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Comparison of PASER and PCI pavement distress indices

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By: Timothy P. Barrette

A REPORT

Submitted in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

CIVIL ENGINEERING

MICHIGAN TECHNOLOGICAL UNIVERSITY

2011

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This report, "Comparison of PASER and PCI Pavement Distress Indices," is hereby approved in partial fulfillment of the requirements for the Degree of MASTER OF SCIENCE IN CIVIL ENGINEERING.

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Introduction

The purpose of this report is to compare two different systems of asphalt pavement rating, Pavement Surface Evaluation and Rating (PASER) which is described in the PASER Manual for Asphalt Roads⁵ and Pavement Condition Index (PCI) which is described in the book Pavement Management for Airports, Roads, and Parking Lots⁴. PASER data used in this report was collected in the fall term of 2009 while PCI data was collected in the fall term of 2010. The PASER method consists of a team performing a ride-over survey of a pavement network and rating each pavement segment based on the type and variety of distresses seen. For the data analyzed in this report, the team consisted of undergraduate students from the Michigan Tech Pavement Enterprise pavement management team and the author. The PCI method uses a sample of pavement segments from throughout the pavement network being rated based on actual measurements of the pavement distresses. The PCI survey was performed strictly by the author. Both of these methods are currently used by various organizations to help manage pavement and determine where to invest resources to keep the network in reasonable condition. This report will also discuss various articles pertaining to pavement rating.

Literature Review

Methods for effectively evaluating pavement distresses has been an issue to those in pavement related industries for a considerable amount of time. *The Unified Pavement Distress Index for Managing Flexible Pavements* was an early attempt to evaluate pavements using "fuzzy sets" which grade pavements A through E for various distresses and use the "fuzzy sets" to compute a Unified Pavement Distress Index from 0 to 1 with 1 being the worst.³ These "fuzzy sets" are mathematical equations which place weights on the various pavement distresses to compute the final rating, similar in form to the indices discussed in the article, *Assessing the Agreement among Pavement Condition Indexes*².

Of further interest is the correlation between various Pavement Condition Indices. In an article published in the Journal of Transportation Engineering, six different pavement condition systems were compared. It was found that what may appear to be similar indices can provide significantly different results.² In this article the authors performed surveys of several pavement sections using the Texas Department of Transportation's condition score (CS) and distress score (DS), the South Dakota Department of Transportation's pavement condition rating (PCR), Pennsylvania Department of Transportation's overall pavement index (OPI), and the Oregon Department of Transportation's overall index (OI). The authors concluded that significant differences can exist between pavement distress indices and that these differences generally result from distress types considered, weighting factors and mathematical forms of each index.²

PASER and PCI are two pavement evaluation systems which were developed after the use of "fuzzy sets" as other means to interpret the various distresses found in pavements. Both of these systems attempt to take the mathematical calculations out of the pavement evaluators' hands. The PCI method does this through the use of charts which give rating deduct values based on density and severity of various distresses. These deduct values are based on the percent of the pavement section affected and the severity of the distress. Using charts provided in *Pavement Management for Airports, Roads, and Parking Lots,* deduct values for each distress are determined. PASER pavement rating involves no calculation what so ever. By performing a drive over survey of the pavement network and providing raters with a detailed list describing what types of distresses are found at various ratings, PASER has made pavement rating possible for people of various backgrounds and qualifications to effectively rate pavement.

An issue of considerable importance when performing a pavement evaluation is that of the training of those performing the analysis. Allotment of resources from many agencies depends on the data that is provided by the pavement rater. It is highly suggested that agencies should establish thresholds limiting the differences between raters.¹

Network Selection

The Pavement network to be evaluated was determined to be the local roads in Houghton, MI, bounded by Mac Innes Drive, Sharon Avenue, Agate Street, and US-41. Using Google Earth it was determined that this network consisted of approximately 4. 7 miles of asphalt pavement. This equates to approximately 24,700 linear feet of pavement. For the PASER rating, the network was broken down into 52 segments, most of which end at intersections.

For the purpose of rating using the PCI method, the pavement was broken down into segments of 2500 square feet, +/- 1000 square feet. For ease of breaking down the pavement 100 linear foot segments were used. When broken down into segments of 100 feet, with any remaining pavement at the end of a street becoming its own segment, a total of 250 measurable segments. Using a Network Level Analysis as described on page 25 of *Pavement Management for Airports, Roads, and Parking Lots,* it was determined that 10 percent of these segments would be rated using the PCI method.

The network is pictured in Figure 1 with the approximate locations of the PCI surveys.



Figure 1: Map of Study Area (©2011 Europa Technologies, ©2011 Google, Image USDA Farm Agency,)

PASER Analysis

PASER analysis of a pavement is based upon a scale of 1 to 10; with 10 representing brand new pavement. Based on the approximate amount of each varying type of pavement distress observed a rating is given as shown in Table 1. Certain distresses, such as alligator cracking, greatly reduce the rating while other distresses do not impact the rating as much.

The PASER survey was performed by undergraduate students in the Michigan Tech Pavement Enterprise with the help of the author of this report. All students were given a short training course by Tim Colling of the Local Technical Assistance Program where students learned to identify the various pavement distresses associated with PASER ratings. One student had previous experience with PASER ratings while working for a county transportation department.

By reviewing the PASER ratings for each segment, an average rating for the network was determined to be 4.4, as shown in Table 2. This was determined by multiplying the length of each segment by its PASER rating, and averaging the results by dividing the sum of the products by the total length of pavement in the network. Based upon the

standard PASER rating system, a rating of 4.4 qualifies the overall pavement network as being in fair condition.

Surface Rating	Visible Distress	General condition/treatment measures
10 Excellent	None.	New construction.
9 Excellent	None.	Recent overlay. Like new.
8 Very Good	No longitudinal cracks except reflection of paving joints. Occasional transverse cracks, widely spaced (40' or greater). All cracks sealed or tight (open less that 1/4").	Recent sealcoat or new cold mix. Little or no maintenance required.
7 Good	Very slight or no raveling, surface shows some traffic wear. Longitudinal cracks (open 1/4") due to reflection or paving joints. Transverse cracks (open 1/4") spaced 10' or more apart, little or slight crack raveling. No patching or very few patches in excellent condition.	First signs of aging. Maintain with routine crack filling.
6 Good	Slight raveling (loss of fines) and traffic wear. Longitudinal cracks (open 1/4"-1/2") spaced 10' or more apart, little or slight crack raveling. No patching or very few patches in excellent condition.	Shows signs of aging. Sound structural condition. Could extend life with sealcoat.
5 Fair	Moderate to severe raveling (loss of fine and coarse aggregate). Longitudinal and transverse cracks (open 1/2") show first signs of slight raveling and secondary cracks. First signs of longitudinal cracks near pavement edge. Block cracking up to 50% of surface. Extensive to severe flushing or polishing. Some patching or edge wedging in good condition.	Surface aging. Sound structural condition. Needs sealcoat or thin non-structural overlay (less than 2").
4 Fair	Severe surface raveling. Multiple longitudinal and transverse cracking with slight raveling. Longitudinal cracking in wheel path. Block cracking (over 50 % of surface). Patching in fair condition. Slight rutting or distortions (1" to 2" deep). Occasional potholes.	Significant aging and first signs of need for strengthening. Would benefit from a structural overlay (2" or more).
3 Poor	Closely spaced longitudinal and transverse cracks often showing raveling and crack erosion. Severe block cracking. Some alligator cracking (less than 25 % of surface). Patches in fair to poor condition. Moderate rutting or distortion (1" to 2" deep). Occasional potholes.	Needs patching and repair prior to major overlay. Milling and removal of deterioration extends the life of overlay.
2 Very Poor	Alligator cracking (over 25 % of surface). Severe distortions (over 2" deep). Extensive patching in poor condition. Potholes.	Severe deterioration. Needs reconstruction with extensive base repair. Pulverization of old pavement is effective.
1 Failed	Severe distress with extensive loss of surface integrity.	Failed. Needs total reconstruction.

Table 1: PASER Pavement Evaluation Criteria

Road Name	Segment Name	From Desc	To Desc	Length	Rating
10th Ave	10th Ave	Agate	Birch	0.159	3
11th Ave	11th Ave	Agate	Birch	0.158	5
12th Ave	12th Ave	Agate		0.169	5
5th Ave	5th Ave	Agate		0.046	6
5th Ave	5th Ave	Emerald	Garnet	0.118	2
5th Ave	5th Ave	Garnet	Vivian	0.049	2
6th Ave	6th Ave	Agate	Emerald	0.129	4
6th Ave	6th Ave	Emerald		0.03	6
6th Ave	6th Ave	Garnet	Vivian	0.054	2
7th Ave	7th Ave	Agate St	Copper St	0.189	3
7th Ave	7th Ave	Copper St	Garnet	0.077	4
7th Ave	7th Ave	Garnet	Clark St	0.116	4
7th Ave	7th Ave	Clark St	Blanche St	0.09	6
7th Ave	7th Ave	Blanche St	East St	0.051	6
7th Ave	7th Ave	East St	Macinnes	0.069	6
8th Ave	8th Ave	Agate	Copper	0.195	5
Birch St	Birch St	10th	11th Ave	0.041	6
Birch St	Birch St	11th Ave	12th	0.052	6
Birch St	Birch St	12th		0.118	2
Blanche St	Blanche St	7th	Townsend	0.088	2
Clark St	Clark St	7th	Townsend	0.131	2
Copper St	Copper St	7th		0.092	5
East St	East St	7th	Townsend	0.084	3
Emerald St	Emerald St	Houghton	Jasper	0.03	8
Emerald St	Emerald St	Jasper	Ruby Ave	0.027	8
Emerald St	Emerald St	Ruby Ave	College	0.031	8
Emerald St	Emerald St	6th	5th	0.05	5
Emerald St	Emerald St	5th	Houghton	0.055	5
Garnet St	Garnet St	Sharon	Hickory	0.077	4
Garnet St	Garnet St	Hickory	Hickory Ln	0.111	4
Garnet St	Garnet St	Hickory Ln		0.087	4
Garnet St	Garnet St		7th	0.114	6
Garnet St	Garnet St	7th	Houghton	0.16	6
Hickory Ln	Hickory Ln	Garnet	Garnet	0.271	4
E Houghton Ave	E Houghton Ave	Franklin	Emerald	0.308	6
E Houghton Ave	E Houghton Ave	Emerald	Pearl	0.098	7
E Houghton Ave	E Houghton Ave	Pearl	Townsend	0.143	6

 Table 2: PASER Ratings for the Pavement Network

	Table 2 Contin	ued			
Hubbell St	Hubbell St	7th	Townsend	0.101	2
Jasper Ave	Jasper Ave	Agate		0.049	5
Jasper Ave	Jasper Ave		Emerald St	0.049	3
Jasper Ave	Jasper Ave	Emerald St		0.049	7
Jasper Ave	Jasper Ave		Pearl	0.048	5
Pearl St	Pearl St	Houghton	Jasper Ave	0.029	6
Pearl St	Pearl St	Jasper Ave	Ruby	0.028	5
Pearl St	Pearl St	Ruby	College	0.032	5
Ruby Ave	Ruby Ave	Agate	Emerald	0.098	5
Ruby Ave	Ruby Ave	Emerald	Pearl	0.096	5
Ruby Ave	Ruby Ave	Pearl	Vivian	0.092	5
Vivian St	Vivian St	7th	6th	0.065	2
Vivian St	Vivian St	6th	5th	0.04	2
Vivian St	Vivian St	5th	Houghton	0.043	2
Vivian St	Vivian St	Houghton	Ruby	0.046	2
			Length We	eighted	
			Avera	ge	4.429839

PCI Segment Selection

In order to provide a representative (not random) sample of the pavement network, each street within the network was broken down into 100 foot segments and 25 segments were selected for the network. To provide a representative sample of the network, depending on the length of the street each street had one or two segments randomly selected to be rated. North-South street segments were numbered starting in the North and East-West street segments were numbered starting in the West. This was used as a starting point for the ratings, but it was determined that if after a ride through of the street the segment did not seem to be representative of the pavement another segment would be chosen. However, this course of action was not determined to be necessary.

PCI Analysis

PCI⁵ Analysis was performed by the author in the fall of 2010 by measuring the severity of 19 different pavement distresses, most of which have 3 severity levels. Severity of each type of distress is typically differentiated by a measurable value, such as the depth of a pothole. The distresses measured for PCI Analysis were Alligator Cracking, Bleeding, Block Cracking, Bumps and Sags, Corrugation, Depression, Edge Cracking, Jt. Reflection Cracking, Lane/Shoulder Drop Off, Longitudinal and Transverse Cracking, Patching and Utility Cut Patching, Polished Aggregate, Potholes, Railroad Crossing,

Rutting, Shoving, Slippage Cracking, Swell, and Weathering/Raveling. Each type of distress varies greatly in how it effects the overall rating of the pavement i.e., low level raveling over the entire segment will not affect the rating nearly as much as a moderate severity pot hole. This is largely due to the fact that certain distresses do not indicate pavement failure while others indicate that something is structurally wrong with the pavement. Most of the pavement distresses observed were climate based. Low level Weathering/Raveling was very prevalent throughout the entire pavement network. Distresses such as rutting, bleeding and reflection cracking were non-existent. This is due to the light loads that are typically seen on local access roads.

The total amount of each type of distress found in each pavement segment was summed and gave a density in percent of each distress (at various severity levels) found in each segment. Using charts provided in Appendix B of *Pavement Management for Airports, Roads, and Parking Lots*⁴, each distress provided a deduct value ranging from 0 to 100, 100 being the highest possible severity. These deduct values were then summed to provide a total deduct value. The total deduct value then needed to be corrected through the iterative method outlined on pages 37 and 38 of *Pavement Management for Airports, Roads, and Parking Lots.*⁴ The calculation of each evaluated segments Pavement Condition Index can be seen in Appendix 2. The figure below is a summary of the standard breakdown of the correlation between a pavements PCI rating and the quality of the asphalt.



Figure 2: Breakdown of PASER and Base 10 PCI Ratings

The PCI survey data was collected by Tim Barrette in the fall of 2010. No formal training in collecting PCI data occurred. The student did however perform a sample PCI survey with Dr. Bernie Alkire in fall of 2009.

Comparison of PASER and PCI Ratings

As was discussed earlier, PASER analysis of the pavement network yielded a rating of 4.4 (the average for the segments from which a PCI survey was performed is 4.5), while the PCI method yielded a rating 53.56, which can be seen in Table 3 on the next page. The network average alone was determined to not be a strong enough indication of any relationship between the systems as it doesn't describe the relationship between the segment ratings. To further compare the results of the two rating systems, the ratings for each segment analyzed using PCI was compared to its corresponding PASER segment. For the sake of comparison, the PCI rating was divided by 10 to provide a more direct correlation with the PASER rating system. The results are shown in Table 3 and Figure 3.

					Lengt		Base 10	Appendix
No.	RoadName	FromDesc	ToDesc	PASER	h	PCI	PCI	1
1	5th Ave	Agate		6	0.046	2	0.2	Table 1
2	5th Ave	Garnet	Vivian	2	0.049	80	8	Table2
3	6th Ave	Garnet	Vivian	2	0.054	55	5.5	Table 3
4	7th Ave	Garnet	Clark St	4	0.116	42	4.2	Table 4
5	7th Ave	Blanche St	East St	6	0.051	38	3.8	Table 5
6	8th Ave	Agate	Copper	5	0.195	82	8.2	Table 6
7	10th Ave	Agate	Birch	3	0.159	63	6.3	Table 7
8	11th Ave	Agate	Birch	5	0.158	84	8.4	Table 8
9	12th Ave	Agate		5	0.169	20	2	Table 9
10	Birch St	11th Ave	12th	6	0.052	82	8.2	Table 10
			Townsen					
11	Blanche St	7th	d	2	0.088	62	6.2	Table 11
			Townsen					
12	Clark St	7th	d	2	0.131	0	0	Table 12
13	Jasper Ave	Emerald St		7	0.049	67	6.7	Table 13
			Townsen					
14	Hubbell St	7th	d	2	0.101	40	4	Table 14
	E Houghton							
15	Ave	Emerald	Pearl	7	0.098	82	8.2	Table 15
	E Houghton		Townsen					
16	Ave	Pearl	d	6	0.143	3	0.3	Table 16
17	Hickory Ln	Garnet	Garnet	4	0.271	58	5.8	Table 17
18	Garnet St		7th	6	0.114	78	7.8	Table 18
			Houghto					
19	Garnet St	7th	n	6	0.16	52	5.2	Table 19
20	Emerald St	Houghton	Jasper	8	0.03	89	8.9	Table 20
21	Emerald St	6th	5th	5	0.05	81	8.1	Table 21
22	Vivian St	Houghton	Ruby	2	0.046	24	2.4	Table 22
23	Ruby Ave	Emerald	Pearl	5	0.096	16	1.6	Table 23
			Townsen					
24	East St	7th	d	3	0.084	56	5.6	Table 24
25	Copper St	7th		5	0.092	82	8.2	Table 25
	Network							
	Average			4.48885	4727	53.52	5.352]

 Table 3: Comparison of PASER and PCI Ratings for evaluated Segments

As Table 3 showed, there is not a strong correlation between the PASER and PCI rating systems for each pavement segment. Using Microsoft Excel, a plot of segment numbers versus ratings was created and is shown in Figure 3. A correlation of 0.225 was calculated, indicating a very weak correlation between the pavement rating systems. It is also worth noting that even when both types of ratings are compared on a scale with a base of 10, the corresponding pavement qualities do not necessarily match.



Figure 3: Comparison of PASER and Base 10 PCI Pavement Ratings

The distribution of the pavement ratings for the entire network is shown in Figure 4. This provides and accurate picture of the percentage of the pavement network that each rating represents for both methods of rating the pavement.



Figure 4: Distribution of Pavement Ratings

To further compare the relationship between the PASER and Base 10 Scale PCI ratings, a scatter plot was made with PASER ratings on the x axis and the PCI rating for the matching segment on the y axis. Segments whose ratings match would fall on the 1:1 equaity line. As Figure 4 illustrates, very few segments fall on the equality line.



Figure 5: PASER and Base 10 PCI Rating Equality

There are several possible reasons why PASER and PCI do not show a strong correlation. First, the weights for various distresses do not correlate well between the rating systems. Because of this, a certain amount of disagreement between the indices could be expected. The amount of samples used for the PCI survey may not have been enough to provide a good indication of the condition of the individual pavement segments and the overall pavement network. The surveys were performed a year apart which may have led to a difference in the distresses observed. The PASER survey group received formal training while the author had little training in performing the PCI surveys. Finally, the roadway segments used for the PASER analysis were predetermined in RoadSoft, an asset management program used by the Pavement Enterprise at Michigan Tech. Had the segmenting been done differently, a stronger correlation may be found. Finally, several pavement segments stood out as strong outliers in the rating comparison. The distresses found in these outliers have very different outcomes for each distress index. Of particular interest are the 5th and 6th Avenue segments between Garnet and Vivian streets (segments 5 and 6), Emerald Street between 5th and 6th Avenues (segment 16), and Houghton Avenue between Pearl Street and Townsend Drive (segment 21). There are several possible causes to the extremely large discrepancies between the two types of ratings.

In the case of 5th Avenue, a large distress which was classified as a pothole was present. Although the severity of the pothole was determined to be moderate, the deduct value for the distress was 120. This pothole only represented less than 3 percent of the pavement surface. After all distresses were classified and the corrected deduct value was found, the PCI rating for this pavement was determined to be 2, suggesting a failed pavement. When this pavement segment was PASER evaluated the rating was 6, suggesting pavement in good condition. This rating differential may have occurred because when averaged out, potholes did not represent the entire pavement using PASER and therefore were not given as much consideration as they were in the PCI segment. It is also possible that while performing PASER evaluation of the pavement, the distress was not identified as a pothole.

On 6th Avenue, moderate block cracking and light raveling were detected over 100 percent of the PCI rated segment. This segment received a PCI of 55 due to the amount of block cracking present. When PASER rated the segment was determined to be a 2. This seems to indicate that alligator cracking exists in portions of the segment which were not evaluated using PCI.

On Emerald Street, a PCI rating of 81 was determined based on the amount of distress, the primary distress being raveling. As defined in the PASER manual, slight raveling of a pavement will reduce its rating to 6. Any other distresses present in the pavement would easily reduce its rating to 5.

Houghton Avenue received a PCI rating of 3, mostly due to a single, high-severity pothole. The pavement received a PASER rating of 6, due to the fact that a single

pothole only does not necessarily reduce a pavements rating unless the potholes occur occasionally throughout the pavement segment.

The correlation of the rating systems was rechecked after throwing out the above listed segments in an attempt to see how the ratings would be affected. Using Microsoft Excel, a correlation coefficient of 0.41 was calculated. This correlation is still not very strong, but shows that due to the stressing of different types of distresses by the PASER and PCI rating systems, a strong correlation may not be possible.

Finally, as PCI analysis was performed strictly on a network basis, not enough samples were taken to accurately compare them to PASER ratings on a street or street segment basis.

Conclusions

As previously discussed, network level analysis did not produce a correlation between PCI and PASER ratings for individual segments; however, looking strictly at the network average, PCI and PASER yield similar results. In the particular case of the local access streets in Houghton, MI, both systems yielded the results that the pavements are bordering between poor and fair condition. Low severity raveling was by far the most prevalent distress observed in PCI analysis, a distress that may have went largely unobserved when performing the PASER analysis. The PASER and PCI surveys were performed by students with limited experience in collecting the data which may have resulted in improperly identifying some of the pavement distresses and in doing so adding inaccuracy to the data.

Recommendations

A better method for comparing these pavement evaluating systems may have been to examine the systems at a project, or individual street, level. By providing more PCI samples per street, data may have correlated more with the PASER data. Doing this, however, was outside of the scope of the report and therefore this research should be conducted at a future date to better establish the correlation between PASER and PCI evaluation techniques.

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Appendix I-Condition Survey Data Sheets

ASPHALT SURFACED ROADS AND PARKING LOTS								Т	ab	le 1		
CONDITION SURVEY DATA SHEET												
FOR SAMP												
		SECTI		SAMPLE								
BRANCH	5th	ON	3	UNIT								
SURVEYED		D 4 75		SAMPLE								
ВҮ		DATE		AREA		2200	<u>, </u>				[
1 Alligator					11	L. Patching &	x	16	Sh	oving		
Cracking 6. Depression						atching		10	. 510	JVIIIg		
eraening	eracking 0. Depression					2. Polished		17	. Slir	opage		
2. Bleeding		7. Edge	Crad	cking	A	Aggregate			acki	ng		
		8. Jt. Re	flect	tion	-					-		
3. Block Cracl	king	Cracking	5		13	3. Potholes		18	. Sw	ell		
								19				
	ulder	14	1. Railroad		We	eath	ering/Rave					
4. Bumps and Sags Drop Off 10 Long & Trans						ossing		lin	g			
E Corrugatio	n	Irans	10	Dutting								
DISTRESS	1.	5. Kutting					DENSI	DEDUCT				
SEVERITY							TOTAL	TY %	VALUE			
	220											
19L	0									2200	100	16
13M	60	1	1							62	2.8	120
1M	50	60								110	5	38
1H	60									60	2.7	45

ASPHALT SURFACED ROADS AND PARKING LOTS								Т	abl	e 2		
CONDITIO	N SU	RVEY DAT	TA SH	HEET								
FOR SAME	PLE U	NIT										
	5t		1	SAMPLE								
BRANCH	h	SECTION	6	UNIT								
SURVEYED				SAMPLE								
BY		DATE		AREA		2200					n	0
					11	L. Patching	&					
1. Alligator					U	til Cut		16	. Shc	oving		
Cracking		6. Depress	sion		Pa	atching		47	cı.			
2 Blooding	2. Bleeding 7. Edge Cracking							17	. Slip	page		
2. Bleeding	3. Block							Cra	аскіг	ig		
S. BIUCK		8 It Rofle	oction	Cracking	13	2 Potholes		10	Swa	الد		
Cracking		0. Jt. Kene	ction	Cracking	1.	5. I Otholes		19	. 500			
4. Bumps an	er Drop	14	1. Railroad		We	eath	ering/Raveli					
Sags Off						ossing		ng				
0		10. Long &	& Trar	ıs		0		0				
5. Corrugati	on	Cracking			15	5. Rutting						
DISTRESS											DENSIT	DEDUCT
SEVERITY				QUANTI	ΤY	1			1	TOTAL	Υ%	VALUE
3L	2	0 100	4	0						160	7.3	7
10L		3 10		7						20	0.91	3
	22	0										
19L		0								2200	100	16
									<u> </u>			

ASPHALT SURFACED ROADS AND PARKING LOTS								Ta	abl	e 3		
CONDITION SURVEY DATA SHEET												
FOR SAME	LE UN	T										
		Sectio		SAMPL								
BRANCH	6th	n	18	E UNIT								
SURVEYED				SAMPL								
BY		DATE		E AREA		2000					1	
					11	L. Patching	&			_		
1. Alligator		6 B			U	til Cut		16.	Sho	ving		
Cracking		6. Depre	ession	1	Pa	atching		47	C 11			
2 Blooding		7 Edgo	Crack	ing	12			17. Cra	Siip	page		
2. Dieeuing		9 It Ro	floctio	ning an	A	ggiegale		Cic		Б		
3 Block Cra	rking	Cracking	11ECU 7		12 Dotholoc			18	Swe	1		
J. DIOCK CIA	cking	Crucking	5		13. Potnoles			19.	5000	-11		
		9. Lane	Shoul	der Drop	14	1. Railroad		We	eathe	ering/Raveli		
4. Bumps an	d Sags	Off			Cr	ossing		ng		0,		
	•	10. Long	g & Tr	ans		•		-				
5. Corrugation	on	Cracking	5		15	5. Rutting						
DISTRESS											DENSIT	DEDUCT
SEVERITY		I	1	QUANTI	ΤY					TOTAL	Υ%	VALUE
	200											
3M	0									2000	100	43
	200											
19L	0	1	1							2000	100	16

SPHALT SURFACED ROADS AND PARKING LOTS									bl	e 4		
CONDITIO	ON SUF	EET										
FOR SAM												
		SECTIO		SAMPL								
BRANCH	7th	Ν	16	E UNIT								
SURVEYE				SAMPL								
D BY		DATE		E AREA	44.5	2400	0					
1 Alligator				11. F	atching	&	16	<u>ch</u> o	vina			
1. Alligator		6 Depres	Pate	hing		10	5110	wing				
0.000000		0. 2 00. 00			12. F	Polished		17. 9	Slip	page		
2. Bleeding	5	7. Edge C	racking	3	Aggr	egate		Crac	kin	g		
3. Block Cra	acking	8. Jt. Refl	ection	Cracking	13. F	otholes		18. 9	Swe	ell		
				_			19.					
4. Bumps a	nd	9. Lane S	houlde	r Drop	14. F		Wea	athe	ering/Raveli			
Sags		10 Long	c	CIUS	Sing		пg					
5. Corrugat	ion	Cracking	c nun	5	15. F	Rutting						
												DEDUC
DISTRESS											DENSIT	Т
SEVERITY				QUANTI	ΓY	[TOTAL	Y %	VALUE	
1M	3	3								6	0.25	11
9H	100	20								120	5	20
9L	50									50	2.1	7
9M	30									30	1.25	5
10M	13									13	0.54	5
10L	13	6	12	15	11	4	8			79	3.3	8
3L	720									720	30	17
7L	30									30	1.25	4
13L	1									1	0	0
	240											
19L	0									2400	100	16

ASPHALT SURFACED ROADS AND PARKING LOTS								Tab	ole 5		
CONDITION	I SURV	EY DAT	A SH	IEET							
FOR SAMPI	E UNI	т									
-		SECTI	2	SAMPLE							
BRANCH	7th	ON	4	UNIT							
SURVEYED				SAMPLE							
ВҮ		DATE		AREA	11	2400					
1 Alligator					L T 	Patching & il Cut		16 Sł	noving		
Cracking		6. Depre	essio	n	Pa	itching		10. 51	IOVING		
					12	. Polished		17. SI	ippage		
2. Bleeding	7. Edge Cracking		Ag	gregate		Crack	ing				
		8. Jt. Rei	flecti	on							
3. Block Crack	king	Cracking	5		13	8. Potholes		18. S\	well		
								19.	/-		
4 Dumps and	Corre	9. Lane S	shou	lder Drop	14	. Railroad		Weat	hering/Rave		
10. Long & Trans		ranc	Crossing			nng					
5. Corrugatio	n	Cracking	, oc n	10115	15	. Rutting					
DISTRESS		<u> </u>	,		-	0				DENSI	DEDUCT
SEVERITY				QUANTI	ΤY				TOTAL	TY %	VALUE
1L	400								400	17	40
	200										
3L	0								2000	83	26
4M	9								9	0.375	15
11L	9	56							65	2.7	6
10L	80								80	3.3	9
	240										
19L	0								2400	100	16
					-						
				1	1	1		· ·	1		

ASPHALT	SPHALT SURFACED ROADS AND PARKING LOTS								e 6		
CONDITIO	N SUR	VEY DATA	۹ SH	IEET							
FOR SAM	PLE UN	IT									
		SECTIO		SAMPL							
BRANCH	8th	Ν	4	E UNIT							
SURVEYED				SAMPL							
BY		DATE		E AREA		2200					
1 Alligator					11	L. Patching &	10	Cha	uin a		
1. Alligator		6 Depres	cion		D	til Cut atching	10	5110	virig		
Clacking		0. Depres	51011		12	2 Polished	17	Slini	nage		
2. Bleeding		7. Edge Ci	rack	ing	A	ggregate	Cra	acking	a and a and a		
0		8. Jt. Refle	ectio	on				- •	5		
3. Block Cra	cking	Cracking			13	3. Potholes	18	Swe	11		
							19				
4. Bumps ar	nd	9. Lane Sł	noul	der Drop	14	4. Railroad	We	eathe	ring/Ravelin		
Sags		Off	_		Cr	rossing	g				
E. Comment		10. Long a	& Tr	ans		Dutting					
5. Corrugati	on	Cracking			13	5. Rutting					
DICTRECC										DENCIT	
DISTRESS SEVERITY				OUANTI	ТΥ				TOTAL	DENSIT Y %	DEDUCT VALUE
DISTRESS SEVERITY 3L	4(0		QUANTI	TY				total 40	DENSIT Y % 1.8	DEDUCT VALUE 3
DISTRESS SEVERITY 3L 19L	4(2		QUANTI	TY				TOTAL 40 2200	DENSIT Y % 1.8 100	DEDUCT VALUE 3
DISTRESS SEVERITY 3L 19L	40	D D		QUANTI	TY				TOTAL 40 2200	DENSIT Y % 1.8 100	DEDUCT VALUE 3 16
DISTRESS SEVERITY 3L 19L	4(D D		QUANTI	TY				TOTAL 40 2200	DENSIT Y % 1.8 100	VALUE 3 16
DISTRESS SEVERITY 3L 19L	4(TY				TOTAL 40 2200	DENSIT Y % 1.8 100	VALUE 3 16
DISTRESS SEVERITY 3L 19L	4(D D		QUANTI	TY				TOTAL 40 2200	DENSIT Y % 1.8 100	DEDUCT VALUE 3 16
DISTRESS SEVERITY 3L 19L	4(QUANTI					TOTAL 40 2200	DENSIT Y % 1.8 100	DEDUCT VALUE 3 16
DISTRESS SEVERITY 3L 19L	40			QUANTI	TY				TOTAL 40 2200	DENSIT Y % 1.8 100	DEDUCT VALUE 3 16
DISTRESS SEVERITY 3L 19L	4(QUANTI					TOTAL 40 2200	DENSIT Y % 1.8 100	DEDUCT VALUE 3 16
DISTRESS SEVERITY 3L 19L	40			QUANTI					TOTAL 40 2200	DENSIT Y % 1.8 100	DEDUCT VALUE 3 16
DISTRESS SEVERITY 3L 19L	4(QUANTI					TOTAL 40 2200	DENSIT Y % 1.8 100	DEDUCT VALUE 3 16
DISTRESS SEVERITY 3L 19L	40			QUANTI					TOTAL 40 2200	DENSIT Y % 1.8 100	DEDUCT VALUE 3 16
DISTRESS SEVERITY 3L 19L	4(TOTAL 40 2200	DENSIT Y % 1.8 100	DEDUCT VALUE 3 16
DISTRESS SEVERITY 3L 19L	40								TOTAL 40 2200	DENSIT Y % 1.8 100	DEDUCT VALUE 3 16
DISTRESS SEVERITY 3L 19L				QUANTI					TOTAL 40 2200	DENSIT Y % 1.8 100	DEDUCT VALUE 3 16

ASPHALT S	URFAC	ED ROA	DS A	ND PARK	g lots		T	ab	le 7			
CONDITION	I SURV	EY DAT	A SH	EET								
FOR SAMP	LE UNI	т										
		SECTI		SAMPLE								
BRANCH	10th	ON	5	UNIT								
SURVEYED				SAMPLE								
BY		DATE		AREA		2400						
					11	. Patching &	Š.					
1. Alligator					Ut	til Cut		16	. Sh	oving		
Cracking		6. Depre	essior	ו	Pa	atching						
			- I		12	2. Polished		17	. Slij	opage		
2. Bleeding		7. Edge	Crack	ling	A٤	ggregate		Cra	acki	ng		
2. Dia als Cra al		8. Jt. Rei	lection.	on	17	Dathalas		10	C			
3. BIOCK Craci	king	Cracking	5		13	s. Potholes		10	. SW	en		
		9 Jane 9	Shoul	der Dron	1/	Bailroad		19	ooth	oring/Ravo		
A Bumps and	Sags	Off	Shou		Cr	nssing		lin	σ	iening/nave		
4. Dumps and	1 2083	10 Long	[,] & Тг	ans	CI	ossing			Б			
5. Corrugatio	n		15	5. Rutting								
DISTRESS			,		-	0					DENSI	DEDUCT
SEVERITY				QUANTI	ΓY					TOTAL	TY %	VALUE
			1									
1L	9	36	5	1						143	6	28
10L	100	12	6							118	5	11
4L	9	9								18	0.75	6
	240											
19L	0									2400	100	16
	•											

ASPHALT S	SPHALT SURFACED ROADS AND PARKING LOTS									e 8		
CONDITIO	N SURV	EY DATA	SH	EET								
FOR SAMF	LE UNIT	Г										
		SECTIO		SAMPL								
BRANCH	11th	N	4	E UNIT								
SURVEYED				SAMPL								
BY		DATE		E AREA		2400						
					11	L. Patching	&	10	Cha			
1 Alligator (racking	6 Doprov	cio	2		til Cut		10	. 500	ving		
1. Alligator C	LIACKING	0. Depres	5510	1	гс 17	Dolishad		17	Slin	nage		
2 Bleeding		7 Edge (rac	king	Δ	pregate		Cra	ackin	a bage		
		8. Jt. Ref	ecti	on		50. 00000				0		
3. Block Crac	cking	Cracking			13	3. Potholes		18	. Swe	ell		
	-	-						19				
		9. Lane S	hou	lder	14	1. Railroad		We	eathe	ering/Raveli		
4. Bumps an	d Sags	Drop Off			Cr	ossing		ng				
	rans											
5. Corrugatio	on	Cracking			15	5. Rutting					DENCIE	0.501107
DISTRESS					~~					TOTAL		
	24			QUANTI	ř		r				1 %	VALUE
10L	24									24	0.01	0
19L	2400									2400	100	16
10M	1									1	0	0

ASPHALT S	SURFAC	ED ROAD	S A		ίN	g lots		Ta	abl	e 9		
CONDITIO	N SURV	EY DATA	SH	EET								
FOR SAME	LE UNIT	Г										
		SECTIO		SAMPL								
BRANCH	12th	Ν	2	E UNIT								
SURVEYED				SAMPL								
BY		DATE		E AREA		2400						
					11	1. Patching	&	16	Cha	vina		
1 Alligator (Tracking	6 Dopro	cio	0		ul Cul		10	. 500	virig		
1. Alligator C	LIACKING	0. Depres	55101	1	гс 12	2 Polished		17	Slin	nage		
2. Bleeding		7. Edge C	racl	king	A	ggregate		Cra	ackin	g		
555 8		8. Jt. Refl	ecti	on		0				0		
3. Block Crac	cking	Cracking			13	3. Potholes		18	. Swe	ell		
								19				
		9. Lane S	hou	lder	14	4. Railroad		We	eathe	ering/Raveli		
4. Bumps an	d Sags	Drop Off	_		Cr	rossing		ng				
5 G		rans										
5. Corrugatio	on I	Cracking			15	5. Rutting					DENCIT	DEDUCT
SEVERITY					~					τοται	V %	
11	1700			QUANTI						1700	71	57
31	50									50	2	2
7M	3									3	0	0
10L	100									100	4	10
13M	1									1	0	0
1M	400									400	17	54
19L	2400									2400	100	16

ASPHALT S	SURFA	CED ROA	DS A	AND PAR		Та	abl	e 10				
CONDITIO	N SUR	VEY DAT	A SH	IEET								
FOR SAME	PLE UN	IIT										
	Birc	SECTIO	1	SAMPL				1				
BRANCH	h	Ν	1	E UNIT								
SURVEYED				SAMPL								
BY		DATE		E AREA		2200						
1 Alligator					11	L. Patching	&	16	Cha	ving		
1. Alligator		6 Depres	cion		D	tching		10.	5110	virig		
Clacking		0. Depres	SION		гс 17	Dolished		17	Slin	nage		
2 Bleeding		7 Edge C	racki	nø		gregate		Cra	ackin	page		
2. Diccomp		8. Jt. Refl	ectio	n	, ,	551 6 5 4 7 6		U.C.		Б		
3. Block Cra	cking	Cracking			13	8. Potholes		18	Swe	211		
	•	-						19				
4. Bumps an	ld	9. Lane Sl	nould	ler Drop	14	I. Railroad		We	eathe	ering/Raveli		
Sags		Off			Cr	ossing		ng				
		10. Long	& Tra	ins								
5. Corrugati	on	Cracking			15	5. Rutting				1		
DISTRESS				OLIANT	T 1/					TOTAL	DENSIT	DEDUCT
SEVERITY	220			QUANTI	IY						Y %	VALUE
19L	220	0			-					2200	100	16
10L	2	2								22	1	3
					1							
					-							
					1							
					1							
					+						<u> </u>	

ASPHALT	SURFAC)S A	ND PARK		Та	abl	e 11				
CONDITIO	ON SURV	EY DATA	SHI	EET								
FOR SAM	PLE UNI	T				1						
	Blanch	SECTIO		SAMPL								
BRANCH	е	N	2	E UNIT								
SURVEYE		DATE		SAMPL		2200						
DBI		DATE		E AREA	11	2200	0					
1 Alligator					11	L. Patching of the second s	Ś.	16	Sho	ving		
1. Alligator		6 Denres	ssion		Pa	atching		10.	5110	VIIIg		
Cracking		0. Depres	551011		12	Polished		17	Slin	nage		
2. Bleeding		7. Edge C	racki	ing	A	gregate		Cra	ickin	g		
		8. Jt. Refl	ectic	n						0		
3. Block Cra	acking	Cracking			13	3. Potholes		18.	Swe	ell		
								19.				
		9. Lane S	houl	der Drop	14	1. Railroad		We	eathe	ering/Raveli		
4. Bumps a	nd Sags	Off			Cr	ossing		ng				
		10. Long	& Tra	ans								
5. Corrugat	ion	Cracking			15	5. Rutting					DENCIT	DEDUCT
					,					TOTAL		
	25	C								TUTAL	1%	VALUE
	25	6	C	b 12						49	2.2	18
4L	6									6	0.27	0
11L	240	/0		8 9						322	15	20
11M	3	40	30) 4						77	3.5	18
10L	4									4	0.18	0
19L	1500									1500	68	14

ASPHALT	SURFAC	ED ROAD	S A	ND PARK	(INC	G LOTS		Tal	ble	e 12		
CONDITIO	N SURV	EY DATA	SH	EET								
FOR SAME	PLE UNI	Г										
		SECTIO		SAMPL								
BRANCH	Clark	N	4	E UNIT								
		DATE				2400						
DI		DATE			11	Patching	8,					
					Uti	il Cut	,	16. S	ho	/ing		
1. Alligator (Cracking	6. Depres	ssior	า	Pa	tching				0		
					12	. Polished		17. S	lipp	oage		
2. Bleeding		7. Edge C	Crack	king	Ag	gregate		Cracl	king	B		
		8. Jt. Ref	ecti	on								
3. Block Cra	cking	Cracking			13	. Potholes	5	18.5	we	11		
		9 Jane S	hou	lder	14	Railroad		19. Wea	tho	ring/Raveli		
4. Bumps ar	nd Sags	Drop Off	nou		Cro	ossing		ng	unc	ing/naven		
		10. Long	& Tı	rans		0		0				
5. Corrugati	on	Cracking			15	. Rutting						
DISTRESS											DENSIT	DEDUCT
SEVERITY				QUANTI	ΓY					TOTAL	Y %	VALUE
1L	1	15								16	0.67	8
1M	40	25								65	2.7	31
3L	144									144	6	6
4H	192									192	8	95
10L	11									11	0.46	0
10M	24	11								35	1.45	12
11L	0.25	2	9	1	1	3	1	3		20.25	0.84	2
19L	2400									2400	100	16

ASPHALT S	SPHALT SURFACED ROADS AND PARKING LOTS									e 13		
CONDITIO	N SUR\	/EY DATA	SH	IEET								
FOR SAMP	LE UNI	т										
	Jaspe	SECTIO		SAMPL								
BRANCH	r	Ν	7	E UNIT								
SURVEYED				SAMPL		2000						
Вĭ		DATE		E AREA	11	2000 Patching &						
1. Alligator					U	til Cut		16.	Sho	ving		
Cracking		6. Depres	sior	ı	Pa	atching		-		0		
					12	2. Polished		17.	Slip	page		
2. Bleeding		7. Edge C	rack	ing	A٤	ggregate		Cra	ickin	g		
		8. Jt. Refl	ecti	on					_			
3. Block Crac	cking	Cracking			13	3. Potholes		18.	Swe	211		
		9 Jane Sl	houl	der Dron	1/	1 Railroad		19. We	athe	oring/Raveli		
4. Bumps an	d Sags	Off	ioui		Cr	ossing		ng	Jucine			
		ans										
5. Corrugatio	on	Cracking			15	5. Rutting						
DISTRESS											DENSIT	DEDUCT
SEVERITY			1	QUANTI	ΓY			-		TOTAL	Y %	VALUE
3L	1700									1700	85	26
19L	2000									2000	100	16
11L	2									2	0.125	0
11M	12									12	0.6	7
				-								
1												

ASPHALT	SURFAC	CED ROA	DS AN		Та	abl	e 14					
CONDITIO	ON SURV	VEY DATA	A SHE	ET								
FOR SAM	IPLE UN	IT										
	Hubbe	SECTIO		SAMPL								
BRANCH	П	N	1	E UNIT								
				SAMPL								
SURVEYE		DATE		E		2400						
DBI		DATE		AREA	11 [3400 Patching	<u></u> &,					
1. Alligator					Util	Cut	Q	16.	Sho	oving		
Cracking		6. Depres	ssion		Patc	hing						
_		-			12. F	Polished		17.	Slip	page		
2. Bleeding	I	7. Edge C	Crackin	g	Aggr	egate		Cra	ickin	g		
		8. Jt. Ref	lection									
3. Block Cra	acking	Cracking			13. F	Potholes		18.	Swe	ell		
		0 1 200 5	houlde	n Dron	1/ 0	Pailroad		19.		oring/Povoli		
4. Bumps a	nd Sags	Off	noulue		Cros	sing		ng	atin	ering/naven		
n Dampe a		10. Long	& Trar	is	0.00	08		0				
5. Corrugat	ion	Cracking			15. F	Rutting						
DISTRESS											DENSIT	DEDUCT
SEVERITY		[1	QUANTITY	/	1		1		TOTAL	Υ%	VALUE
1L	20	15	6	6	10					57	1.7	16
10M	6	3	20	8	17					54	1.6	12
11L	3	2	2	6						13	0.38	0
19H	80									80	2.6	23
17H	4									4	0.12	5
11M	3									3	0.09	3
19L	3320									3320	98	16

ASPHALT S	SURFACE	D ROAD	S AI	ND PARK		T	ab	le 15				
CONDITIO	N SURVE	Y DATA	SHE	ET								
FOR SAME	PLE UNIT											
	Hought	SECTI	1	SAMPL								
BRANCH	on	ON	5	E UNIT								
SURVEYED				SAMPL								
BY		DATE		E AREA		2400						
					11	L. Patching &	Ś	10	c I-			
1 Alligator (Crocking			n		III CUT		10	. Sn	oving		
1. Alligator C	LIACKING	6. Depre	25510	Π	17	Dolichod		17	cli	00000		
2 Bleeding		7 Edge	Crac	king		oregate		L/ Cr:	. Siij acki	ppage ng		
2. Diccuing		8 It Re	flecti	ion	~8	Servegute		CI	uciti	115		
3. Block Cra	cking	Cracking	1		13	3. Potholes		18	. Sw	rell		
	8		5					19				
		9. Lane	Shou	ılder	14	I. Railroad		W	eath	nering/Rav		
4. Bumps an	nd Sags	Drop Of	f		Cr	ossing		eli	ng	-		
		10. Long	у & Т	rans								
5. Corrugati	on	Cracking	5		15	5. Rutting						
DISTRESS											DENSI	DEDUCT
SEVERITY				QUANTIT	Υ		1	1	1	TOTAL	TY %	VALUE
19L	2400									2400	100	16
10L	50									50	2.1	6
							1					

ASPHALT	SPHALT SURFACED ROADS AND PARKING LOTS									e 16		
CONDITI	ON SURVI	EY DATA	SHE	ET								
FOR SAM	1PLE UNIT	-										
	Hought	SECTIO		SAMPL								
BRANCH	on	N	6	E UNIT								
SURVEYE				SAMPL								
D BY		DATE		E AREA		3800						
					11.	Patching		16	Cha	vina		
1 Alligator	r Cracking	6 Denre	ccion		Dot	ching		10.	500	ving		
1. Alligator	Clacking	0. Depre	551011		12	Polished		17	Slin	nage		
2. Bleeding	g	7. Edge C	Crack	ing	Ag	gregate		Cra	ckin	g		
	-	8. Jt. Ref	lectio	on	0.					0		
3. Block Cr	acking	Cracking			13.	Potholes		18.	Swe	ell		
								19.				
		9. Lane S	houl	der Drop	14.	Railroad		We	athe	ering/Raveli		
4. Bumps a	and Sags	Off	о. т.,		Cro	ossing		ng				
5 Corrugo	tion	10. Long	& Ir	ans	15	Putting						
DISTRES		Clacking			15.	Nutting						
S												
SEVERIT											DENSIT	DEDUCT
Y			1	QUANTITY						TOTAL	Υ%	VALUE
1M	3	1		Э						13	0.34	13
3L	2400									2400	63	23
10L	30									30	0.8	2
10H	8	3	4	5 2	2					60	1.6	25
11H	1									1	0	0
13H	0.5	8								8.5	0.22	73
19H	500									500	13.2	67
19L	3300									3300	87	15

ASPHALT S	URFACE	D ROAD	S A	ND PARK		Та	ble	17				
CONDITION	N SURVE	EY DATA	SH	EET								
FOR SAMP	LE UNIT											
	Hicko	SECTI		SAMPLE								
BRANCH	ry	ON	7	UNIT								
SURVEYED				SAMPLE								
BY		DATE		AREA		2200						
					11	. Patching	g &	10.0	SI	_		
1 Alligator C	racking	6 Doore		n	Ut	ll Cut		16.3	snovir	Ig		
1. Alligator Ci	acking	o. Depre	:5510)11	Pd 12	Dolished		17 9	linna	A		
2. Bleeding		7. Edge	Crad	king	Ag	gregate		Crac	king	se		
		8. Jt. Ref	flect	tion		0.00000		0.00	0			
3. Block Cracl	king	Cracking	5		13	. Potholes	5	18. 9	Swell			
	•	-						19.				
		9. Lane S	Sho	ulder	14	. Railroad		Wea	therir	ng/Rave		
4. Bumps and	d Sags	Drop Of	f		Cro	ossing		ling				
		10. Long	; & ⁻	Frans								
5. Corrugatio	n	Cracking	5		15	. Rutting						
				OLIAN	TITV					ΤΟΤΑ		
SEVERITY	100	21	-			22	45	44	4 5	L 215	11%	VALUE
10L	100	21	/	20	4	22	15	11	15	215	10	1/
1L	250									250	10	34
19L	2200									2200	100	16
								ļ				

ASPHALT	SURFAC	ED ROAD	DS A	ND PARK	INC	G LOTS		Та	abl	e 18		
CONDITIC	DN SUR	/EY DATA	SH	EET								
FOR SAM	PLE UNI	т										
	Garne	SECTIO	1	SAMPL								
BRANCH	t	Ν	3	E UNIT								
SURVEYE				SAMPL								
D BY		DATE		E AREA		2400	_					
1 Alligator					11.	Patching	&	16	Cha	vina		
1. Alligator		6 Dopros	cion		Uti	Cut		10.	. 500	ving		
CIACKING		0. Depres	51011		12	Polished		17	Slin	nage		
2. Bleeding		7. Edge C	racki	ng	Ag	gregate		Cra	ackin	g		
		8. Jt. Refl	ectio	n	00	58				0		
3. Block Cra	cking	Cracking			13.	Potholes		18.	Swe	ell		
								19.				
		9. Lane Sl	nould	ler Drop	14.	Railroad		We	eathe	ering/Raveli		
4. Bumps a	nd Sags	Off			Cro	ossing		ng				
		10. Long	& Tra	ans								
5. Corrugat	ion	Cracking			15.	Rutting					DENCIT	DEDUCT
					v					ΤΟΤΑΙ		
101	24	6	n	QUANTI	2					101AL //1	170	
	24		Z	0	5					41	1.7	0
01	20	20								40	1.07	2
9L 10I	2400									2400	1.07	16
196	2400	, 								2400	100	10

ASPHALT S	URFAC	ED ROAD	DS A	ND PARK	IN	g lots		T	ab	le 19		
CONDITION	N SURV	EY DATA	SH	IEET								
FOR SAMP	LE UNIT	-										
	Garn	SECTI		SAMPLE								
BRANCH	et	ON	2	UNIT								
SURVEYED				SAMPLE								
BY		DATE		AREA		2200						
					11	L. Patching &	Ś	10	ch			
1 Alligator C	racking	6 Door		20		til Cut		10	. 50	oving		
1. Alligator Ci	acking	0. Depie	25510	711	гс 17	Dolishad		17	Slir	nage		
2. Bleeding		7. Edge	Crad	king	A	gregate		Cra	acki	ng		
		8. Jt. Re	flect	tion		5000				.0		
3. Block Crac	king	Cracking	3		13	8. Potholes		18	. Sw	ell		
								19				
		9. Lane S	Sho	ulder	14	I. Railroad		W	eath	ering/Rave		
4. Bumps and	d Sags	Drop Of	f		Cr	ossing		lin	g			
		10. Long	g & '	Trans								
5. Corrugatio	n	Cracking	5		15	5. Rutting					DENCI	
SEVERITY				οι ιαντι	тγ					τοται	TV %	VALLIE
11L	3	3	1	1						8	0.36	0
3L	1320		_							1320	60	23
19L	2200									2200	100	16
3M	680									680	40	31
11M	3									3	0.14	3

ASPHALT S	URFACE	D ROAD	S A	ND PARK	INC	g lots		T	ab	le 20		
CONDITIO	N SURVE	Y DATA	SH	EET								
FOR SAMP	LE UNIT											
	Emeral	SECTI		SAMPL								
BRANCH	d2	ON	5	E UNIT								
SURVEYED				SAMPL								
BY		DATE		E AREA		2800						
					11	L. Patching &	Ś.	16	c h	oving		
1 Alligator C	racking	6 Denre	ossin	าท	Pa	atching		10	. 511	oving		
1. Alligator C	acking	0. Depre	2001		12	2. Polished		17	. Slii	opage		
2. Bleeding		7. Edge	Cra	cking	٨	gregate		Cra	acki	ng		
		8. Jt. Re	flec	tion	-					•		
3. Block Crac	king	Cracking	3		13	3. Potholes		18	. Sw	ell		
								19	•			
		9. Lane	Sho	ulder	14	I. Railroad		W	eath	ering/Rave		
4. Bumps and	d Sags	T	Cr	ossing		lin	g					
5 Corrugatio	20	10. Long	g &	Trans	10	Dutting						
DISTRESS		CIACKINE	5		1.	. Nutting					DENSI	DEDUCT
SEVERITY				QUANTI	Υ					TOTAL	TY %	VALUE
19L	933							1023	37	11		

ASPHALT S	SURFACE	D ROAD)S AN	D PARKI	NG	LOTS		Та	abl	e 21		
CONDITIO	N SURVE	EY DATA	SHEE	T								
FOR SAMP	LE UNIT											
	Emeral	Sectio		SAMPL								
BRANCH	d 1	n	4	E UNIT								
				SAMPL								
		DATE				2000						
ы		DAIL		ANLA	11	Patching 8	ર					
					Uti	il Cut	~	16.	Sho	ving		
1. Alligator 0	Cracking	6. Depre	ession		Pa	tching				U		
					12	. Polished		17.	Slip	page		
2. Bleeding		7. Edge	Cracki	ng	Ag	gregate		Cra	ickin	g		
2. Dia als Cras	ما داده	8. Jt. Re	flectio -	n	10	Dathalaa		10	C			
3. BIOCK Crac	King	Cracking	5		13	. Potholes		18.	SWe	211		
		9. Lane	Should	ler Drop	14	Railroad		We	athe	ering/Raveli		
4. Bumps an	d Sags	Off			Cro	ossing		ng				
		10. Lon	g & Tra	ans								
5. Corrugation	on	Cracking	5		15	. Rutting				1		
DICTORCO											DENCIT	DEDUC
DISTRESS					v					τοται	DENSII V %	I VALLE
191	1900			QUANTI						1900	68	14
11	54	16	9							79	2.8	1
3L	100									100	3.6	4
10L	4	30	24							58	2.1	6
11L	1									1	0	0
											_	

ASPHALT	SURFAC	ED ROAD	S AN	ID PARK	NG	LOTS		Та	bl	e 22		
CONDITIO	ON SURV	'EY DATA	SHE	ET								
FOR SAM	PLE UNI	т										
		SECTIO		SAMPL								
BRANCH	Vivian	Ν	3	E UNIT								
SURVEYE				SAMPL								
D BY		DATE		E AREA		2800						1
1 Alligator					11	. Patchin	g	10	Cha	ling		
1. Alligator		6 Denres	sion		Da [.]	tching		10.	200	ving		
Cracking		0. Depres	51011		12	Polisher	h	17	Slin	nage		
2. Bleeding		7. Edge C	rackir	ng	Ag	gregate	u	Cra	ckin	g		
		8. Jt. Refl	ectio	า	0	0 0						
3. Block Cra	acking	Cracking			13	. Pothole	S	18.	Swe	11		
								19.				
		9. Lane Sl	nould	er Drop	14	. Railroad	ł	We	athe	ring/Raveli		
4. Bumps a	nd Sags	Off			Cro	ossing		ng				
E. Communet		10. Long	& Tra	ns	1 -	Duittin a						
5. Corrugat	lon	Cracking			15	. Rutting						
DISTRESS											DENSIT	T
SEVERITY				QUANTITY	,					TOTAL	Y %	VALUE
3M	1400									1400	50	34
3L	1160									1160	41	19
11L	1	1.5	1	1	2	2	2			24	0.85	2
13L	1	1								2	0.08	19
13H	2	0.5								2.5	0.09	53
			6									
19L	600	300	0	400						2260	81	14
-												
-												
-												

ASPHALT	SURFA	CED ROA	DS AN	ND PARK	INC	G LOTS		Та	abl	e 23		
CONDITIC	N SUR	VEY DAT	A SHE	ET								
FOR SAM	PLE UN	IT										
		SECTIO		SAMPL								
BRANCH	Ruby	N	5	E UNIT								
SURVEYE		D 4 7 5		SAMPL		2400						
DBA		DATE		E AREA	11	2400 Datching	0.					
1 Alligator					LT 1	il Cut	α	16	Sho	ving		
Cracking		6. Depres	ssion		Pa	itching		10.	5110	1110		
Ŭ		•			12	. Polished		17.	Slip	page		
2. Bleeding		7. Edge C	racking	3	Ag	ggregate		Cra	nckin	g		
		8. Jt. Refl	ection									
3. Block Cra	cking	Cracking			13	8. Potholes		18.	Swe	ell		
4 Dumps or	. d	0 1000 5	haulda	r Dron	1/	Dailroad		19.		ring (Dovali		
4. builips ai Sags	iu	9. Lane 3	noulue	гор	L4 Cr	nssing		ng	aune	ening/ Kaven		
5465		10. Long	& Tran	s	CI	033116		115				
5. Corrugati	on	Cracking			15	6. Rutting						
DISTRESS											DENSIT	DEDUCT
SEVERITY				QUANTIT	Y			r		TOTAL	Υ%	VALUE
	180											
3M	0									1800	75	40
1L	9									9	0.375	5
11L	10	6	15	20						51	2.125	5
13H	4	1								5	0.21	72
13M	1	0.5								1.5	0.06	25
7L	50									50	2.1	3
			<u> </u>		-			1				

ASPHALT	SURFA	CED ROA	DS /	AND PAR	KIN	IG LOTS		Та	ıble	e 24		
CONDITIO	N SUR	VEY DATA	۹ SH	IEET								
FOR SAM	PLE UN	IT										
		SECTIO		SAMPL								
BRANCH	East	Ν	3	E UNIT								
SURVEYED				SAMPL								
BY		DATE		E AREA		2400						
1 11:					11	L. Patching	&	10	C			
1. Alligator		6 Donros				til Cut		16.	Snov	ving		
Cracking		6. Depres	sion		1	Dolishod		17	Cline	2200		
2 Bleeding		7 Edge Cu	ack	inσ		zareaste		I/. Cra	ckind	Jage		
2. Dieeung		8. Jt. Refle	ectio	n n	~{	Sgregate		Cra	CKIII	5		
3. Block Cra	cking	Cracking			13	3. Potholes		18.	Swe	II		
								19.				
4. Bumps ar	nd	9. Lane Sh	oul	der Drop	14	1. Railroad		We	athe	ering/Ravelin		
Sags			о т		Cr	ossing		g				
5. Corrugati	on	Cracking	x Ir	ans	15	5. Rutting						
DISTRESS		0				0					DENSIT	DEDUCT
SEVERITY				QUANTI	TΥ					TOTAL	Y %	VALUE
3M	210	0								2100	88	42
19L	240	0								2400	100	16

ASPHALT S	URFACE	D ROAD)S A	ND PARK	ING LO	OTS		T	ab	le 25		
CONDITION	N SURVI	EY DATA	SH	EET								
FOR SAMP	LE UNIT											
	Сорр	SECTI		SAMPLE								
BRANCH	er	ON	1	UNIT								
SURVEYED				SAMPLE								
BY		DATE		AREA		2000					1	
					11. Pa	tching 8	<u>s</u>					
		6 B			Util Ci	ut		16	. Sh	oving		
1. Alligator C	racking	6. Depre	essic	n	Patch	ing		47	c.			
2 Blooding		7 Edgo	Cra	king	12. PC	asto		1/	. SII acki	ppage		
2. Dieeuing		7. Euge	floci	tion	Aggre	gale		Ch	acki	IIg		
3 Block Crac	king	Cracking	, 1100	.1011	13 Pc	tholes		18	SW	الم		
5. Block cruc	1118	Crucking	>		13.10	, tholes		19				
		9. Lane S	Sho	ulder	14. Ra	ilroad		W	eath	nering/Rave		
4. Bumps and	d Sags	Drop Of	f		Crossi	ng		lin	g	0.		
	-	10. Long	g & ⁻	Frans		-			-			
5. Corrugatio	n	Cracking	5		15. Ru	itting						
DISTRESS										DENSI	DEDUCT	
SEVERITY		1	1	QUANTI	ΓY	1	1			TOTAL	TY %	VALUE
19L	2000									2000	100	16
10L	18	5	5	10						38	1.9	6

Appendix II-PCI Calculation Iterations

				Table	e 1: 1	7th A	we.	Sec	tio	า 16		
#			De	educt	t Valı	ues				Total	q	CDV
1	20	17	16	11	8	7	5	5	4	93	9	40
2	20	17	16	91	8	40						
3	20	17	16	11	8	7	5	2	2	88	7	42
4	20	17	16	11	8	7	2	2	2	85	6	41
5	20	17	16	11	8	2	2	2	2	80	5	40
6	20	17	16	11	2	2	2	2	2	74	4	40
7	20	17	16	2	2	2	2	2	2	65	3	36
8	20	17	2	2	2	2	2	2	2	51	2	37
9	20	2	2	2	2	2	2	2	2	36	1	37
											CDV=	42
											PCI=	58

			Та	ble 2	: Но	ught	on A	٩ve.	Se	ction 6		
#			De	educ	t Valı	Jes				Total	q	CDV
1	73	67	25	23		218	6	96				
2	73	67	25	207	5	95						
3	73	67	25	23	2	2	2			194	4	97
4	73	67	25	2	2	2	2			173	3	97
5	73	67	2	2	2	2	2			150	2	94
6	73	2	2	2	2	2	2			85	1	85
7												
8												
9												
											CDV=	97
											PCI=	3

			Tab	ole 3:	: 5	th	Ave	e. S	ec	tion 1		
#		0	Dedu	ct Va	lue	es				Total	q	CDV
1	120	45	38	16						219	4	98
2	120	17	16	2						155	3	94
3	120	17	2	2						141	2	89
4	120	2	2	2						126	1	100
5												
6												
7												
8												
9												
											CDV=	100
											PCI=	0

			Tab	le 4:	11	Lth	Av	e. 9	Sec	tion 4		
#		[Dedu	ct Va	lue	es				Total	q	CDV
1	16									16	1	16
2												
3												
4												
5												
6												
7												
8												
9												
											CDV=	16
											PCI=	84

			Та	ble 5	: 12	2th	A١	/e.	Se	ction 2		
#			Dedu	uct V	alue			Total	q	CDV		
1	57	54	16	10	2					139	4	77
2	57	54	16	2	2					131	3	78
3	57	54	2	117	2	80						
4	57	2	2	65	1	65						
5												
6												
7												
8												
9												
											CDV=	80
											PCI=	20

			Т	able	6:	Jas	pe	r Se	ct	ion 7		
#			Dedu	uct V	alue	es				Total	q	CDV
1	26	16	7							49	3	32
2	26	16	2							44	2	33
3	26	2	2		30	1	30					
4												
5												
6												
7												
8												
9												
											CDV=	33
											PCI=	67

			Та	ble	7:	Hi	cko	ory	Se	ction 7		
#		۵	Dedu	ct V		Total	q	CDV				
1	34	17	16							67	3	42
2	34	17	2							53	2	39
3	34	2	2				38	1	38			
4												
5												
6												
7												
8												
9												
											CDV=	42
											PCI=	58

			Tal	ole	8 1	LOt	h A	ve	. Se	ection 5		
#		۵	Dedu	ct V		Total	q	CDV				
1	28	16	11	6						61	4	33
2	28	16	11	2						57	3	37
3	28	16	2	2		48	2	36				
4	28	2	2	2		34	1	34				
5												
6												
7												
8												
9												
											CDV=	37
											PCI=	63

_													
				Та	ble 9): 7	th A	٩ve	. Se	ect	ion 24		
	#			Ded	uct V	'alu	es				Total	q	CDV
	1	40	26	16	15	9	6				112	6	62
	2	40	26	16	15	9	2				108	5	58
	3	40	26	16	101	4	58						
	4	40	26	16	2	2	2				88	3	56
	5	40	26	2	74	2	52						
	6	40	2	2	2	2	2				50	1	50
	7												
	8												
	9												
												CDV=	62
												PCI=	38

			Tal	ole 1	0: 6	5th .	Ave	e. S	Sec	tion 18		
#			Ded	uct V	'alu	es				Total	q	CDV
1	43	16								59	2	42
2	43	2								45	1	45
3												
4												
5												
6												
7												
8												
9												
											CDV=	45
											PCI=	55

		Та	able	211	1:	Но	ugł	nto	n A	ve. Sect	ion 15	
#		D)edu	uct	Va	lue		Total	q	CDV		
1	16	6								22	2	14
2	16	2								18	1	18
3												
4												
5												
6												
7												
8												
9												
											CDV=	18
											PCI=	82

			Та	abl	e 1	2:	5tl	пA	ve.	Section	16	
#		D)edu	uct	Va	lue		Total	q	CDV		
1	16	7	3							26	3	14
2	16	7	2							25	2	19
3	16	2	2					20	1	20		
4												
5												
6												
7												
8												
9												
											CDV=	20
											PCI=	80

			Т	abl	e 1	3:	8tl	h A	ve.	Section	4	
#		0	Ded	uct	Val	lue		Total	q	CDV		
1	16	3								19	9	13
2	16	2								18	8	18
3												
4												
5												
6												
7												
8												
9												
											CDV=	18
											PCI=	82

	Т	abl	e 14	1: E	me	era	ld ((W	est	ern) St. S	Section 4	
#		0	Ded	uct	Va		Total	q	CDV			
1	14	6	4	1						25	3	14
2	14	6	2	1						23	2	17
3	14	2	2	1				19	1	19		
4												
5												
6												
7												
8												
9												
											CDV=	19
											PCI=	81

		Tab	ole 15	5: En	neral	d (E	ast	err	ı) S	St. Secti	on 5	
#			Dec	luct \	Total	q	CDV					
1	11									11	1	11
2												
3												
4												
5												
6												
7												
8												
9												
											CDV=	11
											PCI=	89

			Та	ble 1	.6: V	'ivia	n S	5t. S	Sec	tion 3		
#	Table 16: Vivian St. Set Deduct Values 53 34 19 19 14 2 1 53 34 19 19 2 2 1 1 53 34 19 2 2 2 1 1 53 34 19 2 2 2 1 1 53 34 2 2 2 2 1 1 53 34 2 2 2 2 1 1 53 34 2 2 2 2 1 1 53 34 2 2 2 2 1 1 53 2 2 2 2 2 1 1 1 53 2 2 2 2 2 2 1 1 53 3 1 1 1 1 1 1 1 1 6 1 1 1 1 1			Total	q	CDV						
1	53	34	19	19	14	2				141	5	70
2	53	34	19	19	2	2				129	4	76
3	53	34	19	2	2	2				112	3	70
4	53	34	2	2	95	2	68					
5	53	2	2	2	2	63	1	63				
6												
7												
8												
9												
											CDV=	76
											PCI=	24

			Та	able 2	17:	Cla	rk S	t. S	Sec	tion 4		
#			Ded	uct \	/alu	es				Total	q	CDV
1	95	31	16	12	8	6	2			170	6	82
2	95	31	16	12	8	2	2			166	5	84
3	95	31	16	12	2	2	2			160	4	87
4	95	31	16	2	2	2	2			150	3	88
5	95	31	2	2	2	2	2			136	2	88
6	95	2	2	2	2	2	2			107	1	100
7												
8												
9												
											CDV=	100
											PCI=	0

	Table 18: Blanche St. Section 2											
#			Ded	uct V	/alu	es				Total	q	CDV
1	20	18	18	14						70	4	38
2	20	18	18	2						58	3	37
3	20	18	2	2						42	2	32
4	20	2	2	2						26	1	26
5												
6												
7												
8												
9												
											CDV=	38
											PCI=	62

	Table 19: Hubbell St. Section 1											
#			Dec	duct '	Value	es				Total	q	CDV
1	33	23	16	16	12	5	З			108	7	52
2	33	23	16	16	12	5	2			107	6	52
3	33	23	16	16	12	2	2			104	5	60
4	33	23	16	16	2	2	2			94	4	54
5	33	23	16	2	2	2	2			80	3	50
6	33	23	2	2	2	2	2			66	2	48
7	33	2	2	2	2	2	2			45	1	45
8												
9												
											CDV=	60
				PCI=	40							

			٦	able	20:	Eas	t St	. Se	cti	ion 3		
#			q	CDV								
1	42	16								58	2	43
2	42	2								44	1	44
3												
4												
5												
6												
7												
8												
9												
											CDV=	44
											PCI=	56

			Tabl	e 22	1: (Со	рре	er S	St. S	Section	1	
#		[Dedu	ct V	'alu	ies				Total	q	CDV
1	16	6								22	2	15
2	16	2								18	1	18
3												
4												
5												
6												
7												
8												
9												
											CDV=	18
							PCI=	82				

			Table	e 22	2: (Gar	ne	t Si	t. S	ection 1	13	
#		C	Dedu	ct V	'alu	ies				Total	q	CDV
1	16	9	5	3						33	4	14
2	20	17	16	2						55	3	35
3	20	17	2	2						41	2	28
4	20	2	2	2						26	1	26
5												
6												
7												
8												
9												
											CDV=	35
											PCI=	65

				Т	able	e 23	: F	Rub	y S	St.		
#			Dedı	ıct ۱	/alu	ies				Total	q	CDV
1	72	40	25	5	5	3				150	6	72
2	72	40	25	5	5	2				149	5	78
3	72	40	25	5	2	2				146	4	82
4	72	40	25	2	2	2				143	3	84
5	72	40	2	2	2	2				120	2	82
6	72	2	2	2	2	2				82	1	82
7												
8												
9												
											CDV=	84
											PCI=	16

			Tab	le 2	4:	Gar	net	t St	. Se	ection 2	2	
#			Dedı	۱ct ۱	Valu	les				Total	q	CDV
1	31	23	16	З						73	4	37
2	31	23	16	2						72	3	48
3	31	23	2	2						58	2	42
4	31	2	2	2						37	1	37
5												
6												
7												
8												
9												
											CDV=	48
											PCI=	52

				Та	ble	25	ch :	St. Sectio	n			
#		D	ed	uct	Va	alue	es		Total	q	CDV	
1	16	3								19	2	12
2	16	2								18	1	18
3												
4												
5												
6												
7												
8												
9												
											CDV=	18
											PCI=	82