This document is made available electronically by the Minnesota Legislative Reference Library
as part of an ongoing digital archiving project. http://www.leg.state.mn.us/lrl/lrl.asp

08 - 0526

State Planning and Research

2008 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

Calendar Year 2008

STATE OF MINNESOTA

DEPARTMENT OF TRANSPORTATION

In cooperation with

US DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

This program is prepared and submitted according to provisions of Title 23, United States Code, regulated under 23 CFR Part 420. On August 10, 2005, the new surface transportation reauthorization legislation, the Safe, Accountable, Flexible, Efficient, and Transportation Equity Act: A Legacy for Users (SAFETEA-LU) was signed into law. SAFETEA-LU is a 5-year bill covering FFY 2005 – 2009. The estimated funding levels for FFY 2008 are $8.1 million for statewide planning, 4 million for Metropolitan Planning Organization planning, and $2.7 million for research activities.

The contents of this program describe the continued efforts of the Minnesota Department of Transportation in State Planning and research activities. This document is organized into several parts.

Part I: Planning - Summary and Cost Estimates

Part II: Research, Development & Technology Transfer

Appendix A: Detailed Tasks, Objectives, Methodologies & Products
Appendix B: Description of Research Studies receiving 2008 funds
Appendix C: Minnesota Pooled Fund Projects with Balances but not contributed to in the 2008 program

Status reports on products will be prepared and submitted annually to document the progress of Part I of the program. Part II research activities are updated on a quarterly basis.

TABLE OF CONTENTS

PART I

PART II

APPENDICES

APPENDIX B: DESCRIPTION OF RESEARCH STUDIES RECEIVING 2008 FUNDS

PART I: PLANNING:

Planning and Summary of Costs

JANUARY 1, 2008 – DECEMBER 31, 2008

FINANCIAL SUMMARY

STATE PLANNING AND RESEARCH PROGRAM

Calendar Year 2008

TOTAL ESTIMATED PARTICIPATION

	Federal Participation	Federal Project Number	Appropriation Code
Statewide Planning	$ 8,317,202	SPR-001(048)	L550
MPO Planning	$ 4,029,886	---	L450
Research	$ 2,707,704	SPR-001(048)	L560
Total	$15,054,792	N/A	N/A

METROPOLITAN PLANNING FUNDING SUMMARY (MPO)

FUNDING DISTRIBUTION

JANUARY 1, 2008 – DECEMBER 31, 2008

MPO	FHWA (PL)	FTA (Sec. 5303)	TOTAL CPG
Duluth-Superior MIC	$382,397	$142,110	$524,507
St. Cloud APO	$381,387	$113,811	$495,198
Rochester-Olmsted COG	$381,271	$89,850	$471,121
Fargo-Moorhead COG	$140,083	$29,348	$169,431
Grand Fork/East GF	$34,129	$6,546	$40,675
La Crosse Area Planning Committee	$24,028	$3,838	$27,866
Metropolitan Council	$2,686,591	$771,005	$3,457,596
TOTAL	$4,029,886	$1,156,508	$5,186,394

Notes:

All 2008 funding is estimated.

The MPOs and Mn/DOT developed a formula for distribution of Consolidated Planning Grant (CPG) funds, which was approved by both FHWA and FTA. Actual funding provided will be consistent with the MPO's approved work program.

STATEWIDE PLANNING FUNDING SUMMARY

ITEMIZED COST ESTIMATES

JANUARY 1, 2008 – DECEMBER 31, 2008

Office of Environmental Services	$ 1,600,000
Office of Financial Management	$ 10,000
Office of Freight & Commercial Vehicle Operations	$ 472,338
Office of Investment Management	$ 3,424,268
Office of State Aid for Local Transportation	$ 1,523,170
Office of Traffic, Security and Operations	$ 128,000
Office of Transit	$ 720,000
Office of Transportation, Data, and Analysis	$ 2,348,469
Total Needs	$ 10,266,245
Total Federal Statewide Planning funds available	$ 8,317,202
State funded difference	$ 1,949,043

Office of Environmental Services

(Cultural Resources Unit)

OFFICE OF ENVIRONMENTAL SERVICES (CULTURAL RESOURCES UNIT)

Trunk Highway and County/Municipal Cultural Resource Investigations

Contracts.....$1,600,000

Cultural Resources Firms

TOTAL ESTIMATED CY2008 COST $1,600,000

Office of Financial Management

OFFICE OF FINANCE

Highway Statistics $10,000

Salaries ..... 1.7 Person Months

TOTAL ESTIMATED CY2008 COST $10,000

Office of Freight and Commercial Vehicle Operations

OFFICE OF FREIGHT AND COMMERCIAL VEHICLE OPERATIONS

Freight Planning, Studies and Data Management $472,338

Salaries.....72 Person Months

TOTAL ESTIMATED CY2008 COST.....$472,338

Office of Investment Management

OFFICE OF INVESTMENT MANAGEMENT

State Transportation Improvement Program $ ..... $ 120,750

Salaries...../14 Person Months

State Transportation Plan and Statewide Planning Services ..... $ 585,377

Salaries...../107 Person Months

Federal & State Transportation Programs ..... $ 966,000

Salaries...../112 Person Months

Transportation & Economic Analysis ..... $ 334,755

Salaries...../ 54 Person Months

Land Use Access Management..... $ 62,670

Salaries..... / 45 Person Months

Research Program Development and Financial Mgmt..... $1,050,546

Salaries..... ../174 Person Months

Library and Information Mgmt..... $ 304,170

Salaries..... ./36 Person Months

TOTAL ESTIMATED CY2008 COST $3,424,268

Office of State Aid for Local Transportation

OFFICE OF STATE AID

County State Aid Highway.....$825,790

Salaries .....$820,228 Person/Months

Travel.....$2,472

Supplies $3,090

Municipal State Highway Need Study $697,380

Salaries .....$680,882 Person Months

Supplies ..... $ 1,030

Travel..... $ 30,935

TOTAL ESTIMATED CY2008 COST..... $1,523,170

This 2008 estimate is much higher than the 2007 because several items had been miscoded in the past.

Office of Traffic, Security and Operations

OFFICE OF TRAFFIC, SAFETY AND OPERATIONS

Speed Data Summaries $20,000

Salaries ..... /0.33 FTE's (at $28.74 per hour)

Accident Surveillance $108,000

Salaries ..... /1.50 FTE's (at $33.52 per hour)

Mainframe Computer & Systems Services (at $250 per month)

OET (Office of Enterprise Technology) charges for computer use of the state mainframe system. This system houses TIS which is the basis for OTSO's crash analysis and crash editing that was included in the work plan. The fees that are paid are for operation and services required to maintain an operation mainframe computer system. The charges are based on a per use basis, i.e. the more TIS is used, the more OTSO is charged.

TOTAL ESTIMATED CY2008 COST $128,000

Office of Transit

OFFICE OF TRANSIT

Transit Program Planning $323,000

Salaries ..... /48 Person Months

Professional/Technical 35,000

Bikeway Planning $397,000

Salaries ..... /60 Person Months

Travel (Bikeway Planning) 1,000

Professional/Technical. 30,000

(SBAC) State Bicycle Adv. Comm. 4,000

TOTAL ESTIMATED CY2008 COST $720,000

Office of Transportation Data & Analysis

OFFICE OF TRANSPORTATION DATA & ANALYSIS

Transportation Information System (TIS) & GIS BaseMap Data Maintenance $330,079

Salaries .....330,079/73 Person Months

Vehicle Classification and Truck Weight Studies..... .....$323,062

Salaries .....319,562/56 Person Months

*Travel.....3,000

*Overtime.....500

Traffic Counting $326,568

Salaries .....324,068/66 Person Months

*Travel.....2,000

*Overtime.....500

Traffic Forecasting for Highway Design..... .....$256,346

Salaries .....255,846/46 Person Months

*Travel.....500

Transportation Information System (TIS) Development & Maintenance.....$80,290

Salaries .....80,290/13 Person Months

Transportation Information System (TIS) Support $228,781

Salaries .....228,781/43 Person Months

Municipal Maps..... $197,375

Salaries.....197,375/49.5 Person Months

St. Paul – Minneapolis Area Maps..... $30,330

Salaries .....30,330/5.5 Person Months

County Maps.....$103,824

Salaries .....103,824/18 Person Months

OFFICE OF TRANSPORTATION DATA & ANALYSIS CONT'D

State Maps.....$49,879

Salaries .....49,879/9 Person Months

Roadway History & Project Log.....$89,471

Salaries .....89,471/19 Person Months

Transportation Data & Analysis IT Development (TDA-ITD).....$225,414

Salaries .....225,414/38 Person Months

Transportation Information System IT Replacement (TIS-ITR).....$107,050

Salaries .....107,050/19 Person Months

TOTAL ESTIMATED CY2008 COST.... ..... $2,348,469

*Travel and Overtime Use refers to:

Occasionally we conduct manual traffic counts and vehicle classification counts outside the metro area which requires some travel. Depending on the length of the count needed and the distance from the office, it may require an overnight stay or some overtime.

We have over 85 automatic traffic recorders (ATR) and permanent weigh-in-motion (WIM) sites statewide. Occasionally maintenance and trouble shooting is required at the sites, which requires some travel. If the site is more than 4 hours away, it could also require some overtime. Also, we need an inspector to be present if a contractor is installing loops and sensors in the pavement at ATR and WIM sites. Since this work is done statewide, it requires some travel and overnight stays.

Part II:

Research, Development & Technology Transfer

Part II: Research and Development

Itemized Cost Estimated

Calendar Year 2008

Project Number	Title	Total Project Cost	MN 2008 Commit-ment	Lead State or Agency	Mn/DOT Contact	Start Date	Funding Yrs	New Mod
TPF-5(035)	**Pacific Northwest Snowfighters**	**$ 250,000**	**$ 20,000**	**WA**	**Gabe Guevara**	**2007**	**2007/2008**	**New**
TPF-5(036)	Transportation Asset Management Research Program	$ 960,000	$ 7,200	WI	Steve Lund	2002	2007	Mod
TPF-5(068)	Long Term Maintenance of Load and Resistance Factor Design (LRFP) Specifications	$ 980,000	$ 20,000	IA	Dave Dahlberg	2003	2008	Mod
TPF-5(092)	Clear Roads (Test & Evaluation of Materials, Equipment & Methods for Winter Maintenance)	$ 905,000	$ 25,000	WI	Linda Taylor	2004	2008	Mod
TPF-5(128)	Accelerated Implementation of Intelligent Compaction Technology for Embankment Subgrade Soils, Aggregate Base and Asphalt Pavement Material	$ 725,000	$ 25,000	FHWA	Glenn Engstrom	2005	2006	Mod
TPF-5(139)	PCC Surface Characteristics: Tire Pavement Noise Program Part 3	$ 690,000	$ 15,000	IA	Bernard Izevbekhai	2005	2008	Mod
TPF-5(144)	**Use of Video Feedback in Urban Teen Drivers**	**$ 160,000**	**$ 80,000**	**IA**	**Ray Starr**	**2007**	**2007/2008**	**New**
TPF-5(156)	Mississippi Valley Freight Coalition Pooled Fund Study	$ 425,000	$ 25,000	WI	Bill Gardner	2007	2009	Mod
TPF-5(159)	**Technology Transfer Concrete Consortium**	**$ 299,000**	**$ 5,000**	**IA**	**Doug Schwartz**	**2007**	**2012**	**New**
TPF-5(164)	**Fish Passage in Large Culvert With Low Flows**	**$ 210,000**	**$ 30,000**	**FHWA**	**Petra DeWall**	**2007**	**2007/2008**	**New**
TPF-5(174)	**Construction of Crack Free Bridges - Phase II**	**$ 950,000**	**$ 30,000**	**KS**	**Eirk Wolhowe**	**2007**	**2007/2008**	**New**
SPR-3(017)	Midwest States Pooled Fund Crash Test Program	$ 7,384,934	$ 56,700	NE	Michael Elle	1991	Ongoing	Mod
SPR-3(020)	IVHS Study (ENTERPRISE)	$ 1,170,000	$ 30,000	IA	Ray Starr	1995	Ongoing	Mod
SPR-3(042)	Aurora Program	$ 2,572,500	$ 25,000	IA	Curt Pape	2003	Ongoing	Mod
SPR-3(049)	Urban Mobility Study	Over $1,500,000	$ 30,000	TX	Paul Czech	1990	Ongoing	Mod
MPR-6(019)	Tech Transfer	$ 243,905	$ 40,000	MN	Sue Lodahl	2007	2008	Mod
MPR-6(032)	Native Seeds	$ 120,000	$ 100,000	MN	Paul Walvatne	2008	2008	New
MPR-6(035)	IRI Modification	$ 75,500	$ 45,400	MN	Bruce Holdhusen	2007	2008	Mod
MPR-8(001)	Whitetopping (80/20)	$ 500,000	$ 400,000	MN	Curt Turgeon	2008	2008	New
Total - State Research & Development - (New Studies & Modifications)			**$ 1,009,300**					

****B old indicates 'Transfer of Obligation Authority' Process**

				$ 0.25	
	Plus: SPR FFY 2008	$ 2,707,704.00		$ 2,707,704.25	
	Less: Previous Obligation from FFY 2008		$ 414,596.03	$ 2,293,108.22	
	Less: 2008 Research & Development		$ 1,009,300.00	$ 1,283,808.22	
	Total			**$ 1,283,808.22**	

Appendix A:

Tasks, Objectives, Methodologies & Products

Office of Environmental Services (Cultural Resources Unit)

OFFICE OF ENVIRONMENTAL SERVICES

(CULTURAL RESOURCES UNIT)

TASK TITLES: Cultural Resources Investigations

ESTIMATED 2008 COST: $1,600,000.00

WORK AUTHORITY NUMBER: TH 46801 through TH 46899

WORK PERFORMED BY: Office of Environmental Services

REFERENCE NUMBERS: Pre-Qualification System

OBJECTIVES:

- To preserve and/or document cultural resources subject to disruption due to proposed highway improvements. This work is necessary to ensure that the effects of projects on cultural resources is being taken into account as per the requirements of 36 CFR 800 (Section 106 of the National Historic Preservation Act) so that projects can receive federal funding. This includes the archaeological survey and evaluations of prehistoric and historic sites, standing structures surveys and evaluations, 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:

- National Historic Preservation Act (36 CFR 800), 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 (PL101-601)
- Secretary of the Interior's Standards and Guidelines for Archaeology and Historic preservation Activities. As published in the Federal Register in September 29th, 1983, Volume 248, 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, and Manual for Standing Structures
- Minnesota state historic preservation statutes

METHODOLOGY:

- Project that have the potential to affect cultural resources are determined by the professionally qualified staff of the Mn/DOT Cultural Resources Unit (CRU). These projects include District, County, and City projects. These projects are assigned to vendors in the pre-qualified program on a rotational basis based on the vendor's expertise, workload and availability. Projects are defined by type of investigation and phase as required by Mn/DOT CRU 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)

ACCOMPLISHMENTS:

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

Office of Financial Management

OFFICE OF FINANCIAL MANAGEMENT

ESTIMATED 2008 COST: $10,000

WORK AUTHORITY NUMBER: TH 401

WORK PERFORMED BY: Accounting Systems Section, Financial Reporting Unit

OBJECTIVES:

- 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 use in the formulation of highway policy, and administration of highway matters, informational use by legislators, public officials and the general public.

METHODOLOGY:

- The procedures used to obtain statistical and financial data for reporting purposed 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 Chapters 3, 4 and 5 of FHWA "A Guide to Reporting Highway Statistics".

- Motor fuel statistics are received monthly form 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 fuel gallonage. These statistics are used in the preparation of annual reports and in accordance with Chapter 2, FHWA "A Guide to Reporting Highway Statistics". Periodic checking occurs prior to FHWA use for apportionment purposes.

- Financial reports are prepared from information acquired from the Department's Financial Operations Section records. These records are extensively examined and tabulated. They are prepared for assistance and used in the preparation of annual reports in accordance with the guidelines contained in Chapters 8 and 9 of FHWA "A Guide to Reporting Highway Statistics".

- Local government financial reporting is based on information furnished to the department by all cities, towns and counties on an annual basis. This information is assembled and then forwarded to the Federal Highway Administration in accordance with instructions in Chapter 10 of FHWA "A Guide to Reporting Highway Statistics".

- Travel takes place in connection with training workshops, seminars, etc. that are scheduled annually for increasing effectiveness and efficiency of financial and statistical reporting.

ACCOMPLISHMENTS:

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 Funds and Debt Service transactions
FHWA-556	State Motor Fuel Receipts and Initial Distribution by Collection Agencies
FHWA-551M	Monthly Motor-fuel Consumption
FHWA-561	State Motor-fuel Tax Receipts and 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 Freight and Commercial Vehicle Operations

OFFICE OF FREIGHT AND COMMERCIAL VEHICLES

TASK TITLES: Freight Planning, Studies and Data Management

ESTIMATED 2008 COST: $472,338

WORK AUTHORITY NUMBER: TH 220

WORK PERFORMED BY: Freight Planning & Program Development Unit

OBJECTIVES:

- To improve our knowledge and integration of freight transportation into our policy, long range planning and investment processes. Make better decisions that improve or augment freight transportation service productivity and safety.
- To improve freight transportation by providing information, direction and service to internal and external customers.
- To provide for and facilitate cooperative action, private or public, to improve Intermodal freight transport specifically and freight transportation in general.

METHODOLOGY:

- Integrate the new freight policy " Provide an integrated system of freight transportation in Minnesota – highway, rail, water, air cargo, and intermodal terminals – that offers safe, reliable, and competitive access to statewide, national, and international markets" its six policy direction and 34 strategies in Mn/DOT's planning, programs, investments and system management.
- 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.
- Conduct regional freight studies.
- Maintain and improve the Mn/DOT freight facilities database.
- Staff utilizes the Minnesota Freight Advisory Committee (MFAC) comprised of private industry and public sector members to provide and intermodal perspective and foster public/private cooperation.
- Enhance the efficiency of goods movement in Minnesota and support economic growth through policies and programs that optimize a multimodal transportation system.

ACCOMPLISHMENTS:

- Provide and articulate freight related policies, issue and trend analysis that reflected a district, statewide and system level perspective to be used in the Statewide Transportation Plan update.
- Provide both the frame work and information necessary for districts and regions to plan, improve and develop transportation facility information that account for interregional corridor and trade center influences, function as systems and area consistent with State goals.
- Provide information and stimulate discussion to guide statewide policy development and also local regional transportation investment decisions as well.
- Maintain a high level of freight transportation expertise available to all levels of the Department to provide advice and assistance on freight issue resolution.
- Maintain current freight information, commodity flows and database information
- 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.
- Develop techniques, report formats, mapping capabilities or other ways to turn "data" into information useful in the planning and investment decision process.
- Initiate, support and recommend freight research
- 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
- Develop regional freight profiles summarizing geographic area, such as land mass and the percentage of land devoted to people employed in different types of industries (e.g., agriculture, manufacturing and service). It will also include a high level overview of the transportation infrastructure important to the region.
- Identify and designate NHS Intermodal connectors. Also identify other major freight generating facilities and their connector routes.

Office of Investment Management

Office of Investment Management

TASK TITLES: Statewide Transportation Plan and Statewide Planning Service

ESTIMATED 2008 COST: $585,377.

2008 Estimated Professional Level of Effort Expenditures for Work Authority No. TH102

Position	FTE	Person Months	Rate	Hours	Subtotal	Fringe	Total
Section Director	0.85	10.20	$45.35	1768	$80,178.80	$20,044.70	$100,223.50
Statewide Planning Unit Supervisor	0.95	11.40	$36.05	1976	$71,234.80	$17,808.70	$89,043.50
Planning Director State	1.00	12.00	$36.74	2080	$76,419.20	$19,104.80	$95,524.00
Planning Program Coordinator	1.85	22.20	$30.04	3848	$115,593.92	$28,898.48	$144,492.40
Principal Engineer	0.60	7.20	$38.82	1248	$48,447.36	$12,111.84	$60,559.20
State Program Administrator Sr.	1.00	12.00	$22.75	2080	$47,320.00	$11,830.00	$59,150.00
Senior Planner-Transp	0.40	4.80	$27.01	832	$22,472.32	$5,618.08	$28,090.40
Student Worker Paraprofessional, Senior	0.25	3.00	$12.76	520	$6,635.20	$1,658.80	$8,294.00
							$585,377.00

WORK AUTHORITY NUMBER: TH 102

WORK PERFORMED BY: Statewide Planning & Analysis Section

OBJECTIVES:

- Assist the Metropolitan Planning Organization (MPO's) in developing and maintaining a transportation planning process that fulfills the requirements of the appropriate federal regulations.
- Develop, update, and implement a statewide multi-modal transportation plan including. Provide statewide policy, guidance, and planning services to districts, modal offices, and other partners/customers. This effort includes planning studies statewide in scope, public participation, coordination, consultation and other required or necessary activities. Monitoring of system performance (infrastructure and operations) is also included.

ACTIVITIES:

- MPO Planning Office and in Field
- Statewide Transportation Plan
- Statewide Transportation Planning Services
- RDC Area Planning
- Periodic performance reporting to Mn/DOT management and stakeholders.

METHODOLOGY:

- Coordinate with Mn/DOT district and modal planning staff in the development, review and /or approval of MPO planning documents to ensure the MPOs maintain certifiable transportation planning. Facilitate MPO planning committees to ensure awareness and use of state-of-the-art planning procedures; facilitate training and technical assistance that responds to mutual transportation concerns.
- Prepare, update, implement, and monitor statewide transportation plan that provides a frame work for district and modal plans and that guides Mn/DOT investments. Assist districts in identifying performance-based needs and in developing district long-range transportation investment plans. Coordinate, review and respond to national and state initiatives, policies, and proposed regulations which impact transportation. Administration and coordination of Mn/DOT transportation planning committees, coordination and consultation with units of local government and other stakeholders. Work program direction and oversight for related consultant services.
- Maintain the capability to periodically assess system infrastructure and operations performance and performance-based needs.
- Functional Class & National Highway System: Create, maintain and provide maps and records in an up-to-date status/revision as necessitated for the Functional Classification system and the National Highway system.

PRODUCTS:

- Annual MPO Planning Work Programs and Funding Distribution Agreements.
- Annual MPO Transportation Improvement Program (TIP) and Certification.
- Development of the Statewide Transportation Plan revisions and updates, including district and modal plans and highway operations plan.
- Outreach meetings for discussion and reporting to internal and external stakeholders and other interested parties
- Development of guidelines and performance measures to support statewide transportation policies.

2007 ACCOMPLISHMENTS:

Major activities, products, and accomplishments in 2007 included:

- Statewide and Metropolitan Planning
  - SAFETEA-LU gap analysis
  - MPO oversight: TIPs, plan modifications, UPWPs, federal and state planning grant contract administration
  - Initiation of Statewide Plan Update
    - Formation of interagency steering committee
    - Work plan and schedule
    - Consultant selection and oversight
    - Data compilation and analysis, etc.
  - Outreach meetings with Area Transportation Partnerships and other local interested parties
  - Briefings and discussions with MPOs, RDCs, local engineers and planners, Advisory Council on Tribal Transportation, State Bicycle Advisory Committee, Minnesota Freight Advisory Committee, and many other stakeholder groups and interested parties]
  - Planners' workshop (Mn/DOT, MPO, and RDC participants)
  - Substantial contributions to FHWA/AASHTO Program Development Improvement Tool (PDIT)
  - Major performance measurement reports included: District Summary Performance Report covering major highway products and services and Program Delivery-Preconstruction Performance Trends; five major sets of consolidated transportation system and organizational performance reports presented to executive staff
  - Nearly three dozen individual performance reports given to the Operations and Planning/Modal divisions; facilitated development of new performance measures in priority areas; five Mn/DOT Best Practices achieve full deployment.
  - Performance measurement presentations to TRB conferences, papers to AASHTO, and consultation to NCHRP research panels.

- Conclusion of Statewide Functional Classification Update
  - Iterative revisions and review with MPO and RDC planners
  - Updates for Technical Advisory Committee and scheduling for final meeting
  - Analysis of recommended functional classification system modifications
  - Recommendation of updated statewide functional classification system and assignments

TASK TITLES: Transportation and Economic Analysis

ESTIMATED 2008 COST: $334,755.

2008 Estimated Professional Level of Effort Expenditures for Work Authority No. TH104

Position	FTE	Person Months	Rate	Hours	Subtotal	Fringe	Total
Section Director	0.10	1.20	$45.35	208	$9,432.80	$2,358.20	$11,791.00
Economic Analysis Unit Supervisor	1.00	12.00	$42.18	2080	$87,734.40	$21,933.60	$109,668.00
Economic Policy Analyst	1.70	20.40	$32.41	3536	$114,601.76	$28,650.44	$143,252.20
Engineer Senior	1.00	12.00	$26.94	2080	$56,035.20	$14,008.80	$70,044.00
							$334,755.20

WORK AUTHORITY NUMBER: TH 104

WORK PERFORMED BY: Economic Analysis & Special Studies Section

OBJECTIVES:

- Determine the most cost effective investments for transportation system improvements. Develop investment criteria to evaluate economic feasibility and priority for proposed projects. Analyze economic, demographic transportation and the related trends for their impact on transportation systems and travel demand. Analyze transportation financing trends and transportation issues like Interregional Corridors. Conduct economic analysis for specific transportation investments especially on benefit/cost analysis, financial analysis and business development impact analysis.

ACTIVITIES:

- Transportation & Economic Analysis (Non-project specific)
- Transportation & Economic Analysis (Project specific)

METHODOLOGY:

- Investigate the relationship between transportation along with highways and the economies of the state and nation on topics such as:
  - Effects of major demographic business and economic trend on transportation system demands and revenues.
  - Economic efficiency or financial returns of major transportation system segments and corridors.

- Extent of benefit accrued to local, regional, statewide and/or nation economies from transportation projects.
- Economic impact of alternative solutions to urban transportation problems.
- Focus on economic activities and transportation relationship among Twin Cities, regions and inter-regions of other states.
- Distributional effects of transportation investments.

- Develop criteria for evaluating the economic impact and feasibility of transportation projects through activities such as:
  - Conduct benefit/cost analysis of proposed transportation projects.
  - Calculate the economic rate of return to transportation investments.
  - Evaluate benefit-cost on transportation investments across identified groups in society.
  - Develop standard techniques and practices to implement investment analysis.
  - Incorporate accepted criteria on investment analysis to prioritize and project selection process.
  - Provide personnel involved in transportation process technical training and implement investment analysis.
  - Communicate outcome of investigations by means of reports, presentations or others technique to appropriate audience the status of projects identified.

PRODUCTS:

- Components in scoping, environment and other documents for pending projects. (ongoing)
- Training on use of investment analysis tools in transportation investment. (ongoing)
- Reports in different formats, for examples memos, working papers and research reports, on issues investigated and appropriate status noted above and intended audiences. (ongoing)
- Investment guidelines or criteria. (ongoing)
- Economic analysis training materials such as methodologies and standard values. (ongoing)

REPORT ON 2007 ACCOMPLISHMENTS:

Major activities, products, and accomplishments in 2007 included:

- Completed and submitted HPMS report
- Completed and submitted certified public road mileage
- Completed Road User Cost analyses for use in A+B bidding, lane rental, and contract early completion incentives.
- Presented demographic and economic trend data for use in Mn/DOT planning
- Updated standard economic values for use in economic analysis
- Initiated update for long-range revenue forecast
- Consulted on transportation impact on economic development for State development agency
- Reviewed and consulted on project specific benefit cost analyses
- Completed construction cost inflation forecast
- Presentation on Cost Effectiveness Tech Memo for Design Engineers
- Development of draft maintenance and operations cost index

TASK TITLES: Land Use Access Management

ESTIMATED 2008 COST: $62,670.

2008 Estimated Professional Level of Effort Expenditures for Work Authority No. TH105

Position	FTE	Person Months	Rate	Hours	Subtotal	Fringe	Total
Section Director	0.05	0.60	$45.35	104	$4,716.40	$1,179.10	$5,895.50
Statewide Planning Unit Supervisor	0.05	0.60	$36.05	104	$3,749.20	$937.30	$4,686.50
Planning Program Coordinator	0.15	1.80	$30.04	312	$9,372.48	$2,343.12	$11,715.60
Principal Engineer	0.40	4.80	$38.82	832	$32,298.24	$8,074.56	$40,372.80
							$62,670.40

WORK AUTHORITY NUMBER: TH 105

WORK PERFORMED BY: Statewide Planning & Analysis Section

OBJECTIVES:

Provide policy guidance and technical assistance to Mn/DOT Districts and local government partners on approaches to manage access on all types of roads throughout the state. Produce and maintain the Access Management Manual that defines a Roadway Access Category System. Recommend access spacing. Outline methodologies for application of the System to corridor planning, project development and local land use transportation planning. Establish a uniform access permitting procedure. Provide training to planners and engineers on the Manual content at Mn/DOT Districts and offices and to local government. Provide technical assistance to Mn/DOT and local partners in planning efforts to coordinate long rang land use and transportation plan with a special emphasis on IRC Corridor-related issues.

ACTIVITIES:

- Develop and administer land use and access management policies
- Design and implement research and demonstration projects
- Access management/land use technical assistance

METHODOLOGY:

- Research, develop and implement a comprehensive set of strategies that integrate engineering, land use planning and legal approaches to improve land use and access management practice throughout Minnesota.
- Promote stronger intergovernmental partnerships by providing common access guidelines for use by all partners. Education training and technical assistance in access management and land use integration.
- Promote the safety and mobility of the traveling public.
- Protect and extend the useful life of the public's investment in the State's highway system.
- Support the economical vitality, character and livability of the local community.
- Achieve stronger integration of local government land use decision with state transportation goals and policies including Smart Growth, Interregional Corridors and Multi-modalism.
- Obtain traffic data needs from Office of Transportation Data & Analysis.

PRODUCTS:

- Permitting Procedures
- District Training and Technical Assistance
- Local Government Workshops and Technical Assistance
- Model Access Management and Overlay Ordinance.

REPORT ON 2007 ACCOMPLISHMENTS:

- Access Management Manual, completion of the following chapters:
    - Category System
    - Spacing Guidance
    - Permitting and Development Review
    - Traffic Impact Studies
  - Three Technical Advisory Committee Meetings
  - Three Workgroup Meetings

- Access Management Video Conferences started
  - August, October, November/December?

- Training and Outreach
  - Permit Technicians Meeting
  - Traffic Engineering Organization Meeting
  - Design Engineers Conference
  - Technical Assistance to Districts
    - Elk Run AUAR
    - Dale Properties
    - Perham Hospital
  - Mn/DOT Roundabout Steering Committee (ended in July)
  - Project Management Academy Training
    - Essential Skills Training
    - Advanced Skills Training

- Access Permits and Development Review
    - New worksheets in EDMS
    - Review and Analysis of the 2006 Access Permits

- Research
    - Mn/DOT/LRRB – Right-turn Lane Warrants
    - Mn/DOT/LRRB – Turn Lane Lengths
    - Mn/DOT/LRRB – Statewide Traffic Forecasting Model Feasibility
    - NCHRP – Left-turn Lane Warrants
    - Mn/DOT – Right-turn Lane Design: Safety Audit

TASK TITLES: Research Program Development and Financial Management

ESTIMATED 2008 COST: $1,050,546

WORK AUTHORITY NUMBER: TH 901

WORK PERFORMED BY: Research Services Section

OBJECTIVES:

- Supports measurable improvements in Minnesota's transportation system by meeting the knowledge needs and finding solutions for transportation practitioners and the transportation community.

- Obtain research results that are of practical value and implementable in the most cost effective manner possible. Research must be theoretically rigorous and accurate, but ultimately has the potential to improve the way Mn/DOT does business by providing cost effective solutions to transportation problems.

- Convey research results thought effective technology transfer and outreach.

ACTIVITIES:

- Understanding Mn/DOT issues

- Managing and leveraging various research funds and resources

- Develop/Select Research Proposals

- Develop and administer research contracts

- Outsourcing expertise
- Plan and ensure that Implementation occurs
- Evaluate the impact of Mn/DOT's research investment
- Perform Technology Transfer and Outreach or Research Results
- Develop research roadmaps in Strategic Program Areas (high level) and specific topic areas (low level).

METHODOLOGY:

- Educate clients about the value of knowledge and research and inspire them to learn through customer focus groups and development of different methods to show customers the value of knowledge and research
- Continuously evaluate client needs, expectations and awareness of our services by measuring the frequency of customer contacts and the development and sharing of research specific performance measures.
- Encourage partners to share new knowledge techniques and technologies they acquire by enhancing current partnerships, and identifying and capitalizing on opportunities for new partnerships.

PRODUCTS

- Annual research report
- Research newsletter
- Published research reports
- Research exhibits and conferences and events
- Market research results from research coordinators and technical liaisons survey
- Research Coordinator meeting
- Project Orientation meetings
- Research web site

- Trading Cards
- Technical Summaries
- Roadmaps
- Technical Research Synthesis
- Implementation plans and close out memos

2007 ACCOMPLISHMENTS:

- Strategic Research Visioning event
- SP&R Financial Peer Exchange
- Several exhibits at various conferences
- Published a 5 year research report
- Consultants hired to do Technical Research Synthesis and Technical Summaries
- Published over 50 research reports
- Implementation Programs were developed in many areas including:
    - Intelligent Compaction
    - Maintenance Decision Support

TASK TITLES: Library and Information Management

ESTIMATED 2008 COST: $304,170

WORK AUTHORITY NUMBER: TH 901

WORK PERFORMED BY: Research Services Section

OBJECTIVES:

- Provide information for its customers faster, better, and/or cheaper than they can do so for themselves.

- Meet the transportation-related information needs of employees of the Minnesota Department of Transportation, other transportation practitioners throughout the state, especially city and county engineers, consultants under contract to Mn/DOT, other librarians, both locally and globally, and the general public.

ACTIVITIES:

- Develop and maintain web sites providing access to online databases, full text information resources and organized links to most frequently needed transportation information.
- Reference – provide assistance and searches for literature.
- Develop and contribute catalog data for Mn/DOT information resources to TL cat.
- Share information resources with other libraries.
- Loan information resources to library customers.

METHODOLOGY:

- Educate clients about the available resources and encourage them to take advantage of those resources to meet their own knowledge needs by delivering information to customers, simplify and improve customer access to information, and utilizing improving technology to support Mn/DOT's processes and needs.
- Develop and participate in library networks, local to international in scope.
- Inform clients how we can help with the research and knowledge needs throughout promotion of the library resources and services and library tours.
- Serve on research technical advisory panels as needed.
- Participate in research focus groups and strategic visioning events in order to stay abreast on the current research and implementation needs of transportation practitioners.

2007 ACCOMPLISHMENTS:

- Document delivery
- Periodical Routing
- Internet and Intranet Development

- Circulation Services
- Collection Development
- Reference Assistance
- Recent Acquisitions List
- Alerting Services

Office of State Aid for Local Transportation

OFFICE OF STATE AID FOR LOCAL TRANSPORTATION

TASK TITLES: County State-Aid Highway Needs Study

ESTIMATED 2008 COST: $825,790

WORK AUTHORITY NUMBER: TH 701

WORK PERFORMED BY: State Aid

OBJECTIVES:

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

METHODOLOGY:

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

- In order to keep the needs study 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 arrives at the Data Management Section and is transfer onto the records in the needs study.

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

2007 ACCOMPLISHMENTS:

- Two County Engineers Screening Board Reports
  - June – Unit price study and mileage requests
    - Nine district meetings with all 87 county engineers
    - Screening Board
  - October – Tentative Apportionment, grading cost study and mileage requests
    - Nine district meetings with all 87 county engineers
    - Screening Board
- County State-Aid Apportionment Booklet

  January – Annual apportionments for construction and maintenance accounts

  We print 150 copies of each book and make it available on the website at: http://www.dot.state.mn.us/stateaid/res_csah_books.html
- Miscellaneous legislative, auditor and client requests

TASK TITLES: Municipal State-Aid Street Needs Study

ESTIMATED 2008 COST: $697,380

WORK AUTHORITY NUMBER: TH 702

WORK PERFORMED BY: State Aid

OBJECTIVES:

- To maintain the Municipal State-Aid Needs Studies which result in the annual determination of State-Aid Apportionment in municipalities over 5,000 populations 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 out-state 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 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 populations. The actual allotment is made by the Commissioner of Transportation in January of the following year when the funds available are known.

2007 ACCOMPLISHMENT & EXPENDITURES;

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

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

    - Approximately 190 to 200 copies of each of these three booklets is sent out to all cities over 5000 population, with a copy also being mailed to the City Administrator/Clerk of all cities retaining a consulting engineer as their official city engineer. Copies also available for download or printing on our website at http://www.dot.state.mn.us/stateaid/res_msas_books.html The first annual

booklet explains how the Unit Costs used in computing the allocation is determined. The next shows the annual money needs of each city and gives an estimate of their annual allocation. The last booklet in our annual cycle shows the actual construction and maintenance allotments each city receives.

Office of Traffic, Security and Operations

OFFICE OF TRAFFIC, SECURITY AND OPERATIONS

TASK TITLES: Speed Data Summaries CY2008

ESTIMATED 2008 COST: $20,000

WORK AUTHORITY NUMBER: TH 501

WORK PERFORMED BY: Office of Traffic, Safety and Operations (OTSO)

OBJECTIVES:

- 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, Safety and Operations (OTSO). Monitoring 24-hour period is desirable and therefore Mn/DOT uses a combination of automated traffic recorder stations and weigh-in-motion stations at sites with speed monitoring equipment accessible by telephone telemetry. Different software programs download the data, format it and finally analyze and print the reports. Data is still visually screened to verify accuracy and potential hardware problem. The TDA office maintains the hardware and OTSO does the data analysis. This automated methodology has helped decrease the number of person hours required compared to previous years.

ACCOMPLISHMENTS:

- A complete file of speed characteristics on each category of highways – These files are used to develop quarterly and annual report 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.

- Support outside agencies that request speed data to strategically deploy resources that are commensurate with the Comprehensive Highway Safety Plan and the Towards Zero Deaths vision within Minnesota.

TASK TITLES: Crash Surveillance CY2008

ESTIMATED 2008 COST: $108,000

WORK AUTHORITY NUMBER: TH 502

WORK PERFORMED BY: Office of Traffic, Safety and Operations

OBJECTIVES:

- To provide crash data and estimated safety risks 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 and citizens are processed by DPS and are on-line no later than ninety 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 and transportation modeling tools are executed by OTSO and a report is developed for a requesting agency or internal application.

ACCOMPLISHMENTS:

- 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.
- Surrogate measures of safety levels can be estimated with appropriate modeling tools for selected high risk locations.

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 Transit

TASK TITLES: Transit Planning

ESTIMATED COST: $323,000

WORK AUTHORITY NUMBER: TH 301

WORK PERFORMED BY: Office of Transit

OBJECTIVES:

- To prepare transit and para-transit program plans and reports in cooperation with participating agencies and staff.
- To analyze, document and recommend transit and para-transit program policies that encourage coordination and cost-effectiveness of transit services.
- To develop, evaluate and recommend alternative program strategies and performance criteria.
- To research and prepare a variety of specialized reports, site studies and surveys to ensure that adequate information is available to identify and evaluate alterative 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 that improves the delivery of transit programs.

METHODOLOGY:

- Produce an annual report that summarizes public transit activities.
- Prepare specialized reports and present results to internal and external customers. Legislative and regulatory development will be monitored.
- Develop a transit information network that will maintain information on all transit services in the state in order to further coordination and cost effectiveness of public 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 the overall program strategy implementation.
- Review and update a variety of policy and planning documents that are used by the department and external customers.
- Maximize the transportation investment in transit projects.
- Support office-planning activities.
- Produce results as needed and to be used as a focus for testing new approaches and implementation for practical improvements in transit services.
- Sponsor transit activities, forums, and workshops (e.g. coordination, ADA, safety and security).

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

PRODUCTS:

- Annual Transit Report
- Policy Analysis Reports
- Intercity Bus Study
- Greater Minnesota Transit Plan
- Transit Corridor Planning
- Transit Implementation Plan
- Transit Issue Presentations
- ADA Transition Plan
- Passenger Rail Plan
- Public Education & Involvement Plans/Projects
- Project Oversight (e.g. Transit Coordination Demonstration)
- Transit Publications and Newsletters
- Transit Website (electronic services)
- Transit Policies (ADA, farebox, safety and security) and Technical Assistance
- Transit System Safety Plans
- Transit Coordination Study/Action Plan
- Guidebooks (e.g. transit facilities, service redesign)
- Transit Workshops (ADA regulations, coordination, safety and security)
- Program Performance Reports
- System Performance Evaluations
- Demographic Trend Analysis Reports
- New Starts Service Designs/System Service Redesigns
- Transit Peer Group Analyses
- Transit Needs Assessments
- Technical liaison for transit research proposals

TASK TITLES: Bike and Pedestrian Ways Planning

ESTIMATED COST: $397,000

WORK AUTHORITY NUMBER: TH 117

WORK PERFORMED BY: Office of Transit, Bicycle and Pedestrian Section

OBJECTIVES:

- To promote and facilitate the safe delivery of non-motorized modes into our multi-modal transportation system through planning and research activities

METHODOLOGY:

- This objective will be achieved by devoting staff time to the following activities:
  - Policy Development and Planning
    This activity creates, reviews, and updates a variety of policy and planning documents that are used by the department and external customers in the integration of non-motorized modes in Minnesota's transportation system.
  - Outreach and Awareness
    Staff time is devoted to managing relationships between Mn/DOT and its customers
  - Training
    This activity provides transportation professionals with policy, planning and design tools to apply the principals of non-motorized modes to their transportation plans and projects. Training also provides the additional benefits of allowing staff to meet people in the field and gain immediate and direct customer feedback that in turn improves the categories of consulting and policy development.
  - Technical Assistance
    Staff frequently provides assistance in their areas of technical expertise. This activity is an important source of customer feedback that allows us to have first hand experience with what is working and being used as well as an effective way for staff to increase their pool of shared knowledge.
  - Research
    This activity manages and participates in research to promote the application and benefits of non-motorized modes. It also includes staff serving as Technical Liaison on Tourism/Transportation Research, the U of M (CTS) Environmental Research Council, and provides council to the Hubert Humphrey Institute's Research on Cost Benefits of Bicycling and their work on Bicycle Safety (Toward Zero Deaths).
  - Staff Development and Support
    This activity reflects the time spent in managing resources and ensuring continued growth and development as a departmental resource. It includes resource management, internal communication, work planning, training, conference participation, and other professional development

PRODUCTS:

- Track measures in Bicycle Plan
- Highway Planning Development Process: Part II, Section D, Subject Guidance: Bikeways and Pedestrians update pedestrian component
- Adopt AASHTO pedestrian planning and design guidance via technical memorandum
- Develop pedestrian planning and design training
- Bicycle Planning Design Manual – quarterly updates to new manual
- Provide bicycle planning and design training
- Mn/DOT's Design Advisory Committee inputs
- Federal Surface Transportation Program Solicitation Process for Metro Area
- Plan and map nine cross state scenic bike routes
- State Bicycle Advisory Committee recommendations on bikeway planning products
- National Bike and Pedestrian Coordinators (AASHTO Task Force on Non-motorized Transportation)
- Community Bike and Pedestrians planning and outreach events
- Bike and Pedestrian Facility Planning and Design Technical Assistance
- Project plan reviews
- Participation in State Planning Groups
- Transportation Plan Performance Measures
- Bicycle Safety Education Campaign, "Share the Road" safety promotion and support
- Participate in developing the Non-Motorized Transportation Pilot Program
- Promote Bicycle Commuting Statewide

Office of Transportation Data & Analysis

TASK TITLES: Transportation Information System (TIS) & GIS BaseMap Data Maintenance

ESTIMATED 2008 COST: $330,079

WORK AUTHORITY NO: TH 202

WORK PERFORMED BY: Geographic Mapping & Information Section

OBJECTIVE:

- To maintain TIS and GIS BaseMap data within their respective software environments by providing data collection, data updating and data enhancements.
- To provide analyses of TIS and GIS BaseMap data by providing data quality controls and assurances.
- To provide liaison and user support for both internal and external users/contributors of the Transportation Information System (TIS) and GIS BaseMap data components.

METHODOLOGY:

The Office of Transportation Data and Analysis is the steward for Mn/DOT's linear and spatial location references systems - comprised of a number of databases and systems used for transportation planning and analysis. This system incorporates graphical representations (GIS BaseMap) and associated data (TIS) about roads, railways, navigable waters, and airports. This data includes physical characteristics (both vertical and horizontal), geometric features, various attributes such as bridges, railroad crossings, traffic volumes and classification, crashes, and designation information such as route system and number, federal classification, street names etc.

This task consists of data collection, data analysis, data maintenance, training and user support. Data is collected from a variety of sources such as construction plans, roadway status reports, imagery, and requests to various governmental offices and agencies for resolutions, mapping etc., and various other sources as listed under item number TH 606, County Maps. This information is used to update current information and create new records and is made part of TIS and the BaseMap through several methods such as manual data entry, file transfers, etc.

The information contained in Mn/DOT's TIS and BaseMap data is used by transportation decision makers, planners and analysts and is provided in multiple forms such as text reports, graphs, and attribute maps for transportation planning, asset management, investment tradeoff analysis and project development. It allows for the use of

"windowing in" on a statewide map down to regional, district, county, city or even corridor specific maps. Users are able to display and analyze data from many sources and in any of the several location reference systems. These additional capabilities and resulting flexibility produce a

better picture of transportation networks and interrelationships within the State of Minnesota. TIS and the BaseMap under continuous development and it will be enhanced and maintained by Mn/DOT.

ACCOMPLISHMENTS:

- Current and accurate GIS BaseMap and corresponding TIS file updates using data collection and maintenance methods which meet the needs of the end users.

- Current data on the physical characteristics of roads, trunk highway construction histories, mileage, traffic and crashes to be used for various studies and for reporting to the FHWA's Highway Performance Monitoring System (HPMS) and HSIS.

- TIS data is used to support reporting requirements for other departmental needs and activities such as bridge management, pavement management, and bikeway management.

- 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.

- From 1996 through 2000, the State of Minnesota BaseMap was produced annually and distributed via CD-ROM. Beginning in 2001, the BaseMap was made available via the Internet on Mn/DOT's Web site at: http://www.dot.state.mn.us/tda/basemap/index.html.

- Maps, reports, user manuals, memos and articles relating to GIS BaseMap and TIS data input.

- Mn/DOT's GIS BaseMap is also available on TDA's Web site at: http://www.dot.state.mn.us/tda/basemap/index.html .

- Mn/DOT's TIS roadway data is also available on TDA's Web site at: http://www.dot.state.mn.us/tda/html/roadwaydata.html .

TASK TITLES: Vehicle Classification / Truck Weight Studies

ESTIMATED 2008 COST: $323,062

WORK AUTHORITY NO: TH 213

WORK PERFORMED BY: Traffic Forecasting and Analysis Section & Weight Data & Enforcement Policy Coordination Section

OBJECTIVE:

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

- Process vehicle classification data collected both manually and automatically throughout the state. About 100 locations are counted on a two year cycle with approximately 900 other site counted on a six year cycle.
- Process the truck weight data collected by Weight-In-Motion scales at permanent locations.
- 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 (TIS).
- Provide expertise and coordination in the development and dissemination of weight enforcement policies and regulations.
- Install permanent vehicle classifiers to collect, edit and report on the data. Since 2003, twenty-five such classifiers have been installed and are reporting data.

METHODOLOGY

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

- Develop plans and enforcement policy proposals and make recommendations; attend various meetings and hearings and provide technical advice. Carry out strategy changes and equipment purchases to improve weight enforcement productivity.

ACCOMPLISHMENTS:

- Annual Vehicle Classification and Truck Weight reports.
- Truck volumes produced biennially on the state traffic flow map.
- Heavy Commercial volumes input into TIS.
- Analysis of data and special studies.
- Weight enforcement policies
- Improved interagency coordination and communication processes.
- Improved weight data expert system development.

TASK TITLES: Traffic Counting

ESTIMATED 2008 COST: $326,568

WORK AUTHORITY NO: TH 214

WORK PERFORMED BY: Traffic Forecasting and Analysis Section

OBJECTIVE:

- To conduct and continually improve our traffic counting program which provides data for determining annual average daily traffic (AADT), vehicle miles of travel (VMT) and growth trends for Mn/DOT traffic forecasters, FHWA, and various other public and private agencies.

METHODOLOGY:

- Determine short duration and continuous (Automatic Traffic Recorder – ATR) traffic data requirements and sampling plan for the State's traffic Monitoring Program.

- Coordinate and oversee the collection of traffic data from central office, District and local government agencies, and maintain the data processing infrastructure to process and manage traffic data.

- Develop and apply proper axle correction and seasonal/day-of-week adjustment factors to trunk highway (TH) and local road short duration counts and develop official AADT for all segments according to the count cycle schedule (either 2 or 4 years).

- Help to ensure that all traffic monitoring equipment is tested and repaired when necessary.

- Continuously improve methods for screening, interfacing and reporting raw and final traffic estimates using statistics, new technology, and computer software.

ACCOMPLISHMENTS:

- Statewide, seven county metropolitan area and 52-sheet series, county and city maps depicting TH, County Road and Municipal State Aid street AADT's on paper and CD and via the office web page.
- An ATR summary report containing annual AADT and monthly comparisons, rank order hourly volume data, and maps illustrating ATR locations.
- Count location maps and supporting materials for fieldwork activities.
- Analysis of data to determine adjustment factors, trends and VMT estimates in addition to other special studies and technical assistance.

TASK TITLES: Traffic Forecasting and Highway Design

ESTIMATED 2008 COST: $256,346

WORK AUTHORITY NO: TH 216

WORK PERFORMED BY: Traffic Forecasting and Analysis Section

OBJECTIVE:

- To provide training, traffic monitoring data, auditing and reports for traffic forecasting to the districts and Metro Division.
- Maintain database of traffic forecasts.
- Provide Metro Division and Districts with technical support in traffic forecasting, especially in the use of Travel Demand Modeling.
- Monitor and report short-term traffic trends.
- Assist Metropolitan Planning Organizations and communities with traffic forecasting training and technical studies.

METHODOLOGY:

- Through the use of various computer traffic models, forecasting techniques and analysis of traffic data, provide Metro Division and the districts with instructions on calculating projections of future truck and auto volumes.

ACCOMPLISHMENTS:

- Systems Planning and Analysis reports.
- Individual highway traffic volume and load estimates.
- Estimates of truck volumes and movements.
- Special studies and reports.
- Statewide trunk highway traffic and heavy commercial volume projections for long-range planning efforts.

TASK TITLES: Transportation Information System (TIS) Development & Maintenance

ESTIMATED 2008 COST: $80,290

WORK AUTHORITY NO: TH 224

WORK PERFORMED BY: Data Systems & Coordination Section

OBJECTIVE:

- To design, build, test, deploy, and maintain new applications and technology in order that TIS maintenance and data retrieval efforts are constantly improved.
- To design, build, and test database enhancements (including changes to existing tables, creation of new tables, and maintenance of stored procedures and scripts) to improve performance or enhance data retrieval.
- To provide technical support for the applications and databases required by the TIS users to ensure that the applications and databases remain in an operational state and are accessible to users.
- To work with partners to develop new tools and methods for exchanging and sharing data, including use of the office web site.
- To provide up-to-date and accessible reports, data, and maps via an efficient, effective office web page.

METHODOLOGY:

The Office of Transportation Data and Analysis is responsible for the linear data in Mn/DOT's Transportation Information System (TIS) and the spatial data in Mn/DOT's GIS BaseMap. These systems incorporate data about roads (trunk highways and all other roads), railways, and bridges. These data include spatial roadway network features, physical characteristics (both vertical and horizontal), geometric features, various attributes such as crashes traffic volumes and classification, accidents, and designation information such as route system and number, federal classification, street names, etc.

The information contained in the TIS is used by transportation decision makers, planners and analysts and is provided in multiple forms such as text reports, graphs, and attribute maps for transportation planning, investment tradeoff analysis and project development.

This task consists of developing and maintaining TIS reporting applications and databases, enhancing connectivity between the TIS system and other data systems. It includes developing extraction tools and scripts to easily share data with other users, as well as the creation of tools to receive data updates from external partners such as the Department of Public Safety.

Additional work under this task includes:

- Maintaining and enhancing the office web site which is receiving an average of 4,000 hits per day, and working with county, city, MPR and RDC partners to exchange data and move closer to the goal of entering data once and using it often.
- Ensuring that this system is available whenever it is needed and the data maintenance and report generating functions operate properly and efficiently support is provided for software and hardware maintenance and troubleshooting.
- Providing programming and system analysis services, hardware installations, system enhancements and modifications, and overall system support.

ACCOMPLISHMENTS:

- Software application development and maintenance for updating and managing line work on the Mn/DOT GIS BaseMap and roadway attributes in the Transportation Information System (TIS).
- TIS Report applications and files able to be accessed by users with remote terminals.
- ArcGIS extensions for managing traffic data on TIS.
- Hardware configuration, system data files, computer programs, and systems documentation to meet the needs of various internal and external users.
- Office web page with links to TIS report, GIS BaseMap and traffic volume maps.
- User manuals, metadata dictionaries, memos and articles detailing TIS capabilities.
- Tools for providing crash data for the Office of Traffic, Security and Operations and the Department of Public Safety.
- Tools for providing pavement data for the Office of Materials and Road Research.
- Tools for providing bridge locations for the Bridge Office.
- Tools for providing data for Mn/DOT's Route Builder System.

TASK TITLES: Transportation Information System (TIS) Support

ESTIMATED 2008 COST: $228,781

WORK AUTHORITY NO: TH 610

WORK PERFORMED BY: Data Systems & Coordination Section

OBJECTIVE:

- To manage and provide user support for TIS data management and reporting applications, including ongoing conversion and migration from historical computer legacy systems.
- To act as liaisons between various Mn/DOT offices using TIS and GIS BaseMap data and to maintain relationships with both internal and external users of the TIS applications.
- Respond to requests for TIS data providing information, maps, and data to customers.

METHODOLOGY:

The Office of Transportation Data and Analysis is responsible for the department's Transportation Information System (TIS) and the spatial data in Mn/DOT's GIS BaseMap. These systems incorporate data about roads (trunk highways and all other roads), railways, and bridges. These data include spatial roadway network features, physical characteristics (both vertical and horizontal), geometric features, various attributes such as crashes traffic volumes and classification, accidents, and designation information such as route system and number, federal classification, street names, etc.

The information contained in the TIS is used by transportation decision makers, planners and analysts and is provided in multiple forms such as text reports, graphs, and attribute maps for transportation planning, investment tradeoff analysis and project development.

This task consists of operating TIS report applications, training users, and providing reports and maps as needed or requested. It includes using extraction tools and scripts provide data and maps to users and external partners such as the Department of Public Safety.

As part of this task, systems personnel (analysts, programmers, data maintainers, 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.

ACCOMPLISHMENTS:

- Customer support for TIS Report applications and data extraction tools and methods.
- 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.
- Maps and reports regarding TIS data as requested by TDA customers
- In-house and on-site training in TIS reporting functionality, BaseMap data maintenance and operations, and other tools related to TIS data access.
- Data for Mn/DOT's HPMS submittal to FHWA.
- Data for Mn/DOT's HSIS submittal.

TASK TITLES: Municipal Maps

ESTIMATED 2008 COST: $197,375

WORK AUTHORITY NUMBER: TH 601

WORK PERFORMED BY: Geographic Information and Mapping Section

OBJECTIVES:

- To prepare and maintain a complete set of planimetric street maps at suitable scales for all incorporated municipalities in Minnesota. These maps are used by the department for general-purpose planning and operational 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 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 populations are grouped by county on one or more 24" x 36" sheets with as many municipalities on a sheet as space will allow.

- At present there are 139 incorporated municipalities having a population of 5,000 or more on 151 map sheets; and 716 incorporated municipalities of less than 5,000 population on 256 sheets. This makes a total of 855 municipalities represented on 407 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 TITLES on County Maps.)

- With the implementation for Computer-Assisted Design and Drafting (CADD), we have converted all our map products to computer-generated maps. These digital map files store the locations of geographic features (those elements to be mapped) as digital x, y coordinates in a computer file.

- Update and revision are achieved by entering any revisions to be made in the appropriate digital file and obtaining a new plot.

- Graphic records for all of Minnesota's municipal corporate boundaries are maintained by the Geographic Information and Mapping Unit. For the past three years, an average of over 350 boundary revisions per year have been processed. Due to age, many of these paper 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, local government GIS files and city engineer maps.

- Municipal State Aid Street (MSAS) maps are produced for all municipalities having a population of 5,000 or more. MSAS maps delineate state trunk highways, County State-Aid Highways (CSAH), County Road (CR) and MSAS routes on the appropriate municipal map. These various route systems are shown by computer generated line patterning on the corresponding route. Additionally, MSAS streets are labeled with the number assigned in the Commissioner's Order that establishes the designation.

ACCOMPLISHMENTS:

- A complete set of planimetric street maps of all 855 incorporated municipalities in Minnesota.

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

- Graphic boundary record maps for all 854 incorporated municipalities in Minnesota.

- Mn/DOT municipal maps are also available on TDA's Web site at: http://www.dot.state.mn.us/tda/html/Cities_alpha.html .

TASK TITLES: St. Paul–Minneapolis Metropolitan Area Maps

ESTIMATED 2008 COST: $30,330

WORK AUTHORITY NUMBER: TH 604

WORK PERFORMED BY: Geographic Information and Mapping Section

OBJECTIVES:

- 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 Geographic Information and Mapping Unit maintains a digital base map for the entire Seven County Metropolitan Area. This set of 55 map sheets is referred to as the Metro Area Street Series. While prepared, maintained and usually plotted as 55 individual digital map files these sheets are structured to be seamless and can be mosaiced into any desired metro area coverage.

- 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 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 and range) and geodetic location (lat/long and state plan coordinates).

- The Computer-Assisted Design and Drafting (CADD) method was used to produce the Metro Street Series. Using high-resolution computer graphic workstation and Bentley MicroStation® 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 minutes quadrangle (quad) maps are used as the source for positioning control and the initial line-work to be digitized. Using the same digitizing techniques this "skeletal" line-work is then supplemented with other more up-to-date map information sources such as aerial photographs, road plans, satellite imagery, GIS files and other maps.

- Individual Metro Area Street Series map street coverage is formed by merging and "clipping" appropriate Mn/DOT "skeletal" quad files within the computer. The symbolical and text annotation needed to complete the map are also entered into the digital file. The finished map file is used to produce computer file plots. From this same digitizing, the Geographic Information and Mapping Unit has formatted a single map sheet file entitled 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, 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.)

- 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 areas.

ACCOMPLISHMENTS:

- A 55-map sheet set (Metro Area Street Series) covering the entire Seven County St. Paul–Minneapolis Area at a scale of 1:24000 (one inch equal 2000 feet).

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

- The Metro Area Street Series is also available on TDA's Web site at: http://www.dot.state.mn.us/tda/maps/GIM/index_maps/metross.pdf .

- The St. Paul-Minneapolis Metropolitan Area Map is also available on TDA's Web site at: http://www.dot.state.mn.us/tda/maps/GIM/metroarea.pdf .

TASK TITLES: County Maps

ESTIMATED 2008 COST: $103,824

WORK AUTHORITY NUMBER: TH 606

WORK PERFORMED BY: Geographic Information and Mapping Section

OBJECTIVES:

- To maintain a complete set of current, accurate, legible county maps at a scale of one inch equals to 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 government 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 outlines in the FHWA Guide for the Highway Planning Map Manual (Volume 20, Appendix 25).

- Currently 126 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 form the following reliable sources:

1. County Maps
2. U.S Geographical Survey 1:24000 Quadrangle Maps
3. Mn/DOT Project Construction Plans
4. Aerial photography obtained from Mn/DOT Photogrammetric Unit, U.S, NAPP, Department of Natural Resources and Metropolitan Council
5. Road Status Reports from County and Municipal Council
6. Municipal and County Project Construction Plans
7. Mn/DOT Intermodal Programs Division, Transportation Data Section Road Note Data
8. Railroad and Public Utilities
9. Minnesota Department of Natural Resources

10. Various United States agencies such as Bureau of Land Management, Bureau of India Affairs, U.S. Forest Service, Federal Aviation Administration and Federal Highway Administration
11. Decisions from the U.S. Board of Geographic Names
12. 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 to one mile, with the exception of six of the seven metropolitan are counties that are mapped at a scale of two inches equals to one mile using a polyconic projection. These are classified as full-scale maps.

- County map sheets are prepared utilizing Computer-Assisted Design And Drafting (CADD). The procedures for this process are 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. After completion and checking, copies are submitted to FHWA for approval.

- Minor revisions are received almost daily. These revisions are filed for reference and every county map is updated at least once each year to reflect these changes.

ACCOMPLISHMENTS:

- A complete set of digital county general highway maps covering the entire state.
- Mn/DOT county general highway maps are also available on TDA's Web site at: http://www.dot.state.mn.us/tda/html/counties.html .

TASK TITLES: State Maps

ESTIMATED 2008 COST: $49,879

WORK AUTHORITY NUMBER: TH 608

WORK PERFORMED BY: Geographic Information and Mapping Section

OBJECTIVES:

- 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 government agencies in relating their concerns to Minnesota's transportation systems. Public utilities, private industry and businesses, and the general pubic also make use of these maps for their individual needs.

METHODOLOGY:

- State map originals are prepared and maintained in accordance with the standards outlines 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 showed the state and county lines and the state trunk highway system, and served as the base for all other departmental statewide mappings. (See State Map Products.) In 1992 work was completed on digitizing 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 described in the section on "Municipal Maps". Digitizing was done using the U.S.G.S 1:100,000 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 and the current map.

- Revision of the digitized base map and overlays to show current status is achieved by researching maps and data produced by other 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 needed in accordance with the current map production schedules.

ACCOMPLISHMENTS:

- 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 from a 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 per unit printing cost by coordinating their purchase request with Mn/DOT 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 1:100,000 scale maps. Appropriate map features from these 69 individual source maps were merged into one digital file of statewide coverage for computer plotting at any desired scale

- Other miscellaneous 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 as needed basis.

- The Official Highway Map is also available on Mn/DOT's Web site at: http://www.dot.state.mn.us/statemap/ .

TASK TITLES: Roadway History & Project Log

ESTIMATED 2008 COST: $89,471

WORK AUTHORITY NUMBER: TH 609

WORK PERFORMED BY: Geographic Information and Mapping Section

OBJECTIVES:

- Roadway History provides an historical representation of the vertical roadway structural layers on state trunk highway system. Project Log provides an index of construction and maintenance projects within a trunk highway control section. The data contained in these files are used by the Office of Materials in calculating pavement deterioration rates as part of Mn/DOT's Pavement Management System and district materials engineers to review roadway profiles as part of the project design and pavement selection process.

METHODOLOGY:

- The Office of Transportation Data and Analysis is responsible for the maintenance and update of both the Roadway History and Project Log data files. The updating tasks include the collection, research and interpretation of various source documents – construction plans being the primary source. Appropriate update information is incorporated into the Transportation Information System (TIS) so that TIS contains accurate and up-to-date data.

ACCOMPLISHMENTS:

- Roadway History data is available through several TIS reports including cross-section lists and project contract lists. The data from these lists is incorporated into the Office of Materials' annual Pavement Management System reporting.

- Project Log provides a line diagram file containing one line per project which includes state project number, year work performed, type of work and a diagrammatic location map. Project Log data is also available on TDA's Web site at: http://www.dot.state.mn.us/tda/reports/projectlog.html.

TASK TITLES: Transportation Data and Analysis IT Development (TDA-ITD)

ESTIMATED 2008 COST: $225,414

WORK AUTHORITY NO: TH 611

WORK PERFORMED BY: Geographic Information and Mapping Section

OBJECTIVE:

- To enhance or modify tools, functions, or infrastructure that is part of the current TIS system as part of a specific IT project

METHODOLOGY:

The Office of Transportation Data and Analysis (TDA) is the steward of Mn/DOT's Transportation Information System (TIS). The TIS is an enterprise-wide database that maintains information on all public roads in the state, including physical characteristics (both vertical and horizontal), geometric features, and designation information such as route system and number, federal classification, and street names. In addition, TIS tracks information on roadway related assets such as bridges, railroad crossings, traffic volumes and classification, and crashes. TDA is also responsible for the GIS BaseMap. This product maintains geo-spatial representations of the public road network in Minnesota, providing a graphic counterpart to the tabular TIS data.

In Mn/DOT, any significant bundle of work that would enhance or modify the existing functions, tools, or infrastructure of a production system such as TIS or the GIS BaseMap would have to be conducted as part of a project managed from the Office of Information Technology (OIT). Typically, Mn/DOT desires to track resources assigned to these OIT projects via OIT's job numbers, which are separate from SP&R job numbers. This has resulted in work that is SP&R fund eligible being coded to non-eligible job codes.

This work authority number would be used to cover tasks that are conducted as part of a specific Information Technology Project designed to enhance the existing TIS system but are SP&R fund eligible. These tasks would be tracked under existing SP&R work authority numbers if we were not required to report them under a specific number for OIT resource accounting.

These tasks would include:

- Improving data collection, editing, and quality control methods and processes
- enhancing existing data editing tools to increase efficiency, access new data, or improve quality control
- modifying existing TIS reporting applications and databases
- enhancing connectivity between the TIS system and other data systems
- other tasks falling under TH 224, but being conducting within the bounds of a IT project.

ACCOMPLISHMENTS:

- Processes for data update and creation in the TIS and BaseMap systems that result in more accurate and timely data for analysis and decisions support.
- Effective and efficient applications for updating and managing roadway attributes and roadway-related assets in the Transportation Information System (TIS).
- TIS Report applications and files able to be accessed by users with remote terminals.
- Hardware configuration, system data files, computer programs, and systems documentation to meet the needs of various internal and external users.
- User manuals, metadata dictionaries, memos and articles detailing TIS capabilities.
- Tools for providing crash data for the Office of Traffic, Security and Operations and the Department of Public Safety.
- Tools for providing pavement data for the Office of Materials and Road Research.
- Tools for providing bridge locations for the Bridge Office.
- Tools for providing data for Mn/DOT's Route Builder System.

TASK TITLES: Transportation Information System IT Replacement (TIS-ITR)

ESTIMATED 2008 COST: $107,050

WORK AUTHORITY NO: TH 612

WORK PERFORMED BY: Data Systems and Coordination

OBJECTIVE:

- To design, develop and test tools, functions, or infrastructure to replace existing portions of the TIS system as part of a specific IT project

METHODOLOGY:

The Office of Transportation Dana and Analysis is the steward of Mn/DOT's Transportation Information System (TIS). The TIS is an enterprise-wide database that maintains information on all public roads in the state, including physical characteristics (both vertical and horizontal), geometric features, and designation information such as route system and number, federal classification, and street names. In addition, TIS tracks information on roadway related assets such as bridges, railroad crossings, traffic volumes and classification, and crashes.

In Mn/DOT, any significant bundle of work that would replace the existing functions, tools, or infrastructure of a production system such as TIS would have to be conducted as part of a project managed from the Office of Information Technology (OIT). Typically, Mn/DOT desires to track resources assigned to these OIT projects via OIT's job numbers, which are separate from SP&R job numbers. This has resulted in work that is SP&R fund eligible being coded to non-eligible job codes.

This work authority number would be used to cover tasks that are conducted as part of a specific Information Technology Project designed to enhance the existing TIS system but are SP&R fund eligible. These tasks would be tracked under existing SP&R work authority numbers if we were not required to report them under a specific number for OIT resource accounting.

These tasks would include:

- Designing new tools, functions, and reports required as part of the new TIS system
- Developing the new features in an architecture and infrastructure consistent with the new TIS system
- Testing features and functions of the new TIS system.
- other tasks falling under TH 224, but being conducting within the bounds of a IT project to replace the current TIS system.

ACCOMPLISHMENTS:

- Effective and efficient applications for updating and managing roadway attributes and roadway-related assets in a new Transportation Information System (TIS).
- New TIS Report applications and files able to be accessed by users with remote terminals.
- Hardware configuration, system data files, computer programs, and systems documentation to meet the needs of various internal and external users consistent with the new TIS system.
- User manuals, metadata dictionaries, memos and articles detailing the capabilities and specifications of the new TIS.
- New tools for providing crash data for the Office of Traffic, Security and Operations and the Department of Public Safety.
- New tools and methods for providing pavement data for the Office of Materials and Road Research.
- New tools and methods for providing bridge locations for the Bridge Office.
- New tools and methods for providing data for Mn/DOT's Route Builder System.

Appendix B:

Description of Research Studies

DESCRIPTION OF RESEARCH STUDIES

STATE RESEARCH AND DEVELOPMENT PROGRAM

RSS - RESEARCH PROJECTS, TECHNOLOGY TRANSFER, IMPLEMENTATION, SPECIAL PROJECTS & ADMINISTRATION - SPR-0001(048)

This project provides for the preparation of proposals, detailed work outlines and cost estimates for research studies to be submitted for the SP&R 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 part of the Mn/ROAD and ITS research effort. This project also provides for attendance and participation in various meetings and workshops including the annual FCP conference, which contribute to a better understanding of current problems and fosters the exchange of technical information and leads to improved research management practices.

The studies in the Cooperative Research description section follow the format of the recently established Transportation Pooled Fund web site (www.pooledfund.org). The information has been edited to include only the pertinent information relevant to Mn/DOT's involvement. However, in addition to the information below the web site also has, or links to, project documents such as work plans, reports, project updates, etc. An individual can also sign up to be notified of new studies as they are posted. The site also has a browse and search feature.

Study Number: **TPF-5(035)**
Title: Pacific Northwest Snowfighters
Lead Agency: Washington State Department of Transportation
Background: Public agencies throughout the Northwest buy and use corrosion inhibited deicing chemicals in an attempt to reduce the effects of corrosion due to the deicers that they apply during winter. These inhibitors are organic (typically carbohydrates which are biodegradable) and add about $30-50 per ton to the cost of deicing chemicals. Laboratory test data indicates that we can reduce the corrosive effects of all deicers by 70% or more by the addition of inhibitors, but what we don't know is how long the inhibitors stay with the chlorides after application in a field environment. The deicing chemicals are stored in covered and uncovered facilities in the field and testing needs to be performed to determine if these inhibitors deteriorate and the limit to their effectiveness. Also, the actual field performance of these products needs to be documented to assist maintenance personnel.

Objective: Phase 1: Determine the longevity and cost effectiveness of corrosion inhibitors added to liquid and solid deicing chemicals
Phase 2: Evaluate the performance of liquid and solid deicing chemicals
Phase 1 funding: $250,000
Phase 2 funding: $75,000 (if done in conjunction with Phase 1); $200,000 (if done separately)
(If additional funding is received, a Phase 3 will be discussed by the Technical Advisory Committee.)

The scope of this research is divided into two phases. Phase 1 will evaluate the longevity and cost effectiveness of the corrosion inhibitors that are added to deicers. An evaluation to determine the length of time the inhibitors remain effective within the products as it is applied to the road and also when stored in a variety of storage containment test sites over a period of time. Phase 2 is an evaluation of the performance of the various deicers based on corrosion inhibitors and additives. Each product will be applied at varying rates, road conditions, temperatures, and humidity in order to establish their performance. The products to be evaluated will be decided upon by the Pacific Northwest Snowfighters (PNS) and the technical committee. It is suggested that Phase 2 be conducted in conjunction with Phase 1 if the funding is available (if Phase 2 were conducted separately, we are projecting that the cost would more than double).

As a starting point, the deicers that will be tested fall within the following PNS Categories (specific types will be determined by the Technical Advisory Committee (TAC)):
- PNS Category 1 Corrosion Inhibited Liquid - Magnesium Chloride
- PNS Category 2 Corrosion Inhibited Liquid - Calcium Chloride
- PNS Category 4 Corrosion Inhibited Solid - Sodium Chloride

Scope:

As a part of this research, a portable Road Weather Information System (RWIS) will need to be purchased (or rented) to accurately monitor weather conditions. Storage sites, one covered (roof with three sides and the fourth side is open) and the other uncovered, will need to be built or acquired to test the deterioration of the solid products over time. Also, multiple storage tanks (agitated and non-agitated) will be needed to store the various liquid products. In addition, an unoccupied paved lot, unused airport, or other large paved surface will be needed to conduct these tests.
Procedures will need to be developed to mark and track the inhibitors that are added to the deicers so they can be monitored during the testing for longevity and effectiveness. In addition, data will need to be collected to determine the amount of residual that is left on the road during this process. The laboratory test procedures, sampling techniques, and sampling frequency will be mutually agreed upon by the TAC.

Testing will be performed on an unoccupied paved surface capable of handling multiple tests sections at once and will be equipped with the RWIS. Testing will be performed during various weather conditions. Corrosion inhibited Magnesium Chloride, Calcium Chloride, and Sodium Chloride (PNS Categories 1, 2, and 4, respectively) will be utilized for this research. The exact products and application rates to be tested will be determined by the TAC and the available funding. Hourly and daily tracking will be required to determine the loss of inhibitor and deicer under differing weather conditions. Traffic will not be taken into consideration at this time because of safety concerns and to try to keep the variables to a minimum. (Future work may incorporate traffic if a safe site is available and pending funding.)
Testing will also be performed on the materials stored in the covered and uncovered storage sites and the storage tanks to determine if there is separation of the deicer and inhibitor and whether the product breaks down during storage (i.e. how long can the product be stored and still be effective when applied to the roadway). These products should be evaluated on a regular basis.

Phase 1 will:
- Determine the longevity of the corrosion inhibitors and establish the duration that it remains with the deicer.
- Determine whether the inclusion of the inhibitor is economical.
- Determine the effects of exposure at storage sites (i.e. how long the inhibitors are present and active while being stored at open and covered storage sites and how much inhibitor is lost due to exposure of the elements).
- Evaluate a salt/sand mixture at a storage site to determine if the ratio changes.

Phase 2 will:
- Determine the most effective application rates and the most effective product used to combat ice formation in differing weather conditions.
- Determine the effectiveness of adding different ratios of salt to sand to treat ice formation.
- Determine if inhibitors contribute to the freezing point suppression and if they provide any increase to the effectiveness of the deicers.

Study Number: **TPF-5(036)**
Title: Transportation Asset Management Research Program
Lead Agency: Wisconsin Department of Transportation
Background: To enable participating states to leverage limited resources in an ongoing program of synthesis, research and analysis to facilitate implementation of asset management. The intent is to supplement current national asset management research efforts of the MRUTC, prevent duplicity of existing efforts, and provide a means for regional state DOTs to share resources, technology and ideas in a coordinated environment.
Objectives: Study is in the beginning stages. State partners are still being solicited to determine study focus. Possible asset management related issues to be studied include preventative maintenance, investing strategies, and personnel utilization.

Study Number: **TPF-5(068)**
Title: Long-Term Maintenance of Load and Resistance Factor Design Specifications
Lead Agency: Iowa Department of Transportation
Objectives: To provide timely assistance to the AASHTO Highway Subcommittee on Bridges and Structures in interpreting, implementing, revising, and refining the AASHTO load and resistance factor documents.

Study Number: **TPF-5(092)**
Title: Clear Roads (Test and Evaluation of Materials, Equipment and Methods for Winter Highway Maintenance)
Lead Agency: Wisconsin Department of Transportation
Background: State departments of transportation are aggressively pursing new technologies and practices to improve winter highway maintenance. Current research efforts address one or more aspects of the complex task of anticipating and responding to snow and ice events on highways and bridges across local and state jurisdictions. Considerable effort is directed at developing, deploying and evaluating sensing and communication technologies collected under the umbrella of anti-icing and road weather information systems (AI/RWIS). Some evaluation of anti-icing and de-icing materials and snow and ice removal equipment is also being carried out--a much needed effort. For the most part, however, these testing activities are related to the properties and characteristics of the materials and equipment in and of themselves--that is how they meet specifications or perform on standard lab tests. What is needed, in addition, is related field-testing/follow-up.
Objectives: Conduct structured field testing and evaluation across a range of winter conditions and different highway maintenance organizational structures to assess the practical effectiveness, ease of use, optimum application rates, and barriers to use, durability, and so on, of innovative materials, equipment and methods for improved winter highway maintenance.

Scope of Work: This ongoing pooled fund project will fund new research annually to investigate the applicability of various winter maintenance materials, equipment and methods for use by state and local highway maintenance crews. Project partners who contribute funds to the study will appoint representatives to serve as members of the Technical Advisory Committee (TAC). The committee will be responsible for identifying needed research, selecting investigators, reviewing progress and approving deliverables. This group meets in person two times per year--in January and July.

Study Number: **TPF-5(116)**

Title: Investigation of the Fatigue Life of Steel Base Plate to Pole Connections for Traffic Structures

Lead Agency: Texas Department of Transportation

Background: The project is proposed to investigate what improvements can be made to the base plate to pole connections for traffic structures, such as socket welds, to improve their fatigue life. Recent research on the fatigue life of traffic signal mast arm to pole socket welded connections has shown that the fatigue category of this detail is E¿ and sometimes less. The addition of stiffeners did increase the fatigue performance, but not to the level predicted by the AASHTO Specifications. This research has also shown that small changes in various connection details, such as plate thickness, bolt pattern, and stiffener pattern, can improve the fatigue life of the connection. More research is needed to develop a better understanding of the effect of these changes, and to provide a systematic way that this knowledge can be incorporated into the design process and the AASHTO specifications for signal poles, high mast illumination poles, and other traffic structures.

Objectives: 1.Develop a comprehensive list of connection details that affect the fatigue life of various commonly used connection details
2.Determine which changes to these details could feasibly and most cost effectively be used to increase the fatigue life of base plate to pole connections, with and without stiffeners
3.Determine a quantitative relationship between the changes in the details and their effect on the fatigue life of the connection
4.Develop a fatigue design guide that would show designers how they could quantitatively use the various recommended changes for use in there fatigue designs
5.Develop language to incorporate the above guide into the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals

Scope of Work: Phases
1)Literature review
A review of literature and recent research in the field of fatigue to provide a good idea of what kind of tests have been performed, which ones are worth expanding on, and what factors effect the fatigue life of the connection.

2) Develop test plan
After a list of fatigue life influencing factors has been put together, develop a test matrix. The matrix will show which factors or details are going to be tested, the range to test over, the number of tests

required, and any combination of factors or details that should be tested together. The matrices shall then be reviewed by fabricators and contributing agencies to ensure that all tests are worthwhile and that other factors that may be important or useful will also be considered. This will help to ensure that the results from testing will yield feasible and cost effective solutions.

3) Testing
Since the number of tests required to develop an in depth understanding of the wide gamut of connection possibilities would be quite large, and the costs and time required for such tests also quite large, Finite Element Models (FEM) may be used. These models will be correlated with actual tests, and they will allow an increase in the number of combinations and changes that can be evaluated with a fixed budget and in a reasonable amount of time.

4) Summarize Results
The results should be summarized in three ways.
1. A final report detailing all of the tests, the test methods, literature review, results, and conclusions.
2. A fatigue design guide which outlines how to quantitatively include improvements in the connection detail in the design process.
3.A list of changes to the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals to recommend to the AASTHO T-12 Committee.

Study Number: **TPF-5(128)**

Title: Accelerated Implementation of Intelligent Compaction Technology for Embankment Sub grade Soils, Aggregate Base and Asphalt Pavement Material

Lead Agency: Federal Highway Administration

Background: The compaction process is a vital final step in the construction of quality, long lasting sub grade soils and pavement materials. Embankments, Sub grades, Base Materials, and Pavement must be well compacted to obtain uniform, optimum density levels that ensure adequate support and strength. Currently used compaction equipment and processes can too often result in inadequate and / or non-uniform material density, which can contribute in short embankment and/or pavement service life. Compaction rollers with intelligent compaction (IC) capabilities have been developed and are routinely used in parts of Europe and Asia. Many studies have shown that the use of IC technology can dramatically improve the compaction process. Specifically, it seems that the implementation of IC technology may result in more uniform material density,

improve the efficiency of compaction operations by reducing the number of passes needed to obtain specification density and can provide a valuable tool in QC/QA by allowing a visual record of material stiffness values at 100% of the roadway locations recorded during compaction. Rollers with IC technology for soils / aggregate (single drum) and asphalt pavement (tandem drum) compaction are now becoming available in the United States. At the same time, FHWA and state DOTs have expressed interest in conducting studies to accelerate the study and implementation of IC technology. To this end, FHWA has produced a report titled "Strategic Plan for Intelligent Compaction" that establishes a five-year plan to study IC, write AASHTO-style construction QC specifications and implement the technology. The report suggests, among other things, that a coordinated effort by roller manufacturers and government agencies be undertaken to use IC technology on various roadway construction projects at locations around the country. An IC Strategic Forum was held in December that included FHWA, equipment manufacturers and state DOT representatives. At that meeting, it was found that some major roller manufacturers were planning to provide a limited number of rollers to the US market and that a number of state DOTS were planning projects to utilize and study IC technology. Based on those two facts, at least five state DOTs in attendance expressed interest in participating in a pooled fund approach to coordinate the study and rapid implementation of IC technology.

Objectives:

The primary outcome of the pooled fund project will be:

1. Accelerated development of Intelligent Compaction (IC) QC/QA specifications or Sub grade Soils, Aggregate Base and Asphalt Pavement Material. The focus of the specifications will be to provide a reliable method to capture the maximum potential value added which is possible from current IC technology, and current used/available QC/QA Field testing equipment (dynamic cone, FWD, Plate Load Tests, Density, Moisture, temperature, etc.). Not all possible the potential IC value. All that is possible using current IC and QC/QA Field testing technology.

2. Develop an experienced and knowledgeable IC expertise base within Pool Fund Participating State DOTs.

3. Identify and prioritize needed improvements to, and/or research for, IC equipment and Field QC/QA testing equipment. Prioritization will be based on the potential for: (1) simplifying IC usage; (2) achieving greater IC value, cost benefit, etc.; (3) higher accuracy; and (4) any combination of 1 through 3.

Scope of Work:

1. Develop Report "Intelligent Compaction in Europe: The Owners Experience and Perspective." Currently, all data, exposure, knowledge, and perspectives have been provided by the IC Equipment Manufacturers. Implementation of IC within the US could be greatly accelerated by a documented report on the European owners IC experiences, perspective, and active research activities. Several of the questions to be answered by the report include:
· Why has/does the owner use IC?
· What qualitative or quantitative value do they get?
· How have they successfully implemented and integrated IC?
· What research have they completed or is ongoing? Can we collaborate so that we can leverage our resources? They do one part we do another, and we share.
· Is there a way to establish a broader based users group for moving technology and testing forward?
· Can we collect information on QA/QC, testing equipment, methods etc?

Advanced compaction technology and methods have been used in Europe by highways, airports, and high-speed rail. Leaders in this area have been the Swedes and Germans who began advanced compaction techniques and in the mid 70's and has had specifications in place for over a decade. In addition, the French have advanced compaction testing equipment that may well be superior to the Germans or Swedes. The Report Team will focus on embankments, sub grades, and non-bound base materials.
2. Conduct integrated multi-state IC construction projects (not limited scope equipment demonstrations) to answer key questions about the technology. The goal is for each Pool Fund Participating State to gain experience and expertise from each IC project regardless of its location within the US. Engineers from Pool Fund Participating State will work as a virtual team on each new IC project. Building and sharing IC knowledge with each new project. The goal is for each DOT to gain significantly more IC knowledge via this method then they would have obtained if an equivalent number of IC projects where performed in their home state. In addition to cost savings, this approach should radically reduce the time required to develop IC specifications and development of a US based IC expert pool and network.
3. Providing a travel mechanism for Pool Fund IC engineers to participate in IC business meetings and IC construction projects in fellow participating States.

4. Plan of Action will include a Pool Fund facilitator to assist DOTs with project planning, scheduling and data collection and to coordinate with roller suppliers to schedule the right equipment at the right location at the right time. It is envisioned that the facilitator will be paid consultant.

Study Number: **TPF-5(139)**

Title: PCC Surface Characteristics: Tire -Pavement Noise Program Part 3 - Innovative Solutions /Current Practices

Lead Agency: Iowa Department of Transportation

Background: The purpose of this pooled fund study (Part 3) is to fully implement the PCC Surface Characteristics program. This project is related to a larger study involving two other parts (Part 1 and 2). Those two parts are summarized in the attached Appendix B. Part 3 will consist of the continuation of the comprehensive data collection and analysis program on new and existing pavements started in 2005; expand on it so that the research results have a broader range of applicability; and develop innovative texturing techniques that have the potential to significantly reduce noise.

Objectives: At the completion of this overall study, it is anticipated that it will be possible to specify the desirable surface characteristics of individual projects prior to construction to meet the site specific requirements for noise, skid, texture, and smoothness.

Scope of Work: States included in the pooled fund will be funding part of the field measurements and coordination of work for the new sites. This work will target those projects from the earlier phase of the field study (Part 2) that show good results and are worth further evaluation relative to constructability and consistency. Also included will be projects that will involve new, innovative processes or equipment that is developed as the project moves forward.

In addition, the pooled fund will cover the cost of the on-going technology transfer that will provide the States the results of the overall study (Parts 1, 2, and 3) and the ways that they can incorporate the study results into their activities to meet noise, friction, and safety requirements. The technology transfer elements will be centered around on-site meetings with the management level staff members of each of the participating states. The technology transfer program will also include technical memorandums and conference presentations indicating the study results and recommendations.

Participation in the pooled fund does not require involvement in field site activities. States involved with the project that participate in field experiment sites will be required to provide staff and financial resources. The involvement varies in accordance with the type of project involved.

Type 1 (new) projects will involve the following activities:
-Pay for extra contractor costs for different textures that are to be used
-Provide traffic control for all testing activities
-Complete friction tests utilizing an ASTM E274 trailer along with an ASTM E 524 smooth tire

Type 2 (existing) and 3 (existing and new) projects will involve the following activities:
-Provide traffic control for all testing activities
-Complete friction tests utilizing an ASTM E274 trailer along with an ASTM E 524 smooth tire

Study Number: **TPF-5(144)**
Title: Use of Video Feedback in Urban Teen Drivers
Lead Agency: Iowa Department of Transportation
Background: Newly licensed teens have an extremely high risk for crashes. According to the Insurance Institute for Highway Safety, in 2003 there were 5,691 teenagers (13-19 year olds) that died in motor vehicle crashes (IIHS, 2003). This amounts to more than a third of deaths from all causes for teenagers (Chen, Baker, Braver, & Li, 2000; IIHS, 2005). Thus, motor vehicle crashes are a primary cause of death amongst young teens. Moreover, teen drivers (15 to 19 years) are the demographic group with the largest number of fatalities in the state of Minnesota.
Objectives: The objective of this project is to examine the use of event-triggered video feedback to reduce urban teen unsafe driving. Using system and parent feedback, we hope to significantly reduce the number of unsafe driving behaviors of newly licensed urban teens. This research project is different from other interventional studies because it gives clear, in-context driver feedback in the form of video and audio of the entire event. It is hoped that such feedback will help teen drivers improve their driving for the long-term so that they learn to anticipate other traffic and maneuvers.

Scope of Work: In response to the epidemic of teen driver fatalities, the Universities of Iowa and Minnesota propose leading a pilot project examining the use of new methods to motivate safe teen driving. This method will examine teen driving during the first 6-12 months after obtaining a driver license and is based on using an event-triggered video system to record and give feedback about unsafe driving behavior for teen drivers. The system provides two forms of feedback to the teen driver. First, the system gives blinks and LED to tell the driver that an event trigger has been detected and recorded. Second, video feedback recorded during the unsafe driving episodes is combined with a parent-teen `coaching¿ protocol. The coaching protocol is used to provide support for expected behavioral changes in teen drivers. This pilot research program will provide new insights that can be applied to the long-term development of positive driving habits for urban teens.

The proposed study will recruit 40 teens (20 males and 20 females) from one high school in the twin cities area. This study would be built on the framework and protocols of a rural teen driver study currently underway in rural Tiffin, Iowa, being conducted by the University of Iowa.

Study Number: **TPF-5(156)**
Title: Mississippi Valley Freight Coalition Pooled Fund
Lead Agency: Wisconsin Department of Transportation
Background: The industries and farms of the Mississippi Valley region can compete in the marketplace only if their products can move reliably, safely and at reasonable cost to market. Growing congestion threatens the sustainability of this freight movement. The people of the region are dependent upon farms and industries for their livelihoods and their economic quality of life depends on the flow of goods to our markets. The Mississippi Valley Freight Coalition was created to protect and support the economic wellbeing of the industries, farms and people of the region by keeping the products of those industries, farms and people flowing to markets reliably, safely, and efficiently.

The Safe, Accountable, Flexible, Efficient, and Transportation Equity Act: A Legacy for Users (SAFETEA-LU) established a National University Transportation Center at the University of Wisconsin. This National Center for Freight and Infrastructure Research and Education will focus on Sustainable Freight Transportation Infrastructure and Systems.

The Midwest Regional University Transportation Center (MRUTC) at the University of Wisconsin participated with seven other states in the upper Midwest on a two-phase study for the Upper Midwest Freight Corridor. The outcomes of this study were taken to the AASHTO's Mississippi Valley Board of Directors for their approval (through the signing of a Memorandum of Understanding) to establish a regional organization to cooperate in the planning, operation, preservation and improvement of transportation infrastructure in the Mississippi Valley region and in efforts to engage the public and private sectors in the process to enhance system performance and operations.

The Board of Directors had several requests. Those included adding three additional states in our activities (Kansas, Kentucky, and Missouri), and the formation of an executive committee, technical committee and customer committee. All ten member states¿ representatives on the Board of Directors then signed the MOU at their October 29, 2006 meeting in Portland. Then during a November 30, 2006 teleconference of the MVFC Executive Committee, the charter, pooled fund, and three priority initiatives were approved.

Objectives:

· Share information between agencies that will improve the understanding of freight issues and the management of freight services and facilities
· Reach out to and share ideas with private sector shippers and carriers on approaches to making freight flow more smoothly through the region
· Gather, analyze and share information on the movement of freight throughout the region with sister agencies and with private sector interests
· Define a system of regionally significant freight highway, rail and water corridors and facilities and establish performance expectations for those facilities that will guide their management and operations
· Evaluate, implement and operate technologies and other roadway appurtenances from a regional perspective and in a manner that supports the reliable, efficient and safe movement of freight
· Evaluate, implement and enforce traffic and vehicle regulations that promote the reliable, efficient and safe movement of freight
· Identify corridors or bottlenecks that frustrate the movement of freight and then taking actions, individually or as a group, to improve those corridors or bottlenecks
· Define and support national transportation policies that will support and improve the movement of freight in the region

Scope of Work: The Coalition seeks to work closely with the ten states of the Mississippi Valley region to maximize the operational efficiency of the freight transportation system within our region. This can be achieved through the accomplishment of the objectives above. The objectives can be accomplished through a close working relationship between and executive committee made up of CEOs of each of the ten state DOTs, a technical committee made up of freight policy and traffic operations advisors, and a customer committee made up of shippers and carriers in the region, providing the perspective of the private sector.

Through effective communication between all committees, coordinated by staff of the Wisconsin Transportation Center, a Coalition Action Plan will be generated that identifies research projects, workshops and planning and outreach activities to guide the Coalition's efforts.

Study Number: **TPF-5(159)**
Title: Technology Transfer Concrete Consortium
Lead Agency: Iowa Department of Transportation
Background: Increasingly, state departments of transportation (DOTs) are challenged to design and build longer life concrete pavements that result in a higher level of user satisfaction for the public. One of the strategies for achieving longer life pavements is to use innovative materials and construction optimization technologies and practices. In order to foster new technologies and practices, experts from state DOTs, Federal Highway Administration (FHWA), academia and industry must collaborate to identify and examine new concrete pavement research initiatives. The purpose of this pooled fund project is to identify, support, facilitate and fund concrete research and technology transfer initiatives.

Objectives: The proposed project is for the establishment of a pooled fund for state representatives to continue the collaborative effort begun in TPF-5(066) Materials and Construction Optimization. The TTCC will be open to any state desiring to be a part of new developments in concrete paving leading to the implementation of new technologies which will lead to longer life pavements through the use of the innovative testing, construction optimization technologies and practices, and technology transfer.

Scope of Work: It is envisioned this partnership will be part of the Track Team for the CP Road Map Mix Design and Analysis Track. The Track Team will include state representatives along with FHWA representatives, industry representatives (from ACPA, ACPA chapters, and material suppliers), consultants, and academic representatives. This pooled

fund will be the opportunity for all states interested in the Mix Design and Analysis Track to become part of that endeavor.

TTCC will begin by meeting in conjunction with MCC, twice a year, as the MCO has done in the past. It may be advantageous for MCC in the future to consider melding itself into, and becoming part of the TTCC.

All efforts by the TTCC will be focused towards these project activities and deliverables:

Identify and direct the development and funding of technology transfer materials such as tech brief summaries and training materials from research results
- Review the CP Road Map initiatives and provide feedback to the FHWA, industry, and the CP Tech Center on those initiatives
- Be part of the Track Team for the CP Road Map Mix Design and Analysis Track providing guidance to coordinating activities with the track.
- Provide research ideas to funding agencies
- Identify and instigate needed research projects
- Include current activities and deliverables of the pooled fund on the CP Road Map project website
- Maintain pooled fund project website with current activities and deliverables
- Develop pooled fund research projects for solutions to concrete and concrete pavement issues
- Act as a technology exchange forum for the participating entities
- Contribute to a technology transfer newsletter on concrete pavement research activities every six months in cooperation with the CP Road Map activities
- Publish electronic quarterly reports following lead state guidelines
- Post quarterly reports to the website
- Submit a final report to participants that documents the results of the entire project

Study Number: TPF-5(164)
Title: Fish Passage in Large Culverts with Low Flows
Lead Agency: Federal Highway Administration
Background: Culverts have been traditionally designed and constructed to be hydraulically efficient for conveying flood flows. This efficiency is achieved by causing the flow to contract and accelerate inside of the relatively smooth culvert barrel. In some cases, achieving the objective of culvert efficiency also results in constructing barriers to fish passage. National attention is now focused on modifying traditional design methods (emphasizing culvert efficiency) in such a way that the objective of fish passage is also achieved. To prepare successful designs for fish passage, there is an immediate need to develop more information about the hydraulics of low flows in large culverts. Current information on culvert hydraulics available from FHWA and culvert manufacturers typically addresses flow magnitudes on the order of the bank full stage or greater. This information is being extrapolated to estimate velocities during low flow conditions, and the results are unreliable. Previous studies of fish movements indicate that the fish tend to move upstream along the sides of the culverts where flow velocities are lowest. Therefore, there is a need for a more accurate method to determine the extent of the variation of local velocities within the cross-sectional area of the culvert under low flow conditions. Additional information is also desired in regard to how entrance and exit flow conditions affect fish movement.

Urgency, Payoff Potential, and Implementation

The immediate need for this study was emphasized at a February 15-16, 2006, conference on fish passage held in Denver, Colorado, that was organized by the FHWA and attended by representatives of FHWA and other Federal agencies, various State DOT's, academia and private industry. At present there is still a lack of basic knowledge concerning the hydraulics of low flows in culverts. Because of the availability of advanced instrumentation, FHWA is now able to obtain more precise measurements than were possible in the past to address the concerns about low flow hydraulics. Considerable interest in this proposed study was voiced by the conference participants. The relatively modest cost of this research and the great value of the basic research results make this a high priority study with benefits to all Federal and State agencies involved in solving fish passage problems at highway culverts. The study results can be incorporated in FHWA Hydraulic Engineering Circulars (Future HEC-26, etc.) for nationwide distribution and implementation.

Objectives:

The objective of this project is to develop a report to document the study approach and the research results. The report will include a practical design method for estimating average and local velocities in culverts and will describe how the results can be used to develop improved methods for facilitating fish passage.

The proposed is to study low flow hydraulics in large culverts. The study will be conducted by the FHWA at the Turner-Fairbank Highway Research Center's J. Sterling Jones Hydraulic Research Laboratory in McLean, Virginia. Hydraulic variables will include flow depth, flow condition (laminar, transition and turbulent), Froude number and the variation of flow velocities within the culvert cross-section. Culvert variables will include size and shape, slope, sediment deposits and culvert material. The experiments will be conducted in a new designed culvert test facility where a 15- to 20-foot length of specified culvert geometries will be installed between the headbox and tail box. Only the symmetrical half of the culverts will be modeled allowing larger scale models (1:5). Current FHWA laboratory instrumentation can now achieve much more precise measurements than was possible a few years ago to evaluate these hydraulic characteristics under low flow conditions. An advanced particle image velocimetry (PIV) technology will be used for measuring instantaneous flow fields in the culvert. The particle image velocimetry technique (PIV) is an optical flow diagnostic based on the interaction of light refraction and scattering with inhomogeneous media.

Scope of Work:

The scope of work consists of researching entrance, friction and exit losses for low flows in culverts, to address the effects of low flow conditions on ¿n¿ values and to study boundary layer flow fields.

The project will consist of the following tasks:

Task 1. Assemble a technical advisory committee that will provide oversight and guidance on all aspects of the project.

Task 2. Solicit information from participating States on current methods being used to evaluate/design culverts for fish passage. Solicit information on the range of variables (culvert shapes, sizes, slopes, lengths, materials, entrance conditions, outlet conditions and bed load material), which need to be considered in their fish passage designs.

Task 3. Based on the input received from the participating states, develop a detailed study matrix for the hydraulic tests.

Task 4. Fabricate transparent models of the culverts to be studied on a scale of 1:5. Conduct various hydraulic flow test runs; varying spans widths, culvert materials, flow depths, slopes and bed load materials (sand, gravel, and cobbles).

Task 5. Develop a procedure for computing average velocities and local velocities (using iso-velocity lines) for the range of selected culverts and study conditions. If necessary, numerical modeling will be used to augment the hydraulic laboratory study results.

Task 6. Run full-scale flume tests of commonly used corrugation patterns on flat plates; measure average velocity friction factors for various flow depths above the corrugations and local velocity variations in the vicinity of and between corrugations as a possible explanation for the observation that small fish seem to navigate through culverts at much higher average velocities than would be expected. These full-scale tests will serve to further validate the results of the scale model tests performed in Task 3.

Task 7. Prepare a report to document the study approach and results. The report will include a practical design method for estimating average and local velocities in culverts and will describe how the results can be used to develop improved methods for designing culverts to facilitate fish passage.

Study Number: **TPF-5(171)**
Title: Evaluation of Non Intrusive Traffic Detection Technologies Phase III

Lead Agency: Minnesota Department of Transportation

Background: "Non-intrusive" sensors are defined as those sensors that can be installed, calibrated and used without disruption to traffic. The most common non-intrusive technologies (NIT) used for traffic detections include: passive or active infrared, magnetic, microwave or radar, ultrasonic, passive acoustic, and video. Other, more recent applications use infrared technology to classify vehicles by counting each vehicle's axles from the side of the road. Since 1994, the Minnesota Department of Transportation (Mn/DOT), the Federal Highway Administration (FHWA) and pooled fund study members has implemented a series of NIT sensor evaluations. The most recent project, completed in 2005, designed, fabricated and field tested a portable non-intrusive traffic detection system. These studies have provided valuable information, benefiting both public and private agencies in selecting appropriate technologies for their own data collection purposes.

Objectives: The objective of the proposed project is to conduct field tests of the latest generation of non-intrusive traffic sensors. The field tests will assess the capabilities and limitations in detecting traffic under a variety of conditions. Specific test conditions will be driven by the needs of participating state agencies.

Scope of Work: This project builds on previous research by providing up-to-date field evaluations of currently available NIT sensors. The project will use a variety of existing infrastructure to conduct a 12-month field evaluation. Much of the testing will take place at the Mn/DOT permanent test site at Penn Avenue and I-394 near downtown Minneapolis. This site has a permanent equipment shelter, overhead gantry, and side fire mounting platforms that facilitate a wide variety of tests. In addition, the portable system, developed in the previous project, provides a platform to conduct short-term tests at a wide variety of other locations. The project is broken into the following six tasks.

1) Identify test scope, goal, and objectives
Outline project goals and objectives, and scope of tests.

2) Develop Test Plan
Develop a detailed test plan that will guide the test activities; ensuring they meet the identified project goals and objectives. The test plan will provide test procedures that detail how to assess the sensors under various test conditions. The test plan will also present the selected test methodologies and testing scenarios that facilitate the evaluation of sensors¿ performance and capabilities.

3) Sensor Procurement
A literature search will be conducted to identify the potential participating vendors based on existing and newly developed NIT technologies.

4) Site Preparation
The Mn/DOT NIT test site facilitates both baseline and sensor data collection. These facilities include in-place inductive loops, an automatic data recorder, and communication hardware and software. The existing facilities will be reviewed and upgraded as needed to ensure accurate data collection.

5) Field Testing and Data Acquisition
Installation and Field Test Activities

6) Data Analysis and Report Preparation

Appropriate statistical measures will be identified and used to quantify the performance of sensors in an assortment conditions. Analyzed data will be summarized into various formats to present in the final report.

Study Number: **TPF-5(174)**
Title: Construction of Crack-Free Concrete Bridge Decks Phase II
Lead Agency: Kansas Department of Transportation
Objectives: Cracks in concrete bridge decks provide easy access for water and deicing chemicals that shorten the life of the deck. Both materials increase the effects of freeze-thaw damage, while the deicing chemicals lead to higher concentrations of chlorides, and subsequently, corrosion of reinforcing steel. Measurements taken on bridges in Kansas show that dense, high quality concrete can significantly slow the penetration of chlorides to the level of the reinforcing steel. However, measurements taken at cracks shoe that the chloride content of the concrete can exceed the corrosion threshold at the level of the reinforcing steel by the end of the first winter. The formation of cracks, this significantly however the effectiveness of other techniques that are used to increase the life of a deck.

Background: Research, some of which dates back over 30 years, has addressed the causes of cracking in bridge decks in North America. The research includes two detailed bridge deck surveys carried out by the University of Kansas during the past decade (with another scheduled to start this year). The results of the studies provide specific guidance on modification in materials and construction techniques that will reduce the amount of cracking in bridge decks. Settlement cracks, transverse deck cracks that form immediately over reinforcing bars, can be reduced with increased cover, decreased bar size, and decreased concrete slump. Shrinkage cracks can be reduced by decreasing the volume of water and cement, and maintaining as air content above 6%. Optimized aggregate graduations can be used to minimize the cement past constituent of concrete, and workability can be enhances at reduce past contents using water reducers and super plasticizers. Increased compressive strength, normally associated with high-performance concrete, often has a negative impact on cracking. During construction, plastic shrinkage cracks increase as the rate of evaporation from the concrete surface increases even when plastic shrinkage cracking is not specifically observed, conditions associated with high evaporations rates are also associated with increased total cracking in the completed deck. Due to movement of plastic concrete, Techniques such as wind breaks and fogging have had a positive

impact on the problem, as has thorough curing of the concrete. The surveys by the University of Kansas demonstrate that, in general, cracking increases with increased age. However, concretes cast in different eras exhibit significantly different amounts of cracking-decks in Kansas cast between 1983 and 1987 averages less than half the crack density of bridges cast sine 1990. This observation is taken as evidence by some of the effect of the progressively finer graduations of Portland cement that have been produced to provide higher early strengths, but that also produce concretes with a greater tendency to shrink.

Study Number: **SPR-3(017)**
Title: Midwest States Pooled Fund Crash Test Program
Lead Agency: Nebraska Department of Roads
Objectives: Develop an NCHRP Report 350 acceptable transition between cable median barriers and the bullnose guardrail system.
Background: Cable median barriers have proven to be a very cots beneficial safety treatment for high-volume/high-speed freeways. These barriers can often be installed at one tenth the cost of other median barrier systems and conventional cable barriers have been proven to be capable of restraining most errant vehicles, including heavy trucks. As a result, cable median barriers are gaining acceptance across the nation and are the barrier of choice on almost any freeway with an unpaved median.

One of the biggest obstacles associated with the use of cable median barrier is treatment of median obstacles, such as bridge priers. The large lateral deflections associated with many cable barrier systems preclude the use of thee barriers for protecting fixed objects. However, because cable barriers are usually played as a remedial treatment. Safety treatment are usually in place for any fixed median object within the clear One. If a cable median barrier can be transitioned to existing fixed object safety treatments, the cost and difficulty associated with implementing cable barriers can be greatly reduced. Cable barrier transitions to W-beam guardrail have been developed and have proven to be a very effective low cost option when cable median object in the median. As the bullnose guardrail system gains wider acceptance, there is an increasing need for developing a method for transitioning from cable median barrier to the bullnose system.

Study Number: SPR-3(020)
Title: IVHS Study (ENTERPRISE)
Lead Agency: Iowa Department of Transportation
Objectives: To investigate and promote IVHS approaches and technologies that is compatible with other national and international IVHS initiatives. This project has work plans that include multiple contracts and contractors
Background: The ENTERPRISE Program is a pooled-fund study with member agencies from North America and Europe. Its main purpose is to use the pooled resources of its members, private sector partners and the United States federal government to develop, evaluate and deploy Intelligent Transportation Systems (ITS). As part of its mission, ENTERPRISE seeks to facilitate the sharing of technological and institutional experiences gained from its ITS projects, and the projects of its individual members.

Study Number: SPR-3(042)
Title: Aurora
Lead Agency: Iowa Department of Transportation
Objectives: Aurora is an international program collaborative research, development and deployment in the field of road and weather information systems (RWIS), serving the interest and needs of public agencies. The Aurora vision is to deploy RWIS to integrate state-of-the-art road and weather forecasting technologies with coordinated, multi-agency weather monitoring infrastructures. It is hoped this will facilitate advanced road conditions and weather monitoring and forecasting capabilities for efficient highway maintenance, and provision of real-time information to travelers . Study is ongoing and will continue for the foreseeable future. Members contribute funds annually; propose research projects on RWIS-related projects (Road Weather Information Systems); manage contracts for the research; and prepare reports/submit results for publication. One of Aurora's goals is to provide guidelines for RWIS implementation and usage.

Study Number: SPR-3(049)
Title: Urban Mobility Study
Lead Agency: Texas Department of Transportation
Objectives: 1) Form Steering Committee, which will decide on the congestion reduction methods to include in the new methodology and which cities will be included in study. 2) Continuously Refine the Congestion Index to include multimodal operations or regional operational improvement programs (i.e., ITS service, incident detection and response, travel demand management, transportation systems management, and computerized signal control coordination. 3) maintain Existing Congestion Measures. 4) Add Additional Urban Areas 5) Respond to Requests for Mobility Data. Ongoing. States are still encouraged to participate.

Study Number: MPR-6(019)
Title: Tech Transfer
Lead Agency: Minnesota-Sgl. State project
Background: State would like to continue the development of outreach materials that market the products and services of the Research Services Section (RSS) and the Local Road Research Board (LRRB). These materials will be distributed to current and potential customers in order to communicate the findings of research results and convey the program and services that RSS provides to customers.

Contractor will work closely with State's RSS to develop and deliver Technical Summaries, Informational Sheets, Articles and Annual Reports during the next 14 months. Contractor will provide consulting, writing and editing services in a coordinated manner in close cooperation with State's Project Manager.

Study Number: MPR-6(032)
Title: Native Roadside Prairie/Grassland Seed Mix Model
Lead Agency: Minnesota-Sgl. State project
Background: The focus of this project will be to examine what is already known and apply it to roadside problem-solving for new projects and for rehabilitation. Through the collective efforts and experience of the University of Minnesota, Department of Natural Resources, Bureau of Water and Soil Resources(BWSR) and Mn/DOT, a model for

defining site specific seed mixes will be developed that can be used by Mn/DOT, other state departments of transportation and other road agencies throughout the United States. The final product will be a "how-to" manual based on the processes used to develop site specific Minnesota native grassland seed mixes.

Pressure to do more with less by maintenance departments has led to the acceptance of ecological principles developed by Bill Haywood, Black Hawk County, Iowa in the early 80's. His principles are 1) nature does not allow bare soils to exist, 2) bare soils are revegetated by successions of plant groups until a most-fit community of plants develops and 3) disturbance of the vegetative cover reverses the succession of revegetation back to the bare soil starting point, and therefore allows more invasions. Applying these principles to the roadside became known as Integrated Roadside Vegetation Management, and has led to individual states mapping vegetation, statewide planning and new maintenance/construction practices

Study Number: **MPR-6(035)**
Title: Certification Program for the Mn/DOT International Roughness Index Specification (IRI)
Lead Agency: Minnesota-Sgl. State project
Background: The pavement contractor charged with building a high-quality, high-performance, smooth road within the economic realities of the low-bid system is faced with competing objectives. The pavement must be smooth for the driving public, but also cost-effective, strong and must meet many other specifications required by the owner of the road, the state highway agency and ultimately the drivers who use the road. As an incentive to encourage contractors to optimize these competing objectives, state began offering bonuses to contractors who could resolve the technical problems associated with the task and still achieve a smooth surface on which to drive. As a necessary complement to the bonuses, states also instituted penalties for rough pavement. Most states, including Minnesota, have recognized the benefit of offering incentives for smoother pavements. Although it may be that unit process for pavements increase initially when such a specification is initiated, studies have shown that eventually the cost return to about the same level as before, but with an increase in quality (as contractors learn to produce better-quality pavement surfaces).

In 2005, Mn/DOT funded an implementation project o develop an incentive/disincentive smoothness specification for concrete pavement construction. A small program is available for Microsoft Excel worksheets to compute the bonus or penalty for each applicable tenth-mile section.

The Federal Highway Administration (FHWA) has developed a new software tool called Profile Viewer and Analyzer (ProVAL) with the intent that it will become new standard for pavement profile analysis. The software was used in the project for the analysis of profiles and in testing any recommended specifications.

Two key recommendations from the implementation project were to:

1. Implement a profile machine operator training and certification project, and
2. Require that the profile machine itself be adjusted and/or calibrated according to manufacturers' recommendations prior to each day's testing.

In 2006 all bituminous and several concrete paving projects used the new IRRI specification. Based on this experience, researchers have concluded that a combined specification could simplify procedures and still adequately meet standards. Currently, contractors are required to bring testing equipment to Mn/DOT prior to the construction season for verification. At times, the equipment manufacturer brings in testing equipment for verification, and Mn/DOT has no guarantee that the contractor's operators are properly trained in the use of the equipment, and especially its use with the ProVAL software. This implementation project will improve quality assurance and quality control on Mn/DOT construction projects.

Objective:

The first objective of this project is to combine the two specifications, as closely as possible, into one overall specification governing all pavements constructed by the state. The second objective is to develop a certification program for profile machine operators. This certification program will initially be classroom-based instruction with certification by examination. The final objective of this project is to develop the certification course for online usage, with the examination in person at locations to be determined by Mn/DOT.

Study Number: **MPR-8(001)**

Title: Implementation of Full Scale Whitetopping to Evaluate Constructability, Cost and Performance

Lead Agency: Minnesota-Sgl. State Project

Standard practice in Minnesota has limited the use of concrete pavements to reconstruction and relatively thick unbounded overlay projects. Numerous research scale projects using thin concrete pavements as a rehabilitation strategy have yielded positive performance results and generated information regard thin concrete pavement design. The limited size of the research test sections has not addressed concerns about design considerations, cost, production rates, and constructability.

Objectives: This project will provide for the construction of at least two full-scale thin concrete pavement projects. The objective is to determine the cost, constructability and performance of full scale thin concrete pavement projects in the Minnesota climate. This implementation will lead to better data to a wider selection of pavement rehabilitation strategies and real cost data for use in Life Cycle Cost Analysis.

Appendix C

Minnesota Pooled Fund Projects

With Balance but Not Contributed to in the 2007 Program

MN POOLED FUND AND SINGLE STATE PROJECTS WITH BALANCES BUT NOT CONTRIBUTED TO IN THE 2008 PROGRAM

STATE	PROJ. NO.	PROJECT NAME		PROG. CODE	UNDER AGREEMENT	EXPENDITURE	BALANCE*
MINN	0002001	Application of Global Positioning System for Planning	Active	0800	15,000.00	11,368.44	3,631.56
MINN	0002126	Integrated Drainage Design Computer System (later labeled HYDRAIN)	Active - Completion Date: March 2, 1994	800	38,000.00	37,260.03	739.97
MINN	0002136	FHWA Traffic Noise Model (FHWA TNM) Software, Validation, and Training	Active	0860	5,000.00	4,900.00	100.00
MINN	0002144	Testing of Large and Small Support Signs	Testing has concluded.	0800	10,000.00	9,900.00	100.00
MINN	0002146	Testing of Roadside Safety Systems	Active	0860	42,000.00	36,833.43	5,166.57
MINN	0002146	Testing of Roadside Safety Systems	Active	Q560	50,000.00	20,688.97	29,311.03
MINN	0002155	Durability of Geosynthetics for Highway Application	Three final reports on task areas have been published. A 4th final report on another task area is being processed.	0860	30,000.00	23,072.26	6,927.74
MINN	0002157	Detection Technology for IVHS	Project is complete - final report has been posted	0800	20,000.00	9,212.94	10,787.06
MINN	0002159	Interpretation of Road Roughness Profile Data	Cleared by FHWA but pending approval on 100% SPR	0860	30,000.00	23,428.25	6,571.75
MINN	0002163	Calcium Magnesium Acetate (CMA) at Lower Production Costs	Final report completed, project closed	0860	25,000.00	23,997.41	1,002.59
MINN	0002165	Horizontally Curved Steel Bridge Research Study	As of 6/22/01 the final rpts. are still in draft form	0860	15,000.00	12,702.31	2,297.69

STATE PLANNING RESEARCH PROGRAM

January 2008

STATE	PROJ. NO.	PROJECT NAME		PROG. CODE	UNDER AGREEMENT	EXPENDITURE	BALANCE*
MINN	0002167	Development of Anti-Icing Treatments	The final rpt has been completed, project closed out	0860	20,000.00	19,900.00	100.00
MINN	0002168	Management of the Discharge and Quality of Highway Runoff in Karst Areas to Control Impacts on Ground Water	The final report for this study has been received and is under review. Plans are being considered for public release of the report	0860	23,000.00	22,746.49	253.51
MINN	0002168	Management of the Discharge and Quality of Highway Runoff in Karst Areas to Control Impacts on Ground Water	The final report for this study has been received and is under review. Plans are being considered for public release of the report	Q560	5,000.00	639.50	4,360.50
MINN	0002171	Predicting HOV Facility Demand	Pending Approval	860	30,000.00	24,980.02	5,019.98
MINN	0002174	Accelerated Pavement Testing of Crumb Rubber Modified Asphalt Pavements	FHW would like funds for this program to be used for another project	860	87,000.00	86,900.00	100.00
MINN	0002176	Validation of SHRP Asphalt and Asphalt Mixture Specifications Using Accelerated Loading	Study is complete. Awaiting the final report	860	40,000.00	15,988.46	24,011.54
MINN	0002177	Fatigue Test of High Strength Prestressed Concrete Bridge Girders	MN was lead state on this-we show the project as closed	0860	60,000.00	54,300.43	5,699.57
MINN	0002180	Pavement Performance Model Development	As of 6/12/01 final report is available	0860	10,000.00	0.00	10,000.00
MINN	0002182	Development and Validation of Traffic Data Editing Procedures (TDEP)	As of 2/5/02 study was finishing up. Final was to be issued within 2 months	860	30,000.00	25,898.89	4,101.11
MINN	0002182	Development and Validation of Traffic Data Editing Procedures (TDEP)	As of 2/5/02 study was finishing up. Final was to be issued within 2 months	Q560	20,000.00	17,118.74	2,881.26

STATE PLANNING RESEARCH PROGRAM

January 2008

STATE	PROJ. NO.	PROJECT NAME		PROG. CODE	UNDER AGREEMENT	EXPENDITURE	BALANCE*
MINN	0002184	Long Term Monitoring of Mitigating Corrosion Measures	Active - Final report will be completed by 3/31/03.	0860	20,000.00	19,900.00	100.00
MINN	0002185	Development of Fiber-Optic Sensors to Monitor the Impact of Truck Weights on Pavements and Structures [Completion date September, 2002]	Final draft was in prep on 5/9/01	0860	5,000.00	2,701.43	2,298.57
MINN	0002186	Safety Evaluation of Intersection Design Improvements for Safety Management	The study has proven successful, and the draft final report is currently under review. (2/05/02)	860	75,000.00	63,455.48	11,544.52
MINN	0002187	Roadside Safety Hardware Crash Tested to NCHRP Report 350	Active	0860	50,000.00	20,109.65	29,890.35
MINN	0002188	Crash-Tested Safety Appurtenances for Work Zones	Active	0860	50,000.00	44,676.19	5,323.81
MINN	0002189	Support, Maintenance, and Refinement of the National Transportation Control/ITS Communications Protocol (NTCIP) [Completed]	Unknown	0860	5,000.00	0.00	5,000.00
MINN	0002191	Public Service Campaign - Work Zones	COMPLETED. A new campaign, entitled Get The Picture. Listen To The Signs was developed	0860	5,000.00	0.00	5,000.00
MINN	0002192	Durability of Geosynthetics - Phase II	Active - As of 2/2002, the final report is being written. All of the field and lab work have been completed.	0860	20,000.00	5,489.41	14,510.59
MINN	0002193	Accuracy of Traffic Load Monitoring and Projections Related to Traffic Data Collection Parameters	Active as of April of 2000-several deliverables are available on the web	0860	15,000.00	11,588.24	3,411.76
MINN	0002194	Collection of Data to Relate Vehicle Operating Weights to Registered Weights for Highway Cost Allocation and User-Fee Analysis [Completion date 3/31/02]	Active	0860	10,000.00	66.79	9,933.21
MINN	0002195	Resistance Factors for Drilled Shafts with Minor Defects	Complete - Final report disseminated to participating states. Study went as planned and met objectives of FHWA. (2/4/02)	0860	15,000.00	12,667.82	2,332.18

STATE PLANNING RESEARCH PROGRAM

January 2008

STATE	PROJ. NO.	PROJECT NAME		PROG. CODE	UNDER AGREEMENT	EXPENDITURE	BALANCE*
MINN	0002196	Electrochemical Properties and Reactions at the Surfaces and Interfaces of Concrete Aggregates, Cement and Mineral Admixtures	Active -MN not listed as a participant on web - Fed - Aid form dated 2/11/99 to de-obligate in file. File notes indicate continued interest.	Q560	15,000.00	9,149.60	5,850.40
MINN	0002197	Bridge Fatigue Screening, Monitoring and Retrofitting Manual	Active	Q560	40,000.00	0.00	40,000.00
MINN	0002199	Optimal Acceptance Procedures for Statistical Construction Specifications	Active -Currently reviewing the draft manual submitted by the contractor. Therefore, completion date of the study has been	Q560	25,263.00	9,598.58	15,664.42
MINN	0002200	Compilation and Evaluation of Results from High-Performance Concrete Bridge Projects	Active	Q560	4,000.00	14.67	3,985.33
MINN	0002202	HPMS Computer Based Training	The final product has been delivered by the contractor and the software is being disseminated to all of the state DOTs. (2/5/02)	Q560	20,000.00	19,293.26	706.74
MINN	0002207	Traffic Management Center (TMC) Study	Active	0860	200,000.00	62,093.69	137,906.31
MINN	0002207	Traffic Management Center (TMC) Study	Active	Q560	150,000.00	61,345.87	88,654.13
MINN	0002208	Pavement Subgrade Performance Study	Active	0860	60,000.00	31,077.65	28,922.35
MINN	0002208	Pavement Subgrade Performance Study	Active	Q560	60,000.00	43,664.39	16,335.61
MINN	0002209	Enhanced Guidance for Implementation of Safety Strategies	Active	Q560	150,000.00	29,643.00	120,357.00

STATE PLANNING RESEARCH PROGRAM

January 2008

STATE	PROJ. NO.	PROJECT NAME		PROG. CODE	UNDER AGREEMENT	EXPENDITURE	BALANCE*
MINN	0002210	Comprehensive Highway Safety Improvement Model	Active	Q560	50,000.00	25,310.76	24,689.24
MINN	0002211	Bulk Specific Gravity Round Robin Using the Corelok Vacuum Sealing Device	Active - final report being readied	Q560	10,000.00	5,076.56	4,923.44
MINN	0002212	Non-nuclear Testing of Soils and Granular Bases Using the GeoGauge	Active	0860	12,000.00	0.00	12,000.00
MINN	0002212	Non-nuclear Testing of Soils and Granular Bases Using the GeoGauge	Active	Q560	24,000.00	13,501.17	10,498.83
MINN	0002212	Non-nuclear Testing of Soils and Granular Bases Using the GeoGauge	Active	0860	12,000.00	0.00	12,000.00
MINN	0002212	Non-nuclear Testing of Soils and Granular Bases Using the GeoGauge	Active	Q560	24,000.00	13,501.17	10,498.83
MINN	0002800	SHRP Implementation Asphalt Test Equipment	Active	0860	335,000.00	266,578.62	68,421.38
MINN	0003020	IVHS Study (ENTERPRISE)	Active	0800	25,000.00		25,000.00
MINN	0003020	IVHS Study (ENTERPRISE)	Active	0860	228,500.00		228,500.00
MINN	0003020	IVHS Study (ENTERPRISE)	Active	Q560	175,000.00		175,000.00
MINN	0003024	HELP, Inc	Unknown	0860	40,000.00	30,000.00	10,000.00

STATE	PROJ. NO.	PROJECT NAME		PROG. CODE	UNDER AGREEMENT	EXPENDITURE	BALANCE*
MINN	0003027	Ohio SHRP Test Road-Instrumentation	COMPLETED IN 1998.	0860	4,400.00	0.00	4,400.00
MINN	0003037	Public Perceptions of the Midwest's Highway Pavements	As of 7/7/01 the final reports have been completed. Our files do not indicate receipt.	Q560	146,405.00	135,707.34	10,697.66
MINN	0003042	Aurora	Active	0860	100,000.00	66,276.85	33,723.15
MINN	0003042	Aurora	Active	Q560	175,000.00	125,000.00	50,000.00
MINN	0003042	Aurora	Active	QT20	2,500.00	0.00	2,500.00
MINN	0003044	Base Funding for Northcentral Superpave Center	See TPF-5(021)	0860	20,000.00	18,902.41	1,097.59
MINN	0003044	Base Funding for Northcentral Superpave Center	See TPF-5(021)	Q560	85,000.00	74,468.06	10,531.94
MINN	0003046	Fillet Welding Procedure Qualification Research	Unknown	Q560	20,000.00	13,020.63	6,979.37
MINN	0003049	Urban Mobility Study	Active	0860	90,000.00	71,322.00	18,678.00
MINN	0003049	Urban Mobility Study	Active	H560	17,288.00	17,288.00	0.00
MINN	0003049	Urban Mobility Study	Active	Q560	207,712.00	207,712.00	0.00

STATE PLANNING RESEARCH PROGRAM

January 2008

STATE	PROJ. NO.	PROJECT NAME		PROG. CODE	UNDER AGREEMENT	EXPENDITURE	BALANCE*
MINN	0003055	R&D of the 3rd Phase of an Autonomous Shadow Vehicle Prototype	As of 2/5/02 final rpt is under veview	Q560	50,000.00	48,318.51	1,681.49
MINN	0003062	ITS Deployment Research and Professional Capacity Building	File notes state project is cancelled	Q560	50,000.00	17,271.16	32,728.84
MINN	0003063	IVI Specialty Vehicles Program	Active - draft final in review process	Q560	400,000.00	363,512.63	36,487.37
MINN	0003064	Developing a National Strategic Plan for Advanced Construction and Maintenance Systems	Complete per note from Tom West in CA	Q560	60,000.00	45,988.02	14,011.98
MINN	0003065	Geosynthetic Reinforcement of Base Course Layer of Flexible Pavements	Complete - as of 11/15/01	Q560	20,000.00	19,529.80	470.20
MINN	0003068	Field Evaluation of the CTCLS Traffic Signal Load Switches	Unknown -	Q560	135,497.00	23,415.66	112,081.34
MINN	0003069	Eastern State Transportation Coalition Train Study	Unknown	Q560	35,000.00	22,445.00	12,555.00
MINN	0003072	Strength and Deformation Analysis of MSE Walls at Working Loads	Active	Q560	20,000.00	15,581.79	4,418.21
MINN	0003073	Micro-Surface Mix Design Procedure	Active	860	25,000.00	4,774.30	20,225.70
MINN	0003073	Micro-Surface Mix Design Procedure	Active	Q560	50,000.00	9,538.68	40,461.32
MINN	0003079	REPORT	Active	Q560	232,500.00	220,477.98	12,022.02

STATE PLANNING RESEARCH PROGRAM

January 2008

STATE	PROJ. NO.	PROJECT NAME		PROG. CODE	UNDER AGREEMENT	EXPENDITURE	BALANCE*
MINN	0003081	HERMES II	Active?	Q560	125,000.00	115,575.03	9,424.97
MINN	0003082	Evaluation of PQI	Active	Q560	9,000.00	9,000.00	0.00
MINN	0003083	FIXS-Fabrication error Indexed examples and Solutions	Active	Q560	17,500.00	16,674.92	825.08
MINN	0003092	Fiber Reinforced Polymer Composite Prestressing Strands	Active - Study has been established and will be initiated when adequate funding commitments have been received.	Q560	25,000.00	24,995.00	5.00
MINN	0003093	Environmental/Durability Evaluation of Externally Bonded Composites for Concrete Strengthening	Active - Study has been established and will be initiated when adequate funding commitments have been received.	Q560	25,000.00	19,544.35	5,455.65
MINN	0003094	Pavement Marking Life Cycle	Active - Study has been established and will be initiated when adequate funding commitments have been received.	Q560	40,000.00	40,000.00	0.00
MINN	0003097	Machinability of High-Performance Steel	Active	Q560	10,000.00	3,217.65	6,782.35
MINN	0003098	Pavement Reconstruction Scheduling Software	Active	H560	20,761.85	5,064.21	15,697.64
MINN	0003098	Pavement Reconstruction Scheduling Software	Active	Q560	80,938.15	54,778.73	26,159.42
MINN	0003100	The Impact of the ISO 9000 Quality Assurance Standard on Safety Performance in the Trucking Industry	Active	Q560	20,000.00	12,099.00	7,901.00
MINN	0003100	The Impact of the ISO 9000 Quality Assurance Standard on Safety Performance in the Trucking Industry	Final report approved and published - will be on the web site shortly	Q560	20,000.00	12,099.00	7,901.00

STATE PLANNING RESEARCH PROGRAM

January 2008

STATE	PROJ. NO.	PROJECT NAME		PROG. CODE	UNDER AGREEMENT	EXPENDITURE	BALANCE*
MINN	SPR3095	Establishment of a Program to Support the Research, Development, and Deployment of Cooperative Vehicle-Highway Automation Systems (The Phoenix Project)	Active	Q560	100,000.00	0.00	100,000.00
MINN	TPF5001	Soil Mix Methods for Highway Application	Active	0860	20,000.00	3,929.08	16,070.92
MINN	TPF5001	Soil Mix Methods for Highway Application	Active	Q560	40,000.00	11,416.54	28,583.46
MINN	TPF5004	Long Term Pavement Performance (LTPP) Specific Pavements Study (SPS) Traffic Data Collection	Active				
MINN	TPF5005	Study of Erection Issues and Composite System Behavior of the Full-Scale Curved Girder Bridge Currently under Test at the Turner-Fairbank Highway Research Center	Active	Q560	60,000.00	54,413.12	5,586.88
MINN	TPF5021	North Central Super Pave	Active	0860	45,000.00	20,962.50	24,037.50
MINN	TPF5021	North Central Super Pave	Active	Q560	70,000.00	59,125.00	10,875.00
MINN	TPF5029	High Occupancy Vehicle	Active				
MINN	TPF5036	Transportation Asset Management Research Program	Active	H560	5,000.00	2,680.27	2,319.73
MINN	TPF5039	Falling Weight Deflectometer (FWD) Calibration Center and Operational Improvements	Active	Q560	55,000.00	14,419.11	40,580.89
MINN	TPF5042	Investigation of the Long-Term Effects of Magnesium Chloride	Active - Quarterly Progress Report (April 15 - July 15, 2004)	0860	20,000.00	18,442.14	1,557.86

STATE PLANNING RESEARCH PROGRAM

January 2008

STATE	PROJ. NO.	PROJECT NAME		PROG. CODE	UNDER AGREEMENT	EXPENDITURE	BALANCE*
MINN	TPF5042	Investigation of the Long-Term Effects of Magnesium Chloride	Active - Quarterly Progress Report (April 15 - July 15, 2004)	Q560	20,000.00	18,441.96	1,558.04
MINN	TPF5046	Transportation Curriculum Coordination Council (TCCC)	Active	0860	30,000.00	3,913.12	26,086.88
MINN	TPF5046	Transportation Curriculum Coordination Council (TCCC)	Active	Q560	45,000.00	11,739.36	33,260.64
MINN	TPF5051	Construction of Crack-Free Concrete Bridge Decks	Active	0860	15,000.00	7,411.21	7,588.79
MINN	TPF5051	Construction of Crack-Free Concrete Bridge Decks	Active	Q560	45,000.00	22,233.62	22,766.38
MINN	TPF5055	Rapid Bridge Replacement Techniques	Active	Q560	10,000.00	5,777.26	4,222.74
MINN	TPF5066	Material and Construction Optimization for Prevention of Premature Pavement Distress in PCC Pavements	Active	0860	30,000.00	30,000.00	0.00
MINN	TPF5066	Material and Construction Optimization for Prevention of Premature Pavement Distress in PCC Pavements	Active	Q560	45,000.00	43,357.06	1,642.94
MINN	TPF5069	Core Program Services	Active	0860	104,315.00	67,617.26	36,697.74
MINN	TPF5069	Core Program Services	Active	Q560	208,630.00	208,630.00	0.00
MINN	TPF5070	International Conference on Accelerated Pavement Testing	Active	Q560	15,000.00	8,835.58	6,164.42

STATE PLANNING RESEARCH PROGRAM

January 2008

STATE	PROJ. NO.	PROJECT NAME		PROG. CODE	UNDER AGREEMENT	EXPENDITURE	BALANCE*
MINN	TPF5070	International Conference on Accelerated Pavement Testing	Active	HR50	25,000.00	0.00	25,000.00
MINN	TPF5073	Portable Non-Intrusive Technologies	Active	Q560	15,000.00	15,000.00	0.00
MINN	TPF5073	Portable Non-Intrusive Technologies	Active	H560	10,430.00	10,429.72	0.28
MINN	TPF5078	Upper Midwest Freight Corridor Study	Active	Q560	60,000.00	60,000.00	0.00
MINN	TPF5080	Investigation of Low Temperature Cracking in Asphalt Pavements	Active	0860	100,000.00	29,099.66	70,900.34
MINN	TPF5080	Investigation of Low Temperature Cracking in Asphalt Pavements	Active	Q560	197,713.00	28,820.38	168,892.62
MINN	TPF5086	Reducing Crashes at Rural Intersections (IDS)	Active	0860	44,000.00	24,396.34	19,603.66
MINN	TPF5086	Reducing Crashes at Rural Intersections (IDS)	Active	Q560	22,000.00	13,887.38	8,112.62
MINN	TPF5090	Pavement Tools Consortium	Active – Quarterly Progress Report January 1, 2004 - June 30, 2004	860	17,481.97	17,481.97	0.00
MINN	TPF5090	Pavement Tools Consortium	Active – Quarterly Progress Report January 1, 2004 - June 30, 2004	Q560	42,518.03	14,457.72	28,060.31
MINN	TPF5092	Clear Roads (Test & Evaluation of Materials, Equipment & Methods for Winter Maintenance)	Active	Q560	100,000.00	12,839.56	87,160.44

STATE PLANNING RESEARCH PROGRAM

January 2008

STATE	PROJ. NO.	PROJECT NAME		PROG. CODE	UNDER AGREEMENT	EXPENDITURE	BALANCE*
MINN	TPF5093	North/West Passage Transportation Pooled Fund Program, Phase 1	Active	Q560	200,000.00	64,743.62	135,256.38
MINN	TPF5099	Evaluation of Low Cost Safety Improvements	Active	Q560	195,000.00	27,816.31	167,183.69
MINN	TPF5105	Library Connectivity	Active	H560	60,000.00	3,637.18	56,362.82
MINN	TPF5105	Library Connectivity	Active	Q560	20,000.00	0.00	20,000.00
MINN	TPF5107	Refinement & Field Validation	Active	Q560	30,000.00	0.00	30,000.00
MINN	TPF5109	TRB Core Program Services - '07	Active	Q560	255,410.00	98,696.00	156,714.00
MINN	TPF5111	Development of Standards for Geotechnical Management Systems	Active	H560	25,000.00	10,775.00	14,225.00
MINN	TPF5112	Midwest States Pooled Fund Pavement Preservation Partnership	Active	H560	10,000.00	3,068.22	6,931.78
MINN	TPF5112	Midwest States Pooled Fund Pavement Preservation Partnership	Active	Q560	5,000.00	2,767.76	2,232.24
MINN	TPF5114	Roadside Safety Research Program	Active	H560	50,000.00	8,884.08	41,115.92
MINN	TPF5114	Roadside Safety Research Program	Active	Q560	100,000.00	6,554.00	93,446.00

STATE PLANNING RESEARCH PROGRAM

January 2008

STATE	PROJ. NO.	PROJECT NAME		PROG. CODE	UNDER AGREEMENT	EXPENDITURE	BALANCE*
MINN	TPF5119	North Central Pavement Research Partnership (Frozen Four)	Active	H560	5,000.00	0.00	5,000.00
MINN	TPF5119	North Central Pavement Research Partnership (Frozen Four)	Active	Q560	5,000.00	0.00	5,000.00
MINN	TPF5120	Deer Vehicle Crash Information and Research Center	Active	H560	25,000.00	2,708.00	22,292.00
MINN	TPF5120	Deer Vehicle Crash Information and Research Center	Active	G560	25,000.00	2,708.00	22,292.00
MINN	TPF5126	Geocomposite Capillary Barrier Drain for Limiting Moisture Changes	Active	H560	35,000.00	23,150.91	11,849.09
MINN	TPF5126	Geocomposite Capillary Barrier Drain for Limiting Moisture Changes	Active	Q560	70,000.00	21,657.00	48,343.00
MINN	TPF5127	Consortium of Accelerated Pavement Testing (CAPT) AND Technical Exchange Partnership	Active	H560	25,000.00	0.00	25,000.00
MINN	TPF5128	Accelerated Implementation of Intelligent Compacation Technology for Embackment Subgrade Soils, Aggregate Base and Asphalt Pavement Material	Active	H560	25,000.00	0.00	25,000.00
MINN	TPF5129	Recycled Unbound Pavement Materials	Active				
MINN	TPF5132	Investigation of Low Temperature Cracking in Asphalt Pavements-Phase II (Mn/ROAD Study)					
MINN	TPF5134	PCC Surface Characteristics-Rehabilitation (Mn/ROAD Study)					
MINN	TPD5148	Effects of Implements of Husbandry "Farm Equipment" (Mn/ROAD Study)					
MINN	TPDF5149	Design and Construction Guidelines for Thermally Insulated Concrete Pavements (Mn/ROAD Study)					

STATE	PROJ. NO.	PROJECT NAME		PROG. CODE	UNDER AGREEMENT	EXPENDITURE	BALANCE*
MINN	TPF5135	Tire Pavement Noise Research Consortium	Active	H560	10,000.00	0.00	10,000.00
MINN	TPF5153	Optimal Timing of Preventative Maintenance for Addressing Environmental Aging in HMA Pavements (Mn/ROAD Study)					
MINN	TPF5165	Development of Desing Guide for Thin and Ultrathin Concrete Overlays of Existing Asphalt Pavements (Mn/ROAD Study)					
MINN	TPF5407	National Cooperative Research Program (NCHRP) FY 2006	Active	L560	581,666.00	0.00	581,666.00
MINN	MPR6002	Research Peer Exchange	Active	Q560	50,000.00	34,560.41	15,439.59
MINN	MPR6003	Strategic Program Development	Active	Q560	160,000.00	3,540.47	156,459.53
MINN	MPR6004	Implementation and Closeout of Completed Research Projects	Active	Q560	160,000.00	0.00	160,000.00
MINN	MPR6005	Research Management System-Phase I (Development of Conceptual Design)	Active	Q560	160,000.00	0.00	160,000.00
MINN	MPR6007	Hear Every Voice (HEV)	Active	H560	35,922.18	0.00	35,922.18
MINN	MPR6007	Hear Every Voice (HEV)	Active	Q560	75,997.82	0.00	75,997.82
MINN	MPR6008	Maintenance Decision Support System at Mn/DOT	Active	H560	500,960.00	15,025.92	485,934.08

STATE PLANNING RESEARCH PROGRAM

January 2008

STATE	PROJ. NO.	PROJECT NAME		PROG. CODE	UNDER AGREEMENT	EXPENDITURE	BALANCE*
MINN	MPR6009	TH36 - Full Closure Construction: Evaluation of Traffic Alternatives and Lessons Learned	Active	H560	120,000.00	0.00	120,000.00
MINN	MPR6011	Intelligent Compaction	Active	H560	795,040.00	191,312.21	603,727.79
MINN	MPR6012	Development of a New Test Roller for Subgrade Compaction	Active	H560	240,000.00	0.00	240,000.00
MINN	MPR6013	Cadastral and Right of Way Data Exchange Pilot Project	Active	H560	120,000.00	0.00	120,000.00
MINN	MPR6014	Cargill Safelane	Active	H560	16,000.00	0.00	16,000.00
MINN	MPR6015	Pervious Concrete Mix Design For Wearing Course Applications	Active	H560	60,936.00	0.00	60,936.00
MINN	MPR6016	Unbonded Concrete Overlay	Active	H560	112,816.00	1,824.28	110,991.72
MINN	MPR6017	Investigation of High Performance (60 Year Design) Concrete Pavement	Active	H560	106,272.00	395.56	105,876.44
MINN	MPR6019	Technology Transfer Material Development	Active	H560	155,124.00	0.00	155,124.00
MINN	MPR6020	Crash Data Access Tool for County and City Engineers III	Active	H560	186,880.00	0.00	186,880.00
MINN	MPR6020	Crash Data Access Tool for County and City Engineers III	Active	L560	20,000.00	0.00	20,000.00

STATE PLANNING RESEARCH PROGRAM

January 2008

STATE	PROJ. NO.	PROJECT NAME		PROG. CODE	UNDER AGREEMENT	EXPENDITURE	BALANCE*
MINN	MPR6021	PCC Surface Characteristics - Construction	Active	H560	120,000.00	200.46	119,799.54
MINN	MPR6022	Recycled Asphalt Pavements	Active	H560	92,838.97	0.00	92,838.97
MINN	MPR6022	Recycled Asphalt Pavements	Active	L560	185,761.03	1,114.43	184,646.60
MINN	MPR6023	Use of Taconoite Aggregates in Pavement Applications	Active	L560	155,121.00	671.09	154,449.91
MINN	MPR6024	Permeable Pavement Performance in Cold Regions	Active	L560	117,120.00	275.04	116,844.96
MINN	MPR6025	Trapezoidal Concrete Pavements	Active	L560	115,861.00	1,358.22	114,502.78
MINN	MPR6027	Pervious Concrete Pavement Study	Active	L560	93,930.00	1,394.44	92,535.56
MINN	MPR6029	HMA Surface, Characteristics Related to Ride, Texture, Friction, Noise, Durability (originally on TPF website as TPF-5(163))	Active	37P0	55,411.95	0.00	55,411.95
MINN	MPR6029	HMA Surface, Characteristics Related to Ride, Texture, Friction, Noise, Durability (originally on TPF website as TPF-5(163))	Active	L560	75,000.00	565.68	74,434.32
MINN	MPR6029	HMA Surface, Characteristics Related to Ride, Texture, Friction, Noise, Durability (originally on TPF website as TPF-5(163))	Active	QD40	34,220.00	0.00	34,220.00
MINN	MPR6029	HMA Surface, Characteristics Related to Ride, Texture, Friction, Noise, Durability (originally on TPF website as TPF-5(163))	Active	QR50	87,000.00	0.00	87,000.00

STATE PLANNING RESEARCH PROGRAM

January 2008

STATE	PROJ. NO.	PROJECT NAME		PROG. CODE	UNDER AGREEMENT	EXPENDITURE	BALANCE*
MINN	MPR6031	Concrete Pavement Optimization-Determining the Lower Threshold of Slab Thickness for High Volume Roadways	Active	L560	117,178.00	0.00	117,178.00
MINN	MPR6033	Implementation Plan for a Field Evaluation of Transportation Automated Control System (TRACS)	Active	L560	362,560.00	0.00	362,560.00
MINN	MPR6035	Certification Program for IRI (International Roughness Index) Specification	Active	L560	15,000.00	0.00	15,000.00
MINN	MPR6036	Steel Bridge Maintenance Planning	Active	L560	29,056.00	0.00	29,056.00

*Balances are good as of 12/27/07 FMIS Project

TOTAL BALANCE **8,495,334.46**