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| TO: | File | DATE: | January 7, 2017 |
| FR: | Shimon Israel |  | W.I. 1122 |
| RE: | 2015 TM 1.5 TAZ 1454 Land Use Documentation | | |
|  | This memorandum documents the process for creating the Travel Model 1.5 TAZ Land Use data for the 2015 base year. Data is collected and aggregated via the R script “ACS 2013-2017 create TAZ data for 2015.R.” School EnrollmentParking CostEmploymentGroup Quarters PopulationResidential Workers The number of total employed residents is derived from ACS 2013-2017, Table B23025. The initial distribution of households by household workers comes from Table B08202 for the same period. This household distribution, however, is skewed (relative to PUMS data) toward zero-worker households because its universe only includes workers at work during the ACS survey reference week. That is, workers with a job but not at work (e.g., employees who are ill, on vacation, at personal appointments, etc.) are not included here. In addition, household weights from ACS data appear to undercount workers in larger households (with more 3-plus workers), and the person weights appear more accurate. The approach used for reconciling households by number of workers relies on PUMS person weights to correct for worker undercounts.  PUMS data from 2012-2016 (2013-2017 PUMS weren’t available as of this writing) were used to develop correction factors for TAZ-level households by number of workers. The process is described in the below steps (with a supporting data summary in Table 1, below):   1. The number of households by workers and implied workers in each household category are derived from ACS 2013-2017 Table B08202 (Column 1). The average number of workers for the 3-plus worker category was calculated from the 2012-2016 PUMS as approximately 3.41 (3.40695036711661 was applied). 2. Total workers within each household category (from the person weights in the 2012-2016 PUMS), along with implied households (1-worker / 1, 2-worker / 2, and 3-plus worker / 3.41) are listed in Column 2. 0-worker households are calculated as the difference of total households minus the sum of the 1-, 2-, and 3-plus-worker households. 3. In Column 3, the ACS 2013-2017 aggregate household county totals come from Table B08202, and the aggregate worker county totals for the same period come from Table B23025. Only the relative distributions within each county need to be reconciled. In order to do this, worker distribution shares from the PUMS 2012-2016 within each county are assumed correct for 2013-2017. Category values are then inflated so they sum to county totals; the inflation factor is Column 3 Total Workers / Column 2 Total Workers, respective to each county (e.g., 827,795 / 802,511 for Alameda County). The implied household distribution is derived from the worker counts as above, in Step 2. 4. The final step creates factors for correcting ACS 2013-2017 Table B08202 values at the TAZ level (Column 4). These factors are the quotient of Column 3 Implied Households divided by Column 1 Total Households. The resulting factors were applied in the TAZ-building script, respective to each county and workers per household category. 5. It is noteworthy that group quarters workers (e.g., working college students in dorms) are included in the employed residents data, ACS Table B23025, and in the PUMS person weights. They are, however, excluded from households by number of workers, Table B08202, and from the household weights in the PUMS data (group quarters records are actually given a 0-weight placeholder value in the household file). The approach outlined here uses the full worker universe, those in both households and group quarters, and includes group quarters workers in the final outputted dataset – both in total employed residents and in households by number of workers. “Households” in the latter case include both households and group quarters units. | | |
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**Table 1: Households by Number of Workers**

|  |  | 1 | | 2 | | 3 | | 4 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | ACS 2013-2017 Table B08202 - HH Size by Number of Workers in HH | | PUMS 2012-2016 Workers (ESR==1,2,4,5), Using Person Weights | | ACS 2013-2017 Refactored with County Total Households (Table B08202) and Workers (Table B23025) | | County-Level Correction Factors for TAZ Application |
| County | HH Workers | Total Households | Implied Workers | Implied Households | Total Workers | Implied Households | Workers | Households |
| Alameda | 0\_workers | 140,827 | 0 | 89,345 | 0 | 79,159 | 0 | 0.562 |
|  | 1\_worker | 213,190 | 213,190 | 227,654 | 227,654 | 234,826 | 234,826 | 1.101 |
|  | 2\_workers | 168,962 | 337,924 | 190,241 | 380,481 | 196,234 | 392,468 | 1.161 |
|  | 3p\_workers | 46,091 | 157,030 | 57,053 | 194,376 | 58,850 | 200,500 | 1.277 |
| Alameda Total | | 569,070 | 708,144 | 564,292 | 802,511 | 569,070 | 827,795 | 1.000 |
| Contra Costa | 0\_workers | 92,670 | 0 | 76,635 | 0 | 70,245 | 0 | 0.758 |
|  | 1\_worker | 145,079 | 145,079 | 150,795 | 150,795 | 154,891 | 154,891 | 1.068 |
|  | 2\_workers | 117,893 | 235,786 | 123,855 | 247,709 | 127,219 | 254,438 | 1.079 |
|  | 3p\_workers | 33,955 | 115,683 | 36,256 | 123,524 | 37,241 | 126,880 | 1.097 |
| Contra Costa Total | | 389,597 | 496,548 | 387,541 | 522,028 | 389,597 | 536,209 | 1.000 |
| Marin | 0\_workers | 27,347 | 0 | 22,933 | 0 | 22,657 | 0 | 0.829 |
|  | 1\_worker | 41,727 | 41,727 | 42,776 | 42,776 | 43,155 | 43,155 | 1.034 |
|  | 2\_workers | 30,126 | 60,252 | 31,982 | 63,963 | 32,265 | 64,529 | 1.071 |
|  | 3p\_workers | 5,646 | 19,236 | 6,710 | 22,861 | 6,769 | 23,063 | 1.199 |
| Marin Total |  | 104,846 | 121,215 | 104,401 | 129,600 | 104,846 | 130,747 | 1.000 |
| Napa | 0\_workers | 12,572 | 0 | 9,623 | 0 | 8,700 | 0 | 0.692 |
|  | 1\_worker | 16,470 | 16,470 | 17,628 | 17,628 | 17,890 | 17,890 | 1.086 |
|  | 2\_workers | 15,313 | 30,626 | 16,278 | 32,555 | 16,519 | 33,039 | 1.079 |
|  | 3p\_workers | 4,689 | 15,975 | 5,847 | 19,921 | 5,934 | 20,217 | 1.266 |
| Napa Total |  | 49,044 | 63,071 | 49,376 | 70,104 | 49,044 | 71,146 | 1.000 |
| San Francisco | 0\_workers | 82,119 | 0 | 62,273 | 0 | 55,581 | 0 | 0.677 |
|  | 1\_worker | 139,605 | 139,605 | 147,713 | 147,713 | 152,059 | 152,059 | 1.089 |
|  | 2\_workers | 106,022 | 212,044 | 111,596 | 223,192 | 114,880 | 229,759 | 1.084 |
|  | 3p\_workers | 31,026 | 105,704 | 35,216 | 119,980 | 36,252 | 123,510 | 1.168 |
| San Francisco Total | | 358,772 | 457,353 | 356,798 | 490,885 | 358,772 | 505,329 | 1.000 |
| San Mateo | 0\_workers | 50,750 | 0 | 37,149 | 0 | 32,948 | 0 | 0.649 |
|  | 1\_worker | 95,393 | 95,393 | 98,428 | 98,428 | 100,621 | 100,621 | 1.055 |
|  | 2\_workers | 86,422 | 172,844 | 91,986 | 183,971 | 94,035 | 188,070 | 1.088 |
|  | 3p\_workers | 29,231 | 99,589 | 33,448 | 113,954 | 34,193 | 116,493 | 1.170 |
| San Mateo Total | | 261,796 | 367,826 | 261,010 | 396,353 | 261,796 | 405,183 | 1.000 |
| Santa Clara | 0\_workers | 118,875 | 0 | 80,898 | 0 | 68,980 | 0 | 0.580 |
|  | 1\_worker | 240,595 | 240,595 | 254,546 | 254,546 | 261,911 | 261,911 | 1.089 |
|  | 2\_workers | 204,894 | 409,788 | 217,338 | 434,676 | 223,627 | 447,254 | 1.091 |
|  | 3p\_workers | 66,087 | 225,155 | 73,797 | 251,423 | 75,932 | 258,698 | 1.149 |
| Santa Clara Total | | 630,451 | 875,538 | 626,579 | 940,645 | 630,451 | 967,863 | 1.000 |
| Solano | 0\_workers | 37,665 | 0 | 29,363 | 0 | 28,171 | 0 | 0.748 |
|  | 1\_worker | 54,266 | 54,266 | 56,558 | 56,558 | 58,133 | 58,133 | 1.071 |
|  | 2\_workers | 41,863 | 83,726 | 45,329 | 90,657 | 46,591 | 93,182 | 1.113 |
|  | 3p\_workers | 13,558 | 46,191 | 14,065 | 47,919 | 14,457 | 49,254 | 1.066 |
| Solano Total |  | 147,352 | 184,183 | 145,315 | 195,134 | 147,352 | 200,569 | 1.000 |
| Sonoma | 0\_workers | 51,489 | 0 | 41,782 | 0 | 40,335 | 0 | 0.783 |
|  | 1\_worker | 69,025 | 69,025 | 72,614 | 72,614 | 73,828 | 73,828 | 1.070 |
|  | 2\_workers | 53,747 | 107,494 | 57,596 | 115,192 | 58,559 | 117,118 | 1.090 |
|  | 3p\_workers | 15,797 | 53,820 | 17,051 | 58,093 | 17,336 | 59,064 | 1.097 |
| Sonoma Total | | 190,058 | 230,339 | 189,043 | 245,899 | 190,058 | 250,010 | 1.000 |
| Bay Area | 0\_workers | 614,314 | 0 | 450,001 | 0 | 406,776 | 0 |  |
|  | 1\_worker | 1,015,350 | 1,015,350 | 1,068,712 | 1,068,712 | 1,097,315 | 1,097,315 |  |
|  | 2\_workers | 825,242 | 1,650,484 | 886,198 | 1,772,396 | 909,928 | 1,819,857 |  |
|  | 3p\_workers | 246,080 | 838,382 | 279,444 | 952,051 | 286,966 | 977,679 |  |
| Bay Area Total | | 2,700,986 | 3,504,216 | 2,684,355 | 3,793,159 | 2,700,986 | 3,894,851 |  |

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