

MEMORANDUM

DATE: August 4, 2020
TO: Rafael Martinez, Director of Transportation
FROM: John P. Long, P.E
SUBJECT: TIM Fee Major Update
Technical Memorandum - Fee Rates by Size of Single-Family Unit

Executive Summary

The County’s Traffic Impact Mitigation (TIM) Fee Program currently has one fee rate for new “non-age restricted” single-family dwelling units, regardless of their size. For several other local jurisdictions, DKS Associates (DKS) has established a nexus to justify fee rates that differ by the size of housing units. On October 8, 2019, DKS made a presentation to the Board of Supervisors on how this type of nexus can be established and on the difference in fee rates by housing size that resulted from an analysis conducted for Sacramento County.

At that meeting, the County staff requested direction on whether varying fee rates by the size of a single-family unit should be incorporated into the TIM Fee Program Major Update and the Board directed staff to do so.

The analysis conducted by DKS for Sacramento County cannot be directly used to establish fee rates by housing size for El Dorado County since the average size of single-family units in El Dorado County is significantly higher than Sacramento County. A new analysis based on data from El Dorado County was conducted. The analysis documented in this technical memo provides a nexus for establishing separate fee rates for six square footage categories of single-family housing units. An analysis of several optional category groupings is also provided if the County wants to consider fewer than six square footage categories.

Background

The County’s Traffic Impact Mitigation (TIM) Fee Program focuses on impacts of new development. Like most fee programs, the current TIM Fee Program has one fee rate for new “non-age restricted” single-family dwelling units, regardless of their size. For example, a new 1,500 square foot residential unit is charged the same fee rate as a 3,200 square foot unit.

DKS has established a nexus to justify fee rates that differ by the size of housing units in the following local jurisdictions using data from the U.S. Census and household travel surveys for the Sacramento region:

<u>Jurisdiction</u>	<u>Year Fee Rates by Unit Size Implemented</u>
City of West Sacramento	2004
Sacramento County	2008
City of Rancho Cordova	2013

The analysis conducted by DKS for these jurisdictions could not be directly used to establish fee rates by housing size for El Dorado County due to the differences in the average size of single-family units. The following sections describe the new analysis used to establish the nexus between traffic impacts and unit size for El Dorado County.

Analysis Methodology

“Impact Fees & Housing Affordability – A Guidebook for Practitioners” prepared for the US Department of Housing and Urban Development (HUD) in 2007, looks at the relationship between various characteristics of a dwelling unit (e.g. square footage, bedrooms, etc.) and its impact on public facilities, including roadways. This research suggests that trip generation can be estimated by categories of the dwelling unit size (i.e. ranges of square footage) using the following relationships:

- The average vehicle trips by household size categories (i.e. persons in the household) from national or regional household travel surveys
- The number of single-family housing units in categories of persons per household and square footage of units that were estimated from the American Housing Survey (AHS)

The analysis for El Dorado County involved combining trip generation information from a new household survey conducted by SACOG in 2018 with number of single-family detached units in cross-tabulated categories of persons per household and square footage of household from the 2017 AHS. This resulted in estimates of vehicle trip rates and “equivalent dwelling units” (EDUs) for each square footage category. Then data on the square footage of housing units built in El Dorado County in 2018 and 2019 was used to ensure that using the estimated EDUs by square footage categories would not impact the overall amount of fees collected from single-family residential units.

SACOG Household Travel Survey

SACOG has periodically conducted household travel surveys in its six-county region to collect detailed data on household characteristics and travel behavior. Data from SACOG’s 2018 Household Travel Survey (HTS) was used to estimate the number of vehicle trips by categories of persons in the household.

Region-wide about 4,000 households were surveyed. Ideally, trip generation rates would be estimated from the subset of households surveyed in Eldorado County. However, only 179 of those households were in El Dorado County. To achieve an adequate sample for estimating trip generation rates, surveys from other areas were needed. It was decided to include all sampled households from Placer County since its mix of urban and rural households and average demographics are similar to El Dorado County, as demonstrated in **Table 1**.

Characteristics	El Dorado Co	Placer Co
Population (2019)	192,843	398,329
Average Persons per household	2.67	2.67
Median household income (\$2018) 2014-2018	\$80,582	\$84,357
Median value of owner-occupied units	\$437,200	\$443,700
Owner occupied rate	76.6%	71.6%
Source: US Census Quick Facts		

Combining the data from the two counties results in 636 households that were surveyed, which provides an adequate “raw” sample for estimating trip generation rates by number of people in the household. Since some types of households were sampled at different rates, SACOG weights its sample to reflect the overall mix of households. **Table 2** shows the samples and trip

generation rates for their raw and weighted samples. SACOG recommended that the trip rates from the weighted sample be used for the analysis in El Dorado County.

Table 2 Trip Generation Data SACOG Household Travel Survey for El Dorado and Placer Counties								
Persons in Household	Households				PM Peak Period Home-Based Vehicle Trips			
	Raw Sample		Weighted Sample		Raw Sample		Weighted Sample	
	Households	Percent	Households	Percent	Trips	Trips per Household	Trips	Trips per Household
1	181	28.5%	49,788	25.7%	83	0.46	21,415	0.43
2	289	45.4%	68,942	35.6%	222	0.77	52,765	0.77
3	67	10.5%	30,367	15.7%	74	1.10	36,002	1.19
4	62	9.7%	27,833	14.4%	100	1.61	39,646	1.42
5	28	4.4%	12,439	6.4%	50	1.79	23,049	1.85
6	4	0.6%	2,165	1.1%	5	1.25	2,285	1.06
7+	5	0.8%	1,999	1.0%	8	1.60	4,636	2.32
Total	636	100.0%	193,533	100.0%	551		179,807	
	Average					0.87		0.93
Source: SACOG 2018 Household Travel Survey								

American Housing Survey

The American Housing Survey (AHS), which is conducted by the Bureau of the Census for HUD, collects data on the nation's housing, including data on household characteristics and demographics. The AHS data is collected in odd numbered years. The 2019 AHS enumeration period ended in November 2019 and the Census Bureau is still processing that data. The most recent available survey data is from 2017.

The AHS was designed to include two samples, the National sample and the independent Metropolitan sample. Since 2007 the National and Metropolitan surveys have been conducted together with selected metropolitan areas being "oversampled". The metropolitan areas that are surveyed and the size of the surveys have changed over recent years. These measures have saved costs but they limit localized data,

The analysis required to define trip generation by square footage categories involves cross-tabulating housing units by three variables: the structure type, square footage and persons in the household. This cross-tabulation requires an adequate sample size for each category. Ideally, adequate data would be available from a survey of the Sacramento metropolitan area. However, the Sacramento metropolitan area has not been surveyed since 2004 and that sample size limits its ability to provide information for all square-footage categories. Tools available from the Census Bureau to create cross-tabulations from the AHS indicate that the only sample adequate enough to provide a statistically relevant sample for the three required variables is the full national sample. Thus it was decided that the national sample from the 2017 AHS should be used to define the number of single-family housing units in cross-tabulation categories of persons in the household and the square footage of the housing unit. This data is summarized in **Table 3**.

Trip Generation by Categories of Square Footage

The estimation of the average trip generation rate for each of the AHS square footage categories are shown in **Table 4** and are estimated from the following steps:

- Multiply the trip generation rate for a category of “persons per household” estimated from SACOG’s Household Travel Survey (see Table 2) by the number in single-family units in each AHS square footage category for that same number of persons per household
- Sum the number of trips generated by all households in an AHS square footage category and divide by the total number of households in that square footage category.

The results of these calculations (see bottom row of **Table 4**) show that peak period vehicle trip rates increase from an average of 0.556 for single-family housing units with less than 500 square feet to 1.129 for units with 4,000 square feet or more. These differences in trip rates will be used to establish “equivalent dwelling units” for square footage categories.

Impact of Multiple Single-Family EDU Rates on Fees Collected

The County’s TIM Fee Program allocates the cost of roadway improvements by land use type based on the concept of “equivalent dwelling units” (EDU). An EDU equals the demand placed on the transportation network relative to one single-family dwelling unit which is assigned an EDU of 1. Land uses which have greater overall traffic impacts than a typical single-family residential unit are assigned values greater than 1, while land uses with lower overall traffic impacts are assigned values less than 1.

Like many development fee programs, the County’s TIM Fee Program bases its EDUs on the number of new vehicle trips generated by each land use type. Vehicle trips are derived from studies compiled and vetted by the Institute of Transportation Engineers, which measure the vehicle trips entering and leaving a specific development. Since roadway needs are primarily based on traffic flows and conditions during the PM peak hour on an average weekday, the EDUs reflect the relative trip generation for the evening peak hour.

The average cost per EDU is based on the estimated total growth in EDUs from the projected growth in development through 2040. The growth in single-family units by areas in the County will be estimated for two categories: “age restricted” and “non-age restricted” single-family units. Estimates will not be made for each square footage category of single-family units. However, when a developer gets a building permit and pays fees, a specific land use is known, such as the square footage of each single-family unit. Thus the number of EDUs for that specific land use will be based on specific EDU rates for that category.

If the County has different EDU rates for square footage categories, it is important to show that their use would not significantly change the estimate of total EDUs for the projected growth in total single-family units in the County. As described below, an analysis of recent housing built in the County was conducted to show how EDUs by housing size categories would impact the total fees collected from future growth in single-family units.

Recent Housing Built in El Dorado County

Table 5 and **Figure 1** show the 508 “non-age-restricted” single-family dwelling units built in El Dorado County in 2018 and 2019 by their square footage. The data indicates the following:

- The average size of the single-family dwelling units built in that two year period was 2,520 square feet.
- There were no single-family units less than 800 square feet built in that two-year period

Persons per Household	Total	Less than 500	500 to 749	750 to 999	1,000 to 1,499	1,500 to 1,999	2,000 to 2,499	2,500 to 2,999	3,000 to 3,999	4,000 or more	Not Reported
1	15,277	129	420	1,310	4,276	3,458	2,012	857	652	238	1,925
2	28,059	96	244	1,226	5,761	7,069	4,947	2,813	2,610	1,205	2,086
3	12,771	47	83	556	2,641	3,046	2,403	1,307	1,107	528	1,053
4	12,151	0	99	346	2,106	2,737	2,303	1,430	1,512	727	866
5	5,404	0	21	155	913	1,155	965	565	708	372	530
6	2,049	0	0	50	389	427	307	238	280	146	195
7+	1,122	0	0	36	195	257	153	128	108	88	153
Total	76,833	332	872	3,680	16,281	18,149	13,089	7,339	6,977	3,306	6,808
Average Persons per Household	2.68	1.39	1.90	2.22	2.49	2.64	2.76	2.91	3.05	3.19	2.60

Source: 2017 American Housing Survey

Persons per Household	PM Peak Period Vehicle Trips per Household ¹	Total	Less than 500	500 to 749	750 to 999	1,000 to 1,499	1,500 to 1,999	2,000 to 2,499	2,500 to 2,999	3,000 to 3,999	4,000 or more	Not Reported
1	0.43	6,571	55	181	563	1,839	1,487	865	369	280	102	828
2	0.77	21,475	73	187	938	4,409	5,410	3,786	2,153	1,998	922	1,597
3	1.19	15,141	56	98	659	3,131	3,611	2,849	1,550	1,312	626	1,248
4	1.42	17,308	0	141	493	3,000	3,899	3,280	2,037	2,154	1,036	1,234
5	1.85	10,013	0	39	287	1,692	2,140	1,788	1,047	1,312	689	982
6	1.06	2,163	0	0	53	411	451	324	251	296	154	206
7+	2.32	2,602	0	0	83	452	596	355	297	250	204	355
Average Trips per Household ²		0.980	0.556	0.741	0.836	0.917	0.969	1.012	1.050	1.090	1.129	0.947

¹ Equals "PM Peak Period Vehicle Trips per Household" rate times the number of households in representative cell in Table 3
² Equals sum of total peak period vehicle trips in each AHS square footage category divided by the total number of households in that category

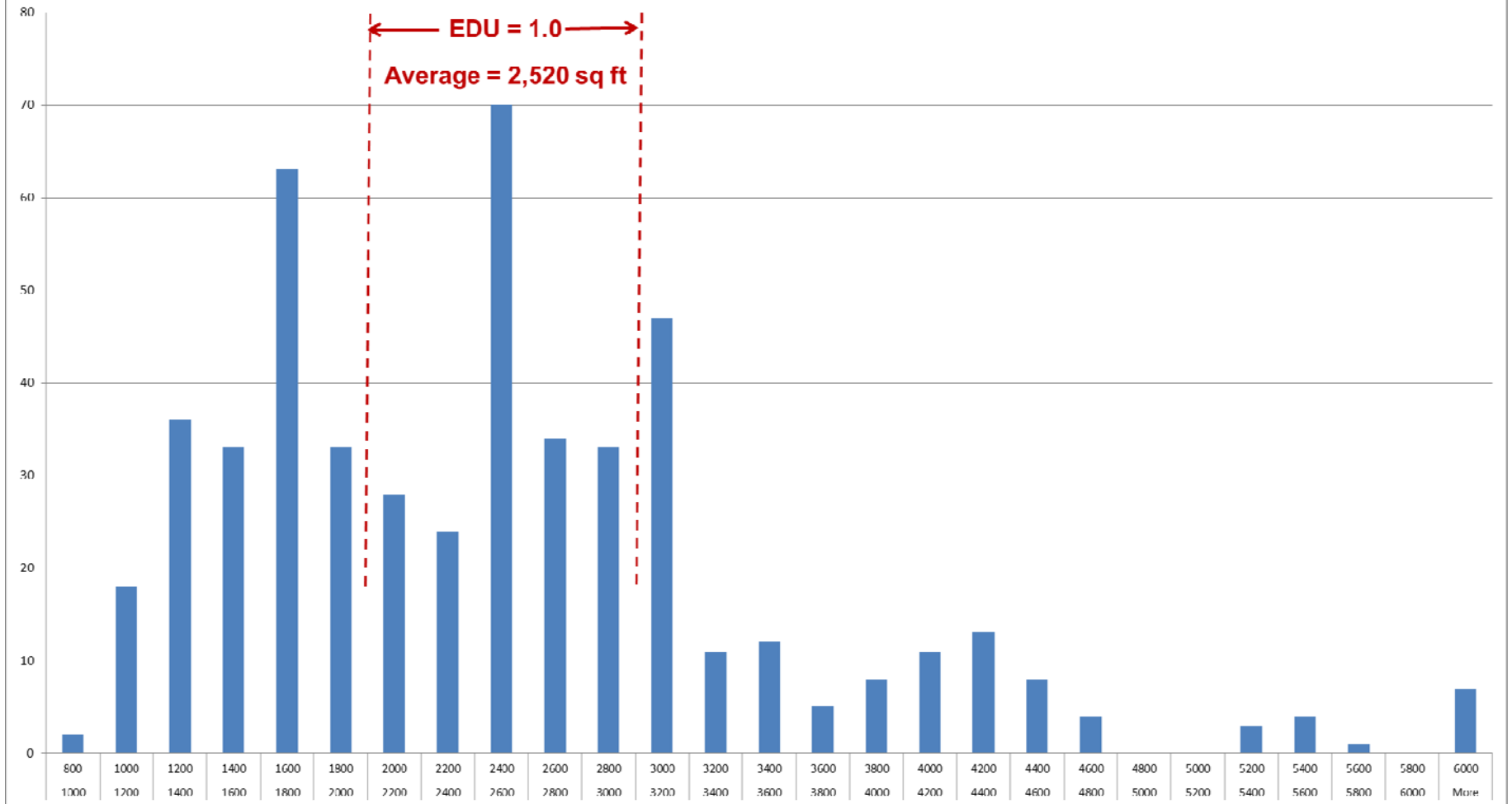
Based on an analysis of this recent local housing data, the following is recommended:

- An EDU of 1.0 should be used for a “middle grouping” of single-family units between 2,000 and 2,999 square feet in size. Single-family units with less than 2,000 square feet will have an EDU of less than 1.0. Units with 3,000 square feet or more will have an EDU of more than 1.0.
- The AHS square footage categories (see Table 3) will be used for units outside the middle grouping, except that there will only be one group for units less than 1,000 square feet and its trip generation rate will be based on the AHS 750 to 999 square foot category.

**Table 5
Number of Single-Family Housing Units Built in El Dorado County by Square Footage During 2018 and 2019 (Not including age-restricted units)**

Square Feet		Single-family Units		Square Feet		Single-family Units	
From	To	Units	Percent	From	To	Units	Percent
800	900	2	0.39%	3,500	3,600	3	0.59%
900	1,000	0	0.00%	3,600	3,700	1	0.20%
1,000	1,100	1	0.20%	3,700	3,800	4	0.79%
1,100	1,200	17	3.35%	3,800	3,900	7	1.38%
1,200	1,300	26	5.12%	3,900	4,000	1	0.20%
1,300	1,400	10	1.97%	4,000	4,100	9	1.77%
1,400	1,500	28	5.51%	4,100	4,200	2	0.39%
1,500	1,600	5	0.98%	4,200	4,300	8	1.57%
1,600	1,700	22	4.33%	4,300	4,400	5	0.98%
1,700	1,800	41	8.07%	4,400	4,500	3	0.59%
1,800	1,900	24	4.72%	4,500	4,600	5	0.98%
1,900	2,000	9	1.77%	4,600	4,700	0	0.00%
2,000	2,100	21	4.13%	4,700	4,800	4	0.79%
2,100	2,200	7	1.38%	4,800	4,900	0	0.00%
2,200	2,300	17	3.35%	4,900	5,000	0	0.00%
2,300	2,400	7	1.38%	5,000	5,100	0	0.00%
2,400	2,500	27	5.31%	5,100	5,200	0	0.00%
2,500	2,600	43	8.46%	5,200	5,300	0	0.00%
2,600	2,700	8	1.57%	5,300	5,400	3	0.59%
2,700	2,800	26	5.12%	5,400	5,500	1	0.20%
2,800	2,900	20	3.94%	5,500	5,600	3	0.59%
2,900	3,000	13	2.56%	5,600	5,700	0	0.00%
3,000	3,100	36	7.09%	5,700	5,800	1	0.20%
3,100	3,200	11	2.17%	5,800	5,900	0	0.00%
3,200	3,300	5	0.98%	5,900	6,000	0	0.00%
3,300	3,400	6	1.18%	6,000	More	7	1.38%
3,400	3,500	9	1.77%	Total		508	100.0%
Average Square Footage of Single-Family Units						2,520 sf.	
Source: El Dorado County							

Figure 1
Number of New Housing Units Built In El Dorado County during 2018 and 2019



Analysis Results

Table 6 shows the estimated EDUs for six recommended square foot groupings. These EDUs are calculated by dividing the average trips per household for each grouping by the average trips per household for the middle (2,000 to 2,999 square feet) group.

Table 7 shows the calculation of the weighted average EDU for all six groupings, which is estimated by multiplying the EDU for each group by the percentage of households in that group (from the 2018 – 2019 County housing data) and summing those values. This calculation shows that the weighted average EDU for “non-age restricted” single-family dwelling units is 0.9915, which is very close to the EDU of 1.0 that is used in estimating the average cost of an EDU.

In other words, if the mix of new single-family housing units by size that are built over the next 20 years is same as the mix of units built in 2018 and 2019, then the use of separate EDU rates by the recommended six square footage groupings will not impact the average cost per EDU and estimated total amount of fees collected.

AHS Square Footage Categories	Average Trips per Household	Recommended Square Footage Groupings	Average Trips per Household	EDU ¹
750 to 999	0.836	Less than 1,000	0.836	0.815
1,000 to 1,499	0.917	1,000 to 1,499	0.917	0.894
1,500 to 1,999	0.969	1,500 to 1,999	0.969	0.945
2,000 to 2,499	1.012	2,000 to 2,999	1.026	1.000
2,500 to 2,999	1.050			
3,000 to 3,999	1.090	3,000 to 3,999	1.090	1.062
4,000 or More	1.129	4,000 or More	1.129	1.101

¹ Equals average trips per household for each grouping divided by the average trips per household for the middle group (1.026)

Recommended Groupings	SF Units Built 2018-2019		EDU	Weighted Average EDU
	Units	Percent		
Less than 1,000	2	0.4%	0.815	0.0032
1,000 to 1,499	82	16.1%	0.894	0.1442
1,500 to 1,999	101	19.9%	0.945	0.1877
2,000 to 2,999	189	37.3%	1.000	0.3725
3,000 to 3,999	83	16.3%	1.062	0.1734
4,000 or More	51	10.0%	1.101	0.1105
Total	508	100.0%		
Weighted Average of All Groups				0.9915

The analysis indicates that the new TIM fee rate for “small” single-family units (those less than 1,000 square feet) would be 81.5% of the fee rate for an “average” single-family unit (2,000 to 2,900 square feet). The largest single-family units (those 4,000 square feet or more) would have a TIM fee rate that is 110.5 % of the “average” single-family unit.

Optional Groupings

The recommendation above includes six square foot groupings. The County may want to consider options that have fewer groupings. **Table 8** shows some optional groupings.

Option A is the recommended six category option described above. The other options have three or four square foot categories. All of the options except Option B are aggregations of the Census Bureau (AHS) size categories. Option B requires a judgment to split the AHS category at 3,500 square feet. Option C has a larger middle category, where the EDU equals 1.0.

Both Options A and C have a "less than 1,000 square foot" category. Based on recent building data, this category will likely have a minimal number of units and thus could be eliminated.

Option A was recommended since it minimizes the change in rates between categories and it does not split an AHS category.

Recommended Action: The Consultants and County staff recommend that the Board consider varying fee rates by the size of a single-family unit, using the recommended square footage grouping, or one of the optional groupings, along with their estimated EDU rates from the nexus analysis.

Table 8
Potential Options for Housing Size Categories
TIM Fee Update

Option A (6 sq ft categories)	SF Units Built 2018-2019		EDU	Average EDU
	Units	Percent		
Less than 1,000	2	0.4%	0.815	0.0032
1,000 to 1,499	82	16.1%	0.894	0.1442
1,500 to 1,999	101	19.9%	0.945	0.1877
2,000 to 2,999	189	37.3%	1.000	0.3725
3,000 to 3,999	83	16.3%	1.062	0.1734
4,000 or More	51	10.0%	1.101	0.1105
Total	508	100.0%		
Weighted Average of All Groups				0.992

Option B (3 sq ft categories)	SF Units Built 2018-2019		Draft EDU ¹	Average EDU
	Units	Percent		
Less than 1,500	84	16.5%	0.895	0.1480
1,500 to 3,499	357	70.3%	1.000	0.7028
3,500 or More	67	13.2%	1.102	0.1453
Total	508	100.0%		
Weighted Average of All Groups				0.996
¹ Using 3,500 sq ft as the boundary between categories requires a judgment interpolation to split the 3,000 to 3,999 AHS category				

Option C (4 sq ft categories)	SF Units Built 2018-2019		Draft EDU	Average EDU
	Units	Percent		
Less than 1,000	2	0.4%	0.815	0.0032
1,000 to 2,000	183	36.0%	0.921	0.3318
2,000 to 2,999	189	37.2%	1.000	0.3720
3,000 or More	134	26.4%	1.075	0.2836
Total	508	100.0%		
Weighted Average of All Groups				0.991

Option D (4 sq ft categories)	SF Units Built 2018-2019		Draft EDU	Average EDU
	Units	Percent		
Less than 2,000	185	36.4%	0.921	0.3352
2,000 to 2,999	189	37.2%	1.000	0.3720
3,000 to 4,000	83	16.3%	1.062	0.1735
4,000 or More	51	10.0%	1.101	0.1105
Total	508	100.0%		
Weighted Average of All Groups				0.991