Metropolitan Washington Council of Governments

## MEMORANDUM

**TO:** Cooperative Forecasting and Data Subcommittee, Members

**FROM:** John Kent, Regional Planner and Greg Goodwin, Regional Planner

**SUBJECT:** Cooperative Forecasting Program – Employment Estimates and Projections

**DATE:** September 11, 2018

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The purpose of this memorandum is to identify and highlight some of the best practices in cooperative forecasting for understanding the relationship between available small area employment data and COG's land use types. Drawing from earlier COG research, COG member-jurisdictions, Metropolitan Planning Organizations around the country, this document will highlight best practices and methods that are most relevant to the COG forecasting process and needs.

The COG staff has been asked by members of the Cooperative Forecasting and Data Subcommittee, to re-examine the relationship between the North American Industrial Classification System (NAICS) and the standard COG land use categories for employment data. Generally, the approach of using NAICS to allocate jobs to the land use type is only useful for estimating a base-year when used in conjunction with a data source, such as a QCEW or Infogroup employment file. COG recognizes the importance of our local partners in developing the Cooperative Forecasts. While COG offers guidance for estimating base years, COG understands that every jurisdiction uses additional data and insight to develop employment estimates and forecasts. The forecast years are just as important as base-year estimates and are based on member-jurisdiction Comprehensive Plans, zoning, and other local land use expertise.

## BACKGROUND

Employment is a major component of the COG Cooperative Forecasting process. TAZ-level employment, household and population data from the Cooperative Forecast is used by Transportation Planning Board (TPB) staff as inputs to the travel demand forecasting model. Member-jurisdictions submit to COG both base-year employment and 30 years of forecasted employment at five-year intervals. Employment in the forecast is divided into four land use categories: Industrial, Office, Retail and Other. The four unique land use types enable the TPB travel demand model to assign different traffic generation rates to each employment category. Retail employment has a higher trip generation factor than the other land use types, although the difference in trip generation rates has fallen in recent years.

Readily available employment data is typically classified under two major standards. NAICS classifies industries based upon products or services. The Standard Occupational Classification (SOC) system classifies workers based upon the job performed. The SOC description of an individual worker's employment duties is often a better indicator of commuting and other transportation requirements than the NAICS industrial sector in which the worker's employer participates. Despite this, NAICS-based data is primarily used because the best data available to employment forecasters—from the Bureau of Labor Statistic's Quarterly Census of Employment and Wages (QCEW)—is classified by NAICS code.

## EXISTING METHODS AND GUIDANCE FOR ALLOCATING EMPLOYMENT DATA

*1985 COG Technical Memorandum: Relationship Between Employment by SIC Code and Employment by Land Use Type*

During the mid-1980's, COG prepared a technical memorandum based on research by the Maryland-National Capital Park and Planning Commission in Montgomery County to allocate employment by Standard Industrial Classification (SIC) system to land use categories (Industrial, Office, Retail and Other). The purpose of the 1985 memorandum was "to develop a method to enhance the current method utilized to allocate employment to land use for trip generation and forecasting purposes". Employment in a single SIC category could be divided and distributed to each of the four land use categories based upon a percentage. Of the 56 SIC-based land use categories listed in the memo, 25 were divided into more than one land use category. Using this allocation methodology can result in a transportation analysis zone (TAZ) having a non-integer employment value in a land use category; rounding is then required.

The methodology outlined in the 1985 memorandum has been useful to subcommittee members but has become outdated. In 1997, the SIC system was replaced by the current NAICS. Economic and technical changes over the past thirty years have resulted in new industries and employment categories that are not covered by the 1985 memorandum or are no longer accurately represented. The practice of dividing and allocating employment in a single industrial category into four separate industrial groups introduces an unnecessary complication into an already complex forecasting task.

Appendix A of the 1985 memorandum categorized over 100 employment activities into one of the four land use types for employment. In 1985, TPB was using the Transportation Integrated Modeling System (T.R.I.M.S.), a predecessor model to the current travel model (known as Version 2.3). As both models use the same four land use categories for employment, the descriptions of employment activities remain relevant, even if the SIC-based categorizations outlined in the memorandum are outdated.

*Employment Allocation Methodologies from COG Jurisdictional Staff*

Since the introduction of NAICS, staff in several jurisdictions around the region have created tables to allocate employment by NAICS to the four land use categories used by the travel model. As in the 1985 memo, these tables allocate employment in a single NAICS category to more than one land use type. Table 1 on the following page shows the NAICS allocation tables provided to COG by staff of three COG members: Fairfax County, Loudoun County and Prince William County. The District of Columbia uses the Fairfax County table for its forecast. These tables have differing groupings and allocations, a reflection of each COG member having unique economies and forecasting approaches. For example, Fairfax County adds a fifth category—Institutional—for its employment forecasts. COG treats institutional employment as office employment when incorporating Fairfax County's forecast into the Cooperative Forecast.

# Table 1: COG Jurisdiction Tables for Converting NAICS to COG Land Use Types

| NAICS | Industry | Fairfax County / DC | | | | Loudoun County | | | | Prince William County | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Industrial | Retail | Office | Other | Industrial | Retail | Office | Other | Industrial | Retail | Office | Other |
| 11 | Agriculture & Forestry | 95 | 5 | 0 | 0 | 95 | 5 | 0 | 0 | 100 | 0 | 0 | 0 |
| 21 | Mining | 95 | 5 | 0 | 0 | 100 | 0 | 0 | 0 | 100 | 0 | 0 | 0 |
| 22 | Utilities | 25 | 0 | 75 | 0 | 25 | 0 | 70 | 5 | 25 | 0 | 70 | 5 |
| 236 | Construction (Buildings) | 34 | 0 | 66 | 0 | 90 | 0 | 10 | 0 | 34 | 0 | 66 | 0 |
| 2371-2373 | Construction (Civil Eng.) | 34 | 0 | 66 | 0 | 90 | 0 | 10 | 0 | 34 | 0 | 66 | 0 |
| 2379 | Construction (Civil Eng.) | 34 | 0 | 66 | 0 | 95 | 0 | 5 | 0 | 34 | 0 | 66 | 0 |
| 238 | Construction (Contractors) | 34 | 0 | 66 | 0 | 90 | 0 | 10 | 0 | 34 | 0 | 66 | 0 |
| 31-33 | Manufacturing | 100 | 0 | 0 | 0 | 100 | 0 | 0 | 0 | 100 | 0 | 0 | 0 |
| 42 | Wholesale Trade | 90 | 5 | 5 | 0 | 80 | 5 | 10 | 5 | 90 | 5 | 5 | 0 |
| 44-45 | Retail Trade | 0 | 96 | 0 | 4 | 0 | 100 | 0 | 0 | 0 | 96 | 0 | 4 |
| 481-486 | Transport & Warehousing | 25 | 0 | 75 | 0 | 95 | 0 | 5 | 0 | 25 | 0 | 70 | 5 |
| 487-488 | Transport & Warehousing | 25 | 0 | 75 | 0 | 0 | 0 | 0 | 100 | 25 | 0 | 70 | 5 |
| 491-492 | Transport & Warehousing | 25 | 0 | 75 | 0 | 60 | 20 | 20 | 0 | 25 | 0 | 70 | 5 |
| 493 | Transport & Warehousing | 25 | 0 | 75 | 0 | 95 | 5 | 0 | 0 | 25 | 0 | 70 | 5 |
| 51 | Information | 0 | 0 | 98 | 2 | 0 | 0 | 100 | 0 | 25 | 0 | 70 | 5 |
| 521 | Finance (Central Banks) | 0 | 0 | 98 | 2 | 0 | 0 | 100 | 0 | 0 | 0 | 98 | 2 |
| 5221 | Finance (Depository) | 0 | 0 | 98 | 2 | 0 | 50 | 50 | 0 | 0 | 0 | 98 | 2 |
| 5222-5223 | Finance and Insurance | 0 | 0 | 98 | 2 | 0 | 0 | 98 | 2 | 0 | 0 | 98 | 2 |
| 523-525 | Finance and Insurance | 0 | 0 | 98 | 2 | 0 | 0 | 98 | 2 | 0 | 0 | 98 | 2 |
| 5311-5312 | Real Estate and Leasing | 0 | 0 | 98 | 2 | 0 | 0 | 100 | 0 | 0 | 0 | 98 | 2 |
| 5313 | Real Estate and Leasing | 0 | 0 | 98 | 2 | 0 | 0 | 0 | 100 | 0 | 0 | 98 | 2 |
| 532 | Real Estate and Leasing | 0 | 0 | 98 | 2 | 0 | 100 | 0 | 0 | 0 | 0 | 98 | 2 |
| 533 | Real Estate and Leasing | 0 | 0 | 98 | 2 | 0 | 0 | 100 | 0 | 0 | 0 | 98 | 2 |
| 54 | Professional and Tech. Srvs. | 0 | 0 | 98 | 2 | 0 | 0 | 100 | 0 | 0 | 0 | 98 | 2 |
| 55 | Management of Companies | 0 | 0 | 98 | 2 | 0 | 0 | 100 | 0 | 0 | 0 | 98 | 2 |
| 561 | Admin. & Waste Services | 25 | 0 | 70 | 5 | 0 | 0 | 100 | 0 | 0 | 0 | 98 | 2 |
| 5621-5622 | Admin. & Waste Services | 25 | 0 | 70 | 5 | 95 | 0 | 5 | 0 | 0 | 0 | 98 | 2 |
| 5629 | Admin. & Waste Services | 25 | 0 | 70 | 5 | 0 | 0 | 100 | 0 | 0 | 0 | 98 | 2 |
| 61 | Educational Services | 0 | 5 | 90 | 5 | 0 | 0 | 10 | 90 | 0 | 0 | 10 | 90 |
| 6211-6214 | Health Care & Social Assist. | 0 | 0 | 98 | 2 | 0 | 0 | 100 | 0 | 0 | 0 | 70 | 30 |
| 6215 | Health Care & Social Assist. | 0 | 0 | 98 | 2 | 0 | 0 | 0 | 100 | 0 | 0 | 70 | 30 |
| 6216 | Health Care & Social Assist. | 0 | 0 | 98 | 2 | 0 | 0 | 80 | 20 | 0 | 0 | 70 | 30 |
| 6219 | Health Care & Social Assist. | 0 | 0 | 98 | 2 | 0 | 0 | 0 | 100 | 0 | 0 | 70 | 30 |
| 622 | Health Care & Social Assist. | 0 | 0 | 98 | 2 | 0 | 0 | 100 | 0 | 0 | 0 | 70 | 30 |
| 623 | Health Care & Social Assist. | 0 | 0 | 98 | 2 | 0 | 0 | 80 | 20 | 0 | 0 | 70 | 30 |
| 6241-6243 | Health Care & Social Assist. | 0 | 0 | 98 | 2 | 0 | 0 | 80 | 20 | 0 | 0 | 70 | 30 |
| 6244 | Health Care & Social Assist. | 0 | 0 | 98 | 2 | 0 | 0 | 0 | 100 | 0 | 0 | 70 | 30 |
| 7111 | Arts and Recreation | 10 | 10 | 70 | 10 | 10 | 0 | 90 | 0 | 0 | 100 | 0 | 0 |
| 7112 | Arts and Recreation | 10 | 10 | 70 | 10 | 20 | 70 | 10 | 0 | 0 | 100 | 0 | 0 |
| 7113-7115 | Arts and Recreation | 10 | 10 | 70 | 10 | 0 | 0 | 100 | 0 | 0 | 100 | 0 | 0 |
| 712 | Arts and Recreation | 10 | 10 | 70 | 10 | 0 | 0 | 0 | 100 | 0 | 100 | 0 | 0 |
| 7131 | Arts and Recreation | 10 | 10 | 70 | 10 | 20 | 70 | 10 | 0 | 0 | 100 | 0 | 0 |
| 7132 | Arts and Recreation | 10 | 10 | 70 | 10 | 0 | 100 | 0 | 0 | 0 | 100 | 0 | 0 |
| 7139 | Arts and Recreation | 10 | 10 | 70 | 10 | 20 | 70 | 10 | 0 | 0 | 100 | 0 | 0 |
| 721 | Accommodation & Food Srvs. | 15 | 65 | 20 | 0 | 30 | 70 | 0 | 0 | 0 | 100 | 0 | 0 |
| 722 | Accommodation & Food Srvs. | 15 | 65 | 20 | 0 | 0 | 100 | 0 | 0 | 0 | 96 | 0 | 4 |
| 811 | Other Services, Public Admin | 0 | 18 | 78 | 4 | 30 | 70 | 0 | 0 | 0 | 100 | 0 | 0 |
| 8121-8122 | Other Services, Public Admin | 0 | 18 | 78 | 4 | 0 | 20 | 80 | 0 | 0 | 100 | 0 | 0 |
| 8123 | Other Services, Public Admin | 0 | 18 | 78 | 4 | 0 | 100 | 0 | 0 | 0 | 100 | 0 | 0 |
| 8129 | Other Services, Public Admin | 0 | 18 | 78 | 4 | 0 | 20 | 80 | 0 | 0 | 100 | 0 | 0 |
| 813-814 | Other Services, Public Admin | 0 | 18 | 78 | 4 | 0 | 0 | 0 | 100 | 0 | 0 | 80 | 20 |
| 921-927 | Public Administration | 0 | 0 | 100 | 0 | 0 | 0 | 40 | 60 | 0 | 0 | 40 | 60 |
| 92811 | Public Admin. (Military) | 0 | 0 | 100 | 0 | 0 | 0 | 40 | 60 | 0 | 0 | 65 | 35 |
| 92812 | Public Administration | 0 | 0 | 100 | 0 | 0 | 0 | 40 | 60 | 0 | 0 | 40 | 60 |
| 99 | Other | 0 | 0 | 0 | 100 | 0 | 0 | 0 | 100 | 15 | 10 | 5 | 70 |

*Employment Allocation Methodologies from other Metropolitan Planning Organizations*

COG staff interviewed planners and engineers from five Metropolitan Planning Organizations (MPOs) from around the country about employment forecasting methodologies. Respondents shared their knowledge and experience in interviews and sent COG tables that detail how NAICS employment is allocated to land use input categories. Four of the five MPOs use (or are transitioning to) an activity-based model, while one uses a traditional four-step travel model. Two of the respondents use a land use model to forecast employment growth. All interviewed MPOs rely on two-digit NAICS employment for base-year employment. No interviewed MPO breaks up a NAICS employment category into multiple land use types, as in the 1985 COG technical memorandum on allocated SIC employment. Each MPO allocates employment from each two-digit NAICS to a single land use input category. The allocation of NAICS employment for each interviewed MPO is shown in Table 2 on page seven.

### Atlanta Regional Commission

The Atlanta Regional Commission (ARC) is the MPO for ten metropolitan Atlanta counties. COG staff interviewed Jim Skinner, a Senior Planner at ARC, about their forecast process. ARC uses an activity-based travel demand model. The region is divided into regional TAZs, which are then further divided into smaller local TAZs for each jurisdiction. ARC staff creates the forecast for regional TAZs, using a land use model; local jurisdiction staff then generate a forecast at the local TAZ level. Base-year employment is allocated using two-digit NAICS employment from QCEW data. The travel demand model uses six categories: “Agricultural & Natural Resources”; “Manufacturing, Wholesale Trade & Transportation”; “Retail Trade”; “Financial & Professional Services”; “Health, Educational and Recreational Services” and “Other”. Employment from each two-digit NAICS is not broken into more than one land use category.

ARC uses two land use models: REMI for regional forecasts and PECAS for small area forecasting. The REMI model’s land use input is based on the square feet of space by building type while PECAS uses employment as the land use input. Employment defined land use data is converted to space defined land use data for use in the PECAS. The outputs from the PECAS model are converted back to employment data again for use in the travel model.

### Baltimore Metropolitan Council

The Baltimore Metropolitan Council (BMC) is the MPO for seven metropolitan Baltimore counties. COG staff interviewed Shawn Kimberly, a Transportation Planner at BMC, about their forecast process. In 2017, BMC began a transition from a traditional, four-step travel model to an activity-based travel model. For the current forecast, BMC will be using both models, so staff can compare model results. The region is divided into 1,392 TAZs, which nestle into larger Regional Planning Districts.

The legacy four-step travel model uses the same four land use categories (Office, Industrial, Retail, Other) that COG uses for its forecast. The new ABM has different land use inputs than the previous travel model. The ABM has seven NAICS based employment categories: Office, Industrial, Retail, Education, Food, Medical and Other. All correspond to a two-digit NAICS, except for Accommodation (721) and Food Services (722), which belong to the same two-digit NAICS category (72: Accommodation and Food Services). Employment from each two-digit NAICS is not broken into more than one land use type.

The Cooperative Forecasting Group utilizes an agreed upon methodology for the development of base year jurisdictional level employment totals formed through the combination of wage and salary employment data from the Bureau of Economic Analysis and Nonemployer Statistics data from the U.S. Census Bureau. The group forecasts in five-year increments, employing a bottom-up methodology. The current Round 9 forecast has a base-year of 2015 and forecasts out to 2045.[1]

### Delaware Valley Regional Planning Commission

The Delaware Valley Regional Planning Commission (DVRPC) is the MPO for nine metropolitan Philadelphia counties in Pennsylvania and New Jersey. COG staff interviewed Ben Gruswitz, a Senior Planner at DVRPC, about their forecast process. DVRPC uses a traditional, four-step travel demand model. Their region is divided into 3,550 TAZs and 18 planning districts. TAZs nest within both planning districts and municipalities. Their travel model uses three employment land use categories: Basic, Retail and Other. DVRPC allocates employment to each land use category based on two-digit NAICS. Each two-digit NAICS perfectly corresponds with one land use category. Employment from each two-digit NAICS is not broken into more than one land use category.

DVRPC uses Dunn and Bradstreet, National Establishment Time-Series (NETS) and Census Transportation Planning Products employment data for base year employment. Forecasted employment relies on county-level forecasts by two-digit NAICS for Woods and Poole and NETS. At the TAZ level, employment for each two-digit NAICS sector grows at the same rate as the county-wide growth rate.

### Puget Sound Regional Council

The Puget Sound Regional Council (PSRC) is the MPO for four counties in the greater Seattle area. COG staff interviewed Michael Jensen, a Senior Planner at PSRC, about their forecast process. PSRC uses an activity-based travel demand model, transitioning from a traditional travel model in 2016. The model uses eight two-digit NAICS-based employment inputs, using CES and QCEW for source data. The land use input categories are Industrial, Natural Resources, Office, Retail, Services, Food, Government and Medical. As at BMC, the two-digit NAICS category for Accommodation and Food Services (72) is broken into its two three-digit NAICS categories.

Regional employment growth forecasts are made from an in-house, top-down econometric model, which uses NAICS employment, population and demographic data as inputs. PSRC relies on the parcel and agent-based UrbanSIM land use model for distributing employment growth. Zoning is the major input for UrbanSIM. UrbanSIM also uses NAICS for categorizing employment, except it uses 12 two-digit NAICS categories. Employment from each two-digit NAICS is not broken into more than one land use category in either the travel or land use models.

### Southern California Association of Governments

The Southern California Association of Governments (SCAG) is the MPO for six metropolitan Los Angeles counties, along with 191 jurisdictions within those counties. COG staff interviewed Ying Zhou, SCAG's Program Manager for Modeling and Forecasting, about their forecast process. SCAG is currently moving from a traditional travel demand model to an activity-based model. The region is

[1] The write-up for BMC was updated on September 19, 2018 after receiving additional feedback from Shawn Kimberly.

divided into approximately 11,000 TAZs. The SCAG demographic forecast is a bottom-up forecast that relies on local general plans and jurisdictional input. The current base-year is 2016 and the years 2020, 2030, 2035, 2040 and 2045 are forecasted.

SCAG uses data from InfoGroup and the California Employment Development Department for base-year employment. Two-digit NAICS is allocated into 13 employment categories for the travel model: “Agriculture”; “Transportation and Utilities”; “Construction”; “Manufacturing”; “Wholesale Trade”; “Retail”; “Information”; “F.I.R.E.”; “Professional Business Services”; “Education & Health”; “Leisure Hospitality”; “Government” and “Other Services”. Employment from each two-digit NAICS is not broken into more than one land use category. The SCAG self-employment factor is seven to eight percent of wage and salary employment. Military employment is not included in the employment forecast.

## Table 2: MPO Tables for Converting NAICS to Travel Model Land Use Types

| NAICS | Industry | ARC (Atlanta) | BMC (Baltimore) | SCAG (Los Angeles) | PSRC (Seattle) | DVRPC (Philadelphia) |
|---|---|---|---|---|---|---|
| 11 | Agriculture, Forestry, and Fishing | Natural Resources | Industrial | Agriculture | Natural Resources | Basic |
| 21 | Mining, Quarrying, and Extraction | Natural Resources | Industrial | Agriculture | Natural Resources | Basic |
| 22 | Utilities | Industrial | Industrial | Transport & Utilities | Industrial | Other |
| 23 | Construction | Other | Industrial | Construction | Industrial | Basic |
| 31 | Manufacturing | Industrial | Industrial | Manufacturing | Industrial | Basic |
| 32 | Manufacturing | Industrial | Industrial | Manufacturing | Industrial | Basic |
| 33 | Manufacturing | Industrial | Industrial | Manufacturing | Industrial | Basic |
| 42 | Wholesale Trade | Industrial | Industrial | Wholesale Trade | Industrial | Basic |
| 44 | Retail Trade | Retail | Retail | Retail | Retail | Retail |
| 45 | Retail Trade | Retail | Retail | Retail | Retail | Retail |
| 48 | Transportation and Warehousing | Industrial | Industrial | Transport & Utilities | Industrial | Other |
| 49 | Transportation and Warehousing | Industrial | Industrial | Transport & Utilities | Industrial | Other |
| 51 | Information | Other | Office | Information | Office | Other |
| 52 | Finance and Insurance | Office | Office | F.I.R.E. | Office | Other |
| 53 | Real Estate and Rental and Leasing | Office | Office | F.I.R.E. | Office | Other |
| 54 | Professional and Technical Services | Office | Office | Prof. Business Servs. | Office | Other |
| 55 | Management of Companies | Office | Office | Prof. Business Servs. | Office | Other |
| 56 | Administrative and Waste Services | Office | Other | Prof. Business Servs. | Office | Other |
| 61 | Educational Services | Services | Education | Education & Health | Services | Other |
| 62 | Health Care and Social Assistance | Services | Medical | Education & Health | Medical | Other |
| 71 | Arts, Entertainment, and Recreation | Services | Other | Leisure Hospitality | Services | Other |
| 721 | Accommodation | Services | Other | Leisure Hospitality | Services | Other |
| 722 | Food Services | Services | Food | Leisure Hospitality | Food | Other |
| 81 | Other Services | Services | Other | Other Services | Services | Other |
| 92 | Public Administration | Other | Office | Government | Government | Other |

*The land use categories for ARC have been abbreviated to fit the table layout.

## RECOMMENDATION TO USE THREE-DIGIT NAICS FOR CONVERSION TABLE

Like COG, the five interviewed MPOs each utilize NAICS-based employment data for base-year forecasts. Unlike past COG practices, these MPOs each allocate a two-digit (or three-digit) NAICS employment total to a single land use type. COG staff find this approach beneficial. It simplifies the base-year employment process and removes the complication of having non-integer employment totals, which arises when using percentages to allocate NAICS employment into more than one land use type. However, using a two-digit NAICS allocation does not allow for enough specificity to match the employment activities listed in Appendix A of the 1985 memorandum. For example, a two-digit based table would require military and public safety jobs (Other) to be classified alongside government office jobs (Office), Hospital jobs (Other) to be classified alongside dentists and primary care physicians (Retail), and Waste Management jobs (Industrial) to be classified alongside administrative jobs (Office). Table 3 on the next page proposes a conversion table allocating each three-digit NAICS to a single land use category. Allocations match the description of employment activities from Appendix A on the 1985 memorandum, but also rely on the memorandum's SIC allocations, COG member-jurisdiction NAICS tables or the interviewed MPO's NAICS tables when Appendix A is ambiguous or omits a three-digit NAICS category.

COG staff looks forward to receiving feedback from our subcommittee members to further enhance this process.

## Table 3: Three-Digit NAICS to COG Land Use Types

| NAICS | Industry Description | Land Use | NAICS | Industry Description | Land Use |
|---|---|---|---|---|---|
| 111 | Crop Production | Other | 483 | Water Transportation | Industrial |
| 112 | Animal Production | Other | 484 | Truck Transportation | Industrial |
| 113 | Forestry and Logging | Other | 485 | Ground Passenger Transport | Industrial |
| 114 | Fishing and Hunting | Other | 486 | Pipeline Transportation | Industrial |
| 115 | Agriculture Support | Other | 487 | Sightseeing Transportation | Industrial |
| 211 | Oil and Gas Extraction | Other | 488 | Transportation Support | Industrial |
| 212 | Mining | Other | 491 | Postal Service | Other |
| 213 | Mining Support | Other | 492 | Couriers and Messengers | Other |
| 221 | Utilities | Industrial | 493 | Warehousing and Storage | Industrial |
| 236 | Construction of Buildings | Industrial | 511 | Publishing Industries | Office |
| 237 | Heavy Construction | Industrial | 512 | Recording Industries | Other |
| 238 | Specialty Trade Contractors | Industrial | 515 | Broadcasting | Office |
| 311 | Food Manufacturing | Industrial | 517 | Telecommunications | Office |
| 312 | Beverage and Tobacco Mfg. | Industrial | 518 | Data Processing and Hosting | Other |
| 313 | Textile Mills | Industrial | 519 | Other Information Services | Other |
| 314 | Textile Product Mills | Industrial | 521 | Monetary Authorities | Office |
| 315 | Apparel Manufacturing | Industrial | 522 | Credit Intermediation | Office |
| 316 | Leather  Manufacturing | Industrial | 523 | Securities | Office |
| 321 | Wood Product Manufacturing | Industrial | 524 | Insurance Carriers | Office |
| 322 | Paper Manufacturing | Industrial | 525 | Financial Vehicles | Office |
| 323 | Printing | Industrial | 531 | Real Estate | Office |
| 324 | Petroleum and Coal Mfg. | Industrial | 532 | Rental and Leasing Services | Retail |
| 325 | Chemical Manufacturing | Industrial | 533 | Lessors of Intangible Assets | Office |
| 326 | Plastics Manufacturing | Industrial | 541 | Professional and Tech. Services | Office |
| 327 | Mineral Product Mfg. | Industrial | 551 | Management of Companies | Office |
| 331 | Primary Metal Mfg. | Industrial | 561 | Admin. and Support Services | Office |
| 332 | Metal Product Mfg. | Industrial | 562 | Waste Management | Industrial |
| 333 | Machinery Manufacturing | Industrial | 611 | Educational Services | Other |
| 334 | Computer Manufacturing | Industrial | 621 | Ambulatory Health Care | Retail |
| 335 | Electrical Manufacturing | Industrial | 622 | Hospitals | Other |
| 336 | Transport Manufacturing | Industrial | 623 | Nursing Care Facilities | Other |
| 337 | Furniture Manufacturing | Industrial | 624 | Social Assistance | Other |
| 339 | Miscellaneous Mfg. | Industrial | 711 | Performing Arts and Sports | Other |
| 423 | Durable Goods Wholesale | Industrial | 712 | Museums and Historical Sites | Other |
| 424 | Nondurable Goods Wholesale | Industrial | 713 | Recreation Industries | Other |
| 425 | Wholesale Brokers | Office | 721 | Accommodation | Retail |
| 441 | Vehicle and Parts Dealers | Retail | 722 | Food Services | Retail |
| 442 | Furniture Stores | Retail | 811 | Repair and Maintenance | Retail |
| 443 | Electronics Stores | Retail | 812 | Personal and Laundry | Retail |
| 444 | Building Material Stores | Retail | 813 | Religious and Civic Orgs. | Other |
| 445 | Food and Beverage Stores | Retail | 814 | Private Households | Other |
| 446 | Personal Care Stores | Retail | 921 | Government Support | Office |
| 447 | Gasoline Stations | Retail | 922 | Justice and Safety Activities | Other |
| 448 | Clothing Stores | Retail | 923 | HR Program Admin. | Office |
| 451 | Hobby Stores | Retail | 924 | Enviro. Program Admin. | Office |
| 452 | General Merchandise Stores | Retail | 925 | Urban Dev't Admin. | Office |
| 453 | Miscellaneous Retailers | Retail | 926 | Econ. Program Admin. | Office |
| 454 | Nonstore Retailers | Office | 927 | Space Research | Industrial |
| 481 | Air Transportation | Industrial | 928 | National Security | Other |
| 482 | Rail Transportation | Industrial | | | |