



# State Planning and Research

**2005  
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 2005

### STATE OF MINNESOTA

### DEPARTMENT OF TRANSPORTATION

**In cooperation with**

### US DEPARTMENT OF TRANSPORTATION

### FEDERAL HIGHWAY ADMINISTRATION

#### **PART I: PLANNING**

#### **PART II: RESEARCH, DEVELOPMENT & TECHNOLOGY TRANSFER**

#### **PART III: FINANCIAL SUMMARY**

This program is prepared and submitted according to provision of Section 307 of Title 23, United States Code as amended. The new Federal transportation bill has not been passed by Congress, therefore, funding levels for the last year of TEA-21 of \$6.06 million for Statewide planning, \$3.07 million for Metropolitan Planning Organization planning and \$2.02 million for research activities have been assumed.

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 of this program is a summary of the Statewide and MPO Planning program. Part II is a summary of the Cooperative Research program. Part III is the financial summary of the total estimated participation costs of the program. Appendix A details the task objectives, methodologies and products by office in the Minnesota Department of Transportation. Appendix B provides the description of research studies. Appendix C summarizes pooled fund projects with balances but not contributed to in the 2005 SP&R program.

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

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**PART I: PLANNING: STATEWIDE****STATEWIDE****CALENDAR YEAR 2005****FUNDING SUMMARY: STATEWIDE PLANNING PORTION OF PART I**

|  |                    |
|--|--------------------|
| <b>Office of Investment Management</b>                       | <b>\$2,063,794</b> |
| <b>Office of Transportation Data Analysis</b>                | <b>\$2,743,881</b> |
| <b>Office of Transit</b>                                     | <b>\$794,738</b>   |
| <b>Office of Finance</b>                                     | <b>\$28,000</b>    |
| <b>Office of Traffic, Security and Operations</b>            | <b>\$157,334</b>   |
| <b>Office of State Aid</b>                                   | <b>633,222</b>     |
| <b>Office of Technical Support</b>                           | <b>\$1,249,663</b> |
| <b>Office of Freight &amp; Commercial Vehicle Operations</b> | <b>\$326,186</b>   |
| <b>Total Needs</b>   | <b>\$7,996,818</b> |
| <b>Total Federal Statewide Planning funds available</b>      | <b>\$6,061,804</b> |
| <b>State funded difference</b>                               | <b>\$1,935,014</b> |

**OFFICE OF INVESTMENT MANAGEMENT**

|  |                    |
|--|--------------------|
| State Transportation Improvement Program.....                  | \$189,698          |
| Salaries...../12 Person Months                                 |                    |
| State Transportation Plan and Statewide Planning Services..... | \$451,814          |
| Salaries...../43 Person Months                                 |                    |
| Federal & State Transportation Programs.....                   | \$466,219          |
| Salaries...../50 Person Months                                 |                    |
| Transportation & Economic Analysis.....                        | \$613,207          |
| Salaries...../24 Person Months                                 |                    |
| Land Use Access Management.....                                | \$342,856          |
| Salaries...../48 Person Months                                 |                    |
| <br>   |                    |
| <b>TOTAL ESTIMATED COST.....</b>                               | <b>\$2,063,794</b> |



## OFFICE OF TRANSPORTATION DATA &amp; ANALYSIS

|   |                     |
|---|---------------------|
| Transportation Information System (TIS) & GIS BaseMap Data Maintenance.....       | \$578,043           |
| Salaries .....  | /101 Person Months  |
| Travel .....  | \$500               |
| Vehicle Classification and Truck Weight Studies .....                             | \$368,488           |
| Salaries .....  | /64.4 Person Months |
| Travel .....  | \$3,000             |
| Overtime.....   | \$500               |
| Traffic Counting.....   | \$451,122           |
| Salaries .....  | /83.9 Person Months |
| Travel .....  | \$2,000             |
| Overtime.....   | \$500               |
| Traffic Forecasting for Highway Design.....                                       | \$207,514           |
| Salaries .....  | /30 Person Months   |
| Travel .....  | \$500               |
| Transportation Information System (TIS) Management, Development & Operations..... | \$507,259           |
| Salaries .....  | /90 Person Month    |
| Municipal Maps.....   | \$220,665           |
| Salaries .....  | /39 Person Months   |
| Travel .....  | 300                 |
| St. Paul – Minneapolis Area Maps.....   | \$99,425            |
| Salaries .....  | /14 Person Months   |
| Travel .....  | \$100               |
| County Maps.....  | \$89,982            |
| Salaries .....  | /13 Person Months   |
| Travel .....  | \$300               |
| State Maps.....   | \$23,215            |
| Salaries .....  | /3 Person Months    |

|                                    |                    |
|------------------------------------|--------------------|
| Travel .....                       | \$200              |
| Roadway History & Project Log..... | \$198,168          |
| Salaries .....                     | /36 Person Months  |
| <b>TOTAL ESTIMATED COST.....</b>   | <b>\$2,743,881</b> |

**OFFICE OF TRANSIT**

|  |                  |
|--|------------------|
| Transit Program Planning.....              | \$250,860        |
| Salaries...../35 Person Months             |                  |
| Travel.....                                | 5,000            |
| Newsletter.....                            | 3,000            |
| Misc.....                                  | 5,960            |
| Transit Research & Program Evaluation..... | \$147,140        |
| Salaries...../23 Person Months             |                  |
| Travel.....                                | 4,000            |
| Misc.....                                  | 2,930            |
| Bikeway Planning.....                      | \$396,738        |
| Salaries...../60 Person Months             |                  |
| Travel.....                                | 4,050            |
| Professional/Technical.....                | 48,827           |
| (SBAC) State Bicycle Adv. Comm. .          | 8,000            |
| Misc.....                                  | 9,925            |
| <b>TOTAL ESTIMATED COST .....</b>          | <b>\$794,738</b> |

**OFFICE OF FINANCE**

Highway Statistics .....\$28,000

Salaries.....4.7 Person Months

**TOTAL ESTIMATED COST.....\$28,000**

**OFFICE OF TRAFFIC, SECURITY AND OPERATIONS**

Speed Data Summaries .....\$21,626

Salaries...../3 Person Months

Accident Surveillance .....\$135,708

Salaries...../23 Person Months

**TOTAL ESTIMATED COST.....\$157,334**

**OFFICE OF STATE AID**

|   |                   |
|---|-------------------|
| County State Aid Highway .....          | \$317,139         |
| Salaries.....                           | 48 Person Months  |
| Travel.....                             | 4,600             |
| Supplies.....                           | 2,800             |
| Municipal State Highway Need Study..... | \$316,083         |
| Salaries.....                           | /46 Person Months |
| Supplies.....                           | 2,300             |
| Travel.....                             | 2,000             |
| <b>TOTAL ESTIMATED COST.....</b>        | <b>\$633,222</b>  |

**OFFICE OF TECHNICAL SUPPORT**

Trunk Highway Cultural Resource Investigation

Contracts .....\$1,175,000

Minnesota Historical Society and Cultural Resource Firms

County/Municipal Cultural Resource Investigation

Contracts .....\$74,663

Minnesota Historical Society and Cultural Firms

**TOTAL ESTIMATED COST.....\$1,249,663**

**OFFICE OF FREIGHT AND COMMERCIAL VEHICLE OPERATIONS**

Freight Planning, Studies and Data Management.....\$326,186

Salaries..... 48 Person Months

**TOTAL ESTIMATED COST.....\$326,186**



**PART I: PLANNING:**  
**METROPOLITAN PLANNING ORGANIZATION (MPO)**  
**FUNDING DISTRIBUTION**  
**CALENDAR YEAR 2005**

| <b>MPO</b>                               | <b>FHWA<br/>(PL)</b> | <b>FTA<br/>(Sec. 5303)</b> | <b>TOTAL<br/>(Planning funds avail.)</b> |
|--|----------------------|----------------------------|--|
| <b>Twin Cities Metropolitan Council</b>  | \$2,051,600          | \$575,220                  | \$2,626,820                              |
| <b>Duluth-Superior MIC</b>               | 292,408              | 109,380                    | 401,788                                  |
| <b>St. Cloud APO</b>                     | 291,692              | 81,005                     | 372,697                                  |
| <b>Rochester – Olmsted COG</b>           | 291,608              | 67,562                     | 359,170                                  |
| <b>Fargo – Moorhead COG</b>              | 104,766              | 21,319                     | 126,085                                  |
| <b>Grand Forks/E. Grand Forks MPO</b>    | 26,932               | 5,396                      | 32,328                                   |
| <b>La Crosse Area Planning Committee</b> | 18,394               | 2,948                      | 21,342                                   |
| <b>TOTAL</b>                             | <b>\$3,077,400</b>   | <b>\$862,830</b>           | <b>\$3,940,230</b>                       |

**Notes**

The MPOs and Mn/DOT developed a formula for the distribution of the Consolidated Planning Grant (CPG) funds, which was approved by both FHWA and FTA.

The total PL figure is the final FFY 2004 apportionment. This is being used because the reauthorization bill has not been passed.

## PART II: RESEARCH AND DEVELOPMENT

## ITEMIZED COST ESTIMATED

CALENDAR YEAR 2005

## COOPERATIVE RESEARCH

| State Study No.<br>*(Asterisk denotes lead state project) | Study Title  | Commitment in Dollars (\$) | New (N), Modification (M) or Ongoing Projects (O) | MnDOT Contact |
|---|--|----------------------------|---|---------------|
| SPR-TPF-5(045)  | National Cooperative Highway Research Program (NCHRP)                                  | \$499,293                  | N   | Billiar       |
| *SPR004(300)  | Investigation of Deterioration of Stainless Steel Dowel Tubes Under Repeated Loading   |                            | O   | Embacher      |
| 0002(207)   | Traffic Management Center (TMC) Study  | \$50,000                   | M   | Thompson      |
| 0003(017)   | Midwest State Crash Testing Timber Rub Rail project (additional project added for '03) | \$55,000                   | M   | Dehdashti     |
| 0003(020)   | Enterprise   | \$25,000                   | M   | Nookala       |
| 0003(042)   | Aurora   | \$25,000                   | M   | Curt Pape     |
| 0003(049)   | Urban Mobility Study   | \$25,000                   | M   | Henkel        |
| 0003(074)   | State Consortium for Pavement Technology (Pavement Research and Technology)            | \$15,000                   | M   | Keranen       |
| 0003(098)<br>(Solicitation#900)                           | Pavement Reconstruction Scheduling Software  | \$26,250                   | M   | Johnson       |
| TPF5(021)   | North Central Superpave Center (NCSC)  | \$20,000                   | M   | Olson         |
| TPF-5(037)  | Southeast Superpave Center (NCAT Tire/Pavement Noise Study)                            | \$21,500                   | N   | Oman          |
| TPF-5(045)  | Performance Guidelines for the selection of Hot-Pour Crack Sealants.                   | \$20,000                   | M   | Olson         |
| TPF-5(046)  | Transportation Curriculum Coordination Council (TCCC)                                  | \$15,000                   | M   | Betts         |
| TPF-5(051)  | Construction of Crack-Free Concrete Bridge Decks                                       | \$15,000                   | M   | Wolhowe       |
| TPF-5(054)  | Development of Maintenance Support System  | \$50,000                   | M   | Pape          |
| TPF-5(066)  | Material & Construction Optimization   | \$15,000                   | M   | Schwartz      |
| TPF-5(069)  | TRB Core Program Services for FY'05  |                            | O   | Billiar       |

| State Study No.<br>*(Asterisk denotes lead state project) | Study Title  | Commitment in Dollars (\$) | New (N), Modification (M) or Ongoing Projects (O) | MnDOT Contact |
|---|--|----------------------------|---|---------------|
| *TPF-5(080)   | Investigation of Low Temperature Cracking in Asphalt Pavements             | \$50,000                   | M   | Worel         |
| *TPF-5(086)   | Reducing Crashes at Rural Intersections (IDS)                              | \$22,000                   | M   | Taavola       |
| TPF-5(090)  | Pavement Tools Consortium  |                            | O   | Olson         |
| TPF-5(092)  | Test & Evaluation of Materials, Equipment & Methods for Winter Maintenance | \$25,000                   | M   | Lodahl        |
| *TPF-5(093)   | North/West Passage (phase I)   |                            | O   | Nelson        |
| TPF-5(099)  | Evaluation Of Low Cost Safety Improvements                                 | \$65,000                   | N   | Hill          |
| <b>COOPERATIVE RESEARCH - TOTAL</b>                       |  | <b>\$1,039,043</b>         |   |               |

**ITEMIZED COSTS NOT COMMITTED TO COOPERATIVE RESEARCH**

|  | AMOUNT                | TOTALS                 |
|--|-----------------------|------------------------|
| <b>SPR-0001(045) Research Projects, Technology Transfer, Implementation, Special Projects &amp; Administration (FFY 2005 anticipated allocation)</b> | <b>\$2,020,601.00</b> | <b>\$2,020,601.00</b>  |
| <b>Previous Years – (FFY 2004) - 0001(044) (available, but not obligated)</b>  | <b>\$2,020,601.00</b> | <b>\$4,041,202.00</b>  |
| <b>Previous Years – (FFY 2003) - 0001(043) unexpended</b>  | <b>\$990,483.15</b>   | <b>\$5,031,685.15</b>  |
| <b>RESEARCH TOTAL</b>  |                       | <b>\$5,031,685.15</b>  |
| <b>Less Cooperative Research Commitments 2005</b>  | <b>\$1,039,043.00</b> | <b>\$ 3,992,642.15</b> |

**KEY**

|                       |   |  |
|-----------------------|---|--|
| New                   | N | OIM does the paperwork and forwards to FHWA  |
| Modification          | M | Federal aid section of Finance does the paperwork on modifications and forwards to OIM |
| Ongoing Projects      | O | No funds will show in the "Commitment" column  |
| Lead State Project    | * | Mn/DOT has responsibility for administration of the project                            |
| Commitment in Dollars |   | Projects with funding committed from prior years, but no funding for current year      |

**PART III**  
**FINANCIAL SUMMARY**  
**STATE PLANNING AND RESEARCH PROGRAM**  
**Calendar Year 2005**

**TOTAL ESTIMATED PARTICIPATION**

|                           | <b>Federal<br/>Participation</b> | <b>Fed. Project Number</b> | <b>Appropriation code</b> |
|---------------------------|----------------------------------|----------------------------|---------------------------|
| <b>Statewide Planning</b> | \$6,061,804                      | SPR-0001(045)              | H55                       |
| <b>MPO Planning</b>       | \$3,077,400                      | --                         | H45                       |
| <b>Research</b>           | \$2,020,601                      | SPR-0001(045)              | H56                       |
| <b>Total</b>              | \$11,159,805                     | NA                         | NA                        |

Notes:

- State funds added \$1.86 million for a State-wide planning total of \$7,918,403
- MPO Planning funds are supplemented by FTA funds, State funds and Local funds.
- Research program is supplemented by State funds.

**APPENDIX A**

**OFFICE OF**

**INVESTMENT**

**MANAGEMENT**

**TASK TITLES:** State Transportation Improvement Program (STIP)

**ESTIMATED COST:** \$189,698.00

**WORK AUTHORITY NUMBER:** TH 101

**WORK PERFORMED BY:** Program Development Section

**OBJECTIVES:**

- Provide guidance in the planning and development of the federally required, fiscally constrained, three year STIP document that includes all anticipated expenditures for all modes of transportation under the authority of Mn/DOT. Publish and distribute the final Web Page availability. Provide analysis as requested. Process STIP amendments and publish web site.

**ACTIVITIES:**

- Prepare State Transportation Improvement Program & Amendments
- Prepare State Transportation Improvement Program Guidance
- State Transportation Improvement Program Analysis

**METHODOLOGY:**

- STIP Guidance and Development: Guidance for the development of the State Transportation Improvement Program (STIP) is provided through continuous communication with the District/ATPs and other partners. A Guidance document provides transportation goals objectives and direction for use in making statewide transportation investment.
- The Area Transportation Partnerships (ATPs) submit prioritized lists of candidate projects based upon the integration of transportation priorities from modal interest, RDC's and MPO's and Mn/DOT consistency. A draft STIP is developed and reviewed by the District/ATP and with their comments considered. A final STIP is prepared.

**PRODUCTS:**

- STIP Guidance and STIP: Guidance is updated periodically and sent to the districts. The three-year State Transportation Improvement Program is produced annually.

**TASK TITLES:** Statewide Transportation Plan and Statewide Planning Service

**ESTIMATED COST:** \$451,814.00

**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 and manage the process of developing a statewide multi-modal transportation plan including scope of services development and management of a consultant contract for statewide multi-modal transportation plan. Provide statewide planning services to districts and other partners/customers; and provide guidance and planning services to districts, offices and other partners. This would include planning studies statewide in scope, public participation processed and other required or necessary activities.
- Perform the necessary activities for evaluating the physical characteristics, performance on all networks in Minnesota.

**ACTIVITIES:**

- MPO Planning Office
- MPO Planning Field
- Statewide Transportation Plan
- Statewide Transportation Planning Services
- RDC Area Planning
- Highway performance Monitoring System
- Functional Class & National Highway System

**METHODOLOGY:**

- Coordinate with Mn/DOT district 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, through training and technical assistance that respond to mutual transportation concerns.
- Prepare a statewide transportation planning and policy studies – such as the Statewide Transportation Planning – to serve as a consultant in developing frame works for district, division and model plan. Assist districts in developing district long-range transportation plans. Coordinate, review and respond to national and state initiatives, policies, and proposed regulations which impact on transportation. Administer and coordination Mn/DOT transportation planning committees and units of local government.
- Maintain the capability to periodically assess by measuring the performance and quality through annual reports upon the condition o f the highways, roads and streets in Minnesota using the Highway Performance Monitoring 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.
- Obtain traffic data needs from Office of Transportation Data & Analysis.

**PRODUCTS:**

- Annual MPO Planning Work Programs and Funding Distribution Agreements.
- Annual MPO Transportation Improvement Program (TIP) and Certification.
- Provide reports and/or maps for highway studies as requested by FHWA, State and Local Road Authorities, including yearly FHWA – 534 reports.
- Development of the Statewide Transportation Plan revisions and updates, including district transportation plans and highway operations plans.
- Development of guideline and performance measures to support statewide transportation policies.
- HPMS yearly data submitted including signed public & mileage certification.



**TASK TITLES:** Federal & State Transportation Programs

**ESTIMATED COST:** \$466,219

**WORK AUTHORITY NUMBER:** TH 103

**WORK PERFORMED BY:** Project Authorization Unit, Regulatory & Policy Analysis Section and Planning & Program Development Unit

**OBJECTIVES:**

- Provide administration of the Federal Aid Highway Program to maximize federal funds and utilize those funds efficiently. Provide budgetary control and fiscal management of the State Road Construction Programs in accordance with legislative constraints and Mn/DOT policy.
- Provide the direction, supervision and general office work necessary for the administration of the State Planning and Research Work Program.
- Maintain computerized Mn/DOT program delivery schedules and to further develop the financial tracking of projects in PPMS.

**ACTIVITIES:**

- Transportation Program Administration
- Federal Aid Coordination
- Emergency Relief Program
- State Planning and Research Program
- Federal Aid System Interface
- Transportation Revolving Loan Fund Program
- PPMS

**METHODOLOGY:**

- Conduct the Federal Aid Programming process, the FHWA project status and the submittal of projects to FHWA for authorization. Coordinate compliance with all federal aid requirements, engineering and fiscal by other division of Mn/DOT offices. Provide directions to the flow of federal funds between Mn/DOT and FHWA for their most efficient innovative use. Ensure the program context is compatible with program funding distribution. Maintain program budget status by listing expenditures, anticipated expenditures and balances. Make the necessary adjustments that conform to legislative budget limits.

- Special federal aid programs: Program all viable projects in compliance with the published FHWA guidelines. These include:
  - Forest Highways
  - Public Lands Highways
  - Emergency Relief
  - State Planning and Research
- Using the project management system to update data such as letting dates, program funding estimates, amounts of contract awards, type of funding, funding agreements, post award changes and program status.

**PRODUCTS:**

- Efficiently use federal and other transportation funds in Federal Program.
- State Planning and Research Program annual report.
- Use a current on-line state program as a tool in managing State Aid, Transit and Mn/DOT Construction program as a statewide program management and project scheduling system.

**TASK TITLES:** Transportation and Economic Analysis

**ESTIMATED COST:** \$613,207

**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 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.
  - Extend 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)

**TASK TITLES:** Land Use Access Management

**ESTIMATED COST:** \$342,856

**WORK AUTHORITY NUMBER:** TH 105

**WORK PERFORMED BY:** Land Use and Access Management Section

**OBJECTIVES:**

Provide policy guidance and technical assistance to Mn/DOT Districts/Metro Division 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, Divisions, offices and 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.

**PRODUCTS:**

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

**OFFICE OF  
TRANSPORTATION  
DATA & ANALYSIS**

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

**ESTIMATED COST:** \$578,043

**WORK AUTHORITY NO:** TH 202

**WORK PERFORMED BY:** Geographic Mapping & Information Section

**OBJECTIVE:**

- To maintain TIS and GIS BaseMap data within Mn/DOT's Location Data Manager (LDM) software environment 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 LDM's Transportation Data System (TIS) and GIS BaseMap data components.

**METHODOLOGY:**

The Office of Transportation Data and Analysis is the steward for Mn/DOT's Location Data Manager (LDM) - a major Information Resource System 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, LDM 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 the LDM through several methods such as manual data entry, file transfers, etc.

The information contained in the LDM's core of 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. The LDM is under continuous development and it will be enhanced and maintained by Mn/DOT.

**PRODUCTS:**

- 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 into the LDM.

**TASK TITLES:** Vehicle Classification / Truck Weight Studies

**ESTIMATED COST:** \$368,488

**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.

**PRODUCTS:**

- 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 COST:** \$451,122

**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.

**PRODUCTS:**

- 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 COST:** \$207,514

**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.

**PRODUCTS:**

- 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) Management, Development & Operations

**ESTIMATED COST:** \$507,259

**WORK AUTHORITY NO:** TH 224

**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 the Location Data Manager (LDM) and TIS data and to maintain relationships with both internal and external users of the LDM and TIS applications.
- To research, test and apply new applications and technology in order that the various activities being conducted under this task are constantly improved and made more efficient.
- To work with partners to develop new tools and methods for exchanging and sharing data.
- Respond to requests for TIS data and 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 department's Transportation Information System (TIS) and the spatial data in Mn/DOT's Location Data Management (LDM). 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.

This task consists of managing, developing and operating TIS report applications, training users, and providing reports and maps as needed or requested. It includes developing extraction tools and scripts to easily share data and maps with other users, as

well as the creation of tools to receive data updates from external partners such as the Department of Public Safety.

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.

Additional tasks include 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.

To ensure 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. Programming and system analysis services, hardware installations, system enhancements and modifications, and overall system support is furnished.

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.

#### **PRODUCTS:**

- Location Data Manager (LDM) application 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.
- 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.
- Hardware configuration, system data files, computer programs, and systems documentation to meet the needs of various internal and external users.
- Maps, reports, user manuals, metadata dictionaries, memos and articles detailing TIS capabilities, and in house and on-site training in TIS.
- Office web page with links to TIS report, GIS BaseMap and traffic volume maps.
- Tools for providing crash data for the Office of Traffic, Security and Operations.
- 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.
- Data for Mn/DOT's HPMS submittal to FHWA.

**TASK TITLES: Municipal Maps****ESTIMATED COST:** \$220,665**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 136 incorporated municipalities having a population of 5,000 or more on 150 map sheets; and 708 incorporated municipalities of less than 5,000 population on 255 sheets. This makes a total of 854 municipalities represented on 405 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 are in the process of converting all our map products computer-generated maps. This process is called "digitizing" where the locations of geographic features (those elements to be mapped) are recorded as digital x, y coordinates in a computer file.
- Update and revision are achieved by either manually drafting any changes to be made on those municipal maps that have not been converted to a digital format or by entering any revisions to be made in the appropriate digital file and obtaining a new plot. At present 100% of the municipalities having a population of 5,000 or more and

78% of the under 5,000 population municipalities have been converted to a digital format.

- 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.

#### **PRODUCTS:**

- A complete set of planimetric street maps of all 854 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.

**TASK TITLES:** St. Paul–Minneapolis Metropolitan Area Maps

**ESTIMATED COST:** \$99,425

**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.

**PRODUCTS:**

- 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.

**TASK TITLES:** County Maps

**ESTIMATED COST:** \$89,982

**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 reproducible 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 from 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 area 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.

**PRODUCTS:**

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

**TASK TITLES:** State Maps

**ESTIMATED COST:** \$23,215

**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 public 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.



**PRODUCTS:**

- The Official Highway Map is produced biennially under this project. All of the cartography, photography text and artwork for this publication are produced in-house. Offset four-color printing is accomplished by low bid 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.

**TASK TITLES:** Roadway History & Project Log

**ESTIMATED COST:** \$198,168

**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.

**PRODUCTS:**

- 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>.

**OFFICE OF**

**TRANSIT**

**TASK TITLES:** Transit Program Planning

**ESTIMATED COST:** \$250,860

**WORK AUTHORITY NUMBER:** TH 301

**WORK PERFORMED BY:** Office of Transit

**OBJECTIVES:**

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

**METHODOLOGY:**

- Produce an annual report that concisely 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 safety and security seminars and workshops (e.g. FTA Substance Abuse, Homeland Security Preparedness).

**PRODUCTS:**

- Annual Report
- Policy Analysis Reports
- Transit Issue Presentations
- Public Education & Involvement Plans
- Project Oversight
- Quarterly Progress Reports
- Semi-annual DBE Reports
- In-Transit Newsletter/Transit Bulletin
- Office of Transit Website
- Drug and Alcohol Testing Policies
- Transit System Safety Plans

**TASK TITLES:** Transit Research and Program Evaluation

**ESTIMATED COST:** \$140,210

**WORK AUTHORITY NUMBER:** TH 302

**WORK PERFORMED BY:** Office of Transit

**OBJECTIVES:**

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

**METHODOLOGY:**

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

**PRODUCTS:**

- Program Performance Reports
- System Performance Evaluations
- Demographic Trend Analysis Reports
- Site Studies for Transit Systems
- New Starts Service Designs/System Service Redesigns
- Transit Peer Group Analyses
- Transit Needs Assessments
- DBE Program Technical Assistance
- Drug and Alcohol Program Technical Assistance

**TASK TITLES:** Bike and Pedestrian Ways Planning

**ESTIMATED COST:** \$396,738

**WORK AUTHORITY NUMBER:** TH 117

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

**OBJECTIVES:**

- To promote and facilitate the delivery of non-motorized modes into our multi-modal transportation system

**METHODOLOGY:**

- This objective will be achieved by devoting staff time to the following sections:
  - Policy Development and Planning  
This section is responsible for the creation, review, and updating of 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  
This section of staff time is devoted to managing the relationship between Mn/DOT and its customers
  - Training  
In a typical year the section works with a broad base of transportation professionals to provide them with tools to apply the principals of non-motorized modes to their transportation planning 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.
  - Consulting  
The staff is frequently sought out for assistance in their areas of technical expertise. This work is also 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 our staff to increase our pool of shared knowledge.
  - Research  
This section manages and participates in research to promote the application and benefits of non-motorized modes. The section also serves as the 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 section reflects the time that is spent in managing resources and ensuring continued growth and development as a departmental resource. These activities include resource management, internal communication, work planning, training, conference participation, and other professional development

**PRODUCTS:**

- Non-motorized Modal Plan (Bike, Pedestrian, Transportation Action Model)
- Mn/DOT Road Design revisions for bicycle facilities
- Highway Project Development Process: Part II, Section D, Subject Guidance: Bikeways and Pedestrians
- Bicycle Design Guideline revisions
- Mn/DOT's Design Advisory Committee inputs
- Bonding Projects: Bicycle and Pedestrian Accommodation Advisories and Recommendations
- Federal Surface Transportation Program Solicitation Process for Metro Area
- State Bicycle Maps
- Metro Bicycle Mapping and System Plan
- Mississippi River Trail
- State Bicycle Advisory Committee
- National Bike and Pedestrian Coordinators (AASHTO Task Force on Non-motorized Transportation)
- Community Bike and Pedestrians events
- Bike Facility Design Technical Assistance
- Participation in State Planning Groups
- Modal representation checklist
- Transportation Plan Performance Measures
- Requested plan reviews
- Economic impact of Bicycling in Minnesota- University of Minnesota
- Cost/Benefit of Bicycle Facilities – Hubert Humphrey Institute's National Study
- Bicycle Safety Education Campaign in CY 2005



**OFFICE OF  
FINANCE**

**TASK TITLES:** Highway Statistics

**ESTIMATED COST:** \$28,000

**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 purposes are as follows:
  - Motor vehicle registration and drivers' license data are received on an annual basis from the registrar of motor vehicles, Department of Public Safety. These data are researched, analyzed and compiled for use in the preparation of reports in accordance with instructions contained in Chapters 3, 4 and 5 of FHWA "A guide to Reporting Highway Statistics".
  - Motor fuel statistics are received monthly from the Petroleum Tax Division, Department of Revenue. Upon receipt of this information, monthly computations are made and placed on tabular form for gasoline and special 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.

**PRODUCTS:**

|           |   |
|-----------|---|
| FHWA-531  | State Highway Income  |
| FHWA-532  | State Highway Expenditures  |
| FHWA-534  | Capital Outlay and Maintenance Expenditures   |
| FHWA-536  | Local Highway Finance Report – cities, counties and townships   |
| FHWA-541  | State Transportation obligations issued during year and allotment of Proceeds                         |
| FHWA-542  | Status of State Transportation Debt   |
| FHWA-543  | State Transportation Sinking 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**

**TRAFFIC, SECURITY AND**

**OPERATIONS**

**TASK TITLES:** Speed Data Summaries

**ESTIMATED COST:** \$21,626

**WORK AUTHORITY NUMBER:** TH 501

**WORK PERFORMED BY:** Office of Traffic, Security 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, Security and Operations (OTSO) and implemented through eight district traffic engineers. 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.

**PRODUCTS:**

- A complete file of speed characteristics on each category of highways – These files is 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.

**TASK TITLES:** Crash Surveillance

**ESTIMATED COST:** \$135,708

**WORK AUTHORITY NUMBER:** TH 502

**WORK PERFORMED BY:** Office of Traffic, Security and Operations

**OBJECTIVES:**

- To provide crash data 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 are executed by OTSO and a report is developed for a requesting agency or internal application.

**PRODUCTS:**

- Semi-annual crash reports will be prepared for road authorities.
- Comprehensive reports are prepared using district boundaries for comparative analysis of accidents within specified areas or highway categories.
- Customized reports can be developed for technical or non-engineering disciplines upon request.
- Crash rates can be calculated for isolated intersections, highway categories or statewide systems as designated by the scope of the requester.
- This timely crash data and summarized reporting provides road authorities an objective basis for prioritizing and developing safety countermeasures, dedicated enforcement efforts and also minimizes tort liabilities.





**OFFICE OF  
STATE AID**

**TASK TITLES:** County State-Aid Highway Needs Study

**ESTIMATED COST:** \$317,139

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

**PRODUCTS:**

- Two County Engineers Screening Board Reports
- One County State-Aid Apportionment Booklet
- Miscellaneous legislative, auditor and client requests

**TASK TITLES:** Municipal State-Aid Street Needs Study

**ESTIMATED COST:** \$316,783

**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 outlines 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 population. The actual allotment is made by the Commissioner of Transportation in January of the following year when the funds available are known.

**PRODUCTS:**

- Two reports to the Municipal Screening Board for 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.



**OFFICE OF**  
**TECHNICAL SUPPORT**

**TASK TITLES:** Cultural Resources Investigations

**ESTIMATED COST:** \$1,249,663

**WORK AUTHORITY NUMBER:** TH 801 through TH 899

**WORK PERFORMED BY:** Office of Technical Support

**REFERENCE NUMBERS:**

T-Contract Program

Agreement Number: 75098      Agreement Number: 75099

Agreement Number: 75100      Agreement Number: 75101

Agreement Number: 75102      Agreement Number: 75103

**OBJECTIVES:**

- To preserve and/or document cultural resources subject to disruption due to proposed highway improvements. This includes the archaeological survey of prehistoric and historic sites, historic research, geo-morphological studies, and/or archaeological data recovery. The information from these investigations is included in the environmental impact study of highway corridors. Results are also forwarded to the State Archaeologist and the State Historic Preservation Office (SHPO).
  - Cultural resource investigations are done in conformance with:
    - Historic Preservation (35 CFR 800
    - National Historic Preservation Act of 1966 (PL 89-665) as amended
    - Department of Transportation Act of 1966 (PL 89-670)
    - Executive Order 11593
    - Archaeological and Historic Preservation Act of 1974 (PL 93-291)
    - Title 36 of the Code of Federal Regulations (CFR) Parts 60-66 and 800
    - Native American Graves Protection and Repatriation Act of 1990 (PL101-601)
    - Secretary of the Interior's Standards and Guidelines for Archaeology and Historic preservation Activities. As published in the Federal Register in September 29<sup>th</sup>, 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
    - Manual for Standing Structures
    - Minnesota State Comprehensive Plan

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

**METHODOLOGY:**

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

Phase I – Initial Reconnaissance

Phase II – Intensive Survey (Determine Significance)

**PRODUCTS:**

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

See also enclosed Special Conditions of agreement





**OFFICE OF  
FREIGHT AND  
COMMERCIAL VEHICLE  
OPERATIONS**

**TASK TITLES:** Freight Planning, Studies and Data Management

**ESTIMATED COST:** \$326,186

**WORK AUTHORITY NUMBER:** TH 220

**WORK PERFORMED BY:** Freight Planning & Program Development

**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:**

- By increasing Mn/DOT's basic knowledge of freight transportation and improving the comprehension of freight transport's relation to Minnesota's economic, social and environmental health.
- Consideration of freight transportation will better integrate into Mn/DOT's planning, programs, investments and system management.
- Conduct community flow 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.

**PRODUCTS:**

- Develop and update freight performance (rural and metro w/cluster approach) measures as well as supporting and recommending other statewide transportation measures.

- Provide and articulate freight related policies, issue and trend analysis that reflected a district, statewide and system level perspective.
- 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.



**APPENDIX B:**

**DESCRIPTION OF**

**RESEARCH STUDIES**

## DESCRIPTION OF RESEARCH STUDIES

### STATE SP&R RESEARCH

#### **RSS - RESEARCH PROJECTS, TECHNOLOGY TRANSFER, IMPLEMENTATION, SPECIAL PROJECTS & ADMINISTRATION - SPR-0001(045)**

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 researches 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 IVHS 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](http://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.

### COOPERATIVE RESEARCH

|                        |   |
|------------------------|---|
| <b>Study Number:</b>   | SPR004(300)   |
| <b>Status:</b>         | Contract signed   |
| <b>Title:</b>          | <b>Investigation of Deterioration of Stainless Steel Dowel Tubes Under Repeated Loading.</b>                          |
| <b>Lead Agency:</b>    | Minnesota   |
| <b>Study Partners:</b> | FHWA  |
| <b>100% SP&amp;R</b>   |   |
| <b>Approval:</b>       | 80% - Approved. – Special project at FHWA's request   |
| <b>Objectives:</b>     | Confirm long-term bearing capacity of 316L stainless steel schedule 40 pipes that are fitted with end caps. Allow the |

Mn/DOT and FHWA to make a reational decision on approval or rejection of this type of dowel bar as a design alternative for high performance concrete pavements. If Schedule 40 pipe is approved for use, many States may adopt Mn/DOT's specifications, as has been the case in similar dowel bar designs.

|                        |  |
|------------------------|--|
| <b>Comments:</b>       | Special project at the request of FHWA   |
| <b>Study Number:</b>   | 0002(207)  |
| <b>Status:</b>         | Contract signed  |
| <b>Title:</b>          | Transportation Management Center Pooled Fund Study   |
| <b>Lead Agency:</b>    | Federal Highway Administration   |
| <b>Study Partners:</b> | AZ, CA, CT, DC, DE, FHWA, FL, GA, I-95 Corridor Coalition, IL, IN, KS, MI, MODOT, NE, NM, NV, NY, PA, RI, VA   |
| <b>100% SP&amp;R</b>   |  |
| <b>Approval:</b>       | Approved   |
| <b>Objectives:</b>     | The goal of the Transportation Management Center (TMC) Pooled Fund Study is to assemble regional, state, and local transportation management agencies and the Federal Highway Administration (FHWA) to (1) identify human-centered and operational issues that are common among TMC operators and managers; (2) suggest approaches to addressing identified issues; (3) initiate and monitor projects intended to address identified issues; (4) disseminate results; and (5) assist in solution deployment. |
| <b>Comments:</b>       | Desired minimum commitment is \$25,000. Level of commitment may vary, based on size and type of agency (e.g. county and city).   |
| <b>Study Number:</b>   | 0003(017)  |
| <b>Status:</b>         | Contract signed  |
| <b>Title:</b>          | <b>Midwest States Pooled Fund Crash Test Program</b>   |
| <b>Lead Agency:</b>    | Nebraska Department of Roads   |
| <b>Study Partners:</b> | CT, FL, IA, KS, MN, MODOT, MT, NE, OH, SD, TX, WI  |
| <b>100% SP&amp;R</b>   |  |
| <b>Approval:</b>       | Approved   |
| <b>Objectives:</b>     | To crash test highway roadside appurtenances to assure that they meet criteria established nationally.   |
| <b>Comments:</b>       | Ongoing: Study has proved to be successful to this point, and will remain active going forward. For more information please refer to the Midwest Roadside Safety website: <a href="http://www.mwrsf.unl.edu/">http://www.mwrsf.unl.edu/</a>  |

**Study Number:** 0003(020)  
**Status:** Cleared by FHWA  
**Title:** **IVHS Study (ENTERPRISE)**  
**Lead Agency:** Iowa Department of Transportation  
**Study Partners:** AZ, CO, IA, KS, MI, MN, NC, VA, WA  
**100% SP&R**  
**Approval:** Pending Approval  
**Objectives:** To investigate and promote IVHS approaches and technologies that are compatible with other national and international IVHS initiatives.

**Study Number:** 0003(042)  
**Status:** Cleared by FHWA  
**Title:** **Aurora Program**  
**Lead Agency:** Iowa Department of Transportation  
**Study Partners:** IA, IL, MN, NY, PA, SD, VA, WI  
**100% SP&R**  
**Approval:** Approved  
**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. (updated 7/7/01)

**Comments:** 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. Refer to <http://www.aurora-program.org/> for project updates. (updated 2/7/02)

**Study Number:** 0003(049)  
**Status:** Contract signed  
**Title:** **Urban Mobility Study**  
**Lead Agency:** Texas Department of Transportation  
**Study Partners:** CA, CO, MD, MN, NY, OH, OR, PA, TX, WA  
**100% SP&R**  
**Approval:** Approved



**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.

**Comments:** Ongoing. States are still encouraged to participate. (2/7/02)

**Study Number:** 0003(074)

**Status:** Cleared by FHWA

**Title:** **Pavement Research and Technology**

**Lead Agency:** Washington State Department of Transportation

**Study Partners:** MN, TX, WA

**100% SP&R**

**Approval:** Approved

**Objectives:** Under this project, each state will create funding to allow technical staff and university researchers to participate in a series of project meetings focused on sharing information, identifying critical issues of mutual interest, developing plans for joint research and testing, and educating transportation professionals on the latest developments in the design, construction, reconstruction and maintenance of highway pavements. (updated 7/7/01)

**Comments:** The participating states have met 11 times to discuss pavement issues and to visit various venues such as Waterways Experiment Station, National Center for Asphalt Technology, and Western Research Institute. The project will run through the year 2005. (updated: 10/16/03)

**Solicitation Number:** 900 [0003(098)]

**Status:** Solicitation posted

**Title:** **Pavement Reconstruction Scheduling Software**

**Lead Agency:** Washington State Department of Transportation

**Study Number:** SPR-3(098)

**Partners:** MN, TX, WA

**Date Posted:** 09/14/2004 09:27:55 AM

**Start Year:** 2005

**End Year:** 2006

**Duration:** 24 months

**100% SP&R**

**Approval:** Approved

- Background:** This pooled fund project developed the constructability scheduling software called CA4PRS. The effort also included the training of personnel from the states of California, Minnesota, Texas and Washington on the use of this software. These four states now see the need to enhance this software to include additional construction options that could not be included in the original development.
- Objectives:** The objective of this study is to enhance the existing CA4PRS software with a broader range of construction options that would include dowel bar retrofit, mill and fill HMA, continuous reinforced Portland cement concrete, and others. The effort will also include the development of a complete users manual and improvements to the program to make it more user friendly. Finally, each of the participating states will be trained in the use of the enhanced software.
- Comments:** The only states eligible to join this pooled fund are those that are members of the State Pavement Technology Consortium (SPTC) that has the project designation SPR-3(074).
- Study Number:** TPF-5(021)  
**Status:** Contract signed  
**Title:** **Base Funding for the North Central Superpave Center**  
**Lead Agency:** Indiana Department of Transportation  
**Contract Amount:** \$125,000  
**100% SP&R**  
**Approval:** Approved  
**Objectives:** This pooled fund project will provide for continued operation of the North Central Superpave Center to assist agencies and industry with Superpave implementation and hot mix asphalt issues. The NCSC will provide technical assistance, training, communication, and research and development work to meet the needs of the region.
- Comments:** The North Central Superpave Center Steering Committee meeting was held at the end of January 2003 in which this study was discussed. Funds and state partners are currently being solicited for participation.
- Study Number:** TPF-5(037)  
**Status:** Cleared by FHWA  
**Title:** **Southeast Superpave Center**  
**Lead Agency:** Alabama Department of Transportation

**Study Partners:** AL, AZ, CO, FL, GA, KY, LA, MI, MS, NC, NJ, NV, RI, SC, TN, TX, VA, VT, WI

**100% SP&R**

**Approval:** Approved

**Objectives:** Support implementation of products of SHRP-Superpave research efforts.

**Comments:** Continuing

**Study Number:** TPF-5(045)

**Status:** Cleared by FHWA

**Title:** **Performance Guidelines for the Selection of Hot-Pour Crack Sealants**

**Lead Agency:** Virginia Department of Transportation

**Study Partners:** CT, DC, GA, MI, MN, NH, NJ, NY, RI, TX, VA

**100% SP&R**

**Approval:** Approved

**Objectives:** This project will result in extended pavement surface life and thus reduced roadway rehabilitation and maintenance costs. Guidelines for sealant selection are being proposed because the durability of crack sealants used on the North American roadways is often shorter than expected, even though crack sealing is the most common method of preventative maintenance.

**Study Number:** TPF-5(046)

**Status:** Cleared by FHWA

**Title:** **Transportation Curriculum Coordination Council Training Management and Development**

**Lead Agency:** Federal Highway Administration

**Study Partners:** LA, WI, MN

**100% SP&R**

**Approval:** Approved

**Objectives:** To facilitate management of the Transportation Curriculum Coordination Council (TCCC) at the national level and for the development of curriculum and core training materials identified by the TCCC panel.

**Study Number:** TPF-5(051)

**Status:** Contract signed

**Title:** **Construction of Crack-Free Concrete Bridge Decks**

**Lead Agency:** Kansas Department of Transportation

**Study Partners:** DE, FHWA, ID, IN, KS, MI, MN, MODOT, MS, MT, ND, NH, OK, SD, TX, WY

**Contract Amount:** \$950,000

**100% SP&R**

**Approval:** Pending Approval

**Objectives:** To implement the most cost-effective techniques for improving bridge deck life through the reduction of cracking.

**Study Number:** TPF-5(054)  
**Status:** Contract signed  
**Title:** **Development of Maintenance Decision Support System**  
**Lead Agency:** South Dakota Department of Transportation  
**Study Partners:** IA, IN, MN, ND, SD  
**Contract Amount:** \$186,547  
**100% SP&R**  
**Approval:** Pending Approval  
**Objectives:** 1) To assess the need, potential benefit, and receptivity in participating state transportation departments for state and regional Maintenance Decision Support Systems.  
2) To define functional and user requirements for an operational Maintenance Decision Support System that can assess current road and weather conditions, forecast weather that will affect transportation routes, predict how road conditions will change in response to candidate maintenance treatments, suggest optimal maintenance strategies to maintenance personnel, and evaluate the effectiveness of maintenance treatments that are applied.  
3) To build and evaluate an operational Maintenance Decision Support System that will meet the defined functional requirements in the participating state transportation departments.  
4) To improve the ability to forecast road conditions in response to changing weather and applied maintenance treatments.

**Study Number:** TPF-5(066)  
**Status:** Cleared by FHWA  
**Title:** **Material and Construction Optimization for Prevention of Premature Pavement Distress in PCC Pavements**  
**Lead Agency:** Iowa Department of Transportation  
**Study Partners:** GA, IA, IN, KS, LA, MI, MN, MODOT, NC, NY, OH, TX, WI  
**100% SP&R**  
**Approval:** Approved  
**Objectives:** To seek ways to optimize materials selection and construction methods to improve the longevity of Portland cement concrete pavements.  
**Comments:** Solicitation due date: December 31, 2002

**Study Number:** TPF-5(069)  
**Status:** Contract signed  
**Title:** **Core Program Services for a Highway Research, Development, and Technology Program, TRB Fiscal Year 2004**  
**Lead Agency:** Federal Highway Administration  
**Study Partners:** AL, CT, IL, IN, ME, MS, MT, ND, NV, OR, PA, TX, WV, WY  
**Contract Amount:** \$3,952,735  
**100% SP&R**  
**Approval:** Approved  
**Objectives:** To provide a mechanism for State transportation departments to support the TRB's core program and services.  
**Comments:** Commitments for TRB fiscal year 2004 (July 2003 - June 2004) have been completed. Obligations were made by participating States and the funds have been applied to the grant with TRB.  
**Objectives:** To provide data collection practitioners with a cost-effective design of a PNIT system and an independent assessment of a variety of detection technologies.

**Study Number:** TPF-5(080)  
**Status:** Cleared by FHWA  
**Title:** **Investigation of Low Temperature Cracking in Asphalt Pavements**  
**Lead Agency:** Minnesota Department of Transportation  
**Study Partners:** CT, IA, ID, IL, KS, MN, ND, NY, VT, WI  
**Commitments Received:** \$580,000  
**100% SP&R**  
**Approval:** Approved  
**Background:** Low temperature cracking is the most prevalent distress found in asphalt pavements built in cold weather climates. As the temperature drops the restrained pavement tries to shrink. The tensile stresses build up to a critical point when a crack is formed and partial stress relief occurs. The current Superpave specification attempts to address this issue by specifying a limiting low temperature for the asphalt binder. The specification does a reasonable job predicting performance of conventional asphalt cements, but this does not hold true for polymer-modified asphalt binders that are manufactured to reach very cold temperature grades needed in cold climates. Typically the base asphalt binder controls the low temperature properties. As an example a PG 58-34 is made with an xx-34 grade

asphalt and polymer is added to achieve the high end (58). Currently the low temperature specification considers only the asphalt binder. Specifications must be developed for the complete asphalt mixture. Although low temperature cracking appears to be controlled by a single-event mechanism, it is very important to understand the mechanism of crack initiation and propagation. These cracks can be initiated by traffic loading, cycles of temperature changes, and then propagated by a large drop in temperature. In addition, the significant effects of aging and moisture on crack formation and propagation is also not fully understood and needs investigation.

**Objectives:** The development of a fracture-mechanics-based specification is one of the objectives of this study. It will allow for a better selection of asphalt binders and mixtures with respect to their resistance to crack formation and propagation. This fracture mechanics approach will also be used to investigate the detrimental role of aging and moisture to fracture resistance of asphalt materials.

**Scope of Work:** Utilize a national Technical Advisory Panel (TAP) to assist in the selection and development of testing methods that measure fundamental material properties related to low temperature cracking.

- Collect samples and mix designs from participating states and industry and run all recommended new testing methods.

- Correlate the test results with documented field performance.

- Develop and refine the most promising new testing methods for low temperature cracking.

- Calibrate and validate the thermal cracking model in the 2002 AASHTO design guide.

- Select mix designs for the reconstruction of MnROAD.

Construction and field validation at MnROAD will be completed in the next phase of the study.

**Comments:** It is anticipated that each state will contribute \$50,000 for this project. The funds can be transferred per the agencies discretion into three possible fiscal years 2004, 2005, and 2006. Committing states are asked to do so electronically.

**Study Number:** TPF-5(086)

**Status:** Cleared by FHWA

**Title:** **Reducing Crashes at Rural Intersections: Toward a Multi-State Consensus on Rural Intersection Decision Support**

**Lead Agency:** Minnesota Department of Transportation

**Study Partners:** GA, IA, MN, NC, NH, WI  
**Contract Amount:** \$367,000  
**100% SP&R**  
**Approval:** Approved  
**Objectives:** The Minnesota objective is to develop a better understanding of the causes of crashes at rural intersections and then develop a toolbox of effective strategies to mitigate the high crash rate. Preliminary information seems to point to the driver's inability to correctly identify and select the gap needed for safe passage. Efforts proposed in this program address rural intersection crashes through the application of a suite of advanced surveillance technology, algorithms which predict vehicle and gap location, and driver interfaces designed to best provide necessary information to drivers at intersections. 'Low tech' solutions will also be considered. The main program emphasis is on the integration of these key components into an effective, affordable system. We will focus on alternatives and traditional traffic signals as a means to decrease the frequency and severity of rural intersection crashes.

**Comments:** It is anticipated that each state will contribute \$70,000 for this project. The funds can be transferred per the agencies discretion over three fiscal years. Committing states are asked to do so electronically.

**Study Number:** TPF-5(090)  
**Status:** Cleared by FHWA  
**Title:** **Pavement Tools Consortium**  
**Lead Agency:** Washington State Department of Transportation  
**Study Partners:** CA, FL, ID, IL, KS, MD, MN, TX, WA  
**Commitments Received:** \$700,000  
**100% SP&R**  
**Approval:** Approved  
**Background:** In May 2000, the University of Washington (UW) embarked on a project for the development of a set of pavement tools that can be used by a DOT or paving contractor to improve communication, training and design/construction for the pavement topic area. A key is the use of enabling technologies, such as the Internet and digital media (DVDs and CDs). This concept allowed for the organization of these products into a broad-based format that is easy to access, straightforward to use, and upgraded quickly.

Funding for these products has come from a variety of sources including:

- Washington State DOT (WSDOT)
- Maryland State Highway Agency (Maryland SHA)
- National Asphalt Pavement Association (NAPA)
- Transportation Northwest (TransNow)
- Federal Highway Administration

**Objectives:**

The objective of the Pavement Tools Consortium (PTC) is to develop and use HMA-oriented, computer-based pavement tools. The major focus of the Consortium is the enhancement of pavement-related training and construction. The goal of the PTC is to further develop and provide pavement tools. Examples include:

- HMA View Database
- Interactive Pavement Training CD/DVD (including the Virtual Superpave Laboratory)
- Computer Simulations
- Distance Learning Content and Delivery
- Computation Software (EverFe, EverFlex, etc.)

Identification of specific pavement tools and the necessary development efforts will be coordinated through an annual Consortium meeting and electronic communication. The initial collaborative duration is five years. The number of products and versions developed depends on the total annual funding available.

**Scope of Work:**

The primary focus for the PTC includes five related areas. The degree of research and development accomplished for each depends on the amount of funding that is available and the agreed upon priorities. These areas currently are:

- HMAView Database
- Interactive Pavement Training CD/DVD Products (includes the VSL)
- Computer Simulations
- Distance Learning Content and Delivery
- Computation Software (EverFe, EverFlex, etc.)

The Consortium members will be provided all the pavement tools shown above and others as they are produced including new versions. Software tools such as HMAView will be limited to use within the participating Consortium member's agency or company. UW will



provide support in the form of documentation, troubleshooting, etc. The individual tools can be viewed as an integrated whole; the separate pieces can be made to compliment the others (analogous to Microsoft Office which has separate but complimentary tools such as Word, Excel, PowerPoint, etc.). As currently envisioned, the pavement tools are sorted by the following categories:

**HMAView:** HMAView would be made available to each Consortium member. The software would not be directly adopted for each agency or contractor but modified to maximize the benefit for all Consortium members. The data that is entered and viewed is currently customizable by the user. Near term, updates will include an extensive mapping capability that allows for GPS location of specific field tests. Consortium members will be given access to source code of HMAView for agency or company specific modifications. See Appendix A for the current status of HMAView.

**Interactive Pavement Guide:** The interactive pavement guide would continue to be expanded and improved. A straightforward process would be created that would allow local content to be added by the Consortium members. This Guide, or versions of it, can be produced in languages other than English. A need for more training in Spanish has been expressed by DOTs in Maryland and Texas.

**Computer Simulations:** The currently available "virtual roller" would be made available to all Consortium members. This will be improved over time. The Consortium members will suggest additional tools, like the roller, that would best serve their training needs. Another planned computer simulation is the VSL.

**Distance Learning Content and Delivery:** Distance Learning (DL) is a rapidly evolving education delivery approach and the other Pavement Tools will significantly aid this process. The UW team will deliver pavement-related content for the members or aid the Consortium members in conducting their own. Such training is intended to supplement existing training venues already available. DL is an exciting and evolving training delivery approach.

**Computation Software:** Software such as EverFe (finite element analysis tool for plain jointed concrete pavements)

and EverFlex (finite element analysis tool for flexible pavement) will be provided to Consortium members for their use. Documentation and training will be provided. If related computational tools are developed via the Consortium, those too will be distributed to members. EverFlex, for example, can accommodate non-uniform tire contact pressures.

**Comments:** States interested in joining the study may do so by contacting the lead agency contact for more information. Our goal is to involve a maximum of 10 states that will contribute \$20,000 per year for 5 years.

**Study Number:** TPF-5(092)

**Status:** Cleared by FHWA

**Title:** **Clear Roads (Test and Evaluation of Materials, Equipment and Methods for Winter Highway Maintenance)**

**Lead Agency:** Wisconsin Department of Transportation

**Study Partners:** IA, IN, MN, WI

**Contract Amount:** \$170,000

**Commitments**

**Received:** \$225,000

**100% SP&R**

**Approval:** Approved

**Background:** State departments of transportation are aggressively pursuing 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, barriers to use, durability, and so on, of innovative

|                                |   |
|--------------------------------|---|
|                                | materials, equipment and methods for improved winter highway maintenance.   |
| <b>Scope of Work:</b>          | This proposal outlines a new transportation pooled fund research project to investigate the applicability of various winter maintenance materials, equipment and methods for use by state and local highway maintenance crews. The pooled fund will be ongoing, with new projects undertaken as previous work is completed. The Wisconsin Department of Transportation will be the lead agency, responsible for administration of the pooled fund and dissemination of results. 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. |
| <b>Comments:</b>               | \$25,000 per year commitment requested from each state. More projects will be funded as additional commitments are received. To commit funds, please send an e-mail of interest to Kim Linsenmayer at <a href="mailto:kim.linsenmayer@ctcandassociates.com">kim.linsenmayer@ctcandassociates.com</a> or call 608-628-3806.  |
| <b>Study Number:</b>           | TPF-5(093)  |
| <b>Status:</b>                 | Cleared by FHWA   |
| <b>Title:</b>                  | <b>North/West Passage Transportation Pooled Fund Program, Phase 1</b>   |
| <b>Lead Agency:</b>            | Minnesota Department of Transportation  |
| <b>Study Partners:</b>         | MN, WI  |
| <b>Contract Amount:</b>        | \$75,000  |
| <b>Commitments Received:</b>   | \$75,000  |
| <b>100% SP&amp;R Approval:</b> | Approved  |
| <b>Background:</b>             | The North/West Passage Corridor, including I-94 and I-90 from Wisconsin to Washington, is soliciting participation in a new Transportation Pooled Fund (TPF) study focused on traveler information across state borders. Today in the North/West Passage Corridor states there are numerous systems for collecting transportation data, for processing and integrating the data, and for delivering the information to users. However, this information is not easily shared across state borders. The states of North Dakota, Wisconsin, Minnesota, Washington, Idaho, Wyoming, Montana, and South Dakota have been in contact since   |

February 25, 2002 discussing the development of a coalition for the North/West Passage Corridor. Currently North Dakota, Minnesota and Wisconsin have secured funding for initiating the development of a North/West Passage TPF study.

**Objectives:** The goals of this TPF study are to implement and evaluate integrated traveler information systems and coordinate maintenance operations across state borders. Using appropriate delivery systems, traveler information will be made available to internal staff and the traveling public via 511, dynamic message signs and other systems. The long-term vision of the North/West Passage Corridor states is to influence ongoing standards development; operate database systems that can transmit and receive multiple data streams; and, utilize effective methods for sharing, coordinating, and integrating traveler information across state borders.

**Scope of Work:** The North/West Passage TPF study will pursue issues and proposed projects that are identified and selected by the membership. The membership will meet annually to complete the process of selecting new projects and conduct periodic telephone conferences to monitor the status of the projects. This membership driven process is intended to ensure that members benefit from their investment in the North/West Passage TPF study. Base on initial commitment from North Dakota, Minnesota and Wisconsin, a Preliminary Work Plan has been developed. The Preliminary Work Plan focuses on integrating traveler information and coordinating maintenance operations among the three states. However, it is envisioned that commitment from other states will expand the Preliminary Work Plan across additional state boundaries.

**Comments:** The Minnesota Department of Transportation has taken the initial lead in the development of the coalition. Additional agencies interested in joining the North/West Passage TPF study should have the appropriate personnel complete the online commitment form. State Departments of Transportation and others may become participants at any time during the year by committing funds to the North/West Passage TPF study. Early submission of the on-line commitment form is encouraged to enable participation in the process to identify and select projects to be initiated in FY 2004. For additional information on joining the North/West Passage TPF Study, contact Ginny Crowson at 651-284-3454, or [ginny.crowson@dot.state.mn.us](mailto:ginny.crowson@dot.state.mn.us). PLEASE NOTE - After

April 7, 2004 please contact Mark Nelson, 651-284-3484  
mark.nelson@dot.state.mn.us, for information.

**Study Number:** TPF-5(099)  
**Status:** Cleared by FHWA  
**Title:** **Evaluation of Low Cost Safety Improvements**  
**Lead Agency:** Federal Highway Administration  
**Study Partners:** FL, IA, IN, KS, MD, MN, MT, NY, OK, PA, TX, VA  
**Commitments Received:** \$1,305,000  
**100% SP&R**  
**Approval:** Approved  
**Background:** This project will encompass safety-effectiveness evaluations of priority strategies from the NCHRP Report 500 Guidebooks, Guidance for Implementation of the AASHTO Strategic Highway Safety Plan. The safety effectiveness of many of the strategies in the guidebooks has not yet been rigorously evaluated. In order to achieve a national goal shared by the USDOT, AASHTO, and GHSA to reduce the fatality rate to 1.0 and save 9,000 lives annually by 2008, these "tried" and "experimental" strategies will need to be appropriately implemented. In this project, therefore, data will be collected and before-after safety effectiveness evaluations will be performed at sites where selected safety strategies are being implemented. A steering committee, comprised of pooled fund State DOT representatives, will provide guidance on the strategies selected for evaluation.

**Objectives:** The goal of the proposed research is to develop reliable estimates of the safety effectiveness of safety improvements identified as strategies in the NCHRP Report 500 Guidebooks through scientifically rigorous before-after evaluations of sites within the U.S. where these strategies are being implemented.

**Scope of Work:** The scope of the Low Cost Safety Improvements Pooled Funds Study is to conduct a research project of priority strategies from all of the NCHRP Report 500 Guidebooks. A target of 24 strategies totaling \$6M over three years is planned, but this will vary depending on the level of support. The data for the study will be gathered from those states that implement the strategies throughout the US. The methodology utilized will typically be an Empirical Bayes evaluation, using before-after data (where the safety improvements are made, as well as untreated base locations), to help determine their effectiveness in reducing the number and severity of crashes. The data will be

collected, and evaluation studies performed, as the strategies are implemented over the course of a few years. The greater the number of States implementing the strategies, the faster the rate of after data collection will be collected. This will in turn shorten the total time for each evaluation. The implementation of the strategies and the evaluations will be staggered; grouping a small number of the evaluations together, as appropriate.

**Comments:**

This project is open to any number of participating states, independent of involvement with the lead state initiative supporting implementation of the AASHTO Strategic Highway Safety Plan. The minimum target amount of funding requested by the participating states should be \$30,000-50,000 per year for three years, totaling (for all states pooled funds) \$3M over 3 years. States wishing to be involved in more than one improvement area (e.g. lane departure, aggressive driving, etc.) are asked to consider increasing their contributions accordingly. FHWA will contribute \$1.5M total, and additional funds will be solicited from other sources.

# **APPENDIX C**

## **MINNESOTA POOLED**

## **FUND PROJECTS**

## MN POOLED FUND PROJECTS WITH AGREEMENT BALANCES BUT NOT CONTRIBUTED TO IN THE 2005 PROGRAM

The table does not include NCHRP numbers.

| STATE | PROJ. NO. | PROJECT NAME  | PROJECT STATUS   | PROG. CODE | UNDER AGREEMENT | EXPENDITURE | BALANCE*  |
|-------|-----------|---|--|------------|-----------------|-------------|-----------|
| MINN  | 0002001   | Application of Global Positioning System for Planning                                       | Unknown  | 0800       | 15,000.00       | 11,368.44   | 3,631.56  |
| MINN  | 0002002   | Geographic Information System-Transportation ISTEAM Management Systems Server-Net Prototype | Unknown  | 0860       | 25,000.00       | 13,750.00   | 11,250.00 |
| MINN  | 0002126   | Integrated Drainage Design Computer System (later labeled HYDRAIN)                          | Active - Completion Date: March 2, 1994  | 0800       | 38,000.00       | 37,260.03   | 739.97    |
| MINN  | 0002134   | Test and Evaluation of Bridge Rails and Transitions   | Active   | 0800       | 60,000.00       | 59,900.00   | 100.00    |
| MINN  | 0002134   | Test and Evaluation of Bridge Rails and Transitions   | Active   | 0860       | 15,000.00       | 14,900.00   | 100.00    |
| 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  | Unknown  | 0860       | 42,000.00       | 35,075.51   | 6,924.49  |
| MINN  | 0002146   | Testing of Roadside Safety Systems  | Unknown  | Q560       | 50,000.00       | 10,580.94   | 39,419.06 |
| MINN  | 0002155   | Durability of Geosynthetics for Highway Application   | Three final reports on task areas have been published. A 4 <sup>th</sup> 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 |



| STATE | PROJ. NO. | PROJECT NAME  | PROJECT STATUS   | PROG. CODE | UNDER AGREEMENT | EXPENDITURE | BALANCE*   |
|-------|-----------|---|--|------------|-----------------|-------------|------------|
| MINN  | 0002159   | Interpretation of Road Roughness Profile Data   | Cleared by FHWA but pending approval on 100% SPR   | 0860       | 30,000.00       | 8,355.99    | 21,644.01  |
| 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   |
| MINN  | 0002166   | Performance Evaluation of Crumb Rubber Modifier (CRM) in Asphalt Pavements                                  | Project deliverables have been completed and the project has been closed out   | 0860       | 20,000.00       | 15,605.88   | 4,394.12   |
| 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  | 0002170   | High Strength Concrete for Bridges  | Supposed to be completed in '01 – delayed because of an environmental lawsuit  | 0860       | 180,000.00      | 27,460.03   | 152,539.97 |
| MINN  | 0002171   | Predicting HOV Facility Demand  | Pending Approval   | 0860       | 30,000.00       | 24,980.02   | 5,019.98   |

| STATE | PROJ. NO. | PROJECT NAME  | PROJECT STATUS   | PROG. CODE | UNDER AGREEMENT | EXPENDITURE | BALANCE*  |
|-------|-----------|---|--|------------|-----------------|-------------|-----------|
| MINN  | 0002174   | Accelerated Pavement Testing of Crumb Rubber Modified Asphalt Pavements   | FHW would like funds for this program to be used for another project                           | 0860       | 87,000.00       | 8,150.00    | 78,850.00 |
| MINN  | 0002176   | Validation of SHRP Asphalt and Asphalt Mixture Specifications Using Accelerated Loading   | Study is complete. Awaiting the final report   | 0860       | 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       | 0.00        | 60,000.00 |
| MINN  | 0002178   | Seasonal Changes in Pavement Material Properties  | MN was lead state on this-we show the project as closed  | 0860       | 60,000.00       | 41,871.83   | 18,128.17 |
| MINN  | 0002179   | Load Testing of Instrumented Pavement Sections  | Final report for this study is number 2000-35. Project is completed but needs to be closed out | 0860       | 90,000.00       | 62,807.80   | 27,192.20 |
| 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                    | 0860       | 30,000.00       | 20,935.91   | 9,064.09  |
| 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       | 13,608.34   | 6,3091.66 |
| 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  |

| STATE | PROJ. NO. | PROJECT NAME   | PROJECT STATUS   | PROG. CODE | UNDER AGREEMENT | EXPENDITURE | BALANCE*  |
|-------|-----------|--|--|------------|-----------------|-------------|-----------|
| 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)             | 0860       | 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   | 29,890.35 |
| 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  |

| STATE | PROJ. NO. | PROJECT NAME   | PROJECT STATUS   | PROG. CODE | UNDER AGREEMENT | EXPENDITURE | BALANCE*  |
|-------|-----------|--|--|------------|-----------------|-------------|-----------|
| 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  |
| 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       | 6,171.48    | 8,828.52  |
| MINN  | 0002197   | Bridge Fatigue Screening, Monitoring and Retrofitting Manual   | Unknown  | Q560       | 40,000.00       | 0.00        | 40,000.00 |
| MINN  | 0002198   | Engineered Flowable Fill Bridge Approaches plus Abutment and Culvert Backfill using Inexpensive Recycled Materials [Cancelled] | Project cancelled – 1998 This study has been merged with NCHRP 24-12 since both studies dealt with the same problem and all concurred.   | Q560       | 20,000.00       | 12,288.00   | 7,712.00  |
| 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 extended an additional six months through 8/28/02. (2/7/02) | Q560       | 25,263.00       | 8,990.19    | 16,272.81 |
| MINN  | 0002200   | Compilation and Evaluation of Results from High-Performance Concrete Bridge Projects   | Active   | Q560       | 4,000.00        | 14.67       | 3,985.33  |

| STATE | PROJ. NO. | PROJECT NAME  | PROJECT STATUS   | PROG. CODE | UNDER AGREEMENT | EXPENDITURE | BALANCE*   |
|-------|-----------|---|--|------------|-----------------|-------------|------------|
| 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  | 0002208   | Pavement Subgrade Performance Study                                       | Active   | 0860       | 60,000.00       | 0.00        | 60,000.00  |
| MINN  | 0002208   | Pavement Subgrade Performance Study                                       | Active   | Q560       | 60,000.00       | 24,567.71   | 35,432.29  |
| MINN  | 0002209   | Enhanced Guidance for Implementation of Safety Strategies                 | Active   | Q560       | 150,000.00      | 0.00        | 150,000.00 |
| MINN  | 0002210   | Comprehensive Highway Safety Improvement Model                            | Active   | Q560       | 50,000.00       | 324.76      | 49,675.24  |
| 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  | 0002218   | Durability of Segmental Retaining Wall Blocks                             | Active   | Q560       | 35,000.00       | 0.00        | 35,000.00  |
| MINN  | 0002800   | SHRP Implementation Asphalt Test Equipment                                | Active   | 0860       | 335,000.00      | 266,578.62  | 68,421.38  |
| MINN  | 0003010   | Crescent Study (Part I Funds) (This study not monitored by R&D)           | Unknown  | 0860       | 70,000.00       | 37,556.95   | 32,443.05  |
| MINN  | 0003021   | Ice Forces On the St. Regis River   | Closed Out In 1993   | 0860       | 10,000.00       | 9,900.00    | 100.00     |
| MINN  | 0003024   | HELP, Inc   | Unknown  | 0860       | 40,000.00       | 30,000.00   | 10,000.00  |
| MINN  | 0003027   | Ohio SHRP Test Road-Instrumentation                                       | COMPLETED IN 1998.   | 0860       | 4,400.00        | 0.00        | 4,400.00   |
| MINN  | 0003033   | Premature Rigid Pavement Deterioration                                    | Study completed  | 0860       | 15,000.00       | 13,415.04   | 1,584.96   |

| STATE | PROJ. NO. | PROJECT NAME   | PROJECT STATUS   | PROG. CODE | UNDER AGREEMENT | EXPENDITURE | BALANCE*   |
|-------|-----------|--|--|------------|-----------------|-------------|------------|
| 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  | 0003044   | Base Funding for Northcentral Superpave Center   | See TPF-5(021)   | 0860       | 20,000.00       | 13,701.74   | 6,298.26   |
| MINN  | 0003044   | Base Funding for Northcentral Superpave Center   | See TPF-5(021)   | Q560       | 85,000.00       | 27,662.01   | 57,337.99  |
| MINN  | 0003046   | Fillet Welding Procedure Qualification Research  | Unknown  | Q560       | 20,000.00       | 13,020.63   | 6,979.37   |
| MINN  | 0003055   | R&D of the 3rd Phase of an Autonomous Shadow Vehicle Prototype                         | As of 2/5/02 final rpt is under review   | Q560       | 50,000.00       | 17,896.47   | 32,103.53  |
| MINN  | 0003062   | ITS Deployment Research and Professional Capacity Building                             | File notes state project is cancelled  | Q560       | 50,000.00       | 586.78      | 49,413.22  |
| MINN  | 0003063   | IVI Specialty Vehicles Program   | Active – draft final in review process   | Q560       | 400,000.00      | 189,509.34  | 210,490.66 |
| 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   | 14,011.92  |
| 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       | 15,551.49   | 4,448.51   |
| MINN  | 0003079   | REPORT   | Active   | Q560       | 232,500.00      | 220,477.98  | 12,022.02  |
| MINN  | 0003081   | HERMES II  | Active?  | Q560       | 125,000.00      | 90,735.87   | 34,264.13  |
| MINN  | 0003083   | FIXS-Fabrication error Indexed examples and Solutions                                  | Active   | Q560       | 17,500.00       | 16,462.77   | 1,037.23   |

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|-------|-----------|--|--|------------|-----------------|-------------|-----------|
| 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       | 15,281.35   | 9,718.65  |
| 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       | 0.00        | 40,000.00 |
| MINN  | 0003097   | Machinability of High-Performance Steel  | Active   | Q560       | 10,000.00       | 366.70      | 9633.30   |
| MINN  | 0003098   | Pavement Reconstruction Scheduling Software  | Active - Study is nearing completion. Software has been distributed to participating states and 8 training sessions have been conducted. (updated: 10/16/03) | Q560       | 49,200.00       | 0.00        | 49,200.00 |
| 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  |
| MINN  | TPF5001   | Soil Mix Methods for Highway Application   | Active   | 0860       | 20,000.00       | 0.00        | 20,000.00 |
| MINN  | TPF5001   | Soil Mix Methods for Highway Application   | Active   | Q560       | 40,000.00       | 403.94      | 39,596.06 |

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|-------|-----------|---|---|------------|-----------------|-------------|-----------|
| 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       | 0.00        | 60,000.00 |
| MINN  | TPF5023   | Investigation of Aggregate Shape Effects on Hot Mix Performance Using An Image Analysis Approach  | Active  | Q560       | 20,000.00       | 1,666.91    | 18,333.09 |
| MINN  | TPF5039   | <u>Falling Weight Deflectometer (FWD) Calibration Center and Operational Improvements</u>   | Active  | Q560       | 30,000.00       | 0.00        | 30,000.00 |
| MINN  | TPF5042   | Investigation of the Long-Term Effects of Magnesium Chloride  | Active - Quarterly Progress Report (April 15 - July 15, 2004) | 0860       | 20,000.00       | 0.00        | 20,000.00 |
| MINN  | TPF5042   | Investigation of the Long-Term Effects of Magnesium Chloride  | Active - Quarterly Progress Report (April 15 - July 15, 2004) | Q560       | 20,000.00       | 2,113.00    | 17,886.80 |
| MINN  | TPF5055   | Rapid Bridge Replacement Techniques   | Active  | Q560       | 10,000.00       | 0.00        | 10,000.00 |
| MINN  | TPF5068   | Long-Term Maintenance of Load and Resistance Factor Design Specifications   | Active - <u>Quarterly Report - Ending August 31, 2004</u>     | Q560       | 40,000.00       | 0.00        | 40,000.00 |
| MINN  | TPF5070   | International Conference on Accelerated Pavement Testing  | Active  | Q560       | 15,000.00       | 0.00        | 15,000.00 |
| MINN  | TPF5073   | Portable Non-Intrusive Technologies   | Active  | Q560       | 15,000.00       | 0.00        | 15,000.00 |
| MINN  | TPF5078   | Upper Midwest Freight Corridor Study  | Active  | Q560       | 60,000.00       | 0.00        | 60,000.00 |



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|-------|-----------|--|--|------------|-----------------|-------------|-----------|
| MINN  | TPF5090   | Pavement Tools Consortium                                      | Active – Quarterly Progress Report<br><u>January 1, 2004 - June 30, 2004</u> | Q560       | 20,000.00       | 0.00        | 20,000.00 |
| MINN  | TPF5093   | North/West Passage Transportation Pooled Fund Program, Phase 1 | Active   | Q560       | 50,000.00       | 0.00        | 50,000.00 |

**TOTAL BALANCE****2,336,103.31**

\* Balances are good as of the date the FMIS report -10/04/04