San Francisco Travel Demand Forecasting Model Development

Data Development

Final Report

prepared for
San Francisco County Transportation Authority

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Updated by:
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Table of Contents

Overview

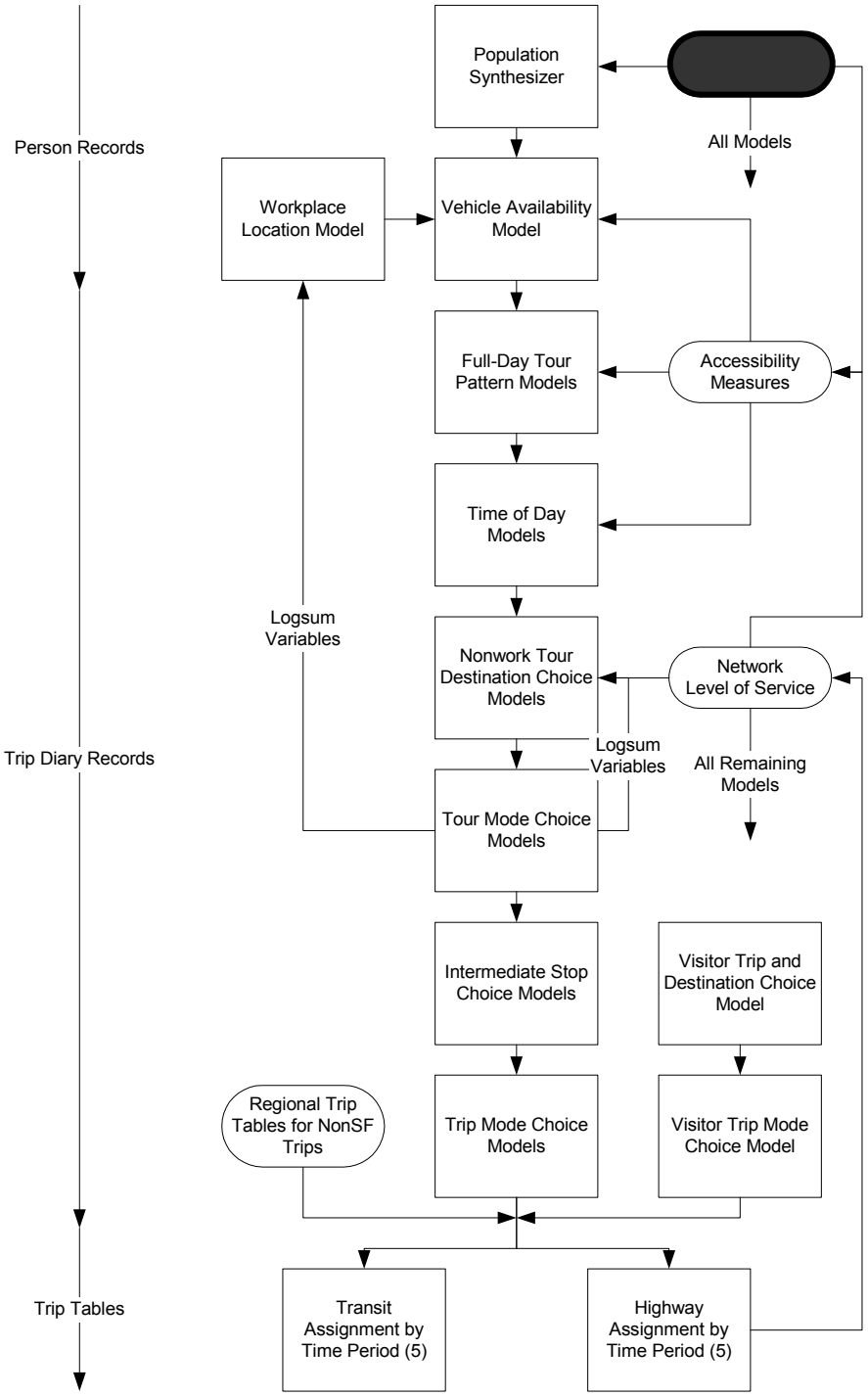
The San Francisco County Travel Demand Forecasting Model (SF Model) was developed for the San Francisco County Transportation Authority (SFCTA) to provide detailed forecasts of travel demand for various planning applications. These applications included developing countywide plans, providing input to microsimulation modeling for corridor and project-level evaluations, transit planning, and neighborhood planning. The objective was to accurately represent the complexity of the destination, temporal and modal options and provide detailed information on travelers making discrete choices. These objectives led to the development of an activity-based model that uses synthesized population as the basis for decision-making rather than zonal-level aggregate data sources. The activity-based model has nine primary components.

Most of the model components were estimated using household survey data collected by the Metropolitan Transportation Commission (MTC) for San Francisco residents only. Each model component was calibrated using various observed data sources, then the full model was validated using traffic count and transit ridership data for each of five time periods. The model is applied as a focused model, which combines trip making from the entire Bay Area (derived from the MTC's BAYCAST trip tables) with the travel demand from San Francisco residents produced by the activity-based model. Figure 1 shows the model system.

Contents of this Report and Related Reports

This report discusses the data required to develop the San Francisco Travel Demand Forecast model. There are three types of data discussed: land use and socioeconomic data, travel demand data and network data.

Figure 1. San Francisco Model System



Land Use and Socioeconomic Data

This section describes the land use and socioeconomic data available for use in the San Francisco County Travel Demand Model prepared for the San Francisco County Transportation Authority. It describes the data sources, the variables that might be of use, and the years for which data and projections are available, and also provides methods for creating base year (1998) estimates from prior years' data and methods for allocating projections to the traffic analysis zone (TAZ) level. This report does not describe synthetic population sampling and the use of the 1990 Census Public Use Microdata Sample (PUMS). That is described in the accompanying Population Synthesis Report.

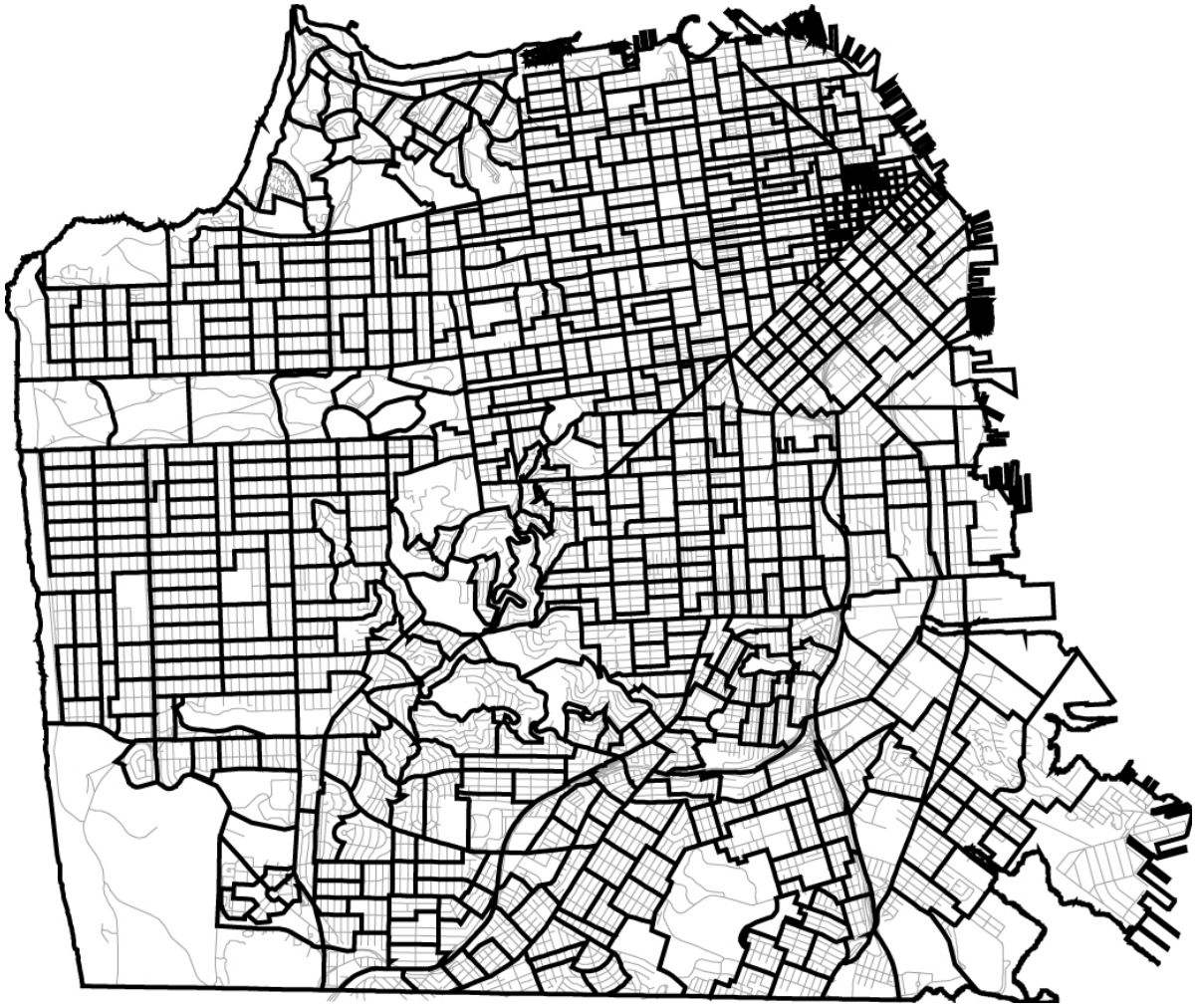
The land use section is organized as follows. First, the methodology used to define the San Francisco Model TAZs is described. Next, the primary data sources are described and evaluated. The final subsections outline methods for estimating base year and future year residential and non-residential travel model inputs.

Travel Analysis Zone Definitions

Within San Francisco, the San Francisco Model TAZs (travel analysis zone) were defined based on the 1990 Census Transportation Planning Package TAZs (the journey-to-work). These TAZs are essentially consistent with the Census Bureau's block groups, except in the downtown core where they are consistent with Census Blocks. Outside of San Francisco, the TAZs are consistent with the TAZs used in the Metropolitan Transportation Commission (MTC)'s regional travel demand forecast model.

In some areas of San Francisco, it was determined that the CTPP TAZs needed to be further subdivided either because they were too large to get reasonable estimates of travel time, or because they were too large to reflect the anticipated land use development in the area. For example, Golden Gate Park was subdivided because travel times to one end of the park are very different than travel times to the other end. The Presidio was subdivided because of the expected growth associated with its redevelopment as a national park, and also because it too was represented by a single zone in the CTPP (an existing zone structure from the GMPA was used to define the new zones). Mission Bay was subdivided because of anticipated growth (again, an existing zone system was used to define the new zones). There were also smaller zone splits used to improve modeling results. For example, a single zone containing both San Francisco State University (SFSU) and the Stonestown Mall was divided into two zones to represent the very different travel patterns associated with these activity centers. Figure 2 shows the San Francisco Model TAZs within San Francisco.

Figure 2: San Francisco Model Travel Analysis Zones



Primary Data Sources

There are five primary sources of data for residential and non-residential land use inputs by traffic analysis zone. The San Francisco Planning Department provided a current parcel database and a current business and employment database (1). The Planning Department (2), the San Francisco Redevelopment Agency (3), and the Port of San Francisco (4) maintain lists of new development projects under construction, approved, and under review, as well as information on development potential for major area plans. The Association of Bay Area Governments' *Projections '98* is the other key source for model inputs (5).

The parcel database provides current estimates of residential units at the block and lot level and the business and employment database contains current estimates of employment by type at the block and lot level. Both databases can be aggregated to the TAZ level. The distribution of units and employment by TAZ derived from the database analyses will be used to generate the base year population, employed population, and employment inputs for the model.

Model inputs for future years depend on changes in the characteristics of residents and businesses occupying the existing building stock as well as on the amount and location of new development in the City. Lists of projects and descriptions of major area plans will provide the backbone for the allocation of growth by TAZ. Finally, *Projections 98* not only provides the citywide totals for population, employed residents, and employment—for the base year and projection years at five-year increments—but also provides a basis for estimating characteristics of future households at the census tract level at each projection year.

Parcel Database

The parcel database (**parcel.dbf**) was provided by the San Francisco Planning Department. The database reflects conditions in San Francisco as of April - June 1998. The primary source of the block and lot level data is the Office of the Assessor, which is supplemented by Port of San Francisco estimates for land area and building space on piers, data about residential units from the Department of Building Inspection, and other information compiled by the San Francisco Planning Department. For all parcels (or lots) in San Francisco, including seawall lots under Port jurisdiction, the parcel database has estimates of land area and building square footage, as well as counts of residential units for residential parcels. The data base includes public property as well as privately-owned property. The information of most use for travel demand model development is the current count of residential units at the parcel level.

Database Fields Defined

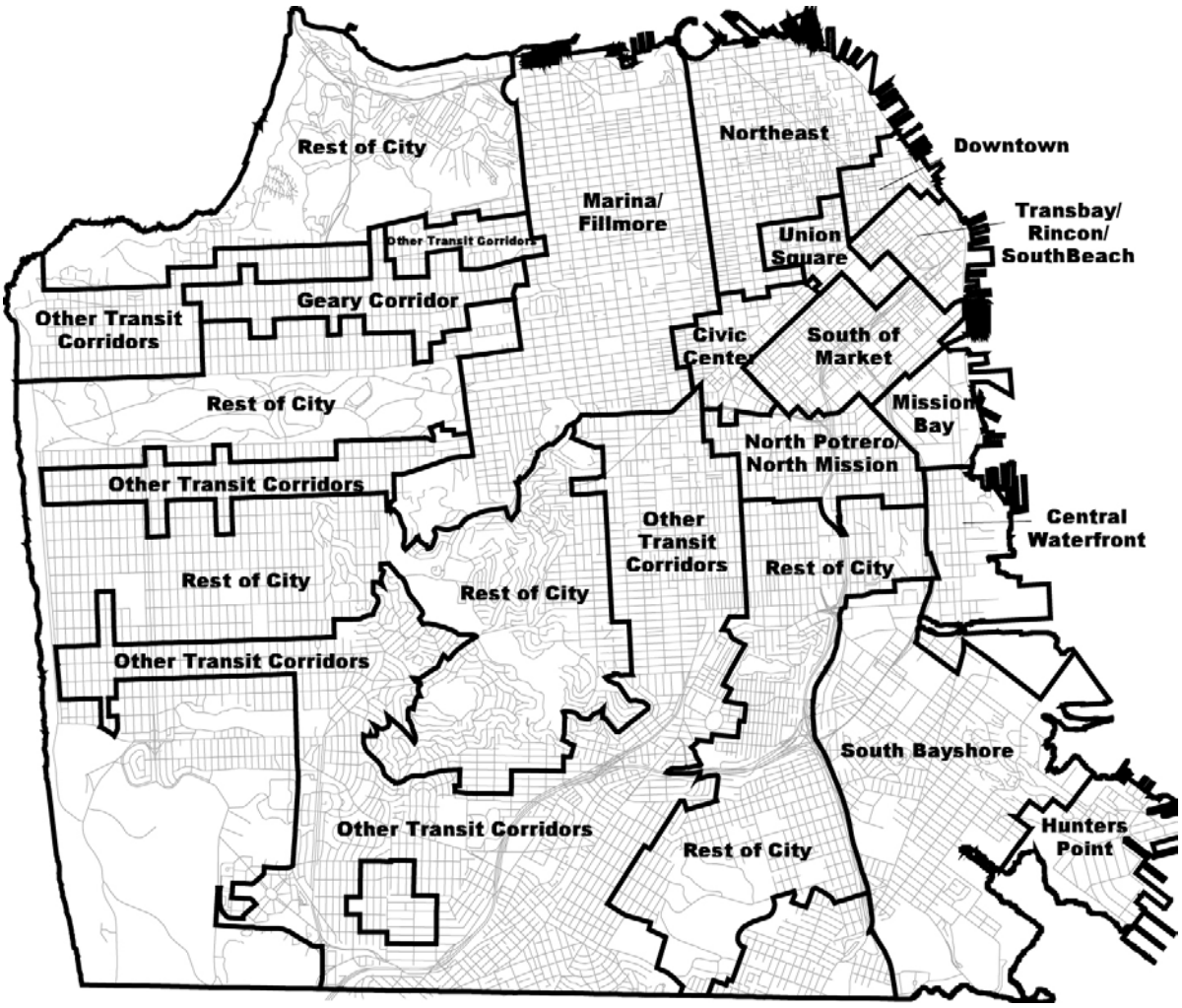
Location

The location of each parcel is identified by Assessor's block and lot number. The location is identified in three fields: **BLOCK**, **LOT**, and **BLKLOT**. The combined field (**BLKLOT**) can be considered the unique identifier for each record in the database. The database also includes a field for aggregating records by areas that are useful in local land use and economic analysis. The Planning Department divided San Francisco into 14 districts for the purposes of the 1998 Citywide Land Use Study. (See Figure 3) The components of the **DISTRICT** field are as follows:

- **Northeast**—area north of Downtown and east of the Van Ness Corridor, including Chinatown, Nob Hill, Polk Street, Northeast Waterfront, North Beach, Russian Hill, Telegraph Hill, and Fisherman's Wharf.
- **Downtown**—most areas of Downtown (C-3) zoning and adjacent Public Use (P) zoning, including the Golden Gateway/Embarcadero Center and Yerba Buena Center redevelopment project areas, the Hayes-Gough neighborhood commercial district, and the South Van Ness planning area. This district includes the Financial District (north of Market Street), Union Square, Yerba Buena Center area, and the Civic Center/South Van Ness Area.
- **Transbay/Rincon Hill/South Beach**—Transbay Concept Plan area (including Downtown Office—C-3-O—districts south of Market Street), Rincon Hill Plan area, and the Rincon Point/South Beach redevelopment project area.
- **South of Market**—remaining South of Market zoning districts.
- **Mission Bay**—proposed Mission Bay North and Mission Bay South redevelopment project areas.
- **North Potrero/North Mission**—areas of primarily light and heavy industrial (M-1 and M-2) zoning west of Mission Bay to the western boundary of the Northeast Mission Industrial Zone (NEMIZ), including North Potrero and Showplace Square.
- **Central Waterfront**—Central Waterfront plan area and adjacent industrially zoned parcels east to U.S. 101.
- **South Bayshore**—South Bayshore plan area, including Executive Park, and adjacent industrially-zoned parcels east to U.S. 101.
- **Hunters Point**—Hunters Point Shipyard Plan area.
- **Marina-Fillmore**—areas of non-residential zoning east of Civic Center and the Van Ness Corridor to the Presidio, Masonic Avenue, Stanyan, and Fourth Avenue, bounded on the north by the Bay and on the south by Clayton and Mt. Sutro.
- **Geary Corridor**—the Geary Boulevard neighborhood commercial district west of Masonic and including Clement Street.
- **Other Transit Corridors**—all other areas defined as transit corridors on the General Plan Map.

- **Rest of the City**—all other land area, primarily areas of existing residential development in the western parts of the City.

Figure 3: Map of Planning Districts



Land Use

There are two fields that describe the existing land use for each parcel: **USE_TYPE** and **NEWUSE**. **USE_TYPE** is the use code assigned by the Office of the Assessor. Assessor's office staff assign "land use class designations" to each lot. There are 49 Assessor's codes. For developed parcels, the codes generally reflect the type of building on the lot, not necessarily the use to which that building is being put. The codes also include designations for vacant land and open space. (For the detailed list, see Appendix A: Data Dictionary for "parcel.dbf"). For the 1998 Citywide Land Use Study, the Planning Department aggregated the 49 Assessor's classes to 14 summary categories more useful for analysis. Those summary categories are represented by the field **NEWUSE**. As is the case for the Assessor's land use classifications, the most appropriate interpretation of the summary categories is that they generally represent building type. A more complete classification by use (based on the economic activity taking place in the building) is possible using the business and employment database described below. The categories in **NEWUSE** are defined as follows:

- **INDUS**—industrial/warehouse
- **INST**—institutional/educational
- **MEDIC**—medical facilities
- **OFFICE**—office
- **OTHER**—other, including vacant and open space parcels
- **PKG**—parking
- **PORT**—property of the Port of San Francisco
- **R-COOP**—residential cooperatives and condominiums
- **R-HI**—residential apartments (higher density)
- **R-LO**—residential flats and dwellings (lower density)
- **R-LWORK**—residential live-work
- **R-SING**—residential single family
- **RETAIL**—retail/entertainment
- **VISIT**—visitor lodging

Parcel Size and Amount of Existing Development

The area of each parcel is presented in the **AREA** field. The number represents square footage of land area within the boundaries of the lot, whether the parcel is developed or undeveloped. The amount of existing development on each parcel is identified in **BLDG_SQFT**. There are estimates for both residential and non-residential buildings. This field is also expressed in terms of square footage of building area. Planning Department staff note that there are cases in which it appears that the estimate reflects the building floorplate

only, not the total square footage of multi-story buildings. A calculated field—**EXISTFAR** (for existing floor area ratio)—measures the ratio of existing building square footage to lot area for each parcel.

Residential Units

The **RES_UNITS** and **TYPE** fields provide information about residential units at the parcel level. These fields were created by the Planning Department based on several sources of information: Department of Building Inspection databases for counts of units in residential hotels (SRO units) and for counts of units in apartment buildings of 3 or more units; the Assessor's Office for counts of units on parcels with single family dwellings and flats prior to 1990; and, for changes to the housing stock since the 1990 Census, Planning Department records, the Department of Building Inspection, and the Department of Public Works. The sources for changes since 1990 are the same as those referred to by the Planning Department to create the annual *Housing Inventory Report*. (See additional discussion on page 10.) The **RES_UNITS** field for each parcel is the key component of the parcel database for this phase of the travel demand model development. The method for using this field to complete the base year estimate of housing units by TAZ is described later in the report.

Zoning

The parcel database also includes fields that describe existing zoning for each site. **ZONING** contains entries for 134 detailed zoning categories. The detailed categories are combined to 15 categories in the field **NEWZON** and further summarized into five categories in **ZONSIMPL**. (Appendix A Data Dictionary for "parcel.dbf" lists the categories for each field.) Other fields in the database can be used to calculate new development potential based on existing zoning: **ALLOWFAR** records the allowable floor area ratio for each parcel and **HEIGHT_LIM** records the allowable height limit.

Table 1: Key Parameters of Parcel.dbf

	Number of Records	Total Units
Complete database	152,535	329,220
Records without block and lot locator	0	0
Records with entry for RES_UNITS	136,618	329,220
Single record representing the most units	1	827
Records where RES_UNITS = 100 or more	168	31,342
Number of records where RES_UNITS = 1	94,995	94,995

Source: Hausrath Economics Group based on a database provided by the San Francisco Planning Department representing land use at the parcel level in San Francisco in 1998.

The complete database contains records for 152,535 parcels in San Francisco. All records have a unique block and lot locator. Of the total, 90% of the records represent parcels with residential units.[1] Those 136,618 parcels account for 329,220 residential units in San Francisco as of mid-year 1998. The residential parcels range in size from one unit to over 800 units. Less than one percent of the parcels (168 parcels) account for 10% of the total units—there are 31,342 units on parcels with 100 or more units. Almost 30% of the units (94,995 units) are on parcels with only one unit.

Additional sources, discussed in the following paragraphs, also provide estimates of San Francisco's housing stock. The total unit counts in these other sources are generally higher than the total reflected in the parcel database. For all sources, the totals differ by only about two percent overall, however.

The San Francisco Planning Department publishes an annual *Housing Inventory Report* that monitors changes in the City's housing stock. The 1998 *Housing Inventory Report* (published in June 1999) counts a total of 336,730 units in the City as of December 31, 1998 This estimate is greater than the total units represented in the parcel database by about 7,500 units.

Although the source of both the *Housing Inventory* and parcel database counts is the Planning Department, there are reasons why the totals differ. The *Housing Inventory Report* presents City totals and totals at the "planning district level". (Planning districts in this case are aggregations of census tracts.) The total unit count in the *Housing Inventory Report* starts with the 1990 Census and tracks changes at the census tract or planning district level. The sources of information on changes in the housing stock since the 1990 Census include the Planning Department, the Department of Building Inspection, and the Department of Public Works. Therefore, while the source for changes in the housing stock match, the sources for the prior base of existing residential units is not the same. Because the *Housing Inventory Report* is not required to reflect detail at the parcel level, it relies on the 1990 Census unit count at the census tract level. The parcel database relies on a variety of different sources for the prior base of existing development (described above).

The California Department of Finance (DOF) estimate of total housing units in San Francisco as of January 1, 1998 is also larger than the parcel database count. DOF shows a total of 336,264 units in San Francisco—about 7,000 more than the total in the parcel database. The DOF estimate for January 1, 1999 (reflecting changes in the housing stock through 1998) shows 337,983 total housing units in the City—an increase of about 1,700 units in one year and an even greater difference from the parcel database count reflecting conditions as of June 1998.

The methodology for using the parcel database to develop 1998 base year estimates of households, household population, and employed residents by TAZ is presented later in this

[1] Comparison with the business and employment database (described in the next section) indicates that 25,765 parcels (17% of all the parcels represented in the parcel database) are occupied by some form of business activity.

report, following the descriptions of the business and employment database, the pipeline list of future development, and *Projections '98* data.

Business and Employment Database

Information about existing conditions for businesses and employment in San Francisco is provided in the **business.dbf** database. The data available describe employment and space use by economic activity and location. The primary source of the data is a Dun & Bradstreet database purchased by the San Francisco Planning Department in 1998.[2] The database reflects results of information collected by Dun & Bradstreet in 1997. Their sources include interviews, mail and telephone surveys of establishments, public records, bank records, and other third-party and government sources. Most of the data included in **business.dbf** is based on establishment-level information reported to Dun & Bradstreet by establishment for each business location.

Database Fields Defined

Establishments

Each establishment in **business.dbf** has a unique identifier. The field name is **DCP_ID**.

Establishment Location

The location of each establishment is identified by Assessor's block and lot number. The location is identified in three fields: **BLOCK**, **LOT**, and **BLKLOT**. The Planning Department matched the original Dun & Bradstreet street address identifier for each establishment with an Assessor's block and lot identifier to assign this location field to the establishment and employment database. The database also includes the **DISTRICT** field (the same as that defined above for the **parcel.dbf**) for aggregating records by areas that are useful in local economic analysis.

Business Type/Type of Economic Activity

The database has five fields identifying the type of business establishment at various levels of detail. The field **SIC5** represents the Standard Industrial Classification (SIC) for the business.

[2] The Planning Department's complete database "**business.dbf**" also includes information from the San Francisco Tax Collector (Business Tax Division). Fields that would not be useful to transportation analysis were not included in the database for the model development, and other information from the Tax Collector is either not as detailed or as reliable as the Dun & Bradstreet source material. The Tax Collector data does not include estimates of space use and does not categorize establishments by Standard Industrial Classification code.

The original source of this data is the Dun & Bradstreet 1997 survey. After some manipulation by the Planning Department, 115 SIC codes were selected to represent the most detailed description of business type. (For the detailed list, see Appendix B: Data Dictionary for "business.dbf"). Most of the SIC codes are at the two-digit level. In the wholesale trade and services sectors, three- and, sometimes, four-digit SIC codes are used to provide more detail.

The field **CODE** represents an aggregation of the detailed SIC codes defined in **SIC5**. There are 32 categories in **CODE** (see Appendix B Data Dictionary for "business.dbf"). SIC's have been summarized generally at the two-digit level; more detail is used to classify separately amusement and recreation services, motion picture production and distribution, health services, and wholesale trade.

CODESUM is **CODE** rolled up to the one-digit-SIC level. There are nine categories (see Appendix B Data Dictionary for "business.dbf"). This field represents the most summary level of economic analysis using the SIC code system to identify business type.

SECTOR may be the most useful field for identifying business type. This field combines SIC and location information to provide a better representation of the type of economic activity and employment actually carried out at an establishment. For example, **SECTOR** identifies manufacturing and transportation companies located in downtown San Francisco as "Management/Information Processing", i.e., office establishments.

SECTOR, defined for the Planning Department's 1998 Citywide Land Use Study, classifies groups of businesses with similar functions, job types, and space use characteristics. Six categories were defined by combining SIC code and location factors. The location factors reflect predominant building types, thereby capturing relatively well-established functional distinctions that the SIC system alone does not capture adequately for the purposes of land use and economic analysis. The categories also are more directly related to zoning districts and to land use designations regulated by the City's General Plan and Planning Code.

The economic activities identified in the **SECTOR** field are defined as follows:

- **Management, Information, and Professional Services (MIPS)--**finance, insurance, and real estate (FIRE), business, legal, and professional services, and public administration throughout the City; plus construction, transportation, communications, and utilities, agriculture, mining, manufacturing, wholesale trade, and motion picture production, distribution, and services in the Downtown area (defined to include the Financial District, Union Square/Yerba Buena, Civic Center), and adjacent districts—Transbay/Rincon Hill/South Beach (south of downtown) and Northeast (north of downtown).
- **Production/Distribution/Repair (PDR)—**automobile and other repair services throughout the City, plus construction, transportation, communications, and utilities, agriculture, mining, manufacturing, wholesale trade, and motion picture production, distribution, and services in all parts of the City outside the Downtown, Transbay, and Northeast districts.
- **Retail/Entertainment (RETAIL/ENT)—**retail trade, amusement and recreation services, and personal services throughout the City.

- **Visitor Lodging (VISITOR)—**hotels and other lodging throughout the City.
- **Cultural/Institutional/Educational Services (CIE)—**educational services, social services, museums and zoos, membership organizations, and private household services throughout the City.
- **Medical and Health Services (MED)—**health services offices and hospitals and laboratories throughout the City.

An additional field for establishments counted in the Dun & Bradstreet database provides another level of detail regarding business type. The **LOB** field (line of business) describes specific products manufactured or specific activities performed by a business.

Characteristics of Businesses

There are two fields in **business.dbf** that describe the size of business establishments in San Francisco. The field **EMPL_HERE** is a count of the number of employees at the establishment location (identified by block and lot). The field **USER_AREA** is an estimate of the square footage of space used by the establishment at that location. **EMPL_HERE** will provide a basis for estimating 1998 employment by TAZ (see discussion below). In addition, employment density factors (gross square feet of space per employee) created from **USER_AREA** and **EMPL_HERE** may be used to translate amounts of future development to estimates of future employment by economic activity and TAZ. Employment density factors would be created for various business activity groups, such as those defined in **SECTOR**.

Table 3: Key parameters of business.dbf.

	Number of Records	Total Jobs
Complete database	65,999	617,862
Records without block and lot locator	1,664	39,292
Records with block and lot locator	64,335	578,570
Records with block and lot locator and sector entry	63,445	578,564
Records with valid block and lot locator and sector entry	63,416	578,515
Single record representing the most employment	1	14,500
Records where EMPL_HERE = 1,000 or more	59	151,459
Number of records where EMPL_HERE = 0	18,441	na

Source: *Hausrath Economics Group based on a database provided by the San Francisco Planning Department representing characteristics of establishments and employment in San Francisco in 1997.*

There are about 66,000 records in the complete database, representing about 617,000 jobs. Just over two percent (2.5%) of those records do not have an entry in the block and lot field; therefore, no location can be assigned to these records.[3] Records without a location identifier are not useful in the TAZ allocation. Another 890 records have a location identifier but no entries in the SIC and sector fields. All but one of these records represent "0" employees. Records without an indicator of business type are also not useful in model development. Subsequent analysis to prepare the correspondence to TAZ revealed 29 records (representing 49 jobs) for which the block and lot locator could not be matched to a TAZ. These records without a valid block and lot locator and TAZ correspondence are also not useful.

After filtering out records without valid location and sector entries, the useful database consists of 63,416 records, representing 578,515 jobs. The record representing the single largest number of employees accounts for 14,500 jobs.[4] There are 50 records where employment is 1,000 or greater. These records represent 151,459 jobs in total (just over 25% of the total employment represented by the useful database records). The average number of

[3] At least one of these records appears to represent employment located outside the physical boundaries of San Francisco. The record ranked second in terms of number of employees (with 12,000 jobs) is coded as SIC 45 (Air Transportation) and appears to be related to the San Francisco Airport. This could represent City and County of San Francisco employees who work at airport, as well as airline, concessionaire, and freight transportation employment.

[4] Based on the block and lot fields, this record represents the University of California at San Francisco, Parnassus Heights Campus.

employees per record for this 1,000 + subgroup is about 2,570. About 30% of the useful records show no employment at the establishment.

The database count of San Francisco employment (578,515 in the database that has useful location and sector fields) compares reasonably well with estimates of total San Francisco employment prepared by government agencies. The State of California Employment Development Department (EDD) estimates total wage and salary employment in San Francisco in 1997 at 550,800 jobs. This estimate, based on unemployment insurance records submitted by employers, does not include self-employed workers. The U.S. Department of Commerce Bureau of Economic Analysis (BEA) estimates total employment in San Francisco in 1997, including self-employed workers at over 15% of the total, to be 720,971. This estimate is substantially greater than the EDD estimate. The BEA estimate of wage and salary workers in San Francisco is about 52,000 greater than the comparable EDD estimate of wage and salary workers. Most local economic analysis of employment in San Francisco is based on EDD estimates, adjusting for self employed workers. The Association of Bay Area Government's (ABAG) estimate of employment in San Francisco (about 555,000 in 1997) is also closer to the EDD estimate.[5] (See the discussion below about using the database to estimate 1998 base year employment by traffic analysis zone.)

Coverage of government employment is often questioned in Dun & Bradstreet and similar databases. Government employment appears in several categories in the business and employment database. Government employment appears in the **SIC5** field in SIC's 91 – 97 (public administration), in SIC 82 (educational services), in SIC 83 (social services), in SIC 43 (U.S. Postal Services), in SIC 41 (local transit) and in various elements of SIC 80 (health services). The following table summarizes information from the database for most of those SIC categories.

[5] Total San Francisco employment 1997 is estimated from ABAG *Projections '98* using the 1995 estimate (534,610 jobs) and the 2000 projection (586,950 jobs). The 1997 estimate reflects a two-year increase of the 1995 total at the 1995 – 2000 compound annual growth rate.

Table 4: Government Employment Counted in the Business and Employment Database

Records with BlockLot ID	Number of Records	Total Jobs	Max Jobs	Sector
SIC 97 Public Administration	299	29,688	8,500	MIPS
SIC 82 Education Services	724	36,175	14,500	CIE
SIC 83 Social Services	1,132	11,657	500	CIE
SIC 43 USPS	22	6,994	4,800	PDR/MIPS
SIC 41 Local Transit	146	6,239	3,784	PDR/MIPS
TOTAL	2,323	90,753		

Note: Not all of the employment in the education and social services categories is government employment, but the majority of it is likely to be state or local government employment. Some of the largest employers in the City fall into this SIC category, e.g., the San Francisco Unified School District and the University of California at San Francisco. In addition, some of the employment in the health services SIC, such as that at the VA Medical Center, would also be counted as government employment.

Source: *Hausrath Economics Group based on a database provided by the San Francisco Planning Department representing characteristics of establishments and employment in San Francisco in 1997.*

The database does not exclude government employment. There are over 90,000 jobs represented in the database in those SIC's where most, if not all, of the employment is government employment. Some of the largest single establishments (i.e., represented by single records) are counted here. For the purposes of citywide economic analysis, the various types of government employment are categorized again in the **SECTOR** field (defined above). Government jobs in public administration appear in the Management, Information, and Professional Services sector. Government jobs in education and social services appear in the Cultural, Institutional, and Educational sector. Jobs in health care services appear in the Medical and Health Services sector. Most of the U.S. Postal Service jobs and local transit jobs appear in the Production, Distribution, and Repair sector.

Pipeline Lists of Development Projects and Major Area Plans

The San Francisco Planning Department maintains a case tracking data base. This will be the primary source of data describing the pipeline of development projects under construction, approved, or under review. Relevant project information includes:

- location (either address or block/lot),

- project description (amount and type of development)
- project status (under construction, approved but not under construction, under review)

Similar information for development projects on Port of San Francisco property will supplement this list.

For non-residential projects, the Planning Department provided information from the case tracking database for projects greater than 20,000 gross square feet. For residential projects, the Department provided data already compiled by staff for the 1998 *Housing Inventory Report*. The data summarized in the Housing Inventory Report include: residential projects with 10 or more units that are approved or under Planning Department review; residential projects with five or more units authorized for construction by the Department of Building Inspection; and live-work projects approved, with permits issued, or under construction.

For the purposes of assembling this database the pipeline was defined as projects under review, approved, or under construction as of January 1, 1999. All other projects will be considered in the 1998 base.

In addition to the pipeline of development projects, much of the future growth in San Francisco is anticipated to occur in areas that have been the subject of major planning efforts in recent years. These areas include: Mission Bay, Hunter's Point Shipyard, the Transbay area, and the Presidio. Information from existing planning documents and relevant background analyses to was used to summarize this future development potential and allocate the development potential to traffic analysis zones.

Projections '98

Projections '98, prepared by the Association of Bay Area Governments (ABAG), is available at the census tract level. There are 150 census tracts in San Francisco. *Projections '98* at the census tract level includes estimates and projections for the years 1990 (reflecting 1990 Census data), 1995, 2000, 2005, 2010, 2015, and 2020. The variables included for each census tract are:

- Total population,
- Household population,
- Employed residents,
- Households,
- Employment by sector (Agriculture & Mining, Manufacturing, Wholesale Trade, Retail Trade, Services, and Other),
- Mean household income,
- Population projections by five age groups (under 5, 5-19-, 20-44, 45-64, and 65+).

In ABAG's *Projections '98*, employment (or total jobs) by place of work includes full- and part-time employment. Total jobs in 1990 are defined as wage and salary employment as well as

self-employed workers. In the projection years, total jobs are estimated assuming a constant ratio between self-employed workers and wage and salary workers.

- Employment by sector is defined according to major SIC groups—generally at the two-digit level of detail:
- Agriculture & Mining includes SIC codes 1-9 and 10-14 (excluding 074—veterinarians);
- Manufacturing includes SIC codes 20 – 39;
- Wholesale Trade includes SIC codes 50 – 51;
- Retail Trade includes SIC codes 52 – 59,
- Services includes SIC codes 70 – 89, plus 074;
- and Other includes SIC codes 15 – 17 (construction), 40 – 49 (transportation, communication, and utilities), 60 – 67 (finance, insurance, and real estate), and 91 – 97 (government).

MTC consistency requirements charge that the San Francisco travel demand model match ABAG projections for total San Francisco population and employment in the base year and each of the forecast years. San Francisco totals for key variables (based on summaries of the ABAG census tract series) are presented in Table 5**.** *Projections '98* at the census tract level was useful for several model development procedures.

Table 5: San Francisco County Projections

	Households	Household Population	Total Population	Employed Residents	Mean Household Income**	Total Jobs
1990	305,584	699,330	723,959	391,277	$56,599	566,648
1995	309,620	728,700	751,708	379,787	$59,600	534,610
2000	317,970	763,100	785,888	403,637	$66,900	586,928
2005	324,270	771,800	794,690	427,894	$72,500	613,646
2010	331,290	783,200	806,203	455,600	$78,800	638,488
2015	334,930	778,300	801,393	463,096	$84,300	663,894
2020	337,340	770,200	793,399	473,010	$89,300	679,654

*** Citywide total from ABAG, Projections '98, published December 1997. Income is expressed in constant 1995 dollars.*

Source: Association of Bay Area Governments, Projections '98 (census tract series for San Francisco), summarized by Hausrath Economics Group.

Estimating 1998 Residential and Non-Residential Model Inputs

The methodology for using the databases in combination with *Projections '98* and other data sources to prepare the household and employment travel model inputs at the traffic zone level of detail are presented below. After completing the steps as outlined, the estimates were evaluated at more aggregate levels to ensure their reasonableness. For example, the household and employment estimates by district and employment by sector were summarized in order to enable comparison to other estimates, such as those developed for the Planning Department's 1998 Citywide Land Use Study and the April 1998 Cumulative Growth Study prepared for the San Francisco Redevelopment Agency. The housing unit estimate was also summarized for comparison with the planning area detail presented in the 1998 *Housing Inventory Report*.

Socioeconomic Data by Traffic Analysis Zone

The steps used to produce 1998 estimates of households, household population, and employed residents for each TAZ in San Francisco were as follows:

- Determine the 1998 control total for total households in San Francisco using ABAG *Projections '98* and DOF estimates, as relevant.
- Use the GIS to aggregate the parcel database by TAZ.
- Calculate the percentage distribution of units by TAZ.
- Distribute 1998 total households to TAZ based on the distribution of units by TAZ from the parcel database. This step makes the assumption that residential vacancy rates are uniform across TAZs. While this is not the case, it is a necessary simplifying assumption for this phase of model development, in the absence of more detailed current vacancy rate information.

Result: 1998 Households by Traffic Analysis Zone

- Establish a correspondence between census tract and TAZ.
- Calculate persons-per-household and employed residents-per-household factors for each census tract from *Projections '98*. Interpolate the 1998 factor based on three years of the annual compound rate of change from 1995 to 2000 for each tract.
- Multiply the persons-per-household and employed residents-per-household factors for each census tract by the household estimates for TAZs within each census tract.

Result: 1998 Household Population and 1998 Employed Residents by TAZ.

The following steps produced 1998 estimates of employment by sector for each San Francisco TAZ:

- Determine the 1998 control total for total employment in San Francisco using ABAG *Projections '98*, as well as EDD and BEA estimates, as relevant.

- Use the GIS to aggregate the business and employment database by TAZ.
- Calculate the percentage distribution of total employment by TAZ.
- Distribute 1998 total employment to TAZ based on the distribution of total employment by TAZ calculated from the database.

Result: 1998 Total Employment by TAZ.

- For each TAZ, calculate the percentage distribution of total employment by sector (using the six categories in the **SECTOR** field, described above) from the data in the business and employment database.
- Distribute 1998 total employment by TAZ to employment by sector by TAZ based on the distribution by sector calculated from the database.

Result: 1998 Employment by Sector by TAZ.

Estimating Residential and Non-Residential Model Inputs for future years

The methodology used to generate the future year model inputs was more iterative. Key components of the approach are outlined below.

- Control to ABAG *Projections '98* estimates of total population and employment in San Francisco for 2000, 2005, 2010, 2015, and 2020.
- Use the pipeline lists of major development projects aggregated to TAZ and the summaries of remaining development potential in major area plans disaggregated to TAZ to begin the allocation of growth at the TAZ level.
- Use project status as a guide to determining the timing for growth by TAZ.
- Convert new residential units to households, assuming a vacancy rate factor and add to existing households by TAZ.
- Use persons-per-household and employed residents-per-household factors for each projection year as reported in the *Projections '98* census tract series to generate household population and employed residents by TAZ for each projection year. Apply the census tract factors to total households in each TAZ.
- Convert new non-residential development by TAZ to employment by sector using employment density factors (from analysis of the business database and other factors used in transportation and planning analyses in San Francisco). Add to existing employment by sector by TAZ.
- Evaluate preliminary totals against ABAG control totals for each projection year. Adjust TAZ projections as necessary.
- Evaluate projections by summarizing TAZ level projections to the planning district level (aggregations of census tracts).

Travel Demand Data

Stated Preference Survey

The stated preference survey (SP) was conducted for 609 households in San Francisco in June 1999 to collect data on transit and auto travel characteristics. The primary focus of the survey was to collect preference data on transit reliability, crowding and personal security and auto parking availability and cost. The survey was conducted by Corey, Canapary and Galanis and the design of the survey was completed by Mark Bradley Research and Consulting, with other members of the Cambridge Systematics team.

The purpose of the survey was to provide data that could be incorporated into the mode choice model estimation process, in the areas of transit reliability, crowding and personal security and auto availability and cost. The analysis of these data was conducted as part of the mode choice model process. Appendix C of this report includes cross-tabulations of the data collected for the stated preference survey.

Stated Preference Survey Results

Crosstabulations of the results of all survey questions are presented in Appendix C. Results were reviewed and found to be logical and complete. SP surveys data were used for both development of the parking data and analysis of specific tradeoff questions for use in mode choice and trip assignment models.

MTC Survey

The following sections describe procedures for forming tours from the 1990 MTC survey trip data.

Data screening

The main unit of analysis for tour generation is a person-day. From the trip diary data, a person-day is included for analysis if the following criteria are met:

- The origin of the first trip record for the day is at home.
- The destination for the final trip of the day is at home.
- The departure and arrival times for all trips across the day are in ascending order.
- The origin purpose and location for each trip are the same as the destination purpose and location of the previous trip (i.e. no missing trips).
- Also accepted are person-days with a single trip record with trip number 0. This indicates a valid observation of no trips made during the diary day.

Forming tours from trips

The following procedure was used:

- Identify the primary workplace: If there is more than one work trip (destination purpose code 2 or 3), the primary work location is defined as the one that is visited most often during the day. If there is a tie according to the number of visits, it is determined according to the duration of time spent at each location across the day.
- If a work location is visited, identify the first and last trips during the day to and from the primary work location. These define the work arrival and departure times for the primary home-based work tour. The last trip leaving home before reaching the primary work location defines the start of the primary work tour, and the first trip reaching home after leaving the primary work location defines the end of the primary work tour. Any trips made between first arrival at the work location and last departure from the work location will define one or more work-based tours. These trips could include trips back to home (i.e. to go home for lunch).
- Divide any remaining trips before and/or after the primary work tour (this includes all trips if no work tour is made) into home-based tours. A new tour begins when the origin purpose is home, and a tour ends when the destination purpose at home.
- Determine the primary destinations of all home-based and work-based tours by comparing the destination purpose of any trips made during the tour. The proposed priority scheme is shown below. The trip with the lowest priority number is designated as the primary destination. If there are two or more destinations with the same priority, then the one with the longest duration of stay is the primary one.

Table 6: MTC Survey Trip Purpose Codes

Priority	Category	Purpose codes
1	Work	2-Work, 3-Work-related
2	Education	11-Education
3	Shop/other	4-Personal business, 5-Medical/dental, 7-Eat meal, 9-Grocery shopping, 10-Non-food shopping, 16,17-Others
4	Social/recreation	6-Visiting, 8-Recreation
5	Serve passenger	12-Child care, 13-Serve adult passenger, 14-Serve child passenger
6	Change mode	15-Change travel mode

- Determine the intermediate stops between home/work and the primary destination of each tour. Any trip destination is counted as an intermediate stop unless the purpose is "change travel mode" (15).
- Accumulate the travel time spent in each type of mode during each tour. The modes are grouped by type as below. (Drive and passenger times are also split according to 1, 2 or 3+ vehicle occupants.) The main mode is determined as the mode with the lowest priority number that is used during the trip (i.e. walk is only the main mode if no other modes are used). If two modes in the same category are used, the main mode is designated as the one in which the longest time is spent. Main modes for each of the two half-tours (to and from the primary destination) are also determined separately in the same way.

Table 7: MTC Survey Mode Codes

Priority	Category	Purpose codes
1	Other	13-Dial-a-ride passenger, 17-Airplane, 24-Other
2	School bus	9-School bus passenger
3	Ferry	18-Ferry passenger
4	Other rail	15-CalTrain passenger, 16-Amtrak
5	BART	14-BART passenger
6	Street-/cable car	11-Streetcar passenger, 10-Cable Car passenger
7	Public bus	8-Public bus passenger
8	Taxi/shuttlebus	7-Taxi, limo passenger, 12-Shuttlebus passenger
9	Driver	1-Auto driver, 3-Truck driver, 5-Van driver, 19-Motorcycle driver
10	Passenger	2-Auto passenger, 4-Truck passenger, 6-Van passenger, 20-Motorcycle passenger
11	Cycle	22-Bicycle, 21-Moped
12	Walk	23-Walk

NOTE: The tour formation program uses census tract/block group information to locate the zones, and census block information is missing for many cases. While the geocoding was being reviewed and revised, many of the census tract/block numbers could only be determined within a range. So, the files identified here contain both low and high bounds for all census tract/block variables. In cases where those are the same, the CTAZ is uniquely determined.

Create a person-day data file

This file was used as the basis for tour generation and vehicle ownership modeling. Residence land use data can be appended to this file using the MTC TAZ and CTAZ zone numbers. There is a record for each person-day, but each contains all relevant household information. For household-level modeling (e.g. car ownership) only the first record from each household should be used.

Create a tour data file

This file was used as the basis for tour type, time of day, destination choice and mode choice modeling. There is a record for each tour.

Results

There are five tables below. The first shows the correspondence between tour type and primary destination purpose for the entire single-day and multi-day samples from all counties. There are 26,236 tours in total. About 40% are home-based work tours and a further 10% are work-based tours, giving the typical result that about half of all trips are related to work tours.

The second table gives the breakdown by main mode within each tour type. Car driver and passenger make up about 80% of the tours, walk and cycle about 10%, and all of the various transit modes together about 10%.

The third table shows the breakdown by "PA type". RS denotes SF county residents, while NR denotes residents of other counties. I-I denotes tours with both the production and attraction ends in SF County, I-X denotes tours produced in SF County and attracted elsewhere, etc. In total, about 11% of tours are produced by SF residents, and about 85% of those are I-I tours. The only tour type with an appreciable fraction of I-X tours by SF residents is home-based work – about 25% of work tours are to destinations outside SF County. Note that there are more I-I work-based tours made by non-residents than by SF residents.

Tables 4 and 5 are the same as 1 and 2, but only include the 2,973 I-I and I-X tours made by SF residents. Now, car driver and passenger make up only about 50% of the tours, walk and cycle almost 20%, public bus over 20% and the other transit modes together about 30%.

From other data in the file, it is possible to determine whether car passenger or driver is used as an access mode to transit. Overall, over 25% of transit trips are park and ride and another 15% are "kiss and ride", but for SF residents the fractions are only about 5% park and ride and 15% kiss and ride.

For tours within San Francisco, travel analysis zone numbers were initially uniquely identified for about 80% of tour origins but only about 30% of tour destinations. This was brought up to higher percentages after the further geocoding.

Table 8: PDPURP Primary dest. purpose (rows) by PDTYPE Primary dest. purpose type (columns)

	Work	Education	Shop/other	Visit/rec	Serve pass	Work-based	Total
Home						208	208
						7.8	0.8
Work	9232					128	9360
	90.8					4.8	35.7
Work-Related	939					627	1566
	9.2					23.6	6
Personal Business			2224			249	2473
			31			9.4	9.4
Medical			620			39	659
			8.6			1.5	2.5
Visiting				563		14	577
				27.7		0.5	2.2
Eat Meal			1068			1072	2140
			14.9			40.3	8.2
Recreation				1469		59	1528
				72.3		2.2	5.8
Grocery Shop			1456			60	1516
			20.3			2.3	5.8
Non-Food Shop			1391			109	1500
			19.4			4.1	5.7
Education		2793				11	2804
		100				0.4	10.7
Child Care					144	3	147
					10.2	0.1	0.6
Serve Adult Pass					416	12	428
					29.6	0.5	1.6
Serve Child Pass					845	34	879
					60.1	1.3	3.4
Change Travel Mode						5	5
						0.2	0
Other			360			29	389
			5			1.1	1.5
Other			57				57
			0.8				0.2
Column	10171	2793	7176	2032	1405	2659	26236
Total	38.8	10.6	27.4	7.7	5.4	10.1	100

Table 9: MMODE Main mode for tour (column) by PDTYPE Primary dest. purpose type (row)

	Work	Education	Shop/other	Visit/rec	Serve pass	Work-base	Total
Auto Driver	7,862	687	4,975	1,083	1,187	1,778	17,572
	77.3	24.6	69.3	53.3	84.5	66.9	67.0
Auto Passenger	534	943	1,244	437	116	116	3,390
	5.3	33.8	17.3	21.5	8.3	4.4	12.9
Truck Driver	47	2	20	5	2	35	111
	0.5	0.1	0.3	0.2	0.1	1.3	0.4
Truck Passenger	3		5	2		1	11
	0.0		0.1	0.1		0.0	0.0
Van Driver	24	3	13	1	7	12	60
	0.2	0.1	0.2	0.0	0.5	0.5	0.2
Van Passenger	14	15	7	1		6	43
	0.1	0.5	0.1	0.0		0.2	0.2
Taxi, Limo Passe	3		10	7		3	23
	0.0		0.1	0.3		0.1	0.1
Public Bus Passe	582	306	201	40	6	30	1,165
	5.7	11.0	2.8	2.0	0.4	1.1	4.4
School Bus Passe	7	274	3	3	3	4	294
	0.1	9.8	0.0	0.1	0.2	0.2	1.1
Cable Car Passen	9		7			2	18
	0.1		0.1			0.1	0.1
Streetcar Passen	89	23	10	2		5	129
	0.9	0.8	0.1	0.1		0.2	0.5
Shuttle Bus Pass	25	11	1		3	14	54
	0.2	0.4	0.0		0.2	0.5	0.2
BART Passenger	531	49	62	12		10	664
	5.2	1.8	0.9	0.6		0.4	2.5
CalTrain Passeng	10						10
	0.1						0.0
AMTRAK Pass	4		1				5
	0.0		0.0				0.0
Ferry Passenger	27	1	1				29
	0.3	0.0	0.0				0.1
Motorcycle Drive	33	7	14	10		2	66
	0.3	0.3	0.2	0.5		0.1	0.3
Motorcycle Passe	3			1		1	5
	0.0			0.0		0.0	0.0
Moped	7	4	2	3			16
	0.1	0.1	0.0	0.1			0.1
Bicycle	100	124	59	84	1	20	388
	1.0	4.4	0.8	4.1	0.1	0.8	1.5
Walk	227	342	530	326	77	601	2,103
	2.2	12.2	7.4	16.0	5.5	22.6	8.0
Other	30	2	11	15	3	22	80
	0.3	0.1	0.1	0.7	0.2	0.7	0.3
Column	10,171	2,793	7,176	2,032	1,405	2,659	26,236

Table 10: PATYPE Production-attraction type (column) by PDTYPE Primary dest. Purpose (row)

	Work	Education	Shop/other	Visit/rec	Serve pass	Work base	Total
RS-I-I	1,014	338	697	185	83	211	2,528
	10	12.1	9.7	9.1	5.9	7.9	9.6
RS-I-X	309	24	73	22	7	10	445
	3	0.9	1	1.1	0.5	0.4	1.7
RS-X-I						9	9
						0.3	0
RS-X-X						57	57
						2.1	0.2
NR-I-I						271	271
						10.2	1
NR-I-X						17	17
						0.6	0.1
NR-X-I	988	46	130	63	25	27	1,279
	9.7	1.6	1.8	3.1	1.8	1	4.9
NR-X-X	7,860	2,385	6,276	1,762	1,290	2,057	21,630
	77.3	85.4	87.5	86.7	91.8	77.4	82.4
Column Total	10,171	2,793	7,176	2,032	1,405	2,659	26,236
	38.8	10.6	27.4	7.7	5.4	10.1	100

Table 11: PDPURP Primary dest. purpose (column) by
PDTYPE Primary dest. purpose type - SF residents only

	Work	Education	Shop/other	Visit/rec	Serve pass	Work base	Total
Home						16	16
						7.2	0.5
Work	1,234					13	1,247
	93.3					5.9	41.9
Work-Related	89					37	126
	6.7					16.7	4.2
Personal Business			255			20	275
			33.1			9	9.2
Medical/Dental			72			3	75
			9.4			1.4	2.5
Visiting				47			47
				22.7			1.6
Eat Meal			126			100	226
			16.4			45.2	7.6
Recreation				160		8	168
				77.3		3.6	5.7
Grocery Shop			168			5	173
			21.8			2.3	5.8
Non-Food Shop			132			17	149
			17.1			7.7	5
Education		362					362
		100					12.2
Child Care					11		11
					12.2		0.4
Serve Adult Pass					52	2	54
					57.8	0.9	1.8
Serve Child Pass					27		27
					30		0.9
Other			14				14
			1.8				0.5
Other			3				3
			0.4				0.1
Total	1,323	362	770	207	90	221	2,973
	44.5	12.2	25.9	7	3	7.4	100

Table 12: MMODE Main mode for tour (column) by PDTYPE Primary dest. purpose type (row) - SF residents only

	Work	Education	Shop/other	Visit/rec	Serve Pass	Work-based	Total
Auto Driver	651	57	338	87	72	61	1,266
	49.2	15.7	43.9	42	80	27.6	42.6
Auto Passenger	59	37	106	25	6	7	240
	4.5	10.2	13.8	12.1	6.7	3.2	8.1
Truck Driver	1					3	4
	0.1					1.4	0.1
Van Driver	1						1
	0.1						0
Van Passenger	1		4	1		1	7
	0.1		0.5	0.5		0.5	0.2
Taxi, Limo Passe	2		5	7			14
	0.2		0.6	3.4			0.5
Public Bus Passe	317	155	123	23	2	18	638
	24	42.8	16	11.1	2.2	8.1	21.5
School Bus Passe	1	20	1		1	1	24
	0.1	5.5	0.1		1.1	0.5	0.8
Cable Car Pas	8		4			2	14
	0.6		0.5			0.9	0.5
Streetcar Pass	78	22	10	2		1	113
	5.9	6.1	1.3	1		0.5	3.8
Shuttle Bus Pass	4	4					8
	0.3	1.1					0.3
BART Pass	92	13	10	3		5	123
	7	3.6	1.3	1.4		2.3	4.1
CalTrain Pass	1						1
	0.1						0
AMTRAK Pass			1				1
			0.1				0
Ferry Pass			1				1
			0.1				0
Motorcycle	7	1	4	2		1	15
	0.5	0.3	0.5	1		0.5	0.5
Moped	3			1			4
	0.2			0.5			0.1
Bicycle	11	1	4	1		6	23
	0.8	0.3	0.5	0.5		2.7	0.8
Walk	85	52	158	54	9	115	473
	6.4	14.4	20.5	26.1	10	52	15.9
Other	1		1	1			3
	0.1		0.1	0.5			0.1
Column	1,323	362	770	207	90	221	2,973
Total	44.5	12.2	25.9	7	3	7.4	100

Network Data

Highway Networks

There are three highway networks used to support the five time periods in the SF model. The AM, midday and PM networks are all specific to these time periods, including differences in lanes and time-based delays on bridges. The early AM, midday and evening networks are identical, since the lanes and time-based bridge delays do not vary for these time periods. Changes in lanes by time of day were derived from GIS-based coverages developed by the San Francisco County Transportation Authority showing the locations and duration of tow-away lanes within San Francisco, and incorporate changes on regional (non-SF) highway links based on the regional model networks.

The highway networks cover the entire Bay Area. Within San Francisco, the highway network was developed based on link and node information contained the San Francisco Department of Public Works (DPW)'s GIS-based street centerline file. Outside of San Francisco, the highway networks are based on and consistent with the Metropolitan Transportation Commission (MTC)'s regional travel demand forecast model networks

Functional Classifications

This documents the procedures used to attach a functional type code to each link in the street centerline database for modeling purposes. Combined with an area type code, the functional type designates the capacity and speed for traffic assignment during the modeling process. The functional types and codes used are:

Table 13: Highway Network Functional Type Classifications

Classification	Code	Source
Freeway – Freeway Connection	01	MTC
Freeway	02	MTC
Expressway	03	MTC
Collector	04	MTC
Freeway Ramp	05	MTC
Centroid Connector / Dummy	06	MTC/CS
Major Arterial	07	MTC
Metered Ramp	08	MTC
Special (not used)	09	MTC
Special (not used)	10	MTC
Local	11	SF
Minor Arterial	12	SF

The initial basis for the functional type designation was the classification of corresponding links in the MTC model network in San Francisco. This basis was chosen to maintain consistency with MTC transportation modeling procedures as far as possible. The functional types found in the MTC network in San Francisco included the freeway types, major arterials, and collectors. All roadways not represented in the MTC model were initially designated as local facilities (type 11).

The functional type designations were subsequently modified using roadway classifications developed by the Department of City Planning (DCP). This information was provided to the consultant team in the form of shapefiles representing major arterials and minor arterials. Using GIS overlay capabilities, any facilities not already classified as major arterials in the initial designation but classified as major arterials by the DCP were upgraded to type 7. A similar procedure was applied to identify any minor arterials (type 12).

There were some differences in functional type designations between the DCP data and the MTC-based network data. For example, the Great Highway is classified as a "recreational" facility by DCP, a category not typically used in transportation modeling. This same facility is classified as a major arterial in the MTC and San Francisco model networks. However, the primary purpose of the functional type codes is to identify the correct speed and capacity values from speed/capacity tables in the modeling process. This purpose should be kept in mind when assessing the functional type classification of network links.

Area Types

The area type is defined to be consistent with MTC and has been taken directly from their data. The area type density is defined as the Total Population + 2.5*Total Employment divided by the sum of the Residential and Commercial/Industrial Acres.

$$\text{Area Type Density} = \frac{\text{Total Population} + (2.5 * \text{Total Employment})}{(\text{Residential} + \text{Commercial/Industrial Acres})}$$

The area type is not recalculated for SF traffic analysis zones; it is derived directly from the MTC zone. There are only four area types within San Francisco County (codes 0-3). Suburban and rural area types exist only outside the county.

Table 14: Area Type Definitions

Area Type	Code	Definition
Regional Core	0	> 300 density
Central Business District	1	100-300 density
Urban Business	2	55-100 density
Urban	3	30-55 density
Suburban	4	6-30 density
Rural	5	<6 density

Speed and Capacity Tables

Speed and capacity tables were developed directly from the MTC speed and capacity tables, except for the two additional functional classifications (Locals and Minor Arterials) that did not exist within the MTC classification scheme. These classifications were developed to be consistent with the other classifications.

The dummy link classification is used by MTC to provide connector links that do not have any time or speed associated with them. It is used primarily for centroid connectors, but also used for HOV link connectors with the SOV freeway system. In all cases, these MTC links are coded with the TSIN=TRUE, indicating that time values are used directly in trip assignment rather than converting speed and distance values into travel time. In SF county, centroid connectors were developed with speed and distance values and travel time is included for these links, whereas outside SF county, centroid connectors are consistent with MTC coding conventions.

Table 15: Speed Table (miles per hour)

	Area Type					
Facility Type	**Core**	**CBD**	**UBD**	**Urban**	**Suburban**	**Rural**
Fwy - Fwy	40	40	45	45	50	50
Freeway	55	55	60	60	65	65
Expwy	40	40	45	45	50	50
Collector	10	15	20	25	30	35
Fwy Ramp	30	30	35	35	40	40
Dummy	10	10	10	10	10	10
Major Art	20	25	30	30	35	40
Meter Rmp	25	25	30	30	35	35
Special	65	50	55	50	40	55
Special	55	35	25	35	0	0
Local	10	15	20	20	25	30

Table 16: Capacity Table (vehicles per lane per hour)

	Area Type					
Facility Type	**Core**	**CBD**	**UBD**	**Urban**	**Suburban**	**Rural**
Fwy - Fwy	1700	1700	1750	1750	1800	1800
Freeway	1850	1850	1900	1900	1950	1950
Expwy	1300	1300	1450	1450	1500	1500
Collector	550	550	600	600	650	650
Fwy Ramp	1300	1300	1400	1400	1400	1400
Dummy	2000	2000	2000	2000	2000	2000
Major Art	800	850	900	900	950	950
Meter Rmp	700	700	800	800	900	900
Special	2000	1840	1530	1780	990	1530
Special	1600	850	860	960	0	0
Local	500	500	550	550	600	600
Minor Arterial	600	600	650	650	700	700

Node numbers

Each directional link in the highway network is identified by a pair of node numbers. The first node (or 'A' node) represents where the link begins and the second node (or 'B' node) represents were the link ends. For highway links within San Francisco, the coordinates used

to create these nodes, and the numbering system used to identify these nodes came from the San Francisco Department of Public Works' citywide GIS basemap. For highway links outside of San Francisco, MTC's node and link numbering system was used.

Special Cases

There are a number of special cases where time delays or tolls are imposed on bridges and where reversible lanes are included in network coding. These special cases are all derived directly from the MTC networks and are included herein for information.

Table 17: One-Way Tolls on Bay Area Bridges ($1990)

Bridge Name	Peak Tolls		Off-peak Tolls	
	DA, SR2	SR3+	DA, SR2	SR3+
Benicia/Martinez Bridge I-680	0.46	0	0.46	0
Carquinez Bridge I-80	0.46	0	0.46	0
Richmond/San Rafael Bridge I-580	0.48	0	0.48	0.48
Golden Gate Bridge US 101	0.47	0	0.47	0.47
Oakland/San Francisco Bay Bridge I-80	0.48	0	0.48	0.48
San Mateo/Hayward Bridge Route 92	0.48	0	0.48	0.48
Dumbarton Bridge Route 84	0.46	0	0.46	0
Antioch Bridge Route 4/Route 160	0.48	0	0.48	0

Time-based delays on the bridges were developed by MTC to represent the one-way tolls (applied in both directions equally rather than a single direction) and an observed time delay on the bridge. These time delays were obtained from the MTC AM networks and values for the other four time periods were estimated from these. The values for the Golden Gate and Bay Bridges were adjusted during model calibration to achieve reliable assignments for each time period.

Table 18: Time-Based Link Delays on Bay Area Bridges (in 1998 network)

Bridge Name	Dir	Toll Class	Delay coding (minutes)				
			EA	AM	MD	PM	EV
Benicia/Martinez Bridge I-680	NB	1	3	6	3	6	3
	SB	1	3	6	3	6	3
Carquinez Bridge I-80	NB	2	3	6	3	6	3
	SB	2	3	6	3	6	3
Richmond/San Rafael Bridge I-580	WB	3	3	6	3	6	3
	EB	3	3	6	3	6	3
Golden Gate Bridge US 101	NB	4	7	7	8	10	6
	SB	4	9	14	8	12	10
Oakland/San Francisco Bay Bridge I-80	WB	5	6	16	12	13	8
	EB	5	4	5	7	6	3
San Mateo/Hayward Bridge Route 92	WB	6	3	9	4	6	4
	EB	6	3	6	3	9	3
Dumbarton Bridge Route 84	WB	7	3	16	8	6	3
	EB	7	3	6	3	16	3
Antioch Bridge Route 4/Route 160	NB	8	3	6	3	6	3
	SB	8	3	6	3	6	3

Table 19: Reversible Lanes

Location	Direction	AM Lanes	PM Lanes
Golden Gate Bridge US 101	NB	2	4
	SB	4	2
Caldecott Tunnel	WB	4	2
	EB	2	4
		AM Use Code	**PM Use Code**
I-80 Sterling On-ramp	EB	1	2

Turn Restrictions

The San Francisco Department of Parking and Traffic (DPT) provided to the San Francisco County Transportation Authority a database of traffic control sign locations and orientations. This database was used to identify locations where turn restrictions should be coded in the model's highway networks. The following sections describe the methodology used to convert this database into a file of turn restrictions

Data

The field of primary importance in the DPT database was 'Col_f', which gives sign position by corner of intersection and block number. Other key fields that were used include the 'sign' field which gives a text description of the sign and the 'street' field (geofield) which gives the street where the sign is located and secondly the cross street of the sign.

Although the data was of generally high quality, it was designed to support sign inventorying and maintenance, and was not designed to support the development of a turn restriction database. As a result there were numerous issues that needed to be addressed. Occasionally, sign positions were given incorrectly. In addition, some of the 'street' fields did not always clearly hold to the "main street" and "cross street" relationship described above. Finally, it was not always possible to definitively determine the turn movement to which a particular sign referred, due to the complexity of certain intersections. These issues are described in greater detail below.

Methodology

The consultant team developed a set of algorithms to process the data in the "Avenue" scripting language, which is used to create custom ArcView GIS databases. The ArcView project which contains these algorithms is named 'turncodes.apr.' There are several algorithms within this project, but the main algorithm is stored under the red diamond button in the main view. The other two custom buttons perform algorithm checks that will not be described here. The main algorithm assigns turns by sign position. If a sign is for a left turn or a no turns indication, the main street opposite the sign is assigned the turn restriction

onto the appropriate cross street. If a sign indicates a right turn restriction, the street on the same side of the street is assigned a turn restriction. Signs that are locating in the centerline, are assumed to reference both directions (as instructed by DPT staff).

Errors

The turn restriction processing algorithm makes is subject to the following types of errors:

- **Street Name Mismatches:** Occurs when street names in the streets file do not match the street names in the intersections file – fairly rare.
- **Bad Reference:** Due to geocoding errors
- **One Way End**: Occurs when a road either ends in a 'T' or changes names.
- **Sign's don't follow naming conventions**: Occurs when DPT sign data does not follow their own naming conventions.
- **Loops:** Not really an algorithm mistake, this error occurs when streets turn back on themselves in loops, generating an unreasonable restriction.
- **Bad Guess**: Occurs when algorithm simply guesses incorrectly (i.e. differently than a human interpreter would).
- **Bad Geocode**: Many intersections do not line up directly with the centerline file. Due to problems with one-way streets (w/o sign facing data) under the non-centerline street file, this data was not used.

Table 20: Types and Frequencies of Turn Restriction Coding Errors

Error	Frequency	Mitigation	Fixed w/Facing Info?
Street Name Mismatches	Low	Sifted, manual checked	No
Bad Reference	High	Sifted, manual checked	Yes
One Way End	High	Sifted, manual checked	Yes
Naming conventions	Low	None	No
Loops	Mid	Sifted, deleted	No
Bad Guess	Low	Spot checked	Yes
Bad Geocode	High	Sifted, manual checked	No

Along with these algorithmic mistakes are all of the mistakes inherent in guessing at which way the sign is facing. The only way to remedy this situation would be through the acquisition of sign facing information.

Verification / Editing

Three main editing tasks were undertaken manually to ensure data quality:

- **Inconsistent Restrictions:** Restrictions that turned back on themselves (due to a combination of errors sited above) were isolated and hand coded. There were 385 of these records.
- **Restrictions too far away:** Largely due to the street name mismatch error type, restrictions with nodes over 1 KM away from each other were hand verified and edited as necessary. There were 147 of these records.
- **Market Street Verified:** All Market street turn restrictions were hand-encoded. There were approximately 50 of these records.

Data Quality

Final non-duplicate restrictions number around 1500. Of these, over 1/3 were hand edited. The manually edited records were assumed to be the records at most risk of error, using the techniques described above. Observation supports this, and there is reason to be confidence that the data is 90%+ accurate, given that assumptions of sign meaning with regards to sign placement are correct. However, this is likely not true. Although large amounts of fieldwork preclude a true estimator of this accuracy, our estimate is that this uncertainty gives another 10-20% error, lowering data quality to below 80% accuracy overall.

Errors under this regime split themselves evenly between encoding that should not exist and encoding that do not exist. Many of the former, however, were less troublesome because they are often encoded for routes that are infeasible at any rate. Thus, the most troubling errors are the latter. The level of data quality (~80%) can not be raised without sign facing data from the Department of Parking and Traffic (DPT). Manual editing can only add marginally to further data quality, perhaps along Mission and Geary.

Data Format

The data was formatted in a DBF (restrictions.dbf) with fromNode, viaNode, toNode, and ID. ID can be used to link to restrictID in the original turns DBF (noturns). Note that this data cannot be inserted in 'noturns' because often many to one or one to many relationships exist between conceptual turn restrictions and actual signage. For example, one intersection (in the Mission somewhere) uses 8 signs to represent two turn restrictions. On the other hand, one sign can represent up to 4 restrictions.

This analysis produced three data files for use in trip assignment and path building: AMTURN.PEN, MDTURN.PEN, PMTURN.PEN that are consistent with TP+ formats for turn restrictions. There are 1,478 turn restrictions in total.

Travel Times

Travel times are generated for the highway networks to represent congested conditions for all time periods. Congested conditions are evaluated by assigning MTC trip tables, converted to the SF zone structure, by time period and direction, mode and purpose, to the highway networks. These travel times also calculate intrazonal travel times based on half the distance to the next nearest zone.

Travel times are also calculated for out-of-vehicle times, also called terminal times. Terminal times are estimated as walking and parking components of out-of-vehicle time and are included at both the origin and destination ends of each trip, by area type. Table 21 presents the terminal times used in the SF Model.

Table 21: Terminal Times

Area Type	Parking Terminal Time (minutes)		Walking Terminal Time (minutes)	
	Origin	Destination	Origin	Destination
Regional Core	1	2	2	4
Central Business District	1	2	2	3
Urban Business	1	2	2	2
Urban	.5	1	1	1
Suburban	0	.5	.5	1
Rural	0	.5	0	0

Transit Networks

There are five transit networks, corresponding to each of the five time periods used in the model. There are nine modes coded, with the first three modes being transit service that is operates entirely within San Francisco County. Transit operators outside San Francisco County have been assigned the remaining six modes. Every MUNI route, as well as every regional route coded in the regional model, is represented in the San Francisco model transit networks. There are 131 routes coded within San Francisco County, 141 routes that cross the county borders and 530 routes that are entirely outside the county.

Like the highway networks, the transit networks cover the entire Bay Area. Within San Francisco, the transit networks were based on detailed GIS-based representations of all transit route alignments and stop locations for all local and regional transit operators providing services in San Francisco. Changes in alignment and frequencies (also known as headways) by time of day are reflected in the transit networks. This information was based on published information provided by the transit operators. In some cases, the headways coded for MUNI routes are based on the actual observed headways, rather than the published headways. This more accurate information was used only where there were sufficient samples by time of day to ensure confidence. Outside of San Francisco, the transit network alignments and headways are based on and consistent with the Metropolitan Transportation Commission (MTC)'s regional travel demand forecast model transit networks.

Table 22: Transit Mode Codes

Mode	Code	Number of Directional Routes Coded (AM)
Muni Express Bus	1	15
Muni Local Bus	2	101
Muni Metro	3	10
Cable Car	3	5
BART	4	5
Regional Bus Local	5	530
SamTrans Express Bus	6	19
Golden Gate Express Bus	7	34
AC Transit Express	8	68
Caltrain & Ferries	9	15
	Grand Total	802

Most routes are coded with the inbound service coded as "A" and outbound service coded as "B". This often results in at least two routes coded for each actual route, unless the alignment

of the route is exactly the same in both the inbound and outbound direction. In many cases, service only operates in one direction during a specific time period. Additional codes for "C," "D," "E", and "F" are used if the route changes its path during different time periods.

Table 23: Muni Routes by Time Period

Mode	Number of Directional Routes Coded
Early AM	18
AM Peak	131
Midday	115
PM Peak	129
Evening	90

Pedestrian Environment Factors

Description

In June and July, 1999, local pedestrian environment factor (PEF) data were collected for the San Francisco Travel Demand Model. Eight members of the San Francisco Pedestrian Advisory Group, made up of staff from local agencies and private enterprises, collected relevant data and allocated the results to the PEF traffic analysis zone (TAZ) system established for the effort. PEF variables collected in this process included:

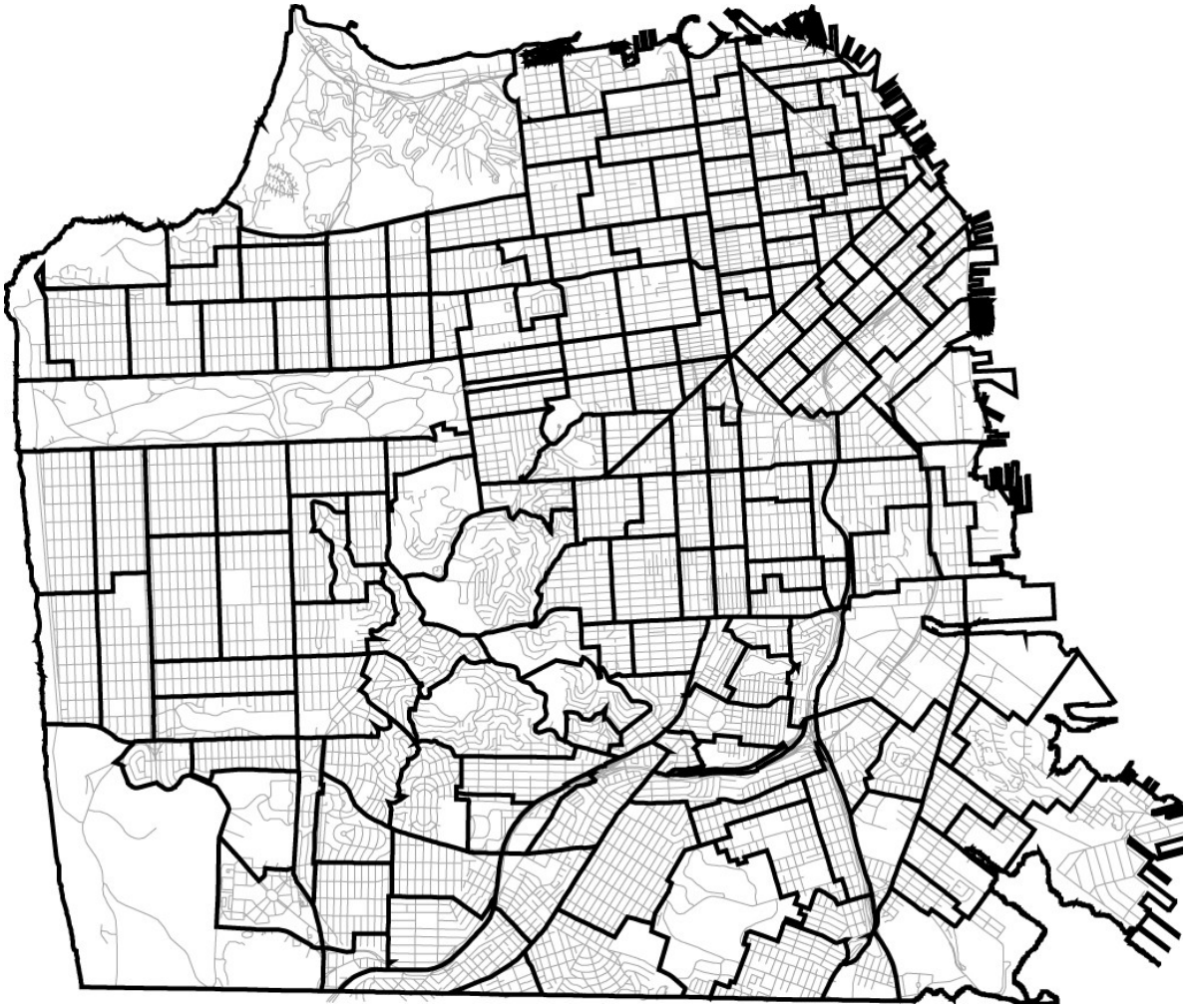
- Network Continuity/Integrity;
- Ease of Street Crossing;
- Perception of Safety and Personal Security;
- Urban Vitality; and
- Topological Barriers.

The participating analysts met with the San Francisco County Transportation Authority (SFCTA) and Cambridge Systematics on June 22, 1999, to discuss the methods and criteria to be used in the PEF collection process.

The collection of PEF variables and development of PEF models provide a new and innovative analytical capabilities to the local agencies responsible for transportation and land use planning in San Francisco. PEFs were developed for a PEF TAZ system that contains 198 PEF TAZs, with boundaries of MTC and/or SF Model TAZs. PEFs allow local planners to:

- quantify base year variables related to the pedestrian environment by geographic area (traffic analysis zone, area type) that can be used for transportation, transit, and land use planning and modeling;
- develop a policy variable to measure the potential impacts of improved pedestrian systems and expected growth (in vehicles, population, employment) that will likely impact future travel demand; and
- incorporate pedestrian factors into the travel demand modeling process to assess integrated land use and transportation policies/alternatives.

Figure 4: Map of Pedestrian Environment Factor Zones



Ratings for each Factor

The definition of the ratings for each factor are provided below:

1. ***Network Continuity/Integrity***

- **High**: Sidewalks and crosswalks mostly available with ample walk space and limited number of curb cuts (i.e., auto access points on sidewalks) on most streets.
- **Medium**: Sidewalks and crosswalks available on some streets with moderate walk space and a large number of curb cuts (i.e., auto access points on sidewalks) on most streets.
- **Low**: Sidewalks and crosswalks generally not available with limited walk space (curb cuts will not be an issue without sidewalks).

2. ***Ease of Street Crossing***

- **High:** Intersections mostly stop sign control or have traffic signal pedestrian phases, with short distances between intersections.
- **Medium:**Some intersection stop sign controls and some traffic signal pedestrian phases, with moderate distances between intersections.
- **Low:** Limited intersection stop sign and traffic signal pedestrian controls with long distances between intersections.

3. ***Perception of Safety and Personal Security***

- **High:** Usually feel safe, ample nighttime lighting on most streets, sidewalks are mostly clean and intact (pavement condition), traffic movement not an issue.
- **Medium:** Sometimes feel safe, ample nighttime lighting on some streets, some sidewalks are clean and intact (pavement condition), traffic movement sometimes an issue.
- **Low:** Rarely feel safe, ample nighttime lighting on very few streets, sidewalks are not clean and intact (pavement condition), traffic movement often an issue.

4. ***Urban Vitality***

- **High:** High volume of pedestrian activity with a high number of pedestrian oriented destinations (views, parks, pathways, store fronts, business/shopping activity), and short distance blocks.
- **Medium:**Some volume of pedestrian activity with some pedestrian oriented destinations (views, parks, pathways, store fronts, business/shopping activity), with mix of short and long blocks.
- **Low:** Very little volume of pedestrian activity with limited number of pedestrian oriented destinations (views, parks, pathways, store fronts, business/shopping activity), and long blocks.

5. ***Topological Barriers***

- **High:** Few or no barriers (hills, steep grades, or obstacles such as freeways, etc.) on the zonal street network.
- **Medium:** Some barriers (hills, steep grades, or obstacles such as freeways, etc.) on the zonal street network.
- **Low:** Significant barriers (hills, steep grades, or obstacles such as freeways, etc.) on the zonal street network.

6. Analyst's Knowledge of the TAZ (self-assessment)

- **High:** Excellent knowledge of the pedestrian and roadway environment of the TAZ.
- **Good:** Good knowledge of the pedestrian and roadway environment of the TAZ.
- **Moderate:** Moderate knowledge of the pedestrian and roadway environment of the TAZ.
- **Fair:** Fair knowledge of the pedestrian and roadway environment of the TAZ.
- **Poor:** Poor knowledge of the pedestrian and roadway environment of the TAZ.

Composite Rankings

For incorporation into the model, it was necessary to develop a single, composite score for each TAZ for each of the pedestrian environment factors. Rather than use an "average" score, which would have tended to pull many of the composite ratings to a central, "medium" value and reduced the usefulness of the scores, the composite rating was instead identified as the most commonly cited ranking. The analyst's knowledge of the zone was a key determining factor in the ranking scheme because it was used as a means of weighting the responses.

The composite rankings were developed using the following scoring system:

- "Knowledge" rankings were used as a score for each respondent and each PEF, by TAZ. These rankings were summed for each PEF rating: high, medium and low, to produce a score. The scores were compared to select the PEF rating with the highest score.
- In the case of a tie score, the higher ranking was used. If the tie score was between the low and high rating, then the medium rating was used.
- In cases where there was a three-way tie score, the medium rating was used.

It should be noted that the "knowledge of a TAZ" variable was ranked with 5 categories of high, good, moderate, fair, and poor. All responses were included in the scoring, weighted based on the level of familiarity. This was chosen as a weighting scheme to provide for an objective method of scoring and to incorporate as much of the participant's knowledge of the pedestrian environment of San Francisco as possible.

A summary of these results is presented as follows:

Table 24: Summary of Pedestrian Environment Factor Ratings

Pedestrian Environment Factor	Number of PEF Zones within each Ranking		
	Low Ranking	Medium Ranking	High Ranking
Network Continuity/Integrity	19	92	87
Ease of Street Crossing	31	106	61
Perception of Safety and Personal Security	20	71	107
Urban Vitality	47	71	80
Topological Barriers	76	55	67

Parking

This following sections document the development of parking data for the San Francisco Model. The following sections describe the use of parking variables including cost, supply, and availability in the model estimation process and for model application. In addition, each section presents recommendations for future enhancements to each type of parking data. This section also provides guidance on improved parking data collection for future model development phases. An overview of the proposed data structure for the parking variables is also provided.

The remainder of this section details the steps followed to develop the parking data for use in model estimation and application. Each subsection covers a different parking variable including price, supply, and availability.

Parking Variables

Parking cost and availability are thought to have a significant impact on mode choice for travel to destinations in San Francisco. The goal of the parking data collection and preparation process was to develop supply, cost, and availability variables, for both on-street and off-street parking, to support model estimation. With the exception of estimated parking supply, averages were developed for each Travel Analysis Zone (TAZ) in the San Francisco Travel Model (SFTM).

- Off-street parking
  - Supply (estimated number of stalls)
  - Average daily cost (for HBW trips)
  - Average monthly cost (where applicable)

  - Average hourly cost (for other trip purposes)
  - Availability: qualitative rating (see below)
- On-street parking
  - Supply (estimated number of spaces)
  - Availability: qualitative rating (see below)

These variables were tested during the model estimation process and those that were found to be most significant were used in model application. The chapters describing the estimation and final form of each model component include more detailed information on how parking variables were ultimately incorporated. Note that off-street parking includes only facilities that are available to the general public and does not include facilities reserved for private tenants of buildings or business customers. Land use codes in the Department of City Planning (DCP) parcel database will be used to analyze the extent of this latter type of parking. However, as a factor in mode and possibly destination choice, the public lots serve as an acceptable proxy for the effect of parking attributes.

Existing Data Sources

Several parking data sources were available to the model development team. The resources identified include:

- A geocoded database of off-street parking garages and lots from the Department of Parking and Traffic (DPT). Attributes include the zip code, number of self-park spaces, number of valet spaces, and square footage of the facility.
- Block face diagrams from DPT. These show the number of parking spaces along the curbs and indicate whether they are metered, or subject to time limits. These diagrams should be available for all streets in the city.
- Map showing location of parking meters throughout the city from DPT.
- Map showing neighborhood parking permit program boundaries from DPT.
- The 1986-1990 Neighborhood Parking Plan from the Department of City Planning. This report focuses mostly on weekend conditions but does provide some parking occupancy information for various locations.
- The San Francisco Parking Downtown Guide (1995) from DPT. A map and brochure describing city-owned garages and rates in the Financial District, Union Square, Chinatown, Transbay Terminal, and Civic Center areas.
- The San Francisco Parking Pal (1997). A privately-published listing of parking lots and garages with hourly, daily, and monthly rates. This list is thought to be fairly comprehensive.

Parking Data Structure

As mentioned above, the goal of this effort was to develop zonal averages for parking variables. However, these averages were calculated from more detailed data so that they may be updated and refined in the future. Detailed parking data was associated with the following geometric types in the SFCTA's Transportation Analysis Database (TAD):

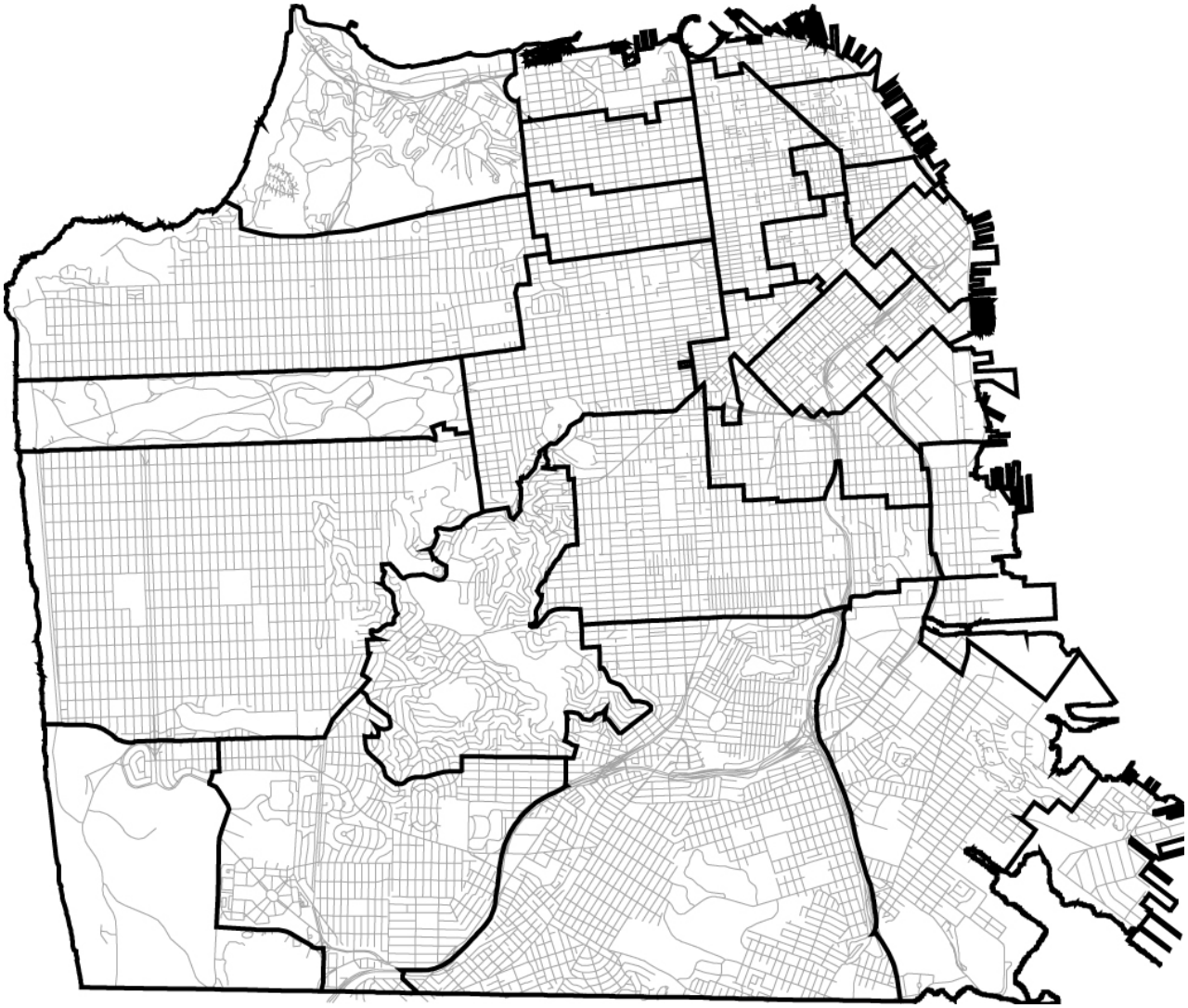
- Point – location of parking lots and garages and their attributes. The starting point for this data was the geocoded database listed above. Price information came from the *Parking Pal.*
- Polygon – in addition to the calculated zonal averages, polygon coverages were used to store data applicable to broad swaths of the city.

Development of Parking Characteristic Zones

Neighborhood parking zones were developed to store information about parking characteristics associated with areas of the city rather than streets or individual facility locations. The parking zones were based initially on the DISTRICT field in the Department of City Planning (DCP) business database, which is at the parcel level of detail. The parking zones needed to nest within the established TAZ structure for ease of model application. Therefore an approximation of the contiguous DISTRICT boundaries was created by aggregating TAZ polygons. Some modifications to the original DISTRICT designations were made; namely, the transit corridors were not used and the "rest of city" district was split into neighborhoods as follows:

- Golden Gate Park and the Presidio were broken out as separate zones;
- The Marina Fillmore district was split along the boundaries of neighborhood parking permit districts M, K, G, L, P, and R;
- Additional zones to represent the Richmond, Sunset, and Southeast areas of the city were created; and
- The remaining neighborhood parking permit districts were split out as separate zones.

Figure 5: Map of Neighborhood Parking Zones



Parking Price Data

Off-Street Dataset Development

- Enter parking price and other information from the *Parking Pal* (7) into the attribute table of the geocoded parking garages and lots (1), including hourly rate, 12 hour maximum rate (if applicable), 24 hour maximum rate (if applicable), and monthly rate (if available).
- Calculate TAZ averages for off-street parking costs for hourly, ½ day, full day, and monthly periods.
- Scale back costs by CPI factor to estimate 1990 costs.

Future Enhancements

The off-street parking ArcView shapefile can continue to be refined and updated. Prices should be updated every two years, if possible. Future editions of the *Parking Pal* will likely be good resources for future updates. In addition, the contents of the off-street parking shapefile can be field-checked whenever the need for a special study focusing on a particular area arises.

Parking Supply Data

Off-Street Supply Model Development

The TAZ-level estimates of off-street parking supply were calculated by summing the total number of spaces in the off-street parking database by TAZ.

Future Enhancements

The off-street parking supply database should be spot-checked and updated periodically, as described previously.

On-Street Supply Model Development

While an inventory of every on-street parking space in the city would be ideal, development of this inventory would be quite time consuming. Instead, an estimate of off-street spaces was developed based on a sample of the block face diagrams from DPT. The sample was used to develop formulas by segment length and facility type for estimating the number of on-street spaces. The estimated number of spaces was then be summed by TAZ. The work steps included:

- Sampling street segments, as described below. The sample was proportional by parking characteristic zone and by facility type.

- Obtaining copies of the block face diagrams for the sampled segments from DPT.
- Entering the information from the diagrams into a database that includes the CNN identification code.
- Estimating a relationship between segment length and number of parking spaces for each functional type and parking zone combination.
- Using the relationships to estimate the number of parking spaces on each segment in the roadway network shapefile.
- Summing the estimated number of on-street parking spaces by TAZ.

Future Enhancements

The estimated parking spaces can be converted to an inventory as time permits. For example, the inventory of parking spaces for a street segment or corridor might be taken on the occasion of a special purpose study. The on-street parking database can then be updated with the inventory information, which should include the date the inventory was taken.

Parking Availability

Parking availability measures the percent of the parking supply that is vacant during any given time period. A rule of thumb often used is that when more than 85 percent of parking spaces are occupied, a driver will spend undue time searching for a space and experience frustration. Thus, 85 percent occupancy is typically cited as the "practical capacity" of a parking facility.

APPENDIX A: Data Dictionary for San Francisco Planning Department's "parcel.dbf"

DATA DICTIONARY

Table Name: **parcel.dbf**

Field Name	Data Type	Data Size	Description	Source	Date
PERIMETER	NUMBER	Double	Length of perimeter of lot	DPW basemap	Jun-98
BLKLOT	Character	9	Concatenated Block No. + Lot No.	DPW basemap	Jun-98
LOT_NUM	Character	4	Assessor's Lot Number, derived from base map	DPW basemap	Jun-98
BLOCK_NUM	Character	5	Assessor's Block Number, derived from base map	DPW basemap	Jun-98
FROM	Character	5	Street Address Range	DPW basemap	Jun-98
TO	Character	5	Street Address Range	DPW basemap	Jun-98
STREETNAME	Character	20	Street name	DPW basemap	Jun-98
TYPE	Character	4	Street Type (Av, St, etc)	DPW basemap	Jun-98
ODD_EVEN	Character	1	E = even #, O = odd #	DPW basemap	Jun-98
USE_TYPE	Character	3	Assessor's Use Class Designations	Assessor	Mar-98
UNITS	NUMBER	Double	Total no. of units of all types on parcel	Assessor	Mar-98
RESUNITS	NUMBER	Double	No. of residential units on parcel	Assessor	Jun-98
STORIES	NUMBER	Double	No. of floors in structure	Assessor	Mar-98
OWNR_NAME	Character	30	Name of Owner	Assessor	Mar-98
ADDRESS_1	Character	27	Address of Owner	Assessor	Mar-98
ADDRESS_2	Character	27	Address of Owner	Assessor	Mar-98
NEWUSE	Character	10	DCP Interpretive summary of USE_TYPE	City Planning	Mar-98
HEIGHT_LIM	Character	18	Zoning Code height limit class	City Planning	Mar-98
DISTRICT	Character	16	City Planning Land Use Study districts	City Planning	Mar-98
SUMDIST	Character	16	Summary of City Planning Land Use Study districts	City Planning	Mar-98
AREA	NUMBER	Double	Square footage of parcel	Assessor & City Planning	Mar-98
NEWZON	Character	25	DCP Interpretive summary of ZONING (15 classes)	City Planning	Mar-98
BLDG_SQFT	NUMBER	Double	Square footage of bldgs on parcel	Assessor	Mar-98
TOTALBLDGS	NUMBER	Double	Total sq. ft. of all bldgs on parcel	Assessor	Mar-98
EXISTFAR	NUMBER	Double	Floor Area Ratio, calc. from BLDG_SQFT / AREA	City Planning	Mar-98
ZONING	Character	15	Zoning Code designation (~135 classes)	City Planning	Mar-98
ALLOWFAR	NUMBER	Double	Zoning Code allowable floor area ratio class	City Planning	Mar-98
SOFTSITE	Character	1			
LANDUSE	Character	20	Assigned land use class, based on if use > 80% of area	City Planning	Mar-98
ZONSIMPL	Character	20	DCP Interpretive summary of ZONING (5 classes)	City Planning	Mar-98
LANDUSE2	Character	20	Assigned land use class, combinations become MIXED-	City Planning	Mar-98

APPENDIX B: Data Dictionary for San Francisco Planning Department's "business.dbf"

DATA DICTIONARY

Table Name: **business.dbf**

Field Name	Data Type	Data Size	Description	Source	Date
DCP_ID	NUMBER	Double	DCP Unique ID No.	City Planning	Mar-98
DUNS_NUM	Character	11	ID No.	Dun & Bradstreet	Mar-98
CERTIF_NO	NUMBER	Double	Certificate No.	Tax Collector	Dec-97
COMPANY	Character	32	Name of Establishment	Dun & Bradstreet	Mar-98
TRADENAME	Character	35	Name of Establishment	Tax Collector	Dec-97
ADDRESS	Character	31	Street Address	Dun & Bradstreet	Mar-98
ST_NO	Character	7	Street Number	Tax Collector	Dec-97
ST_NO_SFX	Character	1	Street Number Suffix	Tax Collector	Dec-97
ST_NAME	Character	30	Street Name	Tax Collector	Dec-97
ST_TYPE	Character	2	Street Type (Av, St, etc)	Tax Collector	Dec-97
EVE_ODD	Character	1	E = even #, O = odd #	Tax Collector	Dec-97
BLOCK	Character	5	Assessor's Block Number, derived from base map	Tax Collector	Dec-97
LOT	Character	4	Assessor's Lot Number, derived from base map	Tax Collector	Dec-97
BLKLOT	Character	9	Concatenated Block No. + Lot No.	Tax Collector	Dec-97
CITY	Character	16	City	Tax Collector	Dec-97
STATE	Character	7	State	Tax Collector	Dec-97
ZIP	Character	10	Zip Code	Tax Collector	Dec-97
PHONE	Character	14	Telephone No.	Tax Collector	Dec-97
CEO_NAME	Character	41	Name of CEO	Dun & Bradstreet	Mar-98
FNAME1	Character	12	CEO First Name	Dun & Bradstreet	Mar-98
MI1	Character	4	CEO Middle Initial	Dun & Bradstreet	Mar-98
LNAME1	Character	9	CEO Last Name	Dun & Bradstreet	Mar-98
SUFFIX1	Character	9	CEO name suffix	Dun & Bradstreet	Mar-98
PREFIX1	Character	9	CEO name prefix	Dun & Bradstreet	Mar-98
TITLE	Character	9	CEO title	Dun & Bradstreet	Mar-98
OWN_CODE	Character	1	Ownership Code	Tax Collector	Dec-97
PBC1	Character	4	Tax Collector Classification System	Tax Collector	Dec-97
LOB	Character	25	Line of Business, identified by the establishment	Dun & Bradstreet	Mar-98
SECTOR	Character	10	City Planning classification based on SIC & location	City Planning	Mar-98
SIC	Character	3	2-digit SIC code	Dun & Bradstreet	Mar-98
SIC1	Character	9	Full SIC code	Dun & Bradstreet	Mar-98
SIC2	Character	9	Second SIC code, if any	Dun & Bradstreet	Mar-98
SIC3	Character	9	Third SIC code, if any	Dun & Bradstreet	Mar-98
SIC4	Character	9	Fourth SIC code, if any	Dun & Bradstreet	Mar-98
SIC5	Character	4	Fifth SIC code, if any	Dun & Bradstreet	Mar-98
SIC6	Character	3	Sixth SIC code, if any	Dun & Bradstreet	Mar-98
GROSS	NUMBER	Double	Annual gross receipts of establishment	Tax Collector	Dec-97

EMPL_HERE	NUMBER	Double	# of employees at this location	Dun & Bradstreet	Mar-98
SQ_FEET	NUMBER	Double	Square Footage of establishment	Dun & Bradstreet	Mar-98
USER_AREA	NUMBER	Double	# of square feet used by establishment	City Planning	Mar-98
MODEL_SQFT	NUMBER	Double	Dun & Bradsreet estimate of sq ft used by estab.	Dun & Bradstreet	Mar-98
DISTRICT	Character	12	City Planning Land Use Study districts	City Planning	Mar-98
SUMDIST	Character	12	Summery of City Planning Land Use Study districts	City Planning	Mar-98
CODE	Character	3	Translation of SIC5 code in classification	City Planning	Mar-98
CODESUM	Character	1	Translation of SIC5 code in classification	City Planning	Mar-98
SECTCODE	Character	3	Translation of SIC5 code in classification	City Planning	Mar-98
DESC	Character	12	Translation of SIC5 code in classification	City Planning	Mar-98
AV_ADD	Character	9	ArcView geocoding field	City Planning	Mar-98
AV_STATUS	Character	1	ArcView geocoding field	City Planning	Mar-98
AV_SCORE	NUMBER	Double	ArcView geocoding field	City Planning	Mar-98

APPENDIX C: Stated Preference Survey Cross-tabulations

Are you age 16 or over and currently residing in San Francisco? * QUOTA Crosstabulation

Count

		QUOTA			
		transit-work trip	transit-non-work	car - work trip	Total
Are you age 16 or over and currently residing in San Francisco?	yes	200	207	202	609
Total		200	207	202	609

Do you work in San Francisco? * QUOTA Crosstabulation

Count

		QUOTA			
		transit-work trip	transit-non-work	car - work trip	Total
Do you work in San Francisco?	yes	200	96	202	498
	no		111		111
Total		200	207	202	609

n the last week, how many days did you travel to work in San Francisco by public transportation? * QUOTA Crosstabulation

Count

		QUOTA			
		transit-work trip	transit-non-work	car - work trip	Total
In the last week, how many days did you travel to work in San Francisco by public transportation?	none		73	186	259
	1 day	15	2	4	21
	2 days	17		2	19
	3 days	26	2	1	29
	4 days	20	1	5	26
	5 days	103	15	2	120
	6 days	12	3	1	16
	7 days	7		1	8
Total		200	96	202	498

SK QUESTIONS ABOUT TRANSIT TRIP TO WORK FOR QUOTA GROUP 1? * QUOTA Crosstabulatio

Count

		QUOTA			
		transit-work trip	transit-non-work	car - work trip	Total
ASK QUESTIONS ABOUT TRANSIT TRIP TO WORK FOR QUOTA GROUP 1?	ask questions	200			200
	quota 1 already filled		23	16	39
Total		200	23	16	239

During the last week, have you made a trip by public transportation from home to a destination within the city, for any purpose other than work or business? * QUOTA Crosstabulation

Count

		QUOTA		
		transit-non-work	car - work trip	Total
During the last week, have you made a trip by public transportation from home to a destination within the city, for any purpose other than work or business?	yes	207	9	216
	no		192	192
	don-t know/refused		1	1
Total		207	202	409

ASK QUESTIONS ABOUT TRANSIT TRIP FOR QUOTA GROUP 2? * QUOTA Crosstabulation

Count

		QUOTA		
		transit-non-work	car - work trip	Total
ASK QUESTIONS ABOUT TRANSIT TRIP FOR QUOTA GROUP 2?	ask questions	207		207
	quota 2 already filled		9	9
Total		207	9	216

SK QUESTIONS ABOUT CAR TRIP TO WORK FOR QUOTA GROUP 3 * QUOTA Crosstabulation

Count

		QUOTA	
		car - work trip	Total
ASK QUESTIONS ABOUT CAR TRIP TO WORK FOR QUOTA GROUP 3?	ask questions	202	202
Total		202	202

TRIP TYPE FOR SCENARIOS * QUOTA Crosstabulation

Count

		QUOTA			
		transit-work trip	transit-non-work	car - work trip	Total
TRIP TYPE FOR SCENARIOS	trip from home to work	200		202	402
	non-work trip from home		207		207
Total		200	207	202	609

What was the main purpose of the most recent trip? * QUOTA Crosstabulation

Count

		QUOTA	
		transit-non-work	Total
What was the main purpose of the most recent trip?	.00	1	1
	shopping	65	65
	medical/dental	19	19
	personal business	31	31
	entertainment	25	25
	recreation	13	13
	social visit	21	21
	pick up/drop off child	3	3
	school	19	19
	other (specify)	10	10
Total		207	207

At about what time did you leave home to begin your transit trip? * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
At about what time did you leave home to begin your transit trip?	15.00		1	1
	30.00		1	1
	60.00		2	2
	150.00	1	1	2
	180.00	1	3	4
	300.00	2	1	3
	315.00	3		3
	335.00	1		1
	345.00		1	1
	360.00	8	2	10
	375.00	3		3
	380.00	2		2
	390.00	7	1	8
	400.00	1		1
	405.00	3		3
	410.00	5		5
	420.00	26	8	34
	421.00	1		1
	430.00	1		1
	435.00	9	1	10
	440.00	2		2
	450.00	17	4	21
	455.00	2		2
	460.00	1		1
	465.00	1		1
	470.00	3		3
	475.00	2		2
	480.00	23	14	37
	485.00	1		1
	490.00	3		3
	495.00	11	2	13
	500.00	1		1
	510.00	15	4	19
	525.00	3		3
	530.00		1	1
	540.00	12	5	17
	555.00	2	3	5
	570.00	4	2	6
	585.00	1	1	2
	600.00	6	21	27
	615.00		2	2
	630.00	3	8	11
	645.00		1	1
	650.00		1	1
	660.00	2	18	20
	675.00		1	1
	680.00	1		1
	690.00		2	2
	705.00		1	1
	720.00	1	21	22
	750.00	1	5	6
	780.00	1	15	16
	795.00		1	1
	810.00		3	3
	825.00		1	1
	835.00	1		1
	840.00	1	11	12
	870.00		1	1
	885.00	1		1
	900.00	1	5	6
	940.00		1	1
	960.00		4	4
	990.00		1	1
	1010.00		1	1
	1020.00	3	5	8
	1030.00		1	1
	1050.00		2	2
	1080.00		2	2
	1110.00		2	2
	1125.00		1	1
	1140.00		5	5
	1145.00		1	1
	1170.00		1	1
	1200.00		4	4
Total		200	207	407

Which transit line did you board first for that trip? * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
Which transit line did you board first for that trip?	.00		1	1
	2.00	4	2	6
	3.00	1	1	2
	4.00	4	5	9
	5.00		1	1
	6.00	2		2
	8.00		1	1
	9.00	4	2	6
	10.00	10	9	19
	12.00	1		1
	13.00	2		2
	14.00	1	1	2
	15.00	3	4	7
	16.00	2	1	3
	17.00	1		1
	18.00	1	2	3
	19.00	2	6	8
	20.00	1	5	6
	22.00		3	3
	23.00	2	1	3
	24.00	1		1
	25.00	3	2	5
	26.00	1		1
	27.00	6	4	10
	29.00	12	22	34
	30.00	2	1	3
	31.00	1		1
	32.00	1	3	4
	34.00		3	3
	35.00	3		3
	37.00	6	4	10
	38.00	6	7	13
	39.00	2		2
	40.00	16	17	33
	42.00	1		1
	43.00	2		2
	44.00	1	2	3
	45.00	3	5	8
	46.00	3	5	8
	49.00	3	2	5
	50.00	3		3
	52.00	11	9	20
	53.00	5	2	7
	55.00		1	1
	56.00		3	3
	57.00		3	3
	58.00	5	3	8
	61.00	1	1	2
	62.00	1		1
	65.00	3	6	9
	67.00	2		2
	68.00		1	1
	69.00	2	4	6
	70.00	1	3	4
	71.00	5	7	12
	72.00	2	1	3
	73.00	9	7	16
	74.00	1		1
	75.00	4	8	12
	76.00	2		2
	77.00	2	5	7
	78.00	1		1
	79.00	1	2	3
	80.00	1	2	3
	82.00	6	3	9
	83.00	17	14	31
	9999999.00	1		1
Total		200	207	407

How did you get there from home? * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
How did you get there from home?	walking	189	196	385
	got a ride	5	3	8
	drove and parked	5	8	13
	other (specify)	1		1
Total		200	207	407

And how long did that take? * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
And how long did that take?	1.00	25	28	53
	2.00	27	30	57
	3.00	22	25	47
	4.00	5	6	11
	5.00	68	58	126
	6.00	2	3	5
	7.00	5	2	7
	8.00	1	4	5
	9.00		1	1
	10.00	28	27	55
	11.00		1	1
	12.00	1	1	2
	15.00	10	7	17
	20.00	2	8	10
	25.00		1	1
	30.00	3	5	8
	602.00	1		1
Total		200	207	407

For that trip, how long did you have to wait there for the vehicle to arrive? * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
For that trip, how long did you have to wait there for the vehicle to arrive?	.00	7	3	10
	1.00	11	17	28
	2.00	7	9	16
	3.00	8	5	13
	4.00	4	6	10
	5.00	55	38	93
	6.00	2	2	4
	7.00	2	6	8
	8.00	3	4	7
	9.00		2	2
	10.00	45	49	94
	12.00	2	2	4
	13.00		2	2
	14.00	1		1
	15.00	21	27	48
	17.00		1	1
	20.00	18	15	33
	25.00	3	6	9
	30.00	6	6	12
	35.00	1		1
	40.00	2	2	4
	45.00	1	5	6
	610.00	1		1
Total		200	207	407

How often does is that line scheduled to run from that stop at the time of day you made your trip? * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
How often does is that line scheduled to run from that stop at the time of day you made your trip?	every 5 minutes	28	13	41
	every 10 minutes	63	42	105
	every 15 minutes	43	42	85
	every 20 minutes	23	29	52
	every 30 minutes	2	5	7
	every 45 minutes		1	1
	cannot say/refused	41	75	116
Total		200	207	407

How often would you say that services on that line are delayed more than 5 minutes at the time of day you made your trip? * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
How often would you say that services on that line are delayed more than 5 minutes at the time of day you made your trip?	less than 5%	18	20	38
	5%	17	11	28
	10%	24	29	53
	15%	23	13	36
	20%	11	15	26
	25%	13	9	22
	30%	7	4	11
	40%	13	6	19
	50%	23	18	41
	more than 50%	31	32	63
	cannot say/refused	20	50	70
Total		200	207	407

How crowded are the vehicles on that line at the time of day you made your trip, typically? * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
How crowded are the vehicles on that line at the time of day you made your trip, typically?	not very crowded	81	108	189
	fairly crowded	57	60	117
	very crowded	62	36	98
	cannot say/refused		3	3
Total		200	207	407

How many transfers did you have to make during that trip before reaching your destination? * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
How many transfers did you have to make during that trip before reaching your destination?	none	152	147	299
	1 transfer	45	49	94
	2 transfers	3	11	14
Total		200	207	407

Which line did you transfer to next? * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
Which line did you transfer to next?	2.00		1	1
	9.00	1		1
	10.00	1	3	4
	15.00	1	1	2
	18.00	1		1
	19.00	1	3	4
	20.00	8	4	12
	22.00	1		1
	25.00		4	4
	29.00	2	4	6
	35.00	1	1	2
	37.00	1		1
	38.00	3	1	4
	40.00		1	1
	43.00	1		1
	44.00		1	1
	45.00	1	2	3
	46.00	1	2	3
	48.00		1	1
	49.00	3		3
	52.00	4	3	7
	53.00		1	1
	55.00	1		1
	57.00		1	1
	58.00	3	1	4
	61.00		1	1
	62.00		1	1
	65.00		1	1
	69.00		1	1
	70.00	2	5	7
	71.00		1	1
	73.00	2	1	3
	75.00	2	2	4
	77.00	1	1	2
	79.00	1	1	2
	80.00	2	3	5
	82.00		3	3
	83.00	3	3	6
	99.00		1	1
Total		48	60	108

How crowded are the vehicles on that line at the time of day you made your trip, typically? * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
How crowded are the vehicles on that line at the time of day you made your trip, typically?	not very crowded	20	21	41
	fairly crowded	15	18	33
	very crowded	13	19	32
	cannot say/refused		2	2
Total		48	60	108

Which line did you transfer to next? * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
Which line did you transfer to next?	.00		1	1
	3.00	1		1
	9.00		1	1
	10.00	1	1	2
	38.00		1	1
	40.00	1		1
	45.00		2	2
	46.00		1	1
	69.00		1	1
	70.00		1	1
	77.00		2	2
Total		3	11	14

How crowded are the vehicles on that line at the time of day you made your trip, typically? * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
How crowded are the vehicles on that line at the time of day you made your trip, typically?	.00		1	1
	not very crowded	1	4	5
	fairly crowded	1	3	4
	very crowded	1	3	4
Total		3	11	14

How long did the journey take, from the time you first boarded until the time you got off at your final destination, including any transfers? * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
How long did the journey take, from the time you first boarded until the time you got off at your final destination, including any transfers?	.00	1		1
	2.00		1	1
	4.00		2	2
	5.00	3	7	10
	6.00	1	5	6
	7.00	4	2	6
	8.00	5	3	8
	10.00	10	30	40
	12.00	4	3	7
	15.00	29	29	58
	17.00	2	1	3
	18.00		1	1
	20.00	28	27	55
	23.00	1		1
	25.00	22	13	35
	27.00	1		1
	28.00		1	1
	30.00	32	27	59
	35.00	6	6	12
	40.00	17	12	29
	43.00	1		1
	45.00	19	16	35
	50.00	3	2	5
	60.00	10	8	18
	70.00		1	1
	75.00		2	2
	80.00	1	1	2
	90.00		7	7
Total		200	207	407

low did you get from there to your destination? * QUOTA Crosstabulatior

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
How did you get from there to your destination?	walking	198	202	400
	by bike		1	1
	other (specify)	2	4	6
Total		200	207	407

And how long did that take? * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
And how long did that take?	.00		1	1
	1.00	21	25	46
	2.00	29	34	63
	3.00	21	11	32
	4.00	5	7	12
	5.00	66	72	138
	6.00	1	1	2
	7.00	4	1	5
	8.00	2	2	4
	9.00	1		1
	10.00	35	41	76
	12.00		1	1
	15.00	10	5	15
	20.00	4	3	7
	25.00		1	1
	45.00	1		1
	60.00		1	1
	3005.00		1	1
Total		200	207	407

Did you pay the fare for that single trip, or did you use a MUNI pass? * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
Did you pay the fare for that single trip, or did you use a MUNI pass?	single trip	100	142	242
	MUNI pass	91	58	149
	other (specify)	9	7	16
Total		200	207	407

How much did you pay for that #TICKET#? * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
How much did you pay for that #TICKET#?	.00	3	2	5
	25.00		1	1
	35.00	8	32	40
	80.00	9	8	17
	85.00	1		1
	100.00	79	89	168
	110.00	3	8	11
	115.00	1		1
	125.00		1	1
	200.00	1	3	4
	210.00	3	2	5
	230.00	1		1
	235.00		1	1
	250.00		1	1
	270.00		1	1
	315.00	1		1
	400.00	1	1	2
	500.00	1		1
	800.00	9	25	34
	850.00		1	1
	900.00	2		2
	2000.00	1		1
	2800.00	1		1
	3200.00	1		1
	3400.00	1	1	2
	3500.00	70	29	99
	3900.00	1		1
	4000.00	1		1
	7500.00	1		1
	99999.00		1	1
Total		200	207	407

JOURNEYTIME-1A * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
JOURNEYTIME-1A	5.00	3	11	14
	7.00	2		2
	10.00	22	36	58
	12.00	2	2	4
	13.00		1	1
	15.00	30	32	62
	17.00	2	1	3
	18.00	1		1
	20.00	23	24	47
	22.00		1	1
	25.00	27	24	51
	28.00		1	1
	30.00	25	17	42
	32.00	1		1
	35.00	11	11	22
	40.00	6	11	17
	45.00	26	8	34
	48.00	1		1
	50.00	6	7	13
	55.00	4	2	6
	60.00	2	5	7
	65.00	5	2	7
	75.00		3	3
	80.00		1	1
	85.00	1		1
	90.00		5	5
	95.00		2	2
Total		200	207	407

JOURNEYTIME-1B * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
JOURNEYTIME-1B	5.00	10	11	21
	7.00	2	1	3
	10.00	14	30	44
	12.00	4	1	5
	15.00	29	37	66
	17.00		2	2
	18.00		1	1
	20.00	32	23	55
	23.00	1	1	2
	25.00	19	22	41
	27.00	1		1
	30.00	22	20	42
	35.00	15	10	25
	40.00	23	9	32
	43.00	1		1
	45.00	8	15	23
	50.00	7	5	12
	55.00	1	2	3
	60.00	8	3	11
	65.00	2	3	5
	70.00		2	2
	80.00	1	1	2
	85.00		2	2
	90.00		2	2
	95.00		4	4
Total		200	207	407

HEADWAY-1A * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
HEADWAY-1A	every 5 minutes	17	6	23
	every 10 minutes	46	36	82
	every 15 minutes	48	40	88
	every 20 minutes	46	44	90
	every 30 minutes	43	80	123
	every 45 minutes		1	1
Total		200	207	407

HEADWAY-1B * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
HEADWAY-1B	every 5 minutes	53	47	100
	every 10 minutes	29	35	64
	every 15 minutes	24	31	55
	every 20 minutes	28	26	54
	every 30 minutes	28	20	48
	every 40 minutes	21	18	39
	every 45 minutes	13	18	31
	every 60 minutes	4	12	16
Total		200	207	407

TRADE1-Which of the two would you prefer? * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
TRADE1-Which of the two would you prefer?	first one	112	99	211
	second one	74	98	172
	no preference	6	5	11
	wouldn-t use either	6	1	7
	don-t know/refused	2	4	6
Total		200	207	407

JOURNEYTIME-2A * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
JOURNEYTIME-2A	5.00	7	13	20
	7.00	3	1	4
	10.00	16	38	54
	12.00	1	2	3
	15.00	21	28	49
	17.00	1	1	2
	18.00	1	1	2
	20.00	39	24	63
	22.00	2		2
	25.00	28	19	47
	30.00	19	21	40
	33.00		1	1
	35.00	15	9	24
	40.00	14	13	27
	45.00	13	10	23
	48.00	1		1
	50.00	8	6	14
	55.00	2	4	6
	60.00	8	3	11
	65.00		2	2
	70.00		1	1
	75.00		2	2
	80.00	1		1
	85.00		3	3
	90.00		5	5
Total		200	207	407

JOURNEYTIME-2B * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
JOURNEYTIME-2B	5.00	5	19	24
	7.00	1	1	2
	10.00	21	26	47
	12.00	4	2	6
	13.00		1	1
	15.00	32	31	63
	17.00	1	1	2
	20.00	17	25	42
	23.00	1		1
	25.00	28	24	52
	27.00	1		1
	28.00		1	1
	30.00	26	15	41
	35.00	13	15	28
	40.00	13	9	22
	43.00	1		1
	45.00	17	13	30
	50.00	7	5	12
	55.00	5	2	7
	60.00	2	5	7
	65.00	4	1	5
	75.00		1	1
	80.00		3	3
	85.00	1	2	3
	90.00		2	2
	95.00		3	3
Total		200	207	407

CROWDING-2A * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
CROWDING-2A	not very crowded	61	63	124
	fairly crowded	72	77	149
	very crowded	67	67	134
Total		200	207	407

CROWDING-2B * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
CROWDING-2B	not very crowded	72	74	146
	fairly crowded	66	53	119
	very crowded	62	80	142
Total		200	207	407

TRADE2-Which of the two would you prefer? * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
TRADE2-Which of the two would you prefer?	first one	101	96	197
	second one	92	103	195
	no preference	5	4	9
	wouldn-t use either	2	1	3
	don-t know/refused		3	3
Total		200	207	407

CROWDING-3A * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
CROWDING-3A	not very crowded	60	73	133
	fairly crowded	78	69	147
	very crowded	62	65	127
Total		200	207	407

CROWDING-3B * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
CROWDING-3B	not very crowded	65	57	122
	fairly crowded	60	78	138
	very crowded	75	72	147
Total		200	207	407

HEADWAY-3A * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
HEADWAY-3A	every 5 minutes	14	7	21
	every 10 minutes	48	31	79
	every 15 minutes	52	51	103
	every 20 minutes	43	37	80
	every 30 minutes	43	81	124
Total		200	207	407

HEADWAY-3B * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
HEADWAY-3B	every 5 minutes	66	48	114
	every 10 minutes	21	31	52
	every 15 minutes	29	27	56
	every 20 minutes	26	27	53
	every 30 minutes	30	23	53
	every 40 minutes	16	25	41
	every 45 minutes	7	14	21
	every 60 minutes	5	12	17
Total		200	207	407

TRADE3-Which of the two would you prefer? * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
TRADE3-Which of the two would you prefer?	first one	104	117	221
	second one	86	80	166
	no preference	4	2	6
	wouldn-t use either	6	6	12
	don-t know/refused		2	2
Total		200	207	407

HEADWAY-4A * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
HEADWAY-4A	.00	4	1	5
	every 5 minutes	43	20	63
	every 10 minutes	44	28	72
	every 15 minutes	28	42	70
	every 20 minutes	27	38	65
	every 30 minutes	33	55	88
	every 40 minutes	8	10	18
	every 45 minutes	7	9	16
	every 60 minutes	4	4	8
Total		198	207	405

HEADWAY-4B * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
HEADWAY-4B	.00	9	1	10
	every 5 minutes	53	38	91
	every 10 minutes	33	27	60
	every 15 minutes	18	31	49
	every 20 minutes	24	37	61
	every 30 minutes	26	18	44
	every 40 minutes	14	21	35
	every 45 minutes	14	25	39
	every 60 minutes	6	9	15
Total		197	207	404

DELAY-4A * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
DELAY-4A	less than 5%	7	11	18
	5%	14	10	24
	10%	20	28	48
	15%	31	20	51
	20%	41	69	110
	25%	20	21	41
	30%	20	8	28
	40%	13	11	24
	50%	19	14	33
	more than 50%	15	15	30
Total		200	207	407

DELAY-4B * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
DELAY-4B	less than 5%	39	38	77
	5%	21	21	42
	10%	15	19	34
	15%	18	15	33
	20%	20	17	37
	25%	17	18	35
	30%	18	24	42
	40%	12	12	24
	50%	10	9	19
	more than 50%	30	34	64
Total		200	207	407

TRADE4-Which of the two would you prefer? * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
TRADE4-Which of the two would you prefer?	first one	99	114	213
	second one	89	84	173
	no preference	1	4	5
	wouldn-t use either	7	3	10
	don-t know/refused	4	2	6
Total		200	207	407

JOURNEYTIME-5A * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
JOURNEYTIME-5A	5.00	6	17	23
	7.00	1	1	2
	10.00	18	31	49
	12.00	3	2	5
	15.00	32	34	66
	17.00	2	1	3
	18.00		1	1
	20.00	21	24	45
	23.00	1		1
	25.00	30	18	48
	27.00	1		1
	28.00		1	1
	30.00	21	18	39
	35.00	16	13	29
	38.00	1		1
	40.00	12	10	22
	45.00	16	12	28
	50.00	6	5	11
	55.00	2	2	4
	60.00	7	5	12
	65.00	3	1	4
	70.00		2	2
	75.00		1	1
	80.00	1	1	2
	90.00		6	6
	95.00		1	1
Total		200	207	407

JOURNEYTIME-5B * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
JOURNEYTIME-5B	5.00	7	10	17
	7.00	2	1	3
	10.00	16	35	51
	12.00	3	2	5
	13.00		1	1
	15.00	23	35	58
	17.00	1	1	2
	18.00	1		1
	20.00	38	23	61
	25.00	24	23	47
	30.00	24	19	43
	32.00	1		1
	33.00		1	1
	35.00	14	10	24
	40.00	17	10	27
	43.00	1		1
	45.00	10	10	20
	50.00	7	7	14
	55.00	4	2	6
	60.00	3	3	6
	65.00	3	4	7
	75.00	1	1	2
	80.00		1	1
	85.00		4	4
	90.00		1	1
	95.00		3	3
Total		200	207	407

DELAY-5A * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
DELAY-5A	less than 5%	7	6	13
	5%	13	4	17
	10%	23	31	54
	15%	25	23	48
	20%	45	74	119
	25%	25	15	40
	30%	18	10	28
	40%	17	16	33
	50%	14	11	25
	more than 50%	13	17	30
Total		200	207	407

DELAY-5B * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
DELAY-5B	less than 5%	33	43	76
	5%	14	14	28
	10%	9	21	30
	15%	11	13	24
	20%	17	14	31
	25%	25	18	43
	30%	27	16	43
	40%	10	22	32
	50%	14	18	32
	more than 50%	40	28	68
Total		200	207	407

TRADE5-Which of the two would you prefer? * QUOTA Crosstabulation

Count

		QUOTA		
		transit-work trip	transit-non-work	Total
TRADE5-Which of the two would you prefer?	first one	115	109	224
	second one	77	87	164
	no preference	3	4	7
	wouldn-t use either	3	3	6
	don-t know/refused	2	4	6
Total		200	207	407

Please think about your most recent #TRIPTYPE# by car. At about what time did you leave home to begin your trip? * QUOTA Crosstabulation

Count

		QUOTA	
		car - work trip	Total
Please think about your most recent #TRIPTYPE# by car. At about what time did you leave home to begin your trip?	-2.00	1	1
	60.00	1	1
	70.00	1	1
	180.00	1	1
	240.00	1	1
	270.00	1	1
	290.00	1	1
	300.00	1	1
	330.00	3	3
	345.00	1	1
	360.00	9	9
	375.00	1	1
	380.00	1	1
	390.00	11	11
	405.00	4	4
	420.00	27	27
	435.00	7	7
	450.00	14	14
	455.00	1	1
	460.00	2	2
	465.00	6	6
	470.00	4	4
	474.00	1	1
	475.00	1	1
	480.00	22	22
	495.00	3	3
	510.00	11	11
	520.00	2	2
	525.00	7	7
	540.00	13	13
	555.00	2	2
	570.00	2	2
	585.00	2	2
	590.00	1	1
	600.00	9	9
	630.00	1	1
	660.00	1	1
	720.00	1	1
	780.00	2	2
	810.00	1	1
	840.00	3	3
	870.00	1	1
	900.00	1	1
	930.00	1	1
	945.00	1	1
	960.00	2	2
	1000.00	1	1
	1020.00	1	1
	1050.00	2	2
	1080.00	1	1
	1110.00	1	1
	1200.00	1	1
	1230.00	1	1
	1350.00	1	1
	1380.00	1	1
	1395.00	1	1
	1410.00	1	1
Total		202	202

How long did it take you to drive from home to where you parked your car near work? * QUOTA Crosstabulation

Count

		QUOTA	
		car - work trip	Total
How long did it take you to drive from home to where you parked your car near work?	3.00	2	2
	5.00	12	12
	6.00	6	6
	7.00	6	6
	8.00	3	3
	10.00	33	33
	11.00	1	1
	12.00	3	3
	13.00	1	1
	15.00	46	46
	18.00	1	1
	20.00	39	39
	25.00	12	12
	30.00	26	26
	40.00	5	5
	45.00	4	4
	60.00	2	2
Total		202	202

What type of parking did you use? * QUOTA Crosstabulation

Count

		QUOTA	
		car - work trip	Total
What type of parking did you use?	free employee garage/lot	48	48
	paid employee garage/lot	12	12
	free public garage/lot	15	15
	paid public garage/lot	48	48
	free on-street	57	57
	paid on-street	16	16
	residential space	6	6
Total		202	202

Which of the following best describes the availability of parking in that area of the city at the time of day you go to work? * QUOTA Crosstabulation

Count

		QUOTA	
		car - work trip	Total
Which of the following best describes the availability of parking in that area of the city at the time of day you go to work?	employer provides a space	49	49
	free spaces available	66	66
	free spaces hard to find	43	43
	no free spaces	41	41
	don-t know/refused	3	3
Total		202	202

2-The cost of parking at or near your destination. * QUOTA Crosstabulation

Count

		QUOTA			
		transit-work trip	transit-non-work	car - work trip	Total
2-The cost of parking at or near your destination.	.00	66	78	55	199
	1.00	4	5	6	15
	2.00	5	6	4	15
	3.00	2	7	4	13
	4.00	4	4	10	18
	5.00	16	23	29	68
	6.00	4	6	9	19
	7.00	9	17	15	41
	8.00	14	12	20	46
	9.00	10	7	7	24
	10.00	66	42	43	151
Total		200	207	202	609

3-The traffic congestion on the roads. * QUOTA Crosstabulation

Count

		QUOTA			
		transit-work trip	transit-non-work	car - work trip	Total
3-The traffic congestion on the roads.	.00	40	51	38	129
	1.00	3	4	8	15
	2.00	9	10	12	31
	3.00	9	10	7	26
	4.00	7	8	9	24
	5.00	30	29	38	97
	6.00	7	8	13	28
	7.00	20	17	11	48
	8.00	16	25	27	68
	9.00	10	6	9	25
	10.00	49	39	30	118
Total		200	207	202	609

6-The reliability of the public transit services. * QUOTA Crosstabulation

Count

		QUOTA			
		transit-work trip	transit-non-work	car - work trip	Total
6-The reliability of the public transit services.	.00	9	14	35	58
	1.00	2	3		5
	2.00	4	3	7	14
	3.00	3	3	6	12
	4.00	4	8	6	18
	5.00	21	24	24	69
	6.00	7	5	11	23
	7.00	17	28	11	56
	8.00	19	33	27	79
	9.00	13	13	13	39
	10.00	101	73	62	236
Total		200	207	202	609

7-The need to transfer between transit lines. * QUOTA Crosstabulation

Count

		QUOTA			
		transit-work trip	transit-non-work	car - work trip	Total
7-The need to transfer between transit lines.	.00	55	37	62	154
	1.00	6	8	2	16
	2.00	7	3	5	15
	3.00	5	5	7	17
	4.00	3	8	6	17
	5.00	34	27	28	89
	6.00	5	14	4	23
	7.00	16	19	13	48
	8.00	18	20	20	58
	9.00	7	15	11	33
	10.00	44	51	44	139
Total		200	207	202	609

8-The time it takes riding in the transit vehicles. * QUOTA Crosstabulation

Count

		QUOTA			
		transit-work trip	transit-non-work	car - work trip	Total
8-The time it takes riding in the transit vehicles.	.00	8	14	37	59
	1.00	3	7	2	12
	2.00	4	7	4	15
	3.00	9	11	3	23
	4.00	8	5	6	19
	5.00	27	33	28	88
	6.00	8	12	10	30
	7.00	26	29	15	70
	8.00	32	28	13	73
	9.00	14	11	17	42
	10.00	61	50	67	178
Total		200	207	202	609

9-The difficulty of getting a seat in the transit vehicles. * QUOTA Crosstabulation

Count

		QUOTA			
		transit-work trip	transit-non-work	car - work trip	Total
9-The difficulty of getting a seat in the transit vehicles.	.00	21	28	55	104
	1.00	10	11	6	27
	2.00	14	12	7	33
	3.00	22	19	18	59
	4.00	9	16	12	37
	5.00	42	36	32	110
	6.00	16	10	8	34
	7.00	21	21	17	59
	8.00	20	17	18	55
	9.00	5	12	5	22
	10.00	20	25	24	69
Total		200	207	202	609

10-Personal safety at the transit stops and in the vehicles. * QUOTA Crosstabulation

Count

		QUOTA			
		transit-work trip	transit-non-work	car - work trip	Total
10-Personal safety at the transit stops and in the vehicles.	.00	15	17	40	72
	1.00	3	6	7	16
	2.00	8	7	7	22
	3.00	9	6	11	26
	4.00	3	8	8	19
	5.00	16	14	32	62
	6.00	5	8	11	24
	7.00	15	7	14	36
	8.00	15	26	14	55
	9.00	14	14	5	33
	10.00	97	94	53	244
Total		200	207	202	609

11-The adequacy of sidewalks and crosswalks for pedestrians. * QUOTA Crosstabulation

Count

		QUOTA			
		transit-work trip	transit-non-work	car - work trip	Total
11-The adequacy of sidewalks and crosswalks for pedestrians.	.00	22	24	54	100
	1.00	3	9	5	17
	2.00	12	9	17	38
	3.00	10	7	8	25
	4.00	4	2	7	13
	5.00	27	20	34	81
	6.00	7	11	9	27
	7.00	10	13	13	36
	8.00	23	27	12	62
	9.00	14	15	6	35
	10.00	68	70	37	175
Total		200	207	202	609

12-Personal safety while walking and crossing streets. * QUOTA Crosstabulation

Count

		QUOTA			
		transit-work trip	transit-non-work	car - work trip	Total
12-Personal safety while walking and crossing streets.	.00	16	19	49	84
	1.00	4	6	7	17
	2.00	8	8	12	28
	3.00	10	6	11	27
	4.00	4	1	4	9
	5.00	23	15	23	61
	6.00	4	10	10	24
	7.00	12	12	11	35
	8.00	14	28	12	54
	9.00	12	9	12	33
	10.00	93	93	51	237
Total		200	207	202	609

13-The presence of steep grades and hills along the way. * QUOTA Crosstabulation

Count

		QUOTA			
		transit-work trip	transit-non-work	car - work trip	Total
13-The presence of steep grades and hills along the way.	.00	52	43	68	163
	1.00	8	17	6	31
	2.00	13	18	22	53
	3.00	27	10	10	47
	4.00	4	7	10	21
	5.00	29	24	30	83
	6.00	9	11	16	36
	7.00	13	17	10	40
	8.00	12	20	11	43
	9.00	9	5	2	16
	10.00	24	35	17	76
Total		200	207	202	609

14-The presence of shops, restaurants and parks to stop at along the way. * QUOTA Crosstabulation

Count

		QUOTA			
		transit-work trip	transit-non-work	car - work trip	Total
14-The presence of shops, restaurants and parks to stop at along the way.	.00	57	45	80	182
	1.00	16	15	13	44
	2.00	17	15	12	44
	3.00	16	6	7	29
	4.00	3	10	8	21
	5.00	33	31	31	95
	6.00	10	12	13	35
	7.00	9	11	15	35
	8.00	16	26	11	53
	9.00	6	9	2	17
	10.00	17	27	10	54
Total		200	207	202	609

ıcluding yourself, how many people are currently living in your household? * QUOTA Crosstabulation

Count

		QUOTA			
		transit-work trip	transit-non-work	car - work trip	Total
Including yourself, how many people are currently living in your household?	1.00	47	63	39	149
	2.00	62	75	74	211
	3.00	42	30	32	104
	4.00	23	25	36	84
	5.00	17	10	11	38
	6.00	8	2	4	14
	7.00	1	2	3	6
	8.00			1	1
	9.00			1	1
	11.00			1	1
Total		200	207	202	609

How many of those people children under the age of 18? * QUOTA Crosstabulation

Count

		QUOTA			
		transit-work trip	transit-non-work	car - work trip	Total
How many of those people children under the age of 18?	.00	107	100	100	307
	1.00	24	28	33	85
	2.00	13	13	20	46
	3.00	9	3	7	19
	4.00			2	2
	5.00			1	1
Total		153	144	163	460

ncluding yourself, how many people in the household are currently employed full or part time (20 hours or more per week)? * QUOTA Crosstabulation

Count

		QUOTA			
		transit-work trip	transit-non-work	car - work trip	Total
Including yourself, how many people in the household are currently employed full or part time (20 hours or more per week)?	.00		16		16
	1.00	25	38	26	89
	2.00	87	66	102	255
	3.00	22	12	21	55
	4.00	14	10	10	34
	5.00	3	1	3	7
	6.00	2	1		3
	7.00			1	1
Total		153	144	163	460

How many vehicles, including cars, trucks, vans and motorcycles, are available for use by members of your household? * QUOTA Crosstabulation

Count

		QUOTA			
		transit-work trip	transit-non-work	car - work trip	Total
How many vehicles, including cars, trucks, vans and motorcycles, are available for use by members of your household?	.00	38	57		95
	1.00	86	79	65	230
	2.00	50	54	84	188
	3.00	17	12	31	60
	4.00	8	4	16	28
	5.00		1	4	5
	6.00	1		2	3
Total		200	207	202	609

Do you currently rent or own your home? * QUOTA Crosstabulation

Count

		QUOTA			
		transit-work trip	transit-non-work	car - work trip	Total
Do you currently rent or own your home?	rent	143	131	96	370
	own	55	71	105	231
	other (specify)		2	1	3
	refused	2	3		5
Total		200	207	202	609

Could you please tell me your age? * QUOTA Crosstabulation

Count

		QUOTA			
		transit-work trip	transit-non-work	car - work trip	Total
Could you please tell me your age?	less than 18	5	12	1	18
	18-24	29	21	13	63
	25-29	43	18	27	88
	30-34	26	24	23	73
	35-39	23	24	30	77
	40-44	23	18	35	76
	45-49	18	15	24	57
	50-54	17	19	23	59
	55-59	6	8	7	21
	60-65	3	14	12	29
	over 65	6	28	1	35
	refused	1	6	6	13
Total		200	207	202	609

GENDER (ASK ONLY IF NECESSARY) * QUOTA Crosstabulation

Count

		QUOTA			
		transit-work trip	transit-non-work	car - work trip	Total
GENDER (ASK ONLY IF NECESSARY)	male	74	96	110	280
	female	126	111	92	329
Total		200	207	202	609

Are you currently...? * QUOTA Crosstabulation

Count

		QUOTA			
		transit-work trip	transit-non-work	car - work trip	Total
Are you currently...?	employed full time	148	75	160	383
	employed part time	40	21	19	80
	self employed	10	18	21	49
	looking for work		12		12
	retired		42		42
	student	2	23	1	26
	homemaker		11		11
	other (specify)		3		3
	refused		2	1	3
Total		200	207	202	609

What type of business do you work in? * QUOTA Crosstabulation

Count

		QUOTA			
		transit-work trip	transit-non-work	car - work trip	Total
What type of business do you work in?	Construction	8	5	14	27
	Trade	25	9	28	62
	Manufacturing	3	1	3	7
	Transport	3	2	3	8
	Utilities	2		4	6
	Government	19	5	25	49
	Medical	13	6	23	42
	Financial	23	8	9	40
	Insurance		1	2	3
	Real estate	1	2	8	11
	Service industry	75	32	55	162
	Other (specify)	27	22	26	75
	refused	1	3	2	6
Total		200	96	202	498

And what is your job or position there? * QUOTA Crosstabulation

Count

		QUOTA			
		transit-work trip	transit-non-work	car - work trip	Total
And what is your job or position there?	Management	31	18	54	103
	Administrative	32	10	14	56
	Clerical	27	5	14	46
	Professional	36	16	42	94
	Technician	15	9	16	40
	Laborer	7	4	6	17
	Machine operator	1	1	2	4
	Sales	17	7	17	41
	Artist/craftsman	6	5	10	21
	Driver/hauler	2	2	5	9
	Household services	7	4	1	12
	Protective services	2	1	1	4
	Other (specify)	16	12	17	45
	refused	1	2	3	6
Total		200	96	202	498

Does your employer provide free parking at work or subsidize the cost of parking elsewhere? * QUOTA Crosstabulation

Count

		QUOTA			
		transit-work trip	transit-non-work	car - work trip	Total
Does your employer provide free parking at work or subsidize the cost of parking elsewhere?	provides free parking	27	18	67	112
	subsidizes parking cost	11	5	13	29
	neither	146	49	100	295
	not relevant	12	20	19	51
	other (specify)	3		3	6
	refused	1	4		5
Total		200	96	202	498

Does your employer subsidize the cost of taking public transportation to work? * QUOTA Crosstabulation

Count

		QUOTA			
		transit-work trip	transit-non-work	car - work trip	Total
Does your employer subsidize the cost of taking public transportation to work?	-2.00			2	2
	yes	26	6	26	58
	no	167	70	152	389
	not relevant	7	18	19	44
	other (specify)			3	3
	refused		2		2
Total		200	96	202	498

inally, including all members of your household who work, could you please tell me wha is your households total annual income before taxes? * QUOTA Crosstabulation

Count

		QUOTA			
		transit-work trip	transit-non-work	car - work trip	Total
Finally, including all members of your household who work, could you please tell me what is your households total annual income before taxes?	Under $5,000	2	5	1	8
	$5,000 - 9999	3	6		9
	$10,000-14999	4	8	2	14
	$15,000-19999	5	6	2	13
	$20,000-24999	8	8	3	19
	$25,000-29999	15	9	2	26
	$30,000-34999	21	15	11	47
	$35,000-39999	3	10	12	25
	$40,000-49999	15	13	17	45
	$50,000-59999	11	14	11	36
	$60,000-74999	19	16	26	61
	$75,000-99999	29	18	26	73
	$100,000-124999	15	7	22	44
	$125,000-149999	3	2	15	20
	$150,000-199999	6	4	7	17
	$200,000 or more	3	8	7	18
	don-t know	11	19	10	40
	refused	27	39	28	94
Total		200	207	202	609

Report

Mean

	QUOTA			
	transit- work trip	transit- non-work	car - work trip	Total
1-The difficulty of finding a parking spot near your destination.	4.9550	5.5169	5.8911	5.4565
2-The cost of parking at or near your destination.	5.3250	4.3623	5.0644	4.9113
3-The traffic congestion on the roads.	5.5800	5.0338	5.1040	5.2365
4-The cost of using public transportation.	5.6850	5.2029	2.4604	4.4516
5-The time it takes to get from home to a transit stop.	6.1700	5.7198	4.4802	5.4565
6-The reliability of the public transit services.	7.9000	7.2802	6.2970	7.1576
7-The need to transfer between transit lines.	5.0300	5.8841	5.0050	5.3120
8-The time it takes riding in the transit vehicles.	7.1350	6.4589	6.3119	6.6322
9-The difficulty of getting a seat in the transit vehicles.	4.9900	5.0097	4.3465	4.7833
10-Personal safety at the transit stops and in the vehicles.	7.4450	7.2995	5.4307	6.7274
11-The adequacy of sidewalks and crosswalks for pedestrians.	6.5500	6.5894	4.5842	5.9113
12-Personal safety while walking and crossing streets.	7.1950	7.2367	5.1782	6.5402
13-The presence of steep grades and hills along the way.	4.1900	4.6908	3.5248	4.1396
14-The presence of shops, restaurants and parks to stop at along the way.	3.7500	4.6667	3.1386	3.8588