Block Equivalency Files for use in the TAZ delineation software (TAZ MTPS)

The Census Transportation Planning Products (CTPP)[1] will be using Traffic Analysis Zones (TAZs) and Traffic Analysis Districts (TADs) in the 5-year and 3-year CTPP products, respectively.[2] TAZs and TADs will be defined by metropolitan planning organizations (MPOs) and state departments of transportation (DOTs) in Spring 2011 to support these CTPP products. The TAZ delineation software, called the TAZ MAF/TIGER Partnership Software, or TAZ MTPS, has been created to assist in delineating the 2010 TAZs and TADs. TAZ and TAD delineation files submitted to the U.S. Census Bureau must be output from the TAZ MTPS.

The TAZ MTPS allows several options for delineating 2010 TAZ and TAD delineations, including starting from scratch, using existing 2010 Census geography as a basis for TAZ/TAD delineation(s), and importing block equivalency files. This handout provides an overview of the block equivalency file method.

Block equivalency files (BEFs) are tabular files created outside the TAZ MTPS, in .csv, .txt, or dbase format that contain:
- two text (not numeric) formatted fields: BLOCKID and TAZCE10 (if TAZ BEF) and/or TADCE10 (if TAD BEF)
  - the BLOCKID field contains the 15 character block unique identifier: the concatenated state FIPS, county FIPS, census tract, and block codes
  - the TAZCE10 field contains the 8 character TAZ code, or, the TADCE10 field contains the 8 character TAD code.[3] , and
- one record for each block within the assigned area, and have a corresponding TAZCE10 or TADCE10 code
  - each block unique identifier (BLOCKID) must be represented only once within the file, i.e., no duplicate BLOCKIDs
  - if a block within the assigned area is not represented in the file, a TAZ or TAD code will not be assigned to that area upon import into the TAZ MTPS; similarly, if a block is represented within the file and no TAZ or TAD code is assigned, then a TAZ or TAD code will not be assigned to that area upon import into the software

BEFs should be imported into the TAZ MTPS to ensure that all TAZ and TAD criteria are met, and that the files submitted to the Census Bureau contain the standardized format and content. After the verification edits are run with the TAZ MTPS, output files are generated to be sent to the Census Bureau.

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[1] The CTPP is a set of special tabulations of census data designed for transportation planners. As decided in 2006 the CTTP will use American Community Survey (ACS) data.

[2] See the Overview of TAZ/TAD criteria and guidelines chart on page 6 of this document for information about TAZs and TADs.

[3] TAZ and TAD codes are alphanumeric, and cannot include spaces or special characters. The codes are not case sensitive (there is no distinction between "A" and "a"). If a TAZ or TAD code that is fewer than 8 characters is created, the code will be filled with leading zeros. The codes "00000000" and "99999999" should not be used.

Example of one possible BEF creation methodology

There are many ways a BEF can be created for import into the TAZ MTPS. The following is an example of one methodology that could be used to create a TAZ BEF using ESRI ArcGIS software[4]. BEF files can be created using other types of GIS software packages.

1. To download 2010 census block shapefiles for the county(s) in which you will be delineating TAZs/TADs, navigate to the following website: http://www.census.gov/cgi-bin/geo/shapefiles2010/main

2. This will take you to the 2010 TIGER/Line [5] Shapefiles web page. Under "Select a layer type", select **"Blocks"** , click submit
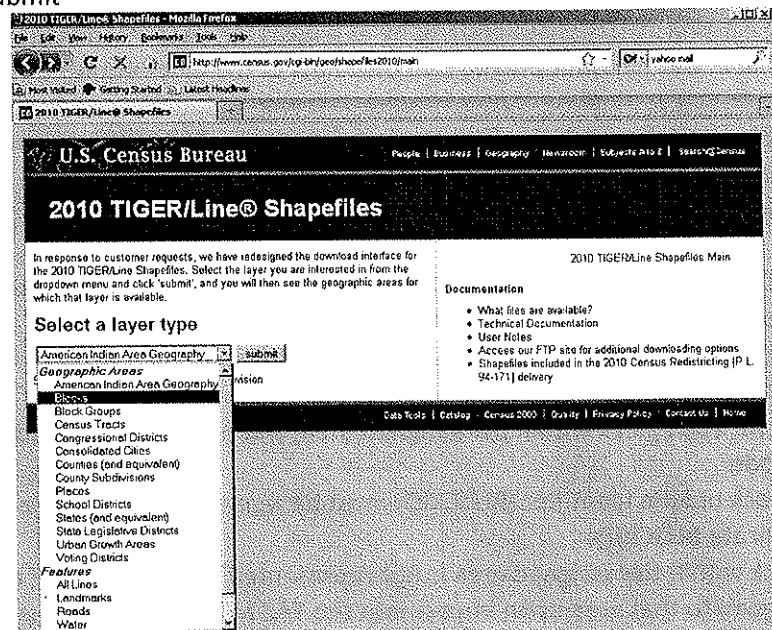

3. On the following screen under **Block (2010)** Select the state from which you would like to download data, click submit.

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[4] ArcGIS™ is a Trademark of Environmental Systems Research Institute, Inc. (ESRI). Note: The location of menus and tools is highly customizable in ArcGIS. Therefore, the way the screen looks in the graphics may not be the same as your settings.

[5] TIGER/Line® is a Registered Trademark of the US Census Bureau.
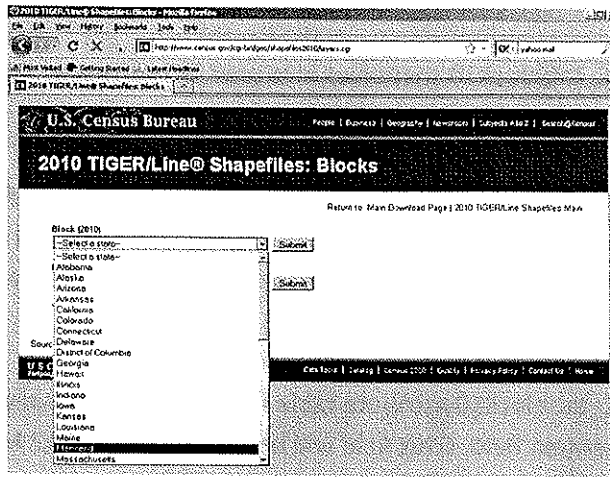
4. On the following screen, select which counties you would like to download, and click download. You can download all counties in one state-based file, if desired. Note: There are many blocks within a state, ranging from 6,507 to 914,231.
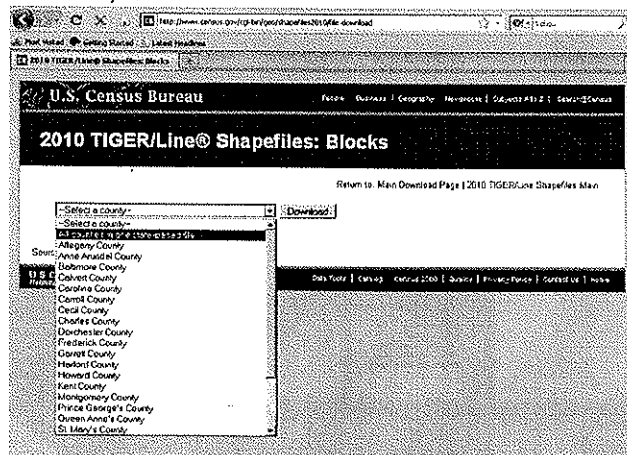
5. Save the Zip file on your local drive in a designated folder on your C: drive. Name this folder "TAZ_Layers."
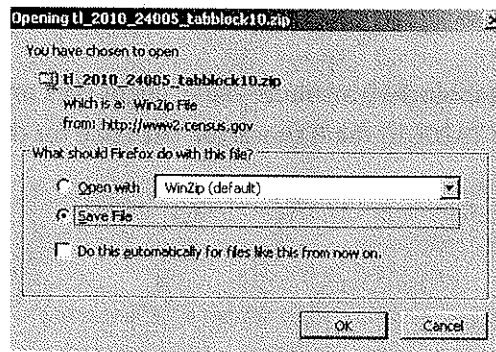

6. Once you have downloaded all selected shapefiles, unzip the files the in the "TAZ layers" folder. The file name for the county-based shapefiles will be **tl_2010_SSCCC_tabblock10** where SS is the 2-digit state FIPS code, and CCC is the 3-digit county FIPS code, e.g., 24031 for Montgomery County, MD.

7. Import **tl_2010_SSCCC_tabblock10** shapefiles into your GIS software. Again, for this example we are using ArcGIS 9.2.

   Optional: If you choose to use an existing geography to inform your TAZ/TAD delineation (e.g., if you have a file containing recent traffic analysis zones for your area), import that file into the project as well. We recommend that you make this "selection layer" hollow with a thick outline to distinguish between the tabblock layers.

8. In the **tl_2010_SSCCC_tabblock10** attribute table (.dbf) add a field named TAZCE10. TAZCE10 must be set as an 8-character text field. (This field will be needed so the TAZ MTPS can correctly read your created BEF file.)

9. Select the tab blocks within the desired area using select tool (or select by location based on your "selection layer").
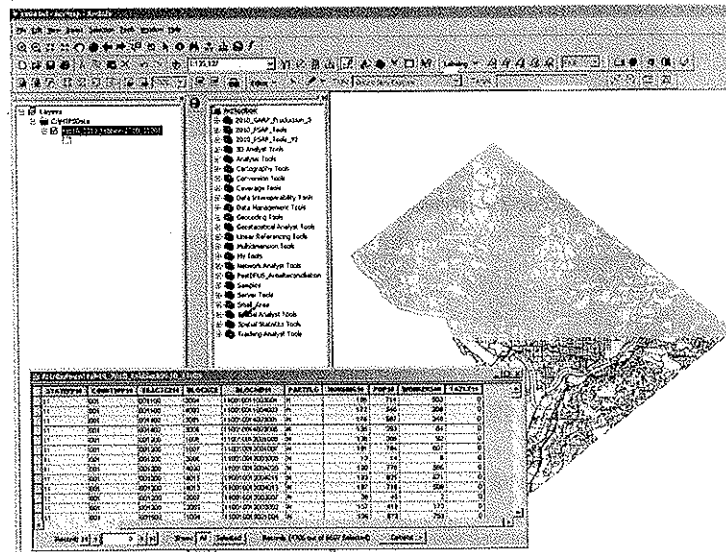
10. Open the **tl_2010_SSCCC_tabblock10** attribute table. Right click on the TAZCE10 field and open Field Calculator. Assign the TAZCE10 the 8 character TAZ code for the selected area.
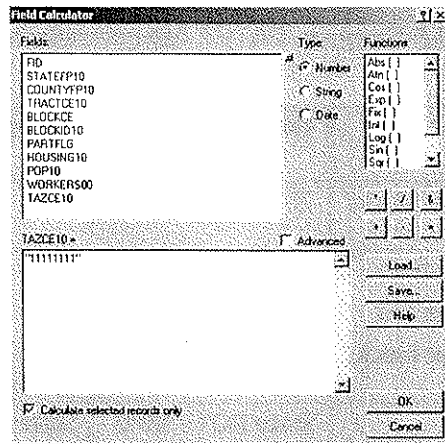
11. Repeat this for each unique TAZ you want to create assigning a unique 8 character code until all records no longer have a TAZCE10 value of "null".

12. Once you have all you TAZCE10 codes assigned, merge all the tl_2010_SSCCC_tabblock10 files together into one shapefile (within Arc Toolbox: Data Management Tools: General).

13. Delete all fields within the merged shapefile *EXCEPT* for **BLOCKID10, TAZCE10, TADCE (if created), FID,** and **Shape** (FID and Shape can not be deleted). The BLOCKID10 and TAZCE10 fields are crucial for importing the BEF into the TAZ MTPS otherwise they will not load.

14. Export layer as a comma-delimited, text, or dbase (.csv, .txt, or .dbf) file, renaming it as BEF_TAZ[6] (.csv, .txt, or .dbf). (Alternately, you can just use the .dbf from your shapefile as your BEF).

NOTE: To create a TAD BEF, a similar methodology would be employed, however, one would need to assure that the TADs were created based on complete TAZs, i.e., all TAZs will nest within TADS (e.g., the TAZ file could be used as the "select by location" features in creating TADs).

If you have any questions, please contact the Census Bureau TAZ team: geo.taz.list@census.gov

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[6] We recommend that you create only one BEF_TAZ for initial import into the TAZ MTPS. If you create more than one BEF file, then append the state and county FIPS code, or another identifier, to the file.

Overview of 2010 Census TAZ/TAD criteria and guidelines

	TAZ	TAD	*Notes*
Aggregates of...	2010 census blocks	2010 TAZs	
Overlap	TAZs may not overlap (one TAZ assigned per block)	TADs may not overlap (one TAD assigned per TAZ)	
Nest within & cover the entire area of...	Counties	State DOT / MPO coverage	*State DOT and MPO coverage is one or more complete counties. TADs may cross county boundaries.*
Codes	Unique within county	Unique within state DOT/MPO coverage	*TAZ and TAD codes are up to 8-characters, alphanumeric, and automatically padded with leading zeros*
Minimum thresholds (suggested)	Resident or worker* population > 600	Resident or worker* population > 20,000	*Data reliability and availability improves as resident and worker population increases* ** 2000 block-level worker estimates were interpolated to 2010 block boundaries*