

# **LTRC Annual Research Program**

Fiscal Year July 1, 2023 - June 30, 2024

**FHWA Part B SPR Research Program  
FAP Number SPR-0010(34)  
&  
FHWA Funded Research Program  
&  
FHWA LTAP Funded Program  
&  
FHWA STP Funded Program  
&  
Self-Generated Funded Research Program  
&  
Other DOTD Funded Projects**



Conducted by:  
Louisiana Department of Transportation and Development  
Louisiana Transportation Research Center  
In accordance with Louisiana R.S. 48.105  
Which governs the creation and operation  
Of the Louisiana Transportation Research Center

In cooperation with  
United States Department of Transportation Federal Highway Administration  
June 2023



---

*Research, Technology Transfer, Education & Training*

---



April 18, 2023

Mr. Charles W Bolinger  
Division Administrator  
Federal Highway Administration  
5304 Flanders Drive, Suite A  
Baton Rouge, LA 70808

Attention: Ms. Mary Stringfellow

RE: FY 2023-2024 Louisiana Transportation Research Center Annual Work Program

Dear Mr. Bolinger:

Enclosed please find the FY 2023-2024 Louisiana Transportation Research Center (LTRC) Annual Work Program for your review and approval. You will note that the program is divided into multiple sections reflecting all funding sources.

As delegated by the Secretary, Louisiana Department of Transportation and Development (LADOTD), I, Samuel B. Cooper, Jr., Director, Louisiana Transportation Research Center, of the State of Louisiana, do hereby certify, that the State is in compliance with all requirements of 23 CFR 420 Subpart B and 23 U.S.C. 505 and its implementing regulations with respect to the research, development, and technology transfer program, and contemplate no changes in statutes, regulations or administrative procedures which would affect such compliance.

If I can provide additional information, please advise.

Sincerely,

Samuel B. Cooper, Jr., Ph.D., P.E.  
Director

cc: Mr. Christopher P. Knotts, P.E.  
Dr. Tyson Rupnow, P.E.



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

**Louisiana Division Office**

June 15, 2023

5304 Flanders Drive, Suite A  
Baton Rouge, LA 70808  
225.757.7600  
225.757.7601 (fax)

**In Reply Refer To:**  
HDA-LA

Dr. Samuel B. Cooper, Director  
Louisiana Transportation Research Center (LTRC)  
Baton Rouge, LA

Subject: State FY 2023-2024 State Planning & Research (SPR) Work Program Part B

Dear Dr. Cooper:

This letter is in response to your submittal of the State Fiscal Year (FY) 2023-2024 Statewide Planning and Research (SPR) Work Program Part B, enclosed. The original submittal from April 18, 2023, was reviewed and comments sent via email to Dr. Tyson Rupnow. The revised SPR B Work Plan was submitted to FHWA on June 9, 2023. This revised version has been reviewed and is approved by FHWA Louisiana Division Office.

A separate request from LDOTD's federal-aid section will be required to process the fiscal documents necessary to obligate the federal funds for this Work Program. Should you have any questions regarding this matter, please contact me at (225) 757-7610.

Sincerely yours,

MARY M  
STRINGFELLOW

Digitally signed by MARY  
M STRINGFELLOW  
Date: 2023.06.15  
14:17:11 -05'00'

Mary M. Stringfellow  
Program Delivery Team Leader

Enclosure: (1)

cc: Ms. Mary Elliot-Bergeron, LDOTD Planning Section  
Mr. Tyson Rupnow, LTRC

AAR	Alkali aggregate reaction
AASHTO	American Association of State Highway Transportation Officials
ACI	American Concrete Institute
ACR	Alkali-carbonate reaction
ACRP	Airport Cooperative Research Program
ADT	Average daily traffic
ALF	Accelerated loading facility
AM	Additive Manufacturing
AMRL	Asphalt and Materials Reference Laboratory
ANFIS	adaptive neuro fuzzy inference system
ANN	Artificial neural network
AO	aromatic oils
APWA	American Public Works Association
ASCE	American Society of Civil Engineers
ASR	Alkali-silica reaction
ATLaS	Accelerated Test Loading and Simulation
ATR-FTIR	Fourier-Transformed infrared
BBR	Bending beam rheometer
CAD	Computer aided drafting
CCRL	Cement and Concrete Reference Laboratory
CE&I	Civil Engineering and Inspection
CIP	Cast in place
CTM	Circular track meter
CPT	Concrete Prism Test
CPT	Cone penetrometer
CPTu	Piezocone Penetration Test
CR	crumb rubber
CUTC	Council of University Transportation Centers
DCP	Dynamic cone penetrometer
DFT	Dynamic friction tester
DIC	Digital image correlation
DIGGS/DIGGSml	Data Interchange for Geotechnical and Geo-Environmental Specialists
DOT	Department of Transportation
DOTD	Louisiana Department of Transportation and Development
DSR	Dynamic shear rheometer
DSRC	Direct Short Range Communications
ECC	Engineered cementitious composite
EMCRF	Engineering materials characterization and research facility
EPA	Environmental Protection Agency
ERDP	Engineering Resource Development Program
ETG	Expert task group
FE	Finite element
FHWA	Federal Highway Administration
FRP	Fiber Reinforced Polymer
FSS	Fully soften shear strength

FY	Fiscal year
GEC	Geotechnical Engineering Circular
GIS	Geographic information systems
GLTP	Geosynthetic load transfer platform
HCM	Highway Capacity Manual
HEMP	Hurricane Evacuation Modeling Package
HFA	Hydrated fly ash
HMA	Hot mixed asphalt
ICC	Internally cured concrete
IRI	International roughness index
IT	Information technology
ITS	Intelligent Transportation System
LA PMS	Louisiana Pavement Management System
LCA	Life-Cycle Assessment
LEO	Louisiana employees online
LIDAR	Light detection and radar
LL	Liquid limit
LMS	Learning management system
LPA	Local public agency
LPD-CPT	Louisiana Pile Design using Cone Penetration Test
LPESA	Louisiana Parish Engineers and Supervisors Association
LRFD	Load and Resistance Factored Design
LRSP	Local Road Safety Program
LSO	Learning solution online
LSU	Louisiana State University
LTA	Long term aged
LTAP	Louisiana Technical Assistance Program
LTRC	Louisiana Transportation Research Center
LWST	Locked wheel skid trailer
LWT	Loaded wheel tester
MASH	Manual for Assessing Safety Hardware
MCPT	Miniature concrete prism test
MEPDG	Mechanistic Empirical Pavement Design Guide
MPO	Metropolitan planning organization
MRI	Major Research instrumentation
MTS	Materials Test Systems
NASA	National Aeronautics and Space Agency
NCAT	National Center for Asphalt Technology
NCHRP	National Cooperative Highway Research Program
NDT	Non-destructive testing
NHS	National highway system
NHTSA	National Highway Transportation Safety Administration
NNBF	Natural and Nature-Based Features
NSF	National Science Foundation
OGC	Open Ground Cloud
OGFC	Open graded friction course
OMC	Office of Multimodal Commerce

OTS	Office of technology services
PAV	Pressure aging vessel
PCC	Portland cement concrete
PCPT	Piezocone penetration test
PCR	Product category rule
PDH's	Professional development hours
PI	Performance index
PI	Principal Investigator
PL	Plastic limit
PMTS	Project management tracking system
PMS	Pavement management system
PRC	Project review committee
PRF	Pavement research facility
PSV	Polished stone value
QA	quality assurance
QC	quality control
RA	Research associate
RAP	Recycled asphalt pavement
RAS	Recycled asphalt shingles
RC	Reinforced concrete
RCC	roller compacted concrete
RH	relative humidity
RITIS	Regional Integrated Transportation Information System
ROR	Run-off-road
RTFO	Rolling thin film oven
SARA	Saturates/Aromatics/Resins/Asphaltenes
SASHTO	Southeastern Association of State Highway and Transportation Officials
SBS	Styrene-Butadiene-Styrene
SCB	Semi-Circular Bend
SCPTu	Seismic Piezocone Penetration Testing
SHSP	Strategic Highway Safety Plan
SLR	Sea Level Rise
SMA	Stone matrix asphalt
SN	Skid number
SOP	Standard operating procedure
SPS	Sandwich plate system
SPT	Standard penetration test
SSAM	Surrogate Safety Assessment Model
SSRB	Louisiana Standard Specifications for Roads and Bridges
STC	Southeast Transportation Consortium
TA	Technical assistance
T-FAST	Turner Fairbanks Highway Research Center Fast ASR Test
TFHRC	Turner Fairbanks Highway Research Center
TIM	Traffic Incident Management

TIMED	Transportation Infrastructure Model for Economic Development
TLC-FID	Thin-layer Chromatography and Flame Ionization Detection
TRB	Transportation Research Board
TSR	Tensile strength ratio
TTEC	Transportation Training and Education Center
UHPFRC	Ultra-High Performance Fiber-Reinforced Concrete
ULL	University of Louisiana-Lafayette
UTC	University Transportation Center
UTM	Universal testing machine
USGA	United States Geological Administration
VMT	Vehicle miles traveled
WIM	Weigh in motion
WMA	warm mix asphalt
XRD	X-ray diffraction
XRF	X-ray fluorescence

# Table of Contents

<b>Budget Recap Sheets</b> .....	A-1 . A-3
<b>Project Summary Sheets</b> .....	B-1 .... B-10
<b>FHWA Part B SPR Funded Research</b>	
Administrative Line Items & Research Support Studies .....	C-1 ....C-9
Continuing Research .....	C-10 ..C-69
Proposed Research .....	C-70...C-111
Pooled Fund Louisiana Lead State Research .....	C-112...C-113
<b>FHWA LTAP Funded Program</b> .....	D-114...D-116
<b>FHWA STP Funded Technology Transfer &amp; Education Program</b> .....	E-117..E-136
<b>Other DOTD Funded Projects</b> .....	G-137..G-141



# **FHWA SPR Work Program**

## **Part B**

**FAP Number SPR-0010(34)**



## FHWA Funding

<b>SPR Research Budget Recap</b>	<b>H#</b>	<b>Federal</b>	<b>State</b>	<b>Total</b>
Administrative Budget	TBD	\$751,212.80	\$187,803.20	\$939,016.00
Research Support Studies Budget	TBD	\$1,293,569.60	\$323,392.40	\$1,616,962.00
Active Studies Budget	TBD	\$3,208,182.40	\$802,045.60	\$4,010,228.00
Proposed Studies Budget	TBD	\$2,237,932.80	\$559,483.20	\$2,797,416.00
Pooled Fund Lead State Studies Budget H: 972490		\$200,000.00	\$0.00	\$200,000.00
<b>Total SPR Budget</b>		<b>\$7,690,897.60</b>	<b>\$1,872,724.40</b>	<b>\$9,563,622.00</b>

<b>SPR External Collaboration Budget Recap</b>	<b>H#</b>	<b>Federal</b>	<b>State</b>	<b>Total</b>
Pool Funded Studies	N/A	\$200,000.00	\$0.00	\$200,000.00
TRB Correlations	N/A	\$138,029.60	\$34,507.40	\$172,537.00
NCHRP	N/A	\$781,872.80	\$195,468.20	\$977,341.00
<b>Total SPR External Collaboration Budget</b>		<b>\$1,119,902.40</b>	<b>\$229,975.60</b>	<b>\$1,349,878.00</b>

## FHWA Funding

<b>LTAP Budget Recap</b>	<b>H#</b>	<b>Federal</b>	<b>State</b>	<b>Total</b>
LTAP	TBD	\$542,938.00	\$150,000.00	\$692,938.00
<b>LTAP Program Total</b>		<b>\$542,938.00</b>	<b>\$150,000.00</b>	<b>\$692,938.00</b>

<b>STP: Technology Transfer Program Budget Recap</b>	<b>H#</b>	<b>Federal</b>	<b>Total</b>
Technology Transfer Program and Operations	TBD	\$1,331,791.00	\$1,331,791.00
Workforce Development Program	TBD	\$7,059,933.00	\$7,059,933.00
Student Support Programs	TBD	\$210,000.00	\$210,000.00
<b>Total STP Budget</b>		<b>\$8,601,724.00</b>	<b>\$8,601,724.00</b>

## Other DOTD Sections Funding

<b>Other DOTD Sections Budget Recap</b>	<b>H#</b>	<b>Federal</b>	<b>State</b>	<b>Total</b>
Active Studies Budget	TBD	\$43,830.40	\$10,957.60	\$54,788.00
Proposed Studies Budget	TBD	\$379,989.00	\$0.00	\$379,989.00
<b>Total Other DOTD Sections Budget</b>				<b>\$434,777.00</b>

LTRC ANNUAL RESEARCH PROGRAM  
 SPR: TT-Fed/TT-Reg (80% Federal / 20% State)

FISCAL\_YEAR 2023-2024

Funding	A/P	Project Type	SIO No.	Research No.	FY Budget	Total Cost	Agency	Principal Investigator	Project Title	Start Date	End Date	End Date (Rev)	Page No.
<b>Project Type: Administrative (80% Federal / 20% State)</b>													
SPR: TT-Fed/TT-Reg2 5	P	ADM	DOTLT1000475	24-1PM	\$939,016	\$939,016	LTRC	Tyson Rupnow	Program Management	7/1/2023	6/30/2024		C-2
					<b>\$939,016</b>	<b>\$939,016</b>	<b>ADMINISTRATIVE BUDGET TOTALS</b>						
<b>Project Type: Research Support (80% Federal / 20% State)</b>													
SPR: TT-Fed/TT-Reg - 5	P	RS	DOTLT1000478	24-1TTRI	\$426,039	\$426,039	LTRC	Tyson Rupnow	Technology Transfer and Research Implementation	7/1/2023	6/30/2024		C-3
SPR: TT-Fed/TT-Reg - 5	P	RS	DOTLT1000481	24-1TRS	\$331,996	\$331,996	LTRC	Tyson Rupnow	Technical Research Surveillance	7/1/2023	6/30/2024		C-4
SPR: TT-Fed/TT-Reg - 5	P	RS	DOTLT1000477	24-1TA	\$399,557	\$399,557	LTRC	Tyson Rupnow	Technical Assistance	7/1/2023	6/30/2024		C-5
SPR: TT-Fed/TT-Reg - 5	P	RS	DOTLT1000482	24-1SSR	\$100,000	\$100,000	LTRC	Tyson Rupnow	DOTD Staff Support for Research	7/1/2023	6/30/2024		C-6
SPR: TT-Fed/TT-Reg - 5	P	RS	DOTLT1000480	24-1NPE	\$24,754	\$24,754	LTRC	Tyson Rupnow	New Product Evaluation	7/1/2023	6/30/2024		C-7
SPR: TT-Fed/TT-Reg - 5	P	RS	DOTLT1000476	24-1LFT	\$11,501	\$11,501	LTRC	Tyson Rupnow	Research Laboratory and Field Test Support	7/1/2023	6/30/2024		C-8
SPR: TT-Fed/TT-Reg2 6	P	RS	DOTLT1000479	24-1EQM	\$323,115	\$323,115	LTRC	Tyson Rupnow	Equipment Management	7/1/2023	6/30/2024		C-9
					<b>\$1,616,962</b>	<b>\$1,616,962</b>	<b>RESEARCH SUPPORT BUDGET TOTALS</b>						

**LTRC ANNUAL RESEARCH PROGRAM**  
**SPR: TT-Fed/TT-Reg (80% Federal / 20% State)**

**FISCAL YEAR 2023-2024**

Funding	A/P	Project Type	SIC No.	Research No.	FY Budget	Total Cost	Agency	Principal Investigator	Project Title	Start Date	End Date	End Date (Rev)	Page No.
<b>Project Type: Bituminous (80% Federal / 20% State)</b>													
SPR: TT-Fed/TT-Reg - 5	A	B	DOTLT1000423	22-1B	\$120,000	\$223,135	LTRC	Saman Salari	Evaluation of Saturates/Aromatics/Resins/Asphaltenes (SARA) Fractionation of asphalt binders in Louisiana	6/1/2022	5/31/2024		C-11
SPR: TT-Fed/TT-Reg - 5	A	B	DOTLT1000391	21-2B	\$117,191	\$326,936	LTRC	Louay Mohammad	Assessment of Long-Term Performance of Louisiana Asphalt Pavements	11/1/2020	10/31/2023		C-12
SPR: TT-Fed/TT-Reg - 5	A	B	DOTLT1000390	21-1B	\$125,321	\$299,944	LTRC	Louay Mohammad	Development of a Cyclic Semi-Circular Bend Test to Evaluate Asphalt Mixture Cracking Resistance at Intermediate Temperature.	1/1/2021	3/31/2023	6/30/2024	C-13
SPR: TT-Fed/TT-Reg - 5	A	B	DOTLT1000195	17-4B	\$16,700	\$181,540	LTRC	Saman Salari	Development of a 4.75mm Asphalt Mixture Design	6/14/2017	6/13/2019	4/30/2023	C-14
SPR: TT-Fed/TT-Reg - 6	A	B	DOTLT1000461	23-2B	\$91,400	\$155,410	LTRC	Saman Salari	Evaluation of Non-Destructive Test Pilot Projects	8/22/2022	8/21/2024		C-15
SPR: TT-Fed/TT-Reg - 6	A	B	DOTLT1000460	23-1B	\$65,000	\$170,491	LTRC	Mostafa Elseifi	Effect of Mineral Fillers on the Moisture Resistance and Performance of HMA	6/1/2022	5/31/2024		C-16
SPR: TT-Fed/TT-Reg - 6	A	B	DOTLT1000386	21-6B	\$0	\$137,110	LSU	Mostafa Elseifi	A New Generation of Porous Asphalt Pavement - OGFC Support Study	9/1/2020	11/30/2022	8/31/2023	C-17
SPR: TT-Fed/TT-Reg - 6	A	B	DOTLT1000385	21-5B	\$0	\$79,156	LTRC	Saman Salari	Improvement of Open-Graded Friction Course (OGFC) Performance and Durability through Materials, Design, and Maintenance	9/1/2020	11/30/2022	11/30/2023	C-18
SPR: TT-Fed/TT-Reg - 6	A	B	DOTLT1000384	21-4B	\$80,000	\$279,463	LTRC	Louay Mohammad	Development of a Standard Practice for the Design of Durable Open-Graded Friction Course (OGFC) Mixtures with Epoxy Asphalt-Support Study	9/1/2020	11/30/2022	12/30/2023	C-19
SPR: TT-Fed/TT-Reg - 6	A	B	DOTLT1000392	21-3B	\$80,000	\$249,609	LTRC	Louay Mohammad	Use of an Innovative Recycling Agent for Improving the Sustainability and Durability of Asphalt Pavements	2/1/2021	4/30/2023		C-20
SPR: TT-Fed/TT-Reg - 6	A	B	DOTLT1000275	19-2B	\$65,000	\$478,165	LTRC	Louay Mohammad	Development of a Moisture Sensitivity Test for Asphalt Mixtures	5/1/2019	4/30/2021	12/30/2023	C-21
SPR: TT-Fed/TT-Reg - 6	A	B	30000112	10-1EMCRF	\$83,957	\$20,501,630	LTRC	Louay Mohammad	Sustainable and Resilient Pavement Materials and Technologies Center (SRPC)	7/1/2009	6/30/2015	6/30/2024	C-22
					<b>\$844,569</b>	<b>\$23,082,589</b>	<b>BITUMINOUS BUDGET TOTALS</b>						

**Project Type: Concrete (80% Federal / 20% State)**

SPR: TT-Fed/TT-Reg - 6	A	C	DOTLT1000424	22-2Cee	\$76,500	\$205,097	LTRC	Jose Milla	Influence of Aggregate Gradation to Reduce Concrete's Permeability	1/17/2022	1/16/2024		C-23
SPR: TT-Fed/TT-Reg - 6	A	C	DOTLT1000422	22-1C	\$64,000	\$205,097	LTRC	Jose Milla	Influence of Internal Curing on Concrete's Permeability in Simulated Field Conditions	1/17/2022	1/16/2024		C-24
SPR: TT-Fed/TT-Reg - 6	A	C	DOTLT1000332	20-2C	\$36,000	\$120,969	LTRC	Jose Milla	Using the Portable XRF to identify/Verify Field Material Properties	10/1/2019	3/31/2021	11/30/2023	C-25
SPR: TT-Fed/TT-Reg - 6	A	C	DOTLT1000331	20-1C	\$14,000	\$232,609	LTRC	Jose Milla	Evaluation of the Miniature Concrete Prism Test (MCPT) for use in LADOTD	10/1/2019	9/30/2022	1/31/2024	C-26
					<b>\$190,500</b>	<b>\$763,772</b>	<b>CONCRETE BUDGET TOTALS</b>						

**Project Type: Geotechnical (80% Federal / 20% State)**

SPR: TT-Fed/TT-Reg - 5	A	GT	DOTLT1000471	23-2GT	\$126,088	\$187,665	LTRC	Nick Ferguson	Field Evaluation of Geophysical Applications for DOTD	2/6/2023	2/5/2025		C-27
SPR: TT-Fed/TT-Reg0 5	A	GT	DOTLT1000393	21-2GT	\$73,725	\$185,539	LTRC	Gavin Gautreau	Geotechnical Database, Phase IV	3/1/2021	2/28/2023	2/28/2024	C-28
SPR: TT-Fed/TT-Reg - 5	A	GT	DOTLT1000375	21-1GT	\$25,534	\$216,717	LTRC	Murad Abu-Farsakh	Internal friction angle of sands with high fines content	8/1/2020	7/31/2022	7/31/2023	C-30
SPR: TT-Fed/TT-Reg0 5	A	GT	DOTLT1000346	20-3GT	\$59,595	\$355,050	LTRC	Murad Abu-Farsakh	Development of a Design Methodology for Geosynthetic Reinforced Pavement using Finite Element Numerical Modeling	5/1/2020	4/30/2023	4/30/2024	C-32
SPR: TT-Fed/TT-Reg - 5	A	GT	DOTLT1000337	20-2GT	\$87,500	\$424,695	LTRC	Murad Abu-Farsakh	Instrumentation and Modeling of Geosynthetic Load Transfer Platform Performance	1/1/2020	6/30/2022	6/30/2024	C-34
SPR: TT-Fed/TT-Reg0 6	A	GT	DOTLT1000473	23-1GT	\$90,508	\$311,126	LTRC	Gavin Gautreau	LIDAR for Geotechnical Applications	3/1/2023	8/31/2025		C-36
SPR: TT-Fed/TT-Reg - 6	A	GT	30000111	10-1GERL	\$160,900	\$18,480,051	LTRC	Murad Abu-Farsakh	LTRC Support for Geotechnical Research at the Geotechnical Engineering Research Laboratory (GERL)	7/1/2010	6/30/2015	6/30/2024	C-37
					<b>\$623,850</b>	<b>\$20,160,843</b>	<b>GEOTECHNICAL BUDGET TOTALS</b>						

**Project Type: Other (80% Federal / 20% State)**

SPR: TT-Fed/TT-Reg - 5	A	Other	DOTLT1000215	18-1Other	\$50,000	\$1,895,149	LTRC	Vijaya Gopu	LTRC Proposal for the Support of Software Development and GIS Applications in LTRC Research	7/1/2017	6/30/2020	6/30/2024	C-39
SPR: TT-Fed/TT-Reg - 5	A	Other	30000169	11-1AD	\$306,412	\$4,672,490	LTRC	Vijaya Gopu	Administration of LTRC External Funding Programs	1/1/2008	6/30/2009	6/30/2024	C-40
					<b>\$356,412</b>	<b>\$6,567,639</b>	<b>OTHER BUDGET TOTALS</b>						

**Project Type: Pavements (80% Federal / 20% State)**

SPR: TT-Fed/TT-Reg - 5	A	P	DOTLT1000431	22-1P	\$88,087	\$169,270	LTRC	Moses Akentuna	Performance Index Rating and Maintenance Cost Assignment for Ramps, Acceleration and Deceleration Lanes in Louisiana	4/1/2022	6/30/2024		C-42
SPR: TT-Fed/TT-Reg0 5	A	P	DOTLT1000216	18-1P	\$5,000	\$150,000	LTRC	Zhongjie Zhang	Exploration of Drone and Remote Sensing Technologies in Highway Embankment Monitoring and Management	9/1/2017	8/31/2018	8/31/2023	C-43
SPR: TT-Fed/TT-Reg - 6	A	P	DOTLT1000340	20-4P	\$129,500	\$402,068	LTRC	Zhong Wu	Assessment of LADOTD's friction aggregate sources through laboratory and accelerated testing	1/1/2020	12/31/2022	12/31/2024	C-44
SPR: TT-Fed/TT-Reg - 6	A	P	DOTLT1000272	19-2P	\$5,400	\$398,137	LTRC	Zhong Wu	Mechanistic Characterization of Asphalt Overlays for Pavement Rehabilitation and Preservation using Pavement ME Approach	8/1/2018	1/31/2021	10/31/2023	C-45
SPR: TT-Fed/TT-Reg0 6	A	P	DOTLT1000218	18-2P	\$40,000	\$315,000	LTRC	Qiming Chen	Mitigating Joint Reflective Cracks using Stone Interlayers: Case Study on Louisiana Highway 5, Desoto Parish	10/17/2017	10/16/2023	10/16/2026	C-46
SPR: TT-Fed/TT-Reg - 6	A	P	30000141	10-1ALF	\$470,600	\$23,096,263	LTRC	Zhong Wu	Management and Operation of the Pavement Research Facility	7/1/2009	6/30/2015	6/30/2024	C-47
					<b>\$738,587</b>	<b>\$24,530,738</b>	<b>PAVEMENTS BUDGET TOTALS</b>						

**Project Type: Safety (80% Federal / 20% State)**

SPR: TT-Fed/TT-Reg - 5	A	SA	DOTLT1000388	21-1SA	\$2,000	\$173,835	LSU	Helmut Schneider	Highway Safety culture Assessment through Louisiana's Regions	5/1/2021	4/30/2023	7/31/2023	C-49
SPR: TT-Fed/TT-Reg - 6	A	SA	DOTLT1000432	22-3SA	\$74,227	\$175,000	LSU	Hany Hassan	Development of Statewide Design Guidelines for Improving Pedestrian Safety on High Speed Arterials in Louisiana	10/1/2022	3/31/2024		C-50
					<b>\$76,227</b>	<b>\$348,835</b>	<b>SAFETY BUDGET TOTALS</b>						

**Project Type: Special Studies (80% Federal / 20% State)**

SPR: TT-Fed/TT-Reg - 5	A	SS	DOTLT1000472	23-8SS	\$97,961	\$158,964	LTRC	Milhan Moomen	Best Practices for Maintenance of Control of Access Fencing	1/1/2023	6/30/2024		C-51
SPR: TT-Fed/TT-Reg - 5	A	SS	DOTLT1000469	23-6SS	\$24,729	\$49,729	Consultant-P.V. Vijay	P.V. Vijay	Collaborative Research and Technical Assistance	1/1/2023	9/1/2023		C-52
SPR: TT-Fed/TT-Reg - 5	A	SS	DOTLT1000468	23-5SS	\$96,667	\$210,850	LTRC	Milhan Moomen	Improved Incident Response through Coordinated, Interoperable Communications	1/1/2023	12/31/2025		C-53
SPR: TT-Fed/TT-Reg - 5	A	SS	DOTLT1000459	23-3SS	\$109,535	\$219,070	LTRC	Ashifur Rahman	Estimating HCM Default Parameters for Louisiana	1/1/2023	12/31/2024		C-54
SPR: TT-Fed/TT-Reg - 5	A	SS	DOTLT1000458	23-1SS	\$64,123	\$189,223	LSU	Hany Hassan	Safety and Traffic Operations at Cloverleaf Interchanges	8/1/2022	7/31/2024		C-55
SPR: TT-Fed/TT-Reg - 5	A	SS	DOTLT1000430	22-5SS	\$17,315	\$123,936	LTRC	Ruijie "Rebecca" Bian	Analyzing Human Mobility for Active Transportation Planning in Louisiana	3/1/2022	8/31/2023		C-57
SPR: TT-Fed/TT-Reg - 5	A	SS	DOTLT1000429	22-4SS	\$88,705	\$200,000	ULL	Stephen Barnes	Economic Impact of Access Management Treatments	7/1/2022	6/30/2024		C-58
SPR: TT-Fed/TT-Reg - 5	A	SS	DOTLT1000427	22-3SS	\$58,588	\$90,981	LTRC	Ruijie "Rebecca" Bian	Testing the Hurricane Evacuation Modeling Package (HEMP)	8/1/2022	1/31/2024		C-59
SPR: TT-Fed/TT-Reg - 5	A	SS	DOTLT1000280	19-1SS	\$121,000	\$1,446,751	ULL	Elisabeta Mitran	LTRC Proposal for the Support of Research and Development in Special Studies	7/1/2019	6/30/2021	6/30/2024	C-60
SPR: TT-Fed/TT-Reg - 5	A	SS	DOTLT1000281	19-1ITS	\$80,825	\$2,367,433	ULL	Vijaya Gopu	LTRC Proposal for the Support of Research and Development in ITS/Traffic	7/1/2019	6/30/2021	6/30/2024	C-61
SPR: TT-Fed/TT-Reg2 5	A	SS	30000125	10-1PLAN	\$86,978	\$9,723,832	LTRC	Ruijie "Rebecca" Bian	LTRC Proposal for the Support of Research and Development in Transportation Planning	7/1/2010	6/30/2015	6/30/2024	C-63
					<b>\$846,426</b>	<b>\$14,780,769</b>	<b>SPECIAL STUDIES BUDGET TOTALS</b>						

**Project Type: Structures (80% Federal / 20% State)**

SPR: TT-Fed/TT-Reg - 5	A	ST	DOTLT1000457	22-3ST	\$82,700	\$383,004	LSU	Murad Abu-Farsakh	Evaluation of Embedded Pile Resistance on Scour Critical Bridges	5/2/2022	5/1/2025		C-65
SPR: TT-Fed/TT-Reg - 5	A	ST	DOTLT1000428	22-2ST	\$196,785	\$460,000	Wiss, Janney, Elstner Associates, Inc.	Gareth Rees	Skew Detection System Replacement on Vertical Lift Bridges Phase 2	2/1/2022	12/31/2022	12/31/2023	C-67
SPR: TT-Fed/TT-Reg - 5	A	ST	DOTLT1000342	20-1ST	\$54,172	\$139,927	LSU	Ayman Okeil	Developing The Load Distribution Formula for Louisiana Culverts	3/1/2020	8/31/2021	6/30/2023	C-69
					<b>\$333,657</b>	<b>\$982,931</b>	<b>STRUCTURES BUDGET TOTALS</b>						
					<b>\$4,010,228</b>	<b>\$91,218,116</b>	<b>SPR: TT-FED/TT-REG ACTIVE BUDGET TOTALS</b>						



**LTRC ANNUAL RESEARCH PROGRAM**  
**SPR: TT-Fed/TT-Reg (80% Federal / 20% State)**

FISCAL YEAR 2023-2024

Funding	A/P	Project Type	SiO No.	Research No.	FY Budget	Total Cost	Agency	Principal Investigator	Project Title	Start Date	End Date	End Date (Rev)	Page No.
<b>Project Type: Bituminous (80% Federal / 20% State)</b>													
SPR: TT-Fed/TT-Reg - 5	P	B			\$65,000	\$100,000	LTRC	Louay Mohammad	Development of a Practical Long-Term Aging Protocol for Semi-Circular Bend (SCB) Test	7/1/2023	12/31/2024		C-71
SPR: TT-Fed/TT-Reg - 5	P	B			\$88,000	\$350,000	LTRC	Louay Mohammad	Performance Of Asphalt Pavements Containing Recycled Materials Under Accelerated Loading	1/1/2018	6/30/2020		C-72
SPR: TT-Fed/TT-Reg - 5	P	B			\$65,000	\$160,000	LTRC	Louay Mohammad	Support Study for Evaluation of Saturates/Aromatics/Resins/Asphaltenes (SARA) Fractionation of asphalt binders in Louisiana	7/1/2022	4/30/2024		C-73
SPR: TT-Fed/TT-Reg - 5	P	B			\$74,241	\$85,000	LTRC	Louay Mohammad	Sustainability through Development of Life-Cycle Information Models for Pavements in Louisiana	7/1/2021	6/30/2023		C-74
SPR: TT-Fed/TT-Reg - 6	P	B			\$80,000	\$85,000	LTRC	Louay Mohammad	Enhanced Interaction between Crumb Rubber Modifiers and Asphalt Binder to Improve Performance	7/1/2021	6/30/2023		C-75
SPR: TT-Fed/TT-Reg - 6	P	B			\$102,000	\$349,000	LTRC	Louay Mohammad	Enhancement of Mechanical Properties of Asphalt Cements and Asphalt Mixtures Containing Waste Plastic	7/1/2021	6/30/2023		C-76
SPR: TT-Fed/TT-Reg - 6	P	B			\$80,000	\$85,000	LTRC	Louay Mohammad	Enhancing Pavement Resiliency to Sea Level Rise Using Natural and Nature-Based Features in Louisiana	7/1/2021	6/30/2023		C-77
SPR: TT-Fed/TT-Reg - 6	P	B			\$83,957	\$155,131	LTRC	Louay Mohammad	Establishment of the Center for Sustainable Pavement Materials and Technologies	7/1/2021	6/30/2022		C-78
SPR: TT-Fed/TT-Reg - 6	P	B			\$60,000	\$300,000	LTRC	Saman Salari	Evaluation of composite pavement consisting of RCC and asphalt overlay	7/1/2023	7/1/2025		C-79
					<b>\$698,198</b>	<b>\$1,669,131</b>	<b>BITUMINOUS BUDGET TOTALS</b>						
<b>Project Type: Concrete (80% Federal / 20% State)</b>													
SPR: TT-Fed/TT-Reg - 5	P	C			\$80,000	\$240,000	LTRC	Samuel Cooper, III	Evaluation of T-Fast (TFHRC ASR Test) Test Method for Aggregate Acceptance	7/1/2023	6/30/2026		C-80
SPR: TT-Fed/TT-Reg - 6	P	C			\$84,000	\$200,000	LTRC	Samuel Cooper, III	Investigation of Piezoelectric and Other Advanced Sensors in Concrete	7/1/2023	6/30/2025		C-81
					<b>\$164,000</b>	<b>\$440,000</b>	<b>CONCRETE BUDGET TOTALS</b>						
<b>Project Type: Geotechnical (80% Federal / 20% State)</b>													
SPR: TT-Fed/TT-Reg - 5	P	GT			\$44,268	\$80,000	LTRC	Gavin Gautreau	Fully Softened Shear Strength at Low Stresses for Analysis & Design of Natural and Compacted Slopes	9/1/2022	9/1/2024		C-82
SPR: TT-Fed/TT-Reg - 5	P	GT			\$51,145	\$150,000	LTRC	Nick Ferguson	Geotechnical Asset Management – Inventory of culverts, slopes, and embankments	7/1/2023	3/31/2025		C-83
SPR: TT-Fed/TT-Reg - 5	P	GT			\$40,000	\$200,000	LTRC	Murad Abu-Farsakh	Statewide Calibration of CPT Direct Design Methods Using Static Load Test Data	10/3/2022	9/30/2025		C-84
SPR: TT-Fed/TT-Reg - 5	P	GT			\$100,000	\$200,000	LTRC		Traffic Signal foundations	7/1/2023	1/31/2025		C-85

SPR: TT-Fed/TT-Reg - 5	P	GT			\$28,100	\$200,000	LTRC	Murad Abu-Farsakh	Update on Evaluating the Magnitude and Time Rate of Consolidation Settlement of Embankments and other Infrastructures from Piezocone Penetration Tests (PCPT)	3/14/2023	3/29/2023		C-86
SPR: TT-Fed/TT-Reg - 5	P	GT			\$28,100	\$200,000	LTRC	Murad Abu-Farsakh	Use and Interpretation of Seismic Piezocone Penetration Testing (SCPTu) for Geotechnical Site Investigation	1/1/2018	12/31/2020		C-88
SPR: TT-Fed/TT-Reg - 5	P	GT			\$32,793	\$160,000	LTRC	Gavin Gautreau	Web-Based Tool to Advance Geotechnical Data Interchange and Reliability -Based Site Characterization	7/1/2023	3/31/2025		C-89
SPR: TT-Fed/TT-Reg - 6	P	GT			\$18,300	\$200,000	LTRC	Murad Abu-Farsakh	Evaluating the effect of pile installation, long-term scour and reduction in overburden pressure on pile capacity	2/28/2023	3/30/2023		C-91
SPR: TT-Fed/TT-Reg - 6	P	GT			\$28,100	\$200,000	LTRC	Murad Abu-Farsakh	Evaluation and development of CPT-based methods for estimating the ultimate axial capacity of drilled shafts	3/7/2023	3/23/2023		C-92
SPR: TT-Fed/TT-Reg - 6	P	GT			\$51,100	\$200,000	LTRC	Murad Abu-Farsakh	Evaluation and Incorporation of Site and lab Variability into LRF Design of Deep Foundations - Phase 2	7/1/2023	6/30/2025		C-93
					<b>\$421,906</b>	<b>\$1,790,000</b>	<b>GEOTECHNICAL BUDGET TOTALS</b>						

**Project Type: Pavements (80% Federal / 20% State)**

SPR: TT-Fed/TT-Reg - 5	P	P			\$80,000	\$250,000	LTRC	QimingChen	Development of a Database for Successfully Performing Pavement Sections in Louisiana	7/1/2023	6/30/2026		C-94
SPR: TT-Fed/TT-Reg - 6	P	P			\$140,300	\$200,000	LTRC	Zhong Wu	Evaluation of Louisiana Maintenance and Rehabilitation Treatment Decision Matrix for Cost effective and Timely Pavement Preservation	1/1/2022	12/31/2023		C-95
					<b>\$220,300</b>	<b>\$450,000</b>	<b>PAVEMENTS BUDGET TOTALS</b>						

**Project Type: Safety (80% Federal / 20% State)**

SPR: TT-Fed/TT-Reg - 5	P	SA			\$120,000	\$250,000			Ground-in Edge and Centerline Rumble Strip/Rumble Stripe Evaluation/Best Practices	1/1/2024	6/30/2025		C-97
SPR: TT-Fed/TT-Reg - 5	P	SA			\$127,500	\$262,000	LTRC	Elisabeta Mitran	Older Road Users Safety in Louisiana: Understanding the Crash Contributing Factors	8/1/2023	7/31/2025		C-98
					<b>\$247,500</b>	<b>\$512,000</b>	<b>SAFETY BUDGET TOTALS</b>						

**Project Type: Special Studies (80% Federal / 20% State)**

SPR: TT-Fed/TT-Reg - 5	P	SS	DOTLT1000495	24-1SS	\$250,000	\$250,000			Updating and Migrating the Louisiana Transportation Research Center (LTRC) Project Management Tracking System (PMTS) from Louisiana State University Server to Office of Technology Services (OTS) Server(s)	7/1/2023	3/31/2024		C-99
SPR: TT-Fed/TT-Reg - 5	P	SS	DOTLT1000463	23-4SS	\$139,430	\$237,000	LTRC	Ruijie "Rebecca" Bian	Statewide Non-Motorized Traffic Monitoring Technology	12/1/2021	6/30/2025		C-100
SPR: TT-Fed/TT-Reg - 5	P	SS			\$100,000	\$200,000	LTRC	Mithan Moomen	Effects of 1-10 Lane Closures on the Performance of other Alternate Routes in Baton Rouge	7/1/2023	1/31/2025		C-101
SPR: TT-Fed/TT-Reg - 5	P	SS			\$80,000	\$180,000	LTRC	Mithan Moomen	Evaluating Practical Applications of Unmanned Aerial Vehicles (UAVs) for Traffic Incident Response and Management.	7/1/2023	1/30/2025		C-102

SPR: TT-Fed/TT-Reg - 5	P	SS			\$120,000	\$250,000			Improved Signalized Intersection Performance through Adaptive Signal Operations Using Computer Vision and Artificial Intelligence	7/1/2023	6/30/2025		C-103
SPR: TT-Fed/TT-Reg - 5	P	SS			\$56,082	\$226,000	LTORC	Ruijie "Rebecca" Bian	Statewide Lane Reconfiguration "Road Diet" Screening for Louisiana	1/1/2024	12/31/2025		C-104
SPR: TT-Fed/TT-Reg - 5	P	SS			\$100,000	\$250,000			Trip Generation for Various Sites	7/1/2023	6/30/2025		C-105
					<b>\$845,512</b>	<b>\$1,593,000</b>	<b>SPECIAL STUDIES BUDGET TOTALS</b>						

**Project Type: Structures (80% Federal / 20% State)**

SPR: TT-Fed/TT-Reg - 6	P	STO			\$50,000	\$180,000			Redesign of Innovative gate Arms (Ramp Closure Gate)	7/1/2023	6/30/2025		C-106
					<b>\$50,000</b>	<b>\$180,000</b>	<b>STRUCTURES BUDGET TOTALS</b>						

**Project Type: TIRE (80% Federal / 20% State)**

SPR: TT-Fed/TT-Reg - 5	P	TIRE	DOTLT1000500	24-5TIRE	\$30,000	\$30,000	ULL		Smart Nanogrids for Safer Roads	7/1/2023	6/30/2024		C-107
SPR: TT-Fed/TT-Reg - 5	P	TIRE	DOTLT1000499	24-4TIRE	\$30,000	\$30,000	LSU		Development of durable self-sensing cementitious composites for transportation infrastructure rehabilitation and monitoring	7/1/2023	6/30/2024		C-108
SPR: TT-Fed/TT-Reg - 5	P	TIRE	DOTLT1000498	24-3TIRE	\$30,000	\$30,000	LTU		Structural Response Evaluation and Design of Ultra High Performance Concrete Bridge Girders	7/1/2023	6/30/2024		C-109
SPR: TT-Fed/TT-Reg - 5	P	TIRE	DOTLT1000497	24-2TIRE	\$30,000	\$30,000	LTU		Smart Bridge Monitoring Employing Deep Learning and Unmanned Aerial Vehicles	7/1/2023	6/30/2024		C-110
SPR: TT-Fed/TT-Reg - 5	P	TIRE	DOTLT1000496	24-1TIRE	\$30,000	\$30,000	LSU		Investigation of free-standing polymer composites for robotic-driven bridge construction	7/1/2023	6/30/2024		C-111
					<b>\$150,000</b>	<b>\$150,000</b>	<b>TIRE BUDGET TOTALS</b>						
					<b>\$2,797,416</b>	<b>\$6,784,131</b>	<b>SPR: TT-FED/TT-REG PROPOSED BUDGET TOTALS</b>						

LTRC ANNUAL RESEARCH PROGRAM

SPR: Pooled Fund: TT-Fed (100% Federal)

FISCAL YEAR 2023-2024

Funding	A/P	Project Type	SIO No.	Research No.	FY Budget	Total Cost	Agency	Principal Investigator	Project Title	Start Date	End Date	End Date (Rev)	Page No.
<b>Project Type: Pooled Fund (100% Federal)</b>													
SPR: Pooled Fund: TT-Fed	A	PF	DOTLT	21-1PF	\$200,000	\$900,000	LTRC	Tyson Rupnow	Southeast Transportation Consortium - Phase II	2/1/2023	6/30/2025		C-113
					\$200,000	\$900,000	<b>SPR: POOLED FUND: TT-FED ACTIVE BUDGET TOTALS</b>						
					\$200,000	\$900,000	<b>POOLED FUND BUDGET TOTALS</b>						

LTRC ANNUAL RESEARCH PROGRAM

FISCAL YEAR 2023-2024

Funding	A/P	Project Type	SIO No.	Research No.	FY Budget	Total Cost	Agency	Principal Investigator	Project Title	Start Date	End Date	End Date (Rev)	Page No.
---------	-----	--------------	---------	--------------	-----------	------------	--------	------------------------	---------------	------------	----------	----------------	----------

**Project Type: LTAP (State = \$150k / Federal = Remaining)**

LTAP: TT-Fed/TT-Reg	P	LTAP	DOTLT1000484	24-LTAP	\$692,938	\$692,938	LTRC	MaryLeah Coco	Local Technical Assistance Program (LTAP)	7/1/2023	6/30/2024		D-115
					<b>\$692,938</b>	<b>\$692,938</b>	<b>LTAP BUDGET TOTALS</b>						
					<b>\$692,938</b>	<b>\$692,938</b>	<b>LTAP: TT-FED/TT-REG PROPOSED BUDGET TOTALS</b>						

**Project Type: Technology Transfer and Training (100% Federal)**

STP: TT-Fed	A	TT	DOTLT1000278	19-TDSS	\$225,000	\$1,213,383	LTRC	Vijaya Gopu	Training and Development Support Services	7/1/2018	6/30/2021	6/30/2024	E-118
STP: TT-Fed	A	TT	30000241	10-4AD	\$10,000	\$100,000	LTRC	Tyson Rupnow	Technology Transfer & Research Implementation Support for Louisiana Universities	1/1/2010	12/31/2013	6/30/2025	E-120
STP: TT-Fed	A	TT	30000320	08-ITSQ	\$430,406	\$1,140,170	LTRC	MaryLeah Coco	Technology Transfer Program and Operations (LSU)	7/1/2015	6/30/2018	6/24/2024	E-121
					<b>\$665,406</b>	<b>\$2,453,553</b>	<b>TECHNOLOGY TRANSFER AND TRAINING BUDGET TOTALS</b>						
STP: TT-Fed	P	TT	DOTLT1000487	24-TTRF	\$100,000	\$100,000	LTRC	MaryLeah Coco	Technology Transfer Registration Fees	7/1/2023	6/30/2024		E-124
STP: TT-Fed	P	TT	DOTLT1000488	24-COOP	\$200,000	\$200,000	LTRC	MaryLeah Coco	LA DOTD CO-OP Program	7/1/2023	6/30/2024		E-125
STP: TT-Fed	P	TT	DOTLT1000486	24-2TT	\$147,600	\$147,600	LTRC	MaryLeah Coco	LTRC Student Worker Program	7/1/2023	6/30/2024		E-12600
STP: TT-Fed	P	TT	DOTLT1000485	24-1WDC	\$4,262,407	\$4,262,407	LTRC	MaryLeah Coco	Workforce Development Contracts	7/1/2023	6/30/2024		E-127
STP: TT-Fed	P	TT	DOTLT1000483	24-1WD	\$1,277,526	\$1,277,526	LTRC	MaryLeah Coco	Workforce Development	7/1/2023	6/30/2024		E-130
STP: TT-Fed	P	TT	DOTLT100490	24-1TT	\$37,500	\$37,500	LTRC	MaryLeah Coco	Technology Transfer and Assistance for Senior Project Courses	7/1/2023	6/30/2024		E-132
STP: TT-Fed	P	TT	DOTLT1000489	24-1TSQ	\$391,285	\$391,285	LTRC	MaryLeah Coco	Technology Transfer Program and Operations (DOTD)	7/1/2023	6/30/2021		E-133
STP: TT-Fed	P	TT	DOTLT1000492	24-1SWD	\$1,520,000	\$1,520,000	LTRC	MaryLeah Coco	DOTD Staff Support for Workforce Development	7/1/2023	6/30/2024		E-136
					<b>\$7,936,318</b>	<b>\$7,936,318</b>	<b>TECHNOLOGY TRANSFER AND TRAINING BUDGET TOTALS</b>						
					<b>\$8,601,724</b>	<b>\$10,389,871</b>	<b>STP: TT-FED ACTIVE BUDGET TOTALS</b>						

**LTRC ANNUAL RESEARCH PROGRAM**  
 Other DOTD Sections (%Federal - Varies / %State - Varies)

FISCAL YEAR 2023-2024

Funding	A/P	Project Type	SIO No.	Research No.	FY Budget	Total Cost	Agency	Principal Investigator	Project Title	Start Date	End Date	End Date (Rev)	Page No.
---------	-----	--------------	---------	--------------	-----------	------------	--------	------------------------	---------------	------------	----------	----------------	----------

**Project Type: Special Studies(%Federal - Varies / %State - Varies)**

Port Priority Program	A	SS	DOTLT1000419	22-2SS	\$54,788	\$141,650	ULL	Stephen Barnes	Economic Evaluation of Applications to the Port Construction and Development Priority Program	7/1/2021	6/30/2023	6/30/2024	G-138
					<b>\$54,788</b>	<b>\$141,650</b>	<b>SPECIAL STUDIES BUDGET TOTALS</b>						
					<b>\$54,788</b>	<b>\$141,650</b>	<b>OTHER DOTD SECTIONS ACTIVE BUDGET TOTALS</b>						

**Project Type: Technology Transfer and Training(%Federal - Varies / %State - Varies)**

Safety	P	TT	DOTLT1000493	24-LRSP	\$379,989	\$379,989	LTRC	Steve Strength	Local Road Safety Program	7/1/2023	6/30/2024		G-140
					<b>\$379,989</b>	<b>\$379,989</b>	<b>TECHNOLOGY TRANSFER AND TRAINING BUDGET TOTALS</b>						
					<b>\$379,989</b>	<b>\$379,989</b>	<b>OTHER DOTD SECTIONS PROPOSED BUDGET TOTALS</b>						

**FHWA**  
**Part B SPR Funded**  
**Research Program**

**ADMINISTRATIVE LINE ITEMS**  
**AND**  
**RESEARCH SUPPORT STUDIES**

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Program Management</b>			<b>Project Status:</b>	<b>Proposed</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>		<b>Budget Category:</b>		<b>FHWA</b>
SIO:	<b>DOTLT1000475</b>		Project Start Date:		7/1/2023
Research Project Number:	24-1PM		Completion Date	(original)	6/30/2024
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow				
<b>BUDGET STATUS</b>					
<b>Total Budget</b>			<b>Estimated 2023-2024 Budget</b>		
Total Cost	(original)	\$939,016	<b>Total</b>		<b>\$939,016</b>
	(revised)				
Est. Expended to Date			Salaries		\$939,016
<b>FY 2022 - 2023 Budget</b>			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		
<b>BUDGET JUSTIFICATIONS</b>					
Budget amounts do not require justifications.					
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>					
<p>Problem Statement: The purpose of this project is to provide for LTRC executive staff salaries.</p> <p>Objective(s): Employees charging to this line item include:  Samuel B. Cooper, Jr., Director  Sheri Hughes, Administrative Assistant  Tyson Rupnow, Associate Director, Research  Melissa Neyland, Administrative Assistant  Theresa Rankin, Administrative Specialist C  Kristina Kleinpeter, Accountant 3  Samuel Cooper, III, Engineer 7  Zhongjie (Doc) Zhang, Engineer 7  Julius Codjoe, Engineer 7</p> <p>Expected Benefits: Research Program Administration</p>					
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>					
<p>LTRC employees are members and serve on the following committees: NCHRP 10-104, 10-110, 14-48, ASCE, ACI, LES, TRB committees AFP30, AFS20, AFS70, AKB10AKB30, AKD20, AKG40, AKG80, AKM50, AMR20, AFK20, AFK40, AFK50, FHWA SPTWG, ASTM D04.20, D04.21, D04.22, D04.24, D04.25, D04.26, D04.44, D04.45, D04.46, and D04.99.</p>					
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>					
Research Program Administration					



**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Technology Transfer and Research Implementation	<b>Project Status:</b>	Proposed
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 5	<b>Budget Category:</b>	FHWA
SIO:	DOTLT1000478	Project Start Date:	7/1/2023
Research Project Number:	24-1TTRI	Completion Date (original)	6/30/2024
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Tyson Rupnow		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost	(original) \$426,039	<b>Total</b>	<b>\$426,039</b>
	(revised)		
Est. Expended to Date		Salaries	\$426,039
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds	(original)	Equipment (non-expendable)	
	(revised)	Travel	
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: The purpose of this project is to document the technology transfer and research implementation efforts of the research staff.</p> <p>Objective(s): The objective is to document the various technology transfer and implementation efforts of the research staff including presentation of findings at seminars, preparation of journal articles, webinar presentations, etc.</p> <p>Expected Benefits: Benefits of technology transfer and research implementation are unparalleled. By actively working to implement research findings, the Department gains better products, processes, etc. Couple that with the various technology transfer activities the research staff are involved in, the transportation community at large has a resource to draw upon for Professional Development Hours, etc.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<p>More than 50 papers were submitted for publication in various journals and/or presented at the TRB Annual Meeting. Additionally numerous other papers, journal articles, and final reports were prepared and presented to various audiences across a wide variety of formats. Additionally many LTRC employees participate in the specification writing and/or re-writing process as a result of completed LTRC research. Many LTRC employees also serve as members of EDC initiative teams and/or on the STIC.</p>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
Technology transfer and research implementation			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Technical Research Surveillance	<b>Project Status:</b>	Proposed
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 5	<b>Budget Category:</b>	FHWA
SIO:	DOTLT1000481	Project Start Date:	7/1/2023
Research Project Number:	24-1TRS	Completion Date (original)	6/30/2024
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Tyson Rupnow		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost	(original) \$331,996	<b>Total</b>	<b>\$331,996</b>
	(revised)		
Est. Expended to Date		Salaries	\$331,996
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds	(original)	Equipment (non-expendable)	
	(revised)	Travel	
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Technical research surveillance is for administration of LTRC research contracts by project engineers and participation on a wide variety of research panels.</p> <p>Objective(s): The objectives of this project are to track employee effort spent on administrating contract research projects by our project engineers, participation on LTRC project and report review committees, and participation on/in external research activities and panels such as TRB, ACRP, NCHRP, FHWA Expert Task Groups, etc.</p> <p>Expected Benefits: Benefits include accurate tracking of employee effort to provide a variety of services such as panel participation. Nearly all LTRC engineers participate on at least on TRB committee with many also serving on one or more NCHRP Project Panels as well as others such as ACI, ASTM, etc.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
Nearly all LTRC engineers participate on at least one TRB Committee with many also serving on one or more NCHRP Panels.			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
Technical research surveillance			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Technical Assistance	<b>Project Status:</b>	Proposed
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 5	<b>Budget Category:</b>	FHWA
SIO:	DOTLT1000477	Project Start Date:	7/1/2023
Research Project Number:	24-1TA	Completion Date (original)	6/30/2024
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Tyson Rupnow		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost	(original) \$399,557	<b>Total</b>	<b>\$399,557</b>
	(revised)		
Est. Expended to Date		Salaries	\$399,557
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds	(original)	Equipment (non-expendable)	
	(revised)	Travel	
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Technical assistance (TA) is any assistance provided by LTRC research staff to others in the transportation community and/or the travelling public.</p> <p>Objective(s): The objective of this project is to provide assistance on a variety of transportation topics to DOTD, local engineers, designers, materials suppliers, contractors, and the public.</p> <p>Expected Benefits: Technical assistance allows for faster implementation and adoption of technologies, solutions to ongoing problems, and overall general relationship building. In FY 22-23, LTRC engineers and staff responded to over XX different TA requests ranging from peer review of papers to local government issues, to specialized testing.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
LTRC engineers and staff responded to over 100 technical assistance requests from private engineers, Department personnel, industry, and the public encompassing a wide variety of topics.			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
Technical assistance.			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	DOTD Staff Support for Research	<b>Project Status:</b>	Proposed
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 5	<b>Budget Category:</b>	FHWA
SIO:	DOTLT1000482	Project Start Date:	7/1/2023
Research Project Number:	24-1SSR	Completion Date (original)	6/30/2024
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Tyson Rupnow		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost	(original) \$100,000	<b>Total</b>	<b>\$100,000</b>
	(revised)		
Est. Expended to Date		Salaries	\$100,000
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds	(original)	Equipment (non-expendable)	
	(revised)	Travel	
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: This project is to provide a mechanism to show and document LTRC staff support for research activities outside of LTRC, specifically UTC support.</p> <p>Objective(s): The objectives of this project are to document support for outside research activities that require matching monies where LTRC/DOTD use salaried employees time to meet that match.</p> <p>Expected Benefits: Benefits of this project include meeting one of the legislative mandates for LTRC of Enhancing Higher Education and promoting interagency relationships between the Department/LTRC and our Louisiana Universities.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<p>In the last fiscal year, LTRC supported over 5 UTC projects for the TranSET Regional UTC held by LSU. Support was given in terms of both in-kind and technician support in both the asphalt and concrete research laboratories. Support was for specialized testing equipment use that LSU does not have the capabilities. Additionally one project is utilizing the ATLaS at the LTRC pavement research center.</p>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
Staff support for outside research activities.			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	New Product Evaluation			<b>Project Status:</b>	Proposed
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 5		<b>Budget Category:</b>		FHWA
SIO:	DOTLT1000480		Project Start Date:		7/1/2023
Research Project Number:	24-1NPE		Completion Date	(original)	6/30/2024
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow				
<b>BUDGET STATUS</b>					
<b>Total Budget</b>			<b>Estimated 2023-2024 Budget</b>		
Total Cost	(original)	\$24,754	<b>Total</b>		<b>\$24,754</b>
	(revised)				
Est. Expended to Date			Salaries		\$24,754
<b>FY 2022 - 2023 Budget</b>			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		
<b>BUDGET JUSTIFICATIONS</b>					
Budget amounts do not require justifications.					
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>					
<p>Problem Statement: The purpose of this project is to evaluate new, or specialty, products or equipment for potential DOTD use.</p> <p>Objective(s): The objective of this project is to identify and test potential/new special products for use in/on DOTD construction projects.</p> <p>Expected Benefits: Adoption of new innovative equipment and products can lead to cost and/or time savings to the Department. Additionally other benefits such as longer service life, etc. can be realized.</p>					
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>					
<p>Last fiscal year LTRC evaluated 12 different new and innovative products for use. LTRC Employees regularly serve on the Specialty Products Evaluation Committee providing guidance, insight, and specialized testing of new and innovative products for use on DOTD projects.</p>					
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>					
Evaluate new products and equipment for potential DOTD use.					

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Research Laboratory and Field Test Support	<b>Project Status:</b>	Proposed
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 5	<b>Budget Category:</b>	FHWA
SIO:	DOTLT1000476	Project Start Date:	7/1/2023
Research Project Number:	24-1LFT	Completion Date (original)	6/30/2024
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Tyson Rupnow		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$11,501	<b>Total</b>	<b>\$11,501</b>
(revised)			
Est. Expended to Date		Salaries	\$11,501
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)		Equipment (non-expendable)	
(revised)		Travel	
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Research laboratory and field test support is used to track specialized testing in field conditions and specialized testing of laboratory samples for the Department, usually the Districts.</p> <p>Objective(s): Conduct specialized field and laboratory testing for the Districts.</p> <p>Expected Benefits: Problem solving, generally these projects are forensic in nature to determine modes and/or causes of failure along with potential remediation strategies.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
Friction testing, profile testing, FWD testing, DCP testing, and coring were completed on a variety of projects across numerous Districts. Friction, profile, and FWD testing was completed in all Districts while coring for samples (HMA and PCC) were completed in District 03, 61, and 58. DCP testing was completed in District 03, 61, and 62.			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
Specialized laboratory and field testing.			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Equipment Management	<b>Project Status:</b>	Proposed
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 6	<b>Budget Category:</b>	FHWA
SIO:	<b>DOTLT1000479</b>	Project Start Date:	7/1/2023
Research Project Number:	24-1EQM	Completion Date (original)	6/30/2024
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Tyson Rupnow		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost	(original) \$323,115	<b>Total</b>	<b>\$323,115</b>
	(revised)		
Est. Expended to Date		Salaries	\$253,115
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds	(original)	Equipment (non-expendable)	\$70,000
	(revised)	Travel	
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
<p>Equipment: This covers non-expendable equipment needed to cover routine maintenance of equipment including the following: purchase of replacement parts, installation of said parts, etc. for the asphalt, concrete, geotechnical, pavements, and ITS research laboratories. Replacement parts do not exceed the \$5,000 threshold for FHWA reporting guidelines.</p>			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: The purpose of this project is to track the management of the many laboratories/facilities that LTRC oversees.</p> <p>Objective(s): The objectives include the following: routine equipment repair/maintenance, small/hand tool replacement, and accreditation activities.</p> <p>Expected Benefits: Properly functioning equipment and accredited facilities are expected when this project is underway.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<p>Maintained CCRL and AMRL accreditation of the laboratories  diagnosed and attempted to repair the three-wheel polisher  Repaired the ATLaS machine at ALF  Calibrations for multiple temperature and stress/strain/strength measuring devices  Routine maintenance on laboratory and field equipment as necessary  Diagnosed issues with leaking skid rig truck  Fixed skid-steer  Fixed trailers</p>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
Equipment management.			

**FHWA**  
**Part B SPR Funded**  
**Research Program**

**CONTINUING RESEARCH**



**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Evaluation of Saturates/Aromatics/Resins/Asphaltenes (SARA) Fractionation of asphalt binders in Louisiana</b>			<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>		<b>Budget Category:</b>		<b>FHWA</b>
SIO:	<b>DOTLT1000423</b>		Project Start Date:		6/1/2022
Research Project Number:	22-1B		Completion Date	(original)	5/31/2024
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Saman Salari				
<b>BUDGET STATUS</b>					
<b>Total Budget</b>			<b>Estimated 2023-2024 Budget</b>		
Total Cost	(original)	\$223,135	<b>Total</b>		<b>\$120,000</b>
	(revised)				
Est. Expended to Date		\$11,819	Salaries		\$120,000
<b>FY 2022 - 2023 Budget</b>			Consumable Supplies & Materials		
FY Funds	(original)	\$116,520	Equipment	(non-expendable)	
	(revised)	\$20,000	Travel		
Est. FY Expenditure		\$15,800	Other		
<b>BUDGET JUSTIFICATIONS</b>					
Budget amounts do not require justifications.					
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>					
<p>Problem Statement: Due to everyday changes to chemical compositions of asphalt binders, it is essential to characterize the asphalt binder chemical fractions through fast and reliable methods such as SARA method.</p> <p>Objective(s): The main purpose is to investigate the capabilities of SARA method comparing to the other chemical characterization methods such as GPC.</p> <p>Expected Benefits: New SARA testing devices has the capability of testing in as few as 20 minutes. This capability in addition with lower testing materials (specifically solvents) can advance the ability of agencies and industry groups to chemically characterize the asphalt binder in fast and reliable method.</p>					
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>					
<p>Work was completed on the following tasks:</p> <p>Task 1: Literature Review</p> <p>Task 2: Collection of asphalt binders – asphalt binders have been collected from suppliers across Louisiana</p> <p>Task 3: SARA testing was completed on collected binders</p>					
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>					
<p>Task 1: Literature review completion</p> <p>Task 2: Obtain additional/remaining asphalt binders for testing</p> <p>Task 3: Complete SARA testing on all remaining samples</p> <p>Task 4: Results will be analyzed</p> <p>Task 5: Complete final report</p>					

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Assessment of Long-Term Performance of Louisiana Asphalt Pavements</b>	<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:	<b>DOTLT1000391</b>	Project Start Date:	11/1/2020
Research Project Number:	21-2B	Completion Date (original)	10/31/2023
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Louay Mohammad		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$326,936	<b>Total</b>	<b>\$117,191</b>
(revised)			
Est. Expended to Date	\$150,000	Salaries	\$85,691
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)	\$92,391	Equipment (non-expendable)	
(revised)	\$65,000	Travel	\$1,500
Est. FY Expenditure	\$65,000	Other	\$30,000
<b>BUDGET JUSTIFICATIONS</b>			
Other: The \$30,000 is for DOTD staff salary working on this project			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Studies completed at LTRC identified effects of various factors (recycled and waste materials, and construction technologies and practices, etc.) on the performance of asphalt pavements. Thus, tracking and assessing the long-term performance of those pavements is essential to validate and/or revise specification recommendation in mixture design and construction practices.</p> <p>Objective(s): The objective of this study is to evaluate the long-term performance of field projects of LTRC completed studies by comparing field rutting, cracking, patching, and smoothness data collected in the Louisiana pavement management system (LA PMS) to the performance predictions made from the laboratory measured performance parameters.</p> <p>Expected Benefits: The long-term field performance data collected from this study will provide a link between laboratory mechanical properties and field performance of new technologies used. It is anticipated that the updated lab and field performance relationship will result in refined recommendations for mixture design and construction practices in Louisiana.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<p>Task 1: Completed literature review;</p> <p>Task 2: Continued identification of field projects as per project factorial.</p> <p>Task 3: Continued familiarization with PMS content and acquisition of distress data,</p> <p>Task 4: Continued analyzes of PMS distress data;</p> <p>Task 5: Continued conduct field survey;</p>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
<p>Task 2: Continue identification of field projects as per project factorial.</p> <p>Task 3: Continue acquisition of distress data,</p> <p>Task 4: Continue analyzes of PMS distress data;</p> <p>Task 5: Continued conduct field survey;</p> <p>Task 6: Continue performing laboratory testing and analyses;</p> <p>Task 7: Ascertain the effect of asphalt mixture component materials, construction technologies, and practices on performance,</p> <p>Task 8: Prepare Draft Final Report</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Development of a Cyclic Semi-Circular Bend Test to Evaluate Asphalt Mixture Cracking Resistance at Intermediate Temperature.</b>			<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>		<b>Budget Category:</b>		<b>FHWA</b>
SIO:	<b>DOTLT1000390</b>		Project Start Date:		1/1/2021
Research Project Number:	21-1B		Completion Date	(original)	3/31/2023
Research Agency:	LTRC		Completion Date	(revised)	6/30/2024
Principal Investigator:	Louay Mohammad				
<b>BUDGET STATUS</b>					
<b>Total Budget</b>			<b>Estimated 2023-2024 Budget</b>		
Total Cost	(original)	\$299,944	<b>Total</b>		<b>\$125,321</b>
	(revised)				
Est. Expended to Date		\$98,000	Salaries		\$123,321
<b>FY 2022 - 2023 Budget</b>			Consumable Supplies & Materials		
FY Funds	(original)	\$83,000	Equipment	(non-expendable)	
	(revised)	\$70,000	Travel		\$2,000
Est. FY Expenditure		\$50,000	Other		
<b>BUDGET JUSTIFICATIONS</b>					
Budget amounts do not require justifications.					
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>					
<p>Problem Statement: DOTD asphalt specifications for roads and bridges require the use of Semi-Circular Bending test as a part of asphalt mixture design. SCB is conducted in a monotonic, displacement-controlled mode at intermediate temperature to assess asphalt mixture fatigue crack resistance. However, fatigue damage is essentially deterioration in material integrity as a result of repeated loading. Thus, monotonic loading may not realistically simulate the effects of traffic loading compared to cyclic loading.</p> <p>Objective(s): The objectives of this study are to (1) acquire and set up a digital image correlation (DIC) system that is optimized for deformation and crack propagation measurements in asphalt mixture testing; and (2) develop a standard cyclic SCB test method coupled with the DIC technique for identification of fatigue crack propagation properties of asphalt concrete.</p> <p>Expected Benefits: Findings from this research will improve reliability and fatigue prediction equation for fatigue cracking of asphalt mixtures in the Mechanistic-Empirical Pavement Design Guide (Pavement ME). Further, the developed cyclic SCB test procedure and analysis scheme will be a reliable and rigorous fatigue performance test in the phase of routine asphalt mixture design.</p>					
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>					
<p>Task 1 – Completed the conduct literature review;</p> <p>Task 2 – Continued identification and collection of asphalt materials as per project experiment factorial.</p> <p>Task 3 – Completed set-up and familiarization processes of the DIC system. Training sessions with vendor were conducted</p> <p>Task 4 – Continued Conduct of laboratory experiment as per project experiment factorial.</p> <p>Task 5 - Continued development of analysis procedure from data of Task 4</p>					
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>					
<p>Task 4 – Continue Conduct of laboratory experiment as per project experiment factorial.</p> <p>Task 5 - Continue development of analysis procedure from data of Task 3</p> <p>Task 6: Prepare the project final report</p>					

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Development of a 4.75mm Asphalt Mixture Design	<b>Project Status:</b>	Ongoing
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 5	<b>Budget Category:</b>	FHWA
SIO:	DOTLT1000195	Project Start Date:	6/14/2017
Research Project Number:	17-4B	Completion Date (original)	6/13/2019
Research Agency:	LTRC	Completion Date (revised)	4/30/2023
Principal Investigator:	Saman Salari		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$140,674	<b>Total</b>	<b>\$16,700</b>
(revised)	\$181,540		
Est. Expended to Date	\$159,552	Salaries	\$16,700
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)		Equipment (non-expendable)	
(revised)		Travel	
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: A mix design criteria for 4.75 mm Nominal maximum aggregate size mixtures is developed. The mechanical tests include the Loaded Wheel Track test, Semi-Circular Bend test, Dynamic Modulus and friction test. Local aggregates and asphalt cements evaluated to determine the most economical mix. The primary aggregate types that will be examined are gravel and limestone because of their prevalence in Louisiana. Asphalt binder grades include, PG 64-22, PG 76-22, and PG 82-22crn (Crumb rubber modified).</p> <p>Objective(s): Task 1: literature review completed;          -Task 2: Mixture with Gravel and limestone has been tested for mechanical tests completed;          -Task 3: Report started; and          -Task 4: Majority of the Results have been analyzed.          -Task 5: Economical analysis was performed</p> <p>Expected Benefits: Recommendations from this project will provide state agencies and contractors with better understanding of low aggregate size mixtures. This research will provide application for unusable low aggregates in the stockpiles.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<ul style="list-style-type: none"> <li>-Task 1: Literature review completed.</li> <li>-Task 2: Experimental program completed.</li> <li>-Task 3: Collected material and conducted mixture design.</li> <li>-Task 4: Lab testing - ongoing.</li> <li>-Task 5: Data analysis - ongoing.</li> <li>-Task 6: Preliminary economic analysis performed.</li> <li>-Task 7: Final report in preliminary draft stage.</li> </ul>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
-Complete tasks 4 - 7.			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Evaluation of Non-Destructive Test Pilot Projects	<b>Project Status:</b>	Ongoing
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 6	<b>Budget Category:</b>	FHWA
SIO:	DOTLT1000461	Project Start Date:	8/22/2022
Research Project Number:	23-2B	Completion Date (original)	8/21/2024
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Saman Salari		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost	(original) \$155,410	<b>Total</b>	<b>\$91,400</b>
	(revised)		
Est. Expended to Date	\$45,000	Salaries	\$91,400
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds	(original) \$88,998	Equipment (non-expendable)	
	(revised) \$50,000	Travel	
Est. FY Expenditure	\$45,000	Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Due to demand for a safe, accurate, non-destructive density device, LTRC conducted field tests on core samples, non-nuclear and nuclear gauge methods to determine their effectiveness for quality assurance of HMA pavement. Based on the research results, the authors recommended the use of the nondestructive testing for both QC and QA testing. A pilot project is now underway to review non-destructive testing and LTRC would like to conduct research to evaluate the findings of the pilot project.</p> <p>Objective(s): The objective of this research is to evaluate the non-destructive testing (NDT) pilot projects and specifications. Technicians from LTRC will use their own non-nuclear density gauges to take readings during the NDT Device Off-set Determination - Validation Day Procedures described in section 502.11.2 of the NDT pilot specification. The readings taken by the technicians can then be compared to those taken by DOTD personnel, contractor reading and the actual core densities.</p> <p>Expected Benefits: This research will analyze the data and help determine any possible problems with the non-destructive testing specification. Once these problems are addressed the specification can then be fully implemented.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<p>Task 1: Recording of non-destructive test readings from pilot projects have started</p> <p>Task 2: Data analysis will begin</p>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
<p>Task 1: Recording of non-destructive test readings from pilot projects will continue</p> <p>Task 2: Data analysis will be conducted</p> <p>Task 3: Draft report will be prepared</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Effect of Mineral Fillers on the Moisture Resistance and Performance of HMA</b>			<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 6</b>		<b>Budget Category:</b>		<b>FHWA</b>
SIO:	<b>DOTLT1000460</b>		Project Start Date:		6/1/2022
Research Project Number:	23-1B		Completion Date	(original)	5/31/2024
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Mostafa Elseifi				
<b>BUDGET STATUS</b>					
<b>Total Budget</b>			<b>Estimated 2023-2024 Budget</b>		
Total Cost	(original)	\$170,491	<b>Total</b>		<b>\$65,000</b>
	(revised)				
Est. Expended to Date		\$15,000	Salaries		\$55,000
<b>FY 2022 - 2023 Budget</b>					
FY Funds	(original)	\$66,000	Consumable Supplies & Materials		\$5,000
	(revised)	\$45,000	Equipment	(non-expendable)	\$5,000
Est. FY Expenditure		\$15,000	Travel		
			Other		
<b>BUDGET JUSTIFICATIONS</b>					
Supplies: Laboratory supplies necessary for conducting the experimental program Equipment: Ridgen voids apparatus will be purchased to characterize the filler					
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>					
<p>Problem Statement: As part of the aggregate structure, a mineral filler is defined as the fraction of the aggregate blend with particle size in the range of 0 to 200 µm. Previous studies have shown that filler properties significantly affect the performance of asphalt mixtures against major distresses including fatigue cracking and rutting. The current Superpave mix design adopted in Louisiana only includes general limits on the dust to binder ratio with limited gradation requirements on the fillers.</p> <p>Objective(s): The main objectives of the proposed study are two folds: (1) to evaluate the effects of various types of inert and active fillers on the moisture resistance and laboratory performance of asphalt mixtures and (2) to propose change to the specifications to optimize the use of mineral fillers in hot-mix asphalt (HMA).</p> <p>Expected Benefits: This study will conduct a comprehensive laboratory evaluation of conventional and innovative mineral fillers including manufactured fillers obtained from industrial wastes and will identify the most promising fillers for enhanced mix durability and life-time extension. In addition, it will develop possible modifications to the current specifications for the acceptance of mineral fillers.</p>					
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>					
The research team has successfully conducted the literature review. In addition, we are currently working on the experimental program. A Stone-Matrix Asphalt (SMA) mix has been collected from the contractor and is currently used in the experimental program.					
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>					
The research team expects to actively working on the experimental program. Results will be shared with the technical manager. We will also work on publishing our results in upcoming conferences.					

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>A New Generation of Porous Asphalt Pavement - OGFC Support Study</b>			<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 6</b>		<b>Budget Category:</b>		<b>FHWA</b>
SIO:	<b>DOTLT1000386</b>		Project Start Date:		9/1/2020
Research Project Number:	21-6B		Completion Date	(original)	11/30/2022
Research Agency:	LSU		Completion Date	(revised)	8/31/2023
Principal Investigator:	Mostafa Elseifi				
<b>BUDGET STATUS</b>					
<b>Total Budget</b>			<b>Estimated 2023-2024 Budget</b>		
Total Cost	(original)	\$119,610	<b>Total</b>		
	(revised)	\$137,110			
Est. Expended to Date		\$136,900	Salaries		
<b>FY 2022 - 2023 Budget</b>			Consumable Supplies & Materials		
FY Funds	(original)	\$25,000	Equipment	(non-expendable)	
	(revised)	\$25,000	Travel		
Est. FY Expenditure		\$25,000	Other		
<b>BUDGET JUSTIFICATIONS</b>					
Budget amounts do not require justifications.					
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>					
<p>Problem Statement: While OGFC offers numerous advantages to the users and the public, challenges reported by contractors and districts in Louisiana have seriously limited its use. The most critical shortcomings of OGFC include durability problems (raveling and stripping due to aging), and clogging of voids by dirt, which result in shorter service life and higher costs. It is, therefore, desirable to develop the OGFC concept into an even better solution for future road construction and management.</p> <p>Objective(s): The objective of this study is to develop a new generation of OGFC mixture that would provide superior durability performance and reduced surface water accumulation. To achieve this objective, current practices including aggregate type and gradation, additives, and fiber type and content, will be reviewed and comprehensively evaluated in the laboratory.</p> <p>Expected Benefits: This research will develop an implementation-ready new generation of OGFC that provides enhanced durability and life-time extension. In addition, it will develop a new generation of OGFC that ensures adequate infrastructure performance under all weather conditions. It will also improve pavement performance in the event of flooding by reducing surface water accumulation while facilitating drainage to the sides of the road.</p>					
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>					
The research team has completed the bulk of the experimental program. Research findings and results have successfully addressed the objectives of this study. Findings of the study are significant. These findings were successfully presented and published.					
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>					
The research team is currently finalizing the results and is preparing the final report. This study will be completed at the beginning of the 2023-2024 fiscal year.					

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Improvement of Open-Graded Friction Course (OGFC) Performance and Durability through Materials, Design, and Maintenance</b>	<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 6</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:	<b>DOTLT1000385</b>	Project Start Date:	9/1/2020
Research Project Number:	21-5B	Completion Date (original)	11/30/2022
Research Agency:	LTRC	Completion Date (revised)	11/30/2023
Principal Investigator:	Saman Salari		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$79,156	<b>Total</b>	
(revised)			
Est. Expended to Date	\$85,811	Salaries	
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)	\$9,700	Equipment (non-expendable)	
(revised)	\$15,000	Travel	
Est. FY Expenditure	\$16,800	Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Design of OGFC with extended life span would require innovative asphalt materials and a performance engineered mixture design procedure. DOTD specifications provide requirements on the physical properties of asphalt binders and aggregate for OGFC. In order to ensure OGFC durability, resistance to fatigue cracking and raveling should also be evaluated together with advanced modifiers and maintenance methods.</p> <p>Objective(s): The objective of this research is to provide an implementable guideline on the design, performance, and maintenance of OGFC with extended service life to improve driving safety and cost-effectiveness. This will be accomplished through several different tasks. It will evaluate maintenance methods, alternative materials, and a new generation of permeable pavements with improved mechanical characteristics, and enhanced pavement performance by modifying the mixture with polymers and fibers.</p> <p>Expected Benefits: In order to improve OGFC durability, research should take place on alternative materials and a performance engineered mixture design procedure. Guidelines or specifications could be recommended to extend the service life of OGFC. With the completion of this research, LTRC will provide guidelines or specifications on: maintenance of existing OGFC; the use of epoxy modified asphalt in OGFC mixtures; and performance engineered mixture design procedures to be used for OGFC pavements in Louisiana.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<p>Task 4-The support study to evaluate alternative materials progressed.</p> <p>Task 5-The support study to evaluate a new generation of permeable pavements progressed.</p> <p>Task 7-A draft project report completed. Waiting on support studies to finalize and publish.</p>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
<p>Task 4-The support study to evaluate alternative materials to be completed.</p> <p>Task 5-The support study to evaluate a new generation of permeable pavements to be completed.</p> <p>Task 7-A draft project report completed. Waiting on support studies to finalize and publish.</p>			



**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Development of a Standard Practice for the Design of Durable Open-Graded Friction Course (OGFC) Mixtures with Epoxy Asphalt-Support Study</b>			<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 6</b>		<b>Budget Category:</b>		<b>FHWA</b>
SIO:	<b>DOTLT1000384</b>		Project Start Date:		9/1/2020
Research Project Number:	21-4B		Completion Date	(original)	11/30/2022
Research Agency:	LTRC		Completion Date	(revised)	12/30/2023
Principal Investigator:	Louay Mohammad				
<b>BUDGET STATUS</b>					
<b>Total Budget</b>			<b>Estimated 2023-2024 Budget</b>		
Total Cost	(original)	\$203,393	<b>Total</b>		<b>\$80,000</b>
	(revised)	\$279,463			
Est. Expended to Date		\$148,000	Salaries		\$78,500
<b>FY 2022 - 2023 Budget</b>			Consumable Supplies & Materials		
FY Funds	(original)	\$50,500	Equipment	(non-expendable)	
	(revised)		Travel		\$1,500
Est. FY Expenditure		\$50,500	Other		
<b>BUDGET JUSTIFICATIONS</b>					
Budget amounts do not require justifications.					
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>					
<p>Problem Statement: Open-graded friction course (OGFC) mixture is placed on asphalt pavement surfaces to increase safety with environmental benefits (reduce hydroplaning, splash and spray, noise, and increase friction resistance). However, high porosity raises concerns on the durability of OGFC as it reduces structural integrity of pavement. Thus, durability, resistance to fatigue cracking, and raveling of OGFC mixtures containing epoxy modified binders should be evaluated to ensure extended performance life.</p> <p>Objective(s): The objective of this research is to develop a mixture design practice including comprehensive performance evaluation, based on the DOTD specifications, for epoxy modified open-graded asphalt mixture (OGFC) with the target service life of 15-20 years.</p> <p>Expected Benefits: It is anticipated that the results of this study will provide recommendations on the design of durable OGFC using epoxy modified asphalt binders with the best cost effectiveness. Further, results will promote the use of sustainable technologies in Louisiana's flexible pavement construction.</p>					
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>					
<p>Task 1: Completed literature review  Task 2: Continued materials selection and acquisition (asphalt binders, epoxy asphalt, aggregates) as per proposal test factorial  Task 3: Continued determination of candidate optimum epoxy asphalt dilution rates based on performance as per proposal test factorial</p>					
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>					
<p>Task 2: Continue material selection and mixture design as per proposal test factorial  Task 3: Continue determination of candidate optimum epoxy asphalt dilution rates based on performance as per proposal test factorial  Task 4: Determine candidate optimum epoxy asphalt dilution rates based on life-cycle cost analysis  Task 5: Recyclability Evaluation of Epoxy Modified OGFC Mixtures as RAP  Task 6: Prepare the project final report</p>					

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Use of an Innovative Recycling Agent for Improving the Sustainability and Durability of Asphalt Pavements</b>	<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 6</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:	<b>DOTLT1000392</b>	Project Start Date:	2/1/2021
Research Project Number:	21-3B	Completion Date (original)	4/30/2023
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Louay Mohammad		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$249,609	<b>Total</b>	<b>\$80,000</b>
(revised)			
Est. Expended to Date	\$137,200	Salaries	\$78,500
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)	\$95,673	Equipment (non-expendable)	
(revised)	\$75,000	Travel	\$1,500
Est. FY Expenditure	\$61,300	Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: There is an increasing need for improving the sustainability of asphalt pavement without compromising performance given the limited natural resources and budget allocation. One such approach is the use of recycled materials, such as reclaimed asphalt pavement (RAP) and recycled asphalt shingles (RAS), to substitute for part of the virgin materials. Use of an innovative rejuvenator has emerged as potential to modify the aged asphalt binders from RAP and RAS.</p> <p>Objective(s): The objectives of this research are (1) Evaluate effectiveness of Lewis acids in increasing RAP percentage in asphalt mixtures; (2) Determine optimum dosage for Lewis acids catalyst; (3) Determine chemical and rheological performance of blends of RAP binders and virgin asphalts; and (4) Determine the mechanistic performance of asphalt mixtures containing high RAP contents and conventional mixtures.</p> <p>Expected Benefits: Finding of this research will substantially promote the use of increased RAP in asphalt mixtures without compromising the performance against traffic and environmental loading. This research will benefit Louisiana as the state is planning to embrace sustainability and green technology for the benefits of low cost, clean environment, and energy. Further, results will promote the use of sustainable technologies in Louisiana's flexible pavement construction.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<p>Task 1: Completed literature review</p> <p>Task 2: Continued material selection and collection as per experimental factorial</p> <p>Task 3: Continued determination of the optimum dosage for each recycling agent.</p> <p>Task 4: Continued validation of the optimum dosage using blends of RAP and virgin asphalts for each recycling agent as per experiential factorial.</p> <p>Task 5: Validate the optimum dosage using asphalt mixture performance tests</p>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
<p>Task 2: Continue material selection and collection as per experimental factorial</p> <p>Task 3: Continue determination of the optimum dosage for each recycling agent as per experimental factorial.</p> <p>Task 4: Continue validation of the optimum dosage using blends of RAP and virgin asphalts for each recycling agent as per experiential factorial.</p> <p>Task 5: Validate the optimum dosage using asphalt mixture performance tests</p> <p>Task 6: Prepare the project final report</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Development of a Moisture Sensitivity Test for Asphalt Mixtures	<b>Project Status:</b>	Ongoing
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 6	<b>Budget Category:</b>	FHWA
SIO:	DOTLT1000275	Project Start Date:	5/1/2019
Research Project Number:	19-2B	Completion Date (original)	4/30/2021
Research Agency:	LTRC	Completion Date (revised)	12/30/2023
Principal Investigator:	Louay Mohammad		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$257,903	<b>Total</b>	<b>\$65,000</b>
(revised)	\$478,165		
Est. Expended to Date	\$330,892	Salaries	\$63,500
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)	\$53,400	Equipment (non-expendable)	
(revised)	\$75,000	Travel	\$1,500
Est. FY Expenditure	\$45,000	Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Moisture induced damage of asphalt mixtures is a significant distress affecting long-term performance of asphalt pavements and of traveling public. It has been studied extensively by numerous researchers, and standard test methods have been used to evaluate the moisture sensitivity of asphalt mixtures. However, studies indicated those test methods are not a reliable indicator of moisture sensitivity of asphalt mixtures.</p> <p>Objective(s): The objective of this study is to establish a reliable moisture-susceptibility test procedure to evaluate consistently the resistance of asphalt mixtures against moisture-induced damage</p> <p>Expected Benefits: Findings from this research will result in an improved laboratory test method for evaluation of asphalt mixture moisture damage. The best conditioning/ test combination will be recommended for consideration of implementation into the Louisiana Standard Specifications for Roads and Bridges. The use of the recommended moisture damage test method will improve the durability and long-term performance of Louisiana's asphalt pavements.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<p>Task 2: Continued material selection and mixture design as per project experimental factorial</p> <p>Task 3: Continued preparation of laboratory test specimens as per project experimental factorial</p> <p>Task 4: Continued conduct of Laboratory tests as per project experimental factorial</p> <p>Task 5: Continued conduct of data analysis. Preliminary results were published in refereed journals</p> <p>Task 6: Evaluated candidate test procedures. Study will be extended to validate the proposed test method on mixtures containing various types of antistripping additives</p>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
<p>Task 3: Continue to prepare asphalt mixtures samples as proposed in the experimental factorial;</p> <p>Task 4: Continue to conduct experiments on laboratory compacted mixtures; and</p> <p>Task 5: Perform data Analysis</p> <p>Continue to compile laboratory test data for subsequent data analysis.</p> <p>Task 6: Evaluate candidate test procedures</p> <p>Task 7: Prepare Draft Final Report</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Sustainable and Resilient Pavement Materials and Technologies Center (SRPC)</b>	<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 6</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:	<b>30000112</b>	Project Start Date:	7/1/2009
Research Project Number:	10-1EMCRF	Completion Date (original)	6/30/2015
Research Agency:	LTRC	Completion Date (revised)	6/30/2024
Principal Investigator:	Louay Mohammad		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$345,000	<b>Total</b>	<b>\$83,957</b>
(revised)	\$20,501,630		
Est. Expended to Date	\$20,501,630	Salaries	\$74,157
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)	\$100,000	Equipment (non-expendable)	
(revised)	\$69,000	Travel	\$4,900
Est. FY Expenditure	\$69,000	Other	\$4,900
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: The Engineering Materials Characterization and Research Facility (EMCRF) provides a multi-disciplinary expertise and state-of-the-art research capabilities to assess the fundamental engineering properties of materials used in the transportation industry. EMCRF also explores innovative techniques for infrastructure preservation and rehabilitation with sustainable, resilient, and recyclable methods to have significant impact on longevity of our society.</p> <p>Objective(s): The objectives of the facility are to maintain and advance state-of-the-art engineering pavement materials characterization and modeling research program at LTRC through identification and conduct of implementable research projects; initiate and/or participate in major research initiatives seeking external funding (UTC, etc.); Disseminate research findings; and develop and provide training for DOTD employees for implementing technology developed</p> <p>Expected Benefits: Results of research conductus at EMCRF provides recommendations for implementations into DOTD's Specifications for Roads and Bridges to improve and solve materials, design, production, and construction specifications. EMCRF provides LTRC with an excellent position to pursue its quest for national and international excellence in research capability of all aspects of pavement materials.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<p>Participated in the Louisiana DOTD Parts five and ten Specification Committee; Developed and submitted proposals to NCHRP and FHWA;          Developed and presented Long Term Field Performance of WMA in Louisiana Webinar Participated in several technical assistance projects          Shear testing protocol to assess effectiveness of tack coat materials used in I-10 / Loyola Interchange Improvement Project; and Revisions considered in Section 504 "Asphalt Tack Coat" of the Louisiana Standard Specifications for Roads and Bridges.</p>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
<p>Continue participation in the Louisiana DOTD Asphaltic Concrete Specification Committee;          Continue participation in technical assistance projects;          Develop and submit proposals for external funding; and          Conduct workshops and seminars.</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Influence of Aggregate Gradation to Reduce Concrete's Permeability</b>	<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 6</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:	<b>DOTLT1000424</b>	Project Start Date:	1/17/2022
Research Project Number:	22-2C	Completion Date (original)	1/16/2024
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Jose Milla		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$205,097	<b>Total</b>	<b>\$76,500</b>
(revised)			
Est. Expended to Date	\$70,000	Salaries	\$76,500
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)	\$102,549	Equipment (non-expendable)	
(revised)		Travel	
Est. FY Expenditure	\$56,000	Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Aggregate gradation can often be overlooked in concrete mixture design to improve durability. In practice, most concrete producers tend to use the grading limits specified in ASTM C33, which happen to be too broad to guarantee optimum packing density. As such, there is a need to optimize aggregate gradations to increase durability. By maximizing the aggregate's packing density, concrete's cement demand can be reduced, resulting in less permeable concrete that can also minimize shrinkage</p> <p>Objective(s): The objectives of this study are to: (1) measure the influence of aggregate gradation on concrete's permeability, and (2) optimize concrete mixture designs to meet strength, permeability, and workability criteria for construction</p> <p>Expected Benefits: This study aims to optimize aggregate gradations to deliver high strength and durability without compromising workability. This research will provide guidance on achieving high quality concrete mixtures that achieve the best results with the lowest cement paste possible</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<p>Task 2: Completed the historical review of past approved mix designs within a 3-year window</p> <p>Task 3: Selected the aggregate gradations that will be used for concrete testing</p> <p>Task 4: Began comparative testing of concrete specimens</p>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
<p>Task 4: Complete comparative testing</p> <p>Task 5: Conduct analysis</p> <p>Task 6: Publish Final Report</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Influence of Internal Curing on Concrete's Permeability in Simulated Field Conditions</b>	<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 6</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:	<b>DOTLT1000422</b>	Project Start Date:	1/17/2022
Research Project Number:	22-1C	Completion Date (original)	1/16/2024
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Jose Milla		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$205,097	<b>Total</b>	<b>\$64,000</b>
(revised)			
Est. Expended to Date	\$75,000	Salaries	\$64,000
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)	\$102,549	Equipment (non-expendable)	
(revised)		Travel	
Est. FY Expenditure	\$60,000	Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Most research conducted on surface resistivity requires strict sample conditioning, where specimens must remain in a 100% relative humidity (RH) condition from the moment of mold removal to testing time. This regime makes it difficult to observe the benefits of internal curing in situ, and as such, there is a need to quantify concrete's durability properties in more realistic conditions.</p> <p>Objective(s): The objectives of this study are to: (1) Assess the influence of internal curing on concrete's transport properties in more realistic curing conditions, and (2) validate the results from surface resistivity with bulk diffusion testing.</p> <p>Expected Benefits: This research will provide a better characterization of ICC in more realistic curing conditions. In addition, the inclusion of a bulk diffusion test will be beneficial to verify the results obtained from surface resistivity, thereby providing additional characterization of concrete's transport properties.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<p>Task 2: Sample preparation completed            Task 3: Continued comparative testing of fresh concrete properties, compressive strength, and preliminary surface resistivity and bulk diffusion readings</p>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
<p>Task 3: Complete comparative testing            Task 4: analyze data            Task 5: Publish Final Report</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Using the Portable XRF to identify/Verify Field Material Properties</b>	<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 6</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:	<b>DOTLT1000332</b>	Project Start Date:	10/1/2019
Research Project Number:	20-2C	Completion Date (original)	3/31/2021
Research Agency:	LTRC	Completion Date (revised)	11/30/2023
Principal Investigator:	Jose Milla		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$82,419	<b>Total</b>	<b>\$36,000</b>
(revised)	\$120,969		
Est. Expended to Date	\$82,240	Salaries	\$36,000
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)		Equipment (non-expendable)	
(revised)		Travel	
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Certain materials must be sent to the central laboratory for characterization to verify that the materials meet project specifications. This can be a labor-intensive and expensive operation, with test results often delayed and some materials only receiving minimal testing. Portable X-ray Fluorescence (XRF) and Fourier-Transform infrared (ATR-FTIR) units have been proposed to quickly determine some of these properties in the field on in-place materials without sampling delays.</p> <p>Objective(s): The objectives of this study are to develop a methodology to apply a portable XRF and ATR FTIR to Louisiana's material needs, and to evaluate the efficiency of the portable devices to characterize relevant materials for acceptance.</p> <p>Expected Benefits: If successful, the portable XRF and ATR FTIR spectroscopy devices will become a viable tool for rapid materials testing in the field use. The results of this research may also be used by other states to further the state of field verification of material quality and fingerprinting to improve quality assurance.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<p>Task 3: Continue evaluating portable XRF device for field use</p> <p>Task 4: Begin analyzing the collected data and compare results with benchtop XRF data</p>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
<p>Task 4: Finish reporting and analyzing data</p> <p>Task 5: Draft and complete final report</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Evaluation of the Miniature Concrete Prism Test (MCPT) for use in DOTD	<b>Project Status:</b>	Ongoing
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 6	<b>Budget Category:</b>	FHWA
SIO:	DOTLT1000331	Project Start Date:	10/1/2019
Research Project Number:	20-1C	Completion Date (original)	9/30/2022
Research Agency:	LTRC	Completion Date (revised)	1/31/2024
Principal Investigator:	Jose Milla		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$162,768	<b>Total</b>	<b>\$14,000</b>
(revised)	\$232,609		
Est. Expended to Date	\$218,000	Salaries	\$14,000
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)	\$21,580	Equipment (non-expendable)	
(revised)	\$59,000	Travel	
Est. FY Expenditure	\$57,500	Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: The miniature concrete prism test (MCPT) method was developed to accelerate the time required to conduct the concrete prism test (CPT) per ASTM C1293, which may take up to 2 years. The industry would like the DOTD to explore the suitability and feasibility of implementing the MCPT. In addition, information on testing performance is needed to determine the presence and/or the extent of any alkali-silica reaction (ASR) deterioration in concrete.</p> <p>Objective(s): The objective of this study is to (1) Evaluate the suitability of the MCPT method to assess alkali-silica reactivity, and (2) determine the level of implementation and/or continued research required for adopting this test method</p> <p>Expected Benefits: If successful, this research will provide a better tool for ASR characterization by reducing the required testing time from 1-2 years to 56 days, as well as provide guidance on the development of specifications to better address ASR in concrete. This will benefit both aggregate suppliers and DOTD in performing routine</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
Task 4: The analysis of the test results should begin once CPT results are finalized.			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
Task 4: Complete Testing Task 5: Draft and publish final report			



**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Field Evaluation of Geophysical Applications for DOTD	<b>Project Status:</b>	Ongoing
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 5	<b>Budget Category:</b>	FHWA
SIO:	DOTLT1000471	Project Start Date:	2/6/2023
Research Project Number:	23-2GT	Completion Date (original)	2/5/2025
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Nick Ferguson		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost	(original) \$187,665	<b>Total</b>	<b>\$126,088</b>
	(revised)		
Est. Expended to Date	\$22,000	Salaries	\$46,088
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds	(original) \$82,728	Equipment (non-expendable)	\$80,000
	(revised) \$22,000	Travel	
Est. FY Expenditure	\$22,000	Other	
<b>BUDGET JUSTIFICATIONS</b>			
<p>Equipment: This project will evaluate specific technologies identified in 20-4GT to aid in the implementation of these beneficial technologies. The Electrical Resistivity device determined to offer great returns to the department can provide insight between soil borings. The Supersting ER Imaging device has been requested amongst LTRC and Section 67 Geotechnical Group as an equipment request after successful results from as site visit in 2022. The device itself costs \$80,000 along with specialized accessories (electrode cable system). <a href="https://www.agiusa.com/supersting-wifi">https://www.agiusa.com/supersting-wifi</a>.</p>			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: This project is a follow up project to 20-4GT, which was a literature review synthesis on Geophysical Technologies that may offer the Department benefits.</p> <p>Objective(s): This project will evaluate Geophysical technologies (the Electrical Resistivity device and others) to determine exact benefits and implementation needs for the Department.</p> <p>Expected Benefits: Additional insight between soil borings and Cone Penetrometer Testing will benefit department designs by providing more confidence. It may also reduce the number of soil borings (high cost and time) or identify areas of concern for more in-depth study. The additional information may reduce foundation costs and or increase the confidence and safety of the design.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<p>Task 1 - Presented a proposal to the PRC in January 2023. The project started in February 2023. Conducted literature and device search on possible geophysical devices Louisiana can utilize. These include possible companies and experts to rent/buy new geophysical devices based on provide demos and expertise for LTRC/DOTD.</p> <p>Task 2: Drafted a site plan for ALF for companies/experts to perform and showcase geophysical devices for DOTD.</p>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
<p>Task 2 - 4: Finalize a site plan for experts to visit and test at LTRC site. Collect field data and conduct analysis/comparisons to see which devices are more efficient and beneficial for Louisiana. Then, follow up with a "second construction site plan" to provide confidence in the geophysical device field data.</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Geotechnical Database, Phase IV</b>			<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>		<b>Budget Category:</b>		<b>FHWA</b>
SIO:	<b>DOTLT1000393</b>		Project Start Date:		3/1/2021
Research Project Number:	21-2GT		Completion Date	(original)	2/28/2023
Research Agency:	LTRC		Completion Date	(revised)	2/28/2024
Principal Investigator:	Gavin Gautreau				
<b>BUDGET STATUS</b>					
<b>Total Budget</b>			<b>Estimated 2023-2024 Budget</b>		
Total Cost	(original)	\$185,539	<b>Total</b>		<b>\$73,725</b>
	(revised)				
Est. Expended to Date		\$65,000	Salaries		\$73,725
<b>FY 2022 - 2023 Budget</b>			Consumable Supplies & Materials		
FY Funds	(original)	\$82,574	Equipment	(non-expendable)	
	(revised)	\$65,000	Travel		
Est. FY Expenditure		\$65,000	Other		
<b>BUDGET JUSTIFICATIONS</b>					
Budget amounts do not require justifications.					
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>					
<p>Problem Statement: Phase I GIS work is no longer supported by ArcGIS software, and DOTD document management software (ContentManager) is moving to newer (File.NET). Additionally, increased computing power has changed the expectations for how geotechnical data should be stored and utilized.</p> <p>Geotechnical software, HoleBASE, an all-in-one enterprise database/data management solution, is now available to DOTD. Deep soil borings and cone penetrometer (CPT) data have not yet been incorporated into HoleBASE.</p> <p>Objective(s): This project will research and assist with DOTD's implementation of Open Ground Cloud (OGC), the cloud-based version of HoleBASE. The implementation of Data Interchange for Geotechnical and Geo-Environmental Specialists (DIGGS) is a DOTD goal. DIGGS allows collection and transfer of geotechnical data from others through the (XML-based) geospatial standard schema. DIGGS is also a goal of the Federal Highway Administration (FHWA) and the American Society of Civil Engineers (ASCE) Geo-Institute</p> <p>Expected Benefits: A robust, all-in-one database/mapping/management solution is the next step in growing our geotechnical database, enhancing design, and managing information about DOTD geotechnical assets.</p> <ul style="list-style-type: none"> <li>• Increased efficiency – unified data (deep boring, CPT, shallow boring, DCP, pile load test);</li> <li>• Fewer new borings/tests, where data already exists;</li> <li>• Time savings in generating soil borings, figures, and design profiles.;</li> <li>• Reduced data input errors;</li> <li>• More streamlined laboratory test reporting process.</li> </ul>					
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>					
<p>Researchers found, uploaded, and geo-referenced hundreds of historical boring log documents into the OGC database (now 837 projects across Louisiana). Researchers converted about 310 gINT (a leading Geotechnical and Geoenvironmental reporting software) project files that include digital data into files acceptable for upload into OGC. Each project contains at least one soil boring, some contain many. Retaining walls (LTRC project 18-4GT) were uploaded and geo-referenced in OGC. Consultant gINT project files were acquired, converted, uploaded, and geo-referenced in OGC. Since gINT will be sunset, efforts were made to transition the DOTD Materials Lab from gINT to Bentley's newer software. Additional efforts were made to pull records from the DOTD document storage (File.NET). These File.NET documents are being uploaded and geo-referenced in OGC to continue to build the database for DOTD Geotechnical, Section 67.</p>					

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

**FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES**

The next category of uploads will be current files in the gINT/HoleBASE format to the OGC database. Section 67 has been in need of Windows 10 machines for this conversion.

Additionally, Section 22 requires upgrade to KeyLAB for deep geotechnical borings. This will likely involve some support from DataForensics, and Scott Deaton. These customizations and training will aid in the transfer of data from Section 22 to Section 67.

LTRC conducts recurring meetings with Section 67 and Bentley representatives (Dataforensics) to strategically transition (and troubleshoot) data from other systems into OGC to grow the database and its functionality for present and future utilization.

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Internal friction angle of sands with high fines content	<b>Project Status:</b>	Ongoing
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 5	<b>Budget Category:</b>	FHWA
SIO:	DOTLT1000375	Project Start Date:	8/1/2020
Research Project Number:	21-1GT	Completion Date (original)	7/31/2022
Research Agency:	LTRC	Completion Date (revised)	7/31/2023
Principal Investigator:	Murad Abu-Farsakh		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$146,690	<b>Total</b>	<b>\$25,534</b>
(revised)	\$216,717		
Est. Expended to Date	\$188,925	Salaries	\$25,534
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)	\$55,800	Equipment (non-expendable)	
(revised)		Travel	
Est. FY Expenditure	\$45,000	Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Several projects in Louisiana with piles driven in sands with high fines content have lower resistances than the design values from static <math>\beta</math>-method, resulting on longer piles than designed. This may be due to uncertainty in estimating the friction angle (<math>\phi</math>) of sands with high fines content from in-situ, or potential reduction of interface friction angle (<math>\delta</math>) due to presence of high fines content. There is a need to modify the in-situ test corrections of <math>\phi</math> for sands with high fine contents.</p> <p>Objective(s): The main objectives of this project are: a) Evaluate the effect of fines content on the internal friction angle, <math>\phi</math>, of sand mixed with fines; b) Evaluate the effect of fines content on the interface friction angle, <math>\delta</math>, between sand soils mixed with fines and piles; c) Determine the threshold of fines content beyond which the sand mixed with fines will behave like cohesive soils, and c) Develop a design method to calculate the ultimate capacity of piles driven into sand mixed with fine contents.</p> <p>Expected Benefits: It is anticipated that this study will provide new/modified correlations and updated SPT/CPT charts and tables for accurate estimation of <math>\phi</math> for sands with fines content. The research team will propose design guidance for piles driven in sand soils mixed with fines content to enhance the safety of pile foundations design for infrastructures. In addition, the finding will include guidelines on evaluating the threshold of fines contest beyond which the sand-fine mixture behave like cohesive soils.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<p>Task 2: Collected soil material from three sites that contains high percent of silt for laboratory shear testing. Conducted laboratory tests to characterize the soil parameters such as standard Proctor, gradation, maximum and minimum void ratios, liquid limit (LL), plastic limit (PL), etc.</p> <p>Task 3: Conducted small-scale direct shear tests on sand soil mixed with four different soils with high percent of fines content (with three soils having high percent of silt) at different percents and different moisture contents.</p> <p>Task 4: Analyzed the performed small-scale and large-scale direct shear test results on sand soil mixed with different percent of fines with high silt.</p> <p>Task 5: Worked on analysing the results of small-scale and large-scale direct shear tests. Work on developing regression models to estimate the shear strength parameters for sand mixed with fines of high silt content.</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

**FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES**

Task 5: Continue analyzing the results of small-scale and large-scale direct shear tests. Work on developing regression models to estimate the shear strength parameters for sand mixed with fines of high silt content.

Task 6: Work on evaluating the threshold of fines content beyond which the sand-fine mixture behaves like cohesive soil.

Task 7: Work on verifying the findings using project sites with piles driven in sand soil layers mixed with fines.

Task 8: Prepare the final report.

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Development of a Design Methodology for Geosynthetic Reinforced Pavement using Finite Element Numerical Modeling</b>	<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:	<b>DOTLT1000346</b>	Project Start Date:	5/1/2020
Research Project Number:	20-3GT	Completion Date (original)	4/30/2023
Research Agency:	LTRC	Completion Date (revised)	4/30/2024
Principal Investigator:	Murad Abu-Farsakh		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$300,302	<b>Total</b>	<b>\$59,595</b>
(revised)	\$355,050		
Est. Expended to Date	\$252,800	Salaries	\$59,595
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)	\$65,669	Equipment (non-expendable)	
(revised)		Travel	
Est. FY Expenditure	\$68,000	Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Pavements build over weak subgrade soils are often associated with construction difficulties, which poses challenge to pavement engineers. The current practice in Louisiana is to stabilize weak subgrades with cement/lime to create a working platform. Geosynthetics can offer a cost-effective alternative solution to this problem by reinforcing the pavement. Although the benefits of geosynthetics in pavements are recognized, the mechanism of reinforcement is still not fully understood.</p> <p>Objective(s): Develop finite element models to simulate the performance of geosynthetic reinforced pavements built over subgrades of different strengths.</p> <p>Evaluate the effect of different parameters on the benefits of geosynthetic reinforcement.</p> <p>Study the effect of reinforcement properties for low, medium, and high volume traffic sections.</p> <p>Develop a design method for geosynthetic-reinforced pavements within the mechanistic-empirical pavement design guide (MEPDG).</p> <p>Expected Benefits: It is anticipated that the research team will develop a cost-effective design methodology that incorporates the benefits of geosynthetic reinforcement in flexible pavements within the context of MEPDG. The results will help the design engineers to select the proper parameters that enhance the geosynthetic benefits. This study will help accelerate the construction of pavements over weak and problematic subgrades, and reduce the cost of pavements construction in Louisiana.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<p>Task 2-Developed finite element (FE) numerical models to simulate the geosynthetic reinforcement of pavement sections built over soft and medium subgrade soils for low volume roads, and medium volume roads,</p> <p>Task 3-Verified and calibrated the developed FE models using the results of in-box laboratory CPL tests, and the results of accelerated load tests conducted on geosynthetic-reinforced sections built at ALF site,</p> <p>Task 4-Conducted comprehensive FE parametric study to evaluate the effect of different variables and parameters on the benefit of geosynthetic reinforcement of pavement built over medium and stiff subgrade soils for low volume, medium volume, and high volume roads,</p> <p>Task 5-Developed regression models to evaluate the traffic benefit ratio (TBR), equivalent base modulus, and equivalent base thickness for geosynthetic reinforcement of pavement built over weak, medium and stiff subgrades soil for low volume roads. Developed machine learning (ML) and artificial neural network (ANN) models to evaluate the TBR, equivalent base modulus, and equivalent base thickness for geosynthetic reinforcement of pavement built over weak, medium and stiff subgrades soil for low volume roads.</p> <p>Task 6-Started developing design procedure based on mechanistic-empirical pavement design guide (MEPDG).</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

**FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES**

Task 4-Continue conducting FE parametric study to evaluate the effect of different variables and parameters on the benefit of geosynthetic reinforcement of pavement built over weak, medium and stiff subgrades soil for high volume roads.

Task 5-Developed regression models to evaluate the TBR, equivalent base modulus, and equivalent base thickness for geosynthetic reinforcement of pavement built over weak, medium and stiff subgrades soil for medium and high volume roads. Developed ML and ANN models to evaluate the TBR, equivalent base modulus, and equivalent base thickness for geosynthetic reinforcement of pavement built over weak, medium and stiff subgrades soil for medium and high volume roads.

Task 6-Continue developing design procedure based on mechanistic-empirical pavement design guide (MEPDG) for geosynthetic reinforced pavements built over weak, medium and stiff subgrades soil for low, medium and high volume roads.

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Instrumentation and Modeling of Geosynthetic Load Transfer Platform Performance</b>	<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:	<b>DOTLT1000337</b>	Project Start Date:	1/1/2020
Research Project Number:	20-2GT	Completion Date (original)	6/30/2022
Research Agency:	LTRC	Completion Date (revised)	6/30/2024
Principal Investigator:	Murad Abu-Farsakh		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$300,331	<b>Total</b>	<b>\$87,500</b>
(revised)	\$424,695		
Est. Expended to Date	\$316,260	Salaries	\$81,300
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	\$6,200
FY Funds (original)	\$83,674	Equipment (non-expendable)	
(revised)		Travel	
Est. FY Expenditure	\$77,500	Other	
<b>BUDGET JUSTIFICATIONS</b>			
<p>Supplies: Multiplexer for collecting data: \$1,400.            Connecting cables between dataloggers and multiplexers: \$500            PVC pipes to protect the instrumentation wires and connection: \$1200            Design steel box to host all dataloggers and multiplexers: \$1000            Sier panels: \$400            Battery for the SAA field portable reader: \$200            Misc/Replacement parts of the instrumentation/monitoring system: \$1500</p>			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p><b>Problem Statement:</b> Imposing significant embankment load over soft clay can cause bearing capacity failures, large settlement, lateral movement, and slope instability. Driven pile, drilled shafts or stone columns are commonly used in the construction of embankment on soft clay to improve the capability of soft clay. To reduce the cost by reducing the number of piles, geosynthetic reinforcement platform can be added below the embankment to work as load transfer platform to the pile caps.</p> <p><b>Objective(s):</b> The objectives of this study are: Monitor the short-term and long-term behavior of geosynthetic load transfer platforms (GLTP) in Louisiana; Evaluate and verify (or modify) important design factors and parameters for GLTP: load distribution (between the piles, geogrid, and soft soil), settlement, and lateral thrust; Conduct finite element parametric study to evaluate the effect of different variables and parameters on the performance of GLTPs; and Propose a design and construction guidance.</p> <p><b>Expected Benefits:</b> The use of GLTP technology beneath the embankment and above the supporting piles has shown evidence to be a cost-effective design in many projects in USA and the world. To realize the potential benefits of using GLTP for pile-supported embankments in Louisiana, DOTD plans to build GLTP for three bridge projects. It is anticipated that the DOTD design method for GLTP will be improved based on the collected data from field instrumentations, and hence reduce the cost.</p>			



**LTRC Annual Research Program**  
**Fiscal Year 2023-2024**

**FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS**

Task 3: Completed the instrumentation at the GLTP project No. 1234, Port Allen Canal Bridge, LA 1. Instrumented the foundation soil and the GLTP at the project No. 2375, Amite River, Baton Rouge.

Task 4: Monitored the performance of GLTP during the construction at the project No. 1234, Port Allen Canal Bridge, LA 1, and the project No. 2375, Amite River, Baton Rouge.

Task 5: Started planning for conducting Load Tests at projects site No. 1234, Port Allen Canal Bridge, LA 1, using Heavy weight Trucks.

Task 6: Developed 2D and 3D finite element (FE) models to simulate the behavior of GLTP pile-supported embankment for the cases of piles tip on dense sand soil, and piles tip on stiff clay soil.

Task 7: Verified the FE models using measurements of field monitoring of fully instrumented GLTP on piles-supported embankment cases in literature.

Task 8: Conducted FE parametric study to evaluate the effect of different variables and parameters on the behavior of GLTP pile-supported embankments for the cases of piles tip on dense sand and piles tip on clay. Compared the FE results with analytical methods for designing GLTP in literature.

**FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES**

Task 3: Complete the instrumentation at the GLTP project No. 2375, Amite River, Baton Rouge.

Task 4: Monitor the performance of the GLTP at the project site No. 2375, Amite River, Baton Rouge, during the construction of embankment.

Task 5: Conduct the load tests using heavy weight trucks at the project No. 1234, Port Allen Canal Bridge, LA 1. Plan for conducting load tests after the end of construction of GLTP at the project site No. 2375, Amite River, Baton Rouge.

Task 6: Continue developing FE models to simulate the behavior of GLTP pile-supported embankment for the cases of piles tip on sand and stiff clay of different soil layering.

Task 7: Continue verifying and calibrating the developed FE models using the measurements of field monitoring of fully instrumented load transfer platform in piles-supported embankments from literature, and the instrumented sites at LA 1, Port Allen and Amite River, Baton Rouge.

Task 8: Continue conducting comprehensive FE parametric study to evaluate the effect of different variables and parameters on the behavior of GLTP pile-supported embankments, for the cases of piles tip on sand and stiff clay of different soil layering. Compare the results with the analytical GLTP design methods in literature

Task 9: Start the long-term monitoring the performance of the GLTP at the project No. 1234, Port Allen Canal Bridge, LA 1. Start monitoring the performance of the GLTP at the project No. 2375, Amite River, Baton Rouge, immediately after completing the construction and instrumentation.

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	LIDAR for Geotechnical Applications	<b>Project Status:</b>	Ongoing
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 6	<b>Budget Category:</b>	FHWA
SIO:	DOTLT1000473	Project Start Date:	3/1/2023
Research Project Number:	23-1GT	Completion Date (original)	8/31/2025
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Gavin Gautreau		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$311,126	<b>Total</b>	<b>\$90,508</b>
(revised)			
Est. Expended to Date	\$50,000	Salaries	\$90,508
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)	\$81,006	Equipment (non-expendable)	
(revised)		Travel	
Est. FY Expenditure	\$50,000	Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Light detection and radar (LIDAR) is a method for measuring distances. The data can be collected from land tripods, automobiles, drones and fixed wing airplanes. DOTD has begun collecting LIDAR on state highways. LIDAR data can be utilized for many purposes; the primary reasons are likely not geotechnical related. However, the data can be utilized for inventory purposes (Geotechnical Asset Management) and change detection of embankment slopes (inspections and problem identification).</p> <p>Objective(s): Explore the utilization of LIDAR within DOTD and develop interfaces to tap into this data for geotechnical purposes. Recurring datasets of the same location could be compared to determine changing slopes. These large datasets may require Machine Learning or special software to open this data to the geotechnical section. Small scale drone-based LIDAR scans could be collected to supplement and define with more precision, problematic slopes that may be difficult, or hazardous, to access.</p> <p>Expected Benefits: The proposed research would utilize an existing dataset within DOTD and provide a user interface for the Geotechnical Section to utilize this data for management of slopes and other geotechnical assets. More accurate location of soil boring elevations (from the office) would also be a benefit.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
The project began in March 2023. Once the project started, meetings were held with involved sections, especially Section 30, Location and Survey. Additional meetings will be held to refine the plan of action regarding data inventory/indexing of existing data.			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
Continue the work to access LIDAR data for Geotechnical Applications within the DOTD (and outside the DOTD). The project will enlist the assistance of LSU staff to help connect the dots/access data. Initial efforts that seem fruitful include assisting Section 30 with an index (GIS based polygons that identify the data, type of scan, area, precision, size of file, etc. of historical scans. This data could be linked to an ArcMap or to OpenGround Cloud via WMS.			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>LTRC Support for Geotechnical Research at the Geotechnical Engineering Research Laboratory (GERL)</b>			<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 6</b>		<b>Budget Category:</b>		<b>FHWA</b>
SIO:	<b>30000111</b>		Project Start Date:		7/1/2010
Research Project Number:	10-1GERL		Completion Date	(original)	6/30/2015
Research Agency:	LTRC		Completion Date	(revised)	6/30/2024
Principal Investigator:	Murad Abu-Farsakh				
<b>BUDGET STATUS</b>					
<b>Total Budget</b>			<b>Estimated 2023-2024 Budget</b>		
Total Cost	(original)	\$523,000	<b>Total</b>		<b>\$160,900</b>
	(revised)	\$18,480,051			
Est. Expended to Date		\$2,370,800	Salaries		\$106,400
<b>FY 2022 - 2023 Budget</b>			Consumable Supplies & Materials		\$33,500
FY Funds	(original)	\$151,364	Equipment	(non-expendable)	
	(revised)		Travel		\$21,000
Est. FY Expenditure		\$185,000	Other		
<b>BUDGET JUSTIFICATIONS</b>					
<p>Supplies: Maintenance and supplies for MTS testing machine: \$4,000.  Purchase multiplexer for field testing and monitoring: \$1500  Calibration of triaxial and shear test machines: \$3,000.  Calibrated of in-situ test devises (Geogauge, LFWD, etc.): \$2,000.  Desktop computers for two graduate students: 2 x \$2000 = \$4,000.  Annual license for PLAXIS 2D finite element software: \$1,500.  Annual license for PLAXIS 3D finite element software: \$1,500.  Misc/Replacement parts for Humboldt testing devise: \$2,500.  Triaxial, direct shear and consolidation tests parts (Dial Gauges, cables, molds, etc.): \$4,000  Fixing the in-box cyclic plate load test (instruments, wires, cables, etc.): \$4,000.  Pump filters, oil change, materials, etc. for Geotech Lab: \$2,500.  General Laboratory supplies and materials: \$3,000.  Travel: Attend TRB Conference for PI and one RA: 2 x \$2500 = \$5000  Attend TRB for twone graduate student: 2 x \$2000 = \$4000  Attend Geocongress Conference for PI and one RA: 2 x \$3000 = \$6000  Attend Geocongress for one graduate student: \$3000  Attend Geosynthetics conference: \$3000</p>					
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>					
<p><b>Problem Statement:</b> Transportation infrastructures in Louisiana, such as bridges and highways, are very essential for the state's residents and businessmen. Many challenges are facing the state to improve/modernize their transportation infrastructures that need to be identified, addressed and solved. Improving analysis, design, and construction of the geotechnical aspects of infrastructures is very vital. Therefore, problem statements and proposals need to be developed to solve the challenges.</p> <p><b>Objective(s):</b> The objectives of this study are: perform studies to meet the beneficiary requirements for geotechnical testing, technical assistance and research; advance the state-of-the-art in geotechnical research; maintain laboratory testing equipment; maintain in-situ testing devises and monitoring instruments, provide development, support and training of new and innovative techniques, and software for advancing transportation system, and develop problem statements and research proposals.</p> <p><b>Expected Benefits:</b> It is anticipated that improving and maintaining modern and safe infrastructures will have a direct impact toward improving the quality of life and boost healthy economic growth in Louisiana. The development of new methodologies for geotechnical infrastructure's analysis, design and construction will help improve the accuracy/reliability of design, accelerate construction, and reduce material/labor cost, resulting in safer and more cost-effective infrastructure design.</p>					

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>
<ul style="list-style-type: none"><li>- Developed potential ideas and problem statements for future LTRC research projects,</li><li>- Provided geotechnical testing support and technical assistance for DOTD,</li><li>- Provided guidance on improving the quality of laboratory testing to DOTD,</li><li>- Developed research proposal on "Evaluation of Embedded Pile Resistance on Scour Critical Bridges",</li><li>- Published several technical papers and proceedings on the findings of LTRC research projects,</li><li>- Published two final reports,</li><li>- Attended several engineering workshops and conferences,</li><li>- Maintained in-situ testing devices and measuring/monitoring instrumentation systems,</li><li>- Maintained laboratory testing equipment,</li><li>- Maintained various software related to CPT applications.</li></ul>
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>
<ul style="list-style-type: none"><li>- Provide geotechnical and geosynthetic testing support and technical assistance for DOTD,</li><li>- Provide support and training for implementation of findings of research studies,</li><li>- Develop research proposals and problem statements for future activities,</li><li>- Develop research proposal on "Statewide Calibration of CPT Direct Design Methods Using Static Load Test Data",</li><li>- Develop research proposal on "Evaluation and Incorporation of Site and lab Variability into LRFD Design of Deep Foundations - Phase 2",</li><li>- Develop research proposal on "Evaluation and Development of CPT-based Methods for Estimating the Ultimate Axial Capacity of Drilled Shafts",</li><li>- Publish research findings on technical papers, proceedings and reports,</li><li>- Maintain laboratory testing equipment,</li><li>- Maintain in-situ testing devices and measuring/monitoring instrumentation systems,</li><li>- Maintain and upgrade the various CPT software applications.</li></ul>

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>LTRC Proposal for the Support of Software Development and GIS Applications in LTRC Research</b>			<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>		<b>Budget Category:</b>		<b>FHWA</b>
SIO:	<b>DOTLT1000215</b>		Project Start Date:		7/1/2017
Research Project Number:	18-1Other		Completion Date	(original)	6/30/2020
Research Agency:	LTRC		Completion Date	(revised)	6/30/2024
Principal Investigator:	Vijaya Gopu				
<b>BUDGET STATUS</b>					
<b>Total Budget</b>			<b>Estimated 2023-2024 Budget</b>		
Total Cost	(original)	\$352,390	<b>Total</b>		<b>\$50,000</b>
	(revised)	\$1,895,149			
Est. Expended to Date		\$587,002	Salaries		\$50,000
<b>FY 2022 - 2023 Budget</b>			Consumable Supplies & Materials		
FY Funds	(original)	\$227,436	Equipment	(non-expendable)	
	(revised)	\$227,436	Travel		
Est. FY Expenditure		\$162,327	Other		
<b>BUDGET JUSTIFICATIONS</b>					
Budget amounts do not require justifications.					
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>					
<p>Problem Statement: Problem Statement: The purpose of this project is to provide a fiscal year structured resource allocation plan for transportation applications originally developed at Louisiana Transportation Research Center (LTRC).</p> <p>Objective(s): Objective(s): The tasks will cover development, upgrading, implementation, and maintenance of customized software, relational databases, servers and GIS (Geographic Information Systems).</p> <p>Expected Benefits: Expected Benefits: Provide IT and GIS solutions as applied research implemented into DOTD processes and procedures.</p>					
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>					
<p>Due to the departure of Adele Lee at the beginning of FY22-23, the planned project tasks could not be pursued. The graduate student working on the project handled the following tasks:</p> <ol style="list-style-type: none"> <li>1. Completed a windows forms program for Tyson to handle some MS Word and Excel functionality for the FHWA AWP yearly submission</li> <li>2. Learnt Pile CPT research version and GeoTech version</li> <li>3. Worked with Dr. Abufarsakh to incorporate the changes to the source code and finish the Batch functionality that Jess Rauser at DOTD HQ requires.</li> </ol>					
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>					
The graduate student will continue to work on the project to complete the tasks that were begun in FY22-23.					

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Administration of LTRC External Funding Programs</b>			<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>		<b>Budget Category:</b>		<b>FHWA</b>
SIO:	<b>30000169</b>		Project Start Date:		1/1/2008
Research Project Number:	11-1AD		Completion Date	(original)	6/30/2009
Research Agency:	LTRC		Completion Date	(revised)	6/30/2024
Principal Investigator:	Vijaya Gopu				
<b>BUDGET STATUS</b>					
<b>Total Budget</b>			<b>Estimated 2023-2024 Budget</b>		
Total Cost	(original)	\$211,428	<b>Total</b>		<b>\$306,412</b>
	(revised)	\$4,672,490			
Est. Expended to Date		\$3,664,519	Salaries		\$295,912
<b>FY 2022 - 2023 Budget</b>			Consumable Supplies & Materials		
FY Funds	(original)	\$296,000	Equipment	(non-expendable)	
	(revised)	\$296,000	Travel		\$10,500
Est. FY Expenditure		\$296,000	Other		
<b>BUDGET JUSTIFICATIONS</b>					
<p>Travel: Travel: Problem Statement: Travel: TRB Annual Meeting (Airfare+Hotel+Meals) = \$2,200  Council of University Transportation Centers (CUTC) Summer Meeting: \$1,000  NSF Center for Integration of Composites in Infrastructure Adv.Board Meetings: \$1,800  AASHTO (American Association of State Highway Transportation Officials) Bridge Committee Annual Meeting: \$1,200  Allowance for other state DOT dissemination meetings: \$3,800</p>					
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>					
<p>Problem Statement: Problem Statement: Enhance the external research funding at LTRC. This would require the new AD to: Identify funding opportunities at the national, regional and state level in the broad area of transportation engineering, planning and management and organize single or multi-campus faculty teams/clusters – multi-disciplinary when needed -- that hold the most promise for being successful in attracting this competitive funding. Pursuit of these opportunities will be channeled through LTRC.</p> <p>Objective(s): Objective(s): To cover administrative costs handled under contract to support the Louisiana Transportation Research Center (LTRC) research, development and technology transfer expansion funding program.</p> <p>Expected Benefits: Expected Benefits: The efforts of this program will generate external funding for university faculty and support the research needs of DOTD.</p> <p>Participation in national level research efforts and programs enhance the stature of LTRC and address the critical needs of the state.</p> <p>Expected Benefits: Tasks carried out with support of external agencies -- NSF, FHWA, etc. -- enable workforce development in critical areas of the transportation sector.</p>					
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>					
<ul style="list-style-type: none"> <li>- Submitted one regional UTC proposal as the lead PI in response to the USDOT UTC solicitation. The proposal was highly recommended but was not funded for reasons unclear to LTRC. The proposal involved 12 university partners in Region 6.</li> <li>- Partnered on three TIER 1 UTC proposals that were led by University of South Carolina, West Virginia University and Mississippi State University. These were not funded.</li> <li>-Established collaboration with several consortiums to develop and submit proposals to the UTC program.</li> <li>- Managed the TIRE program effectively.</li> <li>-Facilitated LTRC sponsorship of inteRaCt webinar series. Webinars are attended by several hundred engineers across the nation.</li> <li>-Chaired the Industrial Advisory Board meetings of the NSF Center for Integration of Composites in Infrastructure.</li> <li>-Several on several NSF review panels.</li> <li>-Presented a paper on the White Bayou Bridge strengthening project at an international conference held in Mumbai, India.</li> <li>-Making efforts to collaborate with the new Regional UTC awarded to Univ. of Oklahoma.</li> <li>-Co-authored two refereed journal articles and developing six more articles for publication.</li> <li>-Conducted the REU (Research Experience for Undergraduates) Summer program in 2022 and submitted final report at conclusion of the program.</li> <li>- Held LTRC Town Hall Meeting at Louisiana Tech University in the 2022 Fall semester.</li> </ul>					

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

**FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES**

- Continue coordination of TIRE program and TIRE projects;
- Hold LTRC town-hall meetings at all state universities with engineering programs.
- Coordinate submission of a revised NSF MRI (Major Research Instrumentation) proposal in this fiscal year
- Explore opportunities for submitting proposals to advance bridge engineering education and practice.
- Support LAPELS Board in its effort to promote professional registration of university faculty.
- Coordinate the LTRC UTC ( university Transportation Center) site projects and the UTC support studies through their completion after gaining funding from the UTC program;
- Disseminate the results of the NSF (National Science Foundation) project on field monitoring and measurement education

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Performance Index Rating and Maintenance Cost Assignment for Ramps, Acceleration and Deceleration Lanes in Louisiana</b>	<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:	<b>DOTLT1000431</b>	Project Start Date:	4/1/2022
Research Project Number:	22-1P	Completion Date (original)	6/30/2024
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Moses Akentuna		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost	(original) \$169,270	<b>Total</b>	<b>\$88,087</b>
	(revised)		
Est. Expended to Date	\$44,204	Salaries	\$58,087
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds	(original) \$78,205	Equipment (non-expendable)	
	(revised)	Travel	
Est. FY Expenditure	\$49,328	Other	\$30,000
<b>BUDGET JUSTIFICATIONS</b>			
Other: An amount of 30000 has been budgeted for the rental of a zero-speed profiler, equipment critical for the completion of the project, for at least 1-month			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Roughness is an important parameter for rating the overall condition of roadways. However, operational conditions on ramps, roundabouts, and other urban roadways make it difficult for modern inertial profilers to provide valid roughness values for these sections of roadways. Therefore, it is imperative to devise a means to accurately rate roughness for cost-effective maintenance of these sections of the highway system by road agencies.</p> <p>Objective(s): (1) Ascertain any differences in international roughness (IRI) and performance index (PI) values of Louisiana DOTD's analysis lanes as compared to ramps, acceleration, or deceleration lanes; (2) develop a framework for measuring and characterizing IRI and PI values for ramps, acceleration, and deceleration lanes; (3) and establish and provide guidelines to address additional treatment costs specific to ramps, acceleration, and deceleration lanes at the project and network levels.</p> <p>Expected Benefits: Guidelines will be developed for measuring and characterizing IRI and PI values for ramps, acceleration, and deceleration lanes. Further, the research team intends to develop a framework for assigning maintenance trigger values and treatment costs for all components of the highway system. These guidelines will assist DOTD engineers to select cost-effective treatment methods for the prompt performance of maintenance activities on Louisiana roads.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<p>Task 2-Completed the development of the test plan for the proposed project.</p> <p>Task 3-Began and continued to execute the proposed test plan.</p> <p>Task 4-Began and continued to analyze field and PMS data.</p>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
<p>Task 3: Complete the execution of the proposed test plan</p> <p>Task 4: Complete Analysis of field and PMS data</p> <p>Task 5: Propose a framework to measure and characterize IRI and PI values</p> <p>Task 6: Ascertain and propose guidelines to address additional treatment costs specific to ramps, acceleration, and deceleration lanes</p> <p>Task 7: Prepare a draft final report</p>			



**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Exploration of Drone and Remote Sensing Technologies in Highway Embankment Monitoring and Management</b>	<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:	<b>DOTLT1000216</b>	Project Start Date:	9/1/2017
Research Project Number:	18-1P	Completion Date (original)	8/31/2018
Research Agency:	LTRC	Completion Date (revised)	8/31/2023
Principal Investigator:	Zhongjie Zhang		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$50,000	<b>Total</b>	<b>\$5,000</b>
(revised)	\$150,000		
Est. Expended to Date	\$145,000	Salaries	\$5,000
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)	\$22,000	Equipment (non-expendable)	
(revised)		Travel	
Est. FY Expenditure	\$20,000	Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Many Louisiana highway embankments were built with high plastic soils due to historical reasons. Many of them have been experiencing surface sliding failures, which become a safety issue and cause traffic disruptions. Since no warning system is available for this type of failures, the Louisiana Department of Transportation and Development (DOTD) can only respond to them after the fact with costly remediation.</p> <p>Objective(s): Use remote sensing and drone technologies with proper sensors to detect soft spots on soil embankment surface.</p> <p>Expected Benefits: A monitoring system for highway embankments will benefit the Department to take proactive maintenance measures to prevent surface sliding failures.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<p>Task 1: Continue the literature search and review on the applications of remote sensing and drone technologies in civil and geotechnical engineering.</p> <p>Task 4: Data Collection. We will continue our field testing flights and get more field images data, which will be correlated with moisture content on the ground surface.</p> <p>Task 5: Process and analyze the collected data based on the entire experiment experience.</p> <p>Task 6: Develop indicators for highway embankment safety in Louisiana if possible.</p>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
Task 7: Prepare final report.			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Assessment of DOTD's friction aggregate sources through laboratory and accelerated testing</b>	<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 6</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:	<b>DOTLT1000340</b>	Project Start Date:	1/1/2020
Research Project Number:	20-4P	Completion Date (original)	12/31/2022
Research Agency:	LTRC	Completion Date (revised)	12/31/2024
Principal Investigator:	Zhong Wu		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$402,068	<b>Total</b>	<b>\$129,500</b>
(revised)			
Est. Expended to Date	\$164,800	Salaries	\$129,500
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)	\$127,600	Equipment (non-expendable)	
(revised)		Travel	
Est. FY Expenditure	\$58,000	Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Due to high variations in the aggregate production and shipments, it is common to get significantly different polished stone value (PSV) results from a same aggregate type shipped-in at a different time. Aggregate suppliers certainly have concerns when the aggregates fail to meet their target PSV values. Therefore, there is an urgent need to better assess friction aggregate sources and formalize the use of aggregate friction testing procedure for DOTD.</p> <p>Objective(s): 1) Assess the PSV test variations in term of sources, shipment, and operators. 2) Evaluate a new aggregate friction testing procedure. 3) Determine the threshold friction design values for commonly-used wearing mixtures. 4) Validate and update a set of lab and field correlations of pavement surface friction characteristics measured and developed from projects of 09- 2B and 12-5P.</p> <p>Expected Benefits: A potential outcome of this project will provide DOTD a new and improved laboratory aggregate friction testing protocol that can be used for initial source approval as well as for predicting field friction performance.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<p>Task 1-Continued the literature review on the prediction of pavement surface friction characteristics based on dynamic friction tester (DFT), circular track meter (CTM) and other frictional parameters.</p> <p>Task 2-Performed a technical training for both dynamic friction tester (DFT) and circular track meter (CTM) testing devices at LTRC.</p> <p>Task 3- A total of six coarse aggregate sources were identified and a minimum of 10 buckets of No. 78 materials have been collected from each selected aggregate source. Chemical composition and PSV tests were performed for all collected aggregates. Eight aggregate ring samples were fabricated in the laboratory, and four of them have been tested using LTRC's three-wheel polishing device (TWPD), each up to 100,000 cycles. However, the TWPD tests were dis-continued due to a machine problem related to the controller. No more laboratory tests could be performed until the device will be fixed.</p> <p>Task 4- Three newly-constructed asphalt pavement sections were selected to perform the locked wheel skid trailer (LWST) test using both rib and smooth tires. The wearing course mixtures of those pavements contained at least one coarse aggregate material considered in Task 3. In addition, the pavement surface frictional characteristics using DFT and CTM devices were also collected on one of the selected pavement sections.</p>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
<p>Task 3- Will continue identifying additional coarse aggregate sources with different aggregate friction rating and collect sufficient aggregates for lab testing; will continue fabricating aggregate ring samples and perform aggregate polishing tests using TWPD; will fabricate slab samples using plant mixtures on selected projects and perform slab-based TWPD tests.</p> <p>Task 4-Will continue performing in situ pavement surface friction measurements using DFT/CTM and the locked wheel skid trailer (LWST). The selected asphalt pavement sites include pre-selected pavement test sections of 12-5P and newly selected sections with wearing course mixtures of stone matrix asphalt (SMA) and open-graded friction course (OGFC).</p> <p>Task 5-Analyze the collected laboratory and field experimental results using the statistical method as well as pavement modeling.</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Mechanistic Characterization of Asphalt Overlays for Pavement Rehabilitation and Preservation using Pavement ME Approach</b>	<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 6</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:	<b>DOTLT1000272</b>	Project Start Date:	8/1/2018
Research Project Number:	19-2P	Completion Date (original)	1/31/2021
Research Agency:	LTRC	Completion Date (revised)	10/31/2023
Principal Investigator:	Zhong Wu		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$319,442	<b>Total</b>	<b>\$5,400</b>
(revised)	\$398,137		
Est. Expended to Date	\$385,000	Salaries	\$5,400
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)	\$29,200	Equipment (non-expendable)	
(revised)		Travel	
Est. FY Expenditure	\$25,000	Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: For a smooth transition from the 1993 AASHTO pavement design guide to the newly-developed Pavement ME Design for DOTD, there is a need to perform local-calibration of distress models for both pavement structural and preservation overlays in Louisiana. In addition, the pavement design engineers of DOTD have encountered several design issues in new asphalt and concrete pavement designs when using a previously-calibrated Pavement ME software.</p> <p>Objective(s): 1) Address the existing Pavement ME's new pavement design issues encountered by the DOTD design engineers. 2) Evaluate the performance and existing trigger system of possible pavement preservation overlay strategies using Pavement ME. 3) Update local-calibration factors of Pavement ME and develop a set of optimum design inputs for both pavement rehabilitation and preservation asphalt overlays for DOTD implementation.</p> <p>Expected Benefits: 1) A detailed implementation plan for Pavement ME's rehabilitation module with a set of updated, local calibration factors and Louisiana design inputs. 2) A set of recommended design inputs for pavement preservation overlay using the Pavement ME. 3) Solutions for the existing Pavement ME Design software issues currently encountered.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<p>Task 9- Completed the determination and finalized a set of Louisiana-specific flexible and rigid pavement design inputs for DOTD implementation of the Pavement ME Design.</p> <p>Task 10-Reviewed the construction as-built plans and inserted new pavement condition measurement data based on the current Pavement Management System for all previously selected flexible and rigid pavement projects considered.</p> <p>Task 11-Performed a local pavement distress model(s) calibration for new flexible pavement design in Louisiana based on the Pavement ME Design Software version 2.6.</p>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
<p>Task 11- Continue to perform the local calibration of pavement distress models for new rigid pavement design in Louisiana and develop the Pavement ME Design's implementation guidelines for DOTD.</p> <p>Task 12-Submit the project final report and technical summary documentation.</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Mitigating Joint Reflective Cracks using Stone Interlayers: Case Study on Louisiana Highway 5, Desoto Parish</b>			<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 6</b>		<b>Budget Category:</b>		<b>FHWA</b>
SIO:	<b>DOTLT1000218</b>		Project Start Date:		10/17/2017
Research Project Number:	18-2P		Completion Date	(original)	10/16/2023
Research Agency:	LTRC		Completion Date	(revised)	10/16/2026
Principal Investigator:	Qiming Chen				
<b>BUDGET STATUS</b>					
<b>Total Budget</b>			<b>Estimated 2023-2024 Budget</b>		
Total Cost	(original)	\$210,000	<b>Total</b>		<b>\$40,000</b>
	(revised)	\$315,000			
Est. Expended to Date		\$160,000	Salaries		\$40,000
<b>FY 2022 - 2023 Budget</b>			Consumable Supplies & Materials		
FY Funds	(original)	\$23,000	Equipment	(non-expendable)	
	(revised)	\$35,000	Travel		
Est. FY Expenditure		\$32,000	Other		
<b>BUDGET JUSTIFICATIONS</b>					
Budget amounts do not require justifications.					
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>					
<p>Problem Statement: Reflective cracking in AC overlays represents a serious challenge associated with pavement rehabilitation. In 2011, LTRC completed a study to evaluate and compare the performance of different crack control treatments in Louisiana for composite pavements. Stone interlayers were not one of the treatments discovered from a survey of DOTD engineers in the study and therefore were not evaluated. The scope of this research is also expanded to include a TA study involving fracture slab approaches.</p> <p>Objective(s): The purpose of this project is to monitor the effectiveness of stone interlayers and fracture slab approaches in composite pavements, determine the effect of stone depth in mitigating reflective cracks at the transverse and longitudinal joints, and measure the movement of the Portland cement concrete (PCC) transverse joints under traffic loading.</p> <p>Expected Benefits: The results of the study may be used to recommend improved pavement design and preservation procedures.</p>					
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>					
<p>Task 1: Literature Review on rubblization and break and seat</p> <p>Task 3: Data mining the Pavement Management Systems database for projects involving rubblization and break and seat</p> <p>Task 5: Field tests (Performed FWD and GPR tests on some of projects involving rubblization and break and seat)</p>					
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>					
<p>Task 1: Literature Review (continue working on literature review)</p> <p>Task 3: Data mining the Pavement Management Systems database (continue collecting distress information on projects involving stone layers, rubblization and break and seat)</p> <p>Task 5: Field tests (Continue performing field test on projects involving stone layers, rubblization and break and seat)</p>					

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Management and Operation of the Pavement Research Facility</b>	<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 6</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:	<b>30000141</b>	Project Start Date:	7/1/2009
Research Project Number:	10-1ALF	Completion Date (original)	6/30/2015
Research Agency:	LTRC	Completion Date (revised)	6/30/2024
Principal Investigator:	Zhong Wu		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$1,730,000	<b>Total</b>	<b>\$470,600</b>
(revised)	\$23,096,263		
Est. Expended to Date	\$1,730,000	Salaries	\$355,600
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	\$100,000
FY Funds (original)	\$479,200	Equipment (non-expendable)	
(revised)		Travel	\$10,000
Est. FY Expenditure	\$470,000	Other	\$5,000
<b>BUDGET JUSTIFICATIONS</b>			
<p>Supplies: The \$100,000 budget will cover the routine maintenance supplies, mechanic repairing (parts and labor), and daily operational costs at the DOTD's Pavement Research Facility. The following supplies and operational items are included in the budget: Parts replacement and mechanic repairing of ALF, parts replacement and mechanic repairing of ATLaS30, building supplies, computer and software upgrade, steel braided cable, pillow block bearing, hydraulic oil filters, electrical solenoids, electrical cables/connector, electrical fuses, pressure relief valve, cable lube spray, poly grease, lawn weed killer, mouse/snake traps, toiletries, wasp spray, gasoline, scag and tractor maintenance.</p> <p>Travel: TRB Annual meeting (3 attendees) - \$7,500 Attend a pavement conference (1 attendee) - \$2,500</p> <p>Other: The \$5,000 cost will cover as-needed professional services, such as moving of ATLaS30 or ALF to new testing locations.</p>			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p><b>Problem Statement:</b> Pavement Research Facility (PRF) is a full-scale accelerated pavement research facility designed to determine in situ true performance for different pavement structures and materials using two heavy vehicle simulator loading devices. The research purpose is to investigate economical and practical alternatives related to the current design and construction practices, and provide implementable pavement solutions for DOTD in solving issues in pavement structure, construction and materials.</p> <p><b>Objective(s):</b> The objective of this study is to provide for the management and operation structure at the PRF site in performing full scale accelerated pavement testing for DOTD. A manager and two operators will be funded in this facility. The scope of the work includes management of the facility, machine maintenance and operation, preparation of plans for individual experiments, construction, pavement instrumentation and accelerated pavement testing.</p> <p><b>Expected Benefits:</b> Research results obtained at PRF can lead directly to implementable recommendations for DOTD in terms of new pavement structure design, paving material selection and construction, better monitoring of statewide pavement performance and advanced analytical tools for pavement structure analysis. PRF provides LTRC with an excellent position to pursue its quest for national and international excellence in research capability in full-scale accelerated pavement testing.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<ul style="list-style-type: none"> <li>- Completed pavement section loading test and developed a final report for Project 19-1P: Application of Mechanistic-Empirical Pavement Design Approach into RCC Pavement Thickness Design.</li> <li>- Completed the accelerated pavement loading tests on two engineered cementitious composite (ECC) pavement test sections (with 2" and 4" ECC thickness, respectively).</li> <li>- Provided technical assistance to LTRC in pavement testing, instrumentation and equipment procurement.</li> <li>- Serviced and upgraded the ATLaS30 wheel-loading control system.</li> <li>- Diagnosed existing issues with the accelerated load facility (ALF) wheel-loading device and replaced damaged electricity switches and connection wires.</li> <li>- Published several journal articles and technical conference papers on LTRC pavement research projects.</li> </ul>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

**FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES**

- Will continue providing technical assistance in pavement testing, instrumentation and equipment procurement.
- Will complete the ATLaS30 loading test on the last ECC pavement test section (the 4" bonded concrete overlay).
- Will complete the repair and resolve all machine mechanical and control system issues of the ALF device.
- Will develop research proposals and problem statements for future testing activities.
- Will continue publishing research findings in technical papers, proceedings and reports.
- Will maintain the PRF site and the ATLaS30 device in good working conditions as well as all other loading/maintenance equipment.

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Highway Safety culture Assessment through Louisiana's Regions	<b>Project Status:</b>	Ongoing
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 5	<b>Budget Category:</b>	FHWA
SIO:	DOTLT1000388	Project Start Date:	5/1/2021
Research Project Number:	21-1SA	Completion Date (original)	4/30/2023
Research Agency:	LSU	Completion Date (revised)	7/31/2023
Principal Investigator:	Helmut Schneider		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$173,835	<b>Total</b>	<b>\$2,000</b>
(revised)			
Est. Expended to Date	\$136,000	Salaries	\$2,000
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)	\$66,334	Equipment (non-expendable)	
(revised)	\$138,000	Travel	
Est. FY Expenditure	\$136,000	Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: For Louisiana to reach the goal of a 50% reduction in highway fatalities by the year 2030, individual behavior must change. Having a more complete understanding of behavior at multiple levels can generate useful and relevant insights into driving behavior and the traffic safety culture, which can inform future strategies and messaging and communication efforts. Beyond individual differences, as noted previously, we will seek to gain an understanding of traffic safety culture within Louisiana</p> <p>Objective(s): The objective of this research is to use a mixed approach that combines quantitative survey methodology with qualitative methods (such as focus groups, case studies, participant observation, etc.) to get top-down and bottom-up insight into driving behavior, perceptions, attitudes, and beliefs about traffic safety. Additionally, this research will assess the state of knowledge/awareness about specific issues such as distracted driving and aggressive driving.</p> <p>Expected Benefits: The results of this study may be used by DOTD, Louisiana Highway Safety Commission, Louisiana State Police, and other SHSP stakeholders to inform strategies and program development. Additionally, the results can be used for more effective media outreach, improving policies/programs/laws, and more effective enforcement of legislations. It is expected that findings from the study would benefit the broader transportation community in addressing matters related to human behavior.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<p>Task 7: Data Analysis of Survey Results was completed</p> <p>Task 8: Identification and Pilot Testing of Road Observation Sites was completed</p> <p>Task 9: Final Report Writing is in progress</p>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
Task 9. Submit final report.			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Development of Statewide Design Guidelines for Improving Pedestrian Safety on High Speed Arterials in Louisiana</b>	<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 6</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:	<b>DOTLT1000432</b>	Project Start Date:	10/1/2022
Research Project Number:	22-3SA	Completion Date (original)	3/31/2024
Research Agency:	LSU	Completion Date (revised)	
Principal Investigator:	Hany Hassan		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$175,000	<b>Total</b>	<b>\$74,227</b>
(revised)			
Est. Expended to Date	\$94,206	Salaries	\$40,729
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	\$290
FY Funds (original)	\$100,773	Equipment (non-expendable)	
(revised)		Travel	
Est. FY Expenditure	\$94,206	Other	\$33,208
<b>BUDGET JUSTIFICATIONS</b>			
Other: We will follow the provided budget items in our approved proposal. The \$33,208 is for subcontract to Arora & Associates.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p><b>Problem Statement:</b> The United States has perceived a 62% rise in urban pedestrian fatality from 2010 to 2019; this trend is indicative of a global rise in pedestrian fatalities. From 2015 to 2020, the number of pedestrian fatalities in Louisiana increased by 35.2%, with 146 fatalities. During the first half of 2021 compared to the same period in 2020, the number of pedestrian fatalities in Louisiana rose by 21%. One major element in these crashes is the absence of pedestrian safety measures on high-speed arterials</p> <p><b>Objective(s):</b> This research aims to develop statewide guidelines for pedestrian facilities on high-speed arterials, recommend countermeasures for improving pedestrian safety, and propose modifications to DOTD's policies and manuals. The study will involve completing seven primary tasks, including reviewing existing literature, analyzing crash data, identifying appropriate countermeasures, and developing a guideline document. The ultimate goal is to reduce pedestrian fatalities and injuries on Louisiana's road</p> <p><b>Expected Benefits:</b> This project will develop a statewide guideline that can enhance pedestrian safety on high-speed arterials in Louisiana. The project will produce a matrix of design features for safe movement on and across arterials, guidelines for prioritizing pedestrian facilities, and a statewide guideline to provide pedestrian facilities on high-speed arterials. These results can help transportation authorities improve pedestrian safety, making communities and roads safer.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<p>Task 1: Literature review was conducted completely.</p> <p>Task 2: Categorizing roadway network was conducted completely.</p> <p>Task 3: Achieved 90% of identifying crossing design features and remaining part of the task is to get feedback from Project Review Committee. Will be obtained during the month of April.</p> <p>Task 4: Made good progress ahead of schedule by completing 50% of the activity related to documenting state-of-practices through a survey. First draft of the survey will be shared with the PRC committee during the month of April to get their feedback.</p>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
<p>Task 4: Conduct the state-of-practice survey and analyze the survey data</p> <p>Task 5: Develop a matrix of design features for the safe movement along and across roadways</p> <p>Task 6: Examine conflicts with existing DOTD policies and/or guidance</p> <p>Task 7: Develop statewide guidelines on the provision of pedestrian facilities on Louisiana's high-speed arterials</p> <p>Task 8: Draft Final Report documenting all research effort and results</p>			



**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Best Practices for Maintenance of Control of Access Fencing</b>	<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:	<b>DOTLT1000472</b>	Project Start Date:	1/1/2023
Research Project Number:	23-8SS	Completion Date (original)	6/30/2024
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Milhan Moomen		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$158,964	<b>Total</b>	<b>\$97,961</b>
(revised)			
Est. Expended to Date	\$61,003	Salaries	\$97,961
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)	\$53,178	Equipment (non-expendable)	
(revised)	\$61,003	Travel	
Est. FY Expenditure	\$61,003	Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Access control fencing has been identified as a maintenance issue for the Louisiana DOTD, especially in the vicinity of high-AADT urban areas where run-off-road (ROR) crashes into fencing are more frequent. In addition to budgetary constraints in regular repair or replacement of old fencing, these ROR damages pose considerable challenges in the proper maintenance for the DOTD. This project researches into best fencing regulation and practices to minimize maintenance costs.</p> <p>Objective(s): 1. Determine the best maintenance practices of access control fencing.                  2. Develop an informational guide for access control fencing maintenance which may aid in updating existing fencing policy.                  3. Determine alternative fencing and other practices to lower maintenance costs.</p> <p>Expected Benefits: This research will provide additional understanding of the policy, guidance and maintenance practices with respect to access control fencing across the nation. Fencing policy in Louisiana can be updated from a knowledge of best practices obtained from this study.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<p>Task 1. Completion of review of Louisiana fencing maintenance practices (Literature and Information review).                  Task 2. Completion of review of maintenance strategies and survey of other jurisdictions.</p>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
<p>Task 3. Completion of evaluation of results and summary of survey and data collection efforts.                  Task 4. Finalizing of recommendations.                  Task 5. Completion and submission of final report.</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Collaborative Research and Technical Assistance</b>	<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:	<b>DOTLT1000469</b>	Project Start Date:	1/1/2023
Research Project Number:	23-6SS	Completion Date (original)	9/1/2023
Research Agency:	Consultant-P.V. Vijay	Completion Date (revised)	
Principal Investigator:	P.V. Vijay		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$49,729	<b>Total</b>	<b>\$24,729</b>
(revised)			
Est. Expended to Date	\$25,000	Salaries	\$24,729
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)	\$49,729	Equipment (non-expendable)	
(revised)	\$25,000	Travel	
Est. FY Expenditure	\$25,000	Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Dr. P.V. Vijay, Associate Professor of Civil Engineering will carry out collaborative research with Dr. VJ Gopu, Associate Director for External Programs at LTRC.</p> <p>Objective(s): Collaborative research, production of research papers, and journal articles.</p> <p>Expected Benefits: Publication and dissemination of research results and products from LTRC.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<ol style="list-style-type: none"> <li>1. Carried out analysis of experimental data obtained from four research projects.</li> <li>2. Prepared drafts of four journal articles related to the four research projects.</li> <li>3. Prepared outlines for additional journal articles for the four projects to accomplish a complete presentation of the results of the research projects.</li> <li>4. Identified opportunities for conducting follow-up studies.</li> </ol>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
<ol style="list-style-type: none"> <li>1. Perform critical analysis of experimental data and observations gathered from three to four additional research projects.</li> <li>2. Complete the submission of four journal articles that were prepared in Fiscal Year 22-23.</li> <li>3. Prepare a minimum of four journal articles based on the analysis work carried out in Fiscal Year 23-24; and submit these articles for publication.</li> <li>4. Prepare PowerPoint presentations of the various articles prepared in this effort for broad dissemination in professional meetings and conferences.</li> <li>5. Identify additional opportunities for further research and future research needs.</li> </ol>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Improved Incident Response through Coordinated, Interoperable Communications</b>	<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:	<b>DOTLT1000468</b>	Project Start Date:	1/1/2023
Research Project Number:	23-5SS	Completion Date (original)	12/31/2025
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Milhan Moomen		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$210,850	<b>Total</b>	<b>\$96,667</b>
(revised)			
Est. Expended to Date	\$61,327	Salaries	\$96,667
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)	\$52,855	Equipment (non-expendable)	
(revised)	\$61,327	Travel	
Est. FY Expenditure	\$61,327	Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Traffic incidents on U.S. highways require a coordinated and efficient response to reduce exposing travelers' and responders lives to risk and to lower delays. This research will carry out an operational and functional needs assessment of TIM in Louisiana to determine areas that may be improved with an interoperable web-based communication platform known as Mutualink. The study will identify implementation issues, conduct a Field Operations Test and undertake a benefit-cost analysis.</p> <p>Objective(s): 1. Carry out an operational needs assessment and a performance evaluation of the state's TIM.                  2. Perform a functional analysis of the Mutualink system.                  3. Carry out a benefit cost analysis of integrating Mutualink into the state's TMC.</p> <p>Expected Benefits: 1. The proposed research approach is integrating an interoperable communications platform into TMCs, which will allow for better coordination and communications during incident response by utilizing the power of the internet.                  2. A statewide deployment of an interoperable system could be instrumental in natural disaster response and reduce crash fatalities, given Louisiana's high crash rate.                  3. Such a system would improve the efficient operations of incident response in the state.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
Task 1 - Information review finalized. Task 2 - Evaluation of TIM System finalized. Task 3 - Establishing TIM evaluation criteria and benchmarks finalized.			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
Task 4 - Demonstrate Mutualink use to stakeholders. Task 5 - Conduct field operations test of Mutualink. Task 6 - Conduct functional and performance evaluation of Mutualink.			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Estimating HCM Default Parameters for Louisiana			<b>Project Status:</b>	Ongoing
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 5		<b>Budget Category:</b>		FHWA
SIO:	DOTLT1000459		Project Start Date:		1/1/2023
Research Project Number:	23-3SS		Completion Date	(original)	12/31/2024
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Ashifur Rahman				
<b>BUDGET STATUS</b>					
<b>Total Budget</b>			<b>Estimated 2023-2024 Budget</b>		
Total Cost	(original)	\$219,070	<b>Total</b>		<b>\$109,535</b>
	(revised)				
Est. Expended to Date		\$25,033	Salaries		\$109,535
<b>FY 2022 - 2023 Budget</b>			Consumable Supplies & Materials		
FY Funds	(original)	\$109,535	Equipment	(non-expendable)	
	(revised)	\$25,033	Travel		
Est. FY Expenditure		\$25,033	Other		
<b>BUDGET JUSTIFICATIONS</b>					
Budget amounts do not require justifications.					
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>					
<p>Problem Statement: The default values from Highway Capacity Manual are more generic and may not suit the local driving conditions. For example, there is a need of a headway defaults for different roadways that suit the local driving conditions for the traffic analysis</p> <p>Objective(s): To evaluate few HCM default parameters like saturation flow rate, headway, percentage of heavy vehicles for the level of service, and peak-hour factor and check if the HCM default values are applicable in Louisiana.</p> <p>Expected Benefits: The values found will be used to help improve traffic analysis in the state which ultimately would benefit all decision makers and stakeholders.</p>					
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>					
<p>Task 1: Literature review was completed.</p> <p>Task 2: Population list of intersection was developed.</p> <p>Task 3: Sample List of Intersections has been generated.</p> <p>Task 4: Sample data have been collected by recording 511 camera footage.</p> <p>Task 5: The video observation to collect field data has started and ongoing.</p> <p>Task 7: The report writing has been partially completed.</p>					
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>					
<p>Task 4: Complete video data collection.</p> <p>Task 5: Continue the video observation in the lab.</p> <p>Task 6: Continue analysis to estimate HCM parameters.</p> <p>Task 7: A major portion of the final report writing including field observation details should be completed.</p>					

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Safety and Traffic Operations at Cloverleaf Interchanges</b>	<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:	<b>DOTLT1000458</b>	Project Start Date:	8/1/2022
Research Project Number:	23-1SS	Completion Date (original)	7/31/2024
Research Agency:	LSU	Completion Date (revised)	
Principal Investigator:	Hany Hassan		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$130,000	<b>Total</b>	<b>\$64,123</b>
(revised)	\$189,223		
Est. Expended to Date	\$29,189	Salaries	\$51,712
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)	\$65,877	Equipment (non-expendable)	
(revised)	\$125,099	Travel	
Est. FY Expenditure	\$122,873	Other	\$12,411
<b>BUDGET JUSTIFICATIONS</b>			
<p>Other: To achieve the study objectives, it is required to collect actual traffic count data at the 8 interchanges under investigation. This data will be used to calibrate and validate the VISSIM models that will be developed in this study. So, it is necessary to modify the project agreement to increase the total budget by the amount needed to collect the traffic count data (\$47,760).</p>			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Cloverleaf and Diamond interchanges are the common forms of interchanges in United States as well as in Louisiana. However, based on previous studies it is found that both cloverleaf and diamond interchanges are becoming less efficient in increasing number of traffic counts. Therefore, it is critical to conduct safety and traffic analysis to evaluate current and future performances of cloverleaf and diamond interchanges and provide recommendation based on it.</p> <p>Objective(s): - Assess the safety and operational performances of cloverleaf interchanges in Louisiana as compared to the traditional diamond interchanges.</p> <ul style="list-style-type: none"> <li>- Use safety and traffic analysis to predict future performance of cloverleaf and diamond interchanges in Louisiana.</li> <li>- Suggest countermeasures/alternative interchange solution that should be implemented of a cloverleaf/diamond interchange is not an appropriate alternative based on their predicted future performance.</li> </ul> <p>Expected Benefits: The summary of the assessment of safety and operational performances of cloverleaf interchanges in Louisiana compared to the traditional diamond interchanges will be presented. Also, discussion regarding the prediction of future performance of cloverleaf and diamond interchanges will be provided. Finally, actionable countermeasures that can be implemented if a cloverleaf/diamond interchange isn't an appropriate alternative based on their predicted future performance will be suggested.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<p>Task 1 - The literature review task for the project was conducted and completed.</p> <p>Task 2</p> <ul style="list-style-type: none"> <li>- Finalized the study area that include 4 cloverleaf interchanges and 4 diamond interchanges that we are going to investigate after detailed discussion with the PRC committee.</li> <li>- Obtained access of the Regional Integrated Transportation Information System (RITIS) to get different traffic data (speed, travel time data). This data along with field count data will be used for the calibration and validation of VISSIM model.</li> <li>- Prepared the report regarding the different areas of interchanges where the traffic count and traffic signal timing is required. It was agreed to hire a third-party company to collect traffic counts for the 8 interchanges.</li> <li>- The report of the locations where traffic count is required was sent to three companies. All three companies sent their quotations with their plans to collect the data. After reviewing the quotation, one of the three companies was selected to collect the data. It will be hired soon after obtaining LSU/LTRC approval.</li> </ul> <p>Task 3 - The building of networks of 4 cloverleaf interchanges and 4 diamond interchanges in VISSIM is completed. Also, it included building of frontage roads, application of priority rules and identification of reduced speed areas.</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

**FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES**

Task 3 – Evaluation of traffic operation through microsimulation analysis (VISSIM) will be completed once field traffic data is received. This includes estimation of average travel speed, average queue length, average vehicle delay, average stopped delay per vehicle, average number of stops per vehicle, travel times of vehicle in the network and operational level of service (LOS) of all 8 interchanges.  
– Safety analysis using Surrogate Safety Assessment model (SSAM) using files generated from VISSIM will be also conducted.

Task 4 – Crash data analysis using database of traffic crashes for the most recent five years will be completed.

Task 5 – Conclusions and recommendations will be prepared considering the results of all previous tasks.

Task 6. The final report of the project will be prepared documenting the entire research effort and providing a detailed description of all research tasks.

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Analyzing Human Mobility for Active Transportation Planning in Louisiana</b>	<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:	<b>DOTLT1000430</b>	Project Start Date:	3/1/2022
Research Project Number:	22-5SS	Completion Date (original)	8/31/2023
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Ruijie "Rebecca" Bian		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$123,936	<b>Total</b>	<b>\$17,315</b>
(revised)			
Est. Expended to Date	\$84,727	Salaries	\$8,195
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)	\$77,327	Equipment (non-expendable)	
(revised)	\$75,202	Travel	
Est. FY Expenditure	\$75,202	Other	\$9,120
<b>BUDGET JUSTIFICATIONS</b>			
Other: Other budget is for a sub-contract to a consultant. The breakout sheet is attached to the proposal.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Active transportation refers to any human-powered mode of transportation, such as walking and bicycling. Promoting active transportation for the benefits of current and future Louisiana residents is significant, in terms of improving chronic disease outcomes as well as mitigating traffic and safety impacts. The pandemic situation also calls our attention to provide more sustainable and resilient transportation infrastructure in response to public health crisis.</p> <p>Objective(s): The proposed project would: (1) observe human mobility patterns in Louisiana and whether/how, the patterns changed during COVID-19 and (2) develop an index showing hotspots needing active transportation infrastructures the most based on the observed mobility pattern.</p> <p>Expected Benefits: The proposed research will be useful to future active transportation planning, project prioritization, and investment decisions. The proposed research approach is especially useful to states who have less active transportation infrastructure and where pedestrian/bicyclist count data are not sufficient.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<p>Task 1: review active transportation demand planning methods. (Completed)</p> <p>Task 2: filter, clean, and enrich the mobility data. (Completed in the previous fiscal year)</p> <p>Task 3: identify active transportation hot areas and trends. (Completed)</p> <p>Task 4: present results visually to support decision-making. (Expect to complete in April 2023)</p> <p>Task 5: collect feedback from stakeholders. (Expect to complete in April 2023)</p> <p>Task 6: prepare the final report. (Expect to submit a draft final report for PRC review by the end of May 2023)</p>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
Task 6: revise the final report based on comments from PRC members.			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Economic Impact of Access Management Treatments			<b>Project Status:</b>	Ongoing
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 5		<b>Budget Category:</b>		FHWA
SIO:	DOTLT1000429		Project Start Date:		7/1/2022
Research Project Number:	22-4SS		Completion Date	(original)	6/30/2024
Research Agency:	ULL		Completion Date	(revised)	
Principal Investigator:	Stephen Barnes				
<b>BUDGET STATUS</b>					
<b>Total Budget</b>			<b>Estimated 2023-2024 Budget</b>		
Total Cost	(original)	\$200,000	<b>Total</b>		<b>\$88,705</b>
	(revised)				
Est. Expended to Date		\$74,813	Salaries		\$88,705
<b>FY 2022 - 2023 Budget</b>			Consumable Supplies & Materials		
FY Funds	(original)	\$112,511	Equipment	(non-expendable)	
	(revised)	\$74,813	Travel		
Est. FY Expenditure		\$74,813	Other		
<b>BUDGET JUSTIFICATIONS</b>					
Budget amounts do not require justifications.					
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>					
<p>Problem Statement: Access management strategies are used by transportation agencies to improve efficiency and safety on roadways. These treatments concentrate on location, spacing, entrances design, intersections, traffic signals, and median openings to minimize the conflict points. We need to assess the economic effect these projects to understand the impact on the economic development of region, to foster better communications at DOTD public meetings, and to convey the impact to adjacent businesses owners.</p> <p>Objective(s): The overall goal of this research is to assess the economic impact of access management techniques on businesses in the corridor where such projects have been implemented in Louisiana. A secondary goal is to assess the perception of businesses near completed projects.</p> <p>Expected Benefits: DOTD and other stakeholders can use the findings for more effective deployment of access management treatments in Louisiana to improve traffic flow and safety. The study will also provide support for improved communication at DOTD public meetings about implications of access management projects. This research will help clarify the impact of access management projects on traffic safety and the economic priorities of local businesses.</p>					
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>					
Task 1: Literature Review Task 2: Identify and Collect Data Task 3: Design Surveys					
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>					
Task 2: Collect additional data Task 4: Conduct business survey Task 5: Conduct Resident Survey Task 6: Analyze Survey Data Task 7: Analyze Sales Tax Data Task 8: Write Report Task 9: PRC Review and Finalize Report					



**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Testing the Hurricane Evacuation Modeling Package (HEMP)	<b>Project Status:</b>	Ongoing
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 5	<b>Budget Category:</b>	FHWA
SIO:	DOTLT1000427	Project Start Date:	8/1/2022
Research Project Number:	22-3SS	Completion Date (original)	1/31/2024
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Ruijie "Rebecca" Bian		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$90,981	<b>Total</b>	<b>\$58,588</b>
(revised)			
Est. Expended to Date	\$16,941	Salaries	\$53,588
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	\$5,000
FY Funds (original)	\$54,222	Equipment (non-expendable)	
(revised)	\$16,941	Travel	
Est. FY Expenditure	\$16,941	Other	
<b>BUDGET JUSTIFICATIONS</b>			
Supplies: The project needs to purchase two software license to test the package. One Academic TransCAD Single User License costs \$2,500 per year. One Academic TransModeler License also costs \$2,500 per year.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: LTRC has developed a computer package that allows estimation of evacuation traffic depending on storm characteristics and decisions made by Emergency Managers. It has been set up to operate in the New Orleans area and requires testing to validate its ability to replicate past storms. Testing of the computer package is necessary to determine the accuracy and usefulness of the package.</p> <p>Objective(s): This project focuses on testing the developed Hurricane Evacuation Modeling Package (HEMP) in different storm scenarios and improving HEMP's performance. The objectives of this project include:</p> <ul style="list-style-type: none"> <li>•Improve and validate prediction accuracy of the developed package</li> <li>•Improve its fitness to actual emergency operations in Louisiana</li> <li>•Improve its computation speed</li> <li>•Explore enhancing HEMP's capabilities</li> </ul> <p>Expected Benefits: A program that predicts the consequences of alternative management evacuation decisions allowing informed decision makings.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<p>Task 1: Revisited/checked the estimated evacuation demand models for application.</p> <p>Task 2: Checked the road network to identify issues.</p> <p>Task 3: Made plans for improving simulation processing speed</p> <p>Task 5: Conducted literature/manual review to explore possibilities of enhancing HEMP's Capabilities</p>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
<p>Task 1: Finalize the model coding</p> <p>Task 2: Check the simulation setup and finalize coding in traffic simulation</p> <p>Task 3: Improve simulation processing speed</p> <p>Task 4: Compare simulation results with actual traffic counts</p> <p>Task 5: Propose possible capability improvements</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>LTRC Proposal for the Support of Research and Development in Special Studies</b>	<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:	<b>DOTLT1000280</b>	Project Start Date:	7/1/2019
Research Project Number:	19-1SS	Completion Date (original)	6/30/2021
Research Agency:	ULL	Completion Date (revised)	6/30/2024
Principal Investigator:	Elisabeta Mitran		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$494,396	<b>Total</b>	<b>\$121,000</b>
(revised)	\$1,446,751		
Est. Expended to Date	\$480,877	Salaries	\$105,000
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	\$3,000
FY Funds (original)	\$110,955	Equipment (non-expendable)	\$3,000
(revised)		Travel	\$10,000
Est. FY Expenditure	\$115,000	Other	
<b>BUDGET JUSTIFICATIONS</b>			
<p>Travel: Travel: Travel: Travel:            - TRB annual meeting - \$5,000 (2 attendees)            - Lifesavers Conference -\$2,500            - GHSA - \$2,500</p>			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p><b>Problem Statement:</b> The focus of LTRC on highway safety-related research has increased over the past 10 years as Louisiana adopted the strategic vision "Destination Zero Deaths" and committed in 2009 to halve fatalities and severe injuries by 2030. The Louisiana Strategic Highway Safety Plan (SHSP) uses a comprehensive, data-driven, multidisciplinary approach to identify the most severe traffic safety problems and the most effective approaches to solve them.</p> <p><b>Objective(s):</b> The purpose of this project is to provide long-term professional assistance to the Louisiana Department of Transportation and Development (DOTD) on the management and conduct of research for special studies-related matters. Projects to be managed can include safety and other special studies, as necessary.</p> <p><b>Expected Benefits:</b> The benefits of this project include specialized technical expertise for the management of ongoing research program to investigate special studies questions, especially in the area of highway safety.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<p>Task 1. Plan, develop, and manage the assigned LTRC research work program in the special studies/safety is ongoing.            Task 2. Provide authoritative review of contract research in the area of special studies/safety. Task is ongoing.            Task 3. Coordinate efforts to disseminate and implement the research findings. Task is ongoing.            Task 4. Conduct transportation engineering research projects, as needed. This task is ongoing.</p>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
<p>Task 1. Continue to plan, develop, and manage the assigned LTRC research work program in the special studies/safety.            Task 2. Continue to provide authoritative review of contract research in the area of special studies/safety.            Task 3. Continue to coordinate efforts to disseminate and implement the research findings.            Task 4. Continue to conduct transportation engineering research projects, as needed.</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>LTRC Proposal for the Support of Research and Development in ITS/Traffic</b>	<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:	<b>DOTLT1000281</b>	Project Start Date:	7/1/2019
Research Project Number:	19-1ITS	Completion Date (original)	6/30/2021
Research Agency:	ULL	Completion Date (revised)	6/30/2024
Principal Investigator:	Vijaya Gopu		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$872,706	<b>Total</b>	<b>\$80,825</b>
(revised)	\$2,367,433		
Est. Expended to Date	\$374,241	Salaries	\$7,725
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	\$5,000
FY Funds (original)	\$105,590	Equipment (non-expendable)	\$11,000
(revised)	\$33,423	Travel	\$20,000
Est. FY Expenditure	\$33,423	Other	\$37,100
<b>BUDGET JUSTIFICATIONS</b>			
<p>Supplies: This is estimated for the purchase of several project related supplies and will be itemized when actually needed to be purchased.</p> <p>Equipment: Anticipated ITS equipment (cameras, wireless services, counting devices, etc.) with an individual cost of an item not to exceed \$5,000</p> <p>Travel: The \$20,000 travel budget is for the following conferences:</p> <ol style="list-style-type: none"> <li>1. TRB (5 attendees) - \$12,000</li> <li>2. GRITS (2 attendees) - \$5,000</li> <li>3. ITE (2 attendees) - \$3,000</li> </ol> <p>Other: The estimated budget is for the following activities:</p> <ol style="list-style-type: none"> <li>1. Deepmetrics - \$5,000</li> <li>2. SPSS - \$1,500</li> <li>3. Consultation - \$15,600</li> <li>4. Data Point - \$10,000</li> <li>5. Vissim - \$5,000</li> </ol>			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p><b>Problem Statement:</b> To conduct research for special studies-related matters, specifically for Intelligent Transportation System (ITS) and traffic engineering related topics.</p> <p><b>Objective(s):</b> The objective is to provide long-term professional assistance to DOTD on the management and conduct of research for special studies-related matters, specifically for ITS and traffic engineering-related topics. No specific research documents will be produced from this project. However, each study identified under this project will have its own proposal developed, complete with objectives, scope of work, deliverables, and amount/resources required to undertake the study.</p> <p><b>Expected Benefits:</b> It would benefit all the designers, planners, decision makers, and stakeholders especially in DOTD's ITS and traffic engineering areas.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<p>Task 1: Re-Evaluate the Vision of LTRC's Intelligent Transportation System (ITS) Laboratory and Re-align with Transportation Needs of LTRC and DOTD to Better Serve the Public.</p> <p>Task 2: Develop Research Protocols and Initiatives.</p> <p>Task 3: Strategically Plan Own Project Schedules and Quantity of Resources to Participate in Research Projects.</p> <p>Task 4: Coordinate Information.</p> <p>Task 5: Assume Leadership Roles in Forming and Maintaining Productive Working Relationships.</p> <p>Task 6: Build and Maintain a Strong Research Program.</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

**FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES**

Continue with Task 1: Re-Evaluate the Vision of LTRC's Intelligent Transportation System (ITS) Laboratory and Re-align with the Transportation Needs of LTRC and DOTD to Better Serve the Public.  
Continue with Task 2: Develop Research Protocols and Initiatives.  
Continue with Task 3: Strategically Plan Own Project Schedules and Quantify Resources to Participate in Research Projects.  
Continue with Task 4: Coordinate Information.  
Continue with Task 5: Assume Leadership Roles in Forming and Maintaining Productive Working Relationships.  
Continue with Task 6: Build and Maintain a Strong Research Program.

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>LTRC Proposal for the Support of Research and Development in Transportation Planning</b>	<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:	<b>30000125</b>	Project Start Date:	7/1/2010
Research Project Number:	10-1PLAN	Completion Date (original)	6/30/2015
Research Agency:	LTRC	Completion Date (revised)	6/30/2024
Principal Investigator:	Ruijie "Rebecca" Bian		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$358,462	<b>Total</b>	<b>\$86,978</b>
(revised)	\$9,723,832		
Est. Expended to Date	\$9,014,396	Salaries	\$79,338
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	\$1,240
FY Funds (original)	\$115,245	Equipment (non-expendable)	
(revised)	\$78,255	Travel	\$6,400
Est. FY Expenditure	\$78,255	Other	
<b>BUDGET JUSTIFICATIONS</b>			
Travel: Travel: The budget is for travel to the Transportation Research Board Annual meeting (~4 attendees).			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: This project provides long-term professional assistance to the Louisiana Department of Transportation and Development on transportation planning and other matters. Research is conducted on topics from LTRC's research program, technical assistance requests from DOTD, and external research solicitations.</p> <p>Objective(s): This project is to satisfy research needs and requirements from DOTD. This project also encourages graduate students to participate in the LTRC research program.</p> <p>Expected Benefits: The research results and technical assistance are expected to facilitate DOTD's transportation planning activities. This project also affords LTRC the opportunity to support the enhancement of higher education.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<p>Task 1: Research activities. (1) Supervised three graduate students and two undergrad students at LSU. (2) Developed four conference sessions and presented at the American Planning Association (APA) Louisiana 2022 Conference, the 2023 Transportation Research Board Annual Meeting (TRB), the 2023 Louisiana Transportation Conference (LTC), and the 2023 National Hurricane Conference (NHC). (3) Published four journal articles within the fiscal year to date. (4) Developed one internal research proposal: "23-4SS Statewide Non-Motorized Traffic Monitoring Study." (5) Developed two external research proposals: "USDOT Regional UTC - Southwest Transportation Alliance for Social and Economic Mobility (STASEM)" and "NSF EPSCoR Research Infrastructure Improvement Program: Track-2 Focused EPSCoR Collaborations (RII Track-2 FEC)." (6) Worked on one external project: NASEM/GRP Early-Career Research Fellowship. (7) Worked on four internal projects as described in Task 2. (8) Finalized two internal project reports: "19-5SS: Assessing the Economic Development Benefits of the Transportation Investment Model for Economic Development (TIMED) Program" and "21-2SS: Evaluate the Impacts of Complete Streets Policy in Louisiana." (9) Received the Best Paper Award from TRB.</p> <p>Task 2: Project management. Managed projects 19-5SS, 21-2SS, 22-3SS (Testing the Hurricane Modeling Package), 22-5SS (Analyzing Human Mobility for Active Transportation Planning in Louisiana) and 22-5SS (Analyzing Human Mobility for Active Transportation Planning in Louisiana).</p> <p>Task 3: Service. (1) Served on Transportation Research Board Standing Committee on Disaster Response, Emergency Evacuations, and Business Continuity (AMR 20) for paper review coordination, workshop development, and liaison with other TRB committees. (2) Served on the Louisiana Complete Streets Advisory Council as a member. (3) Reviewed 41 journal articles in 2022. (4) Provided technical assistance to DOTD "Evaluate the use of Integrated Modeling for Road Condition Prediction (IMRCP) system in Louisiana." (5) Served as a panel member for "NCHRP 08-164: Institutional Integration of Active Transportation" (D08164). (6) Reviewed 12 NCHRP problem statements.</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

**FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES**

Task 1: Research activities. Keep supervising students, publishing research results, and developing proposals for new projects.

Task 2: Project management. Keep managing projects 22-3SS and 22-5SS. Start working on project 23-4SS.

Task 3: Service. Continue serving on technical committees and professional societies.

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Evaluation of Embedded Pile Resistance on Scour Critical Bridges</b>	<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:	<b>DOTLT1000457</b>	Project Start Date:	5/2/2022
Research Project Number:	22-3ST	Completion Date (original)	5/1/2025
Research Agency:	LSU	Completion Date (revised)	
Principal Investigator:	Murad Abu-Farsakh		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$383,004	<b>Total</b>	<b>\$82,700</b>
(revised)			
Est. Expended to Date	\$80,500	Salaries	\$78,000
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	\$4,700
FY Funds (original)	\$130,703	Equipment (non-expendable)	
(revised)	\$80,000	Travel	
Est. FY Expenditure	\$68,500	Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Louisiana DOTD frequently evaluates channel geometry to determine if scour has impact on embedded foundation. In many cases, the resistance of embedded piles' estimated using nearby soil borings and on same static analysis methods used to design piles have shown that the pile resistance in many cases is less than the dead load reaction for the given pile. It is possible that the static equilibrium design methods are not adequate for this type of bridge evaluation that needs investigating.</p> <p>Objective(s): Complete additional structural load tests to confirm whether a bridge is safe to traffic load. Explore methods to evaluate the resistance of embedded piles for bridges subjected to critical scour. Evaluate direct cone penetration test (CPT) methods to determine the best method for estimating the embedded pile resistance. Incorporate the long-term effect of pile resistance (scour, setup). Identify bridges that will be replaced to confirm the best method by loading pile prior to demolition.</p> <p>Expected Benefits: A standardized method of estimating the geotechnical resistance of embedded piles will help provide a more rapid response in determining whether it is safe or not to load post a bridge after any scour event. This will help ensure the safety of bridges to vehicles and passengers prior to open the bridge to traffic, and help prioritize bridge replacement projects.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<p>Task 1- conducted literature review relevant to methods and techniques for evaluation of the current resistance of in-place piles for in-service bridges.</p> <p>Task 2- Conducted proof load tests on seven selected bridges with coordination with DOTD geotechnical and bridge design sections. Identified four bridges to be demolished to cut and conduct a single static pile load test. Prepared notes on cutting and static load testing of a selected pile for inclusion on design plan for the 4 bridges that to be demolished, and we are waiting for update for field tests.</p> <p>Task 3- Performed cone penetration tests (CPT) and seismic CPT tests on the seven proof load test bridges to obtain soil information and properties as close as possible to the pile bent.</p> <p>Task 4- Analyzed the results of the seven proof load tests. Analyzed the results of CPT and seismic CPT tests for the seven proof load tests for evaluating the ultimate capacity of tested piles.</p> <p>Task 5- Explored several analytical methods and techniques for extrapolating the incomplete load-displacement curves for the seven proof load tests to be able evaluate the ultimate pile capacity. Used the FB-Multiplier finite element software to extrapolate the incomplete load-displacement curves from the proof load tests.</p> <p>Task 6- Collected pile load test data from literature for 5 piles subjected to long-term aging and scour. Started updating the curves of aging and consolidation setup with time. Analyzed 14 fully instrumented test piles (10 from Louisiana and 4 from Florida) using 8 direct pile-CPT methods.</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

**FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES**

Task 1-Continue literature review relevant to methods and techniques for evaluation of the current resistance of in-place piles for in-service bridges subjected to critical scour.

Task 2- Continue identifying bridges with critical scour to conduct additional proof load tests. Identify new bridges to be demolished to cut and conduct a single static pile load test.

Task 3- Perform CPT and seismic CPT tests through the bridge deck for any new proof load test sites and any potential bridges to be demolished to obtain soil information as close as possible to the pile bent(s) in question.

Task 4- Continue analyzing the measurements from the field load tests and the in-situ data from CPT and seismic CPT tests for evaluating the ultimate capacity of tested piles.

Task 5 - Continue exploring different extrapolation techniques and finite element analysis to complete the load-settlement curves for the proof load tests. Explore the potential use of seismic CPT tests for extrapolating the incomplete load-displacement curves from proof load tests.

Task 6- Collect as much as possible pile load test cases from literature that were tested up to 30 years after pile installation (subjected to long-term aging and/or scour). Analyzed the collected pile load tests using 8 direct pile-CPT methods. Continue Analyzing data and update curves for consolidation and aging setup effects with time. Start simulating the effect of pile installation on the surrounding stress state and effect of scour on the reduction in capacity using PLAXIS/ABAQUS softwares.



**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Skew Detection System Replacement on Vertical Lift Bridges Phase 2</b>	<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:	<b>DOTLT1000428</b>	Project Start Date:	2/1/2022
Research Project Number:	22-2ST	Completion Date (original)	12/31/2022
Research Agency:	Wiss, Janney, Elstner Associates, Inc.	Completion Date (revised)	12/31/2023
Principal Investigator:	Gareth Rees		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost	(original) \$460,000	<b>Total</b>	<b>\$196,785</b>
	(revised)		
Est. Expended to Date	\$338,611	Salaries	\$86,416
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds	(original) \$18,937	Equipment (non-expendable)	
	(revised) \$233,611	Travel	\$10,369
Est. FY Expenditure	\$233,611	Other	\$100,000
<b>BUDGET JUSTIFICATIONS</b>			
<p>Travel: Task 3 - Design Visit 2 (1 engineer, 2 days)            Task 3 - Design Visit 3 (1 engineer, 2 days)            Task 4 - Final Adjustments Visit 1 (1 engineer, 3 days)            Task 4 - Final Adjustments Visit 2 (1 engineer, 3 days)            Task 5 - Post Installation Visit 1 (1 engineer, 1.5 days)            Task 5 - Post Installation Visit 2 (1 engineer, 1.5 days)            (all include flights, hotel, per diem, etc.)</p> <p>Other: The \$100,000 is the estimated remainder FY cost for an electrical subconsultant for installation.</p>			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p><b>Problem Statement:</b> For a tower drive vertical lift bridge, failure to maintain span longitudinal or transverse skew can lead to jamming of the movable span in its guides and, without adequate protection, can lead to a catastrophic bridge failure. Phase 1 of this study yielded some recommendations for the replacement of the differential selsyn used with new electric / electronic components.</p> <p><b>Objective(s):</b> The objective of this of this project is to: (1) analyze the control system and determine how to interface the encoder system into the existing electrical ladder logic (2) determine the scope of work required to implement the installation (3) perform the installation (4) calibrate and test the installation (5) provide support personnel and time for troubleshooting the installation for a period of 6 months.</p> <p><b>Expected Benefits:</b> A reliable skew detection system with replacement components readily available in the market.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<p>Task 1. 100% drawings and details provided to contractor for cost.            Task 2. Preliminary schedule in process. Revised costs in process            Task 3. Prelim coordination with installation contractor.</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

**FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES**

Task 3. Final coordination and submittal review.

Task 4. Adjust and calibrate the equipment to be able to correctly display skew as well as trip the electrical system when the bridge gets too far out of skew.

Task 5. Post installation visits to check on status.

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Developing The Load Distribution Formula for Louisiana Culverts	<b>Project Status:</b>	Ongoing
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 5	<b>Budget Category:</b>	FHWA
SIO:	DOTLT1000342	Project Start Date:	3/1/2020
Research Project Number:	20-1ST	Completion Date (original)	8/31/2021
Research Agency:	LSU	Completion Date (revised)	6/30/2023
Principal Investigator:	Ayman Okeil		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost	(original) \$99,989	<b>Total</b>	<b>\$54,172</b>
	(revised) \$139,927		
Est. Expended to Date	\$79,755	Salaries	\$54,172
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds	(original) \$75,927	Equipment (non-expendable)	
	(revised) \$75,927	Travel	
Est. FY Expenditure	\$23,643	Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: In Louisiana, the bridge inventory includes approximately 2,600 culverts where cast-in-place (CIP) reinforced concrete (RC) box culverts constitute a sizeable portion of the overall culvert inventory which must be load rated. Current load rating procedures for these culverts often yields unacceptable results though their performance is acceptable with no apparent cracking or deformation. Unacceptable rating implies load posting or expensive upgrade.</p> <p>Objective(s): The objective of this study is to develop live load distribution formulas that can be used to represent the dimensions of the affected area over buried CIP reinforced concrete box culverts. The proposed formulas will take into account Louisiana standard details for negative moment reinforcement at exterior corners. The reliability resulting from these study will be compared with AASHTO LRFD target <math>\beta</math> values.</p> <p>Expected Benefits: The findings of this study will help DOTD make informed decisions about load rating and load posting of cast-in-place reinforced concrete box culverts. The newly developed formulas will take into account DOTD standard details that may not be within the scope of national projects such as NCHRP Project 15-54. This project's findings are expected to alleviate a burden imposed on engineers who try to load rate LA culverts but cannot because of limitations of current procedures.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<p>The following tasks are expected to be conducted during FY 2022-23:</p> <p>Task 7 Finish the reliability study using results from finite element analyses.</p> <p>Task 8 Prepare draft final report, address PRC comments, submit final report.</p>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
Task 9 Develop workshop to disseminate results.			

**FHWA**  
**Part B SPR Funded**  
**Research Program**

**PROPOSED RESEARCH**

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Development of a Practical Long-Term Aging Protocol for Semi-Circular Bend (SCB) Test</b>			<b>Project Status:</b>	<b>Proposed</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>		<b>Budget Category:</b>		<b>FHWA</b>
SIO:			Project Start Date:		7/1/2023
Research Project Number:			Completion Date	(original)	12/31/2024
Research Agency:		LTRC	Completion Date	(revised)	
Principal Investigator:	Louay Mohammad				
<b>BUDGET STATUS</b>					
<b>Total Budget</b>			<b>Estimated 2023-2024 Budget</b>		
Total Cost	(original)	\$100,000	<b>Total</b>		<b>\$65,000</b>
	(revised)				
Est. Expended to Date			Salaries		\$65,000
<b>FY 2022 - 2023 Budget</b>			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		
<b>BUDGET JUSTIFICATIONS</b>					
Budget amounts do not require justifications.					
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>					
<p>Problem Statement: The 2016 DOTD Specifications require a criterion for critical strain energy release rate, J<sub>c</sub>, obtained from Semi Circular Bend (SCB) test as a part of its balanced asphalt mixture design. SCB test is performed on long term aged (LTA) compacted samples (5 days at 85°C). However, practices of QC/QA are time-sensitive. Thus, it is impractical to include LTA SCB samples during QC and QA testing.</p> <p>Objective(s): The objective of this study is to develop a practical LTA protocol for asphalt mixes. The proposed LTA protocol is envisioned to be rapid, easy, and reliable, and requires shorter sample conditioning time for plant-produced asphalt mixture samples than AASHTO R30, which makes it practical for implementation of SCB in QC/QA testing</p> <p>Expected Benefits: The main product of this research will be an implementable specification for the use of the SCB test in QC/QA practices in the state of Louisiana. It is anticipated that findings will complement the current 2018 Louisiana DOTD Specifications for Roads and Bridges, and provide efficient proactive measures to ensure that mixtures are produced and compacted as expected for an extended service life against cracking.</p>					
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>					
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>					
<p>Task 1: Conduct a comprehensive literature review on studies relevant to long-term aging of asphalt mixtures and identify promising aging procedures;</p> <p>Task 2: Develop laboratory experiments for asphalt binder chemical and rheological properties and asphalt mixture SCB J<sub>c</sub> testing;</p> <p>Task 3: Identify field projects and collect component materials of plant-produced asphalt mixtures; and</p> <p>Task 4: Conduct laboratory experiments and perform data analysis</p>					

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Performance Of Asphalt Pavements Containing Recycled Materials Under Accelerated Loading</b>	<b>Project Status:</b>	<b>Proposed</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:		Project Start Date:	1/1/2018
Research Project Number:		Completion Date (original)	6/30/2020
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Louay Mohammad		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost	(original) \$350,000	<b>Total</b>	<b>\$88,000</b>
	(revised)		
Est. Expended to Date		Salaries	\$88,000
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds	(original)	Equipment (non-expendable)	
	(revised)	Travel	
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Recycling of construction materials in flexible pavements is cost effective offers key element of sustainability in transportation infrastructure through reduction in use of virgin materials and eliminates needs for landfill areas. Reclaimed Asphalt Pavement (RAP) is commonly used because of its high compatibility with newly produced asphalt mixtures. Further, Reclaimed Asphalt Shingles (RAS) and waste plastics have become another promising candidate green construction material.</p> <p>Objective(s): The objective of this research is to assess the applicability of "green" construction and performance alternatives such as RAS, increased amount of RAP, and waste plastics in Louisiana asphalt paving projects under accelerated loading.</p> <p>Expected Benefits: Findings from this research results will be used to update asphalt mixture specifications in the Louisiana Specifications for Roads and Bridges. Further, results will promote the use of sustainable technologies in Louisiana's flexible pavement construction.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
<p>Task 1 – Conduct Literature review</p> <p>Task 2 – Develop experimental factorial,</p> <p>Task 3 – Perform laboratory asphalt mixture design and performance testing for mixtures to be used in Task 4</p> <p>Task 4 – Prepare construction documents for construction of test lanes</p> <p>Task 5 – Monitor construction of test lanes as per bid documents</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Support Study for Evaluation of Saturates/Aromatics/Resins/Asphaltenes (SARA) Fractionation of asphalt binders in Louisiana</b>	<b>Project Status:</b>	<b>Proposed</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:		Project Start Date:	7/1/2022
Research Project Number:		Completion Date (original)	4/30/2024
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Louay Mohammad		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$160,000	<b>Total</b>	<b>\$65,000</b>
(revised)			
Est. Expended to Date		Salaries	\$63,500
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)	\$80,000	Equipment (non-expendable)	
(revised)		Travel	\$1,500
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: The 2018 DOTD Specifications require a criterion for critical strain energy release rate, Jc, obtained from Semi Circular Bend (SCB) test as a part of its balanced asphalt mixture design. Asphalt binder aging has a significant effect on long-term performance of asphalt pavement. It causes embrittlement of asphalt binder due to the changes in rheological properties and chemical composition of asphalt binders.</p> <p>Objective(s): The objective of this study is to compare chemical properties of asphalt binders characterized in LTRC Project 22-1B to the corresponding asphalt mixtures' SCB critical strain energy release rate, Jc.</p> <p>Expected Benefits: Finding of this research will substantially increase understanding of the effect of chemical properties of various asphalt binders on intermediate temperature cracking resistance of asphalt mixtures. Specifically, those mixtures with increased use of recycled materials. Further, results will promote the use of sustainable technologies in Louisiana's flexible pavement construction.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
<p>Task 1 – Conduct Literature review</p> <p>Task 2 – Identify Asphalt Binders Characterized in LTRC Project 22-1B</p> <p>Task 3 – Develop Asphalt Mixture Design and Conduct of Laboratory SCB testing</p> <p>Task 4 – Perform Data analyses</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Sustainability through Development of Life-Cycle Information Models for Pavements in Louisiana</b>	<b>Project Status:</b>	<b>Proposed</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:		Project Start Date:	7/1/2021
Research Project Number:		Completion Date (original)	6/30/2023
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Louay Mohammad		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost	(original) \$85,000	<b>Total</b>	<b>\$74,241</b>
	(revised)		
Est. Expended to Date		Salaries	\$72,241
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds	(original)	Equipment (non-expendable)	
	(revised)	Travel	\$2,000
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Principles of sustainability focus on goal of proactively bringing key environmental, social, and economic factors into decision-making process. Life-Cycle Assessment (LCA) is a technique used to analyze and quantify environmental impacts of a product, system, or process. LCA provides a comprehensive approach to evaluate total environmental burden of a product or process by examining all of the inputs and outputs over life cycle, from raw material production to end of life.</p> <p>Objective(s): This research proposes to develop life-cycle assessment framework for asphalt mixtures and pavements in Louisiana, which will cover material production and initial construction, maintenance phase, in-service phase, and end-of-life phase.</p> <p>Expected Benefits: The developed framework is expected to provide an immediately implementable guideline on the implementation of LCA for Louisiana pavements, which can help define pavement systems to support decision making regarding changes to policies and practices to reduce the impacts of pavements on humans and the environment (GWP), while identifying potential unintended negative consequences.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
<p>Task 1: Conduct a comprehensive literature review on studies relevant to life-cycle assessment for pavements.</p> <p>Task 2: Develop product category rule (PCR) for environmental production declaration used for asphalt mixtures.</p> <p>Task 3: Develop a framework for performing an LCA specific to pavement systems along with guidance on the overall approach, methodology and system boundaries.</p>			



**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Enhanced Interaction between Crumb Rubber Modifiers and Asphalt Binder to Improve Performance</b>			<b>Project Status:</b>	<b>Proposed</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 6</b>		<b>Budget Category:</b>		<b>FHWA</b>
SIO:			Project Start Date:		7/1/2021
Research Project Number:			Completion Date	(original)	6/30/2023
Research Agency:		LTRC	Completion Date	(revised)	
Principal Investigator:	Louay Mohammad				
<b>BUDGET STATUS</b>					
<b>Total Budget</b>			<b>Estimated 2023-2024 Budget</b>		
Total Cost	(original)	\$85,000	<b>Total</b>		<b>\$80,000</b>
	(revised)				
Est. Expended to Date			Salaries		\$80,000
<b>FY 2022 - 2023 Budget</b>			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		
<b>BUDGET JUSTIFICATIONS</b>					
Budget amounts do not require justifications.					
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>					
<p>Problem Statement: Addition of crumb rubber (CR) particles to asphalt binders and asphalt mixtures is a sustainable construction technology that ensures waste tires are disposed of in an environmentally sustainable manner. Crumb rubber modifiers have been found to improve durability of asphalt pavements through increased rutting and cracking performance.</p> <p>Objective(s): Objectives of this study are to identify thermally stable aromatic oils (AOs) for enhancement of interaction between CR particles and asphalt binder during CR modification of asphalt binders; (2) evaluate effects of CR type (ambient, cryogenic, proprietaries) and dosage rate on asphalt binder and mixture performance, and (3) evaluate effects of AO type and dosage rate on asphalt binder and mixture performance.</p> <p>Expected Benefits: Findings from this research will offer incorporation of high contents of CR particles into asphalt binders and asphalt mixtures. This will reduce cost of highway construction and the adoption of sustainable construction practices to protect the environment</p>					
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>					
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>					
<p>Task 1: Conduct Literature Review</p> <p>Task 2: Develop a Statistically Based Laboratory Experiment</p> <p style="padding-left: 20px;">Subtask 2.1: Chemical Characterization of CR Particles and Aromatic Oils</p> <p style="padding-left: 20px;">Subtask 2.2: Asphalt binder Experiment (Base Asphalt binder + soaked [CR + AO])</p> <p style="padding-left: 40px;">Chemical, rheological, microstructural characterization</p> <p style="padding-left: 20px;">Subtask 2.3: Asphalt Mixture Experiment</p> <p style="padding-left: 40px;">Characterization at high-, intermediate-, and Low-temperatures</p> <p style="padding-left: 40px;">Moisture susceptibility evaluation</p> <p>Task 3. Perform Laboratory Experiment of Task 2</p>					

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Enhancement of Mechanical Properties of Asphalt Cements and Asphalt Mixtures Containing Waste Plastic</b>	<b>Project Status:</b>	<b>Proposed</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 6</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:		Project Start Date:	7/1/2021
Research Project Number:		Completion Date (original)	6/30/2023
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Louay Mohammad		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost	(original) \$349,000	<b>Total</b>	<b>\$102,000</b>
	(revised)		
Est. Expended to Date		Salaries	\$102,000
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds	(original)	Equipment (non-expendable)	
	(revised)	Travel	
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: There is a growing interest in adoption of more sustainable technologies for road pavement design and construction in order to protect the environment and to provide other economic benefits. In 2017, US EPA reported that approximately 35.5M tons of waste plastic was generated, which represents over 100% increase in waste plastic generation in 27 years. Despite benefits obtained from waste plastics, there are many challenges associated with their use in asphalt pavements.</p> <p>Objective(s): The objectives of the research are to (1) evaluate low-, intermediate- and high temperature properties of waste plastics in asphalt cements and asphalt mixtures; and (2) assess economic and environmental impacts, health and safety, and long-term durability associated with use of waste plastics materials in asphalt mixtures.</p> <p>Expected Benefits: It is anticipated that results from this research will recommend revisions to Louisiana's asphalt specifications for incorporating waste plastics in asphalt cements and mixtures. Further, results will promote the use of sustainable technologies in Louisiana's flexible pavement construction.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
<p>Task 1. Conduct Literature Review and Survey  Task 2- Develop Statistically Based Laboratory Experiment  Task 3- Develop Compatibilizers and Waste Plastic Experiment  Task 4- Perform Asphalt Cement Experiment</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Enhancing Pavement Resiliency to Sea Level Rise Using Natural and Nature-Based Features in Louisiana</b>			<b>Project Status:</b>	<b>Proposed</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 6</b>		<b>Budget Category:</b>		<b>FHWA</b>
SIO:			Project Start Date:		7/1/2021
Research Project Number:			Completion Date	(original)	6/30/2023
Research Agency:		LTRC	Completion Date	(revised)	
Principal Investigator:	Louay Mohammad				
<b>BUDGET STATUS</b>					
<b>Total Budget</b>			<b>Estimated 2023-2024 Budget</b>		
Total Cost	(original)	\$85,000	<b>Total</b>		<b>\$80,000</b>
	(revised)				
Est. Expended to Date			Salaries		\$80,000
<b>FY 2022 - 2023 Budget</b>			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		
<b>BUDGET JUSTIFICATIONS</b>					
Budget amounts do not require justifications.					
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>					
<p>Problem Statement: Climate change and sea level rise (SLR) are significantly increasing risk of severe high tide flooding in many coastal and adjacent inland areas and exacerbating flood risk associated with hurricanes and coastal storms. Surface transportation systems in coastal areas, including roadway corridors, are becoming increasingly vulnerable to flooding, inundation and erosion. Inundation weakens pavement structure with varying degrees of structural deterioration that reduces pavements' service life.</p> <p>Objective(s): The objective of this study is to evaluate the effectiveness of nature-based hybrid structures including dikes, wetlands and dunes incorporated with natural materials that are native to the area, with or without sheet piles, for reducing the impact of SLR and extreme events on roadways.</p> <p>Expected Benefits: The developed practice is expected to provide an immediately implementable guideline on the design and construction of roads with the evaluated Natural and Nature-Based Features for achieving coastal roadways with enhanced resilience.</p>					
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>					
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>					
<p>Task 1: Conduct a comprehensive literature review on studies relevant to roadway damage caused by flooding events, and application of NNBF for improving the resilience of coastal roadways.</p> <p>Task 2: Evaluate the effectiveness of nature-based hybrid structures such as dikes, wetlands and dunes incorporated with natural materials that are native to the area, with or without sheet piles.</p> <p>Task 3: Quantify the frequency, magnitude and duration of inundation events with/without NNBF utilizing existing storm surge and wind wave models with flexible meshes.</p>					

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Establishment of the Center for Sustainable Pavement Materials and Technologies</b>	<b>Project Status:</b>	<b>Proposed</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 6</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:		Project Start Date:	7/1/2021
Research Project Number:		Completion Date (original)	6/30/2022
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Louay Mohammad		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost	(original) \$155,131	<b>Total</b>	<b>\$83,957</b>
	(revised)		
Est. Expended to Date		Salaries	\$74,157
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds	(original) \$155,131	Equipment (non-expendable)	
	(revised)	Travel	\$4,900
Est. FY Expenditure		Other	\$4,900
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Climate change, and escalating costs of materials and energy provide motivation to explore innovative techniques for infrastructure preservation and rehabilitation with sustainable, resilient, and recyclable methods. Using recycled materials and sustainable alternatives methodologies can reduce energy consumption and greenhouse gas emission. Incorporating sustainable materials and technologies into transportation infrastructure will have a significant impact on longevity of our society.</p> <p>Objective(s): The vision is to establish a multi-disciplinary research, education, and technology transfer center focused on evaluation and implementation of sustainable and resilient technologies in transportation industry. Interdisciplinary research will examine design, assessment, and repair for next generation of sustainable and resilience pavement infrastructure. Goals are to minimize non-renewable energy usage, reduce environmental impacts, and encourage use of emerging technologies including renewab</p> <p>Expected Benefits: To pursue the needs of DOTD to integrate cutting-edge cost-effective technologies and materials in current practices; place Louisiana on the leading edge of states in the area of transportation sustainability, resiliency, and provides LTRC with an excellent position to pursue its quest for national and international recognition in research capability of all aspects of sustainable, resilient, and recyclable pavement materials.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
<p>Establishment of the Center for Sustainable and Resilient Pavement Materials and Technologies          Develop and submit proposals for external funding;          Continue participation in the Louisiana DOTD Asphaltic Concrete Specification Committee;          Continue participation in technical assistance projects;          Conduct research relevant to the Center theme and DOTD needs,          Develop and Promote effective Sustainable Pavement Technologies for managing and preserving the infrastructure, and          Conduct workshops and seminars.</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Evaluation of composite pavement consisting of RCC and asphalt overlay	<b>Project Status:</b>	Proposed
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 6	<b>Budget Category:</b>	FHWA
SIO:		Project Start Date:	7/1/2023
Research Project Number:		Completion Date (original)	7/1/2025
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Saman Salari		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost	(original) \$300,000	<b>Total</b>	<b>\$60,000</b>
	(revised)		
Est. Expended to Date		Salaries	\$60,000
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds	(original)	Equipment (non-expendable)	
	(revised)	Travel	
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Roller compacted concrete (RCC) has been used since 1984. While its application used to be limited, recent cost-effective projects were promising to expand the application. RCC is much faster and cheaper comparing to the concrete pavement. The disadvantage of RCC is that, RCC's profile and smoothness may not be suitable for pavements carrying high-speed traffic, and it needs diamond grinding to be desirable for traffic. This issue can be mitigated by using an asphalt overlay on top of RCC.</p> <p>Objective(s): Multiple groups will be working to develop a multi-layer RCC pavement and test it for different pavement criteria. The results will help agencies to evaluate and design RCC pavement in a more effective and durable way.</p> <p>Expected Benefits: LTRC can develop a composite RCC pavement layer with asphalt pavement on top of it. This method will have required smoothness for traffic with fast production. The proposed project can bring new information to improve the performance and application of RCC pavements.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
A design will be finalized for RCC and asphalt overlay. After performing the developed designed layers, each layer will be tested for performance.			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Evaluation of T-Fast (TFHRC ASR Test) Test Method for Aggregate Acceptance</b>			<b>Project Status:</b>	<b>Proposed</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>		<b>Budget Category:</b>		<b>FHWA</b>
SIO:			Project Start Date:		7/1/2023
Research Project Number:			Completion Date	(original)	6/30/2026
Research Agency:		LTRC	Completion Date	(revised)	
Principal Investigator:	Samuel Cooper, III				
<b>BUDGET STATUS</b>					
<b>Total Budget</b>			<b>Estimated 2023-2024 Budget</b>		
Total Cost	(original)	\$240,000	<b>Total</b>		<b>\$80,000</b>
	(revised)				
Est. Expended to Date			Salaries		\$80,000
<b>FY 2022 - 2023 Budget</b>			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		
<b>BUDGET JUSTIFICATIONS</b>					
Budget amounts do not require justifications.					
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>					
<p>Problem Statement: A newly developed test from researchers at Turner-Fairbank Highway Research Center (TFHRC) promises accurate Alkali-Silica Reactivity (ASR) aggregate source testing in as little as 21-days of age.</p> <p>Objective(s): In this project, the T-FAST test will be investigated for potential use by the Department for aggregate acceptance on the AML. Note that FHWA is currently undergoing a Round-Robin set of testing to determine the precision and bias of the proposed test method.</p> <p>Expected Benefits: Implementation of the results would give the Department the ability for aggregate acceptance at a much shorter timeframe than currently available.</p>					
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>					
Proposed Project					
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>					
<p>Write the proposal and identify research tasks;          Conduct literature review;          Begin sample preparation and testing.</p>					

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Investigation of Piezoelectric and Other Advanced Sensors in Concrete	<b>Project Status:</b>	Proposed
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 6	<b>Budget Category:</b>	FHWA
SIO:		Project Start Date:	7/1/2023
Research Project Number:		Completion Date (original)	6/30/2025
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Samuel Cooper, III		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost	(original) \$200,000	<b>Total</b>	<b>\$84,000</b>
	(revised)		
Est. Expended to Date		Salaries	\$80,000
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	\$4,000
FY Funds	(original)	Equipment (non-expendable)	
	(revised)	Travel	
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Advancements in sensor type and capability are rapidly advancing. A new breed of sensors utilizing piezoelectric potential have been developed. This project will investigate utilization of these new, and other potential sensors, for use in concrete non-destructive testing.</p> <p>Objective(s): Review the state of the practice for piezoelectric sensors and other newly developed technology for NDT testing of concrete materials. Procure promising technology and conduct a variety of field tests in various locations across the State.</p> <p>Expected Benefits: New NDT test methods have the potential to eliminate the need for casting cylinders, testing on hardened concrete, predicting sawcut time, etc. If NDT testing sensors allow for a reduction of cylinders, the Department stands to realize savings due to a potential reduction in claims, increased safety, etc.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
Proposed project			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
<p>Write the proposal and identify research tasks;          Conduct literature review;          Acquire recommended technology identified in literature;          Begin sample preparation and testing.</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Fully Softened Shear Strength at Low Stresses for Analysis &amp; Design of Natural and Compacted Slopes</b>	<b>Project Status:</b>	<b>Proposed</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:		Project Start Date:	9/1/2022
Research Project Number:		Completion Date (original)	9/1/2024
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Gavin Gautreau		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$80,000	<b>Total</b>	<b>\$44,268</b>
(revised)			
Est. Expended to Date		Salaries	\$44,268
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)	\$35,643	Equipment (non-expendable)	
(revised)		Travel	
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Natural and compacted slopes constructed with clay can soften over time. Louisiana has lots of clays and some are more problematic than others. Knowing how to design and account for the Fully Soften Shear Strength is important.</p> <p>Objective(s): Define how FSS can be incorporated into DOTD design methodology and practice.</p> <p>Expected Benefits: Awareness and accounting offor FSS will help ensure that DOTD projects will endure and perform over their design lives and hopefully beyond.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
The project is proposed.			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
Conduct laboratory tests that replicate properties of Louisiana clays to correlates field slope design and actual performance. The laboratory testing combined with literature review will define best practices for Louisiana clays and how designers account for FSS.			



**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Geotechnical Asset Management – Inventory of culverts, slopes, and embankments</b>			<b>Project Status:</b>	<b>Proposed</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>		<b>Budget Category:</b>		<b>FHWA</b>
SIO:			Project Start Date:		7/1/2023
Research Project Number:			Completion Date	(original)	3/31/2025
Research Agency:		LTRC	Completion Date	(revised)	
Principal Investigator:	Nick Ferguson				
<b>BUDGET STATUS</b>					
<b>Total Budget</b>			<b>Estimated 2023-2024 Budget</b>		
Total Cost	(original)	\$150,000	<b>Total</b>		<b>\$51,145</b>
	(revised)				
Est. Expended to Date			Salaries		\$51,145
<b>FY 2022 - 2023 Budget</b>					
FY Funds	(original)		Consumable Supplies & Materials		
	(revised)		Equipment	(non-expendable)	
Est. FY Expenditure			Travel		
			Other		
<b>BUDGET JUSTIFICATIONS</b>					
Budget amounts do not require justifications.					
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>					
<p>Problem Statement: Louisiana DOTD has many geotechnical related elements that are part of the transportation system that require maintenance. A database/inventory for geotechnical assets like culverts and slopes is needed. These assets do not fall within the bridge and pavement management inventories. A large culvert database was lost recently within the department. This project can help restore the data.</p> <p>Objective(s): This will be a continuation of project 18-4GT, on Geotechnical Asset Management (GAM) and included data findings of retaining walls across the state of Louisiana. There is a need to grow this preliminary asset database to include other assets, such as culverts, slopes, and embankments.</p> <p>Expected Benefits: The development of the GAM through the inclusion of these other assets will help with the inevitable implementation of a GAM system within Louisiana DOTD. GAM will allow the department a logical method to manage and address each problematic location. The GAM system will help preserve the past as personnel retire and employee turnover occurs to maintain the transportation system for years to come.</p>					
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>					
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>					
<p>The project is proposed.</p> <ul style="list-style-type: none"> <li>• Produce a proposal and present to a PRC for approval.</li> <li>• Begin review of existing state and federal efforts regarding GAM's geotechnical asset database.</li> <li>• Utilize newer mobile applications like Field Maps or Headlight to locate the start and end of geotechnical assets, while in the field, to directly populate the database.</li> </ul>					

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Statewide Calibration of CPT Direct Design Methods Using Static Load Test Data</b>			<b>Project Status:</b>	<b>Proposed</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>		<b>Budget Category:</b>		<b>FHWA</b>
SIO:			Project Start Date:		10/3/2022
Research Project Number:			Completion Date	(original)	9/30/2025
Research Agency:		LTRC	Completion Date	(revised)	
Principal Investigator:	Murad Abu-Farsakh				
<b>BUDGET STATUS</b>					
<b>Total Budget</b>			<b>Estimated 2023-2024 Budget</b>		
Total Cost	(original)	\$200,000	<b>Total</b>		<b>\$40,000</b>
	(revised)				
Est. Expended to Date			Salaries		\$40,000
<b>FY 2022 - 2023 Budget</b>			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		
<b>BUDGET JUSTIFICATIONS</b>					
Budget amounts do not require justifications.					
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>					
<p>Problem Statement: Louisiana was one of pioneering states to implement CPT technology for evaluating the pile resistance. The project (17-2GT) evaluated 22 direct CPT design methods using 80 concrete test piles with majority located in southeastern of state, although piles used throughout the state. Therefore, it is necessary to add more database with spatial state coverage. Also, there is a need to use piezocone penetration tests (CPTu) for evaluating CPTu methods and expand the implementation to other pile types</p> <p>Objective(s): Re-evaluate the CPT-based direct design methods and re-rank them as necessary using the updated database. Evaluate available CPTu-based direct design methods and rank them. Recalibrate resistance factors for use in LRFD pile foundation design. Extend the use of existing direct design methods to include other pile types (pipe piles, helical piles, etc.). Evaluate grouping the pile-CPT/CPTu into regions for regional evaluation and LRFD calibration. Update the LPD-CPT software accordingly.</p> <p>Expected Benefits: Supplementing traditional pile design with CPT/CPTu methods will save exploration costs and prevent overturns cost by providing more data and more reliable design methods. Incorporating CPT/CPTu design methods in "LPD-CPT" software will help design engineers to estimate pile resistance efficiently without need of manual calculation. The accurate evaluation of pile resistance by CPT/CPTu methods can result in significant reduction in construction cost of bridge foundations and infrastructures.</p>					
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>					
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>					
Task 1: Perform literature review on CPT/CPTu direct pile design methods.					
Task 2: Collect additional CPT/CPTu data at test pile and indicator pile sites.					
Task 3: Collect pile load tests and corresponding CPT/CPTu for other pile types (pipe piles, helical piles, etc.), depending on available data.					
Task 4: Start grouping the pile-CPT/CPTu into regions for regional evaluation and LRFD calibration.					

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Traffic Signal foundations	<b>Project Status:</b>	Proposed
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 5	<b>Budget Category:</b>	FHWA
SIO:		Project Start Date:	7/1/2023
Research Project Number:		Completion Date (original)	1/31/2025
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:			
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost	(original) \$200,000	<b>Total</b>	<b>\$100,000</b>
	(revised)		
Est. Expended to Date		Salaries	\$100,000
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds	(original)	Equipment (non-expendable)	
	(revised)	Travel	
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: In recent years the structural code has been updated creating much larger foundations for traffic signals which causes signals to cost more and require more ROW especially in urban areas. In the past with our signal foundations we have rarely had a failure. In Ida there were no signal poles that fell down using our old standards.</p> <p>Objective(s): Examining failure rates for our signal foundations using the old standards to determine if it makes sense to move to larger foundations. Calculate the size of foundation for the new standards vs old standards. See what other states are doing. Determine process for going with the smaller foundations if that is proven to be adequate</p> <p>Expected Benefits: Cost savings for signal design and installations.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
To be decided.			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Update on Evaluating the Magnitude and Time Rate of Consolidation Settlement of Embankments and other Infrastructures from Piezocone Penetration Tests (PCPT)</b>	<b>Project Status:</b>	<b>Proposed</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:		Project Start Date:	3/14/2023
Research Project Number:		Completion Date (original)	3/29/2023
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Murad Abu-Farsakh		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$200,000	<b>Total</b>	<b>\$28,100</b>
(revised)			
Est. Expended to Date		Salaries	\$28,100
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)		Equipment (non-expendable)	
(revised)		Travel	
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: The construction of embankments on soft soils requires accurate estimation of magnitude and rate of settlement to conduct rational and safe design.</p> <p>A previous study was conducted to evaluate several methods for estimating consolidation parameters from piezocone penetration test (PCPT), and a new method was proposed. The study was based on limited lab data and sites. New PCPT methods were developed since then. The developed embankment settlement software was never finalized, verified and tested.</p> <p>Objective(s): The main objective of this research study is to update methods for accurate estimation of the magnitude and time rate of consolidation settlement of embankments and other infrastructures over cohesive soils from piezocone penetration test (PCPT) data and dissipation test data, and to upgrade, verify, and finalize the developed software to include in-situ PCPT data, standard penetration test (SPT) data and laboratory-evaluated soil boring data.</p> <p>Expected Benefits: This study will provide an updated on the best methods for estimating the magnitude and time rate of consolidation settlements utilizing the piezocone penetration and dissipation tests for use in Louisiana. The findings of this study will significantly help improve the estimation of settlements for embankments, MSE walls, Bridges and other infrastructures for safe analysis and design, which can help reduce the construction cost, and result in more resilient geotechnical infrastructure.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

**FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES**

Task 1- Conduct comprehensive literature review on relevant work on estimating the consolidation parameters and embankment settlement from the piezocone penetration and dissipation test data.

Task 2- Identify new construction embankment sites for field instrumenting and monitoring of consolidation settlement with time.

Task 3- Drill boreholes to retrieve soil samples for laboratory consolidation tests, and conduct in-situ piezocone penetration and dissipation tests to evaluate the consolidation parameters needed to calculate the magnitude and time rate of consolidation settlement of cohesive soils as well as the value of over-consolidation ratio (OCR).

Task 4- Start analyzing the laboratory and PCPT data for estimating the magnitude and time rate of consolidation settlement of monitored embankments using the different PCPT methods.

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Use and Interpretation of Seismic Piezocone Penetration Testing (SCPTu) for Geotechnical Site Investigation</b>	<b>Project Status:</b>	<b>Proposed</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:		Project Start Date:	1/1/2018
Research Project Number:		Completion Date (original)	12/31/2020
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Murad Abu-Farsakh		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$200,000	<b>Total</b>	<b>\$28,100</b>
(revised)			
Est. Expended to Date		Salaries	\$28,100
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)		Equipment (non-expendable)	
(revised)		Travel	
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: The piezocone penetration test (CPTu) is a preferred in-situ test for subsurface investigation. The addition of geophone to CPTu (SCPTu) will enhance the geotechnical investigation by providing four independent measurements: tip resistance, sleeve friction, porewater pressure, and shear wave velocity (Vs). The Vs can be used to evaluate small-strain shear modulus (Go), which is appropriate to analyses of foundation systems, retaining walls, and problems involving cyclic and seismic loadings.</p> <p>Objective(s): The objective of this study are: identifying available methods to evaluate small-strain shear modulus (Go) and damping coefficient (C) from SCPTu; conducting SCPTu tests on selected sites; modify/develop models to evaluate Go and C for Louisiana soils; apply Go and C values to evaluate pile capacity using PDA and CAPWAP cases; develop load-deformation curves for selected test piles for comparison with measured data; and develop model to evaluate undrained shear strength (Su) from SCPTu data.</p> <p>Expected Benefits: The proposed research project will help the DOTD to better evaluate the initial shear modulus (Go) and damping coefficient of subsurface soils for various design applications, such as the dynamic analysis of driven piles and the establishment of load deformation curves of piles. This is expected to result in cost effective and safer axial and lateral capacity design of piles.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
<p>Task 1 - Conduct comprehensive literature review on the use of Seismic Piezocone Penetration Testing (SCPTu) for geotechnical engineering applications such as evaluating the static and dynamic soil properties, evaluate small-strain shear modulus (Go) and damping coefficient (C), evaluate the undrained shear strength, Su, establish pile load-deformation curve, etc.</p> <p>Task 2 - Start collecting in-situ test data for selected sites using SCPTu.</p> <p>Task 3 - Start collecting soil samples for laboratory testing to evaluate the Go and C from samples retrieved from soil borings of same sites.</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Web-Based Tool to Advance Geotechnical Data Interchange and Reliability - Based Site Characterization</b>	<b>Project Status:</b>	<b>Proposed</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:		Project Start Date:	7/1/2023
Research Project Number:		Completion Date (original)	3/31/2025
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Gavin Gautreau		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost	(original) \$160,000	<b>Total</b>	<b>\$32,793</b>
	(revised)		
Est. Expended to Date		Salaries	\$32,793
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds	(original)	Equipment (non-expendable)	
	(revised)	Travel	
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: AASHTO LRFD design code is undergoing a major rewrite to focus on reliability and data variability. The methodologies required to perform site characterization will become more difficult computationally. New tools will be needed to help engineers perform and review the required calculations. A web-based tool using DIGGS and existing DOTD gINT formats will greatly help the Department and its consultants adopt the upcoming design changes to stay in accordance with LRFD code.</p> <p>Objective(s): *Develop a DOTD standardized DIGGS dictionary            *Develop a tool to convert DOTD data formats (gINT, HoleBASE, &amp; OpenGround) to DIGGS.            *Develop a web-based platform capable of consuming DIGGSml files, interactively select soil borings, create a composite stratigraphy, plot soil properties, and derived parameters vs. elevation, and develop design profiles.            *In the web-based platform, automate the process of the statistical analyses detailed in FHWA GEC</p> <p>Expected Benefits: *Develop a DOTD standardized DIGGS dictionary.            *Develop a tool to convert DOTD data formats (gINT, OGC) to DIGGS.            *Develop a web-based platform to consume &amp; share DIGGSml files (DOTD, Consultants, Others), interactively select soil borings, create a composite stratigraphy, plot soil properties and derived parameters vs. elevation; develop design profiles.            *Automate the web process/statistical analyses detailed in FHWA GEC No. 5 to facilitate compliance with anticipated future LRFD code.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
The project is proposed.			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

**FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES**

Draft and approve a proposal, then conduct the work in accordance with the approved scope.



**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Evaluating the effect of pile installation, long-term scour and reduction in overburden pressure on pile capacity	<b>Project Status:</b>	Proposed
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 6	<b>Budget Category:</b>	FHWA
SIO:		Project Start Date:	2/28/2023
Research Project Number:		Completion Date (original)	3/30/2023
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Murad Abu-Farsakh		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$200,000	<b>Total</b>	<b>\$18,300</b>
(revised)			
Est. Expended to Date		Salaries	\$18,300
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)		Equipment (non-expendable)	
(revised)		Travel	
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: An accurate estimation of capacity of driven piles taking into consideration the effect of installation, scour, and changes in overburden stresses is a challenge to design engineers. The behavior of piles during installation in terms of stress charge, soil densification, and change in soil properties are unknown, which depends on many factors. The current design considers the scour effect only for sand layers by reducing the overburden pressure; it does not consider the effect on clay/silt soil.</p> <p>Objective(s): The main objective of this research study is to evaluate the effect of pile installation, long-term scour, and reduction in overburden pressure on the strength and stress state of surrounding soils for better analysis and design of pile foundations, especially using direct pile-CPT methods.</p> <p>Expected Benefits: This study will provide DOTD engineers with design methodology and tools to estimate the ultimate capacity of piles that takes into consideration the effect of pile installation and subsequent effects of scour and reduction in overburden pressure. The findings of this study will help improve the reliability and accuracy of estimating the ultimate pile capacity, thus results on reducing the construction cost of pile foundations, and having safer and resilient bridges and other infrastructure.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
<p>Task 1- Conduct comprehensive literature review on relevant work on the effect of pile installation, long-term scour, and reduction in overburden pressure on the strength and stress state of surrounding soils,</p> <p>Task 2- Develop finite element models to simulate the effect of pile installation, and subsequent consolidation setup.</p> <p>Task 3- Develop finite element models to simulate the effect of long-term scour and reduction on overburden pressure.</p> <p>Task 4- Consider any available analytical method for considering the effect of pile installation, long-term scour, and reduction in overburden pressure for design of piles, including the FHWA method.</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Evaluation and development of CPT-based methods for estimating the ultimate axial capacity of drilled shafts	<b>Project Status:</b>	Proposed
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 6	<b>Budget Category:</b>	FHWA
SIO:		Project Start Date:	3/7/2023
Research Project Number:		Completion Date (original)	3/23/2023
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Murad Abu-Farsakh		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost	(original) \$200,000	<b>Total</b>	<b>\$28,100</b>
	(revised)		
Est. Expended to Date		Salaries	\$28,100
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds	(original)	Equipment (non-expendable)	
	(revised)	Travel	
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: The use of drilled shaft foundations has increased significantly due to their ability to carry large loads. The current practice in calculating ultimate capacity of drilled shafts is based on static analysis from soil boring and lab tests. The development and incorporation of the direct CPT method(s) for design of drilled shafts is expected to provide more accurate and cost effective estimation of the ultimate capacity of drilled shafts, and hence save labor time and money for Louisiana.</p> <p>Objective(s): The main objective of this study is to evaluate and develop direct CPT methods for calculating the ultimate capacity of drilled shafts and to calibrate the corresponding resistance factors for LRFD design of drilled shaft utilizing CPT data.</p> <p>Expected Benefits: The research study will provide DOTD engineers with design methodology and tools to calculate the ultimate capacity of drilled shafts efficiently using the CPT data. The locally calibrated resistance factors for the CPT-based design methods will be provided. The findings of this study is expected to improve the accuracy of estimating the ultimate capacity of drilled shafts compared to the currently used static method, thus reducing the construction cost of drilled shaft foundations.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
<p>Task 1- conduct literature review on relevant research work on direct methods for estimating the ultimate capacity of drilled shafts from CPT data.</p> <p>Task 2- Identify and collect all drilled shaft load tests that were performed in Louisiana from DOTD archives,</p> <p>Task 3- Start conducting CPT tests close to drilled shaft tests,</p> <p>Task 4- Start analyze the drilled shaft tests and the corresponding CPT data.</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Evaluation and Incorporation of Site and lab Variability into LRFD Design of Deep Foundations - Phase 2	<b>Project Status:</b>	Proposed
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 6	<b>Budget Category:</b>	FHWA
SIO:		Project Start Date:	7/1/2023
Research Project Number:		Completion Date (original)	6/30/2025
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Murad Abu-Farsakh		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost	(original) \$200,000	<b>Total</b>	<b>\$51,100</b>
	(revised)		
Est. Expended to Date		Salaries	\$51,100
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds	(original)	Equipment (non-expendable)	
	(revised)	Travel	
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Geotechnical engineering deals with high spatial variation of soil properties in horizontal and vertical directions leading to uncertainty in geotechnical and deep foundation design. The variation in soil properties will affect the accuracy/reliability of measured data that can result in either under-design (cause failure), or overdesign (extra cost) of infrastructure foundations. There is a need to incorporate these variations into load and resistance factor design (LRFD) of deep foundations.</p> <p>Objective(s): The main objective of this study is to evaluate the spatial variations of design soil properties of the specific site through conducting proper laboratory and/or in-situ testing, and to incorporate and implement the site variability into LRFD design of deep foundations.</p> <p>Expected Benefits: This study will provide the design engineers with tools to evaluate the spatial site variability of soil properties in the field (i.e., coefficient of variations, COV), as well as variations of measured soil properties in the laboratory. This study will also provide means to incorporate/implement the site/lab soil variability into LRFD design of deep foundations. It is anticipated that this study will improve accuracy, safety, reduce cost, and reduce risk of design of deep foundations.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
<p>Task 1- Conduct comprehensive literature review on relevant published works evaluating, analyzing and incorporating of site variability in geotechnical engineering design.</p> <p>Task 2- Identify several project sites to evaluate the spatial site variability from soil boring with laboratory tests and from in-situ CPT tests.</p> <p>Task 3- Explore different analytical methods and procedures to incorporate the site variability into LRFD design of deep foundations, such as semivariogram, Bayesian, probabilistic approaches.</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Development of a Database for Successfully Performing Pavement Sections in Louisiana			<b>Project Status:</b>	Proposed
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 5		<b>Budget Category:</b>		FHWA
SIO:			Project Start Date:		7/1/2023
Research Project Number:			Completion Date	(original)	6/30/2026
Research Agency:		LTRC	Completion Date	(revised)	
Principal Investigator:	Qiming Chen				
<b>BUDGET STATUS</b>					
<b>Total Budget</b>			<b>Estimated 2023-2024 Budget</b>		
Total Cost	(original)	\$250,000	<b>Total</b>		<b>\$80,000</b>
	(revised)				
Est. Expended to Date			Salaries		\$80,000
<b>FY 2022 - 2023 Budget</b>					
FY Funds	(original)		Consumable Supplies & Materials		
	(revised)		Equipment	(non-expendable)	
Est. FY Expenditure			Travel		
			Other		
<b>BUDGET JUSTIFICATIONS</b>					
Budget amounts do not require justifications.					
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>					
<p>Problem Statement: While LTRC has been often called on to provide forensic investigation of pavement sections which have failed to perform as expected. Up to this point, little has been done to identify and learn from pavement sections which have performed well above expectations for considerable length of time. We all know we can learn a lot from our mistakes and failures. In this case we will be learning from our success.</p> <p>Objective(s): The objective of this research is to create a database for making information about successful pavement sections available.</p> <p>Expected Benefits: What we learn from our success will not only help us to educate the next generation of DOTD pavement engineers about past lessons learned, but also studying these pavements will help current decision makers make better pavement type and material selections on projects right now. Another application is that DOTD's specification unit can use this resource to closely evaluate DOTD's specifications.</p>					
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>					
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>					
<p>Literature Review Evaluation of data from DOTD PMS Meeting with DOTD pavement engineer to discuss criteria for successful pavement sections.</p>					

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Evaluation of Louisiana Maintenance and Rehabilitation Treatment Decision Matrix for Cost-effective and Timely Pavement Preservation</b>			<b>Project Status:</b>	<b>Proposed</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 6</b>		<b>Budget Category:</b>		<b>FHWA</b>
SIO:			Project Start Date:		1/1/2022
Research Project Number:			Completion Date	(original)	12/31/2023
Research Agency:		LTRC	Completion Date	(revised)	
Principal Investigator:	Zhong Wu				
<b>BUDGET STATUS</b>					
<b>Total Budget</b>			<b>Estimated 2023-2024 Budget</b>		
Total Cost	(original)	\$200,000	<b>Total</b>		<b>\$140,300</b>
	(revised)				
Est. Expended to Date			Salaries		\$140,300
<b>FY 2022 - 2023 Budget</b>			Consumable Supplies & Materials		
FY Funds	(original)	\$29,800	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		
<b>BUDGET JUSTIFICATIONS</b>					
Budget amounts do not require justifications.					
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>					
<p>Problem Statement: Louisiana DOTD currently uses pavement condition index based decision matrix in its maintenance and rehabilitation treatment selection. However, some of the trigger index values adapted in the decision matrix table were developed from few projects with few years and log-miles of distress data. To ensure the optimum timing and cost-effective selection of various maintenance and rehabilitation treatments, there is a need to review, modify, and update the current decision matrix table adapted.</p> <p>Objective(s): 1) Analyze PMS data and assess the optimum timing/cost-effectiveness for a number of treatment methods including thin overlays, micro-surfacing, crack sealants, and in-depth stabilization. 2) Provide modification recommendations to the PMS decision matrix in order to ensure optimum timing and cost-effectiveness selection of treatment methods.</p> <p>Expected Benefits: The study will provide the DOTD Pavement preservation and PMS office updated triggers and performance models for cost-effective and timely maintenance and rehabilitation of pavements. Results of the study will immediately be implementable by pavement preservation and PMS office.</p>					
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>					
<ul style="list-style-type: none"> <li>- Conducted the literature review on pavement treatment selection and strategies used for pavement maintenance, preservation and rehabilitation.</li> <li>- Conducted a first round project selection based on different treatment types including thin/medium/structural overlays, in-depth stabilization, micro-surfacing, and crack sealant using the DOTD's pavement management system (PMS) database (2009 - 2021).</li> </ul>					

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

**FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES**

- Continue the literature review on various pavement treatment selections, related data gathering and data mining strategies as well as state-of-the-art analytical tools.
- Collect all historical records on selected pavement sections including the as-built plan, treatment age, traffic and weather information, pavement surface distress conditions before and after the treatment (e.g. thin overlay, micro-surfacing) as well as the treatment construction costs.
- Analyze the before and after treatment performance, and compare the cost and performance of pavement sections with and without the selected treatments.
- Construct decision-tree based models using the PMS-recorded pre-treatment pavement conditions (i.e. the alligator cracking, random cracking, patching, rut, and roughness indices) to determine what a true and representative range would be for all distress indices currently used in the DOTD Treatment Decision Matrix.
- Develop a group of performance prediction models for various treatment types considered including chip seal and micro-surfacing, ultra-thin/thin overlay, medium overlay, structural overlay and reconstruction. The developed analytical models will be used for the performance evaluation of DOTD Treatment Decision Matrix.

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Ground-in Edge and Centerline Rumble Strip/Rumble Stripe Evaluation/Best Practices	<b>Project Status:</b>	Proposed
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 5	<b>Budget Category:</b>	FHWA
SIO:		Project Start Date:	1/1/2024
Research Project Number:		Completion Date (original)	6/30/2025
Research Agency:		Completion Date (revised)	
Principal Investigator:			
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost	(original) \$250,000	<b>Total</b>	<b>\$120,000</b>
	(revised)		
Est. Expended to Date		Salaries	\$120,000
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds	(original)	Equipment (non-expendable)	
	(revised)	Travel	
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: DOTD has a standard rumble strip guideline, but it is implemented in various ways that may not be consistent across different PE offices or across the state. Many skip cutting centerline rumbles within minor intersections. This investigation could evaluate the pattern and depth of the rumbles to ensure that the best standard is being used. Also, there are maintenance issues involved with using the rumble stripe as opposed to a rumble strip outside of the stripe.</p> <p>Objective(s): Research other states guidelines regarding placement and design of rumble strips. Poll districts or perform site visits to determine application of rumble strips: Are gaps being placed at minor intersections? Are rumbles being cut near homes? Is it reasonable to not cut rumbles near residences? What is the noise level created by existing, new rumbles? Does that noise reduce over time? Does the existing pattern and depth of rumble strips in the current standard need to be modified?</p> <p>Expected Benefits: This has the potential to identify common misapplications and help reduce the noise level to adjacent properties.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
To be determined based on the approved research proposal.			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Older Road Users Safety in Louisiana: Understanding the Crash Contributing Factors</b>	<b>Project Status:</b>	<b>Proposed</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:		Project Start Date:	8/1/2023
Research Project Number:		Completion Date (original)	7/31/2025
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Elisabeta Mitran		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost	(original) \$262,000	<b>Total</b>	<b>\$127,500</b>
	(revised)		
Est. Expended to Date		Salaries	\$127,500
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds	(original)	Equipment (non-expendable)	
	(revised)	Travel	
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Older people are involved in more crashes than any other age group. Due to the increasing trends in fatality and serious injury rates per capita of drivers and pedestrians over the age of 65, Louisiana met the criteria to qualify for the Federal Highway Administration Older Driver and Pedestrian Special Rule 23 U.S.C. 148(g)(2). In order to achieve the Louisiana's Destination Zero Deaths and to address current increasing crash trends, we must find ways to improve safety of older road users.</p> <p>Objective(s): The purpose of this study is to understand the factors contributing to older road users crashes in Louisiana to recommend best practices and countermeasures to support the SHSP strategies in reducing traffic fatalities and severe injuries.</p> <p>Expected Benefits: This project will provide DOTD, Louisiana SHSP team, and other highway safety stakeholders with a deeper and more comprehensive understanding of factors influencing older road users' crashes. The study findings could be used as part of Destination Zero Deaths' efforts to reach the goal of zero fatalities and serious injuries on our roadways.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
To be determined based on the approved research proposal.			



**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Updating and Migrating the Louisiana Transportation Research Center (LTRC) Project Management Tracking System (PMTS) from Louisiana State University Server to Office of Technology Services (OTS) Server(s)</b>	<b>Project Status:</b>	<b>Proposed</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:	<b>DOTLT1000495</b>	Project Start Date:	7/1/2023
Research Project Number:	24-1SS	Completion Date (original)	3/31/2024
Research Agency:		Completion Date (revised)	
Principal Investigator:			
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$250,000	<b>Total</b>	<b>\$250,000</b>
(revised)			
Est. Expended to Date		Salaries	\$250,000
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)		Equipment (non-expendable)	
(revised)		Travel	
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: The Louisiana Transportation Research Center (LTRC) has spent considerable effort, time, and money in the development of the LTRC Project Management Tracking System (PMTS) web based application. This application is used by Department of Transportation and Development (DOTD) personnel, outside consultants, and University personnel to update individual research projects. Additionally, financial information for individual projects is tracked as well as final report status, etc.</p> <p>Objective(s): (1) Update the existing PMTS targeting a .NET 6 (or newer) using C# syntax; (2) Remove the Microsoft Word and Excel reports and replace them with a generic form output; (3) Update all security features; (4) Creation of a link to to automatically update the financial information on a daily basis; (5) Migration of newly updated PMTS to OTS servers, (6) Export and transfer all existing PMTS data to the new platform, and (7) Creation of a digital user manual for new users.</p> <p>Expected Benefits: A newer, more updated version of PMTS that is more secure to outside attacks, being continually backed-up and proper server support form OTS.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
Start and complete the project.			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Statewide Non-Motorized Traffic Monitoring Technology</b>	<b>Project Status:</b>	<b>Proposed</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:	<b>DOTLT1000463</b>	Project Start Date:	12/1/2021
Research Project Number:	23-4SS	Completion Date (original)	6/30/2025
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Ruijie "Rebecca" Bian		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$237,000	<b>Total</b>	<b>\$139,430</b>
(revised)			
Est. Expended to Date		Salaries	\$67,866
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)	\$80,000	Equipment (non-expendable)	
(revised)		Travel	
Est. FY Expenditure		Other	\$71,564
<b>BUDGET JUSTIFICATIONS</b>			
Other: Other budget is for a sub-contract to a consultant. The breakout sheet is attached to the proposal.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Non-motorized traffic count data are collected and kept in different formats, which creates barriers in data sharing. In addition, a strategy is need in installing permanent counters at a strategic set of fixed locations and rotating a set of temporary counters to gain a better knowledge of network-wide volume. How will emerging technologies and data products help expand the utility of the observed counts?</p> <p>Objective(s): The current project is to search for the best approaches to integrate non-motorized traffic (e.g., bicyclist/pedestrian) counting into the routine motorized traffic counting practice in Louisiana.</p> <p>Expected Benefits: Including non-motorized traffic (e.g., bicyclist/pedestrian) counting into the routine motorized traffic counting practice will help state DOTs understand pedestrian and bicyclist travel patterns; select and prioritize projects improving multimodal access; ensure projects will be designed to balance multimodal travel needs for communities' benefits; and evaluate outcomes achieved from invested projects from multiple perspectives.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<p>The following tasks are proposed and subject to change based on PRC members' approval:</p> <p>Task 1: Review emerging data sources, methods, and technologies for non-motorized traffic counting</p> <p>Task 2: Continue collecting, managing, and mapping non-motorized traffic counting data</p> <p>Task 3: Test and refine expansion factors for short-term counters</p> <p>Task 4: Test non-motorized traffic counting data from data product vendors</p> <p>Task 5: Evaluate opportunities for expanding counting locations</p> <p>Task 6: Prepare the final report</p>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
<p>Task 1: Review emerging data sources, methods, and technologies for non-motorized traffic counting. (Expect to complete within 2 months since project starts)</p> <p>Task 2: Continue collecting, managing, and mapping non-motorized traffic counting data. (This task will continue throughout the entire project time)</p> <p>Task 3: Test and refine expansion factors for short-term counters. (Expect to complete within 10 months since project starts)</p> <p>Task 4: Test non-motorized traffic counting data from data product vendors. (Expect to start in the 11th month)</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Effects of I-10 Lane Closures on the Performance of other Alternate Routes in Baton Rouge			<b>Project Status:</b>	Proposed
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 5		<b>Budget Category:</b>		FHWA
SIO:			Project Start Date:		7/1/2023
Research Project Number:			Completion Date	(original)	1/31/2025
Research Agency:		LTRC	Completion Date	(revised)	
Principal Investigator:	Milhan Moomen				
<b>BUDGET STATUS</b>					
<b>Total Budget</b>			<b>Estimated 2023-2024 Budget</b>		
Total Cost	(original)	\$200,000	<b>Total</b>		<b>\$100,000</b>
	(revised)				
Est. Expended to Date			Salaries		\$100,000
<b>FY 2022 - 2023 Budget</b>			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		
<b>BUDGET JUSTIFICATIONS</b>					
Budget amounts do not require justifications.					
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>					
<p>Problem Statement: The DOTD's planned expansion of the I-10 road corridor in Baton Rouge will result in at least one lane closure for an extended period of time. The lane closure will result in traffic congestion on the road and may lead to spillage of traffic on other alternative routes in Baton Rouge. This spillover traffic may affect the traffic and durability of these alternative routes. It is imperative for the DOTD to assess the effect this spillover traffic on the durability of these alternate routes in Bat</p> <p>Objective(s): The objective of the study is to assess the effects of the I-10 lane closures on the performance of alternate routes in Baton Rouge. To achieve the above objective, the research team intends to select a couple of alternate routes in Baton Rouge that are likely to carry the spillover traffic from the I-10 lane closures and monitor them before, throughout, and after the lane closures.</p> <p>Expected Benefits: It is anticipated that the findings from this study will inform DOTD decisions on future lane closures for extended periods in Louisiana.</p>					
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>					
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>					
<p>Task 1. Complete literature review.</p> <p>Task 3. Complete data collection.</p> <p>Task 3. Commence analysis of data.</p>					

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Evaluating Practical Applications of Unmanned Aerial Vehicles (UAVs) for Traffic Incident Response and Management.			<b>Project Status:</b>	Proposed
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 5		<b>Budget Category:</b>		FHWA
SIO:			Project Start Date:		7/1/2023
Research Project Number:			Completion Date	(original)	1/30/2025
Research Agency:		LTRC	Completion Date	(revised)	
Principal Investigator:	Milhan Moomen				
<b>BUDGET STATUS</b>					
<b>Total Budget</b>			<b>Estimated 2023-2024 Budget</b>		
Total Cost	(original)	\$180,000	<b>Total</b>		<b>\$80,000</b>
	(revised)				
Est. Expended to Date			Salaries		\$80,000
<b>FY 2022 - 2023 Budget</b>			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		
<b>BUDGET JUSTIFICATIONS</b>					
Budget amounts do not require justifications.					
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>					
<p>Problem Statement: The use of Unmanned Aerial Vehicles (UAVs) also known as drones has increased in different sectors. The use of UAVs in traffic incident management (TIM) shows a lot of promise. UAVs have the potential to arrive at traffic sites faster than response vehicles and their videos may be transmitted to response staff in real-time for a better situational awareness. Evaluate practical applications in Louisiana.</p> <p>Objective(s): This research will undertake a functional analysis of UAV use in TIM. It will also assess the benefits of using UAVs in TIM. Incident detection and clearance times will be evaluated to determine if the use of UAVs significantly impacted these times. Also, challenges to the use of UAVs in TIM including technical and institutional obstacles will be identified during the testing phase. Importantly, guidelines and protocols will be established on the use of UAVs during the study period.</p> <p>Expected Benefits: Implementation may lead to increased situational awareness, increased safety of incident responders, decreased risk of secondary crashes, faster clearance times and a reduction in congestion. Importantly, the use of UAVs could lead to faster responses to traffic incidents in rural areas where there may be limited communication. Economically, UAVs are beneficial by enabling faster data collection, improving safety thereby saving time and money.</p>					
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>					
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>					
<ol style="list-style-type: none"> <li>1. Conduct literature review.</li> <li>2. Develop testing procedure document.</li> <li>3. Commence field tests.</li> </ol>					

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Improved Signalized Intersection Performance through Adaptive Signal Operations Using Computer Vision and Artificial Intelligence</b>			<b>Project Status:</b>	<b>Proposed</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>		<b>Budget Category:</b>		<b>FHWA</b>
SIO:			Project Start Date:		7/1/2023
Research Project Number:			Completion Date	(original)	6/30/2025
Research Agency:			Completion Date	(revised)	
Principal Investigator:					
<b>BUDGET STATUS</b>					
<b>Total Budget</b>			<b>Estimated 2023-2024 Budget</b>		
Total Cost	(original)	\$250,000	<b>Total</b>		<b>\$120,000</b>
	(revised)				
Est. Expended to Date			Salaries		\$120,000
<b>FY 2022 - 2023 Budget</b>			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		
<b>BUDGET JUSTIFICATIONS</b>					
Budget amounts do not require justifications.					
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>					
<p>Problem Statement: The biggest obstacle in the way of economic growth in Louisiana is traffic. This can be challenging when most of traffic signals in Louisiana are operated in a fixed mode. They are usually adjusted only when complaints are received. Lacking of effective intersection performance measures and adaptive signal operations is a problem. This project will perform a vision-based intersection performance evaluation and adaptive signal operations cooperatively across multiple intersections.</p> <p>Objective(s): The objective of this research would be to explore the possibility of evaluating intersection performance using existing video cameras and cooperatively operating signals. Ultimately, this research would create an assessment of the current intersection performance and provide solutions for improving Louisiana's traffic.</p> <p>Expected Benefits: A successful outcome could lead to a large-scale deployment of cameras and dedicated short-range communications (DSRC) devices. The proposed solutions could reduce congestions and save energies. The outcome of this project would be instrumental to meeting the SPaT challenge (development of DSRC infrastructure with SPaT broadcasts in at least one corridor or network) in Louisiana.</p>					
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>					
None					
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>					
To be determined after RFP					

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Statewide Lane Reconfiguration "Road Diet" Screening for Louisiana	<b>Project Status:</b>	Proposed
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 5	<b>Budget Category:</b>	FHWA
SIO:		Project Start Date:	1/1/2024
Research Project Number:		Completion Date (original)	12/31/2025
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	Ruijie "Rebecca" Bian		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost	(original) \$226,000	<b>Total</b>	<b>\$56,082</b>
	(revised)		
Est. Expended to Date		Salaries	\$34,530
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds	(original)	Equipment (non-expendable)	
	(revised)	Travel	
Est. FY Expenditure		Other	\$21,552
<b>BUDGET JUSTIFICATIONS</b>			
Other: Other: Other budget is for a sub-contract to a consultant. The breakout sheet is attached to the proposal.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Not all the road segments marked with higher active transportation investment suitability have sufficient space in their existing conditions to accommodate non-motorists (e.g., bicyclists and pedestrians). Road diet is a solution that works within the existing Right-of-Way to improve safety, operations, and/or expand multimodal access or address other needs.</p> <p>Objective(s): The objective of this research is to investigate opportunities for and feasibility of implementing road diets on roadways as well as identifying other underutilized utility rights-of-way/easements to help Louisiana develop a network accommodating non-motorized travel needs while optimizing use of publicly owned land.</p> <p>Expected Benefits: Results from this research will help DOTD develop its own Road Diet Strategy to guide future construction and preservation projects to make systematic multimodal access improvements.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
Develop a full proposal and kick off the project.			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Trip Generation for Various Sites	<b>Project Status:</b>	Proposed
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 5	<b>Budget Category:</b>	FHWA
SIO:		Project Start Date:	7/1/2023
Research Project Number:		Completion Date (original)	6/30/2025
Research Agency:		Completion Date (revised)	
Principal Investigator:			
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost	(original) \$250,000	<b>Total</b>	<b>\$100,000</b>
	(revised)		
Est. Expended to Date		Salaries	\$100,000
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds	(original)	Equipment (non-expendable)	
	(revised)	Travel	
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: The 11th edition of the ITE Trip Generation Manual is missing several site codes. LTRC Project 18-4SS sought to confirm trip generation for strip malls and provided updated information specific to Louisiana for existing site codes in the ITE Trip Generation Manual. This proposal is to develop new trip generation (new site codes) for various types of sites that currently have no codes in the ITE manual. There may be the need to update some existing codes too.</p> <p>Objective(s): Identify site codes currently included in the 11th Edition of the ITE Trip Generation Manual and confirm or update those using local data. Several uses that are of concern include the following: apartments, boat/RV storage, drive-thru daiquiri shops, car washes, Dollar General stores, Chick-fil-a restaurants, Vineyard/Event Centers and Restaurants with Specialty Markets. Poll DOTD Districts to prioritize list.</p> <p>Expected Benefits: This will help traffic engineers more accurately assess a development's impact to the state highway system.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
Expected to be RFP			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
TBD			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Redesign of Innovative gate Arms (Ramp Closure Gate)	<b>Project Status:</b>	Proposed
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 6	<b>Budget Category:</b>	FHWA
SIO:		Project Start Date:	7/1/2023
Research Project Number:		Completion Date (original)	6/30/2025
Research Agency:		Completion Date (revised)	
Principal Investigator:			
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost	(original) \$180,000	<b>Total</b>	<b>\$50,000</b>
	(revised)		
Est. Expended to Date		Salaries	\$50,000
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds	(original)	Equipment (non-expendable)	
	(revised)	Travel	
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: e Ramp Closure Gate design that was evaluated by TTI did not pass MASH (H.014518). To be efficient the system must pass MASH and be able to remain on the roadways so that they can be deployed rapidly when a closure is declared.</p> <p>Objective(s): Conduct an evaluation of the existing Ramp Closure Gate design and propose a redesign that meets the functional requirement and passes MASH. The final design should utilize a majority of materials currently stocked by the Department.</p> <p>Expected Benefits: To streamline the response to severe weather incidents and to greatly reduce the time required to close sections of the Interstate and other highways, which become unsafe to travel during severe weather, to ensure safety for the travelling public.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
TBD			



**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Smart Nanogrids for Safer Roads	<b>Project Status:</b>	Proposed
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 5	<b>Budget Category:</b>	FHWA
SIO:	DOTLT1000500	Project Start Date:	7/1/2023
Research Project Number:	24-5TIRE	Completion Date (original)	6/30/2024
Research Agency:	ULL	Completion Date (revised)	
Principal Investigator:			
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost	(original) \$30,000	<b>Total</b>	<b>\$30,000</b>
	(revised)		
Est. Expended to Date		Salaries	\$25,749
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	\$4,251
FY Funds	(original)	Equipment (non-expendable)	
	(revised)	Travel	
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: This project studies and evaluates the performance of a smart nanogrid energy hub comprised of piezoelectric harvester, solar PV, and battery storage. An intelligent power-sharing scheme is proposed based on Deep Reinforcement Learning (DRL) that will act as a strong decision-maker under unexpected disturbances and uncertainties to feed the loads.</p> <p>Objective(s): The project's high-level goal is to improve roadway lighting schemes by incorporating sustainable resources and intelligent control systems. Plans and activities are designed to meet two main objectives:</p> <ul style="list-style-type: none"> <li>• Improve energy diversification and resilience enabling enhanced road lighting,</li> <li>• Intelligently control the electric power delivery to lights.</li> </ul> <p>Expected Benefits: The team will formulate the imposed cost as a function of the agents' capacities with respect to different amounts of loads using regression analysis. The results will give investors a better insight into where/how much to invest if they want to scale up the nanogrid to a certain level.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
Start and finish the project.			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Development of durable self-sensing cementitious composites for transportation infrastructure rehabilitation and monitoring			<b>Project Status:</b>	Proposed
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 5		<b>Budget Category:</b>		FHWA
SIO:	DOTLT1000499		Project Start Date:		7/1/2023
Research Project Number:	24-4TIRE		Completion Date	(original)	6/30/2024
Research Agency:	LSU		Completion Date	(revised)	
Principal Investigator:					
<b>BUDGET STATUS</b>					
<b>Total Budget</b>			<b>Estimated 2023-2024 Budget</b>		
Total Cost	(original)	\$30,000	<b>Total</b>		<b>\$30,000</b>
	(revised)				
Est. Expended to Date			Salaries		\$12,267
<b>FY 2022 - 2023 Budget</b>			Consumable Supplies & Materials		\$3,733
FY Funds	(original)		Equipment	(non-expendable)	\$14,000
	(revised)		Travel		
Est. FY Expenditure			Other		
<b>BUDGET JUSTIFICATIONS</b>					
<p>Equipment: Equipment needed includes: Compact Line Potentiostat (\$7000) Ultrasonic Sonicator (\$7000)</p>					
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>					
<p>Problem Statement: Self-sensing cementitious composites are a novel class of materials that can generate electricity from mechanical strain and can be applied to infrastructures SHM. This research will focus on developing self-sensing cementitious composites with high durability that can be used to monitor the structural integrity of different sections of transportation infrastructure, such as reinforced concrete columns, beams, slabs, and even pavements.</p> <p>Objective(s): This research aims to develop self-sensing cementitious composites that can be coated on, embedded in, or used as a substitute for conventional concrete in critical structural members of transportation infrastructure to monitor and evaluate their condition autonomously. Additionally, this study will evaluate and enhance the durability of the proposed materials to improve sustainability.</p> <p>Expected Benefits: This study will be served as a pilot study to collect the data and gain experience in using the materials available in the State of Louisiana to develop SSC. Once the SSC has been developed and verified in the laboratory, field trial testing might be conducted to evaluate the feasibility of the practical application. The goal is to improve the resilience and sustainability of our next-generation intelligent transportation infrastructure.</p>					
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>					
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>					
Start and finish the project.					

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Structural Response Evaluation and Design of Ultra High Performance Concrete Bridge Girders</b>	<b>Project Status:</b>	<b>Proposed</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:	<b>DOTLT1000498</b>	Project Start Date:	7/1/2023
Research Project Number:	24-3TIRE	Completion Date (original)	6/30/2024
Research Agency:	LTU	Completion Date (revised)	
Principal Investigator:			
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$30,000	<b>Total</b>	<b>\$30,000</b>
(revised)			
Est. Expended to Date		Salaries	\$24,231
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	\$5,569
FY Funds (original)		Equipment (non-expendable)	
(revised)		Travel	\$200
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Supplies: The supplies needed for this project include cement, formwork, etc. All supplies purchased will be less than the \$5000 limit from FHWA.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: The growing interest in using UHPFRC in bridge engineering is being hindered by a lack of design guidelines. To address the noted issue, in this project the structural response of UHPFRC girders will be evaluated under different loading conditions using experimental testing, numerical modeling, and machine learning algorithms. The key advantages of using UHPFRC in bridge girders are high shear strength, enhanced post-cracking response, and tensile strain hardening characteristics.</p> <p>Objective(s): The main objectives of this research project include evaluating the structural response of UHPFRC girders subjected to different loading configurations, studying the feasibility of eliminating shear reinforcement, and developing simplified design expressions.</p> <p>Expected Benefits: These benefits also result in financial savings related to reductions in the size of bridge girders, reduced use of materials, reduced or eliminated shear reinforcement, reduced load demands, and maintenance costs.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
Start and complete the project.			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Smart Bridge Monitoring Employing Deep Learning and Unmanned Aerial Vehicles</b>	<b>Project Status:</b>	<b>Proposed</b>
<b>Funding Source:</b>	<b>SPR: TT-Fed/TT-Reg - 5</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:	<b>DOTLT1000497</b>	Project Start Date:	7/1/2023
Research Project Number:	24-2TIRE	Completion Date (original)	6/30/2024
Research Agency:	LTU	Completion Date (revised)	
Principal Investigator:			
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$30,000	<b>Total</b>	<b>\$30,000</b>
(revised)			
Est. Expended to Date		Salaries	\$24,962
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	\$4,838
FY Funds (original)		Equipment (non-expendable)	
(revised)		Travel	\$200
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Significant attention should be devoted to develop new approaches to continuously monitor existing bridges using a platform that enables smart infrastructure monitoring. This project will develop a data-driven framework for smart bridge monitoring through integration of machine/deep learning and UAV images.</p> <p>Objective(s): 1. evaluate the applicability and effectiveness of the proposed framework through laboratory experiments on reinforced concrete beams 2. Apply framework to identify damage/cracks in concrete bridges</p> <p>Expected Benefits: Benefits include further development of autonomous monitoring systems using machine/deep learning specifically with the use of images obtained with UAV's.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
Start and finish the project.			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Investigation of free-standing polymer composites for robotic-driven bridge construction	<b>Project Status:</b>	Proposed
<b>Funding Source:</b>	SPR: TT-Fed/TT-Reg - 5	<b>Budget Category:</b>	FHWA
SIO:	DOTLT1000496	Project Start Date:	7/1/2023
Research Project Number:	24-1TIRE	Completion Date (original)	6/30/2024
Research Agency:	LSU	Completion Date (revised)	
Principal Investigator:			
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost	(original) \$30,000 (revised)	<b>Total</b>	<b>\$30,000</b>
Est. Expended to Date		Salaries	\$25,000
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	\$5,000
FY Funds	(original) (revised)	Equipment (non-expendable)	
Est. FY Expenditure		Travel	
		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Supplies: Supplies are needed for materials (resin, reinforcement, etc.), hardware and extruders, and miscellaneous laboratory supplies such as gloves, paper towels, etc. No individual item to exceed \$5000.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Additive manufacturing (AM), or 3D printing, is a promising technique that allows segmental fabrication of large structures and shows potential for freestanding printing (no support) with photopolymers or frontal polymerization resins. In combination with mobile robotic manipulators, on-site manufacturing could be achieved, further decreasing transportation costs. However, FRP free-standing printing for bridges requires further research to assess their feasibility.</p> <p>Objective(s): The proposed work aims to conduct preliminary research to explore free-standing 3D printing of continuous fiber-reinforced polymers. The experimental approach will focus on small- and medium-scale free-standing printing with desktop and robotic systems to identify best fabrication strategies.</p> <p>Expected Benefits: This project will allow for further understanding of how resin type, composition, and extrusion parameters influence free-standing 3D printing of FRP's and investigate and characterize microstructure and mechanical performance of free-form printed FRP structures.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
Start and complete the project.			

**FHWA**  
**Part B SPR Funded**  
**Research Program**

**POOLED FUND**  
**LOUISIANA**  
**LEAD STATE RESEARCH**

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Southeast Transportation Consortium - Phase II</b>			<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>SPR: Pooled Fund: TT-Fed</b>		<b>Budget Category:</b>		<b>FHWA</b>
SIO:	<b>DOTLT</b>		Project Start Date:		2/1/2023
Research Project Number:	21-1PF		Completion Date	(original)	6/30/2025
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow				
<b>BUDGET STATUS</b>					
<b>Total Budget</b>			<b>Estimated 2023-2024 Budget</b>		
Total Cost	(original)	\$900,000	<b>Total</b>		<b>\$200,000</b>
	(revised)				
Est. Expended to Date		\$25,000	Salaries		
<b>FY 2022 - 2023 Budget</b>			Consumable Supplies & Materials		
FY Funds	(original)	\$180,000	Equipment	(non-expendable)	
	(revised)	\$25,000	Travel		\$15,000
Est. FY Expenditure		\$25,000	Other		\$185,000
<b>BUDGET JUSTIFICATIONS</b>					
Travel: Travel budget is for members of the pooled fund to travel to the annual meeting.					
Other: This budget is for contract research services to be determined from the needs of the pooled fund state partners.					
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>					
<p>Problem Statement: The current Southeast Transportation Consortium (STC) is nearing its second extension to round out 10 years of productive work. In that 10 year period at least 12 research products have been produced on a wide variety of topics of interest to the AASHTO Region 2 member states. Additionally, the technology transfer and idea sharing between the states has benefited all immensely.</p> <p>Objective(s): (1) Discuss and screen potential research or synthesis projects; (2) Conduct research and synthesis studies; (3) Hold a multi-state peer exchange for up to five (5) STC member states on a topic of their choosing; (4) Communicate and disseminate research results and innovative practices through publications and other technology transfer activities;</p> <p>Expected Benefits: Increased knowledge sharing as well as tackling common research interests between STC Member states.</p>					
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>					
A kick-off meeting was held in Greenville, SC March 20-23, 2023. Four research topics were identified and RFP's are being developed. Additionally a multi-state peer exchange was conducted and the required report is under review and will be completed by the end of the FY.					
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>					
Start 3-4 research projects and hold another Annual Meeting in a location to be determined.					

# **FHWA**

## **LTAP Funded Program**



**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Local Technical Assistance Program (LTAP)</b>			<b>Project Status:</b>	<b>Proposed</b>
<b>Funding Source:</b>	<b>LTAP: TT-Fed/TT-Reg</b>		<b>Budget Category:</b>		<b>FHWA</b>
SIO:	<b>DOTLT1000484</b>		Project Start Date:		7/1/2023
Research Project Number:	24-LTAP		Completion Date	(original)	6/30/2024
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	MaryLeah Coco				
<b>BUDGET STATUS</b>					
<b>Total Budget</b>			<b>Estimated 2023-2024 Budget</b>		
Total Cost	(original)	\$692,938	<b>Total</b>		<b>\$692,938</b>
	(revised)				
Est. Expended to Date			Salaries		\$385,480
<b>FY 2022 - 2023 Budget</b>			Consumable Supplies & Materials		\$22,000
FY Funds	(original)		Equipment	(non-expendable)	\$8,000
	(revised)		Travel		\$68,000
Est. FY Expenditure			Other		\$209,458
<b>BUDGET JUSTIFICATIONS</b>					
<p>Supplies: Supplies necessary to conduct technology transfer and workforce development activities for the LA LTAP program. Supplies to be purchased for use only in research and technical activities.</p> <p>Equipment: No individual item will exceed \$5,000.</p> <p>Travel: -Travel for statewide delivery of required courses for the transportation community          -Travel for professional development          -Travel for both pre and post event management activities          -Travel for assistance with onsite course registration and management          -Travel for statewide specification meetings          -Travel for statewide meetings</p> <p>Other: -Professional Services (Special Projects): \$50,000          -Course material production (printing, copying, binding, etc.): \$21,000          -Professional services (instructors): \$100,000          -Professional services (LPA on Line/CBT Module): \$38,458</p>					
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>					
<p>Problem Statement: LTRC's Local Technical Assistance Program (LTAP) stimulates the progressive transfer of highway technology through training, work force development and technical assistance. A cooperative effort of DOTD, FHWA and LSU, LTAP leverages the expertise and resources of these organizations for the benefit of local transportation and public works agencies.</p> <p>Objective(s): To provide cost effective transfer of technology and workforce development opportunities to Louisiana's parish and municipality public transportation and public works agencies through training, technical assistance, and information dissemination.</p> <p>Expected Benefits: LTAP offers training, technical assistance, newsletters, and a multimedia lending library.</p>					

**LTRC Annual Research Program  
Fiscal Year 2023-2024**

<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>
<ul style="list-style-type: none"> <li>-Delivered 9 in-person offerings of "Roads Scholar #4: Temporary Traffic Control" course [240 attendees]</li> <li>-Delivered 5 in-person offerings of "Roads Scholar #14: Bridge Maintenance and Repair" course [108 attendees]</li> <li>-Delivered 6 in-person offerings of "Roads Scholar #2: Maintenance of Asphalt Roads course [200 attendees]</li> <li>-Delivered 1 in-person offering of "Roads Scholar #6: Heavy Equipment Safety &amp; Maintenance for Local Agencies [34 attendees]</li> <li>-Delivered 1 in-person offering of "Roads Scholar #13: Inspection of Local Bridges" 2-day course [21 attendees]</li> <li>-Delivered 16 in-person offerings of "Tractor Mower Safety Training" course [574 attendees]</li> <li>-Delivered Local Public Agency (LPA) training: 2 in-person offerings of "LPA Qualification Core Training" 2-day course [76 attendees], &amp; 2 offerings of the "LPA Construction, Engineering, and Inspection (CE&amp;I)" [63 attendees]</li> <li>-Provided one-on-one technical assistance to 2 local agencies upon request (City of Shreveport and Jefferson Davis Parish) in support of implementing pavement preservation practices</li> <li>-Organized and facilitated the Fall [attendees] and Spring conferences [221 attendees] of the Louisiana Parish Engineers and Supervisors Association (LPESA); supported 4 Board Meetings and 1 General Assembly Meeting at PJAL Convention.</li> <li>-Delivered 3 webinars as part of the quarterly "LPESA Virtual Showcase" series [30 attendees]</li> <li>-Co-hosted with APWA Baton Rouge and Covington branches Public Works Employee Safety Training seminars [200 attendees]</li> <li>-Hosted 1 virtual webinar of "SimCap Louisiana Educational Meetings" [35 attendees]</li> <li>-Hosted FHWA FoRRRwD Peer Exchange for Local Agencies 2-day [45 attendees]</li> <li>-Served as Implementation Team Leaders for the following EDC-6 initiatives: Crowdsourcing for Advancing Operations, Next-Generation TIM: Integrating Technology, Data, and Training; Strategic Workforce Development; and Targeted Overlay Pavement Solutions (TOPS)</li> <li>-Promoted FHWA, DOTD, and LTRC programs and initiatives to local agencies including IJJA/BIL funding opportunities.</li> <li>-Presented at the 2022 NLTAPA Annual Conference, 2022 DSITE Fall and Winter Meetings, 2023 Louisiana Transportation Conference, 2022 SDITE Annual Meeting, and 2022 and 2023 NACE Annual Meetings, among other professional meetings Communications and Outreach</li> <li>-Exhibitor booths at the Conventions of the Police Jury Association of Louisiana (PJAL); Louisiana Municipal Association; and Louisiana Transportation Conference; providing information on LTAP programs, training, and technical assistance.</li> <li>-Produced and disseminated 4 quarterly "Technology Exchange" newsletters, 12 monthly "Local Connections" e-mail bulletins, 6 Leadership Digest Email Bulletins, numerous training and course announcement email bulletins</li> </ul>
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>
<ul style="list-style-type: none"> <li>-Revise content and deliver offerings of "Roads Scholar #9: Signing from the Ground Up" course [9 sessions]</li> <li>-Revise content and deliver offerings of "Roads Scholar #8: Integrated Successful Supervision for Local Road Supervisors" course [9 sessions]; integrate into "Louisiana Leadership for the Locals" program</li> <li>-Revise content and deliver offerings of "Roads Scholar #3: Drainage: The Key to Roads That Last" course [9 sessions]</li> <li>-Deliver "Chainsaw Safety and Precision Felling" course [4 sessions]</li> <li>-Deliver series of Local Public Agency training workshops, involving the LPA Qualification Core Training (2-day training), and LPA Construction, Engineering, &amp; Inspection (CE&amp;I) (1-day training) courses [2 series]</li> <li>-Deliver a virtual offering of "Crowdsourcing for Advancing Transportation Operations" class (developed by EDC-6 effort) [1 session]</li> <li>-Continue to provide technical assistance to local agencies in support of implementing pavement preservation practices</li> <li>-Organize and facilitate the Fall and Spring conferences of LPESA</li> <li>-Deliver webinars as part of the quarterly "LPESA Virtual Showcase" series [4 sessions estimated]</li> <li>-Deliver joint webinars with the Louisiana Chapter of APWA [2 sessions]</li> <li>-Support implementation and outreach activities associated with EDC-6 initiatives: Crowdsourcing for Advancing Operations, Next-Generation TIM: Integrating Technology, Data, and Training; Strategic Workforce Development; and EDC-7, including Nighttime Visibility for Safety.</li> <li>Participate in FHWA EDC Summit sessions for EDC-7 Initiatives</li> <li>-Promote FHWA, DOTD, and LTRC programs and initiatives to local agencies</li> <li>-Provide technical resource speakers for activities of local and regional affiliates of partner organizations: APWA, LMA, ITE, and NLTAPA</li> <li>-Exhibitor booth at the annual Police Jury Association of Louisiana (PJAL) Convention and the annual Louisiana Municipal Association (LMA) Convention; provide information on LTAP programs, training, and technical assistance</li> <li>-Produce and disseminate quarterly "Technology Exchange" newsletters [4 est.] and monthly "Local Connections" e-mail bulletins [12 est.]</li> </ul>

**FHWA  
STP Funded  
Technology Transfer &  
Education Program**

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Training and Development Support Services</b>			<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>STP: TT-Fed</b>		<b>Budget Category:</b>		<b>FHWA</b>
SIO:	<b>DOTLT1000278</b>		Project Start Date:		7/1/2018
Research Project Number:	19-TDSS		Completion Date	(original)	6/30/2021
Research Agency:	LTRC		Completion Date	(revised)	6/30/2024
Principal Investigator:	Vijaya Gopu				
<b>BUDGET STATUS</b>					
<b>Total Budget</b>			<b>Estimated 2023-2024 Budget</b>		
Total Cost	(original)	\$441,453	<b>Total</b>		<b>\$225,000</b>
	(revised)	\$1,213,383			
Est. Expended to Date		\$656,000	Salaries		\$210,000
<b>FY 2022 - 2023 Budget</b>			Consumable Supplies & Materials		
FY Funds	(original)	\$147,288	Equipment	(non-expendable)	
	(revised)		Travel		\$15,000
Est. FY Expenditure		\$120,000	Other		
<b>BUDGET JUSTIFICATIONS</b>					
<p>Travel: -Travel for statewide delivery of required courses for the transportation community          -Travel for professional development          -Travel for both pre and post event management activities          -Travel for assistance with onsite course registration and management          -Travel for statewide specification meetings          -Travel for statewide meetings</p>					
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>					
<p>Problem Statement: The Training and Development Support Services will be involved in the management of the Louisiana Department of Transportation and Development's Structured Training Unit Learning Management System (LMS), which is a mandated system by the State of Louisiana Division of Administration.</p> <p>Objective(s): This project will be responsible for coordinating and maintaining the LEO/LSO (Louisiana Employees Online/Learning Solution Online) system for the Technology Transfer and Training programs as well as other related training. The project will assist in implementing programs that are time sensitive and critical to the DOTD meeting the various training and program requirements.</p> <p>Expected Benefits: Meet internal and external customer needs in order to provide time sensitive programs for the Louisiana Department of Transportation and Development (DOTD).</p>					
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>					
<p>-Worked with CPTP to schedule people who had not completed Louisiana Civil Service mandated supervisory training.          -Made changes to DOTD webpages due to changes in DOTD Training policy.          -Coordinated training days for field people with training delivered by DOTD personnel.          -Standardized DOTD data in the old LMS for migration to the new one.          -Participated in statewide meetings and configuration of the new LMS that was implemented 1/1/2023.          -Evaluated and redesigned existing training programs to work in new LMS          -Conducted multiple trainings for LTRC-DOTD personnel on implementation of the new LMS          -Monitored and assisted with the meeting of training requirements for DOTD personnel. Statewide Yearly Training requirements (DOTD compliance with statewide training at 99.9%, Compliance with DOTD programs 99%).          -Helped with bringing LTRC into the OTS domain          -Setting up new computers for users in OTS environment          -Installation and configuration of new software for users          -Aided in acquisition and programming of new training laptops          -Preparation for conferences and meetings          -Involved with replacement of current EMS system          -Involved with moving current VM servers to OTS environment</p>					

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

**FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES**

- Continue evaluation of training programs and propose revisions to work with the new LMS
- Continue to work with Loss Prevention for record keeping required by the state.
- Continue documenting procedures and developing best practices relating to training records.
- Continue to monitor and assist in efforts to maintain a high level of compliance with required training.
- Review reporting in new LMS and request additional reporting to meet DOTD needs.
- Continue all IT support services for LTRC campus and employees.

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Technology Transfer & Research Implementation Support for Louisiana Universities	<b>Project Status:</b>	Ongoing
<b>Funding Source:</b>	STP: TT-Fed	<b>Budget Category:</b>	FHWA
SIO:	<b>30000241</b>	Project Start Date:	1/1/2010
Research Project Number:	10-4AD	Completion Date (original)	12/31/2013
Research Agency:	LTRC	Completion Date (revised)	6/30/2025
Principal Investigator:	Tyson Rupnow		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost	(original) \$100,000	<b>Total</b>	<b>\$10,000</b>
	(revised)		
Est. Expended to Date	\$78,023	Salaries	
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds	(original) \$10,000	Equipment (non-expendable)	
	(revised) \$3,500	Travel	\$10,000
Est. FY Expenditure	\$3,244	Other	
<b>BUDGET JUSTIFICATIONS</b>			
<p>Travel: This budget item is to pay for associated travel costs for external PI's to travel to conferences to present findings. All travel is subject to DOTD/State of LA travel policies and is approved by LTRC prior to travel.</p>			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: Controlling travel to present research results is a significant issue with many of our external contracts wanting to attend conferences in exotic locations such as Italy, France, etc. This project was created over 10 years ago to combat that very spending issue.</p> <p>Objective(s): The purpose of the project is to provide travel funds to university research principal investigators for dissemination of research results at various technology transfer events. Travel funds are dispersed on a case by case basis as it applies to providing a benefit to Louisiana.</p> <p>Expected Benefits: The benefits of this project are twofold: (1) presentation of Louisiana Research promotes the excellent research work conducted and completed utilizing LTRC funds, and (2) other entities are able to view these presentations and ask questions and even adopt portions or all of the research product as well.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
Send contract researchers to present upon findings of LTRC contract research projects.			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
Send contract researchers to present upon findings of LTRC contract research projects.			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Technology Transfer Program and Operations (LSU)	<b>Project Status:</b>	Ongoing
<b>Funding Source:</b>	STP: TT-Fed	<b>Budget Category:</b>	FHWA
SIO:	<b>30000320</b>	Project Start Date:	7/1/2015
Research Project Number:	08-1TSQ	Completion Date (original)	6/30/2018
Research Agency:	LTRC	Completion Date (revised)	6/24/2024
Principal Investigator:	MaryLeah Coco		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$361,546	<b>Total</b>	<b>\$430,406</b>
(revised)	\$1,140,170		
Est. Expended to Date	\$1,300,934	Salaries	\$375,726
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	\$17,360
FY Funds (original)	\$417,608	Equipment (non-expendable)	\$15,000
(revised)		Travel	\$11,160
Est. FY Expenditure	\$261,000	Other	\$11,160
<b>BUDGET JUSTIFICATIONS</b>			
<p>Supplies: Supplies necessary to conduct technology transfer and workforce development activities for the public information and media team.</p> <p>Supplies to be purchased for use only in research and technical activities.</p> <p>Equipment: This budget item is comprised of various items all not to exceed \$5,000 on an individual basis.</p> <p>Travel: Travel for professional development Travel for both pre and post event management activities Travel for statewide photography and videography Travel for statewide meetings</p> <p>Other: Contracts for external technology transfer initiatives.</p>			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: This program is responsible for developing and maintaining publication design, graphic design, website, database maintenance, public relation press packages, Section 504 compliance, and editing of all media projects for the Louisiana Transportation Research Center and Louisiana Department of Transportation and Development on a statewide level. In addition, this program is responsible for the production of all reports and production pieces for the Louisiana Legislature.</p> <p>Objective(s): The objectives of this study are to: Disseminate information on new technologies and methodologies to the Louisiana Department of Transportation and Development (DOTD) and other transportation-oriented agencies; improve communications on technical, transportation-related issues between the department and other agencies; encourage implementation of new procedures and technologies; and disseminate information on transportation subjects to appropriate managers and engineers in the department.</p> <p>Expected Benefits: Dissemination of technology transfer, training, and research initiatives to the transportation community as a whole.</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

**FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS**

- Managed attendee, sponsorship, and exhibitor registration for 2023 LTC
- Managed 2023 LTC marketing via Constant Contact email and social media channels
- Managed Adobe Cloud licenses for DOTD employees
- Researched mobile app products for 2023 LTC; procured Grupio through OTS and created/managed LTC 2023 mobile app
- Continued development of Project Manager's Manual interactive updates for DOTD
- Developed new forms for asphalt scholarship application process (ASCE and LAPA)
- Created social media-friendly content for LTAP through Adobe Spark
- Designed 4 issues of Technology Exchange for LTAP
- Implemented new online calendar for LTAP website
- Provided web support for NSF project: Field Monitoring and Measurements (FMM) Education
- Working through backlog of document published prior to Oct. 2018 for accessibility issues
- Managed online SASHTO scholarship application process
- Compiled and produced LTRC annual report (21-22)
- Maintained regular posting of all LTRC publications on website and social media channels
- Support for all Section 33 users managing the Registration Management System
- Designed and printed DOTD Employee Survey final reports
- Worked on move to OTS VM servers
- Created pilot accessibility training for DOTD Environmental Section
- Published 4 Tech Today Newsletters
- Created Adobe Spark pages to share on social media
- Created and designed Constant Contact emails to disseminate Tech Todays electronically
- Edited 13 Final Reports/Technical Summaries
- Published 7 Project Capsules
- Published 12 Final Reports/Technical Summaries
- Edited 2 training manuals
- Designed LTC program, conference signs, agenda, and social media sponsorship postings
- Continued to apply disclaimer watermark for safety reports and stay updated concerning new disclaimer requirements
- Continued to apply accessibility requirements for all newly published work
- Continued to implemented new Word template
- Continued to maintain document information form for library liaison
- Updated Tech Today interdepartmental mailing list to reflect new leadership and section heads
- Printed 16 TRB posters for LTRC participants at annual meeting; 3 additional posters for other conferences
- Film and Production- DOTD Fly Louisiana Airport Program
- Film and Production- DOTD Babin Retirement
- Film and Production- AASHTO Post Spring Meeting Promotional Video
- Film and Production- DOTD Essence Fest Safety Message
- Film and Production- DOTD E.V. Infrastructure Plan
- Film and Production- DOTD Atterberg Limits Procedure
- Film and Production- DOTD Vince Latino Retirement
- Film and Production- DOTD Work Zone Awareness
- Film and Production- DOTD Innovations Showcase
- Film and Production- DOTD Customer Service Training
- Film and Production- DOTD LA1 Groundbreaking
- Film and Production- DOTD Mississippi River Bridge Inspection
- Film and Production- DOTD ROADEO Promotional
- Film and Production- DOTD Scenario Planning
- Film and Production- DOTD CMAR Promo
- Film and Production- DOTD DDI Secretary Message
- Film and Production- LTRC Heavyweight Deflector Maintenance
- Post Production- 5 Google Map Animations
- Event Photography
- AASHTO Spring Meeting (May 2022- not included in previous AWP)
- Southeast Regional ROADEO
- 2023 Louisiana Transportation Conference photo/video coverage
- 1,560 Subscribers on YouTube



**LTRC Annual Research Program**  
Fiscal Year 2023-2024

**FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES**

- Continue to prepare project capsules, and review draft final reports
- Continued web/graphics support in all current areas
- Continued work on 508 accessibility issues for PDFs
- Photograph all LTRC and DOTD events
- Video all LTRC and DOTD events
- Readily available for any special assistance requested from Secretary's office
- Continue training and support for online registration management system
- Continue to edit and distribute project capsules, technical summaries, final reports and technical assistance reports
- Publish 4 Tech Today newsletters
- Continued accessibility training development for internal staff/DOTD
- Update Publications & Digital Media standard operating procedures; create SOP for LTC publications duties
- Complete move to OTS VM servers
- Update LTC and LTRC logo/identity branding
- Update LTRC informational video
- Engage in Government Social Media professional organization

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Technology Transfer Registration Fees	<b>Project Status:</b>	Proposed
<b>Funding Source:</b>	STP: TT-Fed	<b>Budget Category:</b>	FHWA
SIO:	DOTLT1000487	Project Start Date:	7/1/2023
Research Project Number:	24-TTRF	Completion Date (original)	6/30/2024
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	MaryLeah Coco		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$100,000	<b>Total</b>	<b>\$100,000</b>
(revised)			
Est. Expended to Date		Salaries	
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)		Equipment (non-expendable)	
(revised)		Travel	
Est. FY Expenditure		Other	\$100,000
<b>BUDGET JUSTIFICATIONS</b>			
Other: Statewide technology transfer and research activities related to workforce development.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: To provide cost effective transfer of technology and workforce development opportunities to Louisiana's parish and municipality and public works agencies through training, technical assistance, and information dissemination.</p> <p>Objective(s): Strengthen the technology transfer, training, education, and other opportunities to Louisiana's parish and municipality and public works agencies.</p> <p>Expected Benefits: Provide access to cost effective workforce development activities that will lead to better trained public works agencies.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
Provided cost effective transfer of technology and workforce development opportunities to Louisiana's parish and municipality and public works agencies through training, technical assistance, and information dissemination.			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
Continue to provide cost effective transfer of technology and workforce development opportunities to Louisiana's parish and municipality and public works agencies through training, technical assistance, and information dissemination.			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	DOTD CO-OP Program	<b>Project Status:</b>	Proposed
<b>Funding Source:</b>	STP: TT-Fed	<b>Budget Category:</b>	FHWA
SIO:	DOTLT1000488	Project Start Date:	7/1/2023
Research Project Number:	24-COOP	Completion Date (original)	6/30/2024
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	MaryLeah Coco		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$200,000	<b>Total</b>	<b>\$200,000</b>
(revised)			
Est. Expended to Date		Salaries	\$200,000
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)		Equipment (non-expendable)	
(revised)		Travel	
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: The Louisiana Department of Transportation and Development (DOTD) Co-Op program is a cooperative endeavor between the DOTD and Louisiana universities with accredited engineering programs, providing practical experience to junior and senior level undergraduates through part-time employment in public transportation engineering work.</p> <p>Objective(s): This program is intended to enhance the educational process by providing opportunities for participants to explore their interest in transportation engineering through practical experience; provide opportunities for DOTD to evaluate participants of this program as potential employees; and enhance the educational process by providing opportunities for students to explore their interest in transportation engineering through practical experience.</p> <p>Expected Benefits: Student will have the opportunity to work in their related career field. Increase the students' employability in their career field of engineering. Increase the students' potential to advance within their career field.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
-15 undergraduate students participated in the Co-Op program at various DOTD districts/sections.			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
<ul style="list-style-type: none"> <li>-Place approximately 15 students in various DOTD districts/sections across the state;</li> <li>-Continue end of semester presentations in a face-to-face or virtual format;</li> <li>-Retain students in the Co-Op program each semester/quarter; and</li> <li>-Attend/participate in engineering related career fairs held throughout the state of Louisiana</li> </ul>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	LTRC Student Worker Program			<b>Project Status:</b>	Proposed
<b>Funding Source:</b>	STP: TT-Fed		<b>Budget Category:</b>		FHWA
SIO:	DOTLT1000486		Project Start Date:		7/1/2023
Research Project Number:	24-2TT		Completion Date	(original)	6/30/2024
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	MaryLeah Coco				
<b>BUDGET STATUS</b>					
<b>Total Budget</b>			<b>Estimated 2023-2024 Budget</b>		
Total Cost	(original)	\$147,600	<b>Total</b>		<b>\$147,600</b>
	(revised)				
Est. Expended to Date			Salaries		\$147,600
<b>FY 2022 - 2023 Budget</b>			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		
<b>BUDGET JUSTIFICATIONS</b>					
Budget amounts do not require justifications.					
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>					
<p>Problem Statement: To pay salaries for undergraduate students employed to provide support in fulfilling necessary job tasks on various Louisiana Transportation Research Center (LTRC) projects.</p> <p>Objective(s): Employee undergraduate students in the field of research, technology transfer, education, and training.</p> <p>Expected Benefits: Offer undergraduate students employment experience in research, technology transfer, education, and training in state government, specifically transportation, that will expose them to public service opportunities post graduation.</p>					
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>					
Thirty (30) undergraduate students were employed by LTRC to provide support in fulfilling necessary job tasks on various LTRC projects, research, technology transfer, training, and education initiatives.					
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>					
Continue to pay for salaries for undergraduate students employed to provide support to various LTRC projects.					

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Workforce Development Contracts	<b>Project Status:</b>	Proposed
<b>Funding Source:</b>	STP: TT-Fed	<b>Budget Category:</b>	FHWA
SIO:	DOTLT1000485	Project Start Date:	7/1/2023
Research Project Number:	24-1WDC	Completion Date (original)	6/30/2024
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	MaryLeah Coco		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost	(original) \$4,262,407	<b>Total</b>	<b>\$4,262,407</b>
	(revised)		
Est. Expended to Date		Salaries	\$1,564,000
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	\$136,400
FY Funds	(original)	Equipment (non-expendable)	\$125,000
	(revised)	Travel	\$49,600
Est. FY Expenditure		Other	\$2,387,407
<b>BUDGET JUSTIFICATIONS</b>			
<p>Supplies: Supplies to be purchased for use only in research and technical activities.</p> <p>Equipment: Special purpose equipment to be purchased for use only in research and technical activities.</p> <ul style="list-style-type: none"> <li>-\$35K: TTEC 100 Projector Replacement</li> <li>-\$12K: TTEC 101 Speaker Upgrade</li> <li>-\$20K: TTEC Room and Occupancy Scheduling Upgrade</li> <li>-\$29.9K: Rooms 101, 175, and 179 Lighting Upgrade</li> <li>-\$1200: Security Camera System Video Card Upgrade</li> <li>-\$300: Security Camera System Monitor Upgrade</li> <li>-\$200: Rack Mount for Monitor in Sever Room</li> <li>-\$1200: TTEC 100 Back up Audio DSP</li> </ul> <p>Software/Licensing:</p> <ul style="list-style-type: none"> <li>-\$1,500: Visix Support Renewal</li> <li>-\$11.1K: Articulate Subscription Renewal</li> <li>-\$4K: Adobe License Renewal</li> <li>-\$16K: Accruent/EMS Software renewal</li> <li>-\$35K: ASTM Standards</li> <li>-\$25K: IHS Engineering Workbench</li> <li>-\$5K: EOS.web</li> </ul> <p>Travel: Travel for statewide delivery of required courses for the transportation community.</p> <ul style="list-style-type: none"> <li>-Travel for professional development</li> <li>-Travel for both pre and post conference management activities</li> <li>-Travel for assistance with onsite course registration and management</li> <li>-Travel for statewide district trainer meetings</li> <li>-Travel for course facilitation</li> </ul> <p>Other: Contracts for external workforce development initiatives.</p>			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p><b>Problem Statement:</b> The purpose of this study is to provide contractual services through federal, university, and private sector suppliers for continuing education, professional development, technical skills, software, leadership, management, and supervisory training. The scope of this project also includes providing individual registration fees for Louisiana Department of Transportation and Development (DOTD) employees to attend workshops/courses/conferences.</p> <p><b>Objective(s):</b> Provide specialized support statewide to the DOTD as well as specialized services to departmental section heads in the delivery of training, creation of competency models, technology integration, technology transfer of technical and non-technical efforts, and special projects that represent a variety of stakeholders in Louisiana.</p> <p><b>Expected Benefits:</b> a platform to share ideas. Promotes innovative technology implementation throughout the transportation community. Enhances collaboration between the state, local, federal, university, and transportation community partners.</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

**FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS**

- Held over 487 events with 5,200 attendees in the TTEC Building;
- Hosted 2023 Louisiana Transportation Conference with 1,881 attendees and vendors
- Used EMS to schedule and report classes and attendee numbers for LTRC;
- A total of 15 undergraduate students participated in the Co-op program at various DOTD districts/sections throughout the School Year
- Hosted Co-op in person student presentations and video-conferenced other DOTD areas in the fall and spring
- Attended and participated in 6 career fairs
- One (1) EI hired into the Engineer Resource Development Program (ERDP) rotated through various LA DOTD sections and districts throughout Louisiana. This number is low due to low applications
- One (1) EI successfully hired into DOTD: Section 25 – Bridge and Structural Design
- EI's will be hired into the ERDP before the end of this FY
- FHWA Grant awarded for \$52,085
- Hosted one TRAC and one RIDES workshop December 2022
- Added 185 new titles to the LTRC library online catalog and updated 2843 titles
- 508 Compliances: maintained and included in negotiation process with database subscription vendors
- Consolidate duplicate materials
- Inventory and consolidate physical and online materials
- Renewed ASTM Standards
- Renewed AASHTO Publications via Engineering Workbench
- Renewed EOS.web
- Renewed Movable Library Stack Maintenance via AOS Office Designs
- NTKN-National Transportation Knowledge Network (the regional TKNs were merged into the National TKN – LTRC Library was a member of ETKN (Eastern TKN)
- SLA-Special Libraries Association, Transportation Division
- TRB-AJE45-Standing Committee on Information and Knowledge Management- Member
- TRB-B0002-TRB Information Services Committee- Friend
- TRB- E0006(1)-TRT (Transportation Research Thesaurus) - Friend
- TRB- ABG20 Standing Committee on Transportation Education and Training-Friend
- Member of the AASHTO's TRAC and RIDES Program Committee
- Held 8 NHI courses training
- Requested and informed employees of available NHI Webinars
- 455 Employees attended 104 individual registration events
- Conduct, host, plan, and present at 2023 LTC March 2023 in Baton Rouge, LA
- National and Louisiana Chapter of the Society of Government Meeting Professionals (SGMP) Member
- 2021-Present Louisiana Chapter of the Society of Government Meeting Professional (SGMP) 1st Vice President
- 2021-Present Louisiana Chapter of the Society of Government Meeting Professional (SGMP) Treasurer
- Held 3 Crane Rigging and Signaling courses
- Held 4 Crane Operator courses
- Coordinated the PE Review 2023 Workshop
- Held 3 training for Traffic Engineering Process & Report
- Used the RMS for registration and tracking
- Conduct Dynamic Friction Tester Training
- Held Indirect Cost training
- Lighting Upgraded for the auditorium (completed March 2023)
- Upgraded Security Camera System Server
- All Security Cameras Upgraded to 4k
- 9 New Security Camera Locations Added
- TTEC 175 Battery backup batteries replaced
- e-Glass Training Class created and offered
- TTEC 160 Classroom Monitoring Software Procured
- Held 71 Uno Microsoft Office classes
- Held 11 ArcGIS classes
- Held 17 ATTSA classes
- Held 9 CADD classes
- Society of Human Resource Management member (SHRM)
- Association for Talent Development (ATD)- Baton Rouge Chapter- Treasurer
- Combined class content and presentation for Managing Across Generations and Transformational Leadership (offered next FY)
- Facilitated 8 Foundations of Leadership Development classes
- Facilitated 5 Emotional Intelligence classes
- Facilitated 2 Organizational Culture classes
- Facilitated 1 Transformational Leadership class
- Facilitated 1 Managing Across Generations
- Updated statewide STPs (at least most of them, if not close to all) – for input into Success Factors
- Helped create and facilitate the Maintenance Academy
- Helped create and facilitate voting for the RPIC
- Presented at and attended the 2023 ATD TK Conference “How to Blend Asynchronous and Synchronous Training With Digital Tools”

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

**FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES**

- Place approximately 15-16 students in the Co-op program in various DOTD districts/sections across the state
- Continue end of semester Co-op presentations in a face-to-face or virtual format
- Retain students in the Co-op program each semester/quarter and summer
- Attend/participate in engineering related career fairs held throughout the state
- Hire approximately 5 - 8 engineering interns to participate in the ERDP
- Host one (1) TRAC and one (1) RIDES Workshop in December 2023
- Continue to facilitate and host events at TTEC
- Continue additions to and updating of library materials into the online catalog
- Continue to monitor 508 Compliance pertaining to the LTRC Library page
- Renew ASTM Standards
- Renew AASHTO Publications- Engineering Workbench
- Renew EOS
- Renew Moveable Library stack AOS Office Designs
- Continue to schedule and use EMS reporting for LTRC
- Continue to register employees for professional development trainings/workshops/conferences.
- Continue to suggest and schedule NHI courses
- Continue to offer NHI Webinars
- RFP, negotiate and secure contract for meeting and exhibitor space for the 2025 Louisiana Transportation Conference  
Approximately 1600 attendees; 185 vendors
- RFP, negotiate and secure contracts for overnight accommodations for the 2025 Louisiana Transportation conference  
Locations TBD. Approximately 800 room nights.
- Request and secure funding assistance from Visit Baton Rouge for expenses incurred with the 2025 Louisiana Transportation Conference (facility rental, shuttle/transportation, conference attendee parking fees, etc.)
- Secure dates for the 2027 Louisiana Transportation Conference
- Secure dates and begin preliminary planning for SASHTO 2028
- Update and complete the LTRC Conference/Event Planning Guide
- Attend the Society of Government Meeting Professionals 2023 National Education Conference
- Facilitate Professional Writing Skills classes
- Facilitate Conflict Management classes
- Host IMSA-Signal Technician 1 Class
- Host IMSA- Signal Technician 2 Class
- Host IMSA Sign Technician class
- Coordinate PE Review 2024
- Host Traffic Engineering Software Training class
- Continue to deliver Leadership classes around the state as needed
- Continue to offer UNO Microsoft Office courses
- Continue to offer GIS and CADD courses
- Continue to host ATTSA courses
- Continue to schedule Mechanics courses training
- Continue to suggest and conduct training through NHI and FHWA
- Submit RFP's as needed throughout the year (about 3 per year)
- Continue to offer and conduct courses as needed and/or requested
- Continue to write contracts/proposals for required and/or requested training as needed
- Request PO's as warranted
- Continue to use the RMS for course registration and tracking
- Update student manual as needed
- Secure Louisiana Transportation Conference (2025 LTC) items
- TTEC 100 Projector Upgrade- Increased Lumens and Fast LED
- TTEC 101 Speaker Upgrade/Expansion
- Security Camera System Video Card Upgrade
- Security Camera System Monitor Upgrade
- Purchase Rack mounted monitor for server room
- TTEC 100 Acquire back up audio DSP
- Renew Visix Support
- Renew Articulate Subscription
- Renew Accruent/EMS Software
- Continue to facilitate Foundations of Leadership Development classes
- Continue to facilitate Emotional Intelligence classes
- Continue to facilitate Organizational Culture
- Continue to facilitate Transformational Leadership/Managing Across Generations classes
- Continue to facilitate Lunch n' Learn classes
- Continue Statewide Competency Model

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Workforce Development	<b>Project Status:</b>	Proposed
<b>Funding Source:</b>	STP: TT-Fed	<b>Budget Category:</b>	FHWA
SIO:	DOTLT1000483	Project Start Date:	7/1/2023
Research Project Number:	24-1WD	Completion Date (original)	6/30/2024
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	MaryLeah Coco		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$1,277,526	<b>Total</b>	<b>\$1,277,526</b>
(revised)			
Est. Expended to Date		Salaries	\$1,257,526
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	\$10,000
FY Funds (original)		Equipment (non-expendable)	
(revised)		Travel	\$10,000
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Supplies: Supplies for technology transfer activities - no single item to exceed \$5,000 Travel: Statewide travel for structure training program delivery.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: The purpose of this study is to provide for the strategic planning, program development, and delivery management of the workforce development programs for the Louisiana Department of Transportation and Development (DOTD) personnel. The scope of this study also includes the development, delivery, and administration of the Louisiana Transportation Research Center's (LTRC's) transportation outreach program.</p> <p>Objective(s): Deliver structured training programs to Louisiana Department of Transportation and Development (DOTD) personnel and other transportation partners statewide.</p> <p>Expected Benefits: Expand the knowledge base of all employees and give employees a greater understanding of their responsibilities within their role within the organization while offering professional growth opportunities.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<ul style="list-style-type: none"> <li>-Began transition to new statewide Learning Management System, SuccessFactors: 60 programs created; 75 curricula created; 107 assignment profiles created; All programs/curricula assigned, and pending data load from OTS will complete DOTD transition to SF; This has replaced ~120 STPs with standardized, current, relevant training .</li> <li>-Uploaded 103 total web-based training videos uploaded into SuccessFactors.</li> <li>-Updated/modified 92 videos for SuccessFactors.</li> <li>-Updated/modified 46 videos to ensure ADA compliance in SuccessFactors.</li> <li>-Administered exams to 47 students for a total of 59 exams.</li> <li>-Construction Certifications: 166 recertifications; 85 initial; 71 new certifications; 55 authorizations; and 108 exams.</li> <li>-Revised process eliminating warehouse, utilizing "just in time logistics" to order publications for districts and sections directly with Publications (eliminates backlog, excess inventory and use of dated material).</li> <li>-Delivered Maintenance Academy review/update (1)</li> <li>-Delivered Basic Flagging course (4)</li> <li>-Delivered Traffic Control Through Work Maintenance Areas (4)</li> <li>-Supporting Loss Prevention rewrite of manual</li> <li>-Delivered New Employee Orientation (10)</li> <li>-Delivered New Supervisor Orientation (4)</li> </ul>			



**LTRC Annual Research Program**  
Fiscal Year 2023-2024

**FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES**

- Complete agency transition to SuccessFactors Learning Management System.
- Revise DOTD PPM 59 (workforce development policy).
- Revise Employee Training Status Check Form.
- Transition efforts to Construction.
- Prioritize and revise manuals for periodic review
- Update math and English courses
- Update Leadership Development program
- Integrate team members into teaching rotation

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Technology Transfer and Assistance for Senior Project Courses</b>	<b>Project Status:</b>	<b>Proposed</b>
<b>Funding Source:</b>	<b>STP: TT-Fed</b>	<b>Budget Category:</b>	<b>FHWA</b>
SIO:	<b>DOTLT100490</b>	Project Start Date:	7/1/2023
Research Project Number:	24-1TT	Completion Date (original)	6/30/2024
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	MaryLeah Coco		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost	(original) \$37,500	<b>Total</b>	<b>\$37,500</b>
	(revised)		
Est. Expended to Date		Salaries	
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds	(original)	Equipment (non-expendable)	
	(revised)	Travel	
Est. FY Expenditure		Other	\$37,500
<b>BUDGET JUSTIFICATIONS</b>			
Other: Items for research and technology transfer purposes only.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: To provide support for senior project engineering courses up to a maximum of \$7,500/university/year.</p> <p>Objective(s): Senior Design Projects allow students to sharpen learned engineering skills in a real-world environment. These include: problem analysis, design analysis, experimentation, use of leading CAD and analysis software, innovation, communication skills, and teamwork, often within an interdisciplinary team.</p> <p>Expected Benefits: Through this senior design project, students will be exposed to products, engineering practices and culture, allowing them to assess the transferability of these skills into their future employability opportunities. This experience of collaborative problem solving, respectful interaction and coordination to achieve a shared goal allows engineers-to-be to develop important teamwork skills that are valued by employers.</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
Participation from three universities: Southern University (1 project); Louisiana Tech University; (1 project); and University of Louisiana at Lafayette (1 project).			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
Continue to provide technology transfer and assistance for senior project engineering courses.			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Technology Transfer Program and Operations (DOTD)	<b>Project Status:</b>	Proposed
<b>Funding Source:</b>	STP: TT-Fed	<b>Budget Category:</b>	FHWA
SIO:	<b>DOTLT1000489</b>	Project Start Date:	7/1/2023
Research Project Number:	24-1TSQ	Completion Date (original)	6/30/2024
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	MaryLeah Coco		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost (original)	\$391,285	<b>Total</b>	<b>\$391,285</b>
(revised)			
Est. Expended to Date		Salaries	\$391,285
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds (original)		Equipment (non-expendable)	
(revised)		Travel	
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: This program is responsible for developing and maintaining publication design, graphic design, website, database maintenance, public relation press packages, Section 504 compliance, and editing of all media projects for the Louisiana Transportation Research Center and Louisiana Department of Transportation and Development on a statewide level. In addition, this program is responsible for the production of all reports and production pieces for the Louisiana Legislature.</p> <p>Objective(s): The objectives of this study are to: Disseminate information on new technologies and methodologies to the Louisiana Department of Transportation and Development (DOTD) and other transportation-oriented agencies; improve communications on technical, transportation-related issues between the department and other agencies; encourage implementation of new procedures and technologies; and disseminate information on transportation subjects to appropriate managers and engineers in the department.</p> <p>Expected Benefits: Dissemination of technology transfer, training, and research initiatives to the transportation community as a whole.</p>			

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

**FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS**

- Prepared 4 Draft Project Capsules
- Provided Technical Review for 4 Final Reports
- Managed attendee, sponsorship, and exhibitor registration for 2023 LTC
- Managed 2023 LTC marketing via Constant Contact email and social media channels
- Managed Adobe Cloud licenses for DOTD employees
- Researched mobile app products for 2023 LTC; procured Grupio through OTS and created/managed LTC 2023 mobile app
- Continued development of Project Manager's Manual interactive updates for DOTD
- Developed new forms for asphalt scholarship application process (ASCE and LAPA)
- Created social media-friendly content for LTAP through Adobe Spark
- Designed 4 issues of Technology Exchange for LTAP
- Implemented new online calendar for LTAP website
- Provided web support for NSF project: Field Monitoring and Measurements (FMM) Education
- Working through backlog of document published prior to Oct. 2018 for accessibility issues
- Managed online SASHTO scholarship application process
- Compiled and produced LTRC annual report (21-22)
- Maintained regular posting of all LTRC publications on website and social media channels
- Support for all Section 33 users managing the Registration Management System
- Designed and printed DOTD Employee Survey final reports
- Worked on move to OTS VM servers
- Created pilot accessibility training for DOTD Environmental Section
- Published 4 Tech Today Newsletters
- Created Adobe Spark pages to share on social media
- Created and designed Constant Contact emails to disseminate Tech Todays electronically
- Edited 13 Final Reports/Technical Summaries
- Published 7 Project Capsules
- Published 12 Final Reports/Technical Summaries
- Edited 2 training manuals
- Designed LTC program, conference signs, agenda, and social media sponsorship postings
- Continued to apply disclaimer watermark for safety reports and stay updated concerning new disclaimer requirements
- Continued to apply accessibility requirements for all newly published work
- Continued to implement new Word template
- Continued to maintain document information form for library liaison
- Updated Tech Today interdepartmental mailing list to reflect new leadership and section heads
- Printed 16 TRB posters for LTRC participants at annual meeting; 3 additional posters for other conferences
- Film and Production- DOTD Fly Louisiana Airport Program
- Film and Production- DOTD Babin Retirement
- Film and Production- AASHTO Post Spring Meeting Promotional Video
- Film and Production- DOTD Essence Fest Safety Message
- Film and Production- DOTD E.V. Infrastructure Plan
- Film and Production- DOTD Atterberg Limits Procedure
- Film and Production- DOTD Vince Latino Retirement
- Film and Production- DOTD Work Zone Awareness
- Film and Production- DOTD Innovations Showcase
- Film and Production- DOTD Customer Service Training
- Film and Production- DOTD LA1 Groundbreaking
- Film and Production- DOTD Mississippi River Bridge Inspection
- Film and Production- DOTD ROADEO Promotional
- Film and Production- DOTD Scenario Planning
- Film and Production- DOTD CMAR Promo
- Film and Production- DOTD DDI Secretary Message
- Film and Production- LTRC Heavyweight Deflector Maintenance
- Post Production- 5 Google Map Animations
- Event Photography
- AASHTO Spring Meeting (May 2022- not included in previous AWP)
- Southeast Regional ROADEO
- 2023 Louisiana Transportation Conference photo/video coverage
- 1,560 Subscribers on YouTube

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

**FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES**

- Continue to prepare project capsules, and review draft final reports
- Continued web/graphics support in all current areas
- Continued work on 508 accessibility issues for PDFs
- Photograph all LTRC and DOTD events
- Video all LTRC and DOTD events
- Readily available for any special assistance requested from Secretary's office
- Continue training and support for online registration management system
- Continue to edit and distribute project capsules, technical summaries, final reports and technical assistance reports
- Publish 4 Tech Today newsletters
- Continued accessibility training development for internal staff/DOTD
- Update Publications & Digital Media standard operating procedures; create SOP for LTC publications duties
- Complete move to OTS VM servers
- Update LTC and LTRC logo/identity branding
- Update LTRC informational video
- Engage in Government Social Media professional organization
- Continue to prepare project capsules, and review draft final reports
- Continue to provide Technology Transfer Manager comments for biannual reports
- Continue to serve as ERDP engineer-of-record (e.g. interview panels, experience verification)

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	DOTD Staff Support for Workforce Development	<b>Project Status:</b>	Proposed
<b>Funding Source:</b>	STP: TT-Fed	<b>Budget Category:</b>	FHWA
SIO:	DOTLT1000492	Project Start Date:	7/1/2023
Research Project Number:	24-1SWD	Completion Date (original)	6/30/2024
Research Agency:	LTRC	Completion Date (revised)	
Principal Investigator:	MaryLeah Coco		
<b>BUDGET STATUS</b>			
<b>Total Budget</b>		<b>Estimated 2023-2024 Budget</b>	
Total Cost	(original) \$1,520,000	<b>Total</b>	<b>\$1,520,000</b>
	(revised)		
Est. Expended to Date		Salaries	\$1,520,000
<b>FY 2022 - 2023 Budget</b>		Consumable Supplies & Materials	
FY Funds	(original)	Equipment (non-expendable)	
	(revised)	Travel	
Est. FY Expenditure		Other	
<b>BUDGET JUSTIFICATIONS</b>			
Budget amounts do not require justifications.			
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>			
<p>Problem Statement: The purpose of this study is to provide for the strategic planning, program development, and delivery management of the workforce development programs for the Louisiana Department of Transportation and Development (DOTD) personnel by non-LTRC employees. This project will not be utilized by LTRC's Section 19 or 33.</p> <p>Objective(s): Provide for the strategic planning, program development, and delivery management of the workforce development programs for the Louisiana Department of Transportation and Development (DOTD) personnel by non-LTRC employees.</p> <p>Expected Benefits: Development, implementation, and evaluation of human resource and organizational development initiatives for the Louisiana Department of Transportation and Development (DOTD).</p>			
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>			
<ul style="list-style-type: none"> <li>-Course development and delivery of Local Public Agency (LPA) training;</li> <li>-DOTD employee structured training;</li> <li>-Human Resources training, maintenance related training; and</li> <li>-Meeting involvement related to DOTD's Transportation Training Curriculum Council.</li> </ul>			
<b>FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES</b>			
<ul style="list-style-type: none"> <li>-Course development and delivery of Local Public Agency (LPA) training;</li> <li>-DOTD employee structured training;</li> <li>-Human Resources training, maintenance related training; and</li> <li>-Meeting involvement related to DOTD's Transportation Training Curriculum Council.</li> </ul>			

# **Other DOTD Funded Projects**

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	<b>Economic Evaluation of Applications to the Port Construction and Development Priority Program</b>			<b>Project Status:</b>	<b>Ongoing</b>
<b>Funding Source:</b>	<b>Port Priority Program</b>		<b>Budget Category:</b>		<b>Other DOTD Sections</b>
SIO:	<b>DOTLT1000419</b>		Project Start Date:		7/1/2021
Research Project Number:	22-2SS		Completion Date	(original)	6/30/2023
Research Agency:	ULL		Completion Date	(revised)	6/30/2024
Principal Investigator:	Stephen Barnes				
<b>BUDGET STATUS</b>					
<b>Total Budget</b>			<b>Estimated 2023-2024 Budget</b>		
Total Cost	(original)	\$86,862	<b>Total</b>		<b>\$54,788</b>
	(revised)	\$141,650			
Est. Expended to Date		\$49,590	Salaries		\$54,788
<b>FY 2022 - 2023 Budget</b>			Consumable Supplies & Materials		
FY Funds	(original)	\$57,907	Equipment	(non-expendable)	
	(revised)	\$65,584	Travel		
Est. FY Expenditure		\$65,584	Other		
<b>BUDGET JUSTIFICATIONS</b>					
Budget amounts do not require justifications.					
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>					
<p>Problem Statement: The Port Priority Program through DOTD must ensure the State of Louisiana is receiving the required minimum rate of return on the State's investment and the applicants are meeting the required benefit cost ratio. Economic evaluations of applications submitted to the Port Priority Program need to be performed by an economist with a doctorate degree in economics, knowledgeable of Louisiana laws, knowledgeable of Louisiana ports and their activities, and be familiar with the Port Priority Program.</p> <p>Objective(s): The objective of this project is to perform research and analysis of Port Priority Program applications to ensure the State is receiving the required minimum rate of return on the State's investment.</p> <p>Expected Benefits: These evaluations will ensure that all applications to the Port Priority Program are considered using a consistent set of metrics and methodology to help the State of Louisiana prioritize strategic investments in ports to help stimulate economic activity.</p>					
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>					
<p>Task 1: Preliminary Meetings With Project-Sponsoring Ports Preliminary meetings will be scheduled as needed with project-sponsoring ports.</p> <p>Task 2: Preliminary Review of Applications All future applications submitted to the program during the project period will be reviewed.</p> <p>Task 3: Application Review Meetings Meetings to discuss applications submitted to the program during the project period will be scheduled as needed.</p> <p>Task 4: Theoretical Benefit-Cost Validity Check All future applications submitted to the program during the project period will undergo a theoretical benefit-cost validity check.</p> <p>Task 5: Verification of Claims All future applications submitted to the program during the project period will have key claims verified by the PI.</p> <p>Task 6: Benefit-Cost Calculations Benefit-cost calculations will be completed for all future applications submitted to the program during the project period.</p> <p>Task 7: Development of Quarterly and Biannual Reports Quarterly reports will be completed during all quarters when applications are received and biannual reports will be completed for all future reporting periods.</p> <p>Task 8: Presentations and Project Support Future presentations and project support will occur as needed.</p>					



**LTRC Annual Research Program**  
Fiscal Year 2023-2024

**FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES**

**Task 1: Preliminary Meetings With Project-Sponsoring Ports**

Preliminary meetings will be scheduled as needed with project-sponsoring ports.

**Task 2: Preliminary Review of Applications**

All future applications submitted to the program during the project period will be reviewed.

**Task 3: Application Review Meetings**

Meetings to discuss applications submitted to the program during the project period will be scheduled as needed.

**Task 4: Theoretical Benefit-Cost Validity Check**

All future applications submitted to the program during the project period will undergo a theoretical benefit-cost validity check.

**Task 5: Verification of Claims**

All future applications submitted to the program during the project period will have key claims verified by the PI.

**Task 6: Benefit-Cost Calculations**

Benefit-cost calculations will be completed for all future applications submitted to the program during the project period.

**Task 7: Development of Quarterly and Biannual Reports**

Quarterly reports will be completed during all quarters when applications are received and biannual reports will be completed for all future reporting periods.

**Task 8: Presentations and Project Support**

Future presentations and project support will occur as needed.

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>Title:</b>	Local Road Safety Program			<b>Project Status:</b>	Proposed
<b>Funding Source:</b>	Safety		<b>Budget Category:</b>		<b>Other DOTD Sections</b>
SIO:	DOTLT1000493		Project Start Date:		7/1/2023
Research Project Number:	24-LRSP		Completion Date	(original)	6/30/2024
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Steve Strength				
<b>BUDGET STATUS</b>					
<b>Total Budget</b>			<b>Estimated 2023-2024 Budget</b>		
Total Cost	(original)	\$379,989	<b>Total</b>		<b>\$379,989</b>
	(revised)				
Est. Expended to Date			Salaries		\$307,458
<b>FY 2022 - 2023 Budget</b>			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		\$72,531
<b>BUDGET JUSTIFICATIONS</b>					
Other: Contracts for Special Services for the Local Road Safety Program.					
<b>PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS</b>					
<p>Problem Statement: The purpose of the Louisiana Local Road Safety Program (LRSP) is to identify key safety needs and guide investment decisions to achieve reductions in fatalities and serious injuries on local rural public roadways.</p> <p>Objective(s): To work in cooperation with the Louisiana Department of Transportation and Development's (DOTD's) Highway Safety Office to implement and manage the Local Road Safety Program (LRSP) in addition to providing support to other statewide road safety initiatives at both the state and local levels.</p> <p>Expected Benefits: The LRSP offers a proactive approach for local road agencies to address safety issues. The LRSP can show the public and policy makers that something is being done to systematically reduce severe crashes, thereby, building trust with local government officials, key stakeholders, and the general public.</p>					
<b>FISCAL YEAR 2022 - 2023 ACCOMPLISHMENTS</b>					
<ul style="list-style-type: none"> <li>-Delivered 11 in-person offerings of "Basics of Work Zone Safety with Basic Flagger" mini-workshops [263 attendees]</li> <li>-Delivered 1 in-person offering of "Combating Rural Roadway Departures" course [18 attendees]</li> <li>-Continued promotion, facilitation, and implementation of parish-level road safety plans.</li> <li>-Managed application submittal process for HSIP projects on locally owned roadways, providing preliminary technical evaluation and tracking through the selection process.</li> <li>-Provided technical assistance tools on local road safety projects from crash profiles and other sources.</li> <li>-Processed and evaluated 15 individual Local Road Safety Project inquiries, pre-applications, or applications this fiscal year.</li> <li>-Worked to bring a Crash Data Engineer contractor on board to update the Top 20 and Other 44 Parish Profiles and provide technical assistance and training to local agency users on their use.</li> <li>-Coordinated with DOTD Highway Safety Section to provide technical assistance and capacity building to the Regional Safety Coordinators, Coalitions, LPAs, and other SHSP stakeholders, including on-site visits; participation in coalition meetings; RSA training, and other activities in the Strategic Highway Safety Plan and regional action plans.</li> <li>-Met with 14 LPAs regarding Plans and Projects on at least 52 separate occasions.</li> <li>-Continued supporting the SHSP and related Infrastructure and Operations initiatives, including serving as Statewide Emphasis Area co-chair, Work Zone Safety Task Force member, and additional safety-related EDC initiatives.</li> <li>-Participated in DOTD/SHSP 2023 Statewide Safety Road Show webinar and individual regional webinars.</li> <li>-Partnered with DOTD Safety Section to improve accessibility and utilization of roadway, crash, and traffic volume data.</li> <li>-Promoted Local Road Safety through external partner publications such as Police Jury Association of Louisiana Magazine, Louisiana Municipal Association e-news, American Planning Association Magazine, etc.</li> <li>-Worked with FHWA and NLTAPA to host and participate in a multi-state Peer Exchange related to roadway departure safety in April of 2023.</li> <li>-Participated in the NLTAPA Safety Circuit Rider engagement group and NLTAPA Safety Work Group</li> <li>-Participated as an Operation LifeSaver board member and worked with DOTD's Rail Safety Group on initiatives to improve safety at local road crossings, including outreach to local agencies regarding proper signing and markings</li> </ul>					

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

**FISCAL YEAR 2023-2024 PROPOSED ACTIVITIES**

- Deliver "Basics of Work Zone Safety with Basic Flagger" mini-workshops upon request [12 sessions estimated]
- Develop, customize, and present a course on Local Road Safety issues in consultation with the DOTD Highway Safety Section, utilizing material from FHWA Every Day Counts (EDC) initiatives, FHWA Resource Center, and TRB Research, with primary emphasis on Safe Systems principles, Vulnerable Road Users (VRU's) countermeasures, and Systemic Safety risk factors to use in safety analysis [9 sessions]
- Promote and facilitate the development and implementation of parish-level road safety plans
- Manage the application submittal process for DOTD's Highway Safety Improvement Program projects on locally owned roadways
- Provide Crash Data analysis and continue to promote new Crash Data tools developed by CARTS and DOTD's Highway Safety Section to local agencies and regional stakeholders
- Provide technical assistance and capacity building to the Regional Safety Coordinators, Coalitions, LPAs, and other SHSP stakeholders, including on-site visits; participation in coalition meetings; RSA training, and other activities in the Strategic Highway Safety Plan and regional action plans
- Continue to support SHSP and related Infrastructure and Operations initiatives, including serving as Statewide Emphasis Area co-chair, Work Zone Safety Task Force member, and additional safety-related EDC initiatives
- Continue to promote the implementation of DOTD's Louisiana Statewide Roadway Departure Plan. The local network is included in this plan with some applicable action items.
- Continue to participate as a core team member in developing a Louisiana version of NHI's Highway Safety Fundamentals Workshop and on LTRC's Safety-Related Research Advisory Teams.
- Promote Local Road Safety through external partner publications such as Police Jury Association of Louisiana Magazine, Louisiana Municipal Association e-news, American Planning Association Magazine, etc.
- Continue to participate in the NLTAPA Safety Circuit Rider engagement group and NLTAPA Safety Work Group
- Continue to participate as an Operation LifeSaver board member and to work with DOTD's Rail Safety Group on initiatives to improve safety at local road crossings, including outreach to local agencies regarding proper signing and markings
- Participate in and present at the Statewide DOTD/SHSP 2024 Safety Road Show webinar as well as at the nine in-person DOTD/SHSP 2024 Road Shows for DOTD District and SHSP Regional Infrastructure and Operations stakeholders
- Form a partnership with stakeholders to develop a clearinghouse and processes for estimating, obtaining, and archiving traffic counts on locally owned roadways. Coordinate with DOTD sections engaged in local data collection to enhance quality, accessibility, and utilization of all available data
- Work with newly hired Crash Data Engineer to update the Top 20 and Other 44 Parish Profiles and provide technical assistance and training to local agency users on their use
- Investigate development of a live and/or virtual class series on Speed Management, Systemic Safety, and Vulnerable Road User Safety, incorporating Proven Safety Countermeasures, Systemic Risk Factors, traffic calming, and related local issues utilizing FHWA and NHTSA resources.
- Present up to 6 Road Safety Assessment workshops upon request for Regional Safety Coalitions, incorporating an actual RSA, as part of the updated SHSP 2022 Strategic Plan.

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

<b>2023 RPIC PROBLEM STATEMENTS</b>	
<b>Final Ranking</b>	<b>PROBLEM STATEMENT TITLE</b>
1	Redesign of Innovative Gate Arms (Ramp Closure Gate)
2	T-FAST (TFHRC ASR Test) Investigation
3	Piezoelectric and other advanced sensors in concrete
4	Ground-in Edge and Centerline Rumble Strip/Rumble Stripe Evaluation/Best Practices
5	Cost-Effectiveness and Sustainability of Pavement Preservation and Maintenance Methods
6	Update on Evaluating the Magnitude and Time Rate of Consolidation Settlement of Embankments and other Infrastructures from Piezocone Penetration Tests (PCPT)
7	Evaluation of composite pavement consisting of RCC and asphalt overlay
8	Traffic Signal foundations
9	Bridge Superstructure and Substructure Selection and Optimization
10	Statewide Lane Reconfiguration "Road Diet" Screening for Louisiana
11	ULTR HIGH PERFORMANCE CONCRETE APPLICATION IN LINK SLABS FOR CRACK MITIGATION
12	Autonomous Trucking Regulatory Landscape Review
13	Web-Based Tool to Advance Geotechnical Data Interchange and Reliability-Based Site Characterization

**LTRC Annual Research Program**  
Fiscal Year 2023-2024

14	Trip Generation for Various Sites
15	Development of a Practical Long-Term Aging Protocol for Semi-Circular Bend (SCB) Test
16	Evaluating Practical Applications of Unmanned Aerial Vehicles (UAVs) for Traffic Incident Response and Management.
17	Vulnerability Assessment of Pavement to Flooding in Louisiana
18	TRUCK PARKING SHORTAGE: IMPROVING EFFICIENCY AND IDENTIFYING OPPORTUNITIES
19	Older Drivers Safety in Louisiana: Understanding the Crash Contributing Factors
20	Evaluation and Calibration of Pavement Treatment Triggers, Treatment Selection, and Performance Models for the Cost-effective Pavement Preservation.