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Date: March 25, 2016

RE: **DRAFT #4** Land Use Assumptions for Impact Fee/Excise Tax Studies

Attached please find Draft Land Use Assumptions for the Impact Fee/Excise Tax Studies. This document will become an Appendix to the final report(s) developed for this assignment.

Please let us know if there are any comments or questions. Thank you.

Appendix A: Demographic Data

The population, housing unit, and job projections contained in this document provide the foundation for the Impact Fee/Excise Tax update for the City of Boulder. To evaluate the demand for growth-related infrastructure from various types of development, TischlerBise prepared documentation on population, housing units, jobs, nonresidential floor area, Average Weekday Vehicle Trip Ends (AWVTE), and demand indicators by type and size of dwelling. These metrics (explained further below) are the service units and demand indicators that will be used in the impact fee update.

Impact fees are based on the need for growth-related improvements and they must be proportionate by type of land use. Demographic data and development projections will be used to demonstrate proportionality and anticipate the need for future infrastructure. All land use assumptions and projected growth rates are consistent with socioeconomic data from the 2015 Boulder Valley Comprehensive Plan Trends Report. In contrast to the Comprehensive Plan, that has a long-range horizon, impact fees/excise taxes require a quantitative analysis with a shorter focus. Typically, impact fee studies look out five to ten years, with the expectation that fees will be periodically updated (e.g., every 5 years). Infrastructure standards are calibrated using Fiscal Year 2015 data, with FY16 being the first projection year. In the City of Boulder, the fiscal year begins on January 1st.

Impact Fee/Excise Tax Service Area

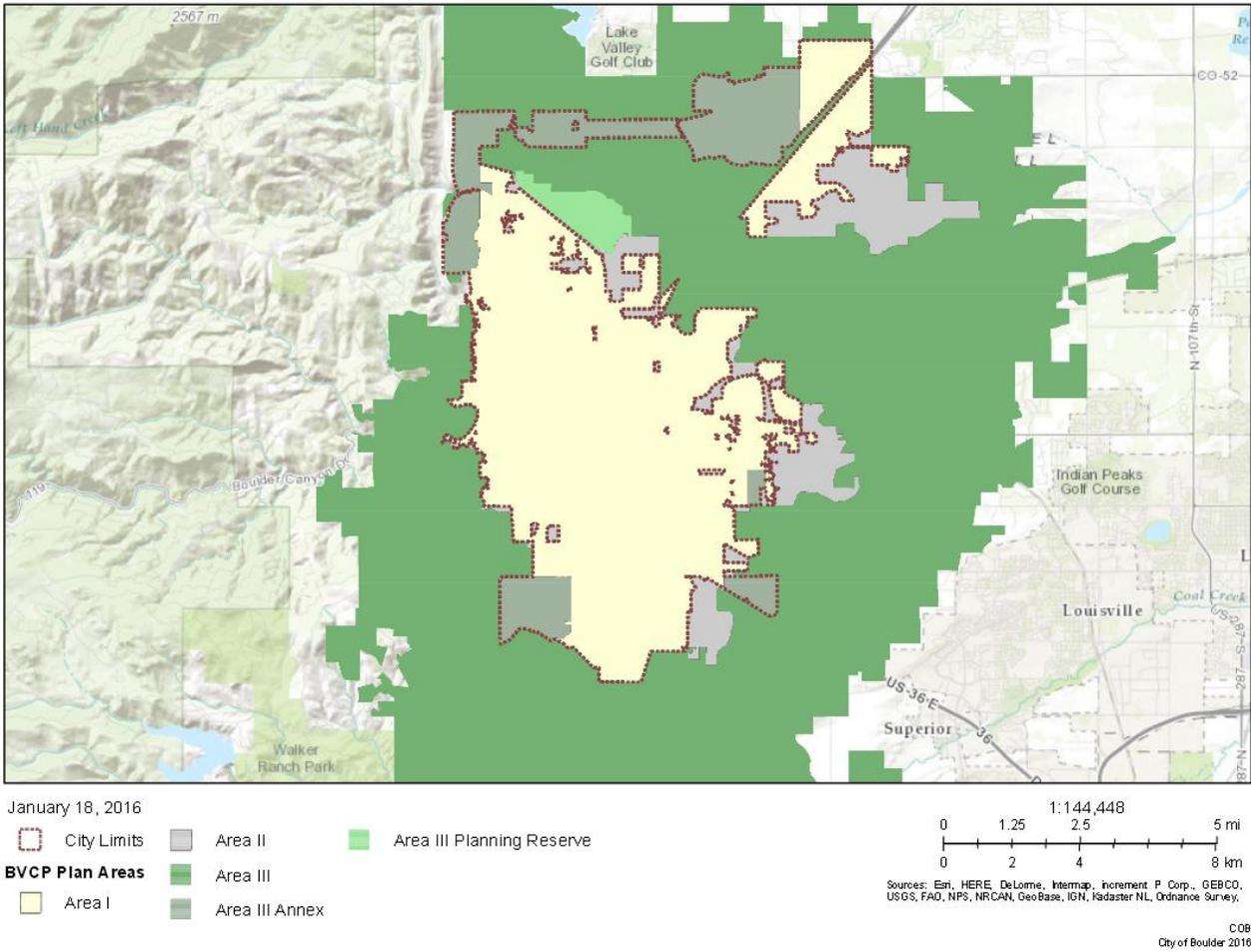
The City of Boulder is part of the Boulder Valley planning area, which is comprised of three areas:

- Area I is the urbanized area of the city.
- Area II is under county jurisdiction but where annexation to the city can be considered and where new urban development may occur coincident with adequate facilities and services.
- Area III is the remaining area in the Boulder Valley, generally under county jurisdiction and where the city and county intend to preserve existing rural land uses and character.¹

The service area for the Impact Fee/Excise Tax study is the city limits. City estimates for 2015 and projections for 2015 to 2040 from the *2015 Boulder Valley Comprehensive Plan (BVCP) Trends Report* are used in this analysis and reflect development within Boulder City limits as defined in the BVCP. **For growth projections, city limits includes future development in both Area I and annexed portions of Area III.**

¹ 2015 BVCP Trends Report.

Figure A1: City of Boulder Planning Areas



Summary of Growth Indicators

Key development projections for the City of Boulder Impact Fee/Excise Tax study are housing units and nonresidential floor area, as shown in Figure A2. These projections will be used to estimate impact fee/excise tax revenue and to indicate the anticipated need for growth-related infrastructure. The goal is to have reasonable projections without being overly concerned with precision. Because impact fee methods are designed to reduce sensitivity to development projections in the determination of the proportionate-share fee amounts, if actual development is slower than projected, fee revenue will decline, but so will the need for growth-related infrastructure. In contrast, if development is faster than anticipated, the City will receive an increase in fee revenue, but will also need to accelerate infrastructure improvements to keep pace with the actual rate of development.

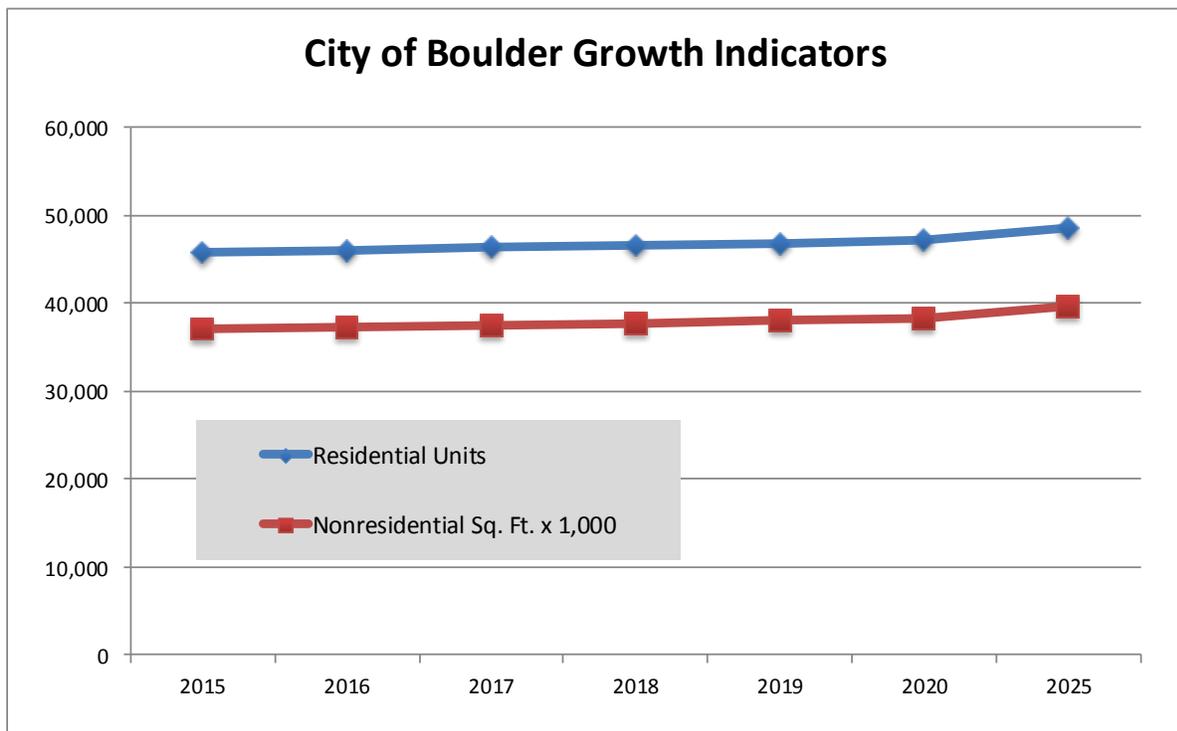
During the next five years, the 2015-2016 impact fee update expects an average increase of 282 housing units per year in the City. In comparison, 365 housing units on average were added per year from 2010 to 2014 and 387 units per year on average from 2004 to 2014.²

For nonresidential development, over the next five years, the City of Boulder expects an average increase of 264,000 square feet of nonresidential floor area per year. Current estimates of floor area by type of nonresidential development are discussed below (see Figure A11 and related text).

² Because approximately 80 percent of recent housing development in the City is multifamily units, development activity is relatively “lumpy,” with yearly increases and decreases reflecting completion of multifamily buildings with multiple buildings coming online as opposed to single units.

Figure A2: Summary of Development Projections and Growth Rates

City of Boulder	10-Year Projection Period								Increase	Compound Growth Rate	
	One-Year Intervals					5-Year Interval		2015 to 2025 Average Annual			
	2015	2016	2017	2018	2019	2020	2025				
Residential Units	45,740	46,012	46,288	46,566	46,846	47,127	48,557	282	0.62%		
Nonresidential Sq. Ft. x 1,000	36,991	37,245	37,503	37,762	38,023	38,286	39,627	264	0.71%		



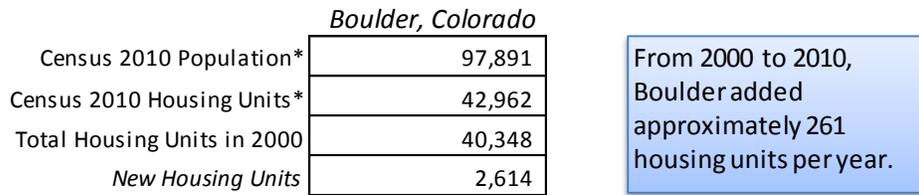
Sources: Figure A13: Population and Housing Unit Projections; Figure A14: Projected Jobs and Nonresidential Floor Area

Residential Construction

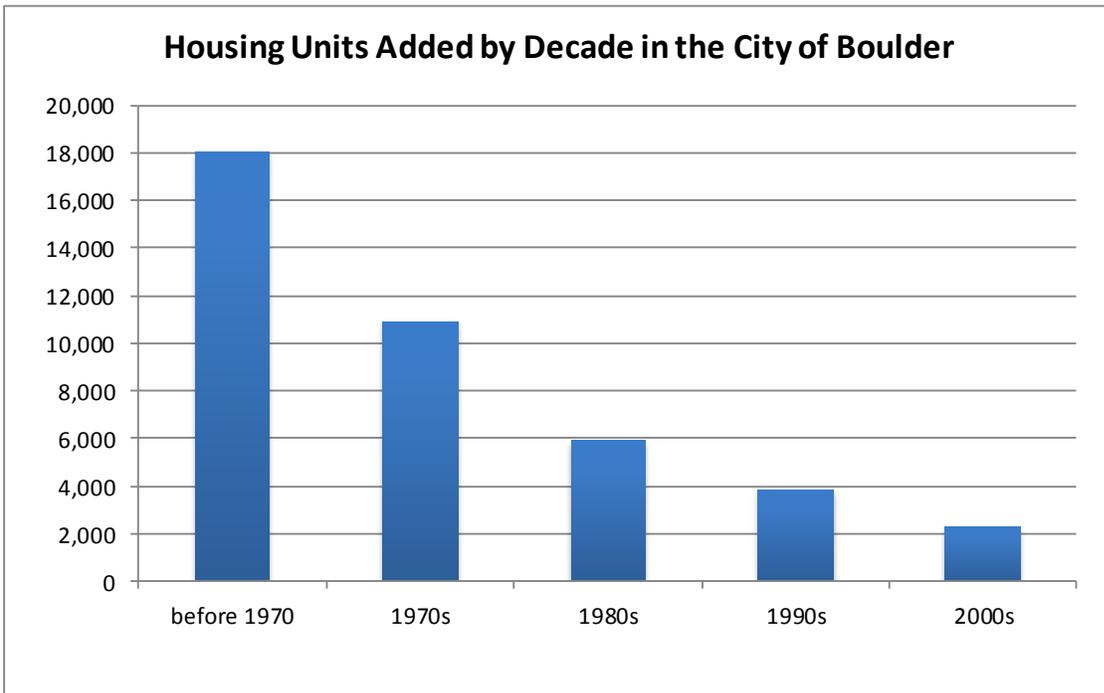
From 2000 to 2010, the City of Boulder increased by an average of 261 housing units per year. Figure A3 indicates citywide housing units added by decade in the city, according to data obtained from the U.S. Census Bureau and the 2015 BVCP Trends Report. Consistent with the nationwide decline in development activity during the Great Recession, residential construction slowed significantly from 2008 to 2010, thus decreasing the number of units added during the past decade. However, development

activity has increased in recent years, and the City of Boulder estimates that over the last five years (2010 through 2014), approximately 365 units have been built per year.

Figure A3: Housing Units by Decade



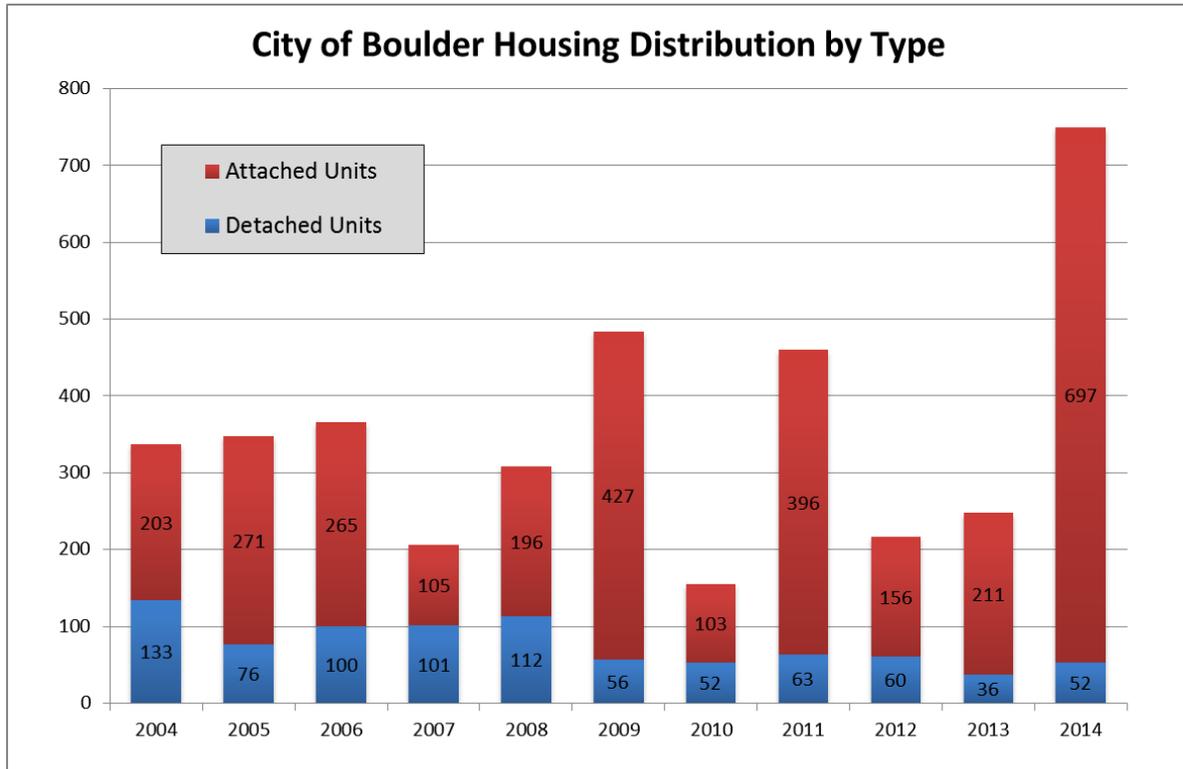
* From City of Boulder, 2015 BVCP Trends Report.



Sources: City of Boulder, 2015 BVCP Trends Report; US Census American Community Survey

Furthermore, recent residential development in the City has been in multifamily structures rather than detached, single family homes. Figure A4 provides detail on residential construction over the last ten years illustrating the recent demand and absorption of multifamily units at a recent trend of approximately 80 percent multifamily attached and 20 percent single family detached, which is consistent with the distribution assumed in the BVCP projections

Figure A4: City of Boulder Housing Unit Distribution Trends by Type



Source: 2015 BVCP Trends Report

Figure A5: City of Boulder Housing Unit 10-Year and 5-Year Trends by Type

	10-Yr Trend	5-Yr Trend
Detached Units	708	263
Attached Units	2,827	1,563
Total Net Increase	3,535	1,826
<i>Average Annual</i>	354	365
Detached %	20%	14%
Attached %	80%	86%

Source: 2015 BVCP Trends Report

Residential Demand Factors

The 2010 Census did not obtain detailed information using a “long-form” questionnaire. Instead, the U.S. Census Bureau has switched to a continuous monthly mailing of surveys, known as the American Community Survey (ACS), which is limited by sample-size constraints. For example, data on detached housing units are now combined with attached single units (commonly known as townhouses). Part of the rationale for deriving fees by bedroom range, as discussed further below, is to address this ACS data limitation. Because townhouses generally have fewer bedrooms and less living space than detached units, fees by house size ensure proportionality and facilitate construction of affordable units.

According to the U.S. 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. TischlerBise recommends that fees for residential development in Boulder be imposed according to the number of year-round residents per housing unit. Figure A6 indicates the average number of year-round residents per housing unit.

Figure A6: Year-Round Persons per Unit by Type of Housing

2013 Summary by Two House Types: City of Boulder

<i>Units in Structure</i>	<i>Persons</i>	<i>Households</i>	<i>Persons per Household</i>	<i>Housing Units</i>	<i>Persons per Housing Unit</i>	<i>Housing Mix</i>	<i>Vacancy Rate</i>
Single Unit*	57,742	22,479	2.57	23,284	2.48	52.9%	3%
All Other	36,747	19,828	1.85	20,767	1.77	47.1%	5%
Subtotal	94,489	42,307	2.23	44,051	2.14		4%
Group Quarters	<u>8,674</u>						
TOTAL	<u>103,163</u>						

* Single unit includes detached and attached (e.g. townhouse).

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

2013 American Community Survey 1-Year Estimates, U.S. Census Bureau.

Demand Indicators by Dwelling Size

Custom tabulations of demographic data by bedroom range can be created from individual survey responses provided by the U.S. Census Bureau, in files known as Public Use Micro-data Samples (PUMS). PUMS files are available for areas of roughly 100,000 persons, and the City of Boulder is wholly contained in Public Use Micro-data Areas (PUMA) 803. At the top of Figure A7, in the cells with yellow shading, are the survey results for the City of Boulder. Unadjusted persons per dwelling, derived from PUMS data, were adjusted upward to match the control totals for the City of Boulder, as documented above in Figure A6.

Figure A7: Average Number of Persons by Bedroom Range (All Housing Types)

City of Boulder 2013 Data

Bedroom Range	Persons (1)	Vehicles Available (1)	Housing Units (1)	Boulder Hsg Mix	Unadjusted Persons/HU	Adjusted Persons/HU (2)
0-1	114	89	89	19%	1.28	1.31
2	220	162	121	25%	1.82	1.86
3	296	236	134	28%	2.21	2.26
4+	372	300	135	28%	2.76	2.83
Total	1,002	787	479		2.09	2.14

(1) American Community Survey, Public Use Microdata Sample for CO PUMA 803 (2013 One-Year unweighted data).

(2) Adjusted multipliers are scaled to make the average PUMS values match control totals based on American Community Survey 2013 1-year data for the City of Boulder.

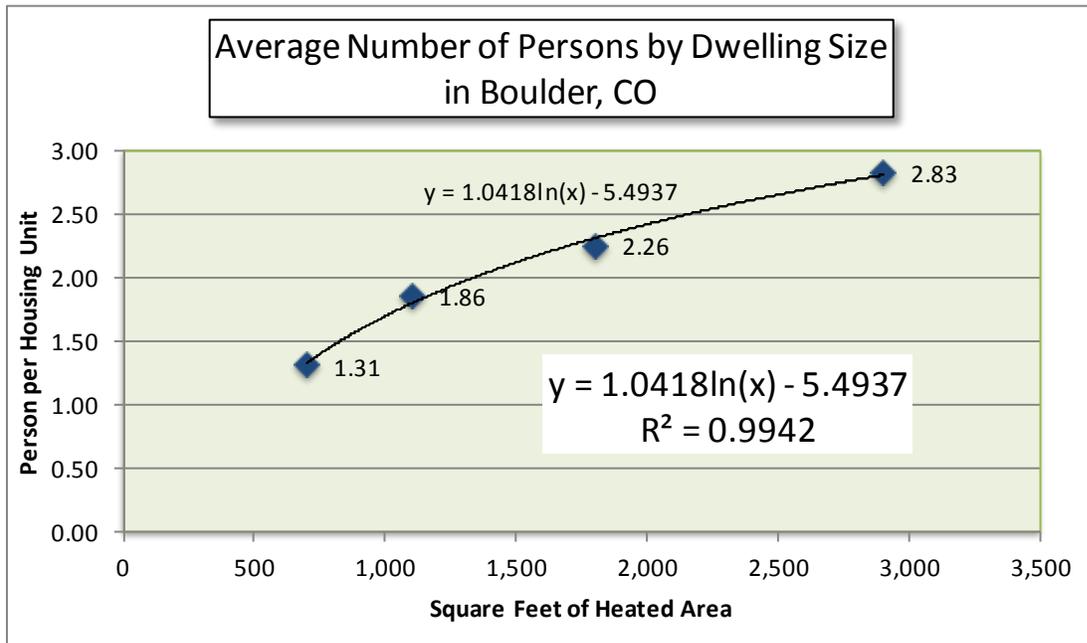
Average Number of Persons by Dwelling Size

Average floor area and number of persons by bedroom range are plotted in Figure A8, with a logarithmic trend line derived from four actual averages in the City. Using the trend line formula shown in the chart, TischlerBise derived the estimated average number of persons, by dwelling size, using five size thresholds. For the purpose of impact fees/excise taxes, TischlerBise recommends a minimum fee based on a unit size of 800 square feet and a maximum fee for units 2201 square feet or larger. Average dwelling sizes by bedroom range in the City was derived from the Property Assessor parcel database.

Figure A8: Persons by Square Feet of Living Space (All Housing Types)

Average dwelling size by bedroom range is from Property Assessor parcel database. Average persons per housing unit by bedroom range are derived from 2013 1-Year ACS PUMS data for CO PUMA 803 (City of Boulder).

Actual Averages per Hsg Unit			Fitted-Curve Values	
Bedrooms	Square Feet	Persons	Sq Ft Range	Persons
0-1	700	1.31	800 or less*	1.17
2	1,100	1.86	801 to 1200	1.80
3	1,800	2.26	1201 to 1600	2.19
4+	2,900	2.83	1601 to 2200	2.52
			2201 or more	2.83



* Assumed as 600 sq. ft.

The City of Boulder anticipates continuing to assess impact fees for the marginal increase in size of residential units. Toward that end, the following figure provides detail on household sizes for 200 square foot increments.

Figure A9: Persons by Square Feet of Living Space in 200 Square Foot Increments

Fitted-Curve Values*	
<i>Sq Ft Range (x)</i>	<i>Persons (y)</i>
600	1.17
800	1.47
1,000	1.70
1,200	1.89
1,400	2.05
1,600	2.19
1,800	2.32
2,000	2.42
2,200	2.52
2,400	2.61
2,600	2.70
2,800	2.78
3,000	2.85
3,200	2.91
3,400	2.98
3,600	3.04
3,800	3.09
4,000	3.15
4,200	3.20
4,400	3.25
4,600	3.29
4,800	3.34
5,000	3.38
5,200	3.42

* Formula: $y = 1.0418\ln(x) - 5.4937$

Nonresidential Development Demand Indicators

In addition to data on residential development, the calculation of impact fees requires data on nonresidential development. TischlerBise uses the term “jobs” to refer to employment by place of work.

Figure A10 indicates the key nonresidential development prototypes that will be used to derive average weekday vehicle trips and Vehicle Miles of Travel (VMT). Current floor area estimates for industrial, commercial, and office/other services, are documented in the next section.

The prototype for future commercial development (i.e., retail and eating/drinking places) is an average-size Shopping Center (ITE code 820). For office and other services, General Office (ITE 710) is the prototype for future development. For future industrial development, two prototypes are included to reflect differences between Light Industrial (ITE code 110) and Warehouse (ITE code 150). (Current industrial estimates and projections use local data.) The remaining nonresidential land use categories included below are anticipated to be included in the impact fee schedule. ITE data for nonresidential land uses are used to reflect the relative average demand on the system from different types of land uses to be used in limited parts of the Impact Fee/Excise Tax Study—Police Impact Fee update and the Multimodal Transportation Funding Study. Further adjustments are anticipated to be made regarding these assumptions particularly for the Multimodal Transportation components of the Study as it progresses.

Figure A10: Nonresidential Service Units per Development Unit

<i>Nonres. Category#</i>	<i>ITE Code</i>	<i>Nonresidential Land Use</i>	<i>Development Unit</i>	<i>ITE Trip Rate per Development Unit</i>	<i>Employees per Development Unit*</i>	<i>Sq. Ft. per Employee*</i>
1	820	Retail / Restaurant / Service	1,000 Sq Ft	42.7	2.51	399
2	710	Office	1,000 Sq Ft	11.03	3.59	279
3	110	Light Industrial [^]	1,000 Sq Ft	6.97	2.31	433
4	150	Warehousing [^]	1,000 Sq Ft	3.56	0.92	1,087
5	520	Institutional ^{**}	1,000 Sq Ft	14.03	0.81	1,235
6	610	Hospital	1,000 Sq Ft	13.22	2.94	340
7	620	Nursing Home/Assisted Living	Bed	2.74	0.84	na
8	310	Lodging	Room	8.17	0.57	na

* Factors derived from ITE trip data except Retail and Office, which is derived from local data (parcel database and current jobs)

[^] Two industrial categories are included here for use in the Impact Fee schedule due to different demand indicators between industrial subcategories.

** Institutional = E.g., schools, churches

Sources: Trip Generation, Institute of Transportation Engineers (ITE), 9th Edition (2012);

Boulder County parcel database for City of Boulder (TischlerBise analysis); QCEW 2014 (CO Dept. of Labor and Employment)

Figure A11 provides the estimate of number and type of jobs located in the City of Boulder in 2015. The 2015 total job estimate of 98,510 is from the City of Boulder 2015 BVCP Trends Report and reflects total of jobs of any type and any location including self-employment. To determine the estimate of jobs at nonresidential locations, TischlerBise used average annual 2014 Quarterly Census of Employment and Wages (QCEW) data for the City of Boulder and applied that distribution to the 2015 at-place estimate of 89,202.

Figure A11: Jobs Estimate by Type

	<i>Jobs 2014*</i>	<i>% of At-Place</i>	<i>Jobs 2015^</i>	<i>% of Total Jobs</i>
Retail / Restaurant / Services	21,232	24%	21,482	22%
Office / Institutional	52,647	60%	53,268	54%
Industrial	14,283	16%	14,451	15%
Total (At Place Jobs)	88,162	100%	89,202	91%
Self-Employed Estimate**			9,308	9%
Total Jobs			98,510	100%

* Colorado Dept. of Labor and Employment, Quarterly Census of Employment and Wages (QCEW) 2014 average annual.

^ City of Boulder 2015 for estimate of at-place jobs and self-employed; distributed based on QCEW 2014 data.

** City of Boulder 2015 estimate.

Using the above data and nonresidential floor area from the City’s parcel database, average square feet per job (and jobs per 1,000 square feet) can be derived. The City currently has approximately 37 million square feet of nonresidential building space in 2015. Dividing floor area by jobs indicates current averages by type of development as shown in Figure A12.

Figure A12: Nonresidential Floor Area Estimates and Demand Factors

	<i>Sq. Ft. *</i>	<i>Jobs 2015^</i>	<i>% Jobs Distribution</i>	<i>Sq. Ft. per Job</i>	<i>Jobs per 1,000 Sq. Ft.</i>
Retail / Restaurant / Services	8,565,611	21,482	24%	399	2.51
Office / Institutional	14,848,416	53,268	60%	279	3.59
Industrial**	13,576,996	14,451	16%	940	1.06
Total Nonresidential	36,991,023	89,202	100%		

* County parcel database for City of Boulder; TischlerBise analysis

^ City of Boulder 2015 for estimate of at-place jobs and self-employed; distributed based on QCEW 2014 data.

** Industrial jobs and square footage reflects the estimated aggregated industrial development of all subcategories in the City of Boulder; therefore the blended average jobs per 1,000 sq. ft. differs from Figure A10.

Detailed Land Use Assumptions

Demographic data shown in Figure A13 will be key inputs for the City of Boulder’s impact fee/excise tax update. Cells with gray shading are from the *2015 BVCP Trends Report*. Per the City projections, it is anticipated that the City will reach residential buildout at 52,000 housing units and 123,000 residents, which occurs prior to 2040.

New housing development is assumed to be predominantly multifamily development. Using recent trends, as shown above in Figure A4 from the *2015 BVCP Trends Report*, new housing units are assumed to be 20 percent single family and 80 percent multifamily.

Figure A13: Population and Housing Unit Projections

	2015	Projections ==>									25-Year Net Increase
		2016	2017	2018	2019	2020	2025	2030	2035	2040	
	Base Yr	1	2	3	4	5	10	15	20	25	
Cumulative Population											
Population [^]	104,808	105,566	106,324	107,082	107,840	108,598	112,388	116,178	119,968	123,000	18,192
Annual Net Increase in Population		758	758	758	758	758	758	758	758	0	
Cumulative Housing Units											
	New %										
Housing Units [^]	45,740	46,012	46,288	46,566	46,846	47,127	48,557	50,032	51,551	52,010	6,270
Single Family Hsg Units	20%	24,242	24,297	24,352	24,407	24,463	24,520	24,806	25,101	25,404	1,254
All Other Hsg Units	80%	21,498	21,716	21,937	22,159	22,382	23,752	24,931	26,146	26,514	5,016
Annual Net Increase in Housing Units		272	276	278	279	281	290	298	307	0	6,270

[^] Includes Colorado University group quarters population (in dormitories) and residential units (apartments)

Source: 2015 BVCP Trends Report; TischlerBise analysis

Figure A14 provides projected jobs, by type of nonresidential floor area. Cells with gray shading are from the *2015 BVCP Trends Report*.

Projected jobs (shown at top of the figure) were converted to projections of nonresidential floor area (at the bottom of the figure) using the current multipliers listed above in Figure A10. The projected “jobs to population” ratio is shown at the bottom of the figure for informational purposes.

Figure A14: Projected Jobs and Nonresidential Floor Area

		Projections ==>										25-Year Net Increase
		5-Year Intervals										
		2015	2016	2017	2018	2019	2020	2025	2030	2035	2040	
		Base Yr	1	2	3	4	5	10	15	20	25	
Cumulative Jobs												
Total Employment		98,510	99,187	99,871	100,561	101,255	101,954	105,523	109,219	113,047	117,010	18,500
Annual Net Increase in Jobs			677	685	689	694	699	724	750	776	804	
	% of Total											
Retail / Restaurant / Services	22%	21,482	21,630	21,779	21,930	22,081	22,233	23,012	23,818	24,652	25,517	4,034
Office / Institutional	54%	53,268	53,634	54,004	54,377	54,753	55,131	57,061	59,059	61,129	63,272	10,003
Industrial	15%	14,451	14,551	14,651	14,752	14,854	14,957	15,480	16,022	16,584	17,165	2,714
Total (At Place Jobs)		89,202	89,815	90,435	91,059	91,688	92,321	95,553	98,899	102,365	105,954	16,752
Self-Employed Estimate	9%	9,308	9,372	9,437	9,502	9,567	9,633	9,971	10,320	10,682	11,056	1,748
Total Jobs		98,510	99,187	99,871	100,561	101,255	101,954	105,523	109,219	113,047	117,010	18,500
Annual Net Increase in Jobs^A												
Retail / Restaurant / Services			148	149	150	151	152	158	163	169	175	4,034
Office / Institutional			366	370	373	375	378	391	405	420	435	10,003
Industrial			99	100	101	102	103	106	110	114	118	2,714
Total (At Place Jobs)			613	620	624	629	633	655	679	703	728	16,752
Self-Employed Estimate			64	65	65	66	66	68	71	73	76	1,748
Total Jobs			677	685	689	694	699	724	750	776	804	18,500
Nonresidential Square Footage												
	Jobs/1000sf											
Retail / Restaurant / Services	2.51	8,565,611	8,624,414	8,683,890	8,743,783	8,804,095	8,864,830	9,174,939	9,496,055	9,828,568	10,172,884	1,607,273
Office / Institutional	3.59	14,848,416	14,950,360	15,053,473	15,157,308	15,261,869	15,367,162	15,904,789	16,461,497	17,037,966	17,634,895	2,786,479
Industrial	1.06	13,576,996	13,670,663	13,765,405	13,860,809	13,956,881	14,053,626	14,547,603	15,059,113	15,588,778	16,137,243	2,560,247
Total Nonresidential Square Footage		36,991,023	37,245,437	37,502,768	37,761,900	38,022,846	38,285,618	39,627,331	41,016,665	42,455,312	43,945,021	6,953,998
Annual Net Increase in Nonres Sq. Ft.			254,414	257,331	259,132	260,946	262,773	272,099	281,757	291,757	302,113	
Population		104,808	105,566	106,324	107,082	107,840	108,598	112,388	116,178	119,968	123,000	18,192
Jobs to Population Ratio		0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.95	1.02

Source: 2015 BVCP Trends Report; TischlerBise analysis