Development of a Data Framework for the Florida Standard Urban Transportation Modeling Structure (FSUTMS)

Final Report

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Prepared by:

Lehman Center for Transportation Research
Florida International University

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Mr. Vidya Mysore of FDOT Systems Planning Office serves as the project manager for this project.

16. Abstract

Current FSUTMS (Florida Standard Urban Transportation Modeling Structure) models use a variety of different input file formats, making it difficult to use and maintain the input data and to develop tools that can be applied across different local models. This project develops a data framework for FSUTMS that sets standards for all input data elements, including file folders, file names, table names, field names, and the associated metadata files. The design of the data framework incorporates three design approaches: (1) it stores all input files, both spatial or non-spatial, in a personal geodatabase that makes it easy to manage and enforce standards; (2) it makes use of a master database approach that stores data for multiple scenarios in a single database to facilitate data maintenance and ensure data consistencies across different scenarios; and (3) it includes all existing fields from all FSUTMS models, allowing the local models to convert to the data framework while continuing to use all of its current fields and modeling approaches. As part of the project effort, a prototype master network developed by the research team for the highway network in a separate project was extended to include public transportation (PT) networks, traffic analysis zone (TAZ) networks, and all other spatial and non-spatial input data, thus creating a master database that is not only multi-year, but also multi-modal and multi-scenario. To help local agencies convert to the master database, a step-by-step procedure for converting existing input files to this master database structure is provided in this report. The implementation of the proposed data framework in a master database will greatly facilitate the development and maintenance of model input data, and allow useful tools to be developed and applied across all models with minimum or no customization.

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EXECUTIVE SUMMARY

Florida Standard Urban Transportation Modeling Structure (FSUTMS) is intended to serve as the standard travel demand model for the state of Florida. Standardization allows Florida to maintain consistent modeling practices across the state and makes it easy to share resources, conduct statewide training, and develop tools that can be applied across different local models. However, over the years, FSUTMS models for different urban areas have become less and less standardized. The scripting capability of Cube Voyager, with its flexibility to define and read different input files largely at will, has made it possible for local models to stray from standardization. To a certain extent, this defeats the purpose of having a standard model for the state and, in the event of a legal dispute, potentially weakens the case for the agency involved. The lack of standardization has also made it difficult to develop tools that can be applied to different local models, as evidenced in the recent development of the Florida ITS Evaluation Tool (FITSEVAL), the FSUTMS Standard Reports, and the LOS Calculator, all of which required customization for individual local models.

This project develops a data framework for FSUTMS that sets standards for all input data elements, including file folders, file names, table names, field names, matrix names, and the associated metadata files. The design of the data framework incorporates three design approaches: (1) it stores input data, both spatial or non-spatial, in a personal geodatabase that makes it easy to manage and enforce standards; (2) it makes use of a master database approach that stores data for multiple scenarios in a single database to facilitate data maintenance and ensure data consistency across different scenarios; and (3) it includes all existing fields from all FSUTMS models, allowing the local models to convert to the proposed data framework while continuing to use all of their existing fields and modeling approaches.

As part of the data framework development, the file folder structure was adapted to suit the master database approach from the standards document released by the Florida Model Task Force (MTF) in January 2006. In addition, the naming conventions for all input data were adapted from the traditional file-based structure to the database structure, which is designed to store the formerly individuated files in tables in the Microsoft Access-based personal geodatabase. Furthermore, a standard metadata file is recommended to help enforce metadata standards that are currently non-existent. In addition to the usual metadata information, the standards implement a two-level structure that allows the users to easily locate and conveniently access the complete data dictionary for all data tables, including look-up tables for attribute codes such as area types and facility types.

The proposed data framework, while independently available for implementation, was built into a master database in this project. This master database was created by extending a prototype master network system developed by the research team for the highway network in a separate project to include public transportation (PT) networks, TAZ network, and all other spatial and non-spatial input data. In other words, the master database is multi-year, multi-modal, and multi-scenario. Unlike a traditional file-based, single-scenario approach, a master database approach combines the base-year and all future-year input data in a single database. With such a design, the user can extract a specific network from its master database by simply indicating the timeline and the design alternative of the scenario to be extracted. After a scenario database is extracted and modified, it can be merged back into the master database. During the merging process, changes to the network can be automatically applied and propagated to other scenarios in the master database,

thus saving time by both eliminating repetitive manual changes and avoiding database coding errors. The master database system was beta tested and verified for its ability to work with the highway, transit, and TAZ networks.

Stored in ESRI's personal geodatabase format, the master database was designed to minimize data storage and extract consolidated networks. The master database also supports open and unlimited data fields and, most importantly, implements both forward and backward change propagations. While the use of a personal geodatabase raised some initial concerns about its 2GB file size storage limitation, the test results with the Southeast Regional Planning Model (SERPM) model, which is perhaps the largest model in terms of data requirements, indicate that the limit will not be a problem as the efficient design of the master database is able to keep the required data size to only a small fraction of the 2 GB capacity.

As part of this project, a standalone master database system was developed to allow the user to extract a scenario database from the master database and to merge a scenario database back to the master database. Because the system works entirely independent of Cube, it requires additional time to detect network changes when a scenario database is merged back to its master database. Currently, this additional time amounts to about one minute or less on an average personal computer for a large network like SERPM. An alternative will be for the Cube developers to generate a log file that records all the network changes after each network editing session. This can reduce the network merging time to seconds.

To help local agencies convert to the master database that implements the proposed data framework, a step-by-step procedure for converting existing input files to the master database structure is provided. The conversion procedure includes both spatial and non-spatial input files, and makes use of a combination of Cube's Geodatabase Manager and ESRI's ArcCatalog tool. The procedure was successfully applied by the research team to convert the SERPM model. In addition, it was also successfully applied by Cambridge Systematics to convert the networks for the Gainesville urban model and the Tampa Bay Regional Planning Model (TBRPM), and by the Corradino Group to convert the Greater Treasure Coast Regional Planning Model (GTCRPM).

The implementation of the proposed data framework in a master database will greatly facilitate the development and maintenance of model input data, and allow useful tools to be developed and applied across all models with minimum or no customization. The proposed data framework also fully considers the local modeling needs. In implementing the proposed data framework, local models will need to modify only the affected Cube scripts to read from a standard database. The framework will not require any changes to the models, nor will the model outputs change after converting to the framework. Local models are encouraged to migrate to the proposed data framework in order to be able to use any future tools that may be developed for statewide applications and to reap the many benefits of employing a master database approach.

Given the complex nature of the master database operations and the fact that the master database approach is new to the Florida transportation modeling community, it is recommended that hands-on training be provided to familiarize the users with the data framework, the master database concepts and operations, and the model conversion process. It is also recommended that the training be conducted as part of the new Cube GIS Workshop. The recommended length of the training is about half a day.

It is important to recognize that the data framework presented in this report includes only the current input data from the ten local models considered. It is expected that these local models will continue to evolve and that new models may be added, while others may be dropped. Consequently, the proposed data framework must be dynamic in nature. In other words, the framework will continue to evolve with the models. It will allow, for example, a new variable to be added or the data domain of a variable to be modified. To this end, continued coordination among the local models will be needed to keep the framework current and relevant. The Web can best serve this purpose. It is recommended that a new webpage devoted to the proposed data framework be developed as part of FSUTMSOnline. The webpage will allow the users to download the master database installation program, provide background information and instructions, and document the data framework standards. For the data framework to be dynamic, the webpage will allow the model coordinators or any other authorized persons (with password access) to make changes to the data framework, such as adding a new variable to a standard table. All changes to the framework will be subject to review and acceptance by the FDOT Central Office and, in the case of a major change, the Florida Model Task Force (MTF). Once approved, the change can be made official on the webpage and become accessible to all users. It is expected the modification, review, and acceptance process will be automated as part of the webpage development. The same webpage can also include such materials as quick references, frequently asked questions (FAQ), etc.

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CHAPTER 1
INTRODUCTION

The Florida Standard Urban Transportation Modeling Structure (FSUTMS) is the standard travel demand model used in the state of Florida. The current version of FSUTMS is powered by the Cube Voyager modeling engine. Developed and distributed by Citilabs, Inc., Cube Voyager is built on the traditional four-step modeling approach, which includes trip generation, trip distribution, mode split, and trip assignment. Each of these modeling steps involves a number of input files. For the purpose of this project, these input files are divided into those related to transportation networks and those that are not directly related to transportation networks.

Transportation networks generally include the highway and transit networks. These networks are represented by a set of interconnected links and nodes. In general, highway segments or transit lines are represented by links and intersections and other break points on the networks are represented by nodes. Other than the attributes (or fields) describing the geometries of the networks, each link and node can further include a number of fields that describe the associated roadway characteristics. The link attributes may include free-flow speed and number of lanes, while the node attributes may include the type of intersection and whether it is signalized. Input files that are not related to transportation networks include those for storing socioeconomic data, which are geo-referenced by traffic analysis zones (TAZ), and reference data for (1) look-up tables for trip rates, frictional factors, speed-capacity, etc.; and (2) model parameters for CTOLL, CONFAC, BPR coefficients, transit fares, etc.

1.1. Problem Statement

The many input files for FSUTMS currently exist in a variety of file formats. For example, socioeconomic data are stored in dBase files, highway network data (loaded and unloaded) are stored in proprietary Voyager binary files, and most transit-related data and look-up tables are stored in text files. Even within the same type of files, there exist different record formats. For example, a text file could be either fixed-width, comma-delimited, a combination of both, or in some other proprietary format. The data stored in these files are not constrained by any required data types, formats, or domains, and are therefore susceptible to user input errors. These files also generally lack a record header, thus relying on the user's familiarity with the record fields. For those files that do have a header, the attribute names can vary from one local FSUTMS model to another, making it difficult for software programs to easily identify specific fields. Lastly, the fact that data are stored in individual files makes them difficult to locate and maintain.

All of the above shortcomings pose significant challenges to users, especially the novice. More importantly, the lack of standardization in these files in terms of their file folders, file formats, data formats, and field names has made it nearly impossible to develop tools that can be applied across different local models. To a certain extent, this defeats the purpose of having a standard model for the state. As evidenced in the recent development of the Florida ITS Evaluation Tool (FITSEVAL), the FSUTMS Standard Reports, and the LOS Calculator, these tools cannot be applied to different local models without customizing for individual model input structures. For the long-term benefits of FSUTMS, a data framework that standardizes the model input data is needed.

1.2. Framework Design Approaches

The design of the FSUTMS data framework in this project is based on the following three approaches:

1. *Use of a personal geodatabase*. The data framework is built on a Cube geodatabase which is a proprietary personal geodatabase that includes some additional system attribute tables used by Cube Voyager. The use of a geodatabase for FSUTMS input data is not new. GIS-TM made use of this approach more than a decade ago. Using a geodatabase to store all input data is attractive as it keeps all of the model input files, either spatial or non-spatial, in a single place. These data are stored in standard relational tables that can easily be located, managed, and accessed. Although Version 5.0 of Cube Voyager allows users to alternatively use an ArcMap-like network editor that works with a geodatabase, it has so far been limited to only the highway network data. In other words, the other files that Cube uses continue to stay in their current file formats, some of which have retained the original file structures from the old TRANPLAN version of FSUTMS. However, as Citilabs moves toward replacing VIPER with a full-fledged GIS window for data editing, it is inevitable that FSUTMS will eventually transition to Cube geodatabase for most of its input data, if not all.

2. *Use of a master database approach*. The data framework is built on a master geodatabase that includes data for all scenarios in a single master database. The objective of using a master database is to further integrate the different model data for different scenarios that have too often become difficult to manage and maintain. The workings of a master database and its advantages are detailed in Chapter 5 of this report. Through a recent contract with the FDOT Research Center, the research team successfully developed a prototype master network that works with highway networks. In this project, this prototype master network is extended to include public transportation (PT) networks, TAZ network, and all other spatial and non-spatial input data. In other words, this project further develops the master **network** into a master **database** that stores all model input data in a multi-year, multi-modal, and multi-scenario personal geodatabase. Chapter 6 of this report provides step-by-step instructions on how to convert existing input files to a master geodatabase that implements the proposed data framework.

3. *Accommodate all existing fields from all local models*. The main purpose of developing a data framework is clearly to standardize data variables (i.e., fields or attributes) in terms of variable name, definition, data type, and data domain. In order to continue to accommodate local modeling needs, the data framework is designed to accommodate all existing variables. In other words, there is no standard set of variables for all local models. Instead, the data framework is inclusive of all variables currently used by all of the local FSUTMS models considered (see Section 1.4). Each local model, however, will only include its own variables. The only requirement for conforming to the data framework is to ensure that all variables, if included in the geodatabase for a specific model, are consistent with that of the variables defined in the framework in terms of variable name, data type, and data domain. This approach allows all local models to continue to use all current variables while taking advantage of the many benefits of a master database approach.

1.3. Project Goal and Objectives

The goal of this project is to design a data framework for FSUTMS that will facilitate the development and maintenance of model input data, and allow useful tools to be developed and applied across all models with minimum or no customization. By following the three design approaches described in the previous section, this project aims to achieve the following four project objectives:

1. Develop standards for folder name and structure, database name, table name, matrix name, field name, and field type for all input data and metadata files.
2. Design a master database that is inclusive of all standard input data tables and fields of all modes from all scenarios of all local models.
3. Develop a master database system that implements the master database approach.
4. Develop a procedure to guide the users in converting input files of the existing model to the proposed master database.

1.4. FSUTMS Models Considered

The data fields in the proposed data framework are inclusive of those from the following FSUTMS models:

1. Florida Statewide Model (FLSWM)
2. Northeast Regional Planning Model (NERPM)
3. Tampa Bay Regional Planning Model (TBRPM)
4. Southeast Regional Planning Model (SERPM)
5. Treasure Coast Regional Planning Model (TCRPM)
6. Greater Treasure Coast Regional Planning Model (GTCRPM)
7. Central Florida Regional Planning Model (CFRPM)
8. Northwest Florida Regional Planning Model (NWFRPM)
9. Gainesville Urbanized Area Transportation Model (GUATS)
10. Polk TPO Model (POLK)

This list includes one state model, all current regional models, and two urban models. A number of known urban models are not included for one of the following three reasons: (1) they overlap a regional model and have been, or are expected to be, phased out; (2) the models are still based on the TRANPLAN version of FSUTMS; and (3) they use the same input format as one of the urban models included, as is the case with the urban models in District 1, which is represented by the Polk TPO model. It is noted that in the case of the SERPM model, both 24-hour and time-of-day (TOD) models are included.

1.5. Report Organization

The rest of this report is organized as follows. Chapter 2 proposes a standard file folder structure; naming conventions for database files, data tables, data fields, and matrix tables (in matrix files); and a standard metadata file. Chapters 3 and 4 present the standard input fields for transportation network- and non-transportation network-related data tables, respectively. Chapter 5 introduces the master database approach, details the inner working of the master database, and presents the user interface and functionalities of the master database system. Chapter 6 describes a step-by-step procedure for converting the input files of existing models to the master database structure developed in this project. Finally, Chapter 7 summarizes the work accomplished in this project and provides recommendations for further studies.

CHAPTER 2
NAMING CONVENTIONS, FOLDER STRUCTURE, AND METADATA

This chapter sets standards for all input data elements that include file folders, file names, table names, field names, matrix names, and the associated metadata files. These data elements are designed in the context of a personal geodatabase operating in a master database environment.

2.1. Naming Conventions

Naming conventions are needed for file folders, database files, data tables, and data fields. The conventions for naming file folders are described in the next section.

2.1.1. Database File Names

There are two general categories of database in the master database approach: master database and scenario databases. For each model there is only one master database, which is a geodatabase that stores all the input data from different model scenarios. The recommended name for the master database carries the following format:

ModelName_MASTER.MDB

where MASTER is a fixed part of the name to clearly indicate that it is a master database file and MDB is the standard file extension for Microsoft Access database. Thus, the master database file for the SERPM model, for example, will have the name SERPM_MASTER.MDB.

On the other hand, there can be as many scenario databases as needed. A scenario database is associated with a model year and a design alternative. Using the familiar three-character naming convention, the following format is recommended for scenario databases:

ModelNameYY?.MDB

where YY represents the last two digits of the model year and "?" is one-letter of the alphabet (usually starting from "A") that indicates a design alternative for the specific model year. For example, SERPM20A.MDB indicates that the file is for the first scenario for model year 2020 for the SERPM model. It is recommended that the same format be used also for the base-year database to clearly indicate the specific year being used as the base.

2.1.2. Data Table Names

Data tables in a database are the equivalent of individual files in a file-based system, with the database serving as a file folder. However, unlike in a file-based system, it is not necessary for a table name to carry the model year and model alternative, which are included as part of the database name. In fact, since separate database files are used to store data for individual scenarios, the table names must be kept the same across all scenario databases for the system to work.

In this project, the following input data tables, along with their proposed names, are considered for incorporation in the data framework. Appendix A lists for each of these tables the original field names used by each of the ten local models considered (see Section 1-4), as well as their recommended standard field names.

- ZONEDATA: Trip zonal production and attraction data for trip generation (Appendix A-1).
- ZONEDATA_LIFESTYLE: Trip zonal production and attraction data trip generation of life-style model (Appendix A-2).
- SPECGEN: Special generator data for trip generation (Appendix A-3).
- EETRIPS: External-external trips between each pair of external zones (Appendix A-4).
- INT_EXT: Internal-external trip productions for trip generation (Appendix A-5).
- PRODRATES: Trip generation production rates (Appendix A-6).
- ATTRRATES: Trip generation attraction rates (Appendix A-7).
- DUWEIGHTS: Percentages used to stratify dwelling units into household size groups based on average persons per dwelling unit ranges (Appendix A-8).
- PANDA: Productions and attractions by TAZ and trip purpose (Appendix A-9).
- SPDCAP: Highway speeds and capacities by area type, facility type, and number of lanes.
- TOLLLINKS: Toll plaza configurations (Appendix A-10).
- TURN_PENALTIES: Turn penalties and prohibitor (Appendix A-11).
- VFACTORS: Variable factors for UROAD, CONFAC, and BPR coefficients (Appendix A-12).
- FF: Friction factors for each trip purpose as a function of time in minutes of travel (Appendix A-13).
- TRANSIT_MODES: Transit modes (Appendix A-14).
- TRANSFER_FARES: Fare to transfer between each pair of transit modes (Appendix A-15).
- TRANSIT_OPERATORS: Names of transit operators (Appendix A-16).
- WAIT_CURVES: Waiting time by service frequency (Appendix A-17).
- TRANSIT_SPEED: Highway/transit speed delay curves (Appendix A-18).

With the exception of the PANDA table, which is also a standard output file from the trip generation program, all other tables contain the original input data provided by the users (as opposed to generating from a program). The naming conventions for network-related tables are described in Chapter 3.

2.1.3. Data Field Names

All data fields are limited to a maximum of 10 characters to accommodate users who may need to convert the data into a .dbf file, such as for ESRI's shapefiles. While not required, it is recommended that all alphabets be written in the upper case (variables in personal geodatabase files are not case-sensitive). For fields involving multiple words, one or more underscores may be used to separate the words when its use improves clarity and does not exceed the 10-character limit. To avoid potential conflicts, the reserved key words used in SQL, MS ACCESS, CUBE, and ArcGIS are avoided. For example, TTIME, instead of the SQL-reserved word TIME, is used for travel time. The standard data fields are provided in Chapters 3 and 4 for transportation and non-transportation network-related tables, respectively. It is noted that the words, “variable”, “attribute”, and “field”, are used interchangeably throughout this report, depending on the context as appropriate.

2.1.4. Matrix Names

A special category of input data involves the matrix files, which store zone-to-zone network skims and trips. Because of the two-dimensional nature of these matrices, they are best stored in the current Cube proprietary matrix file format instead of a geodatabase, which is more suitable for tabulated relational tables. In each matrix file, there are multiple matrices for different trip purposes, time periods (e.g., peak and off-peak), and/or transit modes. Appendix B lists the current matrix names used by various local models as well as the recommended standard names for matrices in the following six matrix files:

1. FREESKIM.MAT: Free-flow highway skims matrix for all zone-to-zone pairs (Appendix B-1).
2. CONGSKIMS.MAT: Congested highway skims matrix for all zone-to-zone pairs (Appendix B-2).
3. PSNTRIPS.MAT: Zone-to-zone person trip tables for different trip purposes (Appendix B-3).
4. TSKIM.MAT: Transit network skims for all zone-to-zone pairs for different time periods and transit modes (Appendix B-4).
5. HWYTRIPS.MAT: Zone-to-zone trip tables for different trip purposes (Appendix B-5).
6. TRNTRIPS.MAT: Zone-to-zone transit trip tables for different trip purposes (Appendix B-6).

2.2. File Folder Structure

Figure 2-1 shows the proposed file folder structure. This structure is adapted from the document entitled *FSUTMS New Standards and Enhancements–A User Oriented Approach*, dated 2006, to suit the master database approach. As can be seen from the figure, the main folder is FSUTMS. The next subfolders are organized by FDOT district number. For example, the subfolder for a model in FDOT district four will have the name “D4.” This is then followed by another subfolder for the specific model name. This subfolder contains the following:

1. The Catalog file for the model.
2. A set of five subfolders (Applications, Archive, Doc, Media, and Parameters) that are used to store files for the indicated purposes.
3. A subfolder called MASTER_DATA that is used to store the master database file and the associated metadata and its template files.
4. A set of subfolders that are used to store individual scenario databases and related output files. These subfolders have the “YYYY?” folder name format, with YYYY indicating the scenario model year and “?” indicating the model alternative. The same naming convention is used for the base-year database. Within each scenario subfolder, there are

two additional subfolders: one for the input scenario database, and one for the corresponding model output files.

Figure 2-1. Standard File Folder Structure

2.3. Metadata Standards

The structure of the proposed metadata file is adapted from that generated by ArcCatalog. It includes the following information: data description, data type and format, data source, keywords, point of contact, time period of data, projection, and data dictionary. In the proposed metadata file, the data dictionary is expanded into a two-level structure. The first level lists all of the input data tables (see Figure 2-2) that apply to one or more of the ten models considered (see Section 1-4). Clicking a specific data table will open a table showing a list of fields for the table, their name, data type, definition, and the specific models that make use of each field. For fields such as facility types, which involve a list of facility type codes, a look-up table is displayed under the field definition (see Figure 2-3). Note that the standard metadata template can be accessed via Windows' **Start|All Programs** folder for the Master Data System described in Chapter 5.

Data Structure and Attribute Information
Attributes of HWYLINKS
Attributes of HWYNODES
Attributes of PTLINES
Attributes of PTLINKS
Attributes of PTNODES
Attributes of ZONEDATA
Attributes of ZONEDATA_LIFESTYLE
Attributes of SPECGEN
Attributes of EETRIPS
Attributes of INT_EXT
Attributes of PRODRATES
Attributes of ATTRRATES
Attributes of DUWEIGHTS
Attributes of PANDA
Attributes of SPDCAP
Attributes of TOLLLINKS
Attributes of TURN_PENALTIES
Attributes of VFACTORS
Attributes of FF

Figure 2-2. First Level Displaying List of Data Tables

DISTANCE

Definition: Calculated distance (in miles)
Type: Double ***Width:*** 8
Models: All

FTYPE

Definition: Facility type code
Type: SmallInteger ***Width:*** 2

Attribute domain values

Value	*Definition*
11	Urban Freeway Group 1 (cities of 500,000 or more)
12	Other Freeways (not in Group 1)
15	Collector/Distributor Lane
16	Controlled Access Expressway
17	Controlled Access Parkway
21	Divided Arterial Unsignalized (55 mph)
22	Divided Arterial Unsignalized (45 mph)
23	Divided Arterial Class Ia)
24	Divided Arterial Class Ib)
25	Divided Arterial Class II/III
31	Undivided Arterial Unsignalized with Turn Bays

Figure 2-3. Second Level Displaying Data Dictionary and Look-up Tables

CHAPTER 3
TRANSPORATION NETWORK DATA

Transportation networks in FSUTMS are generally categorized into highway networks and public transportation (PT) networks. Within a PT network, there can be multiple sub-networks representing the transit routes for different transit modes such as local bus, express bus, rail transit, etc. This chapter presents the standardization of both geometric and data fields used in FSUTMS for different models to describe these transportation networks.

3.1. Network Data Files

Traditionally, highway network data are stored in a Cube Voyager binary network data file with the .NET file extension, and PT network data are defined as transit network route data, which are saved in the .LIN text files. All models use both formats for network data editing and analysis tasks in Cube's VIPER environment. Cube Voyager 5.0 adds a new GIS window and support for ESRI geodatabase feature classes, while continuing to support VIPER 4.x. In the proposed data framework, the data for both highway and PT networks are stored in a personal geodatabase—a Microsoft Access database that contains a set of tables defined by ESRI for holding spatial data and miscellaneous other system information (Arctur and Zeiler, 2004). As will be detailed in Chapter 5 of this report, this personal geodatabase is implemented using the master database approach.

3.2. Highway Network Data

Highway network data inside a geodatabase is organized as a feature dataset. Within this dataset, there are two feature classes: one for the highway links, and the other for the highway nodes.

1. *Highway nodes feature class*: A feature class for the collection of nodes used in the links. The field N is used to represent a highway node to reference the A node and B node in the highway and PT links feature classes.
2. *Highway links feature class*: A feature class for highway links. Fields A and B represent the A node and B node as a directional link.

In order to take full advantage of Cube's GIS editing environment, a geodatabase with highway network data must be compatible with the so-called "Cube geodatabase" format. A Cube geodatabase is simply a personal geodatabase used by Cube that includes some additional system attribute tables. The convention for defining both feature classes in the Cube geodatabase is to use the name of the highway network as a prefix. In the proposed data framework, the highway network name is defined as HNet, so the feature class of highway network nodes is named HNet_Node, and the feature class of highway network links is named HNet_Link. In addition to the highway node and link feature classes, a Cube geodatabase also contains another major attribute table: Citilabs_Networks. This attribute table is used by Cube Voyager to define highway networks and store information that allows the link and node feature classes to form one integrated network (as opposed to two separate feature class layers) to ease network editing in Cube's GIS window. As an integrated network facilitates the simultaneous editing of nodes and links, when a node is moved from point A to point B, all of the links attaching to the node will be automatically moved. In this way, potential spatial data inconsistencies are prevented.

In general, the fields of a feature class inside a geodatabase can be classified into the following three categories:

1. Feature class built-in fields, such as OBJECTID, SHAPE, SHAPE_LENGTH, which are created automatically when a feature class is generated.
2. Network key fields, such as N, A, B, LINEID, which are used to represent a unique feature record.
3. Attribute fields, which include fields for data pertaining to a specific model.

This chapter focuses on the attribute fields that are standardized in the data framework. Detailed explanations of the first two categories are provided in Chapter 5. It is noted that the Byte data type is not used in any of the fields presented in this chapter because the ArcGIS API applied in the master database program described in Chapter 5 will automatically convert all fields defined with a Byte data type to an Integer data type when exporting to a new geodatabase.

3.2.1. Highway Link Feature Class Fields

Table 3-1 list all the network fields currently defined in the data framework. Table 3-2 provides in a separate table additional fields that are used to describe the toll links for networks involving toll facilities. These fields in both tables were developed based on the ten local FSUTMS models considered. It is also noted that in the original GUATS model, many variables are used to store roadway-related attributes from FDOT's Roadway Characteristics Inventory (RCI). The three variables, Roadway, BEGIN_POST, and END_POST, can further be used to link additional RCI attributes. When RCI fields are included, it is expected that the standard RCI "feature" names be used as the field names. Thus, it is necessary that these fields be included in the proposed database framework. It is noted that during the review of highway network link variables, it was found that the fields used to define the geographic locations or counties have different code definitions in different models. Some models redundantly use multiple fields to define the location or county. In the data framework, these fields are consolidated; only the field named COUNTY is defined as the standard field. The code definition for this field is the FDOT traffic database county code number.

Table 3-1. Data Fields for Highway Link Feature Class

Name	Type	Description	Applicable Models
A	Long integer	A node number	All
B	Long integer	B node number	All
DISTANCE	Single	Calculated distance (in miles)	All
FTYPE	Integer	Facility type code	All
ATYPE	Integer	Area type code	All
NUM_LANES	Integer	Directional number of lanes	All
SCREENLINE	Integer	Screen line number	All

Table 3-1. Data Fields for Highway Link Feature Class (continued)

Name	Type	Description	Applicable Models
DIRCODE	Integer	Indicates one-way operation; 1 if one way, 0 if two way	All
TRA_COUNT	Integer	Directional daily traffic count	All
COUNT_STAT	Integer	Count station number	All
COUNT_SRE	Text (50)	Source of count	All except CFRPM
MOCF	Single	Model output conversion factor (also PSCF)	NERPM, POLK
AADT	Integer	Annual Average Daily Traffic	All except CFRPM
COUNTY	Integer	Geographic location code (county); FDOT traffic database county code number	All
TOLL	Integer	Tolled link indicator (0 = no tolls; ≠ 0 tolled link)	All except FLSWM , NERPM, GUATS, CFRPM
TOLL_ID	Integer	Toll plaza ID number	All except FLSWM, GUATS, NWFRPM, GTCRPM
SPEED	Integer	Speed	All except NERPM, GUATS
TTIME	Single	Travel time (in minutes)	All except NERPM, GUATS
CAPACITY	Integer	Capacity	All except CFRPM
NAME	Text (50)	Street name	All
DISTRICT	Integer	Planning district number	All except CFRPM, GTCRPM
CONSTRUCT	Integer	Used in highway evaluation procedure	All except FLSWM, CFRPM, GTCRPM
LANDUSE	Integer	Used in highway evaluation procedure	All except FLSWM, CFRPM
USECODE	Integer	Used in highway evaluation procedure	All except FLSWM, CFRPM
POSTED_SPD	Integer	Posted speed	All except NERPM, GUATS
COFIPS	Integer	County FIPS code	NERPM, FLSWM, POLK
BK_LNS	Integer	Bike lanes code (0 = no bike lanes, 1 = in street bike lanes, 2 = wide buffers for biking, 3 = off street multi-purpose facilities)	GUATS
LOSN	Integer	Level of service standard, expressed as a number, from the MTPO congestion management system (A=1, B=2, C=3, D=4, E=5)	GUATS
MSV	Integer	Maximum service volume (daily) at LOSN, from the MTPO congestion management system	GUATS
ROADWAY	Long Integer	RCI roadway number (county, section and subsection)	GUATS
BEGIN_POST	Single	RCI beginning milepost	GUATS
END_POST	Single	RCI ending milepost	GUATS
PTMS_ID	Integer	Portable traffic counter identifier number	GUATS

Table 3-1. Data Fields for Highway Link Feature Class (continued)

Name	Type	Description	Applicable Models
TTMS_ID	Integer	Telemetry counter identifier number	GUATS
EC_PROJ	Integer	Code to indicate whether this project is different in the E+C and existing (variation) networks	GUATS
ANOTATE	Text (50)	Reserved for annotation in plots	GUATS
ZONENUM	Integer	Zone number	NWFRPM, TBRPM
TMODE	Integer	Transit mode	SERPM, GTCRPM, TCRPM
TDIST	Single	Transit distance	SERPM, GTCRPM, TCRPM
TSPEED	Integer	Transit speed	SERPM, GTCRPM, TCRPM
SEGID	Long Integer	Segment identifier number	SERPM, GTCRPM, TCRPM
CTOTAL	Long Integer	Classification count total	SERPM
PASS_PCT	Single	Classification count percent (passenger vehicles)	SERPM
F4T_PCT	Single	Classification count percent (4-tired trucks)	SERPM
SU_PCT	Single	Classification count percent (single-unit trucks)	SERPM
COMB_PCT	Single	Classification count percent (combination trucks)	SERPM
TOLLTYPE	Integer	Toll type (1=coin, 2=card, 3=AVI)	SERPM, GTCRPM, TCRPM
PLAZADESC	Text (50)	Toll plaza description	SERPM, GTCRPM, TCRPM
PLZALNSMIN	Integer	Minimum number of lanes in toll plaza	SERPM, GTCRPM, TCRPM
PLZALNSMAX	Integer	Maximum number of lanes in toll plaza	SERPM, GTCRPM, TCRPM
CARTOLL	Single	Car toll price ($) (same as SUNPASSTOLL)	SERPM, GTCRPM, TCRPM
SVCMINUTES	Single	Service time in minutes	SERPM, GTCRPM, TCRPM
SVCSECONDS	Integer	Service time in seconds	SERPM, GTCRPM, TCRPM
DECELCODE	Integer	Deceleration code ('1' for FTC2=95, not used)	SERPM, GTCRPM, TCRPM
ACCELCODE	Integer	Acceleration code ('1' for FTC2=95, not used)	SERPM, GTCRPM, TCRPM
EXACTCHLNS	Integer	Number of exact coin/change lanes	SERPM
AVILANES	Integer	Number of dedicated AVI lanes	SERPM, GTCRPM, TCRPM
PCTTRUCKS	Single	Ratio of heavy trucks on toll links	SERPM
STCARD	Text (1)	STCARD (S for speed and T for time)	SERPM
TODRC	Long Integer	Time-of-day total 24-hour raw count (directional)	SERPM
PAMPRD	Single	Percent of AM peak period traffic count	SERPM

Table 3-1. Data Fields for Highway Link Feature Class (continued)

Name	Type	Description	Applicable Models
PMDPRD	Single	Percent of midday period traffic count	SERPM
PPMPRD	Single	Percent of PM peak period traffic count	SERPM
PNTPRD	Single	Percent of night period traffic count	SERPM
PAMPH	Single	Percent of AM peak hour traffic count	SERPM
PPMPH	Single	Percent of PM peak hour traffic count	SERPM
TODRC2W	Long Integer	Time-of-Day total 24-hour raw count (2-way)	SERPM
CNT_AMPRD	Long Integer	AM peak period traffic count	SERPM
CNT_MDPRD	Long Integer	Midday period traffic count	SERPM
CNT_PMPRD	Long Integer	PM peak period traffic count	SERPM
CNT_NTPRD	Long Integer	Night period traffic count	SERPM
CNT_OFPRD	Long Integer	Off-peak period traffic count	SERPM
CNT_AMPKH	Long Integer	AM peak hour traffic count	SERPM
CNT_PMMPH	Long Integer	PM peak hour traffic count	SERPM
TCNT_PAS4T	Long Integer	24-hour classification count - passenger cars and 4-tired truck	SERPM
TCNT_4TIRE	Long Integer	24-hour classification count - 4-tire truck	SERPM
TCNT_SU	Long Integer	24-hour classification count - single-unit truck	SERPM
TCNT_COMB	Long Integer	24-hour classification count - combination truck	SERPM
TCNT_SUCOM	Long Integer	24-hour classification count -SU & COMB truck	SERPM
FTC2	Integer	Revised facility type codes (minor classification)	SERPM, GTCRPM, TCRPM
OVERIDE	Integer	Override capacity indicator (0=no, 1=yes); if yes, users should manually enter CAPACITY field	SERPM, GTCRPM, TCRPM
DIVIDED	Integer	Divided arterials and uninterrupted roadways (1=yes, 0=no); used in capacity calculation	SERPM, GTCRPM, TCRPM
LEFTTURN	Integer	Presence of a left-turn bay (1=yes, 0=no); used in capacity calculation	SERPM, GTCRPM, TCRPM
LFWYMRG	Integer	Left-side ramp and freeway merge (1=yes, 0=no)	SERPM
TDSECID	Integer	Travel time and delay section ID	SERPM
GC_RATIO	Single	User-coded green/cycle length ratio	SERPM, GTCRPM, TCRPM
A_OVERRIDE	Integer	Override "Alpha" value for BPR volume-delay equation	SERPM

Table 3-1. Data Fields for Highway Link Feature Class (continued)

Name	Type	Description	Applicable Models
B_OVERRIDE	Integer	Override "Beta" value for BPR volume-delay equation	SERPM
INTEXT	Text (50)	Variable used to flag internal-external trips on links	NWFRPM
SFCAT	Integer	FDOT traffic database seasonal factor category	NWFRPM
FFTIME	Single	Free flow time in minutes	FLSWM, GTCRPM, TCRPM
UROAD	Single	UROAD factor	FLSWM, GTCRPM, TCRPM
BPRCOEF	Single	BPR coefficient	FLSWM, GTCRPM, TCRPM
BPREXP	Single	BPR exponent	FLSWM, GTCRPM, TCRPM
COMBINED	Integer	Ramp identification code (TIII-NNN-A-D-R-S)	FLSWM
T_THRULANE	Integer	Number of through lanes; indicates the number of striped lanes in both directions	FLSWM
T_OWNRSHIP	Text (50)	Identifies the road owner	FLSWM
T_FFSPD	Single	Free flow speed (Calculated from congested speed and delay)	FLSWM
T_DCAP_LN	Long Integer	Daily Capacity by NHPN Functional Class Code (1=18,500, 2=15,500, 6=10,000, 7=8,500, 8=8,250, 9=7,500, 11=19,000, 12=15,000, 14=8,500, 16=8,000, 17=7,500,19=7,000)	FLSWM
TRKPCT	Single	Truck percentage of the total AADT	FLSWM
HVYTRKPCT	Single	Heavy truck percentage	FLSWM
MEDTRKPCT	Single	Medium truck percentage	FLSWM
STATE	Text (20)	State name	FLSWM
COUNTYNAME	Text (50)	County name	FLSWM
STFIPS	Integer	State level FIPS	FLSWM
NC	Integer	Indicate nine proposed in-state corridors	FLSWM, TBRPM
RC	Integer	1 indicates the major in-state corridors mainline and 2 indicates their ramps	FLSWM
MODEL	Text (50)	Indicates different local model covered regions	FLSWM
TRKPCT	Single	Truck percentage of the total AADT	FLSWM
HVYTRKPCT	Single	Heavy truck percentage	FLSWM
MEDTRKPCT	Single	Medium truck percentage	FLSWM
SITETYPE	Integer	Permanent or temporary count site	FLSWM
DL	Text (50)	Indicates district border roadways	FLSWM
MPOCOL	Text (50)	Border of Alachua and NERPM model roadways	FLSWM
MPOCNT	Long Integer	Count from MPO	FLSWM
MPOCOVOL	Long Integer	Volume from MPO model	FLSWM
MPOCOYEAR	Integer	MPO model year	FLSWM

Table 3-1. Data Fields for Highway Link Feature Class (continued)

Name	Type	Description	Applicable Models
MPOMODEL	Text (50)	MPO model name	FLSWM
NUMSIG	Integer	Number of signals in the signalized segment	GTCRPM, TCRPM
LENGTH	Single	Length of the signalized segment (miles)	GTCRPM, TCRPM
DF	Single	Signalized delay function (Degree of freedom)	GTCRPM, TCRPM
TOLLLANES	Integer	Number of toll lanes	GTCRPM, TCRPM
LBTIME	Single	Local bus travel time in minutes	GTCRPM, TCRPM
EBTIME	Single	Express bus travel time in minutes	GTCRPM, TCRPM
RLTIME	Single	Rail travel time in minutes	GTCRPM, TCRPM
SHTIME	Single	Shuttle bus time in minutes	GTCRPM, TCRPM
TOLL_ACC	Single	Toll lane acceleration speed (mph)	GTCRPM, TCRPM
TOLL_DEC	Single	Toll lane deceleration speed (mph)	GTCRPM, TCRPM
RAMPS	Integer	Flag for ramps (1=ramp, 0=not ramp)	GTCRPM, TCRPM
ON	Integer	Flag for on-ramp (1=on-ramp)	GTCRPM, TCRPM
OFF	Integer	Flag for off-ramp (1=off-ramp)	GTCRPM, TCRPM
TBSDIST	Single	Distance for bus transit	POLK, CFRPM
TBSTIME	Integer	Travel time for bus transit	POLK, CFRPM
TBSSPEED	Single	Average speed for bus transit	POLK, CFRPM
TFGDIST	Single	Distance for fixed-guideway transit	POLK, CFRPM
TFGTIME	Integer	Travel time for fixed-guideway transit	POLK, CFRPM
TFGSPEED	Single	Average speed for fixed-guideway transit	POLK, CFRPM
TFGMODE	Integer	Applicable fixed-guideway transit mode	POLK, CFRPM

Table 3-2. Data Fields for TOLLLINKS Data Table

Name	Type	Description	Applicable Models
TOLL_ID	Integer	Toll plaza ID number	All except GUATS, TCRPM, GTCRPM
TOLLTYPE	Byte	Type of toll plaza	All except GUATS, TCRPM, GTCRPM
A	Long Integer	A node of toll plaza	All except GUATS, TCRPM, GTCRPM
B	Long Integer	B node of toll plaza	All except GUATS, TCRPM, GTCRPM
PLAZADESC	Text (255)	Description of toll plaza location	All except GUATS, TCRPM, GTCRPM
PLZALNSMIN	Byte	Minimum toll plaza lanes	All except GUATS, TCRPM, GTCRPM
PLZALNSMAX	Byte	Maximum toll plaza lanes	All except GUATS, TCRPM, GTCRPM
CARTOLL	Single	Toll rate	All except GUATS, TCRPM, GTCRPM
SVCMINUTE	Byte	Service time in minutes	All except GUATS, TCRPM, GTCRPM
SVCSECOND	Byte	Service time in seconds	All except GUATS, TCRPM, GTCRPM
DECELCODE	Byte	Deceleration code	All except GUATS, TCRPM, GTCRPM
ACCELCODE	Byte	Acceleration code	All except GUATS, TCRPM, GTCRPM
EXACTCHLNS	Byte	Number of exact change lanes	All except GUATS, TCRPM, GTCRPM
AVILANES	Byte	Number of automated vehicle identification lanes	All except GUATS, TCRPM, GTCRPM
PCTTRUCKS	Single	Percentage of trucks	All except GUATS, TCRPM, GTCRPM
CTOLL	Single	Coefficient of toll	FLSWM, SERPM, NWFRPM

3.2.2. Highway Node Feature Class Fields

Compared to the highway network link feature class, the node feature class has significantly fewer attribute fields, with some models using no attribute fields at all. Table 3-3 lists the fields commonly used for the highway node feature class in the data framework. If a model does not use these fields, the values for these fields can be set to null. Table 3-4 lists standard fields for a node-related table called TURN_PENALTIES that is used to specify penalties and prohibitions for specific turning movements.

Table 3-3. Data Fields for Highway Node Feature Class

Name	Type	Description	Applicable Models
N	Long Integer	Node number	All
X	Double	X coordinate	All
Y	Double	Y coordinate	All
SIGLOC	Integer	Signal Location (1=Yes, 0/blank=No)	SERPM, GTCRPM
NODE_TYPE	Integer	(1=Centroid, 2=External, 3=Int. Dummy, 4=Ext. Dummy)	SERPM
CYC_LENG	Integer	User-coded Signal Cycle Length in seconds	SERPM, GTCRPM
STA_NUMBER	Integer	Station ID Number	SERPM
STA_ZONE	Integer	Zone centroid nearest to station	SERPM
ACTIVEFLAG	Integer	Station usage flag (1=Yes, 0=No)	SERPM
STA_DESC	Text (50)	Station description	GUATS, POLK, CFRPM
FAREZONE	Integer	Tri-Rail fare zone (note: this data is used only for display)	SERPM, POLK, CFRPM
COUNTY	Integer	Geographic location code (County), FDOT traffic database county code number is used	CFRPM
PNRSVCAREA	Single	Maximum park-and-ride service area (highway access distance) in miles	GUATS, POLK, CFRPM
PK_SPACE	Integer	Number of park-and-ride parking lot spaces	GUATS, POLK, CFRPM
PRTERMTIME	Single	Park and ride terminal time (walk time from vehicle to bus stop) in minutes	GUATS, POLK
KRTERMTIME	Single	Kiss-and-ride (vehicle drop-off) terminal time (walk time from vehicle to bus stop) in minutes	GUATS, POLK, CFRPM
AMUSEFLAG	Integer	Flag to turn the lot on or off for A.M. or peak network. If "1", the lot is used; if "0", the model ignores the lot	GUATS
AMPNRCOST	Integer	Cost in cents to park for A.M. peak park-and-ride trips	GUATS, POLK, CFRPM
MDUSEFLAG	Integer	Flag to turn the lot on or off for MD or off-peak network. If "1", the lot is used; if "0", the model ignores the lot	GUATS
MDPNRCOST	Integer	Cost in cents to park for MD (off-peak) park-and-ride trips	GUATS, POLK, CFRPM

Table 3-4. Data Fields for TURN_PENALTIES Data Table

Name	Type	Description	Applicable Models
O_NODE	Long Integer	Original node	All
T_NODE	Long Integer	Turn node	All
D_NODE	Long Integer	Destination node	All
SET	Integer	Penalty set	All
PENALTY	Integer	Penalty value	All

3.3. Public Transit Network Data

The file format for the traditional PT transit route, .LIN file, defines transit route records. Each record includes transit line name and route number, one-way flag, headway, network mode, and node numbers. If a node is a transit stop, then this node number will be preceded with a hyphen. In the proposed data framework, a public transit network is also organized as a feature dataset. Within this dataset, there are three feature classes: PT lines, PT links, and PT nodes.

1. *PT line feature clas*s: A feature class for PT lines, in which each PT line is a single feature inside a PT Line feature class. Field LINEID is the unique identifier for each PT line; this field is used to refer to PT links and nodes in PT link and node feature classes.

2. *PT link feature class*: A feature class for PT links, this feature class lists all links for each PT line. Each link for a PT line is identified by four fields: LINEID, SEQNO, A, and B, where SEQNO is the sequential number of this link in the whole line, and A and B are the nodes' numbers. More than one link might exist between a single node pair (A and B) because multiple transit lines can pass through this single node pair, and these multiple lines have different LINEID values.

3. *PT node feature class*: A feature class for the collection of nodes for each PT line. Three fields, LINEID, SEQNO, and NODES, are used to represent a PT node for a link on a line.

In the proposed data framework, the convention for naming a scenario PT network is similar to that of naming a scenario highway network. The PT network is named PTNet, thus the three feature classes, PT lines, PT links, and PT nodes, are named PTNet_PTLine, PTNet_PTLink, and PTNet_PTNode, respectively. Within the Cube geodatabase, there is also another major attribute table named Citilabs_Transit Groups. This table stores the name of the PT network along with related feature class information, which allows the line, link, and node feature classes to form one integrated network and, thereby, ease the editing of the PT network in Cube Voyager's GIS window.

3.3.1. PT Line Feature Class Fields

In the .LIN data file, such information as transit line name and route number, one-way flag, headway, network mode, and node numbers are stored. In the proposed data framework geodatabase, most of this information is stored in the PT line feature class. These fields are inherited from the transit network fields in a Cube geodatabase. When a .LIN data file is imported in the Cube GIS window to create a transit network dataset in a Cube geodatabase, these fields will be created automatically, along with additional attribute fields. Transportation planners can thusly utilize these fields in a number of ways. For example, the field COLOR is used to specify the colors displayed for transit route; if there are no values for this field, Cube will display routes using default colors. Table 3-5 lists the required fields defined for PT line feature class in the proposed data framework. In addition, Tables 3-6 to 3-8 list additional standard fields for transit modes, transfer fares, and transit operators, respectively. More information on the definitions of other fields in a Cube geodatabase is available in the official Cube documentation.

Table 3-5. Data Fields for PT Line Feature Class

Name	Type	Description	Applicable Models
LINEID	Integer	Transit route number	All
NAME	Text (50)	Route name character string	All
ONEWAY	Integer	1 if the line operates in both direction, 0 if otherwise	All
HEADWAY_1	Single	Headway (in minutes)	All
HEADWAY_2	Single	Headway (in minutes); if the route does not operate in the time period, set to 0	All
HEADWAY_R1	Single	Headway in the reverse direction (in minutes)	All
HEADWAY_R2	Single	Headway in the reverse direction (in minutes)	All
MODE	Integer	Mode of transit service	All
OPERATOR	Integer	Operator ID for the line service	All
CIRCULAR	Integer	1 if the line is a circular route, 0 if otherwise	All

Note: For the HEADWAY fields, the user may code up to five different headways in one direction per line.

Table 3-6. Data Fields for TRANSIT_MODES Data Table

Name	Type	Description	Applicable Models
MODE	Integer	Mode of transit service	NERPM, CFRPM, SERPM, GUATS, POLK, TCRPM, GTCRPM
NAME	Text (50)	Short mode name	NERPM, CFRPM, SERPM, GUATS, POLK, TCRPM, GTCRPM
LONG_NAME	Text (255)	Long mode name	NERPM, CFRPM, SERPM, GUATS, POLK, TCRPM, GTCRPM
STURCTURE	Text (50)	Fare structure (flat rate, etc.)	NERPM, CFRPM, SERPM, GUATS, POLK, TCRPM, GTCRPM
SAME	Text (50)	Separate or cumulative	NERPM, CFRPM, SERPM, GUATS, POLK, TCRPM, GTCRPM
BOARD_FARE	Single	Boarding fare value	NERPM, CFRPM, SERPM, GUATS, POLK, TCRPM, GTCRPM

Table 3-7. Data Fields for TRANSFER_FARES Data Table

Name	Type	Description	Applicable Models
FROM_MODE	Integer	ID of the mode transferring from	NERPM, CFRPM, SERPM, GUATS, POLK, TCRPM, GTCRPM
TO_MODE	Integer	ID of the mode transferring to	NERPM, CFRPM, SERPM, GUATS, POLK, TCRPM, GTCRPM
FARE	Single	Transfer fare value	NERPM, CFRPM, SERPM, GUATS, POLK, TCRPM, GTCRPM

Table 3-8. Data Fields for TRANSIT_OPERATORS Data Table

Name	Type	Description	Applicable Models
OPERATOR	Integer	Operator ID for the line service	NERPM, CFRPM, SERPM, GUATS, POLK, TCRPM, GTCRPM
SHORT_NAME	Text (50)	Short name of transit operator	NERPM, CFRPM, SERPM, GUATS, POLK, TCRPM, GTCRPM
LONG_NAME	Text (255)	Long name of transit operator	NERPM, CFRPM, SERPM, GUATS, POLK, TCRPM, GTCRPM

3.3.2. PT Link and Node Feature Class Fields

Although the respective feature classes for PT links and nodes originate from the feature classes for highway links and nodes, both structures of PT feature classes differ from their highway counterpart in that each link and node must have its related PT line identifier (LINEID) and the sequential number of this link segment or node. These variables are listed in Tables 3-9 and 3-10. For those FSUTMS models that do not require the use of all fields, the values of these fields can be set as null.

Table 3-9. Data Fields for PT Link Feature Class

Name	Type	Description	Applicable Models
LINEID	Integer	Transit route number	All
SEQNO	Integer	Transit link sequential number	All
A	Long Integer	Starting node number	All
B	Long Integer	Ending node number	All
DELAY	Single	Layover between two nodes (in minutes)	All
SPEED	Integer	Travel speed between two nodes (in mph)	All

Table 3-10. Data Fields for PT Node Feature Class

Name	Type	Description	Applicable Models
LINEID	Integer	Transit route number	All
SEQNO	Integer	Transit link node sequential number	All
STOPNODE	Integer	Flag for stop; 1 for transit stop, 0 means this node is not a stop	All
NODES	Long Integer	Node number	All
DWELL	Single	Dwell time (in minutes)	All
NNTIME	Single	Travel time (in minutes) between the most recent node and the node preceding the last NNTIME	All
RT	Integer	Intermediate run time from the line's first node to the most recently coded node	All

CHAPTER 4
NON-TRANSPORTATION NETWORK DATA

This chapter presents the standard input data tables that are not directly related to either the highway or public transportation networks. These tables are grouped into the following categories: (1) zone data, which consist mostly of socioeconomic data; (2) trip data, which consist of both collected and generated trips; and (3) reference data, which consist mostly of look-up tables. Each data table includes the standard field names, field data types, field descriptions, and the list of models that use the individual fields. The original field names used by each of the ten local models considered, as well as their recommended standard field names for each table, are given in Appendix A. *It is important to note that although these data tables are stored in the master geodatabase, the master database approach does not apply to these tables as the data are either constant for all scenarios (all reference tables), or vary from scenario to scenario (all zone and trip tables).*

4.1. Zone Data Tables

The master geodatabase defines and includes the following three zone data tables:

1. ZONEDATA: Trip zonal production and attraction data for trip generation (see Table 4-1).
2. ZONEDATA_LIFESTYLE: Trip zonal production and attraction data trip generation of life-style model (see Table 4-2).
3. SPECGEN: Special generator data for trip generation (see Table 4-3).

Note that because the input data for life-style models are very different from those of the traditional generation models, a separate table is used. Also note that, in the master geodatabase, each of these tables contains the complete sets of zonal data associated with each scenario.

Table 4-1. Data Fields for ZONEDATA Input Table

Name	Type	Description	Applicable Models
TAZ	Long Integer	Zone number	All except SERPM, TBRPM, TCRPM, GTCRPM
COUNTYNAME	Text (20)	County name	All except SERPM, TBRPM, POLK, TCRPM, GTCRPM
DISTRICT	Integer	Planning district number	All except SERPM, TBRPM, TCRPM, GTCRPM
SF_DU	Long Integer	Number of single-family dwelling units	All except SERPM, TBRPM, TCRPM, GTCRPM
SF_SEAS	Integer	Number of seasonally occupied single-family dwelling units	NERPM, GUATS
SF_PCT_VNP	Single	Percentage of vacant/non-perm. single-family dwelling units	All except SERPM, TBRPM, GUATS, TCRPM, GTCRPM
SF_PCT_VAC	Single	Percentage of vacant single-family dwelling units	All except SERPM, TBRPM, TCRPM, GTCRPM
SF_POP	Long Integer	Single-family population	All except SERPM, TBRPM, TCRPM, GTCRPM
SF_0AUTO	Long Integer	Single-family dwelling units without autos	All except SERPM, TBRPM, TCRPM, GTCRPM

Table 4-1. Data Fields for ZONEDATA Input Table (continued)

Name	Type	Description	Applicable Models
SF_1AUTO	Long Integer	Single-family dwelling units with 1 auto	All except SERPM, TBRPM, TCRPM, GTCRPM
SF_2AUTO	Long Integer	Single-family dwelling units with 2 autos	All except SERPM, TBRPM, TCRPM, GTCRPM
SF_3AUTO	Long Integer	Single-family dwelling units with 3+ autos	NERPM, GUATS
MF_DU	Long Integer	Number of multi-family dwelling units	All except SERPM, TBRPM, TCRPM, GTCRPM
MF_SEAS	Integer	Number of seasonally occupied multi-family dwelling units	NERPM, GUATS
MF_PCT_VNP	Single	Percentage of vacant/non-perm. multi-family dwelling units	All except SERPM, TBRPM, GUATS, TCRPM, GTCRPM
MF_PCT_VAC	Single	Percentage of vacant multi-family dwelling units	All except SERPM, TBRPM, TCRPM, GTCRPM
MF_POP	Long Integer	Multi-family population	All except SERPM, TBRPM
MF_0AUTO	Long Integer	Multi-family dwelling units without autos	All except SERPM, TBRPM, TCRPM, GTCRPM
MF_1AUTO	Long Integer	Multi-family dwelling units with 1 auto	All except SERPM, TBRPM, TCRPM, GTCRPM
MF_2AUTO	Long Integer	Multi-family dwelling units with 2 autos	All except SERPM, TBRPM, TCRPM, GTCRPM
MF_3AUTO	Long Integer	Multi-family dwelling units with 3+ autos	NERPM, GUATS
HM_DU	Long Integer	Hotel-motel dwelling units	All except SERPM, TBRPM, TCRPM, GTCRPM
HM_PCT_OCC	Long Integer	Percentage of hotel-motel dwelling units occupied	All except SERPM, TBRPM, TCRPM, GTCRPM
HM_POP	Long Integer	Hotel-motel population	All except SERPM, TBRPM, TCRPM, GTCRPM
IND_EMP	Long Integer	Industrial employment	All except SERPM, TBRPM, TCRPM, GTCRPM
COM_EMP	Long Integer	Commercial (retail) employment	All except SERPM, TBRPM, TCRPM, GTCRPM
SVC_EMP	Long Integer	Service employment	All except SERPM, TBRPM, TCRPM, GTCRPM
MFG_EMP	Long Integer	Manufacturing employment	NERPM, GUATS
TOT_EMP	Long Integer	Total employment	All except SERPM, TBRPM, TCRPM, GTCRPM
TOT_POP	Long Integer	Total population	All except SERPM, TBRPM, TCRPM, GTCRPM
SCHOOL	Long Integer	School enrollment	All except SERPM, TBRPM, TCRPM, GTCRPM
SHORT_PARK	Long Integer	Short-term parking	All except SERPM, TBRPM, NWFRPM, TCRPM, GTCRPM
LONG_PARK	Long Integer	Long-term parking	All except SERPM, TBRPM, NWFRPM, TCRPM, GTCRPM
BUILDOUT_Y	Integer	Build out year	FLSWM, POLK

Table 4-2. Data Fields for ZONEDATA_LIFESTYLE Input Table

Name	Type	Description	Applicable Models
TAZ_REG	Long Integer	Regional zone number	SERPM, TBRPM
TAZ_MPO	Long Integer	MPO zone number	SERPM, TCRPM, GTCRPM
COUNTYNAME	Text (20)	County name	SERPM, TBRPM
DISTRICT	Integer	Planning district number	SERPM, TBRPM
SECTOR	Integer	Planning sector number	SERPM, TCRPM, GTCRPM
SORT_INDEX	Long Integer	Sort index	SERPM
POP	Long Integer	Total population	SERPM, TBRPM
EL_SCHOOL	Long Integer	Grade (public) school	SERPM, TCRPM, GTCRPM
MD_SCHOOL	Long Integer	Middle (public) school	SERPM, TCRPM, GTCRPM
HI_SCHOOL	Long Integer	High (public) school	SERPM, TCRPM, GTCRPM
EL_ENRL	Long Integer	Enrollment for grade (public) school	SERPM, TCRPM, GTCRPM
MD_ENRL	Long Integer	Enrollment for middle (public) school	SERPM, TCRPM, GTCRPM
HI_ENRL	Long Integer	Enrollment for high (public) school	SERPM, TCRPM, GTCRPM
PRV_ENRL	Long Integer	Private school (not college & university) enrollment	SERPM, TCRPM, GTCRPM
CU_ENRL	Long Integer	College & university enrollment	SERPM, TBRPM
K12_ENR	Long Integer	Kindergarten to grade 12 enrollment	TBRPM
SCH_ENRL	Long Integer	Total school enrollment	TCRPM, GTCRPM
EL_RATE	Long Integer	School trip rate for grade school	SERPM, TCRPM, GTCRPM
MD_RATE	Long Integer	School trip rate for middle school	SERPM, TCRPM, GTCRPM
HI_RATE	Long Integer	School trip rate for high school	SERPM, TCRPM, GTCRPM
PRV_RATE	Long Integer	School trip rate for private school	SERPM, TCRPM, GTCRPM
CU_RATE	Long Integer	School trip rate for college & university	SERPM
HH_NO_CHLD	Long Integer	Households without children (<18 years age)	SERPM, TCRPM, GTCRPM
HH_CHLD	Long Integer	Households with children	SERPM, TCRPM, GTCRPM
V_NO_CHLD	Long Integer	Vehicles in households without children category	SERPM, TCRPM, GTCRPM
V_CHLD	Long Integer	Vehicles in households with children category	SERPM, TCRPM, GTCRPM
W_NO_CHLD	Long Integer	Workers in households without children category	SERPM, TCRPM, GTCRPM
W_CHLD	Long Integer	Workers in households with children category	SERPM, TCRPM, GTCRPM
P_NO_CHLD	Long Integer	Persons in households without children category	SERPM, TCRPM, GTCRPM
P_CHLD	Long Integer	Persons in households with children category	SERPM, TCRPM, GTCRPM
HM_ROOMS	Long Integer	Total occupied hotel/motel rooms	SERPM, TCRPM, GTCRPM
PCT_HM_PK	Single	Percentage of hotel/motel rooms occupied during the peak season	TCRPM, GTCRPM
PCT_HM_YR	Single	Percentage of hotel/motel rooms occupied year round	TCRPM, GTCRPM
TRAN_DIST	Long Integer	Transit district	SERPM

Table 4-2. Data Fields for ZONEDATA_LIFESTYLE Input Table (continued)

Name	Type	Description	Applicable Models
CARD	Long Integer	Card type for employment data	SERPM, TBRPM, TCRPM, GTCRPM
IND_EMP	Long Integer	Industrial employment	SERPM, TBRPM, TCRPM, GTCRPM
COM_EMP	Long Integer	Commercial employment	SERPM, TCRPM, GTCRPM
SVC_EMP	Long Integer	Service employment	SERPM, TCRPM, GTCRPM
TOT_EMP	Long Integer	Total employment	SERPM, TBRPM, TCRPM, GTCRPM
SHORT_PC	Long Integer	Short-term parking cost	SERPM, TBRPM, TCRPM, GTCRPM
LONG_PC	Long Integer	Long-term parking cost	SERPM, TBRPM, TCRPM, GTCRPM
EXC_AREA	Long Integer	Non-overlapping exceptional areas (water, parks and roadway right-of-way)	SERPM
NET_AREA	Long Integer	Net areas (gross minus exceptional)	SERPM
PCT_NET	Long Integer	Percentages of usable (net) gross areas	SERPM
WALK_INDEX	Long Integer	Non-motorized friendliness index	SERPM
ARSM_NET	Double	Gross area in square miles	SERPM
ARACRS_NET	Double	Gross area in acres	SERPM
REGTAZN	Long Integer	Regional zone centroid number extracted from network	SERPM
CENTROID_X	Long Integer	X-coordinate of zone centroid	SERPM
CENTROID_Y	Long Integer	Y-coordinate of zone centroid	SERPM
C_POP	Long Integer	Total population of 1-mile radius of the TAZ centroid	SERPM
C_EMP	Long Integer	Total employment of 1-mile radius of the TAZ centroid	SERPM
C_AREA	Double	Area of 1-mile radius of the TAZ centroid	SERPM
C_DENSITY	Double	Activity density of 1-mile radius of the TAZ centroid	SERPM
ATYPE	Byte	Activity based density area type	SERPM, TCRPM, GTCRPM
USER_DIST	Long Integer	User specified districts	SERPM
SP_GEN	Yes/No	Special generator indicator	SERPM
DU	Long Integer	Dwelling units	TBRPM, TCRPM, GTCRPM
PCT_DU_PK	Single	Percentage of dwelling units occupied during the peak season	TCRPM, GTCRPM
PCT_DU_YR	Single	Percentage of dwelling units occupied year round	TCRPM, GTCRPM
PCT_SF_PK	Single	Percentage of single family dwelling units occupied during the peak season	TCRPM, GTCRPM
PCT_SF_YR	Single	Percentage of single family dwelling units occupied year round	TCRPM, GTCRPM

Table 4-2. Data Fields for ZONEDATA_LIFESTYLE Input Table (continued)

Name	Type	Description	Applicable Models
PCT_MF_PK	Single	Percentage of multi-family dwelling units occupied during the peak season	TCRPM, GTCRPM
PCT_MF_YR	Single	Percentage of multi-family dwelling units occupied year round	TCRPM, GTCRPM
PCT_DU_VNP	Single	Percentage of vacant/non-perm. Dwelling units	TBRPM
PCT_DU_VAC	Single	Percentage of vacant dwelling units	TBRPM
RET_0	Single	Percentage of dwelling units with retired and 0 car	TBRPM
WNC_0	Single	Percentage of dwelling units working without children and car	TBRPM
WHC_0	Single	Percentage of dwelling units working with children and 0 car	TBRPM
RET_1	Single	Percentage of dwelling units with retired and 1 car	TBRPM
WNC_1	Single	Percentage of dwelling units working without children and with 1 car	TBRPM
WHC_1	Single	Percentage of dwelling units working with children and 1 car	TBRPM
RET_2	Single	Percentage of dwelling units with retired and 2 cars	TBRPM
WNC_2	Single	Percentage of dwelling units working without children and with 2 cars	TBRPM
WHC_2	Single	Percentage of dwelling units working with children and 2 cars	TBRPM
RET_3	Single	Percentage of dwelling units with retired and 3+ cars	TBRPM
WNC_3	Single	Percentage of dwelling units working without children and with 3+ cars	TBRPM
WHC_3	Single	Percentage of dwelling units working with children and 3+ cars	TBRPM
HU_B	Integer	Number of business hotel/motel units	TBRPM, TCRPM, GTCRPM
HU_E	Integer	Number of economy hotel/motel units	TBRPM
HU_R	Integer	Number of leisure/resort hotel/motel units	TBRPM, TCRPM, GTCRPM
HU_MIX	Integer	Number of mix type hotel/motel units	TCRPM, GTCRPM
COMM_REMP	Long Integer	Regional commercial employment	TBRPM
COMM_LEMP	Long Integer	Local commercial employment	TBRPM
SERV_REMP	Long Integer	Regional service employment	TBRPM
SERV_LEMP	Long Integer	Local service employment	TBRPM

Table 4-3. Data Fields for SPECGEN Data Table

Name	Type	Description	Applicable Models
TAZ	Long Integer	Zone number	All except SERPM
DESCR	Text (255)	Description of special generator	All except SERPM
P_OR_A	Text (1)	Production/attraction indicator	All except SERPM
OPERAND	Text (1)	Add, Subtract, or Total Trips	All except SERPM
TRIPS_DIFF	Long Integer	Number of trips or trip difference	All except SERPM
PCT_HBW	Single	Percentage of home-based work trips	All except SERPM, TBRPM
PCT_HBSH	Single	Percentage of home-based shopping trips	All except SERPM, TBRPM
PCT_HBSR	Single	Percentage of home-based social recreation trips	All except SERPM, TBRPM
PCT_HBSC	Single	Percentage of home-based school trips	TCRPM, GTCRPM
PCT_HBO	Single	Percentage of home-based other trips	All except SERPM, TBRPM
PCT_NHB	Single	Percentage of non-home-based trips	All except SERPM, TBRPM
PCT_NHBW	Single	Percentage of non-home-based work trips	TCRPM, GTCRPM
PCT_NHBO	Single	Percentage of non-home-based other trips	TCRPM, GTCRPM
PCT_AIR	Single	Percentage of airport trips	TCRPM, GTCRPM
PCT_4TTK	Single	Percentage of 4-tired truck trips	TCRPM, GTCRPM
PCT_SUTK	Single	Percentage of single-unit truck trips	TCRPM, GTCRPM
PCT_COTK	Single	Percentage of combination truck trips	TCRPM, GTCRPM
TOT_EMP	Long Integer	Total employment subtraction	FLSWM, CFRPM, POLK, TCRPM, GTCRPM
COM_EMP	Long Integer	Commercial employment subtraction	FLSWM, CFRPM, POLK, TCRPM, GTCRPM
SVC_EMP	Long Integer	Service employment subtraction	FLSWM, CFRPM, POLK, TCRPM, GTCRPM
SCHOOL	Long Integer	School enrollment subtraction	FLSWM, CFRPM, POLK, TCRPM, GTCRPM
TOT_DU	Long Integer	Total dwelling unit subtraction	FLSWM, CFRPM, POLK, TCRPM, GTCRPM
OCC_DU	Long Integer	Occupied dwelling unit subtraction	TCRPM, GTCRPM
SECTOR	Integer	Planning sector number	CFRPM, POLK, TCRPM, GTCRPM
PCT_LDTK	Single	Percentage of light-duty truck trips	NERPM
PCT_MDTK	Single	Percentage of medium-duty truck trips	NERPM
PCT_HDTK	Single	Percentage of high-duty truck trips	NERPM
PCT_EILOV	Single	Percentage of external-internal low-occupancy vehicle trips	NERPM
PCT_EIHOV	Single	Percentage of external-internal high-occupancy vehicle trips	NERPM
ACTIVE	Yes/No	If active, yes; otherwise, no	NERPM, NWFRPM

4.2. Trip Data Tables

The following three trip data tables are defined in the master database:

1. EETRIPS: External-external trips between each pair of external zones (see Table 4-4).
2. INT_EXT: Internal-external trip productions for trip generation (see Table 4-5).

3. PANDA: Trip productions and attractions by TAZ and trip purpose (see Table 4-6).

Note that because the input data for life-style models are very different from those of the traditional generation models, a separate table is used. Also note that, unlike the other input tables listed above, the PANDA table contains output trip data from the trip generation step and are used as input in the subsequent model chain. In other words, the table as defined in Table 4-6 simply serves as a place-holder in the geodatabase, one that the trip generation program will save its generated trips to. As with the zone data tables, the trip data tables also contain the complete sets of data associated with each scenario.

Table 4-4. Data Fields for EETRIPS Data Table

Name	Type	Description	Applicable Models
ORIGN_ZONE	Integer	Original zone	All except FLSWM
DESTN_ZONE	Integer	Destination zone	All except FLSWM
AUTO_TRIPS	Long Integer	Number of external-external trips	All except FLSWM
TYPE	Byte	Trip type	TBRPM

Table 4-5. Data Fields for INT_EXT Data Table

Name	Type	Description	Applicable Models
Z	Long Integer	Zone number	NERPM, TBRPM, CFRPM, NWFRPM, GUATS, POLK
IE_PROD	Long Integer	Internal-external trip production	NERPM, TBRPM, CFRPM, NWFRPM, GUATS, POLK, TCRPM, GTCRPM
EI_ATTR	Long Integer	External-internal trip attraction	TCRPM, GTCRPM
PCT_LOV	Single	Percent low-occupant vehicles	NERPM, CFRPM, NWFRPM, GUATS
PCT_HOV	Single	Percent high-occupant vehicles	NERPM, CFRPM, NWFRPM, GUATS
PCT_LDT	Single	Percent light-duty trucks	NERPM, CFRPM, NWFRPM, GUATS
PCT_HDT	Single	Percent high-duty trucks	NERPM, CFRPM, NWFRPM, GUATS
PCT_HBW_P	Single	Percentage of home-based work production trips	TCRPM, GTCRPM
PCT_HBSH_P	Single	Percentage of home-based shopping production trips	TCRPM, GTCRPM
PCT_HBSR_P	Single	Percentage of home-based social recreation production trips	TCRPM, GTCRPM
PCT_HBSC_P	Single	Percentage of home-based school production trips	TCRPM, GTCRPM
PCT_HBO_P	Single	Percentage of home-based other production trips	TCRPM, GTCRPM
PCT_NHBW_P	Single	Percentage of non-home-based work production trips	TCRPM, GTCRPM
PCT_NHBO_P	Single	Percentage of non-home-based other production trips	TCRPM, GTCRPM
PCT_AIR_P	Single	Percentage of airport production trips	TCRPM, GTCRPM

Table 4-5. Data Fields for INT_EXT Data Table (continued)

Name	Type	Description	Applicable Models
PCT_4TTK_P	Single	Percentage of 4-tired truck production trips	TCRPM, GTCRPM
PCT_SUTK_P	Single	Percentage of single unit truck production trips	TCRPM, GTCRPM
PCT_COTK_P	Single	Percentage of combined truck production trips	TCRPM, GTCRPM
PCT_HBW_A	Single	Percentage of home-based work attraction trips	TCRPM, GTCRPM
PCT_HBSH_A	Single	Percentage of home-based shopping attraction trips	TCRPM, GTCRPM
PCT_HBSR_A	Single	Percentage of home-based social recreation attraction trips	TCRPM, GTCRPM
PCT_HBSC_A	Single	Percentage of home-based school attraction trips	TCRPM, GTCRPM
PCT_HBO_A	Single	Percentage of home-based other attraction trips	TCRPM, GTCRPM
PCT_NHBW_A	Single	Percentage of non-home-based work attraction trips	TCRPM, GTCRPM
PCT_NHBO_A	Single	Percentage of non-home-based other attraction trips	TCRPM, GTCRPM
PCT_AIR_A	Single	Percentage of airport attraction trips	TCRPM, GTCRPM
PCT_4TTK_A	Single	Percentage of 4-tired truck attraction trips	TCRPM, GTCRPM
PCT_SUTK_A	Single	Percentage of single unit truck attraction trips	TCRPM, GTCRPM
PCT_COTK_A	Single	Percentage of combination truck attraction trips	TCRPM, GTCRPM
P_HBW_AU_0	Single	Percentage of home-based work trips made from 0 auto households	TCRPM, GTCRPM
P_HBW_AU_1	Single	Percentage of home-based work trips made from 1 auto households	TCRPM, GTCRPM
P_HBW_AU_2	Single	Percentage of home-based work trips made from 2+ auto households	TCRPM, GTCRPM
P_OTH_AU_0	Single	Percentage of other trips made from 0 auto households	TCRPM, GTCRPM
P_OTH_AU_1	Single	Percentage of other trips made from 1 auto households	TCRPM, GTCRPM
P_OTH_AU_2	Single	Percentage of other trips made from 2+ auto households	TCRPM, GTCRPM
ROAD_NAME	Text (50)	Roadway Name	CFRPM, TCRPM, GTCRPM
DESCR	Text (255)	Description	NERPM, TBRPM, CFRPM, NWFRPM, GUATS
SECTOR	Integer	Planning sector number	CFRPM
PCT_EE	Single	Percentage of external-external trips	TBRPM, GUATS

Table 4-6. Data Fields for PANDA Data Table

Name	Type	Description	Applicable Models
TAZ	Long Integer	Zone number	All
HBWP	Single	Home-based work production	All
HBWA	Single	Home-based work attraction	All
HBSHP	Single	Home-based shopping production	All
HBSHA	Single	Home-based shopping attraction	All
HBSRP	Single	Home-based social recreation production	All
HBSRA	Single	Home-based social recreation attraction	All
HBOP	Single	Home-based other production	All
HBOA	Single	Home-based other attraction	All
NHBP	Single	Non-home-based production	All except TBRPM, SERPM, TCRPM, GTCRPM
NHBA	Single	Non-home-based attraction	All except TBRPM, SERPM, TCRPM, GTCRPM
NHBWP	Single	Non-home-based work production	TBRPM, SERPM, TCPRM, GTCRPM
NHBWA	Single	Non-home-based work attraction	TBRPM, SERPM, TCPRM, GTCRPM
NHBOP	Single	Non-home-based other production	TBRPM, SERPM, TCPRM, GTCRPM
NHBOA	Single	Non-home-based other attraction	TBRPM, SERPM, TCPRM, GTCRPM
HBSCPRVP	Single	Home-based private school production	TBRPM, SERPM
HBSCPRVA	Single	Home-based private school attraction	TBRPM, SERPM
HBUP	Single	Home-based university production	TBRPM, SERPM, GUATS, TCRPM, GTCRPM
HBUA	Single	Home-based university attraction	TBRPM, SERPM, GUATS, TCRPM, GTCRPM
HDORMUP	Single	Campus housing-university production	GUATS
HDORMUA	Single	Campus housing-university attraction	GUATS
TAXIP	Single	Taxi production	TBRPM, CFRPM, NWFRPM, POLK
TAXIA	Single	Taxi attraction	TBRPM, CFRPM, NWFRPM, POLK
AIRPP	Single	Airport production	TBRPM, SERPM, TCPRM, GTCRPM
AIRPA	Single	Airport attraction	TBRPM, SERPM, TCPRM, GTCRPM
LTRKP	Single	Light-duty truck production	All except FLSWM, NWFRPM, POLK
LTRKA	Single	Light-duty truck attraction	All except FLSWM, NWFRPM, POLK
MTRKP	Single	Medium-duty truck production	NERPM, SERPM, GUATS, TCRPM, GTCRPM
MTRKA	Single	Medium-duty truck attraction	NERPM, SERPM, GUATS, TCRPM, GTCRPM

Table 4-6. Data Fields for PANDA Data Table (continued)

Name	Type	Description	Applicable Models
HTRKP	Single	High-duty truck production	All except FLSWM, NWFRPM, POLK
HTRKA	Single	High-duty truck attraction	All except FLSWM, NWFRPM, POLK
SOIEP	Single	Single-occupancy vehicle internal-external production	NERPM, GUATS
SOIEA	Single	Single-occupancy vehicle internal-external attraction	NERPM, GUATS
HOIEP	Single	High-occupancy vehicle internal-external production	NERPM, GUATS
HOIEA	Single	High-occupancy vehicle internal-external attraction	NERPM, GUATS
LDIEP	Single	Light-duty truck internal-external production	NERPM, GUATS
LDIEA	Single	Light-duty truck internal-external attraction	NERPM, GUATS
HDIEP	Single	High-duty truck internal-external production	NERPM, GUATS
HDIEA	Single	High-duty truck internal-external attraction	NERPM, GUATS
LDB_P	Single	Long distance business production	FLSWM
LDB_A	Single	Long distance business attraction	FLSWM
SDEI_P	Single	Short distance external-internal production	FLSWM
SDEI_A	Single	Short distance external-internal attraction	FLSWM
IEP	Single	Internal-external production	TBRPM, CFRPM, NWFRPM, POLK
IEA	Single	Internal-external attraction	TBRPM, CFRPM, NWFRPM, POLK
TOTP	Single	Total production	TBRPM, CFRPM, POLK
TOTA	Single	Total attraction	TBRPM, CFRPM, POLK
PK_OP_OR _T	Text (1)	Peak, off-peak or total production/attraction (‘P’ for peak, ‘O’ for off-peak, and ‘T’ for total)	SERPM
AUTO	Text (1)	Number of autos (‘0’ for zero-auto, ‘1” for one or more autos, and “T” for total)	SERPM

4.3. Reference Data Tables

A total of eight reference data tables are defined in the master database:

1. PRODRATES: Trip generation production rates (see Table 4-7).
2. ATTRRATES: Trip generation attraction rates (see Table 4-8).
3. DUWEIGHTS: Percentages used to stratify dwelling units into household size groups based on average persons per dwelling unit ranges (see Table 4-9).
4. SPDCAP: Highway speeds and capacities by area type, facility type, and number of lanes (see Table 4-10).
5. VFACTORS: Variable factors for UROAD, CONFAC, and BPR coefficients (see Table 4-11).

6. FF: Friction factors for each trip purpose as a function of time in minutes of travel (see Table 4-12).
7. TRANSIT_SPEED: Highway/transit speed delay curves (see Table 4-13).
8. WAIT_CURVES: Transit wait curve specification (see Table 4-14)

Unlike zone and trip data tables, there is only one set of data in these tables that apply to all scenarios in the master geodatabase.

Table 4-7. Data Fields for PRODRATES Data Table

Name	Type	Description	Applicable Models
PERSONS_DU	Byte	Persons per dwelling unit	NERPM, CFRPM, NWFRPM, GUATS, POLK, TCRPM, GTCRPM
AUTOS_DU	Byte	Autos per dwelling unit	NERPM, CFRPM, NWFRPM, GUATS, POLK, TCRPM, GTCRPM
DU_TYPE	Text (50)	Dwelling unit type	NERPM, CFRPM, NWFRPM, GUATS, POLK
DU_DESCR	Text (255)	Dwelling unit description	NERPM
CHILD_DU	Byte	Number of children per dwelling unit	CFRPM, TCRPM, GTCRPM
WORKERS_DU	Byte	Number of works per dwelling unit	TCRPM, GTCRPM
RATE_HBW	Single	HBW trip production rate	NERPM, CFRPM, NWFRPM, GUATS, POLK
RATE_HBSH	Single	HBSH trip production rate	NERPM, CFRPM, NWFRPM, GUATS, POLK
RATE_HBSR	Single	HBSR trip production rate	NERPM, CFRPM, NWFRPM, GUATS, POLK
RATE_HBO	Single	HBO trip production rate	NERPM, CFRPM, NWFRPM, GUATS, POLK
SECTOR	Integer	Planning sector number	CFRPM, NWFRPM
TRIP_PURP	Text (50)	Trip purpose	CFRPM, TCRPM, GTCRPM
ATYPE	Byte	Area type code	TBRPM
CATEGORY	Byte	Category number	TBRPM
RATE	Single	Production rate	TBRPM
R_CLASS1	Single	Class 1 production rate	CFRPM
R_CLASS2	Single	Class 2 production rate	CFRPM
R_CLASS3	Single	Class 3 production rate	CFRPM
R_CLASS4	Single	Class 4 production rate	CFRPM
RATE_HM	Single	Hotel/Motel production rate	CFRPM, TCRPM, GTCRPM
RATE_HM_B	Single	Business type hotel/motel production rate	TCRPM, GTCRPM
RATE_HM_R	Single	Leisure/Recreation type hotel/motel production rate	TCRPM, GTCRPM
RATE_HM_M	Single	Mix type hotel/motel production rate	TCRPM, GTCRPM
DESCR	Text (255)	Description	TBRPM, TCRPM, GTCRPM
REGION	Byte	Region number	CFRPM, NWFRPM, TCRPM, GTCRPM

Table 4-8. Data Fields for ATTRRATES Data Table

Name	Type	Description	Models
RATE_INEMP	Single	Attractions per industrial employee	FLSWM, CFRPM, NWFRPM, GUATS, POLK, TCRPM, GTCRPM
RATE_COEMP	Single	Attractions per commercial employee	FLSWM, CFRPM, NWFRPM, GUATS, POLK, TCRPM, GTCRPM
RATE_SEEMP	Single	Attractions per service employee	FLSWM, CFRPM, NWFRPM, GUATS, POLK, TCRPM, GTCRPM
RATE_TOEMP	Single	Attractions per total employee	FLSWM, CFRPM, NWFRPM, GUATS, POLK, TCRPM, GTCRPM
RATE_TOTDU	Single	Attractions per dwelling unit	FLSWM, CFRPM, NWFRPM, GUATS, POLK
R_OCC_DU	Single	Attraction per occupied dwelling unit	TCRPM, GTCRPM
RATE_HM	Single	Attractions per hotel/motel	CFRPM, GUATS, TCRPM, GTCRPM
RATE_SCH	Single	Attractions per school enrollment	FLSWM, CFRPM, NWFRPM, GUATS, POLK, TCRPM, GTCRPM
REGION	Byte	Region number	FLSWM
ATYPE	Byte	Area type code	TBRPM, CFRPM, TCRPM, GTCRPM
SECTOR	Integer	Planning sector number	CFRPM
ATTR_PURP	Text (50)	Attraction purpose	FLSWM, TBRPM, CFRPM, GUATS, POLK, TCRPM, GTCRPM
RATE	Single	Attraction rate	TBRPM
COMMENT	Text (255)	Comment	CFRPM, TBRPM, TCRPM, GTCRPM

Table 4-9. Data Fields for DUWEIGHTS Data Table

Name	Type	Description	Applicable Models
SIZE_RANGE	Integer	Size range number	FLSWM, CFRPM, NWRPM, GUATS, POLK
PCT_1P_HH	Single	Percentage of dwelling unit with 1 persons	FLSWM, CFRPM, NWRPM, GUATS, POLK
PCT_2P_HH	Single	Percentage of dwelling unit with 2 persons	FLSWM, CFRPM, NWRPM, GUATS, POLK
PCT_3P_HH	Single	Percentage of dwelling unit with 3 persons	FLSWM, CFRPM, NWRPM, GUATS, POLK
PCT_4P_HH	Single	Percentage of dwelling unit with 4 persons	FLSWM, CFRPM, NWRPM, GUATS, POLK
PCT_5P_HH	Single	Percentage of dwelling unit with 5 persons	FLSWM, CFRPM, NWRPM, GUATS, POLK
REGION	Integer	Region number	FLSWM, NWFRPM

Table 4-10. Data Fields for SPDCAP Data Table

Name	Type	Description	Applicable Models
LOW_ATYPE	Byte	Bottom of area type range	NERPM, TBRPM, NWFRPM, GUATS, POLK, TCRPM, GTCRPM
HIGH_ATYPE	Byte	Top of area type range	NERPM, TBRPM, NWFRPM, GUATS, POLK, TCRPM, GTCRPM
LOW_FTYPE	Byte	Bottom of facility type range	NERPM, TBRPM, NWFRPM, GUATS, POLK, TCRPM, GTCRPM
HIGH_FTYPE	Byte	Top of facility type range	NERPM, TBRPM, NWFRPM, GUATS, POLK, TCRPM, GTCRPM
LOW_LANES	Byte	Bottom of lanes range	NERPM, TBRPM, NWFRPM, GUATS, POLK, TCRPM, GTCRPM
HIGH_LANES	Byte	Top of lanes range	NERPM, TBRPM, NWFRPM, GUATS, POLK, TCRPM, GTCRPM
CAP_OPERAN	Text (1)	Capacity operand	NERPM, TBRPM, NWFRPM, GUATS, POLK, TCRPM, GTCRPM
CAPACITY	Long Integer	Capacity or capacity factor	NERPM, TBRPM, NWFRPM, GUATS, POLK, TCRPM, GTCRPM
SPEED_OPER	Text (1)	Speed operand	NERPM, TBRPM, NWFRPM, GUATS, POLK, TCRPM, GTCRPM
SPEED	Byte	Speed or speed factor/augment	NERPM, TBRPM, NWFRPM, GUATS, POLK, TCRPM, GTCRPM

Table 4-11. Data Fields for VFACTORS Data Table

Name	Type	Description	Applicable Models
FTYPE	Byte	Facility type code	All except FLSWM
UROAD	Single	Practical/absolute capacity ratio	All except FLSWM
CONFAC	Single	Peak-to-daily capacity factor	All except FLSWM
BPRLOS	Single	BPR (alpha) level-of-service value	All except FLSWM
BPREXP	Single	BPR (beta) exponent	All except FLSWM
BPRGMA	Single	BPR gamma	TBRPM
CONFACAMP	Single	Peak-to-daily capacity factor for AM Peak	SERPM
CONFACPMP	Single	Peak-to-daily capacity factor for PM Peak	SERPM
CONFACOFP	Single	Peak-to-daily capacity factor for Off-Peak	SERPM

Table 4-12. Data Fields for FF Data Table

Name	Type	Description	Applicable Models
TTIME	Integer	Travel time in minutes	All except SERPM, TCRPM, GTCRPM
FF_HBW	Single	Home-based work friction factor	All except SERPM, TCRPM, GTCRPM
FF_HBSH	Single	Home-based shopping friction factor	All except SERPM, TCRPM, GTCRPM
FF_HBSR	Single	Home-based social/recreation friction factor	All except SERPM, TCRPM, GTCRPM
FF_HBO	Single	Home-based other friction factor	All except SERPM, TCRPM, GTCRPM
FF_NHB	Single	Not-home-based friction factor	All except TBRPM, SERPM, TCRPM, GTCRPM
FF_NHBW	Single	Not-home-based work friction factor	TBRPM
FF_NHBO	Single	Not-home-based other friction factor	TBRPM
FF_TT	Single	Truck-taxi friction factor	TBRPM, NWFRPM, POLK
FF_LTRK	Single	Light-duty truck friction factor	FLSWM, NERPM, TBRPM, CFRPM, GUATS
FF_MTRK	Single	Medium-duty truck friction factor	FLSWM, NERPM, CFRPM, GUATS
FF_HTRK	Single	High-duty truck friction factor	FLSWM, NERPM, TBRPM, CFRPM, GUATS
FF_LDB	Single	Long distance business friction factor	FLSWM, NWFRPM
FF_IE	Single	Internal-external friction factor	FLSWM, TBRPM, CFRPM, NWFRPM, POLK
FF_SOV_IE	Single	Single-occupant vehicle internal-external friction factor	NERPM, GUATS
FF_HOV_IE	Single	High-occupant vehicle internal-external friction factor	NERPM, GUATS
FF_LTRK_IE	Single	Light-duty truck internal-external friction factor	NERPM, GUATS
FF_HTRK_IE	Single	High-duty truck internal-external friction factor	NERPM, GUATS
FF_HBSC	Single	Home-based-school friction factor	TBRPM
FF_HBU	Single	Home-based university friction factor	TBRPM, GUATS
FF_HDORMU	Single	Campus housing-university friction factor	GUATS
FF_AIRP	Single	Airport friction factor	TBRPM
CATEGORY	Integer	Category number	FLSWM, CFRPM, NWFRPM
FF_AGRI	Single	Agricultural freight friction factor	FLSWM
FF_NMM	Single	Non-metallic minerals freight friction factor	FLSWM
FF_COAL	Single	Coal freight friction factor	FLSWM
FF_FOOD	Single	Food freight friction factor	FLSWM
FF_NDM	Single	Non-Durable Mfg freight friction factor	FLSWM
FF_LUMBER	Single	Lumber freight friction factor	FLSWM
FF_CHEMIC	Single	Chemicals freight friction factor	FLSWM
FF_PAPER	Single	Paper freight friction factor	FLSWM

Table 4-12. Data Fields for FF Data Table (continued)

Name	Type	Description	Applicable Models
FF_PP	Single	Petroleum products freight friction factor	FLSWM
FF_ODM	Single	Other durable mfg freight friction factor	FLSWM
FF_CCG	Single	Clay/Concrete/Glass freight friction factor	FLSWM
FF_WASTE	Single	Waste freight friction factor	FLSWM
FF_MISC	Single	Misc. freight friction factor	FLSWM
FF_WH	Single	Warehousing freight friction factor	FLSWM

Table 4-13. Data Fields for TRANSIT_SPEED Data Table

Name	Type	Description	Applicable Models
SPD_CRV_ID	Integer	Curve ID	NERPM, TBRPM, GUATS, POLK, TCRPM, GTCRPM
LOW_MODE	Byte	Bottom of transit mode range	NERPM, POLK, TCRPM, GTCRPM
HIGH_MODE	Byte	Top of transit mode range	NERPM, POLK, TCRPM, GTCRPM
LOW_FTYPE	Byte	Bottom of facility type range	NERPM, POLK, TCRPM, GTCRPM
HIGH_FTYPE	Byte	Top of facility type range	NERPM, POLK, TCRPM, GTCRPM
LOW_ATYPE	Byte	Bottom of area type range	NERPM, POLK, TCRPM, GTCRPM
HIGH_ATYPE	Byte	Top of area type range	NERPM, POLK, TCRPM, GTCRPM
RATIO	Single	Speed ratio	NERPM, POLK
PK_ RATIO	Single	Speed ratio for peak period	NERPM
OP_RATIO	Single	Speed ratio for off-peak period	NERPM
DESCR	Text (255)	Description	NERPM, POLK
H_LOW	Single	Low highway speed	TBRPM, TCRPM, GTCRPM
T_LOW	Single	Low transit speed	TBRPM, TCRPM, GTCRPM
H_HIGH	Single	High highway speed	TBRPM, TCRPM, GTCRPM
T_HIGH	Single	High transit speed	TBRPM, TCRPM, GTCRPM
PK_OR_OP	Yes/No	If the speeds are for peak period, yes; otherwise, no	TBRPM
H_SPEED	Single	Highway speed	GUATS
T_SPEED1	Single	Transit speed close to highway speed	GUATS
T_SPEED2	Single	Transit speed slightly slowing down to highway speed	GUATS
T_SPEED3	Single	Speed of common local bus with plenty of stops	GUATS

Table 4-14. Data Fields for WAIT_CURVES Data Table

Name	Type	Description	Applicable Models
WT_CRV_ID	Integer	Wait curve ID	NERPM, CFRPM, SERPM, GUATS, POLK, TCRPM, GTCRPM
SHORT_NAME	Text (50)	Short name of wait curve	NERPM, CFRPM, SERPM, GUATS, POLK, TCRPM, GTCRPM
LONG_NAME	Text (255)	Long name of wait curve	NERPM, CFRPM, SERPM, GUATS, POLK, TCRPM, GTCRPM
CURVE	Text (255)	Wait curve specification string	NERPM, CFRPM, SERPM, GUATS, POLK, TCRPM, GTCRPM

CHAPTER 5
MASTER DATABASE SYSTEM

This chapter introduces the master database approach, details the inner working of the master database, and presents the user interface and functionalities of the master database system. Much of the materials were updated from an earlier report entitled *Development of a Prototype Master Network System for FSUTMS* (Gan and Liu, 2009), which involved only the highway network data. In this chapter, the master network system is inclusive of all networks, including those for highway network, public transit, and TAZ. In addition, it also includes all other non-spatial input files.

5.1. Master Database Approach

Network maintenance is a time-consuming and often problematic task in travel demand modeling. In a typical travel demand analysis, multiple versions of a network are usually created to represent specific network conditions associated with individual model years and design alternatives. Traditionally, these networks are modified individually from their respective base-year networks and stored in separate network files. Maintenance of these networks is not only tedious, but also prone to network coding errors that result in network inconsistencies. For example, a simple link split in a network will require that the same split be performed individually for all other networks that need also be split. Given this manual and repetitive process, network inconsistencies can be easily introduced. This has led to use of the master network (also called multi-year network) approach for network building and maintenance.

Unlike a traditional network, a master network combines the base-year and all future-year networks in a single spatiotemporal database. With such a network database design, the user can extract a specific network from its master network database by simply indicating the timeline and the design alternative of the network to be extracted. After a network is extracted and modified, it can be merged back into the master network database. During the merging process, changes to the network can be automatically applied and propagated to other networks in the master network, saving time by both eliminating repetitive manual changes and avoiding network coding errors.

Recognizing the benefits of the master network approach, the research team extends the prototype master network system developed for FSUTMS in 2009 to accommodate not only the highway network, but also the PT network, the TAZ, and other non-spatial data. This extended system, which is called the master database system, can make the FSUTMS data framework more practical and efficient.

5.2. System Framework

Figure 5-1 shows the components of the master database system and their relationship to one another. As the figure shows, this system aims to accomplish two basic functions: (1) extract a specific scenario database from the master database and output it as a goedatabase that can be read by Cube or ArcGIS Desktop, and (2) input a scenario database that was edited by Cube or ArcGIS Desktop and merge it into the master database.

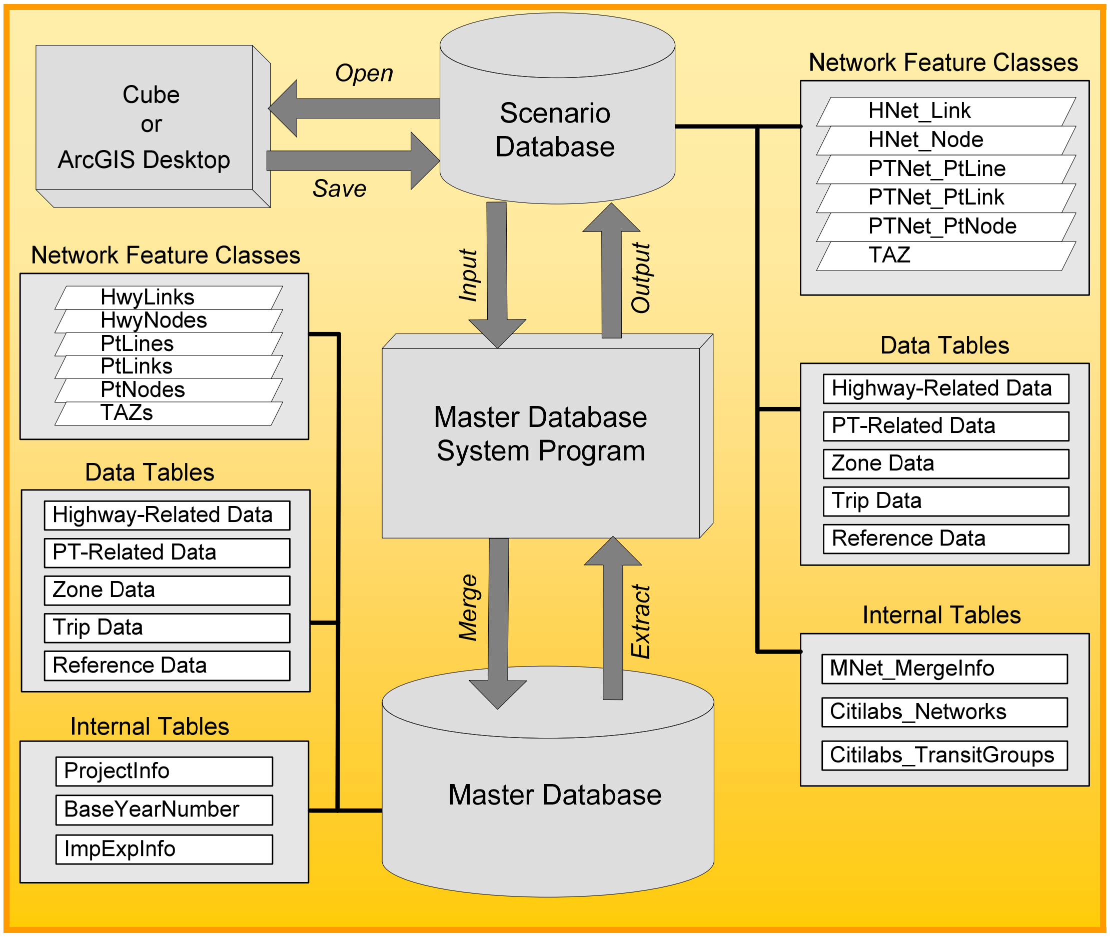

Figure 5-1. Master Database System Framework.

Both the master and scenario databases are stored in ESRI's personal geodatabase. The extracted scenario database, on the other hand, is also compatible with the so-called Cube geodatabase, which is a proprietary geodatabase that includes some additional system attribute tables used by Cube Voyager.

As Figure 5-1 shows, a scenario geodatabase contains highway network feature classes HNet_Node and HNet_Link; PT network feature classes PTNet_PtLine, PTNet_PtLink, and PTNet_PtNode; and a TAZ feature class named TAZ. In addition to these feature classes, a scenario geodatabase also contains three major internal tables: MNet_MergeInfo, Citilabs_Networks, and Citilabs_TransitGroups. The MNet_MergeInfo table is used to record the model year and design alternative of a scenario database. It is also used to keep track of the merging status to ensure consistencies between a scenario database and its master database. The Citilabs_Networks table is used by Cube Voyager to store information that allows the link and node feature classes to form an integrated network (as opposed to two separate feature class layers) to ease network editing within the Cube Voyager's GIS editing window. Similarly, the Citilabs_TransitGroups table enables the PT line, link, and node feature classes to be treated as another integrated PT network in the Cube Voyager. An integrated network allows the nodes and links to be edited simultaneously, thereby preventing potential spatial data inconsistencies.

Similar to scenario databases, a master database also contains the highway, the PT network, and the TAZ feature classes. However, these feature class names are not associated with any specific model year and design alternative, as they are used to store all model years and all design alternatives. The master database also includes three internal tables, i.e., ProjectInfo, BaseYearNumber, and ImpExpInfo. The ProjectInfo table is used to store the project description for each scenario network in the master network database, while the table for BaseYearNumber has only two fields: one field is used to store the base-year number, the other is used to store the model name. The internal table ImpExpInfo stores the importing and exporting support information to manage the socioeconomic and reference data table extraction and merging process. The detailed design and operation of the network feature classes, non-network data tables, and internal tables inside a master database are described in the next section and Chapter 6.

5.3. Master Database Design

As shown in Figure 5-1, the master database structure includes the feature classes for the highway and PT network data, and the attribute tables for other data including socioeconomic, trip, and miscellaneous reference data. These feature classes and tables store the base-year and all future-year data. Tables 5-1, 5-2, 5-3, and 5-4 list some sample records for the highway node, highway link, PT line, and PT link feature classes, respectively. In each table, the required fields for each feature class and some example attribute fields are listed.

Table 5-1. Sample Highway Node Features

OBJECTID	N	X	Y	NAME	DIST-RICT	FARE ZONE	MNet_ Year	MNet_ Status	MNet_ ProjectID
1	1	482451.31	204001.82		1	0	0	0	A
2	2	476594.40	203485.70		1	0	0	1	A
474	2	476594.40	203485.70	Carl	1	0	10	0	A

Table 5-2. Sample Highway Link Features

OBJECTID	A	B	SPEED	NUM_LANES	FUNC_CLASS	MNet_ Year	MNet_ Status	MNet_ ProjectID
1	1	1153	25	2	10	0	1	A
1146	1	1153	25	3	10	10	0	A
2	2	954	25	2	10	0	0	A

Table 5-3. Sample PT Line Features

OBJECTID	LINEID	NAME	HEADWAY_1	MNet_Year	MNet_Status	MNet_ProjectID
1	1	Red Line	15	0	0	A
2	2	Blue Line	20	0	0	A
3	3	Green Line	10	0	0	A

Table 5-4. Sample PT Link Features

OBJECTID	A	B	LINEID	SEQNO	DELAY	MNet_Year	MNet_Status	MNet_ProjectID
1	690	1127	1	1	0	0	0	A
2	1127	689	1	2	0	0	0	A
3	689	685	1	3	0	0	0	A

As mentioned in Chapter 3, the fields in a feature class can be classified into the following three categories:

1. Feature class built-in fields: Includes OBJECTID, SHAPE, SHAPE_Length, and SHAPE_Area. These fields are used for system indexing and geometry display, and are automatically generated by the system when the feature classes are first created. The SHAPE field is a binary field that stores all the vertices of each geometry object, which can be a point, a line, or a polygon. The SHAPE_Length field is created only for a line feature class (such as highway link and PT link feature classes), and stores the length of each line feature. The SHAPE_Area field stores the area of each polygon inside a polygon feature class, such as the TAZ feature class. For simplicity's sake, only ObjectID, which stores the unique ID of each feature record, is shown in the sample records.

2. Master key fields: Includes the N, A, B, LINEID, SEQNO, MNet_Year, MNet_Status, and MNet_ProjectID fields listed in the above tables. Table 5-5 summarizes all key fields for the network feature classes defined in a master database. These fields are key to implementing the structure of the master network database. The "N" key field is used to record the node numbers for the highway node feature class. The "A" and "B" key fields are used to store the beginning (i.e., A-node) and ending (B-node) node numbers that define a link for the highway link feature class. The last three key fields, MNet_Year, MNet_Status, and MNet_ProjectID, which exist in each feature class or data table that utilize the master database system, are used to track the modifications in the nodes and links in the master network database. They are defined as follows:

    a. MNet_Year is an integer field that stores the last two digits of the model year of each feature. For example, "0" is stored for a 2000 feature and "20" is stored for a 2020 feature; "0" instead of "00" is stored in the first example because the field is of the integer data type.

    b. MNet_Status is an integer field that indicates if there has been a modification to the feature; "0" if not modified and "1" if modified.

    c. MNet_ProjectID is a character field that is used to store a scenario network alternative letter; e.g., 'A' for alternative A, 'B' for alternative B, etc.

3. Attribute fields: Includes fields for data pertaining to a specific model, and may also include such fields as functional class, posted speed, number of lanes, etc. The master database has an open structure that allows any number of such attributes to be included for any feature class or data table; however, if the master database system is integrated within the FSUTMS data framework, all attribute field types and names must comply with the definition of the FSUTMS data framework.

Table 5-5. Master Key Fields in a Master Database

Field Name	Field Type	Description	Feature Class
N	Long integer	Node number	Nodes
A	Long integer	Begin node number of a link	Links, PtLinks
B	Long integer	End node number of a link	Links, PtLinks
LINEID	Integer	Line Identifier for a PT line	PtLines, PtLinks, PtNodes
SEQNO	Integer	Sequential number of a PT link segment or a PT node in a PT line	PtLinks, PtNodes
NODES	Long Integer	Node number	PtNodes
TAZ	Integer	TAZ identifier number	TAZs
MNet_Year	Integer	Base-year or future-year number	All
MNet_Status	Integer	1 if a link or node is updated; 0 otherwise	All
MNet_ProjectID	Character	Scenario network project alternative	All

The master database structure stores all scenario data, including the base-year data, in each feature class or data table. An important design feature of the structure is that it stores only the base-year records plus those records that were modified for a specific scenario. In other words, records that have never been modified are stored only once, thus minimizing data redundancy and reducing the storage requirement.

5.4. Scenario Database Merging Process

5.4.1. Merging Steps

Merging a scenario database includes merging a scenario highway network, a scenario PT network, a TAZ feature class, and a set of socioeconomic data. The steps for merging all these types of data are similar; however, the merging procedure is a complex process. As described in the previous section, the master database system relies on three key fields, i.e., MNet_Year, MNet_Status, and MNet_ProjectID, to implement the scenario database merging process. Taking a scenario highway network as an example, the process for merging a modified feature record into a master database is accomplished in the following four steps:

1. *Change MNet_Status in the corresponding base-year feature record.* When a feature record in a scenario network being merged is found to have been modified, the MNet_Status field of the corresponding feature record in the base-year network is changed from 0 to 1. This is done regardless of whether the change is for an attribute value or a geometric shape. Detecting whether a feature record has been modified is accomplished by comparing each feature record in the scenario network being merged with the corresponding record in the original scenario network (from which the scenario network being merged was created).

2. *Copy the corresponding base-year feature record to all other scenario networks.* If the feature record in the base-year network corresponding to the modified feature record has not been modified before, copy this feature record to all scenario networks other than the

one being merged. This causes all existing scenario networks to also keep a copy of the unmodified original feature record.

3. *Merge modified feature record.* The merge can be either to create a new scenario network or to update an existing scenario network. If it is to be merged as a new scenario network, the modified feature record will be inserted as a new record in the master network database for the new scenario network; if it is to update an existing scenario network, the system will simply replace the same feature record in the scenario network being updated. A special case of a modified feature record involves one that has been deleted. A deleted record is detected when an existing record in the scenario network being updated is not found in the scenario network being merged. In this case, the system will delete the feature record in the scenario network being updated.

4. *Propagate modifications to other scenario networks.* This step is applied only when the user selects to propagate the modifications to the other scenario networks in the master network database. In this step, if a feature record in a scenario network that is selected for propagation is found to have the same node number(s) as those of the modified feature record being merged, the feature record will be updated with the modifications. This process is repeated for all scenario networks selected for propagation. It is noted that, instead of replacing the entire modified feature record, only the specific attributes and/or geometric shapes within the record that were modified are replaced.

The above steps are repeated individually for each modified feature record until all modified feature records are merged into the master database.

5.4.2. Example

To further illustrate this four-step merging process, Table 5-6 provides a simple example with two highway link records in a master geodatabase. The links are link 1-1153 and link 2-954 for the 2000 base year. No other future-year scenario networks exist in this master database.

Table 5-6. Original Base-Year Highway Link Records in Master Database

OBJECTID	A	B	NUM_LANES	MNet_Year	MNet_Status	MNet_ProjectID
1	1	1153	2	0	0	A
2	2	954	2	0	0	A

Assume that a scenario highway network has its number of lanes (NUM_LANES) for link 1-1153 changed from 2 to 3 for future year 2010 alternative ‘A’. In step 1, the MNet_Status field for link 1-1153 for the 2000 base year is changed from 0 to 1, as shown in Table 5-7. Because there are no other scenario networks in the current master database, step 2 does not apply. As part of step 3, a new link, 1-1153, with an OBJECTID of 1146 for the future-year 2010 scenario network alternative ‘A’ (i.e., MNet_Year = 10, and MNet_ProjectID = ‘A’) is added. Note that link 1-1153 with an OBJECTID of 1 for the base-year highway network is left unchanged. Also, link 2-954 that is also unchanged belongs to not only the base-year network, but also the 2010, alternative ‘A’ scenario network. Following the above merging process, the current master database now has one scenario network for future year 2010 alternative ‘A’, in addition to the base-year network.

Table 5-7. Link Records in Master Database after Merging a Modified Record

OBJECTID	A	B	NUM_LANES	MNet_Year	MNet_Status	MNet_ProjectID
1	1	1153	2	0	1	A
1146	1	1153	3	10	0	A
2	2	954	2	0	0	A

Assume that scenario network (database) alternative 'A' is extracted from the current master database. If the number of lanes for link 2-954 from this extracted network is modified from 2 to 4 and if this modified network is merged back to the master database as a new scenario network alternative 'B' for the same future year, then, as part of step 1, the MNet_Status field for the link 2-954 is changed from 0 to 1 (see Table 5-8) to reflect the fact that this base-year link record has been changed.

Table 5-8. Base-Year Link Updated in Master Database

OBJECTID	A	B	NUMLANES	MNet_Year	MNet_Status	MNet_ProjectID
1	1	1153	2	0	1	A
1146	1	1153	3	10	0	A
2	2	954	2	0	1	A

Because the base-year record for link 2-954 has not been modified before, and the current master database already has one future-year 2010 scenario network alternative 'A', step 2 must be applied. In this case, a copy of the base-year record for link 2-954 for 2010 scenario network 'A' is made. As Table 4.9 shows, this record has an OBJECTID of 1148. As part of step 3, a new record for link 2-954 with an OBJECTID of 1149 is inserted. This new record has a new number of lanes of 4. For link 1-1153 that was modified for scenario network alternative 'A', it was copied as a new link for alternative 'B' with an OBJECTID of 1147. Table 5-9 shows the complete set of link records in the master network database after the first three steps of the merging process.

Table 5-9. Complete Link Records after Merging a New Scenario Network

OBJECTID	A	B	NUM_LANES	MNet_Year	MNet_Status	MNet_ProjectID
1	1	1153	2	0	1	A
1146	1	1153	3	10	0	A
1147	1	1153	3	10	0	B
2	2	954	2	0	1	A
1148	2	954	2	10	0	A
1149	2	954	4	10	0	B

The link records given in Table 5-9 did not involve any change propagation. If the change in the number of lanes from 2 to 4 in scenario network alternative 'B' is to be automatically propagated to scenario network alternative 'A', for example, the resulting link records in the master network database will be those shown in Table 5-10. The table shows that the attribute value for NUMLANES for the record with an OBJECTID of 1148 will be changed from 2 to 4.

Table 5-10. Links in Master Database after the Propagation

OBJECTID	A	B	NUM_LANES	MNet_Year	MNet_Status	MNet_ProjectID
1	1	1153	2	0	1	A
1146	1	1153	3	10	0	A
1147	1	1153	3	10	0	B
2	2	954	2	0	1	A
1148	2	954	4	10	0	A
1149	2	954	4	10	0	B

5.4.3. Special Cases

Although rare, during the merging process a potential conflict may arise when the user tries to merge a scenario database that includes one or more new node numbers that are already in use by another scenario network. Merging such a new node number into the master database will create conflict when the user chooses to propagate the new node to the scenario network that already uses the same node number for another network entity. This causes the scenario network to have two nodes that represent two separate network entities, but share the same number; extracting this scenario network will therefore result in a network error when it is imported into Cube Voyager.

To prevent this conflict, the system must scan the master database during the merging process to ensure that none of the newly added nodes in the scenario network being merged are already in use by another scenario network. When a conflict is detected, the system automatically assigns another number that is not already in use to the conflicting node. After a scenario network with conflicting new node numbers is merged into the master database, the master database system inserts a code into the scenario database to stop it from being merged again.

5.5. Scenario Database Extraction Process

Extracting a scenario database from a master database is relatively straightforward compared to the merging process. Because the master database stores all of the same types of data (i.e., highway links and nodes) in one feature class or data table, the extraction can be done using a query with a simple SQL "where" clause. To extract the base-year scenario database, the condition for the "where" clause is simply expressed as "(MNet_Year=0 and MNet_ProjectID='A')."

To extract a non-base-year scenario database, for example, for future-year 2010 and alternative 'A', the conditions for the "where" clause are "(MNet_Year=0 and MNet_Status=0) or (MNet_Year=10 and MNet_ProjectID='A')." The first part of the clause, i.e., (MNet_Year=0 and MNet_Status=0), extracts all those base-year records that have not been modified for non-base-year scenario networks or data. These base-year records are shared by all scenarios including the 2010 alternative 'A' network or data. The second part of the "where" clause, i.e., (MNet_Year=10 and MNet_ProjectID='A'), is used to extract the records that are specific to the year 2010 alternative 'A' network. Using the sample link records in Table 5-7, the records for the extracted scenario database for the base year are as listed in Table 5-11. Similarly, for model year 2010 alternative 'A', the extracted records are as listed in Table 5-12.

Table 5-11. Extracted Base-Year Database

OBJECTID	A	B	NUM_LANES	MNet_Year	MNet_Status	MNet_ProjectID
1	1	1153	2	0	1	A
2	2	954	2	0	0	A

Table 5-12. Extracted Model Year 2010 Database Alternative 'A'

OBJECTID	A	B	NUM_LANES	MNet_Year	MNet_Status	MNet_ProjectID
1146	1	1153	3	10	0	A
2	2	954	2	0	0	A

5.6. System Implementation

5.6.1. Development Platform

The master database system was implemented as a standalone desktop application using the C# language. The system interacts with the master geodatabase using the Application Programming Interfaces (APIs) provided by ArcGIS Engine. To execute the master database system, the computer must be installed with Microsoft .NET Framework Runtime and with an ArcGIS Engine Runtime or authorized ArcGIS Desktop license.

5.6.2. Functionalities

As aforementioned, the master database system implements two basic functions. The first is to allow the extraction of a database for a particular scenario from a master database and then save it as a Cube geodatabase. An extracted scenario database can be either for the base year or for a design alternative of a particular planning year. The second function of the program is to allow an extracted geodatabase, after it was modified in Cube, to be merged back into the master network for storage. A network inside this extracted database being merged can either replace an existing network or be added as a new scenario network to the master database.

An important capability of the master database system is to allow the user to apply the same modifications to other scenarios stored in the master database. This capability, which is called propagation, not only saves the time needed to edit individual scenario data repetitively for the same data modifications, but more importantly, ensures that the modifications will be consistent among the affected scenarios. A special note for this propagation function is that it is only applicable to the network data, including the highway, public transit, and TAZ networks and their attributes.

A data modification can involve a change in an attribute value or a change in a geometric feature (i.e., a link or a node). An attribute change can be for a node attribute, a link attribute, or a socioeconomic attribute. Similarly, a change in geometric feature can involve a node, link, line, or TAZ area. Since links are defined by nodes, a geometric change would typically involve both nodes and links. A change to a link, for example, can be to merge two links into one, split a link into two, move a link from one location to another, add a new link, or remove an existing link. The master database system is capable of incorporating all of these changes.

It should also be noted that a modified scenario database can be merged into a master database only if it was originally extracted from the same master database. This ensures that the two databases being merged are of the same structure, with the same set of attributes. The master database system will verify that this requirement is met before merging a scenario database into a master database.

5.6.3. User Interface

The user interface for the master database program is relatively simple, consisting of only two input screens: one for specifying the options for extracting a scenario database from a master database, and another for specifying the options for merging a modified extracted scenario database back into its master database. These two screens are accessible from the two tabs shown in Figure 5-2.

5.6.3.1. Database Extraction

As shown in Figure 5-2, the above screen allows the user to specify the following options:

- The **Master geodatabase source** allows the user to select a master database from which an available scenario database is to be extracted.
- As soon as a master database is selected, all of the model years stored in the database will be listed under the **Model year** dropdown list.
- Depending on the specific model year selected, all model alternatives for the selected model year will be listed under the **Alternative** dropdown list.
- In addition to model year and model alternative, a "Scenario description**"** for the database to be extracted is automatically displayed.
- The final user input is to name the output for **Scenario geodatabase file path and name**.

Once the above inputs are completely specified, the user can click on the **Extract** button at the bottom of the screen to start extracting and saving the selected database. After a scenario database is extracted from the master database, it can be loaded into the Cube Voyager and edited in the Cube GIS window.

5.6.3.2. Database Merging

Figure 5-3 shows the input screen for merging a modified scenario database back into its master database. The user first selects a scenario database to be merged by browsing to the database file. The selected file path and name will be displayed under the **Scenario geodatabase file path and name** text box. The user will then select a master database to merge the modified scenario network into. The selected master database file path and name will be displayed under the **Master geodatabase file path and name** text box. The user must then select either to save the scenario database as a new scenario, or to update the scenario from which the modified scenario database originated.

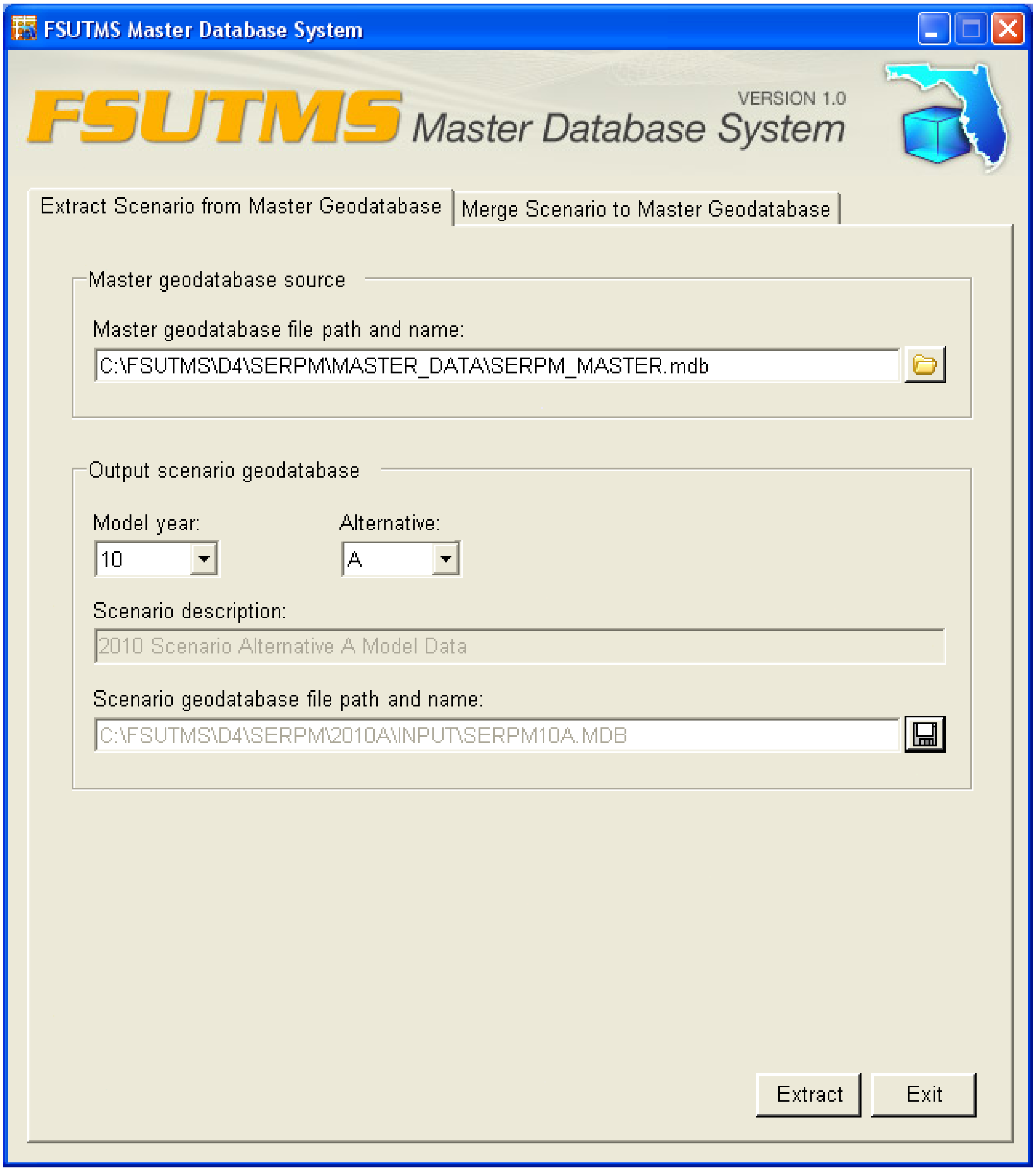

Figure 5-2. Main Screen for Scenario Database Extraction

As an example, Figure 5-3 shows that the scenario network is to be saved as a new alternative under the same planning year of 2010. Since there are already two scenarios in 2010, the system automatically assigns "C" as the alternative letter. The user can choose to save to an existing planning year by selecting from the **Model year** dropdown list. For a case when the scenario network is to be saved as a new alternative of a new planning year that is not already in the master network database, the user can enter the last two digits of the new planning year in the same dropdown list. Following this, the user can enter a description to identify the new scenario under the **Scenario description** text box.

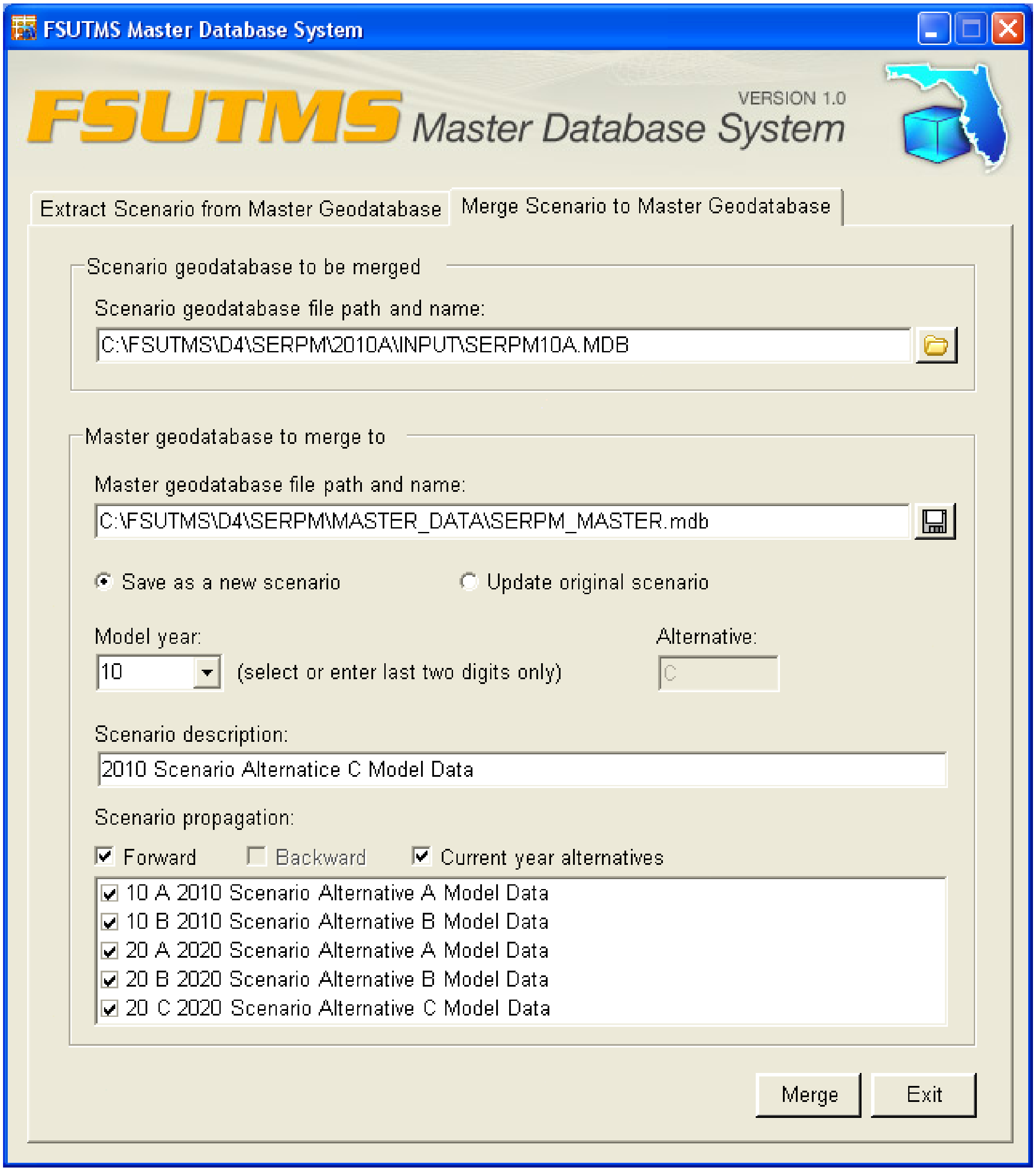

Figure 5-3. Main Screen for Merging a New Scenario Database

Again, as an example, Figure 5-4 shows that the user has chosen to update the scenario from which the modified scenario network originated, in this case, for model year 2010 and alternative "B." The system will automatically retrieve and display the model year and alternative from the modified scenario network file. The system will also automatically list the original project description. Since the scenario network is supposed to have been modified in Cube Voyager, the user is allowed to update the scenario description.

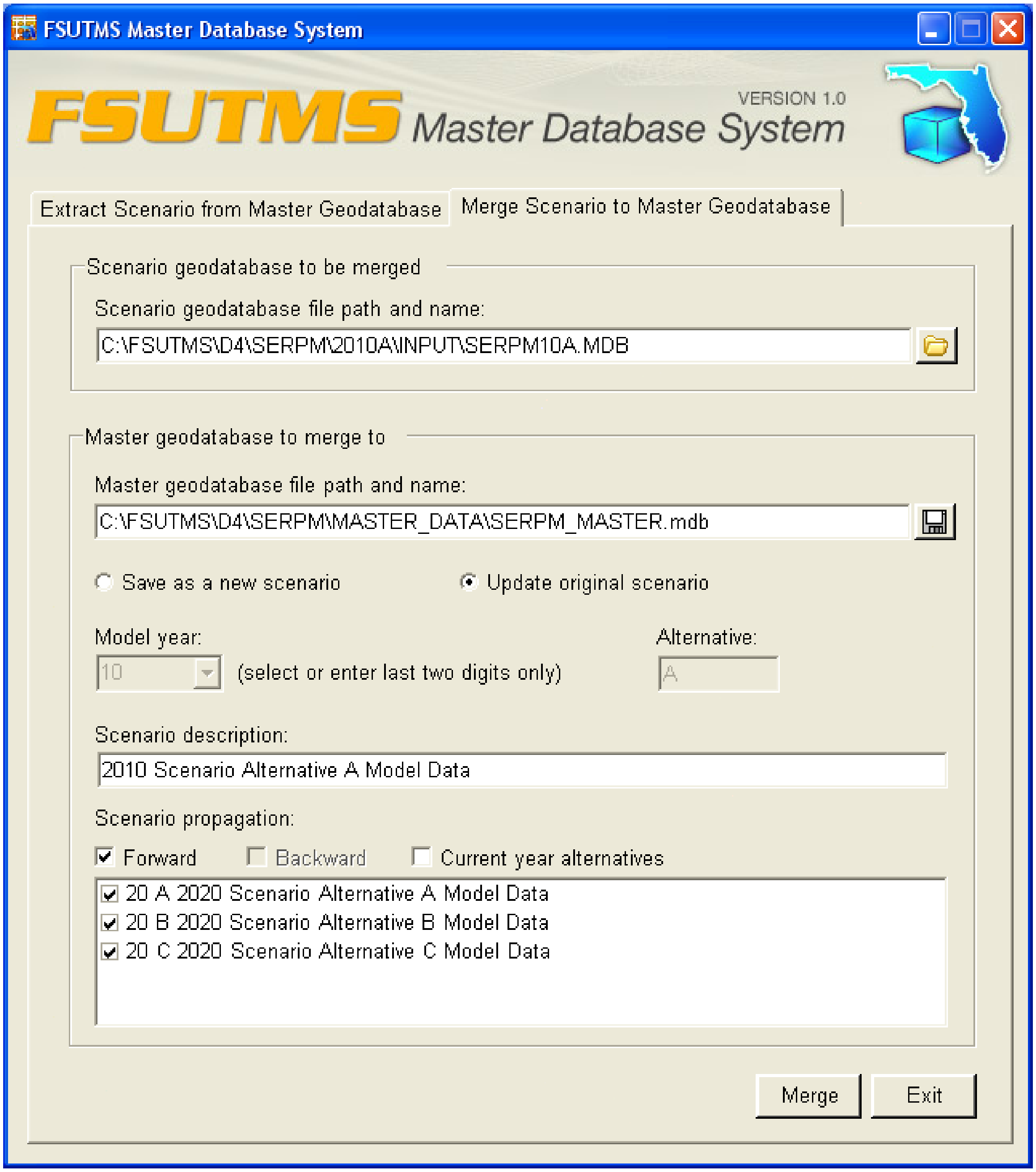

Figure 5-4. Main Screen for Updating the Original Scenario Network

The final user input, as shown in both Figures 5-3 and 5-4, is to select the existing scenarios in the master database to apply the same modifications in the scenarios being merged. This is the most important capability of the master database system, as it not only significantly reduces the time spent having to manually modify individual scenarios with the same modifications, but also ensures consistency among all modified scenarios. The screen allows the user to quickly select the scenarios for which to apply the same modification by checking one or more of the following three options:

1. Checking the “Forward**”** checkbox allows all future-year scenarios to be selected.
2. Checking the “Backward” checkbox allows all past-year scenarios to be selected.
3. Checking the “Current year alternatives” checkbox allows all current year scenarios to be selected.

Future and past years are defined with respect to the model year of the scenario being merged. All selected scenarios are shown in the list box below the checkboxes. The user can choose to deselect any of the listed scenarios by unchecking the checkbox preceding a scenario name.

It is worth noting that any changes to a future-year scenario cannot be propagated to the base-year network until the base-year scenario is updated during the merging process. Also, there is generally one base-year scenario in a master database, which is the base-year alternative ‘A’. However, if model developers and users need multiple base-year alternatives in a master database, the current system can still support this requirement, but only when the base-year alternative ‘A’ is treated as the real base-year scenario, and all other base-year alternatives are treated as future-year scenarios, equally.

5.7. System Advantages

The master database system has the following four advantages:

1. The structure provides full support for both forward and back propagation. The propagation can be applied to any of the selected scenario networks, and can be for either data attributes or geographic features. Change propagation is the most important capability of a master network as it saves the time otherwise taken to manually edit the same changes for each scenario network and, by doing so, helps to maintain network consistencies.

2. The structure minimizes the use of network storage space. This was accomplished by storing only the modified records (with respect to the base-year network) of each scenario network without storing all those that were not modified. It takes advantage of the fact that the differences between a base-year network and a future-year scenario network generally account for only a very small percentage of the total links and nodes. While storage space is generally not a major concern today, the fact that a more efficient storage structure minimizes the chances of reaching the 2 GB file size limit of a Microsoft Access data file (of which geodatabase is based) adds to the significance of this advantage. A smaller database also improves the data I/O speeds and makes file transfers easier.

3. The structure keeps the network links consolidated. Because the structure stores only the original base-year network plus only the modified links/nodes of each scenario network, the base-year network is kept intact and is not affected by the number of scenario networks or the number of link/node modifications in each scenario network. The same is extended to the individual scenario networks, as each is stored as the base-year network plus any network changes that define the particular scenario. Thus, each scenario network is not affected by changes from the other scenario networks. A network with consolidated links

(i.e., links with the same attributes which are not unnecessarily broken down into multiple links) allows the model to run more efficiently.

4. The structure was designed for extendibility. The master network structure uses an open database structure. First, the two feature classes are not restricted to a certain set of attributes. The system will recognize and accept any number of attributes a model wishes to include. In addition, the structure is also not restricted to specific attribute names. These are important as the master network system was designed for multiple agencies in Florida.

5.8. Some Conventions and Restrictions on Master Database Operations

Due to the nature and complexity of the master database operations, the following conventions and restrictions apply:

- Change propagation applies only to network geometry and network attributes, and does not apply to zonal, trip, or reference data tables.

- The base-year model is always designated alternative 'A'. The base year may have multiple alternatives and will be assigned alternatives 'B', 'C', etc.

- For a particular model year, the system will identify its last alternative letter and automatically assign the next letter when the user chooses to save a new alternative.

- By default, the system will export all available network layers.

- Changes can be propagated to all scenarios for all years except base-year alternative 'A', which is the base-year model.

- The base-year model (alternative 'A') permits only direct changes; any changes to the base-year model can then be propagated to all other scenarios. Changes to the base-year model are likely to require application to all other scenarios. As such, the system by default will automatically check all scenarios assuming that the users want to propagate these changes to all scenarios. The user may, however, deselect any of the scenarios to exclude them from propagation.

CHAPTER 6
DATA CONVERSION PROCEDURE

This chapter provides step-by-step instructions for converting existing input files into the proposed master database. The conversion procedure includes both spatial and non-spatial input files, and makes use of a combination of Cube's Geodatabase Manager and ESRI's ArcCatalog tool.

6.1. Creation of a Geodatabase for Base-Year Data

6.1.1. Step 1-A: Create a Geodatabase

A geodatabase can be created in either Cube or ArcCatalog. Figure 6-1 below shows the main screen for the Cube Geodatabase Manager. To create a geodatabase in Cube, the user first clicks the **Create New GDB** button to open the window shown in Figure 6-2. Next, the user specifies the file path and name for the new geodatabase, and then clicks **Create.**

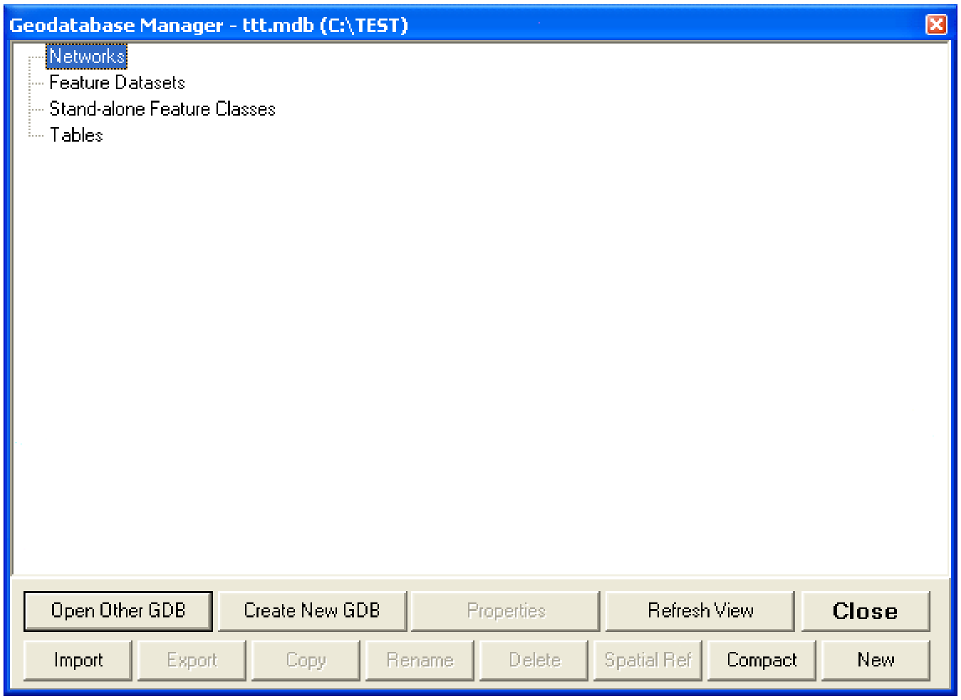

Figure 6-1. Cube Geodatabase Manager Screen

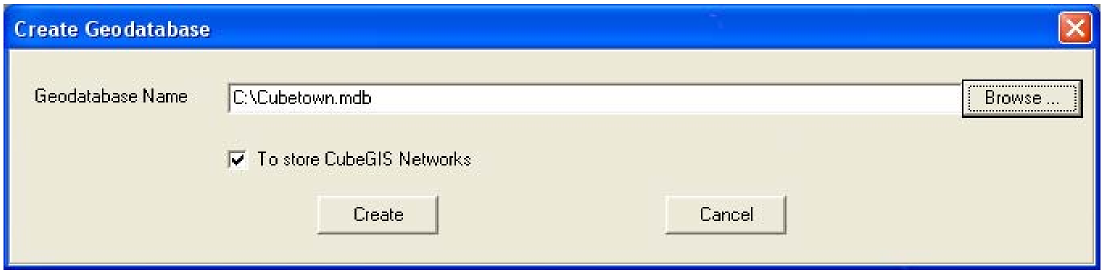

Figure 6-2. Geodatabase Name Input Window

6.1.2. Step 1-B: Import a Highway Network

Figure 6-3 shows an empty geodatabase. To import a highway network (.net) file, select the desired (.net) file and click the **Import** button (see Figure 6-4).

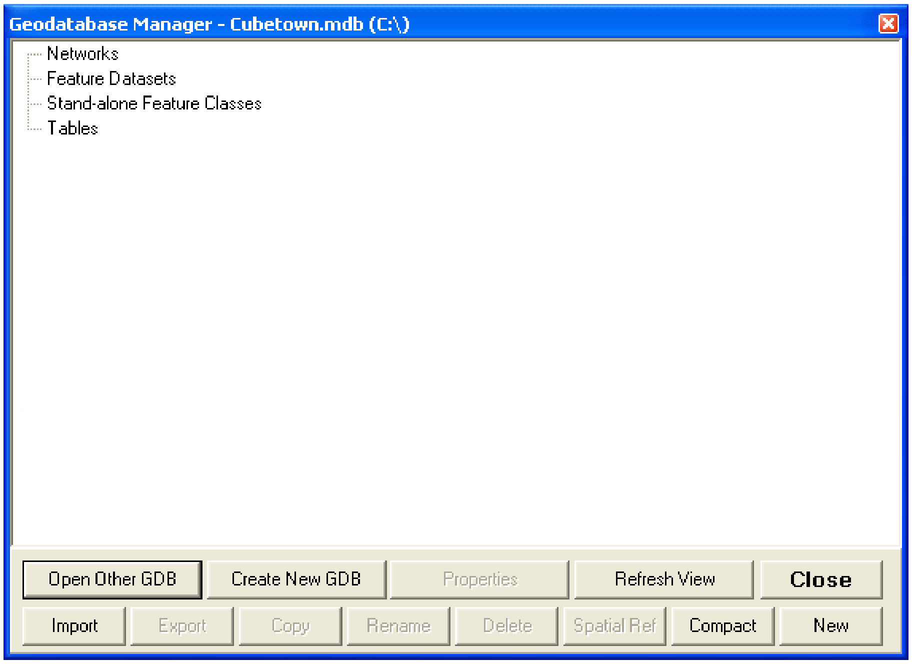

Figure 6-3. An Empty Geodatabase Named Cubetown.mdb

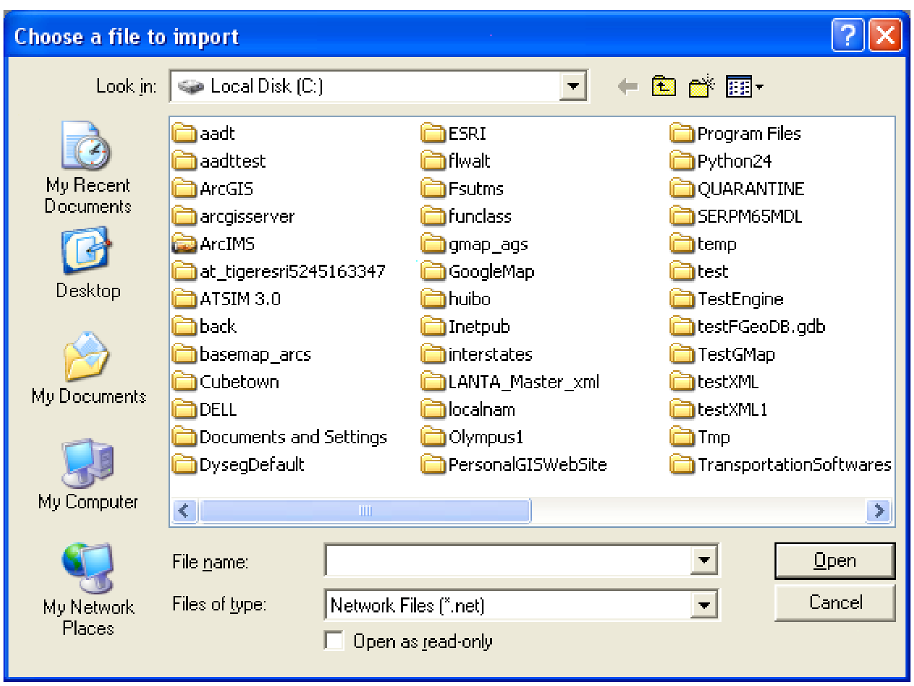

Figure 6-4. Window for Selecting a Highway Network

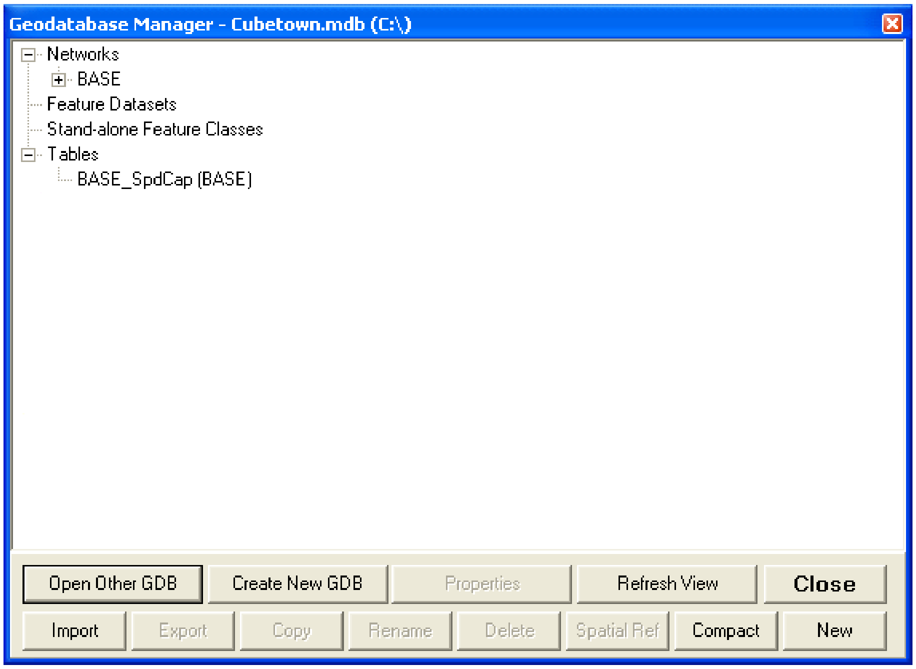

Figure 6-5. An Imported Highway Network Named BASE

6.1.3. Step 1-C: Import a Public Transit Network

To import a public transit network based on a public transit line (.lin) file, click the **Import** button again (see Figures 6-6 and 6-7). Figure 6-7 shows that a PT line file named "basept" is selected. This name is also used as a new data set name for the PT network (see Figure 6-8). Note that this public transit network is based on the highway network imported above.

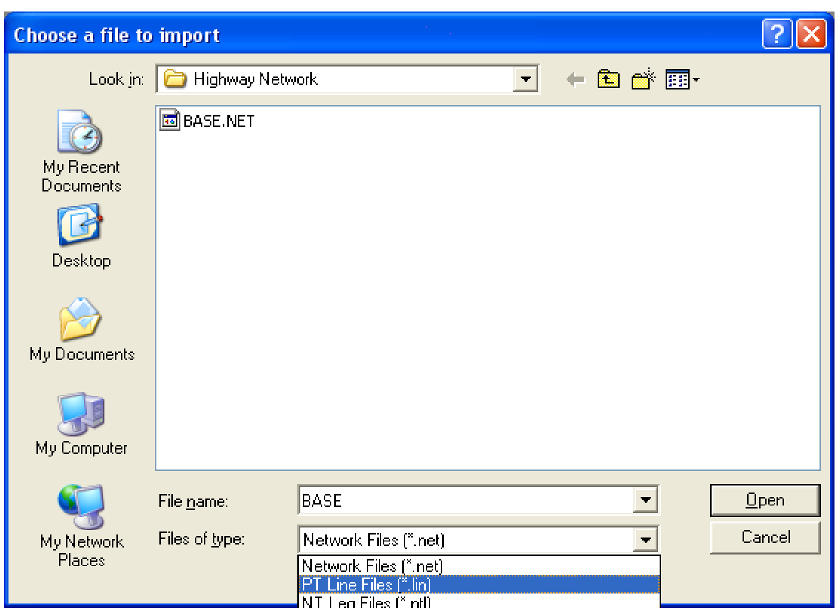

Figure 6-6. PT Line Selection by File Type

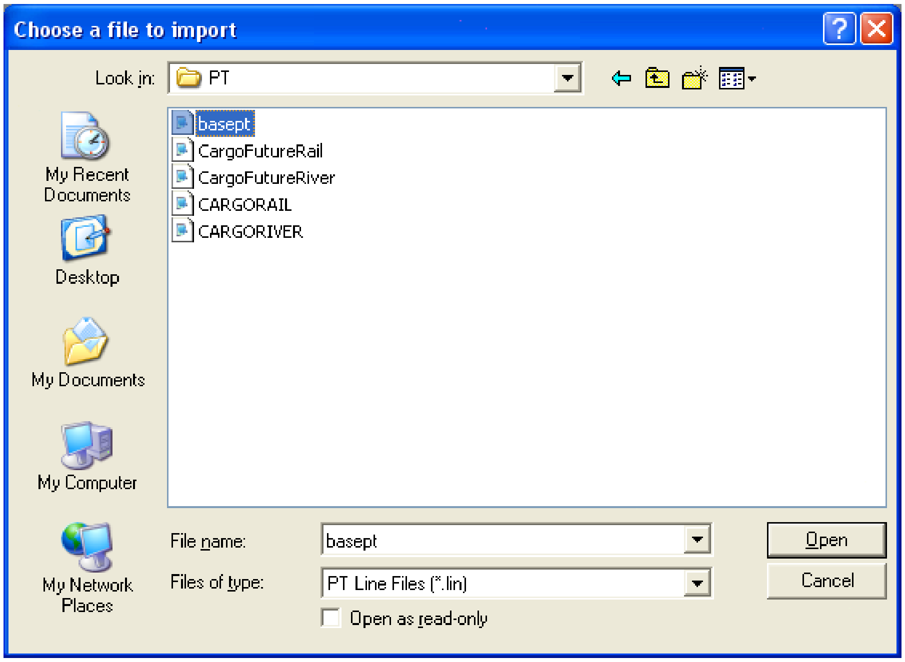

Figure 6-7. A Selected PT Line File

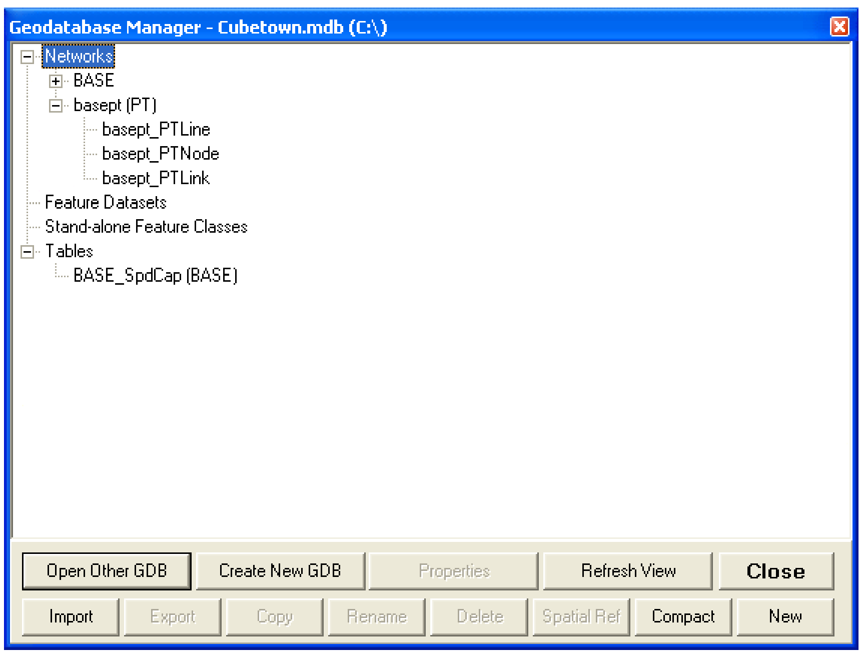

Figure 6-8. An Imported PT Network Named BASEPT

6.1.4. Step 1-D: Import a TAZ Feature Class

TAZ data is generally stored in the ESRI shapefile format. The procedure for importing this GIS data follows the same steps as described above. Figures 6-9 and 6-10 show the importing procedure.

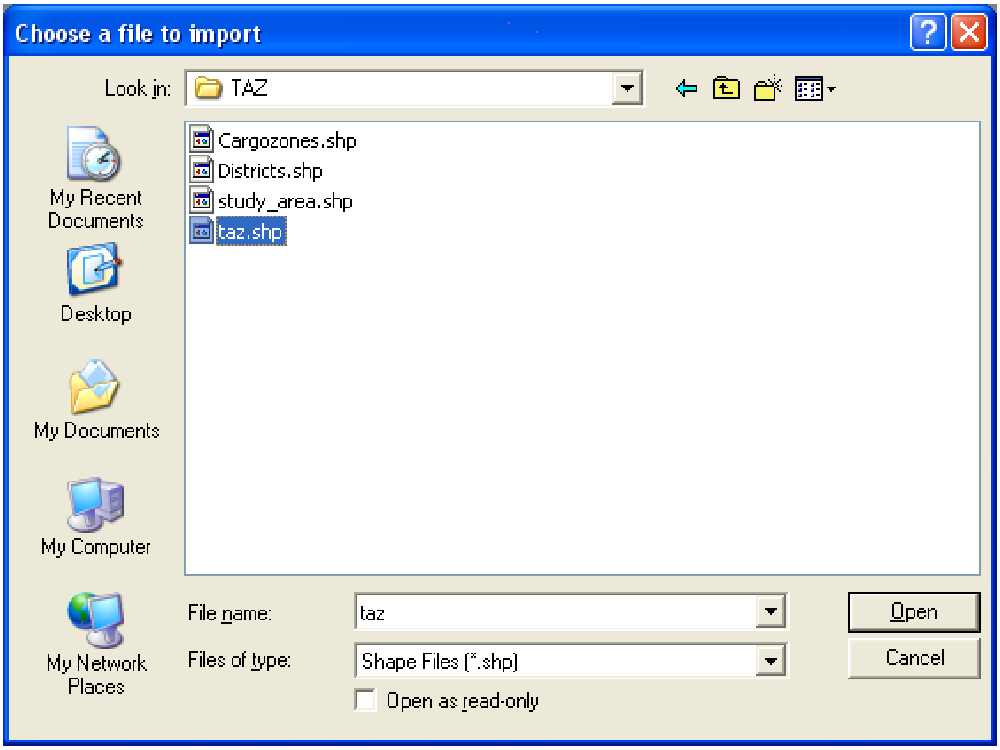

Figure 6-9. A Selected TAZ Shapefile

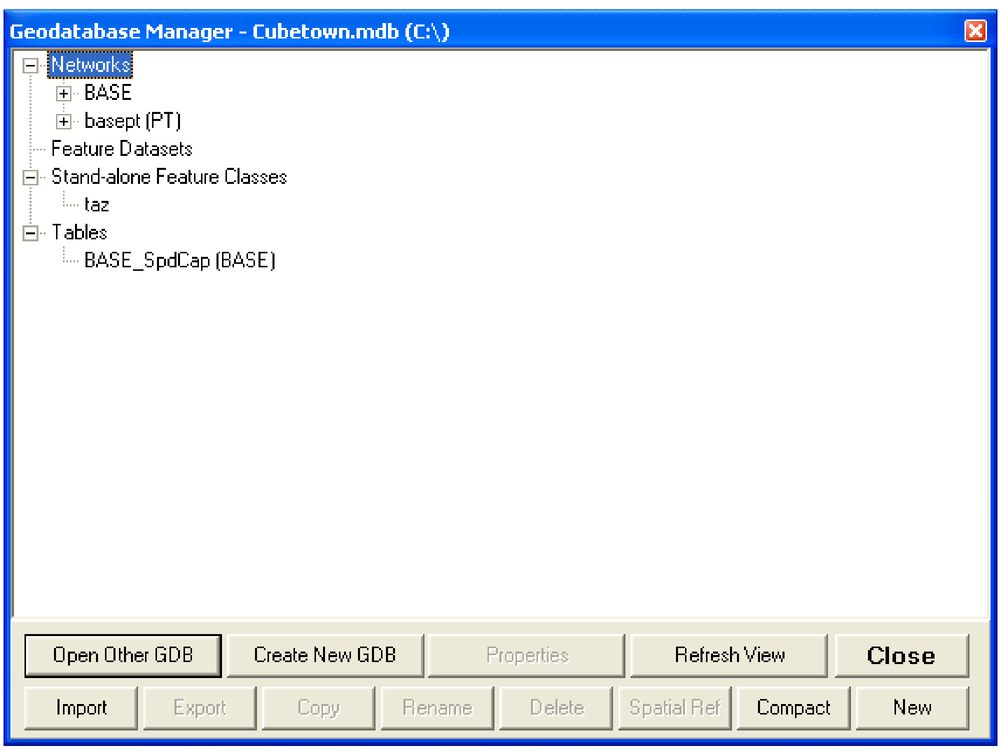

Figure 6-10. An Imported TAZ Feature Class

6.2. Creation of a Master Geodatabase

6.2.1. Step 2-A: Create an Empty Geodatabase in ArcCatalog

In this step, the ESRI ArcCatalog tool (see Figure 6-11) is used to create a master geodatabase. To create a new geodatabase, right-clicking the C:\ folder and selecting New->Personal Geodatabase. Next, rename this file "Cubetown_Master" to create an empty geodatabase (see Figure 6-12).

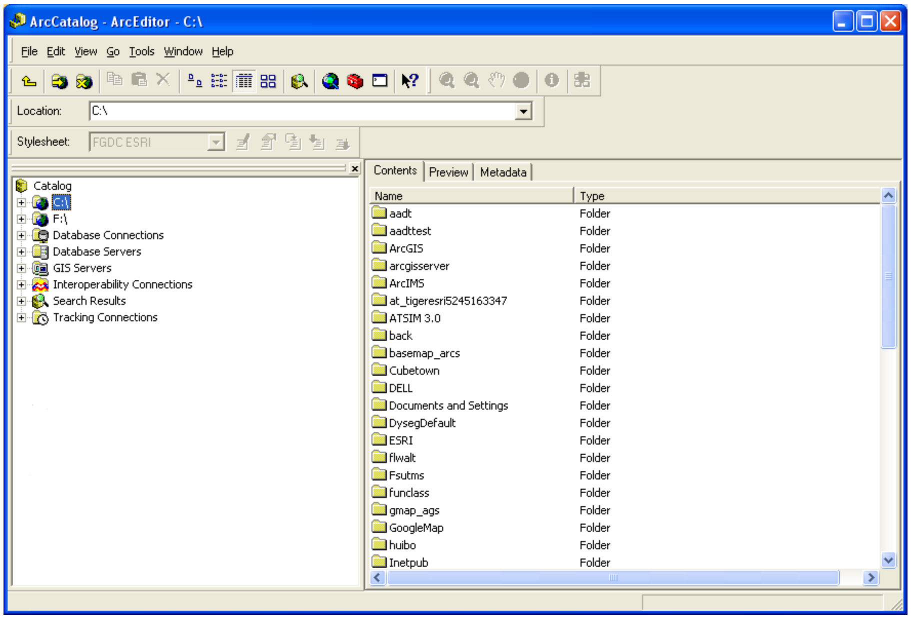

Figure 6-11. ArcCatalog Interface

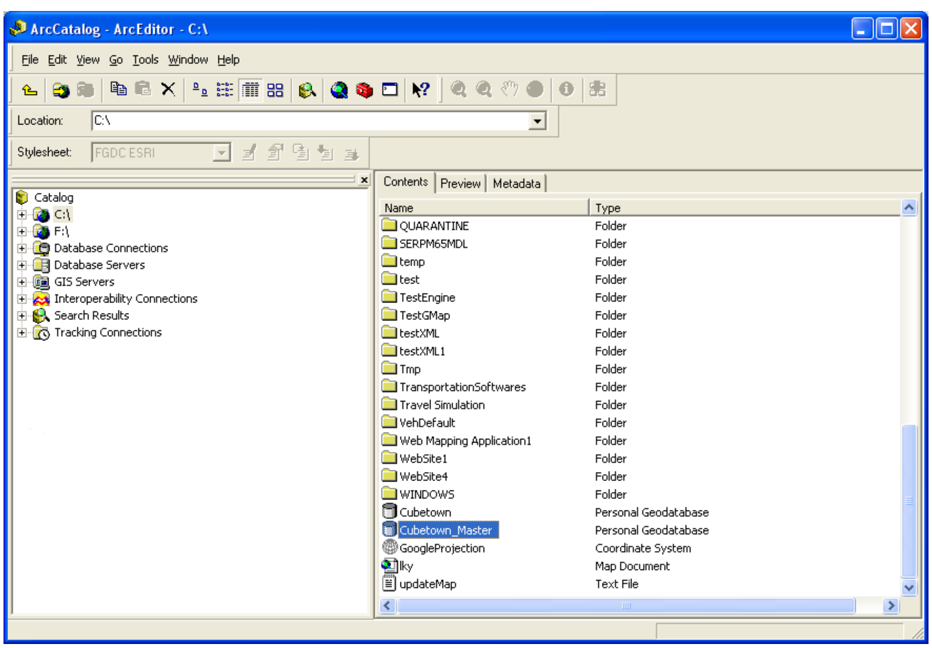

Figure 6-12. A New Empty Geodatabase Named Cubetown_Master

6.2.2. Step 2-B. Import Feature Classes into Master Geodatabase

By right-clicking this newly created **Cubetown_Master** geodatabase and selecting **Import->Feature Class (single)**, the **Import** window, as shown in Figure 6-13, will open. This window allows the base-year feature classes to be imported into the **Cubetown_Master** geodatabase.

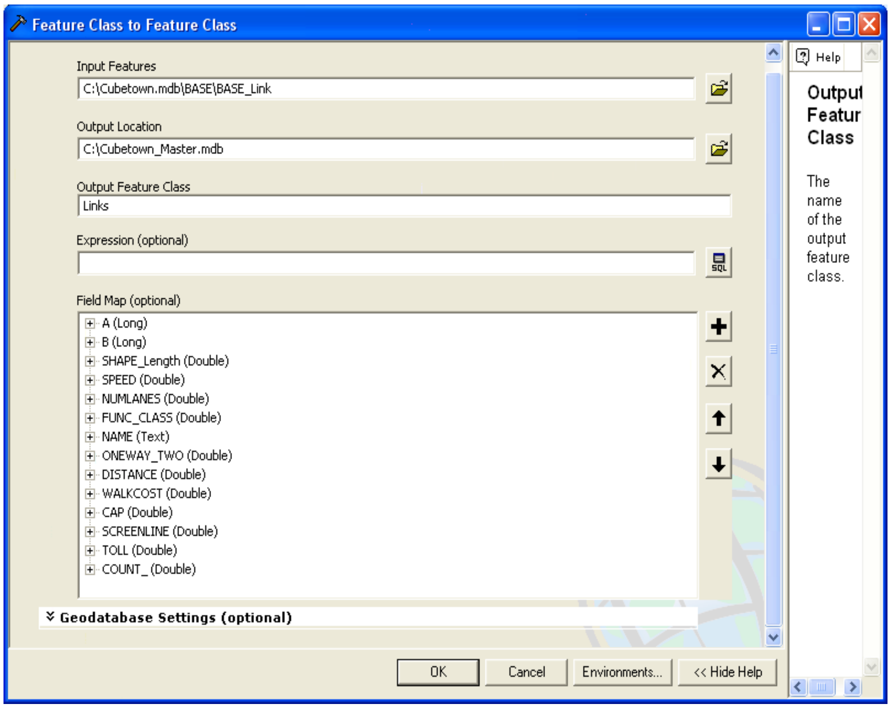

Figure 6-13. Single Feature Class Importing Window

Note that in the master geodatabase, "Links" is a fixed feature class name for the highway network link feature class. The use of a different feature class name will result in a run-time error. Table 6-1 lists all required feature class and internal table names for the master geodatabase.

Table 6-1. Feature Class and Internal Table Names in Master Geodatabase.

Name	**Type**	**Description**
Links	Feature class	Highway network link data
Nodes	Feature class	Highway network node data
PTLines	Feature class	PT network line data
PTLinks	Feature class	PT network link data
PTNodes	Feature class	PT network node data
TAZs	Feature class	TAZ or Zone data
BaseYearNumber	Internal table	Table for base year information
ProjectInfo	Internal table	Table for scenario project information
ImpExpInfo	Internal table	Table for managing data tables, extraction and merging operations

Note: Repeat the same importing procedure to import highway node, public transit line, public transit link, public transit node, and TAZ data into the Cubetown_Master geodatabase.

6.2.3. Step 2-C: Import Non-Transportation Network Data

For non-transportation network data, the original data may have different data formats, including .xls, .txt, or .dbf. In such cases, Microsoft Office Access software is required. First, the user must open the created master geodatabase, and then import these data files as data tables. The importing procedure includes not only renaming the data tables, but also changing the field names and data types within the Microsoft Office Access program. An example of steps to import "s65tazs.dbf" to table "ZONEDATA_LIFESTYLE" for SERPM master database with MS Access 2003 is given below:

Step 1. Import a New Table: Click the menu item **Insert** -> **Table** to insert a new table as shown in Figure 6-14. In the **New Table** dialog, choose **Import Table** and click **OK** button as shown in Figure 6-15. In the **Import** dialog, select the file to import ("s65taz_05.dbf" for this example) and click **Import** button as shown in Figure 6-16. Figure 6-17 shows the new imported table "s65tazs_05."

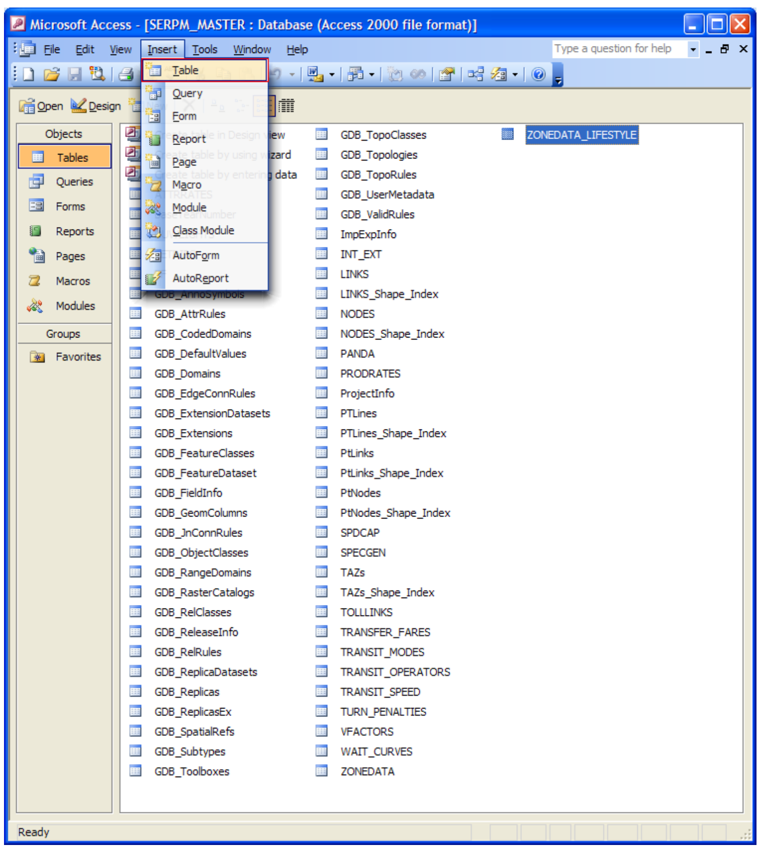

Figure 6-14. Menu Item to Insert New Table

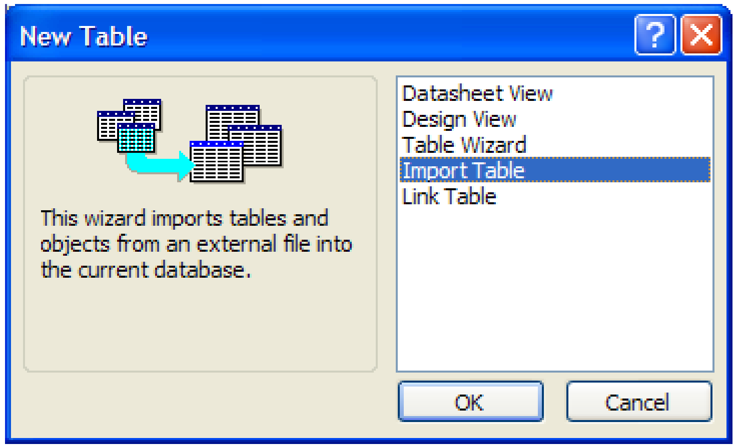

Figure 6-15. New Table Dialog

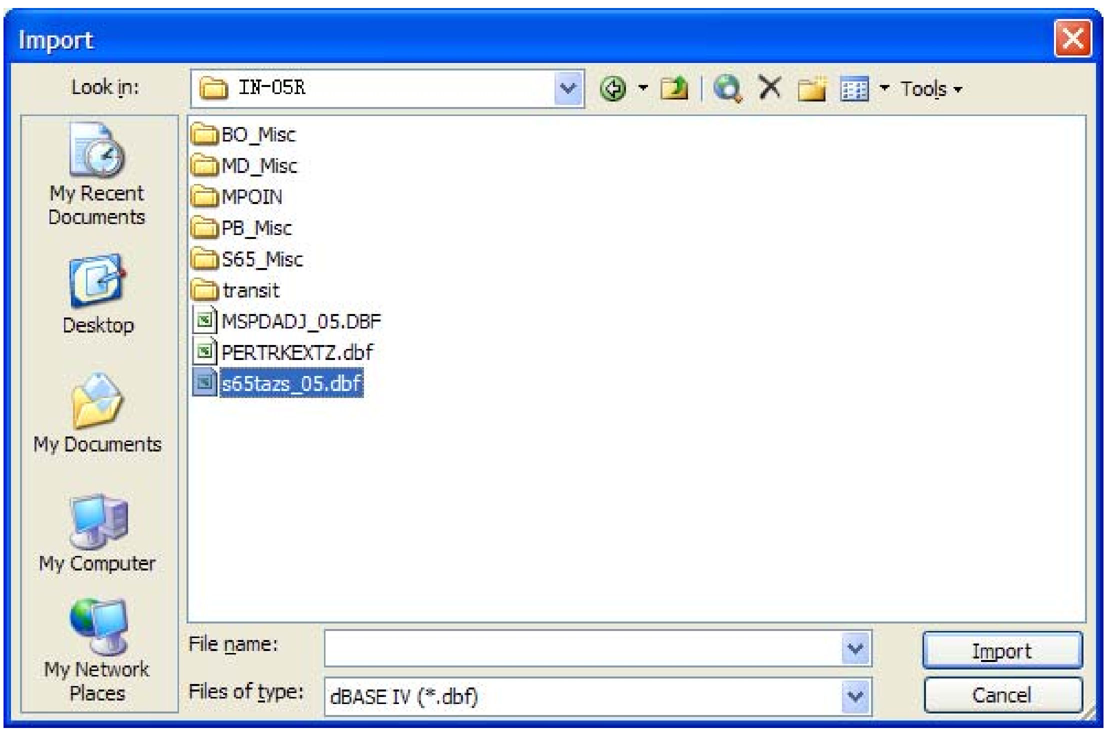

Figure 6-16. Imported File Selection Dialog

Step 2. Copy the Data of the New Imported Table: Open the new imported table “s65tazs_05” and the destination table “ZONEDATA_LIFESTYLE” and tile two windows horizontally as shown in Figure 6-18. Right click a field in table “s65tazs_05” to copy (“TAZ_REG” for this example) and click **Copy** in the pop-up menu as shown in Figure 6-19. Right click a field in table “ZONEDATA_LIFESTYLE” to paste (“TAZ_REG” for this example) and click **Paste** in the pop-up menu as shown in Figure 6-20. Repeat the above copying and pasting process to finish copying all the data from the imported table to the destination table.

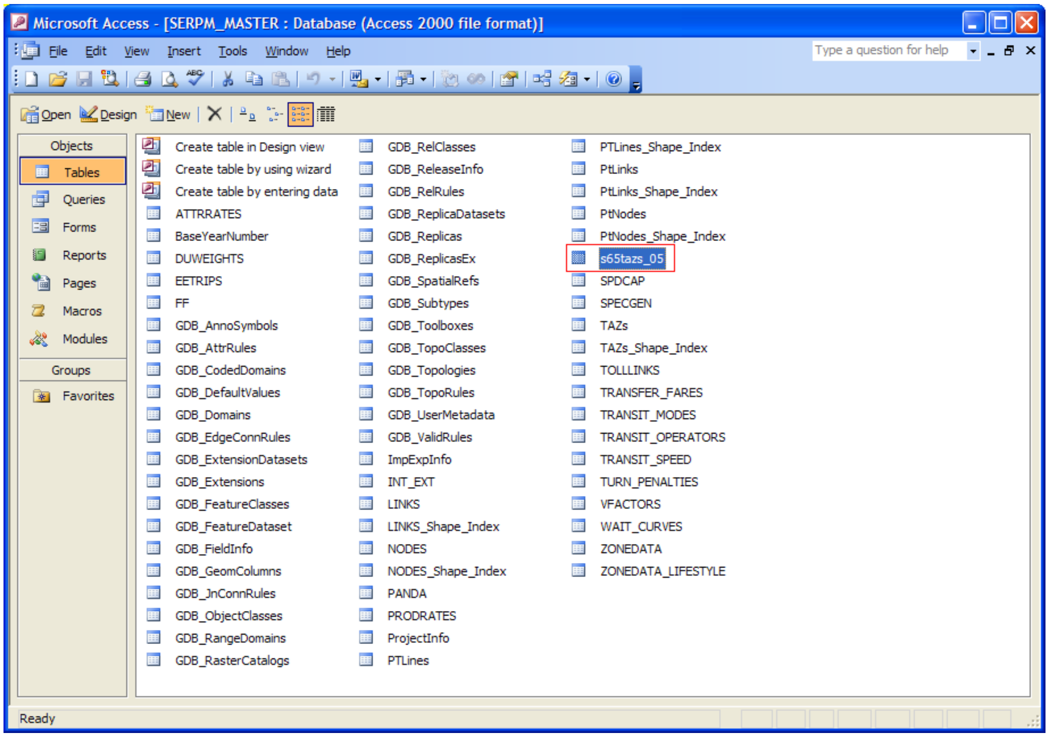

Figure 6-17. Imported Temporary Table

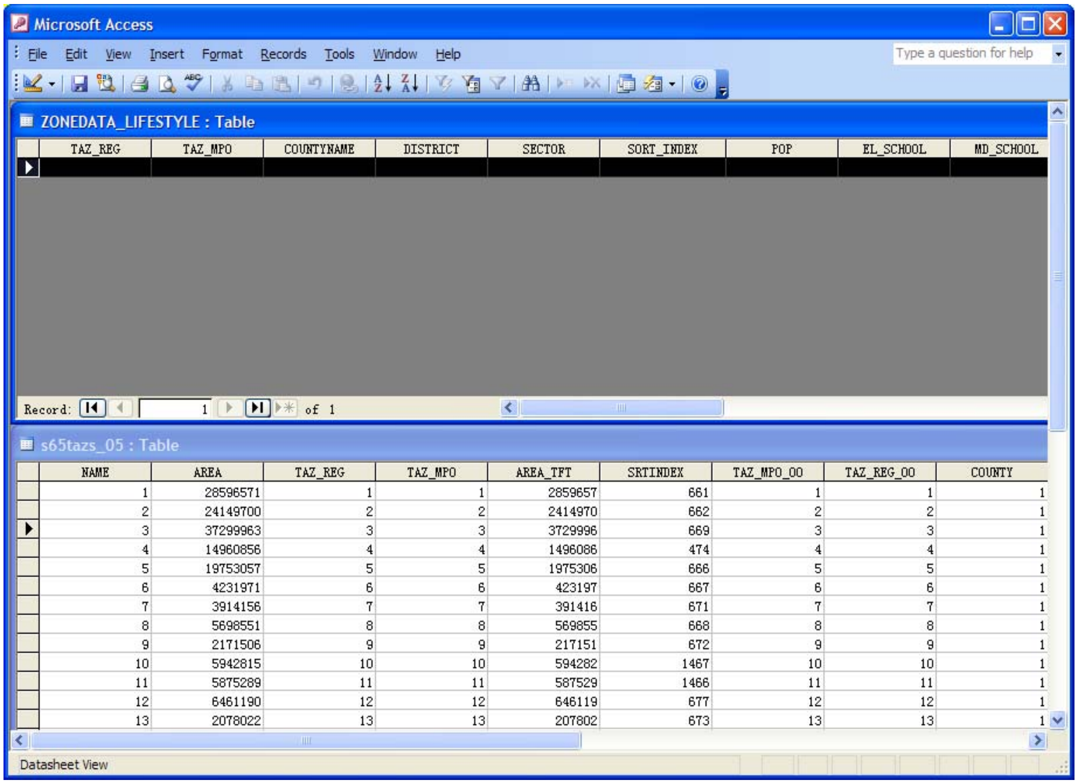

Figure 6-18. Origin and Destination Tables Tiled Horizontally

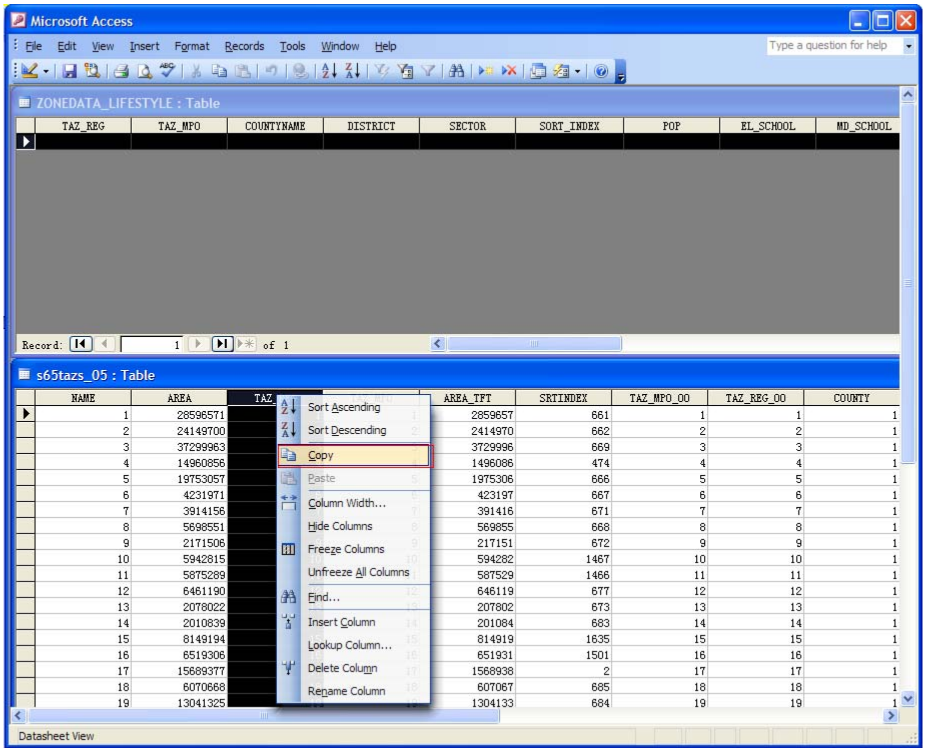

Figure 6-19. Field in Original Table to Copy

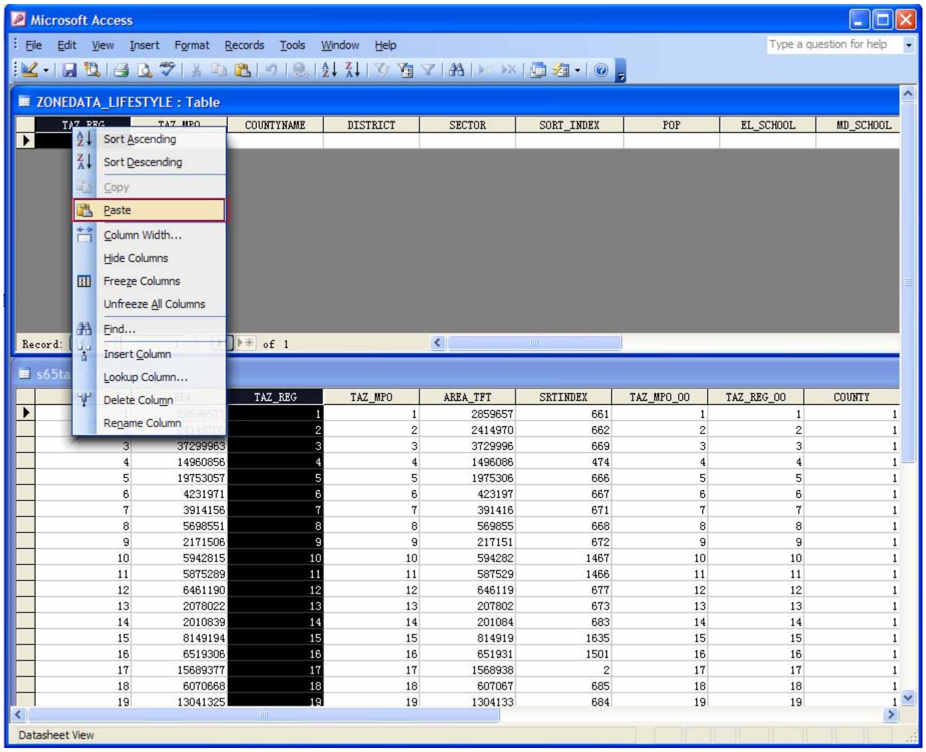

Figure 6-20. Field in Destination Table to Paste

Step 3. Delete the Imported Table: Right click the temporary imported table "s65tazs_05" and click **Delete** in the pop-up menu as shown in Figure 6-21.

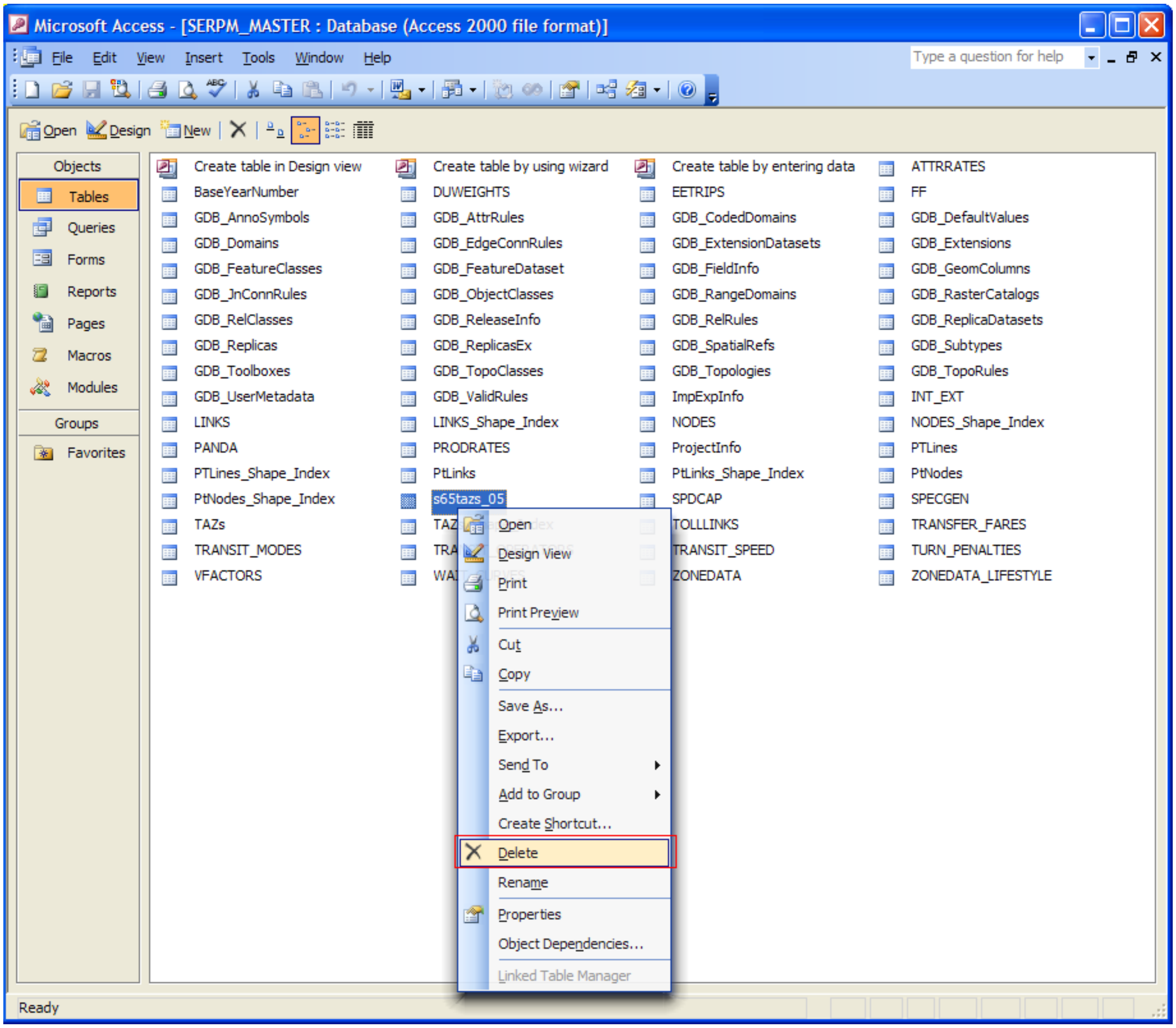

Figure 6-21. Delete Imported Temporary Table

Click **Yes** button in the confirmation dialog as shown in Figure 6-22 to finish deleting the temporary imported table "s65tazs_05."

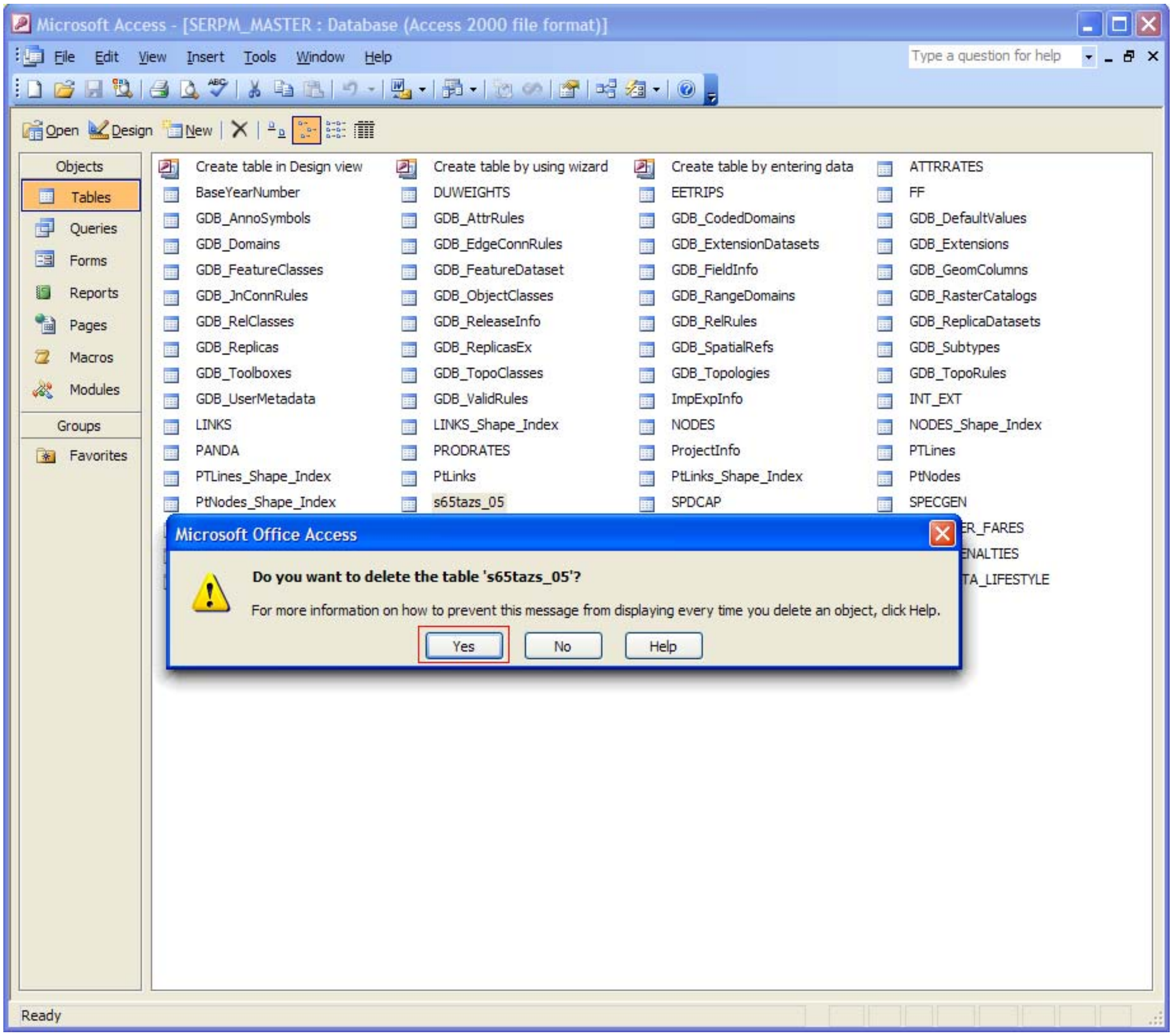

Figure 6-22. Table Deletion Confirm Dialog

6.3. Update the Master Geodatabase

After the master geodatabase with all imported feature classes and data tables is created, an additional step must be taken to make the current master database compliant with the FSUTMS data framework requirements. In short, all field names and their data types within the master database must match the definitions listed in the data framework. This step, called variable standardization, is performed with Microsoft Office Access. Furthermore, some reference tables and key fields must be added into this newly created master geodatabase before it can be used in the master database system. Again, these tasks must be performed in Microsoft Office Access.

6.3.1. Step 3-A: Standardize Variable Definitions

To perform variable standardization, open the **Cubetown_Master.mdb** file in Microsoft Office

Access. Next, click to highlight the table name in which to standardize variables, and then click the **Design** button listed on the toolbar. Figure 6-23 shows the design table interface for a sample highway links table. In this example table, the user can edit the field name and related data type for each non-standardized variable. Repeat this step until all non-standardized variables, in all feature classes and all data tables, are modified.

Note: Fields OBJECTID, Shape, and Shape_Length are GIS built-in fields; DO NOT make any modifications to these fields.

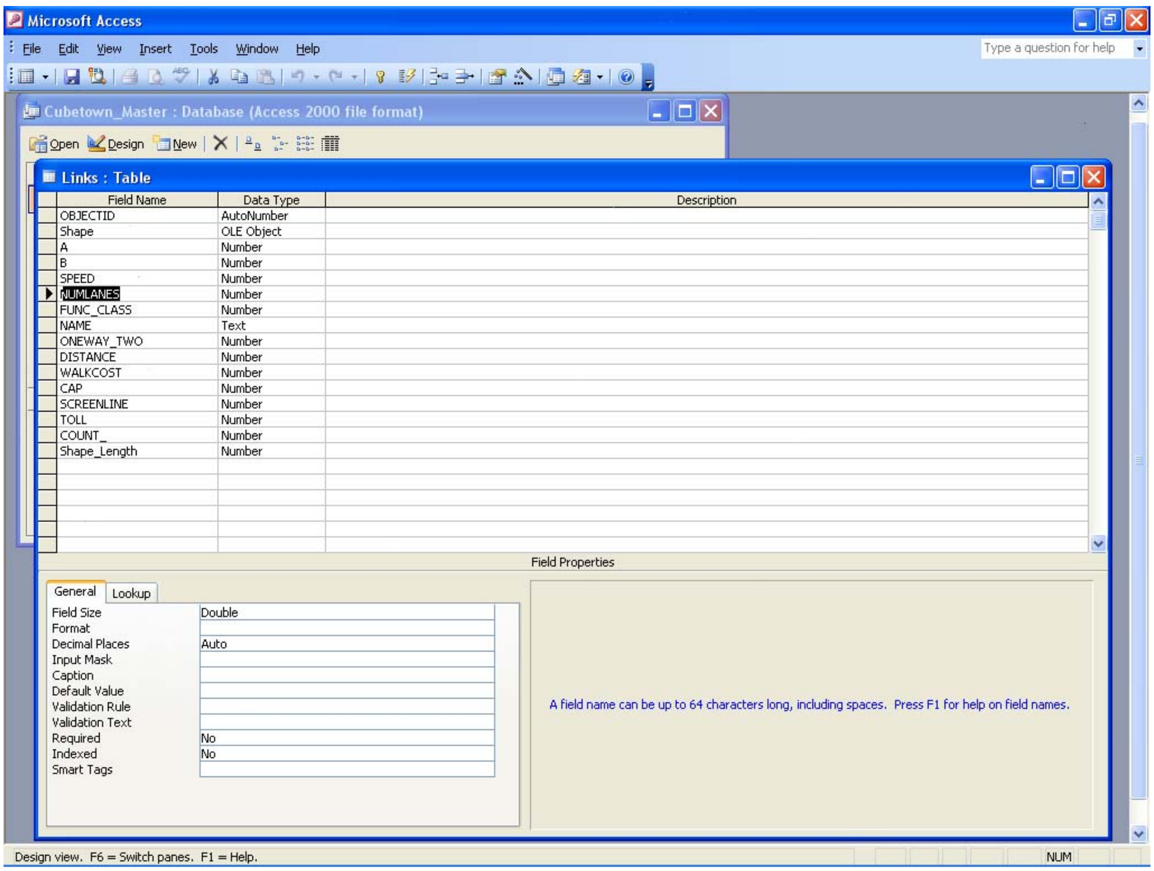

Figure 6-23. Design Table Interface for the "Links" Feature Class

6.3.2. Step 3-B: Add BaseYearNumber Table

To add a BaseYearNumber table, open **Cubetown_Master.mdb** in Microsoft Office Access and then click the **New** button listed on the toolbar. Figure 6-24 shows the new table interface. Currently the **BaseYearNumber** table has two field names, i.e., BaseYear and ModelName (see Figure 6-25). Table 6-2 lists the definitions of both fields. After the **BaseYearNumber** table is created, a new record must be inserted into this table. To create a new record, simply open this table inside the **Cubetown_Master** database and begin entering the new record. In this case, '0' is assigned as the base-year number, which means the base year for the Cubetown_Master geodatabase is 2000.

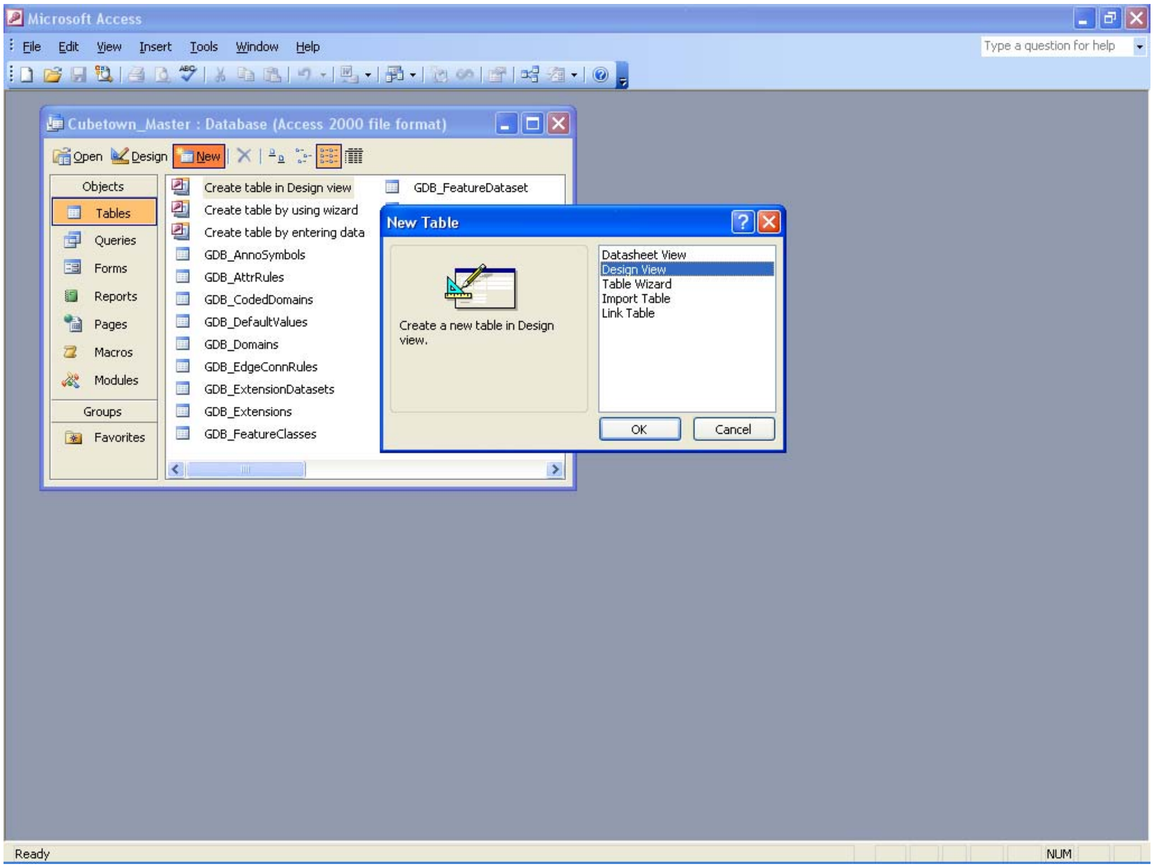

Figure 6-24. New Table Interface

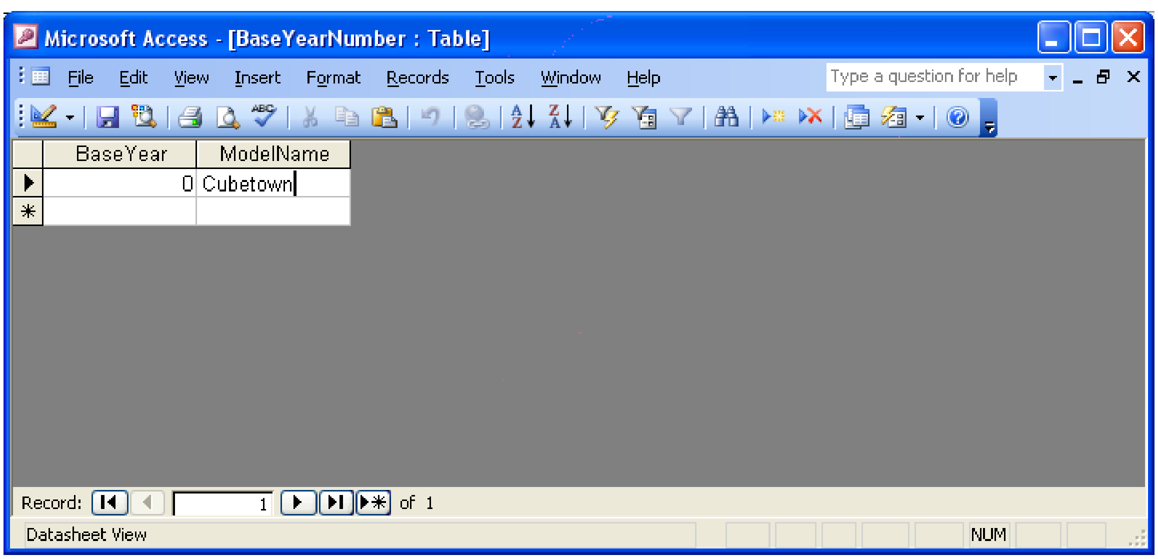

Figure 6-25. BaseYearNumber Table

Table 6-2. Field Definition in BaseYearNumber Table.

Field Name	Data Type	Field Size	Indexed	Required
BaseYear	Number	Integer	No	Yes
ModelName	Text	50	No	Yes

6.3.3. Step 3-C: Add ProjectInfo Table

The **ProjectInfo** table has three fields. The definitions of these fields are listed in Table 6-3. Figure 6-26 shows an empty **ProjectInfo** table. When a future year scenario database is merged back into a master database, a new record that defines this scenario database will be inserted into this table automatically by the master database system.

Table 6-3. Field Definitions in ProjectInfo Table.

Field Name	Data Type	Field Size	Indexed	Required
Year	Number	Integer	No	Yes
ProjectID	Text	1	No	Yes
ProjectDesc	Text	255	No	Yes

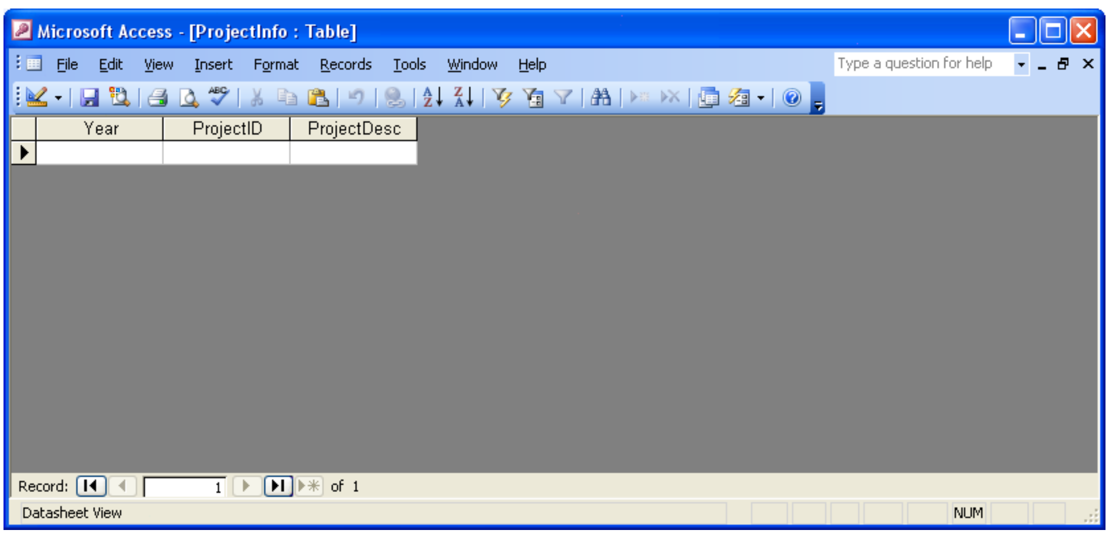

Figure 6-26. ProjectInfo Table

6.3.4. Step 3-D: Add ImpExpInfo Table

The current master database system can automatically handle the extraction and merging operations of the highway network feature classes, PT network feature classes, and TAZ feature class. These feature classes have predefined feature class names. If the zonal and reference data tables need to utilize these operations, they must be registered inside the internal table ImpExpInfo. Table 6-4 lists the fields defined in this table. In this table, each record is a registration item for a managed data table. Field Name defines the name of this managed data table. Currently Field Type has three value options: 0 for data tables that have frequent changes for different scenarios, such as tables ZONEDATA, EETRIPS, and TOLLINKS, etc.; 1 for the feature class (which is for future use and not available in the current version); and 2 for those data tables that are the same and are shared for all scenarios, such as tables SPDCAP, PRODRATES, and VFACTORS, etc. Additionally, fields PrimaryKey and PrimaryKey2 are reserved for future use as they define the key column name(s) to identify each record inside this registered data table. A registered data table will not be extracted into a scenario database if there is no data for this current scenario.

Table 6-4. Field Definitions in the ImpExpInfo Table

Field Name	Field Type	Indexed	Required
Name	Text (50)	No	Yes
Type	Byte	No	Yes
PrimaryKey	Text (15)	No	No
PrimaryKey2	Text (15)	No	No

6.3.5. Step 3-E: Check Key Fields Imported

Highway network link and node data, public transit network line, link and nodes, and TAZ data have several key fields that require verification. These fields are listed in Table 6-5. It is noted that these field names are fixed in the master network, and must be renamed if the imported feature classes differ. For example, A and B must be the field names for the respective beginning and ending nodes of a highway or public transit link, and N must be the field name of a highway node number. The field name, "Nodes", is automatically created in Cube for the public transit node feature class. In this way, the field names maintain compatibility with the Cube application. For the TAZ feature class, the field name "TAZ" is for a TAZ zone number, which should be unique within each scenario data year.

Table 6-5. Key Fields for Checking

Field Name	Table	Data Type	Field Size
A	Links, PTLinks	Number	Long integer
B	Links, PTLinks	Number	Long integer
N	Nodes	Number	Long integer
Nodes	PTNodes	Number	Long integer
TAZ	TAZs	Number	Integer

6.3.6. Step 3-F: Add field LineID for PTLines Feature Class

When a public transit network is created inside the Cube Geodatabase Manager, three feature classes are also automatically created. These feature classes are renamed as PTLines, PTLinks, and PTNodes, respectively, after they are imported into the master geodatabase, although no field for LineID is added into PTLines. The future Cube version will maintain this field, and the master geodatabase will use this field to refer to the corresponding links and nodes. This field has the **Number** data type and the **Long Integer** field size, and must be added manually to the **PTLines** table.

6.3.7. Step 3-G: Add Master Geodatabase Key Fields

Table 6-6 lists three of the master key fields used in the master database system. The user must add these master key fields to the following tables for Links, Nodes, PTLines, PTLinks, PTNodes, and TAZs. The FSUTMS Master Database System uses these key fields to trace and store the differences between disparate scenario data. The names and types for these fields are fixed in the master geodatabase, hence, using a different name or type will result in a system run-time error. Note that these fields are not needed for the **BaseYearNumber** and **ProjectInfo** tables because these tables are used for system management only.

Table 6-6. Master Key Fields

Field Name	Data Type	Field Size	Indexed	Required
MNet_Year	Number	Integer	No	No
MNet_Status	Number	Integer	No	No
MNet_ProjectID	Text	1	No	No

6.3.8. Step 3-H: Initialize Master Geodatabase Key Fields

For all tables with the master key fields added, users must initialize these field values. This can be done in Microsoft Office Access using the following steps:

1. Open the master geodatabase in Microsoft Office Access.
2. Click the **Queries** button listed under Objects on the left panel (see Figure 6-27).
3. In Design view item, click Create query and then click the **Close** button (see Figure 6-28).
4. Select View->SQL from the View menu (see Figure 6-29), and then use the query editor for SQL (see Figure 6-30).
5. Copy the following SQL script into this editor:

   ```
   UPDATE Links SET Links.MNet_Year = 0, Links.MNet_Status = 0,
       Links.MNet_ProjectID = 'A';
   ```

   The above query will initialize the master key field values inside the Links table. Note that if the base-year number is not 2000, the query condition “Links.MNet_Year=X”, where X is the last two digits of the base-year number, must be modified accordingly.

   Copy and paste the above SQL script, save it as a query, and then name it Init_Links for future execution (see Figure 6-31). This named query now appears on the **Queries** list (see Figure 6-32).

6. Follow the same procedure as described in the above steps for all other tables, and save these queries as Init_Nodes, Init_PTLines, Init_PTLinks, Init_PTNodes, and Init_TAZs.

   Note: Replace the “X” with your base-year number.

   SQL Script for Nodes table:

UPDATE Nodes SET Nodes.MNet_Year = X, Nodes.MNet_Status = 0, Nodes.MNet_ProjectID = 'A';

SQL Script for PtLines table:

UPDATE PtLines SET PtLines.MNet_Year = X, PtLines.MNet_Status = 0, PtLines.MNet_ProjectID = 'A';

SQL Script for PtLinks table:

UPDATE PtLinks SET PtLinks.MNet_Year = X, PtLinks.MNet_Status = 0, PtLinks.MNet_ProjectID = 'A';

SQL Script for PtNodes table:

UPDATE PtNodes SET PtNodes.MNet_Year = X, PtNodes.MNet_Status = 0, PtNodes.MNet_ProjectID = 'A';

SQL Script for TAZs table:

UPDATE TAZs SET TAZs.MNet_Year = X, TAZs.MNet_Status = 0, TAZs.MNet_ProjectID = 'A';

SQL Script for data tables: *TableName*

UPDATE *TableName* SET *TableName*.MNet_Year = X, *TableName*.MNet_Status = 0, *TableName*.MNet_ProjectID = 'A';

7. Copy the following SQL script into the query editor and save the query as Init_LineID.

   UPDATE PtLines SET PtLines.LINEID = [OBJECTID];

   This query will initialize the field LineID in table PTLines.

8. Finally, run these newly created queries one-by-one by double-clicking each query item. Figure 6-33 shows each of these queries as listed in the Queries panel.

After all of these steps are successfully completed, the master geodatabase can be used in the Master Database System.

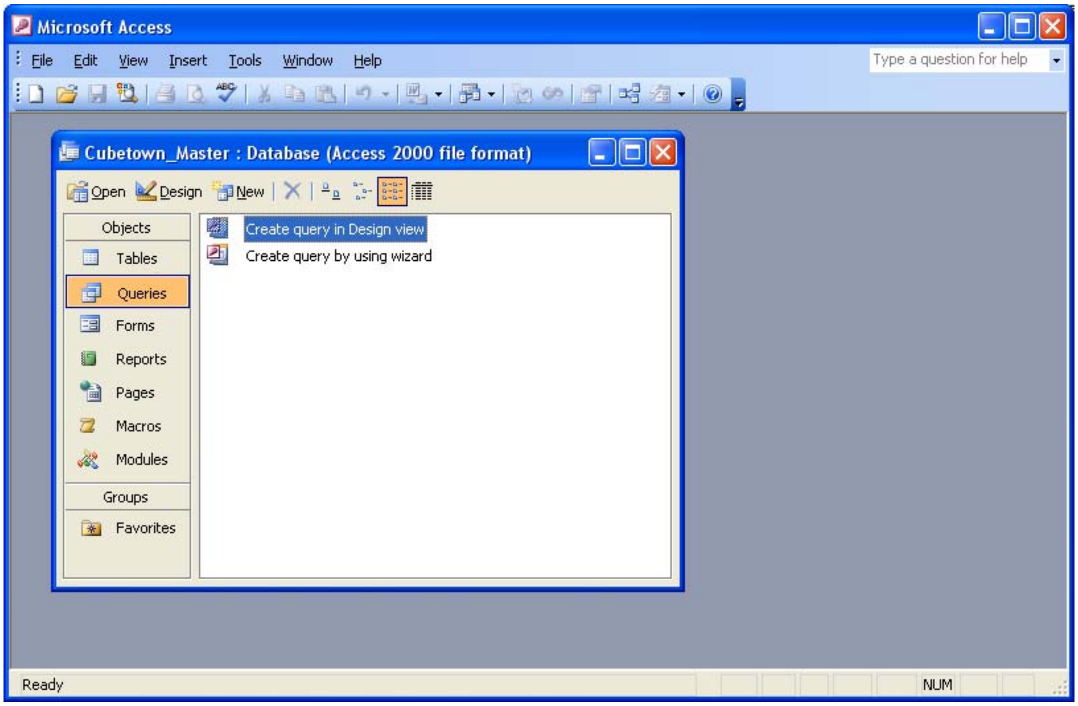

Figure 6-27. Create Query Window

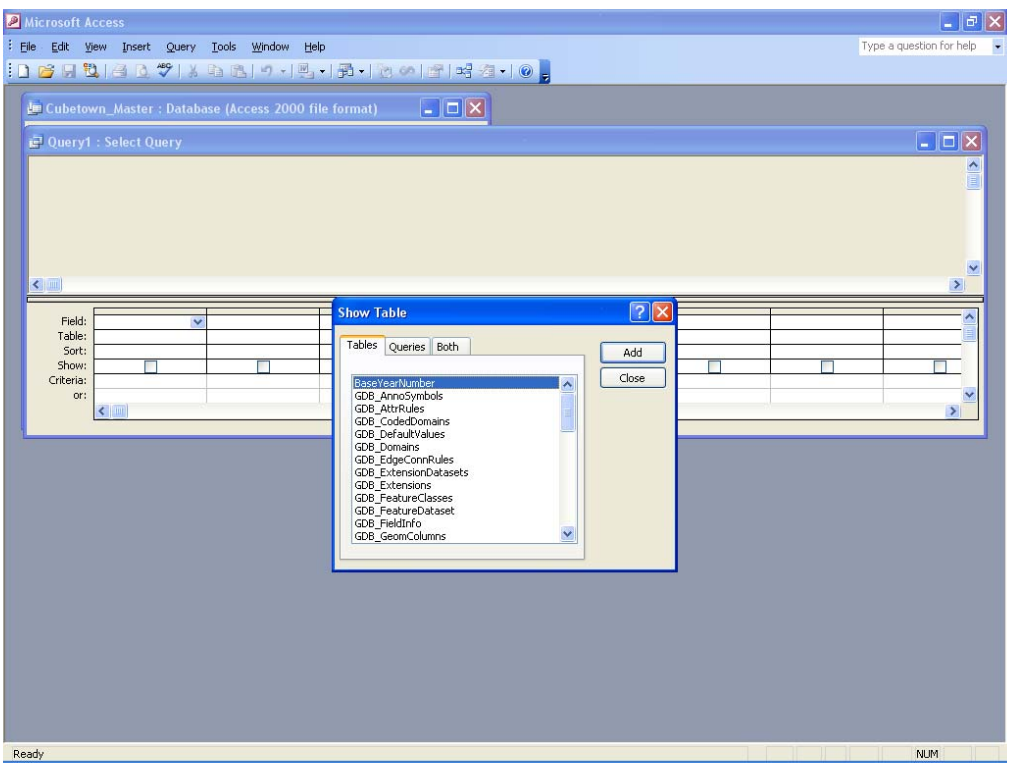

Figure 6-28. Create Query Window (cont.)

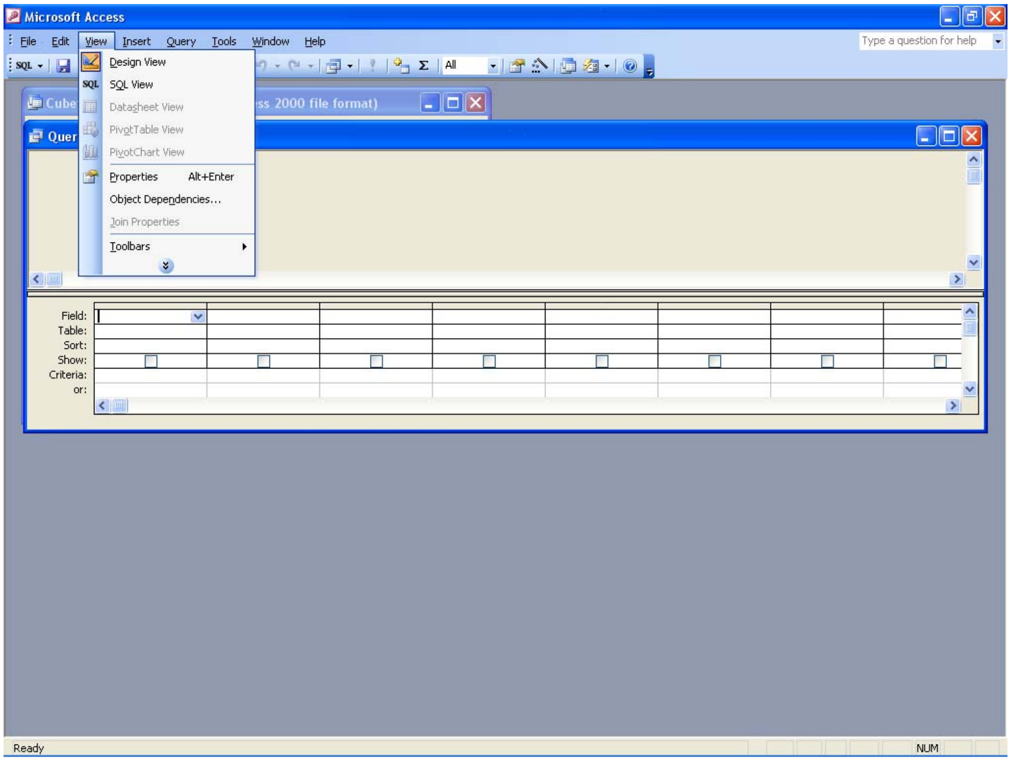

Figure 6-29. Create Query Window (cont.)

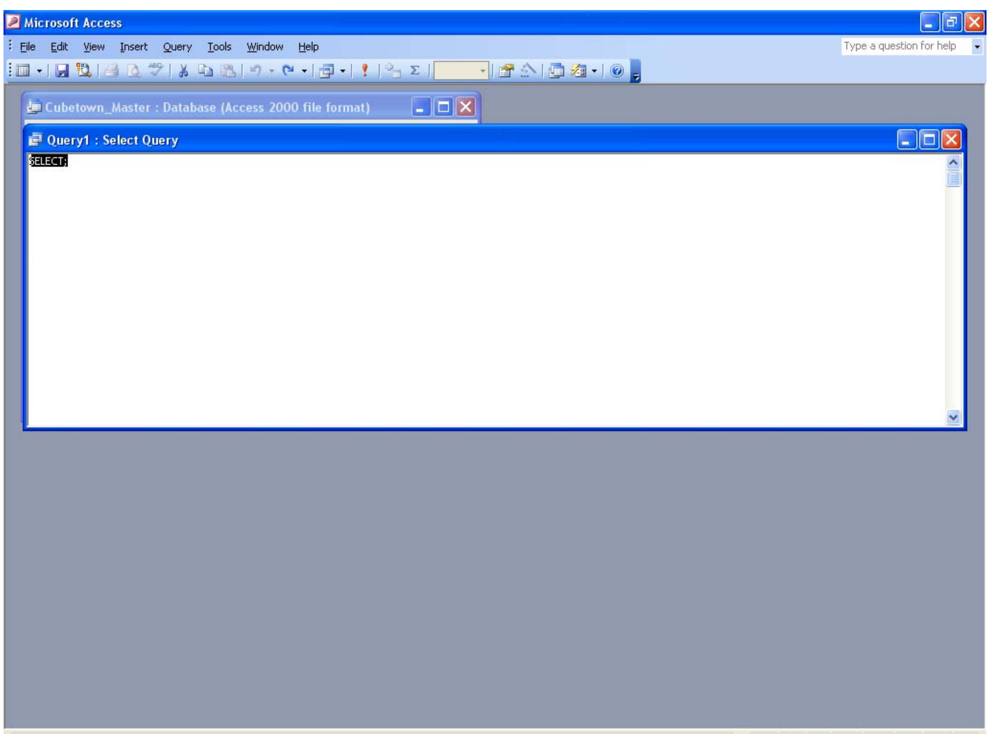

Figure 6-30. Query Editor for SQL

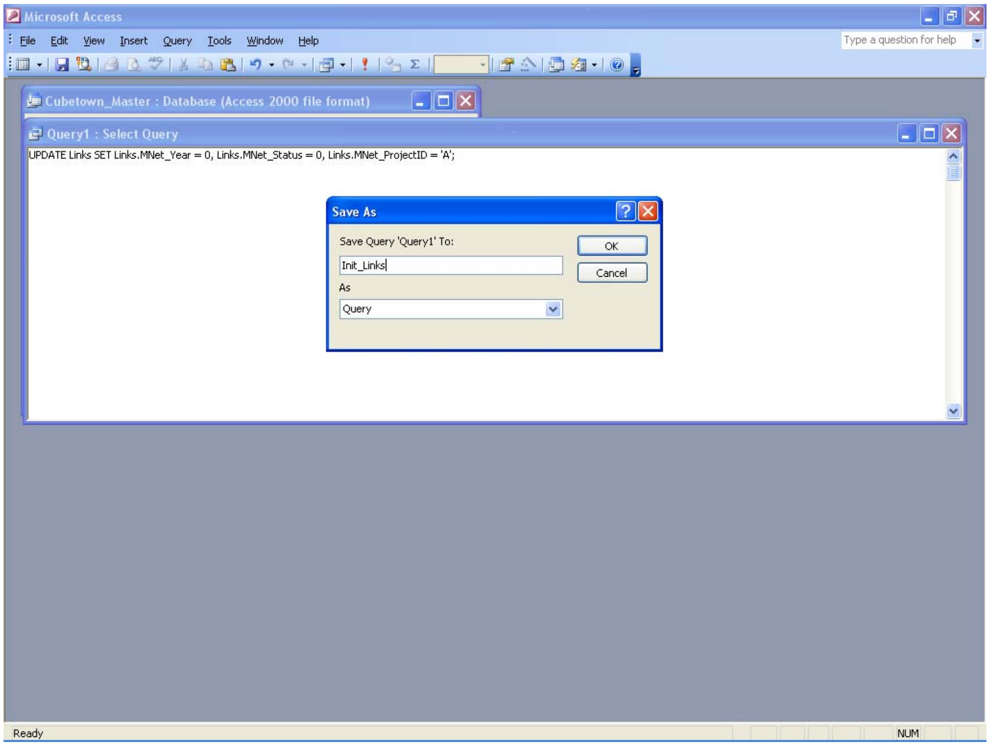

Figure 6-31. Query Save As Window

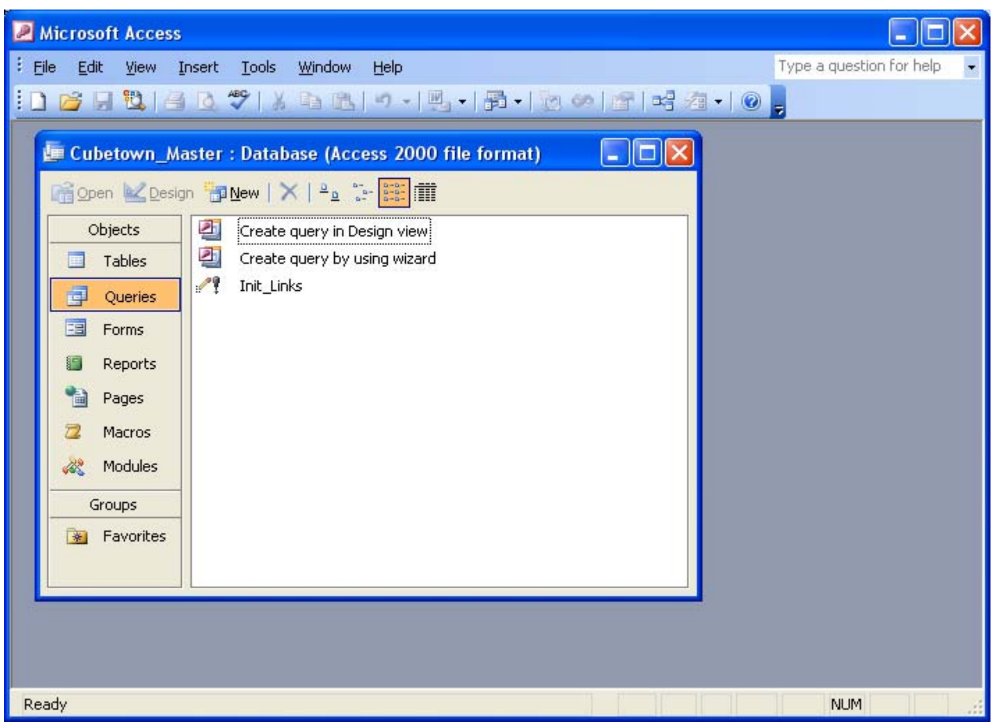

Figure 6-32. Query Init_Links Listed

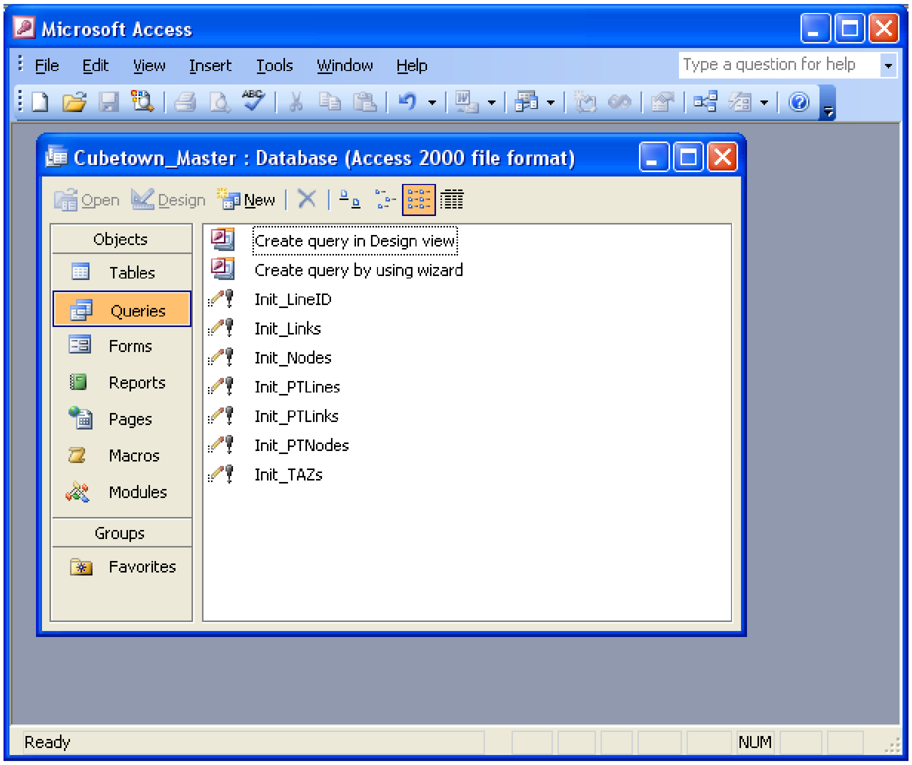

Figure 6-33. All Created Queries

CHAPTER 7
SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Florida Standard Urban Transportation Modeling Structure (FSUTMS) is intended to serve as the standard travel demand model for the state of Florida. Standardization allows Florida to maintain consistent modeling practices across the state and makes it easy to share resources, conduct statewide training, and develop tools that can be applied across different local models. However, over the years, FSUTMS models for different urban areas have become less and less standardized. The scripting capability of Cube Voyager, with its flexibility to define and read different input files largely at will, has made it possible for local models to stray from standardization. To a certain extent, this defeats the purpose of having a standard model for the state and, in the event of a legal dispute, potentially weakens the case for the agency involved. The lack of standardization has also made it difficult to develop tools that can be applied to different local models, as evidenced in the recent development of the Florida ITS Evaluation Tool (FITSEVAL), the FSUTMS Standard Reports, and the LOS Calculator, all of which required customization for individual local models.

This project proposed a data framework for FSUTMS that sets standards for all input data elements, including file folders, file names, table names, field names, matrix names, and the associated metadata files. The design of the data framework incorporates three design approaches: (1) it stores input data, both spatial or non-spatial, in a personal geodatabase that makes it easy to manage and enforce standards; (2) it makes use of a master database approach that stores data for multiple scenarios in a single database to facilitate data maintenance and ensure data consistency across different scenarios; and (3) it includes all existing fields from all FSUTMS models, allowing the local models to convert to the proposed data framework while continuing to use all of their existing fields and modeling approaches.

As part of the data framework development, the file folder structure was adapted to suit the master database approach from the standards document released by the Florida Model Task Force (MTF) in January 2006. In addition, the naming conventions for all input data were adapted from the traditional file-based structure to the database structure, which is designed to store the formerly individuated files in tables in the Microsoft Access-based personal geodatabase. Furthermore, a standard metadata file is recommended to help enforce metadata standards that are currently non-existent. In addition to the usual metadata information, the standards implement a two-level structure that allows the users to easily locate and conveniently access the complete data dictionary for all data tables, including look-up tables for attribute codes such as area types and facility types.

The proposed data framework, while independently available for implementation, was built into a master database in this project. This master database was created by extending a prototype master network system developed by the research team for the highway network in a separate project to include public transportation (PT) networks, TAZ network, and all other spatial and non-spatial input data. In other words, the master database is multi-year, multi-modal, and multi-scenario. Unlike a traditional file-based, single-scenario approach, a master database approach combines the base-year and all future-year input data in a single database. With such a design, the user can extract a specific network from its master database by simply indicating the timeline and the design alternative of the scenario to be extracted. After a scenario database is extracted and modified, it can be merged back into the master database. During the merging process, changes to the network can be automatically applied and propagated to other scenarios in the master database, thus saving time by both eliminating repetitive manual changes and avoiding database coding errors. The master database system was beta tested and verified for its ability to work with the highway, transit, and TAZ networks.

Stored in ESRI's personal geodatabase format, the master database was designed to minimize data storage and extract consolidated networks. The master database also supports open and unlimited data fields and, most importantly, implements both forward and backward change propagations. While the use of a personal geodatabase raised some initial concerns about its 2GB file size storage limitation, the test results with the Southeast Regional Planning Model (SERPM) model, which is perhaps the largest model in terms of data requirements, indicate that the limit will not be a problem as the efficient design of the master database is able to keep the required data size to only a small fraction of the 2 GB capacity.

As part of this project, a standalone master database system was developed to allow the user to extract a scenario database from the master database and to merge a scenario database back to the master database. Because the system works entirely independent of Cube, it requires additional time to detect network changes when a scenario database is merged back to its master database. Currently, this additional time amounts to about one minute or less on an average personal computer for a large network like SERPM. An alternative will be for the Cube developers to generate a log file that records all the network changes after each network editing session. This can reduce the network merging time to seconds.

To help local agencies convert to the master database that implements the proposed data framework, a step-by-step procedure for converting existing input files to the master database structure is provided. The conversion procedure includes both spatial and non-spatial input files, and makes use of a combination of Cube's Geodatabase Manager and ESRI's ArcCatalog tool. The procedure was successfully applied by the research team to convert the SERPM model. In addition, it was also successfully applied by Cambridge Systematics to convert the networks for the Gainesville urban model and the Tampa Bay Regional Planning Model (TBRPM), and by the Corradino Group to convert the Greater Treasure Coast Regional Planning Model (GTCRPM).

The implementation of the proposed data framework in a master database will greatly facilitate the development and maintenance of model input data, and allow useful tools to be developed and applied across all models with minimum or no customization. The proposed data framework also fully considers the local modeling needs. *In implementing the proposed data framework, local models will need to modify only the affected Cube scripts to read from a standard database. The framework will not require any changes to the models, nor will the model outputs change after converting to the framework.* Local models are encouraged to migrate to the proposed data framework in order to be able to use any future tools that may be developed for statewide applications and to reap the many benefits of employing a master database approach.

Given the complex nature of the master database operations and the fact that the master database approach is new to the Florida transportation modeling community, it is recommended that hands-on training be provided to familiarize the users with the data framework, the master database concepts and operations, and the model conversion process. It is also recommended that the training be conducted as part of the new Cube GIS Workshop. The recommended length of the training is about half a day.

It is important to recognize that the data framework presented in this report includes only the current input data from the ten local models considered. It is expected that these local models will continue to evolve and that new models may be added, while others may be dropped. Consequently, the proposed data framework must be dynamic in nature. In other words, the framework will continue to evolve with the models. It will allow, for example, a new variable to be added or the data domain of a variable to be modified. To this end, continued coordination among the local models will be needed to keep the framework current and relevant. The Web can best serve this purpose. It is recommended that a new webpage devoted to the proposed data framework be developed as part of FSUTMSOnline. The webpage will allow the users to download the master database installation program, provide background information and instructions, and document the data framework standards. For the data framework to be dynamic, the webpage will allow the model coordinators or any other authorized persons (with password access) to make changes to the data framework, such as adding a new variable to a standard table. All changes to the framework will be subject to review and acceptance by the FDOT Central Office and, in the case of a major change, the Florida Model Task Force (MTF). Once approved, the change can be made official on the webpage and become accessible to all users. It is expected the modification, review, and acceptance process will be automated as part of the webpage development. The same webpage can also include such materials as quick references, frequently asked questions (FAQ), etc.

REFERENCES

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APPENDIX A:

ORIGINAL AND STANDARD FIELD NAMES FOR NON-TRANSPORTATION NETWORK DATA

Table A-1. Original and Standard Field Names for ZONEDATA Data Table

FLSWM	POLK	GUATS	NERPM	NWFRPM	SERPM	TCRPM	GTCRPM	CFRPM	TBRPM	STANDARD
base_sedata_fl_1 1_11_2008.dbf	*ZONEDATA_yya.DBF*	*ZD1.dbf ZD2.dbf*	*ZDATA_yya.dbf*	*ZDATA1.yya ZDATA2.yya*				*ZDATA1_yya.DBF*		*ZONEDATA*
SWTAZ	ZONE	TAZ	TAZ	Z				TAZ		TAZ
COUNTY			COUNTY							COUNTYNAME
DISTRICT	SECTOR	SEC	DISTRICT					SECTOR		DISTRICT
SFDU	SFDU	SFDU	SFDU	SFDU				SFDU		SF_DU
		SF_SEA	SFSEAS							SF_SEAS
SF_PCTVAC	SF_PCTVNR	SF_VAC		SF_PCTVNP				SF_PCTVNP		SF_PCT_VNP
SF_PCTVNP	SF_PCTVAC		SFVAC	SF_PCTVAC				SF_PCTVAC		SF_PCT_VAC
SFPOP	SFPOP	SPOP	SFPOP	SFPOP				SFPOP		SF_POP
SF_0AUTO	SF_0AUTO	SF_0V	SF0CAR	SF_0AUTO				SF_0AUTO		SF_0AUTO
SF_1AUTO	SF_1AUTO	SF_1V	SF1CAR	SF_1AUTO				SF_1AUTO		SF_1AUTO
SF_2AUTO		SF_2V	SF2CAR	SF_2AUTO				SF_2AUTO		SF_2AUTO
		SF_3V	SF3CAR							SF_3AUTO
MFDU	MFDU	MFDU	MFDU	MFDU				MFDU		MF_DU
		MF_SEA	MFSEAS							MF_SEAS
MF_PCTVAC	MF_PCTVNP	MF_VAC		MF_PCTVNP				MF_PCTVNP		MF_PCT_VNP
MFPOP	MF_PCTVAC		MFVAC	MF_PCTVAC				MF_PCTVAC		MF_PCT_VAC
MF_0AUTO	MFPOP	MPOP	MFPOP	MFPOP				MFPOP		MF_POP
MF_1AUTO	MF_0AUTO	MF_0V	MF0CAR	MF_0AUTO				MF_0AUTO		MF_0AUTO
MF_2AUTO	MF_1AUTO	MF_1V	MF1CAR	MF_1AUTO				MF_1AUTO		MF_1AUTO
	MF_2AUTO	MF_2V	MF2CAR	MF_2AUTO				MF_2AUTO		MF_2AUTO
		MF_3V	MF3CAR							MF_3AUTO
HMDU	HMDU	HMDU	HMUNITS	HMDU				HMDU		HM_DU
HMOCC	HMOCC	HM_POC	HMPCTOCC	HM_PCTOCC				HMOCC		HM_PCT_OCC
HMPOP	HMPOP	HMPOP	HMPOP	HMPOP				HMPOP		HM_POP
IND_EMP	IND_EMP	OIEMP	EMPIND	IND_EMP				INDEMP		IND_EMP
COMM_EMP	COMM_EMP	COMEMP	EMPCOM	COM_EMP				COMEMP		COM_EMP
SERV_EMP	SERV_EMP	SERVEMP	EMPSVC	SER_EMP				SEREMP		SVC_EMP
		MFGEMP	EMPMFG							MFG_EMP
TOT_EMP	TOT_EMP	TOTEMP	EMPTOT	TOT_EMP				TOTEMP		TOT_EMP
			TOTAL_POP							TOT_POP
SCHOOL	SCHOOL	SCHENR	SCHENR	SCHOOL_ENR				SCHENRL		SCHOOL
STPK	SHORTPARK	SHORTPARK	STPKCST					STP		SHORT_PARK
LTPK	LONGPARK	LONGPARK	LTRKCST					LTP		LONG_PARK
			DESCRIPTIO							DESCR
YEAR	BUILDOUT_Y									BUILDOUT_Y

Table A-2. Original and Standard Field Names for ZONEDATA_LIFESTYLE Data Table

FLSWM	POLK	GUATS	NERPM	NWFRPM	SERPM	TCRPM	GTCRPM	CFRPM	TBRPM	STANDARD
					s65tazs_yy.dbf	*ZDATA1B.yya ZDATA2.yya*	*ZDATA1B.yya ZDATA2.yya*		*ZDATA1_yya.dbf ZDATA2_yya.dbf*	*ZONEDATA_LIFESTYLE*
					TAZ_REG				ZONE	TAZ_REG
					TAZ_MPO	TAZID	TAZID			TAZ_MPO
					COUNTY				COUNTY	COUNTYNAME
					JEFFDIST				DISTRICT	DISTRICT
					SEC_05	Sector	Sector			SECTOR
					SRTINDEX					SORT_INDEX
					POP_05				POP	POP
					EL_TAZ_05					EL_SCHOOL
					MD_TAZ_05					MD_SCHOOL
					HI_TAZ_05					HI_SCHOOL
					EL_ENRL_05					EL_ENRL
					MD_ENRL_05					MD_ENRL
					HI_ENRL_05					HI_ENRL
					PRVENRL_05					PRV_ENRL
					CU_ENRL_05					CU_ENRL
									K12ENR	K12_ENR
						ENRSchool	ENRSchool		HIEDUC	SCH_ENRL
					ELEMTR					EL_RATE
					MIDTR					MD_RATE
					HIGHTR					HI_RATE
					PRIVTR					PRV_RATE
					COLUNVTR					CU_RATE
					HHC0_05	HHNoChld	HHNoChld			HH_NO_CHLD
					HHC1_05	HHChld	HHChld			HH_CHLD
					VC0_05	AutoNoChld	AutoNoChld			V_NO_CHLD
					VC1_05	AutoChld	AutoChld			V_CHLD
					WC0_05	WrkrNoChld	WrkrNoChld			W_NO_CHLD
					WC1_05	WrkrChld	WrkrChld			W_CHLD
					PC0_05	PrsnNoChld	PrsnNoChld		CARD	P_NO_CHLD
					PC1_05	PrsnChld	PrsnChld			P_CHLD
					HMR_05	HMRms	HMRms			HM_ROOMS
						PctOccHMRmsPk	PctOccHMRmsPk			PCT_HM_PK
						PctOccHMRmsAnn	PctOccHMRmsAnn			PCT_HM_YR

Table A-2. Original and Standard Field Names for ZONEDATA_LIFESTYLE Data Table (continued)

FLSWM	POLK	GUATS	NERPM	NWFRPM	SERPM	TCRPM	GTCRPM	CFRPM	TBRPM	STANDARD
					TD_05					TRAN_DIST
					CARD2	RecordType	RecordType			CARD
					INDE_05	EmpInd	EmpInd		IND_EMP	IND_EMP
					COME_05	EmpCom	EmpCom			COM_EMP
					SVCE_05	EmpServ	EmpServ			SVC_EMP
					TOTE_05	EmpTot	EmpTot		TOT_EMP	TOT_EMP
					SPK_05	StParkCost	StParkCost		STPC	SHORT_PC
					LPK_05	LtParkCost	LtParkCost		LTPC	LONG_PC
					GR_SQ_TFT					EXC_AREA
					EXC_SQ_TFT					NET_AREA
					PCT_LEFT					PCT_NET
					WLKINDX_05					WALK_INDEX
					ARSM_NET					ARSM_NET
					ARACRS_NET					ARACRS_NET
					REGTAZN_05					REGTAZN
					REGTAZX_05					CENTROID_X
					REGTAZY_05					CENTROID_Y
					SPOP_05					C_POP
					SEMP_05					C_EMP
					SACRES_05					C_AREA
					SADEN_05					C_DENSITY
					SAT1_05	CBDExUrb	CBDExUrb			ATYPE
					DISTRICT					USER_DIST
					SPGEN					SP_GEN
						DUs	DUs		DU	DU
						PctOccDUPK	PctOccDUPK			PCT_DU_PK
						PctOccDUsAnn	PctOccDUsAnn			PCT_DU_YR
						PctSFDUsPk	PctSFDUsPk			PCT_SF_PK
						PctSFDUsAnn	PctSFDUsAnn			PCT_SF_YR
						PctMFDUsPk	PctMFDUsPk			PCT_MF_PK
						PctMFDUsAnn	PctMFDUsAnn			PCT_MF_YR
									PCTVNP	PCT_DU_VNP
									PCTVAC	PCT_DU_VAC
									RET0	RET_0
									WNC0	WNC_0
									WHC0	WHC_0
									RET1	RET_1

Table A-2. Original and Standard Field Names for ZONEDATA_LIFESTYLE Data Table (continued)

FLSWM	POLK	GUATS	NERPM	NWFRPM	SERPM	TCRPM	GTCRPM	CFRPM	TBRPM	STANDARD
									WNC1	WNC_1
									WHC1	WHC_1
									RET2	RET_2
									WNC2	WNC_2
									WHC2	WHC_2
									RET3	RET_3
									WNC3	WNC_3
									WHC3	WHC_3
						OccHMRmsBusi	OccHMRmsBusi		BHU	HU_B
									EHU	HU_E
						OccHMRmsPlsr	OccHMRmsPlsr		RHU	HU_R
						OccHMRmsMix	OccHMRmsMix			HU_MIX
									COMM_REMP	COMM_REMP
									COMM_LEMP	COMM_LEMP
									SERV_REMP	SERV_REMP
									SERV_LEMP	SERV_LEMP

Table A-3. Original and Standard Field Names for SPECGEN Data Table

FLSWM	POLK	GUATS	NERPM	SERPM	TCRPM	GTCRPM	CFRPM	NWFRPM	TBRPM	STANDARD
SPECGENA_yya.dbf SPECGENP_yya.dbf	*SPECGEN_yya. DBF*	*ZDATA3.prn*	*SPGEN_yya.dbf*		*ZDATA3B.yya*	*ZDATA3B.yya*	*ZDATA3_yya.dbf*	*SPGEN_yya.dbf*	*ZDATA3_yya.DBF ZDATA5_yya.DBF*	*SPECGEN*
ZONE	ZONE	TAZ	TAZ		TAZID	TAZID	TAZ	TAZ	ZONE	TAZ
DESCR	DESCR	DESCRIPTIO	DESCRIPTIO		SGDes	SGDes	DESCR	DESCRIPTIO	DESCR & PURP	DESCR
P_OR_A	P_OR_A	PROD & ATTR	PROD & ATTR		ProdAtt	ProdAtt	P_OR_A	PROD & ATTR	P_OR_A	P_OR_A
OPERAND	OPERAND	FUNCTIONP & FUNCTIONA	FUNCTIONP & FUNCTIONA		FuncCode	FuncCode	P_OPERAND & A_OPERAND	FUNCTIONP & FUNCTIONA	OPERAND	OPERAND
TRIPS_DIFF	TRIPS_DIFF	VALUEP & VALUEA	VALUEP & VALUEA		TotPrsnTrips	TotPrsnTrips	P_TRIPS & A_TRIPS	VALUEP & VALUEA	TRIPS_DIFF	TRIPS_DIFF
PCT_HBW	PCT_HBW	HBWP & HBWA	HBWP & HBWA		PctHBW	PctHBW	P_HBW & A_HBW	HBWP & HBWA		PCT_HBW
PCT_HBSH	PCT_HBSH	HBSHP & HBSHA	HBSHP & HBSHA		PctHBShop	PctHBShop	P_HBSH & A_HBSH	HBSHP & HBSHA		PCT_HBSH
PCT_HBSR	PCT_HBSR	HBSRP & HBSRA	HBSRP & HBSRA		PctHBSR	PctHBSR	P_HBSR & A_HBSR	HBSRP & HBSRA		PCT_HBSR
					PctHBSch	PctHBSch				PCT_HBSC
PCT_HBO	PCT_HBO	HBOP & HBOA	HBOP & HBOA		PctHBO	PctHBO	P_HBO & A_HBO	HBOP & HBOA		PCT_HBO
PCT_NHB	PCT_NHB	NHBP & NHBA	NHBP & NHBA				P_NHB & A_NHB	NHBP & NHBA		PCT_NHB
					PctNHBW	PctNHBW				PCT_NHBW
					PctNHBO	PctNHBO				PCT_NHBO
					PctAirport	PctAirport				PCT_AIR
			TRK4P & TRK4A		Pct4TireTrk	Pct4TireTrk				PCT_4TTK
			TRKSUNITP & TRKSUNITA		PctSUTrk	PctSUTrk				PCT_SUTK
			TRKCOMBOP & TRKCOMBOA		PctCombTrk	PctCombTrk				PCT_COTK
TOT_EMP	TOT_EMP				TotalEmp	TotalEmp	TOT_EMP			TOT_EMP
COMM_EMP	COMM_EMP				CommEmp	CommEmp				COM_EMP
SERV_EMP	SERV_EMP				SvcEmp	SvcEmp	SERV_EMP			SVC_EMP
SCHOOL	SCHOOL				SchoolEnroll	SchoolEnroll	SCHOOL			SCHOOL
TOT_DU	TOT_DU				HHs	HHs	TOT_DU			TOT_DU
					HMUnitsOcc	HMUnitsOcc				OCC_DU
	SECTOR				SectorNum	SectorNum	SECTOR			SECTOR
			EILDTP & EILDTA							PCT_LDTK
										PCT_MDTK
			EIHDTP & EIHDTA							PCT_HDTK
			EILOVP & EILOVA							PCT_EILOV
			EIHOVP & EIHOVA							PCT_EIHOV
			ACTIVE					ACTIVE		ACTIVE

Table A-4. Original and Standard Field Names for EETRIPS Data Table

FLSWM	POLK	GUATS	NERPM	NWFRPM	SERPM	TCRPM	GTCRPM	CFRPM	TBRPM	STANDARD
	EETRIPS_yya.dbf	*EETRIPS.DBF*	*EETRIPS.DBF*	*EETRIPS_yya.dbf*	*EETRIPS.yya*	*EETRIPS.DBF*	*EETRIPS.DBF*	*EETRIPS_yya.DBF*	*EETRIPS_yya.DBF*	*EETRIPS*
	ORIGN_ZONE	ORZ	ORZ	ORZ	Column 1	ORZ	ORZ	LORZ (Original Zone)	ORZ	ORIGN_ZONE
	DESTN_ZONE	DSZ	DSZ	DSZ	Column 3	DSZ	DSZ	LDSZ (Destination Zone)	DSZ	DESTN_ZONE
	AUTO_TRIPS	AUTOTRIPS	TRIPS	AUTO_TRIPS	Column 5	TRIPS	TRIPS	TRIPS	TRIPS	AUTO_TRIPS
									TYPE	TYPE

Table A-5. Original and Standard Field Names for INT_EXT Data Table

FLSWM	POLK	GUATS	NERPM	NWFRPM	SERPM	TCRPM	GTCRPM	CFRPM	TBRPM	STANDARD
	INTEXT_yya.dbf	*zdata4.prn*	*EITRIPS_yya.DBF*	*INTEXT_yya.DBF*				*ZDATA4_05A.DBF VOL_ZDATA4B_yya.DBF*	*ZDATA4_yya.DBF*	*INT_EXT*
	ZONE	TAZ	TAZ	ZONE				TAZ	ZONE	TAZ
	IE_PROD	TRIPS	TRIPS	IE_PROD				IE_PROD & PRODS	TRIPS	IE_PROD
								ATTRS		EI_ATTR
		LOV	LOVPCT							PCT_LOV
		HOV	HOVPCT							PCT_HOV
		LDT	LDTPCT							PCT_LDT
		HDT	HDTPCT							PCT_HDT
								PHBW_P		PCT_HBW_P
								PHBSH_P		PCT_HBSH_P
								PHBSR_P		PCT_HBSR_P
								PHBSCH_P		PCT_HBSC_P
								RI.PHBO_P		PCT_HBO_P
								PNHBW_P		PCT_NHBW_P
								PNHBO_P		PCT_NHBO_P
								RI.PAIRPORT_P		PCT_AIR_P
								P4TIRE_P		PCT_4TTK_P
								PSUNIT_P		PCT_SUTK_P
								PCOMB_P		PCT_COTK_P
								PHBW_A		PCT_HBW_A
								PHBSH_A		PCT_HBSH_A
								PHBSR_A		PCT_HBSR_A
								PHBSCH_A		PCT_HBSC_A
								RI.PHBO_A		PCT_HBO_A
								PNHBW_A		PCT_NHBW_A
								PNHBO_A		PCT_NHBO_A
								PAIRPORT_A		PCT_AIR_A
								P4TIRE_A		PCT_4TTK_A
								PSUNIT_A		PCT_SUTK_A
								PCOMB_A		PCT_COTK_A
								HBWHH0		P_HBW_AU_0
								HBWHH1		P_HBW_AU_1
								HBWHH2		P_HBW_AU_2

Table A-5. Original and Standard Field Names for INT_EXT Data Table (continued)

FLSWM	POLK	GUATS	NERPM	NWFRPM	SERPM	TCRPM	GTCRPM	CFRPM	TBRPM	STANDARD
								OTHHH0		P_OTH_AU_0
								OTHHH1		P_OTH_AU_1
								OTHHH2		P_OTH_AU_2
								EXT_NAME		ROAD_NAME
		LOCATION	DESCRIPTIO					DESCR	DESCR	DESCR
		cSec						SECTOR		SECTOR
									EEPCT	PCT_EE
								EXURB		EXURB

Table A-6. Original and Standard Field Names for PRODRATES Data Table

FLSWM	**POLK**	**GUATS**	**NERPM**	**NWFRPM**	**SERPM**	**TCRPM**	**GTCRPM**	**CFRPM**	**TBRPM**	**STANDARD**
PRODRATES.DBF	*PRODRATES.DBF*	*GRATE.SYN*	*GRATES_CUBE.DBF*	*xPRATES.DBF (x=ES, FW, or BA)*		*xGRATESB.SYN (x=IR, SL or MA)*	*xGRATEST.SYN files (x = BR, IR, SL, MA, or PB)*	*PRATES_U.DBF VOL_PRATESB.DBF*	*GRATES.SYN*	*PRODRATES*
								SECTOR		SECTOR
PERSONS_DU	PERSONS_DU	PERHH	PERSONS	PERHH		PERSONS_DU	PERSONS_DU	PERSONS_DU		PERSONS_DU
AUTOS_DU	AUTOS_DU	AUTHH	AUTOS	AUTHH		AUTOS_DU	AUTOS_DU	AUTOS_DU		AUTOS_DU
DU_TYPE	DU_TYPE		DUTYPE	TYPHH				DU_TYPE		DU_TYPE
			DUDESC							DU_DESCR
HBW_PRATE	HBW_PRATE	PRAT_HBW	RATEHBW	PRAT_HBW				PRATEHBW		RATE_HBW
HBSH_PRATE	HBSH_PRATE	PRAT_HBSH	RATEHBSH	PRAT_HBSH				PRATEHBSH		RATE_HBSH
HBSR_PRATE	HBSR_PRATE	PRAT_HBSR	RATEHBSR	PRAT_HBSR				PRATEHBSR		RATE_HBSR
HBO_PRATE	HBO_PRATE	PRAT_HBO	RATEHBO	PRAT_HBO				PRATEHBO		RATE_HBO
REGION				ES, FW, or BA		IR, SL or MA	BR, IR, SL, MA, or PB	VOL or other area		REGION
						TRIP_PURP	TRIP_PURP	PURPOSE	TRIP_PURP	TRIP_PURP
						CHILD_DU	CHILD_DU	CHILD		CHILD_DU
								CLASS1		R_CLASS1
								CLASS2		R_CLASS2
								CLASS3		R_CLASS3
								CLASS4		R_CLASS4
						RATE_HM	RATE_HM	HM		RATE_HM
						RATE_HM_B	RATE_HM_B			RATE_HM_B
						RATE_HM_R	RATE_HM_R			RATE_HM_R
						RATE_HM_M	RATE_HM_M			RATE_HM_M
						WORKERS_DU	WORKERS_DU			WORKERS_DU
									ATYPE	ATYPE
									CATEGORY	CATEGORY
									RATE	RATE
						DESCR	DESCR		DESCR	DESCR

Table A-7. Original and Standard Field Names for ATTRRATES Data Table

FLSWM	POLK	GUATS	NERPM	NWFRPM	SERPM	TCRPM	GTCRPM	CFRPM	TBRPM	STANDARD
ATTRRATES.dbf	*ATTRRATES.dbf*	*GRATE.SYN*		*xARATES.TXT (x=ES, FW, or BA)*		*xGRATESB.SYN (x=IR, SL or MA)*	*xGRATEST.SYN files (x = BR, IR, SL, MA, or PB)*	*PRATES_U.DBF VOL_PRATESB.DBF*	*GRATES.SYN*	*ATTRRATES*
INEMP_RATE	INEMP_RATE	RATE_INEMP		ARat_IndEmp		INDEM	INDEM	ARATEIND & INDEM		RATE_INEMP
COEMP_RATE	COEMP_RATE	RATE_COEMP		Arat_ComEmp		COMEM	COMEM	ARATECOM & COMEM		RATE_COEMP
SEEMP_RATE	SEEMP_RATE	RATE_SEEMP		Arat_SerEmp		SEREM	SEREM	ARATESVC & SEREM		RATE_SEEMP
TOEMP_RATE	TOEMP_RATE	RATE_TOEMP		Arat_TotEmp		TOTEM	TOTEM	ARATETOT & TOTEM		RATE_TOEMP
TOTDU_RATE	TOTDU_RATE	RATE_TOTDU		Arat_TotDU				ARATEDUS & HH		RATE_TOTDU
						HH	HH			R_OCC_DU
		RATE_HM				H/M	H/M	HM		RATE_HM
SCHOOL_RATE	SCHOO_RATE	RATE_SCH		Arat_SchEnr		SCH ENRL	SCH ENRL	ARATESCH & SCHENRL		RATE_SCH
REGION				ES, FW, or BA		IR, SL or MA	BR, IR, SL, MA, or PB	VOL or other area		REGION
						AT	AT	AT	ATYPE	ATYPE
								SECTOR		SECTOR
ATTR_PURPO	ATTR_PURPO	ATTR_PURP				PURP	PURP	PURPOSE & PURP	ATTR_PURP	ATTR_PURP
									RATE	RATE
						COMMENT	COMMENT	COMMENT	COMMENT	COMMENT

Table A-8. Original and Standard Field Names for DUWEIGHTS Data Table

FLSWM	POLK	GUATS	NERPM	NWFRPM	SERPM	TCRPM	GTCRPM	CFRPM	TBRPM	STANDARD
DUWEIGHTS.DBF	*DUWEIGHTS.DBF*	*DUWEIGHT.SYN*		*ESDUWEIGHT.DBF, FWDUWEIGHT.DBF, BADUWEIGHT.DBF*				*DUWEIGHT.DBF*		*DUWEIGHTS*
REGION										REGION
SIZERANGE								SIZERANGE		SIZE_RANGE
1PERSONHH	1PERSONHH	1PERSONHH		1PERSONHH				PCT1PER		PCT_1P_HH
2PERSONHH	2PERSONHH	2PERSONHH		2PERSONHH				PCT2PER		PCT_2P_HH
3PERSONHH	3PERSONHH	3PERSONHH		3PERSONHH				PCT3PER		PCT_3P_HH
4PERSONHH	4PERSONHH	4PERSONHH		4PERSONHH				PCT4PER		PCT_4P_HH
5PERSONHH	5PERSONHH	5PERSONHH		5PERSONHH				PCT5PER		PCT_5P_HH

Table A-9. Original and Standard Field Names for PANDA Data Table

FLSWM	**POLK**	**GUATS**	**NERPM**	**NWFRPM**	**SERPM**	**TCRPM**	**GTCRPM**	**CFRPM**	**TBRPM**	**STANDARD**
PANDA_ayy.DBF	*PANDA_ayy.DBF*	*PANDA.DBF*	*PANDA.DBF*	*PRODANDATTR .DBF*	*PANDA0-PK_05. DBF PANDA0-OP_05. DBF … 9 files*	*PANDA.DBF*	*PANDA.DBF*	*GEN_PANDA.DBF*	*GEN_PANDA.DBF*	*PANDA*
Z	Z	Z	Z	Z	TAZ	Z	Z	TAZ	ZONE	TAZ
HBWP	HBWP	HBWP	HBWKP	P1	P1	P1	P1	PHBW	HBWP	HBWP
HBWA	HBWA	HBWA	HBWKA	A1	A1	A1	A1	AHBW	HBWA	HBWA
HBSHP	HBSHP	HBSHP	HBSHP	P2	P2	P2	P2	PHBSH	HBSHP	HBSHP
HBSHA	HBSHA	HBSHA	HBSHA	A2	A2	A2	A2	AHBSH	HBSHA	HBSHA
HBSRP	HBSRP	HBSRP	HBSRP	P3	P3	P3	P3	PHBSR	HBSRP	HBSRP
HBSRA	HBSRA	HBSRA	HBSRA	A3	A3	A3	A3	AHBSR	HBSRA	HBSRA
HBOP	HBOP	HBOP	HBOTP	P4	P6	P5	P5	PHBO	HBOP	HBOP
HBOA	HBOA	HBOA	HBOTA	A4	A6	A5	A5	AHBO	HBOA	HBOA
NHBP	NHBP	NHBP	NHBSP	P5				PNHB		NHBP
NHBA	NHBA	NHBA	NHBSA	A5				ANHB		NHBA
					P7	P6	P6		NHBWP	NHBWP
					A7	A6	A6		NHBWA	NHBWA
					P8	P7	P7		NHBOP	NHBOP
					A8	A7	A7		NHBOA	NHBOA
					P4				HBSCP	HBSCPRVP
					A4				HBSCA	HBSCPRVA
		HBUP			P5	P4	P4		COLP	HBUP
		HBUA			A5	A4	A4		COLA	HBUA
		HDORMUP								HDORMUP
		HDORMUA								HDORMUA
	TRKTAXIP			P6				PTAX	TAXIP	TAXIP
	TRKTAXIA			A6				ATAX	TAXIA	TAXIA
					P9	P8	P8		AIRPP	AIRPP
					A9	A8	A8		AIRPA	AIRPA
		TK4P	LTRKP		P10	P9	P9	PLTK	LTRKP	LTRKP
		TK4A	LTRKA		A10	A9	A9	ALTK	LTRKA	LTRKA

Table A-9. Original and Standard Field Names for PANDA Data Table (continued)

FLSWM	POLK	GUATS	NERPM	NWFRPM	SERPM	TCRPM	GTCRPM	CFRPM	TBRPM	STANDARD
		SGLUNITP	MTRKP		P11	P10	P10			MTRKP
		SGLUNITA	MTRKA		A11	A10	A10			MTRKA
		TRKTRLRP	HTRKP		P12	P11	P11	PHTK	HTRKP	HTRKP
		TRKTRLRA	HTRKA		A12	A11	A11	AHTK	HTRKA	HTRKA
		SOVIEP	SOIEP							SOIEP
		SOVIEA	SOIEA							SOIEA
		HOVIEP	HOIEP							HOIEP
		HOVIEA	HOIEA							HOIEA
		LDTKIEP	LDIEP							LDIEP
		LDTKIEA	LDIEA							LDIEA
		HDTKIEP	HDIEP							HDIEP
		HDTKIEA	HDIEA							HDIEA
LDB_P										LDB_P
LDB_A										LDB_A
SDEI_P										SDEI_P
SDEI_A										SDEI_A
	IEP			P7				PEI	EIP	IEP
	IEA			A7				AEI	EIA	IEA
	TOTP							TOTALP	TOTALP	TOTP
	TOTA							TOTALA	TOTALA	TOTA
					‘P’ - peak; ‘O’- off-peak; ‘T’ - total					PK_OP_OR_T
					‘0’ - zero-auto; ‘1’ - 1+ autos; ‘T’ - total					AUTO

Table A-10. Original and Standard Field Names for SPDCAP Data Table

FLSWM	POLK	GUATS	NERPM	NWFRPM	SERPM	TCRPM	GTCRPM	CFRPM	TBRPM	STANDARD
	SPDCAP.dbf	*SPDCAP.yya*	*SPDCAP.yya*	*SPDCAP.DEF*		*SPDCAP.ASC*	*SPDCAP.ASC*		*SPDCAP.DBF*	*SPDCAP*
	LOW_ATYPE	LAT	LAT	LAT		COLUMN 1	COLUMN 1		A_LOW	LOW_ATYPE
	HIGH_ATYPE	HAT	HAT	HAT		COLUMN 1	COLUMN 1		A_HIGH	HIGH_ATYPE
	LOW_FTYPE	LFT	LFT	LFT		COLUMN 2	COLUMN 2		F_LOW	LOW_FTYPE
	HIGH_FTYPE	HFT	HFT	HFT		COLUMN 2	COLUMN 2		F_HIGH	HIGH_FTYPE
	LOW_LANES	LLN	LLN	LLN		COLUMN 3	COLUMN 3		L_LOW	LOW_LANES
	HIGH_LANES	HLN	HLN	HLN		COLUMN 3	COLUMN 3		L_HIGH	HIGH_LANES
	CAP_OPERAN	CAPFUNC	CAPFUNC	CAPFUNC					SYMBOL1	CAP_OPERAN
	CAPACITY	CAP	CAP	CAP		COLUMN 4	COLUMN 4		CAPACITY	CAPACITY
	SPEED_OPER	SPDFUNC	SPDFUNC	SPDFUNC					SYMBOL2	SPEED_OPER
	SPEED	SPD	SPD	SPD		COLUMN 5	COLUMN 5		SPEED	SPEED

Table A-11. Original and Standard Field Names for TOLLLINKS Data Table

FLSWM	POLK	GUATS	NERPM	NWFRPM	SERPM	TCRPM	GTCRPM	CFRPM	TBRPM	STANDARD
TOLLLINK_yya.DAT	*TOLLLINK_yya.DAT*		*TOLLLINK.yya*	*TOLLLINK_yya.DAT*	*TOLLLINK.yya*			*TOLLLINK_yya.DBF*	*TOLLLINK_yya.DBF*	*TOLLLINKS*
TOLL	TOLL		TOLL	TOLL	WTOLL			TOLL	TOLL	TOLL_ID
TOLLTYPE	TOLLTYPE		TOLLTYPE	TOLLTYPE	TOLLTYPE			TOLLTYPE	TOLLTYPE	TOLLTYPE
A	A		A	A	A			A	A	A
B	B		B	B	B			B	B	B
PLAZADESC	PLAZADESC		PLAZADESC	PLAZADESC	PLAZADESC			PLAZADESC	PLAZADESC	PLAZADESC
PLZALNSMIN	PLZALNSMIN		PLZALNSMIN	PLZALNSMIN	PLZALNSMIN			PLZALNSMIN	PLZALNSMIN	PLZALNSMIN
PLZALNSMAX	PLZALNSMAX		PLZALNSMAX	PLZALNSMAX	PLZALNSMAX			PLZALNSMAX	PLZALNSMAX	PLZALNSMAX
CARTOLL	CARTOLL		CARTOLL	CARTOLL	CARTOLL			CARTOLL	CARTOLL	CARTOLL
SVCMINUTES	SVCMINUTES		SVCMINUTES	SVCMINUTES	SVCMINUTES			SVCMINUTES	SVCMINUTES	SVCMINUTE
SVCSECONDS	SVCSECONDS		SVCSECONDS	SVCSECONDS	SVCSECONDS			SVCSECONDS	SVCSECONDS	SVCSECOND
DECELCODE	DECELCODE		DECELCODE	DECELCODE	DECELCODE			DECELCODE	DECELCODE	DECELCODE
ACCELCODE	ACCELCODE		ACCELCODE	ACCELCODE	ACCELCODE			ACCELCODE	ACCELCODE	ACCELCODE
EXACTCHGLNS	EXACTCHGLNS		EXACTCHGLNS	EXACTCHGLNS	EXACTCHGLNS			EXACTCHGLNS	EXACTCHGLNS	EXACTCHLNS
AVILANES	AVILANES		AVILANES	AVILANES	AVILANES			AVILANES	AVILANES	AVILANES
PCTTRUCKS	PCTTRUCKS		PCTTRUCKS	PCTTRUCKS	PCTTRUCKS			PCTTRUCKS	PCTTRUCKS	PCTTRUCKS
CTOLL				CTOLL	CTOLL					CTOLL

Table A-12. Original and Standard Field Names for TURN_PENALTIES Data Table

FLSWM	**POLK**	**GUATS**	**NERPM**	**NWFRPM**	**SERPM**	**TCRPM**	**GTCRPM**	**CFRPM**	**TBRPM**	**STANDARD**
TURN_yya.PEN	*TURN_yya.PEN*	*TCARDS.PEN*	*tcards_yya.pen*	*TURN_yya.PEN*	*TURNS_yy.PEN*	*TCARDS.PEN*	*TCARDS.PEN*	*TURN_yya.PEN*	*TURN_yya.PEN*	*TURN_PENALTIES*
O_NODE	O_NODE	O_NODE	O_NODE	O_NODE	O_NODE	COLUMN 1	COLUMN 1	O_NODE	O_NODE	O_NODE
T_NODE	T_NODE	T_NODE	T_NODE	T_NODE	T_NODE	COLUMN 2	COLUMN 2	T_NODE	T_NODE	T_NODE
D_NODE	D_NODE	D_NODE	D_NODE	D_NODE	D_NODE	COLUMN 3	COLUMN 3	D_NODE	D_NODE	D_NODE
SET	SET	SET	SET	SET	SET	COLUMN 4	COLUMN 4	SET	SET	SET
PENALTY	PENALTY	PENALTY	PENALTY	PENALTY	PENALTY	COLUMN 5	COLUMN 5	PENALTY	PENALTY	PENALTY

Table A-13. Original and Standard Field Names for VFACTORS Data Table

FLSWM	**POLK**	**GUATS**	**NERPM**	**NWFRPM**	**SERPM**	**TCRPM**	**GTCRPM**	**CFRPM**	**TBRPM**	**STANDARD**
	VFACTORS_yya.csv	*VFACTORS.yya*	*VFACTORS.yya*	*VFACTORS.DEF*	*MVFACTORS.yya*	*VFACTORS.CSV*	*VFACTORS.CSV*	*VFACTORS_yya.dbf*	*VFACTORS.dbf*	*VFACTORS*
	FT	FT	FT	FT	FTC2	COLUMN 1	COLUMN 1	FT	FT	FTYPE
	UROADFACTOR	UROADF	UROADF	UROADF	UROADF	COLUMN 2	COLUMN 2	UROAD	UROAD	UROAD
	CONFAC	CONFAC	CONFAC	CONFAC	CONFAC24H	COLUMN 3	COLUMN 3	CONFAC	CONFAC	CONFAC
	BPRCOEFFICIENT	BPR LOS	BPR LOS	BPR LOS	BPR LOS	COLUMN 4	COLUMN 4	BPRLOS	BPRLOS	BPRLOS
	BPREXPONENT	BPR EXP	BPR EXP	BPR EXP	BPR EXP	COLUMN 5	COLUMN 5	BPREXP	BPREXP	BPREXP
									BPRGMA	BPRGMA
					CONFACAMP					CONFACAMP
					CONFACPMP					CONFACPMP
					CONFACOFP					CONFACOFP

Table A-14. Original and Standard Field Names for FF Data Table

FLSWM	POLK	GUATS	NERPM	NWFRPM	SERPM	TCRPM	GTCRPM	CFRPM	TBRPM	STANDARD
ff-LDB.csv ff-sd.csv FF_TRUCK.csv FF_FREIGHT.CSV (output)	*FF.dbf*	*FF.DBF*	*FF.DBF*	*FF-LONGDIST.csv FF-SHORTDIST.csv (output)*				*FF_x.DBF (x = BATS, LCTS, OATS, OUATS, VOLUSIA, SYN_2, SUMTER, SAT1, SAT2, SAT3)*	*FF_ALL.dbf*	*FF*
TIME	MINUTE_MRK	TIME	Z	MINUTES				MINUTES	MINUTES	TIME
HBWFF	HBWFF	HBWFF	HBW	HBW				F1 (HBW)	HBW	FF_HBW
HBSHFF	HBSHFF	HBSHFF	HBSH	HBShopping				F2 (HBSH)	HBSH	FF_HBSH
HBSRFF	HBSRFF	HBSRFF	HBSR	HBSOCREC				F3 (HBSR)	HBSR	FF_HBSR
HBOFF	HBOFF	HBOFF	HBO	HBO				F4 (HBO)	HBO	FF_HBO
NHBFF	NHBFF	NHBFF	NHB	NHB				F5 (NHB)		FF_NHB
									NHBW	FF_NHBW
									NHBO	FF_NHBO
	TTFF			TT					TAXI	FF_TT
LIGHT TRUCK FF		TK4FF	LTRK					F6 (LTRK)	LTK	FF_LTRK
Medium Truck FF		TKSGLFF	MTRK					F7 (MTRK)		FF_MTRK
Heavy Truck FF		TKTRLRFF	HTRK					F8 (HTRK)	HTK	FF_HTRK
LD Business like HBW				LD Business like HBW						FF_LDB
SD EI (HBW)	IEFF			IE (SD / LD)				F9 (IE)	EI	FF_IE
		SOVIEFF	SOIE							FF_SOV_IE
		HOVIEFF	HOIE							FF_HOV_IE
		TKLTIEFF	LDIE							FF_LTRK_IE
		TKHTIEFF	HDIE							FF_HTRK_IE
									HBSC	FF_HBSC
		HBUFF							COL	FF_HBU
		HDORMUFF								FF_HDORMU
									AIRP	FF_AIRP
SD, LD, TRUCK, or FREIGHT				SD or LD				Different counties		CATEGORY
Agricultural										FF_AGRI

Table A-14. Original and Standard Field Names for FF Data Table (continued)

FLSWM	POLK	GUATS	NERPM	NWFRPM	SERPM	TCRPM	GTCRPM	CFRPM	TBRPM	STANDARD
Non-Metallic Minerals										FF_NMM
Coal										FF_COAL
Food										FF_FOOD
Non-Durable Mfg										FF_NDM
Lumber										FF_LUMBER
Chemicals										FF_CHEMIC
Paper										FF_PAPER
Petrolium Products										FF_PP
Other Durable Mfg										FF_ODM
Clay/Concrete/Glass										FF_CCG
Waste										FF_WASTE
Misc. Freight										FF_MISC
Warehousing										FF_WH

Table A-15. Original and Standard Field Names for TRANSIT_MODES Data Table

FLSWM	POLK	GUATS	NERPM	NWFRPM	SERPM	TCRPM	GTCRPM	CFRPM	TBRPM	STANDARD
	TSYSD.PTS	*ALACHUA.PTS*	*SYSTEM.PTS*			*SYSTEM.PTS*	*SYSTEM.PTS*	*SYSTEM.PTS*		*TRANSIT_MODES*
	NUMBER	NUMBER	NUMBER			NUMBER	NUMBER	NUMBER		MODE
	LONGNAME	LONGNAME	LONGNAME			LONGNAME	LONGNAME	LONGNAME		LONG_NAME
	NAME	NAME	NAME			NAME	NAME	NAME		NAME
	STURCTURE	STURCTURE	STURCTURE			STRUCTURE	STRUCTURE	STURCTURE		STURCTURE
	SAME	SAME	SAME			SAME	SAME	SAME		SAME
	IBOARDFARE	IBOARDFARE	IBOARDFARE			IBOARDFARE	IBOARDFARE	IBOARDFARE		BOARDING_FARE

Table A-16. Original and Standard Field Names for TRANSFER_FARES Data Table

FLSWM	POLK	GUATS	NERPM	NWFRPM	SERPM	TCRPM	GTCRPM	CFRPM	TBRPM	STANDARD
	TFARES_yya.far	*ALACHUA.FAR*	*TFARES_yya.far*			*BASEFARES.FAR*	*BASEFARES.FAR*	*TFARES.FAR*		*TRANSFER_FARES*
	FAREFROMFS	FAREFROMFS	FAREFROMFS			FAREFROMFS	FAREFROMFS	FAREFROMFS		FROM_MODE
										TO_MODE
										FARE

Table A-17. Original and Standard Field Names for TRANSIT_OPERATORS Data Table

FLSWM	POLK	GUATS	NERPM	NWFRPM	SERPM	TCRPM	GTCRPM	CFRPM	TBRPM	STANDARD
	TSYSD.PTS	*ALACHUA.PTS*	*SYSTEM.PTS*			*SYSTEM.PTS*	*SYSTEM.PTS*	*SYSTEM.PTS*		*TRANSIT_OPERATORS*
	NUMBER	NUMBER	NUMBER			NUMBER	NUMBER	NUMBER		OPERATOR
	NAME	NAME	NAME			NAME	NAME	NAME		SHORT_NAME
	LONGNAME	LONGNAME	LONGNAME			LONGNAME	LONGNAME	LONGNAME		LONG_NAME

Table A-18. Original and Standard Field Names for WAIT_CURVES Data Table

FLSWM	POLK	GUATS	NERPM	NWFRPM	SERPM	TCRPM	GTCRPM	CFRPM	TBRPM	STANDARD
	TSYSD.PTS	*ALACHUA.PTS*	*SYSTEM.PTS*			*SYSTEM.PTS*	*SYSTEM.PTS*	*SYSTEM.PTS*		*WAIT_CURVES*
	NUMBER	NUMBER	NUMBER			NUMBER	NUMBER	NUMBER		WT_CRV_ID
	NAME	NAME	NAME			NAME	NAME	NAME		SHORT_NAME
	LONGNAME	LONGNAME	LONGNAME			LONGNAME	LONGNAME	LONGNAME		LONG_NAME
	CURVE	CURVE	CURVE			CURVE	CURVE	CURVE		CURVE

Table A-19. Original and Standard Field Names for TRANSIT_SPEED Data Table

FLSWM	POLK	GUATS	NERPM	NWFRPM	SERPM	TCRPM	GTCRPM	CFRPM	TBRPM	STANDARD
	TRANSPD.dbf	*SPDCRV.TXT*	*TRANSPD.dbf*			*SDLAYUPD.yya*	*SDLAYUPD.yya*		*TSPEEDpk.DBF* *TSPEEDop.DBF*	*TRANSIT_SPEED*
	CURVE_NO		CURVE_NO			CURVE_ID	CURVE_ID		CURVENUM	SPD_CRV_ID
	LOW_MODE		LOW_MODE			LOW_MODE	LOW_MODE			LOW_MODE
	HIGH_MODE		HIGH_MODE			HIGH_MODE	HIGH_MODE			HIGH_MODE
	LOW_FT		LOW_FT			LOW_FTYPE	LOW_FTYPE			LOW_FTYPE
	HIGH_FT		HIGH_FT			HIGH_FTYPE	HIGH_FTYPE			HIGH_FTYPE
	LOW_AT		LOW_AT			LOW_ATYPE	LOW_ATYPE			LOW_ATYPE
	HIGH_AT		HIGH_AT			HIGH_ATYPE	HIGH_ATYPE			HIGH_ATYPE
	SPEEDRATIO									RATIO
			PKSPDRATIO							PK_ RATIO
			OPSPDRATIO							OP_RATIO
	DESCRIPTIO		DESCRIPTIO							DESCR
						H_LOW	H_LOW		H_LOW	H_LOW
						T_LOW	T_LOW		T_LOW	T_LOW
						H_HIGH	H_HIGH		H_HIGH	H_HIGH
						T_HIGH	T_HIGH		T_HIGH	T_HIGH
										PK_OR_OP
		AUTO SPEED								H_SPEED
		TRANSIT SPEED 1								T_SPEED1
		TRANSIT SPEED 2								T_SPEED2
		TRANSIT SPEED 3								T_SPEED3

APPENDIX B:

ORIGINAL AND STANDARD MATRIX NAMES FOR MATRIX FILES

Table B-1. Original and Standard Matrix Names for FREESKIM.MAT Matrix File

FLSWM	POLK	GUATS	NERPM	NWFRPM	SERPM	TCRPM	GTCRPM	CFRPM	TBRPM	STANDARD
XSKIM.MAT	*FREESKIM_ayy.MAT*	*FHSKIMS.ayy.MAT*	*FHSKIMS.MAT*	*XSKIM.MAT*	*a: FHSKIMS.ayy.MAT b: HFSKIMS.ayy.MAT*			*a: FREESKIM_ayy.MAT b: FREESKIM_HOV_ayy.MAT*	*a: FREESKIM_A06.MAT b: FREESKIM_HOV_A06.MAT*	*FREESKIM.MAT*
SKTM	FREE_TIME	TIME	TIME	SKTM	a.TIME1			a.TIME	a.TIME	TIME
DISTANCE	DISTANCE	DISTANCE	DISTANCE	DISTANCE	a.DISTANCE			a.DISTANCE	a.DISTANCE	DISTANCE
SHORT				SHORT						SHORT
LONG				LONG						LONG
	TERMINAL_TIME	TERMINALTIME	TerminalTime	TERMTIME				a.TERMTIME	a.TERMTIME	TERMTIME
	TOLL		TOLL		a.COST			a.TOLLDOLLARS	a.TOLLDOLLARS	TOLL
	TOLL_TIME		WtdTime					a.TOLLTIMEEQ	a.TOLLTIMEEQ	TOLLTIMEEQ
					a.TIME2			a.TIME2 (a.TIME + a.TOLLTIMEEQ)	a.TIME2 (a.TIME + a.TOLLTIMEEQ)	TIME2
								a.SVCMINUTES	a.SVCMINUTES	SVCMINUTES
								a.SVCSECONDS	a.SVCSECONDS	SVCSECONDS
								a.DELAY	a.DELAY	DELAY
	HOV_TIME		HOVTime		b.TIME1			b.TIME1	b.TIME	HOV_TIME
	HOV_DISTANCE		HOVDistance		b.DISTANCE			b.DISTANCE	b.DISTANCE	HOV_DISTANCE
	HOV_COST		HOVToll		b.COST			b.COST	b.TOLLDOLLARS	HOV_TOLL
	HOV_TOLLTIME		HOVWtdTime						b.TOLLTIMEEQ	HOV_TOLLTIMEEQ
									b.TERMTIME	HOV_TERMTIME
					b.TIME2			b.TIME2	b.TIME2 (b.TIME + b.TOLLTIMEEQ)	HOV_TIME2
									b.SVCMINUTES	HOV_SVCMINUTES
									b.SVCSECONDS	HOV_SVCSECONDS
									b.DELAY	HOV_DELAY
		WALKDISTANCE								WALKDISTANCE
		BIKETIME								BIKETIME

Table B-2. Original and Standard Matrix Names for CONGSKIMS.MAT Matrix File

FLSWM	**POLK**	**GUATS**	**NERPM**	**NWFRPM**	**SERPM**	**TCRPM**	**GTCRPM**	**CFRPM**	**TBRPM**	**STANDARD**
	CONGSKIM_ayy.MAT	*RHSKIMS.MAT*	*PRELSKIMS.MAT*		*a: CGLOVSKM.ayy.MAT* *b: CGHOVSKM.ayy.MAT*			*a: CONGSKIM_ayy.MAT* *b: CONGSKIM_HOV_ayy.MAT*	*a: CONGSKIM_ayy.MAT* *b: CONGSKIM_HOV_ayy.MAT*	*CONGSKIMS.MAT*
	CNG_TIME	TIME	TIME		a.TIME1			a.TIME1	a.TIME1	SOV_TIME1
	DISTANCE	DISTANCE	DISTANCE		a.DISTANCE			a.DISTANCE	a.DISTANCE	SOV_DISTANCE
	TERMINAL_TIME	TERMINALTIME	TerminalTime					a.TERMTIME	a.TERMTIME	SOV_TERMTIME
	TOLL		TOLL		a.COST			a.CARTOLL	a.CARTOLL	SOV_TOLL
								a.SVCMINUTES	a.SVCMINUTES	SOV_SVCMINUTES
								a.SVCSECONDS	a.SVCSECONDS	SOV_SVCSECONDS
			WtdTime					a.DELAY	a.DELAY	SOV_DELAY
								a.TOLLEQ	a.TOLLEQ	SOV_TOLLEQ
					a.TIME2			a.TIME2	a.TIME2	SOV_TIME2
								a.FFTIME	a.FFTIME	SOV_FFTIME
	COMP_TIME									SOV_COMP_TIME
	HOV_CNGTIME		HOVTime		b.TIME1			b.TIME1	b.TIME1	HOV_TIME1
	HOV_DISTANCE		HOVDistance		b.DISTANCE			b.DISTANCE	b.DISTANCE	HOV_DISTANCE
	HOV_TOLL		HOVToll		b.COST			b.CARTOLL	b.CARTOLL	HOV_TOLL
	HOV_TOLLTIME		HOVWtdTime					b.TERMTIME	b.TERMTIME	HOV_TERMTIME
								b.SVCMINUTES	b.SVCMINUTES	HOV_SVCMINUTES
								b.SVCSECONDS	b.SVCSECONDS	HOV_SVCSECONDS
								b.DELAY	b.DELAY	HOV_DELAY
								b.TOLLEQ	b.TOLLEQ	HOV_TOLLEQ
					b.TIME2			b.TIME2	b.TIME2	HOV_TIME2
								b.FFTIME	b.FFTIME	HOV_FFTIME

Table B-3. Original and Standard Matrix Names for PSNTRIPS.MAT Matrix File

FLSWM	POLK	GUATS	NERPM	NWFRPM	SERPM	TCRPM	GTCRPM	CFRPM	TBRPM	STANDARD
XPTT_U_R.ayy	*PSNTRIPS_ayy.MAT*	*PTRIPS.MAT*	*PTRIPS.MAT*	*INTPTT.ayy.MAT*	*PTRIPS1PVeh-OP_ayy.MAT PTRIPS1PVeh-PK_ayy.MAT*	*PTRIPS1.MAT*	*WTDTRIP_ayy.MAT*	*PTRIPS_ayy.MAT*	*PSNTRIPS_ayy.MAT*	*PSNTRIPS.MAT PSNTRIPS_*.MAT (* = PK, OP)*
HBW_P_A	HBW	HBW	HBW	HBW	HBW1_PK / HBW1_OP	HBW	HBW	HBW	HBW	HBW
HBSH_P_A	HBSH	HBSH	HBSH	HBSH	HBSH1_PK / HBSH1_OP	HBSH	HBSHOP	HBSH	HBSH	HBSH
HBSR_P_A	HBSR	HBSR	HBSR	HBSR	HBSR1_PK / HBSR1_OP	HBSR	HBSR	HBSR	HBSR	HBSR
HBO_P_A	HBO	HBO	HBO	HBO	HBO1_PK / HBO1_OP	HBO	HBO	HBO	HBO	HBO
NHB_P_A	NHB	NHB	NHB	NHB				NHB		NHB
					NHBW_PK / NHBW_OP	NHBW	NHBW		NHBW	NHBW
					NHBO_PK / NHBO_OP	NHBO	NHBO		NBHO	NBHO
	TRKTAXI			TT				TAXI	TAXI	TAXI
		TRUCK4			TRK4T_PK / TRK4T_OP	TRUCK4TIRE	4TIRETRUCK			TRUCK4T
		TRUCKSU			TRKSU_PK / TRKSU_OP	TRKSNGLUNIT	SUTRUCK			TRUCKSU
		TRUCKTRLR			TRKCOMB_PK / TRKCOMB_OP	TRACTORTRAILER	COMTRUCK			TRKCOMB
	IE			IE				IE	EI	IE
		SOVIE								SOVIE
		HOVIE								HOVIE
		TRUCKLDIE								TRUCKLDIE
		TRUCKHDIE								TRUCKHDIE
					HBSCALL_PK / HBSCALL_OP	HBSCPRV	HBSCHOOL			HBSCHOOL
		HBU			HBUNIV_PK / HBUNIV_OP				UNIV	HBU
		HDORMU								HDORMU
					AIRPORT_PK / AIRPORT_OP	AIRPORT	AIRPORT		ARPT	AIRPORT
								LTRK	LTRK	LTRK
								HTRK	HTRK	HTRK
									LOS	LOS

Table B-4. Original and Standard Matrix Names for TSKIM.MAT Matrix File

FLSWM	POLK	GUATS	NERPM	NWFRPM	SERPM	TCRPM	GTCRPM	CFRPM	TBRPM	STANDARD
	*TSKIM#*_ayy.MAT (# = PK, OP; * = 1, 2)*	*PEAK TRN LOS.MAT OP TRN LOS.MAT*	*TSKIM#*_ayy.MAT (# = PK, OP; * = 1, 2, …, 6)*		*TSKIM#*_ayy.MTX (# = AM, MD; * = 1, 2, …, 8)*	*TSKIM#*_ayy.MTX (# = AM, MD; * = 1, 2, …, 7)*		*TSKIM*#_ayy.MAT (* = AM, MD; # = 1, 2, 3, 4, 5, 6)*		*TSKIM_#_*_ayy.MAT (# = AM, MD; * = 1, 2, 3, 4, 5, ...)*
	WALKTIME	PKWKTIMELB	WalkTime		WalkConn	TIMEM1		WALKTIME		WALKTIME
	AutoTIME	PKWTTIMELB	AutoTime		DriveConn	TIMEM2		AutoTIME		AutoTIME
	SidewalkTime	PKIVTIMELB				TIMEM3		SidewalkTime		SidewalkTime
	BUSTIME	PKPKCOSTLB	BusTime		LocalBusMover	TIMEM4_12		BUSTIME		BUSTIME
	PBUSTIME	PKOPCOSTLB	PremBusTime		XpressBus	TIMEM5		PBUSTIME		PBUSTIME
	CIRCTIME	PKWKTIMEEX	CircTime			TIMEM6		CIRCTIME		CIRCTIME
	RAILTIME	PKWTTIMEEX	RailTime		MetroRail	TIMEM7		RAILTIME		RAILTIME
	COMRLTIME	PKIVTIMEEX	CRailTime		TriRail	TIMEM8		COMRLTIME		COMRLTIME
	OTHTIME	PKPKCOSTEX	OtherTime					OTHTIME		OTHTIME
	PRJTIME	PKOPCOSTEX	ProjTime		ProjectMode			PRJTIME		PRJTIME
	XFER		NumXfers		Xfers	TRANSFERS				XFER
		PKWKTIMEBA	XferTime		TransferTime					XFERTime
	IWAIT	PKWTTIMEBA	InitWait		FirstWait	FIRSTWAIT		IWAIT		IWAIT
	XWAIT	PKIVTIMEBA	XferWait		SecondWait	SECONDWAIT		XWAIT		XWAIT
	FARE	PKPKCOSTBA	Fare		TFare			FARE		FARE
	TOTTIME	PKOPCOSTBA	TotalTime		TotalTime	TOTALTIME		TOTTIME		TOTTIME
					NewMode					NEWMODE

Table B-5. Original and Standard Matrix Names for HWYTRIPS.MAT Matrix File

FLSWM	POLK	GUATS	NERPM	NWFRPM	SERPM	TCRPM	GTCRPM	CFRPM	TBRPM	STANDARD
	HWYTRIPS_ayy.MAT	*VEHICLES.MAT*	*HWYTTAB_ayy.MAT*		*HBWORKPK_ayy.MTX*	*HWYTTAB.MAT*		*HTTAB_TEM.A05*	*Hwytrips_ayy.MAT*	*HWYTRIPS.MAT #_HWYTRIPS_*.MAT (# = trip purpose; * = PK or OP)*
	DRIVEALONE	DRIVEALONE	SOVIEII		HBWAutoDriveAlonePK	DA		LOV	DRIVEALONE	DA
					HBWAutoOnePassengerPK	SR2			CARPOOL2	SR2
					HBWAutoTwoPassengersPK	SR3			CARPOOL3	SR3
	CARPOOL	CARPOOL	HOVIEII					HOV		CARPOOL
	TRUCKTAXI		TRKIEII							TRUCKTAXI
	EETRIPS	EETRIPS							EE	EE
			TRKEE							TRKEE
			SOVEE							SOVEE
			HOVEE							HOVEE
	SOVIETRIPS									SOVIE
	HOVIETRIPS									HOVIE
		LIGHTTRUCK						LTRK	LIGHTTRUCK	LTRK
		HEAVYTRUCK						HTRK	HEAVYTRUCK	HTRK
						AIRPORT				AIRPORT
						TRUCK4TIRE				TRUCK4T
						TRKSNGLUNIT				TRKSU
						TRACTORTRAILER				TRKCOMB
						PUBLICSCHOOL				PUBLICSCHOOL
						TOTALTRIPS			TOTAL	TOTAL

Table B-6. Original and Standard Matrix Names for TRNTRIPS.MAT Matrix File

FLSWM	POLK	GUATS	NERPM	NWFRPM	SERPM	TCRPM	GTCRPM	CFRPM	TBRPM	STANDARD
	TRNTRIPS_ayy.MAT	*TRANSIT.MAT*	*TRANSITTAB_ayy.MAT*		*HBWORKPK_ayy.MTX*	*TRANSITTAB.MAT*		*TTWRK.ayy TTNWK.ayy*	*Trntrips_ayy.MAT*	*TRNTRIPS.MAT #_TRNTRIPS.MAT (# = trip purpose)*
	PKWalkTransit / OPWalkTransit	PKWALKLOCAL / OPWALKLOCAL	PKWlkBus / OPWlkBus		HBWWalkToBusTransitPK	AM_WLB / MD_WLB		HBW - WALK TO LOCAl TRANSIT	WALKLB	WALKBUS
	PKPNRTransit / OPPNRTransit		PKPNRBus / OPPNRBus		HBWAutoPNRToBusTransitPK	AM_WPM / MD_WPM		HBW - P/R TO LOCAL TRANSIT	PNRLB	PNRBUS
	PKKNRTransit / OPKNRTransit	PKAUTOBA / OPAUTOBA	PKKNRBus / OPKNRBus		HBWAutoKNRToBusTransitPK	AM_APM / MD_APM		HBW - K/R TO LOCAL TRANSIT	KNRLB	KNRBUS
		PKWALKPREM / OPWALKPREM			HBWWalkToNewTransitPK			HBW - WALK TO PREMIUM TRANSIT		WALKPREM
					HBWAutoPNRToNewTransitPK			HBW - P/R TO PREMIUM TRANSIT		PNRPREM
					HBWAutoKNRToNewTransitPK			HBW - K/R TO PREMIUM TRANSIT		KNRPREM
			PKCBDKNRBus / OPCBDKNRBus							CBDKNRBUS
			PKWlkPrj / OPWlkPrj							WALKPRJ
			PKPNRPrj / OPPNRPrj							PNRPRJ
			PKKNRPrj / OPKNRPrj							KNRPRJ
			PKCBDKNRPrj / OPCBDKNRPrj							CBDKNRPRJ
			PKFringe / OPFringe							FRINGE
					HBWWalkToMRLTransitPK					WALKMRL
					HBWAutoPNRToMRLTransitPK					PNRMRL
					HBWAutoKNRToMRLTransitPK					KNRMRL
					HBWWalkToTRLTransitPK					WALKTRL

Table B-6. Original and Standard Matrix Names for TRNTRIPS.MAT Matrix File (continued)

FLSWM	POLK	GUATS	NERPM	NWFRPM	SERPM	TCRPM	GTCRPM	CFRPM	TBRPM	STANDARD
					HBWAutoPNRToTRLTransitPK					PNRTRL
					HBWAutoKNRToTRLTransitPK					KNRTRL
									WALKEB	WALKEB
									PNREB	PNREB
									KNREB	KNREB
									WALKTRI	WALKTRI
									PNRTRI	PNRTRI
									KNRTRI	KNRTRI
									WALKRAIL	WALKRAIL
									PNRRAIL	PNRRAIL
									KNRRAIL	KNRRAIL
									WALKJT	WALKJT
									WALKMOVER	WALKMOVER
									TOTAL	TOTAL