State Planning and Research Work Program
FFY 2023
(October 1, 2022 to September 30, 2023)

Part 1
Strategic Asset and Performance Management

Part 2
Office of Research and Implementation

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

October 2023

Executive Summary

This document describes the Federal Fiscal Year (FFY) 2023 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 Strategic Asset and Performance Management Division (SAPM) and Part 2, the Office of Research and Implementation activities, as well as, national pooled fund studies. The work program is developed and updated annually in cooperation with the Federal Highway Administration.

Planning activities to be conducted in FFY 2023 include data collection, data analysis, data reporting, and planning coordination. Oklahoma Transportation continues to build upon the permanent traffic count inventory. This radar inventory technology allows for better decision making and improves the safety of the Oklahoma Transportation workforce as well as the traveling public. As Oklahoma Transportation progresses through a modernization effort, Planning activities may be managed by different personnel in FFY 2023 than in previous years Funding for Part 1 of the work plan is approximately $10.8 million in FFY 2023.

Research activities for FFY 2023 will include eight research projects one new research project. Implementing two projects for a total of thirteen research projects including 14 New Task Order Projects totaling One Million Dollars. Some of the focus areas for current research projects include: design/construction/ maintenance of infrastructure and safety. ODOT is participating in eleven national pooled fund projects, two of which Oklahoma acts as the lead state. Funding for the research program totals approximately $5 million in FFY 2023.

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 2022) and the proposed activities for the upcoming fiscal year (FFY 2023). In addition, the Financial Section shows the amount programmed for the FFY 2022 in the last work program, and the projected costs for the upcoming fiscal year (FFY 2023). A detailed Annual Performance and Expenditure Report of accomplishments and expended funds for the current FFY 2022 will be completed and submitted for FHWA review by the end of December 2022.

U.S. Department of Transportation
Federal Highway Administration

Oklahoma Division

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September 22, 2022

In Reply Refer To:
HDA-OK

Tim Gatz
Executive Director
Oklahoma Department of Transportation
200 NE 21st Street
Oklahoma City, OK 73105

This letter serves as the Federal Highway Administration (FHWA) Oklahoma Division approval of the proposed Fiscal Year 2023 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. Rick Johnson on August 10, 2022.

Based on our review, we will authorize the federal share of funds associated with FY 2023 SPR Part I - Planning Work, in the amount of $12,598.770.00. We will also authorize the federal share of funds in the amount of $5,029,092.00 associated with FY 2023 SPR Part II – Research (including funds for LTAP and Pooled Fund Study).

We acknowledge that ODOT has committed more than the required federal minimum (25%) in state Research funding. In addition, ODOT has continued its support of Local Technical Assistance Programs (LTAP) administered by the Center for Local Government Technology (CLGT) at Oklahoma State University. Overall, the FY 2023 SPR – Part I budget grew by about 6% over the previous year. While budgets for some work elements increased significantly, other work elements decreased. For example, funding for Statewide Long Rang Transportation Plan (LRTP) and Air Quality Planning increased by large percentage points, while work items under the Traffic and Data Collection sub-category witnessed a decrease. The differences in funding between 2022 versus 2023 are justifiable based on work program descriptions ODOT provided in the document and current emphasis areas.

We would like to thank ODOT's Strategic Asset and Performance Management (SAPM) Division staff for preparing the FY 2023 SPR Work Program and budget and assisting the Oklahoma Division staff to understand all aspects of the Planning and Research elements of FY 2023 Work Program.

We look forward to our review of the Annual Performance and Expenditure Report (APER). The APER provides a summary of FY 2022 SPR Work Program and the status of each work activity and task by the December 31, 2022, deadline.

Should you have questions or comments regarding our action on this work program, please contact Mr. Isaac N. Akem, Community Planner at 405-254-3343 (Part I) or Mr. Waseem Fazal, Program Development Team Leader/Pavement & Material Engineer at 405-254-3332 (Part II).

Sincerely,

SOUZAN BAHAVAR Digitally signed by SOUZAN BAHAVAR Date: 2022.09.22 07:18:28 -05'00'

for Basharat Siddiqi
Division Administrator

cc: Rick Johnson, Director of Project Delivery and Design, ODOT
Waseem Fazal, Program Development Team Leader, FHWA
Isaac Akem, Community Planner, FHWA

Table of Contents

PARTICIPATING POOLED FUNDS

State Planning and Research Program Management

October 1, 2022

Office of Project Delivery and Design

Rick Johnson
Director of Project Delivery and Design
rjohnson@odot.org

Beckie Lyons, CPO, CPM
SPR Program Manager
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SPR Part 1 – Planning

GIS and Data Management Projects
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System and Program Projects
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aagonzalez@odot.org

Urban/Regional Transportation /Long Range Planning and Other Projects
Laura Chaney – Planning Branch Manager
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SPR Part II – Research

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OKLAHOMA DEPARTMENT OF TRANSPORTATION

State Planning & Research (SPR) Financial Summary Sheet Federal Fiscal Year 2023

Program Period October 1, 2022 through September 30, 2023

SPR Part 1 - Planning, SPRY-0010(090)PL, JP# 01946(86)

A. Estimated Costs

SPR Part 1 - Planning	$	10,869,678.00
Total Estimated Costs	**$**	**10,869,678.00**

B. Available Funds

SPR Part 1 Unobligated Balance	$	12,598,770.00
Total Available Funds	**$**	**12,598,770.00**

C. Proposed Financing

Type	Federal	Rate	State	Local		Total
SPR	$10,869,678.00		SMC	$0.00	$	10,869,678.00
Total Proposed Financing JP # 01946(86)					**$**	**10,869,678.00**

SPR Part 2 - Research, SPRY-0010(091)RS, JP# 01946(87)

A. Estimated Costs

SPR Part 2 - Research	$	3,058,000.00
LTAP - SPR	$	393,426.00
Total SPR Pooled Fund Commitments	$	1,577,666.00
Total Estimated Cost	**$**	**5,029,092.00**

B. Available Federal Funds

SPR Part 2 Unobligated Balance	**$**	**3,300,000.00**
SPR Part 1 Unobligated Balance (remainder)	**$**	**1,729,092.00**
Total Available Funds	**$**	**5,029,092.00**

C. Proposed Financing

Type	Federal	Ratio	State	Local	Total
SPR Part 2	$5,029,092.00	80%	SMC	$0.00	
Total Proposed Financing				**$**	**5,029,092.00**

SPR Part 1 & Part 2 Totals

Total SPR Unobligated Balance	**$**	**15,898,770.00**
Total SPR Part 1 and Part 2 Estimated Costs	**$**	**14,321,104.00**
Total SPR Pooled Fund Commitments	**$**	**1,577,666.00**
Total SPR Research Funding	**$**	**3,451,426.00**
Total SPR Research & Pooled Fund Commitments	**$**	**5,029,092.00**
% of SPR Funds for Research		**32%**

SP&R PART 1 - Planning, SPRY-0010(090)PL, JP# 01946(86)

FEDERAL FISCAL YEAR 2023

		PROGRAMMED				
GIS AND DATA MANAGEMENT		**SP&R**	**State**	**PL**	**Local**	**Total**
1101	Continuing Inventory Data Studies	$700,000.00	$0.00	$0.00	$0.00	$700,000.00
1102	Highway Performance Monitoring System	$100,000.00	$0.00	$0.00	$0.00	$100,000.00
1103	Geographical Information Management System for Transportation	$1,500,000.00	$0.00	$0.00	$0.00	$1,500,000.00
	TOTAL GIS AND DATA MANAGEMENT	**$2,300,000.00**	**$0.00**	**$0.00**	**$0.00**	**$2,300,000.00**
TRAFFIC AND DATA COLLECTION						
1301	Coverage Count Program	$680,000.00	$0.00	$0.00	$0.00	$680,000.00
1302	Permanent Traffic County Program	$1,520,000.00	$0.00	$0.00	$0.00	$1,520,000.00
1304	Purchase of Traffic County Equipment	$275,000.00	$0.00	$0.00	$0.00	$275,000.00
1305	Vehicle Classification Counting Program	$450,000.00	$0.00	$0.00	$0.00	$450,000.00
1308	Traffic Monitoring System	$605,000.00	$0.00	$0.00	$0.00	$605,000.00
1309	Traffic Analysis and Projections	$150,000.00	$0.00	$0.00	$0.00	$150,000.00
	TOTAL TRAFFIC AND DATA COLLECTION	**$3,680,000.00**	**$0.00**	**$0.00**	**$0.00**	**$3,680,000.00**
ECONOMIC, SAFETY, AND FISCAL STUDIES						
1405	Motorcycle Safety and Education Program	$61,678.00	$0.00	$0.00	$0.00	$61,678.00
1406	Bridge Health Monitoring	$3,000.00	$0.00	$0.00	$0.00	$3,000.00
	TOTAL ECONOMIC, SAFETY AND FISCAL STUDIES	**$64,678.00**	**$0.00**	**$0.00**	**$0.00**	**$64,678.00**
SYSTEMS AND PROGRAMS						
1604	Pavement Management Systems	$1,500,000.00	$0.00	$0.00	$0.00	$1,500,000.00
	TOTAL SYSTEMS AND PROGRAMS	**$1,500,000.00**	**$0.00**	**$0.00**	**$0.00**	**$1,500,000.00**
URBAN / REGIONAL TRANSPORTATION PLANNING						
1700	General Urban Transportation Planning Activities	$75,000.00	$0.00	$0.00	$0.00	$75,000.00
1701	Oklahoma City Area Regional Transportation Study (OCARTS	$40,000.00	$0.00	$2,330,184.00	$466,037.00	$2,836,221.00
1702	Tulsa Metropolitan Area Transportation Study	$40,000.00	$0.00	$1,554,036.00	$310,807.00	$1,904,843.00
1703	Lawton Metropolitan Area Transportation Study	$30,000.00	$0.00	$192,723.00	$38,545.00	$261,268.00
1709	Ft.Smith Transportation Study	$25,000.00	$0.00	$34,010.00	$6,802.00	$65,812.00
1710	Regional Transportation Planning	$750,000.00	$0.00	$0.00	$181,250.00	$931,250.00
	TOTAL URBAN TRANSPORTATION PLANNING	**$960,000.00**	**$0.00**	**$4,110,953.00**	**$1,003,441.00**	**$6,074,394.00**
LONG RANGE PLAN / OTHER PLANNING ACTIVITIES						
1719	Statewide Transportation Improvement Program	$375,000.00	$0.00	$0.00	$0.00	$375,000.00
1720	Statewide Travel Demand Model	$130,000.00	$0.00	$0.00	0,00	$130,000.00
1902	Statewide Long Range Transportation	$800,000.00	$0.00	$0.00	$0.00	$800,000.00
1904	Air Quality Transportation Planning	$300,000.00	$0.00	$0.00	$0.00	$300,000.00
1905	Freight Planning	$40,000.00	$0.00	$0.00	$0.00	$40,000.00
1913	Active Transportation Planning	$350,000.00	$0.00	$0.00	$0.00	$350,000.00
1914	Transportation Asset Management Plan	$20,000.00	$0.00	$0.00	$0.00	$20,000.00
1915	Performance Measurement Coordination	$350,000.00	$0.00	$0.00	$0.00	$350,000.00
	TOTAL OTHER	**$2,365,000.00**	**$0.00**	**$0.00**	**$0.00**	**$2,365,000.00**
	GRAND TOTAL SPRY-0010(090)PL	**$10,869,678.00**	**$0.00**	**$4,110,953.00**	**$1,003,441.00**	**$15,984,072.00**

Revised 8/4/2022

1101 Continuing Inventory Data Studies

PURPOSE AND SCOPE: Catalog physical characteristics of statewide public roads; which are used to update the Department's ESRI Roads & Highways Database. Conduct meetings with County Commissioners relating to inventory modifications. Inventory Modifications are also based on completed construction projects and County Action Reports. Use SQL queries, procedures and reports to extract inventory data to publish various mileage reports for state, federal and public needs. Maintain data for the National Network of Defense, NHS System, Control Section and Public Roads. Produce AVMT figures that will be used to calculate Annual Accident and Fatality Rates. Keep abreast of the latest technological advances through the attendance of seminars and conferences. The staff managing this item now handles workflows from SPR Item 1601.

PROPOSED ACTIVITIES FOR FFY 2023: Incorporate technological advancements in data collection to streamline field inventory operations. Continue monitoring all County Action Reports, Highway Construction projects and continue collecting HPMS data items. Compile and publish various state and federal reports including: 2023 Certification of County Road Mileage, 2022 Oklahoma Statewide Statistics Book, 2022 HPMS Mileage and Travel Summary Tables.

FINANCIALS	Amount	Fund	Amount	Fund
Programmed Amount FFY 2022	$ 1,072,000	SPR	$0.00	STATE
Estimated Cost FFY 2023	$ 700,000	SPR	$0.00	STATE

CONTACT INFORMATION

Alexander Couch, Inventory Branch Manager / HPMS Coordinator, GIM II 405-522-1066

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.

PROPOSED ACTIVITIES FOR FFY 2023: A HPMS sample adequacy review will be conducted and additional samples will be added in the appropriate categories. Any changes in the HPMS data structure and HPMS console interface as required by changing FHWA requirements will be implemented and tested. Field review documents will be generated and a HPMS data field review will be conducted in cooperation with the Local FHWA Division. The 2021 HPMS data submittal will be transmitted to FHWA using our latest HPMS Console and will be consistent with the latest FHWA Version 8 web-based software. We will also be preparing for the HPMS Version 9 which will be released in the near future.

FINANCIALS	**Amount**	**Fund**	**Amount**	**Fund**
Programmed Amount FFY 2022	$133,500	SPR	$0.00	STATE
Estimated Cost FFY 2023	$100,000	SPR	$0.00	STATE

CONTACT INFORMATION

Samuel Coldiron Inventory Branch Manager / HPMS Coordinator, GIM II 405-522-1066

1103 Geographical 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 as well as geospatial data management for various ODOT divisions. The maps convey specific topics of interest that require customer input and the use of complex GIS software. GIS services are offered to ODOT staff as well as customers outside the Department. The system utilizes aerial photography, GPS, and other sources of data. The efficient use of resources requires a considerable investment in hardware, software, and training for GIMS-T staff. New methods and software are continuously being investigated and tested in order to improve the effectiveness, efficiency, and usability of the Departments applications.

PROPOSED ACTIVITIES FOR FFY 2023: Continue to expand the Map & Data Portal. Update Asset Inventory to current year. Continue the ROW digitization effort. Other map products where appropriate. Continue to provide support to ODOT personnel, other state agencies and partners with map and other products to assist them in their transportation needs. Coordinate with the Environmental, ROW, Rail, Outdoor Advertising, Facilities Management Project Management, and Traffic Engineering Divisions to identify needs and develop solutions that will enable them to efficiently and accurately perform their individual missions. Continue to utilize training of staff. Continue to coordinate with OTA to merge the GIS needs of both agencies.

FINANCIALS	**Amount**	**Fund**	**Amount**	**Fund**
Programmed Amount for FFY 2022	$973,471	SPR	$0.00	STATE
Estimated Cost for FFY 2023	$1,500,000	SPR	$0.00	STATE

CONTACT INFORMATION

Gwen Johnson, GIS Branch Manager, 405-521-4121

1301 Coverage Count Program

PURPOSE AND SCOPE: To collect traffic data on state highways, national 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 with populations over 5,000. State highway and interstate locations are counted on a three-year cycle twice a year along with portions of the county and city system coverage once a year. 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 systems are then recorded and retained for office and public use. Highway traffic maps are published for public distribution.

PROPOSED ACTIVITIES FOR FFY 2023: 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 27 counties scheduled for FY 2023. Update GPS coordinates and site characteristics for all traffic count sites on all systems as needed. Attend seminars, conferences and workshops to keep abreast of the latest technological advances in traffic counting equipment and data collection processes. The increase in requested funding for FFY 2023 is due to an increase in salaries and benefits.

FINANCIALS	**Amount**	**Fund**	**Amount**	**Fund**
Programmed Amount FFY2022	$685,000	SPR	$0.00	STATE
Estimated Cost FFY 2023	$680,000	SPR	$0.00	STATE

CONTACT INFORMATION:

Aaron Fridrich, Field Data Collection Manager, 405-567-7876

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 currently 92 Automatic Vehicle Classification (AVC) and 150 radar station locations in Oklahoma. The traffic data obtained by these AVC sites 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 AVC stations through accounts supplied by the contractor, at their expense.

PROPOSED ACTIVITIES FOR FFY 2023: Under the TMS Radar Installation Contract put in place in FFY 2020, an additional 30 radar AVC units will be installed statewide. Under the TMS Data Collection Connectivity Contract, the additional 13 radar AVC units will be brought online after installation. Under the TMS Site Repair Contract, existing in-ground AVC sensors will be repaired at selected locations until a radar unit is installed at the site. The TMS Site Repair Contract will be reduced to $400,000 to allow some repairs at most sites as needed and data will continue to be collected by both the radar unit and the in-ground AVC sensors until such time that the in-ground sensors require excessive maintenance. At this time, the in-ground AVC site will be monitored for repairs or discontinued and the radar unit will be the sole permanent data collection mechanism. As additional radar units are installed each year, the Connectivity Contract will need to be increased minimally in order to continue to collect data and maintain the radar systems

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$1,520,000	SPR	$0.00	STATE
Estimated Cost FFY 2023	$1,520,000	SPR	$0.00	STATE

CONTACT INFORMATION:

Aaron Fridrich, Field Data Collection Manager Phone: 405-567-7876

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.

PROPOSED ACTIVITIES FOR FFY 2023: The proposed construction and installation of new radar traffic monitoring stations, replacement of old equipment and the purchase additional counters to outfit new personnel comprises the majority of the expenditures for FFY 2023. As older, outdated 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. The decrease in requested funding for FFY 2023 is due to moving the annual Miovision turning movement/ATR processing cost from item 1304 to 1305 due to the nature of the Miovision contract.

FINANCIALS	**Amount**	**Fund**	**Amount**	**Fund**
Programmed Amount FFY 2022	$405,000	SPR	$0.00	STATE
Estimated Cost FFY 2023	$275,000	SPR	$0.00	STATE

CONTACT INFORMATION:

Aaron Fridrich, Field Data Collection Branch Manager Phone: 405-567-7876

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.

PROPOSED ACTIVITIES FOR FFY 2023: ODOT forces will continue the collection of ramp classification counts statewide. Various special studies, including turning movements, utilizing the Miovision scout system and volume/classification counts, 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. Continue to provide resources to fulfill the requests for various types of traffic studies and produce all reports associated with those studies. The increase in requested funding for FFY 2023 is due to an increase in salaries and benefits and from moving the Miovision turning movement/ATR processing cost from item 1304 to 1305 due to the nature of the Miovision contract.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$435,000	SPR	$0.00	STATE
Estimated Cost FFY 2023	$450,000	SPR	$0.00	STATE

CONTACT INFORMATION:

Aaron Fridrich, Field Data Collection Manager Phone: 405-567-7876

1308 Traffic Monitoring System

PURPOSE AND SCOPE: To manage, estimate, report, and publish traffic data estimates as specified in the Highway Performance Monitoring System (HPMS) Manual and the Federal Highway Administration (FHWA) Traffic Monitoring Guide. The program also provides design traffic analysis and forecasts for new highways, planning functions, and improvement of the existing highways. Writing specifications, review and corrections, and approval of consultant engineering contract design traffic projects and research projects are performed as needed. Economic, environmental, and other factors of roadway improvements such as interchanges, realignments, and pedestrian structures are studied for the purpose of determining the economic and engineering feasibility of such proposals.

PROPOSED ACTIVITIES FOR FFY 2023: Traffic Monitoring System will continue the process of verifying, validating, and analyzing automatic vehicle classifiers and short-term traffic counts for AADT estimation and HPMS data submittal. Applications will continue to be researched and developed for an automated estimation process for statewide AADT. Continue assessment of proposed and existing count site locations for coverage of the functional classified roadway system. Remain informed of technological advances and current best practices through attendance of seminars, conferences, and workshops. Manage consultant contracts that help Traffic Monitoring System with data collection and data processing. The estimated cost change for FY 2023 is due to Vehicle Classification Collection, Southern Traffic, and for Traffic Analysis Software, Traffic Analyzer, billed through this item in addition to changes in staff.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$750,000	SPR	$0.00	STATE
Estimated Cost FFY 2023	$605,000	SPR	$0.00	STATE

CONTACT INFORMATION:

Angel Gonzalez, Assistant Division Engineer, 405-437-5688

1309 Traffic Analysis and Projections

PURPOSE AND SCOPE: To provide traffic analysis and forecasts for geometric and structural design of new highways, roadway planning functions, roadway maintenance, and improvement of existing highways. To write specifications and to review, correct, and approve consultant work for engineering contract design traffic projects as well as research projects.

PROPOSED ACTIVITIES FOR FFY 2023: Design traffic data will continue to be furnished for cities, counties, and to ODOT divisions upon approved requests. Consultant design projects as well as feasibility and justification studies will be overseen through completion. Traffic analysis and projections will be completed, as requested for all programmed planning, construction, and maintenance projects. Remain informed of technological advances through attendance of seminars, conferences, and workshops. The estimated cost change for FY 2023 is based on staff changes and changes in time charged against this item.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$150,000	SPR	$0.00	STATE
Estimated Cost FFY 2023	$150,000	SPR	$0.00	STATE

CONTACT INFORMATION:

Angel Gonzalez, Assistant Division Engineer, 405-437-5688

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 focuses on educating motorcyclists about safe riding habits and techniques to prevent crashes. The Oklahoma Highway Patrol (OHP), in coordination with the ODOT Traffic Engineering Division's Collision Analysis & Safety Branch, conducts motorcycle safety course and participates in education, outreach, and public awareness activities as a means of improving motorcycle user safety on the public roadways.

PROPOSED ACTIVITIES FOR FFY 2023: The Oklahoma Highway Patrol, in partnership with ODOT, will continue implementation of the statewide motorcycle safety and education program. The program will include 10 classroom and experiential educational training sessions and public outreach and awareness. OHP will use ODOT collision data to examine program effectiveness and use variables such as age, locations, types of crash etc., to further refine program strategies.

FINANCIALS	**Amount**	**Fund**	**Amount**	**Fund**
Programmed Amount FFY 2022	$57,000	SPR	$0.00	STATE
Estimated Cost FFY 2023	$61,678	SPR	$0.00	STATE

CONTACT INFORMATION

Beckie Lyons, APO IV SPR Program Mananger 405-514-1642

1406 Bridge Health Monitoring

PURPOSE AND SCOPE: The purpose and scope of his task is to coordinate initial test of bridge health monitoring in Oklahoma for data related to over load posted vehicles. Bridge load posting and response analysis. The initial trials will be used to analyze the viability for use on other structures in poor condition.

ACCOMPLISHMENTS DURING FFY 2023: Sensors were installed to monitor and analyze the bridge in search of strengthening. . The data will be compared to the BDI data for accuracy and consistency. Data will be used as a basis for load rating decisions and any necessary retractions.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$10,000	SPR	$0.00	STATE
Estimated Cost FFY 2023	$3,000	SPR	$0.00	STATE

CONTACT INFORMATION:

Beckie Lyons, APO IV SPR Program Mananger, 405-514-1642

1604 Pavement Management System

PURPOSE AND SCOPE: To develop and implement the Department's Pavement Management System. To maintain a computer database of pavement distresses and other roadway characteristics used for the analysis of pavement condition and performance. Maintain application software necessary to analyze roadway information for pavement management. Supply data for inclusion in the Highway Performance Monitoring System (HPMS). Maintain a database indicating ratings for roadways with suggested improvements and costs.

PROPOSED ACTIVITIES FOR FFY 2023: Perform Pavement Management System collection and analysis on all NHS and SHS routes in Oklahoma as well as all non-highway samples required for HPMS. Conduct data quality testing to ensure pavement data quality. Continue refinement of analysis for deterioration curves, pavement strategies, and project optimization utilized by the pavement management software. Provide technical support for the video log software. Document Pavement Management processes by generating manuals for Collection, Analysis, and Reporting. Keep informed of the latest technological advances and practices by attending meeting, webinars and workshops. Proposed increase in cost for FY2023 due to new contract for pavement data collection.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$1,500,000	SPR	$0.00	STATE
Estimated Cost FFY 2023	$1,500,000	SPR	$0.00	STATE

CONTACT INFORMATION

Angel Gonzalez, Assistant Division Engineer, 405-437-5688

1700 General Urban Transportation Planning

PURPOSE AND SCOPE: To coordinate transportation planning efforts which cannot be ascribed to specific transportation studies contained in the unified planning work programs of the State Planning and Research Work Program. To provide linkage between transportation planning and project development, environmental review, and other topics as needed.

PROPOSED ACTIVITIES FOR FFY 2023: Provide coordination with ODOT Central Office, Field Divisions and local, state and federal officials. Disseminate pertinent planning data and information as needed. Provide technical assistance as requested concerning transportation planning and the Infrastructure Investment and Jobs Act (IIJA). Build upon staff knowledge through attendance at workshops, seminars and conferences.

The increased estimated cost in FFY 2023 include staff time for oversight of grant programs related to the IIJA.

FINANCIALS	**Amount**	**Fund**	**Amount**	**Fund**
Programmed Amount for FFY2022	$50,000	SPR	$0.00	STATE
Estimated Cost for FFY 2023	$75,000	SPR	$0.00	STATE

CONTACT INFORMATION

Laura Chaney, Planning & Performance Branch Manager, 405-819-3719

1701 Oklahoma City Area Regional Transportation Study

PURPOSE AND SCOPE: Assist and oversee transportation planning processes and coordination with the Association of Central Oklahoma Governments (ACOG) in the execution of the Unified Planning Work Program (UPWP), Transportation Improvement Program (TIP), and Long Range Transportation Planning (LRTP) for the Oklahoma City Area Regional Transportation Study Area (OCARTS).

PROPOSED ACTIVITIES FOR FFY 2023: Continue to implement activities in Encompass 2045 plan. An emphasis will continue to be placed on financial feasibility, public involvement and the economic and environmental impacts of transportation decisions, and performance-based planning. Continuation of the Regional Transit Authority Task Force activities. Continue utilizing the STBG-UZA evaluation criteria to reflect evolving regional goals and performance measures. Continued coordination with local governments regarding federal transportation funding opportunities. Continue work in areas of air quality, ozone reduction and environmental program planning to comply with federal transportation law.

The SPR estimated cost in FFY 2023 changed due to increases in staff salaries.

FINANCIALS	Amount	Fund	Amount	Fund	Amount	Fund
Programmed Amount FFY 2022	$30,000	SPR	$2,098,264	PL	$ 419,653	LOCAL
Estimated Cost FFY 2023	$40,000	SPR	$2,330,184	PL	$ 466,037	LOCAL

CONTACT INFORMATION

Laura Chaney, Planning & Performance Branch Manager, 405-819-3719

1702 Tulsa Metropolitan Area Transportation Study

PURPOSE AND SCOPE: Assist and oversee transportation planning processes and coordination with the Indian Nations Council of Governments (INCOG) in the execution of the Unified Planning Work Program (UPWP), Transportation Improvement Program (TIP), and Long Range Transportation Planning (LRTP) for the Tulsa Metropolitan Area Transportation Study Area (TMATS).

PROPOSED ACTIVITIES FOR FFY 2023: Continue data collection and monitoring of social, economic and environmental factors that directly relate to the transportation system. address multi-modal transportation issues within the TMA aimed at maintaining a continuing, coordinated and comprehensive planning process. Responsible for preparing and maintaining the Regional Transportation Plan (RTP). Focus areas for FY 2023 will include: Completion of the Regional Transportation Plan with a 2050 horizon year. Multimodal connectivity and continued implementation of the GO plan for 'active' transportation. Maintain the TIP for FFY 2022-2025 through modifications and amendments as needed. INCOG & OHSO will further cooperatively develop strategies with a targeted crash mitigation related to bicycle and pedestrian crashes. In addition, INCOG will continue it's public outreach safety campaign, Travel With Care. Continue coordinating the OZONE ALERT! Program & the Clean Cities Program. Update the Congestion Management Process to adhere to federal requirements within the TMA. Continue assisting member governments in the planning, funding and implementation of an alternative transportation system. Continue the implementation of the Transportation Alternatives (TA) program.

The SPR estimated cost in FFY 2023 changed due to increases in staff salaries.

FINANCIALS	**Amount**	**Fund**	**Amount**	**Fund**	**Amount**	**Fund**
Programmed Amount FFY 2022	$30,000	SPR	$ 1,266,500	PL	$ 253,300	LOCAL
Estimated Cost FFY 2023	$40,000	SPR	$ 1,554,036	PL	$ 310,807	LOCAL

CONTACT INFORMATION

Laura Chaney, Planning & Performance Branch Manager, 405-819-3719

1703 Lawton Metropolitan Area Transportation Study

PURPOSE AND SCOPE: Assist and oversee transportation planning processes and coordination with the Lawton Metropolitan Planning Organization (LMPO) in the Lawton Metropolitan area.

PROPOSED ACTIVITIES FOR FFY 2023: As defined in the FY 2022 UPWP, continue the Feasibility Study and Design Concept for the Extension of Goodyear Boulevard to connect US 62 and the West Lawton Industrial Park. Procure consultant to conduct a Traffic Flow Study. Continue Zero-Emission Bus Analysis and Rollout Plan for the Lawton Area Transit System. Continued research on the benefits of utilizing roundabouts and identifying areas within the LMPO's boundary they could be utilized to improve traffic flow and safety. Continue research and mapping of right-of-way widths of arterials. Analyze pedestrian facilities and identify areas for new bike and pedestrian crossings. Monitor and report on performance measures and establish targets. Continue efforts working with key entities on the multi-modal transportation transfer center. Research and apply for grant opportunities for the construction of a bus transfer center. Maintain the FFY 2022-2025 TIP through modifications and amendments. Continue the public awareness campaign for air quality.

The SPR estimated cost in FFY 2023 changed due to increases in staff salaries.

FINANCIALS	**Amount**	**Fund**	**Amount**	**Fund**	**Amount**	**Fund**
Programmed Amount FFY 2022	$25,000	SPR	$ 325,698	PL	$ 65,140	LOCAL
Estimated Cost FFY 2023	$30,000	SPR	$ 192,723	PL	$ 38,545	LOCAL

CONTACT INFORMATION

Laura Chaney, Planning & Performance Branch Manager, 405-819-3719

1709 Ft. Smith Transportation Study

PURPOSE AND SCOPE: Assist and oversee transportation planning processes and coordination with the Frontier Metropolitan Planning Organization in the Ft. Smith Metropolitan Area.

PROPOSED ACTIVITIES FOR FFY 2023: Frontier will continue to apply performance-based planning, take action to establish opportunities for local, regional, and statewide coordination, and advance efforts for transportation connectivity, equity and accessibility. Key activities will include: carrying out activities in the 2045 Metropolitan Transportation Plan. Continue creating bicycle and pedestrian plans for the region that will provide bicycle and pedestrian education through public outreach, training opportunities and partnerships with federal, state and local agencies. Monitoring safety needs and initiatives, Frontier will continue to evaluate crash data within the metropolitan planning area and coordinate on the use of the data to meet MAP-21 and FAST ACT performances measures with ARDOT and ODOT. Work with local governments to coordinate land use and transportation concerns. Frontier will continue to analyze socio-economic data, such as population, employment, household, and growth projections, as well as transit ridership for use in updating and improving transportation planning decision making. The MPO will continue to work in areas of air quality, ozone reduction and environmental program planning to comply with federal transportation law.

FINANCIALS	**Amount**	**Fund**	**Amount**	**Fund**	**Amount**	**Fund**
Programmed Amount FFY 2022	$25,000	SPR	$ 39,000	PL	$ 7,800	LOCAL
Estimated Cost FFY 2023	$25,000	SPR	$ 34,010	PL	$ 6,802	LOCAL

CONTACT INFORMATION:

Laura Chaney, Planning & Performance Branch Manager, 405-819-3719

1710 Regional Transportation Planning

PURPOSE AND SCOPE: To provide transportation planning assistance for the non-metropolitan areas of the State through the Oklahoma Association of Regional Councils (OARC). The regional transportation planning 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.

PROPOSED ACTIVITIES FOR FFY 2023: The Oklahoma Department of Transportation will continue coordination with the RTPO's in maintaining the 3-C planning process in non-metropolitan areas. monitor the transportation planning process for compliance with administrative, financial, and legal requirements to maintain a continuous, cooperative and comprehensive process. Continue staff education, training and attendance at workshops and seminars. assist in data collection and monitoring of social, economic, environmental and transportation system data. Continued development of each RTPOs Regional Long Range Transportation Plan.

FINANCIALS

	Amount	**Fund**	**Amount**	**Fund**	**Amount**	**Fund**
Central Oklahoma Economic Development District	$125,000	SPR	$0.00	STATE	$31,250	LOCAL
Grand Gateway Economic Development District	$125,000	SPR	$0.00	STATE	$31,250	LOCAL
Northern Oklahoma Development Authority	$175,000	SPR	$0.00	STATE	$43,750	LOCAL
Southwestern Oklahoma Development Authority & Association of South Central Oklahoma Governments	$225,000	SPR	$0.00	STATE	$56,250	LOCAL
Southern Oklahoma Development Agency	$75,000	SPR	$18,750	STATE	$18,750	LOCAL

FINANCIALS	**Amount**	**Fund**	**Amount**	**Fund**	**Amount**	**Fund**
Programmed Amount FFY 2022	$755,000	SPR	$0.00	STATE	$181,250	LOCAL
Estimated Cost FFY 2023	$750,000	SPR	$0.00	STATE	$190,000	LOCAL

CONTACT INFORMATION:

Laura Chaney, Planning & Performance Branch Manager, 405-819-3719

1719 Statewide Transportation Improvement Program

PURPOSE AND SCOPE: To develop, administer and revise a financially-constrained federally funded Statewide Transportation Improvement Program (STIP) for the State of Oklahoma in compliance with the Fixing America's Surface Transportation (FAST) Act and in cooperation with the Federal Highway Administration (FHWA), Federal Transit Administration (FTA), the four Metropolitan Planning Organizations (ACOG, INCOG, LMPO, and Frontier MPO), the Bureau of Indian Affairs, and Tribal Governments.

PROPOSED ACTIVITIES FOR FFY 2023: Manage and amend or modify the STIP as necessary. Continue administration of current STIP using approved procedures. Continue development of an electronic STIP in coordination with the MPOs and FHWA.

FINANCIALS	**Amount**	**Fund**	**Amount**	**Fund**
Programmed Amount for FFY2022	$400,000	SPR	$0.00	STATE
Estimated Cost for FFY 2023	$375,000	SPR	$0.00	STATE

CONTACT INFORMATION:

Laura Chaney, Planning & Performance Branch Manager, 405-819-3719

1720 Statewide Travel Demand Model

PURPOSE AND SCOPE: To use the developed statewide travel demand model to determine regional and corridor-based needs. Mode share will be addressed within regional corridors. The project will use the Statewide Travel Demand Model, which is based on the Oklahoma road network, traffic analysis zone, and demographic, mode, network data, and validation and calibration of a base year model.

PROPOSED ACTIVITIES FOR FFY 2023: Enhance staff knowledge through courses, seminars, trainings, and conferences hosted by the Federal Highway Administration, the National Highway Institute, and others. Initiate models runs to assist in Department planning activities.

FINANCIALS	**Amount**	**Fund**	**Amount**	**Fund**
Programmed Amount for FFY 2022	$ 131,000	SPR	$0.00	STATE
Estimated Cost for FFY 2023	$ 130,000	SPR	$0.00	STATE

CONTACT INFORMATION:

Laura Chaney, Planning & Performance Branch Manager, 405-819-3719

1902 Statewide Long Range Transportation Planning

PURPOSE AND SCOPE: To maintain the Oklahoma Long Range Transportation Plan (LRTP) and other associated statewide planning activities in accordance with the provisions of federal law.

PROPOSED ACTIVITIES FOR FFY 2023: Continue maintenance and implementation of the 2020-2045 LRTP. Continue coordination with ODOT divisions, MPOs and local governments in relation to long range transportation plans. Review federal regulations, and pertinent state legislative transportation issues. Keep apprised of possible changes in long range transportation planning requirements as new federal legislation is developed. Develop a Carbon Reduction Strategy and Resiliency Improvement Plan in coordination with MPOs and FHWA.

The increased estimated cost for FFY 2023 includes staff time and consultant fees for the development of the required Carbon Reduction Strategy and a Resiliency Improvement Plan.

FINANCIALS	**Amount**	**Fund**	**Amount**	**Fund**
Programmed Amount for FFY 2022	$20,000	SPR	$0.00	STATE
Estimated Cost for FFY 2023	$800,000	SPR	$0.00	STATE

CONTACT INFORMATION:

Laura Chaney, Planning & Performance Branch Manager, 405-819-3719

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 the FAST Act. Represent the Department in air quality non-attainment and transportation conformity actions. Analyze and comment on air quality non-attainment 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.

PROPOSED ACTIVITIES FOR FFY 2023: Maintain research and participation in air quality/transportation issues, developments, regulations, and laws; 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. Continue monitoring attainment status throughout the state and facilitate relationships as necessary pertaining to federal attainment requirements. Attend air quality/transportation planning activities of the LMPO, ACOG, and INCOG. Participate in MPO and ODEQ air quality/transportation initiatives, educational programs, and efforts to reduce pollution. Continue partnership with ACOG and INCOG 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. Coordinate with MPOs to sign federally designated alternate fuel corridors. Continue staff education through courses, seminars, and conferences. Update the EV Infrastructure Deployment Plan.

The increased estimated cost for FFY 2023 includes staff time and consultant fees for updating the required EV Infrastructure Deployment Plan.

FINANCIALS	**Amount**	**Fund**	**Amount**	**Fund**
Programmed Amount FFY 2022	$20,000	SPR	$0.00	STATE
Estimated Cost FFY 2023	$300,000	SPR	$0.00	STATE

CONTACT INFORMATION:

Laura Chaney, Planning & Performance Branch Manager, 405-819-3719

1905 FREIGHT TRANSPORTATION PLANNING

PURPOSE AND SCOPE: To coordinate freight planning and freight data analysis with the Long Range Transportation Plan (LRTP), the Oklahoma Freight Transportation Plan, the State Rail Plan, waterway freight planning reports and project development processes. To ensure Oklahoma's freight planning efforts are in compliance with federal regulations.

PROPOSED ACTIVITIES FOR FFY 2023: Review existing and proposed federal regulations as they relate to freight planning. Review and analyze the freight analysis framework (FAF) data, freight congestion, the national performance measures roadway data set, and urban and rural freight transport.

The Oklahoma Freight Transportation Plan was updated in FFY 2022 and because of that the estimated cost of this item for FFY 2023 significantly declined.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$500,000	SPR	$0.00	STATE
Estimated Cost FFY 2023	$40,000	SPR	$0.00	STATE

CONTACT INFORMATION:

Laura Chaney, Planning Performance Branch Manager, 405-819-3719

1913 Active Transportation Planning

PURPOSE AND SCOPE: To coordinate and develop a bicycle and pedestrian program for the State of Oklahoma in compliance with the provisions of existing federal regulations and Fixing Americas Surface Transportation (FAST) Act provisions and all applicable transportation planning regulations and requirements in compliance with the FHWA, FTA, the four Metropolitan Planning Organizations (ACOG, INCOG, LMPO, and Frontier MPO), and non-metropolitan areas.

PROPOSED ACTIVITIES FOR FFY 2023: Monitor bicycle and pedestrian issues, developments, regulations, and laws. Develop educational materials and resources for Department personnel regarding bicycle and pedestrian safety, infrastructure design, and transportation. Attend bicycle and pedestrian planning activities of ACOG, INCOG, LMPO and Frontier MPO and other non-metropolitan areas of the State. Participate in bicycle and pedestrian transportation planning initiatives, seminars, workshops and educational programs across the State. Continue supporting ODOT GIS on data needs and updates for the ODOT Bicycle App. Coordinate the development of a statewide inventory of existing and proposed bicycle and pedestrian facilities. Enhance staff knowledge through courses, seminars, trainings, and conferences hosted by FHWA, LTAP, APBP, WalkBike Places, TRB and others. Work with local communities across the State to install USBR 66 signage and promote cycling along the USBR 66 route. Begin development of the Oklahoma Statewide Active Transportation Plan. Begin development of the Oklahoma Statewide Mobility Plan. Coordinate efforts and projects with the ODOT ADA Coordinator. Work with Local Government on Transportation Alternatives Program (TAP) and Safe Routes to School (SRTS) projects and implementation.

FINANCIALS	**Amount**	**Fund**	**Amount**	**Fund**
Programmed Amount FFY 2022	$500,000	SPR	$0.00	STATE
Estimated Cost FFY 2023	$350,000	SPR	$0.00	STATE

CONTACT INFORMATION:

Shelby Templin, Active Transportation Coordinator, 405-862-5580

1914 Transportation Asset Management Plan

PURPOSE AND SCOPE: To develop a transportation asset management plan (TAMP) for the Oklahoma Department of Transportation. The TAMP is a federal requirement identified in MAP-21 and the FAST Act. The TAMP incorporates many working areas covering target areas of maintenance, construction, financials, inventory, performance data, and programming through the TAMP Steering Committee, the TAMP Working Group, and TAMP Task Forces. The TAMP will meet requirements of the CFR, which was published on October 24, 2016.

PROPOSED ACTIVITIES FOR FFY 2023: Continue to participate in various activities as they are available including meetings, workshops, webinars, conferences and peer exchanges. Keep informed of best practices in asset management and performance management. Implement asset management through action oriented tasks. Monitor the rule making process related to performance measures.

The estimated cost has declined significantly since the TAMP was updated and submitted to FHWA in FFY 2022.

FINANCIALS	**Amount**	**Fund**	**Amount**	**Fund**
Programmed Amount FFY 2022	$50,000	SPR	$0.00	STATE
Estimated Cost FFY 2023	$20,000	SPR	$0.00	STATE

CONTACT INFORMATION:

Laura Chaney, Planning Performance Branch Manager, 405-819-3719

1915 Performance Measures Coordination

PURPOSE AND SCOPE: To coordinate data related to performance measures, metrics (quantifiable indicator of performance), thresholds, and targets. To develop ODOT's State Biennial Performance Report. Performance Measures to be covered in the Biennial Report are described in different Subparts of Title 49 as per the FAST Act. Subpart C concerns Pavement Conditions; Subpart D concerns Bridge Condition; Subpart E concerns System Performance (travel time reliability) of the NHS; Subpart F concerns Freight (Truck) Movement on the Interstate System. Related information for each subpart and related measures, metrics, targets, etc. will be reported annually by the related ODOT "Division Owner", through the Highway Performance Monitoring System (HPMS), the Highway Safety Improvement Program (HSIP), or other processes. Additionally, safety performance data will be reported through the HSIP process.

PROPOSED ACTIVITIES FOR FFY 2023: Continue developing and implementing agency plans for compliance with required performance measures and reporting. Coordinate with subject matter experts on bridge, pavement, travel time reliability, and freight performance measure data collection and preparation. Attend seminars and workshops on performance measures topics and reporting techniques. Continue Speed Data Collection, HERE data, through this item.

FINANCIALS	**Amount**	**Fund**	**Amount**	**Fund**
Programmed Amount for FFY 2022	$360,000	SPR	$0.00	STATE
Estimated Cost for FFY 2023	$350,000	SPR	$0.00	STATE

CONTACT INFORMATION:

Angel Gonzalez, Assistant Division Engineer, 405-437-5688

SPR Part 2 Financial Summary Sheet

SPR PART 2 - RESEARCH, SPRY-0010(091)RS, JP# 01946(87)
FEDERAL FISCAL YEAR 2023

		SPR	STATE	LOCAL	TOTAL
GENERAL ITEMS					
2100	Transportation Research Board (TRB)	$20,000.00			$20,000.00
2105	Peer Exchange	$9,000.00			$9,000.00
2115	Long Term Pavement Performance (LTPP)	$5,000.00			$5,000.00
2120	Technical Assistance - Special Studies	$25,000.00			$25,000.00
2125	Implementation of Technology Transfer	$25,000.00			$25,000.00
2130	General Research Activities	$250,000.00			$250,000.00
2160	OU Interagency Master Agreement for Research and Investigation Services	$500,000.00			$500,000.00
2161	ODOT Transportation Library Management	$183,000.00			$183,000.00
2300	Research Implementation	$100,000.00			$100,000.00
2400	OSU Interagency Master Agreement for Research and Investigation Services	$500,000.00			$500,000.00
2700	Experimental Product Evaluation Program	$80,000.00			$80,000.00
	Total General Activities	**$1,697,000.00**			**$1,697,000.00**
CONTINUING RESEARCH PROJECTS					
2156	Roadside Vegetation Management Training & Consultation	$255,000.00			$255,000.00
2286	Compost Filter Socks for Storm Water & Erosion Control in Construction - Phase 2	$104,000.00			$104,000.00
2287	Eval. Exp. Life and Recoat. of Silane Water Repell. Treatm. on Bridge Decks	$120,000.00			$120,000.00
2288	Long Term Perf. and Benefits of Comb. Balanced Mix Des. And Chem. WMA Techn	$105,000.00			$105,000.00
2290	Bond Behavior of Epoxy Coated Reinforcing Bars in Non-Proprietary UHPC	$140,000.00			$140,000.00
2291	A Fatig. Assmt. Framew. for Steel Brdgs. using Fiber Optic Sens. & Mach. Learning	$105,000.00			$105,000.00
2292	Innov. Multi-Hazard Resistant Bridge Columns for Accelerated Bridge Construction	$105,000.00			$105,000.00
	Total Continuing Research Projects	**$934,000.00**			**$934,000.00**
NEW RESEARCH PROJECTS					
2294	Investigate the Aging Behavior of Asph. Binders at Different Production Stages	$200,000.00			$200,000.00
	Total New Research Projects	**$200,000.00**			**$200,000.00**
CONTINUING IMPLEMENTATION PROJECTS					
	No Continuing Implementation Projects	$0.00			$0.00
	Total Continuing Implementation Projects	**$0.00**			**$0.00**
NEW IMPLEMENTATION PROJECTS					
2316	Solving the Riddle of End Regions in PC Beams	$130,000.00			$130,000.00
2317	Effectiv. of Magnesium-Alumino-Liquid-Phosph.-Based Concrete as a Repair Materi	$97,000.00			$97,000.00
	Total New Implementation Projects	**$227,000.00**			**$227,000.00**
	Total SPRY-0010(091)RS				**$3,058,000.00**
LTAP Project Number TTY-LTAP (011)TT	**JP# 30001(22)**				
1440	Local Technical Assistance Program	$393,426.00			$393,426.00
	Grand Total with LTAP	**$3,451,426.00**			**$3,451,426.00**
POOLED FUND STUDIES					
5000 OK LEAD ITEM (Management)		$10,000.00			$10,000.00
TPF-5(448)	Integrating Construction Practices and Weather Into Freeze Thaw Specifications	$20,000.00			$20,000.00
	Total OK Lead Studies	**$30,000.00**			**$30,000.00**
5005 OK PARTICIPATING ITEMS (Management)		$12,000.00			$12,000.00
TPF-5(###)	NCHRP	$750,000.00			$750,000.00
TPF-5(326)	Develop and Support Transportation Performance Management Capacity Development Needs for State DOT's	$27,000.00			$27,000.00
TPF-5(357)	Impl. Shakecast Across Multiple State Depts. For Rapid Post Erthquake Resp.	$15,000.00			$15,000.00
TPF-5(372)	Building Information Modeling (BIM) for Bridges and Structures	$25,000.00			$25,000.00
TPF-5(394)	Western Maintenance Partnership	$15,000.00			$15,000.00
TPF-5(437)	Technology Transfer Concrete Consortium (TTCC) FY20-FY24	$12,000.00			$12,000.00
TPF-5(465)	Consortium for Asphalt Pavement Research & Implementation (CAPRI)	$10,000.00			$10,000.00
TPF-5(469)	Accel. Perf. Testing on the 2021 NCAT Pavem. Test Track with MnROAD Res. Partner.	$416,666.00			$416,666.00
TPF-5(478)	Demonstration to Advance New Pavement Technologies	$10,000.00			$10,000.00
TPF-5(479)	Clear Roads Winter Highway Operations Phase III Pooled Fund	$25,000.00			$25,000.00
TPF-5(484)	Protecting Bridge Girders from overheight Vehicles	$70,000.00			$70,000.00
TPF-5(496)	TRB Core Program Services for a Highway RD&T Program – Federal Fiscal Year 2022/TRB (State DOTs) Fiscal Year 2023	$160,000.00			$160,000.00
	Total OK Participating Studies	**$1,547,666.00**			**$1,547,666.00**
	Total Pooled Fund Studies	**$1,577,666.00**			**$1,577,666.00**
	TOTAL RESEARCH FUNDING INCLUDING POOLED FUND STUDIES				**$5,029,092.00**

1440 Local Technical Assistance Program

PURPOSE AND SCOPE: The Local Technical Assistance Program (LTAP) is an education program contracted through Oklahoma State University to provide training and technical assistance to county, municipal, and tribal governments responsible for transportation systems at the local level. This is accomplished by (1) conducting classes and workshops; (2) providing on-site technical assistance; (3) maintaining a library of publications, DVDs and other technology documents; (4) providing information and technical assistance on new and existing technologies; (5) coordinating with faculty and staff at OSU, ODOT, FHWA and industry to provide technical expertise; (6) providing a website; (7) maintaining a database of transportation officials in Oklahoma and nationwide; and (8) Transportation Intern Program (TIP).

PROPOSED ACTIVITIES FOR FFY 2023: Plans to hold a Heavy Equipment Rodeo and various levels of instruction; Begin CDL Train the Trainer courses due to federal mandate; Offer Grant Writing 101; Offer Pipe and Culvert installation class; Continue to develop activities to facilitate the implementation of EDC Initiatives; Continue the Roads Scholar curriculum in conducting at least two of each course offering during the fiscal year; Participate in ACCO, CODA, OML, NLTAPA and LTAP Region VI meetings; Continue to teach and develop courses in the FHWA focus areas; Continue to serve as the state office of the Oklahoma Chapter of APWA; Continue assisting agencies through the TRIP; Serve on various local and national committees; Provide technical assistance as requested; Continue to provide website, newsletter, books, plans, DVD's, etc. for distribution; Conduct LTAP Advisory Meeting and develop requested activities where possible; Provide program progress reports to ODOT and FHWA.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$268,740	SPR	$79,142	STATE	$150,000	FHWA
Projected Cost FFY 2023	$393,426	SPR	$78,685	STATE	$150,000	FHWA

CONTACT INFORMATION: Bryan Cooper: Transportation Manager, 405-305-1963

2100 Transportation Research Board (TRB) Participation

PURPOSE AND SCOPE: This item covers employee time travel expenses and time for ODOT ORI personnel to attend the annual TRB meeting to advance technical development of topics and issues required to support the Office if Research and Implementation's work program. Many TRB related activities are either fully covered or discounted as a result of being a TRB Sponsor (see list below). This SPR item may also be used for expenses not covered by TRB, such as employee time, travel to and registrations and/or discounted registrations for TRB related annual technical committee conferences and workshops. This item's funds may not be used for what is already covered in the sponsorship (see list).

Some Major Benefits of Being a $75,500+ Sponsor of TRB's Core Programs:

- Unlimited registrations to the TRB Annual Meeting for all Sponsor ODOT employees.
- Meeting facilities and an exhibit booth at the Annual Meeting (based on availability).
- Sponsors are represented on the TRB Executive Committee.
- TRB maintains standing committees in subject areas of interest to Sponsors.
- TRB standing technical committees currently sponsor or co-sponsor 25-30 conferences and more than 100 workshops annually on a wide range of subjects. Sponsor employees are eligible for discounted registration fees for many of these conferences.
- Sponsor employees are eligible for free registration for TRB sponsored webinars on a wide range of transportation topics.
- TRB operates a staff Field Visit Program to facilitate the exchange of relevant information and increased participation of our Sponsors on committees and programs of NAS/TRB. TRB will schedule visits with Sponsors and establish liaison representatives as appropriate. A summary of the results of these visits is printed annually in the TR News - which is distributed to around 10,000 subscribers, including Sponsors.

More TRB sponsorship benefits (covered resources) can be found under SPR Item 2161

PROPOSED ACTIVITIES FOR FFY 2023: A request will be made for up to three (3) ORI staff members to attend the 2023 annual TRB meeting. Other requests may be made for other TRB committee meetings, webinars and workshops.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$20,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$20,000	SPR	$0.00	STATE

CONTACT INFORMATION

ODOT Project Manager: Ron F. Curb PE CPM, rcurb@odot.org, 405-420-9163

2105 Peer Exchange

PURPOSE AND SCOPE: This item covers activity related to required peer exchange processes outlined in CFR 420. A state DOT is required to host a peer exchange every 3-5 years for the purpose of gaining knowledge that benefits the processes and outcomes of a research program. The peer exchange participants may include other state DOTs, FHWA, other federal agencies, academia, industry, and local and tribal partners. The requirement may be met by a state DOT that participates fully in the exchange. The number of states that can claim “full participation” is limited to four per event. The host state usually pays for all expense of all participants including travel, lodging, and meals,

PROPOSED ACTIVITIES FOR FFY 2023: Plan to host a peer exchange in FFY2023. This peer exchange will be funded through task order 2160-23-02.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$9,000	SPR	$0.00	STATE

CONTACT INFORMATION

ODOT Project Manager: Ron F. Curb PE CPM, rcurb@odot.org, 405-420-9163

2115 Long Term Pavement Performance (LTPP)

PURPOSE AND SCOPE: The purpose of this project is to maintain LTPP test sites, markings and current status, report maintenance to the new FHWA Contractor Stantec. To assist Stantec with data gathering as necessary and act as the general liaison between Stantec and Oklahoma Transportation. Maintain working knowledge related to SHRP product implementation, act as general liaison between FHWA and Oklahoma Transportation for product implementation activities.

PROPOSED ACTIVITIES FOR FFY 2023: Perform annual site investigations; record observations and report findings; perform inventory of all signs and pavement markings; obtain; arrange for continued testing and monitoring of current SPS and GPS site locations in Oklahoma for FFY 2022.
NOTE: Oklahoma has nine (9) sites remaining in the study, however it is uncertain how much longer any section will remain in study.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$5,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$5,000	SPR	$0.00	STATE

CONTACT INFORMATION

Project Manager: Bryan Cooper, Transportation Manager, 405-305-1963

2120 Technical Assistance Special Studies

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

PROPOSED ACTIVITIES FOR FFY 2023: Continue to monitor the GTR project in Canadian County through the performance of condition surveys, monitor new Balanced Mix Design projects, monitor any new EDC initiative implementations; continue to serve on the OKTIM Coalition; continue to monitor any SPR Project field activities; continue to provide support for the Department with assistance and equipment in special investigations, storm drain inspections, pavement testing, traffic control and any other activities of services as requested; acquire, calibrate, test and / or compare new equipment or instruments to existing equipment or instruments where necessary.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$25,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$25,000	SPR	$0.00	STATE

CONTACT INFORMATION

Project Manager: Bryan Cooper, Transportation Manager, 405-305-1963

2125 Support of Innovation Initiatives

PURPOSE AND SCOPE: Innovation has become a critical aspect when considering use of funds, regardless of the source. Innovation is a concept that is demanded of and embraced by all working groups of ODOT. Innovation does not necessarily require that a technology is proven, but that it has the reasonable potential to enhance deliverables in the general areas of lives, time, cost, and environment.

This item will provide support to ODOT innovation initiatives being incorporated into ODOT.

PROPOSED ACTIVITIES FOR FFY 2023: Continue to monitor the implementation of new Diverging Diamond Projects in Oklahoma, along with any other EDC implementation and report progress to the STIC; Continue support for CAV efforts and Unmanned Aerial Systems in Traffic Collision Investigation; support and monitor a demonstration of Fiber Reinforced Asphalt Concrete project using Aramid fibers; Support and monitor a bridge deck cure and seal project; support and monitor the use of an innovative piece of equipment that will test the concrete water/cement ratio at a project site or in the lab. Maintain a website. Monitor any new STIC Incentive and AID Demonstration Projects that are awarded through the STIC Network in the new FY. Continue to serve on the STIC Standing Committee on Special Initiatives (SCSI).

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$25,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$25,000	SPR	$0.00	STATE

CONTACT INFORMATION

Project Manager: Teresa Stephens, Research Engineer, 405-415-5825

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; preparing new and continuing research contracts and contract modifications; research project management; maintaining electronic research project records, i.e., project progress, invoicing, contractual deadlines; reviewing final research reports; meeting with university and private researchers regarding proposed projects; attending industry seminars, conferences, etc.

PROPOSED ACTIVITIES FOR FFY 2023: Solicit for new research ideas for possible FFY 2024 research project funding; generate and post FFY 2024 RFP's; generate FFY 2024 research/implementation project contracts and modifications; organize initiation and final project meetings; coordinate and assemble research implementation task forces and committees; facilitate project implementation plans and direction; continue to perform technical review of final research project reports for required formatting; prepare Part 2 of the FFY 2024 SPR Work Program.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$225,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$250,000	SPR	$0.00	STATE

CONTACT INFORMATION

SPR2 Program Administrator: Bryan Hurst, bhurst@odot.org

2156 Roadside Vegetation Management (RVM)
Training & Consultation

PURPOSE AND SCOPE: This training and consultation initiative is designed to meet the roadside vegetation management (RVM) needs of ODOT and builds upon the previous years of RVM training offered by Oklahoma State University to ODOT. This service and tasks have been designed based upon knowledge of, and being observant of Federal and State Pesticide Laws and Regulations, communications and feedback from ODOT field and headquarters staff, observing areas of continued consultation needs by networking with RVM industry professionals.

PROPOSED ACTIVITIES FOR FFY 2023: Deliver 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; coordinate Herbicide Application and Equipment Calibration Workshops for new employees; assist ODOT in updating the Approved Herbicides and Adjuvants List (AHAL); assist with AHAL contract review; perform survey and review of ODOT field divisions herbicide programs; attend national conferences; provide monthly reports; FFY 2022 annual reports are pending; prepare and submit FFY 2023 annual reports.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$250,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$255,000	SPR	$0.00	STATE

CONTACT INFORMATION

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

Project Sponsor: Taylor Henderson, ODOT Maintenance Division Engineer, 405-521-2557

Project Manager: Wayne Rice, Transportation Manager, jrice@odot.org

2160 The University of Oklahoma Master Agreement for Research and Investigation Services

PURPOSE AND SCOPE: This item will support a task-order based contract for the purpose of providing ODOT the opportunity to address topics and needs that were not brought through the formal annual project selection process and/or were identified outside the formal process. It is anticipated that these projects will range in both scope and financial commitment from simple to complex, but generally be limited to a one-year or less completion cycle. Topics could include traditional research topic areas of interest to the Agency, as well as ancillary effort including education and workforce development and technology transfer through, but not limited to, collaboration, leadership training, addressing student retention and diversity, and internship programs.

PROPOSED ACTIVITIES FOR FFY 2023: Continue supporting SPTC UTC activities. Continue task order contracting mechanism building on FFY 2022 program and further defining processes, procedures and needs for a sustainable UTC.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$500,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$500,000	SPR	$0.00	STATE

CONTACT INFORMATION

OU Contact: Musharraf Zaman, The University of Oklahoma, 405-401-3096

ODOT Sponsor / Project Manager: Ron F. Curb PE CPM, rcurb@odot.org, 405-420-9163

2160-20-01
OU Task Order Contract Administrative Support

PURPOSE AND SCOPE: To provide support and guidance to task order projects at the University of Oklahoma to Principal Investigators and to the Office of Research and Implementation (ORI) in project management.

PROPOSED ACTIVITIES FOR FFY 2023: None. Final report submitted. End of task order. Final invoice submission is pending.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Musharraf Zaman, The University of Oklahoma, 405-401-3096

ODOT Sponsor / Task Order Manager: Ron F. Curb PE CPM, rcurb@odot.org, 405-420-9163

2160-20-02
Repair Evaluations of Depressed Transverse Cracks in Asphalt Pavements in Division 6

PURPOSE AND SCOPE: US-270 in Harper County in Division 6 has experienced severe transverse cracking. Recent field measurements (ODOT Task Order 2160-18-07) indicate cracks of up to four-inch width at some locations in the asphalt pavement. A number of repair options including Polypatch have been previously used by Division 6, however, these have not performed well over time. Therefore, finding and evaluating a cost-effective and durable repair method or methods is important to ensure freight flow and safety of travelling public and goods. Based on the findings of the Task Order 2160-18-07, a new repair method using Fibrecrete was recommended for US-270. Fibrecrete has been used by other state DOTs with success. Based on input from Division 6 staff, another repair method using hot-mix asphalt (HMA) will be investigated as well.

The purpose of this Task Order is to evaluate the effectiveness of these two repair methods, namely (1) trenching and patching using Fibrecrete and (2) trenching and patching using HMA for transverse cracks observed in US-270. Performance of these repair methods will be investigated periodically using falling weight deflectometer (FWD), ground penetrating radar (GPR) and PaveVision 3D. An evaluation of the "do no repair or do nothing" scenario will help document the improvement of the proposed repair methods.

PROPOSED ACTIVITIES FOR FFY 2023: None. Final report submitted. End of task order.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Musharraf Zaman, The University of Oklahoma, 405-401-3096

ODOT Sponsor: Ron McDaniel, ODOT District 6 Engineer, 580-735-2561

Task Order Manager: Bryan Cooper, Transportation Manager, 405-305-1963

2160-20-04
Data Analytics for the Prediction of DBE Expenditures

PURPOSE AND SCOPE: The Oklahoma Department of Transportation (ODOT) is interested in tracking and predicting Disadvantage Business Enterprise (DBE) expenditures. Awarded contracts include funds allocated to businesses that are DBE certified. These funds fall under either race conscious or neutral. Race conscious expenditures must be met on annual bases. The project is to analyze past contracts, especially expenditure data available at ODOT, to develop a tracking and predictive model to monitor DBE expenditures.

PROPOSED ACTIVITIES FOR FFY 2023: None. This work was continued under task order 2160-21-04. End of task order.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Hazem Refai, The University of Oklahoma, 918-660-3243

ODOT Sponsor: Jennifer Hankins, DBELO, 405-708-1846

ODOT Task Order Manager: Ron F. Curb PE CPM, rcurb@odot.org, 405-420-9163

2160-20-06
I-35/SH-7 Subsurface Investigation

PURPOSE AND SCOPE: A section of I-35 beginning at the Carter/Murray County line (Mile Post 45) and extending north to Mile Post 59.5 has experienced longitudinal depression, transverse cracking, and block cracking (Figure 1). Also, longitudinal depressions in the form of rutting near the centerline have been observed on State Highway 7 (SH-7). As a part of a pooled fund study, TPF-5(385): Pavement Structural Evaluation with Traffic Speed Deflection Devices (TSDDs), the pavement conditions of both I-35 and SH-7 sections are being assessed using a TSDD. The TSDD can evaluate pavement condition by measuring near continuous surface deflections at traffic speed. In this Task Order (2160-20-06), subsurface investigations of the entire sections of I-35 and SH-7 noted above will be conducted using a specialized ground penetrating radar, a rapid FWD device, and selective coring and laboratory testing. The goal is to identify distressed locations, identify causes and make data-driven recommendations for future maintenance and surface treatments, as well as repair/reconstruction strategy, for both pavement sections. Ground Penetrating Radar (GPR) is a powerful investigation tool which provides a rapid assessment of pavement subsurface condition. Texas A&M Transportation Institute (TTI) has developed a unique subsurface data collection and processing system using a 1-GHz. The purpose of this Task Order is to generate data on acceptable range of resilient modulus values for commonly available recycled aggregates in Oklahoma through laboratory testing and AASHTO Ware simulations. It is expected that this Task Order will identify the number of revolutions in LA Abrasion test that is representative of the resilient modulus range required for a given level of service life.

PROPOSED ACTIVITIES FOR FFY 2023: None. Final report submitted. End of task order.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Musharraf Zaman, The University of Oklahoma, 405-401-3096

ODOT Sponsor: Scott Garland, ODOT Geotechnical Engineer, 405-522-4998

Task Order Manager: Gary Hook, Implementation Engineer, 405-420-2596

2160-20-07
Further Implementation of ODOT Knowledge Management Framework

PURPOSE AND SCOPE: Knowledge management is the efficient handling of information and resources within an organization. In the transportation field, this can mean preserving and streamlining best practices, enhancing technology transfer, and recording institutional knowledge from experienced professionals. Knowledge management also assists in standardization, improved decision-making, record keeping, maintaining capabilities over time, and speeding up the learning curve of an organization's employees. With these ideas in mind, knowledge management has become a key issue for state DOTs across the country. Several organizations are already attempting to incorporate these practices and create their own "knowledge books" to help streamline processes and aid in knowledge retention and dissemination. ODOT has become increasingly interested in this topic and has an opportunity to become a national leader in this field. Build on the previous task order and continue implementation of the knowledge management framework in the most efficient way possible. Target areas will include the Human Resources Department at ODOT while working towards expanding contacts and liaisons across all other ODOT divisions.

PROPOSED ACTIVITIES FOR FFY 2023: None. Final report submitted. End of task order.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Michael Molina, Librarian, Okla. Transportation Library, 405-420-1003

ODOT Sponsor / Task Order Manager: Ron F. Curb PE CPM, rcurb@odot.org, 405-420-9163

2160-20-08
Monitoring of UHPC Connections on Eufaula Spillway Bridge

PURPOSE AND SCOPE: The project is part of implementation of ultra-high-performance concrete during replacement of the Eufaula Spillway Bridge by the U.S. Army Corps of Engineers with ODOT as an interested party. The bridge will be replaced using precast concrete panels with UHPC connections. This will be the first time UHPC is used in this application in Oklahoma. This project will allow an expert from the University of Oklahoma to be on site during UHPC placement, provide input during the process, and monitor performance.

Task 1. Provide input to the contractor and USACE officials during the planning process:
The OU research team will participate in meetings between the USACE and the bridge contractor to provide input on best practices for UHPC formwork, placement, and curing.

Task 2. Instrument the mock-up test joints before placement of UHPC material:
Vibrating wire strain gages will be placed in the mockup joint material and will be connected to a data collector to obtain temperature and shrinkage strain data over time. These data will help assess performance of the joint.

Task 3. Monitor mock-up joint performance:
In addition to internal instrumentation, detailed pictures of the joint will be taken immediately after placement and used a basis of monitoring performance. The mock-up joint will be reassessed at increments over time to identify potential cracks and locations that may be of concern on the full bridge.

Task 4. Observe UHPC placement:
Dr. Floyd will be present during placement of the UHPC for the mock-up and Dr. Floyd or the graduate student working on the project will be present during placement of the bridge connections. The OU research team will provide input on placement methods, issues that come up during placement, and will inspect joints after casting, if accessible.

Task 5. Conduct compressive strength and material testing of UHPC material:
The OU research team will collect samples from the mockup UHPC batch to test compressive strength. Additional material property tests will be conducted if required.

Task 6. Monthly and final reports:
Monthly progress reports will be prepared and a final report detailing observations made during construction.

PROPOSED ACTIVITIES FOR FFY 2023: None. Final report submitted. End of task order.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Royce Floyd, The University of Oklahoma, 405-325-1010

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

Task Order Manager: Gary Hook, Implementation Engineer, 405-420-2596

2160-20-09

Development of a Transportation Workforce Development Program for Oklahoma

PURPOSE AND SCOPE: With accelerated retirement from DOTs and rapidly changing technologies, tools and practices, workforce development and outreach are getting an increasing attention of many DOTs, including Oklahoma Department of Transportation (ODOT). Workforce development is an integral part of all University Transportation Centers (UTCs). Since its inception as a Regional UTC, the Southern Plains Transportation Center (SPTC) has pursued impactful workforce development and outreach activities including Transportation Regional Internship Program (TRIP), short courses, seminars, workshops, Transportation Leadership Council, Transportation Leadership Forum, and research assistantships. Many undergraduate and graduate students and professionals working in the transportation sector have benefitted from these activities, including receiving professional development hours (PDHs). The primary goal of this Task Order is to take the workforce development programs to a new level. It is expected that SPTC's experience and collaborative role will be important to achieving this goal. The actual tasks of this Task Order will be developed in close collaboration with the Office of Research and Implementation (ORI).

PROPOSED ACTIVITIES FOR FFY 2023: None. Final report submitted. End of task order.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Musharraf Zaman, The University of Oklahoma, 405-401-3096

ODOT Sponsor / Task Order Manager: Ron F. Curb PE CPM, rcurb@odot.org, 405-420-9163

2160-21-01
OU Task Order Contract Administrative Support

PURPOSE AND SCOPE: To provide support and guidance to task order projects at the University of Oklahoma to Principal Investigators and to the Office of Research and Implementation (ORI) in project management.

PROGRAMMED ACTIVITIES FOR FFY 2023: Final report is pending.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Musharraf Zaman, The University of Oklahoma, 405-325-4682

ODOT Sponsor / Task Order Manager: Ron F. Curb PE CPM, rcurb@odot.org, 405-420-9163

2160-21-02
Crane Loading on Bridge Abutments During Construction

PURPOSE AND SCOPE: ODOT does not allow cranes on the backfill behind bridge abutments during construction. Yet contractors need to place their cranes on the backfill to set bridge beams. There is concern because it is not clear what impact, if any, the crane loading has on the bridge abutment and wing walls. In this project the impact of crane loading on the backfill, abutments, and wing walls will be studied using numerical modeling of the backfill/abutment system under the loading produced by a crane in various positions atop the backfill.

PROPOSED ACTIVITIES FOR FFY 2023: None. Final report submitted. End of task order.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

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

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

Task Order Manager: Wayne Rice, Transportation Manager, jrice@odot.org

2160-21-03

Development of an Interactive Database for Soil for Design of New Pavements and Rehabilitation of Existing Pavements in Oklahoma

PURPOSE AND SCOPE: Geotechnical data have been collected by ODOT as part of many construction projects involving bridges, pavements, and embankments. Soil properties data in these reports can be a great resource for pavement design, if they are organized in an interactive and easy to use database. Coupling such a database with GIS will allow pavement designers in retrieving the necessary data efficiently. Also, coupling with a GIS platform makes interpolation of soil properties data from nearby sites easier than currently possible. Interpolated properties are expected to be particularly helpful for short duration projects where geotechnical investigations are not feasible because of time and budgetary constraints. This Task Order seeks to address this gap.

PROPOSED ACTIVITIES FOR FFY 2023: None. Final report submitted. End of task order

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Musharraf Zaman, The University of Oklahoma, 405-401-3096

ODOT Sponsor: Amanda Warren, Roadway Design, 405-521-2602

Task Order Manager: Gary Hook, Implementation Engineer, 405-420-2596

2160-21-04
Data Analytics for the Prediction of DBE Expenditures

PURPOSE AND SCOPE: The objective of this project is to develop a model to track and predict DBE expenditure to ensure contract and agency goal is met per federal fiscal year. The tracking model will monitor DBE expenditure collectively and per contractor. The model processes information automatically obtained from ODOT directory including proposed projects (construction, repairs, etc.), winning bid vendors, and the bi-monthly progress reports to accurately estimate progress toward meeting the annual race conscious and race neutral goal.

Project activities will consist of five main threads: Interface the DBETF software application with ODOT O-database for automatic DBE expenditure imports, Interface the DBETF to ODOT DBE database to automatically update certified DBE vendor list, enhance visualization and reporting tools, develop tools to early predict contractors failing to meet their target DBE expenditures, and modify or add features per ODOT requests. A Software application, namely DBETF, that will run on an individual PC's to automatically import and process data from an ODOT O-database, incorporating many analysis, forecasting, and reporting tools, will be developed to determine ODOT's current DBE goal attainment and forecast the agency's yearly attainment. It will be featured with the following functionalities: Analysis, Forecasting, and Reporting.

Outline of the functionalities are as follows.

Under Analysis, the functions are:

Selected and total DBE Expenditures> per Prime Vendor, Prime Vendor per Contract, Category, Contract Type, County, County on Map, District/Division, Contract, Contract per Items.

Stats Type: Based on DBE Expenditure> Top Prime Vendor, Top Subcontractor, Top Contract Type, Top County, Top Division, Top Contract, Top Item, and Top Category Based on Frequency in Contracts, and DBE Item Expenditure Histogram

DBE Vendor Type> Distribution per State, Distribution per Ok. County, as Prime Vendor, per County, per Prime Contractor

Under Forecasting DBE Payments, the functions are:

Confidence Analysis, Error Analysis, Contract Forecast - per Contract, Contractor Forecast - All, Pay Item Forecast per contract.

Under Reporting, the functions are:

Reports per contractor, per DBE vendor, per item.

PROPOSED ACTIVITIES FOR FFY 2023: Final report is pending.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Hazem Refai, The University of Oklahoma, 918-660-3243

ODOT Sponsor: Jennifer Hankins, DBELO, 405-708-1846

ODOT Task Order Manager: Ron F. Curb PE CPM, rcurb@odot.org, 405-420-9163

2160-21-05
Evaluation of High-Performance Thin Overlays for Extended Pavement Life

PURPOSE AND SCOPE:
The purpose of this Task Order is to evaluate field performance of two high performing thin overlays with two different surface conditions. The selected mixes may be an S5 or an S6 mix and a TOM-C mix. One surface condition will involve micro-milling while the other will not involve any milling. A layer thickness of 1.25-in. for the S5 mix or 1-in. for the S6 mix may be used. The second mix may be an optimized TOM-C mix with 1-in. layer thickness. An optimized balanced mix design (BMD) with focus on cracking and rutting performance will be used in designing these mixes. Quadrant plots, similar to Figure 1, will be used to identify mixes with optimized performance. Similar to other balanced mix designs, some variance from standard Superpave mix type S5 or S6 may be needed to satisfy all required criteria. It typically involves increasing the binder content to achieve mid-point in quadrant plots. ODOT's rich intermediate layer (RIL) mixes are designed using a similar concept. Also, field performance will be monitored and compared. In addition, life cycle cost analysis will be performed to evaluate cost-benefit aspects.

PROPOSED ACTIVITIES FOR FFY 2023: No cost extension approved through October 30, 2022; Produce lab mixes to compare with plant produced field mixes; OU will monitor the construction of 4 test sections; collect mix samples at test sections during construction and evaluate in the Broce Laboratory at OU; Monitor and test the performance of test sections in the field; Perform Life Cycle Cost Analysis for both high performance thin overlays with no milling and micro milling surface conditions; provide monthly reports; prepare and submit final report.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Kenneth Hobson, Oklahoma University, 405-323-5669

ODOT Sponsor: Ron Brown, ODOT District 3 Engineer, 580-332-1526

Task Order Manager: Teresa Stephens, Research Engineer, 405-415-5825

2160-21-06
Workforce Development: Performance Metrics, and Processes and Procedures Improvement

PURPOSE AND SCOPE: During workforce development meetings between ODOT and The University of Oklahoma, specific needs have been identified that, if addressed, could streamline and enhance ODOT employees' engagement, efficiency, and retention. These include improving existing performance metrics for ODOT employees, as well as incorporating knowledge management best practices to identify/document up-to-date processes and procedures for critical operational functions. The PI will contract with a consultant who will a) make recommendations for improvements to performance metrics and b) develop a strategy and begin identifying and documenting critical processes and procedures for ODOT employees.

PROPOSED ACTIVITIES FOR FFY 2023: None. Final report submitted. End of task order.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Musharraf Zaman, The University of Oklahoma, 405-401-3096

ODOT Sponsor / Task Order Manager: Ron F. Curb PE CPM, rcurb@odot.org, 405-420-9163

2160-21-07
ODOT Special Provisions for High-Strength Geotextiles and Geogrids–Phase I

PURPOSE AND SCOPE: The purpose of this project is to develop a Special Provision to establish an Approved Products List within the Materials Division to accommodate the use of the products in the interim. Testing of these various products will eventually lead to a Standard Specification.

PROPOSED ACTIVITIES FOR FFY 2023: None. Final report submitted. End of task order.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Kianoosh Hatami, The University of Oklahoma, 405-325-3674

ODOT Sponsor: Matt Romero, ODOT Materials Division Engineer, 405-436-0028

Task Order Manager: Bryan Cooper, Transportation Manager, 405-305-1963

2160-21-09

Development of a DIGGS-Compatible Geotechnical Database From Existing Geotechnical Reports – Phase 1

PURPOSE AND SCOPE: The Oklahoma Department of Transportation (ODOT) has been collecting geotechnical data for many years as part of the construction projects undertaken by the agency. The Geotechnical Engineering Branch, Bridge Division, and Roadway Division together possess 50 or more years' worth of geotechnical data. Accessing these data for the purpose of design, analysis, and reporting is time-consuming and difficult because currently they are stored as hard copies, scanned images and digital files (.pdf). Geotechnical properties contained in these reports can be a great resource if they are organized in an easily accessible database. With advances in computing capabilities and software, tools are now available that can help with the data collection, archiving, and map-based retrieval/reporting. Several state DOTs are converting their geotechnical reports into Data Interchange for Geotechnical and Geo-environmental Specialists (DIGGS) format, which utilizes an Extensible Markup Language (XML) structure and labeling convention with elements of Geography Markup Language (GML). Conversion of existing hard copies and PDF reports to DIGGS format will help access, analyze, filter, and report geotechnical information efficiently both time and effort wise. Also, it will help plot and visualize data using web-based GIS tools. Additionally, the proposed database will reduce the need for new soil borings and help save taxpayers' money.

PROPOSED ACTIVITIES FOR FFY 2023: None. Final report submitted. End of Phase 1 task order. Phase 2 to be covered by task order 2160-22-03.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Syed Ashik Ali, The University of Oklahoma, 405-325-5911

ODOT Sponsor: Scott Garland, Geotechnical Branch Engineering Manager, 405-226-1719

Task Order Manager: Teresa Stephens, Research Engineer, 405-415-5825

2160-22-01
OU Task Order Contract Administrative Support

PURPOSE AND SCOPE: To provide support and guidance to task order projects at the University of Oklahoma to Principal Investigators and to the Office of Research and Implementation (ORI) in project management.

PROPOSED ACTIVITIES FOR FFY 2023: Final report is pending.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$40,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Musharraf Zaman, The University of Oklahoma, 405-401-3096

ODOT Sponsor / Task Order Manager: Ron F. Curb PE CPM, rcurb@odot.org, 405-420-9163

2160-22-02
Feasibility of Blast Furnace Slag for Stabilizing Sulfate Bearing Soil

PURPOSE AND SCOPE: Blast Furnace Slag by itself or when mixed with Portland cement can improve the strength of sulfate-bearing clay soils without unacceptable swelling behavior. Currently there are no chemicals listed on the OHD L-50 stabilization chart that can be safely used for stabilizing sulfate bearing fine grained soils due to the potential for inducing unwanted swelling behavior. This study will systematically evaluate the feasibility of BFS alone and mixed with other material, as a stabilizer for clayey soil sulfate bearing soil.

PROGRAMMED ACTIVITIES FOR FFY 2023: Final report is pending.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$75,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

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

ODOT Sponsor: Scott Garland, ODOT Geotechnical Engineer, 405-522-4998

Task Order Manager: Gary Hook, Implementation Engineer, 405-420-2596

2160-22-03

Development of a DIGGS-Compatible Geotechnical Database from Existing Geotechnical Reports

PURPOSE AND SCOPE: The Geotechnical Engineering Branch, Bridge Division, and Roadway Division together possess 50 or more years' worth of geotechnical data. Accessing these data for the purpose of design, analysis, and reporting is time-consuming and difficult because currently they are stored as hard copies, scanned images and digital files (.pdf). Geotechnical properties contained in these reports can be a great resource if they are organized in an easily accessible database. With advances in computing capabilities and software, tools are now available that can help with the data collection, archiving, and map-based retrieval/reporting. Several state DOTs are converting their geotechnical reports into Data Interchange for Geotechnical and Geo-environmental Specialists (DIGGS) format, which utilizes an Extensible Markup Language (XML) structure and labeling convention with elements of Geography Markup Language (GML). Conversion of existing hard copies and PDF reports to DIGGS format will help access, analyze, filter, and report geotechnical information efficiently both time and effort wise. Also, it will help plot and visualize data using web-based GIS tools. Additionally, the proposed database will reduce the need for new soil borings and help save taxpayers money.

PROGRAMMED ACTIVITIES FOR FFY 2023: Final report is pending.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$28,650	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Syed Ali, The University of Oklahoma, 405-325-4253

ODOT Sponsor: Scott Garland, ODOT Geotechnical Branch Manager, 405-522-4998

Task Order Manager: Gary Hook, Implementation Engineer, 405-420-2596

2160-22-04

ODOT Social Network Analysis Toward Critical Process and Procedure Identification and Improvement

PURPOSE AND SCOPE: Since 2018, the Oklahoma Department of Transportation (ODOT) and the Oklahoma Transportation Library (OTL) have been working on developing and implementing a knowledge management (KM) project to increase KM practices agency wide. The project has developed information gathering techniques and drafts of new forms, as well as a sample KM platform to store knowledge using MS Teams. The next stage will involve an organization-wide social network analysis, mapping departments and creating a sociogram network map documenting the flow of information. The resulting network map will identify where key subject matter experts/gatekeepers and knowledge repositories are located to increase efficiency, accessibility, and reuse of information. Additionally, the social network analysis will identify critical processes and procedures, IDing and interviewing division heads, and recording the difference between processes that should happen compared to what processes actually occur.

Conducting a social network analysis documenting accurate flow of information will help identify key holders/repositories of knowledge and information across the agency. This group can be implemented into the KM liaison network developed during the last task order to increase efficiency in flow and accessibility of information. Interviewing division heads will also lead to improved clarity on what processes and procedures are being performed and which should be documented as part of ODOT organizational knowledge.

PROGRAMMED ACTIVITIES FOR FFY 2023: Final report is pending.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$75,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Michael Molina, Librarian, Oklahoma Transportation Library, 405-325-5960

ODOT Sponsor, April Meadows, HR Programs Manager, 405-706-2534

ODOT Task Order Manager: Ron F. Curb PE CPM, rcurb@odot.org, 405-420-9163

2160-22-05
Knowledge Management Awareness and Information Storage/Retrieval

PURPOSE AND SCOPE: Since 2018, the Oklahoma Department of Transportation (ODOT) and the Oklahoma Transportation Library (OTL) have been working on developing and implementing a knowledge management (KM) project to increase KM practices agency wide. The project has developed information gathering techniques and drafts of new forms, as well as a sample KM platform to store knowledge using MS Teams. The next stage will involve conducting a concerted awareness campaign to inform ODOT employees, agency-wide, of KM best-practices to increase efficiency, as well as continuing to survey employees on their ideal method for accessing and using critical information. Specifically, if they are wanting to find information, what methods and repositories do they prefer and currently use? Results from this survey will be used to refine the selection process of a technology platform that can deliver information employees need and meet Guidehouse recommendations to establish "process and performance enterprise-side process documentation catalog, standards, and repository.
A concerted KM awareness campaign will inform ODOT employees of KM best practices, helping them increase operational efficiency. Drafting a survey and recommending a content storage and accessibility platform will also assist in cost savings, reducing the time it takes for employees to locate information.

PROGRAMMED ACTIVITIES FOR FFY 2023: Final report is pending.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$75,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Michael Molina, Librarian, Oklahoma Transportation Library, 405-325-5960

ODOT Sponsor, April Meadows, HR Programs Manager, 405-706-2534

ODOT Task Order Manager: Ron F. Curb PE CPM, rcurb@odot.org, 405-420-9163

2160-22-06

Effect of Compaction During Construction on Stiffness and Drainage Characteristics of Recycled Aggregate Base

PURPOSE AND SCOPE: Use of recycled aggregates in pavement construction is getting increased attention due to cost saving, conservation of natural resources, and environmental benefits. In a recent Task Order (2160-19-03), durability of two recycled aggregates and one commonly used virgin aggregate were investigated through laboratory testing and simulations using the AASHTOWare Pavement ME software. In this complementary Task Order, effect of gradation changes due to construction of aggregate base using recycled aggregates will be investigated with respect to corresponding changes in M_R and hydraulic conductivity. Also, changes in index properties pertaining to shape and texture will be investigated. Use of recycled aggregates from an actual construction site will validate findings of Task Order 2160-19-03 and generate useful data toward developing specifications for recycled aggregates.

PROGRAMMED ACTIVITIES FOR FFY 2023: Final report is pending.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$75,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Musharraf Zaman, The University of Oklahoma, 405-325-4682

ODOT Sponsor: Ben Rojas, ODOT Aggregates Branch Manager, 405-522-4987

Task Order Manager: Wayne Rice, Transportation Manager, jrice@odot.org

2160-22-08

Evaluating the Impact of Various Asphalt Rejuvenating Agents on the Performance of Asphalt Binders

PURPOSE AND SCOPE: The use of stiff binders from reclaimed asphalt pavement (RAP) in an asphalt mix can cause premature pavement distresses in the form of fatigue cracking, reflection cracking, low-temperature cracking and accelerated aging. In order to avoid these issues, rejuvenators are often used in asphalt mixes to soften the stiff, oxidized RAP binders. The aim of this Task Order is to evaluate the effect of different rejuvenators on the high and low temperature performance of a commonly used binders. Also, the impact of PAV-aging on the low-temperature performance and Delta Tc (ΔTc) of rejuvenated binders will be evaluated.

PROPOSED ACTIVITIES FOR FFY 2023: Final report is pending.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$60,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Kenneth Hobson, The University of Oklahoma, 405-325-5911

ODOT Sponsor: David Vivanco, ODOT Asphalt Branch Engineering Manager, 405-522-4986

Task Order Manager: Teresa Stephens, Research Engineer, 405-415-5825

2160-22-09
Title TBD

PURPOSE AND SCOPE: OU and OSU Joint Project for District 8 Problem Solving. Co-funded with 2400-22-07.

PROPOSED ACTIVITIES FOR FFY 2023: None. The joint task orders never developed. Both task orders were cancelled and funding was moved to cover other FFY22 mid-year task orders.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$60,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Musharraf Zaman, The University of Oklahoma, 405-325-4682

ODOT Sponsor: Trapper Parks, District 8 Maintenance Engineer, 918-838-9933

Task Order Manager: Bryan Cooper, Transportation Manager, 405-305-1963

2160-22-10
Web-Based Repository of GRS-IBS Projects in the United States

PURPOSE AND SCOPE: This task order will develop a web-based repository of major (and documented) GRS-IBS projects across the U.S. so that ODOT (e.g., Local Government and Bridge Divisions) could access and use as reference for future GRS-IBS projects in Oklahoma. This database will be useful to ODOT in that it will help the agency determine what alternative GRS-abutment designs would be feasible and will likely be successful for a given project relative to its location, site conditions, available budget and other related factors. It will also be useful to other interested parties in Oklahoma and other states (engineers, county commissioners, etc.) who could use data on the size, specifications and performance of earlier GRS bridges that were built with budgets and specifications that are comparable to those of their upcoming projects.

FFY22 scheduled work: Survey documented GRS bridge projects and collect related data on bridge location, span, GRS abutment size and construct, superstructure, cost, and any performance issues reported to date; Compile the data in a spreadsheet; Develop a GRS-IBS website which will be hosted at OU; Provide monthly reports; Prepare and submit final report.

PROPOSED ACTIVITIES FOR FFY 2023: Final report is pending.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$43,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Kianoosh Hatami, The University of Oklahoma, 405-325-3674

ODOT Sponsor: Shelly Williams, ODOT Local Government Div. Eng., 405-208-3289

Task Order Manager: Wayne Rice, Transportation Manager, jrice@odot.org

2160-22-11

Project-Level Evaluation of Pavement Conditions for Maintenance, Asset and Safety Management, and Pavement Design (OU)

PURPOSE AND SCOPE: This is a joint task order between OSU and OU for project-level evaluation of pavement conditions using a hybrid technology. The work by the OU team is based on data from a recent Task Order (2160-20-06) over 30-lane miles of pavements in Oklahoma. The collected data include specialized GPR data (in cooperation with TTI), fast falling weight deflectometer (FFWD) data, selective coring, and laboratory testing. Deflection values from the FFWD testing were compared selectively with the corresponding values from the traffic speed deflection (TSD) data which were collected as part of a pooled fund study participated by ODOT. This task order also benefits from an OSU study (2400-21-05 Analysis of ODOT's Traffic Speed Deflection Device Data for Pavement Structural Evaluation). This task order will provide insights into using a hybrid technology to address engineering needs of multiple districts at ODOT in maintenance, asset and safety management, and pavement design (3 applications).
FFY22 scheduled work: The OU team will use the modulus (indicator of stiffness) and strain (indicator of fatigue cracking) to calibrate the coefficients used by TSD for estimation of number of cycles to failure (indicator of remaining life) for both asphalt and composite pavements. Traffic load-induced strain at the bottom of asphalt layers – an indicator of fatigue – will be determined mechanistically and used for the aforementioned calibration. The OU work is synced with work to be performed by the OSU team using 0.5-mm 3D laser imaging data for the same 30-lane miles for the 3 applications

PROPOSED ACTIVITIES FOR FFY 2023: Final report is pending.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$28,350	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Musharraf Zaman, The University of Oklahoma, 405-401-3096

ODOT Sponsors: Taylor Henderson, ODOT Maintenance Div. Engineer, 405-521-2557

Angel Gonzalez, Assistant SAPM Division Engineer, 405-437-5688

Task Order Manager: Wayne Rice, Transportation Manager, jrice@odot.org

2160-23-01
OU Task Order Contract Administrative Support

PURPOSE AND SCOPE: To provide support and guidance to task order projects at the University of Oklahoma to Principal Investigators and to the Office of Research and Implementation (ORI) in project management.

PROPOSED ACTIVITIES FOR FFY 2023: Maintain oversight of all approved OU task orders in monitoring schedules and budgets; assist PI's and ORI as needed to maintain project scope; assist ORI as requested with specific projects; work with PI's to develop new requests; develop initiatives for task order requests toward developing a sustainable program for future University Transportation Center proposals; prepare and submit final report.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$40,000	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Musharraf Zaman, The University of Oklahoma, 405-401-3096

ODOT Sponsor / Task Order Manager: Ron F. Curb PE CPM, rcurb@odot.org, 405-420-9163

2160-23-02
FFY2023 Research Peer Exchange

PURPOSE AND SCOPE:
Peer exchange is a practical and effective tool to foster excellence in research and technology (R&T) program management. It provides an opportunity for participants to share best practices and management innovations through an open exchange of ideas, knowledge, and brainstorming. Both staff and management from the home State and a group of invited participants with pertinent expertise and experience exchange information particularly relevant to the home State's R&T program over 2 to 4 days. In this Task Order a 3-day peer exchange event will be organized in close collaboration with ODOT. The findings of the peer exchange will be documented in a written report and submitted to ORI.
Participants must include the Oklahoma Department of Transportation and three other state DOTs, with no more than one DOT seeking first time research peer exchange experience. In addition, one representative each from Southern Plains Transportation Center (SPTC), Federal Highway Administration (FHWA), Transportation Research Board (TRB)/ National Cooperative Highway Research Program (NCHRP), and one University Transportation Center (UTC) other than SPTC will be invited to attend the peer exchange. The details of the agenda will be developed in close collaboration with ODOT and others so to maximize the benefit of this event.
A final report documenting the findings of the peer exchange shall be prepared and presented to ODOT Senior Staff.

PROPOSED ACTIVITIES FOR FFY 2023:
In this Task Order a 3-day peer exchange event will be organized by the contractor in close collaboration with ODOT. The findings of the peer exchange will be documented in a written report and submitted to ORI.
Participants must include the Oklahoma Department of Transportation and three other state DOTs, with no more than one DOT seeking first time research peer exchange experience. In addition, one representative each from Southern Plains Transportation Center (SPTC), Federal Highway Administration (FHWA), Transportation Research Board (TRB)/National
Cooperative Highway Research Program (NCHRP), and one University Transportation Center (UTC) other than SPTC will be invited to attend the peer exchange. The details of the agenda will be developed in close collaboration with ODOT and others so to maximize the benefit of this event.
A final report documenting the findings of the peer exchange shall be prepared and presented to ODPOT Senior Staff within one month of the end of the three-day peer exchange.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$116,000	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Musharraf Zaman, The University of Oklahoma, 405-401-3096

ODOT Sponsor / Task Order Manager: Ron F. Curb PE CPM, rcurb@odot.org, 405-420-9163

2160-23-03

Modification of AASHTO T 283 for Improved Screening of Asphalt Mixes for Moisture-Induced Damage

PURPOSE AND SCOPE: Oklahoma DOT has seen major problems in using Tensile Strength Ratio (TSR) from the current AASHTO T 283 test for screening of mixes for moisture-induced damage because of significant variability in test results. Stripping Inflection Point (SIP) from Hamburg Wheel Tracking (HWT) has been found to exhibit inconsistent correlations with field performance as well. Recently, ODOT has adopted Indirect Tensile Asphalt Cracking Test (IDEAL-CT) for screening of asphalt mixes for fatigue cracking. Cracking Tolerance Index (CT index) from IDEAL-CT requires specimen with a height of 62 mm. In this Task Order, the current AASHTO T 283 method will be modified to change the specimen height from 95 mm to 62 mm to be consistent with the IDEAL-CT test and used for the characterization of moisture-induced damage in asphalt mixes. The modification will employ the AASHTO T 283 for moisture conditioning of specimens. Moisture Induced Sensitivity Test (MIST) will be used with the modified AASHTO T 283 method for comparison purposes. In addition to TSR, the applicability of indirect tensile strength and CT index as an indicator of moisture-induced damage or stripping potential of asphalt mixes will be evaluated.

PROPOSED ACTIVITIES FOR FFY 2023: Possible tasks include the following: (1) In consultation with ODOT's Asphalt Branch Manager select three asphalt mix designs with high-, medium- and low-resistance to moisture-induced damage; (2) Collect materials (aggregates, binders, RAP and additives) for mix design in the laboratory; (3) Prepare specimens in the laboratory and conduct AASHTO T 283 test using the current and modified test methods after freeze/thaw and MIST conditioning; (4) Determine indirect tensile strength, TSR, and CT index of each mix and verify repeatability; (5) Determine the effect of change in specimen height on the indirect tensile strength, TSR, and CT index; (6) Draft a special provision for the modified AASHTO T 283 in OHDL format for screening of asphalt mixes for moisture-induced damage; (7) Prepare and submit monthly progress reports and a final report.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$66,000	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Kenneth Hobson, Oklahoma University, 405-323-5669

ODOT Sponsor: David Vivanco, Asphalt Branch Manager, 405-522-4986

Task Order Manager: Wayne Rice, Transportation Manager, jrice@odot.org

2160-23-04
Designing RC Beam Strengthening by Combining FRP Flexural and Shear Strengthening Techniques

PURPOSE AND SCOPE: The Tulsa County US 169 Ramp S-W Over I-244 involved shear strengthening of existing concrete pier cap with CFRP U wrap. The design for such repairs is governed by ACI 440.2R Guide for the Design and Construction of Externally Bonded (EB) FRP Systems for Strengthening Concrete Structures. In practice, to meet shear and flexural demands of RC beams, shear strengthening is combined with flexural strengthening. However, the effect of this combination is only considered additive and reported as independent techniques in ACI. The potential issues associated with rupture of FRP leading to brittle failures is not considered [1]. To ensure designers are aware of the failure modes in this combination and to limit that effect for safety, the development of improved specifications is warranted.

PROPOSED TASKS FOR FFY 2023: This is a new task order and will start October 1, 2022. This service is to report the effects of combining flexural and shear strengthening of RC beams on failure and suggest provisions to be considered for design guidelines.
The following tasks will be performed:

- **Task 1:** Fabrication of 24 RC beams (RC Control – No strengthening, RC with U wrap strengthening, RC with FRP EB flexural strengthening, RC beams with combination). Six beams per type of strengthening with carbon FRP and epoxy resin manufactured with Wet Layup technique.
- **Task 2:** Four Point bending configuration under displacement-controlled loading. Deflections measured with LVDTs and strains measured with strain gauges for all specimens.
- **Task 3:** Analysis of results from experimental program including load-deflection response, strain response, slip.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$64,000	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Shreya Vemuganti, University of Oklahoma, (505) 323-5669

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

Task Order Manager: Gary Hook, Implementation Engineer, (405)-420-2596

2160-23-05

ODOT Special Provisions for Enhancement Geotextiles - Phase 2 "Field Installation of Geotextile Products for a Comparative Study"

PURPOSE AND SCOPE: In the first phase of this study, which was concluded in Summer 2021, we identified candidate geotextile (GT) products for roadway reinforcement and subgrade stabilization that could be used as AASHTO Class 1A alternatives in ODOT projects. The final report of that study included selected property values of the shortlisted products and related requirements from several state DOTs.

In this phase of study, we need to obtain and install samples of the shortlisted products in a roadway project for long-term monitoring and performance evaluation in field conditions. The location of the roadway test section will be determined in an early stage of this project.

PROPOSED ACTIVITIES FOR FFY 2023: This phase of the project will include the following main tasks:

1. Identifying a suitable roadway test section for the project.
2. Procurement of several enhancement GT products from the suppliers and delivery of the materials to the job site.
3. Sampling and testing of subgrade soil to assess the site condition under the roadway, including sections where rolls of GT materials will be installed. This task will include in-situ and laboratory testing and analysis as deemed necessary.
4. Designing the layout of the entire test section relative to the size and locations of individual products using data from Task 3 and input from the suppliers.
5. Installation of alternative GT products in the test section in coordination with the contractor and suppliers' representatives.
6. Documentation of the project relative to the above tasks and the construction of the roadway section for future analysis.
7. Survey of the test section upon construction to establish its as-built condition relative to elevations, pavement condition, etc. to serve as a starting point for long-term monitoring of the test section.
8. Collect traffic and weather data as related to the test section.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$64,000	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Kianoosh Hatami, The University of Oklahoma, 405-325-3674

ODOT Sponsor: Nairi Matevosyan, Materials Division, 405-521-4999

Task Order Manager: Wayne Rice, Transportation Manager, jrice@odot.org

2160-23-06

Knowledge Management Awareness Campaign, SharePoint Site Creation, and Codifying Knowledge

PURPOSE AND SCOPE: Since 2018, Oklahoma Transportation (OT) and the Oklahoma Transportation Library (OTL) have been working on developing and implementing a knowledge management (KM) program to increase KM practices agency wide. The project has developed information gathering techniques, a sample KM platform to store knowledge using MS Teams, and a draft knowledge management awareness campaign. The next stage will involve implementing the awareness campaign to inform OT employees of KM best-practices to increase efficiency. The team will also collect KM-related content to store on a newly-created SharePoint site to serve as a model KM platform that can be scaled to other areas (departments, divisions, districts, etc.). Additionally, the team will work with the Office of Innovation and OT senior leadership to help codify knowledge throughout OT. The team will work with departments within OT to help train and promote the use of KM best practices and make KM part of everyday operations. A KM awareness campaign will inform ODOT employees of KM best practices, helping them increase operational efficiency. Gathering KM-related content for storage on a SharePoint site will create a model that can be scaled to fit multiple departmental needs. Codifying knowledge and assisting in KM training methods will help ensure KM best practices become part of daily operations at OT.

PROPOSED ACTIVITIES FOR FFY 2023: The PI will contract with KM consultants to research and implement these project deliverables:

1. The KM team will assist OT Cabinet agencies in collecting KM-related content and setting up a SharePoint site to serve as a model for other areas (departments, divisions, districts, etc.) who are slated to curate critical organizational knowledge, as identified in Task Order 2160-22-04. Content will be tagged according to a transportation taxonomy to improve content searching, which will be accomplished simultaneous with other tasks during FY23.
2. Working closely with the Office of Innovation, the KM team will execute the KM awareness campaign developed in Task Order 2160-22-05 toward promoting a KM culture across targeted areas (departments, divisions, districts, etc.) at OT Cabinet agencies. The partnership with the Office of Innovation will ensure KM is integrated into the Modernization Implementation framework.
3. The KM team will work with the Office of Innovation and OT Cabinet senior leadership to establish a plan for codifying knowledge at OT by reviewing American Productivity & Quality Center (APQC) guidelines introduced in Task Order 2160-22-04. The team will work with each area (departments, divisions, districts, etc.) to identify which methods are appropriate for targeted working groups and help schedule training and/or methods to promote the use of selected techniques as part of everyday operations, including employee onboarding.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$75,000	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Michael Molina, Librarian, Oklahoma Transp. Library, 405-325-5960

ODOT Sponsor / Task Order Manager, Ron F. Curb PE CPM, rcurb@odot.org 405-420-9163

2160-23-07

Transportation Taxonomy, Additional Social Network Analyses, Growing the KM Liaison Network, and Workforce Development

PURPOSE AND SCOPE: To build on the successes of the previous knowledge management (KM) task orders, the KM team will research and implement a transportation taxonomy (controlled vocabulary) at Oklahoma Transportation (OT) that will standardize file naming to increase information accessibility. The team will also implement social network analysis (SNA) surveys in various departments at OT, focusing on those at high risk for retirement or attrition. Additionally, the team will grow and maintain the KM liaison network created during the previous task order to build KM awareness and facilitate KM information accessibility across the organization.

By standardizing naming conventions at OT through the use of a transportation taxonomy, information findability and accessibility will be increased, providing gained efficiencies in productivity and standardization. Implementing social network analysis surveys across the agency will help identify critical knowledge before it is lost from employees leaving the agency. Growing and maintaining the KM liaison network will also be critical to ensure that nodes of communication relating to KM are present and up-to-date throughout the agency, ensuring increased access to KM information, improving onboarding of personnel and standardization.

PROPOSED ACTIVITIES FOR FFY 2023: The PI will contract with KM consultants to research and implement these project deliverables:

1. The KM team will build and codify a transportation taxonomy and standardized file naming system to increase information searchability and accessibility across the OT Cabinet agencies.
2. The KM team will scale the SNA survey from Task Order 2160-22-04 to include additional areas (departments, divisions, districts, etc.) especially those at high risk for retirement or attrition among employees with a significant amount of job-specific expertise. This task builds on identifying critical knowledge completed during Task Order 2160-22-04.
3. The KM team will continue to grow and/or maintain the KM liaison network created during Task Order 2160-22-04—especially at OTA and OAC—to build KM awareness and facilitate KM Team accessibility to departments/divisions/districts throughout the OT Cabinet agencies. Outreach to OAC will involve recruiting a contact to coordinate with the KM team to implement KM best practices within that group.
4. Provide workshops, seminars/webinars, or short courses pertaining to OT employee needs.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$75,000	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Michael Molina, Librarian, Oklahoma Transp. Library, 405-325-5960

ODOT Sponsor / Task Order Manager: Ron F. Curb PE CPM, rcurb@odot.org 405-420-9163

2161 Management of the ODOT Transportation Library

PURPOSE AND SCOPE: The Oklahoma Department of Transportation (ODOT) wishes to maintain and operate a sound, progressive, and flexible transportation library, which is available to ODOT, local, regional and national users. The goal is to keep ODOT staff and their stakeholders informed of recent developments and innovations in transportation technologies, methodologies and programs. A complementary goal is to increase operational efficiency and reduce cost. The Oklahoma Transportation Library (OTL) seeks to integrate with other transportation libraries nationally while moving toward digital contents and an Internet-based service system.

More Major Benefits of Being a $75,500+ Sponsor of TRB's Core Programs:

- Nearly unlimited delivery of all TRB hard copy publications (~100 per year).
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- Sponsor employees are eligible for free access to all collected Annual Meeting PowerPoint presentations, posters, and the Annual Meeting Compendium of Papers.
- Sponsor employees have access to TRB's Library and to TRID, an integrated database of TRB's Transportation Research Information Services (TRIS) Database and International Transport Research Documentation (ITRD) Database. TRID is also indexed with the Transportation Research Thesaurus (TRT) and the Research in Progress (RiP) records.

PROPOSED ACTIVITIES FOR FFY 2023: Continue to: store, maintain, and provide access to the collection of transportation materials; refine the OTL collection regarding donated items; develop collection; perform traditional library services; organize internal and external outreach efforts including beneficial webinars, workshops, seminars, and lectures on transportation topics; share resources, abide by NTKN policies, and execute long-term and short-term library expansion and outreach goals; maintain and update OTL's virtual library, LibGuide and website; coordinate report printing, binding and distributing services; catalogue; conduct literature search related services; draft ODOT Research Highlighters (summaries). Provide occasional accessibility checks of final research reports. Provide monthly reports. FFY 2022 annual report is pending. Prepare and submit FFY 2023 annual report.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$175,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$183,000	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Michael Molina, Librarian, Oklahoma Transportation Library, 405-325-5960

ODOT Sponsor / Project Manager: Ron F. Curb PE CPM, rcurb@odot.org 405-420-9163

2260 Shrinkage Induced Deformations in Steel Bridges Made Composite with Concrete Deck Slabs – Phase 3

PURPOSE AND SCOPE: Phase 3 of this study builds upon the findings of Phases 1 & 2 research. The goals of Phase 3 research are to develop data to make stronger conclusions regarding Phase 1 & 2 objectives and to develop instrumentation and techniques for long term monitoring of bridges.

The Phase 3 objectives are as follows: 1. Develop new designs and prototypes to ensure proper bracing of formwork and screeds and also provide better elevation controls for new bridge decks, and 2. Develop and demonstrate instrumentation and data acquisition systems for monitoring long term deflections, strains, and temperatures in bridges. Phases 3 is envisioned and developed in order to further the objectives of the research and provide recommendations to ODOT to help mitigate problems with adverse ride quality, or excessive deflections. It is anticipated that overall bridge construction methods and techniques will be improved as a product of this research.

PROPOSED ACTIVITIES FOR FFY 2023: None. Final report submitted. End of project.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Bruce Russell, Oklahoma State University, 405-742-7450

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

Project Manager: Teresa Stephens, Research Engineer, 405-425-5825

2268 Use of a Novel Controlled Release Surface Curing Agent for Bridge Decks - Phase 2

PURPOSE AND SCOPE: The durability of concrete bridge decks is critical to the satisfactory long-term performance of the Oklahoma highway infrastructure system. It is currently required in Oklahoma to place wet burlap or blankets within 10 minutes of strike off of the concrete surface. The job of these materials is to minimize moisture loss, promote hydration, reduce permeability, increase strength gain, and minimize cracking. Current wet curing techniques are labor intensive, logistically challenging, and quite costly. Also, the placement of these materials too early can cause unwanted deformations or damage in the surface of the concrete that may nullify any benefits from the curing.

The objective of the project is to use a novel curing technique that can be rapidly applied to the surface of the fresh concrete and not cause deformations in the concrete surface. This material should show equal or better curing performance than typical wet curing methods and be sustainable and safe for the environment.

The specific objectives for this project include:
1. Develop a field application method for the novel curing material
2. Develop specifications for the quality control and usage of the novel curing material
3. Work with contractors in Oklahoma to implement this technology in the field and evaluate the effectiveness

PROPOSED ACTIVITIES FOR FFY 2023: None. Final report submitted. End of project.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

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

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

Project Manager: Teresa Stephens, Research Engineer, 405-415-5825

2279 Probabilistic Approach for the Design of Drilled Shafts Socketed in Weak Rock in Oklahoma

PURPOSE AND SCOPE: The proposed scope of work has been specifically developed to produce rational and defensible methods for design of drilled shafts in weak rock. The scope reflects a comprehensive load test program that will also supplement currently available tests, with the additional benefit of characterizing site-specific foundation variability. Furthermore, it will provide greater confidence in the design methods and resistance factors that will be developed from the proposed work.

Results of this study will provide the basis for quantifying the value of site-specific load testing for design and for implementing future improvements to design and construction that are currently being developed by FHWA.

The primary objective for the proposed work is to develop rational and practical Load and Resistance Factor Design (LRFD) methods for design of drilled shafts in weak rock formations that are common in Oklahoma.

PROPOSED ACTIVITIES FOR FFY 2023: Final report is pending.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Erik Loehr, University of Missouri, 573-882-6380

Project Sponsor: Shon Jesse, ODOT Geotechnical Engineer, 405-522-3414

Project Manager: Teresa Stephens, Research Engineer, 405-415-5825

2286 Compost Filter Socks for Storm Water and Erosion Control in Construction - Phase 2
"Paired Catchment Comparison of Erosion Control Devices at Construction Sites"

PURPOSE AND SCOPE: An update to the Standards Specifications for Highway Construction of erosion and sediment control measures through the Storm Water Action Team is ongoing. Part of this update includes reviewing and evaluating new erosion control products like compost filter socks. Direct side-by-side testing of CFS systems in a paired system with silt fence, triangle silt dikes, and straw waddles is needed to be able to select the most effective and cost-effective system for a specific ODOT construction site. This Phase 2 portion of the project examines the longevity and effectiveness of three erosion control options using a paired catchment method for a variety of pertinent field site parameters including soil type, slope, and rainfall intensity. The purpose of paired catchment approach is to factor out variables other than the treatment effect that influenced the reduction of erosion rate over time.

PROPOSED ACTIVITIES FOR FFY 2023: **(Yr. 1 of 2)** Analysis of covariance of erosion variables will be conducted. The analysis allows the removal of variation due to the covariate, which is the independent variable, that may have added the factors of erosion to take effect into the treated catchment as the dependent variable before the introduction of an erosion control device. Finally, results from a paired catchment method will be used to inform the ODOT Storm Water Action Team for development a recommendation matrix for use on ODOT construction sites; provide monthly reports; FFY 2022 annual report is pending; prepare and submit FFY 2023 annual report.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$36,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$104,000	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Jason Vogel, The University of Oklahoma, 405-325-2826

Project Sponsor: Joe Brutsche, ODOT Environmental Division Engineer, 405-522-3978

Project Manager: Teresa Stephens, Research Engineer, 405-415-5825

2287 Evaluation of the Expected Life and Recoating of Silane Water Repellant Treatments on Bridge Decks

PURPOSE AND SCOPE: Field evaluations funded by an ODOT task order to evaluate the effectiveness of silane coatings on bridge decks, shows that the silane is not consistently penetrating to the target depth. Further, this material is not resisting water absorption as outlined in the ODOT specifications. Based on discussions with ODOT Materials Division Engineers, the field testing is showing that one in three bridges are failing these tests. This suggests that these coatings are not effective and this puts the long-term performance of the bridge in question. While some results have been obtained with a limited number of bridges, more work is needed to investigate a larger number of bridges and evaluate the current ODOT specification.

This research is timely and will assist ODOT in making sound investments in the long-term performance of Oklahoma's bridges. As a result of this research a new specification for ODOT structures will be developed. The results of this research have the potential to greatly extend the service life of bridges and therefore save the state of Oklahoma millions of dollars.

PROPOSED ACTIVITIES FOR FFY 2023: **(Yr. 4 of 4)** – Continue core collection sampling from 40 different bridges in Oklahoma from different regions and contractors and complete a series of laboratory testing; continue investigation on how cracking, change in w/cm, and different depths of penetration impact the performance of silane coatings; continue determination of the effectiveness of applying silane to extend existing silane coatings; continue investigation of the performance of unique surface sealers; provide monthly reports; prepare and submit final report.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$113,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$120,000	SPR	$0.00	STATE

CONTACT INFORMATION

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

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

Project Manager: Teresa Stephens, Research Engineer, 405-415-5825

2288 Long Term Performance and Benefits of Combined Balanced Mix Design and Chemical WMA Technology

PURPOSE AND SCOPE: Asphalt mix durability has been a serious concern in Oklahoma for a long period of time. To address this and other issues (such as binder source variability, new binder modification materials, and recycled materials), balanced mix design (BMD) approach is being adopted by many state agencies. Different measures and additives have been tried to make the mixes pass rutting, cracking, and moisture damage requirements. One factor which has not been well investigated is chemical warm mix asphalt (WMA) technology when combined with BMD. Compared to hot mix asphalt (HMA), WMA is produced at the temperature of 275 F or lower. Consequently, significant amount of lighter oil component of asphalt binder is kept in the asphalt mix, which is beneficial to asphalt mix durability. However, combining BMD and chemical WMA technology has not been comprehensively evaluated in either laboratory or field. Thus, it is critical to evaluate the long-term performance and benefits of the combined BMD and chemical WMA technology, considering the potential of substantially extended pavement life with such technology.

PROPOSED ACTIVITIES FOR FFY 2023: **(Yr. 3 of 3)** Continue to quantify long-term engineering properties and benefits of asphalt mixtures produced with BMD and chemical WMA technologies and write a special provision/specification for implementation; provide monthly reports; prepare and submit final report.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$102,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$105,000	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Debakanta (Deb) Mishra, Oklahoma State University, 405-744-3332

Project Sponsor: David Vivanco, Asphalt Branch Manager, 405-522-4986

Project Manager: Bryan Cooper, Transportation Manager, 405-305-1963

2290 Bond Behavior of Epoxy Coated Reinforcement Bars in Non-Proprietary UHPC

PURPOSE AND SCOPE: Develop non-proprietary UHPC mixtures using ODOT specified materials along with comparisons with other non-proprietary UHPC mixtures developed for bridge deck applications. Mixtures will be used to construct pull-out and beam-splice specimens for testing to investigate the effects of bar size and spacing, splice/embedment length, cover, fiber content, compressive strength, and bar coatings, including a new textured coating, on the bond strength between reinforcing bars and non-proprietary UHPC mixtures. A performance-based tension test using a notched specimen will be evaluated to determine applicability for use in design. Test results will be used to develop guidelines for splice design, with special emphasis on using UHPC in closure strips between reinforced concrete members.

PROPOSED ACTIVITIES FOR FFY 2023: **(Year 2 of 2)**: Develop non-proprietary UHPC mixtures using ODOT specified materials, establishing performance-based measures; Evaluate UHPC mixtures in modified pull-out or beam-end specimens; and construct and test beam splice specimens; provide monthly reports; prepare and submit final report.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$119,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$140,000	SPR	$0.00	STATE

CONTACT INFORMATION

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

Project Sponsor: Walt Peters, Engineering Manager, 405-521-2606

Project Manager: Teresa Stephens, Research Engineer: 405-415-5825

2291 A Fatigue Assessment Framework for Steel Bridges using Fiber Optic Sensors and Machine Learning

PURPOSE AND SCOPE: The main goal of the proposed research is to develop a machine learning (ML) assisted structural health monitoring (SHM) approach that employs fiber optic sensors (FOS) to enable (a) the assessment of the fatigue life of steel bridge details and (b) the accurate detection of the presence of damage under normal traffic loading conditions. In more detail, the proposed research aims at:

- Constructing a monitoring system based on FOS to enable accurate strain quantification for efficient fatigue assessment and performance evaluation of steel bridge components. The developed monitoring system will be suitable for long-term field application under aggressive environmental conditions.
- Formulating an approach that utilizes data from the FOS for damage detection in steel bridge components. The approach should detect and localize the damage without requiring detailed finite element modeling of the structure or detailed vehicular loading data. These requirements ensure its applicability for automated damage detection for existing bridges without the need for intensive post-processing data analysis.
- Characterizing the effect of key operational parameters on the efficacy of the damage detection algorithm. These include the effect of loading conditions, temperature variations, type of damage, and boundary conditions.

The proposed project will include the design of an instrumentation system for field application and validating its damage detection capabilities using large-scale laboratory testing.

PROPOSED ACTIVITIES FOR FFY 2023: **(Yr. 2 of 3)** Fabricate test specimens; generate load test spectra; prepare the test setup; conduct large scale experimental tests; develop an approach for ML-based damage detection; provide monthly reports; FFY 20-22 annual report is pending; prepare and submit FFY 2023 annual report.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$102,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$105,000	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Mohamed Soliman, Oklahoma State University, 405-744-9777

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

Project Manager: Wayne Rice, Transportation Manager, jrice@odot.org

2292 Innovative Multi-Hazard Resistant Bridge Columns for Accelerated Bridge Construction

PURPOSE AND SCOPE: The Federal Highway Administration (FHWA) and state departments of transportation (DOTs) are actively promoting accelerated bridge construction (ABC) to minimize construction costs and time and to enhance work-zone safety. While several techniques are available to accelerate bridge superstructures, limited techniques are available to accelerate bridge substructures. This proposal focuses on accelerating substructure construction using an innovative multi-hazard resistant bridge column. The column consists of a concrete core sandwiched between an outer fiber-reinforced polymer (FRP) tube and an inner steel tube. Both tubes will act as stay-in-place forms and confine the concrete core. The inner steel tube will be embedded into the footing and will provide flexural and shear reinforcement. The outer FRP tube will protect the concrete and steel materials from corrosion and will provide flexural and shear reinforcement. Both high-strength self-consolidating concrete (SCC) and ultra-high-performance concrete (UHPC) will be investigated for potential use as the concrete core material.

PROPOSED ACTIVITIES FOR FFY 2023: **(Yr. 2 of 2)** Design and construct half-scale HC-FCS columns; test half-scale HC-FCS columns under cyclic lateral load and constant axial load; design and construct small-scale HC-FCS column-footing and column-girder connections; test small-scale HC-FCS column-footing and column-girder connections under cyclic lateral load; perform parametric finite element study of HC-FCS columns; provide monthly reports; prepare and submit final report.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$102,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$105,000	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Jeffery Volz, Oklahoma University, 405-301-5922

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

Project Manager: Gary Hook, Implementation Engineer, 405-420-2596

2294 Investigate the Aging Behavior of Asphalt Binders at Different Production Stages and During the Service Life of the Pavement

PURPOSE AND SCOPE: Asphalt mixtures undergo aging during production, placement, and throughout the service life of the pavement, which affects the pavement performance, and ultimately results in pavement distresses. To improve the asphalt mix design process and extend the pavement life, it is important to evaluate the rate of aging and quantify its impact on the mixture properties. A comprehensive study of asphalt aging includes both a lab and field study of different asphalt mixtures representing a wide range of materials and mix designs in the state of Oklahoma.

PROPOSED ACTIVITIES FOR FFY 2023: **(Yr. 1 of 3)** A Literature review will be performed; Procurement and Installation of the Auto Extraction and Recovery System; Selection and Sampling of Plant-Produced Mixes for Extraction and Recovery; Conduct Extraction and Recovery on Plant-Produced Mixes; Rheological and Chemical Testing of Extracted and Recovered Binders; Long-term Aging of Plant-Produced Mixes involving heating the plant-produced mixes in the oven to simulate long-term aging; asphalt mixes sampled in Task 3 will be reheated in the lab and compacted to produce IDEAL-CT specimens to measure the cracking resistance, and Hamburg-Wheel Tracking (HWT) or IDEAL-RT specimens, as determined based on discussion with ODOT, to measure the rutting resistance; provide monthly reports; prepare and submit FY23 annual report.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$200,000	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Mohamed Elkashef, Ph.D., P.E. Oklahoma State University 405-744-1149

Project Sponsor: David Vivanco, Asphalt Branch Manager, 405-522-4986

Project Manager: Teresa Stephens, Research Engineer: 405-415-5825

2300 Research Implementation

PURPOSE AND SCOPE: Implementation is the incorporation of research results into everyday practices of the organization and is a crucial stage in the research process. Research findings from national and regional studies are also considered for implementation. No matter how the research is derived, it is of little importance if it is not implemented. The budget for this item is prepared to support multiple implementation projects and/or 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 resulting in knowledgeable outcomes significant to the Department. Those projects and/or studies identified at SPR Work Program development that are supported by this item are represented in the following pages.

PROPOSED ACTIVITIES FOR FFY 2023: Support implementation project modification needs, mid-year research program needs and general implementation project support activity personnel needs. We have developed two new implementation RFPs to post for 2023 activity. We are currently in the process to determine the cost benefit/saving of projects that have been implemented.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$100,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$100,000	SPR	$0.00	STATE

CONTACT INFORMATION

ODOT Sponsor: Ron F. Curb PE CPM, rcurb@odot.org, 405-420-9163

Project Manager: Gary Hook, Implementation Engineer, 405-420-2596

2302 Load Test Monitoring of I-235 Bridge Repairs

PURPOSE AND SCOPE: In response to national issues with grouting errors, FHWA has required all of the state DOTs to inspect their post tensioned grouted tendons. Based on these inspections ODOT discovered some issues with the I-235 bridge west of the state capitol. Older methods used during construction of this bridge led to some problems in the post-tensioning ducts. Not until relative recent years have DOT's required the use of thixotropic grouts for post-tensioning. Older grouts did not perform as well as the thixotropic grouts and tended to flow away from the high points leaving only water. Newer designs require additional vents especially at the high points. This project was directed at filling grout voids but stumbled into a few locations that did not have any grout. Due to concerns with section loss of the previously exposed prestressing strands, ODOT restricted permit traffic from travelling over the bridge. However, ODOT calculations show that a posting is not required. The approximate replacement cost for the bridge including the on-ramp is estimated to be $50 million. As such, health monitoring of the bridge is justified. The research team at OSU can help ODOT in the assessment of these repairs by performing an array of nondestructive tests including live load testing, strain monitoring, and acoustic emissions monitoring.

The objective of the project is to assess and monitor the repairs to the regrouted post tensioned tendons in the I-235 bridge. The anticipated benefit of the project is that it will provide insight into the effectiveness of the regrouted tendon repairs and monitor their behavior over time. This knowledge will be valuable in future decisions on safety and maintenance of the monitored bridge members.

PROPOSED ACTIVITIES FOR FFY 2023: Final report is pending.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$86,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Robert Emerson, Oklahoma State University, 405-744-5259

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

Project Manager: Gary Hook, Implementation Engineer, 405-420-2596

2307 A Systems Approach for Design, Construction, and Maintenance of Bridges and Adjacent Roadways

PURPOSE AND SCOPE: Previous research projects funded by the Oklahoma Department of Transportation (ODOT), Federal Highway Administration (FHWA) and other agencies have revealed that many problems faced by bridges, such as expansion joints closing, are related to how the interfaces between a bridge and the adjacent roadway are designed, constructed, and maintained. The current design practice views the bridge and the adjacent roadway as separate components. Therefore, a systems-based approach is needed that considers the important interactions of the bridge and adjacent roadways in a holistic manner. The proposed research will utilize the knowledge gained from the previous studies and develop implementable strategies for improving design, construction, and maintenance of bridges and adjacent roadways.

PROPOSED ACTIVITIES FOR FFY 2023: None. Final report submitted. End of project.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

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

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

Project Manager: Gary Hook, Implementation Engineer, 405-420-2596

2308 Demonstration of the Applicability of the New CPTu/SCPTu Correlations with Soil Parameter Evaluation

PURPOSE AND SCOPE: The most accurate determination of seismic site class is achieved with in situ measurement of shear wave velocities. A seismic cone penetration test with pore water pressure measurement (SCPTu) can perform all of the functions of the CPTu, but has added capability to measure shear wave velocity at discrete depths. Shear wave velocities are not only useful for accurate determination of seismic site class, they can also be used to estimate other soil properties such as the small strain shear modulus (G_{vo}). The objectives of this research project are: To demonstrate the applicability of various CPT, CPTu, SCPTu correlations to a broad range of Oklahoma soils. To develop Oklahoma specific correlations based on laboratory and CPT, CPTu and SCPTu data collected. To develop recommendations for addressing the impact of partial saturation on CPT, CPTu and SCPTu results and estimated soil properties. To produce a comprehensive set of guidelines in a manual of practice for application of CPT, CPTu and SCPTu for geotechnical engineers in Oklahoma.

PROPOSED ACTIVITIES FOR FFY 2023: None. Final report submitted. End of project.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

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

Project Sponsor: Scott Garland, ODOT Geotechnical Engineer, 405-522-4998

Project Manager: Gary Hook, Implementation Engineer, 405-420-2596

2310 Using X-Ray Fluorescence to Assess Soil Subgrade Stabilization Competency During Construction Inspection

PURPOSE AND SCOPE: Currently, ODOT does not have the technology to assess subgrade stabilization content and distribution during construction, prior to pavement laying. Adequate subgrade stabilization is paramount to quality pavement performance. X-Ray Fluorescence (XRF) has been shown to accurately measure the amount of stabilization in soil and, when using proper sampling and testing protocols, can provide an excellent assessment of the spatial distribution of a soil additive. This information can be used to make recommendations to transportation officials on how to employ the portable handheld XRF (PHXRF) and implement laboratory XRF testing protocol on job-sites for quality control applications or during forensic investigations. This technology would help DOTs to more efficiently and effectively build subgrades that would last longer, require less maintenance, and lower the cost of roadway construction. In addition, PHXRF may be a viable solution in sulfate testing in soil subgrades and environmental applications. PHXRF can, potentially, serve several purposes on site, since sulfate detection changes any stabilization protocol because of the threat of ettringite formation.

PROPOSED ACTIVITIES FOR FFY 2023: None. Final report submitted. End of project.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Amy Cerato, The University of Oklahoma, 405-313-8937

Project Sponsor: Scott Garland, ODOT Geotechnical Engineer, 405-522-4998

Project Manager: Gary Hook, Implementation Engineer, 405-420-2596

2311 In-Stream Structures Integrity and Channel Stability Survey and Evaluation

PURPOSE AND SCOPE: In order to reduce impacts on infrastructure within river floodplains, particularly bridges and hydraulic structures, river control or in-stream structures are installed to reduce the impact of peak flows from large flood events. Many of these structures were installed over 50 years prior, but are not routinely evaluated for effectiveness and/or integrity after large storm events, (100-500 year storms). Previously, two ODOT studies (1971 and 1989) have compared the effectiveness of over 20 river-control and streambank-stabilization structures near transportation infrastructure. The results of these studies provide a unique opportunity to build on and enhance the present-day understanding of long-term effectiveness of these structures to limit channel migration and maintain structural function. The proposed project would add to and enhance previous studies through geomorphic surveys and in-depth analysis of the characteristics of installed in-stream structures and stream geomorphology to inform ODOT engineers on causes of survival or failure due to large flooding events over the long term. This information will improve ODOT's understanding of the effectiveness and integrity of river control structures and inform development of standard characteristics and methods for design and installation of resilient instream structures for protection of transportation infrastructure.

PROPOSED ACTIVITIES FOR FFY 2023: None. Final report submitted. End of project.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Jason Vogel, The University of Oklahoma, 405-325-2826

Project Sponsor: Leslie Lewis, ODOT Bridge Division Hydraulics Engineer, 405-521-6500

Project Manager: Gary Hook, Implementation Engineer, 405-420-2596

2313 Design and Monitoring of Non-Proprietary UHPC Joints of Precast Elements

PURPOSE AND SCOPE: The purpose of this study is to take the results of the 2276 study entitled "Evaluation of Ultra-High-Performance Concrete for Use in Bridge Connections and Repair" and implement and monitor the effects of the UHPC process on various bridge deck joints throughout the state. Deterioration of bridges can often be related to poor performance of longitudinal connections between precast members or transverse deck joints. Ultra-high performance concrete (UHPC) is a cementitious composite with mechanical and durability properties far exceeding those of conventional concrete, which makes it an ideal material for bridge deck joints. UHPC is a relatively expensive material and is most economical when use of a small quantity can have a large impact on overall performance of a structure.

PROPOSED ACTIVITIES FOR FFY 2023: Final report is pending.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$72,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Royce Floyd, The University of Oklahoma, 405-325-1010

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

Project Manager: Gary Hook, Implementation Engineer, 405-420-2596

2314 Evaluation and Development of Flood Detection and Prediction System

PURPOSE AND SCOPE: The purpose of this project is to evaluate systems for the rapid detection of flash flooding in problem areas through a weather station platform deployed at an ODOT site and integrate system evaluation in a real-world setting, to develop a prediction model, and to develop a warning system to alert the public of impending flood waters.

PROPOSED ACTIVITIES FOR FFY 2023: Final report is pending.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$99,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Hazem Refai, University of Oklahoma, 405-660-3234

Project Sponsor: Alan Stevenson, Engineering Manager, 405-521-6460

Project Manager: Bryan Cooper, Transportation Manager, 405-305-1963

2315 Adapting ODOT Radar Traffic Monitoring System to Automatically Track Real-Time Traffic Flow

PURPOSE AND SCOPE: The Oklahoma Department of Transportation is in the process of installing 150 radar sites across the State, with most radars deployed on major highways and roadways in the OKC and Tulsa metropolitan areas. The radar units monitor traffic flow and collect information including volume, speed, and vehicle classification. High resolution cameras are installed on the radar and can be configured to take a picture at regular intervals. This project is comprised of three major activities. First is to develop an interface to the radar data to allow real-time sharing of data and pictures with the Intelligent Transportation System group in ODOT Maintenance Division. The system will report speed information as well as pictures. Second is to compare the collected speed data with that obtained from commercial companies. Currently, the State spends large sum of funds to secure annual contract with such companies. Third is to investigate the use of speed data to rapidly detect roadway incidents.

PROPOSED ACTIVITIES FOR FFY 2023: Final report is pending.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$93,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Hazem Refai, University of Oklahoma, 405-660-3234

Project Sponsor: Angel Gonzalez, Assistant SAPM Engineer, 405-521-2704

Project Manager: Gary Hook, Implementation Engineer, 405-420-2596

2316 Solving the Riddle of End Regions-and Holistically Address the Performance of PC Girder Bridges Including Design, Sustainability and Rating

PURPOSE AND SCOPE: The purpose and goals of this research is to develop designs and methods for PC Bridge Beams that: assure safety and strength of PC Beam Bridges, produce PC breams with end regions that are free or nearly free from cracking in end regions of PC beams, produce beams with controlled and predictable prestress losses, produce PC beams with controlled and predicable cambers, and assure the long-lived serviceability of PC beam bridges.

PROPOSED ACTIVITIES FOR FFY 2023: **(Year 1 of 3)** Begin literature review and background search. Perform analytical modeling to evaluate variables in end regions. Perform modeling to examine effects of top strands and modeling to evaluate DF's, IM and service 3. Perform laboratory testing of concrete materials and strands. Acquire and build data acquisition systems for field. Provide monthly reports; prepare and submit FFY 2023 annual report.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$130,000	SPR	$0.00	STATE

CONTACT INFORMATION:

Principal Investigator: Bruce Russell, Oklahoma State University, 405-742-7450

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

Project Manager: Gary Hook, Implementation Engineer, 405-420-2596

2317 Effectiveness of Magnesium-Alumino-Liquid-Phosphate-Based Concrete as a Repair Material (MALP)

PURPOSE AND SCOPE: The purpose and goals of this research is to address the corrosion performance of conventional reinforcing steel in uncracked and cracked MALP concrete in simulated repairs of Portland cement of both high and low quality. Reinforcing bars will be evaluated in both a clean and passive state and in an activity corroding state. The project will evaluate the ability of MALP concrete to withstand freeze-thaw cycles both as an individual material and in conjunction with Portland cement concrete.

PROPOSED ACTIVITIES FOR FFY 2023: **(Year 1 of 3)** Begin literature review and background search. Begin to evaluate corrosion performance of uncorroded and corroded reinforcing steel in cracked and uncracked concrete. Start the evaluation process of the freeze-thaw performance of Phoscrete individually and in conjunction with conventional concrete. Evaluate the shrinkage properties of Phoscrete to minimize crack widths internally and adjacent to sound concrete at a repair site. Provide monthly reports; prepare and submit FFY 2023 annual report.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$97,000	SPR	$0.00	STATE

CONTACT INFORMATION:

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

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

Project Manager: Gary Hook, Implementation Engineer, 405-420-2596

2400 Oklahoma State University Master Agreement for Research and Investigation Services

PURPOSE AND SCOPE: This item will support a task-order based contract for the purpose of providing ODOT the opportunity to address topics and needs that were not brought through the formal annual project selection process and/or were identified outside the formal process. It is anticipated that these projects will range in both scope and financial commitment from simple to complex, but generally be limited to a one-year or less completion cycle. Topics could include traditional research topic areas of interest to the Agency, as well as ancillary effort including education and workforce development and technology transfer through, but not limited to, collaboration, leadership training, addressing student retention and diversity, and internship programs.

PROPOSED ACTIVITIES FOR FFY 2023: Continue supporting SPTC UTC activities. Continue task order contracting mechanism building on FFY 2022 program and further defining processes and needs for a sustainable UTC.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$500,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$500,000	SPR	$0.00	STATE

CONTACT INFORMATION

OSU Contact: Kelvin Wang, Oklahoma State University, 405-744-5189

ODOT Project Manager: Ron F. Curb PE CPM, rcurb@odot.org, 405-420-9163

2400-20-01
OSU Task Order Contract Administrative Support

PURPOSE AND SCOPE: To provide support and guidance to task order projects at Oklahoma State University to Principal Investigators and to the Office of Research and Implementation (ORI) in project management.

PROPOSED ACTIVITIES FOR FFY 2023: None. Final report submitted. End of task order.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

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

ODOT Sponsor / Task Order Manager: Ron F. Curb PE CPM, rcurb@odot.org, 405-420-9163

2400-20-07
Civil Engineering Education Outreach: Transportation Infrastructure Activities

PURPOSE AND SCOPE: This task order requests ODOT funding for a year-long outreach program. The proposed program includes activities aimed at K-12 students, incoming engineering freshmen at Oklahoma State University, as well as practicing professionals. Though targeted toward a wide range of audiences, all of the activities share the purpose of informing the broader public about transportation infrastructure.

PROPOSED ACTIVITIES FOR FFY 2023: None. Final report submitted. End of task order.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Robert Emerson, Oklahoma State University, 405-334-1439

ODOT Sponsor / Task Order Manager: Ron F. Curb PE CPM, rcurb@odot.org, 405-420-9163

2400-20-08
Variation of Shear Wave Velocity Due to Moisture Changes

PURPOSE AND SCOPE: This study will assess the potential of shear wave velocity data to simulate the climate-related variations in mechanical properties of subgrade soils using SCPTu field equipment owned by Dr. Jim Nevels. The basic parameters to be measured with depth are shear wave velocity and moisture content.

PROPOSED ACTIVITIES FOR FFY 2023: None. Final report submitted. End of task order.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Rifat Bulut, Oklahoma State University, 405-744-7436

ODOT Sponsor: Scott Garland, ODOT Geotechnical Engineer, 405-522-4998

Task Order Manager: Gary Hook, Implementation Engineer, 405-420-2596

2400-21-01
OSU Task Order Contract Administrative Support

PURPOSE AND SCOPE: To provide support and guidance to task order projects at Oklahoma State University to Principal Investigators and to the Office of Research and Implementation (ORI) in project management.

PROPOSED ACTIVITIES FOR FFY 2023: Final report is pending.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

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

ODOT Sponsor / Task Order Manager: Ron F. Curb PE CPM, rcurb@odot.org, 405-420-9163

2400-21-02
Load Testing and Long-Term Monitoring of SH 4 Bridge in Canadian Co.

PURPOSE AND SCOPE: Two Prestressed Concrete (PC) Bridge girders were instrumented under an FY2020 Work Order. The instrumentation measures concrete temperatures, and concrete and steel strains at both midspan and end regions. Data was collected throughout each Girder's fabrication including casting, curing, de-tensioning, hauling, and erection. We also collected data during the casting of the bridge deck slabs. Monitoring was continued through October 31, 2020 under the previous work order.

This work order will continue monitoring the performance of PC Girders for one year. In addition, load testing will be performed on Spans 9 and 14. The instruments already installed provide real-time and unprecedented strain data and temperature data. Also, deformations can be measured under truck loading. The instrumentation provides data at both midspan (for critical flexural performance) and at End Regions (critical shear performance). Additionally, the work order will purchase and install LVDT's for the load tests, and accelerometers to provide vibration data, short and long-term deflections, and bridge condition assessment data.

PROPOSED ACTIVITIES FOR FFY 2023: None. Final report submitted. End of task order.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Bruce W. Russell, Oklahoma State University, 405-742-7450

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

Task Order Manager: Wayne Rice, Transportation Manager, jrice@odot.org

2400-21-03
On-Demand Support of the ODOT Skid Program

PURPOSE AND SCOPE: Perform on-demand services for the ODOT skid program, the base cost is estimated to be $5,000 per on-demand service per daily trip. For the most of in state work, a daily trip should Be adequate to finish the work. If the data collection of one service requires multiple days, PI should report to ODOT in advance. For each additional workday, the extra cost is estimated to be $2,500, plus lodging and per diem for the testing crews.

PROPOSED ACTIVITIES FOR FFY 2023: None. Final report submitted. End of task order.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Joshua Li, Oklahoma State University, 405-744-6328

ODOT Sponsor: Angel Gonzalez, SAPM Asst Division Engr, 405-522-2704

Task Order Manager: Gary Hook, Implementation Engineer, 405-420-2596

2400-21-05

Analysis of ODOT's Traffic Speed Deflection Device Data for Pavement Structural Evaluation

PURPOSE AND SCOPE: Traffic Speed Deflection Devices (TSDDs) that measure surface deflection at traffic speeds have recently gained a significant popularity among pavement researchers/engineers as well as state highway agencies. TSDDs, provide a rapid and continuous "picture" of the pavement condition, thereby, significantly enhancing the amount of information available related to the pavement condition as compared to FWDs. This project will analyze the TSDD data being collected by ODOT as apart of Transportation Pooled Fund Project TPF-5(385) and identify different approaches to integrate the data into ODOT's pavement management decisions.

PROPOSED ACTIVITIES FOR FFY 2023: None. Final report submitted. End of task order.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Deb Mishra, Oklahoma State University, 405-744-6328

ODOT Sponsor: Angel Gonzalez, SAPM Asst Division Engr, 405-522-2704

Task Order Manager: Gary Hook, Implementation Engineer, 405-420-2596

2400-21-06
I-235 Viaduct OKC Bridge Monitoring System Installation General

PURPOSE AND SCOPE: This task will involve taking the instrumentation from the Tower bridge and installing it on the I-235 SB bridge over 23rd St. and RR (NBI 22426). Installation will involve the following items: following items:

- One (1) LifeSpan controller with twenty-four (24) sensor slots.
- One (1) surge protector/battery back-up power supply system.
- Twelve (12) LifeSpan TA sensors, and three (3) temperature sensors.

Additionally, the installation will require access provided by OSU, labor needed to install the instrumentation supplied by White Electrical, and cables to hook up the instrumentation. The instrumentation will be used to collect data at critical locations for approximately one year and to collect data on the load test planned for late Spring. It should be noted that the removal of the instruments from the Tower bridge will be done by White Electric and funded through 2300 funds.

PROPOSED ACTIVITIES FOR FFY 2023: None. Final report submitted. End of task order.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Robert Emerson, Oklahoma State University, 405-744-5259

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

Task Order Manager: Gary Hook, Implementation Engineer, 405-420-2596

2400-21-09
Bridge Approach Evaluation and Management

PURPOSE AND SCOPE: Bridge deck approaches at ODOT were mostly constructed with concrete slabs. Certain approaches were overlaid with thin asphalt mix materials due to settlement after construction. Approach quality directly affects the dynamic impact of truck load on both the approaches themselves, and the user cost of all vehicles. This task order will use current ODOT inspection process and the AASHTO Manual of Bridge Evaluation (2018) as guides to evaluate selected number of bridges on I-35 in District 4 using the OSU sub-mm 3D laser imaging technology, and provide recommendations to ODOT in both data collection and management of approaches in the future.

PROGRAMMED ACTIVITIES FOR FFY 2023: Final report is pending.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

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

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

Task Order Manager: Gary Hook, Implementation Engineer, 405-420-2596

2400-21-10
Civil Engineering Education Outreach: Transportation Infrastructure Activities

PURPOSE AND SCOPE: One year-long outreach program. The proposed program includes activities aimed at K-12 students, incoming engineering freshmen at Oklahoma State University, as well as practicing professionals. Though targeted toward a wide range of audiences, all of the activities share the purpose of informing the broader public about transportation infrastructure.

PROPOSED ACTIVITIES FOR FFY 2023: None. Final report submitted. End of task order.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Robert Emerson, Oklahoma State University, 405-744-5259

ODOT Sponsor / Task Order Manager: Ron F. Curb PE CPM, rcurb@odot.org, 405-420-9163

2400-21-11
Data Preparation for Implementing Pavement ME Design in Oklahoma

PURPOSE AND SCOPE: ODOT owns rich data sources that are valuable for the Pavement ME Design, including the county level Mesonet climatic data, a large amount of subgrade/base sampling and testing data, a comprehensive traffic data collection program with hundreds of permanent traffic counters (71 AVC, 21 WIM, and 150 new radar-based units), and extensive testing of surface pavement materials. This task order will utilize these state-specific data sets to prepare the critical inputs for the implementation of ME Design at ODOT, and develop an AASHTOWARE Pavement ME Design Implementation Guide for Oklahoma.

PROGRAMMED ACTIVITIES FOR FFY 2023: Final report is pending.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Joshua Li, Oklahoma State University, 405-744-6328

ODOT Sponsor: Amanda Warren, ODOT Pavement Design Engineer, 405-521-2390

Task Order Manager: Gary Hook, Implementation Engineer, 405-420-2596

2400-21-12
Structural Health Monitoring

PURPOSE AND SCOPE: The I-235 bridge over 16th St., 23rd St., & RR (NBI 22426) has been instrumented with One (1) LifeSpan controller with twenty-four (24) sensor slots, One (1) surge protector/battery back-up power supply system, Twelve (12) LifeSpan TA sensors, and three (3) temperature sensors. However, for ODOT/OSU to receive data from this instrumentation, it is necessary to pay the subscription fee.

PROGRAMMED ACTIVITIES FOR FFY 2023: None. Final report submitted. End of task order.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Robert Emerson, Oklahoma State University, 405-744-5259

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

Task Order Manager: Gary Hook, Implementation Engineer, 405-420-2596

2400-22-01
OSU Task Order Contract Administrative Support

PURPOSE AND SCOPE: To provide support and guidance to task order projects at Oklahoma State University to Principal Investigators and to the Office of Research and Implementation (ORI) in project management.

PROPOSED ACTIVITIES FOR FFY 2023: Final report is pending.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$45,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

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

ODOT Sponsor / Task Order Manager: Ron F. Curb PE CPM, rcurb@odot.org, 405-420-9163

2400-22-02
Civil Engineering Education Outreach: Transportation Infrastructure Activities

PURPOSE AND SCOPE: Includes activities aimed at K-12 students, incoming engineering freshmen at Oklahoma State University, as well as practicing professionals. Though targeted toward a wide range of audiences, all of the activities share the purpose of informing the broader public about transportation infrastructure.

PROPOSED ACTIVITIES FOR FFY 2023: Final report is pending.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$70,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Robert Emerson, Oklahoma State University, 405-334-1439

ODOT Sponsor / Task Order Manager: Ron F. Curb PE CPM, rcurb@odot.org, 405-420-9163

2400-22-03

Evaluation of a Continuous Reinforced Concrete Pavement and the Design of a Bonded Overlay

PURPOSE AND SCOPE: There are 29 lane miles of continuous reinforced concrete pavement on I-35 between SE 15th and SE 89th in Oklahoma City that are showing signs of deterioration because the steel is placed in the wrong location. This task order will provide assistance in documenting the steel location, suggesting repair areas, and also suggesting the mixture design for the overlay. As part of this effort, the following deliverables will be composed:

- A GPR survey of the region completed by Infrasense, Inc.
- Suggested areas for the overlay.
- Suggested overlay mixture design.

PROPOSED ACTIVITIES FOR FFY 2023: Final report is pending.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$86,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

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

ODOT Sponsor: Trenton January, Field District Engineer (Dist. 4), 580-336-7340

Task Order Manager: Teresa Stephens, Engineering Manager, 405-415-5825

2400-22-04
Quality Control and Assurance Guide for Maintenance Equipment Fleet Management Data

PURPOSE AND SCOPE: The Oklahoma Department of Transportation (ODOT) has collected maintenance equipment fleet management data, including equipment inventory, fueling records, maintenance and repair records, and equipment operation logs, for decades. To keep its equipment operating in cost-effective and productive conditions, this data has been traditionally used as the basis for establishing equipment "rental rates" that have been used as a crucial instrument to track and adjust depreciable equipment budget. However, all of these data-driven decisions hinge on the quality of the equipment management data. The ODOT's current equipment data management practices have not implemented a quality control and quality assurance (QA/QC) process. As a result, the poor-quality data can compromise the Division's ability to make accurate forecasts and economic decisions. Therefore, a data quality control and assurance process will be developed through this proposed task order.

PROPOSED ACTIVITIES FOR FFY 2023: Final report is pending.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$70,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Yongwei Shan, Oklahoma State University, 580-744-7073

ODOT Sponsor: Alex Calvillo, ODOT Asst. Div. Eng. for Operations and Maint., 405-521-2557

Task Order Manager: Wayne Rice, Transportation Manager, jrice@odot.org

2400-22-05
Incremental Creep for Cracking at Low Temperature (ICCL)

PURPOSE AND SCOPE: The Oklahoma Transportation Materials Division currently uses a test called the Bending Beam Rheometer (BBR) that is labor intensive and time consuming, taking about 2 days to complete. There is now a device called the Dynamic Shear Rheometer (DSR) that is portable and takes about 5 minutes to complete. The new test can be performed in the field, rather than the lab. It is a surrogate test to determine the continuous low temperature performance grade.

PROPOSED ACTIVITIES FOR FFY 2023: Final report is pending.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$90,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Mohamed Elkashef, Oklahoma State University, 405-744-1149

ODOT Sponsor: David Vivanco, Asphalt Branch Manager, 405-522-4986

Task Order Manager: Bryan Cooper, Transportation Manager, 405-305-1963

2400-22-06
Load Testing and Structural Monitoring of SH 4 and SH 11 Bridges in Canadian and Kay Cos.

PURPOSE AND SCOPE: In prior research work, Bridges in Kay County (SH 11) and Canadian County (SH 4) were instrumented during construction (SH 4, 2020) and rehabilitation (SH 11, 2019). Under a FY 2021 Task Order, SH 4 Bridge is being load tested and monitored. Work remains to evaluate the performance of the PC Bridge Girders in SH 4, and to evaluate the response to load of the SH 11 bridge. This FY22 Task Order will perform Static Load and Moving Load Tests on SH 11 Bridge in Kay County, continue monitoring both bridges for temperatures, strains and accelerations, and evaluate relative performance of PC Bridge Girders on SH 4 Bridge through crack mapping and Finite Element Analysis.

Assess and make recommendations for load distribution factors, impact factors, reinforcement details in end regions (how much vertical steel?), the use of mild reinforcement at midspan and other factors that affect the performance of ODOT Bridges.

PROGRAMMED ACTIVITIES FOR FFY 2023: Final report is pending.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$80,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Bruce Russell, Oklahoma State University, 405-742-7450

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

Task Order Manager: Gary Hook, Implementation Engineer, 405-420-2596

2400-22-07
Title TBD

PURPOSE AND SCOPE: OU and OSU Joint Project for District 8 Problem Solving. Co-funded with 2160-22-09.

PROPOSED ACTIVITIES FOR FFY 2023: None. The joint task orders never developed. Both task orders were cancelled and funding was moved to cover other FFY22 mid-year task orders.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$59,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

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

ODOT Sponsor: Trapper Parks, District 8 Maintenance Engineer, 918-838-9933

Task Order Manager: Bryan Cooper, Transportation Manager, 405-305-1963

2400-22-08
<u>On Demand Support of ODOTR Skid Program</u>

PURPOSE AND SCOPE: Perform on demand support to the ODOT skid program. The base cost is estimated to be $5,000 per on-demand service per daily trip, for most work. If the data collection of one service requires multiple days, the PI should report to ODOT in advance. For each additional workday, the extra cost is estimated to be $2,500, plus lodging and per diem for the testing crews. The UNIVERSITY will charge the DEPARTMENT per the number of services completed during the year according to the above estimated costs. Any unused or surplus funds in the task order will be used to support the identification of the most hazardous hotspots and wet weather crash locations, which frequently occur on surfaces with inadequate pavement friction.

PROPOSED ACTIVITIES FOR FFY 2023: Final report is pending.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$25,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Joshua Li, Oklahoma State University, 405-744-6328

ODOT Sponsor: Angel Gonzalez, Assistant SAPM Division Engineer, 405-437-5688

Task Order Manager: Gary Hook, Implementation Engineer, 405-420-2596

2400-22-09

Project-Level Evaluation of Pavement Conditions for Maintenance, Asset and Safety Management, and Pavement Design (OSU)

PURPOSE AND SCOPE: This is a joint task order between OU and OSU. The descriptions and deliverables are only for the OSU portion of work on applying a hybrid technology for project-level evaluation of pavement conditions including GPR data, TSD and FWD-based deflection data, and sub-mm 3D laser imaging data for surface condition, roughness, and safety over 30-lane miles of pavements in Oklahoma. This task order for OSU will provide insights into using sub-mm 3D laser imaging technologies and other equipment at OSU to address engineering needs of multiple districts at ODOT in maintenance, asset and safety management, and pavement design (three application areas). The OSU team will also assist the OU team in understanding the GPR and defection data sets on the same pavement sections so that a comprehensive evaluation can be conducted on the pavement sections.

FFY22 scheduled work: In this Task Order the OSU team will use OSU 3D laser imaging and relevant equipment to survey the same 30-mile pavement sections as the OU team did for GPS and deflection surveys for both asphalt and composite pavements for the three applications (maintenance, asset and safety, and design).

PROPOSED ACTIVITIES FOR FFY 2023: Final report is pending.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$25,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$0.00	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Kelvin Wang, Oklahoma State University, 580-744-5188

ODOT Sponsors: Taylor Henderson, ODOT Maintenance Div. Engineer, 405-521-2557

Angel Gonzalez, Assistant SAPM Division Engineer, 405-437-5688

Task Order Manager: Wayne Rice, Transportation Manager, jrice@odot.org

2400-23-01
OSU Task Order Contract Administrative Support

PURPOSE AND SCOPE: To provide support and guidance to task order projects at Oklahoma State University to Principal Investigators and to the Office of Research and Implementation (ORI) in project management.

PROPOSED ACTIVITIES FOR FFY 2023: Maintain oversight of all approved OSU task orders in monitoring schedules and budgets; assist PI's and ORI as needed to maintain project scope; assist ORI as requested with specific projects; work with PI's to develop new requests; develop initiatives for task order requests toward developing a sustainable program for future University Transportation Center proposals.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$40,000	SPR	$0.00	STATE

CONTACT INFORMATION

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

ODOT Sponsor / Task Order Manager: Ron F. Curb PE CPM, rcurb@odot.org 405-420-9163

2400-23-02
Benchmarking Oklahoma Asphalt Mixtures for Cracking Performance

PURPOSE AND SCOPE: The Oklahoma Department of Transportation (ODOT), like many other state DOTs, has moved towards the implementation of Balanced Mix Design (BMD) approaches, where asphalt mix design is not only based on volumetric parameters, but also on performance-related thresholds. The BMD implementation process in Oklahoma has involved the selection of appropriate performance tests that would screen the asphalt mixtures based on their rutting and cracking performance. The cracking test selected for implementation by ODOT is the IDEAL-CT test, which is an indirect tensile strength test that does not require specialized specimen preparation.

PROJECTED TASKS FOR FFY 2023: This project will start October 1, 2022. This project will focus extensively on testing of asphalt mixtures selected from different projects across Oklahoma.

A brief description of the test matrix is presented below that are to be completed in FFY2023:

1. Include up to 5 Mix Types (S-2, S-3, S-4, S-5, S-6) in the test matrix.
2. Select projects from across the state so that at least eight (8) to ten (10) mixtures per mix type can be sampled for lab testing. *The test matrix will include a total of at least forty (40), up to fifty (50), asphalt mixtures.*
3. Collect loose mix from the asphalt Plant. *The sample collection activities will be coordinated between ODOT and OSU*4.
4. Verify the Gmm for each mixture in the lab (test at least 2 replicates per mixture for Gmm verification)
5. Compact IDEAL-CT and IDEAL-RT specimens (62-mm thick). Target 7 ± 0.5% air voids
6. Condition the IDEAL-CT specimens at 25 °C for two hours. Condition the IDEAL-RT specimens in a water bath at 50 °C 40 minutes
7. Perform IDEAL-CT Testing (5 replicates per mix)
8. Perform IDEAL-RT Testing (3 replicates per mix). The IDEAL-RT testing will help ‘benchmark’ the rutting performance of Oklahoma mixtures.
9. Analyze the test results focusing on identifying typical IDEAL-CT index values for each mix type. *Propose typical threshold values to be included in the specifications*

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$80,000	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Deb Mishra, Oklahoma State University, 405-744-6328

ODOT Sponsor: David Vivanco, Asphalt Branch Manager, 405-522-4986

Task Order Manager: Gary Hook, Implementation Engineer, 405-420-2596

2400-23-03

Use of Continuous Pavement Deflection Data for Network-Level Structural Condition Assessment of Oklahoma Highways

PURPOSE AND SCOPE: The Oklahoma Department of Transportation (ODOT) has solely relied on pavement functional data for maintenance and rehabilitation decisions, with localized Falling Weight Deflectometer (FWD) testing for project-level designs. Although the FWD is a reliable tool for pavement structural evaluation, its main disadvantage concerns traffic control requirements. Moreover, the FWD provides a spot-based measurement, meaning the tests can be performed at certain points along the pavement surface. Traffic Speed Deflection Devices (TSDDs) that measure surface deflection at traffic speeds have recently gained a significant popularity among pavement researchers/engineers as well as state highway agencies. TSDDs, provide a rapid and continuous "picture" of the pavement condition, thereby, significantly enhancing the amount of information available related to the pavement condition as compared to FWDs. This project will analyze the TSDD data being collected by ODOT as a part of Transportation Pooled Fund Project TPF-5(385) and identify different approaches to integrate the data into ODOT's pavement management decisions in terms of structural design of rehabilitated sections.

PROPOSED TASKS FOR FFY 2023: This project will start October 1, 2023. The following tasks performed will be as follows: Analysis of TSDD data collected by ODOT under FHWA Pooled Fund Study TPF-5 (385) titled, "Pavement Structural Evaluation with Traffic Speed Deflection Devices (TSDDs)". The dataset to be analyzed will be selected through discussions with Mr. Angel Gonzalez and Mr. Matt Swift of ODOT. *It is anticipated that the data to be analyzed will correspond to both North-Bound and South-Bound lanes of I-35.* Back-Calculate individual pavement layer modulus values from the TSDD data using pavement layer thickness data obtained from ODOT records (either from GPR survey or from construction records). A back-calculation tool, recently developed by FHWA, and modified by Deb Mishra at OSU will be used for this purpose. This will help with future pavement rehabilitation design efforts. Identifying the value of pavement evaluation using TSDDs, ODOT is currently participating in TPF-5 (385) and has invested significant amounts of money ($45,000 each for years 2019, 2020, and 2021) to collect TSDD data along its network. *Analysis of this data through this project will result in significant cost savings for ODOT in terms of pavement maintenance/rehabilitation planning and implementation*

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$60,000	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Deb Mishra, Oklahoma State University, 405-744-6328

ODOT Sponsor: Angel Gonzalez, Assistant SAPM Division Engineer, 405-437-5688

Matt Swift, SAPM Division Engineer, 405-521-2704

Task Order Manager: Gary Hook, Implementation Engineer, 405-420-2596

2400-23-04
Field Performance of Novel Asphalt Material Technologies

PURPOSE AND SCOPE: The objective is to monitor the field conditions of the pavement sections using novel asphalt materials and evaluate their performance as compared to that of the control sections. Oklahoma Transportation has implemented several asphalt technologies, such as Balanced Mix Design (BMD), Ground Tire Rubber (GTR), Warm Mix Asphalt (WMA) with RAP, perpetual pavements with Rich Bottom Layer (RBL), High Friction Surface Treatment (HFST), and Open Graded Friction Courses (OGFC). Most of these sections are 5-10 years old and showing various levels of surface deterioration and cracking. These sections generally have counterpart control sections using conventional mixes, which provides an excellent testbed so that field performance can be evaluated.

PROPOSED ACTIVITIES FOR FFY 2023: Collect and analyze field performance and GPR data to evaluate cracking, rutting, surface roughness, texture, and friction at these locations: 3 BMD sites (SH-156 Kay Co., SH-20 Osage Co., I-35 McClain Co.), GTR site (SH-3 Canadian Co.) 6 WMA sites (SH-66 Canadian CO., West of Yukon) 4 Perpetual Pavement sites (US-69 McIntosh Co., SH-152 Oklahoma Co., Kickapoo Turnpike – Oklahoma Co., I-40 Caddo Co.), And 17 HFST sites at various Eastern Oklahoma Counties.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$85,000	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Joshua Li, Oklahoma State University, 405-744-6328

ODOT Sponsor: David Vivanco, Asphalt Branch Manager, 405-522-4986

Task Order Manager: Bryan Cooper, Transportation Manager, 405-305-1963

2400-23-05
Civil Engineering Education Outreach: Transportation Infrastructure Activities

PURPOSE AND SCOPE: This task order requests ODOT funding for a year-long outreach program. The proposed program includes activities aimed at K-12 students, incoming engineering freshmen at Oklahoma State University, as well as practicing professionals. Though targeted toward a wide range of audiences, all of the activities share the purpose of informing the broader public about transportation infrastructure.

PROPOSED ACTIVITIES FOR FFY 2023: This broad outreach program includes the following three major activities:

- **K-12 Outreach Activities**: including a variety of activities designed to introduce civil engineering and transportation infrastructure topics to prospective pre-college-aged students. We will engage in Engineering Day and Engineering Fair activities. We expect to inform K-12 students about transportation infrastructure and interact with K-12 teachers with the goal of expanding our efforts for K-12 students.
- **OSU Summer Bridge**: a part of the existing Summer Bridge program currently presented by the OSU CEAT. It involves a 2-week summer camp for in-coming freshman to the college with the focus on preparation for engineering, science, and math coursework. One of the modules will be focused on civil engineering in general and transportation infrastructure in particular.
- **Oklahoma Summer Transportation Symposium**: a forum to network, discuss, and understand transportation issues we face in Oklahoma for engineers interested in addressing some of these challenges, as well as to gain a better understanding of career options for CE students. Topics covers bridges, pavements, materials, planning, construction, geotechnical, and environmental issues.

- Monthly reporting required by ODOT.
- Summary report documenting the outreach activities and outcomes.

The activities aimed at the younger audiences of course also have the goal of encouraging students to consider careers in civil engineering, while those aimed at professionals have the goal of ensuring Oklahoma's transportation industry has access to the latest information.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$70,000	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Robert Emerson, Oklahoma State University, (405) 334-1439

ODOT Sponsor: Ron F. Curb PE CPM, rcurb@odot.org 405-420-9163

Task Order Manager: Ron F. Curb, PE CPM, rcurb@odot.org, 405-420-9163

2400-23-06
Performance Evaluation of Bridge Approach Slabs and Joints through Inertial, Sub-mm 3D, and Visual Methods

PURPOSE AND SCOPE: Approach slabs and joints on ODOT mainline bridges receive specific maintenance and rehabilitation measures due to settlement and dynamic impact from truck loading. Examples of repair activity include the use of deep-injection technique, backfill for voids, mud jacking, and overlays of pavement approaches to mitigate settlement. The task order is to use state-of-the-art OSU equipment in longitudinal profiling, sub-mm 3D laser imaging, and ultra-high resolution color imaging method to inspect approaches and joints for both identification of problems and field performance evaluation of existing repair techniques. The data collection is non-intrusive and does not require traffic control.

PROPOSED ACTIVITIES FOR FFY 2023: The task order will result in a systematic method for ODOT bridge division to use new evaluation methods to improve data collection and decision-making process.
The OSU team will first obtain maintenance and field performance data from ODOT offices and identify candidate bridges with past approach slab and joint problems for the task order. The OSU team would then plan multiple data collections on the selected slabs and joints using the three advanced equipment at the OSU lab for longitudinal profiling, sub-mm 3D laser imaging, and 9K based color imaging. The report will present the results of applying the three techniques for the evaluations and establish a procedure for possible field implementation by ODOT to improve bridge mitigation and repairs.
Assist ODOT Bridge Division to improve data gathering in a rapid manner using the described three methods for better bridge maintenance practices of sustainability and resiliency.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$95.,000	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Bruce W. Russell, Oklahoma State University, 405-742-7450

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

Task Order Manager: Teresa Stephens, Research Engineer, 405-415-5825

2400-23-07

Structural Monitoring of SH 4 and SH 11 Bridges in Canadian and Kay Counties; and Explore DF's and IM through Analyses

PURPOSE AND SCOPE: In prior research work, Bridges in Kay Co. (SH 11) and Canadian Co. (SH 4) were instrumented during construction (SH 4, 2020) and rehabilitation (SH 11, 2019). Under a FFY 2021 Task Order # 2400-21-02, SH 4 Bridge was load tested and monitored. Under a FFY 2022 Task Order # 2400-22-06, crack mapping was performed on SH 4 and Load Testing was performed on SH 11. This FY23 Task Order will:

a) Continue monitoring both bridges for temperatures, strains, and accelerations.
b) Continue to assess and make recommendations for (i) load distribution factors and ii) impact factors through the use of FEA and other analysis techniques. Consider the grillage method or other approximate techniques.
c) Make recommendations for (i) load distribution factors and (ii) impact factors related to both DESIGN and RATING.
d) Assess strand bond quality for various prestressing strands

Evaluate the impact of varying bond quality on the design and performance of PC Girder bridges.

PROPOSED ACTIVITIES FOR FFY 2023:

1) Perform structural health monitoring on both SH 4 and SH 11 bridges for a period of twelve months.
2) Refine the FEA's to assess IM and distribution factors, and load rating.
3) Continue to evaluate processes and procedures to help mitigate cracking in end regions.
4) Assess the SH 11 bridge using FEA to for sustainability and durability of steel girder bridges in general.
5) Provide recommendations for adoption of Strand Bond quality standards.

FINANCIALS	**AMOUNT**	**FUND**	**AMOUNT**	**FUND**
Programmed Amount FFY 2022	$0.00	SPR	$0.00	STATE
Projected Cost FFY 2023	$70,000	SPR	$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Bruce W. Russell, Oklahoma State University, 405-742-7450

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

Task Order Manager: Gary Hook, Implementation Engineer, 405-420-2596

2700 Experimental Product 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, or have not yet been approved for identified qualified product lists.

PROPOSED ACTIVITIES FOR FFY 2023: Continue working with ODOT Divisions regarding experimental product information, use, trials, results, and modifications to standards for product use in construction and maintenance. Track experimental products through ODOT implementation.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2022	$30,000	SPR	$0.00	STATE
Projected Cost FFY 2023	$80,000	SPR	$0.00	STATE

CONTACT INFORMATION

Project Manager: Gary Hook, Implementation Engineer, 405-420-2596

TPF-5 (255) Highway Safety Manual Implementation

PURPOSE AND SCOPE:
AASHTO published the 1st Edition of the Highway Safety Manual in 2010. The primary focus of the HSM is the introduction and development of analytical tools for predicting the impact of transportation project and program decisions on road safety. The HSM provides the best factual information and tools to facilitate roadway planning, design, operations, and maintenance decisions based on precise consideration of their safety consequences.
Goals of the AASHTO Standing Committee on Highway Traffic Safety include:

- Institutionalize the AASHTO Highway Safety Manual (HSM) and its associated analytical tools to make data-driven decisions, advance the science of safety, and to ultimately reduce fatalities and serious injuries.
- Establish and maintain an HSM Implementation Transportation Pooled-Fund Study.

OBJECTIVES:
The objectives of the study are to: advance ongoing efforts by lead states to implement the HSM, expand implementation to all states as well as coordinate with projects that develop content for future editions of the HSM including NCHRP Project 17-45 "Enhanced Safety Prediction Methodology and Analysis Tool for Freeways and Interchanges" NCHRP Project 17-54 "Consideration of Roadside Features in the Highway Safety Manual" and Transportation Pooled-Fund Study TPF-5(099) "Evaluation of Low Cost Safety Improvements."

PARTNERS:
Louisiana Transportation Research Center, CA, ID, IL, KS, KY, LA, MI, MO, MS, NC, NJ, NV, OH, OK, OR, PA, UT, WA, WI, WV

OKLAHOMA INVOLVEMENT:
Accelerate implementation of the HSM. Representative for the Technical Working Group would identify and prioritize specific tasks and products. Specific tasks may include developing: (1) a calibration manual to accompany the HSM that provides practical advice and examples on how best to adapt HSM calibration procedures, (2) technical guidance for developing safety performance functions, and (3) guidance for assembling and managing the data needed for safety analyses. Exchange information, best practices, lessons learned, and remaining challenges in implementing the HSM. These exchanges would feed an annual process through which the Technical Working Group identifies and prioritizes future tasks to be conducted under the study.

Study Period	2012	2013	2014
State Contribution ($)	25,000	25,000	25,000

ESTIMATED COMPLETION DATE: December 31, 2023

POINTS OF CONTACT:
Lead: Jerry Roche, (515) 233-7323
ODOT: Ed Dihrberg, (405) 521-2146
FHWA: Jerry Roche, (515) 233-7323

TPF-5 (313) Technology Transfer Concrete Consortium

PURPOSE AND SCOPE:
Increasingly, state departments of transportation (DOTs) are challenged to design and build longer life concrete pavements that result in a higher level of user satisfaction for the public. One of the strategies for achieving longer life pavements is to use innovative materials and construction optimization technologies and practices. In order to foster new technologies and practices, experts from state DOTs, Federal Highway Administration (FHWA), academia and industry must collaborate to identify and examine new concrete pavement research initiatives. The purpose of this pooled fund project is to identify, support, facilitate and fund concrete research and technology transfer initiatives.

OBJECTIVES:
The objectives of this study are to, identify needed research projects ,develop pooled fund initiatives, provide a forum for technology exchange between participants, develop and fund technology transfer materials, provide on-going communication of research needs faced by state agencies to the FHWA, industry, and CP Tech Center, provide guidance on priorities for the Next Gen CP Road Map, provide assistance as requested by the Next Gen CP Road Map Executive Committee on other select tracks as needed, provide technical leadership for the national initiative to develop performance engineered concrete mixes.

PARTNERS: AL, CA, CO, FHWA, FL, GADOT, IADOT, ID, IL, IN, KS, KY, LA, MA, MI, MN, MO, MT, NC, ND, NE, NV, NY, OH, OK, OR, PADOT, RI, SC, SD, TN, TX, UT, WA, WI, WV

OKLAHOMA INVOLVEMENT:
Provide monthly data as requested, attend quarterly virtual meetings and attend the yearly meeting on this pooled fund study.

Study Period	2016	2017	2018	2019	2020	2021	2022
State Contribution ($)	12,000	12,000	12,000	16,000			

ESTIMATED COMPLETION DATE: May, 2022

POINTS OF CONTACT:
Lead: Kyle Clute, (515) 239-1646
ODOT: Nairi Matevosyan, (405) 522-4999
FHWA: Mike Praul, (207) 512-4917

TPF-5 (326) Develop and Support Transportation Performance Management Capacity Development Needs for State DOTs

PURPOSE AND SCOPE:
Moving Ahead for Progress in the 21st Century (MAP-21) establishes a broad performance-based approach to the Federal Highway Program. MAP-21 identifies seven performance areas in which the US DOT, in consultation with their stakeholders, will develop performance measures. Under MAP-21, State Transportation Agencies (STAs), Metropolitan Planning Organizations (MPOs), and public transit providers are required to develop strategies and targets for each of the performance measures established by USDOT. The focus of this pooled-fund project will be to determine and support participating State's, MPO's, and Public Transportation providers Transportation Performance Management (TPM) Capacity Development needs.

OBJECTIVES:
This pooled fund project will focus on research, assess training and educational needs of contributing members, develop and deliver training, and facilitate the sharing and retention of performance management best practices.

Funding will be used to:

- Identify Gaps in TPM Knowledge, Skills and Abilities—Conduct a needs analysis for learning and capacity development of contributing members resulting in a short and long-term capacity building roadmap;
- Develop and Deliver Learning and Capacity Development Resources—Develop training and educational material to meet the gaps identified in the knowledge, skills and abilities;
- Establish a TPM Information Clearinghouse—The TPM Information Clearinghouse will be used to showcase PM best practices, foster collaboration, and serve as a repository for PM resources; and
- Support Knowledge Transfer Among Pooled Fund States

PARTNERS:
AL, AR, AZ, CA, CO, CT, DE, FHWA, GDOT, HI, IA, IL, KS, KY, LA, MDOT SHA, MI, MN, MO, MS, ND, NHDOT, NJ, NV, Oahu MPO, OH, OK, PA, RI, SD, TN, TX, UT, VT, WA, WI, WV

OKLAHOMA INVOLVEMENT:
Participate in monthly/quarterly conference calls; Oklahoma is a voting member of this study.

Study Period	2016	2017	2018	2019	2020	2021	2022	2023
State Contribution ($)	10,000	10,000	10,000	27,000	27,000	27,000	27,000	27,000

ESTIMATED COMPLETION DATE: December 2023

POINTS OF CONTACT:
Lead: Lori Fisette, (401) 222-6940
ODOT: Angel Gonzalez, (405) 522-5904
FHWA: Michael Nesbitt, (202) 366-1179

TPF-5 (335) 2016 through 2020 Biennial Asset Management Conference and Training on Implementation Strategies

PURPOSE AND SCOPE:
Section 1203 of the MAP-21 stipulates USDOT to promulgate performance measures in the areas of the National Highway Performance Program (NHPP), Highway Safety Improvement Program (HSIP), the Congestion Mitigation and Air Quality Improvement Program (CMAQ), and the National Freight Movement (Freight) within 18 months after the date of enactment of the MAP-21. State Department of Transportation's are tasked with developing performance measures plans, which include asset management plans. The focus of this pooled fund project will be in the area of the NHPP.

OBJECTIVES:
1. Provide communication and information sharing among member states. Discuss research needs and provide research ideas to TRB.
2. Provide a technology and knowledge exchange forum to enhance the practical knowledge of member states concerning asset management implementation.
3. Enhance the working knowledge of the asset management community.

SCOPE OF WORK:
The Iowa DOT) will serve as lead state for this Pooled Fund project. The principal tasks are:

1. Coordinate a Technical Advisory Committee meeting (i.e., workshop or webinar) for member states to learn and review issues associated with implementation of asset management. Member states share best practices and strategies for overcoming certain challenges.
2. Coordinate an annual survey of state DOT asset management practices to help states evaluate their asset management status. Support development of content for the conference and training activities.
3. Provide a Biennial Asset Management Conference for member states to exchange information on the challenges to asset management implementation.
4. Training – Post wrap-up "Implementation Strategies" webinar for partner states. Deliverables will include quarterly report updates and survey results as well as a webinar and a final summary report following each conference.

PARTNERS:
AR, CA, CO, CT, IA, IL, LA, MI, MN. MS, NC, ND, NJ, NV, OH, OK, TX, UT, VA, WI

OKLAHOMA INVOLVEMENT:
Attend annual conference; member of the conference planning committee.

Study Period	2016	2017	2018	2019	2020	2021	2022
State Contribution ($)	12,000	6,000	6,000	6,000	6,000		

ESTIMATED COMPLETION DATE: December 2022

POINTS OF CONTACT:
Lead: Brian Worrel, (515) 239-1471
ODOT: Matt Swift, (405) 521-2704
FHWA: Stephen Gaj, (201) 366-1336

TPF-5 (343) Roadside Safety Research for MASH Implementation

PURPOSE AND SCOPE:
This solicitation will create a consortium of states that will cooperatively fund and oversee MASH implementation and roadside safety research needs identified and prioritized by its representatives. The pooled fund research program will identify, analyze, and develop solutions for roadside safety problems with the goal of reducing the tremendous loss of life that occurs on our highways each year as a result of roadway departure crashes. Specific research activities addressed within the program will include the design, analysis, testing, and evaluation of roadside safety hardware, and the development of guidelines for the use, selection, and placement of these features. Research problem statements will be developed by participating member state representatives. The members will rank and select specific projects to be funded each fiscal year. Additionally, member states may independently develop and fund research projects through the Roadside Safety Pooled Fund Program through a reimbursable agreement with Washington DOT.

OBJECTIVES:
The objective of the Roadside Safety Pooled Fund Program is to provide a cooperative approach to conducting research on roadside safety hardware. Emphasis will be placed on assisting State DOTs with their implementation of MASH and addressing other roadside safety needs of common interest. Another objective of this pooled fund research is to provide each participating state an opportunity to send a representative to an annual meeting to collaborate with other state DOT safety engineers to assess best practices, new regulatory issues, risk management strategies, and other matters pertaining to roadside safety. Participation in this meeting is funded through the state's annual program contribution. Recently subject reviews were conducted on bridge rails, cable barriers, and breakaway hardware.

PARTNERS:
AK, AL, CA, CO, CT, DE, FL, ID, IL, LA, MA, Maryland DOT, MI, MN, MO, OK, OR, PA, TN, TX, UT, WA, WI, WV

OKLAHOMA INVOLVEMENT:
Oklahoma participates and supports this consortium and incorporates processes and standards into ODOT, as appropriate.

Study Period	2017	2018	2019	2020	2021	2022
State Contribution ($)	10,000	10,000	10,000			

ESTIMATED COMPLETION DATE: December 2023

POINTS OF CONTACT
Lead: Mustafa Mohamedali, (360)704-6307
ODOT: Ed Dihrberg, (405) 521-2146
FHWA: Will Longstreet, (202)366-0087

TPF-5 (357) Implement Shakecast across Multiple State Departments for Rapid Post Earthquake Response

PURPOSE AND SCOPE:
When an earthquake occurs, the U. S. Geological Survey (USGS) ShakeMap portrays the extent of potentially damaging shaking. As a freely-available, post-earthquake situational awareness application, the ShakeCast system automatically:

- retrieves earthquake shaking data from USGS ShakeMap
- analyzes shaking intensity data against users' facilities (e.g., bridges, buildings, roads) sends notifications of potential impacts
- generates maps and other web-based products for emergency managers and responders

The recently released ShakeCast V3 system utilizes State's existing NBI databases to implement shaking-based inspection priority and impact assessments. ShakeCast is particularly suitable for earthquake planning and response purposes by Departments of Transportation (DOTs).

OBJECTIVES:
Since major earthquakes cross state borders, bringing this technology to all states with seismic hazards is a long-term goal. The project will provide a mechanism to actively engage representatives from state DOTs with the common interests in implementing and expanding the application of ShakeCast technologies to improve emergency response capabilities.

The project is comprised of two primary focus areas:

(1) Provide support for participating DOTs to deploy operational ShakeCast systems.
(2) Develop, modify, and customize ShakeCast features to the meet the needs of the state DOTs.

Once project representatives meet at the start of the project, annual meetings will be convened to update the participating agency representatives on the status of the project and to provide a forum for information sharing, training, and feedback. This collaborative effort will bring participating DOTs into full ShakeCast operation for post-earthquake assessment of state and local bridge inventories.

PARTNERS:
CA, ID, MO, MS, OK, OR, SC, TX, UT, WA

OKLAHOMA INVOLVEMENT:
Attended the yearly meeting in California, participate in quarterly meetings and provide data input.

Study Period	2016	2017	2018	2019	2020	2021	2022	2023
State Contribution ($)	15,000	15,000	15,000	15,000			30,000	$15,000

ESTIMATED COMPLETION DATE: September 2024

POINTS OF CONTACT:

Lead: Loren Turner, (916) 229-7173
ODOT: Walt Peters, (405) 521-2606
FHWA: Wen-Hue, (292) 493-3056

TPF-5 (364) Utilization of Laser Induced Breakdown Spectroscopy (LIBS) for Real-Time Testing and Quality Control Monitoring of Aggregate Materials used in Highway Construction

PURPOSE AND SCOPE:
Phase II of TPF 5 (278) is proposed in order to continue and finalize the pooled funded laser scanning research investigation (TPF-5(278)) that began on June 1, 2013 with five participating State Agencies: KS, NY, OH, OK, and PA. Phase II extends involvement for additional State Agencies wanting to take part in this study. This solicitation continues the work and success of the NCHRP 150 Proof of Concept Study, the NCHRP 168 prototype development and the current TPF-5(278) which has shown the potential and success of this technology. Reports from these studies are included in the Documents Section.

OBJECTIVES:
The overall objective is to upgrade QC/QA in the industry by developing a real-time laser scanning system to rapidly classify aggregates used in highway construction. The intent is to employ this classification process to:

- Quantify specific engineering properties (e.g., spec. gravity, acid insol. residue, Microdeval …,
- Assess whether an aggregate source will pass or fail a defined engineering property test,
- Identify and/or quantify the presence of deleterious materials (e.g., reactive aggr., cherts, etc.),
- Determine whether aggregate composition or quality is changing during production, and
- Determine the source material or sources of blended production materials.

An aggregate laser scanning system has the potential to be employed in private and government material testing laboratories, where laser scanning of aggregate samples can be undertaken, providing multiple engineering parametric results in near real time.
PARTNERS: KS, MDOT SHA, NM, NY, OH, OK

OKLAHOMA INVOLVEMENT:
Continue development of the laser scanning system, data analysis software, and expand testing effort to enlarge the database. Anticipated tasks include:

1. Each agency participates in Sample Collection, Scanning and Modeling of Test Parameters
2. Incorporate methods for modifying Hardware, Software and Data Handling, and Modeling
3. Coordinate and prepare AASHTO Standard of Practice
4. Coordinate Project Management, Reporting and Annual Review Meetings
5. Schedule Technology Transfer Meeting for team members to present their research

Study Period	2017	2018	2019	2020	2021	2022
State Contribution ($)		96,000	48,000			

Note: Contribution in 2014-2016 under TPF-5(278)

ESTIMATED COMPLETION DATE: December 2022

POINTS OF CONTACT:
Lead: David Behzadpour, (785) 291-3847
ODOT: Kenny Seward, (405) 521-2186
FHWA: Richard Meininger, (202) 493-3191

TPF-5 (372) Building Information Modeling (BIM) for Bridges and Structures

PURPOSE AND SCOPE:
Building information modeling (BIM) has been widely used in the commercial sector and vertical construction to manage projects from conception through design, fabrication, construction and for future maintenance. Following the conclusion of the NCHRP study and after extensive discussions, T-19 identified a path forward for BIM implementation. The initiative involved the following key decisions:

- Identity: The initiative is being named BIM for Bridges and Structures, as it encompasses the goal of this endeavor without potentially violating trademark rights.
- Governance and Stewardship Framework: The roadmap involves the identification of a governance structure. The selected model will be overseen by T-19 with collaboration with AASHTO Technical Joint Committee on Electronic Standards, FHWA, and various stakeholders.
    - Data Exchange Schema: Multiple schemas for the governance structure of BIM for Bridges and Structures were discussed, with the decision being made to develop an MVD (Model View Definition) compliant with IFC (Industry Foundation Classes) data models. Some consideration was given to OpenBridge model, with the biggest benefit being more control of the governance model.
    - Funding Mechanism for Support: FHWA and pooled fund study.

OBJECTIVES:
The pooled fund project will provide the primary funding mechanism for AASHTO SCOBS T-19 to perform the duties of governance and stewardship of BIM for Bridges and Structures**.**

PARTNERS:
CA, DE, FHWA, FL, IL, IA, KS, MI, NC, MS, NJ, NY, NC, OH, OK, PA, TX, UT, VM, WI

OKLAHOMA INVOLVEMENT:
Oklahoma provides data input for the studies; participate in quarterly meetings via conference call; attend annual meetings.

Study Period	2021	2022	2023
State Contribution ($)	20,000	20,000	25,000

ESTIMATED COMPLETION DATE: January 31, 2024

POINTS OF CONTACT:
Lead: Khyle Clute, (515) 239-1646
ODOT: Walt Peters, (405) 521-2606
FHWA: Brian Kozy, (202) 493-0341

TPF-5 (380) Autonomous Maintenance Technology (AMT)

PURPOSE AND SCOPE:
Reducing hazard to roadway workers and achieving a safer working environment for both CDOT employees and the public remains a key and critical strategic priority for CDOT. The advent of new technologies in the form of autonomous and connected vehicles presents a path for using technical advances to potentially reduce or eliminate threat to employees and maintaining public safety, with initial demonstration conducted with CDOT's Autonomous Truck Mounted Attenuator/Impact Protection Vehicle. CDOT believes that this technology presents considerable potential to remove workers from risk, and the expansion of this technology both inside and outside of Colorado would be of benefit and therefore interest of the department. CDOT's trial implementation and testing program for the ATMA/AIPV has generated interest and questions from other DOTs, motivating the need to develop a cooperative arrangement and agreement to spread and further research autonomy in maintenance applications. This effort aims to address these challenges by forming a coalition of transportation related groups with interest in autonomous maintenance technology research, and create a pooled fund to provide a single source of funding for unified research efforts that will benefit all contributing parties. This will allow for larger and more significant research projects to be undertaken and will lead to an overall cost savings by consolidating many different DOTs' research efforts in the same field.

OBJECTIVES:
The mission of this study is to support and promote collaborative research efforts in the field of autonomous technologies in work zone applications, with the goal of improving the safety, efficiency and quality of work efforts, along with providing better solutions and valuable lessons learned for the integration of new technologies to further these goals. The participation of many transportation related agencies in this study furthers the cooperation in this industry, leading to improved future development of beneficial technologies and improved sharing of information and lessons learned. This is intended to further safety, efficiency, and quality of work done in this field for all relevant agencies.

PARTNERS:
Virginia DOT, AL, CA, CO, IL, IN, KS, MI, MN, MO, ND, NV, OH, OK, TX, WA

OKLAHOMA INVOLVEMENT:
Develop technology findings for ODOT needs; incorporate appropriate findings into construction and maintenance safety programs.

Study Period	2019	2020	2021
State Contribution ($)	25,000	25,000	25,000

ESTIMATED COMPLETION DATE: December 2024

POINTS OF CONTACT:
Lead: David Reeves, (303) 757-9518
ODOT: Alan Stevenson, (405) 919-6573
FHWA: Todd Peterson, (202 366-1988

TPF-5 (394) Western Maintenance Partnership – Phase 3

PURPOSE AND SCOPE:
In the 1980's the Rocky Mountain Maintenance Tour established a highly effective forum for the exchange of information, techniques, policies and strategies for the maintenance of the Highway System. Since that time the role of Maintenance as a critical element in the overall management of the State Highway infrastructure has increased. Most Maintenance managers have been completely replaced since the ending of the Rocky Mountain Maintenance Tour. The primary focus has also shifted from new construction and major rehabilitation to more attention to infrastructure preservation and asset management via cost effective maintenance. Reactive maintenance alone is not adequate to overcome the challenges of rapid deterioration of roads, considering aging of the infrastructure and growing economic constraints. The Western Maintenance Partnership (WMP) previously ran from 2006-2014 as TPF-5(145), and from 2015-2019 as TPF-5(312). This 5-year continuation of the WMP will pool the efforts of the participating agencies to provide a focused look at Maintenance, and will partner with WASHTO states to share experiences, innovations, expertise and solutions to the complex management of highway assets. Maintenance issues include policies, practices, specifications, field investigations, applied research, materials, and training. It is expected that a roundtable and sharing of field experience via hands on demonstration of features will be key elements of the annual meetings.

OBJECTIVES:
The purpose of the Western Maintenance Partnership (WMP) continuation is to provide a partnering forum for promoting effective maintenance strategies through the following objectives: - Provide travel reimbursement funds for an annual meeting (WASHTO Committee on Maintenance) and a multi-day annual workshop/scan tour, for discussion and exchange of information and knowledge about each state's maintenance program. - Provide a means to define, support and share technology of mutual interest. - Provide funds for formal training presentations during the annual workshop. - Provide funds for management support of WMP. - Provide funds for special studies, investigations, research and training.

PARTNERS:
CA, ID, MT, NV, OK, SD, TX, UT, WA

OKLAHOMA INVOLVEMENT:
Attended the yearly meeting in California, participate in quarterly meetings and provide data input.

Study Period	2022	2023	2024
State Contribution ($)		$15,000	

ESTIMATED COMPLETION DATE: June 30, 2024

POINTS OF CONTACT:
Lead: David Stevens, (801) 589-8340
ODOT: Alex Calvillo, (405) 521-2557
FHWA: Russell Robertson, (801) 955-3512

TPF-5 (398) Moving Forward with Next Generation Travel Behavior Data Collection and Processing

PURPOSE AND SCOPE:
Since 1969, the Federal Highway Administration has been collecting travel data to answer evolving questions related to how, why, when and where people travel through a probability based random sampling survey. Given the current challenges and opportunities in collecting travel behavior data, FHWA is launching the Next Generation Travel Behavior Data Initiative to establish a continuous travel monitoring program that will provide annual national and local data. The work plan for the next 5 years is to gather and publish annual national travel behavior data and offer opportunities for States, MPOs, and other entities to obtain agency-specific data.

OBJECTIVES:
The objectives of the Next Generation Travel Behavior Data Initiative are as follows:

1) Establish the Next Generation Travel Behavior Data program to collect, process, estimate, and report national, state and local travel behavior data on an annual basis.

2) Enable and facilitate State transportation departments, MPOs, and other entities' participation in the new local data gathering program with high efficiency and great flexibility.

PARTNERS:
Virginia DOT, Maricopa Association of Governments, EPA, Metropolitan Washington Council of Governments, AAA Foundation for Traffic Safety, Atlanta Regional Commission, AZDOT, CAMPO, GADOT, HI, MDOT SHA, MI, NC, NY, Oahu MPO, OH, OK, OR, SC, TN, WI

OKLAHOMA INVOLVEMENT:
ODOT will use the results of this study to enhance planning and programming input parameters in support of the Agency's construction and maintenance programs.

Study Period	2019	2020	2021	2022
State Contribution ($)	25,000	25,000	25,000	25,000

ESTIMATED COMPLETION DATE: December 2022

POINTS OF CONTACT:
Lead: Daniel Jenkins, (202) 366-1067
ODOT: Laura Chaney, (405) 521-2704
FHWA: Daniel Jenkins, (202) 366-1067

TPF-5 (###) National Cooperative Highway Research Program (NCHRP)

PURPOSE AND SCOPE:
The National Cooperative Highway Research Program (NCHRP) is a national research program carried out through the collaborative efforts of the Federal Highway Administration (FHWA), the National Academy of Sciences, Engineering, and Medicine (NASEM), and the American Association of State Highway and Transportation Officials (AASHTO). Created in 1962 as a means to conduct research in acute problem areas that affect highway planning, design, construction, operation, and maintenance nationwide, the NCHRP is administered by the Transportation Research Board (TRB) and sponsored by the individual State Departments of Transportation (DOTs) of the AASHTO in cooperation with the FHWA.

The NCHRP is a voluntary program funded by the States on an annual basis. Funding for NCHRP comes to 5.5 percent of the 2 percent State planning and research (SP&R) funding set-aside from the Federal-aid highway program. Participation in the NCHRP allows the States to leverage their research funding with that of other States to achieve similar research objectives without duplication of effort. This program affords a unique partnership between State, Federal, and private sector transportation experts.

NCHRP primarily focuses on the following research areas: pavements; economics; operations and control; general materials; illumination and visibility; snow and ice control; traffic planning; forecasting; bituminous materials; specifications, procedures, and practices; law; bridges; equipment; maintenance of highways and structures; general design; roadside development; safety; concrete materials; finance; special projects; testing and instrumentation; vehicle barrier systems; mechanics and foundations; and impact analysis. Information on NCHRP projects can be found at the NCHRP Web site at http://www.trb.org/NCHRP/Public/NCHRP.aspx.

OBJECTIVES:
To provide a mechanism for State transportation departments to support the TRB's NCHRP Program and Services.

PARTNERS:
All states participate in this program.

OKLAHOMA INVOLVEMENT:
Serve as NCHRP Project Panel members when called upon, respond to study surveys and provide other support to projects as appropriate.

Study Period	2023
State Contribution ($)	$750,000

ESTIMATED COMPLETION DATE: July 2023

POINTS OF CONTACT:
Lead: Jean Landolt, (202) 493-3146
ODOT: Ron Curb, (405) 420-9163
FHWA: Jean Landolt, (202) 493-3146

TPF-5 (431) Applications of Enterprise GIS for Transportation, Guidance for a National Transportation Framework

PURPOSE AND SCOPE:
Perform self-assessment of existing data policies to determine if they support data quality and sharing. Identify common needs for state and local government transportation agencies responsible for data collection. Define the role of LRS in data collection and establish core requirements for LRS. Establish guidelines for transportation mapping practices.

OBJECTIVES:
This pooled fund study project will assist the state DOT's and local governments to create enterprise GIS data management systems based on data governance best practices that support collaboration through shared business rules and standards. The goal is to have a single roadway dataset that meets the needs of multiple groups. The first phase of this project will be to develop guidance to be named, a document that will guide the DOTs to one geospatial standard.

PARTNERS: ADOT, CA, FHWA, FL, GADOT, ID, MA, NC, NM, OH, OK, PADOT, TN, WA, North Dakota Department of Transportation

OKLAHOMA INVOLVEMENT:
ODOT will be providing data throughout the study as requested and attend the quarterly virtual meeting, and annual meetings as required.

Study Period	2020	2021	2022
State Contribution ($)	50,000	50,000	

ESTIMATED COMPLETION DATE: December 2022

POINTS OF CONTACT:
Lead: Noel Alcala, (614)466-2848
ODOT: Ron Maxwell, (405) 521-2728
FHWA/Lead: Joseph Hausman, (202) 366-9629

TPF-5 (437) Technology Transfer Concrete Consortium (TTCC) (FY20–FY24)

PURPOSE AND SCOPE:
Increasingly, state departments of transportation (DOTs) are challenged to design and build longer life concrete pavements that result in a higher level of user satisfaction for the public. Collaboration between experts from state DOTs, Federal Highway Administration (FHWA), academia and industry is important for identifying and examining new concrete pavement research initiatives.

Pooled fund activities and budgets are discussed at the semi-annual meetings. Partners often present proposals for minor research, synthesis studies, and/or training for discussion and voting at the semi-annual meetings. NCC members may propose needed research and/or training, however they may not vote on how to utilize the federal pooled funds. Occasionally e-mail discussions and votes are warranted.

OBJECTIVES:
The Iowa DOT, through the National Concrete Pavement Technology Center (CP Tech Center) at Iowa State University, will serve as the lead state, handling all administrative duties associated with the project. The CP Tech Center will also serve as the lead research institution for the project.

Efforts for the TTCC include these examples:

- Maintain the TTCC pooled fund listserv and website with current activities and deliverables
- Guide the development of technology transfer materials (tech brief summaries and training materials)
    - Contribute to a technology transfer newsletter for the CP Road Map project website
- Publish electronic quarterly reports following lead state guidelines
- Submit a final report to participants that documents the results of the entire project

The TTCC has designed this study to foster new technologies and practices by identifying, supporting, facilitating and funding concrete research and technology transfer initiatives. The TTCC is open to any state agency desiring to be a part of new developments in concrete.

PARTNERS:
AL, CA, CO, FL, GADOT, IADOT, ID, IL, IN, KS, KY, MA, MI, MN, MO, MT, NC, ND, NE, NV, NY, OH, OK, OR, PADOT, SC, TN, TX, UT, WA, WI, WV, WY

OKLAHOMA INVOLVEMENT:
Oklahoma provides data input for the studies; participate in quarterly meetings via conference call; attend annual meetings.

Study Period	2020	2021	2022	2023	2024	2023
State Contribution ($)	12,000	12,000	12,000	12,000	12,000	12,000

ESTIMATED COMPLETION DATE: August 2025

POINTS OF CONTACT:
Lead: Khyle Clute, (515)-239-1646
ODOT: Nairi Matevosyan, (405) 521-4999
FHWA: Mike Praul, (207)-512-4917

TPF-5 (442) Transportation Research and Connectivity

PURPOSE AND SCOPE:
The primary goal is to enhance the services which transportation libraries provide through the development of new procedures and technologies for transportation research findability and connectivity. The work plan will be developed based on recommendations by members of the pooled fund study.

OBJECTIVES:
To support coordinated development of transportation libraries as well as research organizations without dedicated libraries. The noted objectives will be accomplished through member activities and partnerships with professional groups such as the Transportation Research Board (TRB) Library and Information Science for Transportation Committee (LIST), the Special Libraries Association (SLA) Transportation Division, and the National Transportation Knowledge Network (NTKN). Completed projects will be stored permanently at the NTKN and the National Transportation Library (NTL) for public use and will be completed within the three-year span of the pooled fund study.
The specific objectives are: 1.Develop a toolkit of recommendations and best practices for transportation research organizations that do not have a transportation librarian.2.Partner with the NTKN to analyze effectiveness of lib-guides, identify gaps in coverage, and survey the needs of DOTs.3.Develop a white paper analyzing the current condition of transportation information infrastructure, including review of pertinent knowledge management resources.4.Develop a cooperative digitization project among members, in partnership with the NTL, to convert copies of older materials to digital formats, as well as providing ADA compliance support for digital documents.5.Enhance communication between group members.

PARTNERS:
Northwestern University Transportation Library, Maggie Sacco Curcio, MLS, AZDOT, CA, ID, IL, MO, NC, NJ, NV, NY, OK, OR, TX, UT, WI, WY
Primary funding will be provided via transfers from other states.

OKLAHOMA INVOLVEMENT:
ODOT has contracted with the Board of Regents of The University of Oklahoma to lead this study. The contractor will continue to facilitate monthly/quarterly conference calls and annual in-person meetings as scheduled. A subcontractor, CTC & Associates, Inc., is handling selected tasks.

Study Period	2020	2021	2022
State Contribution ($)	25,000	25,000	25,000

ESTIMATED COMPLETION DATE: February 28, 2023
POINTS OF CONTACT:
Lead: Ron Curb, (405) 414-9163
ODOT: Ron Curb, (405) 414-9163
FHWA: Richard Meininger, (202) 493-3191

TPF-5 (448) Integrating Construction Practices and Weather into Freeze Thaw Specifications

PURPOSE AND SCOPE:
Current design practices for freeze thaw durability are not based on actual weather conditions and are instead based on artificial conditions created in ASTM C 666 testing of concrete. While these conditions seem to have been conservative, a better answer could be obtained if there was more information about how concrete wetted and dried in different environments. This research will use a novel way to measure this by combining low-cost data loggers to measure the moisture and temperature changes in a concrete sent to a number of different environments. This information will be combined with new models that account for the rate that concrete reaches a critical degree of saturation.

OBJECTIVES:
The ultimate goal of this work is to build on previous research efforts to produce improved specifications and advance existing test methods; while, improve the underlying understanding of freeze thaw damage. This work will specifically focus on construction practices and the impact of weather. Quantify how different weather conditions impact the freeze thaw performance of concrete with low-cost data loggers. Investigate the freeze thaw performance of existing structures in different climates with different air void qualities. Expand the freeze thaw model to a larger range of mixtures to see if the trends still hold. Better understand the damage propagation after critical saturation is reached. Develop freeze thaw specifications based on concrete quality, air void system, and local weather conditions.

PARTNERS:
CA, CO, IADOT, ID, IL, KS, MN, MO, ND, NE, NY, OK, PADOT, WI, FHWA

OKLAHOMA INVOLVEMENT:
Provide test data to the lead team as requested, visit lab as requested, attend virtual meeting and provide input for quarterly and yearly reports.

Study Period	2020	2021	2022
State Contribution ($)	20,000	20,000	20,000

ESTIMATED COMPLETION DATE: July 2023

POINTS OF CONTACT:
Lead: Ron Curb, (405) 420-9163
ODOT: Kenny Seward, (405) 522-4999
FHWA: Ahmad Ardani (202) 493-3422

TPF-5 (479) Clear Roads Winter Highway Operations Phase 3 Pooled

PURPOSE AND SCOPE:

This new Clear Roads project will maintain its mission to advance winter highway operations nationally by undertaking practical, practice-ready research related to materials, equipment, and methods. State departments of transportation are aggressively pursuing new technologies, practices, tools, and programs to improve winter highway operations and safety while maintaining fiscal responsibility. Developing priority areas of interest in FFYs 2022-2026 include advanced anti-icing/deicing methods, new automated and intelligent technologies, improved decision-making tools, and national database networks, as well as others that cannot yet be anticipated over the next half decade. The Clear Roads pooled fund provides the critical funding and structure needed to evaluate these new tools and practices in both lab and field settings, to develop industry standards and performance measures, to conduct cost-benefit analyses, and to develop and evaluate new designs and practices that further improve winter highway safety and minimize environmental impacts. This project responds to research and technology transfer needs not currently met by other pooled fund projects.

OBJECTIVES:

Clear Roads is a pooled fund research project aimed at rigorous testing of winter maintenance materials, equipment, and methods for use by highway maintenance crews. The Clear Roads Technical Advisory Committee (TAC) contracted with CTC & Associates LLC to perform the administrative functions associated with maintaining the pooled fund project as well as information services that support technology transfer.

PARTNERS: Kentucky Department of Transportation, AK, AZDOT, CA, CO, CT, DE, IADOT, ID, IL, IN, KS, MA, MDOT SHA, ME, MI, MN, MO, MT, ND, NE, NHDOT, NV, NY, OH, OK, OR, PADOT, RI, SD, TX, UT, VA, VT, WI, WV, WY

OKLAHOMA INVOLVEMENT:

Provide test data to the lead team as requested, visit lab as requested, attend virtual meeting and provide input for quarterly and yearly reports.

Study Period	2023	2024	2025
State Contribution ($)	25,000	25,000	25,000

ESTIMATED COMPLETION DATE: July 2026

POINTS OF CONTACT:

Lead: Nicole Westadt, (651) 366-4270
ODOT: Alex Calvillo, (405) 521-2557
FHWA: Tony Coventry, (202) 366-0754

TPF-5 (451) Road Usage Charge West

PURPOSE AND SCOPE:
RUC West is a voluntary coalition of state DOTs and provincial Ministries of Transport that are committee to collaborative research and development of a potential new funding method that would collect a road usage charge (RUC) based on actual road usage. Subject to available Transportation Pooled Fund resources and separate funding from consortium members the work plan will undertake select topics, research projects and activities that relate to RUC.

OBJECTIVES:
Explore the technical and operational feasibility of a multi-jurisdictional road usage charge system. Investigate public and key decision maker criteria for acceptance and share experience and lessons learned to foster positive outcomes. Develop standards and protocols for how road use charges could best be collected and remitted among the various jurisdictions. Develop preliminary operational concepts for how a multi-jurisdictional road usage charge system could be administered. Develop a model for regional cooperation and interoperability that can be used in the Western region and potentially across North America. Engage the automotive manufacturing and technology sector to encourage the ability for mileage reporting to occur in conjunction with other products and services the sector provides in the marketplace. Share knowledge to maximize the preparedness for and efficiency of policy and program development for road usage charging among the members.

PARTNERS:
AK, AZDOT, CA, CO, HI, ID, KS, MT, ND, NE, NM, NV, OK, OR, TX, UT, WA, WY

OKLAHOMA INVOLVEMENT:
Oklahoma provides data input for the studies; participate in quarterly meetings via conference call; attend annual meetings.

Study Period	2021
State Contribution ($)	$25,000

ESTIMATED COMPLETION DATE: September 2022

POINTS OF CONTACT:
Lead: Randal Thomas, (971) 240-7094
ODOT: Dawn Sullivan, (405) 521-4768

TPF-5 (456) EconWorks - Improved Economic Insight

PURPOSE AND SCOPE:
The scope of work to operate, maintain and improve the EconWorks website over a five-year period (2019 to 2024) includes the following:
• Host the website and ensure EconWorks tools are operational for all users.
• Provide technical assistance to users utilizing the EconWorks website and tools.
• Develop and add new case studies for inclusions into the EconWorks database.
• Provide webinars and other outreach efforts to ensure all target audiences understand the benefits of EconWorks and are kept up to date on user tips.
• Provide oversight and management of the Econ-Works website. Provide for ongoing support of the site after the termination of the pooled fund study.

OBJECTIVES:
The focus of this pooled fund project will be to support transportation planners with a better understanding of the economic impact of transportation projects by continuing the overall operation, maintenance and improvement to the EconWorks website, and completing and adding additional case studies to provide more robust economic analysis.

PARTNERS:
AR, CT, GADOT, IL, KS, MA, MN, ND, NE, NJ, OK, OR, SC, TN, TX, VA, WI

OKLAHOMA INVOLVEMENT:
Oklahoma provides data input for the studies; participate in quarterly meetings via conference call; attend annual meetings.

Study Period	2020	2021	2022	2023	2024
State Contribution ($)	20,000	($4,000>	Per yr.>	Pre-Paid through>	2024)

ESTIMATED COMPLETION DATE: August 2024

POINTS OF CONTACT:
Lead: Chris Dailey, Chris.Dailey@ardot.gov
ODOT: Laura Chaney, (405) 521-2705
FHWA: Not identified

TPF-5 (465) Consortium for Asphalt Pavement Research and Implementation (CAPRI)

PURPOSE AND SCOPE: To continue fostering the development of new technologies and practices, this pooled fund study will identify and address national priority research and implementation needs for asphalt pavements that state DOTs face today and in the future. The goals of CAPRI are to, provide technical guidance on current and evolving specifications for asphalt materials, develop asphalt pavement research needs, conduct small-scale studies to address knowledge gaps or explore new topics, foster the implementation of practical research findings to help improve the performance, sustainability, value, and safety of asphalt pavements.

OBJECTIVES: The objectives of CAPRI are to, provide technical guidance on current and evolving specifications for asphalt materials, develop asphalt pavement research needs, conduct small-scale studies to address knowledge gaps or explore new topics, foster the implementation of practical research findings to help improve the performance, stainability, value, and safety of asphalt pavements. As a consortium of all asphalt pavement stakeholders, CAPRI will be a key resource to the AASHTO Committee on Materials and Pavements, state DOTs, FHWA, and industry.

SCOPE OF WORK: Activities related to the above goals will be developed through semi-annual meetings rotated among participating organizations. CAPRI meetings will serve as a forum to facilitate knowledge sharing among participants. Outcomes of CAPRI meetings will include technical guidance articles on high profile issues, and research need statements (RNSs) organized into a new National Asphalt Research Roadmap (NARR) that will be made public through a website managed and maintained by NCAT.

PARTNERS:
AL, CO, FL, GADOT, IADOT, ID, IN, KY, MO, MS, NC, NY, OH, OK, PADOT, SC, TN, TX, WI

OKLAHOMA INVOLVEMENT: Provide input to the CAPRI through the in-person meetings, through sharing ideas in asphalt pavement design and research, providing problem statements to the group.

Study Period	2022	2023	2024
State Contribution ($)	10,000	10,000	10,000

ESTIMATED COMPLETION DATE: October 2025

POINTS OF CONTACT:
Lead: Virgil Clifton, (334) 353-6944
ODOT: David Vivanco, (405) 923-5897
FHWA: David Mensching, (206) 336-1286

TPF-5 (469) Accelerated Performance Testing on the 2021 NCAT Pavement Test Track with MnROAD Research Partnership

PURPOSE AND SCOPE:
The scope of work for the pooled fund project will include:

- Hauling materials to the project from offsite locations.
- Rebuilding sections in accordance with sponsors' directives via competitively bid subcontracts administered by NCAT.
- Installing both environmental and response instrumentation in new experimental sections.
- Operating a 5-truck heavy triple-trailer fleet in order to apply accelerated truck traffic on the NCAT test oval following the completion of construction. Human drivers operate NCAT vehicles in order to best induce representative vehicle wander.
- Safely measuring field performance (e.g., rutting, roughness, texture, cracking, deflection, friction, etc.) on a regular basis. Pavement response will also be measured on a routine basis.
- Conducting laboratory testing to quantify basic material and mix performance**,** which will serve as the basis of performance model development**.**

OBJECTIVES:
The primary objectives of the pooled fund project described herein will be: Constructing experimental pavements on the existing 1.7-mile NCAT test oval and the MnROAD mainline bypass that are representative of in-service roadways on the open transportation infrastructure; Applying accelerated performance truck traffic after construction for the duration of the 3-year research cycle; Assessing/comparing the functional and structural field performance of trafficked sections on a regular basis via surface and subsurface measures; Validating/calibrating new and existing methodologies for analysis and design using pavement surface condition, pavement load response, precise traffic and environmental logging, and cumulative damage; Correlating field results with laboratory data for both mix and structural performance; and Answering practical questions posed by research sponsors through formal (i.e., reports and technical papers) and informal (e.g., one-on-one responses to sponsor inquiries) technology transfer. For example, can pavement thickness be reduced as a result of the addition of premium mix additives, and if so, does the thickness reduction offset the additional cost of construction?

PARTNERS:
Virginia DOT, AL, FHWA, FL, GADOT, KY, MS, NC, NY, OK, SC, TN, TX

OKLAHOMA INVOLVEMENT:
Oklahoma had sections and support from 2018-2020 for the following areas: N9, S1, the Preservation Group, and the Cracking Group under TPF-5(374) and (375). From 2021 thru 2023 Oklahoma will sponsor the following sections: N9, S1 and N8 (NCAT, but not MnROAD).

Study Period	2021	2022	2023
State Contribution ($)	466,667	416,667	416,666

ESTIMATED COMPLETION DATE: January 31, 2024

POINTS OF CONTACT:
Lead: Virgil Clifton, (334) 353-6944
ODOT: David Vivanco, (405) 521-2677
FHWA: Derek Nener-Plante, (202) 763-4017

TPF-5 (478) Demonstration to Advance New Pavement Technologies Pooled Fund

PURPOSE AND SCOPE: FHWA will collaborate with the Technical Advisory Committee (TAC) and the contributing State DOTs to define the parameters of each of their state's demonstration project. The FHWA contribution will be used to provide up to $250,000, up to 100 hours of technical assistance, and resources for developing case study reports and videos for each selected demonstration project. The amount of support that will be contributed to each project will vary and ultimately be decided by the TAC. Additionally, FHWA will host a website for publishing case studies and other relevant project documents, as well as peer exchanges for showcasing lessons learned and best practices from the projects. Each state DOT will be expected to participate in pooled fund meeting opportunities and actively collaborate with other states and FHWA to advance these initiatives. The state DOT will complete a report documenting the initiative and outcomes of selected state DOT demonstration projects by using a standard reporting template provided by FHWA.

OBJECTIVES: This pooled fund seeks to support and showcase the implementation of innovative pavement technologies, products, and processes by State DOTs by leveraging of Federal investments with State DOT partnerships.

PARTNERS:
AZDOT, CO, GADOT, HI, IADOT, ID, IL, MO, MS, OK, PADOT, TX, WI

OKLAHOMA INVOLVEMENT:
Oklahoma will provide data for this study, they will also provide a project for the pool fund study, attend meetings as requested.

Study Period	2022	2023	2024	2025	2026
State Contributions ($)	10,000	10,000	10,000	10,000	10,000

ESTIMATED COMPLETION DATE: September 2025

POINTS OF CONTACT:
Lead: Sharon Snead, 202-366-1553
ODOT: Kevin Suitor, (405) 522-4986
FHWA: Sharon Snead, 202-366-1553

TPF-5 (496) TRB Core Program Services for a Highway RD&T Program – FFY 2022 (TRB FY 2023)

PURPOSE AND SCOPE:
This solicitation will cover the period of TRB's fiscal year 2023 that begins July 1, 2022, and ends June 30, 2023. Funds committed by participating States will be from their Federal fiscal year 2022 funding.

This pooled fund study permits States to make their contributions to the TRB Core Program instead of sending their contributions to the TRB directly. The TRB Core Program provides support funding for the TRB annual meeting, the committee structure, State visits by TRB, and the TRB publication program.

Note: TPF Number is unknown at time of publication.

OBJECTIVES:
To provide a mechanism for State transportation departments to support the TRB's Core Program and Services.

PARTNERS:
All states participate in this program.

OKLAHOMA INVOLVEMENT:
Support TRB activities including, but not limited to, TRB State Visit, remain abreast and act as appropriate of requests made to TRB State Representative, support ODOT staff who are members of TRB Standing Committee or NCHRP Project Panels, and inform ODOT Staff of TRB webinar and report releases.

Study Period	2023
State Contribution ($)	160,000

ESTIMATED COMPLETION DATE: July 2023

POINTS OF CONTACT:
Lead: Jean Landolt, (202) 493-3146
ODOT: Ron Curb, (405) 420-9163
FHWA: Jean Landolt, (202) 493-3146

TPF-5 (484) Develop Countermeasure Strategies for Protecting Bridge Girders against Over-Height Vehicles Impact

PURPOSE AND SCOPE:
The innovative steel beam/honeycomb protective system is anticipated to dissipate a large portion of the energy from the colliding truck by crushing/deforming the honeycombs. The effectiveness of this device has been investigated recently by large-scale testing in collaboration with the researchers at Hunan University, where over-height impact was simulated through a drop hammer system. With the success of the large-scale testing program, the actual field installation of full-scale model is deemed necessary to validate its effectiveness to protect existing bridge structures. In particular, this project aims at the following: design of the full-scale testing program and selection of bridge site for the field installation; custom construction and installation of the full-scale model of the prototype attaching to the existing facial girder of the selected structure; full scale testing and evaluation of the system with actual over-height truck impact on site.

OBJECTIVES:
This project will carry out in two phases which include the following eleven (11) main tasks: 1. Develop an over-height impact program for outdoor full scale testing including site & vehicles selection and logistics. 2. Investigate the protection system extensively through numerical simulations on different impact scenarios. 3. Design an effective installation of the proposed protective system including supporting systems, connections, the protective system and means for easy replacement of damaged components.4. Design the entire setup for full-scale prototype testing including the girders to be impacted or a system supporting girder to be impacted that can represent the behavior of an actual bridge through numerical simulations. 5. Prepare and publish the Phase I report including outcomes of the tasks carried out in this phase.6. Conduct full-scale prototype testing to demonstrate the effectiveness of the proposed protective system. 7. Perform parametric studies on the impact performance of the protection devices installed on the prestressed /steel girders. 8. Develop a design method for proportioning the protective system to achieve a specific performance (performance-based approach). 9. Develop design examples and templates to illustrate the design of the protective system for different impact scenarios. 10. Develop new design guidelines for fascia girder to resist the impact loads due to over-height heavy vehicles without protection system. 11. Prepare and publish the final report including findings and outcomes of all the tasks completed in this project.

PARTNERS:
Virginia Department of Transportation, AK, FHWA, LA, NJ, NY, OK

OKLAHOMA INVOLVEMENT:
Oklahoma will provide input data as requested and will attend either in person or virtually the quarterly and yearly meetings.

Study Period	2022	2023	2024
State Contribution ($)	70,000	70,000	70,000

ESTIMATED COMPLETION DATE: September 2024

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