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Mr. Patrick McKenna, Director
Missouri Department of Transportation
Jefferson City, Missouri 65102

June 30, 2017

RE: FY2018 State Planning and Research Work
Program and FY2017 Annual Report
Missouri Project SPR-PL-00 FY (018)

Dear Mr. McKenna:

In your letter dated June 28, 2017, we received your request for the Federal Highway Administration's (FHWA) and the Federal Transit Administration (FTA) review and approval of the final version of Missouri Department of Transportation's (MoDOT) fiscal year (FY) 2018 State Planning and Research (SPR) Work Program and FY2017 Annual Report. After prior discussion and review of draft copies, we find the FY 2018 SPR Work Program satisfactory and approve it as requested, effective July 1, 2017. The MoDOT FY2018 SPR Work Program year begins on July 1, 2017 and ends on June 30, 2018.

This approval includes the estimated funding amounts for the Unified Planning Work Programs (UPWPs) for Missouri's eight metropolitan planning areas. However, the UPWPs for each of the Metropolitan Planning Organizations (MPOs) continue to be subject to ONE DOT's individual review and written approval.

The FY2018 SPR Work Program and FY2017 SPR Annual Reporting data are presented in one planning work product. Please provide our Division Office the addendum that adds the FY 2017 actual cost to the FY 2018 SPR Work Program by August 31, 2017 and take steps to close out the SPR-PL-00 FY (17) project within 90 days of the close of the state fiscal year 2017 work program.

If you have any questions, please contact Brad McMahan at FHWA (573) 638-2609 or Jeremiah Shuler at FTA (816) 329-3940.

Sincerely,

Mokhtee Ahmad
Regional Administrator
Federal Transit Administration

For: Kevin W. Ward
Division Administrator, P.E.
Federal Highway Administration

cc: Mabelle Watkins, MoDOT
Eva Voss, MoDOT
Doug Hood, MoDOT
Bill Stone, MoDOT
Dave Ahlvers, MoDOT
Sharon Monroe, MoDOT

Missouri Department of Transportation
Patrick K. McKenna, Director

1.888.ASK MODOT (275.6636)

June 28, 2017

Mr. Kevin Ward
Division Administrator
Federal Highway Administration
3220 West Edgewood, Suite H
Jefferson City, MO 65109

Mr. Mokhtee Ahmad
Regional Administrator
Federal Transit Administration
901 Locust Street, Suite 404
Kansas City, MO 64106

Dear Messrs. Ward and Ahmad:

Attached is the Missouri Department of Transportation's FY 2018 State Planning and Research Work Program and FY 2017 Annual Report. A draft copy was submitted to your office on June 8, 2017, for review by ONE DOT.

MoDOT is requesting overall approval effective July 1, 2017 of Part I-Planning and Part III-Research, Development and Technology. As discussed in our meeting, Part II-Metropolitan Planning is for informational purposes. The Federal funds will be obligated based on the MPO's UPWP.

We have added Innovated Partnerships and Alternative Funding to Part I of the Final SPR FY 18.

There will be an amendment at a later date for Pre-Scoping activities and developing bridge standards and guidance.

If there are questions regarding this SPR program, please contact Paige Kempker 526-4142 or me at 526-1374.

Sincerely,



Machelle Watkins
Director of Transportation Planning

Enclosure

Copy: Brad McMahon- FHWA
Jeremiah Shuler-FTA
Dave Ahlvers - CM-MODOT



Our mission is to provide a world-class transportation experience that delights our customers and promotes a prosperous Missouri.

www.modot.org

State Planning and Research Program

SPR-PL-00 FY (18)
2018 Fiscal Year
(7/1/17 to 6/30/18)

Work Program

And
SPR-PL-00 FY (17)
2017 Fiscal Year
(7/1/16 to 6/30/17)



Missouri Department
of Transportation

In Cooperation with the
U.S. Department of Transportation
Federal Highway Administration

Annual Report

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List of Abbreviations

AASHTO – American Association of State Highway and Transportation Officials
AEP – Annual Exceedance Probabilities
APA – American Planning Association
ARAN – Automatic Road Analyzer
ARI – Average Recurrence Intervals
ASTM – American Society for Testing and Materials
ATR – Automatic Traffic Recorder
BEAP – Bridge Engineering Assistance Program
CAP – Compliance Assessment Program
CFR – Code of Federal Regulations
CMF – Cash Modification Factor
CMS – Content Management System
CP – Cathodic Protection
CPG – Consolidated Planning Grants
DOT – Department of Transportation
EERC – Earthworks Engineering Research Center
EMTSP – Equipment Management Technical Services Program
EPG – Engineering Policy Guide
EWG – East-West Gateway Council of Governments
FARS – Fatality Analysis Reporting System
FAST Act – Fixing America’s Surface Transportation Act
FFY – Federal Fiscal Year
FHWA – Federal Highway Administration
FRP – Fiber Reinforced Polymer
FTA – Federal Transit Administration
FTZ – Foreign Trade Zone
GIS – Geographic information system
GPR – Ground-Penetrating Radar
GPS – Global Positioning System
HAL – Highway Accident Location
HMA – Hot-Mix Asphalt
HPMS – Highway Performance Monitoring System
HSM – Highway Safety Manual
HS-SCC – High Strength Self-Consolidating Concrete
HVFA – High Volume Fly Ash
IMISS – Implementing Maintenance Innovations from State to State
ITE – Institute of Transportation Engineers
ITS – Intelligent Transportation System
LED – Light Emitting Diode
LETS – Law Enforcement Technology System
LIDAR – Light Detection and Ranging
LKD – Lime Kiln Dust
LPA – Local Public Agencies
LRFD – Load and Resistance Factor Design
LRS – Linear Referencing System Network

LRTP – Long-Range Transportation Plan
LTAP – Local Technical Assistance Program
MACOG – Missouri Association of Councils of Government
MACTO – Missouri Association of County Transportation Officials
MAP-21 – Moving Ahead for Progress in the 21st Century
MARC – Mid-America Regional Council
MATC – Mid-America Transportation Center
MDA – Mixture Design and Analysis
MERIC – Missouri Economic Research and Information Center
MHTC – Missouri Highway Transportation Commission
MLS – Master of Library Science
MoDOT – Missouri Department of Transportation
MPO – Metropolitan Planning Organization
MUTCD – Manual on Uniform Traffic Control Devices
MVFC – Mississippi Valley Freight Coalition
NCAT – National Center for Asphalt Technology
NCHRP – National Cooperative Highway Research Program
NCSC – North Central Super pave Center
NDT – Non-destructive Testing
NHI – National Highway Institute
NTKN – National Transportation Knowledge Network
NTPEP – National Transportation Product Evaluation Program
ONE DOT – Federal Highway Administration and Federal Transit Administration
OTO – Ozarks Transportation Organization
PCC – Portland Cement Concrete
PI – Principal Investigator
PIERS – Port Import Export Reporting Service
PL – Metropolitan Planning
PPG – Planning and Policy Group
QA – Quality Assurance
QC – Quality Control
RAS – Recycled Asphalt Shingles
RCA – Recycled Concrete Aggregate
RPC – Regional Planning Commission
RTAP – Rural Technical Assistance Program
RTS – Right Transportation Solutions
SASW – Spectral Analysis of Surface Waves
SCC – Self-Consolidating Concrete
SDE – Service Desk Express
SFY – State Fiscal Year
SHAL – Safety Handbook for Locals
SICOP – Snow and Ice Pooled Fund Cooperative Program
SPF – Safety Performance Functions
SPR – State Planning and Research
SPT – Standard Penetration Test
SRTS – Safe Routes to School
STARS – Missouri Statewide Traffic Accident Records System
STIP – Statewide Transportation Improvement Program
TAC – Technical Advisory Committee
TCD – Traffic Control Device

TCOAP – Thin-White Topping Concrete Overlays of existing Asphalt Pavement
TE – Transportation Enhancement
TEAP – Traffic Engineering Assistance Program
TIG – Technology Implementation Group
TKN – Transportation Knowledge Networks
TMC – Transportation Management Center
TMS – Transportation Management Systems
TRB – Transportation Research Board
TP – Transportation Planning
TPF – Transportation Pooled Funds
TSP2 – Transportation Pavement Preservation Program
TTC – Temporary Traffic Control
TTCC – Technology Transfer Concrete Consortium
TTIC – Technology Transfer Intelligent Compaction
TWLT – Two-Way Left Turn
UAB – Urban Area Boundary
UPWP – Unified Planning Work Program
USGS – United States Geological Survey
UTCOAP – Ultra-Thin White Topping Concrete Overlays of existing Asphalt Pavement
VMT – Vehicle Miles of Travel
WIM – Weigh-in-motion

Preface

This SPR Work Program is prepared as an overview of the MoDOT activities that relate to Section 505, State Planning and Research, of Title 23, United States Code.

This report focuses on three parts. Part I (Planning) describes the state planning activities. Part II (Urban – Metropolitan planning organizations, MPO – CPG) describes the planning activities of the MPO. Part III (Research-SR) describes the technology transfer, development and research activities.

State Planning (SP) funds identify and develop methods to evaluate, prioritize and finance transportation needs.

Consolidated Planning Grant (CPG) funds are distributed to the nine metropolitan areas for their use in urban planning. The combined state and local urban planning work is coordinated into the Unified Work Program for each of the urbanized areas.

Research, Development and Technology Transfer (SR) funds are used for research, and for development and technology transfer activities necessary in connection with the planning, design, construction and maintenance of highway, public transportation and intermodal transportation systems.

The SFY 2018 SPR Work program is describing the proposed work activities and estimated budgets for each SFY 2018 SPR work program work element and the expenditures for each SFY 2017 SPR work program work activity and SFY 2017 accomplishments. An administrative action will be completed in August 2017 for the purpose of incorporating the actual expenditure amounts for SFY 2017 work activities into the SFY 2018 SPR Work program. This administrative action will be in the form of an addendum and provided to FHWA for informational purposes. It will be available for viewing on www.modot.org.

Introduction

Planning in general involves a method for accomplishing a desired objective – deciding in advance planning activities for the upcoming year. It is a continuous process aimed at maintaining the entire transportation system. Planning is the orderly and continuing assembly of information – including the history of development, the extent, dimensions, condition, use, economic and social effects, costs and future needs. It includes the analysis of this information for use by the administrators for the development and management of the transportation system in an efficient and cost-effective manner.

MoDOT's Mission:

Our mission is to provide a world-class transportation experience that delights our customers and promotes a prosperous Missouri.

MoDOT's Tangible Results:

- Keep Customers and Ourselves Safe
- Keep Roads and Bridges in Good Condition
- Provide Outstanding Customer Service
- Deliver Transportation Solutions of Great Value
- Operate a Reliable and Convenient Transportation System
- Use Resources Wisely
- Advance Economic Development

MoDOT's Value Statements:

- Be Safe,
 - Be Accountable,
 - Be Respectful,
 - Be Inclusive,
 - Be Bold,
 - Be Better, and
 - Be One Team
- So we can be a great organization

Financial Summary Sheet

A. Total Estimated Costs	SFY 2018	SFY 2017
Part I – Planning	\$15,238,298	\$17,065,324
Part II – Metropolitan Planning	\$10,078,190	\$8,225,235
Part III – Research, Development and Technology	<u>\$2,505,811</u>	<u>\$2,826,785</u>
TOTAL ESTIMATED COST	\$27,822,299	\$28,117,344
B. Available Federal Funds	SFY 2018	SFY 2017
Part I - State Planning		
Obligated but Not Spent [Q55/H55/L55, L55E]	\$9,071,995	\$10,938,582
Unobligated Funds [0800, L55E and M550]	\$30,391,396	\$29,600,997
Estimated Annual Apportionment [L55]	<u>\$14,400,000</u>	<u>\$14,200,000</u>
SUBTOTAL – STATE PLANNING	\$53,863,391	\$54,739,579
Part II - Metropolitan Planning		
Obligated but Not Spent [PL and 5303]	\$8,480,979	\$11,612,641
Unobligated Funds [PL and 5303]	\$5,088,526	\$0
Estimated FHWA PL Annual Allocation	\$5,300,000	\$5,200,000
Estimated FTA 5303 Annual Allocation	<u>\$1,743,627</u>	<u>\$1,672,416</u>
SUBTOTAL – METRO PLANNING	\$20,613,132	\$18,485,057
Part III – Research		
*Obligated but not spent [Q56/H56/L56, L56E]	\$2,840,081	\$3,228,471
Unobligated Funds [Q56/H56/L56E]	\$7,247,048	\$7,139,568
Estimated Annual Apportionment	\$4,800,000	\$4,700,000
Less:	<u>(\$1,869,800)</u>	<u>(\$1,812,800)</u>
- NCHRP.....\$1,060,000 estimated		
- TRB Core.....\$170,000 estimated		
- Pooled Funds.....\$639,800 estimated		
SUBTOTAL – RESEARCH	\$13,017,329	\$13,255,239
TOTAL FEDERAL FUNDS AVAILABLE	\$87,493,852	\$86,479,875

* The majority of “Obligated but Not Spent” funds are obligated for pooled fund projects proposed project financing for SFY 2017.

C. Proposed Budget Estimates for SFY 2018

C. Proposed Budget Estimates for SFY 2018	Federal Funds	Percent	Matching Funds	Total
State Planning	\$12,190,638	80%	\$3,047,660	\$15,238,298
Metropolitan Planning (PL and 5303) (Estimated)	\$8,062,552	80%	\$2,015,638	\$10,078,190
Research	\$2,004,649	80%	\$501,162	\$2,505,811
TOTAL SP, SR & CPG	\$22,257,839		\$5,564,460	\$27,822,299

D. SFY 2017 SPR Budget Amounts

D. Proposed Budget Estimates for SFY 2017	Federal Funds	Percent	Matching Funds	Total
State Planning	\$13,652,259	80%	\$3,413,065	\$17,065,324
Metropolitan Planning (PL and 5303) (Estimated)	\$6,580,188	80%	\$1,645,047	\$8,225,235
Research	\$2,261,428	80%	\$565,357	\$2,826,785
TOTAL SP, SR & CPG	\$22,493,875		\$5,623,469	\$28,117,344

Itemized Cost Budget Estimates and Actual Expenditures

Part I – Planning

Transportation Planning Activities	SFY 2018 Budget	SFY 2017 Budget
• Administration	\$1,060,917	\$492,284
• Planning and Performance Group		
o Planning and Policy Group	\$520,353	\$521,555
o Strategic Planning Group	\$429,915	\$380,624
• Statewide Programming	\$695,157	\$663,274
• Transportation Systems Management	\$3,308,560	\$4,586,066
o Administration	\$131,234	\$129,987
o Mapping and Customer Service	\$623,230	\$800,426
o Pavement Analysis and Application Dev.	\$656,192	\$657,038
o Traffic/Collection	\$481,595	\$1,458,940
▪ Field Acquisition	\$890,911	\$939,630
o Data	\$525,397	\$600,045
SUBTOTAL	\$6,014,902	\$6,643,802
<i>District Transportation Planning</i>		
• CD	\$320,829	\$419,901
• KC	\$846,430	\$1,279,195
• NE	\$638,547	\$897,467
• NW	\$303,542	\$419,163
• SE	\$271,773	\$546,717
• SL	\$407,054	\$701,421
• SW	\$428,605	\$1,100,560
SUBTOTAL	\$3,216,780	\$5,364,423
<i>Other Activities</i>		
• Information Systems	\$2,309,315	\$2,209,690
• Regional Planning Commission	\$1,375,000	\$1,375,000
• Financial Planning & Reporting	\$1,190,239	\$1,198,437
• Bridge Division	\$419,864	\$49,515
• Design Division	\$88,907	\$224,457
• Innovative Partnerships and Alternative Funding	\$623,291	\$0
SUBTOTAL	\$6,006,616	\$5,057,100
TOTAL PART I	\$15,238,298	\$17,065,324

*SFY 2017 Actuals will be submitted to FHWA as an addendum August 2017.

Part II – Urban (MPO)

Metropolitan Areas	Current CPG Contract Amount	Estimated FFY 2018 Local Match	Estimated Total FFY 2018 CPG Funds with Match	Estimated Total FFY 2017 CPG Funds with Match
NW Arkansas	\$7,000	\$1,750	\$8,750	\$6,250
Kansas City	\$1,985,365	\$496,341	\$2,481,706	\$2,271,193
St. Louis	\$4,115,236	\$1,028,809	\$5,144,045	\$4,068,638
Springfield	\$754,666	\$188,667	\$943,333	\$712,943
Columbia	\$407,471	\$101,868	\$509,339	\$330,452
Jefferson City	\$140,782	\$35,196	\$175,978	\$188,225
Joplin	\$258,166	\$64,542	\$322,708	\$240,295
St. Joseph	\$178,170	\$44,543	\$222,713	\$231,775
Cape Girardeau	\$215,696	\$53,924	\$269,620	\$175,463
TOTAL PART II	\$8,062,552	\$2,015,638	\$10,078,190	\$8,225,235

- Note:** - The estimated total of MPO contracts (CPG agreements) in place for the SFY 2018 SPR work program is \$8,062,552.
- The PL amount is before post-apportionment set-asides; before penalties; before sequestration.
 - Estimated total apportioned PL Funds = \$5,247,064 Obligation limitation applied at 92.86%

Part III – Research – SPR

Activity	SFY 2018 Budget	SFY 2017 Budget
• Administration (SPR17ADS)	\$254,627	\$252,836
• Research (SPR17RDS)	\$1,673,908	\$2,001,908
• Development (SPR17DVS)	\$84,276	\$82,041
• Technology Transfer (SPR17TTS)	\$493,000	\$490,000
TOTAL PART III	\$2,505,811	\$2,826,785

*SFY 2017 Actuals will be submitted to FHWA as an addendum August 2017.

TOTAL MoDOT SPR WORK PROGRAM

	SFY 2018 Budget	SFY 2017 Budget
• Part I – Planning	\$15,238,298	\$17,065,324
• Part II – Metropolitan Planning	\$10,078,190	\$8,225,235
• Part III – Research	\$2,505,811	\$2,826,785
TOTAL MoDOT SPR WORK PROGRAM	\$27,822,299	\$28,117,344

*SFY 2017 Actuals will be submitted to FHWA as an addendum August 2017.

WORK PLANS

Core and Mandated Activities

Part I – Planning

TRANSPORTATION PLANNING ACTIVITIES

ADMINISTRATION

Purpose and Scope: Administration provides for the management of Transportation Planning’s core functions. Included are items such as training, for example: NHI courses, supervisory/management training, APA training and other various training courses. Also included are such items as office supplies, equipment and travel expenses. The budget amount includes personal services and fringe benefits for employees in this unit.

This unit also includes MoDOT’s participation in the Midwest Rail Initiative that involves sharing of information regarding freight and passenger movements on rail and freight data update coordination and economic studies.

SFY 2018 Proposed Activities:

- Continue providing for the management of Transportation Planning’s core functions including trainings and office supplies, equipment and travel expenses
- Host a statewide planning partner meeting early 2018 to share transportation information and best practices
- Continue participating in the Midwest Rail Initiative
- Attend conferences, peer exchanges, AASHTO meetings and training courses
- Conduct an economic impact analysis for the SFY 2018-2022 STIP
- Update the Long Range Transportation Plan

SFY 2017 Accomplishments:

- Hosted one planning partner meeting, March 9, 2017, and shared information regarding transportation funding, planning for the next Statewide Transportation Improvement Program and asset management planning by regional group
- Attended conferences, peer exchanges, AASHTO meetings and training courses
- Conducted an economic impact analysis for the SFY 2017-2021 STIP

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2018	\$1,060,917	SPR1840S
Budget Amount SFY 2017	\$ 492,284	SPR1740S
Actual Cost SFY 2017	(See Addendum Aug. 2017)	SPR1740S

PLANNING AND PERFORMANCE GROUP

Purpose and Scope: Planning and Performance Group (PPG) includes both the Planning and Policy and Strategic Planning Groups. These two groups have been consolidated into one unit and will continue working on current goals and accomplishments assigned to each group. The budgets and actuals will be tracked separately for each group. The budget amounts include personal services and fringe benefits for employees in these units.

Planning and Policy: PPG maintains the 20-year long-range transportation plan. This plan analyzes needs for all modes of transportation and provides policy and goal direction for MoDOT as it develops the Statewide Transportation Improvement Program. This unit also covers a wide variety of activities and ensures MoDOT's program delivery moves as seamless as possible.

Strategic Planning Group: MoDOT aligns the strategic planning process with its mission, values and tangible results. The tangible results focuses on outcomes that MoDOT's customers expect the department to accomplish. MoDOT uses strategic management to ensure this is an ongoing process rather than an annual event. By linking performance measures to its tangible results, related strategies and objectives are identified, and action plans for the priority items are created. These action plans are continuously reviewed and modified, as necessary, throughout the year. Quarterly management review of the performance management system known as the Tracker ensures accountability at all levels. Annual leadership focus meetings establish high-level department direction and initiatives that help drive performance in key areas. The budget amount includes personal services and fringe benefits for employees coordinating and facilitating these efforts.

SFY 2018 Proposed Activities:

Planning and Policy Group:

- Attend MPOs board and technical committee meetings
- Engage the public in discussions about additional transportation investments and needs
- Continue assisting RPCs in:
 - developing and maintaining work programs and regional transportation plans
 - providing local consultation with rural local officials
- Continue assisting MPOs in developing and maintaining the following work products
 - unified planning work programs
 - transportation improvement programs
 - long-range transportation plans
 - air quality conformity determinations
 - public involvement plans
- Develop analytical tools for use in transportation planning
- Work with local communities to assist with transportation air-quality issues and policy development
- Coordinate and support MoDOT's national involvement in FAST Act/MAP-21 performance measure development and implementation
- Continue monthly FAST Act/MAP-21 implementation calls with MPOs, RPCs, ONE DOT, Arkansas, Illinois, and Kansas DOT, FHWA and FTA staff to collaborate on performance management requirements and share best practices
- Assist MPOs in Performance Based Planning and Programming
- Continue development of the Asset Management Plan
- Administered Tracker surveys: Customer Service Survey (Call Center) and Right Transportation Solutions Survey

- Bid and manage Report Card Survey (customer satisfaction survey of Missourians)
- Participate in the ONE DOT Federal Certification Review of the transportation planning process in the Kansas City metropolitan planning area
- Develop the initial Transportation Asset Management Plan
- Continue to update the district Transportation Asset Management Plan
- Update the FY 2018 State Planning and Research Work Program
- Revise the public involvement element of the Engineer Policy Guide

SFY 2018 Proposed Activities:

Strategic Planning Group:

- Provide team facilitation for process improvement and business planning teams
- Continue to support and develop the Tracker performance management system
- Implement a MoDOT performance scorecard and dashboard
- Provide guidance and reviews of performance measures to MoDOT management
- Produce the quarterly Tracker publications and coordinate quarterly Tracker Review meetings
- Coordinate “deep-dive” sessions and Focal Point publications
- Coordinate strategic issue sessions for senior manager meetings
- Continue to coordinate and develop the Innovations Challenge program
- Develop online tools for process improvement, business planning and performance measurement
- TP internal and external customer satisfaction surveys
- Revise the public involvement element of the EPG

SFY 2017 Accomplishments:

Planning and Policy Group:

- Assisted the RPCs with:
 - developing and maintaining work programs and regional transportation plans and
 - providing local consultation with rural local officials.
- Attended MPOs board and technical committee meetings
- Continued collaborating with RPCs and MPOs and MoDOT district offices on a variety of planning issues targeted at improving federal required work products and to further enhance transportation planning efforts
- Collaborated with local communities to assist with transportation air-quality issues and policy development
- Coordinated and supported MoDOT’s national involvement in FAST Act/MAP-21 performance measure development and implementation
- Initiated monthly FAST Act/MAP-21 implementation calls with MPOs, RPCs, ONE DOT, Arkansas, Illinois, and Kansas DOT, FHWA and FTA staff to collaborate on performance management requirements and share best practices
- Assist MPOs in developing performance measures and targets
- Initiated the development of the Asset Management Plan
- Administered Tracker surveys: Customer Service Survey (Call Center) and Right Transportation Solutions Survey
- Conducted and managed Report Card Survey (customer satisfaction survey of Missourians)
- Participated in the ONE DOT Federal Certification Review of the transportation planning process in the St. Louis and Springfield metropolitan planning areas
- Participated in the ONE DOT process review of the transportation planning process in the Columbia metropolitan planning area

- Participated in the ONE DOT follow-up review conducted in connection with the previously completed Joplin process review
- Worked with districts on Transportation Asset Management Plan
- Updated and submitted FY 2017 State Planning and Research Work Program
- Participated as a co-team leader in the joint FHWA/MoDOT process review of the MoDOT’s statewide public involvement process and MoDOT’s process for consulting with non-metropolitan local officials

SFY 2017 Accomplishments:

Strategic Planning Group:

- Supported and developed the Tracker performance management system including the production of the quarterly Tracker publications and coordination of the quarterly Tracker Review meetings
- Provided guidance and reviews of performance measures to MoDOT management
- Developed and deployed a target setting process for all appropriate Tracker measures
- Developed a performance management scorecard and dashboard
- Deployed action plans for all Focal Point sessions
- Facilitated the implementation of MoDOT’s Maintenance Management System, an electronic signature system and an electronic projects SharePoint site.
- Conducted the first internally facilitated design-build project for the Rogersville Route 60 project.
- Coordinated strategic issue sessions for senior manager meetings
- Updated online best practices pages for internal and external audiences
- Coordinated and further developed the Innovations Challenge program
- Provided guidance to other DOTs interested in starting their own innovations programs
- During the past year, the Innovations Challenge program identified 50 best practices, which have been shared for statewide implementation

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
<u>Planning and Policy Group</u>		
Projected Budget SFY 2018	\$520,353	SPR1840S
Budget Amount SFY 2017	\$521,555	SPR1740S
Actual Cost SFY 2017	(See Addendum Aug. 2017)	SPR1740S
 <u>Strategic Planning Group</u>		
Projected Budget SFY 2018	\$429,915	SPR1890S
Budget Amount SFY 2017	\$380,624	SPR1790S
Actual Cost SFY 2017	(See Addendum Aug. 2017)	SPR1790S

STATEWIDE PROGRAMMING

Purpose and Scope: The Statewide Programming unit develops the STIP and STIP-related products. This includes efforts by MoDOT Central Office personnel only. Personal services and fringe benefits for all employees within this work unit are also included in the budget amount.

SFY 2018 Proposed Activities:

- Produce and maintain the 2018-2022 STIP in accordance with the guidelines of the Planning Framework, and state and federal regulations
- Produce reports on STIP programs and projects
- Develop portions of the Accountability Report

SFY 2017 Accomplishments:

- Updated and completed the 2017-2021 STIP
- Incorporated STIP revisions as needed
- Developed STIP reports as needed
- Completed portions of the annual accountability report
- Posted Program vs. Award and AC conversion reports on the STIP web site

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2018	\$ 695,157	SPR1840S
Budget Amount SFY 2017	\$663,274	SPR1740S
Actual Cost SFY 2017	(See Addendum Aug. 2017)	SPR1740S

TRANSPORTATION SYSTEM ANALYSIS

ADMINISTRATION

Purpose and Scope: Transportation Planning’s administration manages and administers field acquisition, asset data, traffic data, travel way data, analysis of asset/travel way, data query and traffic operations. The budget amount also includes personal services and fringe benefits for all employees within this work unit.

SFY 2018 Proposed Activities:

- Administer and continue to improve the HPMS program
- Analyze transportation data and provide timely and accurate information to MoDOT’s customers
- Continue to provide data for the development of the MoDOT Asset Management Plan
- Administer and continue the Data Zone project

SFY 2017 Accomplishments:

- Administered HPMS program
- Analyzed and provided transportation data to customers and transportation decision makers
- Coordinated the Data Zone project
- Provided data for the development of the MoDOT Asset Management Plan

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2018	\$131,234	SPR1840S
Budget Amount SFY 2017	\$129,987	SPR1740S
Actual Cost SFY 2017	(See Addendum Aug. 2017)	SPR1740S

MAPPING and CUSTOMER SERVICE

Purpose and Scope: The Mapping and Customer Service unit is responsible for the following. The budget amount includes personal services and fringe benefits for all employees within this work unit.

- Provide analysis, custom queries and reports using TMS data
- Provide training and documentation for TMS and TMS customer support through our TMS Help Desk
- Test TMS software for monthly updates
- Maintain and publish MoDOT's state highway map
- Maintain statewide functional classification maps
- Maintain and update state, county, and city maps and develop specialty maps as requested
- Provide GIS data and data support as requested, official state system and county road mileages as well as custom mileage requests
- Work with all Missouri counties to update their county road mileages in TMS
- Provide outstanding customer service both inside and outside the department
- Work with IS to gather business requirements for TMS Design

SFY 2018 Proposed Activities:

- Continue updating, printing and providing distribution support of the Missouri State Highway Map
- Provide customer requested maps and GIS data help to internal and external customers
- Create 2018-2022 STIP maps, 2016 traffic volume map, 2017 Missouri Vehicle Route Map and update functional classification maps as required
- Provide MoDOT representation on Missouri's GIS Advisory Council, Missouri's Board on Geographic Names, FHWA's GIS for Transportation, MidAmerica GIS Consortium, Missouri Geospatial Alliance, Missouri Mappers Association and the National Map Corps
- Conduct TMS data restoration as required by our route update process
- Submit annual mileage of county roads by surface type report to the Missouri Department of Revenue and annual certified mileage report to the Governor and FHWA for approval
- Create annual official state system mileage report and various TMS mileage reports for internal and external customers
- Create county map books used by county commissioners to approve their official mileage
- Research TMS crash location inquiries submitted by law enforcement
- Identify construction projects that opened to traffic
- Provide outstanding customer service both inside and outside the department
- Develop Mapping and Customer Service SharePoint page and continue conversion of TMS documentation into SharePoint
- Create manuals and provide training for TMS Modernization
- Continue testing TMS Modernization and Client Manager rewrites and updates
- Provide representation on the state Innovations Challenge Team and submitted a winning (statewide) best practice in the competition
- Create videos for TMS training
- Create county maps for internal and external customers
- Provide representation on the State Maintenance Team
- Provide GIS data and mapping support to SEMA/FEMA during declared disasters in Missouri
- Provide continued representation/oversight to Missouri state agency LiDAR data server sharing project

- Provide continued oversight to Missouri statewide high-resolution imagery program with the Missouri Office of Administration
- Data Zone application testing and creating manuals

SFY 2017 Accomplishments:

- Continued testing TMS Modernization and Client Manager rewrite and updates
- Testing of the new Data Zone applications
- Created and updated training documentation for TMS, Emergency Operations, LRS Mapping, Safety Crash Browser, Safety Crash Summary, District Design, Average Annual Daily Traffic Map, Travelway Maintenance Agreement Maps, Data Summary Tool, Sign Location and Inspection Map, Signals by Age Map, Travelway Line Diagram, Pavement Statistics by Year and Data Entry Map web applications
- Provided training on TMS applications via video conference and classroom atmosphere
- Conducted and provided monthly TMS application update testing, support and TMS data restoration
- Provided custom GIS data and specialty maps to internal/external customers and planning partners
- Provided ongoing GIS data exchange with Missouri's surrounding states
- Provided MoDOT representation on Missouri's GIS Advisory Council, Missouri's Board on Geographic Names, FHWA's GIS for Transportation, MidAmerica GIS Consortium, Missouri Geospatial Alliance, Missouri Mappers Association and the National Map Corps
- Created annual fiscal year STIP maps, traffic volume maps, county map books, and functional classification map updates as requested
- Submitted annual mileage of county roads by surface type report to the Missouri Department of Revenue and annual certified mileage report to the Governor and FWHA for approval
- Created annual official state system mileage report and various TMS mileage reports for internal and external customers
- Researched TMS location inquiries submitted by the law enforcement
- Identified construction projects that opened to traffic
- Provided outstanding customer service both inside and outside the department
- Provided representation to Missouri state agency LiDAR data server sharing project
- Provided representation to the Missouri statewide high-resolution imagery program (Ortho-Imagery Program) with the Missouri Office of Administration
- Completed testing for the new updates for Flasher, Adobe and Internet Explorer
- Continued with the definition portion of the TMS User Doc in SharePoint
- Migrated Cognos reports to Crystal reports for Safety and Bridge
- Provided representation on the state Innovations Challenge Team and submitted a winning (statewide) best practice in the competition
- Continued distribution support of the 2013-2014 Missouri State Highway Map and created the new 2017 – 2018 state map
- Provided ongoing legislative support regarding road support funding
- Participated in GIS Day through education outreach at elementary schools
- Provided ArcGIS software testing support for the 10.4 upgrade
- Provided representation on the Statewide Maintenance Team, Total Compensation Team, and the Missouri Geographic Bee 2017
- Provided mapping support for the Missouri Department of Tourism – 2017 Total Solar Eclipse Map

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2018	\$623,230	SPR1840S
Budget Amount SFY 2017	\$800,426	SPR1740S
Actual Cost SFY 2017	(See Addendum Aug. 2017)	SPR1740S

PAVEMENT ANALYSIS AND APPLICATION DEVELOPMENT

Purpose and Scope: The Pavement Analysis and Application Development unit provides analysis of pavement data used in project selection and prioritization process as well as track conditions for strategic and long-range plans, and compiling and submitting all HPMS data as required by FHWA. This also includes personal services and fringe benefits for all employees within this work unit.

SFY 2018 Proposed Activities:

- Evaluate pavement data and prepare for HPMS submittal
- Provide pavement data, analysis and projections for transportation decision-making
- Update pavement management system reporting for new FAST Act/MAP-21 pavement reporting requirements as finalized
- Maintain, update and refine MoDOT’s linear referencing system for all public roads
- Update and modernize GIS applications that support asset data management and linear referenced inventories
- Research and develop efficient technologies for building and updating linear referenced GIS networks linked to asset management system
- Prepare and build new processes/systems for new pavement data collection equipment
- Monitor pavement data to evaluate current and past best practices in pavement management

SFY 2017 Accomplishments:

- Completed pavement data analysis and preparation for dual carriage routes for HPMS submittal
- Assisted in developing the data zone application
- Provided pavement data analysis, modeling and forecasting continuing with MoDOT’s Long Range Plan
- Provided analysis and input for MoDOT’s asset management plan
- Updated pavement management system in preparation for new FAST Act/MAP-21 pavement reporting requirements
- Maintained MoDOT’s linear referencing system and continually worked with counties to verify local roads
- Set up error reporting process with State Highway Patrol and local law enforcement agencies to correct naming or new alignment issues with our LRS
- Added additional quality control checks to pavement data ensuring data integrity
- Added new asset inventories into the modernized LRS

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2018	\$656,192	SPR1840S
Budget Amount SFY 2017	\$657,038	SPR1740S
Actual Cost SFY 2017	(See Addendum Aug. 2017)	SPR1740S

TRAFFIC/COLLECTION

Purpose and Scope: The Traffic/Collection unit provides current traffic data, design traffic projections, road-user costs analysis, VMT and annual reports. This unit provides the department and external customers with current and historical traffic information, traffic trends and VMT, and cooperates with the MPOs and other local entities in providing off-system traffic information and VMT for MoDOT and HPMS use. The budget amount also includes personal services and fringe benefits for all employees within this work unit.

SFY 2018 Proposed Activities:

- Provide traffic and pavement data for planning and design activities
- Calculate and provide 2017 statewide travel data

SFY 2017 Accomplishments:

- Processed portable and permanent counts in accordance with the traffic monitoring guide for HPMS submittal
- Calculated and provided 2016 statewide travel data and reports
- Collected pavement data on 35,977 miles of Missouri’s roadways
- Purchased a new ARAN van for collecting data on Missouri’s roads

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2018	\$481,595	SPR1840S
Budget Amount SFY 2017	\$1,458,940	SPR1740S
Actual Cost SFY 2017	(See Addendum Aug. 2017)	SPR1740S

Field Acquisition

Purpose and Scope: The Field Acquisition unit is responsible for collecting condition and operational data for the state highway system, processing and verifying physical roadway data and analyzing and reporting information on pavements. This includes personal services and fringe benefits.

- Traffic data (permanent count locations and special requests) and portable traffic counts, including vehicle classification and speed data
- Manual turning movement counts
- WIM data
- HPMS data collection
- Pavement condition data collection, processing and rating - ARAN van
- Condition reports for pavements
- Friction testing
- ARAN video

SFY 2018 Proposed Activities:

- Complete collection of approximately 5,192 portable counts and classification counts as requested with at least 30 percent of those counts being classification counts.

- Install and repair ATR sites as needed due to new pavement or faulty sensors in the pavement, upgrade at least 2 sites to Wavetronix.
- Continue upgrading our ATR sites to at least 90 percent cellular modem connection.
- Collect HPMS data as requested.
- Collect as much of the 35,000 miles of ARAN data as possible with two new ARAN units. Amount of data collected and used depends on compatibility to previous year’s data collection.

SFY 2017 Accomplishments:

- Collected 5,247 portable counts and class counts with at least 30 percent of those being classification counts
- Installed and repaired existing ATR sites, upgraded two site locations to Wavetronix units
- Continued updating our landline modem communications to cellular modem communication for our ATR sites, currently close to 75 percent switchover
- Collected all HPMS data as requested
- Collected all ARAN miles as requested

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2018	\$890,911	SPR1841S
Budget Amount SFY 2017	\$939,630	SPR1741S
Actual Cost SFY 2017	(See Addendum Aug. 2017)	SPR1741S

DATA

Purpose and Scope: The Data section maintains the system data associated with the state highway network. The budget amount also includes personal services and fringe benefits for all employees within this work unit.

- Change in route status
- Functional classification
- HPMS data
- Rural and urban area functional classification maps
- Bridge vertical clearance data
- State system classification
- National Highway System (NHS)
- Physical inventory of lane data (project location and length, number of lanes, pavement type, widths, thickness)
- Inventory of various data types (i.e., outdoor advertising controlled routes, truck routes, auto issue routes)

SFY 2018 Proposed Activities:

- Maintain all HPMS sample and universe segments
- Verify HPMS data accuracy and meet target submittal date to FHWA
- Maintain roadway data and its attributes
- Update bridge vertical clearances
- Maintain various TMS data types and update data as required by TP’s route update process
- Process functional classification requests and changes

- Improve data accuracy by querying data to locate inconsistencies
- Respond to requests for relocating bridges and other customer service requests
- Supply data to create various maps
- Provide data for automated Motor Carrier routing
- Assist with development of new Motor Carrier application that supports safe, efficient, and timely movement of freight through Missouri
- Improve the Change in Route Status Reports filing process and the process to expedite data retrieval
- Maintain an inventory of Federal Aid Primary as of 1991 for various legal purposes related to the management of Outdoor Advertising
- Review county map books for ownership and accuracy
- Collaborate with FHWA with transportation data regarding urban boundaries
- Work with FHWA to achieve approval of new urban boundaries
- Collect, manage, and report data on all public roads in an effort to support the strategic and performance-based goals in the SHSP and HSIP

SFY 2017 Accomplishments:

- Maintained all HPMS sample and universe segments and submitted the data to FHWA
- Maintained an inventory of roadway lane data and its attributes
- Entered approximately 300 roadway projects into TMS
- Updated bridge vertical clearances and answered bridge and clearance related questions
- Maintained various TMS data types and updated data as required by TP’s route update process
- Processed standard functional classification requests and changes
- Researched and answered inquiries submitted by internal customers (i.e., ownership)
- Provided GIS section with modifications to MoDOT’s route network
- Updated MoDOT performance measures to provide management with information on roadway projects
- Served as a liaison between Motor Carrier Services and TP concerning routing and junction issues
- Provided Motor Carrier Services with weekly progress reports on SDE tickets and other issues
- Assisted with testing the TMS Modernization applications for associatives
- Coordinated the FAST Act/MAP-21 enhanced NHS/Principal Arterial route review with districts
- Updated NHS data upon approval from FHWA and completed NHS changes as a result of the NE, NW and SE district NHS/Principal Arterial reviews
- Processed Change in Route Status Reports
- Researched and determined road sections utilizing plans, deeds and history maps
- Provided technical assistance with database issues pertaining to bridge inventory
- Conducted a statewide review of roadway detail and speed limit data
- Provided Billboard and Junkyard maps to customers as requested
- Reviewed county map books and assigned ownership
- Combined data records as requested using a data rollup program
- Collaborated with FHWA with transportation data regarding urban boundaries
- Entered data for new TMS associative application and map for Federal Aid Primary -1991

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2018	\$525,397	SPR1840S
Budget Amount SFY 2017	\$600,045	SPR1740S
Actual Cost SFY 2017	(See Addendum Aug. 2017)	SPR1740S

DISTRICT TRANSPORTATION PLANNING

This program supports the department’s district planning staff in efforts to provide comprehensive, cooperative and continuing transportation planning assistance and direction to the district staff, MPOs and RPCs. It includes the transportation planning staff efforts and activities with the MPOs, RPCs, local government officials and federal transportation agencies that support the long-range planning process and programming of transportation needs.

<i>District Transportation Planning</i>	<i>FY 2018 Budget</i>	<i>FY 2017 Amended Budget</i>
• CD	\$320,829	\$419,901
• KC	\$846,430	\$1,279,195
• NE	\$638,547	\$897,467
• NW	\$303,542	\$419,163
• SE	\$271,773	\$546,717
• SL	\$407,054	\$701,421
• SW	\$428,605	\$1,100,560
SUBTOTAL	\$3,216,780	\$5,364,423

*SFY 2017 Actuals will be submitted in the August 2017 Addendum.

OTHER ACTIVITIES

INFORMATION SYSTEMS

Purpose and Scope: MoDOT is directing a portion of the SPR funds for support, maintenance and modernization of the Transportation Management System.

SFY 2018 Proposed Activities:

- Maintain and modernize the Transportation Management System

SFY 2017 Accomplishments:

- TMS Core Maintenance Support, including repair, maintenance, and fix of current system, including the following key areas of TMS that provide critical support to MoDOT users and customers: Bridge, Adopt A Highway, Outdoor Advertising, Statewide Transportation Improvement Program, Traffic & Congestion, Pavement Tools, Intelligent Transportation System, and Safety System.

Financials

Projected Budget SFY 2018

Amount

\$2,309,315

Work ID Code

SPR18ISS

Budget Amount SFY 2017	\$2,209,690	SPR17ISS
Actual Cost SFY 2017	(See Addendum Aug. 2017)	

REGIONAL PLANNING COMMISSIONS

Purpose and Scope: MoDOT is directing a portion of the SPR funds to regional planning agencies for transportation planning activities. These funds provide sources of funding for the Missouri RPC to carry out comprehensive and continuing transportation planning processes in cooperation with state and local planning partners. State Planning and Research funds that are allocated to RPC’s assist with producing regional transportation plans, work programs involving transportation planning activities, citizen involvement processes, and other rural transportation planning efforts. Seventeen RPCs will receive federal SPR funding at approximately \$65,000 each. Budget and actual amounts exclude local match.

SFY 2018 Proposed Activities:

- Cooperate and collaborate with MoDOT on transportation planning processes
- Attend MACOG meetings held monthly in Jefferson City to discuss various issues with RPC’s
- Participate in RPCs’ technical committee meetings held in the respective regions throughout the state
- RPC’s work with MoDOT and districts with developing work programs involving transportation planning activities
- Participate in FAST Act/ MAP-21 conference calls

SFY 2017 Accomplishments:

- Attended MACOG meetings held monthly in Jefferson City to discuss various issues with RPC’s
- Participated in RPCs’ technical committee meetings held in the respective regions throughout the state
- Worked with RPC’s and districts with developing work programs involving transportation planning activities
- Attended Statewide Planning Partner meetings hosted by MoDOT, March 9, 2017

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2018	\$1,375,000	SPR1827S
Budget Amount SFY 2017	\$1,375,000	SPR1727S
Actual Cost SFY 2017	(See Addendum Aug. 2017)	SPR1727S

FINANCIAL PLANNING AND REPORTING

Purpose and Scope: These activities support MoDOT’s budget, finance, funds management and infrastructure bank activities. In addition, funds will be managed to achieve a balanced budget and provide coordination of STIP and federal-aid projects. Financial models are prepared to support department long-term plans and short-term cash needs. In addition, the Financial Service staff will continue to provide information on innovative sources of funding for the department’s transportation projects. The budget amount also includes personal services and fringe benefits for employees within this work unit.

SFY 2018 Proposed Activities:

- Provide support for MoDOT’s budget, finance, funds management and infrastructure bank

SFY 2017 Accomplishments:

- Provided activities to support MoDOT's budget, finance, funds management and infrastructure bank activities

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2018	\$1,190,239	SPR1893S
Budget Amount SFY 2017	\$1,198,437	SPR1793S
Actual Cost SFY 2017	(See Addendum Aug. 2017)	SPR1793S

BRIDGE DIVISION

Purpose and Scope: MoDOT is directing a portion of the SPR funds for Bridge Division staff spending all or a portion of their time working on projects prior to them being included in the STIP.

SFY 2018 Proposed Activities:

- Prepare projects to be included in the STIP

SFY 2017 Accomplishments:

- Prepared projects to be included in the STIP

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2018	\$419,864	SPR18BRS
Budget Amount SFY 2017	\$49,515	SPR17BRS
Actual Cost SFY 2017	(See Addendum Aug. 2017)	SPR17BRS

DESIGN DIVISION

Purpose and Scope: MoDOT is directing a portion of the SPR funds for Design Division staff spending all or a portion of their time working on projects prior to them being included in the STIP.

SFY 18 Proposed Activities;

- Prepare projects to be included in the STIP

SFY 2017 Accomplishments:

- Prepared projects to be included in the STIP

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2018	\$88,907	SPR1895S
Budget Amount SFY 2017	\$224,457	SPR1795S
Actual Cost SFY 2017	(See Addendum Aug. 2017)	SPR1795S

INNOVATIVE PARTNERSHIPS AND ALTERNATIVE FUNDING

Purpose and Scope: This newly created Division will develop programs as an adjunct arm of the Director’s Office on issues and projects that have attained the consensus of the Executive Management Team (MoDOT Director, Chief Engineer, Assistant Chief Engineer, and Chief Financial Officer). Programs are largely focused upon alternative revenue strategies and technological innovation in the vehicle communication technology and autonomous vehicles sectors.

SFY 18 Proposed Activities:

- Administration of Surface Transportation Systems Funding Alternative Program (STSFAF): MoDOT executed an agreement with FHWA-HQ in FY ’17 to begin this program and has sought additional funding in FY ’18 to advance the initiative
- Deployment of various experimental vehicle communication technologies
- Assessment of various FHWA and USDOT credit assistance tools for initiation in Missouri
- Development of policy initiatives for the Director’s office for review by state government stakeholders
- Advising on preparation of various discretionary grant applications to USDOT and FHWA

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2018	\$623,291	SPR18IPS

Part II – Urban Transportation Planning

TRANSPORTATION PLANNING IN METROPOLITAN AREAS – CONSOLIDATED PLANNING GRANT (CPG)

The U.S Department of Transportation’s Consolidated Planning Grant Program (CPG) allows the States and Metropolitan Planning Organizations (MPOs) to merge FTA metropolitan or statewide planning funds with FHWA Planning (PL) funds to provide States support for both highway and transit planning activities to single consolidated grants. This CPG program fosters a cooperative effort between the Federal agencies and the participating States to streamline the delivery of their planning programs providing the flexibility in the use of planning funds. Beginning July 1, 2003, MoDOT elected to have FHWA PL Funds and FTA Section 5303 Metropolitan Transportation Planning Funds consolidated. As of June 2016, the lead agency for administering the CPG funds will transfer from FTA to FHWA.

CPG funds provide the principal source of funding for Missouri MPOs to carry out a comprehensive and continuing transportation planning process in cooperation with local, state and federal transportation agencies. This process is a prerequisite for receiving federal-aid funding for transportation improvements in metropolitan areas. FAST Act reaffirmed the leading role of the MPO in the transportation improvement decision-making process, particularly in the large urbanized areas of more than 200,000 populations.

CPG funds, which are all allocated to MPOs, assist MPOs with producing long-range multimodal transportation plans, transportation improvement programs, planning work programs, studies, citizen involvement processes and other urban transportation planning requirements and goals

Under CPG, the FTA and FHWA continue to distribute metropolitan planning and Statewide planning funds according to each agency’s statutory formulas that the MoDOT distributes to MPOs by formulas that meet the legislative factors for each category of funds in 23 U.S.C. 104(f)(4) and 49 U.S.C. 5305(d)(2). MoDOT’s distribution formula has been developed in consultation with the MPOs, and approved by FTA and FHWA for their respective programs.

The following chart shows the estimated amount of CPG funds (FHWA PL and FTA Section 5303) available for Missouri’s MPOs to carry out the metropolitan transportation planning work activities to be budgeted for in each MPOs annual Unified Planning Work Program (UPWP). The MPOs will include the below listed CPG amounts or similar amounts in their UPWPs to complete activities necessary to carry out metropolitan transportation planning. Each MPO UPWP is approved by the MPO Policy Board and the FHWA/FTA (ONEDOT). Planning grant agreements based on approved UPWPs are executed between the MPOs and MoDOT to allow the pass through of Federal planning funds and 5303 Transit funds to the MPOs. SFY 2017 5303 allocation amount used 2010 census urbanized area populations.

Table 1: Total CPG Funds Available to MPOs for SFY 2018 UPWP Work Activities

Metropolitan Areas (Fiscal Year)	MPO Balances as of May 2017 (without FY 2017 allocation)	Estimated FFY18 PL Allocation	Estimated FFY18 5303 Allocation Amounts	FFY17 PL Allocation	Estimated FFY17 5303 Allocation Amounts	Estimated Total CPG Funds	Current CPG Contract Amount
NW Arkansas 07/01 - 06/03	\$4,160	\$5,000	\$0	\$5,000	\$0	\$14,160	\$7,000
Kansas City 01/01 - 12/31	\$1,916,255	\$1,380,298	\$483,996	\$1,342,914	\$474,041	\$5,597,504	\$1,985,365
St. Louis 07/01 - 06/30	\$6,968,016	\$2,429,936	\$914,412	\$2,359,305	\$895,605	\$13,567,274	\$4,115,236
Springfield 07/01 - 06/30	\$1,273,242	\$443,336	\$140,789	\$432,461	\$137,893	\$2,427,722	\$754,666
Columbia 10/01 - 09/30	\$590,988	\$206,473	\$64,164	\$201,517	\$62,844	\$1,125,987	\$407,471
Jefferson City 11/01 - 10/31	\$230,609	\$123,419	\$30,106	\$121,093	\$29,487	\$534,714	\$140,782
Joplin 11/01 - 12/31	\$1,063,518	\$153,826	\$42,575	\$150,537	\$41,699	\$1,452,155	\$258,166
St. Joseph 01/01 - 12/31	\$525,872	\$148,850	\$40,535	\$145,719	\$39,701	\$900,677	\$178,170
Cape Girardeau 07/01 - 6/30	\$585,639	\$115,966	\$27,050	\$113,876	\$26,494	\$869,025	\$215,696
TOTAL PART II	\$13,158,299	\$5,007,104	\$1,743,627	\$4,872,424	\$1,707,764	\$26,489,218	\$8,062,552

* The MPO balance is adjusted to include the actual SFY 2016 CPG allocation and equals the unobligated prior year (SFY2016 and older) CPG allocated amounts. The MPO balance column updates with payments of invoices and the allocation of CPG funds. The balance reported is a snapshot for the SPR work program update. The estimated total of MPO contracts (CPG agreements) that will be in place for the SFY 2018 SPR work program is \$8,062,552.

MPOs annually program consolidated federal planning fund amounts in approved UPWPs to complete activities necessary to implement the metropolitan transportation planning process. MPO UPWPs identify the available amounts of FHWA PL and FTA Section 5303 funds separately as funding sources but are not requested to identify SFY the separate amounts on each work activity or in the financial summary. Each MPO UPWP is approved by the MPO Policy Board and the FHWA/FTA (ONE DOT). CPG agreements, based on approved UPWPs, are executed between the MPOs and MoDOT to allow the pass through of Federal planning funds to the MPOs. MPOs have up to five years to spend CPG balances.

MoDOT allows MARC, OTO and EWG (Kansas City, Springfield and St. Louis, respectively) to use the value of MoDOT's state-funded only metropolitan planning activities to leverage the CPG funds (FHWA PL and FTA Section 5303). These MoDOT District planning activities include data collection, data analysis and data sharing that supports and enhances the overall planning process within each metropolitan planning area. Activities include such work items as traffic counts, signal timing, analysis of planning and/or traffic studies and analysis of traffic volumes and safety concerns. These work items support a more informed, better decision-making process for the MPO and can be demonstrated to be directly attributable to the MPO's planning work elements. MPOs are able to utilize 80 percent of the value of MoDOT eligible metropolitan planning work as a credit to help provide the MPO's required 20 percent match for the Federal planning funds.

The estimated values of the MoDOT state-funded metropolitan planning work activities based on the most current completed fiscal year are as follows:

Kansas City MPO	\$255,508
St. Louis MPO	\$263,341
Springfield MPO	\$91,679

Part III – Research

ADMINISTRATION

Purpose and Scope: Provide general administration funds for the development and monitoring of research programs that benefit the Missouri Department of Transportation. This includes distributing available information concerning past, current and proposed research work related to highways and transportation to supporting agencies; evaluation and development of proposed research studies; and, implementation and dissemination of research results.

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2018	\$254,627	SPR18ADS
Budget Amount SFY 2017	\$252,836	SPR17ADS
Actual Cost SFY 2017	(See Addendum Aug. 2017)	SPR17ADS

RESEARCH

Purpose and Scope: Research at MoDOT primarily expands and advances our knowledge in all areas of transportation, so we may provide the best, total-transportation system for Missourians. The research program responds to our customer needs, provides information and technology for management policy decisions and undertakes research and development issues that have high possibilities of being implemented. It also includes contingency funds for contract research studies approved after the start of the fiscal year.

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2018	\$1,673,908	SPR18RDS
Budget Amount SFY 2017	\$2,001,908	SPR17RDS
Actual Cost SFY 2017	(See Addendum Aug. 2017)	SPR17RDS

DEVELOPMENT

Purpose and Scope: Development studies find and implement products that have the most positive effect on MoDOT's operations. Development takes a product, process or method produced as a result of research and evaluates it for eventual implementation. Implementation applies the research, best practices and new product results within the department. The development and implementation process provides cost savings in material or time, safety issues or improved life-cycle costs.

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2018	\$84,276	SPR18DVS
Budget Amount SFY 2017	\$82,041	SPR17DVS
Actual Cost SFY 2017	(See Addendum Aug. 2017)	SPR17DVS

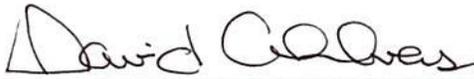
TECHNOLOGY TRANSFER

Purpose and Scope: Technology transfer provides mechanisms to coordinate the transfer of research results and information with MoDOT divisions and districts as well as with outside organizations. The Local Technical Assistance Program provides transportation information and training opportunities to local transportation agencies. Funding is provided to match other funds to support the BEAP and the TEAP. These programs offer assistance to local entities for bridge design and traffic studies. In addition, technology transfer provides direction and support to department personnel to maintain an understanding of new methodologies and technologies.

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2018	\$493,000	SPR18TTS
Budget Amount SFY 2017	\$490,000	SPR17TTS
Actual Cost SFY 2017	(See Addendum Aug. 2017)	SPR17TTS

Certification Statement

I, Dave Ahlvers, State Construction and Materials Engineer, of the State of Missouri, do hereby certify that the State is in compliance with all requirements of 23 U.S. Code 505 and its implementing regulations with respect to the research, development, and technology transfer program, and contemplate no changes in statutes, regulations, or administrative procedures which would affect such compliance.



State Construction and Materials Engineer



Date

Part III Research Summary

Project No.	Project Name	SFY2018 Budget
TA186601	Research Administration	\$254,627
TR18CONT	Research Contingencies	\$232,274
TR201313	Secretary of State Library MOU	\$4,955
TR201417	GRS Rustic Road Bridge	\$0
TR201502	High Volume Recycled Materials	\$0
TR201503	Economical and Crack Free High Performance Concrete	\$0
TR201505	Fiber Reinforced Concrete	\$0
TR201509	Evaluation of Erosion Control Blankets	\$0
TR201514	No Passing Zone Guidance	\$0
TR201515	Investigation of J-Turn Design Factors using the ZouSimulator	\$0
TR201516	FRP Deck Panels	\$0
TR201518	Roller Compacted Concrete	\$9,079
TR201522	MoDOT Customer Satisfaction Tracking Survey	\$12,887
TR201601	Library Support Contract (2016-2017)	\$10,394
TR201602	Poplar Street Approach-Phase II	\$0
TR201606	Long Term Pavement Performance Project 5P3131 Central District	\$0
TR201607	Striping Optimization Enhancements	\$0
TR201609	MEPDG Local Calibration	\$150,317
TR201610	AASHTO Technical Service Program	\$48,000
TR201611	St. Louis In-Laid Pavement Markers Survey	\$0
TR201612	Work Zone Simulator Analysis: Alternate Lane Configurations	\$0
TR201613	Work Zone Split Traffic Symbol Sign	\$37,896
TR201614	Zero Cement Concrete	\$74,338
TR201615	Transportation Research Methods Training	\$0
TR201616	Missouri Highway Safety Manual Recalibration	\$55,961
TR201620	Public Satisfaction Survey of High Friction Surface Treatment	\$0
TR201621	Solar Roadways Evaluation	\$0
TR201701	Internal Curing	\$20,817
TR201702	High Volume Recycled Materials Phase II	\$1,958
TR201703	Economical and Crack Free High Performance Concrete Phase II	\$1,510
TR201704	Design of Ultra High Performance Concrete for Thin Overlays	\$8,570
TR201705	Implementation of FR SCC and FR SWC Phase II	\$10,166
TR201706	RTS—Facebook Pilot	\$0
TR201707	Meramec Flood Inundation Mapping	\$0
TR201709	Runway Condition Index for State Funded Airports	\$135,702
TR201710	MoDOT Fleet Analysis	\$56,971
TR201711	Economic Impact Study for Public Ports	\$298,675
TR201712	Performance Characteristics of Recycled Asphalt	\$99,205
TR201713	Cold Temperature Creep Compliance	\$12,737

TR201714	Foundation Reuse	\$57,162
TR201715	Erosion Control Blanket Workshop Training	\$0
TR201717	Auto Flagger	\$144,334
TR201718	2017 Infrastructure Conference Invoice	\$0
TR201719	OCLC Annual Invoice	\$0
TR201720	Rejuvenating Asphalt Products	TBD
TR201721	Leader-Follower TMA System	TBD
TR201722	Evaluation of Green Lights on TMAs	\$100,000
TR201724	MoDOT Report Card Survey	\$0
TR201725	USGS Scan of Gasconade River Bridges	\$0
TR201801	Library Support Contract (2018-2019)	\$90,000
TD170701	New Product Evaluation	\$84,276
TTAPT001	Local Technical Transfer Assistance Program (LTAP)	\$300,000
TT200701	National Highway Institute (NHI)	\$43,000
TTAPT001	BEAP and TEAP	\$150,000
	Total	\$2,505,811

Administration - SPR18ADS

Estimated Cost - \$254,627

TAyy6601 - Research Administration

Project Type: Contracts Other

MoDOT Contact: Bill Stone

Total Contract Amount: \$254,627

Contract Period: 7/1/1966 to 6/30/2018

Funding: SPR 80%, State 20%

Project Description and Objectives:

Research administration is a funding source for the administration of research activities. This includes office support such as phone, supplies, and office equipment. The type of project is "contract other" because project work will include contract management. The purpose of this item is to provide funds for the development and monitoring of a program designed to meet the research needs of the Missouri Department of Transportation.

Proposed Activities for SFY 2018:

The salary and expenses of the Research Administrator and Research Engineer will be charged against this item.

SFY 2017 Accomplishments:

The Research Section had 40 active contract research projects and a total of 12 projects were completed at the end of the third quarter. The Research Section also published 10 reports as of April 27, 2017.

Financials

Projected Budget SFY 2018

Budget Amount SFY 2017

Actual Cost SFY 2017

Prior to SFY 2017 Actual Cost

Amount

\$254,627

\$252,836

(See Addendum Aug. 2017)

N/A

Research – SPR18RDS

Estimated Cost - \$1,673,908

TRyyCONT - Research Contingencies**Project Type:** Contracts Other**MoDOT Contact:** Bill Stone**Total Contract Amount:** \$27,320**Contract Period:** 7/1/2017 to 6/30/2018**Contract Investigator:** N/A**Funding:** SPR 80%, State 20%**Project Description and Objectives:**

Research and development contingencies are funds for unanticipated costs on current or new activities. These funds are for proposed research projects that are in the initiation stage and for unanticipated projects during the year. The type of project is "Contract Other" because project funded work will include contract management and contract expenditures.

Proposed Activities for SFY 2018:

In addition to funds for unanticipated costs on current or ongoing activities, funds have been included for studies that may be initiated during Fiscal Year 2018. These include administrative and other eligible costs.

SFY 2017 Accomplishments:

Fourteen new projects were approved for funding in Fiscal Year 2017.

TR201706 RTS—Facebook Pilot

TR201707 Meramec Flood Inundation Mapping

TR201709 Runway Condition Index for State Funded Airports

TR201711 Economic Impact Study for Public Ports

TR201712 Performance Characteristics of Recycled Asphalt

TR201713 Cold Temperature Creep Compliance

TR201714 Foundation Reuse

TR201715 Erosion Control Blanket Workshop Training

TR201717 Auto Flagger

TR201718 2017 Infrastructure Conference Invoice

TR201719 OCLC Annual Invoice

TR201720 Rejuvenating Asphalt Products

TR201721 Leader-Follower TMA System

TR201722 Evaluation of Green Lights on TMAs

<u>Financials</u>	<u>Amount</u>
Projected Budget SFY 2018	\$232,274
Budget Amount SFY 2017	\$872,285
Adjusted Budget Amount SFY 2017	\$0
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	N/A

TR201313 - Secretary of State Library MOU

Project Type: Contract Research
MoDOT Contact: Bill Stone
Total Contract Amount: \$23,384
Contract Period: 7/1/2013 to 6/30/2018
Contract Investigator: Waheedah Bilal
Funding: SPR 80%, State 20%

Project Description and Objectives:

MoDOT has established a library to serve employees, researchers and industry partners. This library contains materials (hardcopy and electronic) that are catalogued according to current national bibliographic standards. MoDOT and the Secretary of State Library have executed a Memorandum of Understanding that outlines the responsibilities of each organization. MoDOT and the Secretary of State Library agree to maintain the MoDOT library collection at the Missouri State Library. The library holdings will be included in the state library's integrated online library catalog. The bibliographic records in the MoDOT library collection will be included in the statewide MOBIUS catalog to facilitate resource sharing.

Proposed Activities for SFY 2018:

Expect that 2018 invoice should be received and sent for payment during first quarter.

SFY 2017 Accomplishments:

The 2017 MOU was executed by MoDOT on July 22, 2016. The invoice for the amount of \$4,504.38 was processed on August 25, 2016. The 2018 MOU has been developed and is awaiting SOS signatures (anticipated amount is \$4,954.82).

<u>Financials</u>	<u>Amount</u>
Projected Budget SFY 2018	\$4,955
Budget Amount SFY 2017	\$4,504
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$13,925

TR201417 - GRS Rustic Road Bridge

Project Type: Contract Research
MoDOT Contact: Jen Harper
Total Contract Amount: \$84,999
Contract Period: 2/11/2014 to 12/1/2016
Contract Investigator: Andy Boeckmann
Funding: SPR 80%, State 20%

Project Description and Objectives:

The city of Columbia, MO and Boone County received an Innovative Bridge Research and Deployment (IBRD) grant to deploy a Geosynthetic Reinforced Soil (GRS) abutment bridge. GRS bridges can be an economical and quick method for constructing some types of bridges. This project will evaluate the horizontal and vertical displacements of the abutments and bridge. Pore pressures and earth pressures will also be monitored. After completion of the bridge, the research team will continue to monitor the sensors for two years.

Proposed Activities for SFY 2018:

This project was completed in Fiscal Year 2017.

SFY 2017 Accomplishments:

Monitoring of the GRS system was completed during the first quarter of Fiscal Year 2017. The survey and inclinometer results did not indicate any movement. The pore pressure and earth pressure data are reasonable and indicate the instruments were operational and responsive to changes in water level. The final survey was completed in September 2016. It did not indicate any significant movement. The final report was received in October 2016 and published in early November. The final invoice was paid on January 26, 2017.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$0
Budget Amount SFY 2017	\$1,412
Adjusted Budget Amount SFY 2017	\$3,581
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$81,418

TR201502 - High Volume Recycled Materials

Project Type: Contract Research

MoDOT Contact: Bill Stone

Total Contract Amount: \$80,000

Contract Period: 6/15/2014 to 5/31/2016

Contract Investigator: Dr. Kamal Khayat

Funding: SPR 80%, State 20%

Project Description and Objectives:

It has become essential to effectively reuse demolition waste in order to conserve non-renewable natural resources. Decreasing natural resources, as well as increasing problems with waste management, ecological hazards, landfill limitations and increasing distances between the natural resources and consumption markets, support the idea of recycled wastes to be used for new concrete production. The proposed study aims at developing sustainable concrete materials for infrastructure applications. The main objective of the proposed research project is to maximize the content of recycled materials (at least 50% of the mass of solids) in concrete pavement in an effort to reduce the overall material cost of pavement construction as well as enhancing the sustainability aspects of these operations.

Proposed Activities for SFY 2018:

The project was completed in Fiscal Year 2017. No Activities are anticipated for Fiscal Year 2018.

SFY 2017 Accomplishments:

A presentation of the project was provided to MoDOT on August 16, 2016. This was presented to give MoDOT an opportunity to comment on the project before submission of the draft final report. MoDOT comments to the Draft Report were submitted to the principal investigator on November 10, 2016. The Final Report was received on February 7, 2017. The Final Invoice has been processed.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$0
Budget Amount SFY 2017	\$550
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$79,450

TR201503 - Economical and Crack Free High Performance Concrete

Project Type: Contract Research

MoDOT Contact: Bill Stone

Total Contract Amount: \$80,000

Contract Period: 6/23/2014 to 6/30/2016

Contract Investigator: Dr. Kamal Khayat

Funding: SPR 80%, State 20%

Project Description and Objectives:

The project seeks to develop and validate the behavior of a new class of environmentally friendly and cost-effective high-performance concrete (HPC), which is referred to here as Eco-HPC. The proposed project will develop two classes of Eco-HPC for the following applications: HPC for pavement construction (Eco-Pave-Crete) and HPC for bridge deck and transportation infrastructure construction (Eco-Bridge-Crete). Eco-Bridge-Crete can be used in cast-in-place girders, cast-in-place piers and piles, and other bridge elements.

Proposed Activities for SFY 2018:

The project was completed in Fiscal Year 2017. No Activities are anticipated for Fiscal Year 2018.

SFY 2017 Accomplishments:

The Final Report was received on March 21, 2017. The final invoice was submitted and processed on March 23, 2017.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$0
Budget Amount SFY 2017	\$11,085
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$68,915

TR201505 - Fiber Reinforced Concrete

Project Type: Contract Research
MoDOT Contact: Bill Stone
Total Contract Amount: \$80,619
Contract Period: 7/1/2014 to 6/30/2016
Contract Investigator: Dr. Kamal Khayat
Funding: SPR 80%, State 20%

Project Description and Objectives:

The proposed study seeks to investigate key engineering and structural properties of FR-SCC and fiber-reinforced super workable concrete (FR-SWC) for infrastructure repair and construction. FR-SCC is targeted for repair of sub-structure elements, while the FR-SWC is targeted for construction operations. The expected result from this study will be guidelines and performance-based specifications for the evaluation, selection, and specification of FR-SCC for infrastructure repair of bridge substructures and FR-SWC for the construction of bridge substructure and superstructure elements.

Proposed Activities for SFY 2018:

The project was completed in Fiscal Year 2017. No Activities are anticipated for Fiscal Year 2018.

SFY 2017 Accomplishments:

The bulk of the project was completed in Fiscal Year 2016. The structural performance of 30 beams was remaining and completed in early Fiscal Year 2017. The draft final report was submitted in late fall and the final report was submitted and accepted in the spring.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$0
Budget Amount SFY 2017	\$10,472
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$70,147

TR201509 - Evaluation of Erosion Control Blankets

Project Type: Contract Research
MoDOT Contact: Bill Stone
Total Contract Amount: \$100,000
Contract Period: 1/1/2015 to 6/30/2016
Contract Investigator: Dr. Amanda Cox
Funding: SPR 80%, State 20%

Project Description and Objectives:

Erosion Control Blankets (ECBs) are geosynthetics that provide temporary erosion protection while vegetation becomes established on a disturbed job site. The Missouri Department of Transportation (MoDOT) uses ECBs to prevent stormwater-induced erosion at many job sites. Many varieties of ECBs exist and MoDOT faces challenges with determining which ECBs are appropriate for combinations of slope, run-off, soil type, and other factors specific to Missouri construction sites. Objectives of the project are to develop recommendations for specifications for ECB properties, given Missouri job site characteristics, that can be economically evaluated at independent labs to ensure successful performance. Develop a matrix tool to guide in the selection of appropriate ECB options for MoDOT projects. Develop monitoring guidelines and protocols to evaluate the performance of ECB installations for the purpose of determining failures that warrant prohibiting their future use on MoDOT projects. Develop a short course to train MoDOT engineers and technicians.

Proposed Activities for SFY 2018:

The project was completed in Fiscal Year 2017. No Activities are anticipated for Fiscal Year 2018.

SFY 2017 Accomplishments:

Comments from MoDOT on the draft report and training materials were submitted to the principal investigator on June 2, 2016. The final report and all deliverables were submitted to MoDOT on June 30, 2016. The final report was posted in the Innovation library in July. The final invoice posted on August 19, 2016. This project is completed.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$0
Budget Amount SFY 2017	\$6,302
Adjusted Budget Amount SFY 2017	\$8,602
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$91,398

TR201514 - No Passing Zone Guidance

Project Type: Contract Research

MoDOT Contact: Jen Harper

Total Contract Amount: \$87,587

Contract Period: 1/1/2015 to 7/31/2016

Contract Investigator: Jessica Hutton

Funding: SPR 80%, State 20%

Project Description and Objectives:

For two and three lane roadways with centerline striping, no passing zones are marked at locations where sight distance is less than what is required to safely pass a slower moving vehicle. MoDOT has historically used a 2-car data collection system to identify and record no passing zones; however, the system which has been used is obsolete and no longer supported by the manufacturer. Due to the lack of available systems on the market today, MoDOT is interested in having a system developed using current technology to give the department the capability of determining the proper locations of no passing zones and retaining a data base using GPS records for long term retention.

Proposed Activities for SFY 2018:

This project was completed in Fiscal Year 2017.

SFY 2017 Accomplishments:

The final report was received on July 29, 2016. It is published in the MoDOT Innovation Library. The final invoice was paid on September 7, 2016.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$0
Budget Amount SFY 2017	\$14,639
Adjusted Budget Amount SFY 2017	\$12,708
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$72,948
Unspent Funds	\$1,931

TR201515 - Investigation of J-Turn Design Factors using the ZouSimulator

Project Type: Contract Research

MoDOT Contact: Jen Harper

Total Contract Amount: \$99,207

Contract Period: 9/15/2014 to 10/31/2016

Contract Investigator: Dr. Carlos Sun

Funding: SPR 80%, State 20%

Project Description and Objectives:

J-turns have been shown to improve safety on Missouri highways by reducing overall crashes by 34.8% and injury and fatal crashes by 53.7%. They are a type of alternative intersection design that could see greater implementation in Missouri. Because there is very limited formal design guidance, there are a number of J-turn design considerations that require investigating. Some of them are acceleration/deceleration lane configuration, U-turn spacing, and signage type and layout. This project uses a driving simulator study and a driver survey to analyze driver behavior to different J-turn configurations. A driving simulator study is a safe and cost-effective way of studying geometric design alternatives. The product from this research is a set of J-turn design guidelines that could be incorporated into the MoDOT Engineering Policy Guide.

Proposed Activities for SFY 2018:

This project was completed during Fiscal Year 2017.

SFY 2017 Accomplishments:

Most of the work on the project was completed during Fiscal Year 2016. The final report was received on September 26, 2016. The final invoice was paid on December 8, 2016.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$0
Budget Amount SFY2017	\$14,037
Adjusted Budget Amount SFY2017	\$13,990
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$85,170
Unspent Funds	\$47

TR201516 - FRP Deck Panels

Project Type: Contract Research
MoDOT Contact: Bill Stone
Total Contract Amount: \$45,000
Contract Period: 10/20/2014 to 6/30/2016
Contract Investigator: Dr. Jeff Volz
Funding: SPR 80%, State 20%

Project Description and Objectives:

This project is a second phase of the work done in TR201203 Fiber Reinforced Polymer Bridge Deck Panels. In the previous project, an FRP panel was developed to be used on bridge decks in Missouri. This second phase is to develop the details necessary to put the FRP panels into a construction project. The objective of this project is to develop the final details necessary to fully implement this technology, such as panel-to-panel connections, panel-to-girder connections, and guardrail to panel connections. A cost analysis will also be completed.

Proposed Activities for SFY 2018:

The project was completed in Fiscal Year 2017. No Activities are anticipated for Fiscal Year 2018.

SFY 2017 Accomplishments:

The Principal Investigator provided a Draft Final Report and Draft Report Comments Document on February 9, 2017. The Draft Report Comments Document is a summary report with the changes/additions/corrections necessary to address these issues. The Final Report was received and approved on March 16, 2017. The Final invoice utilizing MoSTIC funds was submitted and processed on March 23, 2017. The SPR funds portion had been processed back in November 2015.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$0
Budget Amount SFY 2017	\$0
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$45,000

TR201518 - Roller Compacted Concrete

Project Type: Contract Research
MoDOT Contact: Bill Stone
Total Contract Amount: \$90,000
Contract Period: 12/1/2014 to 9/30/2017
Contract Investigator: Dr. Kamal Khayat
Funding: SPR 80%, State 20%

Project Description and Objectives:

Increasing interest in decreasing the time and cost in pavement construction, research was recently been undertaken at Missouri S&T in collaboration with the NUTC and MoDOT to investigate the in-situ properties of RCC mixtures in pavement applications. The proposed project will investigate cost-effective, rapid pavement construction techniques that can reduce construction cost and duration. The

roller roller-compacted concrete (RCC) with or without an asphalt topping will be investigated. The study will aim at the development of mixture optimization methodology to design novel materials that can be used in rapid pavement construction through detailed laboratory testing and field implementation. The mixture proportions will be developed to achieve the mixture with satisfactory workability and mechanical and durability properties.

Proposed Activities for SFY 2018:

Continue to monitor the progress of the Scott City compacted concrete project and develop the monitoring and instrumentation plan for that project. This will include the need to develop a Second Supplemental Agreement to extend the contract and account for the instrumentation hardware.

SFY 2017 Accomplishments:

A no-cost extension was executed through eAgreements on March 8, 2017. The projected completion date is now revised to September 30, 2017, which includes time for the performance of all remaining services under the original Task Order. MoDOT is developing plans for the inclusion of approximately a two-mile section of outer road utilizing compacted concrete on a MoDOT project to be let later this year near Scott City in the Southeast District along I-55.

<u>Financials</u>	<u>Amount</u>
Projected Budget SFY 2018	\$9,079
Budget Amount SFY 2017	\$14,782
Adjusted Budget Amount SFY 2017	\$5,704
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$75,217

TR201522 - MoDOT Customer Satisfaction Tracking Survey

Project Type: Contract Research
MoDOT Contact: Bill Stone
Total Contract Amount: \$108,404
Contract Period: 3/4/2015 to 3/16/2018
Contract Investigator: Lance Gentry
Funding: SPR 80%, State 20%

Project Description and Objectives:

This study evaluates MoDOT customer satisfaction through use of a customer survey. This survey will be conducted quarterly to evaluate MoDOT's overall satisfaction. The Right Transportation Survey (RTS) will be conducted once under this contract.

Proposed Activities for SFY 2018:

During each month of the quarter, approximately 200 people who contacted MoDOT the previous month will be surveyed by phone about their experience along with online surveys being distributed to those who provided an email address. A summary report will be provided to MoDOT each month. The contract end date for the project is March 16, 2018. All activities for the Right Transportation Solution surveying were previously completed in Fiscal Year 2016.

SFY 2017 Accomplishments:

During each month of the quarter, approximately 200 people who contacted MoDOT the previous month were surveyed by phone about their experience along with online surveys being distributed to those who

provided an email address. A summary report was provided to MoDOT each month. The annual report for calendar year 2016 was also created and provided in January 2017.

<u>Financials</u>	<u>Amount</u>
Projected Budget SFY 2018	\$12,887
Budget Amount SFY 2017	\$21,930
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$73,587

TR201601 - Library Support Contract (2016-2017)

Project Type: Contract Research
MoDOT Contact: Bill Stone
Total Contract Amount: \$181,077
Contract Period: 7/1/2015 to 6/30/2017
Contract Investigator: Charles Nemmers
Funding: SPR 80%, State 20%

Project Description and Objectives:

The demand for information services has increased as more MoDOT users are realizing the timely, diverse and high quality information they receive using the services of the current librarian. The major objective of this project is to provide library, research and reference support services for MoDOT. University of Missouri-Columbia will provide the services of a Master of Library Science (MLS) librarian who will work 40 hours per week and will be located at the Secretary of State's State Library and MoDOT in Jefferson City.

Proposed Activities for SFY 2018:

Project TR201601 is ending on June 30, 2017. Therefore other than final invoicing there is no activities planned for Fiscal Year 2018. A new project number will be developed for Library Services for the two year period of Fiscal Year 2018-2019.

SFY 2017 Accomplishments:

For 2017 Q1-Q3, the librarian answered a total of 100 requests, 83 short and 17 long (estimate 133 for SFY). 8,128 print and electronic items were circulated (estimate 10,837 for SFY). 174 items were added to library catalog (estimate 232 for SFY). Ten items were borrowed (estimate 13 for SFY) from and 11 items lent to other libraries (estimate 15 for SFY). The librarian collaborated on projects with the Missouri State Library and began closeout of TPF-5(237) Pooled Fund project and discussed next steps with library partners for a successor Pooled Fund. The librarian created a new MoDOT Library destination page in SharePoint and has been assisting the Research Section with its SharePoint migration.

<u>Financials</u>	<u>Amount</u>
Projected Budget SFY 2018	\$10,394
Budget Amount SFY 2017	\$83,218
Adjusted Budget Amount SFY 2017	\$81,817
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$88,866

TR201602 - Poplar Street Approach-Phase II

Project Type: Contract Research
MoDOT Contact: Jason Collins
Total Contract Amount: \$49,763
Contract Period: 7/1/2015 to 7/31/2016
Contract Investigator: Riyadh Hindi
Funding: SPR 80%, State 20%

Project Description and Objectives:

In order to minimizing computational cost of the Finite Element (FE) analysis, a dual-level modeling method is adopted. First, a macro model comprising 4-spans of the bridge between two expansion joints of 61 and 65 was created as reported in previous progress report. This model provides structural analysis data including deflection of the bridge superstructure. In addition, the critical location for the truck load is determined from this model. Then, in order to capture the out-of-plane distortion in the web-gap region, a more sophisticated finite element model (micro-model) which covers a small part of the bridge is developed. All boundary conditions for this model are imported from the macro-model.

Proposed Activities for SFY 2018:

The project was completed in Fiscal Year 2017. No Activities are anticipated for Fiscal Year 2018.

SFY 2017 Accomplishments:

The draft report was received by MoDOT on August 1, 2016. Comments were submitted to the PI and changes were made and the Final Report was received on August 25, 2016. The final invoice was paid on October 12, 2016.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$0
Budget Amount SFY 2017	\$13,313
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$36,450

TR201606 - Long Term Pavement Performance Project 5P3131 Central District

Project Type: Contract Research
MoDOT Contact: William Stone
Total Contract Amount: \$42,000.00
Contract Period: 7/1/2016 to 12/31/2017
Contract Investigator: Magruder Construction
Funding: SPR 80%, State 20%

Project Description and Objectives:

FHWA has been interested in reviewing some of MoDOT's pavement treatments and project 5P3131 in Central District has been selected to have 11 of those different MoDOT treatment options placed during a construction project for FHWA to perform a Long Term Pavement Performance evaluation. The SPR funding is to assist with the difference in cost to place the different treatments for the FHWA evaluation.

Proposed Activities for SFY 2018:

There are no activities proposed for Fiscal Year 2018 for this project.

SFY 2017 Accomplishments:

The budget transfer form to transfer Research Funds to project 5P3131 in Central District was submitted to those for signature in February 2017. Transportation Planning will credit the project a total of \$42,000 at completion: 80% (\$34,000) from the federal SPR funds and 20% (\$8,000) from Research E&E match.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$0
Budget Amount SFY 2017	\$42,000
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$0

TR201607 - Striping Optimization Enhancements

Project Type: Contract Research
MoDOT Contact: Jen Harper
Total Contract Amount: \$20,000
Contract Period: 12/9/2015 to 6/30/2016
Contract Investigator: Ron McGarvey
Funding: SPR 80%, State 20%

Project Description and Objectives:

This is a follow-up project to TR201501. The original project created a computer model for Central District to optimize striping routes. At the end of the initial project it was determined that a different output format was needed to make the program more user friendly. The outputs will include both a map and turn-by-turn directions for the striping crews. A few other enhancements include improvements to the user interface. The new model will be supplied to Central District in mid-March in time for planning of the 2016 spring striping season.

Proposed Activities for SFY 2018:

There are no activities proposed for Fiscal Year 2018 for this project.

SFY 2017 Accomplishments:

The work on this project was completed in Fiscal Year 2016 for everything except processing the final invoice. The final report was posted in the innovation library in July. The final invoice was paid on September 8, 2016.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$0
Budget Amount SFY 2017	\$15,295
Adjusted Budget Amount SFY 2017	\$14,133
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$5,867

TR201609 - MEPDG Local Calibration**Project Type:** Contract Research**MoDOT Contact:** Bill Stone**Total Contract Amount:** \$250,000**Contract Period:** 3/2/2016 to 8/31/2017**Contract Investigator:** Chetana Rao**Funding:** SPR 80%, State 20%**Project Description and Objectives:**

The Missouri Department of Transportation (MoDOT) has always relied on sound engineering for designing new and rehabilitated pavements. The current design approach is the Mechanistic-Empirical Pavement Design Guide (MEPDG), developed under a series of National Cooperative Highway Research Projects (NCHRP). The MEPDG utilizes existing state-of-the-practice mechanistic-based pavement analysis and distress prediction algorithms.

Enough time has elapsed to perform a second local calibration cycle. During this interim period, more performance data has been collected from the original field test sections. In addition, newer models have been introduced to the AASHTO Pavements ME Design Guide software that requires a first local calibration. Greater emphasis will be placed on the rehabilitation models.

Objectives:

- Perform a second local calibration of distress prediction models for existing field test sections.
- Supplement existing test sections with additional rehabilitation pavement sections.
- Perform a first local calibration of newer prediction models in the AASHTO Pavement ME Design Program
- Update the materials database library with contemporary pavement materials properties, including reclaimed materials.
- Fully document the local calibration work, including clear guidance for changing calibration coefficients. Update the user manual. Provide recommendations and precise details of any suggested /incorporated changes.

Proposed Activities for SFY 2018:

Validation of MEPDG models will be run and then calibrated. The project will progress through 2018; the original completion date was August 2017; however, discussion of a contract extension has started.

SFY 2017 Accomplishments:

The project specimens have been collected and tests were run to submit for analysis. Climate data analysis has been completed, and backcalculations are currently being completed.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$150,317
Budget Amount SFY 2017	\$148,500
Adjusted Budget Amount SFY 2017	\$81,577
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$18,106

TR201610 - AASHTO Technical Service Program

Project Type: Contract Research
MoDOT Contact: Bill Stone
Total Contract Amount: \$134,000
Contract Period: 7/1/2014 to 06/30/2018
Contract Investigator: FHWA
Funding: SPR 80%, State 20%

Project Description and Objectives:

Each year, the Standing Committee on Highways and the board of directors of American Association of State Highway and Transportation Officials (AASHTO) approves the listing of Technical Service Programs. The type of project is "Contract Other" because the project is to participate in the Technical Service Programs. The purpose of this item is to support continued participation in various AASHTO Technical Service Programs.

Proposed Activities for SFY 2018:

MoDOT is expected to participate in the following AASHTO Technical Service Programs for Fiscal Year 2018:

- National Transportation Product Evaluation Program (NTPEP), \$17,000.
- AASHTO Innovation Initiative (AII), formerly Technology Implementation Group (TIG), \$6,000.
- Transportation Curriculum Coordination Council (TC3), \$20,000
- Technical Service Program to Develop AASHTO Materials Standards (DAMS), \$5,000.

This will be the first year that Construction and Materials has participated in DAMS. The total amount for SFY2018 for Construction and Materials is \$48,000.

SFY 2017 Accomplishments:

The Construction Materials Division approved the funding of three AASHTO Technical Services Programs. These are the NTPEP program (\$17,000), AASHTO Innovation Initiative (\$6,000) and Transportation Curriculum Coordination Council (\$20,000). The total of \$43,000 was processed on September 20, 2016.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$48,000
Budget Amount SFY 2017	\$43,000
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$43,000

TR201611 - St. Louis In-Laid Pavement Markers Survey

Project Type: Contract Research
MoDOT Contact: Bill Stone
Total Contract Amount: \$84,626
Contract Period: 5/1/2016 to 11/30/2016
Contract Investigator: Carmine Dwyer
Funding: SPR 80%, State 20%

Project Description and Objectives:

In an effort to gain further visibility for lane markings the St. Louis District has placed In-Laid Pavement Markers on various roadways in their district. The inlaid pavement marker consists of a retro-reflective pavement marker installed below the pavement surface. In addition to cutting a location for the marker, a slot shall be grooved in to the pavement both before and after the marker to allow for visibility of the marker and drainage. MoDOT has developed this project to conduct a survey to evaluate the perception of stakeholders regarding the marker’s performance from a user’s perspective and gauge the effectiveness of the markers. This is not an engineering study.

Proposed Activities for SFY 2018:

The project was completed in Fiscal Year 2017. No Activities are anticipated for Fiscal Year 2018.

SFY 2017 Accomplishments:

The Final Report was received from Applied Research on January 5, 2017. The final invoice was received and submitted on March 23, 2017. The Final invoice was processed on March 27, 2017.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$0
Budget Amount SFY 2017	\$84,626
Adjusted Budget Amount SFY 2017	\$70,148
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$4,094
Unspent Funds	\$10,384

TR201612 - Work Zone Simulator Analysis: Alternate Lane Configurations

Project Type: Contract Research

MoDOT Contact: Jen Harper

Total Contract Amount: \$75,009

Contract Period: 5/1/2016 to 12/31/2016

Contract Investigator: Suzi Long

Funding: SPR 80%, State 20%

Project Description and Objectives:

This project will develop driving scenarios using the Missouri S&T driver simulator for use in the evaluation of a Missouri alternate lane shift sign configuration for work zones. Drivers will complete the scenarios comparing the current FHWA approved merge sign configuration with an alternate merge sign configuration proposed by MoDOT. Drivers between the ages of 18 and 64+ will be recruited to drive through the simulation.

Proposed Activities for SFY 2018:

This project was completed in Fiscal Year 2017.

SFY 2017 Accomplishments:

During first quarter Fiscal year 2017, 75 participants completed the driving simulator scenarios. Participants filled out two questionnaires. The first questionnaire was given before participants entered the simulator and asked questions about demographics and driving history. The post simulator questionnaire asked about the driving scenarios. Data analysis took place during the first two quarters. The draft report was received on November 28, 2016. Comments and questions were sent back to the

research team on December 19, 2016. The final report was received on February 9, 2017 and published in the Innovation Library. The final invoice was paid during the fourth quarter and the project was closed out.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$0
Budget Amount SFY 2017	\$59,411
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$15,598

TR201613 - Work Zone Split Traffic Symbol Sign

Project Type: Contract Research
MoDOT Contact: Jen Harper
Total Contract Amount: \$75,000
Contract Period: 5/15/2016 to 8/31/2017
Contract Investigator: Praveen Edara
Funding: SPR 80%, State 20%

Project Description and Objectives:

MoDOT's St. Louis District has gotten FHWA approval to do a pilot project using a new work zone sign. The sign is used when work is done in the middle of the roadway and lanes shift around the work zone. Currently 2 MUTCD signs are required, one on either side of the road. The sign being piloted shows all information on 1 sign. A field evaluation is being done to monitor driver reaction and traffic delays.

Proposed Activities for SFY 2018:

The project will wrap up during the first quarter of Fiscal Year 2018 with the final report being due at the end of August.

SFY 2017 Accomplishments:

The construction project was delayed which caused a delay in the research project. In early December, video data was collected from multiple cameras at different vantage points within the work zone during various time periods such as peak and off-peak hours. In addition, drive through videos were also taken in a variety of time periods. Stakeholder interviews were conducted with contractor staff and MoDOT personnel overseeing the project. A new timeline was developed and a task order extension was signed in January.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$37,896
Budget Amount SFY 2017	\$75,000
Adjusted Budget Amount SFY 2017	\$37,104
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$0

TR201614 - Zero Cement Concrete

Project Type: Contract Research
MoDOT Contact: William Stone
Total Contract Amount: \$100,000.00
Contract Period: 1/3/2017 to 4/30/2018
Contract Investigator: Dr. Mohamad ElGawady
Funding: SPR 80%, State 20%

Project Description and Objectives:

Conventional concrete mixes use ordinary Portland cement (OPC) or OPC and fly ash as the main binding material. Conventional concrete involves slow process of hydration of the OPC/fly ash. Zero-cement (ZC) concrete is a relatively new class of concrete that does not include any Portland cement. The overarching objective of this research is to develop zero-cement concrete mixtures that can be used by MODOT contractors for bridge deck and girders using locally available material. The feasibility of using ZC concrete for partial depth deck and prestressed girder repair works will be explored as well.

Proposed Activities for SFY 2018:

The project will continue with the sampling and testing of materials. This will include how to cure the zero-cement concrete along with testing the hardened and fresh properties of various mixes outlined in the work plan.

SFY 2017 Accomplishments:

The literature review has been completed. Work is underway on Task 2 - Sampling and Chemical Analysis of Materials (30% completed), Task 3 - Zero-cement concrete mixtures preparation and fresh properties testing (10% completed).

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$74,338
Budget Amount SFY 2017	\$25,662
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$0

TR201615 - Transportation Research Methods Training

Project Type: Contract Research
MoDOT Contact: Jen Harper
Total Contract Amount: \$99,618
Contract Period: 2/23/2016 to 4/1/2017
Contract Investigator: Suzi Long
Funding: SPR 80%, State 20%

Project Description and Objectives:

This project will develop a training methodology focused on external funding. This hands-on training will present the basics of external funding identification, teambuilding and collaborative partners, and proposal element design. Real-time searches and tutorials will be presented as part of the project. In addition, actual proposals will be “red teamed”, or reviewed for completeness/readability, and a research methods handbook prepared as the deliverable for the final report.

Proposed Activities for SFY 2018:

This project was completed in Fiscal Year 2017.

SFY 2017 Accomplishments:

The research team periodically sent out notifications of grants that are applicable to MoDOT. The second grant training class took place on July 22, 2016. The topic was Collaborative Partnerships: Building a Winning Team. The final grant training class was held on October 21, 2016. The training class focused on "red-teaming" or editing of grant proposals. The draft final report was received on February 15, 2017. Comments and corrections were sent to the research team in late February and the final report was sent to MoDOT on March 7, 2017. The final invoice was paid in the 4th quarter and the project was closed.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$0
Budget Amount SFY 2017	\$91,136
Adjusted Budget Amount SFY 2017	\$89,980
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$8,482
Unspent Funds	\$1,156

TR201616 - Missouri Highway Safety Manual Recalibration

Project Type: Contract Research

MoDOT Contact: Jen Harper

Total Contract Amount: \$145,977

Contract Period: 4/18/2016 to 12/31/2017

Contract Investigator: Carlos Sun

Funding: SPR 80%, State 20%

Project Description and Objectives:

AASHTO's Highway Safety Manual (HSM) was calibrated in 2013 using 2009 to 2011 data to reflect Missouri driver population, conditions, and environment. This project involves the recalibration of the HSM for Missouri. All 25 HSM values (16 facilities) that were previously calibrated will be recalibrated using additional data since 2011. The facilities that previously resulted in calibration values close to or higher than 2.0 will be carefully reviewed. In addition, crash severity distributions in terms of fatal, severe injury, minor injury, and property damage only (PDO) will be produced.

Proposed Activities for SFY 2018:

This project is scheduled to be completed during the second quarter of Fiscal Year 2018. Most of the work will focus on wrapping up the data processing and then writing the final report.

SFY 2017 Accomplishments:

Data collection for AADT, geometric, land-use, and crash data continued into Fiscal Year 2017. Data is being entered into the IHSDM (Interactive Highway Safety Design Model). The verification of previous calibration sites and the identification of substitute sites were needed due to road facility changes or other facility-specific issues. Data collection for all sample sites was completed during the second quarter. This includes 16 facility types composed of rural and urban segments, freeway segments, and stop-controlled and signalized intersections. The data for developing severity distributions was acquired. The Interactive Highway Safety Model Worksheets were completed for several facilities. These worksheets include traffic, geometric, and crash information.

<u>Financials</u>	<u>Amount</u>
Projected Budget SFY 2018	\$55,961
Budget Amount SFY 2017	\$91,463
Adjusted Budget Amount SFY 2017	\$90,016
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$0

TR201620 - Public Satisfaction Survey of High Friction Surface Treatment

Project Type: Contract Research
MoDOT Contact: Jen Harper
Total Contract Amount: \$31,200
Contract Period: 10/24/2016 to 4/30/2017
Contract Investigator: Heartland Market Research
Funding: SPR 80%, State 20%

Project Description and Objectives:

In Federal Fiscal Year 2015, MoDOT received a federal grant to apply high friction surface treatments (HFSTs) in each district. As part of the grant, a public satisfaction survey must be completed to determine customer perceptions of the project. It was determined to do a public satisfaction survey in conjunction with project J5P3012 in Callaway County on WB US 54 near Kingdom City. Another goal of the survey is to determine the outreach efforts of MoDOT staff to the general public regarding communication of projects and satisfaction with the work zone.

Proposed Activities for SFY 2018:

This project was completed in Fiscal Year 2017.

SFY 2017 Accomplishments:

The Request for Proposals was posted on September 9, 2016. Five proposals were submitted and the technical advisory team chose Heartland Market Research to perform the survey. The PI led a kick off meeting with MoDOT on October 17 where the survey instrument was finalized and the survey plan was approved. Heartland Market Research mailed 2,000 surveys and by the end December had received 277 responses (a response rate of 13.9%). Response rates were lower than guaranteed by the PI. A second round of surveys was mailed out and a total of 466 surveys were returned from the two rounds. Analysis of the data took place in early March and the draft final report was received on March 13, 2017. MoDOT requested only a couple clarifications and revisions and the final report was received on March 28, 2017. The final invoice was paid in the 4th quarter and the project was closed out.

<u>Financials</u>	<u>Amount</u>
Projected Budget SFY 2018	\$0
Budget Amount SFY 2017	\$31,200
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$0

TR201621 - Solar Roadways Evaluation

Project Type: Contract Research
MoDOT Contact: Jen Harper
Total Contract Amount: \$102,000
Contract Period: 7/1/2016 to 6/30/2017
Contract Investigator: Scott and Julie Brusaw
Funding: SPR 80%, State 20%

Project Description and Objectives:

The primary purpose of Solar Roadways is to generate clean renewable energy on surfaces such as roadways, parking lots, sidewalks, etc. The idea is to generate electricity where substantial solar energy already hits a surface but is currently not being captured and turned into energy. The solar panels will be placed on the walkway of the WB I-44 Conway Rest Area. This location allows for quick and safe evaluation of the panels at any time without disruption to the traveling public. For the first DOT installation it was determined to place the panels in a walkway as opposed to the travel way to remove the concern of snow plow blades hitting the panels.

Proposed Activities for SFY 2018:

This project has been cancelled.

SFY 2017 Accomplishments:

The contract with Solar Roadways was executed during the first quarter of Fiscal Year 2017. The first two quarters focused on the site plan and developing the monitoring plans. Delays in the installation put the project on hold for most of the third and fourth quarters. It was determined that due to issues with manufacturing and continued delays the current contract would be cancelled. The supplier has been informed that we are interested in partnering with them in the future.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$0
Budget Amount SFY 2017	\$7,784
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$0

TR201701 - Internal Curing

Project Type: Contract Research
MoDOT Contact: Jen Harper
Total Contract Amount: \$50,000.00
Contract Period: 7/1/2016 to 10/31/2017
Contract Investigator: Dr. Kamal Khayat
Funding: SPR 80%, State 20%

Project Description and Objectives:

The project seeks to develop proper methodology to use internal curing materials to improve the performance and to prolong the service life of concrete. Typical mix design of high-performance concrete (HPC) approved by MoDOT will be used for the baseline mixture and will be modified with different types and contents of materials used for internal curing. The project will establish new mix design and

curing recommendations of concrete made with internal curing materials and validate their performance through laboratory investigation and field demonstration.

Proposed Activities for SFY 2018:

Most of the work in Fiscal Year 2018 will be focused on analyzing the test results and writing the final report. The draft final report is due on August 30, 2017 and the final report is due on September 30, 2017.

SFY 2017 Accomplishments:

Work on the literature search began during the first quarter of Fiscal Year 2017. Work also began on the laboratory testing which includes characterization of internal curing materials, optimization of the materials, and investigation of binder content and curing conditions. Selection and characterization of internal curing materials was completed during the third quarter. It was determined to remove the super absorbent polymers from the project due to product availability issues.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$20,817
Budget Amount SFY 2017	\$40,000
Adjusted Budget Amount SFY 2017	\$29,183
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$0

TR201702 - High Volume Recycled Materials Phase II

Project Type: Contract Research

MoDOT Contact: Jennifer Neely

Total Contract Amount: \$40,000.00

Contract Period: 7/1/2016 to 7/31/2017

Contract Investigator: Dr. Kamal Khayat

Funding: SPR 80%, State 20%

Project Description and Objectives:

The presented research plan proposes a field-oriented study as a follow-up of the Project Number TR201502 entitled “High-Volume Recycled Materials for Sustainable Pavement Construction”. The main goal of this project is to validate findings of the previous research project in the field implementation and to develop guidelines for the selection and use of recycled concrete aggregate (RCA) for sustainable pavement construction. The scope of the proposed research plan includes the construction of full-scale pavement sections and implementation in the actual construction projects in collaboration with Missouri Department of Transportation (MoDOT). The project team will assist in planning, field implementation, and monitoring of pilot projects in the state of Missouri.

Proposed Activities for SFY 2018:

The final report submission date will need to be extended. At the time of this review MoDOT is looking at a possible field implementation project near Sikeston which is being let in May 2017.

SFY 2017 Accomplishments:

Laboratory work consists of concrete mixtures produced from MoDOT's reference mix design and mainly focuses on mechanical properties and shrinkage of RCA mixtures from different sources. In the meantime, research on different sensors was performed. The laboratory investigation observed that

properties of RCA including the specific gravity, water absorption and LA abrasion have significant effects on properties of concrete with RCA. The research team also worked on instrumentation details which will be finalized based on the requirements of the job selected. Preliminary results of Life Cycle Cost Analysis (LCCA) were obtained.

<u>Financials</u>	<u>Amount</u>
Projected Budget SFY 2018	\$1,958
Budget Amount SFY 2017	\$35,000
Adjusted Budget Amount SFY 2017	\$38,042
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$0

TR201703 - Economical and Crack Free High Performance Concrete Phase II

Project Type: Contract Research
MoDOT Contact: Bill Stone
Total Contract Amount: \$40,000
Contract Period: 7/1/2016 to 7/31/2017
Contract Investigator: Dr. Kamal Khayat
Funding: SPR 80%, State 20%

Project Description and Objectives:

The research plan that is proposed here is a follow up of the two-year project and aims to investigate and validate the performance of Eco-HPC mixtures under actual field conditions. The main goal of this follow-up project is to validate findings of the previous research project in the field implementation and to develop guidelines for the use of Eco-HPC for sustainable pavement and transportation infrastructure construction. The project will employ two classes of Eco-HPCs for the following field demonstrations: Eco-Pave-Crete for pavement construction and Eco-Bridge-Crete for transportation infrastructure construction. The project will establish guidelines for material selection, mix design, casting, and performance of such sustainable infrastructure materials through the validation of field implementation.

Proposed Activities for SFY 2018:

The project has a final report submission date of June 30, 2017. However, the research includes laboratory investigation, field implementation, field survey, life-cycle analysis and development of recommendations and guidelines.

SFY 2017 Accomplishments:

The research team completed the evaluation of the life cycle assessment (LCA) and life cycle cost analysis (LCCA) of the proposed optimal concrete mixtures under Task 4 (life cycle assessment) of the proposed work. The analysis includes MoDOT recommended mixtures for pavement and bridge construction that were considered as reference mixtures.

<u>Financials</u>	<u>Amount</u>
Projected Budget SFY 2018	\$1,510
Budget Amount SFY 2017	\$35,000
Adjusted Budget Amount SFY 2017	\$38,490
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$0

TR201704 - Design of Ultra High Performance Concrete for Thin Overlays

Project Type: Contract Research
MoDOT Contact: Jen Harper
Total Contract Amount: \$40,000
Contract Period: 7/1/2016 to 7/31/2017
Contract Investigator: Dr. Kamal Khayat
Funding: SPR 80%, State 20%

Project Description and Objectives:

The main objective of this research is to develop a UHPC as a reliable, economic, low carbon foot print and durable concrete overlay material that can offer shorter traffic closures due to faster construction and long-term service life. This project aims at maximizing the performance of a thin layer of pavement material by reaching to an optimized composition of SCMs and proper types and amounts of fibers.

Proposed Activities for SFY 2018:

The researcher has asked for a project extension due to delays with the casting the pavement sections and issues with the data acquisition system. The final research will take place in early Fiscal Year 2018 and reporting will start 2nd quarter.

SFY 2017 Accomplishments:

During the first quarter of Fiscal Year 2017, 20 large-scale 6" pavement sections were constructed to use as the substrate for UHPC overlays. The typical MoDOT bridge deck concrete was used. The slabs were reinforced by two layers of rebar to reduce shrinkage deformations prior to casting the UHPC overlay. During the second quarter, work began on casting the overlays. A total of four UHPC mixtures will eventually be cast at various depths and curing conditions. The casting of the composite sections has proven to be more challenging and labor intensive than anticipated. Early-age and long-term deformations caused by concrete shrinkage, humidity and temperature gradients, cracking, and delamination are being monitored over time from placement until the age of 6 months.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$8,570
Budget Amount SFY 2017	\$35,000
Adjusted Budget Amount SFY 2017	\$31,430
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$0

TR201705 - Implementation of FR SCC and FR SWC Phase II

Project Type: Contract Research
MoDOT Contact: Bill Stone
Total Contract Amount: \$40,000
Contract Period: 7/1/2016 to 7/31/2017
Contract Investigator: Dr. Kamal Khayat
Funding: SPR 80%, State 20%

Project Description and Objectives:

The proposed study seeks to investigate key engineering and structural properties of FR-SCC and fiber-reinforced super workable concrete (FR-SWC) for infrastructure repair and construction. FR-SCC is targeted for repair of sub-structure elements, while the FR-SWC is targeted for construction operations. The expected result from this study will be guidelines and performance-based specifications for the evaluation, selection, and specification of FR-SCC for infrastructure repair of bridge substructures and FR-SWC for the construction of bridge substructure and superstructure elements.

Proposed Activities for SFY 2018:

The replacement of the bridge deck for Bridge A8509 over Route 50 near Taos, Missouri was let on March 23, 2017. The bridge will incorporate steel and poly fibers in the bridge deck. A cost and time extension will be necessary to accomplish the monitoring of the bridge that will be constructed this summer.

SFY 2017 Accomplishments:

A project was identified to implement a FR-SWC for the replacement of the bridge deck for Bridge A8509 over Route 50 near Taos, Missouri. The bridge was let on March 23, 2017. The instrumentation costs for the project have been compiled.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$10,166
Budget Amount SFY 2017	\$35,000
Adjusted Budget Amount SFY 2017	\$29,834
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$0

TR201706 - RTS--Facebook Pilot

Project Type: Contract Research
MoDOT Contact: Bill Stone
Total Contract Amount: \$1,000
Contract Period: 7/1/2016 to 12/31/2016
Contract Investigator: Facebook
Funding: SPR 80%, State 20%

Project Description and Objectives:

For several years MoDOT has been conducting a project which a contract was negotiated with a professional survey company to conduct a survey entitled “Right Transportation Solutions”. It conducted a public survey regarding multiple projects across the state to gauge the public’s reaction to those projects. With this project MoDOT is looking to conduct a similar survey; however using Facebook as the survey mechanism. The trial will be in the St. Louis district and will conduct the survey on the Facebook platform. The project is being called a “pilot” as it is looking to use this initial survey to determine if the Facebook platform could be a source to try additional surveys in the future.

Proposed Activities for SFY 2018:

The project was completed in Fiscal Year 2017. No Activities are anticipated for Fiscal Year 2018.

SFY 2017 Accomplishments:

The pilot project was conducted and was very successful. It was determined to do a second pilot for a rural project and see if this method could be utilized for non-urban projects as well. The project chosen was an ADA project in Buffalo, Missouri. Management is interested in using this mechanism for future outreach efforts. The process to implement Facebook will need to be developed in the future.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$0
Budget Amount SFY 2017	\$1,000
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$0

TR201707- Meramec Flood Inundation Mapping

Project Type: Contract Research
MoDOT Contact: Bill Stone
Total Contract Amount: \$30,000
Contract Period: 8/17/2016 to 12/31/2017
Contract Investigator: USGS
Funding: SPR 80%, State 20%

Project Description and Objectives:

The Meramec River is the longest free-flowing river through east-central Missouri and has been a source of flood damage for many years. During late December and early January (2015-2016) there was large scale flooding along a 50-mile reach of the Lower Meramec River from Pacific, Missouri downstream to the mouth at the Mississippi River. Substantial impacts in a seven-mile reach of the Meramec River, from Valley Park, downstream to Fenton, Missouri. The USGS Missouri Water Science Center (MOWSC) proposes to develop an online flood inundation mapping tools (FIM) for a selected reach of the lower Meramec River. The Meramec River floodplain is well suited for estimated flood inundation mapping because of the availability of stage and discharge data at both of these streamgages. The objectives of this study are to utilize existing one-dimensional hydraulic models developed by the USACE along the seven-mile reach.

Proposed Activities for SFY 2018:

The project is 80% complete with a completion date anticipated as 12/31/2017.

SFY 2017 Accomplishments:

Inundation maps for the Fenton reach have been submitted to the flood inundation mapper personnel to be loaded into the reviewer mapper until the Scientific Investigations Report is finalized. Inundation maps for the Valley Park reach are nearing completion, and will be submitted to the flood inundation mapper personnel soon. The Scientific Investigations Report for Phase 1 is nearly finished, and after minor changes to the text and figures are finalized it will be ready to be submitted for peer-reviews.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$0
Budget Amount SFY 2017	\$30,000
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$0

TR201709 - Runway Condition Index for State Funded Airports

Project Type: Contract Research
MoDOT Contact: Jen Neely
Total Contract Amount: \$199,856
Contract Period: 12/15/2016 to 3/30/2018
Contract Investigator: Jay Bledsoe
Funding: SPR 80%, State 20%

Project Description and Objectives:

Perform a pavement condition index (PCI) study on all state airport pavements. The PCI study would help to develop a pavement management program (PMP) to efficiently allocate state aviation funds towards maintenance in order to keep the airport pavements in good condition.

Proposed Activities for SFY 2018:

The pavement evaluations will be completed. An analysis of findings will be conducted and a pavement maintenance plan will be written. At the time of this review, the final report is anticipated in December 2017 for the requested research. An additional research opportunity with Smartphone IRI values will have a report delivered in March 2018.

SFY 2017 Accomplishments:

The project was kicked off and the paper and electronic records at MoDOT were reviewed. The researcher has reached out to the airport sponsors to obtain additional maintenance files. At the time of this review, the Pavement evaluation is anticipated to start in May and carry through the end of Fiscal Year 2017.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$135,702
Budget Amount SFY 2017	\$64,154
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$0

TR201710 - MoDOT Fleet Analysis

Project Type: Contract Research
MoDOT Contact: Jen Neely
Total Contract Amount: \$95,558
Contract Period: 4/4/2017 to 10/4/2017
Contract Investigator: Henry Canipe
Funding: SPR 80%, State 20%

Project Description and Objectives:

Develop a process to track and administer an evaluation process for multiple chassis/bodybuilder combinations. How can MoDOT evaluate their selections through a competitive bid basis.

Proposed Activities for SFY 2018:

Finish the Fleet study analysis and present to senior management early Fall.

SFY 2017 Accomplishments:

The agreement was executed between MHTC and the Kercher Group on April 4, 2017. MoDOT hosted the kickoff meeting on April 24, 2017 and shared data files with the vendor.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$56,971
Budget Amount SFY 2017	\$38,587
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$0

TR201711 - Economic Impact Study for Public Ports

Project Type: Contract Research

MoDOT Contact: Jen Harper

Total Contract Amount: \$360,255

Contract Period: 12/15/2016 to 12/31/2017

Contract Investigator: Paula Dowell

Funding: SPR 80%, State 20%

Project Description and Objectives:

Missouri has access to over 1,000 miles of the Missouri and Mississippi Rivers. These natural assets are a vital link to Missouri’s transportation chain. While public ports play an integral role in the transport of freight into and out of Missouri; it can be difficult to quantify the economic impacts ports bring to the state. Many ports rely on state or federal dollars to make infrastructure improvements, but it is difficult to secure these funds without this information. The objective of this project is to quantify the economic impacts of ports to the Missouri economy. Direct, indirect and induced impacts will be identified and quantified. The economic impact of funding port improvements will also be included in the analysis.

Proposed Activities for SFY 2018:

The first quarter will be devoted to wrapping up the statewide and port analysis as well as working on the deliverables. The draft deliverables are due on October 31, 2017 and the final on November 30, 2017. The deliverables include a final report, executive summary, individual port brochures and a presentation of findings to MoDOT and their identified stakeholders.

SFY 2017 Accomplishments:

The RFP for the project was posted on September 23, 2016. Proposals were received and the selection team met on November 6, 2016. The team from Cambridge Systematics, Inc. with subcontractor Hanson was selected. The contract was executed in December and a kickoff conference call took place on December 21. The research team conducted site visits and interviews with 11 Missouri port directors from March 14-March 22, 2017. They also completed a benchmarking analysis of goods movement by water using the FHWA Freight Analysis Framework data. The development of the individual port brochures began in the fourth quarter and will continue through to the fall.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$298,675
Budget Amount SFY 2017	\$61,580
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$0

TR201712 - Performance Characteristics of Recycled Asphalt

Project Type: Contract Research
MoDOT Contact: Jen Neely
Total Contract Amount: \$200,000
Contract Period: 10/14/2016 to 10/31/2017
Contract Investigator: Bill Buttlar
Funding: SPR 80%, State 20%

Project Description and Objectives:

Evaluating performance characteristics of ground tire rubber, recycled roofing shingles and rejuvenators in recycled asphalt pavements in the Midwest climate.

Proposed Activities for SFY 2018:

LCCA and LCA studies will be conducted. Final report is anticipated for September 30, 2017.

SFY 2017 Accomplishments:

The literature review was done in the first quarter. Mid project presentation occurred on April 21st. At the time of this writing, it is expected that all project samplings will have been conducted during this SFY.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$99,205
Budget Amount SFY 2017	\$100,795
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$0

TR201713 - Cold Temperature Creep Compliance

Project Type: Contract Research
MoDOT Contact: Jen Neely
Total Contract Amount: \$80,174
Contract Period: 10/14/2016 to 10/31/2017
Contract Investigator: Mike Lusher
Funding: SPR 80%, State 20%

Project Description and Objectives:

The objective of this project is to determine hot mix asphalt (HMA) thermal cracking properties to use as inputs for MEPDG pavement distress prediction models.

Proposed Activities for SFY 2018:

The anticipated final report is due August 31, 2017.

SFY 2017 Accomplishments:

The test samples from MoDOT were submitted to Rolla for AASHTO T 322 testing. The testing is anticipated to be done by end of SFY 2017 and the reporting will come after.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$12,737
Budget Amount SFY 2017	\$67,437
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$0

TR201714 - Investigation of Existing Foundations under Consideration for Reuse

Project Type: Contract Research
MoDOT Contact: Bill Stone
Total Contract Amount: \$90,000
Contract Period: 1/1/2017 to 2/28/2018
Contract Investigator: Andy Boeckmann
Funding: SPR 80%, State 20%

Project Description and Objectives:

The objective of this research project is to evaluate different methods for investigating the condition and load capacity of existing foundations. The objective will be achieved by comparing investigation techniques for two bridges in Southeast Missouri that are slated for replacement by MoDOT in 2017. The results of the investigations will be compared with “ground truth” values provided by load testing the existing piles and subsequently exhuming them to assess their condition.

Proposed Activities for SFY 2018:

The Geophysics will take place in Fiscal Year 2018. Other testing will include the Sonic Echo/Impulse Response before the demolition of the bridges. The plans call for an anticipated timeline of two weeks for the load testing. Another component for SFY2018 is the “Unload Test”, which will measure the strain relief and vertical displacement of the pile heads before and after the demolition of the superstructure. Also Pile Data Analysis (PDA) will be conducted along with exhuming the piles and recording observations, photographs, measurements of length, diameter, steel thickness, general condition. The research team will monitor the installation of new piles to evaluate how data for new piles fits models created for existing piles.

SFY 2017 Accomplishments:

The parallel seismic testing has been completed at both bridges (Rte. WW and Route U). One CPT sounding has already been completed at each site for the geotech report. The bridges have been let and anticipated closures of the bridges are June 30th for the Rte. WW bridge and beginning the week of August 8th for the Route U bridge.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$57,162
Budget Amount SFY 2017	\$32,838
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$0

TR201715 - Erosion Control Blanket Workshop Training

Project Type: Contract Research
MoDOT Contact: Bill Stone
Total Contract Amount: \$4,863
Contract Period: 1/1/2017 to 6/30/2017
Contract Investigator: Amanda Cox
Funding: SPR 80%, State 20%

Project Description and Objectives:

A research project was recently completed by Saint Louis University for the Missouri Department of Transportation (MoDOT) in which new specification guidelines for Erosion Control Blankets (ECBs) were developed that are specific for Missouri hydrology and soils. During this study, workshop materials were developed for MoDOT with the intent that the materials will be used by MoDOT staff to train employees and contractors on the use and specification of ECBs. The purpose of this proposed work is for Saint Louis University (SLU) civil engineering faculty to train MoDOT personnel on how to execute the ECB workshop, which will be accomplished through a train-the-trainer session in Jefferson City.

Proposed Activities for SFY 2018:

The project was completed in Fiscal Year 2017. No Activities are anticipated for Fiscal Year 2018.

SFY 2017 Accomplishments:

The Erosion Control Blanket Workshop was conducted in Jefferson City on March 22, 2017. The workshop included information on the ECBs and provided the history of the original research project that was the genesis of this workshop. There were also hands-on training examples to identify the different types of ECBs being used.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$0
Budget Amount SFY 2017	\$4,863
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$0

TR201717 - Auto Flagger

Project Type: Contract Research
MoDOT Contact: Jen Harper
Total Contract Amount: \$176,275
Contract Period: 12/15/2016 to 6/30/2018
Contract Investigator: Henry Brown
Funding: SPR 80%, State 20%

Project Description and Objectives:

Highway workers are often active in areas with vehicles traveling at high speeds. Some methods for improving worker safety involve separating workers from traffic, including the use of buffer spaces and barriers. Flaggers are often located closest to the on-coming traffic in order to direct traffic. The Automated Flagger Assistance Device (AFAD) is a portable system that can be used to control traffic during lane closures on two-lane highways thus replacing human flaggers. The AFAD used in this project is built into a truck-mounted attenuator (TMA) truck, thus providing protection for the AFAD operator

who sits in the truck. The goal of this project is to perform a field verification and a driver behavior study of the effectiveness of an AFAD configuration for MoDOT. In addition to worker protection, this AFAD also has the potential benefit of greater visibility by using a large changeable message sign and the TMA checkerboard panel.

Proposed Activities for SFY 2018:

The simulator portion of the project is scheduled to continue through the first quarter of Fiscal Year 2018. The simulator study will include using the AFAD both with the CMS board and without the CMS board. If the results show that the AFAD can be safely used without the CMS board phase 3 will begin which is to do a field study with the AFAD both with and without the CMS board.

SFY 2017 Accomplishments:

The contract was executed in December 2016. Field data collection began at the end of December but was stopped after technical difficulties with the AFAD controller. A motorist survey was developed in both a hard copy form and an electronic version. These were given to motorists that drove through the work zone. Field data collection of the AFAD with the changeable message sign (CMS) was completed on January 31, and the data were processed and analyzed for several Measures of Effectiveness (MOEs). Driver surveys were distributed, and the responses were analyzed to assess driver perceptions of both the flagger and the AFAD (with CMS). The results of the field study of the AFAD (with CMS) were presented to MoDOT on March 29, 2017. An interim report was prepared with documentation from the first phase of the project. In addition, the design of the simulator portion of the study for AFAD (with and without CMS) was completed.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$144,334
Budget Amount SFY 2017	\$31,941
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$0

TR201718 - 2017 Infrastructure Conference Invoice

Project Type: Contract Research
MoDOT Contact: Bill Stone
Total Contract Amount: \$3,000
Contract Period: 7/1/2016 to 6/30/2017
Contract Investigator: Missouri S&T
Funding: SPR 80%, State 20%

Project Description and Objectives:

The Transportation Infrastructure Conference is an annual conference initiated by the Missouri University of Science and Technology. It is conducted in the fall/winter of the year to highlight research projects and activities.

Proposed Activities for SFY 2018:

A Transportation Infrastructure Conference will be scheduled in Fiscal Year 2018. The upcoming conference will be assigned a new project number. There are no further activities proposed for TR201718.

SFY 2017 Accomplishments:

The Transportation Infrastructure Conference was conducted on November 18, 2016 at the Missouri University of Science and Technology. MoDOT was a co-sponsor for the conference and contributed \$3,000 for the logistics of the conference.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$0
Budget Amount SFY 2017	\$3,000
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$0

TR201719 - OCLC

Project Type: Contract Research

MoDOT Contact: Bill Stone

Total Contract Amount: \$2,933

Contract Period: 1/1/2017 to 12/31/2017

Contract Investigator: OCLC

Funding: SPR 80%, State 20%

Project Description and Objectives:

This is a one-time payment of the 2016/2017 OCLC annual subscription for cataloging and resource sharing (ILL). It was previously paid annually by the Transportation Library Connectivity and Development Pooled Fund which ended in Sept. 2015. The payment was made by the Pooled Fund consultant out of our membership fee which came from SP&R funds. There was a delay between when the current invoice was issued (Oct. 2016) while discussions were ongoing about the start-up of a new Pooled Fund. Since that is not forthcoming, it was decided to pay the invoice directly as a one-time payment.

Proposed Activities for SFY 2018:

MoDOT and the Secretary of State Library has discussed the processing of this invoice for the future and will be processing this as part of the Library Services Contract with the University of Missouri-Columbia in the future.

SFY 2017 Accomplishments:

The invoice for the OCLC Invoice was submitted for processing on January 24, 2017 in the amount of \$2933.49.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$0
Budget Amount SFY 2017	\$2,933
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$0

TR201720 - Rejuvenating Asphalt Products

Project Type: Contract Research

MoDOT Contact: Jen Neely

Total Contract Amount: TBD

Contract Period: TBD

Contract Investigator: TBD

Funding: SPR 80%, State 20%

Project Description and Objectives:

The objective of this investigation is to provide recommendations for creating a performance based specification for rejuvenating and surface sealing products that extend asphalt pavement life. The product evaluation will consider the effectiveness of softening the existing asphalt binder, improving the existing rheological properties (less brittle), and decreasing the permeability of the pavement. The product comparisons will outline the pros and cons to include, but not limited to: the testing results, cure time necessary before opening roadway to traffic, daily production rate, material cost, material location, other economical limitations, application rate utilized and blotting materials utilized, if applicable. A field application study will be performed and evaluated by a third party researcher to provide a report of each product’s performance.

Proposed Activities for SFY 2018:

Testing of the submitted products in the lab will determine which products to be placed on the selected roadways in St. Louis and Central District. There will be a Request for Proposal issued that will select the third party researcher that will evaluate the product’s performance in the field study.

SFY 2017 Accomplishments:

A Request for Information (RFI) was posted on April 14, 2017 and solicited vendors were asked to respond with their interest in participating in the field placements and evaluations. The vendors that are interested submitted products to MoDOT for evaluation and consideration for placement on the selected roadways to be evaluated.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	TBD
Budget Amount SFY 2017	\$0
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$0

TR201721 - Leader-Follower TMA System

Project Type: Contract Research

MoDOT Contact: Jen Harper

Total Contract Amount: TBD

Contract Period: TBD

Contract Investigator: TBD

Funding: SPR 80%, State 20%

Project Description and Objectives:

MoDOT’s mobile and slow moving operations, such as striping, sweeping, bridge flushing and pothole patching, are critical for efficient and safe operation of the highway transportation system. MoDOT’s

slow moving operations have been crashed into over 80 times since 2013 resulting in many injuries to MoDOT employees. The objective of this RFP is to provide a NCHRP 350 Level 3 compliant Leader-Follower TMA System capable of operating a driverless rear advanced warning truck in mobile highway operations as described in Traffic Application TA-35a. The system shall consist of a Lead Truck (LT) and a Rear Advanced Warning Truck called the Follow Truck (FT). The goal is to avoid operator injury by eliminating the need for a human operator in the FT.

Proposed Activities for SFY 2018:

It is anticipated the project will be under contract by mid-August. Development of the training and testing plan will be completed in the first half of the fiscal year. The system should be provided to MoDOT by mid-April of 2018. Training of MoDOT staff will begin shortly after delivery and initial testing of the system in a controlled environment will take place. Once the controlled tests have been successfully completed testing will begin in actual work zones. This will most likely take place in early Fiscal Year 2019.

SFY 2017 Accomplishments:

The RFP was posted on May 15, 2017. The project award will not take place until the beginning of Fiscal Year 2018.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	TBD
Budget Amount SFY 2017	\$0
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$0

TR201722 - Evaluation of Green Lights on TMAs

Project Type: Contract Research
MoDOT Contact: Jen Harper
Total Contract Amount: \$133,235
Contract Period: 4/26/2017 to 6/15/2018
Contract Investigator: Henry Brown
Funding: SPR 80%, State 20%

Project Description and Objectives:

Mobile work zones for various types of moving operations such as striping, sweeping, and pothole filling are an important component of maintaining highways. The Manual on Uniform Traffic Control Devices (MUTCD) provides guidance for the layout for mobile work zones. Yellow and white lights are typically used on the TMA to help draw motorists’ attention to the moving work zone. Despite these precautions, some drivers do not respond to warnings and collide with the TMA. One method for increasing the effectiveness of warnings involves the use of alternative colored lights, such as green, on a TMA. A pilot study of green lights on TMAs was undertaken by MoDOT in 2016 at Lee’s Summit Airport. This study will build upon the MODOT pilot study by evaluating driver performance under different light configurations in both simulator and field environments.

Proposed Activities for SFY 2018:

The project will consist of several phases. The first phase will be a simulator study to determine which lighting configurations should be used in the second phase. Phase 2 consists of the field data collection

portion of the project. Once the data collection takes place, the research team will analyze the data and a final report will be submitted. Due to the timing of the legislative session a presentation will be made to MoDOT both after the simulator study and after the field study so that it can be determined if MoDOT wishes to pursue legislative authority to use a different lighting configuration.

SFY 2017 Accomplishments:

This contract was signed during the fourth quarter of Fiscal Year 2017 so most work will begin in Fiscal Year 2018.

<u>Financials</u>	<u>Amount</u>
Projected Budget SFY 2019	\$33,235
Projected Budget SFY 2018	\$100,000
Budget Amount SFY 2017	\$0
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$0

TR201724 – MoDOT Report Card Survey

Project Type: Contract Research
MoDOT Contact: Bill Stone
Total Contract Amount: \$75,330
Contract Period: 4/20/2017 to 12/31/2021
Contract Investigator: Lance Gentry
Funding: SPR 80%, State 20%

Project Description and Objectives:

This project is a statewide evaluation of satisfaction from a general population survey of Missouri adults. Results are reported to MHTC and the Missouri Department of Transportation (MoDOT). Provide a statewide evaluation of satisfaction levels with MoDOT performance from a general population telephone survey of Missouri adults. The survey will be conducted every other year in May in years 2017, 2019, and 2021. MoDOT expects this review to result in reports summarizing the data received by using specified methodology. The results are reported in the July MoDOT Tracker.

Proposed Activities for SFY 2018:

This survey will not be conducted in SFY 2018

SFY 2017 Accomplishments:

The 2017 survey was conducted in May 2017. Information was provided to MoDOT to be included in the July 2017 Tracker. The invoice for the first year of this survey was received in June and sent for processing.

<u>Financials</u>	<u>Amount</u>
Projected Budget SFY 2021	\$24,178
Projected Budget SFY 2020	\$0
Projected Budget SFY 2019	\$24,177
Projected Budget SFY 2018	\$0
Budget Amount SFY 2017	\$26,975
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$0

TR201725 – USGS Scan of Gasconade River Bridges

Project Type: Contract Research
MoDOT Contact: Bill Stone
Total Contract Amount: \$54,600
Contract Period: 6/1/2017 to 9/30/2019
Contract Investigator: USGS
Funding: SPR 80%, State 20%

Project Description and Objectives:

During the spring of 2017 Missouri had a flooding event that closed hundreds of roads. After a flooding event checking the safety of bridges for scouring can be challenging. Of particular concern were several bridges along the Gasconade River in mid-Missouri. USGS used some of their scanning technology to quickly deploy to these locations to determine if there was any undermining of the bridge foundations.

Proposed Activities for SFY 2018:

Final results will be sent to MoDOT in early Fiscal Year 2018.

SFY 2017 Accomplishments:

All bridges were surveyed during the first half of June 2018. Initial results showed no major concerns but some scour had occurred. The preliminary information was shared with the Bridge Division so any locations requiring immediate repairs could be addressed.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$0
Budget Amount SFY 2017	\$54,600
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$0

TR201801 - Library Support Contract (2018-2019)

Project Type: Contract Research
MoDOT Contact: Bill Stone
Total Contract Amount: \$196,428
Contract Period: 7/1/2017 to 6/30/2019
Contract Investigator: Charles Nemmers
Funding: SPR 80%, State 20%

Project Description and Objectives:

The demand for information services has increased as more MoDOT users are realizing the timely, diverse and high quality information they receive using the services of the current librarian. The major objective of this project is to provide library, research and reference support services for MoDOT. University of Missouri-Columbia will provide the services of a Master of Library Science (MLS) librarian who will work 40 hours per week and will be located at the Secretary of State's State Library and MoDOT in Jefferson City.

Proposed Activities for SFY 2018:

The librarian will continue to provide reference and research support services to MoDOT employees. Other services include circulation, cataloging, collection management (which includes digital repositories) & maintenance, marketing & outreach in addition to website content creation. Ongoing activities include coordinating and collaborating with the Missouri State Library.

SFY 2017 Accomplishments:

This project will begin in Fiscal Year 2018.

<u>Financials</u>	<u>Amount</u>
Projected Budget SFY 2020	\$6,428
Projected Budget SFY 2019	\$100,000
Projected Budget SFY 2018	\$90,000
Budget Amount SFY 2017	\$0
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	\$0

Pooled Fund Studies

(Pooled Fund Project contributions are not taken out of the RDS funding category)

TPF-5(193)-Midwest States Pooled Fund Crash Test Program

Project Type: Pooled Funds
MoDOT Contact: Bill Stone
MoDOT Total Commitment: \$640,000
Contract Period: 11/19/2008 to 6/30/2018
Contract Investigator: Nebraska DOT
Funding: SPR 100%

Project Description and Objectives:

This project is continuation of work done under project SPR-3(017), in which MoDOT has been a participant since 1991. The study has proved to be successful to this point and will remain active under the new project number. The purpose of the project is to crash test highway roadside appurtenances to assure they meet criteria established nationally. For more information, please refer to the Midwest Roadside Safety website: www.mwrsf.unl.edu

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2018	\$65,000
Committed Funds SFY 2017	\$65,000
Transferred Funds SFY 2017	\$65,000

TPF-5(255)-Highway Safety Manual

Project Type: Pooled Funds
MoDOT Contact: Jen Harper
MoDOT Total Commitment: \$160,000
Contract Period: 1/19/2012 to 12/31/2019
Contract Investigator: FHWA
Funding: SPR 100%

Project Description and Objectives:

The Highway Safety Manual (HSM), 1st Edition, was published by AASHTO in 2010. The HSM provides the best factual information and tools in a useful form to facilitate roadway planning, design, operations, and maintenance decisions based on precise consideration of their safety consequences. The AASHTO Standing Committee on Highway Traffic Safety has established a goal to institutionalize the AASHTO Highway Safety Manual (HSM) and its associated analytical tools to make data-driven decisions, advance the science of safety, and to ultimately reduce fatalities and serious injuries. The objectives of the study are to advance ongoing efforts by lead states to implement the HSM, and to expand implementation to all states.

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2018	\$20,000
Committed Funds SFY 2017	\$20,000
Transferred Funds SFY 2017	\$20,000

TPF-5(267)-2012 NCAT Pavement Test Track

Project Type: Pooled Funds
MoDOT Contact: Bill Stone
MoDOT Total Commitment: \$840,000
Contract Period: 6/1/2012 to 9/30/2018
Contract Investigator: Alabama DOT
Funding: SPR 100%

Project Description and Objectives:

The 2012 NCAT Pavement Test Track is expected to consist of an even larger structural experiment as well as more mill or inlay surface mixes, with formal research sponsorship expanded to include private sector partners.

The primary objectives are:

- On the existing 1.7 mile NCAT test oval, construct 200 feet of test sections representative of in-service roadways on the open transportation infrastructure.
- Apply accelerated performance truck traffic in two years following construction.
- Assess and compare functional and structural field performance of trafficked sections on a regular basis via surface and subsurface measures.
- Validate M-E approach to pavement analysis and design using both surface and subsurface measures.

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2018	\$120,000
Committed Funds SFY 2017	\$120,000
Transferred Funds SFY 2017	\$120,000

TPF-5(269)-Unbonded Concrete Overlays Pooled Fund

Project Type: Pooled Funds
MoDOT Contact: Jen Harper
MoDOT Total Commitment: \$60,000
Contract Period: 6/17/2013 to 5/31/2018
Contract Investigator: Minnesota DOT
Funding: SPR 100%

Project Description and Objectives:

One pavement rehabilitation option that has been gaining popularity in the U.S. recently is unbonded concrete overlays of existing concrete or composite pavements (UCOCP). While thicker (>7") unbonded concrete overlays have performed very well in many states, current economic restrictions, as well as an interest in using less materials (sustainability), are guiding agencies toward optimizing concrete overlays. This can be done by making the best use of the existing pavement structure and designing a cost effective interlayer and concrete overlay. The primary purpose of this project is to create a unified national design guide for unbonded concrete overlays of existing concrete and composite pavements.

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2018	\$0
Committed Funds SFY 2017	\$0
Transferred Funds SFY 2017	\$0

TPF-5(273)-Institute for Trade and Transportation Studies - ITTS

Project Type: Pooled Funds
MoDOT Contact: Bill Stone
MoDOT Total Commitment: \$199,000
Contract Period: 12/1/2012 to 11/30/2017
Contract Investigator: Louisiana Department of Transportation and Development
Funding: SPR 100%

Project Description and Objectives:

The Southeastern Transportation Alliance was formed in 1996 for the purpose of undertaking the Latin America Trade and Transportation Study (LATTS). The premise of the study was the recognition that Latin America is poised for growth and this presents huge trade potential for southeastern states. Following the completion of LATTS (Phase I) in March 2001, the study was taken to the next level under the name LATTS II. LATTS II was a two-year analysis of the critical infrastructure needs identified in LATTS (Phase I). To continue the original study initiatives, the remaining Alliance states decided to form an independent entity entitled the Institute for Trade and Transportation Studies (ITTS). The purpose of ITTS is to estimate trade volumes with Latin America and other international trade, evaluate

infrastructure investments needed to support growth in international trade, and develop strategies to guide infrastructure investments.

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2018	\$39,800
Committed Funds SFY 2017	\$39,800
Transferred Funds SFY 2017	\$39,800

TPF-5(285)-Lightweight Deflectometer Measurements

Project Type: Pooled Funds
MoDOT Contact: Jen Harper
MoDOT Total Commitment: \$50,000
Contract Period: 11/1/2013 to 12/31/2017
Contract Investigator: Maryland DOT
Funding: SPR 100%

Project Description and Objectives:

Previous research has shown the potential of lightweight deflectometers (LWDs) for determining the moduli of natural subgrades and compacted soil layers, including granular bases. There is currently no widely recognized standard for interpreting the load and deflection data obtained during construction QA testing and then relating these measurements to the elastic modulus values used in pavement design. The primary objective of this study is to provide state DOT and local government engineers with a practical and theoretically sound methodology for the evaluation of in-place elastic modulus of unbound layers, subgrades, and other earthwork from LWD field test data. This will require evaluation of the abilities of LWDs to determine in-place moduli that reflect moisture influences, stress/strain dependency, and layering effects.

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2018	\$0
Committed Funds SFY 2017	\$0
Transferred Funds SFY 2017	\$0

TPF-5(293)-Mid-America Freight Coalition-II

Project Type: Pooled Funds
MoDOT Contact: Bill Stone
MoDOT Total Commitment: \$105,000
Contract Period: 11/6/2013 to 12/31/2018
Contract Investigator: Wisconsin DOT
Funding: SPR 100%

Project Description and Objectives:

The industries and farms of the Mississippi Valley region can compete in the marketplace only if their products can move reliably, safely and at reasonable cost to market. Growing congestion threatens the sustainability of this freight movement. The people of the region are dependent upon farms and industries for their livelihoods and their economic quality of life depends on the flow of goods to our markets. The Mississippi Valley Freight Coalition (MVFC) was created to protect and support the economic wellbeing

of the industries, farms and people of the region by keeping the products of those industries, farms and people flowing to markets reliably, safely, and efficiently. This project is a continuation of Pooled Fund TPF-5(156).

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2018	\$30,000
Committed Funds SFY 2017	\$25,000
Transferred Funds SFY 2017	\$25,000

TPF-5(295)-Smart Work Zone Deployment Initiatives (SWZDI)

Project Type: Pooled Funds
MoDOT Contact: Bill Stone
MoDOT Total Commitment: \$250,000
Contract Period: 5/15/2014 to 1/1/2019
Contract Investigator: Iowa DOT
Funding: SPR 100%

Project Description and Objectives:

The Midwest Smart Work Zone Deployment Initiative (MwSWZDI) was initiated in 1999 as a Pooled Fund Study intended to coordinate and promote research related to safety and mobility in highway work zones. The Iowa DOT has been the lead state since 2004. The program is an ongoing cooperative effort between State Departments of Transportation, universities, and industry. Commercial products are provided by private vendors for evaluation, although this is not the only focus of contracted projects. State DOTs provide funds, prioritize products with respect to the anticipated benefits to their construction and maintenance activities, and cooperate with researchers to identify test sites and conduct the evaluations.

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2018	\$50,000
Committed Funds SFY 2017	\$50,000
Transferred Funds SFY 2017	\$50,000

TPF-5(301)-Support Services for Peer Exchanges

Project Type: Pooled Funds
MoDOT Contact: Bill Stone
MoDOT Total Commitment: \$7,000 (estimated)
Contract Period: 10/1/14 to 6/30/19
Contract Investigator: Oregon
Funding: SPR 100%

Project Description and Objectives:

The Peer exchange has been a requirement for state RD&T programs since 1998 and it has proven to be a useful and effective tool for improving research program management. However, for many states the most difficult aspect of hosting a peer exchange is logistics and procurement. This Peer Exchange Project is intended to provide Research Programs with the option to procure services to help with the logistical and administrative aspects of organizing and holding an RD&T Peer Exchange, as described under 23 CFR 420.203. Doing so will allow Research Programs to focus on the content of their peer exchange.

Each state makes a contribution amount of around \$7,000 but an actual transfer amount is determined after the logistics are finalized and actual costs are determined. MoDOT has not participated in this pooled fund in past years; 2017 will be the first year of participation.

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2018	\$7,000 (estimate)
Committed Funds SFY 2017	\$0
Transferred Funds SFY 2017	\$0

TPF-5(305)-Regional and National Implementation and Coordination of ME Design

Project Type: Pooled Funds
MoDOT Contact: Bill Stone
MoDOT Total Commitment: \$40,000
Contract Period: 1/1/15 to 12/30/18
Contract Investigator: Iowa DOT
Funding: SPR 100%

Project Description and Objectives:

The focus of this pooled fund project will be to provide peer exchanges and the AASHTO National Users Group meeting. The meetings are to support State DOT and Canadian province implementation of ME Design procedures by (1) sharing information between, (2) identifying issues at the local/regional level with regard to implementation, (3) identifying needs or areas that still need to be researched relative to the MEPDG, and (4) organizing implementation efforts on a regional and National basis. The four peer exchanges will be limited to participation by governmental agencies, while the AASHTO Users group meeting will be open to industry representatives, academics, consultants, and others interested in ME Design.

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2018	\$10,000
Committed Funds SFY 2017	\$10,000
Transferred Funds SFY 2017	\$10,000

TPF-5(313)-Technology Transfer Concrete Consortium (TTCC)

Project Type: Pooled Funds
MoDOT Contact: Jen Harper
MoDOT Total Commitment: \$32,000
Contract Period: 2/5/2015 to 8/31/2020
Contract Investigator: Iowa State
Funding: SPR 100%

Project Description and Objectives:

Increasingly, state DOTs are challenged to design and build longer life concrete pavements that result in higher levels of user satisfaction. In order to foster new technologies and practices, experts from state DOTs, FHWA, academia and industry must collaborate to identify and examine new concrete pavement research initiatives. The Technology Transfer Concrete Consortium (TTCC) is to establish a pooled fund for state representatives to continue collaborative efforts begun in TPF-5(066) Materials and Construction Optimization. TTCC will provide new developments in concrete paving leading to implementation of

new technologies and longer life pavements through the use of innovative testing, technology transfer, and construction optimization technologies and practices.

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2018	\$8,000
Committed Funds SFY 2017	\$8,000
Transferred Funds SFY 2017	\$8,000

TPF-5(316)-Traffic Control Device (TCD) Consortium (Traffic)

Project Type: Pooled Funds
MoDOT Contact: Jen Harper
MoDOT Total Commitment: \$7,000
Contract Period: 1/14/2015 to 1/14/2020
Contract Investigator: FHWA
Funding: SPR 100%

Project Description and Objectives:

The Traffic Control Device Consortium will focus on systematic evaluation of novel TCDs, employing a consistent process that addresses human factors and operations issues for each TCD idea and by providing local and state agencies a quicker response to new technologies with the right assessment skills and tools that will enable consistent TCD idea identification and evaluation. TCD Consortium efforts will address TCD issues identified by local and state jurisdictions, industry, and organizations and will aid in the compliance to the MUTCD rule-making process and incorporation of novel TCDs into the MUTCD. This project is a continuation of TPF-5(065).

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2018	\$25,000
Committed Funds SFY 2017	\$25,000
Transferred Funds SFY 2017	\$25,000

TPF-5(317)-Low Cost Safety Improvements

Project Type: Pooled Funds
MoDOT Contact: Bill Stone
MoDOT Total Commitment: \$15,000
Contract Period: 2/10/2015 to 2/9/2020
Contract Investigator: FHWA
Funding: SPR 100%

Project Description and Objectives:

The Evaluation of Low Cost Safety Improvements Pooled Fund Study will encompass safety-effectiveness evaluations of priority strategies from the NCHRP Report 500 Guidebooks, Guidance for Implementation of the AASHTO Strategic Highway Safety Plan. 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 data will be collected, and evaluation studies performed. This project is a continuation of TPF-5(099).

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2018	\$5,000
Committed Funds SFY 2017	\$5,000
Transferred Funds SFY 2017	\$5,000

TPF-5(319)-Transportation Management Center Pooled Fund Study

Project Type: Pooled Funds
MoDOT Contact: Bill Stone
MoDOT Total Commitment: \$75,000
Contract Period: 4/17/2015 to 4/16/2018
Contract Investigator: FHWA
Funding: SPR 100%

Project Description and Objectives:

The Transportation Management Center (TMC) Pooled Fund Study (PFS) serves as a forum to identify and address issues that are common among agencies that manage and operate TMCs and provides an opportunity for agencies to collectively take on those key issues and challenges. The goal of the TMC PFS is to assemble regional, state, and local transportation management agencies and the Federal Highway Administration (FHWA) to (1) identify human-centered and operational issues; (2) suggest approaches to addressing identified issues; (3) initiate and monitor projects intended to address identified issues; (4) provide guidance and recommendations and disseminate results; (5) provide leadership and coordinate with others with TMC interests; and (6) promote and facilitate technology transfer related to TMC issues nationally. This project is a continuation of TPF-2(207).

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2018	\$25,000
Committed Funds SFY 2017	\$25,000
Transferred Funds SFY 2017	\$25,000

TPF-5(326)-Performance Management

Project Type: Pooled Funds
MoDOT Contact: Bill Stone
MoDOT Total Commitment: \$40,000
Contract Period: 7/1/2015 to 6/30/2017
Contract Investigator: Rhode Island DOT
Funding: SPR 100%

Project Description and Objectives:

The focus of this pooled fund project will be to research and assess training and educational needs of contributing members, develop and deliver training, and to facilitate the sharing and retention of performance management best practices.

Funding will be used to:

- Identify Gaps in TPM Knowledge, Skills and Abilities—Conduct a needs analysis for learning and capacity development of contributing members resulting in a short and long-term capacity building roadmap;

- Develop and Deliver Learning and Capacity Development Resources—Develop training and educational material to meet the gaps identified in the knowledge, skills and abilities;
- Establish a TPM Information Clearinghouse—The TPM Information Clearinghouse will be used to showcase PM best practices, foster collaboration, and serve as a repository for PM resources; and
- Support Knowledge Transfer Among Pooled Fund States

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2018	\$10,000
Committed Funds SFY 2017	\$10,000
Transferred Funds SFY 2017	\$10,000

TPF-5(330)-No Boundaries Roadway Maintenance Practices

Project Type: Pooled Funds
MoDOT Contact: Bill Stone
MoDOT Total Commitment: \$40,000
Contract Period: 9/1/2015 to 9/1/2018
Contract Investigator: Ohio DOT
Funding: SPR 100%

Project Description and Objectives:

Through this pooled fund project, the Ohio Department of Transportation will work with other State Departments of Transportation (DOTs) to facilitate the implementation of promising non-snow and ice maintenance innovations and technologies. This project provides a forum for State DOTs to share their maintenance innovations with each other, support technology transfer activities and develop marketing and deployment plans for the implementation of selected innovations. Resources will be provided for implementing the innovations that includes travel, training and other technology transfer activities. This project is a continuation of the previous project initiated and led by the Missouri DOT TPF-5(239). It is anticipated that this consortium will become the national forum for state involvement in the technical exchange needed for collaboration and new initiatives, and be a forum for advancing the application and benefit of research technologies. Workshops will continue to be provided for the states participating in the pooled fund project.

Note: A \$20,000 transfer was made in SFY 2016. This transfer covers the SFY 2015, which was not made in SFY 2015 in the amount of \$10,000 and the SFY 2016 transfer of \$10,000.

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2018	\$10,000
Committed Funds SFY 2017	\$10,000
Transferred Funds SFY 2017	\$10,000

TPF-5(334)- Enhancement to the Intelligent Construction Data Management System (Veda) and Implementation

Project Type: Pooled Funds
MoDOT Contact: Bill Stone
MoDOT Total Commitment: \$75,000
Contract Period: 1/19/2016 to 6/30/2019
Contract Investigator: Minnesota DOT
Funding: SPR 100%

Project Description and Objectives:

MnDOT, in collaboration with local contractors and suppliers, is moving forward with full implementation of geo-spatial technologies such as intelligent compaction and thermal profiling (infrared imaging) as quality control tools on grading, reclamation, and asphalt paving projects. Currently, only 10 to 15 percent of the MnDOT 2014 bituminous paving contracts will utilize these technologies due to lack of needed enhancements to the ICDM-Veda for use in contract administration. The pooled fund offers participating states to be a part of development of a software interface that will provide intelligent construction data collection systems (i.e., geospatial systems such as intelligent compaction, paver-mounted thermal profiling [infrared radar technology], ground penetrating radar (GPR), and pavement smoothness/profile, etc.) gather large quantities of data each day of production activities.

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2018	\$25,000
Committed Funds SFY 2017	\$25,000
Transferred Funds SFY 2017	\$25,000

TPF-5(341)-National Road Research Alliance

Project Type: Pooled Funds
MoDOT Contact: Bill Stone
MoDOT Total Commitment: \$450,000
Contract Period: 4/19/2016 to 6/30/2019
Contract Investigator: Minnesota
Funding: SPR 100%

Project Description and Objectives:

The need for the National Road Research Alliance (NRRRA) has grown over the last several years. It is based on a number of successful efforts the Minnesota Department of Transportation (MnDOT) has achieved utilizing the MnROAD research facility. These efforts include a number of local and national research studies, pool fund research projects, local-national-international partnerships, academic and industry involvement, Transportation Engineering and Road Research Alliance (TERRA) pooled fund, and MnROAD’s 2014 Peer exchange.

Primary objectives of the National Road Research Alliance (NRRRA) are:

- Conduct structured construction, field testing and evaluation using the MnROAD cold weather facility;
- Evaluate pavement materials, equipment and methods under real-world conditions;
- Establish industry standards and develop performance measure for improving pavement performance;

- Develop and/or revise specifications and recommendations;
- Studying and promoting innovative techniques and technologies that will save agencies money, improve safety and increase efficiency;
- Supporting technology transfer by developing practical field guides, best practices, and training curriculum to promote the results of research projects

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2018	\$150,000
Committed Funds SFY 2017	\$150,000
Transferred Funds SFY 2017	\$150,000

TPF-5(353)-Clear Roads Phase II

Project Type: Pooled Funds
MoDOT Contact: Bill Stone
MoDOT Total Commitment: \$50,000
Contract Period: 1/1/2017 to 12/30/2021
Contract Investigator: Minnesota DOT
Funding: SPR 100%

Project Description and Objectives:

The Clear Roads pooled fund project will maintain its focus on advancing winter highway operations nationally but will include a more pronounced emphasis on state agency needs, technology transfer and implementation. State departments of transportation are aggressively pursuing new technologies, practices, tools, and programs to improve winter highway operations and safety while maintaining fiscal responsibility. This pooled fund is needed to evaluate these new tools and practices in both lab and field settings, to develop industry standards and performance measures, to provide technology transfer and cost benefit analysis, and to support winter highway safety.

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2018	\$25,000
Committed Funds SFY 2017	\$25,000
Transferred Funds SFY 2017	\$25,000

TPF-5(357)-Connecting the DOTs: Implementing ShakeCast Across Multiple State Departments of Transportation for Rapid Post-Earthquake Response

Project Type: Pooled Funds
MoDOT Contact: Bill Stone
MoDOT Total Commitment: \$30,000
Contract Period: 1/1/2017 to 6/30/2019
Contract Investigator: California DOT
Funding: SPR 100%

Project Description and Objectives:

When an earthquake occurs, the U. S. Geological Survey (USGS) ShakeMap portrays the extent of potentially damaging shaking. In turn, the ShakeCast system, a freely-available, post-earthquake situational awareness application, automatically retrieves earthquake shaking data from USGS ShakeMap, analyzes shaking intensity data against users' facilities (e.g., bridges, buildings, roads), sends notifications of potential impacts, and generates maps and other web-based products for emergency managers and responders. ShakeCast is particularly suitable for earthquake planning and response purposes by Departments of Transportation (DOTs), in part since it can utilize State's existing NBI databases to implement shaking-based inspection priority and impact assessments. This collaborative effort will bring participating DOTs into full ShakeCast operation for post-earthquake assessment of state and local bridge inventories. The project will provide a mechanism to actively engage representatives from state DOTs with the common interests in implementing and expanding the application of ShakeCast technologies to improve emergency response capabilities.

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2018	\$15,000
Committed Funds SFY 2017	\$15,000
Transferred Funds SFY 2017	\$15,000

TPF-5(360)-TRB Research Subscription FY 2017 & FY 2018

Project Type: Pooled Funds

MoDOT Contact: Bill Stone

MoDOT Total Commitment: \$338,872

Contract Period: 7/1/2014 to 9/30/2017

Contract Investigator: TRB

Funding: SPR 100%

Project Description and Objectives:

This is a subscription for support of core technical activities with the Transportation Research Board (TRB). The subscription is an agreement between MoDOT and the Transportation Research Board for the Research Correlation Service. The Research Correlation Service comprises a bundle of core services whose aim is to promote innovation through the coordination of research and dissemination of research results. The type of project is "Contract Other" because MoDOT purchases the services. The activities supported by this subscription include the collection of available information concerning past, current, and proposed research related to transportation. Sources including federal, state, and other governmental agencies, colleges and universities, research and planning organizations, transport operators and industry, as well as the TRB Annual Meeting and conference programs.

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2018 (estimated)	\$170,000
Committed Funds SFY 2017	\$168,872
Transferred Funds SFY 2017	\$168,872

TPF-5(417)-National Cooperative Highway Research Program (NCHRP) FY 2017 & TPF-5(418)-National Cooperative Highway Research Program (NCHRP) FY 2018

Project Type: Pooled Funds
MoDOT Contact: Bill Stone
MoDOT Total Commitment: \$2,119,128
Contract Period: 7/1/2015 to 6/30/2016
Contract Investigator: NCHRP
Funding: SPR 100%

Project Description and Objectives:

FHWA has a longstanding association with the American Association of State Highway and Transportation Officials (AASHTO) and the National Academy of Sciences for conducting the National Cooperative Highway Research Program (NCHRP) under the Transportation Research Board (TRB). Each year contributions to the NCHRP are requested from the states. The NCHRP meets the criteria for use of federal-aid funds and is authorized to use 100% State Planning and Research Funds for the contribution.

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2018 (estimated)	\$1,060,000
Committed Funds SFY 2017	\$1,059,128
Transferred Funds SFY 2017	\$1,059,128

Development - SPR18DVS

Estimated Cost - \$84,276

TDyy0701 - Product testing in general

Project Type: New Products

MoDOT Contact: Jen Neely

Contract Period: 7/1/2016 to 6/30/2018

Funding: SPR 80%, State 20%

Project Description and Objectives:

Previously, sales persons have been able to contact many divisions, districts, and offices of MoDOT resulting in multiple evaluations, duplicated efforts, and potentially contradictory results. By setting a single point of contact, MoDOT can simplify applications, eliminate duplicate work, and improve evaluations of products. This project combines establishes a centralized application, a review method, and a database for all products submitted to MoDOT. Safety, cost, and minimum qualifications can be checked before resources are spent evaluating a product. If a product is selected for evaluation, then work is coordinated for better, faster, and less expensive testing. This project includes education to help personnel understand procedures and direct sales persons to the Coordinator.

Proposed Activities for SFY 2018:

This is an ongoing project to continually evaluate new products when submitted, update product information, improve centralized methods and information, share information department wide (even nationwide), and encourage two-way communication about products. The coordinators from the specification and non-specification efforts will need to develop a work-plan to be more responsive for incoming submissions.

SFY 2017 Accomplishments:

The new products system continues to be split between specification compliant and non-compliant products.

Financials

Projected Budget SFY 2018

Amount

\$84,276

Budget Amount SFY 2017

\$82,041

Actual Cost SFY 2017

(See Addendum Aug. 2017)

Prior to SFY 2017 Actual Cost

N/A

Technology Transfer - SPR18TTS

Estimated Cost - \$493,000

LTAP = \$300,000

NHI = \$43,000

BEAP = \$120,000

TEAP = \$30,000

TTAP - LTAP Program

Project Type: Contracts Other

MoDOT Contact: Bill Stone

Contract Investigator: Missouri S&T

Funding: SPR 100%

TTAP Number	Calendar Year	SPR Work Program Timeline	Contract \$
TTAP-T001(31)	2016	7/1/16 through 12/31/16	\$133,550
TTAP-T001(32)	2017	1/1/17 through 12/31/17	\$300,000
TTAP-T001(33) assumed	2018	1/1/18 through 6/30/18	\$100,000

Project Description and Objectives:

The Local Technical Assistance Program (LTAP) was established by the Federal Highway Administration (FHWA) in 1982 in response to a recognized need for funding and technical support to the 38,000 communities that maintain local roads and bridges. The Missouri LTAP center is located at Missouri University of Science and Technology. The center enables local counties, parishes, townships, cities and towns to improve their roads and bridges by supplying them with a variety of training programs; new and existing technology updates; and personalized technical assistance. Through these core services, the LTAP center provides access to training and information that may not otherwise be accessible.

Accomplishments

CY 2016:

Due to turnover at the University of Missouri S&T, the Task Order was delayed in being executed. The Task Order was executed by the Commission on February 2016. There was a joint Advisory Committee and Ambassadors meeting on April 28, 2016. At the meeting there was discussion of new courses that are being developed and that it was time to update some past courses to keep them fresh.

CY 2017:

An Advisory Committee meeting was held on November 2, 2016. A Task Order for Calendar Year was executed by MHTC on January 27, 2017. There were delays at Missouri S&T in executing the Task Order due to staffing changes. An Advisory Committee Meeting was held on April 7, 2017. Discussed at that meeting were highlights of the SWOT Analysis conducted in November 2016. 2016 Training numbers were also discussed for 2016, along with new classes being developed for 2017 (Backhoe Safety, CPR First Aid, Drug and Alcohol Awareness, Violence in the Workplace, Disaster Preparedness and Disaster Response).

Proposed Activities

CY 2017 & CY 2018:

- Will be seeking to expand our LTAP contact list by developing partnerships with various organizations. Also continue to look for partnerships through the Local Public Agency LPA efforts with MoDOT.
- Provide technology transfer materials.
- Provide increased information services - Continue to review and update the webpage to increase the services provided online and the links available.
- Conduct and arrange seminars & workshop training sessions.
- Continue offering “Show Me” Roads Scholar Program Level I courses; will be offering more Level II classes.
- Develop more Level II courses.
- Pursue additional funding sources that will allow the program to be expanded. This would allow us to further promote LTAP and our training and services.
- Continue to assist the MoDOT Local Public Agency efforts through training and other administrative opportunities.
- Evaluate program effectiveness.
- Create efficiencies in providing tech transfer materials and training by sharing resources and cost sharing with the Rural Technical Assistance Program (RTAP) on such deliverables as e-newsletters, arranging training and providing materials.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$300,000
Budget Amount SFY 2017	\$300,000
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Actual Cost SFY 2016	\$367,927

TT200701 - NHI National Highway Institute Training SFY 2017 & SFY 2018

Project Type: Contracts Other
MoDOT Contact: Bill Stone
Total Contract Amount: \$83,000
Contract Period: 7/1/2016 to 6/30/2018
Contract Investigator: Sherron Motts
Funding: SPR 80%, State 20%

Project Description and Objectives:

The National Highway Institute (NHI) as part of FHWA is a source for training the transportation community. NHI provides a catalog of available courses that MODOT can purchase and host. Construction and Materials provides research funding in the amount up to \$40,000. The type of project is "Contract Other" because MoDOT purchases the classes. NHI training courses provide direction and support to department personnel. Courses are scheduled and provided for department personnel to maintain an understanding of new methodologies and technologies. Training is also provided to meet employee needs and enhance their abilities to support the department's functions.

Proposed Activities for SFY 2018:

Provide opportunity for training of department personnel through NHI courses. Other training opportunities may be offered that support department functions, including on-site classes and workshops necessary to maintain our goal.

SFY 2017 Accomplishments:

A two-week Safety Inspection of In-Service Bridges was held in Jefferson City during the week of March 27th and was completed during the week of April 7th. The invoice was paid on May 1, 2017.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$43,000
Budget Amount SFY 2017	\$40,000
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	N/A

BEAP Program 2017 and 2018

Project Type: Contracts Other

MoDOT Contact: Bill Stone

Total Contract Amount: \$240,000

Contract Period: 7/1/2016 to 6/30/2018

Funding: SPR 80%, State 20%

Problem, Background, and Significance:

The BEAP program has been in existence for a number of years. It provides an avenue for local agencies without engineering expertise to get some engineering assistance, through approved consultants, to deal with problems on their bridges. The Bridge Division administers the BEAP program. The type of project is "Contract Other" because the project work will include contract management. The objective of this program is to provide engineering technical assistance to various local agencies to deal with operational problems on their bridges. This assistance results in reports that are provided to the local agencies providing them with options for addressing these issues. Implementation by the local agency of the recommendations from these reports will result in improvements to the functionality and safety of their bridges.

Proposed Activities for SFY 2018:

Provide opportunity for local agencies to get technical assistance for bridge engineering problems. It is estimated that the available funds will allow for around 30 BEAP projects. The total number of projects per year will vary depending on the scope and final cost of individual projects.

SFY 2017 Accomplishments:

The funding allocation for SFY2017 has allowed for 29 BEAP studies to provide technical assistance for operational problems on 36 local agency bridges. As of 4/27/17, 18 of these studies have been completed.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$120,000
Budget Amount SFY 2017	\$120,000
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	N/A

The BEAP program is managed by the Bridge Division

TEAP Programs 2017 and 2018

Project Type: Contracts Other

MoDOT Contact: Bill Stone

Total Contract Amount: \$60,000

Contract Period: 7/1/2016 to 6/30/2018

Funding: SPR 80%, State 20%

Problem, Background, and Significance:

The TEAP program has been in existence for a number of years. It provides an avenue for local agencies without engineering expertise to get some engineering assistance, through approved consultants, to deal with problems on their roadways. The Design Division administers the TEAP program. The type of project is "Contract Other" because the project work will include contract management. The objective of this program is to provide engineering technical assistance to various local agencies to deal with operational problems on their bridges and roadways. This assistance results in reports that are provided to the local agencies providing them with options for addressing these issues. Implementation by the local agency of the recommendations from these reports will result in improvements to the functionality and safety of their roadways.

Proposed Activities for SFY 2018:

Provide opportunity for local agencies to get technical assistance for traffic engineering problems. It is estimated that the available funds will allow for around 11 TEAP projects. The total number of projects per year will vary depending on the scope and final cost of individual projects. The TEAP program is managed by MoDOT's Design Division's LPA group.

SFY 2017 Accomplishments:

The funding allocation for SFY2017 has allowed for 11 TEAP studies to provide technical assistance for local agency roadways. The eleven projects were from a combination of technical transfer funding and highway safety funding.

Financials

	<u>Amount</u>
Projected Budget SFY 2018	\$30,000
Budget Amount SFY 2017	\$30,000
Actual Cost SFY 2017	(See Addendum Aug. 2017)
Prior to SFY 2017 Actual Cost	N/A

The TEAP program is managed by the Design Division

ADDENDUM

State Planning and Research Program
Fiscal Year 2017 Annual Report - (07/01/2016 - 06/30/2017)

PART I - PLANNING

Transportation Planning Activities	SFY 2017 Budget with Match	SFY 2017 Expenditures with Match
• Administration	\$492,284	\$536,876
• Planning and Performance Group		
o Planning and Policy Group	\$521,555	\$544,702
o Strategic Planning Group	\$380,624	\$404,823
• Statewide Programming	\$663,274	\$673,740
• Transportation Systems Management	\$4,586,066	\$4,764,177
o Administration	\$129,987	\$139,359
o Mapping and Customer Service	\$800,426	\$801,102
o Pavement Analysis and Application Dev.	\$657,038	\$586,706
o Traffic/Collection	\$1,458,940	\$1,863,433
▪ Field Acquisition	\$939,630	\$937,039
o Data	\$600,045	\$436,538
SUBTOTAL	\$6,643,802	\$6,924,318
 <i>District Transportation Planning</i>		
• CD	\$419,901	207,977
• KC	\$1,279,195	755,111
• NE	\$897,467	565,174
• NW	\$419,163	419,706
• SE	\$546,717	404,361
• SL	\$701,421	462,725
• SW	\$1,100,560	425,309
SUBTOTAL	\$5,364,423	\$3,240,363
 <i>Other Activities</i>		
• Information Systems	\$2,209,690	2,664,560
• Regional Planning Commission	\$1,375,000	1,371,266
• Financial Planning & Reporting	\$1,198,437	1,160,048
• Bridge Division	\$49,515	57,169
• Design Division	\$224,457	21,266
SUBTOTAL	\$5,057,100	\$5,274,309
TOTAL PART I	\$17,065,324	\$15,438,989

Part II – Urban (MPO) – PL

Metropolitan Areas	FY 2017 CPG Funds with Match	FY 2017 CPG Expenditures with Match
NW Arkansas	\$6,250	\$3,550
Kansas City	\$2,271,193	\$2,355,314
St. Louis	\$4,068,638	\$4,338,350
Springfield	\$712,943	\$892,454
Columbia	\$330,452	\$272,890
Jefferson City	\$188,225	\$109,749
Joplin	\$240,295	\$271,782
St. Joseph	\$231,775	\$187,872
Cape Girardeau	<u>\$175,463</u>	<u>\$44,867</u>
TOTAL PART II	\$8,225,235	\$8,476,827

Part III – Research – SPR

Activity	SFY 2017 Budget with Match	SFY 2017 Expenditures with Match
• Administration (SPR17ADS)	\$252,836	\$304,137
• Research (SPR17RDS)	\$2,001,908	\$1,474,253
• Development (SPR17DVS)	\$82,041	\$62,854
• Technology Transfer (SPR17TTS)	<u>\$490,000</u>	<u>\$499,445</u>
TOTAL PART III	\$2,826,785	\$2,340,689

TOTAL MoDOT SPR WORK PROGRAM

	SFY 2017 Budget with Match	SFY 2017 Expenditures with Match
• Part I – Planning	\$17,065,324	\$15,438,989
• Part II – Metropolitan Planning	\$8,225,235	\$8,476,827
• Part III – Research	<u>\$2,826,785</u>	<u>\$2,340,689</u>
TOTAL MoDOT SPR WORK PROGRAM	\$28,117,344	\$26,256,505

Part III Research
Addendum August 2017
SFY2017 Budget to Actual

Project Number	Project Description	SFY 2017 Budget	SFY 2017 Actual
Administration - SPR17ADS		\$252,836.00	\$304,137.10
TA166601	Research Administration	\$252,836.00	\$304,137.10
Research - SPR17RDS Research		\$2,001,908.00	\$1,474,253.35
Research General			
TR17CONT	Research Contingencies	\$872,285.00	N/A
Research Contracts			
TR201313	Secretary of State Library MOU	\$4,504.00	\$4,504.38
TR201417	GRS Rustic Road Bridge	\$1,412.00	\$3,580.69
TR201502	High Volume Recycled Materials	\$550.00	\$549.13
TR201503	Economical and Crack Free High Performance Concrete	\$11,085.00	\$11,084.68
TR201505	Fiber Reinforced Concrete	\$10,472.00	\$10,471.73
TR201509	Evaluation of Erosion Control Blankets	\$6,302.00	\$8,600.96
TR201514	No Passing Zone Guidance	\$14,639.00	\$12,708.15
TR201515	Investigation of J-Turn Design Factors using the ZouSimulator	\$14,037.00	\$13,989.95
TR201516	FRP Deck Panels*	\$0.00	\$0.00
TR201518	Roller Compacted Concrete	\$14,782.00	\$5,703.56
TR201522	MoDOT Customer Satisfaction Tracking Survey	\$21,930.00	\$32,976.00
TR201601	Library Support Contract (2016-2017)	\$83,218.00	\$81,817.19
TR201602	Poplar Street Approach-Phase II	\$13,313.00	\$13,313.37
TR201606	Long Term Pavement Performance Project 5P3131 Central District	\$42,000.00	\$42,000.00
TR201607	Striping Optimization Enhancements	\$15,295.00	\$14,132.64
TR201609	MEPDG Local Calibration	\$148,500.00	\$81,577.38
TR201610	AASHTO Technical Service Program	\$43,000.00	\$43,000.00
TR201611	St. Louis In-Laid Pavement Markers Survey	\$84,626.00	\$70,148.49
TR201612	Work Zone Simulator Analysis: Alternate Lane Configurations	\$59,411.00	\$59,410.70
TR201613	Work Zone Split Traffic Symbol Sign	\$75,000.00	\$37,103.58
TR201614	Zero Cement Concrete	\$25,662.00	\$25,662.01
TR201615	Transportation Research Methods Training	\$91,136.00	\$89,980.23
TR201616	Missouri Highway Safety Manual Recalibration	\$91,463.00	\$90,016.47
TR201620	Public Satisfaction Survey of High Friction Surface Treatment	\$31,200.00	\$31,200.00
TR201621	Solar Roadways Evaluation	\$102,000.00	\$7,783.73
TR201701	Internal Curing	\$40,000.00	\$29,182.88
TR201702	High Volume Recycled Materials Phase II	\$35,000.00	\$38,042.30
TR201703	Economical and Crack Free High Performance Concrete Phase II	\$35,000.00	\$38,489.87
TR201704	Design of Ultra High Performance Concrete for Thin Overlays	\$35,000.00	\$31,429.91
TR201705	Implementation of FR SCC and FR SWC Phase II	\$35,000.00	\$29,833.62
TR201706	RTS—Facebook Pilot	\$1,000.00	\$1,107.93
TR201707	Meramec Flood Inundation Mapping	\$30,000.00	\$30,000.00
TR201709	Runway Condition Index for State Funded Airports	\$64,154.00	\$64,163.63
TR201710	MoDOT Fleet Analysis	\$38,587.00	\$38,587.45
TR201711	Economic Impact Study for Public Ports	\$61,580.00	\$61,579.91
TR201712	Performance Characteristics of Recycled Asphalt	\$100,795.00	\$100,795.32
TR201713	Cold Temperature Creep Compliance	\$67,437.00	\$67,437.33
TR201714	Foundation Reuse	\$32,838.00	\$32,838.23
TR201715	Erosion Control Blanket Workshop Training	\$4,863.00	\$0.00
TR201717	Auto Flagger	\$31,941.00	\$31,941.46
TR201718	2017 Infrastructure Conference Invoice	\$3,000.00	\$3,000.00
TR201719	OCLC Annual Invoice	\$2,933.00	\$2,933.49
TR201720	Rejuvenating Asphalt Products	\$0.00	\$0.00
TR201721	Leader-Follower TMA System	\$0.00	\$0.00
TR201722	Evaluation of Green Lights on TMAs	\$0.00	\$0.00
TR201724	MoDOT Report Card Survey	\$26,975.00	\$26,975.00

TR201725	USGS Scan of Gasconade River Bridges	\$54,600.00	\$54,600.00
TR201801	Library Support Contract (2018-2019)	\$0.00	\$0.00
	total:	\$1,706,240.00	\$1,474,253.35

*part of this project was funded from MoSTIC funding which are not SPR funds, all SPR funds were expended in SFY16 but the project continued in SFY17 utilizing MoSTIC funds

Development - SPR17DVS		\$82,041.00	\$62,853.68
TD160701	New Product Evaluation	\$82,041.00	\$62,853.68
Technology Transfer - SPR17TTS		\$490,000.00	\$499,444.78
TTAPT001	Local Technical Transfer Assistance Program (LTAP)	\$300,000.00	\$305,221.97
TTAPT001	BEAP	\$120,000.00	\$123,995.38
TTAPT001	TEAP	\$30,000.00	\$35,802.43
TT200701	NHI National Highway Institute Training	\$40,000.00	\$34,425.00
Total SFY 2017 Part III Budget		\$2,826,785.00	\$2,340,688.91

ADDENDUM

State Planning and Research Program
Fiscal Year 2017 Annual Report - (07/01/2016 - 06/30/2017)

PART I - PLANNING

Transportation Planning Activities	SFY 2017 Budget with Match	SFY 2017 Expenditures with Match
• Administration	\$492,284	\$536,876
• Planning and Performance Group		
o Planning and Policy Group	\$521,555	\$544,702
o Strategic Planning Group	\$380,624	\$404,823
• Statewide Programming	\$663,274	\$673,740
• Transportation Systems Management	\$4,586,066	\$4,764,177
o Administration	\$129,987	\$139,359
o Mapping and Customer Service	\$800,426	\$801,102
o Pavement Analysis and Application Dev.	\$657,038	\$586,706
o Traffic/Collection	\$1,458,940	\$1,863,433
▪ Field Acquisition	\$939,630	\$937,039
o Data	\$600,045	\$436,538
SUBTOTAL	\$6,643,802	\$6,924,318
<i>District Transportation Planning</i>		
• CD	\$419,901	207,977
• KC	\$1,279,195	755,111
• NE	\$897,467	565,174
• NW	\$419,163	419,706
• SE	\$546,717	404,361
• SL	\$701,421	462,725
• SW	\$1,100,560	425,309
SUBTOTAL	\$5,364,423	\$3,240,363
<i>Other Activities</i>		
• Information Systems	\$2,209,690	2,664,560
• Regional Planning Commission	\$1,375,000	1,371,266
• Financial Planning & Reporting	\$1,198,437	1,160,048
• Bridge Division	\$49,515	57,169
• Design Division	\$224,457	21,266
SUBTOTAL	\$5,057,100	\$5,274,309
TOTAL PART I	\$17,065,324	\$15,438,989

Part II – Urban (MPO) – PL

Metropolitan Areas	FY 2017 CPG Funds with Match	FY 2017 CPG Expenditures with Match
NW Arkansas	\$6,250	\$3,550
Kansas City	\$2,271,193	\$2,355,314
St. Louis	\$4,068,638	\$4,338,350
Springfield	\$712,943	\$892,454
Columbia	\$330,452	\$272,890
Jefferson City	\$188,225	\$109,749
Joplin	\$240,295	\$271,782
St. Joseph	\$231,775	\$187,872
Cape Girardeau	\$175,463	\$44,867
TOTAL PART II	\$8,225,235	\$8,476,827

Part III – Research – SPR

Activity	SFY 2017 Budget with Match	SFY 2017 Expenditures with Match
• Administration (SPR17ADS)	\$252,836	\$304,137
• Research (SPR17RDS)	\$2,001,908	\$1,474,253
• Development (SPR17DVS)	\$82,041	\$62,854
• Technology Transfer (SPR17TTS)	\$490,000	\$499,445
TOTAL PART III	\$2,826,785	\$2,340,689

TOTAL MoDOT SPR WORK PROGRAM

	SFY 2017 Budget with Match	SFY 2017 Expenditures with Match
• Part I – Planning	\$17,065,324	\$15,438,989
• Part II – Metropolitan Planning	\$8,225,235	\$8,476,827
• Part III – Research	\$2,826,785	\$2,340,689
TOTAL MoDOT SPR WORK PROGRAM	\$28,117,344	\$26,256,505

Part III Research
Addendum August 2017
SFY2017 Budget to Actual

Project Number	Project Description	SFY 2017 Budget	SFY 2017 Actual
Administration - SPR17ADS		\$252,836.00	\$304,137.10
TA166601	Research Administration	\$252,836.00	\$304,137.10
Research - SPR17RDS Research		\$2,001,908.00	\$1,474,253.35
Research General			
TR17CONT	Research Contingencies	\$872,285.00	N/A
Research Contracts			
TR201313	Secretary of State Library MOU	\$4,504.00	\$4,504.38
TR201417	GRS Rustic Road Bridge	\$1,412.00	\$3,580.69
TR201502	High Volume Recycled Materials	\$550.00	\$549.13
TR201503	Economical and Crack Free High Performance Concrete	\$11,085.00	\$11,084.68
TR201505	Fiber Reinforced Concrete	\$10,472.00	\$10,471.73
TR201509	Evaluation of Erosion Control Blankets	\$6,302.00	\$8,600.96
TR201514	No Passing Zone Guidance	\$14,639.00	\$12,708.15
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TTAPT001	TEAP	\$30,000.00	\$35,802.43
TT200701	NHI National Highway Institute Training	\$40,000.00	\$34,425.00
Total SFY 2017 Part III Budget		\$2,826,785.00	\$2,340,688.91



U.S. Department of Transportation

Federal Transit Administration
901 Locust Street, Room 404
Kansas City, MO 64106
816-329-3920
816-329-3921 (fax)

Federal Highway Administration
3220 W. Edgewood, Suite H
Jefferson City, MO 65109
573-636-7104
573-636-9283 (fax)

September 15, 2017

Ms. Machelte Watkins, Director of Transportation Planning
Missouri Department of Transportation
P.O. Box 270
Jefferson City, Missouri 65102

RE: State Planning and Research Work Program
July 1, 2017 to June 30, 2018, Missouri Project SPR-
PL-00 FY (018) Amendment Request

Dear Ms. Watkins:

The Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) have reviewed and approved the Missouri Department of Transportation's (MoDOT) request to amend the State Planning and Research (SPR) FY 2018 Work Program. This amendment includes adding funding for pre-scoping activities and increased retirement and medical rates and reducing funding for the Bridge Division's budget, as further described in your letter dated September 8, 2017.

If you have any questions, please contact Brad McMahon at FHWA (573) 638-2609 or Jeremiah Shuler at FTA (816) 329-3940.

Mokhtee Ahmad
Regional Administrator
Federal Transit Administration

Sincerely,

For: Kevin W. Ward
Division Administrator, P.E.
Federal Highway Administration

cc: Eva Voss, MoDOT
Paige Kempker, MoDOT
Bill Stone, MoDOT
Dave Ahlvers, MoDOT
Sharon Monroe, MoDOT

Missouri Department of Transportation
Patrick K. McKenna, Director

1.888.ASK MODOT (275.6636)

September 8, 2017

Mr. Kevin Ward
Division Administrator
Federal Highway Administration
3220 West Edgewood, Suite H
Jefferson City, MO 65109

Mr. Mokhtee Ahmad
Regional Administrator
Federal Transit Administration
901 Locust Street, Suite 404
Kansas City, MO 64106

Dear Messrs. Ward and Ahmad:

MoDOT is requesting approval to amend the FY 2018 State Planning and Research Work Program by adding \$1,345,355 for statewide pre-scoping activities and costs, increased retirement and medical rates, and decrease in Bridge Division's budget. This amendment changes the Part 1 – Planning FY 2018 total budget from \$15,238,298 to \$16,583,455 and Part III—Research from \$2,505,811 to \$2,506,009. Enclosed are excerpts of the amended FY 2018 SPR work program.

If there are questions regarding this amended FY 2018 SPR work program, please contact Paige Kempker at 573-526-4142.

Sincerely,



Machelle Watkins
Director of Transportation Planning

Enclosure

Copy: Brad McMahon – FHWA
Dave Ahlvers – CM-MoDOT



Our mission is to provide a world-class transportation experience that delights our customers and promotes a prosperous Missouri.

www.modot.org

Financial Summary Sheet

A. Total Estimated Costs	SFY 2018	SFY 2017		
Part I – Planning	\$16,583,455	\$17,065,324		
Part II – Metropolitan Planning	\$10,078,190	\$8,225,235		
Part III – Research, Development and Technology	\$2,506,009	\$2,826,785		
TOTAL ESTIMATED COST	\$29,167,654	\$28,117,344		
B. Available Federal Funds	SFY 2018	SFY 2017		
Part I - State Planning				
Obligated but Not Spent	\$9,071,995	\$10,938,582		
Unobligated Funds	\$30,391,396	\$29,600,997		
Estimated Annual Apportionment	\$14,400,000	\$14,200,000		
SUBTOTAL – STATE PLANNING	\$53,863,391	\$54,739,579		
Part II - Metropolitan Planning				
Obligated but Not Spent	\$8,480,979	\$11,612,641		
Unobligated Funds	\$5,088,526	\$0		
Estimated FHWA PL Annual Allocation	\$5,300,000	\$5,200,000		
Estimated FTA 5303 Annual Allocation	\$1,743,627	\$1,672,416		
SUBTOTAL – METRO PLANNING	\$20,613,132	\$18,485,057		
Part III – Research				
*Obligated but not spent	\$2,840,081	\$3,228,471		
Unobligated Funds	\$7,247,048	\$7,139,568		
Estimated Annual Apportionment	\$4,800,000	\$4,700,000		
Less:	(\$1,869,800)	(\$1,812,800)		
- NCHRP.....\$1,060,000 estimated				
- TRB Core.....\$170,000 estimated				
- Pooled Funds.....\$639,800 estimated				
SUBTOTAL – RESEARCH	\$13,017,329	\$13,255,239		
TOTAL FEDERAL FUNDS AVAILABLE	\$87,493,852	\$86,479,875		
C. Proposed Budget Estimates for SFY 2018	Federal Funds	Percent	Matching Funds	Total
State Planning	\$13,266,764	80%	\$3,316,691	\$16,583,455
Metropolitan Planning (PL and 5303) (Estimated)	\$8,062,552	80%	\$2,015,638	\$10,078,190
Research	\$2,004,807	80%	\$501,202	\$2,506,009
TOTAL SP, SR & CPG	\$23,334,123		\$5,833,531	\$29,167,654
D. Proposed Budget Estimates for SFY 2017	Federal Funds	Percent	Matching Funds	Total
State Planning	\$13,652,259	80%	\$3,413,065	\$17,065,324
Metropolitan Planning (PL and 5303) (Estimated)	\$6,580,188	80%	\$1,645,047	\$8,225,235
Research	\$2,261,428	80%	\$565,357	\$2,826,785
TOTAL SP, SR & CPG	\$22,493,875		\$5,623,469	\$28,117,344

**Itemized Cost Estimates and Actual Amounts
PART I**

Transportation Planning Activities	SFY 2018 Budget	SFY 2017 Budget		
• Administration	\$1,158,168	\$492,284		
• Planning and Performance Group				
o Planning and Policy Group	\$480,561	\$521,555		
o Strategic Planning Group	\$430,688	\$380,624		
• Statewide Programming	\$642,494	\$663,274		
• Transportation Systems Management	\$3,451,048	\$4,586,066		
o Administration	\$121,198	\$129,987		
o Mapping and Customer Service	\$575,570	\$800,426		
o Pavement Analysis and Application Dev.	\$606,776	\$657,038		
o Traffic/Collection	\$448,208	\$1,458,940		
▪ Field Acquisition	\$1,214,076	\$939,630		
o Data	\$485,219	\$600,045		
SUBTOTAL	\$6,162,959	\$6,643,802		
District Transportation Planning				
• CD	\$321,030	\$419,901		
• KC	\$1,360,621	\$1,279,195		
• NE	\$638,872	\$897,467		
• NW	\$494,053	\$419,163		
• SE	\$458,561	\$546,717		
• SL	\$534,906	\$701,421		
• SW	\$428,871	\$1,100,560		
SUBTOTAL	\$4,236,914	\$5,364,423		
Other Activities				
• Information Systems	\$2,309,315	\$2,209,690		
• Regional Planning Commission	\$1,375,000	\$1,375,000		
• Financial Planning & Reporting	\$1,191,184	\$1,198,437		
• Bridge Division	\$300,774	\$49,515		
• Design Division	\$383,980	\$224,457		
• Innovative Partnerships and Alternative Funding	\$623,329	\$0		
SUBTOTAL	\$6,183,582	\$5,057,100		
TOTAL PART I	\$16,583,455	\$17,065,324		

Part II – Urban (MPO) – PL

	Current CPG Contract Amount	Estimated FFY 2018 Local Match	Estimated Total FFY 2018 CPG Funds with Match	Estimated Total FFY 2017 CPG Funds with Match
Metropolitan Areas				
NW Arkansas	\$7,000	\$1,750	\$8,750	\$6,250
Kansas City	\$1,985,365	\$496,341	\$2,481,706	\$2,271,193
St. Louis	\$4,115,236	\$1,028,809	\$5,144,045	\$4,068,638
Springfield	\$754,666	\$188,667	\$943,333	\$712,943
Columbia	\$407,471	\$101,868	\$509,339	\$330,452
Jefferson City	\$140,782	\$35,196	\$175,978	\$188,225
Joplin	\$258,166	\$64,542	\$322,708	\$240,295
St. Joseph	\$178,170	\$44,543	\$222,713	\$231,775
Cape Girardeau	\$215,696	\$53,924	\$269,620	\$175,463
TOTAL PART II	\$8,062,552	\$2,015,638	\$10,078,190	\$8,225,235

Part III – Research – SPR

Activity	SFY 2018 Budget	SFY 2017 Budget	
• Administration (SPR17ADS)	\$254,751	\$252,836	
• Research (SPR17RDS)	\$1,673,908	\$2,001,908	
• Development (SPR17DVS)	\$84,350	\$82,041	
• Technology Transfer (SPR17TTS)	\$493,000	\$490,000	
TOTAL PART III	\$2,506,009	\$2,826,785	

TOTAL MoDOT SPR WORK PROGRAM

	SFY 2018 Budget	SFY 2017 Budget	
• Part I – Planning	\$16,583,455	\$17,065,324	
• Part II – Metropolitan Planning	\$10,078,190	\$8,225,235	
• Part III – Research	\$2,506,009	\$2,826,785	
TOTAL MoDOT SPR WORK PROGRAM	\$29,167,654	\$28,117,344	