LOCKWOOD TRANSPORTATION STUDY

FINAL REPORT
11/1/2008

Prepared for

Billings – Yellowstone County Planning

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INTRODUCTION

Members of the Lockwood Transportation District (LTD) Board began conferring with Marvin & Associates in the spring of 2004 with regard to a transportation study for the community of Lockwood. In July 2004 a draft scope of work and fee estimate were developed. Since that time, the LTD Board was able to obtain funding for the project through coordination with the City of Billings-Yellowstone County Planning Department. Thus, this document represents a summary of the study goals and objectives, specific work efforts, and the short-term and long-term recommendations for infrastructure improvements in the Lockwood area. This document will provide the citizens of Lockwood, as well as governmental and private entities that are stakeholders in the future of Lockwood, with a comprehensive list of transportation projects needed to provide a safe and efficient transportation system well into the future.

The City-County Planning Department, in coordination with the Lockwood Steering Committee, recently completed a Community Plan for the Lockwood area. Adopted in August 2006, the Lockwood Community Plan provides general and specific recommendations for preservation of Lockwood's identity, unique character, and the quality of life of its residents by seeking improvements and making recommendations as to future planning and growth. Transportation was one of several focus areas outlined in the Community Plan, with the main objective being completion of a transportation planning study for the Lockwood area. This document serves to fulfill that objective.

The community of Lockwood is fully contained within the boundaries of the Billings Urban Area Transportation Planning District. As such, proposed street and roadway improvement projects to be funded by State and Federal funds have already been identified in the Billings Urban Area Transportation Plan 2005 Update. The intent of this study is not to supersede any portion of the approved Transportation Plan. Rather the results of this study are intended to augment the Transportation Plan's data base and provide additional documentation for future plan updates. The Billings Urban Area Transportation Plan was developed to address general transportation issues within a very

large area. Specific areas, such as the CBD or specific corridors may be addressed in some detail due to unique issues, but resources to address specific elements within defined areas were not available within the urban plan.

Specific traffic operation issues are normally identified and addressed on a local level by the City of Billings' Public Works Department. Unlike the City of Billings, Lockwood is not an incorporated city. Even though Lockwood is one of the larger communities in the state of Montana, it does not have a local government to oversee day to day operations, nor does it have the bureaucratic mechanisms necessary to address traffic and street system needs. It is totally dependant upon Yellowstone County and the Montana Department of Transportation (MDT) for operations and maintenance of its roadways. Yellowstone County and MDT are both responsible for a vast system of roadways and their operations are geared more toward rural type highways. MDT depends on local governments to provide planning and operational services on the Urban Highway System, while the Lockwood area is one of the only densely developed areas within Yellowstone County's jurisdiction. Thus, neither Yellowstone County nor MDT is fully equipped to operate and maintain an urban type street system. In lieu of incorporation or annexation, Lockwood needs to develop a plan for addressing current traffic problems and ensuring an organized and logical system to accommodate future growth within the community.

Through adoption of this community transportation plan, the LTD will have the ability to raise funds through a mill levy or various other funding opportunities. Priority projects could then be implemented either by local funding or by providing matching funds for a variety of state and federal programs. An example of this would be the existing Johnson Lane Interchange, which was constructed using federal funds with local matching funds fully contributed by an LTD mill levy. The interchange funding scheme was the first project of its kind in Montana and the LTD was the first local transportation district ever created in the state. It is anticipated that many of the long term projects defined by this study will be included in the Transportation Improvement Projects list as an update to the current Billings Urban Area Transportation Plan and will therefore compete for state and federal funding with all other projects within the Billings Urban Area.

STUDY GOALS & OBJECTIVES

The goals and objectives of this study were based upon acquired knowledge of the Lockwood study area, the concerns and values of its citizens, the objectives of the Lockwood Transportation District, the concerns of the City-County Planning Department, and the need to provide a safe and efficient transportation system. The following statement summarizes the purpose of the Lockwood Transportation Study:

> *As a supplement to the Lockwood Community Plan and the Billings Urban Area Transportation Plan, the purpose of the Lockwood Transportation Study is to develop a definitive database for critical streets and roadways within the Lockwood Study Area and identify future transportation infrastructure improvements based on public input and analysis of future needs in terms of mobility, connectivity, alternate modes, and emergency access.*

With this purpose statement in mind, the following project objectives were identified at the beginning of the project and updated throughout the course of the study:

- The study will develop a definitive database for critical streets and roadways within the Lockwood Study Area, which can be maintained and expanded upon in the future.
- The study will identify existing deficiencies in safety and efficiency and address methods and concepts that can be used to improve those deficiencies in both the short term and long term.
- The study will evaluate alternative transportation modes including pedestrian, bicycle, and transit facilities and provide recommendations for new or expanded facilities.
- The study will address the existing and future role of commercial trucking on the area street system and provide specific recommendations to accommodate heavy vehicles within planned improvements.
- The study will evaluate future street system needs in terms of mobility, connectivity, safety, and emergency access in the form of a recommended major

street system plan, which can be established as a master plan for future development.

- The study will prepare a summary of recommended street section and approach standards to be used for all future improvements to the major street system.
- The study will provide a detailed list of cost estimates and potential funding sources for short-term and long-term improvement projects.

STEERING COMMITTEE & PUBLIC MEETINGS

Throughout the course of the study, the project consultant team facilitated five steering committee meetings and two public meetings. Steering committee members included representatives from the LTD Board, City-County Planning Department, Yellowstone County Commissioners, City of Billings Public Works, Yellowstone County Public Works, and MET Transit. The consultant team also attended several LTD Board meetings throughout the course of the project.

The first public meeting was held once data had been collected and summarized, and a list of existing deficiencies had been prepared. The purpose of this meeting was to discuss the initial findings, solicit input on additional areas of concern, and discuss potential improvements. A summary of comments from the first public meeting is included in Appendix A.

The second public meeting was held once short-term and long-term improvement concepts had been developed. The second meeting provided a preview of possible recommendations, and public input was gauged to determine potential acceptance and to gain ideas on additional concepts to be considered. A summary of comments from the second public meeting is also included in Appendix A.

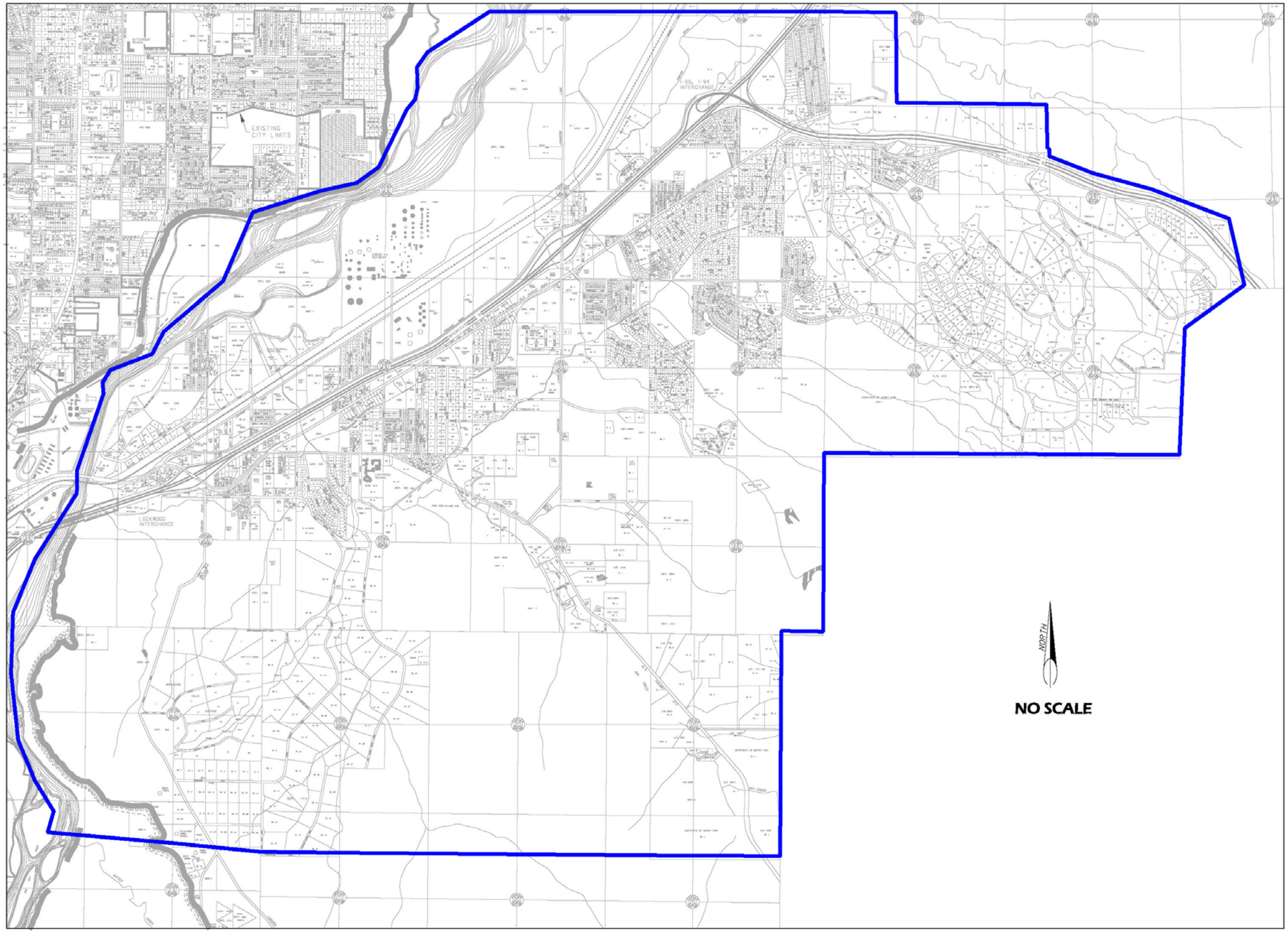
A draft of the study was available for comment by the public. Some comments were received and those concerns were addressed. Based upon those comments, definitive modifications and additions were incorporated within the final report.

EXISTING COMMUNITY FEATURES

STUDY AREA

Figure 1, on the following page, shows the study area used for the Lockwood Transportation Study, which encompasses most of the area historically considered to be the community of Lockwood. Generally it can be described as all developed areas of land southeast of the Yellowstone River. The Yellowstone River represents a defining geophysical boundary to the north, while other boundaries are not so specific. Interstates 90 and 94 also impose boundaries within the Lockwood area and split the community into two portions with distinctly different land use characteristics. Approximate boundaries of the study area are illustrated in Figure 1 and include all areas with high density development, as well as the majority of the lower density development areas south and east of the Interstate 90 corridor. The study area used for this project is similar to that defined in the Lockwood Community Plan, except that this study area also encompasses the Emerald Hills area.

Figure 1. Study Area



DEMOGRAPHICS & GROWTH

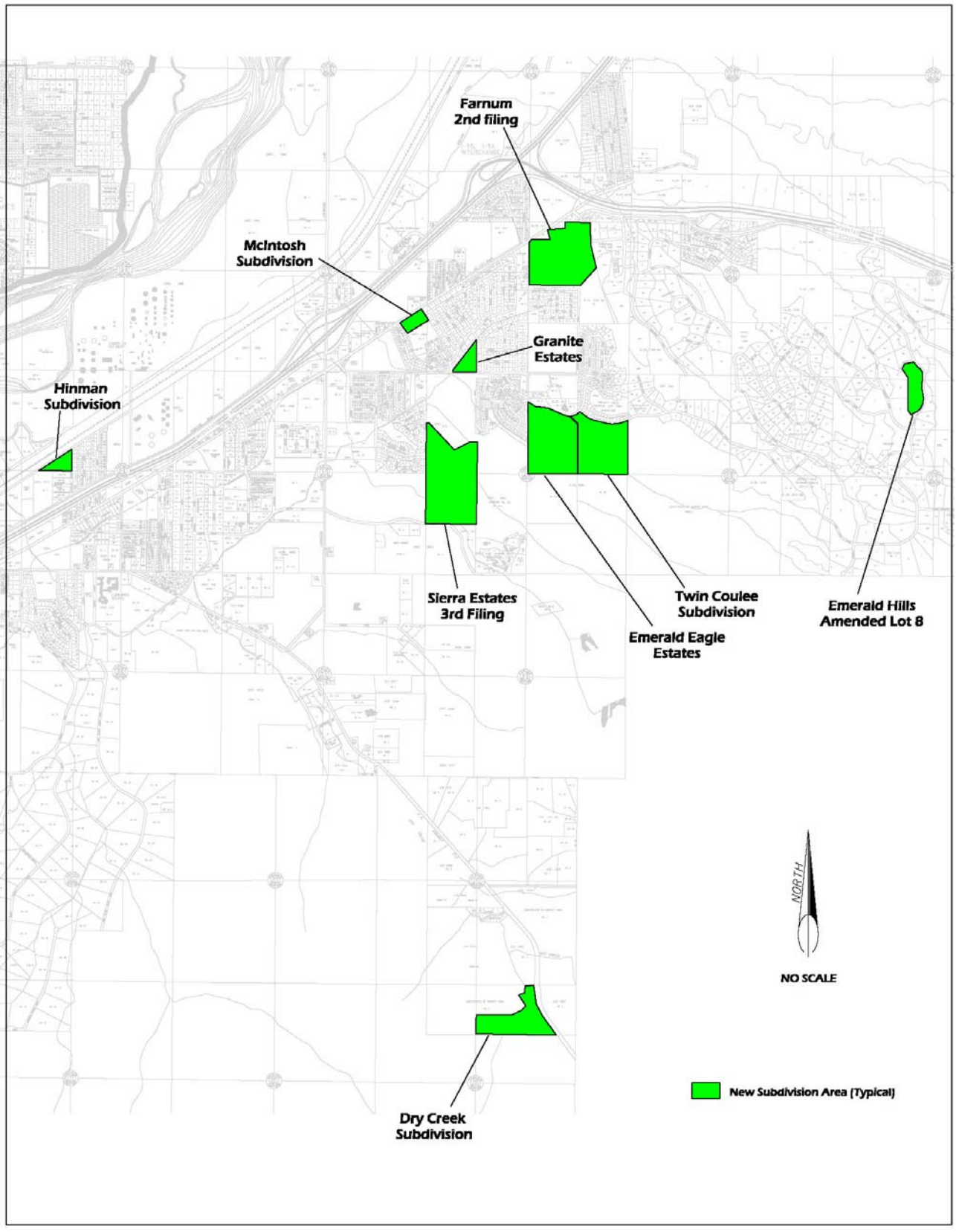
Lockwood is within the Billings urbanized area and is the largest unincorporated community in Yellowstone County and in the State of Montana. The 2000 Census designated a population of 4,306 persons living in the Lockwood area, with a growth rate of 8.5% from 1990 to 2000. However, according to the Lockwood Community Plan, closer review of the Census data using the Lockwood School District 26 boundary showed that approximately 7,200 people live in the Lockwood area.

Through review of recent subdivision platting and development activity in Lockwood, it appears that anticipated growth within the near future would be consistent with the growth rate presented in the Census data. The following subdivisions in the Lockwood area have been submitted for preliminary or final plat approval over the last several years:

- Dry Creek Subdivision – 10 residential lots
- Emerald Eagle Estates Subdivision – 73 residential lots
- Emerald Hills Subdivision, Amended Plat of Lot 8, Block 2 – 3 residential lots
- Farnum Subdivision, Second Filing – 59 residential lots
- McIntosh Subdivision, Fifth Filing – 6 residential lots
- Sierra Estates Subdivision, Third Filing – 88 residential lots
- Granite Estates Subdivision – 8 residential lots
- Hinman Subdivision – 3 commercial lots
- Twin Coulee Subdivision – 50 residential lots

Figure 2 illustrates the location of each of these new subdivisions. Full occupancy of these 297 residential lots could potentially add approximately 743 people to the Lockwood area, based on an average of 2.5 people per household. This would result in an increase of approximately 10.3% over the current population estimate of 7,200 people.

Figure 2. New Lockwood-Area Subdivisions



More impressive than the population figures for this unincorporated community, industry and related employment in the Lockwood study area have always been its most visible characteristics. At the present time, there are approximately 500 retail and 2,000 non-retail jobs in the Lockwood study area. The Exxon refinery is the largest employer in the area and has the largest visible presence. There are also numerous manufacturers, warehousing facilities, wholesale suppliers, and other industrial facilities. In addition to the industrial sector, which depends heavily on truck transport, there are numerous trucking firms and truck service facilities. Home-based commercial trucking facilities and surface transport dependent industrial facilities combine to create a heavy demand on many of Lockwood's area streets. Therefore, location and design of street system improvements in Lockwood requires special attention to the needs of heavy commercial vehicles.

One other distinguishing characteristic of the Lockwood area is the Lockwood School District, which has an outstanding elementary/middle school complex located on Highway 87. It is one of the largest school complexes in the state of Montana and is widely recognized for its excellent staff and facilities. It has become a focal point of the community and serves as a source of community pride and cohesion. While the Johnson Lane Interchange area is considered the commercial center of the community, the Lockwood School is undoubtedly the social center.

ZONING

Figure 3 is a zoning map of the Lockwood area adapted from the Lockwood Community Plan. This map provides an illustration of current land use patterns within the Lockwood area, including the commercial/industrial areas, which parallel the Interstate 90 corridor. Almost all of the area north of Interstate 90 lies within a "Heavy Industrial" or "Controlled Industrial" zone. The majority of land in the study area is currently zoned "Agricultural Open", and is anticipated to eventually be developed as residential. The remainder of zoned areas are equally split between residential and commercial land uses. While zoning provides a guide for future growth potential, there are many areas of non-conformance that were "grandfathered" into the current zoning scheme.

STREET SYSTEM

Lockwood roads and streets are currently an eclectic collection of Montana state highways, frontage roads, urban highway system routes, and Yellowstone County streets. The roadways were all constructed to varying standards. Most are paved, but some local dedicated streets are gravel. There are a number of extended length private roadways. This transportation study included an inventory of most of the streets and roadways within Lockwood to establish a database of existing roadway conditions within the study area. Conditions reported during this inventory include street width, pavement markings, curb and gutter, sidewalk, street lights, surface condition and speed limit. A summary of the results of this data collection effort is provided in Appendix B.

Figure 4 illustrates the current roadway functional classification scheme within Lockwood. This map was adapted from the Billings Urban Area Transportation Plan 2005 Update, but it is not identical to the federally approved classification system. Since the urban plan was generalized by design, all of the future street classifications represent an approximate alignment to provide internal connectivity. To be discussed in further detail in the "Future Street System" section, this localized transportation study provides a more specific representation of location and function of existing and future roadways.

Figure 3. Existing Zoning

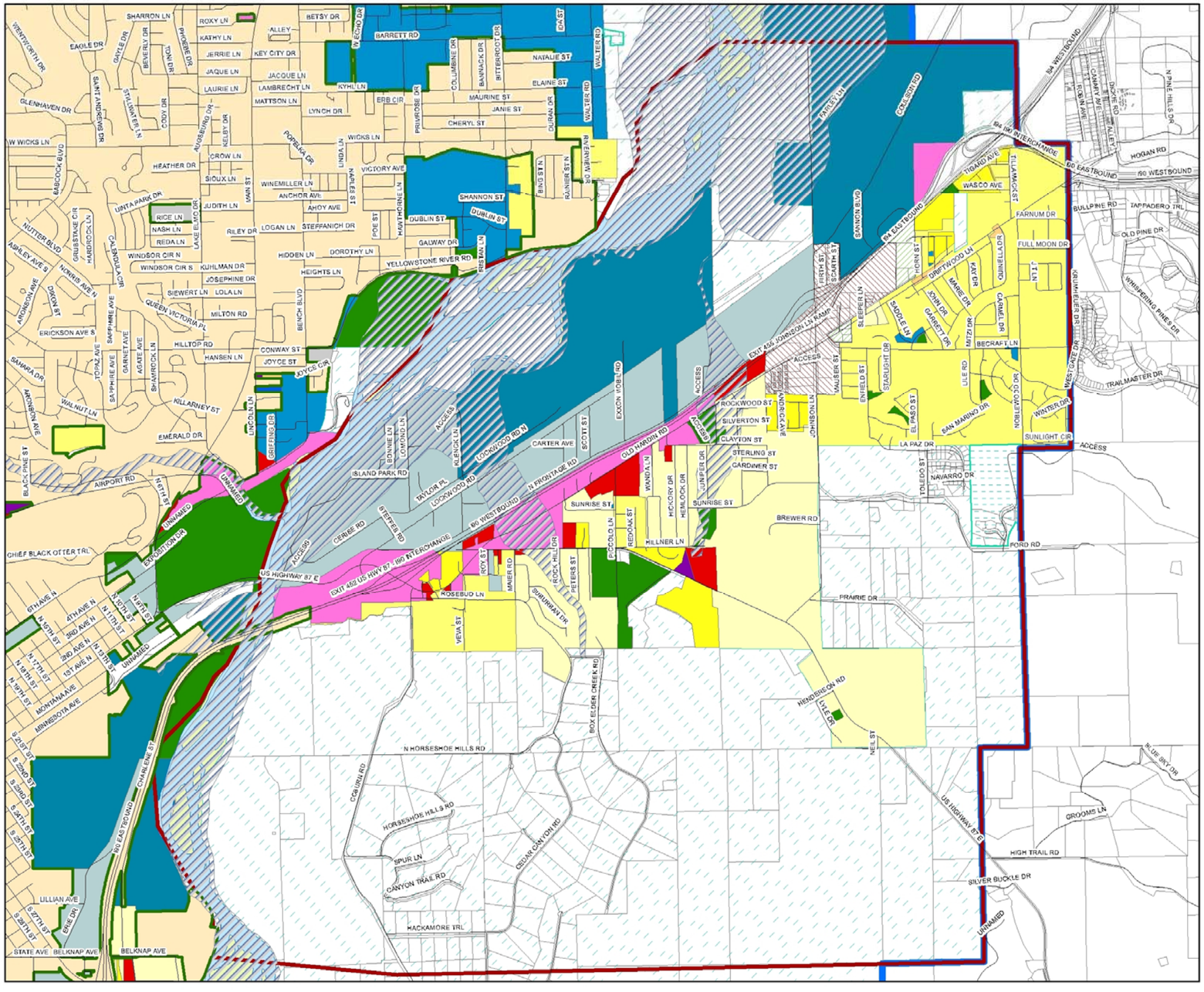
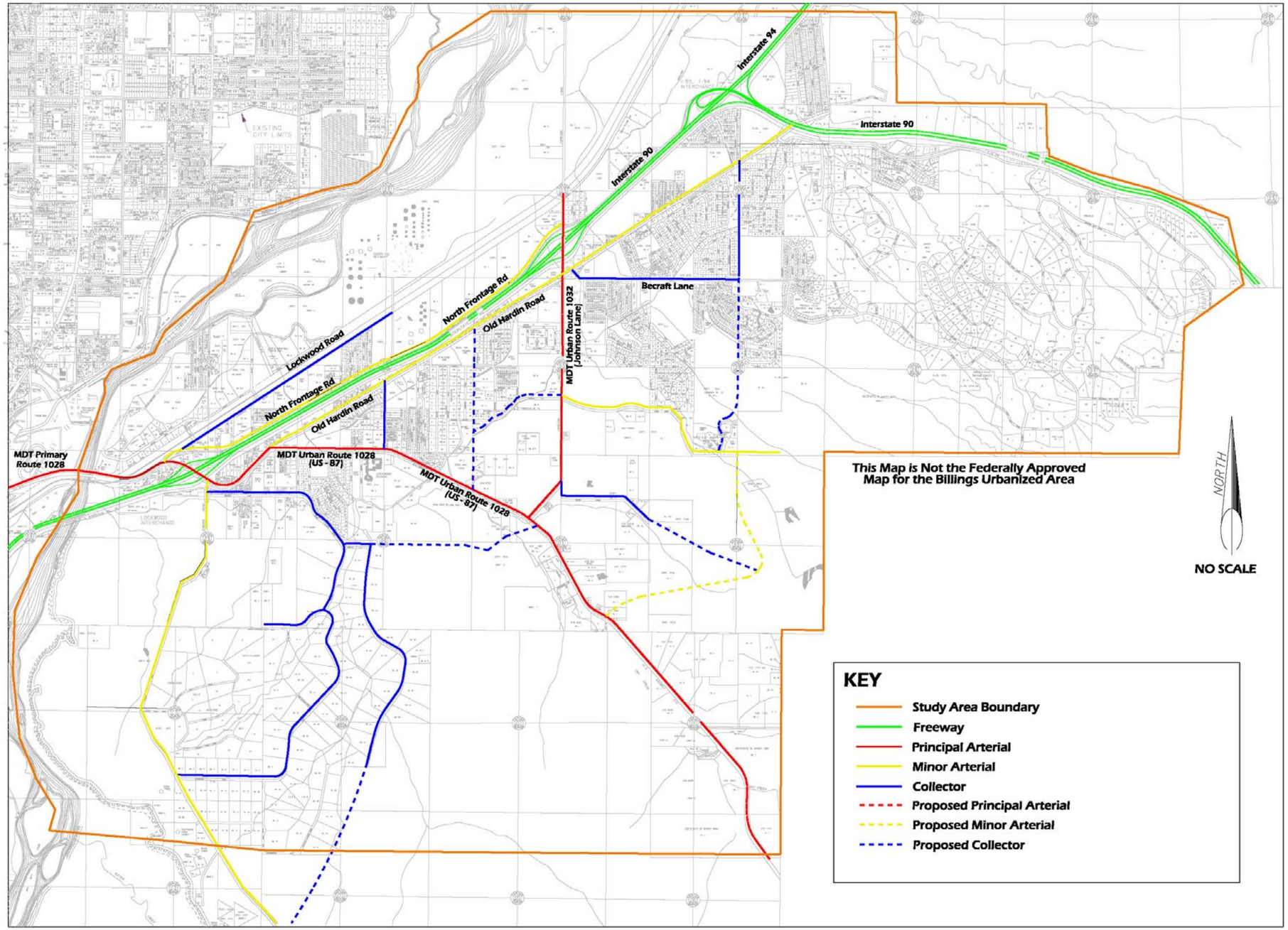


Figure 4. Existing Functional Classification System



INFRASTRUCTURE

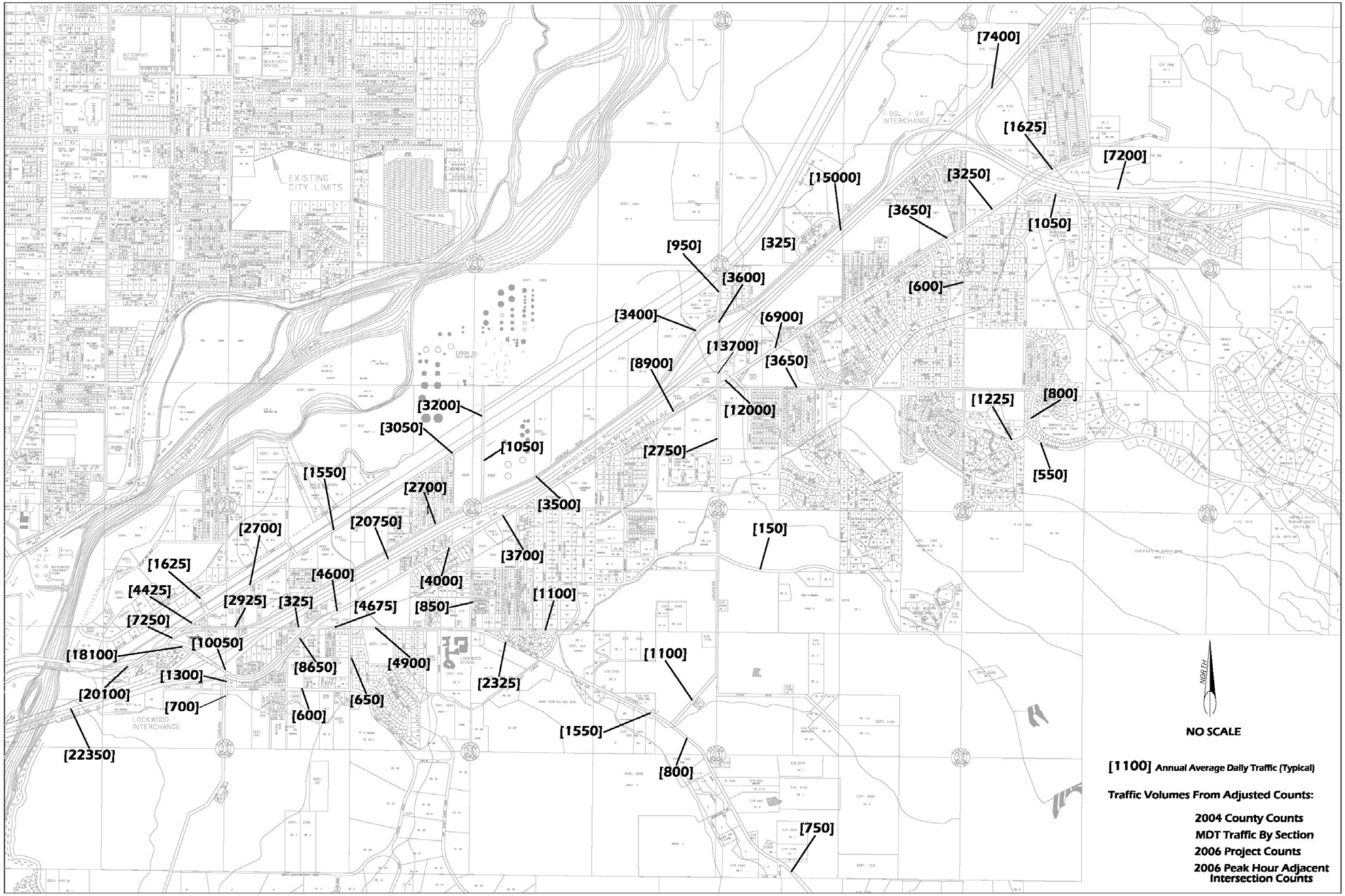
Lockwood currently has an independent water system separate from the City of Billings. In the recent past, a number of attempts have been made to create a sanitary sewer district which would construct a major trunk line system and treatment plant. All proposed initiatives had failed for various reasons. Because of environmental concerns and area growth, Lockwood will eventually need to construct a sewer system. With the recently approved agreement with the City of Billings to provide sewage treatment for Lockwood, it must be assumed that a future sewer system will be in-place or that portions of the system will be incorporated into future street construction projects. For this reason, any recommendations for new street or roadway links will be coordinated with potential economics related to sewer construction.

Lockwood is also devoid of an extensive storm drainage system. It is anticipated that higher density development and the construction of multi-lane street facilities will eventually necessitate construction of underground storm drainage structures and systems. In areas where street rights-of-way are limited and roadside drainage ditches are not feasible, underground systems will be required to prevent deterioration of streets and roadways. Extensive curb and gutter installations would not be possible without a defined and controlled collection and outfall system.

TRAFFIC VOLUMES

This study began with a comprehensive data collection effort. The City-County Planning Department provided recent 24 hour average daily traffic (ADT) counts at 17 different locations. These counts were augmented by additional electronic recording counts at 16 different locations along with PM peak hour turning movement counts at 21 new locations. The aggregate sum of all traffic counts provided an extensive coverage of the entire Lockwood area, which proved to be invaluable throughout all phases of this study. Figure 5 provides a visual summary of existing 24-hour average daily traffic (ADT) at various locations throughout Lockwood.

Figure 5. Existing Traffic Volumes



CRASH HISTORY

Area-wide crash records for the three year period from January 2003 through December 2005 were obtained from the MDT Traffic Safety Bureau. Crash data was screened for clusters and all locations with a minimum of 3 or more crashes were selected as potential safety problem areas. Crash data at the cluster locations was used to calculate individual intersection crash rates and severity rates, as summarized in Table 1. The results of these calculations were used as a tool to identify potential safety problem areas as discussed in greater detail in the following report sections. The only location with a higher than average crash rate was the US-87 and Lockwood Road intersection (1.85/mvm).

Table 1. Lockwood Area Crash Data Summary

Intersection		Crashes	Injuries	Fatalities	Injury Crashes (%)	(1) Crash Rate	(2) Severity Rate
Street Name	Street Name						
US Highway 87	Lockwood Road	46	25	0	35%	1.849	3.135
US Highway 87	I-90 Westbound ramps	15	6	0	27%	0.733	1.123
US Highway 87	I-90 Eastbound ramps	20	20	0	20%	0.987	1.382
US Highway 87	Coburn Road	4	0	0	0%	0.377	0.377
US Highway 87	Piccolo Lane	3	0	0	0%	0.597	0.597
US Highway 87	Old Hardin Road	5	5	0	60%	0.500	1.101
Johnson Lane	North Frontage Road	3	2	0	33%	0.662	1.103
Johnson Lane	I-90 Westbound ramps	4	3	0	75%	0.541	1.353
Johnson Lane	I-90 Eastbound ramps	11	5	0	27%	0.619	0.957
Johnson Lane	Old Hardin Road	11	3	0	18%	0.538	0.734
North Frontage Road	Lockwood Road	3	0	0	0%	0.375	0.375

(1) Crash Rate = # Crashes / Million Vehicles Entering January 2003 to December 2005

(2) Severity Rate = ((# Fatalities x 8 + # Injuries x 3 + # Property Damage) / # Crashes) x # Crash Rate

Intersection crash rates are not typically reported as a statewide statistic by MDT. Therefore, the average intersection crash rate cannot be determined with any degree of certainty. From past studies within the Billings Urban Area, it has been generally accepted that the majority of intersections experience a crash rate less than 1 per million vehicles entering (mve). Intersections with crash rates above 1 crash/mve are generally considered to be higher than average.

CAPACITY ANALYSIS

Planning level capacity calculations were completed at higher volume intersections, the results of which are summarized in Table 2. Although the capacity calculations performed for existing conditions showed that all study area intersections are currently operating at acceptable levels of service, several intersections were identified as operational problem areas as discussed in the following report section.

Table 2. Capacity Calculation Results

Intersection	*Approach*	*Existing (2007) PM Peak*		*Intersection*	*Approach*	*Existing (2007) PM Peak*	
		Control Delay	*LOS*			*Control Delay*	*LOS*
US Highway 87 & Lockwood Road	NB	3.9	A	US Highway 87 & Johnson Lane	NB	-	-
	SB	4.6	A		SB	8.8	A
	EB	19.7	B		EB	7.3	A
	WB	22.6	C		WB		
Lockwood Road & North Frontage Road	NB			Johnson Lane & Old Hardin Road	NB	5.2	A
	SB	7.7	A		SB	7.6	A
	EB	-	-		EB	17.0	B
	WB	18.2	C		WB	16.0	B
Lockwood Road & Steffes Road	NB			I-90 Eastbound ramps & Johnson Lane	NB		
	SB	11.6	B		SB	8.9	A
	EB	8.4	A		EB	12.5	B
	WB	-	-		WB		
Coburn Road & Rosebud Lane	NB			I-90 Westbound ramps & Johnson Lane	NB	8.3	A
	SB	7.5	A		SB		
	EB	-	-		EB	-	-
	WB	8.6	A		WB	19.8	C
US Highway 87 & Coburn Road	NB	23.1	C	Johnson Lane & North Frontage Road	NB	7.4	A
	SB				SB	7.3	A
	EB	-	-		EB	9.6	A
	WB	10.4	B		WB	12.1	B
Lockwood Road & Brickyard Lane	NB	11.0	B	Old Hardin Road & Becraft Lane	NB	21.8	C
	SB	-	-		SB		
	EB				EB	-	-
	WB	7.3	A		WB	9.3	A
Lockwood Road & Klenck Lane	NB			Becraft Lane & Westgate Drive	NB	9.1	A
	SB	10.3	B		SB	-	-
	EB	7.8	A		EB		
	WB	-	-		WB	7.4	A
US Highway 87 & Old Hardin Road	Intersection Capacity Utilization (ICU) = 55.6%			Old Hardin Road & Noblewood Drive	NB	10.0	B
					SB	-	-
	ICU LOS = B				EB		
					WB	7.6	A
US Highway 87 & Maier Road	NB	10.9	B	Old Hardin Road & Dickie Road	NB	9.6	A
	SB				SB	-	-
	EB	-	-		EB		
	WB	7.8	A		WB	7.5	A
US Highway 87 & Piccolo Lane	NB			Westgate Drive & Trailmaster Road	NB		
	SB	9.8	A		SB	7.3	A
	EB	7.4	A		EB	-	-
	WB	-	-		WB	9.0	A
Old Hardin Road & Piccolo Lane	NB	11.0	B	Johnson Lane & Coulson Road	NB		
	SB	10.9	B		SB	7.3	A
	EB	7.5	A		EB	-	-
	WB	8.1	A		WB	8.8	A
North Frontage Road & Exxon Mobile Lane	NB	-	-	I-90 Eastbound ramps & US Highway 87	NB	11.4	B
	SB	9.9	A		SB	18.6	B
	EB	7.9	A		EB	18.1	B
	WB				WB	-	-
Lockwood Road & Exxon Mobile Lane	NB	7.8	A	I-90 Westbound ramps & US Highway 87	NB	3.5	A
	SB				SB	3.5	A
	EB	9.5	A		EB	-	-
	WB	-	-		WB	25.7	C
Old Hardin Road & Greenwood Avenue	NB	11.3	B				
	SB	-	-				
	EB						
	WB	7.8	A				

EXISTING SAFETY AND OPERATIONAL PROBLEM AREAS

Based on a thorough review of the crash data provided by MDT and results of capacity calculations, the locations illustrated in Figure 6 were identified as having safety or operational problems under existing conditions. The following discussions provide a more detailed description of concerns at each of these problem areas.

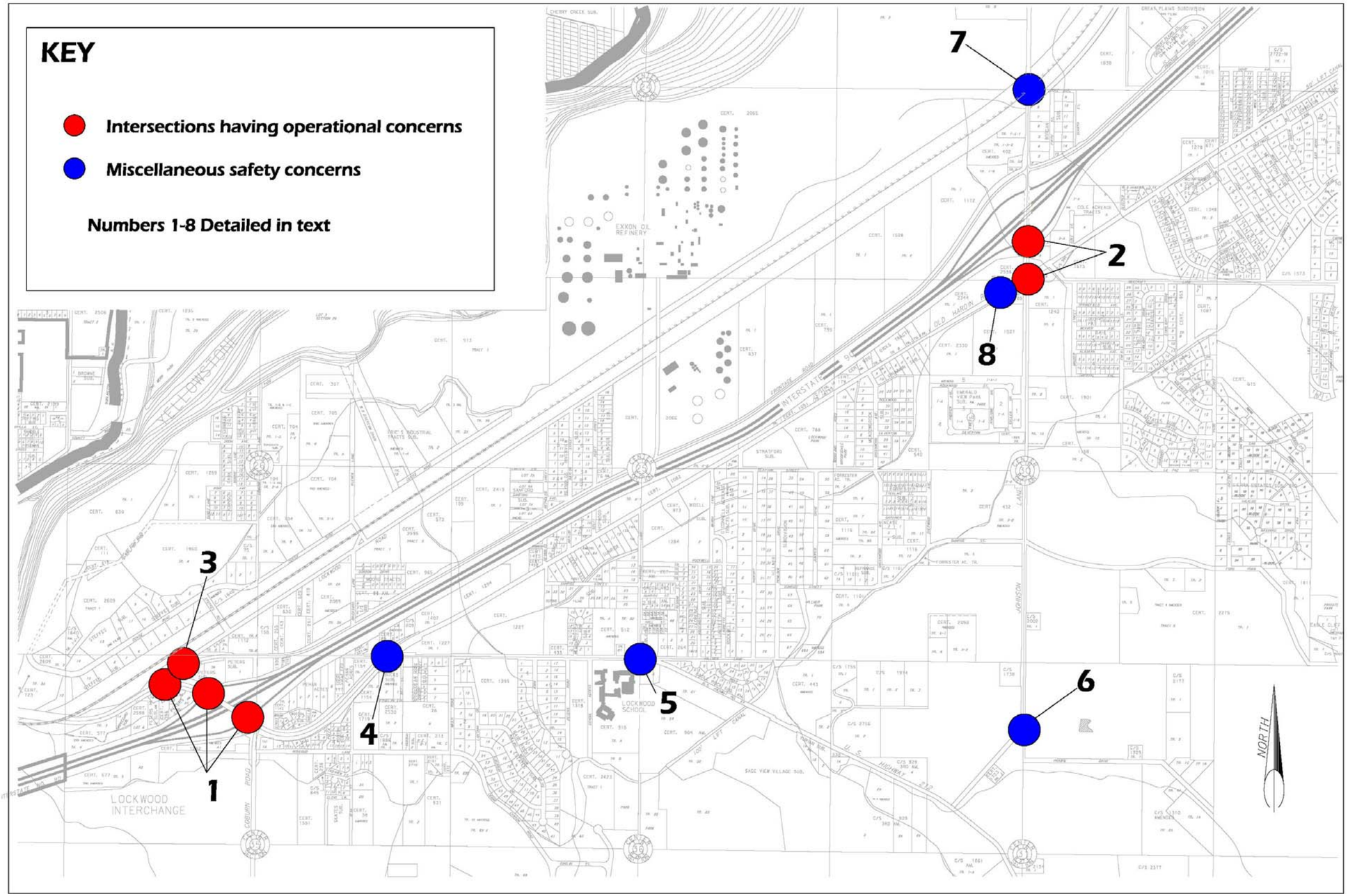
1 - LOCKWOOD INTERCHANGE

Long vehicle queues on the eastbound (EB) Interstate 90 ramp back-up onto Interstate 90 during the evening peak hours. The ramp intersects US 87 at an angle less than 90 degrees and other aspects of the intersection geometry are very restrictive. Vehicles on the eastbound off ramp (especially heavy trucks which make-up approximately 7% of the approach traffic) require an inordinate amount of time to execute the left-turn maneuver. The extended time between vehicle headways is extremely inefficient and takes away valuable green time for other movements at the US 87 – Interstate 90 EB Ramp intersection. Since this intersection is one of three signalized intersections associated with the Lockwood Interchange, inefficient operations at this intersection affects coordination and efficiency along the entire US 87 corridor.

Traffic queues on the eastbound off ramp create a situation where right-turning traffic uses the right ramp shoulder as a defacto right-turn lane. Unserviced vehicles on the ramp during the peak pm hour period were not included in the peak hour counts because saturation flow conditions occur for almost the entire duration of the counting period. Therefore, even though capacity calculations indicate that the level of service (LOS) is acceptable, saturation flow conditions would indicate that the actual and perceived LOS would be “E” or even “F”.

The Montana Department of Transportation (MDT) currently has a safety project being designed at this intersection that includes widening of the ramp to provide a new right-turn lane. This would legitimize the movements currently being made and add additional vehicle storage on the ramp approach.

Figure 6. Existing Safety and Operational Problem Areas



2 - JOHNSON LANE INTERCHANGE

The Johnson Lane Interchange area, including the intersections of Old Hardin Road with Johnson Lane and Becraft Lane, has been the subject of numerous studies in the past. Since most of the internal-external Lockwood traffic demand is funneled into this interchange area, any growth in the eastern half of Lockwood adds to traffic demands on Johnson Lane and Old Hardin Road. Past traffic plans for this location focused on phased improvements, which would have minimized operational problems. However, later phases of the plan were prevented from being implemented by development within the required rights-of-way. At the present time, the interchange and interconnected adjacent intersections operate at an undesirable level-of-service. MDT has recently completed an interchange improvement study for Johnson Lane, the results of which shall be considered as an alternative for future improvements, although several other alternatives will be outlined in this study. MDT has also investigated safety improvements at the intersection of Old Hardin Road and Johnson Lane and completed minor improvements.

3 - NORTH FRONTAGE ROAD & LOCKWOOD ROAD

Difficult geometrics, heavy truck traffic, and traffic flow patterns at the intersection of North Frontage Road and Lockwood Road, on the west end of the study area, have been cause for concern for many years. Steep grades on Lockwood Road further complicate the problem. In the recent past, additional

commercial approaches have been constructed on the south side of the intersection within the operational area of influence of the intersection. Truck drivers approaching the intersection from the east on North Frontage Road have a very difficult time seeing to the east and truck operators in the Lockwood area would like to see some sort of alternative intersection control or geometric changes implemented to improve the safety and efficiency at this intersection.

4 - OLD HARDIN ROAD & US HIGHWAY 87

The intersection of Old Hardin Road and Highway 87, east of the Lockwood Interchange, has undergone numerous traffic control changes in the past 30 years. This three-way stop intersection has experienced safety and efficiency problems due to acute intersection angles, unbalanced traffic flows and high speed operations. The three-way stop condition is confusing since the only traffic that is not required to stop is on the highest speed approach. The unusual traffic flow patterns, combined with three-way stop control create confusion for drivers unfamiliar with the intersection's operation. An evaluation of crash data at this location showed that five crashes occurred at this intersection during the period of 2003 to 2005, all five of which resulted in at least one injury. MDT is currently designing a project that will make this a 4-way stop intersection.

5 - US HIGHWAY 87 & PICCOLO LANE

Extensive improvements on Highway 87 adjacent to the Lockwood school complex have been made over the years, but there are still concerns regarding interaction between traffic and school age pedestrians. School drop-off and pick-up traffic combined with student pedestrian activities occur along one of the few arterial streets in Lockwood (US 87). This study addresses current conditions and provides recommendations regarding further traffic calming measures and access control to provide the safest environment possible.

6 - JOHNSON LANE & US HIGHWAY 87

The connection of Johnson Lane to Highway 87 has some difficult geometric conditions involving both horizontal and vertical curves. Crash data does not reflect safety concerns associated with the alignment conditions due to the relative low traffic volumes on this portion of Johnson Lane. However, as traffic increases in the future the increased exposure rate will undoubtedly increase the incident of crashes.

7 - JOHNSON LANE RAILROAD CROSSING

During steering committee meetings early in the project, the Johnson Lane railroad crossing was identified as an area of particular concern. The existing vertical alignment of the crossing causes site distance limitations for approaching traffic. Representatives from Yellowstone County Public Works indicated that a railroad crossing improvement project had recently been completed. The improvements consisted of a new railroad signal along with improved signing and pavement markings. Future geometric improvements to minimize the vertical curve should also be considered if substantial increases in traffic demand and operational conditions change.

8 - FLYING J TRUCK ACCESS

Based on observation of the study area and input from Lockwood-area residents, truck access to the Flying J located on Old Hardin Road is also a cause for concern. Access to both the restaurant and truck servicing areas are within the operational area of influence of the intersection at Old Hardin road and Johnson Lane. Trucks stacked on Old Hardin Road, awaiting access to the facility, back into the intersection, which sometimes creates gridlock conditions.

SHORT TERM IMPROVEMENT CONCEPTS

Once existing deficiencies were identified, improvement concepts were developed to determine if short term projects would provide immediate benefits and whether low cost improvements could be used as a basis for phased construction of longer term solutions. For purposes of this study, Short Term Improvements are defined as those projects that are currently needed and should be scheduled for completion within the next 5 years. The discussions on the following pages provide details of improvements recommended for short-term improvements.

LOCKWOOD INTERCHANGE

The safety project currently being designed by MDT would address storage problems on the eastbound off-ramp by providing an additional right-turn lane. However, that project should only be considered as a short term solution to problems at that specific intersection. Additional improvements should be considered, which would alleviate efficiency problems on the US 87 corridor at adjacent signalized intersection.

Figure 7, on the following page, illustrates additional improvements directed at the eastbound off-ramp based on realignment of the approach ramp to provide a perpendicular intersection with US Highway 87. The off-ramp in its new location should be striped with a dedicated left-turn lane, a shared through and left-turn lane and a dedicated right-turn lane. These improvements to the eastbound off-ramp would provide a substantial increase in capacity over existing conditions. In addition to these improvements, this would allow the signals at the two ramp intersections, as well as the signal at Lockwood Road to be rephased and/or retimed in order to provide more efficient operations of US 87 within the entire interchange area.

In addition to the improvements shown in Figure 7, future improvements to the intersection of Coburn Road and US 87, just east of the EB Ramps intersection may also be required to avoid conflicts between the two intersections due to their close proximity.

Realignment of Coburn to the east or other alternative geometric changes would likely be required if traffic demand on Coburn Road were to experience substantial increases.

Figure 7. Short-term Improvements – Lockwood Interchange

LOCKWOOD ROAD & NORTH FRONTAGE ROAD

Reconfiguration of the intersection by realigning the westbound North Frontage Road approach to intersect Lockwood Road at a 90 degree angle (thereby creating a traffic island), when combined with grade adjustments on Lockwood Road, would improve sight distance and increase safety as well as efficiency. Channelization and access restrictions for the adjacent approaches would lessen the potential for conflicts and accidents associated with access to the commercial properties. Benefits in safety to both the traveling public and adjacent landowners would result. In addition, the improvements would allow opportunities to improve the aesthetic appearance of the adjacent properties.

Figure 8. Short-term Improvements – Lockwood Road & North Frontage Road

US HIGHWAY 87 & OLD HARDIN ROAD

MDT's current safety project design would create a 4-way stop intersection to replace the confusing 3-way stop condition. Even if an added eastbound free right-turn lane on the US 87 approach is incorporated into the design, additional delay would be added to operations as a sacrifice for safer operations. The MDT project would add immediate benefits in terms of safety, yet improved efficiency is a high priority according to comments received at the December 2007 Lockwood Transportation Study public meeting. Therefore, the improvements illustrated in Figure 9 are recommended as longer term improvements. The roundabout will dramatically improve operations and reduce overall delay at this intersection, especially during the morning hours when stop controlled approaches have the highest traffic volumes. Not only will the roundabout provide superior safety features, but safer access to adjacent commercial properties can be achieved while enhancing the aesthetics of those properties. The recommended improvements were also seen as an enhancement to the community of Lockwood since this is the gateway or terminal point to two key corridors in Lockwood.

Figure 9. Short-term Improvements – US 87 & Old Hardin Road

LOCKWOOD SCHOOL & PICCOLO LANE

The proposed improvements shown in Figure 10 would channelize and constrict traffic lanes as a calming measure while providing defined pedestrian areas and a shorter pedestrian crossing path created by the median would be marked by signs and flashers. Improved intersection geometry for the US 87 – Hilner Lane intersection would substantially lessen the acute intersection angles and relocate the fifth intersection leg to a point where the additional vehicle conflicts do not occur near the pedestrian crossing. The open areas in the resulting traffic island would serve as storm water retention areas allowing for installation of curb and gutter to control and delineate vehicle paths. A westbound left-turn lane into the western school entrance will allow for vehicle stacking without impeding thru traffic during peak periods. These improvements would be accompanied by reconstruction of Piccolo Lane to accommodate future traffic and pedestrian demands.

Figure 10. Short-term Improvements – Lockwood School & Piccolo Lane

JOHNSON LANE & OLD HARDIN ROAD

The proposed improvements shown in Figure 11 feature additional Interstate 90 EB ramp lanes, additional lanes on Old Hardin Road, and construction of a new Becraft Lane access street combined with right-in and right-out restrictions at the existing Becraft-Old Hardin Road intersection. This configuration would allow installation of two new signals that could be coordinated to vastly improve traffic flow within the interchange area. Dual right-turn lanes on the eastbound off ramp would be signalized and coordinated with a signal at Johnson Lane and Old Hardin Road, which would have dual left-turn lanes. Closely coordinated signals with double the existing capacity would substantially reduce vehicle queues on the ramp and minimize vehicle storage demands on Johnson Lane between Old Hardin Road and the ramp. The new access road between Old Hardin Road and Becraft Lane would require right-of-way. Since the new road would dramatically improve access to the adjacent businesses, impacts to the businesses would be positive.

Figure 11. Short-term Improvements – Johnson Lane & Old Hardin Road

FLYING J TRUCK STOP ACCESS

The proposed improvements shown in Figure 12 would require extension of the westbound right turn lane to the western end of the property where all trucks would enter. Existing approaches would be modified to allow entrance and exit only maneuvers. Since these recommendations would require substantial changes to the Flying J internal circulation patterns, a high level of coordination with the Flying J owners would be required during design and it is possible that numerous variations in access control features would need to be investigated. The final result should be geared toward improving both safety and efficiency for the traveling public and for Flying J customers.

Figure 12. Short-term Improvements – Flying J Access

JOHNSON LANE SAFETY PROJECT

Back to back horizontal and vertical curves on the southern end of Johnson Lane are substandard for the operating speed of this facility. While past accident problems have not been extremely severe, increasing traffic demand on Johnson Lane will begin to stress its safety. Substantial horizontal and vertical realignment will be required to meet design speeds of this facility. If in the future there are any developments adjacent to Johnson Lane proposed, approval of the developments should include provisions for future realignment of the roadway as illustrated in figure 13.

Figure 13. Short-term Improvements – Johnson Lane Safety Project

COST ESTIMATES & POTENTIAL FUNDING SOURCES

Cost estimates were developed for each of the short-term improvements identified in the previous section. Possible funding sources were also investigated to determine what projects could be constructed within the near future and what projects may require special funding sources. Table 3 provides a summary of the cost estimates and potential funding sources for each project. Descriptions of the individual funding source programs can be found in Appendix C of this report.

Table 3. Short-term Project Cost Estimates & Potential Funding Sources

	Projects	Construction	A&E	R/W	Total Cost	Funding
1	Lockwood Interchange EB Ramp & Signals	$ 1,015,000.00	$ 160,000.00	$ 90,000.00	$ 1,265,000.00	*A,C,E,F*
2	Lockwood Road - N Frontage Road	$ 360,000.00	$ 45,000.00	$ 90,000.00	$ 495,000.00	*A,B,C,E,G*
3	Old Hardin Road - US 212 Roundabout	$ 490,000.00	$ 70,000.00	$ 70,000.00	$ 630,000.00	*A,B,C,E,G*
4	Lockwood School - Piccolo/Hilner Left-turn Lane	$ 490,000.00	$ 90,000.00	$ -	$ 580,000.00	*C,D,E,G,H*
5	Piccolo Lane Reconstruction/Bike Path	$ 780,000.00	$ 115,000.00	$ 365,000.00	$ 1,260,000.00	*A,D,E,G*
6	Johnson Lane - Old Hardin Road - I-90 Ramps	$ 1,000,000.00	$ 150,000.00	$ 120,000.00	$ 1,270,000.00	*A,E,G*
7	Flying J Access - Congestion Improvements	$ 674,400.00	$ 100,000.00	$ 50,000.00	$ 824,400.00	B,C,E,G
8	Johnson Lane Curve Reconstruction - Safety	$ 955,000.00	$ 150,000.00	$ 150,000.00	$ 1,255,000.00	*B,C,E,G*
	***Total Short Term Projects =**	**$ 5,764,400.00**	**$ 880,000.00**	**$ 935,000.00**	**$ 7,579,400.00**	

* All costs are in 2008 dollars without inflation factors

Funding Sources:
A - STPU Urban Highway System
B - State Fuel Tax
C - HSIP Highway Safety Improvement Program
D - CTEP Community Transportation Enhancement
E - Lockwood Transportation District
F - IM Interstate Maintenance
G - Tax Increment Financing District
H- SRTS Safe Routes to School

TRAFFIC MODELING

The recently updated Billing Urban Area QRS II model was used as the basis for future 20-year traffic volume projections for the Lockwood area. Modifications to the model within the Lockwood study area were made by disaggregating the existing Traffic Analysis Zones (TAZ) into smaller areas. The large TAZs in the Billings model are particularly suited to the general urbanized area of Billings, but would not provide enough corridor specific information for the localized street system in Lockwood. Division of the large TAZs into smaller zones was accomplished by using individual census blocks and visual inventories. Figure 14 illustrates the TAZ disaggregation that was used for this analysis.

New model centroids and connectors were added to the model to determine traffic projections on the internal street system corridors. Computer model runs were made for 20-year volume projections on the existing system, the results of which are illustrated in Figure 15. Without any improvements to the existing roadway network, the 20-year volume projections would result in the streets and intersections identified in Figure 16 being over capacity.

Figure 14. Traffic Analysis Zone (TAZ) Disaggregation

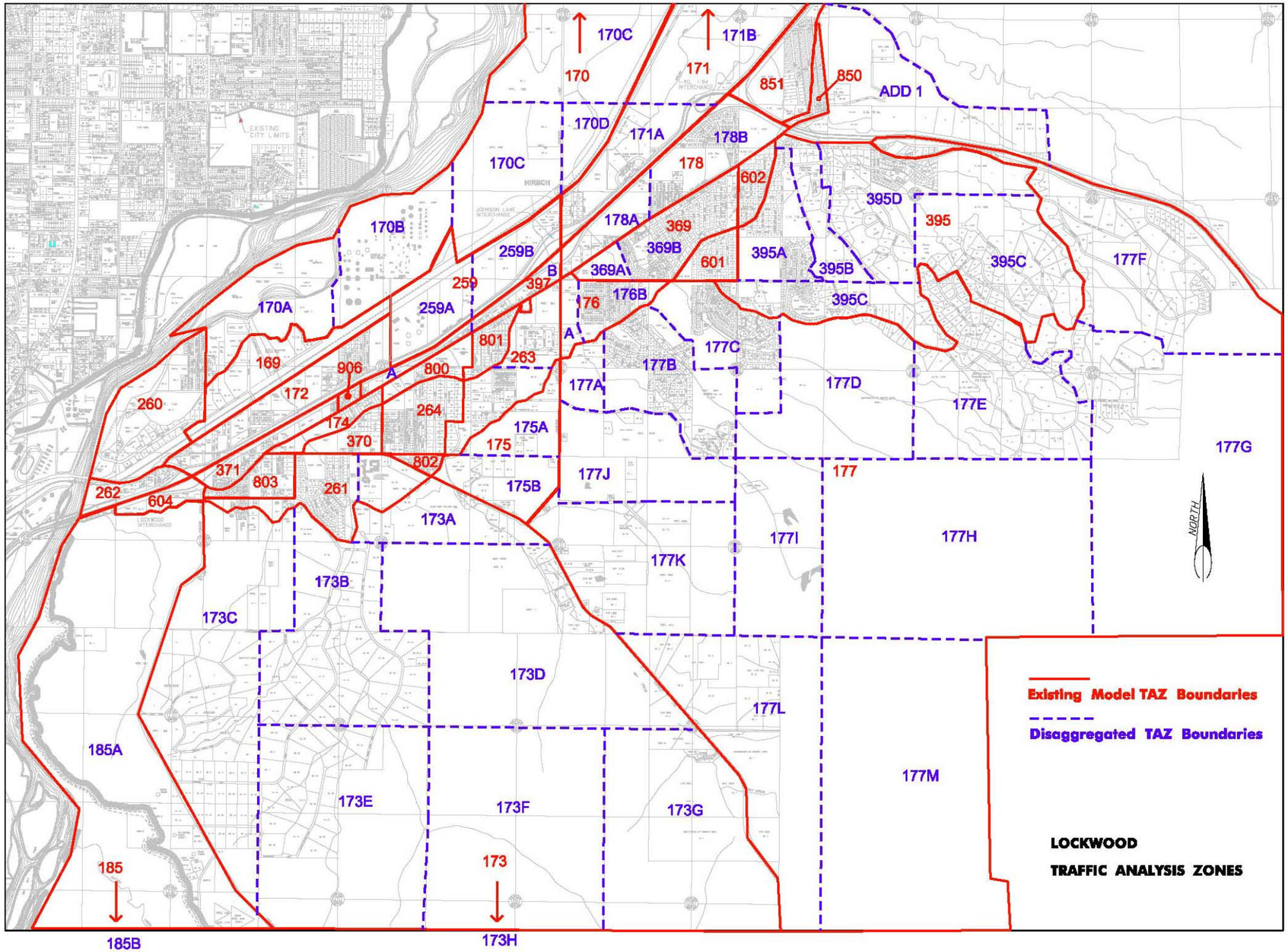


Figure 15. Future Traffic Volume Projections

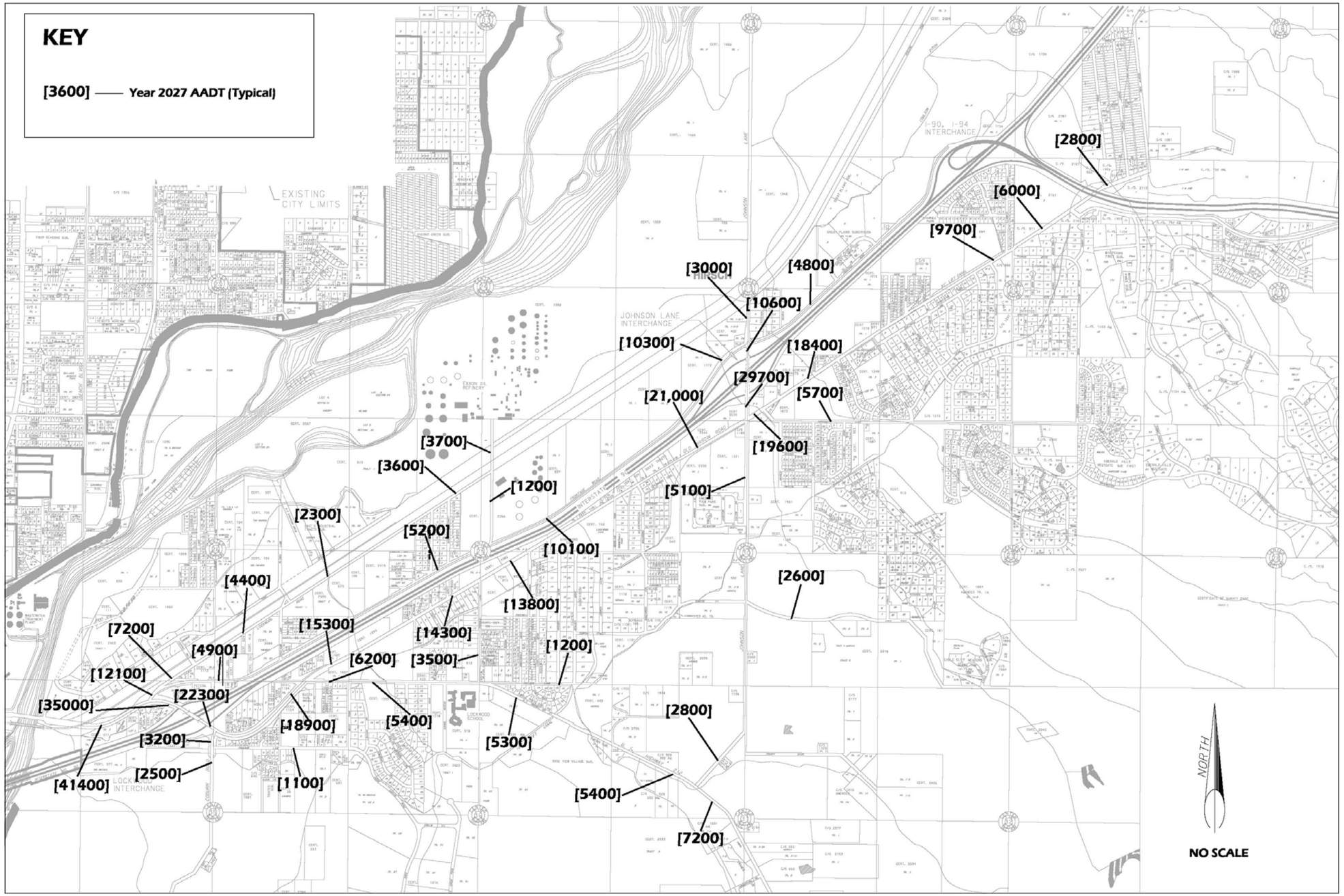
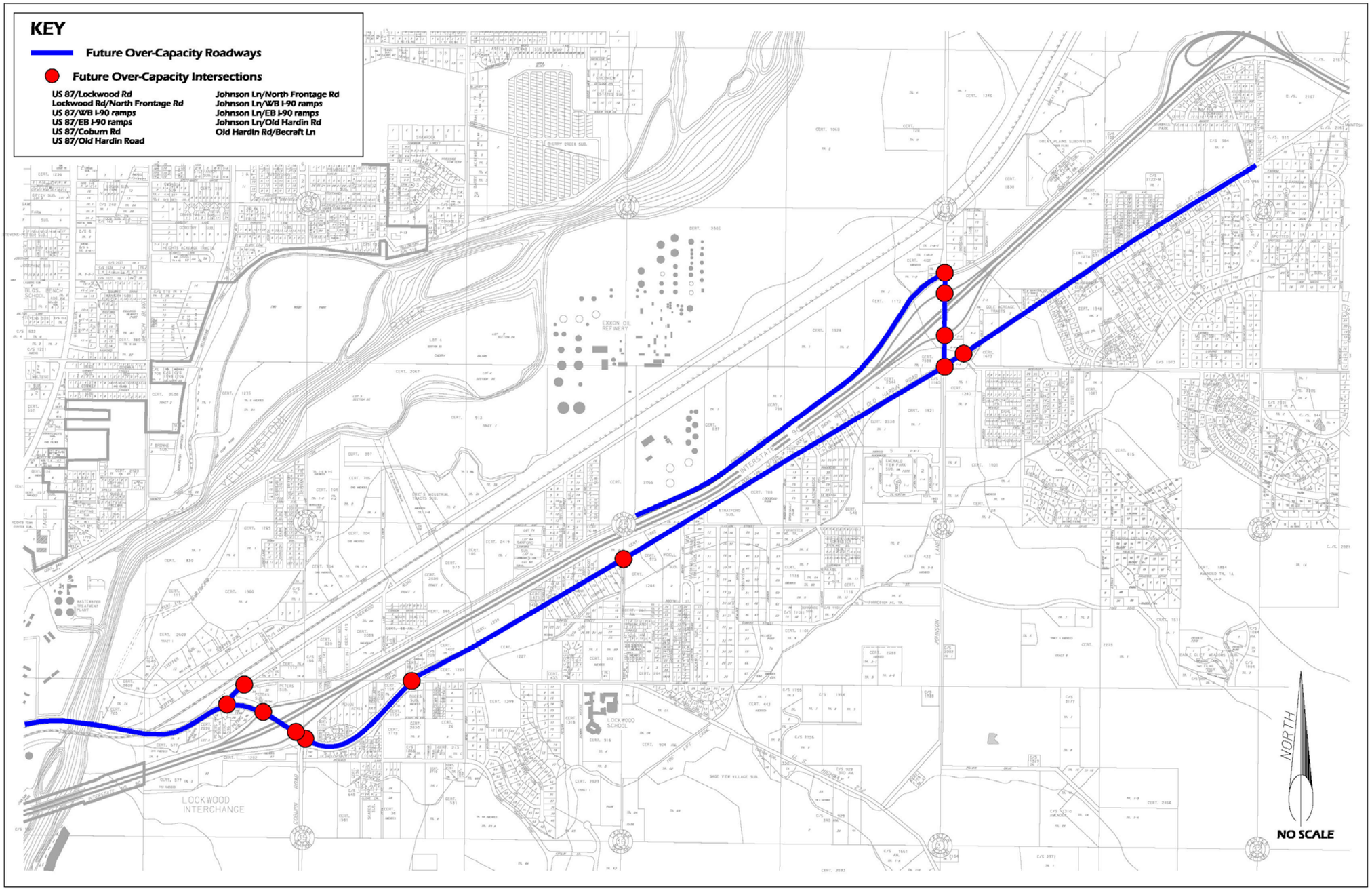


Figure 16. Future Capacity Issues



LONG TERM IMPROVEMENT CONCEPTS

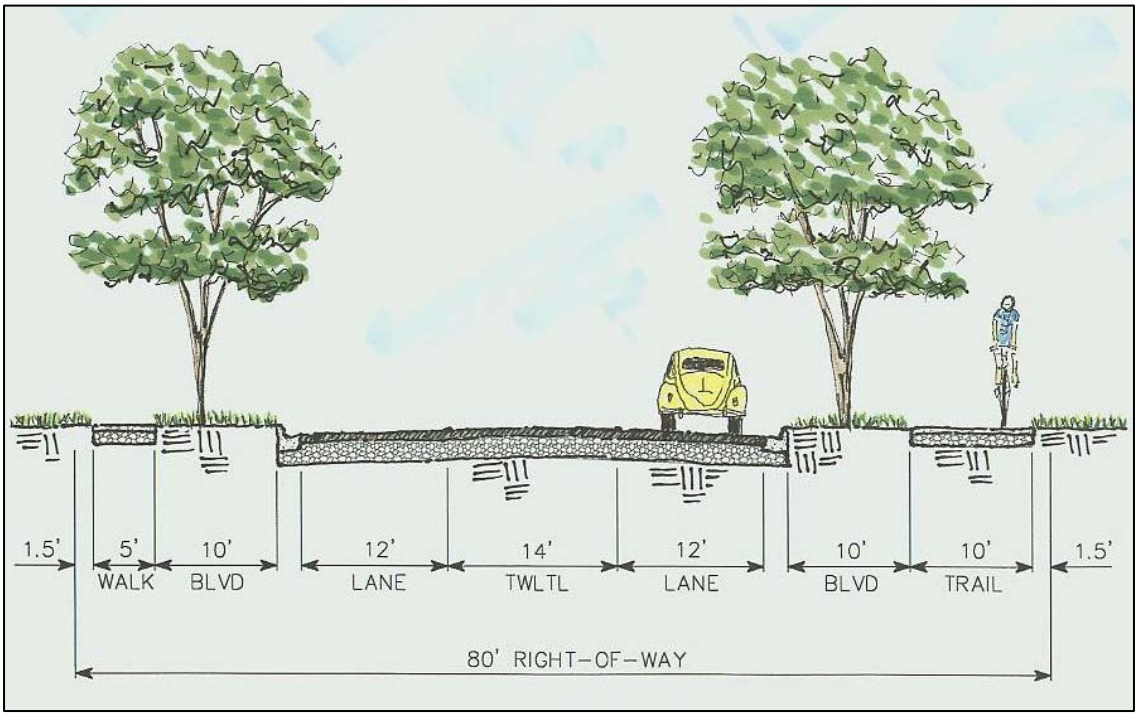
Existing and future street system deficiencies were identified and evaluated in order to determine what improvements could be implemented on the existing street system in the long term. For purposes of this report, long term improvements are defined as mitigation measures for current or anticipated future traffic problems that should be scheduled for completion within a 10 to 20 year time frame. This is in contrast to short term improvements which are encompassed within a 5 year time frame.

Additional traffic model runs were made to determine the relative degree of mitigation that would occur based on these improvements. It is likely that improvements to existing streets will only provide marginal relief to future operational problems. Therefore, additional mitigation measures were tested, including new street links and additional connectivity from Lockwood to other portions of the Billings Urban Area. The following sections provide detailed descriptions of each of the concepts for long-term improvements.

OLD HARDIN ROAD

Twenty year traffic volume projections on Old Hardin Road range from 13,000 to 22,000 ADT. Along the majority of its route, which is parallel to Interstate 90, future traffic volumes would be less than 17,000 ADT, which is near the upper range of capacity for a three lane street section. Because Old Hardin Road is parallel to Interstate 90, it can be assumed that 20 year traffic projections also represent the ultimate traffic volumes that Old Hardin Road may ever be required to service. Therefore, as a long-term improvement, it is recommended that Old Hardin Road be reconstructed to provide a three-lane section with a two-way left-turn lane, a single through lane in each direction, and boulevard-separated accommodations for pedestrians and bicycles. A 10-foot wide multi-use trail should be constructed on the south side of Old Hardin Road and 5-foot wide sidewalk should be constructed on the north side. An example typical section for future improvements is illustrated in Figure 17. This project must coincide with installation of a storm sewer main trunk and outfall.

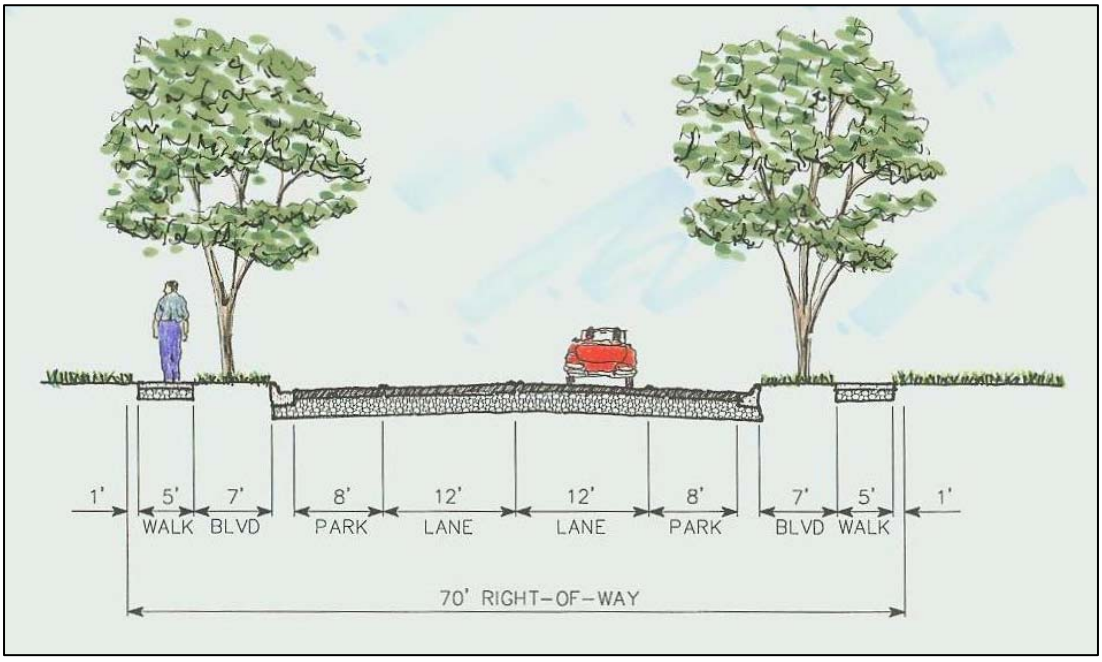
Figure 17. Long-term Improvements – Old Hardin Road Typical Section



US HIGHWAY 87

Twenty year traffic projections on US 87, east of Old Hardin Road, would range between 5,000 and 7,000 ADT. At that level of traffic demand, either a two-lane or three lane facility would provide sufficient capacity. The planned roadway section could be designed initially as a two-lane facility with parking on both sides and boulevard that could be removed and a continuous two-way left-turn lane installed if additional capacity were required in the future. Therefore, as a long-term improvement, it is recommended that US Highway 87 be reconstructed to provide one travel lane in each direction, on-street parking, and boulevard-separated accommodations for pedestrians and bicycles. An example typical section for future improvements to Highway 87 is illustrated in Figure 18.

Figure 18. Long-term Improvements – US Highway 87 Typical Section



JOHNSON LANE INTERCHANGE

In 2006, MDT commissioned a study by SEH Consultants which proposed long term improvements to both the Lockwood and the Johnson Lane interchanges. In both cases, the ramp intersections and adjacent signalized intersections would be replaced by roundabouts. While the MDT interchange study's proposal at Johnson Lane would provide the desired capacity and safety solutions, it was felt that alternatives should also be investigated in future design studies. A potential long-term alternative solution for traffic congestion at the Johnson Lane Interchange is illustrated in the Figure 19. This alternative would remove the Interstate 90 eastbound off-ramp connection from the congested area around the Johnson Lane - Old Hardin Road intersection thereby creating a substantial redirection of traffic within the interchange area. This would redirect Flying J truck traffic in a manner similar to the advanced ramp interchange in Belgrade, MT. Unused right-of-way along the existing EB ramp could be deeded to Flying J to restructure internal circulation and access to their facility. Recommended short term improvements in this area would still function with only minor modifications.

Figure 19. Long-term Improvements – Johnson Lane Interchange

LOCKWOOD INTERCHANGE

Similar to the Johnson Lane Interchange, additional alternatives should be investigated during future design efforts at the Lockwood Interchange. One such alternative that would work well at this location is a Single-Point Urban Interchange (SPUI). It would provide for safe and efficient traffic operations and allow the intersections of US 87 and Coburn and US 87 and Lockwood Road to both operate independently from the ramp intersections. Figure 20 illustrates the potential configuration of a SPUI with the ramp termini intersection on the upper bridge deck and the interstate passing beneath. The interchange shown in Figure 20 is located in Nashville, Tennessee. It operates very efficiently and carries three times the traffic volumes that the Lockwood interchange would have in the year 2028.

Figure 20. Long-term Improvements – Lockwood Interchange

Note: The interchange illustrated above is located in Nashville,TN

NORTH/SOUTH CONNECTOR

Since Interstate 90 divides the community of Lockwood, traffic demand between the north and south areas of Lockwood is currently served by US 87 and Jonson Lane. Both of these connection roads pass through the Interstate 90 interchanges where future access traffic will stress the capacity of both connections. Therefore, alternative access between north and south Lockwood would be desirable. The proposed long-term improvement project, shown in Figure 21, would provide an additional connection between the areas of Lockwood located north and south of Interstate 90. This connection, located near Piccolo Lane, would carry approximately 11,000 ADT and provide substantial relief from traffic congestion at both the Lockwood Interchange and the Johnson Lane Interchange. This proposal would require some reconstruction on Interstate 90 to adjust grades and build overpass structures. The connector road would be partially depressed and storm drainage would be gravity fed using a discharge line to the north. The new storm drainage line could be used as the main trunk for a future Lockwood storm drainage system.

Figure 21 Long-term Improvements – North/South Connector

EMERALD HILLS EMERGENCY ACCESS CONNECTION

The Emerald Hills area has experienced multiple forest fires over the past few years. The single existing access to the area does not provide for adequate access for emergency situations. Prior to finalization of this study, it was recommended that an emergency access connection be made from Box Canyon Road to Old Pine Road, as illustrated in Figure 22. Prior to completion of the final study report, the emergency access roadway was constructed and is currently in-place. It was constructed as a gated access to be used for emergency purposes only.

Figure 22. Long-term Improvements – Emerald Hills Emergency Access Connection

FUTURE ACCESS IMPROVEMENTS

The most severe limitations relative to future growth in the Lockwood study area are the number of connections to Billings. The only direct access road is US 87 at the Lockwood interchange. The only accesses to Interstate 90 are at Johnson Lane and at the Lockwood Interchange. In either case, all trips between Billings and Lockwood must pass thru the Lockwood interchange. Connectivity between Lockwood and Billings has been the subject of various studies ever since the first transportation plan in the early 1960s. Various locations and configurations have been proposed in that period of time, but none of the proposals have ever advanced to the planning phase. A previous concept for a bypass from Highway 3 to Interstate 90 evolved into what is now known as the Billings Bypass project that would connect Interstate 90 to Highway 3, north of Billings. The Billings Bypass Study is a federally funded project that is a part of the Camino Real Trade Corridor. The initial Bypass Feasibility Study (completed in 2001) and the Environmental Impact Study (currently in progress) indicated that the bypass route alignment would be further north and east than the original concept. As such, it would only be marginally effective in serving trips between Lockwood Billings/Billings Heights.

A new, more direct connection between Lockwood and Billings would obviously have dramatic implications on the Billings street system, and the production of meaningful information would require a massive study effort, which is beyond the scope of this study. However, concept level evaluations within this study provide ideas dedicated to improving internal connectivity, such as an underpass between Old Hardin Road and North Frontage Road. Such a connection may be valuable in redistributing traffic demand and providing a direct tie between the two portions of Lockwood now divided by Interstate 90. Other concept evaluations within this study address the benefits of a partial interchange located between the Lockwood and Johnson Lane Interchanges, a direct connection between Billings Heights and Lockwood, and a new Interstate 90 interchange on the northeast corner of Lockwood.

LOCKWOOD/HEIGHTS ARTERIAL CONNECTOR

The first alternative concept evaluated is an arterial street connection between Lockwood and Billings Heights, using the Exxon refinery property to stay out of the Yellowstone River Flood Plain (see Figure 23, on the following page). The feasibility of this alternative is highly dependent upon the ability to locate an arterial along the Exxon refinery property in order stay out of the flood plain and to minimize the length of bridge structure required to cross the Yellowstone River. Another challenge would involve alignment and grade requirements climbing at least part way up a 150' high bluff to connect to either Yellowstone River Road or Wicks Lane. The proposed north/south connector road between Old Hardin Road and North Frontage could also serve as phase 1 of this alternative concept. If the physical challenges or costs prove to be too great for future consideration, at least the internal connector would alleviate some future congestion.

While the political, technical, and financial challenges are great, it is one of the only remaining ways to physically connect the two communities. The traffic benefits appear to be great. Traffic model runs for this alternative indicated a total increase in external traffic entering and leaving Lockwood, since the Billings Heights commercial district would be much closer than ever before in terms of travel time. Thus, this concept appears to have an economic benefit component as well. The modified MDT traffic model indicated that the connection link would carry between 18,000 to 20,000 annual average daily traffic (AADT), resulting in traffic reductions of 4,000 AADT at Johnson Lane interchange and 5,000 AADT at the Lockwood interchange. Similar traffic reductions on Main Street, north of 1st Avenue North would also occur.

Figure 23. Future Access Improvements – Lockwood/Heights Arterial Connector

PARTIAL INTERCHANGE & NORTH/SOUTH CONNECTOR

An alternative connection involves a partial interchange on Interstate 90 in the vicinity of Piccolo Lane, which is about midway between the Johnson Lane and Lockwood interchanges. Figure 24, on the following page, shows a connection road between Old Hardin Road and the North Frontage Road at Piccolo Lane, which was a recommended long term improvement to tie the north and south sides of Lockwood together and avoid internal trips having to use the two existing interchanges (11,000 ADT). For this concept, an eastbound off ramp and a westbound on ramp are added to the north/south connector to gain external access. The traffic model indicates that each ramp would carry 8,000 ADT.

One of the biggest challenges associated with this alternative would be FHWA approval of a partial interchange, even though all geometric design guidelines could be met and traffic operations would be safe and efficient. The benefits for Lockwood would be positive, even though traffic reductions at the Lockwood interchange and on Main Street would not be as great as a direct connection between Lockwood and Billings Heights. Traffic reductions at the Johnson Lane interchange would be substantial and reductions on Interstate 90 between Johnson Lane and the partial interchange would be about 14,000 ADT, which would certainly delay the time when construction of additional lanes on Interstate 90 would be required. The partial interchange could be the location where Interstate 90 becomes a 6 lane facility in the future, with the on and off ramps being the add lane and drop lane transition point.

Figure 24. Future Access Improvements – Partial Interchange & North/South Connector

EMERALD HILLS INTERCHANGE

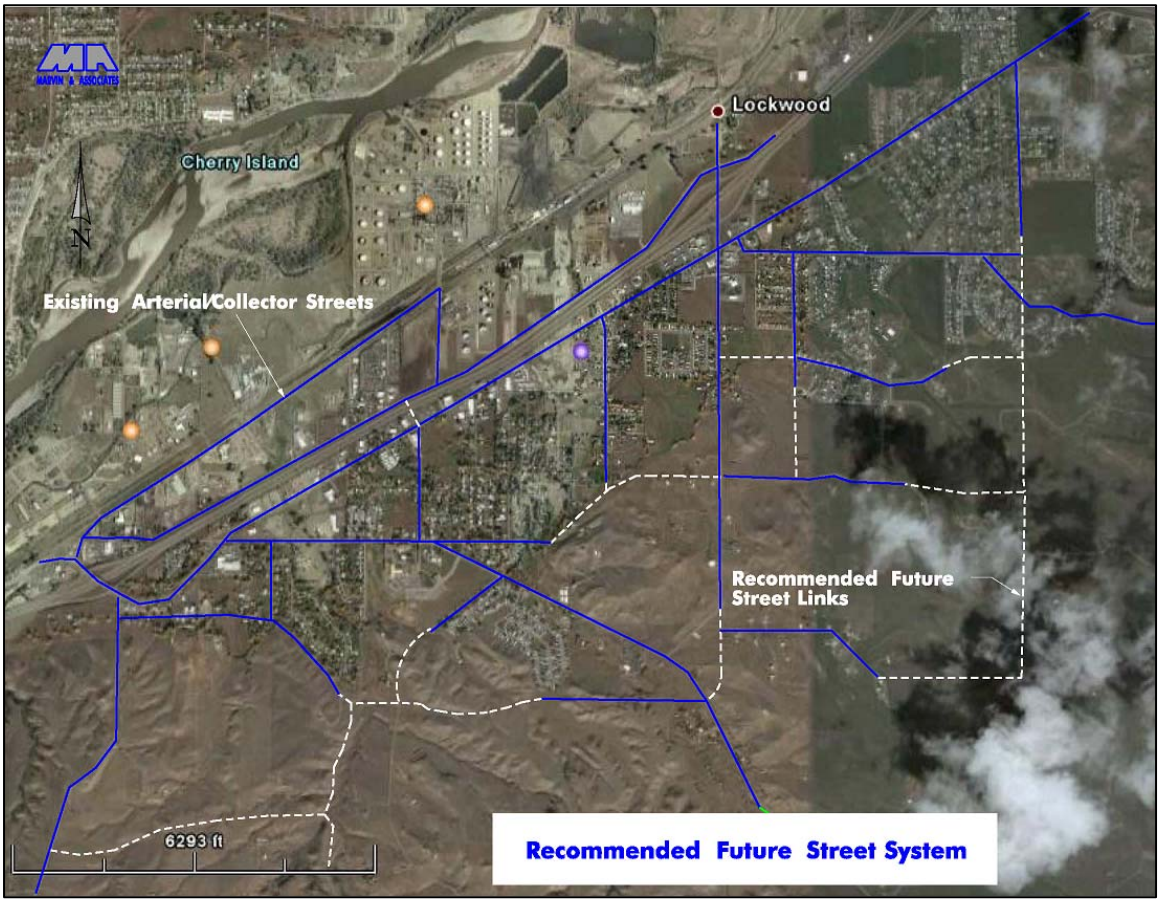
An additional option for accommodating future access needs in the Lockwood area would be construction of a new Interstate 90 interchange near Emerald Hills. The most logical location for this proposed interchange is illustrated in Figure 25. The traffic model for this interchange indicated that year 2027 traffic volume demand would be less than 1,500 ADT. Thus, the benefit/cost ratio for this improvement would probably not be met for many years beyond the planning horizon.

Figure 25. Future Access Improvements – Emerald Hills Interchange

FUTURE STREET SYSTEM

Testing of additional major street links using the traffic model provided measures of effectiveness (MOE) associated with the number and location of future arterial and collector streets. Lockwood currently has three arterial streets on the south side of Interstate 90 and all of them intersect to form a large triangle. This unusual street structure tends to concentrate traffic at critical junctures, where capacity and safety problems can become intense. The existing system of arterial and collector streets only serves a small portion of the total Lockwood area. Additional arterials and collectors will be required to spread-out traffic demand and provide a more equal balance throughout the system. Examples of new street links that were evaluated as part of this study are illustrated in Figure 26.

Figure 26. Future Street System



BIKE & PEDESTRIAN FACILITIES

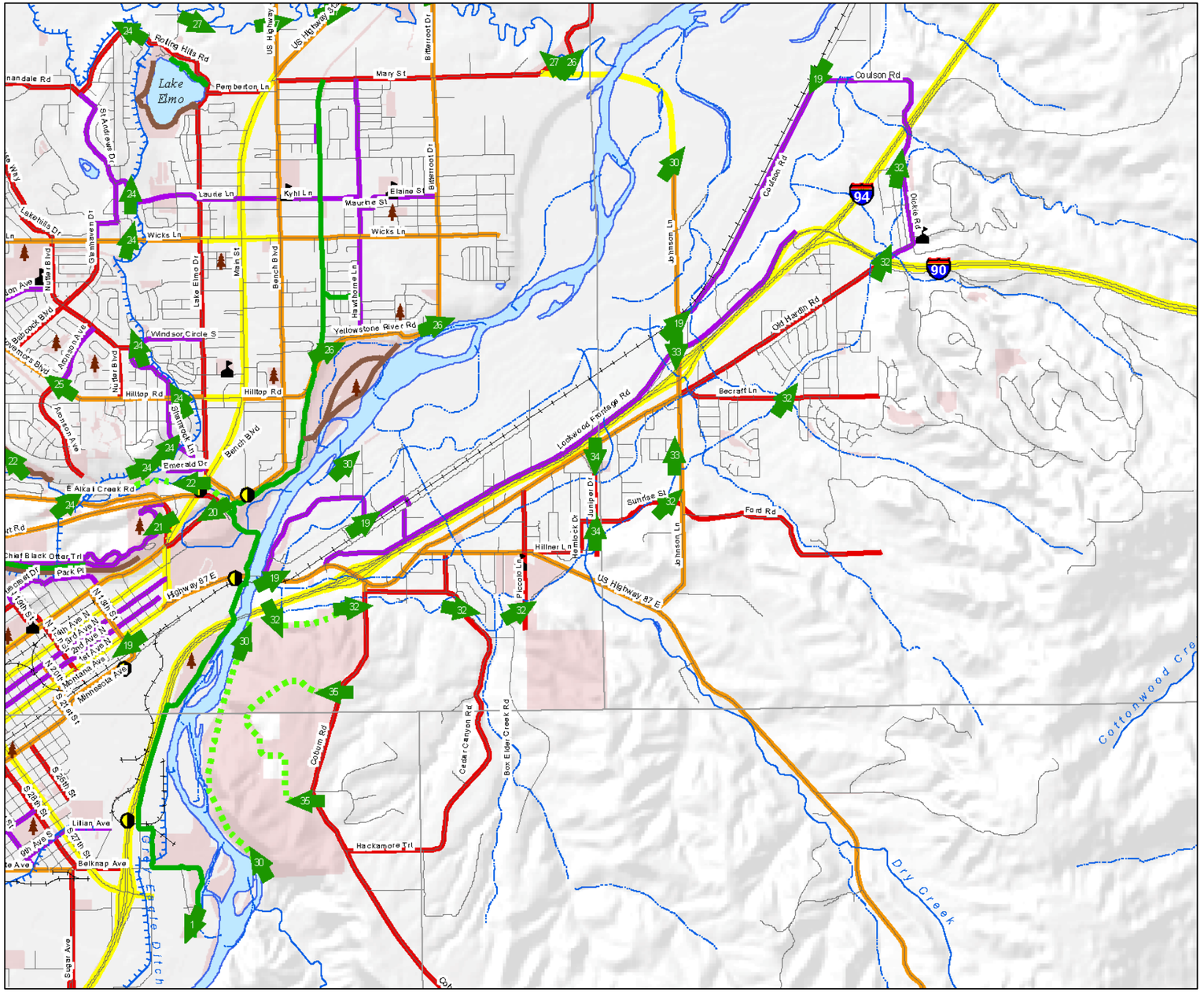
A review of the current bicycle and pedestrian plan for the Billings Urban Area, known as the Heritage Trail Plan, was completed and discussed with residents during both public meetings. Figure 27 presents the proposed trail routes and bikeway map for the Lockwood area, as adapted from the Heritage Trail Plan map.

Bike, pedestrian and equestrian pathways were a focus area of the Lockwood Community Plan. Objectives related to the development of these facilities included the following:

- Construct pathways, trails and sidewalks as applicable with all new road and infrastructure projects.
- Work with the Lockwood Water and Sewer District to investigate constructing trails where right-of-way for new water and sewer lines are being acquired.
- Work with the Lockwood Irrigation District to investigate locating trail facilities along irrigation canals.
- Utilize existing park land in Lockwood to construct trails to connect neighborhoods and reduce on-street pedestrian traffic.

Regardless of this study, these objectives and the recommendations of the Heritage Trail plan are both still relevant to the Lockwood area. However, input from the second public meeting indicated an overwhelming desire to construct a multi-use trail along Old Hardin Road. This trail should be located on the south side of Old Hardin Road from Highway 87 to Becraft Lane, and eventually further east when feasible. Other trail locations proposed during the second public meeting include along Johnson Lane and Becraft Lane. There was also support for construction of a trail along the 100-ft Lift Canal, as identified in the Heritage Trail Plan. As previously discussed, future widening projects on Old Hardin Road, US Highway 87, and many others should include construction of bicycle and pedestrian facilities. Input from the second public meeting also indicated that area residents would be in favor of multi-use trails along roadways, rather than on-street bikeways, particularly along Old Hardin Road.

Figure 27. Heritage Trail Plan – Lockwood Area



The following list of potential funding sources for construction of trails and bikeways was also outlined in the Lockwood Community Plan:

- Private funds raised by the Lockwood Community
- Formation of Rural Special Improvement Districts to construct and maintain sidewalks.
- Sidewalks along roadways could be funded by being included in any road projects in Lockwood that are undertaken by MDT.
- Safe Routes to School Program through State and Federal transportation funding.
- Community Transportation Enhancement Program (CTEP) and Montana Air Quality Initiative funds. CTEP requires a 15% funding match for projects. Montana Air Quality Initiative funds require a 13% funding match if the proposed non-motorized trail is not on the MDT Road System. If the trail is proposed within a road system right-of-way, MDT will provide the funding match.
- Grant funds, including Montana Coal Board Impact Funds that are allocated annually for communities that are impacted by the coal industry in Montana.

TRANSIT

Transit is another alternate mode of travel that should be considered as a future component of the Lockwood transportation system. The City of Billings (MET Transit) does not currently provide bus service to Lockwood, but has recently completed a comprehensive study evaluating the feasibility of expanding transit service into Lockwood (see Appendix D). Throughout the course of this study, several discussions have taken place with MET Transit and Lockwood residents to gauge the feasibility of providing transit service in Lockwood relative to residents' desire to use transit as an alternate mode of transportation.

MET Transit recently hired LSC Transportation Consultants, Inc. to evaluate options for providing transit service to the Lockwood Area. The final report, completed in July 2007, provides five transit service alternatives for the Lockwood area and evaluates

estimated operating costs, ridership, and performance measures for each. The analysis also incorporates a cost allocation model based on MET Transit's recent financial data and existing transit operations. The report provides a cost analysis for each service alternative for the scenario in which MET Transit would provide the service, and for a second scenario in which the Lockwood Community would pursue funding sources to operate the transit service themselves.

Discussions at various steering committee meetings and public meetings indicated that the focus for the Lockwood area should be to get necessary infrastructure improvements in place before transit service could be expanded into the Lockwood area. MET Transit and many Lockwood residents have agreed that roadway improvements need to be the short-term focus, with transit service following later as a long-term improvement.

TRAVEL DEMAND MANAGEMENT

Travel Demand Management or Transportation Demand Management (TDM) is a series of demand side strategies that are used to help reduce traffic congestion. In addition to the recommendations in this report that relate to adding capacity to area roadways, it is also important to consider improvement concepts that would manage the demand.

Future TDM evaluations should be concentrated in the industrial sector of Lockwood, where large numbers of employees are concentrated. A basic evaluation of staggered work hours and existing peak hour industrial traffic demand should be completed to determine if reduced demand would provide sufficient mitigation of problems on critical streets and intersections. If substantial improvements would result, major employers should be interviewed to determine the level of cooperation that may be possible. Staggered works hours and van-pool programs could be addressed.

Another TDM type alternative that could be explored in the future is Park and Ride (P&R) facilities. During public meetings, no one offered suggestions or expressed a desire to see P&R facilities, yet this type of TDM improvements may become desirable, especially as gasoline prices increase. Any future TDM studies should attempt to

determine the potential usage of P&R lots and the availability of land within a mile of the two existing interchanges. One such area would be a strip of publicly owned land between the westbound Interstate 90 ramps and the North Frontage Road at the Johnson Lane Interchange. Access to the lot would be from the North Frontage Road and there would be sufficient storage for 50 to 100 vehicles. Use of this land would be dependent upon requirements for future reconstruction of the interchange and would require approvals from MDT and FHWA. Other properties that are currently vacant would be on the southern portion of Johnson Lane and at the base of Emerald Hills, near Trailmaster Drive. However, currently vacant private properties will have intense pressure for future development and thus, are not as economically feasible for P&R usage.

COMMERCIAL VEHICLE DEMAND & ROUTING

Existing commercial trucking and truck routing within the Lockwood area is confined to Old Hardin Road, US 87, North Frontage Road, and Lockwood Road (see Figure 4 for locations). There were no comments during the public meetings concerning trucks on residential streets or problems with truck routes other than problems at the Johnson Lane Interchange and at the truck stop east of Lockwood Interchange at Coburn Road. Existing truck traffic at the Johnson Lane Interchange may be further impacted by a proposed truck stop on the north side of Interstate 90. Careful consideration of existing operations and recommended improvements detailed within this report should be given in the subdivision or building permit approval process for the new truck stop.

CLASS-BASED STREET STANDARDS

A critical element in the establishment of a safe, efficient, and maintainable street system is the establishment of street construction standards. While MDT has very definitive and restrictive standards for all classes of streets and roadways, Yellowstone County road standards are geared more toward rural type roadways. As the population in Lockwood grows and development becomes more dense, a separate set of enforceable standards for

Yellowstone County could be required for future street construction within the Lockwood area. This study provides the base structure for the development and evolution of such standards on Old Hardin Road and US 87. Yellowstone County Subdivision Urban Standards should be used for all future streets developed in Lockwood and proposed access management principals, currently being reviewed by Yellowstone County, should be adopted as a model for access control. Future governmental authority in the Lockwood area may be determined by incorporation of Lockwood as a legal entity. If not, consideration should be given toward Lockwood being designated as a special overlay planning district to provide flexibility of application of street standards based upon street classification, traffic volumes, speeds, and other operational characteristics. Formation of a standards committee with various representative entities may be necessary to develop future Lockwood Transportation District street standards.

ASSOCIATED BENEFITS OF THIS STUDY

COMMUNITY GROWTH

The most important benefit associated with this transportation study is intended to be realized by the community of Lockwood. The study, through definition of tangible goals and specific projects, should provide a community focus. Once adopted by the Board of County Commissioners and the PCC, it will provide a concrete sense of direction and goals with visible attributes that will eventually enhance the feeling of community.

SUBDIVISION PLATTING

The location of potential arterial and collector street alignments allows Yellowstone County to control development within the corridor, while providing developers with a clear understanding of access and land use controls to guide future subdivision platting. In the past, Yellowstone County has lost opportunities to incorporate key roadway facilities into development plans. It is the intent of this plan to avoid similar situations in the future. Eventual construction of new arterial and collector streets will depend on

right-of-way. It is anticipated that adoption of the transportation study and related street system plan will in itself provide some impetus for future development plans, and that much of the right-of-way can be secured through the platting process. The local government's and the public's acceptance of future alignment and right-of way reservation will be critical to its future usefulness. In that respect, final alignments must also have some flexibility to accommodate minor changes that may occur as future development occurs, so that the transportation value of the corridor would not be compromised in the future.

PUBLIC & PRIVATE UTILITIES

Future water, sewer, storm drain, power, telephone, fiber optic, and cable TV construction in Lockwood will all depend on the proposed location and right-of-way related to new streets. Construction of public utilities cannot reasonably occur without a planned street system. Safe and efficient traffic operations depend upon a planned system of streets and intersections based on informed decisions and accepted operating parameters. Street location and function cannot be based on utility right-of-way availability. Planned street improvement projects offer the opportunity for shared right-of-way and construction costs. Instead of restoring a substandard street after utility construction, restoration costs can be absorbed in the cost of an adequately designed street with full life expectancy.

STATE & FEDERAL HIGHWAY

It is anticipated that MDT will benefit from the community transportation plan in several ways. It will minimize planning efforts to identify future deficiencies within the Billings urban boundaries and provide specific data that can be used in future design projects. An improved local roadway system will reduce demand on state controlled urban routes and result in lower maintenance costs. Improved local design standards incorporated as a part of roadway construction will minimize future upgrade costs if major local streets become part of the future Urban Highway System.

YELLOWSTONE COUNTY

Known construction standards will aid in review of new subdivision developments. The study will provide definitive planning directions and provide a better understanding of immediate needs relative to future goals. Instead of persistent demands for spot improvements at numerous locations, the plan will provide a listing of prioritized projects which have definite boundaries and objectives. It will prevent patchy, short-term improvements that only accentuate additional needs and there will also be reduced maintenance on improved facilities

TRANSPORTATION FUNDING AUTHORITY

Currently, streets and roadways within the Lockwood Study Boundaries consist of Federal and State Highways (Interstate Routes, NHS Routes, and Urban Highway System Routes) under the jurisdiction of MDT and county roads are under the jurisdiction of Yellowstone County. Improvement projects on these facilities typically compete with other projects within Yellowstone County, the Billings Urban Area, and statewide. All of the funding sources listed in the short term improvement projects cost estimate are available for use on short term and long term projects, albeit on a competitive basis.

The community of Lockwood is unique in the fact that another authority exists unlike any other in Montana. The Lockwood Transportation District (LTD) is a legal entity that was originally created to construct the Johnson Lane Interchange. Appendix D contains a copy of the original Yellowstone County Resolution creating the LTD and current (2007) Montana State Codes that details the LTD's legal authority with respect to transportation projects within the district's boundaries. The LTD has the authority to assess mil levies on property taxes within Lockwood district boundaries and to submit an annual operations budget to the Yellowstone County Commissioners. In addition, the LTD may borrow money by the issuance of general obligation or revenue bonds to provide funds for the district. However, limitations on bond indebtedness may not exceed 1.51% of the

total assessed value of taxable property within the district. Therefore, many, if not all of the planned improvements in Lockwood could be funded through the LTD. In many cases, local funding of these projects would only require matching funds for Federal Aid type funding sources, the percentage of which varies from year to year. If the LTD uses funds to design and administer projects, it is conceivable that Lockwood projects wouldn't need to compete with other projects for MDT matching funds.

In order to implement the proposed projects contained within this study, the LTD should take a lead role in packaging desired improvements into a manageable number and the LTD Board should then meet with the Metropolitan Planning Organization's Policy Coordinating Committee (PCC) to outline the projects and determine the administrative hurdles involved in obtaining matching funds and or performing work on facilities under MDT's jurisdiction. When the necessary authority has been established and administrative directions are in-place, the LTD can petition Yellowstone County to include the necessary mill levy on the general ballot.

The LTD Board should retain an Administrative Officer, as provided for in MCA Section7-14-220, to provide for day-to-day operations and act as a single contact to handle the administrative duties related to transportation projects within the district. In the past, there has been little or no coordination with the LTD Board on county or state projects within the district boundaries. As a legal entity, the LTD Board has the authority to oversee transportation improvements within the district. Information and approvals for future transportation projects within the district, whether they are initiated by the LTD or not, should be directed to the LTD Administrative Officer for coordination with the LTD Board.

APPENDIX A
PUBLIC MEETING COMMENTS

LOCKWOOD TRANSPORTATION STUDY
PUBLIC MEETING #1
SUMMARY OF PUBLIC COMMENTS
11-13-06

The following is a list of comments/suggestions obtained from the public during the first public meeting for the Lockwood Transportation Study:

1. Roundabouts were discussed as an alternative to signalized intersections. Concerns were expressed including whether or not they would be able to handle high volumes of traffic during peak periods, whether or not they would be able to accommodate large trucks, and whether or not they would be safe for pedestrians.
2. Speed reductions on Highway 87 should take place further outside of town, further away from Lockwood School.
3. Street lighting should be installed on all major streets, especially near Lockwood School.
4. The potential for a new interchange at the Pine Hills underpass was discussed. Bob noted that this is one of many alternatives currently being analyzed as part of the North Bypass Study.
5. The study should determine and evaluate origins and destinations coming to and from the Lockwood area.
6. The study should evaluate improvements at the intersections of Johnson Lane and Old Hardin Road and Becraft Lane and Old Hardin Road. Suggestions for improvements included realigning Becraft to intersect with Johnson Lane, instead of Old Hardin Road and using grade separation to connect Becraft directly to the interchange.
7. Trails and bikeways were briefly discussed and it was explained that in general all new trails will be multi-use trails that will accommodate many different users (runners, walkers, bicyclists, etc.). It was suggested that all trails within the Lockwood area also be designed to accommodate equestrian use. Equestrian trails were a priority in the Lockwood Community Plan.
8. Another north-south arterial and Interstate 90 interchange should be constructed east of Johnson Lane.
9. Another east-west arterial should be constructed in the approximate location of Ford Road.
10. The signals at the intersections of Highway 87 and the Lockwood Interchange ramps should be evaluated and retimed to improve safety.
11. Accident data should be evaluated to determine how many of the accidents have included large trucks.
12. The general consensus was that transit service would be used, especially by children and the elderly, if it were expanded into Lockwood. It is expected that if service were provided on the arterials, children could walk to the bus stops and the elderly could be served by feeder vans.
13. A priority of this transportation study should be to determine the cost effectiveness of many needed improvements.

LOCKWOOD TRANSPORTATION STUDY
PUBLIC MEETING #2
SUMMARY OF PUBLIC COMMENTS
12-5-07

The following is a list of comments/suggestions obtained from the public during the second public meeting for the Lockwood Transportation Study:

14. In general, all meeting attendees agreed that safety should be the number one priority in implementing proposed improvement projects in Lockwood, especially for children walking or biking.
15. There was an overwhelming desire to construct a multi-use trail along Old Hardin Road, instead of bike lanes and sidewalks as presented in the proposed typical section. The typical section should be updated to include this change in the final report and this project should be considered a short-term priority.
16. Other desired locations for trails include along Johnson Lane, along Becraft Lane to Westgate Drive, and along the 100' Lift Canal. It was also suggested that the 100' Lift Canal be piped and a trail be constructed over the top of it.
17. All future bridges constructed in the Lockwood area should be constructed wide enough for pedestrian and bicycle access.
18. Regarding the proposed roundabout at Highway 87 and Old Hardin Road, concerns were expressed including whether or not they would be able to handle high volumes of traffic during peak periods, whether or not they would be able to accommodate large trucks, and whether or not existing access could be maintained for nearby businesses. In particular, there was some concern regarding access to a business in the northeast quadrant of the roundabout intersection. Bob explained in detail the advantages of a roundabout in this location and explained that most (if not all) of the existing accesses could be maintained with some modifications. It was stated that design of the intersection would make provisions for all access requirements and that a nice feature of roundabouts was their ability to accommodate accesses in close proximity to the intersection. The details of the access designs, as well as the design to accommodate large trucks, will be completed during the design process.
19. It was questioned if the eastbound off ramp at the Lockwood Interchange could also incorporate a loop ramp on the east side of the interchange so the Interstate 90 traffic wanting to turn left toward Billings could enter US 87 using a right-turn movement from the new loop ramp. It was stated that an attempt was made to detail that concept, but it was soon discovered that there was not enough room to accommodate the loop ramp without substantial reconstruction which would be 5 to 6 times the cost of the recommended improvement concept.
20. Speed reductions on Highway 87 should take place on the east side of Johnson Lane, away from Lockwood School. We should suggest that MDT perform a speed study for Highway 87 from the west side of Lockwood School to the east side of Johnson Lane and evaluate the need for modifications to the speed zones. Bob explained that enforcement is a key element in effectively reducing speeds.

21. Regarding proposed short-term improvements at the intersections of Johnson Lane and Old Hardin Road and Becraft Lane and Old Hardin Road, there is a desire to reroute Becraft to intersect Johnson Lane, instead of Old Hardin Road. Bob explained that this would be difficult due to the locations of existing homes and businesses, and because of minimum distance requirements from the intersection of Johnson Lane and Old Hardin Road. The proposed short-term improvements to this area provide the most feasible solution with the least amount of impact to existing homes and businesses.
22. A comment was made that the truck stop was a big reason why the intersections in this area were congested and that Flying J should pay for these improvements instead of the residents, especially for reconfiguring their access.
23. Regarding proposed improvements to the Johnson Lane interchange, it was questioned whether another lane would be needed on the eastbound off ramp for vehicles turning left destined for the proposed Town Pump on the north side of the interchange. It was stated that an additional left turn lane would probably be added for that reason during design.
24. Right-of-way constraints on Piccolo Lane were discussed. The existing right-of-way or easement for the roadway is only 15 feet wide, and has never been accepted by the County Commissioners as public right-of-way. First steps toward future widening of Piccolo Lane will require a petition to the County Commissioners to accept it as a public road and then additional right-of-way will need to be acquired. Bob explained that Piccolo Lane will be a critical link in Lockwood's future roadway network.
25. Potential funding sources for these projects were discussed in detail. In addition to the funding sources included in the presentation, additional options include a mill levy, general obligation bonds, local option gas tax, property tax, and tax increment finance districts. Meeting attendees would prefer to apply the gas tax to diesel fuel, but it was explained that it would require a change to state code. Funding discussions also focused on which of the potential sources would require local matching funds.
26. Long term improvement projects were discussed with emphasis on Old Hardin Road and the need for a main trunk storm drainage system along that roadway to provide the backbone of all future street improvements in Lockwood. It was questioned why the north - south connector street would go under Interstate 90 rather than over. It was stated that the local street connector would need less vertical clearance than Interstate 90 and costs of depressing local streets would be less than raising the grade on Interstate 90. Drainage of the underpass would require a piped outfall north toward the Yellowstone River. It was generally expressed that a north-south connection would be desirable.
27. Proposed long-term improvements and solutions to access issues should be included in the next update to the Billings Urban Area Transportation Plan, so that the projects would be eligible for Urban Highway System funding.
28. The proposed emergency access to the Emerald Hills would be fairly inexpensive to construct and would be located on County property. It could be a gated access used for emergency purposes only. In general, the response to this proposal was positive, and all agreed that an emergency access is needed.

29. Discussion also took place on whether or not the study would prioritize the short-term and long-term improvement projects. Bob explained that we could spend a significant amount of time and energy prioritizing projects, but in the end, it will be up to Lockwood residents which projects they want to put their efforts into first.
30. The future arterial and collector link map was presented and there were no additions or changes in the future system configuration. These links will be examined in the transportation plan update and modifications to the transportation plan will be made based on this study's recommendations.
31. Three alternatives to improve access to Lockwood were presented. No specific comments in favor or against any of the alternative concepts were expressed.

APPENDIX B

LOCKWOOD STREET INVENTORY

Lockwood Transportation Plan - Street Inventory

Street	From	To	Link Distance (miles)	# of Lanes (striped)	Width (feet)	Curb & Gutter		Roadside Ditches		Sidewalk		Street Lights		Surface		Pavement Markings (check all that apply)				Speed Limit (mph)
						Left	Right	Left	Right	Left	Right	Left	Right	Type	Condition	CL	TWLTL	Shldr. Stripe	Other	
US Hwy 87	Yellowstone River	Lockwood Road	0.48	4	84	YES	YES	NO	NO	YES	NO	YES	YES	Concrete	Good	NO (median striping)	NO	YES	Raised Median	45
	Lockwood Road	Coburn Road	0.29	4	84	YES	YES	NO	NO	NO	NO	YES	YES	Concrete	Good	NO (median striping)	NO	YES	Raised Median	45
	Old Hardin Road	Peters Street	0.48	2	26	NO	NO	YES	YES	NO	NO	NO	NO	Asphalt	Good	YES	NO	YES	-	45
	Peters Street	Piccolo Lane	0.19	2	26	NO	NO	YES	YES	NO	NO	NO	NO	Asphalt	Good	YES	NO	YES	-	40
	Piccolo Lane	Lockwood School - South Entrance	?	2	26	NO	NO	YES	YES	NO	NO	NO	NO	Asphalt	Good	YES	NO	YES	-	35 SB/45 NB
	Lockwood School - South Entrance	1/4 mile north of Johnson Lane	?	2	26	NO	NO	YES	YES	NO	NO	NO	NO	Asphalt	Good	YES	NO	YES	-	45
	1/4 mile north of Johnson Lane	Sagehill Farms Road	2.46	2	26	NO	NO	YES	YES	NO	NO	NO	NO	Asphalt	Good	YES	NO	YES	-	70
Johnson Lane	US Hwy 87	Silverton Street	1.06	2	25	NO	NO	NO	NO	NO	NO	NO	NO	Asphalt	New	NO	NO	NO	-	35
	Silverton Street	1/2 mile south of Old Hardin Rd	?	2	40	YES	YES	YES	YES	YES	NO	NO	NO	Asphalt	New	NO	NO	NO	-	35
	1/2 mile south of Old Hardin Rd	Coulson Road	?	2	26	NO	NO	YES	YES	NO	NO	NO	NO	Asphalt	New	NO	NO	NO	-	35
Coburn Road	US Hwy 87	Antennas	?	2	25	NO	NO	YES	YES	NO	NO	NO	NO	Asphalt	New	YES	NO	YES	-	55
	Antennas	Pictograph Caves Park Entrance	?	2	25	NO	NO	YES	YES	NO	NO	NO	NO	Asphalt	Fair	YES	NO	NO	-	55
North Frontage Road	Lockwood Road	Johnson Lane	2.63	2	30	NO	NO	YES	YES	NO	NO	NO	NO	Asphalt	Fair	YES	NO	YES	-	55
Old Hardin Road	Dickie Road	100 feet east of Cole St	1.30	2	26	NO	NO	YES	YES	NO	NO	NO	NO	Asphalt	Poor	YES	NO	YES	-	35
	100 feet east of Cole St	Cole Street	0.02	2	40	YES	NO	NO	NO	NO	NO	NO	NO	Asphalt	Fair	YES	NO	YES	Bay taper striping	35
	Cole Street	Flying J scale exit	0.19	2	40	YES	YES	NO	NO	YES	YES	NO	NO	Asphalt	Fair	YES	NO	YES	Left turn bays	35
	Flying J scale exit	Rykken Circle	0.14	2	40	YES	NO	NO	YES	YES	NO	NO	NO	Asphalt	Fair	YES	NO	YES	Left turn bays	35
	Rykken Circle	US Hwy 87	1.74	2	25	NO	NO	YES	YES	NO	NO	NO	NO	Asphalt	Poor	YES	NO	YES	-	35
Ford Road	Johnson Lane	End	1.18	-	23	NO	NO	YES	YES	NO	NO	NO	NO	Gravel	-	-	-	-	-	NA
Rosebud Lane	Coburn Road	Maier Road	0.52	-	22	NO	NO	NO	NO	NO	NO	NO	NO	Asphalt	Poor	NO	NO	NO	-	25
Cedar Canyon Road	Maier Road	North Horshoe Hills Road	0.81	-	24	NO	NO	YES	YES	NO	NO	NO	NO	Asphalt	Poor	NO	NO	NO	-	25?
	North Horshoe Hills Road	Hackamore Trail	1.13	-	25	NO	NO	YES	YES	NO	NO	NO	NO	Gravel	-	-	-	-	-	25
North Horseshoe Hills Road	Cedar Canyon Road	End	0.91	-	18	NO	NO	YES	YES	NO	NO	NO	NO	Gravel	-	-	-	-	-	NA
Englin Street	Cedar Canyon Road	Box Elder Creek Road	0.15	-	23	NO	NO	YES	YES	NO	NO	NO	NO	Gravel	-	-	-	-	-	
Box Elder Creek Road	Englin Street	End (Residence)	1.39	-	24	NO	NO	YES	YES	NO	NO	NO	NO	Gravel	-	-	-	-	-	
Becraft Lane	Old Hardin Road	300' west of Enfield Street	0.15	2	26	YES	NO	YES	YES	NO	NO	NO	NO	Asphalt	Fair	YES	NO	NO	-	35
	300' west of Enfield Street	Westgate Drive	0.68	-	26	NO	NO	YES	YES	NO	NO	NO	NO	Asphalt	Poor	YES	NO	NO	-	35
	Westgate Drive	Noblewood Drive	0.13	-	22	NO	NO	NO	NO	NO	NO	NO	NO	Asphalt	Poor	NO	NO	NO	-	25
Noblewood Drive	Old Hardin Road	North Spotted Jack Loop	0.25	-	25	NO	NO	NO	NO	NO	NO	NO	NO	-	-	-	-	-	-	25
	North Spotted Jack Loop	Becraft Lane	0.41	-	25	NO	NO	YES	NO	NO	NO	NO	NO	-	-	-	-	-	-	25
Prairie Drive	Johnson Lane	End	0.63	-	22	NO	NO	YES	YES	NO	NO	NO	NO	Gravel	-	-	-	-	-	
Piccolo Lane	US Hwy 87	Old Hardin Road	0.39	2	20	NO	NO	YES	NO	NO	NO	NO	NO	Asphalt	Poor	NO	NO	NO	-	25

APPENDIX C

FUNDING SOURCE DESCRIPTIONS

FINANCIAL ANALYSIS

FUNDING SOURCES

The following list includes federal and state funding sources developed for the distribution of Federal and State transportation funding. This includes Federal funds the State receives under the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)-enacted on August 10, 2005. A narrative description of each source is provided in the following sections of this discussion.

Federal Funding Sources

- Interstate Maintenance (IM)
- National Highway System (NHS)
- Surface Transportation Program (STP)
  - *Primary Highway System (STPP)**
  - *Secondary Highway System (STPS)**
  - *Urban Highway System (STPU)**
  - *Community Transportation Enhancement Program (CTEP)**
- Highway Safety Improvement Program (HSIP)
  - *High Risk Rural Roads Program (HRRR)*
- Highway – Railway Crossing Program (RRX)
- Highway Bridge Replacement and Rehabilitation Program (HBRRP)
  - *On-System Bridge Replacement and Rehabilitation Program*
  - *Off-System Bridge Replacement and Rehabilitation Program*
- Coordinated Border Infrastructure Program (CBI)
- Congestion Mitigation & Air Quality Improvement Program (CMAQ)
  - *CMAQ (formula)*
  - *Montana Air & Congestion Initiative (MACI)–Guaranteed Program (flexible)**
  - *Montana Air & Congestion Initiative (MACI)–Discretionary Program (flexible)**
  - *Urban High Growth Adjustment (flexible)**
- Urban Highway Preservation (UHP) (Equity Bonus)*
- Safe Routes To School (SRTS)

- Federal Lands Highway Program (FLHP)
  - *Public Lands Highways (PLH)*
  - *Parkways and Park Roads*
  - *Indian Reservation Roads (IRR)*
  - *Refuge Roads*

- Congressionally Directed Funds
  - *High Priority Projects (HPP)*
  - *Transportation Improvements Projects*

- Transit Capital & Operating Assistance Funding
  - *Metropolitan Planning/State Planning & Research Programs (Section 5303/5304)*
  - *Public Mass Transportation (Section 5307)*
  - *Clean Fuels Grant Program (Section 5308)*
  - *Discretionary Grants (Section 5309)*
  - *Capital Assistance for the Elderly and Persons with Disabilities (Section 5310)*
  - *Financial Assistance for Rural General Public Providers (Section 5311)*
  - *Job Access Reverse Commute (JARC) (5316)*
  - *New Freedoms Program (5317)*

State Funding Sources

- State Funded Construction (SFC)
- TransADE

FEDERAL AID FUNDING PROGRAMS

The following summary of major Federal transportation funding categories received by the State through the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)-enacted on August 10, 2005, includes state developed implementation/sub-programs. In order to receive project funding under these programs, projects must be included in the State Transportation Improvement Program (STIP).

- **Interstate Maintenance (IM)**

Interstate Maintence (IM) funds are Federally apportioned to Montana and allocated based on system performance by the montana Transportation Commission. The Commission approves and awards projects for improvements on the Interstate Highway System which are let through a comptitive budding process. The Federal share for IM projects is 91.24% and the State is responsible for 8.76%.

- **National Highway System (NHS)**

The purpose of the National Highway System (NHS) is to provide an interconnected system of principal arterial routes which will serve major population centers, international border crossings, intermodal transportation facilities and other major travel destinations; meet national defense requirements; and serve interstate and interregional travel. The National Highway System includes all Interstate routes, a large percentage of urban and rural principal arterials, the defense strategic highway network, and strategic highway connectors.

Allocations and Matching Requirements
NHS funds are Federally apportioned to Montana and allocated based on system performance by the Montana Transportation Commission. The Federal share for NHS projects is 86.58% and the State is responsible for the remaining 13.42%. The State share is funded through the Highway State Special Revenue Account.

Eligibility and Planning Considerations
Activities eligible for the National Highway System funding include construction, reconstruction, resurfacing, restoration, and rehabilitation of segments of the NHS. Operational improvements as well as highway safety improvements are also eligible. Other miscellaneous activities that may qualify for NHS funding include research, planning, carpool projects, bikeways, and pedestrian walkways. The Transportation Commission establishes priorities for the use of National Highway System funds and projects are let through a competitive bidding process. US Highway 93 and MT Highway 40 are on the National Highway System.

- **Surface Transportation Program (STP)**

Surface Transportation Program (STP) funds are Federally apportioned to Montana and allocated by the Montana Transportation Commission to various programs including the Surface Transportation Program Primary Highways (STPP), Surface Transportation Program Secondary Highways (STPS), and the Surface Transportation Program Urban Highways (STPU).

- *Primary Highway System (STPP)**

The Federal and State funds available under this program are used to finance transportation projects on the state-designated Primary Highway System. The Primary Highway System includes highways that have been functionally classified by the MDT as either principal or minor arterials and that have been selected by the Transportation Commission to be placed on the Primary Highway System [MCA 60-2-125(3)].

Allocations and Matching Requirements
Primary funds are distributed statewide [MCA 60-3-205] to each of five financial districts, including the Missoula District. The Commission distributes STPP funding based on system performance. Of the total received, 86.58% is Federal and 13.42% is State funds from the Highway State Special Revenue Account.

Eligibility and Planning Considerations
Eligible activities include construction, reconstruction, rehabilitation, resurfacing, restoration and operational improvements. The Transportation Commission establishes priorities for the use of Primary funds and projects are let through a competitive bidding process.

- *Secondary Highway System (STPS)**

The Federal and State funds available under this program are used to finance transportation projects on the state-designated Secondary Highway System. The Secondary Highway System highways that have been functionally classified by the MDT as either rural minor arterials or rural major collectors and that have been selected by the Montana Transportation Commission in cooperation with the boards of county commissioners, to be placed on the secondary highway system [MCA 60-2-125(4)].

Allocations and Matching Requirements
Secondary funds are distributed statewide (MCA 60-3-206) to each of five financial districts, including the Missoula District, based on a formula, which takes into account the land area, population, road mileage and bridge square footage. Federal funds for secondary highways must be matched by non-federal funds. Of the total received 86.58% is Federal and 13.42 % is non-federal match. Normally, the match on these funds is from the Highway State Special Revenue Account.

Eligibility and Planning Considerations
Eligible activities for the use of Secondary funds fall under three major types of improvements: Reconstruction, Rehabilitation, and Pavement Preservation. The Reconstruction and Rehabilitation categories are allocated a minimum of 65% of the program funds with the remaining 35% dedicated to Pavement Preservation. Secondary funds can also be used for any project that is eligible for STP under Title 23, U.S.C.

MDT and county commissions determine Secondary capital construction priorities for each district with final project approval by the Transportation Commission. By state law the individual counties in a district and the state vote on Secondary funding priorities presented to the Commission. The Counties and MDT take the input from citizens, small cities, and tribal governments during the annual priorities process. Projects are let through a competitive bidding process.

- *Urban Highway System (STPU)**

The Federal and State funds available under this program are used to finance transportation projects on the state-designated Urban Highway System. The Urban Highway System is described under MCA 60-2-125(6), as those highways

and streets that are in and near incorporated cities with populations of over 5,000 and within urban boundaries established by the MDT, that have been functionally classified as either urban arterials or collectors, and that have been selected by the Montana Transportation Commission, in cooperation with local government authorities, to be placed on the Urban Highway System.

Allocations and Matching Requirements
State law [MCA 60-3-211] guides the allocation of Urban funds to projects on the Urban Highway System in the fifteen urban areas through a statutory formula based on each area's population compared to the total population in all urban areas. Of the total received, 86.58% is Federal and 13.42% is non-federal match typically provided from the Special State Revenue Account for highway projects.

Eligibility and Planning Considerations
Urban funds are used primarily for major street construction, reconstruction, and traffic operation projects on the 390 miles on the State-designated Urban Highway System, but can also be used for any project that is eligible for STP under Title 23, U.S. C. Priorities for the use of Urban funds are established at the local level through local planning processes with final approval by the Transportation Commission.

Because the Urban Highway System includes transportation infrastructure that crosses the line between incorporated and unincorporated areas, it is important that city and county governments work together to identify and address urban highway needs. Consideration of cooperative efforts between city and county governments to address urban highways (roads and bridges) should be incorporated into the planning and implementation of the county CIP as appropriate.

- *Community Transportation Enhancement Program (CTEP)**

Federal law requires that at least 10% of STP funds must be spent on transportation enhancement projects. The Montana Transportation Commission created the Community Transportation Enhancement Program in cooperation with the Montana Association of Counties (MACO) and the League of Cities and Towns to comply with this Federal requirement.

Allocations and Matching Requirements
CTEP is a unique program that distributes funding to local and tribal governments based on a population formula and provides project selection authority to local and tribal governments. The Transportation Commission provides final approval to CTEP projects within the State's right-of-way. The Federal share for CTEP projects is 86.58% and the Local and tribal governments are responsible for the remaining 13.42%.

Eligibility and Planning Considerations

Eligible CTEP categories include:

- Pedestrian and bicycle facilities
- Historic preservation
- Acquisition of scenic easements and historic or scenic sites
- Archeological planning and research
- Mitigation of water pollution due to highway runoff or reduce vehicle-caused
- Wildlife mortality while maintaining habitat connectivity
- Scenic or historic highway programs including provisions of tourist and welcome center facilities
- Landscaping and other scenic beautification
- Preservation of abandoned railway corridors (including the conversion and use for bicycle or pedestrian trails)
- Control and removal of outdoor advertising
- Establishment of transportation museums
- Provisions of safety and educational activities for pedestrians and bicyclists

Projects addressing these categories and that are linked to the transportation system by proximity, function or impact, and where required, meet the "historic" criteria, may be eligible for enhancement funding.

Projects must be submitted to the local government to the MDT, even when the project has been developed by another organization or interest group. Project proposals must include evidence of public involvement in the identification and ranking of enhancement projects. Local governments are encouraged to use their planning boards, where they exist, for the facilitation of public participation; or a special enhancement committee. The MDT staff reviews each project proposal for completeness and eligibility and submits them to the Transportation Commission and the federal Highway Administration for approval.

*State funding programs developed to distribute Federal funding within Montana

- **Highway Safety Improvement Program (HSIP)**

Allocations and Matching Requirements

HSIP is a new core funding program established by SAFETEA-LU. HSIP funds are Federally apportioned to Montana and allocated to safety improvement projects identified in the strategic highway safety improvement plan by the Commission. Projects described in the State strategic highway safety plan must correct or improve a hazardous road location or feature, or address a highway safety problem. The Commission approves and awards the projects which are let through a competitive bidding process. Generally, the Federal share for the HSIP projects is 91.24% and the State is responsible for 8.76%.

Eligibility and Planning Considerations

There are two set aside programs that receive HSIP funding: the Highway – Railway Crossing Program and the High Risk Rural Roads Program.

- **High Risk Rural Roads Program (HRRR)**

Funds are set aside from the Highway Safety Improvement Program funds apportioned to Montana for construction and operational improvements on high-risk rural roads. These funds are allocated to HRRRP projects by the Commission. If Montana certifies that it has met all of the needs on high risk rural roads, these set aside funds may be used on any safety improvement project under the HSIP. Montana's set aside requirement for HRRRP is approximately $700,000 per year.

- **Highway – Railway Crossing Program (RRX)**

Funds are Federally apportioned to Montana and allocated by the Commission for projects that will reduce the number of fatalities and injuries at public highway-rail grade crossings; through the elimination of hazards and/or the installation/upgrade of protective devices.

- **Highway Bridge Replacement and Rehabilitation Program (HBRRP)**

Allocations and Matching Requirements
HBRRP funds are Federally apportioned to Montana and allocated to two programs by the Montana Transportation Commission. In general, projects are funded with 86.58% Federal and the State is responsible for the remaining 13.42%. The State share is funded through the Highway State Special Revenue Account. The Montana Transportation Commission approves projects which are then let to contract through a competitive bidding process.

- *On-System Bridge Replacement and Rehabilitation Program*

The On-System Bridge Program receives 65% percent of the Federal HBRRP funds. Projects eligible for funding under the On-System Bridge Program include all highway bridges on the State system. The bridges are eligible for rehabilitation or replacement. In addition, painting and seismic retrofitting are also eligible under this program. MDT's Bridge Bureau assigns a priority for replacement or rehabilitation of structurally deficient and functionally obsolete structures based upon sufficiency ratings assigned to each bridge. A structurally deficient bridge is eligible for rehabilitating or replacement; a functionally obsolete bridge is eligible only for rehabilitation; and a bridge rated as sufficient is not eligible for funding under this program.

- *Off-System Bridge Replacement and Rehabilitation Program*

The Off-System Bridge Program receives 35% percent of the Federal HBRRP funds. Projects eligible for funding under the Off-System Bridge Program include

all highway bridges not on the State system. Procedures for selecting bridges for inclusion into this program are based on a ranking system that weighs various elements of a structures condition and considers local priorities. MDT Bridge Bureau personnel conduct a field inventory of off-system bridges on a two-year cycle. The field inventory provides information used to calculate the Sufficiency Rating (SR).

- **Coordinated Border Infrastructure Program (CBI)**

CBI funds are Federally apportioned to Montana and allocated by the Commission based on system performance and project eligibilities. These funds may be used on projects within 100 miles of the international border to improve transportation, safety, regulation, or improved planning/coordination to streamline international motor vehicle and cargo movements. The Montana Transportation Commission approves projects which are then let to contract through a competitive bidding process. The Federal share is 86.58% and the State is responsible for 13.42%.

- **Congestion Mitigation & Air Quality Improvement Program (CMAQ)**

Federal funds available under this program are used to finance transportation projects and programs to help improve air quality and meet the requirements of the Clean Air Act. Montana's air pollution problems are attributed to carbon monoxide (CO) and particulate matter (PM10 and PM2.5).

Allocations and Matching Requirements
CMAQ funds are Federally apportioned to Montana and allocated to various eligible programs by formula and by the Commission. As a minimum apportionment state a Federally required distribution of CMAQ funds goes to projects in Missoula since it is Montana's only designated and classified air quality non-attainment area. The remaining, non-formula funds, referred to as "flexible CMAQ" is directed to areas of the state with emerging air quality issues through various state programs. The Transportation Commission approves and awards both formula and non-formula projects on MDT right-of-way. Infrastructure and capital equipment projects are let through a competitive bidding process. Of the total funding received, 86.58% is Federal and 13.42% is non-federal match provided by the state for projects on state highways and local governments for local projects.

Eligibility and Planning Considerations
In general, eligible activities include transit improvements, traffic signal synchronization, bicycle pedestrian projects, intersection improvements, travel demand management strategies, traffic flow improvements, and public fleet conversions to cleaner fuels. At the project level, the use of CMAQ funds is not constrained to a particular system (i.e. Primary, Urban, and NHS). A requirement for the use of these funds is the estimation of the reduction in pollutants resulting from implementing the program/project. These estimates are reported yearly to FHWA.

- *CMAQ (formula)*

Mandatory CMAQ funds that come to Montana based on a Federal formula and are directed to Missoula, Montana's only classified, moderate CO non-attainment area.

- *Montana Air & Congestion Initiative (MACI)–Guaranteed Program (flexible)**

This is state program funded with flexible CMAQ funds that the Commission allocates annually to Billings and Great Falls to address carbon monoxide issues in these designated, but "not classified", CO non-attainment areas. The air quality in these cities is roughly equivalent to Missoula, however, since these cities are "not classified" so they do not get direct funding through the Federal formula.

- *Montana Air & Congestion Initiative (MACI)–Discretionary Program (flexible)**

The MACI – Discretionary Program provides funding for projects in areas designated non-attainment or recognized as being "high-risk" for becoming non-attainment. Since 1998, MDT has used MACI-Discretionary funds to get ahead of the curve for CO and PM10 problems in non-attainment and high-risk communities across Montana. District Administrators and local governments nominate projects cooperatively. Projects are prioritized and selected based on air quality benefits and other factors. The most beneficial projects to address these pollutants have been sweepers and flushers, intersection improvements and signal synchronization projects.

- *Urban High Growth Adjustment (flexible)**

Urban High Growth Adjustment funds are distributed to urban areas in Montana where population increased by more than 15% between the 1990 and 2000 censuses. Kalispell, Bozeman, and Missoula are the areas currently eligible for funding through this source. The intent of this funding is to address backlogged needs in these very rapidly growing cities. Nominations for the use of these funds are established at the local level similar to STPU funds. These funds may be spent on the Urban Highway System for projects eligible for either STPU or CMAQ funds.

*State funding programs developed to distribute Federal funding within Montana

- **Urban Pavement Preservation (UPP) (Equity Bonus)***

The Urban Pavement Preservation Program is a state program that addresses urban highway system preservation needs. The program is funded from federal Equity Bonus funds that are appropriated to each State to ensure that each State receives a specific

share of the aggregate funding for major highway programs. The program funds cost-effective treatments for the preservation of the existing Urban Highway System to prevent deterioration while maintaining or improving the functional condition of the system without increasing structural capacity.

Allocations and Matching Requirements
The Transportation Commission determines the annual funding level for this program for preservation projects in the fifteen urban areas. Projects are funded with 86.58% Federal and the State is responsible for the remaining 13.42%. The State share is funded through the Highway State Special Revenue Account. The Montana Transportation Commission approves projects which are then let to contract through a competitive bidding process.

Eligibility and Planning Considerations
Activities eligible for this funding include pavement preservation treatments on the Urban Highway System based on needs identified through a locally developed and maintained pavement management system. Priorities are developed by MDT Districts based on the local pavement management system outputs and consideration of local government nominations with final approval by the Transportation Commission. Projects are let through a competitive bidding process.

*State funding programs developed to distribute Federal funding within Montana

- **Safe Routes To School (SRTS)**

Allocations and Matching Requirements
Safe Routes To School funds are Federally apportioned to Montana for programs to develop and promote a safe environment that will encourage children to walk and bicycle to school. Montana is a minimum apportionment state, and will receive $1-million per year, subject to the obligation limitation. The Federal share of this program is 100%.

Eligibility and Planning Considerations
Eligible activities for the use of SRTS funds fall under two major categories with 70% directed to infrastructure improvements, and the remaining 30% for behavioral (education) programs. Funding may be used within a two mile radius of K-8 schools for improvements or programs that make it safer for kids to walk or bike to school. SRTS is a reimbursable grant program and project selection is done through an annual application process. Eligible applicants for infrastructure improvements include local governments and school districts. Eligible applicants for behavioral programs include state, local and regional agencies, school districts, private schools, non-profit organizations. Recipients of the funds will front the cost of the project and will be reimbursed during the course of the project. For grant cycle information visit:
http://www.mdt.mt.gov/pubinvolve/saferoutes/

- **Federal Lands Highway Program (FLHP)**

FLHP is a coordinated Federal program that includes several funding categories.

- *Public Lands Highways (PLH)*

Discretionary
The PLH Discretionary Program provides funding for projects on highways that are within, adjacent to, or provide access to Federal public lands. As a discretionary program, the project selection authority rests with the Secretary of Transportation. However, this program has been earmarked by Congress under SAFETEA-LU. There are no matching fund requirements.

Forest Highway
The Forest Highway Program provides funding to projects on routes that have been officially designated as Forest Highways. Projects are selected through a cooperative process involving FHWA, the US Forest Service and MDT. Projects are developed by FHWA's Western Federal Lands Office. There are no matching fund requirements.

- *Parkways and Park Roads*

Parkways and Park Roads funding is for National Park transportation planning activities and projects involving highways under the jurisdiction of the National Park Service. Projects are prioritized by the National Park Service and approved and developed by FHWA's Western Federal Lands Office. There are no matching fund requirements.

- *Indian Reservation Roads (IRR)*

IRR funding is eligible for multiple activities including transportation planning and projects on roads or highways designated as Indian Reservation Roads. Funds are distributed to Bureau of Indian Affairs (BIA) area offices in accordance with a Federal formula and are then distributed to projects on individual reservations. Projects are usually constructed by BIA forces. There are no matching fund requirements. Any public road within or leading to a reservation is eligible for the Indian Reservation Road funding. In practice, IRR funds are only rarely expended on state designated roads. MDT staff is aware of only two secondary routes that have received IRR funding support. These are S-418, Pryor Road, in the Crow Reservation; and S-234, Taylor Hill Road, that leads to the Rocky Boy's Reservation.

- *Refuge Roads*

Refuge Roads funding is eligible for maintenance and improvements of refuge roads, rest areas, and bicycle and pedestrian facilities. Allocations are based on a long-range transportation improvement program developed by the US Fish and Wildlife Service. There are no matching fund requirements.

- **Congressionally Directed Funds**

  - *High Priority Projects (HPP)*

High Priority Projects are specific projects named to receive Federal funding in SAFETEA-LU Section 1702. HPP funding authority is available until expended and projects named in this section are included in Montana's percent share of the Federal highway funding program. The Montana Transportation Commission approves projects which are then let to contract through a competitive bidding process. In Montana, the Federal share payable for these projects is 86.58% Federal and 13.42% non-Federal. Montana receives 20% of the total project funding named in each year 2006 thru 2009. These funds are subject to the obligation limitation.

  - *Transportation Improvements Projects*

Transportation Improvement Projects are specific projects named to receive Federal funding in SAFETEA-LU Section 1934. Transportation Improvement Project funding authority is available until expended and projects named in this section are not included in Montana's percent share of the Federal highway funding program. The Montana Transportation Commission approves projects which are then let to contract through a competitive bidding process. In Montana, the Federal share payable on these projects is 86.58% Federal and 13.42% non-Federal. Montana receives a directed percent of the total project funding named in each year as follows: 2005 – 10%, 2006-20%, 2007-25%, 2008-25%, 2009-20%. These funds are subject to the obligation limitation.

- **Transit Capital & Operating Assistance Funding**

The MDT Transit Section provides federal and state funding to eligible recipients through federal and state programs. Federal funding is provided through the Section 5310 and Section 5311 transit programs and state funding is provided through the TransADE program. The new highway bill SAFETEA-LU brought new programs for transit "New Freedoms and Job Access Reverse Commute (JARC). All Federally funded transit projects must be derived from a locally developed, coordinated public transit-human services transportation plan (a "coordinated plan").

The coordinated plan must be developed through a process that includes representatives of public, private, and nonprofit transportation and human service providers and participation from the public.

  - *Metropolitian Planning/State Planning & Research Programs (Section 5303/5304)*

These are the principal sources of federal financial assistance for the development and improvement of comprehensive public mass transportation systems. The eligible recipient of Section 5303/5304 funds is the State of Montana.

- *Public Mass Transportation (Section 5307 Program)*

Because a portion of the corridor study area is within the Missoula urban boundary, public mass transportation funds are considered eligible funding sources. The Section 5307 grant provides public mass transportation for cities with populations over 50,000. Federal funds pay 80 % of capital and planning projects and 50 % of deficit operating costs. The remaining match of 20 % and 50 % respectively, must come from non-federal funds or from non-farebox revenue. The designated recipient of Section 5307 funds is the Governor who in turn can designate the funds to a public body. In Montana, the Governor has designated Missoula, Great Falls and Billings as the recipients of Section 5307 funds.

- *Clean Fuels Grant Program (Section 5308)*

This program is made available to projects in the Bus and Bus Facilities program (Section 5309) and can be used in the procurement of equipment and facilities, which use clean fuel technology such as bio-diesel and Compressed Natural Gas (CNG). This funding is only available to public transit operators in clean air nonattainment or maintenance areas in urban and rural areas.

- *Discretionary Grants (Section 5309)*

Provides capital assistance for fixed guide-way modernization, construction and extension of new fixed guide-way systems, bus and bus-related equipment and construction projects. Eligible applicants for these funds are state and local public bodies.

- *Capital Assistance for the Elderly and Persons with Disabilities (Section 5310)*

The Section 5310 Program provides capital assistance to providers that serve elderly persons and persons with disabilities. Eligible recipients must have a locally developed coordination plan. Federal funds provide 86% of the capital costs for purchase of buses, vans, wheelchair lifts, communication, and computer equipment. The remaining 14% is provided by the local recipient. Application for funding is made on an annual basis.

- *Financial Assistance for Rural General Public Providers (Section 5311)*

The purpose of the Section 5311 Program is to assist in the maintenance, development, improvement, and use of public transportation systems in rural areas (areas under 50,000 population). Eligible recipients are local public bodies, incorporated cities, towns, counties, private non-profit organizations, Indian Tribes, and operators of public transportation services. A locally developed coordinate plan is needed to receive funding

assistance. Funding is available for operating and capital assistance. Federal funds pay for 86% of capital costs, 54% for operating costs, 80% for administrative costs, and 80% for maintenance costs. The remainder, or required match, (14% for capital, 46% for operating, 20% for administrative, and maintenance) is provided by the local recipient. Application for funding is made on an annual basis.

- *Job Access Reverse Commute (JARC) (Section 5316)*

The purpose of this grant program is to develop transportation services designed to transport welfare recipients and low income individuals to and from jobs and to develop transportation services for residents of urban centers and rural and suburban areas to suburban employment opportunities. Funds may be used for capital and operating expenses with Federal funds provided for up to 50 percent of the cost of the project.

- *New Freedoms Program (5317)*

The purpose of the New Freedom Program is to provide improved public transportation services, and alternatives to public transportation, for people with disabilities, beyond those required by the Americans with Disabilities Act of 1990 (ADA). The program will provide additional tools to overcome barriers facing Americans with disabilities who want to participate fully in society. Funds may be used for capital expenses with Federal funds provided for up to 80 percent of the cost of the project, or operating expenses with Federal funds provided for up to 50 percent of the cost of the project. All projects funded must be derived from a locally developed, coordinated public transit-human services transportation plan (a "coordinated plan").

STATE FUNDING SOURCES

- **State Funded Construction (SFC)**

Allocations and Matching Requirements
The State Funded Construction Program, which is funded entirely with state funds from the Highway State Special Revenue Account, provides funding for projects that are not eligible for Federal funds. This program is totally State funded, requiring no match.

Eligibility and Planning Considerations
This program funds projects to preserve the condition and extend the service life of highways. Eligibility requirements are that the highways be maintained by the State. MDT staff nominates the projects based on pavement preservation needs. The District's establish priorities and the Transportation Commission approves the program.

- **TransADE**

The TransADE grant program offers operating assistance to eligible organizations providing transportation to the elderly and persons with disabilities.

Allocations and Matching Requirements
This is a state funding program within Montana statute. State funds pay 50 percent of the operating costs and the remaining 50 percent must come from the local recipient.

Eligibility and Planning Considerations
Eligible recipients of this funding are counties, incorporated cities and towns, transportation districts, or non-profit organizations. Applications are due to the MDT Transit Section by the first working day of February each year. To receive this funding the applicant is required by state law (MCA 7-14-112) to develop a strong, coordinated system in their community and/or service area.

APPENDIX D

LOCKWOOD TRANSPORTATION DISTRICT DOCUMENTATION

The document on the following pages is a copy of the original Yellowstone County Resolution and district boundary map creating the Lockwood Transportation District (LTD). The LTD was created to facilitate construction of the Johnson Lane Interchange and provided the local share of federal funds necessary for its construction. The LTD Board remained active after the project was complete, albeit without any substantial budget to work with.

Commissioner Straw introduced the following and moved for its adoption, Commissioner MacKay seconded the motion, and it was unanimously adopted:

RESOLUTION

WHEREAS, urban transportation districts may be established to supply transportation services and facilities to district residents and other persons, and

WHEREAS, proceedings for creation of a transportation district may be initiated by a petition signed by not less than 20% of the registered electors who reside within the proposed district, and

WHEREAS, a complete petition has been filed with the election administrator, and

WHEREAS, the petition contains the signatures of 20% of the qualified electors of the proposed transportation district, and

WHEREAS, the county clerk (election administrator) has presented the petition and his certificate to the County Commissioners at their first meeting held after he has attached his certificate, and

WHEREAS, the County Commissioners have examined the petition,

NOW, THEREFORE BE IT RESOLVED that:

1. The County Commissioners hereby call for a public hearing on the creation of such district.
2. The County Clerk and Recorder is hereby directed that a notice of the public hearing shall be published in a newspaper having general circulation within the proposed transportation district once each week for at least 2 weeks, the last publication to be at least 2 weeks prior to

the hearing. If there is no newspaper having general circulation within the proposed district, the notice of public hearing shall be posted in at least three public places within the proposed district for 2 weeks prior to the hearing.

3. The notice shall state the time, date, place, and purpose of the hearing and describe the boundaries of the proposed district.
4. At the time fixed for the public hearing, the commissioners shall hear all testimony offered in support of and in opposition to any petition and the creation of the district.
5. The hearings may be adjourned from time to time for the determination of additional information or hearing petitioners or objectors, but no adjournment may exceed 2 weeks after the date originally noticed and published for the hearing.
6. The commissioners, upon completion of the public hearing, shall proceed by resolution to refer the creation of such district to the persons qualified to vote on such proposition.
7. The commissioners may designate in their resolution whether a special election shall be held or whether the matter shall be determined at the next general election. If a special election is ordered, the commissioners shall specify in their order the date for the election and the voting places and shall appoint and designate judges and clerks therefore.
8. The election shall be held in all respects, as nearly as practicable, in conformity with the general election laws.
9. At the election, the ballots shall contain the words:

_____ Transportation district -- YES

_____ Transportation district -- NO

10. For more particulars concerning the powers and structure of the transportation district, please refer to the state statute which is attached and incorporated as "Exhibit A".

11. The legal description of the proposed transportation district is attached as "Exhibit B".

DONE this 23rd day of August, 1983.

BOARD OF COUNTY COMMISSIONERS,
YELLOWSTONE COUNTY, MONTANA

(SEAL)

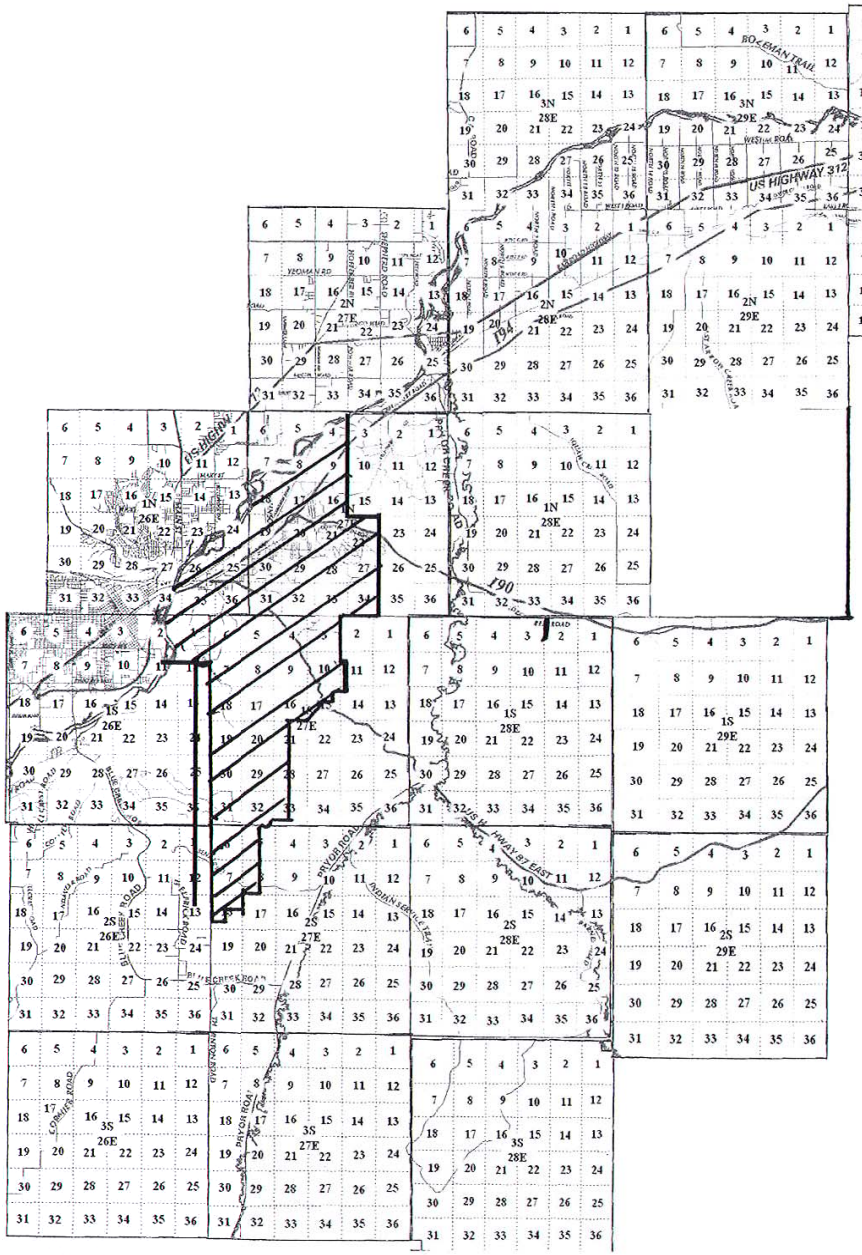
C. David Gorton, Chairman

James Straw, Member

ATTEST:

Dwight MacKay, Member

Merrill H. Klundt
Clerk and Recorder, Yellowstone
County, Montana



LOCKWOOD TRANSPORTATION DISTRICT

Exhibit B.

23000 Ac.

Montana Code Annotated – 2007
Title 7. Local Government
Chapter 14 Transportation
Selected Sections - Operations

7-14-201. Purpose.

7-14-201. Purpose. This part authorizes the establishment of urban transportation districts to supply transportation services and facilities to district residents and other persons.

History: En. 11-4501 by Sec. 1, Ch. 355, L. 1975; R.C.M. 1947, 11-4501.

7-14-202. Definitions.

7-14-202. Definitions. As used in this part, the following definitions apply:

(1) "Board" means the board of transportation of any district created under this part.

(2) "Commissioners" means the board of county commissioners or other governing body of a county.

(3) "District" means any transportation district created under this part.

History: En. 11-4502 by Sec. 2, Ch. 355, L. 1975; R.C.M. 1947, 11-4502.

7-14-212. District to be governed by transportation board.

7-14-212. District to be governed by transportation board.

(1) The district must be governed by a transportation board. The commissioners and the governing bodies of each city or town included or partially included in the district shall determine if the board is to be elected or appointed.

(2) The commissioners and the governing body by resolution shall:

(a) determine the number of board members;

(b) set the term of office;

(c) determine the makeup of the board with respect to the number of appointed members that will represent each county, city, or town;

(d) establish a procedure for selecting the initial members of an elected board. The initial members shall serve until the first county general election after their appointment.

(e) determine the number of candidates for an elected board whose names must be placed on the ballot in the county general election, based on the results of the primary election; and

(f) establish a procedure for filling vacancies on the board, including a provision for public notice.

(3) The commissioners and the governing body may, at any time, adopt a

resolution changing the method by which the members of the board are selected. The resolution must contain a provision that the term of office of the current members of the board may not be shortened.

(4) If the board is elected and if the number of candidates is equal to or less than the number of positions to be elected, the election administrator may cancel the election in accordance with 13-1-304. If an election is not held, the board shall declare elected by acclamation each candidate who filed a nominating petition for a position.

(5) If there are no nominees for an elective office of a member of the board, the vacancy must be filled as provided in subsection (2)(f).

(6) A member of the board taking office pursuant to subsection (4) or (5) serves a term of office as if elected to that office.

History: En. 11-4506 by Sec. 6, Ch. 355, L. 1975; R.C.M. 1947, 11-4506(part); amd. Sec. 1, Ch. 608, L. 1993; amd. Sec. 4, Ch. 254, L. 1999.

7-14-214. Election of members of transportation board.

7-14-214. Election of members of transportation board. Any registered elector in the district may file a petition of candidacy with the election administrator of the county where the district is located. A filing fee may not be required. All candidates shall file a nonpartisan petition for candidacy containing the signatures of not less than 25 registered electors of the district. Except for the number of petition signers required, the petition shall be filed as provided in 13-14-113.

History: En. 11-4506 by Sec. 6, Ch. 355, L. 1975; R.C.M. 1947, 11-4506(part); amd. Sec. 343, Ch. 571, L. 1979; amd. Sec. 1, Ch. 117, L. 1981; amd. Sec. 2, Ch. 608, L. 1993.

7-14-219. Powers of transportation board.

7-14-219. Powers of transportation board. The board shall have all powers necessary and proper to the establishment, operation, improvement, maintenance, and administration of the transportation district.

History: En. 11-4507 by Sec. 7, Ch. 355, L. 1975; R.C.M. 1947, 11-4507(part).

7-14-218. Compensation of transportation board members.

7-14-218. Compensation of transportation board members. The board members shall serve without pay except for necessary transportation expenses.

History: En. 11-4506 by Sec. 6, Ch. 355, L. 1975; R.C.M. 1947, 11-4506(part).

7-14-220. Employment of administrative officer.

7-14-220. Employment of administrative officer. The board shall employ a qualified administrative officer for the district. The board shall give public notice of its solicitation of applications for a qualified administrative officer.

History: En. 11-4507 by Sec. 7, Ch. 355, L. 1975; R.C.M. 1947, 11-4507(2).

7-14-221. Area of service.

7-14-221. Area of service. The district shall primarily serve the residents within the district boundaries but may authorize service outside the district boundaries where deemed appropriate.

History: En. 11-4507 by Sec. 7, Ch. 355, L. 1975; R.C.M. 1947, 11-4507(part).

7-14-231. Transportation district budget.

7-14-231. Transportation district budget. The board shall annually present its budget to the commissioners at the regular budget meetings as prescribed by law and therewith certify the amount of money necessary and proper for the ensuing year.

History: En. 11-4508 by Sec. 8, Ch. 355, L. 1975; R.C.M. 1947, 11-4508(part).

7-14-232. Mill levy authorized.

7-14-232. Mill levy authorized. Subject to 15-10-420, the commissioners shall annually, at the time of levying county taxes, fix and levy a tax in mills upon all property within the transportation district sufficient to operate the district, taking into account the amount requested by the board.

History: En. 11-4508 by Sec. 8, Ch. 355, L. 1975; R.C.M. 1947, 11-4508(part); amd. Sec. 33, Ch. 584, L. 1999; amd. Sec. 41, Ch. 574, L. 2001.

7-14-233. Collection of tax -- role of county treasurer.

7-14-233. Collection of tax -- role of county treasurer.

(1) The procedure for the collection of the tax shall be in accordance with the existing laws of the state of Montana.

(2) The funds collected under the tax levy shall be held by the county treasurer.

(3) The county treasurer shall be, ex officio, the treasurer for the transportation district and shall keep a detailed account of:

(a) all tax money paid into the fund;

(b) all other money from any source received by the district; and

(c) all payments and disbursements from the fund.

History: En. 11-4509 by Sec. 9, Ch. 355, L. 1975; R.C.M. 1947, 11-4509(part).

7-14-234. Warrants to be used for payments.

7-14-234. Warrants to be used for payments. Funds shall be paid out on warrants issued by direction of the board and signed by a majority of its membership.

History: En. 11-4509 by Sec. 9, Ch. 355, L. 1975; R.C.M. 1947, 11-4509(part).

7-14-235. Transportation district bonds authorized.

7-14-235. Transportation district bonds authorized. A transportation district may borrow money by the issuance of general obligation or revenue bonds or a combination thereof to provide funds for the district.

History: En. 11-4510 by Sec. 10, Ch. 355, L. 1975; R.C.M. 1947, 11-4510(part).

7-14-236. Limitation on bonded indebtedness.

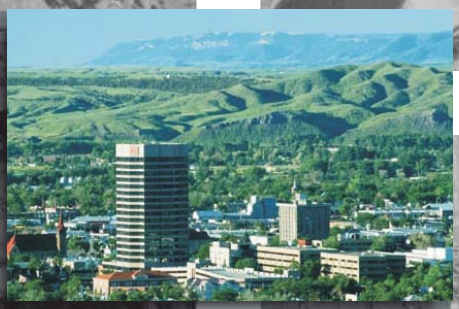
7-14-236. Limitation on bonded indebtedness. The amount of bonds issued to provide funds for the district and outstanding at any time may not exceed 1.51% of the total assessed value of taxable property, determined as provided in 15-8-111, within the district, as ascertained by the last assessment for state and county taxes prior to the issuance of the bonds.

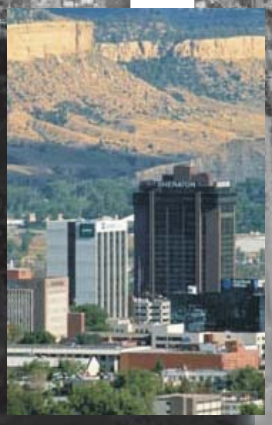
History: En. 11-4510 by Sec. 10, Ch. 355, L. 1975; R.C.M. 1947, 11-4510(part); amd. Sec. 50, Ch. 614, L. 1981; amd. Sec. 15, Ch. 29, L. 2001.

APPENDIX D

LOCKWOOD TRANSIT SERVICE PLAN

Lockwood Transit Service Options





Prepared for

MET Transit

TRANSPORTATION CONSULTANTS, INC.

Lockwood Transit Service Options

Final Report

Prepared for:

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July 31, 2007

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CHAPTER I
Introduction

The City of Billings contracted with LSC Transportation Consultants, Inc. to assist in the development of a transit service plan for the Lockwood area. The plan focuses on developing transit service alternatives for the Lockwood area.

REPORT CONTENTS

Chapter II describes the service area and community demographics. The chapter focuses on identifying the density of various market segments including general public, elderly (60 years and above), persons with disabilities, low-income individuals, and zero-vehicle households in Lockwood. Density information gathered from this chapter is essential in estimating potential transit demand for developing a transit system that will effectively serve the population in the Lockwood area.

Chapter III presents the transit demand models used in estimating ridership for the fixed-route, deviated fixed-route, and paratransit service alternatives in Lockwood.

Chapter IV presents service alternatives. Five alternatives are presented with each showing estimated operating costs, ridership, and performance measures. Route maps are presented which depict the route structure and the service area. This chapter also includes the cost allocation model which is based on MET Transit's most recent financial data and existing transit operations. These costs are used as a basis for estimating the cost of any proposed service alternative.

The plan recommends service alternatives for providing transit services to Lockwood. The current effort focuses on the feasibility of providing public transit services in order to meet Lockwood's transit needs.

Chapter II

TRANSPORTATION
CONSULTANTS, INC.

CHAPTER II

Transit Market Analysis

INTRODUCTION

The Lockwood study area shown in Figure II-1 is a community adjacent to Billings with a population of approximately 4,300 people (2000 census). This chapter presents a brief overview of the important demographic characteristics of the Lockwood area as related to transit service design. There are several national criteria which are used in determining where, and even how frequently, transit service should be provided. For transit to be both effective and efficient, it must serve those areas with the highest propensity for ridership. These areas often include those with a higher proportion of low-income residents, those with disabilities, households with limited or no access to a personal automobile, and finally those who, because of age, may be unable to drive themselves. These demographic factors—combined with transit trip generators, service frequency, and a host of other variables—aid in determining where to provide transit service in a specified area. The information presented will aid in determining service options and recommendations for proposed transit services in the Lockwood area.

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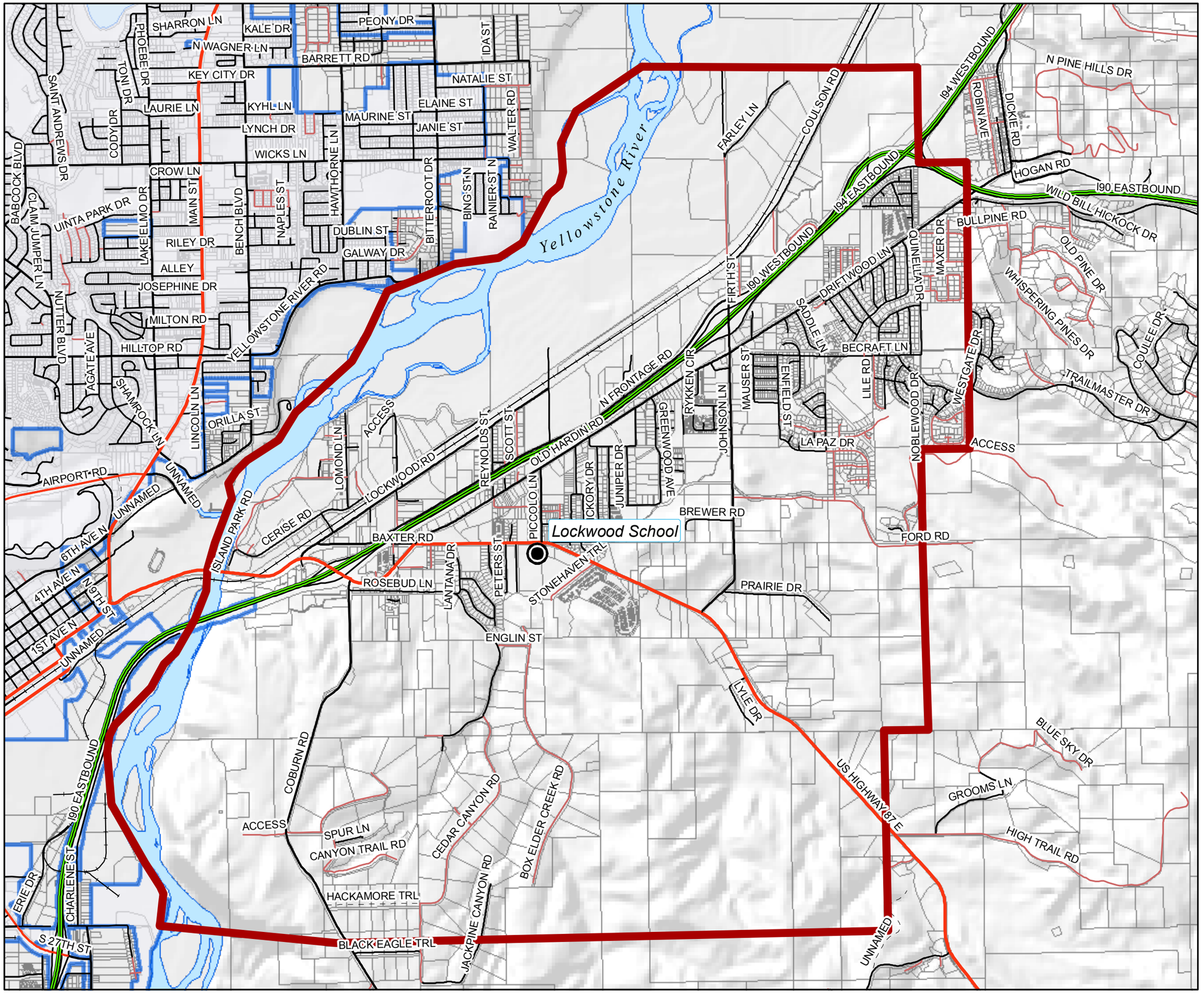
Figure II-1

Lockwood Basemap

Showing Road Surfaces



Legend

- Lockwood Buildout Boundary

Road Surface

- Paved
- Gravel or Unknown
- Dirt
- Billings City Limits

Arterial Streets and Highways

- Interstate Highway
- Primary Highway
- Secondary Highway
- Arterial Street or Road
- Railroad
- Property Boundary
- School

Source for road surface information: Yellowstone County GIS & City County Planning. Data acquired within the last two years has not been field verified. Data may not be complete.

N

Scale in Miles

0 0.5 1

Map Document: (\\Pud-srv3\gis\Maps\Transit\Lockwood_Basemap.mxd)
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STUDY AREA DEMOGRAPHICS

1990-2000 Population

The permanent population of Lockwood was reported to be 3,967 people based on the 1990 US Census. According, to the 2000 US Census, the population was 4,306—an increase of approximately 8.5 percent from the year 1990. In 2006, the Planning Department estimated the population using data from the school district to be 7,200. Table II-1 presents the 2000 population by census block group. Figure II-2 illustrates the census block groups within the Lockwood buildout boundary limits used to map population densities for certain population groups.

Since the Lockwood boundary does not correspond with those of the US Census block groups at which level the detailed analysis was done, the study area for this analysis includes all the US Census block groups that are partly or wholly covered by the Lockwood boundary and therefore includes portions of the surrounding area. As a result, the total population derived from census block group data differs from information based only on the Lockwood boundary.

A census block group is the smallest geographic unit for which the US Census Bureau tabulates sample data. It is defined by the US Census Bureau as a cluster of census blocks generally containing between 600 and 3,000 people, with an optimum size of 1,500 people. Block groups never cross the boundaries of states, counties, or statistically-equivalent entities. However, they frequently cross local area boundaries.

Table II-1
2000 General Population

Census Tract	Census Block Group	Land Area sq. ml.	Total Population 2000	2000 Population By Gender	
				Male	Female
8	1	5.25	1,195	583	612
8	2	1.10	1,617	814	803
8	3	1.82	1,534	753	781
16	2	46.82	2,073	1,041	1,032
16	3	92.35	2,353	1,194	1,159
Lockwood Study Area Totals (General Population):		***147***	***8,772***	***4,385***	***4,387***

Source: 2000 Census, LSC, 2006.

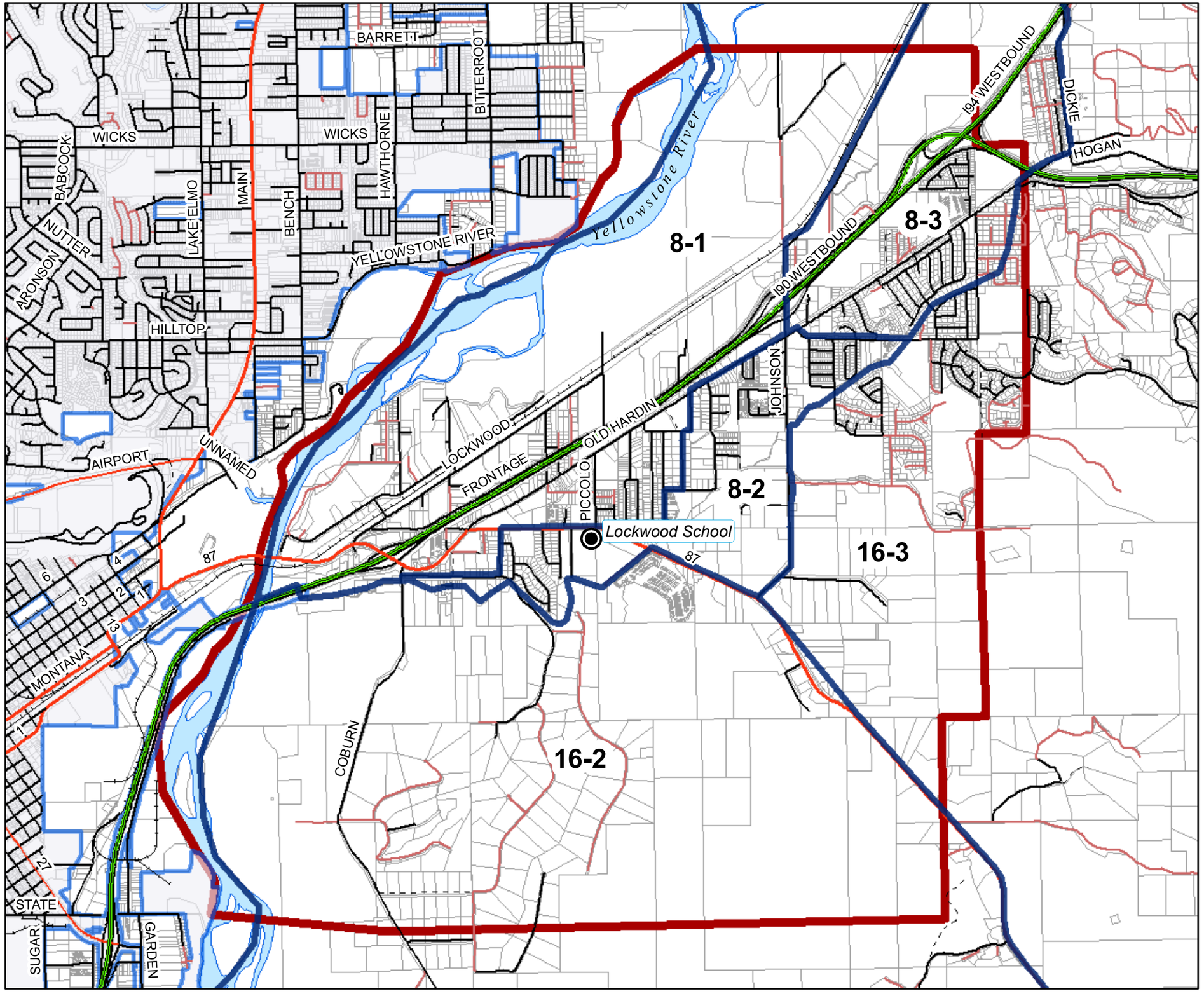
Population Density

Figure II-3 reflects the 2000 population density for Lockwood by block group boundaries. The population is most dense in the central Lockwood area around the Lockwood Elementary School (Block Group 8-2) extending northeast along Interstate 90 (Block Group 8-3).

Figure II-2

Lockwood

2000 Census Block Groups



Legend

- Lockwood Buildout Boundary
- 2000 Census Block Groups

Road Surface

- Gravel or Unknown
- Paved
- Dirt
- Billings City Limits
- Railroad
- School

N

Scale in Miles

0 0.5 1

Map Document: (\\Pud-srv3\gis\Maps\Transit\Lockwood_BlkGrps.mxd)
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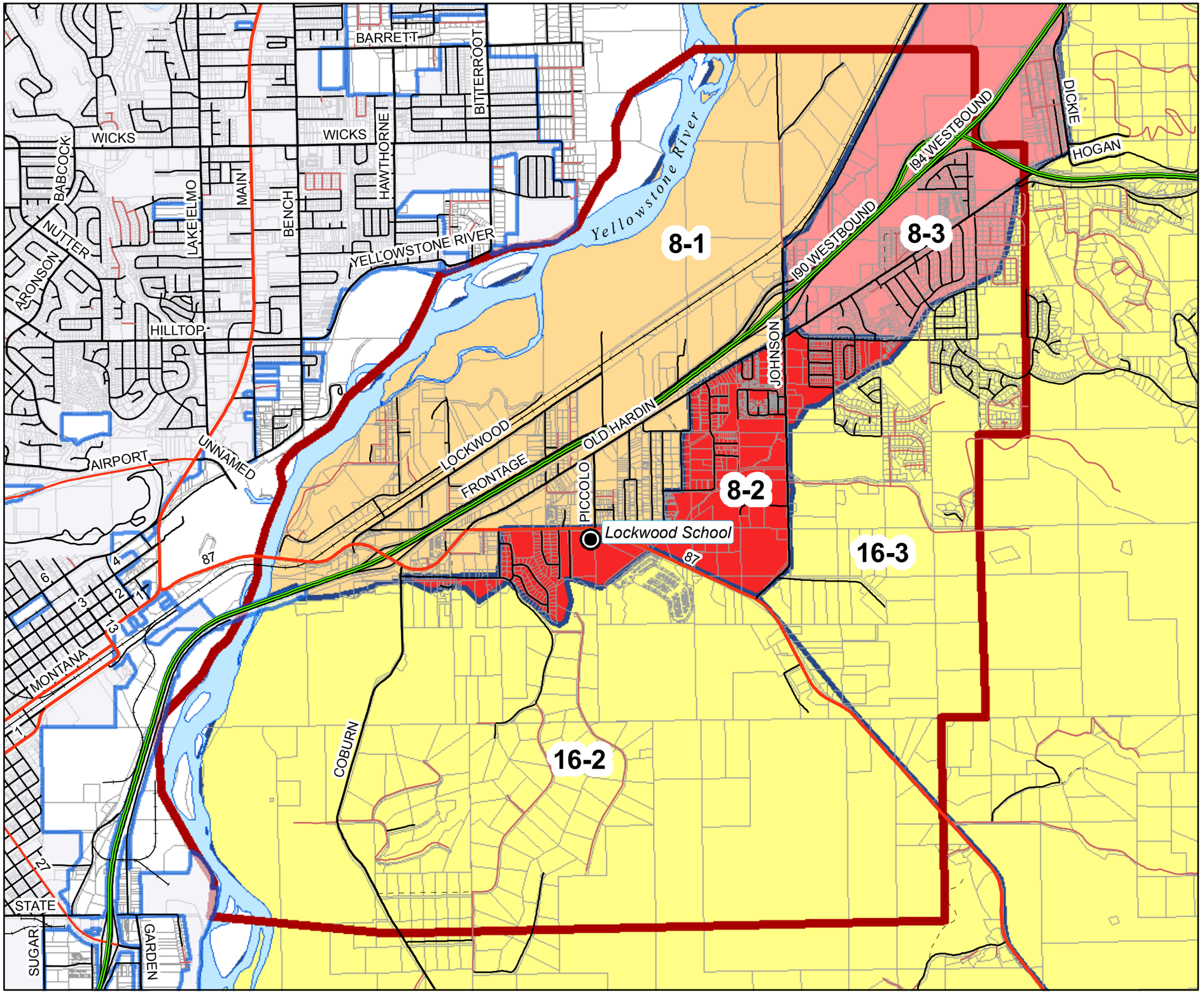
Figure II-3

Lockwood

Population Density



Legend

2000 Census Block Groups

- More than 850 persons per sq mi
- 231 - 850 persons per sq mi
- 45 - 230 persons per sq mi
- Less than 45 persons per sq mi
- Lockwood Buildout Boundary

Road Surface

- Gravel or Unknown
- Paved
- Dirt
- Billings City Limits
- Railroad
- School

N

Scale in Miles

0 0.5 1

Map Document: (\\Pud-srv3\gis\Maps\Transit\Lockwood_Pop-SqMi.mxd)
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Transit-Dependent Population Characteristics

This section provides information on individuals considered by the transportation profession to be dependent upon public transit. In general these population characteristics preclude most such individuals from driving, leaving carpooling and public transit as the only other motorized forms of transportation available.

The four types of limitations which preclude persons from driving are: (1) physical limitations, (2) financial limitations, (3) legal limitations, and (4) self-imposed limitations. Physical limitations may include everything from permanent disabilities such as frailty due to age, blindness, paralysis, or developmental disabilities, to temporary disabilities such as acute illnesses and head injuries. Financial limitations essentially include those persons unable to purchase or rent their own vehicle. Legal limitations refer to such limitations as persons who are too young (generally under age 16). Self-imposed limitations refer to those people who choose not to own or drive a vehicle (some or all of the time) for reasons other than those listed in the first three categories.

The US census is generally capable of providing information about the first three categories of limitation. The fourth category of limitation is currently recognized as representing a relatively small proportion of transit ridership. Table II-2 presents Lockwood's 2000 population for zero-vehicle households, youth population, elderly population, mobility-limited population, and below-poverty population. These types of data are important to the various methods of transit demand estimation.

Elderly Population

Elderly persons represent a significant number of the transit-dependent population and approximately 11 percent of the total population in the Lockwood study area. Figure II-4 illustrates the distribution of elderly persons (age 60 or more) in the Lockwood area. As illustrated in Table II-2 and Figure II-4, the highest density of elderly residents are in the central Lockwood area around the Lockwood School and the area between Juniper Drive and Johnson Lane (Block Group 8-2) and the northeast Lockwood area along Interstate 90 (Block Group 8-3).

Table II-2
2000 General Population Characteristics
Lockwood Area

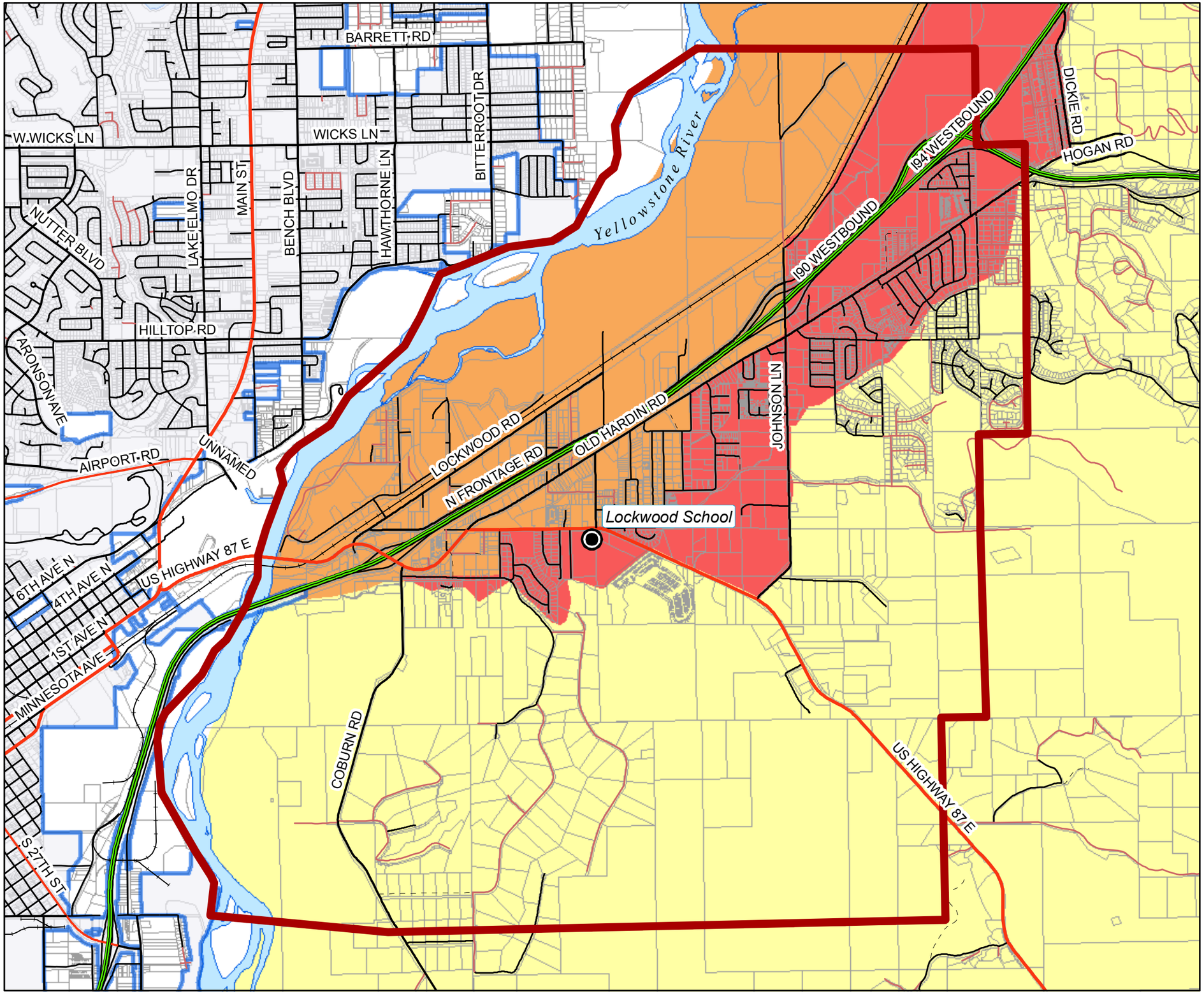
Census Tract	Census Block Group	Area Description	Land Area sq. ml.	Total Population 2000	Total Number of Households	Zero-Vehicle Households 2000		Total Number of Youth Aged 0-15 2000		Total Number of Elderly 60 & Over 2000		Mobility-Limited Population 2000		Below-Poverty Population 2000	
					#	#	%	#	%	#	%	#	%	#	%
8	1	NW Lockwood area	5.25	1,195	481	22	4.6%	263	22.0%	151	12.6%	26	2.2%	129	10.8%
8	2	Lockwood Elementary School	1.10	1,617	569	34	6.0%	472	29.2%	154	9.5%	20	1.2%	114	7.1%
8	3	NE Lockwood area	1.82	1,534	569	26	4.6%	392	25.6%	205	13.4%	56	3.7%	159	10.4%
16	2	South Lockwood area	46.82	2,073	719	17	2.4%	588	28.4%	198	9.6%	41	2.0%	58	2.8%
16	3	East Lockwood boundary	92.35	2,353	787	18	2.3%	649	27.6%	219	9.3%	32	1.4%	45	1.9%
Lockwood Area TOTAL (General Population):				***8,772***	***3,125***	***117***	***3.7%***	***2,364***	***26.9%***	***927***	***10.6%***	***175***	***2.0%***	***505***	***5.8%***

Source: 2000 Census,LSC 2006

Figure II-4

Lockwood

Density of Elderly (60 Years and Above)



Legend

Pop Over 60 / Square Mile

- 30 - 140 persons per sq mi
- 5 - 29 persons per sq mi
- 2 - 4 persons per sq mi
- Lockwood Buildout Boundary
- Billings City Limits

Road Surface

- Gravel or Unknown
- Paved
- Dirt
- Railroad
- School

Source for Population Age:
US 2000 Census.

N

Scale in Miles

0 0.5 1

Map Document: (\\Pud-srv3\gis\Maps\Transit\Lockwood_Seniors.mxd)
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Mobility-Limited Population

The mobility-limited population also represents a large portion of the transit-dependent population. Nationwide, approximately 10 percent of the population has some form of mobility impairment, although this is typically much lower in rural areas. In the Lockwood area approximately two percent of the population have some type of mobility limitation. Figure II-5 illustrates the distribution of the mobility-limited population. In the Lockwood area, the population around Lockwood School (Block Group 8-2) has the highest concentration of mobility-limited persons, followed by the northeast Lockwood area along Interstate 90 (Block Group 8-3). Another area with some mobility-limited population is the area along the Yellowstone River (Block Group 8-1).

Low-Income Population

The low-income population represents approximately 5.8 percent of the total population in the Lockwood area. Figure II-6 illustrates the distribution of low-income persons in the Lockwood area. As illustrated in Table II-2 and Figure II-6, the highest density of low-income residents is the area of the Lockwood School (Block Group 8-2), followed by areas along Interstate 90 in the northeast Lockwood area (Block Group 8-3).

Zero-Vehicle Households

Persons who do not own or have access to a private vehicle are also considered transit-dependent. An estimated seven percent (117) of the households in the Lockwood area have no vehicle available. The distribution of zero-vehicle households in the Lockwood area is shown in Figure II-7. The highest percentages of zero-vehicle households in the Lockwood area are located in the same locations as the other categories—around the Lockwood School, followed by areas along Interstate 90 in the northeast Lockwood area.

SUMMARY

This chapter has presented the community background information, and the areas with the greatest propensity to use transit with which transit alternatives were identified and explored.

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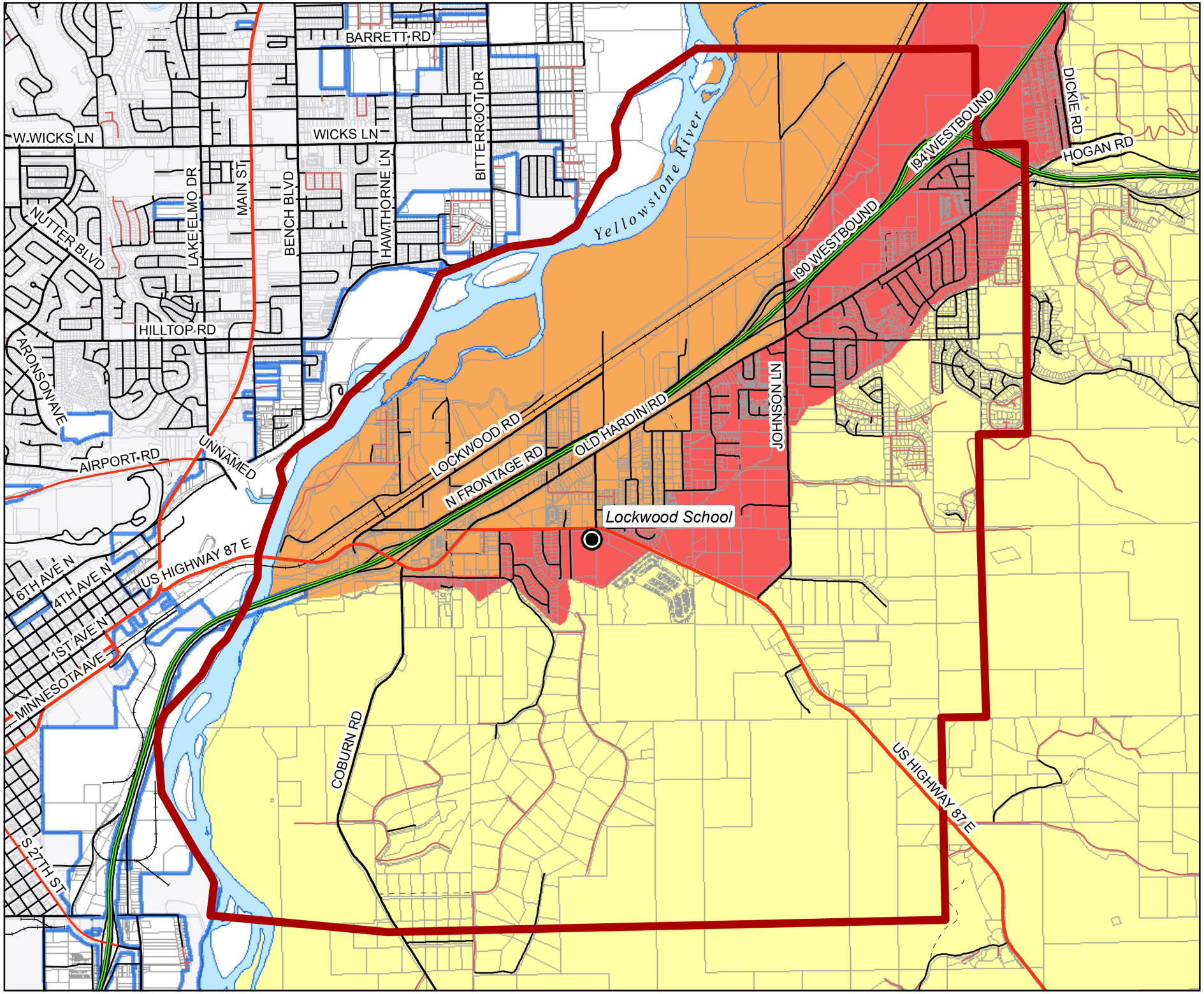
Figure II-5

Lockwood

Density of Mobility Limited



Legend

Mobility Limited / Square Mile

- 6 - 31 persons per sq mi
- 2 - 5 persons per sq mi
- 0 - 1 persons per sq mi
- Lockwood Buildout Boundary
- Billings City Limits

Road Surface

- Gravel or Unknown
- Paved
- Dirt
- Railroad
- School

Source for density of mobility limited population: US 2000 Census.

N

Scale in Miles

0 0.5 1

Map Document: (\\Pud-srv3\gis\Maps\Transit\Lockwood_Mobility_Limited.mxd)
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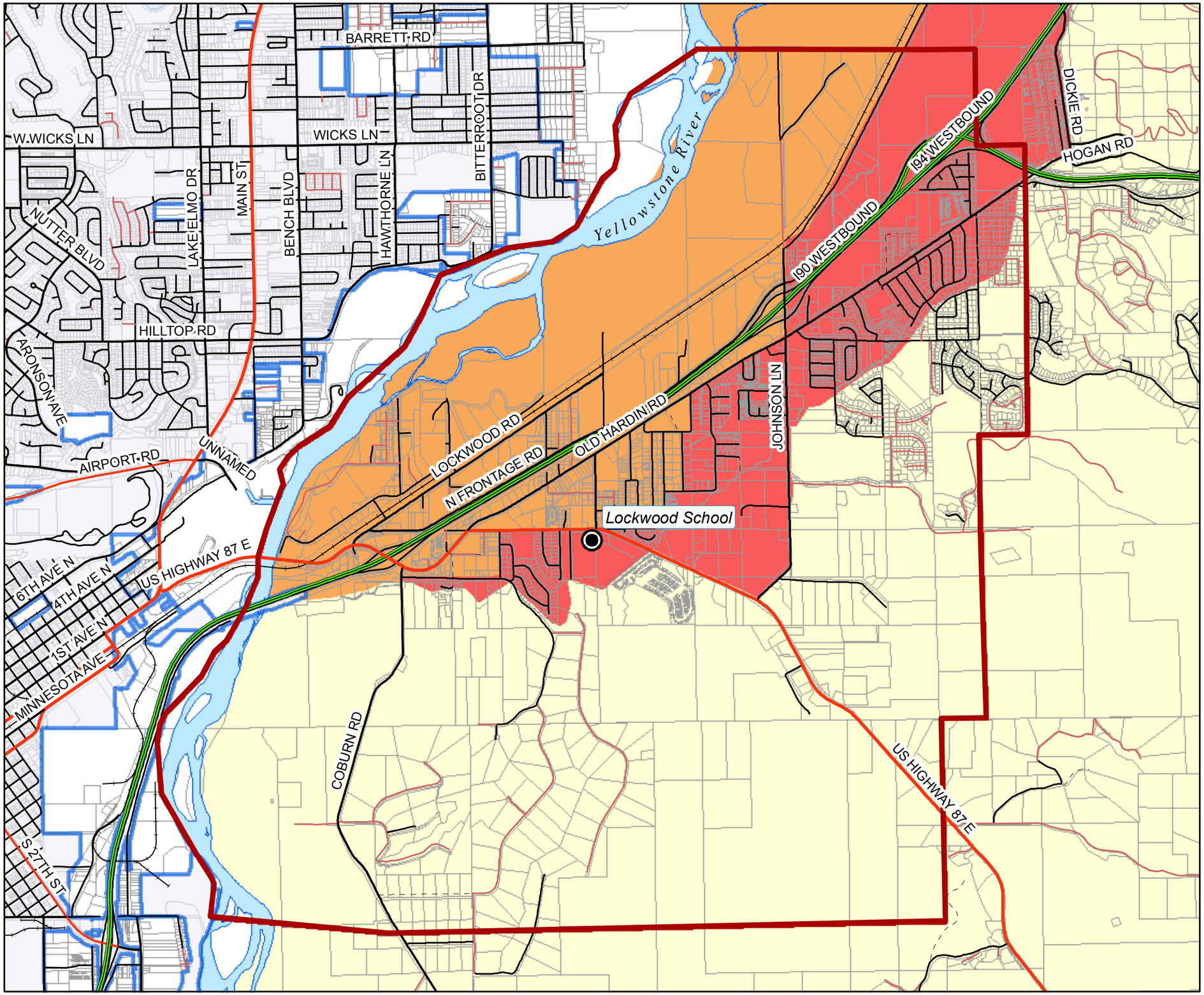
Figure II-6

Lockwood

Density of Low-Income Persons



Legend

Pop Below Poverty / Square Mile

- 50 - 110 persons per sq mi
- 10 -49 persons per sq mi
- 0 - 9 persons per sq mi
- Lockwood Buildout Boundary
- Billings City Limits

Road Surface

- Gravel or Unknown
- Paved
- Dirt
- Railroad
- School

Source for Income:
US 2000 Census.

N

Scale in Miles

0 0.5 1

Map Document: (\\Pud-srv3\gis\Maps\Transit\Lockwood_LowIncome.mxd)
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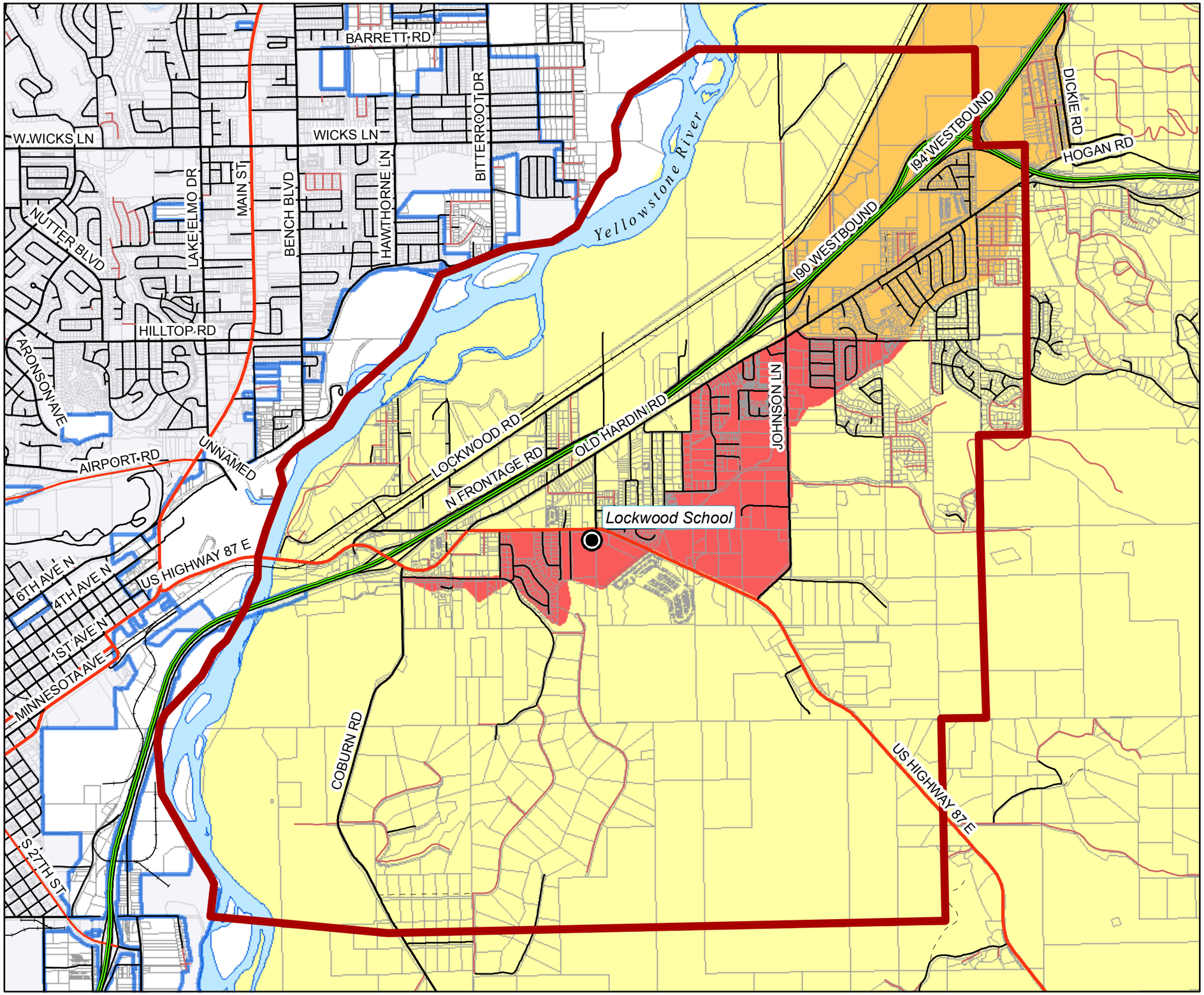
Figure II-7

Lockwood

Density of Zero-Vehicle Households



Legend

HHDs W/O Vehicle / Square Mile

- Over 25 hhlds per sq mi
- Over 10 hhlds per sq mi
- 0 - 4 hhlds per sq mi
- Lockwood Buildout Boundary
- Billings City Limits

Road Surface

- Gravel or Unknown
- Paved
- Dirt
- Railroad
- School

Source for Zero-Vehicle Households:
US 2000 Census.

N

Scale in Miles

0 0.5 1

Map Document: (\\Pud-srv3\gis\Maps\Transit\Lockwood_NoVehicles.mxd)
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Chapter III

TRANSPORTATION
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CHAPTER III

Transit Needs Assessment

INTRODUCTION

A key step in developing and evaluating transit plans is a careful analysis of the mobility needs of various segments of the population and the potential ridership of transit services. Transit demand analysis is the basic determination of demand for public transportation in a given area. There are several factors that affect demand, not all of which can be forecasted. However, as demand estimation is an important task in developing any transportation plan, several methods of estimation have been developed in the transit field. The analysis makes intensive use of the demographic data and trends discussed previously.

This chapter presents an analysis of the demand for transit services in the Lockwood area based upon standard estimation techniques. The transit demand identified in this section was utilized in the identification of transit service alternatives and the evaluation of the various alternatives presented in Chapter IV. Two methods are used to estimate the transit trip demand in Lockwood.

- Fixed-Route/Modified Fixed-Route Model
- ADA Eligibility Model

FIXED-ROUTE MODEL

The fixed-route demand model has been developed to evaluate the scheduled service alternatives for the Lockwood area. The model uses data from other communities that are applicable in Lockwood.

Approach

The model format is based on household vehicle ownership, average walking distance to bus stops, and frequency of operation. The basic approach is described in the paper, *"Demand Estimating Model for Transit Route and System Planning in Small Urban Areas,"* Transportation Research Board, 730, 1979. This model incor-

porates factors for walking distance, the distance traveled on the bus, and the frequency of service or headway. The fixed-route, fixed-route loop, and deviated fixed-route (route-deviation) models calibrated for the Lockwood area are shown in Tables III-1, III-2, and III-3. These models reflect the population for Lockwood and similar ridership data that would be generated with scheduled service. These ridership models were calibrated to adjust to the demographic conditions in Lockwood and the fixed-route structures presented in the service alternatives.

The percentage of households with transit access is determined by the number of households within a quarter-mile of the scheduled transit service. Census block groups located entirely within a quarter-mile show 100 percent transit access.

The basic trip rate for households with no vehicles was 0.2, and the trip rate for households with one or more vehicles was 0.11. The trip rates recognize that, in general, the propensity to use transit is higher for households without automobiles than those with automobiles. Walking distance and headway adjustment factors are based on a service frequency curve which cross-tabulates automobile ownership with walking distance and automobile ownership with headway (in minutes). The walking distance adjustment factors are:

Walking Distance	0-Auto	1 Auto
500 feet	1.25	1.2
1000 feet	1.0	1.1
1200 feet	0.9	1.05
1500 feet	0.7	0.9
2000 feet	0.5	0.7
2500 feet	0.2	0.03

The headway adjustments are:

Headways	0-Auto	1 Auto
30 minutes	1.4	1.5
45 minutes	1.0	1.0
60 minutes	0.6	0.85
90 minutes	0.6	0.75

The walking distance and headway trip rates illustrate a pattern that shorter walking distances to the route and higher trip frequencies generate a higher ridership than longer walking distances and lower headways.

The models, as presented, assume fixed-route transit service along the Old Hardin Road and a fixed-route loop along Old Hardin Road and North Frontage Road and a deviated fixed route (route-deviation) serving the area along Old Hardin Road. Chapter IV details the route structures.

Table III-1
Fixed-Route Demand Model - Lockwood

Census Tract	Block Group	Total # of Hhlds 2000	# of Hhlds with 0 Auto	# of Hhlds with 1 Auto	% of Hhlds with Transit Access	Hhlds Served by Transit 0 Auto	Hhlds Served by Transit 1 Auto	Basic Transit Trip Rates 0 Auto	Basic Transit Trip Rates 1 Auto	Walk Distance (ft)	Walk Factor 0 Auto	Walk Factor 1 Auto	Headway (min)	Headway Factor 0 Auto	Headway Factor 1 Auto	Daily Transit Trips 0 Auto	Daily Transit Trips 1 Auto	Daily Trip # of
8	1	481	22	459	80%	17.6	367.2	0.2	0.11	500	1.3	1.2	30	1.4	1.5	6.2	72.7	79
8	2	569	34	535	50%	17	267.5	0.2	0.11	500	1.3	1.2	30	1.4	1.5	6.0	53.0	59
8	3	569	26	543	50%	13	271.5	0.2	0.11	500	1.3	1.2	30	1.4	1.5	4.6	53.8	58
16	2	719	17	702	15%	2.55	105.3	0.2	0.11	1,500	0.7	0.9	30	1.4	1.5	0.5	15.6	16
16	3	787	18	769	15%	2.7	115.35	0.2	0.11	1,500	0.7	0.9	30	1.4	1.5	0.5	17.1	18
Subtotal		3,125	117	3,008		53	1,127									Estimated Weekday Ridership		230

Source: LSC, 2006.

Table III-2

Fixed-Route Loop Demand Model - Lockwood

Census Tract	Block Group	Total # of Hhlds 2000	# of Hhlds with		% of Hhlds with	Hhlds Served by Transit		Basic Transit Trip Rates		Walk Distance	Walk Factor		Headway	Headway Factor		Daily Transit Trips		Daily Trip
			0 Auto	1 Auto	Transit Access	0 Auto	1 Auto	0 Auto	1 Auto	(ft)	0 Auto	1 Auto	(min)	0 Auto	1 Auto	0 Auto	1 Auto	# of
8	1	481	22	459	90%	19.8	413.1	0.2	0.11	500	1.3	1.2	30	1.4	1.5	6.9	81.8	89
8	2	569	34	535	50%	17	267.5	0.2	0.11	500	1.3	1.2	30	1.4	1.5	6.0	53.0	59
8	3	569	26	543	60%	15.6	325.8	0.2	0.11	500	1.3	1.2	30	1.4	1.5	5.5	64.5	70
16	2	719	17	702	15%	2.55	105.3	0.2	0.11	1,500	0.7	0.9	30	1.4	1.5	0.5	15.6	16
16	3	787	18	769	15%	2.7	115.35	0.2	0.11	1,500	0.7	0.9	30	1.4	1.5	0.5	17.1	18
Subtotal		3,125	117	3,008		58	1,227									Estimated Weekday Ridership		251

Source: LSC, 2006.

Table III-3

Deviated Fixed-Route (Route Deviation) Demand Model - Lockwood

Census Tract	Block Group	Total # of Hhlds 2000	# of Hhlds with		% of Hhlds with	Hhlds Served by Transit		Basic Transit Trip Rates		Walk Distance	Walk Factor		Headway	Headway Factor		Daily Transit Trips		Daily Trip
			0 Auto	1 Auto	Transit Access	0 Auto	1 Auto	0 Auto	1 Auto	(ft)	0 Auto	1 Auto	(min)	0 Auto	1 Auto	0 Auto	1 Auto	# of
8	1	481	22	459	95%	20.9	436.1	0.2	0.11	500	1.25	1.2	45	1	1	5.2	57.6	63
8	2	569	34	535	100%	34.0	535.0	0.2	0.11	500	1.25	1.2	45	1	1	8.5	70.6	79
8	3	569	26	543	100%	26.0	543.0	0.2	0.11	500	1.25	1.2	45	1	1	6.5	71.7	78
16	2	719	17	702	20%	3.4	140.4	0.2	0.11	1,500	0.7	0.9	45	1	1	0.5	13.9	14
16	3	787	18	769	20%	3.6	153.8	0.2	0.11	1,500	0.7	0.9	45	1	1	0.5	15.2	16
Subtotal		3,125	117	3,008		88	1,808								Estimated Weekday Ridership			250

Source: LSC, 2006.

ADA ELIGIBILITY MODEL

LSC prepared demand estimates for the demand-response ridership based on a methodology developed by the Federal Transit Administration (FTA). Factors used in this methodology include demographics, eligibility criteria, service area, availability of other services, socioeconomic characteristics, service characteristics, and fares. The methodology does not include program-related trips.

Paratransit trips are frequently designated as:

- Program-related: Program-related trips occur only to support specific programs, and the demand is directly related to the number of participants in the program.

- Non-program-related trips: Non-program trips are represented most by those individuals traveling for work, school, or other personal reasons.

Low and high demand estimates are produced with this methodology and are shown in Table III-4. The demand estimates have been calculated by census block group and show the current demand for paratransit services in Lockwood. The annual trips for Lockwood area's potential paratransit population ranges from approximately 1,050 to 2,310 annual trips.

Table III-4
Paratransit Demand - Lockwood

Census Tract	Census Block Group	Area Description	Total 2000 Population	% of Mobility Limited Population 2000	Mobility-Limited Population	ADA Eligibility Factor	Estimate of ADA Eligible Population	Certification Factor	Estimate of Certified Population	Trip Rates (1) per Eligible Person Per Month		Eligible Population Annual Trips		Certified Population Annual Trips	
										Low	High	Low	High	Low	High
8	1	Northwest Lockwood	1,195	2.2%	26	60.0%	16	0.25	7	2.0	4.4	374	824	156	343
8	2	Lockwood School	1,617	1.2%	20	60.0%	12	0.25	5	2.0	4.4	288	634	120	264
8	3	Northeast Lockwood; Holiday Inn	1,534	3.7%	56	60.0%	34	0.25	14	2.0	4.4	806	1,774	336	739
16	2	South Lockwood	2,073	2.0%	41	60.0%	25	0.25	10	2.0	4.4	590	1,299	246	541
16	3	East Lockwood	2,353	1.4%	32	60.0%	19	0.25	8	2.0	4.4	461	1,014	192	422
Total			***8,772***	***2%***	***175***		***105***		***44***			***2,520***	***5,544***	***1,050***	***2,310***

(1) Source: Survey of 7 "exemplary" paratransit operators. Crain, Et al. "Working Paper 6: Service Needs Analysis, San Francisco Bay Area Regional Paratransit Plan," Jan. 1990.

Chapter IV

TRANSPORTATION
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CHAPTER IV

Transit Service Alternatives

INTRODUCTION

The basis for any short-range transit plan is the careful consideration of the realistic service alternatives. The capital requirements, financial plans, and management options can then be developed to support the planned services. The first element of Chapter IV presents a cost allocation model for determining the current cost of transit services and estimating operating costs for new services to Lockwood. The second element of this chapter discusses the potential for new services to the Lockwood area.

Cost Allocation Model

The financial, ridership, and service information can be used to develop internal evaluation tools for new service to Lockwood. A cost allocation model provides base information for estimating the cost ramifications of any proposed service alternative. The cost allocation model is shown in Table IV-1. Note that the cost allocation model is based on MET Transit's most recent budget since this is the best indicator of transit operating costs in the Billings area.

Cost information from the fiscal year was used to develop a two-factor cost allocation model of the current MET Transit operations. In order to develop such a model, each cost line item is allocated to one of two service variables—hours and miles. In addition, fixed costs are identified as being constant. This is a valid assumption for the short term, although fixed costs could change over the long term (more than one or two years). Examples of the cost allocation methodology include allocating fuel costs to vehicle-miles and allocating operator salaries to vehicle-hours. The total costs allocated to each variable are then divided by the total quantity (i.e., total revenue-miles or hours) to determine a cost rate for each variable. A separate cost allocation model has been created for fixed-route and paratransit services.

Definitions

- ***Vehicle-Hour*** is defined as the number of hours that all vehicles in the system are operated in service. The typical usage is vehicle revenue-hours.

- ***Vehicle-Mile*** is defined as the total distance traveled by all vehicles in the system when they are in service. The typical usage is vehicle revenue-miles.

The cost allocation model thus divides the operating costs into number of hours operated, number of miles operated, and fixed costs.

The allocation of costs for MET Transit's fiscal year operations yields the following cost equation for new bus operations to Lockwood:

For a Stand-Alone System

Fixed-Route Services

Total Cost = $1,229,217 + ($1.06 x Revenue-Miles) + ($34.91 x Revenue-Hours)

Paratransit Services

Total Cost = $204,894 + ($0.58 x Revenue-Miles) + ($44.45 x Revenue-Hours)

These costs reflect the total fixed costs of the MET system. For service operated by Lockwood, the fixed costs would be lower because of the smaller operation. However, the costs must be considered as part of the cost to operate the new service. The fixed costs include such things as management, facilities, utilities, office supplies, and administrative costs.

For Expansion of Services

Incremental costs such as the extension of service hours or service routes/areas are evaluated considering only the mileage and hourly costs:

Fixed-Route Services

Incremental Costs = ($1.06 x Revenue-Miles) + ($34.91 x Revenue-Hours)

Paratransit Services

Incremental Costs = ($0.58 x Revenue-Miles) + ($44.45 x Revenue-Hours)

In calculating the costs associated with expansion of services, only incremental costs are considered, but for calculating costs associated with a new stand-alone system, the total costs include both fixed costs and incremental costs. If MET was to expand service to Lockwood, the incremental costs would primarily be for direct vehicle operations. There would be no need for additional management, dispatching, or maintenance staff. No new facilities would be required. If Lockwood starts a new separate system, these costs would be incurred. The costs for a separate system are anticipated to be higher than if MET expands to provide the service.

Table IV-1
Cost Allocation Model

FIXED-ROUTE SERVICES

PROPOSED ACCOUNT	Budget FY 06	Vehicle-Hours	Vehicle-Miles	Fixed Cost
Admin. Salaries/Wages/Benefits	$227,401			$227,401
Maint. Salaries/Wages/Benefits	$153,417		$153,417	
Op. Salaries/Wages/Benefits/Other items	$1,337,936	$1,337,936		
Other Salaries/Wages	$249,233			$249,233
Other Office Expenses	$398,466			$398,466
Advertising	$55,375			$55,375
Utilities/Other insurances/expenses	$298,742			$298,742
Bus Maintenance	$47,962		$47,962	
Op. Gas/Oil/Tires	$461,604		$461,604	
TOTAL OPERATING COSTS	**$3,230,136**	$1,337,936	$662,983	$1,229,217
Service Variable Quantities		veh-hrs	veh-mls	Fixed-Cost
Used for Planning Purposes		38,323	626,835	Factor
		$34.91	**$1.06**	**1.61**

PARATRANSIT SERVICES

PROPOSED ACCOUNT	Budget FY 06	Vehicle-Hours	Vehicle-Miles	Fixed Cost
Admin. Salaries/Wages/Benefits	$169,381			$169,381
Maint. Salaries/Wages/Benefits	$8,495		$8,495	
Op. Salaries/Wages/Benefits/Other items	$691,939	$691,939		
Other Salaries/Wages	$1,420			$1,420
Other Office Expenses	$21,577			$21,577
Utilities/Other insurances/expenses	$12,266			$12,266
Bus Maintenance	$2,600		$2,600	
Op. Gas/Oil/Tires	$93,328		$93,328	
Other misc. supplies	$250			$250
TOTAL OPERATING COSTS	**$1,001,255**	$691,939	$104,423	$204,894
Service Variable Quantities		veh-hrs	veh-mls	Fixed-Cost
Used for Planning Purposes		15,568	178,627	Factor
		$44.45	**$0.58**	**1.26**
TOTAL BUDGET	*$4,231,391*			

Note: This cost allocation model will be used as a basis of cost analysis for the new proposed service to Lockwood.

Source: Billings MET Transit, 2006.

Performance Measures

Operating effectiveness and financial efficiency of the transit system are not only important factors to the success of the system but help in estimating realistic ridership and performance measures for the proposed service to Lockwood. The operating effectiveness is the ability of the transit service to generate ridership. Financial efficiency is the ability of the transit system to provide service and serve passenger-trips in a cost-efficient manner. Table IV-2 presents the systemwide characteristics for MET Transit's 2005 to 2006 fiscal year.

Table IV-2
System Performance

Fixed-Route Services		Paratransit Services	
MET Transit	**FY 2006**	***MET Transit***	**FY 2006**
Operating Cost	$3,230,136	Operating Cost	$1,001,255
Revenue	$3,750,452	Revenue	$313,645
Ridership	653,866	Ridership	68,179
Vehicle-Miles	626,835	Vehicle-Miles	178,627
Vehicle-Hours	38,323	Vehicle-Hours	15,568
Operating Effectiveness		***Operating Effectiveness***	
Pass.-Trips per Mile	1.0	Pass.-Trips per Mile	0.4
Pass.-Trips per Hour	17.1	Pass.-Trips per Hour	4.4
Financial Efficiency		***Financial Efficiency***	
Cost per Pass.-Trip	$4.94	Cost per Pass.-Trip	$14.69
Cost per Veh.-Hour	$84.29	Cost per Veh.-Hour	$64.31

Source: MET Transit 2005-2006, LSC 2006.

VEHICLE TYPE

The expression "small transit vehicle" refers to a vehicle smaller than the 35- or 40-foot standard transit bus. Within this group of small transit vehicles, there are a number of different types and sizes. There is no accepted standard for the terms used to describe the subgroups of small transit vehicles. For the purpose of this study, the LSC team divided the vehicles into three groups based upon their method of construction, the vehicle source, and the seating capacity. The three groups include: modified vans, body-on-chassis vehicles, and small buses.

Modified Van

Vans and minivans are frequently modified to meet special needs. The modifications usually adjust the structure and/or include the addition of equipment to improve the performance of vans as transit vehicles. These modifications enable the standard vans to accommodate different types of passengers or provide added comfort and utility to regular passengers.

Increasing van size, particularly the height, is the most common modification. This is often accomplished by raising the roof through the addition of a bubble-top or pop-top, lowering the floor, or both. Other modifications may involve enlarging the entrances; reinforcing and insulating the walls and roof; adding wheelchair lifts, ramps, or low-rise steps to improve accessibility; widening the body and changing the seating arrangement to increase aisle width and make passenger movement easier inside the vehicle; installing rubber floor matting, padding on hard surfaces, and grabrails and stanchions for support; and adding heaters and air conditioners for passenger safety and comfort.

Modifications can also be made to the chassis of the van to increase vehicle durability. These may include an extended or widened wheelbase, heavy-duty brakes, improved transmission, and heavy-duty suspension. Modified vans generally can seat from 9 to16 passengers. Modified minivans typically seat four passengers. Although modified vans may be longer and slightly wider than standard vans, they are still relatively easy to drive and maneuver. The modifications create more room inside the van, so movement is less restricted, providing passengers with more comfort. Accessibility is generally easier in modified vans than in standard vans.

Modified vans do, however, possess potential drawbacks. A raised roof can make the vehicle difficult to handle in heavy winds or on sharp curves, and there is a potential for leaks to develop at points where the raised roof is attached to the vehicle. Another drawback to modified vans is reduced fuel mileage due to the added weight of the modifications and the increased wind resistance caused by

the raised roof. Minivans have the limitation of vehicle capacity although for many paratransit services this is not an issue.

Body-on-Chassis

Body-on-chassis vehicles are produced in two ways. The first method involves building a bus body on the rear of a commercial van chassis. The second method involves building a complete bus body on a light-duty truck or motor home chassis. This method is used to build standard school buses, and as a result, a number of school bus manufacturers have expanded into the small transit vehicle market. A supplier of body-on-chassis vehicles will purchase a chassis produced by a company such as Chevrolet, Dodge, Ford, GMC, or International Harvester. The body is then constructed on the chassis, normally around a steel frame that is attached to the chassis.

Body-on-chassis vehicles are available in various sizes, with seating capacities ranging from 12 to 30 passengers. Body-on-chassis vehicles offer certain advantages over vans. For example, they tend to be more durable than vans, having an expected life of five to seven years, depending upon a number of factors. Another advantage is that some body-on-chassis vehicles have dual rear wheels, making them more stable than vans. They also offer more interior space, which is often necessary for lift equipment and for wheelchair stations.

Some body-on-chassis vehicles have transit-type folding doors and low steps for ease of entry. Another advantage is a larger fuel tank capacity, which can be especially helpful when fueling stops are infrequent. Also, body-on-chassis vehicles are available with diesel engines. This is advantageous since diesel fuel is normally less expensive and diesel engines are generally more durable and fuel-efficient. However, vehicles fueled by diesel may be louder than those fueled by gasoline which is an important consideration to keep in mind.

Another drawback of body-on-chassis vehicles is that they are not built on a durable transit chassis. Many transit experts feel that a small heavy-duty bus should be purchased when a passenger capacity greater than 22 passengers is needed. Some manufacturers produce body-on-chassis models with less than full standing room which are not suitable for many transit applications. Also, some operators comment that the body-on-chassis vehicles have stiff suspensions which produce a bumpy ride. The process of adding a body to a chassis could result in special problems, such as the body being insecurely attached to the chassis, inaccessibility of chassis components for repair and inspection, and damage of electrical components during body assembly.

Small Buses

Small buses contain one feature found in few other small transit vehicles—durability. In a small bus, the durability of a standard transit bus is combined with the advantages of a small transit vehicle. Small buses are the largest of the small transit vehicles, seating from 18 to 35 passengers. They are referred to as "purpose-built buses" since they are designed specifically for transit service and each is constructed as a single unit. In other words, both the body and chassis are supplied by one manufacturer. Since they are designed for transit use, small buses have an expected service life of 10 to 15 years, depending on a number of factors.

The durability of small buses is one of their major advantages. Another is their larger size, which provides a good amount of interior vehicle space. This is especially convenient for passengers in wheelchairs or those who require additional room in which to maneuver. Many of the components of small buses (i.e., transmission, engine, and axles) are identical to heavy-duty components of standard-sized transit buses. This may make maintenance easier, as those standard parts are more readily available.

Small buses use diesel fuel as opposed to gasoline. The savings in fuel may be offset by the high purchase price of small buses. Small buses are less maneuverable and more difficult to drive because of their size, posing another disadvantage.

The best sources for information on small buses are usually the manufacturers themselves, dealers or distributors, and other transit systems which have recently purchased similar equipment. The small bus industry is growing, with a variety of types and seating plan options now available.

TRANSIT ALTERNATIVES

The following section reviews the possible transit service alternatives. Table IV-3, at the end of this chapter, details the alternatives reviewed in this analysis. It estimates the number of passengers and the operating costs by each alternative. Please note the operating cost is based on cost factors derived from the cost allocation model. The alternatives range from fixed routes to demand-response services. The table is further divided into weekday and Saturday service. All service options are scheduled similar to the MET Transit's current hours of operation, Monday to Friday from 6:10 a.m. to 6:45 p.m. and Saturday from 8:10 a.m to 5:45 p.m. It is assumed that demand-response will carry two to four passengers per revenue-hour. All the routes are designed to converge at the downtown transfer center (2nd Avenue and 25th Street), so that passengers can connect to other buses within the Billings area.

Alternative I – Fixed-Route Service

Alternative I is a fixed route as illustrated in Figure IV-1. The fixed route originates at the downtown transfer center, runs northeast where it connects to Old Hardin Road, one of the main commercial spines of the area, then serves the Lockwood Elementary School via Hardin Road and connects back to the Old Hardin Road via Piccolo Street. Further north the route loops south along Noblewood Drive and Becraft Lane, serving the residential areas and connecting back to Old Hardin Road which follows the same route back to the transfer center. This route would operate one vehicle on a 60-minute (one-hour) headway and two vehicles during the peak hours with 30-minute headways. The fixed-route service would be operated using small buses, and paratransit service would be provided using a body-on-chassis or van.

The advantages of this fixed-route service are that it can be provided at a relatively low cost per passenger-trip, schedule reliability is high since buses do not deviate

from their routes, and service does not require advance reservations. This alternative would, however, require paratransit service.

Paratransit Service Area

To comply with the Americans with Disabilities Act (ADA), paratransit service must be provided in a similar service area as the fixed-route system. Paratransit service must be offered during the same times as any fixed-route service, and the minimum service area is established at three-quarters of a mile from the fixed routes. Paratransit service is typically much more costly to operate than fixed-route service because of the characteristics of the service. Fixed routes are established to meet the highest demand travel patterns, while paratransit service must serve many origins and destinations in a dispersed pattern.

This system has an overall cost of $6.00 per passenger. The service includes a paratransit service which has a cost per passenger of $67.53 to $122.68.

The estimated cost for both fixed-route and paratransit service is approximately $402,000 if operated by MET. The estimated ridership for this service is based upon the fixed-route model and paratransit model in Chapter III. This would equate to approximately 67,136 annual trips, although this ridership may not be realized for several years. This service would operate with a total of three buses—two used for the fixed-route service (peak and non-peak service) and the other used for the paratransit service.

Following is a summary of the estimated passenger, operation, and capital for Alternative I:

Fixed-Route Service:

- 12.8 to 14.4 passengers per hour
- 64,630 annual passengers
- Cost per passenger (operated by MET Transit) is $3.39 to $3.85
- Cost per passenger (operated by Lockwood) is $5.52 to $6.09

Paratransit:

- One passenger per hour
- 2,506 annual passengers
- Cost per passenger (operated by MET Transit) is $67.53 to $122.68
- Cost per passenger (operated by Lockwood) is $107.83 to $194.73

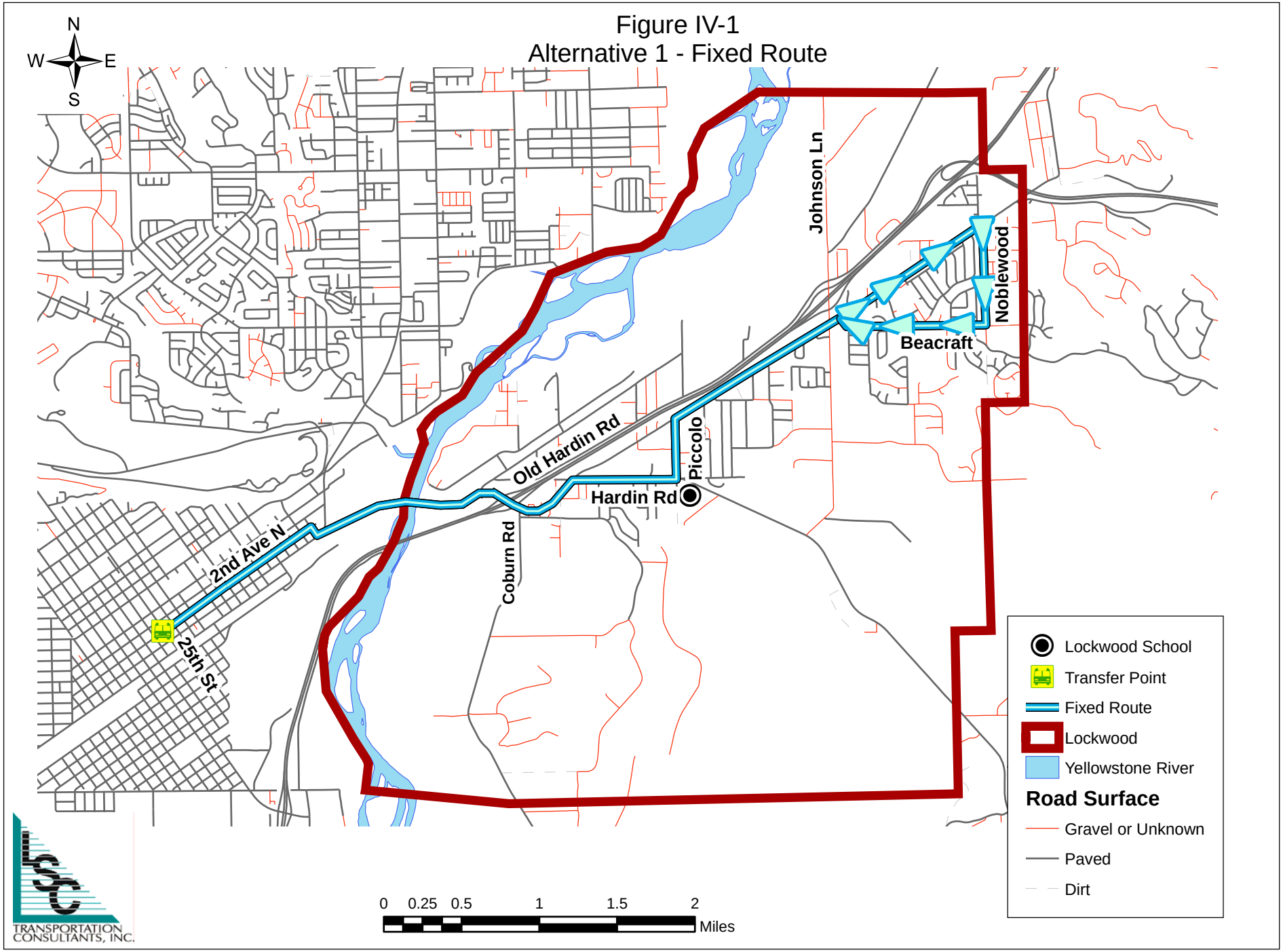
Operation Costs:

- Operated by MET Transit –
  Fixed-Route Service = $222,000 annual cost
  Paratransit Service = $180,000 annual cost
- Operated by Lockwood –
  Fixed-Route Service = $355,000 annual cost
  Paratransit Service = $289,000 annual cost

Capital Costs:

- Two small buses and one modified van = $297,000

Figure IV-1
Alternative 1 - Fixed Route



Alternative II – Route-Deviation Service

This option provides route-deviation services in Lockwood. Service would be provided along a specific route mainly along Old Hardin Road; however, the vehicle would be available to deviate off the fixed route to pick up call-in ride requests. The vehicle could deviate up to three-quarters of a mile off the fixed route, but is required to return to the fixed route within one block of the point of deviation to ensure that all intersections along the route are served. One vehicle would perform this service during non-peak hours. Two small buses or body-on-chassis vehicles would be needed during peak hours, with 45-minute headways. Passengers would be able to board anywhere along the route without prescheduling a pick-up. Figure IV-2 illustrates the deviated fixed route in Lockwood. Under this option, the ADA service could possibly be eliminated and hence greatly reduce the operating costs. Individual streets will have to be evaluated to determine if deviations are possible or if separate paratransit service is required for requests on specific streets.

The estimated cost for the deviated fixed-route service is approximately $226,000 annually if operated by MET or $365,000 if operated independently by Lockwood. The estimated ridership for this service is 70,250 annual trips, based upon the deviated fixed-route model presented in Chapter III.

- 13.9 to 15.6 passengers per hour
- 70,250 annual passengers
- Cost per passenger (operated by MET Transit) is $3.22
- Cost per passenger (operated by Lockwood) is $5.20

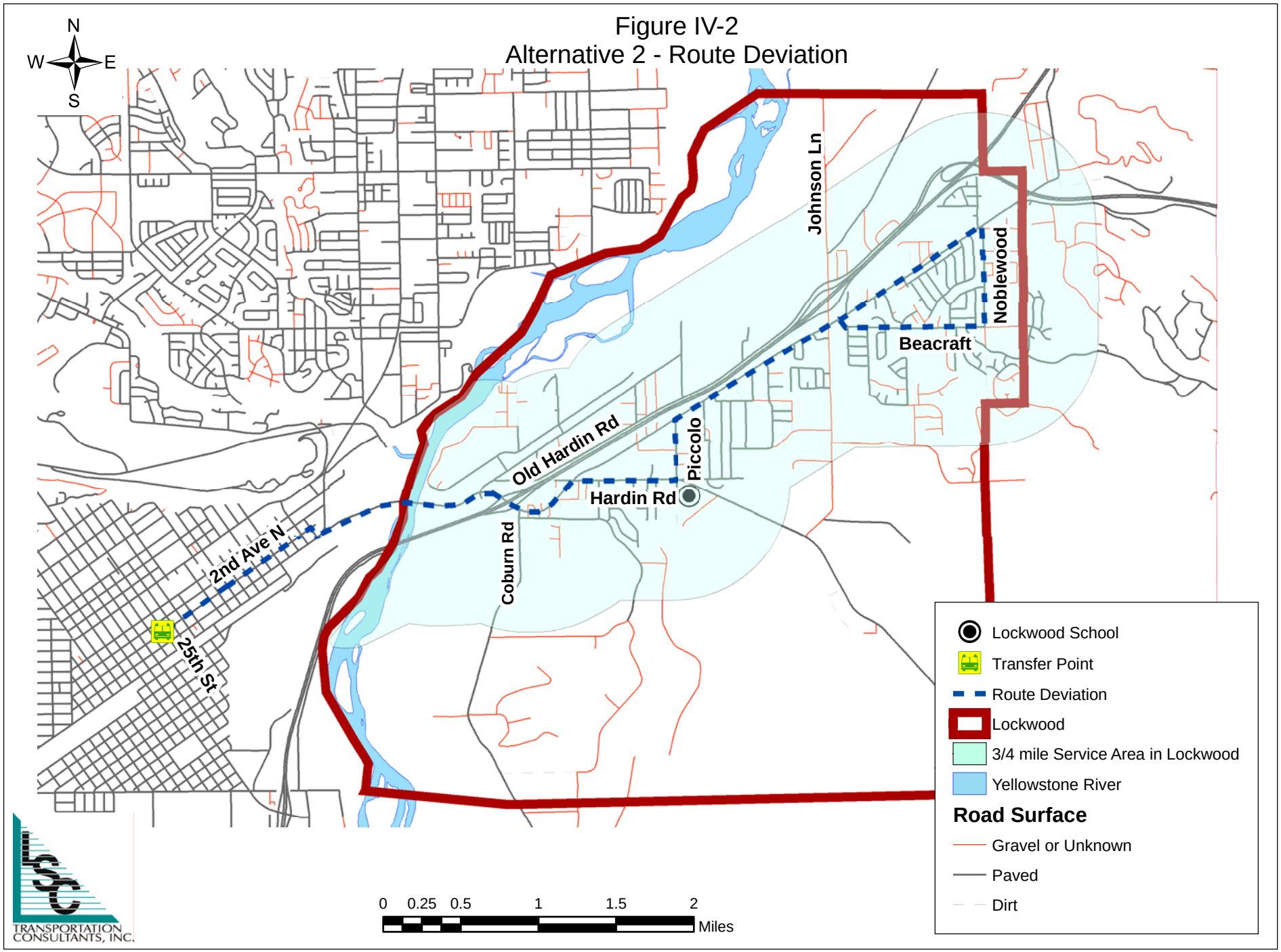
Operation Costs:

- Operated by MET Transit = $226,000 annual cost
- Operated by Lockwood = $365,000 annual cost

Capital Costs:

- Two small buses = $260,000

Figure IV-2
Alternative 2 - Route Deviation



Alternative III – Fixed-Route Loop

Alternative III would operate with one fixed-route loop along Old Hardin Road and North Frontage Road as illustrated in Figure IV-3. The route would serve commercial and residential areas on both sides of Interstate 90 (I-90). The fixed route originates at the MET transfer center, runs northeast where it connects to the Old Hardin Road, then serves the Lockwood Elementary School via Hardin Road and connects back to the Old Hardin Road via Piccolo Street. The route loops south along Noblewood Drive and Becraft Lane, serving the residential areas, and connects back to Old Hardin Road. The route then heads north along Johnson Lane to connect to the North Frontage Road, serves the industrial and commercial areas on the other side of I-90, and finally connects back to the transfer center.

This alternative will have a paratransit service that would operate at a minimum of three-quarters of a mile from the fixed route. This fixed-route loop will operate with one small bus on a 60-minute (one-hour) headway, with two small buses during peak hours on 30-minute headways. The third vehicle will be used for providing paratransit services.

The annual cost to operate this service option, which includes both the fixed-route loop and paratransit service, is estimated to be $402,000 if operated by MET. The estimated ridership for this service option is 73,037 annual trips based upon the fixed-route model calibrated in Chapter III.

Fixed-Route Service:

- 13.9 to 15.7 passengers per hour
- 70,531 annual passengers
- Cost per passenger (operated by MET Transit) is $3.11 to $3.52
- Cost per passenger (operated by Lockwood) is $4.99 to $5.62

Paratransit:

- One passenger per hour
- 2,506 annual passengers
- Cost per passenger (operated by MET Transit) is $67.53 to $122.68
- Cost per passenger (operated by Lockwood) is $108.51 to $195.95

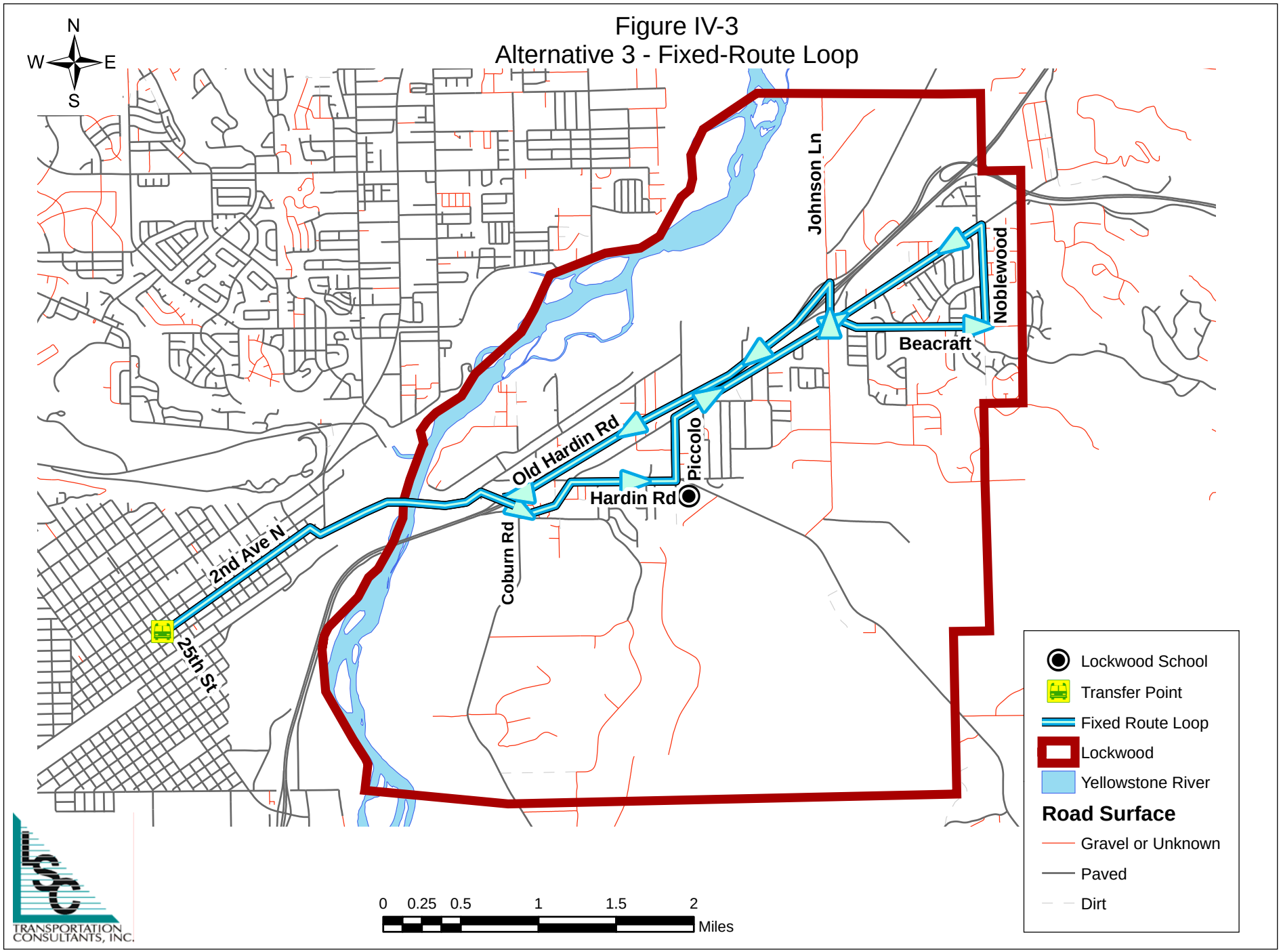
Operation Costs:

- Operated by MET Transit –
  Fixed-Route Loop Service = $222,000 annual cost
  Paratransit = $180,000 annual cost
- Operated by Lockwood –
  Fixed-Route Service = $357,000 annual cost
  Paratransit = $290,000 annual cost

Capital Costs:

- Two small buses and one modified van = $297,000

Figure IV-3
Alternative 3 - Fixed-Route Loop



Alternative IV – Fixed-Route Loop with Demand-Response Zones

In Alternative IV, the fixed-route loop would operate a fixed route similar to Alternative III. In addition, the remainder of the central Lockwood area would be served by two demand-response zones, as presented in Figure IV-4. Each zone would operate one vehicle, for a total of two demand-response vehicles. The demand-response service in these zones acts as a feeder service to the fixed route. One zone would be in the west Lockwood area while the second zone would in the northeast Lockwood area, both serving the area around Interstate 90. The cost of the fixed route loop along Old Hardin Road and North Frontage Road—with one bus during non-peak hours and two buses during peak hours—is estimated at $222,000 if operated by MET and $357,000 if operated by Lockwood. A total of four vehicles are required to operate this alternative—two small buses and two body-on-chassis.

The cost for MET to operate the two demand-response zones would be $329,000 annually. The estimated cost if the service is operated by Lockwood is $530,000. The total estimated cost for this type of service works up to $551,000 if operated by MET, and the total cost for Lockwood would be $887,000 with an annual estimated ridership of 96,883. The cost per passenger for the fixed-route loop service, if operated by MET Transit, is estimated at $3.11 to $3.52, and the demand-response is estimated at $11.66 to $23.50. Following is a summary of the estimated passenger, operation, and capital costs for Alternative IV:

Fixed-Route Loop Service:

- 13.9 to 15.7 passengers per hour
- 70,531 annual passengers
- Cost per passenger (operated by MET Transit) is $3.11 to $3.52
- Cost per passenger (operated by Lockwood) is $4.99 to $5.62

Demand-Response Zone Service:

- 2 to 4 passengers per hour
- 26,352 annual passengers
- Cost per passenger (operated by MET Transit) is $11.66 to $23.50
- Cost per passenger (operated by Lockwood) is $18.73 to $37.47

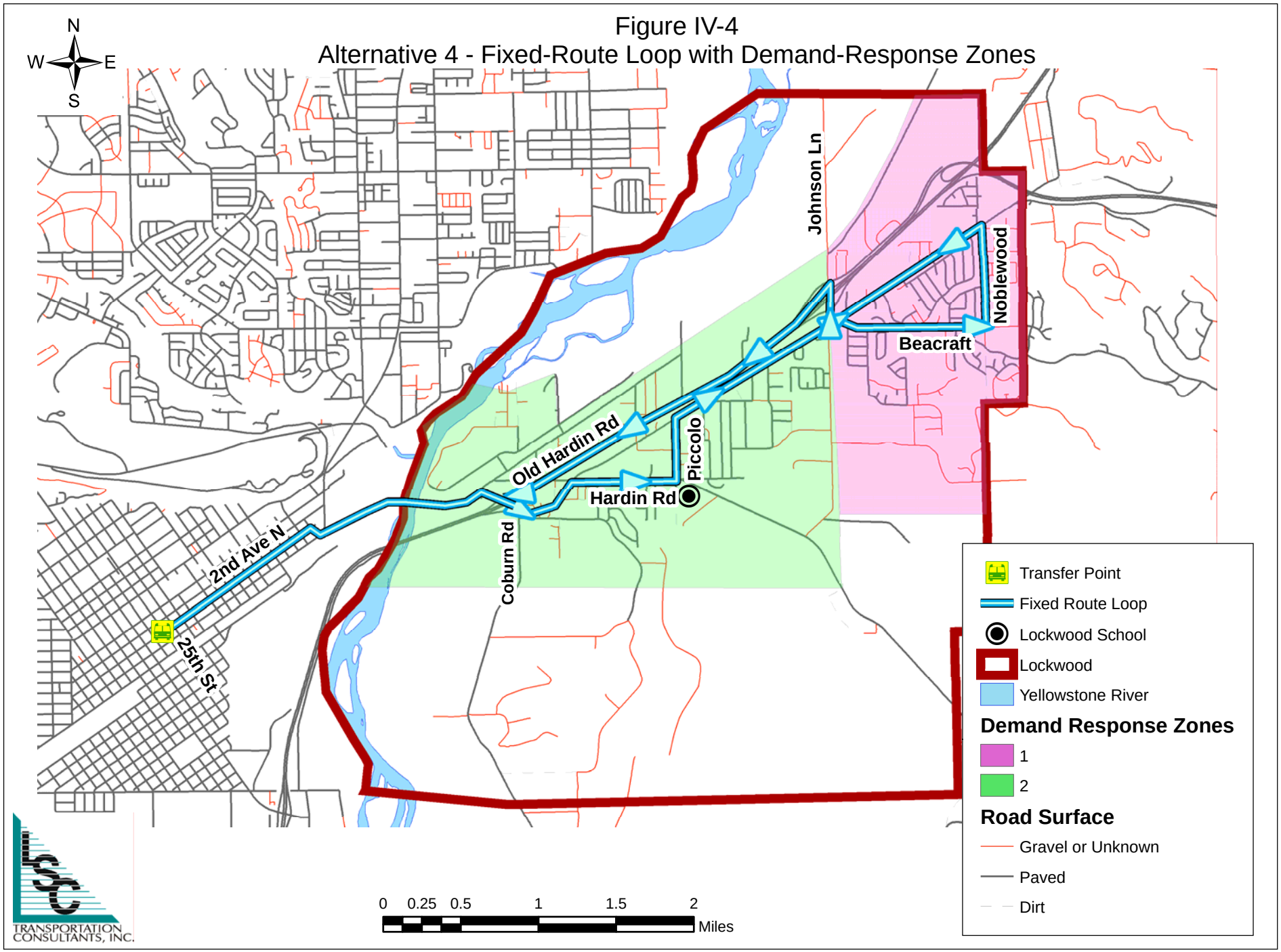
Operation Costs:

- Operated by MET Transit –
  Fixed-Route Loop Service = $222,000 annual cost
  Demand-Response Zone Service = $329,000 annual cost
- Operated by Lockwood –
  Fixed-Route Loop Service = $357,000
  Demand-Response Zone Service = $530,000 annual cost

Capital Costs:

- Two small buses and two body-on-chassis = $390,000

Figure IV-4
Alternative 4 - Fixed-Route Loop with Demand-Response Zones



Alternative V – Demand Response

In this alternative, one van is used to operate demand-response service in Lockwood. A demand-response service would effectively serve the Lockwood area without any structured routes. Demand-response transit service, frequently termed dial-a-ride, is characterized as door-to-door transit service scheduled by a dispatcher. With demand-response service, advance reservations are typically required, although some immediate requests may be filled if time permits and if the service is particularly needed. Ridership on a demand-response service is generally lower than a fixed route system.

The cost for MET to operate the demand-response alternative would be $164,000 annually, and for Lockwood it would be $265,000. The estimated annual trips are 16,936. This equates to a per-passenger cost of $9.68. Following is a summary of the estimated additional passenger, operation, and capital costs for Alternative V:

- 2 to 5 passengers per hour
- 16,936 annual passengers
- Cost per passenger (operated by MET Transit) is $8.88 to $23.50
- Cost per passenger (operated by Lockwood) is $14.33 to $37.47

Operation Costs:

- Operated by MET Transit =$164,000 annual cost
- Operated by Lockwood = $265,000 annual cost

Capital Costs:

- One body-on-chassis = $65,000

SUMMARY

Chapter IV has provided information on various service alternatives for expansion of transit to Lockwood. The alternatives included: fixed-route, route-deviation, fixed-route loop, fixed-route loop with demand-response zones, and demand response. Table IV-3 provides a comparison of the service alternatives.

Table IV-3
Transit System Alternatives to Lockwood

Alternative	Hours	Total Daily			Total Annual				Operated by Lockwood				Operated by MET Transit			
										Performance Measures				Performance Measures		
		# of Veh.	Rev. Hrs.	Rev. Miles	Rev. Hrs.	Rev. Miles	Days	Annual Estimated Ridership	Total Operating Cost	Pass/Hr.	Cost/Hr.	Cost/Pas.	Total Operating Cost	Pass/Hr.	Cost/Hr.	Cost/Pas.
Alt. 1- Fixed-Route	M-F, 6:10 a to 6:45p	2	16	208	4,080	53,040	255	58,650	$318,000	14.4	$77.86	$5.42	$199,000	14.4	$48.77	$3.39
	Sa, 8:10 a to 5:45p	1	9	117	468	6,084	52	5,980	$37,000	12.8	$77.86	$6.09	$23,000	12.8	$49.15	$3.85
Paratransit	M-F, 6:10 a to 6:45p	1	12	132	3,060	33,660	255	2,310	$250,000	0.8	$81.40	$107.83	$156,000	0.8	$50.98	$67.53
	Sa, 8:10 a to 5:45p	1	9	99	468	5,148	52	196	$39,000	0.4	$81.40	$194.73	$24,000	0.4	$51.28	$122.68
Alt. 1- Fixed-Route w/ Paratransit		3	28	340	8,076	97,932	307	67,136	$642,000			$9.56	$402,000			$5.99
Alt. 2- Route Deviation	M-F, 6:10 a to 6:45p	2	16	224	4,080	57,120	255	63,750	$327,000	15.6	$80.05	$5.12	$203,000	15.6	$49.75	$3.18
	Sa, 8:10 a to 5:45p	1	9	126	468	6,552	52	6,500	$38,000	13.9	$80.05	$5.76	$23,000	13.9	$49.15	$3.54
Alt. 2- Route Deviation		2	18	224	4,548	63,672	307	70,250	$365,000			$5.20	$226,000			$3.22
Alt. 3- Fixed-Route Loop	M-F, 6:10 a to 6:45p	2	16	208	4,080	53,040	255	64,005	$320,000	15.7	$78.35	$4.99	$199,000	15.7	$48.77	$3.11
	Sa, 8:10 a to 5:45p	1	9	117	468	6,084	52	6,526	$37,000	13.9	$78.35	$5.62	$23,000	13.9	$49.15	$3.52
Paratransit	M-F, 6:10 a to 6:45p	1	12	132	3,060	33,660	255	2,310	$251,000	0.8	$81.91	$108.51	$156,000	0.8	$50.98	$67.53
	Sa, 8:10 a to 5:45p	1	9	99	468	5,148	52	196	$39,000	0.4	$81.91	$195.95	$24,000	0.4	$51.28	$122.68
Alt. 3- Fixed-Route Loop w/ Paratransit		3	28	340	8,076	97,932	307	73,037	$646,000			$8.84	$402,000			$5.50
Alt. 4- Fixed-Route Loop	M-F, 6:10 a to 6:45p	2	16	208	4,080	53,040	255	64,005	$320,000	15.7	$78.35	$4.99	$199,000	15.7	$48.77	$3.11
	Sa, 8:10 a to 5:45p	1	9	117	468	6,084	52	6,526	$37,000	13.9	$78.35	$5.62	$23,000	13.9	$49.15	$3.52
Demand-Response (with 2 zones)	M-F, 6:10 a to 6:45p	2	24	264	6,120	67,320	255	24,480	$459,000	4.0	$74.94	$18.73	$285,000	4.0	$46.57	$11.64
	Sa, 8:10 a to 5:45p	2	18	198	936	10,296	52	1,872	$71,000	2.0	$74.94	$37.47	$44,000	2.0	$47.01	$23.50
Alt. 4- Fixed-Route Loop w/ Demand-Response		4	40	472	11,604	136,740	307	96,883	$886,000			$9.15	$551,000			$5.69
Alt. 5- Demand-Response	M-F, 6:10 a to 6:45p	1	12	132	3,060	33,660	255	16,000	$230,000	5.2	$74.94	$14.33	$142,000	5.2	$46.41	$8.88
	Sa, 8:10 a to 5:45p	1	9	99	468	5,148	52	936	$36,000	2.0	$74.94	$37.47	$22,000	2.0	$47.01	$23.50
Alt. 5- Demand-Response		1	12	132	3,528	38,808	307	16,936	$265,000			$15.65	$164,000			$9.68

Source: LSC, 2006.

Chapter V

TRANSPORTATION
CONSULTANTS, INC.

CHAPTER V

Implementation Steps

INTRODUCTION

This chapter describes implementation steps which would be required for new public transportation services in Lockwood. This incorporates a review of institutional arrangements, responsibilities, capital planning, and the steps taken to implement the proposed service in Lockwood. This implementation plan should act as a guide or "blueprint" for service implementation. Some of the steps must be taken whether the new service is operated by MET or if Lockwood operates the service. Other steps will be required only if the new service is implemented and operated by the Lockwood community.

TASK FORCE

An implementation Task Force must be formed and become active in implementing the preferred service alternative. The members of the Task Force must have a commitment to working toward implementation and carrying out the tasks necessary for implementation.

The first step in implementing transit service will be to determine which entity should operate the new service. MET Transit is a municipal transit system under Montana law operated by the City of Billings. MET has legal authority to operate transit service within the city limits and limited ability to extend service beyond the city limits. Lockwood is an unincorporated area of Yellowstone County and does not have legal authority to operate transit services. The Lockwood Transportation Improvement Authority established under the authority of Yellowstone County could serve as the entity with legal authority to operate public transit service.

A key activity of the Task Force will be to obtain commitments from their respective agencies for local funding. Once commitments have been made, the Task Force must then move forward with the remaining implementation steps.

The Task Force should also take a role in developing community support for transit service. There appears to be general support for having a transit system, but that support has not been galvanized or developed to the point where elected officials are aware of broader community support. That support should be developed so that the funding partners have a better understanding of the needs in the community and the level of support among community residents.

ORGANIZATIONAL PLAN

Before any other implementation steps can be taken it will be necessary to determine the organizational structure to provide transit service in Lockwood. One option is for the service to be operated by MET. MET has legal authority to operate transit services within the city limits, the authority to receive funds from the Federal Transit Administration, and the capability to generate local revenue to fund transit services. As an existing transit service, MET has the functional capabilities to operate service in Lockwood. However, additional vehicles and operators would be required to operate the additional service.

Lockwood is an unincorporated community in Yellowstone County within the urbanized area boundaries of the Billings Metropolitan Area. Lockwood has a Transportation Improvement Authority with the legal capability to operate public transportation services. Other options that would provide legal authority to operate public transportation include operation by Yellowstone County, formation of an Urban Transportation District, or annexation into the City of Billings. As part of an urbanized area, Lockwood is not eligible for rural transit funding from the Montana Department of Transportation, nor could the community form a private nonprofit corporation to receive federal transit funding.

Establishment of a legal entity to operate public transportation has specific requirements depending on the type of entity to be established. For example, Yellowstone County could operate the service as part of county government. To establish an Urban Transit District (UTD) requires specific steps including a public election of those residing within the proposed district boundaries. If the service is operated by the County, the County Commissioners would serve as the Transit

Board overseeing the transit operations. An Urban Transit District includes establishment of a Board which has oversight of the transit operations.

Another option to operating the service would be to hire a professional transit management firm. These firms specialize in operating transit systems and, for a fee, can provide a transit manager, dispatcher, drivers, and mechanics along with vehicles to operate the service. However, this option still requires a legal entity with authority to operate public transportation, generate local funds, receive federal funds, and contract with the firm.

As can be seen, these organization decisions must be made before other steps can be taken as the organizational structure will directly affect the options for other implementation steps.

FINANCIAL COMMITMENTS

This also is a critical element of implementing transit service in Lockwood. A local entity must commit to provide funding or taking the lead as the operator of public transportation service. Until commitments are made for local funding, implementation cannot move forward. Possible recommendations could be that the Task Force members work with their respective agencies to determine a level of funding that they could provide. A meeting should then be held among the potential funding partners to develop a local funding plan. We recommend that this meeting be facilitated by an outside party who does not have a connection with any of the funding partners. This approach avoids the perception that anyone running the meeting has a vested interest in the outcome.

The outcome of this meeting should be informal commitments from each entity for local funding. If the commitments for local funding are not sufficient, then implementation should be delayed.

IMPLEMENTATION PLAN

The following is a list of activities that need to be completed if Lockwood operated the preferred service. Please note that if MET Transit operated the service, they would be responsible for the entire operation including management, dispatching,

hiring and training drivers, communications, purchasing vehicles, and maintenance.

- Finalize routes and then create a schedule
- Determine bus stop locations
- Develop route and schedule brochures
- Develop job descriptions
- Hire a transit manager
- Hire and train drivers
- Hire and train dispatcher
- Purchase vehicles
- Purchase or lease a facility for transit operations and vehicle storage
- Purchase office equipment, furniture, and supplies
- Set up administrative and dispatch space
- Set up communications system
- Select system name and logo
- Prepare and conduct publicity prior to startup
- Begin service

Transit Manager

Following agreement on the funding commitments and operating responsibilities, a transit manager should be hired. This should be a person who has some experience in transit operations. A person in this position is needed to carry out many of the implementation steps, to work with the Task Force to start the Lockwood transit system, and to manage the service under the appropriate legal authority after service has started.

Capital Plan

Vehicle Purchase

The capital purchases will vary depending on the preferred transit alternative. Many of these capital costs will be incurred whether the service is operated by Lockwood or MET. The primary federal source for transit capital funding in urbanized areas is the Federal Transit Administration Section 5307 urban area program. This provides up to 80 percent of the cost of equipment. The local match for acquisition of vehicles costs of $297,000 would be $59,400. Unlike the match

for operating assistance, this match must be in cash. Table V-1 details the seating capacity number and relevant costs according to the type of vehicle.

Table V-1
Capital Types

Vehicle Type	Seating Capacity	Capital Cost
Minibus	23 passengers	$116,000
Body-On-Chassis	17 passengers	$65,000
Van	6 passengers	$35,000

Source: LSC, 2006.

Transit Facility

A major capital investment is the development of a transit facility. If Lockwood plans to implement the service, the start-up costs involve building a bus barn, maintenance building, and administrative office. The cost of this facility could range widely depending upon the amenities. At this time, the LSC staff is estimating $300,000 for a maintenance building, bus storage area, and small offices (including a dispatch room). In order to reduce the cost, the facility could be built as an addition to an existing structure or share/rent facilities with MET Transit.

Administrative and Maintenance

The administrative and maintenance capital includes the purchase of office equipment, hardware, software, dispatching software, cell phone, or radio communication equipment, and maintenance equipment. The FTA would cover 80 percent of the cost with the remaining covered by the local match.

Bus Stops and Shelters

In order to implement the fixed-route service, bus stops and shelters should be installed at key locations. The bus stops and shelters would allow the public to easily identify the transit pick-up locations and the routes that serve the Lockwood area. Bus stops and shelters would reduce the barriers to using the transit system and would increase the public profile of the transit service.

The bus stops and shelters should be at key locations such as major employment and shopping destinations. Each bus stop should include a sign on a pole. On the

pole, there should be a sign that displays the schedule and route that serves that location. Each bus stop should also have a concrete pad (for the transit users to stand on), bench, and shelter structure. The cost is estimated at $10,000 to $12,000 for each bus stop.

Bus Shelters

For a fixed-route system, it is recommended that bus shelters be purchased and installed at select locations in Lockwood. Additional shelters would be purchased over time. Shelters are estimated to cost approximately $8,000 each.

Shelters not only provide an amenity to passengers, but can be used for advertising the system and promoting the system as open to anyone in the community. The shelters create a sense of solidarity for the system as passengers know that a bus **will** serve the fixed shelters. Advertising revenue can be generated from the stops as well.

Scheduling and Dispatch Software

One of the costs associated with transit service is purchasing scheduling and dispatching software to aid in the implementation of the deviated fixed-route service, as well as aid in scheduling ADA rides for the paratransit dial-a-ride service. This software is estimated to cost approximately $50,000. Support services should be considered throughout the life of the software and budgeted accordingly. On-call support is generally available at a small cost to agencies once a system contract is established.

Developing a Marketing Plan

Marketing functions influence every aspect of a transit system, from the way the telephone is answered to the color of the vehicles. The transit manager would need to handle most of the marketing duties. These duties would most likely be assigned to the administrative assistant at some point, but more realistically would be divided between the two positions.

Communications

An important operational tool for transit is the ability to communicate between the dispatch service and the drivers on the road. The traditional manner used for this operation is via a two-way radio network. A base station is established in the dispatch office and then radios with the same frequency are installed in the transit agency's vehicles. In recent years, however, new technologies have been invented that can complete the same functions as a two-way radio network.

The agency could use cellular telephones—specifically cellular telephones that have a "walkie-talkie" feature, if such a system is available. A telephone and telephone number will be necessary for the dispatcher and one for each vehicle that is in service. A phone for the transit manager may be useful, but is not necessary. Cellular phones are far less expensive than two-way radios and can be purchased with state and federal funds since their purpose will be for the transit system's operational communication system. The cost of purchasing a cell phone and paying the monthly rate for the cellular service has decreased dramatically in recent years. Not only can the phones be used for communications between dispatch and the drivers in service, they can also be used by the drivers to contact the police or fire department in case an emergency occurs on the road.

If the transit agency decides to place advertising on the buses, the transit manager may be able to barter with the cellular phone provider to lower the cost of the cellular phone service in exchange for free advertising on the bus.

For safety reasons, it is strongly recommended the driver phones be equipped with a headset so that the driver does not need to take his/her hands off the steering wheel to use the phone. Another safety precaution could be that the driver needs to pull to the side of the road and stop the bus to take incoming calls or if the driver needs to make a call.

Administrative/Organization Recommendations

For the proposed Lockwood transit system, it is recommended that the service be managed by a transit manager and a dispatcher. Listed below are the duties that need to be performed by these positions.

Transit Manager

1. Develops and administers operational policies and procedures; enforces compliance with rules and regulations.
2. Develops, administers, and monitors the transit budget to include overseeing and approving purchasing procedures.
3. Researches and resolves complaints and problems; develops customer surveys to determine customer satisfaction.
4. Represents the transit agency at meetings and on committees for transportation; provides administrative and technical support for the Transit Coordinating Committee.
5. Supervises staff to include: assigning and reviewing work, ensuring staff are properly trained, evaluating performance, approving time off, handling disciplinary actions, and making hiring and termination recommendations.
6. Is the transit agency's liaison on transit matters with the Montana Department of Transportation and the Federal Transit Administration.
7. Prepares transit reports; researches and works with the City Grant Administrator to apply for local, state, and federal funding.
8. Actively promotes public transportation within the community and develops marketing strategies to increase ridership and positive public perception.
9. Develops transit goals and objectives; develops short- and long-range plans.
10. Performs contract management to include: negotiating contracts, preparing contracts, and making or receiving payments.
11. Develops Annual Report on transit operations.

Dispatcher (Reports to Transit Manager)

1. Assigns and monitors work; provides employee training on proper methods and procedures.
2. Coordinates the repair and maintenance of fleet vehicles by development of work orders, scheduling and monitoring work, service schedules, and tracking expenditures.
3. Orders and picks up supplies and other materials.
4. Completes and maintains required reports which include updating databases, coding and tracking expenditures, and informing supervisor of daily divisional activities.

5. Conducts daily road supervision and responds to vehicle accidents involving transit vehicles.

Implementation Tasks

After hiring the transit manager, the following tasks are necessary to begin operation of the new service.

Develop Policies and Procedures

To provide an efficient and effective operation, it is necessary to have policies and procedures. These should be developed prior to hiring dispatch and operating staff. Typical policies that should be developed include reservations for route-deviations, eligibility for route-deviations, no-shows and cancellations, hiring, staff discipline, dispatch procedures, and cash handling.

Recommended Policies

EMPLOYEE MANUAL: The employee manual should emphasize administrative and operational procedures that hourly employees (drivers, mechanics, and support staff) can easily understand. This manual should contain the following policies and procedures:

1. *Salary Rates and Payment Schedule:* Each employee position should have a starting salary and pay raise increments. Employees should also be informed of when they will be paid (weekly, biweekly, or monthly).

2. *Benefits Package:* This section of the Employee Manual should discuss benefits available to employees such as vacation, holidays, sick leave, and health insurance.

3. *Dress Code:* A typical dress for a bus driver would be a light blue or denim button-down shirt, navy blue or black dress slacks, and black shoes or boots. The winter uniform could include a fleece vest and winter jacket. The shirt, vest, and jacket should all include the transit agency name and logo in a prominent location. Transit agencies typically either purchase or rent uniforms for their drivers and mechanics or provide a uniform allowance for employees to purchase their own uniforms.

4. *Agency Rules and Regulations:* This section should discuss employee conduct when dealing with the public and fellow employees. These rules need to be clear and concise and stress what is important to the agency in conducting the business of providing safe, convenient, and efficient public transportation.

SAFETY AND TRAINING POLICY AND PROCEDURES: There are excellent training programs available from the National Safety and Training Institute for bus driver training. The transit agency should contact Montana DOT for assistance in obtaining these training programs. Developing a safety and training program should be a top priority of the new transit service as well as developing performance policies such as the goal that there should be no more than 2.5 preventable accidents per 100,000 miles of operation.

FARE POLICY: The transit agency should establish a policy on fares and fare collection. Fares to be established should be a one-way fare, multi-trip passes, monthly passes and discounted fares for the elderly and disabled.

MAINTENANCE PROCEDURES AND POLICY MANUAL: This manual should provide clear and concise policies on vehicle maintenance. This manual is needed if the transit agency elects to have its own maintenance facility. This manual should include at minimum:

1. Preventative maintenance policy which establishes preventative maintenance procedures for each vehicle type the agency operates.
2. Work performance procedures which discuss developing a work order and how mechanics record their work on the order.
3. Parts procurement and inventory policy.
4. Mechanic's personal tool policy which is basically a list of tools that a mechanic needs to own.

EQUAL EMPLOYMENT OPPORTUNITIES (EEO) POLICY: This policy is a mandatory regulation and needs to be stated on all bus schedules, posted in the agency's office, on employment applications, and in employment advertisements.

HIRING POLICY: This policy should include the EEO statement and what the agency requires for people to be considered for employment (CDL license, US citizenship).

DRUG AND ALCOHOL POLICY: This would include pre-employment and random testing for safety sensitive (drivers, supervisors, mechanics) employees.

Timing

Policies and procedures should be written prior to hiring of drivers and dispatch staff.

Responsibility

The transit manager will be responsible for drafting all policies and procedures. The policies and procedures should be reviewed by the Task Board with recommendations for approval by the lead agency.

Hire and Train Staff

Drivers must be hired and trained in advance of the service. Training will include vehicle operations and passenger assistance. Drivers must fulfill drug testing requirements. The number of drivers required to operate the proposed new service will depend on the preferred alternative selected. The positions may be a combination of part-time and full-time employees.

The driver's salary should be approximately $18.00 per hour, depending on experience and other salary levels.

Recommended Training Programs

The following training programs should be considered at a minimum:

1. Vehicle operations
2. Winter driving techniques
3. Defensive driving
4. Passenger assistance
5. Lift operations
6. Lift maintenance
7. Customer service

Timing

Recruiting should begin well enough in advance to allow time for hiring and training prior to starting the service. Training should begin so that the drivers and the dispatcher are fully trained prior to the start-up.

Responsibility

The transit manager will be responsible for hiring and training all drivers.

Monitor Service

Once the service is implemented, the transit manager should monitor the performance of the service. These service performance measures will track service quality and performance. A monitoring program is essential to determine the efficiency and effectiveness of the service which is being provided. Monthly reports should be prepared by the transit manager and presented to the Task Board. Periodic reports should be submitted to the funding partners. Information in these reports should include productivity and costs.

Productivity measures for the transit service should be reported monthly. Productivity should be reported by route (the route-deviation service and the senior center bus), indicating the number of passengers per revenue-hour and passengers per revenue-mile. The actual productivity should be compared with system standards.

Cost information should also be reported monthly. The average net cost per passenger should be reported, along with cost per passenger by route, ridership by route, and the average fare. The monthly reports should be prepared in a spreadsheet format for continuing analysis of monthly data and trends.

Timing

Performance monitoring should begin immediately after the service is initiated.

Responsibility

The transit manager will be responsible for preparing monthly and annual reports for review by the Task Board and the funding partners. The transit manager will also be responsible to providing reports to the Montana Department of Transportation and Public Facilities.