NCTC Model Development Report

Prepared for

Nevada County Transportation Commission

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Table of Contents

Appendicies

List of Figures

List of Tables

1

Introduction

The purpose of this report is to present the Travel Demand Forecasting (TDF) model built for the Nevada County Transportation Commission (NCTC) in partnership with the City of Grass Valley. This report describes the model development process, including the data sources used to develop key model inputs.

General Discussion Of The Tdf Model

This section summarizes the answers to commonly asked questions related to TDF models and how NCTC and the City of Grass Valley can use a TDF model.

What is a TDF model?

A TDF model is a computer program that simulates traffic levels and travel patterns for a specific geographic area. The program consists of input files that summarize the area's land uses, roadway network, travel characteristics, and other key factors. Using this data, the model performs a series of calculations to determine the amount of trips generated, the beginning and ending location of each trip, and the route taken by the trip. The model's output includes projections of traffic volumes on major roads, and peak hour turning movements at certain key intersections.

How is a TDF model useful?

The TDF model is a valuable tool for preparing long-range transportation planning studies, like the Regional Transportation Plan. The travel model can be used to estimate the average daily and peak hour traffic volumes on the major roads in response to planned population and employment growth, changes in transportation infrastructure, policy assumptions, and provides a consistent platform to analyze different land use and transportation scenarios.

How do we know if the TDF model is accurate?

To be deemed accurate for projecting traffic volumes in the future, a model must first be calibrated to a year in which actual land use data and traffic volumes are available and well documented. A model is accurately validated when it replicates the actual traffic counts on the major roads within certain ranges of error established in 2010 California Regional Transportation

Plan Guidelines (California Transportation Commission [CTC], 2010) and it demonstrates stable responses to varying levels of inputs.

The NCTC model has been calibrated and validated to 2012 base year conditions using actual traffic counts, census data, and land use data compiled by NCTC staff.

Is the NCTC TDF model consistent with standard practices?

The NCTC model is consistent in form and function with standard travel forecasting models used in transportation planning. The model includes a land-use based trip generation module, a gravity-based trip distribution model, and a capacity-constrained equilibrium traffic assignment process. While it is not sensitive to mode choice in relation to transit, walk or bike, the model was built in a framework that would allow active-mode sensitivity if the need arises. The travel model uses Version 6.0 (Build 6030) of the TransCAD transportation planning software, which is consistent with many of the models used by local jurisdictions in California and throughout the nation.

How can the TDF model be used?

The TDF model can be used for many purposes related to the planning and design of Nevada County's transportation system. The following is a partial listing of the potential uses of the TDF model.

- To update the land use and circulation elements of City or County general plans
- To update the action element of the Regional Transportation Plan
- To conduct a regional transportation mitigation fee program
- To evaluate the traffic impacts of areawide land use plan alternatives
- To evaluate the shift in traffic resulting from a roadway improvement
- To evaluate the traffic impacts of land development proposals
- To determine trip distribution patterns of land development proposals
- To support the development of transportation sections of Environmental Impact Reports (EIRs)
- To support the preparation of project development reports for Caltrans

Study Area and Roadway Network

Figure 1 shows the model area for the NCTC travel forecasting model. The model area encompasses the western half of Nevada County and excludes the eastern portion of the County, most notably, the City of Truckee. The model area extents were chosen to be consistent with the Western Nevada County "isolated rural non-attainment area" boundary.

Figure 1

NCTC Model Area

2

Model Input Data

Data Collection

A data collection effort was undertaken at the outset of the model development process. Data sources included Nevada County for Geographic Information Systems (GIS) data and traffic counts and Caltrans Traffic Data Branch for freeway counts. The City of Grass Valley, Nevada City, Nevada County, and NCTC also provided land use data. Additional data sources are listed below.

- Census Bureau data
- 2012 InfoUSA employment data
- Department of Finance (DOF) housing estimates
- California Statewide Household Travel Survey, 2001
- Employment Development Department (EDD) employment estimates
- Longitudinal Employer-Household Dynamics (LEHD) data

Land Use Data

Land use data is one of the primary inputs to the NCTC model and this data is instrumental in estimating trip generation. The model's primary source of land use data is Nevada County's parcel land use database, which was updated by NCTC, Nevada County, Nevada City, and Grass Valley staff to reflect 2012 conditions. As part of the update, NCTC staff conducted field checks on non-residential land uses in the County to verify existing conditions. Residential land uses were verified via aerial reviews and GIS analysis. This database was then aggregated into the model's traffic analysis zone (TAZ) structure.

The land use data in the model is divided into several residential and non-residential categories. The NCTC model has 21 land use categories, which are described in Table 1.

Table 1 Model Land Use Categories

Land Use Type	Model LU	Units
Single Family Dwelling Unit	SF	Dwelling Units
Multi-Family Dwelling Unit	MF	Dwelling Units
Mobile Home Unit	MH	Dwelling Units
Senior Housing	SEN	Dwelling Units
Office	OFF	Thousand Square Feet
Medical Office	MEDOFF	Thousand Square Feet
Hospital	HOSP	Beds
Light Industrial	LI	Thousand Square Feet
Warehouse	WARE	Thousand Square Feet
Church	CHURCH	Thousand Square Feet
Public/Quasi-Public	PQP	Thousand Square Feet
Park	PARK	Acres
Retail	RET	Thousand Square Feet
Golf Course	GOLF	Holes
Restaurant	REST	Thousand Square Feet
Fast-Food (Hi-Turnover) Restaurant	RESTHI	Thousand Square Feet
Gas Stations	GAS	Pumps
Hotel/Lodging	LODGING	Rooms
K-8 School	K8	Students
High School	HIGHSCH	Students
College/University	COLL	Students

Source: Fehr & Peers, 2014

Traffic Analysis Zone System

TAZs represent geographic areas containing land uses that produce or attract vehicle-trip ends. Travel demand models use TAZs to connect land uses to the roadway network. The TAZ boundaries for the NCTC model were developed from the Nevada County parcel layer and closely nest within the City and community boundaries in Nevada County.

Table 2 lists the TAZ number ranges corresponding to Jurisdictions within Nevada County. Detailed maps showing the TAZ numbers in all portions of the model area are included in Appendix A.

Table 2 TAZ Numbering Range

Jurisdiction	TAZ Range	Number of TAZs
Grass Valley	100 - 364	265
Grass Valley SOI	400 - 481	82
Nevada City	500 - 585	86
Nevada City SOI	600 - 650	51
Lake Wildwood	700 - 712	13
Penn Valley	800 - 807	8
Lake of the Pines	900 - 925	26
Alta Sierra	1000 - 1029	30
Unincorporated County	1100 - 1555	456
Total Number of TAZs		1,023

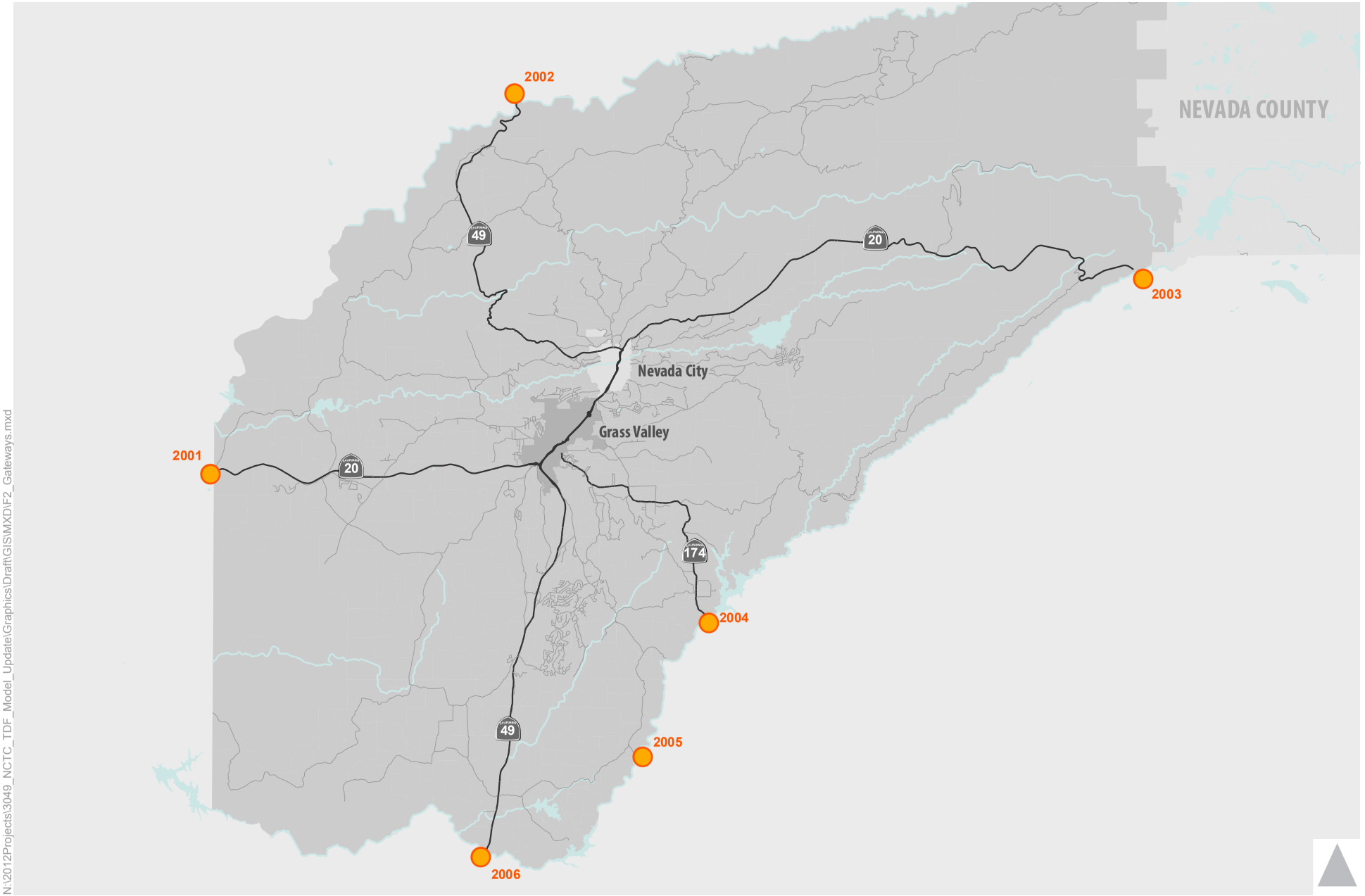
Source: Fehr & Peers, 2014

Also included in the TAZ structure are the external stations at points where major roadways provide access into the model area (see Figure 2 for specific locations). The external stations represent all major routes by which traffic can enter, exit, or pass through the model area. Table 3 lists the six external stations (numbered from 2001 to 2006) established for this model.

Table 3 External Stations

ID	Description
2001	SR 20 – West of Mooney Flat Road / Lombardi Road (Yuba County, CA)
2002	SR 49 – North of Heron Road (Sierra County, CA)
2003	SR 20 – East of Zeibright Road (Western Nevada County, CA)
2004	SR 174 – Southeast of Redberry Road (Placer County, CA)
2005	Dog Bar Road – South of Springfield Drive (Placer County, CA)
2006	SR 49 – South of Linnet Lane (Placer County, CA)

Source: Fehr & Peers, 2014



External Stations

2001 Station ID

Figure 2

NCTC Model External Stations

Roadway Network

The detailed roadway network for the base year model was developed from the Nevada County GIS centerline file provided by Nevada County staff. The model roadway network includes all freeways, arterials, collectors, local, and rural roads within the study area (see Figure 1).

As is typical for travel demand models, the model network focuses on the most used facility types. Residential and rural streets are included on the network, but are not widely assigned trips. The roadway classifications included in the model, and consistent with the Nevada County General Plan, are described below.

Freeways

Freeways are high-capacity facilities that primarily serve longer distance travel. Access is limited to interchanges typically spaced at least one mile apart. A major section of State Route (SR) 49 passing through the Cities of Grass Valley and Nevada City is classified as a freeway.

Principal Arterials

Roadways designated as principal arterials are typically major roads that are not limited-access freeways. In Nevada County, these facilities serve travel between the neighboring jurisdictions and focus on regional auto traffic. Major Arterials typically provide four to six travel lanes and have a posted speed limit of 35 miles per hour (mph) or greater. Portions of SR 20 and SR 49 are designed to principal arterial standards.

Minor Arterials

Roadway segments classified as Minor Arterials provide connections between neighbors in Nevada County. Minor Arterials generally provide two travel lanes and typically have a posted speed limit of 35 mph or greater. Examples of these arterials are Brunswick Road and East Main Street.

Collectors (Major and Minor)

Collectors (Major and Minor) are facilities that connect local streets to the arterial system, and may also provide direct access to local land uses. Collectors generally provide two travel lanes and typically have a posted speed limit of 25 mph or greater. Examples of Collectors are Rough and Ready Highway (Major) and Banner Lava Cap Road (Minor).

Local Streets

Local Streets primarily feed collector roads and generally provide two travel lanes with a posted speed limit of 25-30 mph. The model network focuses on freeways, arterials, and collectors but does include most of the local streets represented in the Nevada County GIS centerline file to provide access from traffic analysis zones to the larger network. If a project application needs to assess local roadway performance, the model has been designed such that detail can be added to improve its sensitivity related to these facilities. These types of changes would typically be performed as part of a specific project application.

The roadway network database includes a street name, distance, functional class, speed, capacity, and number of lanes for each record. These attributes were checked using maps, aerial photographs, and other data provided by NCTC. Table 4 shows the initial roadway speeds and capacities used for each roadway class in the model. Where necessary, these values were adjusted to reflect the relative attractiveness of roadways in relation to each other. The speeds listed in the model are primarily used during the traffic assignment routine and may not reflect posted speed limits.

Table 4 Typical Model Roadway Speeds and Capacities

Roadway Functional Classification	Speed Range (MPH)	Lane Capacity Range (vphl)[1]
Freeways	60 - 65	1,600 – 1,800
Ramps and Access Roads	40 - 65	700 – 1,800
Arterials (Principal & Minor)	35 - 50	700 – 1,100
Major Collectors	25 - 50	600 – 750
Minor Collectors	25 - 50	550
Local Streets	25 - 30	350 – 375
Centroid Connectors[2]	25	10,000

1. vphl - vehicles per hour, per lane
2. Centroid connectors are abstract representations of the starting and ending point of each trip, and therefore should have no capacity constraints

Source: Fehr & Peers, 2014.

03

Model Calibration

Model calibration is the term used to describe the process by which the coefficients and inputs of the model are determined and adjusted to better replicate travel behavior and traffic volumes. This section provides a general description of the calibration steps and the adjustments made during the process to achieve accuracy levels that are within the established CTC guidelines.

Trip Generation

Trip generation rates relate the number of vehicle trips going to and from a site to the type of land use intensity and diversity of that particular site. Each trip has two ends, a "production" and an "attraction". By convention, trips with one end at a residence are defined as being "produced" by the residence and "attracted" to the other use (workplace, school, retail store, etc.), and are called "Home-Based" trips. Trips that do not have one end at a residence are called "Non-Home-Based" trips.

There are 5 trip purposes used in the NCTC model:

- Home-Based Work (HBW): trips between a residence and a workplace
- Home-Based Other (HBO): trips between a residence and any other destination
- Non-Home-Based (NHB): trips that do not begin or end at a residence, such as traveling from a workplace to a restaurant, or from a retail store to a bank
- School (SCHOOL): trips to and from a school (K-12)
- Sierra (SIERRA): trips to and from Sierra College

Trip generation rates are initially defined for total trips and later split by trip purpose, for both productions and attractions.

At the time the trip generation sub model was developed, the most widely used source for individual project vehicle trip generation rates in transportation planning was Trip Generation, 8th Edition (Institute of Transportation Engineers [ITE], 2008). The book contains national averages of trip generation rates for a variety of land uses in what are generally suburban locations. ITE has since released a 9th Edition of the

book with little to no updates to the trip generation rates for land uses categories similar to those represented in the model.

The ITE land use categories tend to be very specific, while model land use categories (accounting for all land use in the County) tend to be more general. ITE rates are appropriate for smaller site-specific uses, such as traffic studies for development review, and commonly provide a starting point for travel models. However, the unique characteristics of Nevada County require the development of specific trip generation rates for the model.

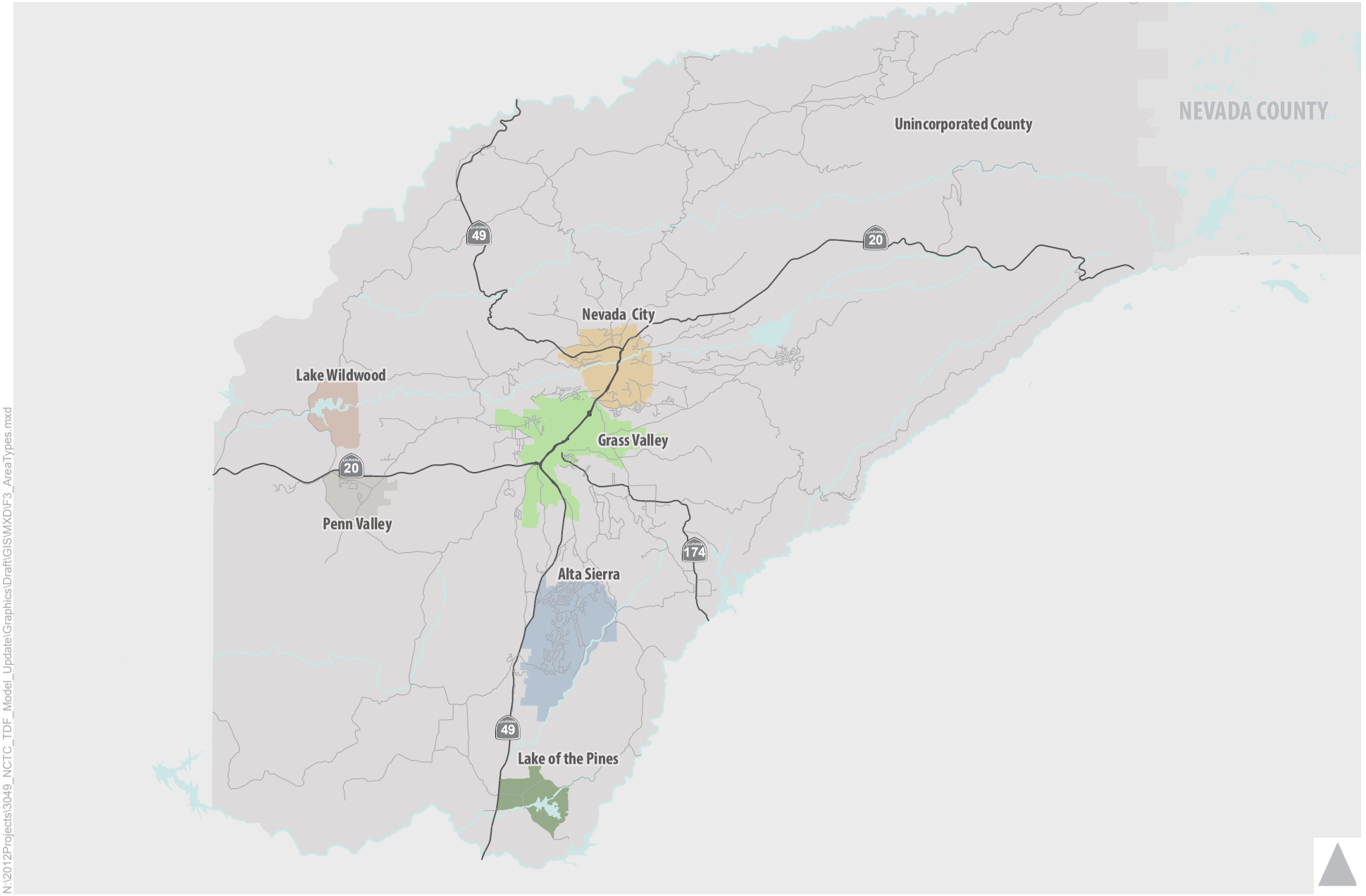
The trip generation rates developed for the NCTC model used previously calibrated rates developed for the Grass Valley and Calaveras County models. These models were selected because they share some socioeconomic and land use characteristics with Nevada County. The rates were then modified to account for local conditions based on traffic counts, production-to-attraction balancing (discussed below), and the difference between ITE and model land use definitions. The final trip generation rates are unique to Nevada County, and they are ultimately based upon the results of successful model calibration and validation.

Area Types

In addition to the standard trip generation procedures, the model area was divided into seven area types derived from the Nevada County General Plan Community Region boundaries to better capture the different trip making characteristics that exist in the County.

Travel demand models frequently benefit from different trip generation rates for single land use categories. For example, single family residences may have different vehicular trip generation characteristics depending on where they are located within the County. For the NCTC model, trip generation and vacancy rates were developed and applied at the refined area type geography rather than county-wide. Trip generation rates for each land use in each area type are listed in Appendix B.

Figure 3 shows the area types applied to the TAZ structure of the NCTC model.



N:\2012Projects\3049_NCTC_TDF_Model_Update\Graphics\Draft\GIS\MXD\F3_AreaTypes.mxd

Figure 3

NCTC Model Area Types

Trip Productions And Attractions

Local trips (internal-to-internal, or I-I) are trips that both start and end in the study area. One of the basic requirements of any travel model is that the total number of local trips produced is equal to the total number of local trips attracted. It is logically assumed that if a journey is started somewhere, it must have an ending somewhere else. If the total productions and attractions are not equal, the model will typically adjust the attractions to match the productions, thus ensuring that each departing traveler finds a destination. While it is never possible to achieve a perfect match between productions and attractions prior to the automatic balancing procedure, a substantial mismatch in one or more trip purposes may indicate an error in the model land use inputs or trip generation.

Table 5 summarizes the local trip productions and attractions from the NCTC model for each trip purpose, prior to the application of the automatic balancing procedure. Guidelines published by Federal Highway Administration's Transportation Model Improvement Program (TMIP) and National Highway Cooperative Research Program (NCHRP) suggest that, prior to balancing, the number of productions and attractions should match to within plus or minus 10% (i.e., the production-to-attraction ratio should be within the range of 0.90 to 1.10). The results shown in Table 5 indicate that the 2012 model meets the published guidelines for all trip purposes.

Table 5 Trip Production to Attraction Ratios by Purpose

Trip Purpose	Production / Attraction Ratio	Percent of Total Daily Vehicle Trips	
		NCTC Model	California
Home-Based Work (HBW)	1.02	16%	21%
Home-Based Other (HBO)	1.01	51%	48%
Non-Home-Based (NHB)	0.98	33%	31%
Total		100%	100%

1. The trip purposes listed are the broad categories applied in most every travel model. The more specific NCTC trip purposes are subsets of these broader trip purposes, and have been aggregated here for ease of comparison. The School and Sierra purposes are subsets of the HBO trip purpose.
2. 2001 California Statewide Household Travel Survey Final Report, June 2002.
Source: Fehr & Peers, 2014.

Trip Distribution (Gravity Model)

Once the trip generation step has estimated the number of trips that begin and end in each zone, the trip distribution process determines the specific destination of each originating trip. The destination may be within the zone itself, resulting in an intra-zonal trip. If the destination is outside of the zone of origin, it is an inter-zonal trip. Inter-zonal trips consist of three types.

- Internal-internal (I-I) trips that originate and terminate within the model area.
- Internal-external (I-X) trips that originate within but terminate outside of the model area.
- xternal-internal (X-I) trips that originate outside and terminate inside of the model area.

Trips passing completely through the model area, without stopping, are external-external (X-X).

The trip distribution model uses a gravity model equation to distribute trips to all zones. This equation estimates an accessibility index for each zone based on the number of attractions in each zone and the travel time between zones. Each attraction zone is given its share of productions based on its share of the accessibility index. This process applies to the I-I, I-X, and X-I trips. The X-X trips are added to the trip matrix prior to final assignment.

Friction Factors

Friction factors, also known as travel time factors, are used in calculating the relative attractiveness of each destination zone based on the travel time between TAZs and the number of potential origins and destinations in each TAZ. These factors are used in the trip distribution stage of the model. The NCTC model friction factors are based on data reported in national modeling reference documents such as National Cooperative Highway Research Program (NCHRP) 365. See Appendix C for friction factor curves.

Internal/External Trips Interactions

One of the important inputs to a travel model is an estimate of the amount of travel between the study area and neighboring areas outside the model. These are typically called internal-external, or I-X/X-I, trips.

The United States Census Bureau surveys residential and work locations at the place level. Based on this data, the proportion of HBW trips entering and leaving the model area was estimated for each area type. For non-work trip purposes, information from the previous NCTC model and City of Grass Valley model, as well as the California Household Travel Survey, was used to develop initial estimates of the percent of HBO and NHB trips that travel between the County to other regions. These estimates were then refined using the County's land use database and external station counts. Table 6 summarizes the proportion of trips by purpose and area type that are assumed to have one end outside the model area.

Table 6 Percent of Trips by Purpose That are Internal/External for Each Area Type

Purpose		Home-Based Work (HBW)	Home-Based Other (HBO)	Non-Home-Based (NHB)	School	Sierra
Grass Valley	Prod.	11%	5%	6%	0%	0%
	Attr.	4%	7%	5%	1%	1%
Nevada City	Prod.	16%	15%	3%	0%	0%
	Attr.	5%	4%	4%	1%	0%
Lake Wildwood	Prod.	25%	25%	1%	0%	0%
	Attr.	1%	5%	1%	0%	0%
Penn Valley	Prod.	18%	5%	1%	0%	0%
	Attr.	2%	2%	3%	0%	0%
Lake of the Pines	Prod.	70%	25%	5%	0%	0%
	Attr.	5%	5%	2%	0%	0%
Alta Sierra	Prod.	24%	10%	5%	0%	0%
	Attr.	3%	2%	2%	0%	0%
Unincorporated County	Prod.	24%	14%	10%	0%	0%
	Attr.	4%	3%	1%	0%	0%

Prod. - Productions, Attr. - Attractions
Source: Fehr & Peers, 2014.

After the number of I-X/X-I trips are estimated, these trips are distributed to the stations around the perimeter of the model area using external station weights. External station weights are based on counts collected at each external station (these are roadway segments at the border of the model area). The number of through trips at each station was subtracted from the count and the remainder was filled in by I-X/X-I trips estimates. The resulting external station weights are presented in Table 7.

Table 7 External Station Weights

ID	Description	Weight
2001	SR 20 – West of Mooney Flat Road / Lombardi Road (Yuba County, CA)	5%
2002	SR 49 – North of Heron Road (Sierra County, CA)	8%
2003	SR 20 – East of Zeibright Road (Western Nevada County, CA)	1%
2004	SR 174 – Southeast of Redberry Road (Placer County, CA)	18%
2005	Dog Bar Road – South of Springfield Drive (Placer County, CA)	4%
2006	SR 49 – South of Linnet Lane (Placer County, CA)	64%

Source: Fehr & Peers, 2014.

Through Trips

Through trips (also called external-external, or X-X trips) are trips that pass through the study area without stopping inside the study area. The major flows of through traffic in Nevada County use SR 49 and SR 20, with lower volumes of through traffic using other arterials. The size of these flows was estimated based on traffic counts collected as part of the model update.

Trip Assignment

The trip assignment process determines the route that each vehicle trip takes from a particular origin to a particular destination. It uses an iterative, capacity-restrained assignment routine to determine a travel path that minimizes travel time, while taking into account congestion delays caused by the other simulated trips in the model.

The general assignment process includes the following steps.

- Assign all trips to the links along their selected paths
- After all assignments, examine the volume on each link and adjust its impedance based on the volume-to-capacity ratio
- Repeat the assignment process for a set number of iterations or until specified criteria related to minimizing travel delays are satisfied

Calibration of the roadway network included modification of the centroid connectors to more accurately represent the location that traffic accesses local roads; adjustment of speeds from posted speed limits to reflect the attractiveness of the route and the prevailing speed of traffic; and adjustment of capacities to reflect the attractiveness of the route.

Time Periods

The NCTC model estimates travel for the average weekday (Monday through Friday). The daily roadway volumes are aggregated from the AM and PM peak period, and Mid-day and Evening off-peak period assignments. Additionally, the model performs AM and PM peak one hour assignments. Descriptions of each assignment time period are presented in Table 8. The specific time periods represented in the model were developed by reviewing the distribution of existing traffic counts across a 24 hour period as well as reviewing the time period distributions of travel models in neighboring jurisdictions (i.e. BCAG, SACOG, TRPA).

Table 8 Time Periods

Description	Duration	Time
AM Peak Period	3 Hours	6:00 – 8:59 AM
Mid-day Period	7 Hours	9:00 AM – 3:59 PM
PM Peak Period	3 Hours	4:00 – 6:59 PM
Off-Peak Period	11 Hours	7:00 PM – 5:59 AM
AM Peak Hour	1 Hour	7:00 – 7:59 AM
PM Peak Hour	1 Hour	5:00 – 5:59 PM

Source: Fehr & Peers, 2014.

Turn Penalties

Turn penalties are used to prohibit or add delay to certain turning movements. The NCTC model prohibits traffic from making turns across impassable medians. In addition, the model may prohibit U-turns at some locations in order to avoid counter-intuitive traffic routing. Turn penalties may be in effect during the entire day, during one or all peak periods, or only at the peak hour level.

4 Model Validation

Model validation is the term used to describe model performance in terms of how closely the model's output matches existing travel data in the base year. The extent to which model outputs match existing travel data validates the assumptions of the inputs.

Traditionally, most model validation guidelines have focused on the performance of the trip assignment function in accurately assigning trips to the roadway network. This metric is called static validation, and it remains the most common means of measuring model accuracy.

Models are seldom used for static applications; however, by far the most common use of models is to forecast how a change in inputs would result in a change in traffic conditions. Therefore, another test of a model's accuracy focuses on the model's ability to predict realistic differences in outputs as inputs are changed. This method is referred to as dynamic validation. This section describes the highest-level validation checks that have been performed for the NCTC model.

Static Validation

The most critical static measurement of the accuracy of any travel model is the degree to which it can approximate actual traffic counts in the base year. The 2010 California Regional Transportation Plan Guidelines, California Transportation Commission, contains the following specific static validation criteria and thresholds that have been used to evaluate the NCTC model performance.

- ***At least 75 percent of the roadway links for which counts are available should be within the maximum desirable deviation***, which ranges from approximately 15 to 60 percent depending on total volume (the larger the volume, the less deviation is permitted).
- ***A correlation coefficient of at least 0.88*** - The correlation coefficient estimates the overall level of accuracy between observed traffic counts and the estimated traffic volumes from the model. These coefficient ranges from 0 to 1, where 1.0 indicates that the model perfectly fits the data.

- *The percent root mean square error (RMSE) below 40%* - The RMSE is the square root of the model volume minus the actual count squared, divided by the number of counts. In other words, it is the average of all the link-by-link percent differences, and it is an indicator on how far the model volumes are away from counts, on link-by-link average, expressed as a percent. It is a measure similar to standard deviation in that it assesses the accuracy of the entire model.

In addition to these criteria, the model-wide volume-to-count ratio was checked against a desired maximum threshold of no more than a 10 percent deviation. The validity of the NCTC model was tested for 201 individual roadway segments under daily conditions and 53 roadways segments in AM and PM peak hour conditions. The results are shown in Table 9.

Table 9 Results of Model Validation

Validation Item	Criterion of Acceptance	Daily	AM Peak Hour	PM Peak Hour
Model-wide Volume-to-Count Ratio	Within ± 10%	-8%	-2%	-3%
Percent of Links Within Deviation Allowance	At Least 75%	86%	96%	89%
Correlation Coefficient	At Least 88%	96%	94%	97%
RMSE	40% or Less	28%	26%	17%

Source: Fehr & Peers, 2014.

Dynamic Validation

Static validation provides information on a model's ability to reproduce a static condition. However, the most common use of models is to forecast how a change in inputs would result in a change in traffic conditions. Dynamic validation tests, recommended in the 2010 California Regional Transportation Plan Guidelines, evaluate a model's response to changing inputs. The results of dynamic validation tests are inspected for reasonableness relative to the direction and magnitude of change. The tests described below do not reflect any planned changes or improvements.

Land Use Tests

The NCTC Model has been developed to be used as a tool to evaluate land use scenarios in planning efforts such as EIRs, City General Plans, and the Regional Transportation Plan. The specific dynamic validation tests completed for this model update are listed below.

- Add 10, 100, and 1,000 dwelling units to a TAZ
- Add 10,000 and 100,000 square feet of retail to a TAZ
- Remove 10 and 100 dwelling units from a TAZ
- Remove 10,000 and 100,000 square feet of retail from a TAZ

The key model output variables involved in the dynamic validation tests are vehicle trips (VT) generated and vehicle miles of travel (VMT). These tests are intended to reveal whether the model output changes in the correct direction and magnitude. The dynamic validation results for the land use changes are summarized in Table 10.

Table 10 Dynamic Validation: Change in Land Uses

Land Use Change	Change in TAZ Trip Generation	Model-wide Changes			
		Vehicle Trips	Vehicle Trips/HU or KSF	VMT	VMT/HU or KSF
Add 10 Housing Units	73	251,753	6.94	1,699,956	46.8
Add 100 Housing Units	714	252,294	6.93	1,700,454	46.7
Add 1,000 Housing Units	7,086	257,708	6.91	1,706,346	45.8
Remove 10 Housing Units	-72	251,632	6.94	1,699,862	46.9
Remove 100 Housing Units	-714	251,091	6.94	1,699,521	47
Add 10 KSF of Retail Space	515	251,834	81.5	1,700,384	550.6
Add 100 KSF of Retail Space	4,990	253,103	79.6	1,704,864	536.4
Remove 10 KSF of Retail Space	-444	251,551	82	1,699,754	554
Remove 100 KSF of Retail Space	-4,634	250,282	84	1,697,639	570

Source: Fehr & Peers, 2014.

Table 10 shows that the model responds reasonably to changes in land uses. For example, when changing residential uses, the change in overall model vehicle trip generation and VMT is stable across the entire range and produces results that are reasonable (i.e., 6.9 vehicle trips per household and 47 VMT per household). In addition, the change in trip generation at the TAZ level is as expected with the increase/decrease corresponding to the change in households. The magnitude of vehicle trip generation at the TAZ level (approximately 7.2 vehicle trip per household) is reasonable given the socioeconomic characteristics of the test area located in Grass Valley.

Roadway Network Tests

The specific network dynamic validation tests performed on the NCTC Model focused on what happens when network capacity crossing SR 20/49 is increased or decreased between Dorsey Drive and Sacramento Street. The specific tests are listed below.

- Add lanes to a roadway segment
- Add a new roadway segment
- Delete a roadway segment

The dynamic validation results for the network tests are summarized in Table 11.

Table 11 Dynamic Validation: Change in Roadway Network

Test	ADT Before Change		ADT After Change	
	Test Roadway	Screenline	Test Roadway	Screenline
Add one lane in each direction to Gold Flat Road overcrossing	6,956	37,674	7,010	37,699
New Road: New Bridge over SR 20/49 connecting Bost Avenue to Searls Avenue	0	37,674	544	37,832
Remove Road: Remove Banner Lava Cap Road Overcrossing	2,694	37,674	0	37,212

ADT – Average Daily Traffic
Screenline includes ADT on Dorsey Dr., Brunswick Rd., Banner Lava Cap Rd., Gold Flat Rd., Bost Ave., and Sacramento St.
Source: Fehr & Peers, 2014.

As shown in Table 11, the model behaves as would be expected in response to changes in the roadway network. For example, the addition of a lane in each direction on the Gold Flat Road overcrossing increases traffic on the link as well and the entire screenline. Similarly, removing the Banner Lava Cap Road overcrossing decreases traffic across the screenline.

When a new bridge connecting Bost Avenue to Searls Avenue was added, the overall screenline volumes increased. However, the new bridge experienced more growth than the screenline as a whole. This result is reasonable, since the new bridge would provide an alternative to more parallel routes and would induce more traffic across the screenline.

05

Future Year Model

Once the base year model calibration and validation was complete, a future year model scenario was developed to represent year 2035 conditions. To facilitate the development of the future year land use dataset, Fehr & Peers set up an interactive data viewer and editor for use by project advisory committee members to enter parcel level land use growth projections. For growth assumptions in Grass Valley, City staff provided land use growth projections in spreadsheet format corresponding to their previous model's TAZ boundaries.

Fehr & Peers took the TAZ growth projections provided by Grass Valley, along with the surrounding parcel level growth projections entered in the interactive data viewer, and developed the land use input file for the future year model scenario. Table 12 reports the land use totals for the base year and future year, along with the growth projections.

Table 12 Model Land Use Categories

Land Use Type	Base Year	Growth	Future Year
Single Family Dwelling Units	31,352	2,734	34,086
Multi-Family Dwelling Units	2,393	1,715	4,108
Mobile Home Units	1,515	100	1,615
Senior Housing Units	1,021	365	1,386
Office (KSF)	1,231	926	2,157
Medical Office (KSF)	231	50	281
Hospital (Beds)	228	0	228
Light Industrial (KSF)	1,622	240	1,861
Warehouse (KSF)	248	40	288
Church (KSF)	380	0	380
Public/Quasi-Public (KSF)	338	100	438
Park (Acres)	838	0	838
Retail (KSF)	3,078	758	3,836
Golf Course (Holes)	81	0	81
Restaurant (KSF)	142	0	142
Fast-Food (Hi-Turnover) Restaurant (KSF)	34	0	34
Gas Stations (Pumps)	196	0	196
Hotel/Lodging (Rooms)	561	20	581
K-8 School (Students)	7,323	516	7,839
High School (Students)	3,440	383	3,823
College/University (Students)	3,520	439	3,959

Source: Fehr & Peers, 2014.

06

Model Enhancements

The 2010 RTP Guidelines recognize the importance of increasing travel demand model sensitivity to more compact development with a mix of housing types (e.g., single-family homes and apartments), work places, and retail opportunities and encourage model enhancements to account for their unique travel characteristics.

Such communities have been proven to generate fewer and shorter vehicle trips since residents and employees of these areas have more home, work, and shopping opportunities within walking or biking distance. Since future land use alternatives may be developed to follow these planning principles, providing additional sensitivity improves the model's ability to capture the potential effects these alternatives would have on vehicle travel.

Ds Overview

The model has been enhanced to apply the Ds (specifically Design, Diversity, Destinations, and Density), which are key built environment variables that have a proven influence on vehicle travel. Given the generally rural nature of Nevada County, the Ds adjustments were applied only to the more urban Grass Valley and Nevada City area types.

Density is measured in dwelling units or employment per acre. A wide body of research suggests that, all else being equal, denser developments generate fewer vehicle-trips per dwelling unit than less dense developments.

Diversity measures how closely the neighborhood in question matches the "ideal" mix of jobs and households, which is assumed to be the ratio of jobs to households measured across the region as a whole. Research suggests that having residences and jobs in close proximity will reduce the vehicle trips generated by each use by allowing some trips to be made on foot or by bicycle.

Design relates to the street network characteristics within a neighborhood. The design variable, when isolated, has the weakest influence on the overall adjustment of the D variables. Street networks

vary from dense urban grids of highly interconnected, straight streets to sparse suburban networks of curving streets forming loops and cul-de-sacs. Street accessibility is usually measured in terms of average block size, proportion of four-way intersections, or number of intersections per square mile. Occasionally, it is also measured in terms of sidewalk coverage, building setbacks, street widths, or other physical variables that differentiate pedestrian-oriented environments.

Given that the future roadway network is not changing, the design variable would not change and, therefore, would not result in a reduction in travel. For this reason, the capability to account for the design variable was added to the model, but not activated at this time.

Destination accessibility is synonymous with regional accessibility. In some cases, regional accessibility is simply represented by distance to the central business district. In other cases, it is represented by the number of jobs or other attractions reachable within a given travel time, which tends to be highest at central locations and lowest at peripheral ones. The gravity model used in the trip distribution stage of the model process adequately accounts for this D variable so it was also not applied.

Ds Parameters

The Ds are applied by comparing the built environment characteristics of a future scenario to the existing condition on the ground. For each of the D variables, there is an associated elasticity, derived from numerous studies, which is used to adjust the vehicle trip generation of each TAZ. In practice, elasticity is a measure of the percentage change that occurs in an independent variable (vehicle trips) as a result of a percentage change in an influential variable (density, diversity, design, or destinations). For example, if vehicle trips decrease by 0.04% for each 1% increase in density, then vehicle trips are said to have an elasticity of -0.04 with respect to density. The elasticities applied in the NCTC model are as follows:

Table 13 D Elasticities

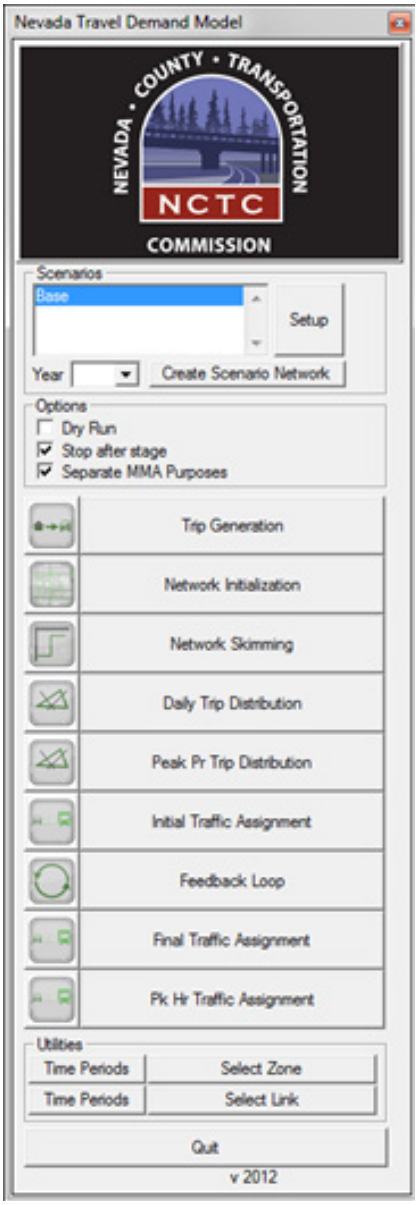
Variable	Elasticity
Density	-0.04
Diversity	-0.06
Design	-0.02
Destinations	-0.03

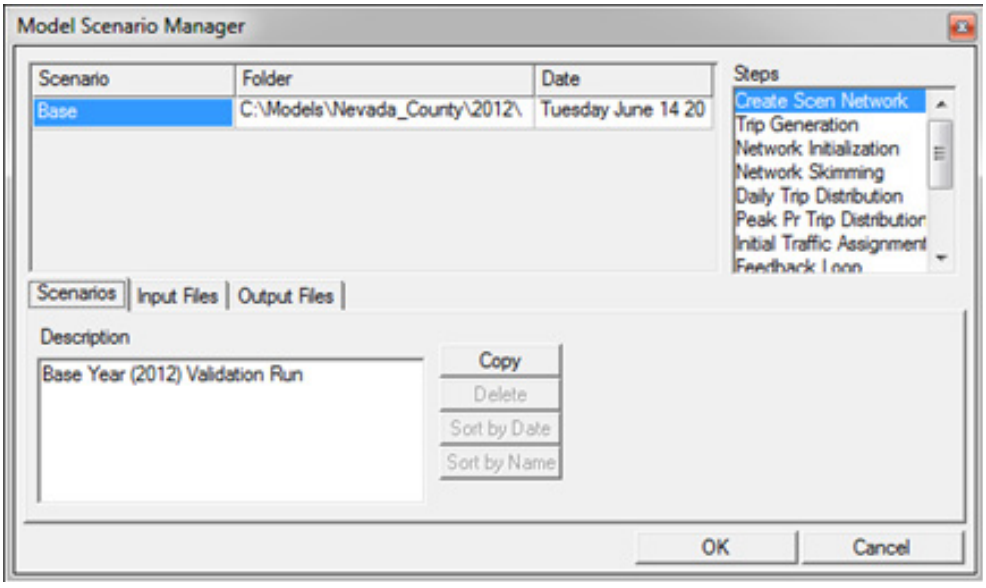
Source: INDEX® 4D Method: A Quick-Response Method of Estimating Travel Impacts from Land-Use Changes, Criterion Planners/Engineers and Fehr & Peers, U.S. EPA, October, 2001.

7

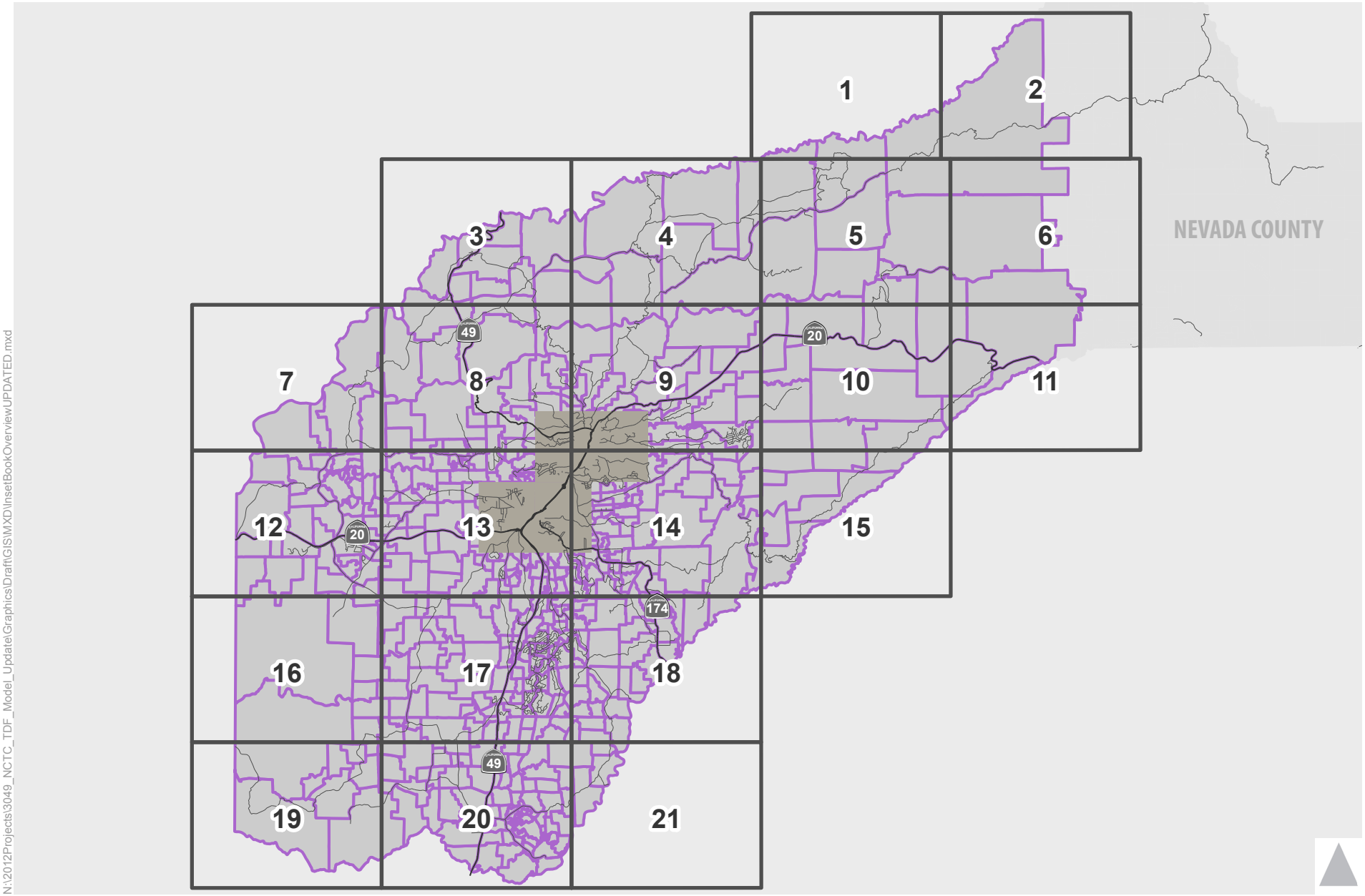
Model Interface

The Graphical User Interface (GUI) developed for the NCTC Travel Demand Model was built to allow the user to conveniently run the model with the click of a button, without going into the technicalities of the programs beneath the model. The GUI closely follows the stages in the model and gives the user the ability to run one stage of the model at a time or run the entire model system by the click of a button.





APPENDIX A
TRAFFIC ANALYSIS ZONES



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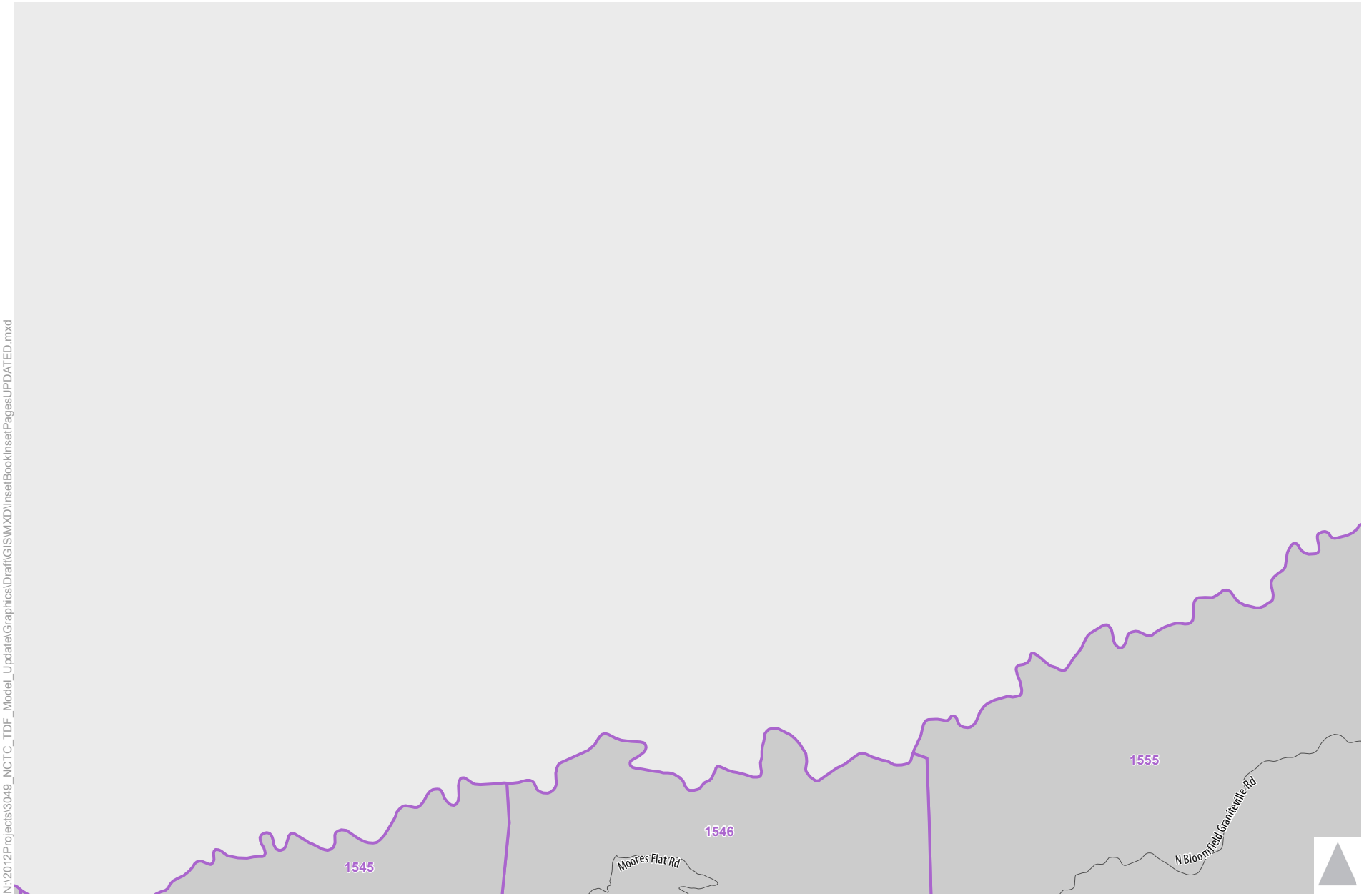
Overview Page

Inset Pages

See "City" Detail

Traffic Analysis Zones

NCTC Traffic Analysis Zones Map Book



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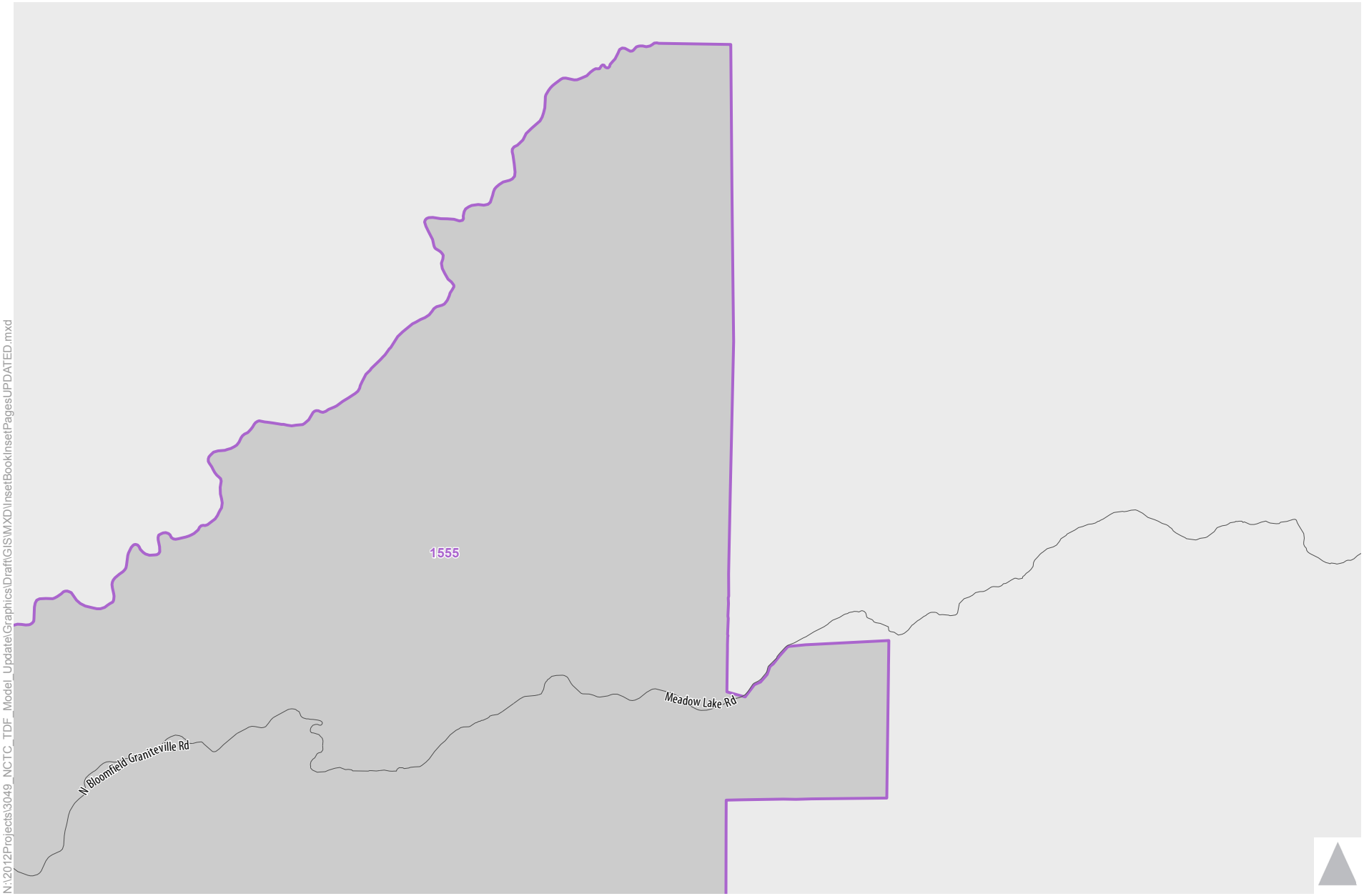

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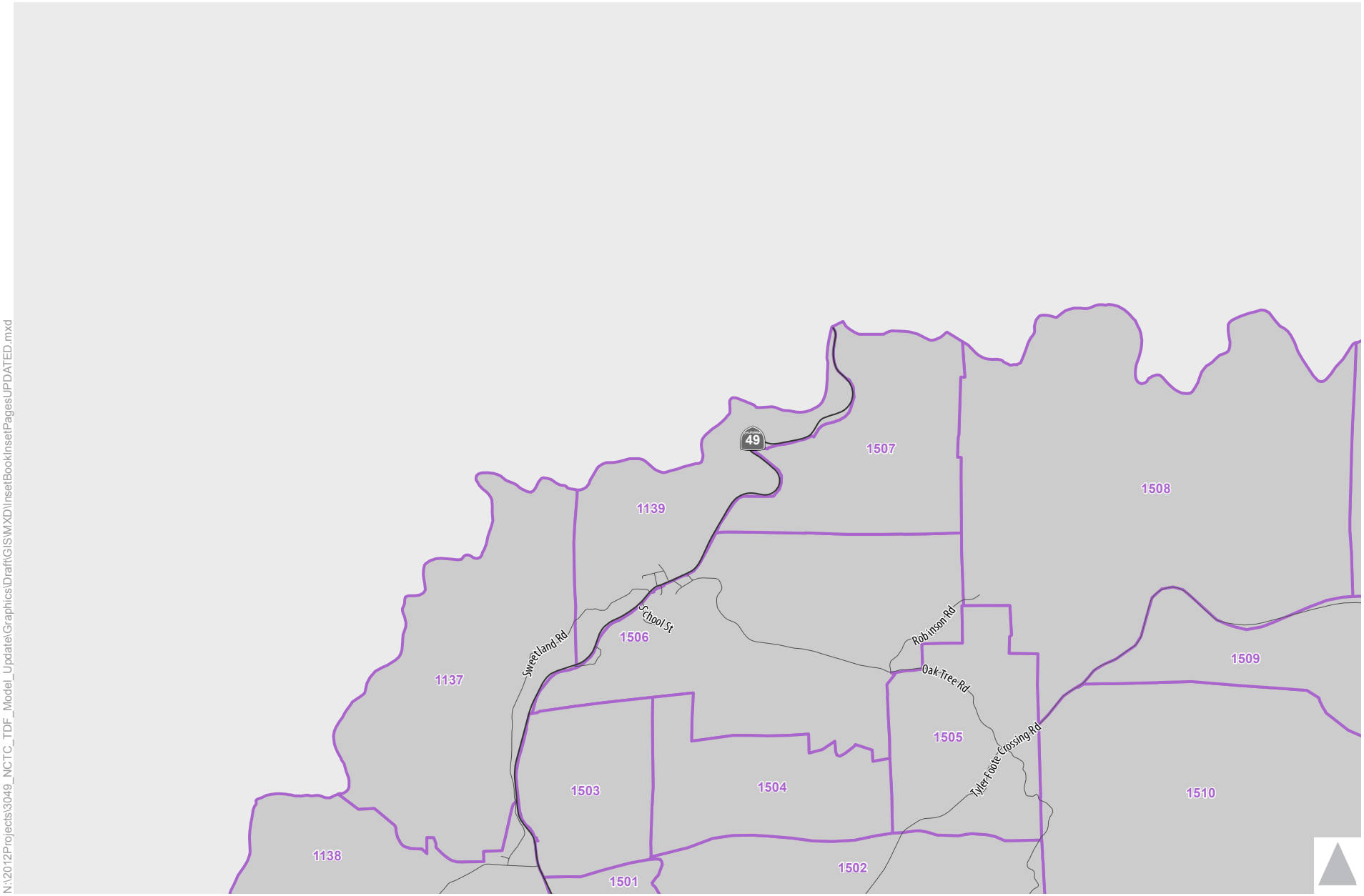

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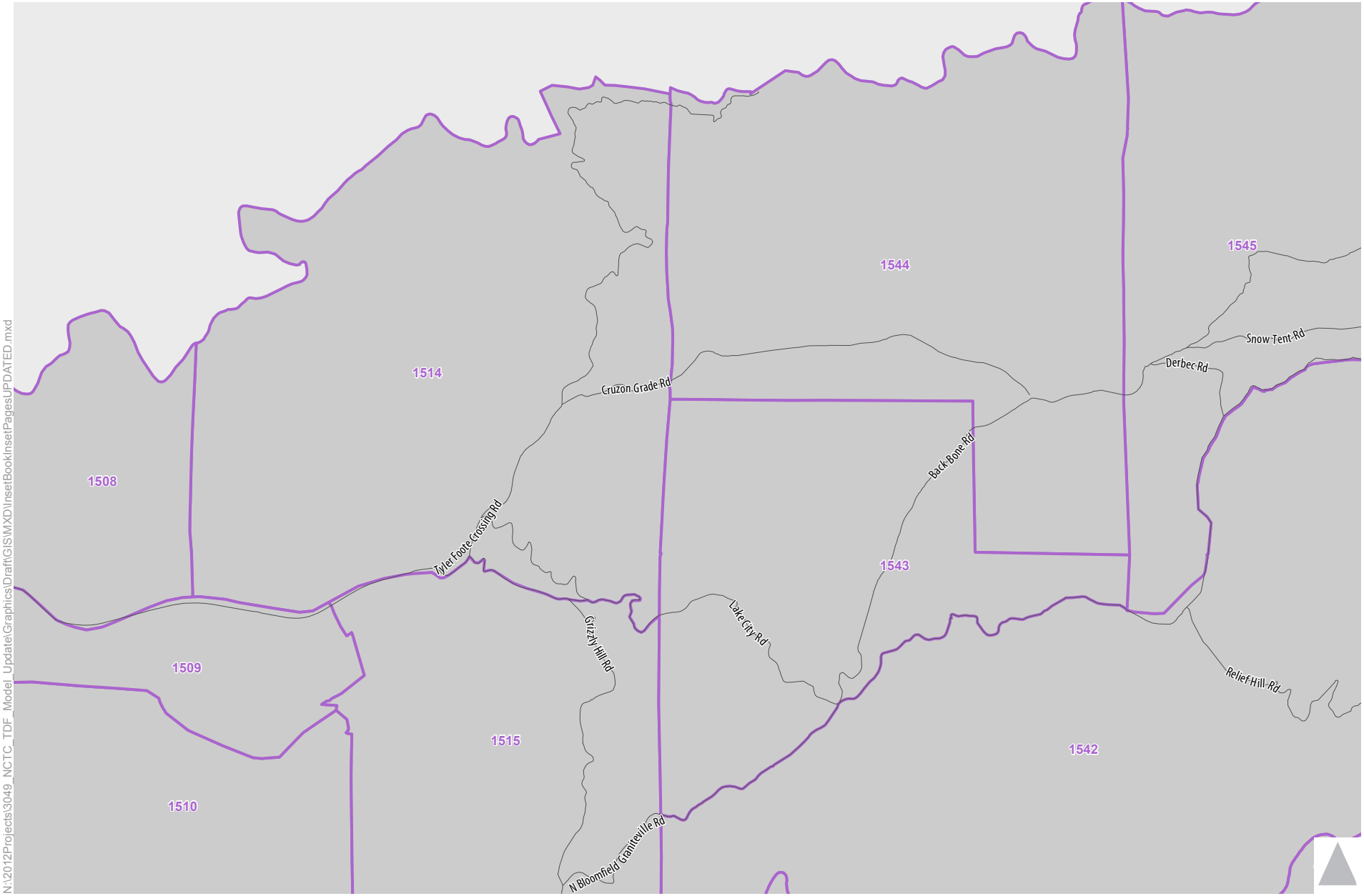

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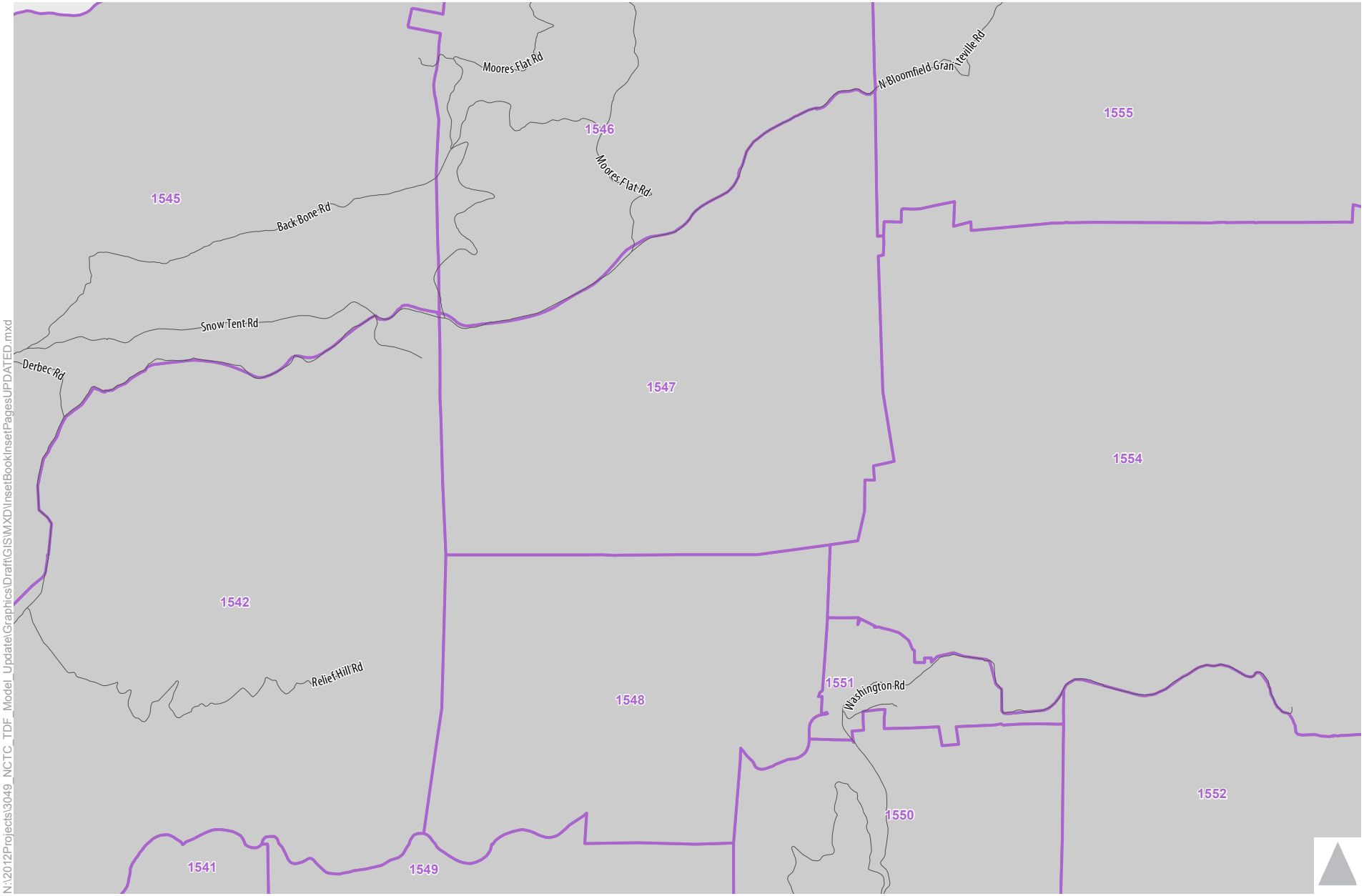

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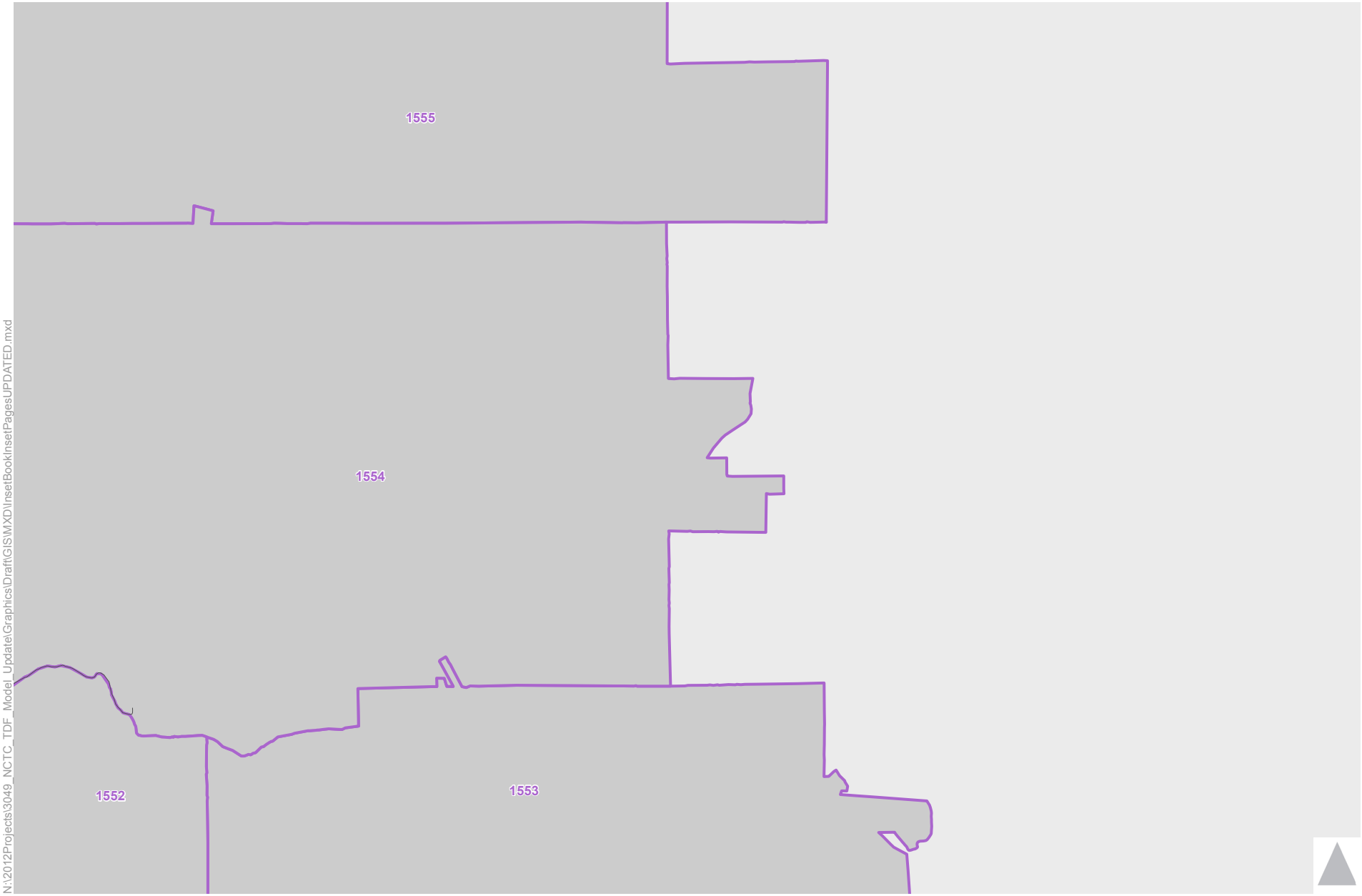

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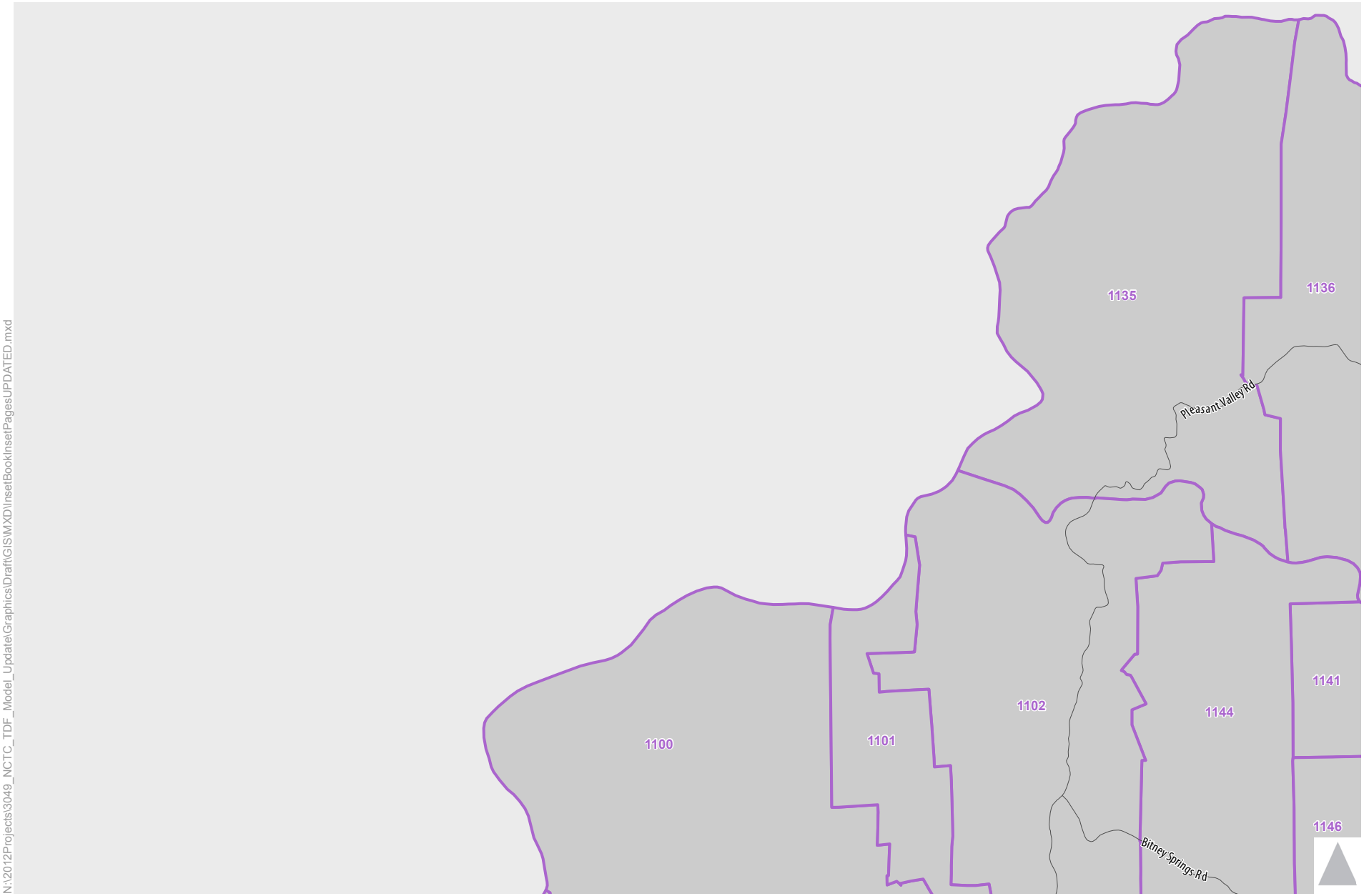

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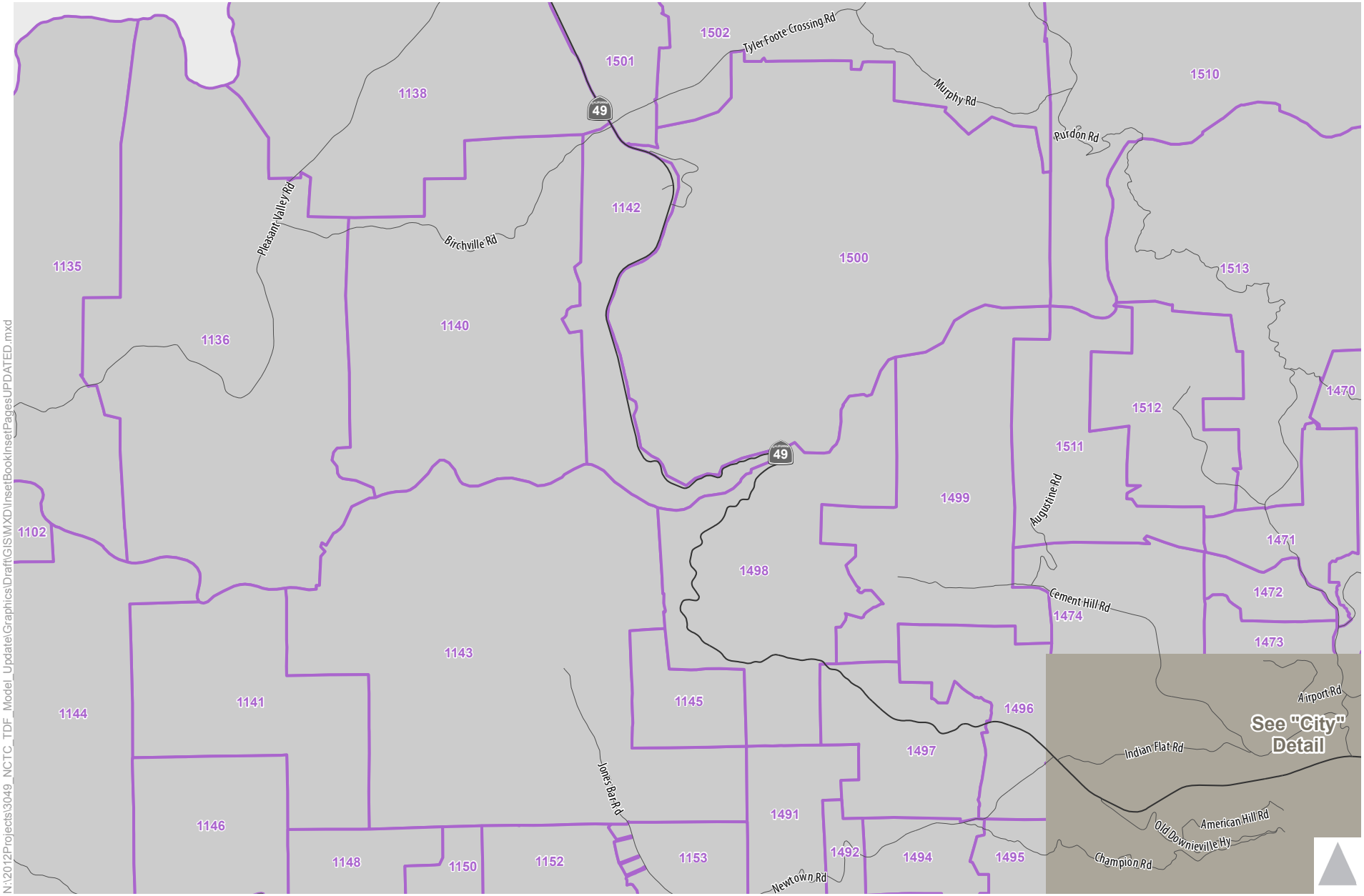

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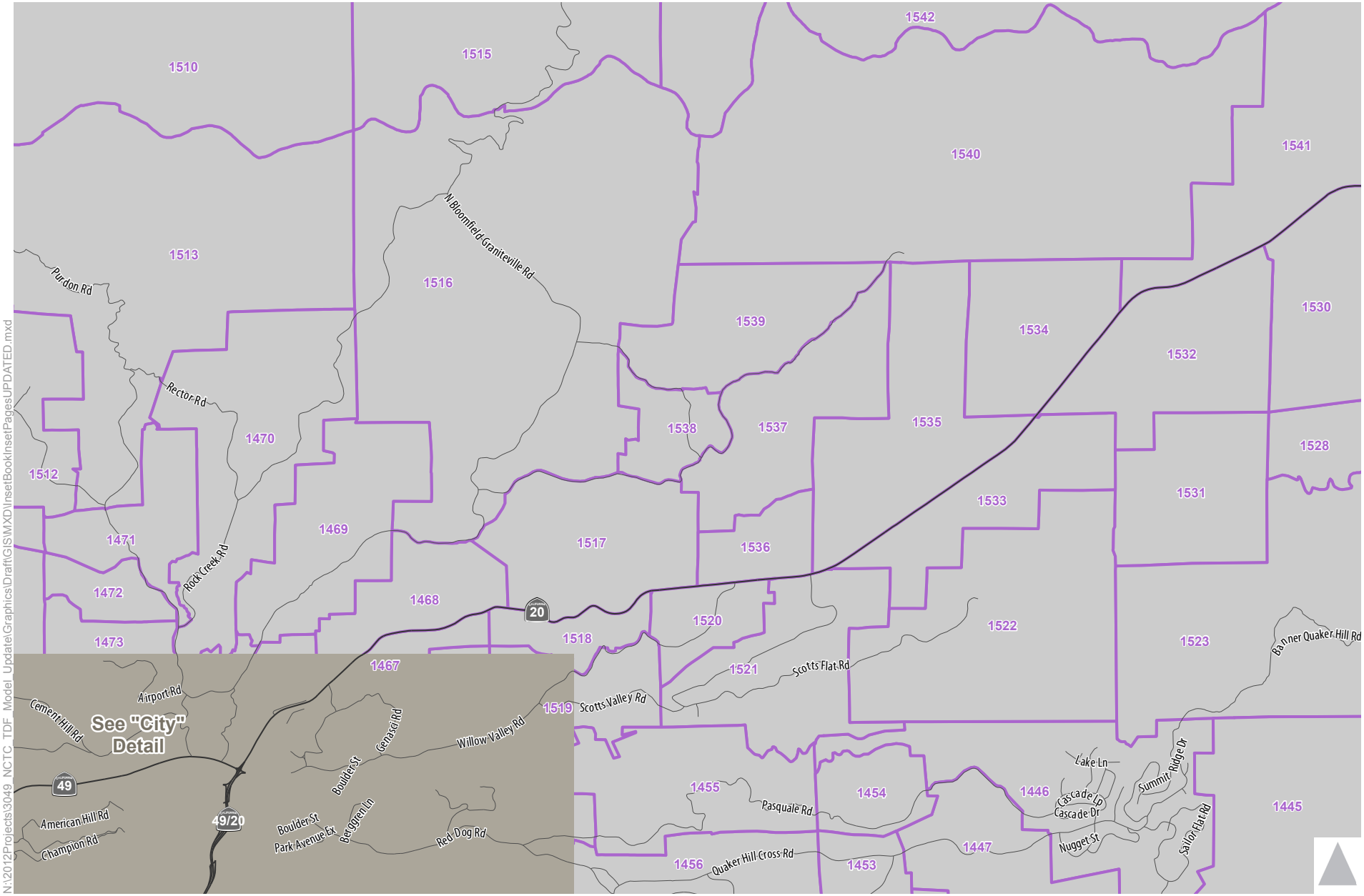

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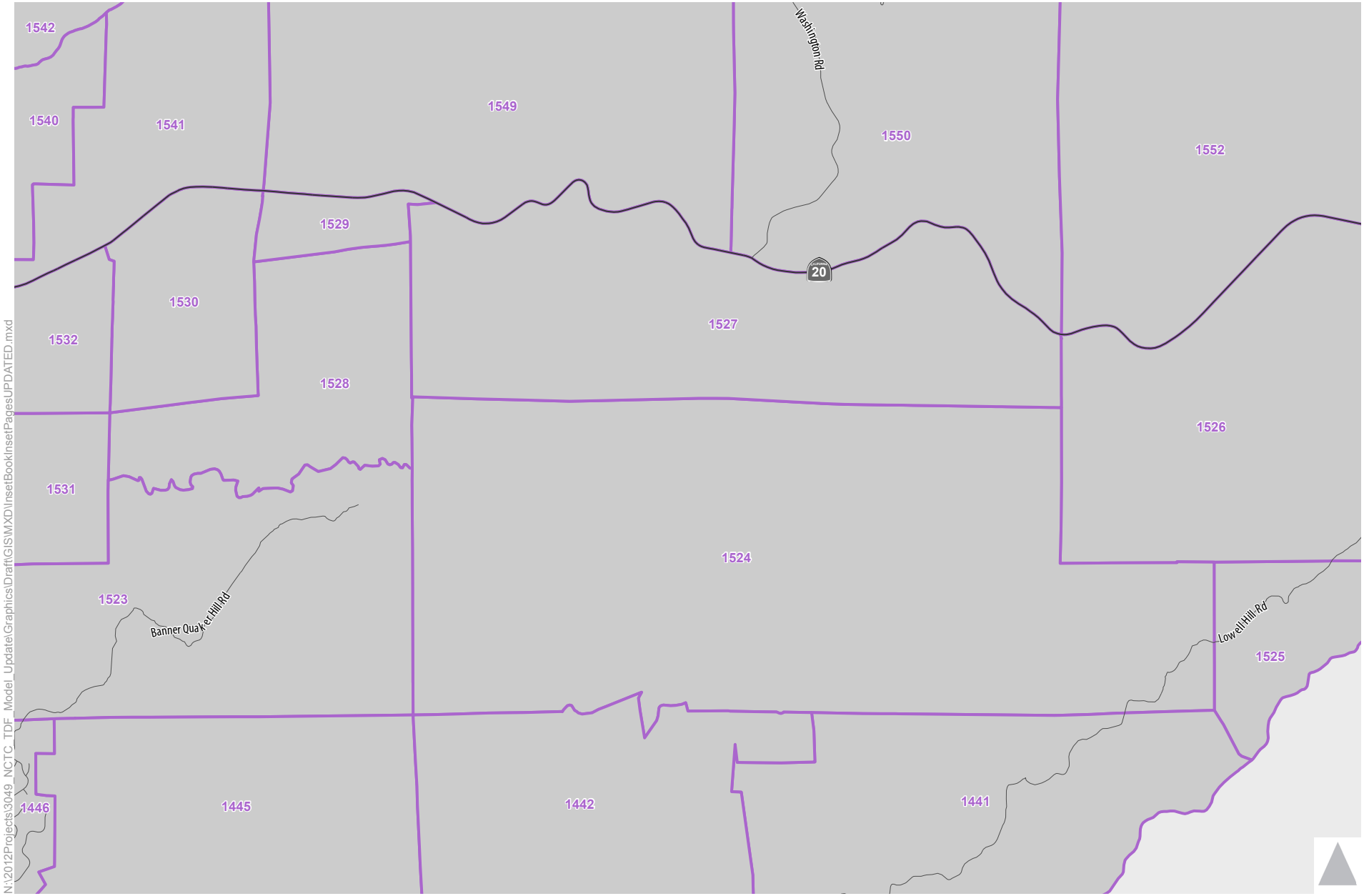

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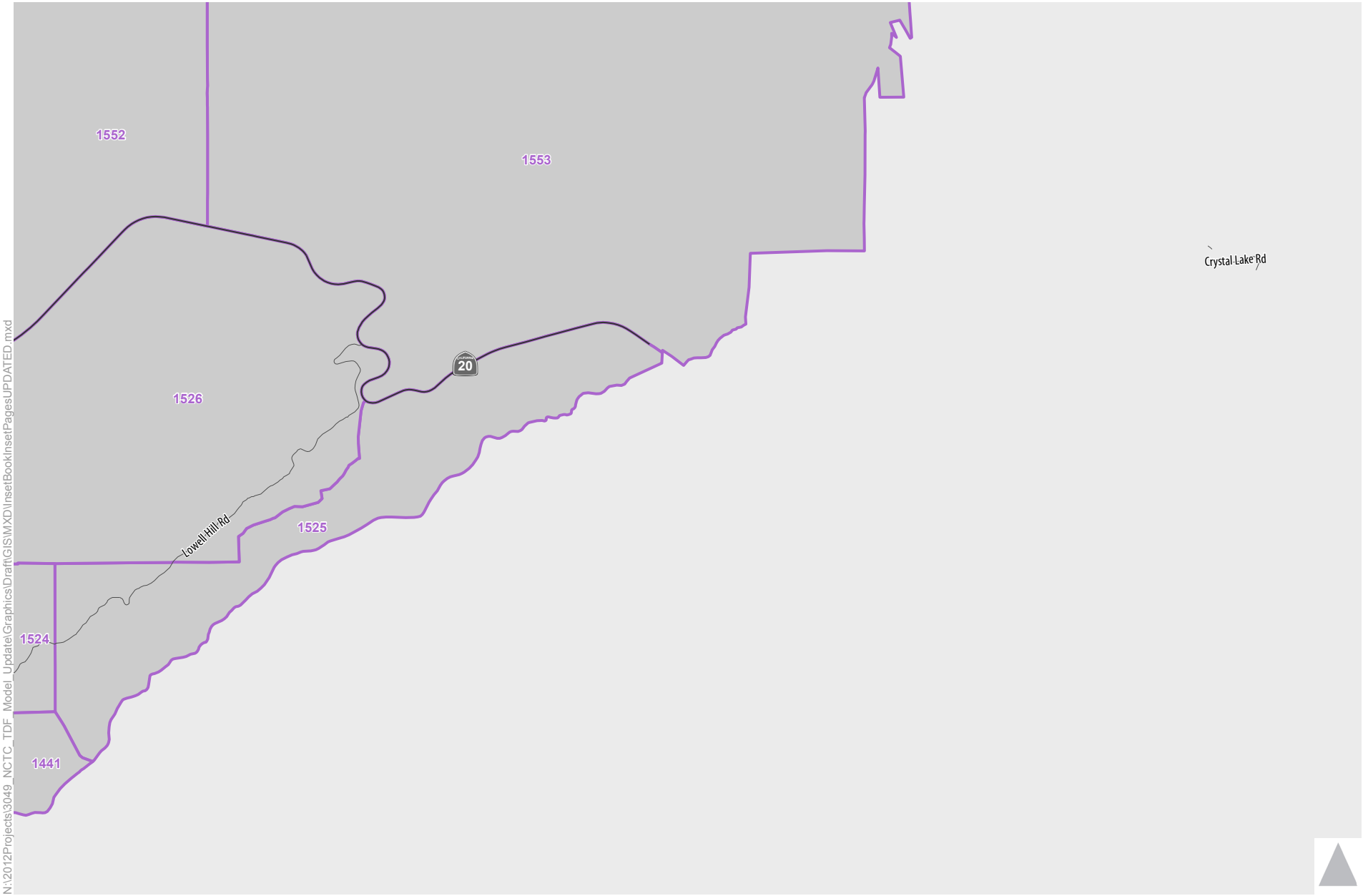

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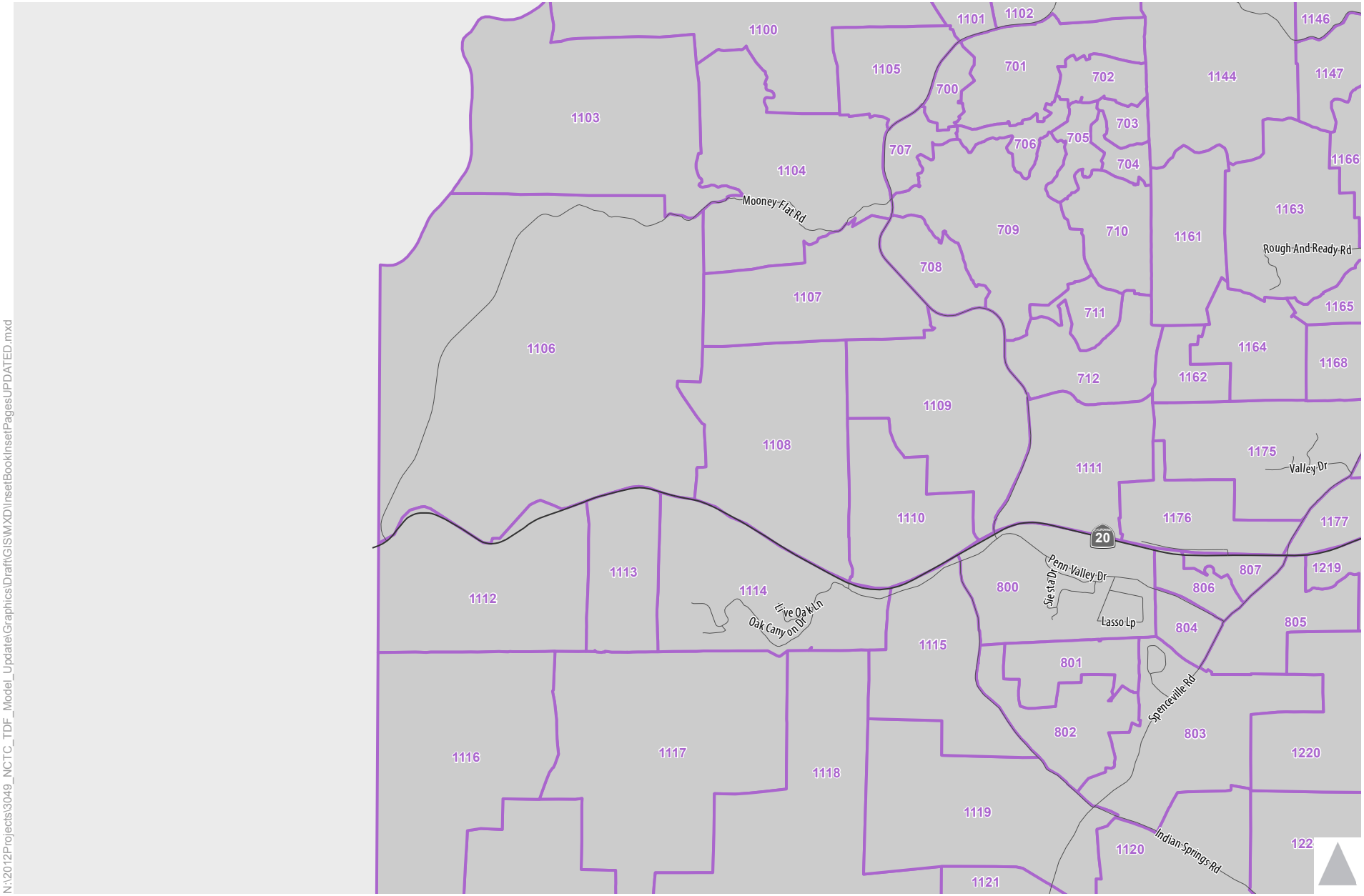

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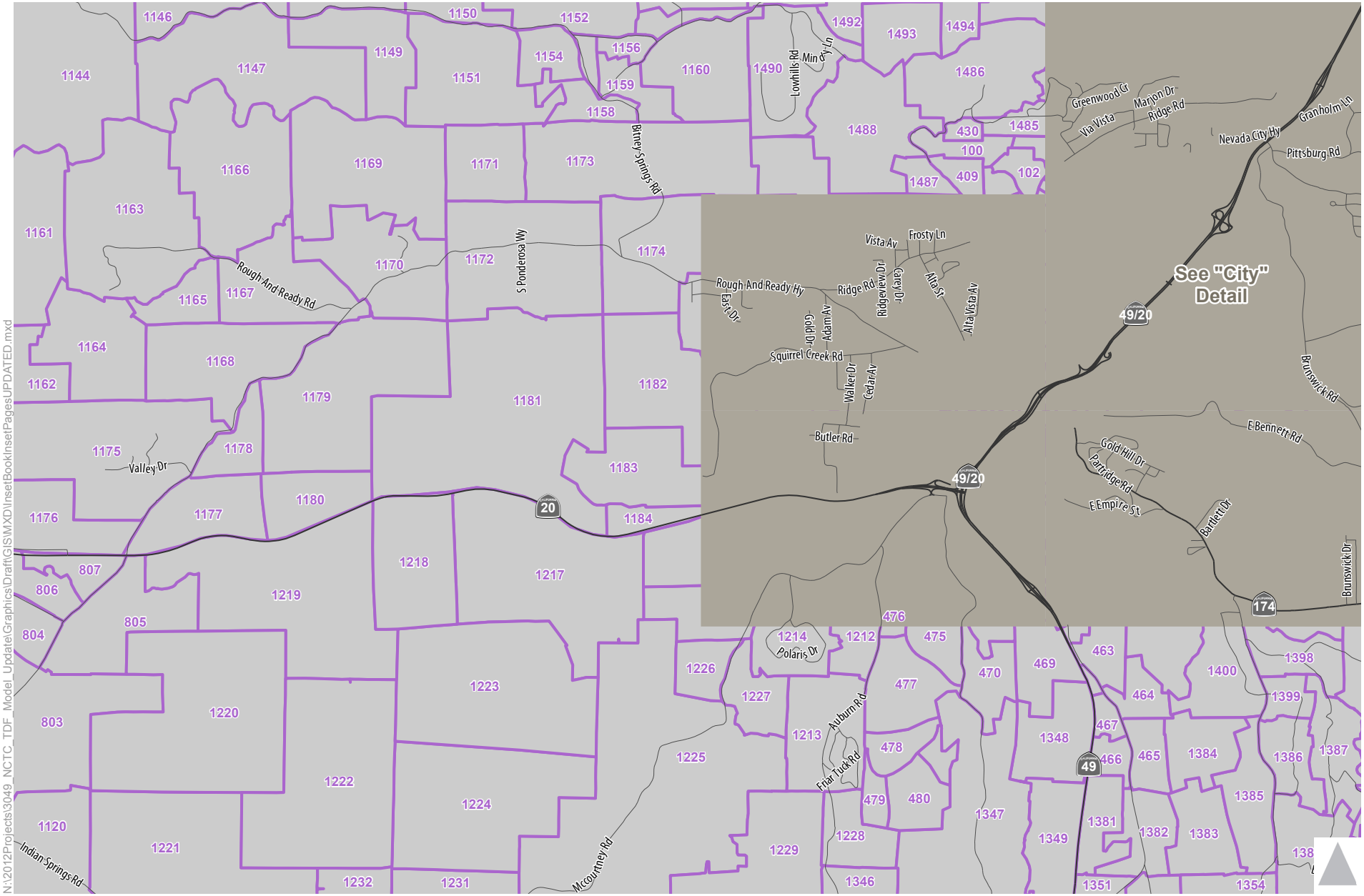

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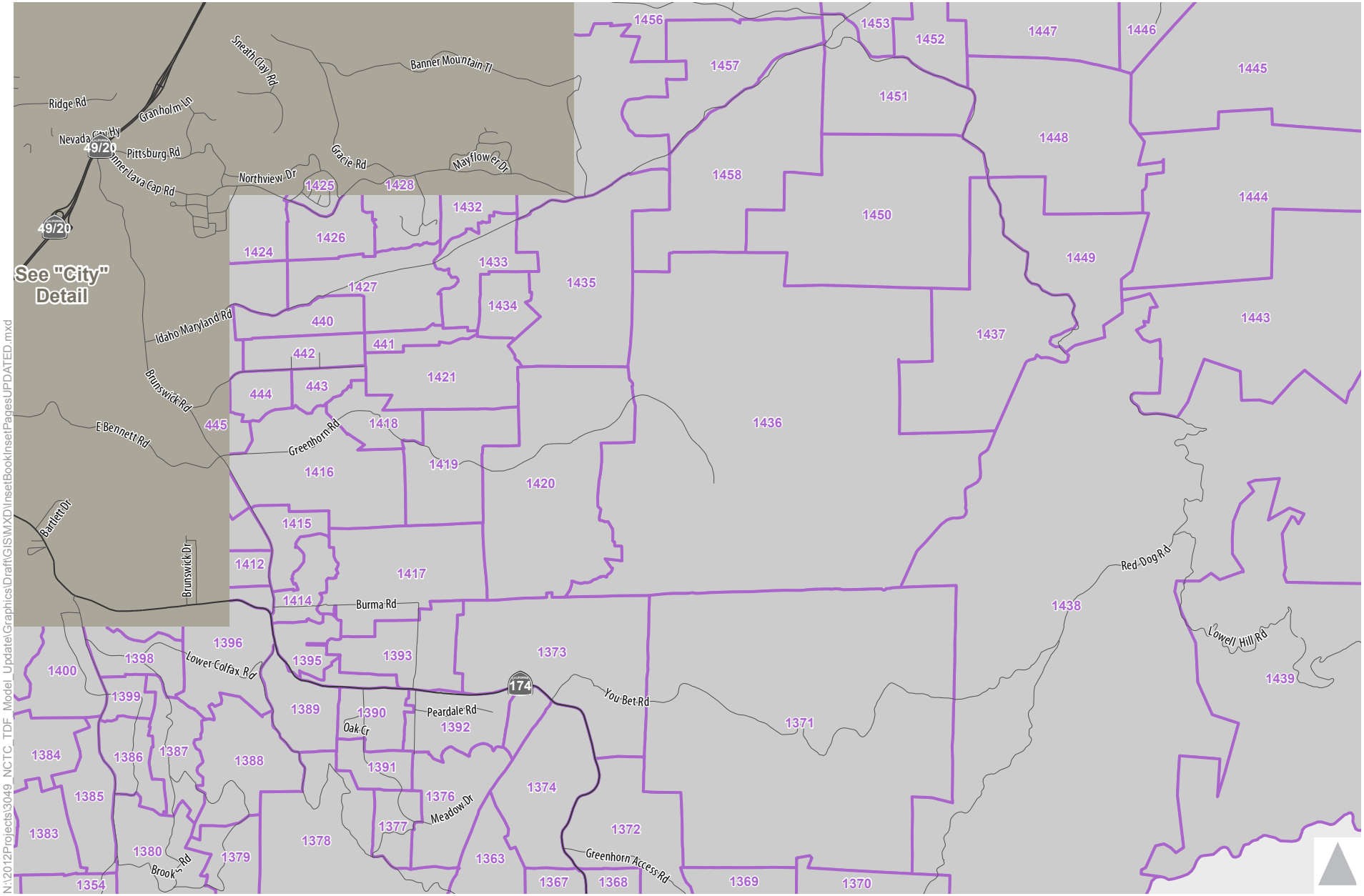

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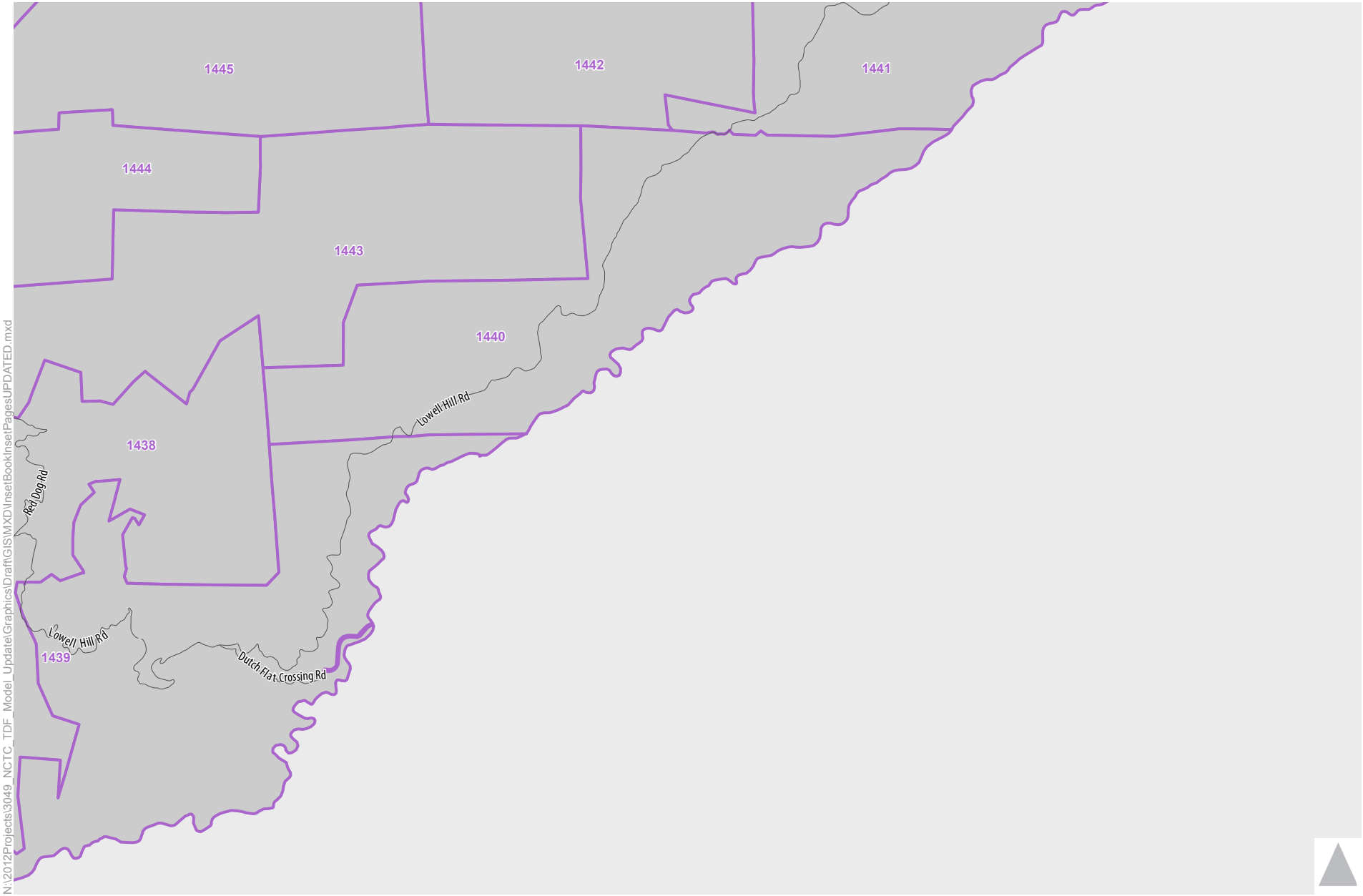

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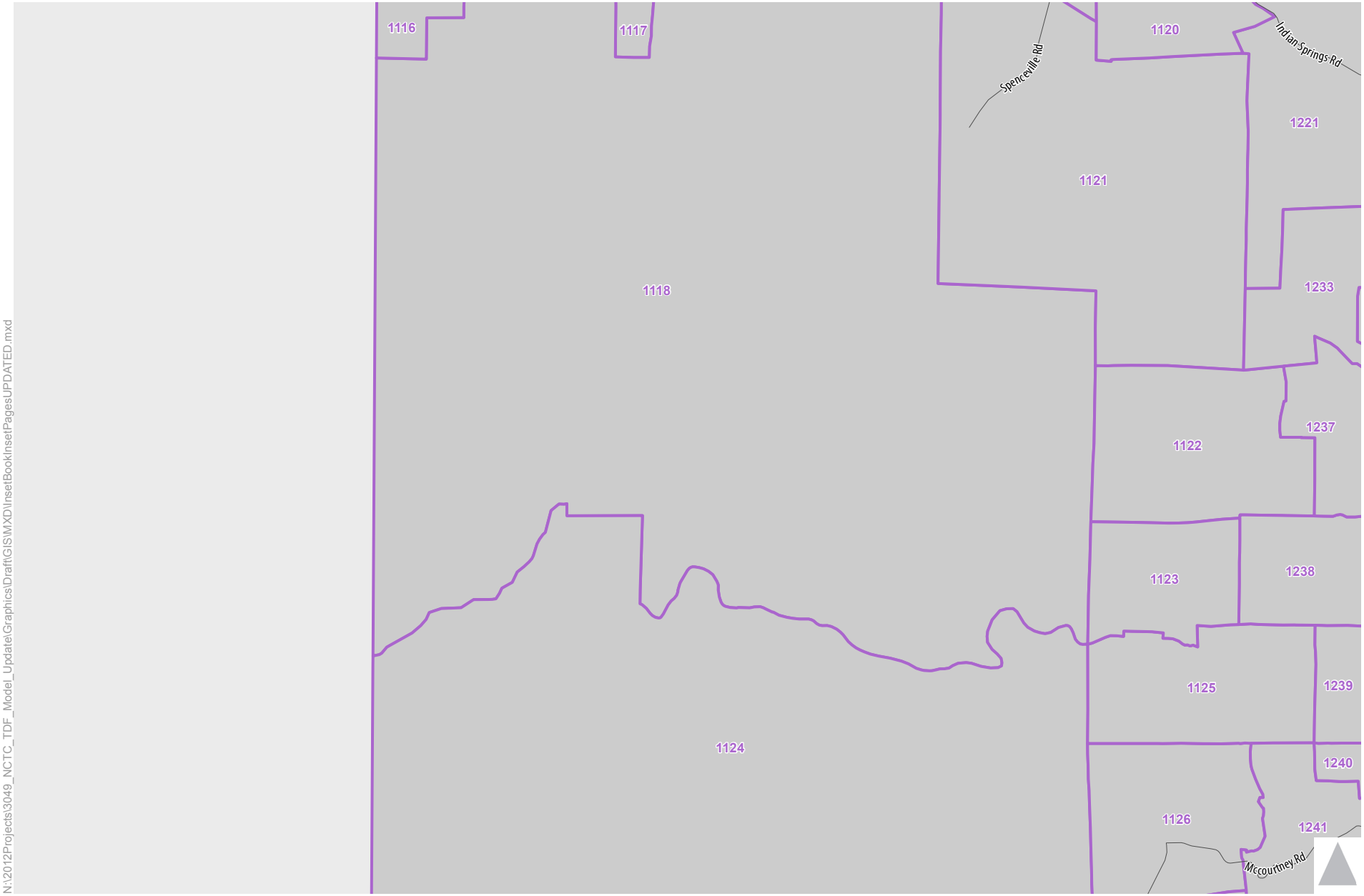

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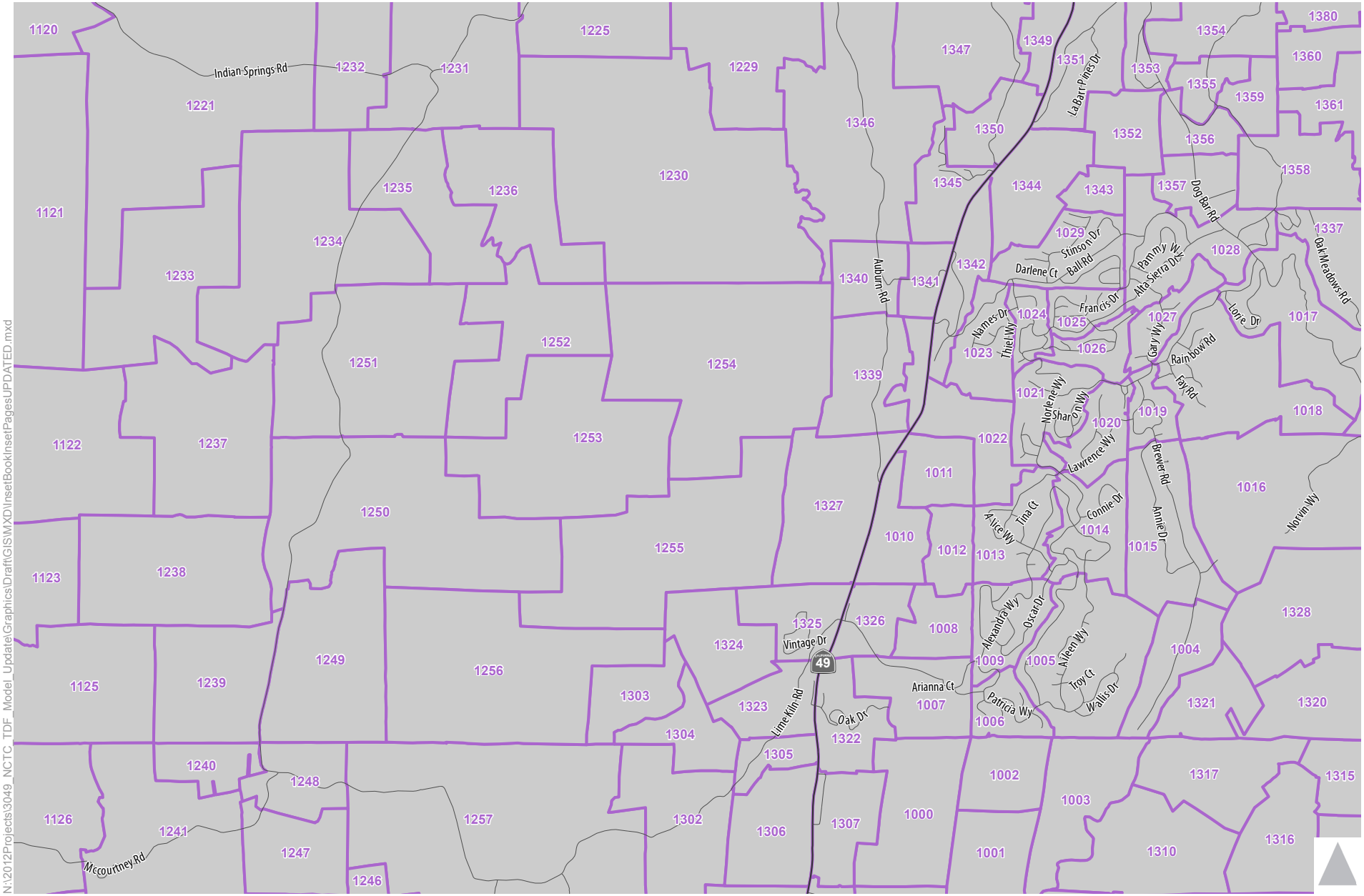

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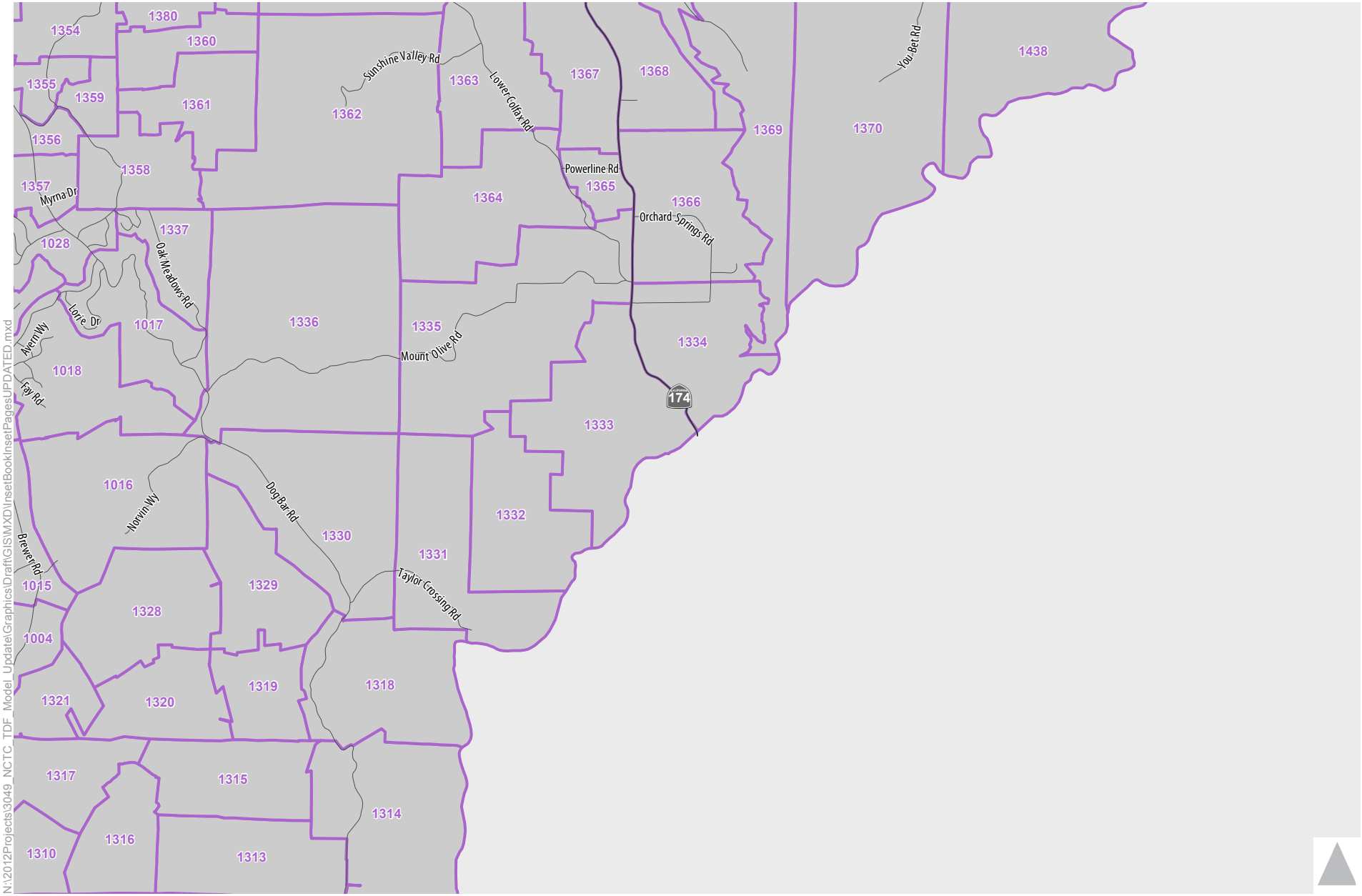

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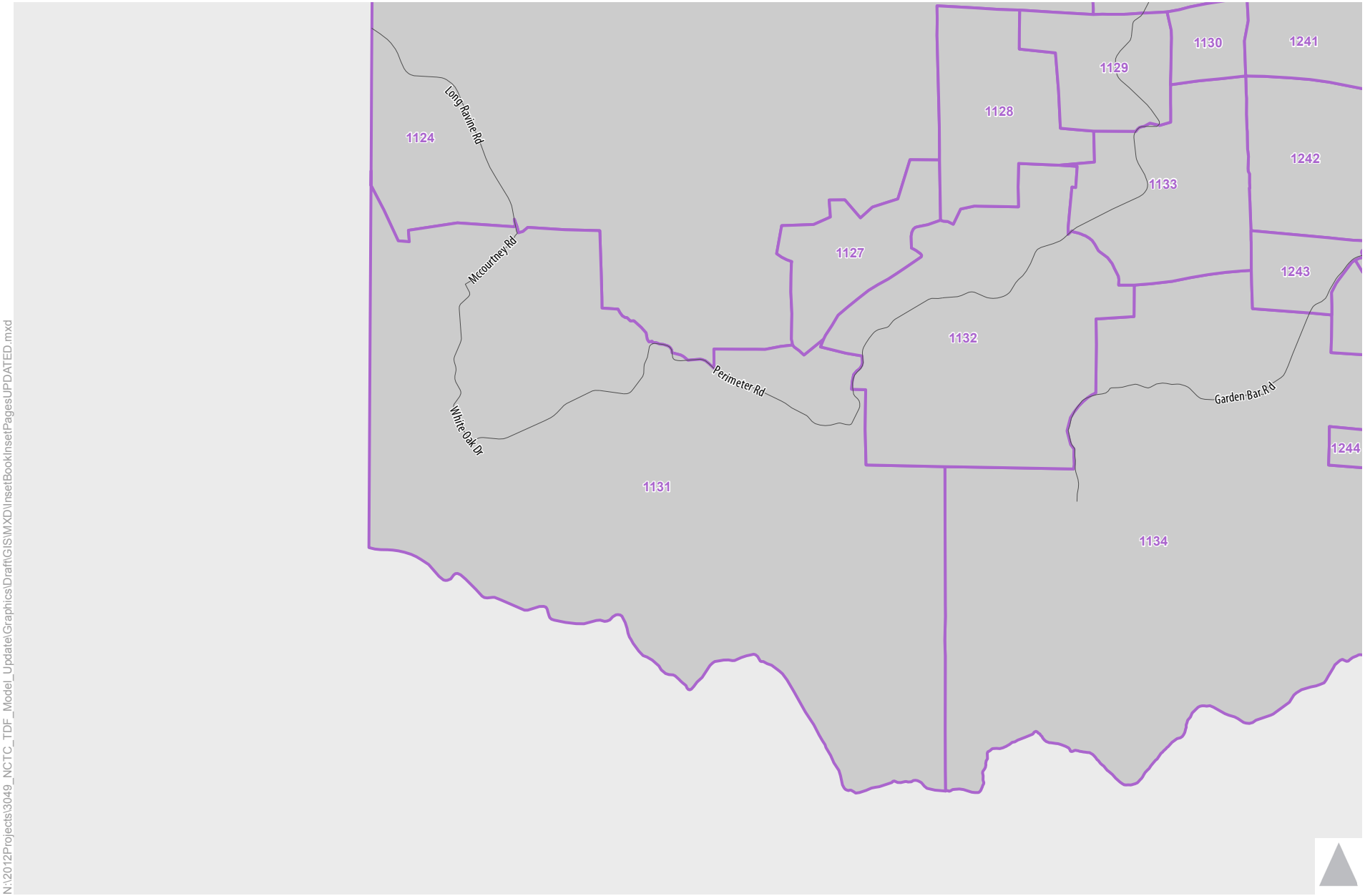

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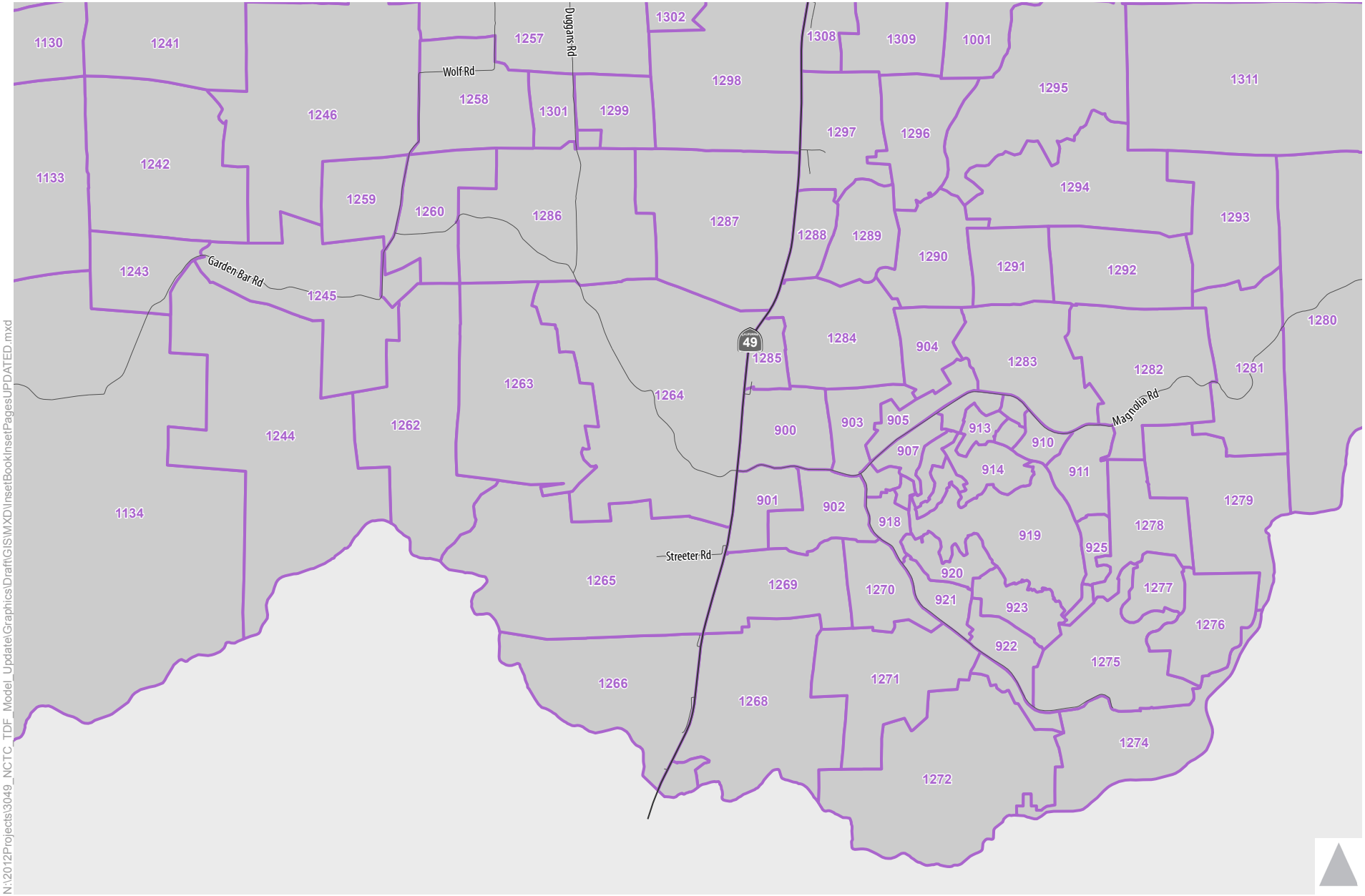

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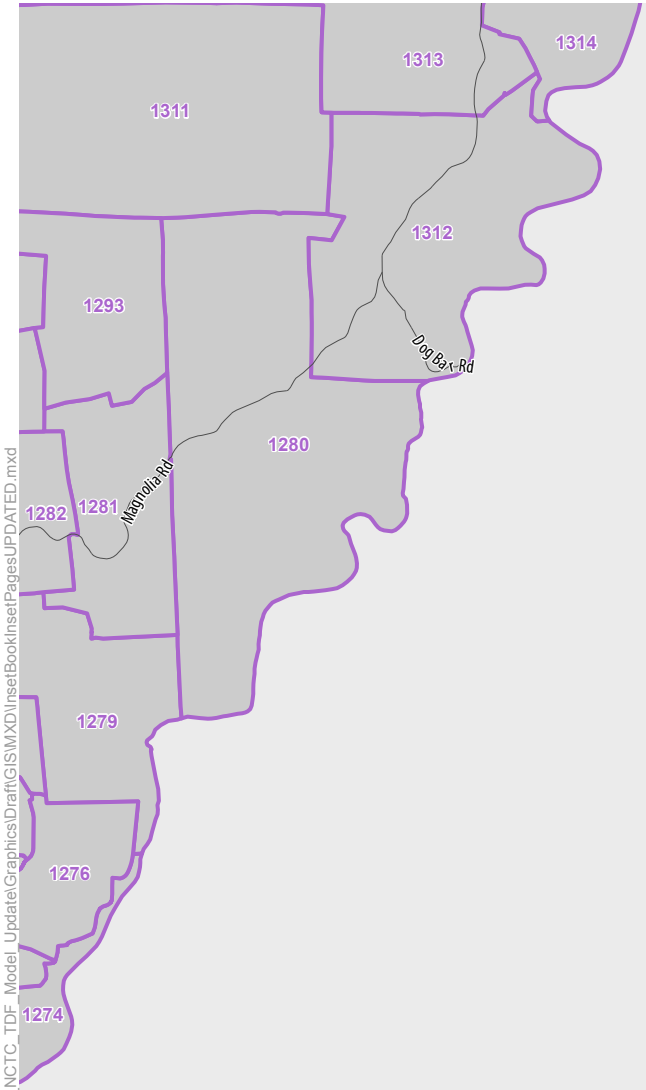

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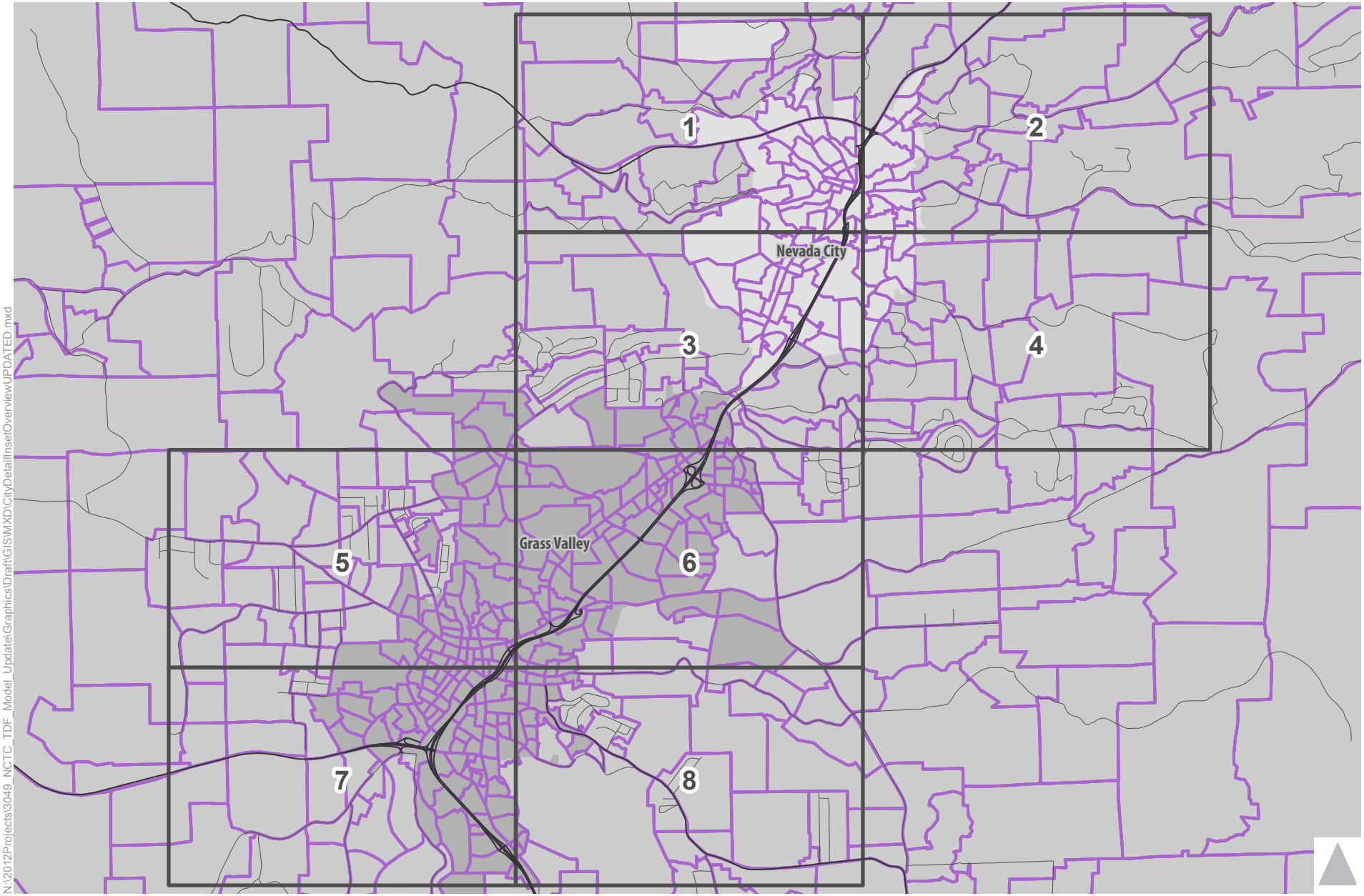

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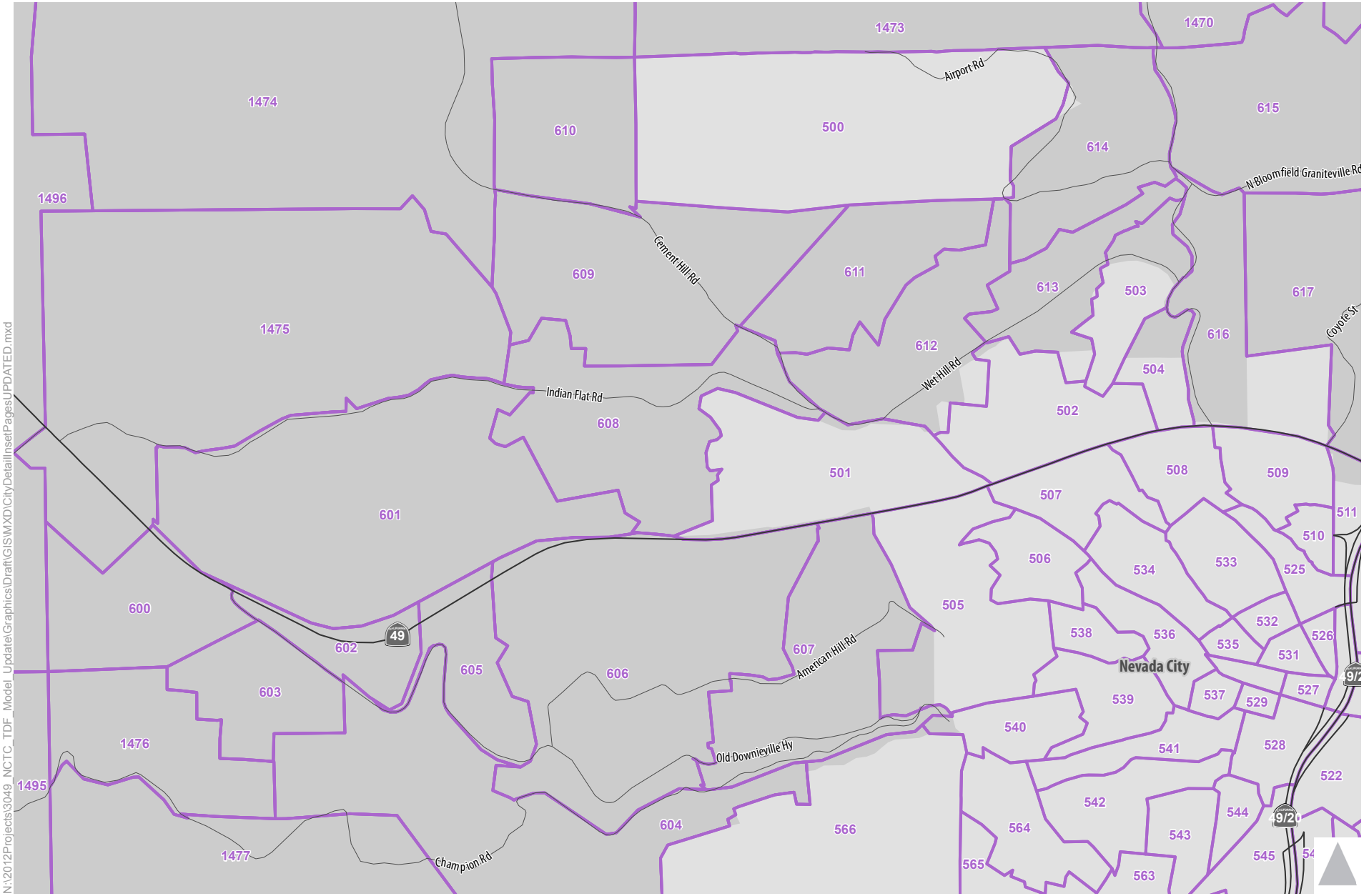
City Detail Overview

"City" Detail Insets

Traffic Analysis Zones

NCTC Traffic Analysis Zones Map Book - "City" Detail



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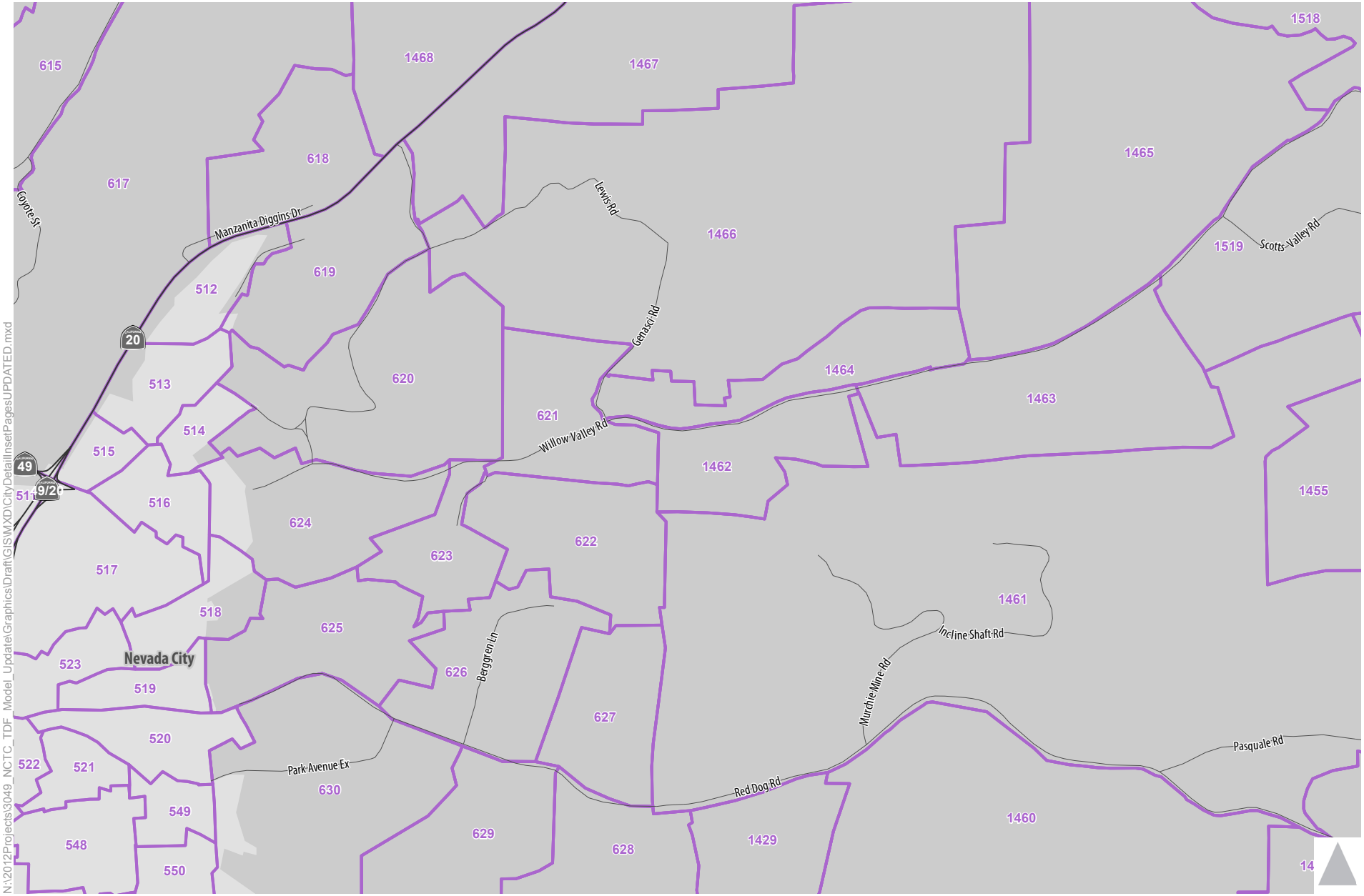
Traffic Analysis Zones

NCTC Traffic Analysis Zones Map Book - "City" Detail



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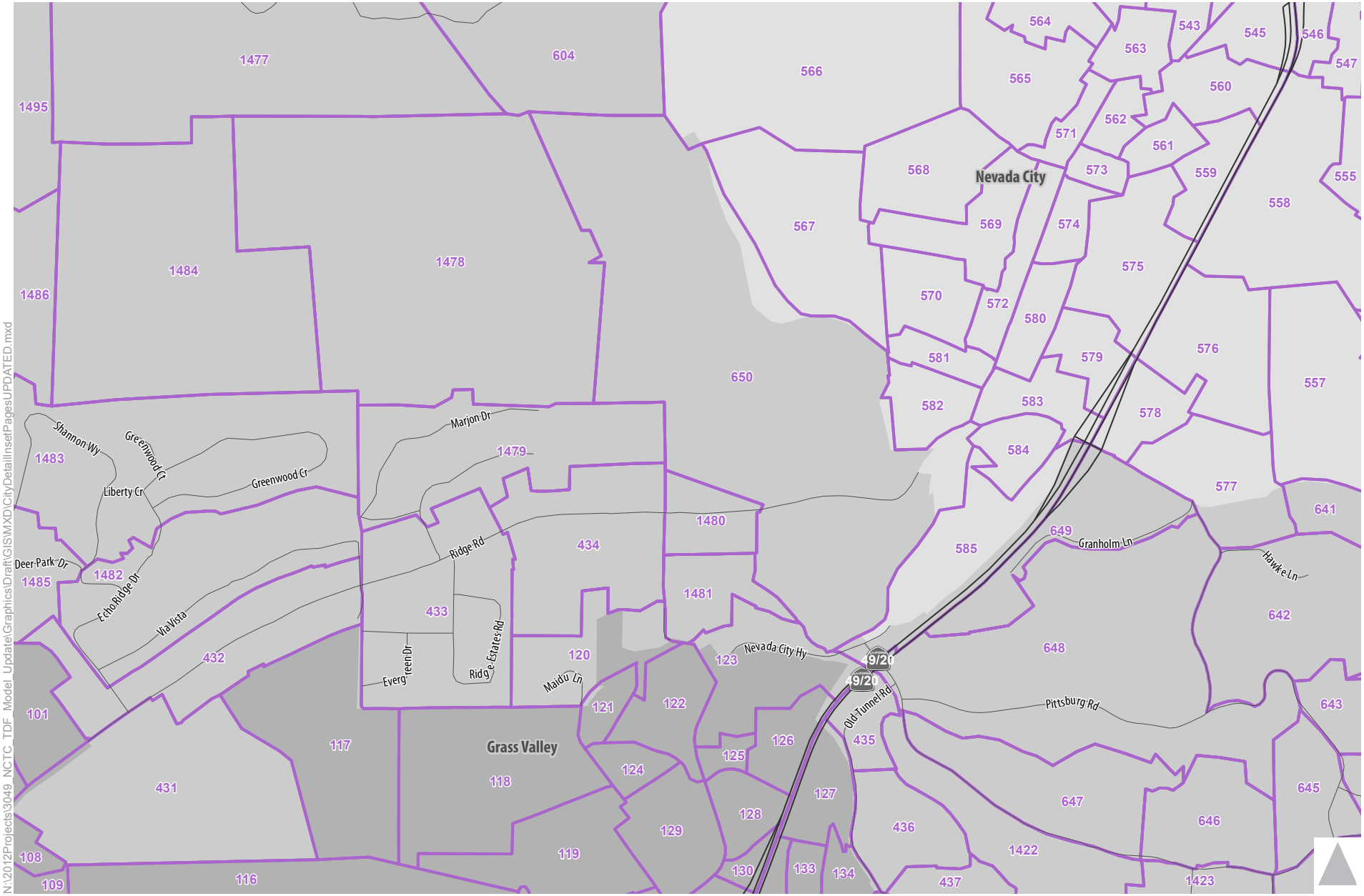
City Detail Page 2

Traffic Analysis Zones

NCTC Traffic Analysis Zones Map Book - "City" Detail



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Traffic Analysis Zones

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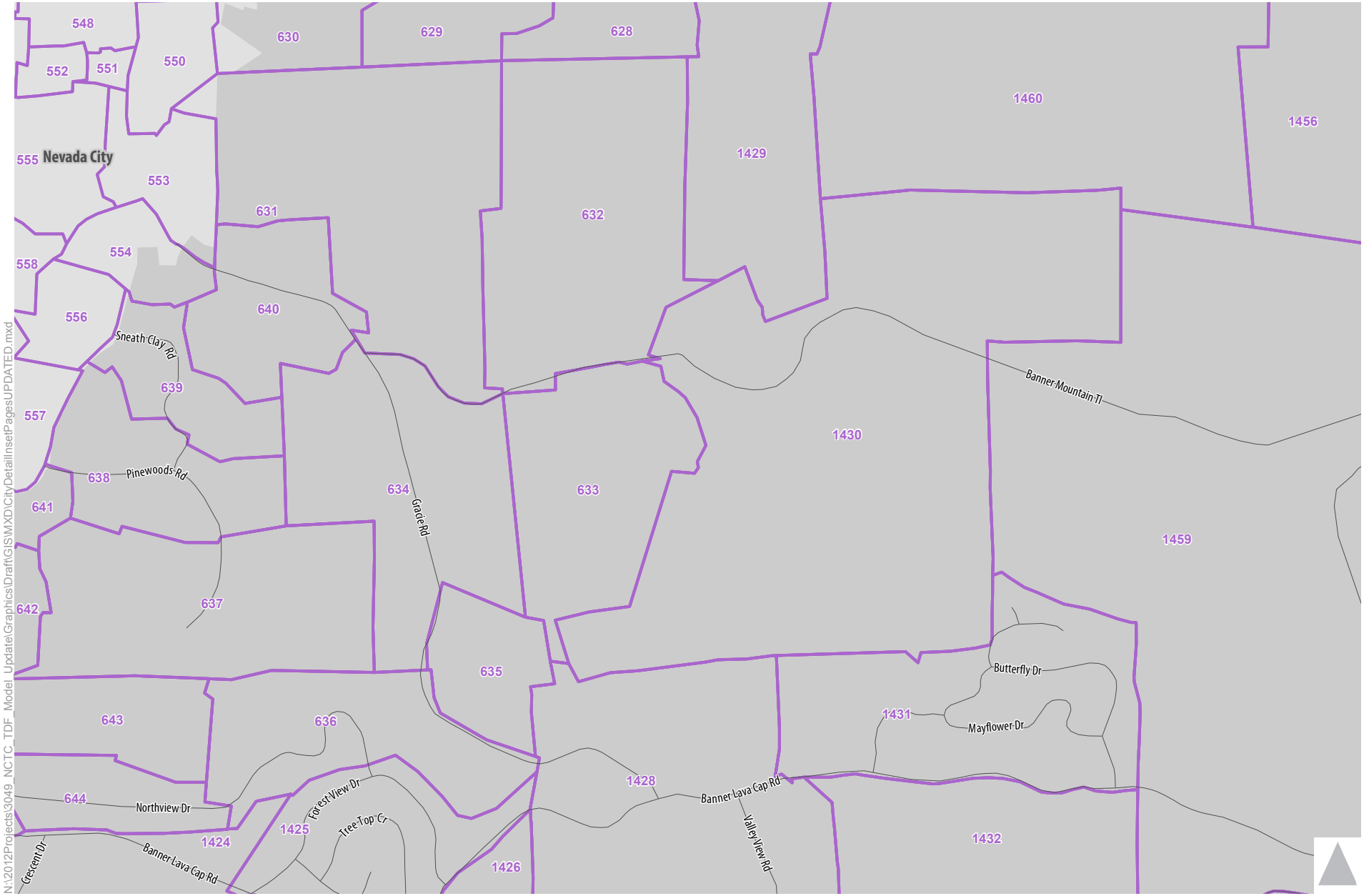

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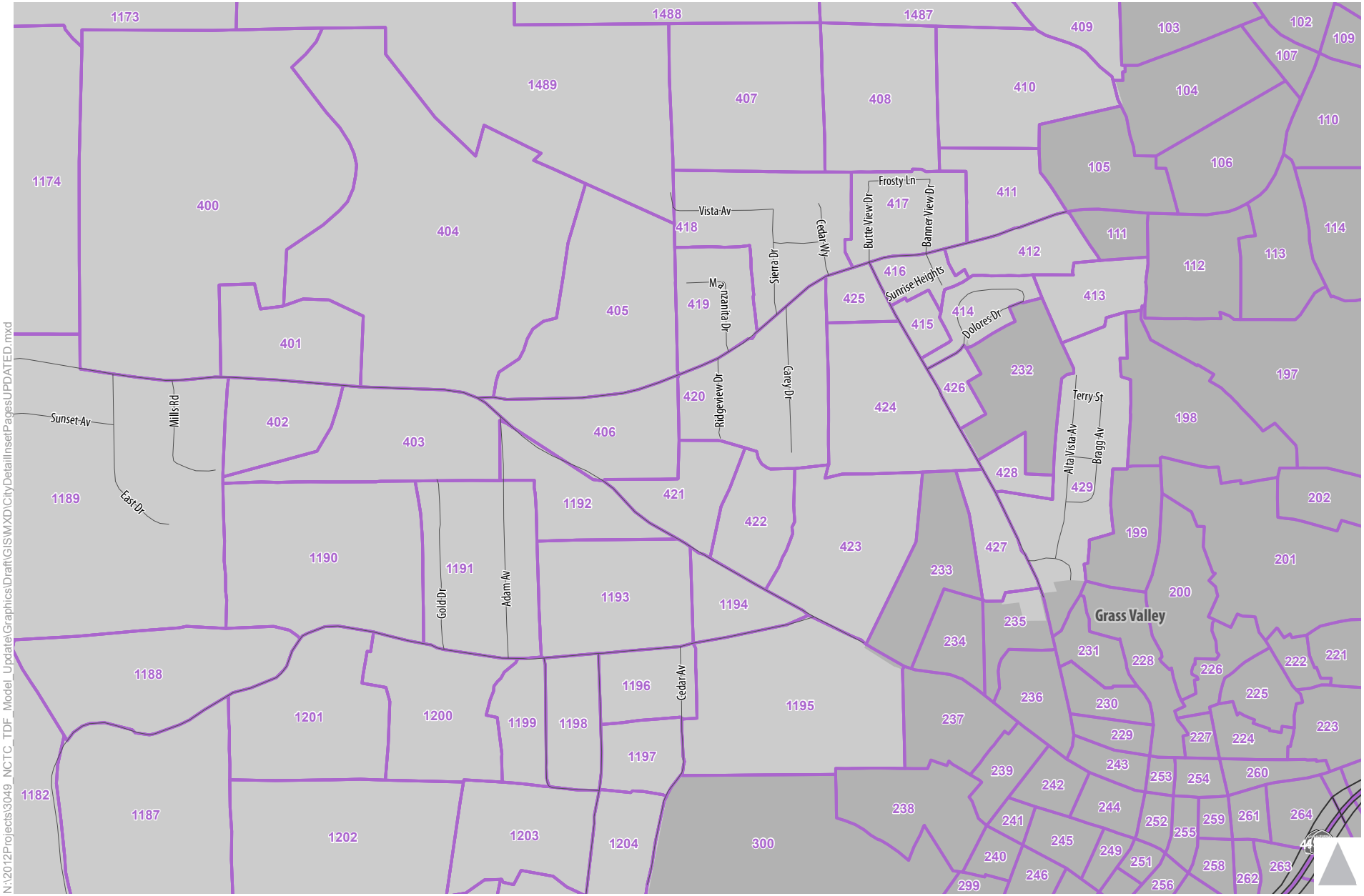

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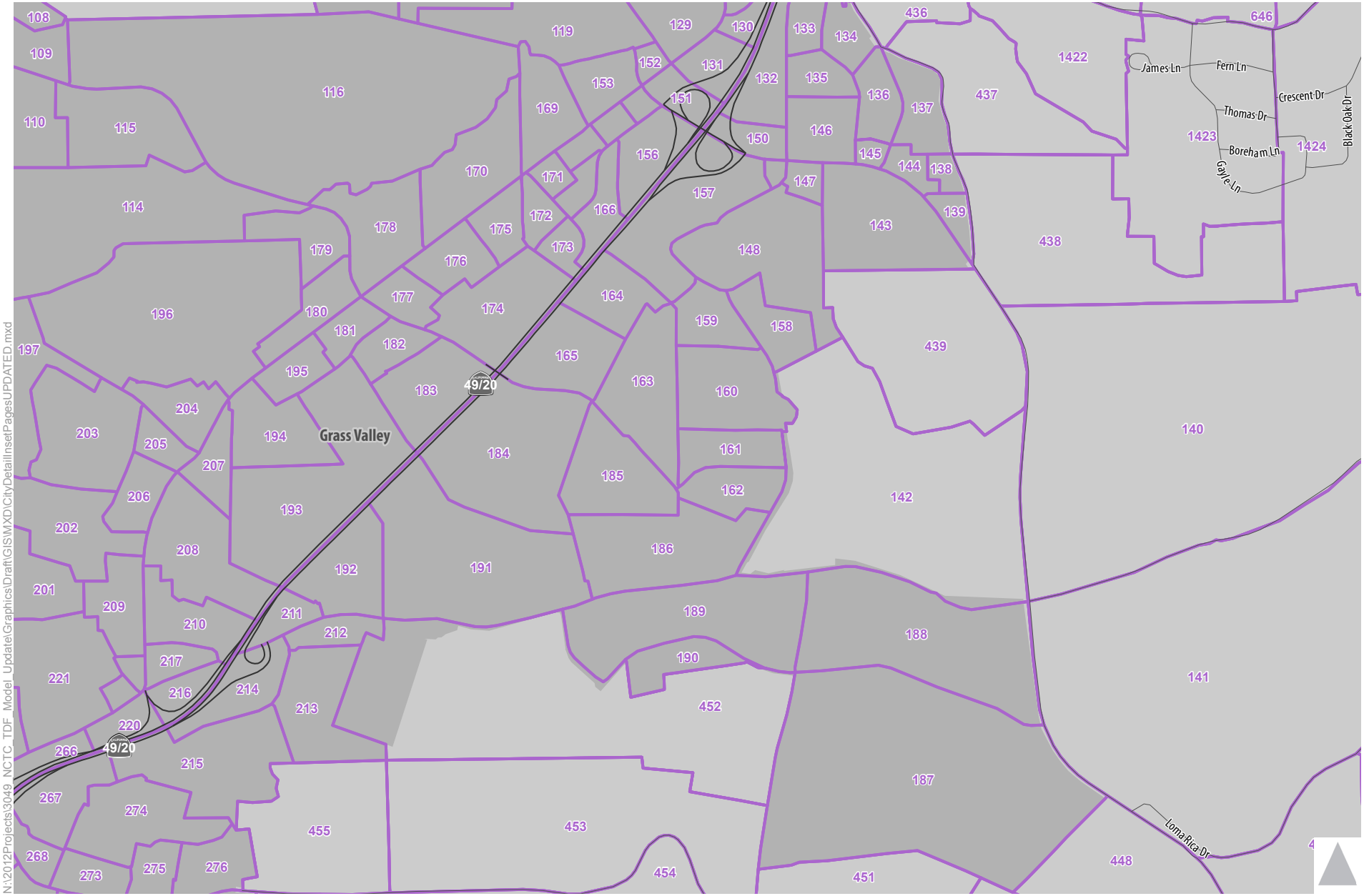

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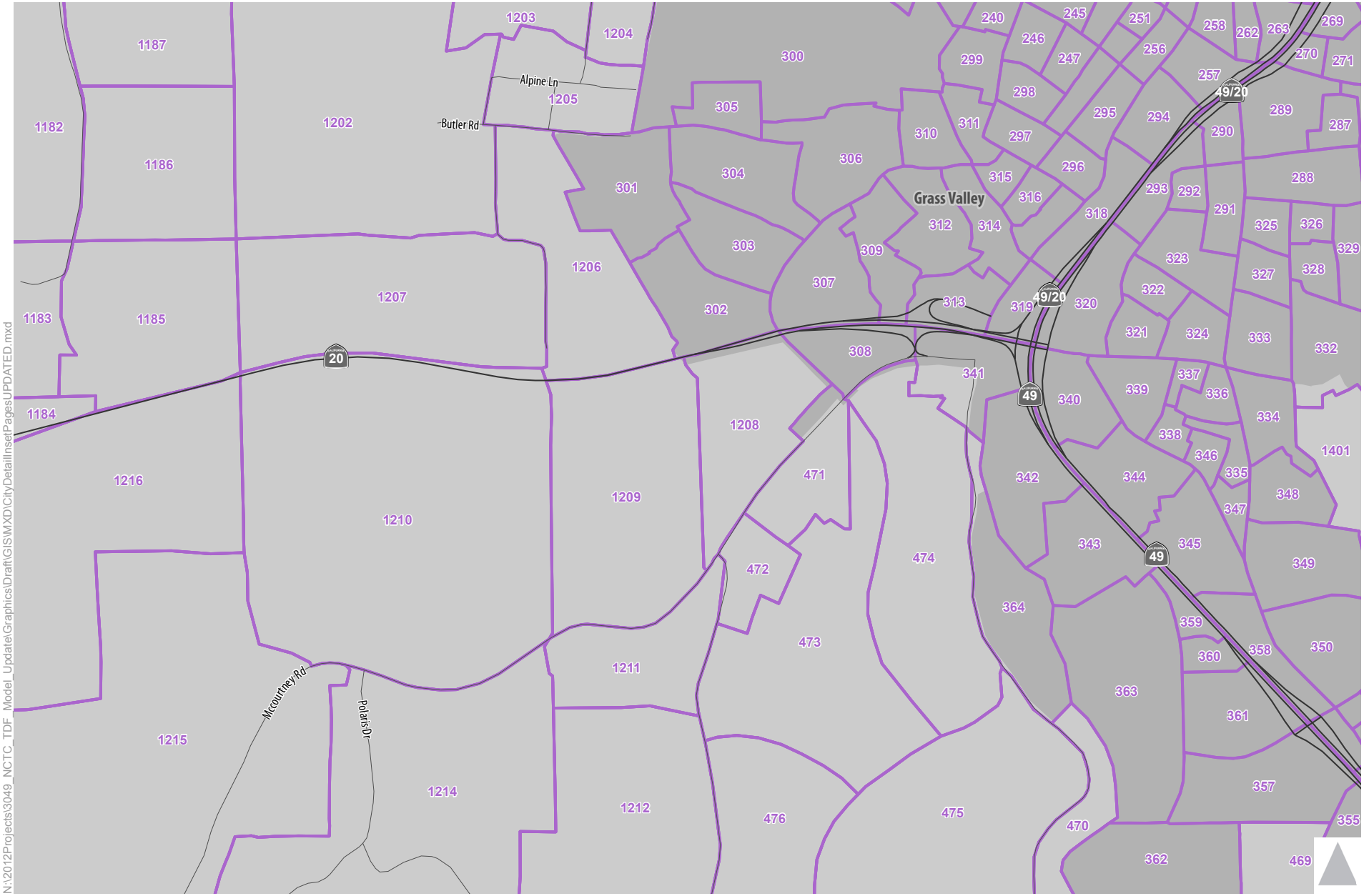

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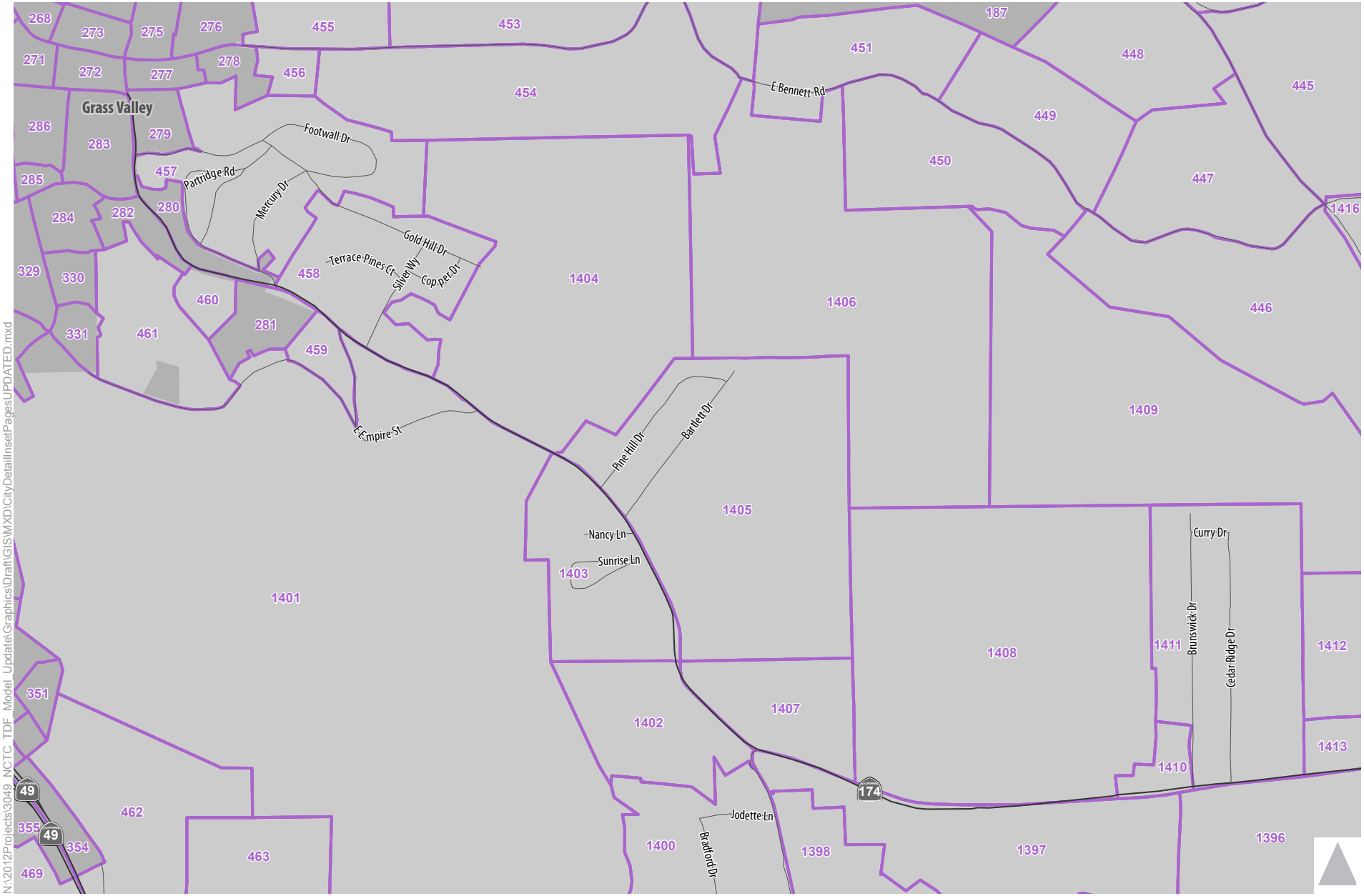

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Traffic Analysis Zones

NCTC Traffic Analysis Zones Map Book - "City" Detail

B

APPENDIX
TRIP GENERATION RATES

CROSS CLASS TABLE

[Area Type]	[Emp. Type]	LU_Type	LU_Unit	R_HBW_P	R_HBO_P	R_NHB_P	R_SCHOOL_P	R_SIERRA_P	R_SP1_P	R_HBW_A	R_HBO_A	R_NHB_A	R_SCHOOL_A	R_SIERRA_A	R_SP1_A	R_HBW_IX	R_HBO_IX_F	R_NHB_IX_F	R_SCHOOL_I	R_SIERRA_I	R_SP1_IX_P	R_HBW_XI_	R_HBO_XI_A	R_NHB_XI_A	R_SCHOOL_X	R_SIERRA_X	R_SP1_XI_A
1	1	SF	DU	1.669	4.275	0.071	0.675	0.300	0.000	0.000	0.000	0.071	0.000	0.000	0.000	0.206	0.225	0.005	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000
1	2	MF	DU	1.306	2.601	0.046	0.440	0.147	0.000	0.000	0.000	0.046	0.000	0.000	0.000	0.161	0.137	0.003	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000
1	3	MH	DU	0.926	1.846	0.033	0.312	0.104	0.000	0.000	0.000	0.033	0.000	0.000	0.000	0.115	0.097	0.002	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000
1	4	SEN	DU	0.000	2.467	0.199	0.000	0.000	0.000	0.000	0.000	0.201	0.000	0.000	0.000	0.000	0.130	0.013	0.000	0.000	0.000	0.000	0.000	0.011	0.000	0.000	0.000
1	5	OFF	KSF	0.000	0.000	2.329	0.000	0.000	0.000	5.285	0.512	2.353	0.000	0.000	0.000	0.000	0.000	0.149	0.000	0.000	0.000	0.220	0.039	0.124	0.000	0.000	0.000
1	6	MEDOFF	KSF	0.000	0.000	8.491	0.000	0.000	0.000	2.775	14.112	8.581	0.000	0.000	0.000	0.000	0.000	0.542	0.000	0.000	0.000	0.116	1.062	0.452	0.000	0.000	0.000
1	7	HOSP	BEDS	0.000	0.000	3.330	0.000	0.000	0.000	0.907	3.515	3.366	0.000	0.000	0.000	0.000	0.000	0.213	0.000	0.000	0.000	0.038	0.265	0.177	0.000	0.000	0.000
1	8	LI	KSF	0.000	0.000	1.409	0.000	0.000	0.000	3.346	0.454	1.424	0.000	0.000	0.000	0.000	0.000	0.090	0.000	0.000	0.000	0.139	0.034	0.075	0.000	0.000	0.000
1	9	WARE	KSF	0.000	0.000	0.669	0.000	0.000	0.000	0.000	1.324	1.353	0.000	0.000	0.000	0.000	0.000	0.043	0.000	0.000	0.000	0.000	0.100	0.071	0.000	0.000	0.000
1	10	CHURCH	KSF	0.000	0.000	0.685	0.000	0.000	0.000	0.700	6.439	0.692	0.000	0.000	0.000	0.000	0.000	0.044	0.000	0.000	0.000	0.029	0.485	0.036	0.000	0.000	0.000
1	11	PQP	KSF	0.000	0.000	18.771	0.000	0.000	0.000	14.378	41.785	18.971	0.000	0.000	0.000	0.000	0.000	1.198	0.000	0.000	0.000	0.599	3.145	0.998	0.000	0.000	0.000
1	12	PARK	Acres	0.000	0.000	0.536	0.000	0.000	0.000	0.109	0.954	0.542	0.000	0.000	0.000	0.000	0.000	0.034	0.000	0.000	0.000	0.005	0.072	0.029	0.000	0.000	0.000
1	13	RET	KSF	0.000	0.000	13.959	0.000	0.000	0.000	4.224	19.437	14.108	0.000	0.000	0.000	0.000	0.000	0.891	0.000	0.000	0.000	0.176	1.463	0.743	0.000	0.000	0.000
1	14	GOLF	HOLES	0.000	0.000	0.000	0.000	0.000	0.000	3.431	29.914	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.143	2.252	0.000	0.000	0.000	0.000
1	15	REST	KSF	0.000	0.000	22.829	0.000	0.000	0.000	8.635	30.115	23.072	0.000	0.000	0.000	0.000	0.000	1.457	0.000	0.000	0.000	0.360	2.267	1.214	0.000	0.000	0.000
1	16	RESTHI	KSF	0.000	0.000	64.477	0.000	0.000	0.000	18.814	36.452	65.163	0.000	0.000	0.000	0.000	0.000	4.116	0.000	0.000	0.000	0.784	2.744	3.430	0.000	0.000	0.000
1	17	GAS	PUMPS	0.000	0.000	10.563	0.000	0.000	0.000	2.697	2.613	10.675	0.000	0.000	0.000	0.000	0.000	0.674	0.000	0.000	0.000	0.112	0.197	0.562	0.000	0.000	0.000
1	18	LODGING	ROOMS	0.159	0.000	2.725	0.000	0.000	0.000	0.856	1.908	2.754	0.000	0.000	0.000	0.020	0.000	0.174	0.000	0.000	0.000	0.036	0.144	0.145	0.000	0.000	0.000
1	19	K8	STUDENTS	0.000	0.000	0.109	0.000	0.000	0.000	0.000	0.000	0.111	1.210	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.006	0.012	0.000	0.000
1	20	HIGHSCH	STUDENTS	0.000	0.000	0.080	0.000	0.000	0.000	0.000	0.000	0.081	1.524	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.004	0.015	0.000	0.000
1	21	COLL	STUDENTS	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.188	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.012	0.000
1	29	LU_Spare05	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1	30	LU_Spare04	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1	31	LU_Spare03	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1	32	LU_Spare02	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1	33	LU_Spare01	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	1	SF	DU	1.579	3.761	0.073	0.825	0.225	0.000	0.000	0.000	0.072	0.000	0.000	0.000	0.296	0.664	0.002	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000
2	2	MF	DU	1.235	2.286	0.047	0.538	0.098	0.000	0.000	0.000	0.047	0.000	0.000	0.000	0.232	0.403	0.001	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000
2	3	MH	DU	0.877	1.622	0.034	0.382	0.069	0.000	0.000	0.000	0.033	0.000	0.000	0.000	0.164	0.286	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
2	4	SEN	DU	0.000	2.208	0.205	0.000	0.000	0.000	0.000	0.000	0.203	0.000	0.000	0.000	0.000	0.390	0.006	0.000	0.000	0.000	0.000	0.000	0.008	0.000	0.000	0.000
2	5	OFF	KSF	0.000	0.000	2.403	0.000	0.000	0.000	5.230	0.528	2.378	0.000	0.000	0.000	0.000	0.000	0.074	0.000	0.000	0.000	0.275	0.022	0.099	0.000	0.000	0.000
2	6	MEDOFF	KSF	0.000	0.000	8.762	0.000	0.000	0.000	2.746	14.568	8.671	0.000	0.000	0.000	0.000	0.000	0.271	0.000	0.000	0.000	0.145	0.607	0.361	0.000	0.000	0.000
2	7	HOSP	BEDS	0.000	0.000	3.437	0.000	0.000	0.000	0.898	3.628	3.401	0.000	0.000	0.000	0.000	0.000	0.106	0.000	0.000	0.000	0.047	0.151	0.142	0.000	0.000	0.000
2	8	LI	KSF	0.000	0.000	1.454	0.000	0.000	0.000	3.311	0.468	1.439	0.000	0.000	0.000	0.000	0.000	0.045	0.000	0.000	0.000	0.174	0.020	0.060	0.000	0.000	0.000
2	9	WARE	KSF	0.000	0.000	0.691	0.000	0.000	0.000	0.000	1.367	1.367	0.000	0.000	0.000	0.000	0.000	0.021	0.000	0.000	0.000	0.000	0.057	0.057	0.000	0.000	0.000
2	10	CHURCH	KSF	0.000	0.000	0.707	0.000	0.000	0.000	0.692	6.647	0.700	0.000	0.000	0.000	0.000	0.000	0.022	0.000	0.000	0.000	0.036	0.277	0.029	0.000	0.000	0.000
2	11	PQP	KSF	0.000	0.000	19.370	0.000	0.000	0.000	14.228	43.133	19.170	0.000	0.000	0.000	0.000	0.000	0.599	0.000	0.000	0.000	0.749	1.797	0.799	0.000	0.000	0.000
2	12	PARK	Acres	0.000	0.000	0.553	0.000	0.000	0.000	0.108	0.985	0.547	0.000	0.000	0.000	0.000	0.000	0.017	0.000	0.000	0.000	0.006	0.041	0.023	0.000	0.000	0.000
2	13	RET	KSF	0.000	0.000	15.472	0.000	0.000	0.000	4.180	17.952	15.312	0.000	0.000	0.000	0.000	0.000	0.479	0.000	0.000	0.000	0.220	0.748	0.638	0.000	0.000	0.000
2	14	GOLF	HOLES	0.000	0.000	0.000	0.000	0.000	0.000	3.395	30.879	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.179	1.287	0.000	0.000	0.000	0.000
2	15	REST	KSF	0.000	0.000	23.558	0.000	0.000	0.000	8.545	31.087	23.315	0.000	0.000	0.000	0.000	0.000	0.729	0.000	0.000	0.000	0.450	1.295	0.971	0.000	0.000	0.000
2	16	RESTHI	KSF	0.000	0.000	66.535	0.000	0.000	0.000	18.618	37.628	65.849	0.000	0.000	0.000	0.000	0.000	2.058	0.000	0.000	0.000	0.980	1.568	2.744	0.000	0.000	0.000
2	17	GAS	PUMPS	0.000	0.000	10.900	0.000	0.000	0.000	2.669	2.697	10.788	0.000	0.000	0.000	0.000	0.000	0.337	0.000	0.000	0.000	0.140	0.112	0.449	0.000	0.000	0.000
2	18	LODGING	ROOMS	0.150	0.000	2.812	0.000	0.000	0.000	0.847	1.970	2.783	0.000	0.000	0.000	0.028	0.000	0.087	0.000	0.000	0.000	0.045	0.082	0.116	0.000	0.000	0.000
2	19	K8	STUDENTS	0.000	0.000	0.113	0.000	0.000	0.000	0.000	0.000	0.112	1.210	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.005	0.012	0.000	0.000
2	20	HIGHSCH	STUDENTS	0.000	0.000	0.083	0.000	0.000	0.000	0.000	0.000	0.082	1.524	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.003	0.015	0.000	0.000
2	21	COLL	STUDENTS	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	29	LU_Spare05	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	30	LU_Spare04	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	31	LU_Spare03	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	32	LU_Spare02	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	33	LU_Spare01	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3	1	SF	DU	1.018	2.363	0.050	0.250	0.150	0.000	0.000	0.000	0.050	0.000	0.000	0.000	0.332	0.788	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
3	2	MF	DU	0.787	1.443	0.032	0.163	0.065	0.000	0.000	0.000	0.032	0.000	0.000	0.000	0.257	0.481	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3	3	MH	DU	0.668	1.226	0.027	0.139	0.055	0.000	0.000	0.000	0.027	0.000	0.000	0.000	0.218	0.409	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3	4	SEN	DU	0.000	1.296	0.139	0.000	0.000	0.000	0.000	0.000	0.139	0.000	0.000	0.000	0.000	0.432	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
3	5	OFF	KSF	0.000	0.000	2.452	0.000	0.000	0.000	5.450	0.523	2.452	0.000	0.000	0.000	0.000	0.000	0.025	0.000	0.000	0.000	0.055	0.028	0.025	0.000	0.000	0.000
3	6	MEDOFF	KSF	0.000	0.000	8.942	0.000	0.000	0.000	2.861	14.416	8.942	0.000	0.000	0.000	0.000	0.000	0.090	0.000	0.000	0.000	0.029	0.759	0.090	0.000	0.000	0.000
3	7	HOSP	BEDS	0.000	0.000	3.508	0.000	0.000	0.000	0.935	3.590	3.508	0.000	0.000	0.000	0.000	0.000	0.035	0.000	0.000	0.000	0.009	0.189	0.035	0.000	0.000	0.000
3	8	LI	KSF	0.000	0.000	1.484	0.000	0.000	0.000	3.450	0.464	1.484	0.000	0.000	0.000	0.000	0.000	0.015	0.000	0.000	0.000	0.035	0.024	0.015	0.000	0.000	0.000
3	9	WARE	KSF	0.000	0.000	0.705	0.000	0.000	0.000	0.000	1.353	1.410	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.000	0.000	0.071	0.014	0.000	0.000	0.000
3	10	CHURCH	KSF	0.000	0.000	0.722	0.000	0.000	0.000	0.722	6.577	0.722	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.000	0.007	0.346	0.007	0.000	0.000	0.000
3	11	PQP	KSF	0.000	0.000	19.769	0.000	0.000	0.000	14.827	42.684	19.769	0.000	0.000	0.000	0.000	0.000	0.200	0.000	0.000	0.000	0.150	2.247	0.200	0.000	0.000	0.000
3	12	PARK	Acres	0.000	0.000	0.564	0.000	0.000	0.000	0.113	0.975	0.564	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.001	0.051	0.006	0.000	0.000	0.000
3	13	RET	KSF	0.000	0.000	15.791	0.000	0.000	0.000	4.356	17.765	15.791	0.000	0.000	0.000	0.000	0.000	0.160	0.000	0.000	0.000	0.044	0.935	0.160	0.000	0.000	0.000
3	14	GOLF	HOLES	0.000	0.000	0.000	0.000	0.000	0.000	3.538	30.558	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.036	1.608	0.000	0.000	0.000	0.000
3	15	REST	KSF	0.000	0.000	24.044	0.000	0.000	0.000	8.905	30.763	24.044	0.000	0.000	0.000	0.000	0.000	0.243	0.000	0.000	0.000	0.090	1.619	0.243	0.000	0.000	0.000
3	16	RESTHI	KSF	0.000	0.000	67.907	0.000	0.000	0.000	19.402	37.236	67.907	0.000	0.000	0.000	0.000	0.000	0.686	0.000	0.000	0.000	0.196	1.960	0.686	0.000	0.000	0.000
3	17	GAS	PUMPS	0.000	0.000	11.125	0.000	0.000	0.000	2.781	2.669	11.125	0.000	0.000	0.000	0.000	0.000	0.112	0.000	0.000	0.000	0.028	0.140	0.112	0.000	0.000	0.000
3	18	LODGING	ROOMS	0.135	0.000	2.870	0.000	0.000	0.000	0.883	1.949	2.870	0.000	0.000	0.000	0.044	0.000	0.029	0.000	0.000	0.000	0.009	0.103	0.029	0.000	0.000	0.000
3	19	K8	STUDENTS	0.000	0.000	0.115	0.000	0.000	0.000	0.000	0.000	0.115	1.222	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
3	20	HIGHSCH	STUDENTS	0.000	0.000	0.085	0.000	0.000	0.000	0.000	0.000	0.085	1.539	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
3	21	COLL	STUDENTS	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3	29	LU_Spare05	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3	30	LU_Spare04	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3	31	LU_Spare03	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3	32	LU_Spare02	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3	33	LU_Spare01	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

CROSS CLASS TABLE

[Area Type]	[Emp. Type]	LU_Type	LU_Unit	R_HBW_P	R_HBO_P	R_NHB_P	R_SCHOOL_P	R_SIERRA_P	R_SP1_P	R_HBW_A	R_HBO_A	R_NHB_A	R_SCHOOL_A	R_SIERRA_A	R_SP1_A	R_HBW_IX	R_HBO_IX_P	R_NHB_IX_P	R_SCHOOL_P	R_SIERRA_IX_P	R_SP1_IX_P	R_HBW_XI_A	R_HBO_XI_A	R_NHB_XI_A	R_SCHOOL_A	R_SIERRA_X	R_SP1_XI_A
4	1	SF	DU	1.024	2.898	0.050	0.450	0.150	0.000	0.000	0.000	0.049	0.000	0.000	0.000	0.226	0.153	0.001	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000
4	2	MF	DU	0.801	1.765	0.032	0.293	0.065	0.000	0.000	0.000	0.032	0.000	0.000	0.000	0.177	0.093	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
4	3	MH	DU	0.681	1.500	0.027	0.249	0.055	0.000	0.000	0.000	0.027	0.000	0.000	0.000	0.150	0.079	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
4	4	SEN	DU	0.000	1.642	0.139	0.000	0.000	0.000	0.000	0.000	0.136	0.000	0.000	0.000	0.000	0.086	0.001	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000
4	5	OFF	KSF	0.000	0.000	2.452	0.000	0.000	0.000	5.395	0.539	2.403	0.000	0.000	0.000	0.000	0.000	0.025	0.000	0.000	0.000	0.110	0.011	0.074	0.000	0.000	0.000
4	6	MEDOFF	KSF	0.000	0.000	8.942	0.000	0.000	0.000	2.833	14.871	8.762	0.000	0.000	0.000	0.000	0.000	0.090	0.000	0.000	0.000	0.058	0.303	0.271	0.000	0.000	0.000
4	7	HOSP	BEDS	0.000	0.000	3.508	0.000	0.000	0.000	0.926	3.704	3.437	0.000	0.000	0.000	0.000	0.000	0.035	0.000	0.000	0.000	0.019	0.076	0.106	0.000	0.000	0.000
4	8	LI	KSF	0.000	0.000	1.484	0.000	0.000	0.000	3.415	0.478	1.454	0.000	0.000	0.000	0.000	0.000	0.015	0.000	0.000	0.000	0.070	0.010	0.045	0.000	0.000	0.000
4	9	WARE	KSF	0.000	0.000	0.705	0.000	0.000	0.000	0.000	1.396	1.381	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.000	0.000	0.028	0.043	0.000	0.000	0.000
4	10	CHURCH	KSF	0.000	0.000	0.722	0.000	0.000	0.000	0.714	6.785	0.707	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.000	0.015	0.138	0.022	0.000	0.000	0.000
4	11	PQP	KSF	0.000	0.000	19.769	0.000	0.000	0.000	14.677	44.032	19.370	0.000	0.000	0.000	0.000	0.000	0.200	0.000	0.000	0.000	0.300	0.899	0.599	0.000	0.000	0.000
4	12	PARK	Acres	0.000	0.000	0.564	0.000	0.000	0.000	0.112	1.005	0.553	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.002	0.021	0.017	0.000	0.000	0.000
4	13	RET	KSF	0.000	0.000	15.791	0.000	0.000	0.000	4.312	18.326	15.472	0.000	0.000	0.000	0.000	0.000	0.160	0.000	0.000	0.000	0.088	0.374	0.479	0.000	0.000	0.000
4	14	GOLF	HOLES	0.000	0.000	0.000	0.000	0.000	0.000	3.503	31.523	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.071	0.643	0.000	0.000	0.000	0.000
4	15	REST	KSF	0.000	0.000	24.044	0.000	0.000	0.000	8.815	31.734	23.558	0.000	0.000	0.000	0.000	0.000	0.243	0.000	0.000	0.000	0.180	0.648	0.729	0.000	0.000	0.000
4	16	RESTHI	KSF	0.000	0.000	67.907	0.000	0.000	0.000	19.206	38.412	66.535	0.000	0.000	0.000	0.000	0.000	0.686	0.000	0.000	0.000	0.392	0.784	2.058	0.000	0.000	0.000
4	17	GAS	PUMPS	0.000	0.000	11.125	0.000	0.000	0.000	2.753	2.753	10.900	0.000	0.000	0.000	0.000	0.000	0.112	0.000	0.000	0.000	0.056	0.056	0.337	0.000	0.000	0.000
4	18	LODGING	ROOMS	0.146	0.000	2.870	0.000	0.000	0.000	0.874	2.011	2.812	0.000	0.000	0.000	0.032	0.000	0.029	0.000	0.000	0.000	0.018	0.041	0.087	0.000	0.000	0.000
4	19	K8	STUDENTS	0.000	0.000	0.115	0.000	0.000	0.000	0.000	0.000	0.113	1.222	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000
4	20	HIGHSCH	STUDENTS	0.000	0.000	0.085	0.000	0.000	0.000	0.000	0.000	0.083	1.539	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000
4	21	COLL	STUDENTS	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4	29	LU_Spare05	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4	30	LU_Spare04	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4	31	LU_Spare03	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4	32	LU_Spare02	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4	33	LU_Spare01	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5	1	SF	DU	0.394	2.288	0.048	0.450	0.100	0.000	0.000	0.000	0.049	0.000	0.000	0.000	0.906	0.763	0.003	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
5	2	MF	DU	0.306	1.394	0.031	0.293	0.033	0.000	0.000	0.000	0.032	0.000	0.000	0.000	0.704	0.465	0.002	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
5	3	MH	DU	0.260	1.184	0.026	0.249	0.028	0.000	0.000	0.000	0.027	0.000	0.000	0.000	0.599	0.395	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
5	4	SEN	DU	0.000	1.296	0.134	0.000	0.000	0.000	0.000	0.000	0.138	0.000	0.000	0.000	0.000	0.432	0.007	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000
5	5	OFF	KSF	0.000	0.000	2.353	0.000	0.000	0.000	5.230	0.523	2.428	0.000	0.000	0.000	0.000	0.000	0.124	0.000	0.000	0.000	0.275	0.028	0.050	0.000	0.000	0.000
5	6	MEDOFF	KSF	0.000	0.000	8.581	0.000	0.000	0.000	2.746	14.416	8.852	0.000	0.000	0.000	0.000	0.000	0.452	0.000	0.000	0.000	0.145	0.759	0.181	0.000	0.000	0.000
5	7	HOSP	BEDS	0.000	0.000	3.366	0.000	0.000	0.000	0.898	3.590	3.472	0.000	0.000	0.000	0.000	0.000	0.177	0.000	0.000	0.000	0.047	0.189	0.071	0.000	0.000	0.000
5	8	LI	KSF	0.000	0.000	1.424	0.000	0.000	0.000	3.311	0.464	1.469	0.000	0.000	0.000	0.000	0.000	0.075	0.000	0.000	0.000	0.174	0.024	0.030	0.000	0.000	0.000
5	9	WARE	KSF	0.000	0.000	0.676	0.000	0.000	0.000	0.000	1.353	1.396	0.000	0.000	0.000	0.000	0.000	0.036	0.000	0.000	0.000	0.000	0.071	0.028	0.000	0.000	0.000
5	10	CHURCH	KSF	0.000	0.000	0.692	0.000	0.000	0.000	0.692	6.577	0.714	0.000	0.000	0.000	0.000	0.000	0.036	0.000	0.000	0.000	0.036	0.346	0.015	0.000	0.000	0.000
5	11	PQP	KSF	0.000	0.000	18.971	0.000	0.000	0.000	14.228	42.684	19.570	0.000	0.000	0.000	0.000	0.000	0.998	0.000	0.000	0.000	0.749	2.247	0.399	0.000	0.000	0.000
5	12	PARK	Acres	0.000	0.000	0.542	0.000	0.000	0.000	0.108	0.975	0.559	0.000	0.000	0.000	0.000	0.000	0.029	0.000	0.000	0.000	0.006	0.051	0.011	0.000	0.000	0.000
5	13	RET	KSF	0.000	0.000	15.153	0.000	0.000	0.000	4.180	17.765	15.631	0.000	0.000	0.000	0.000	0.000	0.798	0.000	0.000	0.000	0.220	0.935	0.319	0.000	0.000	0.000
5	14	GOLF	HOLES	0.000	0.000	0.000	0.000	0.000	0.000	3.395	30.558	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.179	1.608	0.000	0.000	0.000	0.000
5	15	REST	KSF	0.000	0.000	23.072	0.000	0.000	0.000	8.545	30.763	23.801	0.000	0.000	0.000	0.000	0.000	1.214	0.000	0.000	0.000	0.450	1.619	0.486	0.000	0.000	0.000
5	16	RESTHI	KSF	0.000	0.000	65.163	0.000	0.000	0.000	18.618	37.236	67.221	0.000	0.000	0.000	0.000	0.000	3.430	0.000	0.000	0.000	0.980	1.960	1.372	0.000	0.000	0.000
5	17	GAS	PUMPS	0.000	0.000	10.675	0.000	0.000	0.000	2.669	2.669	11.013	0.000	0.000	0.000	0.000	0.000	0.562	0.000	0.000	0.000	0.140	0.140	0.225	0.000	0.000	0.000
5	18	LODGING	ROOMS	0.054	0.000	2.754	0.000	0.000	0.000	0.847	1.949	2.841	0.000	0.000	0.000	0.124	0.000	0.145	0.000	0.000	0.000	0.045	0.103	0.058	0.000	0.000	0.000
5	19	K8	STUDENTS	0.000	0.000	0.111	0.000	0.000	0.000	0.000	0.000	0.114	1.222	0.000	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000
5	20	HIGHSCH	STUDENTS	0.000	0.000	0.081	0.000	0.000	0.000	0.000	0.000	0.084	1.539	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000
5	21	COLL	STUDENTS	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5	29	LU_Spare05	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5	30	LU_Spare04	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5	31	LU_Spare03	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5	32	LU_Spare02	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5	33	LU_Spare01	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6	1	SF	DU	1.023	2.880	0.048	0.250	0.100	0.000	0.000	0.000	0.049	0.000	0.000	0.000	0.327	0.320	0.003	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
6	2	MF	DU	0.791	1.760	0.031	0.163	0.033	0.000	0.000	0.000	0.032	0.000	0.000	0.000	0.252	0.196	0.002	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
6	3	MH	DU	0.672	1.496	0.026	0.139	0.028	0.000	0.000	0.000	0.027	0.000	0.000	0.000	0.215	0.166	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
6	4	SEN	DU	0.000	1.556	0.134	0.000	0.000	0.000	0.000	0.000	0.138	0.000	0.000	0.000	0.000	0.173	0.007	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000
6	5	OFF	KSF	0.000	0.000	2.353	0.000	0.000	0.000	5.340	0.539	2.428	0.000	0.000	0.000	0.000	0.000	0.124	0.000	0.000	0.000	0.165	0.011	0.050	0.000	0.000	0.000
6	6	MEDOFF	KSF	0.000	0.000	8.581	0.000	0.000	0.000	2.804	14.871	8.852	0.000	0.000	0.000	0.000	0.000	0.452	0.000	0.000	0.000	0.087	0.303	0.181	0.000	0.000	0.000
6	7	HOSP	BEDS	0.000	0.000	3.366	0.000	0.000	0.000	0.916	3.704	3.472	0.000	0.000	0.000	0.000	0.000	0.177	0.000	0.000	0.000	0.028	0.076	0.071	0.000	0.000	0.000
6	8	LI	KSF	0.000	0.000	1.424	0.000	0.000	0.000	3.380	0.478	1.469	0.000	0.000	0.000	0.000	0.000	0.075	0.000	0.000	0.000	0.105	0.010	0.030	0.000	0.000	0.000
6	9	WARE	KSF	0.000	0.000	0.676	0.000	0.000	0.000	0.000	1.396	1.396	0.000	0.000	0.000	0.000	0.000	0.036	0.000	0.000	0.000	0.000	0.028	0.028	0.000	0.000	0.000
6	10	CHURCH	KSF	0.000	0.000	0.692	0.000	0.000	0.000	0.707	6.785	0.714	0.000	0.000	0.000	0.000	0.000	0.036	0.000	0.000	0.000	0.022	0.138	0.015	0.000	0.000	0.000
6	11	PQP	KSF	0.000	0.000	18.971	0.000	0.000	0.000	14.527	44.032	19.570	0.000	0.000	0.000	0.000	0.000	0.998	0.000	0.000	0.000	0.449	0.899	0.399	0.000	0.000	0.000
6	12	PARK	Acres	0.000	0.000	0.542	0.000	0.000	0.000	0.111	1.005	0.559	0.000	0.000	0.000	0.000	0.000	0.029	0.000	0.000	0.000	0.003	0.021	0.011	0.000	0.000	0.000
6	13	RET	KSF	0.000	0.000	15.153	0.000	0.000	0.000	4.268	18.326	15.631	0.000	0.000	0.000	0.000	0.000	0.798	0.000	0.000	0.000	0.132	0.374	0.319	0.000	0.000	0.000
6	14	GOLF	HOLES	0.000	0.000	0.000	0.000	0.000	0.000	3.467	31.523	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.107	0.643	0.000	0.000	0.000	0.000
6	15	REST	KSF	0.000	0.000	23.072	0.000	0.000	0.000	8.725	31.734	23.801	0.000	0.000	0.000	0.000	0.000	1.214	0.000	0.000	0.000	0.270	0.648	0.486	0.000	0.000	0.000
6	16	RESTHI	KSF	0.000	0.000	65.163	0.000	0.000	0.000	19.010	38.412	67.221	0.000	0.000	0.000	0.000	0.000	3.430	0.000	0.000	0.000	0.588	0.784	1.372	0.000	0.000	0.000
6	17	GAS	PUMPS	0.000	0.000	10.675	0.000	0.000	0.000	2.725	2.753	11.013	0.000	0.000	0.000	0.000	0.000	0.562	0.000	0.000	0.000	0.084	0.056	0.225	0.000	0.000	0.000
6	18	LODGING	ROOMS	0.135	0.000	2.754	0.000	0.000	0.000	0.865	2.011	2.841	0.000	0.000	0.000	0.043	0.000	0.145	0.000	0.000	0.000	0.027	0.041	0.058	0.000	0.000	0.000
6	19	K8	STUDENTS	0.000	0.000	0.111	0.000	0.000	0.000	0.000	0.000	0.114	1.222	0.000	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000
6	20	HIGHSCH	STUDENTS	0.000	0.000	0.081	0.000	0.000	0.000	0.000	0.000	0.084	1.539	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000
6	21	COLL	STUDENTS	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6	29	LU_Spare05	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6	30	LU_Spare04	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6	31	LU_Spare03	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6	32	LU_Spare02	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6	33	LU_Spare01	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

CROSS CLASS TABLE

[Area Type]	[Emp. Type]	LU_Type	LU_Unit	R_HBW_P	R_HBO_P	R_NHB_P	R_SCHOOL_P	R_SIERRA_P	R_SP1_P	R_HBW_A	R_HBO_A	R_NHB_A	R_SCHOOL_A	R_SIERRA_A	R_SP1_A	R_HBW_IX	R_HBO_IX_F	R_NHB_IX_F	R_SCHOOL_F	R_SIERRA_I	R_SP1_IX_P	R_HBW_XI_	R_HBO_XI_A	R_NHB_XI_A	R_SCHOOL_X	R_SIERRA_X	R_SP1_XI_A
7	1	SF	DU	0.995	2.623	0.045	0.450	0.100	0.000	0.000	0.000	0.050	0.000	0.000	0.000	0.306	0.427	0.005	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
7	2	MF	DU	0.798	1.570	0.029	0.293	0.033	0.000	0.000	0.000	0.032	0.000	0.000	0.000	0.245	0.256	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7	3	MH	DU	0.678	1.334	0.025	0.249	0.028	0.000	0.000	0.000	0.027	0.000	0.000	0.000	0.208	0.217	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7	4	SEN	DU	0.000	1.487	0.127	0.000	0.000	0.000	0.000	0.000	0.139	0.000	0.000	0.000	0.000	0.242	0.014	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
7	5	OFF	KSF	0.000	0.000	2.230	0.000	0.000	0.000	5.285	0.534	2.452	0.000	0.000	0.000	0.000	0.000	0.248	0.000	0.000	0.000	0.220	0.017	0.025	0.000	0.000	0.000
7	6	MEDOFF	KSF	0.000	0.000	8.129	0.000	0.000	0.000	2.775	14.719	8.942	0.000	0.000	0.000	0.000	0.000	0.903	0.000	0.000	0.000	0.116	0.455	0.090	0.000	0.000	0.000
7	7	HOSP	BEDS	0.000	0.000	3.189	0.000	0.000	0.000	0.907	3.666	3.508	0.000	0.000	0.000	0.000	0.000	0.354	0.000	0.000	0.000	0.038	0.113	0.035	0.000	0.000	0.000
7	8	LI	KSF	0.000	0.000	1.349	0.000	0.000	0.000	3.346	0.473	1.484	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.000	0.000	0.139	0.015	0.015	0.000	0.000	0.000
7	9	WARE	KSF	0.000	0.000	0.641	0.000	0.000	0.000	0.000	1.381	1.410	0.000	0.000	0.000	0.000	0.000	0.071	0.000	0.000	0.000	0.000	0.043	0.014	0.000	0.000	0.000
7	10	CHURCH	KSF	0.000	0.000	0.656	0.000	0.000	0.000	0.700	6.716	0.722	0.000	0.000	0.000	0.000	0.000	0.073	0.000	0.000	0.000	0.029	0.208	0.007	0.000	0.000	0.000
7	11	PQP	KSF	0.000	0.000	17.972	0.000	0.000	0.000	14.378	43.582	19.769	0.000	0.000	0.000	0.000	0.000	1.997	0.000	0.000	0.000	0.599	1.348	0.200	0.000	0.000	0.000
7	12	PARK	Acres	0.000	0.000	0.513	0.000	0.000	0.000	0.109	0.995	0.564	0.000	0.000	0.000	0.000	0.000	0.057	0.000	0.000	0.000	0.005	0.031	0.006	0.000	0.000	0.000
7	13	RET	KSF	0.000	0.000	14.355	0.000	0.000	0.000	4.224	18.139	15.791	0.000	0.000	0.000	0.000	0.000	1.595	0.000	0.000	0.000	0.176	0.561	0.160	0.000	0.000	0.000
7	14	GOLF	HOLES	0.000	0.000	0.000	0.000	0.000	0.000	3.431	31.201	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.143	0.965	0.000	0.000	0.000	0.000
7	15	REST	KSF	0.000	0.000	21.858	0.000	0.000	0.000	8.635	31.411	24.044	0.000	0.000	0.000	0.000	0.000	2.429	0.000	0.000	0.000	0.360	0.971	0.243	0.000	0.000	0.000
7	16	RESTHI	KSF	0.000	0.000	61.734	0.000	0.000	0.000	18.814	38.020	67.907	0.000	0.000	0.000	0.000	0.000	6.859	0.000	0.000	0.000	0.784	1.176	0.686	0.000	0.000	0.000
7	17	GAS	PUMPS	0.000	0.000	10.114	0.000	0.000	0.000	2.697	2.725	11.125	0.000	0.000	0.000	0.000	0.000	1.124	0.000	0.000	0.000	0.112	0.084	0.112	0.000	0.000	0.000
7	18	LODGING	ROOMS	0.136	0.000	2.609	0.000	0.000	0.000	0.856	1.990	2.870	0.000	0.000	0.000	0.042	0.000	0.290	0.000	0.000	0.000	0.036	0.062	0.029	0.000	0.000	0.000
7	19	K8	STUDENTS	0.000	0.000	0.105	0.000	0.000	0.000	0.000	0.000	0.115	1.222	0.000	0.000	0.000	0.000	0.012	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
7	20	HIGHSCH	STUDENTS	0.000	0.000	0.077	0.000	0.000	0.000	0.000	0.000	0.085	1.539	0.000	0.000	0.000	0.000	0.009	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
7	21	COLL	STUDENTS	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7	29	LU_Spare05	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7	30	LU_Spare04	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7	31	LU_Spare03	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7	32	LU_Spare02	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7	33	LU_Spare01	N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

APPENDIX C
FRICTION FACTOR CURVES

Friction Factors

TIME	HBW	HBO	NHB	SCHOOL	SIERRA	SP1	HBW_IX	HBO_IX	NHB_IX	SCHOOL_IX	SIERRA_IX	HBW_XI	HBO_XI	NHB_XI	SCHOOL_XI	SIERRA_XI
1	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
2	2241	2241	2157	2241	2241	6000	5232	5232	5232	5232	5232	5232	5232	5232	5232	5232
3	1212	1212	1137	1212	1212	2714	4589	4589	4589	4589	4589	4589	4589	4589	4589	4589
4	762	762	701	762	762	1271	4035	4035	4035	4035	4035	4035	4035	4035	4035	4035
5	521	521	471	521	521	619	3552	3552	3552	3552	3552	3552	3552	3552	3552	3552
6	375	375	335	375	375	314	3130	3130	3130	3130	3130	3130	3130	3130	3130	3130
7	280	280	247	280	280	166	2759	2759	2759	2759	2759	2759	2759	2759	2759	2759
8	215	215	187	215	215	92	2433	2433	2433	2433	2433	2433	2433	2433	2433	2433
9	168	168	144	168	168	53	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146
10	134	134	114	134	134	32	1894	1894	1894	1894	1894	1894	1894	1894	1894	1894
11	108	108	91	108	108	20	1672	1672	1672	1672	1672	1672	1672	1672	1672	1672
12	88	88	73	88	88	13	1475	1475	1475	1475	1475	1475	1475	1475	1475	1475
13	72	72	59	72	72	9	1303	1303	1303	1303	1303	1303	1303	1303	1303	1303
14	60	60	49	60	60	6	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150
15	50	50	40	50	50	4	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016
16	42	42	33	42	42	3	897	897	897	897	897	897	897	897	897	897
17	35	35	28	35	35	2	792	792	792	792	792	792	792	792	792	792
18	30	30	23	30	30	2	700	700	700	700	700	700	700	700	700	700
19	25	25	20	25	25	1	618	618	618	618	618	618	618	618	618	618
20	21	21	17	21	21	1	546	546	546	546	546	546	546	546	546	546
21	18	18	14	18	18	1	482	482	482	482	482	482	482	482	482	482
22	16	16	12	16	16	1	426	426	426	426	426	426	426	426	426	426
23	13	13	10	13	13	1	377	377	377	377	377	377	377	377	377	377
24	12	12	9	12	12	1	333	333	333	333	333	333	333	333	333	333
25	10	10	7	10	10	1	294	294	294	294	294	294	294	294	294	294
26	9	9	6	9	9	1	260	260	260	260	260	260	260	260	260	260
27	8	8	6	8	8	1	229	229	229	229	229	229	229	229	229	229
28	7	7	5	7	7	1	203	203	203	203	203	203	203	203	203	203
29	6	6	4	6	6	1	179	179	179	179	179	179	179	179	179	179
30	5	5	4	5	5	1	158	158	158	158	158	158	158	158	158	158
32	4	4	3	4	4	1	124	124	124	124	124	124	124	124	124	124
34	3	3	2	3	3	1	97	97	97	97	97	97	97	97	97	97
36	2	2	2	2	2	1	75	75	75	75	75	75	75	75	75	75
38	2	2	1	2	2	1	59	59	59	59	59	59	59	59	59	59
40	1	1	1	1	1	1	46	46	46	46	46	46	46	46	46	46
45	1	1	1	1	1	1	25	25	25	25	25	25	25	25	25	25
60	1	1	1	1	1	1	4	4	4	4	4	4	4	4	4	4
90	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

D

APPENDIX D VALIDATION

Daily Model Validation

Segment	Model Link ID	Count	Year	Model	Model/Count	Model Deviation	Maximum Deviation	Within Deviation	Model - Count	Difference Squared
ADAM AV N. OF SQUIRREL CREEK RD	2154	1,416	2011	503	0.36	-0.64	0.63	No	-913	833,569
ALEXANDRA WY E. OF PATRICIA WY	3994	2,310	2011	879	0.38	-0.62	0.63	Yes	-1,431	2,047,761
ALEXANDRA WY S. OF LAWRENCE WY	7771	1,211	2011	429	0.35	-0.65	0.68	Yes	-782	611,524
ALEXANDRA WY W. OF PATRICIA WY	3995	3,112	2011	865	0.28	-0.72	0.58	No	-2,247	5,049,009
ALTA SIERRA DR E. OF HWY 49	2314	5,213	2012	6,271	1.20	0.20	0.48	Yes	1,058	1,119,364
ALTA SIERRA DR E. OF NORLENE WY	4255	1,281	2011	1,817	1.42	0.42	0.63	Yes	536	287,296
ALTA SIERRA DR W. OF DOG BAR RD	4054	2,366	2012	2,648	1.12	0.12	0.63	Yes	282	79,524
ALTA ST GRASS VALLEY CORP LIMIT	3070	3,994	2012	3,062	0.77	-0.23	0.52	Yes	-932	868,624
ALTA ST SE OF RIDGE RD	4404	3,890	2012	2,434	0.63	-0.37	0.52	Yes	-1,456	2,119,936
ALTA STREET S. ALTA HILL MINE ROAD	1491	3,599	2012	2,532	0.70	-0.30	0.58	Yes	-1,067	1,138,489
BALL RD E. OF ALTA SIERRA DR	2235	2,118	2011	1,525	0.72	-0.28	0.63	Yes	-593	351,649
BANNER LAVA CAP RD E. OF GRACIE RD	11193	1,271	2011	1,855	1.46	0.46	0.63	Yes	584	341,056
BANNER LAVA CAP RD E. OF IDAHO MARYLAND RD	3849	2,021	2011	1,681	0.83	-0.17	0.63	Yes	-340	115,600
BANNER LAVA CAP RD E. OF OLD TUNNEL RD	5399	3,917	2011	2,166	0.55	-0.45	0.52	Yes	-1,751	3,066,001
BANNER LAVA CAP RD W. OF GAYLE LN	1309	3,774	2011	1,914	0.51	-0.49	0.52	Yes	-1,860	3,459,600
BANNER LAVA CAP RD W. OF GRACIE RD	4349	2,504	2011	766	0.31	-0.69	0.58	No	-1,738	3,020,644
BANNER LAVA CAP RD W. OF IDAHO MARYLAND RD	3850	1,305	2011	1,681	1.29	0.29	0.63	Yes	376	141,376
BANNER LAVA CAP RD W. OF OLD TUNNEL RD	8946	3,880	2012	2,694	0.69	-0.31	0.52	Yes	-1,186	1,406,596
BANNER QUAKER HILL RD E. OF QUAKER HILL X RD	6038	1,434	2011	1,737	1.21	0.21	0.63	Yes	303	91,809
BANNER QUAKER HILL RD W. OF PASQUALE RD (W)	6036	1,575	2011	1,638	1.04	0.04	0.63	Yes	63	3,969
BITNEY SPRINGS RD N. OF NEWTOWN RD	10481	2,104	2011	2,202	1.05	0.05	0.63	Yes	98	9,604
BITNEY SPRINGS RD N. OF ROUGH AND READY HWY	5	3,243	2012	2,641	0.81	-0.19	0.58	Yes	-602	362,404
BOULDER ST E. OF NEVADA CITY CORP LIMIT	8470	3,910	2011	4,022	1.03	0.03	0.52	Yes	112	12,544
BREWER RD N. OF ANNIE DR (S)	11483	1,421	2011	1,384	0.97	-0.03	0.63	Yes	-37	1,369
BREWER RD S. OF GARY WY	1050	1,580	2011	2,108	1.33	0.33	0.63	Yes	528	278,784
BRUNSWICK RD N. OF IDAHO MARYLAND RD	4492	12,675	2011	8,078	0.64	-0.36	0.33	No	-4,597	21,132,409
BRUNSWICK RD N. OF HWY 174	6392	8,575	2011	7,937	0.93	-0.07	0.41	Yes	-638	407,044
BRUNSWICK RD NW OF E. BENNETT RD	851	10,983	2011	9,618	0.88	-0.12	0.36	Yes	-1,365	1,863,225
BRUNSWICK RD NW OF LOMA RICA DR	5040	14,179	2011	12,004	0.85	-0.15	0.31	Yes	-2,175	4,730,625
BRUNSWICK RD S. OF IDAHO MARYLAND RD	3176	15,276	2011	11,805	0.77	-0.23	0.30	Yes	-3,471	12,047,841
BRUNSWICK RD SE OF E. BENNETT RD	11381	8,794	2011	8,138	0.93	-0.07	0.38	Yes	-656	430,336
BRUNSWICK S. OLD TUNNEL	10793	14,055	2012	8,890	0.63	-0.37	0.31	No	-5,165	26,677,225
BRUNSWICK S. TOWN TALK	4558	10,772	2012	8,084	0.75	-0.25	0.36	Yes	-2,688	7,225,344
CARRIE DR W. OF DOG BAR RD	4697	2,452	2011	613	0.25	-0.75	0.63	No	-1,839	3,381,921
COMBIE RD E. OF HWY 49	5669	11,021	2012	9,082	0.82	-0.18	0.36	Yes	-1,939	3,759,721
COMBIE RD SE OF MAGNOLIA RD	5379	5,537	2012	1,081	0.20	-0.80	0.48	No	-4,456	19,855,936
COMBIE RD W. of W. Hacienda & Magnolia	3181	15,956	2011	9,011	0.56	-0.44	0.30	No	-6,945	48,233,025
DOG BAR RD N. OF MAGNOLIA RD	4595	1,639	2011	1,603	0.98	-0.02	0.63	Yes	-36	1,296
DOG BAR RD NW OF ALTA SIERRA DR	5777	6,430	2011	4,966	0.77	-0.23	0.44	Yes	-1,464	2,143,296
DOG BAR RD NW OF MOUNT OLIVE RD	3236	1,216	2011	1,888	1.55	0.55	0.68	Yes	672	451,584
DOG BAR RD S. OF ALTA SIERRA DR	3956	4,458	2011	2,790	0.63	-0.37	0.52	Yes	-1,668	2,782,224
DOG BAR RD S. OF LABARR MEADOWS RD	5356	8,159	2011	7,226	0.89	-0.11	0.41	Yes	-933	870,489
DOG BAR RD S. OF MOUNT OLIVE RD	5291	1,065	2011	2,051	1.93	0.93	0.68	No	986	972,196
DOG BAR RD SE OF MAGNOLIA RD	6259	1,239	2011	1,239	1.00	0.00	0.68	Yes	0	0
DUGGANS RD N. OF WOLF RD	6176	2,332	2010	2,194	0.94	-0.06	0.63	Yes	-138	19,044
DUGGANS RD SE OF LIME KILN RD	1512	2,529	2010	2,217	0.88	-0.12	0.58	Yes	-312	97,344
E. BENNETT RD E. OF GRASS VALLEY CORP LIMIT	10918	1,787	2011	2,528	1.41	0.41	0.63	Yes	741	549,081
E. BENNETT RD SW OF BRUNSWICK RD	4596	1,248	2011	1,228	0.98	-0.02	0.68	Yes	-20	400
E. EMPIRE ST E. OF GRASS VALLEY CORP LIMIT	10955	3,950	2012	3,980	1.01	0.01	0.52	Yes	30	900
E. EMPIRE ST W. OF HWY 174	3104	4,116	2012	3,982	0.97	-0.03	0.52	Yes	-134	17,956
E. LIME KILN RD E. OF HWY 49	2938	3,520	2012	1,949	0.55	-0.45	0.58	Yes	-1,571	2,468,041
GARDEN BAR RD S. OF WOLF RD	6548	1,062	2011	866	0.82	-0.18	0.68	Yes	-196	38,416
GRACIE RD SE OF GOLD FLAT RD	8081	1,463	2011	1,738	1.19	0.19	0.63	Yes	275	75,625
GRASS VALLEY AVENUE SOUTH OF LOME RICA DR	4913	2,126	2012	3	0.00	-1.00	0.63	No	-2,123	4,507,129
GREENHORN RD E. OF ANCHOR LN	1143	2,235	2012	1,726	0.77	-0.23	0.63	Yes	-509	259,081
GREENHORN RD E. OF TOBY TR	6897	1,103	2012	975	0.88	-0.12	0.68	Yes	-128	16,384
GREENHORN RD NE OF BRUNSWICK RD	3232	3,431	2011	2,343	0.68	-0.32	0.58	Yes	-1,088	1,183,744
IDAHO MARYLAND RD E. OF BRUNSWICK RD	11177	2,495	2011	1,749	0.70	-0.30	0.63	Yes	-746	556,516
IDAHO MARYLAND RD W. OF BANNER LAVA CAP RD	4406	1,324	2011	1,058	0.80	-0.20	0.63	Yes	-266	70,756
IDAHO MARYLAND W. OF SILK TASSLE	2660	1,985	2012	1,749	0.88	-0.12	0.63	Yes	-236	55,696
INDIAN SPRINGS RD SE OF PENN VALLEY RD	6701	1,162	2011	222	0.19	-0.81	0.68	No	-940	883,600
INDIAN SPRINGS RD SE OF SPENCEVILLE RD	6201	1,795	2011	2,303	1.28	0.28	0.63	Yes	508	258,064
INDIAN SPRINGS RD W. OF McCOURTNEY RD	4965	1,830	2011	2,749	1.50	0.50	0.63	Yes	919	844,561
LABARR MEADOWS N. OLD WHITE TOLL ROAD	11260	7,702	2012	9,462	1.23	0.23	0.41	Yes	1,760	3,097,600
LaBARR MEADOWS RD N. OF DOG BAR RD	7388	7,206	2011	9,523	1.32	0.32	0.44	Yes	2,317	5,368,489
LAKE VERA-PURDON RD N. OF ROCK CREEK RD	228	1,225	2011	1,019	0.83	-0.17	0.68	Yes	-206	42,436
LAKE VERA-PURDON RD NW OF N BLOOMFIELD-GRANITEVILLE	5120	2,488	2011	1,466	0.59	-0.41	0.63	Yes	-1,022	1,044,484
LAWRENCE WY E. OF NORLENE WY	4328	1,238	2011	790	0.64	-0.36	0.68	Yes	-448	200,704
LAWRENCE WY W. OF NORLENE WY	10392	1,124	2011	594	0.53	-0.47	0.68	Yes	-530	280,900
LIME KILN RD SE OF McCOURTNEY RD	10365	1,517	2011	1,161	0.77	-0.23	0.63	Yes	-356	126,736
LIME KILN RD W. OF HWY 49	7256	2,476	2011	3,766	1.52	0.52	0.63	Yes	1,290	1,664,100
LOMA RICA DR E. OF BRUNSWICK RD	11172	6,449	2011	4,161	0.65	-0.35	0.44	Yes	-2,288	5,234,944
LOMA RICA DR E. OF GRASS VALLEY AV	5537	2,849	2012	1,130	0.40	-0.60	0.58	No	-1,719	2,954,961
MAGNOLIA RD E. OF COMBIE RD (EB)	5483	6,402	2012	8,600	1.34	0.34	0.44	Yes	2,198	4,831,204
MAGNOLIA RD E. OF KNOLLS DR	650	1,996	2012	1,688	0.85	-0.15	0.63	Yes	-308	94,864
MAGNOLIA RD E. OF LAKESHORE NORTH	5432	7,016	2010	7,990	1.14	0.14	0.44	Yes	974	948,676
MAGNOLIA RD SW OF DOG BAR RD	4845	1,436	2010	1,480	1.03	0.03	0.63	Yes	44	1,936
McCOURTNEY RD NE OF INDIAN SPRINGS RD	4127	2,448	2011	2,634	1.08	0.08	0.63	Yes	186	34,596
McCOURTNEY RD NE OF WOLF MOUNTAIN RD	5329	4,290	2011	2,857	0.67	-0.33	0.52	Yes	-1,433	2,053,489
McCOURTNEY RD S. OF INDIAN SPRINGS RD	1212	2,327	2011	4,375	1.88	0.88	0.63	No	2,048	4,194,304
McCOURTNEY RD SW OF BRIGHTON ST	7984	9,536	2011	9,619	1.01	0.01	0.38	Yes	83	6,889
McCOURTNEY RD W. OF AUBURN RD	10261	6,015	2011	4,209	0.70	-0.30	0.48	Yes	-1,806	3,261,636
MEADOW DR S. OF HWY 174	5535	1,164	2011	1,079	0.93	-0.07	0.68	Yes	-85	7,225
MOUNT OLIVE RD W. OF LOWER COLFAX RD	7697	1,071	2011	1,041	0.97	-0.03	0.68	Yes	-30	900
N BLOOMFIELD-GRANITEVILLE RD N. OF HWY 49	10614	2,809	2011	1,725	0.61	-0.39	0.58	Yes	-1,084	1,175,056
N. BLOOMFIELD GRANITEVILLE RD N. OF COOPER RD	7443	1,100	2011	1,143	1.04	0.04	0.68	Yes	43	1,849
NEVADA CITY HWY S. OF RIDGE RD (NC CORP LIMIT)	10752	6,307	2011	4,406	0.70	-0.30	0.44	Yes	-1,901	3,613,801
NEVADA CITY HWY SW OF BANNER LAVA CAP RD	715	5,850	2011	3,871	0.66	-0.34	0.48	Yes	-1,979	3,916,441
NEWTOWN RD SW OF HWY 49	616	1,495	2011	2,107	1.41	0.41	0.63	Yes	612	374,544
NORLENE WY S. OF TIPPY WY	4079	1,560	2011	1,997	1.28	0.28	0.63	Yes	437	190,969
OAK TREE RD E. OF CHEROKEE RD	502	1,375	2012	855	0.62	-0.38	0.63	Yes	-520	270,400
OAK TREE RD NW OF TYLER FOOTE CROSSING RD	6696	1,421	2012	264	0.19	-0.81	0.63	No	-1,157	1,338,649
OLD TUNNEL RD S. OF BANNER LAVA CAP RD	6917	3,544	2011	1,730	0.49	-0.51	0.58	Yes	-1,814	3,290,596
PENN VALLEY DR NE OF SPENCEVILLE RD	1157	6,526	2011	1,756	0.27	-0.73	0.44	No	-4,770	22,752,900
PENN VALLEY DR SE OF EASY ST	1522	3,281	2012	3,628	1.11	0.11	0.58	Yes	347	120,409
PENN VALLEY DR SE OF PHEASANT ST	5413	4,114	2012	3,817	0.93	-0.07	0.52	Yes	-297	88,209
PENN VALLEY DR SW OF HWY 20 (E END)	6162	5,424	2011	2,940	0.54	-0.46	0.48	Yes	-2,484	6,170,256
PENN VALLEY DR W. OF SPENCEVILLE RD	1077	3,825	2011	3,128	0.82	-0.18	0.52	Yes	-697	485,809
PLEASANT VALLEY RD N. OF HWY 20	902	12,014	2012	10,017	0.83	-0.17	0.34	Yes	-1,997	3,988,009
PLEASANT VALLEY RD N. OF LAKE WILDWOOD DR	3215	6,628	2011	3,910	0.59	-0.41	0.44	Yes	-2,718	7,387,524
PLEASANT VALLEY RD N. OF WILDFLOWER DR	9012	3,174	2011	2,093	0.66	-0.34	0.58	Yes	-1,081	1,168,561
PLEASANT VALLEY RD S. OF BITNEY SPRINGS RD	4690	1,307	2010	1,082	0.83	-0.17	0.63	Yes	-225	50,625
PLEASANT VALLEY RD S. OF LAKE WILDWOOD DR	5811	10,837	2011	9,888	0.91	-0.09	0.36	Yes	-949	900,601
QUAKER HILL CROSS RD NE OF RED DOG RD	2141	1,935	2011	788	0.41	-0.59	0.63	Yes	-1,147	1,315,609
RATTLESNAKE RD S. OF HWY 174	6568	2,968	2011	971	0.33	-0.67	0.58	No	-1,997	3,988,009
RED DOG RD NW OF PARK AV	2231	3,905	2011	3,452	0.88	-0.12	0.52	Yes	-453	205,209
RED DOG RD SE OF PASQUALE RD	5798	2,654	2011	2,618	0.99	-0.01	0.58	Yes	-36	1,296
RIDGE RD E. OF ROUGH AND READY HWY	2169	5,986	2012	3,934	0.66	-0.34	0.48	Yes	-2,052	4,210,704
RIDGE RD E. OF VIA VISTA (W)	6474	6,632	2012	4,511	0.68	-0.32	0.44	Yes	-2,121	4,498,641

Daily Model Validation

Segment	Model Link ID	Count	Year	Model	Model/Count	Model Deviation	Maximum Deviation	Within Deviation	Model - Count	Difference Squared
RIDGE RD W. OF NEVADA CITY HWY (NC CORP)	7929	6,906	2012	4,715	0.68	-0.32	0.44	Yes	-2,191	4,800,481
RIDGE RD W. OF UPPER SLATE CRK (GV CORP)	8419	8,945	2012	6,152	0.69	-0.31	0.38	Yes	-2,793	7,800,849
RIDGE ROAD N. SIERRA COLLEGE BLVD	7112	9,863	2012	6,220	0.63	-0.37	0.38	Yes	-3,643	13,271,449
RIDGE ROAD S. SIERRA COLLEGE BLVD	8678	8,550	2012	7,807	0.91	-0.09	0.41	Yes	-743	552,049
ROUGH & READY HIGHWAY W. OF WEST	6963	5,629	2012	6,215	1.10	0.10	0.48	Yes	586	343,396
ROUGH AND READY HWY N. OF HWY 20	2924	3,431	2012	2,532	0.74	-0.26	0.58	Yes	-899	808,201
ROUGH AND READY HWY NW OF ADAM ST	3158	5,816	2011	4,085	0.70	-0.30	0.48	Yes	-1,731	2,996,361
ROUGH AND READY HWY W. OF BITNEY SPRINGS RD	6	4,282	2011	4,253	0.99	-0.01	0.52	Yes	-29	841
ROUGH AND READY HWY W. OF RIDGE RD	10497	5,099	2011	7,051	1.38	0.38	0.48	Yes	1,952	3,810,304
ROUGH AND READY HWY W. OF SQUIRREL CREEK RD	11100	5,237	2010	3,896	0.74	-0.26	0.48	Yes	-1,341	1,798,281
ROUGH AND READY RD W. OF ROUGH AND READY HWY	5776	1,402	2012	1,002	0.71	-0.29	0.63	Yes	-400	160,000
SPENCEVILLE RD NE OF INDIAN SPRINGS RD	539	1,446	2011	2,720	1.88	0.88	0.63	No	1,274	1,623,076
SPENCEVILLE RD SW OF PENN VALLEY RD	2556	3,616	2010	3,360	0.93	-0.07	0.58	Yes	-256	65,536
SQUIRREL CREEK RD E. OF ADAMS AV	1511	2,441	2010	1,090	0.45	-0.55	0.63	Yes	-1,351	1,825,201
SQUIRREL CREEK RD W. OF ADAMS AV	1702	1,956	2010	834	0.43	-0.57	0.63	Yes	-1,122	1,258,884
SQUIRREL CREEK RD W. OF ROUGH AND READY HWY	2697	2,750	2010	2,764	1.01	0.01	0.58	Yes	14	196
TIPPY WY S. OF ALTA SIERRA DR	4410	1,421	2012	1,976	1.39	0.39	0.63	Yes	555	308,025
TYLER FOOTE CROSSING RD NE OF HWY 49	1824	2,107	2012	1,879	0.89	-0.11	0.63	Yes	-228	51,984
TYLER FOOTE CROSSING RD NE OF OAK TREE RD	8997	1,852	2012	1,100	0.59	-0.41	0.63	Yes	-752	565,504
TYLER FOOTE CROSSING RD SW OF OAK TREE RD	1013	1,990	2012	1,337	0.67	-0.33	0.63	Yes	-653	426,409
VIA VISTA (W) N. OF RIDGE RD	2788	1,208	2011	741	0.61	-0.39	0.68	Yes	-467	218,089
WALKER DR N. OF BUTLER RD	5595	1,431	2012	419	0.29	-0.71	0.63	No	-1,012	1,024,144
WALKER DR S. OF SQUIRREL CREEK RD	2486	1,394	2012	453	0.32	-0.68	0.63	No	-941	885,481
WHEELER CROSS RD E. OF DOG BAR RD	2400	1,248	2012	1,083	0.87	-0.13	0.68	Yes	-165	27,225
WILLOW VALLEY RD NEVADA CITY CORP LIMIT	5980	1,556	2011	514	0.33	-0.67	0.63	No	-1,042	1,085,764
WOLF RD W. OF DUGGANS RD	7666	1,892	2010	653	0.35	-0.65	0.63	No	-1,239	1,535,121
WOLF RD W. OF HWY 49	821	6,514	2011	3,627	0.56	-0.44	0.44	No	-2,887	8,334,769
YOU BET RD NE OF HWY 174	6025	2,583	2011	1,649	0.64	-0.36	0.58	Yes	-934	872,356
SR 49 East of Newtown	5396	6,889	2006	7,208	1.05	0.05	0.44	Yes	319	101,761
SR 49 North of Tyler Foote	7547	3,608	2006	2,370	0.66	-0.34	0.58	Yes	-1,238	1,532,644
SR 20/49 W. EMPIRE ST TO S. AUBURN ST (NORTHBOUND)	8877	17,990	2006	22,202	1.23	0.23	0.29	Yes	4,212	17,740,944
SR 20/49 W. EMPIRE ST TO S. AUBURN ST (SOUTHBOUND)	8718	20,280	2006	22,055	1.09	0.09	0.28	Yes	1,775	3,150,625
SR 20/49 SOUTH AUBURN ST. TO E. BENNETT ST. (NORTHBOUND)	8945	16,450	2006	17,555	1.07	0.07	0.29	Yes	1,105	1,221,025
SR 20/49 SOUTH AUBURN ST. TO E. BENNETT ST. (SOUTHBOUND)	8944	18,550	2006	18,106	0.98	-0.02	0.29	Yes	-444	197,136
SR-20, south of Idaho-Maryland (NORTHBOUND)	8765	22,090	2006	23,081	1.04	0.04	0.27	Yes	991	982,081
SR-20, south of Idaho-Maryland (SOUTHBOUND)	11561	24,910	2006	24,171	0.97	-0.03	0.26	Yes	-739	546,121
SR 20/49 BRUNSWICK RD TO GOLD FLAT RD (NORTHBOUND)	8948	16,120	2006	16,815	1.04	0.04	0.30	Yes	695	483,025
SR 20/49 BRUNSWICK RD TO GOLD FLAT RD (SOUTHBOUND)	8947	16,380	2006	16,964	1.04	0.04	0.29	Yes	584	341,056
SR 20 West of Penn Valley	5925	7,326	2006	9,817	1.34	0.34	0.44	Yes	2,491	6,205,081
NEV CTY HWY SW. OF BRUNSWICK RD	10817	14,261	2012	11,947	0.84	-0.16	0.31	Yes	-2,314	5,354,596
NEV. CTY HWY NE. OF BRUNSWICK RD	10807	17,353	2012	11,380	0.66	-0.34	0.29	No	-5,973	35,676,729
West McKnight Way Freeman to Taylorville	11276	9,779	2012	14,113	1.44	0.44	0.38	No	4,334	18,783,556
West McKnight Way NB SR 49 Ramps to La Barr Meadows	8783	13,782	2012	13,357	0.97	-0.03	0.31	Yes	-425	180,625
South Auburn Street, between Badger and Adams	10967	5,638	2012	5,198	0.92	-0.08	0.48	Yes	-440	193,600
McCourtney Road SR 20 Ramps to Mill Street	10977	9,118	2012	7,464	0.82	-0.18	0.38	Yes	-1,654	2,735,716
Mill Street McCourtney Road to SR 20 Ramps	8151	10,154	2012	9,532	0.94	-0.06	0.36	Yes	-622	386,884
McCourtney Road Brighton Street to SR 20 Ramps	8259	11,443	2012	10,486	0.92	-0.08	0.34	Yes	-957	915,849
Mill Street SR 20 Ramps to French Avenue	8386	5,888	2012	6,337	1.08	0.08	0.48	Yes	449	201,601
SR 174 CENTRAL AVE TO OPHIR ST	8743	4,838	2012	5,074	1.05	0.05	0.52	Yes	236	55,696
OPHIR STREET HWY 174 TO BENNETT STREET	7058	5,846	2012	4,391	0.75	-0.25	0.48	Yes	-1,455	2,117,025
BENNETT ST HENDERSON ST TO OPHIR ST	10915	6,016	2012	3,792	0.63	-0.37	0.48	Yes	-2,224	4,946,176
BENNETT STREET TINLOY STREET TO E. MAIN STREET	8696	7,841	2012	8,751	1.12	0.12	0.41	Yes	910	828,100
BRUNSWICK RD. NEVADA CITY HWY TO MALTMAN DR.	8563	22,560	2012	16,033	0.71	-0.29	0.27	No	-6,527	42,601,729
SR 174 GOLD HILL DR TO RACE ST	8217	6,780	2012	4,835	0.71	-0.29	0.44	Yes	-1,945	3,783,025
BENNETT STREET TINLOY STREET TO HANSEN WAY	8949	7,425	2012	6,948	0.94	-0.06	0.44	Yes	-477	227,529
W EMPIRE ST LE DUC ST TO S AUBURN ST	7633	4,742	2012	3,900	0.82	-0.18	0.52	Yes	-842	708,964
SUTTON WY SOLAR DR TO GOLDEN GATE TERRACE	7101	8,000	2012	3,369	0.42	-0.58	0.41	No	-4,631	21,446,161
SR-20 PLEASANT VALLEY RD. TO PENN VALLEY DR.	5276	8,213	2012	9,810	1.19	0.19	0.41	Yes	1,597	2,550,409
SR-20 Pleasant Valley Road to Rough & Ready Hwy	5002	13,789	2012	15,521	1.13	0.13	0.31	Yes	1,732	2,999,824
SR 20 BRIGHTON STREET TO PENN VALLEY DRIVE	8307	15,338	2012	15,726	1.03	0.03	0.30	Yes	388	150,544
SR-20, MILL STREET TO SR-49 (EASTBOUND)	8785	7,340	2012	9,644	1.31	0.31	0.44	Yes	2,304	5,308,416
SR-20, MILL STREET TO SR-49 (WESTBOUND)	11563	8,016	2012	9,132	1.14	0.14	0.41	Yes	1,116	1,245,456
SR 20/49 IDAHO MARYLAND RD TO BRUNSWICK RD (NORTHBOUND)	8963	17,162	2012	19,024	1.11	0.11	0.29	Yes	1,862	3,467,044
SR 20/49 IDAHO MARYLAND RD TO BRUNSWICK RD (SOUTHBOUND)	8962	19,360	2012	18,647	0.96	-0.04	0.28	Yes	-713	508,369
SR 20 SR 49 TO NEVADA STREET/MANZANITA DIGGINS DR	7790	3,881	2012	6,681	1.72	0.72	0.52	No	2,800	7,840,000
SR 49 SR 20 TO COYOTE STREET	7756	11,878	2012	12,067	1.02	0.02	0.34	Yes	189	35,721
SR 49 W. BROAD ST/CEMENT HILL RD TO ELKS LODGE ENTRANCE	8904	6,648	2012	7,508	1.13	0.13	0.44	Yes	860	739,600
SR 49 NEWTON RD TO JOHN BARLEYCORN RD	7745	4,567	2012	5,366	1.17	0.17	0.52	Yes	799	638,401
SR 49 WOODRIDGE DR TO COMBIE RD	6462	27,858	2012	25,507	0.92	-0.08	0.25	Yes	-2,351	5,527,201
SR 49 COMBIE RD TO CAMEO DR	6461	22,362	2012	26,105	1.17	0.17	0.27	Yes	3,743	14,010,049
SR 49 MEADOWBROOK COURT TO ALTA SIERRA DRIVE	5058	23,001	2012	24,159	1.05	0.05	0.27	Yes	1,158	1,340,964
SR 49 PINGREE ROAD TO LITTLE VALLEY ROAD	7196	23,213	2012	28,461	1.23	0.23	0.27	Yes	5,248	27,541,504
SR 49 CRESTVIEW DRIVE TO W. MCKNIGHT WAY	4860	26,091	2012	28,585	1.10	0.10	0.26	Yes	2,494	6,220,036
SR 49 W. MCKNIGHT WAY TO W. EMPIRE STREET (NORTHBOUND)	8781	18,732	2012	19,510	1.04	0.04	0.29	Yes	778	605,284
SR 49 W. MCKNIGHT WAY TO W. EMPIRE STREET (SOUTHBOUND)	7205	18,327	2012	19,556	1.07	0.07	0.29	Yes	1,229	1,510,441
SR 174 E. EMPIRE STREET OT CHURCH ENTRANCE	1038	8,705	2012	7,737	0.89	-0.11	0.41	Yes	-968	937,024
SR 174 BRUNSWICK RD TO LOS CENDROS LN	5293	9,928	2012	10,907	1.10	0.10	0.38	Yes	979	958,441
SR 174 PARTRIDGE RD TO EMPIRE MINE CROSS RD	9003	5,582	2012	4,222	0.76	-0.24	0.48	Yes	-1,360	1,849,600
SR 49 OVERHILL DR TO LINNET LN (GATEWAY)	7451	25,028	2012	24,741	0.99	-0.01	0.26	Yes	-287	82,369
DOG BAR RD SOUTH OF SPRINGFIELD DR (GATEWAY)	7521	1,265	2012	1,239	0.98	-0.02	0.63	Yes	-26	676
SR 174 SE OF REDBERRY RD (GATEWAY)	7502	4,961	2012	4,876	0.98	-0.02	0.52	Yes	-85	7,225
SR 20 EAST OF HARMONY RIDGE RD (GATEWAY)	7341	3,769	2012	5,870	1.56	0.56	0.52	No	2,101	4,414,201
SR 49 NORTH OF HERON RD (GATEWAY)	8885	2,082	2012	2,509	1.21	0.21	0.63	Yes	427	182,329
SR 20 WEST OF MOONEY FLAT RD (GATEWAY)	2985	8,009	2012	7,986	1.00	0.00	0.41	Yes	-23	529
ZION ST DOANE RD TO ARGALL WY	10765	7,323	2012	4,789	0.65	-0.35	0.44	Yes	-2,534	6,421,156
W. BROAD ST SPRING STREET TO CHIEF KELLY DR	8903	2,610	2012	3,202	1.23	0.23	0.58	Yes	592	350,464
GOLD FLAT RD HAWKE LN TO HOLLOW WY	8339	3,945	2012	2,440	0.62	-0.38	0.52	Yes	-1,505	2,265,025
COYOTE ST CHURCH ST TO WASHINGTON ST	7924	2,971	2012	3,851	1.30	0.30	0.58	Yes	880	774,400
E. BROAD ST MAIN ST TO SR 49	7963	1,946	2012	1,065	0.55	-0.45	0.63	Yes	-881	776,161
SEARLS AVE RIDGE RD TO PERSEVERANCE MINE CT (SOUTH)	7684	5,267	2012	2,615	0.50	-0.50	0.48	No	-2,652	7,033,104
SR 20/49 GOLD FLAT RD TO SACRAMENTO ST (NORTHBOUND)	8426	13,314	2012	14,592	1.10	0.10	0.33	Yes	1,278	1,633,284
SR 20/49 GOLD FLAT RD TO SACRAMENTO ST (SOUTHBOUND)	8375	13,524	2012	15,084	1.12	0.12	0.33	Yes	1,560	2,433,600
	Subtotal	**1,285,696**		**1,184,504**						

Model/Count Ratio =	**0.92**	
Percent Within Caltrans Maximum Deviation =	**86%**	> 75%
Percent Root Mean Square Error =	**28%**	< 30%
Correlation Coefficient =	**0.96**	> 0.88

Total Count	**201**
Link Within Deviation	**172**
Link Outside Deviation	**29**

AM Peak Hour Validation

Segment	Model Link ID	Count	Year	Model	Model/Count	Model Deviation	Maximum Deviation	Within Deviation	Model - Count	Difference Squared
NEV CTY HWY SW. OF BRUNSWICK RD	10817	682	2012	556	0.82	-0.18	0.44	Yes	-126	15,876
NEV. CTY HWY NE. OF BRUNSWICK RD	10807	693	2012	510	0.74	-0.26	0.44	Yes	-183	33,489
West McKnight Way Freeman to Taylorville	11276	217	2012	594	2.74	1.74	0.63	No	377	142,129
West McKnight Way NB SR 49 Ramps to La Barr Meadows	8783	706	2012	701	0.99	-0.01	0.44	Yes	-5	25
South Auburn Street, between Badger and Adams	10967	269	2012	196	0.73	-0.27	0.58	Yes	-73	5,329
McCourtney Road SR 20 Ramps to Mill Street	10977	447	2012	433	0.97	-0.03	0.52	Yes	-14	196
Mill Street McCourtney Road to SR 20 Ramps	8151	445	2012	470	1.06	0.06	0.52	Yes	25	625
McCourtney Road Brighton Street to SR 20 Ramps	8259	693	2012	625	0.90	-0.10	0.44	Yes	-68	4,624
Mill Street SR 20 Ramps to French Avenue	8386	190	2012	305	1.61	0.61	0.63	Yes	115	13,225
SR 174 CENTRAL AVE TO OPHIR ST	8743	257	2012	286	1.11	0.11	0.58	Yes	29	841
OPHIR STREET HWY 174 TO BENNETT STREET	7058	466	2012	256	0.55	-0.45	0.52	Yes	-210	44,100
BENNETT ST HENDERSON ST TO OPHIR ST	10915	387	2012	220	0.57	-0.43	0.52	Yes	-167	27,889
BENNETT STREET TINLOY STREET TO E. MAIN STREET	8696	521	2012	465	0.89	-0.11	0.48	Yes	-56	3,136
BRUNSWICK RD. NEVADA CITY HWY TO MALTMAN DR.	8563	1,090	2012	770	0.71	-0.29	0.36	Yes	-320	102,400
SR 174 GOLD HILL DR TO RACE ST	8217	442	2012	304	0.69	-0.31	0.52	Yes	-138	19,044
BENNETT STREET TINLOY STREET TO HANSEN WAY	8949	392	2012	405	1.03	0.03	0.52	Yes	13	169
W EMPIRE ST LE DUC ST TO S AUBURN ST	7633	222	2012	253	1.14	0.14	0.63	Yes	31	961
SUTTON WY SOLAR DR TO GOLDEN GATE TERRACE	7101	331	2012	166	0.50	-0.50	0.58	Yes	-165	27,225
SR-20 PLEASANT VALLEY RD. TO PENN VALLEY DR.	5276	618	2012	584	0.94	-0.06	0.48	Yes	-34	1,156
SR-20 Pleasant Valley Road to Rough & Ready Hwy	5002	943	2012	1,031	1.09	0.09	0.38	Yes	88	7,744
SR 20 BRIGHTON STREET TO PENN VALLEY DRIVE	8307	989	2012	1,046	1.06	0.06	0.38	Yes	57	3,249
SR-20, MILL STREET TO SR-49 (EASTBOUND)	8785	610	2012	950	1.56	0.56	0.48	No	340	115,600
SR-20, MILL STREET TO SR-49 (WESTBOUND)	11563	361	2012	306	0.85	-0.15	0.58	Yes	-55	3,025
SR 20/49 IDAHO MARYLAND RD TO BRUNSWICK RD (NORTHBOUND)	8963	1,106	2012	1,401	1.27	0.27	0.36	Yes	295	87,025
SR 20/49 IDAHO MARYLAND RD TO BRUNSWICK RD (SOUTHBOUND)	8962	785	2012	569	0.72	-0.28	0.41	Yes	-216	46,656
SR 20 SR 49 TO NEVADA STREET/MANZANITA DIGGINS DR	7790	220	2012	355	1.61	0.61	0.63	Yes	135	18,225
SR 49 SR 20 TO COYOTE STREET	7756	651	2012	744	1.14	0.14	0.44	Yes	93	8,649
SR 49 W. BROAD ST/CEMENT HILL RD TO ELKS LODGE ENTRANCE	8904	322	2012	476	1.48	0.48	0.58	Yes	154	23,716
SR 49 NEWTON RD TO JOHN BARLEYCORN RD	7745	243	2012	330	1.36	0.36	0.63	Yes	87	7,569
SR 49 WOODRIDGE DR TO COMBIE RD	6462	1,826	2012	1,309	0.72	-0.28	0.29	Yes	-517	267,289
SR 49 COMBIE RD TO CAMEO DR	6461	1,588	2012	1,489	0.94	-0.06	0.30	Yes	-99	9,801
SR 49 MEADOWBROOK COURT TO ALTA SIERRA DRIVE	5058	1,611	2012	1,433	0.89	-0.11	0.30	Yes	-178	31,684
SR 49 PINGREE ROAD TO LITTLE VALLEY ROAD	7196	1,559	2012	1,722	1.10	0.10	0.30	Yes	163	26,569
SR 49 CRESTVIEW DRIVE TO W. MCKNIGHT WAY	4860	1,644	2012	1,761	1.07	0.07	0.29	Yes	117	13,689
SR 49 W. MCKNIGHT WAY TO W. EMPIRE STREET (NORTHBOUND)	8781	1,264	2012	1,388	1.10	0.10	0.33	Yes	124	15,376
SR 49 W. MCKNIGHT WAY TO W. EMPIRE STREET (SOUTHBOUND)	7205	849	2012	936	1.10	0.10	0.41	Yes	87	7,569
SR 174 E. EMPIRE STREET OT CHURCH ENTRANCE	1038	314	2012	481	1.53	0.53	0.58	Yes	167	27,889
SR 174 BRUNSWICK RD TO LOS CENDROS LN	5293	630	2012	677	1.07	0.07	0.44	Yes	47	2,209
SR 174 PARTRIDGE RD TO EMPIRE MINE CROSS RD	9003	345	2012	265	0.77	-0.23	0.58	Yes	-80	6,400
SR 49 OVERHILL DR TO LINNET LN (GATEWAY)	7451	1,578	2012	1,242	0.79	-0.21	0.30	Yes	-336	112,896
DOG BAR RD SOUTH OF SPRINGFIELD DR (GATEWAY)	7521	106	2012	63	0.59	-0.41	0.68	Yes	-43	1,849
SR 174 SE OF REDBERRY RD (GATEWAY)	7502	387	2012	244	0.63	-0.37	0.52	Yes	-143	20,449
SR 20 EAST OF HARMONY RIDGE RD (GATEWAY)	7341	185	2012	299	1.62	0.62	0.63	Yes	114	12,996
SR 49 NORTH OF HERON RD (GATEWAY)	8885	114	2012	130	1.14	0.14	0.68	Yes	16	256
SR 20 WEST OF MOONEY FLAT RD (GATEWAY)	2985	624	2012	457	0.73	-0.27	0.48	Yes	-167	27,889
ZION ST DOANE RD TO ARGALL WY	10765	352	2012	271	0.77	-0.23	0.58	Yes	-81	6,561
W. BROAD ST SPRING STREET TO CHIEF KELLY DR	8903	102	2012	150	1.47	0.47	0.68	Yes	48	2,304
GOLD FLAT RD HAWKE LN TO HOLLOW WY	8339	284	2012	159	0.56	-0.44	0.58	Yes	-125	15,625
COYOTE ST CHURCH ST TO WASHINGTON ST	7924	175	2012	250	1.43	0.43	0.63	Yes	75	5,625
E. BROAD ST MAIN ST TO SR 49	7963	67	2012	65	0.97	-0.03	0.68	Yes	-2	4
SEARLS AVE RIDGE RD TO PERSEVERANCE MINE CT (SOUTH)	7684	182	2012	117	0.64	-0.36	0.63	Yes	-65	4,225
SR 20/49 GOLD FLAT RD TO SACRAMENTO ST (NORTHBOUND)	8426	669	2012	726	1.09	0.09	0.44	Yes	57	3,249
SR 20/49 GOLD FLAT RD TO SACRAMENTO ST (SOUTHBOUND)	8375	813	2012	874	1.08	0.08	0.41	Yes	61	3,721
	Subtotal	**32,566**		**31,815**				**Model/Count Ratio =**	**0.98**	
								Percent Within Caltrans Maximum Deviation =	**96%**	> 75%
								Percent Root Mean Square Error =	**26%**	< 30%
								Correlation Coefficient =	**0.94**	> 0.88

Total Count	**53**
Link Within Deviation	**51**
Link Outside Deviation	**2**

PM Peak Hour Validation

Segment	Model Link ID	Count	Year	Model	Model/Count	Model Deviation	Maximum Deviation	Within Deviation	Model - Count	Difference Squared
NEV CTY HWY SW. OF BRUNSWICK RD	10817	998	2012	1,030	1.03	0.03	0.38	Yes	32	1,024
NEV. CTY HWY NE. OF BRUNSWICK RD	10807	1,292	2012	959	0.74	-0.26	0.33	Yes	-333	110,889
West McKnight Way Freeman to Taylorville	11276	855	2012	1,147	1.34	0.34	0.41	Yes	292	85,264
West McKnight Way NB SR 49 Ramps to La Barr Meadows	8783	1,114	2012	1,100	0.99	-0.01	0.36	Yes	-14	196
South Auburn Street, between Badger and Adams	10967	433	2012	389	0.90	-0.10	0.52	Yes	-44	1,936
McCourtney Road SR 20 Ramps to Mill Street	10977	750	2012	600	0.80	-0.20	0.41	Yes	-150	22,500
Mill Street McCourtney Road to SR 20 Ramps	8151	841	2012	793	0.94	-0.06	0.41	Yes	-48	2,304
McCourtney Road Brighton Street to SR 20 Ramps	8259	915	2012	885	0.97	-0.03	0.38	Yes	-30	900
Mill Street SR 20 Ramps to French Avenue	8386	502	2012	485	0.97	-0.03	0.48	Yes	-17	289
SR 174 CENTRAL AVE TO OPHIR ST	8743	367	2012	380	1.04	0.04	0.58	Yes	13	169
OPHIR STREET HWY 174 TO BENNETT STREET	7058	428	2012	329	0.77	-0.23	0.52	Yes	-99	9,801
BENNETT ST HENDERSON ST TO OPHIR ST	10915	533	2012	272	0.51	-0.49	0.48	No	-261	68,121
BENNETT STREET TINLOY STREET TO E. MAIN STREET	8696	560	2012	706	1.26	0.26	0.48	Yes	146	21,316
BRUNSWICK RD. NEVADA CITY HWY TO MALTMAN DR.	8563	1,590	2012	1,376	0.87	-0.13	0.30	Yes	-214	45,796
SR 174 GOLD HILL DR TO RACE ST	8217	559	2012	325	0.58	-0.42	0.48	Yes	-234	54,756
BENNETT STREET TINLOY STREET TO HANSEN WAY	8949	587	2012	516	0.88	-0.12	0.48	Yes	-71	5,041
W EMPIRE ST LE DUC ST TO S AUBURN ST	7633	436	2012	255	0.58	-0.42	0.52	Yes	-181	32,761
SUTTON WY SOLAR DR TO GOLDEN GATE TERRACE	7101	618	2012	235	0.38	-0.62	0.48	No	-383	146,689
SR-20 PLEASANT VALLEY RD. TO PENN VALLEY DR.	5276	651	2012	880	1.35	0.35	0.44	Yes	229	52,441
SR-20 Pleasant Valley Road to Rough & Ready Hwy	5002	1,179	2012	1,248	1.06	0.06	0.34	Yes	69	4,761
SR 20 BRIGHTON STREET TO PENN VALLEY DRIVE	8307	1,336	2012	1,280	0.96	-0.04	0.33	Yes	-56	3,136
SR-20, MILL STREET TO SR-49 (EASTBOUND)	8785	483	2012	547	1.13	0.13	0.52	Yes	64	4,096
SR-20, MILL STREET TO SR-49 (WESTBOUND)	11563	772	2012	793	1.03	0.03	0.41	Yes	21	441
SR 20/49 IDAHO MARYLAND RD TO BRUNSWICK RD (NORTHBOUND)	8963	1,213	2012	1,302	1.07	0.07	0.34	Yes	89	7,921
SR 20/49 IDAHO MARYLAND RD TO BRUNSWICK RD (SOUTHBOUND)	8962	1,924	2012	1,681	0.87	-0.13	0.28	Yes	-243	59,049
SR 20 SR 49 TO NEVADA STREET/MANZANITA DIGGINS DR	7790	355	2012	578	1.63	0.63	0.58	No	223	49,729
SR 49 SR 20 TO COYOTE STREET	7756	1,077	2012	962	0.89	-0.11	0.36	Yes	-115	13,225
SR 49 W. BROAD ST/CEMENT HILL RD TO ELKS LODGE ENTRANCE	8904	591	2012	542	0.92	-0.08	0.48	Yes	-49	2,401
SR 49 NEWTON RD TO JOHN BARLEYCORN RD	7745	414	2012	395	0.95	-0.05	0.52	Yes	-19	361
SR 49 WOODRIDGE DR TO COMBIE RD	6462	2,389	2012	2,284	0.96	-0.04	0.26	Yes	-105	11,025
SR 49 COMBIE RD TO CAMEO DR	6461	1,884	2012	2,158	1.15	0.15	0.28	Yes	274	75,076
SR 49 MEADOWBROOK COURT TO ALTA SIERRA DRIVE	5058	1,959	2012	1,883	0.96	-0.04	0.28	Yes	-76	5,776
SR 49 PINGREE ROAD TO LITTLE VALLEY ROAD	7196	1,909	2012	2,161	1.13	0.13	0.28	Yes	252	63,504
SR 49 CRESTVIEW DRIVE TO W. MCKNIGHT WAY	4860	2,201	2012	2,127	0.97	-0.03	0.27	Yes	-74	5,476
SR 49 W. MCKNIGHT WAY TO W. EMPIRE STREET (NORTHBOUND)	8781	1,324	2012	1,384	1.05	0.05	0.33	Yes	60	3,600
SR 49 W. MCKNIGHT WAY TO W. EMPIRE STREET (SOUTHBOUND)	7205	1,746	2012	1,671	0.96	-0.04	0.29	Yes	-75	5,625
SR 174 E. EMPIRE STREET OT CHURCH ENTRANCE	1038	699	2012	512	0.73	-0.27	0.44	Yes	-187	34,969
SR 174 BRUNSWICK RD TO LOS CENDROS LN	5293	850	2012	772	0.91	-0.09	0.41	Yes	-78	6,084
SR 174 PARTRIDGE RD TO EMPIRE MINE CROSS RD	9003	419	2012	282	0.67	-0.33	0.52	Yes	-137	18,769
SR 49 OVERHILL DR TO LINNET LN (GATEWAY)	7451	2,192	2012	2,226	1.02	0.02	0.27	Yes	34	1,156
DOG BAR RD SOUTH OF SPRINGFIELD DR (GATEWAY)	7521	124	2012	107	0.86	-0.14	0.68	Yes	-17	289
SR 174 SE OF REDBERRY RD (GATEWAY)	7502	456	2012	424	0.93	-0.07	0.52	Yes	-32	1,024
SR 20 EAST OF HARMONY RIDGE RD (GATEWAY)	7341	297	2012	524	1.76	0.76	0.58	No	227	51,529
SR 49 NORTH OF HERON RD (GATEWAY)	8885	183	2012	208	1.14	0.14	0.63	Yes	25	625
SR 20 WEST OF MOONEY FLAT RD (GATEWAY)	2985	628	2012	762	1.21	0.21	0.44	Yes	134	17,956
ZION ST DOANE RD TO ARGALL WY	10765	520	2012	372	0.72	-0.28	0.48	Yes	-148	21,904
W. BROAD ST SPRING STREET TO CHIEF KELLY DR	8903	244	2012	248	1.02	0.02	0.63	Yes	4	16
GOLD FLAT RD HAWKE LN TO HOLLOW WY	8339	224	2012	178	0.79	-0.21	0.63	Yes	-46	2,116
COYOTE ST CHURCH ST TO WASHINGTON ST	7924	154	2012	292	1.90	0.90	0.63	No	138	19,044
E. BROAD ST MAIN ST TO SR 49	7963	157	2012	72	0.46	-0.54	0.63	Yes	-85	7,225
SEARLS AVE RIDGE RD TO PERSEVERANCE MINE CT (SOUTH)	7684	452	2012	210	0.46	-0.54	0.52	No	-242	58,564
SR 20/49 GOLD FLAT RD TO SACRAMENTO ST (NORTHBOUND)	8426	1,183	2012	1,167	0.99	-0.01	0.34	Yes	-16	256
SR 20/49 GOLD FLAT RD TO SACRAMENTO ST (SOUTHBOUND)	8375	1,060	2012	1,161	1.10	0.10	0.36	Yes	101	10,201
	Subtotal	**46,627**		**45,175**				**Model/Count Ratio =**	**0.97**	
								Percent Within Caltrans Maximum Deviation =	**89%**	> 75%
								Percent Root Mean Square Error =	**17%**	< 30%
								Correlation Coefficient =	**0.97**	> 0.88

Total Count	**53**
Link Within Deviation	**47**
Link Outside Deviation	**6**