

APPENDIX B: EVALUATION METHODOLOGY

A. Economics

The economics evaluation of the alternatives was completed by Bay Area Economics.

1. Market Viability

Determination of market viability for a certain development requires a multifaceted evaluation. Primary considerations include whether the location is conducive to the allowed use and whether there is sufficient demand to support the allowed quantity of that use. When evaluating individual study areas, it is difficult in many cases to evaluate the potential demand for a given land use in isolation from the land uses planned in the remainder of the alternative. Again, because the Preferred Alternative is not likely to closely resemble any of the individual Land Use alternatives, this would not likely be a productive exercise. Rather, at this stage of the planning process, it is more useful to comment on general site suitability and market potential to support the land uses allowed in a given study area, under a given alternative. In this way, the market viability assessment flags specific study area and alternative combinations that are most dubious in terms of likely market viability, so that this can be considered in the process of developing the Preferred Alternative.

In several cases, the Market Viability discussion does offer an idea of how much and what kind of retail development might be viable under a particular alternative, based on prior BAE research on retail development throughout California. In general, a population of approximately 12,000 to 13,000 people (about 5,000 to about 8,000 households), is necessary to support a modern, local-serving shopping center, anchored by a large grocery store.

A smaller population of about 3,000 to 12,000 people (about 1,200 to about 5,000 households), would probably not be able to support a full-service grocery store, but could potentially support smaller-sized, local-serving retail. Service stations, convenience stores and fast food establishments will be the most likely types of retail provided. A small independent grocery store may

**BUTTE COUNTY GENERAL PLAN 2030
ALTERNATIVES EVALUATION
APPENDIX B: EVALUATION METHODOLOGY**

be viable in communities as small as 3,000 or fewer residents; however, such stores provide a very limited selection of products and typically do not offer pricing that is competitive with larger regional and national chain supermarkets. Consequently, residents in areas served by these types of stores typically use them for convenience shopping only and then make periodic trips to larger stores in nearby communities for “pantry loading” or to purchase specialty items.

Larger populations, of 20,000 to 50,000 people (about 8,000 households to about 20,000 households) could potentially support a wider range of retail. Community-serving retail, which can include things like clothing and soft goods, office supplies, some home improvements and household furnishings, as well as some specialty stores, requires this larger population to support it.

Alternatives that have strong potential to absorb all planned development within the General Plan time horizon were assigned an A. Alternatives that would likely experience solid demand for a substantial portion of the planned development, but which might not necessarily be able to absorb 100 percent during the General Plan time horizon were assigned a B. Alternatives that include at least one land use that has significant questions in terms of market viability were assigned a C. Alternatives for which there are significant market viability questions for the bulk of the planned development were assigned a D.

The criteria used for scoring alternatives in the summary table are as follows:

- A The alternative has strong potential to absorb all planned development within the General Plan time horizon.
- B The alternative would likely experience solid demand for a substantial portion of the planned development, but might not be able to absorb 100 percent during the General Plan time horizon.
- C The alternative includes at least one land use that has significant questions in terms of market viability.

- D There are significant questions about the market viability of the bulk of the planned development under the alternative.
- 0 The alternative does not include any development, so market viability is not an issue.

2. Fiscal Impacts

This section explains the methodology to evaluate the potential fiscal implications for the development specified in a given study area, for a given General Plan alternative. Specifically, the concern is what type of impact a given type of development may have on the condition of the County's General Fund. This is the fund that receives the County's discretionary revenues each year, and it is the fund from which the County allocates revenues to pay for key public services, such as law enforcement, fire protection, and general government services. Many other functions, such as roadway maintenance, social services, and public health services also receive General Fund support.

Because of the large number of study areas and the multiple General Plan alternatives under consideration, it is not practical to quantify fiscal impacts at this stage of the General Plan Update process. Additionally, because it is unlikely that any single General Plan alternative would be adopted intact as the Preferred General Plan alternative, it is not likely to be useful to attempt to quantify the fiscal impacts of any General Plan alternative as a whole. Rather, it is more useful at the alternatives evaluation stage to identify key fiscal considerations that arise with different types of development in different locations within the county, and then use these considerations to qualitatively evaluate the land uses specified for each study area, under each alternative, so that these issues may be incorporated into the decision-making process to develop the Preferred alternative.

Study area alternatives that have potential to generate fiscal surpluses are assigned an A or B. A study area alternative is assigned a C if it would have no significant fiscal impact (for example, due to lack of planned new development), or if it would be unlikely to generate significant surpluses or

deficits. Areas that are at risk of generating fiscal deficits are assigned a D. It is important to note that while this scoring process assumes only the County's existing revenue structure, the County may have options to implement fiscal mitigation measures to address potential adverse fiscal impacts for alternatives that are otherwise desirable.

Following are the primary factors considered for this analysis:

a. Property Tax Share

Property taxes collected from a given property within the unincorporated area are allocated among a long list of taxing agencies, including Butte County. The different mixture of taxing agencies that provides services to a given area plays a large role in determining the share of property taxes that each agency receives. Each area that has a unique mix of taxing entities is designated as a Tax Rate Area (TRA). Within the unincorporated area TRAs, the County's share ranges from a low of about 7.9 percent, to a high of about 20.6 percent, with an average of about 17.5 percent. This means that of the basic 1 percent ad valorem property tax levy, the County receives between 7.9 and 20.6 percent to provide services. As property taxes represent a major share of the County's overall General Fund revenues, it is significant if development would occur in a study area where the County receives an exceptionally low share of property taxes.

b. Cost of Service Provision

There are a number of factors that can affect the cost of providing services for a given development. These include geographic factors such as topography, roadway access, and proximity to other development that also receives services (i.e. economies of scale). Representatives of the Butte County Sheriff's and Fire Departments who were interviewed in conjunction with this analysis noted that because the communities in the eastern foothills, such as Cohasset, Forest Ranch, and Magalia are located along ridgelines in rugged

BUTTE COUNTY GENERAL PLAN 2030
ALTERNATIVES EVALUATION
APPENDIX B: EVALUATION METHODOLOGY

terrain, they are not very accessible, making it more difficult to serve them.¹ For example, while Cohasset and Forest Ranch are fairly close together as the crow flies, the lack of paved roads connecting the two communities means that effective service provision requires providing separate services for the two communities.

In addition, factors such as existing service capacity and service standards play an important role in determining service costs. For example, the Butte County Sheriff's and Fire Department representatives indicated that as areas become more densely populated and as a full range of community services and facilities are developed, the local population's expectations tend to shift from rural levels of service to more urban levels of service. Reduced law enforcement and fire response times equate to higher service costs. All other things being equal, if the County can focus growth in the unincorporated areas on locations where services can be expanded efficiently, without creating situations where service standards must be increased (increasing costs), the County will have better fiscal results.

Fire protection costs are a major part of the County General Fund budget, and they are very sensitive to the geographic location of fire stations, areas to be served, and the need for timely response in the event of emergencies. Thus, this analysis places a significant emphasis on evaluating the General Plan alternatives for different study areas in relation to established fire protection services. This evaluation draws on detailed analysis of existing fire protection service capacities within the county, conducted for the Butte County Fire Department in its Standards of Response Cover Study.² The analysis assumes that if planned new development is located within an eight-minute travel time of a full-time staffed fire station, that this will be an adequate service standard, since this is a service standard that is prevalent in

¹ Personal communication with Jerry Jones, Jerry Smith; Butte County Sheriff's Department; Henri Brachais, Butte County Fire, January 19, 2008.

² Citygate Associates, 2007. Standards of Response Cover Study for the Butte County Fire Department. November 30.

many developed parts of the unincorporated area at present. If this assumption holds true, then service costs could increase only incrementally with new development, while costs for new development planned outside of the eight-minute fire department travel time range are assumed to increase disproportionately, due to the need to establish new fire stations to provide adequate coverage.

c. Revenue Generating Potential

For a given development, revenue generating potential may vary depending on the value of the property in relation to other possible development types, or in relation to the same property type in different locations (i.e. real estate submarkets). Different types of land uses also generate different revenues. For example, retail land uses are well known for their fiscal attractiveness, since the local jurisdiction receives a significant portion of the sales tax generated by the stores. Similarly, hotels and other lodging places are often fiscally attractive, because they generate transient occupancy taxes, which are controlled by the local jurisdiction. Butte County levies a Transient Occupancy Tax of 6 percent for overnight stays in unincorporated area lodging establishments. A general assessment of the revenue generating potential of the land uses specified in each study area, under each alternative is provided to assist in identifying those uses that may have particularly attractive fiscal implications.

The criteria used for scoring alternatives in the summary table are as follows:

- A The alternative has a realistic potential to generate significant fiscal surpluses.
- B The alternative has a realistic potential to generate some fiscal surpluses.
- C The alternative would be unlikely to generate significant surpluses or deficits, either because the fiscal impacts of development under the alternative would be basically neutral, or because the alternative does not include any new development.

D The alternative is at risk of generating fiscal deficits.

0 Not assigned.

3. Jobs/Housing Balance

This section explains the methodology to quantify the jobs/housing balance for the different General Plan alternatives and their study areas. In essence, the jobs/housing balance analysis estimates the number of jobs that would be associated with the retail or industrial development planned for a given study area, and divides this figure by an estimate of the employed residents who would be housed in the planned housing stock in the same study area, to determine the jobs/housing balance ratio.

As of 2006, the California Employment Development Department (EDD) reported a jobs/employed residents ratio of 0.94 within Butte County overall, meaning that there were slightly fewer jobs than employed residents within the county.

Following are more detailed explanations of the methods and assumptions to calculate the jobs/housing ratios for the alternatives.

a. Population

The population of a given sub-area is a function of the number and type of housing units, the vacancy rate, and the estimated number of residents per housing unit, by housing unit type. DC&E provided the estimates of the number and type of housing units by study area, as summarized in Table I-1, in the Introduction.

i. Residential Vacancy Rates

BAE established the residential vacancy rate assumptions in line with industry standards that are representative of stabilized housing markets, where there is a reasonable balance between the supply of housing and the demand for housing, such that people seeking housing to purchase or rent have an adequate selection and availability while the supply is not so great as to create an over-supply that would create excessive competition between home sellers

or landlords to attract buyers or tenants. For single-family homes, the assumed vacancy rate is 2.0 percent, reflecting the fact that most of these homes will be owner-occupied and therefore, the turnover rate will likely be much lower than renter-occupied homes. For multi-family homes, the assumed vacancy rate is 5.0 percent, reflecting the higher turnover rates of apartments.

ii. Residential Population Density Factors

Population density factors are expressed as persons per occupied housing unit. BAE developed the factors based on a review of population and housing data for Butte County as a whole, from the U.S. Census' 2006 American Community Survey. The alternatives analysis uses average household size data for single-family detached and attached units to establish the assumption for single-family units included in the alternatives and uses data for households in housing units in structures containing five or more residential units to establish the assumption for multi-family units. The density factors are 2.70 persons per occupied single-family housing unit and 1.85 persons per occupied multi-family unit.

b. Jobs

The number of jobs in a given sub-area or alternative is a function of the square footage of commercial buildings (as estimated by DC&E), the estimated vacancy rate, and the estimated square feet of building space per employee, by land use category.

i. Non-Residential Vacancy Rates

BAE established the non-residential building vacancy rates based on an industry-standard 10 percent, for both retail and industrial buildings. This figure is commonly cited as a reasonable long-term average for healthy commercial real estate markets.

ii. Employment Density Factors

BAE established the employment density factors for retail and industrial land uses at 450 square feet per employee and 750 square feet per employee,

respectively. Similar employment density factors are commonly used for planning processes and reflect typical utilization of these building types. The industrial employment density factor reflects an assumption that the buildings would predominantly be used for light industrial activities.

c. Employed Residents

This analysis uses a calculation of the ratio of employed residents to jobs as an indicator of jobs/housing balance. Simply put, a numeric jobs/housing balance indicates that the number of local jobs is approximately equal to the number of employed residents. Achieving such a balance suggests that a community is providing employment opportunities at the same rate that it is providing housing opportunities, so that it does not create a situation where it must rely on either importing or exporting workers from/to other communities.

The number of employed residents is a function of the number of residents, the proportion of residents who are in the labor force (e.g. not too young to work, retired, or out of the labor force for some other reason), and the employment rate of those residents. In order to establish a ratio of employed residents to residents, BAE examined 2006 American Community Survey data for Butte County as a whole. From this information, BAE determined that approximately 44 percent of residents are employed.

d. Jobs/Employed Residents Ratio

The jobs/employed residents ratio is calculated by dividing the number of jobs by the number of employed residents. As suggested above, a ratio of 1.0 indicates an approximate balance between number of employed residents living in the housing provided in the plan and the number of jobs that would be located in the planned supply of commercial space. A ratio below 1.0 suggests a shortage of jobs for the local residents who are employed, indicating that some of the employed residents would need to commute to other communities (out-commuters) in order to obtain employment. A ratio greater than 1.0 suggests that there is an insufficient supply of employed residents in the local area to fill all available jobs, and local employers will

need to rely on importing workers (in-commuters) from other areas to fill their positions. Of course, there is never a perfect match between local jobs and local employed residents, so even with a 1.0 ratio, there will likely be cross-commuting; however, a reasonable jobs/employed residents ratio is a starting point for a balanced community.

The criteria used for scoring alternatives in the summary table are as follows:

- A The alternative provides a significant number of new jobs in an area that needs jobs, a significant number or new homes in an area that needs homes, or maintains the jobs/housing balance of an area that currently has a balance.
- B The alternative provides a small number of new jobs in an area that needs jobs or a small number of new homes in an area that needs homes.
- C The alternative would somewhat exacerbate an existing imbalance in either jobs or housing in a particular area; OR
The alternative would add imbalanced development to an area that is currently balanced.
- D The alternative would significantly exacerbate an existing imbalance in either jobs or housing in a particular area; OR
The alternative would add extremely imbalanced development to an area that is currently balanced.
- 0 The alternative does not include any development, so the jobs/housing balance is not an issue.

B. Public Services

1. Fire and Emergency Services

To evaluate the alternatives' impacts on fire and emergency services, DC&E reviewed the *Standards of Response Cover Study for the Butte County Fire Department*, which was prepared by Citygate Associates, LLC, in November

BUTTE COUNTY GENERAL PLAN 2030
ALTERNATIVES EVALUATION
APPENDIX B: EVALUATION METHODOLOGY

2007. This report provides background information about the Department's capacity, making the general finding that there is not adequate staffing to handle more than two serious fire events or several less-serious emergencies at once in Butte County. This report also includes a map atlas that displays the travel times and fire station concentrations for the county, and describes the appropriate travel times and station concentrations for various population densities:

- ◆ Rural areas (population density less than 500 people per square mile) should be within 10 to 14 minutes of at least one career-staffed fire station.
- ◆ Very low density areas (population density between 500 and 1,000 people per square mile) should be within eight minutes of at least one career-staffed fire station.
- ◆ Suburban areas (population density greater than 1,000 people per square mile) should be within four minutes of at least one career-staffed fire station (called the first-due unit) and within eight minutes of three or more career-staffed fire stations (called the effective response force).

Although these maps were not available in GIS form, DC&E estimated the location of the study areas relative to these maps to characterize the level of fire and emergency services in each study area. DC&E then determined the population densities of the residential land use categories by applying the average household size of 2.42 people from page 2-2 of the *Setting & Trends Report*. DC&E characterized Rural Residential as rural, Very Low Density Residential as very low density, and all remaining residential designations as suburban.

DC&E interviewed Butte County Fire Department (BCFD) Chief Henri Brachais and Division Chiefs Bob Wallen and Mike Santuccio on January 29, 2008. Chiefs Brachais, Wallen and Santuccio provided additional insight about the general capacity of the BCFD, as well as the appropriate service levels for retail and industrial development. Although these uses typically have limited hours during which fire and emergency services are needed, they

**BUTTE COUNTY GENERAL PLAN 2030
ALTERNATIVES EVALUATION
APPENDIX B: EVALUATION METHODOLOGY**

generally have high economic value and generate customers that depend on fire and emergency service. Therefore, high service levels are needed for this development type. DC&E equated the service level need for these uses to the suburban population density.

DC&E interviewed the El Medio Fire Protection District (EMFPD) Chief Rusty Olhausen on January 7, 2008 to discuss the capacity of EMFPD crews and equipment and current response times in the District, which encompasses the majority of Study Area 26, Las Plumas/Southside/Ophir Road. Chief Olhausen indicated that, although there were staffing shortages in the past, staff levels are adequate at this time due to budget increases associated with the casinos. He also indicated that their current response times to the southern end of their District (furthest from the station) are less than five minutes. However, they are considering the possibility of building a second station in that area, which would better serve the new growth planned there. In general, Chief Olhausen felt that growth would be beneficial to the EMFPD due to the associated funding increases and the removal of wildland fire threat, replaced with new homes that will be compliant with current fire codes.

DC&E also overlaid the fire stations data with the study areas in GIS in order to determine the proximity of the study area to the nearest fire station. DC&E measured the shortest distance to the nearest fire station in GIS; this measurement does not take into account actual road distances. The fire stations data was provided by the Butte County Department of Development Services.

DC&E developed a threshold level of development at which a new fire station could be funded based on the costs of providing fire services in other similar California counties. It is assumed that approximately 5,000 homes or 500 acres of retail and/or industrial uses could support a new fire station. This threshold is not based on any standard that is specific to Butte County, but is meant to provide a general guideline for this qualitative and broad brush evaluation.

The criteria used for scoring alternatives in the summary table are as follows:

- A The alternative allows a minimal amount of new development, all of which would have adequate fire and emergency service levels.
- B The alternative allows more than a minimal amount of new development, all of which would have adequate fire and emergency service levels; OR
The alternative allows a minimal amount of new development, a majority of which would have adequate service levels; OR
The alternative allows enough development to fund the construction and operation of a new fire station.
- C The alternative allows more than a minimal amount of new development, portions of which would not have adequate fire and emergency service levels; OR
The alternative allows a minimal amount of new development, all of which would not have adequate service levels.
- D The alternative allows more than a minimal amount of new development, the majority of which would not have adequate service levels.
- 0 There would be no new development under the alternative, so fire and emergency services are not an issue.

2. Sheriff Services

The focus of this evaluation is the Butte County Sheriff's Office (BCSO) and not other law enforcement entities, although there may be mutual aid agreements and state agencies that could jointly offer services. To evaluate the alternatives' impacts on sheriff services, DC&E interviewed Lieutenant John Kuhn of the BCSO on January 15, 2008. DC&E inquired about the capacity of BCSO staff and equipment relative to the identified study areas, the current police response times to reach the study areas, and general thoughts and concerns about the alternatives. Lieutenant Kuhn indicated

BUTTE COUNTY GENERAL PLAN 2030
ALTERNATIVES EVALUATION
APPENDIX B: EVALUATION METHODOLOGY

that, in general, the BCSO is currently understaffed and has limited capacity for the expansion of its services. He explained the typical geographic distribution and number of officers throughout the county, and provided input as to which study areas would experience longer response times due to poor access, driving times, and/or traffic conditions. Lieutenant Kuhn also explained that the higher density projects would likely require additional services due to the higher numbers and concentrations of people.

In a follow up email, Lieutenant Kuhn also explained that the State of California recommends that the County have a ratio of approximately 1.5 officers per 1,000 population. Butte County currently has a ratio of about 1.18 officers per 1,000 population. Using the average household size of 2.42 people from the *Setting and Trends Report*, DC&E determined that approximately 275 dwelling units would generate the need for a new officer.

The criteria used for scoring the alternative in the summary table are as follows:

- A The study area has quick response times and the alternative allows only minimal new development that would not generate the need to hire a new officer.
- B The study area has quick response times and the alternative allows development that would generate the need to hire between one and five new officers.
- C The study area has quick response times and the alternative allows development that would generate the need to hire six or more new officers; OR
The study area has slow response times and the alternative allows development that would generate the need to hire five or less new officers.
- D The study area has slow response times and the alternative allows development that would generate the need to hire six or more new officers.

- 0 There would be no new development under the alternative, so sheriff services are not an issue.

3. Capacity of School Districts

To evaluate the alternatives' impacts on school services, DC&E first developed a student generation rate that is consistent with the rate used by school districts in Butte County: 0.33 kindergarten through junior high school students per dwelling unit and 0.1616 high school students per dwelling unit. DC&E then contacted each of the 12 school districts in Butte County in which study areas are located to inquire of staff the capacity of the school district relative to the number of students that is expected to be generated under each alternative, and to discuss any plans to expand capacities. During the month of January 2008, DC&E interviewed every school district except for the Biggs Unified School District, which did not respond to the requests for information. DC&E instead used enrollment and expansion plan information from the *Setting & Trends Report* for this District.

DC&E also determined the average K-8 and high school sizes using 2006-2007 enrollment data for Butte County from Education Data Partnership.³ The average K-8 school size is 360 students and the average high school size is 980 students. These figures were used to guide determinations about whether an alternative would generate enough students to support a new school.

The criteria used for scoring individual alternatives in the summary table are as follows:

- A All of the students generated from the study area would be accommodated by the existing capacity of the school district(s) which serves the study area.
- B All of the students generated from the study area would be accommodated by the planned capacity of the school district(s) that serves the study area.

³ www.ed-data.k12.ca.us/welcome.asp accessed February 4, 2008.

- C There is no planned capacity for new students, but the study area would generate enough students to support the construction of new schools to accommodate those students.
- D The study area would generate more students than the existing or planned capacity of the school district(s) that serves the study area, but not enough students to support the construction of new schools.
- 0 There would be no new development under the alternative, so schools are not an issue.

C. *Water*

To evaluate the alternatives' impacts on water, DC&E worked with Paul Gosselin, Director of the Butte County Department of Water and Resource Conservation (BCDWRC), as well as the Department of Water Resources (DWR) Northern District Groundwater Section. This evaluation includes two main considerations: water supply and impacts to groundwater recharge.

1. **Water Supply**

The water supply evaluation considered the characteristics of the inventory unit and sub-unit in which the study area is located, as well as the water districts that would serve the study area or areas adjacent to them.

DC&E reviewed a map of water inventory units and sub-units relative to the study areas, as depicted in Figure 12-13 of the *Setting and Trends Report*. DC&E then characterized the units and sub-units using information provided in the *Water Inventory and Analysis Report* prepared by BCDWRC in 2001. This characterization includes a discussion of the principal water sources and needs.

DC&E also overlaid the study areas on a map of water provider districts using GIS, as shown in Figure 8 of this Report. The water district data was provided by Butte County. DC&E then characterized the districts that serve the study areas or areas adjacent to them using information provided in the

BUTTE COUNTY GENERAL PLAN 2030
ALTERNATIVES EVALUATION
APPENDIX B: EVALUATION METHODOLOGY

Water Inventory and Analysis Report prepared by BCDWRC in 2001, as well as the *Final Municipal Service Review for Domestic Water and Wastewater Service Providers* prepared by Butte LAFCO in June 2006. This characterization includes a discussion of the specific water sources and needs.

Alternatives that would not be served by a water supplier would likely rely instead on utilizing groundwater to meet water demands. Such an approach could impact existing groundwater users in the surrounding area. However, available groundwater data is considered to be incomplete, and many not fully represent the existing groundwater levels within and near each study area. Therefore, it is not possible to determine the extent of potential impacts a given alternative may have on other surrounding groundwater users.

The criteria used for scoring individual alternatives in the summary table are as follows:

- A The alternative allows development within the district or sphere of influence of a water provider (except in and around the City of Chico).
- B The alternative allows development that would be located near a water provider (except in and around the City of Chico).
- C The alternative allows development of less than 500 units or 50 acres of retail/industrial uses, and does not have an identified water supply; OR
The alternative allows development near the City of Chico, where there is a known cone of groundwater depression.
- D The alternative allows development of more than 500 units or 50 acres of retail/industrial uses, and does not have an identified water supply.
- 0 There would be no new development under the alternative, so water supply is not an issue.

2. Groundwater Recharge Potential

A major consideration in water resource management is the protection of groundwater recharge areas. Many variables can affect groundwater recharge. A core factor related to groundwater recharge is the type of soil that overlays

the aquifer. Utilizing the permeability values from countywide soil survey data is a common approach to preliminarily evaluate groundwater recharge potential at a regional scale. The National Resource Conservation Service (NRCS) has established maps for various soil types, which are relied upon for a general groundwater recharge appraisal. DWR is currently conducting a more refined analysis, and has begun the process of mapping potential recharge areas based on NRCS soil permeability and land surface slope data. Although this preliminary analysis is very limited due to the many other factors that can affect recharge, it provides a useful generalized indication of possible recharge potential throughout a study area.

Based on the soils permeability data, areas within the Valley and Foothill Inventory Units generally fall within the moderate to high range of groundwater recharge potential. Due to the steep terrain and limited soil cover within the Mountain Inventory Unit, soil permeability and slope analysis indicates this area to be less critical to groundwater recharge. However, further analysis of additional factors, such as geology, vegetation cover, rainfall, and run-off, could significantly alter the interpretation of localized recharge potential in mountain region areas.

The criteria used for scoring individual alternatives in the summary table are as follows:

- A There would be no new development under the alternative; OR
The alternative allows less than 500 new homes or 50 acres of retail/industrial uses in the Mountain Inventory Unit.
- B The alternative allows more than 500 new homes or 50 acres of retail/industrial uses in the Mountain Inventory Unit.
- C The alternative allows less than 500 new homes or 50 acres of retail/industrial uses in the Valley or Foothill Inventory Units.
- D The alternative allows more than 500 new homes or 50 acres of retail/industrial uses in the Valley or Foothill Inventory Units.
- 0 Not assigned.

D. Wastewater

To evaluate the alternatives' impacts on wastewater, DC&E first overlaid the study areas on a map of wastewater provider districts using GIS. The wastewater provider district data was provided by Butte County and Butte LAFCO. For each alternative, DC&E estimated the approximate percentage of development that would require on-site sewage disposal based on the map overlay of wastewater provider districts.

For areas not served by a wastewater service provider, it is important to note that the Butte County Departments of Public Health and Public Works presented a report to the Butte County Board of Supervisors in October of 2004 recommending that outside consulting services be used in the development of on-site wastewater policies and standards to address, at a minimum:

- ◆ Compliance with AB 885, On-Site Wastewater Treatment System Regulations, by the year 2009.
- ◆ Oversight of system operation, maintenance and replacement.
- ◆ Establishment of one or more regional sanitation districts.
- ◆ Cost recovery for program activities.

Engineering began in June of 2005 to perform this work. The Final Report was presented to and accepted by the Board of Supervisors on June 13, 2006, and staff presented a draft plan for implementation of the recommendations at the August 8, 2006 Board meeting. Implementation is taking the form of three distinct program development activities, including:

- ◆ Formation of a countywide Sanitation District.
- ◆ Development of an ordinance to wastewater ponds.

BUTTE COUNTY GENERAL PLAN 2030
ALTERNATIVES EVALUATION
APPENDIX B: EVALUATION METHODOLOGY

- ◆ Development of an ordinance and manual to regulate on-site wastewater systems.

Currently, County staff is working with the Board of Supervisors' Waste Subcommittee to identify the most appropriate structure of the countywide Sanitation District and to clarify remaining policy issues related to the On-Site Wastewater Ordinance and Manual, drafts of which are expected to be complete this month.

DC&E spoke with Ron Dykstra of the Central Valley Regional Water Quality Control Board (CVRWQB) on February 1, 2008, to obtain additional information regarding the CVRWQB review process for septic systems. Residential projects with two or more parcels connected to a community wastewater systems and commercial projects that generate more than 2,500 gallons of discharge per day, would require review by the CVRWQB.

Doug Fogel of the Butte County Department of Public Health, Environmental Health Division, provided additional information about the Nitrate Compliance Plan and Watershed Protection Zone requirements in an email to DC&E on January 30, 2008.

DC&E also reviewed the *Final Municipal Service Review for Domestic Water and Wastewater Service Providers*, which was prepared by Butte LAFCO in June 2006, for the wastewater providers that would serve the study areas or areas adjacent to them. This report provided information about the capacities and conditions of their systems, as well as any expansion plans.

DC&E then conducted follow-up phone calls and correspondence with wastewater providers as needed for additional information. This correspondence included a phone call with Pete Carr, Biggs City Manager, on March 7, 2008, and an email from Marc Sulik, Chico Wastewater Treatment Manager, on March 7, 2008.

**BUTTE COUNTY GENERAL PLAN 2030
ALTERNATIVES EVALUATION
APPENDIX B: EVALUATION METHODOLOGY**

Wastewater from new development in or near the City of Oroville, the Thermalito Irrigation District, or the Lake Oroville Area Public Utilities District, would ultimately be treated by the Sewerage Commission – Oroville Region (SC-OR). When evaluating alternatives for their potential wastewater impacts, DC&E relied on a letter dated January 17, from Ray Sousa, SC-OR General Manager, which states that SC-OR has already experienced at least one sanitary sewer overflow along the West Interceptor under wet-weather conditions. This means that SC-OR’s collection system is already at capacity during wet-weather flows for the area served by the West Interceptor, which includes the Thermalito Irrigation District and portions of the City of Oroville. While new development in SC-OR’s service area would be required to pay a connection fee, which would help fund needed improvements and expansions in SC-OR’s collection and treatment system, that new development would also potentially exacerbate an existing problem. In addition, SC-OR has indicated that their connection fee structure does not adequately cover the costs of providing sewer service to the new development. Therefore, any alternative that would allow urban development within or adjacent to the portion of the SC-OR service area that is served by the West Interceptor was assigned a C due to the capacity issues, and any alternative that would allow urban development within the portion of the SC-OR service area that is not served by the West Interceptor was assigned a B due to the connection fee structure issues.

For the purposes of this evaluation, DC&E assumed that residential densities of 1 du/ac or greater with at least 500 new homes, as well as retail and/or industrial development of 50 acres or more, can effectively be served by sewers, and creates the ability to expand adjacent sewer systems or to form a new sewer system. DC&E also assumed that residential densities of less than 1 du/ac with 100 homes or less can effectively be served by septic.

The criteria used for scoring individual alternatives in the summary table are as follows:

- A The alternative includes only urban levels of development that can be effectively served by sewers, adequate sewer capacity exists in the area,

and the connection fees adequately cover the costs of providing sewer service.

- B The alternative includes reasonably low levels of non-urban development that can effectively be served by septic; OR

The alternative includes only urban levels of development that can be effectively served by sewers, adequate sewer capacity exists in the area, but the connection fees do not adequately cover the costs of providing sewer service; OR

The alternative includes urban levels of development that can be effectively served by sewers, the developable area is adjacent to a sewer system with adequate capacity, and it appears that the development will create the ability to expand the sewer system; OR

The alternative includes urban levels of development that can be effectively served by sewers, and it appears that the development will create the ability to form a new sewer system.

- C The alternative includes urban levels of development that could conceivably be served by septic or package plants, but with difficulty; OR

The alternative includes urban levels of development that can be effectively served by sewers, the developable area is adjacent to a sewer system with adequate capacity, but the development may not create the ability to expand the sewer system;

The alternative includes urban levels of development that can be effectively served by sewers, the developable area is in or adjacent to a sewer system, but the system may not have sufficient capacity to serve additional development.

- D The alternative includes urban levels of development that cannot effectively be served by septic (because it is too numerous or dense), nor with a sewer system (because densities are too low or total numbers are too small).

- 0 There would be no new development under the alternative, so wastewater is not an issue.

E. Circulation

The circulation evaluation of the alternatives was completed by Fehr & Peers Associates.

This section describes the transportation subtopic area, alternatives evaluation scoring methodology, and use of the countywide (BCAG) travel demand forecasting (TDF) model to identify vehicle miles of travel (VMT) outcomes and roadway segment level of service (LOS) under the various alternatives.

Circulation issues in the study areas were evaluated in the following subtopic areas:

- ◆ LOS on roadway serving the study area
- ◆ Proximity to State highways or major roadway
- ◆ Bicycle facilities
- ◆ Transit service

Regional VMT and roadway LOS were calculated for each land use scenario for the entire county, not for each study area.

1. Alternative Evaluation Scoring Methodology

Each study area was evaluated using the following scoring method for all subtopic areas except VMT.

a. Proximity to Freeways and Major Roadways

This subtopic analyzes the proximity of a study area to a State highway or major roadway. The State highways or major roadway segments used in the analysis are shown in Table B-1. The scoring criteria is as follows:

- A The study area is located on or adjacent to a State highway or major roadway.

**BUTTE COUNTY GENERAL PLAN 2030
ALTERNATIVES EVALUATION
APPENDIX B: EVALUATION METHODOLOGY**

TABLE B-1 **BUTTE COUNTY GENERAL PLAN ROADWAY SEGMENTS
ANALYZED FOR LAND USE ALTERNATIVES EVALUATION**

Roadway	Segment
Highway 32	Muir Ave to East Ave
	East Ave to W. Sacramento Ave
	W. Sacramento Ave to W. 1st St
	W. 1st St W. 5th St
	W. 5th St 8th/9th/Walnut St
	8th St (One way WB), Walnut to Main
	9th St (One way EB), Walnut to Main
	8th St (WB), Main to Highway 99
	9th St (EB), Main St to Highway 99
	Highway 99 to Forest Ave
	Forest Ave to Humboldt Rd (Hog Springs)
Humboldt Rd (H.S.) to Robert E. Lee Dr. (F.R.)	
Highway 70	Yuba County Line to Lower Honcut Rd
	Lower Honcut Rd to East Gridley Rd
	East Gridley Rd to Palermo Rd
	Palermo Rd to Highway 162
	Highway 162 to Montgomery St
	Montgomery St to Grand Ave
	Grand Ave to Highway 149
	Highway 149 to Highway 191
	Highway 191 to Pentz Rd
	Pentz Rd to Big Bend Rd (Concow)
Highway 99	Sutter County line to Archer Ave
	Archer Ave to Spruce St (Gridley)
	Spruce St to East Biggs Hwy.
	East Biggs Hwy. Highway 162 (East)
	Highway 162 to (East) to Highway 149
	Highway 149 to Durham-Pentz Rd
	Durham-Pentz Rd to Skyway
	Skyway to East 20th St
East 20th to Highway 32	

**BUTTE COUNTY GENERAL PLAN 2030
ALTERNATIVES EVALUATION
APPENDIX B: EVALUATION METHODOLOGY**

**TABLE B-1 BUTTE COUNTY GENERAL PLAN ROADWAY SEGMENTS
ANALYZED FOR LAND USE ALTERNATIVES EVALUATION
(CONTINUED)**

Roadway	Segment
	Highway 32 to Cohasset Rd
	Cohasset Rd to East Ave
	East Ave to Eaton Rd
	Eaton Rd to Keefer Rd
Highway 149	Highway 70 to Highway 99
	Glenn County line to Highway 99 (south intersect)
	Highway 99 (north intersect) to Larkin Rd
	Larkin Rd to Highway 70
	Highway 70 to Feather River Blvd
Highway 162	Feather River Blvd to Lincoln Blvd
	Lincoln Blvd to Olive Hwy.
	Olive Hwy. to Lower Wyandotte Rd
	Lower Wyandotte Rd to Foothill Blvd
	Foothill Blvd to Canyon Dr.
	Canyon Dr. to Forbestown Rd
	Highway 70 to Durham-Pentz Rd
Highway 191	Durham-Pentz Rd to Airport Rd
	Airport Rd to Bushmann Rd
	Buschmann Rd to Pearson Rd
Aguas Frias Rd	Durham-Dayton Rd to Grainland Ave
	Grainland Ave to Highway 162
Biggs East Hwy.	Biggs to Highway 99
	Highway 99 to Larkin Rd
Clark Rd	Wagstaff Rd to Skyway
	Highway 99 to East Ave
	East Ave to Lupin Rd
Cohasset Rd	Lupin Rd to E. Lassen Ave
	Lassen Ave to Boeing Dr. (Chico M. Airport)
	Boeing Dr. to Keefer Rd
	Keefer Rd to Vilas Rd
	Colusa County line to Pennington Rd
Colusa Hwy.	Pennington Rd to Biggs Gridley Rd
	Biggs Gridley Rd to Highway 99

**BUTTE COUNTY GENERAL PLAN 2030
ALTERNATIVES EVALUATION
APPENDIX B: EVALUATION METHODOLOGY**

TABLE B-1 **BUTTE COUNTY GENERAL PLAN ROADWAY SEGMENTS
ANALYZED FOR LAND USE ALTERNATIVES EVALUATION
(CONTINUED)**

Roadway	Segment
Dayton Rd	Highway 32 to Hegan Lane
	Hegan Lane to Durham-Dayton Hwy.
Durham-Dayton Hwy.	Dayton Rd to Midway
	Midway to Stanford Lane
	Stanford Lane to Highway 99
Durham-Pentz Rd	Highway 99 to Highway 191
	Highway 191 to Pentz Rd
	Highway 32 to Cussick Ave
	Cussick Ave to Esplanade
East Ave- Manzanita Ave- Bruce Ave	Esplanade to Highway 99
	Highway 99 to Cohasset Rd
	Cohasset Rd to Floral Ave
	Floral Ave to Mariposa Ave
	Mariposa Ave to Marigold Ave
	Marigold Ave to Manzanita Ave
	East Ave to Vallombrosa Ave
East Gridley Rd	California Park Dr to Highway 32
	Highway 99 to Larkin Rd
Eaton Rd	Larkin Rd to Highway 70
	Esplanade to Highway 99
Esplanade	Highway 99 to Hicks Lane
	Hicks Lane to Cohasset Rd
	Highway 99 to Garner Lane
	Garner Lane to Eaton Rd
	Eaton Rd to Lassen Ave
Main St (NB) Broadway (SB) Park Ave	Lassen Ave to East Ave
	East Ave to Cohasset Rd
	Cohasset Rd to E. 9th Ave
	E. 9th Ave to E. 1st Ave
Main St (NB) Broadway (SB)	E. 1st Ave to Main St/Broadway
	Esplanade/E. 1st St to 9th St
Main St (NB) Broadway (SB)	Esplanade/E. 1st St to 9th St
	Esplanade/E. 1st St to 9th St
Park Ave	E. 9th St to 16th St

**BUTTE COUNTY GENERAL PLAN 2030
ALTERNATIVES EVALUATION
APPENDIX B: EVALUATION METHODOLOGY**

**TABLE B-1 BUTTE COUNTY GENERAL PLAN ROADWAY SEGMENTS
ANALYZED FOR LAND USE ALTERNATIVES EVALUATION
(CONTINUED)**

Roadway	Segment
	E. 16th St to E. 20th St
	E. 20th St to East Park Ave
E. Park Ave	Park Ave to Highway 99
Forbestown Rd	Highway 162 to Lumpkin Rd
Hegan Lane	Dayton Rd to S.P. Railroad tracks
	S.P. Railroad tracks to Midway
Honey Run Rd	Skyway to Centerville Rd
Centerville Rd	Honey Run Rd to Centerville Rd
	Centerville to Nimsheiw Rd
Nimsheiw Rd	Centerville to Skyway
	Highway 162 to E. Hamilton Rd
	E. Hamilton Rd to East Biggs Hwy
	East Biggs Hwy. to E. Gridley Hwy
Larkin Rd	E. Gridley Hwy. to E. Evans Reimer Rd
	Highway 162 to Marysville Baggett Rd
Lincoln Blvd	Marysville Baggett Rd to Monte Vista Ave
	Monte Vista Ave to Ophir Rd
	Ophir Rd to Palermo Rd
Lower Honcut Rd	Highway 70 to Palermo Honcut Hwy.
	Palermo Honcut Hwy. to LaPorte Rd
LaPorte Rd	Lower Honcut Rd to Oro-Bangor Hwy.
Lower Wyandotte Rd	Highway 162 to Oro-Bangor Hwy.
	Oro-Bangor Hwy. to Ophir Rd
Upper Palermo Rd	Ophir Rd to Palermo Rd
Palermo Honcut Hwy.	Palermo Rd to Lower Honcut Rd
Midway	East Park Ave to Hegan Lane
	Hegan Lane to Durham-Dayton Rd
Montgomery St	Highway 70 to Lincoln Blvd
	Lincoln Blvd to Table Mountain Blvd
Oroville-Bangor Hwy.	Lincoln Blvd to Lower Wyandotte Rd
	Lower Wyandotte Rd to Foothill Blvd
	Foothill Blvd to Swedes Flat Rd

**BUTTE COUNTY GENERAL PLAN 2030
ALTERNATIVES EVALUATION
APPENDIX B: EVALUATION METHODOLOGY**

**TABLE B-1 BUTTE COUNTY GENERAL PLAN ROADWAY SEGMENTS
ANALYZED FOR LAND USE ALTERNATIVES EVALUATION
(CONTINUED)**

Roadway	Segment
	Swedes Flat Rd
Palermo Rd	Upper Palermo Rd to Lincoln Blvd
	Lincoln Blvd to Lone Tree Rd
	Lone Tree Rd to Highway 70
Pentz Rd	Highway 70 to Messilla Valley Rd
	Messilla Valley Rd to Malibu Dr.
Skyway	Highway 99 to Notre Dame Blvd
	Notre Dame Blvd to Bruce Rd
	Bruce Rd to Honey Run Rd
	Honey Run Rd to Pearson Rd
	Pearson Rd to Bille Rd
	Bille Rd to Wagstaff Rd
	Wagstaff Rd to Clark Rd
	Clark Rd to Coutolenc Rd
	Coutolenc Rd to Nimshew
	Nimshew Rd to Lovelock Rd
Lovelock Rd to Powellton Rd	
Table Mountain Blvd	Montgomery St to County Center Dr.
	County Center Dr. to Highway 70

- B The study area is within ½ mile of a State highway or major roadway.
- C The study area is within 1 mile of a State highway or major roadway.
- D The study area is more than 1 mile of a State highway or major roadway.
- 0 There would be no new development under the alternative, so roadway proximity is not an issue.

b. Bicycle Circulation

This subtopic analyzes both a study area's proximity to an existing or proposed bicycle facility and proximity to an existing urban area (which would provide destinations for bicycle trips). The proximity to an urban area measure provides a differentiation between a study area on a recreational bike facility and those on a transportation bike facility. The bicycle facility locations were taken from the proposed bicycle facility improvements plan (September 6, 2007) and current bicycle master plans for the cities of Chico, Paradise, and Oroville.

- A The study area is on or adjacent to an existing or planned bicycle facility and is located within 1 mile of an existing urban area.
- B The study area is on or adjacent to an existing bike facility but located beyond 1 mile of an existing urban area; OR
The study area is on or adjacent to a planned bike facility and located within 1 mile of an existing urban area.
- C The study area is on or adjacent to a planned bike facility and beyond 1 mile of an existing urban area; OR
The study area is not on or adjacent to planned bicycle facility, but is within 1 mile of an existing urban area.
- D The study area is not on or adjacent to an existing or planned bike facility, and it is located more than 1 mile from an existing urban area.
- 0 There would be no new development under the alternative, so bicycle facilities are not an issue.

c. Transit Service

This subtopic analyzes transit service to the study area. Existing transit routes were used as the base for the analysis.⁴

⁴ BCAG – Blaine Transit, 2007.

- A The study area is located on or adjacent an existing transit route.
- B The study area is within $\frac{1}{4}$ mile of an existing transit route.
- C The study area is within $\frac{1}{2}$ mile of an existing transit route.
- D The study area is more than $\frac{1}{2}$ mile of an existing transit route.
- 0 There would be no new development under the alternative, so transit access is not an issue.

2. Roadway Level of Service Analysis Methodology

Establishing roadway level of service (LOS) allows transportation planners to evaluate traffic operating conditions and provides a basis for comparison of operating conditions. A roadway or street segment is assigned a LOS grade that corresponds to its quality of traffic operations. A LOS grade of “A” indicates high quality service; a LOS grade of “F” indicates low quality service.

Table B-2 below presents the characteristics associated with each LOS grade. As shown in the table, LOS “A”, “B” and “C” are considered satisfactory to most motorists, while LOS “D” is marginally acceptable. LOS “E” and “F” are associated with severe congestion and delay and are unacceptable to most motorists.

It is common in traffic engineering practice to design, maintain and improve street facilities in order to maintain level of service “C” or better, except in congested urban areas where this policy would be uneconomical. The policies of the cities of Chico, Oroville, and Paradise, Butte County, and Caltrans concur with this, though their evaluation criteria and degrees of “strictness” vary.

The LOS thresholds used in BCAG’s TDF model were developed based on methodologies described in the 2000 Highway Capacity Manual.

**BUTTE COUNTY GENERAL PLAN 2030
ALTERNATIVES EVALUATION
APPENDIX B: EVALUATION METHODOLOGY**

TABLE B-2 PEAK HOUR LEVEL OF SERVICE (LOS) DESCRIPTIONS

Level of Service	Traffic Flow Quality
A	Represents free flow. Individual users are virtually unaffected by others in the traffic stream. Control delay at signalized intersections is minimal.
B	Stable flow, but the presence of other users in the traffic stream begins to be noticeable. The ability to maneuver within the traffic stream is only slightly restricted, and control delays at signalized intersections are not significant.
C	Stable flow, but the beginning of the range of flow in which the operation of individual users becomes significantly affected by interactions with others in the traffic stream.
D	Represents high-density, but stable flow.
E	Represents operating conditions at or near capacity level.
F	Represents forced or breakdown flow.

Source: Highway Capacity Manual 2000. Transportation Research Board, Washington, D.C.

As discussed in Chapter IV, Fehr & Peers used the BCAG Butte County model to analyze year 2030 roadway segment operations under full buildout of each of the alternatives. They also used the model to forecast VMT for each of the alternatives. The roadway segment LOS analysis and VMT was completed for each of the three major land use scenarios on a countywide basis and not for each individual study area.

3. Developing the Travel Demand Model

As the three land use alternatives call for differing development intensities in the 31 designated growth areas throughout the county, Fehr & Peers selected the Butte County Association of Governments (BCAG) regional TDF model as the most appropriate analysis tool. The BCAG model includes base year (2000), interim year (2015), and cumulative year (2025) versions. Each version provides weekday AM peak hour, PM peak hour, and daily traffic volume forecasts.

a. Land Uses and Roadway Improvements Assumed in BCAG Model

Table B-3 shows the countywide land use totals assumed in the base year and cumulative year versions of the BCAG model. As shown in the table, the cumulative year model assumes a considerable increase in residential units, employment, and school enrollment in Butte County over the base year model.

Table B-3 shows the roadway improvements that are assumed to be complete by 2025 and which are included in the BCAG cumulative year model.

b. Model Adjustments

In order to analyze the three alternatives under consideration by Butte County, Fehr & Peers developed three versions of the cumulative year model, each with land uses reflecting one of the analyzed alternatives. To develop these versions of the model, Fehr & Peers identified the traffic analysis zones (TAZs) that are located in designated study areas. Land uses in these TAZs was scaled to match the level of development called for in the study areas under each alternative. For all TAZs located outside of study areas, the analysis assumed that base year land uses would continue.

The roadway improvements listed in Table B-4 were included for all alternatives. These improvements are based on the 2004 Butte County Association of Governments' Metropolitan Transportation Plan, as well as plans by local jurisdictions in Butte County.

Once the three versions of the cumulative year model were developed, Fehr & Peers used the model to predict relative differences in countywide VMT and roadway segment level of service.

TABLE B-3 **BUTTE COUNTY LAND USE TOTALS**

Model Year	Residential Units (DUs)	Retail (ksf)	Service (ksf)	Other (ksf)	School Enrollment (Students)
Base Year (2000)	84,974	17,313	31,707	31,583	33,342
Cumulative Year (2025)	130,936	25,286	41,792	57,110	44,570
Increase (2000 to 2025)	45,962	7,973	10,085	25,527	11,228

Source: Fehr & Peers, 2007.

4. Roadway Segment Analysis Methodology

To analyze year 2030 roadway segment operations under each of the alternatives, Fehr & Peers used a process called “the difference method”⁵ to develop the 2030 traffic volume forecasts. This method adds the difference between cumulative year and base year traffic model forecasts to existing counts on study roadway segments.

Since the count data collected for this evaluation reflects 2007 volumes on study roadway segments, Fehr & Peers scaled the base year (2000) model volumes to more closely match the count data. The difference between these scaled base year model volumes and the 2030 volumes predicted by each version of the cumulative year network was then added to the count data to develop the year 2030 traffic volume forecasts for each of the three land use alternatives.

In order to determine operations for study roadway segments in 2030 under each land use alternative, Fehr & Peers calculated the volume-to-capacity ratio for each roadway segment using roadway capacities assumed in the cumulative year model and the traffic volumes forecasted for each alternative.

⁵ Transportation Research Board, 1982, National Cooperative Highway Research Program 255.

**BUTTE COUNTY GENERAL PLAN 2030
ALTERNATIVES EVALUATION
APPENDIX B: EVALUATION METHODOLOGY**

TABLE B-4 **BCAG 2025 MODEL ASSUMED REGIONAL CAPACITY
ENHANCING PROJECTS**

Roadway	Segment	Project Description
Bruce Rd	Skyway to Highway 32	Widen to four lanes
Bruce Rd	Highway 32 to California Park Dr	Widen to four lanes
Buschmann Rd	Foster Rd to Skyway	Extension, two Lanes
Clark Rd	Wagstaff to Skyway	Widen to four lanes
Cohasset Rd	Sycamore Creek to Boeing Ave	Widen to four lanes
Eaton Rd	Highway 32 to Highway 99	Construct two-lane expressway
East Ave	Highway 32 to Esplanade	Widen to four lanes
East Ave	Ceanothus Ave to Manzanita/Eaton/East Intersection	Widen to four lanes
Eaton Rd	Hicks Ln to Cohasset Rd	Widen to four lanes
Eaton Rd	Wildwood Dr to Cohasset Rd	Widen to four lanes
Esplanade	Aspen Glen Subdivision to Eaton Rd	Widen to four lanes
Floral Ave	Eaton Rd to East Ave	Widen to four lanes
Forest Ave	Humboldt Rd to Highway 32	Widen to four lanes
Manzanita Ave	East Eaton/Manzanita Interchange to California Park Dr	Widen to four lanes
Notre Dame Blvd	Humboldt Rd to 20th St	Extension, two lanes
Silver Dollar Way	Whitman Ave to Fair St	Construct new two-lane roadway
Skyway	Bille Rd to Pentz Rd	Widen to four lanes
Skyway	Pentz Rd to South Park Dr	Widen to four lanes
Highway 149	Highway 99 to Highway 70	Widen to four lanes
Highway 162	Oro-Dam Blvd to Foothill Blvd	Widen to four lanes

BUTTE COUNTY GENERAL PLAN 2030
ALTERNATIVES EVALUATION
APPENDIX B: EVALUATION METHODOLOGY

Roadway	Segment	Project Description
Highway 70	Highway 162 to Ophir Rd	Widen to four-lane expressway
Highway 99	At E. Park Ave/ Skyway Interchange	Widen overcrossing to four lanes
Table Mountain Blvd	Montgomery Ave to Grand Ave	Widen to four lanes

Source: BCAG, 2003, Fehr & Peers, 2007.

F. Airport Compatibility Zone Conflicts

To evaluate the alternatives' airport compatibility, DC&E overlaid the study areas on a map of the Airport Land Use Compatibility Zones using GIS. The Airport Compatibility Zone data was provided by Butte County. DC&E referred to the Table 2A, Primary Compatibility Criteria, of the 2001 *Airport Land Use Compatibility Plan* (ALUCP) to determine whether allowed land uses would be compatible.

The criteria used for scoring individual alternatives in the summary table are as follows:

- A Study area is located within Airport Land Use Compatibility Zones, and land uses would be consistent with the Airport Land Use Compatibility Plan; OR
Study area is not located within an Airport Land Use Compatibility Zone.
- C Study area is located within Airport Land Use Compatibility Zones, and a portion of the alternative would not be consistent with the Airport Land Use Compatibility Plan.
- D Study area is located within Airport Land Use Compatibility Zones, and the entire alternative would not be consistent with the Airport Land Use Compatibility Plan.
- 0 Not assigned.

G. Potential Loss of Agricultural Land

The potential loss of agricultural land analysis was performed using GIS software. A GIS map was produced by intersecting two data layers, the 2004 Butte County farmland layer and the study areas layer. The farmland layer was developed by the California Department of Conservation, Farmland Mapping and Monitoring Program.

Three types of farmland were incorporated in this study, including Prime Farmland, Farmland of Statewide Importance and Grazing Land. To determine the potential loss of agricultural land, Agriculture and Resource Conservation land use designations were directed onto land in one of the three farmland categories. Under either the Agriculture or Resource Conservation designation, these acres of agricultural land would be preserved from urban uses. Remaining acres of farmland that were not designated for Agriculture or Resource Conservation were determined to be converted to non-agricultural uses.

The criteria used for scoring individual alternatives in the summary table were determined by the number of acres and class of farmland converted to be non-agricultural uses. Prime Farmland and Farmland of Statewide Importance is most suited for crop production. Furthermore, there is less of this farmland class than there is of Grazing Land in Butte County. For these reasons, the criteria established different thresholds for these farmland classes.

The criteria also consider the existing North Chico Specific Plan (NCSP). The NCSP's primary purpose is to provide for a mixed-use development plan in an area where there are existing agricultural resources. The Environmental Impact Report that was prepared for the NCSP accounted for the loss in agricultural land. Although the alternatives in this area would result in the loss of agricultural land, the existing policies have already accounted for this loss. Therefore, significant loss of agricultural land in this area would result in a C.

BUTTE COUNTY GENERAL PLAN 2030
ALTERNATIVES EVALUATION
APPENDIX B: EVALUATION METHODOLOGY

The Chico Area Greenline is also an important policy consideration. This policy defines the limits of future urban development which may occur on agricultural lands in the Chico area, and it specifically affects the Bell Muir study area. The existing Chico Area Greenline policy establishes different requirements for adjusting the Greenline around the Bell Muir study area so that it is on the urban side of the Greenline. The Board of Supervisors may make this change for the Bell Muir area by a simple majority vote without the necessary findings typically required to change the Greenline location. The Chico Area Greenline was not used as a determining factor in the analysis.

The criteria used for scoring individual alternatives in the summary table are as follows:

- A The study area is located outside of an important farmland area; OR
The alternative does not include any development.
- B There is important farmland within or adjacent to the study area, but development would avoid the important farmland.
- C The alternative would allow 1 to 49 acres of Prime Farmland and/or Farmland of Statewide Significance to be developed, or would allow 1 to 99 acres of Grazing Land to be developed; OR
The alternative would allow the conversion of Prime Farmland, Farmland of Statewide Significance or Grazing Land within the North Chico Specific Plan area, which has been identified as a development area.
- D The alternative would allow 50 or more acres of Prime Farmland and/or Farmland of Statewide Significance to be developed, or would allow 100 or more acres of Grazing Land to be developed.
- 0 Not assigned.

H. Biological Resources

The biological resources evaluation of the alternatives was completed by Jones & Stokes Associates.

This report assesses the potential effects of development allowed under three alternatives for 31 study areas on biological resources; these resources were considered under four sub-topics: special-status plants and animals, sensitive habitats, Critical Habitat and other protected lands, and deer herd habitat. Information from a variety of sources (described below) was compiled within a GIS system for review and analysis.

This report examines occurrences and potential habitat for special-status species and includes an inventory of land cover types, protected lands, sensitive habitats, deer herd habitat, and natural resources throughout Butte County.

1. Special-Status Plants and Animals

Special-status species include plants and animals legally protected under State and Federal Endangered Species Acts, or other regulations, as well as those considered sufficiently rare by the scientific community.

- ◆ For the purpose of this report, special-status species are defined as plants and animals that are legally protected under federal and California Endangered Species Acts (ESA and CESA) or other regulations, and species that are considered sufficiently rare by the scientific community to qualify for such listing.

The following sources of information were reviewed to obtain information on the special-status plants and animal that could be affected by development under the alternatives:

BUTTE COUNTY GENERAL PLAN 2030
ALTERNATIVES EVALUATION
APPENDIX B: EVALUATION METHODOLOGY

- ◆ California Natural Diversity Database for Butte County (updated November 2007);⁶ and
- ◆ California Native Plant Society's Inventory of Rare and Endangered Plants of California.⁷

For the western portion of the County within the Butte Regional Conservation Plan (HCP/NCCP 2007, www.buttehcp.com). Modeled Habitat data was available for 34 species (the data models were based on known occurrences of special-status species, land cover maps, and Critical Habitat). The purpose of the models is to identify areas within the planning area where the species occurs or could occur based on known habitat requirements. The Modeled Habitat data maps can be viewed at www.buttehcp.com.

For the eastern portion of the County outside the HCP area, information on potential habitats for special-status species was obtained from:

- ◆ February 2008 Field visits by Jones and Stokes biologists.
- ◆ Butte County General Plan Land Cover maps (ref).
- ◆ Aerial photographs in Google Earth.

The data sources reviewed revealed that 71 special-status animal species and 103 special-status plant species are known to occur in Butte County. Chapter 13 of the *Setting and Trends Report* contains a complete list of these species.

⁶ California Natural Diversity Database (CNDDDB), 2007. RareFind, Version 3.1.0 (November 4, 2007 update). Sacramento, CA: California Department of Fish and Game.

⁷ California Native Plant Society, 2007. Inventory of Rare and Endangered Plants (online edition, v7-07d, 10-18-07). California Native Plant Society. Sacramento, CA. Available: <http://www.cnps.org/inventory>. Accessed January, 2008.

2. Critical Habitat and Other Protected Lands

GIS data showing the boundaries of Critical Habitat and other protected lands was obtained from the Butte County General Plan, Butte County HCP, and U.S. Fish and Wildlife Services' website at www.criticalhabitat.fws.gov.

Critical Habitat and Other Protected Lands comprised:

- ◆ Critical Habitat – In Butte County, Critical Habitat has been designated for:
 - California red-legged frog.
 - Vernal pool species (vernal pool fairy shrimp, vernal pool tadpole shrimp, Conservancy fairy shrimp, and Butte County meadow).
 - Anadromous fish (Central Valley spring run chinook, Central Valley Fall/Late-Fall Run Chinook, and Central Valley steelhead).
- ◆ Recovery areas: the Vernal Pool Core Recovery Areas.
- ◆ Designated wildlife areas, parks, easements, and preserves.
- ◆ State and federal lands (e.g. BLM, USFS).

3. Deer Herd Habitat

There are three migratory herds in Butte County: East Tehama, Mooretown and Bucks Mountain. Under the contract for Butte County General Plan 2030, the County coordinated an analysis, *Technical Study and GIS Model for Land Use within the Migratory Deer Range*, prepared by Gallaway Consulting, Inc. with the Department of Fish and Game to address migratory deer herd ranges in Butte County. The objectives of the analysis are as follows: 1) develop a data ranking system for identification of intermediate, winter and critical winter range habitats; 2) develop a GIS model to update the intermediate, winter and crucial winter range maps; 3) assess values to individual parcels based on their relation to deer habitats and suitability; 4) summarize the data inputs, techniques, and use of the data, and 5) develop a GIS model that can be updated as new scientific data becomes available. GIS data showing the boundaries of the deer herd habitat areas were obtained from Gallaway Consulting Inc. as prepared for the Butte County General Plan and are used in this analysis.

Changes to the winter ranges and to a lesser extent intermediate ranges have a high level impact on the deer herds, since food and refuge from winter weather is scarce and winter ranges tend to be smaller than summer ranges. The Galloway analysis focuses on the habitats in which even minute amounts of alteration or destruction can have significant consequences on deer herd habitat suitability.

4. Alternatives Ranking

It should be noted that the data sources used for this analysis are general, and the development areas under consideration in the alternatives are also only generally identified. Therefore, this analysis is broad – further analysis would need to occur on a parcel-specific basis before exact conflicts could be identified. Moreover, it may be possible to avoid effects to special-status species in any given area by carefully siting development to avoid sensitive resources, or by complying with adopted mitigation protocols.

The potential effects of development on each biological resource sub-topic under each alternative were scored using a 5-point scale. See below for an explanation of scores by sub-topic.

Special-Status Plants and Animals

- A The study area has no known occurrences of special-status species.
- B There are special-status species in the study area, but development could be configured to avoid all known occurrences of special-status species.
- C Development would occur in an area with potential habitat for special-status species, and likely could not be configured to avoid that potential habitat; OR
Agriculture or resource conservation uses would occur in an area with known occurrences of special-status species.

D Development would occur in an area with known occurrences of special-status species.

0 Not assigned.

Critical Habitat and Other Protected Lands

A The study area does not include Critical Habitat or other protected lands.

B The study area includes Critical Habitat or other protected lands, but development would preserve all existing Critical Habitat or other protected lands.

C Development would occur on a small amount of Critical Habitat or other protected lands; OR
Agriculture or resource conservation uses would occur on Critical Habitat or other protected lands.

D Development would occur on a substantial amount of Critical Habitat or other protected lands.

0 Not assigned.

Sensitive Habitat

A The study area does not include sensitive habitat.

B The study area includes areas of sensitive habitat, but development would preserve all sensitive habitats.

C Development would occur on a small area of sensitive habitats; OR
Agriculture or resource conservation uses would occur on sensitive habitat areas.

D Development would occur on a substantial area of sensitive habitats.

0 Not assigned.

Deer Herd Habitat

- A The study area does not include any deer range habitat, OR
The alternative allows only non-timber agricultural uses.
- B The study area includes areas of deer range habitat, but development
would preserve all deer range habitat.
- C Development, timber operations, or resource conservation uses would
occur on Intermediate or Winter Range deer habitat.
- D Development, timber operations, or resource conservation uses would
occur on Critical Winter Range deer habitat.
- 0 Not assigned.

I. Safety and Hazards

1. Fire Hazards

The “Fire Hazard” analysis was performed using GIS software. A GIS map was produced by intersecting two data layers, the fire severity and the study areas layers. The fire severity layer was developed by CALFIRE and was most recently updated in 2007.

This analysis included two fire severity classes, high fire severity and very high fire severity. The intersect tool in GIS was used to determine how many acres of land that would be developed were located in areas of high or very high fire severity. This analysis assumed that to the extent possible, land that would be developed was located in areas not constrained by potential fire hazards.

The criteria used for scoring individual alternatives in the summary table were determined by the number of acres in high or very high fire severity. The criteria were implemented as follows:

- A The study area is located outside of a high or very high fire hazard area;
OR
The alternative does not include any development.
- B The study area includes a high or very high fire hazard area, but development would avoid the fire hazard area.
- C The alternative would allow 1 to 24 acres of development in a very high fire severity area, or 1 to 49 acres of development in a high fire severity area.
- D The alternative would allow 25 or more acres of development in a very high fire severity area, or 50 or more acres of development in a high fire severity area.
- 0 Not assigned.

2. Flood Hazards

The “Flood Hazard” analysis was performed using GIS software. A GIS map was produced by intersecting two data layers, the FEMA flood and the study areas layers. The FEMA flood layer was obtained from the Butte County GIS department.

This analysis included 500-year and 100-year flood plains. The intersect tool in GIS was used to determine how many acres of land that would be developed were located in 500- or 100-year flood plains. This analysis assumed that to the extent possible, land that would be developed was directed to areas not constrained by potential flooding.

The criteria used for scoring individual alternatives in the summary table were determined by the number of acres in 500- or 100-year floodplains. The criteria were implemented as follows:

- A The study area is outside of a FEMA floodplain; OR
The alternative does not include any development.

- B The study area includes a FEMA floodplain, but development would avoid the floodplain.
- C The alternative would allow 1 to 24 acres of development in a 100-year floodplain, or 1 to 49 acres of development in a 500-year floodplain.
- D The alternative would allow 25 or more acres of development in a 100-year floodplain, or 50 or more acres of development in 100-year and 500-year floodplains.
- 0 Not assigned.

3. Geologic Hazards

The “Geologic Hazard” analysis was based on six geologic-type factors, including potential hazards from landslide, erosion, subsidence, expansive soils, faults and liquefaction. The “Geologic Hazard” analysis was performed using GIS software. A GIS map was produced by intersecting each of the geologic factors and the study areas layers. The landslide, subsidence, faults and liquefaction data are based on the Butte county General Plan Seismic Safety Element and Safety Element. The data on erosion and expansive soils was obtained from Questa Engineering in 2008 based on recent soils mapping completed by the Natural Resources Conservation Service.

For this analysis, the intersect tool in GIS was used to determine how many acres of land that would be developed were located in areas of geologic hazard. This analysis assumed that to the extent possible, land that would be developed was located in areas not constrained by geologic hazards. Geologic hazard areas were defined in two ways, very high geologic constraint areas and high geologic constraint areas. Very high geologic constraint areas consist of high landslide, very severe erosion, subsidence and/or very high potential for expansive soils. High geologic constraint areas consist of moderate to high landslide potential, severe erosion potential, subsidence and/or high potential for expansive soils. Additionally, areas within 50 feet of a fault line were also considered.

The criteria used for scoring individual alternatives in the summary table were dependent on all six factors mentioned above. The criteria were implemented as follows:

- A The study area is outside of a geologic hazard area;; OR
The alternative does not include any development.
- B The study area includes a geologic hazard area, but development would avoid it; OR
The alternative would allow development on or near a Pre-Quaternary fault. (Pre-Quaternary faults do not show any evidence of displacement in the last 1.6 million years and therefore are not considered to present a high risk of fault rupture.)
- C The alternative would allow 1 to 99 acres of development in a very highly constrained geologic hazard area, or 1 to 199 acres of development in a highly constrained geologic hazard area.
- D The alternative would allow 100 or more acres of development in a very highly constrained geologic hazard area, 200 or more acres of development in a highly constrained geologic hazard area, or any development on or near the Cleveland Hills fault.
- 0 Not assigned.

J. Cultural Resources

The cultural resources evaluation of the alternatives was completed by Jones & Stokes Associates.

The methodology employed to assess effects of the land use alternatives on cultural resources included four components. First, a count was obtained of all known cultural resources sites in each of the study areas. Second, research was conducted to characterize those geographical features in Butte County that are sensitive for the presence of cultural resources. Third, each study area was given a cultural resources sensitivity rating of low, medium, or high.

**BUTTE COUNTY GENERAL PLAN 2030
ALTERNATIVES EVALUATION
APPENDIX B: EVALUATION METHODOLOGY**

Finally the potential effects of the land use alternatives to cultural resources in each planning area were considered.

Jones & Stokes archaeologists and historians examined records of previously recorded sites in Butte County, obtained from the California Historical Resources Information System (CHRIS) Northeast Information Center (NEIC) at California State University, Chico. All site records for each study area were examined and organized by period, site type, and eligibility for listing in the California Register of Historical Resources or the National Register of Historical Resources. Information received from the NEIC regarding the amount of previous cultural resources surveys conducted in each USGS Topographic quadrangle was also noted.

Landscape characteristics in each of the study areas were also examined. As previous research in Butte County shows, prehistoric sites tend to be located above flood plains, along river terraces, and in foothill and mountain areas that provide suitable habitat for plant and animal resources. Therefore, those study areas on the valley floor have a lower potential to contain prehistoric cultural resources than foothill areas or areas near water features. Areas with the potential to possess historic period cultural resources were identified by examining documents that record or describe the locations of historic period sites, including those pertaining to historic settlement, industry, and transportation.

Jones & Stokes archaeologists and historians then assigned each study area a rating of low, medium, or high sensitivity, depending on the number of previously recorded sites in a study area relative to the size of the study area, the amount of previous cultural resources surveys completed in each topographic quadrangle in Butte County, and the landscape characteristics of each study area.

The amount and characteristics of allowed land uses in each of the Alternatives 1, 2, and 3 were compared to the level of cultural resources sensitivity assigned to each study area, resulting in a final assessment of each

BUTTE COUNTY GENERAL PLAN 2030
ALTERNATIVES EVALUATION
APPENDIX B: EVALUATION METHODOLOGY

alternative on cultural resources in each study area. The methodology assumes that in study areas sensitive for cultural resources, and that contain Resource Conservation land use designations, that concentrations of significant cultural resources would be placed in Resource Conservation land use areas for protection.

The following criteria were used in order to assign the score for each alternative:

- A The alternative includes only Resource Conservation uses; OR
The alternative includes only an agriculture designation that would likely be used for grazing, which has little impacts on cultural resources.
- B The alternative includes only rural residential or very low density residential development, which could likely be configured to avoid impacts to cultural resources; OR
The alternative includes only an agriculture designation that would likely be used for timber, which can be harvested in a way that avoids impacts to cultural resources, OR
The alternative includes development or agricultural cultivation in:
◆ Up to 30 percent of a medium-sensitivity area
◆ Up to 50 percent of a low-sensitivity area
- C The alternative includes development or agricultural cultivation in:
◆ Up to 50 percent of a high-sensitivity area
◆ 31 to 60 percent of a medium-sensitivity area
◆ 51 to 70 percent of a low-sensitivity area
- D The alternative includes development or agricultural cultivation in:
◆ Over 50 percent of a high-sensitivity area
◆ Over 60 percent of a medium-sensitivity area
◆ Over 70 percent of a low-sensitivity area
- 0 Not assigned.