# Built Environment and Physical Activity:

# GIS Templates and Variable Naming Conventions Version 2.1

For the IPEN Adolescent Study*

June 2015

Marc A. Adams, Ph.D.[1]

James Chapman, MSCE[2]

James F. Sallis, Ph.D.[3]

Larry D. Frank, Ph.D.[2]

& International Physical Activity and Environment Network (IPEN) Studies Coordinating Center[3]

[1]Arizona State University

[2] Urban Design for Health, Inc.

[3] University of California, San Diego



*This comprehensive set of documents was created as part of the International Physical Activity and Environment Network (IPEN) Study in collaboration with Urban Design for Health. It attempts to provide a common set of built environment definitions and measurement procedures for investigators in the IPEN study. This set of documents represents an evolving product that will be updated as needed for the Adolescent study.

Original IPEN GIS protocol developed between 2010-2014 and supported by grants (# R01 HL67350 and T32 HL079891). Further refinements developed between 2013-2015 and supported by the IPEN Adolescent grant (#R01HL111378).



Suggested Citation: Adams, Marc A., Chapman, James C., Sallis, James F., Frank, Lawrence D. & the International Physical Activity and Environment Network (IPEN) Study Coordinating Center. (2015). Built Environment and Physical Activity: GIS Templates and Variable Naming Conventions, Version 2. For the IPEN Adolescent Study. Arizona State University, USA. Available for download at: www.ipenproject.org

# Table of Contents

# SECTION 1: IPEN GIS TEMPLATES INTRODUCTIONS

These templates provide greater specificity to common concepts, clearer definitions, and guidance on IPEN GIS variables and procedures. We believe that following these templates closely will ensure that the IPEN Adolescent study has a common set of comparable GIS variables, and can document any deviations where necessary. This process is important for maximizing comparability across countries. Please read carefully.

Note the nomenclature used in the GIS templates for **variables**:

- **Required variable** means that this variable has been judged to be most likely to be completed across all countries. **All countries should produce required variables,** if you have data available to calculate it.
- **Desired variable** means that this variable has been judged to be of greater importance or higher quality than the required ones. Desired variables should be calculated **in addition** to the required variables.
- **Speculative variable** means that it is unknown whether this variable can be completed by even a subset of countries. Speculative variables should be considered exploratory. However, these variables may be important for future consideration.

Note the nomenclature used in the GIS templates for **procedures**:

- **Recommended procedures** should be used **instead of** acceptable procedures. Recommended procedures have been judged to be more common or precise methods of calculating the variables. All countries should attempt to perform recommended procedures.
- **Acceptable procedures** should be used **only if recommended procedures cannot be used**, or if recommended procedures have been deemed inappropriate for country-specific reasons. Acceptable procedures are less accurate than desired procedures, but acceptable to use.
- **Speculative procedures** are the least accurate or least common procedural option. Should only be used if recommended or acceptable procedures cannot be accomplished.

Note the convention for handing **missing data:**

- When a variable value is truly missing for a participant, we require a value of -999 be used. Please do not insert zero values when data are missing, as we cannot determine the difference between true zeros and missing values. If you have true zero values, then zero should be used.

Note for variables that measure '**distance to nearest**': do not use cut-off distances such as 2 km. If a feature does not fall within the region, this value should be set to missing.

In addition, we ask countries to provide:

1. An exhaustive list of the land use subcategories (discrete uses) for the land use variables.
2. We do not want countries to provide us with a calculated land use mix variable, but rather send us land use mix component variables so the IPEN Coordinating Center (CC) can test different definitions of mixed use.

# SECTION 2: VARIABLE NAMING CONVENTION INSTRUCTIONS

We encourage you to name and label your variables by reviewing the Sections 19 and 20. Do not start with the character key (Section 20). The character key is a reference for all the variable names, but it does include overlapping and competing concepts when viewed by character order (first, second, etc.). If you have variables that are not listed in the Naming Convention, please send a list and we will provide unique variable names for your study. You can download Excel and SPSS Versions of IPEN-A variable names by requesting them from marc.adams@asu.edu:

# SECTION 3: "Neighborhood" Selection and Participant Sampling

| | |
|---|---|
| **Aim:** | To develop a standardized approach for sampling participants across countries via neighborhood/*administrative units* and schools (optional) and document sampling procedures. This template presents information on selection and sampling methods and related GIS work.<br><br>Note: In IPEN-Adult (based on the US NQLS sampling design) neighborhoods represented clusters of smaller census-based administrative units that were contiguous and formed defined areas with names. However, in IPEN-Adolescent (based on the US TEAN study) we are *not* selecting neighborhoods per se. Instead, we are using smaller census-based administrative units (no constraints that they be contiguous) to define the areas to recruit participants. Hereafter, for IPEN-Adolescent, "neighborhoods" will be replaced by "administrative units". |
| **Tasks:** | 1. Identify administrative units in your country with available census data on socioeconomic status (SES) (i.e. household income or educational attainment) and spatial built environment data.<br>2. Identify schools by type (age of youth) and locations within your study region to sample adolescents (optional).<br>3. Calculate walkability (e.g. net residential density, land use mix, intersection density, floor area ratio) for each administrative unit across the entire surface of the study region.<br>4. Decile Walkability and SES to stratify administrative units following the 2x2 high/low design for Walkability by SES (i.e. quadrants).<br>5. Sample adolescents from high/low Walkability by SES quadrants (or students via schools but with quadrant defined by student's residence) while ensuring a balance on space, time and demographic variables (defined below). |
| **Datasets:** | For entire study region the following spatial point, line, polygon and attribute data will be needed for use with geographic information system (GIS) software: administrative unit boundaries, socioeconomic (i.e. household income), walkable road network, parcel-level land uses categories, number of dwelling units, and retail floor areas (optional); road intersections, enumerated list of school locations (optional) |
| **Definition:** | **Sample Stratification**<br>IPEN-Adolescent follows a cross-sectional design to sample participants living in areas defined as high/low walkability by high/low SES. This 2x2 quadrant design maximizes within-group (country) variability, which is desirable because many countries have limited variability in urban form features within their country. The international comparisons maximize between-group (country) variability.<br><br>**Administrative Unit**<br>Ideally, the administrative unit used for selection should approach a population estimate ranging from 600 and 3,000 people on average. Examples include the U.S. Census Block Group, Brazil's Census Tract, or New Zealand's Mesh Block Group. Countries are advised to select the smallest administrative unit that approximates these guidelines with available and best quality socioeconomic and GIS data.<br><br>Countries participating in IPEN-Adolescent may be recruiting initially from schools or |

administrative units. However, per the study design, the quadrant to which each participant is assigned (even those recruited via schools) is defined by the administrative unit with the adolescent's residence.

**Administrative Unit Buffers**

To calculate a walkability index for administrative units, a spatial buffers will need to be created around all administrative units. This buffer is represented as the administrative unit plus a 100-meter "shadow buffer" (i.e. airline/straight-line buffer) around the buffer perimeter. The shadow buffer a mirrors the shape of the administrative unit around the perimeter for each administrative unit. The entire enlarged area (administrative unit plus shadow buffer) is considered the buffer (i.e. not "rings"). The shadow buffer will be used for the walkability variables described below. It is not used in SES calculations.

**Walkability Index**

The components for the walkability index are calculated for each *administrative unit buffer* across the entire urban (exclude rural) study city/region. There are four components included in the walkability index:

1) Net residential density defined as the ratio of residential housing units to the land area devoted to residential land area per block group.
2) Intersection density: connectivity of the street network defined as the ratio between the number of true intersections (3 or more legs) to the total buffer area of the block group. A higher density of intersections corresponds with a more direct path between destinations.
3) Land use mix, or entropy, defined as the diversity of land use types present in the administrative unit. A mixed measure of 2 to 7 land use types may be included. Typically, land use types include: residential, retail (excluding region-serving or "big box" uses of 300,000 square feet or larger), entertainment, food-related, office, and institutional/civic (including schools and community institutions). Land use area values should be normalized and range between 0 and 1, with 0 indicating a single use and 1 indicating an even distribution of floor areas across the *n* uses.
4) Retail floor area ratio defined as the retail building square area (from all floors in a building) divided by retail land area of the parcel (squared area). This variable measures the density of retail development. A low ratio reflects substantial parking and a high ratio indicates smaller building setbacks and less parking area. Note that not every country will have the necessary retail floor areas needed to calculate this variable and it is therefore an optional component.

**Note: see FAQ for more information about creating walkability variables**.

The four (or three, if retail floor area is not available) calculated values should be normalized within a country's region using a Z score. See Appendix A and B for the definition of a z-score and examples of how to calculate z-scores. The following calculation from Frank (2010) should be used:

**Walkability Index = [(z score of intersection density) + (z score of net residential density) + (z score of land use mix)+ (z score of retail floor area**

**ratio)]**

… where retail floor area ratio an optional component if the data exist within your country.

Ideally, median household income at the administrative unit level and at least 2 walkability components will be available in your country/region. If median household income is not available in your country, *alternatives* may include:

- Other single indicators of SES from government or census sources (e.g. median education levels)
- SES index including some combination of: income, level of education, ownership of housing, car, computer, telephone, employment status
- Indigenous population (e.g. % Maori)
- Index of Multiple Deprivation

*Additions.* Because of local circumstances, we noticed in IPEN Adult that some countries modified the walkability index for neighborhood selection to include other variables not traditionally part of the 2x2 Walkability / SES design. For IPEN Adolescent, we recommend that these modifications be *additions* to the traditional walkability components provided above. Examples of additions might include access to regular bus or rapid transit, parks, retail parcel density, slope features.

After calculating walkability and obtaining SES data for the region:

- Create deciles of walkability from administrative unit values from across the region
- Create deciles of SES from administrative unit values from across the region
- Create high and low walkability and high and low SES. Conduct independently for walkability and SES.
  - Ideally, Low SES = $1^{st}$, $2^{nd}$, $3^{rd}$, $4^{th}$ deciles and High SES = $7^{th}$, $8^{th}$, $9^{th}$, $10^{th}$ deciles
  - Ideally, Low Walkability = $1^{st}$,$2^{nd}$, $3^{rd}$, $4^{th}$ deciles and High Walkability = $7^{th}$, $8^{th}$, $9^{th}$, $10^{th}$ deciles
  - The remaining deciles (e.g. $5^{th}$ and $6^{th}$ deciles for walkability) are not used for sampling.
  - Alternative: if not enough administrative units are available per quadrant you can use a median split of the deciles.
- Cross high & low walkability with high & low SES to identify administrative units in each of the 4 quadrants (e.g. High Walkable / High SES, High Walkable / Low SES, Low Walkable / High SES, Low Walkable / Low SES.

Using available adolescent counts per administrative unit (e.g. from a marketing firm or census), and an assumed recruitment/ participation rate (e.g. 10%) determine how many of the eligible block groups (those falling with the walk/SES quadrants as defined above) are needed to create a sufficient recruitment pool. For example, if 100 final surveys are desired per quadrant, and a 10% recruitment/completion success rate is assumed, then the population sum of potential participants per quadrant should be 1,000. Knowing the population pool needs to be 1,000 gives a benchmark for determining how many administrative units are a sufficient number to recruit from to

reach the desired number of participants.

For countries recruiting through Schools

- We recommend calculating neighborhood walkability/SES quadrants for the entire region first and then select schools within the quadrants
- Identify where students' homes are located from lists of student residences (obtained from schools or another source) and determine the walkability/SES quadrant of their residential address.
- In each school, you will want to recruit students from across all 4 quadrants to avoid sampling bias confounded with school location.

Balancing across Space, Time and Demographic variables

Participants can be nested within schools, within administrative units, within quadrants. Balancing across **space**, **time**, and **demographics** controls for confounders and biases that may influence results (e.g. secular events, seasonality, demographic differences)

*Balancing across Space:*

- Hierarchy of importance:
  - Critical to recruit same # of **participants** across **quadrants**
  - Very important to sample from at least 30 **administrative units** or more (if available) across the entire study **region**.
  - Would be good to recruit similar # of **students** across **schools** (if recruiting via schools)
  - Would be good to recruit similar # of **schools** across **quadrants** (if recruiting via schools)
  - If you plan to sample from only 30-40 admin units total in region, then it is important to sample a similar # of **administrative units** across **quadrants**
  - If you plan to sample a larger number of total administrative units (>40) from the region, then it is less important to recruit similar number of administrative units. This is only a rule of thumb/recommendation.
  - Not important to have a similar # of **adolescents** across **administrative units,** but it is important to not sample more than 40 adolescents in any 1 administrative unit.

*Balancing across Time:*

- It is absolutely critical to sample adolescents (and schools) from all locations/quadrants equally over time
  - Do **not** start with the easiest or nearest quadrant, and then move to the next one, and next one, etc.
  - **Do** measure from all 4 quadrants at the same time and keep the numbers balanced each month
  - **Do** measure when school is in session
  - Do **not** measure during extended school vacations/holidays or MAJOR holidays periods (e.g. Christmas, New Years, Haunakah)

*Balancing on Demographics:*

- Very important to recruit a similar number of **boys and girls** across quadrants,

| | | | |
|---|---|---|---|
| | schools, and over time (i.e.,study's data collection time frame).<br>○ Important but not critical to balance on **age** because IPEN-Adolescent overall is restricted to adolescents (12 – 18 years)<br>○ Not good to have severely unbalanced distribution (e.g. mostly 17 year olds and only a few 15 year olds)<br>○ Be careful of unbalanced age groups (e.g., if recruiting by grade level) across schools/quadrants<br>○ Not critical to balance on other demographic factors, unless needed or important within your country (e.g. race/ethnicity in U.S.)<br><br>*Additional Thoughts on Balancing.* Working with schools sequentially may result in difficulties balancing across quadrants. If students from a single school are disproportionately distributed across quadrants (e.g. few students in High Walk/Low Income, but many students in the other quadrants), then it might be a good idea to maximize recruitment of High Walk/Low Income students (i.e. recruit as many as possible) and set that number as a quota for the other quadrants. This is just a suggestion to help balance recruitment. More importantly, plan ahead by taking into account the expected number of participants in various quadrants from future schools if you expect a quadrant will be hard to recruit from. Try to recruit more students from that quadrant early on (i.e. oversample from the difficult quadrant).<br><br>***Please see Frequently Asked Questions (FAQ) for more information.*** ***It is located in the Appendix A and B of this document.*** | | |
| **Sidenotes:** | Intersection Identification:<br>The same walkable road network used for buffer creation should be used here. "Walkable" road network means that roads where pedestrians are prohibited must be removed from the network before intersections are identified and counted. | | |
| **Details:** | **Please respond to the questions below:** | Excluded/ NO | Included/ YES |
| | | | |
| 1. What type of administrative/population unit was used in your study? (e.g. Census block group in the U.S.). Please specify below: | | | |
| 2. How many regions and/or cities within your country were included in your study? Please specify below: | | | |
| 3. How many total administrative units were available across your entire study region? That is, how many total administrative units were available before administrative units were deciled and quadrants created? If working in more than one city, how many for each each city? | | | |

| | | |
|---|---|---|
| 4. Did you use a shadow buffer around administrative units? | | |
| 5. Did you use a 100 or 400 meter shadow buffer (note: the 400 meter buffer was in the draft template, but the 100 meter buffer was the final consensus) | | |
| 6. Did you calculate a walkability index for each city/region independently? (see FAQ) | | |
| 7. Did you recruit adolescents through schools? | | |
| a. If yes, how many schools did you sample from? | | |
| 8. Which indicator of socioeconomic status was available in your country and used for administrative unit selection (e.g. household income, education, minority population)? Please specify below: | | |
| a. When was the SES data collected (e.g. year of the dataset)?<br><br>b. What source provided this dataset? | | |
| 9. Were you able to calculate **net residential density** for administrative unit selection? If yes, please provide the year of your dataset below: | | |
| 10. Were you able to calculate **intersection density** for administrative unit selection? If yes, please provide the year of your dataset below: | | |
| 11. Were you able to calculate **land use mix** for administrative unit selection? If yes, please provide the year of your dataset below: | | |
| 12. Were you able to calculate **retail floor area ratio** for administrative unit selection? If yes, please provide the year of your dataset below: | | |
| 13. Were there any additions made to the walkability index (see additions under the definitions above)? If yes, please describe below: | | |
| 14. Please provide the formula used to calculate land use mix: | | |

| | | |
|---|---|---|
| | | |
| 15. Please provide the calculation/formula used to calculate the walkability index: | | |
| 16. Did you sum z-scores of the walkability components mentioned above to calculate the walkability index? | | |
| 17. Which deciles were included in high and low walkability? Please provide below:<br>a. High Walkability:<br>b. Low Walkability: | | |
| 18. Which deciles were used for high and low SES? Please provide below:<br>a. High SES:<br>b. Low SES: | | |
| 19. How many administrative units were actually recruited from in each of the four quadrants?<br>a. High Walk / High Income:<br>b. High Walk / Low Income:<br>c. Low Walk / High Income:<br>d. Low Walk / Low Income: | | |
| 20. How many schools were sampled in total? | | |
| 21. How many schools were sample from:<br>a. High Walk / High Income:<br>b. High Walk / Low Income:<br>c. Low Walk / High Income:<br>d. Low Walk / Low Income: | | |
| 22. When did participant recruitment start and end? Please provide dates in the following format: month/year (e.g. July 2013 to December 2013). | | |
| 23. Did you pause recruitment when the school year was NOT in session? | | |
| 24. Did you pause recruitment for MAJOR holidays or other periods? Please provide those holidays/periods below: | | |
| 25. How many adolescents were sampled (final counts) from:<br>a. High Walk / High Income:<br>b. High Walk / Low Income:<br>c. Low Walk / High Income:<br>d. Low Walk / Low Income: | | |
| 26. Did you balance recruitment of adolescents across quadrants over time? | | |
| 27. Did you use the IPEN tracking database provided by the ICC to keep track of recruitment and balancing across space, time and person? | | |

# SECTION 4: Creation of Street Network Buffers for Home and School

| | |
|---|---|
| **Aim:** | Develop a standardized spatial definition of 'neighborhood' to be used in creating land use and other variables, on which participants will be compared across countries. |
| **Task:** | Buffer -- Participant Residence (home address)<br>• To create 500 and 1000 meter street-network buffers (aggregation polygons) around participants' residences (**required**).<br>• To create 250 and 2000 meter street-network buffers (aggregation polygons) around participants' residences (**desired**).<br><br>Buffer – School location attended by participant<br>• To create 500 and 1000 meter street-network buffers (aggregation polygons) around the location of the school attended by each participant (**required**).<br>• To create 250 and 2000 meter street-network buffers (aggregation polygons) around the location of the school attended by each participant (**desired**). |
| **Datasets:** | Road network and Home/School locations |
| **Definition:** | Street network buffers determine a walkable accessible area around participant residences/schools. "Walkable" means the road network used for buffer creation includes only those roads on which pedestrians are allowed. Roads where pedestrians are prohibited (e.g. limited-access freeways, highway on/off ramps, and possibly toll roads) are removed from the network for buffer creation. |
| **Sidenotes:** | Ensure that removing limited access roads does not accidentally exclude roads where walking or cycling may commonly occur.<br><br>The buffer type to be created is a sausage (or balloon) buffer, offset 25 meters from the selected road segments. Road segments are selected based on the buffer distance (e.g. 500m or 1000m). GIS software (e.g. ESRI ArcGIS Network Analyst) is used to select those road segments radiating out from the participant's home/school address. Those selected road segments are then buffered using a 'crow fly' (straight line) buffer by 25 meters.<br><br>**Appendix C** has examples of this type of buffer in areas with different road densities. The buffers that are created are "**lattice**" like. They are not a solid surface from outer edge to outer edge. They have gaps/holes where adjacent |

| | | | |
|---|---|---|---|
| | roads are separated by more than 50 meters. These buffers are used to determine the counts of points (which have been snapped to the nearest road segment) in the buffer, and to select the polygons that intersect the buffer.<br><br>**IMPORTANT -- All point data should be "snapped" to the nearest road segment before determining which points are in buffers.**<br><br>Any point (once snapped to the road network) and any polygon that intersects the resulting buffers is to be assigned to that buffer, and used in the calculation of buffer level built environment measure values. | | |
| **Details:** | **Please respond to the questions below about participant HOME buffers:** | Excluded /NO | Included /YES |
| 1. Did you geocode the participants' home addresses to a street address? If no, please tell us how you geocoded participants residences (e.g. geocoded using the center of participant's block or nearest cross streets). | | | |
| 2. Did you create 500 meter street-network, 25 meter offset, sausage/balloon buffers (**required**)? If no, what type of buffer did you create? | | | |
| 3. Did you create 1000 meter street-network, 25 meter offset, sausage/balloon buffers (**required**)? If no, what type of buffer did you create? | | | |
| 4. Did you create 250 meter street-network, 25 meter offset, sausage/balloon buffers (**desired**)? If no, but you created another type, what type of buffer did you create? | | | |
| 5. Did you create 2000 meter street-network, 25 meter offset, sausage/balloon buffers (**desired**)? If no, but you created another type, what type of buffer did you create? | | | |
| 6. Was the road network modified in any way? | | | |
| 6.1. Were limited access freeways (e.g. highway interchanges, highway on/off ramps, toll roads) excluded from the road network prior to buffer creation (**required**)? | | | |
| 6.2. Were nationally or regionally important highways (which do not prohibit pedestrians) included or excluded? Many busy roads can still be used by pedestrians. | | | |

| | | |
|---|---|---|
| 6.3. Did you remove alleys and lanes from the road network dataset? | | |
| 7. Was bi-directional travel on one-way streets restricted when buffers were created? Our preference is to allow for bi-directional travel because pedestrians can use roads this way **(required)**. | | |
| 8. Was the road network (or buffers) modified or changed in another way? If so, please describe below. | | |
| 9. Please tell us which GIS software was used to compute street network buffers and all other variables (e.g. ESRI's ArcGIS)? | | |
| 10. Please tell us the exact version of this software below: | | |
| | | |
| **Details: Please respond to the questions below about participant SCHOOL buffers:** | Excluded /NO | Included /YES |
| 1. Did you geocode the participants' school addresses to their street address? If no, please tell us how you geocoded participants' schools (e.g. geocoded using the center of the school's block or nearest cross streets). | | |
| 2. Did you create 500 meter street-network, 25 meter offset, sausage/balloon buffers (**required**)? If no, what type of buffer did you create? | | |
| 3. Did you create 1000 meter street-network, 25 meter offset, sausage/balloon buffers (**required**)? If no, what type of buffer did you create? | | |
| 4. Did you create 250 meter street-network, 25 meter offset, sausage/balloon buffers (**desired**)? If no, but you created another type, what type of buffer did you create? | | |
| 5. Did you create 2000 meter street-network, 25 meter offset, sausage/balloon buffers (**desired**)? If no, but you created another type, what type of buffer did you create? | | |
| 6. Was the road network modified in any way? | | |

| | | |
|---|---|---|
| 6.1. Were limited access freeways (e.g. highway interchanges, highway on/off ramps, toll roads) excluded from the road network prior to buffer creation (**required**)? | | |
| 6.2. Were nationally or regionally important highways (which do not prohibit pedestrians) included or excluded? Many busy roads can still be used by pedestrians. | | |
| 6.3. Did you remove alleys and lanes from the road network dataset? | | |
| 7. Was bi-directional travel on one-way streets restricted when buffers were created? Our preference is to allow for bi-directional travel because pedestrians can use roads this way **(required)**. | | |
| 8. Was the road network (or buffers) modified or changed in another way? If so, please describe below. | | |
| 9. Please tell us which GIS software was used to compute street network buffers and all other variables (e.g. ESRI's ArcGIS)? | | |
| 10. Please tell us the exact version of this software below: | | |

# SECTION 5: Residential Land Use and Density

| | |
|---|---|
| **Aim:** | To develop a standardized definition of **residential land use and residential density** to be compared across participants across countries. The 'residential land use area' sums will be used to calculate the land use mix variable. Net and/or gross density of residential housing units within participants' buffers is part of the walkability index variable. |
| **Tasks:** | • Identify parcels designated as residential.<br>Calculate the number of single family and the number of multi-family residential parcels within participants' 500 and 1000 meter *residential* and *school* buffers (**required**) and 250 and 2000 meter buffers (**desired**).<br><br>• Calculate the sum of single family and the sum of multi-family<br>o land area (**required**) and/or<br>o building floor area (**desired**) and/or<br>within participants' 500 and 1000 meter buffers (**required**) and 250 and 2000 meter buffers (**desired**).<br><br>• Calculate the gross residential density (**required**) and/or net residential density (**desired**) within participants' 500 and 1000 meter *residential* and *school* buffers (**required**) and 250 and 2000 meter buffers (**desired**). |
| **Datasets:** | Buffers; parcel land use data including land and/or building floor area; spatially referenced housing unit data |
| **Definition:** | Residential density is a ratio of residential housing units (preferred) or population (alternative) (numerator) to the land area devoted to residential use in the road network buffer (denominator). When only residential land area is used in the denominator (the **desired** way) then **net-residential density** is calculated. When the total land area of a buffer (all uses) is used then **gross-residential density** is calculated (**required**).<br><br>*For the denominator, include housing where people live permanently, year-round (mostly), in non-moveable (at least not easily moved housing/dwelling units (e.g. recreational mobile homes are easily moved). Include single and multiple family housing units. Include mobile home parks and school-related housing (e.g. dormitories/apartments). Do NOT include temporary housing (e.g.* |

| | |
|---|---|
| | *hotels, motels, hostels) or institutionalized restricted living (e.g. prisons, hospitals, nursing homes).* **Please see Appendix D for a list of included and excluded land uses.**<br><br>Total 'residential land use area' is defined as the sum of the single family and multi-family land area (square meters) of all parcels with a residential land use within a participant's buffer (**required**). The single family sums and the multi-family sums should be provided separately, as well as combined.<br><br>Total 'residential building floor area' is defined as the sum of the single family and multi-family building floor area (from all floors) of all residential buildings within a participant's buffer (**desired**). The single family sums and the multi-family sums should be provided separately, as well as combined.<br><br>These differ from 'residential building footprint area' which is defined as the sum of the single family and multi-family building footprint area of all residential buildings within a participant's buffer (**speculative**). |
| **Important notes:** | The goal is for each country to use the best available source of information. Use the best available data and methods, which most accurately report the number of housing units on each parcel.<br><br>In the U.S. housing unit totals from Census blocks were used as control totals. These counts were apportioned to specific residential parcels, within the blocks, based on the type of residential use on each parcel. This was done because of the lack of complete and reliable parcel-level housing unit counts in the provided parcel data.<br><br>The following criteria were used in the U.S. to apportion the census control totals to each residential parcel and to distinguish between Multi-Family and Single Family Housing Units.<br>*(Note: The following process requires that each parcel is already identified with some differentiation of the type of residential present on the parcel.)*<br>1. In the US the residential parcels within each block were determined. |

2. Any available attribute information in the parcel data was used as part of the apportionment method. A housing unit count was assigned to each parcel based on the residential land use type provided in the parcel data. This assigned count was then used to apportion the census total housing unit count. Steps 3 and 4 below describe the process to assign counts based on the parcel land use classification, and guidance is given on what types of uses are single family and which are multi-family. See the text in parentheses for guidance on the housing unit count.
3. For Single Family (SF):
    a. Single housing unit under one roof (count equals one).
        i. Exceptions--include as single family the following:
            1. "Semi-attached" (count equals number of semi-attached units).
            2. Duplex (two) homes connected by a wall, under same roof (count equals number of duplex structures times two).
            3. House with accessory apartment (count equals number of houses with accessory apartments times two)
4. For Multi-Family (MF):
    a. Three or more housing units under one roof (count equals the number of separate units under one roof)
        i. Exception: a "mobile home park" is considered multi-family even though the mobile homes are not connected to one another under one roof. They are considered multi-family due the levels of densities achieved by these small homes on typically small lots (count equals number of separate mobile homes).
        ii. Duplexes (two attached units) are not considered multi-family due to the structure and size typically being similar to two single family homes that are attached.
5. Once all residential parcels have been assigned a housing unit count (based on the parcel land use categories) the total SF and MF counts are summed for the residential parcels in each block, and then are used to assign the census based control totals.
    a. For example, a census block with 100 housing units (according to the census) contains 30 residential parcels. 20 of these parcels are single family and 10 are multi-family.

i. Each single family parcel is assigned one census unit each (leaving 80 to distribute across the 10 multi-family parcels).
ii. If nothing else is known about these multi-family parcels (e.g. more disaggregate groupings (such as triplexes, 4-10 units, 25 plus units) or building floor area) then each multi-family parcel is assigned 8 units. If information is present to make a more refined, differentiated assignment of the 80 units to each parcel then that should be used.

6. Once each residential parcel is assigned a census-based housing unit count, the parcels' census unit SF and MF counts can be individually summed to each participant buffers.

Additionally, parcels should be used instead of land cover data in the denominator, when available. See Appendix E.

- All area values should be reported in **square meters**. This is *required* for all datasets being sent to the IPEN CC.

- There are different methods of handling multiple residential polygons that intersect and partially overlap participants' buffers. We recommend that the entire residential parcel be included in the sum of 'residential land area' if any portion of a residential-parcel polygon intersects the buffer polygon (**recommended approach**).
- If the parcel is represented by a point (**acceptable approach**) the point should be "snapped" (assigned) to the nearest road segment. If the point intersects or is contained by a buffer, then the point is assigned to that buffer.

<u>Guidance for Parcels with Multiple Land Uses</u>

Vertically Mixed: A vertically mixed use parcel is one which has multiple uses within the same building (e.g. retail, office, residential). Vertical mix is usually indicated by a land use code of "mixed". For example "mixed residential, retail, and office".

There are several methods of handling vertically-mixed use parcels. If it is not possible to determine the building floor area on multiple floors that is dedicated to residential land use, then should

| | | | |
|---|---|---|---|
| | you assign the *entire* parcel land area to residential land use (**recommended approach**), and to each of the other land uses. For example, if a parcel's land area (1500 $m^2$) is designated "mixed residential, retail, and office" and there is no way to determine how much of the building's vertical area is designated for each use, we recommend counting the entire parcel area in the residential (1500 $m^2$), retail (1500 $m^2$) AND office (1500 $m^2$) datasets. This approach triple counts that parcel, but will reflect mixed use for this location.<br><br>If it is possible to determine the building floor area, we still recommend that you follow the above approach to calculate the required land area variables (required variables) and assign the *entire* parcel land area to residential land use, and to each of the other land uses. This ensures that we have comparable variables across countries. However, when calculating building floor areas (desired variable) then the floor areas should be proportionally allocated to the uses based on their floor area relative to the total of entire building floor area.<br><br>Horizontally Mixed: This commonly occurs when there are multiple buildings on the same parcel, but they have different uses (e.g. a residential home next to an office building, but on the same parcel). The *recommended* approach is to divide the land area by the number of buildings. The *acceptable* approach is to proportionally allocate the land area (of the parcel) to the buildings based on their "footprint" or ground-floor area relative to the total of all the buildings ground-floor area. | | |
| **Details:** | **Please respond to the questions below:** | Excluded / NO | Included / YES |
| 1. Did you use the residential land use definitions provided above? | | | |
| a. Did your residential land use definition differ from the one provided above in any way? Please describe below: | | | |
| 2. Did you use parcels or land cover to calculate land use (See Appendix E for an example graphic.)? If neither, please describe below the areal unit that has land use category | | | |

| | | |
|---|---|---|
| attributes in your country. | | |
| 3. Did you compute residential land use variables for participants' *residential* buffers (**required**)? | | |
| 4. Did you create land use variables for participants' 500-meter *residential* buffers (**required**)? | | |
| 5. Did you create land use variables for participants' 1000-meter *residential* buffers (**required**)? | | |
| 6. Did you create land use variables for participants' 250-meter *residential* buffers (**desired**)? | | |
| 7. Did you create land use variables for participants' 2000-meter *residential* buffers (**desired**)? | | |
| 8. Did you compute residential land use variables for participants' *school* buffers (**required**)? | | |
| 9. Did you create land use variables for participants' 500-meter *school* buffers (**required**)? | | |
| 10. Did you create land use variables for participants' 1000-meter *school* buffers (**required**)? | | |
| 11. Did you create land use variables for participants' 250-meter *school* buffers (**desired**)? | | |
| 12. Did you create land use variables for participants' 2000-meter *school* buffers (**desired**)? | | |
| 13. Did you sum the number of residential parcels within participants' buffers (**required**)? | | |
| a. Did you sum the single family amount separate from the multi-family? | | |
| 14. Did you sum residential land area (**required**)? | | |
| a. Did you sum the single family amount separate from the multi-family? | | |
| 15. Did you sum residential building floor area (**desired**)? | | |
| a. Did you sum the single family amount separate from the multi-family? | | |
| 16. Did you report all area measures (i.e. land area or floor areas) in square meters? | | |
| 17. Did you calculate net residential density (**desired**)? | | |
| a. Did you use 'residential land area' in the denominator | | |

| | | |
|---|---|---|
| (**desired**)? If not, please explain your calculation below: | | |
| b. Did you calculate single family net residential density separate from multi-family net residential density? | | |
| 18. Did you calculate gross residential density (**required**)? | | |
| a. Did you calculate single family gross residential density separate from multi-family gross residential density? | | |
| *19. For the numerator, there are different types of counts. Please indicate below if you used housing units, people, or both.* | | |
| a. For the numerator, did you use a count of housing units/dwellings? (**recommended**) What is the source of this data? | | |
| b. For the numerator, did you use a count of people? (**acceptable**) What is the source of this data? | | |
| c. How was the number of housing units or people in each participant's buffer determined? | | |
| d. If you used a count of people, what is an average number of people per household? | | |
| 20. For the denominator, did you use the residential land use definitions provided above? | | |
| *a.* Did you include temporary or institutional housing? | | |
| *b.* Did you include other housing types? | | |
| *c.* Did your land use definition differ from the one provided above in any other way? Please describe below: | | |
| *21.* Did you use "land use area" to calculate the denominator for residential land use? | | |
| *22. For the denominator, there are different methods of handling residential land use polygons/points that intersect and partially overlap participants' buffers. Please indicate which one of these procedures you used:* | | |
| a. An entire residential parcel was included in the sum of 'residential land area' if any portion of an residential- | | |

| | | |
|---|---|---|
| parcel polygon intersected the buffer polygon (**recommended approach**). | | |
| b. An entire residential parcel was included in the sum of 'residential land area' if an residential parcel's centroid intersected or was contained by the buffer polygon (**acceptable**). | | |
| i. If the parcel is represented by a point (e.g. centroid) the point was "snapped" (assigned) to the nearest road segment. | | |
| c. Only a partial area of each residential parcel polygon intersecting the buffer was assigned to the buffer polygon. That is, land area based apportionment was used to assign the proportion of the residential parcel area to the aggregation polygon (**speculative**). | | |
| d. We used another method of handling the partial overlap of residential land use on buffer polygons (**speculative**). Please describe below: | | |
| *23. For the denominator, there are different methods for handling vertically mixed buildings (e.g. 1st floor residential/ 2nd floor office/ 3ed floor residential).* | | |
| a. Does your parcel or land use dataset include an indicator (code) of vertically mixed buildings? | | |
| b. For vertically mixed buildings, does your calculation of residential land area equal the total land area associated with the parcel? (**recommended approach**) | | |
| c. For vertically mixed buildings, does your residential land area equal a proportion of the total land area associated with the building? (**acceptable**) If so how was the residential proportion determined? | | |
| d. For vertically mixed buildings, did you use another approach? If so, please describe below. | | |

| | | |
|---|---|---|
| | | |
| *24. For the denominator, there are different methods for handling the apportionment of total parcel land area between multiple, single use building (e.g. apartment building next to office building) on the same parcel.* | | |
| a. Did you equally divide total parcel land area between the different buildings (**recommended approach**)? | | |
| b. Did you proportionally divide total parcel land area between the different buildings based on the area of their footprint (ground floor area) (**acceptable**)? | | |
| c. Did you use another approach? If so, please describe below. | | |
| 25. Please provide a full and complete list of all land use subcategories used to compute the residential land use variable (see Appendix D as an example). Please list these below: | | |

# SECTION 6: Defining & Counting Parcels with Retail Land Uses. Summing Retail Land and Building Floor Area

| | |
|---|---|
| **Aim:** | To develop a standardized definition of **retail land use** that can be compared across participants across countries. Many investigators will not have retail floor space. Identifying retail parcels is necessary to count the number of retail locations, retail land area or retail building floor area (if available). Numbers of retail uses and land area in retail use also creates predictive land use measures. Those that have retail floor area should also calculate a retail floor area measure and a floor space measure, both of which are part of the walkability index variable. |
| **Tasks:** | • Identify parcels designated as retail.<br>Calculate the number of retail parcels within participants' 500 and 1000 meter *residential* and *school* buffers (**required**) and 250 and 2000 meter buffers (**desired**).<br>Calculate the sum of the land area for the retail parcels (**required**) and/or building floor areas (**desired**) for buildings on retail parcels for within participants' 500 and 1000 meter *residential* and *school* buffers (**required**) and 250 and 2000 meter buffers (**desired**). |
| **Datasets:** | Land use parcel data with parcel and building floor area attributes; participant buffers |
| **Definition:** | A parcel has a retail land use if participants can shop for certain types of goods and services. Retail land use can include independent retail stores, clustered shops, strip malls, specialty markets, bazaars, and shopping malls (neighborhood, community, or regional). **Please see Appendix D for a list of included and excluded retail land uses.** Some examples of types of retail land use include department stores, banking, gas stations with associated retail store, and clothing shops/boutiques. Excluded are automobile-dependent "region-serving" or "big box" (e.g. Costco, WalMart) stores, and/or uses of 300,000 square feet (27,871 square meters) or larger. Entertainment (e.g. movie and performance theaters), food-related, restaurants, recreation facilities (e.g. health clubs, bowling), educational, civic/institutional, vacant and office land uses are excluded from retail, as they will be classified into their own land use area. Retail land use excludes parcels which contain only automobile parking lots.<br><br>Total 'retail land area' is defined as the sum of the land area (acreage) of all parcels with a retail land use within a participant's buffer (**required**).<br><br>Total 'retail building floor area' is defined as the sum of the building floor |

| | |
|---|---|
| | area (all floors) of all retail buildings within a participant's buffer (**desired**) (note that some countries may not have building floor area information).<br><br>These differ from 'retail building footprint area' which is defined as the sum of the building footprint areas of all retail buildings within a participant's buffer. |
| **Important Information:** | • All food-related and restaurant land uses (if available) are excluded from retail land use. Food-related and restaurant land uses should be separated into its own land use area variables (similar to entertainment, recreation, civic variables).<br><br>• All area values should be reported in **square meters**. This is *required* for all datasets being sent to the IPEN CC.<br><br>• There are different methods of handling multiple retail polygons that intersect and partially overlap participants' buffers. We recommend that the entire retail parcel be included in the sum of 'retail land area' if any portion of a retail-parcel polygon intersects the buffer polygon (**recommended approach**).<br><br>• If the parcel is represented by a point (**acceptable approach**) the point should be "snapped" (assigned) to the nearest road segment. If the point intersects or is contained by a buffer, then the point is assigned to that buffer.<br><br><u>Guidance for Parcels with Multiple Land Uses</u><br><br>Vertically Mixed: A vertically mixed use parcel is one which has multiple uses within the same building (e.g. retail, office, residential). Vertical mix is usually indicated by a land use code of "mixed". For example "mixed residential, retail, and office".<br><br>There are several methods of handling vertically mixed use parcels. If it is not possible to determine the building floor area on multiple floors that is dedicated to retail land use, then should you assign the *entire* parcel land area to retail land use (**recommended approach**), and to each of the other land uses. For example, if a parcel's land area (1500 $m^2$) is designated "mixed residential, retail, and office" and there is no way to determine how much of the building's vertical area is |

| | | | |
|---|---|---|---|
| | designated for each use, we recommend counting the entire parcel area in the residential (1500 $m^2$), retail (1500 $m^2$) AND office (1500 $m^2$) datasets. This approach triple counts that parcel, but will reflect mixed use for this location.<br><br>If it is possible to determine the building floor area, we still recommend that you follow the above approach to calculate the required land area variables (required variables) and assign the *entire* parcel land area to retail land use, and to each of the other land uses. This ensures that we have comparable methods across countries. However, when calculating building floor areas (desired variable) then the floor areas should be proportionally allocated to the uses based on their floor area relative to the total of entire building floor area.<br><br>Horizontally Mixed: This commonly occurs when there are multiple buildings on the same parcel, but they have different uses (e.g. a retail store next to an office building, but on the same parcel). The recommended approach is to divide the land area by the number of buildings. The acceptable approach is to proportionally allocate the land area (of the parcel) to the buildings based on their "footprint" or ground-floor area relative to the total of all the buildings ground-floor area.<br><br>Parcels should be used instead of land cover data, if available.<br>See Appendix E. | | |
| **Details:** | **Please respond to the questions below:** | Excluded /NO | Included /YES |
| | | | |
| 1. Did you use the retail land use definitions provided above? | | | |
| a. Did you exclude automobile-dependent "region-serving" or "big box" (e.g. Costco, WalMart) stores, and/or uses of 300,000 square feet or larger in your calculation of retail land use (**required**)? | | | |
| b. Did you exclude parcels classified as parking (**required**)? | | | |
| c. Did your land use definition differ from the one provided above in any other way? Please describe below: | | | |
| 2. Did you use parcels or land cover to calculate land use (See | | | |

| | | |
|---|---|---|
| appendix E)? If neither, please describe below the areal unit that has land use category attributes in your country. | | |
| 3. Did you compute retail land use variables for participants' residential buffers (**required**)? | | |
| 4. Did you compute retail land use variables for participants' 500-meter *residential* buffers (**required**)? | | |
| 5. Did you compute retail land use variables for participants' 1000-meter *residential* buffers (**required**)? | | |
| 6. Did you compute retail land use variables for participants' 250-meter *residential* buffers (**desired**)? | | |
| 7. Did you compute retail land use variables for participants' 2000-meter *residential* buffers (**desired**)? | | |
| 8. Did you compute retail land use variables for participants' *school* buffers (**required**)? | | |
| 9. Did you compute retail land use variables for participants' 500-meter *school* buffers (**required**)? | | |
| 10. Did you compute retail land use variables for participants' 1000-meter *school* buffers (**required**)? | | |
| 11. Did you compute retail land use variables for participants' 250-meter *school* buffers (**desired**)? | | |
| 12. Did you compute retail land use variables for participants' 2000-meter *school* buffers (**desired**)? | | |
| *13.* Did you sum the number of retail parcels (**required**)? | | |
| 14. Did you sum retail land area (**required**)? | | |
| *15.* Did you sum building floor area (**desired**)? | | |
| *16.* Did you report area measures (i.e. land area or floor areas) in square meters? | | |
| 17. *There are different methods of handling multiple retail polygons/points that intersect and partially overlap participants' buffers. Please indicate which one of these procedures best describes the method you used:* | | |

| | | |
|---|---|---|
| a. An entire retail parcel was included in the sum of 'retail land area' if any portion of an retail-parcel polygon intersected the buffer polygon (**recommended approach**). | | |
| b. An entire retail parcel was included in the sum of 'retail land area' if an retail parcel's centroid intersected or was contained by the buffer polygon (**acceptable**). | | |
| i. If the parcel is represented by a point (e.g. centroid) the point was "snapped" (assigned) to the nearest road segment. | | |
| c. Only a partial area of each retail parcel polygon intersecting the buffer was assigned to the buffer polygon. That is, land area based apportionment was used to assign the proportion of the retail parcel area to the aggregation polygon (**speculative**). | | |
| d. We used another method of handling the partial overlap of retail land use on buffer polygons. Please describe below: | | |
| 18. *There are different methods for handling vertically mixed buildings (e.g. 1st floor retail/ 2nd floor office/ 3rd floor residential).* | | |
| a. Does your parcel or land use dataset include an indicator (code) for vertically mixed buildings? | | |
| b. For vertically mixed buildings, does your calculation of retail land area equal the total land area associated with the parcel? (**recommended approach**) | | |
| c. For vertically mixed buildings, does your retail land area equal a proportion of the total land area associated with the building? (**acceptable**) If so how was the retail proportion determined? | | |
| d. For vertically mixed buildings, did you use another approach? If so, please describe below. | | |

| | | |
|---|---|---|
| | | |
| 19. *There are different methods for handling multiple, single use buildings (e.g. retail store next to office building) on the same parcel.* | | |
| a. Did you equally divide total parcel land area between the different buildings (**recommended approach**)? | | |
| b. Did you proportionally divide total parcel land area between the different buildings based on the area of their footprint (ground floor area) (**acceptable**)? | | |
| c. Did you use another approach? If so, please describe below. | | |
| 20. Please provide a full and complete list of all land use subcategories used to compute the aggregated retail/commercial land use variable (see Appendix D as an example). Please list these below: | | |

# SECTION 7: Creation of Civic & Institutional Land Use Area

| | |
|---|---|
| **Aim:** | To develop a standardized definition of **civic and institutional land use** to be compared across participants across countries. The civic/institutional land use area and building floor area (if available) sums will be used to calculate the land use mix variable, which is part of the walkability index variable. |
| **Tasks:** | • Identify parcels designated as civic and institutional.<br>• Count the number of parcels designated as civic and institutional within participants' 500 and 1000 meter *residential* and *school* buffers (**required**) and 250 and 2000 meter buffers (**desired**).<br>• Calculate the sum of the land area (**required**) and/or building floor area (**desired**) of civic and institutional land use parcels within participants' 500 and 1000 meter *residential* and *school* buffers (**required**) and 250 and 2000 meter buffers (**desired**). |
| **Datasets:** | Land use parcel data with land and building floor area attributes; participant buffers |
| **Definition:** | A parcel has a civic and/or institutional land use if the setting is used for educational, religious, health, historical, governmental, correctional, police or military facilities. Civic and institutional land uses may include public facilities such as libraries and some types of private facilities (for non-profit or for profit) such as private colleges. Examples of public civic and institutional facilities include schools, colleges, fire stations, police stations, military bases, government post offices, public works, and other governmental facilities. Private facilities must be related to one of the settings noted above (e.g. private school, private-for-profit hospital). More examples of the types of locations to be designated as civic/institutional are provided in **Appendix D. Please see Appendix D for a list of included and excluded land uses.** Retail, entertainment, food, recreation and office land uses are excluded from civic/institutional land uses, as they will be classified into their own land use type. Civic/institutional land use area can be calculated from land use area or building floor area.<br><br>Total 'civic/institutional land area' is defined as the sum of the land area (acreage) of all parcels with a civic/institutional land use within a participant's buffer<br><br>Total 'civic/institutional building floor area' is defined as the sum of the building floor area (from all floors) of all civic/institutional buildings within a participant's buffer. |

| | |
|---|---|
| | These differ from 'civic/institutional building footprint area' which is defined as the sum of the building footprint area of all civic/institutional buildings within a participant's buffer. |
| **Important Notes:** | • All area values should be reported in **square meters**. This is *required* for all datasets being sent to the IPEN CC.<br><br>• There are different methods of handling multiple civic/institutional polygons that intersect and partially overlap participants' buffers. We recommend that the entire civic/institutional parcel be included in the sum of 'civic/institutional land area' if any portion of an civic/institutional parcel polygon intersects the buffer polygon (**recommended approach**).<br><br>• If the parcel is represented by a point (**acceptable approach**) the point should be "snapped" (assigned) to the nearest road segment. If the point intersects or is contained by a buffer, then the point is assigned to that buffer.<br><br><u>Guidance for Parcels with Multiple Land Uses</u><br><br>Vertically Mixed: A vertically mixed use parcel is one which has multiple uses within the same building (e.g. civic/institutional, office). Vertical mix is usually indicated by a land use code of "mixed". For example "mixed civic/institutional and office".<br><br>There are several methods of handling vertically mixed use parcels. If it is not possible to determine the building floor area on multiple floors that is dedicated to civic/institutional land use, then should you assign the *entire* parcel land area to civic/institutional land use (**recommended approach**), and to each of the other land uses. For example, if a parcel's land area (1500 $m^2$) is designated "mixed residential, civic/institutional, and office" and there is no way to determine how much of the building's vertical area is designated for each use, we recommend counting the entire parcel area in the residential (1500 $m^2$), civic/institutional (1500 $m^2$) AND office (1500 $m^2$) datasets. This approach triple counts that parcel, but will reflect mixed use for this location.<br><br>If it is possible to determine the building floor area, we still recommend that |

| | | | |
|---|---|---|---|
| | you follow the above approach to calculate the required land area variables (required variables) and assign the *entire* parcel land area to civic/institutional land use, and to each of the other land uses. This ensures that we have comparable methods across countries. However, when calculating building floor areas (desired variable) then the floor areas should be proportionally allocated to the uses based on their floor area relative to the total of entire building floor area.<br><br>Horizontally Mixed: This commonly occurs when there are multiple buildings on the same parcel, but they have different uses (e.g. a retail store next to an civic/institutional building, but on the same parcel). The recommended approach is to divide the land area by the number of buildings. The acceptable approach is to proportionally allocate the land area (of the parcel) to the buildings based on their "footprint" or ground-floor area relative to the total of all the buildings ground-floor area.<br><br>Parcels should be used instead of land cover data, if available.<br>See Appendix D. | | |
| **Details:** | **Please respond to the questions below:** | Excluded /NO | Included /YES |
| | | | |
| 1. Did you use the civic/institutional definitions provided above? | | | |
| a. Did your civic/institutional land use definition differ from the one provided above in any way? Please describe below: | | | |
| 2. Did you use parcels or land cover to calculate land use (See appendix E)? If neither, please describe below the areal unit that has land use category attributes in your country. | | | |
| 3. Did you compute civic/institutional variables for participants' residential buffers (**required**)? | | | |
| 4. Did you compute civic/institutional variables for participants' 500-meter *residential* buffers (**required**)? | | | |
| 5. Did you compute civic/institutional variables for participants' 1000-meter *residential* buffers (**required**)? | | | |
| 6. Did you compute civic/institutional variables for participants' 250-meter *residential* buffers (**desired**)? | | | |
| 7. Did you compute civic/institutional variables for participants' 2000- | | | |

| | | |
|---|---|---|
| meter *residential* buffers (**desired**)? | | |
| 8. Did you compute civic/institutional variables for participants' *school* buffers (**required**)? | | |
| 9. Did you compute civic/institutional variables for participants' 500-meter *school* buffers (**required**)? | | |
| 10. Did you compute civic/institutional variables for participants' 1000-meter *school* buffers (**required**)? | | |
| 11. Did you compute civic/institutional variables for participants' 250-meter *school* buffers (**desired**)? | | |
| 12. Did you compute civic/institutional variables for participants' 2000-meter *school* buffers (**desired**)? | | |
| 13. Did you count the number of civic/institutional parcels within participants' buffers (**required**)? | | |
| *14.* Did you sum civic/institutional land area (**required**)? | | |
| *15.* Did you sum civic/institutional building floor area (**desired**)? | | |
| *16.* Did you report area measures (i.e. land area or floor areas) in square meters? | | |
| 17. *There are different methods of handling multiple civic/institutional polygons/points that intersect and partially overlap participants' buffers. Please indicate which one of these procedures best describes the method you used:* | | |
| a. An entire *civic/institutional* parcel was included in the sum of '*civic/institutional* land area' if any portion of an *civic/institutional* parcel polygon intersected the buffer polygon (**recommended approach**). | | |
| b. An entire *civic/institutional* parcel was included in the sum of '*civic/institutional* land area' if an *civic/institutional* parcel's centroid intersected or was contained by the buffer polygon (**acceptable**). | | |
| c. If the parcel is represented by a point (e.g. centroid) the point was "snapped" (assigned) to the nearest road segment. | | |
| d. Only a partial area of each *civic/institutional* parcel polygon intersecting the buffer was assigned to the buffer polygon. That is, land area based apportionment was used to assign the proportion of the *civic/institutional* parcel area to the | | |

| | | |
|---|---|---|
| aggregation polygon (**speculative**). | | |
| e. We used another method of handling the partial overlap of *civic/institutional* land use on buffer polygons. Please describe below: | | |
| 18. *There are different methods for handling vertically mixed buildings (e.g. 1st floor* civic/institutional*/ 2nd floor office/ 3rd floor residential).* | | |
| a. Does your parcel or land use dataset include an indicator (code) for vertically mixed buildings? | | |
| b. For vertically mixed buildings, does your calculation of civic/institutional land area equal the total land area associated with the parcel? (**recommended approach**) | | |
| c. For vertically mixed buildings, does your civic/institutional land area equal a proportion of the total land area associated with the building? (**acceptable**) If so how was the *civic/institutional* proportion determined? | | |
| d. For vertically mixed buildings, did you use another approach? If so, please describe below. | | |
| 19. *There are different methods for handling the apportionment of total parcel land area between multiple, single use building (e.g.* | | |

| | | |
|---|---|---|
| *civic/institutional facility next to office building) on the same parcel.* | | |
| a. Did you equally divide total parcel land area between the different buildings (**recommended approach**)? | | |
| b. Did you proportionally divide total parcel land area between the different buildings based on the area of their footprint (ground floor area) (**acceptable**)? | | |
| c. Did you use another approach? If so, please describe below. | | |
| 20. Please provide a full and complete list of all land use subcategories used to compute the aggregated civic/institutional land use variable (see Appendix D as an example). Please list these below: | | |

# Section 8: Creation of Entertainment Land Use Area

| | |
|---|---|
| **Aim:** | To develop a standardized definition of **entertainment land use** to be compared across participants across countries. The entertainment land use area or building floor space (if available) sums will be used to calculate the land use mix variable, which is part of the walkability index variable. |
| **Tasks:** | • Identify parcels designated as entertainment.<br>• Count the number of parcels designated as entertainment within participants' 500 and 1000 meter *residential* and *school* buffers (**required**) and 250 and 2000 meter buffers (**desired**).<br>• Calculate the sum of the land area (**required**) and/or building floor area (**desired**) of entertainment land use parcels within participants' 500 and 1000 meter *residential* and *school* buffers (**required**) and 250 and 2000 meter buffers (**desired**). |
| **Datasets:** | Land use parcel data with land and/or building floor area attributes; participant buffers |
| **Definition:** | A parcel has an entertainment land use if participants can visit the location for certain types of social activities. Entertainment uses are defined as day or night settings where individuals go to be social with other people or to be entertained. Entertainment uses may include club settings (bars, night clubs), coffee shops, cinemas, theaters, museums, or other social clubs. Excluded from entertainment uses are recreation facilities where people can be social and physically active (e.g. bowling alley, ice skating rinks, country clubs). **Please see Appendix D for a list of included and excluded entertainment land uses.** Retail, recreational, educational, civic/institutional, and office land uses are excluded from entertainment, as they will be classified into their own land use type. Entertainment land use area can be calculated from land use area or building floor area.<br><br>Total 'entertainment land use area' is defined as the sum of the land area (acreage) of all parcels with a entertainment land use within a participant's buffer<br><br>Total 'entertainment building floor area' is defined as the sum of the building floor area (from all floors) of all entertainment buildings within a participant's buffer.<br><br>These differ from 'entertainment building footprint area' which is defined as the sum of the building footprint area of all entertainment buildings within a participant's buffer. |

| | |
|---|---|
| | |
| **Important Notes:** | • All area values should be reported in **square meters**. This is *required* for all datasets being sent to the IPEN CC.<br><br>• There are different methods of handling multiple entertainment polygons that intersect and partially overlap participants' buffers. We recommend that the entire entertainment parcel be included in the sum of 'entertainment land area' if any portion of an entertainment -parcel polygon intersects the buffer polygon (**recommended approach**).<br><br>• If the parcel is represented by a point (**acceptable approach**) the point should be "snapped" (assigned) to the nearest road segment. If the point intersects or is contained by a buffer, then the point is assigned to that buffer.<br><br><u>Guidance for Parcels with Multiple Land Uses</u><br><br>Vertically Mixed: A vertically mixed use parcel is one which has multiple uses within the same building (e.g. retail, entertainment, residential). Vertical mix is usually indicated by a land use code of "mixed". For example "mixed residential, retail, and entertainment".<br><br>There are several methods of handling vertically mixed use parcels. If it is not possible to determine the building floor area on multiple floors that is dedicated to entertainment land use, then should you assign the *entire* parcel land area to entertainment land use (**recommended approach**), and to each of the other land uses. For example, if a parcel's land area (1500 $m^2$) is designated "mixed residential, retail, and entertainment" and there is no way to determine how much of the building's vertical area is designated for each use, we recommend counting the entire parcel area in the residential (1500 $m^2$), retail (1500 $m^2$) AND entertainment (1500 $m^2$) datasets. This approach triple counts that parcel, but will reflect mixed use for this location. |

| | | | |
|---|---|---|---|
| | If it is possible to determine the building floor area, we still recommend that you follow the above approach to calculate the required land area variables (required variables) and assign the *entire* parcel land area to entertainment land use, and to each of the other land uses. This ensures that we have comparable methods across countries. However, when calculating building floor areas (desired variable) then the floor areas should be proportionally allocated to the uses based on their floor area relative to the total of entire building floor area.<br><br>• Horizontally Mixed: This commonly occurs when there are multiple buildings on the same parcel, but they have different uses (e.g. a retail store next to an entertainment building, but on the same parcel). The recommended approach is to divide the land area by the number of buildings. The acceptable approach is to proportionally allocate the land area (of the parcel) to the buildings based on their "footprint" or ground-floor area relative to the total of all the buildings ground-floor area.<br><br>Parcels should be used instead of land cover data, if available.<br>See Appendix E. | | |
| **Details:** | **Please respond to the questions below:** | Excluded /NO | Included /YES |
| | | | |
| 1. Did you use the entertainment definitions provided above? | | | |
| a. Did your entertainment land use definition differ from the one provided above in any way? Please describe below: | | | |
| 2. Did you use parcels or land cover to calculate land use (See appendix E)? If neither, please describe below the areal unit that has land use category attributes in your country. | | | |
| 3. Did you compute entertainment variables for participants' residential buffers (**required**)? | | | |
| 4. Did you compute entertainment variables for participants' 500-meter *residential* buffers (**required**)? | | | |
| 5. Did you compute entertainment variables for participants' 1000-meter *residential* buffers (**required**)? | | | |

| | | |
|---|---|---|
| 6. Did you compute entertainment variables for participants' 250-meter *residential* buffers (**desired**)? | | |
| 7. Did you compute entertainment variables for participants' 2000-meter *residential* buffers (**desired**)? | | |
| 8. Did you compute entertainment variables for participants' *school* buffers (**required**)? | | |
| 9. Did you compute entertainment variables for participants' 500-meter *school* buffers (**required**)? | | |
| 10. Did you compute entertainment variables for participants' 1000-meter *school* buffers (**required**)? | | |
| 11. Did you compute entertainment variables for participants' 250-meter *school* buffers (**desired**)? | | |
| 12. Did you compute entertainment variables for participants' 2000-meter *school* buffers (**desired**)? | | |
| 13. Did you count the number of entertainment parcels within participants' buffers (**required**)? | | |
| 14. Did you sum entertainment land area (**required**)? | | |
| 15. Did you sum entertainment building floor area (**desired**)? | | |
| *16.* Did you report area measures (i.e. land area or floor areas) in square meters? | | |
| 17. *There are different methods of handling multiple entertainment polygons/points that intersect and partially overlap participants' buffers. Please indicate which one of these procedures best describes the method you used:* | | |
| a. An entire entertainment parcel was included in the sum of 'entertainment land area' if any portion of an entertainment - parcel polygon intersected the buffer polygon (**recommended approach**). | | |
| b. An entire entertainment parcel was included in the sum of 'entertainment land area' if an entertainment parcel's centroid intersected or was contained by the buffer polygon (**acceptable**). | | |
| c. If the parcel is represented by a point (e.g. centroid) the point was "snapped" (assigned) to the nearest road segment. | | |
| d. Only a partial area of each entertainment parcel polygon intersecting the buffer was assigned to the buffer polygon. That is, land area based apportionment was used to assign the | | |

| | | |
|---|---|---|
| proportion of the entertainment parcel area to the aggregation polygon (**speculative**). | | |
| e. We used another method of handling the partial overlap of entertainment land use on buffer polygons. Please describe below: | | |
| 18. *There are different methods for handling vertically mixed buildings (e.g. 1st floor entertainment/ 2nd floor office/ 3rd floor residential).* | | |
| a. Does your parcel or land use dataset include an indicator (code) for vertically mixed buildings? | | |
| b. For vertically mixed buildings, does your calculation of entertainment land area equal the total land area associated with the parcel? (**recommended approach**) | | |
| c. For vertically mixed buildings, does your entertainment land area equal a proportion of the total land area associated with the building? (**acceptable**) If so how was the entertainment proportion determined? | | |
| d. For vertically mixed buildings, did you use another approach? If so, please describe below. | | |
| 19. *There are different methods for handling multiple, single use buildings (e.g. entertainment store next to office building) on the* | | |

| | | |
|---|---|---|
| *same parcel.* | | |
| a. Did you equally divide total parcel land area between the different buildings (**recommended approach**)? | | |
| b. Did you proportionally divide total parcel land area between the different buildings based on the area of their footprint (ground floor area) (**acceptable**)? | | |
| c. Did you use another approach? If so, please describe below. | | |
| 20. Please provide a full and complete list of all land use subcategories used to compute the aggregated entertainment land use variable (see Appendix D as an example). Please list these below: | | |

# Section 9: Creation of Food Related Land Use Area

| | |
|---|---|
| **Aim:** | To develop a standardized definition of **food-related** and **restaurant land use** (combined and separated, if possible) to be compared across participants across countries. The 'food-related land area' and/or 'food-related building floor space' (if available) sums will be used to calculate the land use mix variable, which is part of the walkability index variable. |
| **Tasks:** | • Identify parcels designated as food-related and restaurant (combined and separately, if possible)<br>• Count the number of parcels designated as food related (**required**) and/or restaurant (**desired**) within participants' 500 and 1000 meter *residential* and *school* buffers (**required**) and 250 and 2000 meter buffers (**desired**)..<br>• Calculate the sum of the land area (**required**) and/or building floor area (**desired**) of food related and restaurant land use parcels (combined and separately, if possible) within participants' 500 and 1000 meter *residential* and *school* buffers (**required**) and 250 and 2000 meter buffers (**desired**). |
| **Datasets:** | Land use parcel data with parcel and building floor area attributes; participant buffers |
| **Definition:** | A parcel has a food-related land use if participants primarily visit the location in order to purchase unprepared food, or eat or take away fully prepared food. Food related land uses such as grocery stores, convenience stores, bakeries, restaurants, fast food chains, or any stores mainly selling food should be included (not department stores or shopping malls). Do not include multi-use facilities with restaurants, such as hotels, department stores, shopping malls, and office buildings. **Please see Appendix D for a list of included and excluded restaurant land uses.** Retail, entertainment, recreational, educational, civic/institutional, and office land uses are excluded from food-related land use, as they will be classified into their own land use type.<br><br>A restaurant land use should be calculated in addition to food-related land use if possible. Restaurant land use includes any limited or full service location where you eat or take away fully prepared food. Do not include multi-use facilities described above.<br><br>Total 'food-related land area' is defined as the sum of the land area (acreage) of all parcels with a food-related land use within a participant's buffer (**required**).<br><br>Total 'food-related building floor area' is defined as the sum of the building floor area (from all floors) of all food-related buildings within a participant's |

| | |
|---|---|
| | buffer (**desired**).<br><br>These differ from 'food-related building footprint area' which is defined as the sum of the building footprint area of all food-related buildings within a participant's buffer (**speculative**).<br><br>Total 'restaurant land area' is defined as the sum of the land area (acreage) of all parcels with a restaurant land use within a participant's buffer (**desired**).<br><br>Total 'restaurant building floor area' is defined as the sum of the building floor area (from all floors) of all restaurant buildings within a participant's buffer (**desired**).<br><br>These differ from 'restaurant-related building footprint area' which is defined as the sum of the building footprint area of all restaurant buildings within a participant's buffer (**speculative**). |
| **Important Information:** | • All area values should be reported in **square meters**. This is *required* for all datasets being sent to the IPEN CC.<br><br>• There are different methods of handling multiple food-related polygons that intersect and partially overlap participants' buffers. We recommend that the entire food-related parcel be included in the sum of 'food-related land area' if any portion of an food-related parcel polygon intersects the buffer polygon (**recommended approach**).<br><br>• If the parcel is represented by a point (**acceptable approach**) the point should be "snapped" (assigned) to the nearest road segment. If the point intersects or is contained by a buffer, then the point is assigned to that buffer.<br><br><u>Guidance for Parcels with Multiple Land Uses</u><br><br>Vertically Mixed: A vertically mixed use parcel is one which has multiple uses within the same building (e.g. retail, food-related, residential). Vertical mix is usually indicated by a land use code of "mixed". For example "mixed residential, retail, and food-related". |

| | | | |
|---|---|---|---|
| | There are several methods of handling vertically mixed use parcels. If it is not possible to determine the building floor area on multiple floors that is dedicated to food-related land use, then should you assign the *entire* parcel land area to food-related land use (**recommended approach**), and to each of the other land uses. For example, if a parcel's land area (1500 $m^2$) is designated "mixed food-related, retail, and residential" and there is no way to determine how much of the building's vertical area is designated for each use, we recommend counting the entire parcel area in the food-related (1500 $m^2$), retail (1500 $m^2$) AND residential (1500 $m^2$) datasets. This approach triple counts that parcel, but will reflect mixed use for this location.<br><br>If it is possible to determine the building floor area, we still recommend that you follow the above approach to calculate the required land area variables (required variables) and assign the *entire* parcel land area to food-related land use, and to each of the other land uses. This ensures that we have comparable methods across countries. However, when calculating building floor areas (desired variable) then the floor areas should be proportionally allocated to the uses based on their floor area relative to the total of entire building floor area.<br><br>Horizontally Mixed: This commonly occurs when there are multiple buildings on the same parcel, but they have different uses (e.g. a retail store next to an office building, but on the same parcel). The recommended approach is to divide the land area by the number of buildings. The acceptable approach is to proportionally allocate the land area (of the parcel) to the buildings based on their "footprint" or ground-floor area relative to the total of all the buildings ground-floor area.<br><br>Parcels should be used instead of land cover data, if available.<br>See Appendix E. | | |
| **Details:** | **Please respond to the questions below:** | Excluded /NO | Included /YES |
| | | | |
| 1. Did you use the food-related and restaurant definitions provided above? | | | |
| a. Did your food-related land use definition differ from the one | | | |

| | | |
|---|---|---|
| provided above in any way? Please describe below: | | |
| b. Did your restaurant land use definition differ from the one provided above in any way? Please describe below: | | |
| 2. Did you use parcels or land cover to calculate land use (See appendix E)? If neither, please describe below the areal unit that has land use category attributes in your country. | | |
| 3. Did you compute food-related variables for participants' residential buffers (**required**)? | | |
| 4. Did you compute food-related variables for participants' 500-meter *residential* buffers (**required**)? | | |
| 5. Did you compute food-related variables for participants' 1000-meter *residential* buffers (**required**)? | | |
| 6. Did you compute food-related variables for participants' 250-meter *residential* buffers (**desired**)? | | |
| 7. Did you compute food-related variables for participants' 2000-meter *residential* buffers (**desired**)? | | |
| 8. Did you compute food-related variables for participants' *school* buffers (**required**)? | | |
| 9. Did you compute food-related variables for participants' 500-meter *school* buffers (**required**)? | | |
| 10. Did you compute food-related variables for participants' 1000-meter *school* buffers (**required**)? | | |
| 11. Did you compute food-related variables for participants' 250-meter *school* buffers (**desired**)? | | |
| 12. Did you compute food-related variables for participants' 2000-meter *school* buffers (**desired**)? | | |
| 13. Did you compute restaurant-related variables for participants' *residential* buffers (**required**)? | | |
| 14. Did you compute restaurant-related variables for participants' 500-meter *residential* buffers (**required**)? | | |
| 15. Did you compute restaurant-related variables for participants' 1000-meter *residential* buffers (**required**)? | | |
| 16. Did you compute restaurant-related variables for participants' 250-meter *residential* buffers (**desired**)? | | |

| | | |
|---|---|---|
| 17. Did you compute restaurant-related variables for participants' 2000-meter *residential* buffers (**desired**)? | | |
| 18. Did you compute restaurant-related variables for participants' *school* buffers (**required**)? | | |
| 19. Did you compute restaurant-related variables for participants' 500-meter *school* buffers (**required**)? | | |
| 20. Did you compute restaurant-related variables for participants' 1000-meter *school* buffers (**required**)? | | |
| 21. Did you compute restaurant-related variables for participants' 250-meter *school* buffers (**desired**)? | | |
| 22. Did you compute restaurant-related variables for participants' 2000-meter *school* buffers (**desired**)? | | |
| 23. Did you count the number of food-related parcels within participants' buffers (**required**)? | | |
| 24. Did you sum food-related land area (**required**)? | | |
| 25. Did you sum food-related building floor area (**desired**)? | | |
| 26. Did you report food-related area measures (i.e. land area or floor areas) in square meters? | | |
| *27.* Did you count the number of restaurant parcels within participants' buffers (**desired**)? | | |
| *28.* Did you sum restaurant land area (**desired**)? | | |
| *29.* Did you sum restaurant building floor area (**desired**)? | | |
| *30.* Did you report restaurant area measures (i.e. land area or floor areas) in square meters? | | |
| 31. *There are different methods of handling multiple food-related and* restaurant *polygons/points that intersect and partially overlap participants' buffers. Please indicate which one of these procedures best describes the method you used:* | | |
| a. An entire food-related parcel was included in the sum of 'food-related land area' if any portion of a food-related parcel polygon intersected the buffer polygon (**recommended approach**). | | |
| b. An entire food-related parcel was included in the sum of 'food-related land area' if a food-related parcel's centroid intersected or was contained by the buffer polygon | | |

| | | |
|---|---|---|
| (**acceptable**). | | |
| i. If the parcel is represented by a point (e.g. centroid) the point was "snapped" (assigned) to the nearest road segment. | | |
| c. Only a partial area of each food-related parcel polygon intersecting the buffer was assigned to the buffer polygon. That is, land area based apportionment was used to assign the proportion of the food-related parcel area to the aggregation polygon (**speculative**). | | |
| d. We used another method of handling the partial overlap of food-related land use on buffer polygons. Please describe below: | | |
| 32. *There are different methods for handling vertically mixed buildings (e.g. 1st floor food-related/ 2nd floor office/ 3rd floor residential).* | | |
| a. Does your parcel or land use dataset include an indicator (code) for vertically mixed buildings? | | |
| b. For vertically mixed buildings, does your calculation of food-related land area equal the total land area associated with the parcel? (**recommended approach**) | | |
| c. For vertically mixed buildings, does your food-related land area equal a proportion of the total land area associated with the building? (**acceptable**) If so how was the food-related proportion determined? | | |
| d. For vertically mixed buildings, did you use another approach? | | |

| | | |
|---|---|---|
| If so, please describe below. | | |
| 33. *There are different methods for handling multiple, single use buildings (e.g.* grocery *store next to office building) on the same parcel.* | | |
| a. Did you equally divide total parcel land area between the different buildings (**recommended approach**)? | | |
| b. Did you proportionally divide total parcel land area between the different buildings based on the area of their footprint (ground floor area) (**acceptable**)? | | |
| c. Did you use another approach? If so, please describe below. | | |
| 34. Please provide a full and complete list of all land use subcategories used to compute the aggregated **food-related** land use variable (see Appendix D as an example). Please list these below: | | |
| 35. Please provide a full and complete list of all land use subcategories used to compute the aggregated **restaurant** land use variable (see Appendix D as an example). Please list these below: | | |

# Section 10: Creation of Office Land Use Area

| | |
|---|---|
| **Aim:** | To develop a standardized definition of **office-related land use** to be compared across participants across countries. The office land use area and building floor area (if available) sums will be used to calculate the land use mix variable, which is part of the walkability index variable. |
| **Tasks:** | • Identify parcels designated as office use.<br>• Count the number of parcels designated as office within participants' 500 and 1000 meter *residential* and *school* buffers (**required**) and 250 and 2000 meter buffers (**desired**).<br>• Calculate the sum of the land area (**required**) and/or building floor area (**desired**) of office land use parcels within participants' 500 and 1000 meter *residential* and *school* buffers (**required**) and 250 and 2000 meter buffers (**desired**). |
| **Datasets:** | Land use parcel data with land and building floor area attributes; participant buffers |
| **Definition:** | A parcel has an office land use if the setting is mainly related to day-to-day administrative, professional, or clerical activities. Such activities may include administration (school or business), accounting, advertising, billing, financial planning, legal services, medical services (e.g. physician offices, dentists, chiropractors, optometrists, veterinarians), personnel employment, record keeping, logistics, or offices that oversee and administer companies by providing organizational planning. Facilities may include public, nonprofit institutions, or corporate offices. Examples structures can include office buildings, office condominiums, or medical or veterinary offices or any other office type. Office land use does not include warehouses, manufacturing offices, or factories that produce goods or services.<br><br>More examples of the types of locations designated as office are provided in **Appendix D.** Retail, institutional, entertainment, food, and recreation land uses are excluded from office land uses, as they will be classified into their own land use type. Office land use area can be calculated from land use area or building floor area.<br><br>Total 'office land area' is defined as the sum of the land area (acreage) of all parcels with a office land use within a participant's buffer<br><br>Total 'office building floor area' is defined as the sum of the building floor area (from all floors) of all office buildings within a participant's buffer. |

| | |
|---|---|
| | These differ from 'office building footprint area' which is defined as the sum of the building footprint area of all office buildings within a participant's buffer. |
| **Important Notes:** | • All area values should be reported in **square meters**. This is *required* for all datasets being sent to the IPEN CC.<br><br>• There are different methods of handling multiple office polygons that intersect and partially overlap participants' buffers. We recommend that the entire office parcel be included in the sum of 'office land area' if any portion of an office-parcel polygon intersects the buffer polygon (**recommended approach**).<br><br>• If the parcel is represented by a point (**acceptable approach**) the point should be "snapped" (assigned) to the nearest road segment. If the point intersects or is contained by a buffer, then the point is assigned to that buffer.<br><br><u>Guidance for Parcels with Multiple Land Uses</u><br><br>Vertically Mixed: A vertically mixed use parcel is one which has multiple uses within the same building (e.g. retail, office, residential). Vertical mix is usually indicated by a land use code of "mixed". For example "mixed residential, retail, and office".<br><br>There are several methods of handling vertically mixed use parcels. If it is not possible to determine the building floor area on multiple floors that is dedicated to office land use, then should you assign the *entire* parcel land area to office land use (**recommended approach**), and to each of the other land uses. For example, if a parcel's land area (1500 $m^2$) is designated "mixed residential, retail, and office" and there is no way to determine how much of the building's vertical area is designated for each use, we recommend counting the entire parcel area in the residential (1500 $m^2$), retail (1500 $m^2$) AND office (1500 $m^2$) datasets. This approach triple counts that parcel, but will reflect mixed use for this location.<br><br>If it is possible to determine the building floor area, we still |

| | | | |
|---|---|---|---|
| | recommend that you follow the above approach to calculate the required land area variables (required variables) and assign the *entire* parcel land area to office land use, and to each of the other land uses. This ensures that we have comparable methods across countries. However, when calculating building floor areas (desired variable) then the floor areas should be proportionally allocated to the uses based on their floor area relative to the total of entire building floor area.<br><br>• Horizontally Mixed: This commonly occurs when there are multiple buildings on the same parcel, but they have different uses (e.g. a retail store next to an office building, but on the same parcel). The recommended approach is to divide the land area by the number of buildings. The acceptable approach is to proportionally allocate the land area (of the parcel) to the buildings based on their "footprint" or ground-floor area relative to the total of all the buildings ground-floor area. | | |
| **Details:** | **Please respond to the questions below:** | Excluded /NO | Included /YES |
| | | | |
| 1. Did you use the office definitions provided above? | | | |
| a. Did your office land use definition differ from the one provided above in any way? Please describe below: | | | |
| 2. Did you use parcels or land cover to calculate land use (See appendix E)? If neither, please describe below the areal unit that has land use category attributes in your country. | | | |
| 3. Did you compute office land use variables for participants' *residential* buffers (**required**)? | | | |
| 4. Did you compute office land use variables for participants' 500-meter *residential* buffers (**required**)? | | | |
| 5. Did you compute office land use variables for participants' 1000-meter *residential* buffers (**required**)? | | | |
| 6. Did you compute office land use variables for participants' 250-meter *residential* buffers (**desired**)? | | | |
| 7. Did you compute office land use variables for participants' 2000-meter *residential* buffers (**desired**)? | | | |

| | | |
|---|---|---|
| 8. Did you compute office land use variables for participants' *school* buffers (**required**)? | | |
| 9. Did you compute office land use variables for participants' 500-meter *school* buffers (**required**)? | | |
| 10. Did you compute office land use variables for participants' 1000-meter *school* buffers (**required**)? | | |
| 11. Did you compute office land use variables for participants' 250-meter *school* buffers (**desired**)? | | |
| 12. Did you compute office land use variables for participants' 2000-meter *school* buffers (**desired**)? | | |
| 13. Did you count the number of office parcels within participants' buffers (**required**)? | | |
| *14.* Did you sum office land area (**required**)? | | |
| *15.* Did you sum office building floor area (**desired**)? | | |
| 16. Did you report area measures (i.e. land area or floor areas) in square meters? | | |
| 17. *There are different methods of handling multiple office polygons/points that intersect and partially overlap participants' buffers. Please indicate which one of these procedures best describes the method you used:* | | |
| a. An entire office parcel was included in the sum of 'office land area' if any portion of an office-parcel polygon intersected the buffer polygon (**recommended approach**). | | |
| b. An entire office parcel was included in the sum of 'office land area' if an office parcel's centroid intersected or was contained by the buffer polygon (**acceptable**). | | |
| i. If the parcel is represented by a point (e.g. centroid) the point was "snapped" (assigned) to the nearest road segment. | | |
| c. Only a partial area of each office parcel polygon intersecting the buffer was assigned to the buffer polygon. That is, land area based apportionment was used to assign the proportion of the office parcel area to the aggregation polygon | | |

| | | |
|---|---|---|
| (**speculative**). | | |
| d. We used another method of handling the partial overlap of office land use on buffer polygons. Please describe below: | | |
| 18. *There are different methods for handling vertically mixed buildings (e.g. 1st floor* office*/ 2nd floor office/ 3rd floor residential).* | | |
| a. Does your parcel or land use dataset include an indicator (code) for vertically mixed buildings? | | |
| b. For vertically mixed buildings, does your calculation of office land area equal the total land area associated with the parcel? (**recommended approach**) | | |
| c. For vertically mixed buildings, does your office land area equal a proportion of the total land area associated with the building? (**acceptable**) If so how was the office proportion determined? | | |
| d. For vertically mixed buildings, did you use another approach? If so, please describe below. | | |
| 19. *There are different methods for handling the apportionment of total parcel land area between multiple, single use building (e.g. retail/shopping next to office building) on the same parcel.* | | |

| | | |
|---|---|---|
| a. Did you equally divide total parcel land area between the different buildings (**recommended approach**)? | | |
| b. Did you proportionally divide total parcel land area between the different buildings based on the area of their footprint (ground floor area) (**acceptable**)? | | |
| c. Did you use another approach? If so, please describe below. | | |
| 20. Please provide a full and complete list of all land use subcategories used to aggregate to office land use (see Appendix D as an example). Please list these below: | | |

# Section 11: Public & Private Recreation Land Use Area

| | |
|---|---|
| **Aim:** | To develop a standardized definition of public and private **recreation land use** to be compared across participants across countries. The 'recreation land use area' sums will be used to calculate the land use mix variable, which is part of the walkability index variable. **There are separate templates for public park and private recreation facilities for computing count, density, and distance.** |
| **Tasks:** | • Identify parcels designated as public or private recreation.<br>• Count the number of parcels designated as public or private recreation within participants' 500 and 1000 meter *residential* and *school* buffers (**required**) and 250 and 2000 meter buffers (**desired**).<br>• Calculate the sum of the land area (**required**) and/or building floor area (**desired**) of recreation land use parcels within participants' 500 and 1000 meter *residential* and *school* buffers (**required**) and 250 and 2000 meter buffers (**desired**). |
| **Datasets:** | Land use parcel data with building floor area and land area attributes; participant buffers |
| **Definition:** | A parcel has a recreation land use if participants are usually physically active there. Recreation land uses include both public outdoor spaces (e.g. parks, recreational spaces) and private recreation facilities. Examples of private recreation facilities include fitness centers, health clubs, tennis centers, swimming pools, golf courses, outdoor arenas, camp sites, etc. Public outdoor spaces that function as parks are included. Examples of the types of locations to be designated as recreation are provided in **Appendix D.** Excluded from recreation land use are vacant lots (or unusable open space) and outdoor and indoor locations that are not designed for physical activity. **Please see Appendix D for a list of included and excluded recreation land uses.** Retail, entertainment, educational, civic/institutional, and office land uses are excluded from recreation land uses, as they will be classified into their own land use type. Recreation land use area should be calculated from land area and building floor area (if available).<br><br>Total 'recreation land area' is defined as the sum of the land area (acreage) of all parcels with a recreation land use within a participant's buffer (**required**).<br><br>Total 'recreation building floor area' is defined as the sum of the building floor area (from all floors) of all recreation buildings within a participant's buffer (**desired**). Recreation parcels with no building on them (e.g. a public park) will have zero building floor area. |

| | |
|---|---|
| | These differ from 'recreation building footprint area' which is defined as the sum of the building footprint area of all recreation buildings within a participant's buffer. |
| **Important Notes:** | • **Please note: The tasks described here to identify recreation land use area are different than the tasks described in the template called, "Creation of Private Recreation Count/Density Variables." However, the locations of private recreation locations used for both these tasks are the same. The recreation land use area based variables also includes public recreation locations, unlike the private recreation count/density variables.**<br><br>• All area values should be reported in **square meters**. This is *required* for all datasets being sent to the IPEN CC.<br><br>• There are different methods of handling multiple recreation polygons that intersect and partially overlap participants' buffers. We recommend that the entire recreation parcel be included in the sum of 'recreation land area' if any portion of a recreation -parcel polygon intersects the buffer polygon (**recommended approach**).<br><br>• If the parcel is represented by a point (**acceptable approach**) the point should be "snapped" (assigned) to the nearest road segment. If the point intersects or is contained by a buffer, then the point is assigned to that buffer.<br><br><u>Guidance for Parcels with Multiple Land Uses</u><br><br>Vertically Mixed: A vertically mixed use parcel is one which has multiple uses within the same building (e.g. retail, recreation, residential). Vertical mix is usually indicated by a land use code of "mixed". For example "mixed residential, retail, and recreation".<br><br>There are several methods of handling vertically mixed use parcels. If it is not possible to determine the building floor area on multiple floors that is dedicated to recreation land use, then should you assign the |

| | | | |
|---|---|---|---|
| | *entire* parcel land area to recreation land use (**recommended approach**), and to each of the other land uses. For example, if a parcel's land area (1500 $m^2$) is designated "mixed residential, retail, and recreation" and there is no way to determine how much of the building's vertical area is designated for each use, we recommend counting the entire parcel area in the residential (1500 $m^2$), retail (1500 $m^2$) AND recreation (1500 $m^2$) datasets. This approach triple counts that parcel, but will reflect mixed use for this location.<br><br>If it is possible to determine the building floor area, we still recommend that you follow the above approach to calculate the required land area variables (required variables) and assign the *entire* parcel land area to recreation land use, and to each of the other land uses. This ensures that we have comparable methods across countries. However, when calculating building floor areas (desired variable) then the floor areas should be proportionally allocated to the uses based on their floor area relative to the total of entire building floor area.<br><br>Horizontally Mixed: This commonly occurs when there are multiple buildings on the same parcel, but they have different uses (e.g. a retail store next to a recreation building, but on the same parcel). The recommended approach is to divide the land area by the number of buildings. The acceptable approach is to proportionally allocate the land area (of the parcel) to the buildings based on their "footprint" or ground-floor area relative to the total of all the buildings ground-floor area.<br><br>Parcels should be used instead of land cover data, if available.<br>See Appendix E. | | |
| **Details:** | **Please respond to the questions below:** | Excluded /NO | Included /YES |
| | | | |
| 1. Did you use the recreation definitions provided above and in Appendix D? | | | |
| a. Did your recreation land use definition differ from the one provided above in any way? Please describe below: | | | |
| 2. Did you use parcels or land cover to calculate land use (See appendix E)? If neither, please describe below the areal unit that has | | | |

| | | |
|---|---|---|
| land use category attributes in your country. | | |
| 3. Did you compute recreation variables for participants' residential buffers (**required**)? | | |
| 4. Did you compute recreation variables for participants' 500-meter *residential* buffers (**required**)? | | |
| 5. Did you compute recreation variables for participants' 1000-meter *residential* buffers (**required**)? | | |
| 6. Did you compute recreation variables for participants' 250-meter *residential* buffers (**desired**)? | | |
| 7. Did you compute recreation variables for participants' 2000-meter *residential* buffers (**desired**)? | | |
| 8. Did you compute recreation variables for participants' *school* buffers (**required**)? | | |
| 9. Did you compute recreation variables for participants' 500-meter *school* buffers (**required**)? | | |
| 10. Did you compute recreation variables for participants' 1000-meter *school* buffers (**required**)? | | |
| 11. Did you compute recreation variables for participants' 250-meter *school* buffers (**desired**)? | | |
| 12. Did you compute recreation variables for participants' 2000-meter *school* buffers (**desired**)? | | |
| 13. Did you count the number of recreational parcels within participants' buffers (**required**)? | | |
| 14. Did you sum recreation land area (**required**)? | | |
| 15. Did you sum recreation building floor area (**desired**)? | | |
| *16.* Did you report area measures (i.e. land area or floor areas) in square meters? | | |
| 17. *There are different methods of handling multiple recreation polygons/points that intersect and partially overlap participants' buffers. Please indicate which one of these procedures best describes the method you used:* | | |
| a. An entire recreation parcel was included in the sum of 'recreation land area' if any portion of a recreation -parcel polygon intersected the buffer polygon (**recommended approach**). | | |

| | | |
|---|---|---|
| b. An entire recreation parcel was included in the sum of 'recreation land area' if a recreation parcel's centroid intersected or was contained by the buffer polygon (**acceptable**). | | |
| i. If the parcel is represented by a point (e.g. centroid) the point was "snapped" (assigned) to the nearest road segment. | | |
| c. Only a partial area of each recreation parcel polygon intersecting the buffer was assigned to the buffer polygon. That is, land area based apportionment was used to assign the proportion of the recreation parcel area to the aggregation polygon (**speculative**). | | |
| d. We used another method of handling the partial overlap of recreation land use on buffer polygons. Please describe below: | | |
| 18. *There are different methods for handling vertically mixed buildings (e.g. 1st floor recreation/ 2nd floor office/ 3rd floor residential).* | | |
| a. Does your parcel or land use dataset include an indicator (code) for vertically mixed buildings? | | |
| b. For vertically mixed buildings, does your calculation of recreation land area equal the total land area associated with the parcel? (**recommended approach**) | | |
| c. For vertically mixed buildings, does your recreation land area equal a proportion of the total land area associated with the building? (**acceptable**) If so how was the recreation proportion determined? | | |

| | | |
|---|---|---|
| d. For vertically mixed buildings, did you use another approach? If so, please describe below. | | |
| 19. *There are different methods for handling the apportionment of total parcel land area between multiple, single use building (e.g. recreation facility next to office building) on the same parcel.* | | |
| a. Did you equally divide total parcel land area between the different buildings (**recommended approach**)? | | |
| b. Did you proportionally divide total parcel land area between the different buildings based on the area of their footprint (ground floor area) (**acceptable**)? | | |
| c. Did you use another approach? If so, please describe below. | | |
| 20. Please provide a full and complete list of all land use subcategories used to compute the aggregated recreation land use variable (see Appendix D as an example). Please list these below: | | |

# Section 12: Creation of Vacant Land Use Area

| | |
|---|---|
| **Aim:** | To develop a standardized definition of **vacant land use** to be compared across participants across countries. The vacant land use area sums will be evaluated independently and may be used to calculate the land use mix variable, which is part of the walkability index variable. |
| **Tasks:** | • Identify parcels designated as vacant use.<br>• Count the number of parcels designated as vacant within participants' 500 and 1000 meter *residential* and *school* buffers (**required**) and 250 and 2000 meter buffers (**desired**).<br>• Calculate the sum of the land area (**required**) of vacant land use parcels within participants' 500 and 1000 meter *residential* and *school* buffers (**required**) and 250 and 2000 meter buffers (**desired**). |
| **Datasets:** | Land use parcel data with land and building floor area attributes; participant buffers |
| **Definition:** | A parcel is considered vacant land if it is predominately not used for any defined purpose and is without structural or other significant man-made improvements.<br><br>Vacant parcels should not be difficult to determine by walking on the land or viewing aerial photographs. Vacant land may also be physically or legally constrained and therefore not buildable. Additionally, urban or suburban infill parcels, defined as an isolated buildable parcel that are totally or partially vacant, can be considered vacant land if surrounding parcels are mainly developed. The infill parcel could be totally or partially vacant (e.g. abandoned home/business) where its condition is abandoned or severely degraded relative to the condition of surrounding parcels.<br><br>Some unimproved open spaces, parks and recreation areas may be misclassified as vacant. For the purposes of this project these uses are NOT to be considered vacant. Formal unimproved recreation areas should be included as part of the park or recreation land use templates, unless they are informal recreation areas that meet the above vacant definition.<br><br>**Please see Appendix D for an example list of included and excluded land uses.**<br><br>Total 'vacant land area' is defined as the sum of the land area (acreage) of all parcels with a vacant land use within a participant's buffer<br><br>Total 'building floor area' for vacant land use is not possible. |

| | | | |
|---|---|---|---|
| | | | |
| **Important Notes:** | • All area values should be reported in **square meters**. This is *required* for all datasets being sent to the IPEN CC.<br><br>• There are different methods of handling multiple vacant polygons that intersect and partially overlap participants' buffers. We recommend that the entire vacant parcel be included in the sum of 'vacant land area' if any portion of a vacant-parcel polygon **intersects** the buffer polygon (**recommended approach**).<br><br>• If the parcel is represented by a point (**acceptable approach**) the point should be "snapped" (assigned) to the nearest road segment. If the point intersects or is contained by a buffer, then it is assigned to that buffer. | | |
| **Details:** | **Please respond to the questions below:** | Excluded /NO | Included /YES |
| | | | |
| 1. Did you use the vacant definitions provided above? | | | |
| a. Did your vacant land use definition differ from the one provided above in any way? Please describe below: | | | |
| 2. Did you use parcels or land cover to calculate land use (See appendix D)? If neither, please describe below the areal unit that has land use category attributes in your country. | | | |
| 3. Did you compute vacant land use variables for participants' *residential* buffers (**required**)? | | | |
| 4. Did you compute vacant land use variables for participants' 500-meter *residential* buffers (**required**)? | | | |
| 5. Did you compute vacant land use variables for participants' 1000-meter *residential* buffers (**required**)? | | | |
| 6. Did you compute vacant land use variables for participants' 250- | | | |

| | | |
|---|---|---|
| meter *residential* buffers (**desired**)? | | |
| 7. Did you compute vacant land use variables for participants' 2000-meter *residential* buffers (**desired**)? | | |
| 8. Did you compute vacant land use variables for participants' *school* buffers (**required**)? | | |
| 9. Did you compute vacant land use variables for participants' 500-meter *school* buffers (**required**)? | | |
| 10. Did you compute vacant land use variables for participants' 1000-meter *school* buffers (**required**)? | | |
| 11. Did you compute vacant land use variables for participants' 250-meter *school* buffers (**desired**)? | | |
| 12. Did you compute vacant land use variables for participants' 2000-meter *school* buffers (**desired**)? | | |
| 13. Did you count the number of vacant parcels within participants' buffers (**required**)? | | |
| *14.* Did you sum vacant land area (**required**)? | | |
| *15.* Did you report area measures (i.e. land area) in square meters? | | |
| *16. There are different methods of handling multiple vacant polygons/points that intersect and partially overlap participants' buffers. Please indicate which one of these procedures best describes the method you used:* | | |
| a. An entire vacant parcel was included in the sum of 'vacant land area' if any portion of a vacant-parcel polygon intersected the buffer polygon (**recommended approach**). | | |
| b. An entire vacant parcel was included in the sum of 'vacant land area' if a vacant parcel's centroid intersected or was contained by the buffer polygon (**acceptable approach**). | | |
| i. If the parcel is represented by a point (e.g. centroid) the point was "snapped" (assigned) to the nearest road segment. | | |
| c. Only a partial area of each vacant parcel polygon intersecting the buffer was assigned to the buffer polygon. That is, land area based apportionment was used to assign the proportion of the vacant parcel area to the aggregation polygon | | |

| | | |
|---|---|---|
| (**speculative**). | | |
| d. We used another method of handling the partial overlap of vacant land use on buffer polygons. Please describe below: | | |
| 17. Please provide a full and complete list of all land use subcategories used to aggregate to vacant land use (see Appendix E as an example). Please list these below: | | |

# Section 13: Creation of Intersection Density

| | |
|---|---|
| **Aim:** | Develop a standardized definition of **intersection density** to be compared across participants across countries. |
| **Task:** | • To count the number of and calculate the density of intersections on a walkable road network within participants' 500 and 1000 meter *residential* and *school* buffers (**required**).<br><br>• To count the number of and calculate the density of cul-de-sacs/dead-ends within participants' 500 and 1000 meter *residential* and *school* buffers (**required**).<br><br>• To count the number of and calculate the density of intersections on a walkable road network within participants' 250 and 2000 meter *residential* and *school* buffers (**desired**).<br><br>• To count the number of and calculate the density of cul-de-sacs/dead-ends within participants' 250 and 2000 meter *residential* and *school* buffers (**desired**). |
| **Datasets:** | Road network and participant buffers |
| **Definition:** | The same walkable road network used for buffer creation should be used here.<br><br>Roads where pedestrians are prohibited such as freeways and ramps are removed from the network before intersections are identified and counted. For example, limited-access freeways, toll roads, on and off ramps to them, interchanges between these road types should be removed from the network.<br><br>"Intersection" means a point where 3 or more walkable road segments intersect.<br><br>"Cul-de-sac" means a dead-end street with only one inlet/outlet. Cul-de-sacs terminate auto use through residential areas, and may (or may not) allow for continued pedestrian or bicyclist connectivity onto other easements or paths. Cul-de-sacs may widen or blub out at their entrance and the street segment or may loop back or dead end. Dead-end streets should be considered cul-de-sacs. |

| | | | |
|---|---|---|---|
| **Important Information:** | Some countries may need to buffer intersection points because some segments in the road network were not properly aligned (**recommended approach**). Investigators should decide whether road alignment is a problem or not. If it is a problem, then each country should decide the appropriate buffer size after observing their data. | | |
| **Details:** | **Please respond to the questions below:** | Excluded /NO | Included /YES |
| | | | |
| 1. Was the same walkable road network used for buffer creation used for the creation of intersection and/or cul-de-sac densities? If a different road network was used how was it different? What was the reason for using a different road network? Please describe below: | | | |
| 2. Were pseudo-nodes (i.e. nodes that split road segments at non-intersections) removed from the road network prior to counting intersections and cul-de-sacs (**recommended approach**)? If not, please explain why: | | | |
| 3. Was there a need to buffer intersection points because some segments in the road network were not properly aligned (**recommended**)?<br><br>3.1. If so, what size buffer did you use to define intersections with slight spatial mismatch (e.g. 15 meters)?<br><br>3.2. If not, do you have a sense whether spatial mismatch was an issue in your road network dataset? Please describe: | | | |

| | | |
|---|---|---|
| **Please respond to the questions below regarding residential buffers:** | | |
| 4. Were intersections with *3 or more* walkable road segments only counted for **residential** buffers at 500 meters (**required**)? If not, please describe what types of intersections were counted: | | |
| 5. Were intersections with *3 or more* walkable road segments only counted for **residential** buffers at 1000 meters (**required**)? If not, please describe what types of intersections were counted: | | |
| 6. Were intersections with *3 or more* walkable road segments only counted for **residential** buffers at 250 meters (**desired**)? | | |
| 7. Were intersections with *3 or more* walkable road segments only counted for **residential** buffers at 2000 meters (**desired**)? | | |
| 8. To calculate intersections density, did you divide intersection counts by the total land area for the buffer (**required**) for residential buffers? If not, please describe your calculation: | | |
| 9. Were cul-de-sacs counted for **residential** buffers at 500 meters (**required**)? | | |
| 10. Were cul-de-sacs counted for **residential** buffers at 1000 meters (**required**)? | | |
| 11. Were cul-de-sacs counted for **residential** buffers at 250 meters (**desired**)? | | |
| 12. Were cul-de-sacs counted for **residential** buffers at 2000 meters (**desired**)? | | |
| 13. To calculate cul-de-sac density, did you divide cul-de-sac/dead end counts by the total land area for the buffer (**required**) for residential buffers? If not, please describe your calculation: | | |
| **Please respond to the questions below regarding residential buffers:** | | |
| 14. Were intersections with *3 or more* walkable road segments only counted for **school** buffers at 500 meters (**required**)? If not, please describe what types of intersections were counted: | | |
| 15. Were intersections with *3 or more* walkable road segments only counted for **school** buffers at 1000 meters (**required**)? If not, please | | |

| | | |
|---|---|---|
| describe what types of intersections were counted: | | |
| 16. Were intersections with *3 or more* walkable road segments only counted for **school** buffers at 250 meters (**desired**)? | | |
| 17. Were intersections with *3 or more* walkable road segments only counted for **school** buffers at 2000 meters (**desired**)? | | |
| 18. To calculate intersections density, did you divide intersection counts by the total land area for the buffer (**required**) for school buffers? If not, please describe your calculation: | | |
| 19. Were cul-de-sacs counted for **school** buffers at 500 meters (**required**)? | | |
| 20. Were cul-de-sacs counted for **school** buffers at 1000 meters (**required**)? | | |
| 21. Were cul-de-sacs counted for **school** buffers at 250 meters (**desired**)? | | |
| 22. Were cul-de-sacs counted for **school** buffers at 2000 meters (**desired**)? | | |
| 23. To calculate cul-de-sac density, did you divide cul-de-sac/dead end counts by the total land area for the buffer (**required**) for school buffers? If not, please describe your calculation: | | |

# Section 14: Creation of Public Transportation Variables

| | |
|---|---|
| **Aim:** | To develop a standardized definition of access to **public transportation** (e.g. bus, rail and water ferry) to be compared across participants across countries, and create public transportation access variables. |
| **Tasks:** | 1. Identify the presence of all types of public transit options (see definitions below) in your regions and the locations of designated public transit stations and stops.<br>2. Count the number of public transit stations and stops for each transit type within participants' 500 and 1000 meter *residential* and *school* buffers (**required**).<br>3. Calculate the walkable-road network distance from each participant *residence* and *school* to the nearest transit station or stop for each transit type (**required**).<br>4. Count the number of public transit stations and stops for each transit type within participants' 250 and 2000 meter *residential* and *school* buffers (**desired**). |
| **Datasets:** | Public transit stations and stop locations, and transit routes[1]; walkable road network, participants home and school points, participant home and school buffers |
| **Definitions:** | Public transportation includes services that operate on a published schedule, which has fixed routes and locations where people can get on or get off.<br><br>Public transportation includes all types of bus, rail and water vehicles, including commuter rail, subway, elevated rail, light rail, bus, bus rapid transit, trolley, and water ferries. Typically a larger, regional network of transit can be accessed from any given station/stop by means of transfers to other routes at connecting points. Our definition of public transportation does not include taxis, bicycle share stations, informal bus and private van and shuttle services which do not travel a fixed/regular route, and which operate on a demand responsive or as needed basis.<br><br>The following definitions apply to public transit, and represent the types for which count and distance variables should be created:<br><br>Passenger Bus Systems |



[1] In the case of having spatial route information only and no stop/station locations, one could assume a stop is available at each intersection of the route and a major cross street.

**Informal bus** (counts/distances not possible): Informal bus networks may or may not have agreed upon routes. Informal buses can be flagged down or asked to stop anywhere along their route. These buses may be operated by private bus drivers or companies or have very flexible routes, stops, and stations.

**Regular fixed-route buses:** Traditional buses that operate along a regular route with known stops that have a corresponding published timetable. Trolleybuses with electric power would be considered regular bus network.

**Express Bus**: Express buses are similar to regular buses, but are intended to run faster than regular buses. Express buses operate with limited stops and/or travel on faster roads such as freeways.

**Bus rapid transit (BRT)**: Bus rapid transit (BRT) operates in a fully dedicated right-of-way for most of route to avoid traffic congestion. BRT typically includes methods for easy and efficient boarding and existing vehicles.

Passenger Rail Systems

**Tram/Streetcar/Light Rail**: Urban rail systems powered by electricity that run on tracks along streets. The rail vehicles may or may not have a separate right of way, meaning they may or may not use the same roads as other vehicles. They may have stations above or underground. Stations are typically located at grade (at the same level) and closer together than heavy rail.

**Heavy Rail** – Heavy rail is also known as subway, tube, underground, or metro, El, L, sky train, overhead, or overground. It requires a separated exclusive right of way because it draws its power from a 3rd rail on the ground and can be underground, elevated, or at grade. Heavy rail is typically faster and has far more capacity than light rail and stations are spaced further apart and larger.

**Commuter Rail**: Rail networks that link surrounding communities (e.g. suburbs) with job rich urban areas. Usage is therefore typically directional on a daily basis. Commuter rail does not link two major metropolitan regions (e.g. San Diego and Los Angeles).

| | | | |
|---|---|---|---|
| | Passenger Water Systems<br><br>**Ferries**: Ferries are boats used to carry passengers and sometimes vehicles/cargo across water. Ferries typically operate on a regular service schedule. In some regions they may also be known as ferryboats, waterbuses, or water taxis. | | |
| **Important Information:** | • The same walkable road network used for buffer creation should be used here. "Walkable" road network means roads where pedestrians are prohibited are removed from the network before intersections are identified and counted.<br><br>• The presence/absence of various types of public transit within your city is important to know independently of whether you have access to data on stops, stations or routes for a specific type of transit option. Some form of transit will exist within your city, but it may be the case that you do not have access to datasets to describe and measure it. Below we ask about presence/absence of available transit options in addition to your ability to access these datasets and provide count and distance variables. Please provide an accurate accounting.<br><br>• When a variable is truly missing for a participant, we require a value of -999 be used. Please do not insert zero values when data are missing, as we cannot determine the difference between true zeros and missing values. If you have true zero values, then zero should be used. | | |
| **Details:** | **Please respond to the questions below:** | Excluded /NO | Included /YES |
| | | | |
| 1. Did you use the public transit station/stop definitions provided above? | | | |
| a. If the definition you used differed from the any of the ones provided above, please explain how: | | | |
| 2. Please tell us which types of public transit systems are present (actually exist) within your city? Potential types include: | | | |
| a. Informal bus | | | |
| b. Regular buses | | | |
| c. Express Bus | | | |

| | | |
|---|---|---|
| d. Bus rapid transit (BRT) | | |
| e. Tram/Streetcar/Light Rail | | |
| f. Heavy Rail | | |
| g. Commuter Rail | | |
| h. Ferries | | |
| i. Other, please specify: | | |
| 3. Did you count the following types of public transit stations/stops for **residential** buffers at 500 meters (**required**)? Potential types include: | | |
| a. Regular buses | | |
| b. Express Bus | | |
| c. Bus rapid transit (BRT) | | |
| d. Tram/Streetcar/Light Rail | | |
| e. Heavy Rail | | |
| f. Commuter Rail | | |
| g. Ferries | | |
| h. Other? Please describe below | | |
| 4. Did you count the following types of public transit stations/stops for **residential** buffers at 1000 meters (**required**)? Potential types include: | | |
| a. Regular buses | | |
| b. Express Bus | | |
| c. Bus rapid transit (BRT) | | |
| d. Tram/Streetcar/Light Rail | | |
| e. Heavy Rail | | |
| f. Commuter Rail | | |
| g. Ferries | | |
| h. Other? Please describe below | | |
| 5. Did you count the following types of public transit stations/stops for **residential** buffers at 250 meters (**desired**)? Potential types include: | | |
| a. Regular buses | | |
| b. Express Bus | | |
| c. Bus rapid transit (BRT) | | |
| d. Tram/Streetcar/Light Rail | | |
| e. Heavy Rail | | |
| f. Commuter Rail | | |
| g. Ferries | | |
| h. Other? Please describe below | | |

| | | |
|---|---|---|
| 6. Did you count the following types of public transit stations/stops for **residential** buffers at 2000 meters (**desired**)? Potential types include: | | |
| a. Regular buses | | |
| b. Express Bus | | |
| c. Bus rapid transit (BRT) | | |
| d. Tram/Streetcar/Light Rail | | |
| e. Heavy Rail | | |
| f. Commuter Rail | | |
| g. Ferries | | |
| h. Other? Please describe below | | |
| 7. Did you count the following types of public transit stations/stops for **school** buffers at 500 meters (**required**)? Potential types include: | | |
| a. Regular buses | | |
| b. Express Bus | | |
| c. Bus rapid transit (BRT) | | |
| d. Tram/Streetcar/Light Rail | | |
| e. Heavy Rail | | |
| f. Commuter Rail | | |
| g. Ferries | | |
| h. Other? Please describe below | | |
| 8. Did you count the following types of public transit stations/stops for **school** buffers at 1000 meters (**required**)? Potential types include: | | |
| i. Regular buses | | |
| j. Express Bus | | |
| k. Bus rapid transit (BRT) | | |
| l. Tram/Streetcar/Light Rail | | |
| m. Heavy Rail | | |
| n. Commuter Rail | | |
| o. Ferries | | |
| p. Other? Please describe below | | |
| 9. Did you count the following types of public transit stations/stops for **school** buffers at 250 meters (**desired**)? Potential types include: | | |
| q. Regular buses | | |
| r. Express Bus | | |
| s. Bus rapid transit (BRT) | | |
| t. Tram/Streetcar/Light Rail | | |
| u. Heavy Rail | | |
| v. Commuter Rail | | |

| | | |
|---|---|---|
| w. Ferries | | |
| x. Other? Please describe below | | |
| 10. Did you count the following types of public transit stations/stops for **school** buffers at 2000 meters (**required**)? Potential types include: | | |
| y. Regular buses | | |
| z. Express Bus | | |
| aa. Bus rapid transit (BRT) | | |
| bb. Tram/Streetcar/Light Rail | | |
| cc. Heavy Rail | | |
| dd. Commuter Rail | | |
| ee. Ferries | | |
| ff. Other? Please describe below | | |
| 11. Did you calculate 'distance to the nearest' from **home** to the following types of public transit stations/stops (**required**)? | | |
| a. Regular buses | | |
| b. Express Bus | | |
| c. Bus rapid transit (BRT) | | |
| d. Tram/Streetcar/Light Rail | | |
| e. Heavy Rail | | |
| f. Commuter Rail | | |
| g. Ferries | | |
| h. Other, please specify: | | |
| 12. Did you calculate 'distance to the nearest' from each participant's **school** to the following types of public transit stations/stops (**required**)? | | |
| i. Regular buses | | |
| j. Express Bus | | |
| k. Bus rapid transit (BRT) | | |
| l. Tram/Streetcar/Light Rail | | |

| | | |
|---|---|---|
| m. Heavy Rail | | |
| n. Commuter Rail | | |
| o. Ferries | | |
| p. Other, please specify: | | |
| 13. What is the source of the data showing locations of the stations/stops used in the calculations? | | |
| 14. Did you use meters for distance variables? | | |
| 15. Was the same walkable road network used for buffer creation also used to determine the distance to the nearest transportation location? If a different road network was used how was it different? What was the reason for using a different road network? Please describe below: | | |
| 16. When calculating 'distance to nearest' variables, did you use a cut-off distance? For example, if a transit stop was not found within 24 km, did you set the GIS software to stop looking (**speculative**)? If so, please tell us the distance that you used? **We do not recommend this approach.** | | |

# Section 15a: Public Parks – count/area within or intersecting buffers

| | |
|---|---|
| **Aim:** | To develop a standardized definition of **public parks** to be compared across participants across countries.<br><br>To develop park count and park land area variables within or intersecting participants' *residential* and *school* buffers that can be compared across participants across countries. |
| **Tasks:** | • Determine the number of park polygons (all sizes, and by park size) which are either contained by or intersect participants' 500 and 1000 meter *residential* and *school* buffers. See below for the list of park size ranges (**all sizes required, by park size categories desired**).<br><br>• Determine the sum of land area of park polygons (all sizes, and by park size categories) which are either contained by or intersect the participant 500 and 1000 meter *residential* and *school* buffers (**all sizes required, by park size categories desired**). Note: the park land area summed for this variable is the entire park area, not just the segment that intersects the buffer.<br><br>• Determine the number of park polygons (all sizes, and by park size) which are either contained by or intersect participants' 250 and 2000 meter *residential* and *school* buffers. See below for the list of park size ranges (**all sizes, by park size categories desired**).<br><br>• Determine the sum of land area of park polygons (all sizes, and by park size categories) which are either contained by or intersect the participant 250 and 2000 meter *residential* and *school* buffers (**all sizes, by park size categories desired**). Note: the park land area summed for this variable is the entire park area, not just the segment that intersects the buffer.<br><br>• Determine the number of trails that intersect 500 and 1000 meter *residential* and *school* buffers **(desired)**. |
| **Datasets:** | Participant buffers; park polygons, trail lines |
| **Definition:** | The following sources were used in the U.S. to enumerate the total list |

| | |
|---|---|
| | of parks in the study area: government supplied park lists (e.g. name, address, amenities), GIS shapefiles showing park boundaries, parcel data (indicating land uses including parks), Google maps, Thomas Guides, internet websites created by various entities, aerial photography, as well as in-field visits. We found it was necessary to use multiple sources.<br><br>The goal is for each country to use the best available source of information. What is consistent across the sites is the use of the best available data, rather than the source of the data.<br><br>The following criteria were used in the U.S. to determine if an area is a public park:<br>• Considered a public park by the government agency supplying the information. Government agency covers federal, state, county, municipalities, parks departments, planning departments, etc.<br>• Considered a public park if a government agency maintains the park area.<br>• Considered a park if it is physically accessible to the public (e.g. no fences blocking access, open entry points).<br>• Beaches and wooded areas are considered parks if they function as public park areas.<br>• Not considered a park if it is: 1) maintained by a home owner's association, 2) part of an apartment complex playground, 3) an unimproved open space with 'no use designated', 4) or a proposed park, or a school, religious facility, or golf course.<br><br>A trail is a walking/hiking/bicycle facility that is not part of a roadway and is not a sidewalk. The facility can be adjacent to a road, but can't be connected to a road (e.g. a bike lane which is physically connected to the road is not a trail; a paved path (not a sidewalk) that is adjacent to a road, but separated from the road via a grass buffer is a trail.). |
| **Important Information:** | Count and area variables are created for each of the following seven size categories:<br>• Any size<br>• <=1012 square meters land area<br>• >1012 to <= 4047 square meters land area |

| | | | |
|---|---|---|---|
| | • >4047 to <= 20234 square meters land area<br>• >20234 to <= 40469 square meters land area<br>• >40469 to <= 202343 square meters land area<br>• >202343 square meters land area<br>[Where 4,046.86 sq meters = 1 acre]<br><br>• All area values should be reported in **square meters**. This is *required* for all datasets being sent to the IPEN CC. | | |
| **Details:** | **Please respond to the questions below:** | Excluded/ NO | Included/ YES |
| 1. Did your definition of park differ from the one provided above in any way? Please describe below: | | | |
| a. Did parks include public and free locations only? | | | |
| b. Did parks include areas maintained by government agencies? | | | |
| c. Were unimproved open spaces excluded (e.g. green spaces without improvements)? | | | |
| d. Were unique locations included based upon your regional or cultural understanding of park space? Please describe below: | | | |
| 2. Was the same walkable road network used for buffer creation used for the creation of intersection density? If a different road network was used how was it different? What was the reason for using a different road network? Please describe below: | | | |
| 3. Did you count the number of park polygons that are either contained by or intersect participants' *residential* buffers? | | | |
| a. Did you calculate one overall count that includes parks of any size for 500 meter buffers **(required)**? | | | |
| b. Did you calculate one overall count that includes | | | |

| | | |
|---|---|---|
| parks of any size for 1000 meter buffers **(required)**? | | |
| c. Did you calculate one overall count that includes parks of any size for 250 meter buffers **(desired)**? | | |
| d. Did you calculate one overall count that includes parks of any size for 2000 meter buffers **(desired)**? | | |
| e. Did you calculate counts for the specific size categories shown above for 500 meter buffers **(desired)**? | | |
| f. Did you calculate counts for the specific size categories shown above for 1000 meter buffers **(desired)**? | | |
| g. Did you calculate counts for the specific size categories shown above for 250 meter buffers **(desired)**? | | |
| h. Did you calculate counts for the specific size categories shown above for 2000 meter buffers **(desired)**? | | |
| 4. Did you count the number of park polygons that are either contained by or intersect participants' *school* buffers? | | |
| a. Did you calculate one overall count that includes parks of any size for 500 meter buffers **(required)**? | | |
| b. Did you calculate one overall count that includes parks of any size for 1000 meter buffers **(required)**? | | |
| c. Did you calculate one overall count that includes parks of any size for 250 meter buffers **(desired)**? | | |
| d. Did you calculate one overall count that includes parks of any size for 2000 meter buffers **(desired)**? | | |
| e. Did you calculate counts for the specific size categories shown above for 500 meter buffers **(desired)**? | | |

| | | |
|---|---|---|
| f. Did you calculate counts for the specific size categories shown above for 1000 meter buffers **(desired)**? | | |
| g. Did you calculate counts for the specific size categories shown above for 250 meter buffers **(desired)**? | | |
| h. Did you calculate counts for the specific size categories shown above for 2000 meter buffers **(desired)**? | | |
| 5. Did you count the number of trails that intersect each participants' *residential* buffers **(desired)**? | | |
| a. For 500 meter buffers (**desired**)? | | |
| b. For 1000 meter buffers (**desired**)? | | |
| c. For 250 meter buffers (**desired**)? | | |
| d. For 2000 meter buffers (**desired**)? | | |
| 6. Did you count the number of trails that intersect each participants' *school* buffers **(desired)**? | | |
| a. For 500 meter buffers (**desired**)? | | |
| b. For 1000 meter buffers (**desired**)? | | |
| c. For 250 meter buffers (**desired**)? | | |
| d. For 2000 meter buffers (**desired**)? | | |
| 7. Did you sum the land area of park polygons that are either contained by or intersect participants' *residential* buffers. | | |
| a. Did you calculate the sum of park area for parks of all sizes for 500 meter buffers **(required)**? | | |
| b. Did you calculate the sum of park area for parks of all sizes for 1000 meter buffers **(required)**? | | |
| c. Did you calculate the sum of park area for parks of all sizes for 250 meter buffers **(desired)**? | | |
| d. Did you calculate the sum of park area for parks of all sizes for 2000 meter buffers **(desired)**? | | |
| e. Did you calculate the sum of park area for the size categories shown above for 500 meter buffers **(desired)**? | | |
| f. Did you calculate the sum of park area for the size | | |

| | | |
|---|---|---|
| categories shown above for 1000 meter buffers **(desired)**? | | |
| g. Did you calculate the sum of park area for the size categories shown above for 250 meter buffers **(desired)**? | | |
| h. Did you calculate the sum of park area for the size categories shown above for 2000 meter buffers **(desired)**? | | |
| 8. Did you sum the land area of park polygons that are either contained by or intersect participants' *school* buffers. | | |
| a. Did you calculate the sum of park area for parks of all sizes for 500 meter buffers **(required)**? | | |
| b. Did you calculate the sum of park area for parks of all sizes for 1000 meter buffers **(required)**? | | |
| c. Did you calculate the sum of park area for parks of all sizes for 250 meter buffers **(desired)**? | | |
| d. Did you calculate the sum of park area for parks of all sizes for 2000 meter buffers **(desired)**? | | |
| e. Did you calculate the sum of park area for the size categories shown above for 500 meter buffers **(desired)**? | | |
| f. Did you calculate the sum of park area for the size categories shown above for 1000 meter buffers **(desired)**? | | |
| g. Did you calculate the sum of park area for the size categories shown above for 250 meter buffers **(desired)**? | | |
| h. Did you calculate the sum of park area for the size categories shown above for 2000 meter buffers **(desired)**? | | |
| 9. Did you report area measures (i.e. land area) in square meters? | | |
| 10. What sources did you use to enumerate the complete set of public parks in the study area? Please provide a general list (e.g. local government, business directories, areal photography) of all sources. We would like to compare | | |

| | | |
|---|---|---|
| across countries. | | |
| 11. Did you develop any other measures of park or trail access (e.g. total length of trails in buffer)? If so, please list below and provide a complete description of the measure. | | |

# Section 15b: Public Parks and Trails– distance

| | |
|---|---|
| **Aim:** | To develop a standardized definition of distance from home and school to **public parks and trails** to be compared across participants across countries. |
| **Tasks:** | • Calculate variables that indicate the street network distance from each participant's *residential* and *school* address (separately) to the nearest park (**required**), within different size categories (**desired**). To be done for each size range of parks shown below.<br><br>• Calculate variables that indicate the street network distance from each participant's *residential* and *school* address (separately) to the nearest trail (**desired**). |
| **Datasets:** | Home address location; walkable road network, park polygons, trail lines |
| **Definition:** | See definition of park above.<br><br>A variable showing the network distance from the participant's home to the nearest park is created for each of the following seven size categories:<br>• All sizes<br>• <=1012 square meters land area<br>• >1012 to <= 4047 square meters land area<br>• >4047 to <= 20234 square meters land area<br>• >20234 to <= 40469 square meters land area<br>• >40469 to <= 202343 square meters land area<br>• >202343 square meters land area<br>[Where 4,046.86 sq meters = 1 acre]<br><br>• All distance values should be reported in **meters**. This is *required* for all datasets being sent to the IPEN CC. |
| **Important Information:** | A walkable road network should be used for all distance estimates. See intersection density for a description of a walkable road network.<br><br>The distance measures in the U.S. were calculated using the network analyst extension in the ESRI ArcGIS software. Determining distances in this way requires an origin point and a destination point, both of which |

| | | | |
|---|---|---|---|
| | need to be on the walkable road network. The participant's home address is the origin point; the destination is a park represented by a polygon.<br><br>It is therefore necessary to represent the park polygon as a point on the walkable road network. Ideally each park polygon would have points associated with it indicating the entrances from the road network to the park. In the U.S. we did not have that. Instead park polygons were represented as point on the road network by buffering the polygon by 50 feet. Points representing parks were created at the locations where the buffered park polygon intersected with the road network. *This method typically this results in multiple points for a single park. These points were accepted as representative of where someone could enter the park*. In some cases parks were more than 50 feet from the road network. These cases were investigated to determine if it was possible to enter the park from the road, albeit at a distance greater than 50 feet. Depending on the results of the review, points on the road network were created for the parks or the parks were excluded from this task. | | |
| **Details:** | **Please respond to the questions below:** | Excluded/ NO | Included/ YES |
| 1. Did you calculate walkable road network distance from participants' *residences* to nearest parks of any size **(required)**? | | | |
| 2. Did you calculate walkable road network distance from participants' *schools* to nearest parks of any size **(required)**? | | | |
| 3. Did you calculate distances from participants' *residences* to the nearest park size categories shown above (**desired**)? | | | |
| a. Did you use street network distance to determine the distance (**recommended**)? | | | |
| b. Did you use a different method (e.g. crow-fly) for determining the distance? If so, describe the method below: | | | |
| c. If different park size categories were used what are they? Please describe below: | | | |
| 4. Did you calculate distances from participants' *schools* to the park size categories shown above (**desired**)? | | | |
| a. Did you use street network distance to determine the | | | |

| | | |
|---|---|---|
| distance (**recommended**)? | | |
| b. Did you use a different method (e.g. crow-fly) for determining the distance. If so, describe the method below: | | |
| c. If different park size categories were used what are they? Please describe below: | | |
| 5. Did you calculate walkable road network distance from participants' *residences* to nearest trails **(desired)**? | | |
| a. Did you use street network distance to determine the distance (**recommended**)? | | |
| 6. Did you calculate walkable road network distance from participants' *schools* to nearest trails **(desired)**? | | |
| a. Did you use street network distance to determine the distance (**recommended**)? | | |
| 7. Did you report distance units in meters? | | |
| 8. Did you use the same method as described above to represent park polygons as points on the road network? If not, please describe the method used below: | | |
| 9. Did you use the same criteria to designate public parks as are indicated above? If not, what criteria were used? | | |
| 10. When calculating 'distance to nearest' variables, did you use a cut-off distance? For example, if a park was not found within 24 km, did you set the GIS software to stop looking (**speculative**)? **We do not recommend this approach**. If so, please tell us the distance that you used? | | |
| | | |

# Section 16: Creation of Private Recreation Variables

| | |
|---|---|
| **Aim:** | To develop a standardized definition of **private recreation facilities** to be compared across participants across countries, and create count and road network-based distance variables. |
| **Tasks:** | 1. Identify locations designated as private recreation.<br>2. Count the number of private recreation facilities within participants' 500 and 1000 meter *residential* and *school* buffers (**required**).<br>3. Count the number of private recreation facilities within participants' 250 and 2000 meter *residential* and *school* buffers (**desired**).<br>4. Calculate the walkable-road network based distance from each participant *residence* and *school* to the nearest private recreation facility (**required**). |
| **Datasets:** | Enumerated list of private recreation locations; walkable road network, participant buffers |
| **Definition:** | A recreation facility is one where participants can usually be physically active there. Examples of private recreation facilities include fitness centers, health clubs, tennis centers, swimming pools, golf courses, outdoor arenas, camp sites, etc. Public parks are not private recreation locations.<br><br>A location is designated as a private recreation if the facility is not open to the public for free. A private recreation location requires a payment/membership to use the facilities. Examples of such places include fitness centers, health clubs, tennis clubs, etc. The full list of the types of locations to be designated as private recreation is provided in **Appendix D.**<br><br>In the U.S., enumerated lists were based on business listings, phone book listings, marketing firm's address lists, other online internet sources, and parcel data. |
| **Important Information:** | • Check accuracy of parcel data against phone books in a sample. If inaccurate, then supplement parcel data with phone book and other data. Best to use multiple sources of recreation facility data.<br><br>• The same walkable road network used for buffer creation should be used here. "Walkable" road network means roads where pedestrians are prohibited are removed from the network before intersections are identified and counted.<br><br>• When private recreation facility locations are not represented by points, private recreation parcel polygons may be used. There are different |

| | | | |
|---|---|---|---|
| | methods of handling multiple private recreation polygons that intersect and partially overlap participants' buffers. We recommend that the entire private recreation parcel be included in the count of private recreation if any portion of a private recreation parcel polygon intersects the buffer polygon (**recommended approach**).<br><br>• If the parcel area is represented by a point (**acceptable approach**) the point should be "snapped" (assigned) to the nearest road segment. If the point intersects or is contained by a buffer, then the point is assigned to that buffer. | | |
| **Details:** | **Please respond to the questions below:** | Excluded /NO | Included /YES |
| | | | |
| 1. Did you use the private recreation definitions provided above? | | | |
| a. If the definition you used differed from the one provided above in any way? Please describe below: | | | |
| *2.* Did you count the number of private recreation facilities/parcels within participants' 500-meter *residential* buffers (**required**)? | | | |
| 3. Did you count the number of private recreation facilities/parcels within participants' 1000-meter *residential* buffers (**required**)? | | | |
| 4. Did you count the number of private recreation facilities/parcels within participants' 250-meter *residential* buffers (**desired**)? | | | |
| 5. Did you count the number of private recreation facilities/parcels within participants' 2000-meter *residential* buffers (**desired**)? | | | |
| *6.* Did you count the number of private recreation facilities/parcels within participants' 500-meter *school* buffers (**required**)? | | | |
| 7. Did you count the number of private recreation facilities/parcels within participants' 1000-meter *school* buffers (**required**)? | | | |
| 8. Did you count the number of private recreation facilities/parcels within participants' 250-meter *school* buffers (**desired**)? | | | |
| 9. Did you count the number of private recreation facilities/parcels | | | |

| | | |
|---|---|---|
| within participants' 2000-meter *school* buffers (**desired**)? | | |
| *10.* Where private recreation facilities determined from location points, parcel polygons, or both types? | | |
| 11. *If private recreation locations are represented by polygons (rather than points) then there are different methods of handling polygons that intersect and partially overlap participants' buffers. Please indicate which one of these procedures best describes the method you used:* | | |
| a. A private recreation parcel was included in the count of private recreation if any portion of a private recreation parcel polygon intersected the buffer polygon (**recommended approach**). | | |
| b. A private recreation parcel was included in the count of private recreation if the private recreation parcel's centroid intersected or was contained by the buffer polygon (**acceptable**). | | |
| i. If the parcel areas was represented by a point (e.g. centroid) the point was "snapped" (assigned) to the nearest road segment. | | |
| c. We used another method of handling the partial overlap of private recreation land use on buffer polygons (**speculative**). Please describe below: | | |
| 12. Did you report distance units in meters? | | |
| 13. Was the same walkable road network used for buffer creation also used to determine the distance to the nearest private recreation location? If a different road network was used how was it different? What was the reason for using a different road network? Please describe below: | | |

| | | |
|---|---|---|
| 14. When calculating 'distance to nearest' variables, did you use a cut-off distance? For example, if a private recreation facility was not found within 24 km, did you set the GIS software to stop looking (**speculative**)? If so, please tell us the distance that you used? **We do not recommend this approach.** | | |
| 15. Did you check the accuracy of parcel or point data against phone books or other data sources in a sample? | | |

URBAN DESIGN 4 HEALTH

# Section 17: Creation of Regional Accessibility Variables

| | |
|---|---|
| **Aim:** | To develop a standardized definition of **regional accessibility** to be compared across participants in different countries, and to create related accessibility variables.<br><br>Regional accessibility measures the distance from each participant's home and school to destinations. |
| **Task:** | Identify the following destinations for employment, shopping, travel and learning. The location types to be chosen are grouped into regionally and locally significant. The specific types within the two categories are provided below.<br><br>Regionally significant (**required method–** identification of destinations #3, 4, and 5 based on land area) (**desired method**– identification of destinations #3, 4, and 5 based on job counts, and students for #3, and patients for #4):<br>(1) most central location within the downtown/center city,<br>(2) most significant major transit hub,<br>(3) largest university outside of downtown,<br>(4) largest hospital/medical complex outside of downtown<br>(5) largest employment center[1] not already identified<br><br>Locally significant – uniquely identified for each participant (**required–** identification based on land area) (**desired** – identification based on job counts – destination #7 and 8 only. Use land area for #6.):<br>(6) nearest major natural/open space feature where recreational activities occur (a park, beach, lake, etc.) from each participant's home<br>(7) nearest major shopping center from each participant's home (of at least 10 acres/4 hectares or 125 jobs) |



[1] An employment center can be a single employer/business, or adjacent areas with a large number of separate places of employment. In this latter case, since there are many different employment locations (that are near each other) the point location of this center (the collection of all the nearby employment locations) will need to be chosen by the investigator. If it is a single, larger employer, e.g. a factory/manufacturing, then its location would be represented by a street address. The type of employment (e.g. retail, office, manufacturing, etc.) is not important. What is important is that the location is recognized regionally as the largest employment location which attracts the largest number of workers. v. 01/26/2015

| | |
|---|---|
| | (8) Nearest major employment center (not already identified in destination #7) (of at least 10 acres/4 hectares or 125 jobs,[2]) from participant's home.<br><br>QUESTIONS for Partner Sites:<br>1. Do you have job count data available to identify locations #3, 4, 5, 7 and 8 above? This is the desired way.<br>2. If you do not have numbers of jobs at different location, do you have other ways to identify these locations?<br>a. Perhaps using a multiplier of jobs per area of land (or building floor area) by land use category?<br>b. Other data sources?<br>c. Or will you only be able to use land area by land use type?<br>3. Are you able to systematically identify all natural/open area, major shopping centers and major employment centers in your study area?<br>a. NOTE -- Remember locations 6, 7 and 8 are nearest to each participant, so they are uniquely identified for each participant.<br><br>This means that all locations fitting the definitions of 6, 7, and 8 will need to be identified, and then the one nearest each participant selected.<br><br>In contrast locations #1 through 5 are each a single location in your study area (the same one is used for all participants, however their distance to it will be unique for each participant).<br><br>4. Calculate the shortest road network-based driving distance (**using the entire road network** available to vehicles, including all highways, toll roads, and roads, **even if they prohibit pedestrians**) from each participant's residence to the locations identified above and mean distance to all the locations. **(required)** |
| **Datasets:** | Participant household locations, point location of schools attended by each participant, point locations for identified destinations, regional road network. |



[2] Note: 10 acres (4 hectares) based on UD4H judgment. 10 acres is approximately the equivalent of the commercial activity along both sides of a 3 block section (300ft by 250ft blocks). Job approximation is based on average mixed use development (MXD) values reported in Ewing, R., Greenwald, M., Zhang, M., Walters, J., Feldman, M., Cervero, R., Frank, L., and Thomas, J. (2011). "Traffic Generated by Mixed-Use Developments—Six-Region Study Using Consistent Built Environmental Measures." *J. Urban Plann. Dev.*, 137(3), 248–261. Average MXD size = 211 acres. Average jobs per MXD is 2,696. Average jobs/acre ~ 127.

URBAN DESIGN 4 HEALTH

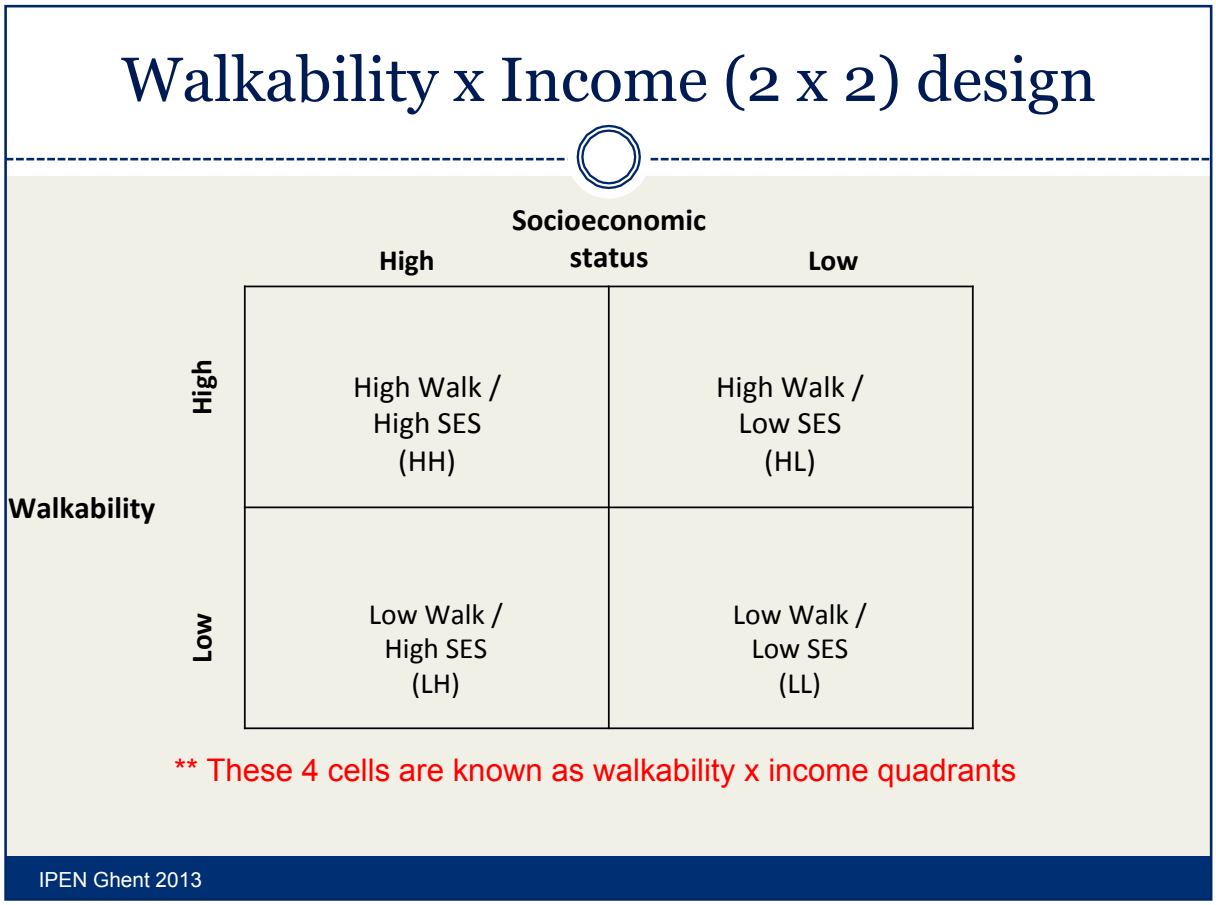
| | | | |
|---|---|---|---|
| **Definition:** | Regional accessibility is a measure of the ease of access to frequently visited destinations within a given region that represent a degree of centrality and concentration of activity. These destinations typically serve basic needs that constitute access to opportunity like employment, food, other goods and services, learning, and transit. At a minimum, regional accessibility is measured by simple network-based distance between an origin and a set of destinations. **Appendix F** provides additional information<br><br>Local accessibility is a measure of the ease of access to frequently visited destinations within a given neighborhood. | | |
| **Important Notes:** | **IMPORTANT** – Regional accessibility must be calculated using the entire **road network available to vehicles, including all highways, toll roads, and roads, even those that prohibit pedestrians**. This road network differs from all other templates! | | |
| **Details:** | **Please respond to the questions below:** | Excluded /NO | Included /YES |
| | | | |
| 1. Did you identify the destinations using the criteria above? Please provide the street address of the location chosen to represent each place. | | | |
| a. most central location within the downtown/center city | | | |
| b. most significant major transit hub | | | |
| c. largest university outside of downtown | | | |
| d. largest hospital complex outside of downtown | | | |
| e. largest employment centers not already identified | | | |
| f. nearest major natural/open space feature | | | |
| g. nearest major shopping center | | | |
| i. What threshold did you use to identify "major" | | | |

| | | |
|---|---|---|
| shopping center? | | |
| 1. The provided recommendation of at least 10 acres? | | |
| 2. The provided recommendation of at least 10 125 jobs? | | |
| 3. If you used a different threshold, please specify what it was. | | |
| h. nearest major employment center (not already identified) | | |
| i. What threshold did you use to identify "major" employment center? | | |
| 1. The provided recommendation of at least 10 acres? | | |
| 2. The provided recommendation of at least 125 jobs? | | |
| 3. If you used a different threshold, please specify what it was. | | |
| i. If you replaced any of the above with other regional destination types, please describe these below: | | |
| 2. Did you calculate the shortest street network distance from **residence** to each destination (**required**)? | | |
| a. most central location within the downtown/center city | | |
| b. most significant major transit hub | | |
| c. largest university outside of downtown | | |
| d. largest hospital complex outside of downtown | | |
| e. largest employment centers not already identified | | |
| f. nearest major natural/open space feature | | |
| g. nearest major shopping center | | |
| h. nearest major employment center (not already identified) | | |
| i. If you replaced any of the above with other regional destination types, please list these below, and answer the question for them: | | |
| 3. Did you calculate the shortest street network distance from **school** to | | |

| | | |
|---|---|---|
| each destination (**required**)? | | |
| a. most central location within the downtown/center city | | |
| b. most significant major transit hub | | |
| c. largest university outside of downtown | | |
| d. largest hospital complex outside of downtown | | |
| e. largest employment centers not already identified | | |
| f. nearest major natural/open space feature | | |
| g. nearest major shopping center | | |
| h. nearest major employment center (not already identified) | | |
| i. If you replaced any of the above with other regional destination types, please list these below, and answer the question for them: | | |
| 4. Did you calculate distance using entire road network available to vehicles, including all highways, toll roads, and roads, even those which prohibit pedestrians? If not, what did you use? | | |
| 5. Did you use meters for the unit of distance measurement? If not, what was? | | |

# Section 18: Template Appendices (A-F)

## Appendix A:



# FAQs for "Neighborhood" Selection and Participant Sampling

**If you have geographic data at two spatial levels (e.g. block groups and census tracts) which one should you use?**

- We recommend using smallest unit since you will have greater number of them and as a result more variance in walkability/SES. Also, recruiting adolescents from more administrative units reduces the clustering effect and can increase statistical power.

**What should we do if we don't have Retail Floor Area Ratio (RFAR) or the data is unreliable when calculating neighborhood selection variables?**

- It is okay to exclude the Retail Floor Area Ratio (RFAR) from the walkability index. Many countries do not have this data.

**When calculating land use mix using the entropy equation in Frank et al. 2010, if I used 5 out of 10 possible types of land uses, the first denominator option is to use 5 types of land use. The second denominator option is to use the total land use (i.e. include land uses that are not part of the 5 types). Which on should I do?**

- Only include the number of land uses used in the numerator for the denominator. Do not include land uses that were excluded from the numerator.

**Can spatial data be temporally mismatched (e.g. recruitment in 2013 but GIS data from 2008)?**

- Yes, ideally find the most recent, best possible data source. Some urban form features (e.g. road network) do not change very quickly so should be okay. Other types change faster but may not be updated frequently. We are planning to add year of data to templates. Keep your GIS metadata.

**If working in more than 1 city should you calculate walkability index across both cities or calculate a separate index for each city?**

- Calculate separate walkability/SES quadrants for each city.

**Do administration units in a quadrant need to be contiguous?**

- Administrative units do not need to be contiguous.

**What's the minimum and maximum number of adolescents that should be sampled from administrative units?**

- This depends on your total sample size and number of administrative units available across your quadrants. The *design priority* is to get balanced participants per quadrant. This criterion is more important than balance of the exact number of administrative units per quadrant or the number of kids per administrative unit. It is better to sample fewer students from more administrative units, keeping the number of students *as balanced as possible* across quadrants. The maximum number is 40 adolescents from any one administrative unit. The minimum number is 1 (or zero if not sampling from some city admin units within a

quadrant). This is okay because the aim is not to obtain a representative sample from the admin unit, but rather to consider it as a random nested factor. EXCEPT that there should not be isolated admin units with very large numbers of kids relative to others (e.g., in a given quadrant for a particular school, don't want 45 kids in one admin unit and 1 kid in each of 10 other admin units. And no more than 40 adolescents in any single admin unit.

**Is it acceptable if there are a different number of admin units for each quadrant for a school?** Consider this example, school 1 might have 100 students in 2 admin units in the HH quadrant and 100 students in 5 admin units from LH quadrant.

- It's most important to balance # numbers of adolescents per quadrants. One suggestion is to limit recruitment at a school once you reach a specific quota. Perhaps base the quota on the rarest neighborhood type. Ideally, good to have a similar number of admin units per quadrant. Try to balance and watch your recruitment closely to manage these numbers. This can be accomplished by recruiting fewer adolescents from a greater number of administrative units.

**Can admin units be reused for different schools if schools have overlapping catchment areas or when recruiting from single sex schools?**

- Yes – it's okay to have adolescents from different schools living in the same admin unit. Keep track of which school the child attends.

**Where can I find more information regarding administrative unit selection and GIS?**

- There are several resources including the:
    - IPEN website (ipenproject.org/methods),
    - Frank LD, Sallis JF, Saelens BE, Leary L, Cain K, Conway TL, et al. The development of a walkability index: application to the Neighborhood Quality of Life Study. Br J Sports Med. 2010 Oct 1;44(13):924–33, Remember that unlike IPEN-Adult, the IPEN-Adolescent study is using smaller census-level administrative units rather than neighborhoods for identifying areas from which to recruiting participants. However, the GIS-based methods for identifying areas falling into the high/low walkability by high/low SES quadrants are very similar
    - IPEN Adult Templates available on the IPEN website,
    - upcoming administrative unit selection webinars

# Appendix B:

# Example Z-Score Calculations for "Neighborhood" Selection and Participant Sampling Template

**Neighborhood Selection: Example of how to calculate z-scores for intersection density, residential density and land use mix variables for admin units**

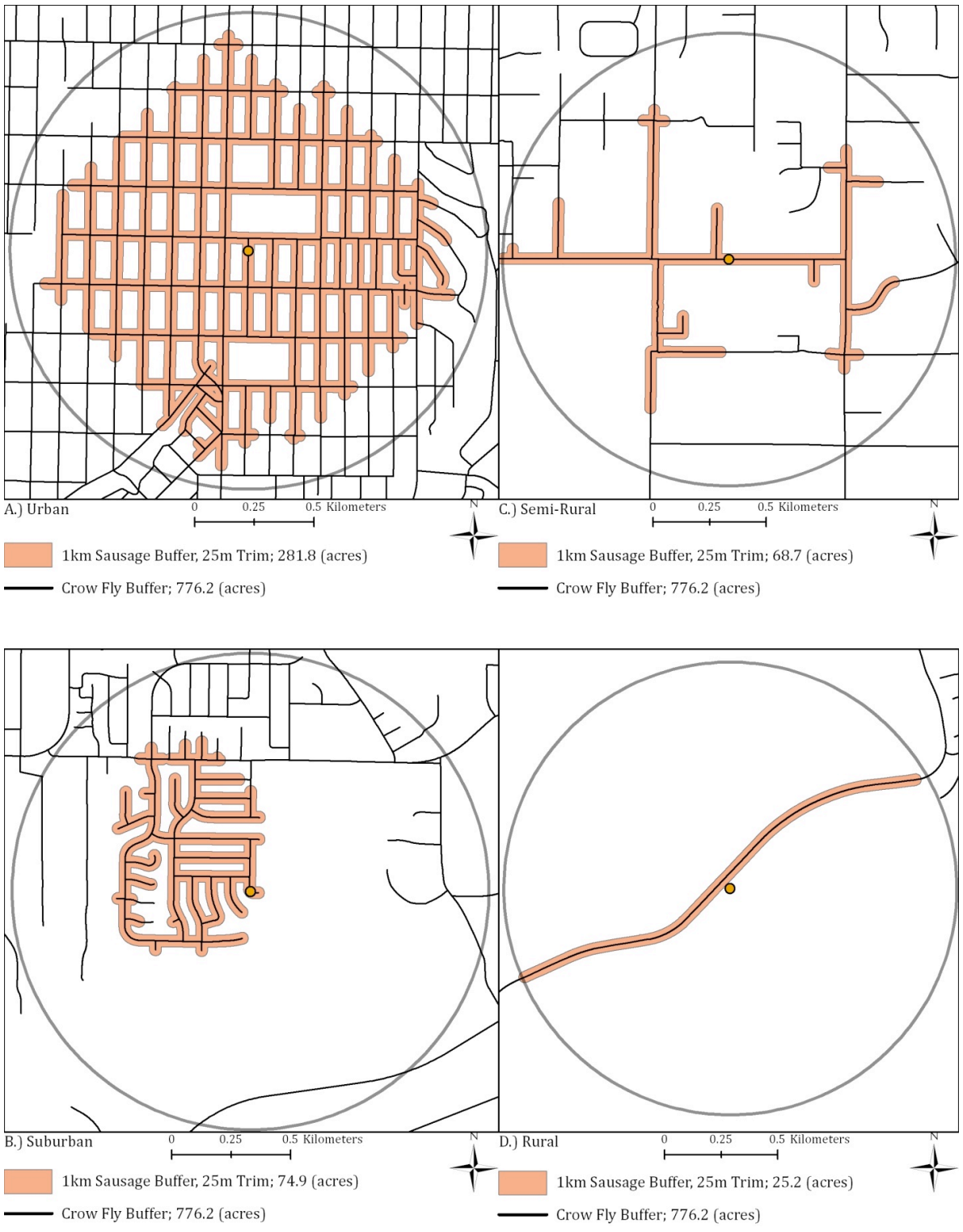
| | Admin unit Buffer area (square km) | Count of Intersections | Intersection density | z-score for intersection density | Residential density | z score for residential density | land use mix (see IPEN templates) | z-score for land use mix |
|---|---|---|---|---|---|---|---|---|
| Admin Unit 1 | 0.9 | 10 | 11.11 | -0.81 | 3867 | -0.39 | 0.35 | -0.33 |
| Admin Unit 2 | 0.76 | 10 | 13.16 | -0.77 | 1461 | -1.02 | 0.05 | -1.30 |
| Admin Unit 3 | 1.1 | 25 | 22.73 | -0.56 | 13093 | 2.03 | 0.43 | -0.07 |
| Admin Unit 4 | 0.95 | 99 | 104.21 | 1.18 | 2572 | -0.73 | 0.98 | 1.72 |
| Admin Unit 5 | 1 | 30 | 30.00 | -0.41 | 2378 | -0.78 | 0.6 | 0.49 |
| Admin Unit 6 | 1.1 | 32 | 29.09 | -0.43 | 9146 | 0.99 | 0.13 | -1.04 |
| Admin Unit 7 | 0.86 | 56 | 65.12 | 0.34 | 1573 | -0.99 | 0.66 | 0.68 |
| Admin Unit 8 | 0.5 | 23 | 46.00 | -0.06 | 7432 | 0.55 | 0.32 | -0.43 |
| Admin Unit 9 | 1.5 | 56 | 37.33 | -0.25 | 2468 | -0.75 | 0.46 | 0.03 |
| Admin Unit 10 | 0.53 | 87 | 164.15 | 2.46 | 6378 | 0.27 | 0.88 | 1.40 |
| Admin Unit 11 | 1.4 | 23 | 16.43 | -0.70 | 8468 | 0.82 | 0.1 | -1.14 |
| … | | | | | | | | |
| Averages | | 41.00 | 49.03 | 0.0 | 5348.727273 | 0.0 | 0.450909091 | 0.0 |
| Standard Deviations | | 29.93 | 46.84 | 1.0 | 3819.979191 | 1.0 | 0.307358245 | 1.0 |

**For reference: z-score = (observation value - mean of observations) / standard deviation of observations**
**Example for Admin Unit 1: z-score for intersection density = (11.11 - 49.03) / 46.84 = -0.81**
http://en.wikipedia.org/wiki/Standard_score

**Please email marc.adams@asu.edu if you would like a Microsoft Excel spreadsheet to help with formulas.**

# Appendix C: Visual Examples of Sausage Buffers

**Figure 1: Urban, suburban and rural examples of the 1km sausage (lattice) buffer form. 25m buffer around selected roads.**



# Appendix D:

## Example Land Use Categories

The following land use classification examples provide a consistent model for classifying parcel land use subcategories into 8 broader categories. These are example codes only. Land use codes may be more detailed or crude depending on urban planning departments within in your country and city. Please review the template definitions or contact the Coordinating Center if you have questions about how to classify a specific land use code.



1. **Residential Land Use Examples:**
   - Single family
     - Single Family
     - Duplex
   - Multi-family
     - 4-Plex
     - Apartment(s)
     - Housing - Trailer Park
     - Mobile Home
     - Mobile Home Park
     - Multi-Family Residential
     - Rental Dwelling
     - Residential Condominium
     - Townhouse
     - Triplex

2. **Retail Land Use Examples:**
   - Shopping Ctr (Neighborhood)
   - Shopping Ctr (Community)
   - Shopping Ctr (Regional)
   - Shopping Ctr (Major Retail)
   - Shopping Ctr (Specialty)
   - Retail(Line/Strip)
   - Retail Store
   - Auto Service Station w/Convenience Store
   - Auto Service Station w/High Volume Gas Sales
   - Bank branch
   - Bank building

- Barber Shop or Hair Salon
- Store convenience market
- Store department
- Store discount
- Store laundromat
- Store liquor
- Store lumber yard
- Store retail

3. **Entertainment Land Use Examples:**
   - Movie Theater
   - Art Gallery/Museum/Soc Srvc
   - Historic Prop(Rec/Entertain)
   - Theater, Live Stage
   - Theater, Cinema
   - Movie Theater
   - Social Club
   - Casinos

4. **Food-Related Land Use Examples:**
   - Restaurant
   - Restaurant Banquet/Catering Facility
   - Restaurant Bar/Tavern
   - Restaurant Converted Dwelling
   - Restaurant Family Style
   - Restaurant Fast Food
   - Store - Food store
   - Store convenience
   - Grocery store
   - Market

5. **Civic/Institutional Land Use Examples:**
   - Educational
   - School(public)
   - School(private)
   - Church with Sunday school
   - Church
   - Fire station (staffed)
   - Government building

- Library, public
- Fire station (volunteer)
- Convention center
- Jail - police station
- Government community service building
- Commission for Historical Preservation
- Detention Center
- Fire Department
- Library
- Market and Comfort Statio
- Police Station
- Public Works Property
- Military Installation
- Armory
- Department of Public Work
- Metropolitan Transit Authority
- Police Station/Barrack
- State Roads Commission (Mass Transit Administration)

**6. Office Land Use Examples:**

- Legal services
- Accounting, tax, bookkeeping, payroll services
- Architectural, engineering, and related services
- Graphic, industrial, interior design services
- Consulting services (management, environmental, etc.)
- Research and development services (scientific, etc.)
- Advertising, media, and photography services
- Veterinary services
- Facilities support services
- Employment agency
- Collection agency
- Travel arrangement and reservation services
- Investigation and security services
- Janitorial
- Carpet and upholstery cleaning
- Packing, crating, and convention and trade show services
- Office building
- Office park

- Condominium (office)
- Historic property (office)

7. **Recreation Land Use Examples:**
   - Recreational
   - Bowling alley
   - City club
   - Clubhouse
   - Country club
   - Skating rink
   - Tennis club, indoor
   - Handball-racquetball club
   - Health club
   - Fitness center
   - Natatorium
   - Field houses
   - Arcade
   - Recreation Centers
   - Senior Centers
   - Public Parks

8. **Vacant Land Use Examples:**
   - Agricultural Vacant Land
   - Industrial, Vacant Land
   - Commercial, Vacant land
   - Apartment, Vacant Land
   - Residential, Vacant land,
   - Lot Vacant Land
   - Exempt HRA Vacant Land
   - Vacant and Undeveloped Land
   - Undetermined Residential
   - Undetermined Commercial
   - Undetermined Industrial
   - Undetermined Condominium,
   - Incomplete subdivision parcel

## Private Recreation Facility Examples:

- Amusement places (with known physical activity facility)
- Arcades (with known physical activity facility)
- Baseball
- Basketball
- Batting cages
- Dance; Dance Companies; Dance - Instruction- Ballet, Tap; Dance - Instruction - Ballroom
- Gymnastics; Gymnastics - Instruction; Gymnastics/Dance
- Health club; Health club/Martial Arts; Health club/pool; Health club/tennis - private
- Hockey rinks
- Indoor rock climbing
- Kayaking
- Lasertag
- Martial arts
- Paintball; Paintball games and supplies
- Racquetball courts - private; Racquetball courts - public
- Soccer; Soccer field
- Swimming pool - private; swimming pool - public
- Tennis - private; tennis - public
- Video games - arcades (with known physical activity facility)
- YMCA/ YWCA
- Yoga; Yoga/Dance; Yoga/Health Club; Yoga/Martial arts

# Appendix E:

# Visual Examples of Land Cover vs. Parcel Data

Figure 1: Land Cover Data (left) vs. Parcel Data (right). Source: Urban Design 4 Health, Inc.

# APPENDIX F:

## REGIONAL ACCESSIBILITY DEFINED – WORKING DRAFT

**February 12, 2013**

### Regional accessibility versus local accessibility

Regional accessibility, or the ability of individuals to access key destinations within the broader region, is a critical factor for individuals and households making transportation and time budget decisions. Regional accessibility for a specific location is determined by the proximity of that location to other places of interest in the region (e.g. employment / retail / entertainment centers or a transportation hub such as an airport or train station) and the characteristics of the transportation infrastructure available to reach those places of interest. A location that connects to a large number of key destinations with low travel time and financial cost is considered to have higher regional accessibility. Regional accessibility is most relevant to automobile and transit modes, though regional cycling accessibility may also be a consideration.

In contrast, local accessibility focuses on access to neighborhood destinations that can be reached primarily on foot or by short bike or transit ride. Local accessibility, or walkability, often focuses on an area no larger than a 20-minute walk, or one mile, from a location of interest. Local accessibility is more concerned with destinations that may be desirable to access every day, such as jobs, shops, groceries, restaurants, cafes, libraries, parks, and recreation facilities. Local accessibility is also more concerned about the micro-scale characteristics of a place and its transportation system, such as sidewalk width and quality, building design, tree canopy, street connectivity, crosswalk presence or absence, and the availability of bike parking.

### How does regional accessibility influence active transportation and physical activity?

Transportation mode choice is strongly influenced by the relative accessibility or utility of each mode compared to each other mode. As travel time or costs decrease for a particular mode, the utility of choosing that mode increases relative to choosing other modes. While individual thresholds differ based on income, individual assessments of the value of time, and availability of an automobile or transit service, ultimately, mode choice decisions largely are determined by comparisons of time and cost per mode. In a study of Puget Sound region transportation behavior, Frank et al. found that regional travel time and cost by mode were significant predictors of mode choice for both work and non-work trips, where lower auto travel times were associated with a moderate increase in auto use, moderate decrease in walking, and substantial decrease in both biking and transit.[i] Similarly, better local

accessibility (higher mixed use index, density, and floor area ratio) were associated with reduced auto use and increased walking, biking, and transit.

These results have been confirmed in several recent studies. In a meta-analysis of more than 50 studies on relationships between the built environment and travel behavior, Ewing and Cervero identified regional job accessibility by auto and the distance to downtown to be the most important predictors of vehicle miles of travel (VMT), as compared to measures of local area density, land use diversity, and street design.[ii] Regional job accessibility by transit and distance to transit were less important predictors, though were more strongly associated with VMT than local area housing density, job density, and jobs:housing balance. Owen et al. also found that the ratio of transit:auto accessibility within 30 minutes of a block group centroid was strongly associated with block group level transit:auto mode choice, predicting over 40 percent of the variation in the mode choice ratio.[iii]

In short, mode choice decisions are a synergistic result of both regional and local accessibility factors. Making the choice to walk or bike depends both on having good local accessibility and on having high relative local:regional accessibility. Without the latter, it becomes more likely that an individual will choose not to walk, even in an area with good local accessibility. Similarly for transit (at least for those that have the option of driving), the likelihood of using transit increases when a transit stop is reasonably accessible by walking or biking, there is a high transit:auto accessibility ratio, driving and/or parking out-of-pocket costs are high, and there is good local accessibility on the destination end of the trip. Since these are either/or decisions, high regional auto accessibility that increases the likelihood of driving simultaneously decreases the likelihood of engaging in active transportation.

Time use in transportation is also an important consideration in determining levels of physical health and other health outcomes. Time spent in an automobile is sedentary time, and has been associated with higher obesity, higher blood pressure, and worse cardiovascular health.[iv,v,vi] Meanwhile, more time spent in automobiles is not only associated with less physical activity through active transportation but also less leisure time available for healthy activities such as physical activity, sleeping, socialization, and cooking.[vii,viii,ix]

**Why is regional accessibility relevant for adolescents?**

While driving-age adolescents are subject to similar mode choice influences as described above, those too young to drive or without access to an automobile are subject to somewhat different influences. Having good local accessibility (combined with parental permission) is key to determining if it is even feasible for an adolescent to engage in local active transportation. Local accessibility for teens is often dependent not only on convenience but also on teen and parental perceptions of safety and security.[x] Teens and younger children are

especially sensitive to travel distances, and the likelihood of walking to school decreases substantially with increasing distance to school.[xi,xii]

In many urban areas, adolescents rely on transit to access school, work, and other destinations, just as adults would. Having good local access to transit service and high regional transit accessibility are critical for allowing adolescents (and their parents) to make the choice to use transit. This is especially true in locations without school bus service (such as non-Western countries), or where school choice rules allow students to attend an out-of-district school.[xiii]

In cases where adolescents are unable to travel independently to meet their needs, their travel decisions are determined by their parent's travel decisions, which depend on relative accessibility of competing modes as discussed above.[xiv,xv,xvi] Children of parents that live in a neighborhood with high regional auto accessibility relative to local accessibility will be more prone to be driven from place-to-place. In contrast, children of parents that live in a neighborhood with high local accessibility will be more likely to be walked or biked from place-to-place, even more so if the regional auto accessibility is relatively poor.

**Policy implications of regional accessibility impacts on adolescent physical activity**

Despite increased focus on regional accessibility as a significant factor in determining transportation and physical activity behaviors for adults, there is little published evidence of the role of regional accessibility on adolescent transportation and physical activity behavior. IPEN Adolescent provides an opportunity to generate this scientific evidence. By developing measures of regional auto accessibility, regional transit accessibility, and local accessibility for each participant, we can quantify both the independent and synergistic impacts of the various types of accessibility on transportation mode choice and leisure time physical activity. The data would provide the ability to directly model and address regional accessibility and travel time requirements on transit relative to driving to promote active transportation, and the ability to speak to the need for the effective integration of transit and location walkability to create an environment that promotes active travel.

More practically, the findings of this analysis could be used to influence transportation and land use decision making. Traditionally, transportation investments have been directed towards increasing regional accessibility (by building new roads or widening existing roads) at the expense of local accessibility. Every time a new investment is used to increase regional accessibility, mode choice utility shifts further towards automobile use and away from active transportation modes. Providing evidence of the influence of regional accessibility on adolescent physical activity will help to provide a case for shifting transportation spending from regional accessibility to local accessibility improvements, and from regional auto to regional transit improvements.

## References for Regional Accessibility Defined


[i] Frank L, Bradley M, Kavage S, Chapman J, Lawton TK. Urban form, travel time, and cost relationships with tour complexity and mode choice. *Transportation*. 2007 Jul 28;35(1):37–54.

[ii] Ewing R, Cervero R. Travel and the Built Environment. *Journal of the American Planning Association*. 2010 Jun;76(3):265–94.

[iii] Owen A, Anderson P, Levinson D. Relative Accessibility and the Choice of Modes. University of Minnesota Department of Civil Engineering. 2012:1–14. Available: http://nexus.umn.edu/Papers/RelativeAccessibilityAndTheChoiceOfModes.pdf

[iv] Frank LD, Andresen MA, Schmid TL. Obesity relationships with community design, physical activity, and time spent in cars. *American journal of preventive medicine*. 2004 Aug;27(2):87–96.

[v] Hoehner CM, Barlow CE, Allen P, Schootman M. Commuting distance, cardiorespiratory fitness, and metabolic risk. American journal of preventive medicine [Internet]. 2012 Jun;42(6):571–8.

[vi] Warren TY, Barry V, Hooker SP, Sui X, Church TS, Blair SN. Sedentary behaviors increase risk of cardiovascular disease mortality in men. *Medicine and science in sports and exercise*. 2010 May

[vii] Christian TJ. Trade-offs between commuting time and health-related activities. *Journal of urban health*. 2012 Oct;89(5):746–57.

[viii] Besser LM, Marcus M, Frumkin H. Commute time and social capital in the U.S. *American journal of preventive medicine*. 2008 Mar;34(3):207–11.

[ix] Yang W, Spears K, Zhang F, Lee W, Himler HL. Evaluation of personal and built environment attributes to physical activity: a multilevel analysis on multiple population-based data sources. *Journal of obesity*. 2012 Jan; ID548910:9pp.

[x] Giles-Corti B, Kelty SF, Zubrick SR, Villanueva KP. Encouraging walking for transport and physical activity in children and adolescents: how important is the built environment? *Sports medicine*. 2009 Jan;39(12):995–1009.

[xi] Mcmillan T. The relative influence of urban form on a child's travel mode to school. *Transportation Research Part A: Policy and Practice*. 2007 Jan;41(1):69–79.

[xii] Timperio A, Ball K, Salmon J, Roberts R, Giles-Corti B, Simmons D, et al. Personal, family, social, and environmental correlates of active commuting to school. *American journal of preventive medicine*. 2006 Jan;30(1):45–51.

[xiii] Wilson EJ, Marshall J, Wilson R, Krizek KJ. By foot, bus or car: children's school travel and school choice policy. *Environment and Planning A*. 2010;42(9):2168–85.

[xiv] McDonald NC. Children's mode choice for the school trip: the role of distance and school location in walking to school. *Transportation*. 2007 Jul 21;35(1):23–35.

[xv] Bradshaw R, Atkins S.. The use of public transport for school journeys in London. Paper from *The Association for European Transport Conference*. January 1, 1996.

[xvi] Campbell EK, Wang Q. Driven to School: Factors Affecting Mode Choice and the Amount of Parent-driven Trips. Unpublished report. 2008. Available: http://www.uvm.edu/~transctr/research/trb_papers/DriventoSchoolFactors.pdf

# SECTION 19: VARIABLE NAMING CONVENTIONS

**Home buffer**-based variable names and labels are provided below by template for 500m, 1km, 250m, and 2km. Names and labels for 'distance to nearest' variables from home are presented after buffer-based variables.

Afterwards, **school buffer**-based variable names and labels are provided by template for 500m, 1km, 250m, 2km. Names and labels for 'distance to nearest' variables from school are presented after buffer-based variables.

To save time, you can obtain Excel or SPSS versions of variable names and labels by contacting: marc.adams@asu.edu

# Buffers around Participant Homes

## 500 Meter Home Street Network Buffers (required buffer)

| | **Buffer Template** |
|---|---|
| G5NB | GIS, 500M, HOME SN BUFF, BUFFER AREA |
| G5NRC | GIS, 500M, HOME SN BUFF, RESIDENTIAL, PARCEL COUNT |
| G5NRCS | GIS, 500M, HOME SN BUFF, RESIDENTIAL, COUNT, SINGLE FAMILY |
| G5NRCM | GIS, 500M, HOME SN BUFF, RESIDENTIAL, COUNT, MULTIPLE FAMILY |
| G5NRL | GIS, 500M, HOME SN BUFF, RESIDENTIAL, LAND AREA SUM |
| G5NRLD | GIS, 500M, HOME SN BUFF, RESIDENTIAL, LAND AREA SUM, NET DENSITY |
| G5NRLDS | GIS, 500M, HOME SN BUFF, RESIDENTIAL, LAND AREA SUM, NET DENSITY, SINGLE FAMILY |
| G5NRLDM | GIS, 500M, HOME SN BUFF, RESIDENTIAL, LAND AREA SUM, NET DENSITY, MULTIPLE FAMILY |
| G5NRF | GIS, 500M, HOME SN BUFF, RESIDENTIAL, FLOOR AREA SUM |
| G5NRFD | GIS, 500M, HOME SN BUFF, RESIDENTIAL, FLOOR AREA SUM, NET DENSITY |
| G5NRFDS | GIS, 500M, HOME SN BUFF, RESIDENTIAL, FLOOR AREA SUM, NET DENSITY, SINGLE FAMILY |
| G5NRFDM | GIS, 500M, HOME SN BUFF, RESIDENTIAL, FLOOR AREA SUM, NET DENSITY, MULTIPLE FAMILY |
| G5NBG | GIS, 500M, HOME SN BUFF, BUFFER, GROSS RES DENSITY |
| G5NBGS | GIS, 500M, HOME SN BUFF, BUFFER, GROSS RES DENSITY, SINGLE FAMILY |
| G5NBGM | GIS, 500M, HOME SN BUFF, BUFFER, GROSS RES DENSITY, MULTIPLE FAMILY |
| G5NDC | GIS, 500M, HOME SN BUFF, DWELLINGS, COUNT |
| G5NLC | GIS, 500M, HOME SN BUFF, PEOPLE, COUNT |
| | **Commercial/Retail Land Use Template** |
| G5NCC | GIS, 500M, HOME SN BUFF, COMMERCIAL, PARCEL COUNT |
| G5NCL | GIS, 500M, HOME SN BUFF, COMMERCIAL, LAND AREA SUM |
| G5NCF | GIS, 500M, HOME SN BUFF, COMMERCIAL, FLOOR AREA SUM |
| | **Institutional Land Use Template** |
| G5NVC | GIS, 500M, HOME SN BUFF, INSTITUTIONAL, PARCEL COUNT |

| | |
|---|---|
| G5NVL | GIS, 500M, HOME SN BUFF, INSTITUTIONAL, LAND AREA SUM |
| G5NVF | GIS, 500M, HOME SN BUFF, INSTITUTIONAL, FLOOR AREA SUM |
| | **Entertainment Land Use Template** |
| G5NEC | GIS, 500M, HOME SN BUFF, ENTERTAINMENT, PARCEL COUNT |
| G5NEL | GIS, 500M, HOME SN BUFF, ENTERTAINMENT, LAND AREA SUM |
| G5NEF | GIS, 500M, HOME SN BUFF, ENTERTAINMENT, FLOOR AREA SUM |
| | **Food-Related Land Use Template** |
| G5NFC | GIS, 500M, HOME SN BUFF, FOOD RELATED, PARCEL COUNT |
| G5NFL | GIS, 500M, HOME SN BUFF, FOOD RELATED, LAND AREA SUM |
| G5NFF | GIS, 500M, HOME SN BUFF, FOOD RELATED, FLOOR AREA SUM |
| G5NHC | GIS, 500M, HOME SN BUFF, RESTAURANT, PARCEL COUNT |
| G5NHL | GIS, 500M, HOME SN BUFF, RESTAURANT, LAND AREA SUM |
| G5NHF | GIS, 500M, HOME SN BUFF, RESTAURANT, FLOOR AREA SUM |
| | **Office Land Use Template** |
| G5NOC | GIS, 500M, HOME SN BUFF, OFFICE, PARCEL COUNT |
| G5NOL | GIS, 500M, HOME SN BUFF, OFFICE, LAND AREA SUM |
| G5NOF | GIS, 500M, HOME SN BUFF, OFFICE FLOOR AREA SUM |
| | **Private and Public Recreation Land Use Template** |
| G5NPC | GIS, 500M, HOME SN BUFF, PRIVATE AND PUBLIC RECREATION LAND, PARCEL COUNT |
| G5NPL | GIS, 500M, HOME SN BUFF, PRIVATE AND PUBLIC RECREATION LAND, LAND AREA SUM |
| G5NPF | GIS, 500M, HOME SN BUFF, PRIVATE AND PUBLIC RECREATION LAND, FLOOR AREA SUM |
| | **Vacant Land Use Template** |
| G5NZC | GIS, 500M, HOME SN BUFF, VACANT, PARCEL COUNT |
| G5NZL | GIS, 500M, HOME SN BUFF, VACANT, LAND AREA SUM |
| | **Intersection Density Template** |
| G5NIC | GIS, 500M, HOME SN BUFF, INTERSECTION, COUNT |
| G5NID | GIS, 500M, HOME SN BUFF, INTERSECTION, DENSITY |
| G5NJC | GIS, 500M, HOME SN BUFF, CUL-DE-SACS, COUNT |
| G5NJD | GIS, 500M, HOME SN BUFF, CUL-DE-SACS, DENSITY |
| | **Private Recreation Facilities Template** |
| G5NYC1 | GIS, 500M, HOME SN BUFF, PRIVATE RECREATION FACILITIES, COUNT, CONTAINED OR INTERSECTED BY BUFFER |
| G5NYC3 | GIS, 500M, HOME SN BUFF, PRIVATE RECREATION FACILITIES, COUNT, ANOTHER METHOD |
| | **Public Parks Template** |
| G5NQC | GIS, 500M, HOME SN BUFF, TRAIL, COUNT |
| G5NGC1A | GIS, 500M, HOME SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, OVERALL |
| G5NGA1A | GIS, 500M, HOME SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, OVERALL |
| G5NGC1B | GIS, 500M, HOME SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, <=1012 SQ METERS |
| G5NGA1B | GIS, 500M, HOME SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, <=1012 SQ METERS |
| G5NGC1C | GIS, 500M, HOME SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >1012 to <= 4047 SQ METERS |
| G5NGA1C | GIS, 500M, HOME SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >1012 to <= 4047 SQ METERS |
| G5NGC1D | GIS, 500M, HOME SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >4047 to <= 20234 SQ METERS |
| G5NGA1D | GIS, 500M, HOME SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >4047 to <= 20234 SQ METERS |
| G5NGC1E | GIS, 500M, HOME SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >20234 to <= 40469 SQ METERS |

| | |
|---|---|
| G5NGA1E | GIS, 500M, HOME SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >20234 to <= 40469 SQ METERS |
| G5NGC1F | GIS, 500M, HOME SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >40469 to <= 202343 SQ METERS |
| G5NGA1F | GIS, 500M, HOME SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >40469 to <= 202343 SQ METERS |
| G5NGC1G | GIS, 500M, HOME SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >202343 SQ METERS |
| G5NGA1G | GIS, 500M, HOME SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >202343 SQ METERS |
| | **Public Transit Template** |
| G5NTDA | GIS, 500M, HOME SN BUFF, TRANSPORTATION, DENSITY, OVERALL |
| G5NTDB | GIS, 500M, HOME SN BUFF, TRANSPORTATION, DENSITY, BUS (REGULAR) ONLY |
| G5NTDE | GIS, 500M, HOME SN BUFF, TRANSPORTATION, DENSITY, BUS (EXPRESS) ONLY |
| G5NTDP | GIS, 500M, HOME SN BUFF, TRANSPORTATION, DENSITY, BUS (RAPID TRANSIT) ONLY |
| G5NTDT | GIS, 500M, HOME SN BUFF, TRANSPORTATION, DENSITY, TRAM/STREETCAR/LIGHT RAIL ONLY |
| G5NTDH | GIS, 500M, HOME SN BUFF, TRANSPORTATION, DENSITY, HEAVY RAIL ONLY |
| G5NTDC | GIS, 500M, HOME SN BUFF, TRANSPORTATION, DENSITY, COMMUTER RAIL ONLY |
| G5NTDF | GIS, 500M, HOME SN BUFF, TRANSPORTATION, DENSITY, FERRIES ONLY |
| G5NTDO | GIS, 500M, HOME SN BUFF, TRANSPORTATION, DENSITY, OTHER ONLY |
| G5NTCA | GIS, 500M, HOME SN BUFF, TRANSPORTATION, COUNT, ANY TYPE |
| G5NTCB | GIS, 500M, HOME SN BUFF, TRANSPORTATION, COUNT, BUS (REGULAR) ONLY |
| G5NTCE | GIS, 500M, HOME SN BUFF, TRANSPORTATION, COUNT, BUS (EXPRESS) ONLY |
| G5NTCP | GIS, 500M, HOME SN BUFF, TRANSPORTATION, COUNT, BUS (RAPID TRANSIT) ONLY |
| G5NTCT | GIS, 500M, HOME SN BUFF, TRANSPORTATION, COUNT, TRAM/STREETCAR/LIGHT RAIL ONLY |
| G5NTCH | GIS, 500M, HOME SN BUFF, TRANSPORTATION, COUNT, HEAVY RAIL ONLY |
| G5NTCC | GIS, 500M, HOME SN BUFF, TRANSPORTATION, COUNT, COMMUTER RAIL ONLY |
| G5NTCF | GIS, 500M, HOME SN BUFF, TRANSPORTATION, COUNT, FERRIES ONLY |
| G5NTCO | GIS, 500M, HOME SN BUFF, TRANSPORTATION, COUNT, OTHER ONLY |
| | **Regional Accessibility Template** |
| G5NA1 | GIS, 500M, HOME SN BUFF, REGIONAL ACCESSIBILITY, DOWNTOWN/CENTER CITY |
| G5NA2 | GIS, 500M, HOME SN BUFF, REGIONAL ACCESSIBILITY, MAJOR TRANSIT HUB |
| G5NA3 | GIS, 500M, HOME SN BUFF, REGIONAL ACCESSIBILITY, LARGEST UNIVERSITY |
| G5NA4 | GIS, 500M, HOME SN BUFF, REGIONAL ACCESSIBILITY, LARGEST HOSPITAL |
| G5NA5 | GIS, 500M, HOME SN BUFF, REGIONAL ACCESSIBILITY, LARGEST EMPLOYMENT CENTER |
| G5NA6 | GIS, 500M, HOME SN BUFF, REGIONAL ACCESSIBILITY, LARGEST NATURAL/OPEN SPACE FEATURE |
| G5NA7 | GIS, 500M, HOME SN BUFF, REGIONAL ACCESSIBILITY, NEAREST MAJOR SHOPPING CENTER |
| G5NA8 | GIS, 500M, HOME SN BUFF, REGIONAL ACCESSIBILITY, NEAREST MAJOR EMPLOYMENT CENTER |

# 1km Home Street Network Buffers (required buffer)

| | **Buffer Template** |
|---|---|
| G1NB | GIS, 1KM, HOME SN BUFF, BUFFER AREA |
| G1NRC | GIS, 1KM, HOME SN BUFF, RESIDENTIAL, PARCEL COUNT |
| G1NRCS | GIS, 1KM, HOME SN BUFF, RESIDENTIAL, COUNT, SINGLE FAMILY |
| G1NRCM | GIS, 1KM, HOME SN BUFF, RESIDENTIAL, COUNT, MULTIPLE FAMILY |
| G1NRL | GIS, 1KM, HOME SN BUFF, RESIDENTIAL, LAND AREA SUM |
| G1NRLD | GIS, 1KM, HOME SN BUFF, RESIDENTIAL, LAND AREA SUM, NET DENSITY |
| G1NRLDS | GIS, 1KM, HOME SN BUFF, RESIDENTIAL, LAND AREA SUM, NET DENSITY, SINGLE FAMILY |
| G1NRLDM | GIS, 1KM, HOME SN BUFF, RESIDENTIAL, LAND AREA SUM, NET DENSITY, MULTIPLE FAMILY |
| G1NRF | GIS, 1KM, HOME SN BUFF, RESIDENTIAL, FLOOR AREA SUM |
| G1NRFD | GIS, 1KM, HOME SN BUFF, RESIDENTIAL, FLOOR AREA SUM, NET DENSITY |
| G1NRFDS | GIS, 1KM, HOME SN BUFF, RESIDENTIAL, FLOOR AREA SUM, NET DENSITY, SINGLE FAMILY |
| G1NRFDM | GIS, 1KM, HOME SN BUFF, RESIDENTIAL, FLOOR AREA SUM, NET DENSITY, MULTIPLE FAMILY |
| G1NBG | GIS, 1KM, HOME SN BUFF, BUFFER, GROSS RES DENSITY |
| G1NBGS | GIS, 1KM, HOME SN BUFF, BUFFER, GROSS RES DENSITY, SINGLE FAMILY |
| G1NBGM | GIS, 1KM, HOME SN BUFF, BUFFER, GROSS RES DENSITY, MULTIPLE FAMILY |
| G1NDC | GIS, 1KM, HOME SN BUFF, DWELLINGS, COUNT |
| G1NLC | GIS, 1KM, HOME SN BUFF, PEOPLE, COUNT |
| | **Commercial/Retail Land Use Template** |
| G1NCC | GIS, 1KM, HOME SN BUFF, COMMERCIAL, PARCEL COUNT |
| G1NCL | GIS, 1KM, HOME SN BUFF, COMMERCIAL, LAND AREA SUM |
| G1NCF | GIS, 1KM, HOME SN BUFF, COMMERCIAL, FLOOR AREA SUM |
| | **Institutional Land Use Template** |
| G1NVC | GIS, 1KM, HOME SN BUFF, INSTITUTIONAL, PARCEL COUNT |
| G1NVL | GIS, 1KM, HOME SN BUFF, INSTITUTIONAL, LAND AREA SUM |
| G1NVF | GIS, 1KM, HOME SN BUFF, INSTITUTIONAL, FLOOR AREA SUM |
| | **Entertainment Land Use Template** |
| G1NEC | GIS, 1KM, HOME SN BUFF, ENTERTAINMENT, PARCEL COUNT |
| G1NEL | GIS, 1KM, HOME SN BUFF, ENTERTAINMENT, LAND AREA SUM |
| G1NEF | GIS, 1KM, HOME SN BUFF, ENTERTAINMENT, FLOOR AREA SUM |
| | **Food-Related Land Use Template** |
| G1NFC | GIS, 1KM, HOME SN BUFF, FOOD RELATED, PARCEL COUNT |
| G1NFL | GIS, 1KM, HOME SN BUFF, FOOD RELATED, LAND AREA SUM |
| G1NFF | GIS, 1KM, HOME SN BUFF, FOOD RELATED, FLOOR AREA SUM |
| G1NHC | GIS, 1KM, HOME SN BUFF, RESTAURANT, PARCEL COUNT |
| G1NHL | GIS, 1KM, HOME SN BUFF, RESTAURANT, LAND AREA SUM |
| G1NHF | GIS, 1KM, HOME SN BUFF, RESTAURANT, FLOOR AREA SUM |
| | **Office Land Use Template** |
| G1NOC | GIS, 1KM, HOME SN BUFF, OFFICE, PARCEL COUNT |
| G1NOL | GIS, 1KM, HOME SN BUFF, OFFICE, LAND AREA SUM |
| G1NOF | GIS, 1KM, HOME SN BUFF, OFFICE FLOOR AREA SUM |

| | |
|---|---|
| | **Private and Public Recreation Land Use Template** |
| G1NPC | GIS, 1KM, HOME SN BUFF, PRIVATE AND PUBLIC RECREATION LAND, PARCEL COUNT |
| G1NPL | GIS, 1KM, HOME SN BUFF, PRIVATE AND PUBLIC RECREATION LAND, LAND AREA SUM |
| G1NPF | GIS, 1KM, HOME SN BUFF, PRIVATE AND PUBLIC RECREATION LAND, FLOOR AREA SUM |
| | **Vacant Land Use Template** |
| G1NZC | GIS, 1KM, HOME SN BUFF, VACANT, PARCEL COUNT |
| G1NZL | GIS, 1KM, HOME SN BUFF, VACANT, LAND AREA SUM |
| | **Intersection Density Template** |
| G1NIC | GIS, 1KM, HOME SN BUFF, INTERSECTION, COUNT |
| G1NID | GIS, 1KM, HOME SN BUFF, INTERSECTION, DENSITY |
| G1NJC | GIS, 1KM, HOME SN BUFF, CUL-DE-SACS, COUNT |
| G1NJD | GIS, 1KM, HOME SN BUFF, CUL-DE-SACS, DENSITY |
| | **Private Recreation Facilities Template** |
| G1NYC1 | GIS, 1KM, HOME SN BUFF, PRIVATE RECREATION FACILITIES, COUNT, CONTAINED OR INTERSECTED BY BUFFER |
| G1NYC3 | GIS, 1KM, HOME SN BUFF, PRIVATE RECREATION FACILITIES, COUNT, ANOTHER METHOD |
| | **Public Parks Template** |
| G1NQC | GIS, 1KM, HOME SN BUFF, TRAIL, COUNT |
| G1NGC1A | GIS, 1KM, HOME SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, OVERALL |
| G1NGA1A | GIS, 1KM, HOME SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, OVERALL |
| G1NGC1B | GIS, 1KM, HOME SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, <=1012 SQ METERS |
| G1NGA1B | GIS, 1KM, HOME SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, <=1012 SQ METERS |
| G1NGC1C | GIS, 1KM, HOME SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >1012 to <= 4047 SQ METERS |
| G1NGA1C | GIS, 1KM, HOME SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >1012 to <= 4047 SQ METERS |
| G1NGC1D | GIS, 1KM, HOME SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >4047 to <= 20234 SQ METERS |
| G1NGA1D | GIS, 1KM, HOME SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >4047 to <= 20234 SQ METERS |
| G1NGC1E | GIS, 1KM, HOME SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >20234 to <= 40469 SQ METERS |
| G1NGA1E | GIS, 1KM, HOME SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >20234 to <= 40469 SQ METERS |
| G1NGC1F | GIS, 1KM, HOME SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >40469 to <= 202343 SQ METERS |
| G1NGA1F | GIS, 1KM, HOME SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >40469 to <= 202343 SQ METERS |
| G1NGC1G | GIS, 1KM, HOME SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >202343 SQ METERS |
| G1NGA1G | GIS, 1KM, HOME SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >202343 SQ METERS |
| | **Public Transit Template** |
| G1NTDA | GIS, 1KM, HOME SN BUFF, TRANSPORTATION, DENSITY, OVERALL |
| G1NTDB | GIS, 1KM, HOME SN BUFF, TRANSPORTATION, DENSITY, BUS ONLY |
| G1NTDE | GIS, 1KM, HOME SN BUFF, TRANSPORTATION, DENSITY, BUS (EXPRESS) ONLY |
| G1NTDP | GIS, 1KM, HOME SN BUFF, TRANSPORTATION, DENSITY, BUS (RAPID TRANSIT) ONLY |
| G1NTDT | GIS, 1KM, HOME SN BUFF, TRANSPORTATION, DENSITY, TRAM/STREETCAR/LIGHT RAIL ONLY |
| G1NTDH | GIS, 1KM, HOME SN BUFF, TRANSPORTATION, DENSITY, HEAVY RAIL ONLY |
| G1NTDC | GIS, 1KM, HOME SN BUFF, TRANSPORTATION, DENSITY, COMMUTER RAIL ONLY |
| G1NTDF | GIS, 1KM, HOME SN BUFF, TRANSPORTATION, DENSITY, FERRIES ONLY |
| G1NTDO | GIS, 1KM, HOME SN BUFF, TRANSPORTATION, DENSITY, OTHER ONLY |
| G1NTCA | GIS, 1KM, HOME SN BUFF, TRANSPORTATION, COUNT, ANY TYPE |
| G1NTCB | GIS, 1KM, HOME SN BUFF, TRANSPORTATION, COUNT, BUS (REGULAR) ONLY |

| | |
|---|---|
| G1NTCE | GIS, 1KM, HOME SN BUFF, TRANSPORTATION, COUNT, BUS (EXPRESS) ONLY |
| G1NTCP | GIS, 1KM, HOME SN BUFF, TRANSPORTATION, COUNT, BUS (RAPID TRANSIT) ONLY |
| G1NTCT | GIS, 1KM, HOME SN BUFF, TRANSPORTATION, COUNT, TRAM/STREETCAR/LIGHT RAIL ONLY |
| G1NTCH | GIS, 1KM, HOME SN BUFF, TRANSPORTATION, COUNT, HEAVY RAIL ONLY |
| G1NTCC | GIS, 1KM, HOME SN BUFF, TRANSPORTATION, COUNT, COMMUTER RAIL ONLY |
| G1NTCF | GIS, 1KM, HOME SN BUFF, TRANSPORTATION, COUNT, FERRIES ONLY |
| G1NTCO | GIS, 1KM, HOME SN BUFF, TRANSPORTATION, COUNT, OTHER ONLY |
| | **Regional Accessibility Template** |
| G1NA1 | GIS, 1KM, HOME SN BUFF, REGIONAL ACCESSIBILITY, DOWNTOWN/CENTER CITY |
| G1NA2 | GIS, 1KM, HOME SN BUFF, REGIONAL ACCESSIBILITY, MAJOR TRANSIT HUB |
| G1NA3 | GIS, 1KM, HOME SN BUFF, REGIONAL ACCESSIBILITY, LARGEST UNIVERSITY |
| G1NA4 | GIS, 1KM, HOME SN BUFF, REGIONAL ACCESSIBILITY, LARGEST HOSPITAL |
| G1NA5 | GIS, 1KM, HOME SN BUFF, REGIONAL ACCESSIBILITY, LARGEST EMPLOYMENT CENTER |
| G1NA6 | GIS, 1KM, HOME SN BUFF, REGIONAL ACCESSIBILITY, LARGEST NATURAL/OPEN SPACE FEATURE |
| G1NA7 | GIS, 1KM, HOME SN BUFF, REGIONAL ACCESSIBILITY, NEAREST MAJOR SHOPPING CENTER |
| G1NA8 | GIS, 1KM, HOME SN BUFF, REGIONAL ACCESSIBILITY, NEAREST MAJOR EMPLOYMENT CENTER |

# 250 Meters Home Street Network Buffers (desired buffer)

| | **Buffer Template** |
|---|---|
| G3NB | GIS, 250M, HOME SN BUFF, BUFFER AREA |
| G3NRC | GIS, 250M, HOME SN BUFF, RESIDENTIAL, PARCEL COUNT |
| G3NRCS | GIS, 250M, HOME SN BUFF, RESIDENTIAL, COUNT, SINGLE FAMILY |
| G3NRCM | GIS, 250M, HOME SN BUFF, RESIDENTIAL, COUNT, MULTIPLE FAMILY |
| G3NRL | GIS, 250M, HOME SN BUFF, RESIDENTIAL, LAND AREA SUM |
| G3NRLD | GIS, 250M, HOME SN BUFF, RESIDENTIAL, LAND AREA SUM, NET DENSITY |
| G3NRLDS | GIS, 250M, HOME SN BUFF, RESIDENTIAL, LAND AREA SUM, NET DENSITY, SINGLE FAMILY |
| G3NRLDM | GIS, 250M, HOME SN BUFF, RESIDENTIAL, LAND AREA SUM, NET DENSITY, MULTIPLE FAMILY |
| G3NRF | GIS, 250M, HOME SN BUFF, RESIDENTIAL, FLOOR AREA SUM |
| G3NRFD | GIS, 250M, HOME SN BUFF, RESIDENTIAL, FLOOR AREA SUM, NET DENSITY |
| G3NRFDS | GIS, 250M, HOME SN BUFF, RESIDENTIAL, FLOOR AREA SUM, NET DENSITY, SINGLE FAMILY |
| G3NRFDM | GIS, 250M, HOME SN BUFF, RESIDENTIAL, FLOOR AREA SUM, NET DENSITY, MULTIPLE FAMILY |
| G3NBG | GIS, 250M, HOME SN BUFF, BUFFER, GROSS RES DENSITY |
| G3NBGS | GIS, 250M, HOME SN BUFF, BUFFER, GROSS RES DENSITY, SINGLE FAMILY |
| G3NBGM | GIS, 250M, HOME SN BUFF, BUFFER, GROSS RES DENSITY, MULTIPLE FAMILY |
| G3NDC | GIS, 250M, HOME SN BUFF, DWELLINGS, COUNT |
| G3NLC | GIS, 250M, HOME SN BUFF, PEOPLE, COUNT |
| | **Commercial/Retail Land Use Template** |
| G3NCC | GIS, 250M, HOME SN BUFF, COMMERCIAL, PARCEL COUNT |
| G3NCL | GIS, 250M, HOME SN BUFF, COMMERCIAL, LAND AREA SUM |
| G3NCF | GIS, 250M, HOME SN BUFF, COMMERCIAL, FLOOR AREA SUM |
| | **Institutional Land Use Template** |
| G3NVC | GIS, 250M, HOME SN BUFF, INSTITUTIONAL, PARCEL COUNT |
| G3NVL | GIS, 250M, HOME SN BUFF, INSTITUTIONAL, LAND AREA SUM |
| G3NVF | GIS, 250M, HOME SN BUFF, INSTITUTIONAL, FLOOR AREA SUM |
| | **Entertainment Land Use Template** |
| G3NEC | GIS, 250M, HOME SN BUFF, ENTERTAINMENT, PARCEL COUNT |
| G3NEL | GIS, 250M, HOME SN BUFF, ENTERTAINMENT, LAND AREA SUM |
| G3NEF | GIS, 250M, HOME SN BUFF, ENTERTAINMENT, FLOOR AREA SUM |
| | **Food-Related Land Use Template** |
| G3NFC | GIS, 250M, HOME SN BUFF, FOOD RELATED, PARCEL COUNT |
| G3NFL | GIS, 250M, HOME SN BUFF, FOOD RELATED, LAND AREA SUM |
| G3NFF | GIS, 250M, HOME SN BUFF, FOOD RELATED, FLOOR AREA SUM |
| G3NHC | GIS, 250M, HOME SN BUFF, RESTAURANT, PARCEL COUNT |
| G3NHL | GIS, 250M, HOME SN BUFF, RESTAURANT, LAND AREA SUM |
| G3NHF | GIS, 250M, HOME SN BUFF, RESTAURANT, FLOOR AREA SUM |
| | **Office Land Use Template** |
| G3NOC | GIS, 250M, HOME SN BUFF, OFFICE, PARCEL COUNT |
| G3NOL | GIS, 250M, HOME SN BUFF, OFFICE, LAND AREA SUM |
| G3NOF | GIS, 250M, HOME SN BUFF, OFFICE FLOOR AREA SUM |

| | |
|---|---|
| | **Private and Public Recreation Land Use Template** |
| G3NPC | GIS, 250M, HOME SN BUFF, PRIVATE AND PUBLIC RECREATION LAND, PARCEL COUNT |
| G3NPL | GIS, 250M, HOME SN BUFF, PRIVATE AND PUBLIC RECREATION LAND, LAND AREA SUM |
| G3NPF | GIS, 250M, HOME SN BUFF, PRIVATE AND PUBLIC RECREATION LAND, FLOOR AREA SUM |
| | **Vacant Land Use Template** |
| G3NZC | GIS, 250M, HOME SN BUFF, VACANT, PARCEL COUNT |
| G3NZL | GIS, 250M, HOME SN BUFF, VACANT, LAND AREA SUM |
| | **Intersection Density Template** |
| G3NIC | GIS, 250M, HOME SN BUFF, INTERSECTION, COUNT |
| G3NID | GIS, 250M, HOME SN BUFF, INTERSECTION, DENSITY |
| G3NJC | GIS, 250M, HOME SN BUFF, CUL-DE-SACS, COUNT |
| G3NJD | GIS, 250M, HOME SN BUFF, CUL-DE-SACS, DENSITY |
| | **Private Recreation Facilities Template** |
| G3NYC1 | GIS, 250M, HOME SN BUFF, PRIVATE RECREATION FACILITIES, COUNT, CONTAINED OR INTERSECTED BY BUFFER |
| G3NYC3 | GIS, 250M, HOME SN BUFF, PRIVATE RECREATION FACILITIES, COUNT, ANOTHER METHOD |
| | **Public Parks Template** |
| G3NQC | GIS, 250M, HOME SN BUFF, TRAIL, COUNT |
| G3NGC1A | GIS, 250M, HOME SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, OVERALL |
| G3NGA1A | GIS, 250M, HOME SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, OVERALL |
| G3NGC1B | GIS, 250M, HOME SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, <=1012 SQ METERS |
| G3NGA1B | GIS, 250M, HOME SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, <=1012 SQ METERS |
| G3NGC1C | GIS, 250M, HOME SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >1012 to <= 4047 SQ METERS |
| G3NGA1C | GIS, 250M, HOME SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >1012 to <= 4047 SQ METERS |
| G3NGC1D | GIS, 250M, HOME SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >4047 to <= 20234 SQ METERS |
| G3NGA1D | GIS, 250M, HOME SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >4047 to <= 20234 SQ METERS |
| G3NGC1E | GIS, 250M, HOME SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >20234 to <= 40469 SQ METERS |
| G3NGA1E | GIS, 250M, HOME SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >20234 to <= 40469 SQ METERS |
| G3NGC1F | GIS, 250M, HOME SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >40469 to <= 202343 SQ METERS |
| G3NGA1F | GIS, 250M, HOME SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >40469 to <= 202343 SQ METERS |
| G3NGC1G | GIS, 250M, HOME SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >202343 SQ METERS |
| G3NGA1G | GIS, 250M, HOME SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >202343 SQ METERS |
| | **Public Transit Template** |
| G3NTDA | GIS, 250M, HOME SN BUFF, TRANSPORTATION, DENSITY, OVERALL |
| G3NTDB | GIS, 250M, HOME SN BUFF, TRANSPORTATION, DENSITY, BUS ONLY |
| G3NTDE | GIS, 250M, HOME SN BUFF, TRANSPORTATION, DENSITY, BUS (EXPRESS) ONLY |
| G3NTDP | GIS, 250M, HOME SN BUFF, TRANSPORTATION, DENSITY, BUS (RAPID TRANSIT) ONLY |
| G3NTDT | GIS, 250M, HOME SN BUFF, TRANSPORTATION, DENSITY, TRAM/STREETCAR/LIGHT RAIL ONLY |
| G3NTDH | GIS, 250M, HOME SN BUFF, TRANSPORTATION, DENSITY, HEAVY RAIL ONLY |
| G3NTDC | GIS, 250M, HOME SN BUFF, TRANSPORTATION, DENSITY, COMMUTER RAIL ONLY |
| G3NTDF | GIS, 250M, HOME SN BUFF, TRANSPORTATION, DENSITY, FERRIES ONLY |
| G3NTDO | GIS, 250M, HOME SN BUFF, TRANSPORTATION, DENSITY, OTHER ONLY |
| G3NTCA | GIS, 250M, HOME SN BUFF, TRANSPORTATION, COUNT, ANY TYPE |
| G3NTCB | GIS, 250M, HOME SN BUFF, TRANSPORTATION, COUNT, BUS (REGULAR) ONLY |

| | |
|---|---|
| G3NTCE | GIS, 250M, HOME SN BUFF, TRANSPORTATION, COUNT, BUS (EXPRESS) ONLY |
| G3NTCP | GIS, 250M, HOME SN BUFF, TRANSPORTATION, COUNT, BUS (RAPID TRANSIT) ONLY |
| G3NTCT | GIS, 250M, HOME SN BUFF, TRANSPORTATION, COUNT, TRAM/STREETCAR/LIGHT RAIL ONLY |
| G3NTCH | GIS, 250M, HOME SN BUFF, TRANSPORTATION, COUNT, HEAVY RAIL ONLY |
| G3NTCC | GIS, 250M, HOME SN BUFF, TRANSPORTATION, COUNT, COMMUTER RAIL ONLY |
| G3NTCF | GIS, 250M, HOME SN BUFF, TRANSPORTATION, COUNT, FERRIES ONLY |
| G3NTCO | GIS, 250M, HOME SN BUFF, TRANSPORTATION, COUNT, OTHER ONLY |
| | **Regional Accessibility Template** |
| G3NA1 | GIS, 250M, HOME SN BUFF, REGIONAL ACCESSIBILITY, DOWNTOWN/CENTER CITY |
| G3NA2 | GIS, 250M, HOME SN BUFF, REGIONAL ACCESSIBILITY, MAJOR TRANSIT HUB |
| G3NA3 | GIS, 250M, HOME SN BUFF, REGIONAL ACCESSIBILITY, LARGEST UNIVERSITY |
| G3NA4 | GIS, 250M, HOME SN BUFF, REGIONAL ACCESSIBILITY, LARGEST HOSPITAL |
| G3NA5 | GIS, 250M, HOME SN BUFF, REGIONAL ACCESSIBILITY, LARGEST EMPLOYMENT CENTER |
| G3NA6 | GIS, 250M, HOME SN BUFF, REGIONAL ACCESSIBILITY, LARGEST NATURAL/OPEN SPACE FEATURE |
| G3NA7 | GIS, 250M, HOME SN BUFF, REGIONAL ACCESSIBILITY, NEAREST MAJOR SHOPPING CENTER |
| G3NA8 | GIS, 250M, HOME SN BUFF, REGIONAL ACCESSIBILITY, NEAREST MAJOR EMPLOYMENT CENTER |

# 2KM Home Street Network Buffers (desired buffer)

| | **Buffer Template** |
|---|---|
| G2NB | GIS, 2KM, HOME SN BUFF, BUFFER AREA |
| G2NRC | GIS, 2KM, HOME SN BUFF, RESIDENTIAL, PARCEL COUNT |
| G2NRCS | GIS, 2KM, HOME SN BUFF, RESIDENTIAL, COUNT, SINGLE FAMILY |
| G2NRCM | GIS, 2KM, HOME SN BUFF, RESIDENTIAL, COUNT, MULTIPLE FAMILY |
| G2NRL | GIS, 2KM, HOME SN BUFF, RESIDENTIAL, LAND AREA SUM |
| G2NRLD | GIS, 2KM, HOME SN BUFF, RESIDENTIAL, LAND AREA SUM, NET DENSITY |
| G2NRLDS | GIS, 2KM, HOME SN BUFF, RESIDENTIAL, LAND AREA SUM, NET DENSITY, SINGLE FAMILY |
| G2NRLDM | GIS, 2KM, HOME SN BUFF, RESIDENTIAL, LAND AREA SUM, NET DENSITY, MULTIPLE FAMILY |
| G2NRF | GIS, 2KM, HOME SN BUFF, RESIDENTIAL, FLOOR AREA SUM |
| G2NRFD | GIS, 2KM, HOME SN BUFF, RESIDENTIAL, FLOOR AREA SUM, NET DENSITY |
| G2NRFDS | GIS, 2KM, HOME SN BUFF, RESIDENTIAL, FLOOR AREA SUM, NET DENSITY, SINGLE FAMILY |
| G2NRFDM | GIS, 2KM, HOME SN BUFF, RESIDENTIAL, FLOOR AREA SUM, NET DENSITY, MULTIPLE FAMILY |
| G2NBG | GIS, 2KM, HOME SN BUFF, BUFFER, GROSS RES DENSITY |
| G2NBGS | GIS, 2KM, HOME SN BUFF, BUFFER, GROSS RES DENSITY, SINGLE FAMILY |
| G2NBGM | GIS, 2KM, HOME SN BUFF, BUFFER, GROSS RES DENSITY, MULTIPLE FAMILY |
| G2NDC | GIS, 2KM, HOME SN BUFF, DWELLINGS, COUNT |
| G2NLC | GIS, 2KM, HOME SN BUFF, PEOPLE, COUNT |
| | **Commercial/Retail Land Use Template** |
| G2NCC | GIS, 2KM, HOME SN BUFF, COMMERCIAL, PARCEL COUNT |
| G2NCL | GIS, 2KM, HOME SN BUFF, COMMERCIAL, LAND AREA SUM |
| G2NCF | GIS, 2KM, HOME SN BUFF, COMMERCIAL, FLOOR AREA SUM |
| | **Institutional Land Use Template** |
| G2NVC | GIS, 2KM, HOME SN BUFF, INSTITUTIONAL, PARCEL COUNT |
| G2NVL | GIS, 2KM, HOME SN BUFF, INSTITUTIONAL, LAND AREA SUM |
| G2NVF | GIS, 2KM, HOME SN BUFF, INSTITUTIONAL, FLOOR AREA SUM |
| | **Entertainment Land Use Template** |
| G2NEC | GIS, 2KM, HOME SN BUFF, ENTERTAINMENT, PARCEL COUNT |
| G2NEL | GIS, 2KM, HOME SN BUFF, ENTERTAINMENT, LAND AREA SUM |
| G2NEF | GIS, 2KM, HOME SN BUFF, ENTERTAINMENT, FLOOR AREA SUM |
| | **Food-Related Land Use Template** |
| G2NFC | GIS, 2KM, HOME SN BUFF, FOOD RELATED, PARCEL COUNT |
| G2NFL | GIS, 2KM, HOME SN BUFF, FOOD RELATED, LAND AREA SUM |
| G2NFF | GIS, 2KM, HOME SN BUFF, FOOD RELATED, FLOOR AREA SUM |
| G2NHC | GIS, 2KM, HOME SN BUFF, RESTAURANT, PARCEL COUNT |
| G2NHL | GIS, 2KM, HOME SN BUFF, RESTAURANT, LAND AREA SUM |
| G2NHF | GIS, 2KM, HOME SN BUFF, RESTAURANT, FLOOR AREA SUM |
| | **Office Land Use Template** |
| G2NOC | GIS, 2KM, HOME SN BUFF, OFFICE, PARCEL COUNT |
| G2NOL | GIS, 2KM, HOME SN BUFF, OFFICE, LAND AREA SUM |
| G2NOF | GIS, 2KM, HOME SN BUFF, OFFICE FLOOR AREA SUM |

| | |
|---|---|
| | **Private and Public Recreation Land Use Template** |
| G2NPC | GIS, 2KM, HOME SN BUFF, PRIVATE AND PUBLIC RECREATION LAND, PARCEL COUNT |
| G2NPL | GIS, 2KM, HOME SN BUFF, PRIVATE AND PUBLIC RECREATION LAND, LAND AREA SUM |
| G2NPF | GIS, 2KM, HOME SN BUFF, PRIVATE AND PUBLIC RECREATION LAND, FLOOR AREA SUM |
| | **Vacant Land Use Template** |
| G2NZC | GIS, 2KM, HOME SN BUFF, VACANT, PARCEL COUNT |
| G2NZL | GIS, 2KM, HOME SN BUFF, VACANT, LAND AREA SUM |
| | **Intersection Density Template** |
| G2NIC | GIS, 2KM, HOME SN BUFF, INTERSECTION, COUNT |
| G2NID | GIS, 2KM, HOME SN BUFF, INTERSECTION, DENSITY |
| G2NJC | GIS, 2KM, HOME SN BUFF, CUL-DE-SACS, COUNT |
| G2NJD | GIS, 2KM, HOME SN BUFF, CUL-DE-SACS, DENSITY |
| | **Private Recreation Facilities Template** |
| G2NYC1 | GIS, 2KM, HOME SN BUFF, PRIVATE RECREATION FACILITIES, COUNT, CONTAINED OR INTERSECTED BY BUFFER |
| G2NYC3 | GIS, 2KM, HOME SN BUFF, PRIVATE RECREATION FACILITIES, COUNT, ANOTHER METHOD |
| | **Public Parks Template** |
| G2NQC | GIS, 2KM, HOME SN BUFF, TRAIL, COUNT |
| G2NGC1A | GIS, 2KM, HOME SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, OVERALL |
| G2NGA1A | GIS, 2KM, HOME SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, OVERALL |
| G2NGC1B | GIS, 2KM, HOME SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, <=1012 SQ METERS |
| G2NGA1B | GIS, 2KM, HOME SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, <=1012 SQ METERS |
| G2NGC1C | GIS, 2KM, HOME SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >1012 to <= 4047 SQ METERS |
| G2NGA1C | GIS, 2KM, HOME SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >1012 to <= 4047 SQ METERS |
| G2NGC1D | GIS, 2KM, HOME SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >4047 to <= 20234 SQ METERS |
| G2NGA1D | GIS, 2KM, HOME SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >4047 to <= 20234 SQ METERS |
| G2NGC1E | GIS, 2KM, HOME SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >20234 to <= 40469 SQ METERS |
| G2NGA1E | GIS, 2KM, HOME SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >20234 to <= 40469 SQ METERS |
| G2NGC1F | GIS, 2KM, HOME SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >40469 to <= 202343 SQ METERS |
| G2NGA1F | GIS, 2KM, HOME SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >40469 to <= 202343 SQ METERS |
| G2NGC1G | GIS, 2KM, HOME SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >202343 SQ METERS |
| G2NGA1G | GIS, 2KM, HOME SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >202343 SQ METERS |
| | **Public Transit Template** |
| G2NTDA | GIS, 2KM, HOME SN BUFF, TRANSPORTATION, DENSITY, OVERALL |
| G2NTDB | GIS, 2KM, HOME SN BUFF, TRANSPORTATION, DENSITY, BUS ONLY |
| G2NTDE | GIS, 2KM, HOME SN BUFF, TRANSPORTATION, DENSITY, BUS (EXPRESS) ONLY |
| G2NTDP | GIS, 2KM, HOME SN BUFF, TRANSPORTATION, DENSITY, BUS (RAPID TRANSIT) ONLY |
| G2NTDT | GIS, 2KM, HOME SN BUFF, TRANSPORTATION, DENSITY, TRAM/STREETCAR/LIGHT RAIL ONLY |
| G2NTDH | GIS, 2KM, HOME SN BUFF, TRANSPORTATION, DENSITY, HEAVY RAIL ONLY |
| G2NTDC | GIS, 2KM, HOME SN BUFF, TRANSPORTATION, DENSITY, COMMUTER RAIL ONLY |
| G2NTDF | GIS, 2KM, HOME SN BUFF, TRANSPORTATION, DENSITY, FERRIES ONLY |
| G2NTDO | GIS, 2KM, HOME SN BUFF, TRANSPORTATION, DENSITY, OTHER ONLY |
| G2NTCA | GIS, 2KM, HOME SN BUFF, TRANSPORTATION, COUNT, ANY TYPE |
| G2NTCB | GIS, 2KM, HOME SN BUFF, TRANSPORTATION, COUNT, BUS (REGULAR) ONLY |

| | |
|---|---|
| G2NTCE | GIS, 2KM, HOME SN BUFF, TRANSPORTATION, COUNT, BUS (EXPRESS) ONLY |
| G2NTCP | GIS, 2KM, HOME SN BUFF, TRANSPORTATION, COUNT, BUS (RAPID TRANSIT) ONLY |
| G2NTCT | GIS, 2KM, HOME SN BUFF, TRANSPORTATION, COUNT, TRAM/STREETCAR/LIGHT RAIL ONLY |
| G2NTCH | GIS, 2KM, HOME SN BUFF, TRANSPORTATION, COUNT, HEAVY RAIL ONLY |
| G2NTCC | GIS, 2KM, HOME SN BUFF, TRANSPORTATION, COUNT, COMMUTER RAIL ONLY |
| G2NTCF | GIS, 2KM, HOME SN BUFF, TRANSPORTATION, COUNT, FERRIES ONLY |
| G2NTCO | GIS, 2KM, HOME SN BUFF, TRANSPORTATION, COUNT, OTHER ONLY |
| | **Regional Accessibility Template** |
| G2NA1 | GIS, 2KM, HOME SN BUFF, REGIONAL ACCESSIBILITY, DOWNTOWN/CENTER CITY |
| G2NA2 | GIS, 2KM, HOME SN BUFF, REGIONAL ACCESSIBILITY, MAJOR TRANSIT HUB |
| G2NA3 | GIS, 2KM, HOME SN BUFF, REGIONAL ACCESSIBILITY, LARGEST UNIVERSITY |
| G2NA4 | GIS, 2KM, HOME SN BUFF, REGIONAL ACCESSIBILITY, LARGEST HOSPITAL |
| G2NA5 | GIS, 2KM, HOME SN BUFF, REGIONAL ACCESSIBILITY, LARGEST EMPLOYMENT CENTER |
| G2NA6 | GIS, 2KM, HOME SN BUFF, REGIONAL ACCESSIBILITY, LARGEST NATURAL/OPEN SPACE FEATURE |
| G2NA7 | GIS, 2KM, HOME SN BUFF, REGIONAL ACCESSIBILITY, NEAREST MAJOR SHOPPING CENTER |
| G2NA8 | GIS, 2KM, HOME SN BUFF, REGIONAL ACCESSIBILITY, NEAREST MAJOR EMPLOYMENT CENTER |

## Distance from Home to nearest (required)

| | |
|---|---|
| GDNY | GIS, DISTANCE (NETWORK) TO NEAREST, HOME, PRIVATE RECREATION FACILITY |
| GDNGXXA | GIS, DISTANCE (NETWORK) TO NEAREST, HOME, PARK, OVERALL |
| GDNGXXB | GIS, DISTANCE (NETWORK) TO NEAREST, HOME, PARK, <=1012 SQ METERS |
| GDNGXXC | GIS, DISTANCE (NETWORK) TO NEAREST, HOME, PARK, >1012 to <= 4047 SQ METERS |
| GDNGXXD | GIS, DISTANCE (NETWORK) TO NEAREST, HOME, PARK, >4047 to <= 20234 SQ METERS |
| GDNGXXE | GIS, DISTANCE (NETWORK) TO NEAREST, HOME, PARK, >20234 to <= 40469 SQ METERS |
| GDNGXXF | GIS, DISTANCE (NETWORK) TO NEAREST, HOME, PARK, >40469 to <= 202343 SQ METERS |
| GDNGXXG | GIS, DISTANCE (NETWORK) TO NEAREST, HOME, PARK, >202343 SQ METERS |
| GDNQ | GIS, DISTANCE (NETWORK) TO NEAREST, HOME, TRAIL |
| GDNTXA | GIS, DISTANCE (NETWORK) TO NEAREST, HOME, TRANSPORTATION, ANY TYPE |
| GDNTXB | GIS, DISTANCE (NETWORK) TO NEAREST, HOME, TRANSPORTATION, BUS (REGULAR) ONLY |
| GDNTCE | GIS, DISTANCE (NETWORK) TO NEAREST, HOME, TRANSPORTATION, BUS (EXPRESS) ONLY |
| GDNTCP | GIS, DISTANCE (NETWORK) TO NEAREST, HOME, TRANSPORTATION, BUS (RAPID TRANSIT) ONLY |
| GDNTCT | GIS, DISTANCE (NETWORK) TO NEAREST, HOME, TRANSPORTATION, RAM/STREETCAR/LIGHT RAIL ONLY |
| GDNTCH | GIS, DISTANCE (NETWORK) TO NEAREST, HOME, TRANSPORTATION, HEAVY RAIL ONLY |
| GDNTCC | GIS, DISTANCE (NETWORK) TO NEAREST, HOME, TRANSPORTATION, COMMUTER RAIL ONLY |
| GDNTCF | GIS, DISTANCE (NETWORK) TO NEAREST, HOME, TRANSPORTATION, FERRIES ONLY |
| GDNTCO | GIS, DISTANCE (NETWORK) TO NEAREST, HOME, TRANSPORTATION, OTHER ONLY |

# Buffers around Schools

## 500 Meter School Street Network Buffers (required buffer)

| | Buffer Template |
|---|---|
| G5SB | GIS, 500M, SCHOOL SN BUFF, BUFFER AREA |
| G5SRC | GIS, 500M, SCHOOL SN BUFF, RESIDENTIAL, PARCEL COUNT |
| G5SRCS | GIS, 500M, SCHOOL SN BUFF, RESIDENTIAL, COUNT, SINGLE FAMILY |
| G5SRCM | GIS, 500M, SCHOOL SN BUFF, RESIDENTIAL, COUNT, MULTIPLE FAMILY |
| G5SRL | GIS, 500M, SCHOOL SN BUFF, RESIDENTIAL, LAND AREA SUM |
| G5SRLD | GIS, 500M, SCHOOL SN BUFF, RESIDENTIAL, LAND AREA SUM, NET DENSITY |
| G5SRLDS | GIS, 500M, SCHOOL SN BUFF, RESIDENTIAL, LAND AREA SUM, NET DENSITY, SINGLE FAMILY |
| G5SRLDM | GIS, 500M, SCHOOL SN BUFF, RESIDENTIAL, LAND AREA SUM, NET DENSITY, MULTIPLE FAMILY |
| G5SRF | GIS, 500M, SCHOOL SN BUFF, RESIDENTIAL, FLOOR AREA SUM |
| G5SRFD | GIS, 500M, SCHOOL SN BUFF, RESIDENTIAL, FLOOR AREA SUM, NET DENSITY |
| G5SRFDS | GIS, 500M, SCHOOL SN BUFF, RESIDENTIAL, FLOOR AREA SUM, NET DENSITY, SINGLE FAMILY |
| G5SRFDM | GIS, 500M, SCHOOL SN BUFF, RESIDENTIAL, FLOOR AREA SUM, NET DENSITY, MULTIPLE FAMILY |
| G5SBG | GIS, 500M, SCHOOL SN BUFF, BUFFER, GROSS RES DENSITY |
| G5SBGS | GIS, 500M, SCHOOL SN BUFF, BUFFER, GROSS RES DENSITY, SINGLE FAMILY |
| G5SBGM | GIS, 500M, SCHOOL SN BUFF, BUFFER, GROSS RES DENSITY, MULTIPLE FAMILY |
| G5SDC | GIS, 500M, SCHOOL SN BUFF, DWELLINGS, COUNT |
| G5SLC | GIS, 500M, SCHOOL SN BUFF, PEOPLE, COUNT |
| | **Commercial/Retail Land Use Template** |
| G5SCC | GIS, 500M, SCHOOL SN BUFF, COMMERCIAL, PARCEL COUNT |
| G5SCL | GIS, 500M, SCHOOL SN BUFF, COMMERCIAL, LAND AREA SUM |
| G5SCF | GIS, 500M, SCHOOL SN BUFF, COMMERCIAL, FLOOR AREA SUM |
| | **Institutional Land Use Template** |
| G5SVC | GIS, 500M, SCHOOL SN BUFF, INSTITUTIONAL, PARCEL COUNT |
| G5SVL | GIS, 500M, SCHOOL SN BUFF, INSTITUTIONAL, LAND AREA SUM |
| G5SVF | GIS, 500M, SCHOOL SN BUFF, INSTITUTIONAL, FLOOR AREA SUM |
| | **Entertainment Land Use Template** |
| G5SEC | GIS, 500M, SCHOOL SN BUFF, ENTERTAINMENT, PARCEL COUNT |
| G5SEL | GIS, 500M, SCHOOL SN BUFF, ENTERTAINMENT, LAND AREA SUM |
| G5SEF | GIS, 500M, SCHOOL SN BUFF, ENTERTAINMENT, FLOOR AREA SUM |
| | **Food-Related Land Use Template** |
| G5SFC | GIS, 500M, SCHOOL SN BUFF, FOOD RELATED, PARCEL COUNT |
| G5SFL | GIS, 500M, SCHOOL SN BUFF, FOOD RELATED, LAND AREA SUM |
| G5SFF | GIS, 500M, SCHOOL SN BUFF, FOOD RELATED, FLOOR AREA SUM |
| G5SHC | GIS, 500M, SCHOOL SN BUFF, RESTAURANT, PARCEL COUNT |
| G5SHL | GIS, 500M, SCHOOL SN BUFF, RESTAURANT, LAND AREA SUM |
| G5SHF | GIS, 500M, SCHOOL SN BUFF, RESTAURANT, FLOOR AREA SUM |
| | **Office Land Use Template** |
| G5SOC | GIS, 500M, SCHOOL SN BUFF, OFFICE, PARCEL COUNT |

| | |
|---|---|
| G5SOL | GIS, 500M, SCHOOL SN BUFF, OFFICE, LAND AREA SUM |
| G5SOF | GIS, 500M, SCHOOL SN BUFF, OFFICE FLOOR AREA SUM |
| | **Private and Public Recreation Land Use Template** |
| G5SPC | GIS, 500M, SCHOOL SN BUFF, PRIVATE AND PUBLIC RECREATION LAND, PARCEL COUNT |
| G5SPL | GIS, 500M, SCHOOL SN BUFF, PRIVATE AND PUBLIC RECREATION LAND, LAND AREA SUM |
| G5SPF | GIS, 500M, SCHOOL SN BUFF, PRIVATE AND PUBLIC RECREATION LAND, FLOOR AREA SUM |
| | **Vacant Land Use Template** |
| G5SZC | GIS, 500M, SCHOOL SN BUFF, VACANT, PARCEL COUNT |
| G5SZL | GIS, 500M, SCHOOL SN BUFF, VACANT, LAND AREA SUM |
| | **Intersection Density Template** |
| G5SIC | GIS, 500M, SCHOOL SN BUFF, INTERSECTION, COUNT |
| G5SID | GIS, 500M, SCHOOL SN BUFF, INTERSECTION, DENSITY |
| G5SJC | GIS, 500M, SCHOOL SN BUFF, CUL-DE-SACS, COUNT |
| G5SJD | GIS, 500M, SCHOOL SN BUFF, CUL-DE-SACS, DENSITY |
| | **Private Recreation Facilities Template** |
| G5SYC1 | GIS, 500M, SCHOOL SN BUFF, PRIVATE RECREATION FACILITIES, COUNT, CONTAINED OR INTERSECTED BY BUFFER |
| G5SYC3 | GIS, 500M, SCHOOL SN BUFF, PRIVATE RECREATION FACILITIES, COUNT, ANOTHER METHOD |
| | **Public Parks Template** |
| G5SQC | GIS, 500M, SCHOOL SN BUFF, TRAIL, COUNT |
| G5SGC1A | GIS, 500M, SCHOOL SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, OVERALL |
| G5SGA1A | GIS, 500M, SCHOOL SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, OVERALL |
| G5SGC1B | GIS, 500M, SCHOOL SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, <=1012 SQ METERS |
| G5SGA1B | GIS, 500M, SCHOOL SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, <=1012 SQ METERS |
| G5SGC1C | GIS, 500M, SCHOOL SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >1012 to <= 4047 SQ METERS |
| G5SGA1C | GIS, 500M, SCHOOL SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >1012 to <= 4047 SQ METERS |
| G5SGC1D | GIS, 500M, SCHOOL SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >4047 to <= 20234 SQ METERS |
| G5SGA1D | GIS, 500M, SCHOOL SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >4047 to <= 20234 SQ METERS |
| G5SGC1E | GIS, 500M, SCHOOL SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >20234 to <= 40469 SQ METERS |
| G5SGA1E | GIS, 500M, SCHOOL SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >20234 to <= 40469 SQ METERS |
| G5SGC1F | GIS, 500M, SCHOOL SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >40469 to <= 202343 SQ METERS |
| G5SGA1F | GIS, 500M, SCHOOL SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >40469 to <= 202343 SQ METERS |
| G5SGC1G | GIS, 500M, SCHOOL SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >202343 SQ METERS |
| G5SGA1G | GIS, 500M, SCHOOL SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >202343 SQ METERS |
| | **Public Transit Template** |
| G5STDA | GIS, 500M, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, OVERALL |
| G5STDB | GIS, 500M, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, BUS (REGULAR) ONLY |
| G5STDE | GIS, 500M, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, BUS (EXPRESS) ONLY |
| G5STDP | GIS, 500M, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, BUS (RAPID TRANSIT) ONLY |
| G5STDT | GIS, 500M, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, TRAM/STREETCAR/LIGHT RAIL ONLY |
| G5STDH | GIS, 500M, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, HEAVY RAIL ONLY |
| G5STDC | GIS, 500M, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, COMMUTER RAIL ONLY |
| G5STDF | GIS, 500M, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, FERRIES ONLY |
| G5STDO | GIS, 500M, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, OTHER ONLY |

| | |
|---|---|
| G5STCA | GIS, 500M, SCHOOL SN BUFF, TRANSPORTATION, COUNT, ANY TYPE |
| G5STCB | GIS, 500M, SCHOOL SN BUFF, TRANSPORTATION, COUNT, BUS (REGULAR) ONLY |
| G5STCE | GIS, 500M, SCHOOL SN BUFF, TRANSPORTATION, COUNT, BUS (EXPRESS) ONLY |
| G5STCP | GIS, 500M, SCHOOL SN BUFF, TRANSPORTATION, COUNT, BUS (RAPID TRANSIT) ONLY |
| G5STCT | GIS, 500M, SCHOOL SN BUFF, TRANSPORTATION, COUNT, TRAM/STREETCAR/LIGHT RAIL ONLY |
| G5STCH | GIS, 500M, SCHOOL SN BUFF, TRANSPORTATION, COUNT, HEAVY RAIL ONLY |
| G5STCC | GIS, 500M, SCHOOL SN BUFF, TRANSPORTATION, COUNT, COMMUTER RAIL ONLY |
| G5STCF | GIS, 500M, SCHOOL SN BUFF, TRANSPORTATION, COUNT, FERRIES ONLY |
| G5STCO | GIS, 500M, SCHOOL SN BUFF, TRANSPORTATION, COUNT, OTHER ONLY |
| | **Regional Accessibility Template** |
| G5SA1 | GIS, 500M, SCHOOL SN BUFF, REGIONAL ACCESSIBILITY, DOWNTOWN/CENTER CITY |
| G5SA2 | GIS, 500M, SCHOOL SN BUFF, REGIONAL ACCESSIBILITY, MAJOR TRANSIT HUB |
| G5SA3 | GIS, 500M, SCHOOL SN BUFF, REGIONAL ACCESSIBILITY, LARGEST UNIVERSITY |
| G5SA4 | GIS, 500M, SCHOOL SN BUFF, REGIONAL ACCESSIBILITY, LARGEST HOSPITAL |
| G5SA5 | GIS, 500M, SCHOOL SN BUFF, REGIONAL ACCESSIBILITY, LARGEST EMPLOYMENT CENTER |
| G5SA6 | GIS, 500M, SCHOOL SN BUFF, REGIONAL ACCESSIBILITY, LARGEST NATURAL/OPEN SPACE FEATURE |
| G5SA7 | GIS, 500M, SCHOOL SN BUFF, REGIONAL ACCESSIBILITY, NEAREST MAJOR SHOPPING CENTER |
| G5SA8 | GIS, 500M, SCHOOL SN BUFF, REGIONAL ACCESSIBILITY, NEAREST MAJOR EMPLOYMENT CENTER |

# 1km School Street Network Buffers (required buffer)

| | |
|---|---|
| | **Buffer Template** |
| G1SB | GIS, 1KM, SCHOOL SN BUFF, BUFFER AREA |
| G1SRC | GIS, 1KM, SCHOOL SN BUFF, RESIDENTIAL, PARCEL COUNT |
| G1SRCS | GIS, 1KM, SCHOOL SN BUFF, RESIDENTIAL, COUNT, SINGLE FAMILY |
| G1SRCM | GIS, 1KM, SCHOOL SN BUFF, RESIDENTIAL, COUNT, MULTIPLE FAMILY |
| G1SRL | GIS, 1KM, SCHOOL SN BUFF, RESIDENTIAL, LAND AREA SUM |
| G1SRLD | GIS, 1KM, SCHOOL SN BUFF, RESIDENTIAL, LAND AREA SUM, NET DENSITY |
| G1SRLDS | GIS, 1KM, SCHOOL SN BUFF, RESIDENTIAL, LAND AREA SUM, NET DENSITY, SINGLE FAMILY |
| G1SRLDM | GIS, 1KM, SCHOOL SN BUFF, RESIDENTIAL, LAND AREA SUM, NET DENSITY, MULTIPLE FAMILY |
| G1SRF | GIS, 1KM, SCHOOL SN BUFF, RESIDENTIAL, FLOOR AREA SUM |
| G1SRFD | GIS, 1KM, SCHOOL SN BUFF, RESIDENTIAL, FLOOR AREA SUM, NET DENSITY |
| G1SRFDS | GIS, 1KM, SCHOOL SN BUFF, RESIDENTIAL, FLOOR AREA SUM, NET DENSITY, SINGLE FAMILY |
| G1SRFDM | GIS, 1KM, SCHOOL SN BUFF, RESIDENTIAL, FLOOR AREA SUM, NET DENSITY, MULTIPLE FAMILY |
| G1SBG | GIS, 1KM, SCHOOL SN BUFF, BUFFER, GROSS RES DENSITY |
| G1SBGS | GIS, 1KM, SCHOOL SN BUFF, BUFFER, GROSS RES DENSITY, SINGLE FAMILY |
| G1SBGM | GIS, 1KM, SCHOOL SN BUFF, BUFFER, GROSS RES DENSITY, MULTIPLE FAMILY |
| G1SDC | GIS, 1KM, SCHOOL SN BUFF, DWELLINGS, COUNT |
| G1SLC | GIS, 1KM, SCHOOL SN BUFF, PEOPLE, COUNT |
| | **Commercial/Retail Land Use Template** |
| G1SCC | GIS, 1KM, SCHOOL SN BUFF, COMMERCIAL, PARCEL COUNT |
| G1SCL | GIS, 1KM, SCHOOL SN BUFF, COMMERCIAL, LAND AREA SUM |
| G1SCF | GIS, 1KM, SCHOOL SN BUFF, COMMERCIAL, FLOOR AREA SUM |
| | **Institutional Land Use Template** |
| G1SVC | GIS, 1KM, SCHOOL SN BUFF, INSTITUTIONAL, PARCEL COUNT |
| G1SVL | GIS, 1KM, SCHOOL SN BUFF, INSTITUTIONAL, LAND AREA SUM |
| G1SVF | GIS, 1KM, SCHOOL SN BUFF, INSTITUTIONAL, FLOOR AREA SUM |
| | **Entertainment Land Use Template** |
| G1SEC | GIS, 1KM, SCHOOL SN BUFF, ENTERTAINMENT, PARCEL COUNT |
| G1SEL | GIS, 1KM, SCHOOL SN BUFF, ENTERTAINMENT, LAND AREA SUM |
| G1SEF | GIS, 1KM, SCHOOL SN BUFF, ENTERTAINMENT, FLOOR AREA SUM |
| | **Food-Related Land Use Template** |
| G1SFC | GIS, 1KM, SCHOOL SN BUFF, FOOD RELATED, PARCEL COUNT |
| G1SFL | GIS, 1KM, SCHOOL SN BUFF, FOOD RELATED, LAND AREA SUM |
| G1SFF | GIS, 1KM, SCHOOL SN BUFF, FOOD RELATED, FLOOR AREA SUM |
| G1SHC | GIS, 1KM, SCHOOL SN BUFF, RESTAURANT, PARCEL COUNT |
| G1SHL | GIS, 1KM, SCHOOL SN BUFF, RESTAURANT, LAND AREA SUM |
| G1SHF | GIS, 1KM, SCHOOL SN BUFF, RESTAURANT, FLOOR AREA SUM |
| | **Office Land Use Template** |
| G1SOC | GIS, 1KM, SCHOOL SN BUFF, OFFICE, PARCEL COUNT |
| G1SOL | GIS, 1KM, SCHOOL SN BUFF, OFFICE, LAND AREA SUM |
| G1SOF | GIS, 1KM, SCHOOL SN BUFF, OFFICE FLOOR AREA SUM |

| | |
|---|---|
| | **Private and Public Recreation Land Use Template** |
| G1SPC | GIS, 1KM, SCHOOL SN BUFF, PRIVATE AND PUBLIC RECREATION LAND, PARCEL COUNT |
| G1SPL | GIS, 1KM, SCHOOL SN BUFF, PRIVATE AND PUBLIC RECREATION LAND, LAND AREA SUM |
| G1SPF | GIS, 1KM, SCHOOL SN BUFF, PRIVATE AND PUBLIC RECREATION LAND, FLOOR AREA SUM |
| | **Vacant Land Use Template** |
| G1SZC | GIS, 1KM, SCHOOL SN BUFF, VACANT, PARCEL COUNT |
| G1SZL | GIS, 1KM, SCHOOL SN BUFF, VACANT, LAND AREA SUM |
| | **Intersection Density Template** |
| G1SIC | GIS, 1KM, SCHOOL SN BUFF, INTERSECTION, COUNT |
| G1SID | GIS, 1KM, SCHOOL SN BUFF, INTERSECTION, DENSITY |
| G1SJC | GIS, 1KM, SCHOOL SN BUFF, CUL-DE-SACS, COUNT |
| G1SJD | GIS, 1KM, SCHOOL SN BUFF, CUL-DE-SACS, DENSITY |
| | **Private Recreation Facilities Template** |
| G1SYC1 | GIS, 1KM, SCHOOL SN BUFF, PRIVATE RECREATION FACILITIES, COUNT, CONTAINED OR INTERSECTED BY BUFFER |
| G1SYC3 | GIS, 1KM, SCHOOL SN BUFF, PRIVATE RECREATION FACILITIES, COUNT, ANOTHER METHOD |
| | **Public Parks Template** |
| G1SQC | GIS, 1KM, SCHOOL SN BUFF, TRAIL, COUNT |
| G1SGC1A | GIS, 1KM, SCHOOL SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, OVERALL |
| G1SGA1A | GIS, 1KM, SCHOOL SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, OVERALL |
| G1SGC1B | GIS, 1KM, SCHOOL SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, <=1012 SQ METERS |
| G1SGA1B | GIS, 1KM, SCHOOL SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, <=1012 SQ METERS |
| G1SGC1C | GIS, 1KM, SCHOOL SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >1012 to <= 4047 SQ METERS |
| G1SGA1C | GIS, 1KM, SCHOOL SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >1012 to <= 4047 SQ METERS |
| G1SGC1D | GIS, 1KM, SCHOOL SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >4047 to <= 20234 SQ METERS |
| G1SGA1D | GIS, 1KM, SCHOOL SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >4047 to <= 20234 SQ METERS |
| G1SGC1E | GIS, 1KM, SCHOOL SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >20234 to <= 40469 SQ METERS |
| G1SGA1E | GIS, 1KM, SCHOOL SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >20234 to <= 40469 SQ METERS |
| G1SGC1F | GIS, 1KM, SCHOOL SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >40469 to <= 202343 SQ METERS |
| G1SGA1F | GIS, 1KM, SCHOOL SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >40469 to <= 202343 SQ METERS |
| G1SGC1G | GIS, 1KM, SCHOOL SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >202343 SQ METERS |
| G1SGA1G | GIS, 1KM, SCHOOL SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >202343 SQ METERS |
| | **Public Transit Template** |
| G1STDA | GIS, 1KM, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, OVERALL |
| G1STDB | GIS, 1KM, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, BUS ONLY |
| G1STDE | GIS, 1KM, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, BUS (EXPRESS) ONLY |
| G1STDP | GIS, 1KM, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, BUS (RAPID TRANSIT) ONLY |
| G1STDT | GIS, 1KM, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, TRAM/STREETCAR/LIGHT RAIL ONLY |
| G1STDH | GIS, 1KM, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, HEAVY RAIL ONLY |
| G1STDC | GIS, 1KM, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, COMMUTER RAIL ONLY |
| G1STDF | GIS, 1KM, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, FERRIES ONLY |
| G1STDO | GIS, 1KM, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, OTHER ONLY |
| G1STCA | GIS, 1KM, SCHOOL SN BUFF, TRANSPORTATION, COUNT, ANY TYPE |
| G1STCB | GIS, 1KM, SCHOOL SN BUFF, TRANSPORTATION, COUNT, BUS (REGULAR) ONLY |

| | |
|---|---|
| G1STCE | GIS, 1KM, SCHOOL SN BUFF, TRANSPORTATION, COUNT, BUS (EXPRESS) ONLY |
| G1STCP | GIS, 1KM, SCHOOL SN BUFF, TRANSPORTATION, COUNT, BUS (RAPID TRANSIT) ONLY |
| G1STCT | GIS, 1KM, SCHOOL SN BUFF, TRANSPORTATION, COUNT, TRAM/STREETCAR/LIGHT RAIL ONLY |
| G1STCH | GIS, 1KM, SCHOOL SN BUFF, TRANSPORTATION, COUNT, HEAVY RAIL ONLY |
| G1STCC | GIS, 1KM, SCHOOL SN BUFF, TRANSPORTATION, COUNT, COMMUTER RAIL ONLY |
| G1STCF | GIS, 1KM, SCHOOL SN BUFF, TRANSPORTATION, COUNT, FERRIES ONLY |
| G1STCO | GIS, 1KM, SCHOOL SN BUFF, TRANSPORTATION, COUNT, OTHER ONLY |
| | **Regional Accessibility Template** |
| G1SA1 | GIS, 1KM, SCHOOL SN BUFF, REGIONAL ACCESSIBILITY, DOWNTOWN/CENTER CITY |
| G1SA2 | GIS, 1KM, SCHOOL SN BUFF, REGIONAL ACCESSIBILITY, MAJOR TRANSIT HUB |
| G1SA3 | GIS, 1KM, SCHOOL SN BUFF, REGIONAL ACCESSIBILITY, LARGEST UNIVERSITY |
| G1SA4 | GIS, 1KM, SCHOOL SN BUFF, REGIONAL ACCESSIBILITY, LARGEST HOSPITAL |
| G1SA5 | GIS, 1KM, SCHOOL SN BUFF, REGIONAL ACCESSIBILITY, LARGEST EMPLOYMENT CENTER |
| G1SA6 | GIS, 1KM, SCHOOL SN BUFF, REGIONAL ACCESSIBILITY, LARGEST NATURAL/OPEN SPACE FEATURE |
| G1SA7 | GIS, 1KM, SCHOOL SN BUFF, REGIONAL ACCESSIBILITY, NEAREST MAJOR SHOPPING CENTER |
| G1SA8 | GIS, 1KM, SCHOOL SN BUFF, REGIONAL ACCESSIBILITY, NEAREST MAJOR EMPLOYMENT CENTER |

# 250 Meters School Street Network Buffers (desired buffer)

| | |
|---|---|
| | **Buffer Template** |
| G3SB | GIS, 250M, SCHOOL SN BUFF, BUFFER AREA |
| G3SRC | GIS, 250M, SCHOOL SN BUFF, RESIDENTIAL, PARCEL COUNT |
| G3SRCS | GIS, 250M, SCHOOL SN BUFF, RESIDENTIAL, COUNT, SINGLE FAMILY |
| G3SRCM | GIS, 250M, SCHOOL SN BUFF, RESIDENTIAL, COUNT, MULTIPLE FAMILY |
| G3SRL | GIS, 250M, SCHOOL SN BUFF, RESIDENTIAL, LAND AREA SUM |
| G3SRLD | GIS, 250M, SCHOOL SN BUFF, RESIDENTIAL, LAND AREA SUM, NET DENSITY |
| G3SRLDS | GIS, 250M, SCHOOL SN BUFF, RESIDENTIAL, LAND AREA SUM, NET DENSITY, SINGLE FAMILY |
| G3SRLDM | GIS, 250M, SCHOOL SN BUFF, RESIDENTIAL, LAND AREA SUM, NET DENSITY, MULTIPLE FAMILY |
| G3SRF | GIS, 250M, SCHOOL SN BUFF, RESIDENTIAL, FLOOR AREA SUM |
| G3SRFD | GIS, 250M, SCHOOL SN BUFF, RESIDENTIAL, FLOOR AREA SUM, NET DENSITY |
| G3SRFDS | GIS, 250M, SCHOOL SN BUFF, RESIDENTIAL, FLOOR AREA SUM, NET DENSITY, SINGLE FAMILY |
| G3SRFDM | GIS, 250M, SCHOOL SN BUFF, RESIDENTIAL, FLOOR AREA SUM, NET DENSITY, MULTIPLE FAMILY |
| G3SBG | GIS, 250M, SCHOOL SN BUFF, BUFFER, GROSS RES DENSITY |
| G3SBGS | GIS, 250M, SCHOOL SN BUFF, BUFFER, GROSS RES DENSITY, SINGLE FAMILY |
| G3SBGM | GIS, 250M, SCHOOL SN BUFF, BUFFER, GROSS RES DENSITY, MULTIPLE FAMILY |
| G3SDC | GIS, 250M, SCHOOL SN BUFF, DWELLINGS, COUNT |
| G3SLC | GIS, 250M, SCHOOL SN BUFF, PEOPLE, COUNT |
| | **Commercial/Retail Land Use Template** |
| G3SCC | GIS, 250M, SCHOOL SN BUFF, COMMERCIAL, PARCEL COUNT |
| G3SCL | GIS, 250M, SCHOOL SN BUFF, COMMERCIAL, LAND AREA SUM |
| G3SCF | GIS, 250M, SCHOOL SN BUFF, COMMERCIAL, FLOOR AREA SUM |
| | **Institutional Land Use Template** |
| G3SVC | GIS, 250M, SCHOOL SN BUFF, INSTITUTIONAL, PARCEL COUNT |
| G3SVL | GIS, 250M, SCHOOL SN BUFF, INSTITUTIONAL, LAND AREA SUM |
| G3SVF | GIS, 250M, SCHOOL SN BUFF, INSTITUTIONAL, FLOOR AREA SUM |
| | **Entertainment Land Use Template** |
| G3SEC | GIS, 250M, SCHOOL SN BUFF, ENTERTAINMENT, PARCEL COUNT |
| G3SEL | GIS, 250M, SCHOOL SN BUFF, ENTERTAINMENT, LAND AREA SUM |
| G3SEF | GIS, 250M, SCHOOL SN BUFF, ENTERTAINMENT, FLOOR AREA SUM |
| | **Food-Related Land Use Template** |
| G3SFC | GIS, 250M, SCHOOL SN BUFF, FOOD RELATED, PARCEL COUNT |
| G3SFL | GIS, 250M, SCHOOL SN BUFF, FOOD RELATED, LAND AREA SUM |
| G3SFF | GIS, 250M, SCHOOL SN BUFF, FOOD RELATED, FLOOR AREA SUM |
| G3SHC | GIS, 250M, SCHOOL SN BUFF, RESTAURANT, PARCEL COUNT |
| G3SHL | GIS, 250M, SCHOOL SN BUFF, RESTAURANT, LAND AREA SUM |
| G3SHF | GIS, 250M, SCHOOL SN BUFF, RESTAURANT, FLOOR AREA SUM |
| | **Office Land Use Template** |
| G3SOC | GIS, 250M, SCHOOL SN BUFF, OFFICE, PARCEL COUNT |
| G3SOL | GIS, 250M, SCHOOL SN BUFF, OFFICE, LAND AREA SUM |
| G3SOF | GIS, 250M, SCHOOL SN BUFF, OFFICE FLOOR AREA SUM |

| | |
|---|---|
| | **Private and Public Recreation Land Use Template** |
| G3SPC | GIS, 250M, SCHOOL SN BUFF, PRIVATE AND PUBLIC RECREATION LAND, PARCEL COUNT |
| G3SPL | GIS, 250M, SCHOOL SN BUFF, PRIVATE AND PUBLIC RECREATION LAND, LAND AREA SUM |
| G3SPF | GIS, 250M, SCHOOL SN BUFF, PRIVATE AND PUBLIC RECREATION LAND, FLOOR AREA SUM |
| | **Vacant Land Use Template** |
| G3SZC | GIS, 250M, SCHOOL SN BUFF, VACANT, PARCEL COUNT |
| G3SZL | GIS, 250M, SCHOOL SN BUFF, VACANT, LAND AREA SUM |
| | **Intersection Density Template** |
| G3SIC | GIS, 250M, SCHOOL SN BUFF, INTERSECTION, COUNT |
| G3SID | GIS, 250M, SCHOOL SN BUFF, INTERSECTION, DENSITY |
| G3SJC | GIS, 250M, SCHOOL SN BUFF, CUL-DE-SACS, COUNT |
| G3SJD | GIS, 250M, SCHOOL SN BUFF, CUL-DE-SACS, DENSITY |
| | **Private Recreation Facilities Template** |
| G3SYC1 | GIS, 250M, SCHOOL SN BUFF, PRIVATE RECREATION FACILITIES, COUNT, CONTAINED OR INTERSECTED BY BUFFER |
| G3SYC3 | GIS, 250M, SCHOOL SN BUFF, PRIVATE RECREATION FACILITIES, COUNT, ANOTHER METHOD |
| | **Public Parks Template** |
| G3SQC | GIS, 250M, SCHOOL SN BUFF, TRAIL, COUNT |
| G3SGC1A | GIS, 250M, SCHOOL SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, OVERALL |
| G3SGA1A | GIS, 250M, SCHOOL SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, OVERALL |
| G3SGC1B | GIS, 250M, SCHOOL SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, <=1012 SQ METERS |
| G3SGA1B | GIS, 250M, SCHOOL SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, <=1012 SQ METERS |
| G3SGC1C | GIS, 250M, SCHOOL SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >1012 to <= 4047 SQ METERS |
| G3SGA1C | GIS, 250M, SCHOOL SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >1012 to <= 4047 SQ METERS |
| G3SGC1D | GIS, 250M, SCHOOL SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >4047 to <= 20234 SQ METERS |
| G3SGA1D | GIS, 250M, SCHOOL SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >4047 to <= 20234 SQ METERS |
| G3SGC1E | GIS, 250M, SCHOOL SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >20234 to <= 40469 SQ METERS |
| G3SGA1E | GIS, 250M, SCHOOL SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >20234 to <= 40469 SQ METERS |
| G3SGC1F | GIS, 250M, SCHOOL SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >40469 to <= 202343 SQ METERS |
| G3SGA1F | GIS, 250M, SCHOOL SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >40469 to <= 202343 SQ METERS |
| G3SGC1G | GIS, 250M, SCHOOL SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >202343 SQ METERS |
| G3SGA1G | GIS, 250M, SCHOOL SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >202343 SQ METERS |
| | **Public Transit Template** |
| G3STDA | GIS, 250M, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, OVERALL |
| G3STDB | GIS, 250M, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, BUS ONLY |
| G3STDE | GIS, 250M, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, BUS (EXPRESS) ONLY |
| G3STDP | GIS, 250M, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, BUS (RAPID TRANSIT) ONLY |
| G3STDT | GIS, 250M, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, TRAM/STREETCAR/LIGHT RAIL ONLY |
| G3STDH | GIS, 250M, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, HEAVY RAIL ONLY |
| G3STDC | GIS, 250M, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, COMMUTER RAIL ONLY |
| G3STDF | GIS, 250M, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, FERRIES ONLY |
| G3STDO | GIS, 250M, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, OTHER ONLY |
| G3STCA | GIS, 250M, SCHOOL SN BUFF, TRANSPORTATION, COUNT, ANY TYPE |
| G3STCB | GIS, 250M, SCHOOL SN BUFF, TRANSPORTATION, COUNT, BUS (REGULAR) ONLY |

| | |
|---|---|
| G3STCE | GIS, 250M, SCHOOL SN BUFF, TRANSPORTATION, COUNT, BUS (EXPRESS) ONLY |
| G3STCP | GIS, 250M, SCHOOL SN BUFF, TRANSPORTATION, COUNT, BUS (RAPID TRANSIT) ONLY |
| G3STCT | GIS, 250M, SCHOOL SN BUFF, TRANSPORTATION, COUNT, TRAM/STREETCAR/LIGHT RAIL ONLY |
| G3STCH | GIS, 250M, SCHOOL SN BUFF, TRANSPORTATION, COUNT, HEAVY RAIL ONLY |
| G3STCC | GIS, 250M, SCHOOL SN BUFF, TRANSPORTATION, COUNT, COMMUTER RAIL ONLY |
| G3STCF | GIS, 250M, SCHOOL SN BUFF, TRANSPORTATION, COUNT, FERRIES ONLY |
| G3STCO | GIS, 250M, SCHOOL SN BUFF, TRANSPORTATION, COUNT, OTHER ONLY |
| | **Regional Accessibility Template** |
| G3SA1 | GIS, 250M, SCHOOL SN BUFF, REGIONAL ACCESSIBILITY, DOWNTOWN/CENTER CITY |
| G3SA2 | GIS, 250M, SCHOOL SN BUFF, REGIONAL ACCESSIBILITY, MAJOR TRANSIT HUB |
| G3SA3 | GIS, 250M, SCHOOL SN BUFF, REGIONAL ACCESSIBILITY, LARGEST UNIVERSITY |
| G3SA4 | GIS, 250M, SCHOOL SN BUFF, REGIONAL ACCESSIBILITY, LARGEST HOSPITAL |
| G3SA5 | GIS, 250M, SCHOOL SN BUFF, REGIONAL ACCESSIBILITY, LARGEST EMPLOYMENT CENTER |
| G3SA6 | GIS, 250M, SCHOOL SN BUFF, REGIONAL ACCESSIBILITY, LARGEST NATURAL/OPEN SPACE FEATURE |
| G3SA7 | GIS, 250M, SCHOOL SN BUFF, REGIONAL ACCESSIBILITY, NEAREST MAJOR SHOPPING CENTER |
| G3SA8 | GIS, 250M, SCHOOL SN BUFF, REGIONAL ACCESSIBILITY, NEAREST MAJOR EMPLOYMENT CENTER |

# 2km Meters School Street Network Buffers (desired buffer)

| | |
|---|---|
| | **Buffer Template** |
| G2SB | GIS, 2KM, SCHOOL SN BUFF, BUFFER AREA |
| G2SRC | GIS, 2KM, SCHOOL SN BUFF, RESIDENTIAL, PARCEL COUNT |
| G2SRCS | GIS, 2KM, SCHOOL SN BUFF, RESIDENTIAL, COUNT, SINGLE FAMILY |
| G2SRCM | GIS, 2KM, SCHOOL SN BUFF, RESIDENTIAL, COUNT, MULTIPLE FAMILY |
| G2SRL | GIS, 2KM, SCHOOL SN BUFF, RESIDENTIAL, LAND AREA SUM |
| G2SRLD | GIS, 2KM, SCHOOL SN BUFF, RESIDENTIAL, LAND AREA SUM, NET DENSITY |
| G2SRLDS | GIS, 2KM, SCHOOL SN BUFF, RESIDENTIAL, LAND AREA SUM, NET DENSITY, SINGLE FAMILY |
| G2SRLDM | GIS, 2KM, SCHOOL SN BUFF, RESIDENTIAL, LAND AREA SUM, NET DENSITY, MULTIPLE FAMILY |
| G2SRF | GIS, 2KM, SCHOOL SN BUFF, RESIDENTIAL, FLOOR AREA SUM |
| G2SRFD | GIS, 2KM, SCHOOL SN BUFF, RESIDENTIAL, FLOOR AREA SUM, NET DENSITY |
| G2SRFDS | GIS, 2KM, SCHOOL SN BUFF, RESIDENTIAL, FLOOR AREA SUM, NET DENSITY, SINGLE FAMILY |
| G2SRFDM | GIS, 2KM, SCHOOL SN BUFF, RESIDENTIAL, FLOOR AREA SUM, NET DENSITY, MULTIPLE FAMILY |
| G2SBG | GIS, 2KM, SCHOOL SN BUFF, BUFFER, GROSS RES DENSITY |
| G2SBGS | GIS, 2KM, SCHOOL SN BUFF, BUFFER, GROSS RES DENSITY, SINGLE FAMILY |
| G2SBGM | GIS, 2KM, SCHOOL SN BUFF, BUFFER, GROSS RES DENSITY, MULTIPLE FAMILY |
| G2SDC | GIS, 2KM, SCHOOL SN BUFF, DWELLINGS, COUNT |
| G2SLC | GIS, 2KM, SCHOOL SN BUFF, PEOPLE, COUNT |
| | **Commercial/Retail Land Use Template** |
| G2SCC | GIS, 2KM, SCHOOL SN BUFF, COMMERCIAL, PARCEL COUNT |
| G2SCL | GIS, 2KM, SCHOOL SN BUFF, COMMERCIAL, LAND AREA SUM |
| G2SCF | GIS, 2KM, SCHOOL SN BUFF, COMMERCIAL, FLOOR AREA SUM |
| | **Institutional Land Use Template** |
| G2SVC | GIS, 2KM, SCHOOL SN BUFF, INSTITUTIONAL, PARCEL COUNT |
| G2SVL | GIS, 2KM, SCHOOL SN BUFF, INSTITUTIONAL, LAND AREA SUM |
| G2SVF | GIS, 2KM, SCHOOL SN BUFF, INSTITUTIONAL, FLOOR AREA SUM |
| | **Entertainment Land Use Template** |
| G2SEC | GIS, 2KM, SCHOOL SN BUFF, ENTERTAINMENT, PARCEL COUNT |
| G2SEL | GIS, 2KM, SCHOOL SN BUFF, ENTERTAINMENT, LAND AREA SUM |
| G2SEF | GIS, 2KM, SCHOOL SN BUFF, ENTERTAINMENT, FLOOR AREA SUM |
| | **Food-Related Land Use Template** |
| G2SFC | GIS, 2KM, SCHOOL SN BUFF, FOOD RELATED, PARCEL COUNT |
| G2SFL | GIS, 2KM, SCHOOL SN BUFF, FOOD RELATED, LAND AREA SUM |
| G2SFF | GIS, 2KM, SCHOOL SN BUFF, FOOD RELATED, FLOOR AREA SUM |
| G2SHC | GIS, 2KM, SCHOOL SN BUFF, RESTAURANT, PARCEL COUNT |
| G2SHL | GIS, 2KM, SCHOOL SN BUFF, RESTAURANT, LAND AREA SUM |
| G2SHF | GIS, 2KM, SCHOOL SN BUFF, RESTAURANT, FLOOR AREA SUM |
| | **Office Land Use Template** |
| G2SOC | GIS, 2KM, SCHOOL SN BUFF, OFFICE, PARCEL COUNT |
| G2SOL | GIS, 2KM, SCHOOL SN BUFF, OFFICE, LAND AREA SUM |
| G2SOF | GIS, 2KM, SCHOOL SN BUFF, OFFICE FLOOR AREA SUM |

| | |
|---|---|
| | **Private and Public Recreation Land Use Template** |
| G2SPC | GIS, 2KM, SCHOOL SN BUFF, PRIVATE AND PUBLIC RECREATION LAND, PARCEL COUNT |
| G2SPL | GIS, 2KM, SCHOOL SN BUFF, PRIVATE AND PUBLIC RECREATION LAND, LAND AREA SUM |
| G2SPF | GIS, 2KM, SCHOOL SN BUFF, PRIVATE AND PUBLIC RECREATION LAND, FLOOR AREA SUM |
| | **Vacant Land Use Template** |
| G2SZC | GIS, 2KM, SCHOOL SN BUFF, VACANT, PARCEL COUNT |
| G2SZL | GIS, 2KM, SCHOOL SN BUFF, VACANT, LAND AREA SUM |
| | **Intersection Density Template** |
| G2SIC | GIS, 2KM, SCHOOL SN BUFF, INTERSECTION, COUNT |
| G2SID | GIS, 2KM, SCHOOL SN BUFF, INTERSECTION, DENSITY |
| G2SJC | GIS, 2KM, SCHOOL SN BUFF, CUL-DE-SACS, COUNT |
| G2SJD | GIS, 2KM, SCHOOL SN BUFF, CUL-DE-SACS, DENSITY |
| | **Private Recreation Facilities Template** |
| G2SYC1 | GIS, 2KM, SCHOOL SN BUFF, PRIVATE RECREATION FACILITIES, COUNT, CONTAINED OR INTERSECTED BY BUFFER |
| G2SYC3 | GIS, 2KM, SCHOOL SN BUFF, PRIVATE RECREATION FACILITIES, COUNT, ANOTHER METHOD |
| | **Public Parks Template** |
| G2SQC | GIS, 2KM, SCHOOL SN BUFF, TRAIL, COUNT |
| G2SGC1A | GIS, 2KM, SCHOOL SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, OVERALL |
| G2SGA1A | GIS, 2KM, SCHOOL SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, OVERALL |
| G2SGC1B | GIS, 2KM, SCHOOL SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, <=1012 SQ METERS |
| G2SGA1B | GIS, 2KM, SCHOOL SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, <=1012 SQ METERS |
| G2SGC1C | GIS, 2KM, SCHOOL SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >1012 to <= 4047 SQ METERS |
| G2SGA1C | GIS, 2KM, SCHOOL SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >1012 to <= 4047 SQ METERS |
| G2SGC1D | GIS, 2KM, SCHOOL SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >4047 to <= 20234 SQ METERS |
| G2SGA1D | GIS, 2KM, SCHOOL SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >4047 to <= 20234 SQ METERS |
| G2SGC1E | GIS, 2KM, SCHOOL SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >20234 to <= 40469 SQ METERS |
| G2SGA1E | GIS, 2KM, SCHOOL SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >20234 to <= 40469 SQ METERS |
| G2SGC1F | GIS, 2KM, SCHOOL SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >40469 to <= 202343 SQ METERS |
| G2SGA1F | GIS, 2KM, SCHOOL SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >40469 to <= 202343 SQ METERS |
| G2SGC1G | GIS, 2KM, SCHOOL SN BUFF, PARK, COUNT, CONTAINED OR INTERSECTED BY BUFFER, >202343 SQ METERS |
| G2SGA1G | GIS, 2KM, SCHOOL SN BUFF, PARK, AREA, CONTAINED OR INTERSECTED BY BUFFER, >202343 SQ METERS |
| | **Public Transit Template** |
| G2STDA | GIS, 2KM, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, OVERALL |
| G2STDB | GIS, 2KM, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, BUS ONLY |
| G2STDE | GIS, 2KM, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, BUS (EXPRESS) ONLY |
| G2STDP | GIS, 2KM, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, BUS (RAPID TRANSIT) ONLY |
| G2STDT | GIS, 2KM, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, TRAM/STREETCAR/LIGHT RAIL ONLY |
| G2STDH | GIS, 2KM, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, HEAVY RAIL ONLY |
| G2STDC | GIS, 2KM, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, COMMUTER RAIL ONLY |
| G2STDF | GIS, 2KM, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, FERRIES ONLY |
| G2STDO | GIS, 2KM, SCHOOL SN BUFF, TRANSPORTATION, DENSITY, OTHER ONLY |
| G2STCA | GIS, 2KM, SCHOOL SN BUFF, TRANSPORTATION, COUNT, ANY TYPE |
| G2STCB | GIS, 2KM, SCHOOL SN BUFF, TRANSPORTATION, COUNT, BUS (REGULAR) ONLY |

| | |
|---|---|
| G2STCE | GIS, 2KM, SCHOOL SN BUFF, TRANSPORTATION, COUNT, BUS (EXPRESS) ONLY |
| G2STCP | GIS, 2KM, SCHOOL SN BUFF, TRANSPORTATION, COUNT, BUS (RAPID TRANSIT) ONLY |
| G2STCT | GIS, 2KM, SCHOOL SN BUFF, TRANSPORTATION, COUNT, TRAM/STREETCAR/LIGHT RAIL ONLY |
| G2STCH | GIS, 2KM, SCHOOL SN BUFF, TRANSPORTATION, COUNT, HEAVY RAIL ONLY |
| G2STCC | GIS, 2KM, SCHOOL SN BUFF, TRANSPORTATION, COUNT, COMMUTER RAIL ONLY |
| G2STCF | GIS, 2KM, SCHOOL SN BUFF, TRANSPORTATION, COUNT, FERRIES ONLY |
| G2STCO | GIS, 2KM, SCHOOL SN BUFF, TRANSPORTATION, COUNT, OTHER ONLY |
| | **Regional Accessibility Template** |
| G2SA1 | GIS, 2KM, SCHOOL SN BUFF, REGIONAL ACCESSIBILITY, DOWNTOWN/CENTER CITY |
| G2SA2 | GIS, 2KM, SCHOOL SN BUFF, REGIONAL ACCESSIBILITY, MAJOR TRANSIT HUB |
| G2SA3 | GIS, 2KM, SCHOOL SN BUFF, REGIONAL ACCESSIBILITY, LARGEST UNIVERSITY |
| G2SA4 | GIS, 2KM, SCHOOL SN BUFF, REGIONAL ACCESSIBILITY, LARGEST HOSPITAL |
| G2SA5 | GIS, 2KM, SCHOOL SN BUFF, REGIONAL ACCESSIBILITY, LARGEST EMPLOYMENT CENTER |
| G2SA6 | GIS, 2KM, SCHOOL SN BUFF, REGIONAL ACCESSIBILITY, LARGEST NATURAL/OPEN SPACE FEATURE |
| G2SA7 | GIS, 2KM, SCHOOL SN BUFF, REGIONAL ACCESSIBILITY, NEAREST MAJOR SHOPPING CENTER |
| G2SA8 | GIS, 2KM, SCHOOL SN BUFF, REGIONAL ACCESSIBILITY, NEAREST MAJOR EMPLOYMENT CENTER |

# Distance from School to nearest (required)

| | |
|---|---|
| GDSY | GIS, DISTANCE (NETWORK) TO NEAREST, SCHOOL, PRIVATE RECREATION FACILITY |
| GDSGXXA | GIS, DISTANCE (NETWORK) TO NEAREST, SCHOOL, PARK, OVERALL |
| GDSGXXB | GIS, DISTANCE (NETWORK) TO NEAREST, SCHOOL, PARK, <=1012 SQ METERS |
| GDSGXXC | GIS, DISTANCE (NETWORK) TO NEAREST, SCHOOL, PARK, >1012 to <= 4047 SQ METERS |
| GDSGXXD | GIS, DISTANCE (NETWORK) TO NEAREST, SCHOOL, PARK, >4047 to <= 20234 SQ METERS |
| GDSGXXE | GIS, DISTANCE (NETWORK) TO NEAREST, SCHOOL, PARK, >20234 to <= 40469 SQ METERS |
| GDSGXXF | GIS, DISTANCE (NETWORK) TO NEAREST, SCHOOL, PARK, >40469 to <= 202343 SQ METERS |
| GDSGXXG | GIS, DISTANCE (NETWORK) TO NEAREST, SCHOOL, PARK, >202343 SQ METERS |
| GDSQ | GIS, DISTANCE (NETWORK) TO NEAREST, SCHOOL, TRAIL |
| GDSTXA | GIS, DISTANCE (NETWORK) TO NEAREST, SCHOOL, TRANSPORTATION, ANY TYPE |
| GDSTXB | GIS, DISTANCE (NETWORK) TO NEAREST, SCHOOL, TRANSPORTATION, BUS (REGULAR) ONLY |
| GDSTCE | GIS, DISTANCE (NETWORK) TO NEAREST, SCHOOL, TRANSPORTATION, BUS (EXPRESS) ONLY |
| GDSTCP | GIS, DISTANCE (NETWORK) TO NEAREST, SCHOOL, TRANSPORTATION, BUS (RAPID TRANSIT) ONLY |
| GDSTCT | GIS, DISTANCE (NETWORK) TO NEAREST, SCHOOL, TRANSPORTATION, RAM/STREETCAR/LIGHT RAIL ONLY |
| GDSTCH | GIS, DISTANCE (NETWORK) TO NEAREST, SCHOOL, TRANSPORTATION, HEAVY RAIL ONLY |
| GDSTCC | GIS, DISTANCE (NETWORK) TO NEAREST, SCHOOL, TRANSPORTATION, COMMUTER RAIL ONLY |
| GDSTCF | GIS, DISTANCE (NETWORK) TO NEAREST, SCHOOL, TRANSPORTATION, FERRIES ONLY |
| GDSTCO | GIS, DISTANCE (NETWORK) TO NEAREST, SCHOOL, TRANSPORTATION, OTHER ONLY |

# SECTION 20: CHARACTER KEY FOR VARIABLE NAMES

**First character:** G = GIS variable

**Second character:** 5 = 500 meters

1 = 1km

3 = 250 meters

2 = 2km

D = Distance to nearest – network distance

C = Distance to nearest – straight line distance

**Third character:** N = Residential (Home) / Home street network buffer

S = School / School street network buffer

X = None

**Fourth character:** A = Regional accessibility

B = Buffer

C = Retail / Commercial land use

D = Dwellings

E = Entertainment land use

F = Food-related land use

G = Park

H = Restaurant land use

I = Intersection

J = Cul-de-sacs

L = People

P = Private and Public Recreation Land

O = Office land use

Q = Trail

R = Residential land use

T = Transportation

V = Civic / Institutional land use

Y = Private Recreation Facilities

Z = Vacant land use

**Fifth character:**

A = Area

C = Count

D = Density

G = Gross Density

F = Floor Area Sum

L = Land Area Sum

P = Footprint Area Sum

X = None

1 = Most central location within the downtown/center city (regional accessibility)

2 = Most significant major transit hub (regional accessibility)

3 = Largest university outside of downtown (regional accessibility)

4 = largest hospital complex outside of downtown (regional accessibility)

5 = largest employment center not already identified (regional accessibility)

6 = nearest major natural/open space feature where recreational activities occur(a park, beach, lake, etc) (regional accessibility)

7 = Nearest major shopping center from each participants home (regional accessibility)

8 = nearest major employment center (not already identified as a destination) (regional accessibility)

**Sixth character:**

1 = Contained by or intersect

2 = Contained by

3 = Another method

A = Overall

B = Bus (Regular) Only

C = Commuter rail

D = Net Density

E = Express Bus

F = Ferries

G = Signalized

H = Heavy rail

M = Multiple Family

O = Other

P = Bus Rapid Transit

S = Single Family

T = Tram, Streetcar, or Light Rail

U = Unsignalized

X = None

**Seventh character:**

A = Overall

B = less than or equal to .25 acre

C = greater than .25 acre but less than or equal to 1 acre

D = Greater than 1 acre but less than or equal to 5 acres

E = Greater than 5 acres but less than or equal to 10 acres

F = Greater than 10 acres but less than or equal to 50 acres

G = Greater than 50 acres

M = Multiple Family

S = Single Family