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ECONOMIC ANALYSIS OF ROADWAY OCCUPANCY FOR FREEWAY PAVEMENT MAINTENANCE AND REHABILITATION

Prepared for
FEDERAL HIGHWAY ADMINISTRATION
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16. Abstroct A computer program was developed to perform an Economic Analysis of Roadway Occupancy for Maintenance and Rehabilitation "EAROMAR." The user specifies the pavement design and traffic. The program generates hourly traffic volume by trip purpose, direction and year; vehicle operational cost as a function of vehicle weight, speed and project design alignment; value of time by trip purpose, income level and time loss, and annual workload by activity. The influence of roadway occupancy on the motorist is executed hourly for each activity and lane closure. The resulting operational, time, accident and pollution impacts are combined for all feasible closures including - traffic detours and crossovers. A 10-mile section of eight-lane portland cement concrete was analyzed over 20 years.

This volume is the second of a three volume report. The others in the series are:

Vol No.	FHWA No.	Short Title
1	76-14	Final Report
3	76-16	Program Documentation

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PREFACE

Report Contents

"An Economic Analysis of Roadway Occupancy for Freeway Pavement Maintenance and Rehabilitation" is contained in three volumes. This is the result of work accomplished under a Federally Coordinated Research Program, Project 5E, Premium Pavements for "Zero Maintenance," during the period of July 1973 to May 1975.

Volume I, Final Report, provides a complete description of the scope, approach, and results of evaluating the economic impact of roadway maintenance crew occupancy, taking into account motor vehicle operating cost, value of time, accidents, and pollution under various freeway traffic conditions. The assessments and conclusions are based upon previous state-of-the-art and study of field data.

Volume II, Users Manual, presents the results of the study as a users manual with a systems approach to pavement design, which evaluates environmental, operational performance and serviceability factors for alternative pavements under a variety of rehabilitation and maintenance strategies. The presentation is in two parts: The first is the Algebraic Users Manual, for hand computations. The second is the User Manual for Program EAROMAR (Economic Analysis for Roadway Occupancy for Maintenance and Rehabilitation) which gives a detailed description of the format and coding for all required input and a general description of the optional input to modify the impacts for local needs.

Volume III, Program Documentation, contains a complete description of the internal variable and computations for the computer program EAROMAR, and thus is the basis for any future program modifications. The format and coding for all inputs are described in detail. One change to the program has been made by FHWA, which is documented in this Volume. This modification incorporates an inflation rate of 10 percent in present worth computations.

Report Applications

High traffic volumes, heavy loads, and weathering on existing pavement designs cause accelerated damage and early deterioration. Maintenance operations required to keep these highway facilities serviceable create a conflict with the motorist causing delays, and increasing pollution and accident opportunities. These repairs are: (1) costly due to the extensive traffic control required, (2) limited to between peak hour periods to avoid exceeding the traffic volume capacity, and (3) difficult to perform and often temporary due to problems in mobilizing the work crew. Thus the elimination of these impacts results in reduced highway maintenance expenditures and higher levels of safety, economy and convenience to the user.

The FHWA has determined that one solution to the difficulties associated with highway maintenance operations is to produce a "premium pavement" which reduces maintenance requirements. The savings derived from direct maintenance expenditures and motorist costs over the life of the pavement could be invested in constructing a "premium pavement" as compared to existing designs.

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METRIC CONVERSION FACTORS

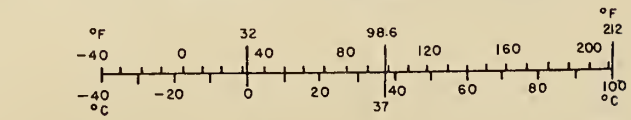
Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
	LENGTH			
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
	AREA			
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	ecres	0.4	hectares	ha
	MASS (weight)			
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
	VOLUME			
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
	TEMPERATURE (exact)			
°F	Fahrenheit tempereture	5/9 (after subtracting 32)	Celsius temperature	°C

*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures. Price $2.25, SD Catalog No. C13.10:286.

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
	LENGTH			
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
	AREA			
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
	MASS (weight)			
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
	VOLUME			
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
	TEMPERATURE (exact)			
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



INTRODUCTION

Existing pavement design on freeways is subject to accelerated deterioration due to weathering, heavy loads and high traffic volumes. This deterioration creates a need for maintenance early in the life of the pavement and results in disruption of traffic by maintenance occupancy forces. Such maintenance is costly due to the extensive traffic control needed to protect both maintenance crews and motorists. Scheduling of these occupancy periods must occur during off peak hours to avoid exceeding volume capacity. Also, maintenance crew job site movements are hampared by limited access and high traffic speeds. Maintenance performed under these conditions must frequently be repeated because limited time results in temporary or hasty repairs which are costly. These occupancy periods also cause conflicts with the motorist and in turn affects motorist operating costs, delays and increases potential for accidents. Finally, the general slowing of traffic generates increased levels of pollution. The elimination of these costs and impacts can result in reduced highway maintenance expenditures and higher levels of safety, economy and convenience to the highway user.

One means of minimizing these difficulties associated with freeway maintenance is to produce a pavement, which can be referred to as a "premium pavement," requiring less maintenance or no maintenance. This subsequent reduction in direct maintenance activities will in turn reduce maintenance expenditures, motorist costs, i.e., operation, time, and accidents. These savings could justify the increased costs of constructing this, so called, "premium pavement."

The economic analysis of the cost of maintenance, rehabilitation and motorist impacts presented in this manual supports the systems approach to pavement design. In the systems approach the allocation of present and future cash flows are quantified and converted to present worth in evaluating a range of pavement design strategies over a pavement's life.

The economic analysis presented in this manual generates costs, delays to drivers and passengers, increased air pollution, potential accidents and accident costs related to maintenance operations.

The manual presents the user with two methods for developing motorist impacts. The first method presents a step-by-step procedure in algebraic nomenclature which draws on tables and graphs. This approach provides the user with a quick manual method for estimating the costs to motorists resulting from the occupancy of a high volume freeway to perform a maintenance or reconstruction activity. The manual approach has been kept simple and designed for easy adaption to fit conditions which exist at local levels. However, this has required that the analysis be limited to the evaluation of one activity at a time.

The graphs and tables developed to support the manual analysis were based on a series of assumptions and assigned unit costs for vehicle operation, time and accidents that were built into a computer program titled "The Economic Analysis of Roadway Occupancy for Maintenance and Rehabilitation. Nevertheless, it is believed that the manual analysis will prove useful in developing quick estimates of motorist costs.

The computer program "EAROMAR" can be used where the manual approach proves too limiting. This program was designed to be easily adaptable to the needs of the 50 State highway departments and other highway agencies.

The computer program EAROMAR does three things. First, it establishes a data matrix of given and assumed information. Second, it determines the specific hours the roadway will be occupied by work crews annually together with the maintenance and rehabilitation costs associated with that occupancy. Finally, the impact to the motorist caused by the roadway occupancy is established in terms of operation costs, time costs, accident costs, and pollution effects.

The user specifies through program inputs the pavement design and thickness, freeway lanes and project length together with the initial and final year traffic. Based on constraints and assumptions, all of which are subject to user modification through optional program input, the program generates data arrays holding the following information:

1. Hourly traffic volume by trip purpose, direction, and year
2. Vehicle operation costs as a function of vehicle weight, speed and project design alignment
3. Value of time by trip purpose, income level and time loss
4. Annual workload for a range of work activities associated with the pavement design
5. Work activity production rates and labor, equipment and material cost requirements
6. Available roadway hourly occupancy intervals for each activity

7. Vehicle speeds as a function of capacity, volume, and speed limit

All of this information is used in a roadway occupancy simulation to develop an activity occupancy matrix by lane closure. The occupancy matrix is used to analyze the influence of roadway occupancy on the motorist.

DEFINITION OF TERMS

Activity - A specific work function which is performed on the pavement, i.e., pavement patching, resurfacing, joint sealing, etc.

Activity Workload - The quantifiable units of work generated for a work activity, e.g., square yards of patching, linear feet of crack sealing, lane miles of resurfacing, etc.

Available Occupancy Hours - The hours of a day when work crews are permitted to occupy a roadway.

Closure Category - A variety of lane closure sequences can be used in the delineation of work zones for activity work crews. Each closure sequence is defined as a closure category. As an example, on an eight-lane freeway, the following six sequences of closure categories are feasible:

1. Close one lane at a time
2. Close two lanes at a time
3. Close three, then one lane
4. Close all lanes and use shoulder
5. Close all lanes and use detour
6. Close all lanes and cross traffic over to opposite lanes

Directional Lanes - The number of lanes going in a single direction for a given freeway, i.e., on an eight-lane freeway, there are four lanes in one direction.

Influence Zone - The distance over which vehicles are operated at an average reduced speed due to lane closures on the freeway.

Lane Closure - The number of directional lanes closed for a work activity, i.e., lane closure 1 is one lane closed, lane closure 2 is two lanes closed, etc.

Maintenance Level - The number of periods in a year when the workload generated by a roadway will be taken care of. If 100 square yards of patching were the annual workload, then a maintenance level of one would mean that the road was occupied for one period to perform the annual work, i.e., work crews would be sent to the road every day until the total workload generated by the roadway had been taken care of by the work crews. A maintenance level of two would mean that at two periods in the year, the roadway would be occupied to perform work.

Maintenance Level (Cont.) - Further, only one-half of the annual workload would be available during each period. Finally, if the maintenance level was .2, then the road would only be occupied every fifth year. The workload generated each year would be continually accumulated until it could be taken care of in the fifth year.

Occupancy Interval - Any continuous interval of time which is less than or equal to 24 hours when the roadway can be occupied. As an example, one occupancy interval could be a roadway occupancy which started at 8 A.M. and was terminated at 3 P.M. If crews reoccupied the road at 8 P.M. and stayed until 11 P.M., that would be a second occupancy interval.

Occupancy Period - A period of time when work crews occupy a roadway on a continual basis, i.e., at every occupancy interval opportunity. Where the maintenance level is greater than one, for example 3, the annual workload is divided into three parts. It requires an occupancy period to complete the workload for each of the three parts.

Pavement Analysis Age - The models predicting maintenance workload are a function of pavement age. A pavement deteriorates due to loadings and fails at a rate related to its design life. The workload models are based on a deterioration of the pavement over twenty years. The pavement analysis age is created for use in the workload models to accommodate axle loads and a design life which do not correspond to the twenty-year life associated with the models.

Pollution Day - The total emissions of CO and HC generated by vehicles operating normally on a freeway of a given length during a 24-hour period. The increase in emissions created during a roadway occupancy are converted into pollution days which therefore represent the days of normal operation required to generate the increased emissions caused by the roadway occupancy.

Simulation Workload - The total units of work performed during the simulation process in subroutine MAINT. The simulation workload is controlled by the worksite workload and the number of interations specified for the simulation.

Worksite - The spot location on the roadway where work crews perform productive work.

Work Zone - The area on a roadway where work crews can actually perform work. The length of this zone does not include the cone taper used to channel traffic.

ALGEBRAIC USER MANUAL

to

Evaluate the
Economic Impact of
Occupying a Roadway
for Maintenance
and Rehabilitation

October 1974

10

General Description

In a systems approach to pavement design, the performance of alternate pavement systems over their entire lifetime is evaluated. Not only are alternate pavement designs evaluated for identified environmental and operational factors, but each alternate pavement design's predicted performance and serviceability are examined in the light of a variety of rehabilitation and maintenance strategies.

In seeking an optimum pavement system, the designer also should address the traffic impacts associated with pavement occupancy by maintenance and rehabilitation crews. These traffic impacts can be substantial if high traffic volumes are queued during roadway occupancy.

The traffic impacts include the delays and inconvenience to the motorist, the increased accidents created by interfering with normal motorist operations and increased pollution levels created when traffic slows in the presence of roadway work. Elimination of motorist impacts can create warrants for the selection of a premium pavement design if such a design can be proved cost effective. One way to show cost effectiveness is to place a dollar value on the elimination of motorist impacts. This can be done for delays through the evaluation of increased vehicle operation costs and by placing a value on time losses. A dollar value also can be placed on potential accident increases.

The total dollar savings resulting from the elimination of motorist costs can be considered as funds available to be spent in the elimination of the pavement defects responsible for the generation of motorist costs.

The algebraic analysis is designed to permit an analyst to determine the costs associated with performing a work activity on a roadway pavement. The total annual costs associated with the activity consist of two components which are:

1. Activity costs
2. Motorist costs

The activity costs are the expenditures incurred by work crews to perform the work which is generated annually by the pavement. The motorist costs include changes in vehicle operation costs, potential accident cost increases, and the value of loss time created when work crews occupy a roadway to perform work.

The algebraic analysis provides for the evaluation of one work activity at a time. This approach simplifies the analysis but does require the user to perform a complete algebraic evaluation for each maintenance activity and rehabilitation activity expected to occur over the life of a given pavement design. The computational requirements can become substantial when a number of alternate pavement systems must be evaluated. However, the computer program EAROMAR is available to be used in these situations. There will be times when only a single work activity will need to be addressed. As an example, a designer may want to know the consequences of eliminating or

reducing a specific maintenance activity such as blowups, or joint sealing or pavement patching. If the savings in maintenance and motorist costs exceeds the increased construction costs, than an economic warrant has been established for the design modification needed to eliminate the maintenance. The elimination of a single maintenance activity will be used in an example illustrating the implementation of the algebraic users analysis.

General Procedure

The algebraic analysis is outlined through an example, i.e., a pavement design situation is presented and the analysis demonstrated using actual numbers in the example. The general steps required to develop both the activity and motorist costs includes the following:

1. The annual lane mile workload for the activity being evaluated is established.
2. A determination is made of the daily hours of roadway occupancy required to perform the activity workload.
3. The annual direct activity costs are computed.
4. The motorist operation costs, time costs and accident costs created because roadway is occupied and normal traffic flow is interrupted are determined.
5. A determination is made of the added motorist operation, time, and accident costs created when the roadway occupancy creates motorist queues.

6. The annual activity and motorist costs are converted to present worth dollars.

7. The present worth dollars for the analysis period are accumulated.

A number of algebraic symbols are used in the illustrated analysis. These are alphabetically defined as follows:

C = The total hours required by a work crew in performing an activity during one day.

CF = Crew fixed roadway occupancy time. This is the sum of TC, CT, and NT.

CN = Productive Interval, the number of hours available for productive work during roadway occupancy.

CT = Cure time in hours following the placement of material at the last worksite for a given occupancy interval.

H = The number of hours required to perform production work at a single worksite.

NT = Nonproductive time in hours during roadway occupancy interval which is allowed for lunch or rest breaks.

P = Activity productivity rate in accomplishment units per hour.

TC = The hours required for a work crew to place an initial traffic control installation and to remove the final traffic control installation for one roadway occupancy interval.

TT = Work crew travel time allowance in hours for traveling from maintenance garage or housing facility to the roadway and then to return.

W = Annual activity workload in accomplishment units per lane mile of roadway.

WS = The average number of workload accomplishment units at a single worksite.

Pavement Design Problem

You as a design engineer have established that a 4-lane divided, 9-inch thick reinforced portland cement concrete pavement will satisfy the environmental and operational requirements specified for a region of your state. However, you are concerned about the performance of the concrete joints because similar conventionally-designed pavements have had joint failures in the region. Also, you are aware that these failures have generated considerable repair expense. You may have available to you a joint design which would eliminate the problem. However, based on the elimination of repair expenses alone, it may not be possible to justify the costs of the joint design.

Through this analysis you also may consider as part of the joint failure costs, the expense incurred by highway motorists when they are slowed and inconvenienced during the joint repair process.

The first step in the analysis is to predict the repair requirements created by the joint failure. You probably have some idea of the expected magnitude of repair from the history of joint repair expenses associated with existing joint failures. For purposes

of this example, assume that the elimination of joint failures will eliminate a full depth concrete patch at 10% of the concrete joints over the life of the pavement. Further, assume that the first joint failure requiring the placement of a concrete patch occurs when the pavement is six years old. Also, assume a constant repair workload each year until the pavement's 20th year when it will be rehabilitated or rebuilt.

These simplifying assumptions produce the following number of annual joint repairs:

W = Joint failure repairs per lane mile per year

F = Failure years = 20-6=14 years

S = Joint spacing = 50 feet (assumed)

W = ((5280/S)x.10)/F = ((5280/50)x.10)/14

W = .75 joint repairs/lane mile/year

Next an average size full depth concrete patch must be established at each joint failure. For purposes of this example we will specify that each concrete patch will be 22 square yards in size. Therefore, starting in the sixth year and continuing every year thereafter until the 20th year, work crews must be sent to the roadway to make .75 full depth concrete patches 22 square yards in size per lane mile of pavement.

From the problem statement and the assumptions the first requirement has been satisfied, that of establishing an annual lane mile workload

Activity Costs

The activity costs consist of the crew costs and the materials needed to satisfy the activity workload W. Before the crew costs can be computed, it is necessary to determine the total crew hours which must be invested to complete the annual activity workload. These crew hours are divided into three components which are:

1. Crew travel time
2. Crew fixed roadway occupancy time
3. Crew variable roadway occupancy time, "Productive Interval"

The variable component, the productive interval, represents the productive time on the roadway. This includes work at each site, travel between worksites and the installation of traffic control when worksites are widely spaced.

A simulation routine in the computer program "EAROMAR" was used to establish the nomograph "DWORK" shown in Figure 1. The total number of worksites which can be handled by a crew each day is determined using this nomograph.

Nomograph Requirements

The analyst needs to determine two values to use the nomograph "DWORK". These are:

1. Hours per worksite (H)
2. Productive interval (CN)

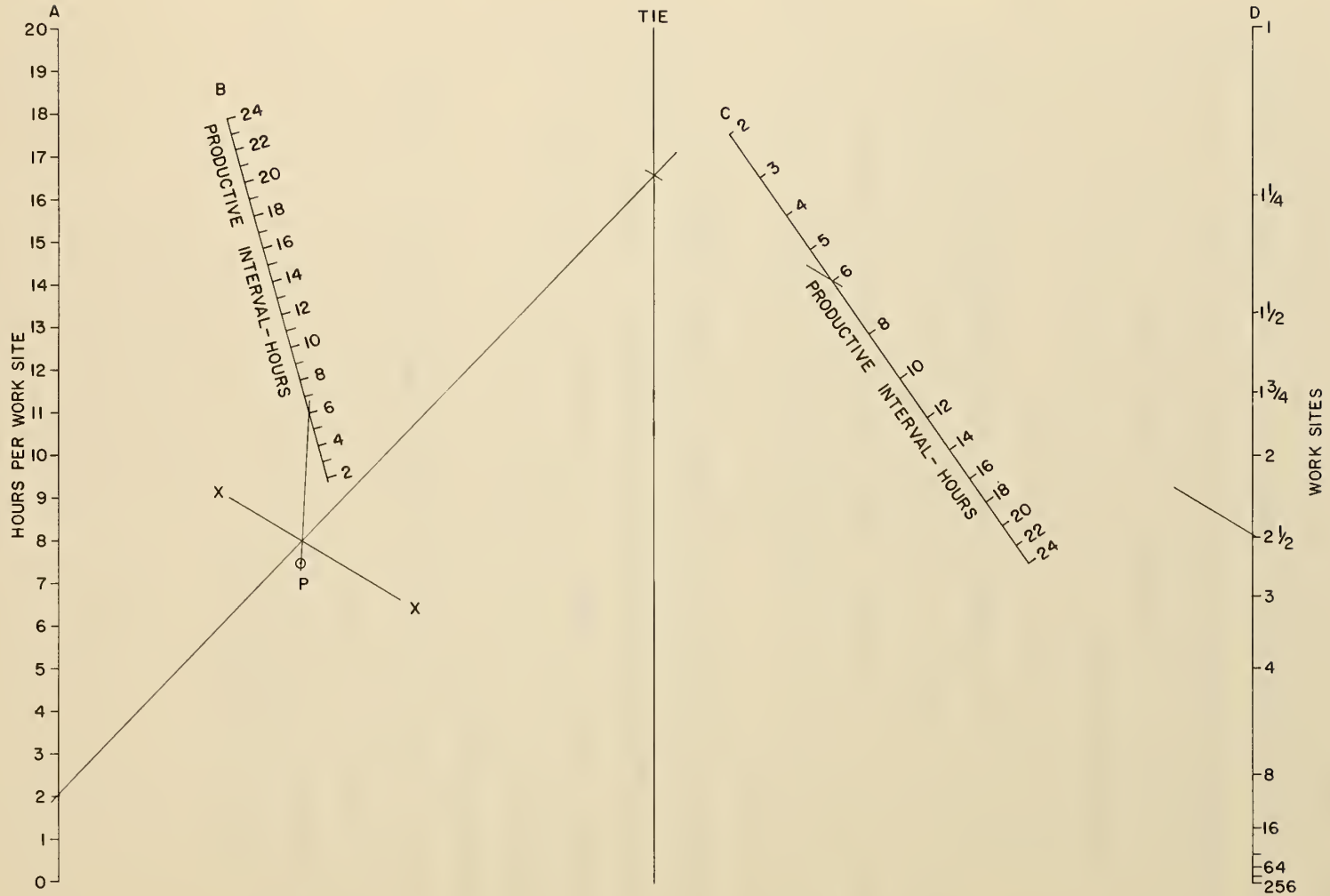


Figure 1. "DWORK" nomograph for the determination of daily worksites as a function of worksite time and roadway occupancy productive time

The hours per worksite depend on the average workload existing at each worksite (WS) and the production rate of the crew (P). If the average concrete patch is 22 square yards in size and the work crew can produce 11 square yards of full depth concrete repair per hour. then the hours per worksite becomes 2 hours.

$$H = WS/P$$

$$H = 22/11 = 2 \text{ hours}$$

Also, note that the worksite size can be based on closing more than one lane. If two lanes were closed and the worksite (WS) increased to 44 SY, then it would be necessary to spend 4 hours at each worksite.

$$H = WS/P$$

$$H = 44/11 = 4 \text{ hours}$$

The productive interval (CN) is that net time on the roadway available for work. This time may be controlled by either the net crew hours available or constrained by policy on available hours that the road can be occupied.

The net crew hours CN value is determined by subtracting from the total crew work hours (C), the values established for CT and CF.

$$CN = C - CT - CF$$

The hours when the roadway is available to be occupied by work crews may be set as a matter of policy. The queue nomographs illustrated in Figures 6 through 8 may provide the analyst with insight in selecting a reasonable occupancy interval for a given traffic flow condition.

If the hours available to occupy the roadway are from 9 A.M. to 4 P.M., this is 7 hours. The crew hours available for productive work

during roadway occupancy based on this occupancy constraint would be

CN = 7 - CF

The lesser value of CN produced by these two approaches should be used with the nomograph.

Use of Nomograph "DWORK"

The use of the nomograph as illustrated is based on the following assumptions:

Hours per worksite (H) = 2 hours

C = 8 hours

CT = 1 hour

CF = 1 hour

Productive Interval (CN) = C - CT - CF

CN = 8 - 1 - 1 = 6 hours

The steps required to use the nomograph are as follows:

1. A line is drawn between the point P and the productive interval (CN) value of 6 hours on scale B. This establishes a point on the line X-X.
2. A line is drawn between the value 2 on Scale A, the hours per worksite, through the established point on the line X-X to the tieline.
3. From the point on the tieline, a line is drawn through the available occupancy interval of 6 hours on scale C to the predicted worksites per day on scale D which is 2.5 worksite locations per day.

The relationships depicted by the nomograph were based on a simulation using random size worksites and random worksite spacing. Therefore, the uneven number 2.5 for worksites is an acceptable solution. The 2.5 worksites can be interpreted as working at two worksites one day and then three worksites on the next day.

Daily Activity Costs

The costs associated with the performance of an activity are based on the hourly crew costs and activity material costs. Typical crew costs are illustrated in Table 1 for a range of maintenance activities. Also shown in the table for each activity is an estimate of material costs for a workload unit. For the activity, full depth concrete pavement patching, an hourly crew costs of $48.40 per hour is shown for labor and equipment. The material costs is shown as $6.25 per square yard. To compute the daily costs of performing concrete patching, the daily crew hours and total daily work accomplishment units must be established. The daily crew hours (C) is computed as follows:

$$C = CN + CF + CT$$

$$C = 6 + 1 + 1 = 8 \text{ hours}$$

The average worksite size was set at 22 square yards and the average number of daily worksites was determined as 2.5 from nomograph "DWORK". Therefore, the daily work accomplishment units become 55 square yards.

$$2.5 \times 22 = 55 \text{ S.Y.}$$

Table 1 . Maintenance activity performance standard data used as defaults in the program.

Activity	Workload Units	Labor & Equipment	Material	Production Rate
Full depth PCC Patching	sq. yds.	$48.40/Hr.	$ 6.25/SY	11.1 SY/Hr.
Partial depth PCC Patching	sq. ft.	$31.92/Hr.	$ 0.20/SF	5 SF/Hr.
Blowups	Sites	$48.98/Hr.	$86.40/Site	.5 Sites/Hr.
Mudjacking	cu. ft.	$35.91/Hr.	$ .70/CF	30 CF/Hr.
Joint Sealing	ln. ft.	$26.62/Hr.	$ .075/LF	280 LF/Hr.
Bituminous Patching	sq. yds.	$55.83/Hr.	$ .50/SY	180 SY/Hr.
Bituminous Base and Surface Repair	cu. yds.	$69.42/Hr.	$ 5.07/CY	5.6 CY/Hr.
Bituminous Crack Sealing	ln. ft.	$28.98/Hr.	$ .10/LF	1500 LF/Hr.
Resurfacing	sq. yds.	---	$ 1.20/SY	700 SY/Hr.

Multiplying and summing the crew hours and material accomplishment units by $48.40 and $6.25 respectively produces a daily crew costs of $722.95.

$$(8 \times 48.40 + 55 \times 6.25) = \$722.95$$

Activity Costs Work Sheet

The step-by-step procedure required in the development of the annual costs to perform an activity on a pavement is summarized in worksheet No. 1 shown in Figure 2. Also shown is the computation of the occupancy interval needed in developing motorist cost.

The worksheet is divided into sections. First values are assigned to certain variables. Then use is made of nomograph "DWORK" to establish worksites per day. Next a series of computation steps are shown to produce daily activity costs and the roadway occupancy interval.

Motorist Costs

The computation of the daily motorist costs, created when the roadway is occupied for work, is divided into two steps. First, the operation costs, time costs, and accident costs associated with motorist operation in a traffic control zone are determined. Second, the increased costs for vehicle operation and time losses are established for hours when traffic is queued.

The computer program EAROMAR was iterated through a range of occupancy intervals, lane closures and traffic volumes to generate costs data. This data was used to create a series of motorist costs

WORKSHEET NO. 1
DAILY ACTIVITY COSTS

Activity: Full Depth PCC Patching Analysis Year 6

Step No.	Assign Values to:
1	Production rate in workload units per hour(P) 11
2	Average number of workload units per worksite(WS) 22
3	Crew travel time(TT) 1.0 hour
4	Crew fixed time(CF) 1.0 hour
5	Crew productive interval(CN) 6.0 hours
6	Crew hourly rate $48.40
7	Material unit costs $ 6.25

Compute and obtain from Nomograph: (Figure 1)

8	Worksite time (2) ÷ (1) = 22 ÷ 11 = 2 hours
9	Worksites per day (8,5) = 2.5

Compute as indicated:

10	Daily crew time(C) (3)+(4)+(5) = 1.0+1.0+6.0 = 8.0 hrs.
11	Daily material costs (7)x(2)x(9) = 6.25x22x2.5 = $343.75
12	Daily crew costs (6)x(10) = 48.40x8 = $379.20
13	Daily activity costs (11)+(12) = 343.75+379.20 = $722.95

Establish for use in motorist costs computation:

14	Occupancy interval (4)+(5) = 1.0+6.0 = 7.0 hrs.

Figure 2. Sample calculations and procedures using Worksheet No. 1

nomographs. The above two steps make use of these nomographs to produce motorist costs.

Use of nomographs "NOC", "TIME", and "ACID"

These nomographs were developed for use in determining operation, time, and accident costs for unqueued conditions during roadway occupancy. They are based on the program EAROMAR and reflect the program default assumptions together with an assumed influence zone length equal to 0.5 miles. The nomographs are shown in Figures 3 through 5.

The use of the nomograph "NOC" as shown in Figure 3 is demonstrated for the following values:

Roadway Occupancy Start Time = 9

Roadway Occupancy Finish Time = 16

Directional ADT volume = 30,000

Using the specified values, the following steps are needed:

1. A line is drawn from the value 9 on the starting time scale A through the value 16 on the finish time scale B to the tie line.
2. From the tie line, a line is drawn through the directional ADT volume of 30,000 to intersect scale C.
3. Finally, a horizontal line is drawn through the intercept point on scale C through scales D and E.

Depending on the lanes available to the motorist, the operation costs can be read directly from either scale C, D, or E. The increased operation cost in Figure 3 would be approximately $220, $240, and $260 for 3-, 2-, and 1-lane operations respectively. The nomographs "TIME" and "ACID"

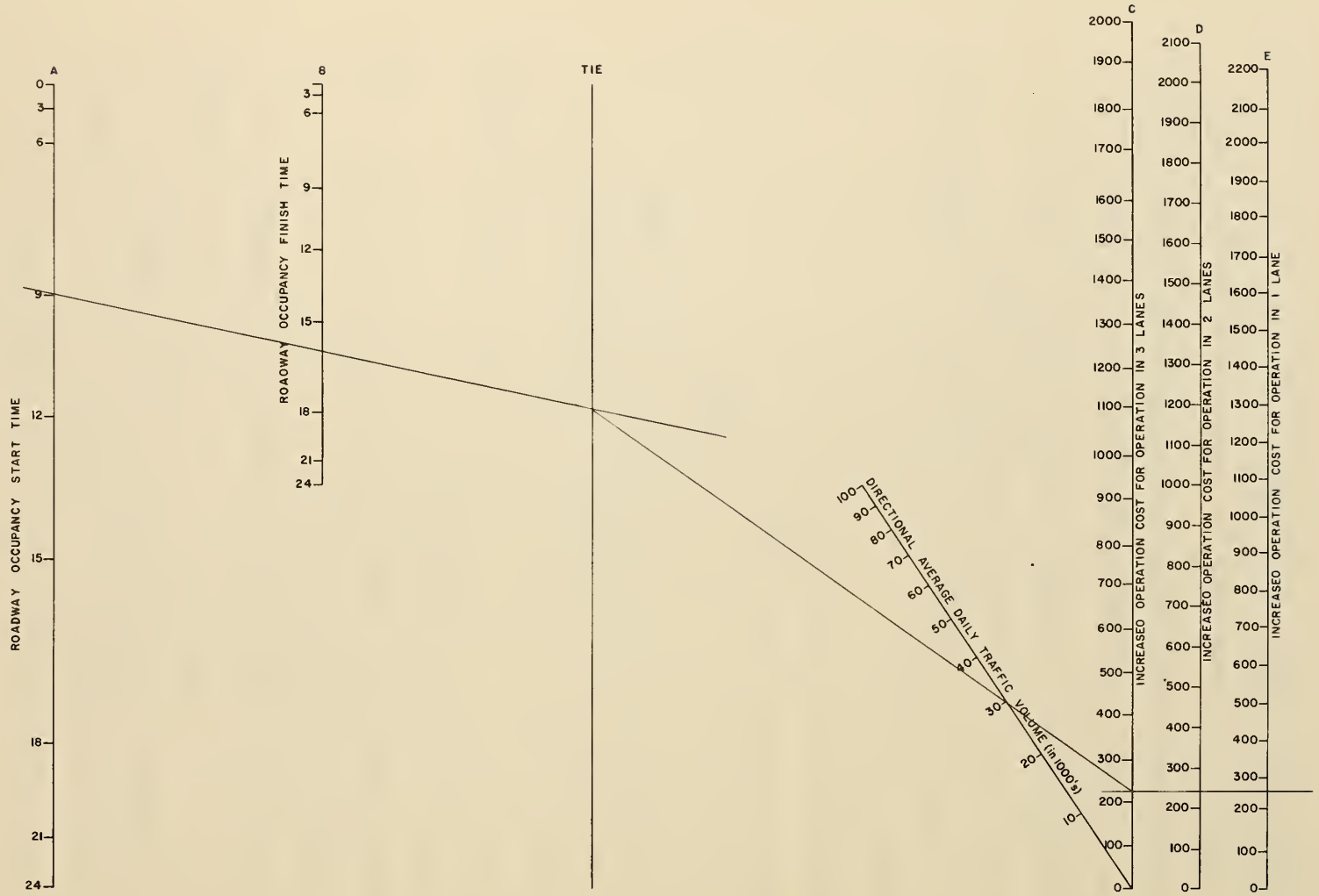


Figure 3. "NOC" nomograph for the determination of increased vehicle operation costs for a range of occupancy intervals, directional volumes and lane closures

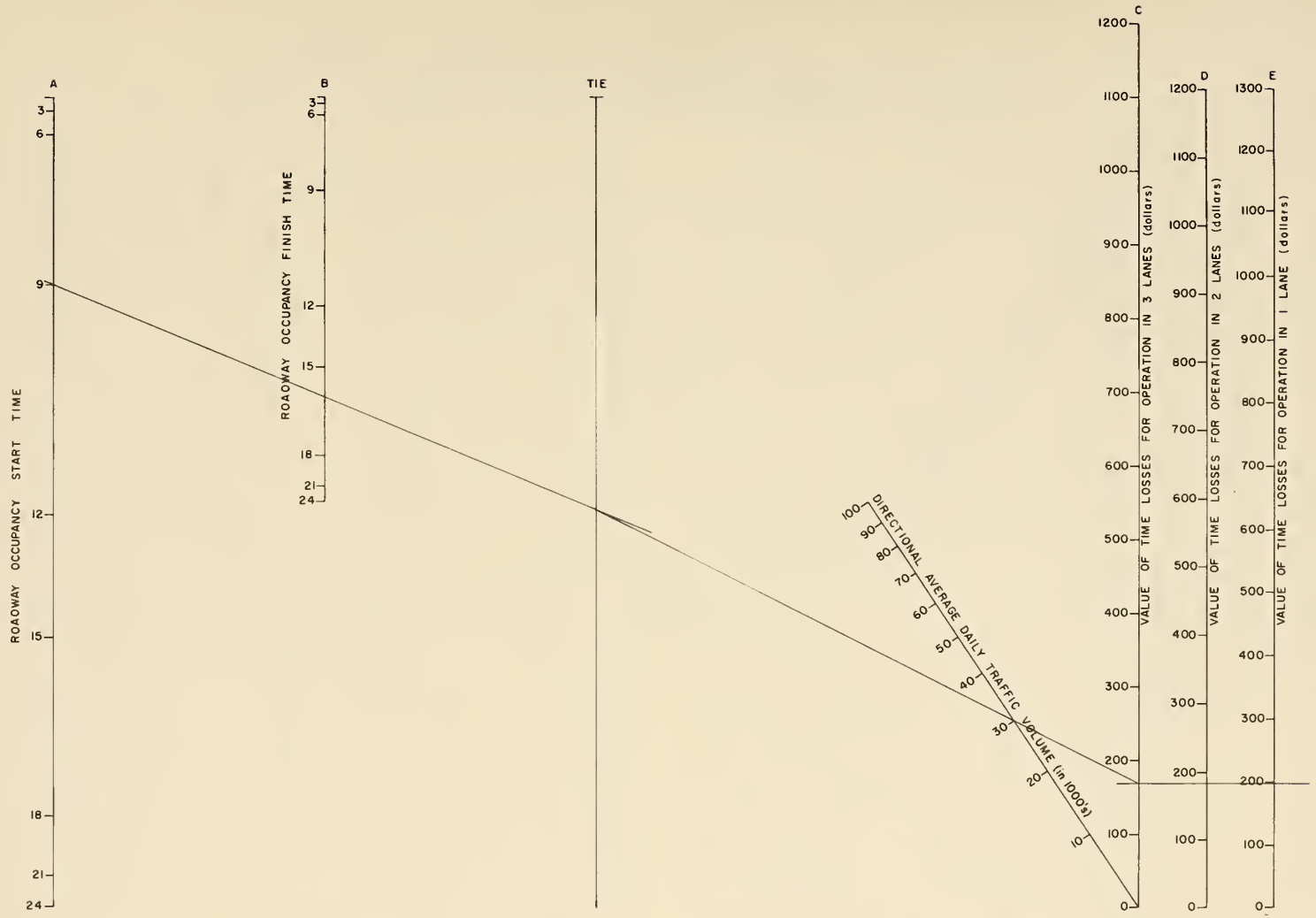


Figure 4. "TIME" nomograph for the determination of the costs of accidents for a range of occupancy intervals, direction volume and lane closures

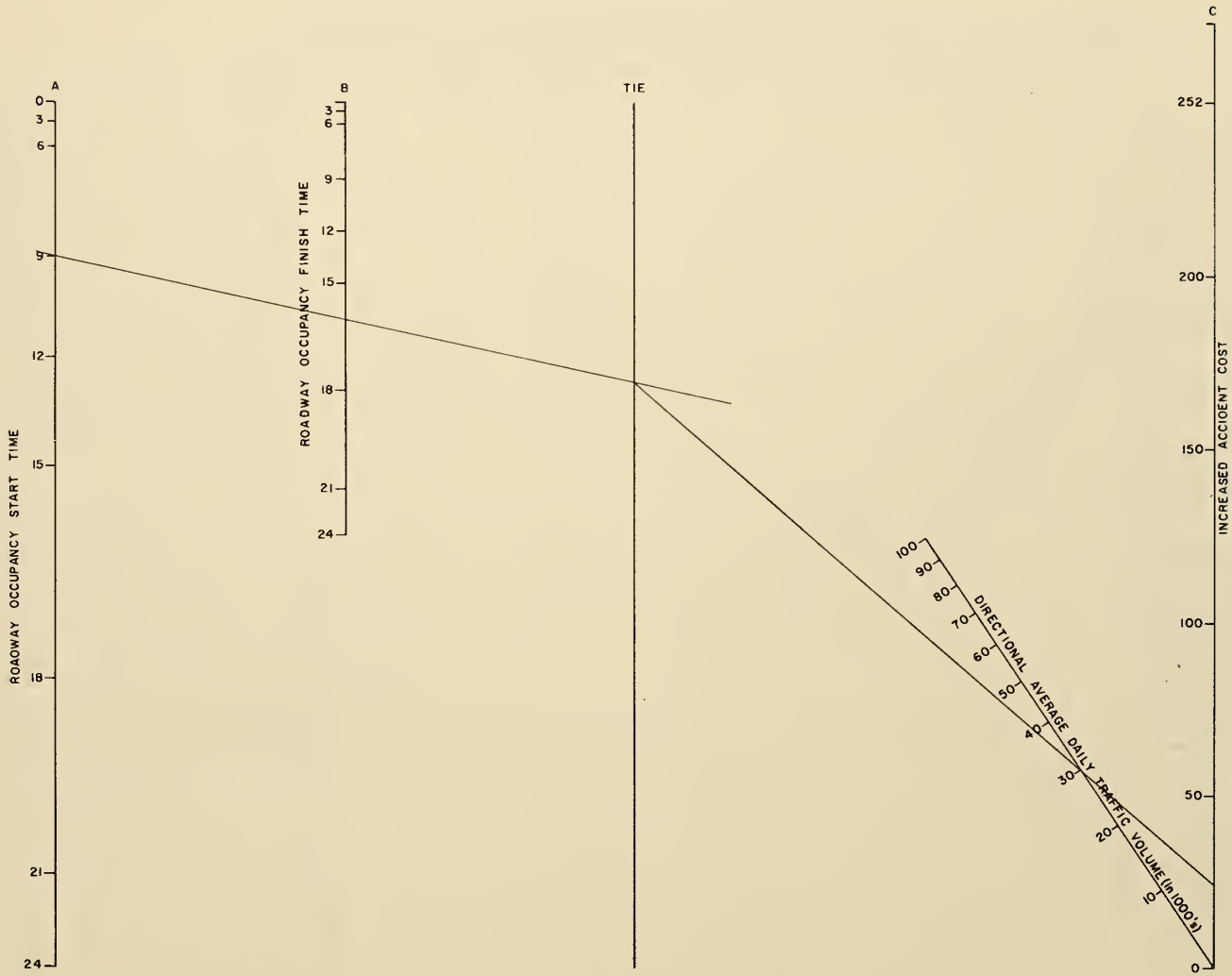


Figure 5. "ACID" nomograph for the determination of the costs of accidents for a range of occupancy intervals, direction volume and lane closures

are used in exactly the same way to produce time costs and increased accident costs for periods of roadway occupancy.

Use of nomographs "QUE(1)", "QUE(2)", and "QUE(3)"

These nomographs were developed to handle queue situations. A typical hourly distribution of traffic is included as part of each nomograph and reflects the percentage of the directional average daily traffic volume occurring in each hour. Only the hours having volumes which exceed a capacity of 2000 vehicles per lane are evaluated for queues. The nomographs are shown in Figures 6 through 8.

The identification of the hours which are evaluated for queuing is demonstrated for a directional average daily traffic of 30,000 in Figure 6 where one lane is open to the motorist. The steps required to use the nomograph are as follows:

1. A line is drawn from point A on the percentage scale to 30,000 on the directional traffic scale to create a point on the X-X line.
2. A line is drawn from point B through the point created on the X-X line to an intercepting point on the percentage scale.
3. A horizontal line is drawn through the interception point created on the percentage scale.

Every "hour of the day" bar which is crossed by the horizontal line is a queue hour for the 30,000 directional volume. The operation costs and value time losses must be determined separately for each

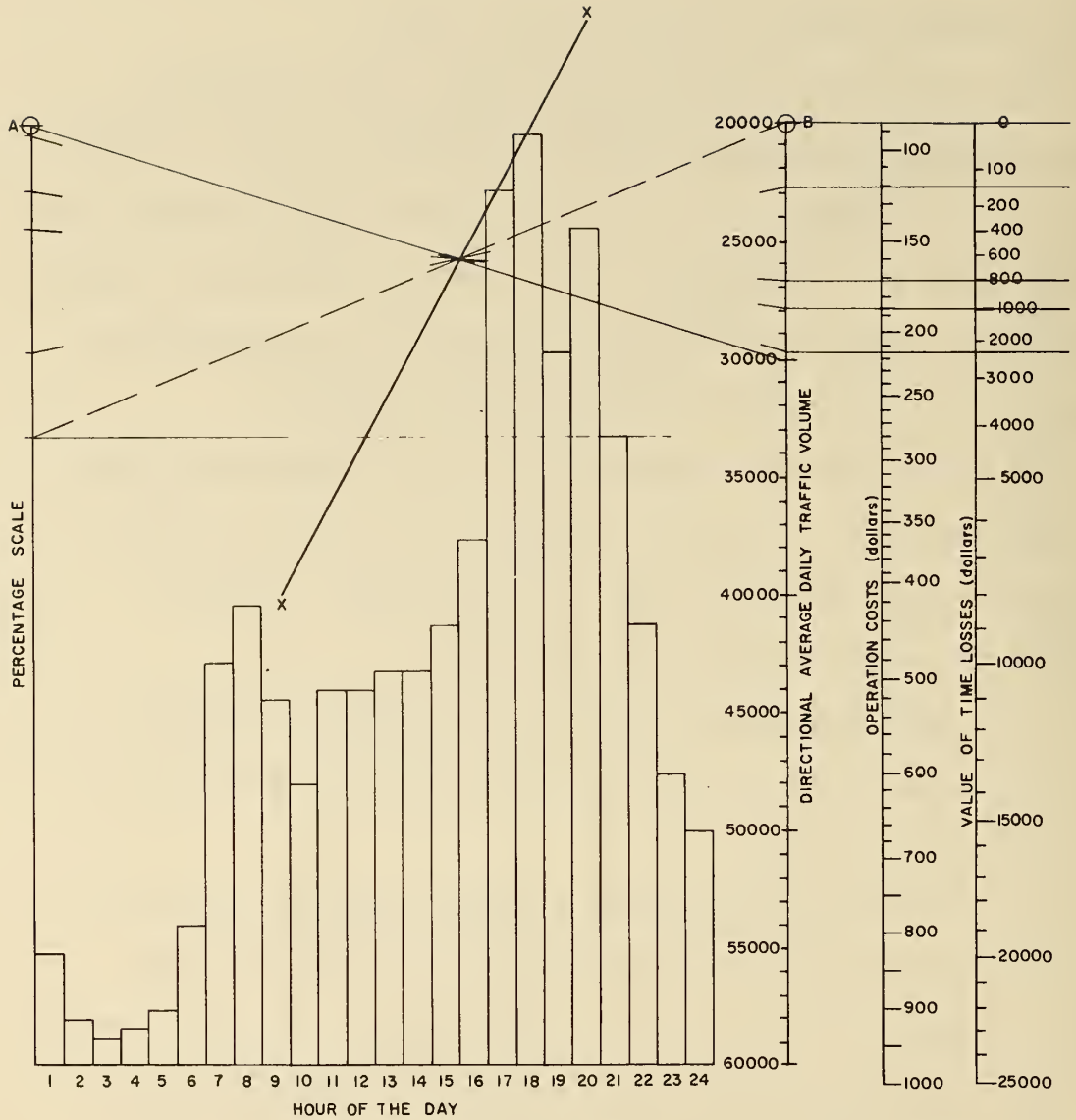


Figure 6. "QUE(1)" nomograph for the determination of increased operation costs and time costs during hours of queuing when one lane is available to the motorist

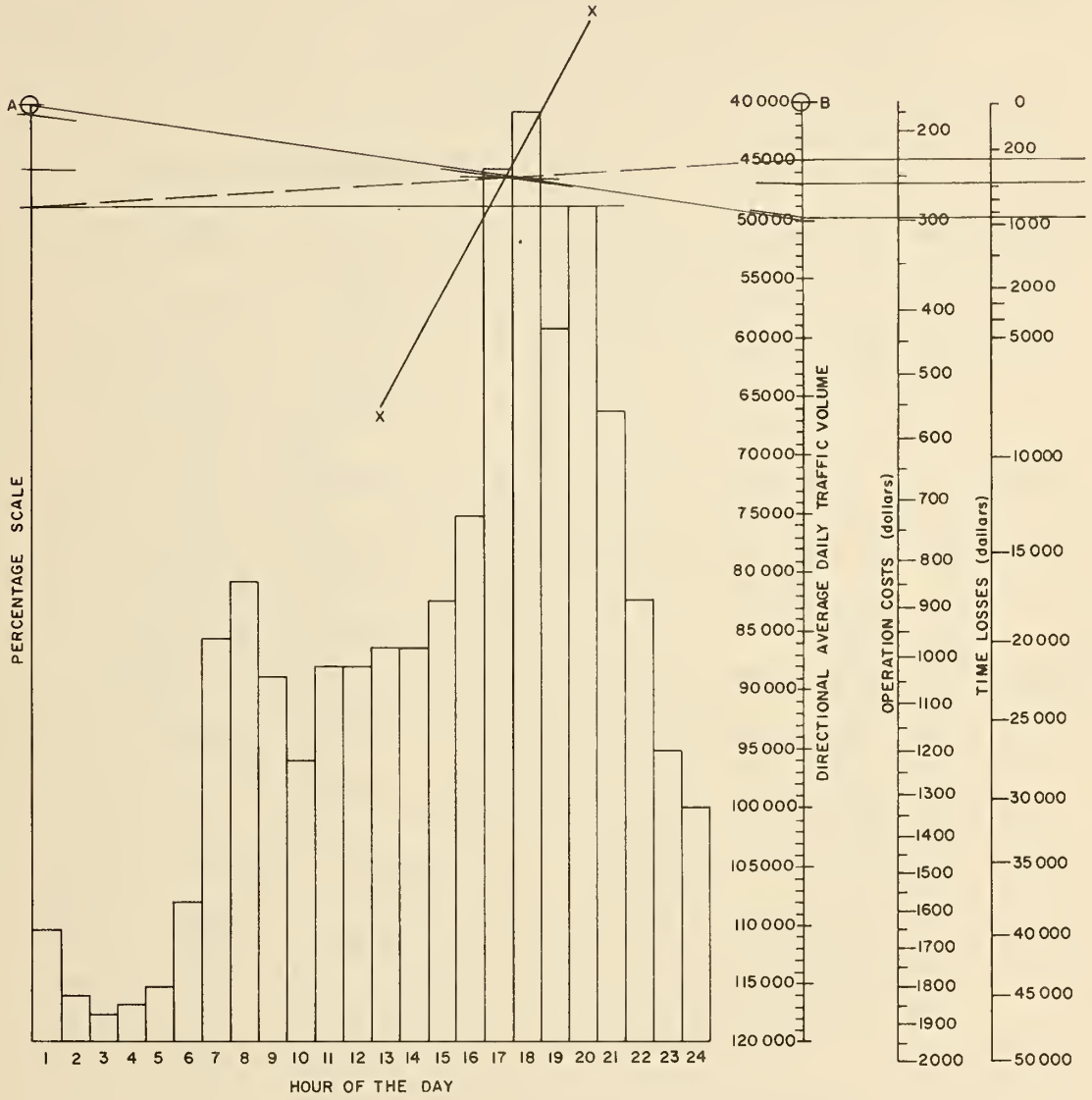


Figure 7. "QUE(2)" nomograph for the determination of increased vehicle operation costs and costs during hours of queuing when two lanes are available to the motorist

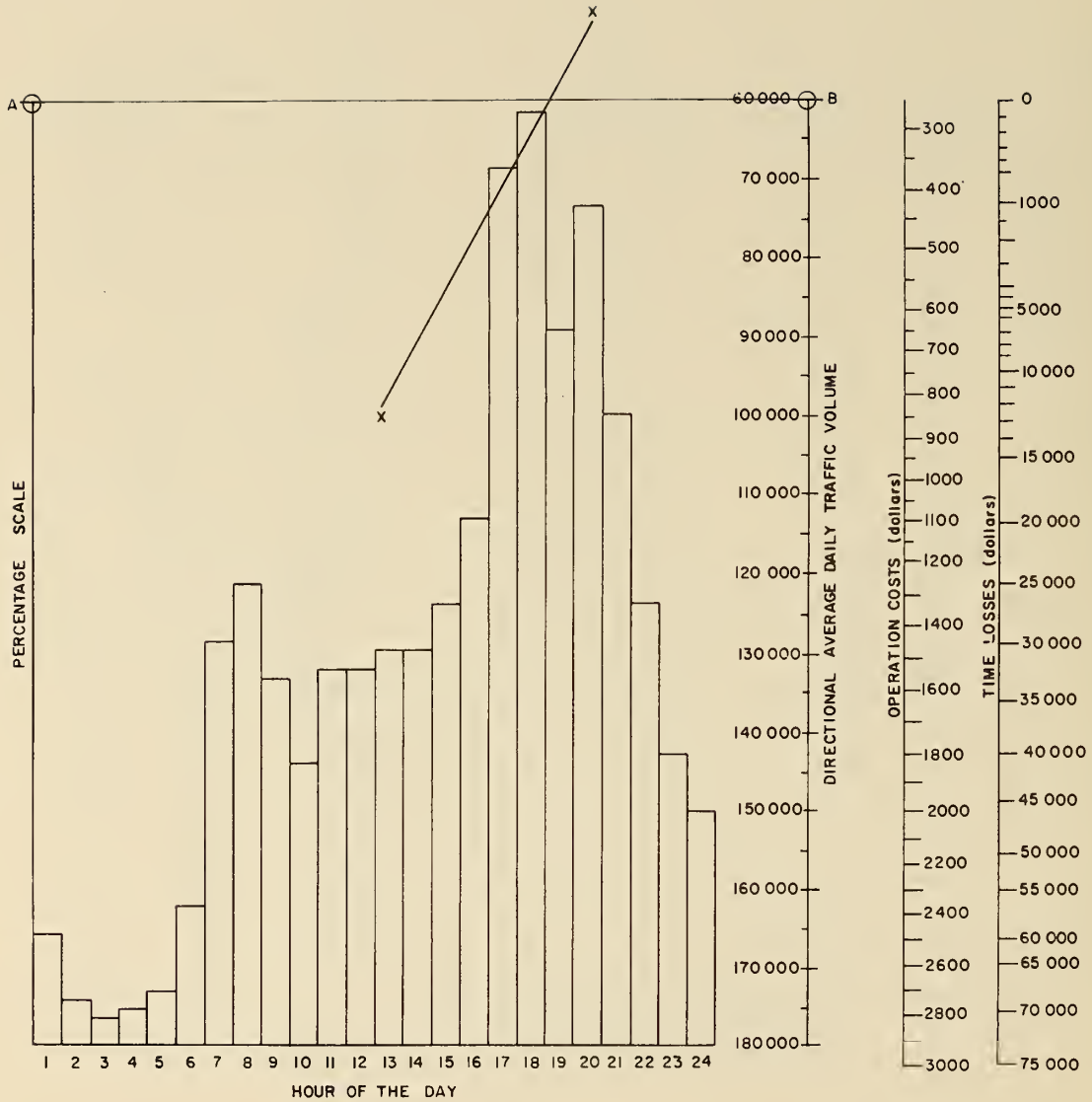


Figure 8. "QUE(3)" nomograph for the determination of increased vehicle operation costs and time costs during hours of queuing when three lanes are available to the motorist

queued hour. In the example illustrated in Figure 6, the hours 17 through 21 are all queued. To determine the costs associated with the queued hours, the following additional steps are needed:

4. Draw a horizontal line from the top of each queued hourly bar to the percentage scale.
5. From each point created on the percentage scale for a queue bar, draw a line through the point created on the X-X line to an intercepting point on the directional average hourly traffic scale B.
6. For each intercepting point on the directional average daily traffic volume scale, draw a horizontal line through the operation costs and value of time losses scales.

The queue costs associated with each of the queue hours 17 through 21 as taken from the nomograph are tabulated in Table 2. Of course, these queued costs would only be determined if the actual roadway occupancy included the queue hours 17 through 21. The impact of the queuing in terms of increased costs to the motorist for operation costs is $778, for loss time is $4250, and the total is $5028.

Motorist Costs Worksheet

Worksheet No. 2, shown in Figure 9 was developed to summarize the steps required in using the motorist nomographs included in Figures 3 through 8. The occupancy interval is obtained from Worksheet No. 1. It is entered as 7 hours for step 1 on the worksheet. This means that any continuous time interval equal to 7 hours can be selected for roadway occupancy. The interval selected for

Table 2. Queuing costs for example conditions illustrated in Figure 11

Hour	Operation Cost	Value of Time Losses
17	$187	$1000
18	215	2300
19	120	150
20	171	800
21	85	0
Total	$778	$4250

Combined Total: $4250 + $778 = $5028

WORKSHEET NO. 2

DAILY MOTORIST COSTS

Activity: Full Depth PCC patching Analysis Year 6

Step No.	Obtain from Worksheet No. 1:	
1	Occupancy Interval	No. 1 (14) = 7 hours
Assign Values to:		
2	Directional traffic volume	30,000
3	Lanes open to motorist	1
4	Start hour of occupancy interval	9
5	Finish hour of occupancy interval	16
Obtain from Nomographs: (Figures 6 through 11)		
6	Daily operation costs increase "NOC"	(4,5,2,3) = $260
7	Daily value of time losses "TIME"	(4,5,2,3,) = $200
8	Daily accident losses "ACID"	(4,5,2) = $25
9	Queue hours operation cost "QUE(Step 3)"	(4,5,2) = 0
10	Queue hours value of time lost "QUE(Step 3)"	(4,5,2) = 0
Compute as indicated:		
11	Non-queue motorist cost	(6)+(7)+(8) = 260+200+25 = $485
12	Queue motorist cost	(9)+(10) = 0+0 = 0
13	Total Daily Motorist Cost	(11) + (12) = 485+0 = $485

Figure 9. Sample calculations and procedures using Worksheet No. 2

the example is shown in steps 4 and 5. This is 9 A.M. to 4 P.M. or 9 to 16 hundred hours which corresponds to the hour of day scales shown on the nomographs. The directional average daily traffic volume selected for the 6th year was 30,000. The worksite size is based on closing one lane to traffic. With a 4-lane divided roadway only one directional lane can be open to traffic and this is shown in step 3.

In step 6, the increase in daily operation costs is established. The notation (4,5,2,3) indicates that the nomograph is entered with the value given in step 4, which is the start hour of 9 A.M. Next and sequentially, the step 5, step 2 and step 3 values of 16, 30,000 and 1 are used with the nomograph "NOC" to obtain $260. This is the increased daily operation costs associated with roadway occupancy between 9 A.M. and 4 P.M. in the traffic control zone. A similar use of nomographs "TIME" and "ACID' produces the lost time costs of $200 and the increased accident costs of $25 shown for steps 7 and 8 on Worksheet No. 2.

As indicated in the description of using the "QUE" nomographs, the hours when traffic is queued are first established. Because the roadway occupancy is terminated at the 16th hour, no traffic queue is created. In the example, therefore, no queue costs for vehicle operation or time losses are applicable in steps 9 and 10. The notation QUE (Step 3) means that the lanes open to traffic in step 3 are used to designate the applicable queue nomograph. In the example this is QUE(1).

Total Annual Occupancy Costs

Once a daily activity costs has been determined using Worksheet No. 1 and a daily motorists cost established using Worksheet No. 2, they are combined. Next they are expanded for the total annual workload on the roadway. The steps required to accomplish these computations are shown on Worksheet No. 3 which is designated Figure 10.

On Worksheet No. 3, the information required from Worksheets No. 1 and 2 are designated by No. 1 or No. 2 and the number in parenthesis refers to the step in the referenced worksheet. At step 1 on Worksheet No. 3, worksites per day are required. The designation No. 1 (9) means Worksheet No. 1, step 9. This is 2.5 sites per day. Also needed from Worksheet No. 1 were steps 2 and 3 which are a 22 S.Y. average worksite size and a $722.95 activity cost per lane mile. The motorist costs associated with the activity is obtained from Worksheet No. 2 and is $485.00 per lane mile.

Steps 5, 6, and 7 are assigned. The annual workload was established to be 16.5 square yards of full depth concrete patching per lane mile. Only one lane is closed so the workload for item 5 remains 16.5 S.Y./mile.

In the example, one lane is closed and a 4-lane divided highway was designated so there will be 4 lane closed groups. This is indicated at step 6. The project length is made one mile for the example. This is sufficient for analysis purposes.

It should be noted that the analysis as outlined is based on a single lane closure sequence, i.e., close one lane at a time. This

WORKSHEET NO. 3
ANNUAL OCCUPANCY COSTS

Activity: Full Depth PCC patching Analysis Year 6

Step No.	Obtain from worksheets 1 and 2:	
1	Worksites per day	No. 1(9) = 2.5
2	Average number of workload units per worksite	No.1(2)=22 SY
3	Daily activity costs	No. 1(13) = $722.95
4	Daily motorist cost	No. 2(13) = $485.00
	Assign Values to:	
5	Annual workload for closed lanes/mile	16.5 SY
6	Lane closed groups	4
7	Project Length	1 Mile
	Compute as indicated:	
8	Annual worksites	(5)x(6)x(7) ÷ (2) = 16.5x4x1 ÷ 22 = 3
9	Work days	(8) ÷ (1) = 3 ÷ 2.5 = 1.2
10	Annual activity cost	(9)x(3) = 1.2x722.95 = $867.54
11	Annual motorist cost	(9)x(4) = 1.2x485.00 = $582.00
12	Total cost	(10) + (11) = 867.54 + 582.00 = $1449.54

Figure 10. Sample calculations and procedures using Worksheet No. 3

is consistent with the worksite size assumption used in developing worksites per day. If a combination of lane closures is desired, e.g., one lane closed, then two lanes closed, then the analyst should make an analysis for both conditions and establish an appropriate worksite workload for each closure.

The annual workload per mile shown in Worksheet No. 3 is for one lane closed. If the example were an eight-lane freeway and two lanes were closed at a time for maintenance, then the workload would be for two lane miles. This means that the lane closed group for the eight-lane freeway would be 4 groups.

The final steps in determining a total annual costs for the activity are computed in steps 8 through 12. The annual worksites are established for the entire one mile long, four-lane wide roadway in step 8. Dividing these annual worksites by worksites per day produces work days which are used in steps 10 and 11 to produce annual activity cost and motorist costs respectively. These are totaled in step 12, producing a total cost of $1449.54 for full depth concrete patching for the 6th year.

Analysis Period

The analysis outlined shows the evaluation of full depth concrete patching during one year. To develop a total economic analysis of the impact of this maintenance activity over the life of a pavement, it is necessary that the operation and motorist costs for the activity be totaled and discounted for each analysis year. This is done in the following manner where:

Ay = Total activity and motorist costs for full depth concrete patching in year y

i = Interest rate of money

n = Analysis period in years

CA_n = Total activity and motorist costs for full depth concrete patching during n years of pavement service

$$CA_n = \sum_{y=1}^{y=n} (Ay/(1 + i)^y)$$

In the example, the total activity and motorist costs need to be established for the 6th year through the 20th year. Because the assumption was made that the workload remains constant over this period, the activity costs each year will remain constant, i.e., every year $867.54 will be expended for full depth concrete patching on the one-mile long, 4-lane divided example pavement section.

The motorist costs will change each year if the traffic volume changes. Normally, volumes increase with time so an annual increase should be expected for the motorist costs. If every assumption except volume is held constant and the nomographs "NOC", "TIME", and "ACID" are used to evaluate a 40,000 directional volume, the values shown on Worksheet No. 2, Figure 11 would result. The queue costs shown on the Worksheet results from a queue being created in the 16th hour. To further simplify the example, it will be assumed that traffic volumes increase from the 30,000 level in the 6th year to a 40,000 level in the 20th year in a way that motorist costs increase linearly each year. Based on these assumptions, the motorist costs are estimated for

WORKSHEET NO. 2
DAILY MOTORIST COSTS

Activity: Full Depth PCC Patching Analysis Year 20

Step No.	Obtain from Worksheet No. 1:	
1	Occupancy Interval	No. 1(14) = 7 hours
Assign Values to:		
2	Directional traffic volume	40,000
3	Lanes open to motorist	1
4	Start hour of occupancy interval	9
5	Finish hour of occupancy interval	16
Obtain from Nomographs: (Figures 6 through 11)		
6	Daily operation costs increase "NOC"	(4,5,2,3) = $370
7	Daily value of time losses "TIME"	(4,5,2,3) = $270
8	Daily accident losses "ACID"	(4,5,2) = $35
9	Queue hours operation cost "QUE(Step 3)"	(4,5,2) = $112
10	Queue hours value of time lost "QUE(Step 3)"	(4,5,2) = $110
Compute as indicated:		
11	Non-queue total motorist cost	(6)+(7)+(8) = 370+270+35 = $675
12	Queue motorist cost	(9)+(10) = 112+110 = $222
13	Total Daily Motorist Cost	(11)+(12) = 675+222 = $897

Figure 11. Sample calculations and procedures using Worksheet No. 2

each year. Motorist costs are shown with the activity costs in Figure 12 where Worksheet No. 3 is presented for year 20. Worksheet No. 4 as shown in Figure 13 was developed to facilitate the analyst in developing a present worth cost for an activity for the analysis period.

A series of present worth factors have been developed for a range of interest rates and are shown in Table 3. These are used in converting each year's total activity cost to a present worth cost on Worksheet No. 4.

The total costs of repairing concrete joint failures with full depth concrete patches over a 20-year period is shown to be $9353 in present worth dollars. This is the money available to be spent for a new joint design.

One way to evaluate the alternate joint design is in terms of available money per linear foot of joint. There are 5068.8 linear feet of joints and therefore $1.84 per linear foot of joint created by joint failures.

$$(5280/50) \times 48 = 5068.8$$

$$\$9353/5068.8 = \$1.84$$

This is money available above normal joint costs that can be justified economically for an improved joint design.

Another approach would be to compare the increased money available per square yard of pavement. Assume that the inplace costs of the conventional 9" reinforced portland cement concrete pavement is $10.00 per square yard. This could be increased to $10.44 per square yard for the new joint design as shown in the following computations:

WORKSHEET NO. 3
ANNUAL OCCUPANCY COSTS

Activity: Full Depth PCC Patching Analysis Year 20

Step No.	Obtain from worksheets 1 and 2:	
1	Worksites per day	No. 1(9) = 2.5
2	Average number of workload units per worksite	No. 1(2)=22 SY
3	Daily activity costs	No. 1(13) = $722.95
4	Daily motorist cost	No. 2(13) = $897.00
	Assign Values to:	
5	Annual workload for closed lanes/miles	16.5
6	Lane closed groups	4
7	Project length	1
	Compute as indicated:	
8	Annual worksites	(5)x(6)x(7) ÷ (2) = 16.5x4x1 ÷ 22 = 3
9	Work days	(8) ÷ (1) = 3 ÷ 2.5 = 1.2
10	Annual activity cost	(9)x(3) = 1.2x722.95 = $867.54
11	Annual motorist cost	(9)x(4) = 1.2x897.00 = $976.40
12	Total cost	(10) + (11) = 867.54 + 976.40 = $1843.94

Figure 12. Sample calculations and procedures using Worksheet No. 3

WORKSHEET NO. 4
ANALYSIS PERIOD COSTS

Activity: Full Depth PCC Patching Analysis Period 20 Yrs.

Year	Activity Costs	+	Motorist Costs	=	Total Cost	x	Discount Factor	=	Present Worth Cost
1	-		-		-		.93		-
2	-		-		-		.86		-
3	-		-		-		.79		-
4	-		-		-		.74		-
5	-		-		-		.68		-
6	868		582		1450		.63		914
7	868		610		1478		.58		857
8	868		638		1506		.54		813
9	868		666		1534		.50		767
10	868		694		1562		.46		719
11	868		722		1590		.43		684
12	868		750		1618		.40		647
13	868		778		1646		.37		609
14	868		807		1675		.34		570
15	868		835		1703		.32		545
16	868		863		1731		.29		502
17	868		891		1759		.27		475
18	868		919		1787		.25		447
19	868		947		1815		.23		417
20	868		976		1844		.21		387
							TOTAL		9353

Figure 13. Sample calculations using Worksheet No. 4

Table 3. Factors to convert total roadway occupancy costs to present worth for interest rates 5 percent through 10 percent

YEAR	INTEREST RATE (PERCENT) 5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0
1	.95	.95	.94	.94	.93	.93	.93	.92	.92	.91	.91
2	.91	.90	.89	.88	.87	.87	.86	.85	.84	.83	.83
3	.86	.85	.84	.83	.82	.80	.79	.78	.77	.76	.75
4	.82	.81	.79	.78	.76	.75	.74	.72	.71	.70	.68
5	.78	.77	.75	.73	.71	.70	.68	.67	.65	.64	.62
6	.75	.73	.70	.69	.67	.65	.63	.61	.60	.58	.56
7	.71	.69	.67	.64	.62	.60	.58	.56	.55	.53	.51
8	.68	.65	.63	.60	.58	.56	.54	.52	.50	.48	.47
9	.64	.62	.59	.57	.54	.52	.50	.48	.46	.44	.42
10	.61	.59	.56	.53	.51	.49	.46	.44	.42	.40	.39
11	.58	.55	.53	.50	.48	.45	.43	.41	.39	.37	.35
12	.56	.53	.50	.47	.44	.42	.40	.38	.36	.34	.32
13	.53	.50	.47	.44	.41	.39	.37	.35	.33	.31	.29
14	.51	.47	.44	.41	.39	.36	.34	.32	.30	.28	.26
15	.48	.45	.42	.39	.36	.34	.32	.29	.27	.26	.24
16	.46	.42	.39	.37	.34	.31	.29	.27	.25	.23	.22
17	.44	.40	.37	.34	.32	.29	.27	.25	.23	.21	.20
18	.42	.38	.35	.32	.30	.27	.25	.23	.21	.20	.18
19	.40	.36	.33	.30	.28	.25	.23	.21	.19	.18	.16
20	.38	.34	.31	.28	.26	.24	.21	.20	.18	.16	.15
21	.36	.32	.29	.27	.24	.22	.20	.18	.16	.15	.14
22	.34	.31	.28	.25	.23	.20	.18	.17	.15	.14	.12
23	.33	.29	.26	.23	.21	.19	.17	.15	.14	.12	.11
24	.31	.28	.25	.22	.20	.18	.16	.14	.13	.11	.10
25	.30	.26	.23	.21	.18	.16	.15	.13	.12	.10	.09
26	.28	.25	.22	.19	.17	.15	.14	.12	.11	.09	.08
27	.27	.24	.21	.18	.16	.14	.13	.11	.10	.09	.08
28	.26	.22	.20	.17	.15	.13	.12	.10	.09	.08	.07
29	.24	.21	.18	.16	.14	.12	.11	.09	.08	.07	.06
30	.23	.20	.17	.15	.13	.11	.10	.09	.08	.07	.06
31	.22	.19	.16	.14	.12	.11	.09	.08	.07	.06	.05
32	.21	.18	.15	.13	.11	.10	.09	.07	.06	.05	.05
33	.20	.17	.15	.13	.11	.09	.08	.07	.06	.05	.04
34	.19	.16	.14	.12	.10	.09	.07	.06	.05	.05	.04
35	.18	.15	.13	.11	.09	.08	.07	.06	.05	.04	.04
36	.17	.15	.12	.10	.09	.07	.06	.05	.04	.04	.03
37	.16	.14	.12	.10	.08	.07	.06	.05	.04	.03	.03
38	.16	.13	.11	.09	.08	.06	.05	.05	.04	.03	.03
39	.15	.12	.10	.09	.07	.06	.05	.04	.03	.03	.02
40	.14	.12	.10	.08	.07	.06	.05	.04	.03	.03	.02

Pavement area = 1760 x 12 = 21120 S.Y.

Available money = $7965/21120 = $0.44/S.Y.

Pavement cost = $10.00 + .44 = $10.44

This represents a 4.4% increase which can be allowed for a pavement design including the modified joint.

Summary

The algebraic users analysis has been illustrated for a single maintenance activity. The analysis showed that $9353 could be saved over the life of a 4-lane one-mile section of portland cement concrete pavement if joint failures requiring concrete repairs could be eliminated. It is possible that other maintenance requirements also could be reduced or eliminated with an improved joint design, e.g., pavement blowups and joint sealing. A similar analysis consisting of the following steps will be required for each activity:

1. The annual lane mile workload for each work activity is established.
2. Worksheet No. 1 is used to compute daily activity costs and roadway occupancy interval.
3. Worksheet No. 2 is used to compute daily motorist costs for the activity.
4. Worksheet No. 3 is used to compute the total activity and motorist costs for an analysis year.
5. Worksheet No. 4 is used to develop a present worth activity costs for an analysis period.

To develop a total economic analysis of the impact of eliminating maintenance, the present worth costs for all pavement activities must be totaled for an analysis period.

In algebraic terms, the economic analysis of roadway occupancy for maintenance and rehabilitation can be summarized as follows:

A_{iy} = Annual Costs to perform activity i in year y

M_{iy} = Annual Motorist costs associated with the performance of activity i in year y

i = Interest rate of money

n = Analysis period

m = Number of activities applicable to the pavement being evaluated

ROC = Roadway occupancy costs for all pavement activities over the analysis period

$$ROC = \sum_{y=1}^{y=n} \left(\sum_{i=1}^{i=m} ((A_{iy} + M_{iy})/(1 + i)^{y}) \right)$$

USER MANUAL

FOR

PROGRAM EAROMAR

An Economic Analysis of
Roadway Occupancy for
Maintenance and
Rehabilitation

October 1974

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Introduction

The computer program developed for the Economic Analysis of Roadway Occupancy for Maintenance and Rehabilitation is referred to as "EAROMAR." The program's general structure is shown in Figure 14. In the broadest sense, the program does three things. First, it establishes a data matrix of given and assumed information. Second, it determines the specific hours the roadway will be occupied by work crews annually together with the maintenance and rehabilitation cost associated with that occupancy. Finally, the impact to the motorist caused by the roadway occupancy is established in terms of operation costs, time costs, accident cost and pollution effects.

Information Matrices

The data used in the program is created in the two subroutines INITAL and OPPARA. These two subroutines each contain a number of routines which were originally designed as subroutines but combined to affect a balance between the core requirement and run time necessary to execute the program. The program will run on any system configuration supporting 92K of available program storage.

The input data required to execute the program is very nominal and consists of pavement design and traffic volume data. This insures that the program can be easily used by State agencies.

The majority of the data matrices are based on defaults which are built into the program. However, each default can be optionally overridden by the program user. This is accomplished through the use of

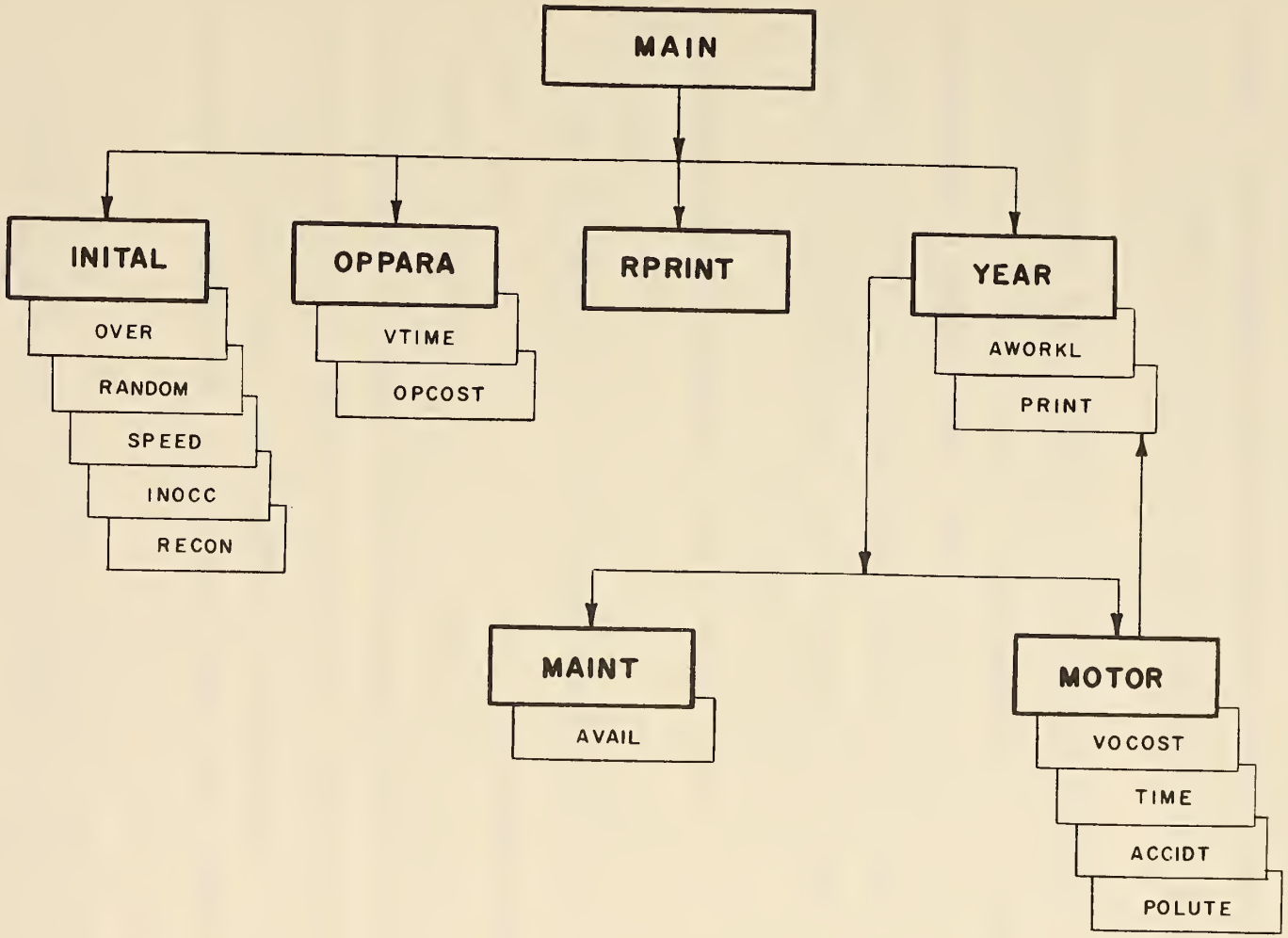

Figure 14. General flow of computer program EAROMAR

routine OVER which resides in subroutine INITAL. The other routines in INITAL are RECON, RANDOM, SPEED, and INOCC. These establish an hourly volume matrix by trip purpose; 1000 random full size and partial size patches and work site locations; a speed matrix by volume-capacity ratio and lane closure; and an available occupancy array respectively.

The second subroutine used in the generation of information matrices is OPPARA. It consists of two routines. The first is VTIME which is an adaptation of a program created by SRI in their development of value of time tables[1]. This routine creates a matrix of the hourly values of time by trip purpose for up to 40 one-minute increments of time loss as a function of income level.

The second routine, called OPCOST, creates a matrix of operation costs for 65 speeds and for passenger cars and commercial vehicles as a function of the roadway alignment and vehicle characteristics.

Maintenance Simulation

A series of workload models, applicable to different pavement types, are used to generate maintenance activity workloads annually in the subroutine YEAR. In the subroutine MAINT, each activity is addressed singularly and based on constraints applicable to each activity, the occupancy of the roadway by work crews is simulated. The occupancy

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(1) Thomas, Thomas C., Thompson, Gordon I., "The Value of Time Saved by Trip Purpose, Stanford Research Institute Project MSU-7362, October 1970.

requirement time in days is accumulated by the hour of the day and lane closure. Crew hours are accumulated and costed with activity standards to produce activity costs. At intervals, which can be indicated through interfacing with a pavement systems program or controlled by the user, resurfacing is executed and the associated occupancy requirements and costs accumulated.

The subroutines YEAR and MAINT of the program EAROMAR were designed to permit maximum adaptability at the State level. The individual workload models can be factored, overridden or deleted completely. Each of the constraints built into the simulation process can be simply overridden by the user. The activity production and unit cost data can be based on local practices. Activities, not accounted for in the existing program, can be added by the user.

Motorist Impact

Through the maintenance simulation in subroutine MAINT the period of roadway occupancy for each activity is established for each feasible lane closure. In MOTOR, the impact on the motorist as a result of the roadway occupancy is evaluated in terms of reduced speeds, delays and volume changes at hourly intervals. These parameters are used in the routines VOCOST, TIME, ACCIDT and POLUTE to develop motorist impacts.

In VOCOST, an hourly analysis is made of the operation costs associated with a lane closure. The analysis is based on hourly volume, operation speed, delays and speed changes. The normal operation cost for the hour is subtracted and the net difference accumulated for all hours and days of roadway occupancy for each activity and closure category.

In the routine TIME, the speed and delay information is used to develop a loss time per vehicle which is then held as loss manhours and dollars by activity and closure category.

ACCIDT is used to predict potential increases in accident numbers and costs.

The added days of pollution resulting from a roadway occupancy are determined in the routine POLUTE.

In support of a pavement design systems program, "EAROMAR" is designed to select the lane closure category which produces the least overall costs for each activity. These are totaled for all activities and discounted for present worth in each analysis year.

The program also is executable independent of a pavement systems analysis. Print options available to the user permit output on each activity by lane closure category for each of the 7 following categories by roadway direction annually:

1. Activity costs
2. Operation cost
3. Accidents
4. Accident costs
5. Manhours loss
6. Time cost
7. Added days of pollution

The minimum data deck required to execute the program EAROMAR consist of the following: (1) a traffic card, (2) a design card, and (3) a packet option end card. Figure 15 shows a general flow of the input portion of subroutine INITAL. It illustrates the position of the required input statements. A packet option end card will cause the routine OVER to be bypassed.

Traffic

The traffic card provides the program with the initial and final year traffic volume, AM peak split and the percentage of commercial traffic.

In the program it is assumed that the growth in traffic volume is linear between the initial and final analysis year. This linear assumption also holds for the AM split percentage and the commercial vehicle percentage.

Volume

The volume is a key input parameter to the program. It is used in the determination of 18-kip axle loadings and therefore has a potential impact on the analysis age used in the maintenance workload models. As age increases maintenance workload increases and therefore the hours of roadway occupancy.

The volume is used in the establishment of the volume-capacity ratio. Where a volume-capacity ratio restriction exists relating to roadway occupancy, volume increases will reduce the available hours in

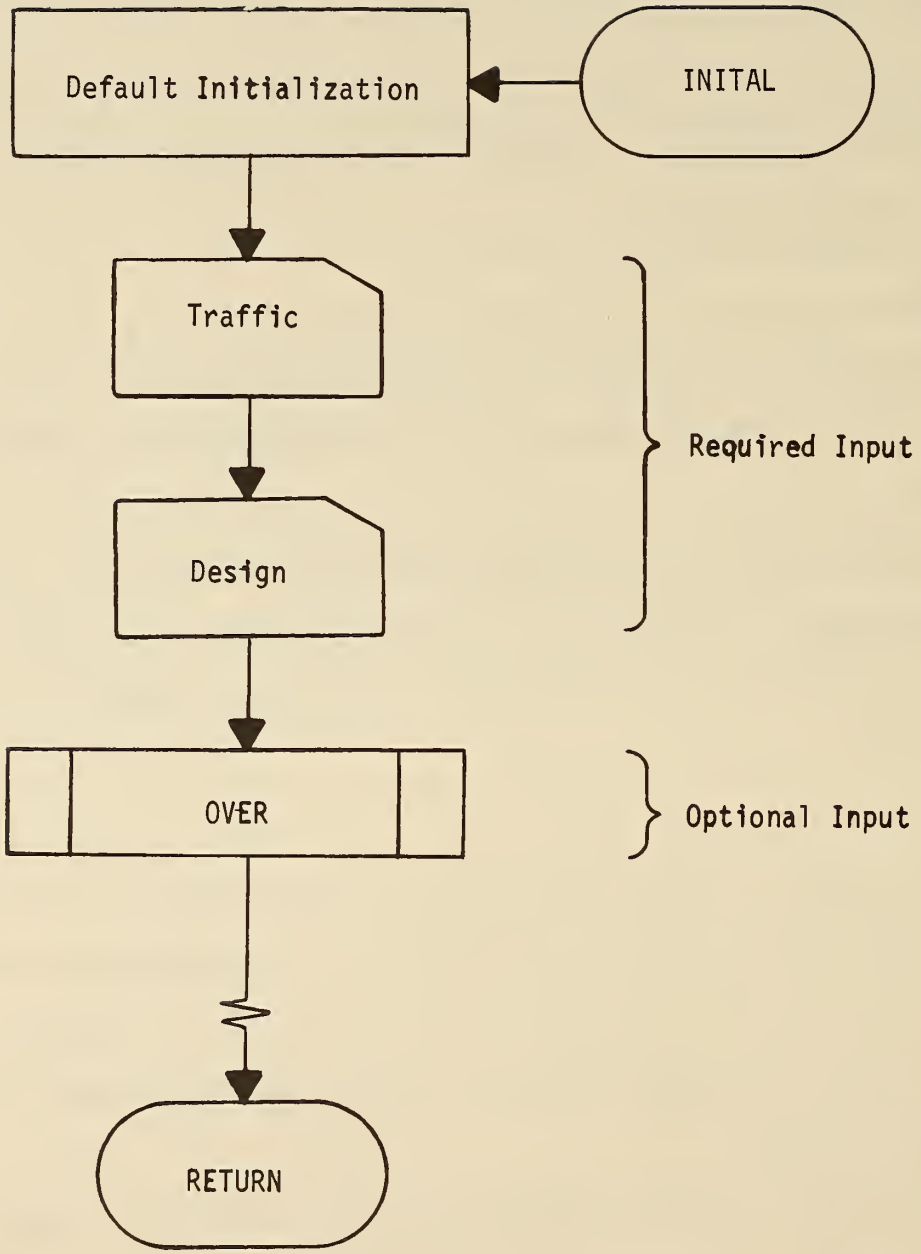

Figure 15. General flow of portion of subroutine INITAL illustrating required and optional input flow levels in program EAROMAR

a day during which work crews are permitted to occupy the roadway to perform work. This creates less efficient operations thereby increasing the required roadway occupancy hours and maintenance costs.

Speed is a function of the volume-capacity ratio. Because capacity is constant with time, increases in volume create decreases in speed. Operation costs change with vehicle speed, time losses increase with speed reduction, and pollution increases with speed reduction. All major indexes of impact to the motorist.

Queues are created in any hour where volumes exceed capacity. Queue delays will increase as volume increases. This creates higher vehicle operating costs, larger time losses, time costs and increased pollution.

Finally, volumes in themselves are multipliers applied to any motorist losses. As volumes increase, the multiplier effect increases.

AM Peak Split

The analysis is performed by direction to allow the program user to adequately accommodate variations in hourly distributions by trip purpose. This is accomplished by assigning the appropriate distribution and trip purpose percentage of total volume to each direction.

Commercial Vehicles

The commercial percentage is important to many phases of the analysis and therefore is required as input. Further, as required input, it supersedes any defaults or optional inputs to the program. As an example, the percentage of commercial vehicles is included with the trip

purposes. The trip purpose array has been assigned default values. This commercial default value is overridden and assigned the percentage associated with the required traffic input.

The commercial volume is treated separately throughout the program. It is used in developing 18 kip axles, has its own operating cost array, is treated separately for speed change cost and in the value of time evaluation.

Traffic Data Card

The traffic data is input on a single data card. The card format is illustrated in Table 4. The traffic data card must be the first card in the data deck.

Design

The second element of required input for the program is the design data card. It contains information relating to the pavement which is deemed necessary to the economic analysis of roadway occupancy. This includes the analysis period, the freeway type, the pavement type, the project length, and the pavement thickness.

Analysis Period

This input parameter controls the number of years that the analysis is performed.

Freeway Type

The program is designed to analyze 4-, 6-, and 8-lane freeways. The actual freeway type must be known because it establishes the number of directional lanes. The number of lane closures and therefore

Table 4. Description of the required traffic input on data card No. 1

Card No.	Variable	Description	Example Value	Columns	Format	Example
1.1	VOLUME(1)	Initial Volume	40(1000's)	1-4	F4.1	40.0
1.2	SPLIT(1)	Initial AM Peak Pct.	40(%)	5-8	F4.1	40.0
1.3	TRUCKS(1)	Initial Commercial Pct.	10(%)	9-12	F4.1	10.0
1.4	VOLUME(2)	Final Volume	200(1000's)	13-16	F4.1	200.
1.5	SPLIT(2)	Final AM Peak Pct.	50(%)	17-20	F4.1	50.0
1.6	TRUCKS(2)	Final Commercial Pct.	5(%)	21-24	F4.1	5.0

closure categories being analyzed are entirely controlled by the number of directional lanes. The freeway types are coded with the following switches:

1. Switch = 1 = 4-lane
2. Switch = 2 = 6-lane
3. Switch = 3 = 8-lane

Pavement Type

The pavement type controls the activity workload models to be used by the program. A different set of workload models is included in the program for each pavement type. Also, default options relating to activity standards, simulation parameters and present serviceability index computations depend on pavement type. The pavement type is identified by the following switches:

1. Switch = 1 = Portland cement concrete pavement
2. Switch = 2 = Bituminous pavement
3. Switch = 3 = Composite pavement

Project Length

The project length influences the magnitude of activity expenditures and motorist impacts. Also, where the alignment option is exercised in the determination of operation costs, the actual mileage of each alignment class can be specified directly to the program. A unit mile project length can be used, but the alignment data must be prorated accordingly.

Pavement Thickness

To accomodate both portland cement concrete and bituminous pavement types, up to three pavement thicknesses can be entered--surface, base, and subbase. The thickness values are used to determine pavement life axle loadings based on AASHO road tests results.

Design Data Card

The design data is input on a single data card. The card format is illustrated in Table 5. The design data card must be the second card in the data deck.

Packet Option

One last data card is required as part of the required input deck to the program. This is the packet option card which is used to terminate or bypass the optional input reading routine "OVER." The packet option card must be the last card in the data deck stream. Its format is illustrated in Table 6. The three data cards of the required input deck are shown in Figure 16.

Table 5. Description of required Design Card on data card No. 2

Card No.	Variable	Description	Example Value	Columns	Format	Example
2.1	NYEAR	Analysis period in years	20 yr.	1-2	I2	20
2.2	KP	Freeway Type, Switch=3	3	3-4	I2	03
2.3	ITYPE	Pavement Type, Switch=1	1	5-6	I2	01
2.4	PROJLN	Project Length	10 miles	7-11	F5.2	10.bb
2.5	THICK1	Surface Thickness	10 inches	12-16	F5.2	10.bb
2.6	THICK2	Base Thickness	0	17-21	F5.2	bbbbb
2.7	THICK3	Subbase Thickness	0	22-26	F5.2	bbbbb

Table 6. Packet option card as used to terminate input data stream

Card No.	Variable	Description	Example Value	Columns	Format	Example
3.1	IP	Override switch	blank	1-2	I2	bb
3.2	END	Literal End	'bEND'	3-6	A4	bEND

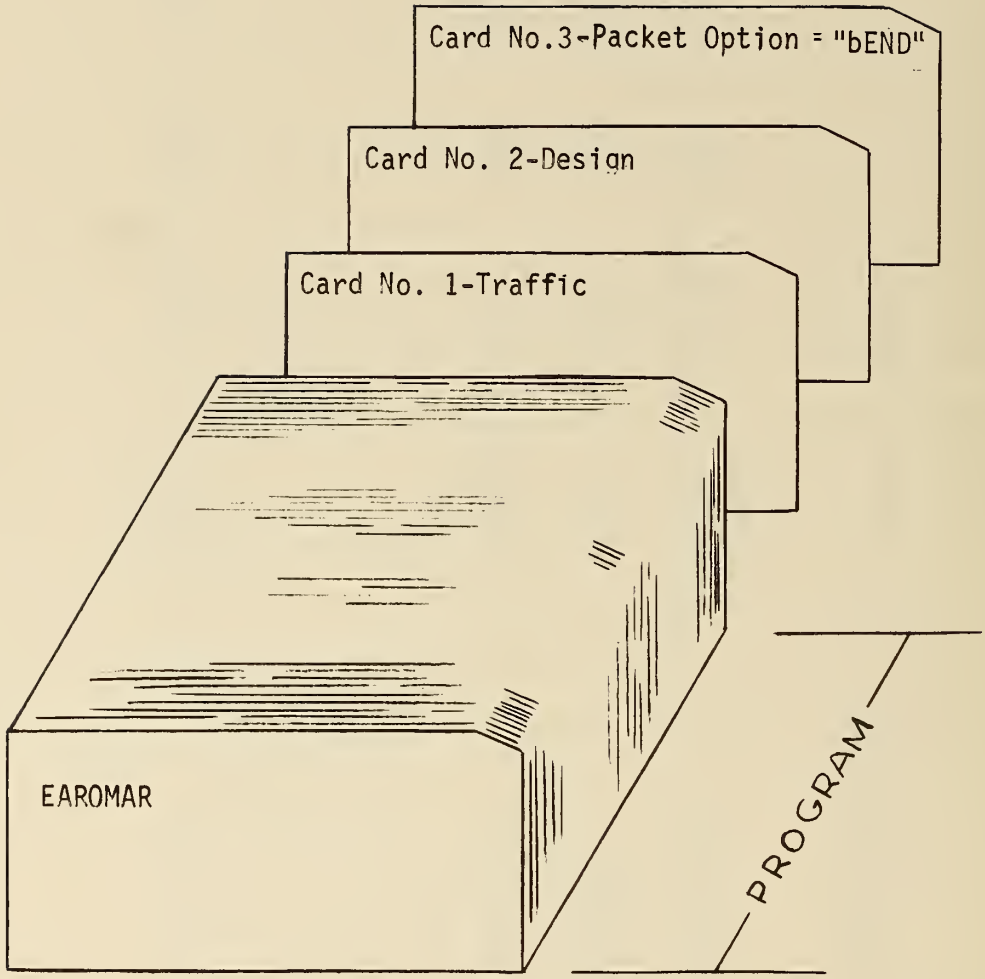

Figure 16. The minimum input deck requirement for program EAROMAR

The user has available to him a wide variety of optional input provisions which can be used to structure the execution of the program "EAROMAR" to comply with local policies, procedures and conditions. These cover essentially every assumption made in the program together with all updatable unit cost elements. Some of the overrides can be used to effect changes to the processing procedure. The options are available through the use of input packets. These packets are principally designed to accommodate input format and therefore changes to various elements in the program may require the use of different packet combinations. The packets can be used in any sequence. The only constraints to the user relate to compliance with packet format. The packets available to the program user are shown in Table 7, where the format constraints and packet requirements are illustrated. In Figure 17 a schematic flow of routine OVER is illustrated. OVER is the routine where all option input is handled.

Activity Workload

The program incorporates a series of workload models which can be used to predict the annual activity workload to be associated with various pavement types. Through optional inputs, the user can modify, substitute, or entirely bypass one or all of these program models.

Table 7 . Option input packets available for program EAROMAR

Packet Option Number	Description	Maximum Descriptor Cards	Format Descriptor Card	Blank End Card
1	Traffic Distribution	7	3I2,24F3.3	Yes
2	Trip Purpose Distribution	6	2I2,6F3.3	Yes
3	Directional Balance	0	N/A	No
4	Occupancy Constraints	9	3I2	Yes
5	Override Array	84	2I2,F7.2	Yes
6	Alignment Description	18	2I2,F7.2	Yes
7	Vehicle Description	10	3F5.2	Yes
8	Simulation Description	7	I2,5F10.2	Yes
9	Operation Unit Costs	4	I2,2F4.2	Yes
10	Print Switch	1	2I2	No
11	Lane Width	1	F5.2	No
12	Income	1	I2	No
13	Occupancy Moves	1	2F5.2	No
14	Terminal PSI	1	F5.2	No
15	Detour Parameters	1	7F4.1	No
16	Design Life	1	2F5.2	No
17	Activity Standards	21	2I2,3F7.2	Yes
18	Capacities	1	5F5.2	No
19	Freeway Design Speed	1	F5.2	No
20	Average Accident Cost	1	F5.0	No
21	Vehicle Occupancy	1	2F5.2	No
22	Commercial Time Value	1	F5.2	No
23	Speed Limits	1	5F5.2	No

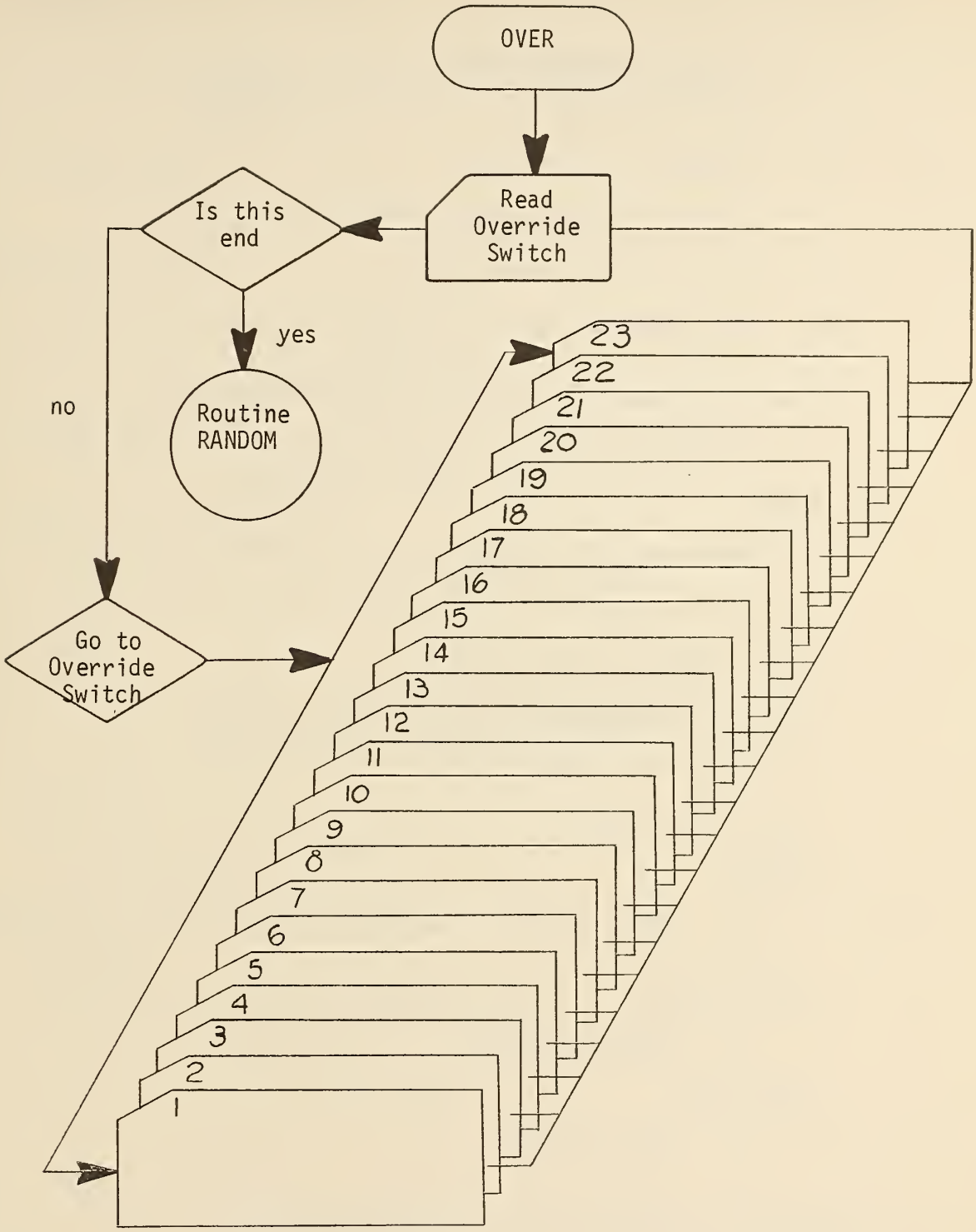

Figure 17. Schematic of overriding routine OVER used for optional inputs.

The workload models incorporated in the program are the following:

y = Original pavement age

ia = Activity number

A = Pavement analysis age

F = Workload Factor (OVER(3,ia))

L = Lane width in feet (WIDTH)

ML = Maintenance Level (OVER(6,ia))

W_{ia} = Workload units per lane mile for activity ia

S = Workload spacing in feet (OVER(2,ia))

PCC Pavement:

Full Depth Concrete Patching:

$$W_1 = F \times 34/(1+e^{-(A-10).1.25)})$$

Partial Depth Concrete Patching:

$$W_2 = F \times W_1 \text{ where } W_1 \leq 1$$

$$W_2 = F \times 1 \text{ where } W_1 \geq 1$$

$$**W_1 = W_1 - W_2/F$$

Blowups:

$$W_3 = .005 \times (y-4) \times F \text{ where } 5 < y < 25$$

Joint Sealing:

$$W_4 = ((5280 \times L)/SxML$$

Mudjacking:

$$W_5 = .25(.5y)^2 e^{-.5y}$$

**The partial concrete repair is deducted from W_1

Other:

W_6 = Constant workload which can be supplied by the program user with variable OVER(4,6) using packet No. 5

Resurfacing:

$$W_7 = 586.67 \times L \times F$$

Bituminous Pavement:

Bituminous Concrete Patching:

$$W_1 = F \times 1100/(1+e^{-(A-10)/1.16})$$

Crack Sealing:

$$W_2 = F \times 1000/(1+e^{-(A-10)/1.16})$$

Base and Surface Repair:

$$W_3 = F \times 5/(1+e^{-(A-10)/1.16})$$

Other:

W_{4-6} = Constant workload which can be supplied by the program user with variable OVER(4,4-6) using packet No. 5

Overlay:

$$W_7 = 586.67 \times L \times F$$

Composite Pavement:

Patching:

$$W_1 = F \times 1100/(1+e^{-(A-10)/1.16})$$

Blowups:

$$W_3 = .005 \times y-4 \times F \text{ where } 5 < y \leq 25$$

Crack Sealing:

$$W_4 = F \times 1000/(1+e^{-(A-10)/1.16})$$

Mudjacking:

$$W_5 = .25(.5y)^2 e^{-.5y}$$

Other:

$W_{2,6}$ = Constant workload which can be supplied by the program user with variable OVER(4,2 or 6) using packet No. 5

Overlay:

$$W_7 = 586.67 \times L \times F$$

Activity Deletion

The user can simply bypass an activity and its associated workload model by setting the maintenance level equal to zero. The maintenance level is controlled by variable "OVER(6,IA)" which can be overridden in packet No. 5 as illustrated in Table 8. In the example, the maintenance level is 2. This means that the freeway will be occupied in two periods of the year and one-half of the annual workload will be done during each occupancy period.

Table 8. Optional input packet No. 5 used for overriding workload models

Card No.	Variable	Description	Example Value	Columns	Format	Example
3	IP	Override Switch = 5	5	1-2	I2	05
7.1	I1	Maint. Level Switch = 6	6	1-2	I2	06
7.2	IA	Activity Number	5	3-4	I2	05
7.3	OVER(6,5)	Maintenance Level	2	5-11	F7.2	2.bbbbb
7.1	I1	Workload Factor Switch = 3	3	1-2	I2	03
7.2	IA	Activity Number	2	3-4	I2	02
7.3	OVER(3,2)	Workload Factor	2	5-11	F7.2	2.bbbbb
7.1	I1	Workload Rate Switch = 4	4	1-2	I2	04
7.2	IA	Activity Number	1	3-4	I2	01
7.3	OVER(4,1)	Workload Rate	11.2	5-11	F7.2	11.2bbb
7.1	I1	Spacing Switch = 2	2	1-2	I2	02
7.2	IA	Activity Number	4	3-4	I2	04
7.3	OVER(2,1)	Spacing Distance	50	5-11	F7.2	50.bbbb
0		Blank Card				

Activity Workload Factoring

Should the user determine that the level of workload predicted by a workload model is too large or small, it can be factored in the program. The factor variable is "OVER(3,IA)". To double the workload generated annually by the program, the user assigns a value of 2 to the variable OVER(3,IA) in Packet No. 5 which is shown in Table 8.

Activity Workload Rate

When the activity is applicable but the user does not agree with the values predicted by the model, the option is available to substitute a single workload rate. This is done using OVER(4,IA) in Packet No. 5. Also, this variable can be used to establish a workload rate for any of the seven activity numbers, regardless of whether a workload model presently exists in the program. A workload rate of 11.2 units per lane mile annually is illustrated for Activity 3 in Table 8.

Workload Spacing

The spacing between work sites, when applicable, is determined by the variable OVER(2,IA). In the determination of joint sealing, the number of joints is controlled by this variable. The default value of 50 feet for Activity 4 is illustrated for this override in Table 8.

An example of Packet 5 is shown schematically in Figure 18.

Activity Standards

Because of the wide use made of activity standards by highway agencies, the program was designed to accept standard activity data. Three

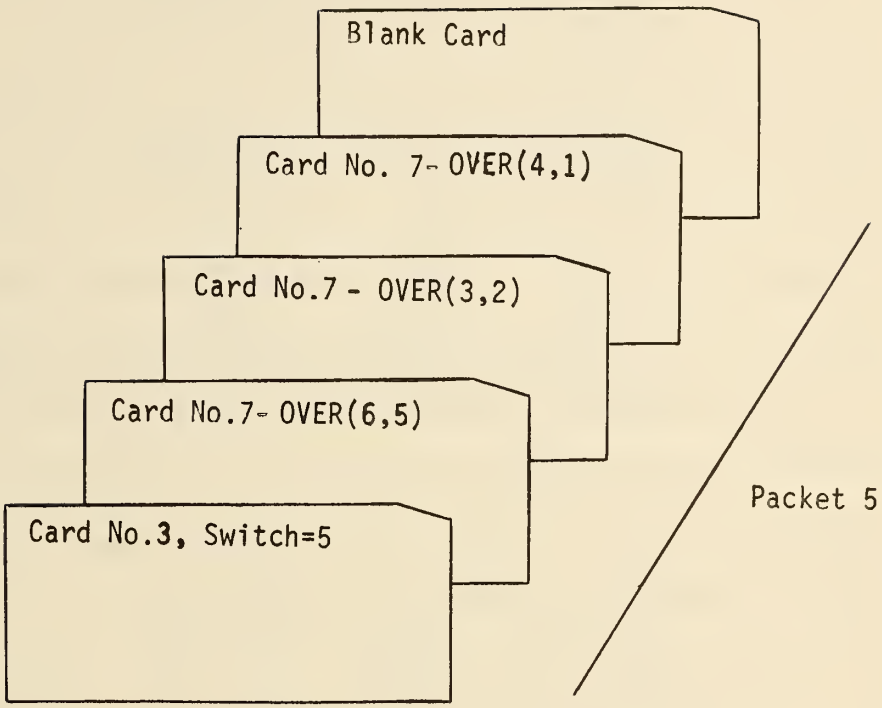

Figure 18. Schematic of Packet No. 5 used in the override example of workload models

components are needed to describe an activity to the program. These are:

1. The crews hourly costs for labor and equipment
2. The material costs per workload unit
3. The production rate in workload units per hour

In the program, the activity standard is used to determine the time required to perform work at a worksite through the use of the production rate given for the standard. This materially controls the hours of roadway occupancy. The combined crew hourly cost and material unit cost are used in determining maintenance and rehabilitation costs.

The user has the option of incorporating his own activity performance data into the analysis through the use of Packet No. 17. The program associates a standard with a pavement type so the pavement type must be specified using the following switches:

1. Switch = 1 = PCC pavement
2. Switch = 2 = Bituminous pavement
3. Switch = 3 = Composite pavement

Three of the default standards are illustrated in Table 9 where the packet format requirement is shown. The example packet is illustrated schematically in Figure 19.

Resurfacing

A number of variables in the program control resurfacing. When the resurfacing cycle is not executed through interfacing with a pavement system's design program, the program EAROMAR generates its own

Table 9. Optional input packet No. 17 used to specify the crew cost, material cost, and the production rate for activity standards

CREW NO.	Variable	Description	Example Value	Columns	Format	Example
3	IP	Override Switch=17	17	1-2	I2	17
19.1	IA	Activity Number	1	1-2	I2	01
19.2	I1	Pavement Type Switch=1	1	3-4	I2	01
19.3	PS(1,1)	Crew hourly cost	$48.40/hr.	5-11	F7.2	48.40bb
19.4	PS(1,2)	Material cost per unit	$ 6.25/unit	12-18	F7.2	6.25bbb
19.5	PS(1,3)	Production-units per hour	11.1/hr.	19-25	F7.2	11.1bbb
19.1	IA	Activity Number	3	1-2	I2	03
19.2	I1	Pavement type switch=1	1	3-4	I2	01
19.3	PS(3,1)	Crew hourly cost	$48.98/hr.	5-11	F7.2	48.98bb
19.4	PS(3,2)	Material cost per unit	$86.40/unit	12-18	F7.2	86.4bbb
19.5	PS(3,3)	Production-units per hour	.5/Hr.	19-25	F7.2	.5bbbbb
19.1	IA	Activity Number	5	1-2	I2	05
19.2	I1	Pavement type switch=1	1	3-4	I2	01
19.3	PS(5,1)	Crew hourly costs	$35.91/hr.	5-11	F7.2	35.91bb
19.4	PS(5,2)	Material costs per unit	$.70/unit	12-18	F7.2	.70bbbb
19.5	PS(5,3)	Production-units per hour	30/hr.	19-25	F7.2	30.bbbb

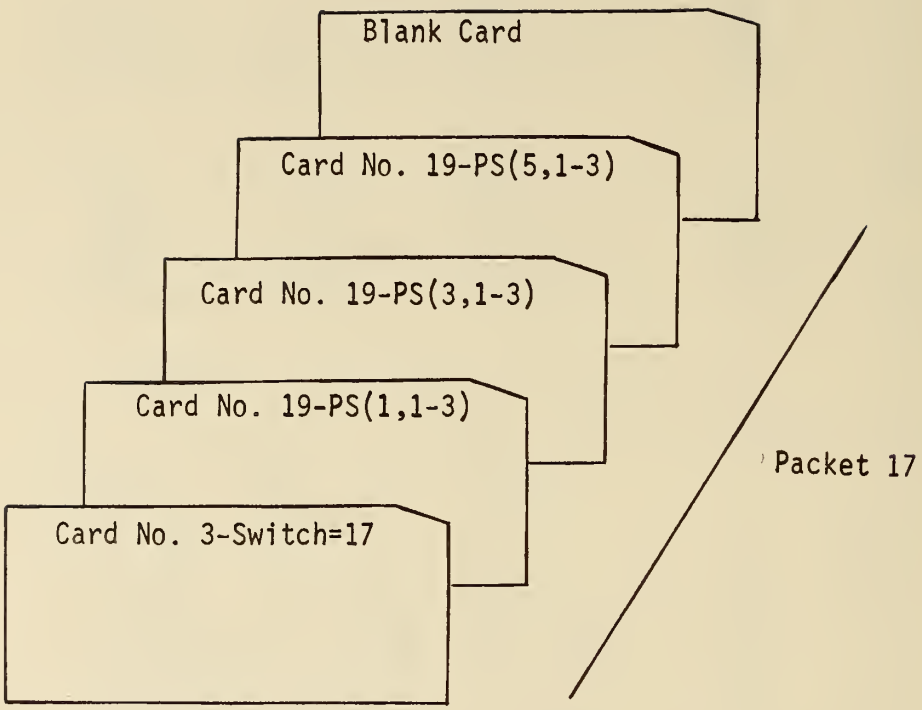

Figure 19. Activity standard override packet

cycles based on a terminal value for a present serviceability index (PSI). The value for this variable, PSIRS, can be optionally input by the user. The program default value of 2 is shown as an example in Table 10 where the format for override packet No. 14 is illustrated. The rate at which the terminal PSI is reached is based in part on the 18-kip axle loadings which are controlled either by the traffic parameters in the program or through interfacing with a pavement system's design program. Resurfacing also can depend on the pavement design life, both initial and resurfaced. These variables can be controlled by the user through Packet No. 16 which also is illustrated with program default values in Table 10.

The resurfacing cost is controlled by the activity standard covered earlier and the workload by the pavement lane width. The width can be specified to the program using Packet No. 11 and this is illustrated in Table 10 with a program default value of 12 feet.

The packet sets used for the resurfacing overrides are shown in Figure 20.

Simulation

Once an annual workload has been established by the program, a simulation process is used to generate the roadway occupancy hours required annually for each pavement work activity. The simulation process involves assigning work crews to the roadway to perform work during available occupancy hours. In the execution of this simulation process, a number of constraints and assumptions are made. These are all subject to user overrides using the input options.

Table 10. Packet Numbers 14, 16, and 11 used in the control of program generated resurfacing cycle

Card No.	Variable	Description	Example Value	Columns	Format	Example
3	IP	Override Switch = 14	14	1-2	I2	14
16	PSIRS	Terminal PSI Value	2.0	1-5	FS.2	2.bbb
3	IP	Override Switch = 16	16	1-2	I2	16
18.1	DLIFE	Initial Design Life	20 yrs.	1-5	F5.2	20.bb
18.2	RLIFE	Resurfaced Design Life	10 yrs.	6-10	F5.2	10.bb
3	IP	Override Switch = 11	11	1-2	I2	11
13	WIDTH	Lane Width	12 ft.	1-5	F5.2	12.bb

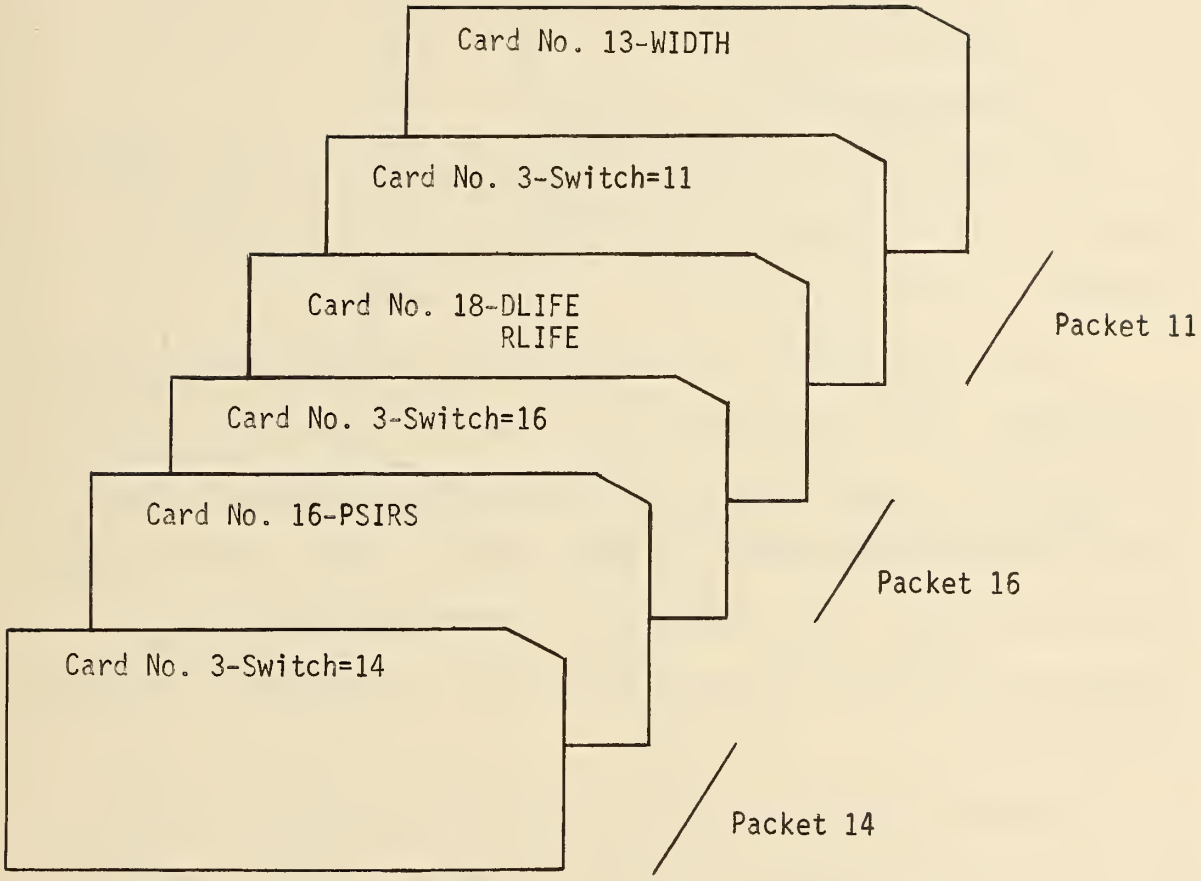

Figure 20. Packet sets for pavement resurfacing overrides

Worksite Size

The size of the workload at each worksite is determined by the three following variables:

1. Worksite type
2. Worksite multiplier
3. Worksite add-on

The worksite type is controlled by specifying one of the following types of worksites using the worksite type switch in the variable SIM which is part of Packet No. 8. The three switches are:

1 = Full size patch; this value resides in an array which has 1000 such patches. They were generated by the program, are random in size and conform to a gamma density distribution with a mean patch size of 16 and a standard deviation of 21 when a portland cement concrete pavement is specified. When the pavement if bituminous, the size is multiplied by 10 or has a mean value of 160. This distribution is shown in Figure 21.

2 = Partial depth concrete patch; this value resides in an array which has 1000 such patches. They were generated by the program, are random in size and conform to a modified gamma density distribution where the gamma distribution creates a mean size of 3 and a standard deviation of 2. However, the distribution allows for patch sizes between 15 and 40 S.F. at a ten percent acceptance level. This distribution also is illustrated in Figure 21.

3 = Number of lanes closed; this type accommodates worksite workloads which are related to the number of lanes which can be worked on, e.g., two 12' joints can be sealed if two lanes are closed.

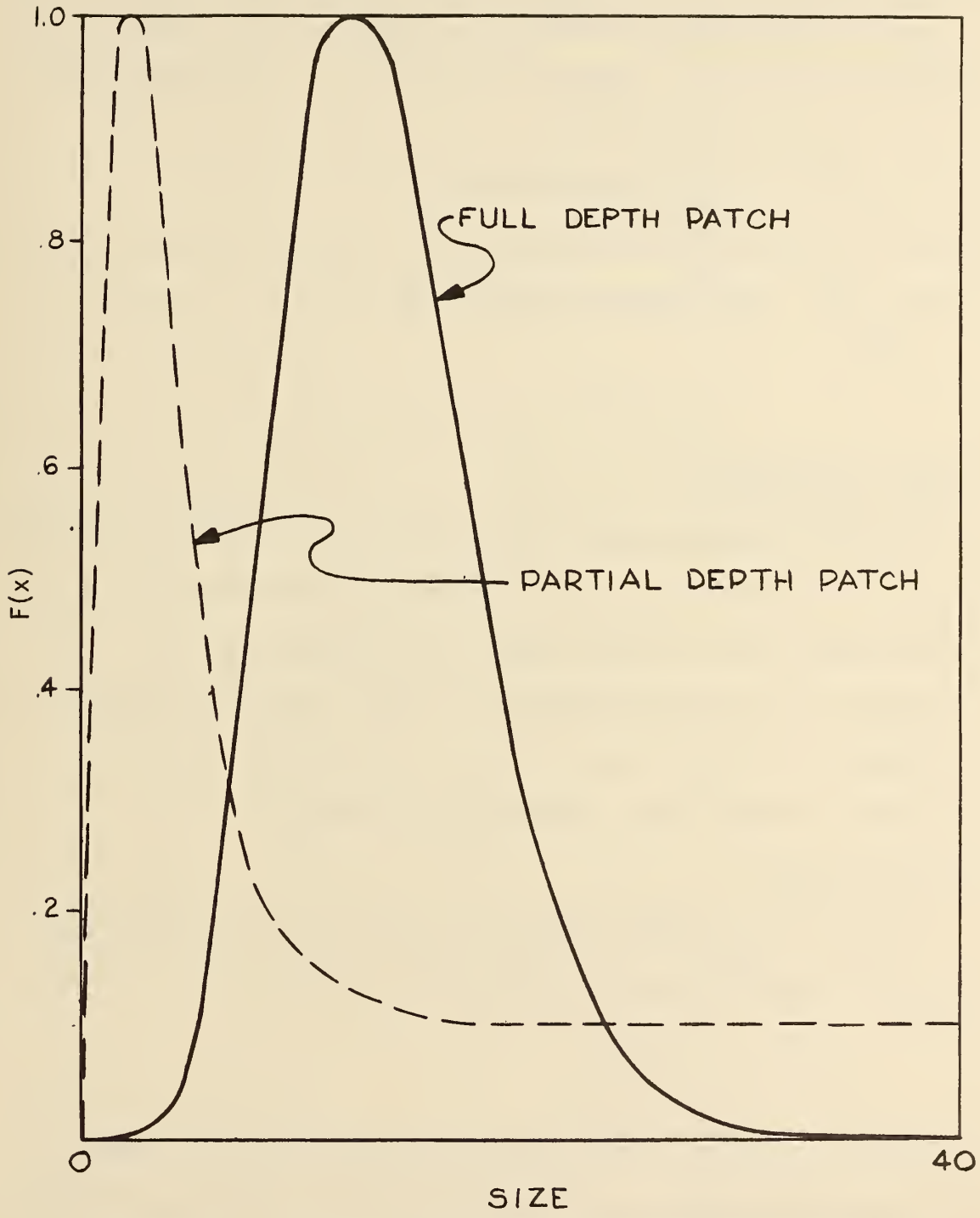

Figure 21. Frequency distribution of the patches computed by the program EAROMAR

The worksite multiplier is used to increase or decrease the magnitude of the worksite indicated by the worksite type switch.

The worksite add-on is a constant value which can be added to the product of the worksite type and the multiplier. As an example let:

W_i = Worksite type

F = Worksite type multiplier

A = Worksite type add-on

S = Workload at each worksite

then:

$$S = W_i \times F + A$$

Number of Simulations

The user also can control the number of iterations which will be used in the simulation process. The maximum number is 1000, which is controlled by the size of the random arrays available for use in the simulation. The iteration number will control accuracy and computer execution time. Where random parameters are selected, or where worksite time is short, longer iterations are warranted.

Worksite Spacing

The user can establish whether the worksites will be uniformly spaced or randomly spaced where the spacing switch is:

1. Switch = 1 = Random
2. Switch = 2 = Uniform

The uniform spacing is based on the input override variable OVER(2,IA) which specifies worksite location spacing in feet. The other option

is random which is based on workload and a program generated random number. There are 1000 random numbers in ascending order between 0 and 1. The workload is used to determine an average spacing between random worksites.

Packet No. 8 is used to input the variable "SIM" which is shown in Table 11. The default values used in the program for concrete pavement mudjacking are illustrated. These values cause the program to simulate the occupancy of a worksite by mudjacing crew 100 times. The workload at each site is S where

S = 3 x (Partial depth patch size) + 10

The spacing between each site is random and depends on the total mudjacking workload. This spacing is determined in the following manner:

SW = Simulation Workload

OW = Occupancy Period Workload

RN = Random Number between 0 and 1

L = Lanes closed

Sta = Worksite Location

Sta = (SW/(OW x L)) x RN

As mentioned under spacing, the variable OVER(2,IA) is used to establish spacing when SIM(5) is equal to 2. This is located in Packet No. 5.

Simulation Constraints

There are additional overrides available in Packet No. 5 which affect the simulation. They are the following elements which are

Table 11 Description of optional input packet No. 8 defining simulation parameters

Card No.	Variable	Description	Example Value	Column	Format	Example
3	IP	Override Switch=8	8	1-2	I2	08
10.1	IA	Activity Number	5	1-2	I2	05
10.2	SIM(5,1)	Worksite Switch	2	3-12	F10.2	2.bbbbbbbb
10.3	SIM(5,2)	Worksite Multiplier	3	13-22	F10.2	3.bbbbbbbb
10.4	SIM(5,3)	Worksite Add on Constant	10	23-32	F10.2	10.bbbbbbb
10.5	SIM(5,4)	Number of iterations	100	33-42	F10.2	100.bbbbbb
10.6	SIM(5,5)	Worksite spacing switch	1	43-52	F10.2	1.bbbbbbbb

illustrated in Table 12 and have been assigned the values used as defaults in the program:

1. Travel time
2. Maintenance level
3. Cure time
4. Traffic control
5. Maximum workzone length
6. Minimum workzone length

Travel Time

The travel time restricts the hours that the crew has available to work on the road. It represents the time in hours required to travel from a housing or garage facility to the roadway and to return.

Maintenance Level

The maintenance level, when greater than 2 will cause the workload to be reduced for each occupancy, i.e., a workload of 100 would be reduced to 50 if the maintenance level were 2. Because the workload controls spacing when the worksite locations are random, the maintenance level can influence the simulation.

Cure Time

Cure time exists to permit the user to accommodate nonproductive time on the roadway. This includes material cure periods following work at the last occupancy worksite for an occupancy interval, lunch and any break time that might be applicable. This is all time which must be deducted from available occupancy time before simulating the productive work on the roadway.

Table 12. Description of optional input packet No. 5 used to change simulation parameters

Card No.	Variable	Description	Example Value	Columns	Format	Example
3.	IP	Override Switch=5	5	1-2	I2	05
7.1	I1	Travel Time Switch=5	5	1-2	I2	05
7.2	IA	Activity Number	5	3-4	I2	05
7.3	OVER(5,5)	Travel time	.5 Hrs.	5-11	F7.2	.5bbbbb
7.1	I1	Maintenance Level Switch=6	6	1-2	I2	06
7.2	IA	Activity Number	5	3-4	I2	05
7.3	OVER(6,5)	Maintenance Level	1	5-11	F7.2	1.bbbbb
7.1	I1	Cure Time Switch=7	7	1-2	I2	07
7.2	IA	Activity Number	5	3-4	I2	05
7.3	OVER(7,5)	Cure Time	1.5 Hrs.	5-11	F7.2	1.5bbbb
7.1	I1	Traffic Control Switch=8	8	1-2	I2	08
7.2	IH	Activity Number	5	3-4	I2	05
7.3	OVER(8,5)	Traffic Control Time	.5 Hrs.	5-11	F7.2	.5bbbbb
7.1	I1	Max. Work Zone Switch=9	9	1-2	I2	09
7.2	IA	Activity Number	5	3-4	I2	05
7.3	OVER(9,5)	Max. Work Zone length	2.0	5-11	F7.2	2.bbbbb
7.1	I1	Min. Work Zone Switch=11	11	1-2	I2	11
7.2	IA	Activity Number	5	3-4	I2	05
7.3	OVER(11,5)	Min. Work Zone length	.02	5-11	F7.2	.02bbbb

Traffic Control

Traffic control time is needed to install or remove the signing and pavement delineation required to create a safe crew work zone on the roadway. In the simulation, at least one installation and one removal are allotted to each occupancy interval.

Zone Length

The maximum workzone length controls the frequency with which zones must be moved. When a long zone is permitted, and worksites are relatively closely spaced, it may be possible for the work crew to spend the entire occupancy interval within a single traffic zone. When zones are short, the work crew must establish zones at frequent intervals and in the simulation, this results in a less efficient operation and therefore more hours of roadway occupancy to complete a fixed workload. However, the long zones result in long influence zones on the motorist and this can create higher motorist impacts. The minimum work zone is the length of the worksite area needed for a single repair. This is needed in the establishment of the average length of the influence zone used in determining motorist impacts.

Occupancy Moves

Two other variables influence the simulation process. One is WALK which specifies the walking rate between worksites. The other is TCMOVE which identifies the speed at which the crew moves between traffic control zones. If the distance between worksites within a workzone requires more than 6 minutes of walk time, the program assumes that the crew

rides to the next worksite and at the rate specified in TCMOVE. Packet No. 13 is used to override the default values of 2 mph and 20 mph which are illustrated in Table 13.

The entire simulation package which has just been discussed is schematically illustrated in Figure 22.

Traffic

The hourly traffic distribution is defined for the following trip purposes:

1. Work
2. Personal Business
3. Social-Recreational
4. School
5. Vacation
6. Commercial
7. Total Travel

This breakdown of the hourly volume of traffic is by direction and is used in the determination of the value of time. The distribution is established by the program using default values residing in two different arrays, one defining the shape of the hourly distribution by trip purpose and the second defining the percentage of total trips falling into a given trip purpose. Both of these arrays are subject to user overrides using the input options.

Traffic Distribution

An hourly traffic distribution is defined for each trip purpose by direction. Figure 23 illustrates the distribution defined by the

Table 13. Description of optional input packet No. 13 used to override movement rates between work sites

Card No.	Variable	Description	Example Value	Column	Format	Example
3	IP	Override Switch=13	13	1-2	I2	13
15.1	WALK	Walking Speed Between Sites	2 mph	1-5	F5.0	2.bbb
15.2	TCMOVF	Travel Speed Between Sites	20 mph	6-10	F5.0	20.bb

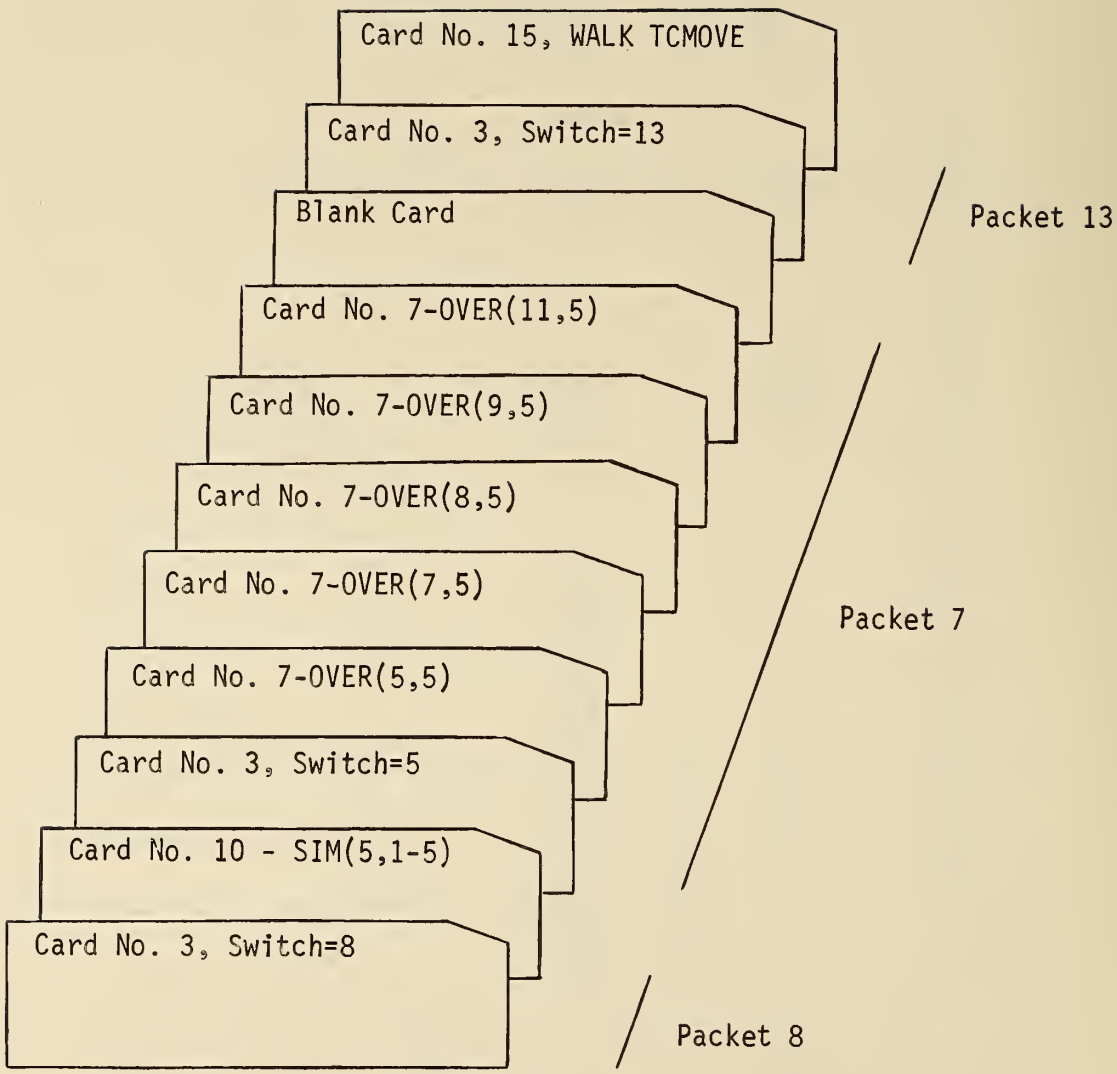

Figure 22. Schematic of example override packet set used in program simulation parameters

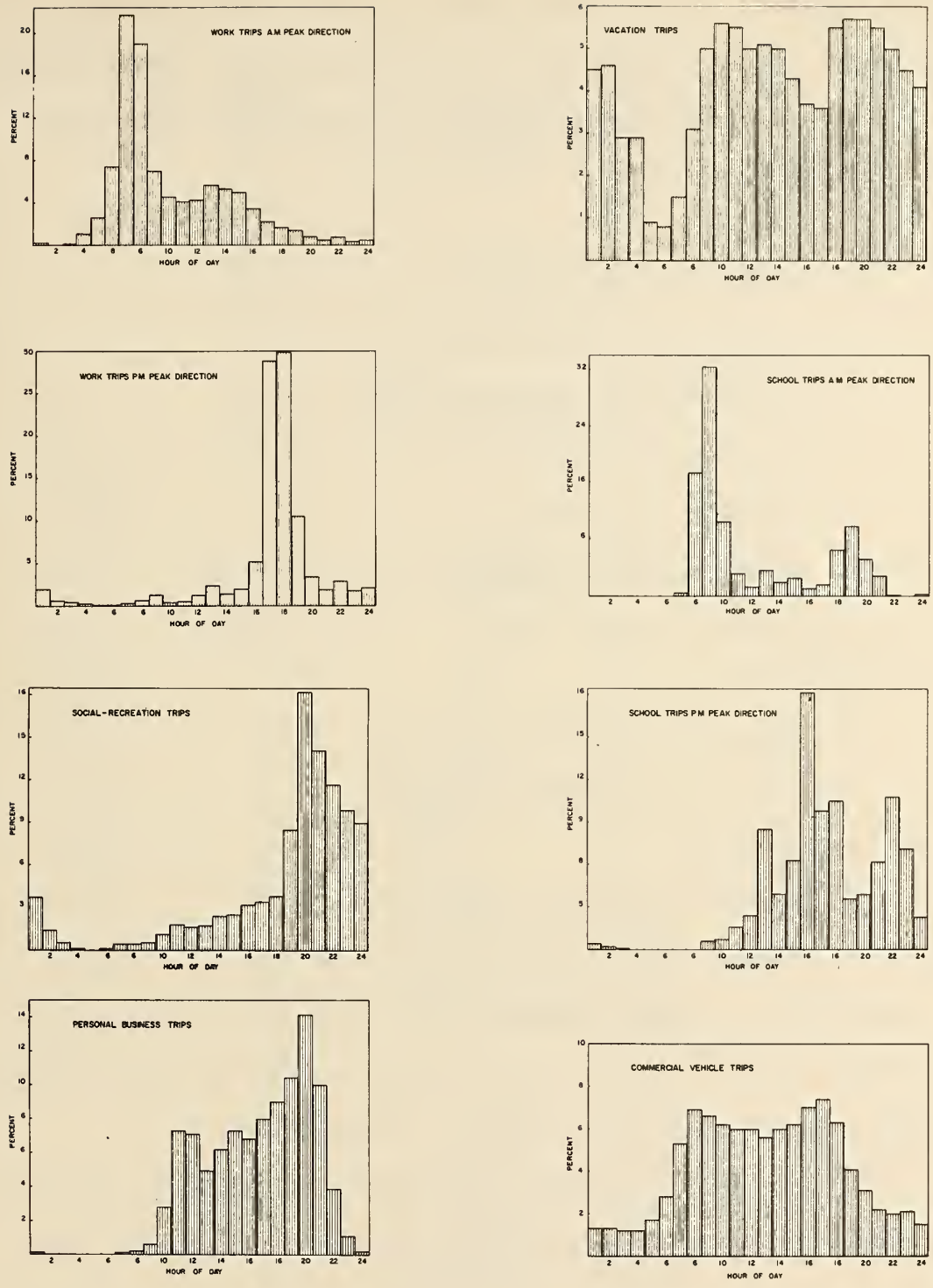

Figure 23. Hourly distributions of traffic by trip purpose and direction developed for use as defaults in program

program for work trips in the AM peak direction. The percentage occurring in each hour is expressed as the decimal portion of unity (24 hours).

The following switches are used for trip purpose, direction and volume level respectively:

1. Trip Purpose
   A. Switch = 1 = Work trips
   B. Switch = 2 = Personal business
   C. Switch = 3 = Social-Recreational
   D. Switch = 4 = School
   E. Switch = 5 = Vacation
   F. Switch = 6 = All commercial
   G. Switch = 7 = All trips
2. Direction
   A. Switch = 1 = AM Peak Direction
   B. Switch = 2 = PM Peak Direction
3. Volume Level
   A. Switch = 1 = Initial Year
   B. Switch = 2 = Final Year

Packet No. 1 is used to input any user overrides to the hourly distribution of traffic and the required format is shown in Table 14 where the program default values are used as an example.

If the user elects to input a distribution for all trips, the program reconciles any other trip purpose distributions to conform with

Table 14. Optional input packet No. 1 used for overriding hourly traffic distribution

Card No.	Variable	Description	Example Value	Columns	Format	Example
3	IP	Override Switch=1	1	1-2	I2	01
4.1	IT	Trip Purpose Switch=1	1	1-2	I2	01
4.2	ID	Direction Switch=1	1	3-4	I2	01
4.3	LEVEL	Volume Level Switch=1	1	5-6	I2	01
4.4	PCTADT(1,1,2,1)	1 AM portion of total volume	.002	7-9	F3.3	002
4.5	PCTADT(2,1,2,1)	2 AM " " " "	.000	10-12	F3.3	000
4.6		3 AM " " " "	.001	13-15	F3.3	001
4.7		4 AM " " " "	.011	16-18	F3.3	011
4.26	PCTADT(23,1,2,1)	23 PM portion of total volume	.004	73-75	F3.3	004
4.27	PCTADT(24,1,2,1)	Midnight " " " "	.005	76-78	F3.3	005

the total distribution. Otherwise, the total distribution is the sum of the components. Either way, the program balances the total distribution to sum to unity for the 24-hour period.

Trip Purpose Distribution

A decimal portion of all trips is defined for each trip purpose by direction for both the initial and final analysis year. The user may override this trip purpose distribution by direction and year level. The switches used are the following:

1. Direction
    A. Switch = 1 = AM Peak Direction
    B. Switch = 2 = PM Peak Direction
2. Year Level
    A. Switch = 1 = Initial Year
    B. Switch = 2 = Final Year

Packet No. 2 is used to input any user override for trip purpose distribution and the required format is shown in Table 15 where the program default values are used as an example.

The hourly traffic distribution override packets are illustrated schematically in Figure 24.

Occupancy Constraints

The hours which a freeway may be occupied by work crews can be restricted by local policy. Further, the restriction may be different for different work activities. Also, constraints might be placed on occupying roads during heavy traffic flows.

Table 15. Optional input packet No. 2 used for overriding trip purpose distribution

Card No.	Variable	Description	Example Value	Columns	Format	Example
3	IP	Override Switch=2	2	1-2	I2	02
5.1	ID	Direction Switch=1	1	1-2	I2	01
5.2	LEVEL	Year Level Switch=2	2	3-4	I2	02
5.3	PERCNT(1,1,2)	Work	.331	5-7	F3.3	331
5.4	PERCNT(2,1,2)	Personal business	.189	8-10	F3.3	189
5.5	PERCNT(3,1,2)	Social-Recreational	.284	11-13	F3.3	284
5.6	PERCNT(4,1,2)	School	.001	14-16	F3.3	001
5.7	PERCNT(5,1,2)	Vacation	.095	17-19	F3.3	095
5.8	PERCNT(6,1,2)	Commercial	.100	20-22	F3.3	100

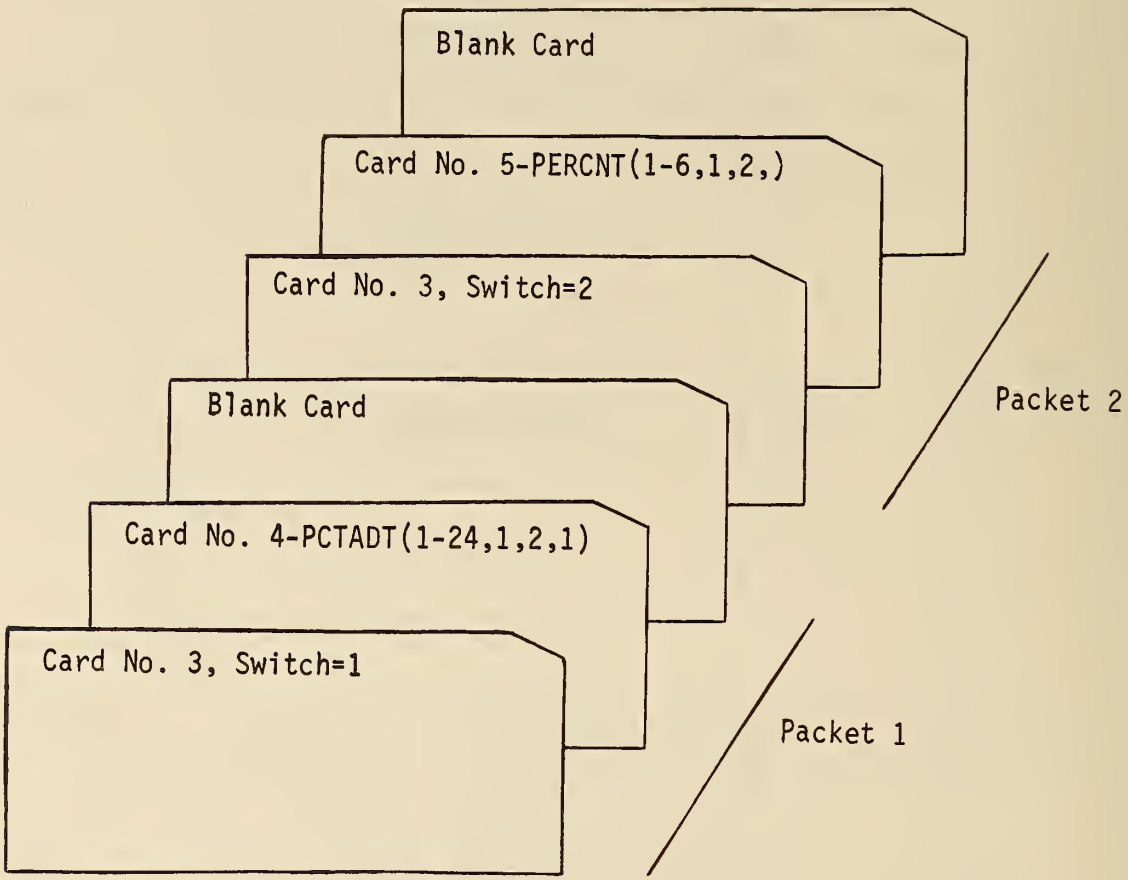

Figure 24. Hourly traffic distribution override packets

The program was designed to accommodate occupancy constraints. The user has a specification, volume-capacity ratio and crew option available to him in defining the available hours for any activity.

Specification Option

The array INOCC can be used to specify for each activity the first and last hour of the day when roadway may be continuously occupied, i.e., an occupancy interval. The user may specify up to nine options. This allows multiple occupancy intervals to be specified for the same activity. A maximum of seven activities is handled by the program. If the user specifies an occupancy interval for each activity, this only leaves two options for multiple specification.

The occupancy interval constraints will be similar for most activities. Therefore, a dummy activity number was established. This is Activity Number 10. When the program encounters an activity not already having a specific assignment, it assigns the dummy's first and last hours to the activity. This use of a dummy activity permits a blanket specification of an occupancy interval to multiple activities and leaves more options available for multiple specifications to a single activity.

Program default occupancy intervals are assigned to all activities using a tenth option position for variable INOCC. Any activity option specified by the user overrides the default assignment to that activity. The user can override the default blanket by specifying a dummy activity number 10.

The specification options for occupancy intervals are handled in Packet No. 4. The present program defaults are in two parts, a dummy blanket activity 10 which assigns all activities the occupancy interval 7 A.M. to 6 P.M. Also used in the program as a default is the interval 3 P.M. to 6 P.M. for the concrete pavement activity, blowups. This specification resides in option position number one and will be overridden by any use of Packet 4 by the user.

Table 16 summarizes the present default options in the program. In Table 17 the format requirements for entering Packet 4 are illustrated. The example values used in Table 17 are shown in Table 16 and illustrate how the occupancy intervals have changed.

Volume-Capacity Ratio Option

Many maintenance organizations require that traffic volumes be below some specified threshold before crews are permitted to occupy the roadway. The program provides for a volume-capacity ratio constraint on occupancy. Each hour of available occupancy is tested against the volume-capacity ratio in that hour. If the allowed ratio is exceeded, the available hour is made unavailable. The variable OVER(11,IA) in Packet No. 5 is used to specify a permitted volume-capacity ratio for roadway occupancy. The example shown in Table 18 illustrates some of the default values presently used in the program. When the volume-capacity constraint is not wanted, as for Activity Number 3, blowups, a large value is specified. This also is illustrated in Table 18.

Table 16. Occupancy intervals established through the use of Specification Packet No. 4

Activity Number	Default Assignment		Packet No. 4 Override	
	First Hour	Last Hour	First Hour	Last Hour
1	7	18	7	18
2	7	18	8	17
3	15	18	8	17
4	7	18	9	17
5	7	18	8	17
6	7	18	8	17
7	7	18	6	21

Table 17. Optional input packet No. 4 used for specifying occupancy intervals for activities

Card No.	Variable	Description	Example Value	Columns	Format	Example
3	IP	Override Switch=4 4	4	1-2	I2	04
6.1	INOCC(1,1)	Activity Number	7	1-2	I2	07
6.2	INOCC(1,2)	First Hour	6	3-4	I2	06
6.3	INOCC(1,3)	Last Hour	21	5-6	I2	21
6.1	INOCC(2,1)	Activity Number	10	1-2	I2	10
6.2	INOCC(2,2)	First Hour	8	3-4	I2	08
6.3	INOCC(2,3)	Last Hour	17	5-6	I2	17
6.1	INOCC(3,1)	Activity Number	1	1-2	I2	01
6.2	INOCC(3,2)	First hour	7	3-4	I2	07
6.3	INOCC(3,3)	Last hour	18	5-6	I2	18
	Blank card					

Table 18. Optional input packet No. 5 used for specifying occupancy constraints

Card No.	Variable	Description	Example Value	Columns	Format	Example
3	IP	Override Switch=5	5	1-2	I2	05
7.1	I1	V/C Ratio Switch=10	10	1-2	I2	10
7.2	IA	Activity Number	1	3-4	I2	01
7.3	OVER(10,1)	Volume Capacity ratio	1	5-11	F7.2	1.bbbbb
7.1	I1	V/C Ratio Switch=10	10	1-2	I2	10
7.2	IA	Activity Number	3	3-4	I2	03
7.3	OVER(10,3)	Volume capacity ratio	10	5-11	F7.2	10.bbbb
7.1	I1	V/C Ratio Switch=10	10	1-2	I2	10
7.2	IA	Activity Number	5	3-4	I2	05
7.3	OVER(10,5)	Volume capacity ratio	1	5-11	F7.2	1.bbbbb
7.1	I1	V/C Ratio Switch=10	10	1-2	I2	10
7.2	IA	Activity Number	7	3-4	I2	07
7.3	OVER(10,7)	Volume capacity ratio	10	5-11	F7.2	10.bbbb
7.1	I1	Crew Hours Switch=1	1	1-2	I2	01
7.2	IA	Activity Number	7	3-4	I2	07
7.3	OVER(1,7)	Continuous crew hours	24 hrs.	5-11	F7.2	24.bbbb

Crew Option

There may be occasions when the local highway organization desires to close portions of a roadway for days at a time. This creates a 24-hour closure impact on the motorist. The program treats a 24-hour assignment of crew time in variable OVER(1,IA) as allowing roadway to be available for occupancy continuously. Further, all other constraints are suppressed by the use of this crew option specification of 24 hours. An example of a 24-hour crew override for Activity Number 7 is shown in Table 18 as part of Packet No. 5.

The specification of this override suppresses both the specification option and the volume-capacity constraint indicated for the same activity earlier. The override packets used for the three occupancy options are shown in Figure 25.

Speed

A principal component in the development of motorist impacts is speed, i.e., the difference in speed between normal and roadway occupancy conditions. Vehicle speed dictates the level of vehicle operation cost and the magnitude of speed changes. It influences the magnitude of loss time and therefore the value of time losses. Finally, pollution emission rates will be larger for slower speeds.

Speed will be closely related to the volume-capacity ratio on a roadway. Also, speed will depend on the roadway design speed and the enforced speed limit on the roadway. An algorithm is used in the program to develop an array of speeds for a range of volume-capacity ratios.

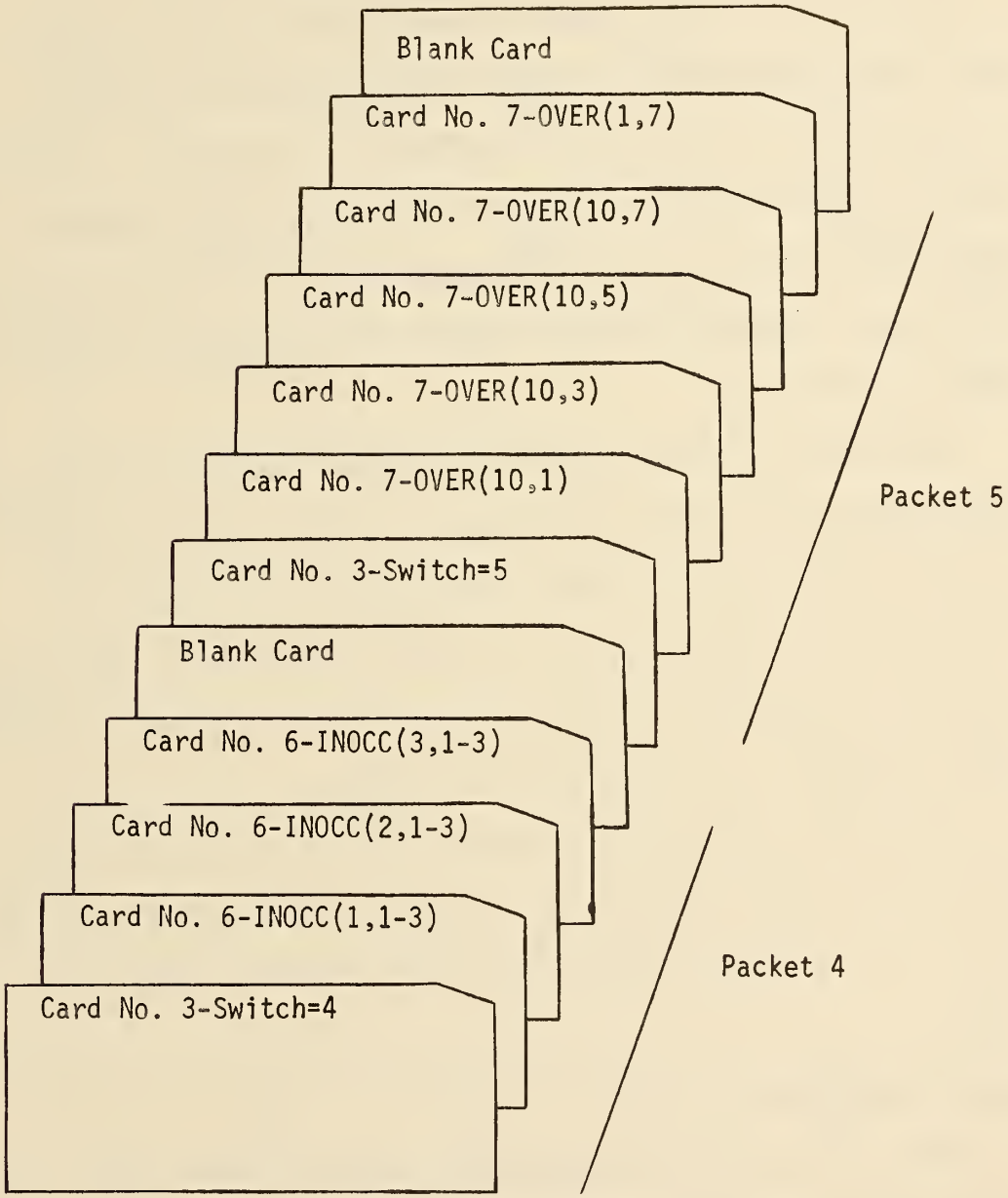

Figure 25. Example packet set used in the specification of available roadway occupancy time

The variables in this algorithm are Design Speed (DSPEED), Capacity (CAP), and the Speed Limit (SLIMIT). The user can control each of these variables using optional inputs. Therefore, the user can control the speed matrix developed for each closure category.

The observations made during field studies revealed that the speed limits were unenforced around lane closures. The motorist drives as fast as possible for the conditions. Therefore, a speed limit is needed which will produce the observed average highway speeds. The program sets the average highway speed equal to 90 percent of the speed limit. Therefore, to get a 55 mph free flow speed requires a speed limit of 61 mph.

The speed curves generated by the program algorithm are illustrated for design speeds and speed limits of 70, 60, and 50 miles per hour and a lane capacity of 2000 vehicles per hour in Figure 26.

For a freeway design speed of 70 mph, the curves for speed limits of 60, 50, 40, and 30 are shown in Figure 27. The influence of changes to the capacity are illustrated in Figure 28.

The user can control the speed curve matrix generated by the program for each closure category by using the override option to specify values for the freeway design speed, closure category speed limits and capacity.

Freeway Design Speed

Packet No. 19 can be used to input a freeway design speed. The program default value is illustrated in Table 19.

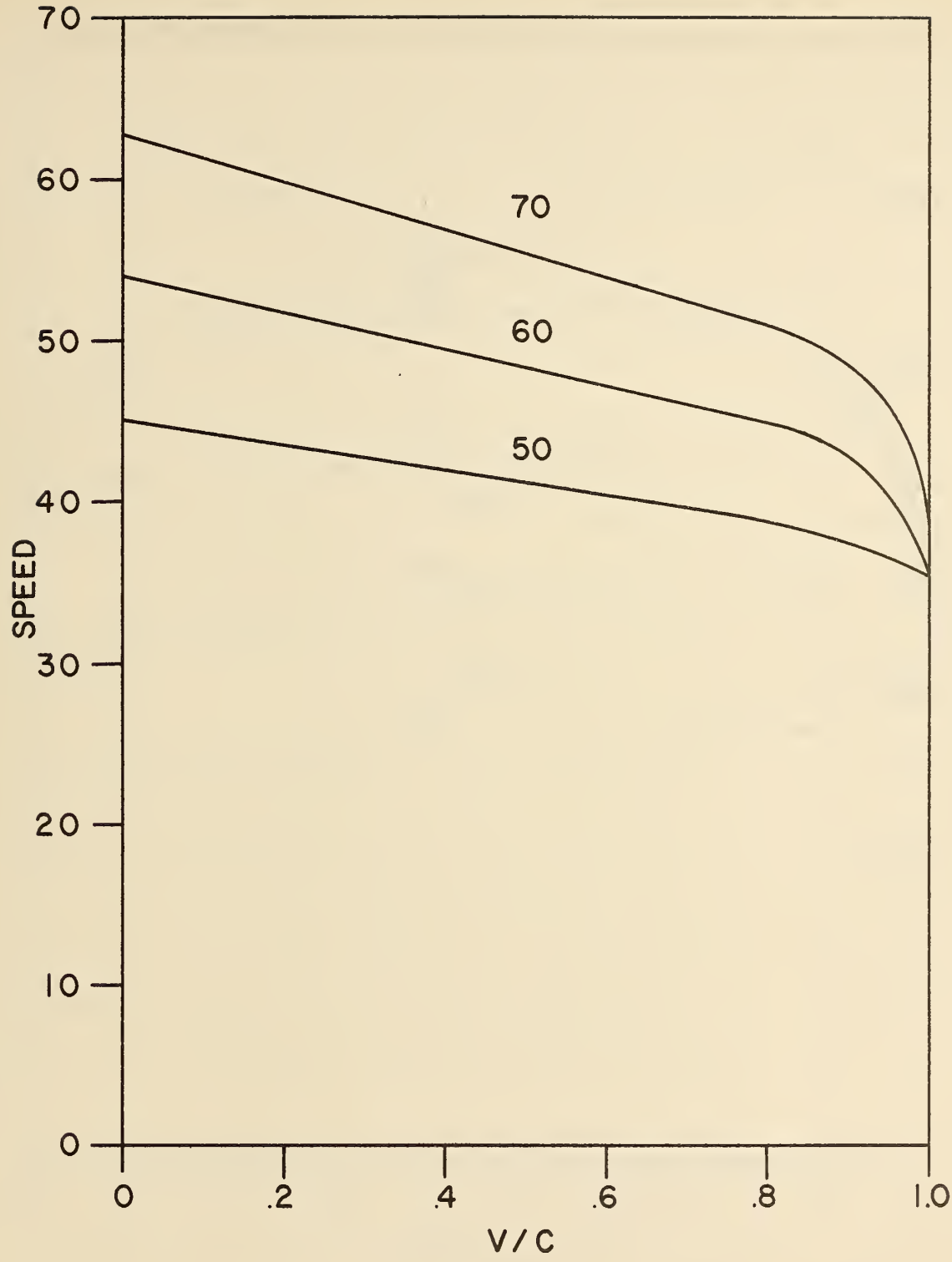

Figure 26. Speed curves for highway designs of 70, 60, and 50 mph where speed limit equals design speed

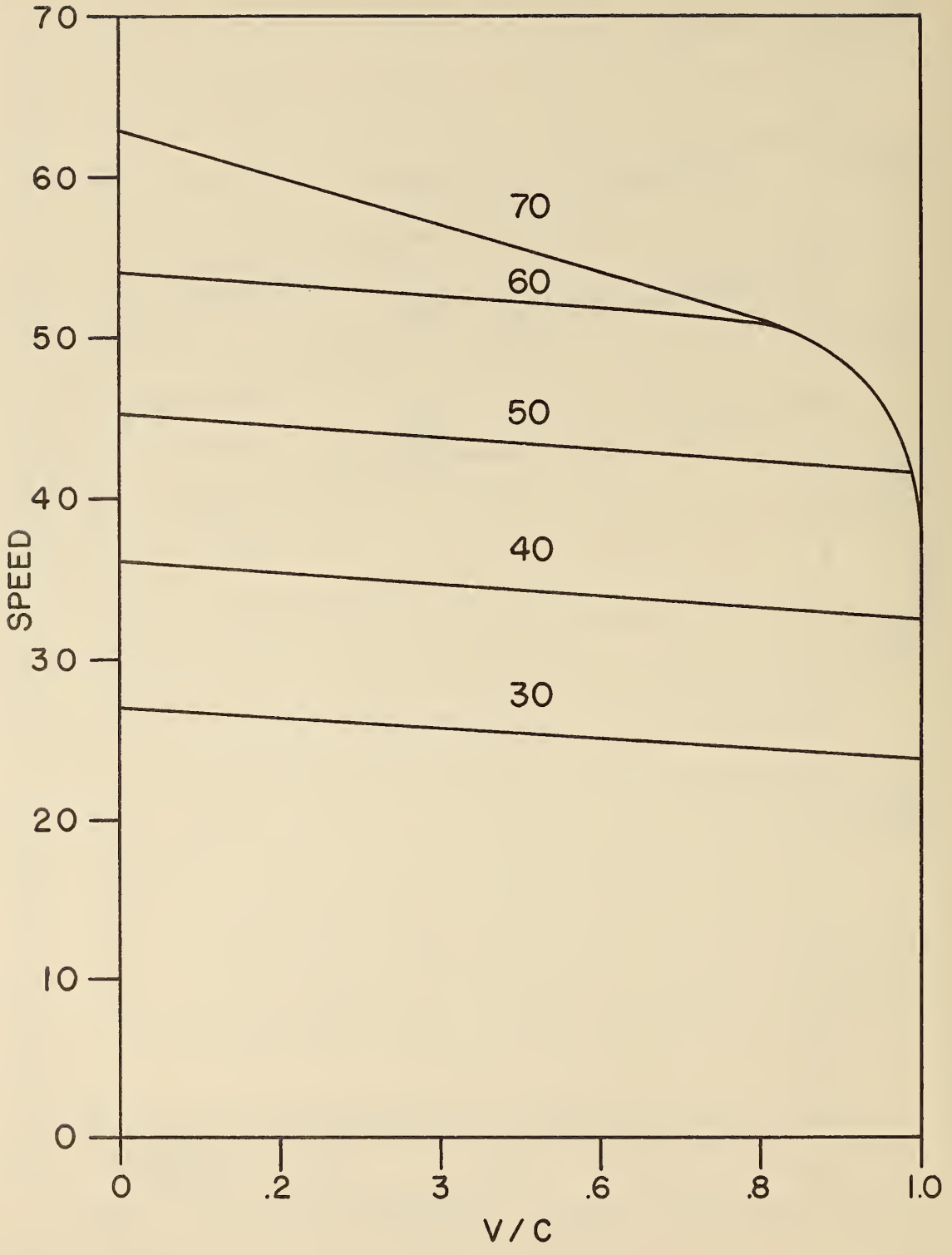

Figure 27. Speed curves for a range of speed limits on a road with a 70 mph design speed

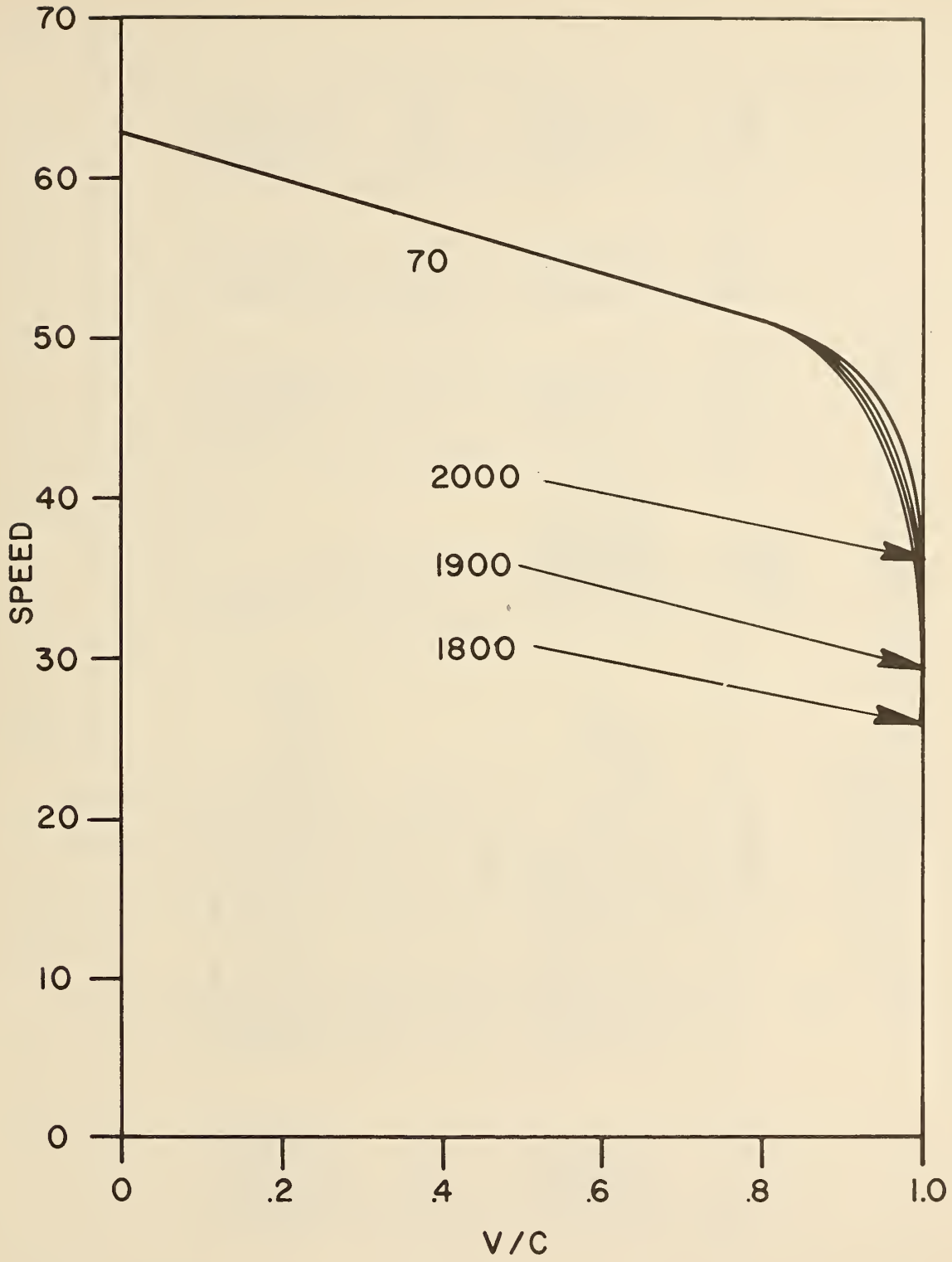

Figure 28. The influence of capacity on a road designed for 70 mph

Table 19. Optional input packets No. 18, 19, and 23 used to specify capacities, freeway design speed and speed limits

Card No.	Variable	Description	Example Value	Columns	Format	Example
3	IP	Override Switch=18	18	1-2	I2	18
20.1	CAP(1)	Capacity one lane closed	1.7(1000's)	1-5	F5.2	1.7bb
20.2	CAP(2)	Capacity two lanes closed	3.8(1000's)	6-10	F4.2	3.8bb
20.3	CAP(3)	Capacity three lanes closed	5.7(1000's)	11-15	F5.2	5.7bb
20.4	CAP(4)	Capacity detour	2.5(1000's)	16-20	F5.2	2.5bb
20.5	CAP(5)	Capacity freeway	8.0(1000's)	21-25	F5.2	8.bbb
3	IP	Override switch=19	19	1-2	I2	19
21	DSPEED	Freeway Design Speed	70	1-5	F5.2	70.bb
3	IP	Override Switch=23	23	1-2	I2	23
25.1	SLIMIT(1)	Speed limit one lane closed	50	1-5	F5.2	50.bb
25.2	SLIMIT(2)	Speed limit two lanes closed	50	6-10	F5.2	50.bb
25.3	SLIMIT(3)	Speed limit three lanes closed	50	11-15	F5.2	50.bb
25.4	SLIMIT(4)	Detour Speed Limit	45	16-20	F5.2	45.bb
25.5	SLIMIT(5)	Freeway Speed Limit	60	21-25	F5.2	60.bb

Speed Limit

The speed limit is overridden with Packet No. 23. The sequence used in complying with the format requirements for the speed limit is important. The position controls the subscript used for the variable SLIMIT. The array SLIMIT has a maximum of 5 subscripts. Depending on the directional lanes, each subscript represents a road closure category. These categories are illustrated in Table 20. Therefore, if the user desires to describe a speed limit of 35 miles per hour on the detour used for traffic on an eight-lane freeway, subscript position 4 is assigned 35 mph.

In Table 20, the program default values are illustrated. These are for an eight-lane freeway which is the maximum size handled by the program.

Capacity

Packet No. 18 is used to specify closure capacities. The capacity is controlled by subscripts in the same manner as the speed limit. The sample format is shown in Table 19 and the subscript definition in Table 20.

The example set of packets used for controlling the program speed matrix is illustrated in Figure 29.

Shoulders

For each roadway lane closure, the user has the option of allowing traffic to use shoulders. The effect of having shoulders is to increment the capacity of a closure category. As an example, the default

Table 20. Interpretation given to the subscripts for variables SLIMIT and CAP by the program EAROMAR

Subscript Value	Description of Closure Categories		
	8-lane Freeway	6-lane Freeway	4-lane Freeway
1	Three lanes open to traffic	Two lanes open to traffic	One lane open to traffic
2	Two lanes open to traffic	One lane open to traffic	Traffic sent to detour
3	One lane open to traffic	Traffic sent to detour	Two lanes open to traffic
4	Traffic sent to detour	Three lanes open to traffic	
5	4 lanes open to traffic		

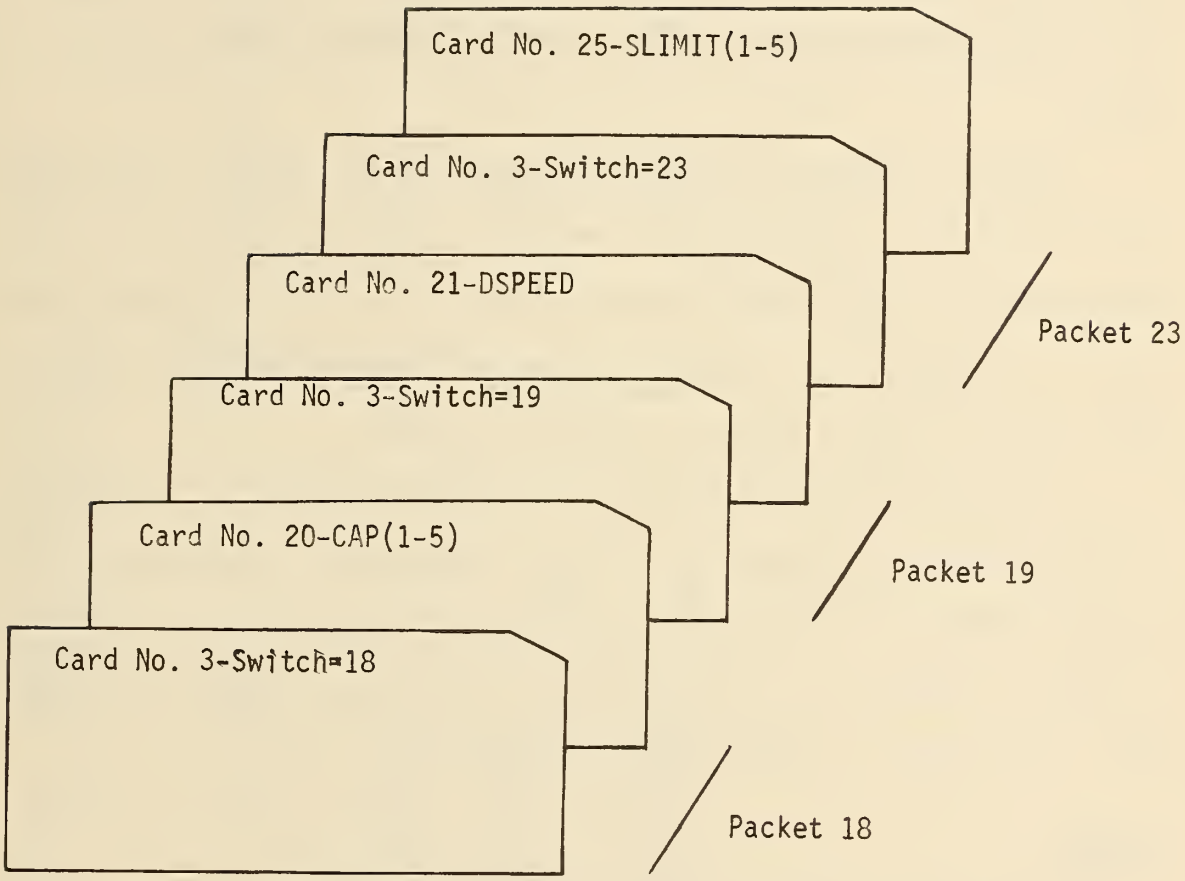

Figure 29. Packet sets used to control the program speed matrix

capacity assigned to a shoulder is 800 vehicles per hour. If two out of three directional lanes are closed to the motorist, the program default capacity for the closure category is 1900 vehicles per hour. If one shoulder is specified, then the capacity increases to 2700 vehicles per hour. This will have an influence on the speed through the influence zone because speed is a function of the volume-capacity ratio.

When all lanes are closed to the motorist, the program first checks to determine if any shoulders are available. When shoulders are available, they are used and the speed is based on the one lane open to the motorist category. The capacity is that of the shoulder. If no shoulders are available, a detour situation is assumed.

The specification of shoulders is handled by Packet No. 5 using the variable OVER(12,IA) where IA is the activity number. The format is illustrated in Table 21 where the program default of two shoulders for Activity No. 3, blowups, and no shoulders for activities 1 and 2 are illustrated. The packet is illustrated in Figure 30.

Detours

One closure category in the program is the detouring of traffic and the closing of all directional lanes on the freeway. The program automatically exercises this option when there are no shoulders to be used and all directional lanes are closed. Because there are an infinite number of detour possibilities, a set of parameters to describe the detour is made available to the user.

Table 21. Optional input packet No. 12 used for specifying shoulder constraints

Card No.	Variable	Description	Example Value	Columns	Format	Example
2	IP	Override Switch = 5	5	1-2	I2	05
7.1	I1	Shoulder Switch = 12	12	1-2	I2	12
7.2	IA	Activity Number	3	3-4	I2	03
7.3	OVER(12,3)	Shoulders open to traffic	2	5-11	F7.2	2.bbbbb
7.1	I1	Shoulder Switch = 12	12	1-2	I2	12
7.2	IA	Activity Number	1	3-4	I2	01
7.3	OVER(12,1)	Shoulders open to traffic	0	5-11	F7.2	0.bbbbb
7.1	I1	Shoulder Switch = 12	12	1-2	I2	12
7.2	IA	Activity Number	2	3-4	I2	02
7.3	OVER(12,2)	Shoulders open to traffic	0	5-11	F7.2	0.bbbbb

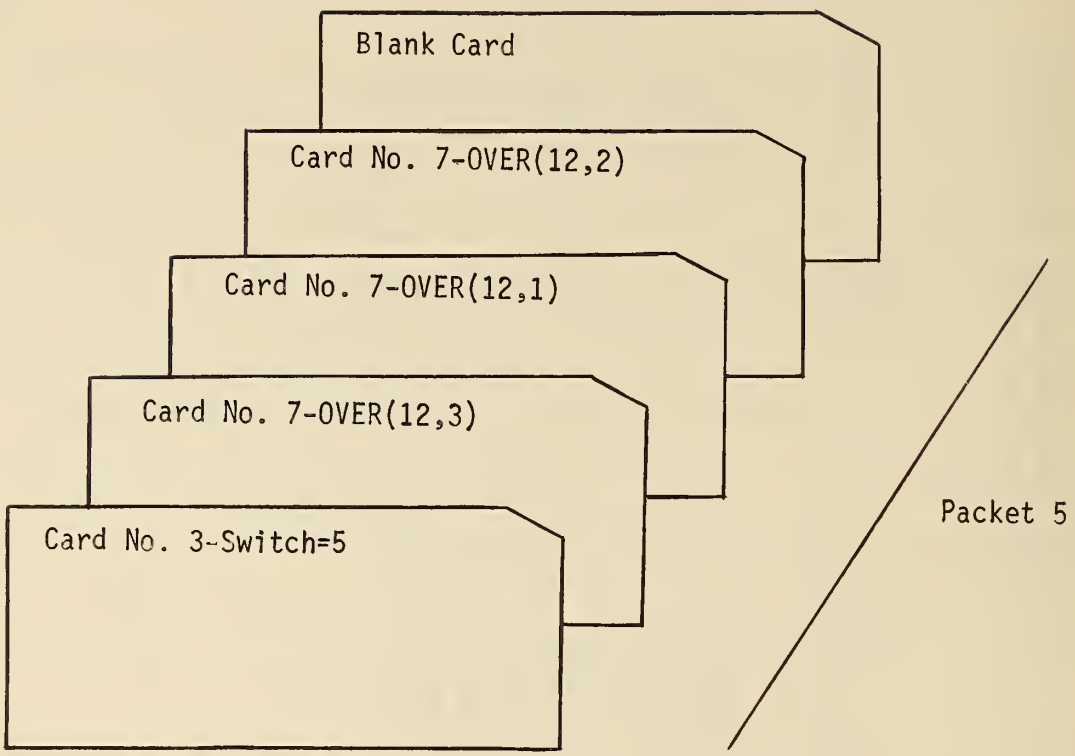

Figure 30. Schematic of Packet No. 5
as used to control shoulders

The variable DETOUR holds the detour parameters and the variable subscripts represent the following parameters:

1. The distance between interchanges in miles
2. The detour length in miles
3. The speed limit associated with the operation on the detour
4. The detour average daily traffic volume in 1000's
5. The detour capacity in 1000's
6. The average number of traffic signal stops which effect all traffic on detour
7. The number of lanes on the detour

Distance Between Interchanges

The program assumes an influence zone on the freeway equal to the distance between interchanges. This is the normal vehicle operation area which is compared with operation on the detour in determining motorist impacts.

Detour Length

The detour length is the influence zone for all detoured traffic. The difference between motorist impacts on the detour and the freeway is the basis for evaluating the cost of the detour closure category.

Detour Speed Limit

The speed limit on the detour is one parameter used in developing a speed matrix for operation on the detour.

Detour Volume

The volume on the detour under normal conditions must be added to the volume diverted from the freeway in determining vehicle operating characteristics on the detour.

Detour Capacity

The capacity on the detour influences the speed matrix and controls operational speeds through the volume-capacity ratio and the occurrence and magnitude of queues.

Signal Stops

The costs of speed changes for both normal operation on the detour and detour operation when freeway traffic is detoured are based on the number of signal stops on the detour. The signal stops should reflect a composite number of stops for all vehicles operating on the detour.

Lanes on Detour

The detour lanes are needed to convert detour capacity to lane capacity in the determination of the speed matrix for the detour.

There are many situations where the volume on the freeway may far exceed the capacity of any single detour route. The specifications for the detour can be enlarged to reflect a multiple number of routes by appropriate increases in volume, capacity and lanes.

The user specifies the detour parameters using Packet No. 15. The format and program default values for this packet are shown in Table 22. The packet is illustrated in Figure 31.

Table 22. Optional input packet No. 15 used for establishing detour parameters

Card No.	Variable	Description	Example Value	Columns	Format	Example
3	IP	Override Switch = 15	15	1-2	I2	15
17.1	DETOUR(1)	Distance between interchanges	2 mi.	1-4	F4.1	2.bb
17.2	DETOUR(2)	Length of detour	2.6 mi.	5-8	F4.1	2.6b
17.3	DETOUR(3)	Speed limit on detour	35 mph	9-12	F4.1	35.b
17.4	DETOUR(4)	Detour ADT	20(1000's)	13-16	F4.1	20.b
17.5	DETOUR(5)	Detour Capacity	2.5(1000's)	17-20	F4.1	2.5b
17.6	DETOUR(6)	Detour average signal stops	.8	21-24	F4.1	.8bb
17.7	DETOUR(7)	Detour directional lanes	2	25-28	F4.1	2.bb

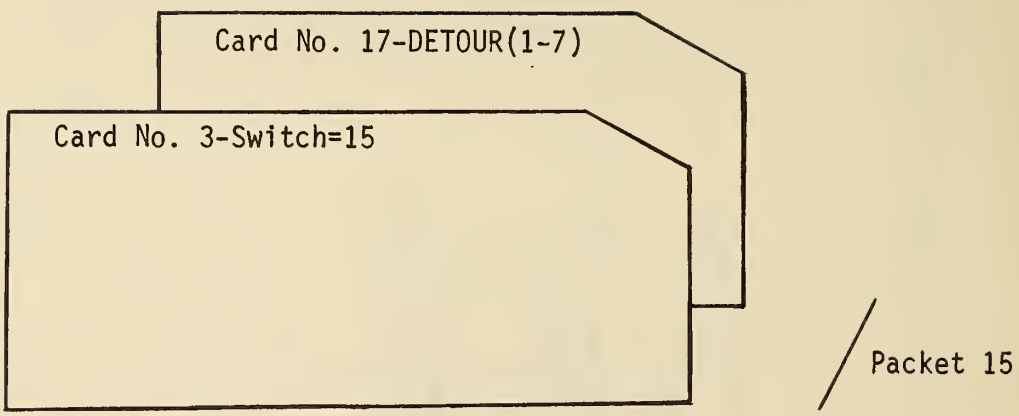

Figure 31. Packet No. 15 used in the specification of detour parameters

Vehicle Operation Costs

The vehicle operation costs used in the program are based on the vehicle consumption parameters: fuel, tires, oil, maintenance and depreciation. Within the program a series of models exists which predict each of the consumption parameters as a function of roadway alignment, vehicle weight and vehicle speed. The program generates an operation cost array for passenger cars and for commercial vehicles. These arrays are based on consumption parameters computed using default values for vehicle weight and roadway alignment. The weight and alignment assumptions may be overridden by the user. Also, default values for the unit costs of fuel, oil, tires and maintenance are used in creating the passenger car and commercial vehicle hourly operating cost arrays. These unit costs also can be overridden by the user.

Roadway Alignment

The user can specify to the program the roadway alignment to the nearest even positive and negative grade between 1 and 6 percent and the horizontal alignment to the nearest even degree between 1 and 6 degrees. The alignment is specified through the use of the following switches:

1. Switch = 1 = Positive grade
2. Switch = 2 = Negative grade
3. Switch = 3 = Horizontal curvature

These overrides are made using Packet No. 6 as illustrated in Table 23. The user provides the mileage of roadway falling into a specified grade or curvature category and the program develops composite consumption

Table 23. Optional Input Packet No. 6 used for specifying roadway alignment used in the development of vehicle consumption parameters

Card No.	Variable	Description	Example Value	Columns	Format	Example
3	IP	Override Switch=6	6	1-2	I2	06
8.1	I1	Alignment Switch=1	1	1-2	I2	01
8.2	I2	Positive Grade	2	3-4	I2	02
8.3	ALIGN(1,2)	Mileage of grade	0.6	5-11	F7.2	.6bbbbb
8.1	I1	Alignment Switch=3	3	1-2	I2	03
8.2	I2	Horizontal curvature	3	3-4	I2	03
8.3	ALIGN(3,3)	Mile of curvature	0.13	5-11	F7.2	.13bbbb
8.1	I1	Alignment Switch=2	2	1-2	I2	02
8.2	I2	Negative grade	1	3-4	I2	01
8.3	ALIGN(2,1)	Mileage of grade	0.81	5-11	F7.2	.81bbbb

parameters which are used in the development of the hourly vehicle operation costs matrices. A normal tangent section is the default alignment assumed in the program.

The example values shown in Table 24 reflect .6 miles of +2% grade, .13 miles of 3 degree curvature and .81 miles of -1% grade.

Vehicle Class Data

The vehicle class data consist of vehicle weight in kips; the percentage of vehicles in the specified weight class and the purchase price of the vehicle. Up to ten vehicle classes may be specified by the user. However, in the event of any optional override to the default values, the user must place the typical passenger vehicle data into the first class specified. All other vehicle classes are combined into a single composite commercial vehicle class.

Packet No. 7 is used to input the vehicle classification data overrides. The values shown as examples in Table 24 are the default values assigned by the program when no user overrides are input.

Unit Costs

In the economic analyses that have been developed to make benefit cost analysis for highways, it is the unit costs, built into the many analysis graphs and tables that have made the analyses obsolete within short time periods. Although the consumption parameters predicted by the models incorporated into the program may not be completely valid as vehicle operation characteristics change in the future, these latter parameters are unlikely to change as rapidly as the unit cost.

Table 24. Optional input packet No. 7 used to specify the weight, percentage and costs of the vehicles used in developing vehicle consumption parameters

Card No.	Variable	Description	Example Value	Columns	Format	Example
3	IP	Override Switch=7	7	1-2	I2	07
9.1	WEIGHT(1,1)	Weight in kips	4.2 kip	1-5	F5.0	4.2bb
9.2	WEIGHT(1,2)	Percentage in class	93.1%	6-10	F5.0	93.1b
9.3	WEIGHT(1,3)	Purchase price	$3000	11-15	F5.0	3000.
9.1	WEIGHT(2,1)	Weight in kips	15.4kip	1-5	F5.0	15.4b
	WEIGHT(2,2)	Percentage in class	2.9%	6-10	F5.0	2.9bb
9.3	WEIGHT(2,3)	Purchase Price	$7300	11-15	F5.0	7300.
9.1	WEIGHT(3,1)	Weight in kips	39.8 kip	1-5	F5.0	39.8b
9.2	WEIGHT(3,2)	Percentage in class	2.2%	6-10	F5.0	2.2bb
9.3	WEIGHT(3,3)	Purchase Price	$24400	11-15	F5.0	24400
9.1	WEIGHT(4,1)	Weight in kips	53.6 kip	1-5	F5.0	53.6b
9.2	WEIGHT(4,2)	Percentage in class	2.8%	6-10	F5.0	2.8bb
9.3	WEIGHT(4,3)	Purchase price	$39300	11-15	F5.0	39300

This program provides the user with the option to specify current unit costs for fuel, tires and oil. Further, a price index can be used to directly update vehicle maintenance costs.

The price index factor presently used in the program as a default is based on the 1974-64 ratio of service prices reported in Economic Indicators[1]. The vehicle maintenance cost models are based on data developed by Winfrey[2].

The type of unit cost is specified through the use of the following switches:

1. Switch = 1 = Fuel cost per gallon
2. Switch = 2 = Oil cost per gallon
3. Switch = 3 = Tire cost per .001 inch wear
4. Switch = 4 = Vehicle maintenance price index factor

The format requirement for the unit costs is shown in Table 25.

The series of override packets which have been illustrated in Table 23 through 25 are combined in the schematic shown in Figure 32.

Value of Time

The value of time is based on the work done at SRI[3]. One variable included in the value of time equations incorporated in the program is income level. The user has the option of specifying this

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[1] Economic Indicators, June 1974, United States Government Printing Office, Washington, 1974.

[2] Winfrey, Robley, "Economic Analysis for Highways," International Textbook Company, Scranton, Pennsylvania, 1969.

[3] Thomas, T. C., and Thompson, G., "The Value of Time Saved by Trip Purpose," Stanford Research Institute, October 1970.

Table 25. Optional input packet No. 9 used for specifying unit cost for fuel, tires, oil and maintenance

Card No.	Vehicle	Description	Example Value	Columns	Format	Example
3	IP	Override Switch=9	9	1-2	I2	09
11.1	I1	Consumption Switch=1	1	1-2	I2	01
11.2	FUEL(1)	Passenger Car Fuel Cost	$.40/Gal	3-6	F4.2	.40b
11.3	FUEL(2)	Commercial Veh. Fuel Cost	$.30/Gal	7-10	F4.2	.30b
11.1		Consumption Switch=2	2	1-2	I2	02
11.2	OIL(1)	Passenger car oil cost	$.80/Qt	3-6	F4.2	.80b
11.3	OIL(2)	Commercial Veh. Oil Cost	$.40/Qt	7-10	F4.2	.40b
11.1		Consumption Switch=3	3	1-2	I2	03
11.2	TIRES(1)	Passenger car tire wear cost	$.10/.001"	3-6	F4.2	.10b
11.3	TIRES(2)	Commercial Veh. tire wear cost	$.20/.001"	7-10	F4.2	.20b
11.1		Consumption Switch=4	4	1-2	I2	04
11.2	SINDEX	Services index factor	1.5	3-6	F4.2	1.5b
11.3	N/A	Not applicable		7-10	F4.2	
0		Blank card				

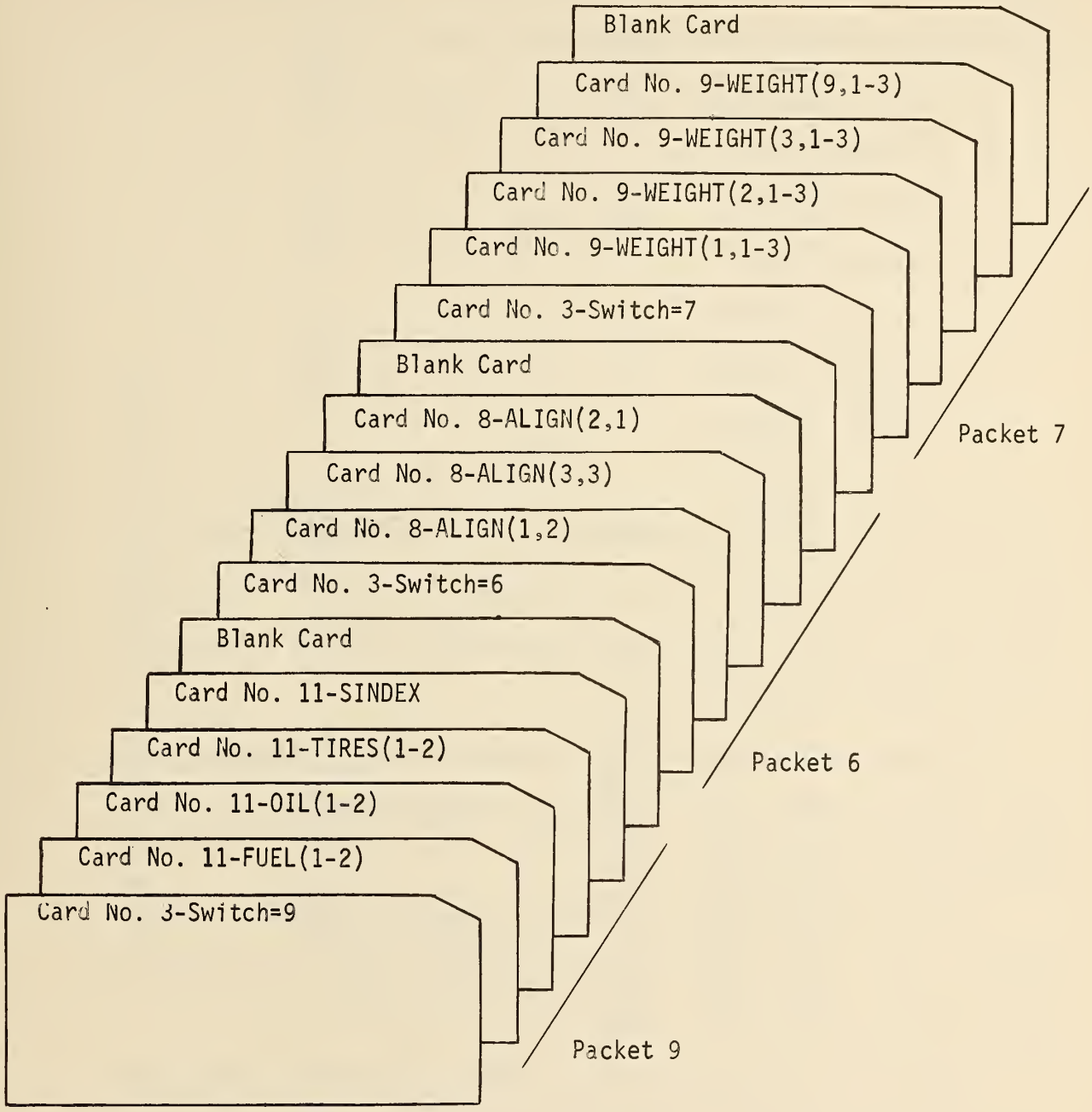

Figure 32. Example packet set used in the establishment of a vehicle operating cost array

value through the optional input packet No. 12. The value of time algorithm uses one of the following income level classes:

1. Under $3,999/yr.
2. $4,000-5,999/yr.
3. $6,000-7,999/yr.
4. $8,000-9,999/yr.
5. $10,000-11,999/yr.
6. $12,000-14,999/yr.
7. $15,000-19,999/yr.
8. Over $20,000/yr.

Through the use of the appropriate composite income level for the analysis, the user has the ability to update the value of time computation and make this component of the economic analysis responsive to wage changes in the future.

The value of time analysis also requires vehicle occupancy for work trips and school trips. These also can be optionally input by the user with Packet No. 21.

A single value of time is used for commercial vehicles. The default value is 8.75 and it can be overridden by the user through the use of Packet No. 22.

The value of time variables and related packets are shown within program default values in Table 26. Further, the packets are illustrated schematically in Figure 33.

Table 26. Value of time packets 12 and 21

Card No.	Variable	Description	Example Value	Columns	Format	Example
3	IP	Override switch=12	12	1-2	I2	12
14	INC	Income Level Code	4	1-2	I2	04
3	IP	Override switch=21	21	1-2	I2	21
23.1	O(WORK)	Vehicle occupancy-Work trip	2.0	1-5	F5.2	2.bbb
23.2	O(SCHL)	Vehicle occupancy-School trip	2.5	6-10	F5.2	2.5bb
3	IP	Override switch = 22	22	1-2	I2	22
24	COMVOT	Commercial vehicle time value	8.75	1-5	F5.2	8.75b

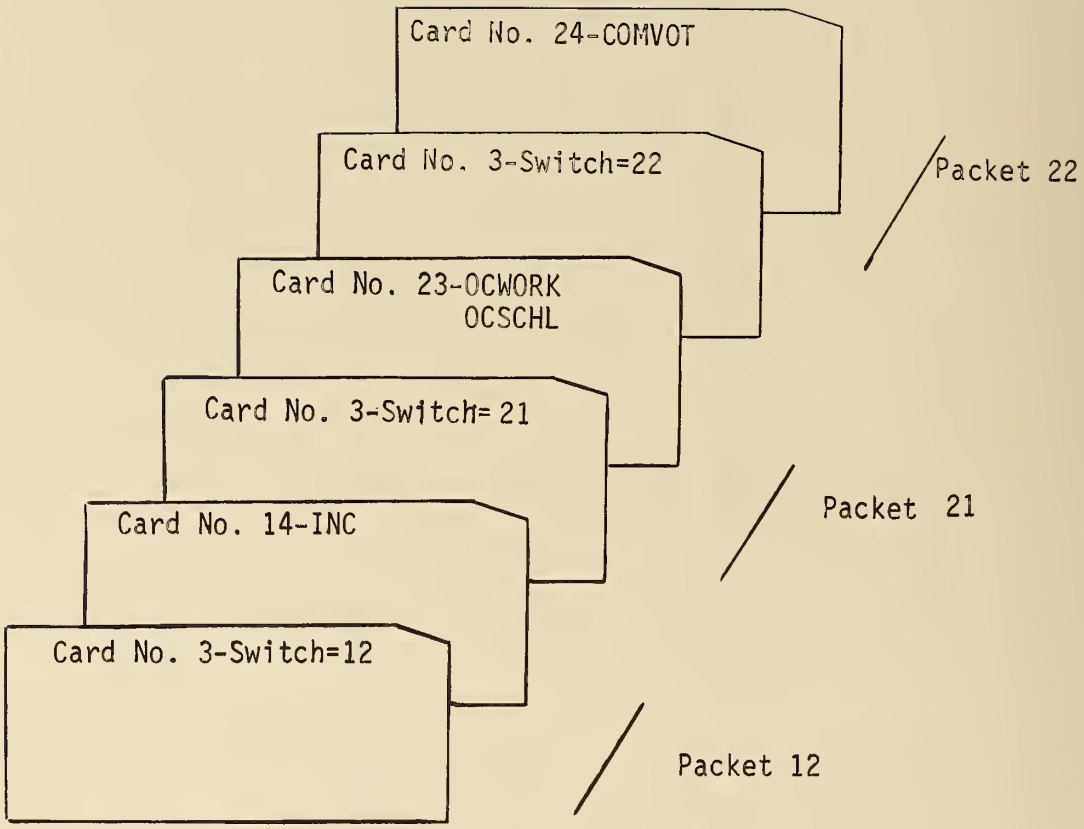

Figure 33. Value of time override packets

Accident Cost

A single dollar value is assigned for each accident in the development of accident costs. The user can specify his own estimate using Packet No. 20 as shown in Table 27 and Figure 34 where the default cost of $850 per accident is used as an example.

Output

Output occurs at two locations in the program. The first is produced by the subroutine RPRINT. This subroutine documents all the input information together with the arrays and scalars which provide basic information and constraints to the program process. The user has the option of suppressing this printout which runs eight pages. The switches used in the control of this printout are the following:

1. Switch=1 = Print
2. Switch=2 = Do not print

The second output from the program occurs at the end of analysis. Four printout levels are structured for this output. The levels are controlled by a print switch which can be controlled by the user. These are as follows:

1. Switch=1 = Complete documentation on each activity's costs and motorist impacts for each closure category by direction each year.
2. Switch=2 = Complete documentation on each activity's costs and motorist impacts for each closure category each year.

Table 27. Packet No. 20 used to specify the costs of an accident

Card No.	Variable	Description	Example Value	Columns	Format	Example
2	IP	Override Switch = 20	20	1-2	I2	20
22	AACOST	Average accident cost	$850	1-5	F5.0	850.b

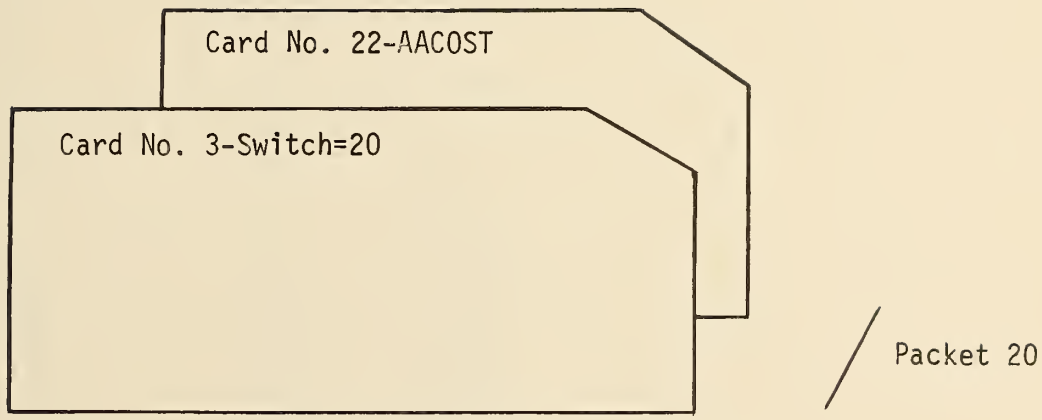

Figure 34. Override Packet No. 20 used for specifying an average accident cost

3. Switch=3 = Documentation on total activity costs and motorist impacts for minimum costs closure category each year.

4. Switch=4 = The discounted total activity costs and motorist impacts for the aggregate minimum cost closure category at the end of the analysis period.

Packet No. 10 is used in specifying the desired level of program output. The packet is illustrated with the program default values. in Table 28 and schematically shown in Figure 35.

Table 28. Optional input packet No. 10 used for controlling the amount of program output

Card No.	Variable	Description	Example Value	Columns	Format	Example
3	IP	Override Switch = 10	10	1-2	I2	10
12.1	IPRINT	Level of analysis output	1	1-2	I2	01
12.2	IPRINT	Input Print Control	1	3-4	I2	01

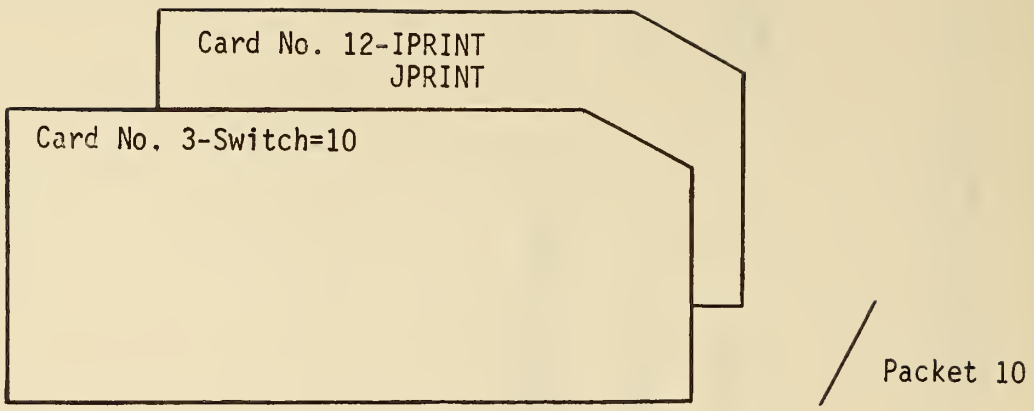

Figure 35. Packet No. 10 used in specifying program output requirements

DEMONSTRATION RUN

To illustrate the documentation generated by the program, a demonstration run was made using the program EAROMAR. All of the program default values were used so only three data input cards needed to be prepared. These were the required input data cards for "Traffic" and "Design" together with a "Packet Option" card with the "bEND" designation. The "Traffic" input specified for the demonstration was as follows:

Initial Volume	=	40,000 ADT
Initial AM Split	=	40%
Initial Commercial	=	10%
Final Volume	=	200,000 ADT
Final AM Split	=	50%
Final Commercial	=	5%

The "Design" input specified for the demonstration was as follows:

Analysis Period	=	20 years
Freeway Type	=	8-lane divided
Pavement Type	=	PCC
Project Length	=	10 miles
Surface Thickness	=	10 inches
Base Thickness	=	0
Subgrade Thickness	=	0

A description of the required traffic input for Traffic and Design are shown in Tables 4 and 5. The data deck is illustrated in Figure 16.

The input information together with the arrays and scalars which provide basic information and constraints to the program process are shown in Figures 36 through 43 in Appendix A. This is program output generated by subroutine RPRINT and reflects the default assumption used in the program.

In Appendix B, the output for each of the 20 years in the analysis period for the demonstration run is shown. The output reflects the default output option number 1. This is the maximum output generated by EAROMAR which includes output tables for each direction each year. Each activity and lane closure category is summarized for both activity and motorist costs together with loss time, increased accidents and pollution days.

A brief explanation of the output table format follows.

Activity Number

Each activity number represents a specific maintenance activity or resurfacing. In the demonstration run, resurfacing occurs in the 17th year. At this point the pcc pavement changes to a composite pavement. Consequently a change occurs in the maintenance that the activity number represents. The following descriptions are applicable to the demonstration run.

Activity Number	PCC Pavement	Composite Pavement
1	Full depth PCC patch	Bituminous patching
2	Partial depth PCC patch	--
3	Blowups	Blowups
4	Joint Sealing	Crack Sealing
5	Mudjacking	Mudjacking
6	--	--
7	Resurfacing	Resurfacing

Closure Category

As defined previously in the definition of terms, closure category represents a sequence of lane closures. In the demonstration run, 5 categories are shown. These are summarized as follows:

Closure Category	Description
1	4 lanes closed, detour or 4 lanes closed, use shoulder
2	3 lanes closed, 1 lane closed
3	2 lanes closed, 2 lanes closed
4	1 lane closed at a time
5	4 lanes closed, cross over to 2 lanes opposite direction

Maintenance and Rehabilitation

The total annual costs required for work crews to complete the annual workload for the indicated activity and closure category.

Operation Costs

The total increase in vehicle operation costs generated when work crews occupy the roadway to perform the annual workload for the indicated activity and closure category.

Accident Costs

The total increase in accident costs generated when work crews occupy the roadway to perform the annual workload for the indicated activity and closure category.

Accident #X100

The annual accidents created when work crews occupy the roadway to perform the annual workload for the indicated activity and closure category. Accidents are expressed as 1/100 accidents because the output is integer. A value of 20 means .2 accidents per year.

Loss Time Costs

The total value in dollars assigned to loss time created when work crews occupy the roadway to perform the annual workload for the indicated activity and closure category.

Loss Time Hours

The total hours of loss time accumulated for all motorists affected by work crews when they occupy the roadway to perform the annual workload for the indicated activity and closure category.

Pollution Days

The number of days of increased pollution created when work crews occupy the roadway to perform the annual workload for the indicated activity and closure category. Pollution days are defined on Page 8 They are expressed as 1/100 days because the output is integer. A value of 87 for pollution days means .87 pollution days per year.

Total Costs

This is a summary of the costs in the columns Maintenance and Rehabilitation, Operation Costs, Accident Costs, and Loss Time Costs.

Total

The columns are totaled for each closure category. Therefore, where 5 closure categories are shown, there are 5 totals.

Minimum Costs

The minimum costs results from selecting the minimum total costs closure category for each activity and then totaling these minimums for all activities.

Discounted Costs

The minimum costs are discounted to a present worth costs. In the demonstration run this is based on an interest rate of 8%.

Accumulated Costs

These are the year to date totals for the discounted costs.

"******"

As noted on the printout, this signifies that the roadway cannot be occupied within V/C constraints. This happens first for closure category 2 because in the demonstration run this reflects a 3-lane closure followed by a 1-lane closure. When 3 lanes are closed, very little capacity is available to motorists and therefore the volume/capacity constraints are easily exceeded. This restriction is turned on when no hours are available for occupancy.

APPENDIX A

Input and Default Arrays and Scalars for the Demonstration Run Using Program EAROMAR

```
TRAFFIC WARRANTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE

ASSUMED VALUES OF ANALYSIS VARIABLES

DESIGN:
EXPRESSWAY TYPE.....  8 LANE
PAVEMENT TYPE.....  CONCRETE
ANALYSIS SECTION LENGTH.....10. MILES
LANE WIDTH.....12.0 FT.
ANALYSIS PERIOD.....20 YEARS
DESIGN LIFE.....20.0 YEARS
RESURFACED DESIGN LIFE.....10. YEARS
TERMINAL PSI VALUE.....2.0

TRAFFIC:
INITIAL VOLUME..... 39999 AADT
INITIAL COMMERCIAL.....10.0 PERCENT
INITIAL AM PEAK SPLIT.....40.0 PERCENT
FINAL VOLUME.....199998 AADT
FINAL COMMERCIAL..... 5.0 PERCENT
FINAL AM PEAK SPLIT.....50.0 PERCENT
NORMAL CAPACITY.....8000. VEHICLES
1 LANE CLOSED CAPACITY.....5700. VEHICLES
2 LANE CLOSED CAPACITY.....3600. VEHICLES
3 LANE CLOSED CAPACITY.....1700. VEHICLES
SHOULDER CAPACITY..... 800. VEHICLES
DETOUR CAPACITY.....2400. VEHICLES
DISTANCE BETWEEN INTERCHANGES..... 2.00 MILES
DETOUR LENGTH..... 2.60 MILES
SPEED LIMIT ON DETOUR.....45.00 MPH
NORMAL DETOUR VOLUME.....20.00 ADT
AVERAGE STOPS ON DETOUR..... 0.80
DETOUR DIRECTIONAL LANES..... 2.00
FREEWAY SPEED LIMIT.....60.00 MPH
1 LANE CLOSED SPEED LIMIT.....50.00 MPH
2 LANE CLOSED SPEED LIMIT.....50.00 MPH
3 LANE CLOSED SPEED LIMIT.....50.00 MPH
4 LANE CLOSED SPEED LIMIT.....45.00 MPH

THE AVERAGE WEIGHT OF A COMMERCIAL VEHICLE IS 36. KIPS
THE AASHO BASED ANNUAL DIRECTIONAL 18 KIP AXLES IS  1984634
```

Figure 36. Design and traffic variables as specified in required input and as defined through program defaults

TRAFFIC WARRANTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE

ASSUMED VALUES OF ANALYSIS VARIABLES

MAINTENANCE:

VARIABLE DESCRIPTION	ACTIVITIES CODE NUMBER 1	2	3	4	5	6	7
WORK LOCATION SPACING.....	50.00	50.00	50.00	50.00	50.00	50.00	1200.00
WORKLOAD MODEL FACTOR.....	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SIMULATION WORKLOAD.....	1674.15	1212.59	1.00	3000.00	4637.76	16741.40	15000.00
WORKLOAD OVERRIDE.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MAINTENANCE LEVEL.....	1.00	1.00	1.00	0.20	1.00	1.00	0.0
TRAVEL TIME IN HOURS.....	0.50	0.50	0.50	0.50	0.50	0.50	0.50
CURE TIME IN HOURS.....	3.00	1.00	1.00	1.00	1.00	1.00	0.0
TRAFFIC CONTROL HOURS.....	0.25	0.25	0.25	0.25	0.25	0.25	0.25
MAXIMUM ZONE LENGTH IN MILES...	0.50	0.50	0.50	2.00	0.50	0.50	1.00
MINIMUM ZONE LENGTH IN MILES...	0.10	0.10	0.10	0.10	0.10	0.10	0.25
ALLOWED CONTINUOUS CREW HOURS..	9.00	8.00	8.00	8.00	8.00	8.00	12.00
ALLOWABLE VOLUME CAPACITY RATIO	1.00	1.00	10.00	1.00	1.00	1.00	10.00
SHOULDERS OPEN TO TRAFFIC.....	0.0	0.0	2.00	0.0	0.0	0.0	0.0
WORKSITE SWITCH.....	1.00	2.00	1.00	3.00	2.00	1.00	3.00
WORKSITE MULTIPLIER.....	1.00	1.00	0.0	12.00	3.00	10.00	1500.00
WORKSITE SIZE ADD ON.....	0.0	0.0	1.00	0.0	10.00	0.0	0.0
NUMBER OF ITERATIONS.....	100.00	100.00	1.00	250.00	100.00	100.00	10.00
WORKSITE SPACING SWITCH.....	1.00	1.00	1.00	2.00	1.00	1.00	2.00

PERFORMANCE STANDARDS:
TRAVEL SPEED BETWEEN SITES.....20. MPH
WALK SPEED BETWEEN SITES..... 2. MPH

ACTIVITY CODE	CONCRETE UNIT COST LAB+EQUIP	CONCRETE UNIT COST MATERIAL	CONCRETE PRODUCTION RATE	BITUMINOUS UNIT COST LAB+EQUIP	BITUMINOUS UNIT COST MATERIAL	BITUMINOUS PRODUCTION RATE	COMPOSITE UNIT COST LAB+EQUIP	COMPOSITE UNIT COST MATERIAL	COMPOSITE PRODUCTION RATE
1	48.40	6.25	11.10	55.83	0.50	180.00	55.83	0.50	180.00
2	31.92	0.20	5.00	28.98	0.10	1500.00	0.0	0.0	0.0
3	48.98	86.40	0.50	89.42	5.07	5.60	48.98	86.40	0.50
4	26.62	0.07	280.00	0.0	0.0	0.0	28.98	0.10	1500.00
5	35.91	0.70	30.00	0.0	0.0	0.0	35.91	0.70	30.00
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	0.0	1.20	700.00	0.0	1.20	700.00	0.0	1.20	700.00

Figure 37. Roadway occupancy and activity parameters generated by program defaults for each activity. The activity code number refers to portland cement concrete activities.

TRAFFIC WARRANTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE

AVAILABLE OCCUPANCY HOURS INDICATED BY 1

DESCRIPTION	1	2	3	4	5	6	7
1	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0
7	1	1	0	1	1	1	1
8	1	1	0	1	1	1	1
9	1	1	0	1	1	1	1
10	1	1	0	1	1	1	1
11	1	1	0	1	1	1	1
12	1	1	0	1	1	1	1
13	1	1	0	1	1	1	1
14	1	1	0	1	1	1	1
15	1	1	1	1	1	1	1
16	1	1	1	1	1	1	1
17	1	1	1	1	1	1	1
18	1	1	1	1	1	1	1
19	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0

Figure 38. Matrix of available roadway occupancy hours by activity generated from default descriptions of start and finish hour for each activity.

TRAFFIC WARRANTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE

V/C RATIO	SPEED (MPH) 1	2	3	4	5
0.0	45.00	45.00	45.00	40.50	54.00
0.10	44.64	44.64	44.64	40.14	53.64
0.20	44.28	44.28	44.28	39.78	53.28
0.30	43.92	43.92	43.92	39.42	52.92
0.40	43.56	43.56	43.56	39.06	52.56
0.50	43.20	43.20	43.20	38.70	52.20
0.60	42.84	42.84	42.84	38.34	51.84
0.70	42.48	42.48	42.48	37.98	51.48
0.80	42.12	42.12	42.12	37.62	51.12
0.90	41.76	41.76	41.76	37.26	50.76
1.00	31.56	31.56	25.73	15.53	35.00

Figure 39. Program generated speed matrix for 8-lane divided freeway where columns 1, 2 and 3 mean 1, 2 and 3 lanes open to motorist, 4 is the detour and 5 is all freeway lanes open.

TRAFFIC WARRANTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE

RANDOM ARRAYS

NO	FULL DEPTH	PARTIAL	LOCATION
1	22.1957	3.4607	0.0002
21	10.7735	34.9453	0.0205
41	7.4644	15.7659	0.0321
61	15.6064	9.7195	0.0488
81	21.8374	9.7335	0.0666
101	19.0178	27.3315	0.0854
121	16.1656	1.9273	0.1053
141	15.2785	3.5399	0.1192
161	9.0736	4.9414	0.1366
181	17.8889	3.6328	0.1507
201	20.6576	1.1136	0.1639
221	10.9401	5.4741	0.1771
241	10.2549	8.6569	0.2006
261	21.4244	2.9995	0.2143
281	17.5869	1.5049	0.2392
301	13.3273	3.4565	0.2544
321	7.9081	16.6393	0.2718
341	13.2464	5.2489	0.2942
361	14.6518	1.7878	0.3145
381	13.5946	10.6343	0.3356
401	16.0640	16.8560	0.3552
421	34.7477	7.7640	0.3752
441	19.6121	1.2377	0.4025
461	12.9400	2.0481	0.4215
481	10.6737	34.0548	0.4404
501	15.9803	34.7287	0.4576
521	13.4686	5.3819	0.4813
541	27.3619	0.6366	0.4919
561	8.8369	0.7089	0.5059
581	16.5965	13.6639	0.5258
601	14.4446	33.3176	0.5573
621	28.1268	3.9763	0.5836
641	11.5515	11.8086	0.5990
661	15.0399	2.3458	0.6281
681	23.6066	1.9978	0.6543
701	16.1769	15.3502	0.6936
721	13.4867	4.1222	0.7120
741	13.4040	6.2810	0.7372
761	11.4030	0.9865	0.7673
781	24.2025	6.4318	0.7900
801	14.6613	1.8260	0.8106
821	11.5267	34.7818	0.8236
841	16.0544	5.9746	0.8430
861	13.8687	25.2802	0.8615
881	20.5272	5.6139	0.8842
901	31.0268	2.4407	0.9033
921	17.6807	5.3924	0.9251
941	36.3356	28.6285	0.9471
961	24.1160	12.9975	0.9648
981	22.7044	0.5225	0.9799

Figure 40. Sample of 1000 random full depth and partial depth portland cement concrete patch sizes and random locations.

TRAFFIC WARRANTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE

HOURLY DISTRIBUTION OF TRAFFIC

INITIAL YEAR:

	AM PEAK DIRECTION							PM PEAK DIRECTION						
HOUR	WORK	SC-REC	PR BUS	VAC.	SCHOOL	COM.	ALL	WORK	SC-REC	PR BUS	VAC.	SCHOOL	COM.	ALL
1	0.071	0.750	0.030	0.005	0.0	0.144	0.009	0.410	0.456	0.019	0.003	0.025	0.087	0.015
2	0.0	0.656	0.0	0.011	0.0	0.333	0.004	0.320	0.426	0.0	0.007	0.031	0.215	0.006
3	0.130	0.371	0.0	0.011	0.0	0.488	0.003	0.364	0.260	0.0	0.008	0.026	0.341	0.004
4	0.714	0.037	0.0	0.006	0.0	0.243	0.005	0.311	0.089	0.0	0.014	0.0	0.587	0.002
5	0.830	0.0	0.0	0.001	0.0	0.169	0.010	0.156	0.0	0.0	0.004	0.0	0.840	0.002
6	0.888	0.007	0.0	0.000	0.0	0.105	0.027	0.095	0.054	0.0	0.002	0.0	0.848	0.003
7	0.913	0.010	0.004	0.000	0.005	0.069	0.078	0.131	0.130	0.037	0.002	0.0	0.730	0.007
8	0.716	0.009	0.006	0.000	0.187	0.081	0.068	0.188	0.072	0.054	0.003	0.0	0.683	0.010
9	0.366	0.015	0.027	0.001	0.484	0.107	0.063	0.298	0.066	0.118	0.003	0.040	0.475	0.014
10	0.366	0.050	0.191	0.001	0.238	0.154	0.041	0.072	0.112	0.430	0.003	0.036	0.347	0.018
11	0.289	0.073	0.442	0.001	0.063	0.132	0.047	0.049	0.101	0.618	0.002	0.045	0.184	0.033
12	0.317	0.067	0.449	0.001	0.026	0.136	0.045	0.120	0.084	0.560	0.001	0.063	0.172	0.036
13	0.417	0.071	0.308	0.001	0.076	0.127	0.045	0.204	0.082	0.357	0.001	0.207	0.148	0.039
14	0.368	0.095	0.369	0.001	0.038	0.129	0.048	0.126	0.124	0.480	0.001	0.101	0.168	0.037
15	0.326	0.093	0.408	0.001	0.047	0.126	0.051	0.149	0.106	0.466	0.001	0.135	0.144	0.044
16	0.257	0.134	0.428	0.001	0.021	0.160	0.045	0.257	0.090	0.288	0.001	0.257	0.108	0.067
17	0.166	0.140	0.495	0.001	0.033	0.166	0.046	0.074	0.045	0.161	0.000	0.066	0.054	0.141
18	0.110	0.141	0.500	0.001	0.121	0.127	0.051	0.068	0.043	0.172	0.000	0.067	0.044	0.148
19	0.073	0.252	0.463	0.001	0.146	0.066	0.064	0.395	0.182	0.335	0.001	0.039	0.048	0.088
20	0.081	0.403	0.470	0.001	0.058	0.037	0.085	0.121	0.371	0.432	0.001	0.040	0.034	0.092
21	0.127	0.432	0.400	0.001	0.043	0.037	0.062	0.087	0.368	0.392	0.001	0.121	0.031	0.072
22	0.068	0.569	0.285	0.001	0.024	0.053	0.039	0.174	0.401	0.201	0.001	0.186	0.037	0.055
23	0.053	0.746	0.113	0.002	0.0	0.086	0.025	0.163	0.513	0.078	0.001	0.185	0.059	0.036
24	0.079	0.810	0.027	0.002	0.009	0.073	0.021	0.246	0.601	0.020	0.001	0.077	0.055	0.028
YEARLY INCREMENT:														
1	0.000	0.003	0.000	0.000	0.0	-0.004	-0.000	0.001	0.001	0.000	0.000	0.000	-0.002	0.000
2	0.0	0.007	0.0	0.000	0.0	-0.007	-0.000	0.002	0.003	0.0	0.000	0.000	-0.005	-0.000
3	0.002	0.007	0.0	0.000	0.0	-0.009	-0.000	0.004	0.003	0.0	0.000	0.000	-0.007	-0.000
4	0.003	0.000	0.0	0.000	0.0	-0.006	-0.000	0.007	0.002	0.0	0.000	0.0	-0.010	-0.000
5	0.004	0.0	0.0	0.000	0.0	-0.004	-0.000	0.007	0.0	0.0	0.000	0.0	-0.007	-0.000
6	0.003	0.000	0.0	0.000	0.0	-0.003	-0.000	0.004	0.002	0.0	0.000	0.0	-0.007	-0.000
7	0.002	0.000	0.000	0.000	0.000	-0.002	0.000	0.004	0.003	0.001	0.000	0.0	-0.009	-0.000
8	0.002	0.000	0.000	0.000	0.000	-0.002	0.000	0.006	0.002	0.002	0.000	0.0	-0.009	-0.000
9	0.001	0.000	0.000	0.000	0.001	-0.003	-0.000	0.005	0.001	0.002	0.000	0.001	-0.009	-0.000
10	0.002	0.000	0.001	0.000	0.001	-0.004	-0.000	0.001	0.001	0.005	0.000	0.000	-0.008	-0.000
11	0.001	0.000	0.002	0.000	0.000	-0.003	-0.000	0.000	0.001	0.003	0.000	0.000	-0.005	-0.000
12	0.001	0.000	0.002	0.000	0.000	-0.003	-0.000	0.001	0.000	0.003	0.000	0.000	-0.004	-0.000
13	0.002	0.000	0.001	0.000	0.000	-0.003	-0.000	0.001	0.000	0.002	0.000	0.001	-0.004	-0.000
14	0.001	0.000	0.001	0.000	0.000	-0.003	-0.000	0.001	0.001	0.002	0.000	0.001	-0.004	-0.000
15	0.001	0.000	0.001	0.000	0.000	-0.003	-0.000	0.001	0.000	0.002	0.000	0.001	-0.004	-0.000
16	0.001	0.001	0.002	0.000	0.000	-0.004	-0.000	0.001	0.000	0.001	0.000	0.001	-0.003	-0.000
17	0.001	0.001	0.002	0.000	0.000	-0.004	-0.000	0.001	0.000	0.000	0.000	0.000	-0.001	0.000
18	0.000	0.001	0.002	0.000	0.000	-0.003	-0.000	0.001	0.000	0.000	0.000	0.000	-0.001	0.000
19	0.000	0.000	0.001	0.000	0.000	-0.002	0.000	0.001	0.000	0.000	0.000	0.000	-0.001	0.000
20	0.000	0.000	0.000	0.000	0.000	-0.001	0.000	0.000	0.000	0.000	0.000	0.000	-0.001	0.000
21	0.000	0.000	0.000	0.000	0.000	-0.001	0.000	0.000	0.000	0.000	0.000	0.000	-0.001	0.000
22	0.000	0.001	0.000	0.000	0.000	-0.001	0.000	0.000	0.000	0.000	0.000	0.000	-0.001	0.000
23	0.000	0.002	0.000	0.000	0.0	-0.002	0.000	0.000	0.001	0.000	0.000	0.000	-0.002	0.000
24	0.000	0.002	0.000	0.000	0.000	-0.002	0.000	0.000	0.001	0.000	0.000	0.000	-0.001	0.000

Figure 41. Matrix of default initial year traffic distributions and yearly increments. The columns labeled "ALL" indicate the daily distribution of all traffic while the other columns present the distribution between the trip purposes for an hour.

TRAFFIC WARRANTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE

MOTORIST COSTS

	FUEL $/GALLON	OIL $/QUART	TREAD WEAR $/.001 INCH
PASSENGER CARS	0.40	0.80	0.10
COMMERCIAL VEHICLES	0.30	0.40	0.20

TOTAL OPERATING COSTS IN DOLLARS/1,000 VEHICLE HOURS:

SPEED	PASSENGER CARS	COMMERCIAL VEHICLES	SPEED	PASSENGER CARS	COMMERCIAL VEHICLES
1	312.	2266.	33	2010.	6000.
2	379.	2287.	34	2070.	6191.
3	439.	2315.	35	2130.	6387.
4	495.	2355.	36	2191.	6587.
5	549.	2406.	37	2253.	6792.
6	601.	2467.	38	2316.	7001.
7	653.	2536.	39	2380.	7216.
8	703.	2612.	40	2445.	7435.
9	753.	2695.	41	2511.	7659.
10	802.	2784.	42	2578.	7889.
11	852.	2878.	43	2646.	8124.
12	901.	2976.	44	2716.	8365.
13	950.	3078.	45	2786.	8611.
14	999.	3184.	46	2858.	8864.
15	1049.	3294.	47	2931.	9123.
16	1098.	3406.	48	3005.	9388.
17	1148.	3522.	49	3081.	9661.
18	1198.	3640.	50	3158.	9940.
19	1249.	3760.	51	3236.	10227.
20	1300.	3884.	52	3317.	10522.
21	1351.	4023.	53	3398.	10826.
22	1403.	4166.	54	3482.	11138.
23	1455.	4313.	55	3567.	11459.
24	1507.	4463.	56	3654.	11790.
25	1561.	4618.	57	3743.	12132.
26	1615.	4777.	58	3834.	12485.
27	1669.	4939.	59	3927.	12850.
28	1724.	5106.	60	4022.	13228.
29	1780.	5277.	61	4120.	13621.
30	1836.	5451.	62	4220.	14028.
31	1894.	5630.	63	4322.	14451.
32	1952.	5813.	64	4428.	14893.

Figure 42. Matrix of hourly operation costs generated by the program using defaults for pavement alignment, vehicle composition and unit costs. The default unit costs are shown.

TRAFFIC WARRANTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE

MOTORIST COSTS

AVERAGE INCOME LEVEL OF MOTORIST..... 4
OCCUPANTS PER VEHICLE ON WORK TRIPS..... 1.4
OCCUPANTS PER VEHICLE ON SCHOOL TRIPS..... 2.5

VALUE OF TIME SAVED IN DOLLARS/HOUR:

COMMERCIAL VEHICLES = 8.72

MINUTES SAVED	WORK	SOC-REC	PER BUS	VAC.	SCHOOL	MINUTES SAVED	WORK	SOC-REC	PER BUS	VAC.	SCHOOL
1	0.33	0.03	0.00	3.86	0.01	21	3.06	1.84	3.96	2.95	2.24
2	0.33	0.03	0.00	3.86	0.01	22	3.05	1.84	4.23	2.96	2.24
3	0.33	0.03	0.00	3.86	0.01	23	3.04	1.84	4.48	2.97	2.24
4	0.33	0.03	0.00	3.86	0.01	24	3.03	1.84	4.71	2.98	2.24
5	0.33	0.03	0.00	3.86	0.01	25	3.03	1.84	4.92	2.99	2.24
6	0.48	0.05	0.01	3.55	0.01	26	3.02	1.84	5.11	3.00	2.24
7	0.69	0.08	0.01	3.34	0.01	27	3.02	1.84	5.29	3.02	2.24
8	0.98	0.12	0.02	3.21	0.02	28	3.01	1.84	5.46	3.03	2.24
9	1.33	0.19	0.05	3.11	0.03	29	3.01	1.84	5.61	3.04	2.24
10	1.72	0.30	0.11	3.05	0.05	30	3.00	1.84	5.75	3.05	2.24
11	2.11	0.45	0.22	3.01	0.08	31	3.00	1.84	5.75	3.05	2.24
12	2.48	0.65	0.42	2.99	0.13	32	3.00	1.84	5.75	3.05	2.24
13	2.80	0.91	0.74	2.98	0.21	33	3.00	1.84	5.75	3.05	2.24
14	3.09	1.19	1.16	2.97	0.33	34	2.99	1.84	5.75	3.05	2.24
15	3.19	1.38	1.61	2.96	0.52	35	2.99	1.84	5.75	3.05	2.24
16	3.16	1.47	2.08	2.95	0.78	36	2.99	1.84	5.75	3.05	2.24
17	3.13	1.57	2.52	2.94	1.09	37	2.99	1.84	5.75	3.05	2.24
18	3.11	1.66	2.94	2.94	1.45	38	2.99	1.84	5.75	3.05	2.24
19	3.09	1.75	3.31	2.94	1.84	39	2.98	1.84	5.75	3.05	2.24
20	3.07	1.84	3.65	2.95	2.24	40	2.98	1.84	5.75	3.05	2.24

Figure 43. Matrix of the value of time generated by the program. All of the program defaults used in time algorithm are shown.

APPENDIX B

Computer Output for the Demonstration Run Using Program EAROMAR

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 1 DIRECTION AM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	1	$ 108	$ 595	$ 24	2	$ 524	317	3	$ 1251
2	2	$ 108	$ 22	$ 9	1	$ 0	0	0	$ 139
2	3	$ 108	$ 12	$ 8	0	$ 0	0	0	$ 128
2	4	$ 108	$ 4	$ 8	0	$ 0	0	0	$ 120
2	5	$ 108	$ 24	$ 16	1	$ 0	0	0	$ 148
3	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 5	$ 0	$ 0	0	$ 19	9	0	$ 24
5	2	$ 5	$ 0	$ 0	0	$ 0	0	0	$ 5
5	3	$ 5	$ 0	$ 0	0	$ 0	0	0	$ 5
5	4	$ 5	$ 0	$ 0	0	$ 0	0	0	$ 5
5	5	$ 5	$ 0	$ 0	0	$ 0	0	0	$ 5
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 113	$ 595	$ 24	2	$ 543	326	3	$ 1275
TOTAL	2	$ 113	$ 22	$ 9	1	$ 0	0	0	$ 144
TOTAL	3	$ 113	$ 12	$ 8	0	$ 0	0	0	$ 133
TOTAL	4	$ 113	$ 4	$ 8	0	$ 0	0	0	$ 125
TOTAL	5	$ 113	$ 24	$ 16	1	$ 0	0	0	$ 153

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 1 DIRECTION PM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	1	$ 108	$ 281	$ 9	1	$ 136	29	0	$ 534
2	2	$ 108	$ 35	$ 2	0	$ 0	0	0	$ 145
2	3	$ 108	$ 28	$ 2	0	$ 0	0	0	$ 138
2	4	$ 108	$ 8	$ 0	0	$ 0	0	0	$ 116
2	5	$ 108	$ 56	$ 4	0	$ 0	0	0	$ 168
3	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 5	$ 0	$ 0	0	$ 0	0	0	$ 5
5	2	$ 5	$ 0	$ 0	0	$ 0	0	0	$ 5
5	3	$ 5	$ 0	$ 0	0	$ 0	0	0	$ 5
5	4	$ 5	$ 0	$ 0	0	$ 0	0	0	$ 5
5	5	$ 5	$ 0	$ 0	0	$ 0	0	0	$ 5
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 113	$ 281	$ 9	1	$ 136	29	0	$ 539
TOTAL	2	$ 113	$ 35	$ 2	0	$ 0	0	0	$ 150
TOTAL	3	$ 113	$ 28	$ 2	0	$ 0	0	0	$ 143
TOTAL	4	$ 113	$ 8	$ 0	0	$ 0	0	0	$ 121
TOTAL	5	$ 113	$ 56	$ 4	0	$ 0	0	0	$ 173

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 2 DIRECTION AM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	1	$ 238	$ 1821	$ 68	8	$ 1186	674	5	$ 3313
2	2	$ 239	$ 148	$ 21	2	$ 112	120	0	$ 520
2	3	$ 240	$ 88	$ 24	2	$ 0	0	0	$ 352
2	4	$ 240	$ 28	$ 24	2	$ 0	0	0	$ 292
2	5	$ 238	$ 175	$ 47	5	$ 0	0	0	$ 460
3	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 13	$ 53	$ 3	0	$ 67	32	0	$ 136
5	2	$ 13	$ 3	$ 0	0	$ 5	5	0	$ 21
5	3	$ 13	$ 0	$ 0	0	$ 0	0	0	$ 13
5	4	$ 13	$ 0	$ 0	0	$ 0	0	0	$ 13
5	5	$ 13	$ 0	$ 0	0	$ 0	0	0	$ 13
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 251	$ 1874	$ 71	8	$ 1253	706	5	$ 3449
TOTAL	2	$ 252	$ 151	$ 21	2	$ 117	125	0	$ 541
TOTAL	3	$ 253	$ 88	$ 24	2	$ 0	0	0	$ 365
TOTAL	4	$ 253	$ 28	$ 24	2	$ 0	0	0	$ 305
TOTAL	5	$ 251	$ 175	$ 47	5	$ 0	0	0	$ 473

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 2 DIRECTION PM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	1	$ 238	$ 841	$ 26	3	$ 377	112	1	$ 1482
2	2	$ 239	$ 149	$ 9	1	$ 0	0	0	$ 397
2	3	$ 240	$ 142	$ 8	0	$ 0	0	0	$ 390
2	4	$ 240	$ 80	$ 8	0	$ 0	0	0	$ 328
2	5	$ 238	$ 282	$ 15	1	$ 0	0	0	$ 535
3	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 13	$ 0	$ 0	0	$ 6	0	0	$ 19
5	2	$ 13	$ 0	$ 0	0	$ 0	0	0	$ 13
5	3	$ 13	$ 0	$ 0	0	$ 0	0	0	$ 13
5	4	$ 13	$ 0	$ 0	0	$ 0	0	0	$ 13
5	5	$ 13	$ 0	$ 0	0	$ 0	0	0	$ 13
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 251	$ 841	$ 26	3	$ 383	112	1	$ 1501
TOTAL	2	$ 252	$ 149	$ 9	1	$ 0	0	0	$ 410
TOTAL	3	$ 253	$ 142	$ 8	0	$ 0	0	0	$ 403
TOTAL	4	$ 253	$ 80	$ 8	0	$ 0	0	0	$ 341
TOTAL	5	$ 251	$ 282	$ 15	1	$ 0	0	0	$ 548

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 1 DIRECTION COMBINED

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	1	$ 216	$ 876	$ 33	3	$ 660	346	3	$ 1785
2	2	$ 216	$ 57	$ 11	1	$ 0	0	0	$ 284
2	3	$ 216	$ 40	$ 10	0	$ 0	0	0	$ 266
2	4	$ 216	$ 12	$ 8	0	$ 0	0	0	$ 236
2	5	$ 216	$ 80	$ 20	1	$ 0	0	0	$ 316
3	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 10	$ 0	$ 0	0	$ 19	9	0	$ 29
5	2	$ 10	$ 0	$ 0	0	$ 0	0	0	$ 10
5	3	$ 10	$ 0	$ 0	0	$ 0	0	0	$ 10
5	4	$ 10	$ 0	$ 0	0	$ 0	0	0	$ 10
5	5	$ 10	$ 0	$ 0	0	$ 0	0	0	$ 10
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 226	$ 876	$ 33	3	$ 679	355	3	$ 1814
TOTAL	2	$ 226	$ 57	$ 11	1	$ 0	0	0	$ 294
TOTAL	3	$ 226	$ 40	$ 10	0	$ 0	0	0	$ 276
TOTAL	4	$ 226	$ 12	$ 8	0	$ 0	0	0	$ 246
TOTAL	5	$ 226	$ 80	$ 20	1	$ 0	0	0	$ 326
MINIMUM COSTS		$ 226	$ 12	$ 8	0	$ 0	0	0	$ 246
DISCOUNTED COSTS		$ 209	$ 11	$ 7	0	$ 0	0	0	$ 227
ACCUMULATED COSTS		$ 209	$ 11	$ 7	0	$ 0	0	0	$ 227

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 2 DIRECTION COMBINED

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	1	$ 476	$ 2662	$ 94	11	$ 1563	786	6	$ 4795
2	2	$ 478	$ 297	$ 30	3	$ 112	120	0	$ 917
2	3	$ 480	$ 230	$ 32	2	$ 0	0	0	$ 742
2	4	$ 480	$ 108	$ 32	2	$ 0	0	0	$ 620
2	5	$ 476	$ 457	$ 62	6	$ 0	0	0	$ 995
3	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 26	$ 53	$ 3	0	$ 73	32	0	$ 155
5	2	$ 26	$ 3	$ 0	0	$ 5	5	0	$ 34
5	3	$ 26	$ 0	$ 0	0	$ 0	0	0	$ 26
5	4	$ 26	$ 0	$ 0	0	$ 0	0	0	$ 26
5	5	$ 26	$ 0	$ 0	0	$ 0	0	0	$ 26
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 502	$ 2715	$ 97	11	$ 1636	818	6	$ 4950
TOTAL	2	$ 504	$ 300	$ 30	3	$ 117	125	0	$ 951
TOTAL	3	$ 506	$ 230	$ 32	2	$ 0	0	0	$ 768
TOTAL	4	$ 506	$ 108	$ 32	2	$ 0	0	0	$ 646
TOTAL	5	$ 502	$ 457	$ 62	6	$ 0	0	0	$ 1021
MINIMUM COSTS		$ 506	$ 108	$ 32	2	$ 0	0	0	$ 646
DISCOUNTED COSTS		$ 433	$ 92	$ 27	2	$ 0	0	0	$ 553
ACCUMULATED COSTS		$ 642	$ 103	$ 34	2	$ 0	0	0	$ 780

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 3 DIRECTION AM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	1	$ 520	$ 4218	$ 172	20	$ 1004	879	7	$ 5914
2	2	$ 528	$ 383	$ 48	5	$ 93	94	0	$ 1052
2	3	$ 529	$ 318	$ 64	7	$ 0	0	0	$ 911
2	4	$ 534	$ 252	$ 64	7	$ 0	0	0	$ 850
2	5	$ 520	$ 627	$ 126	14	$ 0	0	0	$ 1273
3	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 18	$ 75	$ 4	0	$ 13	15	0	$ 110
5	2	$ 18	$ 2	$ 0	0	$ 1	1	0	$ 21
5	3	$ 18	$ 0	$ 0	0	$ 0	0	0	$ 18
5	4	$ 18	$ 0	$ 0	0	$ 0	0	0	$ 18
5	5	$ 18	$ 0	$ 0	0	$ 0	0	0	$ 18
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 538	$ 4293	$ 176	20	$ 1017	894	7	$ 6024
TOTAL	2	$ 546	$ 385	$ 48	5	$ 94	95	0	$ 1073
TOTAL	3	$ 547	$ 318	$ 64	7	$ 0	0	0	$ 929
TOTAL	4	$ 552	$ 252	$ 64	7	$ 0	0	0	$ 868
TOTAL	5	$ 538	$ 627	$ 126	14	$ 0	0	0	$ 1291

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 3 DIRECTION PM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	1	$ 520	$ 2231	$ 66	7	$ 1039	373	3	$ 3856
2	2	$ 528	$ 448	$ 24	2	$ 12	11	0	$ 1012
2	3	$ 529	$ 416	$ 24	2	$ 0	0	0	$ 969
2	4	$ 534	$ 360	$ 24	2	$ 0	0	0	$ 918
2	5	$ 520	$ 820	$ 47	5	$ 0	0	0	$ 1387
3	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 18	$ 11	$ 1	0	$ 16	0	0	$ 46
5	2	$ 18	$ 2	$ 0	0	$ 0	0	0	$ 20
5	3	$ 18	$ 0	$ 0	0	$ 0	0	0	$ 18
5	4	$ 18	$ 0	$ 0	0	$ 0	0	0	$ 18
5	5	$ 18	$ 0	$ 0	0	$ 0	0	0	$ 18
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 538	$ 2242	$ 67	7	$ 1055	373	3	$ 3902
TOTAL	2	$ 546	$ 450	$ 24	2	$ 12	11	0	$ 1032
TOTAL	3	$ 547	$ 416	$ 24	2	$ 0	0	0	$ 987
TOTAL	4	$ 552	$ 360	$ 24	2	$ 0	0	0	$ 936
TOTAL	5	$ 538	$ 820	$ 47	5	$ 0	0	0	$ 1405

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 4 DIRECTION AM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	1	$ 1126	$ 10452	$ 420	49	$ 2391	2151	17	$ 14389
2	2	$ 1150	$ 834	$ 124	14	$ 0	0	0	$ 2108
2	3	$ 1152	$ 834	$ 160	18	$ 0	0	0	$ 2146
2	4	$ 1171	$ 744	$ 164	19	$ 0	0	0	$ 2079
2	5	$ 1126	$ 1649	$ 316	37	$ 0	0	0	$ 3091
3	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 19	$ 105	$ 5	0	$ 20	19	0	$ 149
5	2	$ 19	$ 2	$ 0	0	$ 0	0	0	$ 21
5	3	$ 19	$ 0	$ 2	0	$ 0	0	0	$ 21
5	4	$ 19	$ 0	$ 0	0	$ 0	0	0	$ 19
5	5	$ 19	$ 0	$ 4	0	$ 0	0	0	$ 23
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 1145	$ 10557	$ 425	49	$ 2411	2170	17	$ 14538
TOTAL	2	$ 1169	$ 836	$ 124	14	$ 0	0	0	$ 2129
TOTAL	3	$ 1171	$ 834	$ 162	18	$ 0	0	0	$ 2167
TOTAL	4	$ 1190	$ 744	$ 164	19	$ 0	0	0	$ 2098
TOTAL	5	$ 1145	$ 1649	$ 320	37	$ 0	0	0	$ 3114

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 4 DIRECTION PM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	1	$ 1126	$ 5911	$ 177	20	$ 2591	1057	7	$ 9805
2	2	$ 1167	$ 1165	$ 130	15	$ 65	49	0	$ 2527
2	3	$ 1152	$ 1066	$ 60	7	$ 0	0	0	$ 2278
2	4	$ 1171	$ 1044	$ 60	7	$ 0	0	0	$ 2275
2	5	$ 1126	$ 2108	$ 118	13	$ 0	0	0	$ 3352
3	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 19	$ 21	$ 1	0	$ 21	0	0	$ 62
5	2	$ 19	$ 4	$ 1	0	$ 4	3	0	$ 28
5	3	$ 19	$ 2	$ 0	0	$ 0	0	0	$ 21
5	4	$ 19	$ 0	$ 0	0	$ 0	0	0	$ 19
5	5	$ 19	$ 4	$ 0	0	$ 0	0	0	$ 23
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 1145	$ 5932	$ 178	20	$ 2612	1057	7	$ 9867
TOTAL	2	$ 1186	$ 1169	$ 131	15	$ 69	52	0	$ 2555
TOTAL	3	$ 1171	$ 1068	$ 60	7	$ 0	0	0	$ 2299
TOTAL	4	$ 1190	$ 1044	$ 60	7	$ 0	0	0	$ 2294
TOTAL	5	$ 1145	$ 2112	$ 118	13	$ 0	0	0	$ 3375

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 3 DIRECTION COMBINED

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	1	$ 1040	$ 6449	$ 238	27	$ 2043	1252	10	$ 9770
2	2	$ 1056	$ 831	$ 72	7	$ 105	105	0	$ 2064
2	3	$ 1058	$ 734	$ 88	9	$ 0	0	0	$ 1880
2	4	$ 1068	$ 612	$ 88	9	$ 0	0	0	$ 1768
2	5	$ 1040	$ 1447	$ 173	19	$ 0	0	0	$ 2660
3	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 36	$ 86	$ 5	0	$ 29	15	0	$ 156
5	2	$ 36	$ 4	$ 0	0	$ 1	1	0	$ 41
5	3	$ 36	$ 0	$ 0	0	$ 0	0	0	$ 36
5	4	$ 36	$ 0	$ 0	0	$ 0	0	0	$ 36
5	5	$ 36	$ 0	$ 0	0	$ 0	0	0	$ 36
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 1076	$ 6535	$ 243	27	$ 2072	1267	10	$ 9926
TOTAL	2	$ 1092	$ 835	$ 72	7	$ 106	106	0	$ 2105
TOTAL	3	$ 1094	$ 734	$ 88	9	$ 0	0	0	$ 1916
TOTAL	4	$ 1104	$ 612	$ 88	9	$ 0	0	0	$ 1804
TOTAL	5	$ 1076	$ 1447	$ 173	19	$ 0	0	0	$ 2696
MINIMUM COSTS		$ 1104	$ 612	$ 88	9	$ 0	0	0	$ 1804
DISCOUNTED COSTS		$ 876	$ 485	$ 69	9	$ 0	0	0	$ 1432
ACCUMULATED COSTS		$ 1518	$ 588	$ 103	11	$ 0	0	0	$ 2212

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 4 DIRECTION COMBINED

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	1	$ 2252	$ 16363	$ 597	69	$ 4982	3208	24	$ 24194
2	2	$ 2317	$ 1999	$ 254	29	$ 85	49	0	$ 4635
2	3	$ 2304	$ 1900	$ 220	25	$ 0	0	0	$ 4424
2	4	$ 2342	$ 1788	$ 224	26	$ 0	0	0	$ 4354
2	5	$ 2252	$ 3757	$ 434	50	$ 0	0	0	$ 6443
3	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 38	$ 126	$ 6	0	$ 41	19	0	$ 211
5	2	$ 38	$ 6	$ 1	0	$ 4	3	0	$ 49
5	3	$ 38	$ 2	$ 2	0	$ 0	0	0	$ 42
5	4	$ 38	$ 0	$ 0	0	$ 0	0	0	$ 38
5	5	$ 38	$ 4	$ 4	0	$ 0	0	0	$ 46
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 2290	$ 16489	$ 603	69	$ 5023	3227	24	$ 24405
TOTAL	2	$ 2355	$ 2005	$ 255	29	$ 69	52	0	$ 4684
TOTAL	3	$ 2342	$ 1902	$ 222	25	$ 0	0	0	$ 4466
TOTAL	4	$ 2380	$ 1788	$ 224	26	$ 0	0	0	$ 4392
TOTAL	5	$ 2290	$ 3761	$ 438	50	$ 0	0	0	$ 6489
MINIMUM COSTS		$ 2380	$ 1788	$ 224	26	$ 0	0	0	$ 4392
DISCOUNTED COSTS		$ 1749	$ 1314	$ 164	26	$ 0	0	0	$ 3228
ACCUMULATED COSTS		$ 3267	$ 1902	$ 267	37	$ 0	0	0	$ 5440

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 5 DIRECTION AM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	1	$ 2304	$ 23549	$ 942	110	$ 4793	4714	33	$ 31588
2	2	$ 2531	$ 2382	$ 319	37	$ 616	543	0	$ 5848
2	3	$ 2476	$ 2102	$ 382	44	$ 0	0	0	$ 4960
2	4	$ 2529	$ 2000	$ 400	47	$ 0	0	0	$ 4929
2	5	$ 2304	$ 3986	$ 724	85	$ 0	0	0	$ 7014
3	1	$ 56	$ 42	$ 2	0	$ 77	55	0	$ 177
3	2	$ 56	$ 14	$ 2	0	$ 0	0	0	$ 72
3	3	$ 56	$ 14	$ 2	0	$ 0	0	0	$ 72
3	4	$ 56	$ 0	$ 0	0	$ 0	0	0	$ 56
3	5	$ 56	$ 28	$ 4	0	$ 0	0	0	$ 88
4	1	$ 10548	$ 86331	$ 3282	386	$ 39857	23590	142	$ 140018
4	2	$ 13149	$ 11838	$ 1179	138	$ 8156	7037	15	$ 34322
4	3	$ 10681	$ 6326	$ 1230	144	$ 3996	4018	14	$ 22233
4	4	$ 10947	$ 5380	$ 1292	152	$ 4936	4908	26	$ 22555
4	5	$ 10548	$ 12390	$ 2409	283	$ 7826	7869	29	$ 33173
5	1	$ 18	$ 114	$ 6	0	$ 21	23	0	$ 159
5	2	$ 18	$ 1	$ 1	0	$ 0	0	0	$ 20
5	3	$ 18	$ 0	$ 2	0	$ 0	0	0	$ 20
5	4	$ 18	$ 0	$ 0	0	$ 0	0	0	$ 18
5	5	$ 18	$ 0	$ 4	0	$ 0	0	0	$ 22
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 12926	$ 110036	$ 4232	496	$ 44748	28382	175	$ 171942
TOTAL	2	$ 15754	$ 14235	$ 1501	175	$ 8772	7580	15	$ 40262
TOTAL	3	$ 13231	$ 8442	$ 1616	188	$ 3996	4018	14	$ 27285
TOTAL	4	$ 13550	$ 7380	$ 1692	199	$ 4936	4908	26	$ 27558
TOTAL	5	$ 12926	$ 16404	$ 3141	368	$ 7826	7869	29	$ 40297

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 5 DIRECTION PM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	1	$ 2304	$ 15378	$ 465	54	$ 6853	3234	19	$ 25000
2	2	$ 2505	$ 2898	$ 147	17	$ 328	240	0	$ 5878
2	3	$ 2476	$ 2624	$ 156	18	$ 0	0	0	$ 5256
2	4	$ 2529	$ 2556	$ 152	17	$ 0	0	0	$ 5237
2	5	$ 2304	$ 4976	$ 295	34	$ 0	0	0	$ 7575
3	1	$ 56	$ 143	$ 7	0	$ 5233	1448	6	$ 5439
3	2	$ 56	$ 68	$ 6	0	$ 996	320	1	$ 1126
3	3	$ 56	$ 42	$ 6	0	$ 64	84	0	$ 168
3	4	$ 56	$ 20	$ 4	0	$ 0	0	0	$ 80
3	5	$ 56	$ 84	$ 12	1	$ 128	168	0	$ 280
4	1	$ 10548	$ 62008	$ 1897	223	$ 27269	14208	83	$ 101722
4	2	$ 11578	$ 11412	$ 531	62	$ 4455	2363	8	$ 27976
4	3	$ 10681	$ 8808	$ 670	78	$ 3884	1964	7	$ 23843
4	4	$ 10947	$ 7836	$ 736	86	$ 5528	2620	14	$ 25047
4	5	$ 10548	$ 16859	$ 1312	154	$ 7607	3846	14	$ 36326
5	1	$ 18	$ 21	$ 1	0	$ 21	0	0	$ 61
5	2	$ 18	$ 4	$ 0	0	$ 0	0	0	$ 22
5	3	$ 18	$ 2	$ 0	0	$ 0	0	0	$ 20
5	4	$ 18	$ 0	$ 0	0	$ 0	0	0	$ 18
5	5	$ 18	$ 4	$ 0	0	$ 0	0	0	$ 22
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 12926	$ 77550	$ 2370	277	$ 39376	18890	108	$ 132222
TOTAL	2	$ 14157	$ 14382	$ 684	79	$ 5779	2923	9	$ 35002
TOTAL	3	$ 13231	$ 11276	$ 832	96	$ 3948	2048	7	$ 29287
TOTAL	4	$ 13550	$ 10412	$ 892	103	$ 5528	2620	14	$ 30382
TOTAL	5	$ 12926	$ 21923	$ 1619	189	$ 7735	4014	14	$ 44203

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 6 DIRECTION AM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 292	$ 2445	$ 66	7	$ 6130	1871	7	$ 8933
1	2	$ 294	$ 142	$ 19	2	$ 114	80	0	$ 569
1	3	$ 293	$ 120	$ 24	2	$ 0	0	0	$ 437
1	4	$ 294	$ 104	$ 24	2	$ 0	0	0	$ 422
1	5	$ 292	$ 238	$ 47	5	$ 0	0	0	$ 577
2	1	$ 3632	$ 41281	$ 1650	194	$ 8249	8402	53	$ 54812
2	2	$ 4227	$ 4604	$ 582	68	$ 1602	1411	2	$ 11015
2	3	$ 3868	$ 3752	$ 658	77	$ 0	0	0	$ 8278
2	4	$ 4115	$ 3680	$ 728	85	$ 0	0	0	$ 8523
2	5	$ 3632	$ 7136	$ 1251	147	$ 0	0	1	$ 12019
3	1	$ 112	$ 93	$ 5	0	$ 910	260	0	$ 1120
3	2	$ 112	$ 42	$ 6	0	$ 0	0	0	$ 160
3	3	$ 112	$ 42	$ 6	0	$ 0	0	0	$ 160
3	4	$ 112	$ 28	$ 4	0	$ 0	0	0	$ 144
3	5	$ 112	$ 83	$ 11	1	$ 0	0	0	$ 206
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 16	$ 114	$ 6	0	$ 21	23	0	$ 157
5	2	$ 16	$ 5	$ 1	0	$ 5	5	0	$ 27
5	3	$ 16	$ 0	$ 2	0	$ 0	0	0	$ 18
5	4	$ 16	$ 0	$ 0	0	$ 0	0	0	$ 16
5	5	$ 16	$ 0	$ 4	0	$ 0	0	0	$ 20
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 4052	$ 43933	$ 1727	201	$ 15310	10556	60	$ 65022
TOTAL	2	$ 4649	$ 4793	$ 608	70	$ 1721	1496	2	$ 11771
TOTAL	3	$ 4289	$ 3914	$ 690	79	$ 0	0	0	$ 8893
TOTAL	4	$ 4537	$ 3812	$ 756	87	$ 0	0	0	$ 9105
TOTAL	5	$ 4052	$ 7457	$ 1313	153	$ 0	0	1	$ 12822

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 6 DIRECTION PM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 292	$ 885	$ 24	2	$ 654	314	1	$ 1855
1	2	$ 294	$ 202	$ 8	0	$ 75	54	0	$ 579
1	3	$ 293	$ 146	$ 8	0	$ 0	0	0	$ 447
1	4	$ 294	$ 128	$ 8	0	$ 0	0	0	$ 430
1	5	$ 292	$ 290	$ 15	1	$ 0	0	0	$ 597
2	1	$ 3632	$ 26068	$ 805	94	$ 11993	5927	32	$ 42498
2	2	$ 4126	$ 5058	$ 270	31	$ 515	375	0	$ 9969
2	3	$ 3868	$ 4518	$ 280	32	$ 0	0	0	$ 8666
2	4	$ 4115	$ 4552	$ 280	32	$ 0	0	0	$ 8947
2	5	$ 3632	$ 8592	$ 532	62	$ 0	0	0	$ 12756
3	1	$ 112	$ 316	$ 16	1	$ 13628	3912	14	$ 14072
3	2	$ 112	$ 147	$ 15	1	$ 2805	935	3	$ 3079
3	3	$ 112	$ 134	$ 16	1	$ 996	514	1	$ 1258
3	4	$ 112	$ 104	$ 12	1	$ 60	108	0	$ 288
3	5	$ 112	$ 267	$ 31	3	$ 1991	1027	2	$ 2401
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 16	$ 18	$ 1	0	$ 28	3	0	$ 63
5	2	$ 16	$ 3	$ 0	0	$ 1	0	0	$ 20
5	3	$ 16	$ 0	$ 0	0	$ 0	0	0	$ 16
5	4	$ 16	$ 0	$ 0	0	$ 0	0	0	$ 16
5	5	$ 16	$ 0	$ 0	0	$ 0	0	0	$ 16
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 4052	$ 27287	$ 846	97	$ 26303	10156	47	$ 58488
TOTAL	2	$ 4548	$ 5410	$ 293	32	$ 3396	1364	3	$ 13647
TOTAL	3	$ 4289	$ 4798	$ 304	33	$ 996	514	1	$ 10387
TOTAL	4	$ 4537	$ 4784	$ 300	33	$ 60	108	0	$ 9681
TOTAL	5	$ 4052	$ 9149	$ 578	66	$ 1991	1027	2	$ 15770

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 5 DIRECTION COMBINED

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
1	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	1	$ 4608	$ 38927	$ 1407	164	$ 11646	7948	52	$ 56588
2	2	$ 5036	$ 5280	$ 406	54	$ 944	783	0	$ 11726
2	3	$ 4952	$ 4726	$ 538	62	$ 0	0	0	$ 10216
2	4	$ 5058	$ 4556	$ 552	64	$ 0	0	0	$ 10166
2	5	$ 4608	$ 8962	$ 1019	119	$ 0	0	0	$ 14589
3	1	$ 112	$ 185	$ 9	0	$ 5310	1503	6	$ 5616
3	2	$ 112	$ 82	$ 8	0	$ 996	320	1	$ 1198
3	3	$ 112	$ 56	$ 8	0	$ 64	84	0	$ 240
3	4	$ 112	$ 20	$ 4	0	$ 0	0	0	$ 136
3	5	$ 112	$ 112	$ 16	1	$ 128	168	0	$ 368
4	1	$ 21096	$ 148339	$ 5179	609	$ 67126	37798	225	$ 241740
4	2	$ 24727	$ 23250	$ 1710	200	$ 12611	9400	23	$ 62298
4	3	$ 21362	$ 14934	$ 1900	222	$ 7880	5982	21	$ 46076
4	4	$ 21894	$ 13216	$ 2028	238	$ 10464	7528	40	$ 47602
4	5	$ 21096	$ 29249	$ 3721	437	$ 15433	11715	43	$ 69499
5	1	$ 36	$ 135	$ 7	0	$ 42	23	0	$ 220
5	2	$ 36	$ 5	$ 1	0	$ 0	0	0	$ 42
5	3	$ 36	$ 2	$ 2	0	$ 0	0	0	$ 40
5	4	$ 36	$ 0	$ 0	0	$ 0	0	0	$ 36
5	5	$ 36	$ 4	$ 4	0	$ 0	0	0	$ 44
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 25852	$ 187586	$ 6602	773	$ 84124	47272	283	$ 304164
TOTAL	2	$ 29911	$ 28617	$ 2185	254	$ 14551	10503	24	$ 75264
TOTAL	3	$ 26462	$ 19718	$ 2448	284	$ 7944	6066	21	$ 56572
TOTAL	4	$ 27100	$ 17792	$ 2584	302	$ 10464	7528	40	$ 57940
TOTAL	5	$ 25852	$ 38327	$ 4760	557	$ 15561	11883	43	$ 84500
MINIMUM COSTS		$ 26568	$ 19510	$ 2456	286	$ 7880	5982	21	$ 56414
DISCOUNTED COSTS		$ 18081	$ 13278	$ 1671	286	$ 5363	5982	21	$ 38394
ACCUMULATED COSTS		$ 21348	$ 15180	$ 1938	323	$ 5363	5982	21	$ 43834

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 6 DIRECTION COMBINED

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 584	$ 3330	$ 90	9	$ 6784	2185	8	$ 10788
1	2	$ 588	$ 344	$ 27	2	$ 189	134	0	$ 1148
1	3	$ 586	$ 266	$ 32	2	$ 0	0	0	$ 884
1	4	$ 588	$ 232	$ 32	2	$ 0	0	0	$ 852
1	5	$ 584	$ 528	$ 62	6	$ 0	0	0	$ 1174
2	1	$ 7264	$ 67349	$ 2455	288	$ 20242	14329	85	$ 97310
2	2	$ 8353	$ 9662	$ 852	99	$ 2117	1786	2	$ 20984
2	3	$ 7736	$ 8270	$ 938	109	$ 0	0	0	$ 16944
2	4	$ 8230	$ 8232	$ 1008	117	$ 0	0	0	$ 17470
2	5	$ 7264	$ 15728	$ 1783	209	$ 0	0	1	$ 24775
3	1	$ 224	$ 409	$ 21	1	$ 14538	4172	14	$ 15192
3	2	$ 224	$ 189	$ 21	1	$ 2805	935	3	$ 3239
3	3	$ 224	$ 176	$ 22	1	$ 996	514	1	$ 1418
3	4	$ 224	$ 132	$ 16	1	$ 60	108	0	$ 432
3	5	$ 224	$ 350	$ 42	4	$ 1991	1027	2	$ 2607
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 32	$ 132	$ 7	0	$ 49	26	0	$ 220
5	2	$ 32	$ 8	$ 1	0	$ 6	5	0	$ 47
5	3	$ 32	$ 0	$ 2	0	$ 0	0	0	$ 34
5	4	$ 32	$ 0	$ 0	0	$ 0	0	0	$ 32
5	5	$ 32	$ 0	$ 4	0	$ 0	0	0	$ 36
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 8104	$ 71220	$ 2573	298	$ 41613	20712	107	$ 123510
TOTAL	2	$ 9197	$ 10203	$ 901	102	$ 5117	2860	5	$ 25418
TOTAL	3	$ 8578	$ 8712	$ 994	112	$ 996	514	1	$ 19280
TOTAL	4	$ 9074	$ 8596	$ 1056	120	$ 60	108	0	$ 18786
TOTAL	5	$ 8104	$ 16606	$ 1891	219	$ 1991	1027	3	$ 28592
MINIMUM COSTS		$ 8580	$ 8634	$ 986	112	$ 60	108	0	$ 18260
DISCOUNTED COSTS		$ 5406	$ 5440	$ 621	112	$ 37	108	0	$ 11506
ACCUMULATED COSTS		$ 26754	$ 20620	$ 2559	435	$ 5400	6090	21	$ 55340

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 7 DIRECTION AM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 1560	$ 15262	$ 385	45	$ 39208	11318	39	$ 56415
1	2	$**********	$ 184	$ 37	4	$ 0	0	0	$**********
1	3	$ 1589	$ 902	$ 134	15	$ 196	240	0	$ 2821
1	4	$ 1609	$ 736	$ 148	17	$ 0	0	0	$ 2493
1	5	$ 1560	$ 1761	$ 261	30	$ 382	468	0	$ 3964
2	1	$ 3632	$ 45552	$ 1835	215	$ 9005	9407	54	$ 60024
2	2	$**********	$ 988	$ 201	23	$ 0	0	0	$**********
2	3	$ 3868	$ 4644	$ 684	80	$ 992	1214	1	$ 10188
2	4	$ 4115	$ 3952	$ 804	94	$ 0	0	0	$ 8871
2	5	$ 3632	$ 8832	$ 1300	152	$ 1886	2308	2	$ 15650
3	1	$ 169	$ 118	$ 9	1	$ 2319	602	1	$ 2615
3	2	$ 169	$ 74	$ 10	1	$ 0	0	0	$ 253
3	3	$ 169	$ 70	$ 10	1	$ 0	0	0	$ 249
3	4	$ 169	$ 56	$ 8	0	$ 0	0	0	$ 233
3	5	$ 169	$ 139	$ 19	2	$ 0	0	0	$ 327
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 13	$ 98	$ 5	0	$ 17	20	0	$ 133
5	2	$**********	$ 0	$ 0	0	$ 0	0	0	$**********
5	3	$ 13	$ 2	$ 0	0	$ 0	2	0	$ 15
5	4	$ 13	$ 0	$ 0	0	$ 0	0	0	$ 13
5	5	$ 13	$ 4	$ 0	0	$ 0	4	0	$ 17
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 5374	$ 61030	$ 2234	261	$ 50549	21347	94	$ 119187
TOTAL	2	$**********	$ 1246	$ 248	28	$ 0	0	0	$**********
TOTAL	3	$ 5639	$ 5618	$ 828	96	$ 1188	1456	1	$ 13273
TOTAL	4	$ 5906	$ 4744	$ 960	111	$ 0	0	0	$ 11610
TOTAL	5	$ 5374	$ 10736	$ 1580	184	$ 2268	2780	2	$ 19958

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 7 DIRECTION PM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 1560	$ 5839	$ 162	19	$ 3023	1453	6	$ 10584
1	2	$ 1618	$ 1224	$ 52	6	$ 574	427	0	$ 3468
1	3	$ 1589	$ 870	$ 52	6	$ 0	0	0	$ 2511
1	4	$ 1609	$ 848	$ 52	6	$ 0	0	0	$ 2509
1	5	$ 1560	$ 1698	$ 101	11	$ 0	0	0	$ 3359
2	1	$ 3632	$ 27519	$ 880	103	$ 10435	5006	26	$ 42466
2	2	$ 4126	$ 5206	$ 290	34	$ 710	527	1	$ 10332
2	3	$ 3868	$ 4580	$ 302	35	$ 2	2	0	$ 8752
2	4	$ 4115	$ 4608	$ 304	35	$ 0	0	0	$ 9027
2	5	$ 3632	$ 8710	$ 574	67	$ 3	3	0	$ 12919
3	1	$ 169	$ 1197	$ 13	1	$ 31852	8744	23	$ 33231
3	2	$ 169	$ 469	$ 13	1	$ 8571	2594	5	$ 9222
3	3	$ 169	$ 176	$ 14	1	$ 3246	1216	1	$ 3607
3	4	$ 169	$ 136	$ 12	1	$ 244	408	0	$ 561
3	5	$ 169	$ 355	$ 27	3	$ 6491	2431	2	$ 7042
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 13	$ 16	$ 1	0	$ 22	3	0	$ 52
5	2	$ 13	$ 2	$ 0	0	$ 1	1	0	$ 16
5	3	$ 13	$ 0	$ 0	0	$ 0	0	0	$ 13
5	4	$ 13	$ 0	$ 0	0	$ 0	0	0	$ 13
5	5	$ 13	$ 0	$ 0	0	$ 0	0	0	$ 13
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 5374	$ 34571	$ 1056	123	$ 45332	15206	55	$ 86333
TOTAL	2	$ 5926	$ 6901	$ 355	41	$ 9856	3549	6	$ 23038
TOTAL	3	$ 5639	$ 5628	$ 368	42	$ 3248	1218	1	$ 14883
TOTAL	4	$ 5906	$ 5592	$ 368	42	$ 244	408	0	$ 12110
TOTAL	5	$ 5374	$ 10763	$ 702	81	$ 6494	2434	2	$ 23333

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 8 DIRECTION AM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 3760	$ 34460	$ 988	116	$ 77855	22944	78	$ 117063
1	2	$*********	$ 509	$ 103	12	$ 0	0	0	$*********
1	3	$ 4031	$ 2916	$ 340	40	$ 1646	2014	2	$ 8933
1	4	$ 4072	$ 2036	$ 412	48	$ 0	0	0	$ 6520
1	5	$ 3760	$ 5328	$ 621	73	$ 3007	3680	4	$ 12716
2	1	$ 3632	$ 50071	$ 2023	238	$ 9670	10334	54	$ 65396
2	2	$*********	$ 1065	$ 220	25	$ 0	0	0	$*********
2	3	$ 3942	$ 6090	$ 698	82	$ 3510	4300	5	$ 14240
2	4	$ 4115	$ 4260	$ 880	103	$ 0	0	0	$ 9255
2	5	$ 3632	$ 11432	$ 1310	154	$ 6589	8072	10	$ 22963
3	1	$ 225	$ 131	$ 13	1	$ 4169	1094	3	$ 4538
3	2	$ 225	$ 113	$ 16	1	$ 0	0	0	$ 354
3	3	$ 225	$ 104	$ 16	1	$ 0	0	0	$ 345
3	4	$ 225	$ 92	$ 16	1	$ 0	0	0	$ 333
3	5	$ 225	$ 208	$ 32	3	$ 0	0	0	$ 465
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 10	$ 82	$ 4	0	$ 12	17	0	$ 108
5	2	$*********	$ 0	$ 0	0	$ 0	0	0	$*********
5	3	$ 10	$ 6	$ 0	0	$ 8	8	0	$ 24
5	4	$ 10	$ 0	$ 0	0	$ 0	0	0	$ 10
5	5	$ 10	$ 12	$ 0	0	$ 16	16	0	$ 38
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 7627	$ 84744	$ 3028	355	$ 91706	34389	135	$ 187105
TOTAL	2	$*********	$ 1687	$ 339	38	$ 0	0	0	$*********
TOTAL	3	$ 8208	$ 9116	$ 1054	123	$ 5164	6322	7	$ 23542
TOTAL	4	$ 8422	$ 6388	$ 1308	152	$ 0	0	0	$ 16118
TOTAL	5	$ 7627	$ 16980	$ 1963	230	$ 9612	11768	14	$ 36182

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 8 DIRECTION PM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 3760	$ 14647	$ 440	51	$ 6943	3353	14	$ 25790
1	2	$ 4152	$ 3205	$ 144	16	$ 1864	1390	2	$ 9365
1	3	$ 3976	$ 2258	$ 144	16	$ 0	0	0	$ 6378
1	4	$ 4072	$ 2244	$ 148	17	$ 0	0	0	$ 6464
1	5	$ 3760	$ 4201	$ 267	31	$ 0	0	0	$ 8228
2	1	$ 3632	$ 29312	$ 943	110	$ 11348	5493	26	$ 45235
2	2	$ 4126	$ 5337	$ 310	36	$ 893	666	1	$ 10666
2	3	$ 3863	$ 4708	$ 324	38	$ 26	42	0	$ 8926
2	4	$ 4115	$ 4724	$ 324	38	$ 0	0	0	$ 9163
2	5	$ 3632	$ 8954	$ 616	72	$ 49	79	0	$ 13251
3	1	$ 225	$ 2094	$ 21	2	$ 52928	14247	37	$ 55268
3	2	$ 225	$ 683	$ 20	2	$ 13561	4185	8	$ 14489
3	3	$ 225	$ 242	$ 20	2	$ 5012	1826	2	$ 5499
3	4	$ 225	$ 220	$ 20	2	$ 616	752	0	$ 1081
3	5	$ 225	$ 484	$ 40	4	$ 10024	3652	4	$ 10773
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 10	$ 6	$ 1	0	$ 17	3	0	$ 34
5	2	$ 10	$ 1	$ 0	0	$ 1	1	0	$ 12
5	3	$ 10	$ 0	$ 0	0	$ 0	0	0	$ 10
5	4	$ 10	$ 0	$ 0	0	$ 0	0	0	$ 10
5	5	$ 10	$ 0	$ 0	0	$ 0	0	0	$ 10
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 7627	$ 46059	$ 1405	163	$ 71236	23096	77	$ 126327
TOTAL	2	$ 8513	$ 9226	$ 474	54	$ 16319	6242	11	$ 34532
TOTAL	3	$ 8079	$ 7208	$ 488	56	$ 5038	1868	2	$ 20813
TOTAL	4	$ 8422	$ 7188	$ 492	57	$ 616	752	0	$ 16718
TOTAL	5	$ 7627	$ 13639	$ 923	107	$ 10073	3731	4	$ 32262

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 7 DIRECTION COMBINED

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 3120	$ 21101	$ 547	64	$ 42231	12771	45	$ 66999
1	2	$*********	$ 1408	$ 89	10	$ 574	427	0	$*********
1	3	$ 3178	$ 1772	$ 186	21	$ 196	240	0	$ 5332
1	4	$ 3218	$ 1584	$ 200	23	$ 0	0	0	$ 5002
1	5	$ 3120	$ 3459	$ 362	41	$ 382	468	0	$ 7323
2	1	$ 7264	$ 73071	$ 2715	318	$ 19440	14413	80	$ 102490
2	2	$*********	$ 6194	$ 491	57	$ 710	527	1	$*********
2	3	$ 7736	$ 9224	$ 986	115	$ 994	1216	1	$ 18940
2	4	$ 8230	$ 8560	$ 1108	129	$ 0	0	0	$ 17898
2	5	$ 7264	$ 17542	$ 1874	219	$ 1889	2311	2	$ 28569
3	1	$ 338	$ 1315	$ 22	2	$ 34171	9346	24	$ 35846
3	2	$ 338	$ 543	$ 23	2	$ 8571	2594	5	$ 9475
3	3	$ 338	$ 248	$ 24	2	$ 3246	1216	1	$ 3856
3	4	$ 338	$ 192	$ 20	1	$ 244	408	0	$ 794
3	5	$ 338	$ 494	$ 46	5	$ 6491	2431	2	$ 7369
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 26	$ 114	$ 6	0	$ 39	23	0	$ 185
5	2	$*********	$ 2	$ 0	0	$ 1	1	0	$*********
5	3	$ 26	$ 2	$ 0	0	$ 0	2	0	$ 28
5	4	$ 26	$ 0	$ 0	0	$ 0	0	0	$ 26
5	5	$ 26	$ 4	$ 0	0	$ 0	4	0	$ 30
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 10748	$ 95601	$ 3290	384	$ 95881	36553	149	$ 205520
TOTAL	2	$*********	$ 8147	$ 603	69	$ 9856	3549	6	$*********
TOTAL	3	$ 11278	$ 11246	$ 1196	138	$ 4436	2674	2	$ 28156
TOTAL	4	$ 11812	$ 10336	$ 1328	153	$ 244	408	0	$ 23720
TOTAL	5	$ 10748	$ 21499	$ 2282	265	$ 8762	5214	4	$ 43291
MINIMUM COSTS		$ 11565	$ 10308	$ 1326	153	$ 246	410	0	$ 23445
DISCOUNTED COSTS		$ 6748	$ 6014	$ 773	153	$ 143	410	0	$ 13679
ACCUMULATED COSTS		$ 33502	$ 26634	$ 3332	588	$ 5543	6500	21	$ 69019

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 8 DIRECTION COMBINED

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 7520	$ 49107	$ 1428	167	$ 84798	26297	92	$ 142853
1	2	$*********	$ 3714	$ 247	28	$ 1864	1390	2	$*********
1	3	$ 8007	$ 5174	$ 484	56	$ 1646	2014	2	$ 15311
1	4	$ 8144	$ 4280	$ 560	65	$ 0	0	0	$ 12984
1	5	$ 7520	$ 9529	$ 888	104	$ 3007	3680	4	$ 20944
2	1	$ 7264	$ 79383	$ 2966	348	$ 21018	15827	80	$ 110631
2	2	$*********	$ 6402	$ 530	61	$ 893	666	1	$*********
2	3	$ 7810	$ 10798	$ 1022	120	$ 3536	4342	5	$ 23166
2	4	$ 8230	$ 8984	$ 1204	141	$ 0	0	0	$ 18418
2	5	$ 7264	$ 20386	$ 1926	226	$ 6638	8151	10	$ 36214
3	1	$ 450	$ 2225	$ 34	3	$ 57097	15341	40	$ 59806
3	2	$ 450	$ 796	$ 36	3	$ 13561	4185	8	$ 14843
3	3	$ 450	$ 346	$ 36	3	$ 5012	1826	2	$ 5844
3	4	$ 450	$ 312	$ 36	3	$ 616	752	0	$ 1414
3	5	$ 450	$ 692	$ 72	7	$ 10024	3652	4	$ 11238
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 20	$ 88	$ 5	0	$ 29	20	0	$ 142
5	2	$*********	$ 1	$ 0	0	$ 1	1	0	$*********
5	3	$ 20	$ 6	$ 0	0	$ 8	8	0	$ 34
5	4	$ 20	$ 0	$ 0	0	$ 0	0	0	$ 20
5	5	$ 20	$ 12	$ 0	0	$ 16	16	0	$ 48
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 15254	$ 130803	$ 4433	518	$ 162942	57485	212	$ 313432
TOTAL	2	$*********	$ 10913	$ 813	92	$ 16319	6242	11	$*********
TOTAL	3	$ 16287	$ 16324	$ 1542	179	$ 10202	8190	9	$ 44355
TOTAL	4	$ 16844	$ 13576	$ 1800	209	$ 616	752	0	$ 32836
TOTAL	5	$ 15254	$ 30619	$ 2886	337	$ 19685	15499	18	$ 68444
MINIMUM COSTS		$ 16501	$ 13574	$ 1796	208	$ 642	794	0	$ 32513
DISCOUNTED COSTS		$ 8915	$ 7333	$ 970	208	$ 346	794	0	$ 17565
ACCUMULATED COSTS		$ 42417	$ 33967	$ 4302	796	$ 5889	7294	21	$ 86584

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 9 DIRECTION AM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 6780	$ 46093	$ 1764	207	$ 24412	12942	54	$ 79049
1	2	$**********	$ 1097	$ 218	25	$ 0	0	0	$**********
1	3	$ 7591	$ 4184	$ 628	73	$ 0	0	0	$ 12403
1	4	$ 8051	$ 4388	$ 872	102	$ 0	0	0	$ 13311
1	5	$ 6780	$ 7166	$ 1075	126	$ 0	0	0	$ 15021
2	1	$ 3632	$ 54712	$ 2215	260	$ 10577	11590	55	$ 71136
2	2	$**********	$ 1167	$ 239	28	$ 0	0	0	$**********
2	3	$ 3868	$ 4586	$ 694	81	$ 0	0	0	$ 9148
2	4	$ 4115	$ 4668	$ 956	112	$ 0	0	0	$ 9739
2	5	$ 3632	$ 8722	$ 1319	155	$ 0	0	1	$ 13673
3	1	$ 282	$ 133	$ 18	2	$ 6599	1766	4	$ 7032
3	2	$ 282	$ 154	$ 21	2	$ 0	0	0	$ 457
3	3	$ 282	$ 148	$ 22	2	$ 0	0	0	$ 452
3	4	$ 282	$ 148	$ 20	2	$ 0	0	0	$ 430
3	5	$ 282	$ 296	$ 44	5	$ 0	0	0	$ 622
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 8	$ 63	$ 4	0	$ 9	14	0	$ 84
5	2	$**********	$ 0	$ 0	0	$ 0	0	0	$**********
5	3	$ 8	$ 0	$ 0	0	$ 0	0	0	$ 8
5	4	$ 8	$ 0	$ 0	0	$ 0	0	0	$ 8
5	5	$ 8	$ 0	$ 0	0	$ 0	0	0	$ 8
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 10702	$ 101001	$ 4001	469	$ 41597	26312	113	$ 157301
TOTAL	2	$**********	$ 2418	$ 478	55	$ 0	0	0	$**********
TOTAL	3	$ 11749	$ 8918	$ 1344	156	$ 0	0	0	$ 22011
TOTAL	4	$ 12456	$ 9184	$ 1848	216	$ 0	0	0	$ 23488
TOTAL	5	$ 10702	$ 16184	$ 2438	286	$ 0	0	1	$ 29324

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 9 DIRECTION PM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 6780	$ 26604	$ 898	105	$ 9152	4842	22	$ 43434
1	2	$ 8359	$ 6586	$ 311	36	$ 4638	3364	6	$ 19894
1	3	$ 7591	$ 4526	$ 324	38	$ 0	0	0	$ 12441
1	4	$ 8051	$ 4652	$ 316	37	$ 0	0	0	$ 13019
1	5	$ 6780	$ 7752	$ 554	65	$ 0	0	0	$ 15086
2	1	$ 3632	$ 31078	$ 1006	118	$ 12259	5982	26	$ 47975
2	2	$ 4126	$ 5522	$ 329	38	$ 1098	796	1	$ 11075
2	3	$ 3868	$ 4940	$ 344	40	$ 100	104	0	$ 9252
2	4	$ 4115	$ 4960	$ 344	40	$ 0	0	0	$ 9419
2	5	$ 3632	$ 9395	$ 654	76	$ 190	197	0	$ 13871
3	1	$ 282	$ 2652	$ 27	3	$ 73604	19942	48	$ 76565
3	2	$ 282	$ 1140	$ 28	3	$ 22223	6560	12	$ 23673
3	3	$ 282	$ 354	$ 30	3	$ 6294	2406	2	$ 6960
3	4	$ 282	$ 268	$ 24	2	$ 768	948	0	$ 1342
3	5	$ 282	$ 708	$ 60	7	$ 12588	4812	5	$ 13638
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 8	$ 0	$ 0	0	$ 11	2	0	$ 19
5	2	$ 8	$ 0	$ 0	0	$ 1	1	0	$ 9
5	3	$ 8	$ 0	$ 0	0	$ 0	0	0	$ 8
5	4	$ 8	$ 0	$ 0	0	$ 0	0	0	$ 8
5	5	$ 8	$ 0	$ 0	0	$ 0	0	0	$ 8
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 10702	$ 60334	$ 1931	226	$ 95026	30768	96	$ 167993
TOTAL	2	$ 12775	$ 13248	$ 668	77	$ 27960	10721	19	$ 54651
TOTAL	3	$ 11749	$ 9820	$ 698	81	$ 6394	2510	2	$ 28661
TOTAL	4	$ 12456	$ 9880	$ 684	79	$ 768	948	0	$ 23788
TOTAL	5	$ 10702	$ 17855	$ 1268	148	$ 12778	5009	5	$ 42603

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 10 DIRECTION AM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 10754	$ 74229	$ 2947	346	$ 22996	17508	74	$ 110926
1	2	$**********	$ 1894	$ 374	44	$ 0	0	0	$**********
1	3	$ 11739	$ 6880	$ 1024	120	$ 0	0	0	$ 19643
1	4	$ 12996	$ 7576	$ 1496	176	$ 0	0	1	$ 22068
1	5	$ 10754	$ 12058	$ 1794	211	$ 0	0	1	$ 24606
2	1	$ 3632	$ 59057	$ 2419	284	$ 11449	12765	56	$ 77157
2	2	$**********	$ 1254	$ 260	30	$ 0	0	0	$**********
2	3	$ 3868	$ 4948	$ 752	88	$ 0	0	0	$ 9568
2	4	$ 4115	$ 5016	$ 1040	122	$ 0	0	1	$ 10171
2	5	$ 3632	$ 9410	$ 1430	168	$ 0	0	1	$ 14472
3	1	$ 338	$ 187	$ 24	2	$ 10374	2652	6	$ 10923
3	2	$ 338	$ 201	$ 28	3	$ 0	0	0	$ 567
3	3	$ 338	$ 194	$ 28	3	$ 0	0	0	$ 560
3	4	$ 338	$ 176	$ 28	3	$ 0	0	0	$ 542
3	5	$ 338	$ 388	$ 56	6	$ 0	0	0	$ 782
4	1	$ 10548	$ 153607	$ 5416	637	$ 134407	58214	206	$ 303978
4	2	$**********	$ 1987	$ 531	62	$ 1926	2185	7	$**********
4	3	$ 10681	$ 9428	$ 1660	195	$ 5696	5856	13	$ 27465
4	4	$ 10947	$ 7948	$ 2124	249	$ 7704	8740	29	$ 28723
4	5	$ 10548	$ 18465	$ 3251	382	$ 11156	11469	26	$ 43420
5	1	$ 6	$ 45	$ 3	0	$ 6	9	0	$ 60
5	2	$**********	$ 0	$ 0	0	$ 0	0	0	$**********
5	3	$ 6	$ 0	$ 0	0	$ 0	0	0	$ 6
5	4	$ 6	$ 0	$ 0	0	$ 0	0	0	$ 6
5	5	$ 6	$ 0	$ 0	0	$ 0	0	0	$ 6
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 25278	$ 267725	$ 10809	1269	$ 179232	91148	342	$ 503044
TOTAL	2	$**********	$ 5336	$ 1193	139	$ 1926	2185	7	$**********
TOTAL	3	$ 26632	$ 21450	$ 3464	406	$ 5696	5856	13	$ 57242
TOTAL	4	$ 28402	$ 20716	$ 4688	550	$ 7704	8740	31	$ 61510
TOTAL	5	$ 25278	$ 40321	$ 6531	767	$ 11156	11469	28	$ 83286

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 10 DIRECTION PM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 10754	$ 42745	$ 1468	172	$ 13834	7554	33	$ 68801
1	2	$ 13892	$ 11062	$ 553	65	$ 9211	6516	12	$ 34718
1	3	$ 11739	$ 7206	$ 582	68	$ 0	0	0	$ 19527
1	4	$ 12996	$ 7836	$ 568	66	$ 0	0	0	$ 21400
1	5	$ 10754	$ 12630	$ 1020	120	$ 0	0	0	$ 24404
2	1	$ 3632	$ 32729	$ 1066	125	$ 13207	6448	26	$ 50634
2	2	$ 4126	$ 5677	$ 348	40	$ 1300	920	1	$ 11451
2	3	$ 3868	$ 5136	$ 364	42	$ 226	180	0	$ 9594
2	4	$ 4115	$ 5184	$ 364	42	$ 0	0	0	$ 9663
2	5	$ 3632	$ 9768	$ 692	81	$ 429	342	0	$ 14521
3	1	$ 338	$ 4340	$ 32	3	$ 115008	31598	63	$ 119718
3	2	$ 338	$ 1674	$ 33	3	$ 39772	11407	18	$ 41817
3	3	$ 338	$ 810	$ 36	4	$ 15404	5410	6	$ 16588
3	4	$ 338	$ 412	$ 32	3	$ 1352	1772	1	$ 2134
3	5	$ 338	$ 1620	$ 72	8	$ 30808	10820	13	$ 32838
4	1	$ 10548	$ 98020	$ 2647	311	$ 195996	56656	157	$ 307211
4	2	$ 12476	$ 13922	$ 724	85	$ 2971	1481	4	$ 30093
4	3	$ 10681	$ 10606	$ 954	112	$ 5774	3126	7	$ 28015
4	4	$ 10947	$ 9652	$ 1068	125	$ 7176	3972	13	$ 28843
4	5	$ 10548	$ 20772	$ 1868	219	$ 11309	6122	14	$ 44497
5	1	$ 6	$ 0	$ 0	0	$ 8	2	0	$ 14
5	2	$ 6	$ 0	$ 0	0	$ 1	0	0	$ 7
5	3	$ 6	$ 0	$ 0	0	$ 0	0	0	$ 6
5	4	$ 6	$ 0	$ 0	0	$ 0	0	0	$ 6
5	5	$ 6	$ 0	$ 0	0	$ 0	0	0	$ 6
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 25278	$ 177834	$ 5213	611	$ 338053	102258	279	$ 546378
TOTAL	2	$ 30838	$ 32335	$ 1658	193	$ 53255	20324	35	$ 118086
TOTAL	3	$ 26632	$ 23758	$ 1936	226	$ 21404	8716	13	$ 73730
TOTAL	4	$ 28402	$ 23084	$ 2032	236	$ 8528	5744	14	$ 62046
TOTAL	5	$ 25278	$ 44790	$ 3652	428	$ 42546	17284	27	$ 116266

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 9 DIRECTION COMBINED

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 13560	$ 72697	$ 2662	312	$ 33564	17784	76	$ 122483
1	2	$*********	$ 7683	$ 529	61	$ 4638	3364	6	$*********
1	3	$ 15182	$ 8710	$ 952	111	$ 0	0	0	$ 24844
1	4	$ 16102	$ 9040	$ 1188	139	$ 0	0	0	$ 26330
1	5	$ 13560	$ 14918	$ 1629	191	$ 0	0	0	$ 30107
2	1	$ 7264	$ 85790	$ 3221	378	$ 22836	17572	81	$ 119111
2	2	$*********	$ 6689	$ 568	66	$ 1098	796	1	$*********
2	3	$ 7736	$ 9526	$ 1038	121	$ 100	104	0	$ 18400
2	4	$ 8230	$ 9628	$ 1300	152	$ 0	0	0	$ 19158
2	5	$ 7264	$ 18117	$ 1973	231	$ 190	197	1	$ 27544
3	1	$ 564	$ 2785	$ 45	5	$ 80203	21708	52	$ 83597
3	2	$ 564	$ 1294	$ 49	5	$ 22223	6560	12	$ 24130
3	3	$ 564	$ 502	$ 52	5	$ 6294	2406	2	$ 7412
3	4	$ 564	$ 396	$ 44	4	$ 768	948	0	$ 1772
3	5	$ 564	$ 1004	$ 104	12	$ 12588	4812	5	$ 14260
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 16	$ 63	$ 4	0	$ 20	16	0	$ 103
5	2	$*********	$ 0	$ 0	0	$ 1	1	0	$*********
5	3	$ 16	$ 0	$ 0	0	$ 0	0	0	$ 16
5	4	$ 16	$ 0	$ 0	0	$ 0	0	0	$ 16
5	5	$ 16	$ 0	$ 0	0	$ 0	0	0	$ 16
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 21404	$ 161335	$ 5932	695	$ 136623	57080	209	$ 325294
TOTAL	2	$*********	$ 15666	$ 1146	132	$ 27960	10721	19	$*********
TOTAL	3	$ 23498	$ 18738	$ 2042	237	$ 6394	2510	2	$ 50672
TOTAL	4	$ 24912	$ 19064	$ 2532	295	$ 768	948	0	$ 47276
TOTAL	5	$ 21404	$ 34039	$ 3706	434	$ 12778	5009	6	$ 71927
MINIMUM COSTS		$ 23498	$ 18632	$ 2034	236	$ 868	1052	0	$ 45032
DISCOUNTED COSTS		$ 11754	$ 9320	$ 1017	236	$ 434	1052	0	$ 22527
ACCUMULATED COSTS		$ 54171	$ 43287	$ 5319	1032	$ 6323	8340	21	$ 109111

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 10 DIRECTION COMBINED

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 21508	$ 116974	$ 4415	518	$ 36830	25062	107	$ 179727
1	2	$*********	$ 12956	$ 927	109	$ 9211	6516	12	$*********
1	3	$ 23478	$ 14086	$ 1606	188	$ 0	0	0	$ 39170
1	4	$ 25992	$ 15412	$ 2064	242	$ 0	0	1	$ 43468
1	5	$ 21508	$ 24688	$ 2814	331	$ 0	0	1	$ 49010
2	1	$ 7264	$ 92386	$ 3485	409	$ 24656	19213	82	$ 127791
2	2	$*********	$ 6931	$ 608	70	$ 1300	920	1	$*********
2	3	$ 7736	$ 10084	$ 1116	130	$ 226	180	0	$ 19162
2	4	$ 8230	$ 10200	$ 1404	164	$ 0	0	1	$ 19834
2	5	$ 7264	$ 19178	$ 2122	249	$ 429	342	1	$ 28993
3	1	$ 676	$ 4527	$ 56	5	$ 125382	34250	69	$ 130641
3	2	$ 676	$ 1875	$ 61	6	$ 39772	11407	18	$ 42384
3	3	$ 676	$ 1004	$ 64	7	$ 15404	5410	6	$ 17148
3	4	$ 676	$ 588	$ 60	6	$ 1352	1772	1	$ 2676
3	5	$ 676	$ 2008	$ 128	14	$ 30808	10820	13	$ 33620
4	1	$ 21096	$ 251627	$ 8063	948	$ 330403	114870	363	$ 611189
4	2	$*********	$ 15909	$ 1255	147	$ 4897	3666	11	$*********
4	3	$ 21362	$ 20034	$ 2614	307	$ 11470	8982	20	$ 55480
4	4	$ 21894	$ 17600	$ 3192	374	$ 14880	12712	42	$ 57566
4	5	$ 21096	$ 39237	$ 5119	601	$ 22465	17591	40	$ 87917
5	1	$ 12	$ 45	$ 3	0	$ 14	11	0	$ 74
5	2	$*********	$ 0	$ 0	0	$ 1	0	0	$*********
5	3	$ 12	$ 0	$ 0	0	$ 0	0	0	$ 12
5	4	$ 12	$ 0	$ 0	0	$ 0	0	0	$ 12
5	5	$ 12	$ 0	$ 0	0	$ 0	0	0	$ 12
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 50556	$ 465559	$ 16022	1880	$ 517285	193406	621	$ 1049422
TOTAL	2	$*********	$ 37671	$ 2851	332	$ 55181	22509	42	$*********
TOTAL	3	$ 53264	$ 45208	$ 5400	632	$ 27100	14572	26	$ 130972
TOTAL	4	$ 56804	$ 43800	$ 6720	786	$ 16232	14484	45	$ 123556
TOTAL	5	$ 50556	$ 85111	$ 10183	1195	$ 53702	28753	55	$ 199552
MINIMUM COSTS		$ 53264	$ 44792	$ 5396	631	$ 13048	10934	21	$ 116500
DISCOUNTED COSTS		$ 24671	$ 20747	$ 2499	631	$ 6043	10934	21	$ 53962
ACCUMULATED COSTS		$ 78842	$ 64034	$ 7818	1663	$ 12366	19280	42	$ 163073

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 11 DIRECTION AM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 14724	$ 108154	$ 4297	505	$ 35641	26233	102	$ 162816
1	2	$**********	$ 2645	$ 522	61	$ 0	0	0	$**********
1	3	$ 15497	$ 9408	$ 1348	158	$ 0	0	0	$ 26253
1	4	$ 17502	$ 10580	$ 2088	245	$ 0	0	1	$ 30170
1	5	$ 14724	$ 17325	$ 2482	292	$ 0	0	1	$ 34531
2	1	$ 3632	$ 64335	$ 2615	307	$ 12341	13993	57	$ 82923
2	2	$**********	$ 1308	$ 278	32	$ 0	0	0	$**********
2	3	$ 3868	$ 5156	$ 758	89	$ 0	2	0	$ 9782
2	4	$ 4115	$ 5232	$ 1112	130	$ 0	0	0	$ 10459
2	5	$ 3632	$ 9806	$ 1441	169	$ 0	3	1	$ 14879
3	1	$ 395	$ 330	$ 30	3	$ 16263	3801	9	$ 17018
3	2	$ 395	$ 245	$ 35	4	$ 0	0	0	$ 675
3	3	$ 395	$ 240	$ 36	4	$ 0	0	0	$ 671
3	4	$ 395	$ 212	$ 36	4	$ 0	0	0	$ 643
3	5	$ 395	$ 480	$ 72	8	$ 0	0	0	$ 947
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 4	$ 29	$ 2	0	$ 3	7	0	$ 38
5	2	$**********	$ 0	$ 0	0	$ 0	0	0	$**********
5	3	$ 4	$ 0	$ 0	0	$ 0	0	0	$ 4
5	4	$ 4	$ 0	$ 0	0	$ 0	0	0	$ 4
5	5	$ 4	$ 0	$ 0	0	$ 0	0	0	$ 4
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 18755	$ 172848	$ 6944	815	$ 64248	44034	168	$ 262795
TOTAL	2	$**********	$ 4198	$ 835	97	$ 0	0	0	$**********
TOTAL	3	$ 19764	$ 14804	$ 2142	251	$ 0	2	0	$ 36710
TOTAL	4	$ 22016	$ 16024	$ 3236	379	$ 0	0	1	$ 41276
TOTAL	5	$ 18755	$ 27611	$ 3995	469	$ 0	3	2	$ 50361

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 11 DIRECTION PM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 14724	$ 60399	$ 2096	246	$ 19172	10724	44	$ 96391
1	2	$ 19316	$ 15499	$ 824	96	$ 15397	10337	19	$ 51036
1	3	$ 15497	$ 9662	$ 828	97	$ 0	0	0	$ 25987
1	4	$ 17502	$ 10840	$ 872	102	$ 0	0	0	$ 29214
1	5	$ 14724	$ 17793	$ 1524	179	$ 0	0	0	$ 34041
2	1	$ 3632	$ 34205	$ 1125	132	$ 14144	6866	25	$ 53106
2	2	$ 4126	$ 5833	$ 366	43	$ 1549	1040	2	$ 11874
2	3	$ 3868	$ 5308	$ 382	44	$ 438	274	0	$ 9996
2	4	$ 4115	$ 5328	$ 384	45	$ 0	0	0	$ 9827
2	5	$ 3632	$ 10095	$ 726	85	$ 833	521	0	$ 15286
3	1	$ 395	$ 6212	$ 35	4	$ 153317	43014	72	$ 159959
3	2	$ 395	$ 2092	$ 36	4	$ 54335	15952	21	$ 56858
3	3	$ 395	$ 826	$ 40	4	$ 21936	7236	6	$ 23197
3	4	$ 395	$ 564	$ 40	4	$ 1832	2776	1	$ 2831
3	5	$ 395	$ 1652	$ 80	9	$ 43872	14472	13	$ 45999
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 4	$ 0	$ 0	0	$ 6	1	0	$ 10
5	2	$ 4	$ 0	$ 0	0	$ 1	0	0	$ 5
5	3	$ 4	$ 0	$ 0	0	$ 0	0	0	$ 4
5	4	$ 4	$ 0	$ 0	0	$ 0	0	0	$ 4
5	5	$ 4	$ 0	$ 0	0	$ 0	0	0	$ 4
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 18755	$ 100816	$ 3256	382	$ 186639	60605	141	$ 309466
TOTAL	2	$ 23841	$ 23424	$ 1226	143	$ 71282	27329	42	$ 119773
TOTAL	3	$ 19764	$ 15796	$ 1250	145	$ 22374	7510	6	$ 59184
TOTAL	4	$ 22016	$ 16732	$ 1296	151	$ 1832	2776	1	$ 41876
TOTAL	5	$ 18755	$ 29540	$ 2330	273	$ 44705	14993	13	$ 95330

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 12 DIRECTION AM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 17559	$ 151870	$ 5471	643	$ 160327	60180	183	$ 335227
1	2	$*********	$ 3582	$ 609	71	$ 607	913	0	$*********
1	3	$ 18441	$ 11534	$ 1696	199	$ 0	0	1	$ 31671
1	4	$ 20518	$ 14328	$ 2436	286	$ 2668	3652	2	$ 39950
1	5	$ 17559	$ 21334	$ 3137	369	$ 0	0	2	$ 42030
2	1	$ 3632	$ 69280	$ 2825	332	$ 14091	15406	58	$ 89828
2	2	$*********	$ 1603	$ 279	32	$ 399	547	0	$*********
2	3	$ 3868	$ 5418	$ 812	95	$ 4	16	0	$ 10102
2	4	$ 4115	$ 6412	$ 1116	131	$ 1596	2188	1	$ 13239
2	5	$ 3632	$ 10304	$ 1544	181	$ 7	30	1	$ 15487
3	1	$ 451	$ 151	$ 37	4	$ 23731	5272	12	$ 24370
3	2	$ 451	$ 542	$ 34	4	$ 361	426	0	$ 1388
3	3	$ 451	$ 288	$ 44	5	$ 0	0	0	$ 783
3	4	$ 451	$ 264	$ 44	5	$ 0	0	0	$ 759
3	5	$ 451	$ 576	$ 88	10	$ 0	0	0	$ 1115
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 3	$ 19	$ 2	0	$ 3	4	0	$ 27
5	2	$*********	$ 0	$ 0	0	$ 0	0	0	$*********
5	3	$ 3	$ 0	$ 0	0	$ 0	0	0	$ 3
5	4	$ 3	$ 0	$ 0	0	$ 0	0	0	$ 3
5	5	$ 3	$ 0	$ 0	0	$ 0	0	0	$ 3
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 21645	$ 221320	$ 8335	979	$ 198152	80862	253	$ 449452
TOTAL	2	$*********	$ 5727	$ 922	107	$ 1427	1886	0	$*********
TOTAL	3	$ 22763	$ 17240	$ 2552	299	$ 4	16	1	$ 42559
TOTAL	4	$ 25087	$ 21004	$ 3596	422	$ 4264	5840	3	$ 53951
TOTAL	5	$ 21645	$ 32214	$ 4769	560	$ 7	30	3	$ 58635

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 12 DIRECTION PM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 17559	$ 74451	$ 2621	308	$ 22425	13102	51	$ 117056
1	2	$ 23282	$ 20117	$ 998	117	$ 25342	15212	25	$ 69739
1	3	$ 18441	$ 11564	$ 1008	118	$ 0	0	0	$ 31013
1	4	$ 20518	$ 13020	$ 1092	128	$ 0	0	0	$ 34630
1	5	$ 17559	$ 21390	$ 1864	219	$ 0	0	1	$ 40813
2	1	$ 3632	$ 35585	$ 1181	138	$ 15028	7252	25	$ 55426
2	2	$ 4126	$ 6171	$ 376	44	$ 2303	1348	2	$ 12976
2	3	$ 3868	$ 5424	$ 400	47	$ 720	388	0	$ 10412
2	4	$ 4115	$ 5496	$ 404	47	$ 0	0	0	$ 10015
2	5	$ 3632	$ 10316	$ 760	89	$ 1369	737	1	$ 16077
3	1	$ 451	$ 10389	$ 39	4	$ 205157	59790	89	$ 216036
3	2	$ 451	$ 3179	$ 42	4	$ 79256	23480	27	$ 82928
3	3	$ 451	$ 1226	$ 44	5	$ 32226	10582	9	$ 33947
3	4	$ 451	$ 744	$ 48	5	$ 2348	3992	2	$ 3591
3	5	$ 451	$ 2452	$ 88	10	$ 64452	21164	18	$ 67443
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 3	$ 0	$ 0	0	$ 4	1	0	$ 7
5	2	$ 3	$ 0	$ 0	0	$ 1	0	0	$ 4
5	3	$ 3	$ 0	$ 0	0	$ 0	0	0	$ 3
5	4	$ 3	$ 0	$ 0	0	$ 0	0	0	$ 3
5	5	$ 3	$ 0	$ 0	0	$ 0	0	0	$ 3
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 21645	$ 120425	$ 3841	450	$ 242614	80145	165	$ 388525
TOTAL	2	$ 27862	$ 29467	$ 1416	165	$ 106902	40040	54	$ 165647
TOTAL	3	$ 22763	$ 18214	$ 1452	170	$ 32946	10970	9	$ 75375
TOTAL	4	$ 25087	$ 19260	$ 1544	180	$ 2348	3992	2	$ 48239
TOTAL	5	$ 21645	$ 34158	$ 2712	318	$ 65821	21901	20	$ 124336

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 11 DIRECTION COMBINED

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 29448	$ 168553	$ 6393	751	$ 54813	36957	146	$ 259207
1	2	$**********	$ 18144	$ 1346	157	$ 15397	10337	19	$**********
1	3	$ 30994	$ 19070	$ 2176	255	$ 0	0	0	$ 52240
1	4	$ 35004	$ 21420	$ 2960	347	$ 0	0	1	$ 59384
1	5	$ 29448	$ 35118	$ 4006	471	$ 0	0	1	$ 68572
2	1	$ 7264	$ 98540	$ 3740	439	$ 26485	20859	82	$ 136029
2	2	$**********	$ 7141	$ 644	75	$ 1549	1040	2	$**********
2	3	$ 7736	$ 10464	$ 1140	133	$ 438	276	0	$ 19778
2	4	$ 8230	$ 10560	$ 1496	175	$ 0	0	0	$ 20286
2	5	$ 7264	$ 19901	$ 2167	254	$ 833	524	1	$ 30165
3	1	$ 790	$ 6542	$ 65	7	$ 169580	46815	81	$ 176977
3	2	$ 790	$ 2337	$ 71	8	$ 54335	15952	21	$ 57533
3	3	$ 790	$ 1066	$ 76	8	$ 21936	7236	6	$ 23868
3	4	$ 790	$ 776	$ 76	8	$ 1832	2776	1	$ 3474
3	5	$ 790	$ 2132	$ 152	17	$ 43872	14472	13	$ 46946
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 8	$ 24	$ 2	0	$ 9	8	0	$ 48
5	2	$**********	$ 0	$ 0	0	$ 1	0	0	$**********
5	3	$ 8	$ 0	$ 0	0	$ 0	0	0	$ 8
5	4	$ 8	$ 0	$ 0	0	$ 0	0	0	$ 8
5	5	$ 8	$ 0	$ 0	0	$ 0	0	0	$ 8
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 37510	$ 273664	$ 10200	1197	$ 250887	104639	309	$ 572261
TOTAL	2	$**********	$ 27622	$ 2061	240	$ 71282	27329	42	$**********
TOTAL	3	$ 39528	$ 30600	$ 3392	396	$ 22374	7512	6	$ 95894
TOTAL	4	$ 44032	$ 32756	$ 4532	530	$ 1832	2776	2	$ 83152
TOTAL	5	$ 37510	$ 57151	$ 6325	742	$ 44705	14996	15	$ 145691
MINIMUM COSTS		$ 39775	$ 30330	$ 3394	397	$ 1832	2778	1	$ 75331
DISCOUNTED COSTS		$ 17058	$ 13008	$ 1455	397	$ 785	2778	1	$ 32308
ACCUMULATED COSTS		$ 95900	$ 77042	$ 9273	2060	$ 13151	22058	43	$ 195381

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 12 DIRECTION COMBINED

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 35118	$ 226321	$ 8092	951	$ 182752	73282	234	$ 452283
1	2	$**********	$ 23699	$ 1607	188	$ 26009	16125	25	$**********
1	3	$ 36882	$ 23098	$ 2704	317	$ 0	0	1	$ 62684
1	4	$ 41036	$ 27348	$ 3528	414	$ 2668	3652	2	$ 74580
1	5	$ 35118	$ 42724	$ 5001	588	$ 0	0	3	$ 82843
2	1	$ 7264	$ 104865	$ 4006	470	$ 29119	22658	83	$ 145254
2	2	$**********	$ 7774	$ 655	76	$ 2702	1895	2	$**********
2	3	$ 7736	$ 10842	$ 1212	142	$ 724	404	0	$ 20514
2	4	$ 8230	$ 11908	$ 1520	178	$ 1596	2188	1	$ 23254
2	5	$ 7264	$ 20620	$ 2304	270	$ 1376	767	2	$ 31564
3	1	$ 902	$ 10540	$ 76	8	$ 228888	65062	101	$ 240406
3	2	$ 902	$ 3721	$ 76	8	$ 79617	23906	27	$ 84316
3	3	$ 902	$ 1514	$ 88	10	$ 32226	10582	9	$ 34730
3	4	$ 902	$ 1008	$ 92	10	$ 2348	3992	2	$ 4350
3	5	$ 902	$ 3028	$ 176	20	$ 64452	21164	18	$ 68558
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 6	$ 19	$ 2	0	$ 7	5	0	$ 34
5	2	$**********	$ 0	$ 0	0	$ 1	0	0	$**********
5	3	$ 6	$ 0	$ 0	0	$ 0	0	0	$ 6
5	4	$ 6	$ 0	$ 0	0	$ 0	0	0	$ 6
5	5	$ 6	$ 0	$ 0	0	$ 0	0	0	$ 6
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 43290	$ 341745	$ 12176	1429	$ 440766	161007	418	$ 837977
TOTAL	2	$**********	$ 35194	$ 2338	272	$ 108329	41926	54	$**********
TOTAL	3	$ 45526	$ 35454	$ 4004	469	$ 32950	10986	10	$ 117934
TOTAL	4	$ 50174	$ 40264	$ 5140	602	$ 6612	9832	5	$ 102190
TOTAL	5	$ 43290	$ 66372	$ 7481	878	$ 65828	21931	23	$ 182971
MINIMUM COSTS		$ 45773	$ 35020	$ 4012	469	$ 2352	4008	3	$ 87157
DISCOUNTED COSTS		$ 18177	$ 13907	$ 1593	469	$ 934	4008	3	$ 34611
ACCUMULATED COSTS		$ 114077	$ 90949	$ 10866	2529	$ 14085	26066	46	$ 229992

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 13 DIRECTION AM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 19392	$ 180672	$ 6486	763	$ 205450	75150	213	$ 412000
1	2	$*********	$ 5127	$ 695	81	$ 2707	3745	3	$*********
1	3	$ 20314	$ 13212	$ 1990	234	$ 0	0	1	$ 35516
1	4	$ 23440	$ 20508	$ 2780	327	$ 10828	14980	13	$ 57556
1	5	$ 19392	$ 24543	$ 3696	434	$ 0	0	2	$ 47631
2	1	$ 3632	$ 74029	$ 3028	356	$ 15038	16824	59	$ 95727
2	2	$*********	$ 2135	$ 267	31	$ 1393	1928	1	$*********
2	3	$ 3868	$ 5650	$ 866	101	$ 8	22	0	$ 10392
2	4	$ 4146	$ 8540	$ 1068	125	$ 5572	7712	6	$ 19326
2	5	$ 3632	$ 10745	$ 1647	193	$ 15	41	1	$ 16039
3	1	$ 508	$ 2277	$ 49	5	$ 45176	9877	22	$ 48012
3	2	$ 508	$ 591	$ 47	5	$ 630	634	0	$ 1776
3	3	$ 508	$ 344	$ 52	6	$ 0	0	0	$ 904
3	4	$ 508	$ 320	$ 52	6	$ 0	0	0	$ 880
3	5	$ 508	$ 688	$ 104	12	$ 0	0	0	$ 1300
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 2	$ 8	$ 1	0	$ 2	2	0	$ 13
5	2	$*********	$ 0	$ 0	0	$ 0	0	0	$*********
5	3	$ 2	$ 0	$ 0	0	$ 0	0	0	$ 2
5	4	$ 2	$ 0	$ 0	0	$ 0	0	0	$ 2
5	5	$ 2	$ 0	$ 0	0	$ 0	0	0	$ 2
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 23534	$ 256986	$ 9564	1124	$ 265608	101853	294	$ 555752
TOTAL	2	$*********	$ 7853	$ 1009	117	$ 4730	6307	4	$*********
TOTAL	3	$ 24692	$ 19206	$ 2908	341	$ 8	22	1	$ 46814
TOTAL	4	$ 28096	$ 29368	$ 3900	458	$ 16400	22692	19	$ 77764
TOTAL	5	$ 23534	$ 35976	$ 5447	639	$ 15	41	3	$ 64972

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 13 DIRECTION PM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 19392	$ 85273	$ 3022	355	$ 25332	15199	55	$ 133019
1	2	$ 25653	$ 21877	$ 1149	135	$ 33249	18436	28	$ 81928
1	3	$ 20314	$ 12968	$ 1150	135	$ 90	100	0	$ 34522
1	4	$ 22329	$ 14404	$ 1276	150	$ 0	0	0	$ 38009
1	5	$ 19392	$ 24090	$ 2136	251	$ 167	185	1	$ 45785
2	1	$ 3632	$ 36898	$ 1234	145	$ 15906	7652	25	$ 57670
2	2	$ 4126	$ 6216	$ 391	46	$ 2697	1474	2	$ 13430
2	3	$ 3868	$ 5552	$ 414	48	$ 1068	506	0	$ 10902
2	4	$ 4115	$ 5576	$ 420	49	$ 0	0	0	$ 10111
2	5	$ 3632	$ 10559	$ 787	92	$ 2031	962	1	$ 17009
3	1	$ 508	$ 12302	$ 45	5	$ 242136	70787	100	$ 254991
3	2	$ 508	$ 3833	$ 49	5	$ 96107	28484	32	$ 100497
3	3	$ 508	$ 1428	$ 48	5	$ 37128	12210	9	$ 39112
3	4	$ 508	$ 824	$ 56	6	$ 2604	4500	2	$ 3992
3	5	$ 508	$ 2856	$ 96	11	$ 74256	24420	19	$ 77716
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 2	$ 0	$ 0	0	$ 3	1	0	$ 5
5	2	$ 2	$ 0	$ 0	0	$ 0	0	0	$ 2
5	3	$ 2	$ 0	$ 0	0	$ 0	0	0	$ 2
5	4	$ 2	$ 0	$ 0	0	$ 0	0	0	$ 2
5	5	$ 2	$ 0	$ 0	0	$ 0	0	0	$ 2
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 23534	$ 134473	$ 4301	505	$ 283377	93639	180	$ 445685
TOTAL	2	$ 30289	$ 31926	$ 1589	186	$ 132053	48394	62	$ 195857
TOTAL	3	$ 24692	$ 19948	$ 1612	188	$ 38286	12816	9	$ 84538
TOTAL	4	$ 26954	$ 20804	$ 1752	205	$ 2604	4500	2	$ 52114
TOTAL	5	$ 23534	$ 37505	$ 3019	354	$ 76454	25567	21	$ 140512

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 14 DIRECTION AM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 20175	$ 202298	$ 7191	846	$ 251724	89563	238	$ 481388
1	2	$**********	$ 3886	$ 679	79	$ 0	0	0	$**********
1	3	$ 28088	$ 19808	$ 3670	431	$ 1422	1568	3	$ 52988
1	4	$ 23249	$ 15544	$ 2716	319	$ 0	0	1	$ 41509
1	5	$ 20175	$ 24855	$ 4605	541	$ 1784	1967	4	$ 51419
2	1	$ 3632	$ 79175	$ 3251	382	$ 16069	18210	60	$ 102127
2	2	$**********	$ 1479	$ 266	31	$ 0	0	0	$**********
2	3	$ 4137	$ 6376	$ 1044	122	$ 866	956	0	$ 12423
2	4	$ 4115	$ 5916	$ 1064	125	$ 0	0	0	$ 11095
2	5	$ 3632	$ 11531	$ 1888	222	$ 1566	1728	1	$ 18617
3	1	$ 564	$ 2486	$ 58	6	$ 56555	12608	27	$ 59663
3	2	$ 564	$ 713	$ 56	6	$ 2625	1389	2	$ 3958
3	3	$ 564	$ 392	$ 62	7	$ 0	0	0	$ 1018
3	4	$ 564	$ 364	$ 64	7	$ 0	0	0	$ 992
3	5	$ 564	$ 784	$ 124	14	$ 0	0	0	$ 1472
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 1	$ 0	$ 1	0	$ 1	1	0	$ 3
5	2	$**********	$ 0	$ 0	0	$ 0	0	0	$**********
5	3	$ 1	$ 0	$ 0	0	$ 0	0	0	$ 1
5	4	$ 1	$ 0	$ 0	0	$ 0	0	0	$ 1
5	5	$ 1	$ 0	$ 0	0	$ 0	0	0	$ 1
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 24372	$ 283959	$ 10501	1234	$ 324349	120382	325	$ 643181
TOTAL	2	$**********	$ 6078	$ 1001	116	$ 2625	1389	2	$**********
TOTAL	3	$ 32790	$ 26576	$ 4776	560	$ 2288	2524	3	$ 66430
TOTAL	4	$ 27929	$ 21824	$ 3844	451	$ 0	0	1	$ 53597
TOTAL	5	$ 24372	$ 37170	$ 6617	777	$ 3350	3695	5	$ 71509

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 14 DIRECTION PM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 20175	$ 91878	$ 3287	386	$ 26769	16617	57	$ 142109
1	2	$ 26878	$ 20100	$ 1367	160	$ 2618	1720	1	$ 50963
1	3	$ 22347	$ 14842	$ 1282	150	$ 0	0	0	$ 38471
1	4	$ 23249	$ 15196	$ 1404	165	$ 0	0	0	$ 39849
1	5	$ 20175	$ 25378	$ 2192	257	$ 0	0	1	$ 47745
2	1	$ 3632	$ 38123	$ 1287	151	$ 16741	8043	24	$ 59783
2	2	$ 4209	$ 6254	$ 417	49	$ 463	303	0	$ 11343
2	3	$ 3868	$ 5856	$ 434	51	$ 238	310	0	$ 10396
2	4	$ 4115	$ 5652	$ 436	51	$ 0	0	0	$ 10203
2	5	$ 3632	$ 11137	$ 825	97	$ 452	589	0	$ 16046
3	1	$ 564	$ 23201	$ 47	5	$ 310960	94785	130	$ 334772
3	2	$ 564	$ 5669	$ 54	6	$ 127950	39033	40	$ 134237
3	3	$ 564	$ 1990	$ 54	6	$ 56136	17940	14	$ 58744
3	4	$ 564	$ 1040	$ 60	7	$ 3308	6008	3	$ 4972
3	5	$ 564	$ 3980	$ 103	12	$ 112272	35880	28	$ 116924
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 1	$ 0	$ 0	0	$ 2	0	0	$ 3
5	2	$ 1	$ 0	$ 0	0	$ 0	0	0	$ 1
5	3	$ 1	$ 0	$ 0	0	$ 0	0	0	$ 1
5	4	$ 1	$ 0	$ 0	0	$ 0	0	0	$ 1
5	5	$ 1	$ 0	$ 0	0	$ 0	0	0	$ 1
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 24372	$ 153202	$ 4621	542	$ 354472	119445	211	$ 536667
TOTAL	2	$ 31652	$ 32023	$ 1838	215	$ 131031	41056	41	$ 196544
TOTAL	3	$ 26780	$ 22688	$ 1770	207	$ 56374	18250	14	$ 107612
TOTAL	4	$ 27929	$ 21888	$ 1900	223	$ 3308	6008	3	$ 55025
TOTAL	5	$ 24372	$ 40495	$ 3125	366	$ 112724	36469	29	$ 180716

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 13 DIRECTION COMBINED

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 38784	$ 265945	$ 9508	1118	$ 230782	90349	268	$ 545019
1	2	$**********	$ 27004	$ 1844	216	$ 35956	22181	31	$**********
1	3	$ 40628	$ 26180	$ 3140	369	$ 90	100	1	$ 70038
1	4	$ 45769	$ 34912	$ 4056	477	$ 10828	14980	13	$ 95565
1	5	$ 38784	$ 48633	$ 5832	685	$ 167	185	3	$ 93416
2	1	$ 7264	$ 110927	$ 4262	501	$ 30944	24476	84	$ 153397
2	2	$**********	$ 8351	$ 658	77	$ 4090	3402	3	$**********
2	3	$ 7736	$ 11202	$ 1280	149	$ 1076	528	0	$ 21294
2	4	$ 8261	$ 14116	$ 1488	174	$ 5572	7712	6	$ 29437
2	5	$ 7264	$ 21304	$ 2434	285	$ 2046	1003	2	$ 33048
3	1	$ 1016	$ 14579	$ 94	10	$ 287314	80664	122	$ 303003
3	2	$ 1016	$ 4424	$ 96	10	$ 96737	29118	32	$ 102273
3	3	$ 1016	$ 1772	$ 100	11	$ 37128	12210	9	$ 40016
3	4	$ 1016	$ 1144	$ 108	12	$ 2604	4500	2	$ 4872
3	5	$ 1016	$ 3544	$ 200	23	$ 74256	24420	19	$ 79016
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 4	$ 8	$ 1	0	$ 5	3	0	$ 18
5	2	$**********	$ 0	$ 0	0	$ 0	0	0	$**********
5	3	$ 4	$ 0	$ 0	0	$ 0	0	0	$ 4
5	4	$ 4	$ 0	$ 0	0	$ 0	0	0	$ 4
5	5	$ 4	$ 0	$ 0	0	$ 0	0	0	$ 4
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 47068	$ 391459	$ 13865	1629	$ 549045	195492	474	$ 1001437
TOTAL	2	$**********	$ 39779	$ 2598	303	$ 136783	54701	66	$**********
TOTAL	3	$ 49384	$ 39154	$ 4520	529	$ 38294	12838	10	$ 131352
TOTAL	4	$ 55050	$ 50172	$ 5652	663	$ 19004	27192	21	$ 129878
TOTAL	5	$ 47068	$ 73481	$ 8466	993	$ 76469	25608	24	$ 205484
MINIMUM COSTS		$ 49631	$ 38550	$ 4534	531	$ 2702	4622	3	$ 95417
DISCOUNTED COSTS		$ 18249	$ 14174	$ 1667	531	$ 993	4622	3	$ 35084
ACCUMULATED COSTS		$ 132326	$ 105123	$ 12533	3060	$ 15078	30688	49	$ 265076

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 14 DIRECTION COMBINED

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 40350	$ 294176	$ 10478	1232	$ 278493	106180	295	$ 623497
1	2	$**********	$ 23986	$ 2046	239	$ 2618	1720	1	$**********
1	3	$ 50435	$ 34650	$ 4952	581	$ 1422	1568	3	$ 91459
1	4	$ 46498	$ 30740	$ 4120	484	$ 0	0	1	$ 81358
1	5	$ 40350	$ 50233	$ 6797	798	$ 1784	1967	5	$ 99164
2	1	$ 7264	$ 117298	$ 4538	533	$ 32810	26253	84	$ 161910
2	2	$**********	$ 7733	$ 683	80	$ 463	303	0	$**********
2	3	$ 8005	$ 12232	$ 1478	173	$ 1104	1266	0	$ 22819
2	4	$ 8230	$ 11568	$ 1500	176	$ 0	0	0	$ 21298
2	5	$ 7264	$ 22668	$ 2713	319	$ 2018	2317	1	$ 34663
3	1	$ 1128	$ 25687	$ 105	11	$ 367515	107393	157	$ 394435
3	2	$ 1128	$ 6382	$ 110	12	$ 130575	40422	42	$ 138195
3	3	$ 1128	$ 2382	$ 116	13	$ 56136	17940	14	$ 59762
3	4	$ 1128	$ 1404	$ 124	14	$ 3308	6008	3	$ 5964
3	5	$ 1128	$ 4764	$ 232	26	$ 112272	35880	28	$ 118396
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 2	$ 0	$ 1	0	$ 3	1	0	$ 6
5	2	$**********	$ 0	$ 0	0	$ 0	0	0	$**********
5	3	$ 2	$ 0	$ 0	0	$ 0	0	0	$ 2
5	4	$ 2	$ 0	$ 0	0	$ 0	0	0	$ 2
5	5	$ 2	$ 0	$ 0	0	$ 0	0	0	$ 2
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 48744	$ 437161	$ 15122	1776	$ 678821	239827	536	$ 1179848
TOTAL	2	$**********	$ 38101	$ 2839	331	$ 133656	42445	43	$**********
TOTAL	3	$ 59570	$ 49264	$ 6546	767	$ 58662	20774	17	$ 174042
TOTAL	4	$ 55858	$ 43712	$ 5744	674	$ 3308	6008	4	$ 108622
TOTAL	5	$ 48744	$ 77665	$ 9742	1143	$ 116074	40164	34	$ 252225
MINIMUM COSTS		$ 54956	$ 43358	$ 5622	659	$ 3308	6008	4	$ 107244
DISCOUNTED COSTS		$ 18710	$ 14761	$ 1914	659	$ 1126	6008	4	$ 36512
ACCUMULATED COSTS		$ 151036	$ 119884	$ 14447	3719	$ 16204	36696	53	$ 301588

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 15 DIRECTION AM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 20624	$ 229213	$ 7646	899	$ 362763	134483	310	$ 620246
1	2	$*********	$ 3860	$ 725	85	$ 0	0	0	$*********
1	3	$ 28727	$ 24932	$ 3846	452	$ 7916	9600	4	$ 65421
1	4	$ 23610	$ 15440	$ 2900	341	$ 0	0	1	$ 41950
1	5	$ 20624	$ 31261	$ 4822	567	$ 9925	12037	6	$ 66632
2	1	$ 3632	$ 87775	$ 3358	395	$ 49879	35949	89	$ 144644
2	2	$*********	$ 1470	$ 281	33	$ 0	0	0	$*********
2	3	$ 4210	$ 6076	$ 1118	131	$ 936	1138	1	$ 12340
2	4	$ 4115	$ 5880	$ 1124	132	$ 0	0	0	$ 11119
2	5	$ 3632	$ 10841	$ 1994	234	$ 1670	2030	1	$ 18137
3	1	$ 621	$ 2792	$ 67	7	$ 68727	15762	32	$ 72207
3	2	$ 621	$ 807	$ 65	7	$ 6938	2285	3	$ 8431
3	3	$ 621	$ 432	$ 72	8	$ 0	0	0	$ 1125
3	4	$ 621	$ 388	$ 72	8	$ 0	0	0	$ 1081
3	5	$ 621	$ 864	$ 144	16	$ 0	0	0	$ 1629
4	1	$ 10548	$ 243533	$ 7612	895	$ 422722	152923	353	$ 684415
4	2	$*********	$ 2339	$ 633	74	$ 2190	2629	6	$*********
4	3	$ 15617	$ 27990	$ 2830	332	$ 14256	15856	14	$ 60693
4	4	$ 10947	$ 9356	$ 2532	297	$ 8760	10516	25	$ 31595
4	5	$ 10548	$ 34801	$ 3518	413	$ 17725	19714	17	$ 66592
5	1	$ 1	$ 0	$ 0	0	$ 12	7	0	$ 13
5	2	$*********	$ 0	$ 0	0	$ 0	0	0	$*********
5	3	$ 1	$ 0	$ 0	0	$ 0	0	0	$ 1
5	4	$ 1	$ 0	$ 0	0	$ 0	0	0	$ 1
5	5	$ 1	$ 0	$ 0	0	$ 0	0	0	$ 1
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 35426	$ 503313	$ 18683	2196	$ 904103	339124	784	$ 1521525
TOTAL	2	$*********	$ 8476	$ 1704	199	$ 9128	4914	9	$*********
TOTAL	3	$ 49176	$ 59430	$ 7866	923	$ 23108	26594	19	$ 139580
TOTAL	4	$ 39294	$ 31064	$ 6628	778	$ 8760	10516	26	$ 85746
TOTAL	5	$ 35426	$ 77767	$ 10478	1230	$ 29320	33781	24	$ 152991

*** SIGNIFIES THAT ROAD CANNUT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 15 DIRECTION PM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 20624	$ 90793	$ 3491	410	$ 27898	17820	58	$ 148806
1	2	$ 27448	$ 20694	$ 1448	170	$ 3119	2045	1	$ 52709
1	3	$ 22837	$ 15284	$ 1356	159	$ 0	0	0	$ 39477
1	4	$ 23610	$ 15532	$ 1484	174	$ 0	0	0	$ 40626
1	5	$ 20624	$ 26148	$ 2319	272	$ 0	0	1	$ 49091
2	1	$ 3632	$ 39255	$ 1337	157	$ 17570	8455	24	$ 61794
2	2	$ 4209	$ 6305	$ 432	50	$ 545	374	0	$ 11491
2	3	$ 3868	$ 5918	$ 450	52	$ 300	396	0	$ 10536
2	4	$ 4115	$ 5688	$ 452	53	$ 24	84	0	$ 10279
2	5	$ 3632	$ 11255	$ 855	100	$ 570	753	0	$ 16312
3	1	$ 621	$ 27823	$ 54	6	$ 354181	108441	143	$ 382679
3	2	$ 621	$ 6667	$ 61	7	$ 149631	45668	45	$ 156980
3	3	$ 621	$ 2300	$ 62	7	$ 69012	21426	16	$ 71995
3	4	$ 621	$ 1128	$ 68	8	$ 3592	6624	3	$ 5409
3	5	$ 621	$ 4600	$ 124	14	$ 138024	42852	32	$ 143369
4	1	$ 10548	$ 129016	$ 3328	391	$ 357208	98009	192	$ 500100
4	2	$ 14495	$ 18499	$ 899	105	$ 1973	1283	4	$ 35866
4	3	$ 10681	$ 11722	$ 1178	138	$ 6498	4168	7	$ 30079
4	4	$ 10947	$ 10360	$ 1340	157	$ 7892	5132	12	$ 30539
4	5	$ 10548	$ 22958	$ 2307	271	$ 12727	8163	13	$ 48540
5	1	$ 1	$ 0	$ 0	0	$ 2	0	0	$ 3
5	2	$ 1	$ 0	$ 0	0	$ 0	0	0	$ 1
5	3	$ 1	$ 0	$ 0	0	$ 0	0	0	$ 1
5	4	$ 1	$ 0	$ 0	0	$ 0	0	0	$ 1
5	5	$ 1	$ 0	$ 0	0	$ 0	0	0	$ 1
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 35426	$ 292887	$ 8210	964	$ 756859	232725	417	$ 1093382
TOTAL	2	$ 46774	$ 52165	$ 2840	332	$ 155268	49370	50	$ 257047
TOTAL	3	$ 38008	$ 35224	$ 3046	356	$ 75810	25990	23	$ 152088
TOTAL	4	$ 39294	$ 32708	$ 3344	392	$ 11508	11840	15	$ 86854
TOTAL	5	$ 35426	$ 64961	$ 5605	657	$ 151321	51768	46	$ 257313

*** SIGNIFIES THAT ROAD CANNUT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQOIRING REOOCED MAINTENANCE
ANALYSIS YEAR: 16 OIRECTION AM PEAK

ACTIVITY NUMBER	CLOSORE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	#X100	LOSS TIME COSTS	HOURS	POLLOTION .01 OAYS	TOTAL COSTS
1	1	$ 20833	$ 250896	$ 8014	942	$ 430285	158677	339	$ 710028
1	2	$*********	$ 4048	$ 770	90	$ 0	0	0	$*********
1	3	$ 29023	$ 25138	$ 3660	430	$ 13500	16068	19	$ 71321
1	4	$ 23734	$ 16192	$ 3080	362	$ 0	0	1	$ 43006
1	5	$ 20833	$ 31509	$ 4587	539	$ 16921	20140	24	$ 73850
2	1	$ 3632	$ 95748	$ 3477	409	$ 62668	42925	96	$ 165525
2	2	$*********	$ 1506	$ 297	34	$ 0	0	0	$*********
2	3	$ 4265	$ 7536	$ 1130	132	$ 2416	2980	2	$ 15347
2	4	$ 4115	$ 6024	$ 1188	139	$ 0	0	0	$ 11327
2	5	$ 3632	$ 13351	$ 2002	235	$ 4280	5279	4	$ 23265
3	1	$ 677	$ 4065	$ 87	10	$ 100131	22540	43	$ 104960
3	2	$ 677	$ 897	$ 75	8	$ 11508	3351	5	$ 13157
3	3	$ 677	$ 486	$ 84	9	$ 0	0	0	$ 1247
3	4	$ 677	$ 436	$ 84	9	$ 0	0	0	$ 1197
3	5	$ 677	$ 972	$ 168	19	$ 0	0	0	$ 1817
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 0	$ 0	$ 0	0	$ 11	4	0	$ 11
5	2	$*********	$ 0	$ 0	0	$ 0	0	0	$*********
5	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 25142	$ 350709	$ 11578	1361	$ 593095	224146	478	$ 980524
TOTAL	2	$*********	$ 6451	$ 1142	132	$ 11508	3351	5	$*********
TOTAL	3	$ 33965	$ 33160	$ 4874	571	$ 15916	19048	21	$ 87915
TOTAL	4	$ 28526	$ 22652	$ 4352	510	$ 0	0	1	$ 55530
TOTAL	5	$ 25142	$ 45832	$ 6757	793	$ 21201	25419	28	$ 98932

*** SIGNIFIES THAT ROAO CANNOT BE OCCUPIEO WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIOM PAVEMENTS REQOIRING REOOCED MAINTENANCE
ANALYSIS YEAR: 16 OIRECTION PM PEAK

ACTIVITY NOMBER	CLOSORE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIOENTS COSTS	#X100	LOSS TIME COSTS	HOORS	POLLOTION .01 OAYS	TOTAL COSTS
1	1	$ 20833	$ 100379	$ 3655	430	$ 28277	18637	57	$ 153144
1	2	$ 27701	$ 20913	$ 1512	177	$ 3516	2333	2	$ 53642
1	3	$ 23064	$ 16286	$ 1356	159	$ 1402	1638	1	$ 42108
1	4	$ 23734	$ 15492	$ 1552	182	$ 0	0	0	$ 40778
1	5	$ 20833	$ 27869	$ 2320	272	$ 2399	2803	1	$ 53421
2	1	$ 3632	$ 40245	$ 1385	162	$ 17821	8798	24	$ 63083
2	2	$ 4209	$ 6317	$ 445	52	$ 625	460	0	$ 11596
2	3	$ 3868	$ 6122	$ 450	52	$ 694	876	0	$ 11134
2	4	$ 4115	$ 5692	$ 464	54	$ 92	244	0	$ 10363
2	5	$ 3632	$ 11643	$ 855	100	$ 1319	1666	1	$ 17449
3	1	$ 677	$ 41692	$ 56	6	$ 407806	126223	161	$ 450231
3	2	$ 677	$ 11602	$ 65	7	$ 189020	59641	61	$ 201364
3	3	$ 677	$ 3064	$ 68	8	$ 94458	29378	21	$ 98267
3	4	$ 677	$ 1376	$ 76	8	$ 4520	8460	4	$ 6649
3	5	$ 677	$ 6128	$ 136	16	$ 188916	58756	42	$ 195857
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 0	$ 0	$ 0	0	$ 1	0	0	$ 1
5	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 25142	$ 182316	$ 5096	598	$ 453905	153658	242	$ 666459
TOTAL	2	$ 32587	$ 38832	$ 2022	236	$ 193161	62434	63	$ 266602
TOTAL	3	$ 27609	$ 25472	$ 1874	219	$ 96554	31892	22	$ 151509
TOTAL	4	$ 28526	$ 22560	$ 2092	244	$ 4612	8704	4	$ 57790
TOTAL	5	$ 25142	$ 45640	$ 3311	388	$ 192634	63225	44	$ 266727

*** SIGNIFIES THAT ROAO CANNOT BE OCCOPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 15 DIRECTION COMBINED

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 41248	$ 326006	$ 11137	1309	$ 390661	152303	368	$ 769052
1	2	$**********	$ 24554	$ 2173	255	$ 3119	2045	1	$**********
1	3	$ 51564	$ 40216	$ 5202	611	$ 7916	9600	4	$ 104898
1	4	$ 47220	$ 30972	$ 4384	515	$ 0	0	1	$ 82576
1	5	$ 41248	$ 57409	$ 7141	839	$ 9925	12037	7	$ 115723
2	1	$ 7264	$ 127030	$ 4695	552	$ 67449	44404	113	$ 206438
2	2	$**********	$ 7775	$ 713	83	$ 545	374	0	$**********
2	3	$ 8078	$ 11994	$ 1568	183	$ 1236	1534	1	$ 22876
2	4	$ 8230	$ 11568	$ 1576	185	$ 24	84	0	$ 21398
2	5	$ 7264	$ 22096	$ 2849	334	$ 2240	2783	1	$ 34449
3	1	$ 1242	$ 30615	$ 121	13	$ 422908	124203	175	$ 454886
3	2	$ 1242	$ 7474	$ 126	14	$ 156569	47953	48	$ 165411
3	3	$ 1242	$ 2732	$ 134	15	$ 69012	21426	16	$ 73120
3	4	$ 1242	$ 1516	$ 140	16	$ 3592	6624	3	$ 6490
3	5	$ 1242	$ 5464	$ 268	30	$ 138024	42852	32	$ 144998
4	1	$ 21096	$ 372549	$ 10940	1286	$ 779930	250932	545	$ 1184515
4	2	$**********	$ 20838	$ 1532	179	$ 4163	3912	10	$**********
4	3	$ 26298	$ 39712	$ 4008	470	$ 20754	20024	21	$ 90772
4	4	$ 21894	$ 19716	$ 3872	454	$ 16652	15648	37	$ 62134
4	5	$ 21096	$ 57759	$ 5825	684	$ 30452	27877	30	$ 115132
5	1	$ 2	$ 0	$ 0	0	$ 14	7	0	$ 16
5	2	$**********	$ 0	$ 0	0	$ 0	0	0	$**********
5	3	$ 2	$ 0	$ 0	0	$ 0	0	0	$ 2
5	4	$ 2	$ 0	$ 0	0	$ 0	0	0	$ 2
5	5	$ 2	$ 0	$ 0	0	$ 0	0	0	$ 2
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 70852	$ 850200	$ 26893	3160	$ 1660962	571849	1201	$ 2614907
TOTAL	2	$**********	$ 60641	$ 4544	531	$ 164396	54284	59	$**********
TOTAL	3	$ 87184	$ 94654	$ 10912	1279	$ 98918	52584	42	$ 291668
TOTAL	4	$ 78588	$ 63772	$ 9972	1170	$ 20268	22356	41	$ 172600
TOTAL	5	$ 70852	$ 142728	$ 16083	1887	$ 180641	85549	70	$ 410304
MINIMUM COSTS		$ 77549	$ 64886	$ 9682	1136	$ 18874	21392	36	$ 170991
DISCOUNTED COSTS		$ 24446	$ 20454	$ 3052	1136	$ 5949	21392	36	$ 53903
ACCUMULATED COSTS		$ 175482	$ 140338	$ 17499	4855	$ 22153	58088	89	$ 355491

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 16 DIRECTION COMBINED

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 41666	$ 351275	$ 11669	1372	$ 458562	177314	396	$ 863172
1	2	$**********	$ 24901	$ 2282	267	$ 3516	2333	2	$**********
1	3	$ 52087	$ 41424	$ 5016	589	$ 14902	17706	20	$ 113429
1	4	$ 47468	$ 31684	$ 4632	544	$ 0	0	1	$ 83784
1	5	$ 41666	$ 59378	$ 6907	811	$ 19320	22943	25	$ 127271
2	1	$ 7264	$ 135993	$ 4862	571	$ 80489	51723	120	$ 228608
2	2	$**********	$ 7823	$ 742	86	$ 625	460	0	$**********
2	3	$ 8133	$ 13658	$ 1580	184	$ 3110	3856	2	$ 26481
2	4	$ 8230	$ 11716	$ 1652	193	$ 92	244	0	$ 21690
2	5	$ 7264	$ 24994	$ 2857	335	$ 5599	6945	5	$ 40714
3	1	$ 1354	$ 45757	$ 143	16	$ 507937	148763	204	$ 555191
3	2	$ 1354	$ 12499	$ 140	15	$ 200528	62992	66	$ 214521
3	3	$ 1354	$ 3550	$ 152	17	$ 94458	29378	21	$ 99514
3	4	$ 1354	$ 1812	$ 160	17	$ 4520	8460	4	$ 7846
3	5	$ 1354	$ 7100	$ 304	35	$ 188916	58756	42	$ 197674
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 0	$ 0	$ 0	0	$ 12	4	0	$ 12
5	2	$**********	$ 0	$ 0	0	$ 0	0	0	$**********
5	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 50284	$ 533025	$ 16674	1959	$ 1047000	377804	720	$ 1646983
TOTAL	2	$**********	$ 45283	$ 3164	368	$ 204669	65785	68	$**********
TOTAL	3	$ 61574	$ 58632	$ 6748	790	$ 112470	50940	43	$ 239424
TOTAL	4	$ 57052	$ 45212	$ 6444	754	$ 4612	8704	5	$ 113320
TOTAL	5	$ 50284	$ 91472	$ 10068	1181	$ 213835	88644	72	$ 365659
MINIMUM COSTS		$ 57052	$ 45212	$ 6444	754	$ 4612	8704	5	$ 113320
DISCOUNTED COSTS		$ 16653	$ 13197	$ 1880	754	$ 1346	8704	5	$ 33077
ACCUMULATED COSTS		$ 192135	$ 153535	$ 19379	5609	$ 23499	66792	94	$ 388568

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 17 DIRECTION AM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 20928	$ 275858	$ 8102	953	$ 588230	217931	381	$ 893118
1	2	$*********	$ 4579	$ 783	92	$ 625	946	0	$*********
1	3	$ 29158	$ 26240	$ 3846	452	$ 54714	32908	48	$ 113958
1	4	$ 23890	$ 18316	$ 3132	368	$ 2500	3784	2	$ 47838
1	5	$ 20928	$ 32885	$ 4820	567	$ 68570	41242	60	$ 127203
2	1	$ 3632	$ 104810	$ 3454	406	$ 116968	66929	108	$ 228864
2	2	$*********	$ 1781	$ 292	34	$ 375	567	0	$*********
2	3	$ 4265	$ 7938	$ 1170	137	$ 3730	4678	4	$ 17103
2	4	$ 4115	$ 7124	$ 1168	137	$ 1500	2268	1	$ 13907
2	5	$ 3632	$ 14063	$ 2072	243	$ 6608	8288	7	$ 26375
3	1	$ 734	$ 4333	$ 107	12	$ 130473	30824	55	$ 135647
3	2	$ 734	$ 1022	$ 86	10	$ 15902	4032	7	$ 17744
3	3	$ 734	$ 538	$ 96	11	$ 0	0	0	$ 1368
3	4	$ 734	$ 480	$ 96	11	$ 0	0	0	$ 1310
3	5	$ 734	$ 1076	$ 192	22	$ 0	0	0	$ 2002
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 0	$ 0	$ 0	0	$ 15	5	0	$ 15
5	2	$*********	$ 0	$ 0	0	$ 0	0	0	$*********
5	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 337921	$ 6063609	$ 22707	2671	$55254192	13467555	24424	$ 61678429
7	2	$ 337921	$ 180124	$ 4372	514	$ 2516236	615288	1136	$ 3038653
7	3	$ 337921	$ 666798	$ 3042	357	$16489934	3849322	7198	$ 17497695
7	4	$ 337921	$ 104016	$ 3256	383	$ 1232556	405204	648	$ 1677749
7	5	$ 337921	$ 1331926	$ 6076	714	$32938576	7689006	14378	$ 34614499
TOTAL	1	$ 363215	$ 6448610	$ 34370	4042	$56089878	13783244	24968	$ 62936073
TOTAL	2	$*********	$ 187506	$ 5533	650	$ 2533138	621433	1143	$*********
TOTAL	3	$ 372078	$ 701514	$ 8154	957	$16548378	3886908	7250	$ 17630124
TOTAL	4	$ 366660	$ 129936	$ 7652	899	$ 1236556	411256	651	$ 1740804
TOTAL	5	$ 363215	$ 1379950	$ 13160	1546	$33013754	7738536	14445	$ 34770079

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 17 DIRECTION PM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 20928	$ 103523	$ 3798	446	$ 28637	19473	57	$ 156886
1	2	$ 27841	$ 21044	$ 1568	184	$ 3827	2592	2	$ 54280
1	3	$ 23168	$ 16374	$ 1404	165	$ 1408	1708	1	$ 42354
1	4	$ 23890	$ 15760	$ 1620	190	$ 0	0	0	$ 41270
1	5	$ 20928	$ 28022	$ 2402	282	$ 2409	2923	1	$ 53761
2	1	$ 3632	$ 41256	$ 1431	168	$ 18491	9170	23	$ 64810
2	2	$ 4209	$ 6325	$ 459	54	$ 699	518	0	$ 11692
2	3	$ 3868	$ 6118	$ 464	54	$ 740	970	0	$ 11190
2	4	$ 4115	$ 5728	$ 480	56	$ 188	304	0	$ 10511
2	5	$ 3632	$ 11636	$ 882	103	$ 1407	1844	1	$ 17557
3	1	$ 734	$ 47312	$ 63	7	$ 454261	140952	170	$ 502370
3	2	$ 734	$ 13804	$ 73	8	$ 214695	67851	67	$ 229306
3	3	$ 734	$ 3488	$ 76	8	$ 110456	33986	23	$ 114754
3	4	$ 734	$ 1488	$ 88	10	$ 4824	9184	4	$ 7134
3	5	$ 734	$ 6976	$ 152	17	$ 220912	67972	47	$ 228774
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 0	$ 0	$ 0	0	$ 1	0	0	$ 1
5	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 337921	$ 2578594	$ 22204	2612	$16268497	4814759	5327	$ 19207216
7	2	$ 337921	$ 34163	$ 2450	288	$ 515029	167918	133	$ 889563
7	3	$ 337921	$ 32712	$ 2602	306	$ 23598	30800	31	$ 396833
7	4	$ 337921	$ 75284	$ 2964	348	$ 1904936	627068	446	$ 2321105
7	5	$ 337921	$ 65342	$ 5197	611	$ 47136	61522	63	$ 455596
TOTAL	1	$ 363215	$ 2770685	$ 27496	3233	$16769887	4964354	5577	$ 19931283
TOTAL	2	$ 370705	$ 75336	$ 4550	534	$ 734250	238879	202	$ 1184841
TOTAL	3	$ 365691	$ 58692	$ 4546	533	$ 136202	67464	55	$ 565131
TOTAL	4	$ 366660	$ 98260	$ 5152	604	$ 1909948	636556	450	$ 2380020
TOTAL	5	$ 363215	$ 111976	$ 8633	1013	$ 271864	134261	112	$ 755688

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 18 DIRECTION AM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 712	$ 14125	$ 31	3	$ 0	0	0	$ 14868
1	2	$**********	$ 148	$ 0	0	$ 0	0	0	$**********
1	3	$**********	$ 0	$ 0	0	$ 0	0	0	$**********
1	4	$ 743	$ 592	$ 408	48	$ 29467	12820	19	$ 31210
1	5	$**********	$ 0	$ 0	0	$ 0	0	0	$**********
2	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	1	$ 790	$ 5004	$ 116	13	$ 175834	41854	66	$ 181744
3	2	$ 790	$ 1154	$ 104	12	$ 21808	6451	9	$ 23856
3	3	$ 790	$ 594	$ 108	12	$ 0	0	0	$ 1492
3	4	$ 790	$ 552	$ 108	12	$ 0	0	0	$ 1450
3	5	$ 790	$ 1188	$ 216	25	$ 0	0	0	$ 2194
4	1	$ 5	$ 66	$ 0	0	$ 0	0	0	$ 71
4	2	$**********	$ 0	$ 0	0	$ 0	0	0	$**********
4	3	$**********	$ 0	$ 0	0	$ 0	0	0	$**********
4	4	$ 6	$ 0	$ 1	0	$ 546	133	0	$ 553
4	5	$**********	$ 0	$ 0	0	$ 0	0	0	$**********
5	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	2	$**********	$ 0	$ 0	0	$ 0	0	0	$**********
5	3	$**********	$ 0	$ 0	0	$ 0	0	0	$**********
5	4	$ 0	$ 0	$ 0	0	$ 14	3	0	$ 14
5	5	$**********	$ 0	$ 0	0	$ 0	0	0	$**********
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 1507	$ 19195	$ 147	16	$ 175834	41854	66	$ 196683
TOTAL	2	$**********	$ 1302	$ 104	12	$ 21808	6451	9	$**********
TOTAL	3	$**********	$ 594	$ 108	12	$ 0	0	0	$**********
TOTAL	4	$ 1539	$ 1144	$ 517	60	$ 30027	12956	19	$ 33227
TOTAL	5	$**********	$ 1188	$ 216	25	$ 0	0	0	$**********

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 18 DIRECTION PM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 712	$ 4075	$ 119	14	$ 4170	1441	2	$ 9076
1	2	$ 750	$ 794	$ 39	4	$ 364	254	0	$ 1947
1	3	$ 753	$ 526	$ 78	9	$ 678	208	1	$ 2035
1	4	$ 743	$ 536	$ 36	4	$ 0	0	0	$ 1315
1	5	$ 712	$ 996	$ 147	17	$ 1285	394	3	$ 3140
2	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	1	$ 790	$ 38756	$ 64	7	$ 507787	158572	116	$ 547397
3	2	$ 790	$ 15928	$ 76	8	$ 250516	80089	58	$ 267310
3	3	$ 790	$ 6580	$ 78	9	$ 142242	44458	30	$ 149690
3	4	$ 790	$ 1792	$ 92	10	$ 5908	11260	5	$ 8582
3	5	$ 790	$ 13160	$ 156	18	$ 284484	88916	61	$ 298590
4	1	$ 5	$ 0	$ 0	0	$ 6	1	0	$ 11
4	2	$ 6	$ 0	$ 0	0	$ 0	0	0	$ 6
4	3	$ 6	$ 0	$ 0	0	$ 0	0	0	$ 6
4	4	$ 6	$ 0	$ 0	0	$ 0	0	0	$ 6
4	5	$ 5	$ 0	$ 0	0	$ 0	0	0	$ 5
5	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 1507	$ 42831	$ 183	21	$ 511963	160014	118	$ 556484
TOTAL	2	$ 1546	$ 16722	$ 115	12	$ 250880	80343	58	$ 269263
TOTAL	3	$ 1549	$ 7106	$ 156	18	$ 142920	44666	31	$ 151731
TOTAL	4	$ 1539	$ 2328	$ 128	14	$ 5908	11260	5	$ 9903
TOTAL	5	$ 1507	$ 14156	$ 303	35	$ 285769	89310	64	$ 301735

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 17 DIRECTION COMBINED

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 41856	$ 379381	$ 11900	1399	$ 616867	237404	438	$ 1050004
1	2	$**********	$ 23623	$ 2351	276	$ 4452	3538	2	$**********
1	3	$ 52326	$ 42614	$ 5250	617	$ 56122	34616	49	$ 156312
1	4	$ 47780	$ 34076	$ 4752	558	$ 2500	3784	2	$ 89108
1	5	$ 41856	$ 60907	$ 7222	849	$ 70979	44165	61	$ 180964
2	1	$ 7264	$ 146066	$ 4885	574	$ 135459	76099	131	$ 293674
2	2	$**********	$ 8106	$ 751	88	$ 1074	1085	0	$**********
2	3	$ 8133	$ 14056	$ 1634	191	$ 4470	5648	4	$ 28293
2	4	$ 8230	$ 12852	$ 1648	193	$ 1688	2572	1	$ 24418
2	5	$ 7264	$ 25699	$ 2954	346	$ 8015	10132	8	$ 43932
3	1	$ 1468	$ 51645	$ 170	19	$ 584734	171776	225	$ 638017
3	2	$ 1468	$ 14826	$ 159	18	$ 230597	72483	74	$ 247050
3	3	$ 1468	$ 4026	$ 172	19	$ 110456	33986	23	$ 116122
3	4	$ 1468	$ 1968	$ 184	21	$ 4824	9184	4	$ 8444
3	5	$ 1468	$ 8052	$ 344	39	$ 220912	67972	47	$ 230776
4	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
4	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	1	$ 0	$ 0	$ 0	0	$ 16	5	0	$ 16
5	2	$**********	$ 0	$ 0	0	$ 0	0	0	$**********
5	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 675842	$ 8642203	$ 44911	5283	$71522689	18282314	29751	$ 80885645
7	2	$ 675842	$ 214287	$ 6822	802	$ 3031265	783206	1269	$ 3928216
7	3	$ 675842	$ 699510	$ 5644	663	$16513532	3880122	7229	$ 17894528
7	4	$ 675842	$ 179300	$ 6220	731	$ 3137492	1032272	1094	$ 3998854
7	5	$ 675842	$ 1397268	$ 11273	1325	$32985712	7750528	14441	$ 35070095
TOTAL	1	$ 726430	$ 9219295	$ 61866	7275	$72859765	18767598	30545	$ 82867356
TOTAL	2	$**********	$ 262842	$ 10083	1184	$ 3267388	860312	1345	$**********
TOTAL	3	$ 737769	$ 760206	$ 12700	1490	$16684580	3954372	7305	$ 18195255
TOTAL	4	$ 733320	$ 228196	$ 12804	1503	$ 3146504	1047812	1101	$ 4120824
TOTAL	5	$ 726430	$ 1491926	$ 21793	2559	$33285616	7872797	14557	$ 35525767
MINIMUM COSTS		$ 733320	$ 185624	$ 12442	1461	$ 1205166	451544	686	$ 2196552
DISCOUNTED COSTS		$ 198195	$ 50168	$ 3362	1461	$ 341938	451544	686	$ 593665
ACCUMULATED COSTS		$ 390330	$ 203703	$ 22741	7070	$ 365437	518336	780	$ 982233

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 18 DIRECTION COMBINED

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 1424	$ 18200	$ 150	17	$ 4170	1441	2	$ 23944
1	2	$**********	$ 942	$ 39	4	$ 364	254	0	$**********
1	3	$**********	$ 526	$ 78	9	$ 678	208	1	$**********
1	4	$ 1486	$ 1128	$ 444	52	$ 29467	12820	19	$ 32525
1	5	$**********	$ 996	$ 147	17	$ 1285	394	3	$**********
2	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	1	$ 1580	$ 43760	$ 180	20	$ 683621	200426	182	$ 729141
3	2	$ 1580	$ 17082	$ 180	20	$ 272324	86540	67	$ 291166
3	3	$ 1580	$ 7174	$ 186	21	$ 142242	44458	30	$ 151182
3	4	$ 1580	$ 2344	$ 200	22	$ 5908	11260	5	$ 10032
3	5	$ 1580	$ 14348	$ 372	43	$ 284484	83916	61	$ 300784
4	1	$ 10	$ 66	$ 0	0	$ 6	1	0	$ 82
4	2	$**********	$ 0	$ 0	0	$ 0	0	0	$**********
4	3	$**********	$ 0	$ 0	0	$ 0	0	0	$**********
4	4	$ 12	$ 0	$ 1	0	$ 546	133	0	$ 559
4	5	$**********	$ 0	$ 0	0	$ 0	0	0	$**********
5	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	2	$**********	$ 0	$ 0	0	$ 0	0	0	$**********
5	3	$**********	$ 0	$ 0	0	$ 0	0	0	$**********
5	4	$ 0	$ 0	$ 0	0	$ 14	3	0	$ 14
5	5	$**********	$ 0	$ 0	0	$ 0	0	0	$**********
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 3014	$ 62026	$ 330	37	$ 687797	201868	184	$ 753167
TOTAL	2	$**********	$ 18024	$ 219	24	$ 272688	86794	67	$**********
TOTAL	3	$**********	$ 7700	$ 264	30	$ 142920	44666	31	$**********
TOTAL	4	$ 3078	$ 3472	$ 645	74	$ 35935	24216	24	$ 43130
TOTAL	5	$**********	$ 15344	$ 519	60	$ 285769	89310	64	$**********
MINIMUM COSTS		$ 3045	$ 17071	$ 267	29	$ 5908	11260	5	$ 26291
DISCOUNTED COSTS		$ 762	$ 4272	$ 66	29	$ 1478	11260	5	$ 6579
ACCUMULATED COSTS		$ 391092	$ 207975	$ 22807	7099	$ 366915	529596	785	$ 988812

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 19 DIRECTION AM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 2731	$ 51884	$ 170	20	$ 0	0	0	$ 54785
1	2	$**********	$ 819	$ 0	0	$ 0	0	0	$**********
1	3	$**********	$ 0	$ 0	0	$ 0	0	0	$**********
1	4	$ 3885	$ 3276	$ 1512	177	$ 111020	45770	56	$ 119693
1	5	$**********	$ 0	$ 0	0	$ 0	0	0	$**********
2	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	1	$ 846	$ 4925	$ 130	15	$ 222511	52858	79	$ 228412
3	2	$ 846	$ 2454	$ 118	13	$ 48060	11199	17	$ 51478
3	3	$ 846	$ 652	$ 122	14	$ 0	0	0	$ 1620
3	4	$ 846	$ 600	$ 124	14	$ 0	0	0	$ 1570
3	5	$ 846	$ 1304	$ 244	28	$ 0	0	0	$ 2394
4	1	$ 29	$ 560	$ 1	0	$ 0	0	0	$ 590
4	2	$**********	$ 0	$ 0	0	$ 0	0	0	$**********
4	3	$**********	$ 0	$ 0	0	$ 0	0	0	$**********
4	4	$ 34	$ 0	$ 9	1	$ 3505	900	1	$ 3548
4	5	$**********	$ 0	$ 0	0	$ 0	0	0	$**********
5	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	2	$**********	$ 0	$ 0	0	$ 0	0	0	$**********
5	3	$**********	$ 0	$ 0	0	$ 0	0	0	$**********
5	4	$ 0	$ 0	$ 0	0	$ 15	1	0	$ 15
5	5	$**********	$ 0	$ 0	0	$ 0	0	0	$**********
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 3606	$ 57369	$ 301	35	$ 222511	52858	79	$ 283787
TOTAL	2	$**********	$ 3273	$ 118	13	$ 48060	11199	17	$**********
TOTAL	3	$**********	$ 652	$ 122	14	$ 0	0	0	$**********
TOTAL	4	$ 4765	$ 3876	$ 1645	192	$ 114540	46671	57	$ 124826
TOTAL	5	$**********	$ 1304	$ 244	28	$ 0	0	0	$**********

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 19 DIRECTION PM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 2731	$ 18174	$ 640	75	$ 8889	4381	10	$ 30434
1	2	$ 4123	$ 4413	$ 230	27	$ 2142	1527	1	$ 10908
1	3	$ 4091	$ 3056	$ 436	51	$ 4504	1404	3	$ 12087
1	4	$ 3885	$ 2908	$ 216	25	$ 0	0	0	$ 7009
1	5	$ 2731	$ 4137	$ 590	69	$ 6098	1901	4	$ 13556
2	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	1	$ 846	$ 43339	$ 70	8	$ 557731	174668	121	$ 601986
3	2	$ 846	$ 17978	$ 82	9	$ 278530	89203	61	$ 297436
3	3	$ 846	$ 7446	$ 86	10	$ 160526	50276	33	$ 168904
3	4	$ 846	$ 1908	$ 100	11	$ 6228	12072	5	$ 9082
3	5	$ 846	$ 14892	$ 172	20	$ 321052	100552	66	$ 336962
4	1	$ 29	$ 53	$ 3	0	$ 53	20	0	$ 138
4	2	$ 34	$ 11	$ 0	0	$ 5	0	0	$ 50
4	3	$ 34	$ 6	$ 0	0	$ 10	14	0	$ 50
4	4	$ 34	$ 0	$ 0	0	$ 0	0	0	$ 34
4	5	$ 29	$ 7	$ 0	0	$ 12	17	0	$ 48
5	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 3606	$ 61566	$ 713	83	$ 566673	179069	131	$ 632558
TOTAL	2	$ 5003	$ 22402	$ 312	36	$ 280677	90730	62	$ 308394
TOTAL	3	$ 4971	$ 10508	$ 522	61	$ 165040	51694	36	$ 181041
TOTAL	4	$ 4765	$ 4816	$ 316	36	$ 6228	12072	5	$ 16125
TOTAL	5	$ 3606	$ 19036	$ 762	89	$ 327162	102470	70	$ 350566

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 20 DIRECTION AM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 10047	$ 202416	$ 593	69	$ 0	0	0	$ 213056
1	2	$*********	$ 2860	$ 0	0	$ 0	0	0	$*********
1	3	$*********	$ 0	$ 0	0	$ 0	0	0	$*********
1	4	$ 12469	$ 11440	$ 5610	660	$ 497937	188510	198	$ 527456
1	5	$*********	$ 0	$ 0	0	$ 0	0	0	$*********
2	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	1	$ 903	$ 6619	$ 150	17	$ 280905	67860	97	$ 288577
3	2	$ 903	$ 3358	$ 140	16	$ 68054	18170	25	$ 72455
3	3	$ 903	$ 850	$ 120	14	$ 262	408	0	$ 2135
3	4	$ 903	$ 636	$ 140	16	$ 0	0	0	$ 1679
3	5	$ 903	$ 1700	$ 240	28	$ 524	816	0	$ 3367
4	1	$ 162	$ 3945	$ 6	0	$ 16	24	0	$ 4129
4	2	$*********	$ 18	$ 0	0	$ 0	0	0	$*********
4	3	$*********	$ 0	$ 0	0	$ 0	0	0	$*********
4	4	$ 189	$ 72	$ 57	6	$ 25003	6478	9	$ 25321
4	5	$*********	$ 0	$ 0	0	$ 0	0	0	$*********
5	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	2	$*********	$ 0	$ 0	0	$ 0	0	0	$*********
5	3	$*********	$ 0	$ 0	0	$ 0	0	0	$*********
5	4	$ 0	$ 0	$ 0	0	$ 12	0	0	$ 12
5	5	$*********	$ 0	$ 0	0	$ 0	0	0	$*********
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 11112	$ 212980	$ 749	86	$ 280921	67884	97	$ 505762
TOTAL	2	$*********	$ 6236	$ 140	16	$ 68054	18170	25	$*********
TOTAL	3	$*********	$ 850	$ 120	14	$ 262	408	0	$*********
TOTAL	4	$ 13561	$ 12148	$ 5807	682	$ 522952	194988	207	$ 554468
TOTAL	5	$*********	$ 1700	$ 240	28	$ 524	816	0	$*********

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 20 DIRECTION PM PEAK

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 10047	$ 70352	$ 2672	314	$ 17113	13471	34	$ 100184
1	2	$ 20347	$ 22444	$ 1292	152	$ 12055	8888	6	$ 56138
1	3	$ 18807	$ 15518	$ 1150	135	$ 716	882	0	$ 36191
1	4	$ 12469	$ 10048	$ 1228	144	$ 0	0	0	$ 23745
1	5	$ 10047	$ 16581	$ 1228	144	$ 765	942	0	$ 28621
2	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	1	$ 903	$ 48209	$ 77	9	$ 609139	191275	126	$ 658328
3	2	$ 903	$ 20187	$ 89	10	$ 307616	98717	65	$ 328795
3	3	$ 903	$ 8382	$ 94	11	$ 179630	56350	35	$ 189009
3	4	$ 903	$ 2084	$ 104	12	$ 6616	13072	5	$ 9707
3	5	$ 903	$ 16764	$ 188	22	$ 359260	112700	71	$ 377115
4	1	$ 162	$ 505	$ 18	2	$ 352	149	0	$ 1037
4	2	$ 190	$ 93	$ 5	0	$ 52	15	0	$ 340
4	3	$ 177	$ 62	$ 6	0	$ 54	30	0	$ 299
4	4	$ 189	$ 76	$ 8	0	$ 52	20	0	$ 325
4	5	$ 162	$ 92	$ 8	0	$ 80	44	0	$ 342
5	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 11112	$ 119066	$ 2767	325	$ 626604	204895	160	$ 759549
TOTAL	2	$ 21440	$ 42724	$ 1386	162	$ 319723	107620	71	$ 385273
TOTAL	3	$ 19887	$ 23962	$ 1250	146	$ 180430	57262	35	$ 225499
TOTAL	4	$ 13561	$ 12208	$ 1340	156	$ 6668	13092	5	$ 33777
TOTAL	5	$ 11112	$ 33437	$ 1424	166	$ 360105	113686	71	$ 406078

*** SIGNIFIES THAT ROAD CANNOT BE OCCUPIED WITHIN V/C CONSTRAINTS

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 19 DIRECTION COMBINED

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 5462	$ 70058	$ 810	95	$ 8889	4381	10	$ 85219
1	2	$*********	$ 5232	$ 230	27	$ 2142	1527	1	$*********
1	3	$*********	$ 3056	$ 436	51	$ 4504	1404	3	$*********
1	4	$ 7770	$ 6184	$ 1728	202	$ 111020	45770	56	$ 126702
1	5	$*********	$ 4137	$ 590	69	$ 6098	1901	4	$*********
2	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	1	$ 1692	$ 48264	$ 200	23	$ 780242	227526	200	$ 830398
3	2	$ 1692	$ 20432	$ 200	22	$ 326590	100402	78	$ 348914
3	3	$ 1692	$ 8098	$ 208	24	$ 160526	50276	33	$ 170524
3	4	$ 1692	$ 2508	$ 224	25	$ 6228	12072	5	$ 10652
3	5	$ 1692	$ 16196	$ 416	48	$ 321052	100552	66	$ 339356
4	1	$ 58	$ 613	$ 4	0	$ 53	20	0	$ 728
4	2	$*********	$ 11	$ 0	0	$ 5	0	0	$*********
4	3	$*********	$ 6	$ 0	0	$ 10	14	0	$*********
4	4	$ 68	$ 0	$ 9	1	$ 3505	900	1	$ 3582
4	5	$*********	$ 7	$ 0	0	$ 12	17	0	$*********
5	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	2	$*********	$ 0	$ 0	0	$ 0	0	0	$*********
5	3	$*********	$ 0	$ 0	0	$ 0	0	0	$*********
5	4	$ 0	$ 0	$ 0	0	$ 15	1	0	$ 15
5	5	$*********	$ 0	$ 0	0	$ 0	0	0	$*********
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 7212	$ 118935	$ 1014	118	$ 789184	231927	210	$ 916345
TOTAL	2	$*********	$ 25675	$ 430	49	$ 328737	101929	79	$*********
TOTAL	3	$*********	$ 11160	$ 644	75	$ 165040	51694	36	$*********
TOTAL	4	$ 9530	$ 8692	$ 1961	228	$ 120768	58743	62	$ 140951
TOTAL	5	$*********	$ 20340	$ 1006	117	$ 327162	102470	70	$*********
MINIMUM COSTS		$ 8371	$ 57860	$ 611	70	$ 6228	12072	5	$ 73070
DISCOUNTED COSTS		$ 1939	$ 13407	$ 141	70	$ 1443	12072	5	$ 16931
ACCUMULATED COSTS		$ 393031	$ 221382	$ 22948	7169	$ 368358	541668	790	$ 1005743

TRAFFIC WARRENTS FOR PREMIUM PAVEMENTS REQUIRING REDUCED MAINTENANCE
ANALYSIS YEAR: 20 DIRECTION COMBINED

ACTIVITY NUMBER	CLOSURE CATEGORY	MAINTENANCE & REHABILITATION	OPERATION COSTS	ACCIDENTS COSTS	ACCIDENTS #X100	LOSS TIME COSTS	LOSS TIME HOURS	POLLUTION .01 DAYS	TOTAL COSTS
1	1	$ 20094	$ 272768	$ 3265	383	$ 17113	13471	34	$ 313240
1	2	$*********	$ 25304	$ 1292	152	$ 12055	8888	6	$*********
1	3	$*********	$ 15518	$ 1150	135	$ 716	882	0	$*********
1	4	$ 24938	$ 21488	$ 6838	804	$ 497937	188510	198	$ 551201
1	5	$*********	$ 16581	$ 1228	144	$ 765	942	0	$*********
2	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
2	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
3	1	$ 1806	$ 54828	$ 227	26	$ 890044	259135	223	$ 946905
3	2	$ 1806	$ 23545	$ 229	26	$ 375670	116887	90	$ 401250
3	3	$ 1806	$ 9232	$ 214	25	$ 179892	56758	35	$ 191144
3	4	$ 1806	$ 2720	$ 244	28	$ 6616	13072	5	$ 11386
3	5	$ 1806	$ 18464	$ 428	50	$ 359784	113516	71	$ 380482
4	1	$ 324	$ 4450	$ 24	2	$ 368	173	0	$ 5166
4	2	$*********	$ 111	$ 5	0	$ 52	15	0	$*********
4	3	$*********	$ 62	$ 6	0	$ 54	30	0	$*********
4	4	$ 378	$ 148	$ 65	6	$ 25055	6498	9	$ 25646
4	5	$*********	$ 92	$ 8	0	$ 80	44	0	$*********
5	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
5	2	$*********	$ 0	$ 0	0	$ 0	0	0	$*********
5	3	$*********	$ 0	$ 0	0	$ 0	0	0	$*********
5	4	$ 0	$ 0	$ 0	0	$ 12	0	0	$ 12
5	5	$*********	$ 0	$ 0	0	$ 0	0	0	$*********
6	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
6	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	1	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	2	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	3	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	4	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
7	5	$ 0	$ 0	$ 0	0	$ 0	0	0	$ 0
TOTAL	1	$ 22224	$ 332046	$ 3516	411	$ 907525	272779	257	$ 1265311
TOTAL	2	$*********	$ 48960	$ 1526	178	$ 387777	125790	96	$*********
TOTAL	3	$*********	$ 24812	$ 1370	160	$ 180662	57670	35	$*********
TOTAL	4	$ 27122	$ 24356	$ 7147	838	$ 529620	208080	212	$ 588245
TOTAL	5	$*********	$ 35137	$ 1664	194	$ 360629	114502	71	$*********
MINIMUM COSTS		$ 24661	$ 219191	$ 2077	241	$ 6686	13126	5	$ 252615
DISCOUNTED COSTS		$ 5291	$ 47027	$ 445	241	$ 1434	13126	5	$ 54198
ACCUMULATED COSTS		$ 398322	$ 268409	$ 23393	7410	$ 369792	554794	795	$ 1059941
ACCUMULATED COSTS		$ 398322	$ 268409	$ 23393	7410	$ 369792	554794	795	$ 1059941