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Department of Transportation

Applied Research and Innovation Branch

COMPREHENSIVE EVALUATION OF PAVEMENT MAINTENANCE ACTIVITIES APPLIED TO COLORADO LOW-VOLUME PAVED ROADS-PHASE II

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16. Abstract The primary objective of this report is to document the effectiveness of low-cost treatments applied to low-volume roads (LVRs) in Colorado. By analyzing historical pavement performance data and treatment records, the effectiveness of each treatment type was determined. It was concluded that some surface maintenance strategies are effective long-term treatments for fatigue, longitudinal, and transverse cracking. However, the effectiveness of these treatments depends mainly on the initial condition index. An alternative maintenance strategy was proposed for CDOT considering a light rehabilitation technique with a surface treatment for poor roads. A long-term analysis of road maintenance and costs was conducted on a case study in Colorado. The results show the impact of both current and proposed maintenance strategies on the future of pavement condition. It was found that the proposed strategy would enhance the effectiveness of current policies followed by CDOT. This report also investigates the badly deteriorated LVRs in Colorado considering a specific characteristic of marginal pavement conditions. Different treatment strategies were evaluated to explore how reliable applying more pavement maintenance techniques is on these roads. The analysis of funding needs shows that marginal roads can be improved effectively within a maintenance capital improvement plan of five years from 2016 to 2020. Implementation CDOT is advised to consider specific criteria while applying chip seals and thin overlays on roads. Chip seals shall be applied only while the pavement is still performing well. Pavement performance should be evaluated effectively considering the individual pavement condition indices rather than the overall drivability life value. Cold in-place recycling and full depth replacement are recommended to be integrated with the current applications of chip seals and thin overlays.			
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Executive Summary

In the State of Colorado, low-volume paved roads are currently maintained with low-cost treatments to enhance the overall pavement condition represented by drivability life (DL). Colorado Department of Transportation (CDOT) assigns mainly two maintenance categories. The long-term effectiveness of such strategy at improving pavement performance is not well understood or documented. The primary objective of this report is to document the effectiveness of some in-practice treatments applied to low-volume roads (LVRs) in Colorado. By analyzing historical pavement performance data and treatment records, the effectiveness of each treatment type was determined using an evaluation methodology presented in this report. It was concluded that some surface maintenance strategies are effective long-term treatments for fatigue, longitudinal, and transverse cracking. However, the effectiveness of these treatments depends mainly on the initial condition index. An alternative maintenance strategy was proposed for CDOT considering a light rehabilitation technique with a surface treatment for poor roads. A long-term analysis of road maintenance and costs was conducted on a case study in Colorado. The results show the impact of both current and proposed maintenance strategies on the future of pavement condition. It was found that the proposed strategy would enhance the effectiveness of current policies followed by CDOT. This report also investigates the badly deteriorated LVRs in Colorado considering a specific characteristic of marginal pavement conditions. The different treatment strategies were evaluated to explore how reliable applying more pavement maintenance techniques is on these roads. The analysis of funding needs shows that marginal roads can be improved effectively within a maintenance capital improvement plan of five years from 2016 to 2020. Investing more effort in the marginal roads using only low-cost treatments is not recommended since the effectiveness of such treatments at this stage may not be reliable.

Implementation: The effectiveness of applying low-cost treatments on low-volume roads (LVRs) are dependent on the existing condition of pavement. Therefore, Colorado Department of Transportation (CDOT) is advised to consider specific criteria while applying chip seals and thin overlays on roads. Chip seals shall be applied only while the pavement is still performing well. Pavement performance should be evaluated effectively considering the individual pavement condition indices rather than the overall drivability life value. Accordingly, the pavement management engineers of the different CDOT regions are encouraged to apply chip seals and thin overlays using the threshold values of fatigue and transverse indices included in the proposed maintenance strategy.

The proposed strategy includes light rehabilitations with recycling techniques that can maintain low-volume roads to the desired performance target cost-effectively. Cold in-place recycling and full depth replacement are recommended to be integrated with the current applications of chip seals and thin overlays. Treatment options should be selected based on threshold values of fatigue and transverse indices. In addition, the strategy of maintaining roads by recycling treatments is more encouraging for LVRs with marginal conditions. These roads could be effectively maintained over a capital improvement plan of five years as shown in the report.

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List of Abbreviations

The following table describes the various abbreviations and acronyms used throughout the report:

Abbreviation	Description
AADT	Annual Average Daily Traffic
ACHP	Asphalt Chip Seal
ACIP	Asphalt Cold in Place Recycle
ADTT	Average Daily Truck Traffic
AHIP	Asphalt Hot in Place Recycling
AMDO	Asphalt Medium Overlay
AMFL	Asphalt Mill and Fill
AMJO	Asphalt Major Overlay
AREC	Asphalt Reconstruction
ATHO	Asphalt Thin Overlay
CDOT	Colorado Department of Transportation
CIR	Cold In-Place Recycling
CSU	Colorado State University
DL	Drivability Life
DN	Do Nothing
DOT	Department of Transportation
FDR	Full Depth Reclamation
IRI	International Roughness Index
LVR	Low-Volume Road
MR&R	Maintenance, Rehabilitation, and Repair
MUTCD	Manual on Uniform Traffic Control Devices
PMS	Pavement Management System
RSL	Remaining Service Life
WYT ² /LTAP	Wyoming Technology Transfer Center/Local Technical Assistance Program

Chapter 1: Introduction

A critical role of a pavement management system (PMS) is to provide useful and defensible programs of pavement management activities and resources (AASHTO, 1990). Over the last decade, significant progress has been made to customize the maintenance policies of low-volume roads (LVRs) to local needs and available resources. Because LVRs have relatively lower usage and occur in regions connecting remote areas with local access and collector roads, they are commonly constructed with low conventional design standards. When it comes to managing LVRs, state Departments of Transportation (DOTs) and local agencies are not supported with the appropriate funding levels for optimal serviceability when compared to higher volume roads. Transportation engineers and policy makers need to define effective pavement treatments and informed maintenance decisions to get the best value of the applied maintenance policies.

The strategy of low-cost treatments and light rehabilitation is extensively employed among local agencies and state DOTs on LVRs even if the pavement performance is poor. However, the effectiveness of the applied treatments at improving pavement performance is not well understood or documented. In the context of pavement preservation, low-cost and surface treatments should be applied to roads while the pavement is still performing well (Galehouse, 2004). When considering preventive maintenance as the only treatment for distressed low-volume paved roads, these applications have different effectiveness depending on the initial pavement performance and the surrounding environment. Some of the applied treatments may provide only short-term effectiveness and agencies make unnecessary expenditures when applying these strategies.

In the State of Colorado, LVRs are currently maintained with only low-cost treatments. The current policy of Colorado DOT (CDOT) includes two allowed categories of treatments which are “surface seals” and “thin overlays”. The surface seal treatment category is the lowest cost of treatment recommended by the PMS for treatment of LVR and can include any combination of treatments throughout the length of the project as long as the total cost does not exceed the lane-mile cost of the surface seal category. The ultra-thin overlay treatment category is the other low cost treatment recommended by the PMS for treatment of LVRs in worse pavement condition and can include any combination of treatments throughout the length of the project as long as the total cost does not exceed the lane-mile cost of the ultra-thin category of treatment cost. Chip sealing is one of the most common maintenance options applied to LVRs in Colorado for pavements in good condition (Galehouse, 2004). Overlay application is very limited and it is applied to LVRs only occasionally as funds are available (Hafez et al., 2017). Also, the lack of pre-overlay treatments affects the performance of overlays when they are placed directly on severely distressed pavements. As a result, poor roads that were applied with short-term improvements and no pre-overlay treatment of severely distressed areas display high post-treatment deterioration rates. This study investigates low-cost rehabilitation alternatives to help CDOT balance between pavement preservation and structural improvement on LVRs.

1.1 Objectives

The primary objective of this report is to assist CDOT and other transportation agencies in determining the optimal allocation of available network budget, and the corresponding maintenance policy for LVRs. Considering different maintenance policy should be evaluated

by studying the benefit-cost impact of maintenance alternatives compared to the applied strategy. This report aims to achieve the following:

1. analyze the past performance of historical treatments applied to LVRs,
2. develop a methodology to identify the effectiveness of applied treatments in extending the service life of pavements on LVRs,
3. highlight maintenance activities that are successfully meeting agency needs,
4. establish an alternative maintenance strategy including effective treatments and informed maintenance decisions,
5. compare between the cost-effectiveness of different maintenance policies recommended for LVRs,
6. study the impact of current CDOT policy on future performance of LVRs in Colorado,
7. evaluate the effectiveness of maintenance strategies applied to poor roads with marginal conditions, and
8. identify capital improvement plans on LVRs with marginal conditions.

1.2 Study Background

According to the Manual on Uniform Traffic Control Devices (MUTCD), a LVR is defined as a road carrying an Annual Average Daily Traffic (AADT) less than 400 vehicles per day (MUTCD, 2009). However, most DOTs consider state specific traffic ranges of high, medium, and low-volume roads to keep the road network of each type of manageable size (Hafez et al., 2017). According to CDOT, LVRs are defined as roads carrying ADT less than 2000 vehicles per day and average daily truck traffic (ADTT) less than 100 trucks per day - due to the high traffic volumes in Colorado (Redd, 2013). In recent years, state DOTs and transportation

agencies have focused on performing cost-effective pavement maintenance on LVRs. Agencies are establishing standards and practices for managing their LVRs. The objective is to customize current state and national standards to the available resources of local governments and municipalities. In 2015, Colorado State University (CSU) and the Wyoming Technology Transfer Center/Local Technical Assistance Program (WYT²/LTAP) started a research project to evaluate current national practices and recommend maintenance policies for managing low-volume paved roads in Colorado.

In order to document the most effective and recommended pavement management practices for LVRs, the study consists of two research phases. The first phase has been completed (*Best Practices to Support and Improve Pavement Management Systems for Low-Volume Paved Roads, 2017*) while the second phase is provided in this report. These research phases are described in the following sections.

1.2.1 Previous Study: Phase I

The main objective of the first phase of this study was to investigate current national and local practices and recommended treatment policies that are in place on LVRs. A comprehensive literature review was conducted to highlight and discuss the most commonly applied treatment techniques and new technologies on LVRs. An independent review was introduced about the definitions of LVRs in addition to the key points of LVR pavement design, maintenance, and rehabilitation. Since recycling technologies are being integrated extensively in the maintenance of LVRs, detailed information was provided about the applications of cold in-place recycling (CIR) and full depth reclamation (FDR). The previous management efforts of different state DOTs and transportation agencies were presented showing specific maintenance policies for their LVRs. Most DOTs are combining recycling techniques with surface treatments and chip

seals. Strategies of CIR with chip seals or thin overlays were studied and they can improve the structural status of pavements with lower costs.

The WYT²/LTAP conducted online surveys as part of the research project conducted jointly with the CDOT. The objective of the surveys was to document what transportation agencies, including state DOTs, are doing to face the challenge of managing LVRs with limited resources. Four online surveys were sent to the TRB low-volume roads committee, eight state DOTs, local governments in Colorado, and the material advisory committee in the CDOT. These surveys have an average of 26 questions dealing with PMS specifications recommended for low-volume paved roads. Seventy-one transportation agencies and individuals responded to the survey. The findings of this study provide transportation agencies nationwide with comprehensive guidelines for managing LVRs. It also gives insight about the effectiveness of common treatment strategies applied to LVRs by different states at different management levels (Hafez et al., 2017).

1.2.2 Current Study: Phase II

In today's global economy, some innovative pavement treatments have been developed to customize available resources to limited budgets. However, most of these strategies lack adequate justification or scrutiny to be applied on LVRs. In addition, proposed maintenance strategies are recommended to be optimized within the available budgets to preserve the LVRs network at an acceptable level of service. The second study performs a comprehensive analysis to demonstrate the optimal use of maintenance, rehabilitation, and repair (MR&R) strategies. In 2016, CSU and the WYT²/LTAP started the second research phase to investigate the cost-effectiveness of applied treatments in Colorado based on historical pavement condition data and treatment records so that recommendations can be developed for CDOT and other

transportation agencies. This study develops a treatment evaluation process and an optimization model to compare between the current CDOT maintenance policy and an alternative strategy recommended for LVRs in Colorado. The findings are summarized and documented in this report which focuses only on the management of low-volume paved roads. This approach is expected to increase understanding of selected maintenance policies for LVRs.

Chapter 2: Literature Review

In 2013, CDOT began evaluating the condition of pavements using the Drivability Life (DL) metric. This process provides more reliable pavement performance criteria that reflects the actual driving condition compared to the regular Remaining Service Life (RSL) procedure. In the context of managing LVRs, the consequence of using DL evaluation process is that treatments focus more on enhancing drivability condition in pavement sections using low-cost surface treatments. This chapter provides detailed information about the pavement performance terminology of drivability life for paved roads in Colorado.

2.1 Drivability Life

Drivability Life (DL) is pavement condition measure developed by CDOT to evaluate the overall condition and performance of pavements. DL is an indication of how long a road is anticipated to have acceptable driving conditions in years (Redd, 2013). DL is determined for asphalt pavement based on a trend analysis of five main distresses. As shown in Figure 2.1, three cracking types are considered in the evaluation process, including fatigue, longitudinal, and transverse cracking. These cracks have different severity levels depending on the size, width, and depth of each crack (Miller and Bellinger, 2003). The fourth distress type is road roughness which is an indication of distortion of the road surface along a plane in the travel direction. The higher the road roughness is, the lower the ride quality. The most widely accepted index for measuring roughness is the International Roughness Index (IRI) (Sayers et al., 1986). IRI is represented by a ratio of accumulated suspension motions of a vehicle divided by the distance travelled by the vehicle (m/km or inches/mile). Higher IRI values represent more road roughness. The IRI is obtained by a quarter car model shown in Figure 2.2. The last distress is

pavement rutting. Rutting is a permanent deformation in the pavement surface along the wheel path, as shown in Figure 2.3.

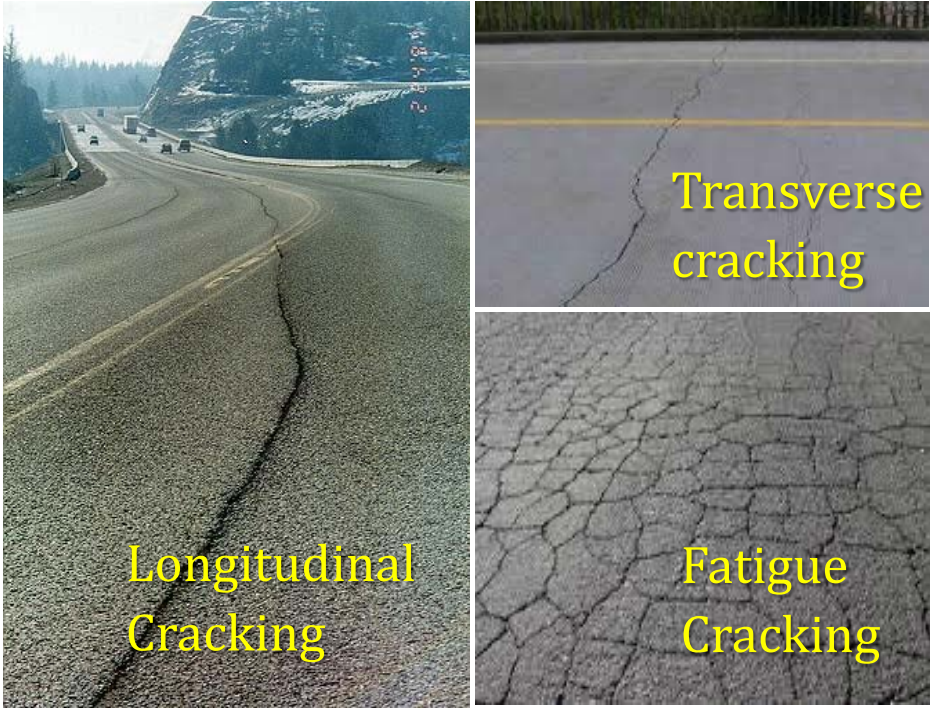


Figure 2.1: Pavement Cracking Indices for Paved Roads in Colorado

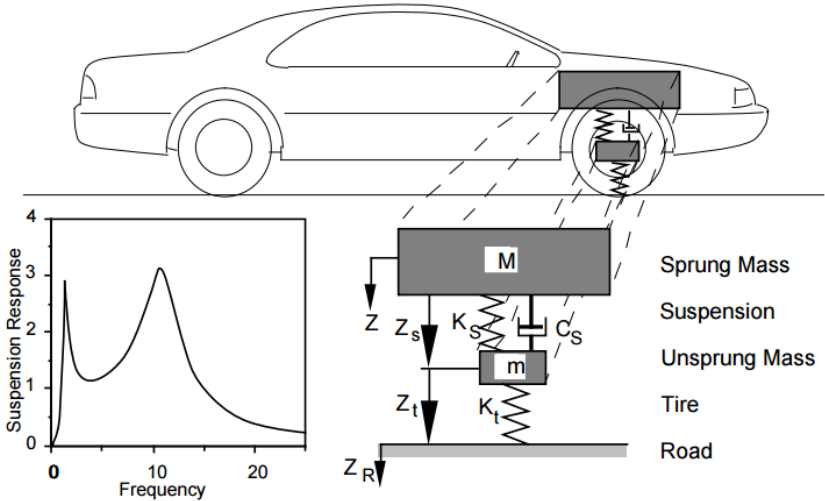


Figure 2.2 Quarter Car Model (Gillespie, 1992)



Figure 2.3: Shape of Rutting in a Pavement Surface (Miller and Bellinger, 2003)

All of the previous distresses are normalized into condition indices on a scale from 0 (pavement's worst state) to 100 (excellent or brand new pavement). Consequently, five condition indices are considered while analyzing the pavement performance of LVRs in Colorado. They are described as follows:

- FATIG_IDX: Fatigue Index
- LONG_IDX: Longitudinal Index
- TRANSV_IDX: Transverse Index
- RIDE_IDX: Ride Index
- RUT_IDX: Rut Index

As shown in Equation (1), the three cracking indices (e.g., fatigue, longitudinal, and transverse indices) are determined based on the relative quantity of cracking at each severity level (e.g., low, medium, and high) compared to the maximum possible amounts on pavements. These maximum values were developed by CDOT and they are listed in Table 2.1. Ride and rut indices are determined using Equations (2) and (3) respectively. Based on the value of each

distress index, the pavement performance can be classified into one of the five categories listed in Table 2.2.

$$Distress\ Index = 100 \left(1 - \frac{Distress_{LOW}}{Max_{LOW}} - \frac{Distress_{MID}}{Max_{MID}} - \frac{Distress_{HIGH}}{Max_{HIGH}} \right) \quad (1)$$

$$RIDE\ Index = 100 * \left(1 - \frac{IRI_{avg} - A_{min}}{B_{max}} \right) \quad (2)$$

$$Rut\ Index = 100 * \left(1 - \frac{Rut_{avg} - B_{min}}{B_{max} - B_{min}} \right) \quad (3)$$

where,

- $Distress_{LOW}$, $Distress_{MID}$, and $Distress_{HIGH}$: Quantity of distress at each severity level (e.g., low, medium, and high) for Fatigue cracking (feet²), transverse cracking (feet), and longitudinal cracking (feet) respectively.
- IRI_{avg} and Rut_{avg} : Average IRI (inch/mile) and rut depth (inch) respectively.
- The values of all other parameters of Equation (1) through Equation (3) are listed in Table 2.1.

Table 2.1: Values of Different Parameters for Asphalt Pavement

Parameter	Fatigue Index	Transverse Index	Longitudinal Index	Ride Index	Rut Index
Max_{LOW}	6230	160	3802	-	-
Max_{MID}	3375	111	2492	-	-
Max_{HIGH}	2014	49	1478	-	-
A_{min}	-	-	-	0	-
B_{min}	-	-	-	-	0.15
B_{max}	-	-	-	26	0.95

Table 2.2: Pavement Performance Category for Each Condition Index

Index Range	Category
Greater than 90	Excellent
80 – 90	Good Condition
70 – 79	Fair Condition
60 – 69	Poor Condition
Less than 60	Very Poor Condition

According to CDOT, the pavement has a DL of 0 when any of the distress indices is less than 50. Each condition index has a specific performance curve as a function of pavement age. The overall DL value of a road is the minimum time remaining until any of the condition indices reaches a threshold value of 50. Figure 2.4 shows an example to determine DL of a road segment. Based on the historical values of distress indices, the pavement performance curve is fit with respect to the pavement age. From the existing value of the condition index, the pavement age can be projected (which is 7 years in the example). Based on the threshold of 50, the future pavement age can be estimated when the road becomes out of service (which is 13 years in the example). The DL value then can be determined which is the difference between the two ages (e.g., 6 years).

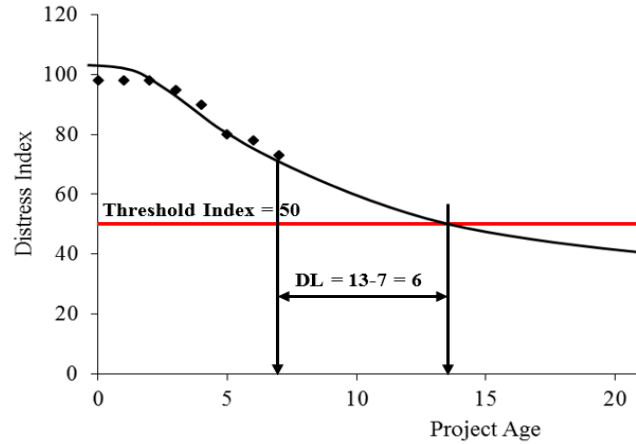


Figure 2.4: An Example of Drivability Life Projection on a Pavement Performance Curve

Three categories are considered to classify the overall DL value of a road. CDOT uses different standards for DL on different road classifications. The cutoff values of DL categories for LVRs are listed in Table 2.3.

Table 2.3: Drivability Life Categories for Low-Volume Roads

DL Range (years)	Category
Greater than 10	High
4 – 10	Moderate
3 and less	Low

Chapter 3: Comprehensive Evaluation Process of Alternative Treatments and Maintenance Policies

3.1 Introduction

To investigate the impact of current CDOT maintenance policy on LVRs, a comprehensive evaluation process was developed. This process includes pavement performance analysis to evaluate the effectiveness of applied treatments in addition to optimization techniques. To study the effectiveness of the applied treatments, the post-treatment performance of pavements should be evaluated. This chapter provides a methodology to assess the current practices applied on LVRs using the historical condition data.

3.2 Evaluation Methodology of Applied Pavement Treatments

A long-term evaluation is recommended when studying the effectiveness of treatments. This evaluation may include constructing test sections to document the performance after applying treatments. Building pavement test sections provides detailed information about the long-term performance of roads. However, it takes considerable time to complete the analysis. In addition, test sections may provide limited results since they are restricted by the condition of test section sites. There are numerous parameters affecting the performance of pavement after applying treatments. Some parameters are not considered in the analysis when studying the performance of the test sections. Another approach of evaluating treatments is by analyzing the historical data of the actual pavement performance of LVRs.

3.2.1 Pavement Performance Model

Pavement performance models are predictive models developed to display the variation or the history of pavement serviceability with respect to time. Pavement performance models hold a very significant place in the development of a pavement management system. This is because many other components in the system are related to the output of the pavement performance models. Such components include the pavement structural design, maintenance treatment strategies, or priority programming (Li and XIE, 1997).

The pavement performance of an individual pavement depends on the pavement materials, soil characteristics, traffic loads, and environmental conditions. However, as displayed in Figure 3.1, the conceptual performance curves of pavements have a typical trend: older pavement sections deteriorate faster and they cost more money to fix. It is not prudent to include only the roads requiring reconstruction in the maintenance strategy of the road network. This is not only an expensive strategy, but good and fair pavements will also continue to deteriorate to very poor levels. Therefore, the process of only repairing the worst roadways when they fall into very poor condition is not a cost-effective strategy. Agencies are applying frequent early treatments in the life of pavement to keep the condition of roads at an acceptable level.

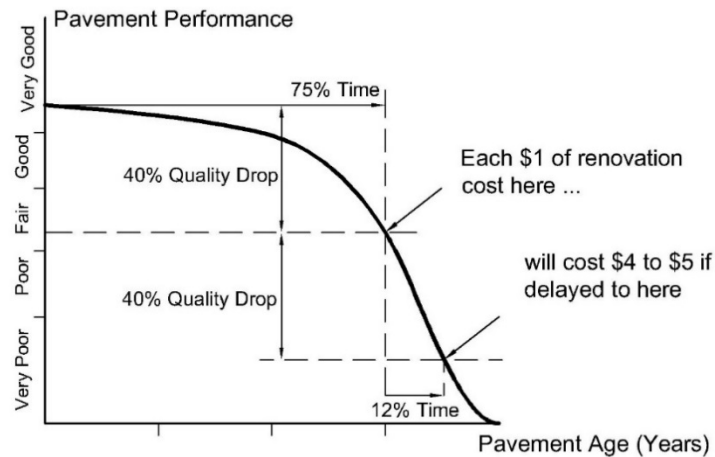


Figure 3.1: Relationship between Pavement Performance and Repairing Costs (Shahin and Walter, 1990)

When it comes to managing LVRs, transportation agencies have low budgets allocated for maintenance. Meanwhile, a high percentage of LVRs is currently in poor condition. Some LVRs accommodate heavier truck loads than the original design values because of increasing industrial activities (Huntington et al., 2013). In addition, most LVRs have aged beyond their design life and there is no historical maintenance and rehabilitation records on these roads. Many agencies apply low-cost treatments on LVRs even if the pavement is in poor condition. When roads receive major treatments, the pavement condition increases significantly on the pavement performance curve. However, some of these roads deteriorate rapidly after applying treatments. The various trends of pavement performance after applying treatments can be observed using the pavement performance model.

3.2.2 Evaluation Criteria of Applied Pavement Treatments

In order to develop evaluation criteria rating the effectiveness of treatments, the first step is to define the treatment categories. Treatments can be classified as effective or not effective treatments based on a minimum condition improvement amount and a corresponding post-

treatment performance. In addition to effective and ineffective treatment categories, another category for applied treatments effectiveness is called 'Uniform performance'. When pavement treatments have uniform performance, they tend to show insignificant deterioration or improvement overtime. The reason for uniform performance is either the condition is at a high level and the rate of deterioration is accordingly small, or routine maintenance has been applied to lower the rate of deterioration of minor defects. These kinds of treatments are beyond the scope of this study because the study focuses only on treatments that provide major improvements. Since most of LVRs in Colorado are in the low DL category, the study focuses only on roads with significant change in the pavement performance. As will be presented in the descriptive analysis chapter, the historical condition data shows that there are some roads having overall low DL values because only one condition index has very low amount while the other indices are still in good levels. Therefore, this study is trying to define treatments that have significant effectiveness on a particular index. Accordingly, treatments were classified in this study into the following four categories:

- Effective treatment,
- Not effective treatment,
- Uniform performance, and
- Other

In order to assign each treatment to a category based on the historical performance data of the road network, three main criteria were identified as shown in Table 3.1. These criteria were simplified to meet the available PMS data parameters of all agencies including local agencies. Each criterion has a specific pavement condition range identified by transportation

agencies depending on the nature of their pavement performance parameters. When roads do not meet any of the three listed criteria, the performance curve of these roads is assigned to the “Other” category.

Table 3.1: Pavement Performance Criteria for Treatment Categories

Criterion	Description
1- Pavement Condition Improvement	A minimum amount of improvement in the condition index should be defined to consider the applied treatment as a major treatment.
2- First Deterioration Amount	A maximum deterioration amount should be defined for the first and second years after applying treatments. Treatments are classified as effective when the deterioration of post-treatment performance is within the First Deterioration Amount.
3- Difference in Pavement Condition for Uniform Performance	A maximum amount of difference in the condition index each year should be defined. When roads have historical values of pavement condition within this criterion, the roads have uniform performance and are assumed to receive routine maintenance.

For Colorado LVRs, specific ranges of each evaluation criterion were set for the five condition indices and they are listed in Table 3.2. These effective ranges were developed based on the distribution of the condition indices of the whole network. Each treatment type can be evaluated using these effective ranges. For example, in the context of fatigue index, the applied treatment is effective when the amount of improvement is more than the first criterion of “Pavement Condition Improvement” which is 15 and the amount of deterioration in each year of the first two years is less than the second criterion of “First Deterioration Amount” which is 5. Figure 3.2 shows an example of a road segment in Colorado received an effective treatment of cold in-place recycling in 2011. For ineffective treatments, Figure 3.3 shows an example of a road segment in Colorado where a chip seal was applied in 2013. According to the historical values of transverse index, the chip seal was found to cause a major enhancement on the pavement because the transverse index was increased from 79 to 89. However, the post-

treatment performance shows high deterioration amounts in 2014 and 2015 that are more than the First Deterioration Amount of 5 for transverse index. Hence, the chip seal treatment was classified as ineffective for this case.

No significant improvement was considered when the historical improvement of the condition index is less than the first criterion. In addition, if the pavement performance is within the third criterion of “Difference in Pavement Condition for Uniform Performance”, then the applied treatment was considered as kinds of routine maintenance for uniform performance. Also, uniform performance was described for roads without any treatment records but the pavement condition remains relatively stable as shown in Figure 3.4.

Table 3.2: Effective Ranges for the Evaluation Criteria of Applied Treatments

Criterion	Fatigue Index	Longitudinal Index	Transverse Index	Ride Index	Rut Index
1- Pavement Condition Improvement	15	5	10	10	10
2- First Deterioration Amount	5	2	5	5	5
3- Difference in Pavement Condition for Uniform Performance	5	2	5	5	5

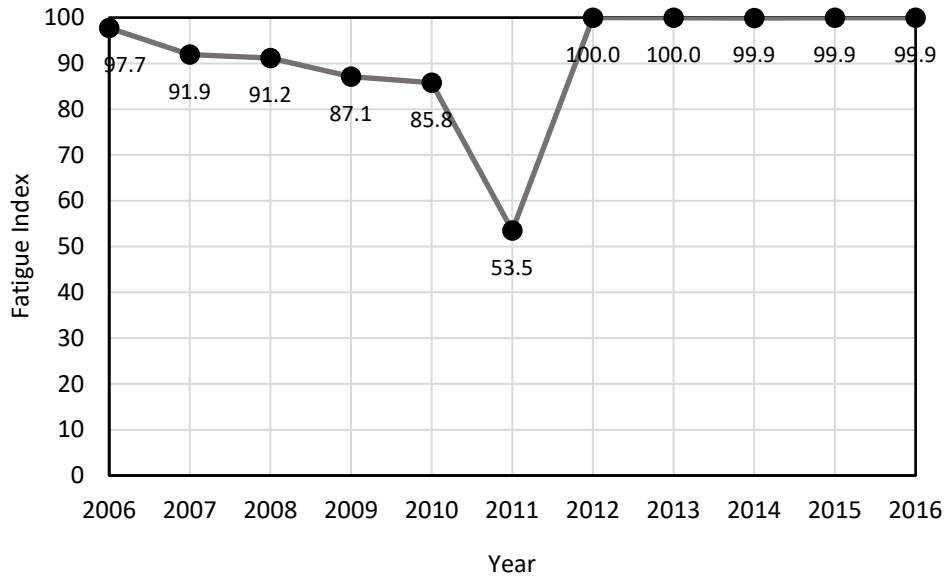


Figure 3.2: Example of Receiving an effective treatment of cold in-place recycling in 2011 shows the effectiveness on the individual performance of Fatigue Index (Route No. 36C; Reference Mile Post = 80.82; Ending Mile Post = 83.71)

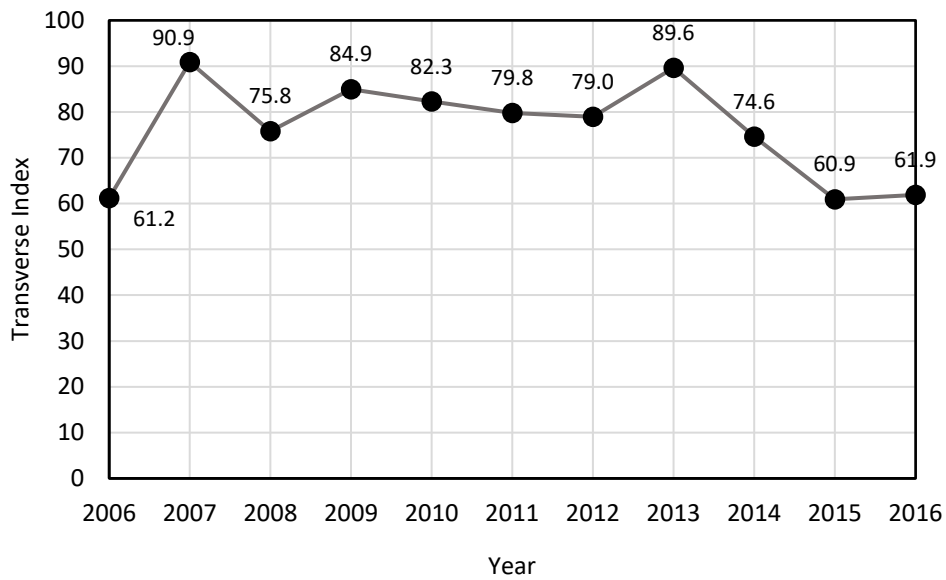


Figure 3.3: Example of Receiving an ineffective treatment of a chip seal in 2013 shows the effectiveness on the individual performance model of Transverse Index (Route No. 72B; Reference Mile Post = 44.10; Ending Mile Post = 48.35)

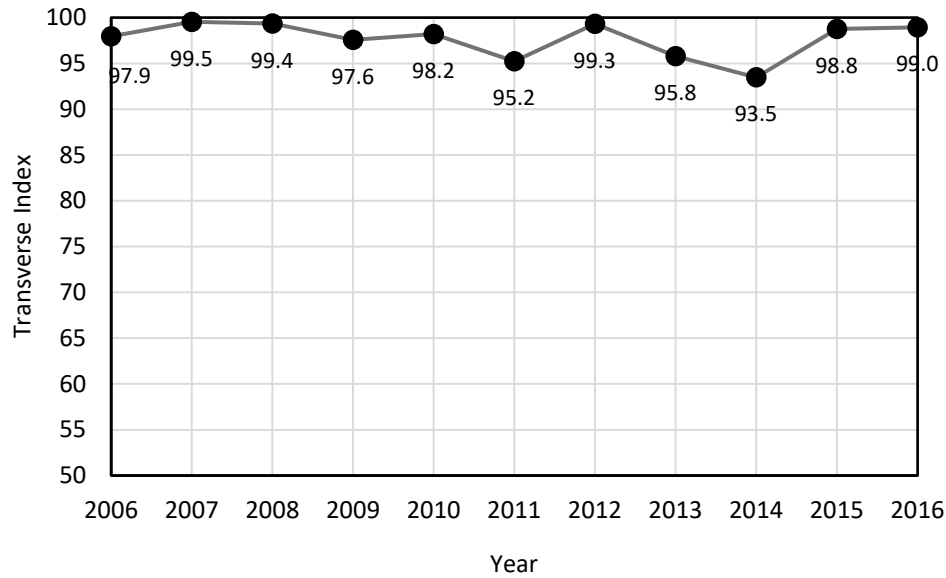


Figure 3.4: Example of stable pavement condition shows uniform performance of Fatigue Index (Route No. 12A; Reference Mile Post = 43.03; Ending Mile Post = 56.85)

The research methodology for evaluating applied treatments is shown graphically in Figure 3.5. Roadway segmentation is a primary task in PMS at the network level. The roadway network is divided into segments which are referenced linearly using the milepost of roads. The roadway segmentation was done by CDOT and a segmented data was received for all roads in different categories. The objective of roadway segmentation is to reduce the volume of data sets for the network. All segments should have relatively homogeneous characteristics such as usage levels, geometry, and surface types. Accordingly, the pavement condition data can be aggregated by taking average values along each segment. The pavement performance data is then filtered based on traffic volumes to include the LVRs segments only. The next step is to develop the pavement performance models for each segment. The historical maintenance records are also aggregated for each segment using the linear reference. By following the

performance criteria stated above on every treatment for every segment, the treatments effectiveness can be identified.

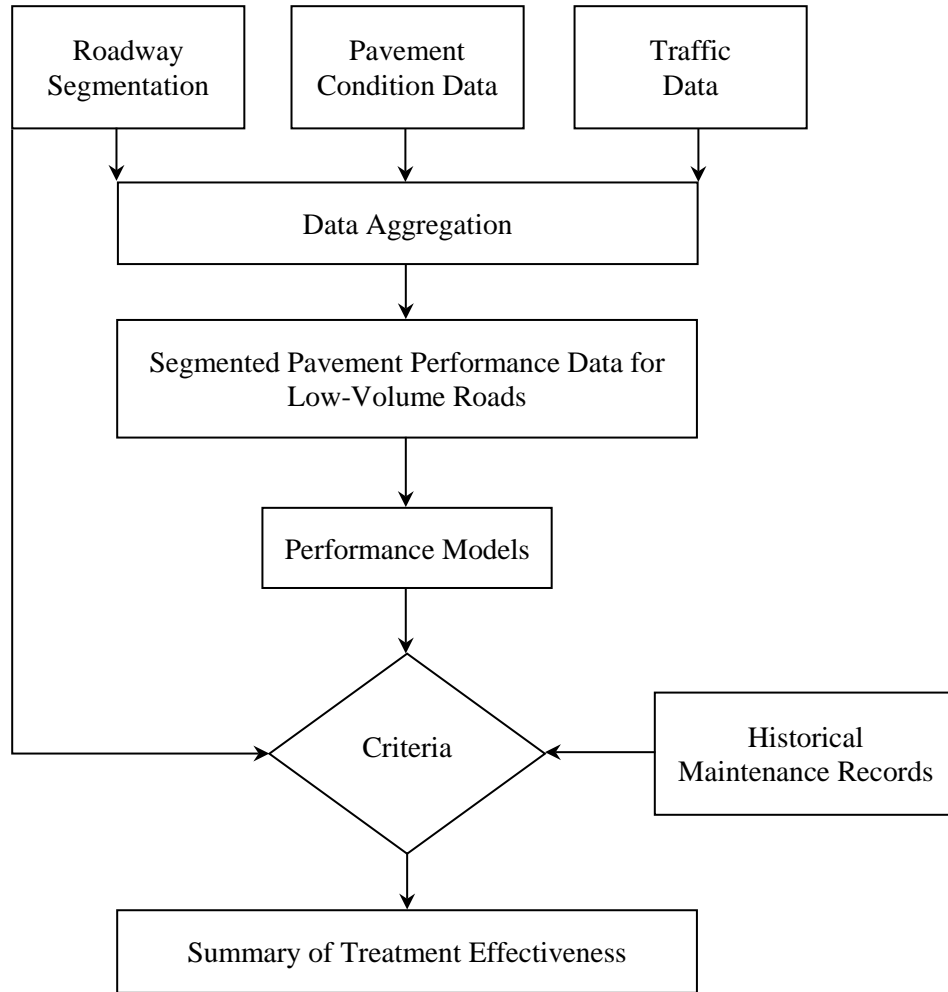


Figure 3.5: Research Methodology of Evaluating Treatments

Chapter 4: Past Pavement Performance on Low-Volume Roads in Colorado

4.1 Introduction

A historical condition dataset was received from CDOT for the time period from 2006 to 2016 showing the recorded pavement condition data for each year on LVRs. Also, historical treatment records were analyzed to investigate how the applied maintenance activities affected the long-term pavement performance. The descriptive analysis of the past pavement performance and applied treatments is introduced in this chapter.

4.2 Descriptive Analysis of Low-Volume Paved Roads in Colorado

In the State of Colorado, about 9,106 center-lane miles are managed and maintained by CDOT (Redd, 2013). More than 50% of these roads are not considered as national highways. There exists 2,022 miles of low-volume paved roads in Colorado's engineering regions shown in Figure 4.1.

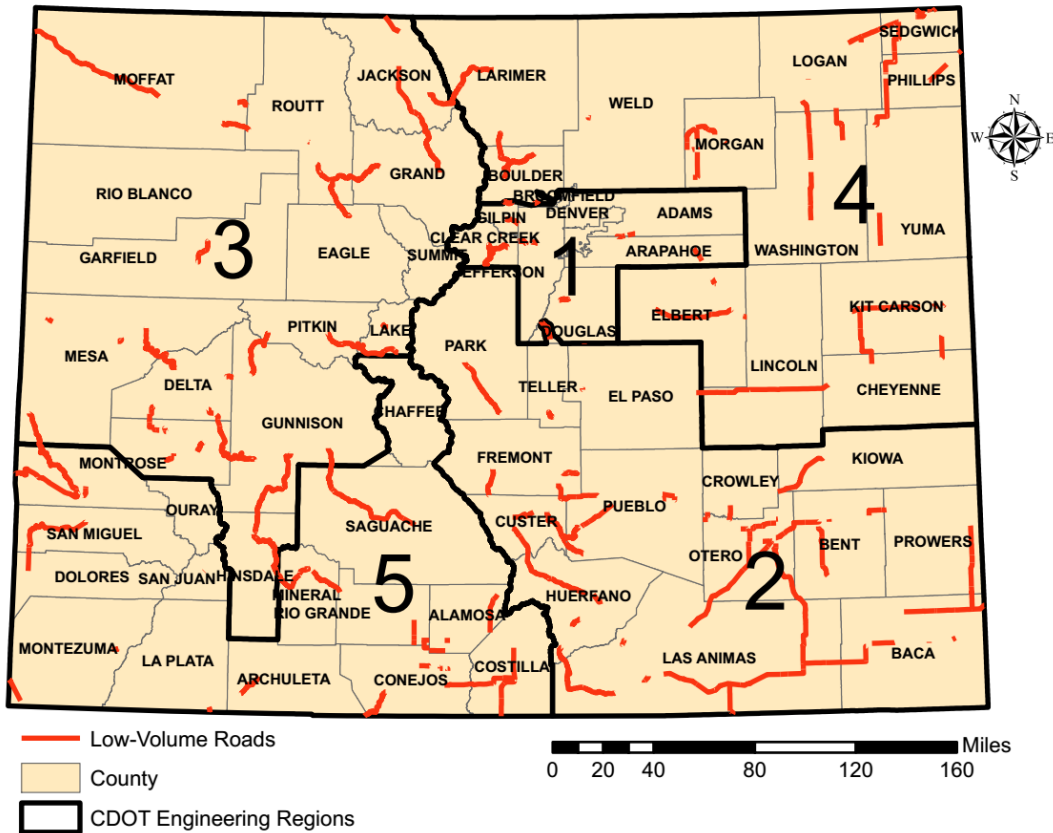


Figure 4.1: Colorado Department of Transportation Engineering Regions (CDOT, 2017)

As shown in Figure 4.2, low-volume paved roads are distributed differently among CDOT engineering regions. The lowest mileage of LVRs occurs in Region 1 which includes the urbanized Denver metro area. Region 2 has the highest mileage of LVRs in Colorado.

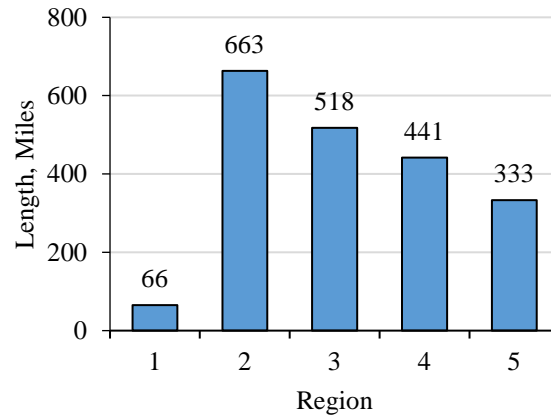


Figure 4.2: Mileage Distribution of Low Volume Paved Roads by Region in Colorado

Although CDOT’s upper limit of traffic volume for LVRs is 2000 vehicles per day, most LVR traffic volumes are not more than 800 vehicles per day. Figure 4.3 shows the mileage split of LVRs in different traffic ranges. The range of traffic volume from 0 to 400 vehicles per day is the most distributed category on all regions except for Region 1 where higher traffic volumes are expected in the metropolitan area of Denver. The following subsections provide detailed information about the current and historical performance of pavements in the context of the five condition indices. In addition, the historical treatments records are analyzed to show the type and quantity of low-volume treatment applications in Colorado.

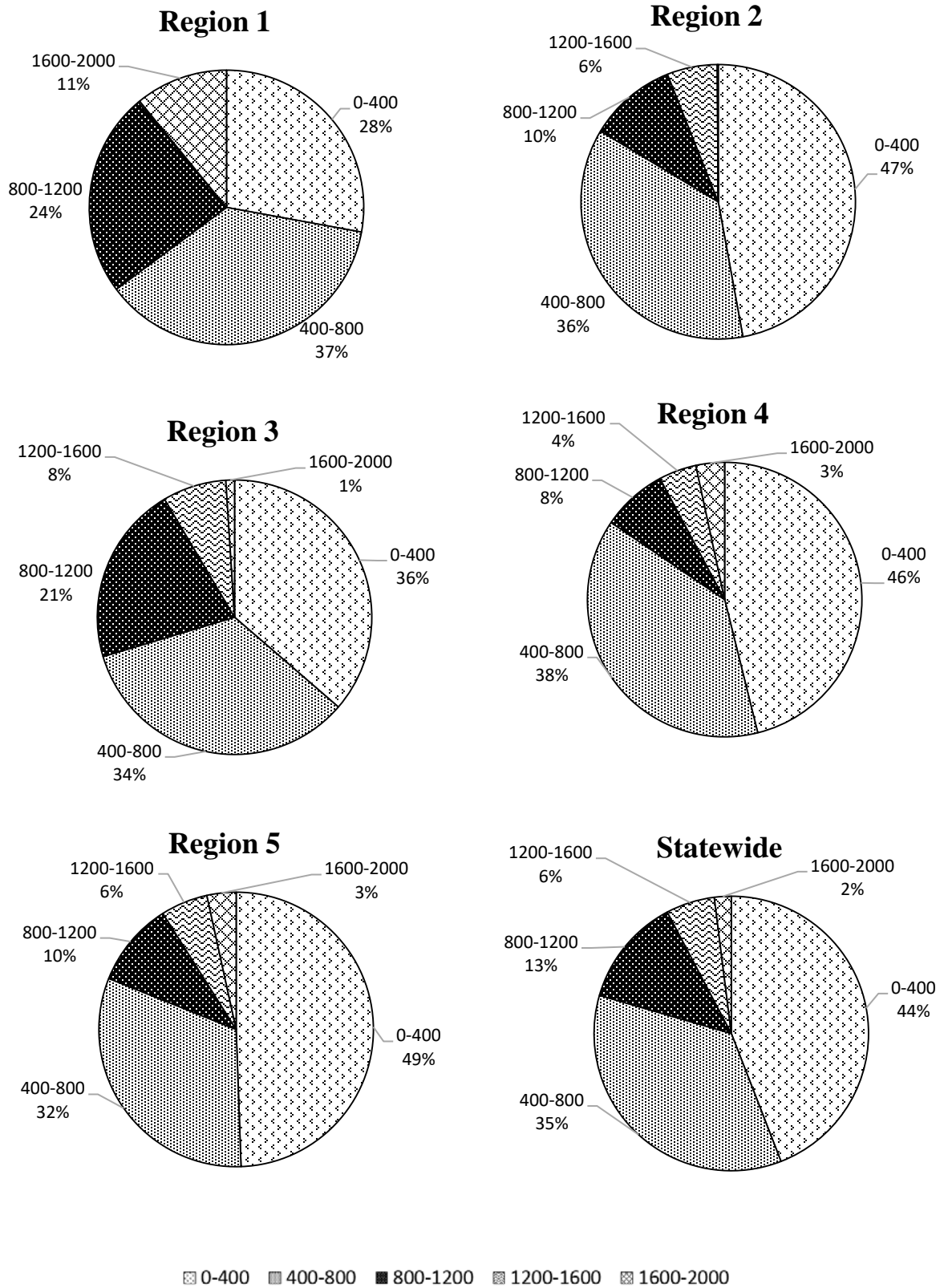


Figure 4.3: Mileage Distribution of Low-Volume Paved Roads by Average Daily Traffic (vehicles per day)

4.2.1 Pavement Performance

Based on the traffic volumes, the road network of LVRs in Colorado is divided into 342 segments. CDOT has a database of pavement management parameters as shown in Table 4.1. The condition data includes the five distress indices which are originally collected every 1/10th mile on the road segment. Historical condition data was received from CDOT for the time period from 2006 to 2016 showing the behavior of pavements condition on LVRs. Based on the linear reference of roads, the pavement condition of each segment was aggregated by taking the average values of each condition index. The historical values are listed in Appendix A-1 through Appendix A-5 for the five condition indices.

Table 4.1: A Sample of Combined Pavement Management Dataset in Colorado

Route	Beg MP	End MP	Rehab Year	Ride Index	Rut Index	Fatigue Index	Transverse Index	Longitudinal Index	Region	DL
005A	0	14.894	1994	42	99	93	70	99	5	0
006A	11.825	13.867	1985	73	98	73	61	96	3	3
006A	11.179	11.825	1985	73	98	73	61	96	3	3
006A	11.08	11.179	1985	73	98	73	61	96	3	3

Table 4.2 lists the summary statistics of the five condition indices for all roads. Using the mean values, it can be noted that the overall performance decreases over specific lengths of time due to pavement deterioration. The increase in the means of fatigue, longitudinal, and transverse indices in 2012 can also be noticed. These improvements could be due to certain maintenance activities applied in 2012 or the accumulated effectiveness of applied treatments in the previous years. However, the research efforts of this study did not consider the overall network condition when studying the effectiveness of treatments. Discrete segments of the network were comprehensively studied according to their individual pavement performance and records of treatments applied during the analysis period. The treatment effectiveness on these segments were evaluated based on the methodology stated in Chapter 3. Figure 4.4 shows

the overall performance models of the network which were developed based on the median value of the condition index in each year. For the fatigue condition index data set, it can be noted that the pavement deteriorated by typical rates from 2006 to 2011 providing high variance at 2011. Then at 2012, the overall performance was increased showing low variability of the values. After that, the segments deteriorated gradually before having a major improvement in 2015.

Table 4.2: Summary Statistics of Condition Indices for Low-Volume Paved Roads in Colorado

Index	Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Fatigue Index	Minimum	24.7	0	0	0	0	0	5.4	0	5	33.8	16.1
	Maximum	100	100	100	100	100	100	100	100	100	100	100
	Mean	93.1	91.8	90.2	86	87.6	80.5	94.9	86.7	87.4	93.2	94
	St. Deviation	11.1	13.9	15	21.4	17.6	24.4	10.2	22	17	12.2	12.8
Longitudinal Index	Minimum	77.2	75.6	72.9	76.9	71.5	62.9	88	38.1	80.4	56.4	72
	Maximum	100	100	100	100	100	100	100	100	100	100	100
	Mean	97	96.1	95.6	95.2	94.8	93.9	98.2	94.9	96.4	94.6	93.9
	St. Deviation	3.2	4	4.7	4.6	4.3	5.9	1.9	6.5	3.1	5.4	5.5
Transverse Index	Minimum	33	10.2	5.8	10.5	48.4	56.6	62.1	43.6	0	0	13.3
	Maximum	100	100	100	100	100	100	100	100	100	100	100
	Mean	78.8	80.2	77.6	85.6	84.4	85.5	90.9	82.7	69	70.7	70.7
	St. Deviation	14.5	14.1	15.6	10.5	9.8	9.2	6	10.3	20.4	20.2	20
Ride Index	Minimum	51.7	32.9	45.1	12.4	30.1	22.8	0	0	21.3	34.5	31.4
	Maximum	88.6	88	88.6	96.1	88.9	88.9	88.4	88.6	87.9	95.3	100
	Mean	77.4	76.5	77	75.5	74.3	74.6	73.6	74.6	75.4	82.7	82.8
	St. Deviation	6.1	7.6	6.6	8.7	8.5	9.5	10.6	10.6	7.9	8	7.3
Rut Index	Minimum	67.8	71.3	66.3	88.8	82.5	73.9	71.9	52.5	84.4	82.5	81.5
	Maximum	100	100	100	100	100	100	100	100	100	100	100
	Mean	95.8	97.8	95.1	99.4	99.2	97.2	97.3	98	99.3	99.1	99.2
	St. Deviation	5.9	3.8	6.1	1.4	1.9	4.1	4.1	4.4	1.9	2.3	2.1

In the context of longitudinal cracking, an increase can be noticed in the overall performance model from 2011 to 2012. All the roads had low variability in each year since the

values of the longitudinal index are relatively high. Consequently, the rate of deterioration of longitudinal cracking is relatively low. The smallest variability was at 2012 when the roads received treatments.

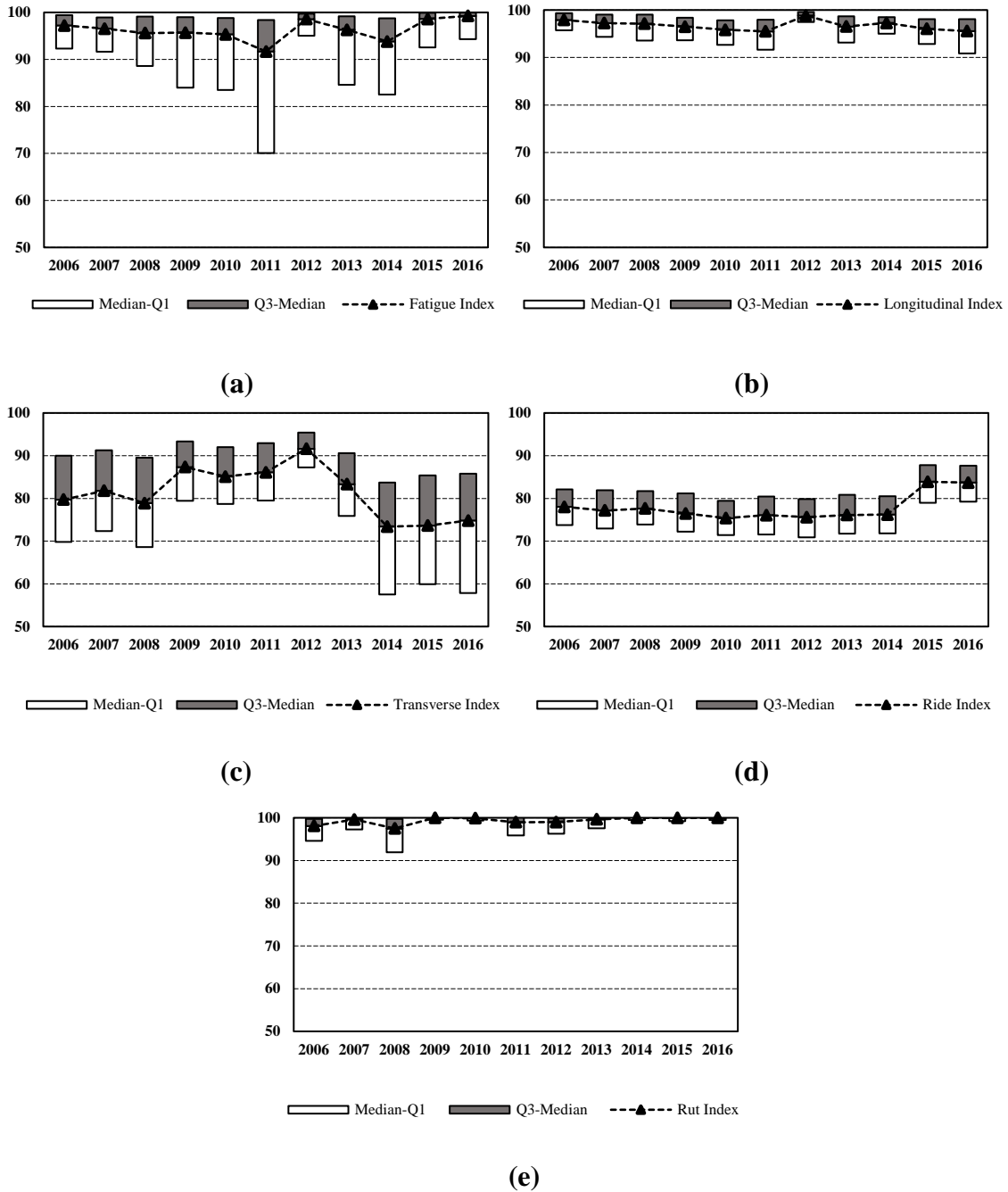


Figure 4.4: Overall Performance Models (a) Fatigue Index; (b) Longitudinal Index; (c) Transverse Index; (d) Ride Index; (e) Rut Index

For the transverse index, higher variability was found in the data set compared to the longitudinal index. The curve of the overall performance shows two different behaviors of pavement conditions. The rate of deterioration seems to be relatively less after 2009 than the rate of deterioration after 2012.

Relatively uniform performance was found in the value distribution of both ride and rut index. The inner quantiles of ride index in each year ranged approximately from 71 to 82. The uniform performance of roads in the context of roughness shows that LVRs may receive treatments that are not effective for enhancing the ride quality of roads. No major improvements for roughness were found in the performance of pavements from 2006 to 2014. However, the overall roughness of roads was enhanced at 2015 which had a uniform performance in 2016. Rut distresses of most roads are in excellent conditions, and no major improvements or deteriorations can be noticed. Table 4.3 through Table 4.7 show summaries of the five condition indices divided by CDOT regions. These summaries are also shown graphically in Figure 4.5 through Figure 4.10. It can be noticed that Region 2 and Region 5 have more miles with the fatigue cracking index rated poor than the rest of the regions. They also have more miles with the transverse cracking index rated poor than the rest of the regions. Longitudinal and rutting indices of low volume roads in all five regions are in good or excellent condition. Only 11 percent of the low volume miles have a poor or very poor ride index, and 89 percent of roads have a fair or good ride index.

Table 4.3: Summary of Fatigue Index by Regions in 2014

Fatigue Index	Condition	Length in Miles by Regions					Grand Total
		1	2	3	4	5	
0 - 59	Very Poor	0 (0%)	71 (11%)	0 (0%)	27 (6%)	42 (13%)	140 (7%)
60 - 69	Poor	0 (0%)	120 (18%)	18 (3%)	4 (1%)	5 (2%)	147 (7%)
70 - 79	Fair	3 (4%)	28 (4%)	6 (1%)	45 (10%)	2 (1%)	84 (4%)
80 - 89	Good	6 (10%)	82 (12%)	75 (15%)	49 (11%)	51 (15%)	264 (13%)
90 - 100	Excellent	55 (85%)	354 (53%)	419 (81%)	312 (71%)	233 (70%)	1373 (68%)
Missing		1 (2%)	9 (1%)	0 (0%)	5 (1%)	0 (0%)	15 (1%)
Grand Total		147	716	498	249	408	2018

Table 4.4: Summary of Longitudinal Cracking Index by Regions in 2014

Longitudinal Index	Condition	Length in Miles by Regions					Grand Total
		1	2	3	4	5	
0 - 59	Very Poor	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
60 - 69	Poor	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
70 - 79	Fair	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
80 - 89	Good	0 (0%)	20 (3%)	3 (1%)	12 (3%)	18 (5%)	52 (3%)
90 - 100	Excellent	64 (98%)	634 (96%)	515 (99%)	425 (96%)	316 (95%)	1954 (97%)
Missing		1 (2%)	9 (1%)	0 (0%)	5 (1%)	0 (0%)	15 (1%)
Grand Total		65	663	518	442	333	2022

Table 4.5: Summary of Transverse Index by Regions in 2014

Transverse Index	Condition	Length in Miles by Regions					Grand Total
		1	2	3	4	5	
0 - 59	Very Poor	9 (14%)	218 (33%)	47 (9%)	75 (17%)	125 (37%)	474 (23%)
60 - 69	Poor	10 (15%)	71 (11%)	43 (8%)	62 (14%)	24 (7%)	209 (10%)
70 - 79	Fair	21 (33%)	184 (28%)	144 (28%)	65 (15%)	101 (30%)	515 (25%)
80 - 89	Good	4 (6%)	99 (15%)	167 (32%)	125 (28%)	51 (15%)	445 (22%)
90 - 100	Excellent	20 (31%)	83 (12%)	117 (23%)	110 (25%)	33 (10%)	363 (18%)
Missing		1 (2%)	9 (1%)	0 (0%)	5 (1%)	0 (0%)	15 (1%)
Grand Total		65	663	518	442	333	2022

Table 4.6: Summary of Ride Index by Regions in 2014

Ride Index	Condition	Length in Miles by Regions					Grand Total
		1	2	3	4	5	
0 - 59	Very Poor	15 (23%)	0 (0%)	25 (5%)	3 (1%)	0 (0%)	43 (2%)
60 - 69	Poor	2 (3%)	18 (3%)	105 (20%)	85 (19%)	16 (5%)	226 (11%)
70 - 79	Fair	25 (38%)	481 (73%)	268 (52%)	195 (44%)	215 (65%)	1185 (59%)
80 - 89	Good	24 (36%)	153 (23%)	120 (23%)	158 (36%)	102 (30%)	557 (28%)
90 - 100	Excellent	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Missing		0 (0%)	10 (1%)	0 (0%)	0 (0%)	0 (0%)	11 (1%)
Grand Total		65	663	518	442	333	2022

Table 4.7: Summary of Rut Index by Regions in 2014

Rut Index	Condition	Length in Miles by Regions					Grand Total
		1	2	3	4	5	
0 - 59	Very Poor	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
60 - 69	Poor	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
70 - 79	Fair	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
80 - 89	Good	0 (0%)	0 (0%)	8 (2%)	1 (0%)	0 (0%)	10 (0%)
90 - 100	Excellent	64 (98%)	654 (99%)	510 (98%)	436 (99%)	333 (100%)	1997 (99%)
Missing		1 (2%)	9 (1%)	0 (0%)	5 (1%)	0 (0%)	15 (1%)
Grand Total		65	663	518	442	333	2022

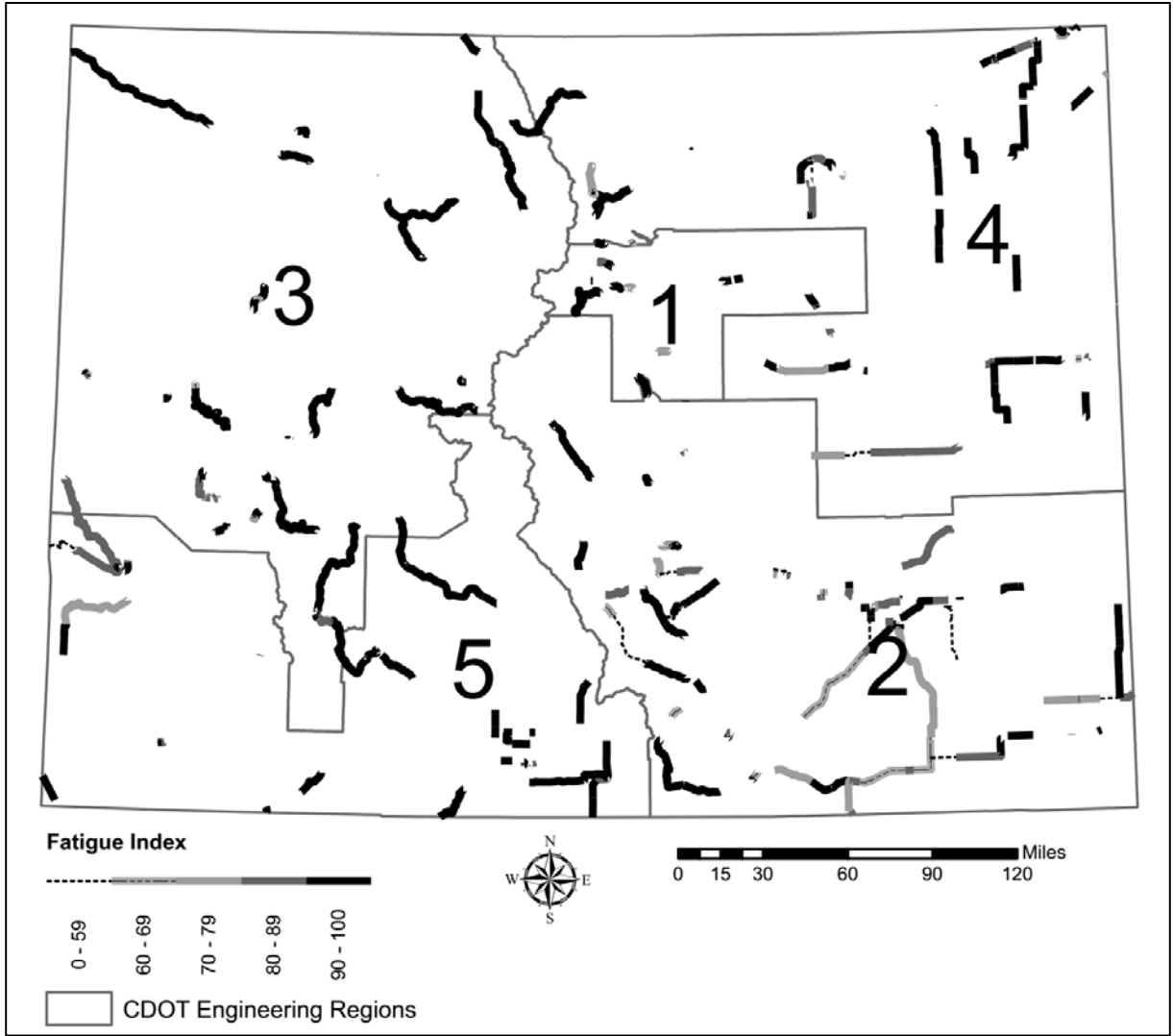


Figure 4.5: Pavement Conditions of Low Volume Roads in 2014: Fatigue Index

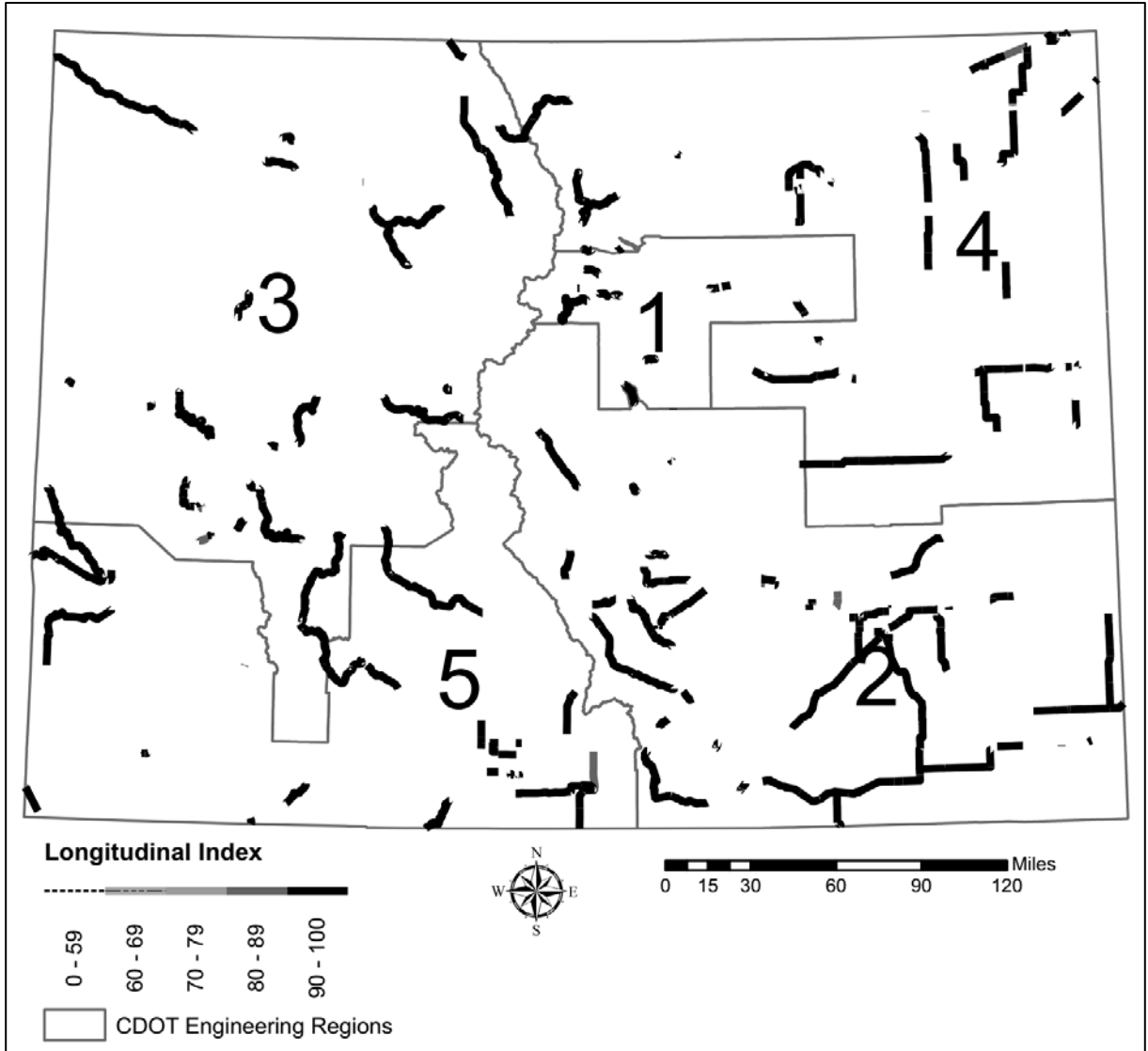


Figure 4.6: Pavement Conditions of Low Volume Roads in 2014: Longitudinal Index

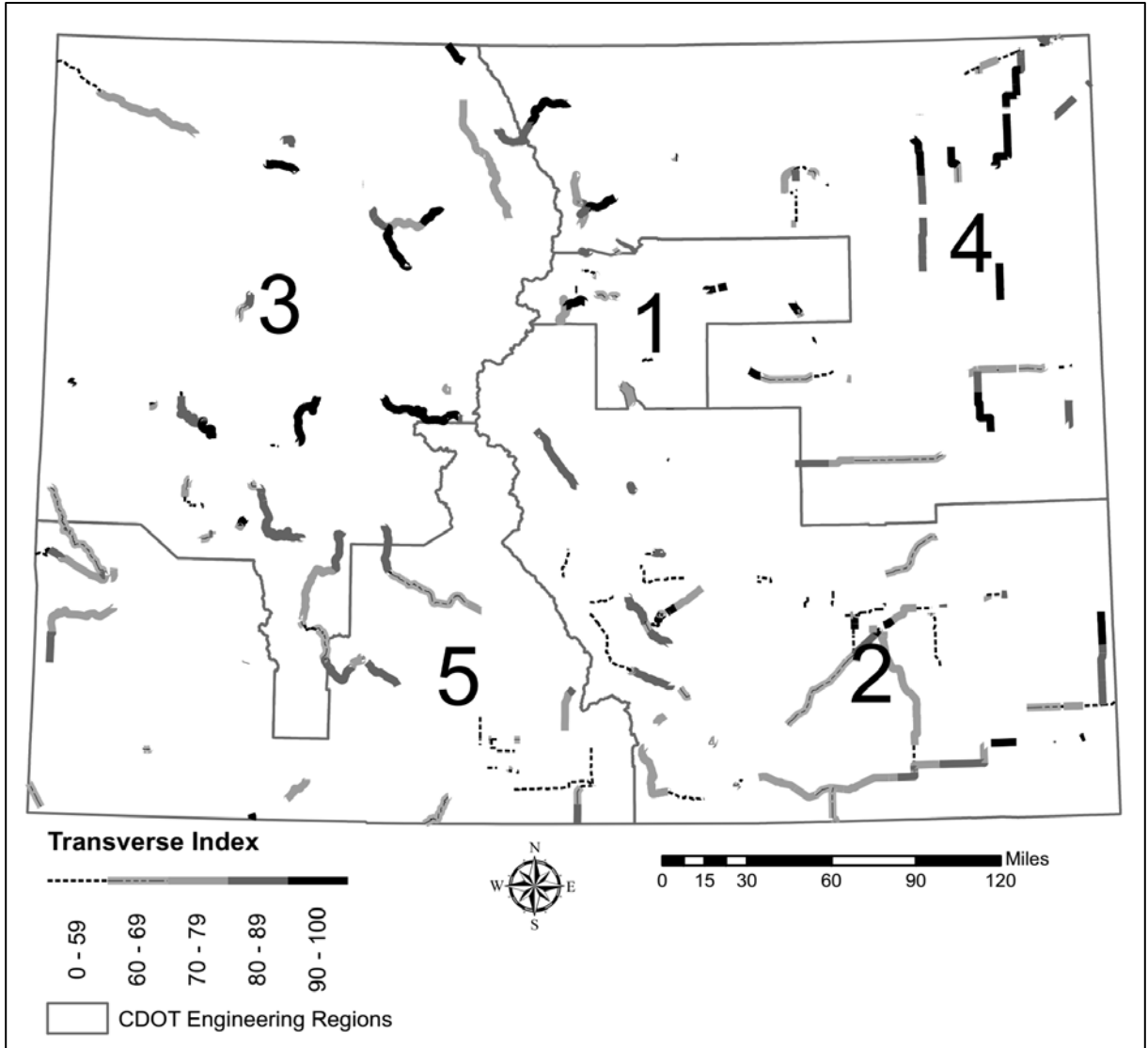


Figure 4.7: Pavement Conditions of Low Volume Roads in 2014: Transverse Index

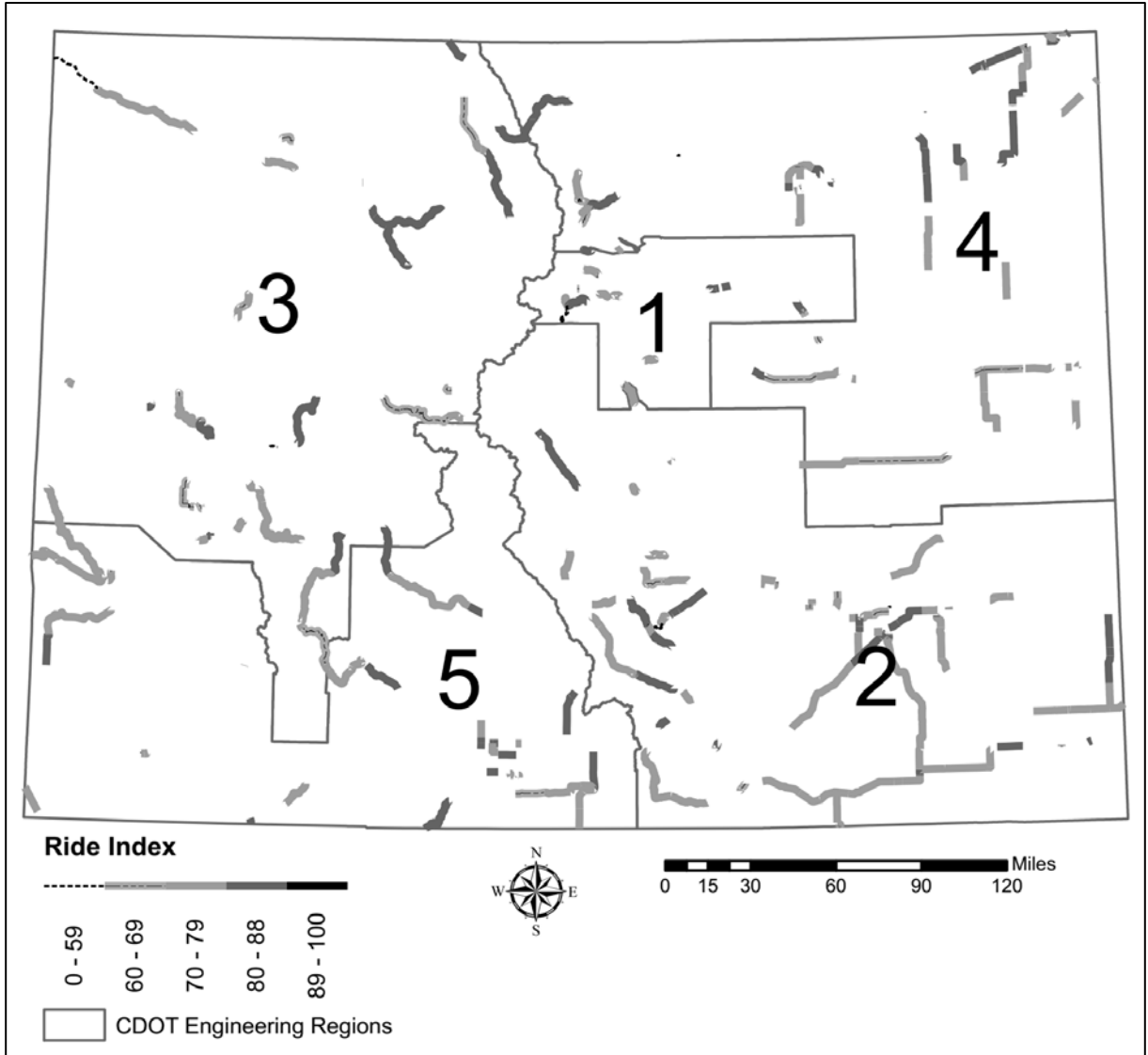


Figure 4.8: Pavement Conditions of Low Volume Roads in 2014: Ride Index

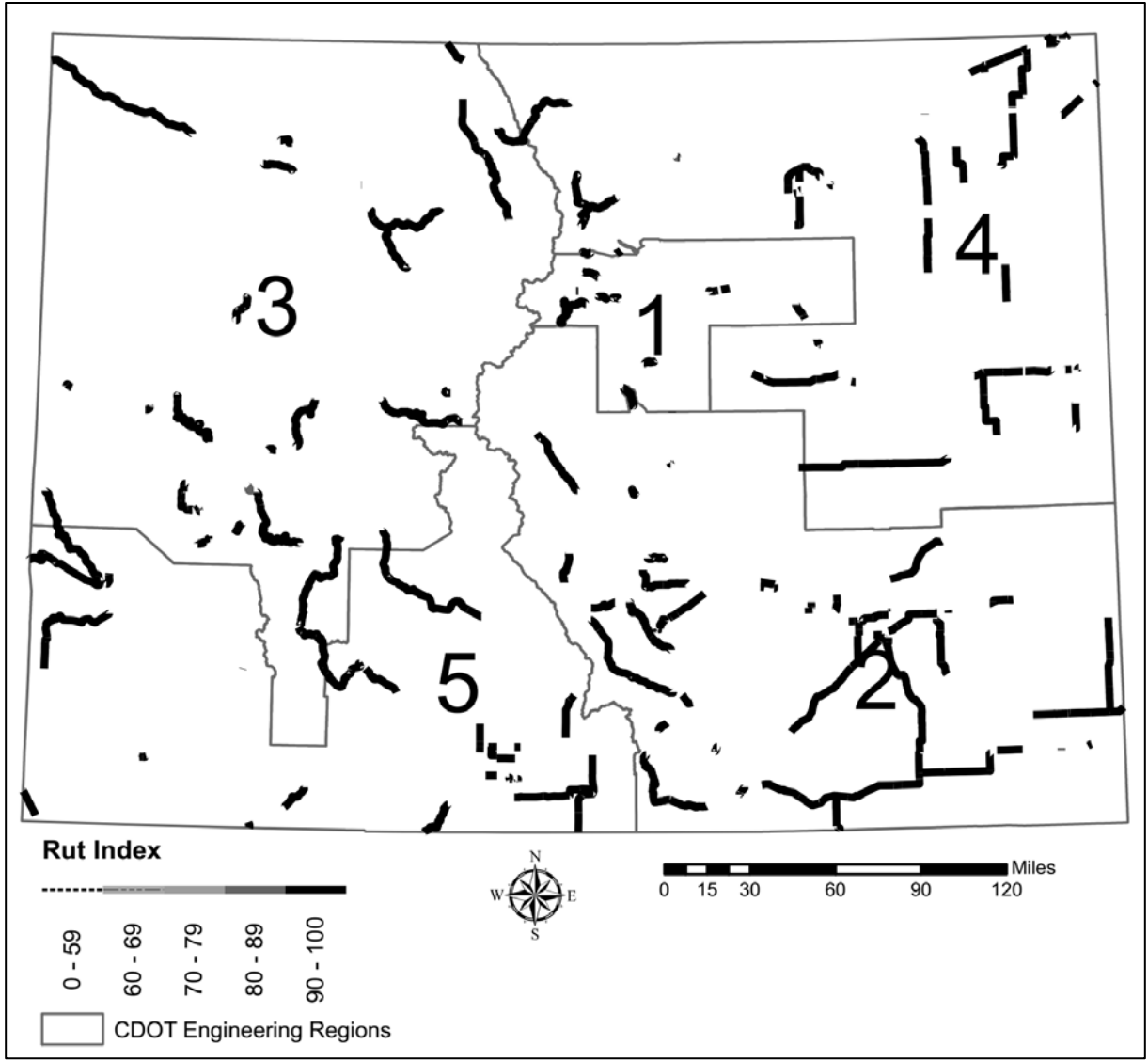


Figure 4.9: Pavement Conditions of Low Volume Roads in 2014: Rut Index

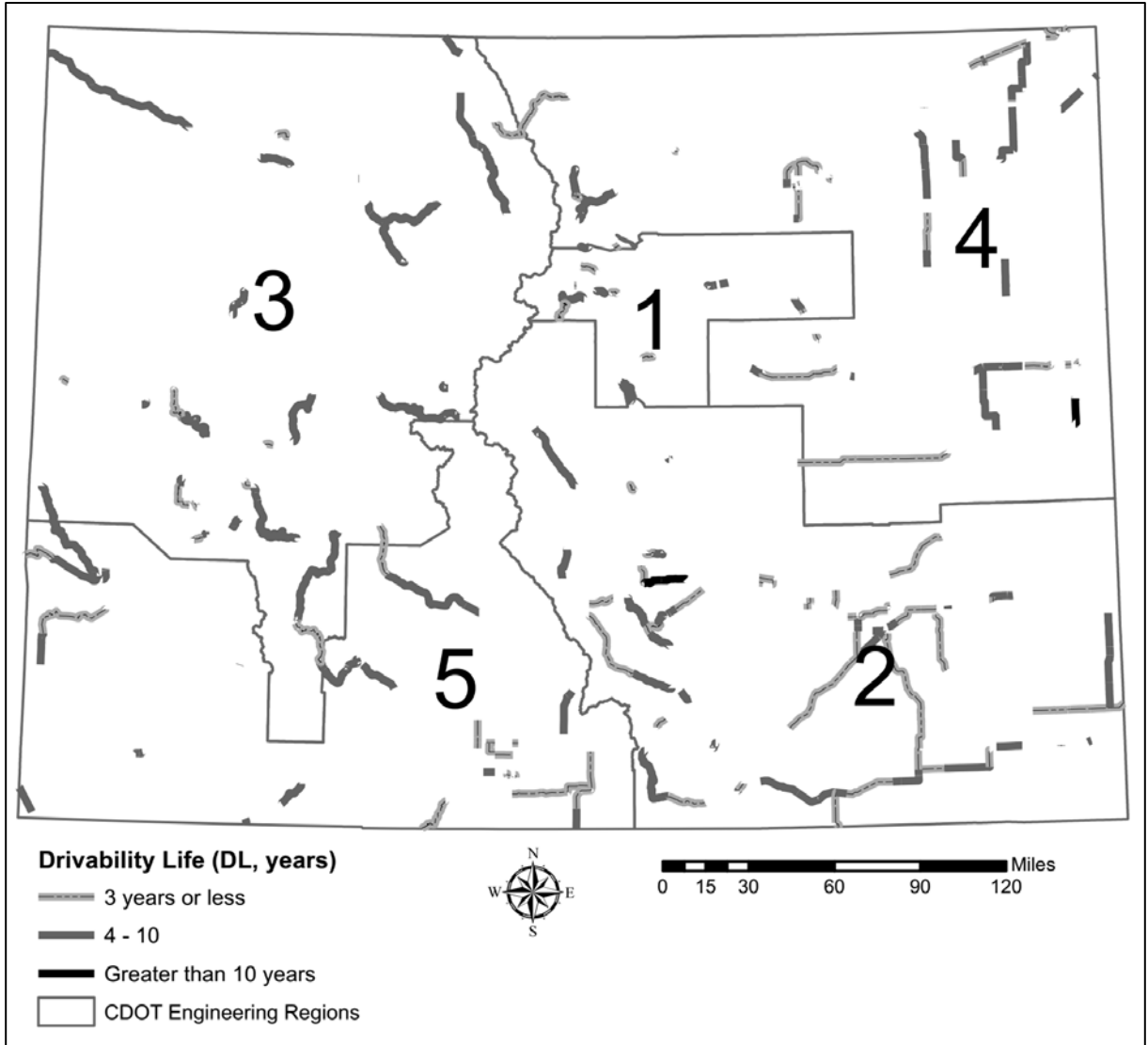


Figure 4.10: Pavement Conditions of Low Volume Roads in 2014: Drivability Life (DL, years)

Table 4.8 and Figure 4.11 summarize the DLs by region for all LVRs in Colorado in 2014. Most of these low-volume roads are in the low or medium categories. Only 1 percent of the whole low-volume road network is in the high DL category. The majority of roads in region 3 are in the medium DL category.

Table 4.8: Summary of Drivability Life by Regions in 2014

DL	Condition	Length in Miles by Regions					Grand Total
		1	2	3	4	5	
3 Years or Less	Low	30 (46%)	364 (55%)	71 (14%)	222 (50%)	168 (50%)	855 (42%)
4 - 10	Moderate	34 (52%)	274 (41%)	447 (86%)	206 (47%)	165 (50%)	1127 (56%)
Greater than 10 Years	High	0 (0%)	16 (2%)	0 (0%)	9 (2%)	0 (0%)	25 (1%)
Missing		1 (2%)	9 (1%)	0 (0%)	5 (1%)	0 (0%)	15 (1%)
Grand Total		65	663	518	442	333	2022

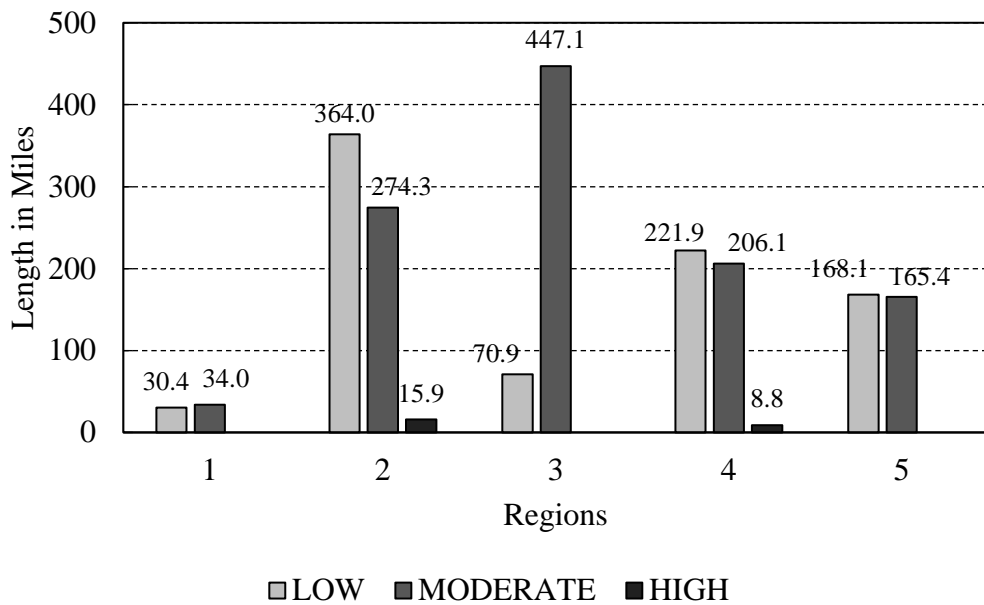


Figure 4.11: Number of Miles in Each DL Category by Region in 2014

4.2.2 Historical Treatments

Historical treatment records were analyzed to present a summary on the historical applications of treatments to LVRs. CDOT provided a historical treatment data set that includes information about the applied treatments on all roads (e.g., low-, medium-, and high- volume roads). The data for medium- and high- volume roads were combined as other roads. Figure 4.12 shows the percentage of projects applied to LVRs compared to the other roads from 2006 to 2015. Figure 4.13 shows the treatment summary by total lengths on roadways. The applied treatments on

LVRs were found to be less than 10% of the annual maintenance program from 2008 to 2012. The reason of having few maintenance projects on LVRs is that transportation agencies apply low-cost treatments on LVRs due to the funding constraints. Some agencies implement routine maintenance and crack sealing activities without having a proper tracking system on roads. Most of these treatment projects were potentially unrecorded by CDOT.

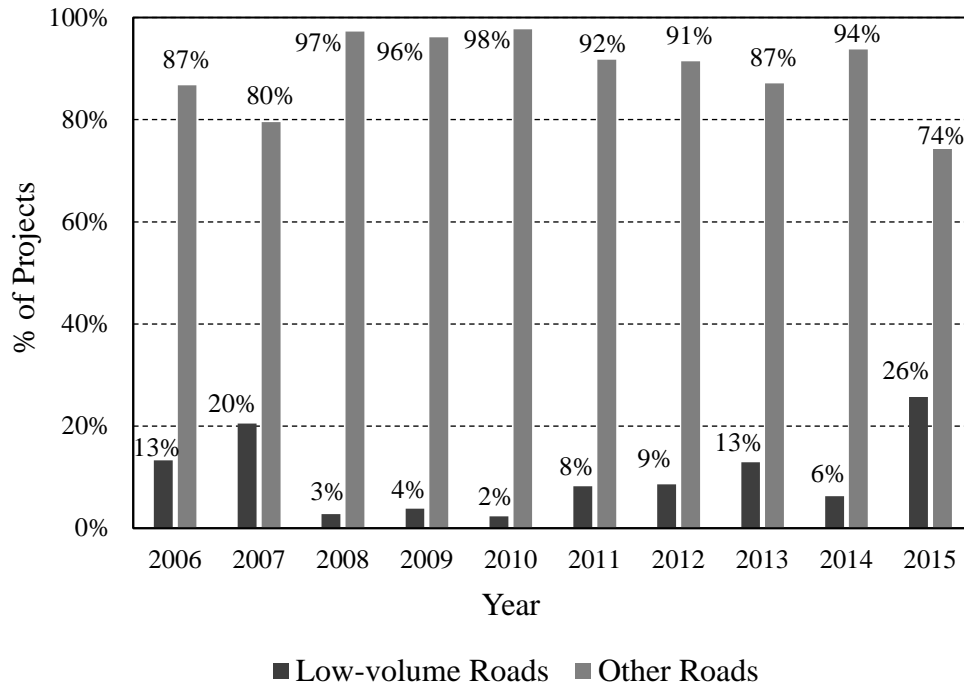


Figure 4.12: Treatment Records Summary on Roadways in Colorado

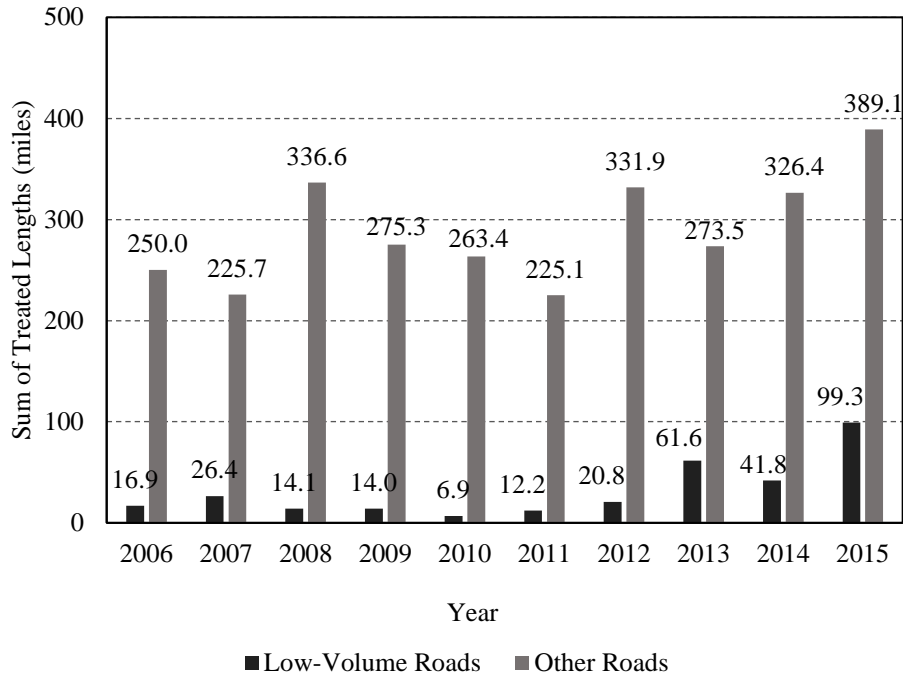


Figure 4.13: Treatment Summary by Total Treated Lengths on Roadways in Colorado

According to CDOT, treatments are recorded using abbreviations. The treatment data was filtered to each traffic-based network using the linear reference of both projects and segments. Eight treatments were applied to LVRs. The key defining these treatments is shown in Table 4.9. The segmented application history of these treatments is presented in Appendix B. For each treatment type, a summary of treated roads was developed from 2006 to 2016 as shown in Table 4.10. Asphalt chip seals (ACHP) and asphalt thin overlays (ATHO) were the most applied treatments on LVRs, especially in recent years.

Table 4.9: Treatment Types Applied on Low-Volume Paved Roads in Colorado Historical Database

Treatment	Description
ACHP	Asphalt Chip Seal
ACIP	Asphalt Cold in Place Recycle (4" + 2")
AHIP	Asphalt Hot in Place Recycling
AMDO	Asphalt Medium Overlay 2" - < 4"
AMFL	Asphalt Mill and Fill (2" R&R)
AMJO	Asphalt Major Overlay 4" - < 6"
AREC	Asphalt Reconstruction $\geq 6"$
ATHO	Asphalt Thin Overlay < 2"

NOTE: These treatments are applied on low-volume paved roads. There are other treatments applied by CDOT on pavements which are out of the interest of this study.

Table 4.10: Historical Summary of Treated Low-Volume Paved Roads in Colorado by Treatment Type

Year	Sum of Treated Segment Lengths (miles)							
	ACHP	ACIP	AHIP	AMDO	AMFL	AMJO	AREC	ATHO
2006			16			0.9		
2007	10.7	15.5			0.3			
2008				7.1				7.1
2009			14					
2010				6.9				
2011		11.6					0.6	
2012	9.9			1.9	0.2	8.7	0.1	
2013	13.5		13.8		19.3			14.7
2014					25.2			16.8
2015	59.5			6.6	13.3			19.9
2016	25.2	14		13.4	1.3	3		40.7
Total	118.9	41.1	43.8	35.8	59.6	12.6	0.7	99.2

The reason for extensively employing ACHP and ATHO is that CDOT began to use a specific maintenance strategy to enhance the drivability condition of LVRs with low-cost treatments when DL-based evaluation was adopted. For the current CDOT policy, general maintenance (GM) are applied such as crack sealing and crack filling when roads have DL

values of more than 10 years (e.g., DL is high). ACHP treatments are applied for roads with DL values between 4 and 10 years (e.g., moderate DL value). When LVRs fall into poor conditions (e.g., low DL value), these roads are addressed with thin overlays which are applied with a thickness less than 2 inches. It should be understood that ACHP is a treatment cost category, not a required prescription for a chip seal treatment. The same is true for those treatments categorized as ATHO. This has been the case since late in 2013 and policy allows for any combination of treatments or single treatment by the materials engineer that remains at or below the prescribed cost limit for either ACHP or ATHO category of low cost treatment. There are occurrences of actual ACHP where chip seal treatment is specifically what was applied. This is also the case for ATHO locations that have received only a thin overlay. These will have been primarily placed between 2006 and 2012. Treatments thereafter may include broader combinations of treatments applied under these designations.

Chapter 5: Impact of Current Maintenance Strategy on Pavement

Conditions of Low-Volume Roads

5.1 Introduction

The performance of pavement sections was analyzed and the results are presented in this chapter showing different trends of common treatment options applied to LVRs. The effectiveness of each treatment type in the context of fatigue, longitudinal, and transverse cracking was evaluated based on the evaluation methodology described in Chapter 3. In order to determine the impact of the current maintenance strategy, performance prediction models are developed for both deteriorated and improved roads using the historical values. Using these models and available financial resources, future maintenance activities were optimized to maximize the overall weighted drivability life. Then an alternative maintenance strategy was proposed which includes a maintenance decision tree for only effective treatments. The comparison between the impact of current maintenance policy and the proposed strategy is also introduced in this chapter.

5.2 Evaluating Effectiveness of Treatments Applied on Roads

Using the evaluation methodology stated in Chapter 3, all applied treatments were assigned to a treatment category. Then, summaries were developed of total miles of segments receiving treatments from each treatment category as shown in Figure 5.1. The results show that the applied treatment strategies had different effectiveness on the pavement performance of each road in the context of fatigue, longitudinal, and transverse distresses.

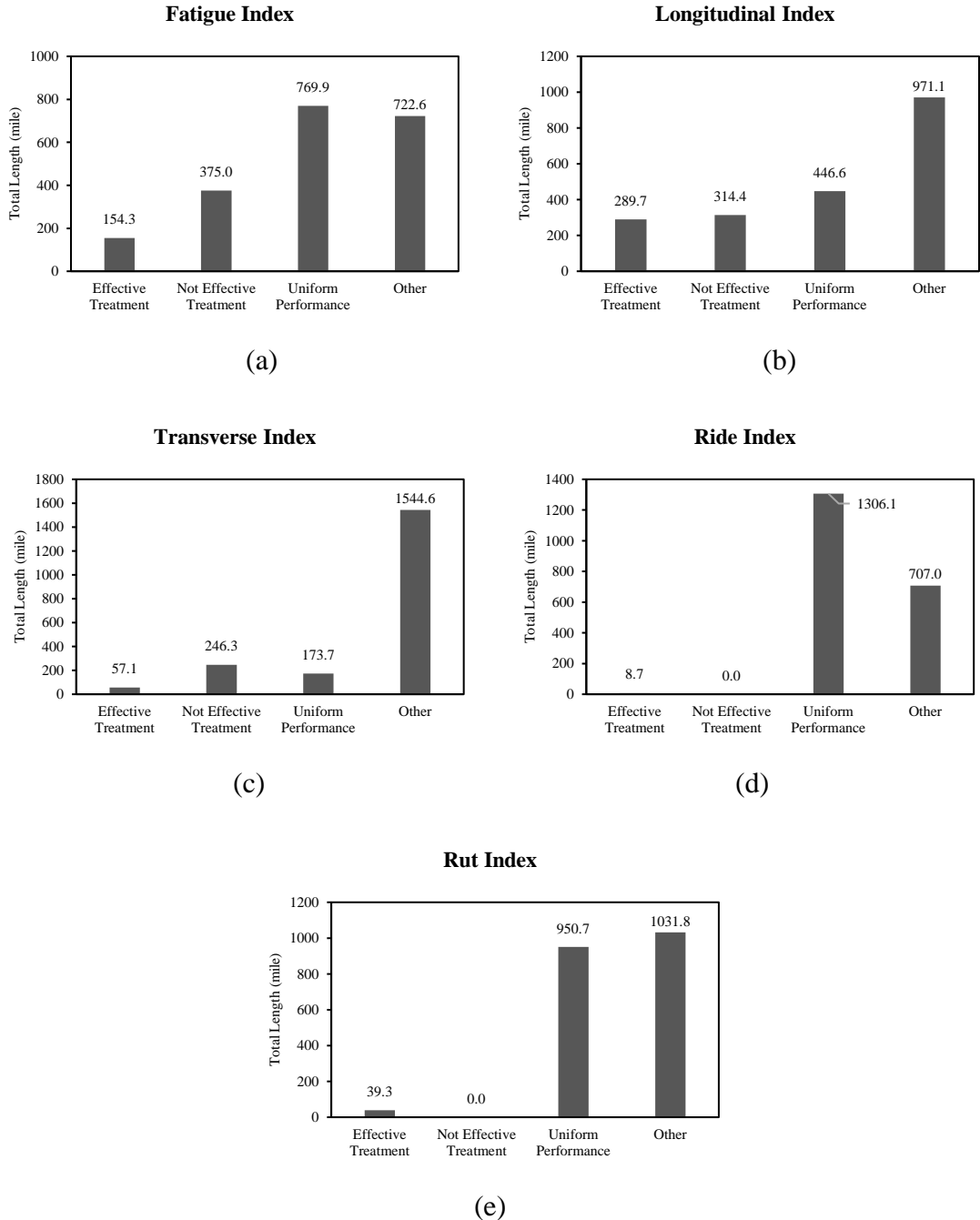


Figure 5.1: Total Length of each Treatment Category (a) Fatigue Index; (b) Longitudinal Index; (c) Transverse Index; (d) Ride Index; (e) Rut Index

Most CDOT LVRs treatments do not produce significant improvements on ride or rut indices. Consequently, most applied treatments were classified into uniform or ‘other’

categories. The presumed reason for the high occurrence of uniform performance for roughness and rutting is the new DL-based evaluation process. When CDOT started evaluating roads in terms of DLs, treatment options focused more on surface treatments which can extend the drivability life of the road (Hafez et al. 2017). Consequently, structural enhancements are limited on LVRs which affect significantly the pavement performance in the context of roughness and rutting. Therefore, no significant improvements were achieved for ride or rutting indices.

According to the historical treatment data of CDOT, the effectiveness of five treatments were investigated. These treatments were ACHP, ACIP, ATHO, AMJO and AMFL. There was not enough historical pavement data to evaluate the effectiveness of AHIP and AMDO treatments. The last treatment option, which is AREC, was considered beyond the scope of the study due to the limited application of this method and restricted budgets allocated for reconstructing LVRs.

Table 5.1 lists the effectiveness summary of the applied treatments. The effectiveness of AMJO treatment on longitudinal index was not defined because the treated segments had uniform performance or classified into “Other”. ACIP, AMJO, and AMFL were found to be effective treatments for fatigue, longitudinal, and transverse cracking. All the segments applied with ACIP and AMJO were classified into the effective category. A minimum effective value of 2 for fatigue index was found for AMJO. There are some segments of LVRs being in very poor pavement condition. The next section in this chapter shows the performance model of pavements developed for all roads using actual data. It shows some of the deteriorated cases where condition indices reached a value of zero for some indices during the analysis period. Although AMJO could not be available for roads due to budget constraints, the evaluation

results do not recommend applying the other available treatments directly on poor roads. Chip sealing (ACHP) was found to have different effectiveness on fatigue distresses depending on the initial fatigue index. The results show that it is not recommended to apply chip seal when the fatigue index is less than 84. Also, chip seals were found to be not effective to enhance the performance in the context of longitudinal and transverse cracking. The applications of thin overlays (ATHO) were not effective for transverse cracking while they have different effectiveness on fatigue and longitudinal cracking. It can be noted that the current policy of applying only low-cost treatments, followed by CDOT, may affect the overall DL of roads differently depending on the existing pavement condition.

Table 5.1: Effectiveness Summary of Applied Treatments

Condition Index	Characteristic	ACHP	ACIP	ATHO	AMJO	AMFL
Fatigue Index	Effectiveness	Effective	Effective	Effective	Effective	Effective
	Minimum value to be effective	84	53	60	2	51
Longitudinal Index	Effectiveness	Not effective	Effective	Effective	-	Effective
	Minimum value to be effective	-	85	88	-	90
Transverse Index	Effectiveness	Not effective	Effective	Not effective	Effective	Effective
	Minimum value to be effective	-	61	-	61	74

5.3 Pavement Performance Prediction Curves

An essential step in managing pavements is developing performance prediction curves. These curves estimate the future deteriorated values of the condition indices over the design period of the pavement, which is normally 15 years. Figure 5.2 displays four deterministic prediction models developed for fatigue, longitudinal, transverse, and ride indices. These models were developed using all the deteriorated cases on each segment of the LVRs network during the analyzed study period. Normally, there are uncertainties in behavior of pavement condition over time due to fluctuating traffic loads and measurement errors. However, the fitted regression

models provide high R-squared values with respect to the management needs of low-volume roads.

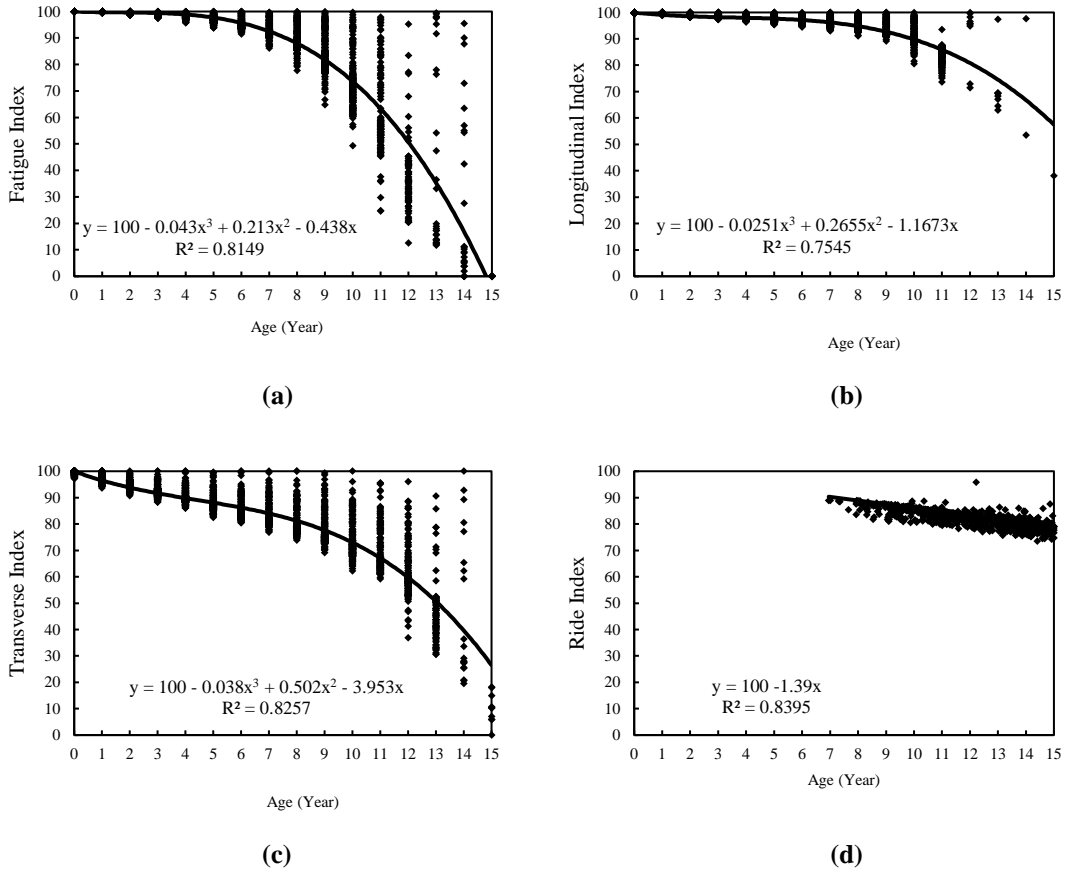


Figure 5.2: Deterministic Performance Models of Pavement Conditions: (a) Fatigue Index; (b) Longitudinal Index; (c) Transverse Index; (d) Ride Index

Using the performance curves, it was possible to define the trigger value of pavement age where the drivability of the road equals zero. The trigger values for both longitudinal and ride indices were found to be more than 15 years. Thus, the overall DL values are projected depending on fatigue and transverse indices for most segments.

5.4 Improvement Models of Applied Treatments

An appropriate measure of improvements needs to be defined when projecting future performance. When applying the proper maintenance, the life expectancy of the road can be extended by a number of years. These extensions are introduced by an increase in the condition index of the road which is called a ‘performance jump’ (Labi and Sinha, 2004). There are multiple parameters affecting the pavement post-treatment performance, including initial conditions, environmental factors, and the maintenance quality. However, the historical condition values of pavement management projects can be used to develop a model to predict the average improvement in pavement condition following a treatment. Table 5.2 lists the improvement models for different treatments applied on LVRs. The improved condition index “terminal value” was determined based on the initial value prior to the application of road maintenance. This analysis provides satisfactory improvement models to estimate the expected jump in the condition index on LVRs, especially when the road network exhibits low traffic variability.

Table 5.2: Improvement Models of Effective Treatments on Low-Volume Paved Roads

Fatigue Index		
Treatment	Terminal value	R-square
ACHP	$87.91 + 0.121 * \text{FATIG_IDX}_{(i)}$ *	0.8748
ACIP	$79.61 + 0.204 * \text{FATIG_IDX}_{(i)}$	0.8704
ATHO	100	–
FDR	100	–
Longitudinal Index		
Treatment	Terminal value	R-square
ACIP	$93.79 + 0.062 * \text{LONG_IDX}_{(i)}$	0.7329
ATHO	100	–
FDR	100	–
Transverse Index		
Treatment	Terminal value	R-square
ACIP	100	–
FDR	100	–

*i: Initial Condition Index

It should be noted that the previous improvement models were developed using only cases receiving effective treatments. For those roads that were poor enough to cause the applied treatments to be classified as ineffective, average percentages of improvements were determined for each treatment type. These percentages were calculated based on the historical values of performance improvement of poor roads.

5.5 Future Projection of Pavement Performance Using Current Maintenance Policy

The future values of pavement performance depend mainly on the maintenance decisions assigned for each road. When roads are applied with treatments, the drivability life is expected to increase according to the expected performance jump of each condition index. However, the maintenance decision should be optimized so that the total annual maintenance costs are within the available maintenance budgets. A case study of Region 4 was analyzed to determine the

impact of current maintenance policy on future pavement performance. There are 85 road segments of LVRs in Region 4 distributed on 442 total miles as shown in Figure 5.3. Region 4 was found to be a representative case study for the LVRs of the whole state because it has various traffic volumes with different DL categories. According to the CDOT pavement management data in 2016, about half of LVRs in Region 4 (48% of road miles) have moderate DL values, as shown in Figure 5.4. There are 41% of road miles in the low DL category while only 11% of roads have high drivability lives of more than 10 years. Most traffic volumes are not more than 800 vehicles per day. The diverse pavement condition and traffic volumes would support the validity of generalizing the analysis results statewide.

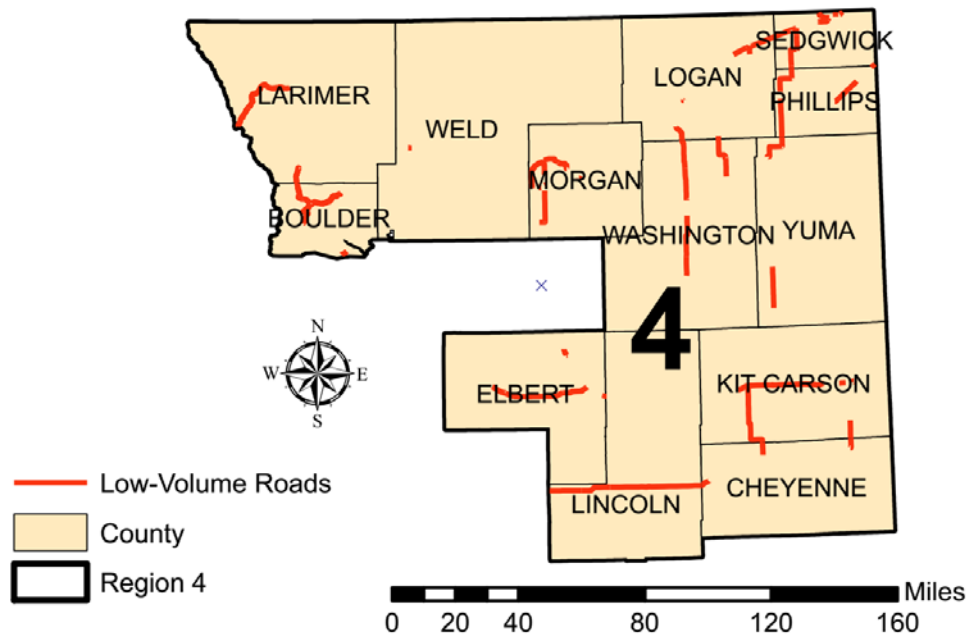


Figure 5.3: Low-Volume Roads in Colorado Region 4

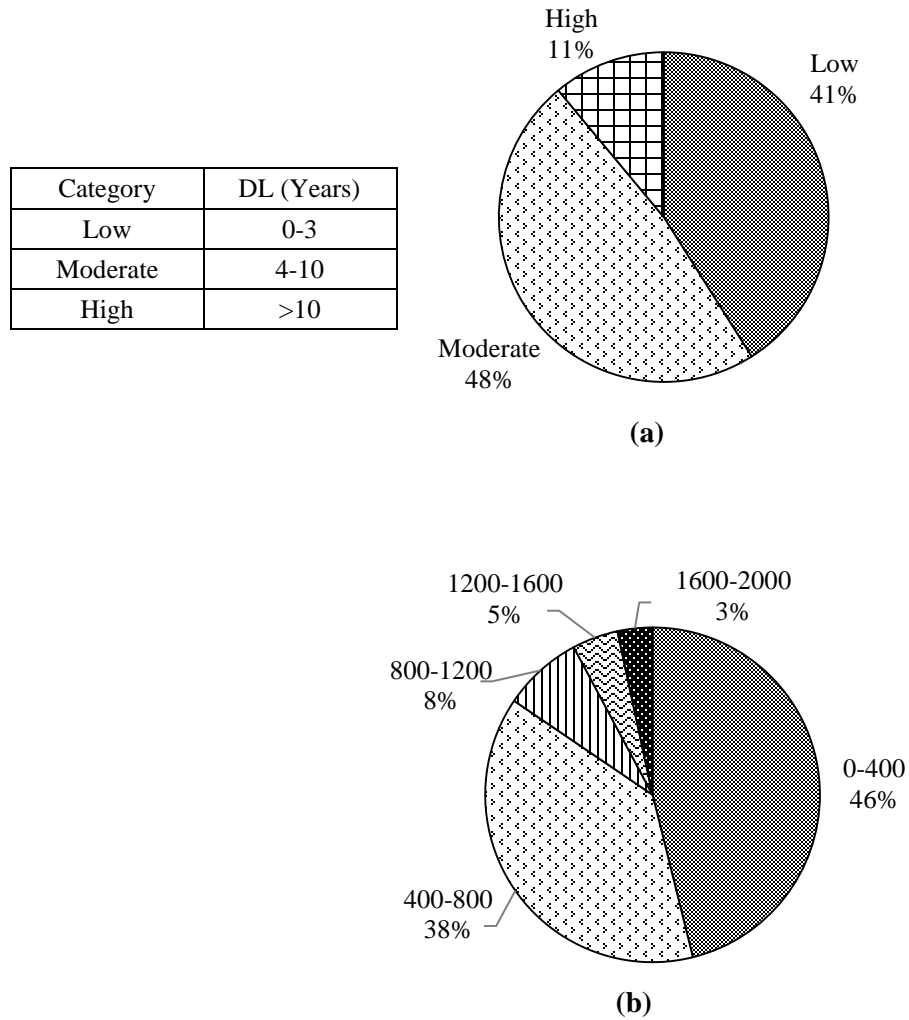


Figure 5.4: Mileage Distribution of Region 4 Low-Volume Paved Roads: (a) Drivability Life; (b) Average Daily Traffic (vehicles per day)

Although CDOT does not designate a budget for managing LVRs, the annual maintenance budgets can be estimated using the average value of past expenditures. These values were obtained from CDOT and it was found that LVRs in Region 4 are assigned with an average value of \$2.8M annually for maintenance. Accordingly, a multi-year optimization analysis was conducted using the current maintenance policy. The objective function was to maximize the overall weighted drivability life. The maintenance costs were set to the budget

constraint so that the total annual costs should not exceed \$2.8M. According to CDOT, the cost of applying a thin overlay is \$151,360 per lane-mile while the cost of an asphalt chip seal is \$42,240 per lane-mile.

Figure 5.5 shows the results of the optimization analysis over the study period from 2016 to 2026. Detailed maintenance decisions for each segment are listed in Appendix C-1 using the current CDOT strategy. For Region 4, the overall weighted DL is 4.87 years. This value was aimed to be maximized over the analysis period using only applications of general maintenance (GM), asphalt chip seals (ACHP), and asphalt thin overlays (ATHO).

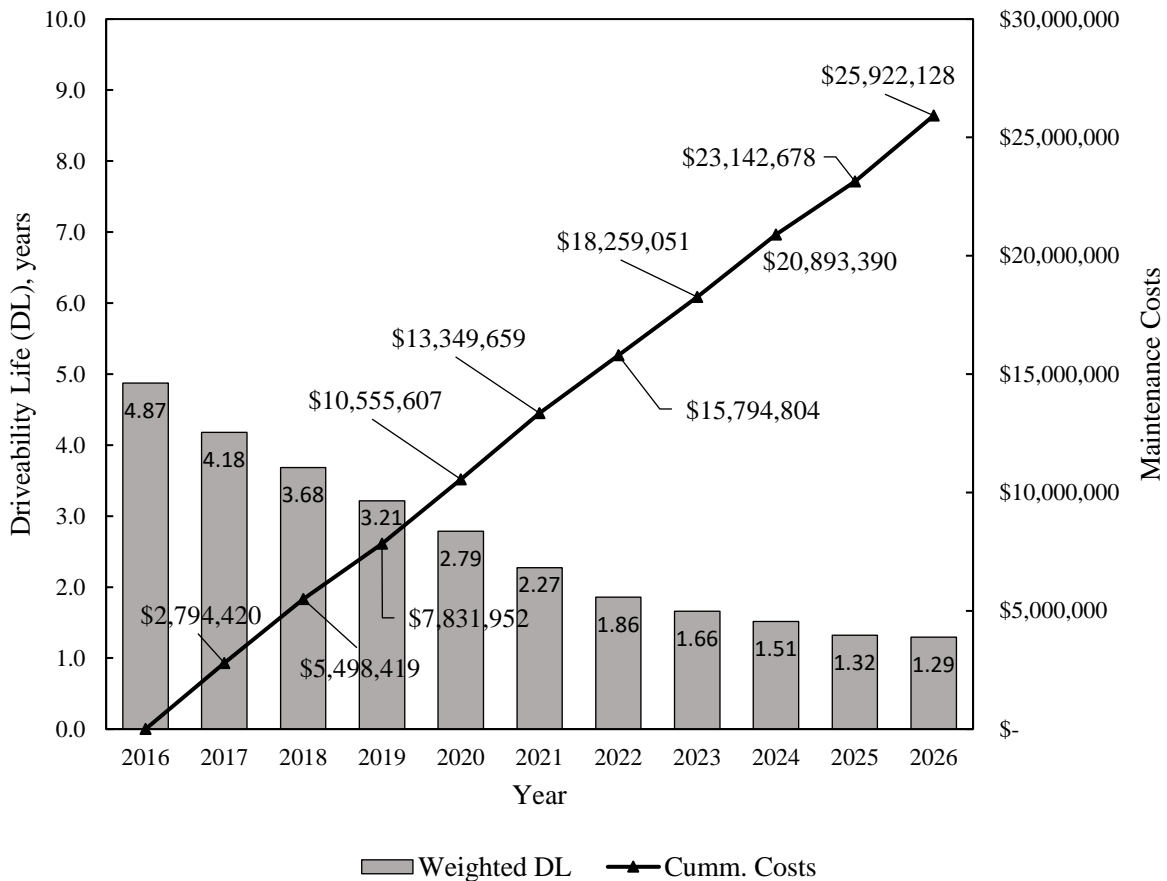


Figure 5.5: Impact of Current CDOT Strategy on Future Pavement Condition in Region 4

However, it was found that the optimized weighted drivability decreases over the study time. As mentioned earlier, about half of LVRs in Region 4 are in the low DL category. According to the current maintenance policy, all of these roads require thin overlays which are an expensive treatment with respect to the available maintenance budgets. With an annual budget of \$2.8M, most poor roads are assigned with the “do nothing” option (DN). As a consequence, the poor roads extensively deteriorate resulting in lower overall weighted drivability life in Region 4. Therefore, the current maintenance strategy with the available annual budget is not adequate to enhance the pavement performance of LVRs.

5.6 Proposed Maintenance Strategy

An alternative maintenance strategy is recommended to include only cost-effective treatments. The following section provides a proposed maintenance strategy for LVRs in Colorado.

5.6.1 Maintenance Alternatives

The key element of developing an effective maintenance strategy is to assign appropriate treatments to the road according to the existing condition. The right maintenance treatment should be selected based on the effectiveness of each treatment type on the different distresses and the minimum values to be effective derived from the evaluation process. Four pavement rehabilitation alternatives involving recycling technologies were proposed which are:

- ACIP layer surfaced with a chip seal (AHP)
- ACIP layer with an asphalt thin overlay (ATHO)
- Full depth replacement (FDR) with 10% patching.

These treatments are integrated with the current strategy of ACHP and ATHO. However, the decision for all treatment options is made based on the existing value of fatigue and transverse indices and not on the overall drivability lives. A proposed decision tree was developed and it is shown in Figure 5.6. This decision tree was developed for CDOT to simplify the network-level decision making process and summarize the annual maintenance requirements and costs. It comprises a logical flow chart with a series of “Yes” and “No” answers to questions pertaining to pavement condition. Trigger values of fatigue and transverse indices were set in the decision tree since they have a direct impact to improve the overall DL of roads. For each treatment type, the trigger values were specified where both fatigue and longitudinal indices do not go below the minimum effective values listed in Table 5.1. No specific consideration was taken for the ride quality because of the uniform trend of pavement performance and the overall DL is not influenced significantly by the ride index. In a different management system, the ride quality can be considered using another parameter such as International Roughness Index (IRI). It is to be noted that all rehabilitation and reconstruction options were avoided from the maintenance strategy due to the limited financial resources. The GM option includes applications of crack sealing and filling where the roads are in good condition. The cost information was obtained from CDOT and is listed in Table 5.3. These costs are based on the dollar value in 2016 which is the base year of the analysis period.

Table 5.3: Estimated Maintenance Unit Costs for Colorado Department of Transportation

Maintenance	Cost (Lane – mile)
GM	\$3,000
ACHP	\$42,240
ACIP + ACHP	\$77,440
ATHO	\$151,360
ACIP + ATHO	\$186,560
FDR	\$195,350

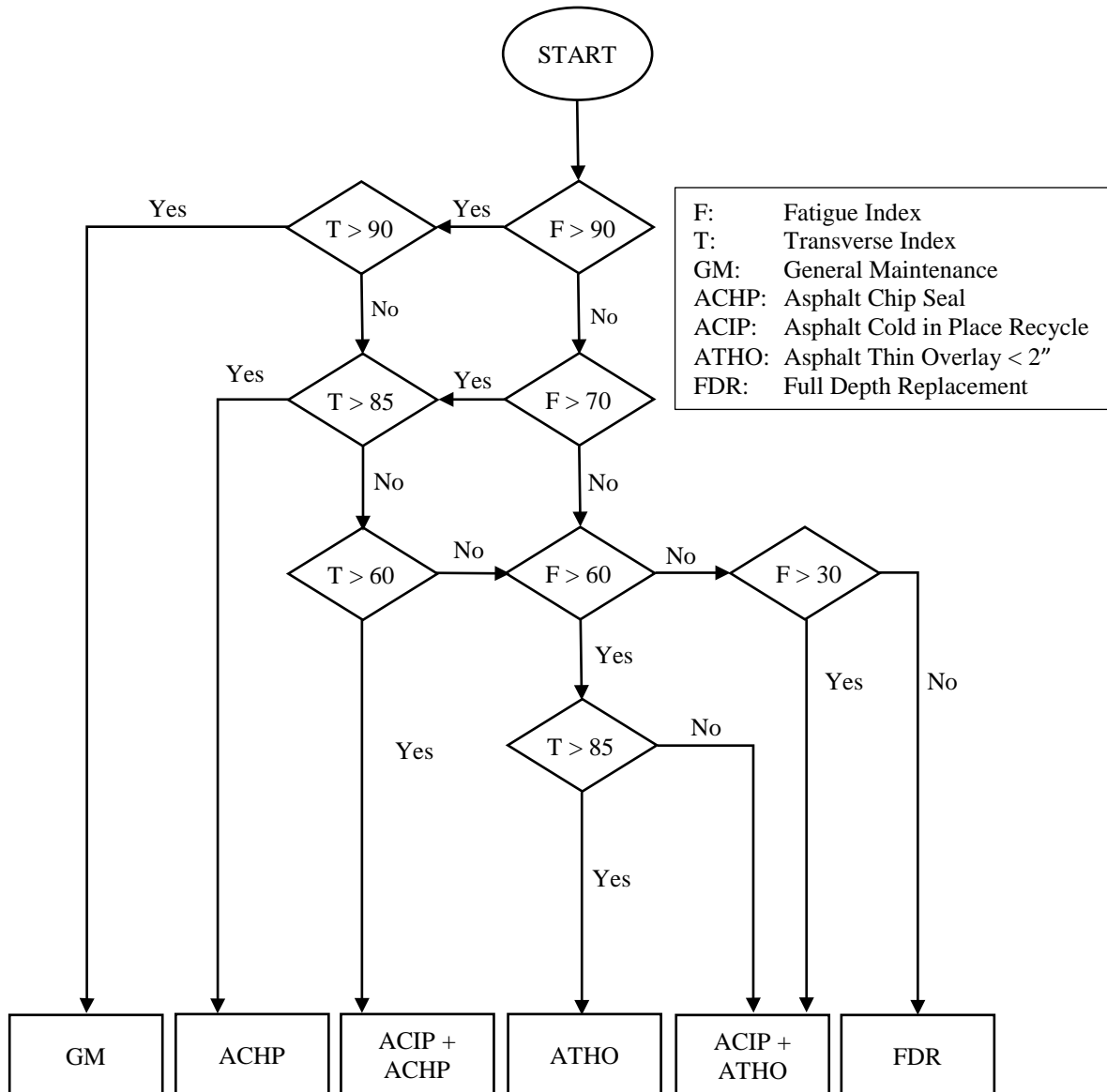


Figure 5.6: Decision Tree of the Alternative Maintenance Strategy

The proposed maintenance strategy has multiple treatment options with diverse maintenance costs. Hence a cost analysis is recommended to investigate the impact of both current and proposed maintenance strategy on the future performance of pavement.

5.6.2 Multi-Year Optimization Analysis

The objective of the optimization models is to develop multi-year maintenance programs using both current and proposed maintenance policies over a planning horizon. The optimized maintenance decisions of the proposed maintenance strategy are listed in Appendix C-2. Figure 5.7 displays the impact of applying the proposed maintenance strategy on the future condition of pavements from 2016 to 2026. It was again found that an annual budget of \$2.8M is not sufficient to preserve the drivability performance. The overall DL value deteriorates from 4.87 years to 2.49 years at the end of 2026.

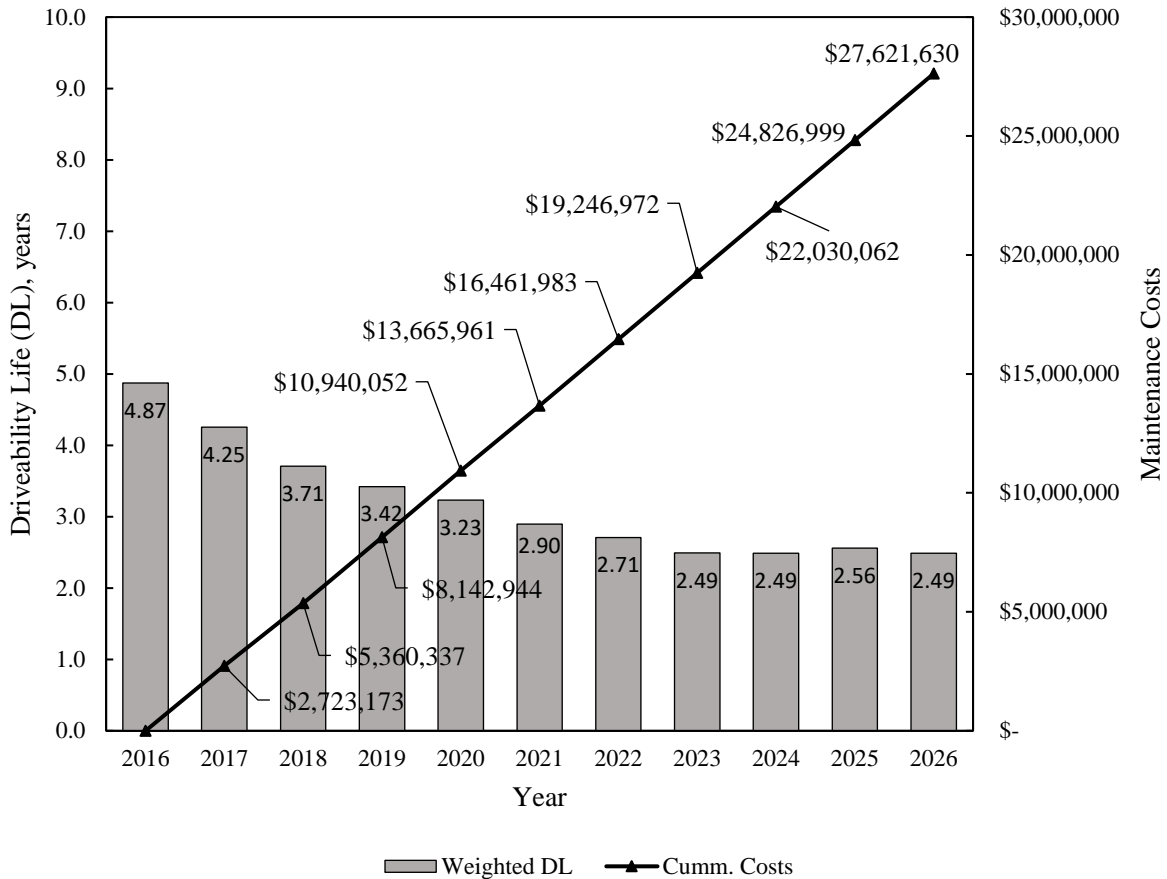


Figure 5.7: Impact of Proposed Maintenance Strategy on Future Pavement Condition in Region 4

In comparison with the current CDOT policy, the proposed maintenance strategy has better effectiveness at preserving pavement performance. Figure 5.8 shows the impact of the two strategies on the pavement performance over the analysis period. Applying treatments considering the existing condition and the corresponding effectiveness of each treatment type significantly delays deterioration of the weighted DL. The proposed maintenance strategy was found to be effective at reducing the amount of deterioration using the same maintenance budgets compared to current CDOT policies.

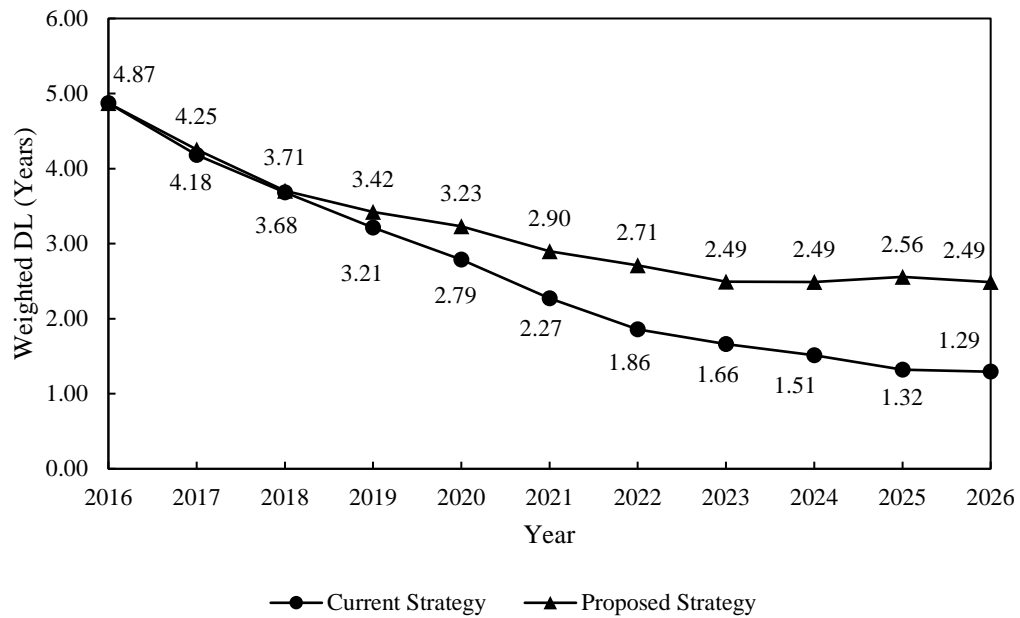


Figure 5.8: Future Projection of Pavement Performance from Different Maintenance Strategies in Region

4

Figure 5.9 further explains the amount of change in DL values for LVRs using the different maintenance strategies. All values are negative since the annual funding is not sufficient to preserve or enhance the overall performance. The difference between the two strategies was found to be not significant at the beginning of the analysis period. The amount

of DL change is almost the same in 2017, 2018, and 2019. The reason is that both the current CDOT and proposed strategies add performance values to the treated roads. However, the difference increases over time to the extent that DL drops 73% of its value using the current CDOT policy while this loss is only 47% for the proposed strategy at the end of 2025.

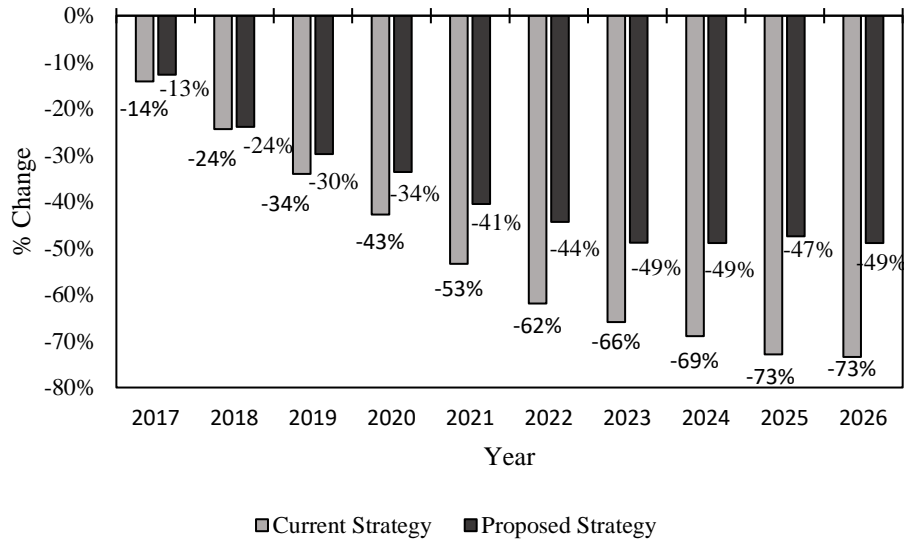


Figure 5.9: Expected DL Percentage of Change for each Treatment Strategy

Chapter 6: Low-Volume Roads in Colorado with Marginal Conditions

6.1 Introduction

Maintaining badly deteriorated roads is the most challenging task for DOTs especially when treatments are restricted with limited funding. CDOT includes only thin overlays for roads in poor condition, which has the potential for only short-term effectiveness on the performance of pavements. As a result, roads in marginal conditions are expected to continue deteriorating to extreme levels of distress, which would make applying pavement maintenance techniques too expensive or less reliable. In this chapter, a comprehensive evaluation for roads in marginal conditions is presented to demonstrate the impact of CDOTs low-cost treatments on low-volume paved roads.

6.2 Definition of Low-Volume Roads in Marginal Condition

The definition of LVRs in marginal condition depends on the managing needs of each DOT. However, these agencies should have an upper limit of pavement performance that defines severe conditions. According to CDOT, poor roads in marginal condition should have extremely low drivability lives. To define these roads, a descriptive analysis was conducted first to investigate the mileage distributions of low-volume paved roads at different categories. Starting with roads having DL values equal to three years or less, Figure 6.1(a) shows the distribution of mileages in the five engineering regions as well as statewide. It can be noticed that close to half of the LVRs network statewide is in marginal condition and also they are distributed across most regions except Region 3.

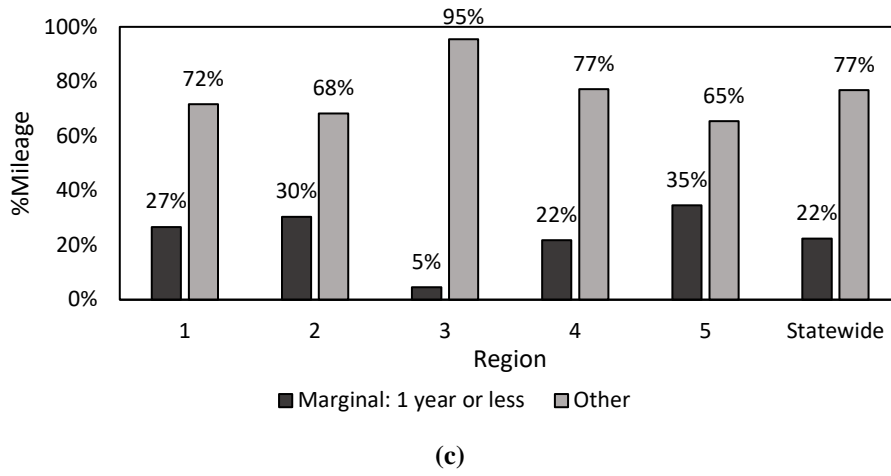
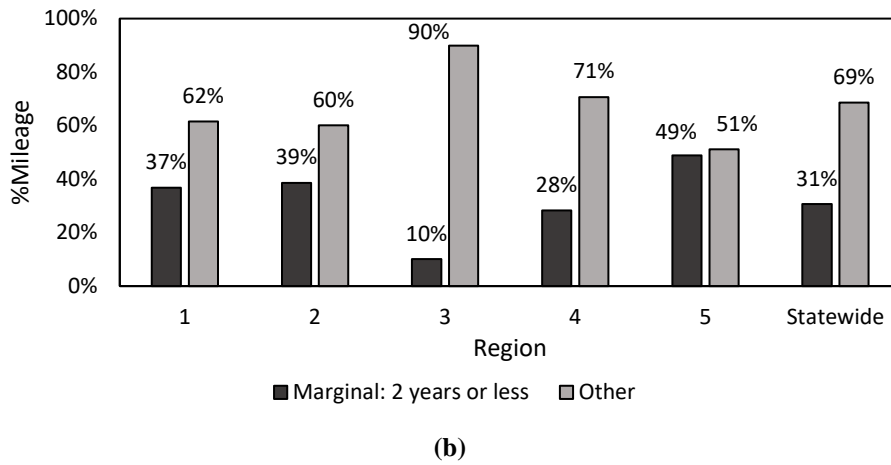
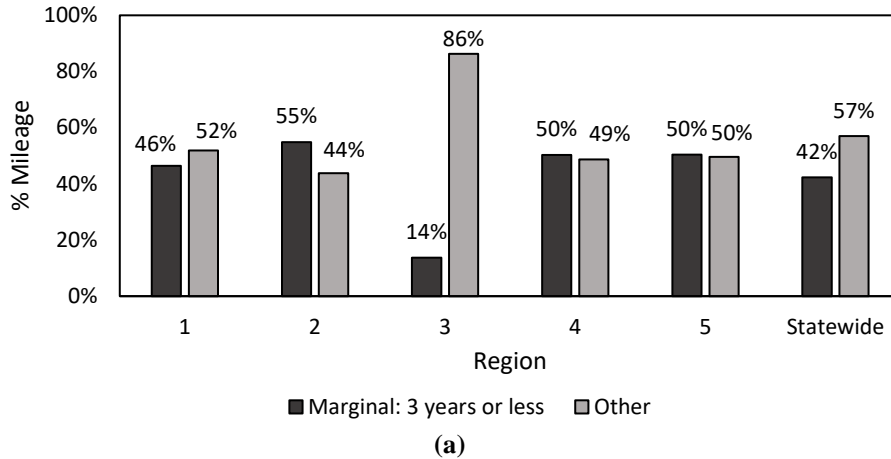


Figure 6.1: Mileage Distribution of DL values in Marginal and Other Conditions (a) 3 Years or Less; (b) 2 Years or less; (c) One Year or Less

It is highly recommended to define these roads in a way that makes the size of the road network manageable. Figure 6.1(b) displays the distribution of roads when marginal conditions are at DL values of two years or less. The number of roads in marginal conditions reduces substantially at this category in Region 2 and Region 4. However, Region 5 still has almost 50% of its network in the marginal category. Statewide, almost one third of the LVRs network is in marginal condition according to that category. Moving to the next severity level, Figure 6.1(c) shows the distribution for marginal roads having DL values of one year or zero. This category shows a kind of uniform distribution among regions except Region 3 where 86% of LVRs are in moderate DL category. However, the portions of marginal roads in this category are more practical for focused management and can be considered for the study analysis.

In this report, roads with marginal conditions are defined as poor pavements with DL values equal to one year or zero. According to the statewide performance data in 2016, there are 361.6 miles of LVRs in the marginal category distributed on 96 segments. The current CDOT maintenance strategy as well as the proposed one were evaluated on these roads showing the long-term effectiveness within limited annual budgets.

6.3 Performance Curves

It was emphasized in the evaluation process of treatments that the application of surface treatments and preservation strategies have only short term effectiveness when the pavement indices are at low values. Therefore, it is not accurate to project the future pavement condition parameters using the overall performance curves developed in Chapter 5. Special performance models should be assigned to the roads with marginal conditions. To develop these models, the

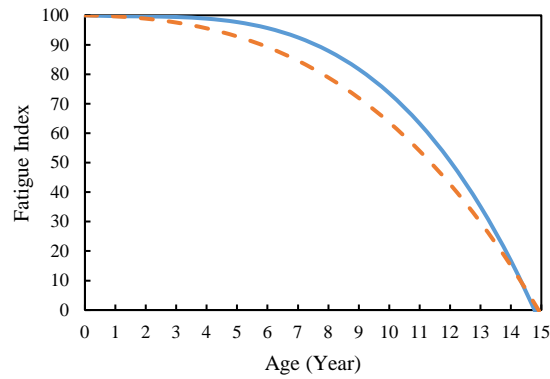
historical values were filtered to include only roads with overall DL values of one year or zero. Then, appropriate curves were fit for each condition index. The results are listed in Table 6.1.

Table 6.1: Deterministic Performance Models for Roads with Marginal Conditions

Index	Model	R-square
Fatigue Index	$y = 100 - 0.0188 x^3 - 0.1579 x^2 - 0.1719 x$	0.854
Longitudinal Index	$y = 100 - 0.0262 x^3 + 0.4196 x^2 - 2.6081 x$	0.672
Transverse Index	$y = 100 - 0.0933 x^3 + 2.0686 x^2 - 14.913 x$	0.621
Ride Index	$y = 100 - 1.7242 x$	0.891

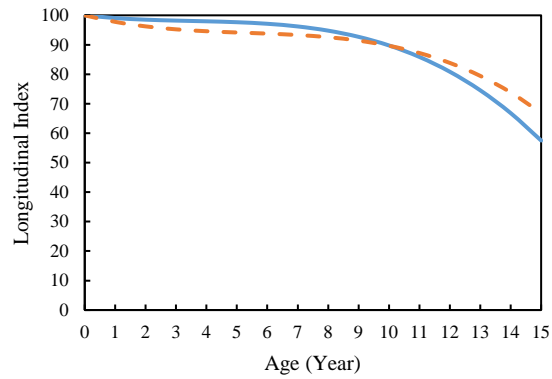
NOTE: “y” represents the condition index; “x” represents the pavement age in years

In comparison with the overall performance curves for all roads, Figure 6.2 shows the pavement performance for both road categories in the context of fatigue, longitudinal, transverse, and ride indices. Although marginal roads have almost the same pavement life for fatigue cracking as other roads, they tend to show higher deterioration rates. That would affect the minimum projected drivability lives on these roads. Also, the longitudinal cracking for marginal roads has a slightly higher deterioration rate than that of all roads. However, after the age of 10 years, the annual deterioration rate for longitudinal cracking is less than that of the overall model. The observed higher performance for longitudinal cracks of marginal roads could be due to the lack of data at this stage. However, this finding wouldn't affect the evaluation analysis since the longitudinal index does not significantly affect the overall DL value and it is not included in the proposed maintenance decision tree.



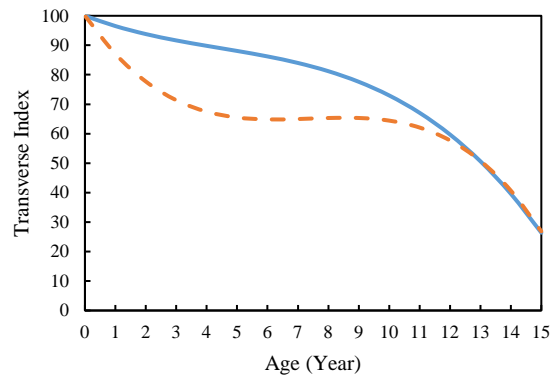
— All Roads - - - Marginal Roads

(a)



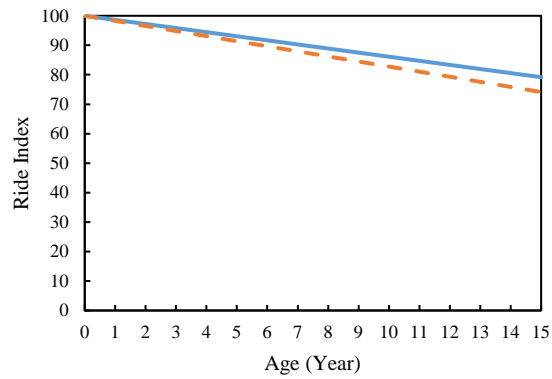
— All Roads - - - Marginal Roads

(b)



— All Roads - - - Marginal Roads

(c)



— All Roads - - - Marginal Roads

(d)

Figure 6.2: Comparison of Performance Curves of all Low-Volume Roads vs. Marginal Roads (a) Fatigue Index; (b) Longitudinal Index; (c) Transverse Index; (d) Ride Index

In the context of transverse index, a very large difference was found between the performances of all low-volume paved roads compared to only the marginal ones. It is reasonable to obtain identical performance curves after the age of 12 years where the roads have almost a DL of zero. However, the rate of deterioration for marginal roads before that time is

much higher than the other roads. These results imply that there were historical conditions where the roads received surface treatments. However, the post-treatment performance of these roads exhibited higher transverse cracking quantities and severities even after applying the treatment within a short time. This emphasizes the short-term effectiveness of applying low-cost surface treatments on severely damaged pavements. No major difference can be noticed for the performances of road categories in the context of ride index because of the uniform performance of roughness statewide. However, the marginal roads still show higher deterioration amounts compared to the overall performance.

6.4 Impact of Maintenance Strategies on Roads with Marginal Conditions

As implemented earlier for all roads, the annual maintenance plans for roads with marginal conditions were optimized to maximize the overall weighted drivability life within an annual maintenance budget. In order to give an appropriate estimate of the financial resources statewide, the study depends mainly on the budget available in Region 4. As mentioned earlier, Region 4 has an average of \$2.8M that is expended annually on a total 441 miles of low-volume paved roads. That is, the budget of maintaining a unit mile of pavements is about \$6,349. Therefore, there are approximately \$12.8M expended on LVRs statewide as maintenance funding. The total budget was previously split among roads depending on the condition of pavement. A survey of pavement management engineers was conducted on how the total budget should be divided on roads in the different performance categories. It was found that the total budget should be equally distributed on three condition levels which are: (1) worst segments, (2) rapidly deteriorating segments, and (3) segments requiring a routine maintenance (Hafez et al., 2017). Accordingly, one third of the total available budget was assigned on the roads with

marginal conditions which represent 22% of the whole network in Colorado. That is, the maintenance plans were optimized so that the annual maintenance budget should not exceed \$4.2M.

According to the performance data of 2016, the overall weighted drivability life of the roads with marginal conditions is 0.36 years. This value shows that the majority of marginal roads have no remaining drivability life. Figure 6.3 shows the cumulative repair costs required to maximize the DL value using current CDOT strategy. The detailed decisions on the 96 segments can be reviewed in Appendix D-1. It can be noticed that the optimization results do not provide any significant improvements on the network of marginal roads. Applying CDOT maintenance activities within \$4.2M annually is still not sufficient to preserve the overall performance of these roads, resulting in overall deteriorated condition of 0.14 years in 2019. Although the overall DL slightly increased after 2019, the amount of improvement is not significant. Over the five following years, the overall DL was improved from 0.14 to 0.42 years only. Then the value was decreased to 0.32 years. In general, all maintenance decisions assigned thin overlays on the marginal roads. However, the cost of thin overlays is relatively expensive which results in limited application of thin overlays. With high deterioration amounts, the overall performance cannot be enhanced significantly given the estimated budget.

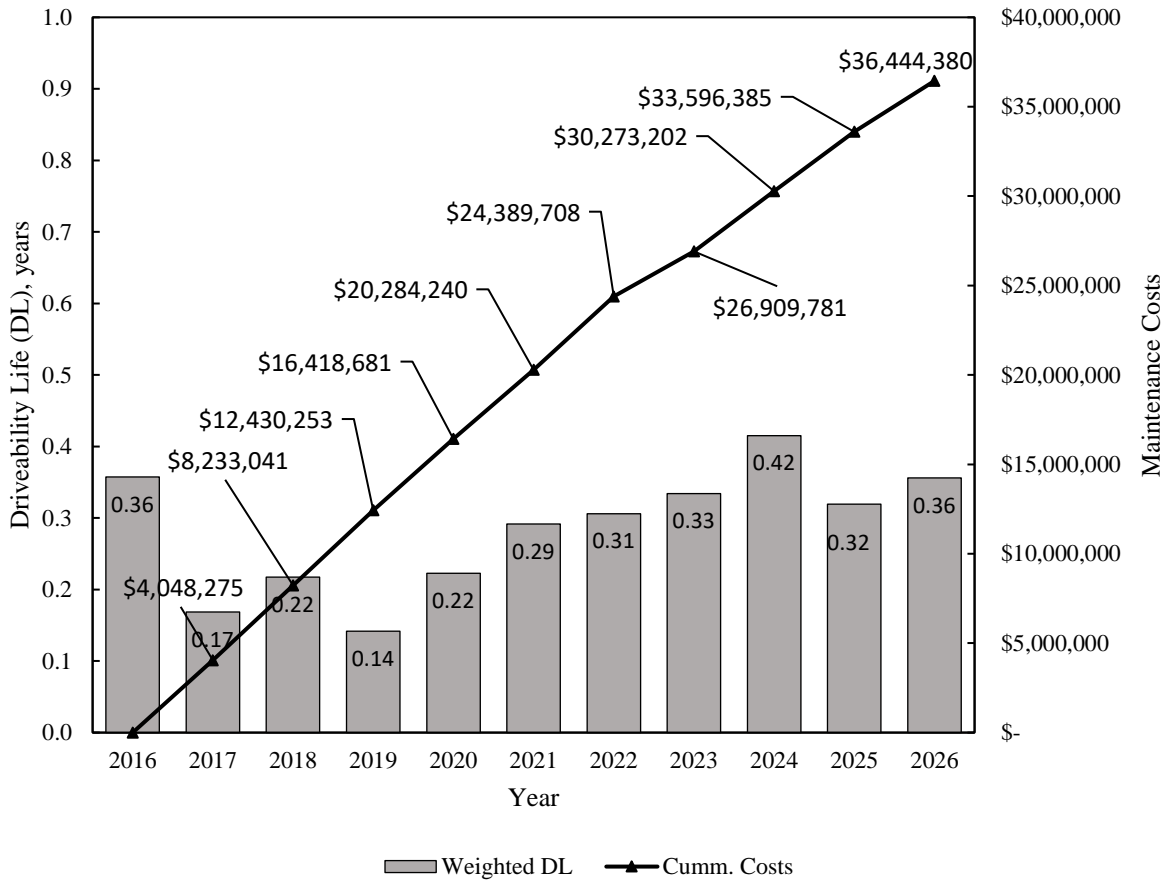


Figure 6.3: Future Projection of Overall Drivability Values for Marginal Roads in Colorado Using CDOT

Maintenance Strategy

Figure 6.4 shows the optimization results when applying the proposed maintenance strategy. Appendix D-2 lists detailed maintenance decisions of the proposed strategy that were assigned to marginal roads during analysis. It was found that the available maintenance budget is also not adequate to enhance the marginal roads significantly. Although the overall drivability has an improvement behavior over the analysis period, the DL value is still less than one year at the end of the 2026. It can be noticed from the maintenance decisions that most marginal roads were assigned with thin overlays that are surfaced after cold in-place recycling of the

existing pavement. This treatment option is more expensive than the regular thin overlays. However, it has better effectiveness on the marginal roads.

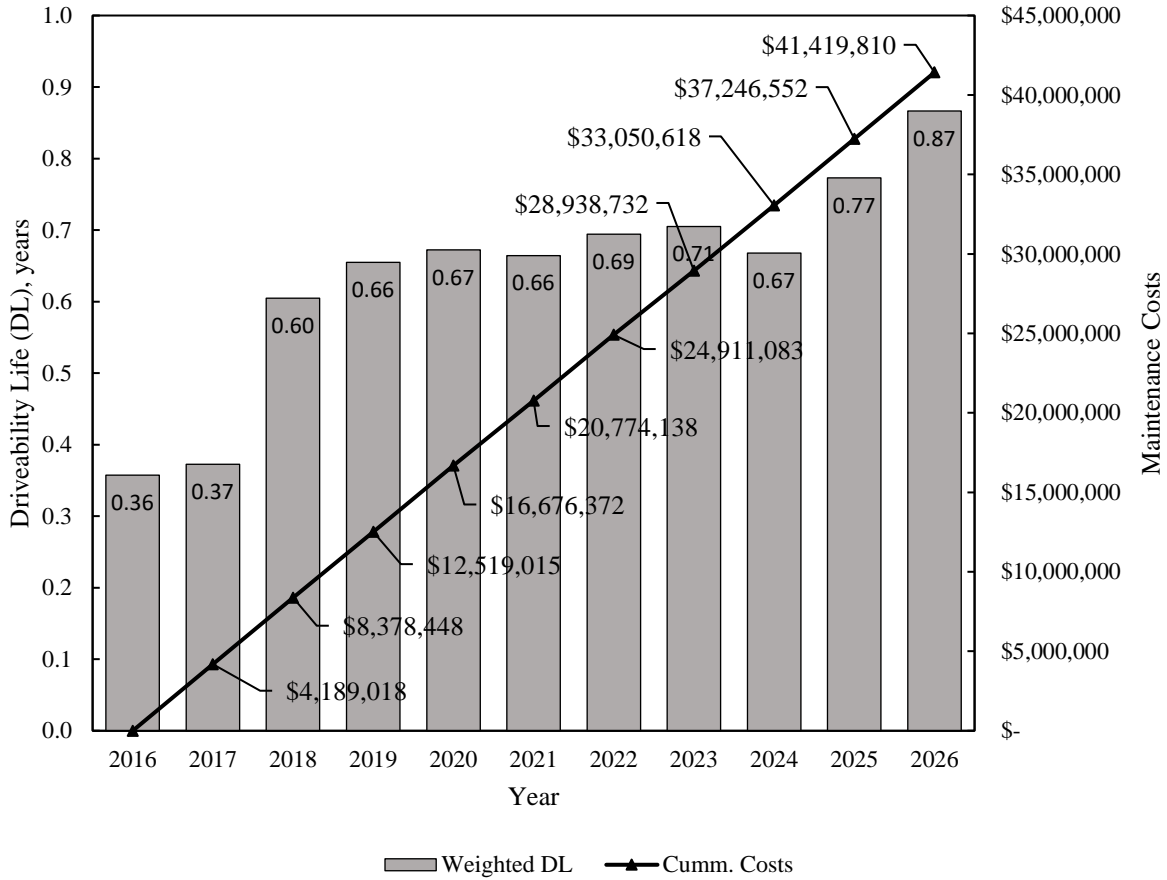


Figure 6.4: Future Projection of Overall Drivability Values for Marginal Roads in Colorado Using Proposed Maintenance Strategy

As shown in Figure 6.5, the difference in effectiveness of both strategies is not significant on roads with marginal conditions. The current CDOT strategy cannot improve the overall drivability more than the current status. Also, the proposed strategy cannot increase the overall drivability of roads to improve the marginal conditions into a higher level.

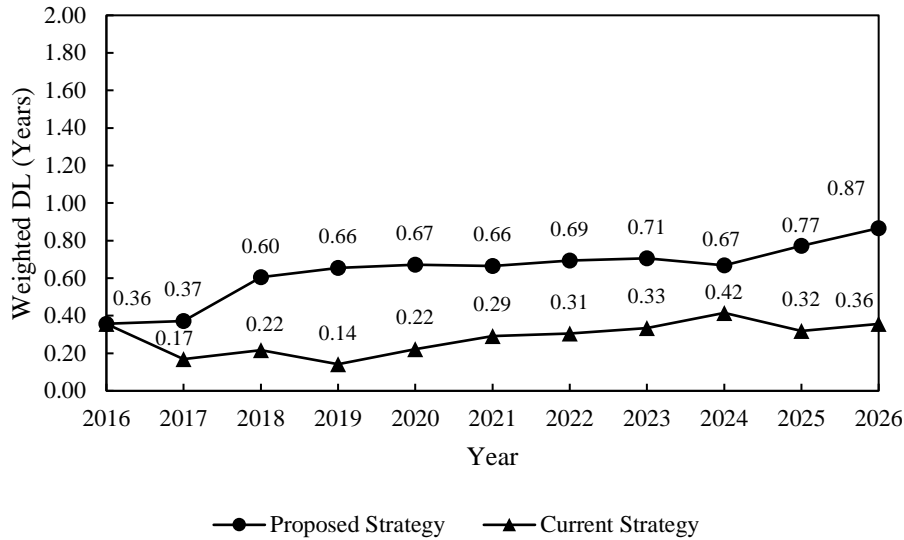


Figure 6.5: Effectiveness of Maintenance Strategies on Marginal Roads in Colorado

6.5 Optimizing Marginal Roads with Performance Targets

Since the estimated available budget is not able to enhance marginal roads, the required funding needs to be investigated. For this optimization model, the overall drivability performance was set in the objective function with a specific performance target. According to the DL distribution statewide, the performance target was set to 5 years. The multi-year optimization was adopted to minimize the annual maintenance costs so that the overall performance of marginal roads gradually increases until it reaches the performance target at the end of 2026. The marginal roads were applied with both proposed and current maintenance strategies. The following subsections provide the results obtained from the two strategies.

6.5.1 Current CDOT Strategy

Figure 6.6 shows the investment needs to enhance the overall drivability using CDOT’s existing strategy. The optimization analysis stopped at 2022 because it was found that the overall DL decreases even after applying maintenance for all roads. Figure 6.7 shows the cash flow diagram

of the annual expenditures estimated for the marginal roads. All roads are assigned with maintenance options in 2021 which cost \$83,398,537. However, the overall DL value was decreased from 2.68 to 2.6 in the next year.

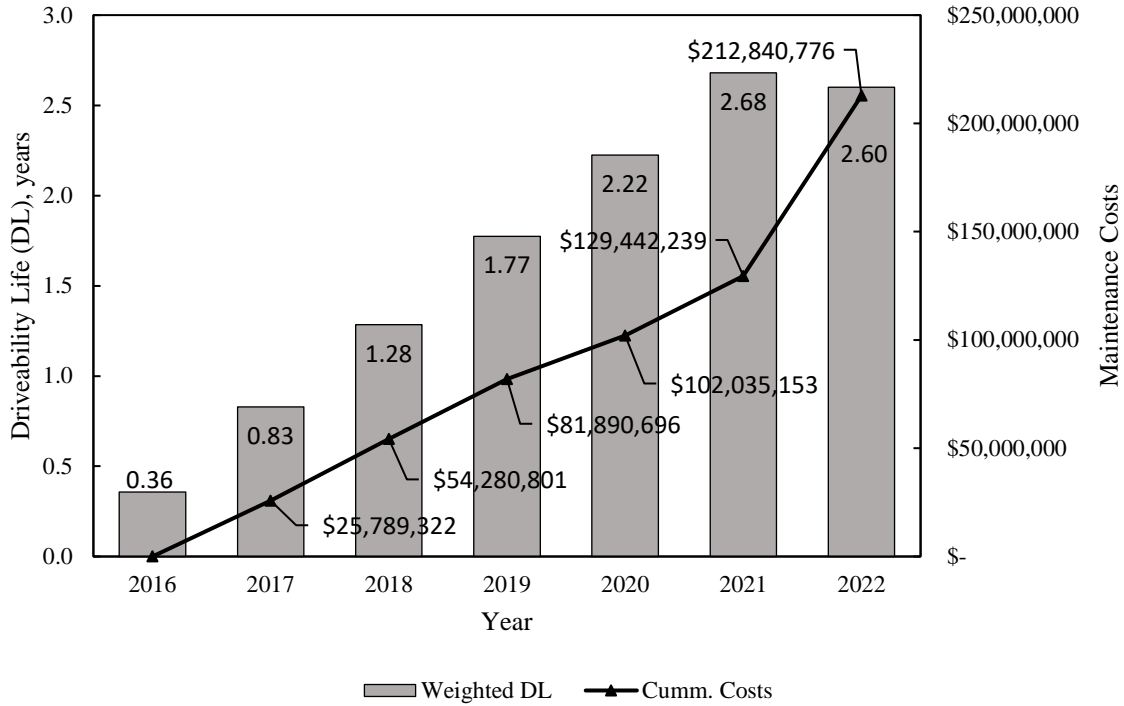


Figure 6.6: Maintenance Costs of CDOT Strategy for Marginal Roads

It is obvious that applying only thin overlays and chip seals over roads in marginal conditions is not practical. It cannot improve the overall drivability of these roads to the required performance target. However, the CDOT strategy can enhance the roads during the time period from 2016 to 2020. An average annual budget of \$25M is estimated to obtain a performance value of 2.68 which is achieved at 2021. The total costs were discounted to the base year of the analysis which is 2016 using Equation (4). Based on a discount rate of 4%, a total cost of \$120,047,916 is estimated for maintaining roads.

$$PV = \sum_{k=1}^N \text{Annual Maintenance Costs} \left[\frac{1}{(1+i)^{nk}} \right] \quad (4)$$

where,

PV = present value

i = discount rate, and

n = year of expenditure

After that, applying more maintenance to these roads would not produce gains in performance. Therefore, the maintenance activities from 2016 to 2020 are called the Capital Improvement Plan (CIP). It represents the capital improvement maintenance projects required for roads with poor conditions. At the end of this plan, the road should receive the maximum cost-benefit. Detailed maintenance activities for this plan from 2016 to 2020 is listed in Appendix E-1.

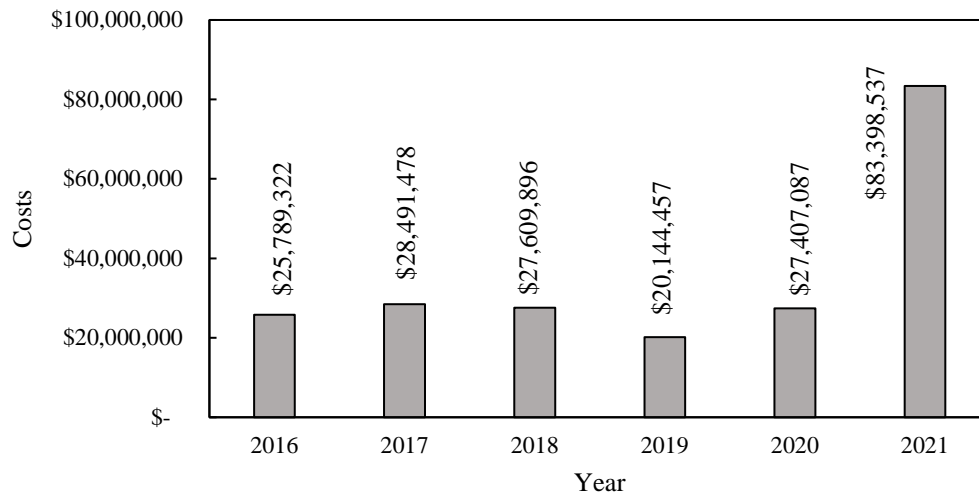


Figure 6.7: Cash Flow Diagram of Maintenance Activities on Marginal Roads Using CDOT Strategy

6.5.2 Proposed Maintenance Strategy

Figure 6.8 shows the results from the optimization analysis of the proposed maintenance strategy. The strategy was able to yield a solution every year and the overall DL was enhanced to the performance target. A cumulative amount of \$158,804,752 was estimated to fulfil the performance objectives.

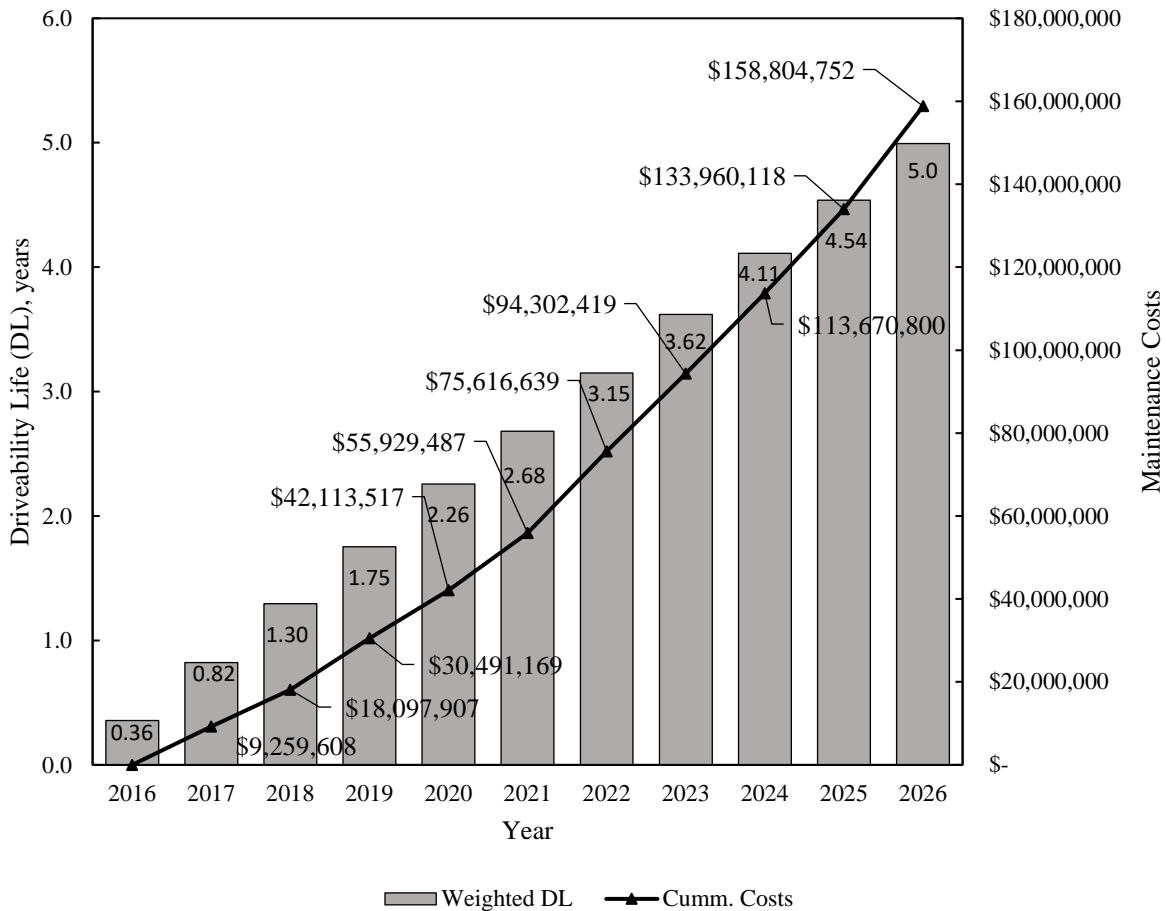


Figure 6.8: Maintenance Costs of Proposed Strategy for Marginal Roads

The cash flow diagram is shown in Figure 6.9. It can be seen that the funding required is much more than the available budget, which was estimated as \$4.2M. At the beginning, the marginal roads require an average of annual budget of \$10M. However, maintaining these roads

is more challenging after 2020. The funding needs are raised to about \$20M annually to reach the performance target. Therefore, the capital improvement plan can be defined to be from 2016 to 2020 where the roads would have maximum benefits with a cumulative discounted cost of \$51,358,414. The maximum benefit of the CIP would enhance the overall drivability value on marginal roads from 0.36 to 2.68 at 2021.

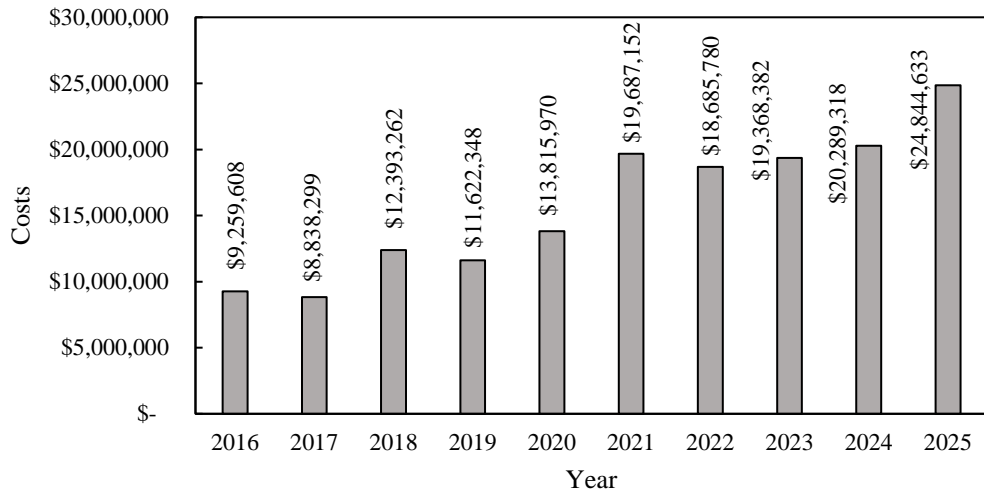


Figure 6.9: Cash Flow Diagram of Maintenance Activities on Marginal Roads Using Proposed Strategy

Chapter 7: Conclusions

This report provides a comprehensive analysis conducted to investigate the impact of CDOT maintenance policy on the pavement life of low-volume paved roads in Colorado. A collection of models and tools was adopted to evaluate the effectiveness of different treatment options and to develop alternative maintenance plans recommended for LVRs. The findings of this report emphasize the need to consider a number of treatments and light rehabilitations on roads depending on the existing condition of pavement and not on the overall drivability performance.

7.1 Conclusions from Evaluating Effectiveness of Treatments

The effectiveness of pavement maintenance programs on LVRs is not well investigated by DOTs. This study developed an evaluation methodology to investigate the effectiveness of pavement treatments applied to LVRs. The proposed methodology has the advantage of analyzing historical treatment data and classifying treatment effectiveness based on the historical performance of pavements. This alternative process avoids constructing pavement test sections which require considerable time to analyze and document the findings. A comprehensive analysis of historical PMS data in Colorado was analyzed for roads in the low-volume category. Based on the improvements of pavement condition and the post-treatment performance, five low-cost treatments were evaluated which lead to the following conclusions:

- The application of chip seals provides effective enhancements for fatigue cracking as long as the fatigue index is more than 84. However, chip seal is not an effective treatment for transverse and longitudinal cracking.

- Cold-in-place recycling provides effective maintenance on LVRs that have condition indices ranging from 53 to 100.
- Fatigue cracking can be maintained effectively by thin overlays when the value of fatigue index is more than 60. However, it is not recommended to apply thin overlays directly on severe transverse cracking.
- In the context of fatigue and transverse cracking, the application of mill and fill is considered an effective treatment for condition indices not less than 70.
- Major overlays with thicknesses ranging from 4" to 6" are effective to enhance the performance of pavements. This treatment has the ability to address fatigue cracking effectively even if the pavement is in very poor condition. However, AMJO could not be available for roads due to budget constraints.
- The historical performance values reveal that all applied treatments do not produce significant improvements to the road roughness. All maintenance activities are considered surface low-cost treatments which enhance the quantity and severity of cracks on the surface. However, they do not add structural value to the treated roads. Most roads exhibit uniform performance of ride index during the analysis period.
- The results from the evaluation process enabled development of an effective maintenance strategy. This strategy includes a combination of low-cost treatments that are applied to roads depending on fatigue and transverse indices thresholds. No specific consideration was taken in the proposed strategy for ride quality because of the uniform historical performance of the ride index.

- Future deterioration can be estimated using well fit deterministic models of each condition index. Although road roughness has an overall uniform performance over time, the average annual decline of ride index can be estimated as 1.4.
- Pavement improvements can be predicted by analyzing the post-treatment performance data of the road network. This analysis is important in determining the long-term effectiveness of the applied treatments at extending the life expectancy of pavements.
- CDOT engineering regions may not have sufficient budgets to preserve the overall condition of pavement on LVRs. The performance and cost analysis of maintaining roads show that expending \$2.8M annually on LVRs in Region 4 will result in having more deteriorated roads and poor pavement conditions.
- The proposed maintenance strategy for LVRs in Colorado is more cost-effective than the current policy of applying only chip seals and thin overlays followed by CDOT. This proposed strategy is able to reduce the annual deterioration amounts using the same available budgets compared to the current CDOT policy.
- The current CDOT policy has almost the same effectiveness as the proposed strategy at the beginning of maintenance period. However, thin overlays have short-term effectiveness on poor roads that make pavements deteriorate into very low performance at the end of the analysis period.

7.2 Conclusions from Roads with Marginal Conditions

Badly deteriorated LVRs were investigated in Colorado considering a specific characteristic of marginal pavement conditions. The different treatment strategies were evaluated to explore how

reliable applying more pavement maintenance techniques is on these roads. Based on the findings of this research study, the following conclusions are drawn:

- According to the distribution of pavement condition on LVRs statewide, marginal roads should be defined considering a maximum limit of DL value. This limit represents the extreme deterioration of pavements on these roads.
- In order to project future conditions of the badly deteriorated roads, specific performance curves should be developed using actual performances of these roads. The roads in marginal condition tend to show higher deterioration rates even after maintenance.
- Based on the historical values, the application of low-cost surface treatments provides short-term effectiveness in enhancing the transverse cracking on roads in marginal condition. The post-treatment performance of transverse index exhibits a significantly higher deterioration rate on marginal roads compared to the roads in better condition.
- The current performance of marginal roads indicates that the pavement is unserviceable. However, the available maintenance budgets may not be sufficient to improve the overall drivability of these roads.
- The proposed maintenance strategy has better effectiveness on marginal roads compared to the current CDOT policy. However, it cannot improve the overall performance significantly. Marginal roads require a budget of more than an estimated annual amount of \$4.2M to enhance the roads significantly.
- The analysis of funding needs shows that marginal roads can be improved effectively within a maintenance capital improvement plan of five years from 2016 to 2020. Over

this plan, the overall DL value of marginal roads is expected to rise from 0.36 to 2.68 years at 2021.

- The proposed maintenance strategy is more cost-effective than the current maintenance program followed by CDOT during the capital improvement plan. The proposed strategy can enhance the overall DL to the level of 2.68 years using a cumulative discounted budget of \$51,358,414 at 2016. On the other hand, CDOT policy requires a discounted budget of \$120,047,916 to achieve the same performance target.

Chapter 8: Recommendations to Colorado DOT

Based on the findings of this report, it is highly recommended that CDOT identifies the specific needs and desired benefits from managing LVRs. This report provides the following recommendations for consideration:

- CDOT is recommended to define the criteria (e.g. cut-off values) for effective treatments that meet its policy and public expectation. Based on this criteria, engineers are recommended to evaluate the applied treatments on LVRs. Other variables such as traffic volumes, type of pavement, road classification, and environmental parameters can be included in the evaluation process to increase the accuracy or to meet specific objectives.
- It is not recommended to make a maintenance decision considering only the DL value of LVRs. The results from this study emphasize that each treatment type has different effectiveness on each type of pavement distress. So considering DL in the decision tree for simplification would not address the exact deficiency of the pavement and the selected treatment may not be the right maintenance.
- Applying thin overlays directly on deteriorated roads is not recommended especially when transverse cracking is severe. CDOT is recommended to consider the appropriate pre-overlay treatments before applying asphalt overlays to avoid reflecting the cracks through the overlaid layers.
- CDOT is encouraged to consider light rehabilitations with recycling techniques in the maintenance strategy on LVRs. Cold in-place recycle and full depth replacement are recommended to be integrated with the current applications of chip seals and thin

overlays. Treatment options should be selected based on threshold values of fatigue and transverse indices.

- Innovative low-cost treatment alternatives should be investigated on LVRs. These treatments should add structural value to the roads in order to improve the road roughness significantly.
- Applying maintenance activities within the currently available budgets will result in having more deteriorated LVRs. A large scale optimization analysis should be implemented to define the performance targets and the corresponding maintenance policy and budgets.
- More advanced optimization tools are recommended to apply such as Genetic Algorithms. These optimization techniques are capable of resolving the computational complexity of optimization problems in a timely fashion. Therefore, state wide implementation plans can be developed for LVRs in Colorado.
- Different maintenance scenarios should be optimized using both current and proposed maintenance strategies. These scenarios have different performance targets so that a more comprehensive comparison can be investigated between the two strategies while minimizing the maintenance costs.
- Specific considerations should be included while managing roads with marginal conditions. An appropriate limit of DL equal to one year or less is recommended on these roads in Colorado. Depending on this definition, the size of this road network is more practical to manage.
- CDOT is advised to consider the capital improvement plan attached in the report when enhancing the marginal roads. Also, the strategy of maintaining roads by recycling

treatments is more encouraging for marginal roads because it is more cost-effective compared to the regular thin overlays.

- Another maintenance strategy or technique is needed when CDOT seeks higher performance than performance targets mentioned in the capital improvement plan. Investing more effort on the marginal roads using low-cost strategies is not recommended. The effectiveness of these treatments at this stage may not be reliable.
- CDOT is also advised to investigate the possibility of depaving marginal roads when the optimized budgets are not affordable or the expected performance is not adequate. This could be a more sustainable solution. However, the issues of depaving roads should be taken into consideration such as traffic volumes, reducing speed, material availability, and dust control.
- A better tracking system should be developed to document the applied treatments and associated costs on LVRs. This enables having a more reliable database for managing LVRs where treatment strategies can be optimized effectively.

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Appendix A-1: Historical Pavement Performance of Colorado Low-Volume Paved Roads “Fatigue Index”

ROUTE	REFPT	END REFPT	Region	LENGTH	Fatigue 2006	Fatigue 2007	Fatigue 2008	Fatigue 2009	Fatigue 2010	Fatigue 2011	Fatigue 2012	Fatigue 2013	Fatigue 2014	Fatigue 2015	Fatigue 2016
005A	0	14.894	1	14.894	Missing	99.26	99.35	99.75	96.69	99.02	99.71	Missing	95.44	97.43	99.59
006A	11.08	11.179	3	0.099	Missing	Missing	Missing	Missing	99.7	99.5	100	99.7	99.9	100	100
006A	11.179	11.825	3	0.646	94.45	85.5	79.35	57.3	54.47	19.83	75.98	33.3	98.7	98.52	99.05
006A	11.825	13.867	3	2.042	98.11	95.33	93.04	96.04	94.17	55.61	92.31	89.38	65.71	87.55	83.23
006C	43.387	45.584	3	2.197	99.99	99.59	99.87	98.96	98.7	96.6	99.97	99.62	98.66	98.9	99.61
006C	45.584	46.058	3	0.474	100	99.63	99.5	98.23	98.18	88.45	99.96	92.13	100	99.95	100
006I	343.7	344.712	4	1.012	98.87	99.13	98.84	99.41	83.33	65.96	99.4	95.82	89.16	99.62	99.93
006I	345.928	346.425	4	0.497	98.95	94.3	97.85	97.43	95.1	84.28	97.83	83.35	86.73	93.08	98.95
006Z	0.445	0.604	4	0.159	Missing	0	0	99.9	64.5	81.1	90	0	25.5	49.2	72.7
007A	3.879	14.91	4	11.031	87.26	95.01	86.89	81.97	82.59	45.82	81.16	63.45	75.5	92.27	92.17
007A	14.91	16.086	4	1.176	89.88	92.69	93.87	92.2	95.05	57.16	97.85	99.75	94.26	99.1	98.81
007A	16.086	19.249	4	3.163	93.66	99.72	97.01	97.41	99.38	68.77	97.92	84.95	90.46	89.29	89.32
007A	19.249	32.649	4	13.4	91.59	100	100	99.96	100	100	100	99.97	99.6	99.99	99.99
007E	0	0.57	4	0.57	92.74	88.62	86.18	62.76	72.94	0	27.6	0	56.16	40.04	42.98
007E	0.57	1.592	4	1.022	96.83	88.04	87.51	74.41	76.3	3.74	5.43	0	66.63	43.49	50.9
009A	21.246	44.929	2	23.683	97.32	94.12	90.02	97.33	91.4	88.73	99.15	99.99	99.97	100	100
009A	44.929	46.98	2	2.051	99.85	98.36	98.59	99.71	98.93	97.84	99.58	99.91	99.94	100	100
010A	68.016	71.026	2	3.01	99.84	95.48	99.79	99.97	98.95	96.65	99.79	99.69	88.67	99.42	98.85
011A	0	0.41	4	0.41	99.7	99.4	96.4	99.43	99.75	99.58	99.7	99.73	57.15	69.43	68.25
011A	0.41	1.35	4	0.94	99.51	99.4	98.26	98.13	98.18	97.98	99.74	99.06	90.09	88.69	86.93
012A	0	4.6	2	4.6	94.9	98.92	95.6	97.16	97.27	82.99	97.02	96.02	67.43	99.8	99.1
012A	15.238	33.058	2	17.82	94.01	96.47	98.4	95.2	97.61	96.64	98.61	94.04	95.87	99.38	98.41
012A	33.058	43.031	2	9.973	95.61	98.57	99.04	97.35	98.22	94.17	99	89.07	94.99	99.18	97.83
012A	43.031	56.848	2	13.817	97.94	99.54	99.35	97.57	98.21	95.23	99.33	95.8	93.47	98.76	98.95
014B	51.317	71.538	3	20.221	97.07	93.15	92.5	83.26	89.19	83.52	96.95	96.47	97.18	98.35	99.32
014B	71.538	90.959	4	19.421	82.46	83.67	75.55	71.15	84.09	77.79	100	92.18	97.46	97.37	98.53
015A	2.393	8.419	5	6.026	98.98	94.73	97.51	83.99	92.19	99.55	99.74	95.6	98.27	99.93	99.93
015A	8.419	10.412	5	1.993	98.02	96	93.71	62.27	92.04	98.91	98.19	98.27	99.79	100	100
015A	10.412	12.374	5	1.962	96.54	95.99	91.83	66.36	97.31	74.28	97.58	28.56	96.99	99.89	99.89

ROUTE	REFPT	END REFPT	Region	LENGTH	Fatigue 2006	Fatigue 2007	Fatigue 2008	Fatigue 2009	Fatigue 2010	Fatigue 2011	Fatigue 2012	Fatigue 2013	Fatigue 2014	Fatigue 2015	Fatigue 2016
015B	22.484	26.562	5	4.078	93.34	94.09	92.62	72.45	81.97	82.42	95	97.23	96.04	99.05	98.69
017A	0	17.28	5	17.28	97.88	93.84	96.62	79.96	82.17	80.03	90.5	95.72	95.83	98.21	98.86
023A	0	9.571	4	9.571	98.81	98.93	97.68	98.73	98.79	93.39	99.44	96.92	93.63	93.76	96.1
023A	16	17.507	4	1.507	99.89	96.99	99.1	98.72	97.75	86.19	99.56	98.71	79.09	79.73	72.56
024B	419.95	422.707	4	2.757	99.2	97.87	97.87	94.3	95.11	96.57	99.92	90.09	82.87	69.81	61.04
024B	422.707	423.059	4	0.352	99.2	97.9	89.25	91.45	93.7	66.1	99.88	81.05	99.95	39.05	54.2
024B	423.059	429.604	4	6.545	99.88	98.99	99.37	97.84	98.16	98.79	99.54	96.24	91.76	88.45	87.61
024B	429.604	436.576	4	6.972	99.77	97.4	96.8	97.68	98.06	99.21	99.88	99.64	92.23	93.85	95.94
024C	437.453	446.851	4	9.398	99.52	97.09	97.06	94.96	96.19	92.29	99.27	99.15	92.66	90.72	91.35
024C	451.87	453.869	4	1.999	89.96	89.4	84.61	48.4	61.36	87.17	97.28	83.41	63.71	53.17	59.46
024D	456.02	456.722	4	0.702	83.97	96.53	84.88	93.12	86.47	91.68	97.93	98.98	88.35	92.8	91.08
024E	0	0.619	2	0.619	95.83	91.88	86.92	85.65	72.95	38.55	78.41	73.32	79.91	79.92	100
025B	0	0.046	2	0.046	100	96.9	99.7	100	98.6	98.7	99.5	95.1	92.6	92.3	85.8
025B	0.046	1.58	2	1.534	99.34	98.96	97.86	96.69	97.39	96.39	99.35	88.46	82.09	99.24	99
025B	1.58	1.948	2	0.368	100	99.7	100	99.73	99.3	98.17	99.5	98.4	98.73	100	99.9
036C	76.394	76.467	1	0.073	99.4	96.8	94.7	98.6	79.6	69.3	52.3	82	84.9	84.9	95.8
036C	76.467	78.69	1	2.223	99.36	96.54	92.74	98.4	97.76	90.06	99.78	99.77	99.81	99.78	99.91
036C	78.69	79.73	1	1.04	99.84	97.75	96.43	97.85	97.51	93.01	100	99.99	100	100	100
036C	80.815	83.71	1	2.895	97.73	91.92	91.18	87.08	85.81	53.51	100	99.99	99.93	99.94	99.94
039A	3.353	7.571	4	4.218	53.31	45.3	56.56	40.88	53.23	24.62	75.08	84.52	32.73	33.77	37.7
040B	272.552	276.18	1	3.628	61.91	Missing	70.63	61.14	66.07	71	97.59	96.56	92.01	93.03	91.59
040C	279.244	281.82	1	2.576	72.65	77.86	36.5	11	68.64	58.4	72.75	96.58	78.84	93.31	96.58
040E	346.29	350.601	1	4.311	95.64	93.67	85.17	88.5	89.14	69.9	91.56	83.02	100	99.99	100
040E	350.601	350.862	1	0.261	95.3	94	86	92.8	73.2	57	95.3	90.8	100	100	100
040E	350.862	351.136	1	0.274	90.65	91.1	71.5	93.95	87.8	0	50	88.2	96.55	100	100
040E	351.136	352.245	1	1.109	99.92	98.82	97.62	88.42	91.85	79.27	96.48	94.7	88.16	91.13	99.58
040F	360.201	362.999	4	2.798	99.02	98.68	Missing	96.57	96.39	88.22	91.4	95.5	88.5	91.43	97.08
040G	380.689	381	4	0.311	Missing	Missing	Missing	Missing	96.93	37.17	86.6	98.4	87.73	88.3	90.63
040G	381	382.184	4	1.184	80.1	99.55	98.45	94.93	94.57	92.35	97.5	97.95	96.61	97.74	97.9
041A	0	9.505	5	9.505	90.24	92.25	91.98	88.03	92.83	83.36	97.64	87.76	93.53	99.28	98.88
046A	0	3.85	1	3.85	99.36	98.26	98.17	92.12	94.69	74.14	96.24	90.04	86.03	98.29	98.75
046A	3.85	5.99	1	2.14	93.8	96.33	99.23	98.05	99.22	95.3	99.68	98.74	93.37	98.16	96.71
046A	5.99	6.61	1	0.62	98.48	97.68	95.45	86.57	78.17	60.58	91.5	97.82	97.6	100	99.83
050C	15.669	16.948	2	1.279	98.68	96.36	94.63	99.05	96.83	42.28	97.39	77.26	71.2	79.66	77.99

ROUTE	REFPT	END REFPT	Region	LENGTH	Fatigue 2006	Fatigue 2007	Fatigue 2008	Fatigue 2009	Fatigue 2010	Fatigue 2011	Fatigue 2012	Fatigue 2013	Fatigue 2014	Fatigue 2015	Fatigue 2016
050D	0	0.852	3	0.852	93.35	88.33	89.78	53.26	92.65	82.93	97.64	68.06	86.55	91.78	99.85
050D	0.931	1.539	3	0.608	95.92	92.8	94.18	57.62	93.2	85.52	95.78	42.16	81.14	89.24	99.74
052A	58.89	60.9	4	2.01	99.15	92.36	96.43	97.34	97.36	95.63	99.68	97.34	91.54	97.41	99.12
052A	60.9	70.895	4	9.995	98.82	95.09	94.33	92.74	97.45	78.88	97.84	95.73	88.69	81.1	86.25
055A	0	0.162	4	0.162	94.8	98.6	98.7	98	97.8	0	75.65	89.3	59.9	100	100
055A	0.162	2.417	4	2.255	99.01	98.19	98.04	91	94.3	64.45	91.56	88.16	70.83	97.88	96.25
059A	15.019	33	4	17.981	99.93	99.84	100	99.85	99.43	99.18	99.85	99.45	99.3	98.06	98.46
059A	33	40.963	4	7.963	99.96	99.88	100	99.98	99.86	98.91	99.82	99.75	97.55	99.47	98.86
059B	74.474	87.535	4	13.061	99.92	99.74	99.13	99.96	99.99	99.61	99.94	99.75	99.81	99.99	99.99
059B	122.864	130.588	4	7.724	100	99.99	100	100	100	99.98	99.98	99.97	99.94	100	100
059B	130.588	145.517	4	14.929	100	99.91	99.95	99.9	99.91	99.93	99.96	99.98	99.9	100	100
059B	147.149	147.218	4	0.069	100	100	100	100	100	100	100	100	100	100	100
059B	147.218	147.507	4	0.289	99.45	98.55	99.15	99.25	99.25	99.3	99.83	99.65	97.25	99.95	99.8
059B	147.814	155.594	4	7.78	99.96	99.87	99.9	99.3	98.8	97.63	99.91	99.83	99.5	99.96	99.96
059B	155.594	159.68	4	4.086	99.97	100	99.99	99.85	100	99.82	99.99	100	99.9	99.98	99.96
059B	159.68	166.498	4	6.818	99.74	98.56	99.14	97.57	98.54	97.75	99.54	99.92	99.32	99.3	99.31
059B	166.498	171.07	4	4.572	99.77	98.32	99.17	98.92	99.06	97.96	99.49	99.9	97.71	94.85	98.8
059B	171.07	173.337	4	2.267	99.39	98.05	99.58	99.32	99.78	99.27	99.42	99.98	98.21	98.66	97.4
061A	8.062	14.03	4	5.968	98.53	99.17	95.85	98.92	99.73	96.95	99.43	99.52	97.32	99.9	99.06
061A	14.03	22.511	4	8.481	100	99.75	100	99.91	99.96	99.78	99.87	99.93	99.61	100	99.99
063A	5.08	11.136	4	6.056	98.54	99.42	95.76	99.02	99.47	91.72	99.97	98.56	96.09	96.63	96.24
063A	11.136	24.196	4	13.06	99.39	99.07	98.31	96.9	97.8	93.91	99.09	97.52	94.43	96.48	96.11
063A	29.006	29.49	4	0.484	70.13	77.13	72.2	43.57	55	0	97.37	99.73	99.23	99.47	99.3
063A	29.49	39.256	4	9.766	97.59	97.87	97.73	98.11	95.87	98.81	99.95	98.46	95.88	99.65	99.36
063A	39.256	48.2	4	8.944	99.93	99.84	99.93	99.99	99.97	99.18	99.99	99.74	99.7	99.93	99.93
063A	48.2	53.29	4	5.09	100	100	100	100	100	99.97	100	99.21	99.65	99.79	99.98
065A	14.35	26.866	3	12.516	84.33	91.17	99.99	99.91	99.02	98.48	99.85	98.84	99.58	99.94	99.93
065A	26.866	36.175	3	9.309	99.85	99.85	99.51	99.97	99.75	99.63	99.99	99.57	99.75	99.99	99.95
065A	36.175	49.565	3	13.39	93.36	99.36	98.58	97.02	96.8	96.12	99.7	97.01	97.67	98.34	98.54
065A	49.565	51.169	3	1.604	98.25	93.11	91.17	77.66	71.44	48.41	92.27	93.25	67.73	64.83	70.63
067A	0	6.835	2	6.835	92.94	89.71	89.75	59.43	73.87	58.21	79.22	78.88	74.07	79.66	80.36
067C	45.56	45.686	2	0.126	94.5	94.1	98.7	96.4	94.5	94.9	100	94.4	97.1	97.1	100
067C	45.686	50.73	2	5.044	98.13	98.37	96.7	97.53	97.66	94.66	98.03	95.16	97.63	99.17	99.43
067D	91.241	100.036	2	8.795	97.5	98.63	95.97	95.65	95.76	95.64	98.27	97.87	97.51	99.5	99.81

ROUTE	REFPT	END REFPT	Region	LENGTH	Fatigue 2006	Fatigue 2007	Fatigue 2008	Fatigue 2009	Fatigue 2010	Fatigue 2011	Fatigue 2012	Fatigue 2013	Fatigue 2014	Fatigue 2015	Fatigue 2016
067E	117.349	122.311	1	4.962	77.14	87.36	58.94	80.59	80.1	70.56	94.61	67.32	70.4	67.79	99.98
069A	0	5.306	2	5.306	98.48	98.51	96.74	92.58	99.6	95.32	99.35	97.6	91.28	99.48	99.67
069A	9.668	25.017	2	15.349	97.56	99.45	99.64	99.38	99.42	98.92	99.68	98.95	93.56	99.9	99.44
069A	25.017	26.042	2	1.025	85.13	100	99.97	100	100	99.96	99.02	99.37	89.73	99.93	100
069A	26.042	49.423	2	23.381	93.49	89.05	82.82	41.81	79.6	53.7	91.59	78.87	56.54	91.12	90.65
069A	49.423	54.125	2	4.702	96.21	91.21	86.16	85.38	97.75	67.15	99.58	97.58	62.83	99.59	99.77
069A	71.566	82.664	2	11.098	98.86	98.09	97.49	97.46	98.55	88.88	99.35	99.24	97.26	98.57	99.12
070K	0	0.723	1	0.723	Missing	Missing	Missing	Missing	Missing	Missing	99.8	98.2	98.96	99.31	99.77
070N	0	0.133	1	0.133	Missing	Missing	Missing	Missing	Missing	Missing	99.3	98.7	98.7	99.5	99.2
070N	0.133	0.396	1	0.263	Missing	Missing	Missing	Missing	Missing	Missing	99.75	100	97.4	84.8	96.1
070O	0	0.353	4	0.353	Missing	Missing	Missing	Missing	Missing	Missing	80.85	96.47	81.13	77.4	88.57
070P	0	0.04	4	0.04	Missing	Missing	Missing	Missing	Missing	Missing	100	94.4	78.5	78.9	71.8
070P	0.04	0.528	4	0.488	Missing	Missing	Missing	Missing	Missing	Missing	99.43	69.4	41.38	47.53	60.03
071A	0	7.036	2	7.036	94.85	90.67	78.32	91.68	75.36	88.71	96.74	92.91	53.02	82.74	91.26
071A	7.036	9.032	2	1.996	95.17	89.03	69.25	27.91	72.1	66.94	92.76	83.24	22.39	69.68	68.99
071B	9.601	11.614	2	2.013	100	99.99	100	100	100	99.93	99.99	99.56	89.8	99.99	100
071B	11.614	13.747	2	2.133	100	100	100	100	99.96	99.94	99.99	99.96	93.48	100	100
071B	13.747	14.076	2	0.329	100	100	100	100	100	100	100	100	99.2	100	99.8
072A	25.608	29.378	1	3.77	100	100	99.98	99.97	99.99	99.66	99.36	99.5	99.31	99.31	99.56
072B	44.095	48.353	4	4.258	73.99	98.94	93.57	96.44	88.91	70.6	84.64	99.98	99.47	99.14	99.68
072B	48.353	54.064	4	5.711	99.81	97.68	94.14	98.77	90.7	79.08	92.67	99.99	99.9	99.9	99.96
078A	0	9	2	9	Missing	Missing	100	Missing	79.26	Missing	89.96	35.77	29	100	Missing
078A	9	12.71	2	3.71	96.81	93.58	88.72	67.07	69	32.14	99.11	77.11	93.24	99.82	99.85
078A	14.586	15.532	2	0.946	99.73	99.93	99.44	100	99.67	99.91	99.92	99.38	99.84	99.94	99.76
078A	15.532	18.192	2	2.66	99.59	99.79	97.98	99.36	99.55	99.37	99.52	98.52	99.46	99.84	99.82
078A	18.192	29.903	2	11.711	97.07	96.6	95.37	92.27	86.74	88.84	74.45	73.31	90.15	95.19	97.19
078B	0	1.493	2	1.493	88.49	89.91	75.76	30.98	37.36	56.92	99.06	98.56	96.78	99.21	98.83
082A	42.471	51.254	3	8.783	Missing	98.06	97.56	96.94	98.83	98.29	99.88	Missing	99.31	97.96	98.11
082A	51.254	79	3	27.746	Missing	92.12	95.34	87.39	88.17	88.62	99.62	95.9	97.36	98.49	99.42
082A	79	83.47	3	4.47	Missing	95.21	Missing	99.12	99.33	99.73	99.97	99.91	99.64	99.64	100
082A	83.47	85.293	3	1.823	Missing	96.89	Missing	99.02	97.08	96.12	98.81	99.8	99.74	99.65	100
086A	27.718	32.248	4	4.53	86.45	87.35	84.03	80.29	77.92	75.11	100	99.66	100	100	100
086A	32.248	51.167	4	18.919	79.88	93.6	74.98	88.4	89.08	88.22	93.67	96.95	75.74	86.18	89.58
086A	51.167	59.279	4	8.112	97.72	96.53	88.87	93.37	92.89	93.69	98.61	99.29	90.99	60.86	75.48

ROUTE	REFPT	END REFPT	Region	LENGTH	Fatigue 2006	Fatigue 2007	Fatigue 2008	Fatigue 2009	Fatigue 2010	Fatigue 2011	Fatigue 2012	Fatigue 2013	Fatigue 2014	Fatigue 2015	Fatigue 2016
089A	0	8.976	2	8.976	99.38	98.28	99.87	99.8	99.9	99.77	99.91	99.74	99.03	99.97	99.89
089A	8.976	18.57	2	9.594	94.88	88.59	100	99.96	100	99.99	100	99.87	99.51	100	100
089A	18.57	21.549	2	2.979	92.68	80.11	100	99.99	100	99.94	99.98	99.93	100	100	100
089A	21.549	33.183	2	11.634	71.48	35.65	100	99.84	99.99	99.97	99.98	99.84	99.97	99.99	99.99
090A	0	9.493	5	9.493	82.42	79.13	71.87	49.48	36.21	49.44	77.46	51.13	52.91	97.15	98.48
090A	9.493	14.797	5	5.304	80.63	76.71	52.46	39.39	13.89	32.62	78.68	26.45	47.18	78.23	88.11
090A	14.797	33.874	5	19.077	88.42	92.09	84.01	76.94	54.25	68.16	94.67	72.18	83.01	89.57	89.85
090B	81.533	81.737	3	0.204	Missing	Missing	Missing	Missing	99.5	100	100	91.6	93.4	97.7	100
090B	81.737	84.884	3	3.147	99.14	97.93	98.62	98.48	95.87	98.16	98.74	56.13	92.39	97.68	100
090B	84.884	86.058	3	1.174	98.29	97.52	98.66	98.56	90.41	96.33	99.61	95.98	94.08	97.29	99.95
090B	86.058	86.931	3	0.873	94.4	98.39	97.69	99.01	91.31	96.84	99.88	99.84	99.51	99.99	100
090B	86.931	87.914	3	0.983	99.88	99.07	99.22	93.44	96.79	95.3	97.87	94.59	96.61	99.84	100
092A	27.082	30.11	3	3.028	97.68	98.57	98.73	98.91	97.55	92.53	96.51	96.59	96.31	97.37	99.31
092A	31.525	33.643	3	2.118	97.54	97.15	97.66	94.23	93.7	89.18	93.79	93.75	97.33	96.16	96.14
092A	33.643	36.577	3	2.934	99.06	97.78	98.95	97.74	96.78	89.77	93.87	91.66	94.34	96.09	97.15
092A	36.577	71.819	3	35.242	99.26	91.38	99.37	99.08	99.01	98.45	99.45	99.05	98.51	99.41	99.5
092A	71.819	73.259	3	1.44	99.69	99.87	99.31	99.98	99.92	99.32	99.94	100	98.71	99.88	99.82
094A	33.079	45.054	4	11.975	93.76	97.08	85.37	76.14	90.54	92.59	98.56	93.57	76.41	93.67	90.93
094A	45.054	54.581	4	9.527	71.52	88.65	45.37	43.64	55.94	72.83	93.38	83.7	31.16	61.48	75.8
094A	54.581	86.174	4	31.593	97.89	95.19	93.21	91.93	96.15	92.07	98.58	93.84	88.77	93.95	93.39
096A	1.313	11.064	2	9.751	95.21	91.48	80.72	81.5	78.56	58.83	96.41	59.04	88.98	83.15	79.78
096A	26.273	33.575	2	7.302	63.32	85.76	77.23	61.72	58.97	30.22	85.65	42.88	50.46	100	100
096A	33.575	42.21	2	8.635	78.59	92.3	94.65	88.03	92.48	47.76	91.76	84.32	82.23	92.14	97.61
096B	70.573	75.496	2	4.923	87.75	94.33	88.48	96.35	80.65	96.91	79.5	52.43	15.59	82.14	90.83
096C	119.491	143.78	2	24.289	58.74	94.14	70.21	75.32	65.62	89.83	99.53	90.66	79.91	87.5	92.72
097A	0.32	3.932	5	3.612	68.95	70.4	33.11	7.21	60.35	84.95	95.93	83.74	93.68	98.51	99.43
097A	3.932	4.584	5	0.652	87.7	86.51	83.2	77.98	5.76	46.58	91.29	47.76	89.41	97.85	98.72
100A	0	0.279	2	0.279	98.4	Missing	96.9	94.2	95.75	96.2	99.23	96.8	81.95	100	99.95
100A	0.279	0.419	2	0.14	Missing	Missing	96.1	98.8	96	88.5	96.65	96.7	77.2	100	100
101A	0.404	1.151	2	0.747	96.48	70.72	84.78	99.55	98.13	93.83	99.34	95.03	95.73	100	99.27
101A	1.151	5.151	2	4	98.33	87.58	91.66	69.82	54.16	10.34	97.99	63.5	42.38	66.73	51.76
101A	5.151	16.45	2	11.299	97.88	94.91	82.31	68.76	73.7	46.91	98.51	89.94	31.71	59.11	43.37
101A	16.45	21.413	2	4.963	90.31	83.91	78.8	23.83	53.3	29.39	95.95	54.74	24.59	56.32	33.55
103A	6.7	13.265	1	6.565	96.13	95.87	96.47	93.29	93.93	84.45	97.17	92	96.27	96.92	100

ROUTE	REFPT	END REFPT	Region	LENGTH	Fatigue 2006	Fatigue 2007	Fatigue 2008	Fatigue 2009	Fatigue 2010	Fatigue 2011	Fatigue 2012	Fatigue 2013	Fatigue 2014	Fatigue 2015	Fatigue 2016
103A	13.265	22.488	1	9.223	95.18	96.66	93.26	96.95	95.07	91.71	99.73	Missing	100	100	100
105A	9.211	9.48	2	0.269	98.9	100	100	99.7	100	100	100	100	100	100	100
109A	0	7.722	2	7.722	91.79	87.9	80.2	74.74	84.7	74.92	92.23	78.36	68.78	94.09	89.62
109A	7.722	53	2	45.278	86.06	53.28	82.02	90.19	93.07	86.01	92.81	96.58	71.69	80.11	80.74
109A	53	54.79	2	1.79	97.44	96.84	100	100	99.96	99.31	99.25	99.56	94.08	95.11	97.28
109A	64.748	65.327	2	0.579	97.74	94.96	92.34	97.32	96.48	60.9	97.48	9.14	Missing	100	99.9
110A	0	0.14	5	0.14	100	99.5	99.2	100	100	99.8	99.55	97.8	100	100	100
114A	0	19	5	19	99.81	99.62	99.37	99.06	99.37	98.85	99.76	97.87	99.13	99.79	99.83
114A	19	20.261	5	1.261	98.92	98.93	97.78	99.37	99.31	95.78	99.88	98.86	98.78	99.13	99.65
114A	20.261	56.043	5	35.782	97.36	97	96.66	93.19	95.05	86.91	97.38	96.85	94.76	95.62	96.85
114A	56.043	61.453	5	5.41	99.69	98.38	99.31	96.6	98.1	91.96	96.47	99.81	99.86	99.99	99.99
116A	0	12.042	2	12.042	94.26	53.55	88.6	71.54	73.36	63.49	87.07	77.68	76.56	88.14	89.24
116A	12.042	12.299	2	0.257	88.1	76.5	18.9	98.8	99.6	92.7	97.55	96.2	80.3	99.2	100
116A	12.299	13.055	2	0.756	94.94	68.41	88.83	94.54	97.16	67.83	96.68	86.11	82.37	97.56	88.93
116A	13.055	20.029	2	6.974	78.94	31.76	69.08	73.94	56.42	49.28	76.14	60.03	77.92	96.32	97.57
116A	20.029	27.02	2	6.991	90.28	25.72	41.69	55.77	60.87	70.7	86.71	72.2	55.47	69.66	65.96
116A	27.02	32.322	2	5.302	86.26	72.37	37.58	29.73	62.69	71.7	88.25	93.88	83.09	81.12	84.93
120A	0	3.105	2	3.105	75.03	87.84	56.89	80.49	81.59	66.32	83.81	55.65	72.8	74.31	84.96
120A	3.105	7.186	2	4.081	54.35	62.32	36.19	35.31	45.66	45.17	81.34	93.93	92.98	84.58	94.38
125A	0	29.46	3	29.46	94.96	88.66	92.58	93.77	92.7	92.97	99.19	96.68	98.32	98.96	99.57
125A	29.46	31.504	3	2.044	94.72	92.28	90.27	93.17	86.03	91.42	98.42	86.11	98.22	99.76	99.92
125A	31.504	35.582	3	4.078	98.36	95.45	94.09	92.45	83.37	99.24	99.82	99.36	99.19	99.87	99.97
125A	35.582	52.02	3	16.438	99.33	98.8	98.85	97.67	97.88	97.34	99.56	95.78	97.83	99.17	99.33
125A	66.558	75.406	3	8.848	96.9	93.03	99.99	99.99	99.94	99.83	99.99	99.86	99.6	100	100
131B	13.709	32.904	3	19.195	99.98	99.94	99.77	99.9	99.68	99.5	99.83	99.02	99.47	99.81	99.92
131B	32.904	38.441	3	5.537	99.87	99.13	99.37	99.19	99.56	98.52	99.49	96.3	98.28	99.66	99.93
131B	38.441	42.05	3	3.609	99.91	99.66	99.66	99.2	99.69	98.72	99.63	95.83	98.28	99.74	99.81
131B	51.859	52.081	3	0.222	98.8	97.9	86.8	86.1	87.4	67.2	92.35	93.7	54.4	100	99.6
133A	24	46.371	3	22.371	99.93	99.86	97.11	99.72	99.41	99.29	99.75	99.09	98.95	99.62	99.8
133A	46.371	51.357	3	4.986	98.33	97.02	96.6	89.73	90.15	93.49	97.05	95.48	97.71	98.94	99.44
133B	13.267	16.076	3	2.809	Missing	Missing	Missing	Missing	Missing	Missing	62.64	64.41	53.89	58.81	57.75
134A	0	16.32	3	16.32	92.17	99.88	98.32	99.8	99.51	99.14	99.56	99.06	98.66	99.82	100
134A	16.32	27.163	3	10.843	89.71	99.91	99.66	99.68	98.42	98.62	99.24	98.98	98.18	99.97	100
136A	0	0.152	5	0.152	99.8	97.8	99.9	99.4	98.7	97.1	99.3	94.8	93.5	97.1	98.5

ROUTE	REFPT	END REFPPT	Region	LENGTH	Fatigue 2006	Fatigue 2007	Fatigue 2008	Fatigue 2009	Fatigue 2010	Fatigue 2011	Fatigue 2012	Fatigue 2013	Fatigue 2014	Fatigue 2015	Fatigue 2016
136A	0.152	0.553	5	0.401	97.4	94.23	63.4	0	92.73	74.1	97.07	96	87.3	99.6	99
136A	0.553	1.579	5	1.026	97.58	99.18	86.87	95.23	95.4	96.3	97.86	94.92	89.72	96.92	99.47
136A	3.48	4.469	5	0.989	98.4	97.29	95.82	83.56	96.94	96.69	98.11	96.17	87.58	98.71	99.67
138A	21.739	26.329	4	4.59	100	99.85	99.92	99.54	99.95	99.46	99.95	99.97	99.84	100	100
138A	26.329	27.503	4	1.174	100	99.95	99.86	99.95	99.98	99.76	99.99	99.91	98.78	100	99.98
138A	27.503	27.911	4	0.408	100	100	99.93	100	99.97	99.33	99.87	99.67	97.5	100	99.87
138A	27.911	34.981	4	7.07	99.99	99.98	99.89	99.27	99.97	99.81	99.98	99.74	99.46	99.96	99.92
138A	34.981	41.385	4	6.404	94.04	99.23	93.79	98.63	92.44	82.08	96.99	83.17	85.06	95.59	89.81
138A	41.385	43.023	4	1.638	91.92	98.28	87.5	93.24	71.35	44.43	91.6	66.39	68.31	99.94	98.54
138A	43.023	43.084	4	0.061	57.6	99.1	95.3	91.3	96.8	97.6	100	98.8	99.4	98	100
138A	43.084	43.413	4	0.329	98.07	99.5	91.43	95.1	92.5	98.27	99.85	99.37	94.7	100	100
138A	50.476	50.633	4	0.157	98.6	93.5	97.6	85.2	76	76.1	90.95	79.1	63.4	92.2	96.5
138A	50.633	50.868	4	0.235	92.4	97.1	91.6	86.4	76.4	32.1	80.85	63.8	50.4	84.2	89.5
138A	50.868	54	4	3.132	91.15	92.83	94.65	84.14	78.07	55.66	89.28	73.65	75.62	81.87	91.68
138A	54	54.81	4	0.81	92.88	96.66	90.2	93.48	89.08	87.28	99.43	97.19	95.01	96.03	99.49
138A	58.534	59.823	4	1.289	99.85	99.82	99.84	99.83	99.83	99.74	99.94	99.96	99.63	100	99.6
141A	0	9.381	5	9.381	99.4	98.07	98.58	97.77	86.72	84.51	98.46	92.65	95.54	94.66	94.27
141A	9.381	11.271	5	1.89	99.84	99.39	98.42	98.83	97.69	95.05	99.26	96.41	98.73	98.33	99.98
141A	11.271	44.124	5	32.853	86.48	83.9	81.53	67.21	69.58	61.06	94.31	63.11	71.42	77.36	80.23
141A	62.436	64.395	5	1.959	99.94	99.94	99.84	99.79	99.82	99.68	99.78	99.17	99.49	100	100
141A	64.395	110.525	5	46.13	90.62	95.28	84.25	75.68	85.13	72.45	95.82	72.73	84.74	88.9	90.7
142A	3.276	13.4	5	10.124	98.54	97.6	97.82	97.56	97.92	94.01	98.57	98.52	93.62	99.5	99
142A	13.4	22.958	5	9.558	96.59	95.07	94.28	85.43	87.67	71.33	97.17	96.8	94.94	92.36	92.43
142A	22.958	28.712	5	5.754	95.54	95.35	95.47	96.95	97.17	90.25	96.92	99.05	95.24	93.89	93.45
142A	28.712	33.84	5	5.128	92.34	91.23	91.24	94.61	96.83	88.24	96.63	96.81	94.92	93.42	91.74
144A	0	0.027	4	0.027	92.4	95.4	84.7	95.9	94.7	45.2	98.4	97	92.4	100	100
144A	0.027	2.821	4	2.794	99.53	97.51	98.25	96.91	96.95	95.54	99.14	98.5	95.12	98.97	99.01
144A	2.821	10.493	4	7.672	99.83	99.41	99.52	99.36	99.62	98.98	99.81	99.59	98.03	98.51	98.91
144A	10.493	11.062	4	0.569	97.1	95.84	92.1	97.58	97.26	97.42	98.18	98.8	64.86	91.38	98.48
144A	11.062	16.601	4	5.539	98.87	98.34	91.37	97.06	95.21	97.1	99.41	98.21	86.74	93.25	97.63
144A	16.601	20.841	4	4.24	99.68	98.99	95.94	98.95	97.36	98	99.92	99.36	92.51	92.17	97.57
144A	26.066	26.887	4	0.821	89.53	97	57.37	95.97	90.56	93.77	92.01	93.79	73.36	91.76	89.1
149A	3.45	18.52	5	15.07	99.98	100	99.99	99.98	99.97	99.58	99.98	99.87	99.61	99.91	99.96
149A	21.566	21.648	5	0.082	89.4	99.1	99.9	97.5	98.3	87.7	98.6	94.6	100	98.6	100

ROUTE	REFPT	END REFPT	Region	LENGTH	Fatigue 2006	Fatigue 2007	Fatigue 2008	Fatigue 2009	Fatigue 2010	Fatigue 2011	Fatigue 2012	Fatigue 2013	Fatigue 2014	Fatigue 2015	Fatigue 2016
149A	21.648	21.892	5	0.244	100	99.8	100	99.6	100	99.3	99.75	98.8	100	100	100
149A	21.892	22.887	5	0.995	99.82	99.6	99.94	98.73	98.72	94.94	99.59	96.8	98.28	99.01	99.7
149A	22.887	26.581	5	3.694	99.99	99.32	99.88	99.57	99.56	98.28	99.78	98.46	99.18	99.86	99.91
149A	26.581	27.689	5	1.108	100	98.49	100	99.77	99.72	98.71	99.92	99.28	99.21	100	99.97
149A	27.689	41.477	5	13.788	100	99.7	99.86	99.81	99.66	99.15	99.89	98.91	99.66	99.97	99.97
149A	41.477	45.465	3	3.988	100	98.76	97.33	97.75	96.24	81.73	89.14	94.46	99.94	100	100
149A	45.465	62.655	3	17.19	98.11	97.34	95.28	79.69	93.95	60.85	88.16	79.23	93.63	97.64	98.82
149A	62.655	69.851	3	7.196	93.47	93.93	85.93	36.05	79.63	46.95	77.27	81.78	85.25	89.77	90.96
149A	69.851	71.901	3	2.05	98.31	95.9	97.71	85.04	93.76	74.73	92.92	92.65	94.6	95.73	98.05
149A	72.829	73.207	3	0.378	98.53	96.73	98.93	95.7	97	76.47	97.27	98.53	83.67	98.7	97.2
149A	73.207	100.601	3	27.394	97.22	96.84	96.47	79.83	90.74	85.56	92.88	89.33	92.07	95.37	96.46
149A	100.601	117.522	3	16.921	99.71	99.36	99.35	99.02	99.62	98.79	99.77	97.46	99.27	99.81	99.86
150A	0	13.511	5	13.511	93.95	93.22	93.07	95.28	99.98	99.93	99.96	99.33	98.5	100	100
150A	13.511	16.114	5	2.603	95.35	96.42	94.27	97.73	100	100	100	99.89	99.93	100	100
151A	22.731	33.96	5	11.229	85.29	90.16	77.88	81.18	87.91	75.69	96.6	98.59	99.35	99.98	99.98
159A	0	7.009	5	7.009	97.91	98.98	98.21	99.76	99.5	99.55	99.71	99.85	99.72	99.89	99.92
159A	7.009	13.3	5	6.291	95.68	92.09	92.85	92.69	93.01	83.34	96.11	96.75	93.92	99.18	99.95
159A	13.3	17.547	5	4.247	91.34	86.18	89.74	86.98	85.86	76.94	93.46	94.35	83.22	98	99.95
159A	17.547	17.789	5	0.242	94.5	96.6	93.5	94	92.8	92.6	94.8	94.4	87.9	100	100
159A	18.334	30.959	5	12.625	99.45	97.4	98.23	98.81	97.5	96.75	99.58	99.91	98.89	99.68	99.63
160C	353.65	367.79	2	14.14	98.88	94.42	98.19	90.48	93.28	85.83	98.74	94.62	73.3	94.76	92.2
160C	367.79	375.832	2	8.042	86.18	79.61	78.13	61.45	64.73	62.38	92.46	96.95	96.18	99.07	99.62
160C	375.832	382.774	2	6.942	97.22	92.89	91.34	84.85	87.68	87.28	96.65	94.28	91.75	97.89	95.95
160C	382.774	386.608	2	3.834	99.07	91.99	97.82	57.59	68.32	69.54	97.53	85.62	86.93	80.23	73.37
160C	386.608	403.656	2	17.048	95.2	73.75	78.48	55.37	33.96	66.92	93.55	50.9	66.84	72.19	66.22
160C	403.656	406.685	2	3.029	98.83	93.37	96.18	92.96	39.36	90.59	99.09	3.9	80.82	96.43	92.93
160C	406.685	414.326	2	7.641	94.68	79.76	89.29	55.72	43.61	57.27	95.27	13.95	67.76	63.31	99.97
160C	414.326	414.755	2	0.429	84.7	21.93	54.27	0	0	0	100	100	77	90.93	100
160C	414.755	416.531	2	1.776	79.4	38.71	51.16	12.54	12.15	31.11	80.9	47.29	69.46	47.41	99.84
160C	416.531	425.681	2	9.15	87.44	86.55	80.5	54.61	33.32	77.81	91.62	8.88	27.14	77.11	99.76
160C	425.681	441.65	2	15.969	98.98	99.13	98.65	98.94	97.94	98.38	99.48	97.21	86.08	99.47	98.99
160C	441.65	447.59	2	5.94	99.81	99.73	99.76	99.84	99.62	99.23	99.5	82.02	98.64	99.96	99.55
160C	450.97	460.147	2	9.177	100	99.91	99.99	99.98	100	99.88	99.99	99.96	94.41	100	100
160C	483.037	484.418	2	1.381	93.39	100	100	99.95	99.95	99.99	99.98	99.48	99.95	99.81	99.92

ROUTE	REFPT	END REFPT	Region	LENGTH	Fatigue 2006	Fatigue 2007	Fatigue 2008	Fatigue 2009	Fatigue 2010	Fatigue 2011	Fatigue 2012	Fatigue 2013	Fatigue 2014	Fatigue 2015	Fatigue 2016
160D	0	0.011	5	0.011	100	99.1	96.7	95	98.1	79.8	91	97.7	100	71.5	90
160D	0.011	1.212	5	1.201	97.58	98.26	93.41	98.48	95.09	90.25	98.22	86.78	93.02	95.25	96.89
160D	1.212	1.457	5	0.245	96.6	91.7	98.6	98	96.3	90.8	99.8	96.7	91.9	94.1	90.9
160D	1.457	2.488	5	1.031	94.04	93.63	90.34	88.74	89.77	62.78	93.87	58.12	86.61	86.37	85.18
165A	0	15.31	2	15.31	99.95	99.37	99.76	99.78	99.85	99.92	99.94	99.17	99.18	99.87	99.81
165A	15.31	18.503	2	3.193	99.97	98.37	99.52	99.92	99.73	99.61	99.81	96.84	97.34	99.85	99.16
165A	18.503	28.558	2	10.055	99.9	99.55	99.73	99.66	99.14	99.38	99.74	95.45	98.33	99.62	99.31
167A	0	1.673	2	1.673	74.14	84.59	90.98	89.74	88.67	48.63	88.15	51.96	61.86	82.88	80.53
167A	1.673	2.005	2	0.332	91.07	87.73	88.23	93.43	88.4	51.6	97.85	20.9	82.23	94.33	92.9
167A	2.005	2.368	2	0.363	91.85	84.95	93.3	93.6	60.3	18	95.5	0	57.05	79.45	26.3
167A	2.368	2.905	2	0.537	91.5	91.28	93.24	98.2	88.66	35.32	98.19	0	77.38	94.6	76.3
167A	2.905	4.86	2	1.955	72.77	75.17	88.53	62.55	75.02	26.48	87.47	33.92	83.72	84.63	82.58
170A	0	2.157	4	2.157	94.46	92.36	90.81	60.49	77.16	12.77	85.62	84.66	61.64	95.73	96.04
172A	0	2.081	5	2.081	96.59	99.93	100	99.96	99.85	100	99.99	99.81	99.93	100	100
183A	0	1	2	1	99.42	98.67	98.98	99	98.69	98.59	99.69	95.98	99.37	99.95	99.94
194A	0	3.8	2	3.8	92.81	87.38	86.33	95.38	66.47	51.43	99.61	94.28	100	100	99.84
194A	3.8	14.678	2	10.878	95.54	91.34	89.89	84.83	87.36	68.54	99.25	97.16	94.91	98.23	99.25
194A	14.678	20.327	2	5.649	91.45	92.23	78.99	88.8	86.46	74.54	98.11	96.19	83.22	91.84	90.59
196A	0	1.6	2	1.6	96.04	91.38	95.06	90.41	93.43	60.33	92.15	68.38	91.36	99.91	100
196A	1.6	6.91	2	5.31	87.37	83.31	93.59	98.33	64.08	78.34	93.46	79.75	92.02	98.69	98.84
196A	6.91	8.922	2	2.012	97.86	79.88	98.61	98.04	61.27	55.58	95.38	88.24	99.22	99.86	100
202A	0	0.11	2	0.11	99.7	100	98.9	88.7	99.5	0	99.8	99.8	95.6	100	100
202A	0.11	0.19	2	0.08	91.9	86.4	83.7	24.8	20.5	68	98.5	96.3	66.6	99.4	100
202A	0.19	1.22	2	1.03	79.73	91.74	94.19	48.77	76.72	99.87	99.95	99.72	95.9	100	100
202A	1.22	3.228	2	2.008	96.58	93.96	93.29	26.46	49.27	48.18	57.14	61.73	95.61	100	100
207A	0	3.513	2	3.513	86.79	80.98	86.42	67.57	85.28	89.33	83.44	12.49	82.61	99.52	99.05
207A	3.513	5.935	2	2.422	91.32	97.66	93.23	86.5	93.67	98.14	95.22	11.23	91.36	99.93	100
209A	0	1.387	2	1.387	94.77	93.58	91.38	93.61	95.93	90.63	99.14	99.49	87.35	99.88	75.6
209A	1.387	1.528	2	0.141	95.7	91.3	94.9	97.5	90.2	91.9	98.1	98.1	90.6	99.8	98.9
239A	0	0.675	2	0.675	99.88	92.1	99.48	85.42	88.88	99.6	100	96.58	96.72	98.93	96.43
239A	0.675	0.972	2	0.297	92.55	93.7	98.2	95.25	96.45	71.75	95.95	95.4	92.45	100	95.95
239A	0.972	3.345	2	2.373	98.9	92.16	98.59	98.68	95.42	65.63	96.32	89.88	69.45	99.5	97.76
257B	0.037	0.644	4	0.607	65.66	57.98	61.5	Missing	Missing	0	56.04	17.3	5.04	45.92	23.58
257B	0.644	1.146	4	0.502	83.83	75	76.35	Missing	Missing	24.6	67.94	28.43	15.88	47.98	16.05

ROUTE	REFPT	END REFPT	Region	LENGTH	Fatigue 2006	Fatigue 2007	Fatigue 2008	Fatigue 2009	Fatigue 2010	Fatigue 2011	Fatigue 2012	Fatigue 2013	Fatigue 2014	Fatigue 2015	Fatigue 2016
266A	0	0.06	2	0.06	55	83.3	34.8	45	48.3	61.2	62.5	78.3	98.1	99.8	98.9
266A	0.06	0.217	2	0.157	73.2	80.9	42.4	0	56.9	0	56.6	41.7	88.6	97.8	95.1
266A	0.217	1.306	2	1.089	98.84	97.48	93.94	97.94	96.6	98.12	99.49	97.71	89.97	98.05	89.83
266A	1.306	2.964	2	1.658	95.88	95.49	86.48	77.25	91.53	93.45	98.64	96.01	78.67	95.02	87.75
266A	2.964	5.363	2	2.399	97.2	93.44	76.77	42.19	79.2	83.95	98.12	86.98	80.17	86.53	80.79
266A	5.363	9.512	2	4.149	98.46	92.16	90.54	85.6	89.96	98.58	98.82	98.32	79.72	97.05	91.58
266A	9.512	11.516	2	2.004	97.12	91.83	89.42	93.14	89.47	98.26	98.9	92.16	87.1	99.95	94.24
300A	0.465	3.356	3	2.891	96.89	98.25	98.57	97.46	96.43	99.6	99.66	95.49	98.42	98.86	99.56
317A	0	12.237	3	12.237	94.51	97.74	95.6	93.9	90.81	93.97	98.05	80.71	95.71	92.92	96.08
318A	0	20.562	3	20.562	96.64	94.52	92.7	87.57	92.21	82.83	91.67	78.04	89.66	98.05	98.8
318A	20.562	54.309	3	33.747	99.17	98.16	98.73	97.07	98.54	95.33	97.88	97.58	97.55	99.68	99.51
318A	54.309	60.697	3	6.388	99.77	98.02	99.64	97.42	98.36	97.54	99.12	99.36	97.65	99.62	99.45
325A	0	4.102	3	4.102	76.65	82.67	90.83	87.32	95.33	96.05	95.48	78.92	90.21	90.8	95.61
325A	4.102	6.977	3	2.875	71.1	63.19	66.79	31.21	54.12	97.99	98.39	80.66	70.35	74.23	90.59
325A	6.977	11.395	3	4.418	82.23	82.2	74.66	21.27	69.73	52.4	72.18	46.49	90.19	92.58	99.61
347A	0	1.821	3	1.821	99.78	98.51	98.69	98.18	96.01	62.48	94.65	54.07	79.14	70.26	88.64
347A	1.821	5.248	3	3.427	98.86	95.23	96.94	98.53	96.87	56.53	63.19	45.66	97.68	94.01	96.42
348A	0	1.343	3	1.343	99.38	98.32	98.99	92.39	91.85	93.7	96.52	88.72	92.92	94.79	99.44
348A	1.343	3.253	3	1.91	97.08	98.03	98.5	98.23	97.71	94.19	99.53	90.99	91.71	93.4	100
348A	3.253	4	3	0.747	94.79	93.93	90.06	66.34	70.9	84.41	90.08	93.8	93.93	97.27	100
348A	4	7.335	3	3.335	92.08	92.61	90.82	70.71	80.2	93.55	96.99	67.62	84.74	89.32	99.98
348A	7.335	11.389	3	4.054	95.01	94.63	89.1	30.16	74.84	80.07	96.09	71.68	82.87	85.67	100
348A	11.389	12.918	3	1.529	96.91	95.27	91.58	64.2	83.53	71.7	95.94	43.77	79.45	85.48	99.97
348A	12.918	14.401	3	1.483	93.63	95.26	86.99	58.5	84.52	84.04	97.58	79.9	79.96	94.59	99.97
350A	23.99	56.237	2	32.247	84.66	84.74	91.65	72.71	70.35	84.62	97.94	96.87	68.17	88.8	91.04
350A	56.237	59.412	2	3.175	89.36	91.79	93.33	95.71	90.27	95.92	98.72	99.66	84.19	96.72	98.44
350A	59.412	69.692	2	10.28	59.66	49.57	63.99	66.69	61.2	72.35	99.04	99.92	91.73	99.64	98.85
350A	69.692	72.021	2	2.329	29.76	28.67	72.34	81.42	81.53	81.98	97.92	100	100	100	100
350A	72.021	72.315	2	0.294	24.65	20.4	11.7	100	99.35	98.85	99.13	100	100	100	100
350A	72.315	72.444	2	0.129	33	72	46.6	31.6	47.4	2	98.7	100	100	100	100
350A	72.444	72.577	2	0.133	44.3	47.5	67.9	13.5	24.4	36.6	94.4	100	Missing	100	100
368A	0	5.021	5	5.021	99.12	96.32	97.21	97.74	98.09	98.41	99.18	99.09	98.97	99.98	99.92
368A	6.022	12.329	5	6.307	94.96	90.97	89.79	98.23	96.22	96.27	97.08	87.47	91.33	96.24	98.34
370A	2.968	3.996	5	1.028	99.93	99.59	99.92	99.93	99.72	99.77	99.93	99.22	99.7	100	100

ROUTE	REFPT	END REFPT	Region	LENGTH	Fatigue 2006	Fatigue 2007	Fatigue 2008	Fatigue 2009	Fatigue 2010	Fatigue 2011	Fatigue 2012	Fatigue 2013	Fatigue 2014	Fatigue 2015	Fatigue 2016
370A	3.996	5.975	5	1.979	99.82	99.65	99.23	94.12	96.35	97.04	99.16	96.84	99.35	99.31	99.27
370A	12.074	14.115	5	2.041	98.8	98.58	99.1	99.14	99.05	99.67	99.72	99.01	98.94	99.85	99.94
385C	167.117	175.939	4	8.822	99.9	98.76	99.58	97.18	97.99	98.1	99.34	98.81	95.17	93.24	98.78
385E	313.849	317.631	4	3.782	99.98	99.88	99.88	99.87	99.82	94.79	99.95	99.86	99.02	99.73	99.69
389A	0	1.894	2	1.894	96.26	98.35	91.8	99.98	96.47	94.04	97.33	91.86	80.73	97.26	98.71
389A	1.894	12.803	2	10.909	93.54	95.93	85.8	90.84	90.99	74.46	98.22	96.52	78.4	97.02	94.86
394A	3.933	9.378	3	5.445	98.3	98.92	98.45	95.11	98.35	94.46	98.61	95.24	97.48	99.66	99.72

Appendix A-2: Historical Pavement Performance of Colorado Low-Volume Paved Roads “Longitudinal Index”

ROUTE	REFPT	END REFPT	Region	LENGTH	Long 2006	Long 2007	Long 2008	Long 2009	Long 2010	Long 2011	Long 2012	Long 2013	Long 2014	Long 2015	Long 2016
005A	0	14.894	1	14.894	Missing	98.09	98.69	95.98	92.88	95.13	97.87	Missing	99.11	97.76	94.97
006A	11.08	11.179	3	0.099	Missing	Missing	Missing	Missing	93.7	94.7	94.4	97.4	99.9	96.4	98.1
006A	11.179	11.825	3	0.646	93.03	91.73	95.5	89	94.28	99.47	92.51	93.55	99.18	96.3	95.6
006A	11.825	13.867	3	2.042	95.56	90.45	91.38	94.66	92.55	92.38	93.38	92.26	93.64	83.49	80.68
006C	43.387	45.584	3	2.197	100	99.98	100	99.98	99.9	99.68	100	99.79	99.41	97.88	97.12
006C	45.584	46.058	3	0.474	100	100	100	99.6	99.83	97.83	99.93	99.6	100	99.58	100
006I	343.7	344.712	4	1.012	98.84	98.91	98.8	98.19	94.35	95.11	99.32	97.69	96.12	91.76	90.73
006I	345.928	346.425	4	0.497	99.48	98.9	98.03	94.48	89.1	84.95	97.34	90.58	93.28	85.35	80.45
006Z	0.445	0.604	4	0.159	Missing	98	97.7	100	97.9	97.2	96.55	87.8	93.4	91.2	78.6
007A	3.879	14.91	4	11.031	95.12	96.65	94.43	88.13	97.41	89.48	95.2	98.32	98.25	95.39	93.16
007A	14.91	16.086	4	1.176	95.2	84.48	96.98	80.59	97.17	83.02	98.62	99.79	99.14	96.95	95.29
007A	16.086	19.249	4	3.163	96.65	99.38	97.48	98.67	99.27	90.25	99.01	91.78	97.13	93.65	92.73
007A	19.249	32.649	4	13.4	99.3	99.99	99.92	99.99	99.91	99.9	99.98	99.84	99.22	99.08	99.78
007E	0	0.57	4	0.57	87.92	95.06	92	86.18	96.92	100	96.06	100	93.78	87.04	88.4
007E	0.57	1.592	4	1.022	95.52	94.38	94.73	81.56	96.11	98.27	95.7	100	98.02	90.47	87.74
009A	21.246	44.929	2	23.683	95.31	97.39	96.52	96.82	93.36	92.91	98.89	99.97	99.33	99.87	99.79
009A	44.929	46.98	2	2.051	98.76	94.21	96.69	97.71	93.08	90.75	98.65	99.97	98.81	99.32	99.03
010A	68.016	71.026	2	3.01	99.94	98.59	99.8	99.6	98.12	98.82	99.57	97.81	97.92	97.24	96.31
011A	0	0.41	4	0.41	99.43	100	98.7	93.1	89.95	83.68	93.83	89.25	95.88	93.6	87.8
011A	0.41	1.35	4	0.94	99.48	98.09	98.56	96.95	93.31	90.58	98.89	96.11	97.46	98.59	96.99
012A	0	4.6	2	4.6	98.31	98.41	95.8	95.91	93.85	79.2	96.95	95.61	94.4	90.83	88.93
012A	15.238	33.058	2	17.82	97.72	97.59	98.86	95.88	94.92	91.19	98.71	95.62	95.35	94.71	91.71
012A	33.058	43.031	2	9.973	97.4	99.02	98.15	96.66	94.94	90.07	98.85	95.27	96.13	93.87	90.72
012A	43.031	56.848	2	13.817	99.37	99.04	99.61	96.88	96.92	95.32	98.72	97.6	95.36	96.13	95.4
014B	51.317	71.538	3	20.221	95.24	96.66	95.4	95.66	94.98	95.5	99.94	97.71	96.61	96.27	94.73
014B	71.538	90.959	4	19.421	97.73	96.37	97.34	94.67	97.5	97.48	100	98.19	98.45	98.25	96.71
015A	2.393	8.419	5	6.026	96.65	95.15	94.79	97.19	93.35	95.24	98.21	95.89	96.3	96.48	96.02
015A	8.419	10.412	5	1.993	93.41	91.54	93.55	85.73	75.07	84.75	95.6	92.86	95.05	93.8	93.51
015A	10.412	12.374	5	1.962	94.54	88.69	94.36	85.68	80.71	87.85	92.33	94.21	90.57	88.57	85.87

ROUTE	REFPT	END REFPT	Region	LENGTH	Long 2006	Long 2007	Long 2008	Long 2009	Long 2010	Long 2011	Long 2012	Long 2013	Long 2014	Long 2015	Long 2016
015B	22.484	26.562	5	4.078	92.85	96.37	94.19	96.98	90.51	90.34	96.86	95.71	95.67	93.52	91.82
017A	0	17.28	5	17.28	95.7	93.9	97.39	95.06	92.13	96.93	98.15	93.97	97.04	95.08	95.58
023A	0	9.571	4	9.571	98.78	97.84	97.97	99.35	97.97	96.54	99.06	97.87	96.06	93.41	91.41
023A	16	17.507	4	1.507	99.67	97.43	99.21	99.81	97.51	96.19	98.38	94.63	96.15	95.24	95.17
024B	419.95	422.707	4	2.757	98.67	98.44	97.77	98.31	96.79	99.27	99.41	95.31	95.26	97.29	95.96
024B	422.707	423.059	4	0.352	99.25	96.7	97.45	94.15	91.25	97	99.93	93.55	99.6	96.5	94.3
024B	423.059	429.604	4	6.545	98.4	96.59	98.02	95.46	94.1	97.45	98.12	96.72	91.91	96.59	94.3
024B	429.604	436.576	4	6.972	99.48	97.37	95.36	94.64	92.08	97.68	99.39	98.67	94.28	94.93	94.17
024C	437.453	446.851	4	9.398	97.45	94.89	95.46	94.17	92.82	96.01	98.68	97.48	96.01	96.77	95.46
024C	451.87	453.869	4	1.999	96.13	92.54	91.25	96.79	95.85	97.74	97.96	93.65	96.44	95.18	91.84
024D	456.02	456.722	4	0.702	97.4	99.49	87.9	98.5	98.12	98.8	96.71	97.38	95.53	94.53	94.68
024E	0	0.619	2	0.619	97.37	97.35	97.6	91.63	88.62	99.78	97.22	86.37	90.5	86.32	100
025B	0	0.046	2	0.046	100	99.4	100	99.1	98.8	98.9	99.3	96.7	94.5	97.6	92.2
025B	0.046	1.58	2	1.534	99.69	99.76	99.94	99.63	99.14	99.37	99.79	95.76	96.46	95.85	93.68
025B	1.58	1.948	2	0.368	99.87	99.27	99.23	99.9	99.8	99.9	99.5	99.27	98.7	97.9	97.07
036C	76.394	76.467	1	0.073	98.4	97.5	97.5	96.5	90.9	92.7	93.9	92.2	89.4	91	75.7
036C	76.467	78.69	1	2.223	97.28	97.24	94.53	92.41	90.4	92.57	99.95	99.71	92.13	98.76	98.72
036C	78.69	79.73	1	1.04	98.14	96.31	95.45	93.86	90.98	89.28	100	98.55	91.58	91.21	91.75
036C	80.815	83.71	1	2.895	96.74	93.74	94.79	88.01	85.91	88.69	100	99.88	99.4	98.88	98.34
039A	3.353	7.571	4	4.218	99.39	93.98	91.7	97.28	98.58	98.42	96.8	91.15	98.51	98.45	95.4
040B	272.552	276.18	1	3.628	94.16	Missing	98.15	98.11	99.3	98.58	99.7	99.21	93.98	95.76	93.97
040C	279.244	281.82	1	2.576	97.93	96.07	90.16	98.15	96.86	98.08	95.82	96.39	96.23	96.06	93.24
040E	346.29	350.601	1	4.311	97.31	93.87	92.8	88.7	91.27	89.98	98	93.47	99.23	98.88	99.66
040E	350.601	350.862	1	0.261	91.2	93.8	83.2	96	96.9	95.5	97.9	88.9	100	99.9	100
040E	350.862	351.136	1	0.274	95.95	85.2	84.2	83.2	91.95	100	100	90.35	97.9	99.55	99.4
040E	351.136	352.245	1	1.109	99.36	98.62	98.32	95.89	96.02	96.08	98.9	96.85	95.57	95.68	95.27
040F	360.201	362.999	4	2.798	99.12	99.24	Missing	89.01	91.4	90.77	96.09	94.64	95.78	95.38	92.35
040G	380.689	381	4	0.311	Missing	Missing	Missing	Missing	94.8	97.87	87.95	96.53	94	93.33	92.23
040G	381	382.184	4	1.184	91.15	98.89	98.28	97.69	90.65	92.73	88.59	97.35	92.28	93.24	95.57
041A	0	9.505	5	9.505	95.46	88.55	94.45	91.26	91.36	93.2	96.75	95.52	90.27	88.73	85.85
046A	0	3.85	1	3.85	98.67	96.23	98.17	95.18	96.61	79.13	98.52	95.06	93.84	96.37	94.94
046A	3.85	5.99	1	2.14	96.11	93.97	96.93	96.96	95.62	69.35	99	95.04	92.68	97.12	94.79
046A	5.99	6.61	1	0.62	98.3	98.18	97.03	96.22	96.53	62.9	99.57	97.97	95.92	99.4	98.83
050C	15.669	16.948	2	1.279	98.35	97.25	98.9	90.68	83.88	100	97.77	93.74	89.21	97.07	95.93

ROUTE	REFPT	END REFPT	Region	LENGTH	Long 2006	Long 2007	Long 2008	Long 2009	Long 2010	Long 2011	Long 2012	Long 2013	Long 2014	Long 2015	Long 2016
050D	0	0.852	3	0.852	94	95.15	91.74	86.75	97.49	92.93	98.81	92.46	93.43	85.93	97.3
050D	0.931	1.539	3	0.608	92.18	94.06	90.38	81.16	92.56	83.12	97.77	92.12	88.02	87	97.82
052A	58.89	60.9	4	2.01	99.02	98.82	98.29	97.97	96.81	97.88	99.54	96.9	96.31	97.24	95.06
052A	60.9	70.895	4	9.995	98.64	98.6	95.9	97.05	96.65	96.45	97.54	92.67	96.43	94.46	92.27
055A	0	0.162	4	0.162	98.6	98.7	99.6	100	99.1	98.2	100	85	98.1	100	97.5
055A	0.162	2.417	4	2.255	97.52	96.39	97.14	97.73	96.74	93.92	97.98	93.38	96.8	92.89	84.61
059A	15.019	33	4	17.981	99.17	98.82	99.98	95.33	97.1	93.75	99.65	99.8	98.26	98.82	98.27
059A	33	40.963	4	7.963	99.74	99.12	100	93.84	95.49	91.15	99.74	99.28	97.79	98.08	97.49
059B	74.474	87.535	4	13.061	99.91	97.75	99.31	98.89	97.77	97.22	99.7	99.04	99.83	99.29	99.54
059B	122.864	130.588	4	7.724	99.98	100	99.8	99.99	99.48	97.37	99.86	99.53	98.68	99.61	99.69
059B	130.588	145.517	4	14.929	99.97	99.7	99.94	99.81	97.6	97.96	99.83	99.57	98.8	99.39	99.57
059B	147.149	147.218	4	0.069	100	100	100	96.5	90.3	94.1	100	99.4	95.9	100	100
059B	147.218	147.507	4	0.289	100	99.4	99.75	95.2	96.45	97.95	99.73	95.8	94.65	99.35	98.75
059B	147.814	155.594	4	7.78	99.97	99.94	99.94	99.88	98.59	99.11	98.74	98.47	98.98	98.61	97.87
059B	155.594	159.68	4	4.086	99.99	100	99.98	99.45	99.95	99.98	99.73	99.7	99.28	98.86	98.55
059B	159.68	166.498	4	6.818	99.81	99.85	98.84	98.51	98.97	98.42	99.45	98.91	98.32	95.61	95.56
059B	166.498	171.07	4	4.572	99.89	99.92	98.88	99.18	99.38	98	99.83	99.47	97.39	96.82	95.77
059B	171.07	173.337	4	2.267	99.54	99.33	98.52	99.5	99.74	98.86	99.61	99.64	98.65	98.18	98.34
061A	8.062	14.03	4	5.968	96.59	97.96	95.16	86.68	97.35	88.81	99.37	98.26	93.89	95.24	94.4
061A	14.03	22.511	4	8.481	99.73	99.34	99.4	96.6	99.3	90.15	99.81	98.53	97.98	99.14	98.66
063A	5.08	11.136	4	6.056	98.61	99.48	99.43	98	98.74	97.99	99.82	98.73	98.61	98.02	97.56
063A	11.136	24.196	4	13.06	99.43	99.3	99.23	98.01	98.81	98.07	99.23	97.2	97.55	96.04	95.64
063A	29.006	29.49	4	0.484	98.43	89.37	94.83	79.4	98.07	99.6	97.4	99.8	97.57	97.8	98.1
063A	29.49	39.256	4	9.766	95.32	96.03	98.19	96.76	98.42	98.01	99.86	98.28	97.2	98.34	97.01
063A	39.256	48.2	4	8.944	99.97	96.95	99.99	98.14	97.15	98.32	99.42	98.29	97.75	96.91	97.46
063A	48.2	53.29	4	5.09	100	99.98	99.85	95.46	99.76	99.15	99.63	98.03	94.85	94.41	95.26
065A	14.35	26.866	3	12.516	96.22	94.53	99.99	99.93	99.06	99.55	99.83	98.98	99.23	99.01	98.17
065A	26.866	36.175	3	9.309	99.8	98.96	99.2	96.93	91.78	89.76	99.89	98.69	96.57	98.5	97.25
065A	36.175	49.565	3	13.39	96.58	99.46	99.82	99.17	96.41	96	99.75	99.23	98.97	98.83	98.22
065A	49.565	51.169	3	1.604	97.93	96.25	97.05	97.25	88.73	92.21	97.26	92.32	93.62	94.35	87.37
067A	0	6.835	2	6.835	95.31	96.2	96.32	98.25	96.97	97.64	97.94	87.34	94.61	90.39	90.58
067C	45.56	45.686	2	0.126	96.8	94.8	97.4	91.8	92.4	89.3	100	93.8	92.5	82.4	99.5
067C	45.686	50.73	2	5.044	99.23	97.84	97.87	91.64	89.98	90.86	98.09	95.24	95.93	96.14	94.66
067D	91.241	100.036	2	8.795	94.51	99.57	98.39	97.52	95.72	98.61	99.31	97.62	98.17	95.04	97.59

ROUTE	REFPT	END REFPT	Region	LENGTH	Long 2006	Long 2007	Long 2008	Long 2009	Long 2010	Long 2011	Long 2012	Long 2013	Long 2014	Long 2015	Long 2016
067E	117.349	122.311	1	4.962	91.09	92.3	93.68	87.29	94.82	81.74	94.21	79.08	92.47	95.49	99.58
069A	0	5.306	2	5.306	98.87	94.91	97.8	95.26	99.37	95.01	98.94	95.03	94.09	94.78	93.17
069A	9.668	25.017	2	15.349	96.35	99.75	99.05	98.65	99.44	97.88	99.51	97.42	97.69	97.54	96.84
069A	25.017	26.042	2	1.025	91.66	99.83	99.97	100	100	99.86	99.91	99.69	99.63	99.49	99.53
069A	26.042	49.423	2	23.381	96.26	93.55	94.76	96.47	96.93	92.77	96.38	85.14	98.05	94.04	92
069A	49.423	54.125	2	4.702	96.89	90.79	96.5	94.85	97.75	97.97	99.5	94.8	97.98	96.2	95.94
069A	71.566	82.664	2	11.098	99.54	94	95.77	89.37	94.14	77.09	97.01	94.77	92.12	88.01	85.67
070K	0	0.723	1	0.723	Missing	Missing	Missing	Missing	Missing	Missing	99.46	99.24	97.94	99.06	98.49
070N	0	0.133	1	0.133	Missing	Missing	Missing	Missing	Missing	Missing	98.7	97.8	97.6	97.8	94.3
070N	0.133	0.396	1	0.263	Missing	Missing	Missing	Missing	Missing	Missing	99.65	100	96.5	99.4	96.3
070O	0	0.353	4	0.353	Missing	Missing	Missing	Missing	Missing	Missing	97.97	95.57	95.9	97.5	96.97
070P	0	0.04	4	0.04	Missing	Missing	Missing	Missing	Missing	Missing	100	99.5	97.2	99.2	97
070P	0.04	0.528	4	0.488	Missing	Missing	Missing	Missing	Missing	Missing	97.1	92.68	90.88	96.25	93.98
071A	0	7.036	2	7.036	95.35	96.46	93.52	97.07	97.53	94.55	97.54	94.69	97.38	88.48	85.63
071A	7.036	9.032	2	1.996	90.83	87.71	89.76	98.34	96.94	94.21	95.87	91.47	98.45	84.06	85.59
071B	9.601	11.614	2	2.013	100	99.84	100	99.97	98.56	99.91	99.82	99.65	99.23	97.46	97.23
071B	11.614	13.747	2	2.133	100	99.96	100	99.96	96.02	99.78	99.41	99.1	97.73	94.97	94.69
071B	13.747	14.076	2	0.329	100	100	100	100	100	100	99.95	100	99.85	98.95	98.8
072A	25.608	29.378	1	3.77	100	99.99	100	99.92	99.93	99.75	99.87	99.84	99.86	99.33	98.4
072B	44.095	48.353	4	4.258	95.1	99.34	98.72	97.94	96.03	98.99	97.18	99.74	98.48	96.06	96.5
072B	48.353	54.064	4	5.711	99.78	99.73	98.51	99.3	95.61	97.76	97.41	99.92	99.28	98.16	98.72
078A	0	9	2	9	Missing	Missing	100	Missing	97.69	Missing	99.58	91.97	98.7	99.99	Missing
078A	9	12.71	2	3.71	96.18	93.4	96.73	97.67	95.61	96.33	99.9	99.35	99.7	99.76	98.38
078A	14.586	15.532	2	0.946	99.52	99.67	99.03	99.82	90.93	99.78	99.97	99.5	99.98	99.8	99.68
078A	15.532	18.192	2	2.66	98.88	99.92	98.84	99.93	96.6	95.79	99.94	99.41	99.81	99.41	99.48
078A	18.192	29.903	2	11.711	99.74	99.37	99.54	98.64	97.89	94.78	99.5	95.3	97.56	90.06	86.35
078B	0	1.493	2	1.493	95.64	95.9	89.21	100	97.51	99.19	99.83	98.31	98.13	95.73	92.1
082A	42.471	51.254	3	8.783	Missing	98.84	97.81	96.66	97.7	96.84	99.75	Missing	99.26	98.88	98.08
082A	51.254	79	3	27.746	Missing	96.97	97	95.38	93.83	98.74	99.4	97.85	98.07	98.25	97.34
082A	79	83.47	3	4.47	Missing	96.94	Missing	97.57	97.7	98.33	99.65	98.99	97.56	97.56	98.39
082A	83.47	85.293	3	1.823	Missing	98.66	Missing	92.47	94.65	94.52	97.5	98.56	98.87	98.46	97.04
086A	27.718	32.248	4	4.53	96.45	93.78	85.48	96.6	95.73	96.11	100	99.73	99.94	99.77	99.84
086A	32.248	51.167	4	18.919	95.62	97.08	95.43	96.77	97.41	95.43	99.29	98.13	97.34	99.25	98.53
086A	51.167	59.279	4	8.112	95.94	96.04	94.55	95.55	93.39	91.73	99.17	96.12	91.47	96.73	95.29

ROUTE	REFPT	END REFPT	Region	LENGTH	Long 2006	Long 2007	Long 2008	Long 2009	Long 2010	Long 2011	Long 2012	Long 2013	Long 2014	Long 2015	Long 2016
089A	0	8.976	2	8.976	98.55	98.26	99.44	97.23	98.72	96.48	96.96	98.66	98.03	94.87	96.18
089A	8.976	18.57	2	9.594	98.07	96.32	100	99.88	99.96	96.31	97.93	94.92	97.65	93.52	95.78
089A	18.57	21.549	2	2.979	98.49	92.09	100	99.81	99.87	97.6	98.99	94.21	96.82	93.2	96.74
089A	21.549	33.183	2	11.634	94.47	91.61	100	99.91	100	99.63	99.9	95.34	98.94	97.84	99.96
090A	0	9.493	5	9.493	96.96	92.23	90.3	98.36	96.42	98.95	98.41	97.07	96.85	98.8	97.58
090A	9.493	14.797	5	5.304	91.18	88.5	84.34	89.33	93.69	98.37	94.21	98.71	98.46	97.64	96.7
090A	14.797	33.874	5	19.077	92.69	94.26	91.95	93.58	93.61	98.22	96.47	94.48	97.41	95.24	94.72
090B	81.533	81.737	3	0.204	Missing	Missing	Missing	Missing	95.2	94.1	97.8	84.7	93.8	97.2	100
090B	81.737	84.884	3	3.147	96.94	96.63	98.58	94.98	86.99	88.66	96.41	91.3	88.66	90.19	99.88
090B	84.884	86.058	3	1.174	97.37	98.35	94.85	96.26	90.16	93.98	98.18	93.13	93.9	92.74	99.45
090B	86.058	86.931	3	0.873	97.73	97.36	97.93	91.61	86.56	85.61	99.89	99.45	97.53	98.93	99.43
090B	86.931	87.914	3	0.983	99.37	95.4	98.11	91.52	88.01	88.73	97.36	89.76	91.11	90.23	99.27
092A	27.082	30.11	3	3.028	99.12	99.11	97.76	98.92	97.2	92.24	98.35	92.6	95.56	92.13	91.84
092A	31.525	33.643	3	2.118	99.3	99.4	98.78	98.07	98.16	94.34	99.24	96.36	96.62	97.02	96.26
092A	33.643	36.577	3	2.934	99.21	99.48	99.2	98.74	98.76	95	99.23	95.59	98.24	96.97	96.32
092A	36.577	71.819	3	35.242	98.68	99.37	99.4	97.83	97.97	96.63	99.64	98.33	96.92	97.64	97.08
092A	71.819	73.259	3	1.44	99.02	99.18	98.65	93.22	94.77	90.93	99.32	97.11	94.65	97.81	97.72
094A	33.079	45.054	4	11.975	99.13	97.63	94.39	97.77	92.55	90.55	97.43	94.34	97.29	95.3	95.76
094A	45.054	54.581	4	9.527	98.89	94.44	90.55	98.24	96.39	89.52	95.46	90.14	97.14	95.46	90.84
094A	54.581	86.174	4	31.593	97.43	97.38	93.44	93.65	94.54	91.64	98.9	96.79	95.51	95.43	91.73
096A	1.313	11.064	2	9.751	98.28	97.21	91.73	97.68	93.17	92.77	96.76	79.81	91.17	87.8	80.84
096A	26.273	33.575	2	7.302	97.07	91.12	90.94	97.42	95.85	97.02	97.62	78.66	94.58	99.9	99.87
096A	33.575	42.21	2	8.635	94.35	92.79	96.17	96.57	93.48	96.25	95.9	93.59	92.05	95.17	90.54
096B	70.573	75.496	2	4.923	99.35	93.48	96.61	94.2	89.2	94.33	96.33	85.01	97.56	93.4	88.06
096C	119.491	143.78	2	24.289	98.42	94.33	91.39	97.75	95.1	94.46	98.96	88.19	96.69	94.78	93.96
097A	0.32	3.932	5	3.612	97.34	91.28	84.6	99.05	95.6	97.67	98.13	89.79	96.15	86.76	85.82
097A	3.932	4.584	5	0.652	95.86	97.13	92.88	94.36	95.02	99.96	91.91	98.38	98.95	86.34	89.42
100A	0	0.279	2	0.279	95.25	Missing	93.6	98.45	83.5	82.7	89.8	95.9	85.5	100	73.45
100A	0.279	0.419	2	0.14	Missing	Missing	97.6	96.2	97	93.6	95.75	97.3	97	100	87.4
101A	0.404	1.151	2	0.747	95.42	91.67	89.58	97.08	98.05	95.42	98.89	92.62	99.38	96.43	95.93
101A	1.151	5.151	2	4	96.79	91.46	92.63	92.9	94.54	93.12	97.3	91.67	96.29	90.94	90.46
101A	5.151	16.45	2	11.299	97.75	93.83	77.6	96.63	96.11	95.7	97.51	78.37	97.57	91.79	94.11
101A	16.45	21.413	2	4.963	93.76	93.53	72.91	98.75	98.26	96.35	98	88.3	97.98	92.6	93.43
103A	6.7	13.265	1	6.565	97.87	94.98	97.69	96.82	92.25	91.85	97.24	93.2	97	92.76	99.97

ROUTE	REFPT	END REFPT	Region	LENGTH	Long 2006	Long 2007	Long 2008	Long 2009	Long 2010	Long 2011	Long 2012	Long 2013	Long 2014	Long 2015	Long 2016
103A	13.265	22.488	1	9.223	95.85	96.64	93.92	96.62	93.16	95.56	99.24	Missing	100	99.97	99.86
105A	9.211	9.48	2	0.269	99.7	100	100	99.7	98.7	100	100	99.6	100	100	100
109A	0	7.722	2	7.722	98.51	97.76	97.09	89.79	96.84	94.75	96.89	92.24	96.56	88.55	86.84
109A	7.722	53	2	45.278	96.21	89.74	96.17	97.03	98.85	98.17	97.26	96.1	97.66	97.55	95.85
109A	53	54.79	2	1.79	99.84	99.32	100	100	95.75	91.56	95.64	94.53	92.86	88.88	84.27
109A	64.748	65.327	2	0.579	96.22	96.62	96.86	97.22	95.84	68.3	99.32	98.38	Missing	69.4	72.02
110A	0	0.14	5	0.14	100	97.5	97.7	100	98.3	91.7	97	93	99	98.1	97.8
114A	0	19	5	19	97.07	99.23	97.21	93.27	90.95	90.48	99.78	99.5	98.69	97.87	97.86
114A	19	20.261	5	1.261	99.39	95.91	98.36	88.71	91.14	87.7	99.15	97.77	97.23	94.89	92.13
114A	20.261	56.043	5	35.782	98.74	96.62	97.21	92.66	95.14	92.61	98.98	97.35	94.25	93.58	92.88
114A	56.043	61.453	5	5.41	99.6	98.58	99.04	94.11	95.68	94.78	98.18	99.49	98.7	98.45	98.75
116A	0	12.042	2	12.042	85.54	90.19	83.69	95.73	90.4	92.54	95.86	90.85	96.54	88.13	85.46
116A	12.042	12.299	2	0.257	77.2	92.9	81.2	89.4	86.4	87.6	96.35	88.8	96.8	86.4	86.3
116A	12.299	13.055	2	0.756	90.77	90.94	89.1	88.8	90.96	91.16	94.83	81.79	90.83	83.21	85.56
116A	13.055	20.029	2	6.974	91.51	84.26	83.61	90.02	84.99	95.75	99.36	97.56	98.16	94.41	90.06
116A	20.029	27.02	2	6.991	85.6	75.55	93.17	97.5	98	94.45	96.59	86.92	98.14	91.12	86.04
116A	27.02	32.322	2	5.302	89.95	87.28	93.24	98.98	98.4	94.89	95.45	95.87	99.68	93.92	91.07
120A	0	3.105	2	3.105	94.88	89.63	90.53	92.4	95.53	92.63	98.35	92.24	93.96	92.45	93.63
120A	3.105	7.186	2	4.081	88.69	83.37	85.68	88.72	91.68	87.39	96.6	88.4	92.11	93.95	95.51
125A	0	29.46	3	29.46	98.25	95.31	96.61	91.42	95.85	93.8	98.78	97.16	94.15	96.06	95.19
125A	29.46	31.504	3	2.044	98.84	97.58	96.21	95.31	96.65	98.27	99.04	98.61	91.77	97.65	96.8
125A	31.504	35.582	3	4.078	99.59	97.1	94.26	89.22	92.78	96.18	99.7	99.69	98.5	98.4	97.72
125A	35.582	52.02	3	16.438	99.52	99.46	97.94	90.25	94.31	97.42	99.48	99.16	97.16	96.41	96.17
125A	66.558	75.406	3	8.848	98.19	95.75	99.97	99.92	99.67	99.78	100	99.82	98.84	97.61	99.95
131B	13.709	32.904	3	19.195	99.95	99.78	99.71	98.98	96.42	95.6	99.74	99.6	99.2	99.03	98.84
131B	32.904	38.441	3	5.537	99.89	99.86	99.58	94.06	93.57	89.7	99.21	99.28	97.92	98.15	97.88
131B	38.441	42.05	3	3.609	98.69	99.63	99.05	94.06	93.17	90.4	98.18	97.24	98.46	97.14	97.73
131B	51.859	52.081	3	0.222	98.8	97.8	97.7	97.6	96.3	96.7	99.35	99.5	96.2	99.6	91.3
133A	24	46.371	3	22.371	99.83	99.73	99.43	97.47	94.73	94.95	99.79	99.38	97.17	98.36	98.18
133A	46.371	51.357	3	4.986	98.65	99.23	98.27	96.38	94.4	95.8	99.52	98.41	97.28	96.92	98.29
133B	13.267	16.076	3	2.809	Missing	Missing	Missing	Missing	Missing	Missing	98.52	92.15	95.18	90.28	85.77
134A	0	16.32	3	16.32	95.34	99.87	99.8	98.92	96.66	96.3	99.69	99.34	93.59	98.07	99.16
134A	16.32	27.163	3	10.843	96.01	99.95	99.85	99.54	98.03	96.79	99.79	99.39	95.9	97.93	99.24
136A	0	0.152	5	0.152	99.5	99.6	97.4	91.2	91.3	91	97.1	96.3	93.5	93.1	90.2

ROUTE	REFPT	END REFPPT	Region	LENGTH	Long 2006	Long 2007	Long 2008	Long 2009	Long 2010	Long 2011	Long 2012	Long 2013	Long 2014	Long 2015	Long 2016
136A	0.152	0.553	5	0.401	92.53	94.77	91.2	99.1	87.9	94.93	93.48	90.87	90.17	77.9	80.63
136A	0.553	1.579	5	1.026	92.97	99.36	92.57	94.57	92.77	93.07	99.03	98.37	97.03	90.86	85.67
136A	3.48	4.469	5	0.989	95.77	94.19	95.23	90.43	93.99	93.28	96.72	91.96	93.59	85.8	84.02
138A	21.739	26.329	4	4.59	99.98	99.79	97.83	96.74	98.09	92.24	98.74	96.09	94.26	98.29	97.78
138A	26.329	27.503	4	1.174	99.93	99.96	98	98.8	99.15	94.16	99.72	96.75	94.1	99.61	98.75
138A	27.503	27.911	4	0.408	99.83	99.63	99.8	98.4	98.1	94.53	99.98	95.8	94.97	99.97	95.23
138A	27.911	34.981	4	7.07	99.44	99.74	98.6	98.44	99.63	95.62	99.94	98.01	96.97	99.04	98.7
138A	34.981	41.385	4	6.404	98.23	91.45	89.68	96.5	91.2	85.14	97.45	85.43	89.47	92.65	90.37
138A	41.385	43.023	4	1.638	93.89	87.49	84.37	91.44	85	88	94.81	69.32	89.26	96.82	95.58
138A	43.023	43.084	4	0.061	98.5	81.8	91.6	97.1	97.2	91.1	97.7	90.2	90.8	88.4	89.9
138A	43.084	43.413	4	0.329	98.63	88.73	81.13	84.83	80.2	94.5	99.22	94.17	92.87	94.27	92.9
138A	50.476	50.633	4	0.157	89.7	95.2	88	94.8	93	79.1	98.5	80.1	95.8	94.7	86.9
138A	50.633	50.868	4	0.235	99.2	95.1	95.8	83.9	89.1	81.1	99	81.3	99	93.7	86.1
138A	50.868	54	4	3.132	94.09	94.47	87.9	96.21	82.66	86.17	96.71	79.74	91.06	89.07	84.15
138A	54	54.81	4	0.81	93.6	95.69	89.44	93.01	90.38	82.66	98.31	92.15	85.03	89.24	84.26
138A	58.534	59.823	4	1.289	96.24	94.49	90.25	96.42	88.87	85.74	99.23	95.21	96.03	95.46	95.37
141A	0	9.381	5	9.381	99.13	99.16	99.12	94.04	96.8	92.92	99.51	97.6	98.16	97.22	95.45
141A	9.381	11.271	5	1.89	99.78	99.59	99.69	97.37	97.03	94.9	99.23	97.81	98.24	98.17	99.72
141A	11.271	44.124	5	32.853	96.43	93.28	92.44	93.71	96.61	95.21	98.45	96.16	97.01	94.3	91.63
141A	62.436	64.395	5	1.959	99.85	100	99.86	96.22	96.57	94.91	99.48	98.54	99.61	99.47	99.23
141A	64.395	110.525	5	46.13	96.27	95.6	97.05	95.98	94.66	94.99	97.88	89.37	96.74	91.45	90.44
142A	3.276	13.4	5	10.124	97.78	95.86	96.98	95.27	95.81	96.16	98.34	95.34	95.6	90.55	89.08
142A	13.4	22.958	5	9.558	97.79	94.43	99.07	97.57	96.61	98.51	98.24	97.46	97.54	92.88	91.62
142A	22.958	28.712	5	5.754	94.81	97.37	96.65	96.59	95.78	97.04	97.76	96.02	97.62	91.78	89.57
142A	28.712	33.84	5	5.128	94.28	95.19	97.28	93.57	93.82	95.59	94.67	95	93.76	85.75	83.93
144A	0	0.027	4	0.027	96	94	91.9	93.9	97.9	97.2	99.5	96.9	97.5	100	95.6
144A	0.027	2.821	4	2.794	99.35	98.82	99.41	97.76	98.3	97.96	99.57	97.23	98.91	95.71	93.9
144A	2.821	10.493	4	7.672	99.15	99.21	99	99.16	99.01	98.06	99.48	98.45	98.93	97.56	95.88
144A	10.493	11.062	4	0.569	99.96	99.22	99.94	99.86	100	99.64	99.82	99.34	97.34	95.18	91.34
144A	11.062	16.601	4	5.539	99.93	98.46	99.25	98.37	98.1	97.71	99.66	97.73	95.48	92.46	84.91
144A	16.601	20.841	4	4.24	99.86	99.03	99.18	99.14	98.88	98.29	99.67	99.1	97.01	93.33	87.03
144A	26.066	26.887	4	0.821	99.87	99.83	99.39	97.97	99.57	99.34	96.55	95.31	96.46	85.46	77.4
149A	3.45	18.52	5	15.07	99.97	99.37	99.92	94.92	96.76	88.65	99.55	98.73	98.01	97.48	97.1
149A	21.566	21.648	5	0.082	86.7	98.6	98.4	94.5	94.1	88.8	97.4	92	97.4	97.4	96.5

ROUTE	REFPT	END REFPT	Region	LENGTH	Long 2006	Long 2007	Long 2008	Long 2009	Long 2010	Long 2011	Long 2012	Long 2013	Long 2014	Long 2015	Long 2016
149A	21.648	21.892	5	0.244	85.1	100	100	93.7	92.5	81.7	99.15	96.5	98.2	95.8	96.1
149A	21.892	22.887	5	0.995	99.79	99.53	99.59	91.87	92.92	86.63	99.34	97.11	96.74	94.5	95.69
149A	22.887	26.581	5	3.694	100	98.64	99.3	88.83	90.43	82.37	99.59	97.04	97.9	96.67	97.42
149A	26.581	27.689	5	1.108	100	99.5	99.25	86.46	91.1	80.63	99.91	98.43	97.74	97.98	98.46
149A	27.689	41.477	5	13.788	100	98.08	97.46	87.08	88.59	81.37	99.37	96.55	96.99	97.86	98.26
149A	41.477	45.465	3	3.988	100	97.62	98.38	84.68	86.07	79.08	94.76	92.73	99.37	98.96	98.07
149A	45.465	62.655	3	17.19	97.01	95.03	93.61	80.37	80.5	78.11	95.31	92.51	97	93.6	90.81
149A	62.655	69.851	3	7.196	94.82	89.74	92.5	84.76	84.45	80.7	96.21	93.26	95.55	93.02	90.9
149A	69.851	71.901	3	2.05	97.83	98.14	97.79	94.78	91.32	93.44	97.63	96.01	97.74	94.24	92.31
149A	72.829	73.207	3	0.378	98.23	95.33	98.33	93	93.97	83.7	98.13	98.33	99.93	90.6	85.43
149A	73.207	100.601	3	27.394	98.79	98.27	99.07	94.13	96.1	90.46	98.76	97.86	98.92	97.55	96.92
149A	100.601	117.522	3	16.921	97.58	99.33	94.85	94.48	94.31	91.16	99.74	99.17	98.89	98.34	98.48
150A	0	13.511	5	13.511	96.38	95.67	95.87	95.53	99.88	99.99	99.95	98.87	99.01	97.9	97.64
150A	13.511	16.114	5	2.603	97.06	97.42	96.85	96.57	100	99.98	99.99	99.89	99.53	99.55	99.27
151A	22.731	33.96	5	11.229	92.11	96.83	97.15	95.75	96.38	97.06	99.11	99.49	98.81	97.86	98.52
159A	0	7.009	5	7.009	97.75	98.44	96.38	98	94.77	96.3	98.98	96.6	98.42	97.57	97.35
159A	7.009	13.3	5	6.291	98.5	98.39	97.98	97.09	95.1	96.25	98.81	96.13	97.21	91.1	87.77
159A	13.3	17.547	5	4.247	97.56	98.46	93.52	95.63	95.58	95.29	99.22	97.6	96.56	87.44	84.68
159A	17.547	17.789	5	0.242	99.7	100	98.7	92.7	89.5	91.8	98	96.1	94.6	81.9	80.2
159A	18.334	30.959	5	12.625	90.43	85.18	86.61	76.94	71.46	72.87	91.85	81.01	85.32	84.1	85.06
160C	353.65	367.79	2	14.14	98.3	98.13	96.56	87.5	95.95	95.55	98.83	95.03	98.45	95.01	92.98
160C	367.79	375.832	2	8.042	96.01	95.98	91.35	96.29	98.67	99.63	99.62	98.16	98.95	97.4	97.34
160C	375.832	382.774	2	6.942	97.56	98.41	92.87	91.43	96.75	94.72	99.03	95.85	98.83	96.35	92.63
160C	382.774	386.608	2	3.834	98.52	97.83	95.28	96.39	95.75	91.76	97.69	81.67	99.17	92.62	89.14
160C	386.608	403.656	2	17.048	96.31	96.19	88.32	90.01	95.4	90.12	97.51	73.58	98.34	94.39	92.69
160C	403.656	406.685	2	3.029	97.53	98.62	96.82	83.93	97.86	91.24	97.63	38.14	98.63	93.92	94.71
160C	406.685	414.326	2	7.641	96.18	95.31	91.16	89.87	93.64	83.34	97.35	53.44	99.55	93.53	99.81
160C	414.326	414.755	2	0.429	83.87	82.1	82.5	100	100	64.5	100	99.7	99.07	98.53	100
160C	414.755	416.531	2	1.776	91.58	86.82	83.05	99.1	98.62	77.9	97.65	90.91	99.82	97.63	99.94
160C	416.531	425.681	2	9.15	97.12	93.47	92.58	99.2	97.85	96.79	98.2	67.12	98.71	96.35	99.57
160C	425.681	441.65	2	15.969	99.55	98.37	98.92	93.61	91.05	98.89	99.41	93.63	98.24	96.24	94.13
160C	441.65	447.59	2	5.94	99.8	99.62	99.03	99.98	97.99	99.77	99.59	69.5	98.05	97.19	96.45
160C	450.97	460.147	2	9.177	99.97	99.92	99.99	100	99.44	99.98	99.99	99.94	99.16	99.6	99.51
160C	483.037	484.418	2	1.381	96.62	100	100	100	100	100	99.78	99.57	99.42	99.52	99.32

ROUTE	REFPT	END REFPT	Region	LENGTH	Long 2006	Long 2007	Long 2008	Long 2009	Long 2010	Long 2011	Long 2012	Long 2013	Long 2014	Long 2015	Long 2016
160D	0	0.011	5	0.011	97.5	98.4	96.9	93.1	96.4	97.5	91.3	100	97.7	90.3	83.7
160D	0.011	1.212	5	1.201	94.57	97.26	92.76	88.98	91.44	95.71	98.87	95.35	89.82	89.48	90.45
160D	1.212	1.457	5	0.245	90.8	98.5	90.3	93.2	91.7	93.7	100	98.2	80.4	75.3	80
160D	1.457	2.488	5	1.031	91.77	95.03	92.61	86.41	87.82	94.79	95.22	80.79	90.03	88	83.1
165A	0	15.31	2	15.31	99.56	98.15	99.58	99.57	99.75	99.52	99.82	99.28	98.69	98.68	98.28
165A	15.31	18.503	2	3.193	99.86	97.22	99.85	98.56	99.25	99.24	99.8	98.65	97.94	94.98	91.18
165A	18.503	28.558	2	10.055	99.79	99.3	99.54	99.01	99.12	99.23	99.85	98.74	98.16	95.08	95.67
167A	0	1.673	2	1.673	98.13	95.49	96.43	95.13	93.29	95.43	98.05	94.23	98.98	92.78	91.98
167A	1.673	2.005	2	0.332	96.43	95.97	94.93	93.77	92.67	95.67	94.9	92.83	93.17	88.07	82.83
167A	2.005	2.368	2	0.363	96.95	97.55	98.2	96.2	90.45	98.2	97.68	100	95.7	83.4	90.55
167A	2.368	2.905	2	0.537	96.56	98.2	98.26	94.7	89.16	91.96	97.45	94.7	92.62	85.18	87.5
167A	2.905	4.86	2	1.955	96.23	85.81	95.93	95.84	91.78	97.81	96.16	98.93	96.03	86.27	86.63
170A	0	2.157	4	2.157	97.11	96.69	94.5	96.55	93.26	97.42	98.24	92.94	98.22	98.48	97.19
172A	0	2.081	5	2.081	93.5	100	100	100	99.77	99.88	99.93	99.49	99.57	99.21	98.85
183A	0	1	2	1	99.46	99.83	99.33	98.95	99.18	96.73	99.8	99.38	96.48	94.8	94.64
194A	0	3.8	2	3.8	98.6	93.03	93.66	98.15	98.48	96.08	99.18	90.29	99.99	98.83	98.83
194A	3.8	14.678	2	10.878	97.73	95.31	96.31	98.26	96.89	94.93	99.05	92.61	98.37	97.25	93.91
194A	14.678	20.327	2	5.649	96.67	97.04	94.88	97.45	97.54	96	99.33	94.19	93.73	93.97	89.79
196A	0	1.6	2	1.6	95.03	97.54	96.79	93.04	93.03	95.76	99.36	92.69	98.73	91.31	90.38
196A	1.6	6.91	2	5.31	93.28	98.4	97.17	98.24	95.88	98.29	99.22	95.08	97.09	92.95	90.9
196A	6.91	8.922	2	2.012	97.38	98.46	98.41	97.39	96.71	95.97	99.2	95.56	99.12	99.61	99.57
202A	0	0.11	2	0.11	99.5	100	100	100	98.3	99.3	99.95	100	98.8	100	100
202A	0.11	0.19	2	0.08	96.6	97.8	97.1	100	97.7	97.1	97.9	98.6	99.1	85.1	100
202A	0.19	1.22	2	1.03	94.68	94.23	91.45	91.49	87	100	99.89	99.49	98.8	99.9	100
202A	1.22	3.228	2	2.008	98.24	95.24	93.08	98.22	94.39	99.32	99.83	98.43	98.79	99.68	100
207A	0	3.513	2	3.513	88.11	91.23	84.67	82.76	86.21	94.08	97.39	97.7	85.16	97.79	96.28
207A	3.513	5.935	2	2.422	89.77	88.53	87.41	81.36	88.34	90.97	96.57	98.5	85.22	97.68	96.19
209A	0	1.387	2	1.387	98.41	94.43	97.78	94.65	94.03	94.04	99.11	98.55	93.39	92.32	93.84
209A	1.387	1.528	2	0.141	98.4	92.2	98.7	90.4	94.5	95.2	98.05	96.2	91.2	84.6	80.2
239A	0	0.675	2	0.675	99.82	98.03	99.97	99.13	97.8	99.47	99.41	99.82	98.55	97.23	97.27
239A	0.675	0.972	2	0.297	99.3	91.05	99.9	100	99.5	100	99.28	96.85	99.1	96.8	97.65
239A	0.972	3.345	2	2.373	98.22	95.84	99.13	99.04	97.12	99.29	98.41	97.02	92.99	89.42	89.01
257B	0.037	0.644	4	0.607	93.4	81.52	76.16	Missing	Missing	100	96.94	100	97.24	62.36	78.02
257B	0.644	1.146	4	0.502	89.93	87.6	87.35	Missing	Missing	99.55	96.24	100	98.48	56.43	86.45

ROUTE	REFPT	END REFPT	Region	LENGTH	Long 2006	Long 2007	Long 2008	Long 2009	Long 2010	Long 2011	Long 2012	Long 2013	Long 2014	Long 2015	Long 2016
266A	0	0.06	2	0.06	95.9	93.5	93.4	100	88.1	93	99.5	91.5	97.2	95.4	93.8
266A	0.06	0.217	2	0.157	93.9	89.4	96.9	100	88.8	92.3	100	91.7	94.6	82.4	78.2
266A	0.217	1.306	2	1.089	98.43	98.11	97.54	96.88	94.95	95.61	98.82	95.39	96.38	89.91	90.36
266A	1.306	2.964	2	1.658	97.56	97.44	96.51	98.38	94.29	97.11	98.79	96.53	97.65	91.95	92.39
266A	2.964	5.363	2	2.399	93.47	92.3	93.57	98.27	91.92	93.19	97.29	91.4	97.53	94.95	93.92
266A	5.363	9.512	2	4.149	95.31	94.09	91.67	95.85	93.28	95.18	98.44	95.2	97.9	87.49	84.46
266A	9.512	11.516	2	2.004	91.52	93.68	88.08	90.19	90.49	92.13	97.96	92.57	93.12	83.82	86.56
300A	0.465	3.356	3	2.891	97.5	98.11	96.99	96.16	96.77	99.13	99.2	97.65	97.92	95.7	96.41
317A	0	12.237	3	12.237	97.43	96.6	97.09	95.06	93.59	91.36	97.77	93.21	97.61	97.57	96.7
318A	0	20.562	3	20.562	98.95	98.28	98.27	94.56	91.71	92.2	99.07	95.56	97.82	88.07	87.87
318A	20.562	54.309	3	33.747	98.72	98.03	98.18	95.19	94.14	91.06	99.33	97.74	98.18	96.28	96.62
318A	54.309	60.697	3	6.388	99.33	98.16	99.42	95.08	93.68	93.46	99.18	97.4	97.49	96.41	96.68
325A	0	4.102	3	4.102	97.06	96.52	96.4	97.57	97.49	97.61	98.71	93.6	97.33	93.3	88.82
325A	4.102	6.977	3	2.875	89.79	92.1	82.22	98.01	96.75	97.39	98.13	89.59	95.24	92.6	85.54
325A	6.977	11.395	3	4.418	93.24	92.67	84.45	97.14	96.28	98.57	98.82	83	98.3	96.67	95.78
347A	0	1.821	3	1.821	99.54	98.41	98.46	97.16	91.83	96.92	97.64	93.08	91.44	94.27	87.37
347A	1.821	5.248	3	3.427	98.29	98.22	97.8	96.81	91.62	97.12	99.09	97.86	96.36	98.57	97
348A	0	1.343	3	1.343	99.76	98.55	99.05	97.25	98.65	96.92	99.49	92.57	96.41	94.11	97.68
348A	1.343	3.253	3	1.91	97.47	96.06	97.71	95.54	97.34	93.16	99.33	87.77	96.14	89.99	99.21
348A	3.253	4	3	0.747	96.06	92.9	95.91	81.59	96.49	88.94	97.19	95.49	96.93	96.69	99.97
348A	4	7.335	3	3.335	94.49	92.28	94.55	93.83	98.09	94.99	97.66	97.96	95.41	93.62	99.53
348A	7.335	11.389	3	4.054	91.95	94.64	91.34	94.65	96.05	92.07	97.4	86.88	94.29	89	99.74
348A	11.389	12.918	3	1.529	95.29	95.51	95.59	93.96	97.55	93.75	97.97	94.55	94.92	91.21	99.45
348A	12.918	14.401	3	1.483	95.96	95.44	96.11	88.94	97.66	89.14	98.56	92.96	93.98	96.76	99.66
350A	23.99	56.237	2	32.247	98.02	97.17	95.14	98.99	95.29	96.87	98.54	94.23	97.7	95.76	94.18
350A	56.237	59.412	2	3.175	97.98	98.04	98.49	98.92	97.61	98.94	98.97	98.48	97.27	97.14	94.13
350A	59.412	69.692	2	10.28	98.6	90.37	92.22	97.68	96.52	97.52	98.95	99.3	98.84	98.6	97.42
350A	69.692	72.021	2	2.329	99.21	90.05	95.2	98.98	99.05	97.29	98.38	100	99.99	100	100
350A	72.021	72.315	2	0.294	98.05	79.8	88	99.6	99.15	99.55	98.6	100	100	100	100
350A	72.315	72.444	2	0.129	100	97.5	92	86.8	86.4	88.8	98.5	100	99.5	100	100
350A	72.444	72.577	2	0.133	99.4	96.5	94.1	90.9	84.9	90.6	94.6	100	Missing	100	100
368A	0	5.021	5	5.021	98.1	95.5	87.74	94.37	88.27	87.3	95.38	93.32	92.45	92.53	90.6
368A	6.022	12.329	5	6.307	93.03	89.34	85.99	95.99	88.88	90.43	94.39	96.14	91.75	82.77	77.02
370A	2.968	3.996	5	1.028	99.31	97.23	96.36	95.61	94.98	95.72	97.8	93.4	95.23	94.08	93.43

ROUTE	REFPT	END REFPT	Region	LENGTH	Long 2006	Long 2007	Long 2008	Long 2009	Long 2010	Long 2011	Long 2012	Long 2013	Long 2014	Long 2015	Long 2016
370A	3.996	5.975	5	1.979	91.75	96.89	87.99	95.89	94.54	95.88	97.8	93.78	94.96	94.95	93.38
370A	12.074	14.115	5	2.041	98.52	99.07	98.54	99.37	98.63	98.35	99.63	98.55	98.74	97.8	97.43
385C	167.117	175.939	4	8.822	99.64	99.86	99.93	99.79	96.97	99.73	99.92	98.66	98.39	95.98	93.23
385E	313.849	317.631	4	3.782	99.45	99.77	98.98	99.42	97.71	96.66	99.76	99.76	97.56	97.84	95.75
389A	0	1.894	2	1.894	98.41	98.4	94.97	92.45	96.46	96.24	98.79	92.47	97.06	98.13	98.58
389A	1.894	12.803	2	10.909	96.57	93.34	90.71	80.72	89.26	86.86	96.45	95.99	97.35	96.77	95.96
394A	3.933	9.378	3	5.445	99.63	98.16	99.57	96.42	98.11	96.99	99.41	98.95	99.36	98.17	97.04

Appendix A-3: Historical Pavement Performance of Colorado Low-Volume Paved Roads “Transverse Index”

ROUTE	REFPT	END REFPT	Region	LENGTH	Transv 2006	Transv 2007	Transv 2008	Transv 2009	Transv 2010	Transv 2011	Transv 2012	Transv 2013	Transv 2014	Transv 2015	Transv 2016
005A	0	14.894	1	14.894	Missing	84.54	84.05	87.72	84.49	83.82	94.24	Missing	75.35	76.1	74.1
006A	11.08	11.179	3	0.099	Missing	Missing	Missing	Missing	91.9	88.1	87.2	85.8	86.9	84.4	87
006A	11.179	11.825	3	0.646	78.97	70.2	73.15	84.45	79.5	96.63	90.2	89.12	91.92	83.67	85.72
006A	11.825	13.867	3	2.042	76.75	69.06	68.61	76.24	71.38	79.23	84.47	63.59	52.66	36.91	42.56
006C	43.387	45.584	3	2.197	99.02	95.51	94.89	92.09	89.26	83.31	94.55	86.11	79.13	78.65	81.49
006C	45.584	46.058	3	0.474	95.65	93.17	91.9	86.75	86.13	77.13	92.55	79.83	100	82.83	100
006I	343.7	344.712	4	1.012	75.88	86.45	79.02	85.47	76.53	82.24	90.56	80.9	58.26	47.67	47.87
006I	345.928	346.425	4	0.497	85.7	87.03	85.77	79.2	81.43	76.9	89.35	74.25	47.8	49.05	46.35
006Z	0.445	0.604	4	0.159	Missing	76	68.9	96.3	90.1	92.2	97.65	96.9	67.8	71.9	46.6
007A	3.879	14.91	4	11.031	66.32	83.36	62.96	81.96	84.26	90.5	77.78	67.34	74.84	66.72	63.27
007A	14.91	16.086	4	1.176	83.06	94.07	89.09	91.1	93.74	98.92	84.67	94.51	88	81.98	78.09
007A	16.086	19.249	4	3.163	87.66	96.54	94.93	95.6	96.22	94.84	86.82	82.11	80.54	76.91	78.52
007A	19.249	32.649	4	13.4	87.08	99.87	99.47	99.08	98.31	97.53	96.25	96	94.97	95.33	95.11
007E	0	0.57	4	0.57	80.24	78.94	81.38	74.86	80.9	100	79.7	65.3	70.46	21.58	46.9
007E	0.57	1.592	4	1.022	75.46	70.06	77.48	81.73	85.84	98.68	89.47	80.28	77.92	33.82	25.91
009A	21.246	44.929	2	23.683	82.63	80.68	76.36	79.78	80.14	86.13	90.77	89.25	89.08	88.77	87.87
009A	44.929	46.98	2	2.051	79.82	78.63	76.14	85.64	80.74	79.79	89.93	83.27	84.06	83.35	83.19
010A	68.016	71.026	2	3.01	98.93	93.24	96.39	98.43	96.17	96.31	96.29	90.19	78.64	82.7	82.84
011A	0	0.41	4	0.41	82.28	89.8	85.53	84.88	86.6	86.98	92.63	82.5	52.73	53.88	44.05
011A	0.41	1.35	4	0.94	79.84	86.66	82.35	83.55	83.76	85.48	90.94	85.61	65.24	71.88	68.83
012A	0	4.6	2	4.6	95.45	95.62	87.93	95.39	94.9	91.78	92.69	86.09	70.55	73.8	70.04
012A	15.238	33.058	2	17.82	90.38	90.47	94.95	95.91	94.82	91.27	95.97	88.73	75.92	82	77.25
012A	33.058	43.031	2	9.973	94.08	93.97	93.45	93.12	92.78	88.4	94.62	85.35	73.31	78.77	72.54
012A	43.031	56.848	2	13.817	98.27	97.91	97.41	97.79	97.67	96.9	98.18	95.39	56.45	92.77	90.42
014B	51.317	71.538	3	20.221	83.75	88.98	82.36	91.22	92.09	92.89	98.43	91.38	86.72	84.4	82.85
014B	71.538	90.959	4	19.421	85.52	88.99	82.91	91.12	95.13	95.64	100	92.35	89.78	89.3	84.98
015A	2.393	8.419	5	6.026	72.11	63.34	56.92	76.22	74.82	78.69	81.82	66.33	47.97	56.55	50.22
015A	8.419	10.412	5	1.993	66.03	52.55	50.3	65.01	57.58	77.27	78.87	58.48	38.33	56.89	50.47
015A	10.412	12.374	5	1.962	63.59	59.15	59.06	67.65	64.01	79.42	77.78	86.56	36.41	50.46	42.79

ROUTE	REFPT	END REFPT	Region	LENGTH	Transv 2006	Transv 2007	Transv 2008	Transv 2009	Transv 2010	Transv 2011	Transv 2012	Transv 2013	Transv 2014	Transv 2015	Transv 2016
015B	22.484	26.562	5	4.078	71.15	75.32	68.31	80.83	69.33	76.77	79.76	77.96	54.86	64.21	60.12
017A	0	17.28	5	17.28	61.44	69.95	63.57	82.42	68.07	73.89	86.07	72.72	63.7	66.04	69.24
023A	0	9.571	4	9.571	90.94	93.17	90.75	90.7	91.85	90.16	95.87	91.73	83.66	85.2	83.29
023A	16	17.507	4	1.507	86.01	89.36	87.27	91.25	89.13	88.95	94.88	86.69	81.7	81.5	79.27
024B	419.95	422.707	4	2.757	71.39	79.68	76.01	86.25	84.03	86.34	95.47	76.91	76.35	66.87	66.72
024B	422.707	423.059	4	0.352	56.15	82.6	70.9	77.95	80.15	70.75	95.93	82.55	76.25	18.9	37
024B	423.059	429.604	4	6.545	77.35	81.88	77.35	81.3	82.48	80.8	91.01	80.11	70.82	57.48	60.73
024B	429.604	436.576	4	6.972	76.93	81.4	75.4	82.34	83.22	81.9	90.91	85.06	73.72	56.05	66.84
024C	437.453	446.851	4	9.398	73.89	78.78	73.56	76.49	77.68	74.88	88.43	83.43	68.62	64.88	57.21
024C	451.87	453.869	4	1.999	64.23	72.33	71.44	81.18	74.45	75.63	86.52	77.9	37.14	52.18	46.78
024D	456.02	456.722	4	0.702	66.15	74.16	62.75	73.03	52.95	75.57	91.62	72.98	49.38	51.57	44.7
024E	0	0.619	2	0.619	82.03	82.43	76.2	73.5	79.33	99.48	78.54	68.43	35.69	40.7	100
025B	0	0.046	2	0.046	94.9	92.4	95	98.1	97.5	96.9	93	90.5	90.2	84.3	78.1
025B	0.046	1.58	2	1.534	99.57	98.37	99.3	99.1	98.79	98.09	98.82	93.34	78.2	91.77	88.29
025B	1.58	1.948	2	0.368	94.17	95.53	97.3	97.63	97.93	96.57	95.32	88.9	84.8	81.63	86.67
036C	76.394	76.467	1	0.073	83.3	80.1	77.7	68.5	75.6	75	78	61.1	33.3	45.1	20.1
036C	76.467	78.69	1	2.223	80.16	86.68	83.09	84.71	86.34	80.72	99.56	97.37	93.9	93.14	90.52
036C	78.69	79.73	1	1.04	82.1	87.01	83.5	82.84	86.3	79.87	100	99.63	99.14	98.34	98.12
036C	80.815	83.71	1	2.895	73.46	71.51	67.7	71.96	80.53	80.64	100	99.76	99.25	97.81	96.41
039A	3.353	7.571	4	4.218	85.2	57.5	39.62	90.03	94.58	96.92	94.5	76.3	81.31	83.13	77.93
040B	272.552	276.18	1	3.628	37.25	Missing	81.36	88.79	82.73	88.44	92.34	77	66.05	53.78	47.02
040C	279.244	281.82	1	2.576	85.29	73.71	62.9	92.87	81.66	95.98	62.05	73.64	62.36	63.16	59.49
040E	346.29	350.601	1	4.311	57.67	74.94	67.9	69.13	77.38	72.89	88.64	75.69	93.27	86.84	83.53
040E	350.601	350.862	1	0.261	46.2	65.6	42.7	58.6	66.1	61.3	83.8	72.2	100	100	100
040E	350.862	351.136	1	0.274	41.2	32.45	36.35	10.45	48.4	100	100	72.75	52.95	72.65	70.95
040E	351.136	352.245	1	1.109	81.32	78.99	73.63	71.82	77.93	76.5	89.11	77.34	59.51	64.08	65.13
040F	360.201	362.999	4	2.798	76.45	87.56	Missing	80.26	84.52	80.47	92.87	85.68	27.49	63.81	67.16
040G	380.689	381	4	0.311	Missing	Missing	Missing	Missing	88.17	92.8	86.05	85.97	71.9	73.73	64.6
040G	381	382.184	4	1.184	55.55	86.18	74.46	83.05	87.57	78.11	85.44	84.54	76.58	71.63	68.79
041A	0	9.505	5	9.505	79.7	72.31	78.17	78.86	79.31	84.71	85.44	80.43	61.92	63.5	61.55
046A	0	3.85	1	3.85	82.31	76.62	71.13	76.95	74.96	71.6	88.06	66.08	39.04	70.25	64.46
046A	3.85	5.99	1	2.14	82.39	78.98	86.21	87.71	87.83	78.71	91.62	80.51	50.98	79.39	73.82
046A	5.99	6.61	1	0.62	83.74	86.68	83.78	84.13	85	82.23	93.73	90.63	73.46	85.67	80.73
050C	15.669	16.948	2	1.279	74.63	70.02	68.85	83.38	68.53	99.61	83.89	59.18	5.91	62	53.68

ROUTE	REFPT	END REFPT	Region	LENGTH	Transv 2006	Transv 2007	Transv 2008	Transv 2009	Transv 2010	Transv 2011	Transv 2012	Transv 2013	Transv 2014	Transv 2015	Transv 2016
050D	0	0.852	3	0.852	73.53	60.94	54.93	60.69	77.01	65.85	87.77	75.08	50.51	31.75	72.4
050D	0.931	1.539	3	0.608	67.64	61.3	45.18	63	71.84	63.86	85.62	86.02	46.24	34.96	74.88
052A	58.89	60.9	4	2.01	89.96	91.2	88.24	90.56	91.93	89.23	95.22	86.25	74	78.99	78.33
052A	60.9	70.895	4	9.995	78.45	82.22	78.89	79.97	83.32	78.19	91.16	79.57	48.95	56.78	59.36
055A	0	0.162	4	0.162	88.2	89.4	89.4	88.8	91	79.9	97.5	86.4	67.9	95.6	83.7
055A	0.162	2.417	4	2.255	83.28	85.08	85.23	86.65	87.7	88.44	92.68	83.78	60.02	62.83	59.22
059A	15.019	33	4	17.981	96.93	97.03	99.43	96.82	96.46	95.11	97.37	93.21	90.33	87.13	87.14
059A	33	40.963	4	7.963	96.69	96.7	100	96.47	96.33	93.62	96.62	92.93	86.86	89.99	88.26
059B	74.474	87.535	4	13.061	95.27	94.3	93.08	92.21	92.96	92.53	96.14	91.93	91.87	90.98	90.35
059B	122.864	130.588	4	7.724	98.97	99.33	97.21	95.38	94.82	93.77	96.63	93.33	92.54	92.6	92.17
059B	130.588	145.517	4	14.929	97.29	98.33	95.28	94.45	94.46	93.88	96.7	93.26	92.73	92.41	90.83
059B	147.149	147.218	4	0.069	100	100	100	100	100	99.4	93.1	96.3	95	91	92.8
059B	147.218	147.507	4	0.289	98.3	95.4	99.05	96.95	97.5	93.4	97.2	89.7	79.25	91.15	88.85
059B	147.814	155.594	4	7.78	99.12	98.58	98.51	98.14	98.56	98.28	98.87	98.36	97.53	97.19	95.66
059B	155.594	159.68	4	4.086	99.92	99.99	99.99	99.98	99.97	99.87	99.63	99.57	99.28	98.84	98.16
059B	159.68	166.498	4	6.818	96.3	96.37	94.85	96.38	95.86	93.18	96.57	94.24	92.27	87.38	84.27
059B	166.498	171.07	4	4.572	92.11	91.96	90.3	88.99	91.72	87.07	94.9	90.43	87.51	82.53	81.18
059B	171.07	173.337	4	2.267	89.81	88.55	88.71	88.79	91.46	86.49	94	90.72	82.09	74.9	78.47
061A	8.062	14.03	4	5.968	81.83	87.39	82.54	78.71	87.21	79.42	92.03	77.39	68.91	71.59	66.73
061A	14.03	22.511	4	8.481	95.6	95.87	94.75	93.12	94.56	92.98	96.92	92.59	91.07	91.11	88.61
063A	5.08	11.136	4	6.056	92.14	93.36	90.33	91.84	92.48	88.98	95.95	92.04	83.44	84	85.11
063A	11.136	24.196	4	13.06	92.36	93.54	90.8	91.78	92.76	90.62	94.98	90.55	82.26	79.67	82.22
063A	29.006	29.49	4	0.484	82.2	63.13	63.17	65.97	93.9	97.73	89.38	99.6	83.3	83.93	81.6
063A	29.49	39.256	4	9.766	83.77	89.14	86.89	88.89	92.81	91.77	97.35	90.18	81.58	84.44	81.21
063A	39.256	48.2	4	8.944	95.96	95.69	95.94	95.92	95.45	94.92	98.22	93.94	91.52	92.05	91.82
063A	48.2	53.29	4	5.09	100	99.94	99.69	99.98	100	99.96	99.52	99.7	98.71	94.93	98.26
065A	14.35	26.866	3	12.516	88.03	96.83	99.58	99.73	99.49	99.25	99.6	98.55	99.1	98.57	98.25
065A	26.866	36.175	3	9.309	94.54	92.85	89.91	91.76	90.7	86.34	94.62	84.93	83.78	81.59	81.99
065A	36.175	49.565	3	13.39	78.85	96.28	93.76	94.34	94.12	91.59	97.17	89.7	85.87	88.93	87.2
065A	49.565	51.169	3	1.604	72.45	73.03	54.69	64.37	69.81	85.23	84.64	58.17	44.5	48.25	40.77
067A	0	6.835	2	6.835	64.37	68.42	64.84	79.11	71.17	92.76	88.41	43.6	32.17	32.98	35.8
067C	45.56	45.686	2	0.126	80.6	79.7	76.5	84.7	81.3	75.9	100	76.4	20.8	0.8	95.7
067C	45.686	50.73	2	5.044	89.9	91.42	85.55	86.75	88.84	86.3	93.83	82.94	79.97	84.98	85.34
067D	91.241	100.036	2	8.795	73.63	91.75	83.93	89.15	87.06	83.97	91.33	87.95	76.71	73	72.75

ROUTE	REFPT	END REFPT	Region	LENGTH	Transv 2006	Transv 2007	Transv 2008	Transv 2009	Transv 2010	Transv 2011	Transv 2012	Transv 2013	Transv 2014	Transv 2015	Transv 2016
067E	117.349	122.311	1	4.962	69.78	82.98	81.14	85.63	77.77	77.79	86.44	67.79	55.63	60.05	99.46
069A	0	5.306	2	5.306	87.87	86.83	86.81	88.72	90.09	88.76	90.52	80.97	61.25	73.62	68.36
069A	9.668	25.017	2	15.349	78.96	97.78	95.26	96.31	95.63	94.81	96.01	92.11	83.01	89.06	84.45
069A	25.017	26.042	2	1.025	57.34	100	97.27	98.76	98.97	97.79	98.3	95.67	78.47	92.81	91.38
069A	26.042	49.423	2	23.381	71.74	67.48	62.7	87.15	79.37	88.54	82.36	59.27	40.25	63.01	56.29
069A	49.423	54.125	2	4.702	71.54	61.61	63.93	67.35	75.8	84.34	90.7	74.72	58.1	63.36	55.65
069A	71.566	82.664	2	11.098	75.86	79.67	78.25	80.23	81.39	75.05	87.49	78.22	56.65	67.76	61.5
070K	0	0.723	1	0.723	Missing	Missing	Missing	Missing	Missing	Missing	96.24	94.51	92.89	91.21	92.87
070N	0	0.133	1	0.133	Missing	Missing	Missing	Missing	Missing	Missing	93.7	83.3	75.6	74.6	52.4
070N	0.133	0.396	1	0.263	Missing	Missing	Missing	Missing	Missing	Missing	96.9	90.6	81.7	63.9	76.8
070O	0	0.353	4	0.353	Missing	Missing	Missing	Missing	Missing	Missing	91.25	85.67	59.47	56.73	64.93
070P	0	0.04	4	0.04	Missing	Missing	Missing	Missing	Missing	Missing	93.1	69.2	67.4	71.1	38.7
070P	0.04	0.528	4	0.488	Missing	Missing	Missing	Missing	Missing	Missing	90.01	76.73	56.2	60.85	50.2
071A	0	7.036	2	7.036	82.39	81.17	78.88	88.47	82.11	86.54	91.94	79.48	57.64	68.05	65.79
071A	7.036	9.032	2	1.996	53.71	63.01	50.89	88.73	66.76	80.1	84.81	62.33	43.68	30.81	33.98
071B	9.601	11.614	2	2.013	100	99.86	99.91	99.97	99.35	99.91	99.53	98.97	96.77	94.76	92.34
071B	11.614	13.747	2	2.133	100	100	100	100	99.45	99.97	99.57	99.48	98.09	96.47	91.53
071B	13.747	14.076	2	0.329	100	100	100	100	99.7	100	100	99.1	99.25	97.85	91.85
072A	25.608	29.378	1	3.77	99.23	98.19	96.98	97.04	96.51	93.06	92.43	91.74	86.59	85.03	79.88
072B	44.095	48.353	4	4.258	61.2	90.9	75.83	84.94	82.27	79.8	78.96	89.61	74.6	60.93	61.91
072B	48.353	54.064	4	5.711	97.76	95.4	87.61	93.61	89.36	87.42	85.71	96.61	88.9	79.96	78.25
078A	0	9	2	9	Missing	Missing	100	Missing	91.97	Missing	96.13	88.33	73.4	99.93	Missing
078A	9	12.71	2	3.71	87.44	87.21	79.72	87.83	83.66	89.18	98.53	95.59	91.65	93.7	92.19
078A	14.586	15.532	2	0.946	98.69	98.86	97.02	98	97.18	97.14	97.96	94.87	93.34	89.98	90.98
078A	15.532	18.192	2	2.66	97.74	97.9	95.39	97.06	96.27	96.33	97.38	94.14	93.27	93.14	92.06
078A	18.192	29.903	2	11.711	92.61	91.41	88.27	91.56	89.62	91.46	94.27	83.25	74.09	68.34	65.5
078B	0	1.493	2	1.493	58.91	81.16	72.64	99.35	85.83	96.49	95.32	86.91	66.25	71.36	69.29
082A	42.471	51.254	3	8.783	Missing	92.82	92.94	93.53	94.3	95.27	97.49	Missing	91.42	94.09	90.4
082A	51.254	79	3	27.746	Missing	91.05	98.87	94.6	92.26	95.37	96.78	78.78	90.01	91.22	87.7
082A	79	83.47	3	4.47	Missing	85.12	Missing	97.74	92.65	95.75	97.9	94.31	89.8	89.8	92.62
082A	83.47	85.293	3	1.823	Missing	84.25	Missing	85.59	76.73	82.16	91.57	85.13	84.35	82.56	73.7
086A	27.718	32.248	4	4.53	72.44	83.76	81.86	80.01	82.19	86.8	99.99	99.6	99.73	99.49	99.43
086A	32.248	51.167	4	18.919	65.45	81.94	79.6	81.04	86.98	86.44	93.48	87.1	67.38	82.76	80.76
086A	51.167	59.279	4	8.112	77.69	79.55	83.79	87.88	91.08	90.49	95.77	88.6	47.27	77.83	77.7

ROUTE	REFPT	END REFPT	Region	LENGTH	Transv 2006	Transv 2007	Transv 2008	Transv 2009	Transv 2010	Transv 2011	Transv 2012	Transv 2013	Transv 2014	Transv 2015	Transv 2016
089A	0	8.976	2	8.976	84.24	89.26	92.95	94.73	93.55	92.91	96.16	92.74	88.91	90.58	89.2
089A	8.976	18.57	2	9.594	67.27	81.17	99.47	97.41	95.15	94.1	96.7	92.71	87.85	89.84	88.49
089A	18.57	21.549	2	2.979	75.18	72.8	99.78	96.77	94.03	93.02	96.36	92.07	87.32	89.82	87.38
089A	21.549	33.183	2	11.634	57.06	68.18	100	99.89	98.76	98.29	98.52	96.63	94.94	94.91	94.9
090A	0	9.493	5	9.493	72.98	74.52	73.25	94.09	86.14	96.31	94.31	92.44	57.58	92.01	82.46
090A	9.493	14.797	5	5.304	55.53	61.64	63.69	88.28	88.23	94.44	93.01	98.28	81.69	82.7	84.46
090A	14.797	33.874	5	19.077	68.81	73.84	72	88.1	83.01	89.06	90.37	88.38	73.47	69.63	78.11
090B	81.533	81.737	3	0.204	Missing	Missing	Missing	Missing	96.7	96.9	96.4	82.2	74.7	70.4	100
090B	81.737	84.884	3	3.147	77.47	75.06	78.95	76.11	73.95	74.69	87.13	82.43	60.06	52.6	93.24
090B	84.884	86.058	3	1.174	88.75	81.75	89.5	83.94	79.54	83.68	92.23	74.71	69.67	68.56	91.32
090B	86.058	86.931	3	0.873	79.6	83.04	84	82.61	81.08	80.15	96.38	90.79	84.78	85.85	85.48
090B	86.931	87.914	3	0.983	78.97	74.44	76.83	68.01	73.01	70.72	87.88	62.81	65.27	61.21	80.31
092A	27.082	30.11	3	3.028	87.47	83.76	85.62	92.43	85.78	79.94	89.2	80.44	61.03	62.57	68.66
092A	31.525	33.643	3	2.118	93.89	91.77	89.66	90.24	90.21	88.61	93.51	88.86	86.45	79.77	76.34
092A	33.643	36.577	3	2.934	96.63	95.06	93.74	92.89	93.4	90.84	95	90.47	88.94	85.69	81.63
092A	36.577	71.819	3	35.242	95.25	94.01	92.99	93.09	93.16	91.54	95.75	90.63	86.51	83.83	81.88
092A	71.819	73.259	3	1.44	93.57	90.35	91.79	91.8	90.86	89.95	94.55	87.91	87.82	85.26	82.98
094A	33.079	45.054	4	11.975	84.12	87.45	76.27	92.46	91.29	89.57	95	83.91	81.02	80.61	81.74
094A	45.054	54.581	4	9.527	73.48	66.89	75.96	91.77	88.99	85.91	91.98	76.22	77.87	69.4	64.18
094A	54.581	86.174	4	31.593	81.78	80.19	73.43	86.04	85.53	83.13	91.24	74.67	62.33	67.4	62.21
096A	1.313	11.064	2	9.751	68.18	72.02	54.02	73.62	69.46	80.18	77.01	58.42	20.58	36.14	18.66
096A	26.273	33.575	2	7.302	70.16	69.07	64.3	76.36	79.63	80.28	86.96	72.11	51.35	97.84	95.1
096A	33.575	42.21	2	8.635	73.35	72.09	74.37	73.21	75.52	81.04	85.74	74.56	31.2	84.79	77.65
096B	70.573	75.496	2	4.923	73.3	81.82	67.01	77.8	79.78	81.46	84.92	69.13	41.28	51.88	43.72
096C	119.491	143.78	2	24.289	77.53	72.44	76.12	84.16	81.12	85.41	94.32	80.87	62.94	60.04	63.7
097A	0.32	3.932	5	3.612	61.49	62.21	50.93	97.56	84.74	86.46	88.95	73.9	71.61	61.1	65.35
097A	3.932	4.584	5	0.652	73.19	75.46	73.05	80.92	74.86	99.28	70.17	81.85	72.52	70.22	77.6
100A	0	0.279	2	0.279	46.2	Missing	63.75	59.9	66.55	64.4	80.3	64.7	55.3	100	54.05
100A	0.279	0.419	2	0.14	Missing	Missing	68.8	65.8	65.7	68.7	79.05	66.3	48	100	47.3
101A	0.404	1.151	2	0.747	58.13	66.13	63.37	92.42	79.08	71.13	82.57	72.63	66.62	64.17	56.65
101A	1.151	5.151	2	4	66.85	67.38	69.03	74.97	73.77	77.87	84.91	80.07	39.95	45.29	45.89
101A	5.151	16.45	2	11.299	77.04	73.77	61.75	84.38	74.56	83.65	79.64	83.64	45.53	52.37	65.24
101A	16.45	21.413	2	4.963	42.48	43.26	41.22	92.5	75.03	85.31	75.27	80.74	38.75	44.65	55.17
103A	6.7	13.265	1	6.565	72.41	80.33	80.92	80.71	81.42	81.94	89.71	86.5	70.53	70.36	98.6

ROUTE	REFPT	END REFPT	Region	LENGTH	Transv 2006	Transv 2007	Transv 2008	Transv 2009	Transv 2010	Transv 2011	Transv 2012	Transv 2013	Transv 2014	Transv 2015	Transv 2016
103A	13.265	22.488	1	9.223	56.69	69.16	61.55	75.97	76.23	75.01	89.85	Missing	97.2	95.25	91.43
105A	9.211	9.48	2	0.269	100	100	100	99.4	99.4	99.4	99.7	99.4	100	100	98.5
109A	0	7.722	2	7.722	80.19	77.8	81.73	82.01	84.98	81.09	84.15	76.23	42.05	38.55	40.26
109A	7.722	53	2	45.278	57.85	59.49	84.04	88.7	91.67	90.96	91.1	89.21	75.13	78.12	74.72
109A	53	54.79	2	1.79	99.66	96.76	99.89	99.89	98.79	98.11	97.53	94.6	71.32	78.68	56.78
109A	64.748	65.327	2	0.579	57.82	68.22	53.16	72.76	69.6	66.16	88.33	93.26	Missing	14.48	20.76
110A	0	0.14	5	0.14	95	93.1	90.9	95.7	94.4	91.9	91.1	72.5	96.3	94.4	83.1
114A	0	19	5	19	94.09	91.96	89.37	90.16	88.97	89.4	94.06	83.53	81.29	74.5	80.45
114A	19	20.261	5	1.261	70.93	64.16	45.85	70.43	67.52	70.58	81.32	57.38	30.57	34.18	24.3
114A	20.261	56.043	5	35.782	87.57	82.75	78.73	84.07	82.49	84.56	90.69	77.05	62.95	64.92	63.36
114A	56.043	61.453	5	5.41	92.45	88.18	85.78	83.45	82.57	83.48	90.51	84.34	78.11	78.92	77.46
116A	0	12.042	2	12.042	66.75	55.62	61.38	93.31	87.46	86.83	91.25	82.2	68.41	60.35	51.97
116A	12.042	12.299	2	0.257	90.1	56.9	68.8	70.1	73.9	56.6	78.95	75.6	33.2	25.9	20.5
116A	12.299	13.055	2	0.756	68.89	51.6	51.1	72.49	72.06	76.11	80.5	71.46	32.96	16.11	24.54
116A	13.055	20.029	2	6.974	82.08	55.71	64.14	92.64	93.2	95.59	96.54	92.04	76.16	70.08	68.68
116A	20.029	27.02	2	6.991	65.78	52.21	81.47	93.55	93.7	84.37	88.18	82.71	49.71	46.56	41.01
116A	27.02	32.322	2	5.302	53.34	45.08	75.48	93.85	88.7	78.91	85.13	78.65	25.35	40.1	29.77
120A	0	3.105	2	3.105	67.1	65.21	51.69	79.35	80.97	83.44	90.35	77.68	55.63	54.77	55.67
120A	3.105	7.186	2	4.081	65.75	61.57	50.62	83.27	85.05	94.73	95.05	88.77	75.7	73.43	77.11
125A	0	29.46	3	29.46	78.91	77.44	70.9	80.8	85.49	80.31	90.81	75.03	71.53	67.33	63.23
125A	29.46	31.504	3	2.044	85.56	83.17	79.45	80.55	81.13	77.73	90.74	72.92	74.71	78.62	75.69
125A	31.504	35.582	3	4.078	78.99	80.72	70.26	74.55	79.24	80.66	91.48	76.69	77.19	75.24	73.77
125A	35.582	52.02	3	16.438	72.36	81.83	76.16	72.89	79.96	75.51	91.08	75.8	77.1	73.61	73.63
125A	66.558	75.406	3	8.848	40.68	61.52	99.81	99.55	96.78	93.75	97.47	92.55	93.29	92.63	93.9
131B	13.709	32.904	3	19.195	98.42	96.57	93.53	96.62	95.72	95.21	96.76	91.27	90.58	90.09	88.94
131B	32.904	38.441	3	5.537	93.85	91.74	91.48	90.27	92.24	90.68	95.45	87.69	86.6	87.25	85.31
131B	38.441	42.05	3	3.609	97.31	94.3	93.67	92.78	93.9	92.52	95.64	87.56	88.15	86.81	84.31
131B	51.859	52.081	3	0.222	86.9	86.6	80	91	89.7	89.4	90.3	91.9	64.5	97.2	83.1
133A	24	46.371	3	22.371	99.35	99.49	98.69	99.27	98.67	98.37	98.76	97.32	95.78	94.43	94.78
133A	46.371	51.357	3	4.986	97.67	98.12	92.59	97.69	96.32	96.89	97.37	96.2	92.07	97.19	98.02
133B	13.267	16.076	3	2.809	Missing	Missing	Missing	Missing	Missing	Missing	94.52	74.84	58.14	42.96	32.94
134A	0	16.32	3	16.32	52.45	91.6	87.74	88.63	88.7	88.42	92.15	81.07	77.09	76.73	83.11
134A	16.32	27.163	3	10.843	65.66	94.81	92.36	92.82	93.69	92.47	95.78	90.7	89.87	89.93	91.11
136A	0	0.152	5	0.152	96.9	94.4	90.3	96	94.7	96.3	93.35	92.5	67.9	84.8	74.8

ROUTE	REFPT	END REFPT	Region	LENGTH	Transv 2006	Transv 2007	Transv 2008	Transv 2009	Transv 2010	Transv 2011	Transv 2012	Transv 2013	Transv 2014	Transv 2015	Transv 2016
136A	0.152	0.553	5	0.401	69.6	71.4	60.4	98.53	68.07	85.4	79.32	70.33	19.47	47.97	49.27
136A	0.553	1.579	5	1.026	74.2	76.37	68.8	73.38	69.67	74.94	80.17	68.98	25.58	45.56	43.37
136A	3.48	4.469	5	0.989	64.89	64.08	62.88	70.33	68.57	74.18	75.4	62.27	28	37.42	36.84
138A	21.739	26.329	4	4.59	97.37	95.06	91.24	91.26	90.52	85.66	88.71	74.74	58.87	72	70.08
138A	26.329	27.503	4	1.174	91.89	94.89	88.35	91.29	90.46	85.65	91.62	78.32	58.5	74.39	74.02
138A	27.503	27.911	4	0.408	96.43	91.43	91.27	90.9	89.4	83.7	90.73	75.4	63.47	85.63	75.2
138A	27.911	34.981	4	7.07	91.19	90.68	89.7	89.13	90	87.95	93.71	83.84	76.93	82.29	81.08
138A	34.981	41.385	4	6.404	66.12	76.53	72.42	75.36	78.13	68.09	89.02	63.56	51.88	66.23	62.26
138A	41.385	43.023	4	1.638	65.04	73.73	70.31	67.31	73.13	76.69	85.89	52.21	35.24	73.56	72.67
138A	43.023	43.084	4	0.061	51.4	53.7	60.5	68.1	71.2	59.3	77.2	73.8	67.2	94.3	59.7
138A	43.084	43.413	4	0.329	55.17	71.17	57.87	61.27	66.83	71.43	89.18	73.57	60.9	65.4	66.73
138A	50.476	50.633	4	0.157	53.9	72.6	68.6	70.7	78.3	60.2	87.15	62.2	7	4	13.9
138A	50.633	50.868	4	0.235	76	82.5	73.8	73.4	79.5	70.7	89.4	66.2	37.8	0	27.2
138A	50.868	54	4	3.132	68.45	74.48	74.84	74.72	78.01	77.57	83.55	64.11	30.67	42.4	51.44
138A	54	54.81	4	0.81	73.95	87.9	78.16	85.76	86.81	85.16	93.67	85.43	68.76	71.83	78.44
138A	58.534	59.823	4	1.289	82.98	80.1	80.44	83.23	83.13	77.61	89.08	75.93	65.03	70.68	66.99
141A	0	9.381	5	9.381	95.92	93.62	91.87	95.1	91.62	92.91	94.47	85.38	81.14	83.86	80.47
141A	9.381	11.271	5	1.89	99.97	97.68	99.11	98.69	95.69	96.82	96.41	93.57	87.88	85.77	98.04
141A	11.271	44.124	5	32.853	72.6	72.77	77.21	90.26	88.19	91.74	92.35	86.43	73.58	68.18	64.79
141A	62.436	64.395	5	1.959	99.22	98.76	96.64	98.36	96.47	94.61	96.5	88.45	87.02	90.42	87.52
141A	64.395	110.525	5	46.13	74.3	81.53	77.74	95.1	75.75	94.3	88.57	85.24	65.13	57.94	59.27
142A	3.276	13.4	5	10.124	75.12	74.6	70.42	71.45	75.87	73	85.04	67.06	43.78	55.45	49.32
142A	13.4	22.958	5	9.558	78.53	76.28	77.95	79.31	80.65	87.79	88.12	79.55	58.28	65.68	59.48
142A	22.958	28.712	5	5.754	69.39	71.13	70.63	69.44	75.8	73.45	85.24	70.12	52.93	56.36	50.3
142A	28.712	33.84	5	5.128	55.34	69.08	63.35	65.1	78.7	74.78	85.41	72.85	41.04	38.39	36.53
144A	0	0.027	4	0.027	58.4	80.1	58	76.1	80.4	79.7	86.8	79.9	59.8	100	84.1
144A	0.027	2.821	4	2.794	72.2	81.24	78.26	81.59	82.97	82.1	91.38	79.13	75.42	77.25	63.17
144A	2.821	10.493	4	7.672	82.12	80.73	81.33	80.17	81.46	80.44	90.25	77.39	73.7	72.17	66.83
144A	10.493	11.062	4	0.569	86.32	83.52	79.44	81.66	81.14	84.1	90.82	80.3	38.58	56.36	49.22
144A	11.062	16.601	4	5.539	88.38	89.15	80.29	86.56	83.74	86.52	94.7	84.49	56.57	60.68	38.5
144A	16.601	20.841	4	4.24	90.44	89.8	82.54	87.37	85.25	87.31	94.55	86.19	61.38	60.98	39.73
144A	26.066	26.887	4	0.821	81.94	86.61	59.56	79.44	79.73	84.36	90.5	77.51	52.9	47.21	20.13
149A	3.45	18.52	5	15.07	98.78	97.48	95.71	94.93	95.11	91.72	96.39	87.33	88.7	87.83	85.86
149A	21.566	21.648	5	0.082	89.4	90	88.1	82.7	87.5	82.5	85.4	80.1	75.2	84.4	79.8

ROUTE	REFPT	END REFPT	Region	LENGTH	Transv 2006	Transv 2007	Transv 2008	Transv 2009	Transv 2010	Transv 2011	Transv 2012	Transv 2013	Transv 2014	Transv 2015	Transv 2016
149A	21.648	21.892	5	0.244	90.6	90	89.4	88.5	91.3	85.6	93.2	86.5	73.4	86.4	86.3
149A	21.892	22.887	5	0.995	90.6	90.43	90.04	88.99	89.78	84.63	93.96	87.71	81.12	82.27	82.64
149A	22.887	26.581	5	3.694	99.69	87.96	89.09	87.2	88.4	81.64	92.6	82.39	78.75	79.45	77.73
149A	26.581	27.689	5	1.108	100	88.5	90.79	89.93	91.18	86.52	94.55	84.21	79.34	85.17	82.94
149A	27.689	41.477	5	13.788	100	88.31	88.3	86.06	87.12	82.91	92.13	81.54	80.29	81.05	76.96
149A	41.477	45.465	3	3.988	100	81.79	77.04	70.13	77.57	72.88	85.73	73.43	88.01	77.61	68.19
149A	45.465	62.655	3	17.19	77.86	72.33	63.18	68.35	68.41	71.29	83.25	63.02	61.88	54.12	46.32
149A	62.655	69.851	3	7.196	62.12	64.33	58.98	71.76	64.72	61.16	84.35	71.82	57.39	38.39	41.18
149A	69.851	71.901	3	2.05	74.07	75.33	75.17	77.59	76.99	76.46	86.32	72.29	64.43	50.38	54.07
149A	72.829	73.207	3	0.378	86.47	88.53	86.07	87.4	88.33	80.8	92.63	83.33	77.83	65.73	60.73
149A	73.207	100.601	3	27.394	85.35	81.32	82.26	87.35	86.98	83.03	92.57	81.88	76.79	75.23	73.31
149A	100.601	117.522	3	16.921	95.8	95.94	91.68	93.7	94.12	92.51	96.01	88.05	83.97	80.54	85.08
150A	0	13.511	5	13.511	73.2	76.69	70.52	77.55	90.76	86.28	92.26	81.48	72.53	76.47	77.17
150A	13.511	16.114	5	2.603	78.59	83.48	75.14	82.82	97.9	89.51	94.26	82.88	80.45	82.85	81.98
151A	22.731	33.96	5	11.229	64.23	74.91	79.51	87.4	83.7	89.14	90.88	78.9	72.92	78.5	81.22
159A	0	7.009	5	7.009	87.66	88.99	87.52	87.96	88.9	88.04	93.59	86.61	84.41	84.39	83.44
159A	7.009	13.3	5	6.291	84.05	83.37	81.9	82.35	83.66	87.96	89.53	79.86	68.85	70.69	66.57
159A	13.3	17.547	5	4.247	79.27	81.46	78.16	79.05	80.8	85.98	85.75	80.53	52.94	60.85	61.93
159A	17.547	17.789	5	0.242	94.2	93.8	87.5	89.4	86.9	90.3	88.45	83.8	77.1	70.6	75.6
159A	18.334	30.959	5	12.625	73.36	71.24	77.18	74.08	77.25	82.41	83.42	71.6	56.71	62.88	59.42
160C	353.65	367.79	2	14.14	83.28	83.52	82.04	82.14	84.61	81.48	88.42	79.6	73.84	67.62	60.48
160C	367.79	375.832	2	8.042	70.46	63.29	76.77	93.67	92.78	93.86	91.6	88.31	73.97	76.85	77.55
160C	375.832	382.774	2	6.942	88.77	86.25	75.88	89.97	89.16	87.39	90.12	83.7	66.54	67.54	50.25
160C	382.774	386.608	2	3.834	74.62	68.06	74.99	92.18	86.95	89.31	93.29	88.09	76.46	66.45	52.52
160C	386.608	403.656	2	17.048	79.16	80.79	65.89	90.01	92.21	89.72	93.87	83	78.28	71.24	66.5
160C	403.656	406.685	2	3.029	84.23	81.89	75.96	86.7	91.93	86.06	93.14	82.3	78.92	73.12	81.57
160C	406.685	414.326	2	7.641	73.53	66.98	67.27	86.72	81.85	81.73	91.91	79.88	80.82	54.73	99.53
160C	414.326	414.755	2	0.429	33	50.63	40.8	100	100	100	100	86.97	67.6	40.43	99.8
160C	414.755	416.531	2	1.776	44.96	64.24	48.05	94.72	92.52	98.09	95.59	87.56	80.55	66.42	99.79
160C	416.531	425.681	2	9.15	63.85	61.11	58.18	92.56	88.63	83.27	91	79.87	73.73	53.57	94.89
160C	425.681	441.65	2	15.969	90.78	89.55	89.2	90.97	87.4	89.78	93.09	83	83.26	71.86	64.46
160C	441.65	447.59	2	5.94	92.14	92.65	92.73	91.49	90.33	91.04	93.96	83.02	74.12	80.05	74.76
160C	450.97	460.147	2	9.177	99.04	98.74	98.41	98.31	97.65	97.41	98	95.84	94.92	94.62	94.05
160C	483.037	484.418	2	1.381	77.25	100	100	100	99.58	99.44	98.35	96.45	95.26	94.87	92.76

ROUTE	REFPT	END REFPT	Region	LENGTH	Transv 2006	Transv 2007	Transv 2008	Transv 2009	Transv 2010	Transv 2011	Transv 2012	Transv 2013	Transv 2014	Transv 2015	Transv 2016
160D	0	0.011	5	0.011	94.7	85.4	87.2	82.7	84.6	76.9	71.4	97.6	99.4	35.9	23.9
160D	0.011	1.212	5	1.201	83.7	81.33	81.03	82.53	83.61	79.25	89.29	72.35	69.21	51.33	58.42
160D	1.212	1.457	5	0.245	79.4	77.5	79.7	75.2	77.1	75.9	89.4	74.8	57.9	18.3	53.1
160D	1.457	2.488	5	1.031	86.43	78.31	83.19	81.12	83.54	83.37	87.45	71	63.37	55.66	50.23
165A	0	15.31	2	15.31	98.06	97.39	96.9	96.58	96.51	96.08	97.78	93.37	87.07	91.43	91.63
165A	15.31	18.503	2	3.193	93.24	90.62	90.05	91.52	89.95	89.22	94.31	80.96	59.78	74.76	72.39
165A	18.503	28.558	2	10.055	95.86	94.75	94.01	94.87	94.22	94.1	96.88	88.56	81.54	86.26	83.86
167A	0	1.673	2	1.673	75.84	62.59	68.53	77.29	70.27	71.44	88.88	78.73	29.1	48.23	34.82
167A	1.673	2.005	2	0.332	70.4	58.13	63.13	80.63	64.3	74.27	87.03	89.2	18.17	57.83	37.67
167A	2.005	2.368	2	0.363	72.8	61.85	71.6	71.8	57.9	72.2	83.3	100	0	24.7	33.1
167A	2.368	2.905	2	0.537	66.52	59.64	67.24	73	65.28	72.14	85.8	92.7	10.64	37.34	37.7
167A	2.905	4.86	2	1.955	67.73	41.4	52.07	92.72	62.52	97.12	85.82	96.01	40.83	40.26	31.69
170A	0	2.157	4	2.157	80.66	80.7	82.94	81.07	82.78	83.77	85.29	72.35	67.42	84.31	78.1
172A	0	2.081	5	2.081	85.2	100	100	100	100	100	100	99.97	99.94	99.93	99.94
183A	0	1	2	1	84.61	84.09	82.15	85.15	83.73	81.02	91.17	83.89	81	79	76.98
194A	0	3.8	2	3.8	63.16	66.68	66.38	92.1	85.86	79.98	84.02	74.21	92.93	89.91	87.05
194A	3.8	14.678	2	10.878	67.58	69.14	69.45	90.47	80.17	72.75	83.61	66.73	72.83	78.4	74.41
194A	14.678	20.327	2	5.649	69.76	79.16	70.35	84.02	80.57	75.9	86.9	74.21	47.32	64.25	55.17
196A	0	1.6	2	1.6	62.4	65.21	62.33	72.41	68.61	76.78	90.67	80.63	71.36	52.95	46.8
196A	1.6	6.91	2	5.31	51.24	79.8	58	75.81	79.43	87.56	92.74	86.19	59	51.38	48
196A	6.91	8.922	2	2.012	67.5	86.55	74.13	78.16	81.48	84.57	93.21	85.23	81.28	92.77	91.35
202A	0	0.11	2	0.11	95.7	100	98.1	98.5	91.8	93.7	97.8	93.8	88	96.9	100
202A	0.11	0.19	2	0.08	67.8	73.3	77.3	95.1	79.9	85.9	80.1	81.7	64.2	50.1	100
202A	0.19	1.22	2	1.03	39.46	53.41	62.46	96.91	89.16	99.53	98.82	96.39	76.88	99.23	100
202A	1.22	3.228	2	2.008	79.76	59.71	59.48	98.15	83.95	98.57	99.17	92.7	54.4	94.67	100
207A	0	3.513	2	3.513	74.6	67.03	63.94	78.05	65.85	77.94	89.94	90.56	27.25	68.96	64.78
207A	3.513	5.935	2	2.422	77.86	72.83	67.78	77.49	68.27	78.16	86.4	95.06	55.51	67.33	63.97
209A	0	1.387	2	1.387	76.64	73.96	69.02	77.2	69.62	76.82	88.8	71.7	38.55	54.96	45.53
209A	1.387	1.528	2	0.141	71.3	70.6	65.1	77.5	70.6	76.9	90.3	75.6	50.2	46.8	39.5
239A	0	0.675	2	0.675	95.57	95.62	97.08	95.35	95.65	95.63	97.21	93.45	81.85	91.83	88.68
239A	0.675	0.972	2	0.297	87.25	91.75	88.4	94.25	92.45	96.45	93.45	95.05	70.55	82.85	78.75
239A	0.972	3.345	2	2.373	82.07	83.56	84	89.93	84.29	93.17	90.37	78.38	36.66	65.17	62
257B	0.037	0.644	4	0.607	33.52	10.22	30.2	Missing	Missing	100	86.78	61.22	75.24	0	13.26
257B	0.644	1.146	4	0.502	46.78	34.08	46.63	Missing	Missing	99.38	81.15	96.28	91.33	2.23	43.25

ROUTE	REFPT	END REFPT	Region	LENGTH	Transv 2006	Transv 2007	Transv 2008	Transv 2009	Transv 2010	Transv 2011	Transv 2012	Transv 2013	Transv 2014	Transv 2015	Transv 2016
266A	0	0.06	2	0.06	56.8	77.1	5.8	95.6	57	73.7	93.1	80.4	59.8	73.3	67.8
266A	0.06	0.217	2	0.157	51.4	36.9	34.2	100	61.9	80.9	100	75.1	52.2	34.5	24.5
266A	0.217	1.306	2	1.089	68.78	75.7	61.48	81.97	78.07	75.76	88.71	71.32	27.79	49.96	43.84
266A	1.306	2.964	2	1.658	67.83	72.88	58.83	91.28	76.25	85.42	90.52	83.34	53.52	57.8	54.05
266A	2.964	5.363	2	2.399	47.67	53.86	43.6	87.55	65.29	75.17	88.25	67.67	52.18	54.91	48.21
266A	5.363	9.512	2	4.149	58.93	59.76	42.21	83.8	68.2	77.88	86.74	65.6	40.5	45.49	41.11
266A	9.512	11.516	2	2.004	50.28	61.57	32.73	76.64	64.43	71.77	85.36	65.37	14.95	45.61	49.83
300A	0.465	3.356	3	2.891	87.18	87.76	77.08	85.54	85.1	90.5	93.82	79.31	77.91	74.94	74.29
317A	0	12.237	3	12.237	85.25	90.45	89.26	90.82	91.88	92.05	95	90.3	94.67	93.05	91.9
318A	0	20.562	3	20.562	83.32	80.7	74.72	80.26	78.1	79.77	88.55	64.33	59.27	65.89	63.31
318A	20.562	54.309	3	33.747	85.07	83.86	81.94	85.25	84.79	85.08	92.41	81.14	77.84	79.31	76.45
318A	54.309	60.697	3	6.388	84.91	83.48	83.45	82.69	82.48	82.32	91.26	81.29	76.29	79.85	72.88
325A	0	4.102	3	4.102	70.13	79.36	84.07	90.13	88.07	86.7	89.68	76.01	64.15	63.84	62.66
325A	4.102	6.977	3	2.875	53.03	71.99	66.2	94.4	85.43	93.4	93.34	70.76	65.99	59.65	63.19
325A	6.977	11.395	3	4.418	70.76	83.99	74.6	97.17	89.03	97.41	96.46	74.06	83.42	77.48	78.95
347A	0	1.821	3	1.821	91.02	88.73	88.43	89.57	88.19	91.51	92.75	90.53	72.09	62.49	46.49
347A	1.821	5.248	3	3.427	88.72	85.73	85.85	93.31	88.5	94.72	97.43	95.27	92.67	92.02	88.23
348A	0	1.343	3	1.343	86.55	85.65	76.45	83.77	84.08	81.08	91.59	81.63	69.29	57.85	78.32
348A	1.343	3.253	3	1.91	77.97	78.28	70.82	83.06	81.21	80.32	90.16	81.02	60.68	52.58	92.79
348A	3.253	4	3	0.747	73.67	67.2	50.16	66.31	85.49	73.54	92.3	92.83	78.63	74.74	86.09
348A	4	7.335	3	3.335	78.75	79.68	70.58	85.57	88.79	84.85	91.77	91.92	71.81	67.74	93.01
348A	7.335	11.389	3	4.054	70.97	76.23	59.68	81.93	82.48	72.68	87.03	78.83	53.8	50.98	95.05
348A	11.389	12.918	3	1.529	69.42	74.67	68.6	65.54	75.99	67.2	86.81	85.89	45.09	27.33	91.81
348A	12.918	14.401	3	1.483	82.05	77.84	75.31	69.42	80.91	74.29	89.07	78.38	53.1	69.46	94.11
350A	23.99	56.237	2	32.247	87.2	79.73	75.5	88.06	83.74	87.33	94	77.41	66.13	78.77	76.58
350A	56.237	59.412	2	3.175	93.1	92.77	87.16	93.63	93.71	92.68	95.7	87.86	68.99	81.81	82.56
350A	59.412	69.692	2	10.28	86.66	73.65	74.25	93.56	93.46	91.09	94.88	90.77	82.96	89.27	87.14
350A	69.692	72.021	2	2.329	76.64	63.71	71.97	89.33	83.9	82.24	88.57	99.9	99.92	99.4	99.22
350A	72.021	72.315	2	0.294	69.85	47.25	42.9	98.3	84.4	80.05	84.38	100	95.2	100	100
350A	72.315	72.444	2	0.129	77.5	72.8	69.2	54.6	62.2	60.9	81.5	100	96.3	95.5	96.4
350A	72.444	72.577	2	0.133	66.7	76.3	56.5	69.9	83.2	81.2	74.7	98.8	Missing	94.5	94.2
368A	0	5.021	5	5.021	80.79	65.76	64.8	80.8	79.01	80.88	82.27	71.19	59.5	66.63	63.15
368A	6.022	12.329	5	6.307	64.93	46.32	56.02	82.94	65.07	70.82	76.81	80.45	17.93	23.3	26.68
370A	2.968	3.996	5	1.028	89.87	81.76	81.31	78.87	78.43	79.39	86.34	72.14	62.39	66.9	59.43

ROUTE	REFPT	END REFPT	Region	LENGTH	Transv 2006	Transv 2007	Transv 2008	Transv 2009	Transv 2010	Transv 2011	Transv 2012	Transv 2013	Transv 2014	Transv 2015	Transv 2016
370A	3.996	5.975	5	1.979	77.72	82.11	69.79	80.72	77.57	80.42	85.63	68.68	53.69	62.74	52.48
370A	12.074	14.115	5	2.041	75.6	73.23	69.89	77.41	76.21	79.45	88.42	72.2	61.46	69.16	65.76
385C	167.117	175.939	4	8.822	96.85	96.1	95.86	95.57	94.42	93.56	96.21	92.02	85.43	80.6	83.17
385E	313.849	317.631	4	3.782	86.14	89.77	86.33	89.76	88.61	88.1	93.34	86.98	81.7	82.46	76.64
389A	0	1.894	2	1.894	88.02	91.64	86.21	97.06	90.37	92	94.58	87.17	73.59	81.22	84.73
389A	1.894	12.803	2	10.909	78.87	74.68	78.27	82.31	76.12	80.12	92.39	87.55	65.61	78.06	70.78
394A	3.933	9.378	3	5.445	86.96	93.62	91.73	87.32	84.02	87.61	94.79	86.04	83.59	79.01	72.66

Appendix A-4: Historical Pavement Performance of Colorado Low-Volume Paved Roads “Ride Index”

ROUTE	REFPT	END REFPT	Region	LENGTH	Ride 2006	Ride 2007	Ride 2008	Ride 2009	Ride 2010	Ride 2011	Ride 2012	Ride 2013	Ride 2014	Ride 2015	Ride 2016
005A	0	14.894	1	14.894	Missing	60.54	57.02	96.1	53.21	55.35	49.83	Missing	53.47	58.55	59.26
006A	11.08	11.179	3	0.099	Missing	Missing	Missing	Missing	76.1	74.4	75.1	74.8	73.4	91.4	79.4
006A	11.179	11.825	3	0.646	73.28	66.73	68.65	65.13	61.85	62.02	61.83	58.47	70.77	76.42	77.53
006A	11.825	13.867	3	2.042	78.7	78.89	76.24	75.95	75.14	74.04	72.74	71.75	70.26	79.23	78.14
006C	43.387	45.584	3	2.197	87.3	86.36	86.68	85.69	85.93	85.56	85.07	84.04	82.92	91.15	90.64
006C	45.584	46.058	3	0.474	88.1	83.03	84.6	83.15	81.68	80.9	83.63	81.95	79.5	87.8	88.08
006I	343.7	344.712	4	1.012	78.27	76.18	76.13	72.67	69.95	69.81	71.77	74.62	73.83	81.54	81.33
006I	345.928	346.425	4	0.497	77.03	73.13	75.9	69.95	70.9	70.13	69.26	67.25	68.7	73.5	71.18
006Z	0.445	0.604	4	0.159	Missing	70.2	70.9	84.7	40	42.2	42.3	25.8	21.3	34.5	31.4
007A	3.879	14.91	4	11.031	76.6	74.84	75.32	74.27	73.77	70.57	72.11	71.29	71.9	80.08	79.16
007A	14.91	16.086	4	1.176	79.78	72.86	77.17	76.89	75.31	75.07	74.41	76.12	77.31	84.89	82.1
007A	16.086	19.249	4	3.163	79.14	76.68	78.33	79.28	78.2	77.66	80.04	77.98	76.49	86.26	83.74
007A	19.249	32.649	4	13.4	78.57	85.4	85.89	85.44	84.98	85.52	85.75	85.34	80.04	87.33	87.64
007E	0	0.57	4	0.57	67.06	50.18	63.12	52.38	48.32	44.7	43.76	41.6	36.22	47.14	46.38
007E	0.57	1.592	4	1.022	71.41	57.73	70.13	64.09	64.86	61.73	63.23	61.78	59.51	69.53	67.11
009A	21.246	44.929	2	23.683	77.51	76.91	75.57	74.36	71.05	73.97	69.16	87.48	86.43	93.89	92.26
009A	44.929	46.98	2	2.051	83.1	80.97	82.41	79.86	74.49	80.43	73.38	86.68	86.65	94.67	93.08
010A	68.016	71.026	2	3.01	78.31	79.73	77.79	78.14	78.14	78.6	77.17	77.59	77.55	84.63	84.23
011A	0	0.41	4	0.41	86.03	85.33	82.05	80.78	75.83	73.75	69.73	72.23	72.75	78	78.73
011A	0.41	1.35	4	0.94	82.81	82.01	76.86	74.56	71.99	71.25	75.91	75.28	73.99	82.85	81.5
012A	0	4.6	2	4.6	84.32	83.72	83.94	83.08	83	82.82	83.35	82.7	82.99	89.77	88.83
012A	15.238	33.058	2	17.82	79.58	80.61	81.39	80.71	78.73	78.92	76.91	79.94	77.36	86.65	85.15
012A	33.058	43.031	2	9.973	82.24	81.58	81.47	80.05	79.74	79.42	79.13	79.29	78.53	85.68	83.9
012A	43.031	56.848	2	13.817	80.51	80.69	79.74	79.75	80.03	79.98	79.53	79.56	79.01	86.04	85.25
014B	51.317	71.538	3	20.221	74.76	81.1	77.05	74.58	77.5	79	79.65	80.91	82.05	87.3	86.99
014B	71.538	90.959	4	19.421	81.2	81.36	80.89	79.77	83.92	83.94	84.07	84.87	85.4	92.39	91.81
015A	2.393	8.419	5	6.026	77.97	73.28	76.53	77.03	76	78.33	79.22	78.52	78.85	87.67	84.86
015A	8.419	10.412	5	1.993	71.32	64.42	68.87	58.53	56.57	51.88	68.78	83.8	82.96	89.6	88.18
015A	10.412	12.374	5	1.962	71.47	69.97	69.98	63.64	64.9	59.86	60.09	63.68	81.21	91.43	90.76

ROUTE	REFPT	END REFPT	Region	LENGTH	Ride 2006	Ride 2007	Ride 2008	Ride 2009	Ride 2010	Ride 2011	Ride 2012	Ride 2013	Ride 2014	Ride 2015	Ride 2016
015B	22.484	26.562	5	4.078	80.3	82.82	79.33	80.07	75.87	78.44	78.22	82.3	81.12	87.88	84.25
017A	0	17.28	5	17.28	77.59	78.2	76.59	75.01	72.35	73.05	70.94	72.79	81.68	88.39	87.85
023A	0	9.571	4	9.571	78.1	79.29	77.49	75.57	74.07	75.56	69.89	71.93	70.56	77.76	71.96
023A	16	17.507	4	1.507	72.25	71.23	72.63	77.07	71.91	75.31	72.29	72.07	70.63	80.19	74.56
024B	419.95	422.707	4	2.757	68.97	68.47	68.31	66.55	64.33	65.24	64.99	69.07	62.68	77.75	80.3
024B	422.707	423.059	4	0.352	71.7	63.75	67.1	62.45	57.3	61.3	58.85	71.05	84.05	59.25	67.05
024B	423.059	429.604	4	6.545	76.11	75.06	71.98	72.98	71.94	72.9	70.28	72.44	67.12	78.91	79.55
024B	429.604	436.576	4	6.972	73.03	71.28	71.69	69.7	69.96	69.04	68.22	72.58	67.26	77.65	81.68
024C	437.453	446.851	4	9.398	73.12	73.09	74.25	67.59	70.84	71.31	70.94	79.64	76.78	83.95	83.03
024C	451.87	453.869	4	1.999	74.62	74.32	75.35	69.95	70.47	79.94	80.75	79.46	75.84	84.54	81.48
024D	456.02	456.722	4	0.702	78.65	65.56	76.1	60.12	60.27	77.1	80.91	71.2	70.13	73.4	70.35
024E	0	0.619	2	0.619	80.12	78.27	77.67	75.9	77.1	78.32	75.99	78.03	73.51	78.08	100
025B	0	0.046	2	0.046	75.7	82.2	75.6	74.7	74.5	74.8	68.6	69.2	35.7	69.5	83.7
025B	0.046	1.58	2	1.534	84.62	84.1	84.43	80.96	81.51	80.55	80.67	81.35	83.96	91.02	91.54
025B	1.58	1.948	2	0.368	79.37	80.33	79.53	81.57	82.43	82.9	76.52	76.9	78.17	83.73	83
036C	76.394	76.467	1	0.073	68.1	62.5	68.1	67	47.1	66.8	41.2	42.4	75.2	63.4	75.6
036C	76.467	78.69	1	2.223	77.62	73.05	76.1	75.89	75.73	74.03	85.43	85.29	84.38	92.03	91.74
036C	78.69	79.73	1	1.04	76.51	71.64	74.22	72.82	73.27	71.14	86	86.29	85.11	93.28	92.61
036C	80.815	83.71	1	2.895	80.36	77.01	77.93	78.56	78.59	78.17	86.02	85.71	85.03	92.8	92.74
039A	3.353	7.571	4	4.218	77.36	77.34	76.2	76.1	76.11	75.48	73.43	74.69	72.18	80.48	75.51
040B	272.552	276.18	1	3.628	68.2	Missing	75.21	68.68	71.06	70.43	76.33	70.45	74.38	82.29	81.77
040C	279.244	281.82	1	2.576	80.22	77.17	79.44	76.79	76.37	78.71	79.28	78.54	78.92	88.37	88.31
040E	346.29	350.601	1	4.311	72.61	65.63	67.56	68.1	69.31	69.74	66.83	68.74	84.77	92.72	91.98
040E	350.601	350.862	1	0.261	66.2	64.7	59.7	67.6	65	63.6	63.35	65	82.8	89	89.8
040E	350.862	351.136	1	0.274	65.75	52	65.65	45.45	49.9	44.25	45.48	61.2	71.9	82.1	80
040E	351.136	352.245	1	1.109	80.88	71.88	77.68	73.03	74.03	72.77	74.05	73.8	67.78	77.31	79.6
040F	360.201	362.999	4	2.798	80.68	72.12	Missing	74.09	74.68	74.19	73.12	71.79	68.79	78.98	77.77
040G	380.689	381	4	0.311	Missing	Missing	Missing	Missing	74.97	66.73	71.6	72.5	75.63	79.13	78.03
040G	381	382.184	4	1.184	68.11	76.69	78.39	79.56	79.38	79.54	78.53	78.11	76.09	82.37	81.51
041A	0	9.505	5	9.505	74.52	74.56	74.79	74.17	74.94	74.67	72.92	73.62	71.54	80.66	78.68
046A	0	3.85	1	3.85	77.82	76.11	77.16	74.59	74.62	73.49	75.57	73.57	74.6	80.74	83.73
046A	3.85	5.99	1	2.14	78.71	78.99	81.79	80.43	79.55	78.53	80.62	77.87	79.39	84.89	88.85
046A	5.99	6.61	1	0.62	81.74	80.67	78.32	80.15	80.15	80.47	79.45	78.65	79.58	85.75	88.7
050C	15.669	16.948	2	1.279	81.13	80.38	80.04	78.13	78.48	77.93	78.83	78.83	78.58	87.36	86.98

ROUTE	REFPT	END REFPT	Region	LENGTH	Ride 2006	Ride 2007	Ride 2008	Ride 2009	Ride 2010	Ride 2011	Ride 2012	Ride 2013	Ride 2014	Ride 2015	Ride 2016
050D	0	0.852	3	0.852	74.49	72.11	71.03	70.61	69.76	68.3	65.26	66.53	65.01	73.24	74.7
050D	0.931	1.539	3	0.608	70.44	67.94	67.1	66.94	58.04	66.5	63.46	62.34	66.14	68.14	84.72
052A	58.89	60.9	4	2.01	82.58	80.6	80.15	76.34	76.19	74.09	71.67	70.26	70.9	75.45	72.58
052A	60.9	70.895	4	9.995	79.21	80.26	76.37	77.6	77.38	76.69	71.96	74.11	73.15	80.73	76.75
055A	0	0.162	4	0.162	83.4	83.6	83.1	67	55.7	56.1	47.9	62.1	77	66.1	86.2
055A	0.162	2.417	4	2.255	79.23	77.51	77.81	74.2	73.83	72.41	71.63	70.41	68.51	79.13	80.96
059A	15.019	33	4	17.981	84.09	83.58	83.45	82.08	82.32	81.62	81.49	81.09	79.42	87.12	86.77
059A	33	40.963	4	7.963	83.66	83.88	83.2	82.33	82.77	81.53	81.24	81.59	79.19	88.22	87.08
059B	74.474	87.535	4	13.061	86.31	80.33	85.32	81.63	80.84	80.55	81.27	79.7	78.22	85.72	82.71
059B	122.864	130.588	4	7.724	85.73	85.3	86.46	85.52	83.14	85.24	85.82	85.58	84.26	92.7	90.56
059B	130.588	145.517	4	14.929	87.19	86.93	86.92	86.09	83.54	85.53	86.03	86.05	84.5	92.84	90.73
059B	147.149	147.218	4	0.069	78.5	77.6	79.4	84.4	84.4	85.2	81.2	24	63.1	76.7	91.6
059B	147.218	147.507	4	0.289	72.35	76.05	70.65	38.2	59.4	59	39.55	71.25	73.75	77.45	72.9
059B	147.814	155.594	4	7.78	87.76	88.01	87.39	87.26	86.35	86.77	86.36	86.56	85.48	93.73	92.1
059B	155.594	159.68	4	4.086	85.77	87.3	85.54	86.66	84.94	85.52	85.81	86.88	85.55	94.06	92.68
059B	159.68	166.498	4	6.818	80.53	81.07	80.11	80.34	80.1	80.49	79.82	79.95	78.15	87.39	85.58
059B	166.498	171.07	4	4.572	82.14	81.38	81.66	79.71	77.51	79.09	78.56	79.48	77.07	85.88	82.34
059B	171.07	173.337	4	2.267	83.41	84.12	81.86	80.3	78.54	79.2	76.89	77.53	76.39	84.93	85.87
061A	8.062	14.03	4	5.968	81.37	81.04	79.36	78.17	77.23	75.47	77.43	77.31	76.37	83.14	80.05
061A	14.03	22.511	4	8.481	84.66	83.58	84.01	81.9	80.3	80.88	82	81.8	80.87	87.74	85.89
063A	5.08	11.136	4	6.056	83.64	77.91	79.48	75.23	73.9	74.68	75.65	74.98	74.17	80.19	76.46
063A	11.136	24.196	4	13.06	82.08	77.57	79.79	77.53	77.27	77.3	76.61	75.74	75.07	81.96	77
063A	29.006	29.49	4	0.484	63.7	64.13	58.63	56.33	55.3	56.37	52.63	74	73.13	80.87	84.43
063A	29.49	39.256	4	9.766	83.25	85.69	83.92	84.39	82.93	83.66	83.04	83.55	82.36	89.24	86.05
063A	39.256	48.2	4	8.944	86.61	85.93	85.4	84.6	84.65	84.83	84.79	84.55	83.84	91.36	88.47
063A	48.2	53.29	4	5.09	86.78	85.8	86.36	84.33	84.72	84.73	85.31	85.14	84.77	92.4	90.77
065A	14.35	26.866	3	12.516	74.72	82.38	83.87	96.1	81.5	82.06	81.02	83.17	82.22	89.56	89.72
065A	26.866	36.175	3	9.309	77.09	83.47	82.33	96.1	74.87	73.48	74.3	79.83	79	86.19	87.08
065A	36.175	49.565	3	13.39	73.57	82.24	81.73	82.14	78.88	79.25	79.17	78.94	77.58	85.71	84.53
065A	49.565	51.169	3	1.604	79.39	77.01	77.51	71.45	70.84	70.03	69.47	66.45	63.23	72.24	71.17
067A	0	6.835	2	6.835	77.02	77.1	76.25	76	75.33	75.83	75.8	75.52	73.75	82.98	81.67
067C	45.56	45.686	2	0.126	56.3	57.6	59.6	54.1	52.1	56.1	62.7	56.6	64.6	63.6	68
067C	45.686	50.73	2	5.044	78.65	79.97	78.19	77.21	76.57	79.75	77.72	74.65	78.8	86.35	86.29
067D	91.241	100.036	2	8.795	80.89	78.71	78.82	77.64	76.97	78.11	78.2	76.3	77.29	85.24	84.07

ROUTE	REFPT	END REFPT	Region	LENGTH	Ride 2006	Ride 2007	Ride 2008	Ride 2009	Ride 2010	Ride 2011	Ride 2012	Ride 2013	Ride 2014	Ride 2015	Ride 2016	
067E	117.349	122.311	1	4.962	73.51	76.87	73.79	73.26	68.56	75.7	69.48	70.83	71.75	74.46	81.64	
069A	0	5.306	2	5.306	81.56	80.89	81.73	80.04	79.02	78.67	79.78	79.53	79.5	87.16	85.61	
069A	9.668	25.017	2	15.349	76.29	81.68	82.07	81.04	80.71	81.57	81.18	81.2	80.14	87.78	86.88	
069A	25.017	26.042	2	1.025	69.96	77.7	79.56	76.61	76.53	77.87	78.81	76.87	75.94	83.87	83.69	
069A	26.042	49.423	2	23.381	72.83	72.87	71.17	71.26	70.22	71.02	69.82	71.95	72.82	81.15	79.78	
069A	49.423	54.125	2	4.702	72.62	72.62	71.42	69.28	72.79	74.26	72.79	73.56	72.98	79.93	77.03	
069A	71.566	82.664	2	11.098	82.65	80.58	79.21	78.45	76.86	77.9	76.65	76.24	76.54	82.97	80.1	
070K	0	0.723	1	0.723	Missing	Missing	Missing	Missing	Missing	Missing	Missing	65.04	65.5	67.43	71.91	73.09
070N	0	0.133	1	0.133	Missing	Missing	Missing	Missing	Missing	Missing	Missing	23.65	30.7	66	71.4	64.1
070N	0.133	0.396	1	0.263	Missing	Missing	Missing	Missing	Missing	Missing	Missing	68.4	71.1	61.8	72.1	72
070O	0	0.353	4	0.353	Missing	Missing	Missing	Missing	Missing	Missing	Missing	47.68	54.77	56.63	63.53	72.37
070P	0	0.04	4	0.04	Missing	Missing	Missing	Missing	Missing	Missing	Missing	58.8	52.3	69.9	67.3	77.5
070P	0.04	0.528	4	0.488	Missing	Missing	Missing	Missing	Missing	Missing	Missing	66.54	67.83	72.03	80.15	83.03
071A	0	7.036	2	7.036	75.44	77.83	75.3	76.69	76.36	76.98	74.69	76.17	75.93	83.37	82.87	
071A	7.036	9.032	2	1.996	77.68	78.34	76.85	77.03	76.24	77.23	74.29	75.16	75.31	81.53	81.41	
071B	9.601	11.614	2	2.013	83.36	84.44	82.01	82.82	83.16	83.65	82.71	83.29	82.43	89.95	89.49	
071B	11.614	13.747	2	2.133	82.27	83.43	81.14	82.17	82.34	82.8	82.14	82.49	82.02	89.31	88.82	
071B	13.747	14.076	2	0.329	79.85	80.8	78.1	80	80.05	80	80.3	78.9	80.5	87.25	87.55	
072A	25.608	29.378	1	3.77	84.2	82.97	83.54	81.16	79.48	81.71	83.09	77.66	82.12	89.17	88.6	
072B	44.095	48.353	4	4.258	71.41	70.66	70.39	67.97	67.85	61.85	65.13	66.08	66.53	71.46	70.53	
072B	48.353	54.064	4	5.711	79.26	79.81	79.12	78.79	79.04	75.29	77.06	76.67	77.54	83.76	83.61	
078A	0	9	2	9	Missing	Missing	45.11	Missing	62.08	Missing	70.13	59.7	68.8	60.44	Missing	
078A	9	12.71	2	3.71	75.39	74.9	71.76	73.51	69.12	71.54	78.34	74.22	78.26	85.75	85.8	
078A	14.586	15.532	2	0.946	87.07	87.42	86.29	87.14	86.73	87.19	86.08	86.47	84.78	93.4	92.62	
078A	15.532	18.192	2	2.66	87.71	87.76	84.71	86.74	87.08	87.08	85.56	86.47	84.76	93.8	92.76	
078A	18.192	29.903	2	11.711	84.06	83.33	83.32	82.74	82.99	82.8	82.64	82.38	79.79	88.94	87.26	
078B	0	1.493	2	1.493	74.87	69.64	73.99	72.58	71.47	75.71	77.81	76.33	75.02	82.28	82.02	
082A	42.471	51.254	3	8.783	Missing	67.71	68.06	83.27	62.41	63.76	65.27	Missing	62.31	69.56	68.14	
082A	51.254	79	3	27.746	Missing	67.06	66.07	85.06	65.24	66.68	67.2	68.68	67.65	76.22	75.5	
082A	79	83.47	3	4.47	Missing	80.43	Missing	78.93	78.73	79.71	77.79	79.47	77.17	84.88	86.54	
082A	83.47	85.293	3	1.823	Missing	66.45	Missing	63.94	65.22	63.36	57.97	70.01	78.98	78.79	84.4	
086A	27.718	32.248	4	4.53	77.77	75.02	76.59	72.93	71.77	72.48	85.77	84.38	83.11	91.11	91.12	
086A	32.248	51.167	4	18.919	72.09	73.44	75.16	71.19	69.4	70.44	71.57	67.79	68.84	85.03	84.31	
086A	51.167	59.279	4	8.112	76.18	74.24	75.14	73.65	73.07	73.04	72.55	72.29	69.96	80.21	82.76	

ROUTE	REFPT	END REFPT	Region	LENGTH	Ride 2006	Ride 2007	Ride 2008	Ride 2009	Ride 2010	Ride 2011	Ride 2012	Ride 2013	Ride 2014	Ride 2015	Ride 2016
089A	0	8.976	2	8.976	74.72	74.97	82.69	81.68	80.9	80.99	79.95	78.08	78.72	86.08	86.36
089A	8.976	18.57	2	9.594	66.97	65.7	85.73	86.02	85.85	86.16	84.91	85.1	84.6	91.41	91.19
089A	18.57	21.549	2	2.979	62.19	64.39	86.79	86.64	86.83	86.94	85.87	85.87	85.28	91.78	91.41
089A	21.549	33.183	2	11.634	74.5	74.3	86.23	86.49	86.57	86.91	86.55	86.42	85.75	93.35	92.58
090A	0	9.493	5	9.493	75.06	72.81	73.74	72.26	73	73.96	74.15	73.44	71.93	78.75	78.96
090A	9.493	14.797	5	5.304	71.83	68.4	69.62	68.73	70.6	70.39	70.85	68.97	70.73	78.81	80.24
090A	14.797	33.874	5	19.077	74.48	75.93	73.6	74.04	74.93	76.25	75.24	75.84	74.72	83	81.39
090B	81.533	81.737	3	0.204	Missing	Missing	Missing	Missing	77.3	77.3	77.6	75.6	70.5	76.7	77
090B	81.737	84.884	3	3.147	74.66	76.61	73.54	74.05	75.05	73.3	71.06	73.94	71.12	78.95	78.56
090B	84.884	86.058	3	1.174	73.32	74.17	72.28	72.22	70.55	71.97	71.27	71.48	73.18	79.19	78.77
090B	86.058	86.931	3	0.873	77.99	75.93	75.64	73.45	73.39	72.06	82.14	82.08	81.83	88.48	89.2
090B	86.931	87.914	3	0.983	84.56	85.5	83.14	84.72	83.48	83.44	82.14	84.32	82.08	89.32	90.24
092A	27.082	30.11	3	3.028	77.64	74.22	76.9	74.34	72.98	73.89	74.01	73.28	72.84	78.94	79.54
092A	31.525	33.643	3	2.118	81.9	80.91	81.21	78.46	78.44	78.43	77.47	76.95	77.66	85.14	83.68
092A	33.643	36.577	3	2.934	84.41	82.98	83.31	81.29	80.93	81.03	80.67	79.83	78.23	85.31	84.18
092A	36.577	71.819	3	35.242	82.95	81.53	82.03	79.83	75.98	79.6	79.01	78.06	77.04	84.28	83.54
092A	71.819	73.259	3	1.44	84.5	82.65	83.08	80.63	72.88	81.1	79.5	78.83	78.78	81.19	85.11
094A	33.079	45.054	4	11.975	77.03	76.71	75.73	75.37	74.72	74.59	73.78	72.89	72.54	80.52	81.57
094A	45.054	54.581	4	9.527	76.97	76.89	76.05	75.26	75.32	75.86	75.78	75.41	74.43	83.35	81.91
094A	54.581	86.174	4	31.593	75.31	75.78	73.86	72.63	73.13	72	69.79	70.28	69.26	77.36	76.21
096A	1.313	11.064	2	9.751	79.61	80.03	77.66	78.16	76.86	76.79	74.59	75.8	75.51	82.58	79.8
096A	26.273	33.575	2	7.302	70.72	69.91	68.33	68.07	67.55	66.33	67.21	66.23	68.3	86.31	85.3
096A	33.575	42.21	2	8.635	75.95	75.93	73.6	74.19	73.93	73.13	72.11	72.81	73.34	88.6	87.53
096B	70.573	75.496	2	4.923	77.59	76.15	76.86	74.87	75.9	75.31	75.05	74.3	73.93	80.91	80.09
096C	119.491	143.78	2	24.289	70.16	69.65	68.7	69.02	71.94	71.34	72.28	72.61	72.55	80.49	83.22
097A	0.32	3.932	5	3.612	75.66	74.04	73.98	72.56	72.1	72.21	71.98	72.19	69.91	79.2	77.75
097A	3.932	4.584	5	0.652	71.68	69.21	68.44	72.88	72.76	72.28	69.12	68.08	67.23	77.64	75.28
100A	0	0.279	2	0.279	86.05	Missing	85.85	78.15	75.3	71.4	75.6	76.05	80.9	83.9	87.45
100A	0.279	0.419	2	0.14	Missing	Missing	79	82.2	77.2	76.7	76.85	76.6	56.4	82.5	79
101A	0.404	1.151	2	0.747	76.02	72.37	75.62	83.45	83.55	83.25	82.93	82.58	82.8	91.03	90.72
101A	1.151	5.151	2	4	78.23	75.08	74.71	70.75	71.25	70.47	73.97	73.98	73.62	80.36	80.43
101A	5.151	16.45	2	11.299	75.21	75.08	74.97	73.93	74.61	75.21	74.08	74.4	73.42	80.87	80.25
101A	16.45	21.413	2	4.963	75.47	72.92	74.91	71.48	71.51	72.55	72.87	71.92	71.8	78.07	79.42
103A	6.7	13.265	1	6.565	71.68	72.62	72.9	70.6	70.44	71.61	69.69	74.5	73.17	78.38	89.02

ROUTE	REFPT	END REFPT	Region	LENGTH	Ride 2006	Ride 2007	Ride 2008	Ride 2009	Ride 2010	Ride 2011	Ride 2012	Ride 2013	Ride 2014	Ride 2015	Ride 2016
103A	13.265	22.488	1	9.223	71.42	72.75	72.81	69.89	71.59	72.93	75.21	Missing	84.06	89.7	89.15
105A	9.211	9.48	2	0.269	82.4	78.8	82.2	79.3	79.1	79.7	81.2	80.6	79.8	87.7	87.1
109A	0	7.722	2	7.722	80.42	81.44	79.15	79.51	78.36	77.97	75.36	76.79	75.98	82.25	84.19
109A	7.722	53	2	45.278	74.61	74.62	82.41	81.51	81.17	81.51	80.71	80.07	79.49	87.03	87.19
109A	53	54.79	2	1.79	81.51	82.31	86.24	87.19	87.38	87.42	86.6	87.08	85.77	93.92	93.64
109A	64.748	65.327	2	0.579	78.2	82.46	78.66	81.68	81.42	75.36	76.93	79.2	Missing	83.98	84.2
110A	0	0.14	5	0.14	76.9	85.5	83.3	70.7	68.6	71	71.9	77.5	73.2	74.1	83.4
114A	0	19	5	19	84.76	85.07	84.05	82.06	75.05	82.03	76.47	81.63	82.83	89.9	88.34
114A	19	20.261	5	1.261	81.97	81.23	79.72	78.71	77.5	78.43	78.5	78.48	77.44	84.28	80.89
114A	20.261	56.043	5	35.782	83.01	83.07	81.22	80.72	74.42	78.13	73.85	77.03	77.63	84.98	82.93
114A	56.043	61.453	5	5.41	81.92	82.49	81.35	81.29	79.44	80.68	80.06	80.35	79.93	87.17	84.5
116A	0	12.042	2	12.042	76.82	76.89	75.96	74.48	75.32	76.93	76.27	75.99	76.01	83.67	83.31
116A	12.042	12.299	2	0.257	67.1	77.9	71	73.3	77	76.7	71.9	77.2	78.5	85	83.7
116A	12.299	13.055	2	0.756	71.93	75.84	70.21	74.66	76.03	75.4	73.68	76.44	78.39	85.79	86.07
116A	13.055	20.029	2	6.974	73.13	71.57	73.11	70.23	70.82	70.8	74.96	75.27	77.56	86.83	86.27
116A	20.029	27.02	2	6.991	68.88	68.96	70.23	70.35	70.84	72.97	73.37	73.18	72.36	80.17	79.92
116A	27.02	32.322	2	5.302	73.06	68.96	70.8	71.67	73.02	73.11	75.59	77.71	77.9	85.72	85.48
120A	0	3.105	2	3.105	67.61	70.83	63.53	68.3	69	68.25	65.4	68.95	70.07	75.83	74.24
120A	3.105	7.186	2	4.081	58.43	58.39	56.21	53.58	54.84	54.75	61.53	67.64	71.84	78.4	78.3
125A	0	29.46	3	29.46	78.46	76.91	76.63	71.52	76.65	79.31	79.84	80.96	79.71	86.82	86.08
125A	29.46	31.504	3	2.044	80.17	76.32	78.01	71	73.46	74.77	76.84	75.61	77.24	87.34	86.31
125A	31.504	35.582	3	4.078	78.27	72.84	76.76	70.03	71.1	77.19	77.24	79.42	75.75	85.3	85.76
125A	35.582	52.02	3	16.438	76.24	75.69	76.29	71.61	72.62	71.13	72.35	71.87	69.1	76.09	78.61
125A	66.558	75.406	3	8.848	74.73	78.7	85.8	83.62	84.33	85.17	85.47	84.89	83.43	91.25	91.14
131B	13.709	32.904	3	19.195	85.01	84.58	84.39	83.62	84.08	84.62	84.19	84.34	83.39	91.14	90.47
131B	32.904	38.441	3	5.537	86.19	86.44	85.15	82.61	82.07	83.97	84.25	83.34	80.75	89.44	88.07
131B	38.441	42.05	3	3.609	87.81	87.49	86.92	83.4	84.61	86.18	86.04	85.55	83.31	92.3	91.11
131B	51.859	52.081	3	0.222	86.4	85	84.7	82.4	83.1	82.7	77.35	81.9	75.9	85.2	89.6
133A	24	46.371	3	22.371	86.15	86.28	85.28	84.82	85.33	85.57	85.45	84.95	83.42	91.72	91.17
133A	46.371	51.357	3	4.986	79.34	79.53	78.36	74.85	76.89	79.9	79.67	80.15	79.65	87.24	89.32
133B	13.267	16.076	3	2.809	Missing	Missing	Missing	Missing	Missing	Missing	55.28	54.93	57.23	60.86	64.06
134A	0	16.32	3	16.32	76.71	85.2	85.72	80.84	81.14	82.45	83.19	84.14	83.43	90.26	90.13
134A	16.32	27.163	3	10.843	73.39	84.93	84.37	81.31	81.48	82.86	82.83	83.5	82.48	89.7	88.31
136A	0	0.152	5	0.152	84.3	51.9	80.6	47.4	40.9	44.9	43.3	52.4	74.6	71.4	79.3

ROUTE	REFPT	END REFPPT	Region	LENGTH	Ride 2006	Ride 2007	Ride 2008	Ride 2009	Ride 2010	Ride 2011	Ride 2012	Ride 2013	Ride 2014	Ride 2015	Ride 2016
136A	0.152	0.553	5	0.401	78.63	78.1	67.5	75.47	72.7	75.07	75.95	75.33	74.57	75.37	82.3
136A	0.553	1.579	5	1.026	82.11	83.14	78.03	81.4	77.96	80.41	80.17	78.9	78.6	86.22	83.41
136A	3.48	4.469	5	0.989	80.99	77.2	79.34	75.82	72.04	75.64	76.06	75.64	74.91	82.74	80.46
138A	21.739	26.329	4	4.59	84.55	83.22	84.04	82.72	81.44	81.82	82.62	82.25	81.61	88.96	87.28
138A	26.329	27.503	4	1.174	86.55	87.55	86.05	85.86	83.46	84.8	85.77	85.74	84.76	90.7	89.53
138A	27.503	27.911	4	0.408	84.2	84.23	83.17	82.93	81.37	82.57	82.47	82.57	82.3	89.87	89.47
138A	27.911	34.981	4	7.07	85.02	86.19	84.72	84.85	81.46	84	84.08	84.46	83.5	90.49	88.59
138A	34.981	41.385	4	6.404	79.33	83.65	82.05	82.9	81.26	82.66	80.12	81.7	80.07	88.83	85.56
138A	41.385	43.023	4	1.638	80.22	79.18	79.25	78.64	77.39	78.09	74.09	77.42	74.58	92.29	90.48
138A	43.023	43.084	4	0.061	79.9	80.7	83.1	83.3	79.9	82.4	85.9	85.3	83.7	53.4	90.5
138A	43.084	43.413	4	0.329	79.97	79.27	77.5	78.27	76.63	85.4	85.3	84.47	85.53	90.57	90.23
138A	50.476	50.633	4	0.157	75.4	76.4	76.4	74.2	72.3	74.1	75	74.8	76.5	78.7	80
138A	50.633	50.868	4	0.235	88.6	84.7	88.6	84.1	81.3	83.7	73.9	72.9	69.8	76.3	77.2
138A	50.868	54	4	3.132	85.37	84.45	86.27	83.21	82.1	80.46	82.78	81.25	81.59	88.41	87.68
138A	54	54.81	4	0.81	83.66	84.95	83.61	83.34	83.11	83.3	80.81	81.26	81.61	88.95	87.18
138A	58.534	59.823	4	1.289	79.24	80.32	83.63	82.47	78.39	80.63	82.75	82.21	80.68	87.04	84.86
141A	0	9.381	5	9.381	82.65	83.16	81.89	82.24	81.92	81.87	80.79	80.57	79.54	87.75	86.33
141A	9.381	11.271	5	1.89	82.94	83.29	82.23	82.63	83.02	83.03	82.54	82.66	80.93	89.14	89.04
141A	11.271	44.124	5	32.853	74.09	75.28	74.16	75.31	75.84	75.7	74.33	75.11	74.9	83.25	83.06
141A	62.436	64.395	5	1.959	81.68	81.66	80.82	80.49	80.5	80.96	77.34	79.04	76.48	86.49	86.73
141A	64.395	110.525	5	46.13	76.31	77.14	76.69	76.59	77.02	77.06	76.61	76.77	75.87	83.76	82.65
142A	3.276	13.4	5	10.124	79.61	78.35	77.86	75.12	73.55	71.63	71.32	69.4	69.19	76	72.73
142A	13.4	22.958	5	9.558	69.93	69	68.66	69.11	68.24	69.54	71.77	71.71	70.72	79.04	76.59
142A	22.958	28.712	5	5.754	75.6	75.88	77.19	76.08	76.54	74.65	73.45	73.91	72.21	79.62	75.56
142A	28.712	33.84	5	5.128	77.69	77.38	77.2	75.03	74.07	73.05	73.56	72.49	73.17	78.75	75.27
144A	0	0.027	4	0.027	82.2	72	80.1	63.9	60.7	22.8	22.7	25.2	70.8	60.4	68.4
144A	0.027	2.821	4	2.794	83.58	84.53	84.16	84.32	83.48	83.19	80.31	82.45	82.5	88.76	85.92
144A	2.821	10.493	4	7.672	80.64	80.55	81.23	79.94	76.77	78.59	79.19	78.85	77.66	84.81	82.23
144A	10.493	11.062	4	0.569	82.54	84.18	82.94	80.28	76.72	78.02	77.71	80.76	79.74	88.34	87.92
144A	11.062	16.601	4	5.539	82.63	83.84	82.63	82.2	77.56	79.74	79.38	80.1	78.88	85.92	83.13
144A	16.601	20.841	4	4.24	83.35	83.97	83.13	82.64	79.08	80.8	81.05	81.56	80.78	87.67	85.64
144A	26.066	26.887	4	0.821	84.1	86.67	85.13	84.93	82.36	83.16	80.77	82.54	83.03	89.59	86.33
149A	3.45	18.52	5	15.07	86.06	85.88	84.74	84.76	80.67	84.51	81.51	84.02	83.51	92.05	90.71
149A	21.566	21.648	5	0.082	73.8	74.8	79.3	65.3	54.7	63.6	73.5	82.4	81.2	79.4	66.4

ROUTE	REFPT	END REFPT	Region	LENGTH	Ride 2006	Ride 2007	Ride 2008	Ride 2009	Ride 2010	Ride 2011	Ride 2012	Ride 2013	Ride 2014	Ride 2015	Ride 2016
149A	21.648	21.892	5	0.244	81	84.9	79.1	83.6	77.2	83.7	66.8	57.8	77.3	87.1	82.1
149A	21.892	22.887	5	0.995	84.61	83.52	82.49	81.5	73.19	78.32	72.88	75.82	75.24	82.68	80.82
149A	22.887	26.581	5	3.694	82.55	83.25	80.28	80.64	74.18	77.99	73.39	75.98	71.68	80.68	77.75
149A	26.581	27.689	5	1.108	83.76	83.44	80.94	80.31	72.74	78.18	70.3	75.05	70.02	78.58	72.74
149A	27.689	41.477	5	13.788	83.39	83.48	80.91	79.8	74.63	76.9	73.45	75.33	70.88	79.45	74.95
149A	41.477	45.465	3	3.988	70.67	69.16	66.67	65.29	64.27	62.66	59.62	59.3	78.09	83.96	79.78
149A	45.465	62.655	3	17.19	66.23	64.92	62.16	61.87	65.88	63.05	60.39	54.47	68.22	74.8	68.98
149A	62.655	69.851	3	7.196	68.97	67.44	65.34	66.04	69.39	68.11	65.41	66.15	66.65	73.53	70.11
149A	69.851	71.901	3	2.05	76.25	75.53	75.64	73.67	73	73.76	70.74	71.39	70.35	75.76	73.93
149A	72.829	73.207	3	0.378	82.13	80.7	80.27	78.97	77.33	80.3	76.07	80.07	75.17	85.37	83
149A	73.207	100.601	3	27.394	79.75	79.36	78.43	77.52	72.35	76.32	72.65	75.56	75.13	82.59	80.29
149A	100.601	117.522	3	16.921	86.46	86.94	85.51	84.74	79.04	84.26	79.07	83.39	84.09	91.65	90.34
150A	0	13.511	5	13.511	82.15	82.29	81.01	81.18	88.9	88.87	88.34	88.39	87.88	95.27	92.96
150A	13.511	16.114	5	2.603	77.14	78.38	76.97	77.78	88.41	88.61	88.37	88.31	87.48	94.82	92.29
151A	22.731	33.96	5	11.229	72.51	75.52	75.38	74.77	77.26	77.36	76.38	77.99	77.64	84.18	82.61
159A	0	7.009	5	7.009	77.22	77.43	76.97	77.86	76.85	76.34	75.88	75.08	73.65	81	77.63
159A	7.009	13.3	5	6.291	80.33	77.7	79.05	76.47	76.04	75.43	77	75.68	74.71	81.48	79
159A	13.3	17.547	5	4.247	78.13	78.57	77.02	77.03	76.65	77.06	77.62	77.6	76.53	83.53	81.62
159A	17.547	17.789	5	0.242	74.2	46.2	73.3	71	71.4	72	62.15	75.7	85.6	73.9	74.8
159A	18.334	30.959	5	12.625	82.15	81.63	81.08	80.16	78.9	80.09	79.83	80.38	81.14	88.13	84.47
160C	353.65	367.79	2	14.14	80.12	77.78	78.78	75.84	76.17	74.81	73.81	73.53	72.16	80.53	80.18
160C	367.79	375.832	2	8.042	74.25	74.88	76.68	74.9	74.66	74.78	76.25	77.71	77.36	85.97	85.62
160C	375.832	382.774	2	6.942	81.43	79.43	80.71	78.73	78.3	78.55	78.63	77.09	76.2	84.72	84.79
160C	382.774	386.608	2	3.834	79.97	76.58	78.35	76.57	76.68	76.16	76.29	74.95	75.24	81.04	81.63
160C	386.608	403.656	2	17.048	76.93	74.47	75.95	72.75	72.95	72.48	72.46	71.64	70.72	79.54	79.81
160C	403.656	406.685	2	3.029	78.01	77.13	77.56	74.93	75.14	75.09	75.33	74.55	73.97	80.78	87.04
160C	406.685	414.326	2	7.641	78.23	76.44	78.14	75.79	75.38	74.97	74.26	73.9	72.92	80.34	93.15
160C	414.326	414.755	2	0.429	82.47	78.8	76.9	77.33	78.2	76.37	84.23	83.37	80.33	89.53	91.9
160C	414.755	416.531	2	1.776	77.61	74.88	78.42	73.24	72.6	72.68	77.1	75.88	80.32	82.54	93.36
160C	416.531	425.681	2	9.15	79.36	76.84	76.88	73.74	73.6	73.01	71.63	71.57	71.01	77.95	92.82
160C	425.681	441.65	2	15.969	82.56	82.31	81.35	80.36	80.93	81.2	78.77	78.78	77.36	84.56	84.73
160C	441.65	447.59	2	5.94	82.39	81.88	81.28	79.8	79.94	80.17	78.87	78.32	76.76	83.8	84.67
160C	450.97	460.147	2	9.177	85.22	86.01	84.26	83.45	84.27	84.67	83.51	83.34	82.73	90.03	89.66
160C	483.037	484.418	2	1.381	75.1	87.62	84.75	87.22	87.56	87.5	86.19	87.31	85.74	94.5	93.61

ROUTE	REFPT	END REFPT	Region	LENGTH	Ride 2006	Ride 2007	Ride 2008	Ride 2009	Ride 2010	Ride 2011	Ride 2012	Ride 2013	Ride 2014	Ride 2015	Ride 2016
160D	0	0.011	5	0.011	51.7	32.9	50.2	76.6	54.2	36	61.2	82.2	82.1	89.6	82.5
160D	0.011	1.212	5	1.201	80.48	66.4	80.95	78.61	79.66	79.14	76.5	75.64	76.24	84.75	83.69
160D	1.212	1.457	5	0.245	75.9	51.1	74.4	68.1	70.1	67.4	75.55	71.6	70.6	44.3	69
160D	1.457	2.488	5	1.031	78.81	55	77.7	72.22	72.73	71.79	72.6	70.91	70.11	79.18	77.4
165A	0	15.31	2	15.31	84.08	84.88	83.38	82.55	79.69	81.47	79.68	84.46	83.23	91.43	90.91
165A	15.31	18.503	2	3.193	79.76	81.56	79.55	80.31	74.88	79.42	74.6	80.39	79.15	86.62	85.55
165A	18.503	28.558	2	10.055	82.74	84.03	81.4	80.95	79.03	80.25	78.71	82.36	80.55	88.67	87.99
167A	0	1.673	2	1.673	77.82	76.41	74.78	72.56	71.83	73.19	76.52	77.07	77.63	81.24	84.35
167A	1.673	2.005	2	0.332	80.9	78.97	81	70.17	69.47	69.97	66.03	58.83	77.27	84.4	85.3
167A	2.005	2.368	2	0.363	78.75	77.2	79.85	74.35	76.45	76.65	76.65	77.1	75.65	85.25	83.1
167A	2.368	2.905	2	0.537	82.28	79.98	81.8	78.48	78.58	78.18	80.06	80.78	79.76	85.92	87.26
167A	2.905	4.86	2	1.955	76.62	74.92	76.46	72.76	74.03	74.87	74.07	76.32	75.44	82.65	81.78
170A	0	2.157	4	2.157	76.57	76.7	76.15	76.19	75.88	75.39	75.74	75.27	76.3	85.49	84.71
172A	0	2.081	5	2.081	79.82	87.42	88.24	88.83	88.8	87.3	87.31	87.67	87.32	94.34	92.09
183A	0	1	2	1	82.47	81.66	81.59	78.51	79.07	79.46	76.62	75.65	77.55	80.71	86.03
194A	0	3.8	2	3.8	77.41	73.99	77.39	72.41	72.01	72.31	73.08	71.45	84.57	91.07	91.2
194A	3.8	14.678	2	10.878	78.56	78.35	78.1	77.54	77.6	78.06	77.23	77.34	82.98	89.74	89.59
194A	14.678	20.327	2	5.649	74.34	74.44	74.83	72.4	71.33	71.47	69.47	70.66	71.98	78.41	78.84
196A	0	1.6	2	1.6	74.28	73.64	75.37	67.44	67.69	69.92	76.08	76.84	76.18	83.89	83.88
196A	1.6	6.91	2	5.31	75.17	74.35	73.64	73.04	74.64	76.2	77.35	77.52	77.1	84.28	84.09
196A	6.91	8.922	2	2.012	77.01	77.21	75.42	75.85	74.63	76.03	74.46	76.73	74.86	87.02	86.78
202A	0	0.11	2	0.11	60	67.7	67	47.3	30.1	23.7	31.35	40.9	61.6	50.4	89.8
202A	0.11	0.19	2	0.08	60.1	67.7	67	36.6	35.3	23.7	31.3	30.8	76.7	84.3	84.4
202A	0.19	1.22	2	1.03	73.78	74.85	72.05	74.1	73.91	83.28	81.8	82.97	83.09	83.96	87.66
202A	1.22	3.228	2	2.008	72.28	74.45	71.15	74.06	73.53	75.13	71.61	74.27	77.41	75.04	82.31
207A	0	3.513	2	3.513	73.29	69.32	72.09	65.85	65.73	69.83	70.86	70.35	71.23	76.73	79.18
207A	3.513	5.935	2	2.422	71.17	68.64	71.04	69.3	68.39	68.78	67.77	69.08	68.14	74.78	77.7
209A	0	1.387	2	1.387	77.59	76.02	76.91	73.55	73.58	74.56	72.25	74.17	72.69	72.12	80.12
209A	1.387	1.528	2	0.141	79.3	75.6	79	77.6	76.7	78.2	71.3	78.1	82.9	77.9	76.4
239A	0	0.675	2	0.675	71.9	77.22	77.12	71	72.2	76.05	68.81	75.62	73.8	82.77	78.8
239A	0.675	0.972	2	0.297	65.8	80.15	75.7	56.7	55.55	55.5	53.45	68.65	76.1	84.6	84.35
239A	0.972	3.345	2	2.373	75.6	75.67	74.4	73.41	72.21	74.05	72.95	72.4	69.17	78.4	78.34
257B	0.037	0.644	4	0.607	73.64	61.58	70.54	Missing	Missing	61.12	61.27	55.56	47.66	63.5	65.44
257B	0.644	1.146	4	0.502	70.93	63.43	69.73	Missing	Missing	57.2	50.99	48.78	52.1	68.98	70.45

ROUTE	REFPT	END REFPT	Region	LENGTH	Ride 2006	Ride 2007	Ride 2008	Ride 2009	Ride 2010	Ride 2011	Ride 2012	Ride 2013	Ride 2014	Ride 2015	Ride 2016
266A	0	0.06	2	0.06	69.3	81.6	65.8	12.4	43.7	46.1	0	0	77.2	78.1	90.8
266A	0.06	0.217	2	0.157	62.4	75.9	63.6	75.7	67.1	62.5	70.45	77	83.3	90.4	91.3
266A	0.217	1.306	2	1.089	82.84	83.08	82.45	81.82	82.39	82.38	81.68	81.92	81.82	89.07	88.4
266A	1.306	2.964	2	1.658	78.03	77.17	77.67	75.11	75.67	75.89	76.14	77.81	75.54	82.05	81.81
266A	2.964	5.363	2	2.399	77.51	75.8	76.82	73.94	74.12	76.53	75.33	75.72	75.73	82.53	81.5
266A	5.363	9.512	2	4.149	71.14	69.6	69.2	67.83	67.99	68.38	67.09	66.77	66.95	71.69	73.11
266A	9.512	11.516	2	2.004	67.14	71.36	65.84	68.36	68.08	68.06	63.33	67.67	66.81	74.63	76.72
300A	0.465	3.356	3	2.891	76.48	75.24	74.1	68.97	64.94	63.93	69.33	70.1	66.94	74	72.78
317A	0	12.237	3	12.237	61.93	62.34	63.23	59.93	59.48	58.23	59.65	56.78	70.48	78.19	78.56
318A	0	20.562	3	20.562	62.65	60.86	61.22	58.92	59	56.75	56.71	56.45	55.88	64.78	64.84
318A	20.562	54.309	3	33.747	74.35	74.88	74.64	72.98	73.47	72.86	73.24	72.68	71.62	79.88	79.62
318A	54.309	60.697	3	6.388	79.15	78.82	78.19	76.25	76.41	76.1	75.51	73.9	74.01	81.13	81.46
325A	0	4.102	3	4.102	73.56	75.95	77.28	77.43	77.27	77.25	77.03	77.02	75.71	82.39	82.19
325A	4.102	6.977	3	2.875	69.66	67	71.18	69.94	70.12	69.65	69.59	68.53	66.72	73.45	72.99
325A	6.977	11.395	3	4.418	71.37	64.85	68.93	63.76	63.61	62.82	64.06	68.16	73.45	80.11	81.31
347A	0	1.821	3	1.821	73.36	75.92	71.86	72.46	73.41	72.07	71.49	74.13	71.58	80.44	78.95
347A	1.821	5.248	3	3.427	77.39	78.35	77.37	72.85	73.69	73.16	71.32	72.14	77.23	83.99	84.85
348A	0	1.343	3	1.343	72.42	71.52	70.25	65.48	64.62	64.68	63.31	63.85	63.02	69.03	72.95
348A	1.343	3.253	3	1.91	69.69	69.98	69.72	69.15	70.13	68.99	67.16	66.78	63.42	71.05	72.06
348A	3.253	4	3	0.747	64.53	66.94	61.49	62.31	63.76	62.4	58.95	68.99	68.83	75.97	76.43
348A	4	7.335	3	3.335	72.83	72.81	71.9	72.15	72.02	71.18	69.67	69.33	67.78	75.79	76.4
348A	7.335	11.389	3	4.054	70	70.44	66.53	69.58	69.86	69.17	65.71	70.81	68.39	75.43	79.93
348A	11.389	12.918	3	1.529	71.57	69.27	68.84	64.57	63.72	64.5	60.67	60.4	58.36	66.01	82.03
348A	12.918	14.401	3	1.483	71.06	69.75	67.9	67.36	66.51	65.67	64.89	63.03	62.39	76.69	80.57
350A	23.99	56.237	2	32.247	76.82	76.5	75.95	75.01	74.92	75.37	73.79	74.38	73.74	83.93	83.9
350A	56.237	59.412	2	3.175	82.81	82.53	82.85	81.71	81.35	81.47	80.83	80.71	80.32	86.9	85.5
350A	59.412	69.692	2	10.28	77.14	76.78	78.89	79.5	80.35	80.56	79.86	85.98	85.32	92.47	90.96
350A	69.692	72.021	2	2.329	65.81	60.46	76.39	76.76	77.86	77.89	77.37	87.31	87.15	94.47	93.9
350A	72.021	72.315	2	0.294	69.7	64.95	69.9	84.35	83.4	83.75	85.6	88.55	77.8	93.9	94.8
350A	72.315	72.444	2	0.129	69	73	70.2	68.9	70.7	71.3	70.5	87.6	67.6	82.4	85
350A	72.444	72.577	2	0.133	66.5	68.6	64.7	68.9	68.7	66.5	69.3	81.3	Missing	84.7	91.7
368A	0	5.021	5	5.021	78.7	81	79.15	77.87	78.77	77.11	78.46	76.15	75.3	82.98	80.43
368A	6.022	12.329	5	6.307	80.66	80.91	80.77	82.73	80.63	82.24	81.07	81.64	80.28	86.54	85.73
370A	2.968	3.996	5	1.028	87.16	85.42	86.47	85.13	81.39	84.39	84.48	83.67	82.56	89.02	86.7

ROUTE	REFPT	END REFPT	Region	LENGTH	Ride 2006	Ride 2007	Ride 2008	Ride 2009	Ride 2010	Ride 2011	Ride 2012	Ride 2013	Ride 2014	Ride 2015	Ride 2016
370A	3.996	5.975	5	1.979	84.08	86.17	85.55	85.91	79.37	85.23	83.79	83.56	83.74	90.85	87.74
370A	12.074	14.115	5	2.041	75.33	80.68	82.65	81.72	79.56	75.34	75.1	73.44	69.73	79.58	77.18
385C	167.117	175.939	4	8.822	82.75	81.92	81.07	79.39	79.41	78.13	76.75	77.83	75.52	83.92	80.26
385E	313.849	317.631	4	3.782	83.16	82.32	82.1	80.25	79.87	79.69	78.2	76.64	75.69	82.54	78.41
389A	0	1.894	2	1.894	78.39	76.5	77.33	76.53	76.38	76.09	75.98	75.22	74.4	81.37	81.49
389A	1.894	12.803	2	10.909	74.74	74.94	74.61	74.18	74.52	74.2	73.03	74.2	73.74	83.12	82.91
394A	3.933	9.378	3	5.445	70.13	67.47	81.58	70.08	71.28	70.01	67.45	65.78	69.31	76.92	77.84

Appendix A-5: Historical Pavement Performance of Colorado Low-Volume Paved Roads “Rut Index”

ROUTE	REFPT	END REFPT	Region	LENGTH	Rut 2006	Rut 2007	Rut 2008	Rut 2009	Rut 2010	Rut 2011	Rut 2012	Rut 2013	Rut 2014	Rut 2015	Rut 2016
005A	0	14.894	1	14.894	Missing	97.67	98.09	100	87.81	96.58	96.7	Missing	98.91	99.36	98.94
006A	11.08	11.179	3	0.099	Missing	Missing	Missing	Missing	100	100	100	100	100	100	96.3
006A	11.179	11.825	3	0.646	91.27	92.93	81.25	95.85	96.07	84.2	89.81	85.63	99.8	99.17	98.77
006A	11.825	13.867	3	2.042	94.22	98.95	88.7	98.95	99.42	93.84	94.26	94.75	97.34	96.59	94.29
006C	43.387	45.584	3	2.197	100	100	99.35	100	100	99.01	100	100	100	100	100
006C	45.584	46.058	3	0.474	100	98.77	97.5	100	100	96.9	100	100	100	100	100
006I	343.7	344.712	4	1.012	92.02	100	98.26	100	100	100	99.07	94.52	98.89	98.38	99.38
006I	345.928	346.425	4	0.497	94.7	100	98.97	100	100	100	99.06	100	100	100	100
006Z	0.445	0.604	4	0.159	Missing	87.5	66.3	100	95	86.3	76.3	52.5	93.8	82.5	100
007A	3.879	14.91	4	11.031	98.36	93.8	97.54	99.57	99.61	99.14	97.89	98.58	99.97	99.72	99.76
007A	14.91	16.086	4	1.176	99.75	93.8	98.76	100	100	100	99.38	99.75	100	100	100
007A	16.086	19.249	4	3.163	95.5	93.8	93.69	99.8	99.44	99.72	95.98	95.9	99.56	98.6	99.15
007A	19.249	32.649	4	13.4	98.42	100	99.87	99.99	100	99.91	100	100	100	100	99.82
007E	0	0.57	4	0.57	100	100	91.78	97.76	99	90.52	98.76	99.76	97.38	98	97.76
007E	0.57	1.592	4	1.022	100	100	93.21	96.97	93.34	94.74	100	100	100	99.59	99.59
009A	21.246	44.929	2	23.683	95.33	92.02	92.89	99.6	99.79	94.48	96.24	100	100	100	99.97
009A	44.929	46.98	2	2.051	100	100	100	100	100	98.91	99.97	100	100	100	99.08
010A	68.016	71.026	2	3.01	99.06	99.87	98.54	99.87	100	99.7	99.14	99.83	100	99.91	100
011A	0	0.41	4	0.41	100	100	91.9	100	100	100	95.03	98.45	100	100	100
011A	0.41	1.35	4	0.94	75.64	100	92.84	100	100	100	97.9	96.59	98.29	99.23	100
012A	0	4.6	2	4.6	99.78	97.57	99.81	100	99.87	100	99.19	99.43	100	99.89	100
012A	15.238	33.058	2	17.82	99.29	97.94	99.53	100	99.94	99.72	98.63	99.72	100	99.99	100
012A	33.058	43.031	2	9.973	99.67	97.52	99.61	99.99	99.42	99.85	99.81	99.05	100	99.9	100
012A	43.031	56.848	2	13.817	99.56	92.51	99	99.86	99.54	99.72	99.35	99.03	99.63	99.31	99.85
014B	51.317	71.538	3	20.221	99.18	99.75	99.39	99.42	99.96	99.49	99.58	99.8	100	100	100
014B	71.538	90.959	4	19.421	98.46	98.41	96.97	99.58	99.1	98.5	98.26	99.2	99.87	99.85	99.86
015A	2.393	8.419	5	6.026	97.01	98.18	96.09	99.86	99.96	92.73	98.86	99.94	100	100	99.92
015A	8.419	10.412	5	1.993	96.53	97.19	97.25	100	100	90.23	98.2	100	100	100	100
015A	10.412	12.374	5	1.962	98.91	94.81	98.97	100	100	84.2	98.76	99.73	100	100	100

ROUTE	REFPT	END REFPT	Region	LENGTH	Rut 2006	Rut 2007	Rut 2008	Rut 2009	Rut 2010	Rut 2011	Rut 2012	Rut 2013	Rut 2014	Rut 2015	Rut 2016
015B	22.484	26.562	5	4.078	97.98	100	98.51	99.75	99.63	97.92	99.3	100	99.56	100	100
017A	0	17.28	5	17.28	99.63	98.16	98.75	99.83	99.91	89.71	96.52	99.01	100	99.96	100
023A	0	9.571	4	9.571	79.11	99.5	91.38	99.91	99.71	99.45	92.01	95.06	99.53	99.65	99.44
023A	16	17.507	4	1.507	67.77	98.43	90.43	99.17	98.83	100	93.94	93.49	97.84	99.25	99.84
024B	419.95	422.707	4	2.757	93.09	97.74	89.19	97.93	94.33	95.39	90.95	94.42	95.3	97	99.91
024B	422.707	423.059	4	0.352	98.15	100	100	100	100	100	87.53	100	100	96.9	100
024B	423.059	429.604	4	6.545	86.29	99.98	89.48	99.75	99.88	96.98	97.73	99.14	99.18	99.7	99.62
024B	429.604	436.576	4	6.972	86.75	97.9	89.38	98.61	98.3	98.1	93.84	96.72	97.53	98.74	99.5
024C	437.453	446.851	4	9.398	88.11	99.23	87.85	99.11	98.28	99.27	96.58	99.76	99.72	99.77	99.93
024C	451.87	453.869	4	1.999	81.87	97.64	89.03	97.57	95.68	97.38	98.52	98.49	99.48	99.74	98.95
024D	456.02	456.722	4	0.702	92.72	99.47	97.72	100	99.8	100	99.9	100	100	99.58	100
024E	0	0.619	2	0.619	97.32	97.3	90.23	100	98.97	97.52	99.28	100	99.59	97.5	100
025B	0	0.046	2	0.046	100	100	100	100	100	100	96.3	98.8	100	100	100
025B	0.046	1.58	2	1.534	100	100	100	99.91	100	100	100	100	100	100	100
025B	1.58	1.948	2	0.368	100	100	100	100	100	100	100	100	100	100	100
036C	76.394	76.467	1	0.073	100	100	98.8	100	100	100	100	100	100	100	100
036C	76.467	78.69	1	2.223	99.06	100	96.63	100	100	99.82	100	100	100	100	100
036C	78.69	79.73	1	1.04	100	100	99.51	100	100	100	100	100	100	100	100
036C	80.815	83.71	1	2.895	99.91	100	94.75	100	99.87	99.91	100	100	100	100	100
039A	3.353	7.571	4	4.218	94.38	95.87	89.41	96.32	93.27	97.35	89.4	88.96	89.84	94.98	94.77
040B	272.552	276.18	1	3.628	82.96	Missing	90.44	96.9	96.3	93.59	99.59	99.25	99.64	99.5	99.65
040C	279.244	281.82	1	2.576	93.82	99.76	91.93	100	100	98.96	97.98	99.7	100	100	100
040E	346.29	350.601	1	4.311	99.02	99.83	89.58	100	99.65	98.69	99.08	99.74	100	100	100
040E	350.601	350.862	1	0.261	100	100	92.5	100	100	100	98.15	100	100	100	100
040E	350.862	351.136	1	0.274	100	100	99.4	100	100	100	99.08	100	100	100	100
040E	351.136	352.245	1	1.109	99.63	100	97.89	100	100	98.76	100	100	99.75	99.63	100
040F	360.201	362.999	4	2.798	99.81	100	Missing	100	99.23	96.4	100	100	100	100	100
040G	380.689	381	4	0.311	Missing	Missing	Missing	Missing	98.33	99.6	91.58	93.77	96.27	99.17	88.37
040G	381	382.184	4	1.184	90.36	100	90.33	100	100	97.97	99.89	100	96.7	97.74	97.62
041A	0	9.505	5	9.505	96.02	97.97	96.84	99.4	99.36	94.12	98.1	97.82	99.04	97.73	99.34
046A	0	3.85	1	3.85	98.14	100	99.08	99.74	99.71	98.4	99.85	99.87	100	100	99.74
046A	3.85	5.99	1	2.14	98.94	100	99.51	99.94	100	100	100	100	100	100	100
046A	5.99	6.61	1	0.62	100	100	99.8	100	100	100	99.69	100	100	100	100
050C	15.669	16.948	2	1.279	99.79	100	95.53	100	100	99.7	100	100	100	100	100

ROUTE	REFPT	END REFPT	Region	LENGTH	Rut 2006	Rut 2007	Rut 2008	Rut 2009	Rut 2010	Rut 2011	Rut 2012	Rut 2013	Rut 2014	Rut 2015	Rut 2016
050D	0	0.852	3	0.852	96.58	86.43	80.34	98.91	97.98	90.34	94.48	92.68	97.05	94.09	95.79
050D	0.931	1.539	3	0.608	85.3	93.28	75.28	99.26	98	91.26	92.03	95.76	98.26	96.26	92.5
052A	58.89	60.9	4	2.01	97.34	100	99.82	100	99.94	100	99.88	100	100	100	100
052A	60.9	70.895	4	9.995	87.74	100	99.17	99.91	99.93	99.98	99.52	99.44	99.96	99.86	99.91
055A	0	0.162	4	0.162	93.8	100	98.8	100	100	100	93.15	97.5	100	100	100
055A	0.162	2.417	4	2.255	99.83	100	99.89	100	99.72	100	99.46	98.65	99.83	100	100
059A	15.019	33	4	17.981	98.81	100	100	100	99.92	100	99.79	99.95	99.97	100	99.99
059A	33	40.963	4	7.963	99.98	100	100	100	100	100	99.63	99.8	100	100	99.68
059B	74.474	87.535	4	13.061	100	100	100	100	100	99.97	98.1	98.2	100	100	99.46
059B	122.864	130.588	4	7.724	99.38	97.78	100	99.79	99.8	99.33	89.92	98.12	100	99.93	100
059B	130.588	145.517	4	14.929	99.97	100	100	99.99	99.98	99.91	94.31	98.79	100	100	99.99
059B	147.149	147.218	4	0.069	98.8	100	100	100	100	100	96.3	100	100	100	100
059B	147.218	147.507	4	0.289	100	100	100	100	100	100	99.7	100	100	100	100
059B	147.814	155.594	4	7.78	100	100	100	100	100	99.98	99.96	100	100	100	99.69
059B	155.594	159.68	4	4.086	100	100	100	99.91	100	100	100	99.88	100	100	99.79
059B	159.68	166.498	4	6.818	99.89	100	100	100	100	99.96	99.92	99.76	99.97	100	99.65
059B	166.498	171.07	4	4.572	100	99.94	100	100	99.86	99.92	99.6	99.45	99.58	99.75	98.78
059B	171.07	173.337	4	2.267	99.83	99.95	99.78	100	100	100	99.69	99.69	100	100	100
061A	8.062	14.03	4	5.968	90.44	100	95.11	100	100	99.85	98.08	100	100	100	100
061A	14.03	22.511	4	8.481	85.71	99.96	96.04	99.99	100	99.69	98.33	100	100	100	100
063A	5.08	11.136	4	6.056	89.65	100	99.49	100	100	100	99.86	99.98	100	100	99.9
063A	11.136	24.196	4	13.06	86.02	99.57	96.16	99.94	99.76	99.84	97.69	98.03	99.74	99.53	99.55
063A	29.006	29.49	4	0.484	68.77	92.53	83.37	100	97.93	100	84.18	100	100	100	100
063A	29.49	39.256	4	9.766	84.18	99.59	97.2	99.91	99.49	99.9	99.37	99.31	100	99.98	100
063A	39.256	48.2	4	8.944	94.11	100	99.53	99.73	99.96	99.97	99.99	100	100	100	100
063A	48.2	53.29	4	5.09	84.05	100	97.61	99.55	99.93	100	99.39	100	100	100	100
065A	14.35	26.866	3	12.516	93.95	98.08	100	100	99.94	98.28	99.97	99.98	100	100	100
065A	26.866	36.175	3	9.309	99.81	99.93	99.84	100	100	96.49	99.84	99.91	100	100	99.97
065A	36.175	49.565	3	13.39	92.91	98.36	97.47	99.42	99.52	95.22	99.33	99.11	99.58	99.75	99.13
065A	49.565	51.169	3	1.604	97.85	97.27	92.68	100	100	93.44	97.76	98.09	99.92	99.59	98.01
067A	0	6.835	2	6.835	96.93	91.75	96.48	99.56	99.49	82.85	97.56	97.84	99.32	98.26	99.78
067C	45.56	45.686	2	0.126	97.5	97.5	96.3	100	100	92.5	100	97.5	100	98.8	100
067C	45.686	50.73	2	5.044	97.97	96.29	91.45	99.93	99.11	97.74	99.57	98.46	99.51	99.65	100
067D	91.241	100.036	2	8.795	96.86	99.69	95.74	99.41	99.93	97.63	99.55	100	100	100	99.63

ROUTE	REFPT	END REFPT	Region	LENGTH	Rut 2006	Rut 2007	Rut 2008	Rut 2009	Rut 2010	Rut 2011	Rut 2012	Rut 2013	Rut 2014	Rut 2015	Rut 2016
067E	117.349	122.311	1	4.962	98.04	99.39	93.15	100	99.77	97.53	95.15	99.9	100	99.72	100
069A	0	5.306	2	5.306	99.18	98.2	99.98	100	98.64	100	99.75	99.88	99.94	99.86	99.46
069A	9.668	25.017	2	15.349	96.55	97.35	99.72	99.7	99.95	99.99	99.87	99.99	100	100	99.92
069A	25.017	26.042	2	1.025	95.84	100	100	100	100	100	99.73	100	99.72	100	100
069A	26.042	49.423	2	23.381	91.55	87.3	90.96	99.05	99.08	96.99	93.89	95.02	98.67	98.14	99.22
069A	49.423	54.125	2	4.702	93.64	88.86	97.08	95.98	97.64	98.57	98.76	99.87	100	99.97	100
069A	71.566	82.664	2	11.098	99.23	90.38	99.06	99.93	99.91	99.78	96.66	98.05	99.9	99.14	99.93
070K	0	0.723	1	0.723	Missing	Missing	Missing	Missing	Missing	Missing	93.96	91.63	95.03	92.51	90.2
070N	0	0.133	1	0.133	Missing	Missing	Missing	Missing	Missing	Missing	98.15	100	100	100	100
070N	0.133	0.396	1	0.263	Missing	Missing	Missing	Missing	Missing	Missing	100	100	100	100	100
070O	0	0.353	4	0.353	Missing	Missing	Missing	Missing	Missing	Missing	99.38	100	100	100	100
070P	0	0.04	4	0.04	Missing	Missing	Missing	Missing	Missing	Missing	100	100	100	100	100
070P	0.04	0.528	4	0.488	Missing	Missing	Missing	Missing	Missing	Missing	99.54	100	100	100	100
071A	0	7.036	2	7.036	96.68	99.66	87.49	99.41	99.34	99.36	90.52	96.62	99.52	99.34	99.56
071A	7.036	9.032	2	1.996	99.41	100	92.98	100	100	99.55	94.77	99.81	100	100	100
071B	9.601	11.614	2	2.013	100	100	100	100	100	100	99.74	100	100	100	100
071B	11.614	13.747	2	2.133	100	100	100	100	100	100	99.66	100	100	100	100
071B	13.747	14.076	2	0.329	100	100	100	100	100	100	100	100	100	100	100
072A	25.608	29.378	1	3.77	100	100	99.9	100	100	99.97	100	99.93	99.97	99.17	100
072B	44.095	48.353	4	4.258	95.65	99.56	98.23	99.91	99.88	99.02	97.4	96.51	99.3	99.68	99.65
072B	48.353	54.064	4	5.711	98.85	99.69	99.07	99.93	99.74	99.27	99.53	98.72	99.93	99.89	99.89
078A	0	9	2	9	Missing	Missing	74.8	Missing	100	Missing	98.55	98.77	100	98.11	Missing
078A	9	12.71	2	3.71	99.4	98.72	92.97	100	99.8	98.86	99.9	99.86	100	100	100
078A	14.586	15.532	2	0.946	100	96	96.7	100	100	100	99.93	100	99.59	100	100
078A	15.532	18.192	2	2.66	99.85	93.48	92.28	99.9	100	100	97.86	100	100	100	100
078A	18.192	29.903	2	11.711	99.43	91.34	98	100	100	100	96.99	99.52	100	99.6	99.98
078B	0	1.493	2	1.493	98.31	94.57	98.58	100	98.93	99.02	99.96	100	100	100	100
082A	42.471	51.254	3	8.783	Missing	97.04	95.79	99.99	97.93	95.68	97.19	Missing	98.41	97.97	98.04
082A	51.254	79	3	27.746	Missing	93.22	89.11	99.08	98.04	96	95.15	96.46	98.6	98.49	98.81
082A	79	83.47	3	4.47	Missing	87.55	Missing	98.93	98.22	91.84	86.91	90.05	96.7	96.7	96.98
082A	83.47	85.293	3	1.823	Missing	92.81	Missing	99.42	99.27	97.15	95.83	97.59	100	99.71	99.85
086A	27.718	32.248	4	4.53	99.72	99.78	99.29	99.97	99.94	100	100	100	100	100	100
086A	32.248	51.167	4	18.919	94.57	97.84	92.65	98.93	98.28	98	93.45	95.2	98.91	98.71	97.61
086A	51.167	59.279	4	8.112	96.38	97.66	92.15	98.24	98.38	98.44	95.48	96.92	99.63	99.08	98.24

ROUTE	REFPT	END REFPT	Region	LENGTH	Rut 2006	Rut 2007	Rut 2008	Rut 2009	Rut 2010	Rut 2011	Rut 2012	Rut 2013	Rut 2014	Rut 2015	Rut 2016
089A	0	8.976	2	8.976	99.69	99.96	99.75	100	100	99.79	99.54	98.55	100	100	99.99
089A	8.976	18.57	2	9.594	98.22	100	99.97	99.62	99.99	99.74	99.95	100	100	100	99.07
089A	18.57	21.549	2	2.979	98.85	99.83	100	100	100	100	100	100	100	100	100
089A	21.549	33.183	2	11.634	96.61	99.1	100	99.97	99.76	98.81	100	99.99	100	100	99.89
090A	0	9.493	5	9.493	94.03	97	95.31	97.96	97.9	88.68	95.42	94.97	97.94	96.71	94.82
090A	9.493	14.797	5	5.304	90.14	97.3	83.91	97.58	98.01	88.15	93.35	95.12	98.6	97.75	97.63
090A	14.797	33.874	5	19.077	90.95	93.32	88.48	95.83	95.19	88.8	92.66	95.27	97.56	96.71	94.65
090B	81.533	81.737	3	0.204	Missing	Missing	Missing	Missing	100	100	100	100	100	100	100
090B	81.737	84.884	3	3.147	98.72	99.83	97.92	100	98.8	98.01	99.77	99.96	100	100	99.92
090B	84.884	86.058	3	1.174	98.43	99.89	95.92	100	99.66	96.26	99.72	100	100	100	100
090B	86.058	86.931	3	0.873	97.68	98.91	92.2	97.68	94.86	88.6	99.93	99.85	100	100	99.7
090B	86.931	87.914	3	0.983	99.87	100	99.32	97.37	100	94.47	99.86	100	100	100	99.87
092A	27.082	30.11	3	3.028	90.44	86.57	88.94	90.4	86.94	73.93	85.02	80.8	86.12	82.65	81.48
092A	31.525	33.643	3	2.118	99.13	97.83	98.26	99.25	99.19	94.79	98.6	96.57	100	100	99.94
092A	33.643	36.577	3	2.934	99.73	98.67	98.75	99.87	100	97.02	99.33	99.42	99.75	99.78	99.24
092A	36.577	71.819	3	35.242	99.89	99.81	99.94	99.71	99.86	96.99	99.95	99.92	99.91	99.93	99.5
092A	71.819	73.259	3	1.44	100	100	100	99.72	99.82	94.45	99.85	100	100	100	99.91
094A	33.079	45.054	4	11.975	92.79	96.07	89.33	97.71	98.51	94.54	92.3	95.04	98.94	97.32	97.18
094A	45.054	54.581	4	9.527	93.4	96.93	84.73	99.54	99.47	96.39	90.63	95.96	99.51	98.57	98.26
094A	54.581	86.174	4	31.593	91.57	98.99	88.82	99.82	99.72	98.84	95.63	97.73	99.55	99.52	99.29
096A	1.313	11.064	2	9.751	97.39	94.04	98.56	100	99.89	99.04	94.87	95.38	99.11	98.46	99.87
096A	26.273	33.575	2	7.302	94.95	95.22	96.04	99.88	99.62	99.09	97.37	97.3	99.66	100	99.79
096A	33.575	42.21	2	8.635	97.04	96.91	96.51	99.38	99.45	98.59	95.71	98.05	98.55	99.93	100
096B	70.573	75.496	2	4.923	95.34	98.94	92.41	99.98	99.92	99.98	91.87	92.61	99.61	99.61	97.53
096C	119.491	143.78	2	24.289	91.29	97.7	85.03	99.11	99.14	98.98	93.98	94.93	99.01	99.03	98.87
097A	0.32	3.932	5	3.612	90.03	96.41	86.85	97.29	97.91	87.92	91.95	93.1	98.06	96.76	99
097A	3.932	4.584	5	0.652	88.94	98.63	88.93	98.26	99.5	87.5	92.4	88.4	97.32	98.13	97.38
100A	0	0.279	2	0.279	100	Missing	97.5	100	100	100	100	100	100	100	100
100A	0.279	0.419	2	0.14	Missing	Missing	100	100	100	100	100	100	100	100	100
101A	0.404	1.151	2	0.747	99.38	95.02	95.03	100	100	100	100	99.58	99.17	99.17	99.38
101A	1.151	5.151	2	4	99.55	99.11	95.12	99.71	99.84	100	97.71	96.52	100	99.94	100
101A	5.151	16.45	2	11.299	92.74	96.61	88.02	98.46	98.99	98.3	93.09	94.2	97.51	97.33	98.1
101A	16.45	21.413	2	4.963	95.61	95.91	85.31	98.37	97.91	98.02	92.59	91.63	96.49	95.72	96.97
103A	6.7	13.265	1	6.565	96.44	99.12	98.07	99.88	99.68	97.97	98.73	100	99.87	98.7	100

ROUTE	REFPT	END REFPT	Region	LENGTH	Rut 2006	Rut 2007	Rut 2008	Rut 2009	Rut 2010	Rut 2011	Rut 2012	Rut 2013	Rut 2014	Rut 2015	Rut 2016
103A	13.265	22.488	1	9.223	95.95	97.94	97.51	99.12	99	95.6	99.74	Missing	100	97.45	100
105A	9.211	9.48	2	0.269	100	100	100	100	100	100	100	100	100	100	100
109A	0	7.722	2	7.722	96.55	99.89	90.91	100	99.73	99.55	94.83	97.54	99.26	99.09	99.39
109A	7.722	53	2	45.278	89.43	97.05	96.2	99.92	99.9	99.55	98.44	98.84	99.65	99.68	99.67
109A	53	54.79	2	1.79	70.53	91.72	99.93	100	100	100	99.93	100	100	100	100
109A	64.748	65.327	2	0.579	98.26	100	98.54	100	100	100	100	100	Missing	100	100
110A	0	0.14	5	0.14	98.8	100	100	100	100	100	100	100	100	100	100
114A	0	19	5	19	84.21	99.73	99.97	99.24	99.71	95.46	99.8	99.88	99.98	99.6	99.93
114A	19	20.261	5	1.261	100	97.1	99.9	100	100	97.64	100	100	100	100	100
114A	20.261	56.043	5	35.782	99.67	98.44	99.63	99.85	99.78	95.17	99.71	99.85	99.99	99.29	99.97
114A	56.043	61.453	5	5.41	100	100	100	99.98	99.91	94.98	99.85	99.3	100	99.69	100
116A	0	12.042	2	12.042	94.37	97.15	84.9	97.81	97.81	98.52	89.35	92.4	98.63	99.1	96.58
116A	12.042	12.299	2	0.257	95	100	88.8	100	100	100	100	100	100	100	100
116A	12.299	13.055	2	0.756	97.51	100	93.77	100	100	100	98.94	99.64	100	100	99.47
116A	13.055	20.029	2	6.974	91.71	93.6	89.72	95.54	96.02	97.09	90.34	93.2	97.14	99.22	98.37
116A	20.029	27.02	2	6.991	88.19	94.91	84.46	98.68	98.7	99.55	92.73	95.02	98.43	98.79	98.83
116A	27.02	32.322	2	5.302	91.35	93.15	85.6	98.4	98.83	98.45	93.13	97.96	99.4	99.83	99.5
120A	0	3.105	2	3.105	92.04	95.39	89.17	100	99.68	83.41	95.07	98.56	99.72	99.44	100
120A	3.105	7.186	2	4.081	88.62	83.32	89.56	96.86	95.92	75.79	95.42	97.69	98.75	97.5	98.5
125A	0	29.46	3	29.46	97.47	98.75	97.63	97.72	99.1	97.46	99.72	99.92	100	99.99	99.98
125A	29.46	31.504	3	2.044	98.33	99.63	99.13	92.77	98.83	96.89	99.78	99.82	100	100	100
125A	31.504	35.582	3	4.078	98.83	99.78	99.78	99.87	99.27	99.24	100	100	100	100	100
125A	35.582	52.02	3	16.438	99.89	99.85	99.93	99.31	99.58	98.68	99.76	99.31	99.92	99.73	99.72
125A	66.558	75.406	3	8.848	99.42	99.79	100	100	100	99.67	100	100	100	100	100
131B	13.709	32.904	3	19.195	100	100	99.95	99.63	99.81	99.23	99.98	99.77	100	100	100
131B	32.904	38.441	3	5.537	100	100	99.89	99.91	99.95	97.26	99.85	99.2	100	100	100
131B	38.441	42.05	3	3.609	99.89	100	98.65	99.54	100	97.12	100	99.62	100	99.86	100
131B	51.859	52.081	3	0.222	81.3	71.3	71.3	88.8	82.5	82.5	71.9	77.5	84.4	92.5	82.5
133A	24	46.371	3	22.371	99.94	100	99.88	100	99.97	98.85	99.99	100	100	100	100
133A	46.371	51.357	3	4.986	97.64	83.59	97.69	99.24	99.72	98.25	99.33	99.17	97.87	99.82	99.92
133B	13.267	16.076	3	2.809	Missing	Missing	Missing	Missing	Missing	Missing	91.57	93.3	95.59	98.8	98.11
134A	0	16.32	3	16.32	98.2	100	99.96	98.92	98.8	97.6	99.97	100	100	100	100
134A	16.32	27.163	3	10.843	96.04	100	99.75	97.81	99.52	95.89	99.99	99.99	99.98	100	100
136A	0	0.152	5	0.152	100	95	100	100	100	100	100	95	100	100	100

ROUTE	REFPT	END REFPT	Region	LENGTH	Rut 2006	Rut 2007	Rut 2008	Rut 2009	Rut 2010	Rut 2011	Rut 2012	Rut 2013	Rut 2014	Rut 2015	Rut 2016
136A	0.152	0.553	5	0.401	100	100	95.83	100	100	99.6	100	100	100	100	100
136A	0.553	1.579	5	1.026	100	100	98.48	100	99.59	100	99.86	100	100	100	100
136A	3.48	4.469	5	0.989	100	95.31	100	99.72	99.03	93.37	97.38	94.47	97.93	94.76	99.31
138A	21.739	26.329	4	4.59	98.7	100	100	100	100	100	100	99.89	100	100	100
138A	26.329	27.503	4	1.174	99.55	100	100	100	100	100	100	100	100	100	100
138A	27.503	27.911	4	0.408	99.2	100	100	100	100	100	100	100	100	100	100
138A	27.911	34.981	4	7.07	99.41	100	99.89	100	100	99.98	100	100	99.96	100	100
138A	34.981	41.385	4	6.404	87.27	100	98.44	100	100	100	99.28	99.04	100	100	100
138A	41.385	43.023	4	1.638	90.11	100	96.59	100	100	100	96.3	97.21	99.85	100	100
138A	43.023	43.084	4	0.061	88.8	100	100	100	100	100	98.8	96.3	100	100	100
138A	43.084	43.413	4	0.329	90.87	100	94.2	100	100	100	98.55	94.6	98.77	100	100
138A	50.476	50.633	4	0.157	71.3	88.8	70	88.8	85	96.3	80	81.3	87.5	86.3	90
138A	50.633	50.868	4	0.235	78.8	100	80	100	100	100	81.9	82.5	96.3	86.3	100
138A	50.868	54	4	3.132	85.92	100	89.78	100	99.16	100	95.12	97.07	100	100	100
138A	54	54.81	4	0.81	75.65	100	88.46	100	99.06	100	95.57	96.6	100	100	100
138A	58.534	59.823	4	1.289	91.79	99.69	99.58	100	100	100	99.17	99.38	100	100	100
141A	0	9.381	5	9.381	95.2	98.79	92.28	99.49	99.43	93.55	94.71	95.35	99.49	98.64	98.49
141A	9.381	11.271	5	1.89	95.99	100	96.2	100	99.72	94.26	98.31	99.31	100	100	100
141A	11.271	44.124	5	32.853	86.75	92.91	84.44	96.34	96.32	84.46	88.45	88.82	96.32	94.83	94.01
141A	62.436	64.395	5	1.959	98.97	99.59	98.41	100	99.93	93.08	95.95	99.52	99.46	99.87	97.73
141A	64.395	110.525	5	46.13	89.83	90.36	86.09	97.67	98.23	89.92	93.85	95.27	97.99	97.06	95.59
142A	3.276	13.4	5	10.124	99.49	98.52	99.72	99.81	99.66	96.65	97.88	99.32	99.89	99.31	99.95
142A	13.4	22.958	5	9.558	95.93	89.78	99.06	99.75	99.69	90.22	95.78	95.49	96.47	95.51	99.11
142A	22.958	28.712	5	5.754	96.5	92.11	99.98	100	99.89	95.28	98.21	98.93	99.32	98.23	99.1
142A	28.712	33.84	5	5.128	96.8	93	100	99.85	99.45	92.55	95.13	97.68	99.73	98.91	99.3
144A	0	0.027	4	0.027	100	100	95	100	100	100	100	93.8	96.3	100	97.5
144A	0.027	2.821	4	2.794	100	100	100	100	100	99.41	99.72	99.54	100	100	99.54
144A	2.821	10.493	4	7.672	98.91	99.98	93.02	99.59	99.2	94.05	99.9	100	99.9	99.95	99.82
144A	10.493	11.062	4	0.569	100	100	100	100	100	100	98.64	100	100	100	100
144A	11.062	16.601	4	5.539	99.96	99.5	98.45	99.84	100	98.98	99.64	99.69	99.93	99.95	99.89
144A	16.601	20.841	4	4.24	99.85	99.79	98.95	100	99.97	99.58	99.5	99.64	100	100	100
144A	26.066	26.887	4	0.821	99.47	100	96.81	100	100	100	97.7	99.83	100	100	100
149A	3.45	18.52	5	15.07	99.69	99.99	99.39	99.96	99.77	96.35	99.72	99.03	100	99.67	100
149A	21.566	21.648	5	0.082	100	100	100	100	100	98.8	100	100	100	100	100

ROUTE	REFPT	END REFPT	Region	LENGTH	Rut 2006	Rut 2007	Rut 2008	Rut 2009	Rut 2010	Rut 2011	Rut 2012	Rut 2013	Rut 2014	Rut 2015	Rut 2016
149A	21.648	21.892	5	0.244	100	100	100	100	100	100	100	98.8	100	100	100
149A	21.892	22.887	5	0.995	100	100	100	100	99.87	99.87	99.93	99.72	100	100	100
149A	22.887	26.581	5	3.694	98.45	100	99.93	100	100	97.69	99.93	99.9	100	100	100
149A	26.581	27.689	5	1.108	99.75	100	100	100	100	95.9	100	100	100	100	100
149A	27.689	41.477	5	13.788	99.78	100	99.66	99.91	99.97	96.3	99.83	99.28	100	99.86	99.91
149A	41.477	45.465	3	3.988	95.5	100	88.77	100	100	94.47	98.6	97.65	100	99.94	99.84
149A	45.465	62.655	3	17.19	96.07	99.54	91.78	99.79	99.98	95.83	98.52	98.47	99.99	99.57	99.79
149A	62.655	69.851	3	7.196	99.58	99.96	95.74	99.81	99.91	94.02	99.82	99.74	99.96	99.07	99.54
149A	69.851	71.901	3	2.05	94.77	99.5	95.96	99.57	99.63	97.44	98.38	99.51	99.97	99.07	99.88
149A	72.829	73.207	3	0.378	99.2	100	98.77	100	100	99.17	100	98.37	98.97	100	100
149A	73.207	100.601	3	27.394	96.57	99.49	95.34	99.5	99.69	94.67	98.42	97.71	99.24	98.52	99.57
149A	100.601	117.522	3	16.921	100	100	99.71	100	99.98	94.16	98.81	99.79	100	99.77	100
150A	0	13.511	5	13.511	99.23	97.68	97.19	99.83	100	89.5	100	100	100	100	100
150A	13.511	16.114	5	2.603	96.25	97.92	94.9	100	99.95	89.12	100	100	100	100	100
151A	22.731	33.96	5	11.229	89.79	92.85	88.19	96.05	99.09	90.22	95.47	94.57	98.7	95.38	99.34
159A	0	7.009	5	7.009	96.13	99	99.56	100	100	98.3	96.47	100	100	99.96	100
159A	7.009	13.3	5	6.291	98.22	96.73	99.5	99.96	100	96.35	96.31	99.38	100	99.74	100
159A	13.3	17.547	5	4.247	95.5	93.42	95.34	100	99.56	96.57	94.37	98.67	100	99.67	100
159A	17.547	17.789	5	0.242	100	97.5	97.5	100	100	95	98.75	97.5	100	91.3	100
159A	18.334	30.959	5	12.625	96.28	93.05	98.12	99.75	99.39	96.55	95.78	97.06	99.48	99.1	99.77
160C	353.65	367.79	2	14.14	99.73	99.59	98.44	99.7	99.5	98.89	98.17	97.72	99.19	99.16	99.23
160C	367.79	375.832	2	8.042	98.22	98.94	95.2	99.66	99.64	99.24	96.76	97.08	99.39	99.47	99.52
160C	375.832	382.774	2	6.942	98.61	98.9	94.9	99.32	99.5	99.09	96.59	97.33	98.68	99.84	99.76
160C	382.774	386.608	2	3.834	99.67	99.38	98.39	99.9	99.9	99.71	97.02	97.06	99.74	99.28	99.51
160C	386.608	403.656	2	17.048	96.45	98.06	91.96	98.95	99.14	98.99	92.81	94.64	98.1	98.05	98.16
160C	403.656	406.685	2	3.029	96.1	99.62	95.1	99.87	99.96	99.4	90.58	94.93	99.19	98.32	99.57
160C	406.685	414.326	2	7.641	96.52	99.23	96.21	99.82	99.7	99.46	93.47	95.51	98.62	98.39	100
160C	414.326	414.755	2	0.429	100	100	99.6	100	100	100	100	100	100	100	100
160C	414.755	416.531	2	1.776	97.09	97.81	91.79	98.02	98.24	99.27	94.76	96.04	99.12	97.95	100
160C	416.531	425.681	2	9.15	99.81	99.75	97.28	99.85	99.81	99.64	94.73	97.71	99.43	99.39	100
160C	425.681	441.65	2	15.969	99.95	100	98.64	99.99	99.93	99.88	97.38	99.87	99.8	99.95	99.79
160C	441.65	447.59	2	5.94	99.81	100	97.09	100	100	99.53	96.4	99.66	100	100	98.54
160C	450.97	460.147	2	9.177	100	100	99.73	100	100	100	99.03	100	100	100	99.51
160C	483.037	484.418	2	1.381	70.77	100	100	100	100	99.81	99.9	100	100	100	100

ROUTE	REFPT	END REFPT	Region	LENGTH	Rut 2006	Rut 2007	Rut 2008	Rut 2009	Rut 2010	Rut 2011	Rut 2012	Rut 2013	Rut 2014	Rut 2015	Rut 2016
160D	0	0.011	5	0.011	97.5	100	96.3	100	100	96.3	100	100	100	100	100
160D	0.011	1.212	5	1.201	99.33	100	99.78	100	100	99.33	100	99.66	99.95	100	100
160D	1.212	1.457	5	0.245	100	100	100	100	100	98.8	100	100	100	100	100
160D	1.457	2.488	5	1.031	96.83	100	100	100	100	95.58	99.93	99.59	100	98.89	100
165A	0	15.31	2	15.31	96.09	97.29	95.13	99.98	99.88	99.86	99.8	99.99	100	100	100
165A	15.31	18.503	2	3.193	92.32	100	91.4	100	100	99.96	99.02	99.76	100	100	100
165A	18.503	28.558	2	10.055	98.82	99.35	96.67	100	99.76	99.7	99.6	99.96	100	100	100
167A	0	1.673	2	1.673	97.82	99.84	87.68	100	99.84	99.69	97.43	99.31	100	100	100
167A	1.673	2.005	2	0.332	99.17	100	97.93	100	100	100	97.08	100	100	100	100
167A	2.005	2.368	2	0.363	98.75	100	96.9	100	100	100	98.15	99.4	100	100	100
167A	2.368	2.905	2	0.537	98.76	100	98.5	100	100	99.02	99.88	100	100	100	100
167A	2.905	4.86	2	1.955	93.01	97.93	86.28	98.34	96.75	95.78	93.11	99.59	99.73	100	100
170A	0	2.157	4	2.157	99.23	99.53	96.56	99.76	99.64	95.68	97.99	97.4	98.87	99.82	99.76
172A	0	2.081	5	2.081	92.95	100	100	100	100	99.07	99.79	100	100	99.5	100
183A	0	1	2	1	100	100	99.26	100	100	99.5	99.69	100	100	100	100
194A	0	3.8	2	3.8	96.27	97.74	88.87	98.39	98	98.17	92	93.77	100	100	100
194A	3.8	14.678	2	10.878	98.83	99.97	95.76	100	99.81	98.69	99.49	99.82	100	100	100
194A	14.678	20.327	2	5.649	94.07	99.62	92.31	99.51	99.51	98.84	96.24	96.89	99.71	99.36	99.56
196A	0	1.6	2	1.6	96.28	97.98	89.64	99.54	99.46	99.08	98.8	99.15	99.85	100	99.77
196A	1.6	6.91	2	5.31	95.08	98.73	88.79	99.48	99.46	99.11	97.63	97.21	99.2	99.37	98.97
196A	6.91	8.922	2	2.012	96.47	99.22	89.96	100	99.94	99.94	96.23	97.45	98.75	99.81	100
202A	0	0.11	2	0.11	100	100	100	100	100	100	100	100	100	100	100
202A	0.11	0.19	2	0.08	97.5	100	100	100	100	100	97.5	100	100	100	100
202A	0.19	1.22	2	1.03	98.64	99.88	93.28	100	98.63	96.89	100	100	100	100	100
202A	1.22	3.228	2	2.008	99.05	99.78	97.73	99.56	95.93	94.69	99.48	100	100	100	100
207A	0	3.513	2	3.513	96.23	98.83	91.52	99.5	97.58	97.97	96.83	97.73	99.47	99.86	99.89
207A	3.513	5.935	2	2.422	98.6	99.73	88.76	97.23	96.16	95.93	93.41	99.03	100	99.62	99.62
209A	0	1.387	2	1.387	96.85	100	95.42	100	100	100	98.95	99.72	99.81	100	100
209A	1.387	1.528	2	0.141	97.5	100	100	100	100	100	100	100	100	100	100
239A	0	0.675	2	0.675	99.8	99.17	98.97	99.58	99.8	86.47	100	100	100	100	100
239A	0.675	0.972	2	0.297	96.25	100	98.75	100	100	83.15	99.08	100	100	100	100
239A	0.972	3.345	2	2.373	99.95	99.84	98.22	98.59	99.19	87.8	99.47	99.95	99.58	100	100
257B	0.037	0.644	4	0.607	78.28	77.02	81	Missing	Missing	95.26	73.38	70.28	84.78	88.02	94.52
257B	0.644	1.146	4	0.502	83.45	83.78	89.4	Missing	Missing	97.2	83.76	79.7	91.25	94.7	96.58

ROUTE	REFPT	END REFPT	Region	LENGTH	Rut 2006	Rut 2007	Rut 2008	Rut 2009	Rut 2010	Rut 2011	Rut 2012	Rut 2013	Rut 2014	Rut 2015	Rut 2016
266A	0	0.06	2	0.06	87.5	100	75	100	100	100	100	100	100	100	100
266A	0.06	0.217	2	0.157	97.5	98.8	98.8	100	100	100	93.75	100	100	100	100
266A	0.217	1.306	2	1.089	99.75	100	99.63	100	100	99.5	99.94	100	100	100	100
266A	1.306	2.964	2	1.658	99.09	98.17	95.27	98.42	99.09	98.59	97.13	95.92	97.42	98.59	97.09
266A	2.964	5.363	2	2.399	95.9	99.89	94.32	99.95	98.33	98.6	99.32	99.89	100	100	100
266A	5.363	9.512	2	4.149	97.02	98.24	90.12	99.67	99.79	99.76	96.58	98	99.55	99.61	99.4
266A	9.512	11.516	2	2.004	96.67	99.74	89.71	99.81	99.74	99.21	97.08	99.87	100	100	100
300A	0.465	3.356	3	2.891	99.82	99.52	98.36	99.65	98.05	97.5	99.71	100	99.06	99.24	98.93
317A	0	12.237	3	12.237	78.8	91.92	79.4	95.26	95.01	89.66	92.08	93.53	97.99	97.17	95.51
318A	0	20.562	3	20.562	79.05	88.26	73.57	94.27	93.4	81.78	79.35	83.37	93.18	89.52	88.66
318A	20.562	54.309	3	33.747	93.89	97	90.95	98.09	98.21	92.82	96.15	96.96	98.6	97.96	97.62
318A	54.309	60.697	3	6.388	99.94	99.88	98.21	99.92	99.88	97.22	99.77	99.98	100	100	99.94
325A	0	4.102	3	4.102	96.3	99.06	98.81	100	100	99.19	99.77	99.97	100	99.94	99.94
325A	4.102	6.977	3	2.875	97.51	93.54	96.45	98.8	98.43	93.17	96.68	95.53	96.28	94.92	95.16
325A	6.977	11.395	3	4.418	98.47	96.82	96.32	98.21	97.57	92	97.47	97.97	99.58	99.3	99.65
347A	0	1.821	3	1.821	98.49	99.04	99.59	99.66	99.93	96.68	99.97	100	100	100	99.31
347A	1.821	5.248	3	3.427	96.75	98.52	99.44	100	99.77	94.57	98.57	98.76	99.96	99.96	100
348A	0	1.343	3	1.343	99.15	97.13	93.78	99.72	99.62	95.62	99.05	99.14	100	99.91	98.95
348A	1.343	3.253	3	1.91	95.01	89.54	92.81	100	99.93	95.92	98.1	98.76	99.55	98.89	97.86
348A	3.253	4	3	0.747	89.84	89.5	85.74	95.9	93.57	95.19	93.68	96.43	98.3	99.64	97.33
348A	4	7.335	3	3.335	94.61	89.76	91.68	99.74	99.48	95.81	97.72	97.51	99.38	99.48	97.89
348A	7.335	11.389	3	4.054	94.89	91.72	87.85	99.52	99.94	95.79	97.42	98.7	99.91	99.81	99.39
348A	11.389	12.918	3	1.529	96.03	96.95	85.19	98.83	99.59	93.19	96.98	99.09	99.63	98.75	100
348A	12.918	14.401	3	1.483	98.05	97.69	83.69	94.21	97.95	89.84	96.35	98.13	99.51	100	99.82
350A	23.99	56.237	2	32.247	97.39	99.06	91	99.56	99.66	98.45	94.59	98.03	99.13	99.32	99.17
350A	56.237	59.412	2	3.175	99	99.96	94.14	100	99.8	100	97.47	98.96	99.92	99.96	99.92
350A	59.412	69.692	2	10.28	89.23	95.58	86.03	99.14	99.12	99.37	94.73	99.64	99.89	99.72	99.78
350A	69.692	72.021	2	2.329	84.59	87.9	94.41	99.95	100	100	98.67	100	100	100	100
350A	72.021	72.315	2	0.294	84.4	89.4	71.25	100	100	100	100	100	100	100	100
350A	72.315	72.444	2	0.129	100	100	100	100	100	100	100	100	100	100	100
350A	72.444	72.577	2	0.133	100	98.8	100	100	100	100	100	100	Missing	100	100
368A	0	5.021	5	5.021	98.43	98.44	98.83	100	99.88	95.42	99.49	98.98	99.78	99.28	99.85
368A	6.022	12.329	5	6.307	98.41	91.15	99.76	100	100	98.4	99.96	99.88	100	99.96	100
370A	2.968	3.996	5	1.028	100	98.91	100	100	100	90.02	99.72	100	100	99.73	100

ROUTE	REFPT	END REFPT	Region	LENGTH	Rut 2006	Rut 2007	Rut 2008	Rut 2009	Rut 2010	Rut 2011	Rut 2012	Rut 2013	Rut 2014	Rut 2015	Rut 2016
370A	3.996	5.975	5	1.979	100	97.83	100	100	100	95.87	99.61	99.35	99.94	99.54	100
370A	12.074	14.115	5	2.041	99.55	99.81	100	100	100	95.14	100	100	100	99.38	100
385C	167.117	175.939	4	8.822	97.89	100	94.65	100	99.77	93.34	99.57	99.96	100	100	99.99
385E	313.849	317.631	4	3.782	100	100	99.38	100	100	99.53	99.98	100	100	100	100
389A	0	1.894	2	1.894	99.17	99.73	96.05	99.66	99.52	98.62	97.62	98.47	99.24	95.36	98.2
389A	1.894	12.803	2	10.909	96.74	99.68	91.57	99.51	99.65	99.08	91.69	97.71	99.28	99.51	99.5
394A	3.933	9.378	3	5.445	87.58	94	81.67	99.29	99.25	96.49	93.06	94.54	98.95	98.33	96.14

Appendix B: Segmented Treatment History for Low-Volume Paved Roads in Colorado

ROUTE	REFPT	ENDREFPT	LENGTH	Year	Treatment Type	Accept Date	Treated miles	%Treatment
063A	29.49	39.256	9.766	2007	ACHP	12/31/2007	4.956	51%
063A	39.256	48.2	8.944	2007	ACHP	12/31/2007	5.744	64%
072B	44.095	48.353	4.258	2012	ACHP	8/3/2012	4.258	100%
072B	48.353	54.064	5.711	2012	ACHP	8/3/2012	5.647	99%
007A	16.086	19.249	3.163	2013	ACHP	7/3/2013	0.149	5%
007A	19.249	32.649	13.4	2013	ACHP	7/3/2013	13.4	100%
050D	0.931	1.539	0.608	2015	ACHP	9/30/2015	0.569	94%
050D	0	0.852	0.852	2015	ACHP	9/30/2015	0.852	100%
090B	81.533	81.737	0.204	2015	ACHP	9/30/2015	0.204	100%
090B	81.737	84.884	3.147	2015	ACHP	9/30/2015	3.147	100%
090B	84.884	86.058	1.174	2015	ACHP	9/30/2015	1.174	100%
090B	86.058	86.931	0.873	2015	ACHP	9/30/2015	0.873	100%
090B	86.931	87.914	0.983	2015	ACHP	9/30/2015	0.983	100%
125A	66.558	75.406	8.848	2015	ACHP	10/1/2015	8.8	99%
133A	46.371	51.357	4.986	2015	ACHP	9/18/2015	1.357	27%
134A	0	16.32	16.32	2015	ACHP	10/1/2015	16.32	100%
134A	16.32	27.163	10.843	2015	ACHP	10/1/2015	10.843	100%
348A	4	7.335	3.335	2015	ACHP	9/30/2015	3.335	100%
348A	7.335	11.389	4.054	2015	ACHP	9/30/2015	4.054	100%
348A	11.389	12.918	1.529	2015	ACHP	9/30/2015	1.529	100%
348A	12.918	14.401	1.483	2015	ACHP	9/30/2015	1.483	100%
348A	0	1.343	1.343	2015	ACHP	9/30/2015	1.343	100%
348A	1.343	3.253	1.91	2015	ACHP	9/30/2015	1.91	100%
348A	3.253	4	0.747	2015	ACHP	9/30/2015	0.747	100%
014B	51.317	71.538	20.221	2016	ACHP	12/31/2016	13.583	67%
014B	71.538	90.959	19.421	2016	ACHP	12/31/2016	11.6	60%
065A	14.35	26.866	12.516	2007	ACIP	12/1/2007	6.65	53%
125A	66.558	75.406	8.848	2007	ACIP	12/1/2007	8.8	99%
036C	80.815	83.71	2.895	2011	ACIP	8/26/2011	2.895	100%
086A	27.718	32.248	4.53	2011	ACIP	9/30/2011	4.53	100%
036C	76.467	78.69	2.223	2011	ACIP	8/26/2011	2.223	100%
036C	78.69	79.73	1.04	2011	ACIP	8/26/2011	1.04	100%
036C	76.394	76.467	0.073	2011	ACIP	8/26/2011	0.067	92%
086A	32.248	51.167	18.919	2011	ACIP	9/30/2011	0.852	5%

ROUTE	REFPT	ENDREFPT	LENGTH	Year	Treatment Type	Accept Date	Treated miles	%Treatment
149A	45.465	62.655	17.19	2016	ACIP	12/31/2016	6.655	39%
149A	62.655	69.851	7.196	2016	ACIP	12/31/2016	7.196	100%
149A	69.851	71.901	2.05	2016	ACIP	12/31/2016	0.149	7%
065A	14.35	26.866	12.516	2006	AHIP	12/1/2006	5.866	47%
065A	26.866	36.175	9.309	2006	AHIP	12/1/2006	0.134	1%
065A	36.175	49.565	13.39	2006	AHIP	12/1/2006	10	75%
125A	0	29.46	29.46	2009	AHIP	12/1/2009	14	48%
149A	41.477	45.465	3.988	2013	AHIP	12/1/2013	3.265	82%
149A	45.465	62.655	17.19	2013	AHIP	12/1/2013	10.535	61%
012A	15.238	33.058	17.82	2008	AMDO	4/25/2008	7.062	40%
014B	71.538	90.959	19.421	2010	AMDO	6/25/2010	6.75	35%
110A	0	0.14	0.14	2010	AMDO	12/31/2010	0.1	71%
014B	51.317	71.538	20.221	2012	AMDO	9/6/2012	1.923	10%
096C	119.491	143.78	24.289	2015	AMDO	12/31/2015	6.6	27%
024E	0	0.619	0.619	2016	AMDO	12/31/2016	0.6	97%
025B	0.046	1.58	1.534	2016	AMDO	12/31/2016	1.48	96%
025B	1.58	1.948	0.368	2016	AMDO	12/31/2016	0.32	87%
072B	44.095	48.353	4.258	2016	AMDO	12/31/2016	4.258	100%
072B	48.353	54.064	5.711	2016	AMDO	12/31/2016	5.711	100%
096C	119.491	143.78	24.289	2016	AMDO	12/31/2016	1	4%
109A	53	54.79	1.79	2007	AMFL	2/7/2007	0.09	5%
159A	13.3	17.547	4.247	2007	AMFL	6/11/2007	0.2	5%
350A	72.444	72.577	0.133	2012	AMFL	6/30/2012	0.133	100%
350A	72.315	72.444	0.129	2012	AMFL	6/30/2012	0.044	34%
194A	0	3.8	3.8	2013	AMFL	9/30/2013	3.8	100%
194A	3.8	14.678	10.878	2013	AMFL	9/30/2013	6.33	58%
103A	13.265	22.488	9.223	2013	AMFL	12/31/2013	9.188	100%
096A	26.273	33.575	7.302	2014	AMFL	12/31/2014	7.302	100%
096A	33.575	42.21	8.635	2014	AMFL	12/31/2014	8.635	100%
350A	23.99	56.237	32.247	2014	AMFL	12/31/2014	9.31	29%
067E	117.349	122.311	4.962	2015	AMFL	12/31/2015	4.962	100%
103A	13.265	22.488	9.223	2015	AMFL	12/31/2015	0.035	0%
160C	416.531	425.681	9.15	2015	AMFL	12/31/2015	1.681	18%
160C	425.681	441.65	15.969	2015	AMFL	12/31/2015	0.019	0%
103A	6.7	13.265	6.565	2015	AMFL	12/31/2015	6.565	100%
040B	272.552	276.18	3.628	2016	AMFL	12/31/2016	1.348	37%
141A	64.395	110.525	46.13	2006	AMJO	6/30/2006	0.9	2%
350A	59.412	69.692	10.28	2012	AMJO	6/30/2012	5.992	58%
350A	69.692	72.021	2.329	2012	AMJO	6/30/2012	2.329	100%
350A	72.021	72.315	0.294	2012	AMJO	6/30/2012	0.294	100%

ROUTE	REFPT	ENDREFPT	LENGTH	Year	Treatment Type	Accept Date	Treated miles	%Treatment
350A	72.315	72.444	0.129	2012	AMJO	6/30/2012	0.085	66%
023A	0	9.571	9.571	2016	AMJO	12/31/2016	3	31%
069A	9.668	25.017	15.349	2011	AREC	11/11/2011	0.6	4%
350A	72.444	72.577	0.133	2012	AREC	6/30/2012	0.072	54%
040E	346.29	350.601	4.311	2013	ATHO	12/31/2013	4.301	100%
040E	350.601	350.862	0.261	2013	ATHO	12/31/2013	0.261	100%
040E	350.862	351.136	0.274	2014	ATHO	12/31/2013	0.238	87%
194A	0	3.8	3.8	2013	ATHO	9/30/2013	3.8	100%
194A	3.8	14.678	10.878	2013	ATHO	9/30/2013	6.3	58%
012A	15.238	33.058	17.82	2008	ATHO	4/25/2008	7.062	40%
086A	32.248	51.167	18.919	2014	ATHO	12/31/2014	12.4	66%
141A	11.271	44.124	32.853	2014	ATHO	6/30/2014	4.2	13%
094A	33.079	45.054	11.975	2015	ATHO	12/31/2015	1.921	16%
160C	403.656	406.685	3.029	2015	ATHO	12/31/2015	1.685	56%
160C	414.326	414.755	0.429	2015	ATHO	12/31/2015	0.429	100%
160C	414.755	416.531	1.776	2015	ATHO	12/31/2015	1.776	100%
160C	416.531	425.681	9.15	2015	ATHO	12/31/2015	6.469	71%
160C	406.685	414.326	7.641	2015	ATHO	12/31/2015	7.641	100%
023A	0	9.571	9.571	2016	ATHO	12/31/2016	6.571	69%
023A	16	17.507	1.507	2016	ATHO	12/31/2016	1.5	100%
024B	423.059	429.604	6.545	2016	ATHO	12/31/2016	6.104	93%
024B	429.604	436.576	6.972	2016	ATHO	12/31/2016	6.972	100%
024C	437.453	446.851	9.398	2016	ATHO	12/31/2016	0.547	6%
096C	119.491	143.78	24.289	2016	ATHO	12/31/2016	5.58	23%
350A	23.99	56.237	32.247	2016	ATHO	12/31/2016	13.4	42%

Appendix C-1: Optimized Maintenance Decisions on LVRs in Region

4 Using CDOT Strategy

ROUTE	REFPT	END REFPT	LENGTH	Maintenance Decisions										
				2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
006I	343.7	345	1.012	DN	DN	DN	DN	DN	DN	ATHO	DN	ATHO	DN	DN
006I	345.93	346	0.497	ATHO	DN	DN	DN	DN	DN	DN	DN	ATHO	DN	DN
006Z	0.445	0.6	0.159	DN	DN	DN	DN	DN	ATHO	DN	DN	DN	DN	DN
007A	3.879	14.9	11.031	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
007A	14.91	16.1	1.176	DN	DN	DN	DN	DN	ATHO	DN	DN	ATHO	DN	ATHO
007A	16.086	19.2	3.163	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
007A	19.249	32.6	13.4	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
007E	0	0.57	0.57	DN	ATHO	ATHO	DN	DN	DN	DN	ATHO	ATHO	DN	DN
007E	0.57	1.59	1.022	DN	DN	DN	DN	DN	ATHO	DN	DN	DN	DN	DN
011A	0	0.41	0.41	DN	DN	ATHO	DN	DN	DN	DN	DN	ATHO	DN	DN
011A	0.41	1.35	0.94	DN	DN	DN	DN	DN	DN	ATHO	DN	DN	DN	DN
014B	71.538	91	19.421	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
023A	0	9.57	9.571	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
023A	16	17.5	1.507	DN	ATHO	DN	DN	DN	DN	DN	DN	DN	ACHP	DN
024B	419.95	423	2.757	DN	DN	DN	DN	DN	ATHO	DN	DN	DN	DN	DN
024B	422.71	423	0.352	ATHO	DN	DN	DN	DN	DN	DN	DN	DN	ATHO	ATHO
024B	423.06	430	6.545	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
024B	429.6	437	6.972	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
024C	437.45	447	9.398	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
024C	451.87	454	1.999	DN	DN	DN	DN	DN	ATHO	DN	DN	DN	ATHO	DN
024D	456.02	457	0.702	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
039A	3.353	7.57	4.218	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
040F	360.2	363	2.798	ATHO	DN	GM	DN	GM	ACHP	ACHP	DN	DN	DN	ACHP
040G	380.69	381	0.311	ATHO	DN	DN	DN	DN	DN	DN	DN	DN	ACHP	DN
040G	381	382	1.184	DN	DN	DN	DN	DN	DN	DN	DN	DN	ATHO	DN
052A	58.89	60.9	2.01	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
052A	60.9	70.9	9.995	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
055A	0	0.16	0.162	DN	ACHP	DN	DN	DN	ACHP	ACHP	DN	DN	ACHP	DN
055A	0.162	2.42	2.255	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
059A	15.019	33	17.981	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
059A	33	41	7.963	DN	ACHP	DN	DN	DN	DN	DN	DN	ACHP	DN	DN
059B	74.474	87.5	13.061	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
059B	122.86	131	7.724	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
059B	130.59	146	14.929	DN	DN	DN	ACHP	DN	DN	DN	DN	DN	DN	DN
059B	147.15	147	0.069	DN	ACHP	DN	GM	DN	DN	DN	DN	ACHP	DN	DN

ROUTE	REFPT	END REFPT	LENGTH	Maintenance Decisions									
				2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
059B	147.22	148	0.289	ACHP	DN	DN	ACHP	DN	GM	DN	DN	ACHP	GM
059B	147.81	156	7.78	GM	DN	DN	DN	DN	DN	ACHP	DN	ACHP	DN
059B	155.59	160	4.086	DN	DN	DN	DN	DN	DN	DN	ACHP	DN	ACHP
059B	159.68	166	6.818	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
059B	166.5	171	4.572	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
059B	171.07	173	2.267	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
061A	8.062	14	5.968	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
061A	14.03	22.5	8.481	DN	ACHP	DN	DN	DN	DN	DN	DN	DN	ACHP
063A	5.08	11.1	6.056	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
063A	11.136	24.2	13.06	ACHP	DN	DN	DN	DN	DN	DN	DN	DN	DN
063A	29.006	29.5	0.484	DN	ACHP	ACHP	DN	ACHP	GM	DN	DN	DN	DN
063A	29.49	39.3	9.766	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
063A	39.256	48.2	8.944	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
063A	48.2	53.3	5.09	DN	ACHP	DN	DN	DN	DN	DN	ACHP	GM	DN
070O	0	0.35	0.353	DN	DN	DN	ATHO	DN	DN	ATHO	DN	DN	DN
070P	0	0.04	0.04	DN	DN	DN	DN	DN	ATHO	DN	DN	DN	DN
070P	0.04	0.53	0.488	DN	ATHO	DN	DN	DN	DN	DN	DN	ATHO	DN
072B	44.095	48.4	4.258	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
072B	48.353	54.1	5.711	DN	DN	ATHO	DN	DN	DN	DN	DN	DN	ACHP
086A	27.718	32.2	4.53	DN	GM	DN	DN	DN	DN	ACHP	DN	DN	ACHP
086A	32.248	51.2	18.919	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
086A	51.167	59.3	8.112	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
094A	33.079	45.1	11.975	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
094A	45.054	54.6	9.527	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
094A	54.581	86.2	31.593	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
138A	21.739	26.3	4.59	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
138A	26.329	27.5	1.174	DN	DN	DN	DN	DN	ATHO	DN	DN	DN	DN
138A	27.503	27.9	0.408	ATHO	DN	DN	DN	GM	ACHP	DN	DN	DN	DN
138A	27.911	35	7.07	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
138A	34.981	41.4	6.404	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
138A	41.385	43	1.638	DN	DN	DN	DN	ATHO	DN	DN	DN	DN	DN
138A	43.023	43.1	0.061	DN	ATHO	ACHP	ACHP	DN	ACHP	DN	DN	DN	DN
138A	43.084	43.4	0.329	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
138A	50.476	50.6	0.157	ATHO	DN	DN	ATHO	DN	ATHO	DN	DN	DN	DN
138A	50.633	50.9	0.235	DN	DN	DN	DN	ATHO	DN	DN	ATHO	DN	DN
138A	50.868	54	3.132	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
138A	54	54.8	0.81	DN	DN	ATHO	DN	DN	DN	DN	DN	DN	DN
138A	58.534	59.8	1.289	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
144A	0	0.03	0.027	ACHP	ACHP	DN	DN	DN	DN	DN	DN	DN	DN
144A	0.027	2.82	2.794	DN	DN	DN	ATHO	DN	DN	DN	DN	DN	DN
144A	2.821	10.5	7.672	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN

ROUTE	REFPT	END REFPT	LENGTH	Maintenance Decisions									
				2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
144A	10.493	11.1	0.569	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
144A	11.062	16.6	5.539	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
144A	16.601	20.8	4.24	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
144A	26.066	26.9	0.821	ATHO	DN	DN	ATHO	DN	DN	DN	DN	DN	DN
170A	0	2.16	2.157	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
257B	0.037	0.64	0.607	DN	DN	DN	ATHO	DN	DN	DN	DN	DN	DN
257B	0.644	1.15	0.502	DN	DN	DN	DN	DN	DN	DN	DN	ATHO	ATHO
385C	167.12	176	8.822	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
385E	313.85	318	3.782	DN	DN	DN	DN	DN	ATHO	ATHO	DN	DN	DN

Appendix C-2: Optimized Maintenance Decisions on LVRs in Region

4 Using Proposed Strategy

ROUTE	REFPT	END REFPT	Maintenance Decisions									
			2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
006I	343.70	344.712	DN	DN	DN	DN	ACIP+ATHO	DN	DN	DN	DN	DN
006I	345.93	346.425	ACIP+ATHO	GM	GM	DN	DN	DN	DN	ACHP	DN	DN
006Z	0.45	0.604	DN	ACIP+ATHO	DN	GM	DN	DN	DN	DN	DN	DN
007A	3.88	14.91	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
007A	14.91	16.086	DN	ACIP+ACHP	DN	DN	DN	DN	DN	ACHP	DN	DN
007A	16.09	19.249	DN	DN	ACIP+ACHP	DN	DN	DN	DN	DN	DN	DN
007A	19.25	32.649	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
007E	0.00	0.57	DN	DN	DN	DN	DN	DN	FDR	GM	DN	DN
007E	0.57	1.592	DN	DN	DN	DN	DN	DN	FDR	GM	DN	DN
011A	0.00	0.41	DN	ACIP+ATHO	DN	DN	DN	GM	GM	DN	DN	ACIP+ACHP
011A	0.41	1.35	DN	ACIP+ACHP	DN	DN	DN	DN	DN	ACHP	DN	DN
014B	71.54	90.959	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
023A	0.00	9.571	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
023A	16.00	17.507	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
024B	419.95	422.707	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
024B	422.71	423.059	ACIP+ATHO	DN	DN	DN	DN	GM	ACHP	ACHP	ACHP	ACHP
024B	423.06	429.604	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
024B	429.60	436.576	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
024C	437.45	446.851	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
024C	451.87	453.869	DN	DN	DN	DN	DN	DN	DN	DN	DN	FDR
024D	456.02	456.722	DN	DN	DN	DN	ACIP+ATHO	DN	DN	DN	DN	GM
039A	3.35	7.571	DN	DN	DN	DN	FDR	DN	DN	DN	DN	DN
040F	360.20	362.999	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
040G	380.69	381	DN	ACIP+ATHO	DN	DN	DN	DN	GM	ACHP	DN	DN
040G	381.00	382.184	DN	DN	ACIP+ATHO	DN	DN	DN	DN	GM	DN	DN
052A	58.89	60.9	ACIP+ACHP	GM	DN	DN	DN	DN	ACHP	DN	DN	ACIP+ACHP
052A	60.90	70.895	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
055A	0.00	0.162	ACIP+ACHP	GM	DN	DN	DN	DN	DN	DN	DN	DN
055A	0.16	2.417	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
059A	15.02	33	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
059A	33.00	40.963	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
059B	74.47	87.535	DN	DN	DN	DN	DN	DN	DN	DN	ACIP+ACHP	DN
059B	122.86	130.588	DN	GM	DN	DN	DN	DN	DN	DN	DN	DN
059B	130.59	145.517	DN	DN	DN	DN	DN	DN	DN	ACIP+ACHP	DN	DN
059B	147.15	147.218	DN	DN	DN	ACHP	DN	ACIP+ACHP	DN	DN	DN	DN

ROUTE	REFPT	END REFPT	Maintenance Decisions									
			2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
059B	147.22	147.507	DN	DN	DN	ACIP+ACHP	DN	DN	DN	GM	DN	DN
059B	147.81	155.594	DN	DN	DN	DN	DN	ACIP+ACHP	GM	DN	DN	DN
059B	155.59	159.68	GM	DN	DN	DN	DN	DN	ACIP+ACHP	DN	DN	DN
059B	159.68	166.498	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
059B	166.50	171.07	DN	DN	ACIP+ACHP	DN	DN	GM	DN	DN	ACHP	DN
059B	171.07	173.337	DN	ACIP+ACHP	DN	GM	DN	DN	GM	DN	DN	DN
061A	8.06	14.03	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
061A	14.03	22.511	DN	ACHP	DN	DN	DN	ACIP+ACHP	DN	GM	DN	DN
063A	5.08	11.136	DN	DN	DN	ACIP+ACHP	DN	GM	GM	DN	DN	DN
063A	11.14	24.196	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
063A	29.01	29.49	ACIP+ACHP	DN	DN	DN	DN	GM	ACHP	DN	ACHP	DN
063A	29.49	39.256	DN	DN	DN	ACIP+ACHP	DN	DN	DN	DN	DN	DN
063A	39.26	48.2	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
063A	48.20	53.29	DN	GM	DN	GM	DN	DN	DN	DN	DN	DN
070O	0.00	0.353	DN	ACIP+ATHO	GM	DN	DN	DN	GM	DN	DN	DN
070P	0.00	0.04	DN	ACIP+ATHO	DN	DN	DN	DN	DN	ACHP	ACHP	ACHP
070P	0.04	0.528	DN	DN	DN	DN	DN	FDR	DN	DN	DN	DN
072B	44.10	48.353	DN	DN	DN	DN	DN	DN	DN	DN	DN	ACIP+ATHO
072B	48.35	54.064	DN	DN	ACIP+ACHP	GM	DN	DN	DN	DN	DN	DN
086A	27.72	32.248	DN	DN	DN	DN	DN	DN	ACIP+ACHP	DN	DN	DN
086A	32.25	51.167	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
086A	51.17	59.279	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
094A	33.08	45.054	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
094A	45.05	54.581	ACIP+ACHP	DN	DN	DN	DN	DN	DN	DN	DN	DN
094A	54.58	86.174	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
138A	21.74	26.329	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
138A	26.33	27.503	DN	DN	DN	DN	ACIP+ATHO	DN	DN	DN	DN	GM
138A	27.50	27.911	ACIP+ACHP	DN	DN	GM	DN	DN	ACHP	ACHP	DN	DN
138A	27.91	34.981	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
138A	34.98	41.385	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
138A	41.39	43.023	DN	ACIP+ACHP	GM	DN	DN	DN	GM	DN	DN	DN
138A	43.02	43.084	DN	ACIP+ATHO	GM	DN	GM	DN	DN	ACHP	DN	DN
138A	43.08	43.413	DN	DN	DN	DN	DN	DN	ACIP+ATHO	DN	DN	DN
138A	50.48	50.633	DN	ACIP+ATHO	GM	GM	DN	DN	GM	ACHP	DN	DN
138A	50.63	50.868	DN	DN	DN	DN	DN	DN	FDR	DN	GM	DN
138A	50.87	54	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
138A	54.00	54.81	ACIP+ACHP	GM	DN	DN	DN	DN	DN	ACHP	DN	DN
138A	58.53	59.823	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
144A	0.00	0.027	DN	DN	DN	ACIP+ACHP	DN	DN	DN	GM	DN	ACHP
144A	0.03	2.821	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
144A	2.82	10.493	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN

ROUTE	REFPT	END REFPT	Maintenance Decisions										
			2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
144A	10.49	11.062	DN	DN	DN	DN	DN	DN	DN	ACIP+ATHO	DN	DN	GM
144A	11.06	16.601	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
144A	16.60	20.841	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
144A	26.07	26.887	ACIP+ATHO	DN	GM	DN	DN	DN	GM	DN	DN	ACIP+ACHP	DN
170A	0.00	2.157	DN	ACIP+ACHP	DN	GM	DN	DN	DN	GM	DN	ACHP	DN
257B	0.04	0.644	DN	DN	FDR	DN	DN	DN	DN	DN	DN	DN	DN
257B	0.64	1.146	DN	DN	DN	FDR	DN	DN	DN	DN	DN	GM	DN
385C	167.12	175.939	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
385E	313.85	317.631	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN

Appendix D-1: Optimized Maintenance Decisions on Roads with Marginal Conditions Using CDOT Strategy

ROUTE	REFPT	END REFPT	Region	LENGTH	Maintenance Decisions										
					2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
006A	11.83	13.87	3	2.04	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
006I	343.70	344.71	4	1.01	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
006I	345.93	346.43	4	0.50	DN	DN	DN	DN	DN	DN	ATHO	DN	ATHO	DN	DN
006Z	0.45	0.60	4	0.16	DN	DN	DN	DN	DN	DN	DN	ATHO	DN	DN	DN
007E	0.00	0.57	4	0.57	DN	DN	ATHO	ATHO	DN	DN	DN	DN	DN	ATHO	DN
007E	0.57	1.59	4	1.02	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
011A	0.00	0.41	4	0.41	ATHO	ATHO	DN	ACHP	ACHP	ACHP	DN	ACHP	DN	ATHO	
015A	2.39	8.42	5	6.03	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
015A	8.42	10.41	5	1.99	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
015A	10.41	12.37	5	1.96	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
024B	419.95	422.71	4	2.76	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
024B	422.71	423.06	4	0.35	DN	DN	DN	DN	DN	DN	DN	DN	DN	ATHO	ATHO
024C	437.45	446.85	4	9.40	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
024C	451.87	453.87	4	2.00	ATHO	DN	DN	DN	DN	DN	DN	DN	ATHO	DN	DN
024D	456.02	456.72	4	0.70	DN	DN	DN	DN	DN	ATHO	DN	DN	DN	DN	DN
036C	76.39	76.47	1	0.07	ATHO	DN	DN	DN	DN	ATHO	DN	DN	DN	DN	DN
039A	3.35	7.57	4	4.22	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
040B	272.55	276.18	1	3.63	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
040C	279.24	281.82	1	2.58	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
050C	15.67	16.95	2	1.28	DN	DN	DN	DN	DN	DN	DN	DN	DN	ATHO	ATHO
052A	60.90	70.90	4	10.00	DN	ATHO	DN	DN	DN	DN	DN	DN	DN	DN	DN
055A	0.16	2.42	4	2.26	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
065A	49.57	51.17	3	1.60	DN	DN	DN	DN	DN	DN	DN	DN	ATHO	DN	DN
067A	0.00	6.84	2	6.84	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
069A	26.04	49.42	2	23.38	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
069A	49.42	54.13	2	4.70	DN	DN	DN	DN	DN	DN	DN	DN	DN	ATHO	DN
070N	0.00	0.13	1	0.13	ATHO	DN	DN	DN	DN	ATHO	ATHO	ACHP	DN	ACHP	ACHP
070P	0.00	0.04	4	0.04	DN	DN	DN	DN	DN	DN	DN	DN	ATHO	DN	DN
070P	0.04	0.53	4	0.49	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
071A	7.04	9.03	2	2.00	DN	DN	DN	DN	DN	ATHO	DN	DN	DN	DN	DN
096A	1.31	11.06	2	9.75	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
096B	70.57	75.50	2	4.92	DN	DN	ATHO	DN	DN	DN	DN	DN	DN	DN	DN
100A	0.00	0.28	2	0.28	ATHO	DN	DN	ATHO	ATHO	ATHO	ACHP	ACHP	ACHP	ACHP	ACHP
100A	0.28	0.42	2	0.14	DN	DN	DN	ATHO	DN	DN	DN	DN	DN	DN	DN
101A	0.40	1.15	2	0.75	ATHO	DN	DN	ATHO	ACHP	DN	ATHO	GM	ACHP	GM	GM
101A	1.15	5.15	2	4.00	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
101A	5.15	16.45	2	11.30	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
101A	16.45	21.41	2	4.96	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
109A	0.00	7.72	2	7.72	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
109A	53.00	54.79	2	1.79	ATHO	DN	DN	ATHO	ACHP	ACHP	ACHP	ACHP	ACHP	DN	ACHP
109A	64.75	65.33	2	0.58	DN	DN	DN	ATHO	ATHO	DN	DN	DN	DN	ATHO	DN
114A	19.00	20.26	5	1.26	ATHO	DN	ATHO	ATHO	ATHO	DN	ACHP	ACHP	DN	ATHO	

ROUTE	REFPT	END REFPT	Region	LENGTH	Maintenance Decisions									
					2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
116A	0.00	12.04	2	12.04	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
116A	12.04	12.30	2	0.26	DN	DN	ATHO	DN	DN	DN	DN	DN	DN	ATHO
116A	12.30	13.06	2	0.76	DN	DN	DN	DN	DN	ATHO	DN	DN	DN	DN
116A	20.03	27.02	2	6.99	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
116A	27.02	32.32	2	5.30	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
120A	0.00	3.11	2	3.11	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
133B	13.27	16.08	3	2.81	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
136A	0.15	0.55	5	0.40	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
136A	0.55	1.58	5	1.03	DN	DN	DN	DN	DN	DN	DN	ATHO	DN	DN
136A	3.48	4.47	5	0.99	DN	DN	DN	DN	DN	DN	ATHO	DN	DN	DN
138A	50.48	50.63	4	0.16	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
138A	50.63	50.87	4	0.24	ATHO	DN	DN	DN	DN	ATHO	ATHO	DN	DN	ATHO
138A	50.87	54.00	4	3.13	DN	ATHO	DN	ATHO	ACHP	ACHP	ACHP	ACHP	DN	ACHP
141A	64.40	110.53	5	46.13	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
142A	3.28	13.40	5	10.12	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
142A	13.40	22.96	5	9.56	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
142A	22.96	28.71	5	5.75	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
142A	28.71	33.84	5	5.13	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
144A	10.49	11.06	4	0.57	DN	DN	DN	DN	ATHO	ATHO	ATHO	DN	DN	DN
144A	11.06	16.60	4	5.54	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
144A	16.60	20.84	4	4.24	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
144A	26.07	26.89	4	0.82	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
149A	45.47	62.66	3	17.19	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
149A	62.66	69.85	3	7.20	DN	DN	DN	DN	DN	ATHO	DN	DN	DN	DN
149A	69.85	71.90	3	2.05	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
159A	18.33	30.96	5	12.63	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
160C	375.83	382.77	2	6.94	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
160C	382.77	386.61	2	3.83	DN	DN	ATHO	DN	DN	DN	DN	DN	DN	DN
160D	0.00	0.01	5	0.01	DN	DN	DN	DN	ATHO	ATHO	DN	ATHO	DN	ATHO
160D	0.01	1.21	5	1.20	ATHO	DN	DN	ATHO	ACHP	ACHP	ACHP	DN	ACHP	DN
160D	1.21	1.46	5	0.25	DN	DN	DN	ATHO	ATHO	ATHO	ATHO	ACHP	ACHP	ACHP
160D	1.46	2.49	5	1.03	ATHO	DN	DN	ATHO	ACHP	ACHP	ACHP	ACHP	ACHP	DN
167A	0.00	1.67	2	1.67	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
167A	1.67	2.01	2	0.33	DN	DN	ATHO	DN	ATHO	DN	DN	ATHO	DN	DN
167A	2.01	2.37	2	0.36	DN	DN	DN	DN	DN	DN	ATHO	DN	DN	DN
167A	2.37	2.91	2	0.54	DN	DN	ATHO	DN	DN	DN	ATHO	ATHO	DN	DN
167A	2.91	4.86	2	1.96	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
194A	14.68	20.33	2	5.65	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
196A	0.00	1.60	2	1.60	DN	DN	DN	DN	ATHO	DN	DN	ATHO	DN	DN
196A	1.60	6.91	2	5.31	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
209A	0.00	1.39	2	1.39	ATHO	DN	ATHO	DN	ATHO	DN	ACHP	ACHP	DN	ACHP
209A	1.39	1.53	2	0.14	ATHO	DN	DN	ATHO	ATHO	ACHP	ACHP	ACHP	ACHP	ACHP
257B	0.04	0.64	4	0.61	DN	DN	ATHO	DN	DN	DN	DN	DN	DN	DN
257B	0.64	1.15	4	0.50	DN	DN	DN	DN	ATHO	DN	ATHO	DN	DN	ATHO
266A	0.06	0.22	2	0.16	DN	DN	ATHO	DN	ATHO	DN	DN	DN	DN	DN
266A	0.22	1.31	2	1.09	DN	DN	DN	DN	DN	DN	ATHO	DN	DN	DN
266A	1.31	2.96	2	1.66	ATHO	DN	DN	ATHO	ACHP	ACHP	DN	ACHP	ACHP	GM
266A	2.96	5.36	2	2.40	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
266A	5.36	9.51	2	4.15	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN

ROUTE	REFPT	END REFPT	Region	LENGTH	Maintenance Decisions									
					2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
266A	9.51	11.52	2	2.00	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
347A	0.00	1.82	3	1.82	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
368A	6.02	12.33	5	6.31	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
370A	2.97	4.00	5	1.03	ATHO	ACHP	DN	ACHP	GM	ATHO	DN	ACHP	DN	ATHO
370A	4.00	5.98	5	1.98	DN	DN	DN	DN	DN	DN	DN	DN	ATHO	DN

Appendix D-2: Optimized Maintenance Decisions on Roads with Marginal Conditions Using Proposed Strategy

ROUTE	REFPT	END REFPT	Region	Maintenance Decisions										
				2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
006A	11.83	13.87	3	DN	DN	DN	DN	DN	DN	DN	DN	DN	FDR	DN
006I	343.70	344.71	4	DN	DN	DN	ACIP+ATHO	DN	DN	DN	ACIP+ATHO	DN	DN	DN
006I	345.93	346.43	4	DN	DN	DN	DN	DN	DN	DN	DN	DN	FDR	DN
006Z	0.45	0.60	4	DN	DN	DN	DN	FDR	DN	ACHP	DN	DN	DN	DN
007E	0.00	0.57	4	DN	DN	DN	DN	DN	DN	FDR	DN	ACHP	DN	DN
007E	0.57	1.59	4	DN	DN	DN	FDR	DN	ACHP	ACHP	DN	DN	DN	DN
011A	0.00	0.41	4	DN	DN	DN	DN	DN	DN	DN	FDR	GM	DN	DN
015A	2.39	8.42	5	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
015A	8.42	10.41	5	DN	DN	DN	DN	DN	DN	DN	DN	DN	ACIP+ATHO	GM
015A	10.41	12.37	5	DN	DN	ACIP+ATHO	DN	DN	DN	DN	DN	DN	DN	DN
024B	419.95	422.71	4	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
024B	422.71	423.06	4	ACIP+ATHO	DN	DN	DN	DN	ACIP+ATHO	GM	DN	DN	DN	DN
024C	437.45	446.85	4	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
024C	451.87	453.87	4	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
024D	456.02	456.72	4	DN	DN	DN	DN	DN	DN	DN	DN	DN	FDR	DN
036C	76.39	76.47	1	ACIP+ATHO	DN	DN	DN	ACIP+ATHO	DN	ACHP	DN	DN	DN	DN
039A	3.35	7.57	4	DN	DN	DN	FDR	GM	DN	DN	DN	DN	DN	DN
040B	272.55	276.18	1	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
040C	279.24	281.82	1	ACIP+ATHO	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
050C	15.67	16.95	2	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
052A	60.90	70.90	4	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
055A	0.16	2.42	4	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
065A	49.57	51.17	3	DN	DN	DN	FDR	DN	DN	DN	DN	DN	DN	DN
067A	0.00	6.84	2	DN	DN	DN	DN	DN	DN	DN	FDR	DN	DN	DN
069A	26.04	49.42	2	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
069A	49.42	54.13	2	DN	DN	DN	DN	DN	ACIP+ATHO	GM	DN	DN	DN	DN
070N	0.00	0.13	1	DN	ACIP+ATHO	DN	DN	ACIP+ACHP	DN	ACHP	DN	DN	DN	DN
070P	0.00	0.04	4	ACIP+ATHO	DN	ACHP	DN	DN	DN	DN	DN	DN	DN	ACIP+ATHO
070P	0.04	0.53	4	DN	DN	DN	DN	FDR	DN	DN	DN	DN	DN	DN
071A	7.04	9.03	2	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
096A	1.31	11.06	2	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
096B	70.57	75.50	2	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
100A	0.00	0.28	2	DN	DN	DN	DN	DN	ACIP+ATHO	GM	ACHP	DN	DN	DN
100A	0.28	0.42	2	DN	DN	ACIP+ATHO	GM	DN	DN	DN	DN	DN	DN	ACIP+ATHO
101A	0.40	1.15	2	DN	DN	DN	ACIP+ATHO	GM	DN	DN	ACIP+ATHO	DN	DN	DN
101A	1.15	5.15	2	DN	DN	DN	DN	DN	FDR	GM	DN	ACIP+ACHP	DN	DN
101A	5.15	16.45	2	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
101A	16.45	21.41	2	DN	DN	DN	DN	DN	DN	FDR	GM	DN	ACIP+ACHP	DN
109A	0.00	7.72	2	DN	ACIP+ATHO	DN	DN	DN	DN	DN	DN	DN	DN	DN
109A	53.00	54.79	2	DN	DN	DN	DN	ACIP+ATHO	DN	DN	DN	DN	DN	DN
109A	64.75	65.33	2	DN	DN	ACIP+ATHO	GM	ACHP	DN	DN	DN	DN	DN	DN
114A	19.00	20.26	5	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
116A	0.00	12.04	2	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
116A	12.04	12.30	2	ACIP+ATHO	DN	DN	ACIP+ACHP	GM	ACHP	DN	DN	DN	DN	DN
116A	12.30	13.06	2	DN	DN	DN	DN	DN	DN	FDR	DN	DN	DN	ACIP+ACHP
116A	20.03	27.02	2	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
116A	27.02	32.32	2	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN

ROUTE	REFPT	END REFPT	Region	Maintenance Decisions									
				2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
120A	0.00	3.11	2	DN	DN	DN	DN	DN	DN	DN	DN	FDR	GM
133B	13.27	16.08	3	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
136A	0.15	0.55	5	DN	DN	DN	DN	DN	FDR	GM	DN	DN	ACIP+ATHO
136A	0.55	1.58	5	DN	DN	DN	DN	ACIP+ATHO	DN	DN	DN	DN	DN
136A	3.48	4.47	5	DN	ACIP+ATHO	DN	DN	DN	DN	ACIP+ATHO	DN	DN	ACIP+ACHP
138A	50.48	50.63	4	DN	DN	DN	DN	DN	FDR	GM	DN	DN	DN
138A	50.63	50.87	4	DN	DN	DN	DN	FDR	DN	DN	DN	DN	DN
138A	50.87	54.00	4	DN	DN	DN	DN	DN	DN	DN	DN	DN	FDR
141A	64.40	110.53	5	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
142A	3.28	13.40	5	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
142A	13.40	22.96	5	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
142A	22.96	28.71	5	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
142A	28.71	33.84	5	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
144A	10.49	11.06	4	ACIP+ATHO	DN	DN	DN	DN	DN	DN	ACIP+ATHO	DN	DN
144A	11.06	16.60	4	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
144A	16.60	20.84	4	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
144A	26.07	26.89	4	DN	ACIP+ATHO	DN	DN	DN	DN	ACIP+ATHO	DN	DN	ACIP+ACHP
149A	45.47	62.66	3	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
149A	62.66	69.85	3	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
149A	69.85	71.90	3	ACIP+ATHO	DN	DN	DN	DN	DN	DN	DN	DN	DN
159A	18.33	30.96	5	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
160C	375.83	382.77	2	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
160C	382.77	386.61	2	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
160D	0.00	0.01	5	DN	ACIP+ATHO	DN	ACHP	DN	DN	DN	ACIP+ATHO	DN	DN
160D	0.01	1.21	5	DN	DN	DN	DN	ACIP+ATHO	GM	DN	ACIP+ACHP	DN	DN
160D	1.21	1.46	5	DN	DN	ACIP+ATHO	DN	DN	DN	DN	DN	DN	DN
160D	1.46	2.49	5	DN	ACIP+ATHO	DN	DN	DN	DN	DN	DN	DN	DN
167A	0.00	1.67	2	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
167A	1.67	2.01	2	DN	DN	DN	DN	DN	DN	FDR	GM	DN	DN
167A	2.01	2.37	2	DN	FDR	GM	ACHP	ACHP	DN	ACIP+ACHP	DN	DN	DN
167A	2.37	2.91	2	DN	DN	DN	DN	FDR	GM	ACHP	DN	DN	DN
167A	2.91	4.86	2	DN	DN	DN	DN	FDR	DN	ACHP	DN	ACIP+ACHP	DN
194A	14.68	20.33	2	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
196A	0.00	1.60	2	DN	DN	ACIP+ATHO	DN	DN	ACIP+ACHP	GM	DN	DN	DN
196A	1.60	6.91	2	ACIP+ATHO	DN	DN	DN	DN	DN	DN	DN	DN	DN
209A	0.00	1.39	2	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
209A	1.39	1.53	2	DN	ACIP+ATHO	DN	DN	DN	DN	DN	DN	DN	ACIP+ATHO
257B	0.04	0.64	4	DN	DN	FDR	GM	DN	DN	DN	DN	DN	DN
257B	0.64	1.15	4	DN	DN	FDR	DN	DN	DN	DN	DN	DN	DN
266A	0.06	0.22	2	DN	DN	ACIP+ATHO	DN	DN	DN	ACIP+ATHO	DN	DN	ACIP+ACHP
266A	0.22	1.31	2	DN	DN	ACIP+ATHO	DN	DN	DN	DN	DN	DN	DN
266A	1.31	2.96	2	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
266A	2.96	5.36	2	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
266A	5.36	9.51	2	DN	DN	ACIP+ATHO	DN	DN	DN	DN	DN	DN	DN
266A	9.51	11.52	2	DN	DN	DN	ACIP+ATHO	DN	DN	DN	DN	DN	ACIP+ATHO
347A	0.00	1.82	3	DN	DN	DN	DN	DN	DN	DN	DN	DN	FDR
368A	6.02	12.33	5	DN	DN	DN	DN	DN	DN	DN	DN	DN	DN
370A	2.97	4.00	5	DN	DN	DN	DN	ACIP+ATHO	DN	ACHP	DN	DN	DN
370A	4.00	5.98	5	DN	DN	DN	DN	ACIP+ATHO	DN	ACHP	ACHP	DN	DN

Appendix E-1: Capital Improvement Plan of Roads with Marginal Conditions Using CDOT Strategy

ROUTE	REFPT	END REFPT	Region	LENGTH	Maintenance Decisions				
					2016	2017	2018	2019	2020
006A	11.83	13.87	3	2.04	ATHO	DN	DN	DN	ATHO
006I	343.70	344.71	4	1.01	ATHO	ATHO	DN	ACHP	ACHP
006I	345.93	346.43	4	0.50	DN	ATHO	ATHO	DN	DN
006Z	0.45	0.60	4	0.16	ATHO	DN	DN	DN	ATHO
007E	0.00	0.57	4	0.57	DN	DN	DN	ATHO	DN
007E	0.57	1.59	4	1.02	DN	DN	ATHO	ATHO	DN
011A	0.00	0.41	4	0.41	ATHO	ATHO	ACHP	DN	ACHP
015A	2.39	8.42	5	6.03	DN	DN	DN	DN	ATHO
015A	8.42	10.41	5	1.99	DN	DN	DN	DN	ATHO
015A	10.41	12.37	5	1.96	DN	ATHO	DN	DN	DN
024B	419.95	422.71	4	2.76	ATHO	ATHO	DN	ACHP	DN
024B	422.71	423.06	4	0.35	DN	DN	ATHO	DN	DN
024C	437.45	446.85	4	9.40	DN	ATHO	DN	ATHO	ACHP
024C	451.87	453.87	4	2.00	DN	ATHO	DN	DN	DN
024D	456.02	456.72	4	0.70	DN	ATHO	DN	DN	ATHO
036C	76.39	76.47	1	0.07	DN	ATHO	ATHO	ATHO	ATHO
039A	3.35	7.57	4	4.22	ATHO	DN	DN	DN	ATHO
040B	272.55	276.18	1	3.63	DN	DN	ATHO	ATHO	ATHO
040C	279.24	281.82	1	2.58	DN	ATHO	DN	DN	ATHO
050C	15.67	16.95	2	1.28	ATHO	DN	DN	DN	DN
052A	60.90	70.90	4	10.00	DN	ATHO	DN	DN	DN
055A	0.16	2.42	4	2.26	ATHO	DN	DN	DN	DN
065A	49.57	51.17	3	1.60	ATHO	ATHO	DN	ACHP	ACHP
067A	0.00	6.84	2	6.84	DN	ATHO	ATHO	ATHO	ACHP
069A	26.04	49.42	2	23.38	DN	DN	DN	DN	DN
069A	49.42	54.13	2	4.70	DN	DN	DN	DN	DN
070N	0.00	0.13	1	0.13	DN	DN	DN	DN	DN
070P	0.00	0.04	4	0.04	DN	DN	ATHO	DN	DN
070P	0.04	0.53	4	0.49	ATHO	ATHO	DN	DN	DN
071A	7.04	9.03	2	2.00	DN	DN	ATHO	DN	DN
096A	1.31	11.06	2	9.75	DN	DN	DN	DN	DN
096B	70.57	75.50	2	4.92	DN	DN	DN	DN	ATHO
100A	0.00	0.28	2	0.28	DN	DN	ATHO	DN	ATHO
100A	0.28	0.42	2	0.14	DN	ATHO	DN	DN	DN
101A	0.40	1.15	2	0.75	DN	ATHO	DN	DN	ATHO
101A	1.15	5.15	2	4.00	DN	DN	ATHO	DN	DN
101A	5.15	16.45	2	11.30	DN	DN	DN	DN	DN
101A	16.45	21.41	2	4.96	DN	DN	ATHO	DN	ATHO
109A	0.00	7.72	2	7.72	DN	DN	DN	ATHO	ATHO
109A	53.00	54.79	2	1.79	ATHO	ACHP	ACHP	ACHP	DN
109A	64.75	65.33	2	0.58	ATHO	DN	DN	DN	ATHO
114A	19.00	20.26	5	1.26	DN	ATHO	DN	ATHO	DN

ROUTE	REFPT	END REFPT	Region	LENGTH	Maintenance Decisions				
					2016	2017	2018	2019	2020
116A	0.00	12.04	2	12.04	DN	ATHO	ATHO	DN	ACHP
116A	12.04	12.30	2	0.26	DN	DN	DN	DN	ATHO
116A	12.30	13.06	2	0.76	DN	DN	DN	DN	DN
116A	20.03	27.02	2	6.99	DN	DN	DN	DN	DN
116A	27.02	32.32	2	5.30	DN	DN	ATHO	DN	DN
120A	0.00	3.11	2	3.11	DN	ATHO	DN	ATHO	ACHP
133B	13.27	16.08	3	2.81	DN	DN	DN	DN	DN
136A	0.15	0.55	5	0.40	DN	ATHO	DN	ATHO	DN
136A	0.55	1.58	5	1.03	DN	ATHO	DN	DN	ATHO
136A	3.48	4.47	5	0.99	ATHO	ATHO	DN	ATHO	DN
138A	50.48	50.63	4	0.16	ATHO	DN	ATHO	ATHO	DN
138A	50.63	50.87	4	0.24	DN	DN	DN	ATHO	DN
138A	50.87	54.00	4	3.13	DN	ATHO	ATHO	ACHP	DN
141A	64.40	110.53	5	46.13	DN	DN	DN	DN	DN
142A	3.28	13.40	5	10.12	DN	DN	DN	DN	DN
142A	13.40	22.96	5	9.56	ATHO	DN	ATHO	DN	ACHP
142A	22.96	28.71	5	5.75	DN	DN	DN	DN	ATHO
142A	28.71	33.84	5	5.13	ATHO	DN	ATHO	ATHO	ACHP
144A	10.49	11.06	4	0.57	DN	DN	DN	DN	DN
144A	11.06	16.60	4	5.54	DN	DN	DN	DN	DN
144A	16.60	20.84	4	4.24	ATHO	DN	DN	DN	DN
144A	26.07	26.89	4	0.82	DN	DN	DN	DN	DN
149A	45.47	62.66	3	17.19	ATHO	DN	ATHO	ACHP	ACHP
149A	62.66	69.85	3	7.20	DN	DN	DN	ATHO	ATHO
149A	69.85	71.90	3	2.05	DN	DN	DN	DN	DN
159A	18.33	30.96	5	12.63	DN	DN	DN	DN	DN
160C	375.83	382.77	2	6.94	DN	ATHO	ATHO	ACHP	GM
160C	382.77	386.61	2	3.83	DN	ATHO	DN	DN	DN
160D	0.00	0.01	5	0.01	DN	DN	DN	DN	ATHO
160D	0.01	1.21	5	1.20	ATHO	DN	ATHO	DN	ACHP
160D	1.21	1.46	5	0.25	DN	DN	DN	DN	ATHO
160D	1.46	2.49	5	1.03	ATHO	DN	DN	ATHO	ACHP
167A	0.00	1.67	2	1.67	DN	DN	ATHO	DN	ATHO
167A	1.67	2.01	2	0.33	ATHO	ATHO	ACHP	DN	DN
167A	2.01	2.37	2	0.36	ATHO	DN	ATHO	ATHO	ATHO
167A	2.37	2.91	2	0.54	ATHO	DN	DN	DN	ATHO
167A	2.91	4.86	2	1.96	ATHO	DN	DN	DN	DN
194A	14.68	20.33	2	5.65	ATHO	ACHP	ACHP	GM	ACHP
196A	0.00	1.60	2	1.60	DN	DN	DN	ATHO	ATHO
196A	1.60	6.91	2	5.31	ATHO	ATHO	GM	ACHP	ACHP
209A	0.00	1.39	2	1.39	DN	ATHO	DN	DN	ATHO
209A	1.39	1.53	2	0.14	DN	DN	ATHO	ATHO	ATHO
257B	0.04	0.64	4	0.61	ATHO	DN	DN	DN	DN
257B	0.64	1.15	4	0.50	DN	DN	ATHO	DN	DN
266A	0.06	0.22	2	0.16	DN	DN	ATHO	ATHO	ATHO
266A	0.22	1.31	2	1.09	DN	DN	ATHO	DN	DN
266A	1.31	2.96	2	1.66	DN	DN	DN	ATHO	DN
266A	2.96	5.36	2	2.40	ATHO	ATHO	GM	ACHP	GM
266A	5.36	9.51	2	4.15	ATHO	DN	DN	DN	ATHO

ROUTE	REFPT	END REFPT	Region	LENGTH	Maintenance Decisions				
					2016	2017	2018	2019	2020
266A	9.51	11.52	2	2.00	ATHO	ACHP	DN	ATHO	ACHP
347A	0.00	1.82	3	1.82	ATHO	ATHO	ACHP	DN	ACHP
368A	6.02	12.33	5	6.31	DN	ATHO	DN	DN	DN
370A	2.97	4.00	5	1.03	DN	DN	DN	DN	DN
370A	4.00	5.98	5	1.98	ATHO	DN	DN	DN	ATHO

Appendix E-2: Capital Improvement Plan of Roads with Marginal Conditions Using Proposed Strategy

ROUTE	REFPT	END REFPT	Region	LENGTH	Maintenance Decisions				
					2016	2017	2018	2019	2020
006A	11.83	13.87	3	2.04	DN	ACIP+ATHO	GM	DN	ACIP+ACHP
006I	343.70	344.71	4	1.01	DN	DN	DN	ACIP+ATHO	DN
006I	345.93	346.43	4	0.50	DN	ACIP+ATHO	DN	ACHP	ACHP
006Z	0.45	0.60	4	0.16	DN	DN	DN	DN	DN
007E	0.00	0.57	4	0.57	DN	FDR	GM	DN	DN
007E	0.57	1.59	4	1.02	DN	DN	DN	DN	DN
011A	0.00	0.41	4	0.41	DN	DN	FDR	DN	DN
015A	2.39	8.42	5	6.03	DN	DN	DN	DN	DN
015A	8.42	10.41	5	1.99	DN	DN	ACIP+ATHO	GM	DN
015A	10.41	12.37	5	1.96	DN	DN	DN	ACIP+ATHO	DN
024B	419.95	422.71	4	2.76	DN	ACIP+ATHO	GM	ACHP	DN
024B	422.71	423.06	4	0.35	DN	DN	FDR	DN	DN
024C	437.45	446.85	4	9.40	DN	DN	DN	DN	DN
024C	451.87	453.87	4	2.00	ACIP+ATHO	DN	DN	DN	DN
024D	456.02	456.72	4	0.70	DN	ACIP+ATHO	DN	DN	ACIP+ACHP
036C	76.39	76.47	1	0.07	ACIP+ATHO	DN	DN	DN	ACIP+ATHO
039A	3.35	7.57	4	4.22	DN	DN	DN	DN	DN
040B	272.55	276.18	1	3.63	DN	DN	DN	DN	DN
040C	279.24	281.82	1	2.58	DN	DN	DN	ACIP+ATHO	DN
050C	15.67	16.95	2	1.28	ACIP+ATHO	GM	ACHP	DN	ACIP+ACHP
052A	60.90	70.90	4	10.00	DN	DN	ACIP+ATHO	DN	ACHP
055A	0.16	2.42	4	2.26	DN	DN	ACIP+ATHO	GM	ACHP
065A	49.57	51.17	3	1.60	DN	DN	DN	DN	DN
067A	0.00	6.84	2	6.84	DN	DN	DN	DN	FDR
069A	26.04	49.42	2	23.38	DN	DN	DN	DN	DN
069A	49.42	54.13	2	4.70	DN	DN	DN	DN	DN
070N	0.00	0.13	1	0.13	DN	DN	ACIP+ATHO	DN	DN
070P	0.00	0.04	4	0.04	ACIP+ATHO	DN	DN	DN	DN
070P	0.04	0.53	4	0.49	DN	ACIP+ATHO	GM	ACHP	ACHP
071A	7.04	9.03	2	2.00	ACIP+ATHO	DN	DN	ACIP+ACHP	DN
096A	1.31	11.06	2	9.75	DN	DN	DN	DN	DN
096B	70.57	75.50	2	4.92	DN	DN	ACIP+ATHO	GM	ACHP
100A	0.00	0.28	2	0.28	DN	DN	DN	DN	DN
100A	0.28	0.42	2	0.14	DN	DN	DN	DN	DN
101A	0.40	1.15	2	0.75	DN	DN	DN	ACIP+ATHO	DN
101A	1.15	5.15	2	4.00	DN	DN	DN	DN	DN
101A	5.15	16.45	2	11.30	DN	DN	DN	DN	DN
101A	16.45	21.41	2	4.96	DN	DN	DN	DN	DN
109A	0.00	7.72	2	7.72	DN	DN	DN	ACIP+ATHO	DN
109A	53.00	54.79	2	1.79	DN	DN	DN	DN	DN
109A	64.75	65.33	2	0.58	DN	ACIP+ATHO	DN	DN	DN
114A	19.00	20.26	5	1.26	DN	DN	DN	DN	DN

ROUTE	REFPT	END REFPT	Region	LENGTH	Maintenance Decisions				
					2016	2017	2018	2019	2020
116A	0.00	12.04	2	12.04	DN	DN	DN	DN	DN
116A	12.04	12.30	2	0.26	ACIP+ATHO	DN	ACHP	ACHP	DN
116A	12.30	13.06	2	0.76	DN	DN	DN	ACIP+ATHO	DN
116A	20.03	27.02	2	6.99	ACIP+ATHO	DN	DN	ACIP+ACHP	DN
116A	27.02	32.32	2	5.30	DN	DN	DN	DN	FDR
120A	0.00	3.11	2	3.11	ACIP+ATHO	DN	ACHP	DN	ACIP+ACHP
133B	13.27	16.08	3	2.81	DN	DN	DN	DN	DN
136A	0.15	0.55	5	0.40	DN	DN	DN	DN	ACIP+ATHO
136A	0.55	1.58	5	1.03	DN	DN	DN	DN	ACIP+ATHO
136A	3.48	4.47	5	0.99	DN	DN	DN	ACIP+ATHO	DN
138A	50.48	50.63	4	0.16	DN	ACIP+ATHO	DN	ACHP	DN
138A	50.63	50.87	4	0.24	DN	ACIP+ATHO	DN	DN	ACIP+ACHP
138A	50.87	54.00	4	3.13	DN	DN	DN	DN	DN
141A	64.40	110.53	5	46.13	DN	DN	DN	DN	DN
142A	3.28	13.40	5	10.12	DN	DN	DN	DN	DN
142A	13.40	22.96	5	9.56	DN	DN	DN	DN	DN
142A	22.96	28.71	5	5.75	DN	DN	DN	DN	DN
142A	28.71	33.84	5	5.13	DN	DN	DN	DN	DN
144A	10.49	11.06	4	0.57	DN	ACIP+ATHO	GM	ACHP	ACHP
144A	11.06	16.60	4	5.54	DN	DN	DN	DN	ACIP+ATHO
144A	16.60	20.84	4	4.24	DN	DN	DN	ACIP+ATHO	DN
144A	26.07	26.89	4	0.82	DN	DN	DN	DN	DN
149A	45.47	62.66	3	17.19	DN	DN	DN	DN	DN
149A	62.66	69.85	3	7.20	DN	DN	DN	DN	DN
149A	69.85	71.90	3	2.05	DN	DN	DN	DN	DN
159A	18.33	30.96	5	12.63	DN	DN	DN	DN	DN
160C	375.83	382.77	2	6.94	DN	ACIP+ATHO	DN	ACHP	ACHP
160C	382.77	386.61	2	3.83	DN	DN	DN	DN	FDR
160D	0.00	0.01	5	0.01	DN	DN	DN	DN	FDR
160D	0.01	1.21	5	1.20	ACIP+ATHO	DN	DN	ACIP+ACHP	DN
160D	1.21	1.46	5	0.25	DN	ACIP+ATHO	DN	DN	DN
160D	1.46	2.49	5	1.03	DN	DN	DN	DN	DN
167A	0.00	1.67	2	1.67	ACIP+ATHO	DN	DN	DN	DN
167A	1.67	2.01	2	0.33	DN	DN	DN	DN	FDR
167A	2.01	2.37	2	0.36	FDR	DN	ACHP	DN	ACIP+ACHP
167A	2.37	2.91	2	0.54	DN	ACIP+ATHO	DN	DN	DN
167A	2.91	4.86	2	1.96	DN	DN	ACIP+ATHO	DN	ACHP
194A	14.68	20.33	2	5.65	DN	DN	DN	DN	DN
196A	0.00	1.60	2	1.60	DN	DN	ACIP+ATHO	DN	ACHP
196A	1.60	6.91	2	5.31	DN	ACIP+ATHO	GM	ACHP	ACHP
209A	0.00	1.39	2	1.39	ACIP+ATHO	GM	DN	ACIP+ACHP	GM
209A	1.39	1.53	2	0.14	DN	ACIP+ATHO	DN	DN	ACIP+ACHP
257B	0.04	0.64	4	0.61	FDR	DN	ACHP	DN	ACIP+ACHP
257B	0.64	1.15	4	0.50	DN	DN	FDR	GM	DN
266A	0.06	0.22	2	0.16	DN	ACIP+ATHO	GM	DN	ACIP+ACHP
266A	0.22	1.31	2	1.09	DN	DN	DN	ACIP+ATHO	DN
266A	1.31	2.96	2	1.66	DN	ACIP+ATHO	DN	ACHP	DN
266A	2.96	5.36	2	2.40	DN	DN	ACIP+ATHO	GM	ACHP
266A	5.36	9.51	2	4.15	DN	DN	ACIP+ATHO	DN	ACHP

ROUTE	REFPT	END REFPT	Region	LENGTH	Maintenance Decisions				
					2016	2017	2018	2019	2020
266A	9.51	11.52	2	2.00	DN	DN	DN	DN	DN
347A	0.00	1.82	3	1.82	ACIP+ATHO	DN	DN	DN	DN
368A	6.02	12.33	5	6.31	DN	DN	DN	DN	DN
370A	2.97	4.00	5	1.03	DN	DN	ACIP+ATHO	GM	DN
370A	4.00	5.98	5	1.98	ACIP+ATHO	GM	DN	ACIP+ACHP	DN