units justified to serve new growth' figures (taken from Table 17) are rounded up to the next 'whole' component in the 'units to be added' column. For example, new growth needs only a portion of a new gazebo by 2040 to meet its service demand. But since one cannot construct 0.7607 of a gazebo, one whole gazebo will have to be built. As a result the total cost of the gazebo is only 76.07% eligible to be recovered from new growth through an impact fee.

Specific recreational facilities to be constructed for which LOS standards were calculated are shown on Table 18, as well as additional improvements to be constructed as part of Phase 1 and Phase 2 of The Ridge project. Collectively, all 'new recreational facilities' to be included in The Ridge project are included in the subtotal for recreational facilities. The same LOS standard applicable for all specified facilities is applied equally to all 'other' facilities proposed in the development.

The Ridge recreational development also includes a number of trails, including a boardwalk. These are listed on Table 18. Because the total number of trail miles justified to serve new growth is greater than the miles to be built in The Ridge, an 'other trails' category is included for future construction of trails in or connected to The Ridge system or in other locations within the city. Since the total miles to be constructed satisfies the miles that are justified to serve new growth, each of the trail projects are 100% impact fee eligible.

Carry-Over Projects

Three major projects were included in the City's 2007 CIE Amendment for impact fee collection, each of which have outstanding balances yet to be collected from future growth and development. Level of Service standards for each project were determined in the 2007 impact fee program, along with costs, which are shown on Table 19. To date, the full amount of the impact fee eligible cost of each project has not been collected or spent, leaving a net amount for future growth and development.

Table 19: Carry-Over Parks Projects

Project Description	Total City Cost*	% Impact Fee Eligible	Impact Fee Cost	Impact Fees Expended**	Net City Cost	Year of Completion	Net Present Value***
P.K. Dixon Property Acquisition	$ 499,265.64	44.05%	$ 219,913.00	$ -	$ 219,913.00	2010	$ 248,763.62
Holliday Dorsey Fife House	$ 1,564,823.95	100.00%	$ 1,564,823.95	$ 166,212.83	$ 1,398,611.12	2004	$ 1,826,287.00
Amphitheater	$ 2,560,364.00	49.71%	$ 1,272,831.81	$ 191,492.81	$ 1,081,339.00	2005	$ 1,365,726.17
	$ 4,624,453.59		$ 3,057,568.76	$ 357,705.64	$ 2,699,863.12		$ 3,440,776.79

* Original cost of project less grants or other non-city assistance.
** Impact fees collected prior to 2014 and expended on project.
*** Net Present Value = cost in year expended, inflated to 2017 using the Consumer Price Index.

Table 19 shows the original cost of each project, the percent impact fee eligible and the resulting 'impact fee cost'. Subtracting out the amount of previously collected impact fees expended on the projects, almost $2.7 million (in 2006 dollars) remains. In 2017 dollars, using the CPI inflation rate

to determine the current value of the remainder, over $3.4 million can be collected in impact fees to fully fund new growth's share of the projects.[2]

Future Costs

Table 20 provides a listing of the carry-over and future capital project costs for the recreation components in place and proposed to serve new growth. The current (2017) 'impact fee eligible cost' figures are drawn from Table 18 for new components and from Table 19 for the carry-over projects. The year each project was or is proposed to be constructed is also shown.

Table 20: Eligible and Non-Eligible Project Costs to Serve Future Growth

Component	Impact Fee Eligible Cost (2017)	Year	Net Present Value	Non-Eligible Project Cost	Net Present Value
Carry-Over Projects					
P.K. Dixon Property	$ 219,913.00	2010	$ 248,763.62	$ -	$ 248,763.62
Holiday Dorsey Fife House	$ 1,398,611.12	2004	$ 1,826,287.00	$ -	$ 1,826,287.00
Amphitheater	$ 1,081,339.00	2005	$ 1,365,726.17	$ -	$ 1,365,726.17
New Park Lands	$ 2,640,000.00	2019	$ 2,759,071.89	$ -	$ 2,759,071.89
New Recreation Facilities					
Picnic Pavillion	$ 18,256.80	2016	$ 18,763.09	$ 5,743.20	$ 5,900.65
Playground (Tot Lot)	$ 7,607.00	2016	$ 7,817.96	$ 2,393.00	$ 2,458.60
Gazebo	$ 7,607.00	2018	$ 7,776.66	$ 2,393.00	$ 2,446.37
Community Building	$ 1,090,387.38	2019	$ 1,114,470.03	$ 343,012.62	$ 350,588.51
Splash Pad	$ 216,027.29	2019	$ 225,770.76	$ 283,972.71	$ 296,780.73
Other Improvements 1	$ 143,468.02	2016	$ 147,446.65	$ 45,131.98	$ 46,369.24
Other Improvements 2	$ 70,745.10	2018	$ 72,322.91	$ 22,254.90	$ 22,751.25
New Trails					
The Ridge Trails 1	$ 3,600.00	2016	$ 3,699.83	$ -	$ 3,699.83
The Ridge Trails 2	$ 10,400.00	2018	$ 10,631.95	$ -	$ 10,631.95
The Ridge Boardwalk	$ 200,800.00	2018	$ 205,278.40	$ -	$ 205,278.40
Other Trails	$ 83,480.26	2025	$ 99,591.01	$ -	$ 99,591.01
	$ 7,192,241.96		**$ 8,113,417.93**	**$ 704,901.41**	**$ 7,246,345.22**

For new projects, NPV = 2017 cost estimate inflated to target year using the ENR Construction Cost Index, reduced to NPV using the Discount Rate. For recoupment projects, NPV is the original cost divided by the CPI for that year, multiplied by the CPI in 2017.

The Net Present Value of each of the carry-over projects is taken from Table 19. For the construction of the new recreational facilities and the trails, the Net Present Values are calculated by increasing the current (2017) estimated construction costs using the Engineering News Record's 10-year average construction cost inflation (CCI) rate, and then discounting the future amounts back to current dollars using the Net Discount Rate. This is done for both the impact fee eligible costs and the non-eligible costs. (The approaches to calculating NPV are explained in detail in the Cost Adjustments and Credits Section of this report.)

[2] Note that impact fees previously collected from 'past' new growth and still on hand will be credited against the total cost of eligible impact fee projects that can be collected from future 2017-2040 growth.

Road Improvements

Introduction

The information in this chapter is derived from road project information reflecting currently on-going and proposed road projects.

Service Area

The service area for these road projects is defined as the entire city, in that these road projects are recognized as providing primary access to all properties within the city as part of the citywide network of principal streets and thoroughfares. All new development within the city will be served by this citywide network, such that improvements to any part of this network to relieve congestion or to otherwise improve capacity will positively affect capacity and reduce congestion throughout the city.

Level of Service Standards

Two types of Level of Service standards are used for road improvements: one for the design of roadways at a designated operational level, and one for the actual accommodation of traffic to be generated by new growth and development. The latter standard allows the cost of improvements to the road system to be equitably allocated between improvements that accrue to existing traffic today and improvements that will accommodate traffic generated by future growth and development.

Operational Design Standards

Level of Service for roadways and intersections is measured on a 'letter grade' system that rates a road within a range of service from A to F. Level of Service A is the best rating, representing unencumbered travel; Level of Service F is the worst rating, representing heavy congestion and long delays. This system is a means of relating the connection between speed and travel time, freedom to maneuver, traffic interruption, comfort, convenience and safety to the capacity that exists in a roadway. This refers to both a quantitative measure expressed as a service flow rate and an assigned qualitative measure describing parameters. *The Highway Capacity Manual, Special Report 209*, Transportation Research Board (1985), defines Level of Service A through F as having the following characteristics:

1. LOS A: free flow, excellent level of freedom and comfort;
2. LOS B: stable flow, decline in freedom to maneuver, desired speed is relatively unaffected;
3. LOS C: stable flow, but marks the beginning of users becoming affected by others, selection of speed and maneuvering becomes difficult, comfort declines at this level;
4. LOS D: high density, but stable flow, speed and freedom to maneuver are severely restricted, poor level of comfort, small increases in traffic flow will cause operational problems;
5. LOS E: at or near capacity level, speeds reduced to low but uniform level, maneuvering is extremely difficult, comfort level poor, frustration high, level unstable; and
6. LOS F: forced/breakdown of flow. The amount of traffic approaching a point exceeds the amount that can transverse the point. Queues form, stop & go. Arrival flow exceeds discharge flow.

The traffic volume that produces different Level of Service grades differs according to road type, size, signalization, topography, condition and access.

The City has set its Level of Service for road improvement operations at LOS 'D', a level to which it will strive ultimately. However, interim road improvement projects that do not result in a LOS of 'D'

will still provide traffic relief to current and future traffic alike, and are thus eligible for impact fee funding.

Accommodating Future Traffic

Regardless of the design of roads in the system, the system must address the future traffic demands that will be created by new growth and development.

All road improvement projects benefit existing and future traffic proportionally to the extent that relief from over-capacity conditions eases traffic problems for everyone. For example, since new growth by 2040 will represent a certain portion of all 2040 traffic, new growth would be responsible for that portions' cost of all road improvements in the system that create new capacity. This approach recognizes that some improvements to the road system do not create new capacity—such as resurfacing, road maintenance, bridge replacements with the same number of lanes, etc.

It is noted that the cost-impact of non-Fayetteville generated traffic on the roads traversing the city (cross commutes) is off-set by state and federal assistance. The net cost of the road projects that accrues to Fayetteville reasonably represents (i.e., is 'roughly proportional' to) the impact on the roads by Fayetteville residents and businesses. Nonetheless, these state DOT projects also create capacity that is available to and used by current and future residents and businesses.

The basis for the road impact fee would therefore be Fayetteville's cost for the improvements that create new capacity divided by all traffic in 2040 (existing today plus new growth)—i.e., the cost per trip—times the traffic generated by new growth alone. For an individual land use, the cost per trip (above) would be applied to the number of trips that will be generated by the new development when a building permit is issued, assuring that new growth would only pay its 'fair share' of the road improvements that serve it, averaged over the entire system. All other (non-capacity) improvements would be the cost responsibility of the current base of residents and businesses, including the creation of new capacity that exceeds the needs of future 2040 traffic.

Forecasts for Service Area

Fayetteville has a long history of improving its road system in response to growing traffic demands, as evidenced in the many Capital Improvements Elements prepared from time-to-time over the past 23 years since 1995. Within the context of its impact fee program, there have been numerous road projects that have been completed and, in some cases, improved again to meet increased demand. For the most part, these completed projects continue to provide capacity to handle the traffic demands of yet further growth and development before they will reach LOS D.

In addition, the City has prepared transportation plans over the years from time to time; two of which are scheduled for updates: the the City's Downtown Plan for this year, and the city will actively coordinate with the Fayette County Comprehensive Transportation Plan 2020, soon to get underway.

Road Improvement Projects

Projects that provide road capacity that will serve new growth have been identified by the City and are shown on Table 21. This is not a list of all City road projects. These projects were selected for inclusion in the City's impact fee program because the specific improvements proposed will increase traffic capacity and reduce congestion to some extent, whether through road widening, improved intersection operations, channellazation reducing mid-block left-turning conflicts, upgraded signalization, etc.

These City road projects are fully described as follows:

- Lafayette Avenue Extension — This project consists of constructing Lafayette Avenue to Church Street providing another grid option downtown by providing the 720 feet extension.

- Lafayette/Glynn Street — This project consists of aligning the intersection with the Lafayette Extension and providing signalization at the intersection.
- Jeff Davis Shoulder — This project consists of performing shoulder work on Jeff Davis Drive to increase the width of the roadway.
- Stonewall/85 Left Turn — This project consists of turn lane modifications and signage on SR 85 and Stonewall Avenue.
- Lafayette/Tiger Trail — This project consists of constructing a roundabout at the intersection of Lafayette Avenue and Tiger Trail to improve the traffic flow from the existing 4-way stop.
- Highway 54/Gingercake — This project consists of reconfiguring the intersection to allow for a dedicated left turn and a straight/left turn lane.
- Hood Avenue Conn/SR 92 — This project consists of combining Hood Avenue and SR 92 into one roundabout terminating at a traffic signal. Also a new roadway network was constructed to combine Church Street, Kathi Avenue and Easterbrook Way into a roundabout.
- Highway 85 Median Design — This project consists of the median design providing raised landscaped medians from Grady Avenue to SR 314. By providing the medians we will eliminate helter-skelter left turns and hope to achieve a traffic calming response. Approximately 3,200 feet
- Highway 85 Median Phase 1 — Construct the landscaped medians in the first phase.
- Highway 85 Median Phase 2 — Construct the landscaped medians in the second phase.
- Highway 85 Median Phase 3 — Construct the landscaped medians in the third phase.
- Highway 85 Streetscape — This project consists of adding streetscape to the downtown right of ways to help improve pedestrian walkability and reduce pedestrial/vehicle confrontations (increasing traffic flow).
- Redwine/Ramah Road Roundabout — This project consists of constructing a roundabout at Redwine Road and Ramah Road to improve the traffic flow from the existing 4-way stop.
- Veterans Parkway Large Roundabout — This project consists of constructing a roundabout on Veterans Parkway to help with traffic flow and was identified in the DRI 2480 as needed as development increased in the area.
- Veterans Parkway Small Roundabout — This project consists of constructing a roundabout at Veterans Parkway and South Sandy Creek to improve traffic flow and was identified in the DRI 2480 as needed and again in the DRI 2788 as needed as development increased in the area.
- Veterans Parkway 4-lane Expansion — This project consists of expanding the existing two lane parkway to 4 lanes and was identified in the DRI 2480 as needed as development increased in the area.
- Habersham Extension — This project consists of constructing a new roadway extending the existing Habersham Road from the business park to the newly constructed roundabout at Hood Road and SR 92. The project is intended to improve traffic flow through the business park and alleviate a highly congested and potentially dangerous intersection with Habersham Road at S.R. 85.
- Fisher Road Extension — This project consists of adding a set of roads forming a grid network south of Stonewall to give more options for traffic flow downtown.
- Highway 54/Grady — This project consists of reconfiguring the intersection to add a dedicated left hand turn lane. Currently the left hand and straight lane are combined. By adding a

dedicated left hand turn lane we will have two left turn options for traffic.

In addition, two major State-funded projects are already scheduled, and are shown on Table 21. Although these projects are not funded by the City and are therefore not impact fee eligible, they do constitute a major, additional source of capacity to serve future traffic demands. There is no cost to the City, of course. The projects are:

- State Route 85 — Widening from 2 to 4-6 lanes, traversing the city between the south terminous just north of Price Road and ending just south of Grady Avenue.
- State Route 920 (McDonough Road) — Widening to 4-lanes with a 20-foot raised median plus bridge replacements, traversing the city from SR 54 on the west to Tara Boulevard in Clayton County.

Road Improvement Costs

The cost figures shown in the first four columns of Table 21 are in current (2017) dollars. These figures are then calculated in Net Present Value (as discussed in the Cost Adjustments and Credits chapter) and shown in the last column, based on the anticipated year of project expenditure.

The two State DOT projects are listed since they add capacity for future growth, but do not involve City financing, and the two transportation-related plan updates are also shown since they will address additional future needs for road improvements but impact fees will not be used to fund them.

Table 21: Road Improvement Projects and Estimated Costs

Project Description	Total Cost	Total City Cost*	Impact Fees Expended**	Net City Cost	Projected Year of Completion	Net Present Value***
Lafayette Ave Extension	$ 900,000.00	$ 900,000.00	$ 8,873.37	$ 891,126.63	2020	$ 952,090.12
Lafayette/Glynn Street	$ 250,000.00	$ 250,000.00	$ 8,873.37	$ 241,126.63	2020	$ 257,622.51
Jeff Davis Shoulder	$ 482,053.00	$ 482,053.00	$ 20,820.25	$ 461,232.75	2020	$ 492,786.47
Stonewall/85 Left Turn	$ 142,000.00	$ 142,000.00	$ 8,873.38	$ 133,126.62	2020	$ 142,234.04
LaFayette/Tiger Trail	$ 1,200,000.00	$ 1,200,000.00	$ 50,307.07	$ 1,149,692.93	2020	$ 1,228,345.38
Highway 54/Gingercake	$ 11,000.00	$ 11,000.00		$ 11,000.00	2020	$ 11,752.53
Hood Ave Conn/SR92	$ 8,000,000.00	$ 8,000,000.00	$ 290,878.95	$ 7,709,121.05	2017	$ 7,709,121.05
Highway 85 Median Design	$ 75,000.00	$ 75,000.00		$ 75,000.00	2020	$ 80,130.88
Highway 85 Medians Phase 1	$ 83,352.33	$ 83,352.33		$ 83,352.33	2020	$ 89,054.60
Highway 85 Medians Phase 2	$ 83,352.33	$ 83,352.33		$ 83,352.33	2020	$ 89,054.60
Highway 85 Medians Phase 3	$ 83,352.33	$ 83,352.33		$ 83,352.33	2020	$ 89,054.60
Highway 85 Streetscape	$ 28,296.00	$ 28,296.00		$ 28,296.00	2020	$ 30,231.78
Redwine/Ramah Road Roundabout	$ 1,200,000.00	$ 1,200,000.00		$ 1,200,000.00	2020	$ 1,282,094.04
Veterans Pkwy Large Roundabout	$ 1,300,000.00	$ 1,300,000.00		$ 1,300,000.00	2022	$ 1,451,580.34
Veterans Pkwy Small Roundabout (Sndy Crk)	$ 900,000.00	$ 900,000.00		$ 900,000.00	2022	$ 1,004,940.23
Veterans Pkwy 4-lane expansion (1.5 mile)	$ 8,000,000.00	$ 8,000,000.00		$ 8,000,000.00	2022	$ 8,932,802.07
Habersham Extension	$ 900,000.00	$ 900,000.00		$ 900,000.00	2022	$ 1,004,940.23
Fischer Road Extension (Downtown Expan.)	$ 15,000,000.00	$ 15,000,000.00		$ 15,000,000.00	2020	$ 16,026,175.47
Highway 54/Grady Avenue	$ 750,000.00	$ 750,000.00		$ 750,000.00	2019	$ 783,827.24
SR 85 Widening--future GDOT costs	$ 66,278,741.00	$ -		$ -	2022-2034	n/a
SR 920 Widening - future GDOT costs	$ 77,355,973.00	$ -		$ -	2035-2038	n/a
2006 Downtown Plan Update	$ 30,000.00	$ 30,000.00		$ 30,000.00	2018	n/a
Fayette County Comprehensive Transportation Plan 2020	Total funded by Fayette County	$ -		$ -	2020	n/a
	$ 183,053,119.99	$ 39,418,405.99	$ 388,626.39	$ 39,029,779.60		$ 41,657,838.17

* Total cost of project less grants or other non-city assistance.
** Impact fees collected prior to 2018 and expended on project.
*** Net Present Value = 2017 cost estimate inflated to target year using the ENR Construction Cost Index, reduced to NPV using the Discount Rate. "n/a" - there is no City cost or impact fees will not be applied to City cost.

Eligible Costs

As discussed thoroughly in the *Methodology: Trip Generation* section of the Technical Appendix, new growth and development will represent 37.437% of the traffic on Fayetteville's road network in 2040. To that extent, new growth's fair share of the road project costs that are attributed to new growth are shown on the following table. This percentage represents new growth's portion of system improvements that create the capacity needed to serve it, while the remaining 62.563% covers that portion of those projects that do not create new capacity, such as resurfacing, road maintenance, and so forth, and those that create more capacity than needed to accommodate new growth's traffic in 2040.

Table 22: Eligible Cost Calculation

Project	Net Present Value	% Impact Fee Eligible*	New Growth Cost
Lafayette Ave Extension	$ 952,090.12	37.437%	$ 356,436.87
Lafayette/Glynn Street	257,622.51	37.437%	96,446.92
Jeff Davis Shoulder	492,786.47	37.437%	184,485.97
Stonewall/85 Left Turn	142,234.04	37.437%	53,248.59
LaFayette/Tiger Trail	1,228,345.38	37.437%	459,859.39
Highway 54/Gingercake	11,752.53	37.437%	4,399.83
Hood Ave Conn/SR92	7,709,121.05	37.437%	2,886,087.05
Highway 85 Median Design	80,130.88	37.437%	29,998.84
Highway 85 Medians Phase 1	89,054.60	37.437%	33,339.64
Highway 85 Medians Phase 2	89,054.60	37.437%	33,339.64
Highway 85 Medians Phase 3	89,054.60	37.437%	33,339.64
Highway 85 Streetscape	30,231.78	37.437%	11,317.96
Redwine/Ramah Road Roundabout	1,282,094.04	37.437%	479,981.44
Veterans Pkwy Large Roundabout x 2	1,451,580.34	37.437%	543,432.54
Veterans Pkwy Small Roundabout (Sndy Crk)	1,004,940.23	37.437%	376,222.53
Veterans Pkwy 4-lane expansion (1.5 mile)	8,932,802.07	37.437%	3,344,200.23
Habersham Extension	1,004,940.23	37.437%	376,222.53
Fischer Road Extension (Downtown Expan.)	16,026,175.47	37.437%	5,999,767.97
Highway 54/Grady Avenue	783,827.24	37.437%	293,443.78
SR 85 Widening--future GDOT costs	n/a	0.000%	n/a
SR 920 Widening - future GDOT costs	n/a	0.000%	n/a
2006 Downtown Plan Update	n/a	0.000%	n/a
Fayette County Comprehensive Transportation Plan 2020	n/a	0.000%	n/a
	$ 41,657,838.17		$ 15,595,571.36

* See the *Methodology--Trip Generation* section in the Technical Appendix.
n/a - impact fees will not be applied to the project.

Five-Year Community Work Program

The following impact fee funded projects are excerpted from this Capital Improvements Element and amend the Community Work Program contained in the Comprehensive Plan to the extent appropriate.

Project	Start Year	Comp. Year	Cost Estimate (NPV)	Funding Source	Responsible Party
Impact Fee Related Projects					
New Fire Truck (Quint)	2016	2021	$1,005,779	100% Impact Fees	Fire Department
Design/Construct New Fire Station 93	2018	2019	$7,454,430	83.8% Impact Fees; SPLOST	Fire Department
Fire Apparatus - Engine	2018	2019	$606,889	100% Impact Fees	Fire Department
Fire Station 91 Expansion	2019	2020	$126,247	100% Impact Fees	Fire Department
Crime Scene Vehicle	2018	2019	$101,148	68.1% Impact Fees; General Fund (CP)	Police Department
Police Dept. Office Space Expansion	2021	2022	$626,796	100% Impact Fees	Police Department
Park Land Acquisitions	2019	2040	$2,759,071	100% Impact Fees	Public Services
Park improvements: Gazebo	2018	2019	$10,223	76.1% Impact Fees; General Fund (CP)	Public Services
Park improvements: Community Building	2019	2020	$1,465,059	76.1% Impact Fees; General Fund (CP)	Public Services
Park improvements: Splash Pad	2019	2020	$522,551	43.2% Impact Fees; General Fund (CP)	Public Services
Park improvements: The Ridge Phase 1	2016	2030	$193,816	76.1% Impact Fees; SPLOST, GF	Public Services
Park improvements: The Ridge Phase 2	2018	2030	$95,074	76.1% Impact Fees; SPLOST, GF	Public Services
The Ridge Trails 1	2016	2020	$3,700	100% Impact Fees	Public Services
The Ridge Trails 2	2018	2022	$10,632	100% Impact Fees	Public Services
The Ridge Boardwalk	2018	2022	$205,278	100% Impact Fees	Public Services

Project	Start Year	Comp. Year	Cost Estimate (NPV)	Funding Source	Responsible Party
Staff Review and Recommendations for revisions to the City's long range Parks & Recreation initiatives.	2019	2020	$0	Staff responsibility	Public Services, Community Development
Lafayette Ave Extension	On-going	2020	$952,090	37.4% Impact Fees; General Fund (CP)	Public Services
Lafayette/Glynn Street	On-going	2020	$257,623	37.4% Impact Fees; General Fund (CP)	Public Services
Jeff Davis Shoulder	On-going	2020	$492,786	37.4% Impact Fees; General Fund (CP)	Public Services
Stonewall/85 Left Turn	On-going	2020	$142,234	37.4% Impact Fees; General Fund (CP)	Public Services
Lafayette/Tiger Trail	On-going	2020	$1,228,345	37.4% Impact Fees; General Fund (CP)	Public Services
Highway 54/Gingercake	On-going	2020	$11,753	37.4% Impact Fees; General Fund (CP)	Public Services
Hood Ave Connector/SR92	On-going	2017	$7,709,122	37.4% Impact Fees; General Fund (CP)	Public Services
Highway 85 Median Design	On-going	2020	$80,131	37.4% Impact Fees; General Fund (CP)	Public Services
Highway 85 Medians Phase 1	On-going	2020	$89,055	37.4% Impact Fees; General Fund (CP)	Public Services
Highway 85 Medians Phase 2	On-going	2020	$89,055	37.4% Impact Fees; General Fund (CP)	Public Services
Highway 85 Medians Phase 3	On-going	2020	$89,055	37.4% Impact Fees; General Fund (CP)	Public Services
Highway 85 Streetscape	On-going	2020	$30,232	37.4% Impact Fees; General Fund (CP)	Public Services
Redwine/Ramah Road Roundabout	On-going	2020	$1,282,094	37.4% Impact Fees; General Fund (CP)	Public Services

Project	Start Year	Comp. Year	Cost Estimate (NPV)	Funding Source	Responsible Party
Veterans Pkwy Large Roundabout	On-going	2022	$1,451,580	37.4% Impact Fees; General Fund (CP)	Public Services
Veterans Pkwy Small Roundabout (Sandy Creek)	On-going	2022	$1,004,940	37.4% Impact Fees; General Fund (CP)	Public Services
Veterans Pkwy 4-lane expansion (1.5 mile)	On-going	2022	$8,932,803	37.4% Impact Fees; General Fund (CP)	Public Services
Habersham Extension	On-going	2022	$1,004,940	37.4% Impact Fees; General Fund (CP)	Public Services
Fischer Road Extension (Downtown Expansion)	On-going	2020	$16,026,175	37.4% Impact Fees; General Fund (CP)	Public Services
Highway 54/Grady Avenue	On-going	2019	$783,827	37.4% Impact Fees; General Fund (CP)	Public Services
SR 85 Widening--future GDOT costs	2022	2034	n/a	GDOT	GDOT
2006 Downtown Plan Update	2018	2018	$30,000	General Fund	Public Services
Fayette County Comprehensive Transportation Plan 2020	2020	2020	n/a	Fayette County	Fayette County

NOTE: All impact fee related project costs are calculated as Net Present Value as required by the Georgia Development Impact Fee law.

Glossary

The following terms are used in the Impact Fee Methodology Report. Where possible, the definitions are taken directly from the Development Impact Fee Act.

Capital improvement: an improvement with a useful life of ten years or more, by new construction or other action, which increases the service capacity of a public facility.

Capital improvements element: a component of a comprehensive plan adopted pursuant to Chapter 70 of the Development Impact Fee Act which sets out projected needs for system improvements during a planning horizon established in the comprehensive plan, a schedule of capital improvements that will meet the anticipated need for system improvements, and a description of anticipated funding sources for each required improvement.

Development: any construction or expansion of a building, structure, or use, any change in use of a building or structure, or any change in the use of land, any of which creates additional demand and need for public facilities.

Development impact fee: a payment of money imposed upon development as a condition of development approval to pay for a proportionate share of the cost of system improvements needed to serve new growth and development.

Eligible facilities: capital improvements in one of the following categories:

(A) Water supply production, treatment, and distribution facilities;

(B) Waste-water collection, treatment, and disposal facilities;

(C) Roads, streets, and bridges, including rights of way, traffic signals, landscaping, and any local components of state or federal highways;

(D) Storm-water collection, retention, detention, treatment, and disposal facilities, flood control facilities, and bank and shore protection and enhancement improvements;

(E) Parks, open space, and recreation areas and related facilities;

(F) Public safety facilities, including police, fire, emergency medical, and rescue facilities; and

(G) Libraries and related facilities.

Impact Cost: the proportionate share of capital improvements costs to provide service to new growth, less any applicable credits.

Impact Fee: the impact cost plus surcharges for program administration and recoupment of the cost to prepare the Capital Improvements Element.

Level of service: a measure of the relationship between service capacity and service demand for public facilities in terms of demand to capacity ratios or the comfort and convenience of use or service of public facilities or both.

Project improvements: site improvements and facilities that are planned and designed to provide service for a particular development project and that are necessary for the use and convenience of the occupants or users of the project and are not system improvements. The character of the improvement shall control a determination of whether an improvement is a project improvement or system improvement and the physical location of the improvement on site or off site shall not be considered determinative of whether an improvement is a project improvement or a system improvement. If an improvement or facility provides or will provide more than incidental service or facilities

capacity to persons other than users or occupants of a particular project, the improvement or facility is a system improvement and shall not be considered a project improvement. No improvement or facility included in a plan for public facilities approved by the governing body of the municipality or county shall be considered a project improvement.

Proportionate share: means that portion of the cost of system improvements which is reasonably related to the service demands and needs of the project.

Rational Nexus: the clear and fair relationship between fees charged and services provided.

Service area: a geographic area defined by a municipality, county, or intergovernmental agreement in which a defined set of public facilities provide service to development within the area. Service areas shall be designated on the basis of sound planning or engineering principles or both.

System improvement costs: costs incurred to provide additional public facilities capacity needed to serve new growth and development for planning, design and engineering related thereto, including the cost of constructing or reconstructing system improvements or facility expansions, including but not limited to the construction contract price, surveying and engineering fees, related land acquisition costs (including land purchases, court awards and costs, attorneys' fees, and expert witness fees), and expenses incurred for qualified staff or any qualified engineer, planner, architect, landscape architect, or financial consultant for preparing or updating the capital improvement element, and administrative costs, provided that such administrative costs shall not exceed 3 percent of the total amount of the costs. Projected interest charges and other finance costs may be included if the impact fees are to be used for the payment of principal and interest on bonds, notes, or other financial obligations issued by or on behalf of the municipality or county to finance the capital improvements element but such costs do not include routine and periodic maintenance expenditures, personnel training, and other operating costs.

System improvements: capital improvements that are public facilities and are designed to provide service to the community at large, in contrast to 'project improvements.'

Appendix

Technical Analysis—Population Forecasts

The purpose of this analysis is to select the most appropriate population forecasts for the City, which will be used in establishing Level of Service calculations for the impact fee program update. The population forecasts will subsequently influence the housing unit and employment forecasts used in this Update.

To accomplish this, a variety of statistical projection approaches were prepared for comparison and consideration. Historic city and county data from the US Bureau of the Census were used extensively as benchmarks from the past, as well as countywide forecasts prepared by the Georgia Office of Planning and Budget (OPB) and Woods & Poole Economics, Inc.

The various approaches presented in the Methodology below are:

- 2000–2016 Census population data projected to 2040 on a 'straight line' basis for each city in Fayette County using a 'linear trend' regression.
- 2000–2016 Census population data projected to 2040 on a 'curved line' basis for each city in Fayette County using a 'growth trend' regression.
- Population projected to 2040 for each city and the county as a whole, assuming that future growth will return to the historic growth each experienced during 2000–2007 (before the great Recession).

In the process:

- Linear and growth trend projections were made for the county and compared to forecasts by the State OPB and Woods & Poole;
- Each city's future 'share' of the county population was calculated and considered; and
- Historical data on the total number of new housing units that were authorized by building permits in the county's three largest cities (Fayetteville, Peachtree City and Tyrone) and in the unincorporated area of the county was considered.

■ Conclusion

Fayetteville's population growth proceeded at a relatively steady pace during the past decade, but levelled off somewhat starting in 2010 and 'up-ticked' beginning in 2014. Building permitting for housing units held its own compared to every other city in the county during the pre-recession years of 2000 to 2007, but fell dramatically during the Great Recession (as was the case in all of the cities in Fayette County). Compared to Peachtree City, Fayetteville's percentage share of countywide population increased gradually throughout the 2000-2010 period while Peachtree City's share fell slowly but steadily during the same decade. Future population growth in the coming 22 years to 2040 is expected to resume and continue within the city, possibly generating additional annexations, such that the city's percentage share of the total county will continue to grow and Fayetteville's 2040 population will draw closer to that of Peachtree City. This trend has already begun, considering the city's notable rebound in building permit activity beginning in 2012 compared to all other Fayette County cities.

Summary: Population Forecasts

The table and graph below summarize the results of the three forecasting approaches described above and detailed in the following description of the Methodology.

The growth rate figures below the graph are particularly revealing.

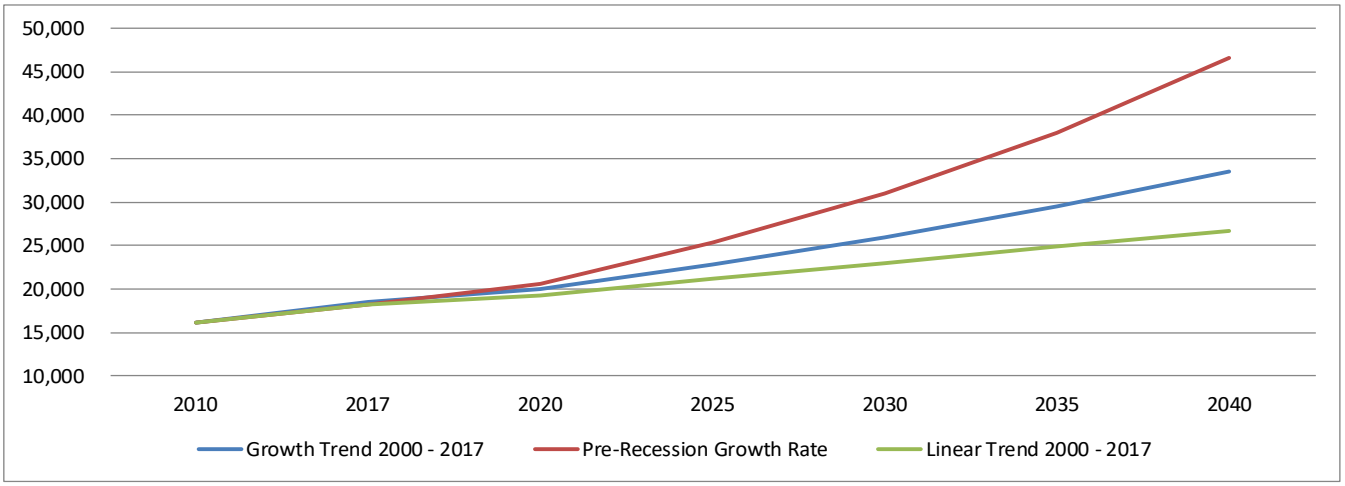
Although the **Pre-Recession Growth** approach was intended to 'resume' the normal growth of the 2000–2007 period, the projection actually exaggerates the results: while the 2000-2007 average annual increase comes out at 4.63%, the population projected to 2040 averages 6.75% per year. This anomaly is a function of the math trying to smooth out a curvilinear pattern to data points that vary each year, both up and down, in a short period of time.

The **Growth Trend** forecast is lower than the pre-recession growth rate with an average at 3.51% per year. Even so, the forecast indicates that the city's population will increase more than 80% over the coming 22 years (compared to a 32% increase experienced between 2000 and 2007, prior to the slump).

The **Linear Trend** forecast proceeds at a low average annual rate of 2.04%, which is below the 2.18% averaged over the good and bad years of the 2000-2017 period. On the other hand, if growth slackens over the next 22 years at the Linear Trend 2.04% annual rate, by 2040 the city still will have increased its population by more than 47%.

Summary: Fayetteville Population Forecasts

	2010	2017	2020	2025	2030	2035	2040	Change 2017-2040
Linear Trend 2000 - 2017	16,204	18,192	19,303	21,155	23,007	24,859	26,711	8,519
Growth Trend 2000 - 2017	16,204	18,574	20,063	22,815	25,945	29,504	33,551	14,978
Pre-Recession Growth Rate	16,204	18,248	20,620	25,280	30,992	37,996	46,582	28,334



	2000-2007	2007-2017	Linear Trend	Growth Trend	Pre-Recession Growth
Percent Increase	32.41%	21.78%	46.83%	80.64%	155.27%
Average Annual Increase	4.63%	2.18%	2.04%	3.51%	6.75%

Recommendation

Fayette County has been a 'hot market' for housing for many years and, despite the Great Recession, will be again in the future. Although Fayetteville authorized building permits between 2000 and 2016 for more housing units than any other city in the county, the unincorporated area of the county

outstripped it by 42%, and permitting in the unincorporated area rebounded from the recession more quickly than did the cities, starting in 2010 and jumping notably from 2012 on. Fayetteville began its rebound in 2012, and continued to issue more permits each year thereafter than Peachtree City and Tyrone.

For Fayetteville, the ability of the city to accommodate future market demand for new housing relies to a large extent on the availability of land for new development, coupled possibly with some limited redevelopment of older deteriorating areas in the decades ahead. The City has annexed land to the west for development of Pinewood Studios and attendant businesses, as well as some new housing. As Fayetteville resumes its role, along with the unincorporated area, as 'the other' hot market for housing and capitalizes on new businesses related to the movie and video industry, additional annexations providing more land availability may occur that will realize the city's future growth potential.

We believe that an approach recognizing that growth will resume a more 'normal' pattern following the recessionary slump is the most realistic.

That approach is best reflected in the Growth Trend forecast for the reasons described above.

Methodology

Historic Population Growth

On Table P-1 the latest population estimates are shown for each year between 2000 and 2016, for each city in Fayette County and the county as a whole, prepared by the Census Bureau as part of their Annual Estimates program. These particular figures are from the Intercensal Estimates for 2000-2009 (the Bureau revises its annual estimates for the preceding decade after a Decennial Census to correct individual errors) and from the Census Bureau's Annual Estimates Program for 2010 through 2016. (When the 2016 annual estimates were published, the 2010 estimate was slightly revised.)

It is important to note that Census Bureau estimates are made as of July 1 of each year, so they are slightly off from the Decennial Census figures for 2000 and 2010. Each Decennial Census is taken as of April 1. For instance, the population figure for '2007' on Table 1 would be as of July 1, 2007, covering the previous 12 months from June 30, 2006.[3]

Also shown on Table P-1 is each city's percentage of the total Fayette County population each year. These percentages will be compared later to percentage share trends into the future to 2040.

Projecting Historic Trends into the Future

In order to get a 'handle' on population projections for Fayette County and its cities, the population figures from the Census Bureau (Table P-1) are projected to the year 2040 using two types of regression analysis (often called 'trend analysis' and referred to by mathematicians as using the 'least squares' method):

- The 'linear trend' regression assumes a straight line relationship between the data for each year, and projects that line forward.
- The 'growth trend' regression assumes there may be some curve to the data, whether an acceleration or deceleration over time, that will continue into the future.

Both of these are mathematical exercises, but valuable for comparison and analysis purposes.

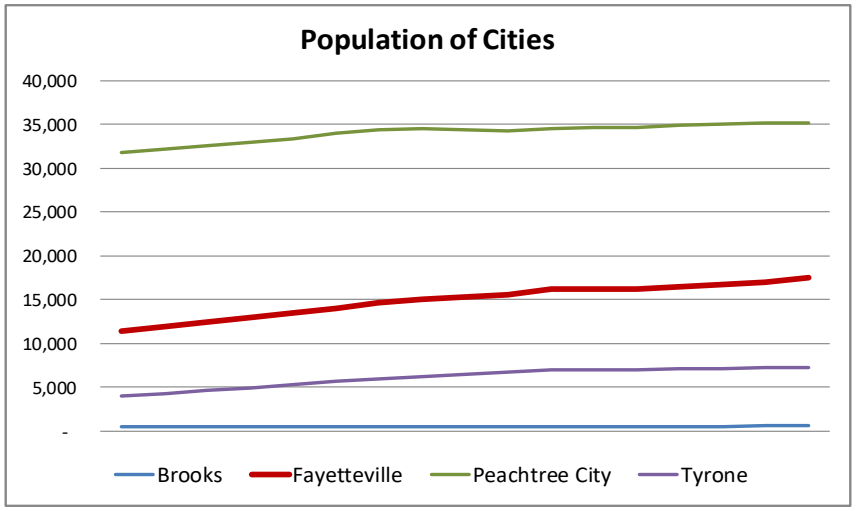
[3] Since the effects of the Great Recession were first observed in late 2007, we therefore refer to the 'pre-recession' years as ending in 2007 and the slump beginning in 2008 when using the annual Census estimates.

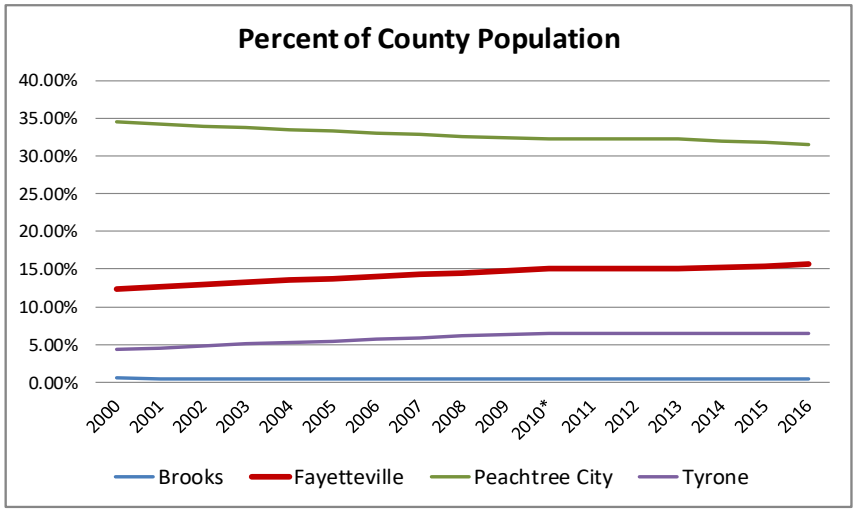
Table P-1: Census Population Data

	← Intercensal Population Estimates										→ Annual Estimates Program						
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010*	2011	2012	2013	2014	2015	2016
Brooks	490	496	501	506	511	520	527	527	524	522	526	526	528	532	540	546	550
Fayetteville	**11,317**	**11,855**	**12,358**	**12,887**	**13,421**	**14,027**	**14,587**	**14,985**	**15,265**	**15,563**	**16,204**	**16,236**	**16,246**	**16,383**	**16,747**	**16,991**	**17,519**
Peachtree City	31,764	32,211	32,519	32,934	33,303	33,913	34,391	34,455	34,301	34,183	34,513	34,565	34,649	34,849	35,030	35,187	35,186
Tyrone	3,982	4,304	4,609	4,931	5,247	5,605	5,946	6,214	6,439	6,663	6,952	6,985	7,015	7,070	7,129	7,181	7,215
Woolsey	156	157	157	158	159	161	162	161	159	158	159	159	159	160	163	166	168
Fayette County	92,073	94,086	95,707	97,634	99,443	101,961	104,099	104,989	105,192	105,493	106,993	107,208	107,463	108,287	109,550	110,546	111,627

Percent of County Population

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010*	2011	2012	2013	2014	2015	2016
Brooks	0.53%	0.53%	0.52%	0.52%	0.51%	0.51%	0.51%	0.50%	0.50%	0.49%	0.49%	0.49%	0.49%	0.49%	0.49%	0.49%	0.49%
Fayetteville	**12.29%**	**12.60%**	**12.91%**	**13.20%**	**13.50%**	**13.76%**	**14.01%**	**14.27%**	**14.51%**	**14.75%**	**15.14%**	**15.14%**	**15.12%**	**15.13%**	**15.29%**	**15.37%**	**15.69%**
Peachtree City	34.50%	34.24%	33.98%	33.73%	33.49%	33.26%	33.04%	32.82%	32.61%	32.40%	32.26%	32.24%	32.24%	32.18%	31.98%	31.83%	31.52%
Tyrone	4.32%	4.57%	4.82%	5.05%	5.28%	5.50%	5.71%	5.92%	6.12%	6.32%	6.50%	6.52%	6.53%	6.53%	6.51%	6.50%	6.46%
Woolsey	0.17%	0.17%	0.16%	0.16%	0.16%	0.16%	0.16%	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%





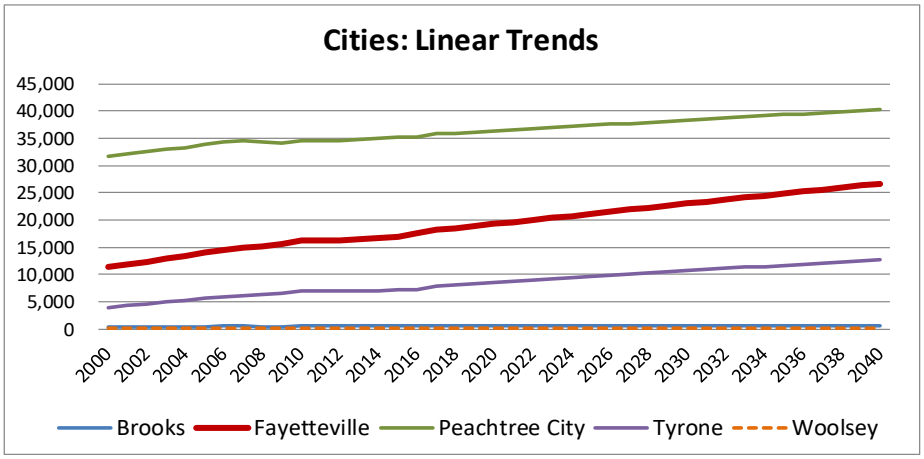
* Revised by Census Bureau in 2016.

Note: All data as of July 1 of each year. 2000 and 2010 differ from Decennial Census counts, which are as of April 1.

Sources: For 2010 to 2016: Census Estimates Program, 2011-2016, US Bureau of the Census. For 2000 to 2009: Intercensal Estimates 2000-2010, US Bureau of the Census.

Table P-2: City Projections, Linear Trend

	Brooks	Fayetteville	Peachtree City	Tyrone	Woolsey
2000	490	**11,317**	31,764	3,982	156
2001	496	**11,855**	32,211	4,304	157
2002	501	**12,358**	32,519	4,609	157
2003	506	**12,887**	32,934	4,931	158
2004	511	**13,421**	33,303	5,247	159
2005	520	**14,027**	33,913	5,605	161
2006	527	**14,587**	34,391	5,946	162
2007	527	**14,985**	34,455	6,214	161
2008	524	**15,265**	34,301	6,439	159
2009	522	**15,563**	34,183	6,663	158
2010	526	**16,204**	34,513	6,952	159
2011	526	**16,236**	34,565	6,985	159
2012	528	**16,246**	34,649	7,015	159
2013	532	**16,383**	34,849	7,070	160
2014	540	**16,747**	35,030	7,129	163
2015	546	**16,991**	35,187	7,181	166
2016	550	**17,519**	35,186	7,215	168
2017	550	**18,192**	35,765	7,973	164
2018	553	**18,562**	35,962	8,183	165
2019	556	**18,933**	36,158	8,392	165
2020	559	**19,303**	36,355	8,602	166
2021	562	**19,673**	36,551	8,811	166
2022	566	**20,044**	36,748	9,021	167
2023	569	**20,414**	36,944	9,231	167
2024	572	**20,785**	37,141	9,440	168
2025	575	**21,155**	37,337	9,650	168
2026	578	**21,525**	37,534	9,859	169
2027	581	**21,896**	37,730	10,069	169
2028	584	**22,266**	37,927	10,278	169
2029	587	**22,637**	38,123	10,488	170
2030	591	**23,007**	38,320	10,697	170
2031	594	**23,377**	38,516	10,907	171
2032	597	**23,748**	38,713	11,116	171
2033	600	**24,118**	38,909	11,326	172
2034	603	**24,489**	39,106	11,535	172
2035	606	**24,859**	39,302	11,745	173
2036	609	**25,229**	39,498	11,955	173
2037	612	**25,600**	39,695	12,164	174
2038	615	**25,970**	39,891	12,374	174
2039	619	**26,341**	40,088	12,583	175
2040	622	**26,711**	40,284	12,793	175



Alternate Projections

Tables P-2 and P-3 present alternate projections for the cities that comprise Fayette County, and Table P-4 for the county as a whole, based on the Census population data for 2000 to 2016.

Table P-2 shows the results of the linear trend regression approach for each of the cities, while Table P-3 shows the projections from the growth trend regression approach.

For Fayetteville, the two projections result in 2040 populations that differ by 20.4% (6,841 people). This is not as great as the difference for Tyrone (33.9%), but far larger than for Peachtree City (1.6%) which is a considerably more 'mature' built-out city than Fayetteville.

The growth trend regression results in a notably larger population for Fayetteville in 2040 over the linear trend regression. A perceptible 'curve' in the historic data is indicated on the Table P-3 graph as Fayetteville's population approaches that of Peachtree City.

Table P-3: City Projections, Growth Trend

	Brooks	Fayetteville	Peachtree City	Tyrone	Woolsey
2000	490	**11,317**	31,764	3,982	156
2001	496	**11,855**	32,211	4,304	157
2002	501	**12,358**	32,519	4,609	157
2003	506	**12,887**	32,934	4,931	158
2004	511	**13,421**	33,303	5,247	159
2005	520	**14,027**	33,913	5,605	161
2006	527	**14,587**	34,391	5,946	162
2007	527	**14,985**	34,455	6,214	161
2008	524	**15,265**	34,301	6,439	159
2009	522	**15,563**	34,183	6,663	158
2010	526	**16,204**	34,513	6,952	159
2011	526	**16,236**	34,565	6,985	159
2012	528	**16,246**	34,649	7,015	159
2013	532	**16,383**	34,849	7,070	160
2014	540	**16,747**	35,030	7,129	163
2015	546	**16,991**	35,187	7,181	166
2016	550	**17,519**	35,186	7,215	168
2017	551	**18,574**	35,814	8,323	164
2018	554	**19,057**	36,023	8,634	165
2019	557	**19,554**	36,234	8,956	165
2020	561	**20,063**	36,446	9,291	166
2021	564	**20,585**	36,659	9,638	166
2022	567	**21,121**	36,874	9,998	167
2023	571	**21,672**	37,090	10,371	167
2024	574	**22,236**	37,307	10,759	168
2025	578	**22,815**	37,525	11,161	168
2026	581	**23,409**	37,745	11,577	169
2027	585	**24,019**	37,966	12,010	169
2028	588	**24,644**	38,188	12,458	170
2029	592	**25,286**	38,411	12,924	170
2030	595	**25,945**	38,636	13,406	171
2031	599	**26,621**	38,862	13,907	171
2032	602	**27,314**	39,090	14,427	172
2033	606	**28,025**	39,318	14,965	172
2034	610	**28,755**	39,548	15,524	173
2035	613	**29,504**	39,780	16,104	173
2036	617	**30,272**	40,013	16,706	174
2037	621	**31,061**	40,247	17,330	174
2038	625	**31,870**	40,482	17,977	175
2039	628	**32,700**	40,719	18,648	175
2040	632	**33,551**	40,958	19,345	176

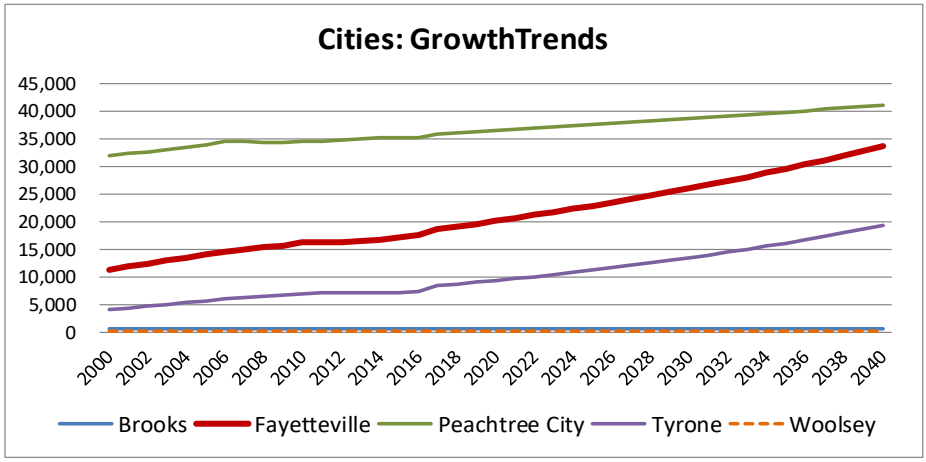


Table P-4: Fayette County Projections

	Census: Linear	Census: Growth	Pre-Recession Growth	Georgia OPB	Woods & Poole
2000	92,073	92,073			
2001	94,086	94,086			
2002	95,707	95,707			
2003	97,634	97,634			
2004	99,443	99,443			
2005	101,961	101,961			
2006	104,099	104,099			
2007	104,989	104,989			
2008	105,192	105,192			
2009	105,493	105,493			
2010	106,993	106,993			106,993
2011	107,208	107,208			107,207
2012	107,463	107,463			107,411
2013	108,287	108,287		108,365	108,295
2014	109,550	109,550		109,209	109,648
2015	110,546	110,546		110,054	110,714
2016	111,627	111,627	111,627	110,898	113,307
2017	113,861	114,352	113,818	111,743	116,038
2018	114,993	115,625	116,052	112,587	118,826
2019	116,126	116,913	118,330	113,483	121,674
2020	117,259	118,215	120,653	114,379	124,581
2021	118,391	119,531	123,021	115,274	127,547
2022	119,524	120,862	125,436	116,170	130,573
2023	120,656	122,208	127,898	117,066	133,658
2024	121,789	123,569	130,408	117,914	136,805
2025	122,921	124,944	132,968	118,762	140,010
2026	124,054	126,336	135,578	119,527	143,272
2027	125,187	127,742	138,239	120,291	146,590
2028	126,319	129,165	140,953	121,055	149,963
2029	127,452	130,603	143,720	121,820	153,392
2030	128,584	132,057	146,541	122,584	156,878
2031	129,717	133,528	149,417	123,132	160,398
2032	130,849	135,015	152,350	123,679	163,951
2033	131,982	136,518	155,340	124,226	167,542
2034	133,114	138,038	158,389	124,773	171,168
2035	134,247	139,575	161,498	125,321	174,829
2036	135,380	141,129	164,668	125,659	178,528
2037	136,512	142,701	167,901	125,997	182,264
2038	137,645	144,290	171,196	126,335	186,038
2039	138,777	145,896	174,557	126,673	189,852
2040	139,910	147,521	177,983	127,011	193,705

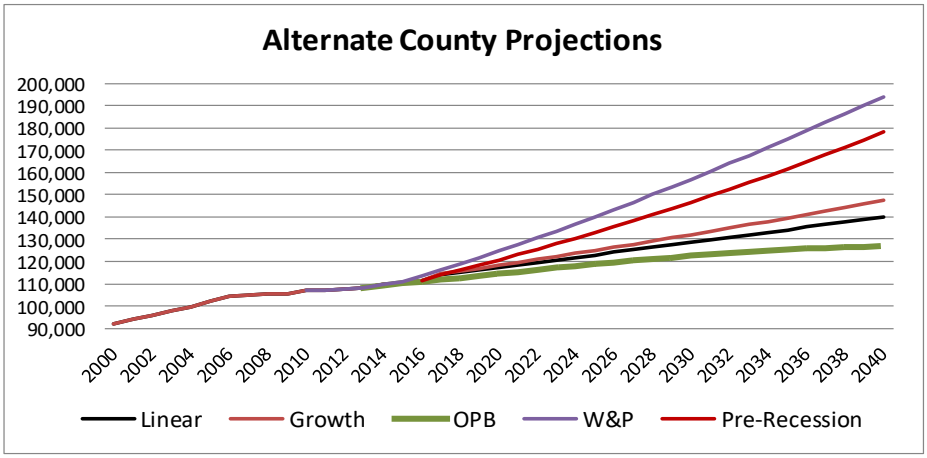


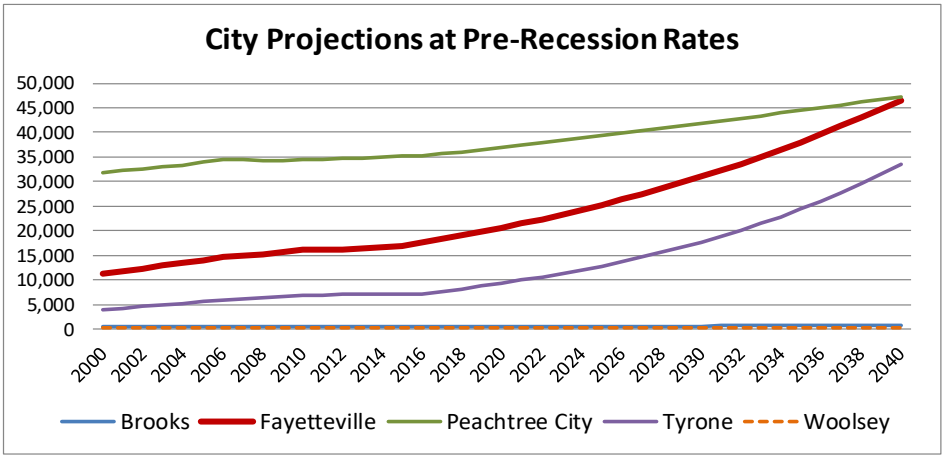
Table P-4 presents the results of the linear trend and growth trend approaches to 2040 for the county as a whole. The results diverge by about 5.4% over the projection period.

For comparison purposes, forecasts prepared for Fayette County by the State OPB and by Woods & Poole Economics (which are generally recognized by DCA as authoritative) are also shown on Table P-4, along with a 'pre-recession' growth forecast for the county (discussed below).

Overall, the countywide linear trend projection and the OPB forecast result in relatively similar but low population figures in 2040, while the Woods & Poole figures 2040 appear overly enthusiastic compared to the others. The growth trend and the 'pre-recession' projections bear further consideration as appearing to be moderate interpretations of future market pressures and population growth.

Table P-5: Pre-Recession Growth Resumes

	Brooks	Fayetteville	Peachtree City	Tyrone	Woolsey	Fayette County
2000	**490**	**11,317**	**31,764**	**3,982**	**156**	**92,073**
2001	**496**	**11,855**	**32,211**	**4,304**	**157**	**94,086**
2002	**501**	**12,358**	**32,519**	**4,609**	**157**	**95,707**
2003	**506**	**12,887**	**32,934**	**4,931**	**158**	**97,634**
2004	**511**	**13,421**	**33,303**	**5,247**	**159**	**99,443**
2005	**520**	**14,027**	**33,913**	**5,605**	**161**	**101,961**
2006	**527**	**14,587**	**34,391**	**5,946**	**162**	**104,099**
2007	**527**	**14,985**	**34,455**	**6,214**	**161**	**104,989**
2008	524	15,265	34,301	6,439	159	105,192
2009	522	15,563	34,183	6,663	158	105,493
2010	526	16,204	34,513	6,952	159	106,993
2011	526	16,236	34,565	6,985	159	107,208
2012	528	16,246	34,649	7,015	159	107,463
2013	532	16,383	34,849	7,070	160	108,287
2014	540	16,747	35,030	7,129	163	109,550
2015	546	16,991	35,187	7,181	166	110,546
2016	550	17,519	35,186	7,215	168	111,627
2017	556	18,248	35,622	7,692	169	113,818
2018	562	19,006	36,063	8,201	170	116,052
2019	569	19,797	36,509	8,743	171	118,330
2020	575	20,620	36,961	9,322	172	120,653
2021	581	21,478	37,419	9,938	173	123,021
2022	588	22,371	37,882	10,596	174	125,436
2023	595	23,301	38,351	11,297	175	127,898
2024	601	24,271	38,826	12,044	176	130,408
2025	608	25,280	39,307	12,840	176	132,968
2026	615	26,331	39,794	13,690	177	135,578
2027	622	27,426	40,287	14,595	178	138,239
2028	629	28,567	40,785	15,561	179	140,953
2029	636	29,755	41,290	16,590	180	143,720
2030	643	30,992	41,802	17,687	181	146,541
2031	650	32,281	42,319	18,857	182	149,417
2032	657	33,624	42,843	20,104	183	152,350
2033	664	35,022	43,374	21,434	184	155,340
2034	672	36,479	43,911	22,852	185	158,389
2035	679	37,996	44,455	24,363	186	161,498
2036	687	39,576	45,005	25,975	187	164,668
2037	695	41,222	45,562	27,693	188	167,901
2038	702	42,936	46,127	29,525	189	171,196
2039	710	44,722	46,698	31,478	191	174,557
2040	718	46,582	47,276	33,560	192	177,983



Pre-Recession Growth Rates

Up to this point, the various projections have been based on the full complement of historic data from 2000 to 2016. This span of time, of course includes what may be considered 'normal' growth between 2000 and 2007, followed by the recessionary slump from 2008 to 2011 and the flicker of a recovery starting in 2012.

The projections on Table P-5 are made on the assumption that, now that recovery seems to be a reality, 'normal' growth will eventually return. Basing the projections for the county and all of its cities on the 2000-2007 period is a two-step procedure: First projections to 2040 are made using the growth trend regression model against the 'normal' years, with the first projection year being 2008. (This, of course, results in 2016 figures larger than the Census data.) The second step, therefore, is to adjust the projections to the 'actual' 2016 figure, reducing the initial data stream for each city and the county accordingly.

Table P-6: Pre-Recession Growth - Percent of County

	Fayette County	Brooks	Fayetteville	Peachtree City	Tyrone	Woolsey
2000	92,073	0.53%	12.29%	34.50%	4.32%	0.17%
2001	94,086	0.53%	12.60%	34.24%	4.57%	0.17%
2002	95,707	0.52%	12.91%	33.98%	4.82%	0.16%
2003	97,634	0.52%	13.20%	33.73%	5.05%	0.16%
2004	99,443	0.51%	13.50%	33.49%	5.28%	0.16%
2005	101,961	0.51%	13.76%	33.26%	5.50%	0.16%
2006	104,099	0.51%	14.01%	33.04%	5.71%	0.16%
2007	104,989	0.50%	14.27%	32.82%	5.92%	0.15%
2008	105,192	0.50%	14.51%	32.61%	6.12%	0.15%
2009	105,493	0.49%	14.75%	32.40%	6.32%	0.15%
2010	106,993	0.49%	15.14%	32.26%	6.50%	0.15%
2011	107,208	0.49%	15.14%	32.24%	6.52%	0.15%
2012	107,463	0.49%	15.12%	32.24%	6.53%	0.15%
2013	108,287	0.49%	15.13%	32.18%	6.53%	0.15%
2014	109,550	0.49%	15.29%	31.98%	6.51%	0.15%
2015	110,546	0.49%	15.37%	31.83%	6.50%	0.15%
2016	111,627	0.49%	15.69%	31.52%	6.46%	0.15%
2017	113,818	0.49%	16.03%	31.30%	6.76%	0.15%
2018	116,052	0.48%	16.38%	31.07%	7.07%	0.15%
2019	118,330	0.48%	16.73%	30.85%	7.39%	0.14%
2020	120,653	0.48%	17.09%	30.63%	7.73%	0.14%
2021	123,021	0.47%	17.46%	30.42%	8.08%	0.14%
2022	125,436	0.47%	17.83%	30.20%	8.45%	0.14%
2023	127,898	0.47%	18.22%	29.99%	8.83%	0.14%
2024	130,408	0.46%	18.61%	29.77%	9.24%	0.13%
2025	132,968	0.46%	19.01%	29.56%	9.66%	0.13%
2026	135,578	0.45%	19.42%	29.35%	10.10%	0.13%
2027	138,239	0.45%	19.84%	29.14%	10.56%	0.13%
2028	140,953	0.45%	20.27%	28.94%	11.04%	0.13%
2029	143,720	0.44%	20.70%	28.73%	11.54%	0.13%
2030	146,541	0.44%	21.15%	28.53%	12.07%	0.12%
2031	149,417	0.44%	21.60%	28.32%	12.62%	0.12%
2032	152,350	0.43%	22.07%	28.12%	13.20%	0.12%
2033	155,340	0.43%	22.55%	27.92%	13.80%	0.12%
2034	158,389	0.42%	23.03%	27.72%	14.43%	0.12%
2035	161,498	0.42%	23.53%	27.53%	15.09%	0.12%
2036	164,668	0.42%	24.03%	27.33%	15.77%	0.11%
2037	167,901	0.41%	24.55%	27.14%	16.49%	0.11%
2038	171,196	0.41%	25.08%	26.94%	17.25%	0.11%
2039	174,557	0.41%	25.62%	26.75%	18.03%	0.11%
2040	177,983	0.40%	26.17%	26.56%	18.86%	0.11%

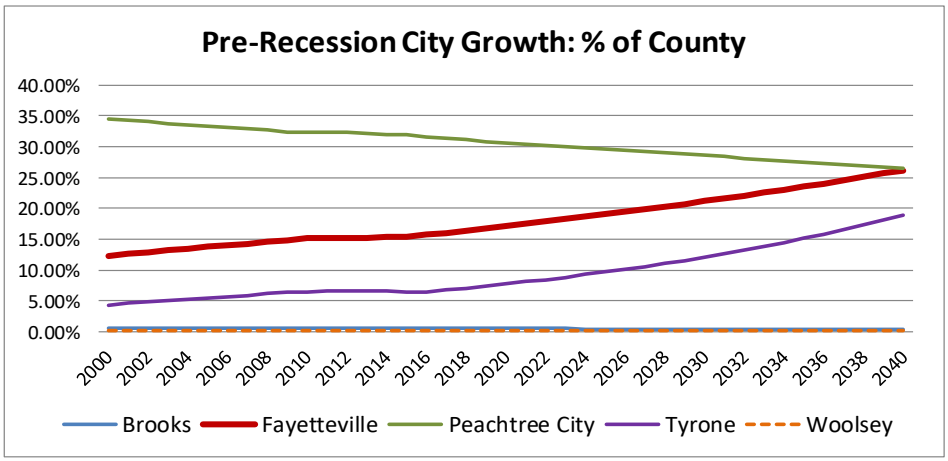
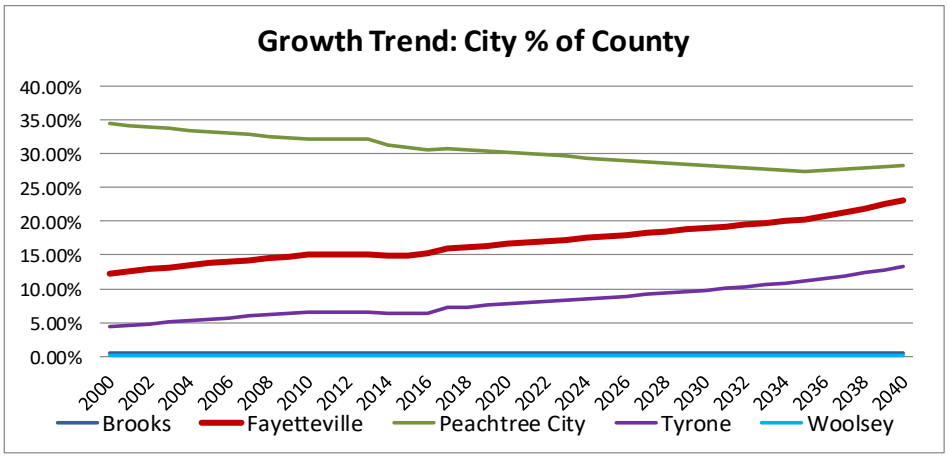


Table P-6 converts the 'pre-recession' projections from 2017 to 2040 for the cities into percentage shares of the county total which, when compared to the percentage shares of the 2000-2016 period show a continuing trend from the past into the future.

Table P-7: Growth Trend Forecast - Percent of County

	Fayette County	Brooks	Fayetteville	Peachtree City	Tyrone	Woolsey
2000	92,073	0.53%	12.29%	34.50%	4.32%	0.17%
2001	94,086	0.53%	12.60%	34.24%	4.57%	0.17%
2002	95,707	0.52%	12.91%	33.98%	4.82%	0.16%
2003	97,634	0.52%	13.20%	33.73%	5.05%	0.16%
2004	99,443	0.51%	13.50%	33.49%	5.28%	0.16%
2005	101,961	0.51%	13.76%	33.26%	5.50%	0.16%
2006	104,099	0.51%	14.01%	33.04%	5.71%	0.16%
2007	104,989	0.50%	14.27%	32.82%	5.92%	0.15%
2008	105,192	0.50%	14.51%	32.61%	6.12%	0.15%
2009	105,493	0.49%	14.75%	32.40%	6.32%	0.15%
2010	106,994	0.49%	15.14%	32.26%	6.50%	0.15%
2011	107,232	0.49%	15.14%	32.23%	6.51%	0.15%
2012	107,442	0.49%	15.12%	32.25%	6.53%	0.15%
2013	108,365	0.49%	15.12%	32.16%	6.52%	0.15%
2014	111,999	0.48%	14.95%	31.28%	6.37%	0.15%
2015	113,395	0.48%	14.98%	31.03%	6.33%	0.15%
2016	114,810	0.48%	15.26%	30.65%	6.28%	0.15%
2017	116,242	0.47%	15.98%	30.81%	7.16%	0.14%
2018	117,691	0.47%	16.19%	30.61%	7.34%	0.14%
2019	119,159	0.47%	16.41%	30.41%	7.52%	0.14%
2020	120,646	0.46%	16.63%	30.21%	7.70%	0.14%
2021	122,150	0.46%	16.85%	30.01%	7.89%	0.14%
2022	123,674	0.46%	17.08%	29.82%	8.08%	0.13%
2023	125,216	0.46%	17.31%	29.62%	8.28%	0.13%
2024	126,778	0.45%	17.54%	29.43%	8.49%	0.13%
2025	128,359	0.45%	17.77%	29.23%	8.69%	0.13%
2026	129,960	0.45%	18.01%	29.04%	8.91%	0.13%
2027	131,581	0.44%	18.25%	28.85%	9.13%	0.13%
2028	133,222	0.44%	18.50%	28.66%	9.35%	0.13%
2029	134,884	0.44%	18.75%	28.48%	9.58%	0.13%
2030	136,566	0.44%	19.00%	28.29%	9.82%	0.12%
2031	138,269	0.43%	19.25%	28.11%	10.06%	0.12%
2032	139,994	0.43%	19.51%	27.92%	10.31%	0.12%
2033	141,740	0.43%	19.77%	27.74%	10.56%	0.12%
2034	143,507	0.42%	20.04%	27.56%	10.82%	0.12%
2035	145,297	0.42%	20.31%	27.38%	11.08%	0.12%
2036	145,298	0.42%	20.83%	27.54%	11.50%	0.12%
2037	145,299	0.43%	21.38%	27.70%	11.93%	0.12%
2038	145,300	0.43%	21.93%	27.86%	12.37%	0.12%
2039	145,301	0.43%	22.50%	28.02%	12.83%	0.12%
2040	145,302	0.44%	23.09%	28.19%	13.31%	0.12%



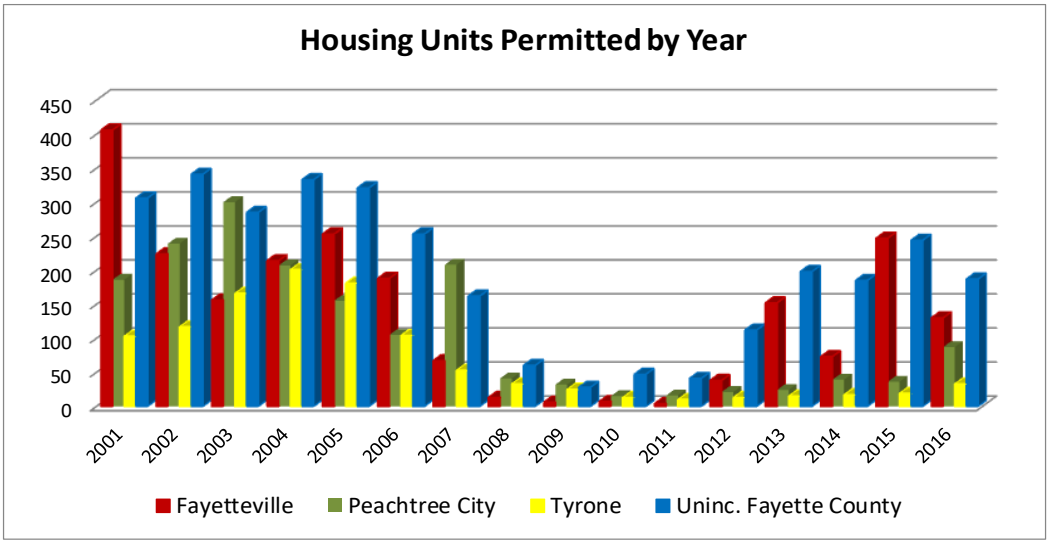
For comparison purposes, Table P-7 has been prepared to show the percentage shares of the county and for each city using the Growth Trend figures – from Table P-3 for the cities and from Table P-4 for the county. The Growth Trend projection to 2040 for the county as a whole is 145,302, compared to the Pre-recession Growth trend projection reaching 177,983. When compared to the percentage shares of the 2000-2016 period, the city shares produced by the Growth Trend show a continuing trend from the past into the future, much like the results of the Pre-Recession Growth projections but at lower percentages for Fayetteville and Tyrone and a higher percentage for Peachtree City.

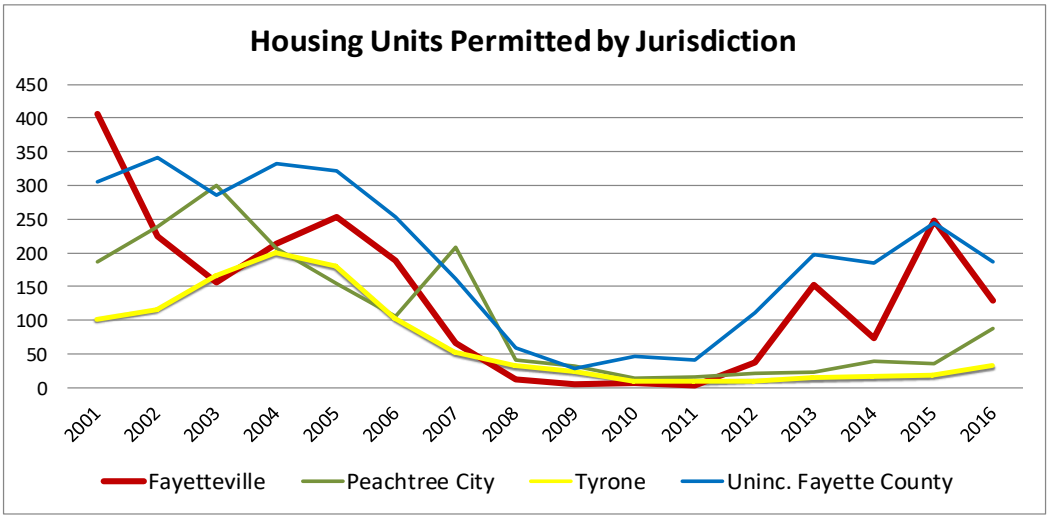
Under the Growth Trend projections, Fayetteville grows from 15% of the County's population to 23%, while Tyrone grows from 6% to 13% and Peachtree City's share experiences a drop from almost 31% to 28%.

Table P-8: Housing Units Permitted 2001 through 2016

	Fayetteville	Peachtree City	Tyrone	Uninc. Fayette County
2001	406	186	103	306
2002	224	239	117	341
2003	156	300	166	285
2004	214	207	201	333
2005	253	155	181	321
2006	188	105	104	253
2007	67	208	53	162
2008	13	41	33	60
2009	6	32	25	28
2010	7	15	13	47
2011	4	16	10	41
2012	38	21	13	112
2013	152	24	15	198
2014	73	39	17	185
2015	247	36	19	244
2016	130	87	33	187

Note: Uninc. Fayette County includes Brooks and Woolsey.





As an aside to the population projections, Table P-8 shows the total number of housing units authorized by building permits in the county's largest three cities and in the unincorporated area. Nothing better reflects the devastating effects of the collapse of the housing market and the ensuing recession on all of these jurisdictions as permitting began to plummet for most starting in calendar year 2007 and continued with dramatic reductions in 2008. Some turnaround can be seen in the unincorporated area beginning in 2012 and in Fayetteville in 2012-2013, while Peachtree City and Tyrone have seen very modest increases.

Technical Analysis—Housing and Employment Forecasts

Following on the selection of the population forecast that will be used for the impact fee calculations (the 'Growth Trend' forecast), estimates have been made of the future number of housing units and employment in the City to 2040.

Note that Parks & Recreation LOS standards will be based on the number of housing units in the city, while Fire Protection and Police Services will combine population and employment into a 'day-night' population to reflect their 24-hour service demand. (Road improvements, of course, are based on capacity calculations of trip generation data rather than housing unit, population or employment forecasts).

Housing Units

The table on the next page shows how the housing projections were figured. The approach is to calculate the number of households (which equates to the number of occupied housing units) and then to expand that to the total number of housing units by adding in vacant units.

The first section of the table shows the Woods & Poole forecasts for population and households for the entire county. These figures are used only to allow a calculation of the average number of people per household countywide, and to reveal how W&P projects those averages to change in the future. As discussed in the preceding Population Forecasts section of this Appendix, the W&P population forecasts are considered unrealistically exuberant for impact fee purposes. However, given the tightly knit sociometric model that W&P uses, the relationship between population and households relative to average ratios between them is considered viable as guides to such ratios for Fayetteville.

The assumption, therefore, is that the average population-per-household sizes in Fayetteville will 'track' proportionally the trend projected by Woods & Poole countywide. Based on the 2010 Census, the average population-per-household size in Fayetteville was 2.65 people, compared to the countywide figure of 2.79. The Fayetteville 2010 figure is a little over 95% of the countywide figure; this percentage is applied to the countywide averages through 2040 to arrive at future average population-per-household sizes for Fayetteville. These average household sizes are then divided into the Fayetteville 'Growth Trend' projected population every year to arrive at the household forecasts.

To arrive at the total housing unit estimate for each year, including vacant units, the number of households (i.e., occupied housing units) is divided by the applicable occupancy rate.

In 2010, in the depths of the recession, vacancies were somewhat higher than registered in the 2000 Census. The number of future Housing Units each year is calculated for Fayetteville beginning with the 2010 housing occupancy rate (92.41%), building back to the 2000 occupancy rate (94.88%) by 2035, and continuing the further reduction at the same progression to 2040. This follows the assumption that the city will get back to its historic levels as time goes by and will then progress beyond that in the future.

Table H-1: Housing Unit Forecasts

	Fayette County (Woods & Poole)			Fayetteville				
	Population	Households	Population per Household*	Population**	Population per Household*	Total Households	Occupancy Rate	Total Housing Units
2000	92,073	31,818	2.89	11,148	2.57	4,338	94.88%	4,572
2001	94,086	33,265	2.83					
2002	95,707	33,892	2.82					
2003	97,634	34,940	2.79					
2004	99,443	35,432	2.81					
2005	101,961	36,399	2.80					
2006	104,099	37,128	2.80					
2007	104,989	37,595	2.79					
2008	105,192	37,607	2.80	Multiplier:	95.10%			
2009	105,493	37,491	2.81					
2010	106,993	38,328	2.79	15,945	2.65	6,006	92.41%	6,499
2011	107,207	39,154	2.74	16,236	2.60	6,235	92.51%	6,740
2012	107,411	40,342	2.66	16,246	2.53	6,416	92.61%	6,928
2013	108,295	41,625	2.60	16,383	2.47	6,621	92.71%	7,142
2014	109,648	42,574	2.58	16,747	2.45	6,837	92.81%	7,367
2015	110,714	43,701	2.53	16,991	2.41	7,052	92.91%	7,590
2016	113,307	45,128	2.51	17,519	2.39	7,337	93.01%	7,889
2017	116,038	46,516	2.49	18,574	2.37	7,829	93.11%	8,409
2018	118,826	47,866	2.48	19,057	2.36	8,072	93.20%	8,661
2019	121,674	49,192	2.47	19,554	2.35	8,312	93.30%	8,909
2020	124,581	50,516	2.47	20,063	2.35	8,554	93.40%	9,158
2021	127,547	51,841	2.46	20,585	2.34	8,798	93.50%	9,410
2022	130,573	53,136	2.46	21,121	2.34	9,038	93.60%	9,656
2023	133,658	54,416	2.46	21,672	2.34	9,277	93.70%	9,901
2024	136,805	55,694	2.46	22,236	2.34	9,518	93.80%	10,148
2025	140,010	56,975	2.46	22,815	2.34	9,762	93.89%	10,397
2026	143,272	58,266	2.46	23,409	2.34	10,010	93.99%	10,650
2027	146,590	59,570	2.46	24,019	2.34	10,263	94.09%	10,907
2028	149,963	60,885	2.46	24,644	2.34	10,521	94.19%	11,170
2029	153,392	62,202	2.47	25,286	2.35	10,782	94.29%	11,435
2030	156,878	63,521	2.47	25,945	2.35	11,046	94.39%	11,703
2031	160,398	64,846	2.47	26,621	2.35	11,316	94.49%	11,976
2032	163,951	66,171	2.48	27,314	2.36	11,591	94.59%	12,254
2033	167,542	67,499	2.48	28,025	2.36	11,872	94.68%	12,538
2034	171,168	68,834	2.49	28,755	2.36	12,159	94.78%	12,828
2035	174,829	70,175	2.49	29,504	2.37	12,452	94.88%	13,124
2036	178,528	71,546	2.50	30,272	2.37	12,756	94.98%	13,430
2037	182,264	72,971	2.50	31,061	2.38	13,076	95.08%	13,753
2038	186,038	74,445	2.50	31,870	2.38	13,410	95.18%	14,089
2039	189,852	75,966	2.50	32,700	2.38	13,758	95.28%	14,440
2040	193,705	77,536	2.50	33,551	2.38	14,121	95.38%	14,806

* Total population (including group quarters) per household (not average household size).

** 2000 and 2010: Census counts as of April 1 each year. 2011-2016: Annual Census Estimates. 2017-2040: projected population.

Employment

For the employment projections, the countywide forecasts prepared by Woods & Poole were relied upon heavily. W&P counts jobs, not just employed people, which captures people holding two or more jobs, self-employed sole proprietors and part-time workers. This gives a more complete picture than Census figures (the number of people with jobs).

However, the Woods & Poole forecasts rely on a socioeconomic model that inter-relates population and employment growth at the local, regional and statewide levels. Since the W&P population forecasts for Fayette County are notably higher than for the Growth Forecast prepared by ROSS+associates, the W&P figures have been adjusted proportionately.

Table E-1: Employment Forecasts - Fayette County

	Total Jobs	Non-Site Specific*	Value-Added Jobs
2010	54,972	3,802	51,170
2011	55,857	3,741	52,116
2012	56,668	3,957	52,711
2013	57,971	4,074	53,897
2014	60,923	4,383	56,540
2015	62,952	4,742	58,210
2016	63,842	4,818	59,024
2017	64,679	4,882	59,797
2018	65,509	4,931	60,578
2019	66,325	4,978	61,347
2020	67,149	5,024	62,125
2021	67,978	5,067	62,911
2022	68,819	5,113	63,706
2023	69,672	5,156	64,516
2024	70,527	5,195	65,332
2025	71,389	5,228	66,161
2026	72,257	5,258	66,999
2027	73,136	5,283	67,853
2028	74,021	5,304	68,717
2029	74,917	5,323	69,594
2030	75,819	5,342	70,477
2031	76,735	5,357	71,378
2032	77,674	5,373	72,301
2033	78,628	5,387	73,241
2034	79,599	5,402	74,197
2035	80,593	5,417	75,176
2036	80,603	5,364	75,239
2037	80,628	5,313	75,315
2038	80,667	5,264	75,403
2039	80,713	5,216	75,497
2040	80,776	5,171	75,605

* Transitory and non-site specific jobs such as farm, forestry and construction workers.

Source: Woods & Poole Economics, 2017 Georgia State Profile, adjusted to Growth Trend projection by ROSS.

Table E-1 shows the adjusted number of jobs forecasted for the county as a whole, and breaks out the types of jobs that would not be associated with an impact fee (such as farm workers and itinerant construction workers). This 'net' employment, called the 'value-added jobs', is shown in the last column.

Table E-2 compares employment figures from the Census Bureau to the W&P 'value-added' figures for 2010. That was the first and only year that the Census Bureau published its employment figures at the city level. Since these

Table E-2: Benchmark Data - 2010

Total Jobs in County

Woods & Poole*	51,170
Census Bureau**	44,031
Multiplier:	1.16

Fayetteville

Census Bureau**	12,183
× Multiplier = Estimated Jobs	14,158
Fayetteville % of County	27.67%
Households	6,006
Jobs per Household	2.36

* Value-Added Jobs, as adjusted.

** Based on commuting patterns of employed persons.

are derived from census 'employed persons' data and commuting patterns, the real figures for total jobs would be higher.

Countywide, the adjusted 2010 W&P employment figure is 1.16 times the number reported by the Census Bureau. This multiplier is applied to the Fayetteville Census number to arrive at an allocation of the W&P countywide figure.

The left portion of Table E-3 below takes the estimated jobs figure for Fayetteville in 2010 (14,158) and carries it forward to 2040 as a percentage of total value-added county jobs. This 'percentage share' approach assumes that Fayetteville will continue to maintain its current percentage of countywide employment over the projection period. This approach results in an employment increase between 2017 and 2040 of 4,374 jobs, a more than 26% increase. In the center portion of the table, an approach is used based on the number of jobs in the city relative to the number of households.

Table E-3: Employment Forecasts - Fayetteville

	Percent of County Jobs		Jobs per Household Ratio			Averaged Number	
	Total County Jobs*	Fayetteville Jobs	Number of Households	Fayetteville Jobs	Percent of County	Fayetteville Jobs	Percent of County
	At: 27.67%		At: 2.36				
2010	51,170	14,158	6,006	14,158	27.67%	14,158	27.67%
2011	52,116	14,420	6,235	14,698	28.20%	14,559	27.94%
2012	52,711	14,584	6,416	15,124	28.69%	14,854	28.18%
2013	53,897	14,913	6,621	15,608	28.96%	15,261	28.31%
2014	56,540	15,644	6,837	16,117	28.51%	15,881	28.09%
2015	58,210	16,106	7,052	16,624	28.56%	16,365	28.11%
2016	59,024	16,331	7,337	17,296	29.30%	16,814	28.49%
2017	59,797	16,545	7,829	18,455	30.86%	17,500	29.27%
2018	60,578	16,761	8,072	19,028	31.41%	17,895	29.54%
2019	61,347	16,974	8,312	19,594	31.94%	18,284	29.80%
2020	62,125	17,189	8,554	20,164	32.46%	18,677	30.06%
2021	62,911	17,407	8,798	20,740	32.97%	19,074	30.32%
2022	63,706	17,627	9,038	21,305	33.44%	19,466	30.56%
2023	64,516	17,851	9,277	21,869	33.90%	19,860	30.78%
2024	65,332	18,076	9,518	22,437	34.34%	20,257	31.01%
2025	66,161	18,306	9,762	23,012	34.78%	20,659	31.23%
2026	66,999	18,538	10,010	23,597	35.22%	21,068	31.44%
2027	67,853	18,774	10,263	24,193	35.66%	21,484	31.66%
2028	68,717	19,013	10,521	24,801	36.09%	21,907	31.88%
2029	69,594	19,256	10,782	25,417	36.52%	22,337	32.10%
2030	70,477	19,500	11,046	26,039	36.95%	22,770	32.31%
2031	71,378	19,749	11,316	26,675	37.37%	23,212	32.52%
2032	72,301	20,005	11,591	27,324	37.79%	23,665	32.73%
2033	73,241	20,265	11,872	27,986	38.21%	24,126	32.94%
2034	74,197	20,529	12,159	28,663	38.63%	24,596	33.15%
2035	75,176	20,800	12,452	29,353	39.05%	25,077	33.36%
2036	75,239	20,818	12,756	30,070	39.97%	25,444	33.82%
2037	75,315	20,839	13,076	30,824	40.93%	25,832	34.30%
2038	75,403	20,863	13,410	31,612	41.92%	26,238	34.80%
2039	75,497	20,889	13,758	32,432	42.96%	26,661	35.31%
2040	75,605	20,919	14,121	33,288	44.03%	27,104	35.85%

* Value-Added Jobs, from Woods & Poole as adjusted to the Growth Trend projection by ROSS+associates.

While many employees commute into the city to work, and many residents commute to jobs elsewhere, the jobs-to-households approach has merit as it relates job growth to city growth (rather than county growth) – i.e., cities with higher residential growth attract more businesses within or near their borders. The result is a notably higher 2040 projection (increasing by more than 80% over 2017 with 14,833 new jobs), and, of equal note, employment in the city as a percentage of the county increases over the projection period, reflecting the growing economic importance of the city relative to the county.

The two alternate approaches above present certain issues. On the one hand, the 'percentage share' approach does not recognize the city's growing incorporation of and attraction to business development relative to other cities in the county and to the unincorporated area, and therefore seems low. On the other hand, the 'jobs-to-households' approach seems too high, resulting in 44% of all employment in the county to be located within the city.

The right-hand portion of the above table, therefore, presents the results of averaging the two approaches as a compromise solution between Fayetteville's sharing in the economic trends of the county while recognizing its relative pre-eminence in 'disproportionately' attracting business development internally and through annexation.

Considering the major employment opportunities that have already been approved or are under development in the city, and the potential to attract more jobs in the future relative both to growth in business activity and the customer base, we recommend that the 'averaged number' approach be adopted for impact fee purposes. This reflects an increase of 9,604 jobs over 2017 (a 55% increase over 22 years) and a rise in the percentage of countywide jobs located within the city from 29% today to 36% in 2040 (an increase of 6.6 percentage points, or about a 22.5% increase in economic position).

Service Areas

Combining the previously prepared residential population forecasts with the recommended employment forecasts (for day/night population figures) and the housing unit projections, gives us the figures necessary to establish projections for the various types of public facilities by their service areas.

Table S-1: Service Area Forecasts

	Housing Units (Parks)	Day/Night Population (Fire, Police))
2017	8,409	36,074
2018	8,661	36,952
2019	8,909	37,838
2020	9,158	38,739
2021	9,410	39,659
2022	9,656	40,587
2023	9,901	41,532
2024	10,148	42,492
2025	10,397	43,474
2026	10,650	44,477
2027	10,907	45,502
2028	11,170	46,551
2029	11,435	47,623
2030	11,703	48,714
2031	11,976	49,833
2032	12,254	50,978
2033	12,538	52,151
2034	12,828	53,351
2035	13,124	54,581
2036	13,430	55,716
2037	13,753	56,892
2038	14,089	58,107
2039	14,440	59,360
2040	14,806	60,655
Net Increase:	**6,397**	**24,581**

Day/Night population is the combination of residents and 'value added' employment.

Methodology—Trip Generation

In order to calculate new growth and development's fair share of the cost of road improvements, it is necessary to establish how much of the future traffic on Fayetteville's roads will be generated by new growth, over and above the traffic generated by the city's residents and businesses today. This Methodology describes the process through which this determination is made.

Summary

A Level of Service must be established for road improvements in order to assure that, ultimately, existing development and new growth are served equally. This Section also presents the process through which new growth and development's 'fair share' of road improvement costs is calculated, and tables summarizing the technical portions of this Methodology are included.

Level of Service

The City has set its Level of Service for road improvements at LOS "D", a level to which it will strive ultimately. However, interim road improvement projects that do not result in a LOS of "D" will still provide traffic relief to current and future traffic alike, and are thus eligible for impact fee funding.

All road improvement projects benefit existing and future traffic proportionally to the extent that relief from over-capacity conditions eases traffic problems for everyone. For example, since new growth by 2040 will represent a certain portion of all 2040 traffic, new growth would be responsible for that portions' cost of the road improvements.

It is noted that the cost-impact of non-Fayetteville generated traffic on the roads traversing the city (cross commutes) is off-set by state and federal assistance. The net cost of the road projects that accrues to Fayetteville reasonably represents (i.e., is 'roughly proportional' to) the impact on the roads by Fayetteville residents and businesses.

The basis for the road impact fee would therefore be Fayetteville's cost for the improvements divided by all traffic in 2040 (existing today plus new growth)—i.e., the cost per trip times the traffic generated by new growth alone. For an individual land use, when a building permit is issued, the cost per trip (above) would be applied to the number of trips that will be generated by the new development, assuring that new growth would only pay its 'fair share' of the road improvements that serve it.

Approach

This Methodology proceeds along the following lines:

- Total traffic currently generated by Fayetteville residents and businesses on the road system within the city is calculated from trip generation and commuting data for 2010, and extended to 2017.
- Future Fayetteville-generated traffic from new growth in the city is calculated from housing unit and employment forecasts to 2040.
- The portion of total 2040 traffic that is generated by new housing units and employment in the city establishes the percentage of Fayetteville's cost of the future road improvements that can be included in an impact fee.

Summary Table

The table below shows how the portion of 2040 traffic generated by new growth is calculated.

Table T-1: Average Daily Trip Ends Generated by New Growth

	2017	2040	Increase	Percent New Growth Trip Ends
Residential Trips	74,386	132,082	57,696	
Nonresidential Trips	427,264	661,743	234,479	
Less: Internal Commutes*	(5,940)	(9,201)	(3,261)	
	495,710	784,624	288,914	36.8%

* Residents who work in Fayetteville. These trips to and from work are included in the residential trips, above.

The next table, below, calculates the Primary Trip Ends generated by existing and future traffic by deleting pass-by and diverted trips (which are discussed below).

Overall, new residents and businesses located within Fayetteville will generate 37.4% of all primary trips on the city's roads. Thus, new growth's 'fair share' of the cost to the City to provide road improvements to serve current and future traffic cannot exceed 37.4%.

Pass-by and Diverted Trips

The impact of new growth and development on Fayetteville's road network is the increased number of vehicles added to the system, expressed by transportation engineers as 'trips'. Every 'trip' has two ends—a beginning at its origin and an end at its destination (known as 'trip ends'). There are three types of trips, defined as:

A **Primary Trip** (and its trip ends) — a vehicle travelling from its original beginning to its intended final destination. Driving from one's home directly to one's place of work is an example of a primary trip.

Table T-2: Primary Daily Trip Ends Generated by New Growth

	Percent Primary Trip Ends*	Primary Trip Ends 2017	Primary Trip Ends 2040	Primary Trip Ends Increase	Percent New Growth Primary Trip Ends
Residential Trips	81.2%	60,423	107,290	46,866	
Commercial	50.9%	212,016	328,372	116,356	
Industrial+Utility	92.0%	9,738	15,077	5,339	
Less: Internal Commutes	100.0%	(5,940)	(9,201)	(3,261)	
		276,238	441,537	165,300	37.4%

* Derived from'Trip Generation Handbook' chapter, *Trip Generation*, 9th Edition, Institute of Transportation Engineers.

A **Pass-by Trip** — a vehicle travelling along its usual route from its origin to its final destination that stops off at an intermediate location for any reason. A trip from home to work that stops along the way for gas, dropping off a child at daycare, picking up coffee or dinner, or for any other reason, represents a 'pass-by' trip at the intermediate location.

A **Diverted Trip** (previously called a diverted 'link' trip) — a vehicle that diverts from its normal primary trip route between its origin to its final destination, and takes a different route to stop off at an intermediate location for any reason. While a pass-by trip remains on its normal route, a diverted trip changes its route to other streets to arrive at the intermediate stop.

New primary trips add vehicles to the road network. Pass-by and diverted trips involve the same vehicles stopping off between their original beginnings and their final destinations, and therefore do not add new vehicles to the road network—the vehicles were already there on their way to their destinations.

These different types of trips result in different types of 'trip ends'. On a home-to-daycare-to-work trip, for instance, there are two primary trip ends (home and work) and two pass-by or diverted trip ends: arriving at the daycare center and leaving from there to drive to work. The net impact on the road network, however, is created by the one vehicle and its two primary trip ends.

Impact fee calculations take note of these pass-by and diverted trip ends as not adding to the overall traffic on the road network, and deletes them from the total trip ends reported in ITE's *Trip Generation* manual.

While the Table T-2 above uses overall average percentages of primary trip ends derived from ITE for broad land use categories, the actual percentage for each land use listed on the impact fee schedule for roads is applied to the total trip ends to determine the primary trip ends attributed to that land use.

Although both summary tables above reflect about the same percentage of 2040 traffic that will be generated by new growth, the increase in primary trip ends from the second table will play an important role in calculating the per-trip road impact fee.

Residential Trip Generation

Average trip generation rates published by the Institute of Transportation Engineers (ITE) differentiate between 'single-family detached housing' and 'apartments'. The closest correlations with the US Census definitions are 'single-family units' and 'multi-family units', which are shown on the following table.

The 2010 breakdown of housing units by type on Table T-3 are taken from the 2010 Census. These numbers are extended to the number of housing units projected in 2017 (in a previous appendix chapter), combining the proportion of housing units by type authorized by building permits between 2010 and 2016, with adjustments to reach the 2017 estimated total.

The next column shows the percent of building permits by housing type historically issued by the City from 2001 to 2016. It is assumed that these percentages will persist into the future, producing a breakdown of the projected 6,397 new housing units forecast for the 2017-2040 period.

Table T-3: Residential Units by Type: 2017 and 2040

	2010	Additional Units*	2017	Percent**	Increase 2017-2040	Total in 2040
Single-Family Units	5,375	1,059	6,434	82.6%	5,281	11,715
Multi-Family Units	1,124	851	1,975	17.4%	1,116	3,091
Total	6,499	1,910	8,409	100.0%	6,397	14,806

* Based on proportion of building permits issued 2010-2016 by use, adjusted to 2017 total.

** Percent by use authorized by building permits: 2001-2016.

Table T-4, below, calculates the amount of traffic that is generated by the city's housing stock today, and the amount that will be generated in 2040. The calculations are made on the basis of 'average daily traffic' on a normal weekday, using average trip generation rates derived through multiple

Table T-4: Residential Trip Generation: 2017-2040 New Growth Increase

	ADT* Trip Ends	2017 Units	2017 ADT Trip Ends	2040 Units	2040 ADT Trip Ends	Increase 2017-2040	Percent New Growth Trip Ends
Single-Family Units	9.52	6,434	61,252	11,715	111,527	50,275	
Multi-Family Units	6.65	1,975	13,134	3,091	20,555	7,421	
Total		8,409	74,386	14,806	132,082	57,696	43.7%

* Average Daily Traffic on a weekday; Institute of Transportation Engineers *Trip Generation* , 9th Edition. Total includes trips to/from work.

traffic studies (350 for single-family and 86 for apartments) and published by ITE. The rates are expressed for 'trip ends'—that is, traffic both leaving and coming to a housing unit.

Comparing traffic in 2017 to 2040, the future increase in trip ends can be calculated, which will represent 43.7% of all residential trip ends generated in the city.

It should be noted that the traffic generated includes trips to and from work and, more particularly, residents who work at a business within the city.

Nonresidential Trip Generation

Calculating traffic generated by businesses located in Fayetteville is more problematical than residential trips because there is no breakdown of types of businesses in the city that is readily available. In addition, while employment forecasts have been made in terms of the number of jobs, there is no data available for floor areas, much less by detailed type of use.

The alternate is to view nonresidential traffic generation on a broad 'average' basis. For this, there is data available from ITE for a number of individual uses relating to the total number of trips generated per employee. These trips, of course, include not only trips taken by the employees (to/from work, lunch, etc.) but also customers and others that are attracted to the use or serve it in some way.

The Table T-5 on the following page shows the 'trips per employee' for those uses for which impact fees are commonly collected and for which the data is available.

Overall, the average trip generation rate of all uses listed is 23.01 trips per employee. The table also shows average rates by category (truck terminals are included with 'industrial' and drive-in banks are included with 'retail' uses). The last column shows the average rate for all 'commercial' uses listed, as opposed to the 'industrial' uses shown in the column on its left.

Table T-5: ITE Trips-per-Employee Data

	ITE CODE	LAND USE	ADT Trip Ends per Employee	Average by Category	Average All Commercial
Port and Terminal (000-099)	30	Intermodal Truck Terminal	6.99	10.21	25.31
Industrial (100-199)	110	General Light Industrial	3.02		
	120	General Heavy Industrial	0.82		
	140	Manufacturing	2.13		
	150	Warehousing	3.89		
	151	Mini-Warehouse	32.47		
	152	High-Cube Warehouse	22.13		
Lodging (300-399)	310	Hotel or Conference Motel	14.34	13.58	
	320	Motel	12.81		
Recreational (400-499)	430	Golf Course	20.52	34.79	
	443	Movie Theater	53.12		
	460	Arena	10.00		
	480	Amusement Park	8.33		
	490	Tennis Courts	66.67		
	491	Racquet/Tennis Club	45.71		
	492	Health/Fitness Center	46.71		
	495	Recreational Community Center	27.25		
Institutional (500-599)	520	Private Elementary School	15.71	29.58	
	530	Private High School	19.74		
	560	Church/Place of Worship	26.24		
	565	Day Care Center	28.13		
	566	Cemetery	58.09		
Medical (600-699)	610	Hospital	4.50	5.26	
	620	Nursing Home	3.26		
	630	Clinic	8.01		
Office (700-799)	710	General Office Building	3.32	4.18	
	714	Corporate Headquarters Building	2.33		
	715	Single-Tenant Office Building	3.70		
	720	Medical-Dental Office Building	8.91		
	760	Research and Development Center	2.77		
	770	Business Park	4.04		
Retail (800-899)	812	Building Materials & Lumber Store	32.12	32.86	
	814	Variety Store	66.70		
	815	Free-Standing Discount Store	28.84		
	816	Hardware/Paint Store	53.21		
	817	Nursery (Garden Center)	21.83		
	818	Nursery (Wholesale)	23.40		
	826	Specialty Retail Center	22.36		
	841	Automobile Sales	21.14		
	850	Supermarket	87.82		
	854	Discount Supermarket	40.36		
	860	Wholesale Market	8.21		
	861	Discount Club	32.21		
	875	Department Store	11.56		
	890	Furniture Store	12.19		
Services (900-999)	912	Drive-in Bank	30.94		
		OVERALL AVERAGE	23.01		

Source: *Trip Generation* , 9th Edition, Institute of Transportation Engineers, where survey results given for key land uses.

The number of people that worked in Fayetteville in 2010 was calculated in a previous appendix chapter, based on commuting patterns reported by the Census Bureau that year and Woods & Poole estimates. The next table, below, provides a breakdown between commercial and industrial employment in the city and calculates trip ends generated by each.

Tax base valuations give us some clue as to the breakdown. When the City's 'industrial' and 'utility' tax valuations are combined, the figures suggest that a little over 94% of all uses are 'commercial' in nature, while a little less than 6% is 'industrial'. These percentages, applied to total employment in Fayetteville, give us the number of employees in 2010 in each category.

The upper portion of the table calculates the total number of trips using the average rates for commercial and industrial from the previous table. From the total of all nonresidential trips is deducted the number of trips to/from work generated by city residents, since these trips have already been calculated as part of the residential trip generation rates.

For comparison, the lower part of the table calculates all trips using the overall average for all uses, regardless of type.

Table T-6: Nonresidential Trip Generation: 2010

	Tax Base			Percent of Total	2010 Employees	Avgerage ADT	Total Nonres Trip Ends
Commercial	$ 769,155,493	$	769,155,493	94.1%	13,319	25.31	337,104
Industrial	$ 22,284,190	$	48,432,353	5.9%	839	10.21	8,564
Utility	$ 26,148,163						
Total Nonresidential	$ 817,587,845	$	817,587,845		14,158		345,668
			Internal Commutes*		2,403	times 2 =	4,806
						Net Nonres Trips	**340,862**
		Alternate Using Overall Average					
					14,158	23.01	325,801
			Internal Commutes*		2,403	times 2 =	4,806
						Alternate Net Nonres Trips	**320,995**

* Residents who work in Fayetteville. Trips are included in residential trip generation rate.

Lastly, the following Table T-7 calculates the total number of trip ends that will be generated by new nonresidential growth in future traffic on Fayetteville's roads.

Table T-7: Nonresidential Trip Generation: 2017-2040 New Growth Increase

	2017 Employees	2017 Trip Ends	2040 Employees	2040 Trip Ends	2017-2040 Increase	Percent New Growth Trip Ends
Commercial	16,463	416,679	25,498	645,355	228,676	
Industrial+Utility	1,037	10,585	1,606	16,388	5,803	
Total	17,500	427,264	27,104	661,743	234,479	
Internal Commutes at	1.39%	5,940		9,201	3,261	
Net Nonres Trips		421,324		652,542	231,218	35.4%

The table shows the number of trip ends generated by Fayetteville businesses based on 2017 employment. The trip ends by use are distributed using the same percentages calculated on the previous table. The same calculations are made for the year 2040 based on projected employment in the city, and the difference between 2017 and 2040 represents trip ends generated by future growth and development. This totals 35.4% of all nonresidential 2040 trip ends.

The results of the residential and nonresidential trip generation analyses are combined on the Summary Table T-1 at the beginning of this Methodology for an overall calculation of new growth's share of future traffic generated by Fayetteville residents and businesses. From these figures, pass-by and diverted trip ends are deleted on Table T-2 to determine primary trip ends, which more closely relates to vehicles on the road and thus contribute to traffic congestion.

Terminology

This Methodology uses the term 'average daily traffic' (ADT) for a weekday, which is defined by ITE as the 'average weekday vehicle trip ends', which are "the average 24-hour total of all vehicle trips counted from a study site from Monday through Friday."

Additionally, ITE defines a 'trip or trip end' as "a single or one-direction vehicle movement with either the origin or the destination (exiting or entering) inside a study site. For trip generation purposes, the total trip ends for a land use over a given period of time are the total of all trips entering plus all trips exiting a site during a designated time period".

Lastly, ITE defines 'average trip rate' as "the weighted average of the number of vehicle trips or trip ends per unit of independent variable (for example, trip ends per occupied dwelling unit or employee) using a site's driveway(s). The weighted average rate is calculated by dividing the sum of all independent variable units where paired data is available. The weighted average rate is used rather than the average of the individual rates because of the variance within each data set or generating unit. Data sets with a large variance will over-influence the average rate if they are not weighted".