

**Oklahoma Department of Transportation  
Planning and Research Division**



**State Planning and Research Work Program  
FFY 2013**

**(October 1, 2012 to September 30, 2013)**

**Part 1—Planning  
Part 2—Research**

**Prepared by the  
Oklahoma Department of Transportation  
in cooperation with the  
US Department of Transportation  
Federal Highway Administration**

**October 2012**





U.S. Department  
of Transportation  
**Federal Highway  
Administration**

**Oklahoma Division**

September 26, 2012

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In Reply Refer To:  
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Gary Ridley  
Director  
Oklahoma Department of Transportation  
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Oklahoma City, OK 73105

FY 2013 SPR (Part I) Work Program, and  
FY 2013 SPR (Part II) Research Program

Dear Mr. Ridley:

The FHWA has reviewed the Fiscal Year 2013 State Planning and Research (SPR) Part I (Planning) and Part II (Research) Work Programs and Budget for the Oklahoma Department of Transportation (ODOT) as submitted by Mr. John Bowman, Planning and Research Division Engineer, on September 25, 2012. Part I (Planning) contains the metropolitan planning (PL) program funds that we previously approved as part of the FY 2013 Unified Planning Work Programs (UPWP) and budgets for Tulsa, Oklahoma City, and Lawton MPOs, as well as the Frontier (Bi-State) MPO planning area.

As proposed, the FY 2013 SPR work program and budget complies with Title 23 CFR 420 - regarding the development of statewide work programs for transportation planning activities. The FY 2013 SPR work program provides a description of work tasks to be undertaken and the estimate of costs associated with each task. In addition, the work program budget also identifies federal, state and local funding sources as required under Title 23 CFR 420.111(b)(1), as well as funding for the Oklahoma Local Technical Assistance Program (LTAP), administered by the Center for Local Government Technology (CLGT) at Oklahoma State University.

The proposed FY 2013 SPR work program also provides for Subpart B (SPR Part II) of 23 CFR 420 - which outlines research, development and technology (RD&T) transfer activities to be undertaken by ODOT in the FY 2013. ODOT identifies research, development and technology tasks in order to mitigate transportation issues before they become critical problems. In addition, SPR Part II is also expected to include technology transfer initiatives to facilitate the dissemination of new research findings and promotion of new technology. SPR Part II initiatives are divided into General Activities, Continuing Research Projects, New Research Projects, Joint ODOT/Oklahoma Transportation Center (OkTC) Interagency Projects and Pooled Fund Studies. The SPR Part II provides a description of research activities expected to be conducted in FY 2013 and the estimate of costs associated with each eligible activity. ODOT supports new and continuing research as well as participates in national pool funded studies. On-going research

initiatives include Instrumented Pavement Construction and Portable WIM for Pavement Design. New research initiatives include Energy Dissipation in 12' Broken-Back Culverts, Vehicle Classification with Focus on Motorcycles, etc. Details of these research activities are provided in the work program document.

For clarification, each task description provides five areas of emphasis, including: 1) Purpose and Scope, 2) FY 2012 Accomplishments, 3) Proposed FY 2013 Activities, 4) Budget Table and 5) Contact Information. The budget table for each task provides the Estimated/Programmed budgets for the current year and the projected budget for next fiscal year.

ODOT collaborates with the OkTC to conduct a variety of studies on transportation in the state. The OkTC is a nationally designated University Transportation Center (UTC) composed of researchers at the University of Oklahoma (OU), Oklahoma State University (OSU) and Langston University (LU).

We commend Mr. John Bowman and the ODOT Planning & Research Division staff for the opportunity to jointly review and discuss the initial draft of this Work Program and Budget. We also commend ODOT for their continuing support of the LTAP program and partnership with the OkTC on a variety of research initiatives.

Thank you for your cooperation in developing the FY 2013 SPR Work Program and Budget. Based on our review of the draft document and our joint discussions, we concur with your request for approval of the FY 2013 Work Program and Budget as submitted. If you have questions or comments regarding our approval action, please contact Mr. Isaac N. Akem, Community Planner, at 405-254-3343.

Sincerely,



Elizabeth A. Romero  
Planning and Technical Team Leader

CC: David Streb, ODOT  
John Bowman, ODOT

# Introduction

This document describes the Federal Fiscal Year (FFY) 2013 State Planning and Research Work Program for the Oklahoma Department of Transportation (ODOT). This program is prepared and submitted according to provisions of Title 23, United States Code, regulated under 23 CFR Part 420. Part 1 of the work program describes the Planning activities and Part 2, the Research activities. The work program is developed and updated annually in cooperation with the Federal Highway Administration.

Planning activities to be conducted in FFY 2013 include data collection/analysis/reporting, mapping, public involvement, and planning coordination/studies. Additional efforts are planned for data collection related to air quality and pavement structural condition. Funding for the planning portion of the work program is approximately \$11.9 million.

Research activities for FFY 2013 will include nine new projects and ten continuing projects in addition to five projects jointly shared with the Oklahoma Transportation Center. Some of the focus areas for current research projects include: design/construction/maintenance of infrastructure and safety. In addition, ODOT is participating in 9 national pooled fund projects. Funding for the research program totals nearly \$5.5 million in FFY 2013.

The detailed projects for each section are listed by item number and include a description of the purpose and scope of the project, the accomplishments during the current federal fiscal year (FFY 2012) and the proposed activities for the upcoming fiscal year (FFY 2013). In addition, the Financials Section shows the amount programmed for the FFY 2012 in the last work program, an estimate of the total funds that will be expended by the end of FFY 2012, and the projected costs for the upcoming fiscal year (FFY 2013).



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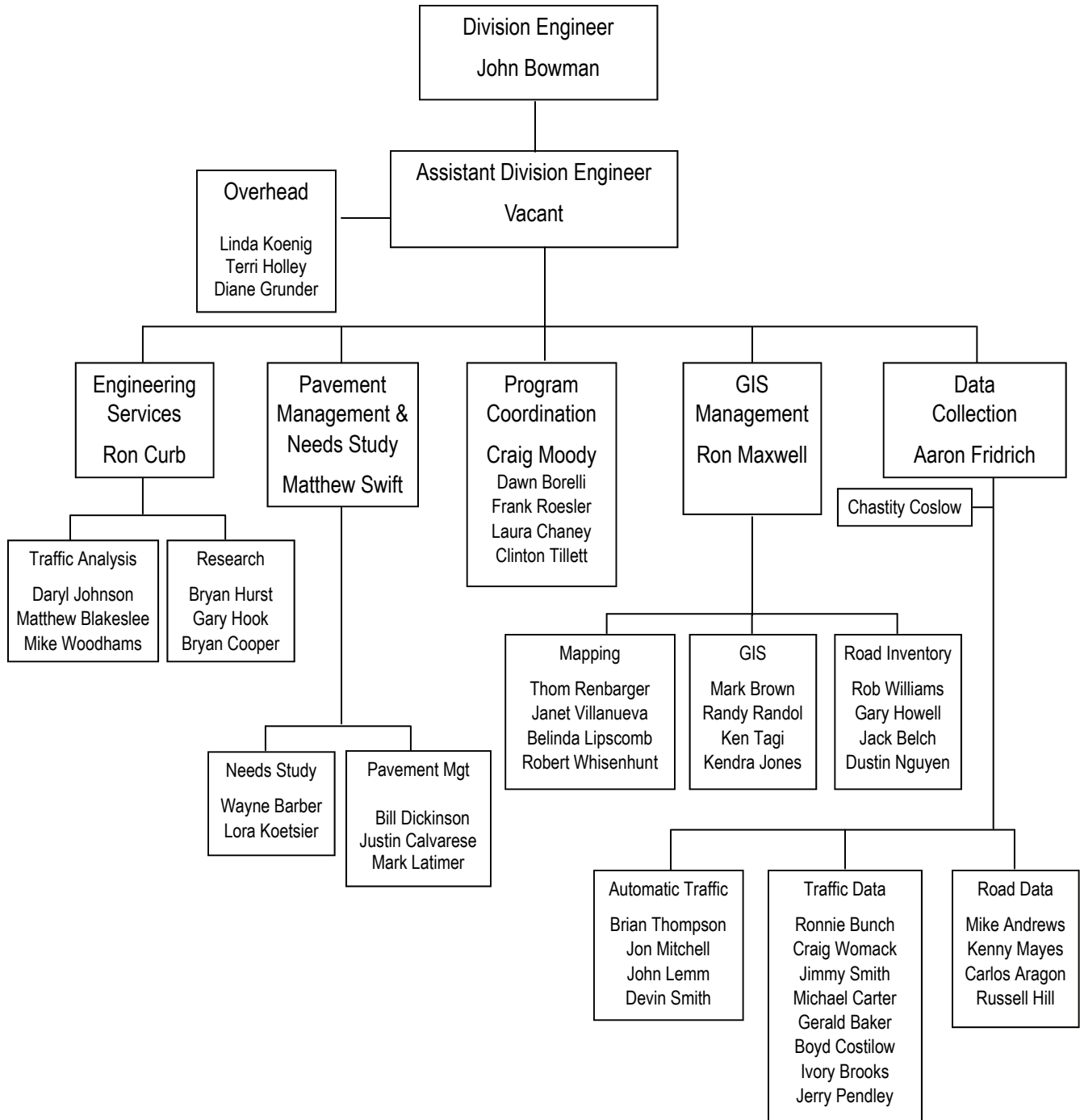
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## October 1, 2012





**OKLAHOMA DEPARTMENT OF TRANSPORTATION  
State Planning & Research (SPR) Financial Summary Sheet  
Federal Fiscal Year 2013  
Program Period October 1, 2012 through September 30, 2013**

**SPR Part 1 - Planning, SPRY-0010(57)PL, JP# 01946(59)**

**A. Estimated Costs**

SPR Part 1 - Planning	\$8,770,161.00
LTAP (SPR Part 1)	\$298,854.00
Metropolitan Planning (PL)	<u>\$2,801,771.00</u>
<b>Total Estimated Costs</b>	<b>\$11,870,786.00</b>

**B. Available Funds**

SPR Part 1 Unobligated Balance	\$9,520,220.00
PL Funding	\$2,372,111.00
Local	<u>\$429,660.00</u>
<b>Total Available Funds</b>	<b>\$12,321,991.00</b>

**C. Proposed Financing**

<u>Type</u>	<u>Federal</u>	<u>Ratio</u>	<u>State</u>	<u>Local</u>	<u>Total</u>
SPR	\$9,069,015.00	80%	\$0.00	\$0.00	\$9,069,015.00
PL	\$2,372,111.00	80%	\$0.00	\$429,660.00	<u>\$2,801,771.00</u>
<b>Total Proposed Financing</b>					<b>\$11,870,786.00</b>

**SPR Part 2 - Research, SPRY-0010(58)RS, JP# 01946(60)**

**A. Estimated Costs**

SPR Part 2 - Research	<u>\$4,209,205.00</u>
<b>Total Estimated Costs</b>	<b>\$4,209,205.00</b>

**B. Available Federal Funds**

SPR Part 2 Unobligated Balance	\$3,758,000.00
SPR Part 1 Unobligated Balance (remainder)	<u>\$451,205.00</u>
<b>Total Available Funds</b>	<b>\$4,209,205.00</b>

**C. Proposed Financing**

<u>Type</u>	<u>Federal</u>	<u>Ratio</u>	<u>State</u>	<u>Local</u>	<u>Total</u>
SPR Part 1 & 2	\$4,209,205.00	80%	\$0.00	\$0.00	<u>\$4,209,205.00</u>
<b>Total Proposed Financing</b>					<b>\$4,209,205.00</b>

**SPR Part 1 & Part 2 Totals**

Total SPR Unobligated Balance	\$13,278,220.00
Total Other Funds (PL, State, Local)	<u>\$2,801,771.00</u>
Total Available Funding	<b>\$16,079,991.00</b>
Total SPR Part 1 and Part 2 Estimated Costs	<b>\$16,079,991.00</b>
Total SPR Pooled Fund Commitments	<b>\$1,299,508.00</b>
Total SPR Research Funding	<b>\$5,508,713.00</b>
% of SPR Funds for Research	<b>38%</b>
Total LTAP (\$177,878 Fed LTAP; \$240,488 SPR; \$58,366 Local)	<b>\$476,732.00</b>



**SPR PART 1 - PLANNING, SPRY-0010(57)PL, JP# 01946(59)  
FEDERAL FISCAL YEAR 2013**

		<u>2013 SPR</u>	<u>STATE</u>	<u>PL</u>	<u>LOCAL</u>	<u>TOTAL</u>
<b>GIS AND DATA MANAGEMENT</b>						
1101	Continuing Inventory Data Studies	\$670,500.00	\$0.00			\$670,500.00
1102	Highway Performance Monitoring System	\$96,000.00	\$0.00			\$96,000.00
1103	Geographical Information Management System for Transportation	\$490,000.00	\$0.00			\$490,000.00
	<b>Total GIS and Data Management</b>	<b>\$1,256,500.00</b>	<b>\$0.00</b>			<b>\$1,256,500.00</b>
<b>MAPPING</b>						
1201	County, City and other Planning Maps	\$310,000.00	\$0.00			\$310,000.00
	<b>Total Mapping</b>	<b>\$310,000.00</b>	<b>\$0.00</b>			<b>\$310,000.00</b>
<b>TRAFFIC AND DATA COLLECTION</b>						
1301	Coverage Count Program	\$834,000.00	\$0.00			\$834,000.00
1302	Permanent Traffic Count Program	\$879,000.00	\$0.00			\$879,000.00
1304	Purchase of Traffic Counting Equipment	\$265,500.00	\$0.00			\$265,500.00
1305	Vehicle Classification Counting Program	\$593,000.00	\$0.00			\$593,000.00
1306	Weigh-in-Motion Program	\$444,500.00	\$0.00			\$444,500.00
1308	Traffic Monitoring System	\$192,000.00	\$0.00			\$192,000.00
1309	Traffic Analysis and Projections	\$148,000.00	\$0.00			\$148,000.00
1310	Skid Studies Program	\$456,000.00	\$0.00			\$456,000.00
	<b>Total Traffic and Data Collection</b>	<b>\$3,812,000.00</b>	<b>\$0.00</b>			<b>\$3,812,000.00</b>
<b>ECONOMIC, SAFETY, AND FISCAL STUDIES</b>						
1404	Safety Planning	\$100,000.00	\$0.00			\$100,000.00
1405	Motorcycle Safety & Education Program	\$400,000.00	\$0.00			\$400,000.00
1510	Justification Studies	\$20,000.00	\$0.00			\$20,000.00
	<b>Total Economic, Safety, Fiscal Studies</b>	<b>\$520,000.00</b>	<b>\$0.00</b>			<b>\$520,000.00</b>
<b>SYSTEMS AND PROGRAMS</b>						
1601	Federal-Aid Systems Coordination	\$89,000.00	\$0.00			\$89,000.00
1603	Highway Needs Study	\$172,371.00	\$0.00			\$172,371.00
1604	Pavement Management Systems	\$983,290.00	\$0.00			\$983,290.00
	<b>Total Systems and Programs</b>	<b>\$1,244,661.00</b>	<b>\$0.00</b>			<b>\$1,244,661.00</b>
<b>URBAN / REGIONAL TRANSPORTATION PLANNING</b>						
1700	General Urban Transportation Planning	\$5,000.00	\$0.00			\$5,000.00
1701	Oklahoma City Area Regional Transportation Study (OCARTS)	\$80,000.00	\$0.00	\$1,111,287.00	\$200,000.00	\$1,391,287.00
1702	Tulsa Metropolitan Area Transportation Study	\$35,000.00	\$0.00	\$1,100,000.00	\$197,500.00	\$1,332,500.00
1703	Lawton Metropolitan Area Transportation Study	\$15,000.00	\$0.00	\$120,000.00	\$24,000.00	\$159,000.00
1709	Ft. Smith Transportation Study	\$15,000.00	\$0.00	\$40,824.00	\$8,160.00	\$63,984.00
1710	Substate Planning	\$250,000.00	\$0.00			\$250,000.00
1719	Statewide Transportation Improvement Program (STIP)	\$85,000.00	\$0.00	\$0.00	\$0.00	\$85,000.00
	<b>Total Urban Transportation Planning</b>	<b>\$485,000.00</b>	<b>\$0.00</b>	<b>\$2,372,111.00</b>	<b>\$429,660.00</b>	<b>\$3,286,771.00</b>
<b>LONG RANGE PLAN / OTHER PLANNING ACTIVITIES</b>						
1902	Statewide Long Range Transportation	\$2,000.00	\$0.00			\$2,000.00
1903	Intelligent Transportation Systems Planning	\$125,000.00	\$0.00			\$125,000.00
1904	Air Quality Transportation Planning	\$100,000.00	\$0.00			\$100,000.00
1905	Freight Planning	\$200,000.00	\$0.00			\$200,000.00
1906	Rail Planning	\$100,000.00	\$0.00			\$100,000.00
1910	Public Involvement & Visualization Techniques	\$285,000.00	\$0.00			\$285,000.00
1911	Inventory of Depression Era Structures	\$330,000.00	\$0.00			\$330,000.00
	<b>Total Long Range Plan and Planning</b>	<b>\$1,142,000.00</b>	<b>\$0.00</b>			<b>\$1,142,000.00</b>
	<b>Grand Total SPRY-0010(051)PL</b>	<b>\$8,770,161.00</b>	<b>\$0.00</b>	<b>\$2,372,111.00</b>	<b>\$429,660.00</b>	<b>\$11,571,932.00</b>
<b>LOCAL TECHNICAL ASSISTANCE PROGRAM</b>						
1440	Local Technical Assistance Program	\$240,488.00	\$58,366.00		<b>LTAP (Fed)</b> \$177,878.00	\$476,732.00
	<b>Total LTAP</b>	<b>\$240,488.00</b>	<b>\$58,366.00</b>		<b>\$177,878.00</b>	<b>\$476,732.00</b>





## 1101 Continuing Inventory Data Studies

**PURPOSE AND SCOPE:** To collect, record, and compile data on the physical characteristics for all statewide public roads and streets implementing established road inventory procedures and GPS/GIS technology. Catalogue cultural features used to update the Departments official County Highway Maps. Generate detailed maps used to conduct inventory meetings with County Commissioners pertaining to roadway modifications. Maintain current Oracle Spatial Database tables of inventory data and update the Department's Central Data file. Write SQL procedure definitions necessary to extract needed summary data from the files. Produce and publish various mileage summary tables for the state, federal and public needs. Maintain necessary information for the National Network of Defense and NHS systems. Develop and maintain Control Section numbers and other unique identification systems for all public roads. Produce AVMT figures that will be used to calculate Annual Accident and Fatality Rates.

**ACCOMPLISHMENTS DURING FY 2012:** The County Road inventory procedures were continued with six county inventories completed; (Canadian, Custer, Ellis, LeFlore, McCurtain and Woods) and three counties (Latimer, Major and Nowata) are in progress. Eight counties were reassessed and coded; (Adair, Cimarron, Harmon, Jackson, Jefferson, Muskogee, Texas, Tillman) and one (McCurtain) is currently in progress. Approximately 85% of the local road network has been geo-located (GIS). All County Action Reports were verified and processed. All Highway construction projects pertaining to the Department's Highway, Graphical Roadway Network (NLF), Reference Point, and Open to Traffic databases were completed. The following annual publications and reports were completed; 2012 Certification of County Road Mileage, 2012 Statewide Mileage Table Book, and 2012 HPMS mileage, and Travel Summary Tables.

**PROPOSED ACTIVITIES FOR FY 2013:** An additional 10% of the local road network will be geo-located this year, and is currently in progress. Continue coding and updating the Department's Central Database files. Incorporate on technology advancements in data collecting to insure the process of efficient information. Continue to improve on all procedural inventory operations. Seven of the following eleven counties are scheduled to be inventoried; (Alfalfa, Caddo, Choctaw, Creek, Dewey, Garfield, Grady, Murray, Oklahoma, Pittsburg and Roger Mills). Six of the following ten counties are scheduled to be reassessed and coded; (Canadian, Choctaw, Custer, Dewey, Ellis, Latimer, LeFlore, McCurtain, Oklahoma, Major, Nowata, Woods). Continue monitoring all County Action Reports, and Highway Construction projects. Continue collecting HPMS data items. Continue identifying traffic count sites statewide using GPS technology. Compile and publish various state and federal reports including the 2013 Oklahoma Statewide Statistics Book, 2013 Certification of County Road Mileage, 2013 Control Section Map Book, and 2013 HPMS Mileage and Travel Summary Tables. Keep abreast of the latest technological advances through attendance of seminars, conferences and workshops. Process and update all inventory files/tables for modifications to the functional classification, population codes, urban boundaries, due to the latest 2010 census.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$836,000	SPR	-0-	STATE
Estimated Cost FFY 2012	\$575,000	SPR	-0-	STATE
Projected Cost FFY 2013	\$667,000	SPR	-0-	STATE

### CONTACT INFORMATION

Ron Maxwell, GIS Management Branch Manager, 405-521-2728

## 1102 Highway Performance Monitoring System

**PURPOSE AND SCOPE:** To collect, process, and compile data and information as needed to prepare and submit an accurate and timely HPMS submission to the Federal Highway Administration (FHWA) according to the reporting requirements established in the HPMS Reassessment 2010+ Data Specifications.

**ACCOMPLISHMENTS DURING FY 2012:** ODOT continues to work with Consultants to renovate the new HPMS data model reflecting the changing needs and requirements as specified in the 2010+ Reassessment Study and the new Data Requirements document. A web based graphical user interface, Oracle stored procedures and C#/ASP code was designed, implemented and tested. The GUI interface is named the HPMS Console Version 2. ODOT continues to work closely with FHWA Washington DC in providing feedback on the new web based HPMS software Version 8 which was designed, built, tested and implemented by FHWA for use in the 2010 submittal process. Over 150 validation checks for validity of the data were established. ODOT added 10 more validation constraints this previous year. ODOT added 65 new samples. The 2011 HPMS data submittal was completed using the new HPMS Console V2 and the new FHWA HPMS Version 8 software.

**PROPOSED ACTIVITIES FOR FY 2013:** Primary focus will be implementing the new 2010 Urban boundaries, along with the functional classifications changes into the system. ODDT will continue to focus on data quality improvement and add more validations cross-checks to the console for submittal. Our Visidata video log along with Google Earth will be used to verify and collect HPMS sample data. A HPMS sample adequacy review will be conducted and 78 additional samples will be added in the appropriate strata. Any changes in the HPMS data structure and HPMS console interface as required by changing FHWA requirements will be implemented and tested. We will continue to work closely with FHWA Washington DC in providing feedback on the HPMS Version 8 web based software. Field review documents will be generated and a HPMS data field review will be conducted in cooperation with FHWA Oklahoma Division. The 2012 HPMS data submittal will be transmitted to FHWA using the HPMS Console V2 and the FHWA Version 8 web-based software.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$193,000	SPR	-0-	STATE
Estimated Cost FFY 2012	\$80,000	SPR	-0-	STATE
Projected Cost FFY 2013	\$96,000	SPR	-0-	STATE

### CONTACT INFORMATION

Ron Maxwell, GIS Management Branch Manager, 405-521-2728

## **1103 Geographic Information Management System for Transportation**

**PURPOSE AND SCOPE:** To design, develop, implement and maintain a Geospatial Information Management System for Transportation (GIMS-T). The system supports transportation related decision making by producing high quality map products and reports generated from Enterprise data. The maps convey specific topics of interest that require customer input and the use of complex GIS software. GIMS-T staff also supports GIS projects initiated by other ODOT Divisions. GIS services are offered to ODOT staff and customers outside the Department. An intranet GIS enterprise-wide portal is available to anyone having access to the ODOT network. The web portal is known as the Geographical Resource Intranet Portal (GRIP). An internet application known as GRIPLite is also supported and is made available to the general public. The efficient use of resources require a considerable investment in training for GIMS-T staff. The system utilizes aerial photography, global positioning data and other sources of data. The data provided includes but is not limited to 8 Year Construction Work Plan, 4 Yr STIP, Road Characteristic Inventory, Highway Needs Study Reports, Construction and Transportation Improvement Programs, Projects under Construction, Crashes and Speed Limits, Pontis Bridge Inventory and Rating Systems, Pavement Management International Roughness Indexes and Structural History, Highway Performance Monitoring System (HPMS), Rail Crossing Inventory, Videolog Inventory, Environmental themes and datasets including the ODOT Storm water layer and Regulated Routes and Outdoor Advertising location data and information. These systems are continuously undergoing review for ways which they can be improved, made to be more cost effective or more user-friendly. New methods and softwares are continuously being investigated and tested in order to improve the effectiveness and useability of the Departments applications.

**ACCOMPLISHMENTS DURING FY 2012:** Statewide Transportation Improvement Plan (STIP) maps were completed as well as creation of map products for the 2035 Long Range Plan. Staff generated numerous custom maps such as Bridge Vertical Clearance and Posted Load/Design Load maps used for routing oversize/overweight trucks, a series of maps based on the 2010 Needs Study Report; updates to the Posted Load Bridge Maps, and continued support for the Environmental Programs Division, with detour, wetland maps, Sensitive Waters-Right of Way Parcels, and other maps requested by the NEPA Coordinators, biologists, and others. Both the Rural and Urban Functional Classification Map Books continue to be redesigned and updated. The GIS Team is currently working on the development of a new version of the GRIP browser application, leveraging to use of KML, Open Source API's, Widgets as well as developing various role based dashboards for use by divergent users to access and query against the departments data, The staff have created KML files for, Regulated Routes, Billboards, Vertical Clearance, 2012-2019 Workplan, Environmental Sediment-Siltation, COG's with links to COG webpages, AtGrade Rail Crossings, On and Off System Bridges and Culverts and Counties. Many of the KML files contain links to both internal and external document vaults. A network including all of the grade-separated ramps for Interstate, U.S. and State Highway Systems as well as Climbing Lanes and Frontage Roads continues to be updated with new data as it becomes available. Staff continues to provide limited GeoMedia user support on the GMUSERS Schema. Staff continues to work with DPS in creating KML Files for them to use in the event that the OkiePros OSOW site goes down. Staff is also assisting the Traffic Division by creating maps showing the location of road segments with narrow or no shoulders, along with the crash data associated with those segments, and also supplying them with the tabular data used to create the maps for their use in analysis of the crash data in relation to the roadway shoulder width/type. GIS staff continues to attend training whenever the opportunity presents. GIS Staff is currently working with the OK GIS Council and the ODOT Training Division to schedule training in ArcGIS10. We are working closely with the vendor to continue to evaluate ArcGIS10 functionality and whether it has the ability to connect to our Oracle 11G database.

## 1103 Geographic Information Management System for Transportation (cont.)

**PROPOSED ACTIVITIES FOR FY 2013:** Continue maintenance of the Point to Point Mileage LRS and Applications. Create a more efficient method for creating the 8 Year Work Plan and STIP Map products. Continue to provide support to Senior Staff as well as others within the Department in the creation of GIS Map products which facilitate and improve the decision making process within ODOT. Provide all customers with working and final map products during the urban boundary revision process due to the 2010 Census. Continue working with the consultants on the maintenance of the GRIP family of products Begin planning phase for the redesign and enhancement of the GRIP / GRIPLite products to make use of open sources where relevant over the internet.

Using GIS software, continue to improve on the design and creation of updated County/Urban Functional Classification Atlases. In coordination with the ODOT Environmental Programs Division, the Outdoor Advertising Branch and the ODOT Rail Programs Division continue to identify needs and develop solutions that will enable them to efficiently and accurately perform their individual missions. Make use of the training in HTML, XML, and JAVA Script to create an Index of Workflows for the various products and applications created by the GIS Team and have them published to a web enabled document for use by ODOT personnel. Continue the major initiative aimed at CADD integration into the GIS environment. Continue coordination with the Traffic Data section in creating map products to assist in collecting AADT for Ramps. Continue to conduct certified training to personnel in the software products required for the GIMS-T staff to continue to provide efficient and high quality GIS products to customers. Continue to search for and provide certified GIS Training to the GIS Section and others within the GIS Management Branch. Redesign data loaders for construction work plans for use in data mapping. Create and distribute as much ODOT data as possible in KML format for viewing in the Google Earth platform.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$472,000	SPR	-0-	STATE
Estimated Cost FFY 2012	\$425,000	SPR	-0-	STATE
Projected Cost FFY 2013	\$490,000	SPR	-0-	STATE

### CONTACT INFORMATION

Mark Brown, GIS Management Branch, 405-522-1036

## 1201 County, City, and other Planning Maps

**PURPOSE AND SCOPE:** The purpose and scope of the Cartographic Design Section is to produce county and city CADD maps showing current reliable, accurate and legible information for roads, drainage features, street names, city limits, boundaries with symbology indicating man-made culture and features. The scope also includes the creation of other special purpose planning maps and supporting graphics.

**ACCOMPLISHMENTS DURING FY 2012:** Nine counties and seventy five cities were completed using CADD software from the latest available information. Counties completed were Beckham, Carter, Garvin, Hughes, Johnston, Kay, Logan, McClain and Noble. The Cartographic Design Section's city and county designs are implemented using Microstation V8i allowing graphic integration into most G.I.S. databases. All county and city maps were also updated to reflect the latest 2010 Census populations.

The seventy five incorporated city maps are listed by county name. (All maps use geospatially referenced aerial photography, GPS lines, shape files and topographic maps aligned to our Oklahoma Coordinate System.) Eleven cities of over 5,000 in 2010 U.S. Census populations are shown in bold letters.: **Beckham County:** Carter, **Elk City**, Erik, Sweetwater, Sayre, Texola, **Carter County:** Ardmore, Dickson, Gene Autry, Healdton, Lone Grove, Ratliff City, Springer, Tatum, Wilson, **Garvin County:** Erin Springs, Elmore City, Lindsay, Maysville, Paoli, **Pauls Valley**, Stratford, Wynnewood, **Hughes County:** Allen, Atwood, Calvin, Dustin, Gerty, **Holdenville**, Horntown, Lamar, Spaulding, Stuart, Wetumka, Yeager, **Johnston County:** Bromide, Mannsville, Milburn, Mill Creek, Ravia, Tishomingo, Wapanucka, **Kay County:** **Blackwell**, Braman, Kaw City, Kildare, Newkirk, **Ponca City**, Tonkawa, **Logan County:** Cashion, Cedar Valley, Cimarron City, Coyle, Crescent, **Guthrie**, Langston, Marshall, Meridian, Mulhall, Orlando, **McClain County:** **Blanchard**, Byars, Cole, Dibble, Goldsby, **Newcastle**, **Purcell**, Rosedale, Washington, Wayne, **Noble County:** Billings, Marland, Morrison, **Perry**, Red Rock

Special map graphics and other graphic projects were produced as needed for Planning & Research Division studies and to facilitate other ODOT personnel's SPR assignments.

**PROPOSED ACTIVITIES FOR FY 2013:** The Cartographic Design Section will continue drawing all county and city maps in geospatially referenced formats with improved accuracy. Three county maps are in progress: Beaver, Ottawa and Seminole, with a goal to complete ten or more counties in the coming year. All CADD maps will be updated as highway revisions are completed. CADD design features may be integrated into our Oracle Spatial database to facilitate their use from Cartographic Design to the needs of other GIS Management Sections and governmental agencies.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$314,000	SPR	-0-	STATE
Estimated Cost FFY 2012	\$221,000	SPR	-0-	STATE
Projected Cost FFY 2013	\$310,000	SPR	-0-	STATE

### CONTACT INFORMATION

Thom Renbarger, Mapping Section, GIS Management Branch, 405-521-2526

## 1301 Coverage Count Program

**PURPOSE AND SCOPE:** To collect traffic data on state highways, interstates and the National Functional Classified System for establishing average daily traffic volumes. Approximately 3,300 short duration locations are counted on the highway system and 11,700 on the secondary system that includes the county road coverage and urban city street coverage in cities populations over 5,000. State highway and interstate locations are counted on a three-year cycle along with the county and city system coverage. Counts collected on the highway system are incorporated into an Annual Average Daily Traffic (AADT) map published annually for distribution. Counts collected on the county and city system are recorded and retained for office use. Highway traffic maps are published for public distribution.

**ACCOMPLISHMENTS DURING FY 2012:** Short duration traffic counts were completed on the state highway system, county off-system and small urban system in the 25 counties scheduled for FY 2012. In addition to the normal coverage counts, small city counts were collected in select cities with populations under 5,000. Continuous updating of the GPS coordinates and site characteristics for all traffic count sites on all systems was performed. The Oklahoma Traffic Count Information System Web Page was continuously updated throughout the year.

**PROPOSED ACTIVITIES FOR FY 2013:** Continue to analyze all road systems for areas where coverage is deficient, establish new count locations as needed and retire locations that are no longer needed. Collect short duration traffic counts on the state highway system, county off-system and small urban system in the 25 counties scheduled for FY 2013. Collect and update GPS coordinates and site characteristics for all traffic count sites on all systems as needed. The Short Duration Traffic Count Contract will be rebid for the collection of Oklahoma County and any additional counts as we deem necessary. We will be implementing a new enhanced version of the Oklahoma Traffic Count Information System Web Page which will include enhanced maps, report printing and possibly truck traffic information. Attend seminars, conferences and workshops to keep abreast of the latest technological advances in traffic counting equipment and data collection processes.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$780,000	SPR	-0-	STATE
Estimated Cost FFY 2012	\$481,500	SPR	-0-	STATE
Projected Cost FFY 2013	\$834,000	SPR	-0-	STATE

### CONTACT INFORMATION

Aaron Fridrich, Transportation Manager II, 405-736-9466

## 1302 Permanent Traffic Count Program

**PURPOSE AND SCOPE:** To collect hourly and 15 minute increment traffic data by lane for traffic monitoring design needs. There are 72 Automatic Vehicle Classification (AVC) station locations and 23 Weigh-in-Motion (WIM) station locations in Oklahoma. The traffic data obtained are the basis for seasonal and axle factor variation as recommended for traffic monitoring in FHWA's Traffic Monitoring Guide. A biennial traffic characteristic report is generated from the data collected at these sites. Utilities provided for operational support are maintained for permanent WIM stations through accounts with 12 different electric power companies and 6 different telephone companies.

**ACCOMPLISHMENTS DURING FY 2012:** The previous comprehensive Traffic Monitoring Systems (TMS) Operations and Maintenance Contract has been converted to two separate contracts. Services now are provided through the TMS Data Collection Contract and the TMS Site Repair Contract. The contractors provided enhanced services and expertise particularly in the area of data collection, systems validation, TCIS web page support and TMS site repair. The TMS site operational rate experienced a marked increase. Additionally, improved systems diagnostics and trend analysis provided by contract data systems experts have resulted in a much needed systems approach towards operations and maintenance support as evident in the detailed construction and renovation project coordination executed during this period. The scope of work accomplished during FY 2012 included renovation of twenty-one (21) existing sites (6 WIM and 15 AVC) and construction of two new AVC sites on the new OKC I-40 Crosstown Expressway.

**PROPOSED ACTIVITIES FOR FY 2013:** The TMS Data Collection Contract will continue to improve data collection efficiency and renovate the Traffic Count Information Web Page. The ongoing conversion of WIM sites to wireless communication will enhance data collection efficiency. The TMS Site Repair Contract addressed in this section will commence with ongoing repair and replacement construction projects identified and planned during FY 2012. The scope of work to be accomplished in FY 2013 is as follows:

- 1) Complete solar and wind power conversion to remaining 19 WIM sites.
- 2) Complete wireless communications conversion to remaining 17 WIM sites.
- 3) Execute schedule maintenance for up to 95 sites.
- 4) Complete site renovations and repairs to estimated 30 permanent sites.
- 5) WIM Site calibration.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$843,000	SPR	-0-	STATE
Estimated Cost FFY 2012	\$805,000	SPR	-0-	STATE
Projected Cost FFY 2013	\$879,000	SPR	-0-	STATE

### CONTACT INFORMATION

Aaron Fridrich, Transportation Manager II, 405-736-9466

## 1304 Purchase of Traffic Counting Equipment

**PURPOSE AND SCOPE:** To improve the efficiency of the traffic counting operation by systematic replacement of older outdated equipment and stolen or damaged equipment as well as support of increased equipment requirements resulting from expanded operations.

**ACCOMPLISHMENTS DURING FY 2012:** Equipment purchases executed in FY 2012 continued to support on-going projects in traffic monitoring systems operations in both permanent sites and short-duration count site locations. Specifically, these purchases consisted of 1) traffic counters and traffic count / classifiers for the Permanent Traffic Count Program and the Weigh-in-Motion Program, 2) solar panels and accessories for the on-going project for site power conversion, 3) wireless communications terminals for the on-going wireless communications deployment in support of data collection at the permanent traffic monitoring stations.

Additionally, the Traffic Data Section rented and then purchased two MioVision Scout video collection units to use for turning movement studies that usually require more than one field technician. The Road Data Section executed purchases in support of instruments and hardware required to meet data collection requirements under the HPMS program.

**PROPOSED ACTIVITIES FOR FY 2013:** The proposed construction of new traffic monitoring stations, the conversion to solar power and digital wireless data communications, and the continuing requirement for additional GPS equipment comprises the majority of the expenditure requirement for FY 2013. As older, out-dated data recorders become uneconomically repairable and obsolete, timely replacement becomes vital to maintaining data integrity and continuity of operations in the permanent traffic monitoring stations and particularly the short duration count program which depends on hardware availability and continuous replacement of road tubes and accessories. In FY 2013, the department will experience a significant surge in both solar energy conversion and accelerated deployment of the digital wireless data communication network at 19 permanent sites. Due to the advanced age of the Skid Testing Vehicle, extensive equipment repair or replacement is expected in FY 2013.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$265,000	SPR	-0-	STATE
Estimated Cost FFY 2012	\$95,500	SPR	-0-	STATE
Projected Cost FFY 2013	\$265,500	SPR	-0-	STATE

### CONTACT INFORMATION

Aaron Fridrich, Transportation Manager II, 405-736-9466



## 1305 Vehicle Classification Counting Program

**PURPOSE AND SCOPE:** To gather vehicle classification data and develop estimates of the composition of traffic on the various Functional Classifications of roadways in the state and to collect complex traffic data required for planning, traffic and design studies. Data gathered and used to facilitate these studies includes machine counts, vehicle classification counts and turning movement studies with pedestrian counts.

**ACCOMPLISHMENTS DURING FY 2012:** Vehicle classification data collection continued at the short term sites in support of the traffic analyst's effort in the development of updated annual average truck volumes. All 2-lane highway classification site locations were counted for 24 hours using Peek Traffic ADR-1000 Automatic Traffic Recorders. The vehicle classification counting program for FY 2012 was supplemented with a contract with RDSC for collection of multi-lane urban and rural rural classification data statewide. During FY 2012, various special studies were conducted throughout the year providing timely data for traffic engineers, planners and designers in the department's central office division as well as for traffic engineers, construction and maintenance managers in the eight field divisions. The type and scope of these various special studies and the activities to which the data was provided are as follows:

- |   |  |
|---|--|
| <p>(A) For the Data Collection Branch</p> <ul style="list-style-type: none"> <li>2 - Turning movements with pedestrian counts</li> <li>32 - (24 hour) Hourly Machine Counts</li> <li>33 - (24 hour) Cumulative Machine Counts</li> <li>138 - (24 hour) Vehicle Classification Counts</li> </ul>     | <p>(C) For the Traffic Engr. Division (and Field Divisions)</p> <ul style="list-style-type: none"> <li>58 - Turning movements with pedestrian counts</li> <li>38 - (24 hour) Hourly Machine Counts</li> <li>22 - (24 hour) Cumulative Machine Counts</li> <li>3 - (24 hour) Vehicle Classification Counts</li> <li>1 - Gap Study (AM, noon &amp; PM peak hours)</li> </ul> |
| <p>(B) For the Engineering Services Branch</p> <ul style="list-style-type: none"> <li>24 - Turning movements with pedestrian counts</li> <li>230 - (24 hour) Hourly Machine Counts</li> <li>4 - (24 hour) Cumulative Machine Counts</li> <li>7 - (24 hour) Vehicle Classification Counts</li> </ul> | <p>(D) For other Divisions</p> <ul style="list-style-type: none"> <li>0 - Turning movements with pedestrian counts</li> <li>0 - (24 hour) Hourly Machine Counts</li> <li>0 - (24 hour) Cumulative Machine Counts</li> <li>0 - (24 hour) Vehicle Classification Counts</li> </ul>   |

**PROPOSED ACTIVITIES FOR FY 2013:** The vehicle classification counting program for FY 2013 will be supplemented with a new contract for collection of multi-lane urban and all rural classification data statewide. During FY 2013, various special studies will be conducted throughout the year providing timely data for traffic engineers, planners and designers in the department's central office division as well as for traffic engineers, construction and maintenance managers in the eight field divisions. We will continue to provide resources to fulfill the requests for various types of traffic studies and produce all reports associated with those studies

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2012	\$501,500	SPR	-0-	STATE
Estimated Cost FFY 2012	\$476,000	SPR	-0-	STATE
Projected Cost FFY 2013	\$593,000	SPR	-0-	STATE

### CONTACT INFORMATION

Aaron Fridrich, Transportation Manager II, 405-736-9466

## 1306 Weigh-in-Motion Program

**PURPOSE AND SCOPE:** To collect and conduct preliminary analysis of data describing vehicle characteristics and vehicle weight trends. The Department uses this data as an intricate part of the traffic monitoring system. These data collection systems provide axle weight factors used in design and pavement management studies and to fulfill FHWA requirements for the Strategic Highway Research Program (SHRP) and the Long Term Pavement Performance (LTPP) program. The Department operates 23 permanent weigh- in- motion (WIM) data collection sites and 72 Automatic Vehicle Classifier (AVC) sites located throughout the state.

**ACCOMPLISHMENTS DURING FY 2012:** The progress made in this year's effort resulted in the continued use and monitoring of solar power and the digital wireless data communications at all 72 of our existing AVC continuous count traffic monitoring stations. The solar power conversion project has reduced electric utility costs and increased site operational rates. The wireless network conversions have dramatically improved the speed and dependability of traffic data transfers as compared to land line telephone service. The wireless conversions were facilitated through a research study with the University of Oklahoma. The University provided traffic data transfers to an IP address on the internet which allowed import into the department's Traffic Operations and Planning Software data base. The University also provided a web page which allowed for real time monitoring of Wireless Traffic Monitoring Sites operations and repairs to be made in a timely fashion. The conversion of 21 old WIM 1068 systems to newer iSync Lite systems was completed in FY 2011 and efforts continued to be made to convert these sites to wireless and communicate with the University's developed software for data transfer through the internet. The previous comprehensive TMS Operations & Maintenance contract has been converted to two separate contracts, The TMS Data Collection Contract and the TMS Site Repair Contract.

**PROPOSED ACTIVITIES FOR FY 2013:** The TMS Data Collection Contract will focus on: 1) Data collection, 2) development of data validation software using historical data, 3) support services for the digital wireless data communications network, 4) development of software supporting remote programming and configuration of traffic data recorders, 5) development of software allowing for the addition of multiple analog sensors to the communications terminal unit, 6) development of remote monitoring and diagnostics for trouble shooting, 7) development of a power monitoring system for calculating charging rate and power consumption rate to adjust wireless transmission frequency and 8) improvements to existing ODOT Traffic Count Information Web Page. The TMS Site Repair Contract will focus on repair or replacement of sensors and equipment at all AVC and WIM sites and WIM site calibration.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$533,500	SPR	-0-	STATE
Estimated Cost FFY 2012	\$452,000	SPR	-0-	STATE
Projected Cost FFY 2013	\$444,500	SPR	-0-	STATE

### CONTACT INFORMATION

Aaron Fridrich, Transportation Manager II, 405-736-9466

## 1308 Traffic Monitoring System

**PURPOSE AND SCOPE:** The Oklahoma Traffic Monitoring System (TMS) is a comprehensive statewide traffic data gathering, editing, and reporting system created to fulfill the requirements of the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). The purpose of TMS is to computerize traffic estimation and reporting, including data from public and private non – state government entities.

**ACCOMPLISHMENTS DURING FY 2012:** Annual processing was completed for the traffic year 2011 and the data was checked for accuracy along with the correction of count site placement in the Highway Inventory File. Peak Hour, Truck estimates, and Forecast AADTs were estimated on 65 new HPMS Sample locations. The HPMS samples were updated with 2011 Truck counts. 2011 Truck counts from contract, state forces, and the Oklahoma Turnpike Authority were also used to update the 2011 NHS Truck System. The annual publication of the 2011 AADT Map was completed. Updating the TMS mapping system to GeoMedia was completed. This allows a more efficient accounting of all traffic monitoring locations and is a necessary step toward completing the new ramp traffic estimation requirements. All of the TMS counties were finalized in GeoMedia maps and delivered to Data Collection in early 2012. Over 500 vehicle classification locations have been added to the Oklahoma TMS. One third of the counties had truck counts taken by contract and state forces, beginning the cycle in calendar year 2012. Two Branch Employees attended the North American Traffic Monitoring Exposition and Conference in Dallas in June 2012.

**PROPOSED ACTIVITIES FOR FY 2013:** Revise and streamline the process of recording and compiling short term counts and producing seasonal and axle factors for AADT estimation in the HPMS System and 2012 AADT Map. Keep informed of technological advances through attendance of seminars, conferences, and workshops.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$192,000	SPR	-0-	STATE
Estimated Cost FFY 2012	\$185,000	SPR	-0-	STATE
Projected Cost FFY 2013	\$192,000	SPR	-0-	STATE

### CONTACT INFORMATION

Daryl Johnson, Traffic Data Analyst, 405-522-6376

## 1309 Traffic Analysis and Projections

**PURPOSE AND SCOPE:** Traffic forecasts provide the basis for geometric and structural design of new highways, roadway planning functions, roadway maintenance, and improvement of existing highways. The existing or assigned traffic volumes are projected twenty (20) years into the future for design purposes. Design Hourly Volume (DHV) of the Annual Average Daily Traffic (AADT), percent of trucks of the AADT and DHV, and the percent of heavy trucks (AADT) are prepared for each request of design traffic information. Writing specifications, review and correction, and approval of consultant Design Traffic Projects and Research Projects is to be performed as needed.

**ACCOMPLISHMENTS DURING FY 2012:** Design traffic was furnished to the city and county governments and various divisions within ODOT. Information prepared for the larger population areas was based on the comprehensive area and regional transportation studies in those cities. Information for urban, rural communities and small cities was prepared utilizing historical data, such as traffic volumes, vehicle use, population trends, special traffic counts and other related traffic information gathered through special studies. Approximately 251 requests for design traffic were completed. Several consultant traffic analyses were overseen and edited. The Portable WIM research project was overseen.

**PROPOSED ACTIVITIES FOR FY 2013:** Design traffic data will continue to be furnished for cities, counties and to ODOT divisions upon approved requests. Traffic analysis and projections will be completed, as requested for all programmed construction and maintenance projects. Project Planning Reports and other required special studies will be developed. Remain informed of technological advances through attendance of seminars, conferences and workshops.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$130,000	SPR	-0-	STATE
Estimated Cost FFY 2012	\$85,000	SPR	-0-	STATE
Projected Cost FFY 2013	\$148,000	SPR	-0-	STATE

### CONTACT INFORMATION

Daryl Johnson, Traffic Data Analyst, 405-522-6376

## 1310 Skid Studies Program

**PURPOSE AND SCOPE:** To assess the skid resistance for pavement surfaces of Oklahoma's highway system in accordance with the guidelines of the Highway Safety Improvement Program and ASTM standards. The scope of the program includes: scheduled testing of all roadways comprising the National Highway System in a three-year test cycle. This includes the annual testing of all interstate highways and the Strategic Highway Research Program (SHRP) sites. Conduct special skid resistance testing as requested.

**ACCOMPLISHMENTS DURING FY 2012:** The annual test cycle for FY 2012 encompassed pavement friction testing of highways in Divisions 1, 2 & 3 and all Interstates. The new Pavement Friction (Skid) Testing System purchased in FY 2007 was in its 6th year of use in this year's test cycle and again experienced increased productivity in test miles. This year's testing cycle totaled 10,101.32 miles. The new system's software provides a more efficient and streamlined reporting process. Highway mileage with less than adequate skid resistance value registers an average of approximately 8 percent of all pavements tested.

**PROPOSED ACTIVITIES FOR FY 2013:** The Pavement Friction Skid Equipment is scheduled to be calibrated in April 2013 at the Texas Transportation Institute located at Texas A&M. We are proposing to replace the current skid truck and trailer in FY-2013. If we are successful in replacing the current skid truck and trailer, we will not need to follow through on the calibration of the old system. The FY-2013 test cycle encompasses state, federal and interstate highways totaling approximately 10,623.36 miles in Division 5, 6 & 7. Testing is done annually on all interstate highways including US-69. Completion is scheduled for the fall of 2013.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$166,500	SPR	-0-	STATE
Estimated Cost FFY 2012	\$160,000	SPR	-0-	STATE
Projected Cost FFY 2013	\$456,000	SPR	-0-	STATE

### CONTACT INFORMATION

Aaron Fridrich, Transportation Manager II, 405-736-9466

## 1404 Safety Planning

**PURPOSE AND SCOPE:** To address transportation safety in the development and implementation of the Statewide Intermodal Transportation Plan (Long Range Plan) and the Oklahoma Statewide Transportation Improvement Program (STIP). To collaborate with ODOT Traffic Engineering Division in implementation and documentation of Oklahoma's Strategic Highway Safety Plan (SHSP).

Provide review of projects and programs to ensure consistency with the Long Range Plan and inclusion in the STIP. Maintain/update current Strategic Highway Safety Plan (SHSP) in accord with federal regulations. Continue implementation of adopted SHSP. Undertake strategies to achieve goals and address emphasis areas highlighted in the Plan.

**ACCOMPLISHMENTS DURING FY 2012:** Provided interface to include safety and security considerations in Long Range Transportation Plan and STIP. Worked with ODOT Traffic Engineering staff on implementation of SHSP.

Coordinated with Transportation Safety Institute to host Highway Safety Peer Exchange in March 2012. A total of 47 states were represented at the Peer Exchange. The program, provided by experts from the states, covered the following topics: traffic safety planning, roadway departures, intersection safety, and human factors in highway safety.

**PROPOSED ACTIVITIES FOR FY 2013:** Address transportation safety in implementation of Long Range Plan and development and implementation of STIP. Review and update SHSP/develop SHSP 2.

Continue monitoring implementation of adopted SHSP. ODOT Traffic Engineering Division implementation focus in 2013 includes, but is not limited to: carrying out the Oklahoma Systemic Intersection Safety Plan by developing and constructing low cost intersection safety improvements on a systemwide basis in Division 8 (Tulsa area); calibrating and testing collision analysis software customized to recognize safety problem locations and to identify the appropriate mitigation measures; and measuring/evaluating the effectiveness of safety corridor enforcement as a tool to curb unsafe driver behavior.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$100,000	SPR	-0-	STATE
Estimated Cost FFY 2012	\$15,000	SPR	-0-	STATE
Projected Cost FFY 2013	\$100,000	SPR	-0-	STATE

### CONTACT INFORMATION

Linda Koenig, Transportation Planner, 405-522-0171

## 1405 Motorcycle Safety & Education Program

### PURPOSE AND SCOPE:

The Statewide motorcycle safety and education program seeks to reduce motorcycle crashes that result in fatalities and injuries. The program seeks to curb aggressive driving and speeding by motorcycle users. The Oklahoma Highway Patrol will implement a motorcycle safety course as a means of improving motorcycle user safety on the public roadways.

**ACCOMPLISHMENTS DURING FY 2012:** The Oklahoma Highway Patrol, in partnership with ODOT, procured equipment for, and conducted a Motorcycle Safety Training Course for three classes in a statewide motorcycle and safety and education program. The program focused on safe motorcycle rider training, education of other motorists, and motorcycle safety awareness.

### PROPOSED ACTIVITIES FOR FY 2013:

The Oklahoma Highway Patrol, in partnership with ODOT, will continue development and implementation of a statewide motorcycle and safety and education program. The program is designed to improve the skill level of motorcycle operators and increase public awareness of sharing the road between motorcycles and other motor vehicle operators. In 2013, the program will deliver the Motorcycle Safety Training Course to at least 12 classes in various locations throughout the state. The program will deliver publication education/information materials through various venues including public service announcements, community events, and public forums.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$400,000	SPR	-0-	STATE
Estimated Cost FFY 2012	\$400,000	SPR	-0-	STATE
Projected Cost FFY 2013	\$400,000	SPR	-0-	STATE

### CONTACT INFORMATION

Linda Koenig, Transportation Planner, 405-522-0171

## 1440 Local Technical Assistance Program

**PURPOSE AND SCOPE:** The Local Technical Assistance Program (LTAP) is a training program contracted through Oklahoma State University's Center for Local Government Technology to provide technical maintenance training and assistance to Oklahoma's 77 counties' personnel in the areas of road and bridge construction, repair and maintenance and other transportation related issues. This is accomplished by (1) conducting workshops, seminars and other training opportunities; (2) providing on-site technical assistance; (3) maintaining a lending library for publications, videotapes, DVDs and other technology resource documents; (4) providing information on new and existing technology; (5) coordinating with faculty and staff at OSU and ODOT to provide technical expertise and support; and (6) publishing a quarterly newsletter and (7) maintaining a database of rural, local and state transportation officials and other resources in Oklahoma and nationwide.

**ACCOMPLISHMENTS DURING FY 2012:** Conducted Right of Way Acquisition class in conjunction with ODOT's Right of Way Division and FHWA. Conducted five of FHWA's "Every Day Counts" initiative classes and webinars. Continued the Roads Scholar curriculum in conducting numerous training sessions, with a record number of 84 participants completing the program; placed student interns into six local government agencies; developed and conducted new training courses as requested by the LTAP Advisory Board and counties, with emphasis on safety; continued to develop hands on training through cooperation efforts with industry; continued to maintain website, publish various literature, tapes, DVD, etc. for distribution; attended year end meeting with ODOT staff aimed to further improve LTAP program direction and goals; provided program progress reports.

**PROPOSED ACTIVITIES FOR FY 2013:** Develop more activities to facilitate the implementation of FHWA's Every Day Counts initiatives by promoting the use of Geo-Synthetic Reinforced Soil technology and other initiatives. Continue the Roads Scholar, Road Safety Audit, Welding Safety, OSHA Forklift, Comprehensive MUTCD, Wildland Fire Training, provide Infrastructure Management training to include Motor Grader Operation, Chip Seal Class, Asphalt operations. Participate in Assoc. of County Commissioner of Oklahoma (ACCO) conferences and County Officer & Deputies Association (CODA) conferences; continue to lead Workforce Development classes; continue to improve and serve as the state office of the Oklahoma Chapter of the American Public Works Assoc. (APWA) in handling daily office functions, organizing and conducting the annual conference and attendance of board meetings; continue to build on and improve the Transportation Intern Program developed by the Center for Local Government Technology (CLTG); serve on various local and national committees such as the Association of County Commissioners of Oklahoma Strategic Planning, National LTAP Association Conference. Planning, etc.; attend various conferences including the TRB Annual Conference and the National LTAP Conference.; provide technical assistance in all areas; continue to provide website, literature, tapes, DVD's, etc. for distribution; provide program

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$179,809	SPR	\$48,156	STATE	\$160,191	FHWA
Estimated Cost FFY 2012	\$179,809	SPR	\$48,156	STATE	\$160,191	FHWA
Projected Cost FFY 2013	\$240,488	SPR	\$58,366	STATE	\$177,878	FHWA

### CONTACT INFORMATION

Bryan Cooper, Transportation Research Section, 405-736-9475



## 1510 Justification Studies

**PURPOSE AND SCOPE:** To study the economic, environmental and other effects of design features of roadway improvements such as interchanges, grade separations, bypasses, utility structures, pedestrian structures, etc., for the purpose of determining the economic and engineering feasibility of such proposals.

**ACCOMPLISHMENTS DURING FY 2012:** Reviewed consultant studies as needed.

**PROPOSED ACTIVITIES FOR FY 2013:** Consultant studies will be overseen as needed. Keep informed of technological advances through attendance of seminars, conferences, and workshops.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$20,000	SPR	-0-	STATE
Estimated Cost FFY 2012	\$2,000	SPR	-0-	STATE
Projected Cost FFY 2013	\$20,000	SPR	-0-	STATE

### CONTACT INFORMATION

Daryl Johnson, Traffic Data Analyst, 405-522-6376

## 1601 Federal-Aid Systems Coordination

**PURPOSE AND SCOPE:** To be responsible for the coordination of the State and United States Highway System, Federal-aid Highway System (includes the Interstate System and National Highway System) and the Functional Classification System. Prepare and coordinate all highway and classification revisions pertaining to these systems. To record, maintain, research, and provide any documents and historical data relating and pertaining to these systems. To communicate, inform and coordinate with city, county, state and federal officials pertaining to these systems.

**ACCOMPLISHMENTS DURING FY 2012:** A total of 4 highway revisions were approved by the Transportation Commission. A total of 13.14 miles of highways were added and 10.99 miles were removed for a grand total of 2.15 highway miles removed from the State Highway System. A total of 6.0 miles were added to the Rural Functional Classification System. *The County Collector System* books were brought up to date and printed as of July, 2011. New forms were tested for revisions to the Functional Classification Systems. These forms were designed to be completed online to help reduced paper cost and filing. Many highway history questions this office received were extensive researched and answered. The *Oklahoma's Memorial Highways & Bridges* book is presently being updated for publication in 2013.

**PROPOSED ACTIVITES FOR FY 2013:** Continue to coordinate all necessary highway revisions within the State. Do necessary on-site reviews of revisions as needed. The Urban Areas will be adjusted in accordance with the 2010 Census this coming year, along with all Functional Classification System revisions that are impacted from the new boundaries The Rural Functional Classification System will be adjusted as well. Much travel will be needed to complete this task. New classification books for both urban and rural will be published. The *Oklahoma's Memorial Highways & Bridges* book for 2013 will be updated with the new 2012 data, but the book will not be published until 2013. The will be updated again with the 2013 data, then published.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$93,000	SPR	-0-	STATE
Estimated Cost FFY 2012	\$65,000	SPR	-0-	STATE
Projected Cost FFY 2013	\$89,000	SPR	-0-	STATE

### CONTACT INFORMATION

Gary Howell, Systems Coordinator, GIS Management Branch, 405-522-1041

## 1603 Highway Needs Study

### PURPOSE AND SCOPE:

To estimate the current and future needs of the state highway system using up-to-date software and techniques. To publish a Needs Study and Sufficiency Report biennially showing the physical and financial needs of the state highway system over a twenty-year period for construction, maintenance, and administration. To maintain a file of geometric deficiencies on the state highway system. To maintain a construction and maintenance status log of highway projects. To develop, maintain, and recommend a list of highway segments for potential removal from the state highway system and its associated cost. To maintain a database indicating sufficiency ratings for roadways and bridges along with recommended improvements and costs.

**ACCOMPLISHMENTS FOR FY 2012:** The Needs Study and Sufficiency Rating Report was restructured into three separate categories: Bridge, Pavement and Geometrics. Supporting programs, charts and tables were added or modified to support these categories. Published and distributed the 2011 Needs Study and Sufficiency Rating Report, Volumes I & II and the Potential Removals from the State Highway System Report. Updated the Sufficiency Rating Manual, Field Division Pavement Preservation Manual and the Needs Study Procedure Manual were. Updated the Sufficiency file highway subsections, inventory, and improvement data for use in the collection of field data. The geometric data contained in the Needs Study Deficiency database file was updated. Began field data collection for upcoming 2013 Needs Study Report.

**PROPOSED DURING FY 2013:** Continue field data collection for upcoming 2013 Needs Study Report. Meet with Field Division 1-8 personal to coordinate their participation in data collection. Process collected field data. Run programs to produce graphs, charts and tables for Report. Compile maintenance and construction costs for Report. Begin assembly of the 2013 Needs Study and Sufficiency Rating Report, Volumes I & II and the 2013 Needs Study Potential Removals from the State Highway System Report.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$171,248	SPR	-0-	STATE
Estimated Cost FFY 2012	\$171,248	SPR	-0-	STATE
Projected Cost FFY 2013	\$172,371	SPR	-0-	STATE

### CONTACT INFORMATION

Wayne Barber, Needs Study Program Manager, 405-522-6705

## 1604 Pavement Management Systems

**PURPOSE AND SCOPE:** To develop and implement the Department's Pavement Management System (PMS); maintain a computer database of pavement distresses and other roadway characteristics used for the analysis of pavement condition and performance and as an aid to pavement design; maintain application software necessary to analyze roadway information for pavement management; and supply data for inclusion in the Highway Performance Monitoring System (HPMS).

**ACCOMPLISHMENTS DURING FY 2012:** Performed PMS analysis of the NHS Highway Systems in Oklahoma. Provided technical support for the video log software. Completed a round of condition data collection and began a new round. Collected all routes (including HPMS samples) in Divisions 3, 4 and 8. Collected NHS routes in Divisions 1, 2, 5, 6 & 7. Continued coordinating integration of Video Log with GRIP. Completed Falling Weight Deflectometer (FWD), Ground Penetrating Radar (GPR) and core data on the NHS and Division 5. Kept informed of the latest technological advances and practices by attending the Pavement Management Conference in Oklahoma City and Norman.

**PROPOSED ACTIVITIES FOR FY 2013:** Perform PMS analysis of the Interstate and Statewide Highway Systems in Oklahoma. Continue refinement of PMS procedures by updating performance curves, treatment costs, and triggers. Provide technical support for the video log software, both in-house and web-based. Initiate pavement condition data collection on the following:

- All NHS routes; Primary Direction IRI and Right-of-way video only.
- All non-NHS routes in Divisions 1, 2, 5, 6 and 7
- HPMS non-highway sample sections in Divisions 1, 2, 5, 6 and 7

Keep informed of the latest technological advances and practices through seminars, conferences, and workshops.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$950,672	SPR	-0-	STATE
Estimated Cost FFY 2012	\$950,672	SPR	-0-	STATE
Projected Cost FFY 2013	\$983,290	SPR	-0-	STATE

### CONTACT INFORMATION

William Dickinson, Pavement Management Program Manager, 405-522-1448

## 1700 General Urban Transportation Planning

**PURPOSE AND SCOPE:** This item includes coordinating with staff members in the Plan & Program Coordination Branch in conducting general planning and research activities which cannot be ascribed to specific transportation studies contained in the unified planning work programs or the SPR Report. These activities include: a) coordination between ODOT Central Office and Field Divisions; b) coordination with and among local, state, and federal officials; c) dissemination of social and economic data and traffic counts to the public and private sector on request; d) providing technical assistance on planning and research activities/studies upon request; e) tracking federal and state legislation and regulations affecting the Department, and; f) keeping abreast of the latest technology advances and federal regulations in transportation planning, ITS, etc. through seminars, workshops and reading materials.

**ACCOMPLISHMENTS DURING FY 2012:** Continued coordination with appropriate ODOT staff members and Field Divisions. Assisted with research and public meetings for State Rail Plan. Provided socioeconomic data and traffic counts, upon request, to local and state officials and to citizens. Attended various seminars and workshops related to transportation planning and policies in order to maintain, upgrade and develop needed expertise, proficiency and professionalism. Coordinated with and among local, state and federal officials. Submitted applications for federal discretionary funds. Monitored federal and state legislation and regulations affecting the Department. Provided review and comment on Surface Transportation Act reauthorization language.

**PROPOSED ACTIVITIES FOR FY 2013:** Coordination with ODOT staff members, Field Divisions and local, state and federal officials will be continued. Dissemination of pertinent planning data and information will be accomplished on request. Management of on-demand planning studies on multimodal/intermodal transportation improvements. Technical assistance will be provided upon request concerning transportation planning requirements cited in the new federal legislation, Moving Ahead for Progress in the 21st Century (MAP-21). Professional enrichment will be pursued through attendance at workshops, seminars and conferences.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$35,000	SPR	-0-	STATE
Estimated Cost FFY 2012	\$87,000	SPR	-0-	STATE
Projected Cost FFY 2013	\$5,500	SPR	-0-	STATE

### CONTACT INFORMATION

Linda Koenig, Transportation Manager I, 405-522-0171

## 1701 Okla. City Area Regional Transportation Study

**PURPOSE AND SCOPE:** To maintain up-to-date socioeconomic and land use data and a viable Long Range Transportation Plan in compliance with the provisions of existing federal regulations and SAFETEA-LU provisions and all applicable transportation planning regulations and requirements for the Oklahoma City urbanized area.

**ACCOMPLISHMENTS DURING FY 2012:** Completed and Policy Committee approved the Encompass 2035 OCARTS Long-Range Transportation Plan. Continued to serve as Coordinated Public Transit-Human Services Transportation Plan guide. Continued implementation of strategies to alleviate congestion problems in OCARTS area. Continued work with the Air Quality by monitoring and evaluating levels and administering a comprehensive public education program. Partnered in funding an Intermodal Transportation Hub Study. Updated local government projects included in the TIP as well as developed and adopted the FFY 2013-2016 TIP.

**PROPOSED ACTIVITIES FOR FY 2013:** Data collection and monitoring of social, economic, environmental and transportation system data; Continue calibration and application regional land use distribution model; Long Range Planning including major streets and highways; Short Range Planning coordination; Transit Route Performance and Service Plans; Congestion Management; Elderly and Disabled Transportation Planning; Program implementation of the TIP, Urbanized Area Surface Transportation Program and project coordination and monitoring; Alternative Transportation planning including Pedestrian and Bicycle, Public Transit, Human Services Transportation and Passenger Rail; Transportation Effects of air quality, ozone reduction and environmental programs; Public education planning of the Citizen Participation and public information, nondiscrimination compliance plan and conducting broad-based public involvement activities; Program administration and implementation.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$70,000	SPR	\$1,219,474	PL	\$200,000	In-Kind
Estimated Cost FFY 2012	\$55,000	SPR	\$1,219,474	PL	\$200,000	In-Kind
Projected Cost FFY 2013	\$80,000	SPR	\$1,127,400	PL	\$200,000	In-Kind

### CONTACT INFORMATION

Dawn Borelli, Program Coordination Branch, 405-521-6433

## 1702 Tulsa Metropolitan Area Transportation Study

**PURPOSE AND SCOPE:** To maintain up-to-date socioeconomic and land use data and a viable Long Range Transportation Plan in compliance with the provisions of existing federal regulations and SAFETEA-LU provisions and all applicable transportation planning regulations and requirements for the Tulsa urbanized area.

**ACCOMPLISHMENTS DURING FY 2012:** Continued development of the Regional Transportation Plan, Connections 2035. Preparation and finalization of the FY 2013 UPWP was completed. The FY 2013 Agreement was executed and authorization to expend federal funds effective July 1, 2012 through June 30, 2013 was granted by FHWA. The Transportation Improvement Program (TIP) for FFY 2013-2016 was developed and adopted. Continued the coordination of the Ozone Alert! Clean Cities and Green Traveler Alternative programs. Reviewed and analyzed the Congestion Management Process and implemented modified system. Assisted in the planning, funding and development of the Bicycle/Pedestrian Trail system as well as developed a pedestrian master plan for the region.

**PROPOSED ACTIVITIES FOR FY 2013:** Data collection and monitoring of social, economic, environmental and transportation system data. Development and maintenance of the Geospatial Information System and integration with the travel demand model. Update and maintain a major street and highway plan for the region. Review and assess congestion and congestion management strategies, revise CMP document. Initiation of development of a comprehensive pedestrian, bicycle plan for the region, implementation of bicycle elements of the Regional Transportation Plan. Implement High Speed Passenger Rail plan and initiate Alternative Analysis of commuter corridors in the region. Review and update the Public Participation Plan.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$35,000	SPR	\$737,102	PL	\$147,420	Local
Estimated Cost FFY 2012	\$35,000	SPR	\$737,102	PL	\$147,420	Local
Projected Cost FFY 2013	\$35,000	SPR	\$823,900	PL	\$164,780	Local

### CONTACT INFORMATION

Laura Chaney, Program Coordination Branch, 405-521-2705

## 1703 Lawton Metropolitan Area Transportation Study

**PURPOSE AND SCOPE:** To maintain up-to-date socioeconomic and land use data and a viable Long Range Transportation Plan in compliance with the provisions of existing federal regulations and SAFETEA-LU provisions and all applicable transportation planning regulations and requirements for the Lawton Metropolitan area.

**ACCOMPLISHMENTS DURING FY 2012:** Transportation planning for the Lawton Metropolitan Planning Area was carried out as described in the FY 12 Unified Planning Work Program (UPWP). During FY 12 staffing shortages and lack of transportation, planning experience by employees of the Lawton Metropolitan Planning Organization (LMPO) postponed numerous projects. Accomplishments during FY 12 included: published the Annual Listing of Obligated Projects, adoption of the FFY 2013-2016 Transportation Improvement Program (TIP), preparation of the annual transportation planning funding documents, assisted Lawton Public Schools in Safe Routes to Schools application process, implemented a feasibility study for providing transit service to the West Lawton Industrial Area, developed an air quality education program in cooperation with the Lawton Metropolitan Area Air Quality Committee, participated in Transportation Air Quality Work Group meetings, and participated in committee to review transportation enhancement grant applications.

**PROPOSED ACTIVITIES FOR FY 2013:** Data collection and monitoring of social, economic, environmental and transportation system data. Prepare a study in relocating the transit transfer center, administer the contract for the Lawton Metropolitan Bicycle and Pedestrian Plan, review the Public Participation Plan to ensure it is in compliance with Title VI and LEP requirements, review and update the traffic analysis zones, review pedestrian facilities and connectivity to transit in proximity to secondary schools, collect data and convert data into GIS maps for sidewalks, bus shelters, traffic reports, and increase public awareness of air quality through various outreach efforts.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$15,000	SPR	\$120,000	PL	\$24,000	Local
Estimated Cost FFY 2012	\$21,000	SPR	\$120,000	PL	\$24,000	Local
Projected Cost FFY 2013	\$15,000	SPR	\$120,000	PL	\$24,000	Local

### CONTACT INFORMATION

Laura Chaney, Transportation Manager I, 405-521-2705



## 1709 Ft. Smith Transportation Study

**PURPOSE AND SCOPE:** To maintain up-to-date socioeconomic and land use data and a viable Long Range Transportation Plan in compliance with the provisions of existing federal regulations and SAFETEA-LU provisions and all applicable transportation planning regulations and requirements for the Fort Smith urbanized area.

**ACCOMPLISHMENTS DURING FY 2012:** Transportation planning for the Frontier Metropolitan Planning Area was carried out as described in the FY 12 Unified Planning Work Program (UPWP). Accomplishments during FY 12 included published the Annual Listing of Obligated Projects, adoption of the FFY 2013-2016 Transportation Improvement Program (TIP), preparation of the annual transportation planning funding documents and maintenance and update of the Frontier MPO website.

**PROPOSED ACTIVITIES FOR FY 2013:** The Oklahoma Department of Transportation will continue coordination with the Frontier Metropolitan Planning Organization and the Arkansas Highway and Transportation Department (AHTD) in maintaining the 3-C planning process in the Fort Smith area. Monitor the transportation planning process for compliance with administrative, financial and legal requirements for maintaining a continuous, cooperative and comprehensive process. Continue staff education, training and attendance at workshops and seminars.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$15,000	SPR	\$40,824	PL	\$8,160	Local
Estimated Cost FFY 2012	\$15,000	SPR	\$40,824	PL	\$8,160	Local
Projected Cost FFY 2013	\$15,000	SPR	\$40,824	PL	\$3,940	Local

### CONTACT INFORMATION

Laura Chaney, Transportation Manager I, 405-521-2705

## 1710 Substate Planning

**PURPOSE AND SCOPE:** To provide transportation planning assistance for the non-metropolitan areas of the State thru the Oklahoma Association of Regional Councils (OARC). The rural transportation program will assist ODOT in meeting Federal and State requirements for the Statewide Planning Process to address the transportation needs in non-metropolitan areas. Develop and provide ongoing public participation for the transportation planning process.

**ACCOMPLISHMENTS DURING FY 2012:** Developed an Oklahoma Rural Transportation Planning Manual. Preparation of annual transportation planning funding documents, agreement between ODOT and OARC signed and Planning Work Program (PWP) in development.

**PROPOSED ACTIVITIES FOR FY 2013:** Implement the public participation process thru OARC. Begin the development of long range regional transportation planning.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$200,000	SPR	-0-	STATE
Estimated Cost FFY 2012	\$200,000	SPR	-0-	STATE
Projected Cost FFY 2013	\$250,000	SPR	-0-	STATE

### CONTACT INFORMATION

Laura Chaney, Transportation Manager I, 405-521-2705

## 1719 Statewide Transportation Improvement Program

**PURPOSE AND SCOPE:** To develop, administer and revise a financially-constrained federally funded transportation construction program for the State of Oklahoma in compliance with SAFETEA-LU and in cooperation with the FHWA, FTA, the four Metropolitan Planning Organizations (ACOG, INCOG, LMPO, and Frontier MPO), the Bureau of Indian Affairs, and Tribal Governments.

**ACCOMPLISHMENTS DURING FY 2012:** Developed the Statewide Transportation Improvement Program (STIP) for approval and implementation. The STIP webpage was revised to reflect the Amendments and Statewide Line Items. The FFY 2011 – 2014 STIP contains an Executive Introduction of the Transportation Commission; Explanation of STIP; Balancing Process including Clarification, Anticipated Revenues and Expenditures; Project Selection and Prioritization including Construction Program Maps by Division and Project Listing by Year; Transit Program including Project listing by Year; MPO TIPs; Indian Reservation Roads TIP; County Improvements for Roads and Bridges (CIRB); Federal Lands Program including Applications; ODOT Certification; Public Involvement Process including the *Procedures for Developing and Amending the STIP and TIP*.

The current STIP was administered through administrative modifications, statewide line items and amendments. All amendments to the STIP and TIPs were in accordance with the federally approved revised *Procedures for Developing and Amending the STIP and TIP*. The Process includes publication of proposed amendments for a minimum of 14 days for review and comment. The public involvement process was completed in accordance with TEA 21 and SAFETEA-LU, regarding publication of project amendments. Revised the Definitions included in the *Procedures for Developing and Amending the STIP and TIP* in coordination with the FHWA, FTA, and MPOs.

**PROPOSED ACTIVITIES FOR FY 2013:** Develop the FFY 2013-2016 Statewide Transportation Improvement Program (STIP) for approval and implementation. Continue administration of current STIP using currently approved procedures. Amend the FFY 2013 portion of the STIP based upon revision of the ODOT 8 Year Construction Work Plan.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$85,000	SPR	-0-	STATE
Estimated Cost FFY 2012	\$85,000	SPR	-0-	STATE
Projected Cost FFY 2013	\$85,000	SPR	-0-	STATE

### CONTACT INFORMATION

Dawn Borelli, Transportation Manager I, 405-521-6433

## 1902 Statewide Long Range Transportation Planning

**PURPOSE AND SCOPE:** To maintain the Statewide Intermodal Transportation Plan and other associated statewide planning activities in accordance with the provisions of MAP-21. To conduct and/or participate in the development of plans related to Improvement Studies and other activities identified in the Statewide Plan.

**ACCOMPLISHMENTS DURING FY 2012:** Managed contract for Statewide Plan with PB Americas Inc. Continued management of and oversaw completion of Transit Gap Study. Continued coordination and management of Freight Flow analysis and mapping study; the product will provide information on 2009 Freight Analysis Flow (FAF) truck data, waterborne cargo data and railroad waybill data. Continued review of projects and programs for consistency with Statewide Plan.

**PROPOSED ACTIVITIES FOR FY 2013:** Continue with Long Range Plan activities including completion of Freight Flow Study. Continue coordination with MPOs and other local governments in relation to long range transportation plans. Review new federal legislation, Moving Ahead for Progress in the 21st Century (MAP-21) and related regulations, in relation to Statewide Plan requirements.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$0	SPR	-0-	STATE
Estimated Cost FFY 2012	\$900	SPR	-0-	STATE
Projected Cost FFY 2013	\$2,000	SPR	-0-	STATE

### CONTACT INFORMATION

Linda Koenig, Transportation Planner, 405-522-0171

## 1903 Intelligent Transportation Systems Planning

**PURPOSE AND SCOPE:** Incorporate Intelligent Transportation Systems (ITS) into the transportation planning process in compliance with the provisions of Federal regulations [23 Code of Federal Regulations, Parts 655 and 940, Intelligent Transportation System (ITS) Architecture and Standards]. Use an ITS integration strategy by defining roles, responsibilities and shared operational strategies to address key policy and operational issues creating and / or updating the conceptual design for ITS within the planning area. Ensure the interoperability and institutional / technical integration of ITS efforts through compliance with ITS Statewide / Regional Architectures and related ITS standards. Also ensure that all transit, rail and waterways modes are included. Commercial vehicle operations are to be integrated into the statewide plan and architecture as well.

**ACCOMPLISHMENTS DURING FY 2012:** Oklahoma's CVO Program Plan and Top Level Design for CVISN Core and Expanded Deployment update on hold pending approval to proceed after federal audit hold. No activity on the Oklahoma ITS Plans or Architecture. No contracts for updates to ITS or CVISN.

**PROPOSED ACTIVITIES FOR FY 2013:** Via personal or corporate services contract with a qualified consultant, update the ITS documents for the Oklahoma Statewide, Oklahoma City Regional, Tulsa Regional, Frontier Regional, Lawton Regional, Commercial Vehicle, Transit, Rail, and Waterways ITS Plans and Architectures. Process contracts / invoices for the contract. Assist the consultant in the preparation of lists of relevant ITS stakeholders with other divisions, agencies and organizations.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$10,000	SPR	-0-	STATE
Estimated Cost FFY 2012	\$0	SPR	-0-	STATE
Projected Cost FFY 2013	\$125,000	SPR	-0-	STATE

### CONTACT INFORMATION

Ron F. Curb, Engineering Services Branch Manager, 405-522-3795

## 1904 Air Quality Planning

**PURPOSE AND SCOPE:** Monitor and participate in air quality transportation planning developments relating to requirements of the Clean Air Act Amendments and SAFETEA-LU. Represent the Department in air quality nonattainment and transportation conformity actions. Analyze and comment on air quality nonattainment and transportation regulations and laws. Maintain information flow to and from decision-makers regarding air quality/transportation issues, developments, regulations and laws. Continue staff education, training and attendance at workshops and seminars. Assist the Department to be a progressive participant in reducing the impacts of transportation-related pollution.

**ACCOMPLISHMENTS DURING FY 2012:** Participated in the air quality/transportation planning activities of Lawton, Association of Central Oklahoma Governments (ACOG), and Indian Nations Council of Governments (INCOG) Metropolitan Planning Organizations (MPO). Attended air quality meetings with partners at the Federal Highway Administration (FHWA) and Oklahoma Department of Environmental Quality. Researched and maintained resource materials on air quality/transportation issues; and reviewed and commented on MPO air quality education programs. Coordinated the planning process for air quality modeling funding and actions between the States, MPOs, ODOT and the ODEQ. Monitored regulations on National Ambient Air Quality Standards (NAAQS), Climate Change and Greenhouse Gas Emissions.

**PROPOSED ACTIVITIES FOR FY 2013:** Maintain research and participation in air quality/transportation issues, developments, regulations and laws. Assist in providing data for air quality modeling efforts. Continue to develop education materials and resources for Department personnel regarding air quality and transportation. Continue to monitor the air quality regulations and impact to the Department. Attend air quality/transportation planning activities of the Lawton, ACOG, and INCOG MPO. Participate in MPO and ODEQ air quality/transportation initiatives, educational programs, and efforts to reduce pollution. Continue partnership with INCOG and ACOG to enhance and extend data collection and modeling outside of the study areas to establish base data for air quality issues in rural/donut areas. Facilitate meetings of the Oklahoma Transportation Air Quality Work Group. Continue staff education through courses, seminars, and conferences.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$100,000	SPR	-0-	STATE
Estimated Cost FFY 2012	\$100,000	SPR	-0-	STATE
Projected Cost FFY 2013	\$100,000	SPR	-0-	STATE

### CONTACT INFORMATION

Laura Chaney, Transportation Manager I, 405-521-2705

## 1905 Freight Planning

**PURPOSE AND SCOPE:** To coordinate freight planning and freight analysis with the Long Range Transportation Plan, Oklahoma Statewide Freight and Passenger Rail Plan, and Statewide Transportation Improvement Program (STIP), and project development processes.

**ACCOMPLISHMENTS DURING FY 2012:** Coordination with the Statewide Intermodal Transportation Plan, Oklahoma Statewide Freight and Passenger Rail Plan, and STIP processes in addressing intermodal freight solutions for the State of Oklahoma. Completion of FHWA Freight Profile Assessment to define current freight focus and potential freight network gaps. Preparation of position paper discussing impact of Panama Canal Expansion on Oklahoma Highways. Preparation of updated maps for McClellan-Kerr Arkansas River Navigation System (MKARNS).

**PROPOSED ACTIVITIES FOR FY 2013:** Define Oklahoma portion of National Freight Network to include primary freight network, interstate system not on the primary freight network, and critical rural freight corridors in accordance with the Moving Ahead for Progress in the 21st Century Act (MAP-21) Act of 2012.

Conduct an intermodal freight needs assessment to include inventory of existing freight facilities and systems, identification of current and anticipated future freight issues and concerns (bottlenecks, safety, commodity growth, etc.), and description of freight system needs in coordination with Oklahoma Departments of Commerce, Agriculture, and other agencies as appropriate.

Continue review of Statewide Intermodal Transportation Plan and the Oklahoma Statewide Freight and Passenger Rail Plan policies and recommendations, and collaboration with STIP process in addressing freight solutions.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$8,500	SPR	-0-	STATE
Estimated Cost FFY 2012	\$2,500	SPR	-0-	STATE
Projected Cost FFY 2013	\$200,000	SPR	-0-	STATE

### CONTACT INFORMATION

Craig Moody, Transportation Manager II, 405-522-1465

## 1906 Rail Planning

**PURPOSE AND SCOPE:** To coordinate rail planning in the state in accordance with the recently approved Oklahoma Statewide Freight and Passenger Rail Plan (State Rail Plan) and relevant elements of MAP-21, as well as the forthcoming federal Rail Title that was not addressed as part of MAP-21.

**ACCOMPLISHMENTS DURING FFY 2012:** The Oklahoma Statewide Freight and Passenger Rail Plan was completed and approved by the Oklahoma Transportation Commission. The second of three phases of a Feasibility Study of Freight Rail Improvements from Shawnee, OK to McAlester, OK explored the concept of rehabilitating the currently out-of-service UPRR-owned rail line between the two cities.

**PROPOSED ACTIVITIES FOR FFY 2013:** Focus on implementing State Rail Plan recommendations to improve freight rail capacity. In particular, analyze need for upgrading to a heavier car standard and improving rural freight connectivity. (The national rail industry has begun adopting a heavier car standard of 286,000 lbs (286k) per car, up from 263,000 lbs per car. Under certain conditions, the 286k standard will improve capacity and efficiency for shippers, increase train speeds, save fuel, and reduce maintenance of the track.) Evaluate the need for Oklahoma short line rail operators to adopt a 286k rail car standard.

Continue study of the feasibility of freight rail improvements from Shawnee to McAlester. The study is looking at the cost to rehabilitate the rail line (including cost to borrow the funds), the potential users of the line and the income that could be generated, and the estimated time needed to pay back the funds borrowed for the improvements. The Study will conclude with a Business Plan for the Shawnee to McAlester freight rail operation. The Study is financed with contract funds established in 2011. Since contracts were fully funded, no additional funds are required for FFY 2013.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$0	SPR	-0-	STATE
Estimated Cost FFY 2012	\$ 0	SPR	-0-	STATE
Projected Cost FFY 2013	\$100,000	SPR	-0-	STATE

### CONTACT INFORMATION

Johnson Bridgwater, Rail Programs Division, 405-521-4203



## 1910 Public Involvement and Visualization Techniques

**PURPOSE AND SCOPE:** To develop and maintain a Public Participation Plan (PPP) to encourage full public participation in the transportation planning and programming process including the Statewide Transportation Improvement Plan (STIP), the Long Range Plan, and the National Environment Protection Act (NEPA) Process.

**ACCOMPLISHMENTS DURING FFY 2012:** Held several public meetings statewide. Visualization techniques were implemented utilizing 3-dimensional design, video, and animation and were incorporated into public outreach. The current ODOT Public Involvement web page was updated and improved. Successfully completed the public involvement plan for the updated STIP. Brought forward new methods for public outreach.

**PROPOSED ACTIVITIES FOR FFY 2013:** Provide for public involvement for environmental, planning and construction projects. Include special outreach to non-metropolitan public officials, and the traditionally underserved. Develop and improve upon presentation processes and techniques. Provide visualization of proposed projects for the STIP. Provide visualization of existing and proposed conditions for presentation to public and other agencies at public and stakeholders meetings for planning purposes. Update the current PPP.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$280,000	SPR	-0-	STATE
Estimated Cost FFY 2012	\$275,000	SPR	-0-	STATE
Projected Cost FFY 2013	\$285,000	SPR	-0-	STATE

### CONTACT INFORMATION

Frank Roesler, Transportation Manager, 405-521-2350

## 1911 Inventory of Depression Era Structures

**PURPOSE AND SCOPE:** Executive Order 11593 and Sections 106 and 110 of the National Historic Preservation Act require the identification and evaluation of historic properties that are under agency ownership or jurisdiction. This project will identify and evaluate Depression-era road-related resources in the State of Oklahoma. ODOT completed two previous studies and NRHP assessments of bridges in the state: *Spans of Time: Oklahoma Historic Highway Bridges* (1993) and a 2007 re-evaluation and update. The two studies are useful management tools as references for early planning and mitigation of potential adverse effects to these resources. Depression-era resources have become increasingly significant to the history of Oklahoma and it is necessary to incorporate them into transportation planning. Preliminary assessments indicate that WPA alone was involved in the construction of 2712 bridges and 50,306 culverts on Oklahoma's highway and county transportation system. The total number of Depression-era work relief resources in the state, however, is unknown.

**ACCOMPLISHMENTS DURING FY 2012:** Completed a Historic Context Study report. The context study is the first component of the statewide inventory of Depression-era bridges. The context report provides an understanding of the range and influence of work-relief programs in Oklahoma and presents information for interpreting the significance of bridges from this period. Research was conducted at ODOT, Oklahoma SHPO, Oklahoma Historical Society, and various other state and local repositories. A context report was produced that will be necessary for the evaluation of Depression-era bridges for eligibility to the National Register of Historic Places. Completed a National Register Criteria for Evaluation study and report. This study area report documents the features necessary for Depression-era bridges to be eligible for inclusion in the NRHP. Completed a "sample inventory" of on and off-system bridges at ODOT headquarters and in Divisions 2, 5, and 8 consisting of 50 bridges in each division. The sample inventory will be used to gauge the type of information available for Depression-era works programs bridges. This information will be used to assess the need for further research at the national level, should certain information be unavailable from divisions or headquarters.

**PROPOSED ACTIVITIES FOR FY 2013:** Use the information compiled from the FY 2012 reports and sample inventory to prepare a *complete inventory* of all Depression-era works programs bridges (on and off-system) in Oklahoma. Research at the National Archives may be necessary if information detailing the association of Oklahoma bridges to Depression-era federal aid programs is not available. Begin field investigations of all Depression-era works program bridges in Oklahoma and assess the eligibility for the NRHP using guidelines established in the Historic Context Study report and National Register Criteria for Evaluation study. The project will result in an inventory of Depression-era works programs resources throughout the state and recommendations for NRHP eligibility. The project will

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$400,000	SPR	-0-	STATE
Estimated Cost FFY 2012	\$297,602	SPR	-0-	STATE
Projected Cost FFY 2013	\$330,000	SPR	-0-	STATE

### CONTACT INFORMATION

Dawn Sullivan, Engineering Manager IV, 405-521-2927

**SPR PART 2 - RESEARCH, SPRY-0010(58)RS, JP# 01946(60)  
FEDERAL FISCAL YEAR 2013**

		<u>SPR</u>	<u>STATE</u>	<u>LOCAL</u>	<u>TOTAL</u>
<b>GENERAL ACTIVITIES</b>					
2100	Transportation Research Board	\$150,000.00			\$150,000.00
2115	Long Term Pavement Performance	\$5,000.00			\$5,000.00
2120	Technical Assistance - Special Studies	\$80,000.00			\$80,000.00
2130	General Research Activity	\$421,542.00			\$421,542.00
2160	Oklahoma Transportation Center	\$984,120.00			\$984,120.00
2700	Experimental Product Evaluation Program	\$20,000.00			\$20,000.00
<b>Total General Activities</b>		<b>\$1,660,662.00</b>			<b>\$1,660,662.00</b>
<b>ANNUAL RESEARCH PROJECTS</b>					
2103	Transportation Research Day	\$6,593.00			\$6,593.00
2102	Research Library Services	\$150,000.00			\$150,000.00
2156	Roadside Vegetation Management	\$219,971.00			\$219,971.00
2157	Herbicide Research Program	\$78,344.00			\$78,344.00
<b>Total Annual Research Projects</b>		<b>\$454,908.00</b>			<b>\$454,908.00</b>
<b>CONTINUING RESEARCH PROJECTS</b>					
2200	Instrumented Pavement Construction	\$275,000.00			\$275,000.00
2208	Development and Implementation of an MEPDG for Rigid Pavements Ph II	\$148,176.00			\$148,176.00
2228	Overtuning Forces at Bridge Abutments	\$86,122.00			\$86,122.00
2231	Stainless Steel Reinforcement as a Replacement for Epoxy Coated Steel	\$35,107.00			\$35,107.00
2235	Distress Modeling for DARWin-ME, Phase I	\$96,079.00			\$96,079.00
2236	Drying Shrinkage Problems in High PI Subgrade Soils	\$90,204.00			\$90,204.00
2237	Reduction in Storm Water Runoff	\$92,465.00			\$92,465.00
2239	Develop Draft Chip Seal Cover Aggregate Specifications Based on AIMS Test	\$85,810.00			\$85,810.00
2240	Portable WIM for Pavement Design	\$89,340.00			\$89,340.00
2241	Real-Time Monitoring of Slope Stability in Eastern Oklahoma	\$113,912.00			\$113,912.00
<b>Total Continuing Research Projects</b>		<b>\$1,112,215.00</b>			<b>\$1,112,215.00</b>
<b>NEW RESEARCH PROJECTS</b>					
2243	Recommended Fatigue Test for Oklahoma DOT	\$132,749.00			\$132,749.00
2244	Field Verification of Geogrid Properties for Base Course Reinf. Applications	\$100,000.00			\$100,000.00
2245	Fatigue Performance of Asphalt Pavements Containing RAS and RAP	\$109,421.00			\$109,421.00
2246	Performance Evaluation of Asph. Pvmnts Constr Using Intelligent Compact.	\$122,199.00			\$122,199.00
2247	Energy Dissipation in 12' Broken-Back Culverts	\$99,800.00			\$99,800.00
2248	Creep Compliance and Percent Recovery of OK Cert. Binders Using MSCR	\$104,586.00			\$104,586.00
2249	Black Ice Detection and Road Closure Control System for Oklahoma	\$108,326.00			\$108,326.00
2250	Vehicle Classifications with Focus on Motorcycles	\$86,568.00			\$86,568.00
2251	3D Laser Imaging for ODOT Interstate Network at True 1-mm Resolution	\$117,771.00			\$117,771.00
<b>Total New Research Projects</b>		<b>\$981,420.00</b>			<b>\$981,420.00</b>
<b>Grand Total SPRY-0010(52)RS</b>		<b>\$4,209,205.00</b>			<b>\$4,209,205.00</b>
<b>FFY 2012 JOINT ODOT/OKTC INTERAGENCY AGREEMENT PROJECTS Item 2160</b>					
2160	Investigation of Optimized Graded Concrete for Oklahoma	\$92,274.00			\$92,274.00
2160	Evaluation of the Enhanced Integrated Climatic Model	\$91,382.00			\$91,382.00
2160	Interpretation of In Situ Tests as Affected by Soil Suction	\$92,626.00			\$92,626.00
2160	Prototype Reinforced Soil Embankment for Reconstruction of US-62 Slope Failure	\$99,998.00			\$99,998.00
2160	The Effects of Soil Suction on Shallow Slope Stability	\$107,840.00			\$107,840.00
<b>Total ODOT/OKTC 2160 Projects</b>		<b>\$484,120.00</b>			<b>\$484,120.00</b>
<b>POOLED FUND STUDIES</b>					
TPF-5(408)	NCHRP	\$661,508.00			\$661,508.00
Sol. 1329	Next Generation Concrete Pavement Road Map	\$15,000.00			\$15,000.00
Sol. 1330	2014 Asset Management Conference and Training on Implementation	\$10,000.00			\$10,000.00
TPF-5(099)	Evaluation of Low Cost Safety Improvements	\$30,000.00			\$30,000.00
TPF-5(159)	Technology Transfer Concrete Consortium	\$10,500.00			\$10,500.00
TPF-5(165)	Whitetopping Design Procedure	\$12,500.00			\$12,500.00
TPF-5(197)	The Impact of Wide-Base Tires on Pavement Damage: A National Study	\$25,000.00			\$25,000.00
TPF-5(209)	Support of the Transportation Curriculum Coordination Council (TCCC)	\$20,000.00			\$20,000.00
TPF-5(231)	ITS Pooled Fund Program (ENTERPRISE)	\$30,000.00			\$30,000.00
TPF-5(232)	Study of the Impacts of Implements of Husbandry on Bridges	\$10,000.00			\$10,000.00
TPF-5(243)	Motorcycle Crash Causation Study	\$50,000.00			\$50,000.00
TPF-5(255)	Highway Safety Manual Implementation	\$25,000.00			\$25,000.00
TPF-5(256)	HY-12 Storm Drain Hydraulic Analysis Program - Phase Two of Development	\$10,000.00			\$10,000.00
TPF-5(267)	Accelerated Performance Testing on the 2012 NCAT Pavement Test Track	\$370,000.00			\$370,000.00
TPF-5(269)	Development of an Improved Design Procedure for Unbonded Concrete	\$20,000.00			\$20,000.00
<b>Total Pooled Fund Projects</b>		<b>\$1,299,508.00</b>			<b>\$1,299,508.00</b>
<b>Total Research Funding</b>		<b>\$5,508,713.00</b>			<b>\$5,508,713.00</b>

**ENDING RESEARCH PROJECTS**

2218	QCQA Testing Differences Between HMA & WMA - "Foamed Asphalt"	\$0.00	\$0.00
2219	Evaluation of the Effectiveness of ODOT's Cable Barrier Program	\$0.00	\$0.00
2226	Hamburg Rut Tester for Field Control of HMA - "Use of MIST"	\$0.00	\$0.00
2227	Applied Approach Slab Settlement Research	\$0.00	\$0.00
2229	Expected Life of Silanes	\$0.00	\$0.00
2230	Effect of Y-Cracking on CRCP Performance	\$0.00	\$0.00
2234	Energy Dissipation in 18' Broken-back Culverts	\$0.00	\$0.00
2238	New Asphalt Mix Design Program for ODOT	\$0.00	\$0.00
2242	Efficacy of Road Bond and Condor as Soil Stabilizers	\$0.00	\$0.00

**RECENTLY COMPLETED RESEARCH PROJECTS**

2188	Vegetative Rehabilitation of Highway Cut Slopes in Eastern Oklahoma	\$0.00	\$0.00
2217	Development of Best Practices Program for a Collaboration of Minority Truckers	\$0.00	\$0.00
2220	Development of ODOT Guidelines for Use of Geogrids in Aggregate Bases	\$0.00	\$0.00
2223	Test Methods for Use of Recycled Asphalt Pavement in Asphalt Mixes	\$0.00	\$0.00
2232	Next Generation Smart Barrel System for Workzone Safety Enhancement	\$0.00	\$0.00

**ACTIVE AND PAID POOLED FUND STUDIES**

TPF-5(063)	Improving the Quality of Pavement Profiler Measurement	\$0.00	\$0.00
TPF-5(117)	Development of Performance Properties of Ternary Mixes	\$0.00	\$0.00
TPF-5(145)	Western Maintenance Partnership	\$0.00	\$0.00
TPF-5(174)	Construction of Crack-Free Bridge Decks, Phase II	\$0.00	\$0.00
TPF-5(187)	Updating U.S. Precipitation Frequency Estimates for the Midwestern Region	\$0.00	\$0.00
TPF-5(195)	Core Program Services for a Highway RD&T Program - FFY 2009 (TRB FY 2010)	\$0.00	\$0.00
TPF-5(205)	Impl. of Conc. Pave. Mix. Des. & Analysis (MDA) Track of Conc. Pavement Road	\$0.00	\$0.00
TPF-5(208)	Accelerated Performance Testing on the 2009 NCAT Pavement Test Track	\$0.00	\$0.00
TPF-5(229)	Characterization of Drainage Layer Properties for MEPDG	\$0.00	\$0.00
TPF-5(251)	Relative Operational Performance of Geosynthetics Used as Subgrade	\$0.00	\$0.00

**PAID AND ENDED IN 2013 POOLED FUND STUDIES**

SPR-2(134)	Test and Evaluation of Bridge Rails and Transitions	\$0.00	\$0.00
SPR-2(173)	Adhesion Criteria Between Water-Based Inorganic Coatings and Their Topcoats	\$0.00	\$0.00
SPR-2(176)	Validation of SHRP Asphalt and Asphalt Mixture Specifications Using Accelerate	\$0.00	\$0.00
SPR-2(191)	Public Service Campaign - Work Zones	\$0.00	\$0.00
SPR-2(800)	SHRP Implementation Asphalt Test Equipment	\$0.00	\$0.00
TPF-5(008)	Development of Computer-Based Training (CBT) Lessons Study	\$0.00	\$0.00
TPF-5(036)	Transportation Asset Management Research Program	\$0.00	\$0.00
TPF-5(184)	Investigation of Highway Asset Inventory and Data Collection Methods	\$0.00	\$0.00

## 2100 Transportation Research Board Core Program

**PURPOSE AND SCOPE:** This item will cover TRB subscription costs, travel expenses and time for ODOT personnel to attend the annual TRB meeting.

**ACCOMPLISHMENTS DURING FFY 2012:** Attended annual TRB meeting.

**PROPOSED ACTIVITIES FOR FFY 2013:** Attend annual TRB meeting.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$5,000	SPR	-0-	STATE
Estimated Cost FFY 2012	\$5,000	SPR	-0-	STATE
Projected Cost FFY 2013	\$150,000	SPR	-0-	STATE

### CONTACT INFORMATION

ODOT Planning and Research Div. Engineer: 405-521-2175

## 2102 Research Library Services

**PURPOSE AND SCOPE:** Provide the Oklahoma Department of Transportation (ODOT) and customers with an information clearinghouse. The primary goals are to allow for a sound, progressive, flexible library available to ODOT and Oklahoma Transportation Center's university personnel statewide and to keep them informed of recent innovations in transportation technology, methodologies and programs. Aligning with this is the goal of providing proficient systematic searches of all resources when requested. Additional services are aimed at providing ODOT with editing and publishing capabilities to assist the Planning & Research Division in generating and distributing reports and publications.

**ACCOMPLISHMENTS DURING FFY 2012:** Provided transportation information, services and updates to ODOT and other state universities; developed procedures to enhance services and accessibility to Transportation Library resources by ODOT and Oklahoma Transportation Center's university personnel; began converting and implementing the Paradox 10 Database System to the Library of Congress System; reproduced, bound and distributed research reports as required; retrieved new publications, reports and various documents from ODOT for Library inclusion; distributed and delivered documents as requested; produced progress reports; submitted FFY 2011 Annual Report; FFY 2012 Annual Report submission is pending.

**PROPOSED ACTIVITIES FOR FFY 2013:** Continue to contract with Langston University (LU) to provide current information, publications, articles, services and updates to ODOT, other state universities and transportation industry entities; maintain data base of pertinent resources for each information category; perform literature and information searches both electronically and manually as requested; coordinate and distribute research information, executive summaries, surveys, reports and journals to ODOT personnel; maintain records and track borrowed materials; continue to conduct data entry in the Paradox system and/or Library of Congress system of publications; retrieve and deliver research materials between ODOT and LU; continue to convert the Paradox system to a Library of Congress system; perform report reproduction, binding and distribution as documents become available; produce progress reports; submit FFY 2013 Annual Report.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012 (Yr 1 of 1)	\$150,000	SPR	-0-	STATE
Estimated Cost FFY 2012	\$150,000	SPR	-0-	STATE
Projected Cost FFY 2013 (Yr 1 of 1)	\$150,000	SPR	-0-	STATE

### CONTACT INFORMATION

Principal Investigator: Wilson B. Brewer, Langston University, 405-521-1379

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

## **2103 Transportation Research Day Technical Support Services**

**PURPOSE AND SCOPE:** To provide technical assistance in preparing for and organizing the Oklahoma Department of Transportation (ODOT) & Oklahoma Transportation Center (OkTC) Transportation Research Day program activities.

**ACCOMPLISHMENTS DURING FFY 2012:** Assisted ODOT, OkTC, OU and OSU in planning, preparations & organization of the 2011 Transportation Research Day program; assisted with the solicitation of project presentation speakers; assisted with lobby poster presentations; generated and submitted attendee list for future Transportation Research Day invitations and problem statement/ideas solicitation; produced progress reports; submitted FFY 2011 Annual Report; FFY 2012 Annual Report submission is pending.

**PROPOSED ACTIVITIES FOR FFY 2013:** Assist ODOT and OkTC in all areas of the ODOT/OkTC Transportation Research Day event where needed including attendance in necessary pre-event meetings, providing easels for poster presentations, assistance in tables & chairs set up and take down for snack areas and luncheon, assisting with attendee sign in and name tags and all other areas where assistance may be needed.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012 (Yr 1 of 1)	\$14,865	SPR	-0-	STATE
Estimated Cost FFY 2012	\$14,865	SPR	-0-	STATE
Projected Cost FFY 2013 (Yr 1 of 1)	\$6,593	SPR	-0-	STATE

### **CONTACT INFORMATION**

Principal Investigator: Wilson B. Brewer, Langston University, 405-521-1379

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

## 2115 Long Term Pavement Performance

**PURPOSE AND SCOPE:** The purpose of this project is to maintain LTPP test sites, markings and current status, report maintenance to Southern Region Contract Office (SRCO), assist SRCO with data gathering as necessary, act as general liaison between SRCO and ODOT. Maintain working knowledge related to SHRP product implementation, act as general liaison between FHWA and ODOT for product implementation activities.

**ACCOMPLISHMENTS DURING FFY 2012:** Performed annual site investigation observations and reported findings; replaced pavement markings for all in-study sections across the state; assisted SRCO in traffic control and testing at section 404157 at Wagoner / Mayes County line; monitored construction project in section 404157 at Wagoner / Mayes County line for effects on future testing; assist in traffic control and testing at 9 other site locations statewide; replaced all missing and damaged signs on section Right-of-Way; removed all signing from sections that have been taken out of study.

**PROPOSED ACTIVITIES FOR FFY 2013:** Perform annual site investigation observations and report findings; obtain information from the SRCO for specific continued data collection locations, as well as, sites recently removed from the LTPP study; arrange for continued testing plans and monitoring of current SPS and GPS site locations in Oklahoma during spring 2013.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$5,000	SPR	-0-	STATE
Estimated Cost FFY 2012	\$5,000	SPR	-0-	STATE
Projected Cost FFY 2013	\$5,000	SPR	-0-	STATE

### CONTACT INFORMATION

ODOT Field Research Manager: Bryan Cooper, 405-736-9475



## 2120 Technical Assistance Special Studies

**PURPOSE AND SCOPE:** Provide ongoing technical support or special investigations to the Department when a full-scale research project is not warranted or when a quick turnaround is required.

**ACCOMPLISHMENTS DURING FFY 2012:** Provided support for the Department with assistance and equipment in special investigations, and other activities where needed; prepared and executed "Reading the Road" course presentation from annual LTAP Region VI meeting to ODOT Data Collections Branch during annual retreat; performed pipe inspections at 3 locations in Weatherford, OK, ODOT Division V; performed site investigations and collected photographic documentation at Hereford Lane Bridge rehab project in Pittsburg County, OK and SH-82 landslide project in LeFlore County, OK associated with current SP&R research projects; collected still photographs for various in-house and SP&R research projects; assisted Materials Division personnel in the purchase of MIT-Scan equipment and monitored implementation; continued to consult with ODOT staff to address situations where further technical support may be needed.

**PROPOSED ACTIVITIES FOR FFY 2013:** Continue to provide support for the Department with assistance and equipment in special investigations, storm drain inspections, bridge deck testing, pavement testing, traffic control and any other activities or services as requested; acquire, calibrate, test and/or compare new equipment or instruments to existing equipment or instruments where necessary.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$80,000	SPR	-0-	STATE
Estimated Cost FFY 2012	\$80,000	SPR	-0-	STATE
Projected Cost FFY 2013	\$80,000	SPR	-0-	STATE

### CONTACT INFORMATION

ODOT Field Research Manager: Bryan Cooper, 405-736-9475

## 2130 General Research Activities

**PURPOSE AND SCOPE:** This activity covers various research activities which are necessary for the operation of a research section but which cannot be accurately included in other projects. Examples of this type of activity include: attending quality task force meetings; writing work plans for emerging research projects which have not been assigned an item number when the work plan is written; reviewing research reports; meeting with university and private researchers regarding proposed projects; attending industry seminars, conferences, etc. This item also covers costs of various professional services contracts for research projects which fill needs of the Department but were not foreseen when the SPR budget was written and therefore were not included as separate items. This may include special technical assistance on multiple projects, and providing matching funds for leveraging research program funds, such as, OCAST/IDEA programs for research significant to the Department. This activity would also include routine maintenance of the ODOT Planning & Research internet and intranet websites.

**ACCOMPLISHMENTS DURING FFY 2012:** Solicited ODOT subject matter experts, Field Division personnel and university staff for new research ideas and problem statements for possible FFY 2013 research project funding; coordinated and carried out two Research Advisory Committee (RAC) meetings; received and compiled 25 new research problem statements; reviewed 10 new research ideas and/or problem statements for priority ranking; generated and posted 8 FFY 2013 Request for Proposals (RFP's) for research proposal submissions; reviewed 18 new research proposals submitted for possible FFY 2013 project funding; discussed proposed project work with researchers and ODOT subject matter experts; awarded and prepared 11 continuing research contract modifications for FFY 2013; awarded 4 annual research projects for FFY 2013 and prepared research contracts for each; awarded 10 new FFY 2013 research projects and prepared research contracts for each; awarded and prepared 5 no cost time extension contract modifications for FFY 2012; awarded and prepared 2 FFY 2012 research contracts for SP&R item numbers 2208 (Phase II) and SP&R 2242 that were not foreseen when the FFY 2012 SP&R work plan was being generated; organized initiation and final SP&R project meetings; performed technical reviews of final SP&R research project reports for formatting and ADA compliance; prepared Part 2 of the FFY 2013 SP&R Work Program.

**PROPOSED ACTIVITIES FOR FFY 2013:** Solicit for new research ideas for possible FFY 2014 research project funding; coordinate two RAC meetings for review of new FFY 2014 research ideas and proposals; generate FFY 2014 RFP's; generate FFY 2014 research project contracts and modifications; organize initiation and final project meetings; continue to perform technical review of final research project reports for required formatting and ADA compliance; make funds available for various research contracts/activities which may not be foreseen while this work plan and budget is being prepared; prepare Part 2 of the FFY 2014 SP&R Work Program.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$350,000	SPR	-0-	STATE
Estimated Cost FFY 2012	\$350,000	SPR	-0-	STATE
Projected Cost FFY 2013	\$421,542	SPR	-0-	STATE

### CONTACT INFORMATION

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

## **2156 Roadside Vegetation Management Training & Consultation Program**

**PURPOSE AND SCOPE:** The objectives of this program are to 1. Conduct yearly herbicide applicator certification schools related to Roadside Vegetation Management (RVM); 2. Collect and maintain accurate records of attendance of both certified and noncertified ODOT personnel; 3. Provide ODOT personnel with technical consultation on an 'as needed' basis; 4. Conduct calibration workshops to train newly hired and/or newly Certified ODOT applicators; 5. Assist ODOT Maintenance and Purchasing personnel in maintaining the Approved Herbicide & Adjuvant List (AHAL); 6. Provide the ODOT Maintenance Division and the State of Oklahoma Department of Central Services (DCS) personnel with technical expertise on herbicides and spray adjuvants.

**ACCOMPLISHMENTS DURING FFY 2012:** Conducted and completed Annual Pesticide Applicator Certified Training and Continuing Education Applicator Workshops for all ODOT field divisions and maintained records on all ODOT certified applicators; provided consultation to ODOT office and field personnel as needed; conducted Sprayer Equipment inspection and calibration workshops; assisted ODOT in maintaining and producing an updated AHAL; assisted ODOT in Statewide Herbicide Contract review; collected digital photographs of implementation demonstration plots; attended the Oklahoma Vegetation Management Association "National Southern Weeds Science" meeting and the "National Roadside Vegetation Management Association" meeting; produced project progress reports; completed and produced 5 FFY 2011 comprehensive research reports; 5 FFY 2012 comprehensive report submissions are pending.

**PROPOSED ACTIVITIES FOR FFY 2013:** Conduct Annual Pesticide Applicator Certified Training and Continuing Education Applicator Workshops for all ODOT field divisions and maintain records on all ODOT certified applicators; provide as needed consultation to ODOT office and field personnel; complete Herbicide Application and Equipment Calibration Workshops for new employees; assist ODOT in maintaining the AHAL; assist ODOT in Statewide Herbicide Contract review; produce project progress reports; produce 5 FFY 2013 comprehensive reports as proposed.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012 (Yr 1 of 1)	\$200,997	SPR	-0-	STATE
Estimated Cost FFY 2012	\$200,900	SPR	-0-	STATE
Projected Cost FFY 2013 (Yr 1 of 1)	\$219,971	SPR	-0-	STATE

### **CONTACT INFORMATION**

Principal Investigator: Dennis Martin, Oklahoma State University, 405-744-5419

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

Project Sponsor: Luis Malave, ODOT Maintenance Division, 405-521-2557

## 2157 Herbicide Research Program

**PURPOSE AND SCOPE:** The objectives of this program are to 1. Evaluate new herbicide active ingredients and new generic formulations of existing active ingredients for potential integration into existing ODOT Roadside Vegetation Management (RVM) programs or inclusion in the Approved Herbicide & Adjuvant List (AHAL); 2. To evaluate new or reformulated herbicides and drift control products for their compatibility with commonly-used ODOT herbicide treatments.

**ACCOMPLISHMENTS DURING FFY 2012:** Completed evaluations of new and generic herbicide formulations for integration into the ODOT RVM programs and implemented findings in winter CEU Training Workshops, as well as, in the AHAL; completed evaluation of adjuvants and recommended herbicides for tank mix compatibility and included findings into the AHAL; constructed research test plots and completed field experiments, data collection and analysis; collected digital photographs of each plot treatment; conducted semi-annual meeting; produced project progress reports; completed and produced 2 FFY 2011 Annual Reports; submission of 2 FFY 2012 Annual Reports is pending.

**PROPOSED ACTIVITIES FOR FFY 2013:** Continue to perform evaluations of new and generic herbicide formulations for integration into the ODOT RVM) programs and implemented findings in winter CEU Training Workshops; complete evaluation of adjuvants and recommended herbicides for tank mix compatibility and included findings into the AHAL; construct research test plots and complete field experiments, data collection and analysis and collect digital photographs of each plot treatment; produce project progress reports; complete and produce 2 FFY 2013 Annual Reports as proposed.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012 (Yr 1 of 1)	\$69,349	SPR	-0-	STATE
Estimated Cost FFY 2012	\$69,300	SPR	-0-	STATE
Projected Cost FFY 2013 (Yr 1 of 1)	\$78,344	SPR	-0-	STATE

### CONTACT INFORMATION

Principal Investigator: Dennis Martin, Oklahoma State University, 405-744-5419

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

Project Sponsor: Luis Malave, ODOT Maintenance Division, 405-521-2557

## 2160 Oklahoma Transportation Center

**PURPOSE AND SCOPE:** The Oklahoma Transportation Center (OkTC) is a nationally-designated University Transportation Center (UTC) composed of researchers at the University of Oklahoma, (OU) Oklahoma State University, (OSU) and Langston University (LU). Research personnel in this organization have expertise and experience covering a wide range of transportation-related topics. The purpose of this item is to coordinate and contract research activities covering various topics on behalf of ODOT and to provide matching funds to OkTC.

**ACCOMPLISHMENTS DURING FFY 2012:** Supported OkTC with \$467,564 towards research project matching funds; provided new list of ranked topics for OkTC “pull” project solicitation; began a mix of 5 transportation research projects through a joint ODOT/OSU interagency agreement and served as co-sponsor for each; continued to participate in board and committee meetings; provided ODOT expert review of research reports; assisted select reviewers and participated in proposal review processes; participated in initial, semi-annual and final project meetings; OkTC provided ODOT with research project progress reports and Annual Reports for all jointly funded projects.

**PROPOSED ACTIVITIES FOR FFY 2013:** Continue support of OkTC; continue to participate in board and committee meetings; assist select reviewers and oversee proposal review process; provide ODOT expert review of research reports; participate in initial, semi-annual and final project meetings where required; OkTC will provide ODOT with project progress reports, Annual Reports, as well as, Draft and Final Reports for all jointly funded projects where necessary.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$967,564	SPR	-0-	STATE
Estimated Cost FFY 2012	\$467,564	SPR	-0-	STATE
Projected Cost FFY 2013	\$984,120	SPR	-0-	STATE

### CONTACT INFORMATION

OkTC Executive Director: Tony Dark, 918-527-3275

ODOT Contact: Planning & Research Division Engineer, 405-521-2175

## **2188 Vegetative Rehabilitation of Highway Cut Slopes**

**PURPOSE AND SCOPE:** The purpose of this project is to develop improved vegetation specifications to be used on relatively steep slopes. Areas of moderate to severe erosion are occurring on highway rights of way in Eastern Oklahoma. Silt resulting from this erosion is filling ditch bottoms causing drainage problems. The answer to these recurring problems is to vegetate the erosive areas so that the soil remains on the slope and out of the drainage system. This is intended to be a five-year research project during which time, soil amendments, plant species, planting methods, planting dates, planting rates, mulches, mulch rates and application methods which demonstrate the most success will be identified. These will then be incorporated into improved vegetation specifications.

**ACCOMPLISHMENTS DURING FFY 2012:** Completed and produced Final Report.

**PROPOSED ACTIVITIES FOR FFY 2013:** End of project.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	-0-	SPR	-0-	STATE
Estimated Cost FFY 2012	-0-	SPR	-0-	STATE
Projected Cost FFY 2013	-0-	SPR	-0-	STATE

### **CONTACT INFORMATION**

Principal Investigator: Randy King, USDA/NCRS, 479-675-5182

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

Project Sponsor: Vincent G. Reidenbach, Geotechnical Engineer, 405-522-4998

## 2200 Instrumented Pavement Construction - Phase 2

**PURPOSE AND SCOPE:** Conduct instrumented pavement research to collect and analyze mechanistic-empirical pavement design data on I-35 in McClain County, Oklahoma in an accelerated manner. Field Division 3 will construct an 800' flexible pavement test section. The National Center for Asphalt Technology (NCAT) will purchase equipment and install pavement monitoring instrumentation of test section. The University of Oklahoma (OU) will conduct monitoring and modeling of the test section over a five year period.

**ACCOMPLISHMENTS DURING FFY 2012:** Continued weekly visual observation and data collection; performed comparison of observed and predicted fatigue behaviors; ran prediction and measurement of rut values for increased ESALs; captured increased rutting during summer months; monitored pavement distress including the formation of pot holes that are likely with freeze-thaw cycles; documented five-year data and field performance of the test section; produced project progress reports; completed and produced FFY 2011 Annual Report; Phase 1 Final Report submission is pending.

**PROPOSED ACTIVITIES FOR FFY 2013:** Continue weekly downloading and processing of traffic data; continue quarterly field testing and processing of data; continue to update rut prediction models and compare predicted and measured ruts; collect block samples and cores and conduct laboratory testing; perform distress modeling using MEPDG software; produce project progress reports; prepare and submit FFY 2013 Annual Report.

**NOTE:** \$53,690.00 has been allocated for the FFY 2013 "Projected Cost", while \$221,310 has been allocated for the full depth replacement of the pavement section at the completion of this study.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012 (Yr 1 of 1)	\$51,544	SPR	-0-	STATE
Estimated Cost FFY 2012	\$51,500	SPR	-0-	STATE
Projected Cost FFY 2013 (Yr 1 of 2)	\$275,000	SPR	-0-	STATE

### CONTACT INFORMATION

Principal Investigator: Musharraf Zaman, University of Oklahoma, 405-325-2626

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

Project Sponsor: Jeff Dean, ODOT Pavement Design Engineer, 405-522-0988

**2207 Validation and Refinement of Chemical Stabilization Procedures for Pavement Subgrade Soils in Oklahoma**

**PURPOSE AND SCOPE:** The goal of this research project is to assist the state in validating and improving the recommendations of OHD L-50 "Soil Stabilization Mix Design Procedure." The proposed research will primarily focus on AASHTO Soil Group Classifications falling under the fine-grained soil category (i.e. A-4 to A-7). It is expected that the results of testing on fine-grained soils may be intuitively extended to address variability found in fines of the A-2 soil class. Granular soils in the A-1 category and fine sandy soils of the A-3 category are not included in this proposal. In addition to the exclusions mentioned above, soils containing appreciable levels of sulfate will be excluded as these soils are not recommended for stabilization using calcium-based chemical additives. Note: a current research project at OU, funded through OTC, is focused on determining threshold levels of soluble sulfates that cause adverse behavior in chemically treated Oklahoma soils. Soils used in the currently proposed research will be subjected to soluble sulfate testing and current research on sulfate soils will help to guide the selection of suitable soil candidates for the proposed research.

**ACCOMPLISHMENTS DURING FFY 2012:** Completed and produced Volume II Final Report.

**PROPOSED ACTIVITIES FOR FFY 2013:** End of project.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	-0-	SPR	-0-	STATE
Estimated Cost FFY 2012	-0-	SPR	-0-	STATE
Projected Cost FFY 2013	-0-	SPR	-0-	STATE

**CONTACT INFORMATION**

Principal Investigator: Amy B. Cerato, University of Oklahoma, 405-325-5625

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

Project Sponsor: Jeff Dean, ODOT Pavement Design Engineer, 405-522-0988



## **2208 Development and Implementation of a Mechanistic and Empirical Pavement Design Guide (MEPDG) for Rigid Pavements—Phase II**

**PURPOSE AND SCOPE:** ODOT intends to use the DARWin-ME as the standard method to analyze the capacity of concrete pavements for new construction. However, the default values for the material properties used in the MEPDG may not be appropriate for the materials and construction practices that are common in Oklahoma. Because of this, it is suggested in the MEPDG manual that testing be completed to determine these values for local materials. The research for Phase II of this project aims to provide these inputs and to therefore improve the analysis results of the MEPDG. This would allow a greater economy and improvement in the predicted performance for ODOT designs for rigid pavement. This research will provide several new tools that can assist ODOT to design and specify a high quality concrete pavement product at an economical price.

**ACCOMPLISHMENTS DURING FFY 2012:** Instrumented a new CRCP pavement section; obtained data from LTPP sites in Oklahoma and compared to measured values; continued to investigate the impact of different curing methods on the curling and warping of concrete pavements; continued to characterize different pavement mixtures used in Oklahoma; produced project progress reports; submitted FFY 2011 Annual Report; Phase I Final Report submission is pending; FFY 2012 Annual Report submission is pending.

**PROPOSED ACTIVITIES FOR FFY 2013:** Continue to monitor instrumented CRCP pavement section and collect data; continue to obtain data from LTPP sites in Oklahoma and compared to measured values; resume investigations of the impact of different curing methods on the curling and warping of concrete pavements; perform a comparison of DARWin-ME predicted performance and actual field performance; begin an investigation of DARWin-ME adjustments for local calibration factors; continue to characterize different pavement mixtures used in Oklahoma; produce project progress reports; prepare and submit FFY 2013 Annual Report.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012 (Yr 1 of 3)	\$43,567	SPR	-0-	STATE
Estimated Cost FFY 2012	\$7,100	SPR	-0-	STATE
Projected Cost FFY 2013 (Yr 2 of 3)	\$148,176	SPR	-0-	STATE

### **CONTACT INFORMATION**

Principal Investigator: Tyler Ley, Oklahoma State University, 405-744-5257

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

Project Sponsor: Jeff Dean, ODOT Pavement Design Engineer, 405-522-0988

**2217 Development of Best Practices Program  
for a Collaboration of Minority Truckers**

**PURPOSE AND SCOPE:** The ODOT Regulatory Services Office has an efficient certification program, however, they cannot require the large prime contractors to utilize small minority subcontractors when it is not cost effective. This research will focus on assisting the disadvantaged business enterprise (DBE) Certification program to evaluate and develop processes and training to eliminate challenges DBE firms face. Research will reveal if, by pooling resources, DBE truckers can achieve an effective economy of scale by operating together more efficiently at a lower costs than they could individually which will eventually make their bids more attractive to prime contractors. Langston University will aid in the development of a collaborative venture of minority truckers that will address both availability and capacity shortcomings which will enhance DBE participation in ODOT contracts. Ultimately the research findings can be duplicated and used for other DBE transportation related businesses.

**ACCOMPLISHMENTS DURING FFY 2012:** Completed and produced FFY 2011 Final Report.

**PROPOSED ACTIVITIES FOR FFY 2013:** End of project.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	-0-	SPR	-0-	STATE
Estimated Cost FFY 2012	-0-	SPR	-0-	STATE
Projected Cost FFY 2013	-0-	SPR	-0-	STATE

**CONTACT INFORMATION**

Principal Investigator: Wilson B. Brewer, Langston University, 405-521-1379

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

Project Sponsor: Susan McClune, ODOT Regulatory Services, 405-521-6046

## **2218 QCQA Testing Differences Between Hot Mix Asphalt and Warm Mix Asphalt**

**PURPOSE AND SCOPE:** The objectives of this study are to develop testing protocols for the different WMA additives for mix design and QC/QA procedures. For mix design, testing protocols need to be developed for rut testing and moisture sensitivity testing. For QC/QA, protocols need to be developed for lab-molded void properties and asphalt content. To meet the objectives, equivalent compaction temperatures and/or compactive efforts need to be established for WMA additives. Once this is established, the effect of WMA additives on lab-molded volumetric results from Superpave Gyratory Compactor (SGC) samples (QC/QA properties) and mix design results (moisture sensitivity and rutting) could be determined. If properties/results differ significantly from those obtained from the same conventional HMA mix, standard testing protocols using the SGC would be developed that would provide test results consistent with conventional HMA test results. Test protocols could be dependent upon the specific WMA technology. The proposed research is essential in formulating the design requirements necessary to write new QC/QA specifications and mix design tests that will produce quality WMA, allowing full implementation of this new technology.

**ACCOMPLISHMENTS DURING FFY 2012:** Continued to gather and obtain materials; determined mix design equivalent laboratory compaction temperatures; performed lab-molded void testing; performed rut depth tests; performed moisture sensitivity testing, (AASHTO T 283); executed and evaluated laboratory produced foamed WMA and compared results to the QC/QA procedures developed from the previous 2 year project; recommended changes for foam WMA; produced project progress reports; submitted FFY 2011 Annual Report; Final Report submission is pending.

The PI has requested a 3 month No Cost Time Extension for continued project operations and the completion of the Final Report.

**PROPOSED ACTIVITIES FOR FFY 2013:** None.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012 (Yr 1 of 1)	\$78,397	SPR	-0-	STATE
Estimated Cost FFY 2012	\$78,300	SPR	-0-	STATE
Projected Cost FFY 2013	-0-	SPR	-0-	STATE

### **CONTACT INFORMATION**

Principal Investigator: Steve Cross, Oklahoma State University, 405-744-7200

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

Project Sponsor: Kenneth Hobson, Bituminous Engineer, 405-521-2677

## **2219 Evaluation of the Effectiveness of ODOT's Cable Barrier Program**

**PURPOSE AND SCOPE:** Oklahoma has been using cable barrier systems for several years as a method of reducing or eliminating cross-over crashes. At present, Oklahoma uses several types of cable barrier systems. They differ in the types of support posts/bases, heights of cables, types of cables/anchorage, as well as, the placement of the system. As more median cable barrier systems are installed, there is a need to study their effectiveness in reducing crossover accidents and the cost-effectiveness of the various cable barrier systems. This study would include all crashes related to the systems being hit, types of systems, system placement, initial cost per mile, repair cost analysis related to manufacture type, and an analysis of prevented accidents since the installation. This research program will help identify successful designs, placement and implementation practices.

**ACCOMPLISHMENTS DURING FFY 2012:** FFY 2010 Final Report submission is pending.

**PROPOSED ACTIVITIES FOR FFY 2013:** End of project.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	-0-	SPR	-0-	STATE
Estimated Cost FFY 2012	-0-	SPR	-0-	STATE
Projected Cost FFY 2013	-0-	SPR	-0-	STATE

### **CONTACT INFORMATION**

Principal Investigator: Chris Ramseyer, University of Oklahoma, 405-325-1415

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

Project Sponsor: Harold Smart, ODOT Traffic Engineer, 405-521-2861

## **2220 Development of ODOT Guidelines for Use of Geogrids in Aggregate Bases**

**PURPOSE AND SCOPE:** The objective of this study is to help ODOT develop materials specifications and guidelines for the acceptance and use of geogrids for aggregate base reinforcement. ODOT's current geogrid specifications are very limited and exclusive of many new types of geogrids that could be equally effective for base reinforcement applications at lower costs. Currently, ODOT engineers are unsure of minimum material properties that are necessary to ensure that a geogrid will perform adequately in base reinforcement applications in the field. Using geogrids to reinforce aggregate bases and/or subgrades can result in considerable cost-savings and improved performance. The focus of this study is to address current shortcomings of the AASHTO and FHWA guidelines with respect to the influences of junction mechanical properties and type of geogrids on their performance in reinforced bases. The goal of this study is to help make the new ODOT specifications more generic, consistent and cost-effective by including a wider variety of commercially available products than what is currently included in their specifications.

**ACCOMPLISHMENTS DURING FFY 2012:** Completed and produced Final Report.

**PROPOSED ACTIVITIES FOR FFY 2013:** End of project.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	-0-	SPR	-0-	STATE
Estimated Cost FFY 2012	-0-	SPR	-0-	STATE
Projected Cost FFY 2013	-0-	SPR	-0-	STATE

### **CONTACT INFORMATION**

Principal Investigator: Kianoosh Hatami, University of Oklahoma, 405-325-5911

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

Project Sponsor: Vincent G. Reidenbach, Geotechnical Engineer, 405-522-4998

## **2223 Test Methods for Use of Recycled Asphalt Pavement in Asphalt Mixes**

**PURPOSE AND SCOPE:** Although ODOT has adopted the use of RAP in asphalt pavements, some field divisions are concerned about the quality of aggregates in some RAPs. Such concerns arise partly from the use of aggregates in original pavements from quarries that might not meet current ODOT specifications. Also, there are questions on possible influence of the Abson Recovery method, which is commonly used by ODOT, on the Performance Grade of recovered binders. To help address such questions and concerns, the proposed study will compare the physical and mechanical properties of recovered aggregates with those of the virgin aggregates from the same source to examine potential statistical differences. This study will also evaluate the influence of the Abson Recovery method on the Performance Grade of recovered binders, and demonstrate if an alternate recovery method is better. The objective of this study is to generate laboratory data on recovered and virgin aggregates and binders that will help address the aforementioned concerns on the use of RAP in asphalt pavements. The results from this study will be very useful in revising specifications for use of RAP in asphalt pavements and are expected to be useful for ODOT in devising better management plan for the usage of RAP in HMA.

**ACCOMPLISHMENTS DURING FFY 2012:** Completed and produced Final Report.

**PROPOSED ACTIVITIES FOR FFY 2013:** End of project.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	-0-	SPR	-0-	STATE
Estimated Cost FFY 2012	-0-	SPR	-0-	STATE
Projected Cost FFY 2013	-0-	SPR	-0-	STATE

### **CONTACT INFORMATION**

Principal Investigator: Musharraf Zaman, University of Oklahoma, 405-325-5625

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

Project Sponsor: Kenneth Hobson, Bituminous Engineer, 405-521-2677

## **2226 Evaluation of Hamburg Rut Tester for Field Control of HMA**

**PURPOSE AND SCOPE:** The Asphalt Pavement Analyzer (APA) and AASHTO T 283, Resistance of Compacted Bituminous Mixture to Moisture-Induced Damage, are currently used in mix designs to evaluate rutting and moisture damage potential of hot mix asphalt (HMA) mixtures. AASHTO T 283 is also used for field control of HMA mixtures. ODOT is moving toward replacing the APA with the Hamburg Wheel Test. Variability of T 283 field test results has always been an issue and currently ODOT does not check rutting potential of field produced mixtures. The Hamburg rut tester is being used by other DOTs to monitor field produced mixtures for rutting and moisture susceptibility. Use of the Hamburg rut tester needs to be evaluated for field control of HMA mixtures in Oklahoma. Laboratory prepared (mix design) samples and field produced mix from across Oklahoma will be sampled and tested for Hamburg rutting resistance and AASHTO T 283. APA testing could be included for comparison. Results of this research could lead to the implementation of the Hamburg Rut Tester as a viable test method for evaluating the field performance of HMA.

**ACCOMPLISHMENTS DURING FFY 2012:** Gathered sufficient AASHTO T 283 and Hamburg Rut Test data from laboratory prepared (mix design) samples and field produced mix from across Oklahoma; determined if the Hamburg Rut Tester can be implemented to monitor field produced mixtures for rutting and/or moisture susceptibility; recommended draft implementation plans (draft test methods and/or specifications); applied the use of a "Moisture Induced Stress Tester" (MIST) to perform an evaluation of moisture damage of HMA; produced project progress reports; submitted FFY 2011 Annual Report; Final Report submission is pending.

The PI has requested a 3 month No Cost Time Extension for continued project operations and the completion of the Final Report.

**PROPOSED ACTIVITIES FOR FFY 2013:** None.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012 (Yr 1 of 1)	\$49,034	SPR	-0-	STATE
Estimated Cost FFY 2012	\$49,000	SPR	-0-	STATE
Projected Cost FFY 2013	-0-	SPR	-0-	STATE

### **CONTACT INFORMATION**

Principal Investigator: Steve Cross, Oklahoma State University, 405-744-7200

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

Project Sponsor: Kenneth Hobson, Bituminous Engineer, 405-521-2677

**2227 Applied Approach Slab Settlement  
Research, Design/Construction**

**PURPOSE AND SCOPE:** Approach slab settlement is a recurring problem in Oklahoma, resulting in countless repair efforts and utilizing limited labor and dollars. Substantial research has been conducted on the mechanisms involved with bridge approach embankment settlement both nationally and locally. Further research is needed to validate the design and construction procedures currently being used for bridge approach slabs in Oklahoma. An effort is needed to identify lessons learned and the determine ways in which ODOT is not applying state of the practice in design or construction of approach slabs. Proposed research for this project includes performing a thorough literature search in addition to surveying other state DOTs about how they have dealt with bridge approach slab settlement issues and to investigate the problems associated with settling of bridge approach slabs in Oklahoma. With assistance from ODOT personnel, a select number of problem bridge approach slabs will be investigated from design through the construction practices used to complete the approach slab construction. From these findings, the researcher will provide ODOT with the state of practice solutions for mitigating the potential for approach slab settlement problems both in design and construction.

**ACCOMPLISHMENTS DURING FFY 2012:** Continued to perform field investigations of existing approach slab settlement sites; performed further laboratory soil sample tests; performed assessment of forensic data to determine possible settlement causes and combination(s) of contributing settlement factors; investigated design and construction methods and provided recommendations to minimize or eliminate approach slab settlement; produced project progress reports; submitted FFY 2011 Annual Report; Final Report submission is pending.

The PI has requested a 3 month No Cost Time Extension for continued project operations and the completion of the Final Report.

**PROPOSED ACTIVITIES FOR FFY 2013:** None.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012 (Yr 2 of 2)	\$99,558	SPR	-0-	STATE
Estimated Cost FFY 2012	\$99,500	SPR	-0-	STATE
Projected Cost FFY 2013	-0-	SPR	-0-	STATE

**CONTACT INFORMATION**

Principal Investigator: Gerald Miller, University of Oklahoma , 405-325-4253  
 ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794  
 Project Sponsor: Vincent G. Reidenbach, Geotechnical Engineer, 405-522-4998



## **2228 Overturning Forces at Bridge Abutments and the Interaction of Horizontal Forces from Adjacent Roadways**

**PURPOSE AND SCOPE:** ODOT has numerous bridges throughout the state where the expansion joints have closed up, roller support bearings tilted, and beams have pushed up against the abutment backwall. Abutments are not performing as expected which has led to frequent and costly repairs that strain limited maintenance budgets. After repairs, some of these bridges experience more movement resulting in further damage. Factors needing further exploration are the thermal expansion of rigid pavements exerting horizontal forces perhaps combining with the embankment forces on the abutments to cause movement of the abutment, premature expansion joint failure, damage to back walls, and tilting of roller bearings. Due to the numerous bridges that are affected by expansion joint failure and the resulting problems caused to the various bridge elements (e.g. roller bearing failure, abutments rotated, beam ends with lack of clearance to the backwall) there is a need to instrument roadways adjacent to bridges, the embankments, and the abutments themselves to monitor and better understand what is taking place. Results of this research could result in modifications to standard abutment details and may influence the way ODOT approaches repair projects.

**ACCOMPLISHMENTS DURING FFY 2012:** Installed instrumentation on selected bridges; was approved for supplemental funding to include the instrumentation of an additional bridge; initiated a subsurface exploration to include soils boring sampling and laboratory in situ tests; performed instrumentation data collection and analysis; created computer models of instrumented bridges; developed preliminary computer simulations concerning complex soil-structure interactions that may be occurring at test sites; produce project progress reports; submitted FFY 2011 Annual Report; FFY 2012 Annual Report submission is pending.

**PROPOSED ACTIVITIES FOR FFY 2013:** Perform monthly data collection and analysis; carry out computer simulations and validation; execute a parametric study using computer simulations; produce synthesis of computer simulations results to develop implementable guidelines and specifications for the design and construction of new bridges; submit project progress reports; prepare and submit Final Report.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012 (Yr 2 of 3)	\$83,721	SPR	-0-	STATE
Estimated Cost FFY 2012	\$83,700	SPR	-0-	STATE
Projected Cost FFY 2013 (Yr 3 of 3)	\$86,122	SPR	-0-	STATE

### **CONTACT INFORMATION**

Principal Investigator: Kanthasamy Muraleetharan, University of Oklahoma, 405-325-4247

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

Project Sponsor: Walt Peters, ODOT Assist. Bridge Engineer, 405-521-2606

**2229 Expected Life of Silane Water Repellant Treatments on Bridge Decks**

**PURPOSE AND SCOPE:** With the ever increasing costs to the maintenance of concrete bridge decks due to corrosion of reinforcing steel from the environment and routine maintenance applications of salt, it is important to have a better understanding of the effectiveness and durability of silane-treated bridge decks. Historically, bridge decks in Oklahoma are treated once at the time of construction. Little is known of the time frame for which silane remains as an effective barrier to prevent the intrusion of corrosive salts into the bridge deck. Through an extensive literature search, survey of state DOT's, and coring and analyzing of bridge deck cores from bridges of various ages, the researcher will determine the life expectancy of a onetime application of silane. ODOT Bridge Division will assist the PI in the selection of bridges to be used in this study. It is expected that an effective duration range can be determined. With these findings it is expected that a routine maintenance practice can be established for the re-treatment of bridge decks based on environment, salt application, regional and age considerations resulting in extended bridge deck life expectancy and lower life cycle costs.

**ACCOMPLISHMENTS DURING FFY 2012:** Continued to establish laboratory procedures to evaluate silane performance; continued investigations of non-destructive field techniques to evaluate silane performance; continued to determine and evaluate the effectiveness of silanes for in-service bridge decks using both destructive and nondestructive techniques; investigated methods of reapplication of silanes to mature concrete; produced project progress reports; submitted FFY 2011 Annual Report; Final Report submission is pending.

**PROPOSED ACTIVITIES FOR FFY 2013:** None.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012 (Yr 2 of 2)	\$98,084	SPR	-0-	STATE
Estimated Cost FFY 2012	\$98,000	SPR	-0-	STATE
Projected Cost FFY 2013	-0-	SPR	-0-	STATE

**CONTACT INFORMATION**

Principal Investigator: Tyler Ley, Oklahoma State University, 405-744-5257

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

Project Sponsor: Walt Peters, ODOT Assist. Bridge Engineer, 405-521-2606

## 2230 Effect of Y-Cracking on CRCP Performance

**PURPOSE AND SCOPE:** Performance of Continuously Reinforced Concrete Pavement (CRCP) is thought to be highly dependent on the early age cracking pattern. Punchouts, the primary failure mechanism in CRCP, are found to occur more frequently at Y-crack and other irregular or closely spaced crack locations. In 1996, Y- cracking was observed on some newer ODOT CRCP projects and there was a concern about the effect it might have on future performance. This project would determine if the early age Y-cracking observed on those projects has had a detrimental effect on the long-term performance of the pavements. The researcher will gather information from previous reports, the pavement management condition database, and the ODOT CRCP database to attempt to correlate present condition to the presence or absence of early age Y-cracking. If Y-cracking is correlated to poor performance in Oklahoma CRC pavements, further examination would include looking at different variables (base type, % reinforcement, absence of transverse steel, tied vs. free or AC shoulders, tube fed vs. tied steel, season and or time of construction, and other design features) that could have contributed to Y- cracking on those specific pavements. The results of this study are anticipated to lead to improved CRCP design, construction, and performance

**ACCOMPLISHMENTS DURING FFY 2012:** Continued literature review of both previous national reports and papers and ODOT reports to determine previous experience with Y-cracking, mitigation methods used, and potential future cost-effective solutions to prevent Y-cracking; extended the update of the ODOT CRCP project database for projects constructed since 2003 utilizing available data; continued to review pavement management condition data to determine current and previous performance levels of CRCP with and without Y-cracking; continued to perform field inspections on pavement sections with and without Y-cracking, including core sampling; continued to perform early-age stress development and time to first cracking modeling for pavements evaluated in this study; developed investigation correlations between the occurrence of Y-cracking and pavement performance; developed methods to minimize Y-Cracking; produced project progress reports; submitted FFY 2011 Annual Report; Final Report submission is pending.

**PROPOSED ACTIVITIES FOR FFY 2013:** None.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012 (Yr 2 of 2)	\$35,276	SPR	-0-	STATE
Estimated Cost FFY 2012	\$35,200	SPR	-0-	STATE
Projected Cost FFY 2013	-0-	SPR	-0-	STATE

### CONTACT INFORMATION

Principal Investigator: Tyler Ley, Oklahoma State University, 405-744-5257

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

Project Sponsor: Jeff Dean, ODOT Pavement Design Engineer, 405-522-0988

## **2231 Stainless Steel Reinforcement as a Replacement for Epoxy Coated Steel in Bridge Decks**

**PURPOSE AND SCOPE:** Corrosion of reinforcing steel is a primary cause of bridge deck deterioration. Epoxy coatings have been used since the 1980s to protect reinforcing steel from penetration of de-icing salts and anti-icing chemicals and delay the onset of corrosion. However, epoxy coatings are imperfect and defects allow intrusion of corrosive salts and chemicals. Stainless steel reinforcing has emerged as one alternative to epoxy coated steel but it is substantially more expensive. Little is known about the time to corrosion for stainless steel reinforcing as compared to epoxy coated reinforcing. Research is also needed to quantify the costs and benefits of using stainless steel reinforcement as a replacement for epoxy coated steel in conventional bridge construction. This study will compare the basic performance of stainless steel, epoxy coated, and other commonly used bridge deck reinforcing steels. The researcher will perform a thorough life cycle cost analysis of stainless steel reinforcement and identify when it is cost effective to use in bridge construction. The study will also document the construction of a specific bridge using stainless steel deck reinforcement.

**ACCOMPLISHMENTS DURING FFY 2012:** Continued to perform accelerated corrosion lab testing procedures on various forms of steel; estimated life expectancy and cost effectiveness of tested steels; documented construction of a bridge project; performed a life cycle cost analysis and identified life cycle cost parameters; produced project progress reports; submitted FFY 2011 Annual Report; FFY 2012 Annual Report submission is pending.

**PROPOSED ACTIVITIES FOR FFY 2013:** Continue to perform accelerated corrosion lab testing procedures on various forms of steel; estimate life expectancy, cost effectiveness and life cycle cost parameters of tested steels; produce project progress reports; prepare and submit Final Report.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012 (Yr 2 of 3)	\$80,925	SPR	-0-	STATE
Estimated Cost FFY 2012	\$80,900	SPR	-0-	STATE
Projected Cost FFY 2013 (Yr 3 of 3)	\$35,107	SPR	-0-	STATE

### **CONTACT INFORMATION**

Principal Investigator: David Darwin, Kansas University, 785-864-3827

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

Project Sponsor: Walt Peters, ODOT Assist. Bridge Engineer, 405-521-2606

## **2232 Next Generation Smart Barrel System for Workzone Safety Enhancement**

**PURPOSE AND SCOPE:** Work zones are among the most safety-critical areas on the state and national roadways. A “smart barrel”, as originally proposed by University of Michigan for FHWA, is a device appearing to be a normal traffic control barrel while internally equipped with low-cost sensors and wireless transceivers. Once deployed as a distributed system, the smart barrels can adaptively sense the condition of traffic flow in the area, send speed and queue advisory signals through LED flashes automatically, and inform the “site supervisor” or traffic monitoring centers. The past four years of development in distributed sensor network protocols, integrated sensors and new battery sources has come to a matured stage. This will allow researchers to develop a completely new generation of smart barrel which transforms the centralized system control into a fully distributed scheme, enables more autonomous and intelligent behaviors of the smart barrels, and greatly reduces the costs and power consumptions in the overall system. It is envisioned that the new smart barrels will have mesh-networking capability and enhanced onboard processing, be capable of sensing the work zone environments (including both traffic and roadway environment condition) in real-time, at lower cost per unit, and lower power consumption for normal operations. The objective of this effort is to achieve a very low-cost single-chip package that utilizes the same RF frequency band for shared traffic detection, speed monitoring, relative localization, and mesh networking functions.

**ACCOMPLISHMENTS DURING FFY 2012:** Completed and produced Final Report.

**PROPOSED ACTIVITIES FOR FFY 2013:** End of project.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	-0-	SPR	-0-	STATE
Estimated Cost FFY 2012	-0-	SPR	-0-	STATE
Projected Cost FFY 2013	-0-	SPR	-0-	STATE

### **CONTACT INFORMATION**

Principal Investigator: Yan Zhang, University of Oklahoma, 405-325-6036

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

Project Sponsor: Harold Smart, ODOT Traffic Engineer, 405-521-2861

## **2234 Energy Dissipation in Eighteen-Foot Broken-back Culverts Using Laboratory Models**

**PURPOSE AND SCOPE:** To develop a methodology to analyze broken-back culverts in Oklahoma such that the energy is mostly dissipated within the culverts or downstream of the culverts in order to minimize the degradation downstream. This project will study dissipation efficiency and appurtenances design for 18 foot drop using laboratory scale modeling technique by investigating vertical drops of 6 and 18 feet that may result in effective energy dissipation and consequently minimize scour downstream of broken-back culverts, thus, reducing construction and rehabilitation costs of culverts in Oklahoma.

**ACCOMPLISHMENTS DURING FFY 2012:** Constructed a laboratory scale model for 150 feet long, two barrels of 10 X 10 feet and a broken-back culvert with vertical drop of 18 feet; simulated different flow conditions for 0.8, 1.0 and 1.2 times the hydraulic head in the scale model; evaluated the energy dissipation between upstream and downstream ends of the broken-back culvert with sills and/or friction blocks of different sizes and shapes; refined the sill design for easy drainage of water from the broken-back culvert; observed, in physical experiments, the efficiency of hydraulic jump with and without friction blocks between upstream and downstream ends of the culvert and the location of hydraulic jump from the toe of the drop in the culvert; produced project progress reports; Final Report submission is pending.

**PROPOSED ACTIVITIES FOR FFY 2013:** None.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012 (Yr 1 of 1)	\$99,992	SPR	-0-	STATE
Estimated Cost FFY 2012	\$99,900	SPR	-0-	STATE
Projected Cost FFY 2013	-0-	SPR	-0-	STATE

### **CONTACT INFORMATION**

Principal Investigator: Avdhesh Tyagi, Oklahoma State University, 405-744-9307

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

Project Sponsor: Bob Rusch, Bridge Division Engineer, 405-521-2606

## 2235 Distress Modeling for DARWin-ME, Phase I

**PURPOSE AND SCOPE:** The objective of this study will be to investigate data needs for distress models in the new DARWin-ME, based on past ODOT research work, to establish a workflow in using local level data sets on cracking, rutting, and roughness for DARWin-ME prediction models, and to assist ODOT in implementing DARWin-ME in the next decade as part of ODOT long-term plan in studying and deploying DARWin-ME in a production environment. The PI will provide an assessment of the results of this study which should include expected benefits and action needed for successful implementation, draft specifications, if applicable, with final recommended implementation activities, methods or schedules to meet ODOT goals. Specifically, toward the end of the research, the research team shall provide a 4-day training to ODOT pavement design staff on DARWin-ME basics, data inputs, model calibrations, and sample runs of pavement design and analysis. Results of this research would result in documentation and technical procedure on using ODOT historical distress and roughness data bases for DARWin-ME implementation. This step is critical in ODOT's effort to use the next-generation design software for pavement engineering in Oklahoma.

**ACCOMPLISHMENTS DURING FFY 2012:** Began literature review; gathered cracking, rutting, and roughness data from ODOT on selected routes and sites for testing; collected design, materials, construction, and performance data from ODOT for calibration of DARWin-ME distress models; performed data analysis and calibrated the models with data from the selected sites by examining precision and bias levels of rutting, cracking, and roughness data sets in the historical ODOT databases; produced project progress reports; FFY 2012 Annual Report submission is pending.

**PROPOSED ACTIVITIES FOR FFY 2013:** Continue to performed data analysis; present a recommended distress model master plan for ODOT implementation; produce project progress reports; prepare and submit Final Report.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012 (Yr 1 of 2)	\$106,398	SPR	-0-	STATE
Estimated Cost FFY 2012	\$106,300	SPR	-0-	STATE
Projected Cost FFY 2013 (Yr 2 of 2)	\$96,079	SPR	-0-	STATE

### CONTACT INFORMATION

Principal Investigator: Kelvin Wang, Oklahoma State University, 405-744-5189

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

Project Sponsor: Jeff Dean, ODOT Pavement Design Engineer, 405-522-0988

**2236 Drying Shrinkage Problems  
in High PI Subgrade Soils**

**PURPOSE AND SCOPE:** Longitudinal cracking in pavements due to drying shrinkage of high PI subgrade clays has been a major problem in Oklahoma. These cracks occur close to the shoulder of the pavement where the climate plays a significant role in terms of changes in water content (suction). This research project will evaluate the current Enhanced Integrated Climatic Model (EICM) of the Mechanistic-Empirical Pavement Design Guide (MEPDG) for analyzing the moisture regimes underneath the pavement. The formations and network of the shrinkage cracks will be investigated in the light of unsaturated soil mechanics. The study will include laboratory soil testing, field forensic investigation of problem sites, and modeling. The research will lead to practical analyses and recommendations for design of pavements on potentially shrinking clay soils.

**ACCOMPLISHMENTS DURING FFY 2012:** Performed literature search; performed testing of 3 laboratory produced subgrade soil samples; performed testing on 3 field produced subgrade soil samples; used the Enhanced Integrated Climatic Model (EICM) and Thornthwaite Moisture Index (TMI) with the Oklahoma climatic information (i.e., Oklahoma Mesonet), to evaluate the seasonal moisture content changes in subgrade soils; performed numerical modeling to analyze moisture diffusion processes, soil suction variations and corresponding volume changes within shrinking subgrade clay soils under different geometry and moisture flux boundary conditions; conducted a feasibility study and investigated different materials for the purpose of using as horizontal and/or vertical moisture barriers; conducted Numerical and Statistical Analysis of Data using information collected from the literature review, EICM and Oklahoma Mesonet, laboratory and field prepared test results, as well as, numerical analysis and modeling; produced project progress reports; FFY 2012 Annual Report submission is pending.

**PROPOSED ACTIVITIES FOR FFY 2013:** Continue testing on laboratory produced subgrade soil samples; continue testing on field produced subgrade soil samples; continue to utilize the EICM, TMI and Oklahoma Mesonet to evaluate seasonal moisture content changes in subgrade soils; continue to perform numerical modeling; proceed with feasibility study; continue to conduct Numerical and Statistical Analysis of Data; produce project progress reports; prepare and submit Final Report.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012 (Yr 1 of 2)	\$55,879	SPR	-0-	STATE
Estimated Cost FFY 2012	\$55,800	SPR	-0-	STATE
Projected Cost FFY 2013 (Yr 2 of 2)	\$90,204	SPR	-0-	STATE

**CONTACT INFORMATION**

Principal Investigator: Rifat Bulut, Oklahoma State University, 405-744-5189  
 ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794  
 Project Sponsor: Christopher Clarke, Geotechnical Engineer, 405-522-4994



## 2237 Reduction in Storm Water Runoff

**PURPOSE AND SCOPE:** The proposed Storm water Rules recently passed by the US EPA are expected to mandate construction sites to meet a numeric standard for turbidity in storm water runoff from rainfall events less than a 2-year, 24-hour storm. Due to the high clay content in many Oklahoma soils, most construction sites in Oklahoma, including highway construction sites, will almost assuredly be required to employ chemical addition to induce flocculation to decrease their runoff turbidity to the required level. The proposed project address this problem by continued development and demonstration of a system for turbidity control at highway construction sites in Oklahoma that is effective, predictable, and practical. Because of the high clay content of many Oklahoma soils, construction sites will most likely not be able to reach the new US EPA turbidity standard without the use of this type of system. Results of this project will lead to the implementation of this new technology that will result in compliance with the new US EPA Construction Effluent Limitation Guidelines (ELG) for turbidity. This has the potential to result in fewer penalties and fines for construction activities. In addition, this technology allows construction activities to meet the Clean Water Act requirements and protect our valuable water resources.

**ACCOMPLISHMENTS DURING FFY 2012:** Estimated flocculation and turbidity constants; investigated the validity of using laboratory jar tests for designing and sizing the OSU Injection and Mixing System; installed and monitored an OSU Flocculant Injection and Mixing System at an active ODOT highway construction site; produced project progress reports; FFY 2012 Annual Report submission is pending.

**PROPOSED ACTIVITIES FOR FFY 2013:** Continue to analyze soils for turbidity and flocculant parameters and interpret results; continue to conduct jar tests and interpret results; continue to monitor field demonstration site; coordinate and execute an on-site field trip; produce project progress reports; prepare and submit Final Report.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012 (Yr 1 of 2)	\$92,541	SPR	-0-	STATE
Estimated Cost FFY 2012	\$92,500	SPR	-0-	STATE
Projected Cost FFY 2013 (Yr 2 of 2)	\$92,465	SPR	-0-	STATE

### CONTACT INFORMATION

Principal Investigator: Jason Vogel, Oklahoma State University, 405-744-7532

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

Project Sponsor: Michelle Dolan, Environmental Storm Water Manager, 405-521-6771

## 2238 New Asphalt Mix Design Program for ODOT

**PURPOSE AND SCOPE:** Oklahoma Department of Transportation (ODOT) has been using the Superpave mix design software for several years [9]. The original Superpave mix design software was built around Fox Database and did not meet ODOT requirements. The software currently being used by ODOT is implemented using two Microsoft Excel® files to create asphalt mix designs and is customized for ODOT use. However, the implementation is inefficient and cumbersome to maintain. This proposal is being submitted to ODOT with the specific aim of developing a Microsoft Visual Basic 2010® based Asphalt Mix Design Software that is efficient and easy to use. The software architecture will allow for the transition to a networked SQL server based version and simplify the revisions and the maintenance of the software in the future. The objective of the proposed work is the software implementation of the ODOT Asphalt Mix Design method. This work will include the migration of the existing Microsoft EXCEL® based software to Microsoft Visual Basic 2010® Express. The Express version of Visual Basic is freely available and does not require the purchase of additional software licenses. The upgrade of the ODOT Asphalt Mix Design software will also include a systematic redesign of the current software to improve its efficiency. The software will be thoroughly tested and the output will be compared with the mix designs obtained using the current Excel® based process to verify the accuracy of the software. The project team will work with the relevant personnel from ODOT to facilitate the transition to the new software. On successful completion of the project, complete documentation of the software will be provided along with user manuals and training modules to facilitate the adoption of the software by the user community.

**ACCOMPLISHMENTS DURING FFY 2012:** Developed a detailed design document for requirement specifications, design and test matrix; revised software and replaced the Excel and VBA modules with modules implemented in VB 2010; implemented revised software, optimized the code and improved transaction security; demonstrated the new software and worked with ODOT to identify and remedy any coding/performance issues; trained ODOT personnel; delivered software, user documentation and training manuals; produced project progress reports; Final Report submission is pending.

**PROPOSED ACTIVITIES FOR FFY 2013:** None.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012 (Yr 1 of 1)	\$89,995	SPR	-0-	STATE
Estimated Cost FFY 2012	\$89,900	SPR	-0-	STATE
Projected Cost FFY 2013	-0-	SPR	-0-	STATE

### CONTACT INFORMATION

Principal Investigator: Sesh Commuri, University of Oklahoma, 405-325-4302

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

Project Sponsor: Kenneth Hobson, Bituminous Engineer, 405-521-2677

## **2239 Develop Draft Chip Seal Cover Aggregate Specifications Based on AIMS Test Results**

**PURPOSE AND SCOPE:** The proposed study seeks to improve ODOT chip seal design and performance through introducing new criteria for the selection of cover aggregate and binder. These criteria exploit the recent technological advances in the characterization of aggregate shape and texture as well as aggregate-binder compatibility in a creative way. The proposed work will include aggregate index properties obtained from the Aggregate Imaging System (AIMS) and performance-based uniformity coefficients (PUC) in tweaking ODOT chip seal cover aggregate specifications and the surface free energy (compatibility ratio) approach in evaluating the aggregate-binder compatibility. Moreover, the chip seal construction practice followed by different ODOT Maintenance Divisions will be documented and the best practice will be identified. The proposed study involves both laboratory testing and construction and performance evaluation of chip seal test sections and has three objectives: 1. To evaluate the shape and texture-related index properties, as well as durability, of commonly used cover aggregates in chip seal programs in Oklahoma, and provide a methodology for inclusion as a metric in future chip seal specifications; 2. To quantify how well the newly developed performance-based uniformity coefficient (PUC) correlate with chip seal performance in Oklahoma, and if it should be incorporated into state chip seal specifications; 3. To generate aggregate-binder compatibility data, based on the surface free energy (compatibility ratio) approach, for commonly used aggregates and asphalt emulsion binders in Oklahoma, which will be a useful resource for ODOT maintenance divisions.

**ACCOMPLISHMENTS DURING FFY 2012:** Performed literature review; identified cover aggregates and binder sources and collected samples; performed laboratory testing of aggregates; began laboratory evaluation of aggregate-binder compatibility; conducted evaluation of Performance-based Uniformity Coefficient (PUC); initiated field testing and monitoring for performance evaluation of chip seals; constructed and monitored 10 new chip seal test sections; started constructability review of division chip seal practices; analyzed findings and began draft cover aggregate specifications; conducted 1 of 2 tech transfer workshops; produced project progress reports; FFY 2012 Annual Report submission is pending.

**PROPOSED ACTIVITIES FOR FFY 2013:** Continue literature review; continue laboratory evaluation of aggregate-binder compatibility; continue field testing and monitoring for performance evaluation of chip seals; continue review of division chip seal practices; analyze findings and continue draft cover aggregate specifications; conduct 2 of 2 tech transfer workshops; produce project progress reports; prepare and submit Final Report.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012 (Yr 1 of 2)	\$45,570	SPR	-0-	STATE
Estimated Cost FFY 2012	\$45,500	SPR	-0-	STATE
Projected Cost FFY 2013 (Yr 2 of 2)	\$85,810	SPR	-0-	STATE

### **CONTACT INFORMATION**

Principal Investigator: Musharraf Zaman, University of Oklahoma, 405-325-5625

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

Project Sponsor: Scott Seiter, ODOT Assist. Materials Engineer, 405-521-2677

**2240 Portable Weigh-In-Motion (WIM)  
for Pavement Design—Phase-II**

**PURPOSE AND SCOPE:** Keeping the public’s roads, highways and bridges in good condition is not only vital to safety, economical productivity and success, but also necessary to save billions of dollars used for road repair and replacement each year. Road deterioration depends on many factors: road characteristics (pavement materials and thickness); weather conditions (temperature cycles and precipitation); and dynamic interaction between vehicle and road (speed, suspension characteristics, and surface roughness), in addition to loads distinguished by axles spacing, tire pressure, and weight per axle. Of these, vehicle axle weight proves to be the factor that most extremely increases road wear. Therefore, both appropriately weighted and overweight trucks are chiefly responsible for the rapid deterioration of roads. Reducing the average weight of truck axles would substantially reduce the rate of pavement wear. Analyzing historical WIM data collected by ODOT to aid in the improvement of pavement design, and collecting weight data at strategic temporary sites using the OTC funded portable system could accomplish this.

**ACCOMPLISHMENTS DURING FFY 2012:** Performed literature search; initiated WIM data analysis discussions; obtained historical WIM data over the last five years; converted historical WIM data into comma delimited data; developed techniques to obtain vehicle signatures; developed data mining algorithms for vehicle signature detection, time and route traveled; performed 1st and 2nd order analysis on WIM data; expanded 1st and 2nd order analyses across different seasons and years to establish tendencies; implemented a camera based system for vehicle classification validation; developed image processing algorithms for axel and axel space detections; tested and evaluated portable WIM with the camera based classifier; collected WIM data samples using portable WIM system developed under previous research; produced project progress reports; FFY 2012 Annual Report submission is pending. This project was awarded a 1 year FFY 2013 Phase-II continuation.

**PROPOSED ACTIVITIES FOR FFY 2013:** Investigate various sensor layouts for multi-lane portable WIM systems; develop a portable WIM system to monitor multiple lanes at once; deploy portable WIM systems at two additional sites; develop data patterns/models for detection of site miscalibration; develop software to monitor and track data patterns and alerts; correct data inaccuracy; produce project progress reports; prepare and submit Final Report.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012 (Yr 1 of 1)	\$103,009	SPR	-0-	STATE
Estimated Cost FFY 2012	\$103,000	SPR	-0-	STATE
Projected Cost FFY 2013 (Yr 1 of 1)	\$89,340	SPR	-0-	STATE

**CONTACT INFORMATION**

Principal Investigator: Hazem Refai, University of Oklahoma, 918-660-3243  
 ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794  
 Project Sponsor: Daryl Johnson, Traffic Analyst Engineer, 405-522-6376

## **2241 Real-Time Monitoring of Slope Stability in Eastern Oklahoma**

**PURPOSE AND SCOPE:** This research project is focused on landslides occurring in the eastern portion of Oklahoma with the idea that this research will be continued to encompass all of Oklahoma, as landslides occur in almost every division of the state. Even with well established slope stability codes (i.e., Corps of Engineers EM 1110-2-1902 and Federal Highway Administration FHWA-SA-94-005), there is currently a lack of technical understanding about why certain soil deposits and road cuts fail at commonly used slope geometries. Several roadway embankments and road cuts in Oklahoma failed in the past few years for various reasons, rendering many miles of high vehicle traffic roadways inoperable or severely impaired for months, years or in some cases, permanently. The goals of this research project are to assist the state in understanding, recognizing, and addressing landslide prone areas by creating a functional landslide hazard map that may be used by ODOT and others when building and maintaining infrastructure to predict and prevent future transportation corridor blockages.

**ACCOMPLISHMENTS DURING FFY 2012:** Performed literature search; identified and characterized problematic slide areas in eastern OK; collected historical landslide data; gathered satellite and surface observational network information; established a comprehensive Oklahoma Landslide Inventory Database; created a first-cut regional Susceptibility and Hazard Landslide Map; derived and classified landslide-controlling factors; assigned numerical weight values to classify landslide-controlling factors; derived and verified landslide hazard maps; produced project progress reports; FFY 2012 Annual Report submission is pending.

**PROPOSED ACTIVITIES FOR FFY 2013:** Install remote sensing in situ equipment into a selected slide mass to observe slope behavior over time and to possess data to validate future landslide prediction models; validate and verify model on a landslide “hotspot”; synthesize, analyze and disseminate year 2 results; produce project progress reports; prepare and submit Final Report.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012 (Yr 1 of 2)	\$88,531	SPR	-0-	STATE
Estimated Cost FFY 2012	\$88,500	SPR	-0-	STATE
Projected Cost FFY 2013 (Yr 2 of 2)	\$113,912	SPR	-0-	STATE

### **CONTACT INFORMATION**

Principal Investigator: Amy Cerato, University of Oklahoma, 405-325-5625

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

Project Sponsor: Christopher Clarke, Geotechnical Engineer, 405-522-4994

## **2242 Efficacy of Road Bond and Condor as Soil Stabilizers**

**PURPOSE AND SCOPE:** The goal of this research is to test the effectiveness of Road Bond and Condor as soil stabilizers for three typical fine-grained Oklahoma soils. Test soils will include a moderately plastic and highly plastic clayey soil, as well as, a clayey soil containing at least 10,000 ppm sulfate. At the completion of this study, it is expected that ODOT will have a comprehensive set of laboratory testing data demonstrating the degree of effectiveness of Roadbond and Condor for stabilizing clayey soils and sulfate-bearing soils. If conclusions of this study suggest Roadbond and/or Condor are potentially viable for soil stabilization, particularly those soils containing sulfate, then a test (s) section(s) could be incorporated on an actual highway construction project. Although some questions may remain regarding long-term durability, a successful pilot project may lead to gradual implementation of the project recommendations. Possibly, results of this research may suggest that one or both products are not viable and/or other testing should be performed.

**ACCOMPLISHMENTS DURING FFY 2012:** Collected three fine-grained test soils; conducted basic soil testing on untreated soils; conducted mix designs for Roadbond and Condor treated soils; conducted unconfined tests on untreated soils and soils mixed with other additives; conducted oedometric swell tests on treated and untreated soils; produced project progress reports; Final Report submission is pending.

**PROPOSED ACTIVITIES FOR FFY 2013:** None.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012 (Yr 1 of 1)	\$25,536	SPR	-0-	STATE
Estimated Cost FFY 2012	\$25,500	SPR	-0-	STATE
Projected Cost FFY 2013	-0-	SPR	-0-	STATE

### **CONTACT INFORMATION**

Principal Investigator: Gerald Miller, University of Oklahoma, 405-325-4253

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

Project Sponsor: Christopher Clarke, Geotechnical Engineer, 405-522-4994

## 2243 Recommended Fatigue Test for Oklahoma DOT

**PURPOSE AND SCOPE:** Fatigue cracking and rutting are two dominant distresses in flexible pavements. Oklahoma Department of Transportation (ODOT) currently evaluates the rutting potential of asphalt mixes through the Hamburg rut test in accordance to OHD L-55, which is similar to AASHTO T324. However, no standard test procedure is currently available to ODOT for screening of mixes for fatigue resistance, which is extremely important for quality control and quality assurance of flexible pavements. The proposed study will investigate selected test methods and procedures to measure fatigue resistance or fatigue life of different types of asphalt mixes. Mechanistic frameworks, namely dissipated energy, fracture mechanics, and viscoelastic continuum damage, will be utilized to analyze the data, as appropriate. The variability and repeatability of each test method will be evaluated statistically. The results from this study will lead to test methods/protocols and the associated equipment will be recommended that can be used by ODOT for screening of asphalt mixes for their fatigue resistance during the mix design phase.

**ACCOMPLISHMENTS DURING FFY 2012:** New Project

**PROPOSED ACTIVITIES FOR FFY 2013:** Perform literature review: survey other DOT's practices and experiences by questionnaire; perform evaluation of climate data; selection of modified and unmodified asphalt mixes; perform laboratory testing of asphalt mixes; prepare cylindrical samples of asphalt mixes; perform various laboratory fatigue tests on modified and unmodified asphalt mixes, including Cyclic Direct Tension (CDC) Test, Beam Fatigue Test, Overlay Testing, Indirect Tension Test and Semi-Circular Bend Test; perform analysis of data using mechanistic framework for all laboratory tests; perform comparison of test results and ranking of asphalt mixes; perform analysis of repeatability and variability of selected test methods; produce project progress reports; prepare and submit FFY 2013 Annual Report.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	-0-	SPR	-0-	STATE
Estimated Cost FFY 2012	-0-	SPR	-0-	STATE
Projected Cost FFY 2013 (Yr 1 of 3)	\$132,749	SPR	-0-	STATE

### CONTACT INFORMATION

Principal Investigator: Musharraf Zaman, University of Oklahoma, 405-325-5625

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

Project Sponsor: Kenneth Hobson, Bituminous Engineer, 405-521-2677

## **2244 Field Verification of Geogrid Properties for Base Course Reinforcement Applications**

**PURPOSE AND SCOPE:** Research is needed to develop guidelines for acceptance and specification of available geogrids for such applications. This study will be complementary to a recently completed ODOT/OkTC-funded project, which is aimed at addressing the need for improved guidelines for base reinforcement applications that produced a significant amount of test data on a selection of geogrids and their in-aggregate performance. As a result, field verification of geogrid performance is in a position to be carried out in order to provide ODOT with a more complete picture of how geogrids with different mechanical properties are expected to perform as base reinforcement materials in commonly used aggregates in Oklahoma projects. A primary objective of this study is to help ODOT develop new design guidelines in their Specifications Manual for the use of geogrids in reinforced aggregate base roadway projects in Oklahoma. The benefits of using geosynthetics in enhancing the stability of aggregate bases and other pavement applications have been observed in terms of increased performance (i.e. serviceability), stability, durability and cost effectiveness of roadway-related applications ranging from subgrade and base layers to retaining walls, embankments, slopes and bridge abutments.

**ACCOMPLISHMENTS DURING FFY 2012:** New Project

**PROPOSED ACTIVITIES FOR FFY 2013:** Perform literature search; select ODOT full-depth roadway construction project in which the design requires the use of a reinforced aggregate base course and incorporate a test section into the construction contract so that the base reinforcement within that section will include a range of geogrid products to measure and monitor side-by-side performance; collect and document geotechnical and pavement data on the field test section; perform in-situ testing of test section; collect materials samples for laboratory testing; reduce data for interpretation and analysis; produce project progress reports; prepare and submit FFY 2013 Annual Report.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	-0-	SPR	-0-	STATE
Estimated Cost FFY 2012	-0-	SPR	-0-	STATE
Projected Cost FFY 2013 (Yr 1 of 3)	\$100,000	SPR	-0-	STATE

### **CONTACT INFORMATION**

Principal Investigator: Kianoosh Hatami, University of Oklahoma, 405-325-5911

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

Project Sponsor: Christopher Clarke, Geotechnical Engineer, 405-522-4994



## **2245 Fatigue Performance of Asphalt Pavements Containing RAS and RAP**

**PURPOSE AND SCOPE:** Recycled asphalt shingles (RAS) and reclaimed asphalt pavements (RAP) are increasingly used in hot mix asphalt (HMA) for environmental, economic and other reasons. Although previous studies have shown improved resistance to rutting and moisture damage, contradictory results have been reported on fatigue life and thermal cracking of pavements constructed with mixes containing RAS and RAP. Several states have specifications for design of mixes containing RAS and RAP, but such specifications are not yet developed by the Oklahoma Department of Transportation (ODOT). The proposed study seeks to evaluate the fatigue performance of HMA mixes containing RAS and RAP. The primary objectives of this study are: (i) to generate laboratory data on fatigue performance or fatigue life of HMA mixes containing RAS and RAP in Oklahoma; and (ii) to make recommendations on guidelines/special provisions for the design of HMA containing RAS and RAP.

**ACCOMPLISHMENTS DURING FFY 2012:** New Project

**PROPOSED ACTIVITIES FOR FFY 2013:** Perform literature review; perform review of other DOT's construction specifications in regards to RAS and RAP; perform evaluation of climate data; collection of bulk materials and samples; perform preliminary tests on collected materials; conduct volumetric mix designs; prepare cylindrical and beam samples; carry out various laboratory performance tests; perform analysis of test data; compare fatigue and low temperature cracking performance; perform analysis of repeatability and variability of selected test methods; produce project progress reports; prepare and submit FFY 2013 Annual Report.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	-0-	SPR	-0-	STATE
Estimated Cost FFY 2012	-0-	SPR	-0-	STATE
Projected Cost FFY 2013 (Yr 1 of 2)	\$109,421	SPR	-0-	STATE

### **CONTACT INFORMATION**

Principal Investigator: Musharraf Zaman, University of Oklahoma, 405-325-5625

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

Project Sponsor: Kenneth Hobson, Bituminous Engineer, 405-521-2677

**2246 Evaluation of Performance of Asphalt Pavements  
Constructed Using Intelligent Compaction Techniques**

**PURPOSE AND SCOPE:** Improving the quality of asphalt pavements during construction can greatly enhance performance and longevity. Lack of adequate tools to determine the quality of compaction of the entire pavement in a non-destructive manner is a leading factor in the early deterioration of pavements. Tools that can estimate the quality in real-time can help avoid over/under-compaction during the construction process. Improved quality of the roads can minimize rutting, cracking and other forms of pavement distresses, while improving long-term performance of the pavement. Several original equipment manufacturers (OEMs) have proposed Intelligent Compaction (IC) as a means of achieving uniformity in the compaction of soil subgrades and asphalt pavements. Over the past nine years, the lead researchers of this proposal have developed the Intelligent Asphalt Compaction Analyzer (IACA) technology to estimate the density and stiffness (dynamic modulus, |E\*|) of an asphalt pavement during its construction. The technology has been extended to estimate the resilient modulus (MR) of stabilized subgrades that form the base of asphalt pavements. Improvement in the quality obtained through the use of IACA during the construction of asphalt pavements, as well as the stabilized subgrades that form the base of these pavements, will be demonstrated and compared to conventional construction practices under this study.

**ACCOMPLISHMENTS DURING FFY 2012:** New Project

**PROPOSED ACTIVITIES FOR FFY 2013:** select 2 sites involving milling and overlay of HMA pavements; perform characterization of sites prior to construction and locate IACA demonstration section; determine dynamic modulus master curves; construct pavement test sections and use of IACA; perform analysis of compaction quality data obtained using IACA; produce project progress reports; prepare and submit FFY 2013 Annual Report.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	-0-	SPR	-0-	STATE
Estimated Cost FFY 2012	-0-	SPR	-0-	STATE
Projected Cost FFY 2013 (Yr 1 of 2)	\$122,199	SPR	-0-	STATE

**CONTACT INFORMATION**

Principal Investigator: Sesh Commuri, University of Oklahoma, 405-325-4302  
 ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794  
 Project Sponsor: Kenneth Hobson, Bituminous Engineer, 405-521-2677

## **2247 Energy Dissipation in Twelve-Foot Broken-back Culverts Using Laboratory Models**

**PURPOSE AND SCOPE:** To develop a methodology to analyze broken-back culverts in Oklahoma such that the energy is mostly dissipated within the culverts or downstream of the culverts in order to minimize the degradation downstream. This project will study dissipation efficiency and appurtenances design for 12 foot drop using laboratory scale modeling techniques that may result in effective energy dissipation and consequently minimize scour downstream of broken-back culverts, thus, reducing construction and rehabilitation costs of culverts in Oklahoma.

**ACCOMPLISHMENTS DURING FFY 2012:** New Project

**PROPOSED ACTIVITIES FOR FFY 2013:** Construct a laboratory scale model for 150 feet long, two barrels of 10 X 10 feet and a broken-back culvert with vertical drop of 12 feet; simulate different flow conditions for 0.8, 1.0 and 1.2 times the hydraulic head in the scale model; evaluate the energy dissipation between upstream and downstream ends of the broken-back culvert with sills and/or friction blocks of different sizes and shapes; refine the sill design for easy drainage of water from the broken-back culvert; observe, in physical experiments, the efficiency of hydraulic jump with and without friction blocks between upstream and downstream ends of the culvert and the location of hydraulic jump from the toe of the drop in the culvert; produce project progress reports; prepare and submit FFY 2013 Final Report.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	-0-	SPR	-0-	STATE
Estimated Cost FFY 2012	-0-	SPR	-0-	STATE
Projected Cost FFY 2013 (Yr 1 of 1)	\$99,800	SPR	-0-	STATE

### **CONTACT INFORMATION**

Principal Investigator: Avdhesh Tyagi, Oklahoma State University, 405-744-9307

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

Project Sponsor: Bob Rusch, Bridge Division Engineer, 405-521-2606

**2248 Creep Compliance and Percent Recovery of Oklahoma Certified Binders Using the Multiple Stress Creep Recovery (MSCR) Method**

**PURPOSE AND SCOPE:** To enhance the durability and strength of asphalt concrete (AC) pavements in order to sustain high traffic volume, coupled with heavier loads and extreme weather conditions, asphalt industries in the United States and around the world are increasingly using polymer-modified binders. The recently released Multi Stress Creep Recovery (MSCR) test (AASHTO TP 70) on short-term aged binders can better relate the predicted laboratory-based high temperature properties of asphalt binders (virgin and recovered) to actual rutting performance of in-service pavements. The objectives of this research are: (1) to evaluate the creep compliance and percent recovery of various asphalt binders used by the Oklahoma Department of Transportation (ODOT); and (2) to determine the feasibility of the adoption of the MSCR test by ODOT. If recommended, specific guidelines (MSCR letter grade and acceptable minimum percentage of elastic recovery) will be developed for use by ODOT. Furthermore, this study will evaluate binders recovered from reclaimed asphalt pavement (RAP) materials and assess the presence of polymer through the percent recovery of the MSCR test method.

**ACCOMPLISHMENTS DURING FFY 2012:** New Project

**PROPOSED ACTIVITIES FOR FFY 2013:** Perform literature review; select binder types and sources; recover binders from RAP using Rotary Evaporator Method, i.e., “Rotovapor”® (as per AASHTO T 319); execute MSCR tests; perform Superpave grading of virgin binders; conduct analysis of ODOT in-house MSCR data; generate statistical analysis of MSCR data; produce project progress reports; prepare and submit FFY 2013 Annual Report.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	-0-	SPR	-0-	STATE
Estimated Cost FFY 2012	-0-	SPR	-0-	STATE
Projected Cost FFY 2013 (Yr 1 of 2)	\$104,586	SPR	-0-	STATE

**CONTACT INFORMATION**

Principal Investigator: Zahid Hossain, University of Oklahoma, 405-325-2626

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

Project Sponsor: Kenneth Hobson, Bituminous Engineer, 405-521-2677

## **2249 Black Ice Detection and Road Closure Control System for Oklahoma**

**PURPOSE AND SCOPE:** Black ice is a thin coating of glazed ice on roadways or other transportation surfaces and has a similar appearance of a wet black pavement road. Black ice often forms during calm weather and is highly transparent and thus difficult to see. Black ice usually forms at night or early morning, first on bridges and overpasses, then on the roads as temperatures continue to drop. Black ice is especially hazardous and is a factor in many auto accidents, some of which are deadly, each year in Oklahoma and many other states. Unfortunately, the current static road-side warning signs (such as “Ice May Form on Bridge”) simply do not draw enough attention from drivers. Objectives of this study include, 1) the development of a decision support system (DSS) to predict and detect black ice formation and pin point dangerous road sections, 2) the development of an Oklahoma Black Ice Database and Black Ice Risk Index Prediction and 3) the development of a functionally competent and economically feasible sensing system for black-ice detection by using arrays of MEMS temperature and humidity sensors, together with existing road monitoring cameras.

**ACCOMPLISHMENTS DURING FFY 2012:** New Project

**PROPOSED ACTIVITIES FOR FFY 2013:** Perform literature search; perform black ice risk index prediction using hybrid approach; establish GIS database for ice emergencies; develop low-cost ice detection sensor system; develop sensing and remote warning system; produce project progress reports; prepare and submit FFY 2013 Annual Report.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	-0-	SPR	-0-	STATE
Estimated Cost FFY 2012	-0-	SPR	-0-	STATE
Projected Cost FFY 2013 (Yr 1 of 2)	\$108,326	SPR	-0-	STATE

### **CONTACT INFORMATION**

Principal Investigator: Tieming Liu, Oklahoma State University, 405-744-9871

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

Project Sponsor: Ron Curb, Engineering Manager II, 405-522-3795

**2250 The Study of Vehicle Classification Equipment with Solutions to Improve Accuracy in Oklahoma**

**PURPOSE AND SCOPE:** The Federal Highway Administration (FHWA) and Oklahoma Department of Transportation (ODOT) are unremittingly interested in ever-evolving vehicle classification systems. More accurate systems are essential for suitable roadway design and to ensure adequate capacity, surface durability, and commuter safety for all motorists. Proper Vehicle Classification is essential for proper roadway planning and design. This project proposes a study of vehicle classification accuracy at existing ODOT weigh-in-motion (WIM), automatic vehicle classifier (AVC), and short-term classification systems for 13 FHWA vehicles with solutions proposed. The primary objectives of the project are 1) to investigate the vehicle classification accuracy of ODOT WIM, AVC, and short-term classification systems; 2) to identify causes in each system that are responsible for inaccurate vehicle classification and propose methods to improve system accuracy; 3) to deploy several vehicle classification systems on Oklahoma highways near a current WIM/AVC site; 4) to evaluate vehicle classification accuracy of the systems and compare results with classification data gathered at nearby WIM/AVC sites; 5) to test possible solutions to improve vehicle classification accuracy and make recommendations.

**ACCOMPLISHMENTS DURING FFY 2012:** New Project

**PROPOSED ACTIVITIES FOR FFY 2013:** Begin development of portable video-based vehicle classification system and field test; develop software for road tube vehicle classification system; perform field testing of video system at AVC and WIM sites used for vehicle classification evaluation; add portable class counter testing at AVC/WIM sites to evaluate classification accuracy; perform short-term classification error analyses to investigate development of solutions and describe causes of vehicle misclassification; prepare Vehicle Class Testing Results comparison report; make equipment/software corrections to improve vehicle class accuracy; investigate solutions to correct classification system error, field test, and report; produce project progress reports; prepare and submit Final Report.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	-0-	SPR	-0-	STATE
Estimated Cost FFY 2012	-0-	SPR	-0-	STATE
Projected Cost FFY 2013 (Yr 1 of 1)	\$86,568	SPR	-0-	STATE

**CONTACT INFORMATION**

Principal Investigator: Hazem Refai, University of Oklahoma, 918-660-3243  
 ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794  
 Project Sponsor: Daryl Johnson, Traffic Analyst Engineer, 405-522-6376

## **2251 3D Laser Imaging for ODOT Interstate Network at True 1-mm Resolution**

**PURPOSE AND SCOPE:** Pavement data collection technologies have improved gradually in the last few decades. Particularly after steady investments in pavement profile measurements since the 1980's, roughness, rutting, and macro-texture data can be inexpensively obtained at acceptable accuracy levels. Due to sensor and computing limitations and inadequate research funding, the hardware and software necessary to automatically obtain pavement cracking and other distress data at acceptable precision and bias levels have not been realized. With 3D image data representing actual pavement surface at full-lane coverage, it is possible to create a true representation of pavement surface at 1mm resolution which in turn can be used as input data for various condition evaluations and safety analysis. Results of this research would result in documentation and technical procedure on using the collected 3D pavement data of an ODOT network and the provided analysis software programs. Pavement management at ODOT will have a virtual tool to examine pavement surface characteristics through the provided software solutions to fulfill both data needs at network level and project level.

**ACCOMPLISHMENTS DURING FFY 2012:** New Project

**PROPOSED ACTIVITIES FOR FFY 2013:** Perform data collection of ODOT interstate network and SH 51 section; discuss and generate solutions for automated condition survey; discuss and prepare software solutions to identify pavement surface safety problems; conduct data analysis of flexible and rigid pavements using collected 3D surface data; produce project progress reports; prepare and submit FFY 2013 Annual Report.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	-0-	SPR	-0-	STATE
Estimated Cost FFY 2012	-0-	SPR	-0-	STATE
Projected Cost FFY 2013 (Yr 1 of 2)	\$117,771	SPR	-0-	STATE

### **CONTACT INFORMATION**

Principal Investigator: Kelvin Wang, Oklahoma State University, 405-744-5189

ODOT SP&R Part 2 Program Administrator: Bryan Hurst, 405-522-3794

Project Sponsor: William Dickinson, Pavement Management Branch Manager 405-522-1448

## 2700 Experimental Product and Evaluation Program

**PURPOSE AND SCOPE:** This project was established to provide ODOT with a means of providing for the (experimental) use, monitoring, evaluation and implementation of products for highway and bridge construction where the products do not meet current ODOT standards and specifications.

**ACCOMPLISHMENTS DURING FFY 2012:** Maintained records of new products where manufacturers provided literature or made presentations; provided product information to and consulted with applicable ODOT division subject matter experts on new product evaluations; distributed product submissions to various ODOT divisions for review and interest; consulted with product vendors, representatives and firms; organized product meetings and presentations; published in-house final reports on “Hydro-Straw”, “EarthGuard”, and “Cusak Hay Wattles.”; approval letter was generated by ODOT Roadway Design for “Cusak Hay Wattles.”; product presentation executed by Tensar Corporation on Mirafi MPV600 paving fabric to incorporate into ODOT Chip Seal study.

**PROPOSED ACTIVITIES FOR FFY 2013:** Continue to maintain records on products submitted to ODOT; meet with vendor representatives; circulate product literature and provide information to applicable ODOT division subject matter experts; coordinate product meetings and presentations for new product evaluation forms received; continue to conduct product performance evaluations and monitoring; continue collection of monthly photographic records for current and new product applications as they are implemented.

<b>FINANCIALS</b>	<b>AMOUNT</b>	<b>FUND</b>	<b>AMOUNT</b>	<b>FUND</b>
Programmed Amount FFY 2012	\$20,000	SPR	-0-	STATE
Estimated Cost FFY 2012	\$35,000	SPR	-0-	STATE
Projected Cost FFY 2013	\$20,000	SPR	-0-	STATE

### CONTACT INFORMATION

ODOT Field Research Manager: Bryan Cooper, 405-736-9475