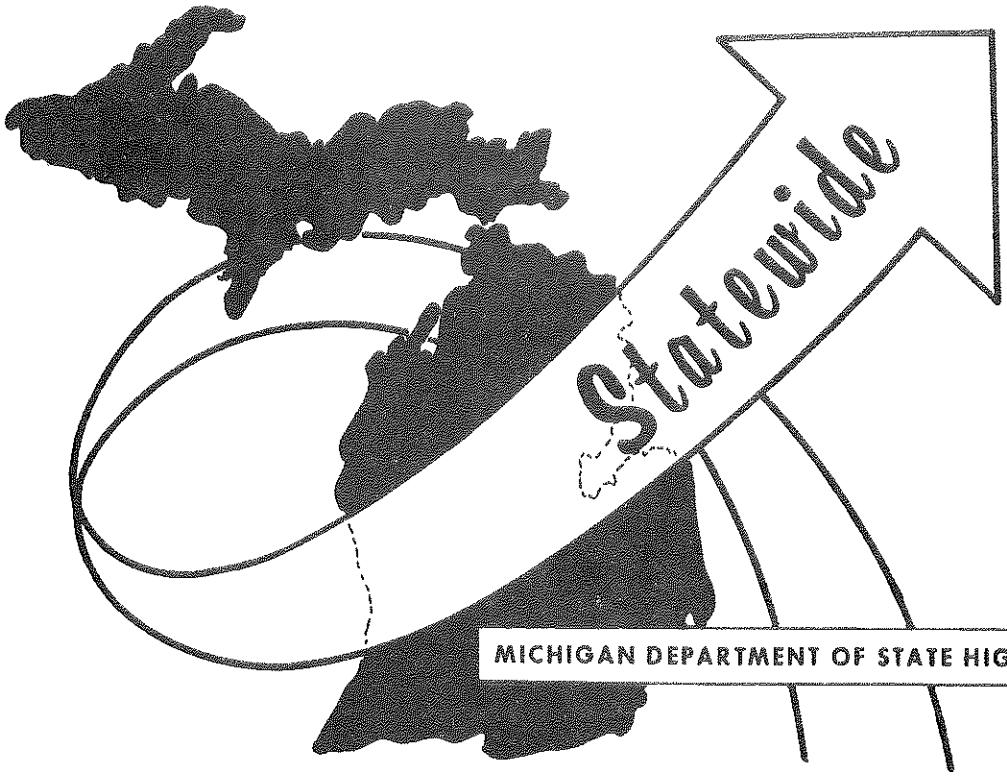
Statewide Transportation Analysis & Research

MICHIGAN'S STATEWIDE
TRANSPORTATION MODELING SYSTEM

VOLUME XV-B

RAILROAD COMMUNITY IMPACT ANALYSIS

STATEWIDE TRANSPORTATION
PLANNING PROCEDURES



MICHIGAN DEPARTMENT OF STATE HIGHWAYS AND TRANSPORTATION

MICHIGAN DEPARTMENT

OF

STATE HIGHWAYS AND TRANSPORTATION

BUREAU OF TRANSPORTATION PLANNING

MICHIGAN'S STATEWIDE
TRANSPORTATION MODELING SYSTEM

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RAILROAD COMMUNITY IMPACT ANALYSIS

STATEWIDE TRANSPORTATION
PLANNING PROCEDURES

STATE OF MICHIGAN

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DEPARTMENT OF STATE HIGHWAYS AND TRANSPORTATION

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JOHN P. WOODFORD, DIRECTOR

February 3, 1976

Mr. Sam F. Cryderman, Deputy Director
Bureau of Transportation Planning
Michigan Department of State Highways
and Transportation
P.O. Drawer K
Lansing, Michigan 48904

Dear Mr. Cryderman:

The Highway Planning Division has recently been involved in developing a railroad impact analysis process. The present emphasis on all transportation modes, and upon railroads in particular, has made the development of such a process a necessary step in transportation planning. It makes many types of railroad impact analysis available. Each of these are produced by utilizing the available railroad data, the existing statewide transportation model, and several procedures developed specifically for use in this analysis process.

Several reports have been written to describe this analysis process. This report describes the Railroad Community Impact Process. This analysis procedure was initially developed by R. L. Banks and Associates, Inc., under contract to the Rail Planning Section, to help assess the probable impact of railroad abandonments upon the surrounding communities. Their procedure has been adapted to make full use of the Statewide Transportation Model and the available railroad data.

The Community Impact Analysis Process, together with the adaption to the Statewide Transportation Model and available railroad data, is described in this report by Miss Joyce Newell, a member of the Statewide Transportation Planning Procedures Section, managed by Mr. Richard E. Esch.

Sincerely,

R. J. Lilly

R. J. Lilly, Administrator
Highway Planning Division

TABLE OF CONTENTS

"RAILROAD COMMUNITY IMPACT ANALYSIS"

by

Joyce A. Newell

Page

PREFACE 1

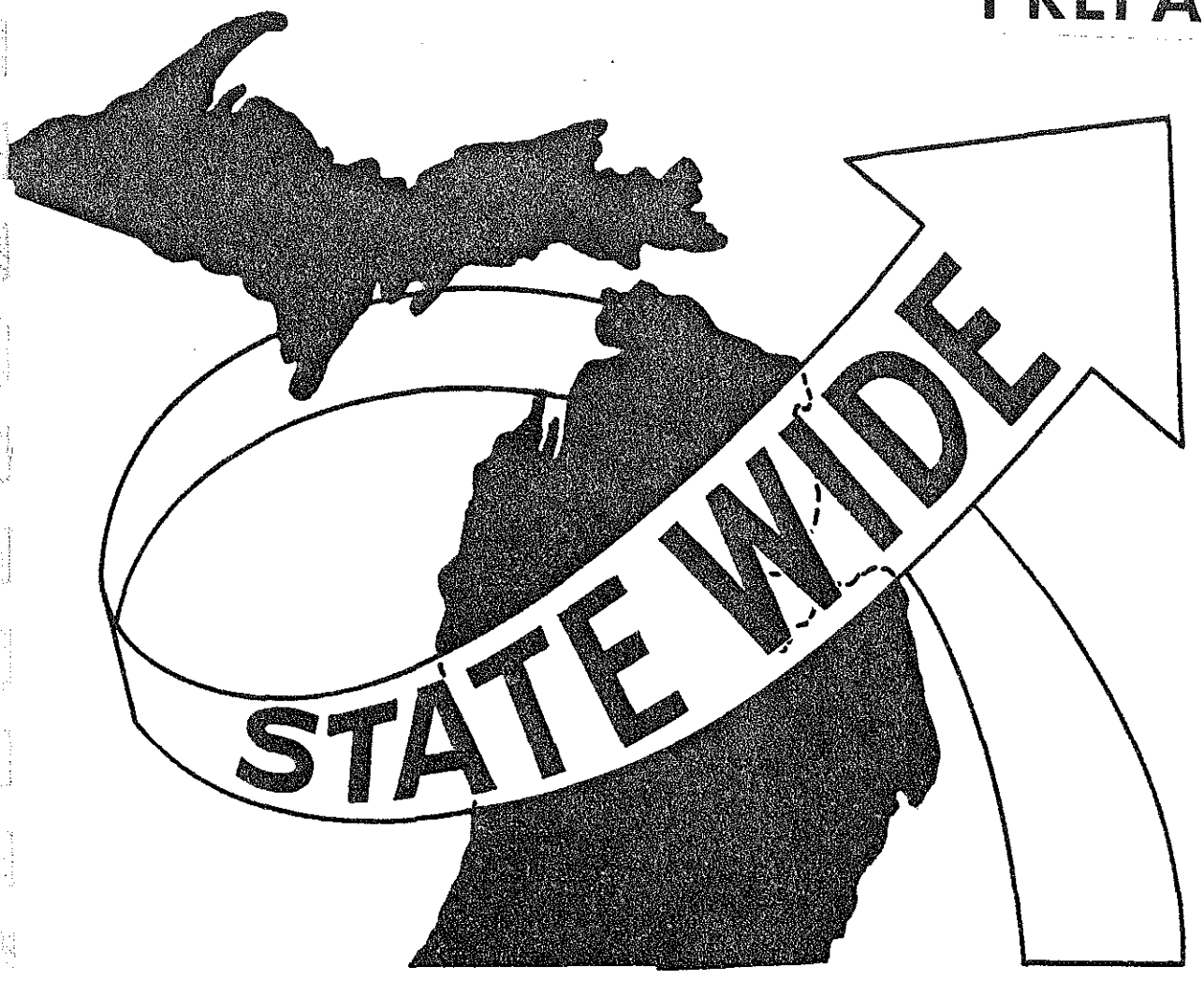
INTRODUCTION 4

MODEL OPERATION 9

APPLICATION 27

CONCLUSION 32

PREFACE



PREFACE

Multi-modal planning is becoming an increasingly vital part of transportation planning. This is due, in part, to an increased awareness of possible environmental, economic, and social impacts upon already delicately balanced areas. The growing concern is reflected in the Federal-Aid Highway Act of 1970 which states that "appropriate consideration must be given to reasonable alternatives, including the alternative of not building the project and alternative modes . . . appropriate alternatives which might minimize or avoid social, economic, or environmental effects should be studied and described." In anticipation of growing demands for multi-modal studies, the development of a multi-modal system was begun over two years ago. Reports describing such developments and the resultant modal networks are XIII-Michigan Goes Multi-Modal and XIII-A Multi-Modal Mobility and Accessibility Analysis; these reports, and all others listed on page 3, are available from the Statewide Transportation Planning Procedures Section, Michigan Department of State Highways and Transportation. Other reports will soon be made available describing the most recent developments in this area.

One important area of multi-modal planning, namely railroad planning, has been of extreme importance in the past several months, largely due to the Rail Reorganization Act of 1973 and the recent deadline for submitting a Michigan Phase II Railroad Plan. Many tools were developed to permit quick, effective analysis of Michigan's Railroad System. Railroad waybill tapes were utilized to study past traffic and commodity flows. The three tapes that have thus far been studied are the 1973 100% Penn Central Waybill tape, the

1973 100% Ann Arbor Waybill tape, and the 1973 1% Waybill tape for all Michigan Railroads. More information about these tapes may be found in Reports XIV A, B, and C - Commodity Flow Matrices. Other waybill tapes will be studied as they become available and as time schedules permit. The Railroad Viability Analysis system created by USRA for branch line analysis, together with the data supplied by USRA were acquired and adapted to Michigan's Railroad system. For more detail, see Report XV-A Railroad Financial Impact Analysis. An environmental impact system developed by Indiana for their Railroad Phase II Report was modified and used to help determine the environmental impacts of critical lines. This analysis package is described in Report XV-C, Railroad Environmental Impact Analysis. Finally, a railroad community impact procedure is now available. This procedure was developed by R. L. Banks and Associates, Inc.,[1] - and Creighton, Hamburg, Inc., and altered by Statewide Transportation Planning Procedures Section to permit estimates of community impacts, based upon carloads per branch line. This report will describe the revised community impact procedure.

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[1]Banks, R. L., Michigan Segmented Line Analysis: Traffic; Revenue, Cost, and Community Impact

STATEWIDE TRAVEL MODELING SERIES

Volume	I	Objectives and Work Program
Volume	I-A--	Region 4 Workshop Topic Summaries
Volume	I-B--	Single and Multiple Corridor Analysis
Volume	I-C--	Model Applications: Turnbacks
Volume	I-D--	Proximity Analysis: Social Impacts of Alternate Highway Plans on Public Facilities
Volume	I-E--	Model Applications: Cost-Benefit Analysis
Volume	I-F--	Air and Noise Pollution System Analysis Model
Volume	I-G--	Transportation Planning Psychological Impact Model
Volume	I-H--	Level of Service Systems Analysis Model: A Public Interaction Application
Volume	I-J--	Service-Area Model
Volume	I-K--	Effective Speed Model: A Public Interaction Tool
Volume	I-L--	System Impact Analysis Graphic Display
Volume	I-M--	Modeling Gasoline Consumption
Volume	II --	Development of Network Models
Volume	III --	Multi-Level Highway Network Generator ("Segmental Model")
Volume	III-A--	Semi-Automatic Network Generator Using a "Digitizer"
Volume	V	Part A --Travel Model Development: Reformation-Trip Data Bank Preparation
Volume	V	Part B --Development of the Statewide Socio-Economic Data Bank for Trip Generation-Distribution
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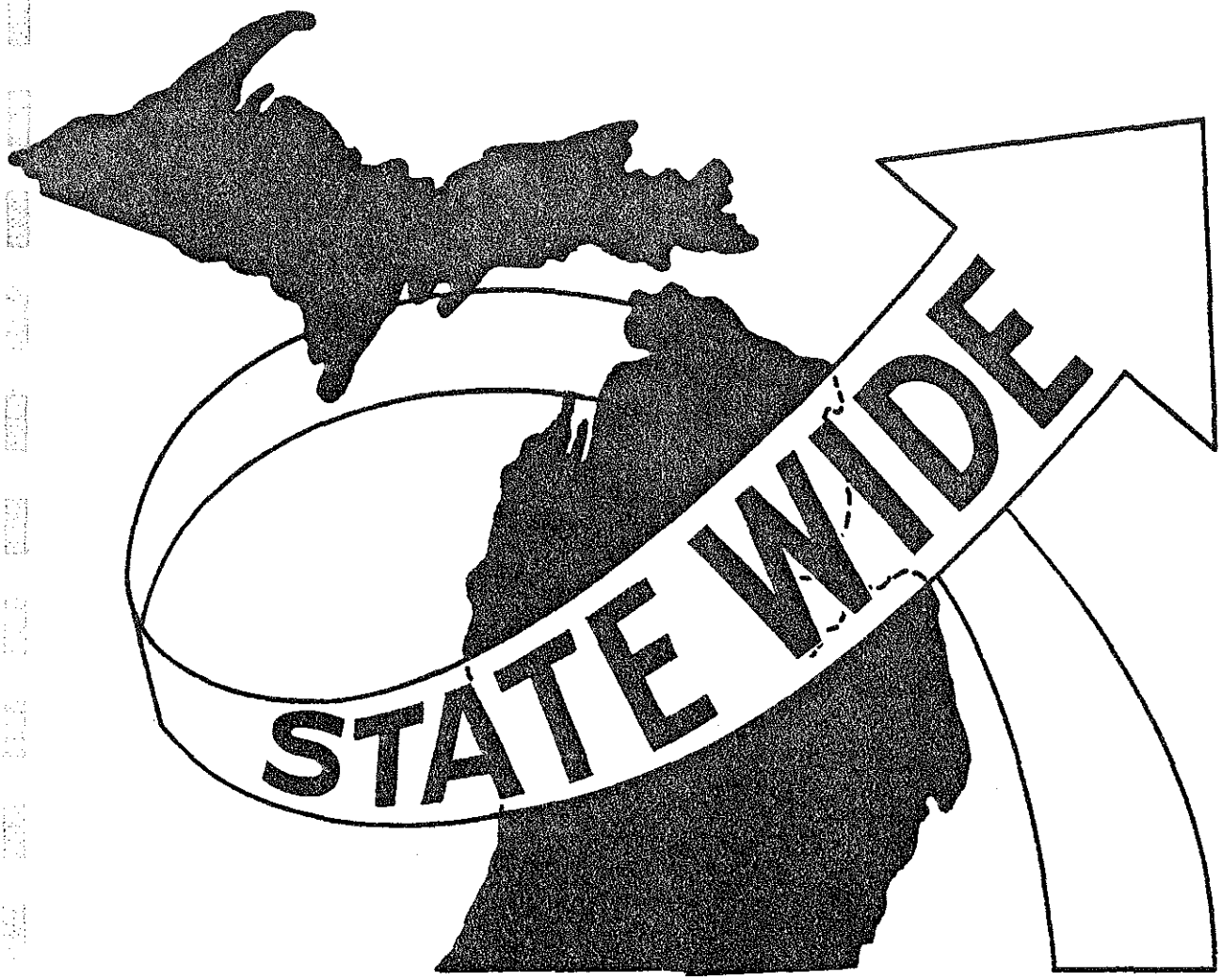
Volume	VII-B--	Modeling Major Facility Opening Impact on DHV
Volume	VIII --	Statewide Public and Private Facility File
Volume	IX --	Statewide Socio-Economic Data File
Volume	X-A--	Statewide Travel Impact Analysis Procedures
Volume	X-B--	Statewide Social Impact Analysis Procedures
Volume	X-C--	Statewide Economic Impact Analysis Procedures
Volume	XI --	Computer Run Times - An Aid in Selecting Statewide Travel Model System Size
Volume	XIII --	Michigan Goes Multi-Modal
Volume	XIII-A--	Multi-Modal Mobility and Accessibility Analysis
Volume	XIV-A--	Commodity Flow Matrix - Ann Arbor Railroad
Volume	XIV-B--	Commodity Flow Matrix - Penn Central Railroad
Volume	XIV-C--	Commodity Flow Matrix Michigan Railroads 1% Sample
Volume	XV-A--	Railroad Financial Impact Analysis
Volume	XV-B--	Railroad Community Impact Analysis
Volume	XV-C--	Railroad Environmental Impact Analysis
Volume	XVI --	Multi-Modal Analysis: Dial-a-Ride
Volume	XVII --	Statewide Intermodal Impact Analysis - Truck and Railroad

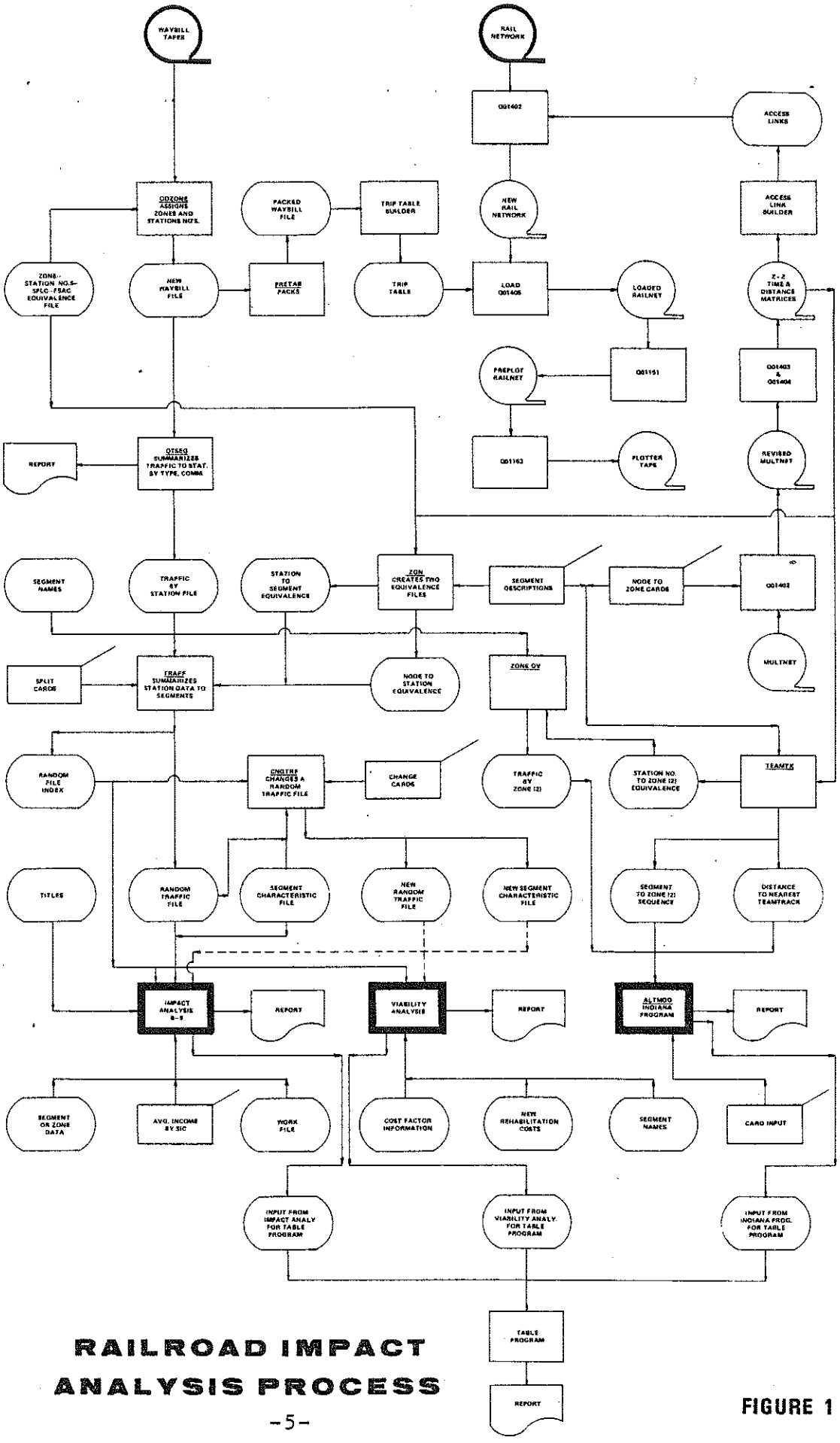
INTRODUCTION



INTRODUCTION

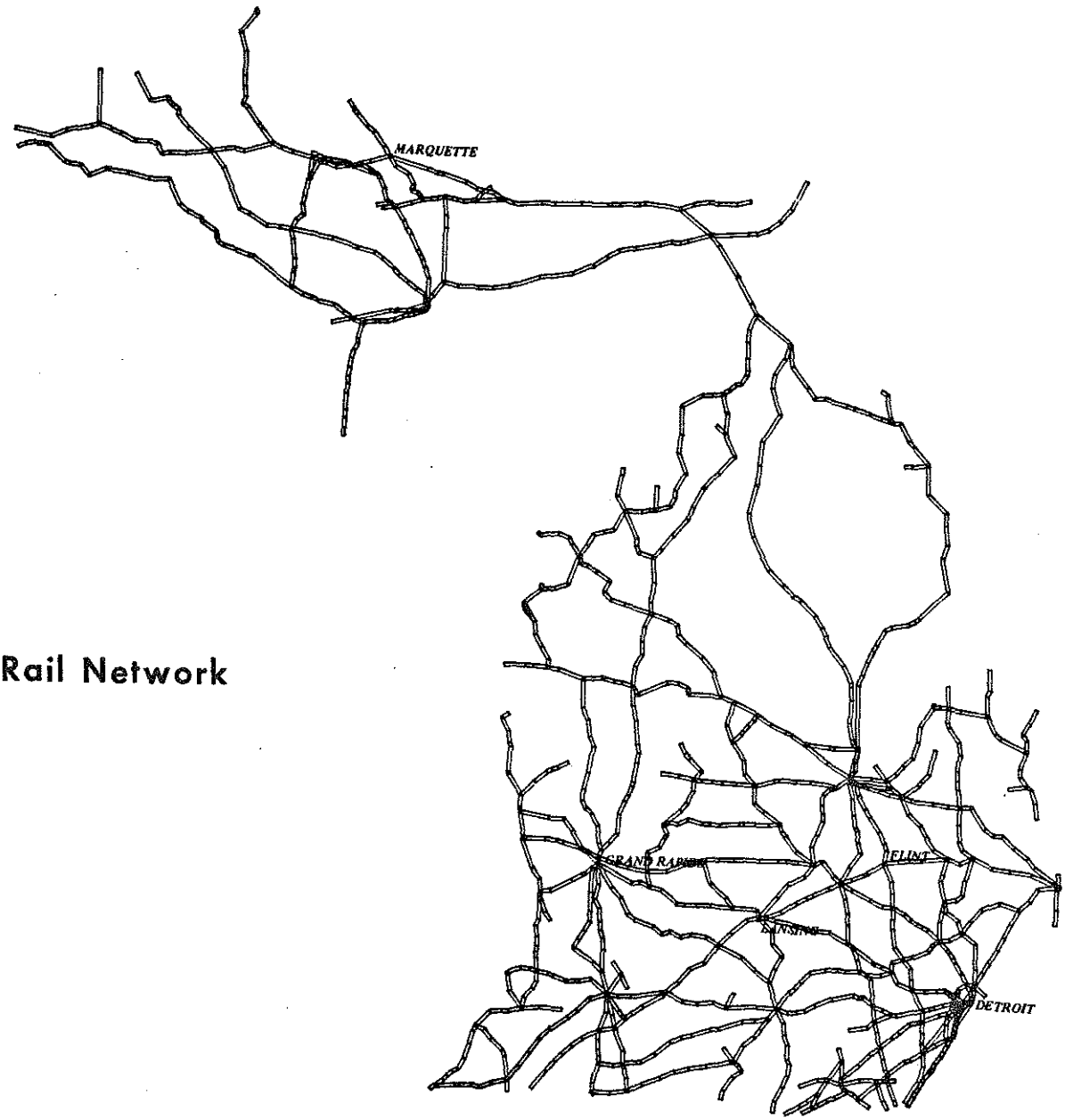
The Railroad Impact Analysis Process (see Figure 1) was developed in response to the urgent demands of a Phase II Report deadline. Extensive use of the process was made when writing the report, and future use appears inevitable. The process contains many options and possibilities for detailed studies of Michigan Railroads. It begins with railroad waybill tapes and a statewide rail network, Figure 2. The waybill tapes are used to provide traffic information: carloads, tons, revenue, and short-line miles, by commodity and by station or branch line. This traffic information may be used in conjunction with the rail network to explore shortest distance rail assignments of cars and tons; assignments by rail company -- station-to-station, or even to examine the intermodal impacts of truck and rail -- see XVII - Intermodal Impact, Truck and Rail. The traffic data has also been used in each of the impact analysis packages: Financial, Environmental, and Community Impacts. The rail network, in addition to assignments, is used to help determine the environmental impacts of each branch line.

In some instances, it may be desirable to change the traffic data derived from the waybill tapes. This capability has been provided. Also, the process which assigns each station to the proper branch line or segment provides the option of reassigning the traffic from any station to any other branch line. Caution should be used when considering any local traffic -- i.e., traffic with origin and destination both on the same segment. Another option which has been used involves only the traffic-by-station data from the waybill tapes and the USRA traffic by USRA branch lines, provided by USRA, to arrive at the data necessary for the



RAILROAD IMPACT ANALYSIS PROCESS

FIGURE 1



Rail Network

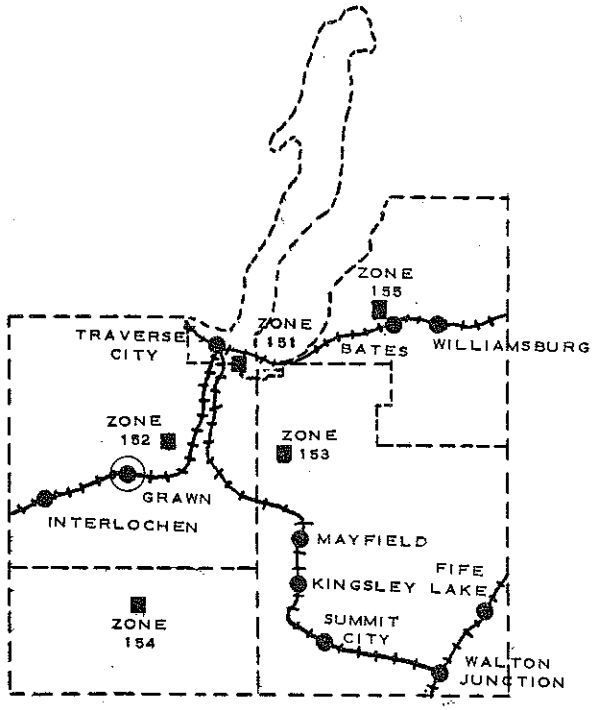
FIGURE 2

three major impact analysis processes. Within each of these processes, other, more specific, options are available, and will be documented in each of the individual railroad impact reports mentioned above, of which this report is one.

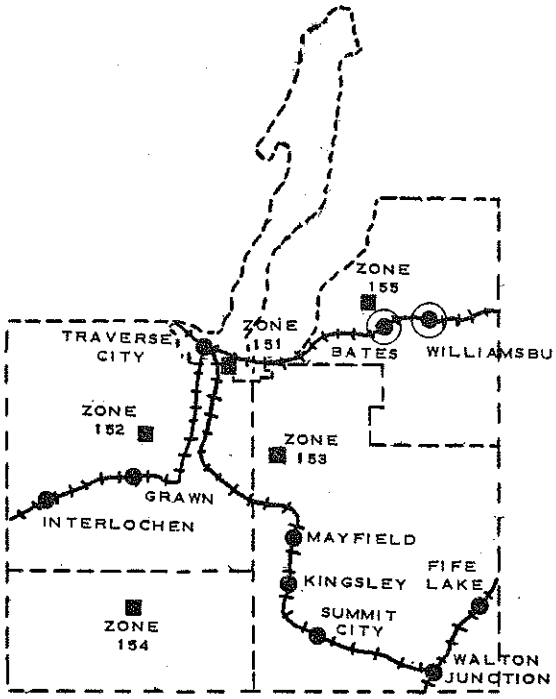
The Railroad Community Impact Procedure was originally developed by R. L. Banks and Associates, Inc., and Creighton, Hamburg, Inc., for the Office of Planning, Pennsylvania Department of Transportation, and later changed by R. L. Banks and Associates, Inc., to reflect the differences between Pennsylvania and Michigan law. These changes took place primarily in the calculation of taxes and public assistance payments. The Statewide Transportation Planning Procedures Section has since provided several more options, mainly options enabling one to use the process given carload data in the absence of a complete rail user's survey. Community impacts may now be estimated by station, by branch line or by zone, (Figure 3) using either carload data or a rail user's survey. The carload data may be by station or branch line and although commodity information is desirable, it is not essential. Estimates of employment loss, wage loss, unemployment and welfare payments, and state and federal tax decreases are developed, as well as estimates of increased transportation costs and the number of expected dislocations, using formulas provided by R. L. Banks and Creighton, Hamburg. These estimates may be at the station, zone, or branch line "segment" level, or a combination of any of the above levels, given significantly detailed data.

POSSIBLE IMPACT SUMMARY AREAS

A. Community Impact
if Grawn Rail Station
abandoned.
(Station Summaries)



B. Community Impact
if Rail Service abandoned
for Zone 155.
(Zone Summaries)



C. Community Impact
if Rail Segment from Walton
Junction to Traverse City abandoned.
(Segment Summaries)

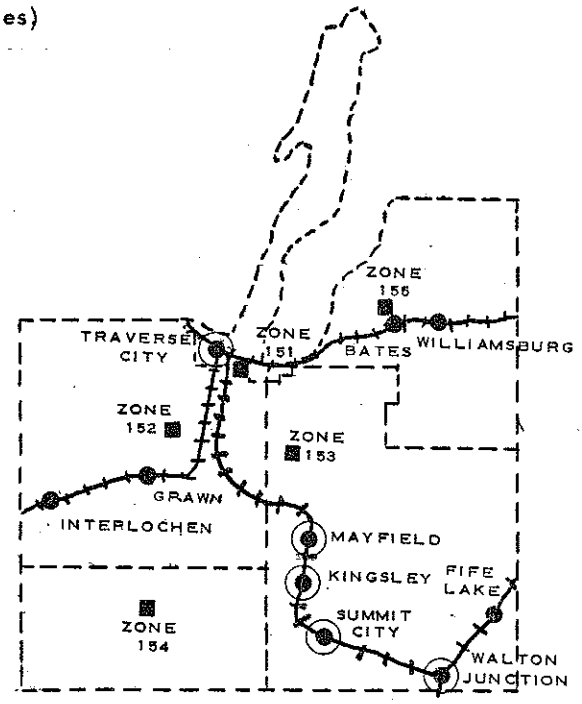
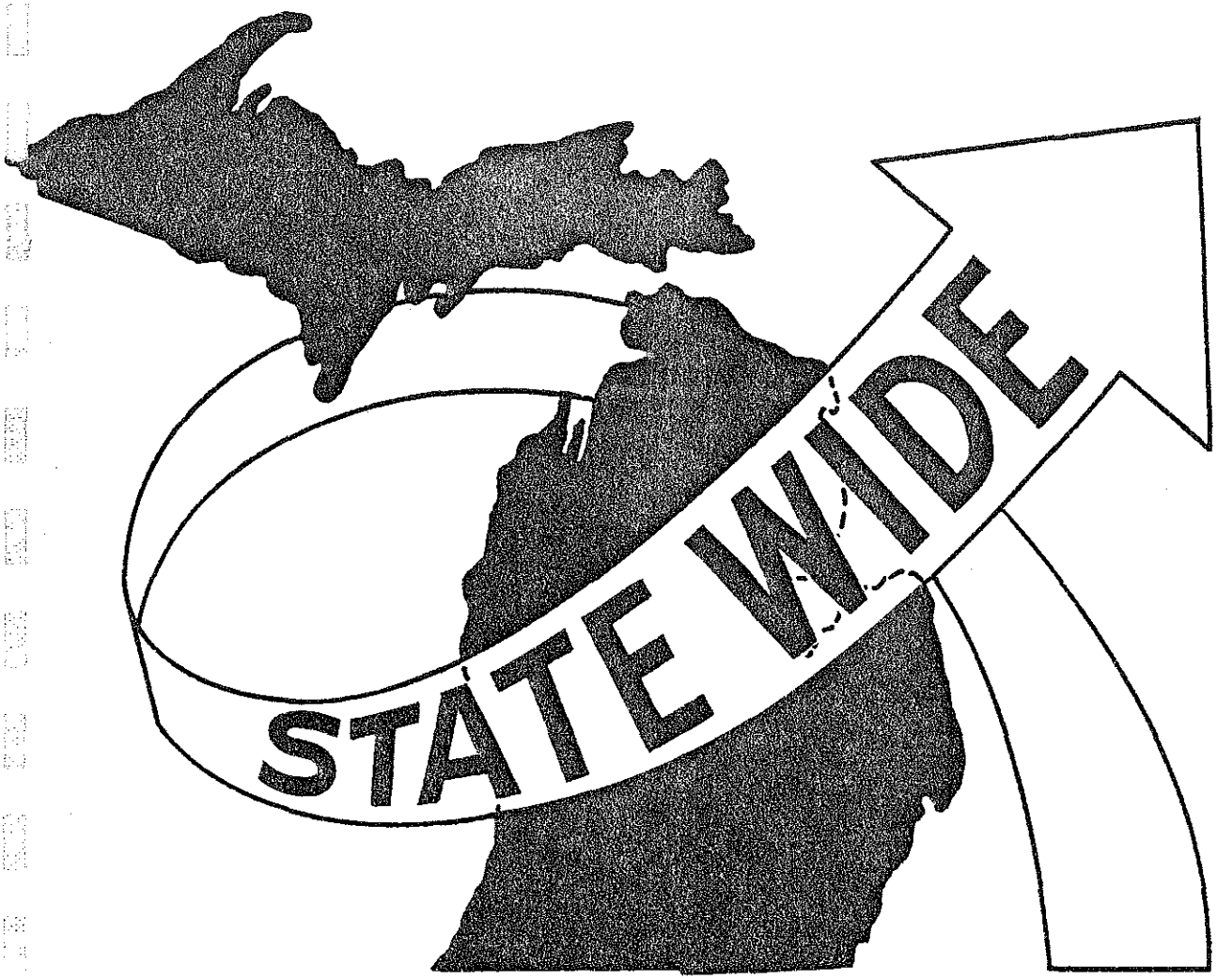


FIGURE 3

MODEL OPERATION



MODEL OPERATION

Section 304 of the Regional Rail Reorganization Act of 1973 provides a partial Federal subsidy (maximum 70%) to support the continued operation of bankrupt light density lines not included in ConRail; the balance of support must then, in reality, be furnished through State auspices or by the State itself. Whether or not continued service is worth subsidizing becomes an important public policy issue. To help rail planners, especially at the State level, to resolve the issue, the "Community Impact" study, a short expression for the analysis of the economic effects of abandonment of an individual light density line on communities is required in addition to the financial and environmental analysis of each line.

Limitations. We will begin the description of the approach by pointing out its limitations. Several points in this regard must be stressed.

First, each community would in theory experience unique impacts from rail abandonment because of its industry mix, degree of isolation and other factors. Several economic consequences common to all or most of the affected communities are, however, expected.[2] Our approach deals with only a limited number of such consequences. They are listed in Figure 4.

The omissions of many important economic impacts are obvious. The Federal income tax effects, the effect of rail abandonment on the long-run growth and development of the community, especially in terms of state land development policy, the price impact in

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[2]Benjamin Allan, "The Economic Effect of Rail Abandonment on Communities: A Case Study," Transportation Journal, Vol. 15, No. 1, Fall 1975,p.55.

COMMUNITY IMPACTS

EMPLOYMENT EFFECTS (INCLUDING MULTIPLIER EFFECT)

INCOME (PAYROLL) EFFECTS

STATE TAX REVENUE EFFECTS

WELFARE PAYMENT EFFECTS

ADDITIONAL FREIGHT CHARGES (BY TRUCK)

RESULTANT DISLOCATIONS

FIGURE 4

terms of its implications to the consumer as well as producer, and environmental impacts in terms of economic costs are but a few examples.

Second, the most serious limitation concerns the implicit assumption of independency. Each line is evaluated by itself in isolation, regardless of interdependency among lines. For example, USRA Line No. 454a between Cadillac and Cedar Springs connects USRA Line No. 454 between Cadillac and Mackinaw City in the north and USRA Line No. 461 between Cedar Springs and Comstock Park in the south. If USRA No. 454a were abandoned, both USRA No. 454 and No. 461 would suffer impacts. But such impacts have not been taken into account. What is implicitly assumed here is that all traffic generated on each study line is local traffic, both originating and terminating on the same line, and thus affecting only that line. This would lead to lower estimates of the impact measures than should be realistically assumed.

This problem may be solved by estimating "overhead traffic", i.e., traffic which travels the entire length of a segment with both origin and destination on other segments. The railroad waybill tapes and the rail network can, in the future, be used to obtain these estimates. Because of the present railroad routing patterns, a national tendency for a given company to retain any traffic on their own tracks for the maximum possible distance, and the sometimes restrictive yard facilities at any given station, caution must be exercised when "assigning" overhead traffic to any one segment. However, many valuable techniques are available which should help to overcome the problems mentioned and lead to some reasonable estimates.

Third, the approach does not consider the timing of the events that would occur. In other words, economic effects are not time-specific. For example, job losses could occur in a single year or spread over several years. For this reason, our estimates represent only the total impact but are sometimes expressed as an annual effect.

The rail shipper survey is the cornerstone of any community impact study of rail transportation. Unfortunately, there presently is no complete rail users survey available. However, a survey is presently being undertaken by the Commerce Department which promises to be very useful for many types of analysis, and will greatly improve the community economic impact analysis for long range planning. In the interim period, impacts are being estimated on the basis of jobs lost per thousand carloads. This carload information, minus some last minute changes made by USRA, has been obtained, aggregated to those lines analyzed in the USRA Final System Plan, July 1975. The carload information by station is also available as recorded on the railroad waybill tapes mentioned above. This station data may be aggregated to any desired rail segment or geographic area if single station impacts are not desired.

When using carload versus a rail users survey, three types of information must be supplied from other sources. A good rail users survey would supply the analyst with: 1) total expected job loss; 2) total wage loss and/or average wage per employee, and 3) expected increase in shipping costs. From carload data, one

is supplied only the number of carloads and the number of tons (annual) per station or branch line. From this data, the above three items must be calculated. This was accomplished as follows:

1. Total expected job loss can be estimated on a job loss per thousand carloads basis. For even more reliable results, readily truckable commodities could be excluded from consideration. A job loss per thousand carloads coefficient was derived, by Banks, from the answers supplied by 89 shippers who had reported both annual carloads and the number of employees who would lose their jobs as a result of rail service abandonment.[3] Included here are those companies located either on impacted lines or in any of the affected counties served by those rail lines. Table 1 summarizes the results by county, and gives the job loss coefficient of 62.7 derived by Banks. Variations among counties in job loss coefficients are impressive, ranging from zero for Saginaw to 411.4 for Hillsdale. To correct this variation, extreme values were eliminated, namely the data for Hillsdale County, and an average of fifty-nine jobs per thousand carloads was obtained. Given more complete data, this average could easily be changed and the resultant changed estimates calculated.

2. Estimated wage averages were originally desired by county, but this data did not appear to be readily available, often due to disclosure problems. So, an alternative, and perhaps more accurate, solution was found. Using County Business Patterns, 1973, Michigan, published by the U.S. Department of Commerce, and updated to 1975 averages by comparison with the Statewide "Manufacturing and Selected Nonmanufacturing Industries - Average Weekly Earnings

TABLE 1

SURVEY RESULTS – EXCERPT

MICHIGAN DEPARTMENT OF STATE HIGHWAYS AND TRANSPORTATION

RAILROAD PLANNING SECTION CONSAD--MICH 74-2/1

Affected County	Number of Companies Reported	Annual Carloads	Loss of Employment	Employment Loss Per Thousand Carloads
Allegan	3	1,483	4	2.7
Bay	46	23,881	1,702	71.3
Berrien	1	2	0	0
Gratiot	3	314	9	28.7
Hillsdale	3	333	137	411.4 – out
Isabella	4	90	2	22.2
Kent	20	4,647	54	11.6
Lapeer	4	364	53	145.6
Otsego	1	12	0	0
Saginaw	2	178	0	0
Shiawassee	1	10	0	0
Tuscola	1	60	6	100.0
TOTAL	89	31,374	1,967	62.7
		– 333	– 137	
REVISED TOTAL		31,041	1,830	59.0

of Production Workers", obtained from the Michigan Employment Security Commission, Hours and Earnings Analysis Unit, statewide average wages by Standard Industrial Classification Codes (SIC) were obtained. Thus, if 5,000 carloads were transported over one branch line, and the cars contained two different types of commodities, the wage loss per carload is based upon the average wage of employees in the particular industry manufacturing the given commodity for each of the two commodities. If commodity types are not supplied, an average state wage for all commodities is used. This average state wage is also used for secondary job losses.

3. Finally, a method for estimating increased transportation costs was needed when not using a rail user's survey. R. L. Banks and Associates, Inc., using data from Consad's "Michigan Freight Transportation Survey", compiled the data shown in Table 2. "This table includes only those counties for which average freight charges per ton is higher by truck than by rail, based on the information supplied by the respondents who are now using both rail and truck service for inbound as well as outbound traffic. The results indicate that a truck would charge, on the average, $5 per ton more than a railroad."--- R. L. Banks and Associates, Inc., Task 2 report. This is admittedly a very rough estimate of the expected transportation cost increase. Another estimate, based upon distances and fuel costs may be obtained from the environmental impact analysis battery described in report XV-C - Railroad Economic Impact Analysis. When the rail users survey has been completed, these two estimates may be replaced with the estimates provided by rail shippers.

TABLE 2

SURVEY RESULTS – EXCERPT

MICHIGAN DEPARTMENT OF STATE HIGHWAYS AND TRANSPORTATION

MICHIGAN FREIGHT TRANSPORTATION SURVEY

IN AND OUT

	Truck		Rail		Freight Charges Per Ton	
County	Freight Charges	Tons	Freight Charges	Tons	Truck	Rail
Allegan	$ 244,732	12,154	$ 640,644	38,587	$20.14	$16.60
Barrien	2,829,001	117,961	1,335,972	69,641	23.98	19.18
Cheboygan	662,060	24,435	1,784,885	87,405	27.09	20.42
Ingham	255,461	17,617	943,944	71,287	14.50	13.24
Kalamazoo	410,617	35,513	294,249	26,828	11.56	10.97
Marquette	22,471	946	105,360	5,443	23.75	19.36
Muskegon	390,000	5,000	200,000	5,000	78.00	40.00
TOTAL	$4,814,342	213,626	$5,305,054	304,191	$22.54	$17.44

With the data mentioned thus far, one can estimate the "immediate" or primary effect of rail abandonments, but possible "secondary" effects cannot be estimated. To overcome this weakness, the community impact analysis makes use of a "Multiplier Effect", which was calculated by Banks and explained in the following paragraphs.

The estimation of the multiplier effect for a given locality requires the use of what is called an "economic base" analysis. The analysis is actually quite simple. However, before proceeding with an explanation of the calculation, a brief review of the theoretical foundation upon which this technique rests is in order.

The principle thesis behind economic base theory is that in a large and interdependent national economy such as our own, each local sub-economy supports its own existence by producing certain goods and/or services for consumption by those in other localities. The income received from sales to other localities provides the means of payment for imports from non local areas and provides the income necessary to support purely local economic activity. Those industries which produce for consumption primarily by non-locals are called basic industries. These industries include most manufacturing enterprises, many state and most federal activities, most agriculture, forestry and fisheries, tourist and recreational attractions, and more. Those industries which produce primarily for local consumption are called non-basic industries. These include most service industries, local government, most retail and wholesale trade, most finance, insurance and real estate except, for example, the home office of a large insurance company, public utilities, and more as listed in Table 3.

SIC Code	BASIC
	Agriculture
	Mining
10	Metal Mining
11	Anthracite Mining
12	Bituminous Coal + Lignite
13	Crude Petrol + Natural Gas
14	Mining of Nonmetallic Min.
	Metal Industries
33	Primary Metal Industries
34	Fabricated Metal Products
	Machinery
35	Machinery Except Electrical
36	Elec. Machin. Equip. + Supply
37	Transportation Equipment
20	Food and Kindred Products
	Textile Industries
22	Textile Mill Products
23	Apparel + Fin. Fabric Prod.
	Chemical Industry
28	Chemicals + Allied Products
29	Petrol. Refin. + Related Ind.
30	Rubber + Misc. Plastic Prod.
	Lumber Industries
24	Lumber + Wood Prod. - Not Furn.
25	Furniture and Fixtures
	Other Manufacturing
32	Stone, Clay, Glass + Concrete
38	Science + Control Instrum.
39	Msicellaneous
21	Tobacco Manufactures
26	Paper and Allied Products
31	Leather + Leather Products
91	Federal Government

BASIC AND NON-BASIC INDUSTRIES

SIC Code	NON – BASIC
	Contract Construction
15	General Building Construct.
16	Other Construction - Not Bld.
17	Special Trade Contractors
27	Print., Publish, + Allied Ind.
	Transp., Commun., + Pub. Utilities
40	Railroad Transportation
41	Local + Suburban Transit
42	Motor Freight - Warehousing
44	Water Transportation
45	Transportation by Air
46	Pipe line Transportation
47	Transportation Services
48	Communication
49	Public Utilities
	Wholesale and Retail Trade
50	Wholesale Trade
	Retail Trade
52	Build, Mat., Hardware, Etc.
53	General Merchandise
54	Food Stores
55	Auto Dealers, Gas Ser. Sta.
56	Apparel + Accessory Stores
57	Furniture, Home Furnishings
58	Eating & Drinking Places
59	Miscellaneous Retail Stores
	Finance, Insurance & Real Estate
60	Banking
61	Other Credit Agencies
62	Security + Commodity Brokers
63	Insurance Carriers
64	Insr. Agents, Brokers + Serv.
65	Real Estate
66	Fire + Law Offices
67	Holding + Investment Comp.
	Services
70	Hotels - Lodging Places
72	Personal Services
73	Misc. Business Services
75	Auto Repair & Services
76	Misc. Repair Services
78	Motion Pictures
79	Amusement + Recreation
80	Medical + Health Services
81	Legal Services
82	Educational Services
84	Museums, Art Gall., Gardens
86	NonProfit Organziations
88	Private Households
89	Misc. Services
92	State & Local Government

TABLE 3

This theory adds a new dimension to the analysis of economic impacts resulting from any disturbance to the local economy. Quite simply, when one job in the basic sector of the economy is lost, it can be expected that a certain number of non-basic jobs will consequently be lost. This is because the decreased production in the basic sector results in decreased income to the local economy. The new lower level of local income will support fewer jobs in the non-basic sector than were supported previously. Thus, when 1 basic job is lost, 1 + x total jobs are lost in the local economy resulting in the multiplier effect.

It is now possible, using the theory which has been presented, to devise a simple method of calculating the multiplier.

A six-curve regression analysis was used to determine the relationship between basic and secondary employment, using cross-section data of 23 counties as shown in Table 4. In some cases, Jackson County, for example, certain basic employment is combined with secondary because of problems of disclosure. Using this data, Banks concluded that, in Michigan, one job lost in basic employment would induce 1.41 job losses in secondary employment, as indicated by the slope of the equation: $Y = 1783.08 + 1.41X$, where Y = secondary employment and X = basic employment.

We are now ready to describe the steps used in the railroad community impact analysis process.

1. Estimate Basic Employment Loss

a. When a rail user's survey is used, the estimated job loss must be provided in the survey. This loss is calculated under basic employment loss only if the firm satisfies the definition

TABLE 4

MICHIGAN EMPLOYMENT MULTIPLIER AND BASIC AND SECONDARY EMPLOYMENT BY COUNTY

	1974 Employment	
	Basic (X)	Secondary (Y)
Saginaw	32,500	47,100
Jackson	17,900	34,600
Lenawee	12,825	13,825
Bay	10,000	22,400
St. Joseph	8,950	8,550
Allegan	8,125	8,325
Montcalm	5,575	6,400
Hillsdale	4,550	5,500
Gratiot	3,125	7,225
Tuscola	2,925	6,550
Manistee	2,400	3,100
Charlevoix	1,800	3,375
Mecosta	1,375	9,150
Isabella	1,300	10,375
Antrim	1,150	2,150
Cheboygan	1,125	3,750
Emmet	1,025	5,550
Otsego	900	2,350
Clare	825	2,975
Arenac	625	1,575
Ogemaw	600	2,050
Benzie	550	1,900
Roscommon	425	2,125

Equation: $Y = 1783.08 + 1.40899X$ ($R^2 = .89$)

Note: Basic employment includes agriculture, fishing and forestry, mining and manufacturing; all other employment is secondary.

Source: Michigan Employment Security Commission, Civilian Labor Force and Employment Estimates, 1974.

of a "basic industry" given above.

b. If only carload data is available, the job loss coefficient is used to estimate job loss. Here, also, the job loss is considered basic only if the commodity being shipped is one produced by a "basic industry".

2. Determine Primary Wage Loss

The average wage should be available directly from the shipper's survey. If a survey is not used, the state average wages by SIC code described above will be used. The wage loss is found by multiplying the job loss by the average wage.

3. Determine Secondary Wage Loss

Secondary employment effects are derived from secondary income effects rather than vice-versa. This is because any payroll information supplied on a shipper survey form is judged to be more reliable than the employment data. The employment data may include both full-time and part-time employees, while the payroll is expressed in terms of a constant dollar unit. The secondary wage loss is estimated by multiplying the primary wage loss by the employment multiplier of 1.4. For shippers or commodities in the non-basic class, the wage loss calculated in step two is used as the secondary wage loss and the primary wage loss is assumed to be zero.

4. Determine Secondary Employment Loss

For non-basic industries or commodities, this is the number derived from step one, and no basic employment loss is assumed. For basic industries, the secondary wage loss is divided by "an average wage for an average job" to determine the total number of

jobs lost.

5. Compute State and Federal Tax Revenue Loss

Each prospective unemployed person is assumed to have a family of four, with a gross income equivalent to the estimated annual payroll. Two items are then deducted from this gross income, both permitted by Federal Law.

a. Dependent allowance of $3,000; and

b. Sixteen percent of standard deduction of gross income after dependent allowance.

A uniform rate of 4.6 percent of taxable income as of May 1, 1975, determined by Michigan Income Tax Service, is applied to the taxable income to obtain the State tax revenue loss. A 1974 abridged tax table is used to determine the estimated federal tax revenue loss.

6. Compute Public Assistance Payments

In the area of public assistance, both potential state unemployment and welfare (ADC) costs were calculated. Both numbers were calculated, even though by Michigan law only one may be collected. This was done on the assumption that the potential loss of jobs will not only affect the newly unemployed, but will also affect those already without a job. In other words, the additional job losses will make it more difficult for those already unemployed to find a job. Even though both figures were calculated, the change in personal income was figured only on the basis of an income change from wages to unemployment compensation on the basis that those already without a job will not have a change in personal income.

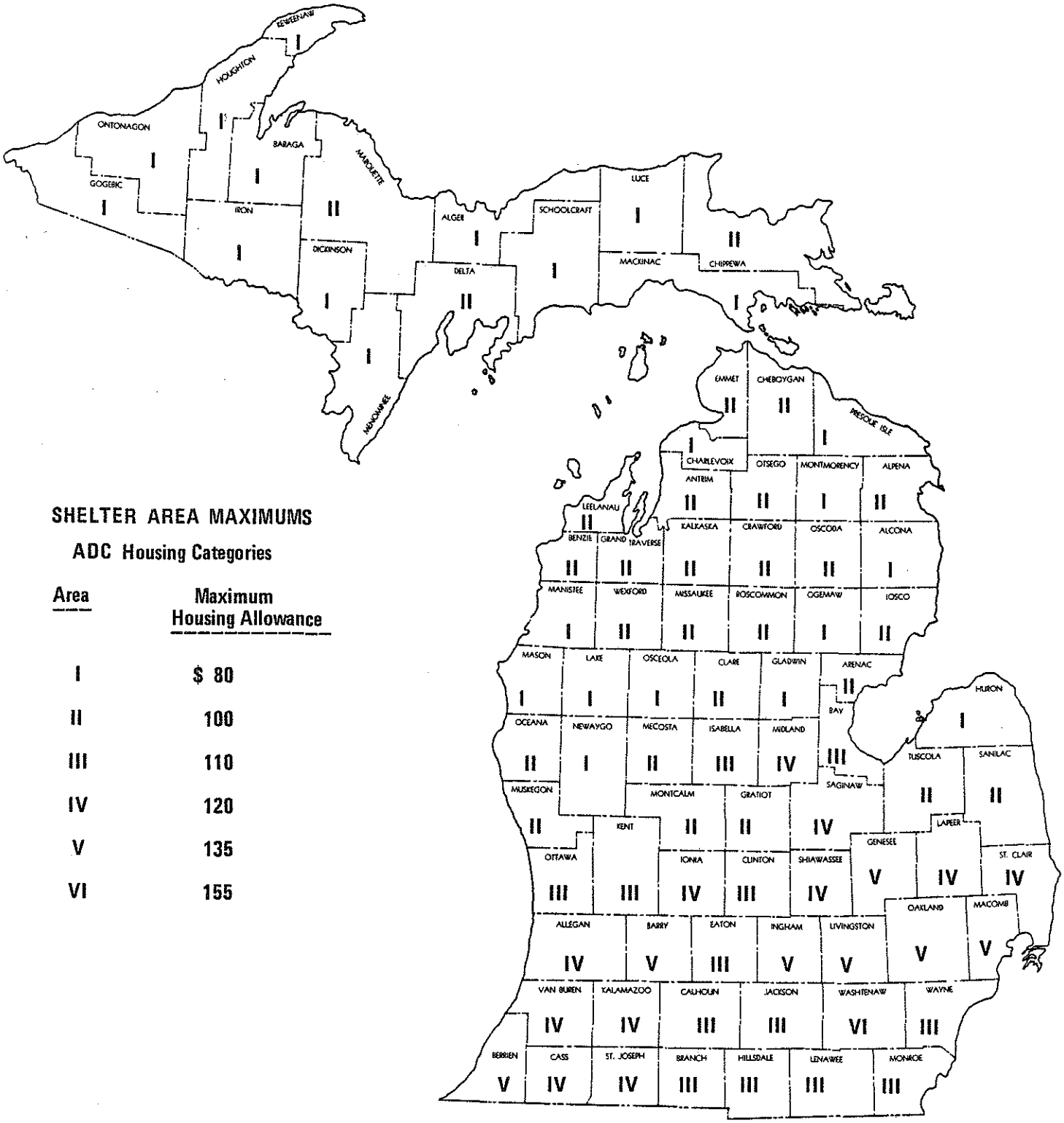
The monthly unemployment payments to each unemployed person is estimated at $165, for a maximum annual payment of $1,980. In performing the tax and public assistance calculations, the assumptions were made that a family of four was involved, and the State pays only one half of the welfare ADC payments out of its own funds. This was based on information received from the Michigan Department of Social Services that such assumptions are used in their planning processes. To compute ADC payment, it was necessary to know which housing region the affected area was in, since the housing allowance varies by housing regions. This was easily accomplished since housing regions follow county boundaries as shown in Figure 5.

7. Estimate Additional Freight Charges

As mentioned, an extra $5 per ton shipping charge is assumed if the shippers must use truck instead of rail. This estimate is used whenever carload data is used. When a rail user's survey is available, the estimated additional shipping charges will be information supplied by the survey.

8. Estimation of Dislocations

The community impact procedure, as released to the Rail Planning Section, Michigan Department of State Highways and Transportation, contains a dislocation formula which R. L. Banks and Associates, Inc., developed for the State of Pennsylvania. This formula or its derivation was not mentioned in their Task 2 report for Michigan, nor was it changed, so we will repeat the description found in the Pennsylvania Report:



SHELTER AREA MAXIMUMS

ADC Housing Categories

Area	Maximum Housing Allowance
I	$ 80
II	100
III	110
IV	120
V	135
VI	155

FIGURE 5

The purpose of the following is to outline the procedure used to compute the formula for estimating dislocations resulting from layoffs.

1. Labor turnover statistics published by the Pennsylvania Bureau of Employment Security were used in conjunction with some general employment/population ratios found in statistical abstracts, census publications and a variety of other data sources.

Labor turnover statistics for manufacturing industries in 11 labor market areas of Pennsylvania indicate an average of slightly over two new hires per 100 employees per month. It was assumed that these figures are relatively representative of the Pennsylvania labor market as a whole. It was also assumed that 10 percent of the new job opportunities generated by the labor market would be acceptable to those laid off. Without having any hard data on this subject, a conservative estimate was made. This results in two local job opportunities per 100 local employees per month. A period of 10 weeks was allowed for local job seeking -- this equals one-half the time assumed for the collection of unemployment benefits. This results in a new figure of .5 local job opportunities per 100 local employees.

This formula estimates the number of persons which will find local jobs and, thus, will <u>not</u> be dislocated. The figure is subtracted from the total layoff figure to estimate the number of those who will be dislocated. If

there are more job opportunities than layoffs, of course, the dislocation estimate will be zero. "Negative" dislocations -- really representing local in-migration -- are not a concern of this study.

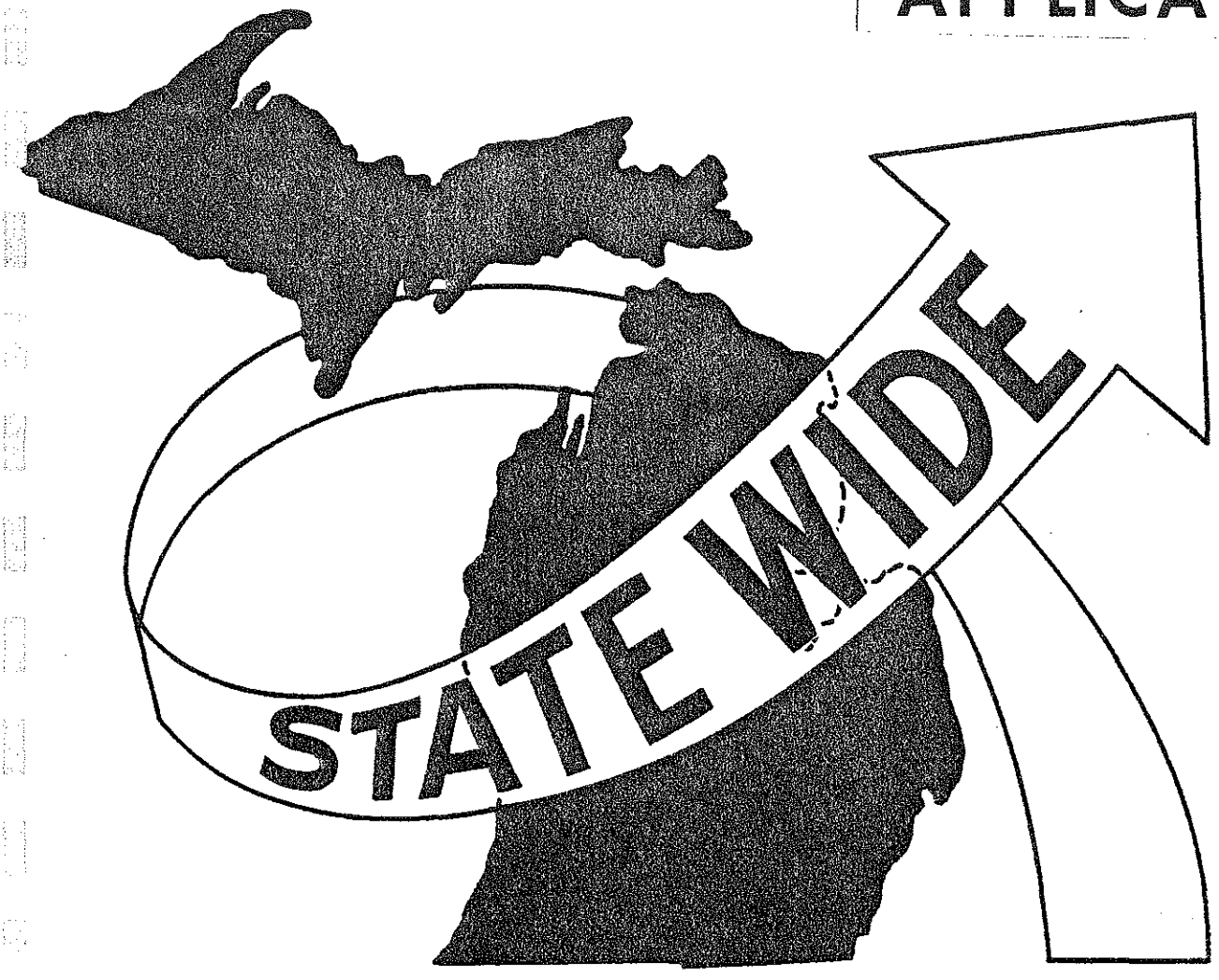
Summarizing, dislocations will be estimated as follows:

a. Impact area dislocations = 1/2 total employment losses - .005 x employment of impact area.

b. Total dislocations = 1.5 x impact area dislocations. If the formula produces a negative number, no dislocations are expected.

Since this was developed for Pennsylvania, it would doubtlessly be wise to examine it closely before making extensive use of it for the State of Michigan.

APPLICATION



APPLICATION

The community impact analysis has been used with carload data for each of the three summary areas: i.e., station, branch line, and zone. Because no user survey is yet available, the estimates derived should be used merely as rough guidelines to rail planning. A one-page summary of impacts for each line, station, or zone, is produced. Following are samples of estimates obtained for two USRA segments, Figures 6 and 7, and the state totals table, Figure 8, which sums the impacts of all the USRA segments considered. The location of the two USRA segments is shown in Figure 9.

Given a usable rail users survey, items 10-14 change as follows:

10 - Number of surveyed firms

11 - Total employment in surveyed firms

12 - Estimated total wages in surveyed firms

13 - % job loss of surveyed firms

14 - % wage loss of surveyed firms

Summaries by station, branch line, or zone would all be possible with firm survey data as well as with carload data, and summaries by firm would be a simple possibility.

COMMUNITY IMPACT ANALYSIS FOR LINE 0393

(ANNUAL BASIS)

LINE	ITEM	PRIMARY	SECONDARY	TOTAL
1.	ESTIMATED EMPLOYMENT LOSS	97.	136.	233.
2.	ESTIMATED WAGE LOSS	900604.	1260846.	2161450.
3.	ESTIMATED UNEMPLOYMENT PAYMENTS	689294.	965011.	1654305.
4.	ESTIMATED WELFARE PAYMENTS (STATE FUNDS)	199923.	279892.	479815.
5.	ESTIMATED STATE TRANSFER PAYMENTS (LINE 3+LINE 4)	889217.	1244903.	2134120.
6.	NET PERSONAL INCOME LOSS (LINE 2 - LINE 3)	211311.	295835.	507145.
7.	ESTIMATED FEDERAL TAX DECREASE	54379.	76131.	130510.
8.	ESTIMATED STATE TAX DECREASE	22149.	31008.	53157.
9.	TOTAL TAX DECREASE (LINE 7 + LINE 8)	76528.	107139.	183667.
10.	NUMBER OF STATIONS (SEGMENTS)			1.
11.	CARLOADS GENERATED BY STATIONS			1652.
12.	REVENUE GENERATED BY STATIONS			********
13.				0.
14.				0.
15.	ESTIMATED INCREASED TRANSPORT COST			0.
16.	ESTIMATED DISLOCATIONS			175.

FIGURE 6

COMMUNITY IMPACT ANALYSIS FOR LINE 0438

(ANNUAL BASIS)

LINE	ITEM	PRIMARY	SECONDARY	TOTAL
1.	ESTIMATED EMPLOYMENT LOSS	5.	7.	12.
2.	ESTIMATED WAGE LOSS	46339.	64874.	111213.
3.	ESTIMATED UNEMPLOYMENT PAYMENTS	35466.	49653.	85119.
4.	ESTIMATED WELFARE PAYMENTS (STATE FUNDS)	8967.	12554.	21520.
5.	ESTIMATED STATE TRANSFER PAYMENTS (LINE 3+ LINE 4)	44433.	62206.	106639.
6.	NET PERSONAL INCOME LOSS (LINE 2 - LINE 3)	10873.	15222.	26094.
7.	ESTIMATED FEDERAL TAX DECREASE	2798.	3917.	6715.
8.	ESTIMATED STATE TAX DECREASE	1140.	1595.	2735.
9.	TOTAL TAX DECREASE (LINE 7 + LINE 8)	3938.	5513.	9450.
10.	NUMBER OF STATIONS (SEGMENTS)			1.
11.	CARLOADS GENERATED BY STATIONS			85.
12.	REVENUE GENERATED BY STATIONS			******
13.				0.
14.				0.
15.	ESTIMATED INCREASED TRANSPORT COSTS			0.
16.	ESTIMATED DISLOCATIONS			9.

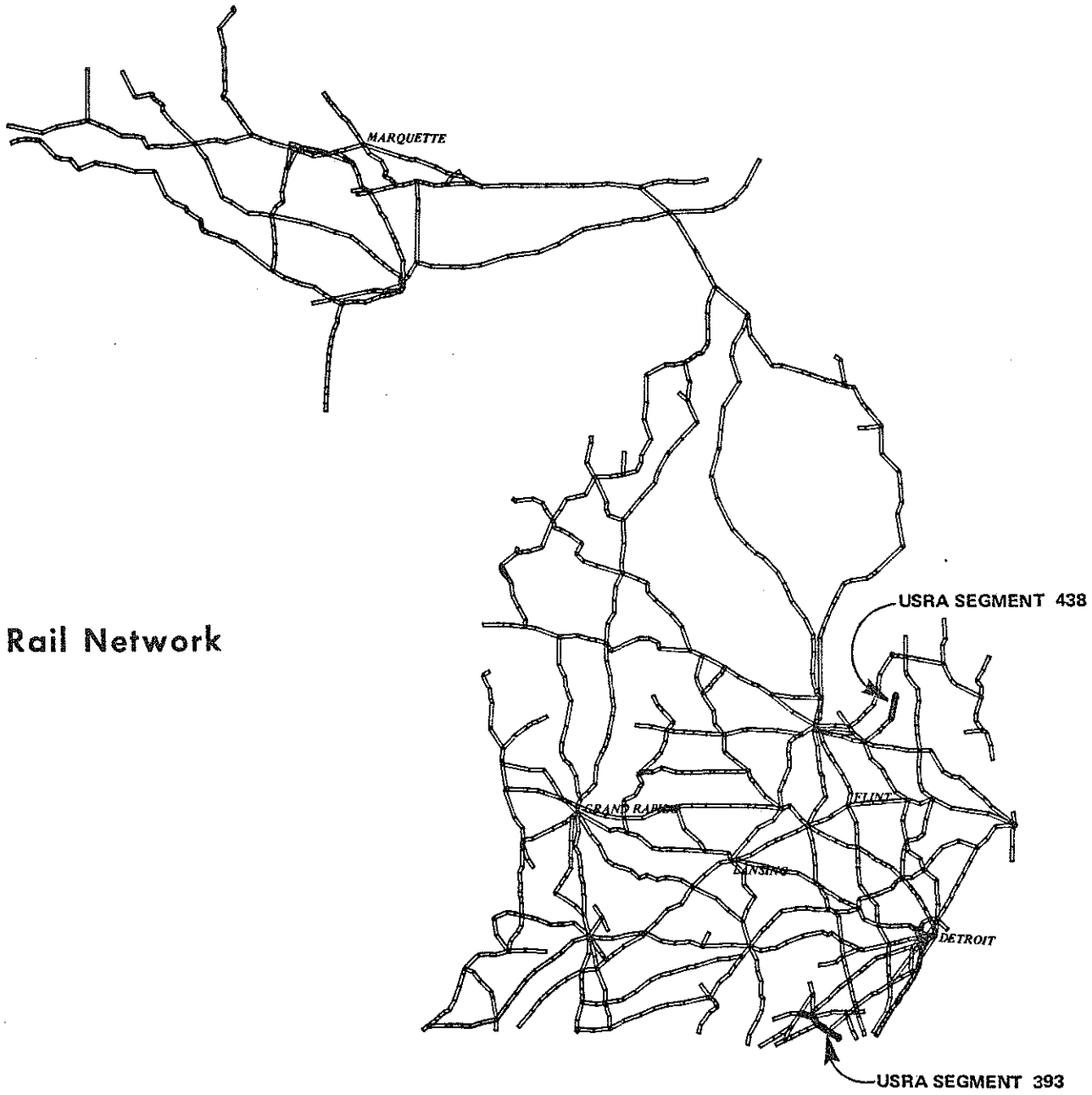
FIGURE 7

COMMUNITY IMPACT ANALYSIS TOTALS FOR STATE

(ANNUAL BASIS)

LINE	ITEM	PRIMARY	SECONDARY	TOTAL
1.	ESTIMATED EMPLOYMENT LOSS	3531.	4943.	8474.
2.	ESTIMATED WAGE LOSS	32625645.	45675904.	78301549.
3.	ESTIMATED UNEMPLOYMENT PAYMENTS	24970624.	34958873.	59929497.
4.	ESTIMATED WELFARE PAYMENTS (STATE FUNDS)	6338924.	8874494.	15213418.
5.	ESTIMATED STATE TRANSFER PAYMENTS (LINE 3 + LINE 4)	31309548.	43833367.	75142915.
6.	NET PERSONAL INCOME LOSS (LINE 2 - LINE 3)	7655022.	10717030.	18372052.
7.	ESTIMATED FEDERAL TAX DECREASE	1969968.	2757955.	4727922.
8.	ESTIMATED STATE TAX DECREASE	802365.	1123311.	1925676.
9.	TOTAL TAX DECREASE (LINE 7 + LINE 8)	2772332.	3881265.	6653598.
10.	NUMBER OF STATIONS (SEGMENTS)			42.
11.	CARLOADS GENERATED BY STATIONS			59846.
12.	REVENUE GENERATED BY STATIONS			*********
13.				0.
14.				0.
15.	ESTIMATED INCREASED TRANSPORT COSTS			0.
16.	ESTIMATED DISLOCATIONS			6356.

FIGURE 8



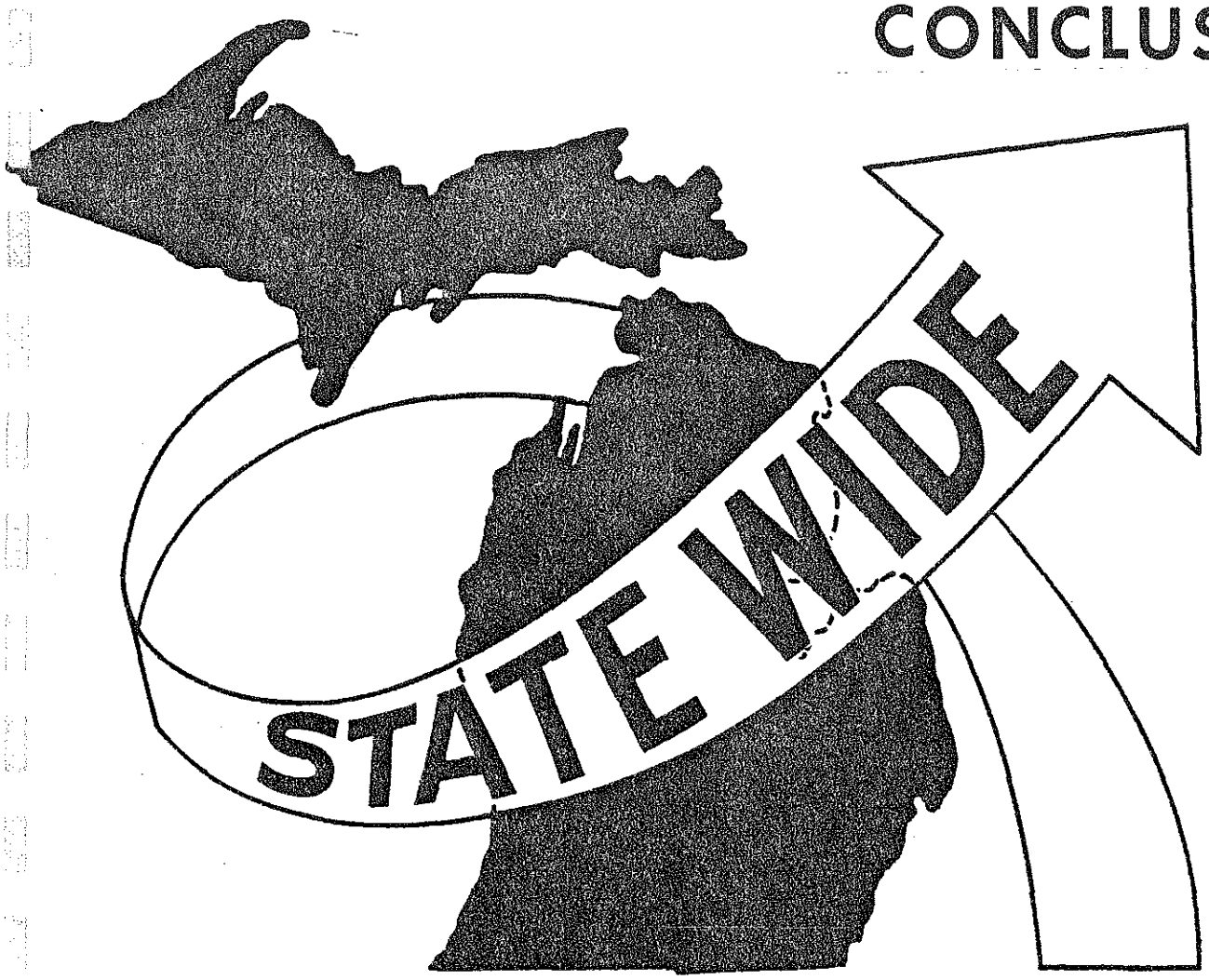
Rail Network

USRA SEGMENT 393 — from Vulcan, Ohio to N & W crossing east of Adrian, Mich.

USRA SEGMENT 438 — from Caro to Colling, Mich.

FIGURE 9

CONCLUSION



CONCLUSION

The railroad community impact procedure helps to provide very important information to rail planners. Although presently, only rough estimates are possible, in the near future, with the completion of a rail users survey, this could become an even more effective tool. Even now, it could be further refined, if desired. The job loss coefficient could be further developed to better estimate job losses, perhaps by obtaining figures by county versus a state-wide average. Truckable commodities could be eliminated or reduced when computing job losses. The shipping cost increase of $5 per ton should be verified more fully. The multiplier effect of 1.4 secondary jobs lost per 1 primary job might be improved. R. L. Banks developed county multipliers for Pennsylvania, but for Michigan, only a state average. This is probably not the best method. It would also be desirable to update the Federal tax table to 1975 tables, and possibly to enter a little more detail, as was suggested by Banks. The dislocation formula should be studied and replaced, if necessary, before extensive use. Other improvements may be suggested, and many may be easily accomplished.

Of course, the major improvement remains -- the collection of a complete rail users survey. As earlier mentioned, this is presently being undertaken in a very fine form by the Michigan Commerce Department. Any such survey should ideally contain, in some form, the data listed in Table 5. This information can be obtained from the

ITEMS TO BE OBTAINED FROM RAIL USER'S SURVEY

1. The area location number of the firm. The numbering system must correspond to that being used for area data.

2. The total employment of the firm;

3. The total payroll of the firm;

4. The firm's expected job loss due to loss of rail service;

5. The firm's expected payroll loss due to the job loss;

6. The first two digits of the Standard Industrial Classification of that firm; and

7. The dollar amount of any transportation cost increase to the firm due to loss of rail service.

TABLE 5

POSSIBLE ALTERNATIVES TO MISSING ITEMS IN RAIL USER'S SURVEY

Location	None. Do not use data on that firm.
Total Employment	None. Do not use data on that firm.
Total Payroll	Enter 0. The program will estimate the total from the area data.
Expected Job Loss	Assume to be 0. The program will not estimate the loss.
Expected Payroll Loss	Enter 0. The program will estimate a value based on total employees and total payroll.
Housing Region	Assume the same as Detroit. This is the method used by Social Services to estimate their budget needs.
Standard Industrial Classification Code	If the SIC is not known, use 19 for suspected basic industry and 99 for a suspected non-basic.
Increased Transportation Costs	Enter 0. Assume, if not stated, there is no change. A future program change might be to estimate this from the traffic of a given firm.

TABLE 6

survey presently being undertaken.

However, if for any reason, some pieces of data for a given firm are not available, the remaining data for that firm may still be used by substituting values as outlined in Table 6. It should be mentioned that any survey which does not include all rail shippers should be used with extreme caution, since all impacts would tend to be low, and the degree of accuracy would be impossible to estimate.

In case of questions, or for additional information, please contact:

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