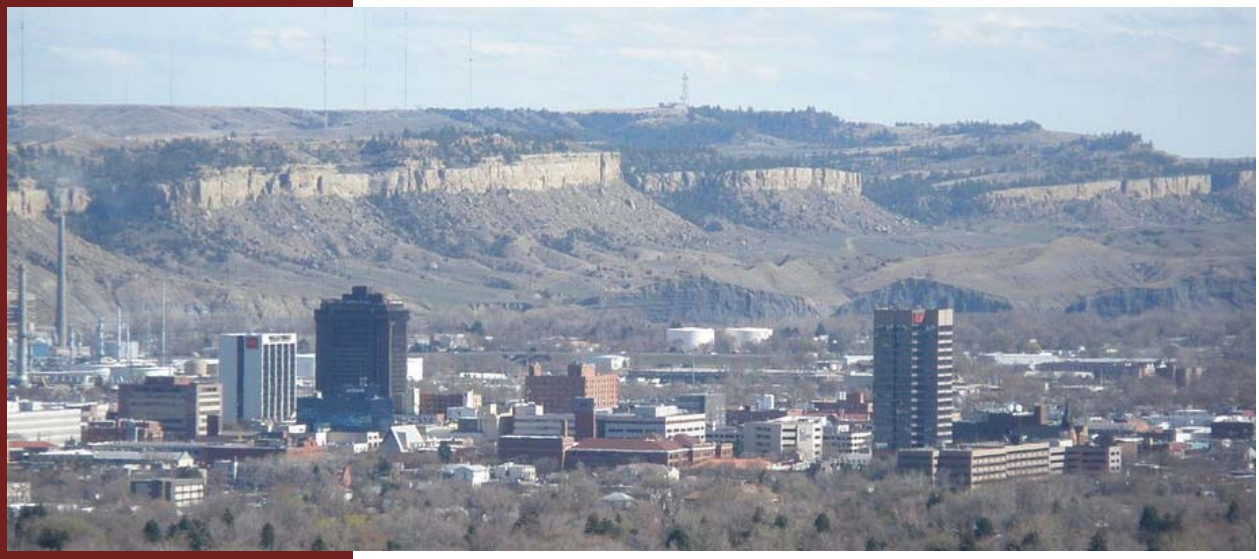
City of Billings, MT
Parking Technology Audit

Final Report
August 19, 2011



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INTRODUCTION

DESMAN Associates has been retained by the City of Billings to conduct an audit of the technologies currently being used by the Parking Division to manage, operate and collect revenues for both on-street and off-street parking in downtown Billings. The study first provides a review of existing facilities, equipment, systems, and operating policies and procedures. This is followed by a listing of strengths and weaknesses of the current equipment, systems, and operations. Alternative technologies and systems are then identified and evaluated. Also provided are case studies on the different technologies and operating methodologies used by other cities. In conjunction with city staff, technologies and systems will be selected for further evaluation and a preliminary plan for implementing the selected technologies/systems developed. Finally, the possible outcomes of implementing the new technologies and operating methodologies will be identified, including both the potential challenges that may arise as well as possible benefits that may be realized.

SCOPE OF SERVICES

Following is the Scope of Services for the on-street and off-street parking technology audit for the City of Billings.

On-Street Assessment

A. Analyze Existing Conditions

Task A.1: Organizational Meeting – DESMAN staff will meet with city staff members and other appropriate individuals (as identified by the city) in order to clarify the objectives of the study, define desired outcomes, review and update the work plan and schedule and identify expected project milestones. At this time, all pertinent information available from the city and other stakeholders relating to this assignment, including previous reports not already in hand, will be collected.

Task A.2: Review of Existing Equipment and Systems – DESMAN personnel, with guidance from appropriate city staff, will become familiar with the existing on-street parking meter technology and associated back office systems. We will discuss the pros and cons of the current equipment (i.e. user-friendliness, equipment maintenance issues, etc.) and associated systems with city staff and get their input regarding what they need/desire from new parking technologies. The information gathered on-site will be supplemented by the results of the most recent downtown parking study.

Task A.3: Review of Revenue Collection and Reconciliation Processes – With the help of city staff, DESMAN personnel will become familiar with the revenue collection and reconciliation procedures presently employed by the on-street parking system. This includes reviewing collection routes, historical revenues and expenses, coin counting procedures, etc. with the goal of determining the strengths and weaknesses of the current system in order to address these issues when evaluating new parking technologies/systems.

Task A.4: Review of Parking Enforcement Policies and Procedures – With the help of city staff, DESMAN personnel will become familiar with the parking enforcement policies and procedures presently employed in relation to the on-street parking system. This includes reviewing current parking violation policies, enforcement personnel job descriptions, historical ticket volumes, etc. with the goal of determining the strengths and weaknesses of the current program. Areas of possible improvement will be noted and factored into the evaluation of the various new parking technologies/systems being considered for recommendation. The information gathered on-site will be supplemented by the results of the most recent downtown parking study.

B. Identify and Evaluate Appropriate Technologies and Operating Procedures

Task B.1: Consolidate Pros and Cons of Current System – Based on the information from the most recent downtown parking study, the interviews conducted with city staff and other stakeholders, and the data gathered in Task A, a complete listing of the strengths and weaknesses of the on-street parking technology and systems and revenue collection and parking enforcement policies and procedures will be developed. This list will be used to guide DESMAN and city staff in the evaluation of possible new parking technologies, systems and operating methodologies.

Task B.2: Discuss Possible Technology and Operating Methodologies with City Staff – Alternative parking technologies will be discussed with city staff along with potential methods for improving the collections and enforcement aspects of the system. DESMAN will provide case studies of how other cities/municipalities utilize different technologies and operating methodologies including on-street pay parking, on-street meter-less parking and parking enforcement and revenue collection options.

Task B.3: Identify Appropriate Options – Based on city staff input, appropriate on-street pay parking (if pay parking is the chosen alternative) and enforcement technologies will be identified along with desired operating methodologies. The pros and cons associated with these technologies and methodologies will be identified as well.

Task B.4: Develop Cost Estimates and Evaluate Procurement Options – Once city staff have agreed upon the desired technology alternative(s), detailed unit cost estimates will be developed. These estimates will include equipment and software costs, estimated shipping and handling charges and estimated installation costs. Quantities of revenue control equipment and support equipment will be estimated.

Additionally, DESMAN will present information regarding the different options for obtaining the equipment/systems such as direct purchase, equipment leasing and/or arrangements made through an equipment vendor/manufacturer.

C. Develop an Implementation Plan and Project Potential Outcomes

Task C.1: Develop Preliminary Implementation Plan – DESMAN will develop a preliminary plan for implementing the selected technologies/systems for review by city staff. This plan will include, but not

be limited to, the following:

- Collection of baseline data from which to determine the impacts of implementation.
- Development of benchmarks or assessments to measure the success of the implementation of new technologies.
- Identifying the quantity of equipment needed.
- Selection of typical locations for the on-street pay parking equipment to be installed (if pay parking option is selected).
- Establishment of timeframes for the purchase and installation of the equipment.
- Appropriate marketing and communication strategies.
- Basic signage, notification and enforcement needs/concerns.
- Possible impacts on day-to-day parking operations, management, collections, staffing levels and auditing.

Task C.2: Identify Possible Implementation Outcomes – DESMAN will identify the possible outcomes of implementing the new technologies and operating methodologies. This includes both the potential challenges that may arise as well as possible benefits that may be realized with the installation of new equipment and the institution of new collections and enforcement policies and procedures.

D. Deliverables

Task D.1: Produce Draft Report – DESMAN will produce a draft report summarizing the results of the on-street parking technology assessment for review by the city. City staff will review the draft report and provide feedback as well as indicate any areas which need to be addressed further.

Task D.2: Produce Final Report – DESMAN will produce a final report which incorporates the feedback provided by the city on the draft report. The final report will also combine the results of the on-street assessment with those of the off-street assessment.

Off-Street Assessment

A. Analyze Existing Conditions

Task A.1: Organizational Meeting – DESMAN staff will meet with city staff members and other appropriate individuals (as identified by the city) in order to clarify the objectives of the study, define desired outcomes, review and update the work plan and schedule and identify expected project milestones. At this time, all pertinent information available from the city and other stakeholders relating to this assignment, including previous reports not already in hand, will be collected.

Task A.2: Review of Facilities, Existing Equipment and Operating Methodologies – DESMAN personnel, with guidance from appropriate city staff, will become familiar with the city's off-street parking facilities.

We will look at various aspects of the off-street system, including: parking access and revenue control systems currently in place, operating methodologies in place, existing validation systems, facility staffing levels and parking facility design issues/opportunities – among others. The existing equipment will be examined in order to determine its possible usefulness in future system upgrades.

DESMAN will also speak with the operations personnel responsible for running each facility in order to get a better sense of how each facility operates and to gain insight into potential opportunities for improving the facilities.

B. Identify and Evaluate Appropriate Technologies and Operating Procedures

Task B.1: Identify Strengths and Weaknesses of Each Facility – Based on the information from the most recent downtown parking study, the interviews conducted with city staff and information gathered on-site at each parking facility, DESMAN will identify the strengths and weaknesses of each parking facility from an equipment, operations and design standpoint. This will be used as the basis for our recommendation.

Task B.2: Discuss Possible Technology and Operating Methodologies with City Staff – Alternative parking access and revenue control technologies will be discussed with city Staff along with their potential impacts to current operations (i.e. improved service offerings, improved access and revenue control, rate flexibility, improved validation management, staffing changes, additional data collection capabilities, etc.). Possible technology and operating methodologies will be discussed with city staff and designated community stakeholders for future consideration.

DESMAN will provide case studies of how other organizations utilize different off-street equipment/systems and operating methodologies as well as any associated benefits and challenges. The analysis of benefits and challenges will include issues related to operations and management as well as parking customers.

Task B.3: Identify Appropriate Options – Based on city staff input, appropriate parking access and revenue control technologies will be identified along with desired operating methodologies. The pros and cons associated with these technologies and methodologies will be identified as well.

Task B.4: Develop Cost Estimates and Evaluate Procurement Options – Once city staff have agreed upon the desired technology alternative(s), preliminary cost estimates will be developed. These estimates will include equipment and software costs, estimated shipping, handling, and installation costs.

Additionally, DESMAN will present information regarding the different options for obtaining the equipment/systems such as direct purchase, equipment leasing through an equipment vendor/ manufacturer and equipment leasing through a private leasing company.

DESMAN will also provide a preliminary recommendation for funding the purchase of the selected parking access and revenue control system alternative.

C. Develop an Implementation Plan

Task C.1: Develop Preliminary Implementation Plan – DESMAN will develop a preliminary plan for implementing the selected parking access and revenue control technologies for review by city staff. This plan will include, but not be limited to, the following:

- Collection of baseline data from which to determine the impacts of implementation.
- Development of benchmarks or assessments to measure the success of the implementation of new technologies.
- Determining the quantity of equipment needed.
- Establishment of timeframes for the purchase and installation of the equipment.
- Appropriate marketing and communication strategies.
- Basic signage, notification and enforcement needs/concerns.
- Possible impacts on day-to-day parking operations, management, collections, staffing levels and auditing.

D. Deliverables

Task D.1: Produce Draft Report – DESMAN will produce a draft report summarizing the results of the off-street parking technology assessment for review by the city. City staff will review the draft report and provide feedback as well as indicate any areas which need to be addressed further.

Task D.2: Produce Final Report – DESMAN will produce a final report which incorporates the feedback provided by the city on the draft report. The final report will also combine the results of the off-street assessment with those of the on-street assessment.

EXISTING CONDITIONS ANALYSIS

On-Street Parking System Overview

The on-street parking system is comprised of both metered spaces and legal non-metered spaces situated throughout a 70-block area recognized as downtown Billings. The latest comprehensive inventory of downtown parking was documented in the City of Billings Downtown Parking Plan. At that time it was reported that there were 2,168 on-street spaces and 1,053 (49%) were metered spaces. The remainder of the on-street spaces (1,115) were either signed for loading, 10 to 30 minutes, or two hours of parking, unmarked (i.e. without sign limiting parking time), or restricted to authorized permit holders.

As of September 2010, the Parking Division reported a total of 1,073 meters. Since the comprehensive study was completed, the number of 2-hour meters has decreased by six and the number of 10-hour meters has increased by 26. The increase in 10-hour meters is due to loss of long-term metered spaces in the Library Lot.

On-Street Parking Inventory

	2009	2010
2-Hour Meters	826	820
4-Hour Meters	42	42
10-Hour Meters	185	211
Total On-Street Meters	**1,053**	**1,073**
Loading Zones & 10/15/30 Minutes	130	
2-Hour Unmetered	189	
Unrestricted	743	
Permit Only	53	
Total Non-Metered	**1,115**	
Total On-Street Spaces	**2,168**	

Parking Meter Hardware

DUNCAN Industries is the manufacturer and supplier of all the parking meters. The electronic meter timing mechanisms are powered by 9-volt batteries. The meters have an infrared wireless communication port for sending and receiving ID, usage, rate, time, calendar, and revenue data to and from companion handheld data collection units. The meters are housed in both single and twin zinc alloy housings and coin deposits are collected in either open plastic cups or metal containers.

Parking Meter Rates

The meter rate for the majority of the 820 two-hour meters is $0.35 an hour; however, there are 53 unique two-hour meters that have green painted cased iron housings dispersed throughout downtown in high activity areas that have a hourly rate of $0.50. The city gives fifty percent of the revenue collected from these higher priced 2-hour meters to the Downtown Billings Association (DBA) to partially fund downtown beautification projects. There are 42 4-hour meters with white painted case iron housings that are $0.35 per hour and 211 10-hour meters with yellow painted case iron housings that are $0.10 per hour. The last meter rate increase occurred in 2006 when the 2-hour meter rate was changed from $0.25 to $0.35 per hour.

Downtown employees can also purchase a monthly on-street parking permit for $15. The usage of these on-street permits is only allowed at 10-hour meters with yellow painted case iron housings.

Parking Enforcement

The City of Billings Parking Division is charged with the responsibility of enforcing all metered and non-metered on-street parking regulations, permit parking activity in the four city parking garages, and meter usage and permit parking activity at several off-street surface lots. The City Police Department patrol officers also enforce on-street parking regulations, but to a lesser extent than the does the Parking Division enforcement staff.

The Parking Division enforcement staff is comprised of four full-time employees that have the job title of Parking Enforcement Officer (PEO). DESMAN found the PEOs we interviewed to be well informed of their job responsibilities, the parking regulations they are charged to enforce, and on the prevailing parking violation patterns throughout their enforcement zones. While the PEO's primary job duty is parking enforcement they also can be tasked to serve as stand-in parking garage attendants when needed and/or to serve as traffic controller officer at accident sites and during special events. The temporary re-assignment of at least one or two PEO's to parking attendant duty commonly occurs, which causes frequent fluctuations to the coverage and consistency of downtown parking enforcement activities.

When the full complement of PEO's are on duty each officer is assigned one of four separate enforcement routes. Three PEOs drive gas-powered single-occupant scooters to enforce three of the routes and a one PEO walks to enforce the core area of downtown. The single-occupant three wheel enforcement scooters reportedly can be used without problem during the majority of the winter months.

Hours of enforcement begin at 8:00 AM and end at 5:00 PM Monday-Friday. PEO's enforce on-street meter parking and the unmetered parking time limit zones. Each PEO is armed with a Casio IT 3000 digital handheld enforcement device that has a built-in camera and citation printer, tire chalking

equipment, and cellular/radio phones for field communications. The tire chalking equipment is used to keep track of the time a vehicle has been parked in the same location within an unmetered time limited parking zone. The PEOs also assist the meter maintenance staff with the installation of Wheel Boots used to immobilize vehicles with multiple unpaid parking tickets.

The PEOs we interviewed reported that Casio handheld ticket writing units are very reliable, but the camera component of the units produce poor quality black and white images. The Casio units are supported by Cardinal Tracking Inc. software. DESMAN found that the Parking Division staff had limited training as to the data analysis and retrieval capability of the Cardinal Tracking system. The staff had to rely on Cardinal Tracking Inc. personnel to generate detailed reports on ticket issuance activity. These detailed reports are typically relied upon to analyze the productivity of the individual PEO's, identify area where parking violations most often occur, and to monitor and analyze the volume and type of citations that are most often written.

Parking Fines

There are seven different fine amounts that apply to 31 different parking regulation infractions in the City Code. The seven fine amounts are $0, $5.00, $10.00, $15.00, $20.00, $50.00 and $100.00. The table on the following page lists the fine amounts for the 31 parking infractions along with the volume of tickets written for each type of parking infraction in 2008 and 2009.

The City of Billings parking fine structure includes courtesy tickets for first offenders with no fine and an escalating fine structure for repeat offenders of selected parking infractions. The city has implemented a tiered parking fine system for posted sign (code 21) and expired meter (code 11) violations as follows:

- First citation – No Fine
- Second citation - $5.00
- Third Citation - $10.00
- Fourth and subsequent citations - $20.00

Courtesy citations are also issued to first time offenders for plugging parking meters (code 7A infraction); however, subsequent fines for this infraction do not escalate. The amount of the fine for parking violations is determined by the number of citations received over a 180-day period. If subsequent violations do not occur over the 180 day period, the fine reverts back to the first citation and the 180 day count starts over.

This tiered approach to parking fines is favored by many cities to charge infrequent offenders minimal fines and repeat offenders more expensive fines. The no charge for the first offense and tiered parking fines represent a customer-friendly approach to parking enforcement, which is commendable.

If a parking patron has more than $50 of unpaid tickets, a sticker notice is placed on the vehicle stating that if the amount is left unpaid the vehicle will be booted and an additional $100 fine will be assessed.

City of Billings Parking Fine Structure

			2008			2009		
Violation Number	Violation Description	Fine Amt.	# Tkts Issued	% of Total	Fine Amt. %	# Tkts Issued	% of Total	Fine Amt. %
11	METER EXPIRED 24-456	$0.00	12,767	46.9%		10,026	42.9%	
21	POSTED SIGNS 24-412	$0.00	2,258	8.3%	56.1%	2,160	9.2%	52.9%
7A	METER PLUGGING COURTESY	$0.00	242	0.9%		177	0.8%	
1	METER EXPIRED	$5.00	21	0.1%		57	0.2%	
2	POSTED SIGNS	$5.00	82	0.3%		67	0.3%	
12	METER EXPIRED 24-456	$5.00	3,014	11.1%	14.4%	2,280	9.8%	13.7%
22	POSTED SIGNS 24-412	$5.00	701	2.6%		720	3.1%	
6F	OTHER	$5.00	87	0.3%		74	0.3%	
13	METER EXPIRED 24-456	$10.00	1,157	4.3%		876	3.7%	
23	POSTED SIGNS 24-412	$10.00	337	1.2%		260	1.1%	
2A	NO UNATTENDED VEHICLES	$10.00	342	1.3%		310	1.3%	
2B	EMPLOYEE PARKING	$10.00	202	0.7%		248	1.1%	
6G	18"+ FROM CURB	$10.00	97	0.4%		49	0.2%	
6H	DRIVEWAY	$10.00	85	0.3%	13.5%	87	0.4%	13.8%
8A	NOT REGISTERED	$10.00	908	3.3%		827	3.5%	
8B	ROOF IN COVERED OR RESERVED	$10.00	59	0.2%		61	0.3%	
8C	ROOF IN HOURLY	$10.00	46	0.2%		81	0.3%	
8D	COVERED OR RESERVED IN HOURLY	$10.00	101	0.4%		119	0.5%	
8E	TAKING 2 SPACES	$10.00	342	1.3%		298	1.3%	
6E	PARKED AGAINST TRAFFIC	$15.00	363	1.3%	1.3%	904	3.9%	3.9%
14	METER EXPIRED 24-456	$20.00	1,460	5.4%	6.9%	1,290	5.5%	6.9%
24	POSTED SIGNS 24-412	$20.00	428	1.6%		332	1.4%	
3	LOADING ZONE	$25.00	400	1.5%		272	1.2%	
4	ALLEY	$25.00	115	0.4%		129	0.6%	
5	DELIVERY PERMIT	$25.00	49	0.2%		36	0.2%	
7	METER PLUGGING $25	$25.00	79	0.3%	6.0%	55	0.2%	5.7%
6A	YELLOW ZONE	$25.00	672	2.5%		531	2.3%	
6C	SIDEWALK	$25.00	105	0.4%		48	0.2%	
6D	BUS/CAB ZONE	$25.00	8	0.0%		12	0.1%	
NP	NO PARKING ANYTIME	$25.00	217	0.8%		252	1.1%	
0	HANDICAP ZONE	$100.00	322	1.2%		626	2.7%	
9	FIRE LANE	$100.00	89	0.3%	1.7%	62	0.3%	3.1%
6B	FIRE HYDRANT	$100.00	45	0.2%		35	0.1%	
TOTALS			27,200	100%	100%	23,361	100%	100%

Parking Enforcement Staff Productivity and Parking Fine Collections

According to records provided by the City of Billings Finance Department, parking citation payment receipts for fiscal years 2008 and 2009 amounted to $133,909 and $125,128, respectively. While the financial records related to revenue generated by parking citation payments are maintained by fiscal year, the actual parking ticket issuance records obtained from Cardinal Tracking were tabulated based on a calendar year. This inconsistency should be corrected so the ticketing activity can easily be correlated with the official revenue records on file in the Finance Department.

The following table shows the Cardinal Tracking Systems records of parking citations issued and parking citations paid in calendar years 2008 and 2009. There were 27,200 tickets written in 2008 and 23,361

tickets written in 2009. The tickets written by the City Police Department personnel accounted for 4.3% and 9.3% of all the tickets in 2008 and 2009, respectively. Therefore, on average each of the four PEO's wrote approximately 6,500 tickets (26 tickets a day over 250 days a year) in 2008 and 5,300 tickets (21 tickets a day over 250 days a year) in 2009. Given an estimated 2,168 on-street parking spaces in downtown Billings, the PEO's wrote 12 tickets per on-street space in 2008 and 10 tickets per on-street space in 2009.

City of Billings Parking Citation Issuance and Payment Analysis for 2008 and 2009

	2008						2009					
Citations Categories	# Tkts Written	% of Total	Tkt. $ Value	# Paid Tkts	% of Tkts Written	Tkt Rev. Collected	# Tkts Written	% of Total	Tkt. $ Value	# Paid Tkts	% of Tkts Written	Tkt Rev. Collected
Total Tickets Issued	27,200	100%	$186,215	7,794	29%	**$100,900**	23,361	100%	$199,825	7,595	33%	**$115,360**
Voided Tickets	1,384	5%	$35,535	0	0%		1,476	6%	$52,815	0	0%	
Valid Tickets	25,816	95%	$150,680	7,794	30%		21,885	94%	$147,010	7,595	35%	
Courtesy Tickets	15,267	56%	$0	0	0%	**$0**	12,363	53%	$0	0	0%	
Non-Courtesy Tickets	11,933	44%	$186,215	7,794	**65%**	**$100,900**	10,998	47%	$199,825	7,595	**69%**	**$115,360**
Expired Meter Courtesy *	12,767	46.9%	$0	0	0%	**$0**	10,026	42.9%	$0	0	0%	**$0**
Expired Meter Violations *	5,652	20.8%	$55,945	4,586	81%	**$45,260**	4,503	19.3%	$46,245	3,597	80%	**$37,625**
Plugging Meter Courtesy *	242	0.9%	$0	0	0%	**$0**	177	0.8%	$0	0	0%	**$0**
Plugging Meter Tickets *	79	0.3%	$1,975	57	72%	**$1,425**	55	0.2%	$1,375	48	87%	**$1,200**
Posted Sign Courtesy	2,258	8.3%	$0	0	0%	**$0**	2,160	9.2%	$0	0	0%	**$0**
Posted Sign Violations	1,548	5.7%	$15,845	901	58%	**$6,085**	1,379	5.9%	$13,175	1,080	78%	**$10,410**
Not Registered	908	3.3%	$9,080	404	44%	**$4,040**	827	3.5%	$8,270	269	33%	**$2,690**
Yellow Zone Tickets	672	2.5%	$16,800	54	8%	**$1,350**	531	2.3%	$13,275	420	79%	**$10,500**
Handicapped	322	1.2%	$32,200	81	25%	**$8,100**	626	2.7%	$62,600	164	26%	**$16,400**
Improper Parking [1]	992	3.6%	$13,310	654	66%	**$7,970**	1,386	5.9%	$19,100	968	70%	**$13,275**
Restricted Zone Parking [2]	1,125	4.1%	$35,145	685	61%	**$23,005**	1,046	4.5%	$29,705	656	63%	**$19,580**
Other Off-Street Citations [3]	635	2.3%	$5,915	372	59%	**$3,665**	645	2.8%	$6,080	393	61%	**$3,680**
TOTALS	**27,200**	**100.0%**	**$186,215**	**7,794**	**29%**	**$100,900**	23,361	**100.0%**	**$199,825**	**7,595**	**33%**	**$115,360**
City Police Officer Tickets	1,176	4.3%					2,181	9.3%				
Parking Division PEO Tickets	26,024	95.7%					21,180	90.7%				
Avg. Yrly. Tkts Per PEO	6,506						5,295					
Avg. Mo. Tkts Per PEO	542						441					
Avg. Daily Tkts Per PEO	26						21					
Tickets Per On-Street Space	12						10					
Tickets Per Meter Per Month*	1.3						1.0					

* Denotes parking meter citations

[1] Includes Taking 2 Spaces, Driveways, 18" from Curb, Parking Against Traffic and Sidewalk Citations

[2] Includes Alley, Employee, Fire Lane, Fire Hydrant, Bus/Cab, Delivery Permit, No Parking Anytime and Loading Zone Citations

[3] Includes Roof in Covered or Reserved, Roof in Hourly, Covered or Reserved in Hourly and Unattended Vehicle

In 2008 69% (18,740) of all the tickets were written for meter violations (i.e. expired meter and plugging meter citations) and in 2009 64% (14,761) of all the tickets were written for meter violations. The PEO's and the Police Department wrote an average of 1.3 and 1.0 tickets per meter per month in 2008 and 2009, respectively. These ticket issuance figures suggest a low capture rate of parking violators, particularly since 78% of the parking meters have a 2-hour parking time limit. This low capture rate is due in part to the current Parking Division practice of having the PEO's replace absent parking garage attendants and helping with parking meter maintenance and collections whenever necessary. In order to get a more accurate representation of the PEO's daily ticket writing productivity, the Parking Division should require each PEO to indicate the number enforcement hours worked each day on their end-of-shift report. The

preceding table also reveals that the city's rate of fine collection for all non-courtesy tickets issued was relatively high at 65% and 69% for 2008 and 2009, respectively.

Voided Parking Tickets

The Parking Division currently does not require PEO's or others to specify the reason for voiding a parking ticket and it is our understanding that there are no written policies or guidelines governing the voiding of parking tickets. Voided parking tickets accounted for 5% and 6% of the total tickets written in 2008 and 2009, respectively. These percentages are slightly higher than the 2% to 3% industry average for voided parking tickets. The adoption of a policy regarding voided tickets will tend to reduce the number of voided tickets. There are usually several legitimate reasons for a PEO to void a ticket such as a writing error, failure to notice a handicapped hangtag, the driver arrives before the ticket is printed, etc. Voided tickets also arise as a result negligence on the part of a PEO so tracking voided ticket volumes of PEO's can serve as an indicator of poor performance or a need for additional training.

Courtesy Ticket Policy

The City of Billings has enacted a policy of issuing courtesy tickets to first time offenders of certain parking violations. The three violations for which courtesy tickets are written are for being Parked at an Expired a Meter, being Parked in Violation of Posted Signs, and for Plugging Meters to exceed the allowable meter time limit. If the offender does not receive a second ticket within 180 days, the same parking violator will issued another courtesy ticket. Those ticketed for plugging meters are eligible for only one courtesy ticket over the lifetime registration of their vehicle. Casio handheld ticket writing units used by the PEOs are apparently programmed to maintain accurate records of the license plate number of registered vehicles that are issued these courtesy tickets. However, no record audit has ever been conducted to verify that the courtesy ticket database is accurate and reliable.

While this is customer-friendly approach to parking enforcement and is commendable, the volume of courtesy tickets issued annually accounted for well over half of all the tickets written in both 2008 and 2009. Though this policy certainly leaves first time and infrequent visitors with a favorable impression of Billings, the sheer volume of courtesy tickets being written each year suggest that local residents and frequent visitors to downtown Billings are taking advantage of the policy of two courtesy tickets over a 360-day period. The merits of this policy need to be more closely examined given the amount of potential citation revenue being forfeited each year. Cardinal Tracking system ought to be able to produce statistics on the numbers vehicles that have habitually been issued two courtesy tickets every 360 days. DESMAN believes that a more balanced policy would be to extend the courtesy to 365 days instead of the current 180 days. In theory, such a change should lead to a substantial reduction in the issuance of courtesy tickets and some portion of the habitual violators to more quickly graduate to the higher fine categories for these parking violations.

Consideration should also be given to eliminating the courtesy ticket for first citations. Courtesy tickets represented approximately 56% of the tickets issued in 2008 and 53% of the tickets issued in 2009. If the

first violation carried a $5.00 fine and subsequent violation fines increased $5.00 up to a maximum of $20, approximately $103,000 and $83,000 more in revenue would have been generated in 2008 and 2009, respectively.

DESMAN also audited the parking citations issued during the week of May 10th – 14th, 2010. There were 481 citations issued with a total amount of $3,755 in fines. Of the 481 citations, 414 (86%) were for meter and posted sign citations. Of the 414 meter and posted sign citations issued, 276 were courtesy tickets. The 276 courtesy tickets represent 67% of the meter and posted sign tickets issued that week.

Meter Collections and Maintenance

The Parking Division has two full-time staff members assigned to the Meter Shop. Their duties include the collection and maintenance of the parking meter system. For security and oversight purposes, the two staff members work side by side to collect meter coinage three times a week on Tuesday, Wednesday and Thursday. There are three collection routes that are walked that take approximately 3 to 5 hours to complete. A vehicle is used to collect the green meters which are dispersed throughout downtown.

Control of meter keys is a critical element of the security for a parking meter system. Ineffective control over the access to meter keys can make meter revenue vulnerable to possible theft. The City of Billing's meter system is considered a moderate sized system by industry standards. Moderate sized meter systems usually have no more than 500 meters per one meter key. This practice is instituted so that if a key is lost or stolen, the cost to rekey that segment of the system is kept low and the exposure to lost revenues is relatively low. In Billings, the entire meter system can be accessed by a single key and there are no procedures in place to limit when and which individuals have access to the meter key and its duplicates.

Coinage collected in open cups/containers inside the meters is emptied into a larger locked collection cart that is wheeled around each walking collection route. This system of collections, which allows the collection personnel open access to the coinage, is completely unsecure and susceptible to pilferage. In a "closed" and secure collection system, the open cups and containers inside the meters would be replaced with sealed coin vaults especially designed to be inserted into a large locked collection cart receptacle in order to empty the coins out of the vault, thus eliminating the collector's ability to access the coinage. No matter the technology and equipment selected for on-street metered parking in the future, consideration should be given to a locked vault type system where closed coin canisters can only be emptied directly into a locked collection cart, which would provide the city with a higher level of revenue control.

Duncan AutoCite X3Casio IT3100 handheld devices are used by the collection personnel every two weeks to audit individual meters deposits. Base on a sampling of audited meters it was concluded that the meter ID and coinage deposit data transmitted wirelessly from the meters to the handheld units is accurate and reliable. However, the revenue collection data totals retrieved directly from the meter system and bagged for deposit at a downtown Bank is never matched with the receipts issued by the Bank several days after the deposit is made. This lack of reconciliation means that coinage could be pilfered from the collection deposit bags prior to them being delivered to the Bank, as the Bank is only counting and acknowledging deposit of the contents of the meter collection bags. Although an audit process that cross checks the electronic meter revenue deposit totals with the Bank deposit total will rarely if ever completely match, the difference between the two totals should never be significant. Periodically conducting such an audit on an impromptu basis would be a reasonable revenue theft deterrent for the Parking Division collection personnel, and it would also expose revenue pilferage that could also potentially occur at the bank.

Off-Street Parking System Overview

The off-Street parking system is comprised of four parking structures and four surface parking lots. Together these off-street facilities account for a total 2,345 spaces. All four of the parking garages are owned and operated by the Parking Division, but Yellowstone County owns one of the four surface lots operated by the Parking Division. A brief description of the off-street parking facilities follows:

Parking Garages

Park 1 Garage, 2912 Third Ave. North

5 Level 455-space structure with leasable ground level retail
4 Lanes Total
2 Lanes Inbound with Ticket Dispenser, Card Reader, Barrier Gate and Full Sign
1 Lane Outbound with Card Reader and Barrier Gate
1 Lane Outbound with Cashier Booth, Fee Display, Card Reader and Barrier Gate

Park 2 Garage, 2651 First Ave. North

6 Level 760-space structure with portion of the ground level area dedicated to auto teller service for an adjacent commercial bank
7 Lanes Total
2 Lanes Inbound with Ticket Dispenser, Card Reader, Intercom and Barrier Gate
1 Lane Outbound with Cashier Booth, Fee Display, Card Reader, Intercom and Barrier Gate
3 Lanes Outbound with Card Reader, Intercom and Barrier Gate
1 Lane Outbound with Card Reader and Barrier Gate

Park 3 Garage, 210 N. 27th Street

6 Level 273-space structure connected to Billings City Hall
3 Lanes Total
1 Lane Inbound with Ticket Dispenser, Card Reader, Barrier Gate and Full Sign
1 Reversible Lane with Ticket Dispenser, Card Reader and Barrier Gate Inbound and Card Reader and Barrier Gate Outbound
1 Lane Outbound with Card Reader, Cashier Booth and Barrier Gate

Park 4 Garage, 510 N. 31st. Street

5 Level 760-space structure
7 Lanes Total
3 Lanes Inbound with Ticket Dispenser, Card Reader, Barrier Gate and Full Sign
2 Lanes Outbound with Card Reader and Barrier Gate
1 Lane Outbound with Cashier Booth, Fee Display, Card Reader and Barrier Gate
1 Lane Internal (to secured parking area) with Card Reader In and Free Out

Parking Lots

27th Ave Lot (North)
34 Parking Spaces
9 Two-Hour Meters

Library Lot
52 Parking Spaces
49 Two-Hour Meters

27th Ave. Lot (South)
26 Parking Spaces
21 Two-Hour Meters

County Building Lot
25 Spaces
22 Two-Hour Meters

27th Avenue Parking Lot (South)

Parking Facility Operating Hours

All of the off-street surface lots and Park 1, Park 2 and Park 3 are accessible to the general public on a 24 hour 7 day per week basis. The general public's access to Park 4 is limited to 14 and a half hours a day (between 7:00 AM and 9:30 PM) Monday through Friday; however, any contract parkers can obtain assistance from on-call Parking Division staff or from authorized security personnel based at a nearby office building should they have a need to enter or exit Park 4 before or after the garage has been closed off to the general public.

Park 1, Park 3 and Park 4 are staffed with one parking attendant from 10:30 AM to 6:30 PM Monday through Friday, and Park 2 is staffed with one parking attendant from 7:15 AM to 11:00 PM Monday through Saturday. Before and after the garages are staffed the gates are raised to allow users to exit without paying. Presently, because the in-lane vehicle detection counters are not fully functional, the

Parking Division is unable to determine how many vehicles enter and exit the garages during these "free-out" periods. Additionally, the current system allows daily parkers who enter the garage during periods when fees are charged to wait until after the attendant has left the premised and the exit gates are raised to leave without paying the charge they incurred from earlier in the day.

Ideally, the system should be designed so that only parkers that enter the garages during the "free-out" periods are allow to exit without paying and any parkers who incur parking charges prior to the start of the "free-out" period should be required to pay after hours using an automatic in-lane pay station.

Monthly & Transient Parking Rates

The City of Billings has sanctioned the Parking Board with the authority to set parking rates and to set terms for parking validation programs and volume sales discounts. The following parking rates are applicable to all the garages and lots as noted below:

Monthly Garage Parking	**General Public**	**City Employees**
Assigned Space	$100.00 per month	$80.00 per month
Covered Interior Space	$50.00 per month	
Rooftop Space	$25.00 per month	
Refundable Permit Deposit	$5.00	

Monthly Lot Parking	**General Public**
Unassigned Space	$45.00 per month
Refundable Permit Deposit	$5.00

Monthly On-Street Permit	**Downtown Employees Only**
Yellow Meter Space Permit	$15.00 per month

Transient Garage Parking	**General Public**
First 2 Hours in Garage	$0.25 per hour
Each Additional Hour	$1.00 per hour
Daily Maximum	$5.00

Garage Parking Rate Discounts	
Park & Shop Validations	Free
City Departmental Validations	Free to Customer/Charged to Departments
Crown Plaza Hotel Validations	Value of Discounted Parking Increases as Length of Stay Increases
Monthly Group Parking	5 to 15% for single billing groups of 5 to 100
Parking Coin Tokens	Valued at $.25 each/Distributed by Downtown Businesses

Parking Validation Program

The Parking Division has historically offered discounted value validations to transient parking customers at each of the four garages. Three types of validation programs are offered by the Parking Division. The Downtown Billings Association (DBA) promotes and facilitates the processing of the Park & Shop

Validation Program, while separate parking validation programs serve Crown Plaza Hotel patrons and the Lincoln Education Center. The objective of these programs is to promote downtown commerce by reducing the cost of parking. The table below shows that in 2009 the three validation programs accounted 82,031 hours of discounted parking transactions in the four city garages. The Park & Shop validations can be redeemed at all four of the parking garages while the Crown Plaza and Lincoln Education Center validations are predominantly redeemed are Park 2 and Park 4, respectively.

Validation Discounted Hours Parked for 2009

Park & Shop	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL	% of P&S Hrs.	% of Total Hrs.
Park 1	387	384	636	292	454	384	257	281	173	673	376	379	**4,676**	9%	
Park 2	1,542	1,447	1,998	1,618	1,291	1,426	1,354	1,513	1,631	1,619	1,367	1,375	**18,181**	37%	
Park 3	1,433	1,574	1,875	1,814	1,705	2,121	1,922	2,161	2,346	2,378	1,681	2,129	**23,139**	47%	
Park 4	212	521	398	155	923	164	247	180	202	266	169	164	**3,601**	7%	
Subtotal	**3,574**	**3,926**	**4,907**	**3,879**	**4,373**	**4,095**	**3,780**	**4,135**	**4,352**	**4,936**	**3,593**	**4,047**	**49,597**	**100%**	**60.5%**
Crown Plaza	**2,512**	**1,951**	**2,462**	**2,664**	**2,511**	**2,807**	**2,468**	**2,488**	**2,540**	**2,833**	**2,249**	**2,123**	**29,608**		**36.1%**
Lincoln Center	**308**	**264**	**202**	**461**	**436**	**45**	**0**	**147**	**245**	**347**	**256**	**115**	**2,826**		**3.4%**
TOTAL	**6,394**	**6,141**	**7,571**	**7,004**	**7,320**	**6,947**	**6,248**	**6,770**	**7,137**	**8,116**	**6,098**	**6,285**	**82,031**		**100%**

The table on the following page shows the number and duration of stay of Park & Shop validation transactions that were processed at each of the city's parking garages. Aside from the transactions processed at Park 2, the majority of the Park & Shop validations were received from patrons that parked for four of more hours and third of this group typically parks for seven or more hours. Since downtown shopping and/or business trips usually last a maximum of 3 to 4 hours and based on the extended length of stay that is common to the majority of Park & Shop parking customers, it appears that the program has evolved into widely accepted mechanism for all day or long-term daily parking privileges at a discounted rate. The city may want to consider establishing a time limit for the Park & Shop program to generate more revenue and discourage long-term parking under a program that is intended for short-term parking customers. Under such a program change, customers that have obtained a Park & Shop validation could be require to pay for any parking charges incurred after a three or four duration of stay in any of the city garages.

Shop & Park Transactions by Month and Duration of Stay

Duration of Stay	Month												Annual Transactions	% of Total	
	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC			
PARK 1 in 2009															
1	0	1	0	1	1	0	1	0	0	0	0	0	4	0%	
2	4	1	1	3	2	2	0	2	0	0	2	0	17	2%	10%
3	10	2	8	9	4	4	1	3	2	8	8	4	63	7%	
4	5	6	19	11	3	5	3	3	3	3	6	4	71	8%	
5	18	18	18	9	9	13	16	25	12	17	11	23	189	22%	90%
6	6	12	11	16	12	11	14	16	10	15	18	9	150	18%	
7	29	27	54	39	44	31	11	5	5	66	23	26	360	42%	
	72	**67**	**111**	**88**	**75**	**66**	**46**	**54**	**32**	**109**	**68**	**66**	**854**	**100%**	
PARK 2 in 2009															
1	171	145	n/a	188	172	145	178	138	154	175	158	156	1780	29%	
2	209	159	n/a	188	182	162	140	159	160	180	174	139	1852	31%	74%
3	81	92	n/a	73	85	69	65	57	71	79	99	88	859	14%	
4	29	47	n/a	41	44	30	35	38	46	56	48	43	457	8%	
5	33	15	n/a	46	27	25	21	17	19	27	27	16	273	5%	26%
6	5	17	n/a	26	16	15	18	21	20	18	22	17	195	3%	
7	57	49	n/a	95	60	40	60	52	61	56	51	45	626	10%	
	585	**524**	**0**	**657**	**586**	**486**	**517**	**482**	**531**	**591**	**579**	**504**	**6042**	**100%**	
PARK 3 in 2008															
1	15	17	n/a	21	22	28	33	40	33	29	19	21	278	6%	
2	42	36	n/a	49	47	49	36	41	48	42	65	45	500	11%	30%
3	47	52	n/a	45	56	62	64	42	63	63	49	48	591	13%	
4	70	64	n/a	62	59	91	81	60	99	68	75	85	814	18%	
5	26	39	n/a	47	56	58	61	54	43	44	72	54	554	12%	70%
6	15	18	n/a	22	33	28	26	32	25	33	28	31	291	6%	
7	99	110	n/a	135	101	141	120	173	181	198	144	154	1556	34%	
	314	**336**	**0**	**381**	**374**	**457**	**421**	**442**	**492**	**477**	**452**	**438**	**4584**	**100%**	
PARK 4 in 2009															
1	6	3	9	4	6	4	2	2	2	4	1	1	44	6%	
2	4	3	4	7	3	4	0	5	7	6	4	8	55	8%	23%
3	4	4	5	4	12	3	4	7	3	5	4	3	58	8%	
4	5	10	9	6	2	5	3	11	2	4	6	8	71	10%	
5	7	25	9	5	17	8	4	4	6	1	6	3	95	14%	77%
6	2	15	16	1	9	1	2	1	1	3	4	0	55	8%	
7	17	35	27	10	104	11	27	11	19	28	10	13	312	45%	
	45	**95**	**79**	**37**	**153**	**36**	**42**	**41**	**40**	**51**	**35**	**36**	**690**	**100%**	

As indicated in the table on the following page, the discounted parking for the Park & Shop validation program equates to a 36% price reduction from the standard transient parking rate schedule. However, a review the monthly tally of Park & Shop parking transactions revealed the manual process used to generate billing to the DBA contained math formula errors that appeared to have resulted in some of the businesses participating in the program being charged the wrong amount for their monthly validations.

Park & Shop Validation Rate Summary

Duration of Stay	Standard Rate	Validation Rate	Rate Reduction	Percent Reduction
0-1 hr.	$0.25	$0.16	$0.09	-36%
1-2 hrs.	$0.50	$0.32	$0.18	-36%
2-3 hrs.	$1.50	$0.96	$0.54	-36%
3-4 hrs.	$2.50	$1.60	$0.90	-36%
4-5 hrs.	$3.50	$2.24	$1.26	-36%
5-6 hrs.	$4.50	$2.88	$1.62	-36%
6 hrs.+	$5.00	$3.20	$1.80	-36%

Unlike the Park & Shop validation program, the parking validation program for the Lincoln Education Center is based on the standard rate schedule for the students and visitors parking in Park 4. The institution validates the parking stubs of it students and visitors and pays the accumulated transient parking charges they incur at the end of each month. Eighty-one percent of the Lincoln Education Center parking validations in 2009 were for transactions that did not exceed a four-hour duration of stay in Park 4, as indicated in the table below.

Lincoln Center Validations by Month and Duration of Stay

Duration of Stay	Month												Annual Transactions	% of Total	
	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC			
PARK 4 in 2009															
1	1	5	n/a	9	1	0	n/a	0	5	5	2	1	29	4%	
2	19	16	n/a	32	10	2	n/a	2	14	19	13	9	136	19%	81%
3	26	16	n/a	41	38	7	n/a	4	19	34	19	13	217	30%	
4	10	11	n/a	25	33	2	n/a	8	30	36	37	9	201	28%	
5	12	11	n/a	17	23	1	n/a	13	3	4	2	0	86	12%	
6	2	3	n/a	11	3	0	n/a	1	1	4	1	0	26	4%	19%
7	5	0	n/a	2	6	1	n/a	4	2	2	1	3	26	4%	
	75	**62**	**0**	**137**	**114**	**13**	**0**	**32**	**74**	**104**	**75**	**35**	**721**	**100%**	

The Crowne Plaza Hotel has an agreement with the City of Billings that allows the hotel use up to 275 spaces in Park 2 at the prevailing daily rate structure for its guests and/or employees. The hotel pays the city the daily maximum parking rate (i.e. $5.00) for every overnight guest that parks in Park 2 and does not pass on this charge to its guests. The same agreement also allows the hotel to validate discounted parking charges at Park 2 for its short-term parking customers. The short-term parkers mostly include non-overnight patrons that dine or attend events and meetings at the hotel. However, the hotel also relies on this validation agreement to offer Billings Airport traveler's extended stay parking at Park 2 when they stay one night at the hotel prior to their departure. According to the city's validation agreement with the Crown Plaza Hotel the standard per hour parking rate schedule in Park 2 is discounted as follows:

Crowne Plaza Hotel Validation Rate Summary

Duration of Say	Per Hour Rate	Standard Parking Charge	Discounted Parking Charge
1 to 8 Hours	$0.30	$0.25 to $5.00	$0.30 to $2.40
9 to 24 Hours	$0.15	$5.00 for each additional 24 hr. period of parking	$1.35 to $3.60
25 to 200 Hours	$0.10		$2.50 to $20.00
201+ Hours	$0.05		$10.05 and up

In the following table are the Crowne Plaza Hotel Parking Validations in 2009. Only about 6% of the total validations were for more than 25 hours of parking.

Crowne Plaza Hotel Parking Validation in 2009

Duration	Month													% of
of Stay	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Total
1 to 8	n/a	1,042	821	1,015	1,136	n/a	1,115	1,000	920	947	1,115	946	**10,057**	**40.3%**
9 to 25	n/a	1,236	1,048	1,301	1,430	n/a	1,424	1,342	1,450	1,447	1,536	1,197	**13,411**	**53.7%**
25 to 200	n/a	207	75	134	86	n/a	252	116	111	140	164	88	**1,373**	**5.5%**
201 or mor	n/a	13	7	6	7	n/a	7	4	4	1	6	6	**61**	**0.2%**

Off-Street Parking Access and Revenue Control System (PARCS) Equipment

Each of the four downtown parking garages has Federal APD parking access and revenue control equipment. The parking equipment package in each garage is generally comprised of barrier gates, card readers, vehicle detection devices, ticket dispensers, fee display units, and full signs.

The city's public parking lots are not access controlled (ungated). Contract parking permits are available for 30 of the 60 spaces at the 27th Avenue surface lots and two-hour single space electronic parking meters are used to collect the transient revenue at most of the spaces at the city's surface lots.

Contract parkers in the garages are issued proximity card readers to enter and exit. Daily or transient parkers must obtain a machine-issued time stamped ticket from an in-lane ticket dispenser to open the access gates and enter each of the garages. To exit the garage, daily and transient parkers give the same ticket to a parking attendant who determines the length of stay and calculates the fee to be collected from the parking patron.

The parking equipment hardware was last upgraded in Park 1, Park 2 and Park 3 in 2007 and Park 4 was upgraded in 2005. The parking access and revenue control equipment is supported by Scan Net, an integrated central management software program developed by Federal ADP. This central management

system has the capacity to monitor and generated historical and real-time information and data reports on all the system hardware devices relative to vehicle counts, access and revenue receipts. A fully configured and properly used central management system is the foundation of any effectively operated parking system.

The central management system in place at the Billings Parking Division is hampered by a number of significant problems which preclude it from being utilized to its full capacity. First, it seems that there is an overall lack of appreciation for why and how the central management system can be relied on to optimally manage, monitor, analyze and audit parking activity and revenue generation at each garage and across the system as a whole. Second, the system has never been fully configured to serve the facility management needs of the Parking Division and parking staff has not been effectively trained on how to use the system. Third, the firmware chips, which facilitates the central management systems retrieval, assemblage and reporting of garage data, have not been uniformly updated. It was reported that the firmware at Park 4, Park 1, Park 3 and Park 2 date back to 2003, 2004, 2006 and 2008, respectively.

The lane count system, designed to maintain annual and daily counts of vehicle entries and exits as well as real time tallies of vehicles presently inside a garage, at Park 2 and Park 3 was setup in the central management system even though all four garages are equipped with in-lane vehicle detection loops. While lane count systems are setup for Park 1 and Park 4, the output of the count program at both garages has been corrupted because the counters have not been reset since the equipment was installed. The combination of these problems currently makes it impossible for actual vehicle traffic volumes in and out of the garages to be correlated with access card usage and revenue transaction receipts – hence, there is no way to effectively audit the revenue generated by the garages. At present, there can be no certainty that all the revenue received by the parking garage attendants is being properly processed through the cash register at each garage.

In two of the garages, the attendants can manually open an exit gate without being recorded by the ScanNet software system. This loophole makes it possible for an attendant to collect payment from a customer, and allow the customer to exit the facility and withhold processing the cash transaction through the cash register. In such a case, the collected cash could kept by the attendant without detection because the funds in the fee computer register at shift end are never matched with the non-access card entry/exit counts that should be generated by the in-lane vehicle detection loops.

These and other problems with the parking access and revenue control system hardware and software need immediate attention, which we believe can best be addressed by having a Federal APD authorized and trained system specialist to conduct a full performance evaluation of the Parking Division system. Specifically, the following work tasks need to be undertaken:

- The latest versions firmware and software needs to be downloaded and uniformly programmed at each parking garage.

- The full and proper functionality of all the hardware components has to be verified. The cause any of malfunctions (i.e. power supply, wiring, connectivity, programming, mechanical damage/disrepair, etc.) will need to be specified and appropriate corrective measures will need to be identified.
- A PARCS plan needs to be specifically designed to serve the particular operating requirements of each garage and for the system as whole. Doing so will reduce, if not eliminate, the need to manually process and record critical data and facilitate essential and efficient auditing and real time monitoring capabilities.
- Provide comprehensive in-depth system training to the Parking Division manager, shift supervisors and in-house information technology specialist.

Parking Garage Summaries

In the table below is a summary of average daily activity for each garage from September 2009 to August 2010. The majority of parking in each garage is for permit holders. Hourly spaces range from a low of 37 spaces in Park 1 (8% of the total supply) to a high of 157 spaces in Park 2 (40% of the total supply). Permits in Park 2 and Park 3 are currently oversold at 8% and 22%, respectively. Permit sales have been declining in all of the garages except for in Park 3, where there is currently a waiting list for permit parking.

Average daily cash is highest and comparable in Park 2 and Park 3 at $154.51 and $135.44, respectively. Park 3 has the highest daily Park & Shop hours at 119 and is followed by Park 2 with 64 hours. There are 112 daily Crowne Plaza validations in Park 2. Average daily tickets, cash, and Park & Shop hours are very low in Park 1 and Park 4.

Parking Garage Summaries, September 2009 to August 2010

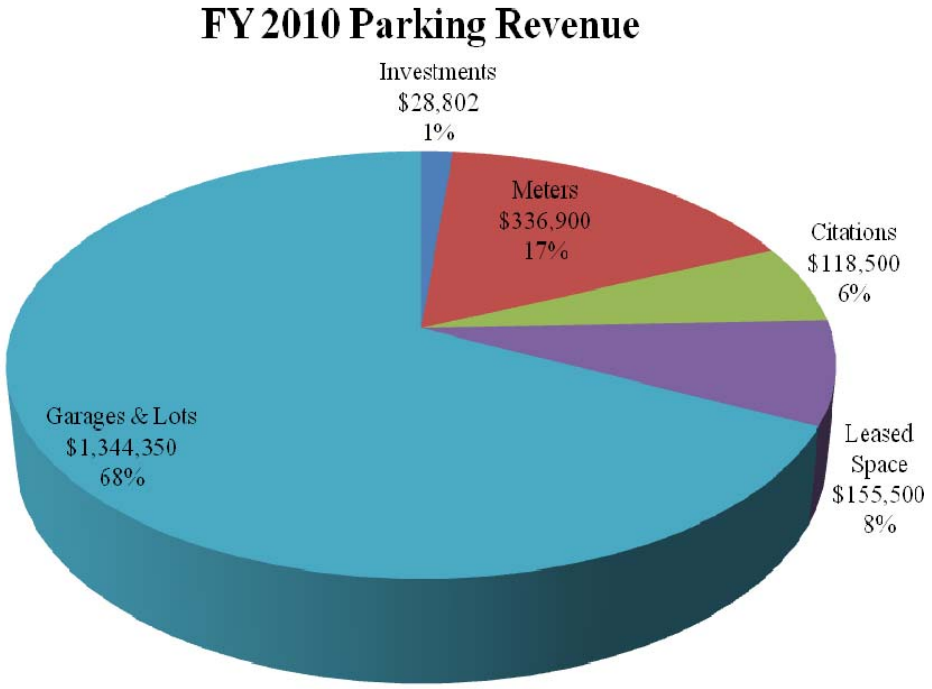
	Parking Spaces			Number of	Permit	Average Daily	Average Daily	Avrg. Daily Park & Shop	Avrg. Daily Adult Ed	Avrg. Daily Crowne Plaza
Garage	Hourly	Monthly	Total	Permits (1)	Oversell	Tickets (2)	Cash (2)	Hours (2)	Hours (2)	Validations (2)
Park 1	37	418	455	391	-6%	15	$48.87	19	n/a	n/a
Park 2	157	603	760	649	8%	96	$154.51	64	n/a	112
Park 3	108	165	273	201	22%	83	$135.44	119	n/a	n/a
Park 4	65	695	760	561	-19%	10	$29.24	10	14	n/a

(1) Permits in August 2010.
(2) Daily average from September 2009 to August 2010.
Source: City of Billings Parking Division

Parking Division Revenues and Expenses

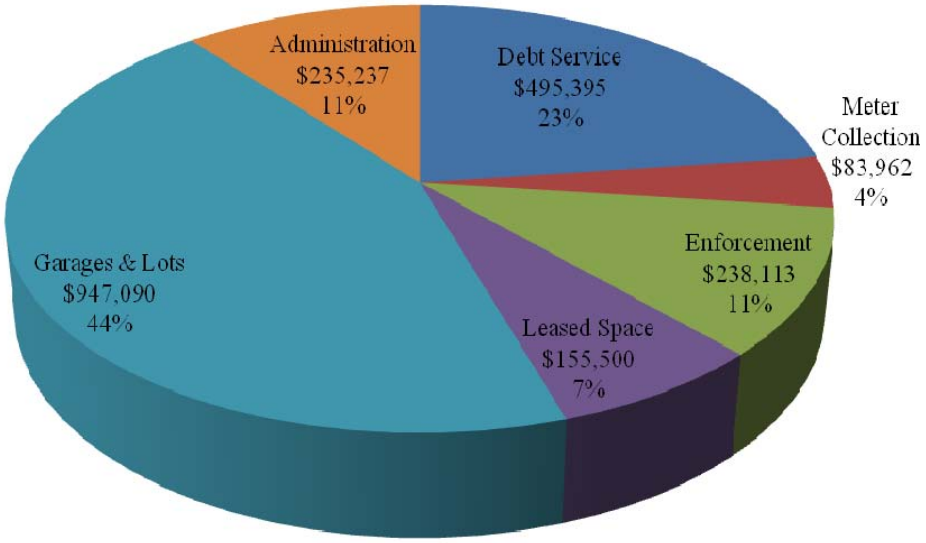
Indicated in the chart on the following page is FY 2010 Parking Division revenue. The garages and lots generate the most revenue by a large amount at $1,344,350, which represents 68% of the total revenue of $1,984,052. Meters are the next largest source of revenue at $336,900, which represents 17% of the total revenue. The meters generate approximately three times more revenue than citations at $118,500, which

represents 6% of the total revenue. The remaining 9% of the revenue is from commercial leased space in the garages and investments. Parking is operated as an enterprise fund and is self supporting. Surplus revenues are used to fund capital improvement projects.



FY 2010 expenses are indicated in the chart on the following page. The operating and maintenance expenses for the parking garages and the lots of $947,090 account for 47% of the total expenses of $2,024,435. Debt service is the next largest expense at $495,395, which represents 24% of the total expenses. Enforcement is the next largest expense at $238,113, which represents 12% of the total expenses. The cost of enforcement exceeds citation revenue by 101%. While meters generate almost three times the revenue as citations, the expense to collect and maintain the meters is about one-third the cost of enforcement at $83,962. Enforcement represents a net loss of -$119,613 and meters represent a net gain of $252,938.

FY 2010 Parking Expenses



STRENGTHS AND WEAKNESSES OF EXISTING OPERATIONS AND EQUIPMENT

On-Street Meters Hardware and Network

Strengths:

- Existing electronic meters are well understood and convenient for users (for those who have coins).
- Meters generate significant revenue.
- Meters encourage parking turnover.
- Meters make it easier to enforce parking regulations.
- Color coded meter housing effectively convey parking time limits.
- Meter service and repair program is effective with minimal unit down time.
- Meter revenue greatly exceeds collection and maintenance costs.
- Capable and hard working collections/maintenance personnel.

Weaknesses:

- Meters do not accept multiple payment options.
- Meter technology does not maximize revenues.
- Open collection system exposes the city to theft and lost revenues.
- Meters are not effectively audited.
- Meter system database and software program cannot be configured to effectively analyze system performance.
- The 2-hour meters west of 30th Street are significantly underutilized.
- Meters contribute to streetscape clutter.
- Meters may discourage downtown customers and visitors as well as businesses to locate downtown.

Parking Fines and Enforcement

Strengths:

- Tiered parking fine program penalizes repeat offenders.
- No charge for first offense is customer friendly.
- Capable and hard working enforcement personnel.

Weaknesses:

- No revenue generated from courtesy tickets.
- Courtesy tickets reward non-compliant behavior.
- Fines are relatively low overall.
- Fines do not escalate if unpaid.
- 180-day period with no violations is lenient.
- The cost of enforcement greatly exceeds citation revenue.
- Enforcement officer deployment is inconsistent as they serve as backup cashiers when the garages are not adequately staffed.
- No anti-shuffling ordinance.

- Existing enforcement system is not effective in detecting overtime parking and shuffling.
- Tire chalking is slow and often ineffective.
- Handhelds do not provide good quality photographs.
- Parking enforcement officers are not required to explain reasons for voided tickets.
- Insufficient coordination between meter repair personnel and enforcement staff related to meter malfunctions.

Parking Rates

Strengths:

- On-street short-term parking (2 hours or less) is more expensive than off-street parking.
- Higher green meter rates fund downtown projects.
- Meters accept tokens.

Weaknesses:

- Low 10-hour meter rates and on-street permit prices may discourage use of off-street parking facilities.
- On-street rates are relatively low overall and have not been increased since 2006.
- Downtown employees are allowed to use Park & Shop validations for daily parking.
- There is no duration of stay limit applied to the Park & Shop validations program.
- The tracking and accounting for Park & Shop validations is cumbersome.

Off-Street Parking Operations and Equipment

Strengths:

- Cashiers are customer friendly.
- Cashiers can manually operate equipment in case of a malfunction.

Weaknesses:

- Cashiers are expensive and may not be justified based on low traffic volumes, particularly in Park 1 and Park 4.
- Cash registers operate independent of the access gate controls and lane counters so actual garage entries/exits cannot be cross referenced with cash and non-cash transactions.
- Park & Shop validation program is not programmed into the cash registers.
- Use of tokens in garages requires manual accounting.
- Mismatched firmware at the four garages inhibits the full functionality of the central management system.
- PARCS reporting functionality has been crippled by the volume of historical transaction records dating back to the initial installation of the equipment, which needs to be archived.
- Parking Division staff has not been adequately trained on the Federal ADP central management system.
- No effective mechanism has been established to audit parking garage revenue.

- The PARCS at Park 2 and Park 3 have not been properly configured to produce the same Federal ADP Scan Net System reports as can be produced for Park 1 and Park 4.
- Revenue control system in garages does not accept credit cards.
- Loss of revenue after hours when garages are not staffed.
- Meters in lots do not accept multiple payment options.
- The present setup of the PARCS and garage attendant oversight does not adequately guard against revenue pilferage.

Parking Division Management

Strengths:

- The Parking Manager is a capable parking professional.
- The Parking Advisory Board provides citizen and business input on all aspects of parking.
- The Parking Advisory Board and Parking Manager are not satisfied with the status quo and want to improve the on- and off-street parking systems.

Weaknesses:

- Staff needs training on data retrieval and configuring and analyzing system management reports.
- Aspects of the daily, monthly and annual revenue reporting and tracking functions are dispersed among several members of the Parking Division rather than consolidated and assigned to a single in-house staff member with basic accounting skills.
- The parking equipment service and technical advisors to the Parking Division have been effectively challenged to adequately train Division personnel or to insure that the systems technology has been kept up to date.
- No effort has been made to establish a practice and process for auditing revenue generated by the parking system.

RECOMMENDATIONS IN 2010 DOWNTOWN BILLINGS PARKING PLAN

Following is a summary of the recommendations from the Rich Associates' 2010 Downtown Billings Parking Plan that are related to this study:

- Develop an anti-shuffling ordinance.
- Use the full capability of the handhelds to deter overtime parking and shuffling, which may require a software upgrade.
- Parking enforcement personnel should also be parking ambassadors and should not be routinely reassigned to other duties.
- Replace the meters on Montana Avenue, and consider multi-space meters instead of single-space meters.
- Change the color scheme (yellow) of the existing 10-hour meters to another color.
- Upgrade the parking control equipment in the garages and transition to an automated Pay-in-Lane system.
- Covert the 2-hour metered parking west of 30th Avenue to 10-hour metered parking.
- Convert Park 1 to permit parking only.
- Consider selling Park 4 to expedite the development of a new downtown parking structure.
- Increase on-street and off-street parking rates as follows:
    - Increase the 10-hour meter rate from $0.10 to $0.20.
    - Increase the 10-hour meter permit rate from $10 to $30 (it has since been increased to $15).
    - Increase the hourly rate in the garages from $0.25 to $0.35 for the first two hours.

ON-STREET PARKING TECHNOLOGY OPTIONS

There are four primary operating methods that should be considered for on-street parking including maintaining the current approach, removing the meters and increasing enforcement efforts and overtime parking fines, upgrading the single-space meters, and multi-space meters.

1. Maintain the Existing Single-Space Electronic Meter System

Although improved meter technology would likely increase parking revenues and provide a higher level of customer service due to multiple payment options, the existing meters function reasonably well, are easy to use and well understood by downtown patrons, and would be very expensive to replace. On the other hand, the meters are outdated, are breaking down more frequently, are labor intensive to enforce and collect, do not maximize revenues, and do not provide a high level of revenue control. More and more cities across the United States have installed or are considering installing high-tech meters as their aging meters need to be replaced and new technology is being introduced and refined.

Following are the general advantages of the existing parking meter system:

- Provide an accurate time check on parking and simplify the detection of overtime parking.
- Reduce the personnel required for parking enforcement.
- Discourage all-day parkers in short-term spaces.
- Increase turnover and make more parking available for the intended users.
- Produce revenue and aid in the financing of parking improvements.
- Meters visually delineate on-street spaces.

Following are the general disadvantages of the existing parking meter system:

- The meters only accept coins and tokens.
- Rate increases must be units based on coin nickel, dime and quarter coin values.
- Meters can arouse resentment if used where they are not warranted.
- If not properly enforced, users learn that they can park overtime (plug the meters) without receiving a parking citation.
- Once meters are installed there can be reluctance to remove them to aid traffic flow because of the production of revenue.
- If parking is prohibited during rush hour where meters are installed, the presence of the meters can confuse motorists and make enforcement more difficult.

2. Removal of all On-Street Parking Meters

While the existing parking meters generate a significant amount of revenue for the city each year, some believe the meters discourage shoppers and others from visiting downtown when they can park for free in the suburbs, and they also discourage businesses from locating downtown because

their customers and employees would be required to pay for parking. The question is: Will it be possible to maintain the current revenue stream without meters by eliminating staff and increasing enforcement and fines?

Following are the general advantages of removing the existing on-street parking meters:

- The cost associated with meter system supplies, maintenance, repair and collection is eliminated.
- The elimination of meter delineated spaces tends to result in increased curbside vehicle parking capacity.
- Banking fees and charges for meter revenue processing are eliminated.
- Users enjoy free parking as long as they comply with posted parking regulations.
- Token program for meter parking can be eliminated.

Following are the general disadvantages of removing the existing on-street parking meters:

- No more on-street meter revenue and revenue sharing with the DBA.
- The need for more posted signage to inform the public of the on-street parking zones.
- Greater burden on users to read and comply with posted signage.
- Enforcement effort to become more difficult, more time consuming, and more expensive.
- Enforcement will be viewed by public as being punitive.
- Citations disputes and appeals likely to increase.
- Enforcement personnel and public conflicts likely to increase without meter timing mechanisms.
- Potential future revenue growth from meter rate increases is lost.

3. Upgraded Single-Space Meters

The latest single-space meters are solar powered, have rechargeable battery packs, and are wirelessly networked to a remote web-based management system. The system allows remote diagnostics and configuration of the meters. They accept coins, tokens, credit cards, debit cards and smart cards. It is also possible to pay by cell phone. These meters can also come with a wireless sensor to reset the meters to “0” when a vehicle vacates a parking space.

Advantages of the upgraded single-space meters include:

- Multiple payment options including coins, credit cards and smart cards.
- Fundamental rules and usage habits of the existing meter system remain unchanged.
- More user-friendly and better understood by users than multi-space meters.
- More convenient to use than multi-space meters as they are located next to the parking space.
- No space numbering required.
- Meter placement delineates on-street parking spaces.

- No additional signage required advising users to pay at the parking station and either key in their parking space number or place a receipt on their dashboard.
- Existing meter poles and base of meter housings are retained.
- Meter malfunctions are wirelessly communicated to the maintenance shop so repair efforts can be handled as needed rather than on a routine basis.
- If a meter fails, only a single space is affected.
- No paper jams or increased costs for consumables.
- Parking enforcement can be done in a vehicle and it is also made easier with more highly visible expiration indicators.
- Audit control and real-time reporting and alarming.
- Credit card usage will reduce meter revenue collection efforts and coin deposits.
- Represents a lower cost per space on blocks with fewer parking spaces than multi-space meters.

Disadvantages of the upgraded single-space meters include:

- More maintenance and collection costs compared to multi-space meters.
- More streetscape clutter than with multi-space meters.
- There is currently a single supplier of these meters.
- Credit card user will not be provided with a receipt.
- Wireless communication and credit card processing fees to be incurred.
- Wireless communication service interruptions could delay credit card processing.

4. Multi-Space Meters

Multi-space meters are similar to standard parking meters but provide single-point control for a larger number of spaces. They can be configured to be either Pay-by-Space or Pay-and-Display. With pay-by-space, patrons note the parking space number, proceed to the multi-space meter, insert the appropriate fee and key the parking space number into the machine. With pay-and-display, patrons proceed to the meter, insert the appropriate fee and are issued a parking ticket to display on their dashboard. Although pay-by-space requires numbering the spaces, it is more convenient for users and easier to enforce. One or two meters are required for each block face where metered parking is provided, depending upon the length of the block.

The advantages of multi-space meters include:

- Multiple payment options including coins, bills, smartcards and credit cards.
- A high level of security for owners/operators.
- Reduced maintenance and collection costs compared to conventional parking meters.
- Audit control and real-time reporting and alarming.
- Less streetscape clutter than with single-space meters.

The principal disadvantages of multiple-space meters include:

- Confusion among users who are unfamiliar with this form of revenue control.
- Signage is required to provide patrons with the information needed to locate and use multi-space meters.
- All of the parking spaces must be numbered with pay-by-space, which can be problematic in colder climates with snow.
- Increased walking distance between parking spaces and meter.
- Pay-and display requires users to walk from the meter back to their vehicles to display a receipt.
- High cost per space on blocks with fewer parking spaces.
- Two meters required on longer blocks, increasing the cost per space.
- Wireless communication and credit card processing fees to be incurred.
- Wireless communication service interruptions could delay credit card processing.

OFF-STREET PARKING TECHNOLOGY OPTIONS

The selection of the appropriate parking access and revenue control systems is essential to ensure efficient operations and maximize the collection of parking revenues. The revenue control system selected for a parking facility should be related to its size, location, user groups served, and revenue generated. Following are four primary options for consideration for the parking garages.

1. Exit Cashiering

Exit cashiering represents the existing method of operation. Exit cashiering has an average service rate of 135 vehicles per hour (vph). Exit cashiering should not be entirely overlooked as it has several advantages, including:

- Maximizes revenues as transients pay a variable rate based on the length of stay.
- Is well understood by patrons, is generally convenient, and provides a high level of customer service.
- Requires no enforcement.
- Guarantees the presence of people to manually operate equipment in the event of a malfunction.
- Gated facilities generally produce more revenue than non-gated facilities.

The primary disadvantages of exit cashiering include:

- A relatively low service rate and possible delays when exiting.
- It can be far more labor intensive to operate than automated systems.
- Virtually no revenue control if the system is manually operated.
- It is labor intensive to monitor (audit) the system if it is manually operated.

If exit cashiering is continued at any of the garages, the system should be upgraded (computerized) and be capable of accepting credit cards.

2. Pay-on-Foot (POF)

With this system a patron would insert their parking ticket into a centrally located cashiering station that calculates the parking fee. These systems typically accept cash, credit cards, debit cards, and validations, and can return change when appropriate. The patron would then pay the parking fee and the machine issues a ticket to exit the garage (a manned central cashier station can replace the cashier machine). The patron inserts the issued ticket into a lag-time exit verifier and the barrier gate opens if the fee has been paid. This method of operation has a service rate of approximately 360 vph at the vehicle exit. These systems are generally recommended for parking facilities with very high levels of activity and significant revenue production because the equipment is very expensive.

The primary advantages to this system include:

- A high service rate compared to exit cashiering and pay-in-lane machines.
- Less labor intensive than exit cashiering.
- No enforcement requirements.
- Transients pay a variable rate based on the length of stay.
- Gated facilities generally produce more revenue than non-gated facilities.
- High level of revenue control and efficient auditing system.

Disadvantages of this system include:

- The purchase of very expensive cashiering machines and other equipment.
- Relatively new technology that is not well understood by many patrons.
- Not as customer-friendly as exit cashiering.
- Does not guarantee the presence of people to manually operate equipment in the event of a malfunction.
- Extensive signage is required informing patrons to take their parking tickets with them and to pay for parking in advance of vehicle retrieval.
- Without a pay-in-lane option at the exit, escape lanes are required for those who do not pay in advance of vehicle retrieval.
- Pay-in-lane has a very slow service rate (approximately 80 vph on average), which can cause traffic backups.

It is also not uncommon to combine POF (either automated, manned or both) with exit cashiering. Repeat users of the facility would likely utilize central cashiering and take advantage of shorter lines in the lanes with exit verifiers. Those unfamiliar with the parking facility and POF could pay a cashier upon exiting. Effective signage would be required to direct patrons to the appropriate exit lane. It is also difficult to predict in advance the use of the machines with a hybrid system, although at least a 50% reduction in cashiering would eventually be expected.

It should be noted that there are currently no acceptable locations for POF machines in three of the four garages in downtown Billings.

3. Pay-in-Lane (PIL)

With a Pay-in-Lane (PIL) system, a patron is issued a ticket from a ticket dispenser upon entry. When exiting, the ticket is fed by the patron into a machine at the exit lane that calculates the amount owed. The customer then pays with cash, credit card, smartcard or validation. Once payment is received the exit gate opens and the patron is allowed to exit.

Advantages of this system include:

- Less labor intensive than exit cashiering.
- No enforcement requirements.
- Transients pay a variable rate based on the length of stay.

- Gated facilities generally produce more revenue than non-gated facilities.
- High level of revenue control and efficient auditing system.

Disadvantages of this system include:

- A very slow service rate (approximately 80 vph on average), which can cause traffic backups.
- Relatively new technology that is not well understood by many patrons.
- Not as customer-friendly as exit cashiering.
- Does not guarantee the presence of people to manually operate equipment in the event of a malfunction.

It is generally recommended to use PIL when it is combined with either exit cashiering or POF. It does not usually represent a viable stand alone method of revenue control due to its very slow service rate. PIL is most often used with exit cashiering after hours when there are lower traffic volumes or, as previously mentioned, in combination with POF for those that do not pay in advance of vehicle retrieval. A telephone or intercom system should be included with PIL if personnel are not present to deal with problems and manually operate the gates.

It should be noted that a new PIL system would require that the ticket dispensers in all of the garages be upgraded.

4. Multi-Space Meters

As previously mentioned, multi-space meters are similar to standard parking meters but provide single-point control for a larger number of spaces. They can be configured to be either Pay-by-Space or Pay-and-Display. The parking garages would not have barrier gates at the entry and exit lanes with this operating system. Multi-space meters would be used to collect revenues from transient patrons and contract parkers could display hangtags or have a separate “nested” area within the garage that is access controlled. The primary advantages of multi-space meters are multiple payment options and free flow service rates upon entering and exiting the parking facility (approximately 600 to 800 vehicles per hour). The principal advantages and disadvantages of multiple-space meters are listed in the on-street section of the report (page 31). Multi-space meters are more commonly placed in parking lots and used for on-street parking.

CASE STUDIES

Following are eight case studies outlining different technologies and operating methodologies used by other cities that are being considered in Billings, including removing meters and enhancing enforcement, increasing parking fines, multi-space meters, "smart" single space meters, and pay-in-lane in the garages.

City of Fort Collins, CO

The City of Fort Collins, CO removed parking meters from downtown in the late 1980's. Several years after the removal of the meters and due to the rampant use of short-term parking by long-term users and the underutilization of downtown parking structures, a comprehensive parking management plan was developed as part of a Downtown Strategic Plan in 2004. Short-term strategies recommended to improve the parking situation included the following:

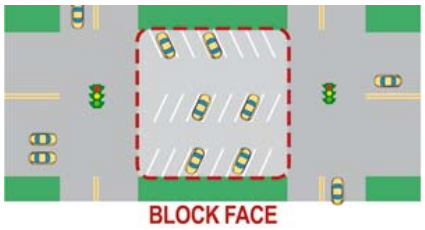
- An enhanced enforcement program with upgraded handheld citation devices and a license plate recognition system.
- Increased enforcement hours and personnel.
- Strengthen parking regulations to support enforcement efforts.
- Escalate the on-street parking fine structure.
- Develop affordable off-street parking alternatives for downtown employees.
- Correct the current "upside down" parking pricing policy (on-street parking was less expensive than off-street parking).

Although on-street pay parking was not a short-term recommendation in the plan, it was recommended to consider utilizing single space electronic parking meters in the future to further address downtown parking problems.

Fort Collins Parking Services now has one specialized vehicle (a small pick-up truck) that utilizes License Plate Recognition (LPR) technology to more quickly identify parking violators. The LPR system used is AutoVu LPR by Genetec. The initial investment in the truck and LPR system was $80,000 in 2005. The city has since upgraded to the latest version of the LPR system for $50,000. AutoVu was the only vendor offering mobile LPR when the city purchased their first system, and they decided to stay with the existing vendor for the upgrade. The system has a read-rate of about 95%. Occasionally a plate cannot be read because of an acute angle or the plate is too dirty. The specialized vehicle with LPR is now primarily used to patrol the periphery of the downtown area because of its slow speed and disruption of traffic in the core area. Enforcement officers patrol the core area by foot. They would like to purchase one additional enforcement vehicle with LPR.

Parking enforcement officers use handheld computers to write citations when violations are observed. Parking is now enforced Monday through Saturday from 8:00 AM to 6:00 PM. Most of the parking in the downtown core is two-hour timed parking and parkers are allowed to move to another block face before time has expired. Parkers are not allowed to return to the same block face (the on-street parking in the

center and on both sides of the street between two intersections) for a minimum of four hours, or they risk receiving a citation for overtime parking. The city currently employs six full-time enforcement officers and one full-time supervisor. There are 3,149 on-street parking spaces in downtown Fort Collins, but not all of the spaces are in the parking enforcement area.



The amount of the fine for overtime violations is determined by the number of citations received over a 180-day period. The fine schedule for overtime parking violations follow:

First = Warning or Free
Second = $10 fine
Third = $25 fine
Forth or more = $50 fine

If a fine is not paid within eight days, fines increase as follows:

$10 fine increases to $20
$25 fine increases to $50
$50 fine increases to $75

Those who owe $75 or more or have four or more outstanding overdue unpaid citations are subject to being booted if the citations remain unpaid 20 days after receiving a notice from the city by mail. The boot remains on a vehicle until the amount owed is paid in full in addition to a $50 boot fee. Despite enhanced enforcement and increased fines, employees are still parking in short-term spaces and turnover has not improved as much as hoped.

The city has 1,697 off-street parking spaces in five surface lots and two parking garages. Parking permits in the parking garages cost $44 per month for covered parking and $24 per month for rooftop parking. If payment is received in advance (before the first day of the month) covered parking is $36 and rooftop parking is $18. Hourly parking is provided in the parking structures for free the first hour and then for $1 an hour for each additional hour. Parking is free on Sundays and on city holidays. Permit parking in five surface lots ranges from $18 per month to $38 per month. If paid in advance permits range from $12 to $30.

Although parking attendants (cashiers) are on duty in the parking structures during “rush” hours to speed operations and to provide customer-friendly service, payment can be made 24/7 using pay-in-lane machines. All of the pay-in-lane machines have a telephone system that is manned 24/7 to attend to any problems when personnel are not present on site, and the gates can be opened remotely when necessary. Due to the low service rate of the pay-in-lane units, traffic backs up in the garages during busy periods. When there are special events that attract a large number of people, the garages are staffed and payment is

made upon entry and exiting traffic is unrestricted. In the one parking lot that offers hourly parking, payment is made to a pay-by-space machine that accepts currency (coins and bills) and credit cards.

The parking system grosses approximately $1.8 million annually in revenue. Approximately 40% of the revenue is from parking fines (approximately $720,000). The remaining revenue is generated by the sale of parking permits and hourly fees in the off-street facilities. The Parking Services Manager strongly supports putting meters back in downtown Fort Collins, but he does not believe that the downtown businesses community would support parking meters at this time. Parking meters, in his opinion, would generate far more revenue than fines are currently producing and would improve turnover. Parking meters, in his opinion, are only a problem if the price is too high and should be considered for removal only if the downtown area has a high vacancy rate and low patronage.

Contact: Randy Hensley, Parking Services Manager
City of Fort Collins
(970) 416-2058

City of Bozeman, MT

Parking meters were removed from the downtown streets in the 1970's when a suburban mall was built. There are presently approximately 765 two-hour timed spaces in downtown Bozeman that are enforced. The city has one enforcement vehicle with License Plate Recognition, but it is not being used much because it is having difficulty reading the new blue Montana license plates. They use an older version of AutoVu LPR by Genetec. The majority of enforcement is done by foot. The fine for overtime parking is $20. Those that have received six citations are subject to being booted. The city has a "rolling rule" that requires vehicles to leave a block face every two hours.

The city has four public parking lots and one garage and monthly permits are $35 to $45. A 10% discount is offered for annual permits. The first 30 minutes of parking in the lots and garage is free. It costs $0.25 per half hour for off-street parking after the first half hour. The parking system is self sufficient even without meters. The city's parking manager would like to have meters downtown to increase turnover, make it easier to enforce parking violations, and to provide added revenue for downtown beautification projects. He believes that downtown patrons would rather pay $0.50 an hour for convenient on-street parking rather than receive a $20 parking ticket for overtime parking. However, he does not believe that the downtown businesses community would support parking meters anytime in the foreseeable future. Some in the downtown community do not even support the enforcement of the two-hour spaces.

Contact: Paul Burns, Parking Manager
City of Bozeman
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City of Boulder, CO

The City of Boulder replaced 1,270 single-space meters with 140 solar-powered Cale MP 104 compact pay-and-display units in 2007. The new meters accept coins, credit cards, pre-paid cards and tokens. The city also increased on-street parking rates from $1.00 an hour to $1.25 and increased enforcement hours from 9:00 AM to 7:00 PM Monday-Friday when the new meters were installed. There were several reasons why the city replaced the old electronic meters with the new multi-space meters. The old meters were aging and breaking down more frequently. The new pay stations are more reliable, provide the city with immediate on-line information and better revenue controls, free up space on the sidewalks (some of the old meter posts were converted to bike racks), and provide customers with benefits including multiple payment options, a five-minute grace period, and the ability to use remaining time on a previously purchased ticket at another on-street location for no additional charge. Credit cards account for more than half of the transactions at the new meters.

The city placed one or two pay stations on each block face depending upon the length of the block. For convenience, the old meters remained at accessible spaces. Time limits at the pay stations range from two to four hours, with most having three hour limits. The city stationed parking ambassadors throughout the downtown area to help new users operate the pay-and-display stations. While meter revenues are up, the number of tickets written has declined since the meters were installed, which was expected. The primary reason they installed the new meters was to improve customer service. The City of Boulder has had parking meters downtown since 1949.

Contact: Molly Winter, Director
The Downtown & University Hill Management Division & Parking Services
City of Boulder
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City of Denver, Colorado

Approximately 4,500 “smart” single-space meters manufactured by IPS Group were installed in downtown Denver in May 2010. The 4,500 solar-powered meters were installed after the successful completion of a pilot program where 126 meters were installed on ten blocks. Approximately 15% of the old electronic meters, which accept pre-paid cash keys, have remained in areas where metered parking is being re-evaluated. A pilot program was also recently completed in the Cherry Creek North (CCN) neighborhood, an upscale shopping district near downtown, where 12 smart meters were

installed. The new meters will also be installed in CCN in the near future, and will replace 77 Parkeon Stelio pay-and-display units. The shopping area did not have paid parking prior to the installation of the multi-space meters in 2004. The cost of on-street parking in the city of Denver is $1.00 an hour.

The new meters have two hour limits and payment options include credit cards, smart cards (preloaded debit cards that can be purchased from the city), and coins. The IPS single-space meters fit into existing poles and housings and can be replaced in seconds. It is simply a matter of removing the original top and mechanism and replacing it with the new one.

Visitors to downtown Denver are welcoming the new more user-friendly meters and meter revenues have increased as more people are paying for curb parking with the credit card option. IPS reports 20% to 30% increases in revenues with the new meters. Although meter revenues are up in Denver because more people are paying for parking, fines for overtime parking are down. In April 2010 parking enforcement officers issued 16,000 citations. This is down from 20,000 citations in April 2009, which represents a 20% reduction. Although Denver officials expected the decline in fine revenue, they wanted to promote customer service and ease of use instead of writing more tickets. Other cities around the county, including Boulder, CO and Missoula, MT are concentrating on pleasing rather than penalizing people who park downtown, which represents a growing trend in downtown parking over the past several years.

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City and County of Denver
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City of Los Angeles, CA

The City of Los Angeles recently completed the installation of 10,000 IPS smart meters after a pilot program where 500 meters were installed. Revenues increased by nearly 40% where the meters were installed during the pilot project, and the city estimates that the new meters will generate an additional $1.0 to 1.5 million in net revenue annually. The city expects the new meters to provide more convenient and reliable service to the Los Angeles residents and visitors parking on city streets. The City of Los Angeles now has the most solar powered individual space parking meters in the country. Parking meter rates in the city range between $1.00 and $4.00 per hour, depending upon location and parking demand.

Contact: Daniel Mitchell
City of Los Angeles
(213) 216-6266

City of Missoula, MT

The City of Missoula recently installed 36 IPS smart meters as part of a three-month pilot program to replace decades-old meters for which parts are no longer available. The new technology is on trial until

the end of the year. To gauge how well people like the meters, parking officers are periodically stopping downtown parkers and asking them to take a five-question survey. So far the meters have gotten mixed reviews. The new meters are getting high marks for the flexibility to use credit cards and for solar power. They are getting lower marks for occasional coin jams and credit card transaction fees.

Contact: Anne Guest, Director
Missoula Parking Commission
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City of Austin, TX

The City of Austin, TX recently replaced 3,800 aging single-space meters with 750 solar-powered Parkeon Strada multi-space meters. The old meters had been in service for over thirteen years and more than 18,000 meter failures were predicted for the year prior to the installation of the new meters, which was increasing city labor costs, forfeiting significant dollars in revenue to the city, and inconveniencing motorists. The pay-and-display units, which are manufactured in the United States, accept credit cards, debit cards and coins. The primary customer benefits of the new meters are payment flexibility, the use of remaining time at another location, and increased parking time from two hours to three hours at most locations. City benefits include solar powered units with batteries lasting three years, more efficient maintenance and collections, fewer broken meters, and increased parking revenue. The city completed the bulk of the meter replacement in August 2009.

In August 2010 the city completed the installation of 500 solar powered IPS single space meters as the final step in the technology upgrade. The city installed the more cost-effective single space meters where there were only a few metered spaces on a block face.

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Austin Transportation Department
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Town of Vail, CO

The Town of Vail has approximately 230 short-term shopper parking spaces in two parking structures that were previously not gated and controlled with pay-by-space units. The town recently installed parking barrier gates and pay-in-lane machines in these short-term parking areas. The pay-in-lane machine selected by the town is Model 9000C Pay-In-Lane Device from Federal APD, shown on the right. Payment options

include paper currency, coins, vouchers, merchant validations, debit cards, and credit cards. The new technology is expected to increase parking revenues and will eliminate the need for enforcement in the shopper parking areas.

Contact: Mike Rose, Manager of Transportation & Parking
Town of Vail
(970) 479-2178

PREFERRED OPTIONS

After reviewing and discussing the "Draft" Parking Technology Audit issued on November 24, 2010, the City of Billings Parking Division and Parking Advisory Board have decided to further evaluate the merits and challenges of pursuing the following on-street and off-street parking system technology options:

On-Street

1. Assess the probable impact of reducing the on-street parking meters by eliminating underutilized parking meters on the periphery of downtown.

2. Further explore the practicality of transitioning from single space electronic meters to single space smart meters that accept credit cards.

3. Research the viability of enacting an anti-shuffling ordinance and further explore the technology required to enforce the ordinance. Specifically, the Parking Advisory Board wants to know if the existing handheld enforcement devices and software can be upgraded and used to better detect shuffling activity.

Off-Street

1. Further explore Pay-in-Lane revenue collection technology at each of the city's garages.

2. Define the technology enhancements required to better control the cashiering system in the garages, provide revenue and transaction reporting, and ways to effectively reconcile and audit.

3. Define the technologies, support services and the probable cost associated with the acceptance of credit cards as a form of payment in the parking garages.

Eliminating Underutilized Parking Meters

Based on the review of the *City of Billings Downtown Parking Plan* by Rich and Associates, there are 198 two-hour metered spaces west of 30th Street between 6th Avenue and Montana Avenue, as indicated below by street:

31st Street:	80
32nd Street:	49
1st Avenue:	26
2nd Avenue:	9
3rd Avenue:	18
4th Avenue:	17
Total:	199 spaces

Although parking occupancy data presented in the study is not presented consistently and there are gaps in the data, the 2-hour spaces west of 30th Street were not well utilized on October 1, 2009. As indicated in the table below, of 167 spaces included in the survey, only 31% were occupied at 11:00 AM and 34% were occupied at 1:00 PM. The same analysis of fewer 2-hour meters on the other survey day (December 18, 2008) indicates similar results.

2-Hour On-Street Parking Occupancy (Thursday, October 1, 2009)

Block Face	Parking Spaces	Occupied Spaces (11:00 AM)	Occupied Spaces (1:00 PM)	Percent Occupied (11:00 AM)	Percent Occupied (1:00 PM)
56D	23	4	3	17%	13%
59B	14	5	8	36%	57%
59D	7	1	6	14%	86%
60D	8	3	5	38%	63%
61B	6	2	3	33%	50%
62B	15	4	7	27%	47%
64D	4	4	0	100%	0%
65B	26	14	10	54%	38%
65D	19	5	6	26%	32%
66B	19	5	4	26%	21%
66C	11	0	0	0%	0%
67B	7	0	0	0%	0%
70A	8	5	5	63%	63%
Total:	167	52	57	31%	34%

On the other hand, the long-term on-street spaces (unrestricted and 10-hour meters) west of 30th Street were 57% occupied at 11:00 AM and 58% occupied at 1:00 PM on October 1, 2009. On the block faces where the spaces were 85% to 100% occupied, 77 of the 81 spaces were unrestricted or 10-hour metered spaces, and all of the 70 well utilized spaces (85% to 100% occupied) on the other survey day were unrestricted and 10-hour metered spaces. There are 12 two-hour unmetered spaces on Block Face 68B that were unoccupied all day except for one parked vehicle at 11:00 AM. There are also 15 two-hour unmetered spaces on Montana Avenue that were not well utilized, although the occupancy data in the study for this area is incomplete.

This analysis indicates that eliminating the 2-hour meters west of 30th Street could be justified and it would not be recommended to convert them to 2-hour unmetered spaces. As such, they would not likely be well utilized and would be difficult to enforce. While removing the meters will reduce meter collection and repair efforts and cost, we believe these savings will be fairly insignificant. DESMAN does not believe that removing the meters will necessarily reduce the downtown enforcement effort and cost. If the meters are replaced with 2-hour unmetered parking, it will take enforcement officers more time to enforce these spaces than it presently takes because the meters make it easier and faster to enforce parking violations. If the 2-hour meters are replaced with unrestricted parking, use of the spaces will likely increase and enforcement officers will still have to enforce other infractions such as yellow zones,

blocking driveways, parking against traffic, fire hydrants, no parking zones, 18"+ from the curb, posted signs, etc. Even if the enforcement personnel do spend less time in these underutilized parking areas, this would allow them to spend more time in areas closer to the core of downtown where there is more demand for parking and more parking violations. If there is a strong desire to eliminate the 2-hour meters west of 30th Street, these spaces should be converted to long-term metered spaces, unrestricted spaces or a combination of the two. DESMAN's preference would be to convert them to long-term metered spaces to raise additional revenue.

Single Space Smart Meters

As previously mentioned, the latest single-space meters are solar powered, have rechargeable battery packs, and are wirelessly networked to a remote web-based management system. The system allows remote diagnostics and configuration of the meters. The meters accept coins, tokens, credit cards, debit cards and smart cards. It is also possible to pay by cell phone. The meters can also come with a wireless sensor to reset the meters to "0" when a vehicle vacates a parking space. The IPS Group, Inc. and Duncan Solutions (the city's current meter supplier) are the two manufacturers of the new smart meters that the city should consider. Because existing meter housings and poles can be reused with both manufacturers, the IPS and Duncan meters are the most economical for the city to purchase.

IPS Group, Inc.

The single space smart meters by IPS Group Inc. are presently very popular and have recently diminished the sales of multi-space meters. DESMAN believes that these meters would be better accepted by parking patrons in downtown Billings than would multi-space meters. The meters are easy to use and provide the traditional benefits of single space metering. The new meter mechanism with credit card capability would be placed into existing meter housings and poles. The base cost per meter is $495.00 (includes a 12 month warranty). The meters can be purchased with an optional vehicle detection sensor for an additional $150 per meter and a RFID tag system for an additional $15 per meter. A 5% discount is offered with the following payment terms: 40% with order, 40% on delivery, and 20% on installation. There are also lease-to-own options of $12/month per meter for a five-year term ($720 per meter) or $15/month per meter for a three-year term ($540 per meter). The lease rates do not include the vehicle detection sensor and RFID tag system options. The minimum setup and installation cost is $2,125 plus reimbursement for travel expenses. Training costs are covered as part of the installation and commissioning fee above. There are on-going monthly expenses associated with the meters, including secure wireless, management system license, and credit card transaction fees. The cost per meter for secure wireless is $3.75 per month and the cost per meter for the management system license is $2.00 per month. The credit card fee is $0.13 per transaction. In addition, the credit card fee does not include any additional bank fees and the ongoing fees are subject to annual adjustment due to inflation, which is based on the Consumer Price

Index. The fees are significant when compared to the current meter rates in downtown Billings. Other towns and cities with lower meter rates have installed the meters with the main purpose of providing better customer service and convenience. According to an official with IPS, the lowest hourly rate where the meters have been installed is $0.50/hour.

City of Missoula Update

The City of Missoula recently completed a pilot program with 40 IPS meters and provided DESMAN with an analysis of their three-month trial. Coin transactions and revenue greatly exceeded credit card transactions and revenue by approximately 94% to 6%. The average coin transaction was $0.36 and the average credit card transaction was $0.34. The monthly meter fees, including an additional bank fee of $0.06 per credit card transaction, averaged $269.22, which represents an average monthly fee of $6.73 per meter for 40 meters. The average fee per meter transaction was under $0.07, which is a very low figure because of the large number of coin transactions compared to credit card transactions. The average fee per credit card transaction was $0.25. Total meter fees were 3.3 times more than credit card revenue over the three-month period.

City of Los Angeles Update

According to report presented to the LA City Council, the city's new 10,000 IPS smart meters have resulted in the following:

- A 50% increase in revenue.
- A 75% reduction in contested meter citations.
- A 55% reduction in complaints to the city's "Meter Hotline."
- 99% up-time and operating rate.

The city is crediting much of the increase in revenue to the 99% up-time rate and the rule that if the meters are not accepting coins, then a credit card must be used or the motorist must move to a different space.

IPS is offering to supply and install 30 of these meters in downtown Billings for a 90-day trial period free of charge. The city has little to lose by accepting the free trial and testing the meters. If the meters are temporarily installed it will be important to communicate that the city is testing the meters and to survey users of the meters. If the meters are well accepted, installing them on a permanent basis could justify raising meter rates to $0.50 or $0.60 per hour.

Contact: Lauri Keller
Director of Sales, Western Region
IPS Group, Inc.
(858) 404-0607
Lauri.keller@ipsgroupinc.com

Duncan Solutions

Duncan recently introduced the "Liberty" single-space meter mechanism that accepts credit cards. Like the IPS meters, Liberty is solar powered and are wirelessly networked to a remote web-based management system. Liberty fits within the dome of existing Duncan single-space housings for a fast and easy upgrade. Payment options include coins, tokens, credit cards, debit cards, smart cards and pay-by-cell phone. The base cost per meter is $475.00 and the meters can be purchased with an optional vehicle detection sensor for an additional $150 per meter. Duncan does not provide a lease-to-own option. There are on-going monthly expenses associated with the meters, including secure wireless and credit card transaction fees. The secure wireless fee is $7.50 per month per meter and credit card transactions are through PayPal. There are no setup charges or monthly fees with PayPal, but there are transaction fees of approximately 2% to 3% of the charge, depending upon monthly sales volume, plus $0.30 per transaction.

Although they have a few cities that have ordered the meters, the meters are so new that they have no current installations. Duncan is also offering to supply and install the meters in downtown Billings for a trial period free of charge. Duncan is offering a risk free purchase of the meters. The city would be invoiced for the meters upon delivery, but would have up to 90 days to pay the invoice. The meters can be returned to Duncan at any stage within the 90 day risk free period at no cost to the city. Duncan will also pay the credit card fee during the free trial period and the city would only be responsible for standard merchant processing (bank) fees. The city should also consider testing the meters, although the monthly secure wireless fee and very high credit card transaction fees would ultimately not be supported by current meter rates.

Contact: Paul J. Descombes, Vice President
Domestic & International Sales
Duncan Solutions, Inc.
(870) 446-2375
pdescombes@duncansolutions.com

Anti-Shuffling Ordinance and Enforcement

The City of Fort Collins and the City of Bozeman anti-shuffling ordinances are located in the Appendix. In the City of Fort Collins, parkers are not allowed to return to the same block face (the on-street parking in the center and on both sides of the street between two intersections) for a minimum of four hours, or they risk receiving a citation for overtime parking. The City of Bozeman has a "rolling rule" that requires vehicles to leave a block face every two hours. An anti-shuffling ordinance should be considered in downtown Billings if it can be effectively enforced.

The Casio IT 3000 digital handheld enforcement devices and TicketTrak software do not represent an effective and efficient method of tracking the movement of vehicles and enforcing an anti-shuffling ordinance. With these devices the information required to track the movement of vehicles must be input manually by the enforcement officers (license plate number and parking location), which is very time consuming and does not represent a good use of their time. According to Cardinal Tracking, Inc., the City of Billings has the latest version of the tracking software and there are no upgrades available to effectively detect shuffling. A more effective way to enforce an anti-shuffling ordinance would be with a License Plate Recognition (LPR) system.

AutoVu by Genetec

The best known and widely used system is AutoVu by Genetec. The system is equipped with dual infrared cameras mounted to a vehicle that automatically reads license plates as the vehicle travels around at approximately 15 mph. The license plate is then compared to an onboard database of license plates to determine if it is in violation. The system is particularly effective in detecting overtime parking (meter plugging) and shuffling. With this type of system, it would no longer be necessary for enforcement officers to manually chalk tires, and the system is over three times faster than chalking tires. With no chalking, downtown parkers will not know whether parking enforcement has marked their vehicle or not. The cost of the mobile system (hardware and software) with one camera is in the range of $35,000 to $40,000, exclusive of the enforcement vehicle. The return on investment with this type of system, because of its efficiency and ability to detect overtime parking violations, is fairly rapid. Genetec is interested in demonstrating the system to the city.

Contact: Gary J. Shull
AutoVu Regional Sales Manager - Northwest
Genetec
(513) 444-4900
gshull@genetec.com

autoChalk Mobile by Tannery Creek Systems

Another system that the city should seriously consider is autoChalk Mobile by Tannery Creek Systems. Their system uses high-tech digital imaging to detect parking time violations while scanning at normal traffic speed (30 mph). Instead of only reading vehicle license plate numbers, autoChalk uses a very accurate GPS system and lazars for color images showing not just the license plate and wheel but the whole vehicle profile and significant background content (e.g. building front), which provides situational evidence for the enforcement officers. As the parking enforcement officer drives by a violating vehicle,

autoChalk sounds an alarm. Before and after images are recorded of the vehicles profile and, if visible, the license plate number and the enforcement officer makes the decision to ticket or not based on the photographic evidence. The system has the ability to automatically adjust to different parking time zone durations.

The autoChalk system utilizes four cameras (two on the front of the vehicle and two on the rear of the vehicle) and the cameras work best if mounted to a standard sized vehicle. They also recommend reading only one side of the street at a time. Although they have been in existence only since 2007, they have an impressive list of clients and references, including the cities of Calgary, Madison, WI; Fredericksburg, VA; and Santa Barbara, CA. The cost of the complete system is $50,000 to $65,000, exclusive of the enforcement vehicle. The system comes with a one year warranty and hardware and software upgrades. There is an optional full maintenance plan in the second and subsequent years, which is 20% of the purchase price. They also offer remote diagnostics on equipment, which generally reduces system downtime. autoChalk typically has a return on investment of less than a year. They are willing to demonstrate the equipment to the city and/or do a free (except expenses) pilot program.

Contact: Bill Franklin
Enforcement System Automation
Tannery Creek Systems, Inc.
(905) 738-1406
bfranklin@tannerycreeksystems.com

LPR Read Rates

At 15 mph a LPR system has the theoretical ability to read up to 1,800 license plates an hour. At 30 mph a LPR system has the theoretical ability to read up to 3,600 license plates an hour. However, actual read rates per hour will be much less than the reported read rates and will vary depending upon the route traveled, the number of stop signs and traffic lights, the time of day and pedestrian/vehicle traffic volumes, weather conditions, road conditions, etc. Also significantly impacting the read rate will be the number of times the vehicle stops so the PEO can write a parking citation. In any event, a good and reliable LPR system would likely replace a PEO.

Pay-in-Lane (PIL) in the Garages

Installing PIL equipment in the garages makes a lot of sense to possibly replace cashiers in Park 1 and Park 4 and to collect revenue in Park 2 and Park 3 when the garages are not staffed. Although it is not

recommended to eliminate exit cashiering in Park 2 and Park 3 entirely, the number of hours the garages are staffed could possibly be reduced. The PIL will have to be coupled with a telephone or intercom system that will be manned when the garages are not staffed to attend to any problems. It will also be essential to be able to open parking barrier gates from a remote location when necessary. Given the very low daily transient traffic volumes in Park 1 and Park 4, one PIL unit should be sufficient in these facilities. Two PIL units are recommended for Park 2 and Park 3. It will also be necessary to upgrade the ticket dispensers in the garages to accommodate PIL. The recommended PIL unit is Model 9000C Pay-In-Lane Device from Federal APD. Payment options should include paper currency, coins, vouchers, merchant validations, debit cards, and credit cards.

Merchant Validators will also be required as part of this system. Each business that desires to validate customer parking will need to be supplied with a validator. This off-line, non-powered device encodes parking tickets by punching a series of holes into the ticket. The unique hole pattern is read by the pay-in-lane device to calculate the value of the validation. The validator also applies a three-digit ink stamp to the ticket as an additional way to identify which merchant provided the validation. The ScanNet central management software is capable of providing usage reports for each three-digit code. Each ticket is capable of accepting up to four different merchant validations in a validation zone.

The cost for the hardware, software upgrade and labor to install the equipment is $313,000. The hardware included in the cost estimate from Ace Electric consists of ticket dispensers, PIL devices, power pad fee computers, 15 merchant validators, and the intercom system. The actual number of merchant validators required may be more or less than 15. The current cost of a validator is $2,180 and the cost estimate can be adjusted up or down depending upon the actual number of validators required. Excluded from this cost estimate are conduit and wire to interconnect devices.

Upgraded Exit Cashiering and Acceptance of Credit Cards

The exit cashiering system in the garages is antiquated and should be upgraded for better revenue control and to provide customers with a higher level of service. The existing cash registers will be replaced with fee computers that automatically read tickets, compute the parking fee, and process credit and debit cards. Because the ticket dispensers and fee computers are networked, the time and ticket information will be accurate. With encoded parking tickets and parking fees calculated automatically rather than manually, human error and the ability to alter

or manipulate ticket transaction records by employees will be virtually eliminated. The credit card processing procedure will need to be quick so that traffic does not back up during peak periods. Because of this, the credit card system for the garages will need to be independent of the city's existing credit card system.

The upgraded equipment and ScanNet Central Management System software will be able to produce comprehensive statistical reports and cash audits and reports. These reports will be used to verify that the reported revenue matches the collected revenue and, in the event there is a discrepancy, the auditing capabilities will be able to pin-point the discrepancy and help the Parking Division resolve the problem quickly and accurately. The back-office software will also enable the complete monitoring of the parking system. The upgraded system will provide the following benefits:

- Over 40 standard parking activity and revenue reports.
- The ability to customize standard reports.
- Integration with third-party accounting systems.
- The ability to export information to a number of different programs such as Microsoft Office and QuickBooks.
- The ability to monitor activities and transactions as they occur.
- The inability to delete or alter the information captured in any way.

The cost of this system is included in the PIL budget. Upgrading the cashiering system independently of the PIL would cost $20,000, according to Ace Electric. It will be imperative that Parking Division personnel be better trained to fully utilize the capabilities of the upgraded equipment and parking management system. If this cannot be done internally within the Parking Division, an individual within the Parking Division should take a Federal APD classroom course on ScanNet programming and operation in Novi, Michigan.

Contact: Dwight Fischer
Ace Electric
(406) 628-8886
dfischer@cablemt.net

IMPLEMENTATION PLAN

Eliminating Underutilized Parking Meters

The Parking Supervisor (PS) and Parking Advisory Board (PAB) have mutually agreed to remove an estimated 199 two-hour parking meters that are underutilized on the periphery of downtown west of 30th Street between 6th Avenue and Montana Avenue and to provide unrestricted parking on the blocks where the meters are removed. The approximate location of these spaces is graphically illustrated on the map below.

Source: Rich & Associates

Removing the meters represents a parking policy and management decision that should not be taken lightly. Removing the two-hour meters and replacing them with unrestricted parking will change the mix of short- and long-term parking in the area. While more long-term parking may be suitable for this area given its character, two to three hour time limits are usually recommended in fringe areas of downtown to discourage all-day parking and to provide convenient access to area businesses. If the unrestricted on-

street spaces are occupied by all-day users, will there be parking spaces available for short-term users who will be expecting convenient parking and shorter walking distances? Before the meters are removed, it is suggested to further study the issue on a block-by-block basis and to talk to and/or survey area businesses to make sure they are in favor of eliminating the meters and replacing them with unrestricted parking. The time limits placed (or not placed) on parking should be consistent with the needs of nearby businesses. While converting the metered spaces to unrestricted parking makes sense from an enforcement perspective, the city will experience a decrease in parking revenue due to the removal of the 2-hour meters, a decline in the use of nearby 4- and 10-hour meters, and a decrease in permit sales in Park 4 with the addition of 199 convenient, free and unrestricted on-street parking spaces on the west side of downtown. It is estimated that the annual revenue lost with the conversion of the 2-hour meters to unrestricted parking is approximately $56,500, as follows:

- 199 two-hour meters x 35% (average occupancy) x 2.5 (average turnover) x $0.50 (average rate) x 250 days = $21,875.
- 20* four-hour meters x 35% (average occupancy) x 1.5 (average turnover) x $.70 (average rate) x 250 days = $1,837.50
- 114* ten-hour meters x 65% (average occupancy) x 1.0 (average turnover) x $15 (average rate per month) x 12 months = $13,320.
- 65 permits (199-134 long-term meters = 65) x $25 (rooftop permit fee) x 12 months = $19,500.

** 4- and 10-hour meters on and west of 30th Street.*

If it is ultimately decided to remove the meters, meter collection/maintenance personnel should be able to remove them as time permits on a block-by-block basis. There will be signage on these blocks that will need to be changed and/or added as the meters are removed. A detailed assessment of the 23 block faces where the meters are to be removed is required to determine the signage requirements and the estimated cost to manufacture and install the signs.

License Plate Recognition (LPR)

The PS and PAB also have an interest in LPR if it is the only effective means of determining shuffling activity, which we believe it is. A system that automatically reads license plates is the only viable method to detect shuffling activity. Having enforcement officers manually input license numbers in handheld devices would be too time consuming and not cost effective. It is recommended to have both Genetec (AutoVu) and Tannery Creek Systems (autoChalk) demonstrate their systems to the city and to get quotes from both companies if the city is interested in LPR after the demonstrations. An anti-shuffling ordinance will need to be developed and passed by City Council for legal enforceability. It should be noted that LPR is used mostly in downtown areas with short-term timed spaces (non-metered spaces), such as Fort Collins and Bozeman, and may represent excess technology for mainly detecting shuffling activity. The preliminary cost of LPR ranges from $35,000 to $60,000, exclusive of the enforcement vehicle.

Single Space Smart Meters

The PS and PAB are also interested in the single space smart meters. It is recommended to pursue a pilot program with IPS Group, Inc. to test the meters if/when the city believes that meter rates can support the fees associated with the smart meters. IPS is currently favored over Duncan Solutions for a pilot program due to their high number of installations and lower fees. It should be noted again that the fees associated with the meters are significant when compared to the current meter rates in downtown Billings. According to IPS, the average fee per credit card transaction is in the range of $0.20 to $0.30. The City of Missoula averaged $0.25 per credit card transaction during their 3-month trial and it was recently reported that the City of Denver averages $0.28 per credit card transaction, both of which fall within the range reported by IPS. Although current meter rates in Billings do not support upgrading the meters, other towns and cities with relatively low meter rates ($0.50/hour) have installed the meters with the main purpose of providing better customer service and convenience. If the city decides to test the meters, it will be of upmost importance to communicate to the general public in the local media that the city is testing the meters and to periodically survey the users of the meters.

Upgraded Exit Cashiering and Acceptance of Credit Cards

The PS and PAB have also decided to further pursue equipment and software upgrades in Park 2 and Park 3. Specifically, it has been decided to add Pay-In-Lane (PIL) devices and to accept credit cards. Thirty merchant validators will also be required as part of this system. It will be necessary to upgrade the ticket dispensers and replace cash registers with fee computers in the garages to accommodate PIL and accept credit cards. Because PIL has a very low service rate, it is not recommended to replace cashiers with PIL during busier periods. PIL will work best during nonpeak periods when there are lower traffic volumes and less chance for traffic backups. As previously mentioned, PIL will have to be coupled with a telephone or intercom system that will be manned when the garages are not staffed to attend to any problems. It will also be essential to be able to open parking barrier gates from a remote location when necessary. The upgraded ScanNet Central Management System software will be able to produce comprehensive statistical reports and cash audits for the Parking Supervisor. The quote from Ace Electric to supply and install the equipment and software in Park 2 and Park 3 is $276,700.

The Rich and Associates parking study estimated that the Parking Division would retain and raise approximately $400,000 in revenue by converting to a PIL system in all four garages. This consisted of $310,400 in cost savings for labor and $87,000 of additional revenue by collecting parking fees after hours. Since two of the four garages will be converting to PIL only after hours as it is not recommended to fully replace cashiers with PIL devices, savings and additional revenues will likely be in the range of $150,000 or less.

Integrated Parking Management System

Finally, the PS and PAB are interested in an integrated parking management system versus the current three vendor approach consisting of Duncan meters, Federal APD parking access and revenue control equipment and ScanNet software, and the Cardinal Tracking enforcement system. The recommended IT

company for an integrated parking management system is T2 Systems, Inc. They have developed T2 Flex™, which is an open-architecture and browser-based system that provides centralized management, reporting and operation of all subsystems from a single, unified system. T2 Flex has five modules including parking enforcement, permits, access control, revenue control and event parking. T2 Flex would enable the Parking Division to:

- Manage all financial transactions including permits, transient revenues and citations
- Bring in data from other systems for analysis and reporting
- Integrate cashiering with other parking office services
- Generate reports for the city's entire parking operation
- Manage individuals and groups that park, scofflaws, tow/boot processes, permits, access cards, etc.
- Track validations and special event passes
- Manage, inventory, classify and allocate all of the spaces in the parking system
- Provide continuous monitoring, recording, reporting, and alarming for PARCS
- Integrate the citation and appeals process and more easily collect on outstanding citations
- Provide notification of overdue invoices and permit renewals

According to an official with T2 Systems, although they have the ability and desire to develop the software to integrate the city's systems, not all vendors are willing to work with them. One of the vendors that will not work with T2 Systems or other IT companies developing software systems for parking, because they view them as competition, is Federal APD. Therefore, it is presently not possible to fully integrate the city's systems (meters, enforcement and PARCS) into a single, unified system. Integrating systems would require that the city change vendors to those that T2 Systems has established partnerships with or vendors that are willing to work with them. T2 Systems has established partnerships with third party applications including Digital Payment Technologies, Casio Business Solutions, Magnetic Autocontrol and Genetec, among others. Contact information for T2 Systems is below if the city would like to further explore an integrated parking management system.

Company Headquarters:
T2 Systems, Inc.
7835 Woodland Dr., Suite 250
Indianapolis, IN 46278
(800) 434-1502
www.t2systems.com

Western US Contact:
Wade Bettisworth
(317) 524-2145 Direct
wbettisworth@t2systems.com

APPENDIX

City of Fort Collins Block Face Ordinance

No person shall park or direct another person to park a vehicle in a block face or a public parking lot for a period in excess of any time restriction established for parking in the block face or public parking.

Unless permission from the Parking Services Manager or designee has been granted, no person shall, after having vacated a time-restricted parking space in a lot or block face, return and park or direct another person to return and park the same vehicle in the same lot or block face within a four-hour period thereafter, regardless of whether or not the maximum time restriction has elapsed. (Ord. 016, 2003 §1; Ord. 139, 2004 §2; Ord. 097, 2009 §30)

City of Bozeman Ordinance No. 1579

AN ORDINANCE OF THE CITY COMMISSION OF THE CITY OF BOZEMAN, MONTANA, PROVIDING THAT THE BOZEMAN MUNICIPAL CODE BE AMMENDED BY REVISED SECTION 10.32.250 OF SAID CODE, ESTABLISHING REQUIREMENTS FOR COMPLIANCE WITH POSTED TIME LIMITS FOR PARKING ON THE SAME BLOCK FACE OR WITHIN 500 FEET OF WHERE ORIGANALLY PARKED.

BE IT ORDAINED by the City Commission of the City of Bozeman, Montana:

That the Bozeman Municipal Code be amended so that such section shall read as follows:

10.32.250 Parking – Maximum time designated.

A. When signs are erected on any street, alley or highway within the city designating a maximum time for parking, no person shall park any vehicle for longer than the maximum time posted.

B. A vehicle may not return to a parking space in the same block face or within 500 feet of where previously parked on the same block face for a three hour period.

C. Upon expiration of the maximum parking duration as posted, a citation may be issued, in accordance with section 10.32.410 of this code, to any vehicle which remains parked or stopped on the same block face unless:

    1. The vehicle has moved more than 500 lineal feet, measured along the curb or edge line;

    2. The vehicle has moved to an unregulated area in the same block face; or

    3. The vehicle has vacated the block face for a minimum of 3 hours.

D. Not withstanding the foregoing, no person shall park a vehicle for longer than forty eight consecutive hours at any time upon a street, alley or highway within the city. Signs may be erected by the director of public safety giving notice thereof. However, the signs are not required.