



**State Planning
and
Research**

**1998
SPR**

**Work Program
and
Estimate of Cost**



MINNESOTA DEPARTMENT OF TRANSPORTATION

**In cooperation with the
U.S. DEPARTMENT OF TRANSPORTATION
Federal Highway Administration**

STATE PLANNING AND RESEARCH
PART I PLANNING
PART II RESEARCH AND DEVELOPMENT

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

in cooperation with

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

This program is prepared and submitted in pursuant to provisions of Section 307 of Title 23, United States Code as amended.

The contents of this program describe the continuing efforts of the Minnesota Department of Transportation in highway planning and research activities. The task descriptions will serve from year to year. A new description will be written only when there is a major change to any of the basic components of a task or a new task is added.

The annual element of the State Planning and Research Work Program will contain the itemized cost estimates for the work program year, new tasks, revised tasks and a revision page delineating changes for that peculiar year. The annual elements are to replace similar sheets from the previous year program.

This program is organized by Office according to the Minnesota Department of Transportation organization structure. An index page is included showing the tasks by Volume according to the Federal Highway Administration's "Highway Planning and Programming Manual".

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**ITEMIZED COST ESTIMATE
FOR
PART ONE PLANNING**

**SPR PROJECT - 1(38)
(JANUARY 1, 1998 - DECEMBER 31, 1998)**

I. OFFICE OF INVESTMENT MANAGEMENT

Small Urbanized Area Planning		\$68,047
Salaries	61,047/ 9 Person Months	
Travel	5,000	
Photo Lab.	1,000	
Printing	1,000	
Statewide Policy & Plan Development		\$116,400
Salaries	105,400/21 Person Months	
Travel	4,000	
Photo Lab.	1,000	
Print & Comm.	3,000	
Meeting Expense	2,000	
Special Studies		\$201,500
Salaries	198,000/50 Person Months	
Travel	2,000	
Photo Lab	1,500	
Economic Analysis/Special Studies		\$57,500
Salaries	54,000/24 Person Months	
Photo Lab.		
500		
Printing	3,000	
Program Development		\$75,168
Salaries	75,168/10 Person Months	
Project Authorization		\$157,500
Salaries	157,500/32 Person Months	

Program Management	\$138,091
Salaries	138,091/12 Person Months
Economic Analysis	\$423,000
Salaries	396,000/84 Person Months
Travel	12,000
Consultant	15,000
SP&R Program Administration & Control	\$17,402
Salaries	16,902/ 4 Person Months
Printing	500
Total Estimate Cost	\$1,254,608

II. OFFICE OF MANAGEMENT DATA SERVICES

Transportation Information System (TIS) Management	\$1,029,469
Salaries	1,029,469/237.5 person months
Videolog	\$171,123
Salaries	171,123/20 person months
Vehicle Classification and Truck Weight Studies	\$373,375
Salaries	373,375/38 Person Months
Traffic Counting	\$800,537
Salaries	800,537/186 Person Months
Traffic Forecasting for Highway Design	\$123,912
Salaries	123,912/20 Person Months
Transportation Information System Re-Engineering	\$89,774
Salaries	89,774
Total Estimated Cost	\$2,588,190

III. OFFICE OF TRANSIT

Transit Program Planning	\$206,474
Salaries	189,474/28 Person Months	
Travel	2,000	
Printing	15,000	
Transit Research & Design Evaluation	\$130,393
Salaries	128,393/23 Person Months	
Travel	2,000	
Total Estimated Cost	\$336,867

IV. OFFICE OF FINANCIAL MANAGEMENT

Highway Statistics \$38,010

Salaries	25,010/4.25 Person Months
Consultant	13,000

Total Estimated Cost \$ 38,010

V. OFFICE OF TRAFFIC ENGINEERING

Speed Data Summaries		\$22,593
Salaries	22,593/8 Person Months	
Accident Surveillance		\$73,845
Salaries	58,845/13 Person Months	
Consultant	15,000	
Total Estimated Cost		\$96,438

VI. OFFICE OF LAND MANAGEMENT

Municipal Maps		\$362,039
Salaries	360,939/84.5 Person Months	
Travel	300	
Photo Lab	800	
St. Paul - Minneapolis Area Maps		\$109,674
Salaries	109,374/24.2 Person Months	
Travel	100	
Photo Lab	200	
County Maps		\$378,731
Salaries	377,431/88.4 Person Months	
Travel	300	
Photo Lab	1,000	
State Maps		\$ 20,997
Salaries	20,497/9.3 Person Months	
Travel	200	
Photo Lab	300	
Total Estimated Cost		\$ 871,441

VII. OFFICE OF STATE AID

County State Aid Highway \$524,235

Salaries	314,835/59 Person Months
Travel	4,000
Photo Lab	3,000
Supplies	2,400
Computer	200,000

Municipal State Highway Need Study \$181,511

Salaries	181,511
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Total Estimated Cost \$705,746

VIII. OFFICE OF TECHNICAL SUPPORT

Trunk Highway Cultural Resource Investigation	
Contracts	\$1,175,000
Minnesota Historical Society and Cultural Resource Firms	
County/Municipal Cultural Resource Investigation	
Contracts	\$74,663
Minnesota Historical Society and Cultural Resource Firms	
Total Estimate Cost	\$1,249,663

IX. OFFICE OF ADVANCED TRANSPORTATION

Bikeway Planning \$156,024

Salaries	145,224/28 Person Months
Travel	5,000
Photo Lab	500
Printing	5,000

Total Estimated Cost \$156,020

X. OFFICE OF FREIGHT, RAILROADS & WATERWAYS

Freight Studies \$153,020

Salaries 153,020/25 Person Months

Total Estimated Cost.....\$153,020

TOTAL SP&R PART ONE PLANNING \$7,450,007

**ITEMIZED COST ESTIMATED FOR
PART TWO RESEARCH, DEVELOPMENT & COOPERATIVE RESEARCH
PROJECT SPR-1(38)
JANUARY 1, 1998 - DECEMBER 31, 1998**

<u>State Study</u>	<u>Study Title</u>	
SPR-1(038)	Research AdministrationTechnology Transfer, Implementation and Special Projects.	\$450,000
TRB-1(098)	Transportation Research Board membership dues	\$85,010
Total Part Two- Research & Development		\$535,010
 <u>Cooperative Research</u>		
SPR-4(198)	National Cooperative Highway Research Program	\$71,016
HPR-3(017)	Midwest States Crash Testing Program	\$47,403
HPR-3(020)	ENTERPRISE	\$25,000
SPR-3(042)	Aurora	\$25,000
SPR-2(182)	Development Validation of Traffic Data Editing Procedures	\$10,000
SPR-3(037)	Public Perception of Midwest Highways	\$49,405
SPR-3(044)	North Central Superpave Center (NCSC)	\$20,000
SPR-3(045)	Use of Reclaimed Asphalt Pavement Under Superpave Specifications (NCSC)	\$15,000
SPR-3(046)	Fillet Welding Procedure Qualification Research	\$20,000
SPR-3(049)	Urban Mobility Study-Texas DOT	\$15,000
Cooperative Research Total		\$297,823
Research Total		<u>\$832,833</u>

PL FUNDS

C.Y. 1998 METROPOLITAN PLANNING ORGANIZATION

		<u>CY 1998</u> <u>APPROVED</u> <u>UWP</u>
PL-1013 (38)	Twin Cities Metro Council	\$1,432,966
PL-1113 (38)	Duluth-Superior MIC	233,000
PL-1244 (38)	Rochester ROCOG	172,800
PL-1268 (38)	St. Cloud APO	192,154
PL-1188 (38)	Fargo-Moorhead FMCOG	96,228
PL-1289 (38)	Grand Forks-E. Grand Forks	24,562
PL-1243 (38)	LaCrosse-LaCrescent	<u>11,974</u>
		\$2,163,684

**FINANCIAL SUMMARY
State Planning and Research Program
Calendar Year 1998**

A. Federal Funds Research:

	<u>RD-TT</u>
SPR-4(198) will require	\$71,016
HPR-3(017) will require	47,403
HPR-3(020) will require	25,000
SPR-3(042) will require	25,000
SPR-2(182) will require	10,000
SPR-3(037) will require	49,404
SPR-3(044) will require	20,000
SPR-3(045) will require	15,000
SPR-3(046) will require	20,000
SPR-3(049) will require	15,000
Research Administration	450,000
TRB dues	85,010
TOTAL	832,833

* *Appropriation Code*

Planning - 081

Research, Development & Technology Transfer - 086

MPO Planning - 085

B. Total Estimated Participating

<u>Project Number</u>	<u>Statewide Planning</u>	<u>Research</u>
SPR-1(038)	\$7,450,007	\$832,833
<u>MPO Planning</u>		
\$2,163,684		
Total Estimated Participating	10,446,524	

OFFICE OF

INVESTMENT

MANAGEMENT

TASK TITLE: Small Urbanized Area Planning

WORK AUTHORITY NO.: TH__101

WORK PERFORMED BY: Planning Program Development and Project Authorization Section

OBJECTIVE:

To assist the six small area Metropolitan Planning Organizations (MPO's) in developing and maintaining a transportation planning process which fulfills the requirements of the appropriate federal regulations.

METHODOLOGY:

- Manage the FHWA Title 23 U.S.C. Section 104(f) (planning-PL) pass-through funds to ensure effective expenditure by the MPO's.
- Coordinate with the Mn/DOT District planning staff in the development, review and/or approval of MPO planning documents to ensure that the MPO maintains a certifiable transportation planning process.
- Coordinate with the Mn/DOT District planning staff in the representation of Mn/DOT on the MPO committees to ensure awareness and responsiveness to mutual transportation concerns.
- Provide technical assistance and training to the MPO's and Mn/DOT District planning staff to ensure use of state-of-the-art planning procedures.
- Participate in Mn/DOT activities (ISTEA Implementation, district plans, related to planning to ensure consideration of the MPOs perspective.

PRODUCTS:

- Annual MPO Planning Work Programs and funding distribution agreements.
- Annual MPO Transportation Improvement Program (TIP) and Certification.
- Current MPO Long Range Multimodal Transportation Plan reflecting short and long range goals of the urbanized area.

TASK TITLE: Statewide Planning and Policy Development

WORK AUTHORITY NO.: TH__102

WORK PERFORMED BY: Planning, Program Development and Project Authorization Section

OBJECTIVE:

To direct the preparation of statewide transportation planning and policy studies, such as the Statewide Transportation Planning; to serve as a consultant in developing frameworks for district/division and modal plans; to assist the districts in developing district long-range transportation plans; and to coordinate, review and respond to national and state initiatives, policies, proposed regulations which impact on transportation. To administer and coordinate Mn/DOT's transportation planning activities with the Regional Development Commissions (RDC's), their committees and units of local government

METHODOLOGY:

- Coordinate research and analysis of transportation, demographic and economic trends.
- Develop and implement processes for ensuring stakeholder involvement in the identification of goals and objectives, issues, alternatives and recommended strategies and actions.
- Coordinate public involvement activities to enhance citizen understanding of and participation in statewide transportation planning studies, policy guidelines and performance measures.
- Work with District/Division and modal offices to build frameworks for describing the results of effective planning processes.
- Participate on and provide staff support to various Department committees, councils and task forces related to statewide planning issue areas.
- Provide for the administration and coordination of the activities necessary to provide technical assistance for local planning activities to RDC's and to Mn/DOT Districts. Manage funding programs for planning to ensure funds are effectively expended by RDC's.

PRODUCTS:

- Development of the Statewide Transportation Plan Revisions and Updates.
- Development of guidelines and performance measures to support statewide transportation policies.
- Development of frameworks for district/division planning.

- Coordination of Mn/DOT responses and positions to national and state initiatives that impact on transportation such as the Governors' Task Force Report on sustainability and the Metropolitan Council's Growth Options Report.
- Preparation of reports on other statewide planning studies.
- A continuing and coordinated planning process for carrying out comprehensive transportation planning. Inclusion of projects in the Transportation Improvement Programs.

TASK TITLE: Special Studies

WORK AUTHORITY NO.: TH__103

WORK PERFORMED BY: Special Studies Section

OBJECTIVE:

To perform the necessary activities for evaluating the physical characteristics, performance, and programs on all road networks in Minnesota for use by department administrators, FHWA, State Legislature, and others.

METHODOLOGY:

This objective will be achieved by:

- Quantifying capital improvement cost alternatives for the trunk highway system for varying standards and levels of service and to provide the department with a system level policy analysis tool. (Highway Performance Monitoring System Investment Package).
- Operating and maintaining a computerized method of evaluating the adequacy of the Trunk Highway System (Highway Sufficiency and Condition Ratings). Annually collect and code data for updating the file.
- Maintaining the capability to periodically assess through annual reports, the condition of the highways, roads and streets in Minnesota to measure their performance and quality (Highway Performance Monitoring System). This is done in accordance with FHWA annual reporting requirements. Construction accomplishments and capital obligations are received from the local authorities as well as Mn/DOT.
- Providing review and coordination of the approval of local officials (RDC's & MPO's) approval of revisions to the Urban Area Boundaries, the Functional Classification Plans, and the eligibility of Federal-Aid Routes, in accordance with established procedures.
- Creating, maintaining, and providing maps and records for the Functional Classification system and the Federal-Aid system in a current status as necessitated by revisions or updates requested by local, state, or federal officials, in accordance with the provision under ISTEA and other established rules and procedures. (Includes coordination of requests for designation by the FHWA, of the National Highway System (NHS)).
- General oversight of the Transportation Information Systems Files (TIS). Responsibility for the correctness of data entry related to Functional Classification, Federal-Aid, HPMS, Sufficiency, and Condition TIS coding. TIS is the reference file for most roadway information developed by and for in-house and outside users.

- Review of Federal-Aid considerations for recommendation of State Right of Way Reconveyance Orders. Part of the Mn/DOT responsibilities under the provisions of ISTEA.
- Coordination of review for truck route designations on Trunk Highways, recommendations forwarded to the Truck Center per Mn/DOT procedures conforming to Federal Register Vol. 55, No. 106, part 658.
- Provide guidance, authorship, and documentation of control section records and legislative control of routes as required by Mn/DOT and the Legislature.
- Solicit data and provide mapping and analysis of spring load restrictions as required by Minnesota law.
- Providing information from any of the above systems in the form of mapping, special reports, and data sets, on request from interested parties, while maintaining consistency and accuracy within the time limits of the client.

PRODUCTS:

- HPMS - Maintenance
- Sufficiency and Condition Ratings
- HPMS - Investment Package
- Functional Classification System (maps and records)
- Federal system documents (maps and records)
- National Highway System (maps and records)
- National Truck Network (Review) (maps)
- Provide reports and/or data for other highway studies as requested by FHWA, State, and Local Road Authorities, etc.

Note: (maps and records) referred to above are digital mapping and data records used to provide both "hard copy and electronic" information to users.

TASK TITLE: Special Studies

WORK AUTHORITY NO.: TH__105

WORK PERFORMED BY: Economic Analysis/Special Studies Section

OBJECTIVE:

To provide direction for the preservation, improvement, and further physical development of the state transportation system. To direct the analysis of the transportation system, including financing and long range planning considerations. To direct special studies.

METHODOLOGY:

Statewide transportation planning studies provide a coordinated response to federal and state requirements while fostering unique solutions to individual problems. Research and investigation into common issues provide a forum for sharing successes (and failures) in responding to similar issues. Statewide transportation planning activities include data collection, analysis, coordination, direction setting and evaluation.

PRODUCTS:

- National Highway System
- National Highway System Connections to Major Intermodal Facilities
- Regional Centers
- InterRegional Corridors
- Funding Target Formula
- Guidance for Developing the Statewide Transportation Improvement Program
- Guidance for the Project Work Plan and Project Studies Plan
- Analysis of Alternative Geometric Design Standards
- Financial Forecasts
- Pavement Rehabilitation and Preservation Strategies
- Social, Economic and Demographic Data Analysis
- Travel Trends
- NCHRP Projects and Surveys
- AASHTO Surveys

TASK TITLE: Program Development

WORK AUTHORITY NO: TH__106

WORK PERFORMED BY: Planning, Program Development and Project Authorization

OBJECTIVE:

To develop and manage a statewide transportation improvement program that promotes the safe and efficient movement of people and goods, and preserves and maintains the existing transportation system. Improvements to the system are made where cost effective and based on sound planning principles. Program Development is composed of several separate tasks.

STIP Guidance and Development: Develop and document the assumptions, procedures and processes to be used by the transportation partners when developing their respective Area Transportation Improvement Programs. To develop a Statewide Transportation Improvement Program that allows Minnesota to maintain and improve the safety of all components of the transportation system.

Special Federal Aid Programs: To develop, maintain, and program projects for special categories of funds, such as Forest Highways, Public Lands, and Emergency Relief.

METHODOLOGY

STIP Guidance and Development: Guidance for the development of the State Transportation Improvement Program (STIP) is provided through continuous communication with the District/ATP's and other partners through a Guidance document. The document provides transportation goals objectives and direction for use in making statewide transportation investments.

The Area Transportation Partnerships (ATPs) submit prioritized lists of candidate projects based upon the integration of transportation priorities from RDC's ,MPO's and Mn/DOT districts. The candidates are analyzed with respect to state goals, available funding, consistency and a draft STIP is developed. The draft STIP is reviewed by the ATP and with their comments considered, a final STIP is prepared.

Time frames:

April ATP submit candidate lists

May/June Draft Program reviewed by ATPs

July Final STIP developed and submitted to FHWA/FTA

PRODUCTS:

STIP Guidance and STIP: Guidance is sent to the Area Transportation Partners every year. A three year Statewide Transportation Improvement Program is then developed annually.

TASK TITLE: Special Federal Aid Programs and Project Authorization

WORK AUTHORITY NO: TH__112

WORK PERFORMED BY: Project Authorization Section

OBJECTIVE:

To provide administration of the Federal Aid Highway Program to maximize federal funds and utilize those funds effectively.

To provide budgetary control and fiscal management of the State Road Construction Programs in accordance with legislative constraints and Mn/DOT policy.

METHODOLOGY:

Conduct the Federal Aid programming process, the FHWA Project Status Record, and the submittal of project to the FHWA for authorization. Coordinate compliance with all Federal Aid requirements, engineering and fiscal, by other divisions and offices of Mn/DOT. Provide direction to the flow of federal funds between Mn/DOT and FHWA for their most efficient use. Ensure that program content is compatible with categorical distribution of program funding. Maintain the status of program budgets by listing expenditures, anticipated expenditures, and balances; and make the necessary adjustments that conform with legislated budget limits.

Special Federal Aid Programs: Program all viable projects in compliance with the published FHWA guidelines.

FAPG Subchapter G, Part 660 (Forest Highways)
FAPG Subchapter G, Part 667 (Public Lands Highways)
FAPG Subchapter G, Part 668 (Emergency Relief)

PRODUCTS:

A Federal Aid Program that effectively uses federal and other transportation funds.

An ongoing schedule of all special programs prepared for state, county, and municipal projects.

PROJECT TITLE: Program Management

WORK AUTHORITY NO.: TH__116

WORK PERFORMED BY: Program Development Section

OBJECTIVE:

To maintain and develop computerized Mn/DOT program delivery schedules, and to further develop the financial tracking of projects in the Project Management and Scheduling System. This automated scheduling system contains all the information used in the distribution of State and Federal Funds, as well as manpower requirements for all pre-letting functions.

METHODOLOGY:

This task involves updating the most current program data into the computer system. It includes adding such data as letting dates, program funding estimates, amount of contract awards, type of funding, funding agreements, post-award changes, and program status.

PRODUCT:

A current on-line statewide program management and project scheduling system which is used as a tool in managing State Aid, Transit and Minnesota Department of Transportation construction program.

TASK TITLE: Administration and Control of State Planning & Research Program

WORK AUTHORITY NO.: TH__201

WORK PERFORMED BY: Project Authorization Section

OBJECTIVE:

To provide the direction, supervision and general office work necessary for the administration of the Planning and Research Work Program.

METHODOLOGY:

This work element provides for the administrative and coordination of the activities necessary to manage the State Planning and Research Work Program. The tasks in this program are reviewed and updated on an annual basis with funding obligation and program approval obtained from FHWA on or before the first of each year. An annual accomplishment report is prepared for monitoring the SP&R activities. This task provides for salaries and expenses of the SPR Coordinator to carry out the administrative responsibilities related to highway planning and research activities.

PRODUCT:

Annual Work Program, Annual Accomplishment and Financial Report. Internal quarterly financial report.

TASK TITLE: Economic Analysis

WORK AUTHORITY NO.: TH__218

WORK PERFORMED BY: Economic and Special Studies Section

OBJECTIVE:

To determine the most cost effective investments for transportation system improvements. Develop classic investment criteria to evaluate the economic feasibility and priority for proposed projects.

To investigate the relationship between transportation, including highways, and the economy and to investigate special issues.

This information is necessary to help guide Mn/DOT policy and decisions because transportation is not an end in itself, but rather exists to serve larger goals in society, including encouraging the growth of the economy.

METHODOLOGY:

1. Investigate the relationship between transportation, including highways, and the economies of the State and Nation including such topics as:
 - a. The effects of major demographic business and economic trends on transportation system demands and revenues.
 - b. The economic efficiency or financial returns of major transportation system segments and corridors.
 - c. Benefit incidence from transportation projects. To what extent do benefits accrue to local, regional, statewide, and/or national economies.
 - d. Economic impacts of alternative solutions to urban transportation problems.
 - e. Linkages between the Twin Cities and other regions of the state and other inter-regional relationships as well, with a focus on economic activities and transportation.
 - f. Distributional effects of transportation investments.
2. Develop criteria for evaluating the economic impact and feasibility of transportation projects through activities such as:
 - a. Conducting benefit/cost analysis of proposed transportation investment projects.
 - b. Calculating the economic rate of return to transportation investments.

- c. Evaluating the distribution of benefits and costs of transportation investments across identified groups in society.
 - d. Develop standards and practices for implementing investment analysis techniques.
 - e. Incorporating accepted investment analysis criteria into the project selection and prioritization process.
 - f. Providing technical training for implementing investment analysis to others involved in the transportation investment process.
3. Communicate the results of the investigations by means of reports, presentations, etc. appropriate to the stage of the projects and/or the audience involved.

PRODUCTS:

1. Components in Major Investment Studies for pending projects.
2. Workshops on use of investment analysis tools in transportation investment decisions.
3. Reports in various formats (memos, working papers, research reports) on the issues investigated and appropriate to the stages noted above and the intended audience.
4. Investment guidelines or criteria.
5. Economic analysis components of ATIPs.

OFFICE OF

MANAGEMENT

DATA SERVICES

TASK TITLE: Transportation Information System (TIS) Management

WORK AUTHORITY NO.: TH__202

WORK PERFORMED BY: Systems Research and Development Section and the
Transportation Data Section

OBJECTIVE:

To manage the TIS by providing system, software, hardware and user support, data collection, file updating and maintenance, and by developing products such as visual and graphic reports. To develop and maintain liaisons and working relationship with the various staff assigned to this task as well as both internal and external users. To research, test and apply new products and technology in order that the various activities being conducted under this task are constantly improved and made more efficient.

METHODOLOGY:

The Transportation Research and Investment Management Division is responsible for a major Information Resource System comprised of a number of data bases and systems used for transportation planning and analysis. This system incorporates data about roads (trunk highways and all other roads), railways and bridges. This data includes physical characteristics, various attributes such as traffic volumes and classification, and truck weight data, and designation information such as route system and number, federal classification, street names etc.

This task consists of data collection, data maintenance, file maintenance, training users, and providing reports as needed or requested. Data is collected using various methods such as laptop computers for vehicle classification data, electronic systems imbedded in the highways for Weigh-in-Motion data and requests to various offices and governmental agencies for resolutions, construction plans etc. This information is used to update current information and create new records and is made a part of the TIS through several methods; manual data entry, file transfers, etc.

The information contained in the TIS is used by Transportation decisions makers, planners and analysts and is provided in multiple forms such as text reports, graphs, and as attribute maps.

To ensure that this system is available whenever it is needed and that the data maintenance and report generating functions operate properly and efficiently support is provided for software and hardware maintenance and troubleshooting. Programming and System analysis services, hardware installations, system enhancements and general overall system support is furnished.

As part of this task systems personnel (analysts, programmers, coders, users, etc.) are provided with training, manuals, and periodic articles and information to assure everyone is kept current of any relevant TIS changes or problems and their resolution.

PRODUCT:

Prompt, efficient and accurate TIS file updates using up-to-date, state of the art data maintenance and collection methods which meet the needs of the end users.

TIS roadway data files able to be accessed by users with remote terminals.

Current data on the physical characteristics of roads, vehicle classifications, truck weights is available for input into the T.I.S. to be used for various studies and submission to the Long Term Pavement Performance Study (LTPP) Traffic Database and for input into the Mn/DOT Traffic Database.

Local road attributes maps for use by DPS and law enforcement agencies and Road Life records, Construction Project Logs, and Control Section Listings to be used as references by districts and other offices and agencies.

Hardware configuration, system data files, computer programs, and systems documentation to meet the needs of various internal and external users.

Maps, reports, user manuals, memos and articles detailing TIS capabilities, and in house and on-site training in TIS and IBM software systems (JCL, TSO, ISPF, IOF).

TASK TITLE: Videolog
WORK AUTHORITY NO.: TH__206
WORK PERFORMED BY: Transportation Data Section

OBJECTIVE:

To obtain a pictorial record of the entire Trunk Highway System and selected portions of the non-trunk highway system, which can be used as a source of information for purposes such as studying accident locations, inventory and evaluation of traffic control devices, collecting data for special studies, and development of sufficiency rating.

METHODOLOGY:

Videologging captures video images on an optical disc while the system computer simultaneously stores related data. Each year one half of the metro area and one third of the outstate districts highways are videologged.

During the late fall and winter, after field work is completed, the images and data are edited, duplicated and distributed to the affected Districts, the Office of Materials Research, the Office of Traffic Engineering and Department of Public Safety Accident Records Unit.

PRODUCT:

An up to date video disc file and related data file of all Trunk Highways, available to the Department, various government subdivisions and the public for reference and observation.

TASK TITLE: Vehicle Classification and Truck Weight Studies

WORK AUTHORITY NO.: TH__213

WORK PERFORMED BY: Traffic Forecast and Analysis Section

OBJECTIVE:

To determine the types and weights of vehicles using the States roadways and continually improve our method of accomplishing this. Analyze and report on the data in the format needed by Mn/DOT traffic forecasters, FHWA, and various other public and private parties.

1. Process vehicle classification data collected both manually and automatically throughout the state. About 100 locations are counted on a 2-year cycle and 900 on a 6-year cycle.
2. Process the truck weight data collected by Weigh-in-Motion scales at 16 permanent continuously operating sites.
3. Evaluate and update traffic data collection and analysis methods through the use of statistics, new technology and computer software while making available additional traffic data in the Transportation Information System.

METHODOLOGY:

Through the use of both PC based and mainframe programs, the raw data is processed to represent average day of the year values. Reviewal of current methods and the use of innovative techniques will facilitate our meeting our users' needs.

PRODUCTS:

1. Annual Vehicle Classification and Truck Weight reports.
2. Truck volumes on the state traffic flow map biennially.
3. Biennial 5 axle semi maps.
4. Analysis of data and special studies.

TASK TITLE: Traffic Counting

WORK AUTHORITY NO.: TH__214

WORK PERFORMED BY: Traffic Forecast and Analysis Section & Transportation Data Section

OBJECTIVE:

To conduct and continually improve our traffic counting programs which provide data for determining annual average daily traffic, vehicle miles of travel and growth trends for Mn/DOT traffic forecasters, FHWA, and various other public and private agencies.

1. Collect traffic data, using portable counter-classifier and from Automatic Traffic Recorders (ATR's) located throughout the state, into TIS.
2. Test ATR's for accuracy by manually counting at each site and comparing results.
3. Process traffic data using acceptable statistical methods.
4. Prepare traffic maps for the state trunk highway system on a 2 year cycle. Enter the count data for items 1-3 in the Traffic Files of the Transportation Information System (TIS).
5. Improve our methods of handling and reporting on the data through the use of statistics, new technology, and computer software.
6. Prepare traffic maps for the 7 county metropolitan area on a 2-year cycle.
7. Prepare traffic maps for the 80 outstate counties on a 4-cycle.

METHODOLOGY:

A cooperative approach is used which has our personnel selecting the counting location, District personnel collecting the counts, and our personnel processing the data to produce the traffic volumes for the average day of the year. Use all resources at our disposal to improve the procedures.

PRODUCTS:

1. County work maps with traffic volumes on Trunk highways plus a state traffic flow map derived from the county traffic maps.
2. An ATR summary report plus seasonal adjustment factors to apply to the counts taken it items 1-3 listed above.

3. Seven county metropolitan area maps on a 52-sheet street series with traffic volumes on the Municipal State Aid Street (MSAS) system.
4. 80 outstate county maps with traffic volumes on County State Aid Highways (CSAH's), County Roads (CR's) and MSAS.
5. Analysis of data and special studies.

TASK TITLE: Traffic Forecasting for Highway Design

WORK AUTHORITY NO.: TH__216

WORK PERFORMED BY: Traffic Forecast and Analysis Section

OBJECTIVE:

To provide traffic forecasts, data and reports for highway design for Mn/DOT district offices and highway planning organization.

1. Prepare forecasts of traffic volumes, axle loading and truck traffic.
2. Provide rural districts with technical support in traffic forecasting.
3. Monitor short term traffic trends.
4. Assist Metropolitan Planning Organizations and communities with traffic forecasts and technical studies.
5. Assist the Metropolitan Council with transportation system analysis and planning.

METHODOLOGY:

Through the use of various computer traffic models, forecasting techniques and analysis of traffic data, projections of future truck and auto volumes will be calculated.

PRODUCTS:

1. Systems Planning Analysis reports.
2. Individual highway traffic estimates.
3. Estimates of truck volumes and movements.
4. Traffic forecasting model maintenance and updates.
5. Special studies and reports.

TASK TITLE: Transportation Information System (TIS) Migration and Conversion

WORK AUTHORITY NO.: TH__224

WORK PERFORMED BY: Transportation Information Management Section

OBJECTIVE:

To convert and migrate the Transportation Information System data from the mainframe to a relational database in the WINDOWS NT environment and to build applications that parallel the current TIS applications and new applications as needed.

METHODOLOGY:

Rationale: TIS, which is used to support reporting requirements for HGIS, HPMS, WIMS, LTPP and other departmental needs and activities such as bridge management, pavement management, accident and safety tracking and management, railway management, and bikeway management, resides on an IBM mainframe. It suffers from a number of deficiencies that make it difficult to meet the transportation data management and analysis needs of Mn/DOT. Examples of specific problems are listed below:

- Not user friendly.
- Information not easily accessible and quantifiable.
- Costly and cumbersome data maintenance procedures.
- Data outdated, incomplete, and inaccurate.
- Cannot easily integrate with mapping software (GIS, CAD).
- System environment and architecture is very outdated (over 20 years old).
- Increasingly difficult to find information resource professionals who know IBM mainframe operating system, procedures, and programs (TSO, JCL, PANVALET, PL/1, EASYTRIEVE) that are being used to maintain the system.

Plan: The plan is to design and build a relational database (Oracle) that will parallel the current structure of the current TIS and to build applications that correspond to the current TIS applications and new applications as determined to be needed. The new system will be more user-friendly and will provide the easy integration of geographic applications (GIS and CAD).

The initial objective is to move the data for the trunk highway system (about 10,000 miles of data) from the mainframe to an Oracle database. It will be used primarily for displaying data on a map (GIS map). This will be phase 1 of the project.

The data will continue to be maintained using the mainframe TIS until all the data is migrated and the applications on the mainframe are duplicated on the relational database. A methodology for moving the data from the mainframe to the Oracle will be established to be able to refresh the data periodically.

Phase 2 of the project will be the development of the applications that will duplicate the current mainframe applications, i.e., for data entry and update and for report generation. Once this is developed and tested and working correctly, then phase 3, which is the migration and conversion of all the transportation data will be done.

PRODUCT:

A relational database in Oracle with redesigned data files, data maintenance procedures, analysis and reporting software which will be integrated with GIS applications.

OFFICE OF

TRANSIT

TASK TITLE: Transit Program Planning

REFERENCE NO.: TH__301

WORK PERFORMED BY: Office of Transit

OBJECTIVE:

To prepare transit and paratransit program plans and in cooperation with participating agencies and staff. To analyze, document and recommend transit and paratransit program policies that encourage coordination and cost-effectiveness of transit services. To develop, evaluate and recommend alternative program strategies and performance criteria.

METHODOLOGY:

Produce an annual report which concisely summarizes public transit activities. Prepare specialized reports and present results to internal and external advisory groups. Legislative and regulatory developments will be monitored. Develop a transit information network which will maintain information on all transit services in the state in order to further coordination and cost effectiveness of transit services. Alternative strategies are developed and analyzed when issues arise. Establish performance measures that are applicable to the various transit services and providers. Policies and other considerations are combined and documented as part of overall program strategy implementation. Support office planning activities.

Results will be produced as needed and will be used as a focus for testing new approaches and implementing practical improvements in transit services.

PRODUCTS:

- Annual Report
- Policy Analysis reports
- Transit issue presentations
- Quarterly Progress Reports
- Transit Service Inventory
- Five Year Transit plan

TASK TITLE: Transit Research and Program Evaluation

WORK AUTHORITY NO.: TH__302

WORK PERFORMED BY: Office of Transit

OBJECTIVE:

To research and prepare a variety of specialized reports, site studies, and surveys to ensure that adequate information is available to identify and evaluate alternative options involving numerous transit issues. To provide technical assistance to transit programs and project managers on specific transit planning and research projects. To develop research programs using a comprehensive computerized transit program data base and specialized software.

METHODOLOGY:

Prepare specialized reports on current transit topics. Analyze market characteristics for changing transit service areas. Conduct site studies for existing public transit systems. Develop, implement and analyze on-board transit surveys to continually update ridership profiles. Analyze trends (economic, social, demographic, etc.) that have current and/or potential impacts on public transit via utilization of specialized computer software. Support office research and program evaluation activities.

PRODUCTS:

- Program performance reports
- Demographic trend analysis reports
- Site studies for Transit Systems
- Transit research projects
- Transit Need Assessments

OFFICE OF

FINANCIAL

MANAGEMENT

TASK TITLE: Highway Statistics

WORK AUTHORITY NO.: TH__401

WORK PERFORMED BY: Financial and Management Analysis Section General Ledger Unit

OBJECTIVE:

To furnish information on motor vehicle registration, fees and taxes; driver license regulation and fees; and fuel consumption. This data is used to develop motor vehicle and motor fuel usage for forecasting future highway-user imposts and determining vehicle and fuel tax policies. Data is collected on state and local government highway finances and taxation for use in the formulation of highway policy, administration of highway matters, and informational use by legislators, public officials and the general public.

METHODOLOGY:

The procedures used to obtain statistical and financial data for reporting purposes are as follows:

- Motor vehicle registration and drivers' license data are received on an annual basis from the registrar of motor vehicles, Department of Public Safety. These data are researched, analyzed and compiled for use in the preparation of reports in accordance with instructions contained in Chapter 3, 4 and 5 of FHWA "A Guide To Reporting Highway Statistics."
- Motor fuel statistics are received monthly from the Petroleum Tax Division, Department of Revenue. Upon receipt of this information, monthly computations are made and placed on tabular form for gasoline and special fuels gallonage. These statistics are used in the preparation of annual reports and in accordance with Chapter 2, FHWA "A Guide to Reporting Highway Statistics."
- Financial reports are prepared from information acquired from the Department's Financial Management Analysis Section records. These records are extensively examined and tabulations, etc. are prepared for assistance and used in the preparation of annual reports in accordance with the guidelines contained in Chapter 8 and Chapter 9 of FHWA "A Guide to Reporting Highway Statistics."
- Local government financial reporting is based on information furnished by all cities, towns and counties on an annual basis. This information is now prepared by the Governmental Information Division of the State Auditor's Office. The Annual completed workup is submitted to the Department's Financial Management Analysis Section for approval. It is then forwarded to the Federal Highway Administration. This is in accordance with instructions in Chapter 10, FHWA "A Guide to Reporting Highway Statistics."
- Travel takes place in connection with training workshops, seminars, etc. which are scheduled annually for increasing effectiveness and efficiency of financial and statistical reporting.

PRODUCTS:

FHWA-531	State Highway Income
FHWA-532	State Highway Expenditures
FHWA-534	Capital Outlay and Maintenance Expenditures
FHWA-536	Local Highway Finance Report - Cities, Counties, and Townships
FHWA-541	State Transportation Obligations Issued During Year and Allotment of Proceeds
FHWA-542	Status of State Transportation Debt
FHWA-543	State Transportation Sinking Fund and Debt Service transactions
FHWA-551M	Monthly Motor-Fuel Consumption
FHWA-556	State Motor-Fuel Tax Receipts and Initial Distribution by Collection Agencies
FHWA-561	State Motor Vehicle Registrations, Registration Fees and Other Receipts; Initial Distribution by Collecting Agencies
FHWA-562	State Drivers' Licenses and Fees
FHWA-566	State Motor Vehicle Registration Fees and Other Receipts; Initial Distribution by Collecting Agencies
FHWA-571	Receipts from State Taxation of Motor Vehicles Operated for Hire and Other Motor Carriers

These reports are used as a basis for the statistical data and the U.S. Department of Transportation's annual publication "Highway Statistics."

OFFICE OF

TRAFFIC

ENGINEERING

PROJECT TITLE: Speed Data Summaries

WORK AUTHORITY NO.: TH__501

WORK PERFORMED BY: Office of Traffic Engineering

OBJECTIVE:

To monitor highway speeds and develop speed characteristics at various sites located on five highway categories. Data summaries are reported quarterly and annually.

METHODOLOGY:

Data collection procedures are developed by the Office of Traffic Engineering (OTE) and implemented through eight district traffic engineers. Monitoring 24 hour periods is desirable, therefore Mn/DOT uses a combination of automated traffic recorder stations (ATR) and weigh-in-motion (WIM) stations at sites with speed monitoring equipment accessible by telephone telemetry. Different software programs download the data, format it and finally analyze and print reports. Data is still visually screened to verify accuracy and potential hardware problems. The TRIM office maintains the hardware and OTE does the data analysis. This automated methodology has helped decrease the number of person hours required compared to previous years.

PRODUCTS:

A complete file of speed characteristics, on each category of highways, from which quarterly and annual reports are developed to evaluate motorists compliance with speed limits. Data may also be used to evaluate effectiveness of enforcement and public awareness programs. Speed trends also play a role in evaluating accident trends.

TASK TITLE: Crash Surveillance

WORK AUTHORITY NO.: TH__502

WORK PERFORMED BY: Office of Traffic Engineering

OBJECTIVE:

To provide crash data which can be used to reveal high crash locations and over represented crash characteristics on all roads and streets in the State. This information relates to the highway facility, vehicle, environment, and human factors and provides input for establishing highway safety needs and priorities for development of a long-range safety improvement program.

METHODOLOGY:

Traffic crashes, reported per state law by investigating officers or citizens, are processed by DPS and are on-line no later than 90 days afterward. A wide range of variables from the vehicle, injury, roadway, driver and environment support the federal emphasis of crash analysis and safety counter measure development. Various TIS software programs are executed by OTE And a report is developed for a requesting agency or internal application.

The software programs are over 15 years. A consultant will be hired to modify and enhance this software. These changes will improve user friendliness of both maintaining the data files and producing customized reports.

PRODUCT:

Semi-annual crash reports will be prepared for road authorities. Comprehensive reports are prepared using district boundaries for comparative analysis of accidents within specified areas or highway categories. Customized reports can be developed for technical or non-engineering disciplines upon request. Crash rates can be calculated for isolated intersections, highway categories or statewide systems as designated by the scope of the requester.

This timely crash data and summarized reporting provides road authorities an objective basis for prioritizing and developing safety countermeasures, dedicated enforcement efforts and also minimizes tort liabilities.

OFFICE OF

LAND

MANAGEMENT

TASK TITLE: Municipal Maps

WORK AUTHORITY NO.: TH__601

WORK PERFORMED BY: Cartographic Unit

OBJECTIVE:

To prepare and maintain a complete set of planimetric street maps at suitable scales for all incorporated municipalities in Minnesota. Reproducible and prints of these maps are used by the department for general purpose planning and operation functions and for municipal corporate boundary reference. In addition, many federal, state and local agencies, and the general public, use these maps for business and recreational purposes.

METHODOLOGY:

The original base maps of all incorporated municipalities are prepared in accordance with standards outlined in the *FHWA Guide for a Highway Planning Map Manual (Volume 20, Appendix 25)*. Municipalities are categorized as being either over or under 5,000 population. The procedures followed in producing these maps are the same in both cases.

Municipalities having a population of 5,000 or greater are represented individually on one or more 24" x 36" map sheet. Municipalities with less than 5,000 population are grouped by county on one or more 24" x 36" sheets, with as many municipalities on a sheet as space will allow.

At the present time, there are 125 incorporated municipalities having a population of 5,000 or more on 140 map sheets, and 729 incorporated municipalities of less than 5,000 population on 221 sheets. This makes for a total of 855 municipalities represented on 358 24" x 36" map sheets.

In the development and maintenance of municipal maps, all possible current information is collected and compiled from the same various map information sources as listed under county maps. (See TASK TITLE on County Maps).

With the implementation of computer assisted design and drafting (CADD), we are in the process of converting our manually drafted maps (analog) to computer generated maps (digital). This process is called "digitizing" where the locations of geographic features (those elements to be mapped) are recorded as digital x, y, coordinates in a computer file.

These digital computer map files may be structured as either a vector format where linear features are represented as a list of ordered x, y coordinates, or as a raster format, where the data structure is composed of rows and columns forming a grid of cells which may be assigned various values. Computer plots of either file format can be made onto paper (for edit) or film (for reproducible used in diazo process copying).

Update and revision are achieved by either manually drafting any changes to be on those municipal maps that have not be converted to a digital format or by entering any revisions to be made in the appropriate digital file and obtaining a new plot. At present, 50 municipal map sheets have been converted to a digital format.

Graphic records for all of Minnesota's municipal corporate boundaries are maintained by the Cartographic Unit. Due to age, many of these graphic files are in poor condition. We are in the process of converting those plats that are in the most serious condition and those that generate the most revision activity to a digital format.

For those deteriorating graphic records that only need preservation, a technique called "scanning" is used to generate a digital raster file. For those graphic records that have constant or extensive revisions to be mapped, digital vector CADD files are created from the existing analog map, and supplemented with additional information from appropriate Mn/DOT Right-of-Way maps, plat maps, legal land descriptions and city engineer maps.

The overlay method of mapping is used to produce Municipal State Aid Street (MSAS) maps for all municipalities having a population of 5,000 or more and Average Daily Traffic (ADT) maps for municipal maps that were surveyed for ADT volumes.

MSAS maps delineate state trunk highways, County State Aid Highways (CSAH), County Roads (CR) and MSAS routes on the appropriate municipal map. These various route systems are shown by overlaying approved patterns on the corresponding route. Additionally, MSAS streets are labeled with the number assigned in the Commissioner's Order that establishes the designation. For digital municipal maps, the corresponding MSAS overlay is also created in a digital format. A composite reproducible plot of the base map and the MSAS overlay (as a reference file) is then made for diazo process copying. For manually produced municipal maps, a drafting film overlay is manually prepared and combined with the respective municipal map to create a composite reproducible which is also used for diazo process copying.

The manual overlay drafting method is also used to create ADT traffic maps for all non-digital municipal maps in those counties for which traffic volume surveys were taken. (NOTE: ADT maps for digital municipal maps are prepared by the Traffic Forecasts and Analysis Section). These overlays show ADT traffic volumes on all state trunk highways, CSAHs, CRs and MSAS streets. A composite reproducible is made from the municipal map, and the respective MSAS and ADT traffic overlays for diazo process copying.

PRODUCTS:

A complete set of planimetric street maps of all incorporated municipalities in Minnesota.

Municipal State Aid Street (MSAS) maps for all incorporated Minnesota municipalities having a population of 5,000 or more.

Municipal Traffic Maps.

TASK TITLE: St. Paul-Minneapolis Metropolitan Area Maps

WORK AUTHORITY NO.: TH__604

WORK PERFORMED BY: Cartographic Unit

OBJECTIVE:

To prepare and maintain maps of the St. Paul-Minneapolis Metropolitan Area showing existing streets and roads, route system designations, railroads, political boundaries and other miscellaneous features. These maps provide the department and various other governmental agencies with basic mapping for general purpose planning and operation functions.

METHODOLOGY:

The Cartographic Unit maintains a digital base map for the entire Seven County Metropolitan Area. This set of 50 map sheets is referred to as the Metro Area Street Series. While prepared, maintained and usually plotted as 50 individual digital map files, these sheets are structured for seamless mosaicking into desired metro area coverages.

These maps show all roads and streets in single line format. Route systems, such as state trunk highways or county roads, are portrayed by different line weights as well as their respective route designation symbol and number. These maps also show all political boundaries, hydrography and railroads as well as selected references to the Public Land Survey System (section, township, range) and geodetic location (lat/long and state plane coordinates).

The computer assisted design and drafting (CADD) method was used to produce the Metro Street Series. Using a high resolution computer graphic workstation and Intergraph® software, a mapping technician "digitizes" all the various graphic elements contained within the computer map file. (See Task Title on Municipal Maps for explanation of digitizing).

USGS 1:24000 scale 7½ minute quadrangle (quad) maps are used as the source for positional control and the initial line-work to be digitized. Using the same digitizing techniques, this "skeletal" line-work is then supplemented with other map information sources such as aerial photographs, road plans, road inventory notes and other maps.

Individual Metro Area Street Series map sheet coverage is formed by merging and "clipping" appropriate Mn/DOT "skeletal" quad files within the computer. The symbology and text annotation needed to complete the map are also entered into the digital file. The finished map file is used to produce computer film plots which are then used for diazo process paper map copies.

From this same digitizing, The Cartographic Unit has formatted a single map sheet file titled the St. Paul-Minneapolis Area Map. Features depicted on this map include all state trunk highways and county state-aid highways, selected county roads and other local arterial roads, railroads,

hydrography and political/civil boundaries. The graphic format and level assignment of this file resembles that of the county mapping activity. (See Task Title for County Maps).

A full-sized and a reduced scale computer plot on film are made for further diazo process paper map copies.

Additionally, this same Metro Area Street Series digitizing serves as the base for formatting individual municipal maps for those cities within the seven county metropolitan area.

PRODUCTS:

A 50 map sheet set (Metro Area Street Series) covering the entire Seven County St. Paul-Minneapolis Area at a scale of 1:24000 (one inch equals 2000 feet).

A single sheet St. Paul-Minneapolis Metropolitan Area Map.

TASK TITLE: County Maps

WORK AUTHORITY NO.: TH__606

WORK PERFORMED BY: Cartographic Unit

OBJECTIVE:

To maintain a complete set of current, accurate, legible county map originals and reproducibles at a scale of one inch equals one mile. (Maps in the Seven-County Minneapolis-St. Paul Metropolitan Area are prepared at a scale of two inches equals one mile.) Prints and/or duplicate reproducibles of these maps are used in the planning, location, and design of projects by the Minnesota Department of Transportation. Additionally, these maps are used as base maps by most state agencies, local and county governmental units, many federal agencies, private sector business application, such as transit and transportation industry, utilities, manufacturing, etc., and by the general public for business or recreational purposes.

METHODOLOGY:

The original, full scale county maps are prepared and maintained in accordance with standards outlined in the FHWA Guide for a Highway Planning Map manual (Volume 20, Appendix 25).

Currently, 125 map sheets are required to map Minnesota's 87 counties. These are produced on a uniform sheet size of 36" x 56" requiring from one to seven sheets for a single county.

In the development of a new county map base all possible current information is obtained from the following reliable sources:

County Maps

1. U. S. Geological Survey 1:24000 quadrangle maps
2. Mn/DOT project construction plans
3. Aerial photography obtained from Mn/DOT Photogrammetric Unit, U.S. NAPP, Department of Natural Resources and Metropolitan Council
4. Road Status Reports from County and Municipal Engineers
5. Municipal and County project construction plans
6. Mn/DOT Intermodal Programs Division, Transportation Data Section road note data
7. Railroad and public utilities
8. Minnesota Department of Natural Resources
9. Various United States agencies such as Bureau of Land Management, Bureau of Indian Affairs, U. S. Forest Service, Federal Aviation Administration, and Federal Highway Administration
10. Decisions from the U. S. Board of Geographic Names
11. Others

After all data is collected the information is plotted using colors to denote various items. Colors are used to facilitate the later map preparation. Maps are prepared at a scale of one inch equals one mile, with the exception of six of the seven metropolitan area counties that are mapped at a scale of two inches equals one mile, using a polyconic projection. These are classified as full-scale county maps.

Originally, base maps were prepared by placing appropriate symbols and patterns on a mylar sheet. These were cut from pre-printed, adhesive-backed acetate sheets which we call "stipple". Since 1986, all new county map sheets have been prepared utilizing computer-assisted design and drafting (CADD). Computer-assisted mapping has definite advantages in revisions and updates. After completion and checking, copies are submitted to FHWA for approval.

With the implementation of CADD, a new method called "digitizing" is being utilized to create new, updated and very accurate maps. The procedure for this process is described in the section on "Municipal Maps". This method is labor intensive in the initial stages but saves considerable time when making annual updates. The positional accuracy of the map product and the ability to seamlessly combine adjoining counties to create area maps are important benefits of this method. These digital county maps will be used in the future development of a state-wide Mn/DOT geographic information system (GIS) database.

The original base maps are filed in the Cartographic Unit and are used only to make full-size photographic mylar reproducibles. These full-size reproducibles are used to make diazo blue line prints on an "as ordered" basis and to make half-scale photographic reductions. Commercially printed lithographic prints of the half-scale maps are made and are available for sale or other distribution. Half-scale printing is done only every two years.

Minor revisions are received almost daily. These are filed for reference and every county map is updated at least once each year to reflect these changes. The full-scale base maps and reproducibles are revised concurrently so that the latest information is available to the requestor.

Using the half-scale county maps as the base and the manual overlay method for drafting, traffic maps are created for the counties in which traffic surveys were taken and for which there is no digital base map. These maps show traffic on all trunk highways, County State-Aid Highways and County Roads. A reproducible composite of the base map and traffic overlay is furnished to the Mn/DOT Traffic Data and Analysis Unit for further copying and distribution.

PRODUCTS:

A complete set of county general highway maps covering the entire state.

Half-scale reductions and lithographic prints of county maps.

TASK TITLE: State Maps

WORK AUTHORITY NO.: TH__608

WORK PERFORMED BY: Cartographic Unit

OBJECTIVE:

To prepare and maintain current, accurate and legible Minnesota maps depicting Minnesota's transportation systems statewide. These state maps are used by Mn/DOT for administrative and planning activities as well as by other federal, state and local governmental agencies in relating their concerns to Minnesota's transportation systems. Public utilities, private industry and business and the general public also make use of these maps for their individual needs.

METHODOLOGY:

State map originals are prepared and maintained in accordance with the standards outlined in the FHWA "Guide for a Highway Map Manual" (Volume 20, Appendix 25).

When Mn/DOT (formerly Minnesota Highway Department) began producing its own Official Highway Map in 1965, the base map showing state and county lines and the state trunk highway system was also to serve as a base for all other departmental statewide mapping concerns (See State Map Products). In 1992, work was completed on the digitizing of a new base map for the Official Minnesota Highway map utilizing the capabilities of computer-assisted design and drafting (CADD).

The new Official Highway map base was created, in much the same manner as is described in the section on "Municipal Maps". Digitizing was done using the U.S.G.S. 1:100000 quadrangle map series for Minnesota as the basis. Prior to digitizing, all pertinent map data was supplemented and updated with current information from all available sources. With the completion of this project, considerable flexibility is available in generating the necessary overlays for printing the current map.

Revision of the digitized base map and overlays to show current status is achieved by researching maps and data produced by reliable governmental mapping agencies and various other sources as listed under item number TH__606, County Maps. The Official Highway Map is updated every two years while the other map derivatives are updated as the need occurs, in accordance with current map production schedules.

The Cartographic Unit is also in the process of developing a statewide data base for transportation system mapping through the use of CADD. Because map features are being located in the field by state plane coordinates, a strict Lambert conformal conic projection is being plotted to preserve map accuracy. The CADD system allows many transportation related elements to be identified with the transportation networks of highways, rail, pipelines and waterways. It also allows for the use of "windowing in" on a statewide map down to regional,

district, county or even corridor specific maps. These additional capabilities and resulting flexibilities will produce a better picture of transportation interrelationships within the State of Minnesota.

PRODUCTS:

The Official Highway map is produced biennially under this project. All of the cartography, photography text and artwork for this publication are produced in-house. Offset four color printing is accomplished by low bid of local commercial printer. Mn/DOT funds are used for purchasing the number of maps needed by Mn/DOT distribution outlets at a unit price that covers the cost of printing. Other state agencies may also purchase quantities of maps, at the per unit printing cost, by coordinating their purchase request, with Mn/DOT's, through the Department of Administration.

The state trunk highway system map and the state county outline map were prepared by digitizing U.S. Geological Survey 1:100000 scale maps. Appropriate map features from these 69 individual source maps were merged into one file of statewide coverage. Computer plots of these maps are made to various scales and copies are produced by diazo process as the need arises.

Miscellaneous other state maps that portray transportation related data statewide are either derivatives of or overlays to the state trunk highway system map. These types of maps are plotted and/or printed on an as needed basis.

A set of Mn/DOT district maps has also been digitized and annotated. District offices access, update and plot their respective areas through the network on an as needed basis.

**OFFICE
OF
STATE AID**

TASK TITLE: County State Aid Highway Needs Study

WORK AUTHORITY NO.: TH__701

WORK PERFORMED BY: State Aid (CY 1998)

OBJECTIVE:

To compile a computerized record of the entire County State Aid Highway System with specific attention given to mileage and money needs. Basically, money needs are defined as the construction cost required to improve the county state aid system to approved standards. Based on direction from the County Engineers Screening Board, each county's mileage and annual money needs are presented to the Commissioner of Transportation. Using this information and pursuant to Minnesota Statutes, Chapter 162; the Commissioner apportions the County State Aid portion of the road user fund to the various counties.

METHODOLOGY:

Each county engineer is annually required to update his needs study based on construction accomplished, system revision, traffic, needs reinstatement, and any other necessary changes. With these updates, the computer record is revised and a completely updated needs study is created.

Each year, in order to keep the needs study unit prices current, each year a five year average unit price study is produced. Using the results from this study, the County Engineers Screening Board develops new unit prices for inclusion into the needs study.

Each year approximately 25% of the counties have their traffic counted. This information is received from the Data Management Section and transferred onto the records in the needs study.

All the above data is presented to the County Engineers Screening Board for their use in making an annual recommendation of mileage, lane/miles, and money needs to the Commissioner of Transportation.

The entire needs study process (computer programs, etc.) is being reviewed and rewritten. This will take several years and will result in increased budget numbers.

PRODUCTS:

Two County Engineers Screening Board Reports.

One County State Aid Apportionment Booklet.

Misc. Legislative, Auditor, and client requests.

PROJECT TITLE: Municipal State Aid Street Needs Study

PROJECT AUTHORITY: TH__702

WORK PERFORMED BY: State Aid

OBJECTIVE:

To maintain the Municipal State Aid Needs Studies which result in the annual determination of State Aid Apportionment to municipalities over 5,000 population according to Minnesota Statutes, Rules and Screening Board Directives.

METHODOLOGY:

The City Engineers annually report the construction accomplishments, system revisions, certification of mileage and status corrections as outlined in the State Aid Manual. Also, the Twin Cities Metropolitan area traffic data is updated every two years, and the outstate cities every four years. These items are processed through a computer program together with unit prices which are annually updated and approved by the Municipal Screening Board at their spring meeting.

The resulting needs and tentative apportionments are reported to the Municipal Screening Board at their fall meeting. Prior to November 1, of each year, the board recommends the money needs to be used by the Commissioner of Transportation for the following year's allotment to the municipalities over 5,000 population. The actual allotment is made by the Commissioner of Transportation in January of the following year when the funds available are known.

PRODUCTS:

Two reports to the Municipal Screening Board for their use in making their annual recommendations to the Commissioner of Transportation.

One annual "Municipal Apportionment" report to the municipalities over 5,000 population showing their annual allotment and the methods of determining the amounts.

**OFFICE OF
TECHNICAL
SUPPORT**

TASK TITLE: Cultural Resource Investigations

WORK AUTHORITY NO: TH__801 THROUGH TH __899

WORK PERFORMED BY: Office of Technical Support

REFERENCE NO: T-Contract Program
 Agreement No. 75098 Agreement No. 75099
 Agreement No. 75100 Agreement No. 75101
 Agreement No. 75102 Agreement No. 75103

OBJECTIVE:

To preserve and/or document cultural resources subject to disruption due to proposed highway improvements. This includes the archaeological survey of prehistoric and historic sites, historic research, geomorphological studies, and/or archaeological data recovery. The information from these investigations is included in the environmental impact study of highway corridors. Results are also forwarded to the State Archaeologist and the State Historic Preservation Office (SHPO).

Cultural resource investigations are done in conformance with:

Historic Preservation (36 CFR 800);
National Historic Preservation Act of 1966 (PL 89-665) as amended;
Department of Transportation Act of 1966 (PL 89-670);
Executive Order 11593;
Archaeological and Historic Preservation Act of 1974 (PL 93-291);
Title 36 of the Code of Federal Regulations (CFR) Parts 60-66 and 800;
Native American Graves Protection and Repatriation Act of 1990 (PL 101-601);
Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation Activities. As published in the Federal Register on September 29, 1983, Volume 2 48, No. 190, Part IV. (48 FR 44716 through 44740);
Association of Iowa Archaeologist's Guidelines for Geomorphological Investigation in Support of Archaeological Investigations (1992);
State Historic Preservation Office (SHPO) Guidelines for Archaeological Projects in Minnesota;
Manual for Standing Structures;
Minnesota State Comprehensive Plan;

Minnesota state historic preservation regulations and guidelines, and Secretary of the Interior and/or SHPO standards, guidelines, and directives in force during the period of work performance.

METHODOLOGY:

Projects which may be affected by proposed highway improvements are identified through the districts, counties, and municipalities. These projects are assigned to vendors in the T-contract program on a rotational basis based on the vendor's expertise, work load and availability. Projects are defined by type of investigation and phase as required by SHPO after review of the proposed project area. Types are Geomorphology, Historical, archaeological, and architectural phases are defined as:

- Phase I - Initial Reconnaissance
- Phase II - Intensive Survey (Determine Significance)

PRODUCTS:

Monthly progress reports, field notes are submitted. Pictures and documentation of historical sites, if historical research is cited. If archaeology is identified, artifacts are curated. Final reports and conclusion of research and findings.

See also enclosed Special Conditions of agreement.

**OFFICE OF
ADVANCED
TRANSPORTATION**

TASK TITLE: Bikeways Planning

WORK ACTIVITY NO.: TH__117

WORK PERFORMED BY: Sustainable Transportation Initiatives (STI)

OBJECTIVE:

To integrate safe, efficient, and accessible facilities community transportation modes (i.e. bicycles, pedestrians, transit, telecommuting) into the state's roadway network through transportation planning and Mn/DOT policies.

METHODOLOGY:

This objective will be achieved by:

- Providing technical transportation planning assistance and training to the 8 Mn/DOT districts and Central Office to ensure proper consideration of appropriate bicycle and pedestrian enhancements on all trunk highway projects so that safety improvements for all travelers can be made in a cost effective manner.
- Providing technical assistance to local units of government in bikeway/pedestrian planning and development, and mapping.
- Working with and tracking funding of ISTEPA for the local units of government concerning bicycle/pedestrian improvements.
- Develop working partnership with local, state, national and international membership to investigate and plan for bicycle/pedestrian/transit friendly environments.
- Work with Minnesota State Bicycle Advisory Committee on issues concerning bicycles.
- Develop bicycle program and funding support policies for consideration and adoption by MN/DOT, various state agencies, the State Bicycle Advisory Committee, and the legislature.
- Educate Mn/DOT and general public on the benefits of telecommuting.

PRODUCTS:

- A continuing and coordinated bikeways planning process which assists Mn/DOT, other state agencies, and local units of government in the enhancement of bicycle travel in the state.
- Meet goals and measurable objectives set by “Plan B: The Comprehensive State Bicycle Plan”.

- A bikeways brochure which provides accurate and up to date travel information, both on paper and eventually available via the Internet on Mn/DOT's home page.
- Pilot project for Bicycle/Pedestrian/Transit friendly community in Hutchinson, Minnesota utilizing Light Traffic Task Force plan. This project contingent upon available resources from Willmar District and local community.
- A program which assists communities in the establishment and development of safe and efficient local bikeway system using ISTEA funding.
- Development of Mn/DOT Policy for the safe accommodation for bicycles in both rural and urban settings.
- Help in supporting Minnesota Recreation Trail Users Association first annual conference.
- Working with the University of Minnesota in developing an Autoscope system which will create a safer environment for bicyclists and bus drivers traveling between the St. Paul and Minneapolis campuses.
- Postcard called "Bicycle Friendly Minnesota" to encourage the information of the citizens to the proper agencies of possible fixes to unsafe bicycle facilities as well as regular roadway fixes.
- Bicycle Miles Traveled (BMT) development and estimates for the State of Minnesota.
- Work with communities in Minnesota on the Transportation Action Model (TAM). This is a model currently being used in Cambridge to let the community develop a transportation plan specific to its wants and needs.
- Continue development and administration of Mn/DOT's Cambridge Telework Center.
- Have working display of the "Telework Experience" at the Transportation Conference.
- Develop and hold training classes for employees who are able to telecommute.

OFFICE OF

FREIGHT, RAILROADS

& WATERWAYS

TASK TITLE: Freight Studies

WORK AUTHORITY NO.: TH__220

WORK PERFORMED BY: Freight Section

OBJECTIVE:

To improve freight transport by providing information, direction and service to internal and external customers. To provide for and facilitate cooperative action, private and public, to improve Intermodal freight transport specifically and freight transportation in general.

METHODOLOGY:

By increasing Mn/DOT's basic knowledge of freight transportation and improving the comprehension of freight transport's relation to Minnesota's economic, social and environmental health, consideration of freight transport will better integrate into Mn/DOT's planning, programs, investments and system management. Conduct commodity flow studies. Develop a freight facilities database. Staff and utilize the Intermodal Management Advisory Team comprised of private industry and public sector members to provide an intermodal perspective and foster public/private cooperation.

PRODUCTS:

1. *Policy Development, Issue & Trend Analysis*
Provide and articulate freight related policies and issue and trend analyses that reflected a Statewide and system level perspective. Provide both the framework and information necessary for Districts and Regions to plan, improve and develop transportation facilities that account for interregional influences, function as systems, and are consistent with State goals. Provide information and stimulate discussion to guide Statewide policy development and also local and regional transportation investment decisions as well.
2. *Freight Expertise & Intermodal Freight Perspective*
Maintain a high level of freight transportation expertise, available to all levels of the Department, to provide advice and assistance on freight issue resolution. The Intermodal Management System development and related efforts would be included in this product to provide an Intermodal perspective and facilitate private involvement and input.
3. *Freight Information, Commodity Flows, & Database Development*
Provide for development and dissemination of freight transportation related information to improve the Department's level of understanding in this important sector and help Mn/DOT be a learning organization.

Provide commodity flow data and information to improve the level of understanding of customer needs, Minnesota markets, transportation demand and freight's relationship to economic activities. Concentrate on the broader Statewide, multi-state, national/internal

flows while working with MPOs, RDCs, Districts and Metro Division to develop regional and localized information.

Lead the development of Statewide freight related database, coordinating with the Information Resource Management Project and TIS reengineering. Develop techniques, report formats, mapping capabilities or other ways to turn "data" into information useful in the planning and investment decision processes.

4. *Research & Communication - Coordination*

Provide development of research proposals and stay current with freight related research efforts regionally and nationally. Coordinate within Mn/DOT and provide freight information to internal and external customers. Provide coordination of weight enforcement planning with the State Patrol.

DESCRIPTION OF RESEARCH STUDIES

I. State SPR Research

Research Administration

Provides for the preparation of proposals, detailed work outlines, and cost estimates for research studies to be submitted for the SPR Work Program. This includes incidental and miscellaneous expenses which occur during the course of the year and which are pertinent to the overall research, development and implementation efforts. Included will be the costs of support staff and researchers needed to administer and monitor the studies in the State's Research Program. These studies can be found in this section. Many of these studies are a part of the Mn/ROAD and the IVHS research effort. Also provides for attendance and participation in various meetings, workshops, including the annual FCP conference, which contribute to a better understanding of current problems, foster exchange of technical information and lead to improved research management practices.

Transportation Research Board Dues TRB-1 (098)

The activities supported by this subscription include the collection of available information concerning past, current, and proposed research related to transportation from all sources including federal, state, and other governmental agencies, colleges and universities, research and planning organizations, transport operators and industry, as well as the TRB Annual Meeting and conference programs; the study and correlation of this information through the work of the committees of the Board and dissemination of the useful findings of research and other information by all feasible means including the several TRB publication series, the output of the Transportation Information Services, and through personal contacts during scheduled field visits by the TRB professional staff.

II. Cooperative Research

National Cooperative Highway Research Program (NCHRP) SPR-4(195)

This is a joint program of the American Association of State Highway and Transportation Officials (AASHTO), the Federal Highway Administration (FHWA) and the Transportation Research Board (TRB).

The AASHTO acts as executive agent for State Highway Agencies (SHA) which contribute 5½ percent of their SP&R funds for the research. The AASHTO represents their interest in formulating the annual programs, approves the selection of contractors, and monitors the NCHRP and the individual studies in the program. The National Academy of Sciences (NAS), through TRB and NCHRP advisory groups, administers

the annual programs and the Research and Development (R&D) studies in them. The FHWA advises and assists the other organizations.

Candidate studies for this program are submitted to AASHTO annually by SHA's. The Transportation Research Board selects the contractors, and reviews the research work through to its completion, and reviews and publishes the final reports. The majority of this research is conducted by independent contractors, universities, transportation departments of research foundations.

HELP INC - SPR-3(024)

This study is for the development and implementation of a national automatic heavy vehicle electronic license plate (HELP) system.

The Heavy Vehicle Electronic License Plate (HELP) System is an integrated truck traffic monitoring system. It combines automatic vehicle identification (AVI), weigh-in-motion (WIM), and automatic vehicle classification (AVC) technologies with a computerized data communications network.

Current methods for collecting data on the movement of trucks on the Nation's highway systems are very costly to both the State and the trucking industry. Despite this they are often ineffective. A technique is needed to economically acquire information on the characteristics of specific heavy vehicles and to provide a data base which can be used for improved highway planning, design and management.

Truck data are required for a wide variety of purposes, which include:

1. Enforcement, and monitoring the enforcement of vehicle and axle weight limits;
2. Similarly, enforcement/monitoring of heavy axle spacings (bridge formula) rules;
3. Enforcement/monitoring of vehicle length and trailer configuration regulations;
4. Enforcement/monitoring of vehicle height and width limits;
5. Enforcement/monitoring of maximum speed limit compliance.
6. Monitoring and control of the movement of oversize and/or overweight permit vehicles;
7. Determining heavy vehicle usage patterns by functional highway system, for the planning and design of highway improvement schemes;
8. Satisfying FHWA-mandated vehicle weight and speed monitoring programs;

9. Establishing trends in truck characteristics such as body type, size, and weight and axle configuration for geometric design and highway safety studies;
10. Obtaining axle load/frequency data and trends for pavement design;
11. Assessing cost responsibilities of different truck types, for the determination of a more equitable road user taxes;
12. Providing an input to pavement monitoring and management systems;
13. Allowing the implementation and enforcement of weight-distance tax provisions, where such legislation has been enacted.

The Inspector General of the GAO has recommended that the FHWA should develop a nationwide weigh-in-motion plan. Its objective will be to develop and implement an improved method to evaluate the effectiveness of the states' truck size and weight enforcement programs, as well as collecting truck volume, classification and weight data needed to plan, design and operate the nation's highways. Similar programs are under consideration in Europe, Australia and other regions of the world, involving hundreds of millions of dollars' investment with returns which are potentially far greater.

Midwest States Pooled Fund Crash Testing Program - HPR-3(017)

This is a regional pooled fund study for full-scale crash testing of highway safety appurtenances and obstacles. The studies and full scale crash tests will be performed by the Midwest Roadside Safety Facility located at the University of Nebraska - Lincoln.

The objective of the regional pooled fund program is to share information concerning crash testing and to lower costs by coordinating crash testing of mutual interest among participating state highway agencies. The intent of the program is not to duplicate a national study, but to supplement it and to provide a quicker response to the more urgent regional safety problems. Participation in the pooled fund study is limited to no more than ten states to assure flexibility.

ENTERPRISE IVHS - HPR-3(020)

(Acronym for "Evaluating New Technologies for Road Program Initiatives in Safety and Efficiency - Intelligent Vehicle Highway System".)

The principal objective of the ENTERPRISE program will be to accelerate the systematic advancement of selected IVHS technologies. Within this overall theme, program members will support and execute IVHS projects and activities ranging from fundamental research efforts, through technology development, demonstration and

standardization to fully operational system deployment. Technical goals of the ENTERPRISE program can be summarized as:

- to investigate and develop IVHS approaches and technologies that are compatible with and complementary to other national and international IVHS initiatives;
- to promote the development of marketable systems for in-vehicle use that are affordable and attractive to motorists;
- to implement early operational tests of technologies, wherever possible, to better illustrate the potential benefits and immediate feasibility of IVHS;
- to study and resolve human factors issues associated with the selected IVHS technologies;
- to help address any institutional and legal issues associated with the successful IVHS approaches; and
- to contribute to standardization activities for appropriate IVHS breakthroughs.

AURORA - SPR-3(042)

The AURORA Consortium is a proposed program of collaborative research, development and deployment ventures in the field of road and weather information systems that reflects the interests of governmental agencies and industrial groups.

AURORA is expected to provide the basis for productive public-private partnerships of mutual benefit to industry and government. The outcome of the research is improvement to and technological advancement of existing systems that will help improve operations, save lives, preserve property and significantly reduce the adverse impacts of winter driving conditions.

Vision and Mission

Vision - To deploy advanced road and weather information systems that fully integrate state-of-the-art roadway and weather forecasting technologies with coordinated, multi-agency weather monitoring infrastructures.

Mission - To create a joint program for cooperative research, evaluation and deployment of advanced technologies for detailed road weather monitoring/forecasting for efficient highway maintenance and effective real-time information outreach to travelers.

Proposed Project Areas

- Standardized Weather and Road Condition Presentation
- Expert System as a Decision Support Tool
- Adaptation of Local Climatological Model into New Areas/Geo Thermal Mapping Model
- Automated Low Visibility Detection

- R/WIS Communication Standards
- Institutional Issues Identification
- Standardized Testing
- Meso Scale Modeling

Goals and Objectives

The goals of AURORA members define areas of potential benefit which the group intends to pursue. AURORA's goals include the following:

- To provide and/or improve R/WIS information dissemination to both transportation providers and users;
- To improve the efficiency of maintenance operations, primarily costly winter maintenance activities;
- To reduce potential weather-related construction activity delays via improved R/WIS information;
- To support and enhance information dissemination activities in the rural environment.
- To reduce traffic congestion delays in urban areas due to adverse weather-related conditions; and
- To aid in the development of seamless maintenance operations and information dissemination R/WIS programs.

AURORA's objectives address activities or areas of work which will support realization of the above goals. General objectives for AURORA include:

- To enhance and support the individual road/weather system deployment plans of AURORA participants;
- To jointly pursue emerging road/weather project opportunities in areas of interest to the group's members;
- To identify common development and evaluation needs within the group and to coordinate resulting technical activities;
- To provide a mechanism to facilitate further regional and international project cooperation and technical information interchange;
- To support the development and deployment of promising advanced technologies for use in road weather monitoring, forecasting, information exchange and dissemination;
- To facilitate the formation of public-private partnerships addressing appropriate program activities; and
- To provide test beds in a variety of environments and locations for the evaluation of emerging road/weather system technologies and standards.

Development and Validation of Traffic Data Editing Procedures SPR-2(182)

All States are involved in Traffic Data Program(s) that involve Traffic counting. Automatic Vehicle Classification (AVC) and Weigh-in Motion (WIM) activities. The study will develop automated editing procedures for the Count. Classification and WIM data. The Products will include Software for identifying "Questionable/invalid" data, processing the edited (acceptable) data and appropriate reporting of processed data.

Public Perceptions of the Midwest's Highway Pavements SPR-3 (037)

Data on the public perception of pavements dates to the AASHO Road Tests in the 1950's. During the road test, a pavement serviceability rating panel evaluated sections of differing pavements types in Ottawa, Illinois, on a scale of 0 to 5 (subjective ratings).

In all the studies that have been reported in literature, sample sizes were small, many variables of highway classification and regional differences between urban and rural areas were not addressed. Most studies addressed only correlation of perception with ride (IRI or PSI) and psychological satisfaction with ride, and except for Wisconsin, did not address trade-off issues or other measures of psychological satisfaction. Statistical reliability of sample size and margin of error were not reported. This study will help to address the issues not addressed in prior studies.

The primary objective of the study is to seek and provide systematic customer input for the continuing improvement of pavement policy. This is to be accomplished by:

1. determining how the traveling public perceives the Departments' highway pavements in terms of comfort, convenience and related trade-offs;
2. identifying other important attributes and issues of pavements specific to each Department that may not have been considered; and
3. determining possible relationships between perceptions and measured pavement condition thresholds (including a general level of winter tolerance where applicable).

The secondary objective of this study are to:

4. provide a versatile tool to obtain future, systematic, customer input and
5. provide information which can help structure public information programs.

North Central Superpave Center (NCSC) SPR-3 (044)

This regional pooled fund study to provide base funding for the operation of the North Central Superpave Center which includes:

- communication of advancements, changes and experiences related to Superpave testing, specification, construction and performance through personal presentations, quarterly newsletter, news flashes via e-mail and/or fax, and electronic mail;
- training assistance including free tuition for up to four people in Superpave classes held at the North Central Superpave Center or a host state;
- consultations by phone, e-mail, fax or letter on Superpave related questions;
- cooperative research efforts with the states without the customary overhead charge; and

- Superpave binder or mixture testing in conjunction with pilot or experimental projects.

These activities are consistent with the Steering Committee's guidance that the North Central Superpave Center should work in the areas of communication, training and research. Industry in the state is also free to participate in these activities.

Use of Reclaimed Asphalt Pavement (RAP) Under Superpave Specifications SPR-3 (045)

The work to be performed under this two-year pooled fund study will include testing materials typical to the North Central region to investigate the effects of RAP on binder and mixture properties. This research will be coordinated with, but will not duplicate National Cooperative Highway Research Project (NCHRP) 9-12, Incorporation of Reclaimed Asphalt Pavement in the Superpave System, which the North Central Superpave Center is conducting with the Asphalt Institute. This regional research will allow us to take advantage of and expand upon the work done under the national study.

Fillet Welding Procedure Qualification Research SPR-3 (046)

By code and industry standard, all welding on steel bridge members must be performed in accordance with an approved welding procedure. Requirements for procedure qualification and approval are provided by the Bridge Welding Code, AASHTO/AWS D1.5, generally referred to as D1.5. Writing and development of the code is directed by a subcommittee comprised of six AASHTO members and six AWS members, each having experience in bridge fabrication. The work of the subcommittee is overseen by the larger AWS D1 committee for structural welding, as well as the AASHTO Technical Committee on Welding.

Procedure qualification for fillet welding involves extensive testing of both groove and fillet test weldments but there are problems with this approach:

1. Properties of metal deposited in groove welds do not necessarily correspond to those of fillet welds for many reasons including:
2. Due to inherent differences between groove welds and fillets welds, it is sometimes difficult to accomplish a good groove weld using the parameters which should be applied for fillet welds.
3. The extensive testing is very time consuming and very costly in many ways.

Achieving a new method ensuring fillet weld quality will result in better fillet welding, a higher degree of quality assurance for production welds on bridge members, more cost-effective fabrication, improved relationships between fabricators and owners,

increased confidence in the bridge welding code, and improved overall quality and safety of the work in steel bridge fabrication.

Urban Mobility Study Summary - Texas Transportation institute SPR-3(049)

The Texas Department of Transportation (TxDOT) provided funding for the Texas Transportation Institute (TTI) to develop a methodology to measure congestion levels in Texas in a way that was easy to convey to the public. This was accomplished with the development of the roadway congestion index (RCI) that is a macroscopic traffic density measure for an urban area. Eventually, 50 urban areas from across the United States were included in the congestion study and the duration of the project was extended to ten years.

Annually, the findings from the research report summarizing the study are released through an official media release. The results from this study generate a great deal of interest from the media, transportation professionals, and other public officials.

Transportation issues, including traffic congestion, have been among the top concerns of residents in urban areas for a long time. Examples of this concern include the development of tollways in many cities throughout the U.S. and the creation of transit authorities in many cities in the 1970s and 1980s. These actions indicate that urban residents are willing to support higher tax levels for important issues. Urban residents have shown that they perceive a relationship between ease of transportation and “quality of life”.

If the public is asked to continue to support these programs and projects, quantitative measurement of traffic conditions seems appropriate to provide the public with an easily understood means of reviewing the effectiveness of these programs and projects. State Departments of Transportation staff need to be able to communicate the results of these types of congestion reduction methods with other transportation agencies and the public.