

Capital Improvements Plan and Impact Fee Study

Prepared for:
Hendersonville, Tennessee

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EXECUTIVE SUMMARY

The City of Hendersonville, Tennessee retained TischlerBise to prepare this study to analyze the impacts of development on the City's capital facilities and to calculate impact fees based on that analysis. Through interviews and discussions with City staff, TischlerBise developed the proposed impact fees discussed in this study. Impact fees are collected from new construction at the time a building permit is issued and used to construct system improvements needed to accommodate new development. An impact fee represents new growth's proportionate share of capital facility needs. Impact fees do have limitations, and should not be regarded as the total solution for infrastructure funding needs. Rather, they are one component of a comprehensive portfolio to ensure provision of adequate public facilities needed to serve new development. In contrast to general taxes, impact fees may not be used for operations, maintenance, replacement of infrastructure, or correcting existing deficiencies.

The City of Hendersonville has seen significant residential growth over the past several years and with it increased need for infrastructure improvements. This growth is expected to continue in the future. The City currently does not have an impact fee ordinance in place.

This study offers the following fee components for the City of Hendersonville:

- Parks & Recreation
- Police
- Fire
- Roads

GENERAL LEGAL FRAMEWORK

While the State of Tennessee does not have specific authorizing legislation for impact fees, the State does grant the power for municipalities with a mayor-aldermanic charter to impose impact fees on new development. As a mayor-aldermanic charter city, the City of Hendersonville may:

"Establish, open, relocate, vacate, alter, widen, extend, grade, improve, repair, construct, reconstruct, maintain, light, sprinkle and clean public highways, streets, boulevards, parkways, sidewalks, alleys, parks, public grounds, public facilities, libraries and squares, wharves, bridges, viaducts, subways, tunnels, sewers and drains within or without the corporate limits, regulate their use within the corporate limits, assess fees for the use of or impact upon such property and facilities, and take and appropriate property therefor under § 7-31-107 -- 7-31-111 and § 29-16-203, or any other manner provided by general laws." (Tenn. Code Ann. § 6-2-201 (15))

Both state and federal courts have recognized the imposition of impact fees as a legitimate form of land use regulation, provided the fees meet standards intended to protect against regulatory takings. Land use regulations, development exactions, and impact fees are subject to the Fifth Amendment prohibition on taking of private property for public use without just compensation. To comply with the Fifth Amendment, development regulations must be shown to substantially advance a legitimate governmental interest. In the case of impact fees, that interest is in the protection of public health, safety, and welfare by ensuring development is not detrimental to the quality of essential public services. The means to this end are also

important, requiring both procedural and substantive due process. The process followed to receive community input (i.e. stakeholder meetings, work sessions, and public hearings) provides opportunities for comments and refinements to the impact fees.

There is little federal case law specifically dealing with impact fees, although other rulings on other types of exactions (e.g., land dedication requirements) are relevant. In one of the most important exaction cases, the U. S. Supreme Court found that a government agency imposing exactions on development must demonstrate an “essential nexus” between the exaction and the interest being protected (see *Nollan v. California Coastal Commission*, 1987). In a more recent case (*Dolan v. City of Tigard, OR*, 1994), the Court ruled that an exaction must also be “roughly proportional” to the burden created by development. However, the *Dolan* decision appeared to set a higher standard of review for mandatory dedications of land than for monetary exactions such as impact fees.

There are three reasonable relationship requirements for impact fees that are closely related to “rational nexus” or “reasonable relationship” requirements enunciated by a number of state courts. Although the term “dual rational nexus” is often used to characterize the standard by which courts evaluate the validity of impact fees under the U.S. Constitution, we prefer a more rigorous formulation that recognizes three elements: “need,” “benefit,” and “proportionality.” The dual rational nexus test explicitly addresses only the first two, although proportionality is reasonably implied, and was specifically mentioned by the U.S. Supreme Court in the *Dolan* case. Individual elements of the nexus standard are discussed further in the following paragraphs.

All new development in a community creates additional demands on some, or all, public facilities provided by local government. If the capacity of facilities is not increased to satisfy that additional demand, the quality or availability of public services for the entire community will deteriorate. Impact fees may be used to recover the cost of development-related facilities, but only to the extent that the need for facilities is a consequence of development that is subject to the fees. The *Nollan* decision reinforced the principle that development exactions may be used only to mitigate conditions created by the developments upon which they are imposed. That principle clearly applies to impact fees. In this study, the impact of development on infrastructure needs is analyzed in terms of quantifiable relationships between various types of development and the demand for specific capital facilities, based on applicable level-of-service standards.

The requirement that exactions be proportional to the impacts of development was clearly stated by the U.S. Supreme Court in the *Dolan* case and is logically necessary to establish a proper nexus. Proportionality is established through the procedures used to identify development-related facility costs, and in the methods used to calculate impact fees for various types of facilities and categories of development. The demand for capital facilities is measured in terms of relevant and measurable attributes of development (e.g. a typical housing unit’s average weekday vehicle trips).

A sufficient benefit relationship requires that impact fee revenues be segregated from other funds and expended only on the facilities for which the fees were charged. Impact fees must be expended in a timely manner and the facilities funded by the fees must serve the development paying the fees. However, nothing in the U.S. Constitution or the state enabling legislation requires that facilities funded with fee revenues be available *exclusively* to development paying the fees. In other words, benefit may extend to a general area including multiple real estate developments. Procedures for the earmarking and

expenditure of fee revenues are discussed near the end of this study. All of these procedural as well as substantive issues are intended to ensure that new development benefits from the impact fees they are required to pay. The authority and procedures to implement impact fees is separate from and complementary to the authority to require improvements as part of subdivision or zoning review.

As documented in this report, the City of Hendersonville has complied with applicable legal precedents. Impact fees are proportionate and reasonably related to the capital improvement demands of new development. Specific costs have been identified using local data and current dollars. With input from City staff, TischlerBise identified demand indicators for each type of infrastructure and calculated proportionate share factors to allocate costs by type of development. This report documents the formulas and input variables used to calculate the impact fees for each type of public facility. Impact fee methodologies also identify the extent to which new development is entitled to various types of credits to avoid potential double payment of growth-related capital costs.

CONCEPTUAL IMPACT FEE CALCULATION

In contrast to project-level improvements, impact fees fund growth-related infrastructure that will benefit multiple development projects, or the entire jurisdiction (referred to as system improvements). The first step is to determine an appropriate demand indicator for the particular type of infrastructure. The demand indicator measures the number of demand units for each unit of development. For example, an appropriate indicator of the demand for park facilities is population growth, and the increase in population can be estimated from the average number of residents per housing unit. The second step in the impact fee formula is to determine infrastructure units per demand unit, typically called level-of-service (LOS) standards. In keeping with the parks example, a common LOS standard is park amenities per resident. The third step in the impact fee formula is the cost of various infrastructure units. To complete the parks example, this part of the formula would establish the cost for purchasing and/or constructing new park amenities.

GENERAL METHODOLOGIES

There are three general methods for calculating impact fees. The choice of a particular method depends primarily on the timing of infrastructure construction (past, concurrent, or future) and service characteristics of the facility type being addressed. Each method has advantages and disadvantages in a particular situation, and can be used simultaneously for different cost components.

Reduced to its simplest terms, the process of calculating impact fees involves two main steps: (1) determining the cost of development-related capital improvements and (2) allocating those costs equitably to various types of development. In practice, though, the calculation of impact fees can become quite complicated because of the many variables involved in defining the relationship between development and the need for facilities within the designated service area. The following paragraphs discuss three basic methods for calculating impact fees and how those methods can be applied.

Cost Recovery (Past Improvements)

The rationale for recoupment, often called cost recovery, is that new development is paying for its share of the useful life and remaining capacity of facilities already built, or land already purchased, from which

new growth will benefit. This methodology is often used for utility systems that must provide adequate capacity before new development can take place.

Incremental Expansion (Concurrent Improvements)

The incremental expansion method documents current level-of-service (LOS) standards for each type of public facility, using both quantitative and qualitative measures. This approach ensures that there are no existing infrastructure deficiencies or surplus capacity in infrastructure. New development is only paying its proportionate share for growth-related infrastructure. Revenue will be used to expand or provide additional facilities, as needed, to accommodate new development. An incremental expansion cost method is best suited for public facilities that will be expanded in regular increment to keep pace with development.

Plan-Based Fee (Future Improvements)

The plan-based method allocates costs for a specified set of improvements to a specified amount of development. Improvements are typically identified in a long-range facility plan and development potential is identified by a land use plan. There are two options for determining the cost per demand unit: (1) total cost of a public facility can be divided by total demand units (average cost), or (2) the growth-share of the public facility cost can be divided by the net increase in demand units over the planning timeframe (marginal cost).

Credits

Regardless of the methodology, a consideration of “credits” is integral to the development of a legally defensible impact fee methodology. There are two types of “credits” with specific characteristics, both of which should be addressed in impact fee studies and ordinances.

- First, a revenue credit might be necessary if there is a double payment situation and other revenues are contributing to the capital costs of infrastructure to be funded by impact fees. This type of credit is integrated into the impact fee calculation, thus reducing the fee amount.
- Second, a site-specific credit or developer reimbursement might be necessary for dedication of land or construction of system improvements funded by impact fees. This type of credit is addressed in the administration and implementation of the impact fee program.

PROPOSED FEE METHODS AND COST COMPONENTS

Figure 1 summarizes the methods and cost allocation components used for each infrastructure category in Hendersonville’s impact fee study. Parks & Recreation costs were only allocated towards residential development, while Police, Fire, and Roads costs were allocated towards both residential and nonresidential development. With the exception of Roads, population was used as the cost allocation factor for residential development, and nonresidential vehicle trips were used to allocate costs for nonresidential development. Road costs associated with both residential and nonresidential development were allocated based on vehicle trips.

After consideration of input during work sessions and public hearings, the City Council may change the proposed impact fees by eliminating infrastructure types, cost components, and/or specific capital

improvements. If changes are made during the adoption process, TischlerBise will update the fee study to be consistent with legislative decisions.

Figure 1: Proposed Fee Methods and Cost Components

<i>Fee Category</i>	<i>Service Area</i>	<i>Cost Recovery (past)</i>	<i>Incremental Expansion (present)</i>	<i>Plan-Based (future)</i>	<i>Cost Allocation</i>
Parks and Recreation	Citywide		Amenities & Improvements	Fee Study	Population
Fire	Citywide		Fire Stations, Apparatus	Fee Study	Population, Vehicle Trips
Police	Citywide		Police Facilities, Vehicles & Equipment	Fee Study	Population, Vehicle Trips
Roads	Citywide			Road Improvements, Fee Study	Vehicle Trips

PROPOSED IMPACT FEE SCHEDULE

For residential development, proposed fees are assessed per housing unit by type of unit. The proposed residential fee categories include single family and multi-family units. Single family units include detached, attached (i.e. “townhouse”), and mobile home units. Multi-family units include duplexes, condominiums and apartments with two or more units. For nonresidential development, fees are assessed per 1,000 square feet of floor area. The proposed fee schedule for nonresidential development is designed to provide a reasonable impact fee determination for three broad property classes – industrial, commercial, and office & institutional.

Figure 2 summarizes proposed impact fees for new development in Hendersonville. The amounts shown are “maximum allowable” amounts based on the methodologies, levels of service, and costs for the capital improvements identified herein. The fees represent the highest amount feasible for each type of applicable development, which represent new growth’s fair share of the system improvement costs detailed in this report. The City can adopt amounts that are lower than the maximum amounts shown; however, a reduction in fee revenue will necessitate an increase in other revenues, a decrease in planned capital expenditures, and/or a decrease in the City’s level of service.

Figure 2: Maximum Allowable Impact Fees

Residential Impact Fees (per Housing Unit)					
Type	Fire	Police	Parks and Recreation	Roads	Proposed Fee
Single-Family	\$818	\$469	\$1,699	\$1,503	\$4,489
Multi-Family	\$513	\$294	\$1,066	\$1,165	\$3,038

Nonresidential Impact Fees (per 1,000 Square Feet)					
Type	Fire	Police	Parks and Recreation	Roads	Proposed Fee
Industrial	\$239	\$137	\$0	\$624	\$1,000
Commercial	\$1,201	\$689	\$0	\$3,134	\$5,023
Office/Institutional	\$469	\$269	\$0	\$1,225	\$1,964

A note on rounding: Calculations throughout this report are based on an analysis conducted using Excel software. Most results are discussed in the report using one, two, and three digit places, which represent rounded figures. However, the analysis itself uses figures carried to their ultimate decimal places; therefore, the sums and products generated in the analysis may not equal the sum or product if the reader replicates the calculation with the factors shown in the report (due to the rounding of figures shown, not in the analysis).

PARKS & RECREATION IMPACT FEES

METHODOLOGY

The sole component of Hendersonville’s Parks & Recreation fees is park amenities, which represent a wide range of improvements and facilities built upon existing parkland. The City does not foresee the need to purchase any additional parkland over the next ten years, so parkland was excluded from the fee calculations. Because the City’s parks primarily benefit residents, as opposed to businesses and other types of nonresidential development, the capital costs of park amenities are allocated to residential development only. The impact fees for park amenities were calculated using the incremental expansion method, in which a level of service (LOS) standard is established and the fees are derived from the cost to maintain that existing level of service for future development. The fees are calculated on a per capita basis, with the net capital cost per person multiplied by the persons per housing unit factors discussed in Appendix A.

SERVICE UNITS

Parks & Recreation impact fees are calculated on a per capita basis, then converted to an appropriate amount for each type of housing unit based on persons per housing unit (PPHU) factors. As shown in Figure 3, the current PPHU ratios are 2.74 persons per single family unit and 1.72 persons per multi-family unit. These figures are based on the U.S. Census Bureau’s 2016 ACS 5-year estimates (further discussed in Appendix A).

Figure 3: Current Estimates of Persons per Housing Unit

Housing Type	Residents*	Housing Units*	PPHU
Single Family	45,904	16,769	2.74
Multi-Family	8,992	5,236	1.72

* U.S. Census Bureau, 2016 American Community Survey, 5-Year Estimates

PARK AMENITIES

Existing Standards and Cost Factors

Demand for additional park amenities will come from new residential development. Amenities include, but are not limited to, soccer and baseball fields; basketball, tennis, and volleyball courts; playgrounds; shelters; boat ramps and docks; maintenance and storage facilities; restrooms; concession stands; and parking spaces. As previously stated, the incremental expansion methodology is used to calculate the park amenity portion of the impact fee. As shown in Figure 4, the fee study assesses residential level-of-service standards based on the City’s estimated population in 2018. When the total number of park amenities (3,478) is divided by the 2018 population (57,084), the existing level of service standard is 0.0609 amenities per person. To determine the cost per demand unit, the existing level of service standard (0.0609 amenities per person) is multiplied by the average cost per amenity (\$10,155), yielding a cost per demand unit of \$618.69 per person.

Figure 4: Existing Standards for Park Amenities

Amenities	# of Units	Avg. Cost per Unit	Total Replacement Cost
Football Fields	2	\$200,000	\$400,000
Football Press Box, Concession, Restrooms,	1	\$525,000	\$525,000
Softball Fields	16	\$375,000	\$6,000,000
Softball Concession, Restrooms, etc.	2	\$650,000	\$1,300,000
Baseball Turf Field	1	\$750,000	\$750,000
Batting Cages	6	\$33,333	\$200,000
Childrens Soccer Fields	15	\$233,333	\$3,500,000
Soccer Concession, Restrooms, etc.	1	\$550,000	\$550,000
Stadium Soccer Field	1	\$750,000	\$750,000
Full Size Soccer Fields	2	\$750,000	\$1,500,000
Disc Golf Course	1	\$125,000	\$125,000
Model Airplane Field	1	\$25,000	\$25,000
Sand Volleyball Courts	3	\$50,000	\$150,000
Tennis Courts	12	\$83,333	\$1,000,000
Tennis Building	1	\$325,000	\$325,000
Basketball Courts	1	\$50,000	\$50,000
Playgrounds (including Special Needs)	9	\$272,222	\$2,450,000
Walking Trails	2	\$275,000	\$550,000
Shelters (Small, Large, and Group)	10	\$285,000	\$2,850,000
Gazebo	1	\$50,000	\$50,000
Skate Park	1	\$350,000	\$350,000
Inline Hockey Rink	1	\$1,000,000	\$1,000,000
Dog Park	1	\$100,000	\$100,000
Fishing Pier	1	\$250,000	\$250,000
Boat Ramps (Large and Small)	2	\$400,000	\$800,000
Boat and Jet Ski Docks	4	\$207,500	\$830,000
Maintenance & Storage Facilities	1	\$2,500,000	\$2,500,000
Restrooms	4	\$343,750	\$1,375,000
Parking Spaces	3,375	\$1,500	\$5,062,500
TOTAL	3,478	\$10,155	\$35,317,500

Level-of-Service (LOS) Standards	
Population in 2018	57,084
Total Amenity Units	3,478
LOS: Amenities per Person	0.0609

Cost Allocation	
Average Cost per Unit	\$10,155
LOS: Amenities per Person	0.0609
Cost per Person	\$618.69

PROJECTED DEMAND FOR GROWTH-RELATED PARKS & RECREATION IMPROVEMENTS

To accommodate projected development over the next ten years, Hendersonville will make capital improvements to its park and recreational facilities as development occurs. As shown in Figure 5, the ten-year projected increase in population of 10,852 persons (from the Land Use Assumptions in Appendix A) is multiplied by the level-of-service standard of 0.0609 amenities per person to produce an anticipated need of 661 additional park amenities. With an average cost per amenity of \$10,155, the total capital cost of park amenities needed to accommodate new growth is approximately \$6.71 million.

Figure 5: Growth-Related Need for Park Amenities and Trails

Level-of-Service		Demand Unit	Unit Cost
0.0609	Amenities	per Person	\$10,155

Year	Population	Park Amenities
Base	2018	57,084
Year 1	2019	58,152
Year 2	2020	59,225
Year 3	2021	60,301
Year 4	2022	61,381
Year 5	2023	62,465
Year 6	2024	63,550
Year 7	2025	64,640
Year 8	2026	65,736
Year 9	2027	66,834
Year 10	2028	67,936
Ten-Year Increase		10,852
Growth-Related Expenditure		\$6,712,153

PROPOSED PARKS & RECREATION FEES

Figure 6 details the proposed maximum supportable Parks & Recreation impact fees in Hendersonville. The fees are derived from the average number of persons per housing unit and the total cost per person. Cost factors are summarized at the top, which include park amenities and the cost of the Parks & Recreation portion of the Impact Fee Study. The Fee Study cost is allocated by the net population increase through 2023 because the City is required to update its impact fees every five years (see Appendix B). The sum of these cost factors produces a cost per person of \$620.64.

To calculate the impact fee per housing unit, the cost per person is simply multiplied by the average persons per housing unit for single and multi-family units, per the Land Use Assumptions in Appendix A. The proposed fee for single family housing units is \$1,699, and the proposed fee for multi-family housing units is \$1,066.

Figure 6: Proposed Fee Schedule for Parks & Recreation

Fee Component	Cost per Person
Park Amenities	\$618.69
Fee Study	\$1.95
TOTAL	\$620.64

Residential (per household)

Type of Household	Persons per Housing Unit	Proposed Fee
Single-Family	2.74	\$1,699
Multi-Family	1.72	\$1,066

PROJECTED REVENUE FROM PARKS & RECREATION IMPACT FEES

Revenue projections assume implementation of the proposed Parks & Recreation fees, and that development over the next ten years is consistent with the Land Use Assumptions described in Appendix A. To the extent the rate of development either accelerates or slows down, there will be a corresponding change in the impact fee revenue. As shown in Figure 7, Parks & Recreation fee revenue is expected to total \$6.73 million over the next ten years, compared to projected expenditures of \$6.72 million.

Figure 7: Capital Costs and Revenue for Parks & Recreation

Cost Component	Growth Cost
Park Amenities	\$6,712,153
Fee Study	\$10,477
Total Expenditures	\$6,722,630

		Single Family	Multi-Family
		\$1,699 per Unit	\$1,066 per Unit
Year		Housing Units	Housing Units
Base	2018	17,422	5,469
1	2019	17,747	5,573
2	2020	18,072	5,679
3	2021	18,397	5,787
4	2022	18,722	5,898
5	2023	19,047	6,011
6	2024	19,372	6,126
7	2025	19,697	6,243
8	2026	20,022	6,362
9	2027	20,347	6,484
10	2028	20,672	6,608
10-year Increase		3,250	1,139
Projected Revenue		\$5,521,620	\$1,214,004
Total Projected Revenue		\$6,735,624	
Surplus / (Deficit)		\$12,994	

POLICE IMPACT FEES

METHODOLOGY

The Police impact fee includes components for facilities and vehicles & equipment. Police impact fees are based on the incremental expansion methodology. Costs are allocated to both residential and nonresidential development using different demand indicators for each type of development.

Proportionate Share

TischlerBise recommends functional population to allocate the cost of police facilities and vehicles to residential and nonresidential development. Functional population is similar to what the U.S. Census Bureau calls "daytime population," by accounting for people living and working in a jurisdiction, but also considers commuting patterns and time spent at home and at nonresidential locations. OnTheMap is a web-based mapping and reporting application that shows where workers are employed and where they live. It describes geographic patterns of jobs by their employment locations and residential locations as well as the connections between the two locations. OnTheMap was developed through a unique partnership between the U.S. Census Bureau and its Local Employment Dynamics (LED) partner states. OnTheMap data is used, as shown in Figure 8, to derive Functional Population shares for Hendersonville.

Residents that do not work are assigned 20 hours per day to residential development and 4 hours per day to nonresidential development (annualized averages). Residents that work in Hendersonville are assigned 14 hours to residential development and 10 hours to nonresidential development. Residents that work outside Hendersonville are assigned 14 hours to residential development. Inflow commuters are assigned 10 hours to nonresidential development. Based on 2015 functional population data, the residential allocation is 77 percent, and the nonresidential allocation is 23 percent.

Figure 8: Functional Population

Demand Units in 2015		Demand Hours/Day	Person Hours	Proportionate Share
Residential				
Total Population	54,005			
51% Residents Not Working	27,489	20	549,780	
49% Resident Workers	26,516			
14% Worked in City	3,796	14	53,144	
86% Worked Outside City	22,720	14	318,080	
	Residential Subtotal		921,004	77%
Nonresidential				
Non-working Residents	27,489	4	109,956	
Jobs Located in City	16,695			
23% Residents Working in City	3,796	10	37,960	
77% Non-Resident Workers (inflow commuters)	12,899	10	128,990	
	Nonresidential Subtotal		276,906	23%
	TOTAL		1,197,910	100%

SERVICE UNITS

Residential impact fees are calculated on a per capita basis, then converted to an appropriate amount for each type of housing unit based on persons per housing unit (PPHU) factors. As shown in Figure 9, the current PPHU ratios are 2.74 persons per single family unit and 1.72 persons per multi-family unit. These figures are based on the U.S. Census Bureau’s 2016 ACS 5-year estimates (further discussed in Appendix A).

Figure 9: Current Estimates of Persons per Housing Unit

Housing Type	Residents*	Housing Units*	PPHU
Single Family	45,904	16,769	2.74
Multi-Family	8,992	5,236	1.72

* U.S. Census Bureau, 2016 American Community Survey, 5-Year Estimates

TischlerBise uses nonresidential vehicle trips as the nonresidential “service unit” for police infrastructure. As previously discussed in the Projected Demand subsection of the Executive Summary, average weekday vehicle trip ends for nonresidential development are from the 10th edition of the reference book, *Trip Generation*, published in 2017 by the Institute of Transportation Engineers. A “trip end” represents a vehicle either entering or exiting a development (as if a traffic counter were placed across a driveway). Trip ends for nonresidential development are calculated per thousand square feet, and require an adjustment factor to avoid double counting each trip at both the origin and destination points.

The basic trip adjustment factor is 50 percent for all nonresidential development except commercial. For commercial/retail development, the trip adjustment factor is less than 50 percent because retail uses attract vehicles as they pass by on arterial and collector roads. For an average size shopping center, the ITE (2017) indicates that on average 34 percent of the vehicles that enter are passing by on their way to some other primary destination. The remaining 66 percent of attraction trips have the shopping center as their primary destination. Because attraction trips are half of all trips, the trip adjustment factor ($0.66 \times 0.50 = 0.33$) is approximately 33 percent of the trip ends.

Using the current estimates of nonresidential square footage by type, TischlerBise applied the trip end estimates and adjustment factors to calculate the average number of weekday trips generated by nonresidential development in Hendersonville, as shown in Figure 10. TischlerBise estimates that there are 52,775 weekday trips attributable to existing nonresidential development in the City of Hendersonville.

Figure 10: Current Estimates of Average Weekday Nonresidential Vehicle Trips

Nonresidential Gross Floor Area (1,000 sq. ft.)		Assumptions	
Industrial		2,078	
Commercial		2,807	
Office & Institutional		2,599	
Total Nonresidential Floor Area		7,484	

Average Weekday Vehicle Trips Ends per 1,000 Sq. Ft.	Trip Ends*	Adj. Factor
Industrial	4.96	50%
Commercial	37.75	33%
Office & Institutional	9.74	50%

Nonresidential Vehicle Trips		Vehicle Trips
Industrial		5,153
Commercial		34,965
Office & Institutional		12,657
Total Inbound Nonresidential Trips		52,775

*Source: Trip Generation, 7th Edition, Institute of Transportation Engineers (ITE), 2017.

POLICE STATIONS

Existing Standards and Cost Factors

The first component included in the Police fee is police station space. As previously stated, the incremental expansion methodology is used to determine the Police station component of the impact fees. The fee study assesses residential level of service standards based on 2018 population, and nonresidential level of service standards based on vehicle trips in 2018. As shown in Figure 11, Hendersonville's police facilities include a police station and an annex building, with a total of 29,373 square feet. The Police Department does not have replacement cost estimates available for these facilities, so TischlerBise conservatively assumed, based on similar impact fee studies in region, the station would cost \$250 per square foot to replace and the annex would cost \$150 per square foot.

To derive the residential level of service standards, the existing police facilities floor area (29,373 sq ft) is multiplied by the residential cost share (77%) and divided by the 2018 population (57,084), yielding 0.396 square feet of police facilities per person. Similarly, the nonresidential level of service standard is calculated by multiplying the police station floor area (29,373 sq ft) by the nonresidential cost share (23%) and dividing by nonresidential vehicle trips (52,775), yielding 0.128 square feet per vehicle trip. To determine the cost per demand unit, the level of service standards (0.396 sq ft per person and 0.128 sq ft per vehicle trip) are multiplied by the average replacement cost per square foot (\$210.40), for a cost per demand unit of \$83.36 per person and \$26.93 per vehicle trip.

Figure 11 Existing Standards for Police Facilities

Facility	Square Footage	Cost per Sq Ft*	Replacement Cost
Police Department	17,740	\$250	\$4,435,000
Police Annex	11,633	\$150	\$1,744,950
Total	29,373	\$210.40	\$6,179,950

Level-of-Service (LOS) Standards

Population in 2018	57,084
Nonresidential Vehicle Trips in 2018	52,775
Residential Share	77%
Nonresidential Share	23%
LOS: Square Feet per Person	0.396
LOS: Square Feet per Vehicle Trip	0.128

Cost Analysis

Cost per Square Foot	\$210.40
LOS: Square Feet per Person	0.396
LOS: Square Feet per Vehicle Trip	0.128
Cost per Person	\$83.36
Cost per Vehicle Trip	\$26.93

* Estimates by TischlerBise

POLICE VEHICLES & EQUIPMENT**Existing Standards and Cost Factors**

The second component included in the Police fee is police vehicles and equipment. The incremental expansion methodology is used to determine this portion of the impact fees. The fee study assesses residential level of service standards based on 2018 population, and nonresidential level of service standards based on nonresidential vehicle trips in 2018. As shown in Figure 12, Hendersonville's Police Department owns 115 units of vehicles and equipment, with a replacement cost of over \$6.44 million, or an average of \$56,036.58 per unit.

To derive the residential level of service standards, the quantity of vehicles and equipment (115 units) is multiplied by the residential cost share (77%) and divided by the 2018 population (57,084), yielding 0.00155 units per person. Similarly, the nonresidential level of service standard is calculated by multiplying the quantity of vehicles and equipment (115 units) by the nonresidential cost share (23%) and dividing by nonresidential vehicle trips (52,775), yielding 0.00050 units per vehicle trip. To determine the cost per demand unit, the existing level of service standards (0.00155 units per person and 0.00050 units per vehicle trip) are multiplied by the average replacement cost per unit (\$56,036.58), for a cost per demand unit of \$86.93 per person and \$28.08 per vehicle trip.

Figure 12: Existing Standards for Police Vehicles & Equipment

Vehicles & Equipment	# of Units	Unit Cost	Replacement Cost
Ford Crown Victoria	35	\$46,000	\$1,610,000
Chevy Caprice	25	\$46,000	\$1,150,000
Chevy Impala	4	\$46,000	\$184,000
Ford F250	1	\$50,809	\$50,809
Ford PPV Explorer	42	\$44,454	\$1,867,068
Ford Expedition	3	\$55,511	\$166,533
Ford Expedition EL	1	\$55,794	\$55,794
Chevy Tahoe	2	\$56,560	\$113,120
Command Post	1	\$500,000	\$500,000
Police Boat	1	\$225,000	\$225,000
Crime Scene Vehicle	1	\$42,601	\$42,601
Horse Trailer	2	\$15,825	\$31,650
Chevy Trailblazer	8	\$44,454	\$355,632
Chevy Silverado	2	\$46,000	\$92,000
Total	115	\$56,036.58	\$6,444,207

Level-of-Service (LOS) Standards

Population in 2018	57,084
Nonresidential Vehicle Trips in 2018	52,775
Residential Share	77%
Nonresidential Share	23%
LOS: Vehicles & Equipment per Person	0.00155
LOS: Vehicles & Equipment per Vehicle Trip	0.00050

Cost Analysis

Average Cost per Unit	\$56,036.58
LOS: Vehicles & Equipment per Person	0.00155
LOS: Veh & Equip per Vehicle Trip	0.00050
Cost per Person	\$86.93
Cost per Vehicle Trip	\$28.08

PROJECTED DEMAND FOR GROWTH-RELATED POLICE IMPROVEMENTS

To accommodate projected development over the next ten years, Hendersonville will construct additional square footage of police facilities and purchase additional vehicles & equipment as development occurs. Figure 13 demonstrates the Police Department's growth-related needs, which are based on the development projections contained in Appendix A. In order to maintain the same level of service, the City will need to provide the following growth-related improvements over the next ten years:

- 5,824 square feet of police station floor area at an approximate cost of \$1.225 million
- 23 units of vehicles & equipment at an approximate cost of \$1.289 million

Figure 13: Growth-Related Need for Police Facilities and Vehicles & Equipment

Police Facilities Level-of-Service Standards			
Level-of-Service			Unit Cost
Residential	0.3962	Sq. Ft. per Person	\$210.40
Nonresidential	0.1280	Sq. Ft. per Vehicle Trip	

Growth-Related Need for Police Facilities				
Year		Population	Nonres. Vehicle Trips	Square Feet Needed
Base	2018	57,084	52,775	29,373
Year 10	2028	67,936	64,687	35,197
Ten-Year Increase		10,852	11,911	5,824
Growth-Related Expenditures				\$1,225,344

Police Vehicles & Equipment Level-of-Service Standards			
Level-of-Service			Unit Cost
Residential	0.00155	Units per Person	\$56,036.58
Nonresidential	0.00050	Units per Vehicle Trip	

Growth-Related Need for Police Vehicles & Equipment				
Year		Population	Nonres. Vehicle Trips	Vehicles & Equipment Needed
Base	2018	57,084	52,775	115
Year 10	2028	67,936	64,687	138
Ten-Year Increase		10,852	11,911	23
Growth-Related Expenditures				\$1,288,841

PROPOSED POLICE FEES

Figure 14 details the proposed maximum supportable Police impact fees for Hendersonville. Residential fees are derived from the average number of persons per housing unit and the total cost per person. Nonresidential fees are based on the average number of nonresidential vehicle trip ends per 1,000 square feet of floor area, nonresidential trip rate adjustments, and the total cost per vehicle trip.

Cost factors for police station facilities and vehicles & equipment are summarized at the top of the figure. Also included in the cost factors is the cost of the Police portion of the Impact Fee Study, allocated based on the net increase in population and nonresidential vehicle trips through 2023 (see Appendix B). The cost of the study was spread out only five years because the City needs to update its impact fees every five years. The sum of these cost factors yields a cost per person of \$171.29 and cost per vehicle trip of \$55.29. Proposed residential fees are calculated by multiplying the cost per person by the persons per housing unit. Proposed nonresidential fees are calculated by multiplying the cost per vehicle trip by the ITE trip generation rates and the trip adjustment factors.

Figure 14: Proposed Fee Schedule for Police

Fee Component	Cost per Person	Cost per Vehicle Trip
Police Facilities	\$83.36	\$26.93
Vehicles & Equipment	\$86.93	\$28.08
Fee Study	\$1.00	\$0.28
TOTAL:	\$171.29	\$55.29

Residential (per housing unit)		
Type of Household	Persons per Housing Unit	Proposed Fee
Single Family	2.74	\$469
Multi-Family	1.72	\$294

Nonresidential (per 1,000 square feet)			
Type	Trip Ends per 1,000 Sq. Ft.	Trip Rate Adjustment	Proposed Fee
Industrial	4.96	50%	\$137
Commercial/Retail	37.75	33%	\$689
Office & Institutional	9.74	50%	\$269

PROJECTED REVENUE FROM POLICE IMPACT FEES

Revenue projections assume implementation of the proposed police fees and that development over the next ten years is consistent with the Land Use Assumptions described in Appendix A. To the extent the rate of development either accelerates or slows down, there will be a corresponding change in the impact fee revenue. As shown in Figure 15, Police fee revenue is expected to total approximately \$2.517 million over the next ten years, compared to projected expenditures of \$2.521 million.

Figure 15: Capital Costs and Revenue for Police

	Growth Cost
Police Facilities	\$1,225,344
Vehicles & Equipment	\$1,288,841
Impact Fee Study	\$6,985
Total Expenditures	\$2,521,170

Projected Police Impact Fee Revenue

		Single-Family	Multi-Family	Industrial	Commercial	Office & Institutional
		\$469 per Unit	\$294 per Unit	\$137 per KSF	\$689 per KSF	\$269 per KSF
Year		Housing Units	Housing Units	KSF	KSF	KSF
Base	2018	17,422	5,469	2,078	2,807	2,599
1	2019	17,747	5,573	2,092	2,868	2,656
2	2020	18,072	5,679	2,106	2,931	2,715
3	2021	18,397	5,787	2,120	2,995	2,775
4	2022	18,722	5,898	2,134	2,134	2,836
5	2023	19,047	6,011	2,148	3,128	2,899
6	2024	19,372	6,126	2,162	3,197	2,963
7	2025	19,697	6,243	2,177	3,267	3,029
8	2026	20,022	6,362	2,191	3,338	3,095
9	2027	20,347	6,484	2,206	3,412	3,164
10	2028	20,672	6,608	2,220	3,486	3,234
10-year Increase		3,250	1,139	142	680	635
Projected Revenue		\$1,524,250	\$334,866	\$19,454	\$468,130	\$170,773

Total Projected Revenue	\$2,517,473
Surplus / (Deficit)	(\$3,697)

FIRE IMPACT FEES

METHODOLOGY

The Fire impact fee includes components for fire station facilities and apparatus. Fire impact fees are based on the incremental expansion methodology. Costs are allocated to both residential and nonresidential development using different demand indicators for each type of development.

Proportionate Share

TischlerBise recommends functional population to allocate the cost of fire facilities and vehicles to residential and nonresidential development. Functional population is similar to what the U.S. Census Bureau calls "daytime population," by accounting for people living and working in a jurisdiction, but also considers commuting patterns and time spent at home and at nonresidential locations. OnTheMap is a web-based mapping and reporting application that shows where workers are employed and where they live. It describes geographic patterns of jobs by their employment locations and residential locations as well as the connections between the two locations. OnTheMap was developed through a unique partnership between the U.S. Census Bureau and its Local Employment Dynamics (LED) partner states. OnTheMap data is used, as shown in Figure 16, to derive Functional Population shares for Hendersonville.

Residents that do not work are assigned 20 hours per day to residential development and 4 hours per day to nonresidential development (annualized averages). Residents that work in Hendersonville are assigned 14 hours to residential development and 10 hours to nonresidential development. Residents that work outside Hendersonville are assigned 14 hours to residential development. Inflow commuters are assigned 10 hours to nonresidential development. Based on 2015 functional population data, the residential allocation is 77 percent, and the nonresidential allocation is 23 percent.

Figure 16: Functional Population

Demand Units in 2015	Demand Hours/Day	Person Hours	Proportionate Share
Residential			
Total Population	54,005		
51% Residents Not Working	27,489	20	549,780
49% Resident Workers	26,516		
14% Worked in City	3,796	14	53,144
86% Worked Outside City	22,720	14	318,080
	Residential Subtotal		921,004 77%
Nonresidential			
Non-working Residents	27,489	4	109,956
Jobs Located in City	16,695		
23% Residents Working in City	3,796	10	37,960
77% Non-Resident Workers (inflow commuters)	12,899	10	128,990
	Nonresidential Subtotal		276,906 23%
	TOTAL		1,197,910 100%

SERVICE UNITS

Residential impact fees are calculated on a per capita basis, then converted to an appropriate amount for each type of housing unit based on persons per housing unit (PPHU) factors. As shown in Figure 17, the current PPHU ratios are 2.74 persons per single family unit and 1.72 persons per multi-family unit. These figures are based on the U.S. Census Bureau’s 2016 ACS 5-year estimates (further discussed in Appendix A).

Figure 17: Current Estimates of Persons per Housing Unit

Housing Type	Residents*	Housing Units*	PPHU
Single Family	45,904	16,769	2.74
Multi-Family	8,992	5,236	1.72

* U.S. Census Bureau, 2016 American Community Survey, 5-Year Estimates

TischlerBise uses nonresidential vehicle trips as the nonresidential “service unit” for fire infrastructure. As previously discussed in the Executive Summary, average weekday vehicle trip ends for nonresidential development are from the 10th edition of the reference book, *Trip Generation*, published in 2017 by the Institute of Transportation Engineers. A “trip end” represents a vehicle either entering or exiting a development (as if a traffic counter were placed across a driveway). Trip ends for nonresidential development are calculated per thousand square feet, and require an adjustment factor to avoid double counting each trip at both the origin and destination points.

The basic trip adjustment factor is 50 percent for all nonresidential development except commercial. For commercial/retail development, the trip adjustment factor is less than 50 percent because retail uses attract vehicles as they pass by on arterial and collector roads. For an average size shopping center, the ITE (2017) indicates that on average 34 percent of the vehicles that enter are passing by on their way to some other primary destination. The remaining 66 percent of attraction trips have the shopping center as their primary destination. Because attraction trips are half of all trips, the trip adjustment factor ($0.66 \times 0.50 = 0.33$) is approximately 33 percent of the trip ends.

Using the current estimates of nonresidential square footage by type, TischlerBise applied the trip end estimates and adjustment factors to calculate the average weekday trips for nonresidential development in Hendersonville, as shown in Figure 18. TischlerBise estimates that there are 52,775 weekday trips attributable to existing nonresidential development in the City of Hendersonville.

Figure 18: Current Estimates of Average Weekday Nonresidential Vehicle Trips

Nonresidential Gross Floor Area (1,000 sq. ft.)		Assumptions	
Industrial		2,078	
Commercial		2,807	
Office & Institutional		2,599	
Total Nonresidential Floor Area		7,484	

Average Weekday Vehicle Trips Ends per 1,000 Sq. Ft.	Trip Ends*	Adj. Factor
Industrial	4.96	50%
Commercial	37.75	33%
Office & Institutional	9.74	50%

Nonresidential Vehicle Trips	Vehicle Trips
Industrial	5,153
Commercial	34,965
Office & Institutional	12,657
Total Inbound Nonresidential Trips	52,775

*Source: Trip Generation, 7th Edition, Institute of Transportation Engineers (ITE), 2017.

FIRE STATIONS

Standards and Cost Factors

The first component included in the Fire fee is fire stations. As previously stated, the incremental expansion methodology is used to determine the fire station component of the impact fees. As shown in Figure 19, Hendersonville's has a total of six fire stations, one of which (Station #2) is currently under construction and will be completed in 2019. Therefore, the base year demand units (population and nonresidential vehicle trips) used to establish the level-of-service standards will be 2019 instead of 2018. The total square footage of fire stations totals 44,328 square feet. To estimate the replacement cost of these stations, the actual cost to build Station #2 at \$330 per square foot was used.

To derive the residential level of service standards, the existing fire station floor area (44,328 sq ft) is multiplied by the residential cost share (77%) and divided by the 2019 population (58,152), yielding 0.587 square feet of fire facilities per person. Similarly, the nonresidential level of service standard is calculated by multiplying the fire station floor area (44,328 sq ft) by the nonresidential cost share (23%) and dividing by nonresidential vehicle trips in 2019 (53,856), yielding 0.189 square feet per vehicle trip. To determine the cost per demand unit, the existing level of service standards (0.587 sq ft per person and 0.189 sq ft per vehicle trip) are multiplied by the average replacement cost per square foot (\$330), for a cost per demand unit of \$193.69 per person and \$62.47 per vehicle trip.

Figure 19: Level of Service Standards for Fire Stations

Station	Square Footage	Cost per Square Foot	Replacement Cost
Station 1	4,880	\$330	\$1,610,400
Station 2*	14,460	\$330	\$4,771,800
Station 3	8,434	\$330	\$2,783,220
Station 4	3,200	\$330	\$1,056,000
Station 5	7,354	\$330	\$2,426,820
Station 6	6,000	\$330	\$1,980,000
Total	44,328	\$330	\$14,628,240

Level-of-Service (LOS) Standards

Population (2019)*	58,152
Nonresidential Vehicle Trips (2019)*	53,856
Residential Share	77%
Nonresidential Share	23%
LOS: Sq. Ft. per Person	0.587
LOS: Sq. Ft. per Vehicle Trip	0.189

Cost Analysis

Cost per Square Foot	\$330
LOS: Square Feet per Person	0.587
LOS: Square Feet per Vehicle Trip	0.189
Cost per Person	\$193.69
Cost per Vehicle Trip	\$62.47

* Station 2 will be completed in 2019. Therefore, the Level of Service (LOS) Standards have a base year of 2019.

FIRE APPARATUS**Existing Standards and Cost Factors**

The second component included in the Fire fee is fire apparatus. The incremental expansion methodology is used to determine this portion of the impact fees. The fee study assesses residential level of service standards based on 2018 population, and nonresidential level of service standards based on nonresidential vehicle trips in 2018. As shown in Figure 20, Hendersonville's Fire Department owns 31 units of apparatus, with an average replacement cost of \$247,430 per unit.

To derive the residential level of service standards, the quantity of apparatus (31 units) is multiplied by the residential cost share (77%) and divided by the 2018 population (57,084), yielding 0.00042 units per person. Similarly, the nonresidential level of service standard is calculated by multiplying the quantity of vehicles and equipment (31 units) by the nonresidential cost share (23%) and dividing by nonresidential vehicle trips (52,775), yielding 0.00014 units per vehicle trip. To determine the cost per demand unit, the existing level of service standards (0.00042 units per person and 0.00014 units per vehicle trip) are multiplied by the average replacement cost per unit (\$247,430), for a cost per demand unit of \$103.46 per person and \$33.43 per vehicle trip.

Figure 20: Existing Standards for Fire Apparatus

Apparatus	Unit Cost	Quantity	Replacement Cost
1991 Int'l/Luverne 1250 GPM Pumper	\$552,805	1	\$552,805
1988 Ford F-250 4X4 Brush Truck	\$150,000	1	\$150,000
1998 Freightliner FL-80 Fire Engine	\$552,805	1	\$552,805
2000 Chevy C1500 4X4 Pick Up Truck	\$28,000	1	\$28,000
1999 American Eagle Pumper	\$552,805	1	\$552,805
Tactical Rescue Trailer	\$6,000	1	\$6,000
2003 Ford Expedition	\$28,000	1	\$28,000
2004 Ford Expedition	\$28,000	1	\$28,000
2006 Hummer	\$28,000	1	\$28,000
Jet Skis	\$10,000	2	\$20,000
2007 E-One Pumper Custom Chassis	\$552,805	1	\$552,805
2001 Crown Victoria	\$28,000	1	\$28,000
2011 E-One 100' Platform Ladder Truck	\$1,256,144	1	\$1,256,144
2012 Chevrolet Silverado 2500	\$28,000	1	\$28,000
2012 Chevrolet Tahoe	\$28,000	1	\$28,000
2012 E-One Pumper Custom Chassis	\$552,805	1	\$552,805
CBRNE Fire/Rescue Boat (33-FT)	\$300,000	1	\$300,000
12 Ft. Rigid Hull Inflatable Boat with Motor	\$7,000	2	\$14,000
2013 E-One Typhoon Pumper	\$552,805	1	\$552,805
2013 E-One Cyclone 100' Ladder Truck	\$1,003,045	1	\$1,003,045
2015 Chevrolet Silverado	\$28,000	2	\$56,000
2015 SUTPHEN Engine	\$552,805	1	\$552,805
2015 Spartan	\$673,005	1	\$673,005
2016 Kawasaki Mule	\$14,500	1	\$14,500
2017 Chevrolet Silverado	\$28,000	2	\$56,000
2018 Chevrolet Silverado	\$28,000	2	\$56,000
TOTAL	\$247,430	31	\$7,670,329

Level-of-Service (LOS) Standards

Population in 2018	57,084
Nonresidential Vehicle Trips in 2018	52,775
Residential Share	77%
Nonresidential Share	23%
LOS: Units per Person	0.00042
LOS: Units per Vehicle Trip	0.00014

Cost Analysis

Average Cost per Unit	\$247,430
LOS: Units per Person	0.00042
LOS: Units per Vehicle Trip	0.00014
Cost per Person	\$103.46
Cost per Vehicle Trip	\$33.43

PROJECTED DEMAND FOR GROWTH-RELATED FIRE IMPROVEMENTS

To accommodate projected development over the next ten years, Hendersonville will construct additional square footage of fire stations and purchase additional apparatus as development occurs. Figure 21 demonstrates the Fire Department’s growth-related needs, which are based on the development projections contained in Appendix A. In order to maintain the same level of service, the City will need to provide the following growth-related improvements over the next ten years:

- 8,625 square feet of fire station floor area at an approximate cost of \$2.85 million
- 6.1 units of apparatus at an approximate cost of \$1.51 million

Figure 21: Growth-Related Need for Fire Stations and Apparatus

Fire Facility Level-of-Service Standards			
Level-of-Service			Unit Cost
Residential	0.59	Sq. Ft. per Person	\$330
Nonresidential	0.19	Sq. Ft. per Vehicle Trip	

Growth-Related Need for Facilities				
Year		Population	Nonres. Vehicle Trips	Square Feet Needed
Base	2018	57,084	52,775	43,497
Year 10	2028	67,936	64,687	52,121
Ten-Year Increase		10,852	11,911	8,625
Growth-Related Expenditures				\$2,846,250

Fire Apparatus Level-of-Service Standards			
Level-of-Service			Unit Cost
Residential	0.00042	Units per Person	\$247,430
Nonresidential	0.00014	Units per Vehicle Trip	

Growth-Related Need for Apparatus				
Year		Population	Nonres. Vehicle Trips	Apparatus Needed
Base	2018	57,084	52,775	31
Year 10	2028	67,936	64,687	37
Ten-Year Increase		10,852	11,911	6.1
Growth-Related Expenditures				\$1,509,323

PROPOSED FIRE FEES

Figure 22 details the proposed maximum supportable Fire impact fees in Hendersonville. Residential fees are derived from the average number of persons per housing unit and the total cost per person. Nonresidential fees are based on the average number of nonresidential vehicle trip ends per 1,000 square feet of floor area and the total cost per vehicle trip end.

Cost factors for fire station facilities and apparatus are summarized at the top of the figure. Also included in the cost factors is the cost of the Fire portion of the Impact Fee Study, allocated based on the net increase in population and nonresidential vehicle trips through 2023 (see Appendix B). The cost of the study was spread out only five years because the City is required to update its impact fees every five years. The sum of these cost factors yields a cost per person of \$298.79 and cost per vehicle trip of \$96.37. The proposed residential fees are found by multiplying the cost per person by the persons per housing unit ratios. The proposed nonresidential fees are found by multiplying the cost per vehicle trip by the ITE trip generation rates and the trip adjustment factors.

Figure 22: Proposed Fee Schedule for Fire

Fee Component	Cost per Person	Cost per Vehicle Trip
Facilities	\$193.69	\$62.47
Vehicles	\$103.46	\$33.43
Fee Study	\$1.64	\$0.47
TOTAL	\$298.79	\$96.37

Residential (per housing unit)

Type of Household	Persons per Housing Unit	Proposed Fee
Single Family	2.74	\$818
Multi-Family	1.72	\$513

Nonresidential (per 1,000 square feet)

Type	Trip Ends per 1,000 Sq. Ft.	Trip Rate Adjustment	Proposed Fee
Industrial	4.96	50%	\$239
Commercial/Retail	37.75	33%	\$1,201
Office & Institutional	9.74	50%	\$469

PROJECTED REVENUE FROM FIRE IMPACT FEES

Revenue projections assume implementation of the proposed fire fees and that development over the next ten years is consistent with the Land Use Assumptions described in Appendix A. To the extent the rate of development either accelerates or slows down, there will be a corresponding change in the impact fee revenue. As shown in Figure 23, Fire fee revenue is expected to total about \$4.39 million over the next ten years, compared to projected expenditures of \$4.37 million.

Figure 23: Capital Costs and Revenue for Fire

	Growth Cost
Fire Facilities	\$2,846,250
Fire Apparatus	\$1,509,323
Fee Study	\$11,475
Total Expenditures	\$4,367,048

Projected Fire Impact Fee Revenue

		Single-Family	Multi-Family	Industrial	Commercial	Office & Institutional
		\$818 per Unit	\$513 per Unit	\$239 per KSF	\$1,201 per KSF	\$469 per KSF
Year		Housing Units	Housing Units	KSF	KSF	KSF
Base	2018	17,422	5,469	2,078	2,807	2,599
1	2019	17,747	5,573	2,092	2,868	2,656
2	2020	18,072	5,679	2,106	2,931	2,715
3	2021	18,397	5,787	2,120	2,995	2,775
4	2022	18,722	5,898	2,134	2,134	2,836
5	2023	19,047	6,011	2,148	3,128	2,899
6	2024	19,372	6,126	2,162	3,197	2,963
7	2025	19,697	6,243	2,177	3,267	3,029
8	2026	20,022	6,362	2,191	3,338	3,095
9	2027	20,347	6,484	2,206	3,412	3,164
10	2028	20,672	6,608	2,220	3,486	3,234
10-year Increase		3,250	1,139	142	680	635
Projected Revenue		\$2,658,269	\$584,457	\$34,055	\$815,863	\$297,940

Projected Revenue	\$4,390,585
Surplus / (Deficit)	\$23,537

ROAD IMPACT FEES

METHODOLOGY

Road impact fees use the plan-based methodology, which uses the City's Capital Improvements Plan (CIP) to allocate capital costs to residential and nonresidential development based on vehicle trips. This methodology allows Hendersonville to complete the necessary roadway expansion projects in its CIP to accommodate new growth. Impact fee revenue collected using this methodology may not be used to replace or rehabilitate existing roadway deficiencies.

SERVICE UNITS

Trip Generation Rates

TischlerBise uses vehicle trips as the "service unit" for road infrastructure for both residential and nonresidential development. Average weekday vehicle trip ends are from the 10th edition of the reference book, *Trip Generation*, published in 2017 by the Institute of Transportation Engineers. A "trip end" represents a vehicle either entering or exiting a development (as if a traffic counter were placed across a driveway). Trip ends for residential development are calculated per housing unit, and trip ends for nonresidential development are calculated per thousand square feet.

Adjustments for Commuting Patterns and Pass-By Trips

Trip ends require an adjustment factor to avoid double counting each trip at both the origin and destination points. Because every trip has two end points, the basic trip adjustment factor is 50 percent. Residential development has a larger trip adjustment factor of 63% to account for commuters leaving Hendersonville for work. According to the 2009 National Household Travel Survey, weekday work trips are typically 31% of production trips (i.e., all out-bound trips, which are 50% of all trip ends). As shown in Figure 24, the Census Bureau's web application OnTheMap indicates that 86% of resident workers traveled outside the city for work in 2015. In combination, these factors ($0.31 \times 0.50 \times 0.86 = .13$) support the additional 13% allocation of trips to residential development.

Figure 24: Residential Trip Adjustment

Trip Adjustment Factors for Commuters¹	
Employed Residents	26,516
Residents Working and Living in Hendersonville	3,796
Residents Commuting Outside Hendersonville for Work	22,720
Percent Commuting out of Hendersonville	86%
Inbound Trip Discount	50%
Home-based Work Trips ²	31%
Additional Production Trips²	13%
Residential Trip Adjustment Factor	63%

1. U.S. Census Bureau, *OnTheMap Application and LEHD Origin-Destination Employment Statistics, 2015*.

2. According to the *National Household Travel Survey (2009)*, home-based work trips are typically 31% of "production" trips; in other words, out-bound trips (which are 50% of all trip ends).

The nonresidential trip adjustment factor is 50 percent, except commercial. For commercial/retail development, the trip adjustment factor is less than 50 percent because retail uses attract vehicles as they pass by on arterial and collector roads. For an average size shopping center, the ITE (2017) indicates that on average 34 percent of the vehicles that enter are passing by on their way to some other primary destination. The remaining 66 percent of attraction trips have the shopping center as their primary destination. Because attraction trips are half of all trips, the trip adjustment factor ($0.66 \times 0.50 = 0.33$) is approximately 33 percent of the trip ends. The top of Figure 25 in the next section shows each development type's average weekday vehicle trip ends (VTE) per unit and its trip adjustment factor.

PROJECTED SERVICE UNITS AND DEMAND

TischlerBise created an aggregate travel model to convert development units within Hendersonville to vehicle trips. The factors included in the demand model include average weekday vehicle trip ends and the trip adjustment factor, as discussed above.

Travel Demand Model

Projected development in Hendersonville over the next 10 years, and the corresponding additional vehicle trips is shown in Figure 25. Vehicle trip quantities for each development type were calculated by multiplying the trip generation rate and trip adjustment factor by the projected development units (see Land Use Assumptions in Appendix A). For example, the residential projections indicate there are 17,422 single family units in 2018. This figure is multiplied by the ITE trip generation rate of 9.44 and by the trip adjustment factor of 63%, yielding 104,074 average weekday vehicle trips. If Hendersonville grows in accordance with the Land Use Assumptions, the new development will generate an additional 36,602 daily vehicle trips by 2028.

Figure 25: Travel Demand Model

Development Type	ITE Code	Wkdy VTE ¹	Dev Unit	Trip Adj
Single Family	210	9.44	HU	63%
Multi-Family	220	7.32	HU	63%
Industrial	110	4.96	KSF	50%
Commercial	820	37.75	KSF	33%
Office & Institutional	710	9.74	KSF	50%

1. Trip rates are from the Institute of Transportation Engineers (ITE) Trip Generation Manual (2017).

	2018 Base	2019 1	2020 2	2021 3	2022 4	2023 5	2028 10	10-Year Increase
Single Family Units	17,422	17,747	18,072	18,397	18,722	19,047	20,672	3,250
Multi-family Units	5,469	5,573	5,679	5,787	5,898	6,011	6,608	1,139
Industrial Floor Area (KSF)	2,078	2,092	2,106	2,120	2,134	2,148	2,220	142
Commercial Floor Area (KSF)	2,807	2,868	2,931	2,995	3,061	3,128	3,486	680
Off. & Inst. Floor Area (KSF)	2,599	2,656	2,715	2,775	2,836	2,899	3,234	635
Single Family Trips	104,074	106,016	107,957	109,899	111,840	113,782	123,489	19,415
Multi-family Trips	25,333	25,815	26,306	26,806	27,321	27,844	30,609	5,276
Industrial Trips	5,153	5,188	5,222	5,257	5,292	5,327	5,507	353
Commercial Trips	34,965	35,732	36,515	37,315	38,133	38,969	43,431	8,466
Off. & Inst. Trips	12,657	12,936	13,222	13,514	13,813	14,118	15,748	3,092
Total Vehicle Trips	182,183	185,687	189,223	192,792	196,399	200,040	218,785	36,602

CAPITAL IMPROVEMENTS PLAN AND COST ALLOCATION

Hendersonville's Capital Improvements Plan for Roads includes 6 projects, shown in Figure 26. These projects are needed to accommodate anticipated new residential and nonresidential development. The projects will add approximately 8.05 lane miles to the existing road network, and are expected to cost over \$36 million in total. However, each of these projects has received federal grant funding, which reduces the cost burden on the City. The Local Funds Required column in Figure 26 represents the minimum portion of each project's cost which must be funded by the City itself. The total amount of local funds needed to complete these roadway expansion projects totals \$9.166 million, and it is this amount which shall be used for the roads impact fee calculations.

The ten-year Capital Improvements Plan is explicitly to accommodate anticipated new development, so 100% of the locally-incurred costs of the CIP are allocated towards new development. As discussed in the previous section, new residential and nonresidential development is anticipated to add 36,602 average daily vehicle trips over the next ten years. Dividing the Local Funds Required total of \$9.166 million by the ten-year increase in vehicle trips produces an average cost per vehicle trip of \$250.43.

Figure 26: Roads Capital Improvements Plan and Cost Allocation

Improvement	Lane Miles	Total Project Cost	Local Funds Required
Rockland Road Widening	1.50	\$4,683,500	\$936,700
Walton Ferry / Old Shackle Island Rd Improvements	2.34	\$12,678,123	\$2,535,625
Sanders Ferry / Drakes Creek Bike Path	1.52	\$3,414,100	\$682,820
Indian Lake Rd Widening	1.50	\$8,000,000	\$1,500,000
Drakes Creek Rd Widening	0.75	\$2,700,000	\$511,200
Saundersville Rd Local Interstate Connector	0.44	\$5,000,000	\$3,000,000
Total	8.05	\$36,475,723	\$9,166,345

Growth-Related Cost	\$9,166,345
10-Year Vehicle Trip Increase	36,602
Average Cost per Vehicle Trip	\$250.43

PROPOSED ROAD FEES

Figure 27 details the cost factors and proposed maximum supportable Roads impact fees in Hendersonville. Cost factors include the cost per vehicle trip and the cost of the Roads portion of the Impact Fee Study, allocated based on the net increase in average daily vehicle trips through 2023 (see Appendix B). The cost of the study was spread out only five years because the City must update its impact fees every five years. The sum of cost factors is \$251.60 per vehicle trip.

The proposed road impact fees are shown in the bottom portion of Figure 27. Residential impact fees are expressed per housing unit, and nonresidential impact fees are expressed per 1,000 square feet (KSF) of floor area. The fee amounts are calculated by multiplying the cost per vehicle trip by the ITE trip generation rates and trip rate adjustment factors. For example, the Single Family impact fee for roads is determined by multiplying the cost per vehicle trip of \$251.60 by the ITE trip generation rate of 9.44 trip ends per housing unit and the trip rate adjustment factor of 63%, yielding a fee of \$1,503.

Figure 27: Cost Factors and Proposed Impact Fees for Roads

Cost Factors per Vehicle Trip End	
Capital Improvements	\$250.43
Fee Study	\$1.17
Net Capital Cost per Vehicle Trip	\$251.60

Development Type	Avg Wkdy Vehicle Trip Ends	Trip Rate Adjustment	Proposed Fee
Residential (per Housing Unit)			
Single Family Units	9.44	63%	\$1,503
Multi-family Units	7.32	63%	\$1,165
Nonresidential (per 1,000 Sq. Ft. of Floor Area)			
Industrial	4.96	50%	\$624
Commercial	37.75	33%	\$3,134
Office & Institutional	9.74	50%	\$1,225

PROJECTED REVENUE FROM ROADS IMPACT FEES

Revenue projections assume implementation of the proposed roads fees and that development over the next ten years is consistent with the Land Use Assumptions described in Appendix A. To the extent the rate of development either accelerates or slows down, there will be a corresponding change in the impact fee revenue. As shown in Figure 28, roads fee revenue is expected to total about \$9.21 million over the next ten years, compared to projected expenditures of \$9.19 million.

Figure 28: Capital Costs and Fee Revenues for Roads

	Growth Cost
Planned Improvements	\$9,166,345
Impact Fee Study	\$20,953
Total Expenditures	\$9,187,298

Projected Road Impact Fee Revenue

		Single-Family	Multi-Family	Industrial	Commercial	Office & Institutional
		\$1,503 per Unit	\$1,165 per Unit	\$624 per KSF	\$3,134 per KSF	\$1,225 per KSF
Year		Housing Units	Housing Units	KSF	KSF	KSF
Base	2018	17,422	5,469	2,078	2,807	2,599
1	2019	17,747	5,573	2,092	2,868	2,656
2	2020	18,072	5,679	2,106	2,931	2,715
3	2021	18,397	5,787	2,120	2,995	2,775
4	2022	18,722	5,898	2,134	2,134	2,836
5	2023	19,047	6,011	2,148	3,128	2,899
6	2024	19,372	6,126	2,162	3,197	2,963
7	2025	19,697	6,243	2,177	3,267	3,029
8	2026	20,022	6,362	2,191	3,338	3,095
9	2027	20,347	6,484	2,206	3,412	3,164
10	2028	20,672	6,608	2,220	3,486	3,234
10-year Increase		3,250	1,139	142	680	635
Projected Revenue		\$4,884,750	\$1,326,935	\$88,608	\$2,129,868	\$777,683

Total Projected Revenue	\$9,207,844
Surplus / (Deficit)	\$20,546

APPENDIX A – LAND USE ASSUMPTIONS

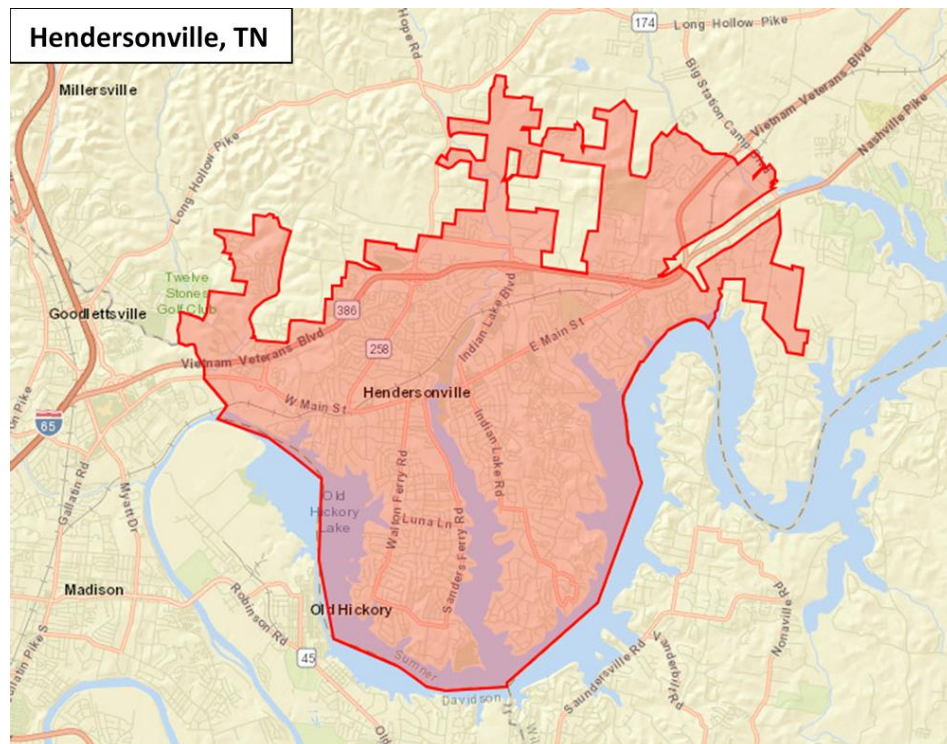
INTRODUCTION

The City of Hendersonville, Tennessee, retained TischlerBise to analyze the impacts of development on its capital facilities and to calculate impact fees based on that analysis. The population, housing unit, and job projections contained in this document provide the foundation for the impact fee study. To evaluate demand for growth-related infrastructure from various types of development, TischlerBise prepared documentation on demand indicators by type of housing unit, jobs and floor area by type of nonresidential development. These metrics (explained further below) are the service units and demand indicators used in the impact fee study.

Impact fees are based on the need for growth-related improvements, and they must be proportionate by type of land use. The demographic data and development projections are used to demonstrate proportionality and to anticipate the need for future infrastructure. Demographic data reported by the U.S. Census Bureau, and data provided by Hendersonville staff, are used to calculate base year estimates and annual projections for a ten-year horizon. Impact fee studies typically look out five to ten years, with the expectation that fees will be updated every three to five years.

SERVICE AREA

The estimates and projections of residential and nonresidential development in this Land Use Assumptions document are for areas within the boundaries of the City of Hendersonville. The map below depicts the area within the City's boundaries, outlined in red, which for the purposes of this study shall coincide with the service area boundaries.



RESIDENTIAL DEVELOPMENT

Since its founding, Hendersonville's population has grown steadily, particularly in the latter half of the twentieth century. Continued housing and population growth is expected for the City over the next ten years. The most recent Census Bureau estimates and future projections of residential development are detailed in this section, including housing units by type and population.

Current Estimates of Residential Development

In 2010 the U.S. Census Bureau transitioned from the traditional long-form questionnaire to the American Community Survey (ACS), which is less detailed and has smaller sample sizes. As a result, Census data now has more limitations than before. For example, data on detached housing units are now combined with attached single units (commonly known as townhouses). For impact fees in Hendersonville, "single family" residential includes both detached units and townhouses that share a common sidewall but are constructed on an individual parcel of land. The "multi-family" category includes all structures with two or more units on an individual parcel of land.

According to the Census Bureau, a household is a housing unit that is occupied by year-round residents. Impact fees often use per capita standards and persons per housing unit, or persons per household, to derive proportionate-share fee amounts. When persons per housing unit are used in the fee calculations, infrastructure standards are derived using year-round population. When persons per household are used in the fee calculations, the impact fee methodology assumes all housing units will be occupied, thus requiring seasonal or peak population to be used when deriving infrastructure standards.

TischlerBise recommends that impact fees for residential development in the City of Hendersonville be imposed according to year-round residents per housing unit. For the impact fee calculations, TischlerBise used the ACS results shown at the top of Figure A1 on the following page to indicate the relative number of persons per housing unit, by units in a residential structure, and the housing mix in Hendersonville.

According to the American Community Survey (5-year estimates), there are an average of 2.49 persons per housing unit. The persons per housing unit for single family homes at 2.74 is considerably higher than that for multi-family homes at 1.72. Hendersonville's residential vacancy rate, derived from the difference in total households versus total housing units, is 3.0% for single-family homes and 10.3% for multi-family homes. The housing mix in Hendersonville is predominantly single family, representing 76% of all housing units.

Figure A1: Persons per Housing Unit by Type

Type	Persons	Households	Persons per Household	Housing Units	Persons per Housing Unit	Vacancy Rate
Single Family*	45,904	16,260	2.82	16,769	2.74	3%
Multi-Family	8,992	4,695	1.92	5,236	1.72	10%
Subtotal	54,896	20,955	2.62	22,005	2.49	5%
Group Quarters	177					
TOTAL	55,073		2.63	22,005	2.50	

Source: Tables B25033, B25032, B25024, and B26001.

* Single Family includes detached, attached, and mobile homes.

Five-Year Estimates, 2016 American Community Survey, U.S. Census Bureau.

Residential Construction

Figure A2 shows residential permit data over the last six years, provided by City of Hendersonville staff. From 2012 to 2017, the City permitted an average of 254 single family units and 155 multi-family units, for a total of 409 housing units per year. The total number of permits per year generally follows an increasing trend, with single family units being added steadily year-over-year and multi-family units being added much more sporadically. To estimate the total number of housing units during this period, TischlerBise used the number of housing units from the 2016 ACS data in the Figure above as the base year, and added or subtracted units for each year based on the permit data. From these estimates, a compound annual growth rate was derived, which will be used to forecast future residential development.

Figure A2: Anticipated Housing Unit Permits by Development

Permits from Prior Years				Total Housing Units			
Year	SF Units	MF Units	All Units	Year	SF Units	MF Units	All Units
2012	192	10	202	2012	15,901	4,537	20,438
2013	224	6	230	2013	16,093	4,547	20,640
2014	203	342	545	2014	16,317	4,553	20,870
2015	249	341	590	2015	16,520	4,895	21,415
2016	326	42	368	2016	16,769	5,236	22,005
2017	327	191	518	2017	17,095	5,278	22,373
				2018	17,422	5,469	22,891
				Compound Anl Growth Rate			
				SF Units	MF Units	All Units	
				1.53%	3.16%	1.91%	

Residential Development Forecast

To estimate the number of housing units in 2018, the base year for this study, TischlerBise used the U.S. Census Bureau's 2016 ACS housing numbers and added the number of permits in 2016 and 2017, suggesting a total of 22,891 housing units in 2018. To project residential housing growth over the next ten years through 2028, the permit data was used to derive a compound annual growth rate for housing units of 1.91%. The use of compound annual growth, a form of exponential growth, produces more conservative short-term estimates which increase over time. Applying the compound annual growth rate to the 2018 housing unit estimates resulted in a ten-year increase of 3,629 single family units and 1,139

multi-family units. However, City staff opined that single family unit growth would not exceed 325 units per year, so the single family unit growth was adjusted to 325 units per year for a ten-year increase in 3,250 single family units.

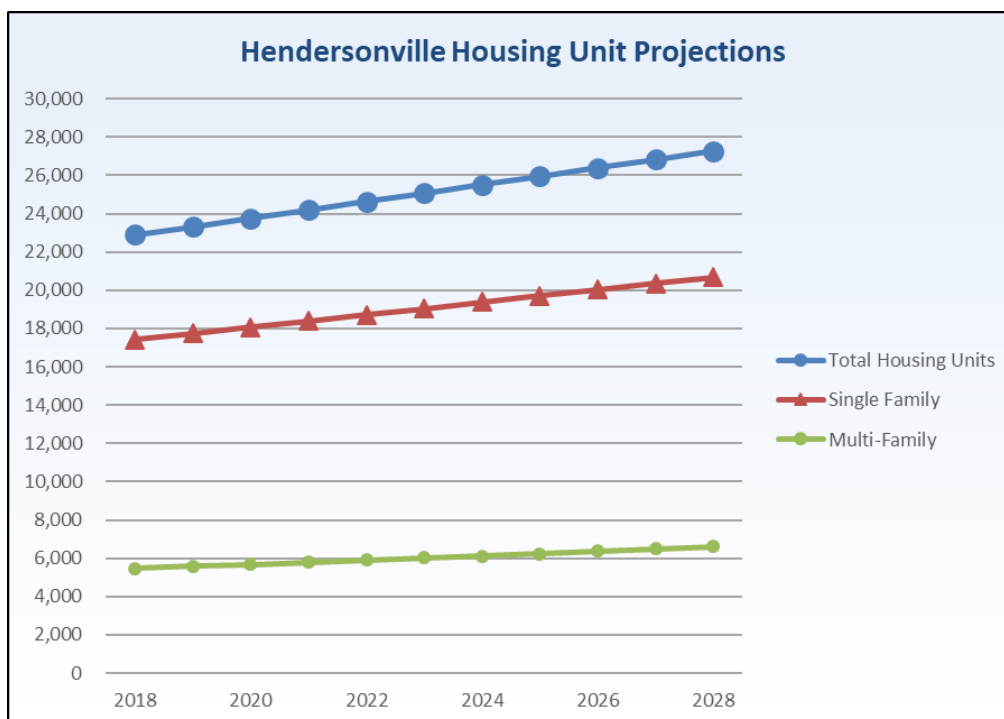
Population forecasts were produced by multiplying the housing unit estimates by the persons per housing unit ratios derived from the Census Bureau’s 2016 ACS, 5-year estimates. Therefore, single family and multi-family units were assumed to house an average of 2.74 and 1.72 persons per housing unit, respectively. The ratios were assumed to remain constant throughout the projection period. TischlerBise’s projections for housing units and population through 2028 are shown in Figure A3 below. Over the next ten years, Hendersonville is projected to add approximately 4,389 housing units and 10,852 residents.

Figure A3: Housing and Population Projections

	2018	2019	2020	2021	2022	2023		2028	10-Year Increase	Avg Annual Increase
	Base	1	2	3	4	5		10		
Resident Population	57,084	58,152	59,224	60,299	61,379	62,463		67,936	10,852	1.76%
Housing Units										
Single Family	17,422	17,747	18,072	18,397	18,722	19,047		20,672	3,250	1.73%
Multi-Family	5,469	5,573	5,679	5,787	5,898	6,011		6,608	1,139	1.91%
Total Housing Units	22,891	23,320	23,751	24,184	24,620	25,058		27,280	4,389	1.77%
Single Family PPHU	2.74	2.74	2.74	2.74	2.74	2.74		2.74		
Multi-Family PPHU	1.72	1.72	1.72	1.72	1.72	1.72		1.72		

Multi-family units are expected to grow slightly faster percentage-wise than single family units, a phenomenon which was also observed in the past years permit data. Figure A4 depicts the growth of single family and multi-family housing units over the next ten years.

Figure A4: Projected Single and Multi-Family Housing Share



NON-RESIDENTIAL DEVELOPMENT

Current estimates and future projections for jobs and non-residential square footage are detailed in this section. TischlerBise uses the term “jobs” to refer to employment by place of work (as opposed to place of residence).

Jobs by Type of Nonresidential Development

Figure A5 shows estimates for Hendersonville’s 2015 job quantities and nonresidential floor area. The number of jobs is based on estimates from the U.S. Census Bureau’s OnTheMap application for Hendersonville. Employment sectors were aggregated into one of three categories: Industrial, Commercial, and Office & Institutional. The floor areas were estimated using a square foot per employee multiplier obtained from the Institute of Transportation Engineers (ITE 2017). For Industrial jobs, the ITE multiplier for Light Industrial was used. The multiplier for Commercial is that for an average-size shopping center, and the multiplier for Office & Institutional is that for an average-sized office.

In 2015 there were an estimated 16,695 jobs in Hendersonville and approximately 7.1 million square feet of nonresidential floor area. 43% of all jobs in the City fall into the Office & Institutional category, whose sectors include Finance & Insurance, Information, Science & Technology, Health Care, Education, and Public Administration. Commercial was the next largest category at 37%, and is comprised of Retail Trade, Accommodation & Food Services, and Arts & Entertainment sectors. Industrial jobs, which includes Manufacturing, Construction, Transportation & Warehousing, and Wholesale Trade sectors, is the smallest employment category, accounting for 20% of all jobs.

Figure A5: Current Jobs and Floor Area Estimates

	2015 Jobs ¹	% Share	Sq Ft per Job ²	Floor Area
Industrial	3,313	20%	615	2,037,000
Commercial	6,160	37%	427	2,630,000
Office & Institutional	7,222	43%	337	2,434,000
TOTAL	16,695	100%	425	7,101,000

(1) Jobs in 2015 based on U.S. Census Bureau's OnTheMap web application, 2015.

(2) Sq Ft per Job based on Trip Generation Rates, 10th Edition, Institute of Transportation Engineers (2017).

In Figure A6, blue shading indicates the three nonresidential development prototypes used by TischlerBise to estimate floor area in Hendersonville.

Figure A6: Employee and Building Area Ratios

ITE Code	Land Use / Size	Demand Unit	Wkdy Trip Ends Per Dmd Unit*	Wkdy Trip Ends Per Employee*	Emp Per Dmd Unit	Sq Ft Per Emp
110	Light Industrial	1,000 Sq Ft	4.96	3.05	1.63	615
130	Industrial Park	1,000 Sq Ft	3.37	2.91	1.16	864
140	Manufacturing	1,000 Sq Ft	3.93	2.47	1.59	628
150	Warehousing	1,000 Sq Ft	1.74	5.05	0.34	2,902
254	Assisted Living	bed	2.60	4.24	0.61	na
320	Motel	room	3.35	25.17	0.13	na
520	Elementary School	1,000 Sq Ft	19.52	21.00	0.93	1,076
530	High School	1,000 Sq Ft	14.07	22.25	0.63	1,581
540	Community College	student	1.15	14.61	0.08	na
550	University/College	student	1.56	8.89	0.18	na
565	Day Care	student	4.09	21.38	0.19	na
610	Hospital	1,000 Sq Ft	10.72	3.79	2.83	354
710	General Office (avg size)	1,000 Sq Ft	9.74	3.28	2.97	337
760	Research & Dev Center	1,000 Sq Ft	11.26	3.29	3.42	292
770	Business Park	1,000 Sq Ft	12.44	4.04	3.08	325
820	Shopping Center (avg size)	1,000 Sq Ft	37.75	16.11	2.34	427

* *Trip Generation*, Institute of Transportation Engineers, 10th Edition (2017).

Nonresidential Development Forecast

Figure A7 on the following page offers ten-year job and nonresidential floor area projections for Hendersonville. The projections are based on compound annual growth rates for Industrial, Commercial and Office & Institutional jobs, which were derived from the Nashville Area Metropolitan Planning Organization's job estimates for Sumner County in 2010 and 2040. The MPO estimates Industrial jobs will grow by 0.67% per year, Commercial jobs by 2.19% per year, and Office & Institutional jobs by 2.21% per year. These growth rates were then applied to the 2017 ESRI job figures to produce estimates for 2018 through 2028. Just as before, nonresidential floor area projections were derived by multiplying jobs by the ITE square-foot-per-employee multipliers highlighted in the figure above.

Between 2018 and 2028, Hendersonville is projected to add a total of 3,707 jobs, an average of 371 jobs per year. About half of the job growth (1,884 jobs) is anticipated to occur in the Office & Institutional sector, followed by the Commercial sector (1,592 jobs) and Industrial sector (232 jobs). In concurrence with the job growth, the City is projected to add approximately 1,457 thousand square feet (KSF) of nonresidential floor in the ten-year projection period. The vast majority of new nonresidential floor area is expected to be uses in the Commercial or Office & Institutional sectors, at 680 and 635 thousand square feet of floor area being built, respectively. About 142 thousand square feet of Industrial floor area is expected to be added as well.

Figure A7: Projected Jobs and Nonresidential Floor Area

	2018	2019	2020	2021	2022	2023		2028	10-Year Increase
	Base	1	2	3	4	5		10	
Jobs									
Industrial	3,380	3,402	3,425	3,447	3,470	3,493		3,611	232
Commercial	6,574	6,718	6,865	7,016	7,170	7,327		8,166	1,592
Office & Institutional	7,711	7,882	8,056	8,234	8,416	8,602		9,595	1,884
Total Jobs	17,665	18,002	18,346	18,697	19,056	19,422		21,372	3,707
Jobs to Housing Ratio	0.77	0.77	0.77	0.77	0.77	0.78		0.78	
Nonresidential Floor Area (square feet in thousands)									
Industrial KSF	2,078	2,092	2,106	2,120	2,134	2,148		2,220	142
Commercial KSF	2,807	2,868	2,931	2,995	3,061	3,128		3,486	680
Office & Institutional KSF	2,599	2,656	2,715	2,775	2,836	2,899		3,234	635
Total Floor Area	7,484	7,616	7,752	7,890	8,031	8,175		8,941	1,457
Avg Sq Ft Per Job	424	423	423	422	421	421		418	

DETAILED DEVELOPMENT PROJECTIONS

Figure A8 summarizes Hendersonville’s development projections, with cumulative projections at the top and annual increases shown at the bottom.

Figure A8: Development Projections Summary

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	10-Year Increase
	Base	1	2	3	4	5	6	7	8	9	10	
Resident Population	57,084	58,152	59,224	60,299	61,379	62,463	63,550	64,640	65,735	66,834	67,936	10,852
Housing Units												
Single Family	17,422	17,747	18,072	18,397	18,722	19,047	19,372	19,697	20,022	20,347	20,672	3,250
Multi-Family	5,469	5,573	5,679	5,787	5,898	6,011	6,126	6,243	6,362	6,484	6,608	1,139
Total Housing Units	22,891	23,320	23,751	24,184	24,620	25,058	25,498	25,940	26,384	26,831	27,280	4,389
Jobs												
Industrial	3,380	3,402	3,425	3,447	3,470	3,493	3,517	3,540	3,564	3,587	3,611	232
Commercial	6,574	6,718	6,865	7,016	7,170	7,327	7,487	7,651	7,819	7,990	8,166	1,592
Office & Institutional	7,711	7,882	8,056	8,234	8,416	8,602	8,792	8,986	9,185	9,388	9,595	1,884
Total Jobs	17,665	18,002	18,346	18,697	19,056	19,422	19,796	20,178	20,568	20,966	21,372	3,707
Nonresidential Floor Area (square feet in thousands)												
Industrial KSF	2,078	2,092	2,106	2,120	2,134	2,148	2,162	2,177	2,191	2,206	2,220	142
Commercial KSF	2,807	2,868	2,931	2,995	3,061	3,128	3,197	3,267	3,338	3,412	3,486	680
Office & Institutional KSF	2,599	2,656	2,715	2,775	2,836	2,899	2,963	3,029	3,095	3,164	3,234	635
Total Floor Area	7,484	7,616	7,752	7,890	8,031	8,175	8,322	8,472	8,625	8,781	8,941	1,457
Annual Increase												Avg Anl Increase
Resident Population		1,068	1,072	1,075	1,080	1,084	1,087	1,090	1,095	1,099	1,102	1,085
Housing Units		429	431	433	436	438	440	442	444	447	449	439
Jobs		337	344	351	359	366	374	382	390	398	406	371
Total Nonres KSF		390	135	138	141	144	147	150	153	156	159	171
Industrial KSF		41	14	14	14	14	14	14	14	15	15	17
Commercial KSF		181	63	64	66	67	69	70	72	73	75	80
Office & Institutional KSF		169	59	60	61	63	64	65	67	68	70	75

Summary of Growth Indicators

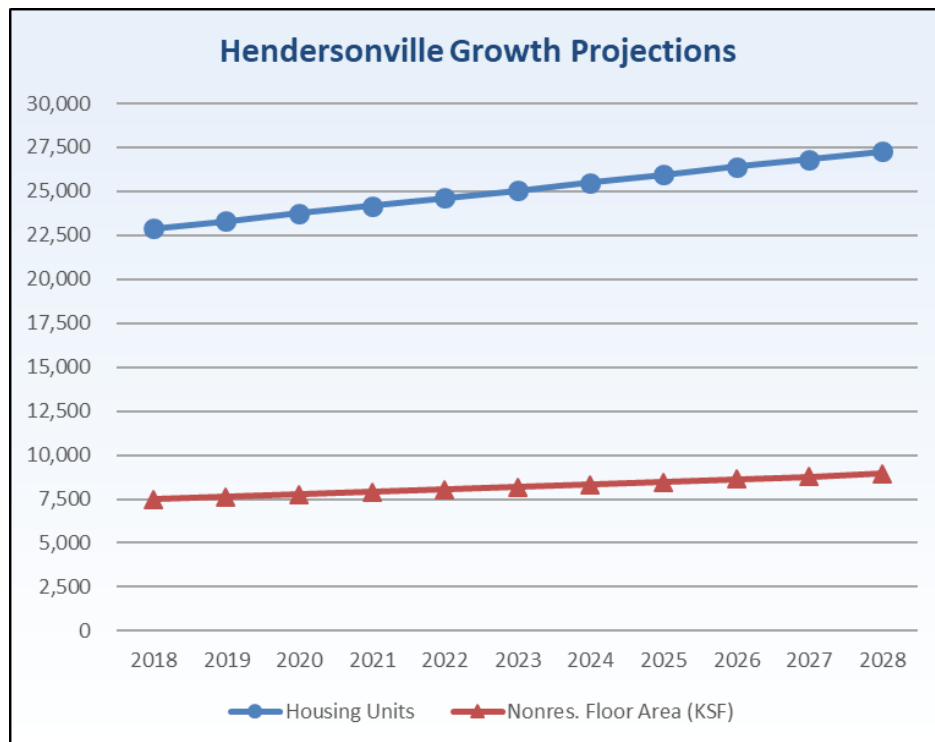
The housing unit projections from 2018 to 2028 were developed by TischlerBise using U.S. Census Bureau’s 2016 ACS 5-Year Estimates and the City of Hendersonville’s housing permit data from 2012 through 2017. Hendersonville is projected to add 4,389 housing units by 2028, an average of 439 housing units per year. Projected housing units were converted to population using a ratio of 2.74 persons per single family housing unit and 1.72 persons per multi-family housing unit, derived from the 2016 ACS 5-Year Estimates.

The job projections are based on 2015 estimates from the U.S. Census Bureau’s OnTheMap application, and the compound annual growth rates derived from the Nashville Area Metropolitan Planning Organization’s 2010 and 2040 job estimates for Sumner County. To derive job numbers for the years between 2015 and 2028, the compound annual growth rates for each sector were used. Hendersonville is projected to add 3,707 jobs by 2028, most of which (94%) will come from the Office & Institutional and Commercial sectors.

Nonresidential floor area was derived from the job projections using square-feet-per-employee multipliers obtained from the Institute of Transportation Engineers (ITE 2017). In the next ten years, Hendersonville is projected to add roughly 1,457 thousand square feet of nonresidential floor area, or an average of 146 thousand square feet per year.

Figure A9 below illustrates the growth in housing units and nonresidential floor area through 2028.

Figure A9: Housing Unit and Nonresidential Floor Area Projections



APPENDIX B: FEE STUDY COST ALLOCATION

Per the contract between the City of Hendersonville and TischlerBise, the cost to prepare this Capital Improvements Plan and Impact Fee Study is \$49,890, broken down amongst the four fee categories as shown in Figure B1. The costs of the study are included in the impact fees so that new development covers the cost. Costs for the Parks portion of the fee study are allocated based on population. The Fire and Police portions are allocated based on population for the residential fees, and vehicle trips for the nonresidential fees (the proportionate share percentages from Figures 10 and 18 are used to allocate between residential and nonresidential development). Road fees are allocated entirely by vehicle trips.

Hendersonville plans to update its fees every five years, so the costs for the fee study are allocated based on the projected five-year change in demand units (2018-2023) from the Land Use Assumptions in Appendix A. Multiplying each fee component's cost by the proportionate share and dividing by the projected change in demand units yields the cost per demand unit of the fee study, shown in Figure B1 below.

Figure B1: Fee Study Cost Allocation

Fee Component	Cost	Assessed Against	Proportionate Share	Demand Unit	2018	2023	Change	Cost per Demand Unit
Parks and Recreation	\$10,477	Residential	100%	Population	57,084	62,463	5,379	\$1.95
Fire	\$11,475	Residential	77%	Population	57,084	62,463	5,379	\$1.64
		Nonresidential	23%	Vehicle Trips	52,775	58,414	5,639	\$0.47
Police	\$6,985	Residential	77%	Population	57,084	62,463	5,379	\$1.00
		Nonresidential	23%	Vehicle Trips	52,775	58,414	5,639	\$0.28
Roads	\$20,953	All Development	100%	Vehicle Trips	182,183	200,040	17,857	\$1.17
TOTAL	\$49,890							