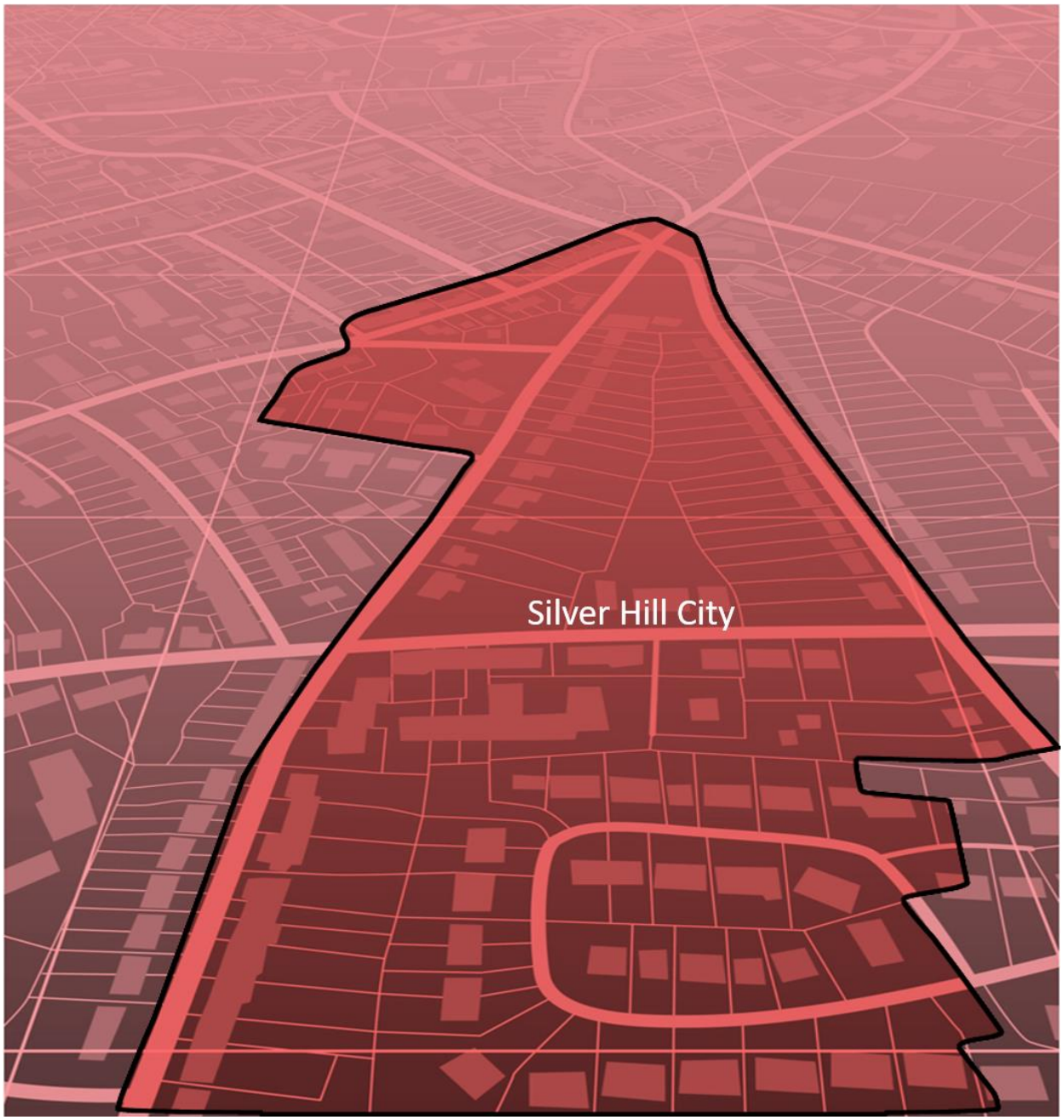
Boundary and Annexation Survey (BAS) Respondent Guide: Digital

Instructions for Participating in the 2020 Boundary and Annexation Survey

Revised as of October 07, 2019



United States Census Bureau

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INTRODUCTION

A. The Boundary and Annexation Survey

The U.S. Census Bureau conducts the Boundary and Annexation Survey (BAS) annually to collect information about selected legally defined geographic areas, such as counties (and equivalent areas), incorporated places, minor civil divisions (MCDs), federally recognized American Indian Areas (AIAs) — including reservations, off-reservation trust lands and tribal subdivisions, and Hawaiian Homelands. BAS also provides an opportunity for participants to review the names and geographic relationships for these areas. Title 13, Section 6, United States Code authorizes this survey.

The Census Bureau uses the boundary information collected during BAS to tabulate data for the decennial and economic censuses, and to support the yearly delivery of the Population Estimates Program (PEP) and the American Community Survey (ACS) data. Maintaining correct boundaries and boundary-to-feature relationships through BAS helps ensure that the Census Bureau assigns the appropriate housing and population counts to each government.

In compliance with the Office of Management and Budget Circular A-16, BAS supports the Census Bureau's spatial data steward responsibilities for the Federal Geographic Data Committee (FGDC) and the Geospatial One-Stop by updating the inventory and boundaries of governments.

In addition, BAS is the source of up-to-date information on changes to the boundaries, codes and names of incorporated places, MCDs, counties (and equivalent areas), Hawaiian Homelands, and federally recognized AIAs, which include reservations and off-reservation trust lands used by the U.S. Geological Survey (USGS), the National Map, and the Geographic Names Information System (GNIS).

Please visit the BAS program website at <https://www.census.gov/programs-surveys/bas.html>.

For more information on BAS, please view the BAS video series on the Census Bureau's BAS website at <https://www.census.gov/programs-surveys/bas/library/videos.html>.

B. What's New for the 2020 BAS?

1. The Boundary Validation Program (BVP) runs in parallel with the 2020 BAS. The BVP provides Tribal Chairs (TCs) and Highest Elected Officials (HEOs), of tribal, state, and local governments, the opportunity to review the Census Bureau's boundary data to ensure the Census Bureau has the correct legal boundary, name, and status information for eligible governments across the United States. For more information on the BVP, please visit the BVP website at: <https://www.census.gov/programs-surveys/bas/information/bvp.html>.
2. The 2020 BAS is the final opportunity for tribal, state, and local governments to provide legal boundary, name, and status information updates prior to 2020 Census data tabulation.

3. The Census Bureau developed a BAS Partnership Toolbox for ArcGIS users. This toolbox is designed to simplify and standardize the BAS updating process. The toolbox and additional information can be found at <https://www.census.gov/programs-surveys/bas/geographies/map-tools/arcmap-tools.html> or refer to **Appendix B** for a step-by-step guide to using this new tool.

C. Key Dates for BAS Respondents

January 1, 2020—Boundary changes must be legally in effect on or before this date to be reported in the current survey year and to be used for the 2020 Census data tabulations. Boundary updates effective after this date will be held until the following BAS cycle.

March 1, 2020— Boundary updates returned by this date will be reflected in the 2020 Census, the Final BVP materials, and in next year's BAS materials.

May 31, 2020—Boundary updates returned by this date will be reflected in the 2020 Census and in next year's BAS materials.

D. BAS State Agreements

The Census Bureau has established a number of agreements with states for reporting boundary changes. Please visit the BAS State Agreements webpage within the BAS program website at <https://www.census.gov/programs-surveys/bas/information/state-agreements.html> or call **1-800-972-5651** for information regarding state agreements.

Note: The Census Bureau can only establish BAS state agreements for states that require local governments to report boundary changes to a state agency.

E. Legal Disputes

If the Census Bureau discovers that an area of land is in dispute between two or more jurisdictions, the Census Bureau will not make any boundary corrections until the parties come to a written agreement, or there is a documented final court decision regarding the dispute. To learn more, please contact the Census Bureau Legal Office at **1-301-763-9844**.

For disputes involving tribal areas, the Census Bureau must defer to the Office of the Solicitor at the Department of the Interior for a legal opinion. Often complicated land issues require an extended period of time for resolution, and in those cases, the Census Bureau will retain the current boundary in the database until a legal opinion is issued by the Solicitor's office.

CHAPTER 1 DIGITAL BAS REQUIREMENTS

1.1 Digital BAS Participation Requirements

1. All participants must create a new shapefile of boundary change polygons based off the current Census Bureau boundary. Submissions containing only a whole entity boundary shapefile of the current local data will not be accepted.
2. All participants must provide current information for the BAS point of contact, the person updating the shapefiles, and the HEO for the government.
3. All participants must provide legal documentation numbers and effective dates for all legal boundary changes (annexations and deannexations).
4. Each non-legal boundary correction must contain proper update documentation according to boundary correction guidelines listed below, or the Census Bureau will not make the correction for this BAS cycle.
5. All participants must use the Secure Web Incoming Module (SWIM) to submit their changes to the Census Bureau. Due to security requirements, the Census Bureau cannot accept submissions via File Transfer Protocol (FTP), email or any protocol other than the SWIM site. For details on registering and using SWIM, please see **Section 5.7.6, Submitting Digital Files via SWIM**. To access SWIM, enter the following URL in a new browser window: <https://respond.census.gov/swim/>.

1.2 BAS Informational and Tutorial Videos

The Census Bureau created training videos to give BAS participants detailed instructions and information on how to report and submit BAS changes. These videos are available on the BAS website at: <https://www.census.gov/programs-surveys/bas/library/videos.html>.

If there are any questions or concerns about the participation requirements, contact the Census Bureau at **1-800-972-5651** or geo.bas@census.gov.

For participants already familiar with GIS and BAS updating procedures, **Appendix B** and **Appendix C** provide step-by-step guidelines for making updates.

CHAPTER 2 TOPOLOGICAL RELATIONSHIPS AND SPATIAL ACCURACY

The Geography Division of the Census Bureau is responsible for developing geographic applications and executing related activities needed to support the Census Bureau in collecting and disseminating census data. For more than twenty years, the Census Bureau's Master Address File and Topologically Integrated Geographic Encoding and Reference (MAF/TIGER) System has been a critical resource for supporting the Census Bureau Geographic Partnership Programs.

The following section will describe how the Census Bureau uses a topologically integrated system and how this differs from traditional GIS, which use separate layers of data.

2.1 Topological Relationships in the MAF/TIGER System

At the Census Bureau, topology is described as the spatial relationship between different levels of geography. The MAF/TIGER system is a geographic database in which the topological structures define the location, connection, and relationships of streets, rivers, railroads, and other features. These topological structures help define the geographic areas for which the Census Bureau tabulates data.

Instead of having a separate layer for each feature class (roads, boundaries, etc.), all MAF/TIGER system information is stored in one layer or file. See **Figure 1** for a sample of a topologically integrated file in the MAF/TIGER system.

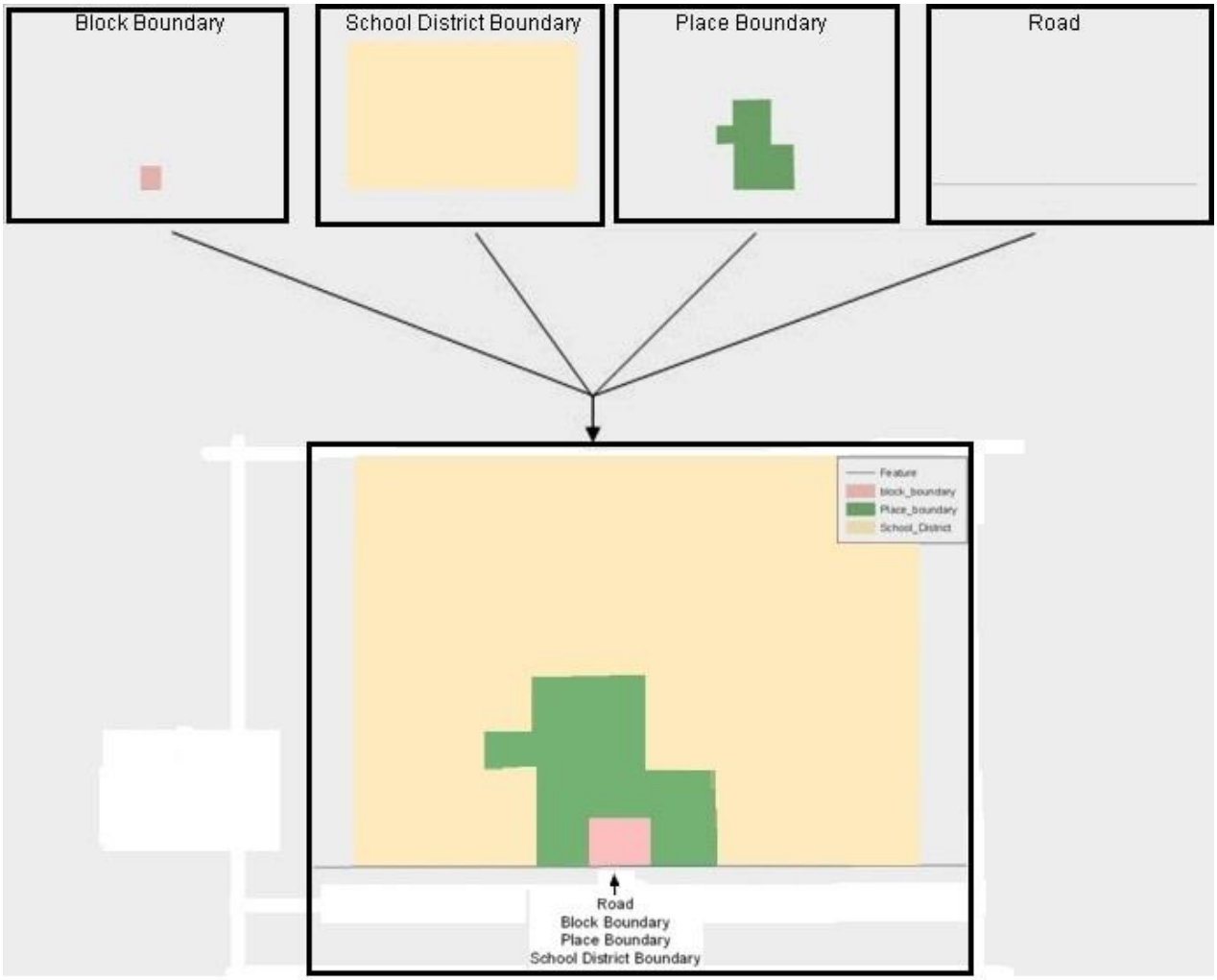


Figure 1. Topological Integration of Four Classes

This example shows the topological integration of four different feature classes into one layer. One road feature represents not only a road, but also a block boundary, place boundary, and a school district boundary.

2.2 GIS and Spatial Accuracy

In a GIS, feature classes are often not topologically integrated; they are separated into individual layers. When these layers are overlaid in a GIS, there may be boundary misalignments due to the nature of the data. These non-topologically integrated layers could cause issues in the MAF/TIGER system. **Figure 2** and **Figure 3** show how files that are not topologically integrated might appear in a GIS when overlaid.

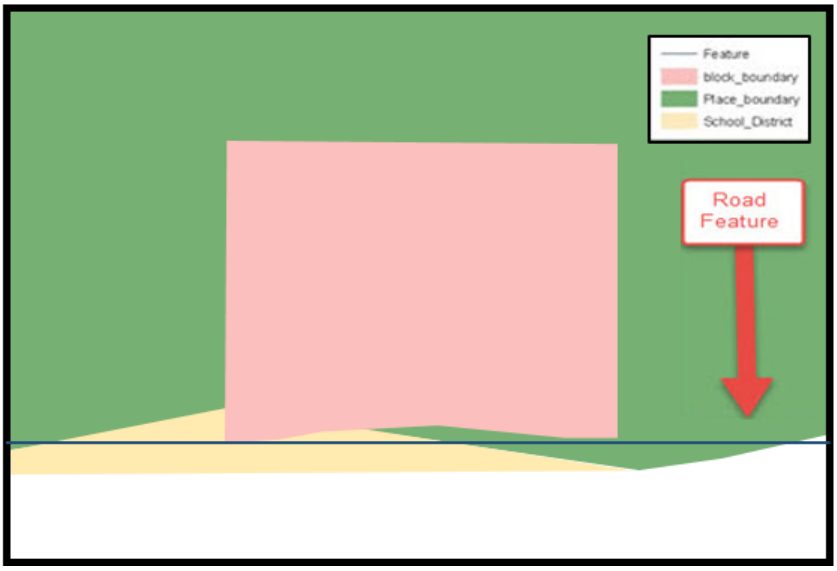


Figure 2. Overlay of Four Feature Classes

This example shows an overlay of four different feature classes. Notice how the topological relationship is compromised. The block, place, and school district boundaries, which are supposed to follow the road feature, are no longer aligned with the road in several locations.

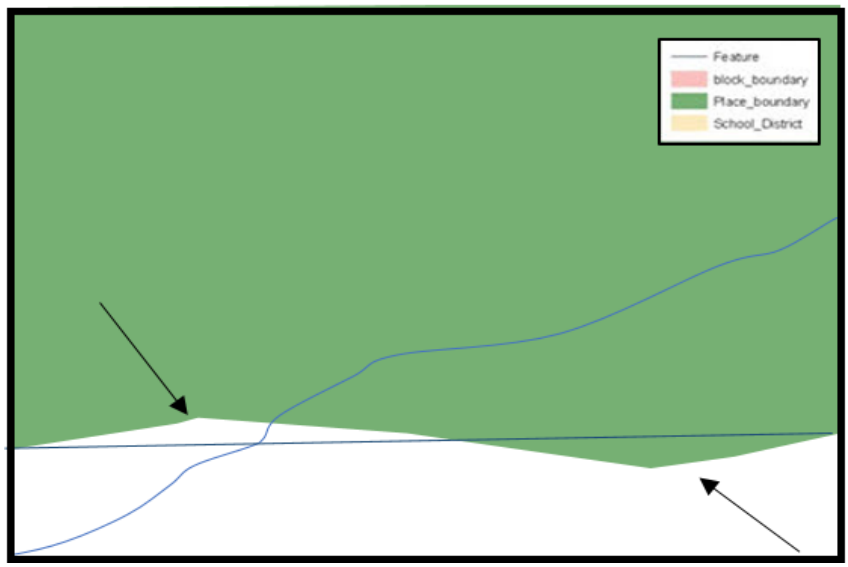


Figure 3. GIS Place Boundary Does Not Follow Road Feature

This example shows a situation where a local GIS place boundary does not follow a road feature. Assuming that the boundary follows the road feature in the MAF/TIGER system, changing the Census Bureau place boundary to match the local file exactly and become misaligned (see arrows) would dissolve the topological relationship in the MAF/TIGER system.

The spatial differences between local GIS data and the Census Bureau's topologically integrated file are often very small (less than ten feet) and can create boundary-to-feature relationship issues for the Census Bureau. Instructions on how to review digital submissions for small spatial boundary corrections are given in **Section 5.6: Reviewing Changes to the Census Bureau Shapefiles**. It also lists some of the potential consequences of making spatial boundary corrections that dissolve the topological relationships present in the MAF/TIGER system.

To find step-by-step instructions of suggested methods for correctly making boundary changes, please see **Appendix B** and **Appendix C**.

2.3 Census Bureau Topology Training Video

The Census Bureau created a video on the subject of topology and why topology is important to BAS. For more information, please go to <https://www.census.gov/programs-surveys/bas/library/videos.html> to watch the video.

CHAPTER 3 CENSUS BUREAU PROVIDED SHAPEFILES

The Census Bureau provides data layers in Esri shapefile format for download on the BAS website. Regardless of the number of geographic polygon-based shapefiles each participant downloads and edits, there is only one shapefile for the linear feature network for each county. See **Table 1** for the names of the shapefiles.

Table 1: BAS Shapefile Naming Conventions

Government Type	Shapefile Naming Convention
County	PVS_19_v2_county_<ssccc>.shp
Minor Civil Division	PVS_19_v2_mcd_<ssccc>.shp
Incorporated Place	PVS_19_v2_place_<ssccc>.shp
Consolidated City	PVS_19_v2_concity_<ssccc>.shp
Edges (Roads, Rail, Hydro, etc.)	PVS_19_v2_edges_<ssccc>.shp
Area Landmarks	PVS_19_v2_arealm_<ssccc>.shp
Point Landmarks	PVS_19_v2_pointlm_<ssccc>.shp
Hydro Area	PVS_19_v2_water_<ssccc>.shp
Geographic Offsets / Corridors	PVS_19_v2_offset_<ssccc>.shp

Please download shapefiles from the BAS website at <https://www.census.gov/geographies/mapping-files/2020/geo/bas/2020-bas-shapefiles.html> in order to review the boundaries and submit changes.

Note: <ssccc> represents the two-digit state FIPS code and three-digit county FIPS code.

All shapefiles provided by the Census Bureau are in the following unprojected geographic-based coordinate system:

- Geographic Coordinate System – North American Datum 1983 (GCS NAD83).
- Angular Unit: Degree (0.017453292519943299).
- Prime Meridian: Greenwich (0.000000000000000000).
- Datum: D_North_American_1983.
- Spheroid: GRS_1980.
- Semi-major Axis: 6378137.000000000000000.
- Semi-minor Axis: 6356752.314140356100000000.
- Inverse Flattening: 298.257222101000020000.

3.1 Federal Information Processing Standards (FIPS) Codes

The Census Bureau recommends using FIPS codes to identify governments such as counties, MCDs, and incorporated places. Using a standard coding scheme facilitates the digital exchange of data. The Census Bureau includes these codes in the BAS shapefiles in the fields that end in 'FP'. The codes can be found online at <https://www.census.gov/programs-surveys/bas/technical-documentation/code-lists.html>. If there are any questions or problems, contact the Census Bureau at **1-800-972-5651** or geo.bas@census.gov.

CHAPTER 4 CENSUS BUREAU GEOCODING

Geocoding is how the Census Bureau codes the location of the population within the legal boundaries of a geographic area. There are two primary methods of geocoding used by the Census Bureau, and both of these involve coding an address to a spatial polygon. One uses Global Positioning System (GPS) technology to create a Master Address File (MAF) structure point (MSP) and the other uses address ranges for geocoding.

4.1 MAF Structure Point (MSP) Geocoding

A field worker stands in front of a house or living quarters, and records the physical location with a GPS device (**Figure 4**). Usually, the GPS point should fall very close to the front door of the house. However, since GPS points were collected in the field, real-world obstacles like locked fences, poor satellite reception, or even aggressive dogs might sometimes prevent the worker from gaining access to the front door. In these circumstances, the worker may have to take the GPS coordinate from the sidewalk or side of the road.

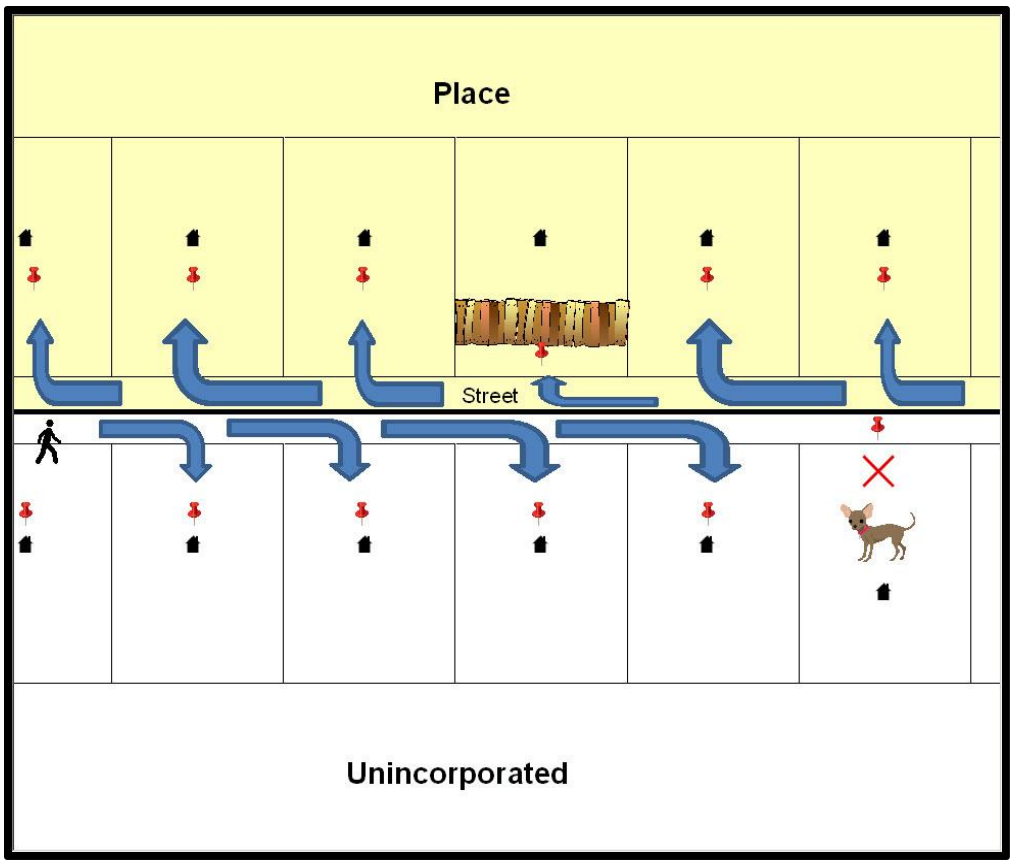


Figure 4. GPS Method of Geocoding

Notice that it is occasionally not possible for the field worker to go all the way to the front door due to unforeseen circumstances, like the fence or the dog shown above. Thus, the MSP (represented here by the red pins) can sometimes fall within the road or the road right-of-way.

4.2 Address Range Geocoding

When no MSP is available, the Census Bureau codes houses and living quarters according to a potential range of addresses associated with the adjacent stretch of road (**Figure 5**).

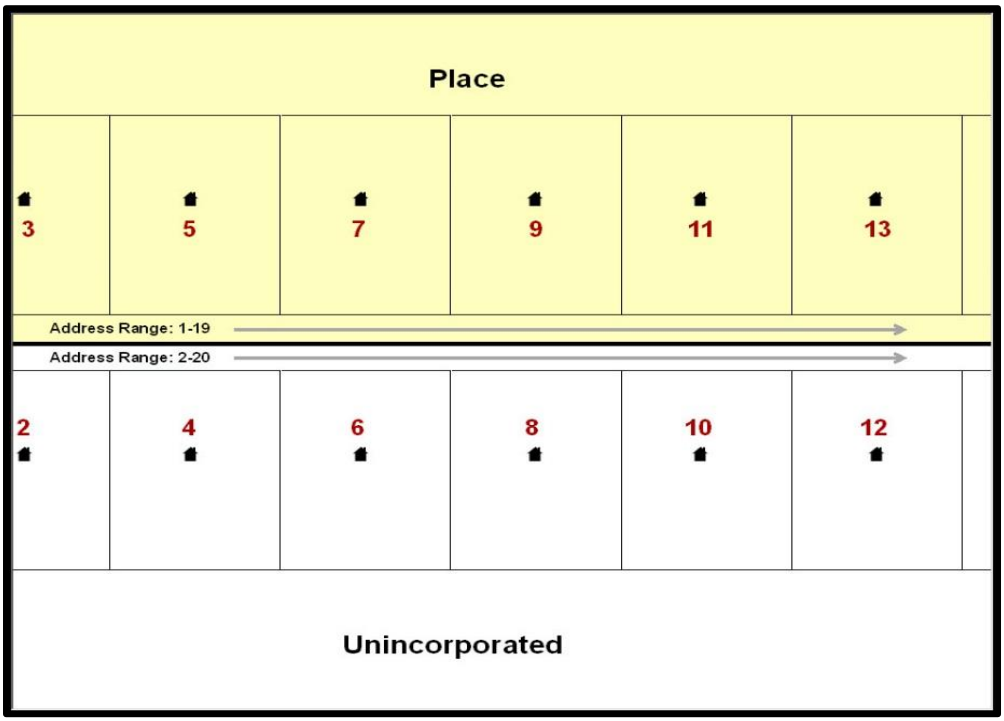


Figure 5. Address Range Method of Geocoding

When it is not possible to collect an MSP, houses are geocoded according to their placement along a range of potential addresses along that road. Since the address has a relationship with the road, boundaries placed on front-lot-lines will lead to mis-geocoding unless an offset flag is used.

While the two methods of geocoding differ greatly, both rely heavily on the integrated nature of the MAF/TIGER System. These geocoding methods are affected by the way streets and boundaries are represented in relation to one another. This interdependence between streets, boundaries, and geocoding means that Census Bureau representations of legal boundaries may sometimes differ from other representations (e.g., in local or state GIS). This is especially true regarding geographic corridors and offsets that follow road right of ways (or the front-lot-lines of parcels). In both of the examples above, delineating a boundary along the front-lot-line will tend to increase the risk of incorrect geocoding. As a result, using the road centerline as a boundary is the safer method.

When completing a BAS submission in which a road or road right-of-way is owned or maintained by a place but the adjacent housing is not, the respondent should use the centerline of the road (not the front-lot-line) as the boundary whenever possible. If local or state law requires the use of the front-lot-line boundary, the respondent must explicitly designate the polygon(s) between the road centerline and the front-lot-boundary as a corridor or an offset (see **Section 5.8, Geographic Corridors** and **Section 5.9, Geographic Offsets** of this document for more details).

CHAPTER 5 UPDATING THE CENSUS BUREAU SHAPEFILES

Census Bureau shapefiles downloaded from the partnership verification shapefiles (PVS) download page can be used to create new shapefiles for boundary and/or linear feature changes that have occurred since the last BAS update. Step-by-step instructions for these procedures can be found in **Appendix B** and **Appendix C** and in the videos at <https://www.census.gov/programs-surveys/bas/library/videos.html>.

Note: If there are problems with the processing of returned files, the Census Bureau will email a feedback document requesting clarification of any issues. If the problem cannot be resolved before the project deadline, the changes in question will not be made during the current BAS.

5.1 General File Setup Guidelines

After downloading the shapefiles from the PVS download page, follow these procedures before beginning actual updates:

- Open the downloaded ZIP file to verify its contents.
- Copy the shapefiles into a directory on a server/hard drive.
- Open the shapefiles with GIS software.

5.2 Changing the Map Projection

Census Bureau files are in GCS NAD83 format and can be projected into any local coordinate system/projection. Most GIS software packages will allow users to transform file coordinate systems and projections. For example, if using ArcGIS, use its **'Project tool'** in **ArcToolbox**. Shapefile extracts contain defined projection information in the *.prj file. ArcGIS accesses the *.prj file for projection information so there is no need to define these parameters before changing the file coordinate systems.

When updates are complete, participants may submit the boundary change shapefile using any local coordinate system/projection if the shapefile contains a *.prj file or spatial reference materials such as metadata.

5.3 Boundary Changes

In order to update the MAF/TIGER system, participants must create a separate change polygon layer for each updated government type (county, MCD, place). Please create change polygons in relation to the current MAF/TIGER boundary.

Appendix B and **Appendix C** provide two examples for creating annexation and deannexation, boundary correction, new incorporation, geographic corridor, and geographic offset change polygons. See **Appendix C** for specific tools used to make changes to files.

Additionally, **Appendix B** covers the steps required to complete a submission using the new BAS Partnership Toolbox. The toolbox includes tools to download Census Bureau data, use the geoprocessing tool to create a changes layer containing all the differences between Census

Bureau and local boundaries, and create a ZIP file for submission through SWIM. Please review any boundary change polygons before submitting them (**Section 5.7, Additional Information Review**).

5.3.1 Annexations and Deannexations

The Census Bureau will accept annexations and deannexations from counties, MCDs, and incorporated places. For a boundary change to an existing legal government (or the new incorporation or disincorporation of a legal government) to be processed as a legal change, participants must provide the legal documentation number (e.g., law or ordinance number), effective date, and authorization type. They are not required to submit paperwork documenting the change.

Each annexation or deannexation change polygon must have the required attributes and corresponding change type populated, as seen in **Table 2**. The Census Bureau will snap any annexation or deannexation to a MAF/TIGER feature when it exists within **thirty** feet of that feature.

Note: Enter the name of the jurisdiction annexing or deannexing the area in the NAME field.

Table 2: Annexations and Deannexations

	NAME	CHNG_TYPE	EFF_DATE	AUTHTYPE	DOCU (Not Required in GA)	AREA (Required in GA)	RELATE
Annexation	X	X ('A')	X	X	X	* See Note	
Deannexation	X	X ('D')	X	X	X	* See Note	

(**Note:** 'X' = Required Field)

Note: Area in acres is required for Georgia, and requested for all other areas.

5.3.2 Boundary Corrections

The Census Bureau will also accept specific boundary corrections from counties, MCDs, and incorporated places. As with annexations and deannexations, the participant must create individual change polygons for each boundary correction. Each boundary correction must also have the required attributes and corresponding change type populated, as seen in **Table 3**, or the Census Bureau will reject them.

Note: Enter the name of the jurisdiction the boundary correction is for in the NAME field.

Table 3: Boundary Corrections

	NAME	CHNG_TYPE	EFF_DATE	AUTHTYPE	DOCU	AREA	RELATE
Boundary Correction	X	X ('B')					X ('IN', 'OUT')

(**Note:** 'X' = Required Field)

The Census Bureau uses a topologically integrated database. As a result, the Census Bureau cannot process all types of boundary corrections for inclusion in the MAF/TIGER system. The Census Bureau **will** accept and process properly documented boundary corrections during the current BAS cycle that spatially interact with (abut) other BAS legal changes (annexation, deannexation, corridor, offset) and meet both of the following two conditions:

- In situations where the existing boundary has been digitized incorrectly or appears in the incorrect location due to Census Bureau activities.
- Where the overall shape of the geographic area is maintained and no feature-to-boundary relationships are dissolved.

The Census Bureau **will reject** boundary corrections:

- Along county boundaries unless there is a written agreement between the two counties that documents the correct location of the boundary.
- Between adjacent incorporated places or adjacent MCDs unless the county submitting the changes is part of a Consolidated BAS (CBAS) agreement or there is a written agreement between the two incorporated places or MCDs.
- That dissolve boundary-to-feature relationships (roads, rivers, railroads, etc.) if the difference is less than thirty feet.
- Which are greater than one square mile, or not contiguous with the rest of the government boundary. These boundary corrections may be part of annexations that were never reported to the Census Bureau. If they are previously unreported boundary changes, please include effective dates and legal documentation numbers for these changes; or
- That have a width of less than thirty feet over the entire polygon.

Note: Remember that the Census Bureau will snap any boundary correction to a MAF/TIGER feature when it exists within thirty feet of that feature.

5.3.3 Boundary Changes to Legal Governments in Georgia and Indiana

For questions about required documentation for a particular jurisdiction, contact the Census Bureau by phone at **1-800 972-5651** or by email at geo.bas@census.gov.

Georgia: Any legal boundary change made to an incorporated place in the state of Georgia must include: (1) the effective date and (2) the acreage of the legal change. In addition, before entering the change, ensure that all annexation/deannexation information has been reported to the Department of Community Affairs (DCA). The DCA provides the Census Bureau a list of the governments that reported boundary changes each year. Any legal boundary changes to incorporated places not on this list will not be placed in the MAF/TIGER System. For additional information, see: <https://www.census.gov/programs-surveys/bas/technical-documentation/methodology/state-agreements.html>.

Indiana: Per Indiana state law, counties must provide the legal boundary updates for townships. For more information, refer to Indiana Code 36-6 Government of Townships at <http://iga.in.gov/legislative/laws/2019/ic/titles/036>.

5.3.4 New Incorporations

Participants may submit new incorporations for incorporated places and MCDs through Digital BAS. As with other change types, an individual change polygon must be created for each new incorporation and possess the required attributes and the corresponding change type field must be populated (see **Table 4**). Participants should also provide the new incorporation paperwork (which should include the date of incorporation) as well as information for the HEO and BAS contact of the newly incorporated government.

Note: Enter the name of the new jurisdiction in the NAME field. For required documentation for new incorporations, contact the Census Bureau at **1-800-972-5651** or geo.bas@census.gov.

Table 4: New Incorporations

	NAME	CHNG_TYPE	EFF_DATE	AUTHTYPE	DOCU	AREA	RELATE
New Incorporation	X	X ('E')	X	X	X		

(**Note:** 'X' = Required Field)

5.3.5 Disincorporations

Participants may submit disincorporations through Digital BAS. As with other change types, an individual change polygon must be created for each disincorporation and must possess the required attributes. The corresponding change type must be populated as shown in **Table 5**. Participants should also provide the official disincorporation paperwork, which should include the official date of disincorporation.

Table 5: Disincorporations

	NAME	CHNG_TYPE	EFF_DATE	AUTHTYPE	DOCU	AREA	RELATE
Disincorporation	X	X ('X')	X	X	X		

(**Note:** 'X' = Required Field)

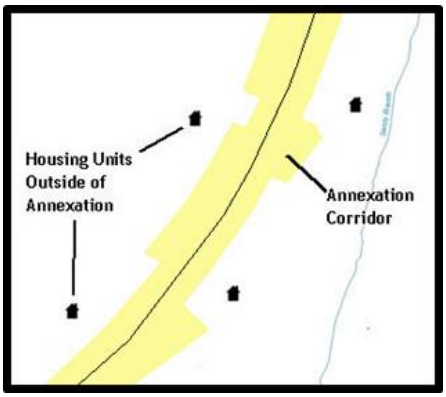
5.3.6 Geographic Corridors

The Census Bureau geocodes addresses based on the street centerline. If the geocoding of these addresses would result in the assignment of population to the incorrect government, participants should create a geographic corridor.

A **geographic corridor** is an area that includes only the road right-of-way and does not contain any structures addressed to either side of the street. **Figure 6** shows a corridor (shown in color) created where the incorporated place owns the right-of-way but the housing units are not included in the incorporated place. These are often used to connect two disconnected parts of a geography when local law does not permit for discontinuous annexations.

Figure 7 shows that the right-of-way belongs in the unincorporated area, while the housing units are included in the incorporated place (shown in color). This is important for some cities because they are portraying that the city is not responsible for road maintenance.

This is not relevant for Census Bureau tabulations and is not easy to depict in the MAF/TIGER system. This type of corridor should not be included in a BAS response.



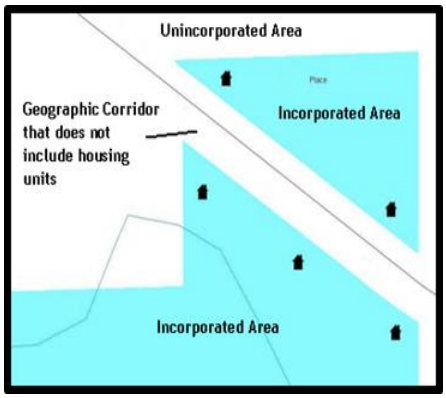


Figure 6. Geographic Corridor Created

Figure 7. Geographic Corridor Not Created

The image on the left (Figure 6) shows that a geographic corridor should be created to allow for proper geocoding of homes. The image on the right (Figure 7) shows that the geographic corridor should not be created and features should be snapped to the street centerline.

The Census Bureau will accept new geographic corridors. Please create individual change polygons for each new geographic corridor. Each change polygon must have the required attributes and corresponding change type populated, as seen in **Table 6**. In the **NAME** field, enter the name of the jurisdiction gaining or losing the area associated with the corridor. In the **RELATE** field, indicate whether the change is adding IN or taking OUT (removing) the corridor.

Table 6: Geographic Corridors

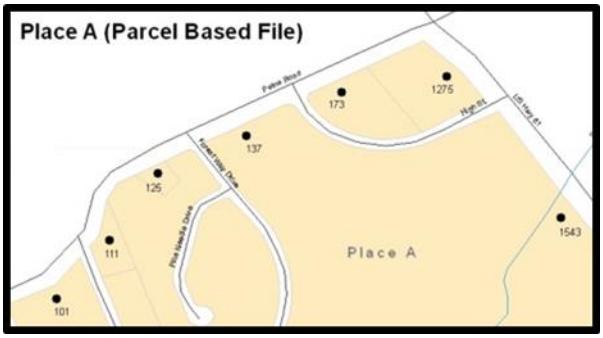
	NAME	CHNG_TYPE	EFF_DATE	AUTHTYPE	DOCU	AREA	RELATE
Geographic Corridor	X	X ('C')					X ('IN', 'OUT')

(**Note:** 'X' = Required Field)

5.3.7 Geographic Offsets

A **geographic offset** is an area claimed by a government that is only on one side of a road and does not include structures addressed to that side of the road.

The Census Bureau is aware that many governments base their legal boundaries on cadastral (parcel-based) right-of-way mapping. The Census Bureau bases their maps on spatial data that is topologically integrated. This makes the maintenance of geographic offsets inefficient. Snapping a government boundary to the centerline wherever applicable will help to establish more accurate population counts. If a boundary is the front-lot-line, the Census Bureau strongly prefers that the boundary be snapped to the road. If a boundary is at the rear of a lot, then please depict it as such. **Figure 8** depicts a cadastral (parcel-based) boundary map and **Figure 9** shows how the boundary should be reported when sent to the Census Bureau.



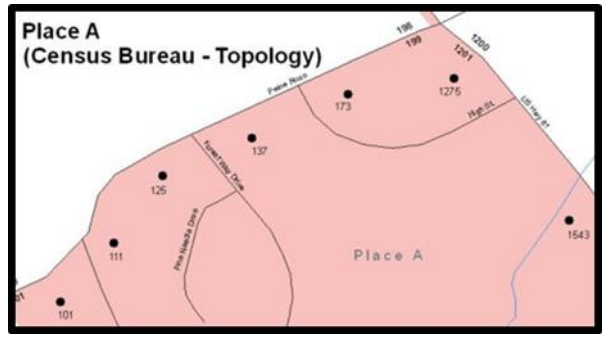


Figure 8. Cadastral Data

Figure 9. Same Data Edited to Census Requirements

On the left in Figure 8 is an example of cadastral data. Figure 9 on the right, is the same area shown edited to conform to census requirements.

The Census Bureau will accept new geographic offsets. Please create individual change polygons for each new geographic offset. Each change polygon must have the required attributes and corresponding change type populated, as seen in **Table 7**. In the **NAME** field, enter the name of the jurisdiction gaining or losing the area. In the **RELATE** field, indicate whether the change is adding IN or taking OUT (removing) the area represented as an offset.

Table 7: Geographic Offsets

	NAME	CHNG_TYPE	EFF_DATE	AUTHTYPE	DOCU	AREA	RELATE
Geographic Offset	X	X ('F')					X ('IN', 'OUT')

(**Note:** 'X' = Required Field)

The Census Bureau has included an "offset" shapefile in the BAS materials (**PVS_19_v2_offset_<ssccc>.shp**), so that participants' jurisdiction can be checked for any existing corridors or offsets. While the Census Bureau prefers that new offsets are not created, (see above), this information can be helpful in determining if current boundaries are correct.

5.4 Linear Feature Updates

The Census Bureau will accept linear feature modifications when needed. The easiest method of updating linear features is to edit the **PVS_19_v2_edges_<stcou>.shp** included in the partnership shapefiles and export the modified or added records to a new separate linear feature update layer. This will ensure all required fields are present and populated before submission. The general guidelines for updating linear features are:

- If a road, subdivision, etc. is missing from the Census Bureau's feature network, add the feature(s), enter 'AL' in the CHNG_TYPE field, and provide the name (FULLNAME) and MTFCC.
- If a feature that does not exist is in the Census Bureau's feature network, mark the feature for deletion by entering 'DL' in the CHNG_TYPE field.
- If a feature is in the incorrect location in the Census Bureau's feature network, mark the feature for deletion and re-add it in the correct location. Only do this if the feature is very far off or in the wrong position relative to boundaries or other features.

Note: A video on updating linear features is available in the BAS video series at <https://www.census.gov/programs-surveys/bas/library/videos.html>.

5.4.1 Adding, Deleting, Renaming, and Recoding Linear Features

Each linear feature update must have the required attributes and corresponding change type populated, as seen in **Table 8**. Preserve the TIGER/Line ID (TLID) in the TLID field when requesting to modify or delete features to ensure the correct features are affected. A TLID is not required for any features being added though an MTFCC is required for new features.

Table 8: Linear Feature Updates

	CHNG_TYPE	TLID	FULLNAME	MTFCC
Add Feature	X ('AL')		X	X
Delete Feature	X ('DL')	X		
Rename Feature	X ('CA')	X	X	
Recode Feature	X ('CA')	X		X

(**Note:** 'X' = Required Field)

Note: A list of MAF/TIGER Feature Classification Codes (MTFCC) can be found in **Appendix D**.

5.4.2 Address Range Updates

The Census Bureau accepts address range data as part of the linear feature update layer. As with other linear feature updates, address ranges must have the required attributes and corresponding change type populated. As existing address ranges cannot be shown in the Census Bureau's outgoing shapefiles, it is recommended that participants only add address ranges to new features (see **Table 9**).

Table 9. Address Range Updates

	CHNG_TYPE	FULLNAME	MTFCC	LTOADD	RTOADD	LFROMADD	RFROMADD
Address Ranges	X ('CA')			X	X	X	X

(**Note:** 'X' = Required Field)

5.5 Area Landmarks, Hydrographic Areas, and Point Landmarks

Area Landmarks (e.g., lakes) and point landmarks (e.g., mountain peaks) can be updated through the BAS, but are not required.

Acceptable area landmark updates include water bodies, swamps, quarries, national parks and forests. Airports, parks, schools, golf courses, museums, and cemeteries may be submitted as area landmarks or point landmarks.

Acceptable point landmark feature updates include mountain peaks or summits, libraries, city halls, community centers and police stations. Airports, parks, schools, golf courses, museums, and cemeteries may be submitted as point landmarks or area landmarks.

5.5.1 Area Landmark/Hydrographic Area Updates

The Census Bureau accepts updates to area landmarks and hydrographic areas in a similar manner to legal boundary changes. However, area landmarks and hydrographic areas are not legal governments, so no documentation or effective dates are required.

In order to submit area landmark and hydrographic area updates, create a separate change polygon layer. Updates to area landmarks and hydrographic areas include:

- Boundary corrections (adding and removing area).
- Creating a new area landmark or hydrographic area.
- Removing an area landmark or hydrographic area.
- Name changes.

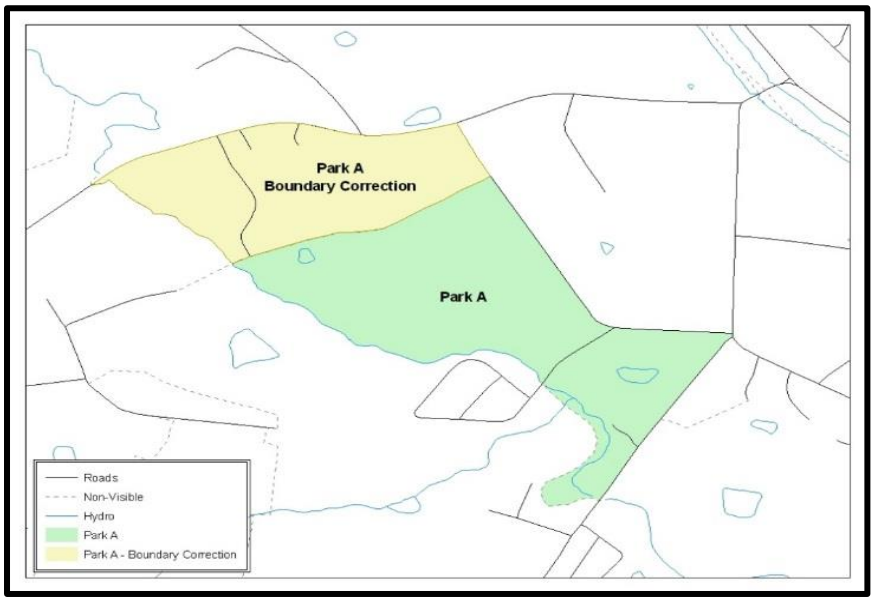


Figure 10. A Boundary Correction to Park A

Each area landmark or hydrographic area update must have the required attributes and corresponding change type populated. Preserve the AREAID in the AREAID field when requesting to modify or delete landmarks to ensure the correct areas are affected. An AREAID is not required for any areas being added though an MTFCC is required for new landmarks (refer to **Table 10**).

Table 10: Landmarks and Hydrographic Areas

	FULLNAME	CHNG_TYPE	RELATE	MTFCC	AREAID
Boundary Correction (Add Area)	X	X ('B')	X ('IN')		X
Boundary Correction (Remove Area)	X	X ('B')	X ('OUT')		X
Delete Landmark		X ('D')			X
Change Landmark Name	X	X ('G')			X
New Landmark	X	X ('E')		X	

(**Note:** 'X' = Required Field)

The steps in **Appendix C** provide information on how to create change polygons using ArcGIS. While the sample processes are written for legal boundary changes, the same methods apply for creating change polygons for area landmarks and hydrographic areas. When adding new area landmarks or hydrographic areas, only add the following types of areas:

- Water bodies.
- Glaciers.
- Airports.
- Cemeteries.
- Golf courses.
- Parks.

The Census Bureau cannot add other types of areas at this time (although some may already exist in the MAF/TIGER system). The acceptable MTFCC codes for new area landmarks or hydrographic areas are listed in **Table 11**.

Table 11: Acceptable MTFCCs for New Area Landmarks/Hydrographic Areas

MTFCC	Description
H2030*	Lake/Pond
H2040*	Reservoir
H2041*	Treatment Pond
H2051*	Bay/Estuary/Gulf/Sound
H2081*	Glacier
C3023	Island
K1231	Hospital/Hospice/Urgent Care Facility
K1235	Juvenile Institution
K1236	Local Jail or Detention Center
K1237	Federal Penitentiary, State Prison, or Prison Farm
K2110	Military Installation
K2180*	Park
K2181	National Park Service Land
K2182	National Forest or Other Federal Land
K2183	Tribal Park, Forest, or Recreation Area
K2184	State Park, Forest, or Recreation Area
K2185	Regional Park, Forest, or Recreation Area
K2186	County Park, Forest, or Recreation Area
K2187	County Subdivision Park, Forest, or Recreation Area
K2188	Incorporated Place Park, Forest, or Recreation Area
K2189	Private Park, Forest, or Recreation Area
K2190	Other Park, Forest, or Recreation Area (quasi-public, independent park, commission, etc.)
K2424	Marina
K2540	University or College
K2457*	Airport – Area Representation
K2561	Golf Course
K2582*	Cemetery

***May not be edited.**

Note: If adding an MTFCC K2457 (Airport – Area Representation) area landmark, please limit the updates to major airports (major regional and international airports). The feature should show the full extent of the airport facility, that is, do not limit the addition to simply the landing strips.

Area Landmark/Hydrographic Area Changes May Be Delayed

The Census Bureau prioritizes boundary changes to legal areas to meet ACS, PEP, and BAS deadlines. Therefore, there may be delays in incorporating area landmark and hydrographic area changes to the MAF/TIGER System. Please do not resubmit any changes that were sent during the previous year's BAS. The Census Bureau is working on incorporating those changes, and they will be reflected in the next year's BAS materials.

5.5.2 Point Landmark Updates

The Census Bureau accepts updates to point landmarks. Please submit point landmark updates as a separate point landmark update layer. Updates to point landmarks include:

- Adding a new point landmark.
- Deleting an existing point landmark.
- Renaming a point landmark.

The Census Bureau also cannot delete or modify any point landmarks imported from the USGS GNIS database. Changes submitted for the following types of landmarks may be left unchanged:

- K2451 (Airport).
- K2582 (Cemetery).
- C3022 (Summit or Pillar).
- C3081 (Locale or Populated Place).
- C3061 (Cul-de-sacs).

Each point landmark update must have the required attributes and corresponding change type populated. Preserve the POINTID in the POINTID field when requesting to modify or delete point landmarks to ensure the correct landmarks are affected. A POINTID is not required for any landmarks being added though an MTFCC is required for new landmarks.

Table 12: Point Landmark Updates

	FULLNAME	CHNG_TYPE	MTFCC	POINTID
New Point Landmark	X	X ('E')	X	
Delete Point Landmark		X ('D')		X
Change Name	X	X ('G')		X

(**Note:** 'X' = Required Field)

Due to Title 13 privacy concerns, any landmark with an MTFCC shown in **Table 13** below cannot be added to the MAF/TIGER System as a point landmark. The MAF/TIGER System no longer maintains any point landmarks with these MTFCCs. Landmarks with these codes could identify a residence or private business. Thus, it is also important *not* to add any of the point landmark types shown in the table using alternative MTFCCs.

Table 13: Restricted Point Landmark MTFCC Codes

MTFCC	Description
K1100	Housing Unit Location
K1121	Apartment Building or Complex
K1122	Rooming or Boarding House
K1223	Trailer Court or Mobile Home Park
K1226	Housing Facility/Dormitory for Workers
K1227	Hotel, Motel, Resort, Spa, Hostel, YMCA, or YWCA
K1228	Campground
K1229	Shelter or Mission
K1232	Halfway House/Group Home
K1233	Nursing Home, Retirement Home, or Home for the Aged
K1234	County Home or Poor Farm
K1235	Juvenile Institution
K1241	Sorority, Fraternity, or College Dormitory
K1251	Military Group Quarters
K1299	Other Group Quarters Location
K2100	Governmental
K2197	Mixed Use/Other Non-residential
K2300	Commercial Workplace
K2361	Shopping Center or Major Retail Center
K2362	Industrial Building or Industrial Park
K2363	Office Building or Office Park
K2364	Farm/Vineyard/Winery/Orchard
K2366	Other Employment Center
K2464	Marina
K2500	Other Workplace
K2564	Amusement Center

Point Landmark Changes May Be Delayed

The Census Bureau prioritizes boundary changes to legal areas to meet ACS, PEP, and BAS deadlines. Therefore, there may be delays in incorporating point landmark changes to the MAF/TIGER System. Please do not resubmit any changes that were sent during the previous year's BAS. The Census Bureau is working on incorporating those changes, and they will be reflected in the next year's BAS materials.

5.6 Reviewing Changes to the Census Bureau Shapefiles

Please review all changes to ensure that they are intentional and correct. The Census Bureau has created videos with information on many of the topics below. Videos can be found on the web at: <https://www.census.gov/programs-surveys/bas/library/videos.html>.

5.6.1 Boundary-to-Feature Relationships

Please review all changes to ensure that the correct boundary-to-feature relationships are being created or maintained. The Census Bureau is aware that many governments base their legal boundaries on cadastral (parcel-based) right-of-way mapping; however, the Census Bureau bases maps on spatial data that is topologically integrated (see **Section 2.1, Topological Relationships in the MAF/TIGER System)**. Therefore, snap boundaries to street centerlines (or rivers, railroads, etc.) wherever applicable. This will help establish a more accurate population count for governments.

Figure 11 and **Figure 12** show situations where boundary changes should be snapped to existing linear features. The Census Bureau will snap boundary changes to any linear feature that is correctly located within **thirty** feet of the change.

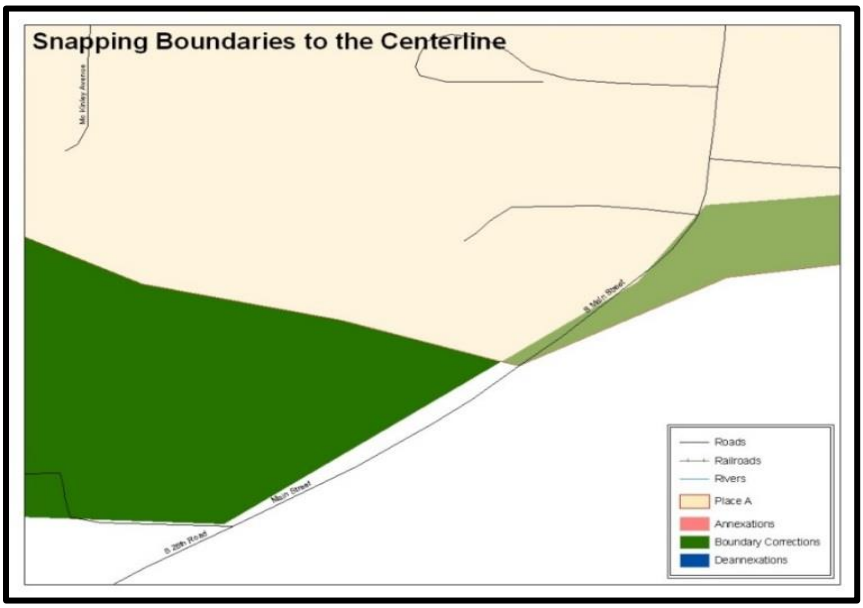


Figure 11. Boundary Corrections Not Snapped to Existing Linear Features

These boundary corrections are not snapped to existing linear features in the MAF/TIGER system. Both boundary corrections should be snapped to centerlines or population may be assigned to incorrect governments.

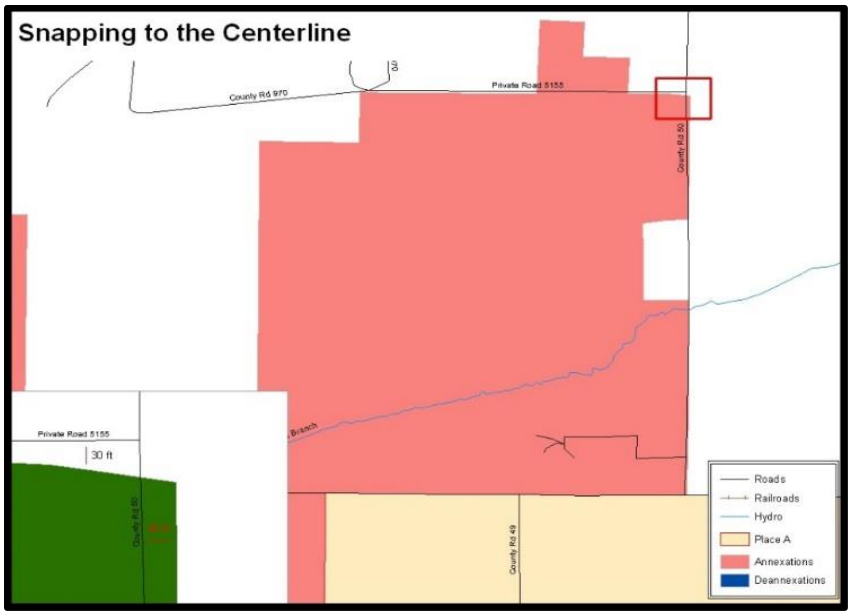


Figure 12. Annexation Created without Snapping to Centerlines

This is an example of an annexation created without snapping to existing centerlines in the MAF/TIGER system. Unless the boundary is snapped to centerlines, some of the population may be assigned to an incorrect government.

The Census Bureau will not accept boundary corrections that dissolve the current relationship between an existing boundary and linear feature without specific instruction that the relationship is incorrect. The Census Bureau will not incorporate any boundary corrections that create thirty feet or less of gap or overlap between the existing linear feature and boundary into the MAF/TIGER system. **Figure 13** and **Figure 14** show examples of changes that will not be accepted.

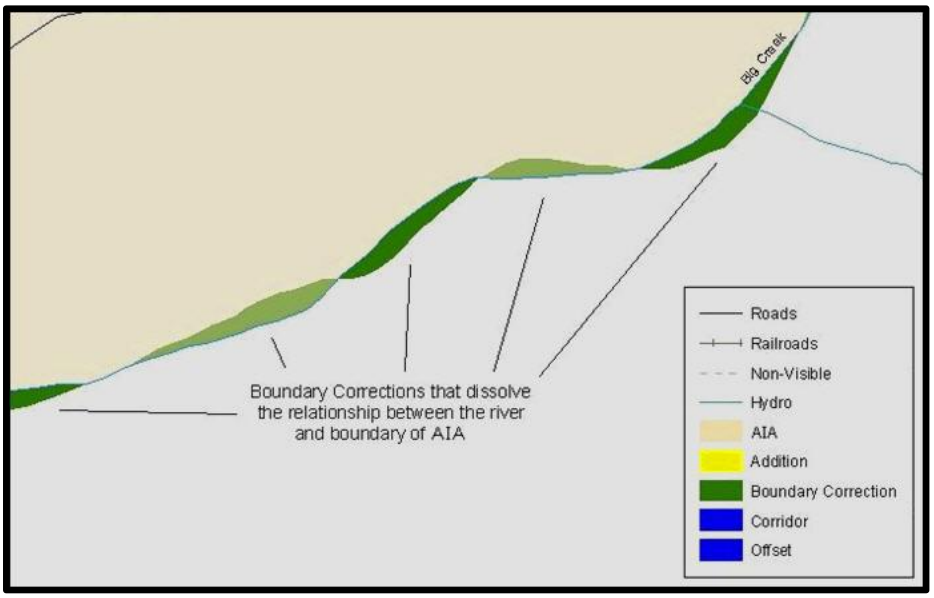


Figure 13. Small Spatial Correction Not Incorporated

Small spatial boundary corrections would dissolve the relationship with the river. These boundary corrections will not be incorporated into the MAF/TIGER system.

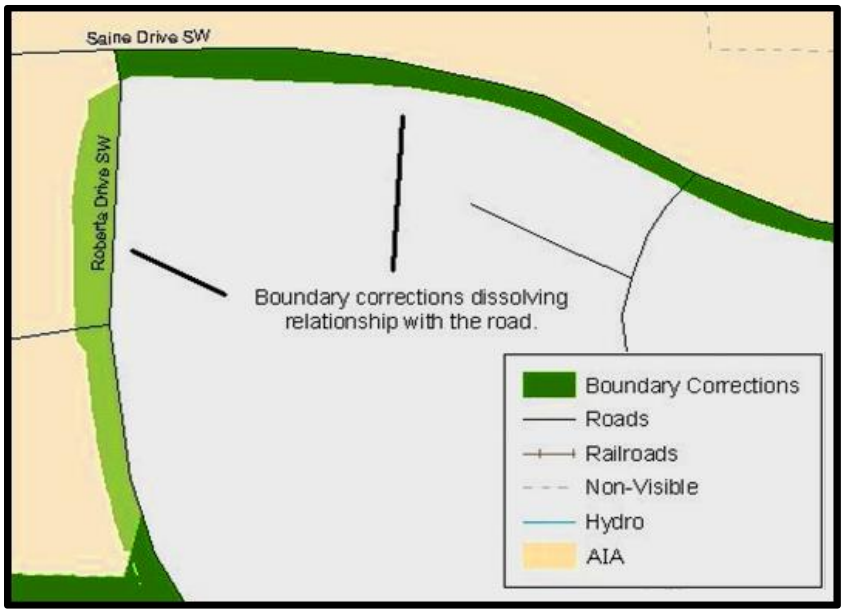


Figure 14. Small Spatial Correction Not Accepted

Small spatial boundary corrections would dissolve the boundary-to-feature relationship with multiple streets. Incorporating these changes would affect the population counts for the area. Therefore, the Census Bureau will not accept these small boundary corrections.

5.6.2 Large Boundary Corrections

The Census Bureau will not accept large boundary corrections to a government without the appropriate legal documentation numbers and effective dates. These large boundary corrections (**Figure 15**) may be legal boundary changes that occurred in the past and were never reported to the Census Bureau. Please submit the appropriate legal documentation number and effective date so that the changes may be incorporated into the MAF/TIGER system.

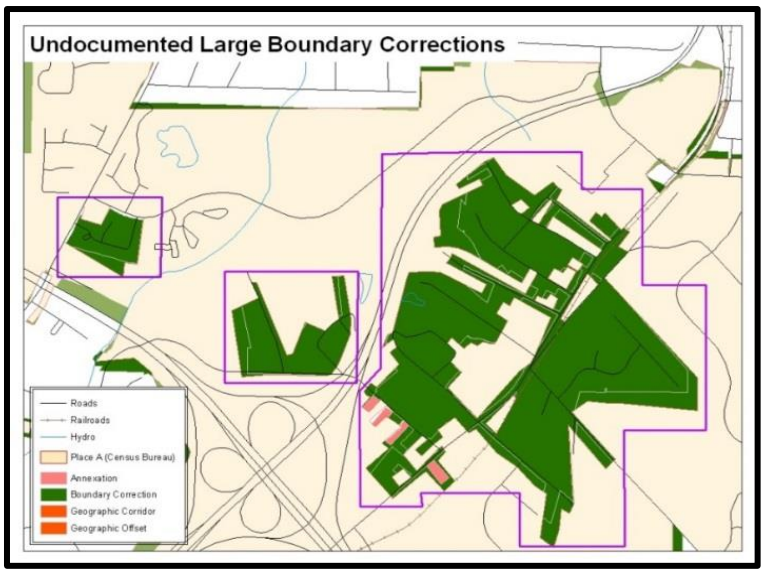


Figure 15. Large Boundary Corrections

Without the appropriate documentation, the Census Bureau will not accept large boundary corrections.

Note: There may be a few instances when large boundary corrections need to be made because of incorrect digitizing or where the boundary appears in the incorrect location due to other Census Bureau activities.

5.6.3 Required Attribute Information

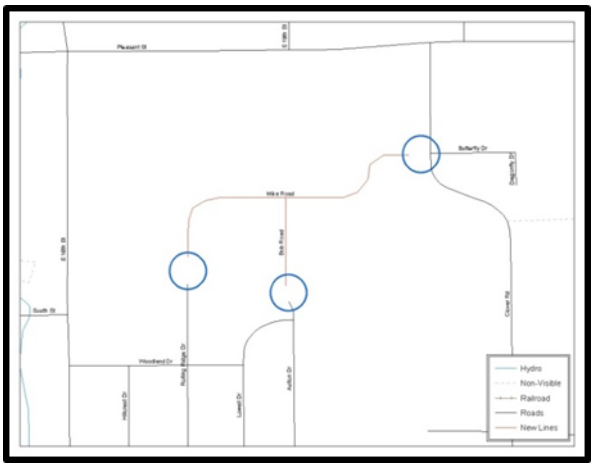
It is important to review each change polygon and confirm that the correct attribute information is included. Without the correct attribute information, the Census Bureau will be unable to process and incorporate the changes into the MAF/TIGER system. See **Section 5.3 Boundary Changes** for the required attribute information and corresponding change type codes.

5.6.4 Appropriate Projection Information

It is important that the appropriate projection information is included. Each update layer submitted should contain a correct *.prj file so that the Census Bureau can convert the projection back to GCS_NAD83. If the GIS being used cannot create a *.prj file, include the projection information in metadata. This is critical for the Census Bureau to be able to process the file and incorporate the updates into the MAF/TIGER system.

5.6.5 Linear Feature Updates

Please review linear feature changes to ensure that they align with the features currently in the MAF/TIGER system. If linear feature changes do not align with current MAF/TIGER linear features, the Census Bureau may not incorporate the submitted updates (**Figure 16** and **Figure 17**).



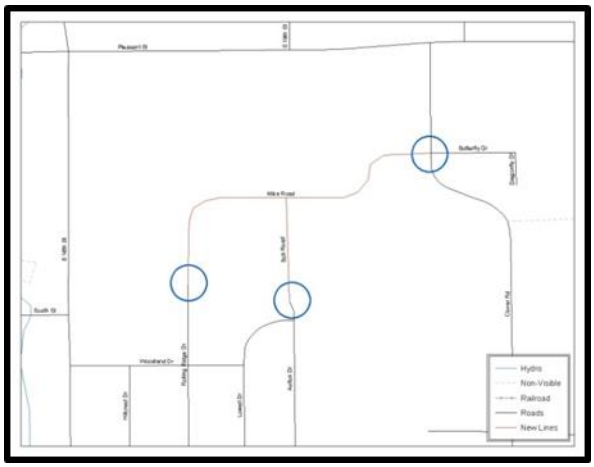


Figure 16. New Road Features, Not Added to Existing Road

Figure 17. New Road Features, Correctly Added

The image on the left (Figure 16) shows new road features added to the existing feature network, but not connected to existing road features. The image on the right (Figure 17) shows the correction connecting the new roads to the existing road features.

5.7 Additional Information Review

The Census Bureau will not make any boundary change that affect adjacent legal governments without the appropriate documentation. Please review any change polygons that affect adjacent governments to determine if they are intentional legal changes.

Note: The Census Bureau will snap any annexation, deannexation, or boundary correction to a MAF/TIGER feature when it exists within thirty feet of that feature. This helps maintain the boundary-to-feature relationships in the MAF/TIGER system and will ensure correct housing tabulation counts for governments.

5.7.1 Submitting Digital Data

Participants reporting changes to the BAS are required to submit at least the change polygon shapefile. The total number of shapefiles submitted depends on what types of changes are reported. The following is a list of change files *may* be needed:

1. **Change Polygon Layers** (county, MCD, incorporated place, and consolidated city)
   - These layers consist of the changes that the Census Bureau needs to make.
   - A layer of change polygons should be created for each level of geography (county, MCD, place, etc.) for which changes are being submitted.
2. **Whole Modified Entity Layer** (county, minor civil division, incorporated place, and consolidated city)
   - These layers should only contain the complete and current boundary for the government being updated.
   - A whole entity layer should be created for each level of geography for which change polygons are being created.
3. Local Government Feature Network, Parcel, and Boundary Layers *(optional)*
   - These layers will help the Census Bureau resolve any questionable change polygons and establish the correct boundary-to-feature relationships.
4. **Feature Update Layer** (only if there are feature (road, river, railroad, etc.) additions, deletions, name changes, recodes, or address range updates)
   - Include a linear feature update layer with only feature segments requiring a correction.
5. Area Landmarks/Hydrographic Areas Update Layer
   - An area landmark/hydrographic area update layer should be submitted only if there are area landmark and/or hydrographic area updates.
6. Point Landmark Update Layer
   - A point landmark update layer should be submitted only if there are point landmark updates.

7. **BAS Contact Text File** (if the BAS point of contact (the person that receives the BAS Annual Response Email) has changed).
   - This can be updated online at: <http://www.census.gov/geo/partnerships/bas/bas_ar_form.html>.
   - This update should include the following information:
     - First Name.
     - Last Name.
     - Department.
     - Position.
     - Shipping Address.
     - City.
     - State.
     - Zip Code.
     - Phone: xxx-xxx-xxxx.
     - Fax: xxx-xxx-xxxx.
     - Email.
     - HEO Term Expires: mm/yyyy.
     - HEO Term Length: x years.

5.7.2 Change Polygon Layer Naming Conventions

The following table provides change polygon layer naming conventions for county submissions, MCDs, incorporated places, and consolidated cities. The <basID> in the change polygon layer naming conventions represents the participant's BAS ID, found on the BAS Annual Response email or online from this link: <https://www.census.gov/programs-surveys/bas/technical-documentation/code-lists.html>.

Table 14: Change Polygons

Participant	Submitting Changes For:	Shapefile Naming Conventions
County	County	bas20_<basID>_changes_county.shp
County	Minor Civil Division	bas20_<basID>_changes_cousub.shp
County	Incorporated Place	bas20_<basID>_changes_incplace.shp
Minor Civil Division	Minor Civil Division	bas20_<basID>_changes_cousub.shp
Incorporated Place	Incorporated Place	bas20_<basID>_changes_incplace.shp
Consolidated City	Consolidated City	bas20_<basID>_changes_concity.shp

5.7.3 Whole Entity Polygon Layer Naming Conventions

The following table provides the whole entity polygon layer naming conventions for county, minor civil divisions, incorporated places, and consolidated cities. The <basID> in the whole entity polygon layer naming conventions represents the participant's BAS ID, found on the BAS Annual Response email or online from this link: <https://www.census.gov/programs-surveys/bas/technical-documentation/code-lists.html>.

Table 15: Whole Entity Polygon Layer Naming Conventions

Participant	Changes Submitted For:	Shapefile Naming Conventions
County	County	bas20_<basID>_WholeEntity_county.shp
County	Minor Civil Division	bas20_<basID>_WholeEntity_cousub.shp
County	Incorporated Place	bas20_<basID>_WholeEntity_incplace.shp
Minor Civil Division	Minor Civil Division	bas20_<basID>_WholeEntity_cousub.shp
Incorporated Place	Incorporated Place	bas20_<basID>_WholeEntity_incplace.shp
Consolidated City	Consolidated City	bas20_<basID>_WholeEntity_concity.shp

5.7.4 Linear Feature, Area Landmark/Hydrographic Area, and Point Landmark Updates

The following table provides the update layer naming conventions for the edges, area landmark, and point landmark update layers (not required). The <basID> in the naming conventions for the edges, area landmark, and point landmark update layers represents the participant's BAS ID found on the BAS Annual Response email or online from this link: <https://www.census.gov/programs-surveys/bas/technical-documentation/code-lists.html>.

Table 16: Optional Files

Participant	Changes Submitted For:	Shapefile Naming Conventions
All Participants	Edges	bas20_<basID>_LN_Changes.shp
All Participants	Area Landmarks/ Hydrographic Areas	bas20_<basID>_Alndk_Changes.shp
All Participants	Point Landmarks	bas20_<basID>_Plndk_Changes.shp

5.7.5 Compressing the Digital Files

The Census Bureau requires participants to submit all BAS returns through SWIM as compressed (zipped) files. Please compress **ALL** updated materials (including change polygon shapefiles, whole entity shapefiles, linear feature updates, landmark updates, local government feature network and boundary layers, any supporting documentation, and the text or other file with the participant's updated BAS contact information) as zipped files.

Note: Centerline files or any additional information that may be helpful for Census to process the participant's file are optional. One example where this would be helpful is if a particular polygon was not snapped to a river or road because the boundary does not follow the river or road.

Refer to **Figure 18** and the steps listed below to compress digital files:

1. Navigate to the directory with the shapefiles.
1. Select all files and right click on the selection.
2. Select WinZip, and then Add to ZIP file.

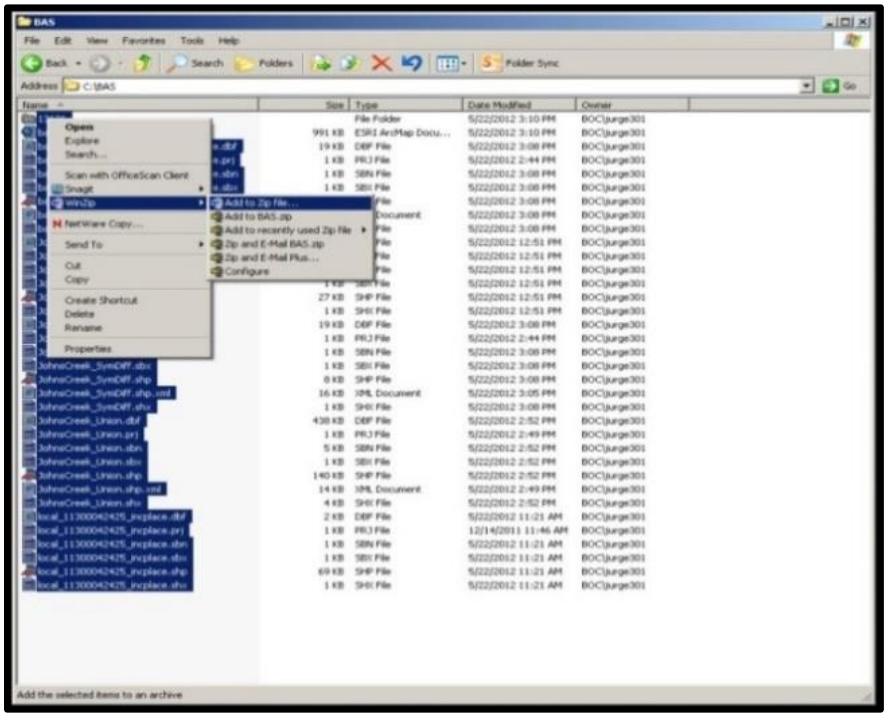


Figure 18. Selecting and Zipping Return Files

Note: Versions of WinZip may vary so the interface may be slightly different. Software other than WinZip (e.g., 7zip) may be used to zip the return files.

3. In the Add window, in the Add to archive field, type the filename in the proper naming convention: bas20_<basID>_return and then click Add (**Figure 19**).

Note: Look for the BAS ID number on the BAS Annual Response email or online from this link: <https://www.census.gov/programs-surveys/bas/technical-documentation/code-lists.html>.

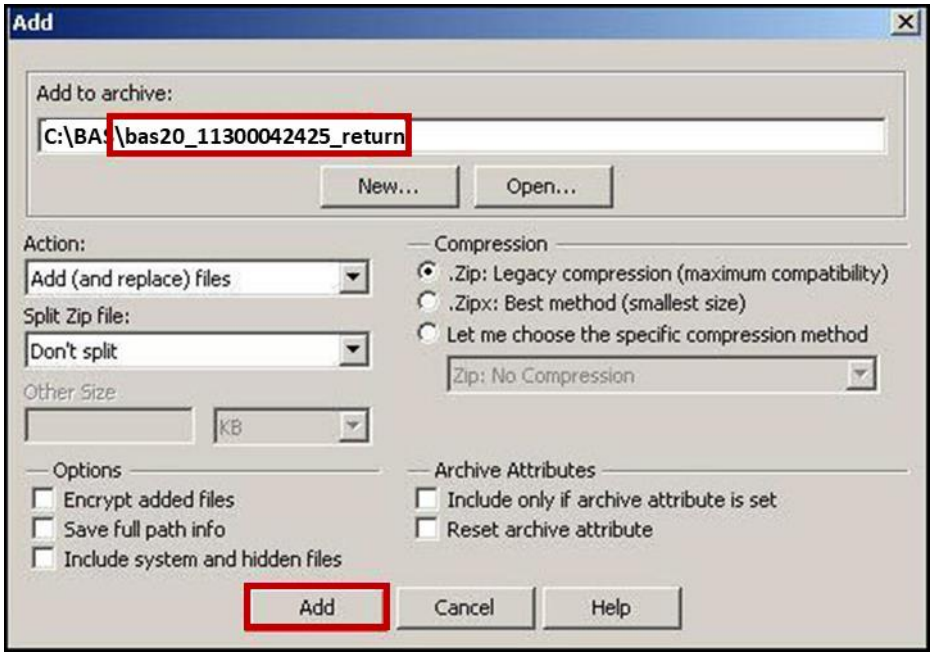


Figure 19. Naming the ZIP File

4. Check the folder where the ZIP file was saved to verify that it was created properly. If the ZIP file is correct, then the return file is ready for submission.

Note: If assistance is required in preparing or zipping the BAS return files, please call the Census Bureau at **1-800-972-5651** or email geo.bas@census.gov.

5.7.6 Submitting Digital Files through SWIM

SWIM is a one-stop location for submitting geographic program files to the Census Bureau. The Census Bureau now requires that all BAS participants use the Census Bureau's SWIM for submitting update materials.

Do not send submissions as an email attachment, as the Census Bureau cannot accept them due to security policy.

The Census Bureau will email the BAS contact a SWIM registration token and digital submission instructions five days after the BAS contact responds to the BAS Annual Response indicating that they have changes to report. To respond online, please fill out the online form at <http://www.census.gov/geo/partnerships/bas/bas_ar_form.html>. The five-day waiting period will give the Census Bureau staff time to update the BAS contact record if necessary so that the email reaches the right person.

This token is good for one personal account within the SWIM. Once participants have registered for an account in SWIM, they will no longer need the token to login into the system. If participants require additional individual SWIM accounts within their organization, please contact the Census Bureau at **1-800-972-5651** or email geo.bas@census.gov.

Current SWIM Users

If participants are participating in other Census Bureau partnership programs, or have participated in previous BAS years, and already have SWIM accounts, they may use their current account to submit files for BAS. They do not need to set up a new account.

Participants will **not** be able to upload a file larger than **250 MB**.

SWIM **blocks** participants from uploading a ZIP file that contains another ZIP file.

Follow the instructions listed below:

1. In a web browser, navigate to <https://respond.census.gov/swim>.
2. Login:
   a) **New Users**: Participants must have a registration token to create a new account (please see above on how to obtain a SWIM token). Once participants have their token, they should sign-up by clicking the 'Register Account' button. Registration is self-serve, but does require the new user to enter a registration token to validate their rights to the system.

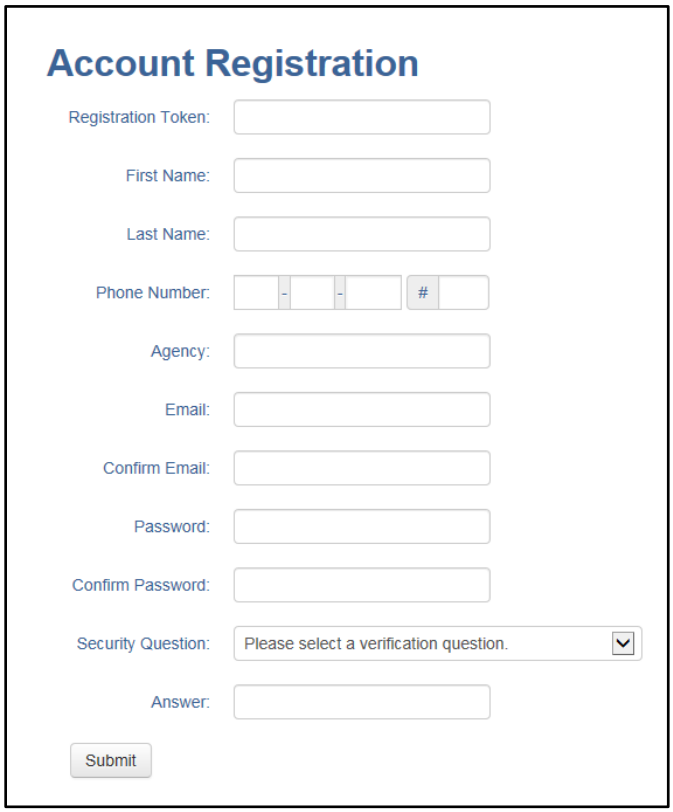


Figure 20. SWIM Account Registration

   b) **Existing** Users: If participants already have a registered account from a previous BAS year, they should login with their user credentials.

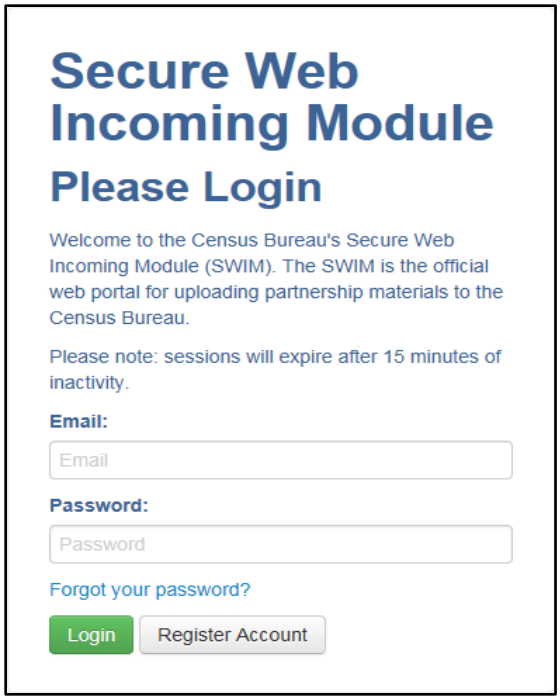


Figure 21. SWIM Login Window

3. If participants have submitted files before, SWIM lists them on the startup screen upon login. Click 'Start New Upload' to continue.

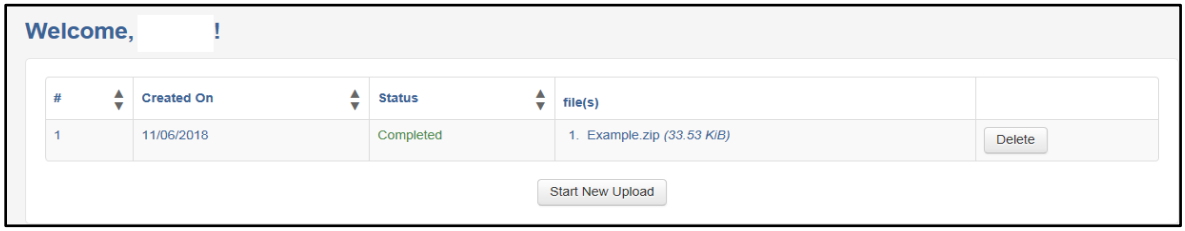


Figure 22. Welcome Screen with Upload History

4. On the next screen, select the "Boundary Annexation Survey (BAS)" option as the geographic partnership program, and click 'Next' to continue.

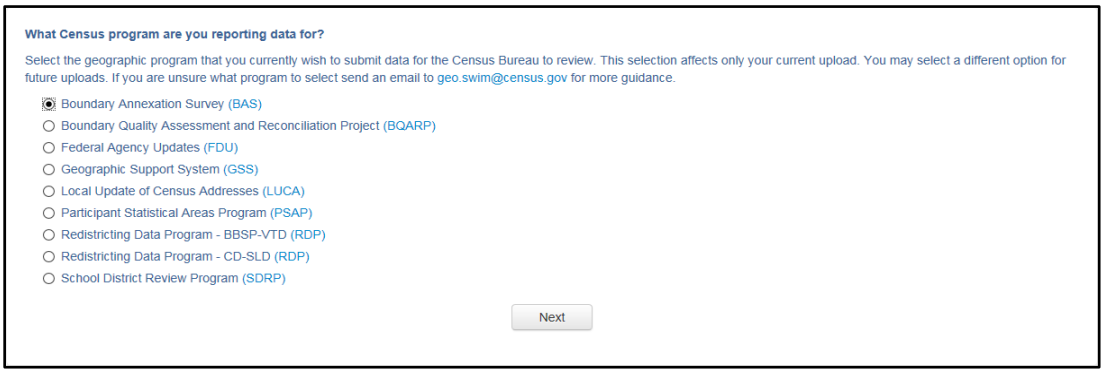


Figure 23. Geographic Partnership Program Selection Window

5. On this screen, participants will select a geographic level. This is the geography type of their agency (e.g., if submitting data for a county government, select county. If an incorporated place, then select place...etc.). Click 'Next' to continue.

Figure 24. Geographic Level Selection Window

6. Participants will find the name of their government using the drop-down selectors. These options dynamically update based on the geography type selected from the previous screen. Click 'Next' to continue.

Figure 25. Government Selection Window

7. On the file upload screen, please click on the '+ Add file' button and a file browser dialog will appear.

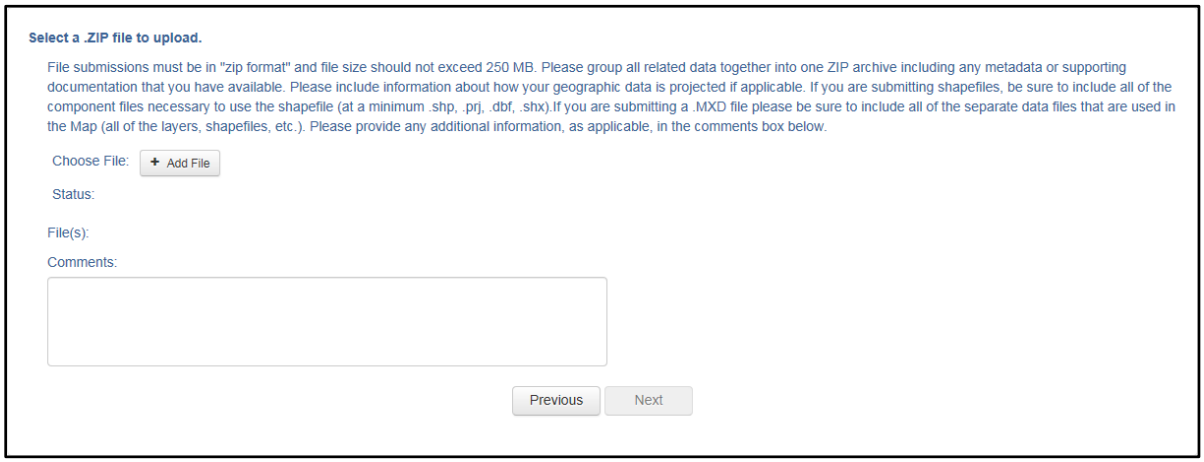


Figure 26. File Upload Screen

8. In the file browser dialog box, select the ZIP file that is to be uploaded. Please be aware that the SWIM website only accepts ZIP files. Click 'Open' to continue.

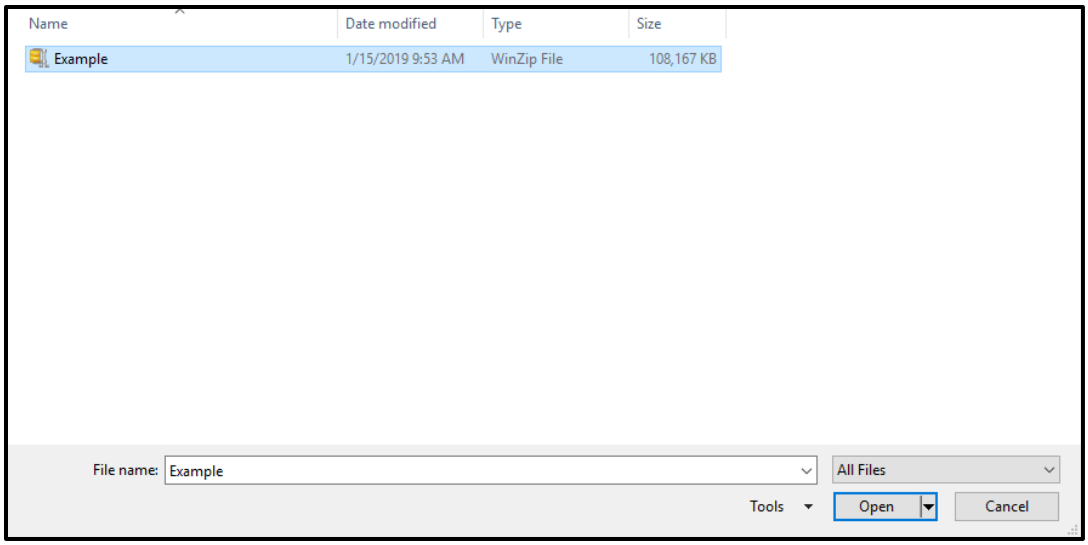


Figure 27. File Browser Dialog Box

9. At this time, participants may enter any comments that they wish to include with their file. Click 'Next' to upload the submission.

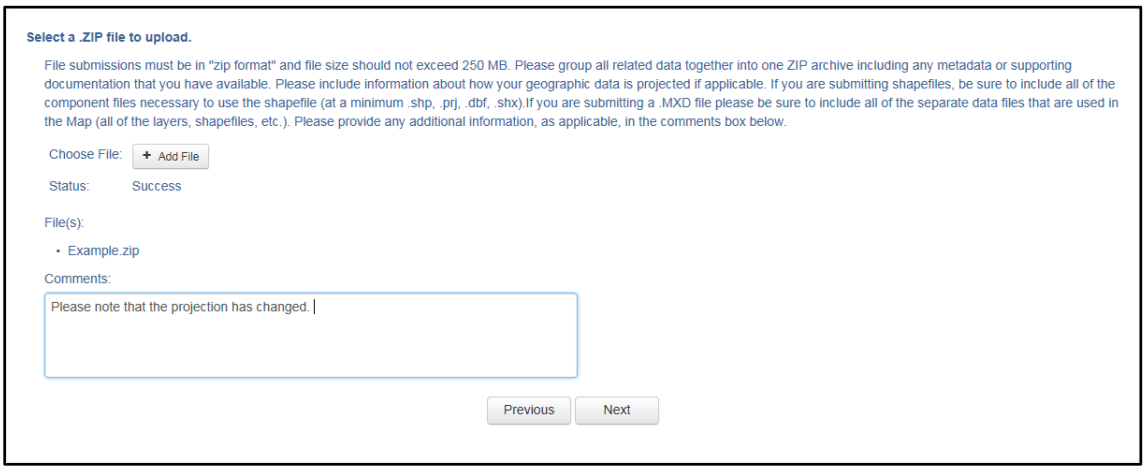


Figure 28. Entering Comments into the File Upload Window

10. The final screen will be a 'Thank You' screen confirming receipt of the file submission. If this screen does not appear, or if issues occur during this upload process, please contact the Census Bureau at **1-800-972-5651** or <geo.bas@census.gov>.

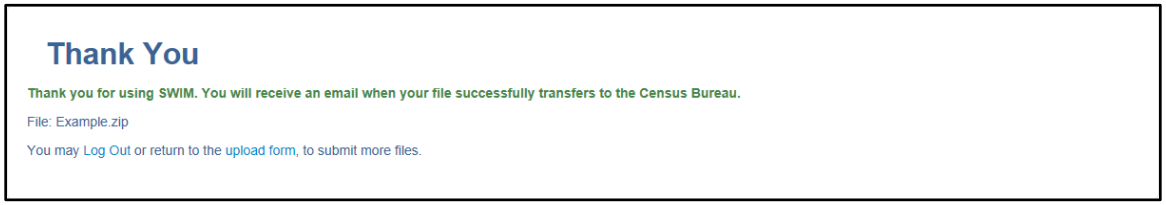


Figure 29. Thank You Screen

APPENDICES

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APPENDIX A DATA DICTIONARY

Table 17: County and Equivalent Areas Shapefile

ATTRIBUTE FIELD	LENGTH	TYPE	DESCRIPTION
STATEFP	2	String	FIPS State Code
COUNTYFP	3	String	FIPS County Code
COUNTYNS	8	String	ANSI feature code for the county or equivalent feature
NAMELSAD	100	String	Name with translated LSAD code
LSAD	2	String	Legal/Statistical Area Description code
FUNCSTAT	1	String	Functional status
CLASSFP	2	String	FIPS 55 class code describing an entity
CHNG_TYPE	2	String	Type of area update
EFF_DATE	8	Date	Effective date or vintage
AUTHTYPE	1	String	Authorization type (O – Ordinance, R – Resolution, L – Local Law, S – State Level Action, X – Other)
DOCU	120	String	Supporting documentation
FORM_ID	4	String	Record ID (GUPS only)
AREA	10	Double	Area of update
RELATE	120	String	Relationship description
JUSTIFY	150	String	Justification of change
NAME	100	String	Entity name
VINTAGE	2	String	Vintage of the data

Table 18: County Subdivisions Shapefile

ATTRIBUTE FIELD	LENGTH	TYPE	DESCRIPTION
STATEFP	2	String	FIPS State Code
COUNTYFP	3	String	FIPS County Code
COUSUBFP	5	String	FIPS 55 county subdivision code
NAMELSAD	100	String	Name with translated LSAD
COUSUBNS	8	String	ANSI feature code for the county subdivision
LSAD	2	String	Legal/Statistical Area Description
FUNCSTAT	1	String	Functional status
CLASSFP	2	String	FIPS 55 class code describing an entity
CHNG_TYPE	2	String	Type of area update
EFF_DATE	8	Date	Effective date or vintage
AUTHTYPE	1	String	Authorization type (O – Ordinance, R – Resolution, L – Local Law, S – State Level Action, X – Other)
DOCU	120	String	Supporting documentation

ATTRIBUTE FIELD	LENGTH	TYPE	DESCRIPTION
FORM_ID	4	String	Record ID (GUPS only)
AREA	10	Double	Area of update
RELATE	120	String	Relationship description
JUSTIFY	150	String	Justification of change
NAME	100	String	Entity name
VINTAGE	2	String	Vintage of the data

Table 19: Incorporated Place Shapefile

ATTRIBUTE FIELD	LENGTH	TYPE	DESCRIPTION
STATEFP	2	String	FIPS State Code
COUNTYFP	3	String	FIPS County Code
PLACEFP	5	String	FIPS 55 place code
NAMELSAD	100	String	Name with translated LSAD
PLACENS	8	String	ANSI feature code for the place
LSAD	2	String	Legal / Statistical Area Description
FUNCSTAT	1	String	Functional status
CLASSFP	2	String	FIPS 55 class code describing and entity
PARTFLG	1	String	Indicates if only part of a feature is represented
CHNG_TYPE	2	String	Type of area update
EFF_DATE	8	Date	Effective date or vintage
AUTHTYPE	1	String	Authorization type (O – Ordinance, R – Resolution, L – Local Law, S – State Level Action, X – Other)
DOCU	120	String	Supporting documentation
FORM_ID	4	String	Record ID (GUPS only)
AREA	10	Double	Area of update
RELATE	120	String	Relationship description
JUSTIFY	150	String	Justification of change
NAME	100	String	Entity name
VINTAGE	2	String	Vintage of the data

Table 20: Consolidated City Shapefile

ATTRIBUTE FIELD	LENGTH	TYPE	DESCRIPTION
STATEFP	2	String	FIPS State Code
COUNTYFP	3	String	FIPS County Code
CONCITYFP	5	String	FIPS 55 place code
NAMELSAD	100	String	Name with translated LSAD
PLACENS	8	String	ANSI feature code for the place
LSAD	2	String	Legal/Statistical Area Description
FUNCSTAT	1	String	Functional status
CLASSFP	2	String	FIPS 55 class code describing an entity

ATTRIBUTE FIELD	LENGTH	TYPE	DESCRIPTION
PARTFLG	1	String	Indicates if only part of a feature is represented
CHNG_TYPE	2	String	Type of area update
EFF_DATE	8	Date	Effective date or vintage
AUTHTYPE	1	String	Authorization type (O – Ordinance, R – Resolution, L – Local Law, S – State Level Action, X – Other)
DOCU	120	String	Supporting documentation
FORM_ID	4	String	Record ID (GUPS only)
AREA	10	Double	Acreage of update
RELATE	120	String	Relationship description
JUSTIFY	150	String	Justification of change
NAME	100	String	Entity name
VINTAGE	2	String	Vintage of the data

Table 21: Edges Shapefile

ATTRIBUTE FIELD	LENGTH	TYPE	DESCRIPTION
STATEFP	2	String	FIPS State Code
COUNTYFP	3	String	FIPS County Code
TLID	10	Double	Permanent edge ID
TFIDL	10	Double	Permanent face ID (left)
TFIDR	10	Double	Permanent face ID (right)
MTFCC	5	String	MAF/TIGER Feature Class Code
FIDELITY	1	String	Indication to a respondent when their entity boundary has changed through spatial enhancement
FULLNAME	40	String	Decoded feature name with abbreviated qualifier, direction, and feature type
SMID	22	String	Spatial Theta ID
SMIDTYPE	1	String	SMIDTYPE code
BBSPFLG	1	String	Redistricting data project participant's submitted request of an EDGE for selection as a block boundary
CBBFLG	1	String	Indicates the status of an EDGE for a selection as a block boundary
BBSP_2020	1	String	New BBSP flag
CHNG_TYPE	4	String	Type of linear feature update
JUSTIFY	150	String	Justification of change
LTOADD	10	String	Left To Address
RTOADD	10	String	Right To Address
LFROMADD	10	String	Left From Address
RFROMADD	10	String	Right From Address

ATTRIBUTE FIELD	LENGTH	TYPE	DESCRIPTION
ZIPL	5	String	Left ZIP Code
ZIPR	5	String	Right ZIP Code
EXTTYP	1	Char	Extension type
MTUPDATE	10	Date	Date of last update to the edge

Table 22: Area Landmark Shapefile

ATTRIBUTE FIELD	LENGTH	TYPE	DESCRIPTION
STATEFP	2	String	FIPS State Code
COUNTYFP	3	String	FIPS County Code
MTFCC	5	String	MAF/TIGER Feature Class Code
FULLNAME	120	String	Area landmark name
PARTFLG	1	String	Indicates if only part of a feature is represented
AREAID	22	String	Object ID
ANSICODE	8	String	ANSI code for area landmarks
CHNG_TYPE	2	String	Type of area landmark update
EFF_DATE	8	Date	Effective date or vintage
RELATE	120	String	Relationship description
JUSTIFY	150	String	Justification of change
BAG	3	String	Block area grouping

Table 23: Hydrographic Area Shapefile

ATTRIBUTE FIELD	LENGTH	TYPE	DESCRIPTION
STATEFP	2	String	FIPS State Code
COUNTYFP	3	String	FIPS County Code
ANSICODE	8	String	ANSI code for hydrography area
MTFCC	5	String	MAF/TIGER Feature Class Code
FULLNAME	120	String	Hydro landmark name
CHNG_TYPE	2	String	Type of hydrographic area update
HYDROID	22	String	Object ID
RELATE	120	String	Relationship description
JUSTIFY	150	String	Justification of change

Table 24: Point Landmark Shapefile

ATTRIBUTE FIELD	LENGTH	TYPE	DESCRIPTION
STATEFP	2	String	FIPS State Code
COUNTYFP	3	String	FIPS County Code
POINTID	22	String	Object ID
ANSICODE	8	String	ANSI code for point landmarks
MTFCC	5	String	MAF/TIGER Feature Class Code
FULLNAME	120	String	Point landmark name
CHNG_TYPE	2	String	Type of point landmark update
JUSTIFY	150	String	Justification of change

Table 25: Geographic Offset Shapefile

ATTRIBUTE FIELD	LENGTH	TYPE	DESCRIPTION
TFID	20	Integer	Permanent Face ID
STATEFP	2	String	FIPS State Code
COUNTYFP	3	String	FIPS County Code
OFFSET	1	String	Geographic Offset / Corridor Flag
ADDEXCLUDE	1	String	Address Exclusion Indicator
CHNG_TYPE	2	String	Type of area update
EFF_DATE	8	Date	Effective date or vintage
RELATE	120	String	Relationship description
JUSTIFY	150	String	Justification of change

APPENDIX B 2020 DIGITAL BAS EXAMPLE PROCESS 1

The 2020 Digital BAS Example Process 1 provides step-by-step instructions for using the BAS Partnership Toolbox to facilitate the updating process. For best results, use the toolbox in ArcGIS 10.0 and higher (not including ArcGIS Pro).

B1 How to Use the BAS Partnership Toolbox

In an effort to ease the burden of creating BAS updates, a toolbox was developed for ArcGIS. This toolbox simplifies the updating process by automating the downloading of data, creating changes, removing slivers, formatting and checking attribution, and preparing/exporting files for submission. Before running these tools, users will need the following:

- **The BAS Partnership Toolbox**, which can be downloaded at: <https://www.census.gov/programs-surveys/bas/geographies/map-tools/arcmap-tools.html>.
- **The BAS ID for the government being processed.** This can be found on the BAS Annual Response email or online at: <https://www.census.gov/programs-surveys/bas/technical-documentation/code-lists.html>.
- **A shapefile or feature class showing the legal boundary of the government.**
  - Data in this layer should have data including the name of the government being processed formatted to agree with the Census Bureau's naming convention for the same government as found in the NAME field or the NAMELSAD field for Minor Civil Division (MCD) and American Indian / Alaska Native / Native Hawaiian (AIANNH).
- **The 2020 BAS Partnership Shapefiles located at:** <https://www.census.gov/geographies/mapping-files/2020/geo/bas/2020-bas-shapefiles.html>.

B2 Toolbox Tools Setup

These Toolbox tools were designed primarily for use in ArcCatalog though they run in ArcMap as well. The instructions for most steps are assuming use in ArcCatalog.

1. Unzip the **Digital BAS Partnership Tools.zip** to the C: drive or other preferred working folder. The folder location does not matter as long as it can be accessed from ArcCatalog. Inside there will be a folder called DBAS, containing all the files to work with for a government. Open ArcCatalog and connect to the DBAS folder. When expanded, the following should be visible:

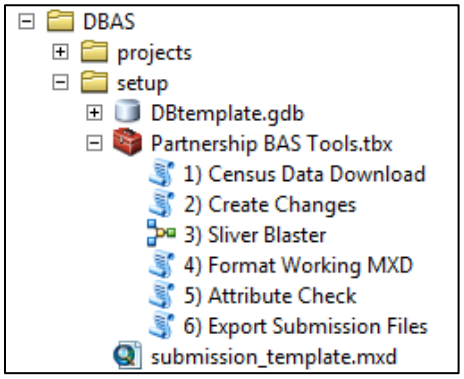

Figure 30. Partnership BAS Tools Menu

Note: To connect to a folder in ArcCatalog, click on the Connect to Folder button on the Standard Toolbar, find the DBAS folder, and then click OK.

B3 Census Data Download Tool

The Census Data Download tool will gather all the partnership shapefile data needed to create changes from the Census Bureau website. If the data is on a Census Bureau provided disc, this tool will also work but only if the data is loaded to the computer before running the tool. This tool can also use the ZIP files downloaded from the 2020 BAS Partnership Shapefiles site: <https://www.census.gov/geographies/mapping-files/2020/geo/bas/2020-bas-shapefiles.html> and outlined in **Chapter 3**. Please follow the steps below to run the Census Data Download tool.

1. Expand the **DBAS folder** and the **setup subfolder**. In the setup folder, find the **Partnership Toolbox**. Expand the toolbox and double click on the **1) Census Data Download** tool.

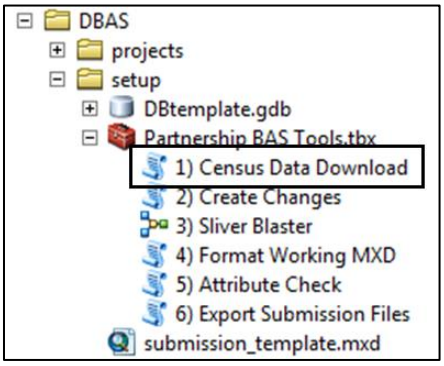

Figure 31. Partnership BAS Tools Menu with Census Data Download Selected

2. There are two ways to use this tool: one that downloads the data from the Census Bureau for the user and one that takes in a folder with the Census Bureau data already downloaded. If you have already downloaded the data, you must unzip the downloaded pvs batch zip file (e.g. pvs_batch_from_<st>) to display the partnership shapefiles zip files (e.g. partnership_shapefiles_19v2_<st> and partnership_shapefiles_19v2_<stcou>). The tool will look for these partnership_shapefiles zip files when it runs.
   - Enter the 11-digit BAS ID in the **User's BAS ID** field. If you are a county participant, responding for the governments within your jurisdiction, you will enter the County BAS ID.
   - Select Yes or No under the **Use Data Downloader?** field. If you select No, you must enter a path to the already downloaded partnership shapefiles in the next field.
   - Navigate or drag the folder into **Path to ZIP files** field. Make sure the folder only contains the Census Bureau ZIP files to ensure there are no future data issues.

This example shows how a user would complete the fields to have data downloaded for them.

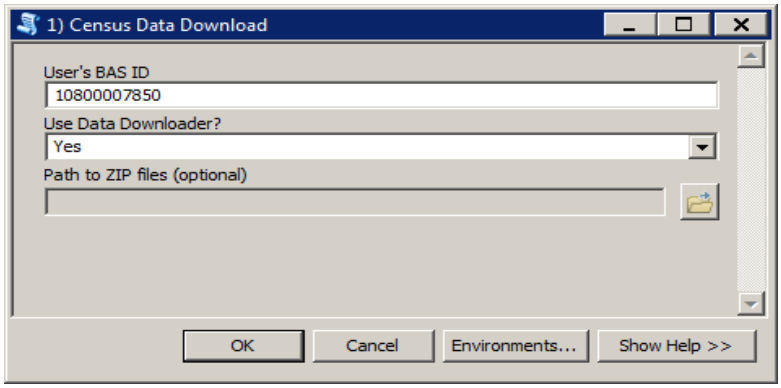

Figure 32. The Census Data Download Window with 'Yes' in the Use Data Downloader Field

This example shows how a user would complete the fields if they already have the partnership shapefiles downloaded and saved on their computer.

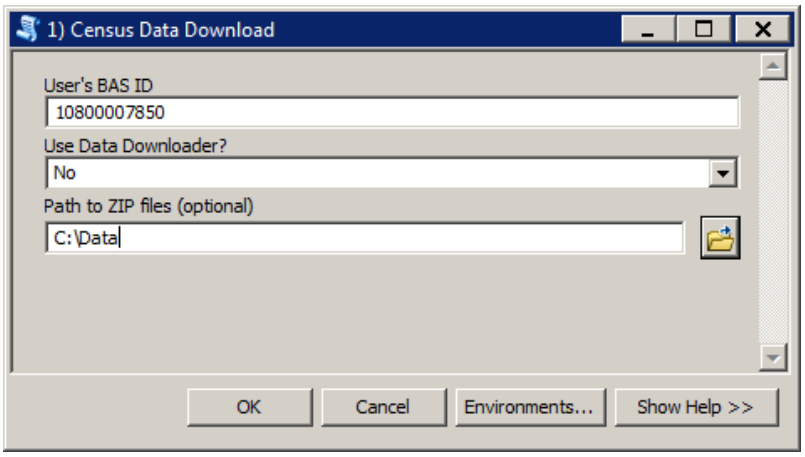

Figure 33. The Census Data Download Window with 'No' in the Use Data Downloader Field

3. Click **OK** to run.
4. When this tool is complete, there should now be a folder for the BAS ID in the projects folder. Inside that folder, there will be a geodatabase with reference data in it and an archive folder.

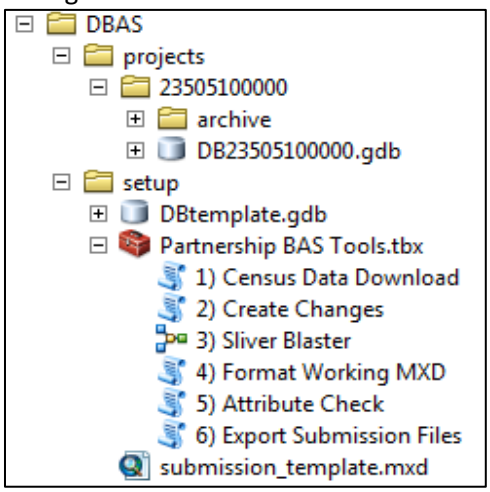

Figure 34. Partnership Tools Menu Showing a Folder for the BAS ID in the Projects Folder

Note: The archive folder contains other Census Bureau data that may be useful as well.

B4 Create Changes Tool

Once the necessary Census Bureau data is obtained, run the **2) Create Changes** tool to create the change polygons. Before this tool can successfully complete, there must be an attribute field in the local boundary layer that contains the name of the government or governments as they appear in Census Bureau records (**Figure 35**). This includes matching capitalization, spacing, and in the case of MCDs a descriptor of the geography (e.g. township, village, borough, etc.) which can be found in the NAMELSAD field of the bas_cousub layer in the reference feature dataset (**Figure 36**). If it is a new entity or the legal name is changing, it does not need to agree though other attribution must be updated to reflect this change.

bas_place

STATEFP	COUNTYFP	PLACEFP	NAME	NAMELSAD	PLAC
42	007	00820	Aliquippa	Aliquippa city	01214
42	007	02288	Ambridge	Ambridge borough	01214
42	005	02720	Apollo	Apollo borough	01214
42	005	02752	Applewold	Applewold borough	01214
42	003	03320	Aspinwall	Aspinwall borough	01214
42	005	03480	Atwood	Atwood borough	01214
42	003	03608	Avalon	Avalon borough	01214
42	007	03736	Baden	Baden borough	01214
42	003	03928	Baldwin	Baldwin borough	01214
42	121	04136	Barkeyville	Barkeyville borough	01215

0 (0 out of 213 Selected)

bas_place

places

OBJECTID	MUNICIPALI	MCN_CODE	MCN_NAME	NAME
8	BRUIN BORO	340	BRUIN	Bruin
34	BUTLER CITY	560	BUTLER	Butler
52	CALLERY BORO	350	CALLERY	Callery
5	CHERRY VALLEY BORO	360	CHERRY VALLEY	Cherry Valley
24	CHICORA BORO	460	CHICORA	Chicora
42	CONNOQ BORO	370	CONNOQ	Connoq
36	EAST BUTLER BORO	380	EAST BUTLER	East Butler
6	EAU CLAIRE BORO	390	EAU CLAIRE	Eau Claire
46	EVANS CITY BORO	400	EVANS CITY	Evans City
20	FAIRVIEW BORO	410	FAIRVIEW	Fairview

0 (0 out of 24 Selected)

places

Figure 35. NAME Field in Census Data vs Local Boundary Data

The bas_place layer on the left shows how the Census Bureau NAME field is populated for all the places in Butler County, PA while the local places data shows how local data may need to be manipulated to agree with the Census Bureau NAME field.

bas_cousub

Shape *	STATEFP	COUNTYFP	COUSUBFP	NAMELSAD	COUSUBNS	LS
Polygon	42	019	00300	Adams township	01216040	44
Polygon	42	003	00724	Aleppo township	01215797	44
Polygon	42	007	00820	Aliquippa city	01214861	25
Polygon	42	121	00884	Allegheny township	01217138	44
Polygon	42	019	00860	Allegheny township	01216041	44
Polygon	42	007	02288	Ambridge borough	01214862	21
Polygon	42	005	02720	Apollo borough	01214844	21
Polygon	42	005	02752	Applewold borough	01214845	21
Polygon	42	031	03248	Ashland township	01216200	44
Polygon	42	003	03320	Aspinwall borough	01214763	21

7 (0 out of 427 Selected)

bas_cousub

muniboundary

FID	Shape *	OBJECTID_1	OBJECTID	MUNICIPALI	MCN_CODE
28	Polygon	0	49	Adams township	010
3	Polygon	0	7	Allegheny township	020
9	Polygon	0	16	Brady township	030
31	Polygon	0	59	Buffalo township	040
20	Polygon	0	39	Butler township	050
15	Polygon	0	27	Center township	060
6	Polygon	0	11	Cherry township	070
10	Polygon	0	18	Clay township	080
22	Polygon	0	38	Clearfield township	090
30	Polygon	0	54	Clinton township	100

0 (0 out of 33 Selected)

muniboundary

Figure 36. Appropriate Attribution for COUSUB or AIANNH Changes

The bas_cousub attribution on the left in the NAMELSAD field shows how the local MUNICIPALI field on the right should be formatted to ensure that the Create Changes tool works for the MCD changes in Butler County, PA.

1. Double click on **2) Create Changes** tool.

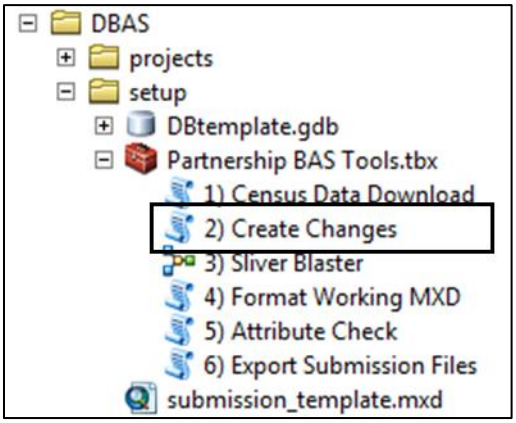

Figure 37. Partnership Tools Menu with Create Changes Tool Selected

2. In the **Create Changes** window:
   - In the **Local Boundary File** field, enter the path or navigate to the full boundary polygon.
   - Enter the 11-digit BAS ID in the **BAS ID** field.
   - Under **Changes Being Processed**, choose the type of changes to create from the dropdown options:
     a. Incplace (incorporated place).
     b. County.
     c. Cousub (MCDs).
     d. AIANNH (Tribal areas).

   - For the **Name Field in Local Data**, the boundary file may need to be modified to agree with a field in the Census Bureau's data. Type the name of the field (as it appears in ArcCatalog) containing the information matching the Census Bureau's NAME field. If processing an MCD or AIANNH file where the Census Bureau NAME field contains duplicates, match the Census Bureau's NAMELSAD.

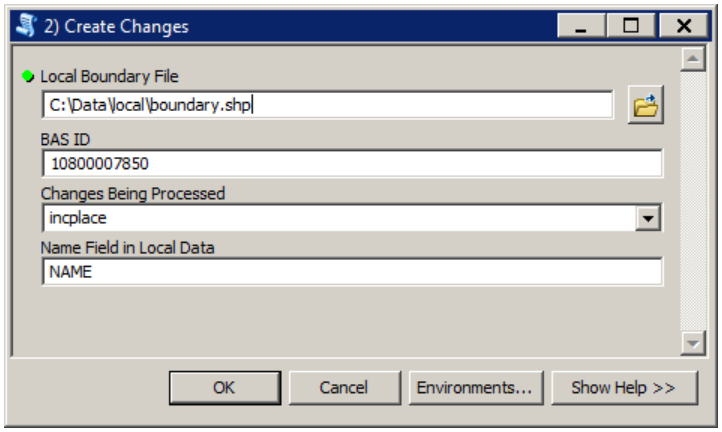

Figure 38. Create Changes Window

3. Click **OK** to run the tool.
4. Once the tool is complete, the output will be placed in the geodatabase under the submission feature dataset.

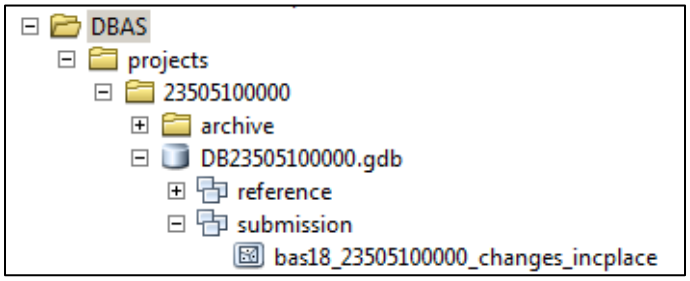

Figure 39. Partnership Tools Menu with Geodatabase

5. Repeat steps for any other levels of geography that need changes created.

B5 Sliver Blaster Tool (Optional)

The Sliver Blaster tool is useful for governments that have numerous very small change polygons that are time consuming to manually parse through for deletion. Since the Census Bureau cannot guarantee inclusion of changes under 30 feet, use this tool to remove changes that are lower than that threshold. Participants can also change the tolerance for slivers if they know there are small changes that need to be included. This automated tool will vary in processing time depending on the number of features in the entity.

1. Double click on the **3) Sliver Blaster** tool.

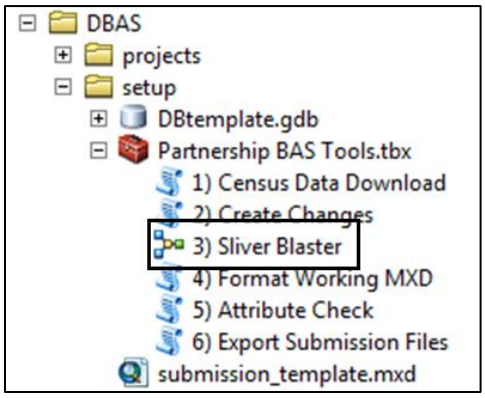

Figure 40. Partnership Tools Menu with Sliver Blaster Selected

2. In the **Sliver Blaster** tool window:
   - The **Changes File** refers to the file created in the previous step, found in the submission feature dataset.
   - The **Census Edges** feature class is found in the benchmark feature dataset and is called bas_edges.
   - The **Buffer Distance** field is set to 30 feet by default, but this can be adjusted to accommodate smaller changes.
3. Click **OK** to run.

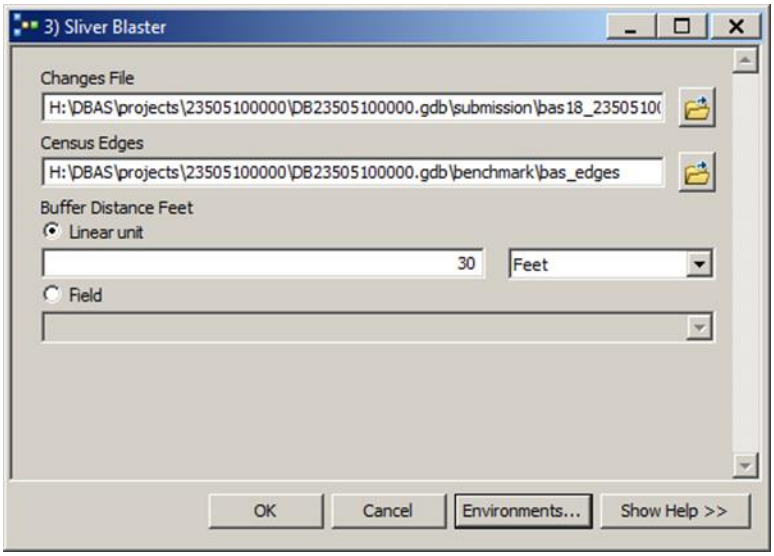

Figure 41. Sliver Blaster Window

B6 Format Working MXD Tool (Optional)

The intent of this tool is to create a map document (.mxd) for users containing their change file and all of the reference layers they will need to finalize a submission. If users would prefer to use their own .mxd, this step is not required.

1. Double click on the **4) Format Working MXD** tool.

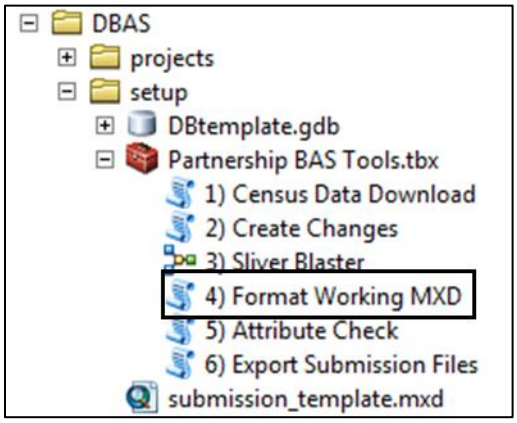

Figure 42. Partnership Tools Menu with Format Working MXD Selected

2. The only input for this tool is the **Working Folder**, which is the folder with the governments BAS ID as its name.

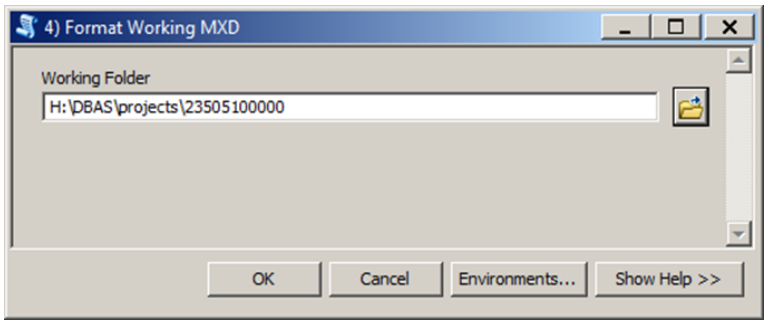

Figure 43. Format Working MXD Window

3. Click **OK** to run the tool.
4. Open the new .mxd and begin working with the change polygons.

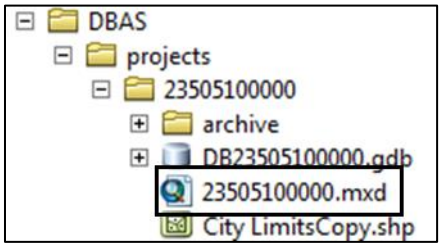

Figure 44. Projects Submenu with mxd file Selected

B7 Attribute Check Tool

This tool is used to verify that there are no inconsistencies with the data included in the submission. Run this tool during or after change polygons have been reviewed for spatial accuracy to produce a report of attribution errors (see **Section 5.6** for guidance on conducting a spatial review). It may also run for all levels of geography that have changes since it is run on each individual change file.

1. Double click on the **5) Attribute Check** tool**.**

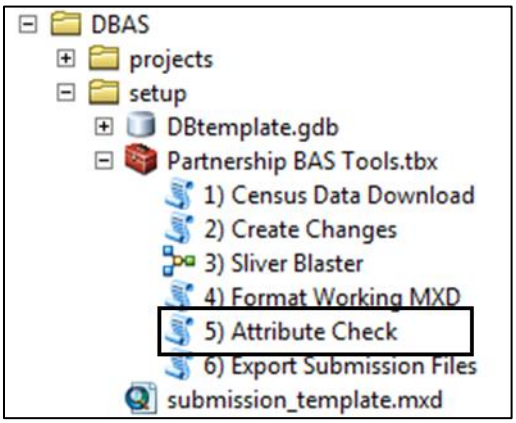

Figure 45. Partnership Tools Menu with Attribute Check Selected

2. In the **Attribute Check** window:
   - The **Change File** should be the change file created in tool **2) Create Changes** for which to generate a report.
   - In **Geography Type**, chose the type of geography being worked on from the dropdown. The same options as the Create Changes tool are available here.
   - The last input is the optional check box for **Includes Changes in Georgia**. This box only needs to be checked if responding in the state of Georgia.

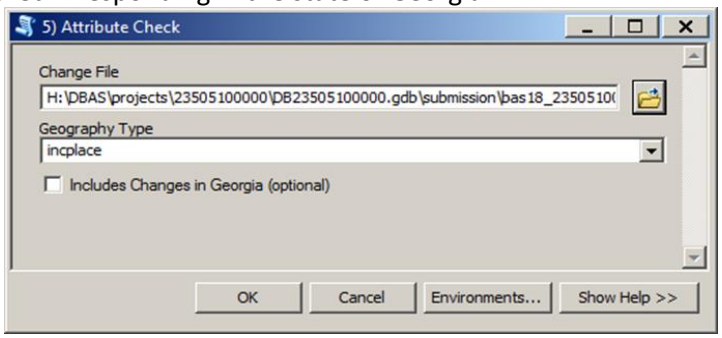

Figure 46. Attribute Check Window

3. Click **OK** to run the tool.
4. There should now be a text file in the working folder called **attribute_check_<geogtype>.txt** containing all the discrepancies identified in the change file that still need to be fixed.

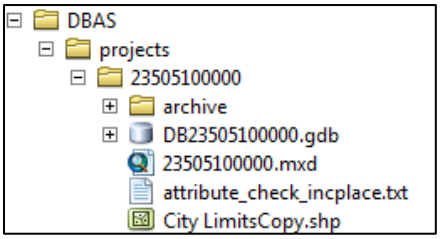

Figure 47. Projects Submenu Showing an attribute_check Text File

B8 Export Submission Tool

Upon review of the changes file and the attribute error report, the finalized changes can be exported for submission to the Census Bureau. This tool can also be used to provide updated contact information with the submission.

1. Double click on the **6) Export Submission Files** tool.

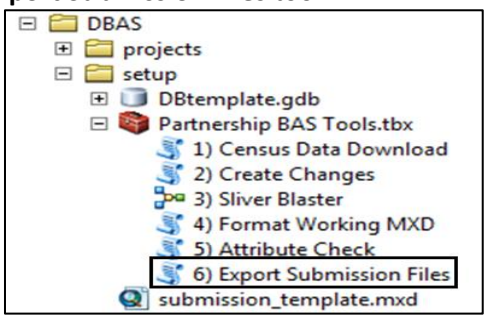

Figure 48. Partnership Tools Menu with Export Submission Files Selected

2. In the **Export Submission Files** tool window:
   - Enter the 11-digit BAS ID in the **BAS ID** field.
   - Under **Additional Files**, drag in or navigate to any additional files to be included in the submission. This can include parcel data, legal documentation, or any other helpful supporting data. This is an optional field so it can also be left blank. There is no need to add the changes layers here as the tool will handle those already based on the BAS ID.
   - For **BAS Contact**, **Entity Name**, **Contact Title or Department Name**, **Address**, **Email**, and **Phone Number**, please include any or all contact information updates that are to be sent to the Census Bureau. These fields can be left blank if there are no updates, though if someone other than the BAS Contact prepared the submission, include the contact information.

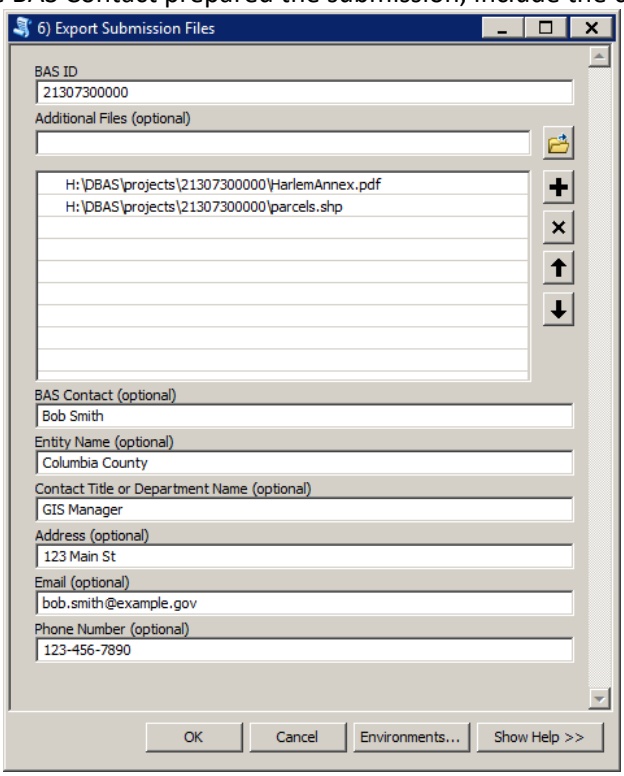

Figure 49. Export Submission Files Window

3. Click **OK** to run the tool.

B9 Submitting through the Secure Web Incoming Module (SWIM)

The Census Bureau requires participants to submit updated BAS materials as ZIP files using the Census Bureau's **SWIM** site. Please submit only the ZIP file(s). **SWIM** is located at <https://respond.census.gov/swim>. For instructions on how to use SWIM, see **Section 5.7.6, Submitting Digital Files through SWIM**.

APPENDIX C 2020 DIGITAL BAS EXAMPLE PROCESS 2

The 2020 Digital BAS Example Process 2 provides step-by-step instructions for participants creating their own change shapefiles using ArcGIS.

C1 Required Census Bureau Shapefiles

When downloading shapefiles for the 2020 BAS, shapefiles will begin with the prefix **PVS** (e.g., **PVS_19_v2_edges_<ssccc>.shp**). Throughout this guide, Census Bureau uses the prefix of **bas_2020**, but the **PVS files** are exactly the same.

Copy the data to a hard drive/server and unzip the data to ensure that the correct data was downloaded. For an incorporated place, these layers are critical:

- PVS_19_v2_place_<ssccc>.shp
- PVS_19_v2_edges_<ssccc>.shp

Note: <ssccc> represents the two-digit state code and three-digit county code.

The shapefiles should include the home county/counties as well as all adjacent counties (if necessary).

Note: The Census Bureau suggests that participants make an extra copy of the data as an emergency backup.

C2 Local Data

The minimum data necessary is a jurisdiction polygon shapefile showing only the outer boundary or boundaries. Local parcel files are not acceptable for this method. If each jurisdiction's boundaries are contiguous, the file should contain only one polygon for each government; if some of the governments within the jurisdiction are non-contiguous, they may be saved as a multi-part polygon or consist of one polygon for each disjointed part. Other local data layers that may be helpful, if available, include centerline data, hydrography, railroad or other linear feature data, and imagery.

C3 Symbolizing Layers in ArcGIS

The following are suggestions for symbolizing Census data in ArcGIS. For the Edges layer, symbolize the linear features by grouping like MTFCC codes (codes sharing the same first character). See **Table 26**.

Table 26: Suggested MTFCC Symbolization

MTFCC 1st Character	Linear Feature Type	Symbol
H	Hydrographic	
P	Non-Visible Feature (boundary)	

MTFCC 1st Character	Linear Feature Type	Symbol
R	Railroad	
S	Road	

C4 Symbolizing Geographic Areas

Symbolize the place layer using Fill Color of RGB (255, 235, 190) with no outline.

Note: County participants with many adjacent incorporated places may want to use different colors to distinguish one place from another.

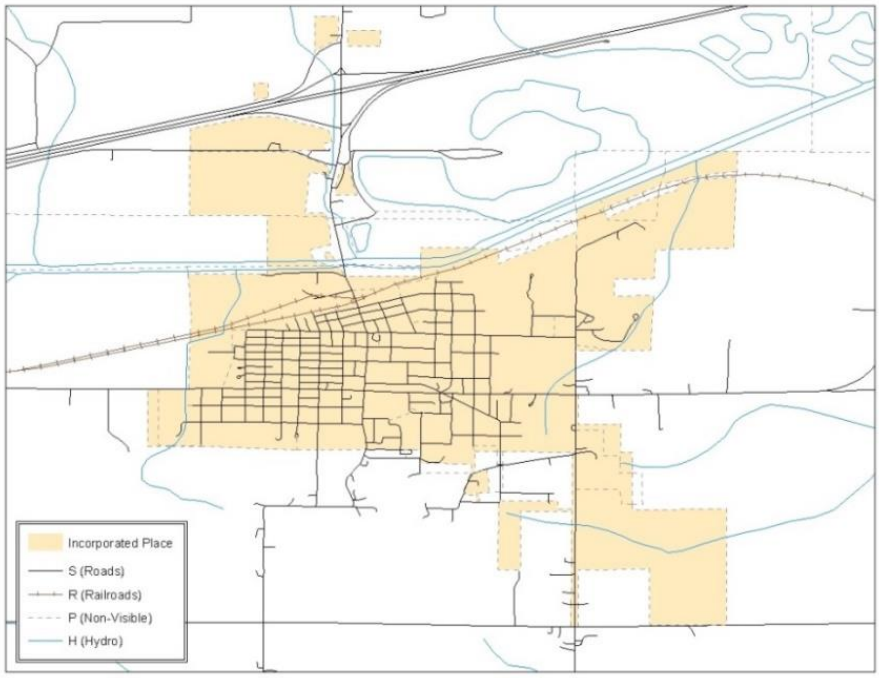

Figure 50. Suggested Map Symbolization

C5 Extracting Incorporated Place or MCD Data from Census Shapefiles

Participants submitting for a single incorporated place or MCD will need to extract their government from the appropriate data layer.

Note: County participants submitting county boundary changes can skip this step. Use the *PVS_19_v2_county_<ssccc>* shapefile which only contains the county boundary. Counties submitting for multiple incorporated places or MCDs skip ahead to **Section C6, Merging Multipart Place Data**.

C5.1 Filtering the Data

1. In ArcMap, click **Selection** and then click **Select by Attributes**.
2. In the Select By Attributes window:
   - From the Layer dropdown, select PVS_19_v2_{place|mcd}_<ssccc>.
   - Double click "**NAME.**"
   - Left click the = button.
   - Click the **Get Unique Values** button.
   - In the list, locate and double click the name of the government (It will appear in the formula).
   - Click **OK**.

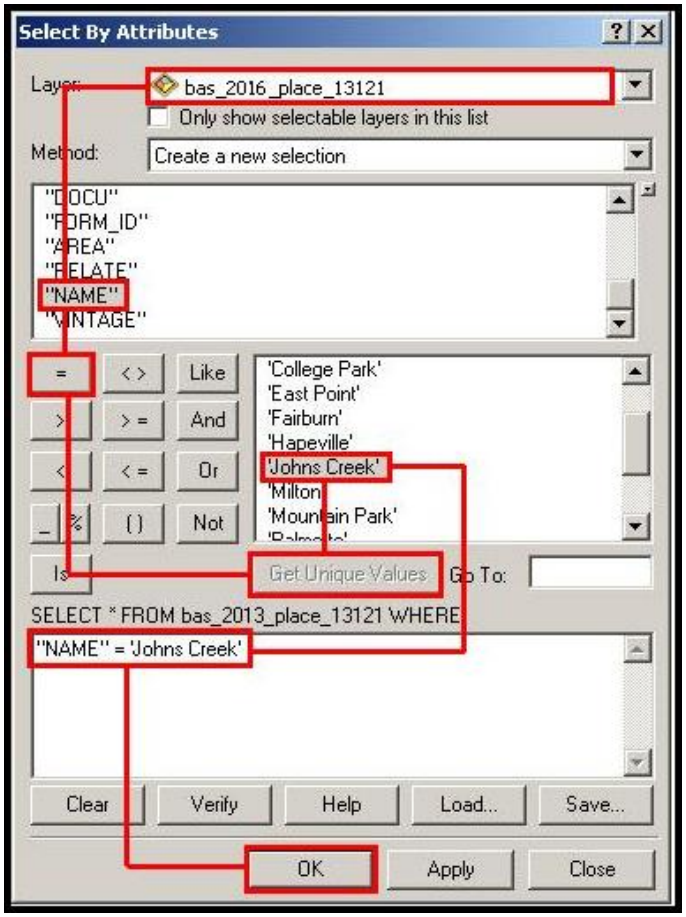

Figure 51. Filtering Data

C5.2 Exporting the Data to a New Shapefile

1. In the **Table of Contents**, right click the Incorporated **Place** or **MCD** layer, select **Data**, and then click **Export Data**.
2. In the **Export Data** window:
   - From the **Export** dropdown, choose **Selected Features**.
   - In the **Output feature class** field, enter a location to save the shapefile.
   - Click **OK**.

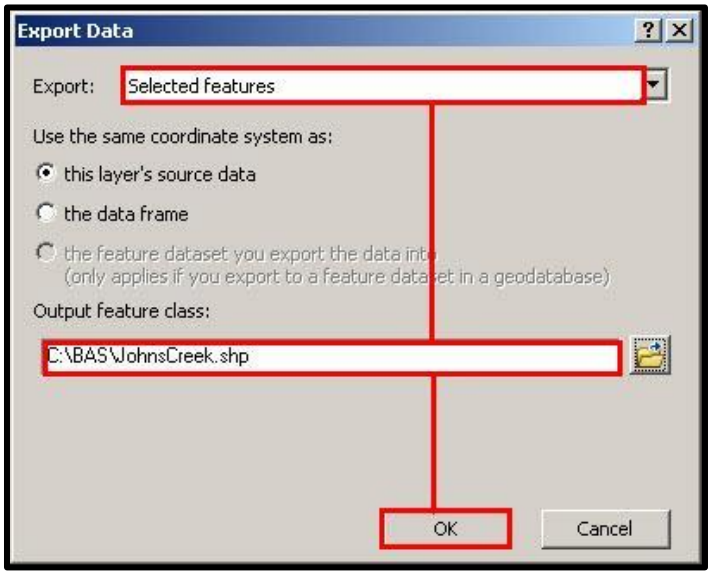

Figure 52. Export Data Window

Note: If the incorporated place spans more than one county, it will need to be exported from each county's place shapefile and merged. Follow the instructions in **Section C6, Merging Multipart Place Data** if the incorporated place needs to merge, otherwise skip to **Section C7.2, Creating Change Polygons Using Union**.

C6 Merging Multipart Place Data

1. In **ArcToolbox**, double-click **Data Management Tools**, then double-click **General**, and then double-click **Merge**.
2. In the **Merge** window:
   - Next to the **Input Datasets** field, click the arrow and select each layer (or use the Browse button to the right of the field to find the layers)
   - In the **Output Dataset** field, browse to and select a location to save the shapefile.
     - Name the shapefile **Export_Output_Final** or **Merged**, or anything easy to find/remember.
   - Click **OK**.

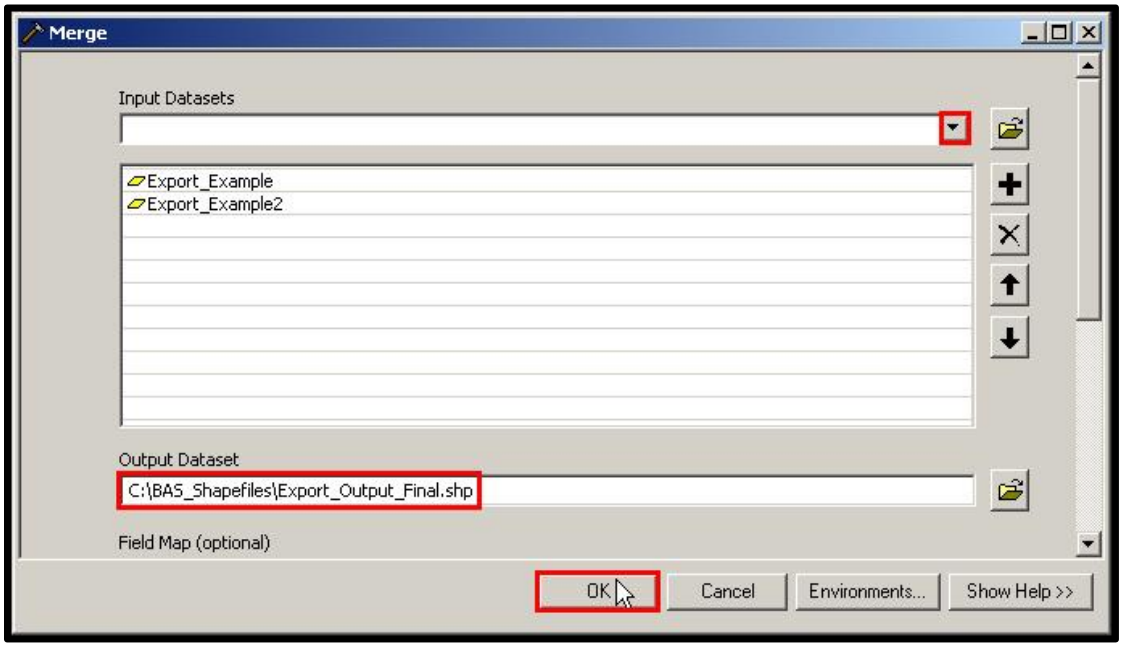

Figure53. Finalizing the Merge Process

C7 Creating Change Polygons

There are two methods used for creating change polygons. Symmetrical Difference is the recommended method for single geographic areas and those with an appropriate ArcGIS license. Steps for using a symmetrical difference are outlined in **Section C7.1, Creating Change Polygons Using Symmetrical Difference**. Otherwise the Union method is acceptable and outlined in **Section C7.2, Creating Change Polygons Using Union**.

C7.1 Creating Change Polygons Using Symmetrical Difference

1. In **ArcToolbox**, double-click **Analysis Tools**, then double-click **Overlay**, and then double-click **Symmetrical Difference**.
2. In the Symmetrical Difference window:
   - In the **Input Features** field, click the arrow (or browse) and select the layer created in **Section C6, Merging Multipart Place Data** if the Census Bureau data required merging.
   - In the **Update Features** field, click the arrow (or browse) and select the local government boundary layer (the participant's data).
   - In the **Output Feature Class** field, browse to and select a location to save the shapefile.
     - Name the shapefile **Differences_between_BAS_local**, **Differences1**, or anything easy to find/remember.
   - Click **OK**.

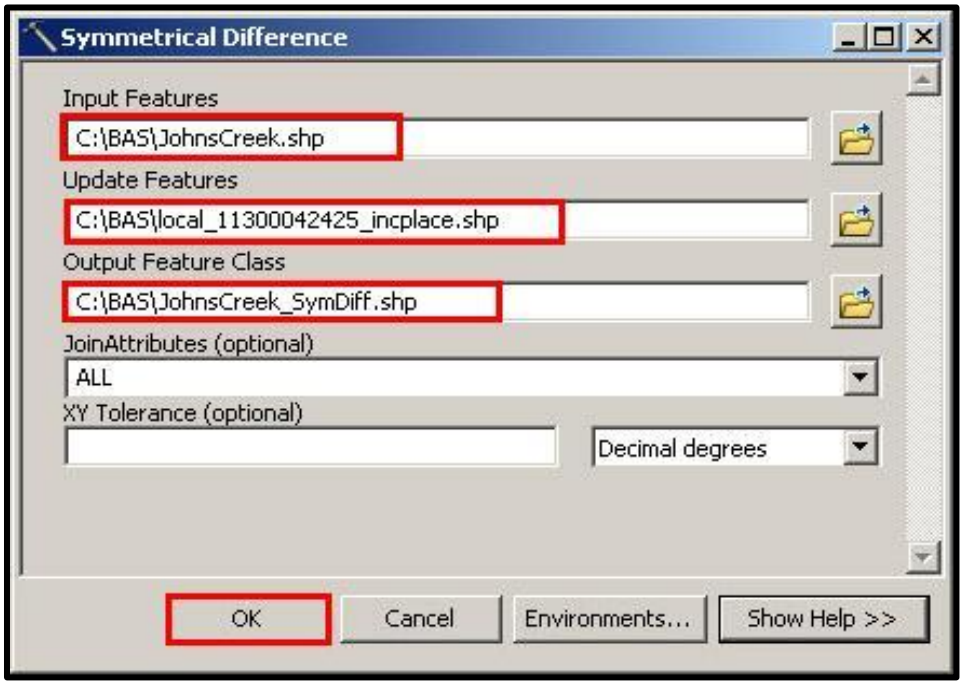

Figure 54. Finalizing the Symmetrical Difference Process

Note: This process creates a layer that contains all of the differences between Census Bureau and local boundaries. However, the Symmetrical Difference tool creates multipart polygons that need to be broken up and individually coded.

3. Turn on Editing (using the **Editing** dropdown in the **Editor** toolbar). Select all of the records in the layer that was created in the Symmetrical Difference step.

4. On the **Advanced Editing** toolbar, click the **Explode** tool . The layer will now contain a separate record for each change.

The created layer shows individual change polygons representing the differences between the Census Bureau and local government boundaries. Please review these differences and code them appropriately.

Skip to **Section C8, Reviewing and Attributing Change Polygons**.

C7.2 Creating Change Polygons Using Union

1. In **ArcToolbox**, double-click **Analysis Tools**, then double-click **Overlay**, and then double-click **Union**.

2. In the **Union** window:

   - In the **Input Features** field, click the arrow (or browse) and select **PVS_19_v2_{place|mcd}_<ssccc>**, and the local incorporated place or MCD layer.

   - In the **Output Feature Class**, browse to and select a location to save the shapefile.

     - Name the shapefile **Export_Output_union**, or **Union**, or anything easy to find/remember.

- Click **OK**.

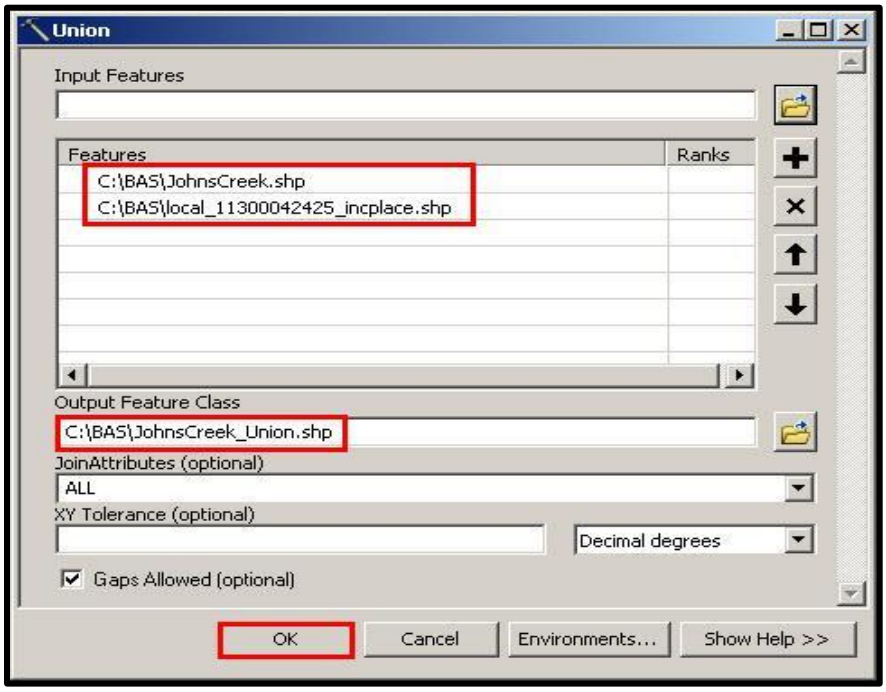

Figure 55. Finalizing the Union Process

The union operation will create records that contain differences as well as areas that are in common between the Census Bureau and local government boundary layers.

The next step is selecting and deleting the areas in common between the Census Bureau and local government boundary layers.

1. On the **Editor** toolbar, click **Editor**, and then click **Start Editing**.
2. If a **Start Editing** window opens, in the top pane click to highlight the **union** shapefile, and then click **OK**.

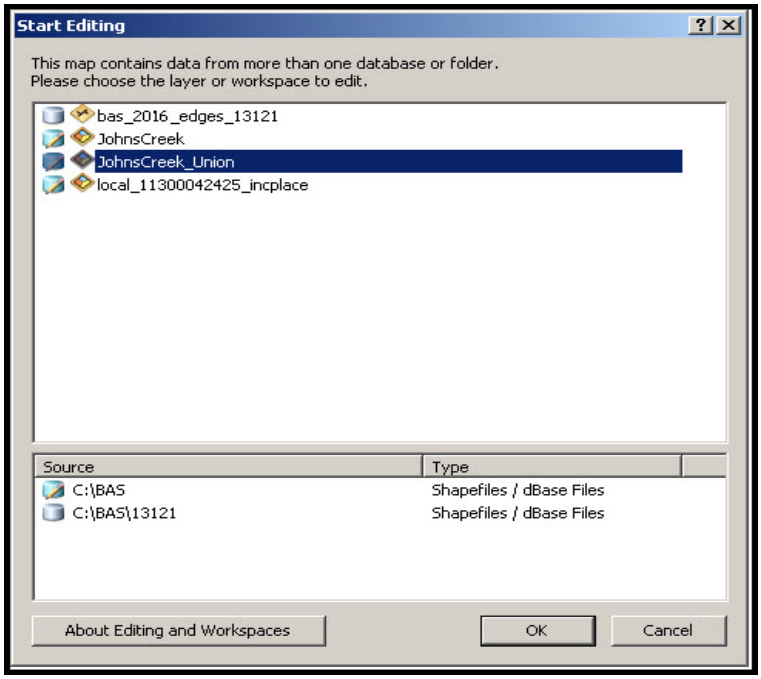

Figure 56. Locating the Union Shapefile

3. In **ArcMap**, in the **Tools** toolbar, click the **Select Features** button.
   - Locate features on the map that the Census Bureau and the local government layers have in common.
   - Select each feature individually, or click and hold the left mouse button and drag a box to highlight the common features.
   - Press **Delete**.
   - Repeat these steps until only the features that have changed are left in the map.
4. Once all of the areas in common have been removed from the union shapefile, on the **Editor** toolbar, click **Editor**, and then click **Save Edits**.
5. Select all of the remaining records in the layer that was created in the Union step.
6. On the **Advanced Editing** toolbar, click the **Explode** tool. The layer will now contain a separate record for each change.

The new layer shows individual change polygons representing the differences between the Census Bureau and the local government's representation of the boundaries. Please review these differences make sure they are coded appropriately. Continue to the next section for instructions on reviewing and coding change polygons.

C8 Reviewing and Attributing Change Polygons

After the individual change polygons have been created, each must be reviewed and appropriately coded. When reviewing the polygons, please refer to **Section 5.3, Boundary Changes** in the main part of this guide to look for polygons that should be deleted from the

submission, as well as those that should be snapped to nearby visible features to maintain boundary-to-feature relationships.

C8.1 Examples

These examples show very small sliver polygons that should be deleted during review as they eliminate boundary-to-feature relationships with a river (left) and a road (right). Furthermore, these boundary corrections also are not located near legal changes or corridor/offset changes (type 'A', 'D', 'C', 'F'), so they should be removed from consideration.

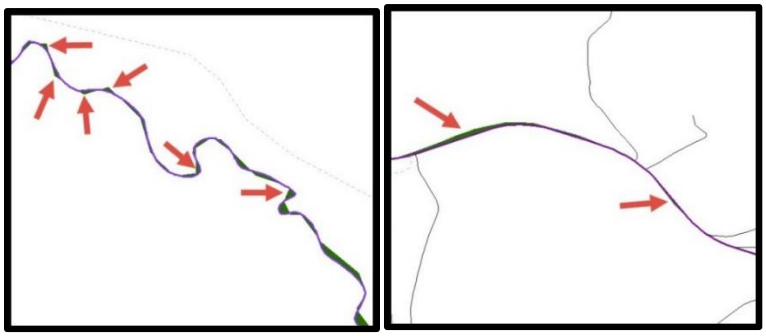

Figure 57. Small Slivers That Should Be Deleted

The examples in Figure 57 show small slivers along rivers (left) or roads (right) that should be deleted.

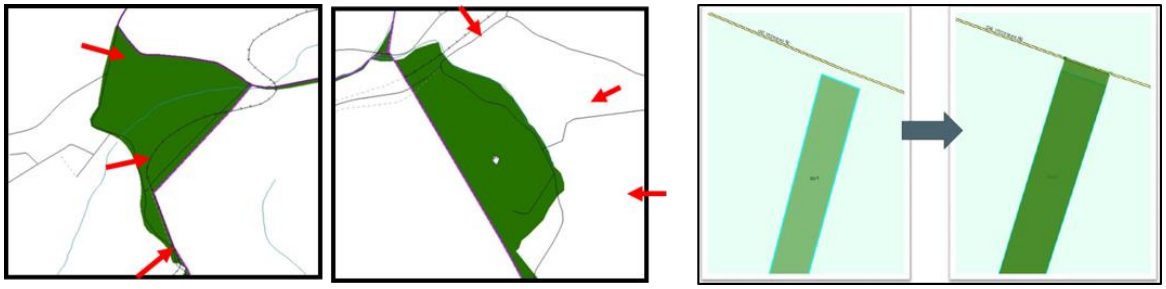

Figure 58. Polygons (Before and After) Snapped to Roads or Rivers

The two examples one the left show polygons that should be snapped to rivers (left) or roads (right). The two examples on the right show how a snapped area will look.

C9 Attribute Information

Note: All updates MUST be attributed. **Table 2**, **Table 3**, and **Table 4** in **Section 5.3, Boundary Changes** cover the required attributes.

C9.1 To Begin Updating Attributes for Annexation

- On the **Editor Toolbar**, click **Editor**, and then click **Start Editing**.
- On the **Editor Toolbar**, click the **Edit** Tool button and select the annexation polygon.
- On the **Editor Toolbar**, click the **Attributes** button.

- In the **Attributes** window, fill out the mandatory fields required for an annexation:
  - **NAME, CHNG_TYPE, AUTHTYPE, DOCU** and **EFF_DATE**.
  - The **CHNG_TYPE** for an annexation is **A**.

C9.2 To Begin Updating Attributes for Deannexation

- On the **Editor Toolbar**, click the **Edit Tool** button and select the deannexation polygon.
- On the **Editor Toolbar**, click the **Attributes** button.
- In the **Attributes** window, fill out the mandatory fields required for a deannexation:
  - **NAME, CHNG_TYPE, AUTHTYPE, DOCU** and **EFF_DATE.**
  - The **CHNG_TYPE** for an annexation is **D**.

C9.3 To Begin Updating Attributes for Geographic Corridors

- On the **Editor Toolbar**, click the **Edit Tool** button and select the corridor polygon.
- On the **Editor Toolbar**, click the **Attributes** button.
- In the **Attributes** window, fill out the mandatory fields required for a corridor:
  - **NAME, CHNG_TYPE, RELATE**.
  - The **CHNG_TYPE** for a corridor changes is **C**.
  - In the **RELATE** field, enter **IN** if the change is adding corridor area to the place or **OUT** if the change is removing corridor area.

C9.4 To Begin Updating Attributes for Geographic Offsets

- On the **Editor Toolbar**, click the **Edit Tool** button and select the offset polygon.
- On the **Editor Toolbar**, click the **Attributes** button.
- In the **Attributes** window, fill out the mandatory fields required for an offset:
  - **NAME, CHNG_TYPE, RELATE**.
  - The **CHNG_TYPE** for an offset change is **F**.
  - In the **RELATE** field, enter **IN** if the change is adding offset area to the place or **OUT** if the change is removing offset area.

C9.5 To Finish Updating Attributes

- Once all of the attribute changes have been made, in the **ArcMap** menu, click **Editor**, and then click **Stop Editing**. (In the **Save** window, click **Yes**.)

C10 Renaming and Finalizing Change Polygons

After creating and coding all change polygons, please rename the change polygon layer prior to its submission to the Census Bureau. This process must be completed for each level of geography (county, place, MCD) that has changes.

C10.1 Renaming the Shapefile

1. In **ArcMap**, open the **ArcCatalog**

tab.
2. In **ArcCatalog**, navigate to shapefile, right-click and select **Rename**.
3. Save the output shapefile in the proper naming convention: **bas20_<basID>_changes_<government_type>**.

Note: The BAS ID numbers can be found on the BAS Annual Response Email or online from this link: <https://www.census.gov/programs-surveys/bas/technical-documentation/code-lists.html>

Note: See **Section 5.7.5, Compressing the Digital Files** for instructions on zipping updates.

C10.2 Submitting the shapefile

The Census Bureau requires participants submit BAS return ZIP files using the Census Bureau's **SWIM** site. Please submit only the ZIP file. The **SWIM** is located at <https://respond.census.gov/swim>. For instructions on how to use SWIM, see **Section 5.7.6, Submitting Digital Files through SWIM** of this respondent guide.

C10.3 To Begin Updating Attributes for Boundary Corrections

- On the **Editor Toolbar**, click the **Edit Tool** button and select the boundary correction polygon.
- On the **Editor Toolbar**, click the **Attributes** button.
- In the **Attributes** window, fill out the mandatory fields required for a boundary correction:
  - **NAME, CHNG_TYPE, RELATE**.
  - The **CHNG_TYPE** for a boundary correction is **B**.
  - In the **RELATE** field, enter **IN** if the boundary correction is adding area or **OUT** if the boundary correction is removing area.

Note: If a county is reporting for adjacent incorporated places or MCDs, and a boundary correction to one government affect or takes land from another, use RELATE = IN and NAME = <government being added to>. This is due to the fact that RELATE = OUT leaves a question as to whether or not there should be a gap between the two governments.

APPENDIX D MTFCC DESCRIPTIONS

The MAF/TIGER Feature Classification Code (MTFCC) is a 5-digit code assigned by the Census Bureau to classify and describe geographic objects or features in Census Bureau MAF/TIGER products.

MTFCC	Feature Class	Feature Class Description
C3022	Mountain Peak or Summit	A prominent elevation rising above the surrounding level of the Earth's surface.
C3023	Island	An area of dry or relatively dry land surrounded by water or low wetland [including archipelago, atoll, cay, hammock, hummock, isla, isle, key, moku and rock].
C3024	Levee	An embankment flanking a stream or other flowing water feature to prevent overflow.
C3026	Quarry (not water-filled), Open Pit Mine or Mine	An area from which commercial minerals are or were removed from the Earth; not including an oilfield or gas field.
C3027	Dam	A barrier built across the course of a stream to impound water and/or control water flow.
C3061	Cul-de-sac	An expanded paved area at the end of a street used by vehicles for turning around. For mapping purposes, the Census Bureau maps it only as a point feature.
C3062	Traffic Circle	A circular intersection allowing for continuous movement of traffic at the meeting of roadways.
C3066	Gate	A movable barrier across a road.
C3067	Toll Booth	A structure or barrier where a fee is collected for using a road.
C3071	Lookout Tower	A manmade structure, higher than its diameter, used for observation.
C3074	Lighthouse Beacon	A manmade structure, higher than its diameter, used for transmission of light and possibly sound generally to aid in navigation.
C3075	Tank/Tank Farm	One or more manmade structures, each higher than its diameter, used for liquid (other than water) or gas storage or for distribution activities.
C3076	Windmill Farm	One or more manmade structures used to generate power from the wind.
C3077	Solar Farm	One or more manmade structures used to generate power from the sun.
C3078	Monument or Memorial	A manmade structure to educate, commemorate, or memorialize an event, person, or feature.
C3079	Boundary Monument Point	A material object placed on or near a boundary line to preserve and identify the location of the boundary line on the ground.
C3080	Survey Control Point	A point on the ground whose position (horizontal or vertical) is known and can be used as a base for additional survey work.
C3081	Locality Point	A point that identifies the location and name of an unbounded locality (e.g., crossroad, community, populated place or locale).
C3085	Alaska Native Village Official Point	A point that serves as the core of an Alaska Native village and is used in defining Alaska Native village statistical areas.
G2100	American Indian Area	A legally defined state- or federally recognized reservation and/or off-reservation trust land (excludes statistical American Indian areas).
G2120	Hawaiian Home Land	A legal area held in trust for the benefit of Native Hawaiians.

MTFCC	Feature Class	Feature Class Description
G2130	Alaska Native Village Statistical Area	A statistical geographic entity that represents the residences, permanent and/or seasonal, for Alaska Natives who are members of or receiving governmental services from the defining legal Alaska Native Village corporation.
G2140	Oklahoma Tribal Statistical Area	A statistical entity identified and delineated by the Census Bureau in consultation with federally recognized American Indian tribes that have no current reservation, but had a former reservation in Oklahoma.
G2150	State-designated Tribal Statistical Area	A statistical geographic entity identified and delineated for the Census Bureau by a state-appointed liaison for a state-recognized American Indian tribe that does not currently have a reservation and/or lands in trust.
G2160	Tribal Designated Statistical Area	A statistical geographic entity identified and delineated for the Census Bureau by a federally recognized American Indian tribe that does not currently have a reservation and/or off-reservation trust land.
G2170	American Indian Joint Use Area	An area administered jointly and/or claimed by two or more American Indian tribes.
G2200	Alaska Native Regional Corporation	Corporate entities established to conduct both business and nonprofit affairs of Alaska Natives pursuant to the Alaska Native Claims Settlement Act of 1972 (Public Law 92-203). There are twelve geographically defined ANRCs and they are all within and cover most of the State of Alaska (the Annette Island Reserve-an American Indian reservation-is excluded from any ANRC). The boundaries of ANRCs have been legally established.
G2300	Tribal Subdivision	Administrative subdivisions of federally recognized American Indian reservations, off-reservation trust lands, or Oklahoma tribal statistical areas (OTSAs). These entities are internal units of self-government or administration that serve social, cultural, and/or economic purposes for the American Indians on the reservations, off-reservation trust lands, or OTSAs.
G2400	Tribal Census Tract	A relatively small and permanent statistical subdivision of a federally recognized American Indian reservation and/or off-reservation trust land, delineated by American Indian tribal participants or the Census Bureau for the purpose of presenting demographic data.
G2410	Tribal Block Group	A cluster of census blocks within a single tribal census tract delineated by American Indian tribal participants or the Census Bureau for the purpose of presenting demographic data.
G3100	Combined Statistical Area	A grouping of adjacent metropolitan and/or micropolitan statistical areas that have a degree of economic and social integration, as measured by commuting.
G3110	Metropolitan and Micropolitan Statistical Area	An area containing a substantial population nucleus together with adjacent communities having a high degree of economic and social integration with that core, as measured by commuting. Defined using whole counties and equivalents.
G3120	Metropolitan Division	A county or grouping of counties that is a subdivision of a Metropolitan Statistical Area containing an urbanized area with a population of 2.5 million or more.
G3200	Combined New England City and Town Area	A grouping of adjacent New England city and town areas that have a degree of economic and social integration, as measured by commuting.

MTFCC	Feature Class	Feature Class Description
G3210	New England City and Town Metropolitan and Micropolitan Statistical Area	An area containing a substantial population nucleus together with adjacent communities having a high degree of economic and social integration with that core, as measured by commuting. Defined using Minor Civil Divisions (MCDs) in New England.
G3220	New England City and Town Division	A grouping of cities and towns in New England that is a subdivision of a New England City and Town Area containing an urbanized area with a population of 2.5 million or more.
G3500	Urban Area	Densely settled territory that contains at least 2,500 people. The subtypes of this feature are Urbanized Area (UA), which consists of 50,000 + people and Urban Cluster, which ranges between 2,500 and 49,999 people.
G4000	State or Equivalent Feature	The primary governmental divisions of the United States. The District of Columbia is treated as a statistical equivalent of a state for census purposes, as is Puerto Rico.
G4020	County or Equivalent Feature	The primary division of a state or state equivalent area. The primary divisions of 48 states are termed County, but other terms are used such as Borough in Alaska, Parish in Louisiana, and Municipio in Puerto Rico. This feature includes independent cities, which are incorporated places that are not part of any county.
G4040	County Subdivision	The primary divisions of counties and equivalent features for the reporting of Census Bureau data. The subtypes of this feature are Minor Civil Division, Census County Division/Census Subarea, and Unorganized Territory. This feature includes independent places, which are incorporated places that are not part of any county subdivision.
G4050	Estate	Estates are subdivisions of the three major islands in the United States Virgin Islands (USVI).
G4060	Subbarrio (Subminor Civil Division)	Legally defined divisions (subbarrios) of minor civil divisions (barrios-pueblo and barrios) in Puerto Rico.
G4110	Incorporated Place	A legal entity incorporated under state law to provide general-purpose governmental services to a concentration of population. Incorporated places are generally designated as a city, borough, municipality, town, village, or, in a few instances, have no legal description.
G4120	Consolidated City	An incorporated place that has merged governmentally with a county or minor civil division, but one or more of the incorporated places continues to function within the consolidation. It is a place that contains additional separately incorporated places.
G4210	Census Designated Place	A statistical area defined for a named concentration of population and the statistical counterpart of an incorporated place.
G4300	Economic Census Place	The lowest level of geographic area for presentation of some types of Economic Census data. It includes incorporated places, consolidated cities, census designated places (CDPs), minor civil divisions (MCDs) in selected states, and balances of MCDs or counties. An incorporated place, CDP, MCD, or balance of MCD qualifies as an economic census place if it contains 5,000 or more residents, or 5,000 or more jobs, according to the most current data available.
G5020	Census Tract	Relatively permanent statistical subdivisions of a County or equivalent feature delineated by local participants as part of the Census Bureau's Participant Statistical Areas Program.

MTFCC	Feature Class	Feature Class Description
G5030	Block Group	A cluster of census blocks having the same first digit of their four-digit identifying numbers within a Census Tract. For example, block group 3 (BG 3) within a Census Tract includes all blocks numbered from 3000 to 3999.
G5035	Block Area Grouping	A user-defined group of islands forming a single census tabulation block. A BAG must: (1) consist of two or more islands, (2) have a perimeter entirely over water, (3) not overlap, and (4) not cross the boundary of other tabulation geographies, such as county or incorporated place boundaries.
G5040	Tabulation Block	The lowest-order census defined statistical area. It is an area, such as a city block, bounded primarily by physical features but sometimes by invisible city or property boundaries. A tabulation block boundary does not cross the boundary of any other geographic area for which the Census Bureau tabulates data. The subtypes of this feature are Count Question Resolution (CQR), current, and census.
G5200	Congressional District	The 435 areas from which people are elected to the U.S. House of Representatives. Additional equivalent features exist for state equivalents with nonvoting delegates or no representative. The subtypes of this feature are 106th, 107th, 108th, 109th, and 111th Congressional Districts, plus subsequent Congresses.
G5210	State Legislative District (Upper Chamber	Areas established by a state or equivalent government from which members are elected to the upper or unicameral chamber of a state governing body. The upper chamber is the senate in a bicameral legislature, and the unicameral case is a single house legislature (Nebraska).
G5220	State Legislative District (Lower Chamber)	Areas established by a state or equivalent government from which members are elected to the lower chamber of a state governing body. The lower chamber is the House of Representatives in a bicameral legislature.
G5240	Voting District	The generic name for the geographic features, such as precincts, wards, and election districts, established by state, local, and tribal governments for the purpose of conducting elections.
G5400	Elementary School District	A geographic area within which officials provide public elementary grade-level educational services for residents.
G5410	Secondary School District	A geographic area within which officials provide public secondary grade-level educational services for residents.
G5420	Unified School District	A geographic area within which officials provide public educational services for all grade levels for residents.
G6120	Public-Use Microdata Area	A decennial census area with a population of at least 100,000 or more persons for which the Census Bureau provides selected extracts of household-level data that are screened to protect confidentiality.
G6300	Traffic Analysis District	An area delineated by Metropolitan Planning Organizations (MPOs) and state Departments of Transportation (DOTs) for tabulating journey-to-work and place-of-work data. A Traffic Analysis District (TAD) consists of one or more Traffic Analysis Zones (TAZs).
G6320	Traffic Analysis Zone	An area delineated by Metropolitan Planning Organizations (MPOs) and state Departments of Transportation (DOTs) for tabulating journey-to-work and place-of-work data.

MTFCC	Feature Class	Feature Class Description
G6330	Urban Growth Area	An area defined under state authority to manage urbanization that the Census Bureau includes in the MAF/TIGER® System in agreement with the state.
G6350	ZIP Code Tabulation Area (Five-Digit)	An approximate statistical-area representation of a U.S. Postal Service (USPS) 5-digit ZIP Code service area.
G6400	Commercial Region	For the purpose of presenting economic statistical data, municipios in Puerto Rico are grouped into commercial regions.
H1100	Connector	A known, but nonspecific, hydrographic connection between two nonadjacent water features.
H2025	Swamp/Marsh	A poorly drained wetland, fresh or saltwater, wooded or grassy, possibly covered with open water [includes bog, cienega, marais and pocosin].
H2030	Lake/Pond	A standing body of water that is surrounded by land.
H2040	Reservoir	An artificially impounded body of water.
H2041	Treatment Pond	An artificial body of water built to treat fouled water.
H2051	Bay/Estuary/Gulf/Sound	A body of water partly surrounded by land [includes arm, bight, cove and inlet].
H2053	Ocean/Sea	The great body of salt water that covers much of the earth.
H2060	Gravel Pit/Quarry filled with water	A body of water in a place or area from which commercial minerals were removed from the Earth.
H2081	Glacier	A body of ice moving outward and down slope from an area of accumulation; an area of relatively permanent snow or ice on the top or side of a mountain or mountainous area [includes ice field and ice patch].
H3010	Stream/River	A natural flowing waterway [includes anabranch, awawa, branch, brook, creek, distributary, fork, kill, pup, rio, and run].
H3013	Braided Stream	A natural flowing waterway with an intricate network of interlacing channels.
H3020	Canal, Ditch or Aqueduct	An artificial waterway constructed to transport water, to irrigate or drain land, to connect two or more bodies of water, or to serve as a waterway for watercraft [includes lateral].
K1225	Crew-of-Vessel Location	A point or area in which the population of military or merchant marine vessels at sea are assigned, usually being at or near the home port pier.
K1231	Hospital/Hospice/Urgent Care Facility	One or more structures where the sick or injured may receive medical or surgical attention [including infirmary].
K1235	Juvenile Institution	A facility (correctional and non-correctional) where groups of juveniles reside; this includes training schools, detention centers, residential treatment centers and orphanages.
K1236	Local Jail or Detention Center	One or more structures that serve as a place for the confinement of adult persons in lawful detention, administered by a local (county, municipal, etc.) government.
K1237	Federal Penitentiary, State Prison, or Prison Farm	An institution that serves as a place for the confinement of adult persons in lawful detention, administered by the federal government or a state government.
K1238	Other Correctional Institution	One or more structures that serve as a place for the confinement of adult persons in lawful detention, not elsewhere classified or administered by a government of unknown jurisdiction.

MTFCC	Feature Class	Feature Class Description
K1239	Convent, Monastery, Rectory, Other Religious Group Quarters	One or more structures intended for use as a residence for those having a religious vocation.
K1246	Community Center	Community Center.
K2110	Military Installation	An area owned and/or occupied by the Department of Defense for use by a branch of the armed forces (such as the Army, Navy, Air Force, Marines, or Coast Guard), or a state owned area for the use of the National Guard.
K2165	Government Center	A place used by members of government (either federal, state, local, or tribal) for administration and public business.
K2167	Convention Center	An exhibition hall or conference center with enough open space to host public and private business and social events.
K2180	Park	Parkland defined and administered by federal, state, and local governments.
K2181	National Park Service Land	Area—National parks, National Monuments, and so forth—under the jurisdiction of the National Park Service.
K2182	National Forest or Other Federal Land	Land under the management and jurisdiction of the federal government, specifically including areas designated as National Forest, and excluding areas under the jurisdiction of the National Park Service.
K2183	Tribal Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of an American Indian tribe.
K2184	State Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a state government.
K2185	Regional Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a regional government.
K2186	County Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a county government.
K2187	County Subdivision Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a minor civil division (town/township) government.
K2188	Incorporated Place Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a municipal government.
K2189	Private Park, Forest, or Recreation Area	A privately owned place or area set aside for recreation or preservation of a cultural or natural resource.
K2190	Other Park, Forest, or Recreation Area (quasi-public, independent park, commission, etc.)	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of some other type of government or agency such as an independent park authority or commission.
K2191	Post Office	An official facility of the U.S. Postal Service used for processing and distributing mail and other postal material.
K2193	Fire Department	Fire Department.
K2194	Police Station	Police Station.
K2195	Library	Library.

MTFCC	Feature Class	Feature Class Description
K2196	City/Town Hall	City/Town Hall.
K2400	Transportation Terminal	A facility where one or more modes of transportation can be accessed by people or for the shipment of goods; examples of such a facility include marine terminal, bus station, train station, airport and truck warehouse.
K2424	Marina	A place where privately owned, light-craft are moored.
K2432	Pier/Dock	A platform built out from the shore into the water and supported by piles. This platform may provide access to ships and boats, or it may be used for recreational purposes.
K2451	Airport or Airfield	A manmade facility maintained for the use of aircraft [including airstrip, landing field and landing strip].
K2452	Train Station, Trolley or Mass Transit Rail Station	A place where travelers can board and exit rail transit lines, including associated ticketing, freight, and other commercial offices.
K2453	Bus Terminal	A place where travelers can board and exit mass motor vehicle transit, including associated ticketing, freight, and other commercial offices.
K2454	Marine Terminal	A place where travelers can board and exit water transit or where cargo is handled, including associated ticketing, freight, and other commercial offices.
K2455	Seaplane Anchorage	A place where an airplane equipped with floats for landing on or taking off from a body of water can debark and load.
K2456	Airport—Intermodal Transportation Hub/Terminal	A major air transportation facility where travelers can board and exit airplanes and connect with other (i.e. non-air) modes of transportation.
K2457	Airport—Statistical Representation	The area of an airport adjusted to include whole 2000 census blocks used for the delineation of urban areas.
K2458	Park and Ride Facility/Parking Lot	A place where motorists can park their cars and transfer to other modes of transportation.
K2459	Runway/Taxiway	A fairly level and usually paved expanse used by airplanes for taking off and landing at an airport.
K2460	Helicopter Landing Pad	A fairly level and usually paved expanse used by helicopters for taking off and landing.
K2540	University or College	A building or group of buildings used as an institution for post-secondary study, teaching, and learning [including seminary].
K2543	School or Academy	A building or group of buildings used as an institution for preschool, elementary or secondary study, teaching, and learning [including elementary school and high school].
K2545	Museum, Visitor Center, Cultural Center, or Tourist Attraction	An attraction of historical, cultural, educational or other interest that provides information or displays artifacts.
K2561	Golf Course	A place designed for playing golf.
K2582	Cemetery	A place or area for burying the dead [including burying ground and memorial garden].
K2586	Zoo	A facility in which terrestrial and/or marine animals are confined within enclosures and displayed to the public for educational, preservation, and research purposes.
K3544	Place of Worship	A sanctified place or structure where people gather for religious worship; examples include church, synagogue, temple, and mosque.

MTFCC	Feature Class	Feature Class Description
L4010	Pipeline	A long tubular conduit or series of pipes, often underground, with pumps and valves for flow control, used to transport fluid (e.g., crude oil, natural gas), especially over great distances.
L4020	Powerline	One or more wires, often on elevated towers, used for conducting high-voltage electric power.
L4031	Aerial Tramway/Ski Lift	A conveyance that transports passengers or freight in carriers suspended from cables and supported by a series of towers.
L4110	Fence Line	A man-made barrier enclosing or bordering a field, yard, etc., usually made of posts and wire or wood, used to prevent entrance, to confine, or to mark a boundary.
L4121	Ridge Line	The line of highest elevation along a ridge.
L4125	Cliff/Escarpment	A very steep or vertical slope [including bluff, crag, head, headland, nose, palisades, precipice, promontory, rim and rimrock].
L4130	Point-to-Point Line	A line defined as beginning at one location point and ending at another, both of which are in sight.
L4140	Property/Parcel Line (Including PLSS)	This feature class may denote a nonvisible boundary of either public or private lands (e.g., a park boundary) or it may denote a Public Land Survey System or equivalent survey line.
L4150	Coastline	The line that separates either land or Inland water from Coastal, Territorial or Great Lakes water. Where land directly borders Coastal, Territorial or Great Lakes water, the shoreline represents the Coastline. Where Inland water (such as a river) flows into Coastal, Territorial or Great Lakes water, the closure line separating the Inland water from the other class of water represents the Coastline.
L4165	Ferry Crossing	The route used to carry or convey people or cargo back and forth over a waterbody in a boat.
P0001	Nonvisible Linear Legal/Statistical Boundary	A legal/statistical boundary line that does not correspond to a shoreline or other visible feature on the ground.
P0002	Perennial Shoreline	The more-or-less permanent boundary between land and water for a water feature that exists year-round.
P0003	Intermittent Shoreline	The boundary between land and water (when water is present) for a water feature that does not exist year-round.
P0004	Other non-visible bounding Edge (e.g., Census water boundary, boundary of an aerial feature)	A bounding Edge that does not represent a legal/statistical boundary, and does not correspond to a shoreline or other visible feature on the ground. Many such Edges bound area landmarks, while many others separate water features from each other (e.g., where a bay meets the ocean).
R1011	Railroad Feature (Main, Spur, or Yard)	A line of fixed rails or tracks that carries mainstream railroad traffic. Such a rail line can be a main line or spur line, or part of a rail yard.
R1051	Carline, Streetcar Track, Monorail, Other Mass Transit	Mass transit rail lines (including lines for rapid transit, monorails, streetcars, light rail, etc.) that are typically inaccessible to mainstream railroad traffic and whose tracks are not part of a road right-of-way.
R1052	Cog Rail Line, Incline Rail Line, Tram	A special purpose rail line for climbing steep grades that is typically inaccessible to mainstream railroad traffic. Note that aerial tramways and streetcars (which may also be called “trams”) are accounted for by other MTFCCs and do not belong in R1052.
S1100	Primary Road	Primary roads are generally divided, limited-access highways within the interstate highway system or under state management, and are

MTFCC	Feature Class	Feature Class Description
		distinguished by the presence of interchanges. These highways are accessible by ramps and may include some toll highways.
S1200	Secondary Road	Secondary roads are main arteries, usually in the U.S. Highway, State Highway or County Highway system. These roads have one or more lanes of traffic in each direction, may or may not be divided, and usually have at-grade intersections with many other roads and driveways. They often have both a local name and a route number.
S1400	Local Neighborhood Road, Rural Road, City Street	Generally, a paved non-arterial street, road, or byway that usually has a single lane of traffic in each direction. Roads in this feature class may be privately or publicly maintained. Scenic park roads would be included in this feature class, as would (depending on the region of the country) some unpaved roads.
S1500	Vehicular Trail (4WD)	An unpaved dirt trail where a four-wheel drive vehicle is required. These vehicular trails are found almost exclusively in very rural areas. Minor, unpaved roads usable by ordinary cars and trucks belong in the S1400 category.
S1630	Ramp	A road that allows controlled access from adjacent roads onto a limited access highway, often in the form of a cloverleaf interchange. These roads are unaddressable and do not carry a name in the MAF/TIGER System.
S1640	Service Drive usually along a limited access highway	A road, usually paralleling a limited access highway, that provides access to structures along the highway. These roads can be named and may intersect with other roads.
S1710	Walkway/Pedestrian Trail	A path that is used for walking, being either too narrow for or legally restricted from vehicular traffic.
S1720	Stairway	A pedestrian passageway from one level to another by a series of steps.
S1730	Alley	A service road that does not generally have associated addressed structures and is usually unnamed. It is located at the rear of buildings and properties and is used for deliveries.
S1740	Private Road for service vehicles (logging, oil fields, ranches, etc.)	A road within private property that is privately maintained for service, extractive, or other purposes. These roads are often unnamed.
S1750	Internal U.S. Census Bureau use	Internal U.S. Census Bureau use.
S1780	Parking Lot Road	The main travel route for vehicles through a paved parking area.
S1820	Bike Path or Trail	A path that is used for manual or small, motorized bicycles, being either too narrow for or legally restricted from vehicular traffic.
S1830	Bridle Path	A path that is used for horses, being either too narrow for or legally restricted from vehicular traffic.
S2000	Road Median	The unpaved area or barrier between the carriageways of a divided road.

Note: The information in this table was last updated in November 2017.