Final

Fiscal Impact Analysis of Future Growth Scenarios, Beaverhead County, Montana

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Delivered to Beaverhead County Commissioners
and Planning Commission January 1, 2007.

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Executive Summary

Key Findings:
Status quo scenario is 46% more expensive for roads and bridges and 14% more expensive for law enforcement than the alternative scenario

Alternative scenario saves $5.5 million in one-time capital improvements costs.

Alternative scenario saves $300k annually, equivalent to a countywide property tax of 19 mills.

Dillon Fire District operates at 44% higher annual expenses in status quo than in alternative scenario.

Amenity-driven, dispersed rural development patterns underway throughout the Northern Rockies is expensive to serve with basic government services. In Beaverhead County, MT, more compact development patterns in the future could save money by reducing the amount driving and reducing infrastructure costs. Laying and maintaining infrastructure for traffic, enforcing traffic laws, and responding to accidents is expensive, but can be made less expensive. By focusing development closer to existing communities and near main arteries of the transportation network, and allowing limited densities in prime agricultural land, Beaverhead County and its fire districts would save millions of dollars.

Sonoran Institute's Growth Model

In 2005-06, Sonoran Institute's Northern Rockies office produced a GIS growth model that imitates the amenity-driven residential growth patterns that have evolved over the years in rural, amenity-rich areas throughout the West.

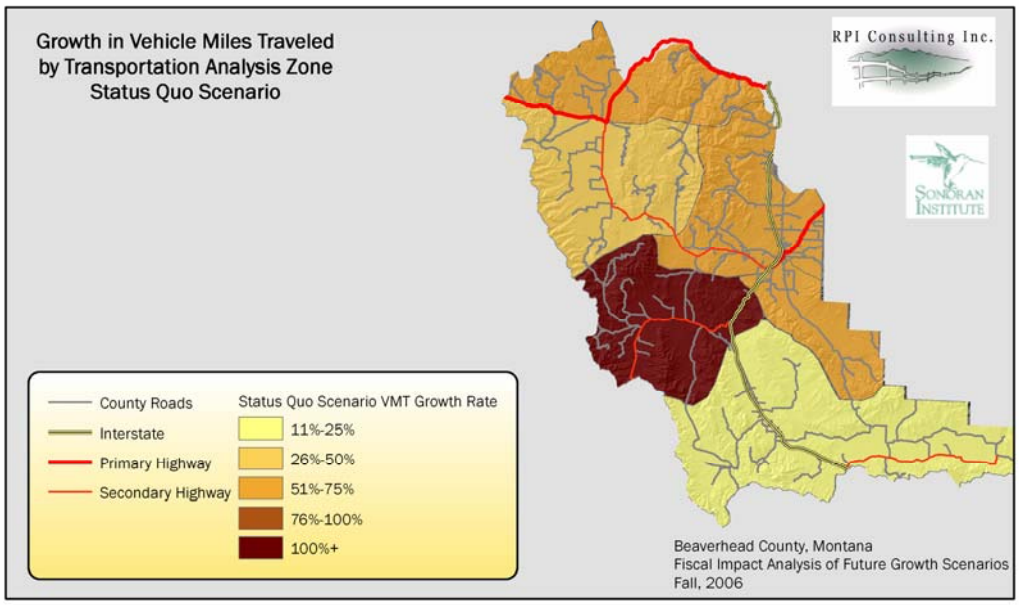
Recognizing that Beaverhead County, Montana could experience the next wave of rural residential development occurring in neighboring counties, county officials became interested in seeing how growth patterns play out.

Sonoran Institute (SI) ran the *status quo scenario* GIS model in Beaverhead County to see what it would look like if the development patterns underway continue into the future. To visualize and evaluate development patterns in a prime agricultural land conservation scenario, SI worked with county officials to create an *alternative scenario* that limits residential densities in prime agricultural areas.

Development Patterns and Traffic

This spatially dynamic analysis evaluates the fiscal implications on county government and fire districts of the *status quo*

Map 1

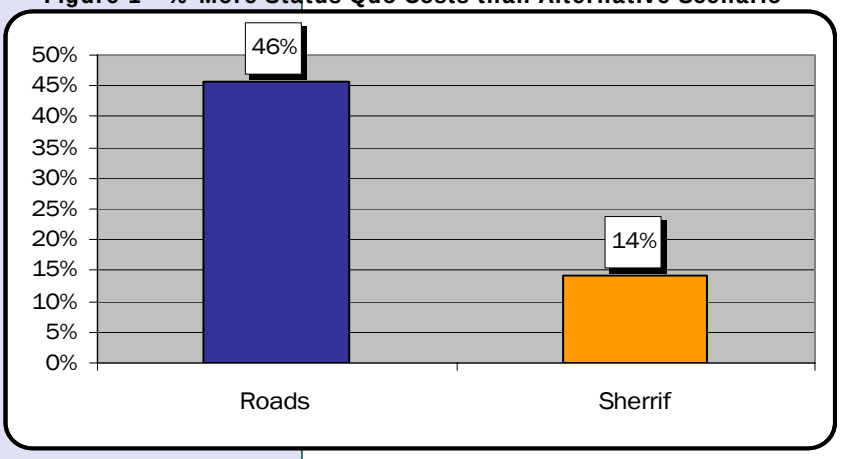


Roads that were built to handle agricultural traffic evolve into residential collector roads.

scenario (development patterns underway continue) and the *alternative scenarios* (reduced development in prime agricultural land).

The alternative scenario concentrates more future residential development near existing communities and generally closer to the arterial transportation network, with fewer new homes out in the rural-most reaches of the county road network.

Figure 1—% More Status Quo Costs than Alternative Scenario



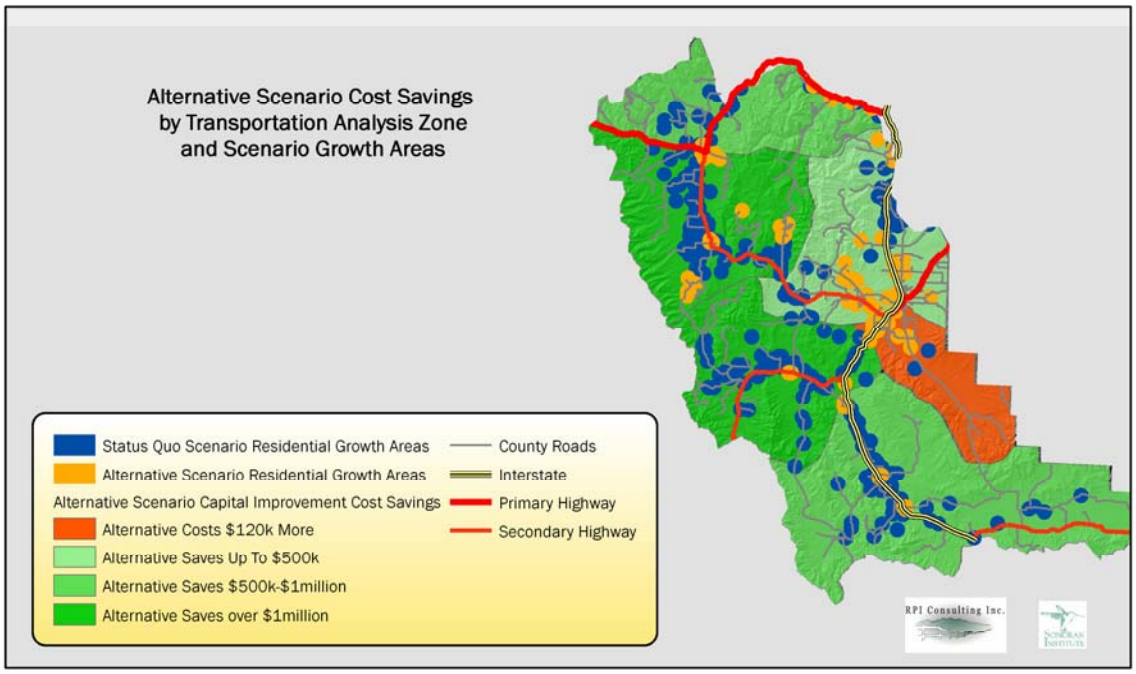
To evaluate the different implications of each scenario on the demand for transportation related services and infrastructure, RPI Analysts developed a custom GIS *county travel demand model* designed specifically to quantify the amount of driving based on the location and spatial distribution of future development in Beaverhead County (measured in vehicle miles traveled).

The results of the county travel demand model show that the status quo development pattern, which tends towards more rural subdivisions, especially near water and other natural amenities, results in longer drives, more vehicle miles traveled (VMT) on county roads.

Development Scenarios and County Costs

As agricultural lands are converted to residential areas, roads that were built to handle agricultural traffic evolve into residential collector roads. Every additional mile a vehicle travels on a daily

Map 2



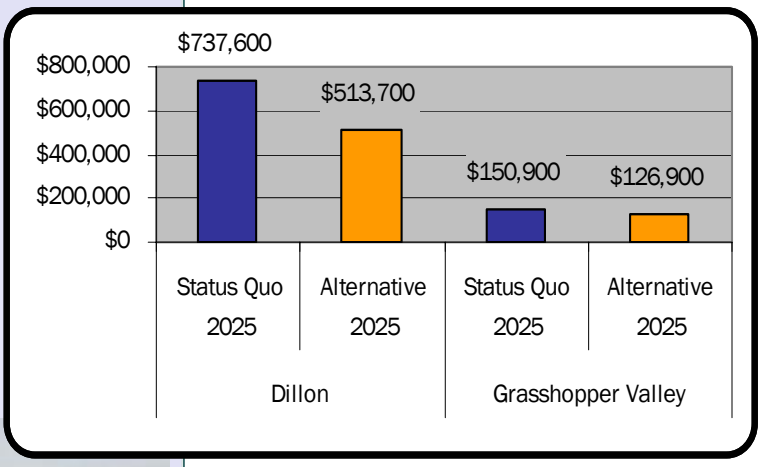
The alternative scenario saves the annual equivalent of a countywide 19 mills property tax.

basis adds to the expense of maintaining and improving county roads as well as enforcing traffic laws on those roads and responding to accidents.

Application of the results of the travel demand model in a dynamic fiscal impact analysis revealed that the status quo scenario costs 46% more than the alternative scenario for roads and 14% more for law enforcement. These cost differences hold for both annual costs and one-time capital investment costs. The lower difference for law enforcement reflects the fact that most of the sheriff department workload is not traffic related.

The alternative scenario saves the county about $5.5 million in capital facilities investments and capital improvement costs for the road and sheriff departments over the course of the next two decades and over $300k annually in operations and maintenance cost. This is roughly equivalent to a 19 mills countywide property tax according to the latest countywide assessed valuation.

Figure 2– Fire District Capital Expenditures by Scenario



There is no mistaking that widespread rural subdivisions cost more money to serve than a more compact development patterns focusing growth in and near communities and closer to the state highway system. More driving means more expense.

Scenarios and Fire/EMS Costs

Fire districts are also affected by additional driving. Rural districts usually respond to vehicle accidents and other road related fires or emergencies and provide ambulance service.

Since the county travel demand model was designed to count vehicle miles traveled on both county and state roads, it accounted for the increased traffic on highways (where most traffic incidents occur) and estimated associated vehicle miles traveled for the two future land use scenarios.

Over $200k savings in capital facilities result from less vehicle miles traveled in the alternative scenario while operations and maintenance costs are 44% higher for fire protection in the status quo scenario.

Other Implications

The lower vehicle miles traveled in the alternative scenario could also save a household earning the Montana median household income a week's pay in extra fuel costs each year.

Countywide, over 4,000 gallons of gas and diesel would be saved every day by developing according to the alternative scenario, ultimately preventing 14,000 tons of CO_2 annually from entering our atmosphere.

By reducing the distances traveled and time behind the wheel, more compact development patterns can save county and fire/EMS protection districts money. Not only do counties and fire districts save, but residents save money at the pump as well. Ultimately, fuel consumption and greenhouse gas emissions are less.

Introduction

Linking Future Land Use Scenarios with Fiscal Impact Analysis

By looking at historic census counts geographically, the model 'learns' how development patterns occur.

The analysis project summarized in this report set out to find answers to two research questions:

Generally, how do rural land use patterns affect costs of providing basic public services?

More specifically, how would future outcomes of an agricultural land conservation policy affect costs in Beaverhead County, Montana?

Urban planning departments have been modeling future land use patterns since the 1970s. Early modeling efforts were typically focused on specific proposals, that is, they would demonstrate how land use patterns would look if an area were suburban residential versus more mixed density residential, commercial, or industrial land uses. When Geographic Information Systems (GIS) were applied to modeling land use patterns during the land development boom of the 1990s, modeling efforts began to encompass enough factors to yield intuitive, useful results.

As growth pressures continued to mount in the West and GIS technology was integrated into planning departments and universities, efforts to model the outcomes of past and current land use trends into the future began.

One of the earliest efforts in Colorado, conducted by principals at Rock Creek Studios, Carbondale, Colorado, used 'measle mapping' techniques to imitate past development patterns to spatially distribute projected future populations in the Aspen, Carbondale, Glenwood Springs area.

More recently, the Center of the American West's *Western Futures* Program[1] added sophistication to the modeling process and increased the scale to the entire West. By looking at a geodatabase of historic census counts, the model 'learns' how development patterns occur. Future growth projections are then dumped into the model and it distributes the population across private lands according to past tendencies. In this way, the model encompasses the complexity of preferences driving past waves of settlement and development and projects it into future development patterns.

The alternative scenario, based on maintaining productivity of prime agricultural land, presents a more compact development pattern.

The Spatially Dynamic Fiscal Impact Analysis summarized in this report is based on future growth patterns developed by the Sonoran Institute's growth model. Sonoran Institute's (SI) growth model contains innovations not possessed by other rural residential development pattern models, most importantly, it identifies and statistically incorporates known *drivers* of growth into the modeling process. Some of the key factors include:

- Proximity to water and other natural resource amenities
- Transportation and other infrastructure
- Proximity to high amenity communities
- Location of existing development.

While the model geographically distributes future development based on the identified drivers (*status quo scenario*), it also allows for integration of alternative futures based on any number of potential land use policies such as zoning, agricultural preservation, clustering or other significant factors influencing future land use patterns (*alternative scenario*).

As represented in Map 3 (pg. 10), the alternative scenario, based on maintaining productivity of prime agricultural land, presents a more compact development pattern, with more growth closer to the highways and communities and less growth out in the rural agricultural areas of the county.

Fiscal Impact Analysis

While efforts to model future development patterns in the rural West have been underway for some time now, evaluating the fiscal implications of future rural development patterns is only just beginning.

This analysis treads new ground by spatially evaluating the fiscal implications of future land use scenarios on Beaverhead County's year to year operations and maintenance costs and capital investment needs.

Evaluation of impacts of future scenarios requires the establishment of the *level of service*. A simple analogy serves to illustrate the concept. Suppose that you entered a restaurant with a small kitchen, two tables, and two waiters; you sit at one of the tables and begin dinner. You would expect, given the ratio of waiters to tables, that the service be good.

Consider entering the same restaurant a week later, with the same kitchen and the same two waiters, to discover that they have added one hundred additional tables and that the restaurant is packed with people. Certainly, after having been seated, you would expect a significantly decreased level of service from the two waiters.

The same happens with provision of government services and infrastructure. If new growth is not accounted for in law enforcement, roads, fire, health, sewer and a host of other services while population is being added, we should expect to see a decrease in our overall level of service. Meaning, that perhaps we hit more potholes, it takes a year to get on

Model Comparison Sources:

http://www.centerwest.org/futures/western_futures_final_draft.pdf

[2] Project by Patty Gude, with contributions from Dr. Ray Rasker and Dr. Andrew Hansen see http://www.sonoran.org/programs/socioeconomics/yellowstone_data/

Level of Service is a measuring stick from which the community can decide to increase, decrease or maintain the quality of its public services.

the agenda for a land use item, meeting rooms are crowded, or that our water use is limited to certain times of day.

Level of service also allows the community to see where it stands in relation to other communities or even against national standards. It is a measuring stick from which the community can decide to increase, decrease, or maintain the quality of its existing services.

Providing road infrastructure is one of the top expenses for rural county governments. General wear and tear on the roads system, the attendant maintenance requirements, and the need for expanding the capacity and safety of the system both accompany increased traffic.

Meanwhile, county law enforcement workload is directly affected by the increased need for traffic enforcement and so is the local emergency management system.

As evident in Map 3 (pg. 10), the alternative scenario, based on maintaining productivity of prime agricultural land, presents a more compact development pattern, with more growth closer to the highways and communities and less growth out in the rural agricultural areas of the county. As described in detail further on in the report the more dispersed development pattern suggested by the status quo scenario results in more driving, and increases county costs.

Other county services are centralized, such as administration, planning, and health services. These departments are also affected by growth in housing units, but not tangibly affected by spatial distribution of those housing units.

The analysis mirrors this functional division in county departments, those affected by traffic are included in the dynamic analysis, those unaffected are contained in the centrally located services analysis.

Report Organization

This report has five main components:

Residential Growth and Traffic: In this section projected housing unit growth is summarized and a GIS-based travel demand model is used to simulate the amount of driving on county roads associated with each future land use scenario.

Dynamic Fiscal Analysis of *Roads Department and Law Enforcement:* This section makes the link between the amount of driving associated with each scenario and the costs to the Road and Bridge and Sheriff Departments.

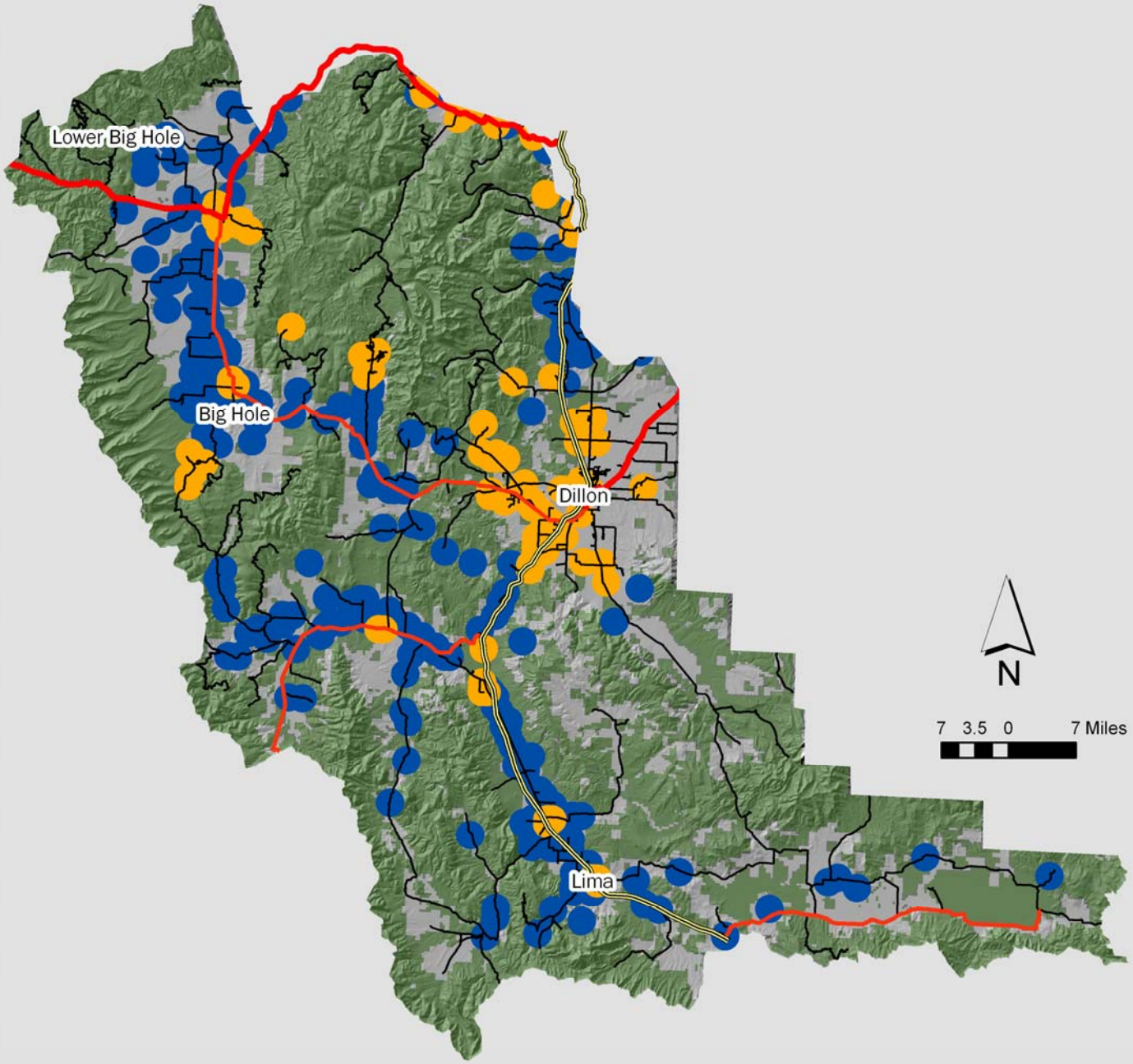
Fiscal Impact Analysis of *Centrally Located County Departments:* Levels of service for all remaining county departments are established and costs of maintaining those service levels given the projected housing unit growth of the future land use scenarios.

Fire District Dynamic Fiscal Impact Analysis: Two fire districts were included in this comprehensive evaluation of the implications of the scenarios on provision of fire protection and associated EMS.

Vehicle Fuel Use, Expenditures, and Emissions: This final step links future land use patterns to gasoline consumption, consumer spending, and associated emissions.

Map 3

Future Growth Areas in the Status Quo and Alternative Scenarios



Alternative Scenario Residential Growth Areas
Status Quo Scenario Residential Growth Areas
Public Land
Private Land
County Roads
Interstate
Primary Highway
Secondary Highway

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Residential Growth and Traffic

The more vehicle miles traveled a roads system has to support, the more it will cost to maintain the current level of service.

Existing-Projected Residential

Growth projections suggest that new development in the unincorporated Beaverhead County will be predominantly residential. Additional demand on county services and facilities results from this increase in residential land uses. Assessor records show that in the past decade, the unincorporated portions of the county, including Wisdom and the areas around Lima only accounted for about one square foot of developed non-residential floor area out of every 10 square feet county-wide.

Figure 3 - Current and Projected Housing Units

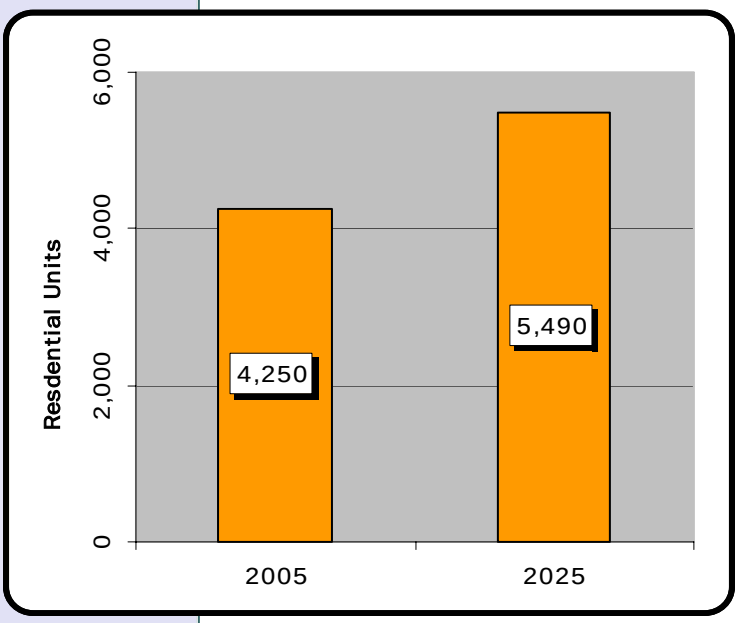


Figure 3 Sources: U.S. Census, Sonoran Institute's Growth Model

Thus non-residential development is a minor component of the total growth.

Both the status quo and alternative scenarios project 1,240 new residential units over the next 20 years, entirely located in the currently unincorporated portions on the county. The incorporated portions of Dillon account for nearly half the residential units in the county, while the unincorporated areas around Dillon, together with the city itself comprise the bulk of the dwelling units in Beaverhead County.

Existing-Projected Traffic

Increased traffic is one of the most noticeable effects of growth. New land uses cause new traffic. When someone builds a home on a vacant residential lot, additional traffic is generated by that home's residents, whether they are full or part-time. Incremental increases in residential land uses in turn leads to an incremental increases in traffic.

Increased traffic is a result of increased driving. The most accurate way to measure the amount of driving occurring is to calculate the *Vehicle Miles Traveled*. The more vehicle miles traveled a road system has to support, the more it will cost to maintain the current level of service.

Vehicle Miles Traveled (VMT) directly relates to demand for road operations, maintenance, and capital improvements. While some natural forces contribute to road maintenance (water and erosion damage, etc.), driving is the prime reason for road degradation over time.

In addition to increased road costs, increased driving in the county will create the need for additional traffic enforcement to keep up with existing service levels.

For the most part, off-the-shelf transportation models are designed for urban transportation systems and are extremely data intensive. Therefore, RPI teamed with Animas Geographic Services to produce a custom county travel demand model. Creating the county travel demand model (using ESRI products) involved 2 programming components and the use of *Network Analyst*.

The traffic model calculates the length of trip on county and/or state roads needed to get to the nearest highway .

Travel Demand Model Data & Methodology

GIS Data

Beaverhead County GIS base data

Montana NRIS Library: http://nris.mt.gov/gis/

Montana Department of Transportation: transportation addressing system

USGS DEM for Beaverhead County: http://seamless.usgs.gov/

Sonoran Institute: 2005 existing conditions, Status Quo, and Alternative Scenarios quarter-section shape files

Methodology

1. Set-up: Assembled data into geodatabase and made manual fixes to the road layer where necessary
2. Programming: Quarter section existing, status quo, and alternative housing unit projections (and their daily trips) were associated with nearest road.

   Programming Rules:

   Traffic from housing units initially accesses county roads if closer than Forest/BLM roads, but traffic will access state highways or interstate frontage roads if closer than county or Forest/BLM roads.

   Traffic initially accessing USFS/BLM roads accesses state highways if within 1/2 mile of a state highway or interstate.

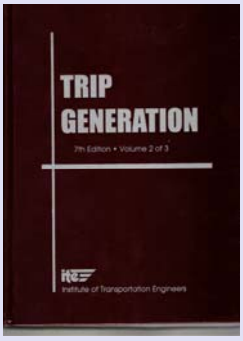
3. Network Analyst: Routes created along road network to nearest interstate Exit or Municipality.

   Programming Rules:

   Traffic from housing units finds its way to the nearest interstate exit, unless the City of Dillon is closer. The assumption is that destinations are accessed in municipalities or via the interstate. The direction vehicles go once they reach the highway is not as important, for this analysis, as the amount of driving on county roads, which is largely unaffected by the direction vehicles turn when they reach the highway.

4. Programming: Routes were spatially associated with roads, allowing direct application of road data to roads. This also allowed analysts to differentiate between the length of travel on county roads vs. travel on state highways.
5. Mathematics: The key result from the analysis process is that it calculates the length of trip on county and/or state roads needed to get to the nearest highway, and onto the nearest exit or municipality. Based on 350 traffic studies summarized in the Institute of Transportation Engineers *Trip Generation 7th Edition,* single family dwelling units produce a daily average of 9.57 trips (in + out).

   Thus VMT per quarter section = (quarter section trip length) X (average daily trips)



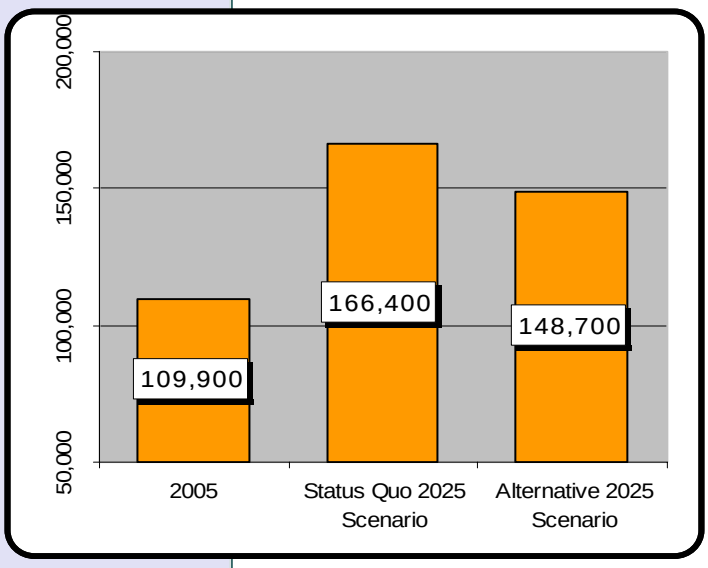
The status quo scenario results in 46% more driving associated with future residential units than the more compact alternative scenario.

Numeric Results

Placing the 1240 future residential dwellings according to the development patterns in the status quo and alternative scenarios results in a status quo increase of 51% vehicle miles traveled and a 35% increase for the more compact alternative scenario (Figure 5).

The status quo scenario results in 46% more growth in driving associated with future residential units than the more compact alternative scenario.

Figure 4 - Vehicle Miles Traveled by Scenario



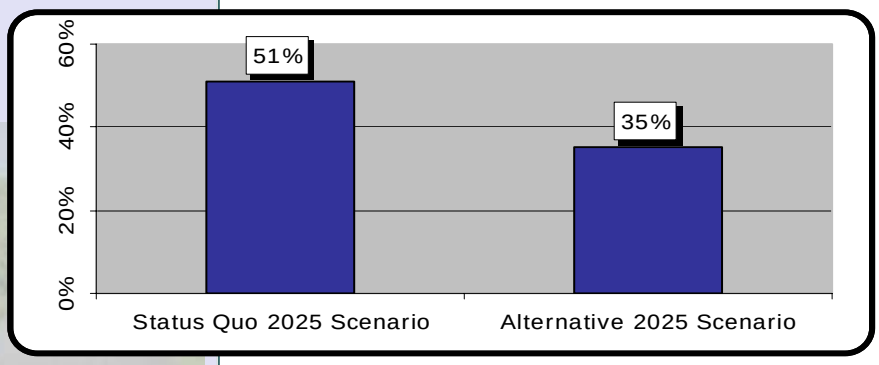
Geographic Results

Maps 4 and 5 show the growth in Vehicle Miles Traveled by Transportation Analysis Zone (TAZ). TAZ boundaries were generated in several iterations between the Beaverhead County Road and Bridge Director and RPI analysts. They were delineated based on the human and physical geographic features that influence travel behavior.

A glance at each map shows that vehicle miles traveled on county roads is significantly higher in the status quo development pattern (see pg. 14) vs. the amount of driving in the alternative development pattern (see pg. 15). This is particularly true for the more remote portions of the county's northern half, in Big Hole, and the Horse Prairie TAZs. The legend colors on the two maps are consistent, allowing comparison of the two.

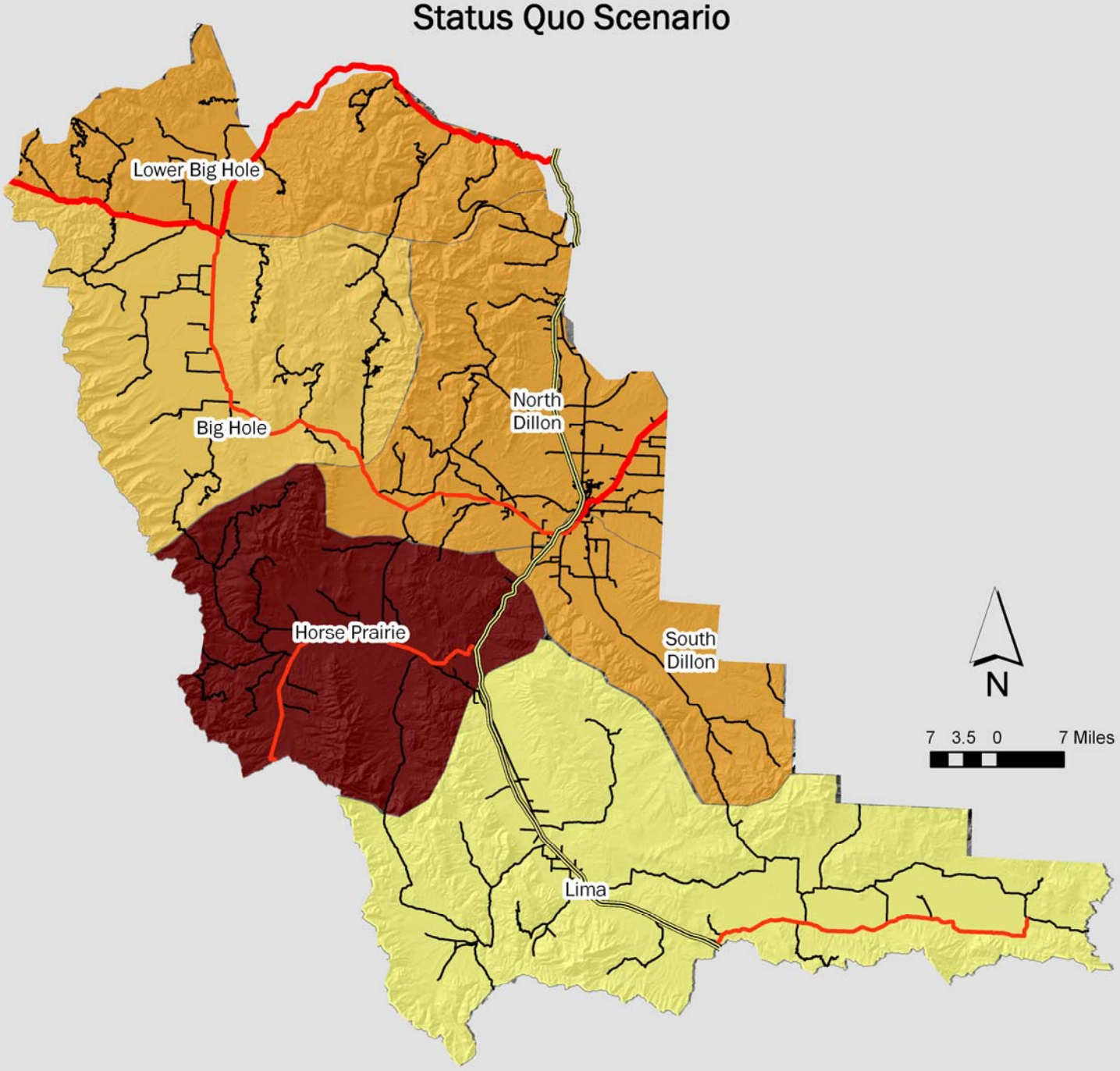
The status quo scenario produces significant increases in vehicle miles traveled in the Horse Prairie and Big Hole TAZs. Not surprisingly the alternative scenario, which projects future development in concentrated areas and around Dillon, produces more vehicle miles in the TAZs surrounding Dillon.

Figure 5 - Percent Growth in Vehicle Miles Traveled by Alternative Base Year 2005



Map 4

Growth in Vehicle Miles Traveled by Transportation Analysis Zone Status Quo Scenario



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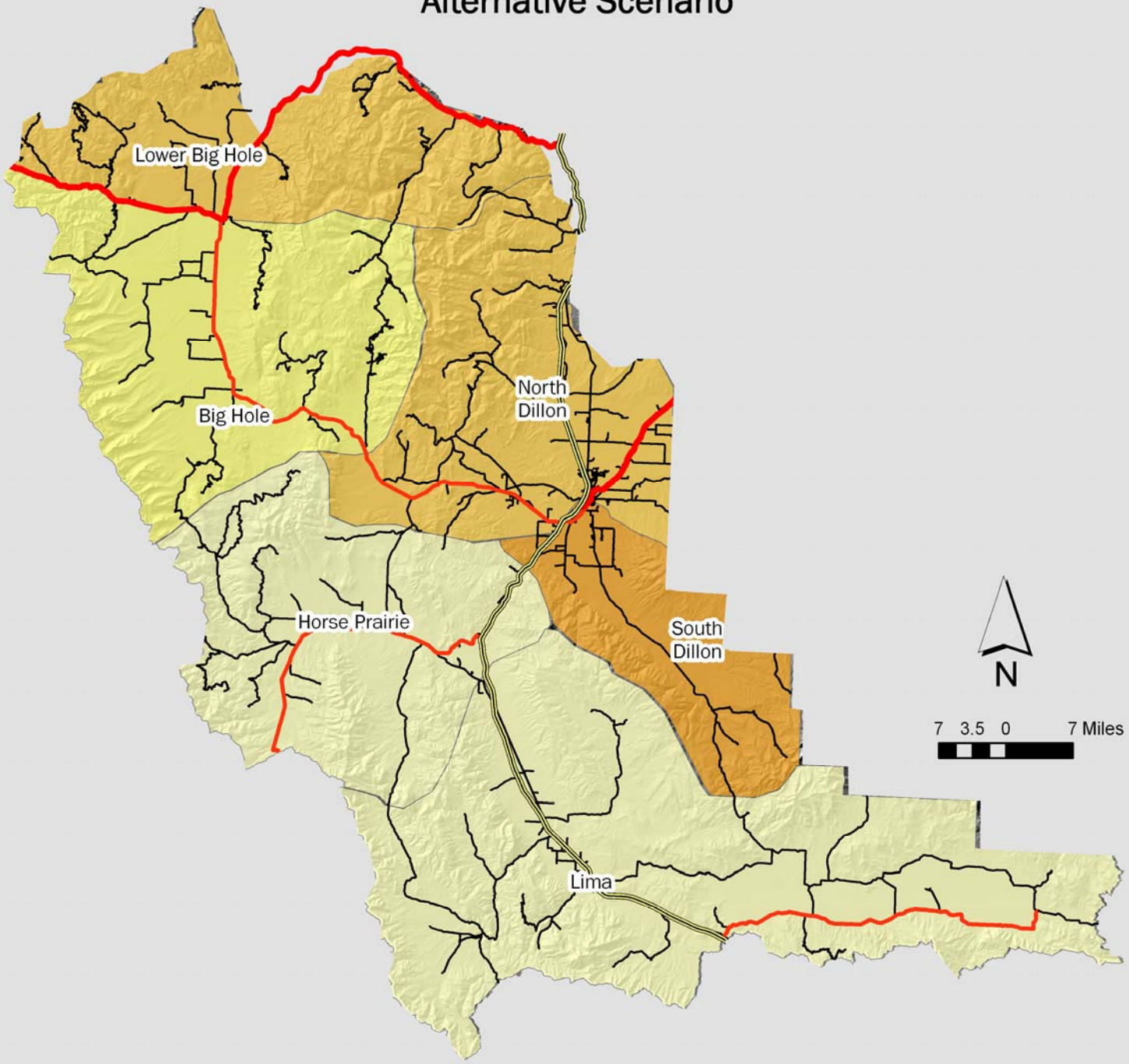
Map 5

Growth in Vehicle Miles Traveled by Transportation Analysis Zone Alternative Scenario



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Dynamic Fiscal Impact Analysis

County Road Department and Sheriff Department

Roads costs about $1,500 annually per household living 10 miles out a county road.

Roads Current Level of Service

Level of service analysis consists of two main components:

Operations and Maintenance: the ongoing day-to-day expenses of running a county department, expressed annually.

Capital Facilities: the one-time expenses associated with increasing the capacity of infrastructure and capital facilities to keep up with demand.

Operations and Maintenance

According to the itemized mean expenditures from the 2004-2005 Beaverhead County audits, it costs about $1.2 Million annually to provide the operations and maintenance now offered by the county road department.

Given the level of traffic on county roads, it costs about $1,500 annually to provide road maintenance for 100 average daily vehicle miles traveled. 100 average daily vehicle miles traveled is equivalent to one household living 10 miles out a county road.

Capital Facilities

Three types of capital contribute to the maintenance and development of the county road system:

the road system

maintenance facilities

equipment.

Table 1 - Roads Capital Facilities Detail

Asset Replacement Value	
Rd and Bridge Equipment	$1,919,784
Rd and Bridge Facilities	$1,344,501
Total	$3,264,285
Cost per 100 Daily VMT	*$3,000*
Planned Improvements	
7 yr Planned Improvements	$2,720,000
Average Annual	$388,600
20 Year Total	$7,772,000
Cost per 100 Daily VMT	*$4,700*
Paving Gravel Roads	
Cost per Mile to Rebuild and Pave a Gravel Road	$386,000
Current Miles of Paved County Roads	65
Miles of Paved County Roads per 100 VMT	0.06
Cost per 100 Daily VMT	*$22,800*

Roads System Improvements

The level of service for roads capital facilities is derived from planned improvements and the quantity of paved roads in the county. The Roads Capital Improvement Plan in the Beaverhead County Growth Policy reflects the pace of improvement expenditures that are necessary to keep up with current levels of growth. Over twenty years the current level of service for planned improvements is $4,700 per daily vehicle mile traveled. This assumes that future vehicle miles traveled will be dictated by the status quo scenario.

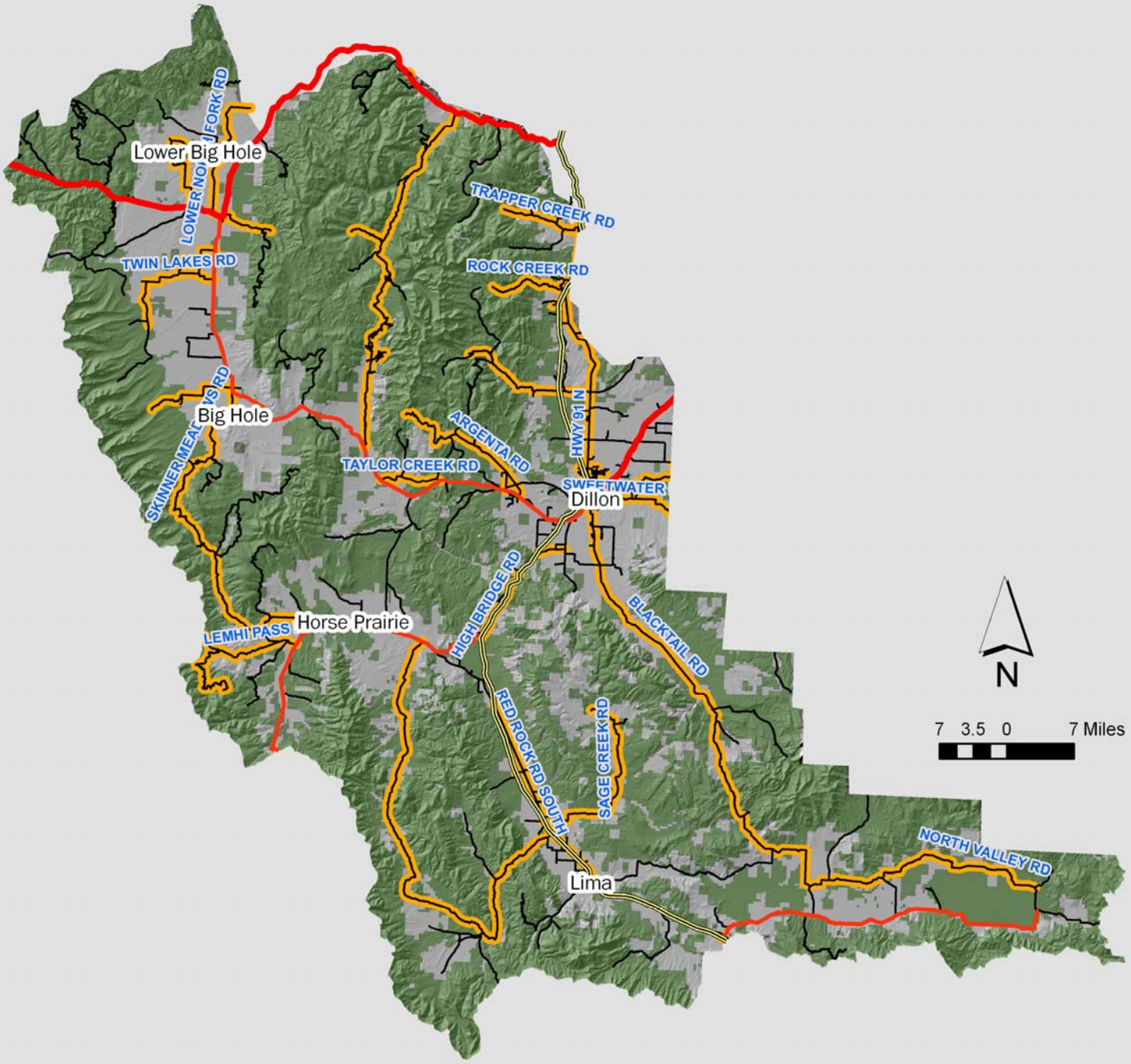
Table 1 Sources: Beaverhead County Insurance Policy Property Inventory,
Road and Bridge Department project Budget for Airport Road improvements, Beaverhead County Growth Policy Capital Improvement s Plan

Table 2 - Roads Level of Service

	Annual Operations Costs per 100 Vehicle Miles Travled	Capital Costs per 100 Vehicle Miles Travled
2005	$1,500	$30,500

Map 6

2025 County Road Paving Thresholds



Roads w/ Segments Reaching Paving Thresholds by 2025
County Roads
Interstate
Primary Highway
Secondary Highway
Public Land
Private Land

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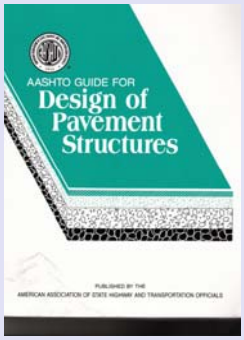
Bid prices from the recent Airport Road pave and rebuild project show costs $386k per mile to rebuild and pave a gravel road



Paving gravel roads is a major expense as the county grows and traffic levels trigger the need for an upgrade from and aggregate to a flexible pavement surface.

To demonstrate ongoing paving demand, the county travel demand model was employed to find the maximum traffic flow given the traffic projections contained in the status quo.

Chapter 4 of the American Association of State Highway Officials Guide for Design of Pavement Structures includes a Flexible Pavement—Aggregate Surface Catalogue. This catalogue indicates that for Montana's climate, roads with average daily trip (ADT) volumes in excess of 771 ADT should be paved. Volumes below this level will function with aggregate, or gravel/dirt surfaces.

Map 6 (pg. 17) shows entire roads that, based on maximum traffic flows, could need portions paved at some point during the next 20 years in the status quo scenario.

Bid prices from the recent Airport Road pave and rebuild project show costs $386k per mile to rebuild and pave a gravel road in Beaverhead County. The Beaverhead County Road and Bridge Department estimated 65 miles of paved county owned/maintained roads. Given that current average daily vehicle miles traveled on county roads total 109,00 VMT, there are .06 miles of paved road per 100 VMT. This is the level of service expression for county road paving.

Miles of paved roads per VMT is a particularly fitting level of service expression for rural county road systems because as traffic increases, the county will need to incrementally rebuild and pave county roads.

As further testimony to this point, the Beaverhead County Growth Policy Transportation Improvements Plan cites several such projects, and as cited above, the county has recently invested in a nearly half-$million project rebuilding Airport Road.

Given current costs for road re-building and paving, it costs $22,800 per 100 VMT (one-time) to maintain the current level of service for *incremental paving* of gravel and dirt roads.

Maintenance Facilities and Equipment

As traffic increases, maintenance schedules get full and improvement projects mount. The county will need to add capacity to its maintenance fleet and facilities to meet increased demand.

Given the current county road VMT and the nearly $3.3 million current replacement value of the road maintenance facilities and equipment, it will cost $3,000 for each 100 VMT to maintain the current level of service in the future.

In total, it will cost $30,500 per 100 vehicle miles traveled to maintain service levels for roads capital improvements (paving, planned improvements) and roads equipment and facilities. This is a one time cost that would accrue as residential units are built.

Sheriff Dept. Level of Service

The majority of sheriff's law enforcement services are not tangibly affected by development patterns. In order to isolate the proportion of the sheriff department's law enforcement services that is affected by development patterns from those that are driven by household

totals and growth in commercial and other non-residential land uses requires a proportionate share analysis (Figure 5).

Proportionate Share

The Beaverhead County Sheriff estimates that 20% of the department's efforts are directed towards traffic enforcement with the remaining 80% dedicated to general law enforcement.

A detailed categorization of crime case data provided online by the Montana Board of Crime yielded a break-down of 32% of general law enforcement dedicated to activity in non-residential development and 68% to cases oriented towards the residential population (Figure 4).

Table 3 - Beaverhead County Crimes by Type

	Cases 04-05	Proportionate Share Factors
SEXUAL INTERCOURSE WITHOUT CONSENT	2	Domestic
SEXUAL INTERCOURSE WITHOUT CONSENT - FORCIBLE	1	Domestic
ASSAULT, PHYSICAL W/ LACERATIONS/ BROKEN BONES	2	Domestic
CRIMINAL ENDANGERMENT	2	Domestic
PARTNER OR FAMILY ASSAULT - AGGRAVATED	6	Domestic
HATE MOTIVATED INTIMIDATION OR HARASSMENT	1	Domestic
BURGLARY, RESIDENCE	11	Implied Location
SHOPLIFT	2	Implied Location
THEFT OF BELONGINGS FROM MOTOR VEHICLES	3	Traffic
THEFT OF MOTOR VEHICLES PARTS AND ACCESSORIES	1	Traffic
THEFT FROM BUILDINGS	6	Residential Vs Non-Residential Property
THEFT, ALL OTHERS	43	Residential Vs Non-Residential Property
MOTOR VEHICLE THEFT	3	Traffic
RESISTING ARREST	1	Domestic
ASSAULT, SIMPLE W/ NO LACERATIONS BROKEN BONES	9	Domestic
STALKING	3	Domestic
PARTNER OR FAMILY ASSAULT (NON-AGGRAVATED)	7	Domestic
ASSAULT - SIMPLE - USE OF THREAT TO COERCE GA	1	Domestic
ISSUING A BAD CHECK	29	Implied Location
DECEPTIVE BUSINESS PRACTICES	1	Implied Location
DECEPTIVE PRACTICES, COMPELLED STATEMENTS	2	Implied Location
THEFT OF IDENTITY	3	Implied Location
CRIMINAL MISCHIEF	44	Domestic
CARRYING CONCEALED WEAPON	1	Domestic
SEXUAL ASSAULT	2	Domestic
INCEST	1	Domestic
SALE OF DANGEROUS DRUGS	1	Domestic
POSSESSION OF DANGEROUS DRUGS	3	Domestic
POSSESSION OF DRUG PARAPHERNALIA	6	Domestic
POSSESSION WITH INTENT TO SELL	1	Domestic
ENDANGERING THE WELFARE OF CHILDREN - ABANDON	1	Domestic
UNLAWFUL TRANSACTIONS WITH CHI	1	Domestic
VIOLATION OF PROTECTIVE ORDER	1	Domestic
DUI	1	Traffic
DUI	1	Traffic
DUI, UNDER 21 WITH BAC OF 0.02 - LIQUOR	1	Traffic
DUI (ALCOHOL OR DRUGS)	15	Traffic
ATTEMPT TO PURCHASE OR POSSESS INTOXICATING	9	Domestic
SELLS OR GIVES AN ALCOHOLIC BEVERAGE TO MINOR	1	Domestic
DISORDERLY CONDUCT	10	Implied Location
OBSTRUCTING A PEACE OFFICER OR OTHER PUBLIC	11	Domestic
OBSTRUCTING JUSTICE	1	Domestic
PUBLIC NUISANCE	3	Residential Vs Non-Residential Property
UNLAWFUL RESTRAINT	1	Domestic
TRESPASS, CRIMINAL, TO VEHICLE	6	Traffic
TRESPASS, CRIMINAL, TO PROPERT	27	Residential Vs Non-Residential Property
CRUELTY TO ANIMALS	3	Domestic
GARBAGE/ LITTERING	5	Residential Vs Non-Residential Property
INTERFERENCE WITH A SENTENCE OR COURT ORDER	1	Domestic
OBSCENE PHONE CALL - PRIVACY IN COMMUNICATION	5	Domestic

Figure 4 and Table 3 Sources: Montana Board of Crime http://bccdoj.doj.state.mt.us/
Figure 5 Source: Beaverhead County Sheriff

Figure 4 - Non-Traffic Law Enforcement Proportionate Share

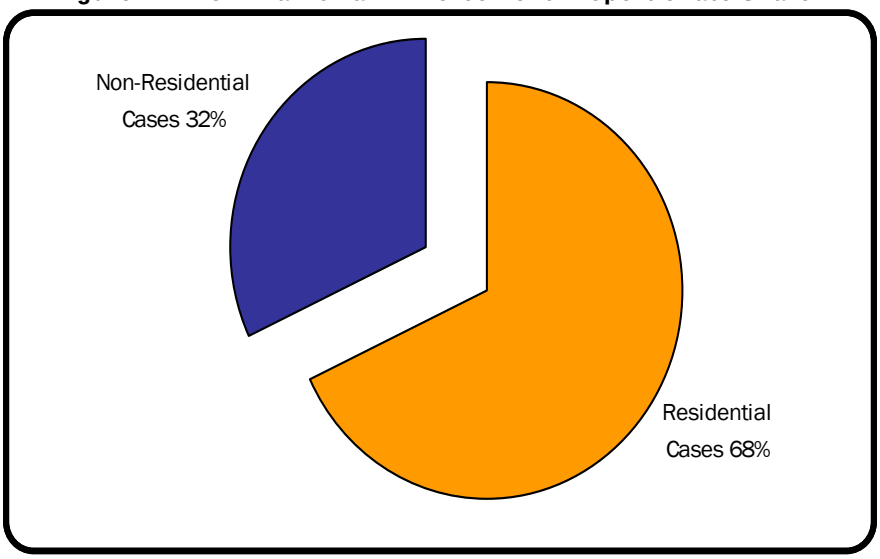


Figure 5 - Traffic Enforcement & Incidents as Perecnt of Law Enforcement Resources

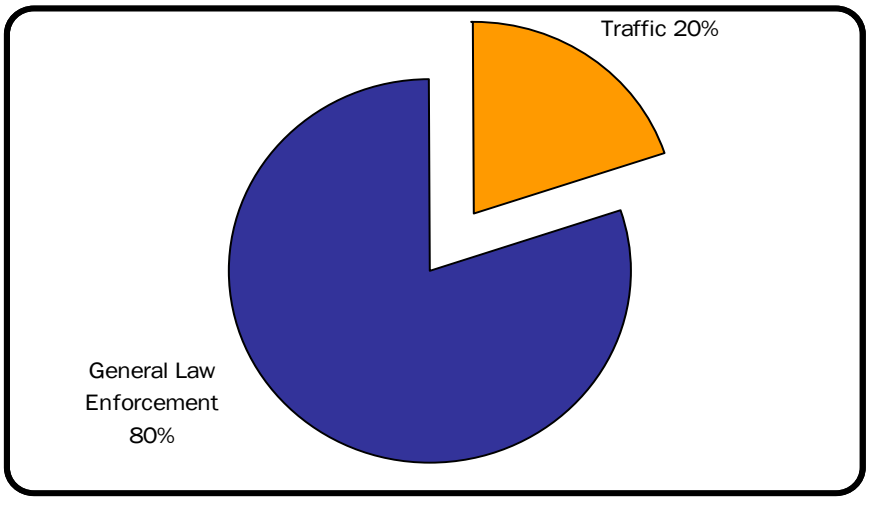


Table 4 - Law Enforcement Current Level of Service

Traffic Enforcement		
Officers per 10,000 VMT	Annual Operations and Maintenace Costs per 100 VMT	Capital Improvement Costs per 100 VMT
0.31	$218	$491
General Law Enforcement		
Officers per 100 residential Units	Annual Operations and Maintenace Costs Per Residential Unit	Capital Improvement Costs per Residential Unit
0.4	$259	$346

In terms of property taxes, the alternative scenario would save the equivalent of 19 mills countywide.

Table 4 Sources: 2004, 2005 Beaverhead County Audit, Travel Demand Model Results (See figure 4), County payroll list. US Census, Montana Department of Revenue Property Tax Division

Operations and Maintenance

The mean annual sheriff's budget is nearly $1.2 million for 2004-05. Given the proportionate share factors cited above, it costs about $218 annually and about $500 in one-time capital facilities and equipment expansion costs to maintain the current level of service for one household 10 miles out on county roads (100 Ave. Daily VMT).

Having removed the non-residential demand using the proportionate share analysis discussed above, the remaining costs *per residential unit* to maintain the current level of services general law enforcement is $259 annually for operations and maintenance and almost $350 dollars in capital facilities expansion to maintain current levels of service for facilities and equipment.

Dynamic Analysis

The level of service has been calculated for the Road Department and the Sheriff Department both in terms of those costs associated with traffic growth and those that are not connected to traffic growth.

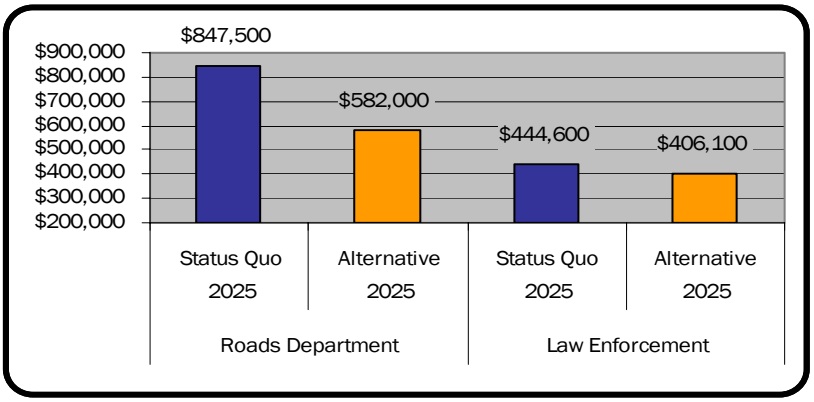
Using this important baseline, the differences between costs associated with the status quo vs. the alternative scenario can be represented by applying the costs per vehicle mile traveled to the vehicle miles traveled as calculated earlier in the report using the county travel demand model.

By including the costs per residential unit that are not tangibly affected by increased daily driving, county officials can see the true relative cost savings resulting from development patterns like those represented in the alternative scenario.

Operations and Maintenance

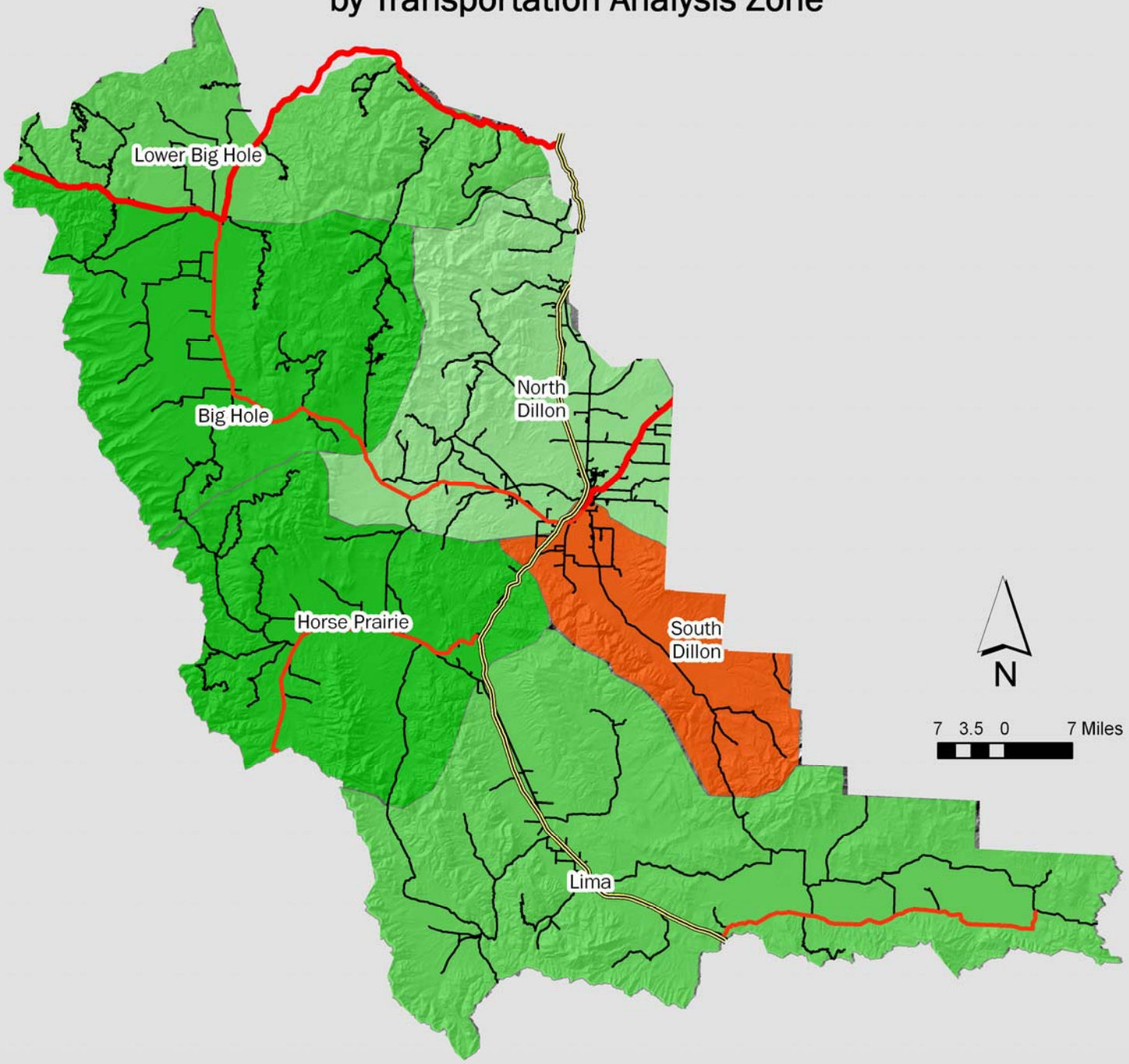
Annually, the alternative scenario development pattern would save the county road and sheriff departments a combined $304k (2005 fixed dollars) in annual operations and maintenance costs (Figure 6). That is over 6% of the total county budget, which if aggregated over the course of several years becomes a significant cost savings. In terms of property taxes, the alternative scenario would save the equivalent of 19 mills countywide, given the 2005 assessed valuation.

Figure 6 - Roads and Law Enforcement Operations and Maintenance Annual Cost by Scenario



Map 7

Traffic Related Capital Improvement Cost Savings of Alternative Scenario over Status Quo Scenario by Transportation Analysis Zone



County Roads
Interstate
Primary Highway
Secondary Highway

Alternative Scenario Capital Improvement Cost Savings
Alternative Costs $120k More
Alternative Saves Up To $500k
Alternative Saves $500k-$1million
Alternative Saves over $1million

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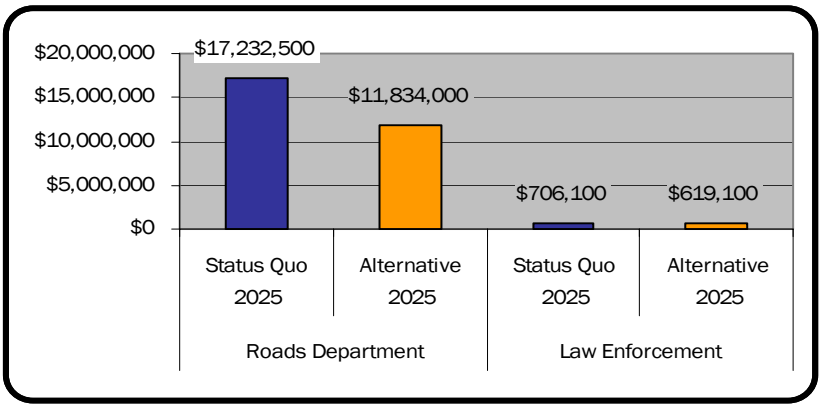
The status quo scenario would be 46% more expensive for the road department alone.

Capital Improvements

Capital improvements savings associated with the more compact alternative scenario development pattern are significant. The status quo scenario would be 46% more expensive for the roads department alone, with an estimated one-time costs savings totaling almost $5.5 million associated with the alternative scenario development pattern (Figure 7). Capital improvement costs are one-time costs as residential units develop.

Figure 7 - Road and Law Enforcement One-Time Capital Improvement Cost by Scenario



As with operations and maintenance, the relative difference between the alterative and status quo scenarios for law enforcement are less than that for the roads department because just 20% of law enforcement is related to traffic.

Looking at Map 8 (pg. 23) where alternative scenario cost savings are layered against both scenarios' growth areas, the reason for the extra costs becomes even more clear: the status quo scenario's growth areas tend to be far down county roads, resulting in more driving and more expenses for the county.

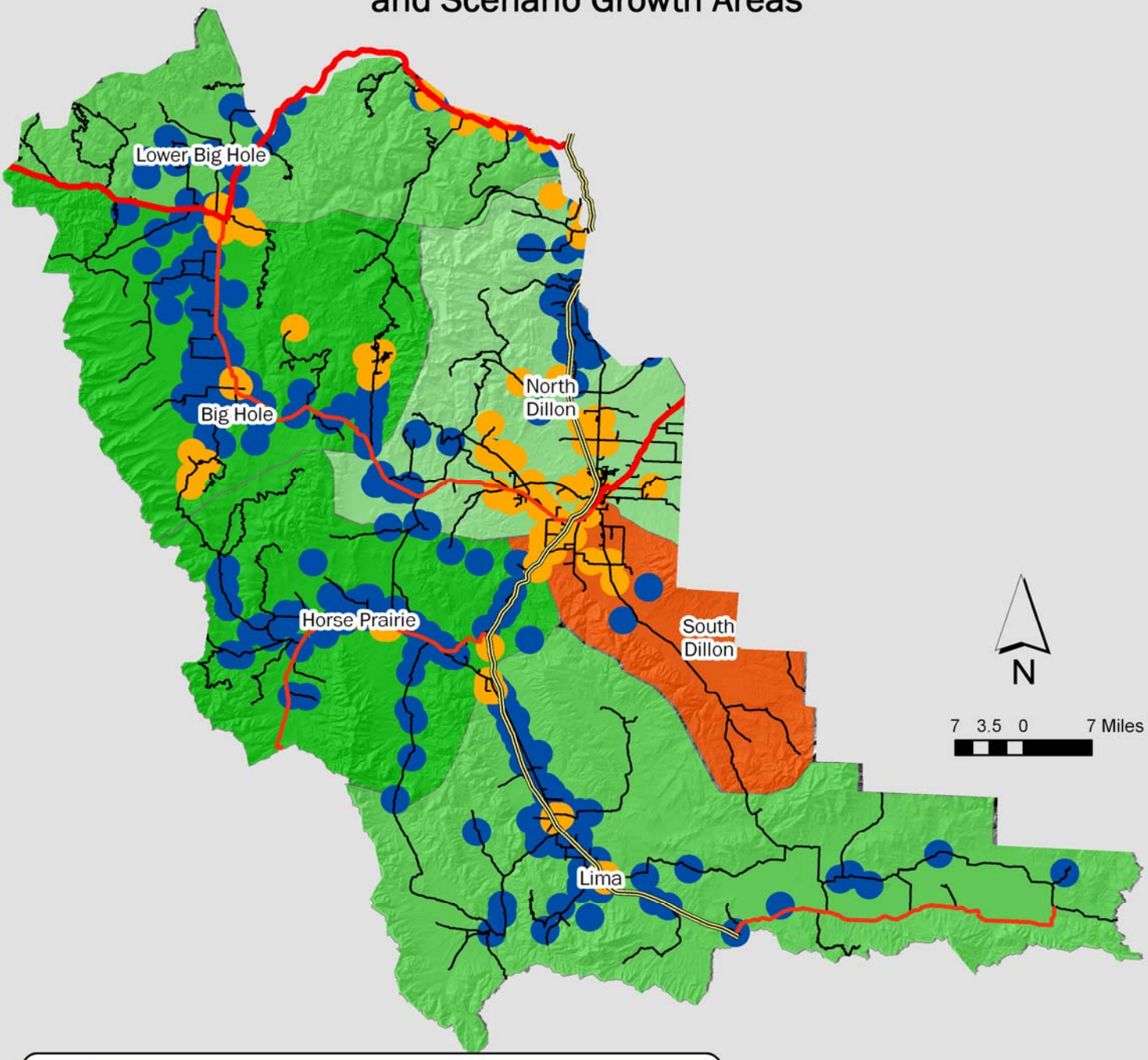
Geographic Results

By looking at capital improvement cost savings of the alternative over the status quo by transportation analysis zone (map 7, pg. 21), it becomes clear that the status quo costs mount up in the rural areas of the county. The South Dillon TAZ actually gains more traffic and costs more in the alternative scenario, which emphasizes development near Dillon. However, the $120k additional cost in the Dillon area is eclipsed by the millions saved in the rural TAZs in the remainder of the county under the alternative scenario.

Recently Paved Airport Road

Map 8

Alternative Scenario Cost Savings by Transportation Analysis Zone and Scenario Growth Areas



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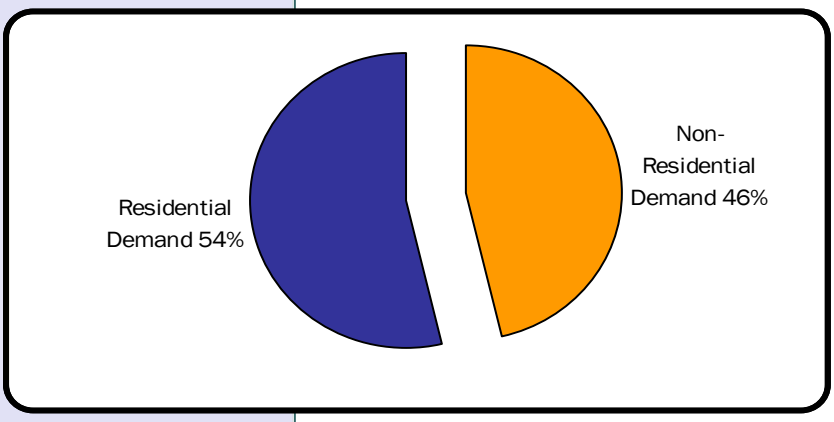
Fiscal Impact Analysis for Centralized Services

County Departments Unaffected by Development Patterns

Figure 8 - Administration, Health, and Other County Services Proportionate Share



Administration, Health, and Other County Services Proportionate Share

Fundamentally, demand for these core county services increases with the quantity of activity Beaverhead County. The demand for these services is split between activities associated with residential land uses vs. non-residential land uses. This split varies widely between communities, depending on the relative quantities of commercial and governmental activity located in a particular county.

One reliable way to establish a planning level ratio between residential and non-residential demand is to compare the fundamental demographic unit of commercial activity, employees, to the fundamental unit of residential activity, population (Figure 8).

This proportionate share methodology suggests that the breakdown for general administration, health and community services, and other services is nearly half and half.

Administration Level of Service

Currently, Beaverhead County administration requires 23 FTEs employees. Administration employees applied to the proportionate share above yields a level of service of .3 administration FTEs per 100 residential units in the county at an annual cost of $17,000 and .4 FTEs per 100,000 sq. ft. non-residential development at an annual cost of $21,700. Because most of the county's administrative responsibilities extend into the municipalities, the population and non-residential sq. ft. used in the above calculation include the entire county.

Table 5 Sources: 2004, 2005 Beaverhead County Audit, County payroll list., US Census, Montana Department of Revenue Property Tax Division

Table 5 - Administration Level of Service

	Administration Staff	Operations and Maintenance (Annual Cost)	Capital Facilities
Per 100 Residential Units	0.34	$17,000	$40,000
Per 100,000 s.f. Non-Residential Floor Area	0.4	$21,700	$51,000

Administration's 48% share of the Courthouse is valued at $3.18 million by Beaverhead County's insurance company. Maintaining this level of service as the county grows will require $40k per 100 housing units and $51k per 100k sq. ft. of non-residential floor area (one-time).

annual cost hovering around $6k for each.

Due to the nature of health and other county services functions, involving contributions to other organizations, seasonal employees, and multi-tasking county employees, there was insufficient information to determine the capital facilities level of service.

Table 6 - Health and Community Services Level of Service

	Operations and Maintenance (Annual Cost)
Per 100 Residential Units	$4,200
Per 100,000 s.f. Non-Residential Floor Area	$3,700

County Health and Community Services and Other Services

The county health department and support to local health organizations and other community services cost $337k for 2004-05, meaning that it costs roughly $4,200 per year per 100 residential units and $3,700 per year for 100k sq. ft. of non residential floor area.

Non-Residential Land Uses In Wisdom

Other county services include county extension, weed management, coroner, and other assorted county responsibilities. In sum, the annual budget, for these services over the past couple years is $523k annually. The level of service for miscellaneous services is .3 employees (mostly seasonal) per 100 residential units and .4 employees per 100k sq. ft. of non-residential floor area with an

Table 7 - Other County Services Level of Service

	Other County Services Staff (85% seasonal)	Operations and Maintenance (Annual Cost)
Per 100 Residential Units	0.3	$6,600
Per 100,000 s.f. Non-Residential Floor Area	0.4	$5,700

Table 6 & 7 Sources: 2004, 2005 Beaverhead County Audit, County payroll list., US Census, Montana Department of Revenue

Fiscal Summary for Centrally Located County Services

Aggregate Costs

Maintaining the current level of service for county administration, health and community services, and other services for an additional 1240 residential units projected in both the alternative and status quo scenarios is going to require an additional 8 employees, and another $345k annually.

Table 8 - Total Costs of Maintaining Level of Service for 1240 Residential Units for Administration, Health and Community Services, and Other Services

	Staff	Operations and Maintenance (Annual Cost)	Capital Facilities
Cost of Maintaining Currentl Level of Service for Residential 1240 Residential Units	8.12	$344,700	$496,000

Facilities to accommodate the extra staff and demand for 1,240 residential units will cost just under $500k (one-time, Table 8).

Per Unit Costs

The cost for each (1) housing unit demonstrates how the overall administration of a county government and the health, community services, and other services the county provides add up to a hefty sum of $278 per year needed to maintain the current level of service and $400 in one-time capital facilities expansion costs for each new housing unit (Table 9).

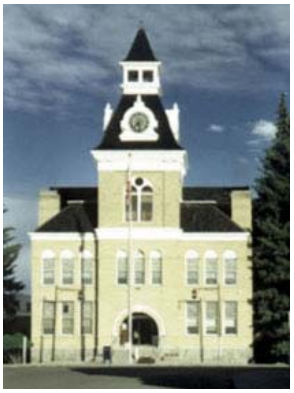


Table 9 - Costs of Maintaining Level of Service for per (1) Residential Unit for Administration, Health and Community Services, and Other Services

	Operations and Maintenance (Annual Cost)	Capital Facilities
Cost of Maintaining Currentl Level of Service for One (1) Residential Unit	$278	$400

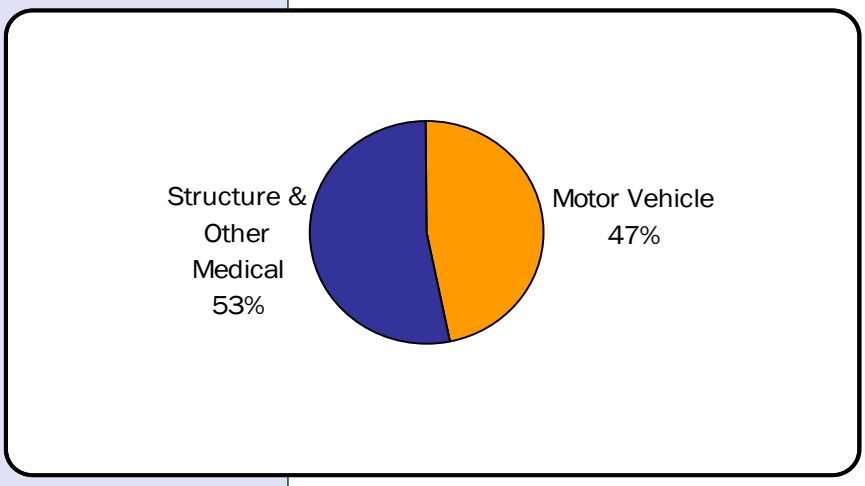
Fire District Dynamic Fiscal Analysis

Introduction

To evaluate fiscal impacts of future residential development patterns produced by the status quo and alternative future land use scenarios, two fire districts were selected. Dillon Fire District was selected because it serves most of the population in Beaverhead County, and as a case study for the rural fire districts, Grasshopper Valley Fire District was included (Map 9).

Figures 9 & 10 Source: 2004-05 Fire District Detailed Incident Summaries

Figure 9 - Dillon Fire District 2004-05 Incident Summary



Proportionate Share

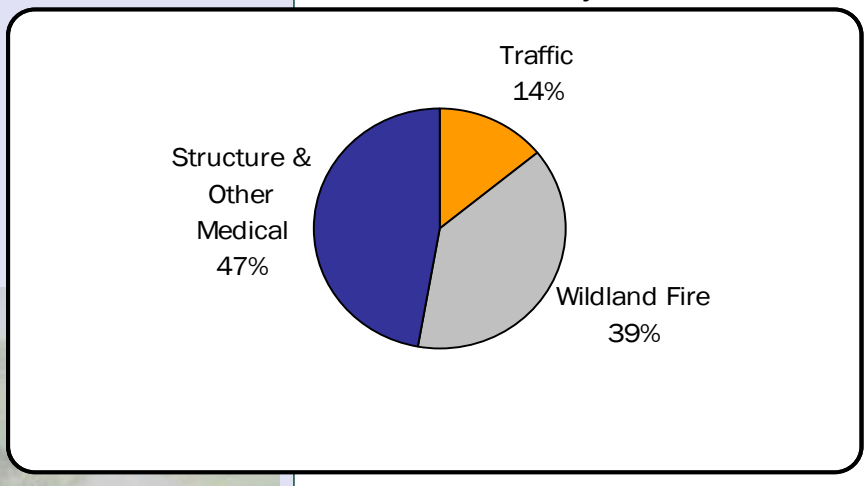
To determine the proportion of demand for fire district services related to increased traffic vs. growth in structures vs. wildland fires, it was necessary to conduct a proportionate share analysis. Proportionate share was established by analyzing incident records provided by the districts. Because motor vehicle accidents require both ambulance service and fire protection, multi-tasking rural fire districts are more affected by growth in traffic than is obvious at first glance.

To determine the connection between demand for district services and traffic, traffic oriented responses (motor vehicle fire and medical incidents) were isolated from fire protection responses and other medical responses.

Since the travel demand model results established the connection between development patterns and traffic, isolating the portion of resources dedicated to traffic response provides the analytical link between the fire districts and county development patterns.

The Grasshopper Valley Fire District is responsible for structure protection in the wildland-urban interface, and is equipped and trained to fight wildland fires. In fact, 39% of their responses are wildland fire responses coordinated with other fire protection agencies.

Figure 10 - Grasshopper Valley Fire District 2004-05 Incident Summary

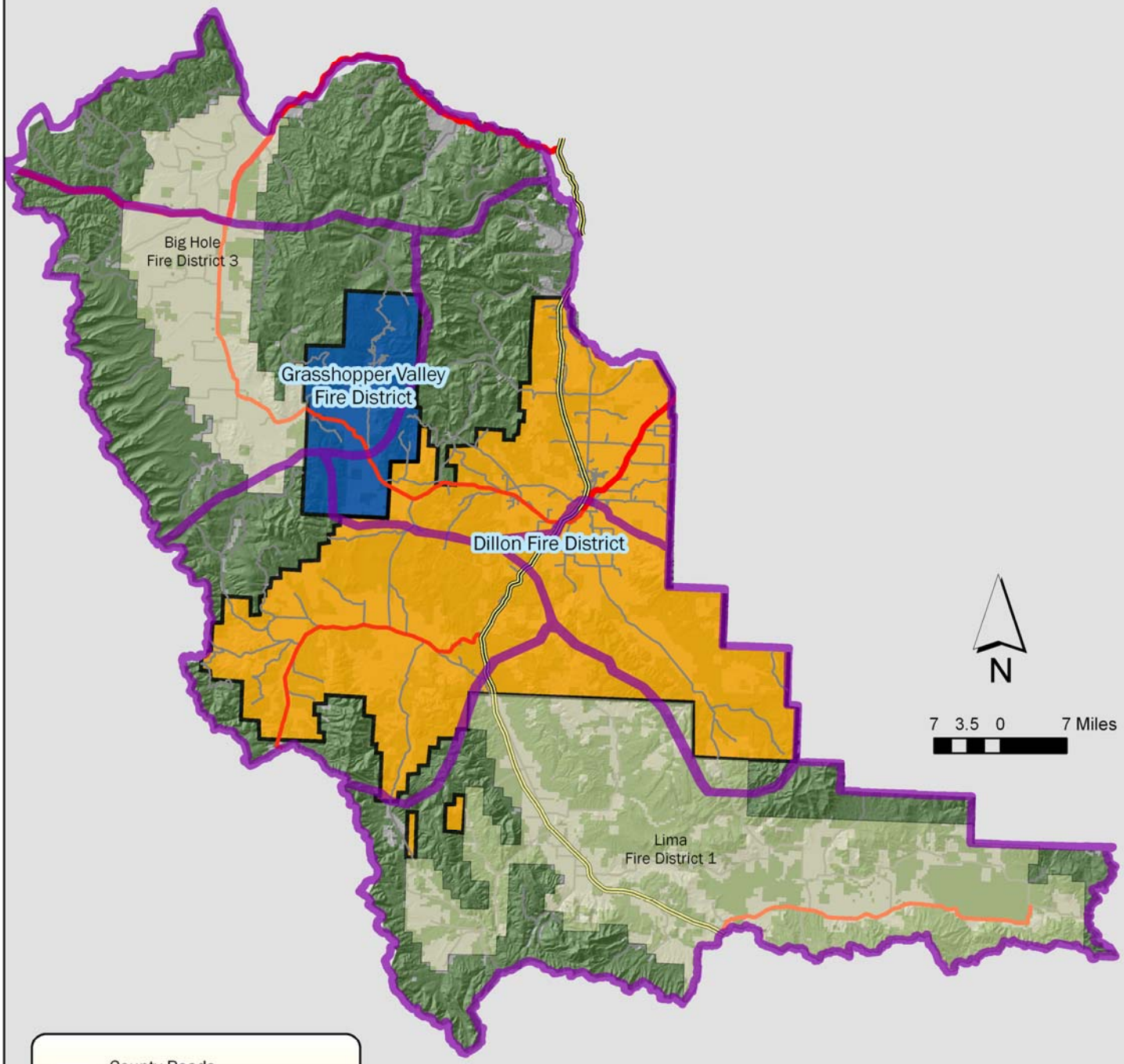


Projected Growth & Traffic

An inventory of property improvements contained in a report produced by the State of Montana Department of Revenue specifically for this project provided information necessary to estimate the number of residential units and commercial structures within the boundaries of each fire district. This provides the data necessary to calculate the level of service per structure under protection of the districts.

Map 9

Fire District Boundaries



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The increased per structure costs [for Grasshopper Valley] reflect a geographically limited service area and the extra equipment and training costs associated with protecting development in the wildland-urban interface.

Table 10 Sources: Beaverhead County Audit, Travel Demand Model Results (See figure 4), US Census, Montana Department of Revenue Property Tax Division, Sonoran Institute Growth Model
Table 11 Sources: 2004-05 District Budgets, District Asset Inventories and Replacement Values,

Projected growth in traffic was estimated by aggregating the growth in traffic for the Transportation Analysis Zones (TAZ) in which each district falls.

The alternative scenario logged about 1/2 the daily vehicle miles traveled that the status quo scenario accumulates in both fire districts.

Since fire districts respond to state highway and interstate accidents and fires, the traffic growth factors for the fire analysis *includes traffic on state highways* as well as the vehicle miles traveled on county roads. The travel demand model was designed to allow analysis by road owner (county, city, state), providing the ability to isolate county road traffic for the county fiscal impact analysis and include state highway and interstate traffic for the fire district assessment.

Table 10 - Fire District Growth Factors

Dillon	
Traffic Growth (Includes State Highways)	
Fire District	North Dillon, South
Transportation Analysis Zone(TAZ)	Dillon, Horse Prairie
Status Quo Combined Growth Rate	81%
Alternative Combined Growth Rate	47%
Structure Growth	
Current Residential Improved Properties	2,490
Commercial Structures	170
Total Protection Properties	2,660
2005-2025 New Residential Properties	710
Structure Growth 2005-2025	27%
Grasshopper Valley	
Traffic Growth (Includes State Highways)	
Fire District	
Transportation Analysis Zone (TAZ)	Big Hole
Status Quo Combined VMT Growth Rate	30%
Alternative Combined VMT Growth Rate	16%
Structure Growth	
Current Residential Improved Properties	130
Total Protection Properties	130
2005-2025 New Residential Properties	70
Structure Growth 2005-2025	54%

Dynamic Fiscal Impact Study

In the fiscal impact analysis the level of service for structure protection is calculated separately from a traffic growth impact assessment. The impact of development patterns on structure protection is related to response times more than to expenses, with the exception that wildland-urban interface fire protection requires investment in specialized and very expensive equipment.

Table 11 - Fire District Structure Protection Level of Service

Dillon	
Operations Cost per Structure	$20
Capital Investment Cost per Structure	$283
Grasshopper Valley	
Operations Cost per Structure	$69
Capital Investment Cost per Structure	$1,393

Structure Protection Level of Service

Given the proportionate share discussed above, and the fire district's operation budget, it costs the Dillon Fire District $20 dollars per year per structure to maintain operations and maintenance LOS, and $283 dollars per structure for one-time capital facilities and equipment purchase.

Grasshopper Valley's level of service expenditures are higher for both operations and maintenance ($69 per structure) and $1,393 for capital facilities and equipment. The increased per structure costs reflect a geographically limited service area and the extra equipment and training costs associated with protecting development in the wildland-urban interface.

The alternative scenario is 44% less expensive for the Dillon Fire District than status quo future land use pattern.

Dynamic Fiscal Summary

In the Dillon Fire District, serving the greater Dillon area, the travel demand model projects traffic to almost double (81%) given the status quo development patterns. The status quo scenario produces 75% more traffic than the alternative scenario in the Dillon Fire District.

The extra traffic growth associated with the status quo scenario reflects the relatively continuous rural development occurring along Bannack Bench Road, Taylor Creek Road, Birch Creek Road, and other rural growth areas at the far reaches of the road system (see Map 3) This growth in traffic, along with the per structure costs of maintaining service levels means that the alternative scenario is 44% less expensive for the Dillon Fire District than status quo future land use pattern.

Because Grasshopper Valley only has one stretch of state highway running through it and just a few county roads, the traffic incident load is not as heavy relative to the structure and wildland interface responses. Still, the nearly 25% savings associated with the alternative scenario capital facilities expenditures shows the alternative scenario to be a fiscally efficient development pattern.

Figure 11 - Capital Improvement Costs by Scenario

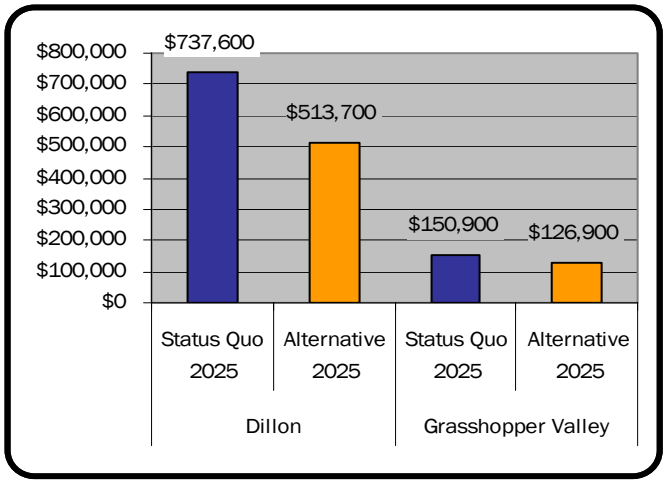


Figure 12 - Operations and Maintenance Costs by Scenario

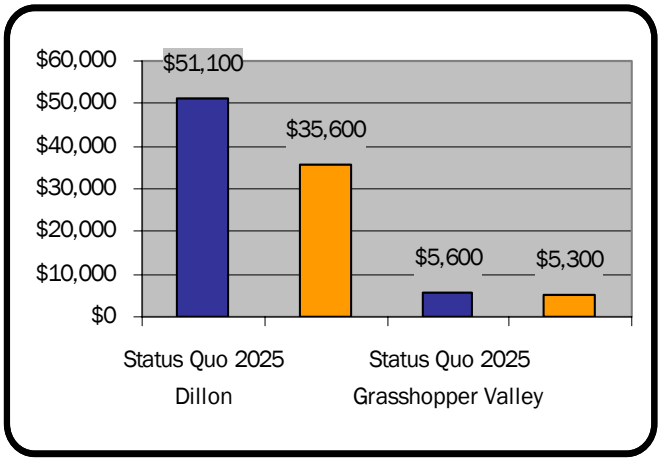


Table 12 - Fire District Fiscal Summary

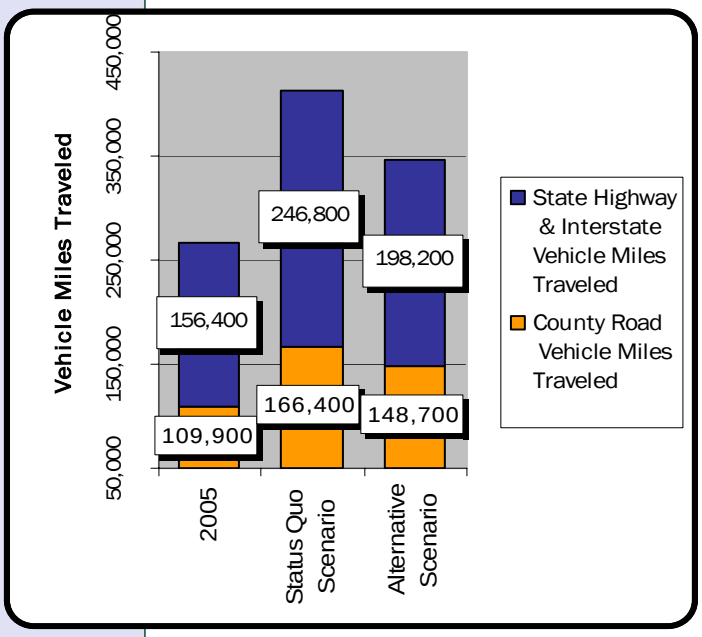
		Annual Operations and Maintenance Costs for Projected Traffic and Structures in District	Capital Investment for Projected Traffic and Structures in District
Dillon	Status Quo 2025	$51,100	$737,600
	Alternative 2025	$35,600	$513,700
Grasshopper Valley	Status Quo 2025	$5,600	$150,900
	Alternative 2025	$5,300	$126,900

Vehicle Fuel Use, Resident Expenditures, and Emissions

Introduction

This analysis estimates the fuel consumed by automobiles in the status quo development pattern and the more compact agricultural land conservation oriented alternative scenario development pattern.

Figure 13 - Vehicle Miles Traveled on Highways + County Roads



Because gasoline and diesel costs have increased drastically in the past five years, gasoline consumption continues to be a hefty portion of Montanans' expenditures. Since the petroleum industry is a global industry, other than retailing the fuel in local stations, local economies do not gain direct benefits from fuel sales. In this sense, fuel purchases are a low-return expenditure in regional economy.

Given the continued confidence of scientists in the reality of global warming, and the contribution of Carbon Dioxide (CO_2) to this thermodynamic cycle, a thorough evaluation of land use patterns and vehicle miles traveled includes an estimate of CO_2 emissions.

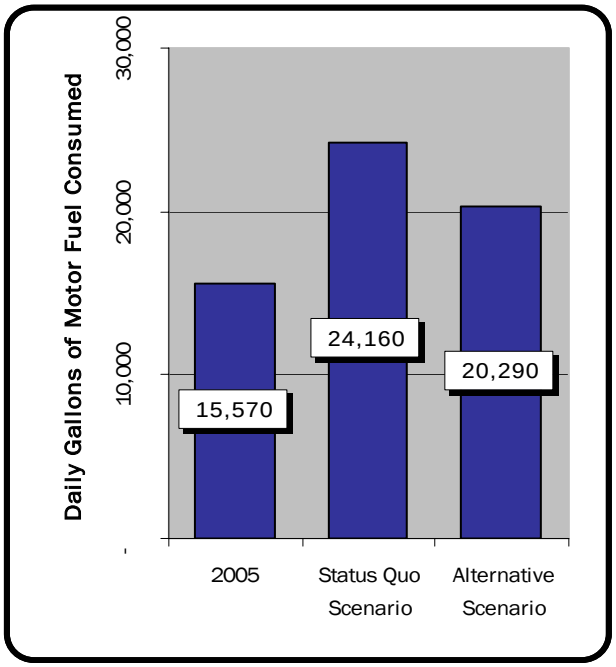
Fuel Consumption

The traffic analysis in the dynamic fiscal impact assessments for county services and fire districts is based on vehicle miles traveled. Because fuel consumption occurs regardless of whether a driver is on a county road or state highway, the fuel consumption analysis includes vehicle miles traveled on both county roads and state highways.

Average Fuel Economy for Passenger Vehicles	
Miles Per Gallon	17.1
Gallons per Mile	0.06

Having obtained the combined county road and state highway vehicle miles traveled from the travel demand model results (413k daily VMT for status quo, and 345k daily VMT for the alternative scenario) it is then possible to calculate fuel consumption.

Figure 14 - Automobile Fuel Consumption by Scenario



Longer commutes and trips to the store have real implications on residents' wallets

The EPA 2006 average passenger vehicle fuel consumption rate of 17.1 miles per gallon to a gallons per mile figure of .06 gallons consumed per mile.

Applying this consumption rate to the VMT projected in the travel demand model we find that on average today, county residents currently consume around 15,000 to 16,000 gallons of fuel daily, with a projected 24,160 gallons consumed daily to accommodate the status quo scenario. The alternative scenario results in about 20,300 gallons daily, almost 4,000 fewer daily gallons consumed than under the status quo scenario .

Fuel Expenditure Study

By multiplying the annual fuel consumption by the September 2006 average fuel cost of $2.70 per gallon for Montana (EPA– www. fueleconomy.gov), and dividing by the projected new residential units (1,240 for both scenarios) we find that per household fuel consumption is the same for the alternative scenario and current consumption, but increases for the status quo scenario.

The longer commutes and trips to the store implied by continued development on the furthest reaches of county roads have real implications on future Beaverhead County residents' wallets. $700 per year, a week's wages or salary for a household earning the median household income in Montana ($34,449/yr, 2003, BEA) will be spent under the status quo scenario.

CO_2 Emissions

Carbon Dioxide emissions parallel fuel consumption. The lower amount of driving associated with the more compact alternative future land use scenario reduces annual CO2 emissions by 14,000 tons.

Figure 15 - Average Household Annual Fuel Expenditures by Scenario

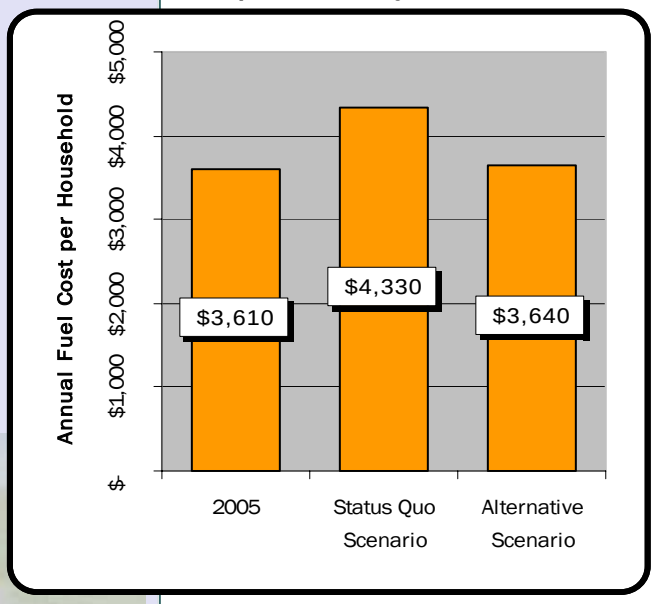


Figure 16 - Annual CO_2 Emissions by Scenario