

**Statewide Sampling Protocol and Management Strategy for
Assessing Field Maintenance Activities**

**A Report on the Sampling Methodology
used for the Summer 2002 Data Collection**

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1 Introduction

This project addresses a structured long-term data collection plan of maintenance activities statewide in Montana. One goal of the project is the formulation of a statewide sampling protocol for maintenance activities requiring field assessment as defined in the AMMO (Accountability for Montana's Maintenance Operations) Field Data Collection Manual.

The current AMMO Field Data Collection Manual provides descriptions of deficiency thresholds, reporting measures, and methodology when surveying maintenance activities. A surveying protocol based on statistically-sound sampling principles is needed for successful implementation of the AMMO process. Statistically-based survey sampling methods were developed based on available information of centerline miles to define natural stratification criteria of roadway miles statewide.

This report summarizes the statistical methodology used to generate the initial stratified sampling plan of roadway sites to be surveyed statewide. It will include a description of the procedure for selecting roadway sites to be sampled and the information to be collected at each site.

Assessment of the current state of 20 maintenance activities based on analysis of the data collected during the summer of 2002 will be included in a subsequent report.

2 Stratification Criteria and the Sampling Frame

To describe the initial stratified sampling plan, the following issues will be addressed:

- A multi-level stratification of the Montana roadway system based on the 11 maintenance divisions and 5 roadway systems.
- Information on centerline miles for each highway system within each maintenance division.
- Sampling frequency for each highway system within each maintenance division.

- Selection of the roadway segments at which maintenance activity data will be collected.
- The measurements to be recorded at each surveyed roadway segment.

One of the most commonly-used sampling procedures is stratified simple random sample and was adopted for this project. Specifically, the Montana roadway system is partitioned in 11 maintenance divisions. Each roadway can also be classified as one of 5 highway systems (**N**ational **H**ighway **S**ervice, **O**FFicial, **P**RImary, **S**ECONDary, and **U**RBan). This means that there are potentially 55 combinations of maintenance divisions and highway systems. Only 52 of these combinations exist. Table 1 contains a list of these 52 combinations and information regarding mileage (which will be discussed later).

Based on resource constraints, it was determined that within each maintenance division approximately one hundred 1/10 mile segments could be surveyed during the July/August 2002 sampling period. Or, equivalently, 10 miles of roadway could be surveyed within each maintenance division. Because this was a pilot sampling project, the optimal length of a roadway sampling unit is unknown. It was decided to use .2-mile roadway segments for all highway systems (except urban which was set at .1 mile per segment because of limited roadway miles). Data, however, was to be recorded for each half of the .2-mile segments. After data collection, this will allow a comparison of sampling plans using .1 mile and .2-mile segments. This comparison will provide information for allocation of sampling effort in future surveys.

Before determining sample sizes, the total centerline miles for each maintenance division and highway system had to be found. The actual centerline miles (i.e., the miles in the *target* population) is given in the (Target) column in Table 1. A value in this column is the sum of the centerline miles across all corridors that comprise that highway system. Because .2-mile segments are to be sampled, each corridor length was rounded down to the nearest multiple of .2 (i.e., .0, .2, .4, .6, or .8) for NHS, OFF, PRI, and SEC highway systems.

Table 1: Summary of Roadway Miles and Sample Sizes

Maintenance Division and (total miles)	Highway System	Miles in (Target) (Study) Population		Percentage of centerline miles	Number of sampling segments	Segment size in miles
MISSOULA (1071.0m)	NHS	577.0	576.6	53.8	27	.2
	OFF	177.8	175.8	16.4	8	.2
	PRI	177.0	176.8	16.5	8	.2
	SEC	127.5	126.6	11.8	6	.2
	URB	15.6	15.2	1.4	2	.1
KALISPELL (848.4m)	NHS	331.4	331.2	39.0	19	.2
	OFF	16.1	15.6	1.8	2	.2
	PRI	321.3	320.8	37.8	19	.2
	SEC	178.7	177.2	20.9	10	.2
	URB	3.7	3.6	0.4	2	.1
BUTTE (1450.6m)	NHS	682.5	681.8	47.0	23	.2
	OFF	259.3	256.4	17.7	9	.2
	PRI	282.2	281.8	19.4	10	.2
	SEC	209.5	208.6	14.4	7	.2
	URB	23.1	22.0	1.5	2	.1
BOZEMAN (1039.0m)	NHS	380.7	380.2	36.6	18	.2
	OFF	44.8	44.0	4.2	2	.2
	PRI	375.4	374.8	36.1	18	.2
	SEC	229.8	228.4	22.0	11	.2
	URB	12.0	11.6	1.1	2	.1
GREAT FALLS (1133.0m)	NHS	426.6	425.8	37.6	19	.2
	OFF	155.9	155.0	13.7	7	.2
	PRI	218.8	218.4	19.3	10	.2
	SEC	318.0	317.0	28.0	14	.2
	URB	17.5	16.8	1.5	2	.1
HAVRE (1246.6m)	NHS	435.8	435.8	35.0	17	.2
	OFF	76.4	75.0	6.0	3	.2
	PRI	167.5	167.0	13.4	7	.2
	SEC	567.7	566.2	45.4	23	.2
	URB	2.7	2.6	0.2	2	.1
GLENDIVE (870.6m)	NHS	402.1	401.6	46.1	23	.2
	OFF	69.6	68.4	7.9	4	.2
	PRI	213.8	213.2	24.5	12	.2
	SEC	188.1	187.4	21.5	11	.2
	URB					
WOLF POINT (1051.8m)	NHS	397.6	397.4	37.8	19	.2
	OFF	6.3	6.2	0.6	2	.2
	PRI	281.3	281.0	26.7	13	.2
	SEC	368.2	367.2	34.9	17	.2
	URB					
MILES CITY (364.8m)	NHS	365.1	364.8	40.7	20	.2
	OFF	76.1	74.6	8.3	4	.2
	PRI	329.7	329.0	36.7	18	.2
	SEC	129.1	128.4	14.3	7	.2
	URB					
BILLINGS (1543.8m)	NHS	704.2	703.6	45.6	23	.2
	OFF	257.5	255.8	16.6	8	.2
	PRI	183.4	183.2	11.9	6	.2
	SEC	378.7	377.6	24.5	12	.2
	URB	24.1	23.6	1.5	2	.1
LEWISTOWN (814.4m)	NHS	397.5	397.2	48.8	24	.2
	OFF	1.3	1.2	0.1	0	.2
	PRI	251.9	251.4	30.9	15	.2
	SEC	164.5	163.6	20.1	10	.2
	URB	1.2	1.0	0.1	2	.1

- For example, the beginning and ending milepost markers for the Missoula/NHS C0000019N corridor are 26.9 and 64, respectively, for a total length of 37.1 miles. The 37.1 is rounded down to 37.0 miles which contains $5 \times 37 = 185$ segments of .2 miles. The remaining .1 mile is excluded.

Analogously, URB corridor lengths are rounded down to the nearest .1 mile. After rounding for each corridor, we have the *study* centerline miles. These are given in the (Study) column in Table 1. It is from the “Study” centerline miles that we can determine the set of potential roadway segments to survey known as the *sampling frame*. Each segment is given a sampling identification number so that it is uniquely identified.

- For example, we begin with the Missoula maintenance division in which there are 576.6 NHS study miles (or 2883 .2-mile segments). These 2883 segments will be numbered 1 to 2883. We then proceed to the 175.8 OFF miles which contain 879 .2-mile segments. These will be numbered 2884 to 3762. This sequential numbering continues until all segments are labeled providing us with a sampling frame.

Proportional allocation based on total centerline miles is now used to determine how many roadway segments to sample for highway system within each maintenance division. That is, within each maintenance division, the proportion (or percentage) of miles corresponding to each of the five highway systems is calculated. The percentages are given in the ‘Percentage of centerline miles’ column in Table 1. If a roadway segment is .2 miles then we divide the percentage by 2 and round to the nearest integer. Because the percentages are less than 2% for all URB cases, two .1 mile segments will be sampled within each maintenance division to guarantee replication. Note that the Glendive, Wolf Point, and Miles City divisions do not have URB routes. The last two columns of Table 1 summarize the allocation and segment size within the 10 miles of roadway sampling units.

- For example, 53.8%, 16.4%, 16.5%, 11.8%, and 1.4% of the total centerline study miles in the Missoula maintenance division correspond to the NHS, OFF, PRI, SEC, and URB highway systems, respectively. Thus, of the 10 miles to be sampled

in this division, approximately 5.4, 1.6, 1.6, 1.2, and 0.2 miles will be sampled in the NHS, OFF, PRI, SEC, and URB highway systems, respectively. Or, 27, 8, 8, and 6 segments of .2 miles and 2 segments of .1 mile will be sampled in the NHS, OFF, PRI, SEC, and URB highway systems, respectively.

Next, within each maintenance division and highway system, we randomly select the specified number of roadway segments (given in Table 1). This is accomplished using the identification numbers in the sampling frame.

- For example, to select the 27 NHS segments in the Missoula maintenance division, we randomly select 27 numbers between 1 and 2883. These 27 numbers indicate which 27 NHS segments to sample. Next, to select the 8 OFF segments in the Missoula maintenance division, we randomly select 8 numbers between 2884 and 3762 which indicate the 8 OFF segments to sample. This process continues until the entire stratified sample is determined.

A list of the roadway segments to sample was provided to the Maintenance Division of the Montana Department of Transportation in May 2002. The list is also included in the Appendix with starting milepost and ending milepost values rounded the nearest .1 milepost marker.

At each roadway segment in the survey, measurements corresponding to multiple maintenance activities will be recorded. These measurements are listed on the AMMO Field Data Collection Form. Based on these measurements, the goal will be to estimate certain quantities of interest. Table 2 summarizes the 20 quantities to be estimated for each of the three types of maintenance activities: Roadside, Traffic, and Roadway.

Once data entry is completed, the data analysis will be conducted which will provide the aforementioned quantities to be estimated. The summary of the statistical methods and the estimates will be provided in a subsequent report.

Table 2: Quantities to be Estimated

ROADSIDE Maintenance Activities

1.	% drainage structures acceptable
2.	% fencing acceptable
3.	% mowing acceptable
4.	% nuisance vegetation acceptable
5.	% paths and sidewalks acceptable
6.	% slopes and ditches acceptable
7.	pieces of litter per mile

TRAFFIC Maintenance Activities

8.	% crash barriers acceptable
9.	% guide signs acceptable
10.	% highway lighting acceptable
11.	% traffic signals acceptable
12.	% right striping acceptable
13.	% center striping acceptable
14.	% left striping acceptable
15.	% pavement symbols acceptable
16.	% protective barriers acceptable
17.	% regulatory and warning symbols acceptable
18.	% roadside delineators acceptable

ROADWAY Maintenance Activities

19.	pieces of debris per mile
20.	% of roadway swept

APPENDIX:

**Summary of Roadway Segments to be
Sampled for the Summer 2002 Data Collection**

ROADWAY SEGMENTS TO BE SAMPLED

DIVISION 11: MISSOULA

DIVISION 12: KALISPELL

Unit #	Highway System	Corridor ID	Starting Milepost	Ending Milepost
1	NHS	C000005N	8.6	8.8
2	NHS	C000005N	43.2	43.4
3	NHS	C000007N	5.6	5.8
4	NHS	C000007N	21.4	21.6
5	NHS	C000007N	40.6	40.8
6	NHS	C000007N	76.0	76.2
7	NHS	C000024E	26.2	26.4
8	NHS	C000024E	35.0	35.2
9	NHS	C000090E	1.2	1.4
10	NHS	C000090E	57.6	57.8
11	NHS	C000090E	100.6	100.8
12	NHS	C000090E	104.8	105.0
13	NHS	C000090E	118.2	118.4
14	NHS	C000090E	134.2	134.4
15	NHS	C000090W	8.0	8.2
16	NHS	C000090W	47.0	47.2
17	NHS	C000090W	51.2	51.4
18	NHS	C000090W	72.2	72.4
19	NHS	C000090W	85.2	85.4
20	NHS	C000090W	85.6	85.8
21	NHS	C000090W	122.0	122.2
22	NHS	C000090W	126.8	127.0
23	NHS	C000090W	131.6	131.8
24	NHS	C000090W	138.6	138.8
25	NHS	C000090W	153.0	153.2
26	NHS	C000093E	7.6	7.8
27	NHS	C000093E	16.8	17.0
1	OFF	C031007N	1.0	1.2
2	OFF	C031007N	2.6	2.8
3	OFF	C031011N	3.0	3.2
4	OFF	C031070E	14.2	14.4
5	OFF	C031086E	0.4	0.6
6	OFF	C031169N	0.2	0.4
7	OFF	C032758E	0.4	0.6
8	OFF	C081024E	48.0	48.2
1	PRI	C000006E	73.7	73.9
2	PRI	C000006E	87.3	87.5
3	PRI	C000019N	31.1	31.3
4	PRI	C000019N	43.7	43.9
5	PRI	C000019N	55.9	56.1
6	PRI	C000083N	21.6	21.8
7	PRI	C000083N	27.8	28.0
8	PRI	C000083N	32.0	32.2
1	SEC	C000211W	5.2	5.4
2	SEC	C000212E	2.8	3.0
3	SEC	C000269N	6.2	6.4
4	SEC	C000269N	10.4	10.6
5	SEC	C000348W	4.2	4.4
6	SEC	C000513W	2.2	2.4
1	URB	C008128E	0.5	0.6
2	URB	C008128E	2.7	2.8

Unit #	Highway System	Corridor ID	Starting Milepost	Ending Milepost
1	NHS	C000001E	4.4	4.6
2	NHS	C000001E	10.8	11.0
3	NHS	C000001E	12.2	12.4
4	NHS	C000001E	46.0	46.2
5	NHS	C000001E	50.4	50.6
6	NHS	C000001E	59.4	59.6
7	NHS	C000001E	92.4	92.6
8	NHS	C000001E	107.6	107.8
9	NHS	C000001E	109.6	109.8
10	NHS	C000001E	147.9	148.1
11	NHS	C000001E	196.9	197.1
12	NHS	C000005N	58.8	59.0
13	NHS	C000005N	92.8	93.0
14	NHS	C000005N	106.4	106.6
15	NHS	C000005N	108.2	108.4
16	NHS	C000005N	125.0	125.2
17	NHS	C000005N	152.4	152.6
18	NHS	C000005N	153.4	153.6
19	NHS	C000005N	170.6	170.8
1	OFF	C015750E	0.4	0.6
2	OFF	C024003N	0.2	0.4
1	PRI	C000006E	16.4	16.6
2	PRI	C000006E	52.4	52.6
3	PRI	C000006E	57.4	57.6
4	PRI	C000033N	11.8	12.0
5	PRI	C000033N	25.0	25.2
6	PRI	C000033N	25.8	26.0
7	PRI	C000033N	40.4	40.6
8	PRI	C000033N	61.6	61.8
9	PRI	C000036E	20.8	21.0
10	PRI	C000052N	8.2	8.4
11	PRI	C000052N	9.8	10.0
12	PRI	C000052N	14.2	14.4
13	PRI	C000056N	9.8	10.0
14	PRI	C000056N	10.6	10.8
15	PRI	C000056N	24.4	24.6
16	PRI	C000056N	26.8	27.0
17	PRI	C000082E	6.0	6.2
18	PRI	C000083N	56.4	56.6
19	PRI	C000083N	71.0	71.2
1	SEC	C000206N	6.0	6.2
2	SEC	C000260W	1.2	1.4
3	SEC	C000260W	3.0	3.2
4	SEC	C000292N	4.6	4.8
5	SEC	C000424N	2.0	2.2
6	SEC	C000424N	4.2	4.4
7	SEC	C000471W	10.4	10.6
8	SEC	C000503E	3.0	3.2
9	SEC	C000548E	0.8	1.0
10	SEC	C000548E	5.2	5.4
1	URB	C000317N	0.8	0.9
2	URB	C000317N	0.9	1.0

ROADWAY SEGMENTS TO BE SAMPLED (cont.)

DIVISION 21: BUTTE

DIVISION 22: BOZEMAN

Unit #	Highway System	Corridor ID	Starting Milepost	Ending Milepost
1	NHS	C000008E	20.6	20.8
2	NHS	C000008E	35.8	36.0
3	NHS	C000015N	54.4	54.6
4	NHS	C000015N	69.0	69.2
5	NHS	C000015N	90.0	90.2
6	NHS	C000015N	99.0	99.2
7	NHS	C000015N	164.4	164.6
8	NHS	C000015N	179.8	180.0
9	NHS	C000015N	180.6	180.8
10	NHS	C000015N	201.6	201.8
11	NHS	C000015N	214.2	214.4
12	NHS	C000015S	9.2	9.4
13	NHS	C000015S	24.6	24.8
14	NHS	C000015S	99.4	99.6
15	NHS	C000015S	172.2	172.4
16	NHS	C000015S	175.4	175.6
17	NHS	C000015S	197.0	197.2
18	NHS	C000015S	204.2	204.4
19	NHS	C000015S	210.6	210.8
20	NHS	C000015S	211.2	211.4
21	NHS	C000090E	180.4	180.6
22	NHS	C000090E	191.0	191.2
23	NHS	C000090W	187.2	187.4
1	OFF	C001280E	3.2	3.4
2	OFF	C001309N	20.4	20.6
3	OFF	C022099N	9.0	9.2
4	OFF	C022249N	6.8	7.0
5	OFF	C022253N	1.2	1.4
6	OFF	C039241N	5.8	6.0
7	OFF	C047548E	1.6	1.8
8	OFF	C081001N	27.0	27.2
9	OFF	C081011N	7.0	7.2
1	PRI	C000019N	24.0	24.2
2	PRI	C000029N	54.1	54.3
3	PRI	C000029N	72.1	72.3
4	PRI	C000041N	16.2	16.4
5	PRI	C000046E	10.2	10.4
6	PRI	C000046E	75.8	76.0
7	PRI	C000049N	18.0	18.2
8	PRI	C000049N	23.2	23.4
9	PRI	C000055N	0.2	0.4
10	PRI	C000089N	1.2	1.4
1	SEC	C000273N	7.8	8.0
2	SEC	C000275S	2.6	2.8
3	SEC	C000278W	14.6	14.8
4	SEC	C000278W	19.4	19.6
5	SEC	C000278W	30.8	31.0
6	SEC	C000279N	9.8	10.0
7	SEC	C000359S	0.2	0.4
1	URB	C001820W	0.6	0.7
2	URB	C005805S	1.9	2.0

Unit #	Highway System	Corridor ID	Starting Milepost	Ending Milepost
1	NHS	C000008E	76.7	76.9
2	NHS	C000008E	92.5	92.7
3	NHS	C000008E	100.5	100.7
4	NHS	C000011N	2.2	2.4
5	NHS	C000011N	18.8	19.0
6	NHS	C000011N	22.4	22.6
7	NHS	C000011N	50.4	50.6
8	NHS	C000012E	2.4	2.6
9	NHS	C000050N	81.0	81.2
10	NHS	C000085N	0.0	0.2
11	NHS	C000085N	3.0	3.2
12	NHS	C000090E	277.5	277.7
13	NHS	C000090E	316.5	316.7
14	NHS	C000090E	343.3	343.5
15	NHS	C000090W	276.9	277.1
16	NHS	C000090W	290.3	290.5
17	NHS	C000090W	322.7	322.9
18	NHS	C000090W	338.1	338.3
1	OFF	C016044E	0.0	0.2
2	OFF	C016565N	3.4	3.6
1	PRI	C000013N	1.0	1.2
2	PRI	C000013N	8.0	8.2
3	PRI	C000013N	14.8	15.0
4	PRI	C000013N	57.8	58.0
5	PRI	C000013N	68.2	68.4
6	PRI	C000014E	45.8	46.0
7	PRI	C000014E	53.2	53.4
8	PRI	C000029N	0.4	0.6
9	PRI	C000029N	7.8	8.0
10	PRI	C000050N	83.5	83.7
11	PRI	C000050N	89.1	89.3
12	PRI	C000059N	7.4	7.6
13	PRI	C000059N	11.4	11.6
14	PRI	C000086N	0.8	1.0
15	PRI	C000086N	17.6	17.8
16	PRI	C000086N	37.2	37.4
17	PRI	C000087E	5.4	5.6
18	PRI	C000087E	6.2	6.4
1	SEC	C000205E	5.6	5.8
2	SEC	C000235E	0.4	0.6
3	SEC	C000284S	16.2	16.4
4	SEC	C000285W	7.2	7.4
5	SEC	C000288S	5.2	5.4
6	SEC	C000288S	7.0	7.2
7	SEC	C000288S	11.2	11.4
8	SEC	C000290N	3.2	3.4
9	SEC	C000294E	8.4	8.6
10	SEC	C000360W	1.2	1.4
11	SEC	C000540N	0.8	1.0
1	URB	C001201S	1.3	1.4
2	URB	C001201S	2.1	2.2

ROADWAY SEGMENTS TO BE SAMPLED (cont.)

DIVISION 31: GREAT FALLS

DIVISION 32: HAVRE

Unit #	Highway System	Corridor ID	Starting Milepost	Ending Milepost
1	NHS	C000003N	4.2	4.4
2	NHS	C000010N	32.7	32.9
3	NHS	C000010N	47.1	47.3
4	NHS	C000015N	233.3	233.5
5	NHS	C000015N	301.5	301.7
6	NHS	C000015N	308.5	308.7
7	NHS	C000015S	229.1	229.3
8	NHS	C000015S	245.3	245.5
9	NHS	C000015S	255.1	255.3
10	NHS	C000015S	266.7	266.9
11	NHS	C000015S	283.5	283.7
12	NHS	C000024E	65.1	65.3
13	NHS	C000024E	88.5	88.7
14	NHS	C000024E	115.3	115.5
15	NHS	C000060N	77.4	77.6
16	NHS	C000315W	0.2	0.4
17	NHS	C005205N	3.9	4.151
18	NHS	C005205N	6.3	6.551
19	NHS	C005210E	1.0	1.200
1	OFF	C081003N	38.4	38.600
2	OFF	C081005N	8.0	8.200
3	OFF	C081005N	11.8	12.000
4	OFF	C081005N	13.4	13.600
5	OFF	C081005N	14.0	14.200
6	OFF	C081022E	1.6	1.800
7	OFF	C081022E	4.2	4.400
1	PRI	C000003N	21.4	21.6
2	PRI	C000003N	51.6	51.8
3	PRI	C000003N	61.6	61.8
4	PRI	C000009N	58.4	58.6
5	PRI	C000009N	63.2	63.4
6	PRI	C000010N	1.6	1.8
7	PRI	C000060N	37.5	37.7
8	PRI	C000060N	38.1	38.3
9	PRI	C000060N	43.1	43.3
10	PRI	C000080S	0.4	0.6
1	SEC	C000223N	12.6	12.8
2	SEC	C000227S	9.0	9.2
3	SEC	C000228E	11.4	11.6
4	SEC	C000330W	3.6	3.8
5	SEC	C000330W	5.4	5.6
6	SEC	C000330W	34.1	34.3
7	SEC	C000365E	16.8	17.0
8	SEC	C000379E	1.6	1.8
9	SEC	C000379E	8.0	8.2
10	SEC	C000379E	9.4	9.6
11	SEC	C000408W	19.2	19.4
12	SEC	C000431E	16.6	16.8
13	SEC	C000431E	16.8	17.0
14	SEC	C000434N	12.4	12.6
1	URB	C005205N	2.2	2.3
2	URB	C005206E	2.6	2.7

Unit #	Highway System	Corridor ID	Starting Milepost	Ending Milepost
1	NHS	C000001E	215.9	216.1
2	NHS	C000001E	229.5	229.7
3	NHS	C000001E	278.5	278.7
4	NHS	C000001E	325.5	325.7
5	NHS	C000001E	334.3	334.5
6	NHS	C000001E	347.1	347.3
7	NHS	C000001E	353.1	353.3
8	NHS	C000001E	415.7	415.9
9	NHS	C000010N	54.5	54.7
10	NHS	C000010N	102.9	103.1
11	NHS	C000010N	107.7	107.9
12	NHS	C000015N	362.3	362.5
13	NHS	C000015N	365.5	365.7
14	NHS	C000015S	344.5	344.7
15	NHS	C000015S	354.3	354.5
16	NHS	C000015S	383.7	383.9
17	NHS	C000015S	384.9	385.1
1	OFF	C037358E	0.0	0.2
2	OFF	C051029N	3.8	4.0
3	OFF	C081006E	12.6	12.8
1	PRI	C000003N	65.8	66.0
2	PRI	C000003N	97.6	97.8
3	PRI	C000003N	100.6	100.8
4	PRI	C000003N	103.8	104.0
5	PRI	C000044E	9.0	9.2
6	PRI	C000058N	46.2	46.4
7	PRI	C000066N	44.5	44.7
1	SEC	C000213N	22.8	23.0
2	SEC	C000219E	1.8	2.0
3	SEC	C000223N	31.4	31.6
4	SEC	C000223N	46.6	46.8
5	SEC	C000224N	5.2	5.4
6	SEC	C000232N	40.6	40.8
7	SEC	C000232N	42.6	42.8
8	SEC	C000234S	5.2	5.4
9	SEC	C000234S	10.4	10.6
10	SEC	C000236N	87.7	87.9
11	SEC	C000240S	17.2	17.4
12	SEC	C000334S	3.6	3.8
13	SEC	C000358N	5.2	5.4
14	SEC	C000358N	13.0	13.2
15	SEC	C000366E	0.0	0.2
16	SEC	C000366E	6.0	6.2
17	SEC	C000366E	17.4	17.6
18	SEC	C000417S	3.0	3.2
19	SEC	C000417S	4.8	5.0
20	SEC	C000464N	2.6	2.8
21	SEC	C000464N	19.8	20.0
22	SEC	C000464N	26.4	26.6
23	SEC	C000464N	33.6	33.8
1	URB	C000234S	0.1	0.2
2	URB	C000234S	1.0	1.1

ROADWAY SEGMENTS TO BE SAMPLED (cont.)

DIVISION 41: GLENDIVE

Unit #	Highway System	Corridor ID	Starting Milepost	Ending Milepost
1	NHS	C000020N	14.6	14.8
2	NHS	C000020N	15.8	16.0
3	NHS	C000020N	36.8	37.0
4	NHS	C000020N	44.8	45.0
5	NHS	C000057E	176.3	176.5
6	NHS	C000057E	240.5	240.7
7	NHS	C000057E	251.7	251.9
8	NHS	C000057E	253.1	253.3
9	NHS	C000057E	275.5	275.7
10	NHS	C000057E	275.7	275.9
11	NHS	C000057E	278.5	278.7
12	NHS	C000057E	323.3	323.5
13	NHS	C000094E	190.0	190.2
14	NHS	C000094E	201.2	201.4
15	NHS	C000094E	218.8	219.0
16	NHS	C000094E	219.0	219.2
17	NHS	C000094E	226.4	226.6
18	NHS	C000094E	240.0	240.2
19	NHS	C000094E	242.6	242.8
20	NHS	C000094W	163.0	163.2
21	NHS	C000094W	197.8	198.0
22	NHS	C000094W	234.0	234.2
23	NHS	C000094W	243.6	243.8
1	OFF	C011315N	3.0	3.2
2	OFF	C011330E	0.0	0.2
3	OFF	C040128E	0.4	0.6
4	OFF	C081021N	1.4	1.6
1	PRI	C000018N	55.5	55.7
2	PRI	C000018N	58.5	58.7
3	PRI	C000018N	60.9	61.1
4	PRI	C000018N	68.9	69.1
5	PRI	C000025N	13.2	13.4
6	PRI	C000027N	56.5	56.7
7	PRI	C000027N	60.9	61.1
8	PRI	C000027N	65.1	65.3
9	PRI	C000042N	21.4	21.6
10	PRI	C000051E	10.0	10.2
11	PRI	C000051E	26.6	26.8
12	PRI	C000051E	32.2	32.4
1	SEC	C000201E	45.4	45.6
2	SEC	C000201E	48.0	48.2
3	SEC	C000201E	48.2	48.4
4	SEC	C000201E	62.8	63.0
5	SEC	C000253N	3.0	3.2
6	SEC	C000253N	19.0	19.2
7	SEC	C000254W	2.2	2.4
8	SEC	C000254W	18.8	19.0
9	SEC	C000254W	19.8	20.0
10	SEC	C000254W	25.0	25.2
11	SEC	C000261N	4.0	4.2

DIVISION 42: WOLF POINT

Unit #	Highway System	Corridor ID	Starting Milepost	Ending Milepost
1	NHS	C000001E	499.3	499.5
2	NHS	C000001E	511.9	512.1
3	NHS	C000001E	516.1	516.3
4	NHS	C000001E	571.5	571.7
5	NHS	C000001E	612.3	612.5
6	NHS	C000001E	648.5	648.7
7	NHS	C000001E	653.9	654.1
8	NHS	C000001E	656.9	657.1
9	NHS	C000022E	70.0	70.2
10	NHS	C000022E	81.6	81.8
11	NHS	C000022E	82.6	82.8
12	NHS	C000034N	7.6	7.8
13	NHS	C000034N	11.2	11.4
14	NHS	C000061N	138.0	138.2
15	NHS	C000062S	12.0	12.2
16	NHS	C000099N	9.2	9.4
17	NHS	C000099N	39.4	39.6
18	NHS	C000099N	51.2	51.4
19	NHS	C000099N	52.0	52.2
1	PRI	C000025N	50.1	50.3
2	PRI	C000025N	52.5	52.7
3	PRI	C000030E	7.8	8.0
4	PRI	C000030E	10.6	10.8
5	PRI	C000031N	2.2	2.4
6	PRI	C000031N	18.6	18.8
7	PRI	C000031N	23.0	23.2
8	PRI	C000031N	36.8	37.0
9	PRI	C000032N	38.2	38.4
10	PRI	C000032N	45.2	45.4
11	PRI	C000032N	52.2	52.4
12	PRI	C000032N	64.2	64.4
13	PRI	C000042N	66.4	66.6
1	SEC	C000201E	0.0	0.2
2	SEC	C000248E	11.2	11.4
3	SEC	C000248E	26.8	27.0
4	SEC	C000344E	0.6	0.8
5	SEC	C000344E	7.0	7.2
6	SEC	C000344E	9.4	9.6
7	SEC	C000344E	17.2	17.4
8	SEC	C000363E	4.3	4.5
9	SEC	C000438N	25.6	25.8
10	SEC	C000511N	12.8	13.0
11	SEC	C000516N	5.8	6.0
12	SEC	C000517E	1.6	1.8
13	SEC	C000517E	8.0	8.2
14	SEC	C000528W	1.0	1.2
15	SEC	C000537N	7.2	7.4
16	SEC	C000573N	2.6	2.8
17	SEC	C000573N	14.0	14.2

ROADWAY SEGMENTS TO BE SAMPLED (cont.)

DIVISION 43: MILES CITY

Unit #	Highway System	Corridor ID	Starting Milepost	Ending Milepost
1	NHS	C000023S	7.8	8.0
2	NHS	C000023S	10.2	10.4
3	NHS	C000023S	28.2	28.4
4	NHS	C000023S	54.8	55.0
5	NHS	C000023S	64.2	64.4
6	NHS	C000023S	112.4	112.6
7	NHS	C000037E	75.1	75.3
8	NHS	C000037E	92.7	92.9
9	NHS	C000037E	101.7	101.9
10	NHS	C000094E	86.9	87.1
11	NHS	C000094E	102.5	102.7
12	NHS	C000094E	109.1	109.3
13	NHS	C000094E	115.7	115.9
14	NHS	C000094W	82.5	82.7
15	NHS	C000094W	89.5	89.7
16	NHS	C000094W	92.7	92.9
17	NHS	C000094W	118.1	118.3
18	NHS	C000094W	139.1	139.3
19	NHS	C000094W	143.9	144.1
20	NHS	C000094W	157.7	157.9
1	OFF	C009224E	0.4	0.6
2	OFF	C044148E	0.0	0.2
3	OFF	C081018E	15.3	15.5
4	OFF	C081019N	1.2	1.4
1	PRI	C000002E	3.2	3.4
2	PRI	C000002E	28.2	28.4
3	PRI	C000002E	35.6	35.8
4	PRI	C000014E	225.3	225.5
5	PRI	C000014E	237.1	237.3
6	PRI	C000014E	238.3	238.5
7	PRI	C000014E	266.3	266.5
8	PRI	C000018N	18.2	18.4
9	PRI	C000018N	26.0	26.2
10	PRI	C000027N	9.0	9.2
11	PRI	C000027N	20.2	20.4
12	PRI	C000027N	26.8	27.0
13	PRI	C000027N	29.4	29.6
14	PRI	C000027N	48.4	48.6
15	PRI	C000039N	14.8	15.0
16	PRI	C000039N	50.0	50.2
17	PRI	C000054N	15.4	15.6
18	PRI	C000054N	17.0	17.2
1	SEC	C000322S	1.0	1.2
2	SEC	C000322S	4.6	4.8
3	SEC	C000323S	1.8	2.0
4	SEC	C000323S	2.6	2.8
5	SEC	C000484S	1.4	1.6
6	SEC	C000489E	2.8	3.0
7	SEC	C000489E	4.6	4.8

ROADWAY SEGMENTS TO BE SAMPLED (cont.)

DIVISION 51: BILLINGS

DIVISION 53: LEWISTOWN

Unit #	Highway System	Corridor ID	Starting Milepost	Ending Milepost
1	NHS	C000004N	9.6	9.8
2	NHS	C000004N	17.0	17.2
3	NHS	C000004N	43.6	43.8
4	NHS	C000037E	3.0	3.2
5	NHS	C000037E	16.2	16.4
6	NHS	C000053N	5.2	5.4
7	NHS	C000090E	399.0	399.2
8	NHS	C000090E	401.6	401.8
9	NHS	C000090E	426.0	426.2
10	NHS	C000090E	451.8	452.0
11	NHS	C000090E	473.8	474.0
12	NHS	C000090E	517.6	517.8
13	NHS	C000090E	525.6	525.8
14	NHS	C000090E	533.8	534.0
15	NHS	C000090W	376.0	376.2
16	NHS	C000090W	405.2	405.4
17	NHS	C000090W	471.8	472.0
18	NHS	C000090W	517.6	517.8
19	NHS	C000090W	553.8	554.0
20	NHS	C000094E	11.0	11.2
21	NHS	C000094E	36.6	36.8
22	NHS	C000094W	18.6	18.8
23	NHS	C000094W	54.0	54.2
1	OFF	C002047N	10.2	10.4
2	OFF	C048011N	4.0	4.2
3	OFF	C048245N	10.8	11.0
4	OFF	C048245N	12.4	12.6
5	OFF	C052050E	0.4	0.6
6	OFF	C056931N	0.6	0.8
7	OFF	C081014E	0.6	0.8
8	OFF	C081016E	21.4	21.6
1	PRI	C000004N	54.5	54.7
2	PRI	C000028N	93.0	93.2
3	PRI	C000028N	94.0	94.2
4	PRI	C000048N	13.8	14.0
5	PRI	C000048N	18.0	18.2
6	PRI	C000078N	45.0	45.2
1	SEC	C000298S	10.2	10.4
2	SEC	C000306N	4.0	4.2
3	SEC	C000313S	0.2	0.4
4	SEC	C000313S	21.0	21.2
5	SEC	C000313S	30.6	30.8
6	SEC	C000314N	25.8	26.0
7	SEC	C000419W	13.4	13.6
8	SEC	C000451S	5.6	5.8
9	SEC	C000451S	23.2	23.4
10	SEC	C000451S	28.0	28.2
11	SEC	C000463S	3.0	3.2
12	SEC	C000463S	3.6	3.8
1	URB	C001014E	0.9	1.0
2	URB	C001022E	0.9	1.0

Unit #	Highway System	Corridor ID	Starting Milepost	Ending Milepost
1	NHS	C000014E	102.9	103.1
2	NHS	C000014E	129.3	129.5
3	NHS	C000014E	138.5	138.7
4	NHS	C000014E	144.9	145.1
5	NHS	C000016N	21.7	21.9
6	NHS	C000016N	34.1	34.3
7	NHS	C000016N	42.7	42.9
8	NHS	C000053N	36.9	37.1
9	NHS	C000057E	33.3	33.5
10	NHS	C000057E	53.3	53.5
11	NHS	C000057E	63.3	63.5
12	NHS	C000057E	71.9	72.1
13	NHS	C000057E	75.3	75.5
14	NHS	C000057E	84.9	85.1
15	NHS	C000057E	103.3	103.5
16	NHS	C000057E	108.9	109.1
17	NHS	C000057E	114.3	114.5
18	NHS	C000057E	141.1	141.3
19	NHS	C000057E	159.3	159.5
20	NHS	C000057E	159.7	159.9
21	NHS	C000061N	28.8	29.0
22	NHS	C000061N	67.2	67.4
23	NHS	C000063N	33.6	33.8
24	NHS	C000063N	35.4	35.6
1	PRI	C000014E	78.4	78.6
2	PRI	C000014E	80.8	81.0
3	PRI	C000014E	84.8	85.0
4	PRI	C000014E	99.2	99.4
5	PRI	C000014E	146.9	147.1
6	PRI	C000014E	191.9	192.1
7	PRI	C000043E	10.2	10.4
8	PRI	C000043E	27.6	27.8
9	PRI	C000045N	27.4	27.6
10	PRI	C000066N	1.0	1.2
11	PRI	C000066N	2.8	3.0
12	PRI	C000066N	13.4	13.6
13	PRI	C000080S	37.0	37.2
14	PRI	C000080S	62.2	62.4
15	PRI	C000081E	33.4	33.6
1	SEC	C000236N	2.4	2.6
2	SEC	C000236N	20.2	20.4
3	SEC	C000238S	70.7	70.9
4	SEC	C000244N	17.8	18.0
5	SEC	C000244N	19.6	19.8
6	SEC	C000297N	26.4	26.6
7	SEC	C000297N	28.0	28.2
8	SEC	C000426E	17.1	17.3
9	SEC	C000500N	2.6	2.8
10	SEC	C000551N	1.0	1.2
1	URB	C000237N	0.6	0.7
2	URB	C000237N	0.8	0.9