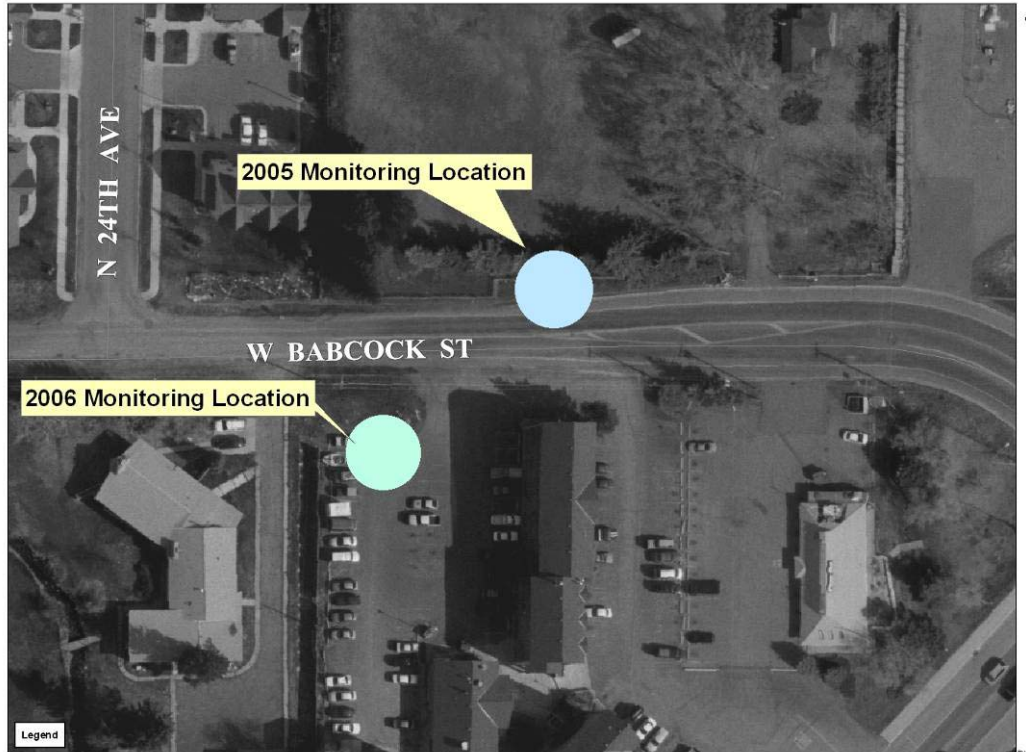


2005-2006 West Babcock Street Pedestrian and Bicyclist Monitoring Project

Final Report



BOZEMAN PLANNING AND



COMMUNITY DEVELOPMENT

Abstract/Conclusion

The City of Bozeman conducted video monitoring on West Babcock Street in 2005-2006 to investigate the effects of adding bicycle lanes and sidewalks on bicycling and pedestrian activity. The presence of safe and functional bicycle and pedestrian facilities is directly related to the willingness of people to use them. Adding sidewalks and bike lanes to West Babcock Street increased pedestrian and bicycle usage at the monitoring site from April 2005 to April 2006 by 256%. This increase has both transportation and public health impacts.

Introduction

Transportation and the development of land have always been closely related. The great cities of the world developed along rivers, ports, and overland trade routes that allowed the easy transportation of goods and ideas. Locally, the arrival of the Northern Pacific Railroad in 1883 began the largest building boom in Bozeman's history. Access to property is an essential for its development. The design and character of streets has a substantial visual impact on a community and strongly influences many decisions affecting the use of land. Therefore, transportation choices continue to be a significant influence on land development and community character.

Transportation-related issues were an area of primary concern identified by the public during outreach and information gathering efforts for the Bozeman 2020 Community Plan (2020 Plan). Over 41 percent of surveyed respondents identified a transportation issue as one of the principal issues they wished the 2020 Plan to address. The 2020 Plan and the Greater Bozeman Area Transportation Plan 2001 Update address the need for adequate transportation, coupled with efficient land use policy, to meet future transportation demand. Past land development policy through the 1930s to 1970s encouraged low density residential and highway oriented commercial land use patterns. These patterns have discouraged non-automotive means of transportation by increasing distances between destinations. An increasing emphasis on multimodal transportation began in the 1980s. The 2020 Plan furthered policies to encourage effective multimodal transportation. A policy emphasis on providing multimodal transportation networks, in conjunction with more efficient land use and better community design, allows a more desirable land use pattern and community character than would otherwise be possible.

Background

The City of Bozeman was originally designed for a largely pedestrian society. At the time of its founding in 1863, walking was the primary means of travel within the city. The reliance on walking is manifested in the physical design of the original townsite with small block sizes and an interconnected street grid. An increasing emphasis on the automobile beginning in the 1930s manifested in an altered pattern of larger blocks and less centralized commercial activities. Street connections were also reduced as cul-de-sacs became a significant design feature in new development.

The City is again emphasizing pedestrian and bicycle activity throughout the community. Linear parks, bicycle lanes and sidewalks have all facilitated multiple modes of travel. Over the past 25 years the community has actively pursued the development of walking trails, bicycle lanes, and other means to support non-automotive transportation and recreation. Several private groups, such as the Gallatin Valley Land Trust, have also been active in the acquisition and development of pathways. Examples of significant successes are the Galligator Trail, which reclaimed an abandoned railroad bed, and the Highland Boulevard trail. In 2001, Bozeman adopted the Greater Bozeman Area Transportation Plan Update and the Bozeman 2020 Community Plan.

These documents encouraged the development and use of multimodal transportation as a basic service, not as an afterthought.

The provision of an adequate pedestrian and bicycle travel network gives individuals a viable choice of travel options. The construction of these alternatives must be coordinated with the development of the motorized travel system in order to attain the greatest utility for the funds expended. The 1990 Master Plan Update and the 1993 Transportation Plan Update both addressed the need for increased efforts in supporting multimodal transportation.

Bike and pedestrian planning has changed since early efforts. Today, the integration of multimodal pathways – whether sidewalks, bike lanes, or other designs – with streets has provided a greater commuter emphasis than in the past. However, transportation and recreation can not be completely separated. The Greater Bozeman Area Transportation Plan 2001 Update includes design standards for streets that incorporate pathways in all types and classifications of rights-of-way. Bicycle use and walking serve the purpose of physical fitness as well as of transportation.

Goals and policies to support multimodal transportation were adopted, such as these quotes from the Bozeman 2020 Community Plan:

Section 6.1.2 *“Transportation systems should support the desired land use pattern and be interconnected multimodal networks (e.g. bikes, walking, transit, automobiles) rather than focusing solely on automobiles.”*

Goal 10.8.2 *Ensure that a variety of travel options exist which allow safe, logical, and balanced transportation choices.*

Objective 1. *For the purposes of transportation and land use planning and development, nonmotorized travel options and networks shall be of equal importance and consideration as motorized travel options. This balance shall ensure that a variety of travel opportunities are available which do not require the use of automobiles for all local trips.*

Implementation Policy 38) *Provide for pedestrian and bicycle networks to connect employment centers; public spaces and services, such as parks, schools, libraries; and other destinations.*



An important part of the planning cycle is the periodic evaluation of the results of actions taken to carry out identified goals. In 2004, as the rebuilding of West Babcock Street was being scheduled, the staff of the Department of Planning and Community Development recognized an opportunity to assess the impact of adding dedicated bicycle and pedestrian facilities on bicycle and pedestrian activity on this

street. West Babcock Street is a collector street which has seen substantial development along its length over the past ten years. The street was a substandard road in comparison to the City's adopted standards and was badly in need of widening for safety and capacity reasons.

The street section in early 2005 had no provisions for pedestrians or bicyclists. Despite the narrow width, non-motorists used the facility to travel towards MSU, Downtown, and other major destinations. The initial monitoring showed an average daily use by a total of 94 bicyclists and pedestrians.

The Western Transportation Institute (WTI), part of the Montana State University College of Engineering, graciously allowed the use of a video monitoring trailer to record travel activity. The trailer was equipped with a time lapse video recording system. This enabled a single tape to hold the recording for an entire 14 hour day, thereby reducing personnel effort required to obtain the travel data. The camera system was set up on April 25, 2005 and recording was conducted daily until May 2, 2005. Camera placement allowed a single location to monitor both east and west bound travel by both bicyclists and pedestrians.

During the summer of 2005, West Babcock Street was widened to include a center turn lane, one motor vehicle travel lane in each direction, with bicycle lanes and sidewalks on either side. The video monitoring trailer was again set up from April 24, 2006 through May 1, 2006. A slightly different video camera location was used in 2005 than in 2006, though the same section of street was recorded. The camera placement location is shown on the cover of this report.



West Babcock Street, Spring 2006

Data and Analysis



2005 Video Monitoring Still Image

The video system recorded video tape for manual review. The recorded tapes allowed tabulation of the number and type of pedestrian and bicycle users. Users were classified according to the following rules:

1. The hour in which they entered the video frame.
2. The direction they exited the video frame.
3. Persons riding a bicycle were counted as cyclists, all others were pedestrians.

Each day of the week was recorded for a period of 14 hours from 7 am to 9 pm. As the tape was reviewed users were classified according to the rules stated above. Data was tabulated by user, direction of travel, year, date, and hour of the day. The monitoring in 2005 indicated an average daily total count of 94 pedestrians and bicyclists traveling this section of West Babcock Street. The monitoring in 2006 showed an increase in total daily user count to 239 pedestrians and bicyclists. Information on the weather was also collected both from the video and from a weather station at MSU. Pedestrian and bicyclists are more sensitive to weather conditions and may choose to use a motor vehicle in wet or cold weather.



2006 Video Monitoring Still Image

Findings

After all of the video tape had been reviewed the data was entered into an Excel spreadsheet. Analysis showed that several significant changes had occurred in the utilization of the street by bicyclists and pedestrians as shown on Table 1 below.

Substantial increases were found in both pedestrian and bicycle users

- Combined Pedestrian and Bicyclist Increase 256%
- Bicycle Increase 247%
- Pedestrian Increase 273%

The data demonstrates a significant increase in multi-modal transportation when safe, dedicated facilities are provided for pedestrians and bicyclists. The investment in bike lanes and sidewalks yielded material increases in persons using multi-modal transportation. As the City continues to seek for means to provide transportation to its citizens, bike lanes and sidewalks should continue to be provided.

A major destination for travelers from this part of the community is Montana State University. There are still several lengthy sections of roadway between MSU and the monitored section of West Babcock Street that do not have sidewalks or bicycle facilities. If there was continuous safe pedestrian and bicycle access to and from the campus, greater increases in multi-modal use may have been seen.

Additional use of bicycles and walking for the purpose of traveling also encourages physical activity and increased personal fitness. Although this report has primarily focused on transportation benefits from the addition of bicycle lanes and sidewalks, increased fitness is an additional significant public health benefit. Recreational use of the facilities was also demonstrated by the presence of joggers and recreational cyclists.

Table 2 describes the weather on each day of monitoring. Both years had a mix of pleasant and stormy weather. Temperatures were slightly higher on average for 2006. Weather conditions were not sufficiently different to account for the significant increase in pedestrians and bicyclists.

Chart 1 presents in graphical form the average number of pedestrians and bicyclists by hour of the day for 2005 and 2006, as well as the numbers of users combined.

Table 1

SEVEN DAY TOTALS - PEDESTRIANS AND BICYCLISTS											
2005 Seven Day Totals						2006 Seven Day Totals					
All Users	Direction West Bound		Direction East Bound		Hourly Total	All Users	Direction West Bound		Direction East Bound		Hourly Total
	Ped	Bicycle	Ped	Bicycle			Ped	Bicycle	Ped	Bicycle	
7:00 AM	1	3	5	18	27	7:00 AM	4	9	19	70	102
8:00 AM	1	5	5	23	34	8:00 AM	5	7	30	74	116
9:00 AM	3	0	4	15	22	9:00 AM	9	9	12	37	67
10:00 AM	8	4	10	8	30	10:00 AM	9	14	16	38	77
11:00 AM	5	6	10	13	34	11:00 AM	12	19	18	27	76
12:00 PM	4	12	7	10	33	12:00 PM	14	24	25	28	91
1:00 PM	5	16	4	18	43	1:00 PM	14	32	21	27	94
2:00 PM	8	27	4	11	50	2:00 PM	14	38	23	24	99
3:00 PM	15	33	5	8	61	3:00 PM	32	54	21	17	124
4:00 PM	17	23	9	28	77	4:00 PM	44	60	31	58	193
5:00 PM	9	30	14	23	76	5:00 PM	33	74	38	39	184
6:00 PM	17	34	8	16	75	6:00 PM	43	71	27	46	187
7:00 PM	10	22	14	6	52	7:00 PM	21	68	32	44	165
8:00 PM	11	13	7	10	41	8:00 PM	19	36	15	29	99
Sub Total	114	228	106	207		Sub Total	273	515	328	558	
			Total		655				Total		1674
	Average Daily Pedestrians				31.4		Average Daily Pedestrians				85.9
	Average Daily Bicyclists				62.1		Average Daily Bicyclists				153.3
	Average Daily Total Combined				93.6		Average Daily Total Combined				239.1
							Percent Increase Pedestrians				273%
							Percent Increase Bicyclists				247%
							Percent Increase Bicyclist and Pedestrians Combined				256%

Chart 1
AVERAGE DAILY NUMBER OF USERS BY TYPE AND YEAR

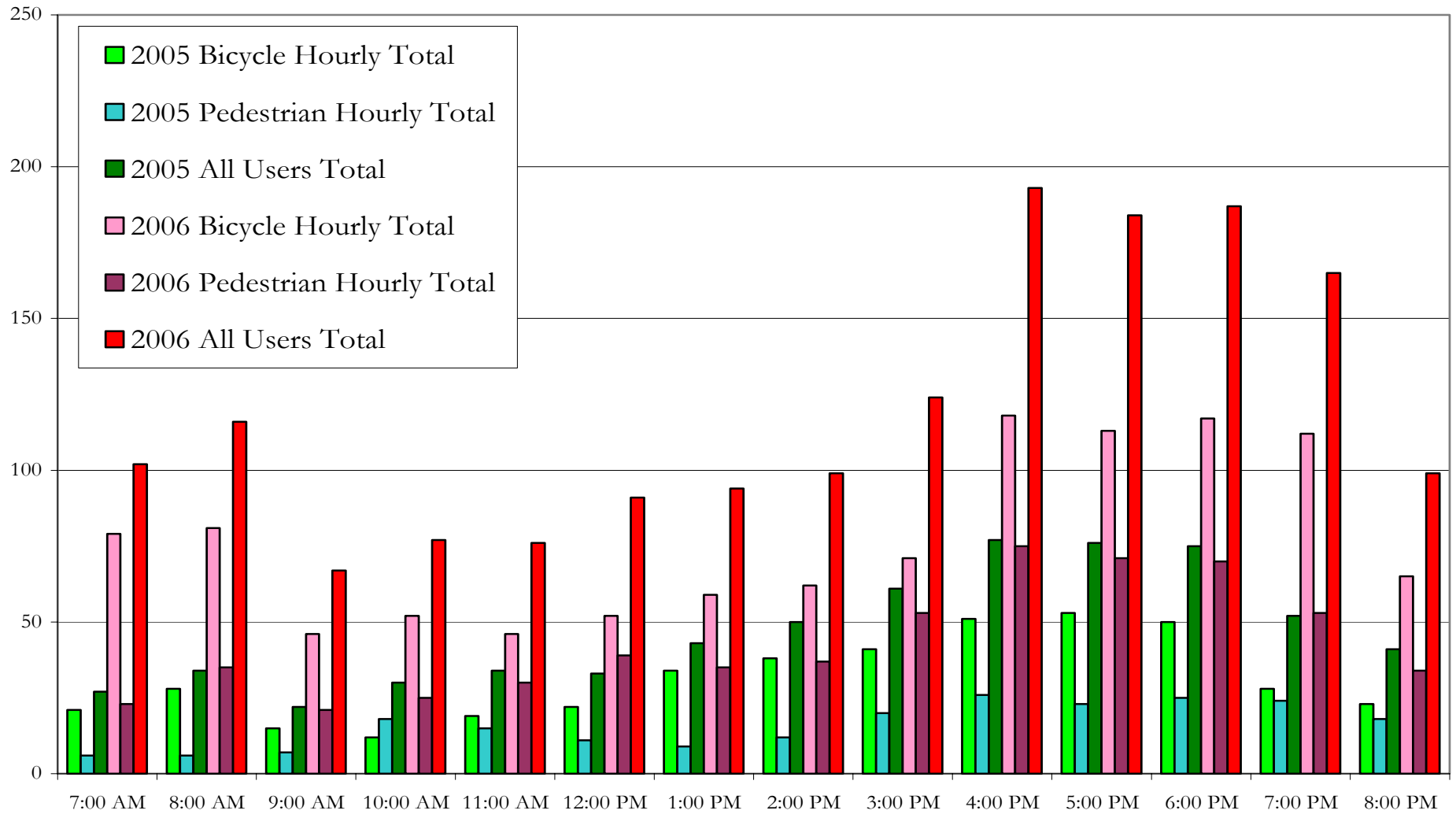


Table 2
Weather Conditions
2005

Date	Temp 7 am	Daily High	Conditions
4/25/2005	42.9	64.8	Clear, Dry
4/26/2005	42.8	55.7	Partly Cloudy, Dry
4/27/2005	32.2	35.1	Light snow
4/28/2005	22.2	36.5	Snow Flurries
4/29/2005	17.7	44.7	Dry, Sunny
4/30/2005	26.8	47.6	Dry, Sunny
5/1/2005	27.5	52.8	Dry, Sunny
5/2/2005	27.6	59	Dry, Sunny
Average	30.0	49.5	

2006

Date	Temp 7 am	Daily High	Conditions
4/24/2006	28.7	37.2	Windy, Dry
4/25/2006	30.2	53.9	Clear, Dry
4/26/2006	34.8	63.8	Breezy, Dry
4/27/2006	49	59	Scattered Showers
4/28/2006	35.6	63.3	Clear, Dry
4/29/2006	42.1	72	Clear
4/30/2006	46.5	60.5	Morning Rain
5/1/2006	31.8	63.3	Clear
Average	37.3	59.1	