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Addendum to the 2015-16 Campus Travel Survey and the 2016-17 Campus Travel Survey Reports

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ADDENDUM TO
THE 2015-16
CAMPUS TRAVEL SURVEY
AND
THE 2016-17
CAMPUS TRAVEL SURVEY
REPORTS

Institute of Transportation Studies

and

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Introduction

The UC Davis Campus Travel Survey (CTS) is administered annually to a sample of students, faculty, and staff. Because we survey only a sample of the campus population and because some groups are more likely to respond to the survey than other groups, it is necessary to apply “expansion factors” and “weights” to the sample to achieve an accurate estimate of the responses for the entire campus population. In effect, we use the expansion factors and weights to make the sample of around 4,000 respondents look like the population of around 45,000. The calculation of the expansion factors and weights requires an estimate of the campus population by role group and gender, as explained in more detail below.

The campus population is a difficult number to pin down, as it varies over the year and depends on whether and how different categories of people are counted. For the 2016-17 Campus Travel Survey, a new protocol was used to estimate the campus population, as explained in the posted report.¹ In reviewing the report, campus officials noticed that the new population protocol produced an underestimate of students living on campus, which significantly changed the estimated mode split and other results. A third protocol was devised to correct the problem, and we re-analyzed results from the 2015-16 and 2016-17 surveys using population estimates based on this new protocol.

This addendum explains the procedure for expansion factors and weights, describes the new population estimation protocol, and presents the revised results for selected tables from the CTS reports.

Weights and Expansion Factors

The choice that students, faculty, and staff make about traveling to the UC Davis campus follow certain patterns. Students tend to bicycle and take the bus more than staff, for example, and women are less likely to bicycle than men. Because the CTS sample is not a perfect subset of the UC Davis population with respect to role group and gender, it is important to “weight” the sample so that it matches the population. If too few students answer the survey, for example, we give their responses more weight in the analysis; if too many women answer the survey, we give their responses less weight. By applying these weights, we achieve a more accurate estimate of travel to campus.

While campus officials are sometimes interested in percentages, e.g. the percentage of the campus population traveling by each mode, they are often interested in totals, e.g. the total number of cars coming to campus each day, the total amount of greenhouse gas emissions these cars produced. To estimate total values for the campus, we must “expand” the sample to the population. If the final sample is 4,000 respondents and the population is 45,000, then each response is, in effect, counted just over 11 times. By applying the expansion factors, we achieve an estimate to total travel to campus.

This approach, well established in survey research, is based on an assumption that the respondents in the sample are representative of the rest of the population within their role group (freshman, sophomore, junior, senior, Master’s student, PhD student, faculty, and staff) and gender with respect to the factors that influence their transportation choices. It is unlikely that this assumption is 100% true in any given

¹ Add URL for 2016-17 report when it gets posted.

year, and therefore “sampling error” is an important consideration. The sample in one year might include a disproportionate share of student who like bicycling, for example, or a disproportionate share of staff members who live in Davis rather than other cities. Adding weights for additional factors, beyond role group and gender, would help to correct for these errors, but doing so would require an estimate of the population broken down by these characteristics. The use of role and gender to create the weights corrects for what we believe to be the biggest sources of sampling error.

The calculation and application of weight factors and expansion factors is explained in Appendix H of the CTS reports. The weight factor is a ratio of the population share to the sample share for each role group. That is, with N total population, n in the sample, and N_i in role and gender group i in the population (for instance, female freshmen), and n_i of that group i in the sample, we apply the weight factor $W_i = (N_i/N) / (n_i/n)$ to all cases in group i . Applying the weight factors alters the apparent distribution of respondents by role and gender, but the overall sample size is unchanged. In instances where we would like to expand the sample to a projection of the full population, we weight each case by an *expansion* factor E_i , equal to (N_i / n_i) . Applying the expansion factors alters both the distribution of respondents by role and inflates the sample to the size of the population (i.e. the expansion factors are in fact a combined weight and expansion factor). Revised versions of Table 53, showing the new weight and expansion factors for 2015-16 and 2016-17, are attached.

Population Estimation Protocol

Since weighting the data significantly influences the final results as presented in the CTS reports, the accuracy of campus population numbers used to create the weights is critically important. The student population is especially variable, as enrollment numbers decline from fall to winter to spring quarters. In previous years, we used an estimate of campus population produced at the end of the academic year that reflected an average over the year. However, these estimates were not available until the summer, thereby delaying publication of the CTS reports until late summer. In addition, the UC Davis Long Range Development Plan (LRDP) update process got underway in 2016, and the UC Davis Campus Planning department requested that the 2016-17 survey use the same campus population numbers as the LRDP process.

For the 2016-17 survey, campus officials thus adopted a new protocol for the population estimates. The new protocol produced a higher estimate of the number of staff and a lower estimate of the number of faculty in 2016-17 than in 2015-16, meaning that the responses of staff are given more weight and those of faculty less weight in analyzing the results. The new protocol for student population estimates used winter quarter enrollment as a surrogate for the average for the year (since winter enrollment is lower than fall but higher than spring). The weights calculated using student population estimates from this new protocol, however, when applied to the survey sample, produced an underestimate of students living on campus and an overestimate of those living off campus. Exploration of the causes of this error yielded the explanation that the winter enrollment numbers reflect a substantial shift of “freshman” to “sophomore” status owing to advanced placement (AP) credits. For this reason, the results presented in the 2016-17 CTS report under-count freshmen, most of whom live on campus, and over-count sophomores, most of whom live off campus.

The revised protocol, applied in this Addendum, uses the LRDP approach to estimating staff and faculty (as used in the 2016-17 CTS report) but fall quarter enrollment numbers for students. This revised

protocol means that the same student population numbers are used for calculating the needed sample size and for calculating the weight factors (as described in Appendices G and H of the CTS reports). It also matches the timing of the survey to the timing of the population estimates, both fall quarter. The totals estimated from the sample (e.g. for number of cars coming to campus, GHG emissions, etc.) will be higher than if we used either of the previous population estimation protocols, given that fall enrollments are higher than other quarters. For this reason, the new protocol produces a more conservative estimate of how UC Davis is doing in reducing car travel and GHG emissions.

Results

This addendum presents revised versions of four key tables from the CTS reports: Table 14, Table 15, Table 42, and Table 43.

Tables 14a and 14b show that the new population estimate protocol produces an estimate of students living on-campus in 2016-17 (7,739) that is close to the number reported by campus officials (around 7,500). These tables also show, however, a considerable increase in the share of faculty and staff living outside Davis between 2015-16 and 2016-17: the share for faculty increases from 28.2% to 35.2% and for staff from 49.2% to 61.7%. It is possible that this increase reflects a true shift in where faculty and staff are living that could be explained by high housing prices in Davis. It is also likely that this increase in part reflects sampling error, as described above. If the true split is known from administrative records, it would be possible to also weight for residential location (in Davis, outside Davis).

The shift towards living outside Davis explains differences in the results for mode share (Tables 15a and 15b), annual greenhouse gas emissions (Tables 42a and 42b), and annual tons of greenhouse gas emissions avoided (Tables 43a and 43b). Because faculty and staff living outside of Davis are more likely to drive and less likely to bicycle than those living inside Davis, the driving share and greenhouse gas emissions increase from 2015-16 to 2016-17.

Table 14a. Residential location by role group – 2015-16

| Role | On campus | West Village | Off campus in Davis | Outside Davis | Weighted sample | Projected population |
|-----------------------------|-----------|--------------|---------------------|---------------|-----------------|----------------------|
| Student | 22.5% | 5.5% | 63.3% | 8.6% | 2,336 | 34,116 |
| Undergraduate | 25.1% | 5.9% | 61.6% | 7.4% | 1,920 | 28,038 |
| Freshman | 93.5% | 0.2% | 3.2% | 3.1% | 389 | 5,682 |
| Sophomore | 6.8% | 10.2% | 80.2% | 2.9% | 335 | 4,889 |
| Junior | 8.7% | 7.7% | 73.9% | 9.6% | 535 | 7,815 |
| Senior | 7.4% | 5.7% | 76.5% | 10.4% | 661 | 9,652 |
| Graduate | 10.7% | 3.3% | 71.5% | 14.5% | 416 | 6,078 |
| Master's | 9.4% | 5.6% | 67.6% | 17.4% | 187 | 2,729 |
| PhD | 11.8% | 1.5% | 74.7% | 12.1% | 229 | 3,349 |
| Employee | 0.4% | 0.0% | 53.2% | 46.4% | 834 | 12,179 |
| Faculty | 0.7% | 0.3% | 70.7% | 28.2% | 112 | 1,636 |
| Staff | 0.3% | 0.0% | 50.5% | 49.2% | 722 | 10,543 |
| Overall | 16.7% | 4.0% | 60.7% | 18.6% | 3,170 | 46,295 |
| Weighted sample | 530 | 128 | 1,923 | 589 | 3,170 | NA |
| Projected population | 7,739 | 1,870 | 28,086 | 8,599 | NA | 46,295 |

Results are based on responses to question Q16. Data are weighted by role and gender based on the 4,132 valid responses to questions Q01, Q10, and Q20-30 (see Table 9).

Table 14b. Residential location by role group – 2016-17

| Role | On campus | West Village | Off campus in Davis | Outside Davis | Weighted sample | Projected population |
|-----------------------------|-----------|--------------|---------------------|---------------|-----------------|----------------------|
| Student | 22.7% | 5.5% | 60.0% | 11.8% | 2,864 | 35,333 |
| Undergraduate | 25.8% | 6.1% | 57.6% | 10.5% | 2,365 | 29,179 |
| Freshman | 92.0% | 0.8% | 2.5% | 4.6% | 501 | 6,176 |
| Sophomore | 7.7% | 11.9% | 73.7% | 6.7% | 401 | 4,945 |
| Junior | 10.7% | 8.3% | 67.1% | 13.9% | 672 | 8,293 |
| Senior | 5.9% | 4.6% | 76.3% | 13.2% | 792 | 9,765 |
| Graduate | 8.1% | 2.5% | 71.0% | 18.4% | 499 | 6,154 |
| Master's | 8.4% | 4.5% | 68.4% | 18.8% | 222 | 2,741 |
| PhD | 7.9% | 0.8% | 73.2% | 18.1% | 277 | 3,413 |
| Employee | 0.0% | 0.2% | 41.8% | 58.0% | 1,002 | 12,363 |
| Faculty | 0.3% | 0.5% | 63.9% | 35.2% | 139 | 1,719 |
| Staff | 0.0% | 0.2% | 38.2% | 61.7% | 863 | 10,644 |
| Overall | 16.8% | 4.1% | 55.2% | 23.8% | 3,866 | 47,696 |
| Weighted sample | 651 | 158 | 2,136 | 920 | 3,866 | NA |
| Projected population | 8,036 | 1,955 | 26,352 | 11,353 | NA | 47,696 |

Results are based on responses to question Q16. Data are weighted by role and gender based on the 4,132 valid responses to questions Q01, Q10, and Q20-30 (see Table 9).

Table 15a. Share using each mode on an average weekday, by role group (all locations) – 2015-16

| Role | Physically travelling | Of those physically traveling to campus | | | | | | Weighted sample | Projected population |
|-----------------------------|-----------------------|---|---------------|-------------|-----------------|-------|-------|-----------------|----------------------|
| | | Bike | Walk or skate | Drive alone | Carpool or ride | Bus | Train | | |
| Student | 88.5% | 49.7% | 8.0% | 14.9% | 4.0% | 22.7% | 0.7% | 2,792 | 34,116 |
| Undergraduate | 89.2% | 48.7% | 8.4% | 12.7% | 3.6% | 26.1% | 0.4% | 2,295 | 28,038 |
| Freshman | 87.6% | 67.7% | 21.8% | 4.2% | 1.9% | 4.0% | 0.4% | 465 | 5,682 |
| Sophomore | 91.3% | 49.0% | 2.9% | 8.8% | 3.0% | 36.4% | 0.0% | 400 | 4,889 |
| Junior | 90.4% | 44.2% | 5.8% | 14.8% | 3.2% | 31.4% | 0.6% | 640 | 7,815 |
| Senior | 88.0% | 41.2% | 5.7% | 18.1% | 5.2% | 29.2% | 0.5% | 790 | 9,652 |
| Graduate | 85.1% | 54.7% | 5.8% | 25.4% | 6.0% | 6.1% | 2.0% | 497 | 6,078 |
| Master's | 83.4% | 50.0% | 5.2% | 31.3% | 4.1% | 7.3% | 2.1% | 223 | 2,729 |
| PhD | 86.5% | 58.5% | 6.2% | 20.8% | 7.5% | 5.2% | 1.8% | 274 | 3,349 |
| Employee | 83.0% | 25.4% | 3.5% | 56.5% | 9.5% | 3.8% | 1.3% | 997 | 12,179 |
| Faculty | 78.8% | 44.5% | 5.4% | 38.0% | 6.0% | 2.7% | 3.4% | 134 | 1,636 |
| Staff | 83.7% | 22.6% | 3.3% | 59.2% | 10.0% | 3.9% | 1.0% | 863 | 10,543 |
| Overall | 87.0% | 43.6% | 6.9% | 25.3% | 5.4% | 17.9% | 0.8% | 3,789 | 46,295 |
| Weighted sample | 3,298 | 1,439 | 227 | 836 | 178 | 591 | 28 | 3,789 | NA |
| Projected population | 40,292 | 17,578 | 2,769 | 10,209 | 2,173 | 7,224 | 339 | NA | 46,295 |

Results are based on responses to question Q21 (whether they traveled to campus each day) and question Q30 (primary means of transportation each day). All mode split percentages are calculated as follows: we first calculate the percent of five weekdays that an individual used a particular mode and then take the average over all respondents. Data are weighted by role and gender based on the 4,132 valid responses to questions Q01, Q10, and Q20-30 (see Table 9).

Table 15b. Share using each mode on an average weekday, by role group (all locations) – 2016-17

| Role | Physically travelling | Of those physically traveling to campus | | | | | | Weighted sample | Projected population |
|-----------------------------|-----------------------|---|---------------|-------------|-----------------|-------|-------|-----------------|----------------------|
| | | Bike | Walk or skate | Drive alone | Carpool or ride | Bus | Train | | |
| Student | 84.8% | 44.3% | 9.9% | 18.4% | 4.2% | 22.6% | 0.4% | 3,061 | 35,333 |
| Undergraduate | 85.7% | 42.9% | 10.7% | 16.6% | 3.6% | 25.7% | 0.4% | 2,528 | 29,179 |
| Freshman | 87.6% | 67.1% | 24.8% | 3.2% | 1.5% | 2.7% | 0.6% | 535 | 6,176 |
| Sophomore | 86.9% | 38.4% | 6.9% | 12.1% | 4.0% | 38.4% | 0.2% | 428 | 4,945 |
| Junior | 85.8% | 36.5% | 7.0% | 21.0% | 4.4% | 30.4% | 0.6% | 718 | 8,293 |
| Senior | 83.7% | 34.9% | 6.6% | 24.0% | 4.2% | 30.1% | 0.1% | 846 | 9,765 |
| Graduate | 80.6% | 51.4% | 5.7% | 27.4% | 7.1% | 7.4% | 0.9% | 533 | 6,154 |
| Master's | 76.2% | 49.6% | 6.1% | 28.7% | 6.4% | 8.8% | 0.4% | 237 | 2,741 |
| PhD | 84.1% | 52.8% | 5.4% | 26.5% | 7.5% | 6.5% | 1.3% | 296 | 3,413 |
| Employee | 79.4% | 17.1% | 3.9% | 63.4% | 8.8% | 4.9% | 1.7% | 1,071 | 12,363 |
| Faculty | 73.9% | 35.8% | 6.7% | 42.7% | 9.9% | 2.0% | 2.8% | 149 | 1,719 |
| Staff | 80.3% | 14.4% | 3.5% | 66.5% | 8.7% | 5.4% | 1.5% | 922 | 10,644 |
| Overall | 83.4% | 37.6% | 8.4% | 29.5% | 5.3% | 18.3% | 0.7% | 4,132 | 47,696 |
| Weighted sample | 3,446 | 1,297 | 290 | 1,017 | 184 | 630 | 26 | 4,132 | NA |
| Projected population | 39,781 | 14,968 | 3,347 | 11,743 | 2,120 | 7,269 | 296 | NA | 47,696 |

Results are based on responses to question Q21 (whether they traveled to campus each day) and question Q30 (primary means of transportation each day). All mode split percentages are calculated as follows: we first calculate the percent of five weekdays that an individual used a particular mode and then take the average over all respondents. Data are weighted by role and gender based on the 4,132 valid responses to questions Q01, Q10, and Q20-30 (see Table 9).

Table 42a. Annual tons of CO₂e emitted, by mode and role (not including Unitrans) – 2015-16

| Role | Annual tons of CO ₂ e emissions | | | | | | Average tons per person | Share of total CO ₂ e | Share of population | Projected population |
|----------------------|--|---------|------|-------|-------|-------------------------|-------------------------|----------------------------------|---------------------|----------------------|
| | Drive alone | Carpool | Ride | Bus | Train | Total CO ₂ e | | | | |
| Student | 13,161 | 833 | 380 | 538 | 855 | 15,766 | 0.46 | 38.7% | 73.7% | 34,116 |
| Undergraduate | 9,749 | 711 | 319 | 418 | 325 | 11,521 | 0.41 | 28.3% | 60.6% | 28,038 |
| Freshman | 608 | 59 | 18 | 2 | 34 | 721 | 0.13 | 1.8% | 12.3% | 5,682 |
| Sophomore | 677 | 132 | 23 | 14 | - | 846 | 0.17 | 2.1% | 10.6% | 4,889 |
| Junior | 3,289 | 323 | 59 | 150 | - | 3,821 | 0.49 | 9.4% | 16.9% | 7,815 |
| Senior | 5,176 | 197 | 219 | 252 | 290 | 6,134 | 0.64 | 15.1% | 20.8% | 9,652 |
| Graduate | 3,412 | 122 | 60 | 120 | 531 | 4,245 | 0.70 | 10.4% | 13.1% | 6,078 |
| Master's | 1,988 | 29 | 13 | 67 | 215 | 2,312 | 0.85 | 5.7% | 5.9% | 2,729 |
| PhD | 1,424 | 93 | 48 | 53 | 316 | 1,933 | 0.58 | 4.7% | 7.2% | 3,349 |
| Employee | 22,225 | 1,291 | 258 | 666 | 550 | 24,990 | 2.05 | 61.3% | 26.3% | 12,179 |
| Faculty | 1,682 | 57 | 12 | 37 | 131 | 1,919 | 1.17 | 4.7% | 3.5% | 1,636 |
| Staff | 20,543 | 1,234 | 246 | 629 | 419 | 23,071 | 2.19 | 56.6% | 22.8% | 10,543 |
| Outside Davis | 32,568 | 1,902 | 377 | 1,129 | 1,404 | 37,381 | 4.35 | 91.7% | 18.6% | 8,599 |
| Within Davis | 2,817 | 222 | 260 | 75 | 2 | 3,376 | 0.09 | 8.3% | 81.4% | 37,696 |
| On Campus | 11 | 2 | 9 | 3 | 1 | 27 | 0.00 | 0.1% | 16.7% | 7,739 |
| West Village | 16 | 1 | 3 | 2 | - | 22 | 0.01 | 0.1% | 4.0% | 1,870 |
| Off Campus | 2,790 | 218 | 248 | 70 | 1 | 3,327 | 0.12 | 8.2% | 60.7% | 28,086 |
| Overall | 35,386 | 2,124 | 638 | 1,204 | 1,405 | 40,756 | 0.88 | 100.0% | 100.0% | 46,295 |

Data are weighted for both years by role and gender (see Table 9)

Table 42b. Annual tons of CO₂e emitted, by mode and role (not including Unitrans) – 2016-17

| Role | Annual tons of CO ₂ e emissions | | | | | | Average tons per person | Share of total CO ₂ e | Share of population | Projected population |
|----------------------|--|---------|------|-------|-------|-------------------------|-------------------------|----------------------------------|---------------------|----------------------|
| | Drive alone | Carpool | Ride | Bus | Train | Total CO ₂ e | | | | |
| Student | 16,690 | 776 | 494 | 648 | 727 | 19,334 | 0.55 | 41.6% | 74.1% | 35,333 |
| Undergraduate | 12,746 | 433 | 412 | 583 | 503 | 14,676 | 0.50 | 31.6% | 61.2% | 29,179 |
| Freshman | 802 | 32 | 56 | 75 | 167 | 1,131 | 0.18 | 2.4% | 12.9% | 6,176 |
| Sophomore | 1,323 | 159 | 58 | 88 | 45 | 1,674 | 0.34 | 3.6% | 10.4% | 4,945 |
| Junior | 5,269 | 136 | 153 | 219 | 267 | 6,044 | 0.73 | 13.0% | 17.4% | 8,293 |
| Senior | 5,352 | 107 | 145 | 200 | 24 | 5,827 | 0.60 | 12.5% | 20.5% | 9,765 |
| Graduate | 3,944 | 343 | 82 | 65 | 224 | 4,658 | 0.76 | 10.0% | 12.9% | 6,154 |
| Master's | 1,842 | 182 | 40 | 5 | 42 | 2,112 | 0.77 | 4.5% | 5.7% | 2,741 |
| PhD | 2,102 | 161 | 42 | 60 | 182 | 2,546 | 0.75 | 5.5% | 7.2% | 3,413 |
| Employee | 24,343 | 1,199 | 272 | 565 | 726 | 27,105 | 2.19 | 58.4% | 25.9% | 12,363 |
| Faculty | 1,911 | 94 | 36 | 30 | 220 | 2,291 | 1.33 | 4.9% | 3.6% | 1,719 |
| Staff | 22,432 | 1,105 | 236 | 535 | 506 | 24,814 | 2.33 | 53.4% | 22.3% | 10,644 |
| Outside Davis | 38,307 | 1,741 | 596 | 1,095 | 1,452 | 43,191 | 3.80 | 93.0% | 23.8% | 11,353 |
| Within Davis | 2,725 | 234 | 169 | 118 | 1 | 3,248 | 0.09 | 7.0% | 76.2% | 36,343 |
| On Campus | 15 | 2 | 6 | 4 | 0 | 27 | 0.00 | 0.1% | 16.8% | 8,036 |
| West Village | 18 | 2 | 2 | 1 | - | 22 | 0.01 | 0.0% | 4.1% | 1,955 |
| Off Campus | 2,692 | 231 | 161 | 113 | 1 | 3,198 | 0.12 | 6.9% | 55.2% | 26,352 |
| Overall | 41,033 | 1,975 | 765 | 1,213 | 1,453 | 46,439 | 0.97 | 100.0% | 100.0% | 47,696 |

Data are weighted for both years by role and gender (see Table 9)

Table 43a. Annual tons of CO2e emissions avoided compared to driving alone – 2015-16

| Role | Annual tons of CO2e avoided | | | | | | Average savings/person | Projected population |
|----------------------|-----------------------------|---------------|-----------------|-------|-------|--------|------------------------|----------------------|
| | Bike | Walk or skate | Carpool or ride | Bus | Train | Total | | |
| Students | 6,709 | 977 | 1,044 | 1,962 | 1,255 | 11,946 | 0.35 | 34,116 |
| Undergraduate | 5,224 | 822 | 843 | 1,825 | 476 | 9,191 | 0.33 | 28,038 |
| Freshman | 855 | 248 | 66 | 26 | 50 | 1,244 | 0.22 | 5,682 |
| Sophomore | 1,025 | 67 | 143 | 394 | - | 1,630 | 0.33 | 4,889 |
| Junior | 1,310 | 328 | 351 | 584 | - | 2,573 | 0.33 | 7,815 |
| Senior | 2,034 | 180 | 283 | 822 | 426 | 3,744 | 0.39 | 9,652 |
| Graduate | 1,485 | 154 | 200 | 137 | 779 | 2,755 | 0.45 | 6,078 |
| Master's | 592 | 43 | 38 | 72 | 315 | 1,060 | 0.39 | 2,729 |
| PhD | 893 | 111 | 163 | 65 | 464 | 1,695 | 0.51 | 3,349 |
| Employees | 2,243 | 432 | 1,865 | 468 | 807 | 5,815 | 0.48 | 12,179 |
| Faculty | 462 | 66 | 152 | 26 | 192 | 898 | 0.55 | 1,636 |
| Staff | 1,782 | 366 | 1,713 | 441 | 615 | 4,917 | 0.47 | 10,543 |
| Outside Davis | 451 | 523 | 2,560 | 719 | 2,059 | 6,312 | 0.73 | 8,599 |
| Within Davis | 8,501 | 886 | 349 | 1,711 | 2 | 11,449 | 0.30 | 37,696 |
| On campus | 984 | 311 | 4 | 22 | 1 | 1,322 | 0.17 | 7,739 |
| West Village | 326 | 11 | 1 | 80 | - | 418 | 0.22 | 1,870 |
| Off campus | 7,191 | 565 | 343 | 1,609 | 1 | 9,709 | 0.35 | 28,086 |
| Overall | 8,952 | 1,409 | 2,909 | 2,430 | 2,061 | 17,762 | 0.38 | 46,295 |

Bike savings = 1.1 lbs./mile*annual person-miles biked

Walk or skate savings = 1.1 lbs./mile*annual person-miles walked or skated

Carpool or ride savings = 1.1 lbs./mile*(carpool or ride PMT)

Bus savings = 1.1 lbs./mile – 4.64 lbs./mile*annual bus PMT. "Unitrans" estimates are used to conservatively estimate savings.

Train savings = 1.1 lbs./mile – 39.96 lbs./mile*annual train PMT

Table 43b. Annual tons of CO2e emissions avoided compared to driving alone – 2016-17

| Role | Annual tons of CO2e avoided | | | | | | Average savings/person | Projected population |
|----------------------|-----------------------------|---------------|-----------------|-------|-------|--------|------------------------|----------------------|
| | Bike | Walk or skate | Carpool or ride | Bus | Train | Total | | |
| Students | 5,062 | 1,168 | 1,226 | 1,851 | 1,066 | 10,414 | 0.29 | 35,333 |
| Undergraduate | 3,798 | 1,073 | 525 | 1,733 | 738 | 7,907 | 0.27 | 29,179 |
| Freshman | 830 | 384 | 39 | 62 | 245 | 1,561 | 0.25 | 6,176 |
| Sophomore | 641 | 165 | 172 | 396 | 66 | 1,440 | 0.29 | 4,945 |
| Junior | 1,119 | 155 | 164 | 612 | 391 | 2,444 | 0.29 | 8,293 |
| Senior | 1,207 | 369 | 150 | 663 | 35 | 2,462 | 0.25 | 9,765 |
| Graduate | 1,264 | 95 | 700 | 118 | 328 | 2,506 | 0.41 | 6,154 |
| Master's | 485 | 48 | 362 | 43 | 62 | 1,000 | 0.36 | 2,741 |
| PhD | 779 | 47 | 338 | 75 | 267 | 1,506 | 0.44 | 3,413 |
| Employees | 1,097 | 870 | 1,774 | 440 | 1,065 | 5,254 | 0.43 | 12,363 |
| Faculty | 321 | 123 | 208 | 22 | 323 | 1,001 | 0.58 | 1,719 |
| Staff | 775 | 747 | 1,566 | 417 | 742 | 4,253 | 0.40 | 10,644 |
| Outside Davis | 388 | 1,107 | 2,682 | 698 | 2,130 | 7,045 | 0.62 | 11,353 |
| Within Davis | 5,771 | 930 | 318 | 1,593 | 1 | 8,623 | 0.24 | 36,343 |
| On campus | 965 | 355 | 5 | 18 | 1 | 1,347 | 0.17 | 8,036 |
| West Village | 249 | 21 | 2 | 119 | - | 391 | 0.20 | 1,955 |
| Off campus | 4,557 | 555 | 310 | 1,457 | 1 | 6,886 | 0.26 | 26,352 |
| Overall | 6,159 | 2,038 | 3,000 | 2,291 | 2,131 | 15,668 | 0.33 | 47,696 |

Bike savings = 1.1 lbs./mile*annual person-miles biked

Walk or skate savings = 1.1 lbs./mile*annual person-miles walked or skated

Carpool or ride savings = 1.1 lbs./mile*(carpool or ride PMT)

Bus savings = 1.1 lbs./mile – 4.64 lbs./mile*annual bus PMT. "Unitrans" estimates are used to conservatively estimate savings.

Train savings = 1.1 lbs./mile – 39.96 lbs./mile*annual train PMT

Appendix H. Weighting by role and gender

| UC Davis Total On- and Off-Campus Headcount Population | | |
|--|----------------|----------------|
| Fall headcount for students and two-month average for employees¹ | | |
| | 2015-16 | 2016-17 |
| Total On- and Off-campus Population | 60,398 | 62,241 |
| On-campus Population | 46,291 | 47,698 |
| Off-campus Population ² | 14,107 | 14,543 |
| | | |
| | | |
| | | |
| Student Population | 2015-16 | 2016-17 |
| Total Student Population (fall quarter) | 36,119 | 37,398 |
| On-campus | 34,110 | 35,333 |
| Off-campus ² | 2,009 | 2,065 |
| | | |
| <u>On-campus</u> | | |
| Freshmen | 5,682 | 6,176 |
| Sophomore | 4,889 | 4,945 |
| Junior | 7,815 | 8,293 |
| Senior | 9,652 | 9,765 |
| Graduate & Other Prgms (Masters, Professional, Post Bacs) | 2,465 | 2,414 |
| Doctoral | 3,346 | 3,413 |
| Self-Supporting ³ | 261 | 327 |
| Total on-campus | 34,110 | 35,333 |
| | | |
| <u>Off-campus</u> | | |
| Undergraduate | 220 | 200 |
| Graduate & Other Prgms (Masters, Professional, Post Bacs) | 1,399 | 1,475 |
| Doctoral | 29 | 30 |
| Self-Supporting ³ | 361 | 360 |
| Total off-campus | 2,009 | 2,065 |
| | | |

| Faculty & Staff Population (excludes student employees) | | |
|---|----------------|----------------|
| | 2015-16 | 2016-17 |
| Total Faculty & Staff Population⁴ | 24,279 | 24,843 |
| <i>On-campus</i> | | |
| Faculty | 1,638 | 1,721 |
| Staff | 9,023 | 9,160 |
| <i>Affiliated (Agriculture & Natural Resources)</i> | 865 | 891 |
| <i>Without Salary Employees</i> | 655 | 594 |
| Total on-campus | 12,181 | 12,365 |
| <i>Off-campus</i> | | |
| Faculty | 792 | 838 |
| Staff | 10,086 | 10,494 |
| <i>Affiliated (Agriculture & Natural Resources)</i> | 148 | 152 |
| <i>Without Salary Employees</i> | 1,072 | 996 |
| Total off-campus | 12,098 | 12,478 |
| **Totals may be affected by rounding | | |
| NOTES | | |
| 1 Annual averages for students represent fall, winter, spring quarter averages (or semester averages for the School of Law and the School of Veterinary Medicine). Annual averages for faculty and staff represent two-month averages (one fall month, one spring month) of snapshot figures for | | |
| 2 Includes students, faculty and staff at UCDCM, Bodega Bay, Lawrence Livermore Laboratory and other locations outside the City of Davis. | | |
| 3 Self-supporting programs include such programs as the Working Professional MBA, Forensic Science and Master of Advanced Study. These programs are not state-supported, although several professional programs charge special fees. | | |
| 4 As of 2011-12, the data source for faculty and staff population data changed from the Campus Payroll Personnel Data Warehouse (PPS) to the Corporate Personnel System (CPS). Along with this data change, slight modifications to the methodology were made. Most notably, employee location is now determined by home department except in the case of some without salary (WOS) employees who have health science related jobs. Also, only 10 percent of the emeriti faculty were included in the WOS headcount for the campus. | | |

| 2015-16 Population by Gender | | | |
|-------------------------------------|-------------|---------------|--------------|
| | Male | Female | |
| Undergrad | 41.1% | 58.9% | |
| Grad | 47.6% | 52.5% | |
| Faculty | 65.4% | 34.5% | |
| Staff | 34.4% | 65.6% | |
| | Male | Female | Total |
| Freshmen | 2,335 | 3,347 | 5,682 |
| Sophomore | 2,009 | 2,880 | 4,889 |
| Junior | 3,212 | 4,603 | 7,815 |
| Senior | 3,967 | 5,685 | 9,652 |
| Graduate & Ot | 1,298 | 1,431 | 2,729 |
| Doctoral | 1,593 | 1,757 | 3,349 |
| Faculty | 1,071 | 565 | 1,636 |
| Staff | 3,627 | 6,916 | 10,543 |

| 2016-17 Popoulation by Gender | | | |
|--------------------------------------|-------------|---------------|--------------|
| | Male | Female | |
| Undergrad | 41.0% | 59.0% | |
| Grad | 51.0% | 49.0% | |
| Faculty | 63.5% | 36.4% | |
| Staff | 33.4% | 66.6% | |
| | Male | Female | Total |
| Freshmen | 2,532 | 3,644 | 6,176 |
| Sophomore | 2,027 | 2,918 | 4,945 |
| Junior | 3,400 | 4,893 | 8,293 |
| Senior | 4,004 | 5,761 | 9,765 |
| Graduate & Ot | 1,398 | 1,343 | 2,741 |
| Doctoral | 1,741 | 1,672 | 3,413 |
| Faculty | 1,093 | 626 | 1,719 |
| Staff | 3,555 | 7,089 | 10,644 |

Table 53a. Weight factors, applied by role and gender - 2015-16

| Role | Gender | Population (N) | Factors by role, gender, and mode | | | | Factors by role, gender, mode, and geocoded | | | |
|----------------|--------|----------------|-----------------------------------|-----------------------------|--------------------------|----------------------|---|-----------------------------|--------------------------|----------------------|
| | | | Valid responses (n) | Weight factor (Ni/N)/(ni/n) | Expansion factor (Ni/ni) | Weighted sample size | Valid responses (n) | Weight factor (Ni/N)/(ni/n) | Expansion factor (Ni/ni) | Weighted sample size |
| Freshman | Female | 3,347 | 249 | 1.100 | 13.442 | 274 | 238 | 0.963 | 14.063 | 229 |
| | Male | 2,335 | 100 | 1.911 | 23.350 | 191 | 96 | 1.665 | 24.323 | 160 |
| Sophomore | Female | 2,880 | 373 | 0.632 | 7.721 | 236 | 338 | 0.583 | 8.521 | 197 |
| | Male | 2,009 | 112 | 1.468 | 17.938 | 164 | 86 | 1.600 | 23.360 | 138 |
| Junior | Female | 4,603 | 305 | 1.235 | 15.092 | 377 | 263 | 1.198 | 17.502 | 315 |
| | Male | 3,212 | 124 | 2.120 | 25.903 | 263 | 110 | 1.999 | 29.200 | 220 |
| Senior | Female | 5,685 | 360 | 1.292 | 15.792 | 465 | 315 | 1.236 | 18.048 | 389 |
| | Male | 3,967 | 155 | 2.095 | 25.594 | 325 | 137 | 1.983 | 28.956 | 272 |
| Master's | Female | 1,430 | 152 | 0.770 | 9.408 | 117 | 130 | 0.753 | 11.000 | 98 |
| | Male | 1,299 | 108 | 0.984 | 12.028 | 106 | 89 | 0.999 | 14.596 | 89 |
| PhD | Female | 1,755 | 271 | 0.530 | 6.476 | 144 | 235 | 0.511 | 7.468 | 120 |
| | Male | 1,594 | 157 | 0.831 | 10.153 | 130 | 141 | 0.774 | 11.305 | 109 |
| Faculty | Female | 564 | 239 | 0.193 | 2.360 | 46 | 184 | 0.210 | 3.065 | 39 |
| | Male | 1,072 | 237 | 0.370 | 4.523 | 88 | 194 | 0.378 | 5.526 | 73 |
| Staff | Female | 6,916 | 586 | 0.966 | 11.802 | 566 | 425 | 1.114 | 16.273 | 474 |
| | Male | 3,627 | 261 | 1.137 | 13.897 | 297 | 189 | 1.314 | 19.190 | 248 |
| Overall | - | 46,295 | 3,789 | 0.000 | 12.218 | 3789 | 3170 | 0.000 | 14.604 | 3170 |

^a Based on valid responses to Q10 and Q30

^b Based on valid responses to Q10, Q30 and successful geocoding of home location (from questions Q18-Q19)

Table 53b. Weight factors, applied by role and gender - 2016-17

| Role | Gender | Population (N) | Factors by role, gender, and mode | | | | Factors by role, gender, mode, and geocoded | | | |
|-----------|--------|----------------|-----------------------------------|-----------------------------|--------------------------|----------------------|---|-----------------------------|--------------------------|----------------------|
| | | | Valid responses (n) | Weight factor (Ni/N)/(ni/n) | Expansion factor (Ni/ni) | Weighted sample size | Valid responses (n) | Weight factor (Ni/N)/(ni/n) | Expansion factor (Ni/ni) | Weighted sample size |
| Freshman | Female | 3,644 | 350 | 0.902 | 10.411 | 316 | 348 | 0.849 | 10.471 | 295 |
| | Male | 2,532 | 123 | 1.783 | 20.585 | 219 | 121 | 1.696 | 20.926 | 205 |
| Sophomore | Female | 2,918 | 357 | 0.708 | 8.174 | 253 | 334 | 0.708 | 8.737 | 237 |
| | Male | 2,027 | 125 | 1.405 | 16.216 | 176 | 111 | 1.480 | 18.261 | 164 |
| Junior | Female | 4,893 | 406 | 1.044 | 12.052 | 424 | 377 | 1.052 | 12.979 | 397 |
| | Male | 3,400 | 206 | 1.430 | 16.505 | 295 | 191 | 1.443 | 17.801 | 276 |
| Senior | Female | 5,761 | 459 | 1.087 | 12.551 | 499 | 433 | 1.078 | 13.305 | 467 |
| | Male | 4,004 | 177 | 1.960 | 22.621 | 347 | 162 | 2.003 | 24.716 | 325 |
| Master's | Female | 1,343 | 195 | 0.597 | 6.887 | 116 | 180 | 0.605 | 7.461 | 109 |
| | Male | 1,398 | 136 | 0.891 | 10.279 | 121 | 120 | 0.944 | 11.650 | 113 |
| PhD | Female | 1,672 | 303 | 0.478 | 5.518 | 145 | 286 | 0.474 | 5.846 | 136 |
| | Male | 1,741 | 163 | 0.925 | 10.681 | 151 | 153 | 0.922 | 11.379 | 141 |
| Faculty | Female | 626 | 233 | 0.233 | 2.687 | 54 | 217 | 0.234 | 2.885 | 51 |
| | Male | 1,093 | 250 | 0.379 | 4.372 | 95 | 236 | 0.375 | 4.631 | 89 |
| Staff | Female | 7,089 | 433 | 1.418 | 16.372 | 614 | 397 | 1.447 | 17.856 | 575 |
| | Male | 3,555 | 216 | 1.426 | 16.458 | 308 | 200 | 1.441 | 17.775 | 288 |
| Overall | - | 47,696 | 4,132 | 0.000 | 11.543 | 4132 | 3866 | 0.000 | 12.337 | 3866 |

^a Based on valid responses to Q10 and Q30

^b Based on valid responses to Q10, Q30 and successful geocoding of home location (from questions Q18-Q19)