4.0 RISK ASSESSMENT

"In the fire-adapted ecosystems of the South, the issue is not whether an area will burn but when it will burn and at what intensity" (Andreu and Hermansen-Baez 2008). While this view may appear to be somewhat fatalistic, it empowers communities to respond to this inherent risk by making choices that allow them to become more fire adapted. Conditions that exist in the interface between the wildland and the community urban setting have a significant impact on wildfire behavior and, subsequently, on risk to the people and structures and other resources located there.

The WUI, as defined in **Section 3.1.2.1**, is determined by a set of conditions rather than a specific boundary and is subject to change as development occurs. In turn, conditions in the WUI determine the level of risk wildfire presents, and informed communities will mitigate that risk. Assessing WUI conditions and the related risks are important steps in making choices that modify ignition potential and intensity.

There are two steps for identifying WUI conditions and making risk assessments. Wildfire risk modeling, as discussed in **Sections 4.1 through 4.3**, is an effective way to use Geographic Information Systems (GIS) technology in making initial measurements of WUI conditions and assessing regional risk. Physical observations, also known as "ground truthing", corroborate GIS modeling outputs and help develop the best mitigation strategies for site-specific conditions. Qualitative and quantitative assessment methods are discussed in **Section 4.4**. For the Austin-Travis County CWPP, this risk assessment is focused on wildfire risk modeling, while the confirmation and mitigation strategies are deferred to the preparer of the local-level CWPP.

4.1 PURPOSES FOR WILDFIRE RISK MODELING

One of the primary goals of the Austin-Travis County CWPP is to identify and analyze wildfire risk throughout Travis County and the City of Austin to help prioritize areas of concern for further analysis and mitigation. This risk assessment achieves that goal by broadly identifying communities and areas within the planning area that are at risk from wildfire.

The specific goals of the risk assessment are:

- Determine the potential risk for Travis County using the best available data
- Develop a community base map and create digital layers for the following data sets:
    - Communities at risk
    - Risk of wildfire occurrence
    - Hazards posed by fuels, weather, and topography
    - Values (life, property, and essential infrastructure) requiring protection
    - Structure Combustion Risk – expressed as the probability of structure loss
    - Spot Risk - risk to urban areas from fire embers (spot iginitions) expressed as the probability of spot occurrence
- Identify areas for additional refined analysis through community or neighborhood-level assessments done for an associated local-level CWPP
- Provide data on which to base the prioritization of structural flammability reduction, public education, and hazardous fuel treatment projects.

Accomplishing two objectives addressed these goals. First, a detailed wildfire risk model was developed tuned to the unique conditions found in Travis County. Second, this model was used to analyze relative risk across the planning area. Both objectives helped prepare an ordinal list to set strategic priorities for the development of scalable graphic tools in preparing local-level CWPPs, and to select the best mitigation strategies for tactical implementation.

4.2 WILDFIRE RISK MODELING FOR THE ATC CWPP

Wildfire risk modeling is a well-established field that continues to grow as technology improves. The Texas A&M Forest Service (TFS) sponsors the Wildfire Risk Assessment Portal, an interactive, web-based statewide system commonly called

TxWRAP. This suite of applications gives statewide users access to regional data to assess their communities' general wildfire risk. In order to enhance the level of detail for the unique environments in Travis County, Dr. Joseph White and his Spatial Ecology Laboratory team at Baylor University were contracted to develop a GIS database for analyzing wildfire risk and to perform initial wildfire risk modeling for this countywide CWPP.

Baylor University's Spatial Ecology Lab and Dr. White conducted research on the Balcones Canyonlands Preserve (BCP) and the Balcones Canyonlands National Wildlife Refuge (BCNWR) where they characterized and described wildfire fuel types related to the local vegetation, which then were used in the development of this planning effort's wildfire risk model (White et al. 2009 and White et al. 2010). For this CWPP, they created a countywide database, built a wildfire behavior model, and conducted an initial risk analysis. Their findings ("Baylor report") are summarized in this section and are presented in further detail in **Appendix B**.

4.2.1 OVERVIEW

According to the Baylor report found in **Appendix B**:

"The goal of a Community Wildfire Protection Plan (CWPP) is to help protect life and property from wildfires. Because fire is inherently a spatial process, utilization of geographical data is important to help capture and assess to landscape context under which fires occur which may affect humans in an urbanized setting. The purpose of the work described here was to accumulate the most recent spatial information on vegetation, specifically fuel and canopy attributes, coupled with terrain information for input into a fire behavior simulation model, FlamMap ver. 5.0 (FlamMap). Information about fire burn frequency, fireline intensity, and ember loft and transport from this model was then used to estimate risk of fire, particularly associated with initiation of structure fires from wildland burning. Risk was then classified into a rating, which could then be averaged for communities. In this project, communities were expected to reflect a super-neighborhood organization that would provide the organizational backbone for wildfire planning and mitigation as needed."

The following summation is intended to provide a synopsis of the highly technical material covered in the report. Many of the term definitions and methodology concepts covered in the following sections are framed for the reader approaching the topic from a less scientific perspective. For the reader seeking the fullest detail, the report in its entirety is included as **Appendix B** of this CWPP.

4.2.2 GIS DATABASE DEVELOPMENT

The Austin-Travis County CWPP uses a suite of nationally recognized and accepted GIS-based models to define existing and potential wildfire risks and threats to the planning area communities. These models include a variety of inputs to model fire behavior: elevation, aspect, slope, canopy cover, canopy base height, canopy height, canopy bulk density, weather conditions, and wildland fuels data.

FlamMap, the principal wildfire modeling software, relies heavily on appropriate fuel inputs (see **Section 3.2.1**). Within this database, general fuel types are based on Scott and Burgan (2005) while woodland categories utilize the types derived from the BCNWR study (White et al. 2009). Fuel types, thematic classes, and other characteristics are presented in **Table 10** as excerpted from the Baylor report in **Appendix B**.

Table 10. Fuel Types for FlamMap Analysis

Description	Scott and Burgan	Thematic Class	1 hr (t/ac)	10 hr (t/ac)	100 hr (t/ac)	Live Herb. (t/ac)	Live Woody (t/ac)	Area: Volume (1/ft)	Fuel Depth (ft)	Extinct. Moisture (%)	Energy of Combust (Btu/lb)
Sparse Dry Climate Grass	GR1	1	0.100	0.000	0.000	0.300	0.000	2200	0.4	15	8000
Aggrading Juniper Shrub	n.a.	14	2.013	1.526	3.737	1.729	1.097	2000	2.1	25	8000
Closed Juniper Woodland	n.a.	15	1.269	1.421	1.427	0.698	0.798	2000	1.0	25	8000
Mixed Juniper Hardwood Forest	n.a.	16	1.084	1.448	3.842	0.931	1.019	2000	0.5	25	8000
Urban/ Developed	NB1	91	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Agricultural	NB3	93	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Open Water	NB8	98	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Low Load Activity Fuel	SB1	201	1.500	3.000	11.000	0.000	0.000	1653	1.0	25	8000
Low Load Blowdown	SB2	202	4.500	4.25	4.000	0.000	0.000	1884	1.0	24	8000

Data sources used to create this database are listed in the Baylor report and include the City of Austin GIS ftp site, Travis County, Travis County Appraisal District, the Capital Area Council of Governments (CapCOG) geospatial data website, the U.S. Department of Agriculture (USDA), Texas Natural Resource Information System (TNRIS), Austin Fire Department (AFD), and Texas Parks and Wildlife Department (TPWD). The database requires more than 80 gigabytes (Gb) of storage capacity.

4.2.3 FIRE BEHAVIOR MODELING

Fire behavior for this project was modeled using FlamMap, which is a spatial application that calculates landscape-scale fire spread and simulates fire occurrence within the study area. It takes into consideration the directional basis of wildfire and the wavelet nature of fire line intensity as wind drives it, factoring in wind speed, direction, topographic slope, and fuel characteristics (Burgan and Rothermal 1984). Canopy fire and spot fires due to ember lofting were also modeled.

North and south wind scenarios were simulated in FlamMap. The simulated weather and fuel moisture conditions for each scenario included 30-mph north or south winds, relative humidity at six percent, live leaf moisture at 60 percent, live herbaceous moisture at 30 percent, and live woody moisture at 60 percent. The fuel moisture values represent the near-worst drought conditions set by the U.S. Forest Service (Scott and Burgan 2005). North winds were selected to represent winter scenarios; south winds were selected to represent the predominant wind direction for Travis County (see wind rose in **Section 3.2.3**, **Figure 10**). Wind speed was set at 30 mph, which is near the maximum sustained speed for this region and was close to the average value during the 2011 Labor Day fires. A detailed discussion of the models, methods and data used for the simulations, as well as model limitations, can be found in **Appendix B**.

The FlamMap simulations utilized the spatial data acquired and appropriate fuel characteristics to analyze random wildfire ignitions using both north and south winds. The model outputs described the following parameters:

- <u>Burn Probability</u> **-** "The burn probability for a given pixel is an estimate of the likelihood that a pixel will burn given a random ignition within the study area and … is not an estimate of the future likelihood of a wildfire…" (Ager et al. 2007).

- Crown fire activity – An indicator of the type of fire in the canopy that may be occurring. Passive torching is characterized by individual tree torching such that the entire tree crown is suddenly consumed in flames from the base to the top without fire transfer to neighboring tree canopies (Rothermel 1991). An active crown fire is one in which fire spreads through canopy fuel that may be sustained based on heat released from surface fuels (Scott and Reinhardt 2001).
- Fire line intensity - The rate of heat release along the fire front.
- Heat per unit area - The amount of heat energy released over an area, which accounts for the energy of the fuel consumed, the burn duration, and area affected.
- Rate of spread - The linear rate of advance of a fire front in the direction perpendicular to the fire front.
- Flame length - The distance from the ground at the leading edge of the flame to tip of the flame.
- Spotting distance – Fire behavior that produces firebrands transported by ambient winds, fire whirls, and/or convection columns causing spot fires ahead of the main fire perimeter (Andrews 1996; NWCG 2005).
- Total fire area perimeter - The total area affected by fire generally identified by blackened and scorched vegetation that can be easily and visually identified following fire extinguishment.

The resulting outputs of the model are identified in **Table 11** and mapped outputs can be viewed in Appendix C of the Baylor report (included as **Appendix B** of this CWPP).

Table 11. Output files for the wildfire modeling simulations for the CWPP planning area.

Description	Units	Austin-Travis County CWPP Geodatabase File Name
Burn probability	Unit less; number of fires per pixel/maximum number of fires per pixel	Burnprob
Crown fire activity	1=surface fire only 2=passive torching 3=active crown fire	Crownfireactivity
Fire line intensity	kilowatts/meter (kW/m)	Firelineintensity
Heat per unit area	kW/m^2	Heatperunitarea
Rate of fire spread	chains/hr	Rateofspread
Flame length	Feet	Flamelength
Spotting distance and direction	Vector length = m/s; orientation = degree from north	Maxspotvector
Total fire area perimeter	m^2	MTTperimeter

Adapted from **Appendix B**.

Of these FlamMap outputs, crown fire activity, fire line intensity, heat per unit area, rate of spread and flame length represent the potential for fire effects based on combination of fuel, terrain, and climate. Interpretation of these outputs, as with any model of natural system behavior, is meant to provide the upper boundary of expected fire behavior and effect *if* a fire burned in those areas. For example, if an area has a value of 2,500 kW/m for fire line intensity, this value represents the maximum energy derived from fuel consumption if a fire burned in that area.

In contrast, the burn probability, spotting trajectories, and fire perimeter outputs provide some estimate of where fires are more likely to burn and how embers would be transported given the current conditions and the simulated weather conditions. Analysis of values for each output layer was performed and showed minimal differences in behavior and effect on properties between wind direction scenarios of simulated fires across the project area. Using the fire perimeter polygons, the average and maximum simulated fire sizes by fuel type were calculated (**Table 12**) to assess general simulated fire properties.

Table 12. Mean and maximum simulated fire sizes calculated for each fuel type.

Fuel Type	Mean Simulated Fire Area (acres)	Maximum Simulated Fire Polygon (acres)
Short Grass	155	1,917
Aggrading Juniper Shrub	60	1,575
Closed Juniper Woodland	48	1,101
Mature Juniper Hardwood Forest	48	1,719
Low Load Blowdown (Dead Canopy)	153	2,039

4.2.4 FIRE RISK

The Austin-Travis County CWPP uses the *environmental risk* concept, which defines risk as the product of the probability of a hazardous event, and the negative consequences associated with the event (Smith 2013). In this assessment, risk is defined as the probability of a wildfire under conditions conducive to large, fast-moving fires that burn through fuels producing high heat energy and flaming embers. Negative elements were defined as fire line intensity and spotting distance, as both are primary factors associated with the spread of structural fire from wildfire. Both were identified as key factors in fire spread and home loss in the Bastrop fire (Ridenour et al. 2012).

Since these risk factors are tied to structure risks, a 150-meter buffer was applied to available road and rooftop information. This offset was used to define the Urban Zone, the maximum area anticipated to contain all areas with conditions that can be defined as the WUI. The distance of 150 meters was set on the basis of being the distance needed to contain and ensure coverage of (1) the HIZ, defensible space, and community protection zones as detailed in **Section 5**; (2) errors associated with current road and rooftop information, and (3) first-hand observation of effective transition from wildland vegetation and urban environments in the Travis County area. Characterizing risk in this manner provides an objective basis of risk independent of demographic and sociopolitical boundaries.

- Structure or Radiant Combustion Risk is defined as the probability of structure loss during a wildfire. Wilson and Ferguson (1986) established a probabilistic relationship between fire line intensity, building characteristics, and probability of structures surviving a fire. Risk from radiant combustion was calculated as burn probability multiplied by fire line intensity. This risk was scaled from zero to one using the Wilson and Ferguson (1986) model of structural combustion to calculate the probability of structure survival for a given roof and landscape vegetation features. For the purposes of the Austin-Travis County CWPP, structures were assumed to be wooden, with a wooden roof framed and decked at a pitch ≥10° with yard vegetation that was ≥5 m in height, utilizing the worst case scenario. The model includes the capacity to analyze six other structure and landscape configurations but the GIS data does not allow individual differentiation. According to Wilson and Ferguson (1986), these structural configurations are more susceptible to catching fire at lower wildfire temperatures.

  Other models have been developed that include heat production from fires, such as the Structure Ignition Assessment Model (Cohen 1995). However, these models are based on mechanisms such as window breakage and paint blistering, which have been shown to be ineffective at predicting structure loss. In addition, other models only consider fire energy characteristics, not construction materials.

- Spot Risk is defined as the probability that spot fire ignition due to embers would occur. For the risk associated with spot fires, burn probability was used where the model had predicted the lofting and transport of embers. Spotting distance was also chosen since fire embers can travel long distances under certain conditions and certain structural conditions (e.g., leaf litter on roof, open vents) can increase the likelihood of potential ignition (Manzello et al. 2009).

Again, since these risk factors are structure based, the calculation of risk values is restricted to cells or pixels in the Urban Zone. Areas beyond the Urban Zone, while subject to wildfire, are considered to be landscape that would require defining different risk factors. Maps of the Urban Zone and the associated risk factors are available in the Baylor report on pages 53 through 55. Utilization of the risk factors in assessing risk for the plan area begins in **Section 4.2.6** with Baylor's community breakout and continues in **Section 4.3** with additional aggregations of the various scales of other defined communities within the plan area.

The Baylor report covers a number of other topics related to fire risk in central Texas. Fire risk is heightened by drought, wind, and fuel availability. These are three factors central Texas is facing in increasing measure; with fuel supply being the one most readily mitigated. In addition to the naturally occurring fuels, fuel availability in the WUI can be increased by improper disposal of yard waste, use of combustible materials in construction of fences and accessories, and other human activities. Fuel buildup occurs when the suppression of frequent, low-intensity fires inhibits one of nature's means for reducing fine fuels -- grass and tree litter, and ladder fuels -- which when mature can allow a surface fire to transition to the crown. Many of the treatments presented in **Section 5.4** are focused on reducing potential wildfire fuels, including, but not limited to, yard waste disposal, tree thinning, and prescribed burns.

The Baylor report also includes discussions regarding the implications of vegetation types on wildfire risk, particularly related to juniper, which many central Texas residents refer to as cedar trees. It notes that "stands dominated with junipers should be considered a low fire risk," meaning that hearty stands under normal conditions can withstand low-intensity surface fires that may occur at a higher frequency. However, the hotter, drier current conditions just discussed can leave that same stand susceptible to a stand-clearing canopy fire that places a high-intensity fire line in proximity to structures in the WUI.

4.2.5 FUEL MITIGATION POTENTIAL

An analysis determined the sensitivity of the risk results to help identify fuel mitigation potential relative to the variables modeled. Fuel mitigation aids in limiting available energy to constrain flame intensity and height, breaking horizontal continuity to reduce the opportunity to spread, and vertical continuity to minimize ladder fuels and transition of a surface fire to a canopy fire. Canopy fires in woody vegetation frequently produce the highest amounts of energy (heat) and embers that can jeopardize structures. A stepwise multiple linear regression analyzed the potential for mitigating the impacts of canopy fires.

The canopy attributes derived from the LiDaR data -- canopy cover (CC), canopy height (CH), canopy base height (CBH), and canopy bulk density (CBD) -- were compared to the $Risk_{spot}$ and $Risk_{rad}$ outputs to determine which contributed to variation in modeled risk. CBD was the only canopy attribute that significantly correlated with the modeled risk types. This indicates that as canopy bulk density increases, so do relative risk values. Therefore, reducing CBD reduces relative risk. Pruning the canopy reduces CBD, which is directly related to canopy mass.

4.2.6 COMMUNITY DATA

Assessing risk factors within and between communities begins with selecting or describing a scale or parameters that define the level of community at which the data will be analyzed for the assessments being done. According to the HFRA, a community is defined as "… a group of homes and other structures with basic infrastructure and services (such as utilities and collectively maintained transportation routes)...". Examples of communities meeting this definition include neighborhoods, subdivisions, municipalities, county precincts, ESDs, and the county as a whole.

With respect to strategic consideration of the entire 1,200-square-mile plan area, the use of subdivision, municipalities, and/or U.S. Census data either (1) did not provide complete coverage or (2) presented challenges with overlap and/or fragmentation that were not readily resolvable and would not yield data in a desirable format. The most basic unit of ownership providing complete coverage is the parcel and there are over 300,000 individual parcels in Travis County.

Travis County Appraisal District (TCAD) identifies each unique parcel of land with a 10-digit alphanumeric tax identification number. Using the first six characters of this number, the Baylor team was able to group the parcels and merge them into polygons, which were then used to represent communities providing complete coverage of Travis County. The Baylor team developed a field called NEIGHBOR2 for the merged parcels and created a new database to accommodate risk analysis based on these communities. This aggregation provided visual fidelity across Travis County as shown on the Communities map provided by Baylor on page 58 of their report.

This definition of community allows for an adjusted risk value to be calculated for each risk factor for each community. The adjusted risk is based on averaging the Urban

Zone risk values for each risk factor within the community, which can then be displayed as the risk value for that community as a whole. This aggregation provides one means for defining communities and facilitates an initial mapping of Structure Combustion Risk and Spot Risk across the planning area as illustrated in **Figures 14** and **15**. These maps, used in conjunction with the more detailed output in **Section 4.3.4** below and various TxWRAP outputs online, can aid in the preparation of local-level CWPPs, and are discussed further in **Section 4.4**.

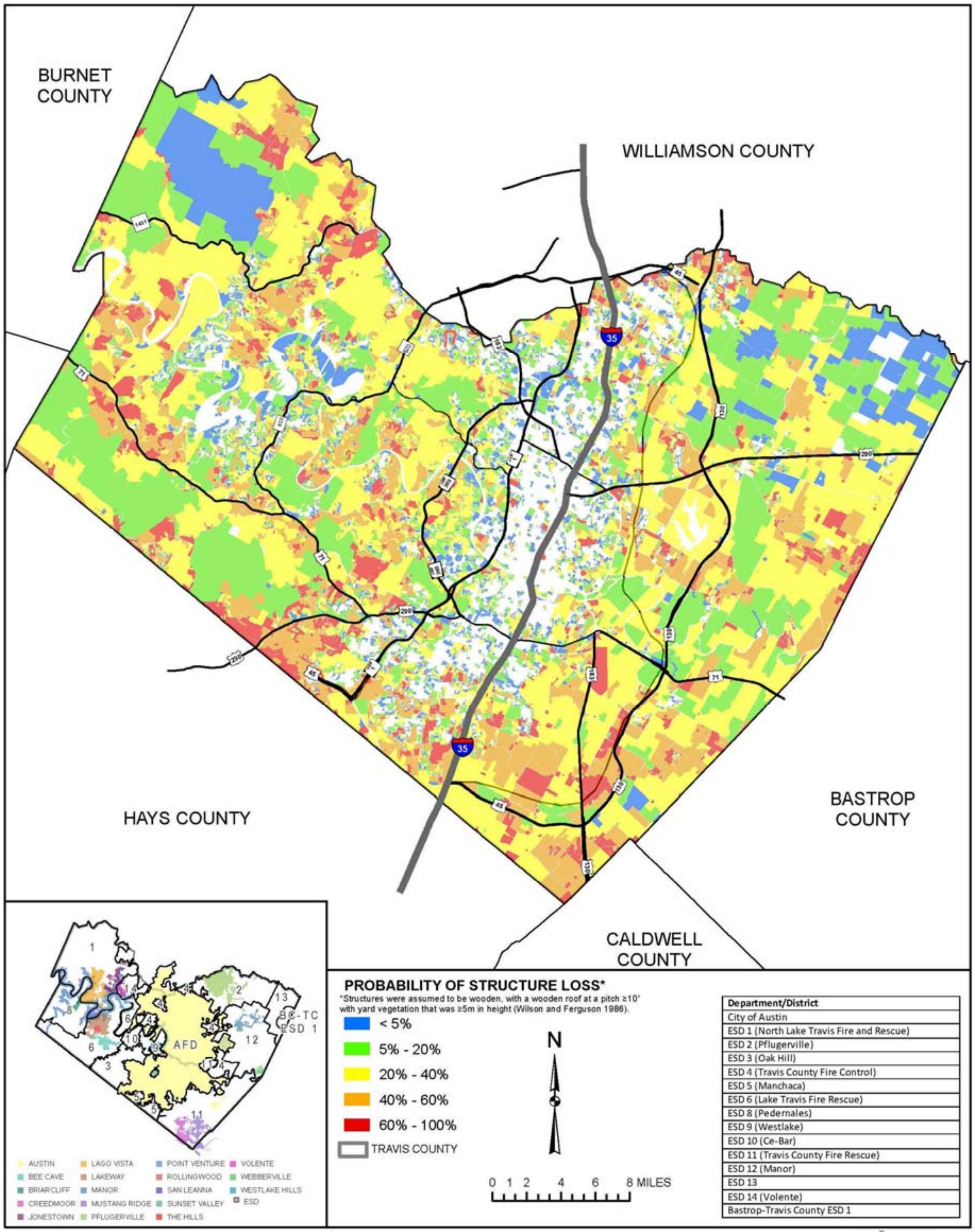


Figure 14. Structure Combustion Risk by parcel based community

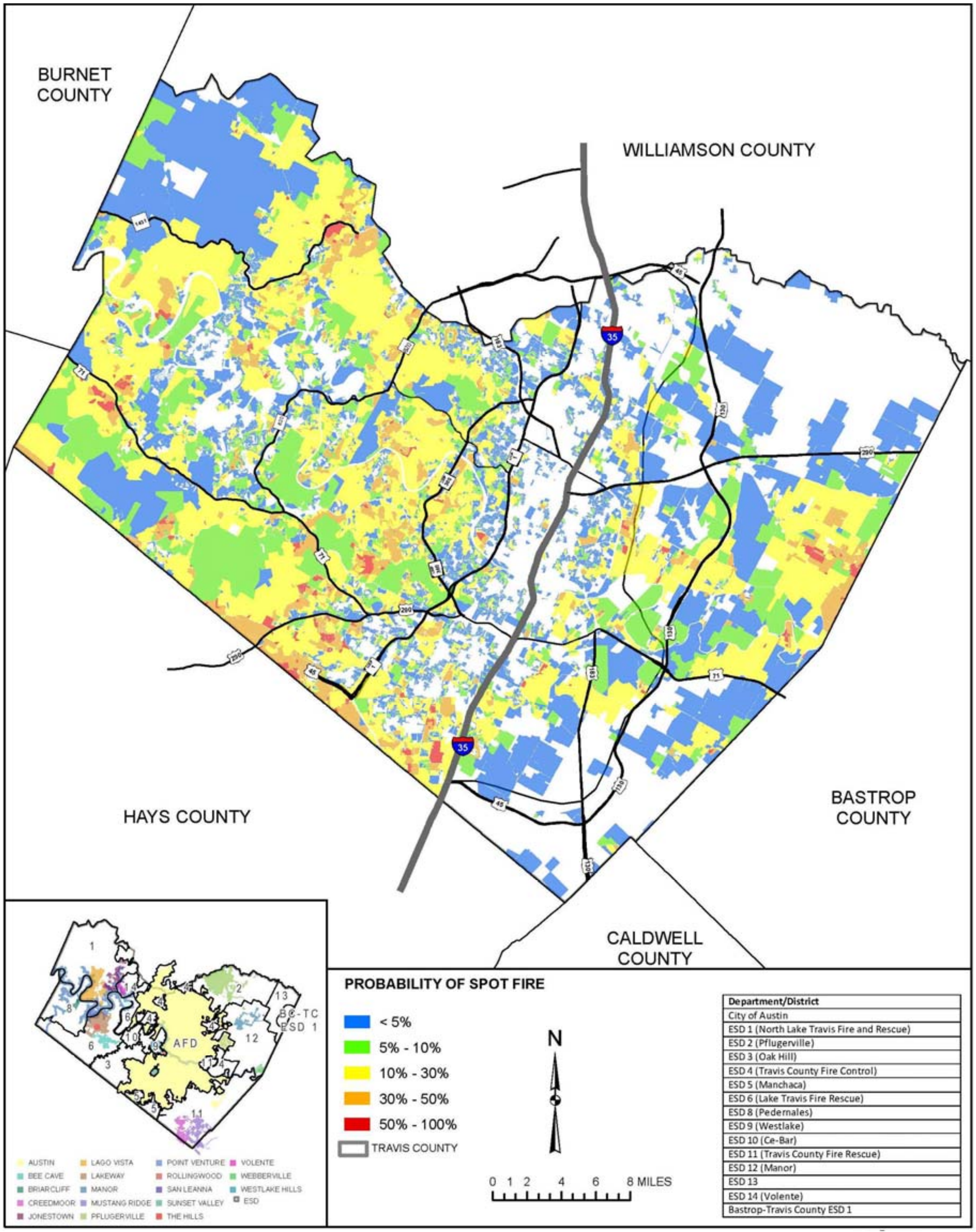


Figure 15. Spot Risk by parcel based community

4.2.7 INITIAL RISK ASSESSMENT

This initial risk assessment is also based on the community definition from **Section 4.2.6** where both risk factors have been averaged within the NEIGHBOR2 polygon boundaries. Backing out to a more strategic vantage point, the municipality and the Fire Department (FD)/Emergency Services District (ESD) are two local levels of community functionality defined by existing jurisdictional boundaries. Results of the analysis for municipalities are in **Table 13.** Similar assessments for the FDs/ESDs within the plan area were developed and are in **Table 14**.

Table 13. Structure combustion and spot risk assessments for municipalities in the Austin-Travis County CWPP Plan Area.

Municipalities	Structure Combustion Risk (%)	Spot Risk (%)	Department/District
Austin	17.6	6.8	AFD
Bee Cave	38.3	9.7	ESD 6 (Lake Travis Fire Rescue)
Briarcliff	12.6	2.0	ESD 8 (Pedernales)
Cedar Park	17.3	5.2	Cedar Park FD
Creedmoor	38.6	0.3	ESD 11 (Travis County Fire Rescue)
Elgin	19.2	3.0	Elgin FD
Jonestown	36.8	17.6	ESD 1 (North Lake Travis Fire and Rescue)
Lago Vista	20.6	7.0	ESD 1 (North Lake Travis Fire and Rescue)
Lakeway	17.0	4.8	ESD 6 (Lake Travis Fire Rescue)
Leander	34.0	13.7	Leander FD
Manor	24.5	2.1	ESD 12 (Manor)
Mustang Ridge	40.1	0.5	ESD 11 (Travis County Fire Rescue)
Pflugerville	19.8	0.5	ESD 2 (Pflugerville)
Point Venture	4.1	1.4	ESD 1 (North Lake Travis Fire and Rescue)
Rollingwood	5.8	3.2	ESD 9 (Westlake)
Round Rock	11.3	0.5	Round Rock FD

Table 13. Structure combustion and spot risk assessments for municipalities in the Austin-Travis County CWPP Plan Area.

Municipalities	Structure Combustion Risk (%)	Spot Risk (%)	Department/District
San Leanna	26.9	18.2	ESD 5 (Manchaca)
Sunset Valley	28.6	19.0	AFD
The Hills	23.1	13.0	ESD 6 (Lake Travis Fire Rescue)
Volente	35.0	13.6	ESD 14 (Volente)
Webberville	43.5	10.7	ESD 12 (Manor)
West Lake Hills	19.8	11.9	ESD 9 (Westlake)

This indicates that Webberville and Mustang Ridge have the highest average Structure Combustion Risk while their Spot Risk is medium and low respectively. Bee Cave, Creedmoor, Jonestown, Leander, and Volente also have relatively high Structure Combustion Risk based on the community definition. When compared with the Table 14 results for the FD/ESD assessment -- where ESD 3, ESD 5, and ESD 11 came in highest for Structure Combustion Risk, with LFD, ESD 4 (West), and ESD 8 also high -- several areas warranting strategic planning attention begin to identify themselves. These tables, used in conjunction with the more detailed output in 4.3 below and various TxWRAP outputs online, can help set strategic priorities as discussed further in 4.4.

Table 14. Structure Combustion and Spot Risk Assessments for Fire Departments/Emergency Service Districts in Travis County, Texas.

FD/ESD	Municipalities within the FD/ESD	Structure Combustion Risk (%)	Spot Risk (%)
AFD	Austin (Hays & Williamson Counties), Sunset Valley	17.5	6.8
CPFD	Cedar Park	9.3	3.3
LFD	Leander	34.0	13.7
JFD	Jollyville	13.2	17.4
RRFD	Round Rock	2.8	0.1
ESD 1	Jonestown, Lago Vista, Point Venture	24.2	8.8

Table 14. Structure Combustion and Spot Risk Assessments for Fire Departments/Emergency Service Districts in Travis County, Texas.

FD/ESD	Municipalities within the FD/ESD	Structure Combustion Risk (%)	Spot Risk (%)
ESD 2	Pflugerville	20.5	1.0
ESD 3		37.0	22.4
ESD 4 E		26.5	7.6
ESD 4 W		31.3	17.1
ESD 5	San Leanna	38.7	22.6
ESD 6	Bee Cave, Lakeway, The Hills	25.3	10.3
ESD 8	Briarcliff	33.5	30.4
ESD 9	Rollingwood, West Lake Hills	27.3	15.5
ESD 10		30.4	15.2
ESD 11	Creedmoor, Mustang Ridge	36.7	3.5
ESD 12	Manor, Webberville	30.4	9.3
ESD 13		11.9	0.4
ESD 14	Volente	28.6	16.6
BC/TC ESD 1	Elgin	20.9	2.3

Additional information organized around this FD/ESD community breakout is in **Exhibits 1-38, Part A** of **Appendix C**. These graphic representations of the Structure Combustion and Spot Risk levels are formatted as maps, and zoomed in to the ESD's extents, illustrating the NEIGHBOR2 polygon-based risk probabilities determined by Baylor**. Figures 16** and **17** are examples of the ESD exhibits based on the community description used to develop **Table 14**.

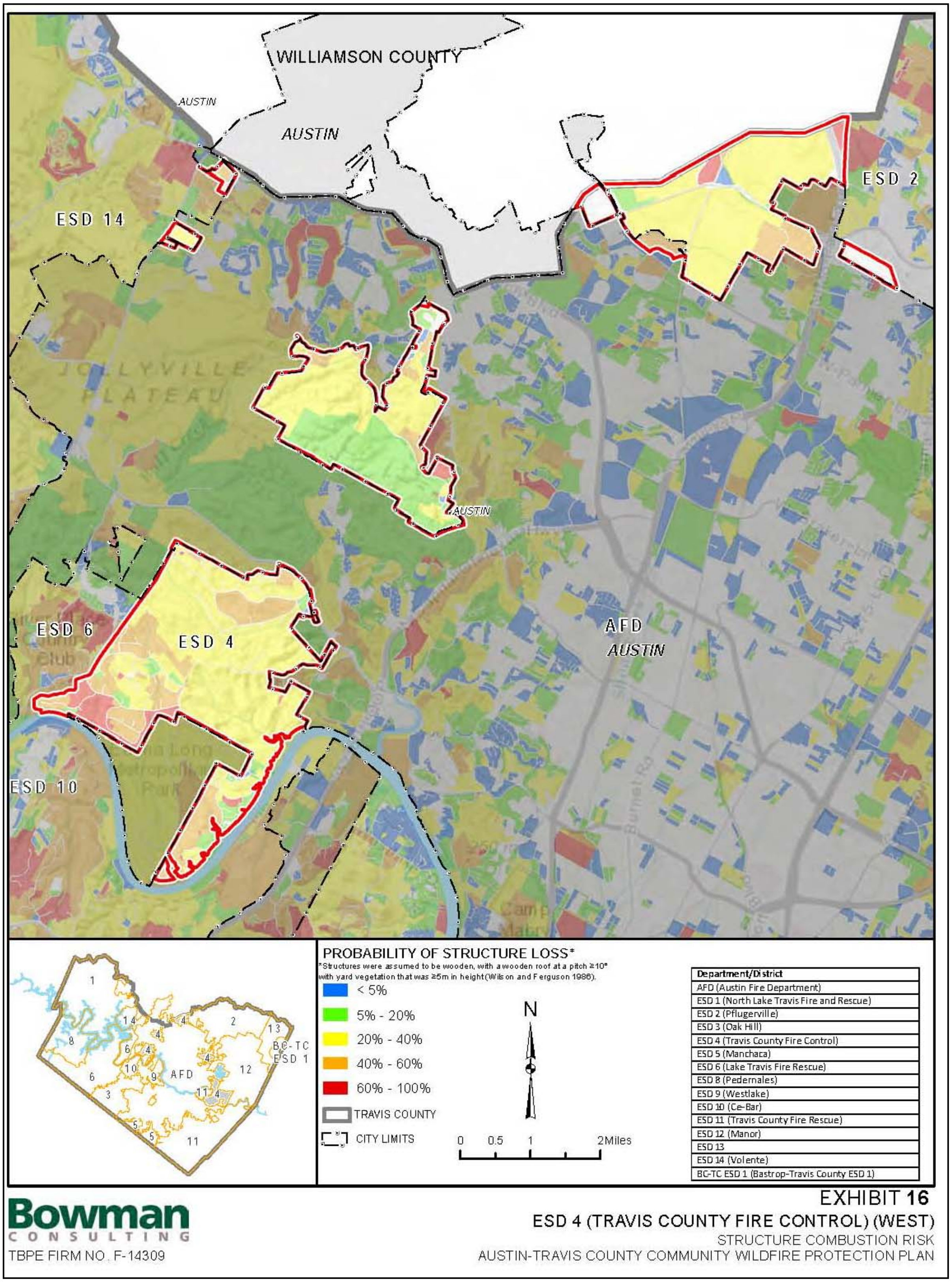


Figure 16. Sample ESD based Structure Combustion Risk map

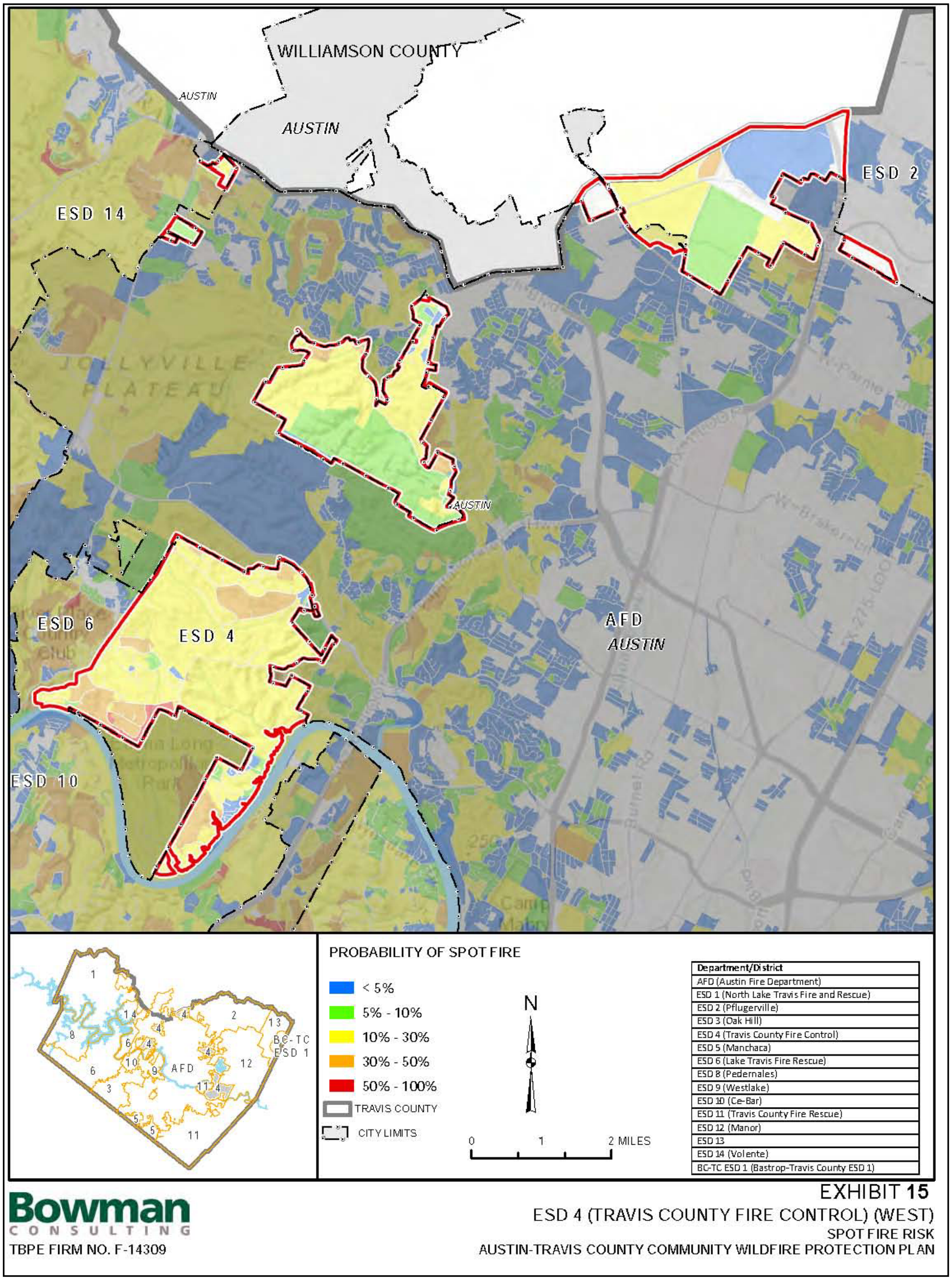


Figure 17. Sample ESD based Spot Risk map

Figure 18 provides another example of the capabilities of the Austin-Travis County CWPP database. It shows specific NEIGHBOR2 polygons, with their calculated risk levels, located within and around Webberville. Additional community information may be useful for prioritizing where mitigation actions should be taken first. This powerful database can produce a wide variety of tools for both strategic and tactical wildfire

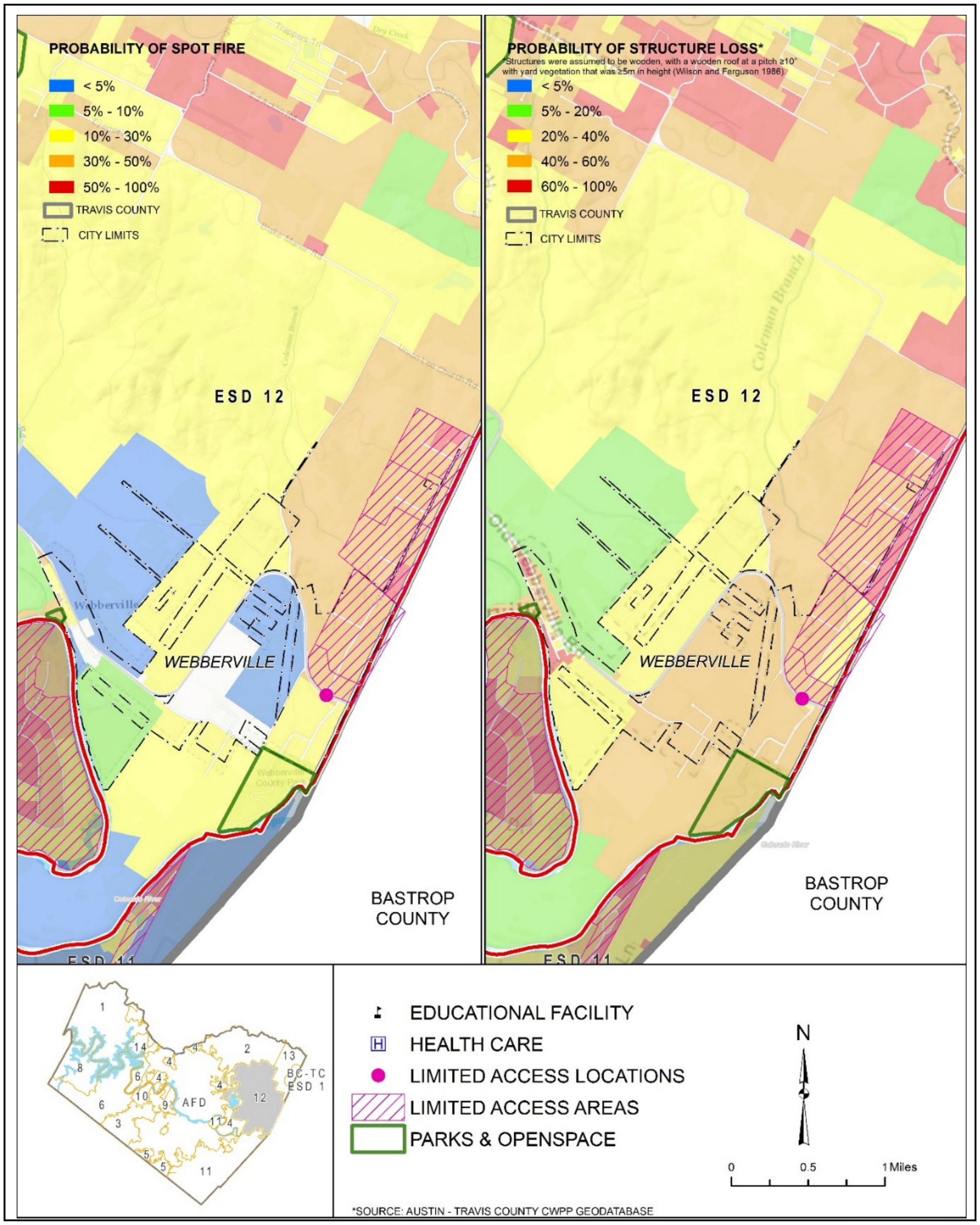


Figure 18. Sample municipality map showing Structure Combustion Risk and Spot Risk

mitigation planning depending on the focus of the study and the level of detail desired in the output products.

The tables and exhibits based on the NEIGHBOR2 polygons provide one way to look at the wildfire risk across Travis County. However, the community definition used for this analysis is based on the TCAD information for parcels within Travis County and areas of the City of Austin within Hays and Williamson Counties are not included. The available parcel data in these adjacent counties are not compatible with the sort process being used. Not including the entire plan area does not negate the value of the tabular information and maps generated, but it does preclude the use of this community basis for determining relative risk across the entire CWPP plan area. Therefore, additional risk assessment tools were developed and provided in **Section 4.3**, including information regarding the WUI context, pixel-based risk imagery, determining appropriate community extents, and prioritization based on relative risk.

4.3 RELATIVE RISK DETERMINATION

One of the main goals of this countywide CWPP is to support the development of numerous local-level CWPPs. One element of that support is a means for determining relative risk so that resources for public education, structural hardening, fuel reduction, and other wildfire mitigation efforts can be first directed to the areas of greatest risk. This section describes the process used to prepare an ordinal list of subareas across the entire planning area based on a risk ranking system.

The plan area has the potential to be divided into thousands of local-level CWPPs due to the pattern of development and the surrounding WUI conditions. The local-level CWPP plan area should be based on a risk assessment of the local conditions and should be determined following a holistic review of the adjacent properties. The vast number of potential communities and the variety of configurations that could be assumed makes it impractical to analyze the relative risk across the whole plan area. Understanding the parameters ultimately to be used in determining the extents of a local-level CWPP is important to developing an appropriate level of area aggregation, a slightly larger scale community or planning unit, and for determining the relative risk across the planning units that make up the plan area.

This subsection expands defining larger-scale communities based on the anticipated process for determining the extents of smaller-scale communities. A larger scale community concept based on a Planning Unit (PU) is introduced and its functions described. Given this aggregation of community, further analysis applying the risk factors is used to determine and display the relative risk ranking for each PU. The outputs of this process for the regional user include tables and detailed maps that provide information for assessing risk considerations with respect to both the PU and some of the existing jurisdictions. Additionally, Planning Unit Exhibits have been developed and will be an important assistance tool for local-level community leaders and fire professionals in developing the local-level CWPP.

4.3.1 DETERMINING THE PLAN AREA FOR A LOCAL-LEVEL CWPP

A community is more about how various subsets of the WUI can work together as a localized effort to mitigate wildfire impacts than it is about a specific set of parameters. The outcomes of the risk-mapping process have reinforced that the WUI is not just a place but also a set of conditions: proximity and combustibility of structures, climate, vegetation, topography, etc.

There are numerous configurations of developments within the WUI and a single definition of community is not ideal for establishing the extents of the optimal local-level CWPP for every situation. Coordination of local-level CWPPs with adjacent or nearby communities may be important, as risks from fire spread and intense fire heat production, as well as spot fires from torching canopies, may affect structures some distance from the actual community.

The most basic local-level CWPP configuration is likely a subdivision or master-planned community with wildland, under management by a single owner, adjacent on all sides. The HOA and land manager must first recognize the mutual benefits of wildfire mitigation in the WUI they share and then work together to prepare and implement a CWPP customized to their local conditions. This basic configuration is likely to be rare, thus the need for mapping tools that aid the property owners in understanding risks in the WUI around them.

With myriad development configurations and WUI conditions throughout the county, a holistic approach with multiple disciplines across applicable jurisdictions can result in local-level CWPPs with a wide variety of forms including, but not limited to:

- One or more adjacent subdivisions and a preserve next door;
- Two or more subdivisions on either side of a protected riparian way,
- A municipality and one or more subdivisions on the fringe of its full purpose limits.

Presence of physical features, jurisdictional boundaries, cooperative neighbors, and other factors will ultimately determine the extents for a local-level CWPP to provide the best mitigation opportunities. Tools discussed in the balance of this section will aid in identifying the best method for guiding local leaders and fire professionals based on site-specific conditions.

4.3.2 PLANNING UNITS

With values for Structure Combustion Risk and Spot Risk provided for every 30-meter-by-30-meter pixel, some data aggregation is necessary to provide a clear picture on a countywide map. Given that the 1,200-square-mile county has over 300,000 parcels and more than 4,000 communities using the NEIGHBOR2, a manageable number of subunits must be defined to develop a relative risk-ranking process suited to its purpose. For creating appropriate comparisons with respect to countywide strategic planning, there are too few precincts and ESDs to provide appropriate levels of detail and there are too many parcels and subdivisions to be manageable. The amorphous nature of the configurations for the potential local-level CWPPs across the county precluded defining arbitrary communities as plan areas. Thus, it was determined that the countywide planning area would be divided into Planning Units (PU).

The PU boundaries were determined by identifying various physical features (roads, rivers, etc.), jurisdictional boundaries (neighborhood planning areas, city limits, ESD, etc.), and a sense of place (bringing together neighbors, contributing to potential cohesion between property owners, etc.). While cutting the planning area into an orthographic grid may have simplified the calculations by producing more subareas with consistent size, it also disconnected analysis from functional reality on the ground. The planning team identified 83 subareas that incorporated some functional sense of place, generally conformed to jurisdictional boundaries, or were confined by logical physical conditions.

Figure 19 shows a plan-area-wide view of the planning units and acts an index for the six zone maps (**Figures 20 through 25**) that follow and zoom in for more detail to identify where a particular location falls within a PU. The PU identification labels facilitate an abbreviated reference to each PU while the table on each zone map connects the PU name with some well-known feature within the PU.

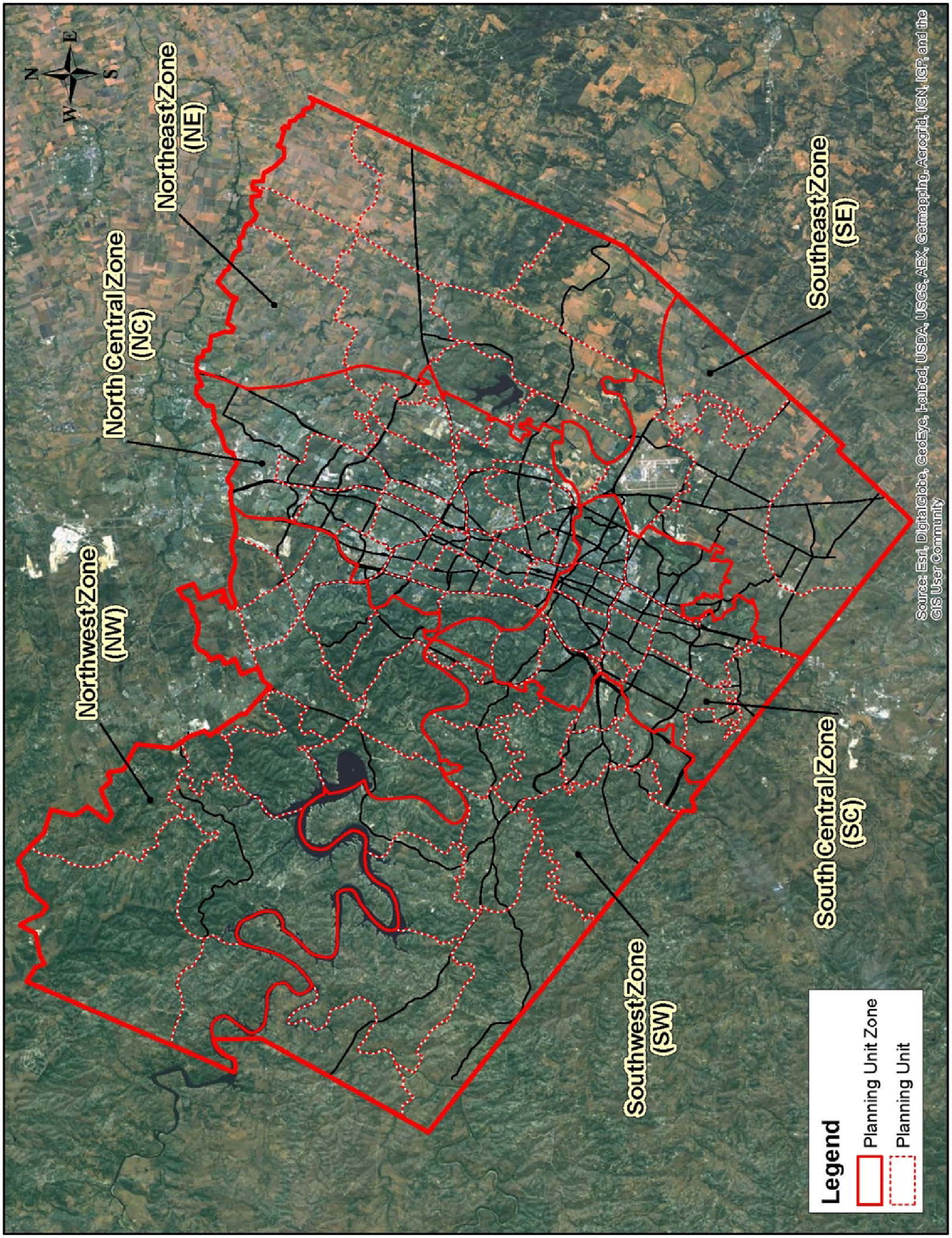


Figure 19. Index Map for ATC CWPP Planning Units

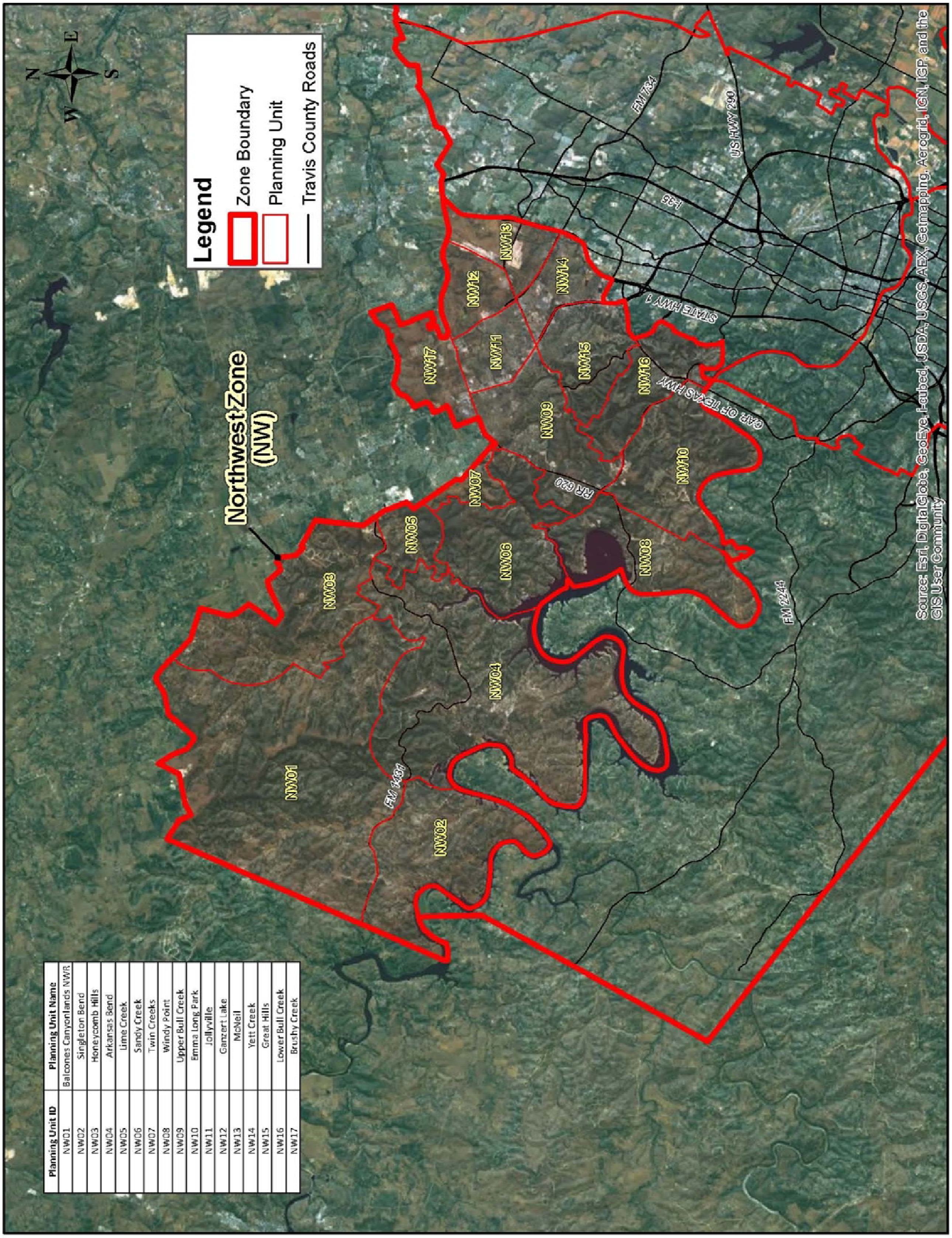


Figure 20. Planning Units in the Northwest Zone

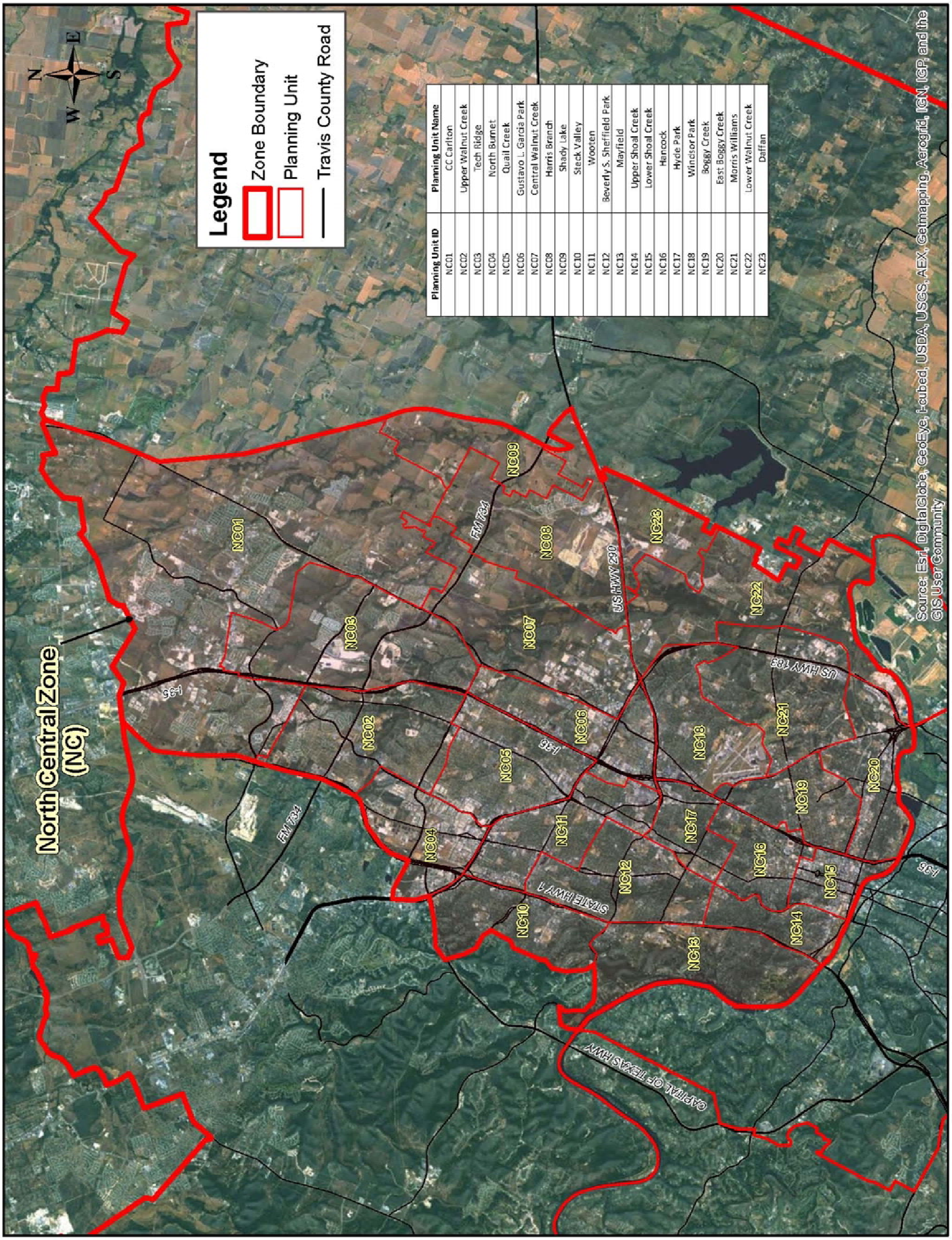


Figure 21. Planning Units in the North Central Zone

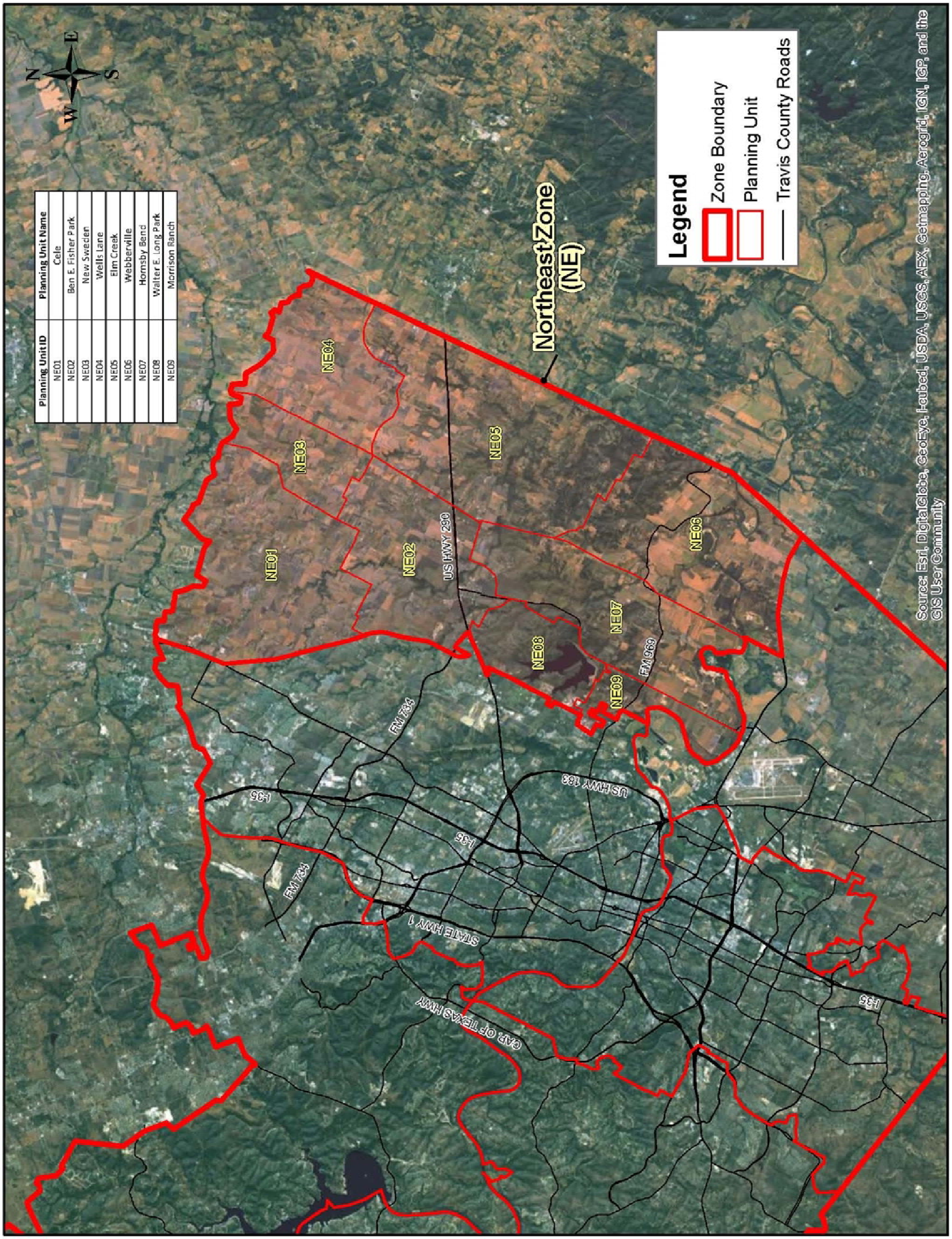


Figure 22. Planning Units in the Northeast Zone

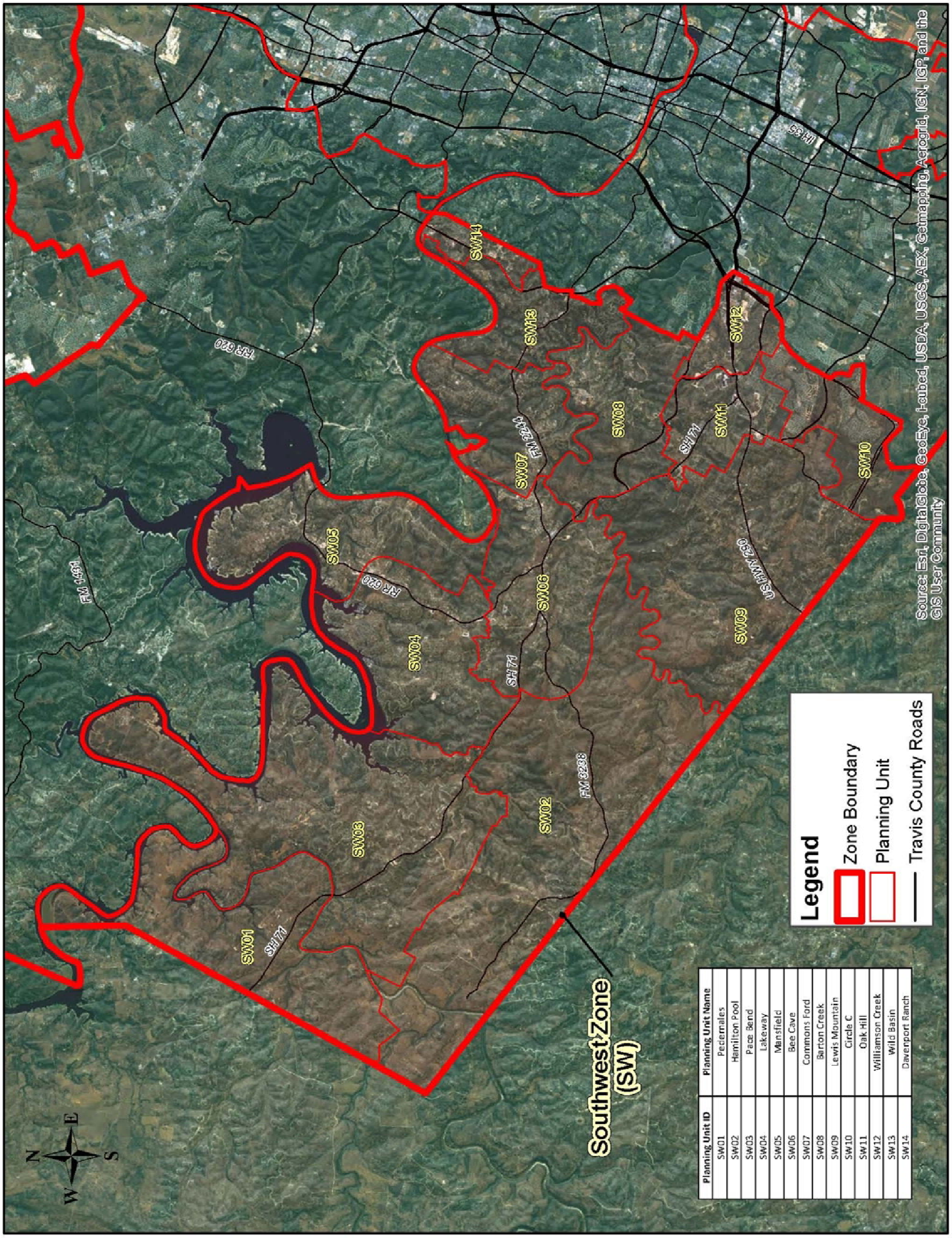


Figure 23. Planning Units in the Southwest Zone

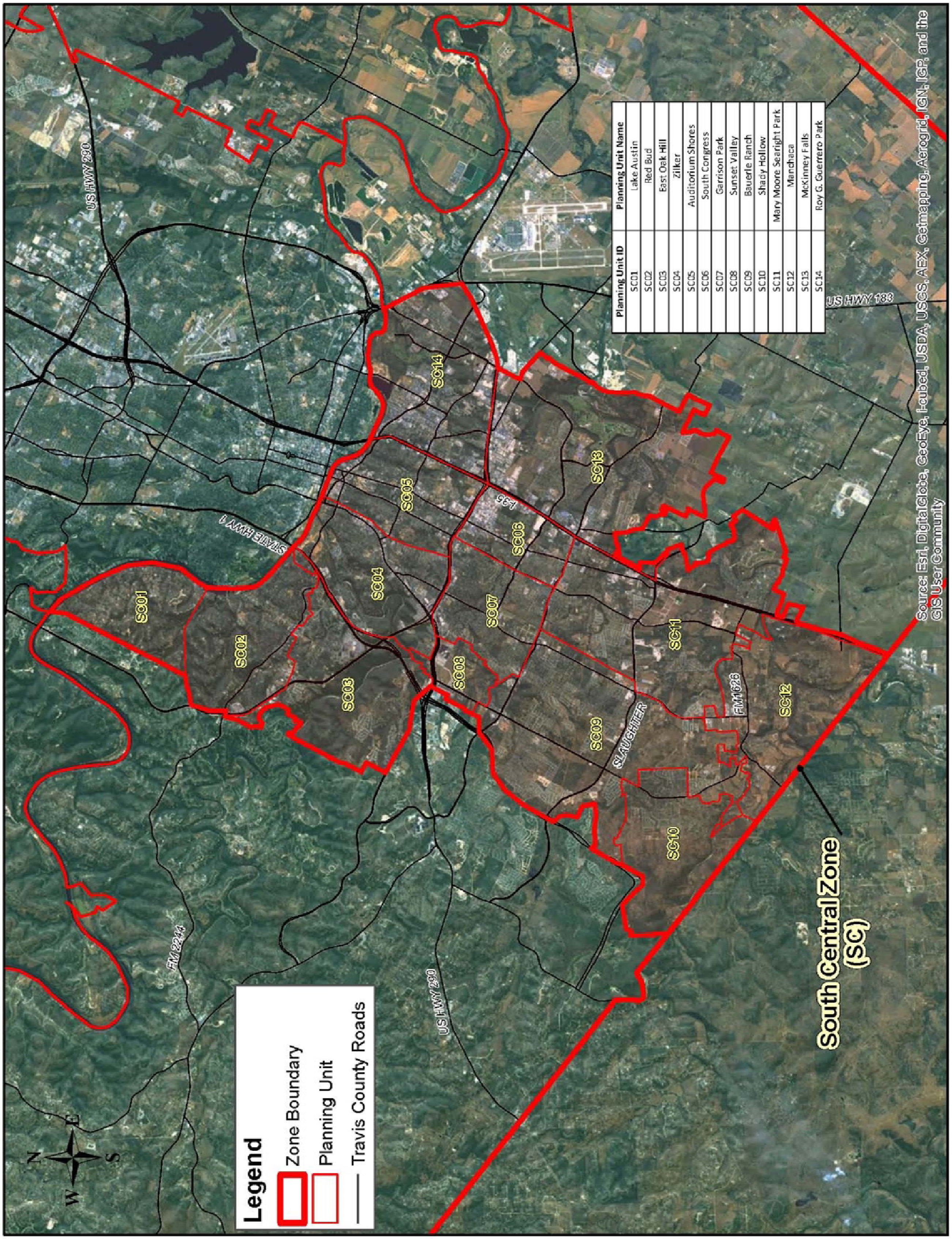


Figure 24. Planning Units in the South Central Zone

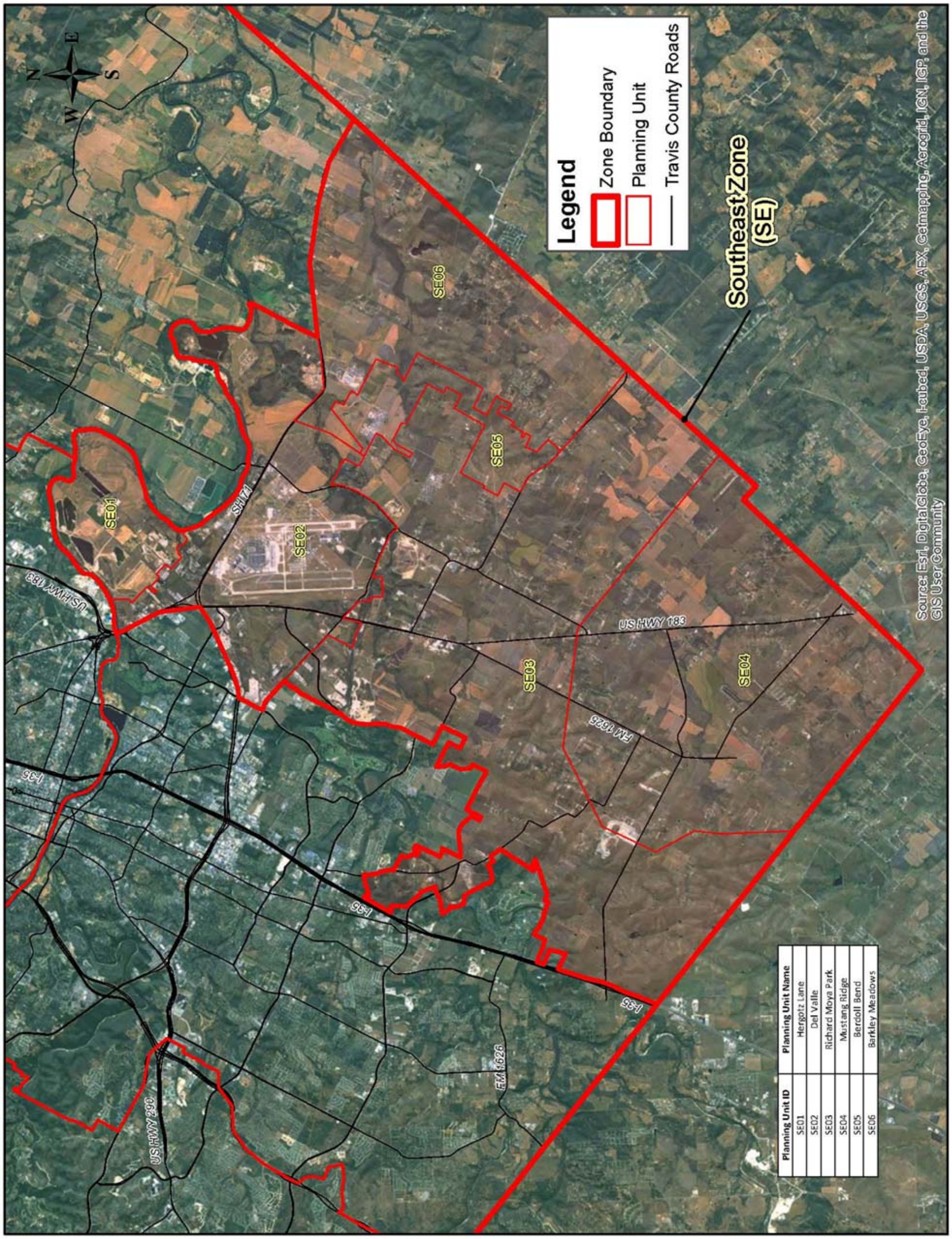


Figure 25. Planning Units in the Southeast Zone

Each of the planning units contains one or more WUI areas that a local-level CWPP can protect. It is important to note that the PU boundary is strictly a strategic planning tool. The PU delineations should not constrain developing a local-level CWPP that's best fitted to the site-specific WUI conditions it's intended to mitigate. A CWPP may cross one or more PU boundaries as needed to provide holistic implementation of the appropriate wildfire mitigation strategies. These situations are discussed and illustrated in **Section 4.4** with a few hypothetical CWPP plan areas discussed with respect to the potential conditions dictating their configuration.

4.3.3 RELATIVE RISK RANKING

Structure Combustion Risk was used to develop a single, ordinal ranking for planning unit risk. While the Spot Risk value is important, the risk of structural ignition by radiant heat can be mitigated with treatments that reduce the intensity of the fire directly threatening the structure. Additionally, these same mitigation strategies also address Spot Risk, and the computation of the ranking has less variability when based only one risk factor.

An Adjusted Risk value was determined for each planning unit by incorporating the Structure Combustion Risk values for each pixel within the Urban Zone (UZ) of each planning unit, combined with prorating the amount of UZ within the PU (UZ/PU). An exponential transformation of the average of the risk values was used to prevent smaller proportions of a risk category from outweighing the more prevalent ones. Similarly, an exponential transformation was applied to the application of the UZ/PU ratio. This reduced the influence of the Adjusted Risk value of a PU with less UZ, and precluded it from having an inordinate influence relative to a PU with more UZ, which correlated to more people and more structures at risk.

The presentation of the relative ranking for the PU Adjusted Risk value can take many forms. **Table 15** provides the full listing of each PU with its associated structure combustion risk ranked from highest as one to lowest at 83. Public officials and wildfire management professionals can use this ordinal list whenever there is a need to prioritize projects proposed for a particular PU. Additional factors may influence the prioritization process but with respect to the strategic importance of addressing the highest-risk PU first, this list shows the relative risk between planning units based on the Structure Combustion Risk across the PU.

Table 15. Planning Units by Structure Combustion Risk Ranking.

Rank	PU ID	PU Name	Rank	PU ID	PU Name
1	SE04	Mustang Ridge	43	SE01	Hergotz Lane
2	NW05	Lime Creek	44	SC01	Lake Austin
3	SC12	Manchaca	45	SW12	Williamson Creek
4	NW03	Honeycomb Hills	46	SE05	Berdoll Bend
5	SW09	Lewis Mountain	47	NW01	Balcones Canyonlands NWR
6	SE03	Richard Moya Park	48	NC03	Tech Ridge
7	SW01	Pedernales	49	NW09	Upper Bull Creek
8	SE06	Barkley Meadows	50	SW05	Mansfield
9	NC23	Daffan	51	NC21	Morris Williams
10	NW02	Singleton Bend	52	SC09	Bauerle Ranch
11	NE06	Webberville	53	SC03	East Oak Hill
12	NC09	Shady Lake	54	SW04	Lakeway
13	SW08	Barton Creek	55	NW07	Twin Creeks
14	SW03	Pace Bend	56	SC13	McKinney Falls
15	NE05	Elm Creek	57	SC14	Roy G. Guerrero Park
16	NW13	McNeil	58	NE03	New Sweden
17	SE02	Del Valle	59	SC02	Red Bud
18	NE09	Morrison Ranch	60	NC13	Mayfield
19	NW06	Sandy Creek	61	NW15	Great Hills
20	SW02	Hamilton Pool	62	NW16	Lower Bull Creek
21	NC08	Harris Branch	63	SC04	Zilker
22	SW06	Bee Cave	64	NW11	Jollyville
23	SW13	Wild Basin	65	NC20	East Boggy Creek
24	SC10	Shady Hollow	66	NC02	Upper Walnut Creek
25	NE07	Hornsby Bend	67	NC18	Windsor Park
26	SW07	Commons Ford	68	NC10	Steck Valley
27	NW17	Brushy Creek	69	NC06	Gustavo L. Garcia Park
28	NW12	Ganzert Lake	70	SC05	Auditorium Shores
29	NC22	Lower Walnut Creek	71	NC12	Beverly S. Sheffield Park
30	SW11	Oak Hill	72	NC04	North Burnet
31	NW10	Emma Long Park	73	SC07	Garrison Park
32	NE02	Ben E. Fisher Park	74	NE04	Wells Lane

Rank	PU ID	PU Name	Rank	PU ID	PU Name
33	NE08	Walter E. Long Park	75	NC19	Boggy Creek
34	SC08	Sunset Valley	76	NW14	Yett Creek
35	NW08	Windy Point	77	SC06	South Congress
36	NW04	Arkansas Bend	78	NC17	Hyde Park
37	SC11	Mary Moore Searight Park	79	NC05	Quail Creek
38	SW14	Davenport Ranch	80	NC16	Hancock
39	NC07	Central Walnut Creek	81	NC14	Upper Shoal Creek
40	SW10	Circle C	82	NC11	Wooten
41	NE01	Cele	83	NC15	Lower Shoal Creek
42	NC01	CC Carlton			

Figure 26 shows bands of higher risk that fall along the eastern and southern county borders that correlate closely with the burn probability variable from the Baylor model. Another band of higher risk units stretches northward from near the center of the southern border, arcing northwestward to the Williamson County line, also tracking well with the model. The central band of lower risk areas tracks along the IH-35 corridor showing the impact of more urbanized conditions in the cities along that edge of the Edwards Plateau. This illustrates a categorical breakout emphasizing the heterogeneity of the Adjusted Risk value for each PU. The risk ranking from **Table 15** is broken into quintile categories and the PU shading provides a graphic view of risk distribution across the plan area. The actual Structure Combustion Risk ranking is displayed within the PU boundary.

Tables 16 and **17** present the northern and southern PU groups listed by PUI ID with their risk rank and risk category for both risk factors. This format provides an easy way to search for a specific PU and connects it directly with the risk factors analyzed. The differences in the ranking and categories of the two risk factors can be used when selecting the most appropriate wildfire mitigation strategies for the PU. Remember that while the modeling outputs provide benefits in strategic and tactical planning, the final selection of the optimal mitigation strategies will be driven by observations of the actual physical conditions and cooperation with the various codes and regulations governing the area.

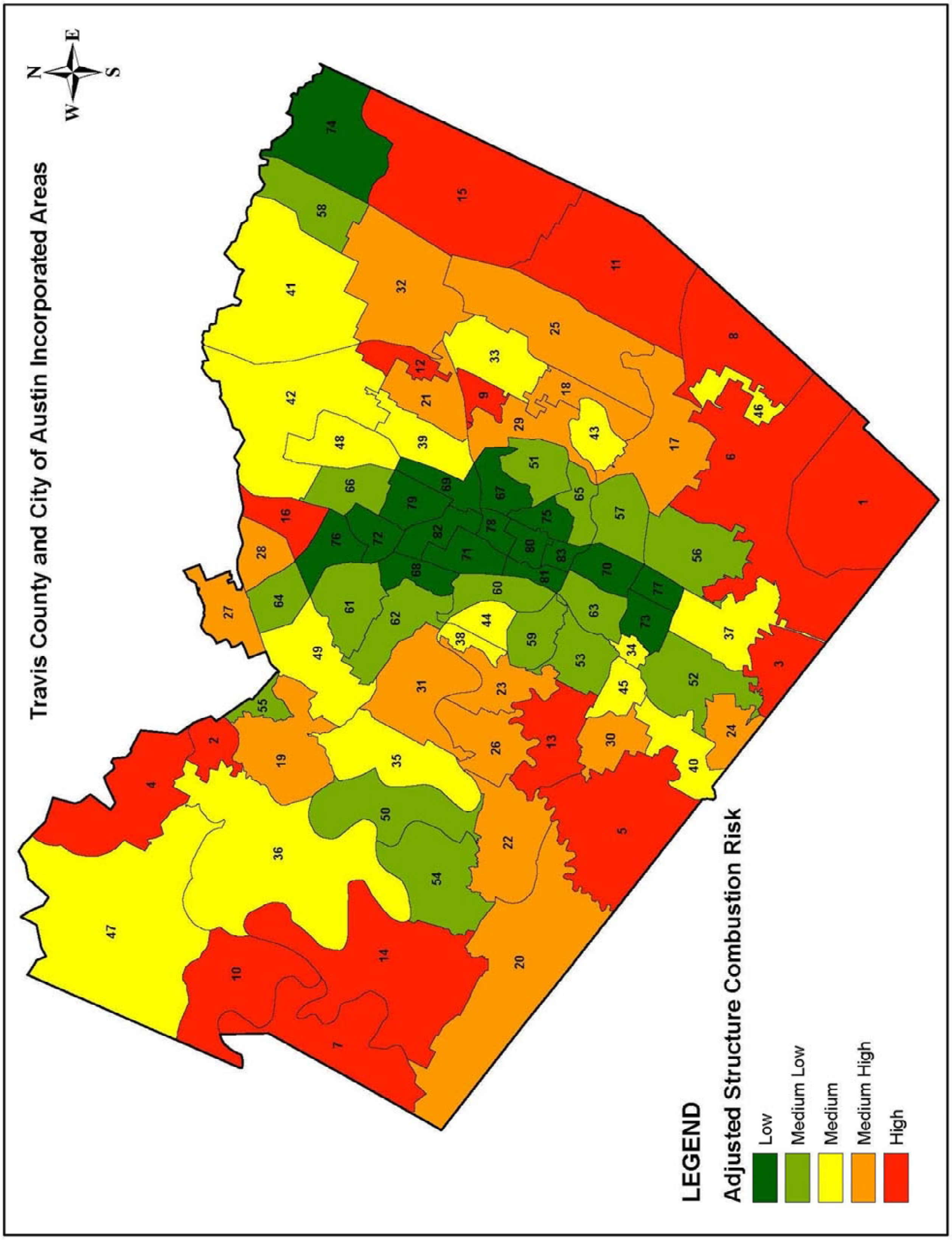


Figure 26. Planning Units by Structure Combustion Risk Ranking

Table 16. Northern Planning Unit Structure Combustion Risk & Spot Risk Rankings.

PU ID	PU Name	Structure Combustion Risk		Spot Risk	
		Rank	Category	Rank	Category
NW01	Balcones Canyonlands NWR	47	Medium	69	Lowest
NW02	Singleton Bend	10	Highest	15	Highest
NW03	Honeycomb Hills	4	Highest	36	Medium
NW04	Arkansas Bend	36	Medium	25	High
NW05	Lime Creek	2	Highest	1	Highest
NW06	Sandy Creek	19	High	10	Highest
NW07	Twin Creeks	55	Low	40	Medium
NW08	Windy Point	35	Medium	24	High
NW09	Upper Bull Creek	49	Medium	17	High
NW10	Emma Long Park	31	High	5	Highest
NW11	Jollyville	64	Low	63	Low
NW12	Ganzert Lake	28	High	14	Highest
NW13	McNeil	16	Highest	43	Medium
NW14	Yett Creek	76	Lowest	57	Low
NW15	Great Hills	61	Low	33	Medium
NW16	Lower Bull Creek	62	Low	31	High
NW17	Brushy Creek	27	High	27	High
NC01	CC Carlton	42	Medium	71	Lowest
NC02	Upper Walnut Creek	66	Low	50	Low
NC03	Tech Ridge	48	Medium	59	Low
NC04	North Burnet	72	Lowest	70	Lowest
NC05	Quail Creek	79	Lowest	77	Lowest
NC06	Gustavo L. Garcia Park	69	Lowest	64	Low
NC07	Central Walnut Creek	39	Medium	39	Medium
NC08	Harris Branch	21	High	53	Low
NC09	Shady Lake	12	Highest	58	Low
NC10	Steck Valley	68	Lowest	49	Medium
NC11	Wooten	82	Lowest	78	Lowest
NC12	Beverly S. Sheffield Park	71	Lowest	56	Low
NC13	Mayfield	60	Low	34	Medium
NC14	Upper Shoal Creek	81	Lowest	67	Lowest
NC15	Lower Shoal Creek	83	Lowest	81	Lowest
NC16	Hancock	80	Lowest	65	Low
NC17	Hyde Park	78	Lowest	76	Lowest

PU ID	PU Name	Structure Combustion Risk		Spot Risk	
		Rank	Category	Rank	Category
NC18	Windsor Park	67	Lowest	62	Low
NC19	Boggy Creek	75	Lowest	74	Lowest
NC20	East Boggy Creek	65	Low	51	Low
NC21	Morris Williams	51	Low	23	High
NC22	Lower Walnut Creek	29	High	26	High
NC23	Daffan	9	Highest	73	Lowest
NE01	Cele	41	Medium	80	Lowest
NE02	Ben E. Fisher Park	32	High	75	Lowest
NE03	New Sweden	58	Low	82	Lowest
NE04	Wells Lane	74	Lowest	83	Lowest
NE05	Elm Creek	15	Highest	42	Medium
NE06	Webberville	11	Highest	21	High
NE07	Hornsby Bend	25	High	47	Medium
NE08	Walter E. Long Park	33	Medium	60	Low
NE09	Morrison Ranch	18	High	28	High

Table 17. Southern Planning Unit Structure Combustion Risk & Spot Risk Rankings.

PU ID	PU Name	Structure Combustion Risk		Spot Risk	
		Rank	Category	Rank	Category
SW01	Pedernales	7	Highest	18	High
SW02	Hamilton Pool	20	High	30	High
SW03	Pace Bend	14	Highest	29	High
SW04	Lakeway	54	Low	44	Medium
SW05	Mansfield	50	Low	41	Medium
SW06	Bee Cave	22	High	32	High
SW07	Commons Ford	26	High	8	Highest
SW08	Barton Creek	13	Highest	7	Highest
SW09	Lewis Mountain	5	Highest	2	Highest
SW10	Circle C	40	Medium	16	Highest
SW11	Oak Hill	30	High	20	High
SW12	Williamson Creek	45	Medium	35	Medium
SW13	Wild Basin	23	High	3	Highest
SW14	Davenport Ranch	38	Medium	12	Highest
SC01	Lake Austin	44	Medium	6	Highest
SC02	Red Bud	59	Low	13	Highest
SC03	East Oak Hill	53	Low	19	High
SC04	Zilker	63	Low	38	Medium
SC05	Auditorium Shores	70	Lowest	54	Low
SC06	South Congress	77	Lowest	68	Lowest
SC07	Garrison Park	73	Lowest	55	Low
SC08	Sunset Valley	34	Medium	9	Highest
SC09	Bauerle Ranch	52	Low	37	Medium
SC10	Shady Hollow	24	High	11	Highest
SC11	Mary Moore Searight Park	37	Medium	22	High
SC12	Manchaca	3	Highest	4	Highest
SC13	McKinney Falls	56	Low	45	Medium
SC14	Roy G. Guerrero Park	57	Low	46	Medium
SE01	Hergotz Lane	43	Medium	66	Low
SE02	Del Valle	17	High	48	Medium
SE03	Richard Moya Park	6	Highest	61	Low
SE04	Mustang Ridge	1	Highest	79	Lowest
SE05	Berdoll Bend	46	Medium	72	Lowest
SE06	Barkley Meadows	8	Highest	52	Low

Table 18 is a listing of the Fire Department/Emergency Services Districts (FD/ESD) jurisdictions with the constituent planning units broken out by the same risk categories. This configuration of the data demonstrates the distribution of the Structure Combustion Risk for each PU served by the FD or ESD.

Table 18. FD/ESD Listing with PU by Structure Combustion Risk Category.

Department/ District	Planning Units within FD/ESD by Risk Category				
	Highest	High	Medium	Low	Lowest
AFD	NW13	Nw17, SW11, SE02, NC08, SC01, NC22, NW10	NW09, SW10, SW12, SC11, SW14, NE08, SC08, SC10, NC07, NC01, NC03, SE05	NW11, NW15, NW16, SC09, SC03, SC04, SC02, SC13, SC14, NC02, NC21, NC20, NC13	SC05, SC06, SC07, NC18, NC10, NC06, NC12, NC04, NC19, NC17, NC05, NC16, NC14, NC11, NC15, NW14
CPFD	NW05			NW07	
LFD	NW03				
JFD		NW12		NW11	
RRFD	NW13	NW12	NC01		
ESD 1	NW03, NW05, NW02		NW01, NW04		
ESD 2		NC08	NE01, NC01, NC03	NE03, NC02	
ESD 3	SW09, SW08	SC01	SC08, SC10		
ESD 4 E	NC23	NE09, NE07, NC08, NC22, NW12	NC07, NC01	NW11	
ESD 4 W	NW13	NW10, NW12	NW09	NW15, NW16, NW11	
ESD 5	SC12	SC10	SC11, SC08	SC09	
ESD 6		SW02, SW06, NW10	NW08	SW05, SW04	
ESD 8	SW01, SW03	SW02			
ESD 9		SW13	SC01	SC02, SC03	

Department/ District	Planning Units within FD/ESD by Risk Category				
	Highest	High	Medium	Low	Lowest
ESD 10		SW07			
ESD 11	SE03, SE04, SE06, NE06	SE02	SE01, SE05		
ESD 12	NE06, NE05, NC09, NC23	NE02, NE07, NC08	NE08		
ESD 13	NE05				NE04
ESD 14		NW06	NW08	NW07	
BC/TC ESD 1	NE05				

NOTE:

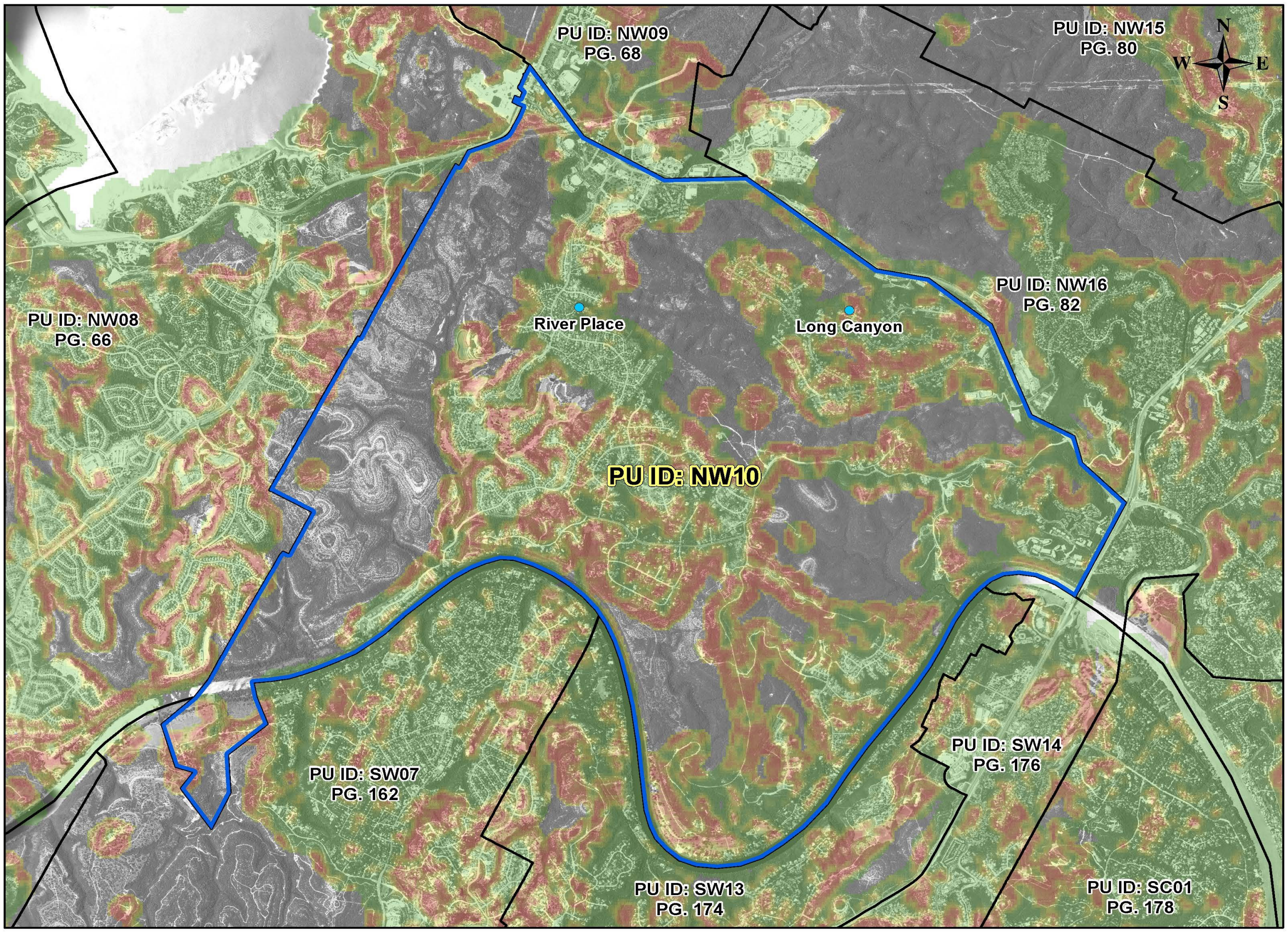
1. Some Planning Units extend across an ESD boundary and their PU ID will appear more than once.

ESDs 1, 11, and 12 have three or four of their PU areas with Structure Combustion Risk values in the highest category. This information correlates closely with the information in **Table 14**, and provides another way to prioritize for utilizing these established jurisdictions with their organizational resources already in place.

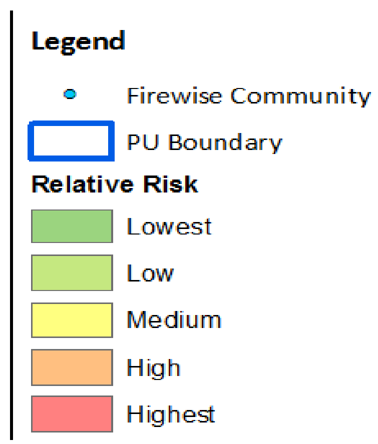
Expanded discussions regarding the utility of these tables and maps can be found in **Sections 4.4**, **5.0** and **6.0**. Until the database is made available to the public, contact the City of Austin Wildland Conservation Division or Travis County Transportation and Natural Resources (TNR) to inquire about the availability of additional output formats.

4.3.4 PLANNING UNIT EXHIBITS

While countywide tables and maps provide public officials and wildfire management leaders with useful tools for strategic planning, developers of local-level CWPPs, such as community leaders and local fire professionals, need location-specific tools. Planning Unit Exhibits have been developed to improve the accessibility to Structure Combustion Risk and other database information. A sample PU Exhibit is shown on **Figures 27** and **28**. They provide a more detailed risk map zoomed in to the PU and list various PU-specific details to aid in preparing local-level CWPPs in and around the example PU NW10. **Part B of Appendix C** contains an index map and the PU Exhibits for all 83 of the subareas. Expanded discussions regarding the utility of the PU Exhibits can be found in **Sections 4.4** and **5.0** and **6.0**.



PU Area = 10339 acres
UZ Area = 6728 acres



Overall PU Risk Information:

	Adjusted Risk Ranking	Relative Risk Ranking
Structure Combustion Risk	31	High
Spot Risk	5	Highest

Figure 27. Sample Planning Unit Exhibit – NW10 – Ema Long Park PU - exhibit page.

PU #NW10 Emma Long Park Planning Unit 71

Jurisdictions

Austin City Limits	Austin LTD	Austin 2 Mile ETJ	Austin Full Purpose		
TCEQ	Austin Fire Dept	Travis Co. ESD #4	Travis Co. ESD#6		
TFS	Travis Co. Precinct #2				

Watersheds

Commons Ford Creek	Connors Creek	Turkey Creek	Panther Hollow
Hog Pen Creek	Coldwater Creek	Lake Austin	West Bull Creek

Large Subdivisions/Developments in this PU

2222 BUSINESS PARK	AUSTIN CHRISTIAN FELLOWSHIP	CHAMPION CITY PARK EAST SUBD	COLDWATER	DIAMOND SKY SUBD
FLEECIE P. PURNELL ESTATE SUBD	GLENLAKE	GREENSHORES ON LAKE AUSTIN	HIDDEN VALLEY	LONG CANYON
MONTEVISTA CONDOMINIUMS	NEW CORRIDOR AT RIVER PLACE SUBD	OAK SHORES ON LAKE AUSTIN	PANTHER HOLLOW CREEK	PARK 22
RIVER PLACE GOLF	RIVER POINTE SUBD	SANCTUARY AT COLDWA-TER	SHEPHERD MOUNTAIN	THE PRESERVE AT RIVER PLACE
THE WOODS OF GREENSHORES	VAUGHT RANCH	WESTCLIFF	WESTMINSTER GLEN	YACHTMAN SUBD

Special Conditions

- A wide variety of special conditions (i.e. protected species habitats, critical environmental features) occur throughout the plan area. Therefore, it is imperative that a team preparing a local level CWPP include collaboration with the City and County representatives as discussed in the Toolkit for Local Level CWPPs provided in Appendix E.

Active Wildfire Programs

Austin Independent School District Ready, Set, Go! Program	Austin Wildlands Conservation Area Ready, Set, Go! Program	Travis Co. ESD #4 & 6 Ready, Set, Go! Programs
River Place Firewise Community	Long Canyon Firewise Community	

Emergency Services Contacts

In the case of an actual emergency, call 9-1-1

Travis Co. Precinct #2 700 Lavaca St. Suite 2.300 Austin, TX 78701 (512) 854-9222		TCEQ Region 11 12100 Park 35 Cir Bldg A, # 179 Austin, TX 78753 (512) 339-2929	Texas A&M Forest Service 700 S Reynolds St. La Grange, TX 78945 (979) 968-5555	Austin Fire Dept 4201 Ed Bluestein Blvd. Austin, TX 78721 (512) 974-0130	Travis Co. ESD #4 11800 N Lamar Suite 4B Austin, TX 78753 (512) 836-7566	Travis Co. ESD#6 15304 Pheasant Lane Lakeway, TX 78734 (512) 266-2533	

Figure 28. Sample Planning Unit Exhibit – NW10 – Emma Long Park PU - data page.

4.4 PHYSICAL OBSERVATION AND ASSESSMENT

Wildfire risk modeling and the use of GIS tools provide information to develop both regional and local CWPPs. Shifting from the *strategic* approach of regional risk assessment based on wildfire risk modeling to the *tactical* approach required at the local-level CWPP process introduces the need for more specific physical observations. An extensive discussion of this spectrum of assessment can be found in the Firewise Communities publication, *A New Look at Understanding Hazard Assessment Methodologies* in **Appendix D**. While that document focuses on the risk assessment methodology spectrum between HIZ, subdivision, and city, it also includes a detailed discussion about qualitative and quantitative assessments.

Qualitative assessments of wildfire risks are subjective in nature and provide an evaluation report that does not effectively support comparison between sites. This type of assessment is best suited for individual residents. The AFD has produced a *Home Ignition Zone Structure Assessment Guide* that is included in **Section 5.6.1** as an example of a qualitative assessment.

Quantitative assessments of wildfire risks are more objective and use rating systems that can be used to compare the wildfire risk between communities. The AFD has derived a quantitative assessment called the "Wildland Urban Interface Community Wildfire Hazard Assessment" that is included in **Section 5.6.1** as an example of a quantitative assessment. The assignment of numeric values to various conditions gives this format the capacity to determine relative risk when applied to comparable communities.

These are two of the many assessment formats that the local wildfire professional can choose from. As discussed in the Firewise Communities publication identified above, the target audience and local wildfire conditions will typically drive the selection of a risk assessment format. Both of the forms referenced in this subsection break down when applied on a regional scale, particularly when there are numerous ways to configure the myriad communities that function at different levels within a region. The determination of the plan area for a community pursuing a local-level CWPP is affected by a variety of factors and precludes region-wide relative risk calculations without an arbitrary imposition of community definition parameters and boundaries.

The plan area for this regional CWPP is based on enclosing all of the City of Austin city limits and the county lines encompassing Travis County. Local-level CWPPs that form around the edges of this plan area, or are sponsored by cities that cross the county line, should not be based solely on an area that does not take into account the local fire conditions, functional community, and other factors that need to be considered in a holistic wildfire risk mitigation effort. As a plan rather than a code, the CWPP may not carry the uniform enforcement or mitigation funding capacity of a regulatory jurisdiction across the plan area, but it can catalyze collaboration resulting in more effective implementation of wildfire mitigation strategies.

4.5 RISK ASSESSMENT SUMMARY

This risk assessment has presented a new wildfire risk database and model, including an initial risk assessment, and has then applied these tools to develop a planning-unit-based risk assessment with a relative risk ranking for the entire plan area. The objective has been to support wildfire mitigation planning functions at both the strategic level for countywide CWPP users and the strategic and tactical levels for local-level CWPP builders.

Regional leaders and wildfire mitigation managers can apply this risk assessment both proactively and responsively. Many proactive uses -- identifying high-risk areas and promoting the development of local-level CWPPs -- can be accomplished with the assessment tools provided in this section and are detailed further in **Section 6.0**. Responsive applications include cases wherein timing priorities must be established between locations that may be competing for the same mitigation resources. That is, limited biomass disposal capacity can be assigned based on the relative risk of the PU being served.

Developers of local-level CWPPs can use the applicable risk assessment information for a number of functions. The Planning Unit Exhibits contain information that will help determine the optimal extents of their plan area, help draft the risk assessment portion, guide the on-the-ground risk assessment process, and other functions detailed in **Section 6.0**. This risk assessment closes with additional discussion of some issues related to utilizing the Planning Unit Exhibit to determining the configuration of the community developing a CWPP.

The Planning Unit Exhibit map for the NW10 – Emma Long Park Planning Unit has been used to illustrate a few hypothetical CWPP plan areas. A few of the options could be detailed as follows:

- Option A – Develops a CWPP that springs from the existing River Place Firewise Community and expand it to envelop adjacent subdivisions.
- Option B – Works with the Long Canyon Firewise Community to prepare a CWPP that covers a high-risk area across FM 2222 -- in an adjacent PU -- and collaborate with other neighbors on the opposite side of a preserve area to coordinate fuel reduction along the preserve perimeters that simultaneously maximizes both preserve functions and potential wildfire mitigation.
- Option C – Illustrates a potential CWPP plan area that crosses a PU boundary to provide full coverage for several neighborhoods between SH 360 and Lake Austin.
- Another option – The blue line representing the limits of NW10 may be the best option if there is an adequate sense of place so that the CWPP feels “local” and gets sufficient buy-in from the landowners and managers to support implementation of the needed mitigation strategies.

Local constraints and opportunities will vary when configuring a local-area CWPP. And this variability precludes using a uniform definition for community. But using available wildfire risk assessment models and onsite risk confirmation are necessary for guiding the planning and implementation of mitigation strategies for fire-adapted communities.

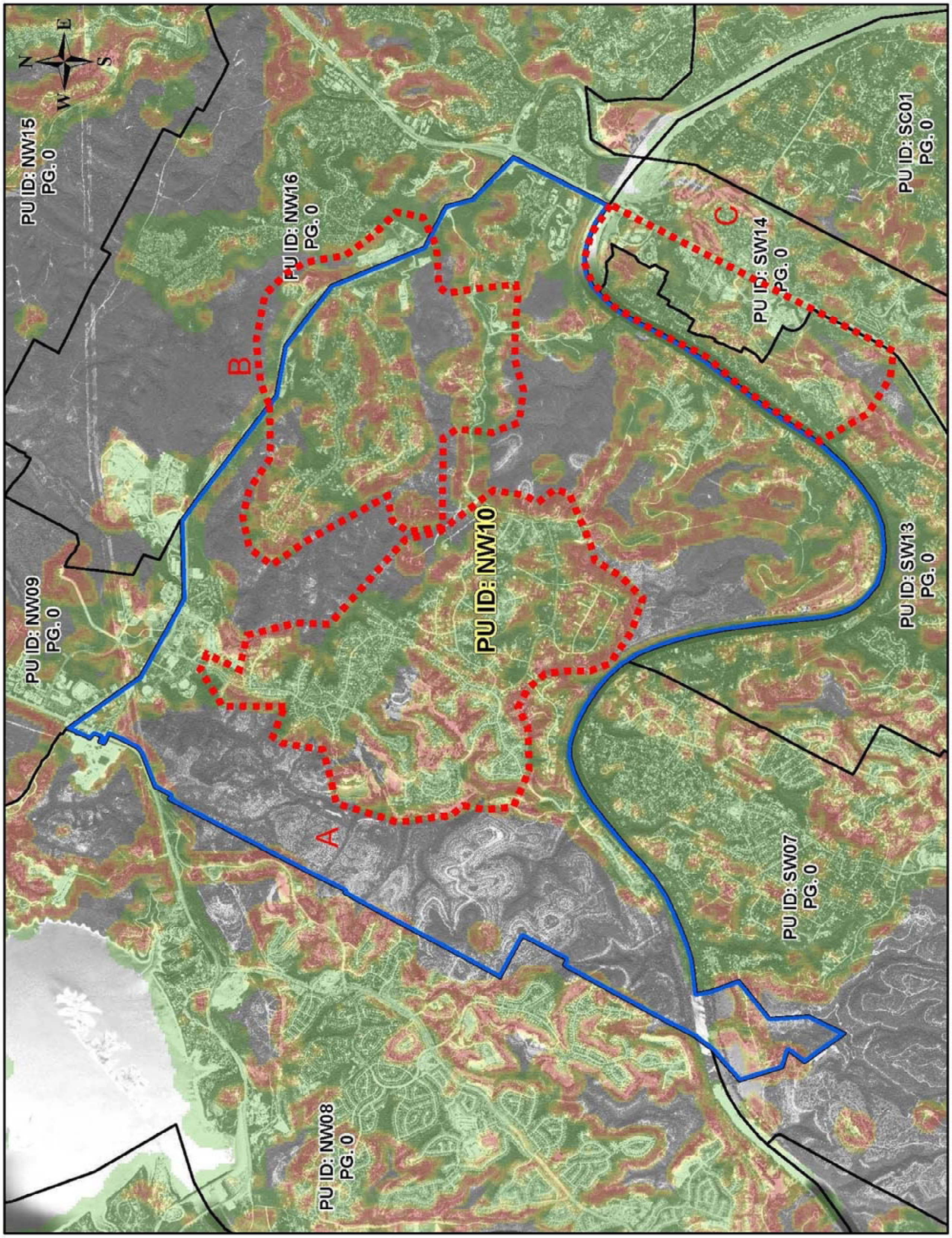


Figure 29. Hypothetical local level CWPPs with a Planning Unit.

The risk assessments presented in this section are just a few of the many assessment formats that can be developed using the database created by the Baylor team. Initially, the risk assessment tools prepared for this CWPP will only be available in hard copy. As this countywide CWPP moves through the various approval processes, electronic copies and the database will only be accessed through specific GIS teams at the City of Austin and Travis County. A plan is being formulated to provide a progression that increases access to the database that allows future sharing among planning staffs and fire professionals, ultimately culminating in a web based configuration open to the public, similar to TxWRAP. Until that time, contact your local fire department to obtain information on how to gain access to the database**.**

Sections 5.0 and **6.0** of this CWPP include additional information regarding the use of these assessment results in strategic and tactical planning for both selecting and implementing wildfire mitigation strategies. The level of detail in the data collected and the modeling methodologies used are scalable to accommodate numerous community configurations and assorted assessment queries. All of these elements have been designed to support the development and implementation of local-level CWPPs, which will form a patchwork quilt of fire-adapted communities across the plan area.