LTRC Annual Research Program

Fiscal Year July 1, 2018 - June 30, 2019

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

Conducted by:
Louisiana Department of Transportation and Development
Louisiana Transportation Research Center

In cooperation with
United States Department of Transportation Federal Highway Administration
June 2018

U.S. Department of Transportation
Federal Highway Administration

Louisiana Division Office

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

June 8, 2018

In Reply Refer To:
HDA-LA

Shawn Wilson, Ph.D.
Secretary
Louisiana Department of Transportation
and Development
Baton Rouge, LA

Subject: 2018-2019 Statewide Planning and Research (SPR) Work Program Part II

Attention: Eric Kalivoda, LDOTD

Dear Mr. Wilson:

This letter is in response to Mr. Sam Cooper's submittal on April 26, 2018, of the Louisiana Transportation Research Center's (LTRC) Fiscal Year (FY) 2018-2019 Statewide Planning and Research (SPR) Work Program Part II. We reviewed the subject work program and have worked with Mr. Tyson Rupnow, who made revisions to several areas of the Work Program. He submitted a revised Work Plan that has been reviewed and is now approved. The research projects in the work program can move forward. Please submit a final copy of this revised Work Plan to me as soon as possible – 1 hard copy and an electronic version.

Please make the following notes for the next year's SPR Work Program Part II:

- all research project task sheets with an amount in the "Other" category of $5,000 or greater shall include a description of expenses.

- FHWA Headquarters has informed us that they are working on new guidance for the SPR Work Program Part II that should be coming out later this Summer. We will forward the new guidance as soon as it is received. Before you appoint your next Research Problem Identification Committees (RPIC) and solicit problem statements this Fall, we will need to review this new guidance to ensure that LTRC is in compliance with this new guidance.

A separate request from your federal-aid section will be required to process the fiscal documents necessary to obligate the SPR funds. 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
DN: c=US, o=U.S. Government, ou=FHWA, ou=FHWABatonRougeLA, ou=DOT, cn=MARY M STRINGFELLOW
Date: 2018.06.11 08:28:59 -05'00'

Mary M. Stringfellow
Program Delivery Team Leader

cc: Mr. Tyson Rupnow, LTRC

LOUISIANA TRANSPORTATION RESEARCH CENTER
LTRC

Research, Technology Transfer, Education & Training

DOTD
LOUISIANA DEPARTMENT OF TRANSPORTATION & DEVELOPMENT

April 26. 2018

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

Attention: Ms. Mary Stringfellow

RE: FY 2018-2019 Louisiana Transportation Research Center Work Program

Dear Mr. Bolinger:

Enclosed please find the FY 2018-2019 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 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., P.E., Ph.D.
Director

Enclosure
c: Ms. Chris Knotts
Mr. Tyson Rupnow

Abbreviations and Acronyms

Funding

SPR	State Planning and Research
NCHRP	National Cooperative Highway Research Program
TRB	Transportation Research Board
IBRD	Innovative Bridge Research Deployment
LTAP	Local Technical Assistance Program
STP	State Transportation Program
NSF	National Science Foundation
TT-Fed	Transportation Trust – Federal
TT-State	Transportation Trust – State

Project Types

ADM	Administrative
RS	Research Support
GT	Geotechnical
P	Pavements
B	Bituminous
SA	Safety
SS	Special Studies
C	Concrete
ST	Structures
TT	Technology Transfer
LTAP	Local Technical Assistance Program
PF	Pooled Fund (Louisiana Lead)

Project Status

A	Active
P	Proposed
RFP	Request for Proposal

Table of Contents

FHWA SPR Work Program

Part II

FAP Number SPR-0010(34)

FHWA Funding

SPR Research Budget Recap	Total
Administrative Budget	$769,752
Research Support Studies Budget	$1,719,768
Active Studies Budget	$4,309,131
Proposed Studies Budget	$3,331,395
Pooled Fund Lead State Studies Budget	$100,000
Total SPR Budget	**$10,230,046**

SPR External Collaboration Budget Recap	Total
Pool Funded Studies	$178,000
TRB Correlations	$141,017
NCHRP	$802,974
Total SPR External Collaboration Budget	**$1,121,991**

LTAP Budget Recap	Total
LTAP	$686,318
LTAP Program Total	**$686,318**

STP: Technology Transfer Program Budget Recap	Total
Technology Transfer Program and Operations	$1,110,302
Workforce Development Program	$6,574,759
Student Support Programs	$210,000
Total STP Budget	**$7,895,061**

Federal Funding

Federal Budget Recap	Total
Active Studies Budget	$0
Proposed Studies Budget	$50,000
Total Federal Budget	**$50,000**

Self-Generated Funding

Self-Generated Budget Recap	Total
Active Studies Budget	$100,000
Proposed Studies Budget	$65,000
Total Self-Generated Budget	**$165,000**

Other DOTD Sections Funding

Other DOTD Sections Budget Recap	Total
Active Studies Budget	$3,008,304
Proposed Studies Budget	$551,212
Total Other DOTD Sections Budget	**$3,559,516**

LTRC ANNUAL RESEARCH PROGRAM

Administrative SPR: TT-Fed/TT-Reg

FISCAL YEAR 2018-2019

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: Administrative													
SPR: TT-Fed/TT-Reg	P	ADM	DOTLT1000247	19-1PM	$769,752	$769,752	LTRC	Tyson Rupnow	Program Management	7/1/2018	6/30/2019		C-2
					$769,752	**$769,752**	**ADMINISTRATIVE BUDGET TOTALS**						
Project Type: Research Support													
SPR: TT-Fed/TT-Reg	P	RS	DOTLT1000250	19-1TTRI	$597,427	$597,427	LTRC	Tyson Rupnow	Technology Transfer and Research Implementation	7/1/2018	6/30/2019		C-3
SPR: TT-Fed/TT-Reg	P	RS	DOTLT1000253	19-1TRS	$292,273	$292,273	LTRC	Tyson Rupnow	Technical Research Surveillance	7/1/2018	6/30/2019		C-4
SPR: TT-Fed/TT-Reg	P	RS	DOTLT1000249	19-1TA	$277,647	$277,647	LTRC	Tyson Rupnow	Technical Assistance	7/1/2018	6/30/2019		C-5
SPR: TT-Fed/TT-Reg	P	RS	DOTLT1000254	19-1SSR	$100,000	$100,000	LTRC	Tyson Rupnow	DOTD Staff Support for Research	7/1/2018	6/30/2019		C-7
SPR: TT-Fed/TT-Reg	P	RS	DOTLT1000252	19-1NPE	$71,963	$71,963	LTRC	Tyson Rupnow	New Product Evaluation	7/1/2018	6/30/2019		C-8
SPR: TT-Fed/TT-Reg	P	RS	DOTLT1000248	19-1LFT	$49,639	$49,639	LTRC	Tyson Rupnow	Research Laboratory and Field Test Support	7/1/2018	6/30/2019		C-9
SPR: TT-Fed/TT-Reg	P	RS	DOTLT1000251	19-1EQM	$330,819	$330,819	LTRC	Tyson Rupnow	Equipment Management	7/1/2018	6/30/2019		C-10
					$1,719,768	**$1,719,768**	**RESEARCH SUPPORT BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

SPR: TT-Fed/TT-Reg Active

FISCAL YEAR 2018-2019

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: Geotechnical													
SPR: TT-Fed/TT-Reg	A	GT	DOTLT1000196	18-3GT	$18,295	$69,836	Consultant	David Culpepper	DOTD Support for UTC Project: Synthesis of Fault Traces in SE Louisiana Relative to Infrastructure	7/1/2017	12/31/2018		C-12
SPR: TT-Fed/TT-Reg	A	GT	DOTLT1000202	18-2GT	$12,496	$15,900	LSU	Navid Jafari	DOTD Support for UTC Project: Prediction and Rehabilitation of Highway Embankment Slope Failures in a Changing Climate	7/1/2017	6/30/2018	12/31/2018	C-14
SPR: TT-Fed/TT-Reg	A	GT	DOTLT1000208	18-1GT	$50,000	$129,159	LSU	Shengli Chen	Analysis of Driven Pile Capacity within Pre-bored Soil	9/1/2017	2/28/2019		C-15
SPR: TT-Fed/TT-Reg	A	GT	DOTLT1000165	17-2GT	$116,208	$455,673	LTRC	Murad Abu-Farsakh	Update the Pile Design by CPT Software to Incorporate Newly Developed Pile-CPT Methods and Other Design Features	6/1/2017	5/31/2019		C-16
SPR: TT-Fed/TT-Reg	A	GT	DOTLT1000112	16-6GT	$125,478	$476,813	LTRC	Murad Abu-Farsakh	Incorporating the Site Variability and Laboratory/In-situ Testing Variability of Soil Properties in Geotechnical Engineering Design	7/1/2016	12/31/2018		C-18
SPR: TT-Fed/TT-Reg	A	GT	DOTLT1000097	16-1GT	$49,987	$79,987	GeoStellar Engineering, LLC	Ed Tavera	LADOTD Geotechnical Design Manual	10/6/2016	1/5/2018	6/30/2019	C-20
SPR: TT-Fed/TT-Reg	A	GT	DOTLT1000048	15-1GT	$60,000	$200,000	Dataforensics, LLC	Scott Deaton	pLog Enterprise - Enterprise GIS-Based Geotechnical Data Management System Enhancements	7/31/2015	8/1/2017	8/1/2018	C-22
SPR: TT-Fed/TT-Reg	A	GT	30000981	13-5GT	$11,571	$369,752	LTRC	Murad Abu-Farsakh	Monitoring of In-Service Geosynthetic Reinforced Soil (GRS) Bridge Abutments in Louisiana	10/1/2014	9/30/2016	12/31/2018	C-23
SPR: TT-Fed/TT-Reg	A	GT	DOTLT1000103	13-3GT	$80,248	$308,292	LTRC	Murad Abu-Farsakh	Finite Element Analysis of the Lateral Load Test on Battered Pile Group at I-10 Twin Span Bridge	3/1/2016	5/31/2018	6/30/2019	C-24
SPR: TT-Fed/TT-Reg	A	GT	30000661	11-1GT	$25,231	$354,679	LTRC	Murad Abu-Farsakh	In Situ Evaluation of Design Parameters and Procedures for Cementitiously Treated Weak Subgrades using Cyclic Plate Load Tests	3/18/2013	9/17/2015	12/31/2018	C-26
SPR: TT-Fed/TT-Reg	A	GT	30000111	10-1GERL	$210,424	$13,991,168	LTRC	Murad Abu-Farsakh	LTRC Support for Geotechnical Research at the Geotechnical Engineering Research Laboratory (GERL)	7/1/2010	6/30/2015	6/30/2021	C-28
					$759,938	**$16,451,259**	**GEOTECHNICAL BUDGET TOTALS**						
Project Type: Pavements													
SPR: TT-Fed/TT-Reg	A	P	DOTLT1000219	18-3P	$25,750	$50,000	WPI	Minjiang Tao	Best Practices for Assessing Roadway Damages Caused by Flooding	1/29/2018	10/28/2018		C-29
SPR: TT-Fed/TT-Reg	A	P	DOTLT1000218	18-2P	$53,000	$210,000	LTRC	Kevin Gaspard	Mitigating Joint Reflective Cracks using Stone Interlayers: Case Study on Louisiana Highway 5, Desoto Parish	10/17/2017	10/16/2023		C-30
SPR: TT-Fed/TT-Reg	A	P	DOTLT1000216	18-1P	$49,000	$50,000	LTRC	Zhongjie Zhang	Exploration of Drone and Remote Sensing Technologies in Highway Embankment Monitoring and Management	9/1/2017	8/31/2018	8/31/2019	C-31
SPR: TT-Fed/TT-Reg	A	P	DOTLT1000145	17-1P	$114,000	$250,000	LSU	Mostafa Elseifi	Improving the Use of Crack Sealing to Asphalt Pavement in Louisiana	11/1/2016	1/31/2019		C-33
SPR: TT-Fed/TT-Reg	A	P	DOTLT1000107	16-6P	$100,000	$170,588	LTRC	Zhong Wu	Quality Management of Cracking Distress Survey in Flexible Pavements Using LTRC Digital Highway Data Vehicle	4/1/2016	3/31/2018	6/30/2019	C-34

LTRC ANNUAL RESEARCH PROGRAM

SPR: TT-Fed/TT-Reg Active

FISCAL YEAR 2018-2019

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: Pavements (cont.)													
SPR: TT-Fed/TT-Reg	A	P	DOTLT10000089	16-5P	$77,081	$199,997	ULL	Mohammad Khattak	Pavement Service Life Extension Due to Asphalt Surface Treatment Interlayer	7/1/2016	6/30/2018		C-35
SPR: TT-Fed/TT-Reg	A	P	DOTLT10001046	16-2P	$60,000	$190,950	LTRC	Zhong Wu	Transportation Infrastructure Asset Damage Cost Recovery Correlated with Shale Gas/Oil Recovery Operations in Louisiana	8/1/2016	7/31/2018		C-37
SPR: TT-Fed/TT-Reg	A	P	DOTLT10000009	14-2P	$15,000	$218,597	LSU	Mostafa Elseifi	Assessment of Structural Capacity Indicators from Rolling Wheel Deflectometer Data Collection in Louisiana	7/1/2014	12/31/2015	12/31/2018	C-38
SPR: TT-Fed/TT-Reg	A	P	30000425	12-2P	$48,000	$529,685	LTRC	Kevin Gaspard	Assessment of Environmental, Seasonal and Regional Variations in Pavement Base and Subgrade Properties	9/1/2011	8/31/2013	12/30/2018	C-39
SPR: TT-Fed/TT-Reg	A	P	30000607	12-1P	$48,000	$516,642	LTRC	Kevin Gaspard	Assessment of Pavement Distresses caused by Trees on Rural Highway	2/1/2012	7/1/2014	6/30/2019	C-40
SPR: TT-Fed/TT-Reg	A	P	30000610	12-11P	$12,856	$325,000	LTRC	Mark Martinez	Field Validation of Equivalent Modulus for Stabilized Subgrade Layer	5/1/2012	4/30/2014	12/31/2018	C-41
SPR: TT-Fed/TT-Reg	A	P	30000141	10-1ALF	$648,000	$16,682,103	LTRC	Zhong Wu	Management and Operation of the Pavement Research Facility	7/1/2009	6/30/2015	6/30/2021	C-42
					$1,250,687	**$19,393,562**	**PAVEMENTS BUDGET TOTALS**						
Project Type: Bituminous													
SPR: TT-Fed/TT-Reg	A	B	DOTLT10000197	18-3B	$12,000	$38,000	LSU	Marwa Hassan	DOTD Support for UTC Project: Development of Self-Healing and Rejuvenating Mechanisms for Asphalt Mixtures Containing Recycled Asphalt Shingles	7/1/2017	6/30/2018	12/31/2018	C-43
SPR: TT-Fed/TT-Reg	A	B	DOTLT10000203	18-2B	$18,000	$38,000	LSU	Marwa Hassan	DOTD Support for UCT Project: Improving Durability and Extending the Service Life of Asphalt Pavements Through the Use of Innovative Light Induced Self-Healing Material	7/1/2017	6/30/2018	12/31/2018	C-45
SPR: TT-Fed/TT-Reg	A	B	DOTLT10000198	18-1B	$12,261	$20,000	LTU	Nazimuddin Wasiuddin	DOTD Support for UTC Project: Development of a Standard Test Method for Characterization of Asphalt Modifiers and Aging-Related Degradation Using an Extensional Rheometer	7/1/2017	6/30/2018	12/31/2018	C-47
SPR: TT-Fed/TT-Reg	A	B	DOTLT10000195	17-4B	$87,975	$140,674	LTRC	Saman Salari	Development of a 4.75mm Asphalt Mixture Design	6/14/2017	6/13/2019		C-49
SPR: TT-Fed/TT-Reg	A	B	DOTLT10000161	17-1B	$158,700	$200,000	LTU	Nazimuddin Wasiuddin	Field Implementation of Handheld FTIR Spectrometer for Polymer Content Determination and for Quality Control of RAP Mixtures	7/14/2017	7/13/2019		C-50
SPR: TT-Fed/TT-Reg	A	B	DOTLT10000059	15-2B	$53,700	$300,365	LSU	William Daly	Support Study for Evaluation of Crumb Rubber Modification of Louisiana Mixtures	4/15/2015	7/14/2017	12/31/2018	C-52
SPR: TT-Fed/TT-Reg	A	B	30000112	10-1EMCRF	$160,000	$14,801,811	LTRC	Louay Mohammad	Pavement Materials Research Using Special Equipment at the Engineering Materials Characterization Research Facility	7/1/2009	6/30/2015	6/30/2021	C-54
					$502,636	**$15,538,850**	**BITUMINOUS BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

SPR: TT-Fed/TT-Reg Active

FISCAL YEAR 2018-2019

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: Structures													
SPR: TT-Fed/TT-Reg	A	ST	DOTLT1000199	18-2ST	$0	$6,980	ULL	Paul Darby	DOTD Support for UTC Project: Bridge Inspection with Unmanned Aerial Vehicles	7/1/2017	12/31/2018		C-55
SPR: TT-Fed/TT-Reg	A	ST	DOTLT1000205	18-1ST	$11,000	$15,000	LSU	Ayman Okeil	DOTD Support for UTC Project: A Comprehensive Framework for Corrosion Damage Monitoring and Reliability-Based Repair Design of Reinforced Concrete Structures	7/1/2017	6/30/2018	12/31/2018	C-56
SPR: TT-Fed/TT-Reg	A	ST	DOTLT1000109	16-4ST	$30,000	$172,589	LSU	George Voyiadjis	Overheight Impact Avoidance and Incident Detection System	7/1/2016	6/30/2018	6/30/2019	C-57
SPR: TT-Fed/TT-Reg	A	ST	DOTLT1000099	16-1ST	$231,396	$400,658	Texas A&M Transportation Institute (TTI)	William Williams	Retrofit of Existing Statewide Louisiana Safety Walk Bridge Barrier Railing Systems	7/1/2016	6/30/2018		C-58
SPR: TT-Fed/TT-Reg	A	ST	DOTLT1000043	15-3ST	$4,144	$150,000	West Virginia University	Hota-WVU GangaRao	Rehabilitation of Deteriorated Timber Piles using Fiber Reinforced Polymer (FRP) Composites	11/2/2015	11/1/2017	11/1/2018	C-60
SPR: TT-Fed/TT-Reg	A	ST	30001660	14-1ST	$34,991	$179,991	LSU	Ayman Okeil	Evaluating Louisiana New Continuity Detail for Girder Bridges	4/21/2014	12/31/2016	12/31/2018	C-61
					$311,531	**$925,218**	**STRUCTURES BUDGET TOTALS**						
Project Type: Special Studies													
SPR: TT-Fed/TT-Reg	A	SS	DOTLT1000240	18-7SS	$11,925	$15,900	LSU	Osama Osman	DOTD Support for UTC Project: Investigating and Analyzing Factors Affecting Lane-Capacity Variations in the Roadway Network in Baton Rouge, LA Measures for Mitigating Traffic Congestion	3/15/2018	9/14/2019		C-62
SPR: TT-Fed/TT-Reg	A	SS	DOTLT1000221	18-5SS	$13,934	$28,734	University of Alabama in Huntsville	Sherif Ishak	Support Study for the Development of Guidelines for Ramp Metering Implementation and Performance Evaluation on I-12	11/1/2017	8/31/2019		C-63
SPR: TT-Fed/TT-Reg	A	SS	DOTLT1000212	18-4SS	$75,000	$177,518	LTRC	Chester Wilmot	Trip Generation Modification Factors for Louisiana	7/1/2017	6/30/2019		C-64
SPR: TT-Fed/TT-Reg	A	SS	DOTLT1000211	18-3SS	$59,928	$96,928	LTRC	Julius Codjoe	Evaluation of DOTD's Existing Queue Estimation Procedures	8/1/2017	7/31/2019		C-66
SPR: TT-Fed/TT-Reg	A	SS	DOTLT1000200	18-2SS	$12,400	$15,900	LSU	Christofer Harper	DOTD Support for UTC Project: Recruiting, Retaining, and Promoting for Construction Careers at Transportation Agencies	7/1/2017	6/30/2018	12/31/2018	C-67
SPR: TT-Fed/TT-Reg	A	SS	DOTLT1000206	18-1SS	$5,000	$15,900	LSU	Osama Osman	DOTD Support for UTC Project: Promoting Economic Development in the Baton Rouge Area, LA: Improving the Performance of the Transportation System through Supply-Oriented, Demand-Oriented and Economic Measures for Mitigating Traffic Congestion	7/1/2017	6/30/2018	12/31/2018	C-69
SPR: TT-Fed/TT-Reg	A	SS	DOTLT1000168	17-6SS	$151,982	$1,235,895	LTRC	Tyson Rupnow	Evaluation of HeadLight: An E-Construction Inspection Technology	4/1/2017	8/31/2018		C-71
SPR: TT-Fed/TT-Reg	A	SS	DOTLT1000167	17-5SS	$100,000	$171,213	LSU	Osama Osman	Development of Guidelines for Ramp Metering Implementation and Performance Evaluation on I-12	3/1/2017	8/31/2019		C-73

LTRC ANNUAL RESEARCH PROGRAM

SPR: TT-Fed/TT-Reg Active

FISCAL YEAR 2018-2019

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 (cont.)													
SPR: TT-Fed/TT-Reg	A	SS	DOTLT1000159	17-3SS	$193,481	$381,374	LSU	Chester Wilmot	Hurricane Evacuation Modeling Package	2/1/2017	8/31/2018	1/31/2019	C-75
SPR: TT-Fed/TT-Reg	A	SS	30000125	10-1PLAN	$120,000	$7,006,861	LTRC	Chester Wilmot	LTRC Proposal for the Support of Research and Development in Transportation Planning	7/1/2010	6/30/2015	6/30/2021	C-76
					$743,650	**$9,146,223**	**SPECIAL STUDIES BUDGET TOTALS**						
Project Type: Concrete													
SPR: TT-Fed/TT-Reg	A	C	DOTLT1000245	18-6C	$39,835	$53,113	LTRC	Tyson Rupnow	Influence of Internal Curing on Measured Resistivity	4/1/2018	3/31/2019		C-77
SPR: TT-Fed/TT-Reg	A	C	DOTLT1000237	18-5C	$6,200	$50,000	LSU	Jose Milla	DOTD Support for UTC Project: Self-healing Concrete Using Encapsulated Bacterial Spores in a Simulated Hot Subtropical Climate	3/15/2018	9/14/2019		C-78
SPR: TT-Fed/TT-Reg	A	C	DOTLT1000239	18-4C	$15,189	$15,189	LSU	Michele Barbato	DOTD Support for UTC Project: Use of Bagasse Ash as a Concrete Additive for Road Pavement Applications	3/15/2018	9/14/2019		C-79
SPR: TT-Fed/TT-Reg	A	C	DOTLT1000236	18-3C	$13,144	$27,404	LSU	Gabriel Arce	DOTD Support for UTC Project: Application of Engineered Cementitious Composites (ECC) for Jointless Ultrathin White-topping Overlay	3/15/2018	9/14/2020		C-80
SPR: TT-Fed/TT-Reg	A	C	DOTLT1000201	18-2C	$20,000	$30,000	LSU	Marwa Hassan	DOTD Support for UTC Project: Self-Healing Microcapsules as Concrete aggregates for Corrosion Inhibition in Reinforced Concrete	7/1/2017	6/30/2018	12/31/2018	C-81
SPR: TT-Fed/TT-Reg	A	C	DOTLT1000207	18-1C	$41,000	$49,000	LSU	Gabriel Arce	DOTD Support for UTC Project: Evaluation of the Performance and Cost-Effectiveness of Engineered Cementitious Composites (ECC) Produced form Region 6 Local Materials	7/1/2017	6/30/2018	12/31/2018	C-83
SPR: TT-Fed/TT-Reg	A	C	DOTLT1000155	17-1C	$83,918	$467,176	LTRC	Tyson Rupnow	Effect of Clay Content on Alkali-Carbonate Reactive (ACR) Dolomitic Limestone	11/1/2016	6/29/2018	10/31/2019	C-85
SPR: TT-Fed/TT-Reg	A	C	30001663	14-4C	$0	$269,183	LTRC	Zhong Wu	Evaluation of Bonded Concrete Overlays over Asphalt under Accelerated Loading	4/8/2014	4/7/2016	6/30/2019	C-86
					$219,286	**$961,065**	**CONCRETE BUDGET TOTALS**						
Project Type: Other													
SPR: TT-Fed/TT-Reg	A	Other	DOTLT1000215	18-1Other	$115,970	$352,390	LTRC	Adele Lee	Developing, Upgrading, and Maintaining Softwares for Transportation Applications	7/1/2017	6/30/2020		C-87
SPR: TT-Fed/TT-Reg	A	Other	30000169	11-1AD	$286,000	$3,726,356	LTRC	Vijaya Gopu	Administration of LTRC External Funding Programs	1/1/2008	6/30/2009	6/30/2021	C-89
					$401,970	**$4,078,746**	**OTHER BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

SPR: TT-Fed/TT-Reg Active

FISCAL YEAR 2018-2019

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: Safety													
SPR: TT-Fed/TT-Reg	A	SA	DOTLT1000238	18-6SA	$9,424	$14,260	LSU	Osama Osman	DOTD Support for UTC Project: Truck Crash Causation in Louisiana	3/15/2018	9/14/2019		C-91
SPR: TT-Fed/TT-Reg	A	SA	DOTLT1000149	17-1SA	$18,000	$196,722	LTRC	Julius Codjoe	Evaluating the Effectiveness of Regulatory and Warning Signs on Driver Behavior near Highway/Rail crossings	11/1/2016	6/30/2017	10/31/2018	C-92
SPR: TT-Fed/TT-Reg	A	SA	DOTLT1000105	16-5SA	$86,419	$293,359	LSU	Yimin Zhu	Highway Work Zone Construction Safety Research and Training: A Driving Simulator Study	7/1/2016	9/30/2018	12/31/2018	C-93
SPR: TT-Fed/TT-Reg	A	SA	DOTLT1000143	16-1SA	$5,590	$117,006	LSU	Helmut Schneider	Highway Construction Work Zone Safety Performance and Improvement in Louisiana	7/1/2016	4/30/2018	9/30/2018	C-95
					$119,433	**$621,347**	**SAFETY BUDGET TOTALS**						
					$4,309,131	**$67,116,270**	**SPR: TT-FED/TT-REG ACTIVE BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

SPR: TT-Fed/TT-Reg Proposed

FISCAL YEAR 2018-2019

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: Geotechnical													
SPR: TT-Fed/TT-Reg	P	GT	DOTLT1000226	18-4GT	$93,458	$150,000	LTRC	Gavin Gautreau	Geotechnical Asset Management	7/1/2017	12/31/2018		C-97
SPR: TT-Fed/TT-Reg	P	GT			$125,707	$150,000	LTRC	Nick Ferguson	Quality Control/Assurance on Base Course and Embankment with the Dynamic Cone Penetrometer	7/1/2016			C-99
SPR: TT-Fed/TT-Reg	P	GT			$66,533	$250,000	LTRC	Murad Abu-Farsakh	Development of a Design Methodology for Geosynthetic Reinforced Pavement using Finite Element Numerical Modeling	9/1/2017	8/31/2020		C-100
SPR: TT-Fed/TT-Reg	P	GT			$52,000	$52,000	LTRC	Murad Abu-Farsakh	Develop a Synthesis on the Application Of PCPT Technology for Geotechnical Engineering Design	10/2/2017			C-102
					$337,698	**$602,000**	**GEOTECHNICAL BUDGET TOTALS**						
Project Type: Pavements													
SPR: TT-Fed/TT-Reg	P	P			$100,000	$180,000	ULL	Qian Zhang	Mitigating Pavement Reflective Cracking Using A Ductile Concrete Interlayer	9/1/2018	8/31/2020		C-104
SPR: TT-Fed/TT-Reg	P	P			$30,000	$50,000	LTRC		Support Study to Mitigating Pavement Reflective Cracking Using A Ductile Concrete Interlayer	1/1/2019	12/31/2019		C-105
SPR: TT-Fed/TT-Reg	P	P			$150,000	$162,000			Support to Exploration of Drone and Remote Sensing Technologies in Highway Embankment Monitoring and Management	7/1/2018	9/30/2019		C-106
SPR: TT-Fed/TT-Reg	P	P			$116,200	$200,000	LTRC	Zhong Wu	Application of Mechanistic-Empirical Pavement Design Approach into RCC Pavement Thickness Design	7/1/2017	6/30/2019		C-107
SPR: TT-Fed/TT-Reg	P	P			$81,500	$200,000	LTRC	Zhong Wu	Mechanistic Characterization of Asphalt Overlays for Pavement Rehabilitation and Preservation using Pavement ME Approach	7/1/2017	6/30/2019		C-108
SPR: TT-Fed/TT-Reg	P	P			$100,000	$250,000	LTRC	Moinul Mahdi	Development of Roller Compacted Concrete Fatigue Model with and without Fibers for Pavement Design	7/1/2018	6/30/2020		C-109
					$577,700	**$1,042,000**	**PAVEMENTS BUDGET TOTALS**						
Project Type: Bituminous													
SPR: TT-Fed/TT-Reg	P	B	DOTLT1000244	18-5B	$80,000	$113,000	LSU	Mostafa Elseifi	Evaluation of Asphalt Rubber and Reclaimed Tire Rubber in Chip Seal Applications	1/2/2018	12/31/2019		C-111
SPR: TT-Fed/TT-Reg	P	B			$131,761	$279,000	LTRC	Louay Mohammad	Development of a Cyclic Semi-Circular Bend Test to Evaluate Asphalt Mixture Cracking Resistance at Intermediate Temperature.	7/1/2017	6/30/2019		C-112
SPR: TT-Fed/TT-Reg	P	B			$128,225	$270,000	LTRC	Louay Mohammad	Assessment of Long-Term Performance of Louisiana Asphalt Pavements	7/1/2017	6/30/2019		C-114
SPR: TT-Fed/TT-Reg	P	B			$98,000	$350,000	LTRC	Louay Mohammad	Performance Of Asphalt Pavements Containing Recycled Materials Under Accelerated Loading	1/1/2018	6/30/2020		C-116
SPR: TT-Fed/TT-Reg	P	B			$100,000	$220,000	LTRC	Louay Mohammad	Develop a Fracture Mechanic Based Test for the Evaluation of Moisture Sensitivity in Asphalt Mixtures				C-118

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: Bituminous (cont.)													
SPR: TT-Fed/TT-Reg	P	B			$128,432	$233,000	LTRC	Louay Mohammad	Implementation of Semi Circular Bend Test for QC/QA of Asphalt Mixtures	7/1/2016			C-119
					$666,418	**$1,465,000**	**BITUMINOUS BUDGET TOTALS**						
Project Type: Special Studies													
SPR: TT-Fed/TT-Reg	P	SS	DOTLT1000224	18-6SS	$100,000	$150,000			LADOTD Plan Development Consultant Contract Process Review	10/1/2017	3/31/2019		C-120
SPR: TT-Fed/TT-Reg	P	SS			$45,300	$70,000	LTRC	Julius Codjoe	Determine Louisiana's Roundabout Capacity	1/1/2018	6/30/2019		C-122
SPR: TT-Fed/TT-Reg	P	SS			$40,420	$47,000	LTRC	Julius Codjoe	Permitted/Protected versus Protected Left Turns	1/1/2018	12/31/2018		C-123
SPR: TT-Fed/TT-Reg	P	SS			$30,000	$86,000	LTRC	Julius Codjoe	Development of a CAV Roadmap for Louisiana DOTD	7/1/2017	6/30/2018		C-124
SPR: TT-Fed/TT-Reg	P	SS			$33,375	$500,000	ULL	Julius Codjoe	LTRC Proposal for the Support of Research and Development in ITS/Traffic	7/1/2018	6/30/2021		C-16
SPR: TT-Fed/TT-Reg	P	SS			$280,000	$840,000	ULL	Elisabeta Mitran	LTRC Proposal for the Support of Research and Development in Special Studies	7/1/2018	6/30/2021		C-127
SPR: TT-Fed/TT-Reg	P	SS			$51,496	$51,496	LTRC	Julius Codjoe	Evaluating Cell Phone Data for AADT Estimation: Phase II	7/2/2018	6/28/2019		C-128
SPR: TT-Fed/TT-Reg	P	SS			$75,000	$125,000			Assessing the Economic Benefits of the TIMED Program	8/1/2018	10/31/2019		C-129
SPR: TT-Fed/TT-Reg	P	SS			$65,000	$100,000			Transportation Infrastructure Improvement Funding Sources for New Industrial and Expansion Projects in Louisiana	11/1/2018	1/31/2020		C-130
SPR: TT-Fed/TT-Reg	P	SS			$75,000	$150,000			Comprehensive State of the Practice for Managing Sedimentation in Navigable Waterways	9/1/2018	2/29/2020		C-131
SPR: TT-Fed/TT-Reg	P	SS			$25,000	$100,000			Competing with other Transportation Modes for State (and Local) Funding	3/1/2019	6/30/2020		C-133
SPR: TT-Fed/TT-Reg	P	SS			$75,000	$150,000		Kevin Gaspard	Benefit Cost Analysis of Interstate Roadway Striping in Louisiana	9/1/2018	2/29/2020		C-135
SPR: TT-Fed/TT-Reg	P	SS			$50,000	$150,000			The Last Mile: Port Access in a Redeveloping New Orleans	1/1/2019	6/30/2020		C-136
SPR: TT-Fed/TT-Reg	P	SS			$50,000	$200,000	LSU	Chester Wilmot	Visualization and Analyzation of Big Data	10/1/2018	9/30/2020		C-138
SPR: TT-Fed/TT-Reg	P	SS			$50,000	$150,000			Identifying, Prioritizing and Managing the Largest Risks to the Louisiana DOTD's Mission	1/1/2019	6/30/2020		C-140
					$1,045,591	**$2,869,496**	**SPECIAL STUDIES BUDGET TOTALS**						
Project Type: Other													
SPR: TT-Fed/TT-Reg	P	Other			$50,000	$150,000	LTRC	Louay Mohammad	Establishment of the Center for Sustainable Pavement Materials and Technologies	7/1/2016			C-142
					$50,000	**$150,000**	**OTHER BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

SPR: TT-Fed/TT-Reg Proposed

FISCAL YEAR 2018-2019

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: Safety													
SPR: TT-Fed/TT-Reg	P	SA	DOTLT1000246	18-7SA	$42,000	$52,080	LSU	Osama Osman	Support Study for the "Assessment and Quantification of Crash Risk Associated with Distracted Driving Behavior: A Naturalistic Driving Study"	4/1/2018	3/31/2019		C-144
SPR: TT-Fed/TT-Reg	P	SA	DOTLT1000225	18-5SA	$74,000	$88,000	LTRC	Julius Codjoe	Pedestrian Crossings for High Speed Urban Arterials	1/1/2018	6/30/2019		C-145
SPR: TT-Fed/TT-Reg	P	SA	DOTLT1000217	18-4SA	$70,000	$150,000			Intersection on Horizontal Curves: Problems and Potential Solutions	8/1/2017	1/31/2019		C-146
SPR: TT-Fed/TT-Reg	P	SA	DOTLT1000210	18-3SA	$37,949	$153,820	LSU	Sherif Ishak	Crash Risk Assessment and Quantification Using the SHRP2 Naturalistic Driving Study Data	7/3/2017	3/29/2019		C-147
SPR: TT-Fed/TT-Reg	P	SA	DOTLT1000209	18-2SA	$77,049	$200,000			Louisiana's Alcohol-Impaired Driving Problem: An Analysis of Crash and Cultural Factors	9/1/2017	9/30/2019		C-148
SPR: TT-Fed/TT-Reg	P	SA			$75,000	$175,000			Young Driver Crashes in Louisiana: Understanding the Contributing Factors to Decrease the Numbers	8/1/2018	7/31/2020		C-149
SPR: TT-Fed/TT-Reg	P	SA			$50,000	$125,000			Reduce Pedestrian Fatal Crashes in Louisiana by Improving Lighting Conditions	10/1/2018	3/31/2020		C-150
SPR: TT-Fed/TT-Reg	P	SA			$30,000	$30,000	LSU		A Systematic Assessment on Pedestrian Walking Environment for Future Planning	7/1/2018	6/30/2019		C-151
SPR: TT-Fed/TT-Reg	P	SA			$50,448	$50,448			Evaluation of Pedestrians/Cyclists Counting Algorithm	7/2/2018	6/28/2019		C-152
					$506,446	**$1,024,348**	**SAFETY BUDGET TOTALS**						
Project Type: TIRE													
SPR: TT-Fed/TT-Reg	P	TIRE	DOTLT1000270	19-5TIRE	$29,907	$29,907	ULL	Prasanthe Buchireddy	Evaluation of Switch Grass Filter Socks to Mitigate Pollution Resulting from Highway Storm Water and Construction Runoff	7/1/2018	6/30/2019		C-153
SPR: TT-Fed/TT-Reg	P	TIRE	DOTLT1000269	19-4TIRE	$27,637	$27,637	ULL	Robert Miller	A Model-Based Approach to Detect Zones of Inaccessibility during Extreme Flood Events: A Case Study in the Teche-Vermilion Watershed of South-Central Louisiana	7/1/2018	6/30/2019		C-154
SPR: TT-Fed/TT-Reg	P	TIRE	DOTLT1000268	19-3TIRE	$30,000	$30,000	ULL	Emmanuel Revellame	Louisiana Interstate Right of Way Utilization for Renewable Energy Systems	7/1/2018	6/30/2019		C-155
SPR: TT-Fed/TT-Reg	P	TIRE	DOTLT1000267	19-2TIRE	$30,000	$30,000	LSU	Navid Jafari	Smartphone Photogrammetry for Rapid Prediction of Debris Volumes after Extreme Events	7/1/2018	6/30/2019		C-156
SPR: TT-Fed/TT-Reg	P	TIRE	DOTLT1000266	19-1TIRE	$29,998	$29,998	LSU	Yong-Cheol Lee	Development of Audio-based Process Monitoring and Safety Surveillance Systems for Roadway and Bridge Construction	7/1/2018	6/30/2019		C-157
					$147,542	**$147,542**	**TIRE BUDGET TOTALS**						
					$3,331,395	**$7,300,386**	**SPR: TT-FED/TT-REG PROPOSED BUDGET TOTALS**						

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: Pooled Fund													
SPR: Pooled Fund: TT-Fed	A	PF	DOTLT1000002	14-5PF	$100,000	$506,812	LTRC	Louay Mohammad	Design and Analysis Procedures for Asphalt Mixtures Containing High-RAP Contents and/or RAS	11/1/2014	10/31/2017	10/31/2018	C-159
					$100,000	**$506,812**	**SPR: POOLED FUND: TT-FED ACTIVE BUDGET TOTALS**						
					$100,000	**$506,812**	**POOLED FUND BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

LTAP: TT-Fed/TT-Reg

FISCAL YEAR 2018-2019

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: Technology Transfer and Training													
LTAP: TT-Fed/TT-Reg	P	TT	DOTLT1000256	19-LTAP	$686,318	$686,318	LTRC	Marie Walsh	Local Technical Assistance Program (LTAP)	1/1/2019	12/31/2019		D-2
					$686,313	**$686,313**	**LTAP BUDGET TOTALS**						
					$686,313	**$686,313**	**LTAP: TT-FED/TT-REG PROPOSED BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

STP: TT-Fed Technology Transfer and Training

FISCAL YEAR 2018-2019

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: Technology Transfer and Training													
STP: TT-Fed	P	TT	DOTLT1000259	19-TTRF	$100,000	$100,000	LTRC	MaryLeah Coco	Technology Transfer Registration Fees	7/1/2018	6/30/2019		E-2
STP: TT-Fed	P	TT	DOTLT1000263	19-PONTIS	$125,000	$125,000	LTRC	MaryLeah Coco	AASHTO PONTIS Agreement	7/1/2018	6/30/2019		E-3
STP: TT-Fed	P	TT	DOTLT1000260	19-COOP	$200,000	$200,000	LTRC	MaryLeah Coco	LA DOTD CO-OP Program	7/1/2018	6/30/2019		E-4
STP: TT-Fed	P	TT	DOTLT1000259	19-2TT	$147,600	$147,600	LTRC	MaryLeah Coco	LTRC Student Worker Program	7/1/2018	6/30/2019		E-5
STP: TT-Fed	P	TT	DOTLT1000257	19-1WDC	$3,833,000	$3,833,000	LTRC		Workforce Development Contracts	7/1/2018	6/30/2019		E-6
STP: TT-Fed	P	TT	DOTLT1000255	19-1WD	$1,221,759	$1,221,759	LTRC	MaryLeah Coco	Workforce Development	7/1/2018	6/30/2019		E-9
STP: TT-Fed	P	TT	DOTLT1000262	19-1TT	$37,500	$37,500	LTRC	MaryLeah Coco	Support for Senior Project Courses	7/1/2018	6/30/2019		E-11
STP: TT-Fed	P	TT	DOTLT1000261	19-1TSQ	$338,656	$338,656	LTRC	MaryLeah Coco	Technology Transfer Program and Operations (DOTD)	7/1/2018	6/30/2019		E-12
STP: TT-Fed	P	TT	DOTLT1000264	19-1SWD	$1,520,000	$1,520,000	LTRC	MaryLeah Coco	DOTD Staff Support for Workforce Development	7/1/2018	6/30/2019		E-14
					$7,523,515	**$7,523,515**	**TECHNOLOGY TRANSFER AND TRAINING PROPOSED BUDGET TOTALS**						
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	6/30/2019	E-15
STP: TT-Fed	A	TT	30000320	08-1TSQ	$361,546	$361,546	LTRC	MaryLeah Coco	Technology Transfer Program and Operations (LSU)	7/1/2015	6/30/2018	6/30/2021	E-16
					$371,546	**$461,546**	**TECHNOLOGY TRANSFER AND TRAINING ACTIVE BUDGET TOTALS**						
					$686,313	**$686,313**	**LTAP: TT-FED/TT-REG PROPOSED BUDGET TOTALS**						
					$8,581,374	**$8,671,374**	**STP: TT-FED BUDGET BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

100% Federal

FISCAL YEAR 2018-2019

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: Bituminous													
100% Federal	P	B	DOTLT1000214	18-4B	$50,000	$50,000	LSU	Louay Mohammad	Effect of Increased Asphalt Pavement Density on its Durability	7/10/2017	12/28/2018		F-2
					$50,000	**$50,000**		**BITUMINOUS BUDGET TOTALS**					
					$50,000	**$50,000**		**100% FEDERAL PROPOSED BUDGET TOTALS**					

LTRC ANNUAL RESEARCH PROGRAM

Self-Generated

FISCAL YEAR 2018-2019

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: Structures													
NSF	A	ST	DOTLT1000101	16-2ST	$100,000	$337,312	LTRC	Vijaya Gopu	Field Monitoring and Measurements Education: A Model for Civil and Environmental Engineering	2/15/2016	8/14/2019		G-2
					$100,000	**$337,312**	**STRUCTURES BUDGET TOTALS**						
					$100,000	**$337,312**	**SELF-GENERATED ACTIVE BUDGET TOTALS**						
Project Type: Bituminous													
Self-Generated	P	B			$45,000	$58,000	LTRC	Louay Mohammad	Evaluation of the Effect of Homogeneity of the Binder on Performance of the Recycled Mixture	6/1/2017	6/30/2018		G-4
Wisconsin Dot	P	B			$20,000	$30,000	LTRC	Louay Mohammad	Investigation of Tack Coat Materials on Tracking Performance	7/1/2017	6/30/2018		G-5
					$65,000	**$88,000**	**BITUMINOUS BUDGET TOTALS**						
					$65,000	**$88,000**	**SELF-GENERATED PROPOSED BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

Other DOTD Sections

FISCAL YEAR 2018-2019

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													
Safety	A	SS	DOTLT1000151	17-2SS	$2,835,367	$8,291,932	Highway Safety Research Group	Helmut Schneider	Louisiana Traffic Records Management System Support	10/1/2016	9/30/2019		H-2
Port Priority Program	A	SS	DOTLT1000148	17-1SS	$86,732	$83,732	LSU	James Richardson	Economic Evaluation of Applicants to the Port Construction and Development Priority Program	7/1/2016	12/31/2017	6/30/2018	H-4
					$2,922,099	**$8,375,664**	**SPECIAL STUDIES BUDGET TOTALS**						
Project Type: Safety													
Safety	A	SA	DOTLT1000213	18-1SA	$76,205	$152,411	LSU	Helmut Schneider	Economic Effect of Restricted Crossing U-Turn Intersections in Louisiana	7/1/2017	12/31/2018		H-5
					$76,205	**$152,411**	**SAFETY BUDGET TOTALS**						
Project Type: Geotechnical													
Emergency Fund	A	GT	30000980	13-9GT	$10,000	$474,380	LSU	J. Anthony Cavell	CORS 911: Continuously Operating Reference Stations for the Bayou Corne Sinkhole	3/18/2013	3/17/2014	9/30/2018	H-6
					$10,000	**$474,380**	**GEOTECHNICAL BUDGET TOTALS**						
					$3,008,304	**$9,002,455**	**OTHER DOTD SECTIONS ACTIVE BUDGET TOTALS**						
Project Type: Other													
Safety	P	Other	DOTLT1000265	19-LRSP	$310,912	$310,912	LTRC	Marie Walsh	Louisiana Local Road Safety Program	1/1/2019	12/31/2019		H-7
					$310,912	**$310,912**	**OTHER BUDGET TOTALS**						
Project Type: Safety													
Safety	P	SA			$100,000	$125,000			Evaluation of Crash Characteristics and Compliance with Speed and Lane Restrictions on I-10 over the Atchafalaya Basin	4/2/2018	9/28/2019		H-9
Safety	P	SA			$100,000	$125,000			A Comprehensive Safety Study of Louisiana Roadways close to Waterways and Drainage Structures	4/16/2018	9/17/2019		H-10
					$200,000	**$250,000**	**SAFETY BUDGET TOTALS**						
Project Type: Special Studies													
Highway/Rail Safety	P	SS			$40,300	$100,000	LTRC	Julius Codjoe	Exploring the Use of Pavement Markings in the Dynamic Envelope of a Railroad Crossing to Enhance Safety	1/1/2018			H-11
					$40,300	**$100,000**	**SPECIAL STUDIES BUDGET TOTALS**						
					$551,212	**$660,912**	**OTHER DOTD SECTIONS PROPOSED BUDGET TOTALS**						

FHWA

Part II SPR Funded Research Program

ADMINISTRATIVE LINE ITEMS AND RESEARCH SUPPORT STUDIES

Title:	**Program Management**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000247**		Project Start Date:		7/1/2018
Research Project Number:	19-1PM		Completion Date	(original)	6/30/2019
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$769,752		**Total**		**$769,752**
	(revised)					
Est. Expended to Date				Salaries		$769,752
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

Program Management

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

Program Management

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Program Management

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Technology Transfer and Research Implementation**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000250**		Project Start Date:		7/1/2018
Research Project Number:	19-1TTRI		Completion Date	(original)	6/30/2019
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$597,427		**Total**		**$597,427**
	(revised)					
Est. Expended to Date				Salaries		$597,427
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

Technology Transfer and Research Implementation

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

More than 20 papers were submitted and presented at the TRB Annual Meeting in Washington, D.C. Additionally, numerous other papers, journal articles, and final reports were prepared and presented upon. Over 250 speakers presented at the biennial Louisiana Transportation Conference in March, 2018.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Technology Transfer and Research Implementation

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Technical Research Surveillance**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000253**		Project Start Date:		7/1/2018
Research Project Number:	19-1TRS		Completion Date	(original)	6/30/2019
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$292,273		**Total**		**$292,273**
	(revised)					
Est. Expended to Date				Salaries		$292,273
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

Technical Research Surveillance is for administration of LTRC research contracts by project engineers, participation on LTRC Project and Report review committees, and participation on / in external research activities such as NCHRP, ACRP, FHWA, TRB, etc.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

Technical Research Surveillance

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Technical Research Surveillance

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Technical Assistance**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000249**		Project Start Date:		7/1/2018
Research Project Number:	19-1TA		Completion Date	(original)	6/30/2019
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$277,647		**Total**		**$277,647**
	(revised)					
Est. Expended to Date				Salaries		$277,647
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

Technical Assistance

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS
-Noise level reduction due to Vegetation near Essence lane and I-10; -Assessment of stripping that is used for rumble strips; -Method to assess flooded roadways for GOSHEP; -US 90 -LA 318 Design build friction assessment; -I-10 - LA 415 to Atchafalaya River Bridge; -BCS as a potential interlayer, with Sammy Cooper; -District 61 support for US 61 BCS shoulders stabilized with slag; -District 61 support possibility of low cement stabilization in BCS shoulders; -District 03 Direct shear support; -Nucor Sand evaluation (Tyson); -Student requests to test shear strength of Catoosa Shale (Dr. Dahi, LSU); -BCS technical questions (Deep South Crane & Rigging, LLC); -Geotechnical database boring log search (Stantec); -Geotechnical database questions (TAMU); -Cement stabilization report questions (Coastal Bridge); -Plastic Pipe and Trench Backfill questions (Chris Nickel HQ); -I-49 Section J cracked pavement; -Chloride content of old concrete piles; -RCC specification for LCG; -IC implementation assistance for LCG; -Precast pavement specifications; -Forensic evaluation of the effect of asphalt binder types on long-term pavement performance (State Projects H.012132 and H.009721); -Forensic evaluation of the effect of tack coat material types on long-term pavement performance (State Projects H.011302 and H.012111, I-20); -Technical assistance on modification of asphalt specification for binders containing crumb rubber from waste tires; -Performance of Asphalt Binders and Asphalt Mixtures Containing Re-Refined Engine Oil Bottoms (REOB); -Evaluation of the effects of increasing the initial in-place density of asphalt pavements on their potential field performance (State Project H.009549 - US 190); -Evaluation of Planning-Level Cost Estimation; -Economic Impact of Extended Interstate Closures (due to weather) on Regional Freight Movements; -Comparative Analysis of Performance of Bluetooth Devices; -Distracted Driving: Strategies and State of the Practices; -Evaluation of Road Signs on Driving Behavior; -Literature Review of the Implications of Differential Speed Limit Implementation; -Research Brief: Traffic Safety Messages on Dynamic Message Signs (DMS); -Preservation manual: helped manage pavement preservation manual; -I-20 Tack Coat: Assisted EMCRF by obtaining tack coat cores from I-20 near Minden, LA.; -LA 3276: Stripping issues observed on LA 3276 in district 04; tested roadway cores at LTRC asphalt lab; stripping problems in binder course was observed; -I-20 Exit 3 ramp: Severe rutting on exit ramp 3 on I-20 in district 04 issues; obtained and tested roadway cores at LTRC and Materials lab; incorrect PG binder application was observed; and -High Density for EMCRF: assisted EMCRF for high density research by obtaining density gauge readings and cores.
FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
Technical Assistance

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	DOTD Staff Support for Research	Project Status:	Proposed
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000254**		Project Start Date:		7/1/2018
Research Project Number:	19-1SSR		Completion Date	(original)	6/30/2019
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow				

BUDGET STATUS

Total Budget			Estimated 2018-2019 Budget		
Total Cost	(original)	$100,000	**Total**		**$100,000**
	(revised)				
Est. Expended to Date			Salaries		$100,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

Provide a mechanism to show and document Louisiana Transportation Research Center (LTRC) staff support for outside research activities, specifically UTC Support.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

Supported 6 UTC projects from three different State universities.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Continue staff support for outside research activities, specifically UTC support.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	New Product Evaluation	Project Status:	Proposed
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000252**		Project Start Date:		7/1/2018
Research Project Number:	19-1NPE		Completion Date	(original)	6/30/2019
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow				

BUDGET STATUS

Total Budget			Estimated 2018-2019 Budget		
Total Cost	(original)	$71,963	**Total**		**$71,963**
	(revised)				
Est. Expended to Date			Salaries		$71,963
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The purpose of this project is to evaluate new products for potential Louisiana Department of Transportation and Development (LADOTD) use.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Super Slurry Evaluation, meetings, laboratory support and test sections;
-FMT Ash as a potential soil stabilizer;
-Lithified Technologies;
-Earthlok;
-Plastic Pins for slope repair (Sadik Khan); and
-Resonator.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Evaluate new products for potential LADOTD use.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Research Laboratory and Field Test Support**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000248**		Project Start Date:		7/1/2018
Research Project Number:	19-1LFT		Completion Date	(original)	6/30/2019
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$49,639		**Total**		**$49,639**
	(revised)					
Est. Expended to Date				Salaries		$49,639
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

Research Laboratory and Field Test Support

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

Research Laboratory and Field Test Support

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Research Laboratory and Field Test Support

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	Equipment Management	Project Status:	Proposed
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000251**		Project Start Date:		7/1/2018
Research Project Number:	19-1EQM		Completion Date	(original)	6/30/2019
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$330,819		**Total**		**$330,819**
	(revised)					
Est. Expended to Date				Salaries		$260,819
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)			Equipment	(non-expendable)	$70,000
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

Equipment Management

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

Equipment Management
-Maintained accreditation in the Geotechnical, Asphalt, and Concrete research laboratories (CCRL and AMRL); and
-Maintained equipment in working order per CCRL and AMRL requirements including repair and purchase of replacement equipment as needed.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Equipment Management
-$70,000 non-expendable equipment generally covers routine maintenance of equipment, purchase of replacement parts, installation of said replacement parts, etc. Replacement parts generally do not exceed the $5000 threshold for FHWA reporting guidelines.

FHWA

Part II SPR Funded Research Program

CONTINUING RESEARCH

Title:	**DOTD Support for UTC Project: Synthesis of Fault Traces in SE Louisiana Relative to Infrastructure**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000196**		Project Start Date:		7/1/2017
Research Project Number:	18-3GT		Completion Date	(original)	12/31/2018
Research Agency:	Consultant		Completion Date	(revised)	
Principal Investigator:	David Culpepper				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$69,836		**Total**		**$18,295**
	(revised)					
Est. Expended to Date		$32,000		Salaries		$17,295
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)	$51,541		Equipment	(non-expendable)	
	(revised)	$51,541		Travel		$1,000
Est. FY Expenditure		$51,541		Other		

PURPOSE AND SCOPE

The objective of this project is to determine locations of geological faults in southeastern Louisiana (Fig.1) through the compilation of existing literature and, in particular, the synthesizing of recent university research on surface and near-surface faults mapped using high-quality energy industry data sets. This will include the development of best practices and methodologies for describing and characterizing the attributes of faults and quality of geological interpretations. The synthesis will form a knowledge base of surface fault locations in relation to critical infrastructure in the coastal zone of southeastern Louisiana.

An additional aim is the development of a list of potential mitigation techniques to assist in the preliminary design phase for critical infrastructure projects. In-place infrastructure that may be affected by faults will also be identified, and a list of potential mitigation and rehabilitation techniques for critical infrastructure projects will be generated.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Locate Critical Infrastructure Underlain by Existing 3D Oil and Gas Industry Seismic Data Arc-GIS shape files for existing Oil & Gas Industry 3D have been compiled. Waiting for DOTD/LTRC contact to incorporate designated Critical Infrastructure locations;
-Identify any Data Gaps in Precise Seismic Coverage and Attempt to Fill These Using Data Available from Industry Such as 2D Seismic Data gaps between 3D data sets have been identified and existing oil & gas industry 2D data Arc-GIS files have been compiled; and
-Compile Existing Surface Fault Trace Maps and Descriptive Information in the Form of Metadata, Including the Quality and Reliability of the Data Used to Interpret the Faults Surface trace maps from published sources and DOTD/LTRC supported research in process of compilation. Important task of creating descriptive information in the form of metadata based on data source and interpretive reliability is under development.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
– Locate Critical Infrastructure Underlain by Existing 3D Oil and Gas Industry Seismic Data Arc-GIS shape files for existing Oil & Gas Industry 3D have been compiled. Waiting for DOTD/LTRC contact to incorporate designated Critical Infrastructure locations (40%); – Identify any Data Gaps in Precise Seismic Coverage and Attempt to Fill These Using Data Available from Industry Such as 2D Seismic Data gaps between 3D data sets have been identified and existing oil & gas industry 2D data Arc-GIS files have been compiled (40%); – Compile Existing Surface Fault Trace Maps and Descriptive Information in the Form of Metadata, Including the Quality and Reliability of the Data Used to Interpret the Faults Surface trace maps from published sources and DOTD/LTRC supported research in process of compilation. Important task of creating descriptive information in the form of metadata based on data source and interpretive reliability is under development (80%); – Develop a List of Potential Mitigation Techniques for New Projects in the Preliminary or Initial Design Stages (100%); – Develop a List of Potential Rehabilitation Techniques for Critical Infrastructure Projects Currently Constructed in Affected Areas (100%); – Implementation: Workforce Development (100%); – Implementation: Outreach Activities (100%); and – Implementation: Education (100%).

Title:	**DOTD Support for UTC Project: Prediction and Rehabilitation of Highway Embankment Slope Failures in a Changing Climate**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000202**		Project Start Date:		7/1/2017
Research Project Number:	18-2GT		Completion Date	(original)	6/30/2018
Research Agency:	LSU		Completion Date	(revised)	12/31/2018
Principal Investigator:	Navid Jafari				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$15,900		**Total**		**$12,496**
	(revised)					
Est. Expended to Date		$3,404		Salaries		$11,496
FY 2017 - 2018 Budget				Consumable Supplies & Materials		$1,000
FY Funds	(original)	$14,310		Equipment	(non-expendable)	
	(revised)	$12,496		Travel		
Est. FY Expenditure		$3,404		Other		

PURPOSE AND SCOPE

The objective of this study is to (a) develop a framework that predicts which locations have a high risks of slope failure and demonstrate its functionality in Region 6; and (b) identify cost-effective rehabilitation techniques for repairing slides. These objectives will be achieved through the following activities:
-Review of documented embankment failures and remediation techniques,
-Laboratory fully softened shear strength testing and development of empirical correlation,
-Laboratory unsaturated hydraulic properties,
-Development of predictive framework,
-Implementation of research results, and
-Workforce development and education.
The objectives are accomplished by conducting six specified tasks in Phase 1 and three tasks in Phase 2.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

Initiate project work and complete project Tasks 1 to 2 in Phase 1.
-Task 1 Systematic review of documented embankment failures in Region 6 and evaluation of existing rehabilitation methods, and
-Task 2 Conduct laboratory testing of fully softened strength of Louisiana and Texas soils.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Complete project Tasks 3-6 in Phase I and implement Phase II.
-Task 3 Conduct laboratory testing of unsaturated soil properties of Louisiana and Texas soils,
-Task 4 Perform inverse stability analyses of documented failures,
-Task 5 Develop a framework that predicts which locations have a high risks of slope failure in Region 6 and assess the reliability of the proposed model with documented slope failures, and
-Task 6 Determine cost-effective methods for repairing landslides.
Phase II implementation includes workforce development, outreach activities, and education.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Analysis of Driven Pile Capacity within Pre-bored Soil**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000208**	Project Start Date:		9/1/2017
Research Project Number:	18-1GT	Completion Date	(original)	2/28/2019
Research Agency:	LSU	Completion Date	(revised)	
Principal Investigator:	Shengli Chen			

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$129,159	**Total**		**$50,000**
	(revised)				
Est. Expended to Date		$15,000	Salaries		$48,500
FY 2017 - 2018 Budget			Consumable Supplies & Materials		$1,500
FY Funds	(original)	$80,000	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$15,000	Other		

PURPOSE AND SCOPE

It is expected that the relative strength of the soil as well as the diameter of the pilot hole relative to the pile will have an impact on pile drivability and its long-term load carrying capacity. Quantifying such an impact will greatly help geotechnical design engineers to understand the interactions among the factors of pre-boring, pile size, soil conditions, pile driving, etc. and improve the design and construction qualities of pile foundations in hard/dense soils. Since the field testing data is not readily available, a finite element analysis on pre-bored piles will be conducted for a sensitivity analysis based on various field conditions.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Conducted a thorough literature review on the subject of pre-bored piles and submitted it to the Project Review Committee (PRC), and
-A preliminary ABAQUS numerical model, incorporating the first two installation and consolidation stages of pre-bored piles as planned in the proposal, has been developed by the postdoctoral associate recruited for this project.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

-Finalize the soil properties as suitable input parameters for the FEM modelling with the assistance from LADOTD geotechnical experts,
-Development of numerical model for simulating the pile loading process and its integration with the two previous stages of pile installation and soil consolidation; Further validation of the developed ABAQUS model, and
-Quantification of the reduction factor of side friction based on the numerical results.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Update the Pile Design by CPT Software to Incorporate Newly Developed Pile-CPT Methods and Other Design Features**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000165**		Project Start Date:		6/1/2017
Research Project Number:	17-2GT		Completion Date	(original)	5/31/2019
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Murad Abu-Farsakh				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$455,673		**Total**		**$116,208**
	(revised)					
Est. Expended to Date		$112,500		Salaries		$113,728
FY 2017 - 2018 Budget				Consumable Supplies & Materials		$2,480
FY Funds	(original)	$140,000		Equipment	(non-expendable)	
	(revised)	$110,000		Travel		
Est. FY Expenditure		$112,500		Other		

PURPOSE AND SCOPE

A research project (FHWA/LA.99/334) was completed in 1999 to evaluate eight different direct CPT methods for estimating the pile resistance in Louisiana, which resulted in implementing three CPT methods into a visual basic software (LPD-CPT). However, the evaluation was based on estimating the total pile resistance using scanned CPT data (no electronic files), which recently showed discrepancy in estimating frictional and end bearing components of instrumented piles. Since 1999, many new CPT methods have been developed (Eslami & Fellenius, Almeida et al., Powell et al., UWA-05, UF, etc.), and a lot of new pile load tests with electronic CPT data are available that warrant re-evaluating the CPT – pile estimation methods. The effect of scour on pile resistance was not considered. In addition, it is to use data from multi-CPT tests (spatial variation) to estimate the nominal resistance of all piles in the specific project and incorporating the LRFD resistance factors for pile design in the LPD-CPT software.

There is a need to re-evaluate the CPT methods including previously evaluated and recent developments for estimating the nominal end bearing resistance, nominal side friction resistance and total resistance of driven piles in Louisiana using the updated pile load test -CPT databases including instrumented piles. The research study will identify the best CPT method, modifications or developing a different CPT method, if needed, to best estimate the pile resistance in Louisiana. The effect of scour depth on pile resistance (overburden pressure) will be incorporated into the selected/developed CPT methods that will be implemented into the LPD-CPT. The LPD-CPT will be modified to include the capability of using multi-CPT data (and possibly soil borings and SPT data) to estimate the nominal pile resistances of all piles in a specific project considering site variation. The LPD-CPT method will also be updated to incorporate the default and user selectable resistance factors for LRFD design of piles. Other software usability enhancements such as cone factor override and batch processing will be implemented.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS
-Conducted literature review on available articles, journal papers, thesis, and dissertations on available direct CPT methods to estimate pile resistance. About twenty Pile-CPT design methods were collected; -Conducted literature review on methods and interpretation techniques (such as Kriging) to generate synthetic CPT profile and soil borings data from existing CPT and soil borings; -Collected about 80 pile load test database from LA DOTD archives along with the corresponding CPT data, soil borings, and pile information data; -Collected multi CPT data from 6 sites and multi soil borings from 4 sites for evaluating the different techniques to generate synthetic CPT profile and soil borings data from existing CPT and soil borings, -Implemented Robertson 2010 CPT classification method (in addition to probabilistic method) to the draft Pile-CPT software; -Prepared a draft visual basic software code and excel sheet templates for the collected twenty Pile-CPT design methods; and -Started evaluating the 20 direct Pile-CPT methods to estimate the pile resistance from CPT Data using the 80 pile load test database.
FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
-Continue evaluating the direct Pile-CPT methods to estimate the pile resistance from CPT Data; -Continue incorporating features into the "LPD-CPT" software with coordination with LADOT Geotechnical Group; -Continue evaluating the different techniques to generate synthetic CPT profile and soil borings data from existing CPT and soil borings; and -Prepare a an interim report.

Title:	**Incorporating the Site Variability and Laboratory/In-situ Testing Variability of Soil Properties in Geotechnical Engineering Design**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000112**		Project Start Date:		7/1/2016
Research Project Number:	16-6GT		Completion Date	(original)	12/31/2018
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Murad Abu-Farsakh				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$476,813		**Total**		**$125,478**
	(revised)					
Est. Expended to Date		$227,212		Salaries		$125,478
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)	$90,200		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure		$90,000		Other		

PURPOSE AND SCOPE

The main objective of this research is to evaluate the different sources of geotechnical variability and quantify the variability of soil properties for inclusion in the analysis and design of different geotechnical engineering systems. This generally includes:
-Evaluating operator-induced variations on design soil properties;
-Evaluating equipment-induced variations on design soil properties;
-Evaluating site/spatial variations of design soil properties;
-Developing QA/QC guidelines for laboratories; and
-Incorporating site variability and measurement error into LRFD geotechnical design.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Conducted twelve (12) in-box tests to study measurement variation of shallow in-situ tests (DCP, LWD, DSPA, Geogauge, and NDG) in the lab;
-Conducted field tests on four project site sections to study measurement variation of shallow in-situ tests in the field;
-Constructed and tested twelve (12) field sections in the ALF to study measurement variation of shallow in-situ tests in the field;
-Evaluated lab variability study through conducting selected geotechnical lab tests (e.g., CBR, UU, DST consolidation etc.);
-Collected CPT and soil boring data from LA DOTD headquarter for different projects to study site variability;
-Performed 30 CPT tests at LA 1 intercostal site; and
-Started analyzing the collected lab and field test data to study site variability.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
-Complete the lab variability study by conducting selected geotechnical lab tests (e.g., CBR, UU, consolidation etc.); -Complete the in-situ testing of the constructed sections at ALF to study measurement variation of shallow in-situ tests in the field; -Look for more construction sites to study measurement variation of shallow in-situ tests; -Continue analyzing the collected lab and field test data to study site variability; and -Develop correlation(s) between undrained shear strength and CPT data.

Title:	**LADOTD Geotechnical Design Manual**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000097**		Project Start Date:		10/6/2016
Research Project Number:	16-1GT		Completion Date	(original)	1/5/2018
Research Agency:	GeoStellar Engineering, LLC		Completion Date	(revised)	6/30/2019
Principal Investigator:	Ed Tavera				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$79,987		**Total**		**$49,987**
	(revised)					
Est. Expended to Date		$30,000		Salaries		$46,987
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)	$45,000		Equipment	(non-expendable)	
	(revised)			Travel		$3,000
Est. FY Expenditure		$30,000		Other		

PURPOSE AND SCOPE

The Louisiana Department of Transportation and Development (DOTD) has a Design Guide #8 for Mechanically Stabilized (MSE) walls, but does not have other volumes for a complete manual. There is a need to expand this concept to cover all issues within the Geotechnical Design Section and consolidate the information into a single document with specifics covered in separate volumes (piles, shafts, MSE walls, etc.) Training and succession planning are also important items regarding consistency of service. A Geotechnical Design Manual should be established to assist the Geotechnical Design Section with policy, training, and production activities. The manual would help clarify current design policy, ease the training of new employees, and serve as valuable reference and living document for the Geotechnical Design Section, other sections, consultants, etc.

Creation and implementation of the manual will establish and confirm the policy, and help handle comments and/or recommendations regarding the manual/policy so they can be effectively addressed (revised or incorporated) into the document with updates. Additional benefits include the efficiency, and clarity of having the policy online, creating confidence and transparency for all actions and design decisions.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

Progress was begun on these and other chapters:
-Table of Contents;
-Project Coordination Process;
-Consultant Services and Review;
-Subsurface Investigation Guidelines,
-Field and Laboratory Testing Procedures; and
-Material Description-Classification-Logging.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
The Consultant shall be responsible for the following: -Organization and recording of regularly scheduled technical sessions with the Louisiana Department of Transportation and Development (LADOTD) Geotechnical Design staff. The consultant shall meet with the LADOTD Geotechnical staff to discuss the various subject/chapters to be included in the manual; -Submittals and electronic drafts of each chapter based on technical content included in all previous sessions for comment by the LADOTD Geotechnical staff. Interim drafts shall be submitted for review and comment in accordance with the schedule to be determined by the Project Manager; -Independent research and recommendations on select subject matter; -Submittal of final draft in written and electronic linkable hypertext format; and -Continuing maintenance for duration of the contract. This will include, but may not be limited to, periodic review, and incorporation if necessary, of AASHTO LRFD Bridge design specification revisions, attendance at technical meetings with Pavement and Geotechnical Services Section to review and discuss revisions or updates to the Manual, and independent research as requested by LADOTD Pavement and Geotechnical Services Section on subjects to be added or updated within the manual. Work will continue on these chapters: -Table of Contents; -Project Coordination Process; -Consultant Services and Review, -Subsurface Investigation Guidelines; -Field and Laboratory Testing Procedures; -Material Description-Classification-Logging; -GeoMechanics; -Geotechnical LRFD Design; -Geotechnical Resistance Factors; -Geotechnical Performance Limits; -LA Geology and Seismicity; -Shallow Foundations; -Deep Foundations; -Embankments; -Earth Retaining Structures; -Ground Improvement; -Geosynthetic Design; -Geotechnical Reports; -Plan Preparation; -Specifications and Special Provisions; -Construction QA-QC; -Construction Monitoring and Instrumentation; -Geotechnical Software; -Geotechnical Design Section Forms; -MSE Walls; -Reinforced Soil Slopes; -Geotechnical Template Plans; and -Project Specific Specifications List. Continue to Develop the Design Manual and provide a brief final report as the manual is the majority of the documentation.

Title:	**pLog Enterprise - Enterprise GIS-Based Geotechnical Data Management System Enhancements**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000048**		Project Start Date:		7/31/2015
Research Project Number:	15-1GT		Completion Date	(original)	8/1/2017
Research Agency:	Dataforensics, LLC		Completion Date	(revised)	8/1/2018
Principal Investigator:	Scott Deaton				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$200,000		**Total**		**$60,000**
	(revised)					
Est. Expended to Date		$140,000		Salaries		$55,000
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)	$140,000		Equipment	(non-expendable)	
	(revised)			Travel		$5,000
Est. FY Expenditure		$140,000		Other		

PURPOSE AND SCOPE

This research will address the needs of the HQ Pavement and Geotechnical and expand on work developed under the initial and Phase 2 projects. This research will add modules to the system. Specifically: shallow soil subgrade survey data, including Dynamic Cone Penetrometer (DCP) data, and district auger boring information. This data should be incorporated into the database; and like deep borings, be plotted and added to the plans, via a standardized template accessible to districts and designers for analysis. There will likely be some linkage to ongoing work by the Materials Lab on Materials Manager/ Laboratory Information Management System (LIMS) in order to access the data without replication or duplication of data. Pile load test data, driving records, Ground Penetrating Radar (GPR), and other information could also be added to the database and be made digitally available and accessible via GIS systems. A tracking system/template, incorporated with SharePoint (a software already within the department) will also be addressed. Security issues within IT regarding public access to geotechnical borings logs will also be addressed.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

Systems installed and training begins.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Implement the results and finalize the report.

Title:	**Monitoring of In-Service Geosynthetic Reinforced Soil (GRS) Bridge Abutments in Louisiana**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**30000981**		Project Start Date:		10/1/2014
Research Project Number:	13-5GT		Completion Date	(original)	9/30/2016
Research Agency:	LTRC		Completion Date	(revised)	12/31/2018
Principal Investigator:	Murad Abu-Farsakh				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$232,200		**Total**		**$11,571**
	(revised)	$369,752				
Est. Expended to Date		$298,900		Salaries		$11,571
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)	$49,000		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure		$49,025		Other		

PURPOSE AND SCOPE

Traditional bridge construction can be slow, expensive, and complex. Researchers at the Federal Highway Administration (FHWA) recognized that bridges could be built better, faster, and for less money. In 2010, the FHWA introduced an initiative "Every Day Counts" (EDC)to promote technologies that speed up the design and construction of highway projects such as bridge abutments, while at the same time reducing their costs. One promising technology is to use Geosynthetic Reinforced Soil (GRS) in the Integrated Bridge Systems (IBS). The use of GRS can also help in eliminating/minimizing the roadway and bridge "bump" problem. The purpose of this research study is to apply the GRS technology in the design and construction of bridge abutments in Louisiana; and evaluate the performance of GRS abutments during construction and under service loads. The project will include instrumenting and monitoring selected GRS bridge abutment at Maree Michel Bridge.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Continued monitoring the performance of the GRS-IBS abutment at Maree Michel Bridge;
-Continued analyzing the data collected during the static load tests and measurements of instruments during monitoring;
-Performed 2-D finite element analysis to simulate the behavior of the GRS-IBS abutment at Maree Michel Bridge under various loading conditions;
-Developed a 3-D finite element model to simulate the 3-D performance of Maree Michel Bridge;
-Conducted FE parametric study on the effect of different variables and parameters on the performance of GRS-IBS in terms of lateral deformation, vertical settlement, vertical and lateral pressure, and strain distribution along geotextiles for internal and external stability; and
- Prepared a draft report.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

-Complete the FE parametric study; and
-Finalize the report.

Title:	**Finite Element Analysis of the Lateral Load Test on Battered Pile Group at I-10 Twin Span Bridge**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000103**		Project Start Date:		3/1/2016
Research Project Number:	13-3GT		Completion Date	(original)	5/31/2018
Research Agency:	LTRC		Completion Date	(revised)	6/30/2019
Principal Investigator:	Murad Abu-Farsakh				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$260,368		**Total**		**$80,248**
	(revised)	$308,292				
Est. Expended to Date		$212,922		Salaries		$80,248
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)	$90,800		Equipment	(non-expendable)	
	(revised)	$91,000		Travel		
Est. FY Expenditure		$80,500		Other		

PURPOSE AND SCOPE

A unique full-scale lateral load test was conducted at M19 pier of the new I-10 Twin Span Bridge over Lake Pontchartrain to assess the current methodology used in the design and analysis of batter pile group foundations and to evaluate their performance under lateral loading. Measurements obtained from instrumentations (inclination and strains) can provide valuable information for use in the analysis of lateral behavior of battered pile foundations and for back-calculating the soils' p-y curves. Two approaches can be used to analyze the lateral behavior of piles: simplified p-y methods and continuum-based FE methods. The simplified methods are based on the theory of subgrade reaction, in which soils surrounding piles are simplified as a set of linear or nonlinear springs resenting the soils' resistances (assumed p-y curves) to lateral movement of piles. With the development of computer software's, such as LPile and FB-MultiPier, this approach has been widely used for design of laterally loaded piles. However, the p-y method cannot describe the three dimensional nature of the problem, pile geometry, different boundary conditions, continuum behavior of soil, soil-structure interface effect and soil-porewater pressure interaction. The continuum-based FE analysis is desirable for a better understanding of the problem. The continuum-based methods treat the soils surrounding piles as elastic or elasto-plastic continuums using constitutive models that can describe the actual behavior of soils under any loading.

In order to better understand the behavior of batter pile group foundations subjected to lateral loading, we propose to develop a three-dimensional finite element model to analyze the lateral load test that was conducted at M19 pier. The finite element technique is a powerful tool that can simulate the behavior of complex soil-structure interaction problems. The piles and foundation (pile cap) will be simulated as solid elements. The surrounding soils will be treated as a continuum media (instead of springs), representing the actual soil properties and their behavior will be described using the elasto-plastic anisotropic modified cam clay model. The soil-pile interaction will be also simulated using Mohr Coulomb frictional criteria. The finite element model will be first calibrated using the results of full-scale test at M19 pier. Once the model is calibrated, it will then be used to conduct a comprehensive finite element parametric study to evaluate the effect of different variables and parameters on the lateral performance of batter pile group foundations. The results from parametric study will be used to evaluate the group effect of piles (p-multipliers), evaluate the contribution of lateral loads transferred to battered piled in axial direction, and develop p-y curve models that represent the different soil type and conditions in Louisiana for implementing in the FB-MultiPier and other programs for future analysis and design of batter pile group foundations.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS
-Developed and verified the three-dimensional finite element numerical models to simulate the lateral behavior of vertical and battered pile group foundations; -Performed finite element analysis to evaluate the lateral behavior of battered pile group foundations as compared to vertical pile group foundations and single vertical pile; -Conducted finite parametric study to evaluate the pile group effect (p-multiplier) in terms of pile row and column spacing and soil type; -Evaluated the contribution of lateral loads transferred to battered piled in axial direction; and -Started the development of p-y curves for use in analysis and design of battered pile group foundations subjected to lateral loads.
FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
-Complete the finite parametric study to evaluate the pile group effect (p-multipliers) in terms of pile row and pile column spacing and soil type; -Continue the development of p-y curves for use in analysis and design of battered pile group foundations subjected to lateral loads; -Perform three-dimensional finite element numerical model to simulate the lateral response of battered pile group foundation subjected to dynamic barge impact; and -Prepare a draft report.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	In Situ Evaluation of Design Parameters and Procedures for Cementitiously Treated Weak Subgrades using Cyclic Plate Load Tests	Project Status:	Ongoing

Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

SIO:	**30000661**		Project Start Date:		3/18/2013
Research Project Number:	11-1GT		Completion Date	(original)	9/17/2015
Research Agency:	LTRC		Completion Date	(revised)	12/31/2018
Principal Investigator:	Murad Abu-Farsakh				

BUDGET STATUS

Total Budget			Estimated 2018-2019 Budget		
Total Cost	(original)	$294,679	**Total**		**$25,231**
	(revised)	$354,679			
Est. Expended to Date		$310,134	Salaries		$25,231
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$45,000	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$45,000	Other		

PURPOSE AND SCOPE

The purpose of this research study is to evaluate the design parameters and procedures for cementitious treated soft subgrade soil using cyclic plate load tests. This includes evaluating the composite resilient modulus (Mr)of various cementitious (cement, lime, flyash)t reated soft subgrade materials for inclusion in the pavement design. A treated subgrade soil has many characteristics that contribute to the performance of the pavement structure. As such, an adequate evaluation of the design parameters of treated subgrade soils is necessary in pavement analysis and design. The resilient modulus is a key input parameter for subgrade soil in both the 1993 AASHTO and the Mechanistic-Empirical Pavement Design Guide (MEPDG). Therefore, the determination and use of the "composite" resilient modulus of cementitious treated soft subgrades can provide a more suitable pavement structure design responsive to site conditions and projected loading is crucial in pavement design process. The work program includes conducting in-box resilient and permanent deformation tests using cyclic plate load tests on sections build inside a steel test box with dimensions of 6.5 ft (length) × 6.5 ft (width) × 5.5 ft (height. Laboratory unconfined compression tests, resilient mod repeated plate load tests will be also conducted on cementatious treated soft subgrade samples. In addition, Dynamic Cone Penetrometer (DCP), Light Falling Weight Deflectometer (LFWD), Geogauge, Portable Seismic Pavement Analyzer (PSPA) tests, and repeated triaxial load tests will be conducted.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Conducted four (4) cyclic plate load tests to evaluate the resilient and permanent deformation behavior of cement treated test sections for another research project by Dr. Wu (12-3P: Micro-cracking of cement treated bases);
-Constructed eight (8) cementitious treated test sections at ALF site for conducting cyclic plate load testing (CPLT),;and
-Completed four (4) cyclic plate load tests on four cementitious treated test sections at ALF to evaluate the in-situ resilient modulus and permanent deformations of these sections.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
-Complete the cyclic plate load tests on the rest of cementitious treated test sections at ALF site (Four more tests) to evaluate the in-situ resilient modulus and permanent deformations of these sections; -Complete analyzing the results of cyclic plate load tests conducted on the different ALF cementitious test Sections; and -Prepare a final report.

Title:	**LTRC Support for Geotechnical Research at the Geotechnical Engineering Research Laboratory (GERL)**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**30000111**		Project Start Date:		7/1/2010
Research Project Number:	10-1GERL		Completion Date	(original)	6/30/2015
Research Agency:	LTRC		Completion Date	(revised)	6/30/2021
Principal Investigator:	Murad Abu-Farsakh				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$523,000		**Total**		**$210,424**
	(revised)	$13,991,168				
Est. Expended to Date		$1,573,000		Salaries		$155,224
FY 2017 - 2018 Budget				Consumable Supplies & Materials		$37,200
FY Funds	(original)	$193,000		Equipment	(non-expendable)	
	(revised)			Travel		$18,000
Est. FY Expenditure		$193,000		Other		

PURPOSE AND SCOPE

The objectives of this research are to:
-Perform support studies to meet the beneficiary requirements for geotechnical and geosynthetic testing; technical assistance and research;
-Advance the state-of-the-art in geotechnical and geosynthetic research;
-Maintain laboratory testing equipment;
-Provide development, support and training of new and innovative techniques, software and equipment for advancing the performance of the transportation system; and
-Develop problem statements and research proposals.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Provided geotechnical testing support and technical assistance for LADOTD;
-Published several technical papers and proceedings on findings of LTRC research projects;
-Attended several engineering workshops and conferences;
-Developed potential ideas and problem statements for future LTRC research projects;
-Developed research proposal on "Development of a Design Methodology for Geosynthetic Reinforced Pavement using Finite Element Numerical Modeling";
-Maintained laboratory testing equipment; and
-Maintained software's related to CPT application.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

-Provide geotechnical and geosynthetic testing support and technical assistance for LADOTD;
-Provide support and training for implementation of research results;
-Develop research proposals and problem statements for future activities;
-Publish research findings on technical papers, proceedings and reports;
-Maintain laboratory testing equipment; and
-Maintain and upgrade the CPT software's.

Title:	**Best Practices for Assessing Roadway Damages Caused by Flooding**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000219**		Project Start Date:		1/29/2018
Research Project Number:	18-3P		Completion Date	(original)	10/28/2018
Research Agency:	WPI		Completion Date	(revised)	
Principal Investigator:	Minjiang Tao				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$50,000		**Total**		**$25,750**
	(revised)					
Est. Expended to Date		$24,250		Salaries		$24,250
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)	$24,250		Equipment	(non-expendable)	
	(revised)			Travel		$1,500
Est. FY Expenditure		$24,250		Other		

PURPOSE AND SCOPE

The major purpose of the project is to identify the best practices for assessing roadway damages caused by flooding and thus to develop multiple levels of roadway damage assessment protocols. A comprehensive literature review and a national survey will be conducted to develop hierarchical level of flood-induced damage evaluation, from a holistic point of view by considering the characteristics of flood, pavement, and costs associated with damage repairing and mitigation.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

A comprehensive literature review and a national survey will be conducted to gather information on how federal, state and local public agency engineers typically conduct inspections on flooded pavements in order to determine the best practice for assessing flood-induced roadway damages. A comprehensive literature review summary will be prepared to the Project Manager and the Project Review Committee, which will include: (i) different types of flood-induced damages to roadways (damages to HMA and deteriorations due to the increased degree of saturation in unbound pavement layers) and the corresponding factors (HMA mixes and the characteristics of pavement sections and unbound layers); and (ii) the commonly used practice, including both testing and simulation approaches, for evaluating flood-induced damages.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

A holistic framework and a hierarchical engineering protocol will be developed for evaluating roadway's relative risk to flood by considering severity of flood, vulnerability of roadway, and consequence of flood-induced damage. The research team will also prepare a final report, Technical Summary, and recommendations of implementing the research findings.

Title:	**Mitigating Joint Reflective Cracks using Stone Interlayers: Case Study on Louisiana Highway 5, Desoto Parish**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000218**		Project Start Date:		10/17/2017
Research Project Number:	18-2P		Completion Date	(original)	10/16/2023
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Kevin Gaspard				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$210,000		**Total**		**$53,000**
	(revised)					
Est. Expended to Date		$40,000		Salaries		$48,500
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)	$100,000		Equipment	(non-expendable)	$4,500
	(revised)	$40,000		Travel		
Est. FY Expenditure		$40,000		Other		

PURPOSE AND SCOPE

The purpose of this project is to monitor the effectiveness of stone interlayers 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 PCC transverse joints under traffic loading. The results of the study may be used to recommend improved pavement design and preservation procedures.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

Purchased equipment for test section installation and conducted laboratory study to calibrate them. There were originally planned to have 5 test sections on this project but they were reduced to two test sections due to right of way and ditch issues. Because of that the projected fiscal years funds need to be reduced. this project is scheduled to be let in March and we do not know when construction will occur. Because of that no funds are being allocated this fiscal year for the field work.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Install field instrumentation during construction and conduct field monitoring of instruments when the roadway is open to traffic and six months after the roadway is open to traffic.

Title:	**Exploration of Drone and Remote Sensing Technologies in Highway Embankment Monitoring and Management**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000216**	Project Start Date:		9/1/2017
Research Project Number:	18-1P	Completion Date	(original)	8/31/2018
Research Agency:	LTRC	Completion Date	(revised)	8/31/2019
Principal Investigator:	Zhongjie Zhang			

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$50,000	**Total**		**$49,000**
	(revised)				
Est. Expended to Date		$60	Salaries		$49,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$50,000	Equipment	(non-expendable)	
	(revised)	$60	Travel		
Est. FY Expenditure		$60	Other		

PURPOSE AND SCOPE

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 (LADOTD) can only respond to them after the fact with costly remediation. Since the surface slide of embankment can only occur when the once compacted soils of slope close to be fully softened due to the dry and wet cycles of the climate, the capability of surface soils to store water (surface moisture) can be a good indicator of health condition of embankment slopes. A long term monitoring system on highway embankments can be built on this indicator and this challenging job can be accomplished using remote sensing and drone technologies with proper sensors.

The budget of this project is for LTRC Lab technicians' activities.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Task 1: Have continued the Literature Search and Review on the Applications of Remote Sensing and Drone Technologies in Civil and Geotechnical Engineering 70%; and
-Task 2: Have identified a group of remote sensing experts from the Department of Geography & Anthropology at LSU and have been working with them to develop the research proposal of the supporting study. Due to complexity of the problem, the process is very slow. Also, the future available budget of LTRC is not very clear due to the current financial situation of the state. Therefore, the sub-contract process is on hold for the time being. For this reason, this project needs to be extended in the future 60%.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
If the budget allows, we will -Task 1: Continue the Literature Search and Review on the Applications of Remote Sensing and Drone Technologies in Civil and Geotechnical Engineering; -Task 2: We will help the research group of LSU to finalize their research proposal of supporting study; -Task 3: Select Sites for Controlled Experiments of Remote Technologies and other Field Embankment Testing Sites; -Task 4: Collect Experimental and Field Testing Data; and -Task 5: Process and Analyze the Collected Data.

Title:	**Improving the Use of Crack Sealing to Asphalt Pavement in Louisiana**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000145**	Project Start Date:		11/1/2016
Research Project Number:	17-1P	Completion Date	(original)	1/31/2019
Research Agency:	LSU	Completion Date	(revised)	
Principal Investigator:	Mostafa Elseifi			

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$250,000	**Total**		**$114,000**
	(revised)				
Est. Expended to Date		$97,750	Salaries		$114,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$113,040	Equipment	(non-expendable)	
	(revised)	$83,000	Travel		
Est. FY Expenditure		$43,700	Other		

PURPOSE AND SCOPE

The main objective of this study is to quantify the performance and benefits of using crack sealing and other impermeable surface treatments (e.g., seal coat and chip seal) under various groundwater table conditions and to develop a user guideline for applying impermeable surface treatments to Louisiana highways.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

The researchers have completed or are in near completion of the following tasks in the project:
-TASK 1: Literature Review;
-TASK 2: Review of LADOTD State-of-the-practice;
-TASK 3: Collection of historical Louisiana performance data; and
-TASK 5: Analysis of Louisiana historical data collected.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

The researchers expect the project to be completed in fiscal year 2018/2019. The following tasks are expected to be completed:
-TASK 4: Laboratory evaluation of crack sealants and seal coat materials;
-TASK 6: Analysis of the effect of high water tables on impermeable surface treatments;
-TASK 7: Cost-benefit analysis;
-TASK 8: Develop a guide document;
-TASK 9: Prepare Final Report, recommendations, and implementation plan.

Title:	**Quality Management of Cracking Distress Survey in Flexible Pavements Using LTRC Digital Highway Data Vehicle**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000107**	Project Start Date:		4/1/2016
Research Project Number:	16-6P	Completion Date	(original)	3/31/2018
Research Agency:	LTRC	Completion Date	(revised)	6/30/2019
Principal Investigator:	Zhong Wu			

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$170,588	**Total**		**$100,000**
	(revised)				
Est. Expended to Date		$69,700	Salaries		$100,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$57,850	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The Louisiana Department of Transportation and Development (LADOTD) is currently implementing the AASHTO's new Mechanistic-Empirical pavement design software- Pavement ME, which was locally calibrated based on the PMS database. The objectives of this research are to compare and validate cracking survey results on selected flexible pavements obtained from the Louisiana Transportation Research Center (LTRC) data collection system and from the Louisiana current contracted application; to investigate the feasibility of converting the existing PMS cracking data to comply with the MEPDG definition of cracking; and to recommend a cracking analysis procedure for flexible pavements using LTRC's Digital Highway Data Collection System.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

Due to the upgrade of LTRC's Digital Highway Data Collection System as well as its associated cracking analysis software package, additional in situ pavement image data need to be collected using the new system. Currently, no charge was made to this project and the task for searching new cracking software is in progress.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

An automated cracking analysis software will be acquired or developed for the upgraded LTRC's digital highway data collection system. With the new cracking software, the following activities will be performed:
-Compare the new cracking software and Vision Software;
-Evaluate the alligator cracking model in Pavement ME using LTRC measured data and update the calibration coefficients accordingly;
-Develop conversion correlation models for different cracking measurements at LTRC and LADOTD; and
-Develop final report.

Title:	**Pavement Service Life Extension Due to Asphalt Surface Treatment Interlayer**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000089**		Project Start Date:		7/1/2016
Research Project Number:	16-5P		Completion Date	(original)	6/30/2018
Research Agency:	ULL		Completion Date	(revised)	
Principal Investigator:	Mohammad Khattak				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$199,997		**Total**		**$77,081**
	(revised)					
Est. Expended to Date		$122,919		Salaries		$44,261
FY 2017 - 2018 Budget				Consumable Supplies & Materials		$1,500
FY Funds	(original)	$101,081		Equipment	(non-expendable)	
	(revised)			Travel		$1,250
Est. FY Expenditure		$24,000		Other		$30,070

PURPOSE AND SCOPE

The overall goal of the study is to use the DOTD time dependent pavement management data to develop, for each pavement distress and condition type, statistical performance prediction models of pavement structures with and without asphalt surface treatment AST) interlayers over soil-cement. The development of such models will draw on the state of the practice of DOTD. Further, the performance models will be complemented by cost data to evaluate the cost-effectiveness of the AST interlayers over-soil cement basel;

-Conduct a comprehensive review of the state-of-the-practice of DOTD districts and other US State Highway Agencies (SHA) about AST interlayers practices over soil-cement bases for flexible pavements, its performance, and selection of candidate projects;
-Identify pavement projects with and without AST interlayers over soil-cement bases for flexible pavements with sufficient historical records (e.g., traffic, age, pavement structure and materials, cost data, etc.) and pavement performance data by exploring the information available in DOTD's databases;
-Perform extensive evaluation of performance of the selected projects with and without AST interlayer treatment over soil-cement bases. Such evaluation will be based on comprehensive analysis of the time series distress data (roughness, cracking, and rutting) available from the PMS database;
-Develop performance prediction models for each distress type based on the available pavement distress data. The models will make it possible to estimate the benefits and the life-cycle costs of the projects with and without AST interlayer and its impact on the pavement service life and remaining service life;
-Develop guidelines for the implementation of cost-effective utilization of AST interlayer that would maximize the user and agency benefits and minimize their costs; and
-Develop implementation plan to integrate the developed performance models into the DOTD PMS, Pavement Preservation system, and Pavement design system.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS
-Review of the literature and state of practice related to AST on soil cement bases; -Review of current practices of AST on soil cement bases within the state; -Conducted, analyzed and documented the results of the district Survey related to AST practices; -Identification and selection of projects with sufficient historical records (e.g., traffic, age, pavement structure and materials, cost data, etc.) and pavement performance data by utilizing the information stored in LADOTD's databases; -Algorithms for determination of SL. SL, and SLE were developed and corrected; -Determination and Comparison of RSL, SLE of projects with and without AST interlayer was done; and -Progress report to PRC was presented.
FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
-Pavement distress data from PMS and TOPS will be acquired to identify additional project for analysis; -Performance evaluation and performance modeling will commence for each pavement type and distress type; -The models will make it possible to estimate the benefits and remaining service life of AST treatment; -The life-cycle costs of the projects with and without AST interlayer and its impact on the pavement service life and remaining service life will be analyzed; -Develop guidelines for the implementation of cost-effective utilization of AST interlayer that would maximize the user and agency benefits and minimize their costs; -Propose implementation plan to integrate the developed performance models into the DOTD PMS, Pavement Preservation system, and Pavement design system; and -The "Other" cost item is to be paid to a subcontract for the services of a project consultant (Baladi).

Title:	**Transportation Infrastructure Asset Damage Cost Recovery Correlated with Shale Gas/Oil Recovery Operations in Louisiana**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000146**	Project Start Date:		8/1/2016
Research Project Number:	16-2P	Completion Date	(original)	7/31/2018
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Zhong Wu			

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$190,950	**Total**		**$60,000**
	(revised)				
Est. Expended to Date		$106,000	Salaries		$60,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$70,500	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$41,000	Other		

PURPOSE AND SCOPE

The objectives of this study are to quantify the pavement damage caused by shale oil/gas recovery activities; to estimate the costs of the pavement damage and recommend a strategy of fiscal remedies; and to forecast the impact of future shale oil/gas well development activities on Louisiana roadways and validate the recommended strategy of fiscal remedies.
(1) collect project information about shale oil/gas operations and any past studies that evaluated the impact of those operations on roadways; (2) determine distresses due to design traffic and the design traffic plus extra traffic generated from the oil/gas activities; (3) The damage cost will be subsequently analyzed, and a strategy of fiscal remedies will be proposed based on the cost analysis.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Collected and analyzed the Haynesville area related overweight permits;
-Allocated the Origins/Destinations of the overweight trips on the ArcGIS map;
-Assigned the overweight trips on the Louisiana roadway map according to the shortest path method;
-Calculated the total vehicle miles traveled;
-Estimated damage costs to impacted pavements due to shale/gas activities; and
-Performed FWD tests and pavement surface distress survey on selected projects.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

-Propose fiscal remedy strategy based on cost analysis results; and
-Prepare final report.

Title:	**Assessment of Structural Capacity Indicators from Rolling Wheel Deflectometer Data Collection in Louisiana**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000009**	Project Start Date:		7/1/2014
Research Project Number:	14-2P	Completion Date	(original)	12/31/2015
Research Agency:	LSU	Completion Date	(revised)	12/31/2018
Principal Investigator:	Mostafa Elseifi			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$103,287
	(revised)	$218,597
Est. Expended to Date		$168,145
FY 2017 - 2018 Budget		
FY Funds	(original)	$27,000
	(revised)	$43,750
Est. FY Expenditure		$32,325

Estimated 2018-2019 Budget		
Total		**$15,000**
Salaries		$15,000
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		
Other		

PURPOSE AND SCOPE

The objective of this study was twofold. First, this project evaluated structural capacity indicators previously developed in 09-1P and their effectiveness in predicting pavement structural conditions based on RWD measurements. Based on this evaluation, a methodology was developed to integrate the most promising structural capacity indicator into the Louisiana Pavement Management System (PMS) decision matrix and into overlay design. This project also assessed the feasibility of using TSD measurements at the network-level for pavement conditions structural evaluation in Louisiana and in back calculation analysis.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

The final report for the TSD analysis has been completed and is currently under editorial review. The remaining research activities for this project aim to develop and to validate a mechanistic-based methodology using 3D-MOVE in order to utilize TSD deflection measurements in back calculation. The remaining tasks on the project were based on extracting field cores and measuring the dynamic modulus for these cores. These values will be used in 3D-MOVE to calculate surface deflections. Unfortunately, cores extraction and testing were delayed due to issues beyond the control of the research team. The research completion date was modified to account that coring and laboratory testing has been delayed until May or June. The new completion date will be December 31st, 2018.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

The research team is working on the 3D-MOVE analysis in preparation for completing this work by the new completion date of 12/31/2018. A supplemental report will be submitted to document this part of the analysis. This work will be completed once laboratory test results are provided to the research team.

Title:	**Assessment of Environmental, Seasonal and Regional Variations in Pavement Base and Subgrade Properties**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**30000425**		Project Start Date:		9/1/2011
Research Project Number:	12-2P		Completion Date	(original)	8/31/2013
Research Agency:	LTRC		Completion Date	(revised)	12/30/2018
Principal Investigator:	Kevin Gaspard				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$262,210		**Total**		**$48,000**
	(revised)	$529,685				
Est. Expended to Date		$451,517		Salaries		$43,500
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)	$119,617		Equipment	(non-expendable)	$4,500
	(revised)	$50,000		Travel		
Est. FY Expenditure		$48,000		Other		

PURPOSE AND SCOPE

The purpose of this project is to validate the prediction of seasonal variation strengths in the base course and subgrade, validate MEPDG provided soil properties and strengths, validate soil properties and locations from Soil Unit Maps, link soil unit maps with the Louisiana Department of Transportation and Development (LADOTD) Geotechnical data base, document water table depths, and obtain Level 2 modulus inputs with data from the Falling Weight Deflectometer (FWD) and Dynamic Cone Penetrometer (DCP). A companion study will be conducted through the Southeast Superpave Pool Fund Study to refine the historical climatic model and build new future climatic models to be utilized in the MEPDG.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Finished Laboratory testing;
-Conducted field data collection seasonally until December 31, 2017;
-Conducted data analysis for final report; and
-Began composing final report.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Complete final report and close project.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	Assessment of Pavement Distresses caused by Trees on Rural Highway	Project Status:	Ongoing
Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

SIO:	30000607		Project Start Date:		2/1/2012
Research Project Number:	12-1P		Completion Date	(original)	7/1/2014
Research Agency:	LTRC		Completion Date	(revised)	6/30/2019
Principal Investigator:	Kevin Gaspard				

BUDGET STATUS

Total Budget			Estimated 2018-2019 Budget		
Total Cost	(original)	$341,459	**Total**		**$48,000**
	(revised)	$516,642			
Est. Expended to Date		$326,288	Salaries		$43,500
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$89,005	Equipment	(non-expendable)	$4,500
	(revised)	$40,000	Travel		
Est. FY Expenditure		$37,000	Other		

PURPOSE AND SCOPE

Pavement surface and foundation distresses due to shrinking and swelling soils are an issue on certain Louisiana Highways which is the focus of this study. Desiccation is a common phenomenon due to diurnal changes in soil moisture content and can be caused by three primary sources (Evaporation, Transpiration, Water Table Fluctuations), hereafter referred to as Evapotranspiration. Expansive clay soils (PI>20) are particularly vulnerable to changes in moisture content; shrinking during the drying cycles (desiccation) and swelling during wetting cycles (recharge). While research has been conducted in these areas, though sometimes sparingly, assessment guidelines for soil characterization, environmental factors, and the stress state of the pavement system coupled with appropriate cost effective mitigation methods for evapotranspiration distresses on Highways will be provided through a comprehensive report and technical assistance to the Districts.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Monitored LA 493 and LA 454 every two months;
-Complete GIS software which displays locations of tree distresses from District survey;
-Completed laboratory program and field program to determine seasonal subgrade moisture content from TDR's and suction gauges; and
-Begin composing final report.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Complete Final report and recommend to PRC that project be closed instead of seeking additional sites.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Field Validation of Equivalent Modulus for Stabilized Subgrade Layer**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**30000610**	Project Start Date:		5/1/2012
Research Project Number:	12-11P	Completion Date	(original)	4/30/2014
Research Agency:	LTRC	Completion Date	(revised)	12/31/2018
Principal Investigator:	Mark Martinez			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$263,502
	(revised)	$325,000
Est. Expended to Date		$313,702
FY 2017 - 2018 Budget		
FY Funds	(original)	$40,840
	(revised)	$10,000
Est. FY Expenditure		$5,779

Estimated 2018-2019 Budget		
Total		**$12,856**
Salaries		$12,856
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		
Other		

PURPOSE AND SCOPE

The central objective of the research is to validate the newly developed Modulus Analysis spreadsheet through comparison to field collected data so that current pavement design strategies and policies can be updated and modified in an effort to improve long-term performance and increase benefit-cost ratios on future pavement projects. It is also an objective of this research to develop a subgrade stabilization specification (lime and\or cement) of the Louisiana Department of Transportation and Development (LADOTD) that will allow the Department to take design advantage of the structural improvements that subgrade treatment applications provide.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Task 2: Finished HWD and DCP testing on relevant projects; and
-Task 5: Developed Draft Report and called final PRC meeting.

Project extended six months to cover delays resulting from emergence of several time sensitive TA projects taking precedence due to unforeseen personnel losses across a number of LTRC Units.

A Budget increase was also required to cover cost of reevaluating a portion of the raw data that was mishandled.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

-Task 3: Complete reprocessing of collected data;
-Task 4: Complete development of usage model; and
-Task 5: Complete final report and benefit-cost analysis.

Title:	**Management and Operation of the Pavement Research Facility**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**30000141**		Project Start Date:		7/1/2009
Research Project Number:	10-1ALF		Completion Date	(original)	6/30/2015
Research Agency:	LTRC		Completion Date	(revised)	6/30/2021
Principal Investigator:	Zhong Wu				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$1,730,000		**Total**		**$648,000**
	(revised)	$16,682,103				
Est. Expended to Date		$379,000		Salaries		$460,000
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)	$670,970		Equipment	(non-expendable)	$100,000
	(revised)			Travel		$12,000
Est. FY Expenditure		$670,900		Other		$76,000

PURPOSE AND SCOPE

The Pavement Research Facility (PRF) is a full scale test facility site designed to test any and all types of pavements using the Australian designed ALF. The purpose of the Louisiana Transportation Research Center's (LTRC's) Pavement Research Facility is to investigate and evaluate economic and practical alternatives to current design and construction practices.
The objective of this study is to provide for the management and operation structure of the PRF site in performing full-scale accelerated pavement testing.
A manager and two operators will be funded in this study. The scope of the work includes management of the facility, maintenance and operation, preparations of plans for individual experiments, construction and instrumentation activities and planning.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Completed loading on the 6-inch bonded concrete overlay section;
-Continued testing on the 2-inch bonded concrete overlay section;
-Completed trench survey for Geo-grid reinforced test sections; and
-Prepared testing plan for new RCC ME test sections.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

-Complete loading test on all bonded concrete overlay sections;
-Trench survey and forensic investigation on failed overlay sections;
-Start loading on 8-inch RCC sections with new sets of instrumentation sensors;
-Develop pre-maintenance inventory plan for both ALF and ATLaS devices; and
-Prepare testing plans for next ALF project.

Justification for the equipment budget: (1) For both ATLaS and ALF devices- re-design (e.g. winch, dolly), manufacturing and replacement components; (2) For Pavement Unit to acquire in situ testing equipment.

Title:	**DOTD Support for UTC Project: Development of Self-Healing and Rejuvenating Mechanisms for Asphalt Mixtures Containing Recycled Asphalt Shingles**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000197**		Project Start Date:		7/1/2017
Research Project Number:	18-3B		Completion Date	(original)	6/30/2018
Research Agency:	LSU		Completion Date	(revised)	12/31/2018
Principal Investigator:	Marwa Hassan				

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$38,000	**Total**		**$12,000**
	(revised)				
Est. Expended to Date		$15,000	Salaries		$12,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$35,000	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$26,000	Other		

PURPOSE AND SCOPE

The objectives of the project are:
-Develop a synthesis procedure for production of sodium-alginate hollow-fibers containing an asphalt rejuvenator;
-Evaluation of thermal stability and the resistance to mixing processes of the fibers;
-Evaluation of the performance against fatigue cracking, low temperature cracking, and rutting susceptibility of HMA with fibers will be assessed through laboratory tests; and
-Evaluation of self-healing efficiency of hollow-fibers, through crack healing and stiffness recovery of damaged mixture specimens under two different healing conditions.

The investigator plans to accomplish these objectives by undertaking six tasks in Phase 1 and three tasks in Phase 2.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS
The project has successfully developed a synthesis procedure for the production of sodium-alginate hollow-fibers containing an asphalt rejuvenator product. An optimization process of the production parameters for the sodium-alginate fibers was performed in order to produce the best suitable fibers for HMA mixing processes. In addition, the rheological properties of asphalt binder blends containing the developed fibers and recycled materials such as RAS and RAP have been evaluated by performing controlled laboratory tests procedures. Furthermore, the project has successfully produced HMA mixtures containing the developed fibers corroborating the fibers are suitable to the high-temperatures and shear stresses during a mixing process. The mechanical properties of the HMA mixtures containing sodium-alginate fibers have been evaluated to compare their performance with conventional mixtures against distresses such as permanent deformation, fatigue cracking and low-temperature cracking. Finally, a self-healing experiment was developed to evaluate the enhancement of the self-healing ability of asphalt binder with the addition of sodium-alginate fibers. The project participated in a poster presentation in the Transportation Research Board 2018 Conference. Also, a journal paper has been submitted for publication in the ASCE Journal of Materials in Civil Engineering. In addition, the preliminary results of the project were disseminated in another poster presentation in the Louisiana Transportation Conference 2018. Finally, a conference paper with preliminary results was submitted to the World Transportation Conference 2018. The project has provided funding to one PhD student at Louisiana State University. Also, the project has hired students from BRCC as part-time student workers to introduced them to research in transportation.
FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
Start phase II.

Title:	**DOTD Support for UCT Project: Improving Durability and Extending the Service Life of Asphalt Pavements Through the Use of Innovative Light Induced Self-Healing Material**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000203**		Project Start Date:		7/1/2017
Research Project Number:	18-2B		Completion Date	(original)	6/30/2018
Research Agency:	LSU		Completion Date	(revised)	12/31/2018
Principal Investigator:	Marwa Hassan				

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$38,000	**Total**		**$18,000**
	(revised)				
Est. Expended to Date		$15,000	Salaries		$18,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$35,000	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$20,000	Other		

PURPOSE AND SCOPE

The objectives of the project are to:
-Develop an optimized synthesis procedure for the production of UV light induced self-healing polymers;
-Examine the thermal stability of the produced polymer during asphalt pavement mixing processes;
-Evaluate the effect of self-healing polymer on the rheological properties of the binder;
-Evaluate the effect of self-healing polymer on the mix mechanical properties; and
-Evaluate the effect of UV light induced polymer on self-healing capabilities of asphalt mixture.

To achieve the objectives, the investigators will conduct seven tasks in a Phase 1 effort and three tasks in Phase 2 effort.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

An innovative, light-activated, self-healing polymer was synthesized in the laboratory by means of a photocatalytic-based chemical method. The synthetic degree of produced self-healing polymers was examined, using FT-IR spectroscopy, while the thermal stability was analyzed by means of TGA. The FT-IR analysis confirmed the successful synthesis of cross-linked networks of self-healing polymer (OXE-CHI-PUR) in the laboratory. In addition, TGA results showed that the produced polymers achieved the required thermal stability for resisting the high temperature during asphalt mixture's production processes.

Furthermore, binder blends were prepared with three different percentages of self-healing polymer and with or without recycled asphalt materials (RAS/RAP). Prepared blends were characterized, using laboratory rheological tests (rotational viscometer, the dynamic shear rheometer and bending beam rheometer), and by comparing the Superpave Performance Grade (PG) of the modified binder blends to the unmodified binder. Furthermore, prepared samples (DSR and BBR samples), were exposed to 2 different duration of UV light (1h, and 48h) to examine the effect of various UV exposure on the performance of the binder blends containing self-healing polymer.

DSR test results showed that complex modulus of binder blends containing only RAS or RAP decreased with the addition of 1% self-healing polymer. These values increased by increasing the percentages of self-healing polymer to 3% and 5%. An increase in complex modulus and a decrease in phase angle of binder blends was observed with self-healing polymer when compared to the binder blends containing only recycled asphalt materials. Performance grading results showed an increase in high temperature grade of the binder blends containing recycled asphalt materials and binder blends containing both recycled asphalt materials and self-healing polymer. However, the low-temperature grade was the same for all tested binder blends.

The difference between the critical stiffness temperature and the m-value critical temperature (Delta Tc) showed an improvement in low service temperature performance for samples exposed to UV light, with binder blend containing 5% self-healing polymers showing the best results.

Based on the results, a binder blend, containing 5% self-healing polymer, showed the best results among the tested binder blends, and therefore, was selected for mixture and self-healing testing.

Based on the previous explanation, following tasks have been completed:

-Develop an optimized synthesis procedure for the production of UV light induced self-healing polymers;
-Examine the thermal stability of the produced polymer during asphalt pavement mixing processes; and
-Evaluate the effect of self-healing polymer on the rheological properties of the binder;

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Based on the result obtained from previous tasks, following activities are planned for fiscal year 2018-2019:

-Evaluate the effect of self-healing polymer on the mix mechanical properties; and
-Evaluate the effect of UV light induced polymer on self-healing capabilities of asphalt mixture
& Phase II implementation.

During task 5, the laboratory performance of asphalt mixtures containing RAP and/or RAS, with and without self-healing polymers will be evaluated through laboratory measurements of mechanistic properties. A series of laboratory mechanistic tests will be conducted to characterize the high, intermediate, and low temperature properties for asphalt mixtures. These tests include semi-circular bend (SCB) test for intermediate temperature fracture performance, thermal stress restrained specimen tensile strength test (TSRST) for low temperature performance, and a Hamburg type loaded wheel tracking (LWT) test to evaluate the mixtures resistance to permanent deformation and moisture susceptibility. Additionally, the effect of self-healing polymer on the healing efficiency of mixture will be tested by preparing rectangular beams with or without RAS and/or RAP and self-healing polymer. Samples will be loaded beyond the linear region in order to induce cracks at the bottom of the beams. The stiffness of the beams will be re-measured after creating the cracks and will be referenced as the damaged stiffness or day 0 stiffness. Finally, the beam stiffness will be measured after 6 days of healing. Healing efficiency of the beams will be evaluated by comparing undamaged, damaged and healed stiffness. In order to monitor the healing of cracks in the different mixtures, various cracks with varying widths will be monitored, using light microscopy and image analysis. Images will be captured and analyzed at day 0, day 1, day 2, day 3 and day 6.

Title:	DOTD Support for UTC Project: Development of a Standard Test Method for Characterization of Asphalt Modifiers and Aging-Related Degradation Using an Extensional Rheometer	Project Status:	Ongoing

Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

SIO:	DOTLT1000198		Project Start Date:		7/1/2017
Research Project Number:	18-1B		Completion Date	(original)	6/30/2018
Research Agency:	LTU		Completion Date	(revised)	12/31/2018
Principal Investigator:	Nazimuddin Wasiuddin				

BUDGET STATUS

Total Budget			Estimated 2018-2019 Budget		
Total Cost	(original)	$20,000	**Total**		**$12,261**
	(revised)				
Est. Expended to Date		$5,000	Salaries		$9,200
FY 2017 - 2018 Budget			Consumable Supplies & Materials		$1,000
FY Funds	(original)	$20,000	Equipment	(non-expendable)	
	(revised)	$7,739	Travel		
Est. FY Expenditure		$7,739	Other		$2,061

PURPOSE AND SCOPE

This study has been initiated to (a) characterize modified asphalt binders relating to their aging-related degradation; and (b) develop a new standard and specification to supplement the knowledge gap in the performance grade (PG) system for modified asphalt binders. In the proposed study, an extensional rheometer fixture will be used in a DSR platform to perform a suite of tests. Elongation tests and fracture tests will be performed using the extensional rheometer varying sample geometry, temperature and strain rate. To replace ductility test (AASHTO T51), the final strain in the elongation test will be analyzed along with other parameters. The second force peak of force ductility test (AASHTO T300) will be compared to second force peak in elongation test. A novel and direct low-temperature cracking susceptibility test will be developed by analyzing fracture strength and fracture energy parameters in fracture test using extensional rheometer. Extensional stress relaxation modulus and strain hardening will be investigated to determine the influence of polymer microstructures such as linear and radial styrenebutadiene-styrene (SBS). The proposed study will also investigate and quantify (a) the degradation of modifiers with aging; and (b) how polymers/ modifiers influence aging susceptibility. A standard test method and corresponding specifications will be developed for immediate implementation.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

The major accomplishments are:
-A novel method has been developed for polymer content determination in polymer modified emulsion; and
-An effective method has been developed for determination of polymer degradation in asphalt binder due to oxidative aging.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
The primary activities are: -More binder testing for implementation. and -Develop specifications for implementation.

Title:	**Development of a 4.75mm Asphalt Mixture Design**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**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)	
Principal Investigator:	Saman Salari			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$140,674
	(revised)	
Est. Expended to Date		$18,500
FY 2017 - 2018 Budget		
FY Funds	(original)	$63,865
	(revised)	
Est. FY Expenditure		$40,000

Estimated 2018-2019 Budget		
Total		**$87,975**
Salaries		$87,975
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		
Other		

PURPOSE AND SCOPE

The objective of this research is to develop some mix design criteria for 4.75 mm NMAS mixtures. Criteria targeted in the research will be gradation controls, volumetric property requirements (air voids, VMA, VFA, and dust-to-binder ratio) and mechanical tests. The mechanical tests include the Loaded Wheel Track (LWT) test, Semi-Circular Bend (SCB) test, and Dynamic Modulus. Local aggregates and asphalt cements will be 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 tested will follow Louisiana standard specifications which include, PG 64-22, PG 76-22, and PG 82-22crm.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Continue literature review;
-Collect local aggregate and asphalt cement;
-Mixture with Gravel and lime stone has been designed; and
-Mixture with Gravel and lime stone has been tested for LWT.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

-Writing the report;
-Analysis of the results;
-Testing and designing more aggregate combinations; and
-Testing and designing more base binders.

Title:	**Field Implementation of Handheld FTIR Spectrometer for Polymer Content Determination and for Quality Control of RAP Mixtures**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000161**		Project Start Date:		7/14/2017
Research Project Number:	17-1B		Completion Date	(original)	7/13/2019
Research Agency:	LTU		Completion Date	(revised)	
Principal Investigator:	Nazimuddin Wasiuddin				

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$200,000	**Total**		**$158,700**
	(revised)				
Est. Expended to Date		$41,300	Salaries		$68,203
FY 2017 - 2018 Budget			Consumable Supplies & Materials		$4,622
FY Funds	(original)	$127,000	Equipment	(non-expendable)	$54,000
	(revised)		Travel		$625
Est. FY Expenditure		$41,300	Other		$31,250

PURPOSE AND SCOPE

The purpose of this research project is to determine if the FTIR can be implemented in Louisiana for polymer content determination and for quality control of recycled mixtures. The FTIR spectrometer has the advantage of being faster, easier to handle, and inexpensive than current testing methods, but requires further researching of its capabilities. The FTIR will need to be tested for precision, testing time, and cost effectiveness versus the other asphalt binder testing devices.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

The 2017-18 accomplishments are:

-DCM solvent extraction was used in the laboratory for rapid analysis of binder absorbance spectra which indicated that solvent amount did not affect the absorbance value of the ATR spectra after 95% evaporation of the solvent;

-At determination of C=O oxidation, aggregate particle sizes up to #200 passing sieve did not affect the binder spectra whereas slight deviation was observed in S=O oxidation range which was not statistically significant;

-In laboratory aging, PAV samples demonstrated approximately 33% increase in oxidation signal for C=O oxidation and 26% increase in S=O oxidation. Oxidation in PAV samples were significantly higher compared to unaged and RTFO; and

-Aging due to RAP binder addition illustrated that N- Propyl Bromide should be used to ensure a good extraction. In this study, % of RAP content increased the sulfoxide oxidation significantly which were 211% for 20% RAP and 378% for 80% RAP compared to the oxidation signal of unaged binder.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
The major activities are: -Diffuse reflectance (DR) method will be investigated along with ATR method (touch method); -At least four field study will be performed; -Handheld FTIR will be used for polymer content determination; -Final FTIR test parameters will be selected based on the study; -Final statistical method for data analysis will be selected based on investigation; and -Equipment line item of $54,000 is for the purchase of FTIR equipment.

Title:	**Support Study for Evaluation of Crumb Rubber Modification of Louisiana Mixtures**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000059**		Project Start Date:		4/15/2015
Research Project Number:	15-2B		Completion Date	(original)	7/14/2017
Research Agency:	LSU		Completion Date	(revised)	12/31/2018
Principal Investigator:	William Daly				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$160,866		**Total**		**$53,700**
	(revised)	$300,365				
Est. Expended to Date		$247,000		Salaries		$45,000
FY 2017 - 2018 Budget				Consumable Supplies & Materials		$6,200
FY Funds	(original)	$33,071		Equipment	(non-expendable)	
	(revised)	$86,000		Travel		
Est. FY Expenditure		$87,000		Other		$2,500

PURPOSE AND SCOPE

The objective of this research is to provide chemical support to LTRC Project No. 15-1B entitled “Evaluation of Crumb Rubber Modification of Louisiana Mixtures”. This research will also evaluate potential methods for quality control/quality assurance (QC/QA) of binders modified with crumb rubber. The binder evaluation will include standard SHRP Superpave rheometer testing and comprehensive chemical analysis, CRM binder blends and cements will be laboratory aged, the binder will be extracted, and the extent of ageing will be assessed using FTIR, DTA and SEM techniques.
Several CRM technologies and blending procedures have been presented as a part of LTRC 15-1b/15-2b research projects. During the course of the testing for the current scope, concerns arose over the various blending temperatures used and the impact on the quality of the asphalt binder. This project extension will investigate the nature of released components of different types of CR (ambient crumb rubber, cryogenic crumb rubber, and Ecorphalt rubber) in asphalt binder, at 170° C and 190° C. The effect of the released components at the two temperatures on the properties of the asphalt binder will be investigated. This will allow DOTD to screen blending procedures that may negatively impact the asphalt cement properties.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Task 5: Perform Data Analysis;
-Task 6: Evaluate feasibility of quality control measures; and
-Task 7: Contribute to draft project report.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
-Task 3: Perform additional testing per the modification agreement; -Task 5: Perform Data Analysis; -Task 6: Evaluate feasibility of quality control measures; and -Task 7: complete draft project report.

Title:	**Pavement Materials Research Using Special Equipment at the Engineering Materials Characterization Research Facility**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**30000112**		Project Start Date:		7/1/2009
Research Project Number:	10-1EMCRF		Completion Date	(original)	6/30/2015
Research Agency:	LTRC		Completion Date	(revised)	6/30/2021
Principal Investigator:	Louay Mohammad				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$345,000		**Total**		**$160,000**
	(revised)	$14,801,811				
Est. Expended to Date		$345,000		Salaries		$154,000
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)	$160,000		Equipment	(non-expendable)	
	(revised)			Travel		$6,000
Est. FY Expenditure		$160,000		Other		

PURPOSE AND SCOPE

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 in Louisiana. EMCRF plays an important role in the evaluation of the engineering properties of materials used in the LTRC's regional pavement testing facility, ALF. In addition, EMCRF provides specialized analytical expertise for on-going as well as newly initiated in-house research projects; develops new software to be used by DOTD engineers; provides experimental design and analysis; provide training for DOTD employees for the purpose of adopting newly developed technology and implementation methodology into the daily operations of DOTD, and, assists in-house LTRC investigators to develop thorough research programs.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Participated in the Louisiana DOTD Parts five and ten Specification Committee;
-Developed and submitted proposals to NCHRP and FHWA; and
-Participated in several technical assistance projects.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

-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.

Title:	**DOTD Support for UTC Project: Bridge Inspection with Unmanned Aerial Vehicles**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000199**		Project Start Date:		7/1/2017
Research Project Number:	18-2ST		Completion Date	(original)	12/31/2018
Research Agency:	ULL		Completion Date	(revised)	
Principal Investigator:	Paul Darby				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$6,980		**Total**		
	(revised)					
Est. Expended to Date				Salaries		
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)	$6,980		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure		$6,980		Other		

PURPOSE AND SCOPE

The objective of the project is to investigate the potential for deployment of UAVs for bridge inspection. The project will be executed in two (2) phases, i.e. Phase I, i.e. the Research or Technical Phase, and Phase II, i.e. the Implementation Phase.

Phase I will commence with surveys, data gathering, and analysis pursuant to provide recommendations for two instrumented Unmanned Aerial Vehicle Systems (UAVs) for demonstration to determine their application, feasibility, suitability, practicality, and effectiveness according to a defined rubric centered around routine bridge inspection activities. The Research/Technical phase will finish with a report on the findings of the demonstration project, identifying the advantages, disadvantages, and limitations of the use of UAVs in routine bridge inspection work in Louisiana.

The Second phase, i.e. the Implementation Phase, will utilize the informational and educational fruits of the technical research phase for Workforce Development, Outreach Activities, and Education. Workforce development will include disseminating the results through conferences, meetings, workshops, the project website, and webinars to educate and train professionals in the transportation industry, educating students and practicing engineers.

The study will involve four tasks in Phase 1 and three tasks in Phase 2 to accomplish the objective of the research effort.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

The four tasks involved in Phase I of the project will be completed in this fiscal year, i.e. 2017-2018. The drones will be purchased and deployed as planned.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

The three tasks in Phase 2 of the project dealing with implementation will be carried out in fiscal year 2018-2019 in order to accomplish all the planned research objectives.

Title:	**DOTD Support for UTC Project: A Comprehensive Framework for Corrosion Damage Monitoring and Reliability-Based Repair Design of Reinforced Concrete Structures**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000205**	Project Start Date:		7/1/2017
Research Project Number:	18-1ST	Completion Date	(original)	6/30/2018
Research Agency:	LSU	Completion Date	(revised)	12/31/2018
Principal Investigator:	Ayman Okeil			

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$15,000	**Total**		**$11,000**
	(revised)				
Est. Expended to Date		$3,400	Salaries		$9,604
FY 2017 - 2018 Budget			Consumable Supplies & Materials		$596
FY Funds	(original)	$15,000	Equipment	(non-expendable)	
	(revised)	$15,000	Travel		$800
Est. FY Expenditure		$4,000	Other		

PURPOSE AND SCOPE

The purpose of the project is to develop a probabilistic framework for reliability assessment of reinforced concrete structures subjected to corrosion damage over its service life

The research will integrate deterministic modeling of corrosion damage evolution at micro scale and statistical modeling of the effect of environmental conditions on corrosion of RC structures at the macro scale.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

TAMU conducted experimental tests to obtain data for use in calibrating the developed corrosion damage model. LSU developed a structural reliability model using generic corrosion damage models, which will eventually be updated with the calibrated TAMU corrosion model. UNM is working on repair techniques of corrosion damaged structures.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

The corrosion damage model will be tied with the developed structural reliability model. The developed framework will be implemented on sample cases located at sites with different environmental conditions.

Title:	**Overheight Impact Avoidance and Incident Detection System**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000109**		Project Start Date:		7/1/2016
Research Project Number:	16-4ST		Completion Date	(original)	6/30/2018
Research Agency:	LSU		Completion Date	(revised)	06/30/2019
Principal Investigator:	George Voyiadjis				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$172,589		**Total**		**$30,000**
	(revised)					
Est. Expended to Date		$140,000		Salaries		$30,000
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)	$102,589		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure		$90,000		Other		

PURPOSE AND SCOPE

During construction there is a tendency for construction containment and work platforms with reduced vertical clearance to be impacted by over height loads. This may also be true for select truck routes where the bridge superstructure is legal, but lower than expected. The impact vehicle is usually not loaded correctly and can damage the members hit and put workers at risk.
The proposed research would investigate and pilot a laser device that could be set up well in advance of a construction site to identify vehicles that will impact the overhead obstacle. This device, when triggered, would set off an alert system (flashing lights and warning information) that would notify the vehicle of an impending collision and direct them to pull over to the shoulder, stop and the system calls the police. The system would include a camera recording system to document any damage the may occur to the bridge and identify the vehicle causing the damage.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Task 3: Location selection, System(s) Installation, and
-Task 4: Monitor System(s)

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

-Task 4: Monitor System(s), and
-Task 5: Final Report.

Title:	**Retrofit of Existing Statewide Louisiana Safety Walk Bridge Barrier Railing Systems**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000099**	Project Start Date:		7/1/2016
Research Project Number:	16-1ST	Completion Date	(original)	6/30/2018
Research Agency:	Texas A&M Transportation Institute (TTI)	Completion Date	(revised)	
Principal Investigator:	William Williams			

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$169,172	**Total**		**$231,396**
	(revised)				
Est. Expended to Date		$400,568	Salaries		$100,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		$101,396
FY Funds	(original)	$21,000	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$26,000	Other		$30,000

PURPOSE AND SCOPE

The purpose of this research project is to evaluate the current strength and performance of the most common types of vintage concrete safety walk barriers currently in use by the Louisiana Department of Transportation and Development (LADOTD). These designs will be evaluated with respect to MASH TL-3 and 4 Specifications. For the common rail types that do not meet the requirements, retrofit bridge railing options will be engineered, design and detailed. These retrofit options will be developed to improve the strength and crash performance of the barrier systems with respect to MASH TL-4. The retrofit options developed for this project will improve the crash performance of the bridge rail systems and maintain the safety walk areas. The retrofit options will be designed to be cost effective to fabricate and install. We understand the proposed retrofits developed for the safety rails selected for this project will consider the us (continued use) of the safety walk for maintenance activities or emergency vehicular stoppages.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Task 2: Literature Review of LADOTD Database of Bridges with Safety Walk Barriers complete this year;
-Task 3: Bridge Rail Analyses, Design & Detailing (System Development) completed this year. Site visit to review similar designs and take measurements was completed December 2017;
-Task 5: Due to the design of the proposed retrofit no static testing needed just additional engineering analyses; and
-Task 6: Due to the proposed retrofit design developed computer simulation not performed since further analyses were performed for the unique tube rail retrofit.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
-Task 7: Full Scale Testing of Select Bridge Rail Retrofit Design for MASH TL-4 in progress. Getting bids to construct full-scale test installation now (March 16, 2016); expenses for this work ($101,396.00) are budgeted under "Consumable Supplies and Materials". A crash test site will be built for performing crash test for different categories of vehicles; -Task 8: Develop Retrofitting Methods for Single Bridge Rail Design; and -Task 9: Final Report & Technical Summary.

Title:	**Rehabilitation of Deteriorated Timber Piles using Fiber Reinforced Polymer (FRP) Composites**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000043**	Project Start Date:		11/2/2015
Research Project Number:	15-3ST	Completion Date	(original)	11/1/2017
Research Agency:	West Virginia University	Completion Date	(revised)	11/1/2018
Principal Investigator:	Hota-WVU GangaRao			

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$150,000	**Total**		**$4,144**
	(revised)				
Est. Expended to Date		$145,856	Salaries		$3,253
FY 2017 - 2018 Budget			Consumable Supplies & Materials		$154
FY Funds	(original)	$71,001	Equipment	(non-expendable)	
	(revised)	$23,397	Travel		$737
Est. FY Expenditure		$23,397	Other		

PURPOSE AND SCOPE

Timber bridge piles are highly susceptible to decay in the vicinity of the waterline, and replacement of these piles typically requires cutting out the damaged section and replacing with new wood. Even for this code approved approach, certain stringent restrictions are in order. This process is difficult to complete and is not a long-term solution as the exposed heart wood tends to rot. Using Fiber Reinforced Polymer (FRP) wraps to reinforce the decayed area with filler materials to arrest future rot can be a cost effective and long-lasting method for repair of timber piles. However, the installation methods and design guidelines for load enhancement through FRP repair of piles are severely lacking.
The objectives of this research project are:
-Determine the best materials and rehabilitation techniques to be used for FRP repair through literature review and laboratory testing, and
-Develop simplified design methods for rehabilitating deteriorated timber piles using FRP wraps for use by the Louisiana Department of Transportation and Development (LADOTD).

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Task 2: Axial Load Carrying Capacity: All testing was fully completed in February 2018 with the testing of the aged samples. Data is now being compiled into the final report;
-Task 3: Filler Selection: All testing and evaluation is complete and conclusions are being compiled into the final report and guide documents;
-Task 4: Design Methodology: The results from Task 2 are being incorporated into a design methodology; and
-Task 5: Guide Document: The results from Tasks 3 and 4 are being incorporated into guide documents.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

-Task 6: Workshops; and
-Task 7: Final Report.

Title:	**Evaluating Louisiana New Continuity Detail for Girder Bridges**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**30001660**		Project Start Date:		4/21/2014
Research Project Number:	14-1ST		Completion Date	(original)	12/31/2016
Research Agency:	LSU		Completion Date	(revised)	12/31/2018
Principal Investigator:	Ayman Okeil				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$179,991		**Total**		**$34,991**
	(revised)					
Est. Expended to Date		$145,000		Salaries		$28,991
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)	$50,000		Equipment	(non-expendable)	
	(revised)	$25,000		Travel		$1,000
Est. FY Expenditure		$25,000		Other		$5,000

PURPOSE AND SCOPE

The main objective of the proposed research is to evaluate the field performance of a continuity detail that will be included in the new Louisiana Bridge Design and Evaluation Manual(BDEM). The new detail is different from the standard continuity detail in the current Bridge Design manual (BDM).

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

The structural health monitoring system is finally completed.
The following tasks were completed in FY 2017-2018:
–Task 3: Monitor and Inspect the Installation of Instrumentation. Trouble shooting revealed that some sensors were malfunctioning and needed to be replaced. Replacement of malfunctioning sensors took place in January 2018; and
-Task 4: Conducted a static live load test.

The following task is currently ongoing:
-Task 5: Data Collection, processing, and link slab evaluation.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

During the next FY (2018-2019), provided that the no cost extension due to circumstances beyond the PI's control is approved, it is proposed that the following tasks continue:
-Task 5: Continue data collection and evaluation of the performance of the link slab;
-Task 6: Prepare a draft of the final Report; and
-Task 7: Train of LADOTD personnel on using the SHM system and transfer control to LTRC/LADOTD.

Title:	**DOTD Support for UTC Project: Investigating and Analyzing Factors Affecting Lane-Capacity Variations in the Roadway Network in Baton Rouge, LA Measures for Mitigating Traffic Congestion**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000240**		Project Start Date:		3/15/2018
Research Project Number:	18-7SS		Completion Date	(original)	9/14/2019
Research Agency:	LSU		Completion Date	(revised)	
Principal Investigator:	Osama Osman				

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$15,900	**Total**		**$11,925**
	(revised)				
Est. Expended to Date		$2,300	Salaries		$11,925
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$2,384	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$2,300	Other		

PURPOSE AND SCOPE

This project will examine factors affecting capacity and, hence, leading to severe and prolonged congestion in Baton Rouge area. Research objectives include: (1) Identifying problematic corridors in the Baton Rouge Area, (2) Collecting historical traffic data for the identified problematic corridors, and (3) Analyzing the collected data to identify all parameters affecting lane capacity.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

Problematic corridors have been identified within the Baton Rouge Metro area and historical traffic data collection has commenced.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Complete problematic corridor data collection and start data analysis. An outline for a draft final report will be developed.

Title:	**Support Study for the Development of Guidelines for Ramp Metering Implementation and Performance Evaluation on I-12**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000221**	Project Start Date:		11/1/2017
Research Project Number:	18-5SS	Completion Date	(original)	8/31/2019
Research Agency:	University of Alabama in Huntsville	Completion Date	(revised)	
Principal Investigator:	Sherif Ishak			

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$28,734	**Total**		**$13,934**
	(revised)				
Est. Expended to Date		$15,241	Salaries		$13,934
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$15,241	Equipment	(non-expendable)	
	(revised)	$15,241	Travel		
Est. FY Expenditure		$15,241	Other		

PURPOSE AND SCOPE

The main focus of the research is the development of guidelines for ramp metering implementation and performance evaluation along I-12 in Baton Rouge, LA.
This support study facilitates the continued involvement Dr. Sherif Ishak since his departure from LSU. For more information on the project, see the work program sheet for the parent project, 17-5SS.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

For FY accomplishments, see the work program sheet for the parent project, 17-5SS.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Compete all remaining tasks.

Title:	**Trip Generation Modification Factors for Louisiana**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000212**	Project Start Date:		7/1/2017
Research Project Number:	18-4SS	Completion Date	(original)	6/30/2019
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Chester Wilmot			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$177,518
	(revised)	
Est. Expended to Date		$50,233
FY 2017 - 2018 Budget		
FY Funds	(original)	$112,243
	(revised)	
Est. FY Expenditure		$100,000

Estimated 2018-2019 Budget		
Total		**$75,000**
Salaries		$28,244
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		
Other		$46,756

PURPOSE AND SCOPE

The objective of this study is to develop adjustment factors to the ITE Trip Generation rates for Louisiana. However, because the task of developing adjustment factors for all land uses in the ITE Trip Generation Manual would be an enormous task, just strip malls were selected as the land use for consideration in this study. The study investigates the impact of the surrounding built environment, demographics, and transportation service on trip generation rates. The study also investigates possible means of automating the counting of trips to land uses in an effort to make identification of adjustment factors to multiple land uses feasible given the excessive labor costs involved in manual counting.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Task 1: Identify the land use to be studied in this study (completed);
-Task 2: Identify factors affecting trip rates of the selected land use (completed);
-Task 3: Identify data (80% complete);
-Task 4: Experimental design (complete);
-Task 5: Identify survey sites (90% complete); and
-Task 8: Incorporate trip rate identification in a GIS (50% complete).

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
-Task 3: Complete identification of data; -Task 5: Complete identification of survey sites; -Task 6: Conduct survey; -Task 7: Conduct analysis; -Task 8: Complete incorporation of trip rate identification in a GIS; and -Task 9: Prepare final report. Other expenses: - Subcontract with Dr. Peter Stopher, Plantrans LLC (remaining amount due: $34,756); and - Subcontract with Professor Angela Antipova, University of Memphis (remaining amount due: $12,000).

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	Evaluation of DOTD's Existing Queue Estimation Procedures	Project Status:	Ongoing
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000211**		Project Start Date:		8/1/2017
Research Project Number:	18-3SS		Completion Date	(original)	7/31/2019
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Julius Codjoe				

BUDGET STATUS

Total Budget			Estimated 2018-2019 Budget		
Total Cost	(original)	$96,928	**Total**		**$59,928**
	(revised)				
Est. Expended to Date		$18,700	Salaries		$54,128
FY 2017 - 2018 Budget			Consumable Supplies & Materials		$1,000
FY Funds	(original)	$37,000	Equipment	(non-expendable)	$4,800
	(revised)		Travel		
Est. FY Expenditure		$37,000	Other		

PURPOSE AND SCOPE

This project will review and evaluate the Louisiana Department of Transportation and Development's (LADOTD's) existing queue estimation procedures by comparing to actual queue data.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Undertake literature review;
-Identify construction sites; and
-Begin data collection.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

-Complete data collection;
-Complete data analysis;
-Complete Final Report;
-Complete Technical Report; and
-Complete project.

Title:	**DOTD Support for UTC Project: Recruiting, Retaining, and Promoting for Construction Careers at Transportation Agencies**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000200**		Project Start Date:		7/1/2017
Research Project Number:	18-2SS		Completion Date	(original)	6/30/2018
Research Agency:	LSU		Completion Date	(revised)	12/31/2018
Principal Investigator:	Christofer Harper				

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$15,900	**Total**		**$12,400**
	(revised)				
Est. Expended to Date			Salaries		$10,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$15,900	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		$2,400

PURPOSE AND SCOPE

The purpose of this research project is to identify and document the best strategies to attract, hire, retain and promote employees at state DOTs. Both public and private sector organizations within the construction industry struggle to fill vacancies with workers that possess the necessary and desired sets of skills, and to find workers from minority and underrepresented groups of individuals. Competition for quality workers is very high with the demand not looking to decrease anytime soon. Therefore, new and innovative guidance is needed in terms of recruiting and retaining employees from younger and current generations and from underrepresented minorities for careers at transportation agencies.
The objectives for this project are:
-Determine the best practices employed by transportation agencies, other public agencies, and organizations, and private firms that lead to recruitment of qualified transportation agency employees;
-Assess current best practices that are used to retain qualified and experienced transportation agency employees;
-Identify potential institutional barriers that exist within transportation agencies that limit the recruitment and retention of high quality employees; and
-Develop outreach, educational, and workforce development hands-on activities to expose, and engage bright young minds from underrepresented groups to broader fields of transportation and the associated careers.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

The project start date was May 8, 2017. Phase 1, which is the technical research phase of the project, is 12 months in duration, with completion expected by May 7, 2018. For the work completed between July 1, 2017 and June 30, 2018, the technical phase will be completed. Also, phase 2, the implementation phase of six months begins in May 2018. Tasks 2-1, 2-2, and 2-3 will be ongoing during the end of FY 2017-2018 and continuing into FY 2018-2019

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
The proposed activities for FY 2018-2019 include the implementation of tasks 2-1, 2-2, and 2-3, which will result in the dissemination of the technical research results for practical applications in workforce development, outreach, and education. The proposed implementation phase tasks are: -Task 2-1: Workforce development; -Task 2-2: Outreach activities; and -Task 2-3: Education activities.

Title:	**DOTD Support for UTC Project: Promoting Economic Development in the Baton Rouge Area, LA: Improving the Performance of the Transportation System through Supply-Oriented, Demand-Oriented and Economic Measures for Mitigating Traffic Congestion**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000206**		Project Start Date:		7/1/2017
Research Project Number:	18-1SS		Completion Date	(original)	6/30/2018
Research Agency:	LSU		Completion Date	(revised)	12/31/2018
Principal Investigator:	Osama Osman				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$15,900		**Total**		**$5,000**
	(revised)					
Est. Expended to Date		$10,131		Salaries		$5,000
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)	$14,300		Equipment	(non-expendable)	
	(revised)	$14,300		Travel		
Est. FY Expenditure		$10,131		Other		

PURPOSE AND SCOPE

This project aims to perform network analysis to identify the extent of the congestion problem in the Baton Rouge area with the focus on the I-10 Mississippi Bridge. Based on that, the research team will:
-Identify the major data sources in the study area
-Compile existing data from critically congested locations at the I-10 Mississippi Bridge;
-Quantify the magnitude and extent of the congestion problem at the bridge;
-Develop a simulation model for the bridge and the surrounding roadway network;
-Identify potential solutions to address the congestion problem at the bridge; and
-Investigate the effectiveness of each solution using the simulation model.

The investigators plan to conduct nine specific research tasks to accomplish the above stated objectives.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

The research team finalized the following tasks:
-Literature review;
-Identification of the major data sources in the study area;
-Data collection required for the project;
-Identification of potential countermeasures to overcome congestion; and
-Simulation model development and calibration.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

In the upcoming evaluation period, the research team will:
-Determine a number of simulation runs and scenarios needed to test the different solutions identified in Task 5. A set of simulation scenarios will be constructed to comparatively evaluate the effectiveness of the different solutions. For each scenario, multiple runs will be conducted to account for the random variation in the simulation results. The simulation network with the existing traffic conditions will serve as a base case for this study;
-Establish some evaluation criteria for the comparative performance evaluation of the different solutions. Based on this criteria, some performance measures will be set as the output of the simulation runs; such as, travel time, delay, and throughput. The research team will then conduct a detailed statistical analysis on the simulation results to comparatively evaluate the effectiveness of the different solutions and make recommendations; and
-Prepare the final report, and document the entire research effort and obtained results. The final report will include all significant findings and directions for future research and implementation.

Title:	**Evaluation of HeadLight: An E-Construction Inspection Technology**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000168**		Project Start Date:		4/1/2017
Research Project Number:	17-6SS		Completion Date	(original)	8/31/2018
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$1,235,895		**Total**		**$151,982**
	(revised)					
Est. Expended to Date		$1,064,800		Salaries		$3,822
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)	$404,360		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure		$404,360		Other		$148,160

PURPOSE AND SCOPE

Project delivery and inspection is a challenging, resource intensive job and the information collected in the field is valuable with significant impacts for the Louisiana Department of Transportation and Development (LADOTD). LADOTD's current processes for capturing field data still relies heavily on a paper-based process and does not properly leverage technologies that would prevent laborious and inefficient practices, nor integrate with any existing work flow procedures. A central focus of the research is to understand the key impacts of the collection and utilization of digital project data from end to end. In addition, the construction data collected has high value beyond a project's completion during the maintenance phase of the asset life-cycle. This research will also explore how the construction data collected can effectively be provided to assist in the maintenance of LADOTD transportation assets.

As part of the research, LADOTD will evaluate and use a new e-construction technology called HeadLight, leveraging 200 field inspectors and their project teams over 12-18 projects across the state. This system will enable LADOTD to capture field inspection information digitally from active project jobsites, send it back to agency project offices in real-time, and provide project insights to help make engineering decisions as projects are in-progress. The research will enable the agency to effectively determine the long-term viability of an agency-wide deployment of the innovation.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Filed projects have been identified and about 26 active projects are being monitored;
-Integration with Site Manager Construction was completed in early March 2018 with Site Manager Materials expected to be completed by July 2018; -A draft final report has been developed with the literature review nearly completed; and
-Regular project progress updates will be made to the e-construction implementation team at LADOTD in charge of the EDC initiative.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
Other justification: This is the contract services to Pavia for their portion of the research efforts.

Title:	**Development of Guidelines for Ramp Metering Implementation and Performance Evaluation on I-12**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000167**	Project Start Date:		3/1/2017
Research Project Number:	17-5SS	Completion Date	(original)	8/31/2019
Research Agency:	LSU	Completion Date	(revised)	
Principal Investigator:	Osama Osman			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$199,947
	(revised)	$171,213
Est. Expended to Date		$65,000
FY 2017 - 2018 Budget		
FY Funds	(original)	$100,000
	(revised)	$80,000
Est. FY Expenditure		$65,000

Estimated 2018-2019 Budget		
Total		**$100,000**
Salaries		$99,000
Consumable Supplies & Materials		$1,000
Equipment	(non-expendable)	
Travel		
Other		

PURPOSE AND SCOPE

Based on the findings of LTRC Projects 11-2SS and 14-1SS, the Project Review Committee (PRC) recommended this proposed project as part of the implementation of those projects.
The main focus of the research is the development of guidelines for ramp metering implementation in Louisiana and a performance evaluation along I-12. The specific objectives of this research are to: (1) evaluate the performance of the currently implemented ramp metering and queue override strategies on I-12 using recently collected traffic data, (2) evaluate the impact of the existing geometric conditions on ramp metering performance, (3) examine the feasibility of several control solutions at congested ramp junctions, and (4) develop guidelines for ramp metering implementation and performance evaluation in Louisiana and make final recommendations.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

The research team finalized the literature review, data collection, and simulation model development and calibration tasks.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
In the upcoming evaluation period, the research team will do the following: -Complete analysis of the data collected in task 2 in order to assess the performance of the currently implemented ramp metering and queue override strategies along I-12. In doing so, several analyses will be conducted using selected performance measures such as % use of flushing times and effectiveness of queue override. The comparison will be based on statistical analysis and the use of statistical tools such as the tests of hypotheses and analysis of variance. Due to extreme difficulty in collecting the required data (flushing times) for this task, this task will be now performed using simulation. Hence, its completion will be after the simulation model is developed; -Determine the number of simulation runs and scenarios needed to test the different control solutions. A set of simulation scenarios will be constructed in order to comparatively evaluate the performance of the different solutions. For each scenario, multiple runs will be conducted to account for the random variation in the simulation results. The simulation network with the existing ramp metering and queue override strategies will serve as a base case for this study; -Establish some evaluation criteria for the comparative performance evaluation of the different control solutions. Based on this criteria, some performance measures will be set as the output of the simulation runs; such as, travel time, delay, and throughput. The research team will then conduct a detailed statistical analysis on the simulation results to comparatively evaluate the performance of the control solutions; -Estimate the required cost to implement each control solution. A cost benefit analysis will then be performed to assess the pros and cons of each control solution and identify the optimal control solution for each ramp location; and -Summarize all the study results in the form of guidelines to identify the requirements to make ramp metering successful at each ramp location. These guidelines will act as a checklist for future implementations of ramp meters.

Title:	**Hurricane Evacuation Modeling Package**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000159**		Project Start Date:		2/1/2017
Research Project Number:	17-3SS		Completion Date	(original)	8/31/2018
Research Agency:	LSU		Completion Date	(revised)	1/31/2019
Principal Investigator:	Chester Wilmot				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$381,374		**Total**		**$193,481**
	(revised)					
Est. Expended to Date		$101,863		Salaries		$181,981
FY 2017 - 2018 Budget				Consumable Supplies & Materials		$1,000
FY Funds	(original)	$187,893		Equipment	(non-expendable)	$2,500
	(revised)			Travel		$2,500
Est. FY Expenditure		$187,893		Other		$5,500

PURPOSE AND SCOPE

The objective of this study is to incorporate the LTRC hurricane evacuation models and the data on which they operate into a single, user-friendly computer package. The intention is that the program will provide Emergency Managers with a convenient means of estimating the consequences of alternative emergency management decisions before they need to make them, and so be able to select the decision scenario that they consider will produce the best outcome.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Task 1: Identify a suitable computer package platform(complete);
-Task 2: Develop data base (90% complete);
-Task 3: Estimate the parameters of models in the package (50% complete);
-Task 4: Determine the output the package will produce (20% complete); and
-Task 5: Write programs to integrate the models (70% complete).

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Complete the following tasks:
-Task 2: Develop data base;
-Task 3: Estimate the parameters of models in the package;
-Task 4: Determine the output the package will produce;
-Task 5: Write programs to integrate the models;
-Task 6: Demonstrate the model package in a test case; and
-Task 7: Prepare final report.

Other expenses:
-Software support and software licenses.

Title:	**LTRC Proposal for the Support of Research and Development in Transportation Planning**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**30000125**		Project Start Date:		7/1/2010
Research Project Number:	10-1PLAN		Completion Date	(original)	6/30/2015
Research Agency:	LTRC		Completion Date	(revised)	6/30/2021
Principal Investigator:	Chester Wilmot				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$358,462		**Total**		**$120,000**
	(revised)	$7,006,861				
Est. Expended to Date		$6,307,904		Salaries		$116,000
FY 2017 - 2018 Budget				Consumable Supplies & Materials		$2,000
FY Funds	(original)	$100,000		Equipment	(non-expendable)	
	(revised)			Travel		$2,000
Est. FY Expenditure		$100,000		Other		

PURPOSE AND SCOPE

This project provides long-term professional assistance to the Louisiana Department of Transportation and Development (LADOTD) on transportation planning and other matters, has supported the management responsibility of the Special Studies section of the Louisiana Transportation Research Center (LTRC), and permits teaching of courses in the Department of Civil and Environmental Engineering at the Louisiana State University (LSU) on a case by case basis depending on the work schedule. Such exposure encourages graduate students to participate in the LTRC research program and affords LTRC the opportunity to support the enhancement of higher education. The Principal Investigator of this project reports to the Director, LTRC. Research is conducted on topics from LTRC's research program, technical assistance requests from LADOTD, and external research solicitations.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Taught CE 3600 "Principles of Highway and Traffic Engineering", Fall 2017;
-Taught CE 7641 "Urban Transportation Planning Models" in Spring 2018;
-Managed LTRC projects 14-3SS, 16-5SS, 17-3SS, and 18-4SS;
-Managed LTRC project 15-2SS "Subsurface Utility Engineering";
-Served on LOOP Advisory Committee; and
-Served on Southeastern Louisiana Flood Protection Advisory Committee.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

-Teach CE 7640 "Transportation Policy and Planning", Fall 2018;
-Teach CE 7621 "Mass Transit Systems", Spring, 2019;
-Manage LTRC projects 16-5SS, 17-3SS, and 18-4SS;
-Serve on LOOP Advisory Committee; and
-Serve on Southeastern Louisiana Flood Protection Advisory Committee.

Title:	**Influence of Internal Curing on measured resistivity**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000245**		Project Start Date:		4/1/2018
Research Project Number:	18-6C		Completion Date	(original)	3/31/2019
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$53,113		**Total**		**$39,835**
	(revised)					
Est. Expended to Date		$13,000		Salaries		$39,835
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)	$13,278		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure		$13,000		Other		

PURPOSE AND SCOPE

The density of concrete can be influenced by a number of factors. Previous research conducted at LTRC showed a general increase in resistivity values with an increase in the content of lightweight fine aggregate. With interest in Internally Cured Concrete for structural concrete applications, research is needed to better understand the effect of internal curing on surface resistivity.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Develop a test matrix to incorporate various internally cured concrete mixture designs, and
-Test and monitor fresh and hardened properties, including surface resistivity of the developed mixtures.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

-Test and monitor fresh and hardened properties, including surface resistivity of the developed mixtures; and
-Complete analysis and publish final report.

Title:	**DOTD Support for UTC Project: Self-healing Concrete Using Encapsulated Bacterial Spores in a Simulated Hot Subtropical Climate**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000237**		Project Start Date:		3/15/2018
Research Project Number:	18-5C		Completion Date	(original)	9/14/2019
Research Agency:	LSU		Completion Date	(revised)	
Principal Investigator:	Jose Milla				

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$50,000	**Total**		**$6,200**
	(revised)				
Est. Expended to Date		$42,000	Salaries		$6,200
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$43,800	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$42,000	Other		

PURPOSE AND SCOPE

The objective if this project is to evaluate the performance of two bacterial strains for self-healing concrete applications and its effect on concrete properties and crack-sealing in wet-dry cycles.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

Produced several batches of encapsulated bacterial spores for inclusion in the concrete specimens to be produced.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

-Produce concrete in the laboratory and then induce cracking to determine the effect of encapsulated bacterial spores on crack healing; and
-Develop a draft final report and the technology transfer plan.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	DOTD Support for UTC Project: Use of Bagasse Ash as a Concrete Additive for Road Pavement Applications	Project Status:	Ongoing
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000239**		Project Start Date:		3/15/2018
Research Project Number:	18-4C		Completion Date	(original)	9/14/2019
Research Agency:	LSU		Completion Date	(revised)	
Principal Investigator:	Michele Barbato				

BUDGET STATUS

Total Budget			Estimated 2018-2019 Budget		
Total Cost	(original)	$15,189	**Total**		**$15,189**
	(revised)				
Est. Expended to Date			Salaries		$15,189
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The goal and purpose of this project is to develop new uses for bagasse as as an additive for concrete, especially as a partial replacement of Portland cement.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

Started the project and produced preliminary test specimens.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Finish laboratory testing and develop a final report.

Title:	**DOTD Support for UTC Project: Application of Engineered Cementitious Composites (ECC) for Jointless Ultrathin White-topping Overlay**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000236**		Project Start Date:		3/15/2018
Research Project Number:	18-3C		Completion Date	(original)	9/14/2020
Research Agency:	LSU		Completion Date	(revised)	
Principal Investigator:	Gabriel Arce				

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$27,404	**Total**		**$13,144**
	(revised)				
Est. Expended to Date		$14,000	Salaries		$13,144
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$14,260	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$14,000	Other		

PURPOSE AND SCOPE

The purpose of this project is to determine the failure mechanism of UTW produced with an ECC material under accelerated loading. Three test sections will be built and tested to determine failure mechanisms.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

Started the project and performed preliminary laboratory work to develop mixture design.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Pave the test lane and start testing.

Title:	**DOTD Support for UTC Project: Self-Healing Microcapsules as Concrete aggregates for Corrosion Inhibition in Reinforced Concrete**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000201**		Project Start Date:		7/1/2017
Research Project Number:	18-2C		Completion Date	(original)	6/30/2018
Research Agency:	LSU		Completion Date	(revised)	12/31/2018
Principal Investigator:	Marwa Hassan				

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$30,000	**Total**		**$20,000**
	(revised)				
Est. Expended to Date		$5,000	Salaries		$18,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$18,000	Equipment	(non-expendable)	$2,000
	(revised)		Travel		
Est. FY Expenditure		$10,000	Other		

PURPOSE AND SCOPE

The main goal of this effort is to validate the performance of corrosion inhibiting self-healing microcapsules capable of enhancing durability and resiliency of RC structures.
The proposed project has the following objectives.
-Optimize the design parameters needed to produce single and/or double-walled corrosion inhibiting self-healing microcapsules to be used in concrete structures;
-Design an electrochemical set up for qualitative/qualitative characterization of concrete additives/microcapsules;
-Perform method of advanced laboratory techniques based on electrochemical and transport phenomena principles;
-Validation of the methodology by testing several conditions and samples with different microcapsules concentrations and formulations;
-Validate the methodology with the existing standard to support the obtained results;
-Apply the methodology to the inhibition mechanism proposed;
-Plan to include two PhD students and two undergraduate students in the project.

The project involves six tasks in Phase 1 and three tasks in Phase 2 to accomplish the above stated objectives.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS
During this fiscal year, the following objectives have been accomplished: -Optimize the design parameters needed to produce single and/or double-walled corrosion inhibiting self-healing microcapsules to be used in concrete structures. The microencapsulation procedures of calcium nitrate and triethanolamine was developed and will be described in the project's final report. The calcium nitrate microcapsules are activated during a cracking event, where the microcapsules rupture and release calcium nitrate. On the other hand, the triethanolamine capsules feature a controlled release mechanism where the corrosion inhibitor is released depending on the pH, and therefore, such specimen groups do not need to be cracked to test the microcapsule's corrosion inhibitor performance; -Designed an electrochemical set up for qualitative/qualitative characterization of concrete additives/microcapsules; -Performed method of advanced laboratory techniques based on electrochemical and transport phenomena principles; -Included two PhD students, one Masters Student, and one undergraduate student in the project; and -Validated the methodology with the existing standard to support the obtained results.
FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
Complete project tasks in Phase 1 and start phase II.

Title:	**DOTD Support for UTC Project: Evaluation of the Performance and Cost-Effectiveness of Engineered Cementitious Composites (ECC) Produced form Region 6 Local Materials**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000207**		Project Start Date:		7/1/2017
Research Project Number:	18-1C		Completion Date	(original)	6/30/2018
Research Agency:	LSU		Completion Date	(revised)	12/31/2018
Principal Investigator:	Gabriel Arce				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$49,000		**Total**		**$41,000**
	(revised)					
Est. Expended to Date		$7,000		Salaries		$36,000
FY 2017 - 2018 Budget				Consumable Supplies & Materials		$5,000
FY Funds	(original)	$8,000		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure		$8,000		Other		

PURPOSE AND SCOPE

The main goal of this project is to develop and characterize cost-effective ECC materials prepared with locally available ingredients by means of the following objectives:
-Develop ECC mix designs implementing locally available materials;
-Evaluate ECC mix designs mechanical properties (ultimate tensile strength and strain, flexural strength, compressive strength);
-Characterize ECC cracks (obtain crack width distribution);
-Identify key parameters affecting ECC properties; and
-Perform a feasibility study for implementation.

The investigators plan to accomplish the objectives by conducting six tasks in Phase 1 and three tasks in Phase 2 of the project.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

Work was initiated and significant progress was achieved in six of the seven tasks proposed in the project.
-Task 1: Sample preparation (partially completed);
-Task 2: ECC testing (partially completed);
-Task 3: Characterization of ECC cracking (partially completed);
-Task 4: Identification of key parameters ensuring ECC strain hardening response (partially completed);
-Task 5: Evaluation of optimal mix design (partially completed);
-Task 6: Feasibility study for implementation (partially completed); and
-Task 7: Field study (pending).

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
Finalize all seven tasks of the project. -Task 1: Sample preparation; -Task 2: ECC testing; -Task 3: Characterization of ECC cracking; -Task 4: Identification of key parameters ensuring ECC strain hardening response; -Task 5: Evaluation of optimal mix design; -Task 6: Feasibility study for implementation; and -Task 7: Field study.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Effect of Clay Content on Alkali-Carbonate Reactive (ACR) Dolomitic Limestone**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000155**		Project Start Date:		11/1/2016
Research Project Number:	17-1C		Completion Date	(original)	6/29/2018
Research Agency:	LTRC		Completion Date	(revised)	10/31/2019
Principal Investigator:	Tyson Rupnow				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$467,176		**Total**		**$83,918**
	(revised)					
Est. Expended to Date		$52,875		Salaries		$83,918
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)	$58,713		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure		$22,977		Other		

PURPOSE AND SCOPE

This project will investigate the hypothesis that clay content plays and overarching role in ACR expansion and deterioration. Beams will be produced and tested in long term ACR expansion.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Continue to acquire more aggregate sources, and
-Continue length change testing.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

-Continue to acquire more aggregate sources, and
-Continue length change testing.

Title:	**Evaluation of Bonded Concrete Overlays over Asphalt under Accelerated Loading**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**30001663**	Project Start Date:		4/8/2014
Research Project Number:	14-4C	Completion Date	(original)	4/7/2016
Research Agency:	LTRC	Completion Date	(revised)	6/30/2019
Principal Investigator:	Zhong Wu			

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$269,183	**Total**		
	(revised)				
Est. Expended to Date		$269,183	Salaries		
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$46,076	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$46,076	Other		

PURPOSE AND SCOPE

This project will investigate concrete overlays of various thicknesses under accelerated loading. Thicknesses to be investigated include 2 inch, 4 inch, and 6 inches. The base course will be identical under all three sections and includes a 3 inch dense graded HMA over crushed stone. The sections will be loaded progressively until failure to show performance and identify, based on ESALS or load to failure, locations to implement the selected design thicknesses across the State.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

The 6-inch section has been tested to failure. The 2-inch section is currently under the loading device and being tested.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Complete all accelerated loading, analysis of results, and publication of the final report. No cost extension to complete the work.

Title:	**Developing, Upgrading, and Maintaining Softwares for Transportation Applications**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000215**		Project Start Date:		7/1/2017
Research Project Number:	18-1Other		Completion Date	(original)	6/30/2020
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Adele Lee				

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$352,390	**Total**		**$115,970**
	(revised)				
Est. Expended to Date		$44,000	Salaries		$113,490
FY 2017 - 2018 Budget			Consumable Supplies & Materials		$2,480
FY Funds	(original)	$116,803	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$44,000	Other		

PURPOSE AND SCOPE

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). The activities will cover development, upgrading, implementation, and maintenance.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Crafted best practices and processes for LTRC software development and GIS development;
-Technical consultation for TranSET Project Tracking System (through August 2017);
-Software programming to update capabilities and resolve issues on PMTS;
-Software programming to upgrade LTRC geotechnical software's (SoilCPT, Embankment Settlement);
-Hiring, training, and technical supervision of graduate student computer programming
-GIS liaison to DOTD Section 21 for LTRC GIS implementation procedures;
-GIS data and implementations for LTRC Project 16-5GT, 18-3GT, 18-4SS;
-Maintain Server Frameworks (GIS, PMTS) and offsite source code repository (TFS);
-Set-up development environments on laptops and desktops for software development; and
-Technical consultation on software development for LTRC Project 17-3SS.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
-Software programming to update capabilities and resolve issues on PMTS; -Software programming to upgrade LTRC geotechnical software's (Soil CPT, Embankment Settlement); -Hiring, training, and technical supervision of graduate student computer programming; -GIS liaison to DOTD Section 21 for LTRC GIS implementation procedures; -GIS data and implementations for LTRC Project 16-5GT, 16-3GT, 14-4SS, 18-4SS; -Maintain Server Frameworks (GIS, PMTS) and offsite source code repository (TFS); -Set-up and upgrade development environments for software development to Windows 10 (desktops and laptop); and -Technical consultation on software development for LTRC Project 17-3SS.

Title:	**Administration of LTRC External Funding Programs**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**30000169**		Project Start Date:		1/1/2008
Research Project Number:	11-1AD		Completion Date	(original)	6/30/2009
Research Agency:	LTRC		Completion Date	(revised)	6/30/2021
Principal Investigator:	Vijaya Gopu				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$211,428		**Total**		**$286,000**
	(revised)	$3,726,356				
Est. Expended to Date		$2,231,800		Salaries		$276,000
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)	$286,000		Equipment	(non-expendable)	
	(revised)			Travel		$10,000
Est. FY Expenditure		$274,000		Other		

PURPOSE AND SCOPE

To cover administrative costs handled under contract to support the Louisiana Transportation Research Center (LTRC) research, development and technology transfer expansion funding programs.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Coordinated the preparation and submission of four LTRC's Site proposals for the Regional UTC;
-Coordinated the TIRE Program and managed the five TIRE projects awarded in 2017;
-Serving as the PI on a NSF award dealing with FMM education. Developed educational modules for delivery in CE classes;
-Collaborated in the submission of one MRI proposal and one REU Site proposal. REU Site proposal for $350,000 was funded;
-Served on several NSF proposal review panels and site visit teams dealing with MRI, CAREER, National Engineering Hazard Research Infrastructure Programs at NSF;
-Presented several technical papers dealing with timber bridge performance, fiber reinforced polymer composites application in infrastructure rehabilitation, and hazard mitigation at national and international meetings; and
-Coordinated/chaired two technical sessions at the Tulane Engineering Forum.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
-Continue to coordinate the LTRC UTC site projects and the UTC support studies that have been awarded; -Coordinate all activities on the NSF project on FMM education; -Continue coordination of TIRE program and TIRE projects; -Hold LTRC town hall meetings at all state universities with engineering programs; -Review and submit IDEA proposal for the upcoming cycle; -Coordinate submission of a revised NSF MRI proposal in the event the current proposal is not funded; -Initiate work on NDE of capacity of deteriorated timber piles; and -Review the work being conducted at the University of West Virginia on FRP repair of timber piles and ensure project objectives are met.

Title:	**DOTD Support for UTC Project: Truck Crash Causation in Louisiana**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000238**		Project Start Date:		3/15/2018
Research Project Number:	18-6SA		Completion Date	(original)	9/14/2019
Research Agency:	LSU		Completion Date	(revised)	
Principal Investigator:	Osama Osman				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$14,260		**Total**		**$9,424**
	(revised)					
Est. Expended to Date		$1,500		Salaries		$9,424
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)	$1,587		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure		$1,500		Other		

PURPOSE AND SCOPE

This project will examine the causes and implications of commercial truck crashes in Louisiana. Objectives include: (1) collecting comprehensive historical truck crash data in Louisiana, (2) Identifying the factors that contribute to truck crashes, and (3) identifying potential countermeasures to reduce truck crash rates.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

The project was started and data collection commenced with a collection of historical truck crash data for Louisiana.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Identify causation factors and potential countermeasures to reduce truck crash rates. This information will be then reported and a draft final report and a technology transfer plan will be developed.

Title:	**Evaluating the Effectiveness of Regulatory and Warning Signs on Driver Behavior near Highway/Rail crossings**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000149**		Project Start Date:		11/1/2016
Research Project Number:	17-1SA		Completion Date	(original)	6/30/2017
Research Agency:	LTRC		Completion Date	(revised)	10/31/2018
Principal Investigator:	Julius Codjoe				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$196,722		**Total**		**$18,000**
	(revised)					
Est. Expended to Date		$110,000		Salaries		$18,000
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)	$24,000		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure		$54,000		Other		

PURPOSE AND SCOPE

Regulatory signs and warning signs are tools designers use to relay information to drivers about hazards that may not be readily apparent or to elicit certain driver behavior that will improve the probability of safely traversing a crossing. These signs are widely used and are believed to be effective; however, the proposed study seeks to quantify their effectiveness. While the results of the research will not result in a new device, the research has the potential to impact if and when Warning or Regulatory signs are used near highway/rail crossings. The results will give designers a better understanding of the impacts of the signs and allow for optimal utilization of the signs.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Identify crossings where the Traffic Safety group or Highway/Rail Safety Unit would like to install signage;
-Install cameras and record the vehicles/drivers before the signs are deployed;
-Data analysis have been performed for five sites; and
-Summary Stage A report issued.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

-Complete Summary Stage B Report;
-Issue Final Report;
-Issue Technical Report; and
-Complete project.

Title:	**Highway Work Zone Construction Safety Research and Training: A Driving Simulator Study**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000105**		Project Start Date:		7/1/2016
Research Project Number:	16-5SA		Completion Date	(original)	9/30/2018
Research Agency:	LSU		Completion Date	(revised)	12/31/2018
Principal Investigator:	Yimin Zhu				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$280,859		**Total**		**$86,419**
	(revised)	$293,359				
Est. Expended to Date		$156,267		Salaries		$86,419
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)	$163,732		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure		$149,968		Other		

PURPOSE AND SCOPE

The purpose of this project is to determine the effectiveness of an integrated virtual environment as a potential research apparatus for studying highway work zone safety and support the decision-making of transportation administration agencies as well as to determine the potential of incorporating the integrated virtual environment in safety training for the Louisiana Department of Transportation and Development.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Literature review: The task has been completed. The outcome of the task is a list of factors that have significant importance to work zone safety according to previous studies. The project team reported the results to the Project Review Committee (PRC). Per PRC's request, a survey has been created and tested to identify specific factors in the list for implementation. Both paper and digital versions of the survey are created. The survey has been conducted and results are analyzed. Key factors identified by the survey are applied in modeling virtual environments;
-Design of a virtual environment: This task has been completed. First, the project team visited the Jones Creek Rd expansion project. Photos of daytime construction were taken. However, further investigation on the capabilities of the driving simulator reveals that the development of virtual environments is limited by the capabilities of the simulator and its software. Thus, the project team has used scenes collected from the site visit as reference and created a similar virtual environment. This environment includes a work zone and can be used for testing training materials. The project team has modeled two separate environments, using the driving simulator and programmed construction worker to understand driver's behavior, and using a head mounted device to replicate features of drivers and then study worker's behaviors;
-Equipment installation: The driving simulator has been moved back to the PTH building. Software has been upgraded. However, the vendor cannot provide an integrated environment that we first envisioned;
-Simulation Interface Integration: The project team has studied the characteristics of driver and worker behaviors using the two VR environments. With the current limitations of the driving simulator, the two-environment approach may be the only way at this time for a pilot test;
-Developing a Risk-Assessment Approach: The project team has developed codes in the driving simulator and the Unreal Engine (for using head mount devices) to implement surrogate safety measures. The sense of distance in VR needs further investigation in order to select a proper surrogate; and
-Preliminary Testing: The project team has conducted a preliminary test in the summer and fall semesters in 2017. Over 50 students at LSU participated in the preliminary testing, 28 in driving simulator tests and 32 in IVE experiments. Results are reported separately.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

-Complete Task 5 - Develop a risk-assessment approach;
-Complete Task 7 - Experimental Training;
-Complete Task 8 - Analysis of Results; and
-Complete Task 9 - Review and Final Report.

Title:	**Highway Construction Work Zone Safety Performance and Improvement in Louisiana**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000143**		Project Start Date:		7/1/2016
Research Project Number:	16-1SA		Completion Date	(original)	4/30/2018
Research Agency:	LSU		Completion Date	(revised)	9/30/2018
Principal Investigator:	Helmut Schneider				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$117,006		**Total**		
	(revised)					
Est. Expended to Date		$66,863		Salaries		
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)	$60,858		Equipment	(non-expendable)	
	(revised)	$52,435		Travel		
Est. FY Expenditure		$52,435		Other		

PURPOSE AND SCOPE

The purpose of this project is to provide a review of current practices for reporting work zone crashes on the Louisiana crash reports by police officers, to review literature to obtain the state of knowledge on work zone crashes and reporting practices, to identify factors associated with work zone crashes in Louisiana that can be used to develop strategies to reduce work zone crashes and injuries, and to develop recommendations for improved reporting of work zone related crashes.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Task 4-Data Analysis -Crash data analysis was performed on all crashes by work zone, entrance, and exit for all projects as a whole and on an individual project basis. Similar areas were identified as same stretch of road a few years before and after the work zone was in effect. Crash data analysis was performed on all crashes by work zone, entrance, and exit for all similar areas as a whole and on an individual project basis. VMT data was captured and crash rates were computed and analyzed for the work zone areas and similar areas for all areas as a whole and for individual areas.
-Task 5-Final Report - Submit report.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

-Task 4-Finish analysis for the Final Report;
-Task 5-Document project scope, analysis, findings and recommendations; and
-No cost extension to complete the work.

FHWA

Part II SPR Funded Research Program

PROPOSED RESEARCH

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	Geotechnical Asset Management	Project Status:	Proposed
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000226**		Project Start Date:		7/1/2017
Research Project Number:	18-4GT		Completion Date	(original)	12/31/2018
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Gavin Gautreau				

BUDGET STATUS

Total Budget			Estimated 2018-2019 Budget		
Total Cost	(original)	$150,000	**Total**		**$93,458**
	(revised)				
Est. Expended to Date		$10,000	Salaries		$93,458
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$83,987	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$10,000	Other		

PURPOSE AND SCOPE

The Louisiana Department of Transportation and Development (LADOTD) has many elements that compose the transportation system. A management system for assets like retaining walls, slopes, and other geotechnical elements that could affect our highway corridors does not exist within the state.
This project will search how other states manage these items, and develop a system to inventory and store information into a Geotechnical Asset Management Database. The goal is to track the design life of these structures to be more proactive in their life's maintenance.
Starting with low hanging fruit the project will document existing wall locations. Secondly, a rough assessment of how they are performing, then basic construction parameters.
Ideally, the research will establish a system to identify and catalog items within the state utilizing the resources of the Districts and HQ. The research will identify sensitive elements like: location, height, slope, construction, structure integrity and stability, etc. These elements must be quantified and statistically analyzed to determine the level of risk and repair priority associated with each. Certain elements will have more detailed and complex sensitivity levels, based on available data/method. The researcher will evaluate the sensitivity of each element to identify critical elements and methods for level analysis (ex. Level 1 has no data, Level 2 has some data, Level 3 has good data, Level 4 recommended data level). Then, provide LADOTD with a logical method to evaluate and rate the elements of their existing system and compare those ratings against associated risks as compared to minimum safety standards.
This action plan will guide the LADOTD through a phased implementation of a comprehensive geotechnical asset management system to analyze and manage elements/data. The analysis/management tool will be used to rate and evaluate elements as a highway network, and identify locations of risk (red flags) based on existing and collected information when compared against best practices and acceptable standards.
When the threat analysis/management tool combines the socio-economic consequence of failure, the tool will be used to prioritize risks (red flags) and allocate available funding, and more detailed engineering analysis, to the most critical areas of the highway system in Louisiana.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS
The project performed a literature review and met with critical DOTD staff relating to asset management, bridge management, pavement management, GIS, and Agile Assets. Existing guides on wall and geotechnical asset management provided direction on how to establish and begin Geotechnical Asset Management (GAM) within LADOTD.
FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
Starting with low hanging fruit the project will document existing wall locations within Agile Assets and GIS. Additionally, construction parameters and assessment of how they are performing will be formulated and implemented.

Title:	Quality Control/Assurance on Base Course and Embankment with the Dynamic Cone Penetrometer	Project Status:	Proposed

Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

SIO:			Project Start Date:		7/1/2016
Research Project Number:			Completion Date	(original)	
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Nick Ferguson				

BUDGET STATUS

Total Budget			Estimated 2018-2019 Budget		
Total Cost	(original)	$150,000	**Total**		**$125,707**
	(revised)				
Est. Expended to Date			Salaries		$125,707
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

Current QA/QC processes on base courses and subgrades are based on densities and moisture contents obtained from the nuclear gauge. Nuclear gauges utilize radioactive materials to determine the density and moisture contents. These gauges are expensive to maintain and dispose of. The DCP is a simple tool, relatively inexpensive compared to nuclear devices, and can be used in areas where nuclear devices cannot. Furthermore, nuclear gauges produce average values for the layer that the probe is inserted to while the DCP produces the entire stiffness profile.
The DCP has been utilized in both research and construction projects for over 10 years in Louisiana. Currently, DCP readings are required on certain subgrade soil surveys and on all projects which are assessed for rubblization.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

The project is currently proposed and will likely start in Fiscal Year 2018-2019.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Conduct field events with supporting lab work to compare the device to the Nuclear Density Gauge (NDG) for technical accuracy, precision, and, consistency; and field use, safety concerns, paperwork, and cost.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Development of a Design Methodology for Geosynthetic Reinforced Pavement using Finite Element Numerical Modeling**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		9/1/2017
Research Project Number:		Completion Date	(original)	8/31/2020
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Murad Abu-Farsakh			

BUDGET STATUS

Total Budget			Estimated 2018-2019 Budget		
Total Cost	(original)	$250,000	**Total**		**$66,533**
	(revised)				
Est. Expended to Date			Salaries		$64,053
FY 2017 - 2018 Budget			Consumable Supplies & Materials		$2,480
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

Gesynthetic reinforcement has been used for the past three decades or so to improve the performance of paved and unpaved roadways. Although the benefits of geosynthetics reinforcement have been well-realized in terms of increasing the pavement's service life, reducing the thickness of base course layer, and stabilizing and allowing construction over soft subgrade layer, unfortunately, there is no nationally acceptable design method until now for geosynthetic reinforcement/stabilization of pavement. There are several design methods proposed by the geosynthetic manufacturers that need to be verified, modified and/or develop new design methods. The MEPDG did not consider geosynthetic reinforced pavement due to the lack of understanding the geosynthetic mechanism and lack of quantifying the benefits of geosynthetic.

Two experimental research projects (05-5GT, 11-3GT) had been conducted at LTRC using cyclic plate load testing and accelerated load testing on geosynthetic reinforced test sections for the purpose of evaluating the benefits of geosynthetic reinforcement in flexible pavements constructed over weak subgrades. However, the tested sections in these studied included only 2 and 3-inch-thick AC layers and 12 and 18- inch- thick base course layers build over weak subgrade, which will make it difficult to develop a generalized design methodology for geosynthetic reinforced pavement involved sections with different AC and base layers' thicknesses, and different subgrade strength/stiffness condition.

The finite element method is a powerful technique that can be used to simulate and model difficult geotechnical and pavement engineering problems. The objective of this study is to develop a finite element numerical model to study geosynthetic reinforced pavement. The numerical model will be first verified and calibrated using the results of experimental test sections conducted at LTRC. The model will then be used to perform comprehensive parametric study on the effect of different variables and parameters contributing to the benefits of geosynthetic reinforcement of pavement including stiffness and thickness of AC layer, stiffness and thickness of base layer, tensile modulus and location of geosynthetics and strength of subgarde layer (for low volume to high volume roads). The results of finite element parametric study can be used to quantify the geosynthetic benefits and develop a comprehensive design method for geosynthetic reinforced pavement that can be incorporated into the context of AASHTO 1993 Design Guide and MEPDG.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS
None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
-Conduct literature review relevant to experimental, analytical and finite element analysis of geosynthetic reinforced pavements; -Develop a finite element numerical model to simulate geosynthetic reinforcement of pavements; -Verify the model using the results of in-box and field accelerated load testing on geosynthetic reinforced Pavements; and -Start the parametric study.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Develop a Synthesis on the Application Of PCPT Technology for Geotechnical Engineering Design**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		10/2/2017
Research Project Number:			Completion Date	(original)	
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Murad Abu-Farsakh				

BUDGET STATUS

Total Budget				Estimated 2018-2019 Budget		
Total Cost	(original)	$52,000		**Total**		**$52,000**
	(revised)					
Est. Expended to Date				Salaries		$52,000
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

The piezocone penetration tests (PCPT) has been widely considered for many years as the most useful in situ testing device for subsurface investigation and soil characterization. The CPT is a robust, simple, fast, reliable, and economical test that can provide continuous soundings of subsurface soil with depth. The piezocone penetrometer is capable of measuring the cone tip resistance (qc), sleeve friction (fs), and pore pressures at different locations, depending on the location of the pressure transducer (at the cone face (u1) or behind the base (u2)). These measurements can be effectively utilized for soil stratification and identification, evaluation of different soil properties such as strength and consolidation design parameters of soils, and direct applications to geotechnical engineering design such as the estimation of ultimate pile resistance. The main objective of this research project is to synthesize the various applications of the CPT technology for geotechnical engineering analysis and design. This includes evaluating soil classification, undrained shear strength, pre-consolidation pressure (or OCR), coefficient of lateral earth pressure (ko), constrained modulus (M), small-strain shear modulus (Go), coefficient of consolidation (Cv), relative density and friction angle of sand, direct methods for estimating of ultimate pile resistance, and evaluating the bearing capacity of shallow foundations.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
Start the project with conducting comprehensive literature review on the use of CPT and PCPT technologies on various geotechnical engineering applications such as: evaluating the strength and consolidation properties of soils, evaluating pile resistance, evaluating embankment settlement, etc.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Mitigating Pavement Reflective Cracking Using A Ductile Concrete Interlayer**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		9/1/2018
Research Project Number:		Completion Date	(original)	8/31/2020
Research Agency:	ULL	Completion Date	(revised)	
Principal Investigator:	Qian Zhang			

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$180,000	**Total**		**$100,000**
	(revised)				
Est. Expended to Date			Salaries		$85,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		$10,000
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		$5,000
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

This is a follow-up study to the LTRC TIRE project(18-1TIRE): Development of High Performance Impact Resistant Concrete Mixtures for Crash Barrier Application. The objective of the project is to implement the ductile high-performance fiber reinforced concrete (HPFRC) interlayer technology to improve pavement performance by suppressing reflective cracking in pavement. HPFRC is a special kind of fiber reinforced concrete that exhibits strain hardening behavior and high ductility under tension. Unlike conventional brittle concrete, HPFRC forms multiple tight cracks under tension before final fracture, which leads to high deformation capacity, energy absorption capacity and fracture resistance. With these unique characteristics of HPFRC, it is anticipated that by adding a thin layer of (precast or cast-in-place) HPFRC material between the existing pavement and overlay at the location of existing joints/cracks, reflective cracking can be arrested, and the service life of the overlay will be greatly improved.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Develop research proposal and conduct research activities.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	Support Study to Mitigating Pavement Reflective Cracking Using A Ductile Concrete Interlayer	Project Status:	Proposed
Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

SIO:			Project Start Date:		1/1/2019
Research Project Number:			Completion Date	(original)	12/31/2019
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget			Estimated 2018-2019 Budget		
Total Cost	(original)	$50,000	**Total**		**$30,000**
	(revised)				
Est. Expended to Date			Salaries		$30,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

This is a support study to the main project: Mitigating Pavement Reflective Cracking Using A Ductile Concrete Interlayer. The budget is for LTRC lab technicians to charge for facilitating field testing activities and support.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Start field support activities.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Support Study to Exploration of Drone and Remote Sensing Technologies in Highway Embankment Monitoring and Management**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		7/1/2018
Research Project Number:		Completion Date	(original)	9/30/2019
Research Agency:		Completion Date	(revised)	
Principal Investigator:				

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$162,000	**Total**		**$150,000**
	(revised)				
Est. Expended to Date			Salaries		$132,300
FY 2017 - 2018 Budget			Consumable Supplies & Materials		$6,200
FY Funds	(original)		Equipment	(non-expendable)	$6,500
	(revised)		Travel		$5,000
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

This project is to support LTRC research project (18-1P): Exploration of Drone and Remote Sensing Technologies in Highway Embankment Monitoring and Management. It will hire a sub-contractor for his/her drone and remote sensing technologies to monitor the variation of surface moisture on embankment slopes.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

This project will buy a UAV multispectral camera, UAV thermal camera, and other consumable supplies and conduct lab and field experiments to prove the concept and collect field data.

Title:	**Application of Mechanistic-Empirical Pavement Design Approach into RCC Pavement Thickness Design**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		7/1/2017
Research Project Number:			Completion Date	(original)	6/30/2019
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Zhong Wu				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$200,000		**Total**		**$116,200**
	(revised)					
Est. Expended to Date				Salaries		$93,900
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)	$66,307		Equipment	(non-expendable)	$10,000
	(revised)			Travel		
Est. FY Expenditure		$30,000		Other		$12,300

PURPOSE AND SCOPE

The main objectives of this study are to: investigate factors that may impact RCC pavement performance, including mix design, joint, cracking and environment effects, quantify the impact of different axle load magnitude on RCC fatigue damage, and develop a Mechanistic-Empirical (M-E) based RCC pavement thickness design procedure for LADOTD.
The scope will include: Testing of two 8-in. thick RCC pavement sections over treated and stabilized soil bases using a dual-tire ATLaS30 wheel load of 20 ~ 25 kip; Load-induced and environmental pavement responses to be collected at every 70,000 repetitions under different load magnitudes (9-kip, 16-kip, 20,-kip, 22, kip and 25-kip); Performing of distress survey and NDT tests periodically; Conducting of Laboratory fatigue tests; and Developing of finite element RCC pavement model and M-E RCC thickness design framework.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

Performed comprehensive literature and prepared APT testing plan and instrumentation.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

-Begin loading of the proposed RCC test sections; and
-Conduct laboratory fatigue testing.
-Justification for the equipment budget: To acquire retrofitted sensors (e.g. fiber optic gages) and instrumentation plates to measure dynamic pavement responses of RCC layer (top & bottom) under different loading conditions.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Mechanistic Characterization of Asphalt Overlays for Pavement Rehabilitation and Preservation using Pavement ME Approach**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		7/1/2017
Research Project Number:		Completion Date	(original)	6/30/2019
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Zhong Wu			

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$200,000	**Total**		**$81,500**
	(revised)				
Est. Expended to Date			Salaries		$72,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$88,000	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$30,000	Other		$9,500

PURPOSE AND SCOPE

Asphalt overlays are commonly used as a pavement rehabilitation and preservation technique for rigid and flexible pavement. Despite the widespread use, there remain questions about their life expectancy and potential role in improving pavement's structural capacity and functional properties. The proposed research work aims at facilitating the design approach transition by characterizing the performance of thin and intermediate asphalt overlays using both 1993 AASHTO pavement design and locally-calibrated Pavement ME approaches.
The scope includes: assess performance of the existing and prospective structural overlay sections using local-calibrated Pavement ME; evaluate performance and existing trigger system of pavement preservation overlay using the Pavement ME; develop optimum Pavement ME design inputs for both pavement rehabilitation and preservation overlays; address existing issues encountered by design engineers when using the local-calibrated Pavement ME design.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Performed comprehensive literature; and
-Prepared the research plan.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

-Project selection of existing and prospective overlays for both Pavement Rehabilitation and Preservation;
-Pavement condition survey and NDT data collection; and
-Evaluate the performance of pavement overlay sections using Pavement ME software.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	Development of Roller Compacted Concrete Fatigue Model with and without Fibers for Pavement Design	Project Status:	Proposed
Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

SIO:			Project Start Date:		7/1/2018
Research Project Number:			Completion Date	(original)	6/30/2020
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Moinul Mahdi				

BUDGET STATUS

Total Budget			Estimated 2018-2019 Budget		
Total Cost	(original)	$250,000	**Total**		**$100,000**
	(revised)				
Est. Expended to Date			Salaries		$95,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		$5,000
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The purpose of this project is to build upon existing knowledge for RCC fatigue equations developed by LTRC and ACPA. Beam fatigue tests will be performed at different stress ratios on RCC beam specimens collected from the APT field test sections. This results will be also useful to develop a correlation between the laboratory and APT field fatigue performance of RCC test sections. If necessary, more beam samples will be prepared at the laboratory with different mixture proportions to do further beam fatigue testing to quantify the effect of mixture proportioning on the fatigue performance of RCC. Beam samples with different fiber content will also be prepared and tested for the fatigue model development with fibers. The fatigue equations will then be established with the regression of test results, which will be obtained by testing the beam specimens under different stress ratios and corresponding fatigue number. A finite element model will be developed to simulate the laboratory beam fatigue tests and will be useful to quantify the effect of different RCC mix proportions and fiber quantity on the fatigue performance.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
Start Project.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	Evaluation of Asphalt Rubber and Reclaimed Tire Rubber in Chip Seal Applications	Project Status:	Proposed
Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

SIO:	DOTLT1000244		Project Start Date:		1/2/2018
Research Project Number:	18-5B		Completion Date	(original)	12/31/2019
Research Agency:	LSU		Completion Date	(revised)	
Principal Investigator:	Mostafa Elseifi				

BUDGET STATUS

Total Budget			Estimated 2018-2019 Budget		
Total Cost	(original)	$113,000	**Total**		**$80,000**
	(revised)				
Est. Expended to Date			Salaries		$70,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		$10,000
FY Funds	(original)	$48,300	Equipment	(non-expendable)	
	(revised)	$5,000	Travel		
Est. FY Expenditure		$5,000	Other		

PURPOSE AND SCOPE

The objective of this study is to improve the durability and to extend the life of chip seal applications in Louisiana using asphalt rubber and reclaimed rubber tires in the aggregate layer.
Job mix formula will be developed for rubberized chip seal and will be evaluated in the laboratory. Crumb rubber will be used as a binder modifier as well as part of the aggregate stone. Construction, short-term field performance, and cost-benefit analysis of this new class of asphalt surface treatment will be evaluated to facilitate implementation in pavement preservation activities.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

The project is expected to start on April 1st, 2018.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

The following tasks will be completed in the 2018/2019 fiscal year:
-Task 1: Review of state practices in the use of asphalt rubber chip seals;
-Task 2: Development of job mix formula for rubberized chip seal; and
-Task 3: Laboratory performance evaluation of asphalt rubber chip seals;

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Development of a Cyclic Semi-Circular Bend Test to Evaluate Asphalt Mixture Cracking Resistance at Intermediate Temperature.**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		7/1/2017
Research Project Number:			Completion Date	(original)	6/30/2019
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Louay Mohammad				

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$279,000	**Total**		**$131,761**
	(revised)				
Est. Expended to Date			Salaries		$71,761
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	$60,000
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

Currently, LADOTD specifications for roads and bridges, Section 502, require the use of Semi-Circular Bending (SCB) test as a part of asphalt mixture design (Table 502-6). This test is traditionally conducted in a monotonic, displacement-controlled mode at intermediate temperature to assess the fatigue crack resistance of asphalt concrete. However, fatigue damage is essentially deterioration in material integrity as a result of repeated loading. As such, monotonic loading may not realistically simulate the effects of traffic loading compared to cyclic loading. Notched beams under cyclic loading has been used to investigate fracture propagation characteristics in asphalt concrete. Compared to beam, use of SCB specimens has the advantages of less material use, simpler test set-up, and absence of the sagging problem. It is proposed to use cyclic SCB test coupled with fracture mechanics principles to establish crack propagation laws and quantify material's crack resistance in a more realistic manner.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
-Conduct a comprehensive literature review on notched beam fatigue test, cyclic SCB test, and mechanistic modeling effort related to fatigue cracking; -Acquire and set up a Digital Image Correlation (DIC) measurement system that is optimized for cyclic SCB testing; -Develop and conduct experimental factorial; and -Use finite element analysis to obtain the critical strain energy release rate (Jc) for each cycle. An equipment cost of $60,000 will be used to purchase Digital Image Correlation (DIC) system. This system provides a full-field, non-contact measurement of displacement and deformation of materials in testing. Compared to the traditional use of extensometer, strain gauge, and linear variable differential transducer (LVDT), the DIC system can accommodate very large deformations without concerns on damaging the measuring equipment. DIC also makes it possible to have strain distributions over a full region rather than locally. These features make it particularly appropriate for fatigue/cracking test (such as the cyclic SCB test) in which material is highly strained to induce damage.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Assessment of Long-Term Performance of Louisiana Asphalt Pavements**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		7/1/2017
Research Project Number:			Completion Date	(original)	6/30/2019
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Louay Mohammad				

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$270,000	**Total**		**$128,225**
	(revised)				
Est. Expended to Date			Salaries		$101,725
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		$1,500
Est. FY Expenditure			Other		$25,000

PURPOSE AND SCOPE

Recent LTRC research studies identified effects of various asphalt pavement construction factors on the mixture mechanical properties such as dynamic modulus (|E*|), rut depth (RD) measured by a Hamburg Wheel-Tracking device, indirect tensile strength (ITS), and fracture resistance at intermediate temperature measured by the semi-circular bend (SCB Jc) test.
LTRC study FHWA/LA.15/553 “Evaluation of Warm Mix Asphalt Technology in Flexible Pavements,” evaluated several warm mix asphalt (WMA) technologies that showed WMAs mixtures exhibited similar or better laboratory performance as compared to conventional hot-mix asphalts (HMAs).
LTRC study 14-1B “Effects of Temperature Segregation on Volumetric and Mechanistic Properties of Asphalt Mixtures,” ascertained temperature zones that negatively affected laboratory measured properties such as density, rut depth, and SCB Jc of field cores collected after construction.
The objective of this proposed study is to re-visit field projects included in these two studies to collect field performance data (rutting, cracking, etc.) in order to link and verify laboratory-measured properties to field performances.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
-Review the two previous LTRC studies: LTRC Projects 07-1B and 14-1B; -Obtain PMS data and analyzing: mapping of distress trends in the field projects; -Perform field forensic investigations and distress surveys on select field projects: for verification of PMS distress database and/or to acquire the initial distress data from recently constructed pavement sections; -Obtain field samples (as needed) and conducting follow-up laboratory tests; and -Perform data analysis. The $25,000 cost in the "Other" field is for salaries of DOTD staff participation in this Project.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	Performance Of Asphalt Pavements Containing Recycled Materials Under Accelerated Loading	Project Status:	Proposed
Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

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				

BUDGET STATUS

Total Budget			Estimated 2018-2019 Budget		
Total Cost	(original)	$350,000	**Total**		**$98,000**
	(revised)				
Est. Expended to Date			Salaries		$98,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

Recycling of construction materials in pavements is not only a cost-saving alternative, but also a key element in the sustainability of transportation infrastructure, since it reduces the use of virgin materials and eliminates the needs for landfill areas. One of the most recycled materials in pavements is the Reclaimed Asphalt Pavement (RAP) because of its high compatibility with the newly produce asphalt mixtures. Further, Reclaimed Asphalt Shingles (RAS) have become another promising candidate of recycling also because of the high compatibility with paving asphalt mixtures. The objective of the proposed ALF experiments is to assess the applicability of “green” construction alternatives such as RAS and increased amount of RAP in Louisiana asphalt paving projects. The applicability will be evaluated by comparing the long-term performance of asphalt pavement sections constructed with combinations of RAS and/or RAP to that of conventional pavement under accelerated loading. Five test lanes with various percentages of RAP and/or RAS are proposed to be constructed.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
-Task 1: Conduct Literature review; -Task 2: Develop experimental factorial; -Task 3: Perform laboratory asphalt mixture design and performance testing for mixtures to be used in Task 4; -Task 4: Prepare construction documents for construction of test lanes; and -Task 5: Monitor construction of test lanes as per bid documents.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Develop a Fracture Mechanic Based Test for the Evaluation of Moisture Sensitivity in Asphalt Mixtures**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		
Research Project Number:		Completion Date	(original)	
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Louay Mohammad			

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$220,000	**Total**		**$100,000**
	(revised)				
Est. Expended to Date			Salaries		$99,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		$1,000
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

Moisture induced damage of asphalt mixtures is a significant distress affecting not only the long-term performance of asphalt pavements, but also the safety of traveling public. The issue has been studied extensively for decades by numerous researchers), and standard test methods have been used to evaluate the moisture sensitivity of asphalt mixtures. The modified Lottman test (AASHTO T283-Standard Method of Test for Resistance of Compacted Asphalt Mixtures to Moisture-Induced Damage) is one of the most widely used methods, which uses the tensile strength ratio (TSR) of moisture conditioned specimen to dry specimen to evaluate the moisture sensitivity. Several studies indicated that the TSR is not a consistent and reliable indicator of moisture sensitivity of asphalt mixtures. Moreover, the moisture conditioning procedure of the modified Lottman test have been also criticized for the impracticality and incapability of simulating the moisture damage in field. The objective of this study is to develop a new standardized fracture mechanics-based laboratory test procedure to evaluate the moisture of asphalt mixtures

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

-Conduct literature review;
-Evaluate existing moisture damage test methods;
-Develop laboratory test procedure for moisture damage;
-Develop laboratory experimental plan; and
-Performing laboratory tests.

Title:	**Implementation of Semi Circular Bend Test for QC/QA of Asphalt Mixtures**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		7/1/2016
Research Project Number:		Completion Date	(original)	
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Louay Mohammad			

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$233,000	**Total**		**$128,432**
	(revised)				
Est. Expended to Date			Salaries		$102,432
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		$1,000
Est. FY Expenditure			Other		$25,000

PURPOSE AND SCOPE

Louisiana's Quality Control and Quality Assurance (QC/QA) practice for asphalt mixtures in pavement construction is mainly based on controlling physical properties of plant produced asphalt mixtures that include gradation and asphalt content, voids filled with asphalt, air voids, moisture susceptibility tests, and roadway density. These physical properties have served Louisiana well, however, with the increase use of recycled materials in asphalt mixtures such as crumb rubber modified asphalts, reclaimed asphalt pavement (RAP), and recycled asphalt shingles, Louisiana DOTD has recently proposed specification changes to incorporate the use of the semicircular bend (SCB) test at intermediate temperature (ASTM d 8044, LADOTD TR 330) in order to ensure cracking resistance of the designed mixtures. The objective of this study is to evaluate the SCB test results from several pilot projects selected for the implementation of the new specifications.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

-Task 1: Conduct Literature review;
-Task 2: Identify Field Projects and Material Collection;
-Task 3: Conduct of Laboratory Investigation; and
-Task 4: Perform Preliminary Data analyses.

The $25,000 cost is the Other field is for salaries of LADOTD staff participation in this project

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	LADOTD Plan Development Consultant Contract Process Review	Project Status:	Proposed
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000224**	Project Start Date:		10/1/2017
Research Project Number:	18-6SS	Completion Date	(original)	3/31/2019
Research Agency:		Completion Date	(revised)	
Principal Investigator:				

BUDGET STATUS

Total Budget			Estimated 2018-2019 Budget		
Total Cost	(original)	$150,000	**Total**		**$100,000**
	(revised)				
Est. Expended to Date			Salaries		$95,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		$1,000
FY Funds	(original)	$75,000	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		$4,000

PURPOSE AND SCOPE

In discussions with various Sections of the Louisiana Department of Transportation and Development (LADOTD) responsible for delivering completed plans, many have expressed dissatisfaction with plan quality provided by consultants. The plans may be incomplete or contain errors in quantities. The plans may also not follow LADOTD specific design guidelines or EDSM's. The combination of the aforementioned issues leads to unnecessary delays in project delivery. Consultants have indicated that LADOTD has no transparent and systematic method for documenting and tracking project comments. Consultants receive written and verbal comments independently from all sections involved in the project development process and it is difficult to determine what the priorities are. Consultants have also indicated that past performance ratings are not indicative of work product.

This project will complete a thorough process review of the LADOTD consulting contract process. Input will be gathered from both LADOTD and consultants that perform work for LADOTD in plan development. Potential outcomes of this research project could include but is not limited to the following: (1) A "common" errors checklist for consultants, (2) Evaluation and potential restructuring of the consultant rating system, and (3) Analysis of barriers to expedient delivery including communication, EDSM, design policies, etc. Implementation of favorable results of this study will enable the Department to expedite project plan delivery. Other potential outcomes include less labor required for plan review due to less errors, a better working relationship between the consultants and LADOTD, and an updated, well defined, consultant rating system.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS
The PRC has met and developed a draft RFP. The RFP is under review and should be advertised in April 2018.
FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
To be determined based on the selected proposal.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	Determine Louisiana's Roundabout Capacity	Project Status:	Proposed
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		1/1/2018
Research Project Number:			Completion Date	(original)	6/30/2019
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Julius Codjoe				

BUDGET STATUS

Total Budget			Estimated 2018-2019 Budget		
Total Cost	(original)	$70,000	**Total**		**$45,300**
	(revised)				
Est. Expended to Date			Salaries		$40,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		$500
FY Funds	(original)	$16,000	Equipment	(non-expendable)	$4,800
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

There are several equations and software options used to determine capacity of a roundabout. The Louisiana Department of Transportation and Development (LADOTD) uses a "factor of safety" since roundabouts are relatively new. This project takes actual counts at existing roundabouts and compare to software outcomes. Results will assist LADOTD with determining the best design for roundabouts in Louisiana.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

The proposed activities will be determined once the detailed scope of work is developed with the Project Review Committee (PRC).

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Permitted/Protected versus Protected Left Turns**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		1/1/2018
Research Project Number:		Completion Date	(original)	12/31/2018
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Julius Codjoe			

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$47,000	**Total**		**$40,420**
	(revised)				
Est. Expended to Date			Salaries		$40,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		$420
FY Funds	(original)	$13,000	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

This study investigates safety and operation of existing intersections with protected only, protected/permitted left turns and all of the different geometric features, speeds, etc. The objective is to develop guidance on when protected/permitted is okay versus protected left turns only.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

The proposed activities will be determined once the detailed scope of work is developed with the Project Review Committee (PRC).

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	Development of a CAV Roadmap for Louisiana DOTD	Project Status:	Proposed
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		7/1/2017
Research Project Number:			Completion Date	(original)	6/30/2018
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Julius Codjoe				

BUDGET STATUS

Total Budget				Estimated 2018-2019 Budget		
Total Cost	(original)	$86,000		**Total**		**$30,000**
	(revised)					
Est. Expended to Date				Salaries		$30,000
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)	$86,000		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

The purpose of the project is to develop a road map for connected and automated vehicle (CAV) technology deployment in Louisiana with the main focus on the city of New Orleans. The concept of CAV relies on vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communication technologies, which require a robust platform to allow for not only creativity and interoperability, but also the ability to interact with the complex human behavior especially at automation levels from 0 to 3. This project will investigate and report on what steps other state DOT's are implementing to embrace CAV; what state DOT-specific applications are being developed to use the technology; and how state DOT's are adapting their infrastructure to embrace CAV. It will further make recommendations on steps the Louisiana Department of Transportation and Development(LADOTD) can take to implement CAV on its roadways, using New Orleans as a test case.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
The proposed activities will be determined once the detailed scope of work is developed with the Project Review Committee (PRC). Some preliminary ideas for tasks are as follows: -Perform a thorough review on CAV deployments in other states across the US; -Identify the infrastructure needs for CAV deployment in New Orleans; -Identify the short- and long-term CAV penetration rates in New Orleans; -Develop a road map for CAV technology deployment in New Orleans; -Identify potential stakeholders to support CAV deployment in Louisiana; and -Offer on-going support to DOTD CAV Technology Team.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**LTRC Proposal for the Support of Research and Development in ITS/Traffic**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		7/1/2018
Research Project Number:		Completion Date	(original)	6/30/2021
Research Agency:	ULL	Completion Date	(revised)	
Principal Investigator:	Julius Codjoe			

BUDGET STATUS

Total Budget			Estimated 2018-2019 Budget		
Total Cost	(original)	$500,000	**Total**		**$33,375**
	(revised)				
Est. Expended to Date			Salaries		$22,195
FY 2017 - 2018 Budget			Consumable Supplies & Materials		$500
FY Funds	(original)		Equipment	(non-expendable)	$2,700
	(revised)		Travel		$7,980
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

This project provides long-term professional assistance to the Louisiana Department of Transportation and Development (LADOTD) on traffic-related and Intelligent Transportation Systems (ITS) matters. Research will be conducted on topics from LTRC's biennial project research program, technical assistance requests from LADOTD, and external research solicitations.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

-Recruit a full time Research Associate (RA) to assist with research;
-Develop and manage the ITS lab at LTRC;
-Conduct transportation engineering research projects (as PI or co-PI);
-Develop research problem statements and proposals;
-Supervise Graduate Research Assistants in their execution of research duties;
-Disseminate research findings;
-Promote ITS throughout Louisiana and neighboring Gulf Region through Gulf Region Intelligent Transportation Society (GRITS);
-Travel amount allows for presentation at TRB (PI and RA), Applied Human Factors and Ergonomics conference (PI), and GRITS workshops/annual meeting (PI).

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**LTRC Proposal for the Support of Research and Development in Special Studies**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		7/1/2018
Research Project Number:			Completion Date	(original)	6/30/2021
Research Agency:	ULL		Completion Date	(revised)	
Principal Investigator:	Elisabeta Mitran				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$840,000		**Total**		**$280,000**
	(revised)					
Est. Expended to Date				Salaries		$269,000
FY 2017 - 2018 Budget				Consumable Supplies & Materials		$500
FY Funds	(original)			Equipment	(non-expendable)	$3,000
	(revised)			Travel		$7,500
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

This project provides long-term professional assistance to the Louisiana Department of Transportation and Development (LADOTD) on the management and conduct od research for special studies-related matters. Projects to be managed can include safety, traffic, environmental, and other special studies, as necessary. Research can be conducted on topics from LTRC's biennial project priority list, technical assistance requests from LADOTD, and external research solicitations.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

-Recruit a full time Research Associate (RA) to assist with research and management;
-Manage assigned SS and SA research projects;
-Conduct transportation engineering research projects (as PI or co-PI);
-Develop research problem statements and proposals;
-Supervise Graduate Research Assistants in their execution of research duties;
-Disseminate research findings;
-Promote SS and SA research throughout Louisiana and nationally (as requested)
-Travel amount allows for attendance/presentation at TRB (PI and RA), and other events deemed necessary by LTRC.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	Evaluating Cell Phone Data for AADT Estimation: Phase II	Project Status:	Proposed
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		7/2/2018
Research Project Number:			Completion Date	(original)	6/28/2019
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Julius Codjoe				

BUDGET STATUS

Total Budget			Estimated 2018-2019 Budget		
Total Cost	(original)	$51,496	**Total**		**$51,496**
	(revised)				
Est. Expended to Date			Salaries		$34,396
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	$17,100
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The primary objective of this project is to evaluate the accuracy of Streetlytics Seasonal Variations volume counts and to make a recommendation as to whether the state of Louisiana can adopt this tool to provide accurate AADT for all its roadways, including state and non-state roads. This project particularly compares monthly traffic counts for selected months in 2018.

Non-expendable equipment cost is estimated licensing fees to acquire Streetlytics data.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

-Task 1: Perform Review of Studies to Date;
-Task 2: Collect ground truth traffic volumes;
-Task 3: Acquire corresponding Streetlytics data;
-Task 4: Undertake Comparative Studies; and
-Task 5: Prepare and Submit Final Report.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	Assessing the Economic Benefits of the TIMED Program	Project Status:	Proposed
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		8/1/2018
Research Project Number:			Completion Date	(original)	10/31/2019
Research Agency:			Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget			Estimated 2018-2019 Budget		
Total Cost	(original)	$125,000	**Total**		**$75,000**
	(revised)				
Est. Expended to Date			Salaries		$73,500
FY 2017 - 2018 Budget			Consumable Supplies & Materials		$500
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		$1,000
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The TIMED program was created by Act 16 of the Louisiana Legislature and was voted for by the citizens of the state. The program was designed to enhance economic development in Louisiana through investment in infrastructure. The program consisted of (16) capital improvement projects chosen by lawmakers in a package that included a four cent per gallon gas tax dedicated to funding the design and construction of the identified projects.

Economic development is a nebulous term with no widely accepted criteria to quantify the benefits. Without being able to quantify benefits against a set of established criteria it is very difficult to prioritize projects from a list of needed improvements.

This proposed project plans to evaluate potential criteria to be used as surrogates for economic development. If direct criteria can be established all the better. The criteria will be evaluated against the (14) TIMED projects that have been completed to date to establish a baseline which can be compared against future projects being proposed to enhance economic development.

Establishing criteria for evaluating economic benefits can be used to aid decision-makers when determining the feasibility of undertaking projects identified as improving or creating economic development. In this way, proposed projects can be compared using actual data and analysis.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

To be determined based on results of the RFP.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Transportation Infrastructure Improvement Funding Sources for New Industrial and Expansion Projects in Louisiana**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		11/1/2018
Research Project Number:			Completion Date	(original)	1/31/2020
Research Agency:			Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$100,000	**Total**		**$65,000**
	(revised)				
Est. Expended to Date			Salaries		$64,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		$1,000
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

Industry routinely discusses traffic problems within existing corridors and touts the need for roadway improvements for new or expansion projects before they are built. The requests for improvements rarely come with funding suggestions or contributions. Industry feels as if they are contributing to economic development by bringing jobs to the community and improving the overall tax base. Roadways are not funded by property, sales or income taxes. They are funded from gasoline taxes which do not proportionally increase like the other taxes.
This proposed project seeks to:
-Analyze a test case for a new plant being considered that the state has offered tax incentives;
-Determine the traffic impact, the desired roadway improvements and the cost of those improvements;
-Determine the potential associated increase in gas, income, property and sales tax revenues;
-Assess the company's economic benefit of building the plant, i.e., quantify their income and return on the investment; and
-Recommend potential funding redistribution of tax revenue or private industry funding for the roadway improvements necessary for the project to locate and succeed.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

To be determined based on the results of the RFP.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Comprehensive State of the Practice for Managing Sedimentation in Navigable Waterways**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		9/1/2018
Research Project Number:			Completion Date	(original)	2/29/2020
Research Agency:			Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$150,000	**Total**		**$75,000**
	(revised)				
Est. Expended to Date			Salaries		$73,500
FY 2017 - 2018 Budget			Consumable Supplies & Materials		$500
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		$1,000
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

Annual sedimentation deposits pose serious problems for Louisiana ports. The lack of frequent maintenance dredging of our navigation channels has threatened the commercial viability of coastal and inland ports in Louisiana. Areas in the state's navigable waterways that are regularly dredged are simply moving sediment around, to have the water currents move it back to where it is in the way again; this creates an expensive negative feedback loop. There is currently no motivation for innovative thinking when it comes to keeping our waterways at their authorized dimensions.

This proposed research project could investigate the following potential tasks:

-Develop a grant-funded competition to develop and award 1-3 pilot projects that provide an alternative approach/new technologies to keeping the navigable waterways and ports open at authorized depths;
-Creating a program that sells leases to sediment rich locations in the river (crossings) to mining companies, charge company's/projects fees from depositing in river (408s);
-Build upon the previous work conducted by the UNO Transportation Institute (that focused on the Port of Lake Providence and the Madison Parish Port) to access the varying degrees of how all of Louisiana ports are affected by seasonal sedimentation and what options there are to address these issues including cost and implementation potential);
-Develop alternatives to depositing dredged material in the river - opportunities might include such measures as new borrow areas, bank/batcher deposition, barging, pumping to a mining site, potential for march creation (using fluff); and
-Investigate creating an assistance program that links with creating a dredge disposal location out-of-river (future mining site) - people would apply for receiving the sediments to elevate their homes; sell sediment to developers, etc.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS
None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
To be determine from the results of the RFP.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Competing with other Transportation Modes for State (and Local) Funding**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		3/1/2019
Research Project Number:			Completion Date	(original)	6/30/2020
Research Agency:			Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$100,000	**Total**		**$25,000**
	(revised)				
Est. Expended to Date			Salaries		$24,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		$1,000
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The objective of this research is to provide a “state of the industry” summary of how each state allocates funding across all transportation modes, and then provide guidance for state multimodal departments (i.e. ports, waterways, aviation, commercial trucking, rail, etc.) on how to justify the need for project funding across all modes when compared with other transportation funding needs (highways and bridges).
Using ports as an example, since 1989, the LA Legislature has provided the port priority program with approximately $20 million per year in state TTF funding with the primary goal of improving infrastructure of ports and harbors in Louisiana. Despite a $5 return to the state’s economy for every $1 invested, the investment to Louisiana ports has remained the same. In FY 2016-2017, the LA governor increased the PCDPP funding to $39.4 million. However, the current outstanding balance of unfunded projects on the PCDPP list is nearly $125 million. Ownership and funding mechanisms vary widely nationwide. In Louisiana, ports are independent political subdivisions. Traditionally funding for LA port improvements have come from PCDPP, Capital Outlay, LED, federal funding and the port’s own generated funds. This study would compare funding mechanisms of Louisiana ports to other public ports nationwide and provide guidance on evaluating the needs related to ports versus other modes.
A two-part approach to this project is envisioned. The first part would include an inventory of current practices for each state in allocating transportation funding across all modes. Once the states are identified that are in this competition for funding with other modes of transportation, case studies could be conducted to share success stories in a resulting resource guide. Working from the case studies, an assessment can be made of existing tools and techniques that are being used by individual state multimodal groups to measure success and comparisons. As part of the research, additional tools and techniques (such as a framework for comparison and metrics to measure benefits by) that can be implemented will be further developed by the research. It is important to note that each state manages budgets differently, and not all of the tools and techniques that may be developed will apply in every scenario.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS
None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
To be determined based on the results of the RFP.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	Benefit Cost Analysis of Interstate Roadway Striping in Louisiana	Project Status:	Proposed
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		9/1/2018
Research Project Number:			Completion Date	(original)	2/29/2020
Research Agency:			Completion Date	(revised)	
Principal Investigator:	Kevin Gaspard				

BUDGET STATUS

Total Budget			Estimated 2018-2019 Budget		
Total Cost	(original)	$150,000	**Total**		**$75,000**
	(revised)				
Est. Expended to Date			Salaries		$70,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		$1,000
FY Funds	(original)		Equipment	(non-expendable)	$3,000
	(revised)		Travel		$1,000
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

With money being tight the Louisiana Department of Transportation and Development (LADOTD) needs to determine the most cost effective striping for rural, urban, and suburban interstates. This proposed project will evaluate LADOTD's exiting striping data and collect new data using LTRC's mobile retroreflectometer to determine a benefit-cost ratio for different materials, ADT, roadway types, and minimum retro reflectivity levels.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

To be determined based on the proposal developed by the Louisiana Transportation Research Center (LTRC).

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	The Last Mile: Port Access in a Redeveloping New Orleans	Project Status:	Proposed
Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

SIO:			Project Start Date:		1/1/2019
Research Project Number:			Completion Date	(original)	6/30/2020
Research Agency:			Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget			Estimated 2018-2019 Budget		
Total Cost	(original)	$150,000	**Total**		**$50,000**
	(revised)				
Est. Expended to Date			Salaries		$48,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		$1,000
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		$1,000
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The Port of New Orleans, a vital component of the busiest port complex in the world, is having severe problems with congested freight transportation access, particularly for trucking. This congestion is occurring in the final stretch of access to the Port's uptown facilities, known in the industry as the Port's "last mile." The increasing growth of Port operations along with major redevelopment around Port facilities is severely hampering the current and future needs of the Port, a key economic entity not only for the City of New Orleans but also for the state, the nation, and the global economy.

While the Port's last mile problem is well-known in the industry, an official plan to mitigate the effects of the immense redevelopment restricting the Port's access has yet to be proposed. This research seeks to build upon previous work that has helped to illuminate the immense breadth of factors and stakeholders involved in this problem. With the Port's operations continuing to grow and the redevelopment surrounding it progressing every day, the problem must now be addressed and the details of possible solutions thoroughly worked out. Previous research has offered a range of possible solutions to the Port's freight transportation dilemma, including shifting the bulk of its freight activities to off-peak hours, redesigning traffic management patterns near the Port's access, and especially, expansion of the Port's intermodal capacity away from the uptown facilities that contend with congestion issues. This may involve moving much of the freight burden from trucks to the New Orleans Public Belt Railroad and transporting freight from the Port to a projected France Road Terminal expansion at the Inner Harbor Navigational Canal. The specifics and logistics of such a project and its impacts on neighborhoods and other area stakeholders will need to be fully examined.

Although focusing on the Port's intermodal capacity may be a more viable option, a range of possible answers to the Port's freight transportation dilemma exists. The viability and effectiveness of these solutions vary. More research is necessary to determine exactly how, with so many stakeholders involved, to address this last mile problem and to what degree possible solutions can be integrated to alleviate it. All potential solutions must be thoroughly vetted to produce a multi-faceted strategic plan which allows both the Port and the City to thrive. Moving the Port forward will prove invaluable to the future economic success of the City of New Orleans, the State of Louisiana, and the global economy.

*** NOTE: The RPIC Committee recognized that the NORPC is conducting a related project and this problem statement is envisioned to complement the NORPC efforts, not duplicate them.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS
None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
To be determined.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Visualization and Analyzation of Big Data**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		10/1/2018
Research Project Number:			Completion Date	(original)	9/30/2020
Research Agency:	LSU		Completion Date	(revised)	
Principal Investigator:	Chester Wilmot				

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$200,000	**Total**		**$50,000**
	(revised)				
Est. Expended to Date			Salaries		$44,600
FY 2017 - 2018 Budget			Consumable Supplies & Materials		$500
FY Funds	(original)		Equipment	(non-expendable)	$4,900
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The ITS lab at LTRC has initiated an effort to collect and archive traffic related data (traffic counts from various locations, travel time, video detection data, and possibly others) for consumption of research community and LADTOD. Consequently, data will start accumulating and the size will eventually grow in the future. Those datasets have the characteristics of big data, such as high velocity, broad variety, and vast volume. It is a well-known fact that traditional algorithms that do not account for the volume of big data perform inefficiently and it will become quite a challenge to visualize and analyze data in meaningful and beneficial ways in order to draw conclusions.

The main objective of this research is to identify the variety and volume of data that are anticipated to accumulate on the ITS lab server and then develop algorithms that enable researchers to visualize and analyze data that could be utilized in a meaningful way. The following are the list of tasks that are proposed:
-Identify the different types of data that would be accumulated on the ITS server;
-Conduct a literature search to identify commercially available visualization and analytic tools along with other open source algorithms that are available in academia/research community;
-Check if any of the commercially available software would satisfy the needs;
-Collaborate with the LSU CCT (Center for Computational Technology) Big Data research team (led by Dr. S.J Park) to develop a software tool to analyze the collected datasets;
-Integrate all the algorithms into one software package;
-Demonstrate the function of new software package on gathered data; and
-Document findings.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS
None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
To be determined based on the proposal.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Identifying, Prioritizing and Managing the Largest Risks to the Louisiana DOTD's Mission**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		1/1/2019
Research Project Number:			Completion Date	(original)	6/30/2020
Research Agency:			Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$150,000	**Total**		**$50,000**
	(revised)				
Est. Expended to Date			Salaries		$48,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		$1,000
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		$1,000
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

Nationwide, managing risks at transportation agencies has generally been limited, and thus not very effective at reducing DOT exposure to the potential impacts (typically in the tens of millions of dollars per year per agency).

The following steps will be part of the intended research:
-Comprehensively identify and characterize risks to LA DOTD's mission;
-Quantify the threat (i.e. potential impacts) of not managing these risks;
-Risk "costs" can be in the several tens of $millions per year (per results from the CDOT risk analysis, performed by this researcher) for typical state transportation agencies;
-Categorize risk opportunities so that processes, frameworks, and tools can be implemented to manage these types of risk. Also, determine the costs and benefits of managing the risks;
-Means to consider uncertainties in planning and target-setting processes; specifically, the projection of asset conditions, and the ability to analyze planned versus actual results;
-Ability to consider risk in the formulation and scoping of projects along with performance-based opportunities, including the ability to examine risk priorities using geospatial analysis; and
-Enable risk-based opportunities to be factored into TAM decisions, such as allocation of resources across the highway network, regions, districts, etc.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
To be determined based on the results of the RFP.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	Establishment of the Center for Sustainable Pavement Materials and Technologies	Project Status:	Proposed
Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

SIO:			Project Start Date:		7/1/2016
Research Project Number:			Completion Date	(original)	
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Louay Mohammad				

BUDGET STATUS

Total Budget			Estimated 2018-2019 Budget		
Total Cost	(original)	$150,000	**Total**		**$50,000**
	(revised)				
Est. Expended to Date			Salaries		$50,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The transportation infrastructure in Louisiana includes 60,925 miles of streets, roads, and highways, as well as more than 13,426 bridges. Annually, freight transportation in this system carries over 360 million tons of goods valued at approximately 96 billion dollars; 49% of these goods are transported by trucks. The State economy relies completely on our ability to move goods, fuel, and people freely and inexpensively to every corner of our State. Therefore, efficient operation of the highway network is critical for the viability of the State economy and its growth and productivity. The inadequacy of many of the existing roads and the escalating costs of materials and energy provide a great motivation for exploring new innovative techniques and methods for design, building, and preserving roads that ensure its sustainability. In recent years, many state agencies and the Federal Highway Administration (FHWA) have emphasized the importance of pavement sustainability and recycling. The recent increase in energy prices and the gradual depletion of natural resources have also pressed the need to conserve energy in highway construction activities and to adopt methodologies that would be beneficial to the environment, to the users, and to the industry. Using recycled materials and sustainable methodologies will not only reduce help to overcome the current rapid escalation of the costs for building with new virgin highway materials, but it will also maximize the usage of our existing pavement assets in our rehabilitation strategies. In addition, by incorporating sustainable and recyclable materials and technologies into transportation infrastructure, those structures will have a significant impact on the viability and longevity of our society. The use of sustainable and recycled materials will reduce the amount of materials to be quarried, processed, and transported and protect the environment and scarce natural resources. In addition, energy consumption and greenhouse gas emission are also reduced as a result of the use of sustainable alternatives. Therefore, the proposed center will focus on conducting research into the concepts of sustainable material development and how it can be applied to the practice of pavement design, engineering, and construction.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS
None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
-Establishment of the Center for Sustainable Pavement Materials and Technologies; -Develop proposals for external funding for the center; -Conduct research relevant to the Center theme and DOTD needs; and -Develop and Promote Effective Sustainable Pavement Technologies for managing and preserving the infrastructure.

Title:	**Support Study for the "Assessment and Quantification of Crash Risk Associated with Distracted Driving Behavior: A Naturalistic Driving Study"**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000246**	Project Start Date:		4/1/2018
Research Project Number:	18-7SA	Completion Date	(original)	3/31/2019
Research Agency:	LSU	Completion Date	(revised)	
Principal Investigator:	Osama Osman			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$52,080
	(revised)	
Est. Expended to Date		
FY 2017 - 2018 Budget		
FY Funds	(original)	$52,080
	(revised)	$10,000
Est. FY Expenditure		

Estimated 2018-2019 Budget		
Total		**$42,000**
Salaries		$42,000
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		
Other		

PURPOSE AND SCOPE

The purpose of the parent project (18-3SA) is to perform a comprehensive analysis of SHRP2 NDS data to identify the factors contributing most to the occurrence of crash/near crash events. The specific objectives are to: (1) analyze the SHRP2 NDS events data and identify the crash risk associated with different secondary tasks; (2) analyze the SHRP2 NDS events data and identify the socioeconomic attributes of significant association with the likelihood of drivers' engagement in secondary tasks; (3) identify all factors significantly associated with the likelihood of drivers' engagement in secondary tasks and crash risk; and (4) evaluate the previously outlined index for crash risk quantification.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

The research team developed a research proposal, which was reviewed by the PRC for the parent project 18-3SA,

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

The following activities are proposed:
-Literature Review;
-Identification of Socioeconomic Attributes with Significant Association with Drivers' Engagement in Secondary Tasks;
-Evaluation of the Previously Developed Crash Risk Index; and
-Developing the Final Report.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	Pedestrian Crossings for High Speed Urban Arterials	Project Status:	Proposed
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000225**		Project Start Date:		1/1/2018
Research Project Number:	18-5SA		Completion Date	(original)	6/30/2019
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Julius Codjoe				

BUDGET STATUS

Total Budget				Estimated 2018-2019 Budget		
Total Cost	(original)	$88,000		**Total**		**$74,000**
	(revised)					
Est. Expended to Date				Salaries		$73,500
FY 2017 - 2018 Budget				Consumable Supplies & Materials		$500
FY Funds	(original)	$14,000		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

The purpose of this project is to investigate the best practices for providing (or excluding) pedestrian crossings for high speed (45 mph or greater) urban arterials.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

A Project Review Committee (PRC) meeting was held on February 19, 2018 to discuss the scope of work. Another PRC meeting is scheduled for March 27, 2018 to further discuss and develop the scope of work.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

The proposed activities will be determined once the research proposal is developed.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Intersection on Horizontal Curves: Problems and Potential Solutions**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000217**	Project Start Date:		8/1/2017
Research Project Number:	18-4SA	Completion Date	(original)	1/31/2019
Research Agency:		Completion Date	(revised)	
Principal Investigator:				

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$150,000	**Total**		**$70,000**
	(revised)				
Est. Expended to Date			Salaries		$70,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The purpose of this research is to quantify safety performance at un-signalized intersections on curves on all Louisiana public roads, prioritize sites and identify risk factors that contribute to crashes, and develop possible countermeasures to reduce crashes.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-A PRC meeting was held on November 9,2017 to develop the scope of work; and
-A draft RFP was developed and is under review.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

To be determined based on the research proposal.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	Crash Risk Assessment and Quantification Using the SHRP2 Naturalistic Driving Study Data	Project Status:	Proposed
Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

SIO:	DOTLT1000210		Project Start Date:		7/3/2017
Research Project Number:	18-3SA		Completion Date	(original)	3/29/2019
Research Agency:	LSU		Completion Date	(revised)	
Principal Investigator:	Sherif Ishak				

BUDGET STATUS

Total Budget			Estimated 2018-2019 Budget		
Total Cost	(original)	$153,820	**Total**		**$37,949**
	(revised)				
Est. Expended to Date			Salaries		$37,949
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$85,962	Equipment	(non-expendable)	
	(revised)	$10,000	Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The main focus of this study is to perform a comprehensive analysis using the SHRP2 NDS data to identify the factors contributing most to the occurrence of crash/near crash events. Based on this analysis, the study will identify the crash risk associated with the different secondary tasks and evaluate the crash risk quantification methodology. The specific objectives are:
-To analyze the SHRP2 NDS events data and identify the crash risk associated with different secondary tasks;
-To analyze the SHRP2 NDS events data and identify the socioeconomic attributes of significant association with the likelihood of drivers' engagement in secondary tasks;
-To identify all factors significantly associated with the likelihood of drivers' engagement in secondary tasks and crash risk; and
-To evaluate the previously outlined methodology for crash risk quantification.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-A research proposal was developed by the research team;
-The research proposal was reviewed by the PRC; and
-The contract is pending approval.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

The following activities are proposed:
-Data Extraction and Preparation;
-Identification of Secondary Tasks with Significant Impact on Crash Event;
-Valuation of the Previously Developed Crash Risk Index; and
-Preparation of final report.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	Louisiana's Alcohol-Impaired Driving Problem: An Analysis of Crash and Cultural Factors	Project Status:	Proposed
Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

SIO:	DOTLT1000209		Project Start Date:		9/1/2017
Research Project Number:	18-2SA		Completion Date	(original)	9/30/2019
Research Agency:			Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget			Estimated 2018-2019 Budget		
Total Cost	(original)	$200,000	**Total**		**$77,049**
	(revised)				
Est. Expended to Date			Salaries		$30,509
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$80,000	Equipment	(non-expendable)	
	(revised)	$58,923	Travel		$3,126
Est. FY Expenditure			Other		$43,414

PURPOSE AND SCOPE

The objective of this research is to use multiple risk factors analysis approaches to identify underlying individual, community, and cultural influences that contribute to drinking and driving in Louisiana.

The specific objectives are to:
-Synthesize and document existing resources that agencies can use to assess alcohol-impaired driving;
-Identify influential individual, community, and cultural factors that contribute to impaired driving in Louisiana; and
-Provide a final detailed report with interactive web tool for systemic risk assessment.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-A PRC meeting was held on August 2, 2017 to develop the scope of work and request for proposal (RFP);
-Five proposals were received by LTRC in response to the RFP;
-Another PRC meeting was held on February 5, 2018 to review the proposals; and
-The research team for performing this research was selected and the contract is pending approvals.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

The following tasks are proposed:
-Review literature and data systems;
-Identify the risk factors using a systemic approach;
-Create and administer a survey based on the identified risk factors;
-Develop an interim report; and
-Qualitative research project to investigate identified risk factors of sub-groups.

$40,596 of the "other" ($43,414) amount is for a subcontract to ULL.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Young Driver Crashes in Louisiana: Understanding the Contributing Factors to Decrease the Numbers**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		8/1/2018
Research Project Number:			Completion Date	(original)	7/31/2020
Research Agency:			Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$175,000	**Total**		**$75,000**
	(revised)				
Est. Expended to Date			Salaries		$75,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The purpose of this study is two-fold: (1) to focus on identifying underlying contributing factors associated with young driver crashes and (2) to evaluate Louisiana's GDL program. The research will be designed to perform extensive analysis on existing crash data to identify age-related as well as experience-related factors associated with young driver crashes in Louisiana. Secondly, the research study should evaluate how Louisiana's GDL program is implemented and compliance with GDL restrictions.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

To be determined based on the research proposal.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Reduce Pedestrian Fatal Crashes in Louisiana by Improving Lighting Conditions**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		10/1/2018
Research Project Number:		Completion Date	(original)	3/31/2020
Research Agency:		Completion Date	(revised)	
Principal Investigator:				

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$125,000	**Total**		**$50,000**
	(revised)				
Est. Expended to Date			Salaries		$50,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The purpose of this research is to investigate the relationship between lighting conditions and pedestrian fatal and severe crashes and how to reduce them by improving lighting conditions in Louisiana. The research will identify the crash locations, explore existing lighting conditions at these locations, identify the options to improve lighting conditions, and conduct the cost/benefit analyses.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

To be determined based on the research proposal.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**A Systematic Assessment on Pedestrian Walking Environment for Future Planning**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		7/1/2018
Research Project Number:			Completion Date	(original)	6/30/2019
Research Agency:	LSU		Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$30,000	**Total**		**$30,000**
	(revised)				
Est. Expended to Date			Salaries		$28,800
FY 2017 - 2018 Budget			Consumable Supplies & Materials		$1,000
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		$200
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The objective of this exploratory research (to be conducted by Dr. Ruijie Bian of LTRC) is to:
-Systematically assess the pedestrian walking environment from 3 aspects: the need for investment, the support for investment, and the benefit of investment;
-Generate a composite score to express overall assessment; and
-Demonstrate its use in East Baton Rouge Parish.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

-Task 1: Literature Review;
-Task 2: Data Collection;
-Task 3: Conduct assessment;
-Task 4: Area identification; and
-Task 5: Final Report.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	Evaluation of Pedestrians/Cyclists Counting Algorithm	Project Status:	Proposed
Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

SIO:			Project Start Date:		7/2/2018
Research Project Number:			Completion Date	(original)	6/28/2019
Research Agency:			Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget			Estimated 2018-2019 Budget		
Total Cost	(original)	$50,448	**Total**		**$50,448**
	(revised)				
Est. Expended to Date			Salaries		$25,878
FY 2017 - 2018 Budget			Consumable Supplies & Materials		$4,410
FY Funds	(original)		Equipment	(non-expendable)	$18,900
	(revised)		Travel		$1,260
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The primary objective of this study is to evaluate Numina's capability of accurately detecting, tracking, and counting pedestrians and cyclists under varying conditions (weather, time of day, and density). It is anticipated that the results will lay the foundation for the development of a more robust automated system that will replace manual counting statewide.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

-Task 1: Perform Literature Review
-Task 2: Confirm Test Locations
-Task 3: Mount Data Collection Devices
-Task 4: Collect Pedestrian and Cyclist Data
-Task 5: Undertake Comparative Studies
-Task 6: Prepare and Submit Final Report

Non-expendable equipment cost relates to cost of acquiring and deploying Numina products. Current estimates allows three devices to be rotated twice on different sites.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Evaluation of Switch Grass Filter Socks to Mitigate Pollution Resulting from Highway Storm Water and Construction Runoff**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000270**		Project Start Date:		7/1/2018
Research Project Number:	19-5TIRE		Completion Date	(original)	6/30/2019
Research Agency:	ULL		Completion Date	(revised)	
Principal Investigator:	Prasanthe Buchireddy				

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$29,907	**Total**		**$29,907**
	(revised)				
Est. Expended to Date			Salaries		$24,644
FY 2017 - 2018 Budget			Consumable Supplies & Materials		$5,000
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		$263
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

This project will evaluate the effectiveness of switch grass stock to remove contaminants resulting from highway storm water runoff.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Start and complete the project.

Title:	**A Model-Based Approach to Detect Zones of Inaccessibility during Extreme Flood Events: A Case Study in the Teche-Vermilion Watershed of South-Central Louisiana**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000269**		Project Start Date:		7/1/2018
Research Project Number:	19-4TIRE		Completion Date	(original)	6/30/2019
Research Agency:	ULL		Completion Date	(revised)	
Principal Investigator:	Robert Miller				

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$27,637	**Total**		**$27,637**
	(revised)				
Est. Expended to Date			Salaries		$27,637
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

This project aims to develop a general framework to detect zones of inaccessibility (ZOI's are areas that are inaccessible due to rising floodwaters) based upon available flood elevation data in complex low-gradient urbanized watersheds. This project will assist in determining a framework for which to determine a decision making tool for draining improvements.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Start and complete the project.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	Louisiana Interstate Right of Way Utilization for Renewable Energy Systems	Project Status:	Proposed
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000268**		Project Start Date:		7/1/2018
Research Project Number:	19-3TIRE		Completion Date	(original)	6/30/2019
Research Agency:	ULL		Completion Date	(revised)	
Principal Investigator:	Emmanuel Revellame				

BUDGET STATUS

Total Budget			Estimated 2018-2019 Budget		
Total Cost	(original)	$30,000	**Total**		**$30,000**
	(revised)				
Est. Expended to Date			Salaries		$28,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		$2,000

PURPOSE AND SCOPE

The purpose of this project is to identify the potential for ROW utilization of Louisiana's interstate transportation system for implementation of renewable energy systems.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Start and finish the project.

The $2000 in other: $770 - GIS Software and $1230 - Computer

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	Smartphone Photogrammetry for Rapid Prediction of Debris Volumes after Extreme Events	Project Status:	Proposed
Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

SIO:	DOTLT1000267		Project Start Date:		7/1/2018
Research Project Number:	19-2TIRE		Completion Date	(original)	6/30/2019
Research Agency:	LSU		Completion Date	(revised)	
Principal Investigator:	Navid Jafari				

BUDGET STATUS

Total Budget			Estimated 2018-2019 Budget		
Total Cost	(original)	$30,000	**Total**		**$30,000**
	(revised)				
Est. Expended to Date			Salaries		$28,500
FY 2017 - 2018 Budget			Consumable Supplies & Materials		$1,500
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

To develop a low-cost, rapid, and efficient smartphone app to calculate the volume of waste debris piles by the Louisiana Department of Transportation and Development (LADOTD), cities, and parishes.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Start and finish the project.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Development of Audio-based Process Monitoring and Safety Surveillance Systems for Roadway and Bridge Construction**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000266**	Project Start Date:		7/1/2018
Research Project Number:	19-1TIRE	Completion Date	(original)	6/30/2019
Research Agency:	LSU	Completion Date	(revised)	
Principal Investigator:	Yong-Cheol Lee			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$29,998
	(revised)	
Est. Expended to Date		
FY 2017 - 2018 Budget		
FY Funds	(original)	
	(revised)	
Est. FY Expenditure		

Estimated 2018-2019 Budget		
Total		**$29,998**
Salaries		$24,998
Consumable Supplies & Materials		$1,000
Equipment	(non-expendable)	
Travel		$4,000
Other		

PURPOSE AND SCOPE

Develop an audio-based process monitoring and safety surveillance system for roadway and bridge construction.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Start and complete the project.

FHWA

Part II SPR Funded Research Program

POOLED FUND
LOUISIANA
LEAD STATE RESEARCH

Title:	**Design and Analysis Procedures for Asphalt Mixtures Containing High-RAP Contents and/or RAS**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: Pooled Fund: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000002**		Project Start Date:		11/1/2014
Research Project Number:	14-5PF		Completion Date	(original)	10/31/2017
Research Agency:	LTRC		Completion Date	(revised)	10/31/2018
Principal Investigator:	Louay Mohammad				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$306,812		**Total**		**$100,000**
	(revised)	$506,812				
Est. Expended to Date		$397,312		Salaries		$98,000
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)	$90,500		Equipment	(non-expendable)	
	(revised)			Travel		$2,000
Est. FY Expenditure		$905,000		Other		

PURPOSE AND SCOPE

Despite recent advancements in the design of asphalt mixtures containing Reclaimed Asphalt Pavement (RAP), many states are still cautious in their regulations to avoid durability problems related to the recycling process. In many states, RAP is currently not allowed in highest-class asphalt mixtures and in polymer-modified asphalt products. In addition, high percentages of RAP exceeding 25% are not commonly used in practice. On the other hand, many state agencies are taking a more aggressive approach by considering increasing the allowable percentages of RAP in asphalt mixture to take full advantage of this promising technology. For instance, up to 50% RAP has been used in some asphalt mixtures, which produced an acceptable level of performance. In addition, reclaimed asphalt shingles (RAS), defined by The American Association of State Highways and Transportation Officials (AASHTO) MP 15-09 “Standard Specification for Use of Reclaimed Asphalt Shingles as an Additive in Hot-Mix Asphalt (HMA)” as “any type of waste roofing asphalt shingles that have been processed into a recyclable product,” have become another promising candidate of recycling, also because of the high compatibility with paving asphalt mixtures. However, to ensure successful use of RAP and/or RAS, confidences in the mixture design procedure require addressing many concerns related to the interaction between virgin and recycled materials and durability of the produced mixture. Current AASHTO recommendations make it difficult to design asphalt mixtures with high-RAP and/or RAS contents. Modifications to the current specifications are needed to assure agencies that satisfactory performance will result from the use of high-RAP and/or RAS content asphalt mixes. The objectives of this study are to 1) establish mechanistic test criteria for asphalt mixtures (warm and hot) containing high-RAP content and/or reclaimed asphalt shingles (RAS); and 2) propose asphalt mixture specifications that incorporate the mechanistic test criteria as tested on plant produced specimen and/or roadway cores based on the results of the study.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS
-Continued communications with participating states personnel from Florida (Mr. Wayne Rilko), Colorado (Mr. B. Schiebel, Mr. Michael Stanford), and Louisiana (Dr. Sam Cooper, III). The purpose of these communications are to provide assistance and guidance in identifying the second field projects from each state as per the test factorial. The first Project identification and mixture acquisition have been completed in collaboration with FDOT and CDOT. Field cores from Florida and Colorado projects have been acquired; -Laboratory Experiment: Mixtures of all ten lanes from FHWA-ALF have been evaluated using dynamic modulus test, S-VECD characterization, semi-circular bend (SCB) test, Texas Overlay test, beam fatigue test, and indirect tension (IDT) test. Dynamic modulus test, indirect tension (IDT), Texas Overlay, S-VECD characterization, and semi-circular bend (SCB) have been completed for the Colorado and Florida mixtures. Asphalt binder extraction and mechanistic characterization have been completed on the ten ALF lanes. For all asphalt binder, the mechanical characterization program includes PG grading, dynamic shear modulus, MSCR, and LAS tests. Binders have been extracted for the CO and FL mixtures and testing is underway for rheology and fatigue characterization; and -Preliminary data analyses were performed and results of the study are included in a paper submitted to the 97th Transportation Research Board (TRB) Annual Meeting for presentation and publication consideration. This paper in included in the annual TRB program and accepted for publication.
FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
-Continue Identification of Field Projects and Material Collection; -Conduct laboratory experiment on mixtures collected from field projects; -Perform data analysis; and -Prepare draft final report.

FHWA

LTAP Funded Program

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Local Technical Assistance Program (LTAP)**	**Project Status:**	**Proposed**

Funding Source:	**LTAP: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000256**		Project Start Date:		1/1/2019
Research Project Number:	19-LTAP		Completion Date	(original)	12/31/2019
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Marie Walsh				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$686,318		**Total**		**$686,318**
	(revised)					
Est. Expended to Date				Salaries		$445,005
FY 2017 - 2018 Budget				Consumable Supplies & Materials		$24,000
FY Funds	(original)			Equipment	(non-expendable)	$8,000
	(revised)			Travel		$23,313
Est. FY Expenditure				Other		$186,000

PURPOSE AND SCOPE

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.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Sponsored two Louisiana Parish Engineers and Supervisors Statewide technical conferences for over 160 participants;
-Delivered two LPA Core Training classes to 80 participants; two LPA Project Development and Delivery training workshops for LPA Responsible Charge to over 100 people;
-Co-sponsored multi day EDC Pavement Preservation workshop sin Baton Rouge and Alexandria for over 100 participants and nearly 700 contact hours;
-Conducted 19 Tractor mower safety classes in 15 statewide locations for approximately 350 participants and included new tailgate safety materials and coaching;
-Sponsored Engineering Ethics required training for APWA Branches in Baton Rouge and Covington;
-Conducted 10 sessions of Basic of Work Zone Safety to over 150 local agency participants;
-Presented one RS#4 Temporary Traffic Control for local agencies in New Orleans to 30 attendees;
-Presented eight RS#9: The Road to Better Signing to over 160 local agency personnel;
-Presented RS#3: Drainage: The Key to Roads that last in five locations to over 100 local agency participants;
-Coordinated Trenchless Technology Workshop with approximately 80 participants;
-Conducted four stakeholder partnering sessions in North and South Louisiana and completed report with recommendations for long and short term opportunities to improve LPA project delivery project. EDC/STIC funds were utilized;
-Coordinated efforts of FEMA/FHWA/GOHSEP and DOTD to provide outreach and training to local agencies on pre-event documentation and damage assessment processes; and
-Implemented technical assistance contract and training on asset management for local agencies with plan to link to ER damage assessment requirements; pavement preservation activities; and related DOTD data management efforts.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Equipment (Non-Expendable):
-Computers – New Upgrade, Projection Equipment - $8,000.

LTAP Other:
-Professional Services (Special Projects) - $40,000;
-Course material production (printing, copying, binding, etc.) - $11,000;
-Professional services (instructors) - $60,000; and
-Professional services (LPA on Line/CBT Module) – $75,000.

Proposed Activities:
-Distribute asset management and pavement condition assessment on line training module's and present two classroom training events to support CBT resources;
-Implement asset management and data collection technical assistance program and coordinate currently unrelated local attempts to collect and manage asset data;
-Conduct follow-up meetings in North and South Louisiana on stakeholder partnering activities and future steps;
-Revise and deliver basic asphalt Roads Scholar class;
-Conduct three day LPA training series in Baton Rouge at a minimum;
-Develop and deliver Asset assessment training to prepare for emergency damage assessment to locals on an annual basis.
-Plan and conduct two pavement preservation for local agency workshops as part of EDC 4 efforts. Locations in north or central and south Louisiana anticipated; and
-Plan and conduct new Safety Inspection of Local Bridges in cooperation with DOTD's Bridge Inspection and Maintenance Department.

FHWA

STP Funded
Technology Transfer &
Education Program

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Technology Transfer Registration Fees**	**Project Status:**	**Proposed**
Funding Source:	**STP: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000259**	Project Start Date:		7/1/2018
Research Project Number:	19-TTRF	Completion Date	(original)	6/30/2019
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	MaryLeah Coco			

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$100,000	**Total**		**$100,000**
	(revised)				
Est. Expended to Date			Salaries		
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		$100,000

PURPOSE AND SCOPE

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.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

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.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

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 2018-2019

Title:	**AASHTO PONTIS Agreement**	**Project Status:**	**Proposed**
Funding Source:	**STP: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000263**	Project Start Date:		7/1/2018
Research Project Number:	19-PONTIS	Completion Date	(original)	6/30/2019
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	MaryLeah Coco			

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$125,000	**Total**		**$125,000**
	(revised)				
Est. Expended to Date			Salaries		
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		$125,000

PURPOSE AND SCOPE

AASHTO PONTIS Agreement.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

AASHTO PONTIS Agreement.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Other:
AASHTO PONTIS Agreement.

Proposed Activities:
AASHTO PONTIS Agreement.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**LA DOTD CO-OP Program**	**Project Status:**	**Proposed**
Funding Source:	**STP: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000260**	Project Start Date:		7/1/2018
Research Project Number:	19-COOP	Completion Date	(original)	6/30/2019
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	MaryLeah Coco			

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$200,000	**Total**		**$200,000**
	(revised)				
Est. Expended to Date			Salaries		$200,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The Louisiana Department of Transportation and Development (LADOTD) Co-op program is a cooperative endeavor between the LADOTD 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. This program is intended to enhance the educational process by providing opportunities for participants too explore their interest in transportation engineering through practical experience. This program also provides opportunities for LAOTD to evaluate participants of this program as potential employees.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-17 students participated in the Co-op programs at various LADOTD districts/sections throughout Louisiana.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

-Place approximately 15 students in various LADOTD districts/sections across the state;
-Continue end of semester presentations;
-Retain students in the Co-op program; and
-Attend engineering related career fairs held throughout the state.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**LTRC Student Worker Program**	**Project Status:**	**Proposed**
Funding Source:	**STP: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000259**	Project Start Date:		7/1/2018
Research Project Number:	19-2TT	Completion Date	(original)	6/30/2019
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	MaryLeah Coco			

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$147,600	**Total**		**$147,600**
	(revised)				
Est. Expended to Date			Salaries		$147,600
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

To pay salaries for undergraduate students employed to provide support in fulfilling necessary job tasks on various Louisiana Transportation Research Center (LTRC) projects.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

Thirty (30) undergraduate students were employed by LTRC to provide support in fulfilling necessary job tasks on various LTRC projects.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Continue to pay for salaries for undergraduate students employed to provide support to various LTRC projects.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Workforce Development Contracts**	**Project Status:**	**Proposed**
Funding Source:	**STP: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000257**		Project Start Date:		7/1/2018
Research Project Number:	19-1WDC		Completion Date	(original)	6/30/2019
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$3,833,000		**Total**		**$3,833,000**
	(revised)					
Est. Expended to Date				Salaries		$1,225,000
FY 2017 - 2018 Budget				Consumable Supplies & Materials		$110,000
FY Funds	(original)			Equipment	(non-expendable)	$125,000
	(revised)			Travel		$40,000
Est. FY Expenditure				Other		$2,333,000

PURPOSE AND SCOPE

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 (LADOTD) employees to attend workshops, courses, and conferences to enhance their professional and technical development.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Instructed over 514 classes with over 6,300 attendees;
-17 students participated in the Co-op Program at various LADOTD districts/sections throughout Louisiana;
-3 Co-op students hired into the Department after graduation: District 03 – Lafayette, Section 24 - Road Design, Section 33 – Training and Technology Transfer – ERDP;
-Hosted at TTEC end-of-the semester Co-op presentations and video-conferenced in outlying students. Increased participation attendance by advertising department wide, universities and with the LTRC Policy Committee;
-9 EI's were hired into the ERDP and rotated through various LADOTD sections and districts throughout Louisiana;
-3 ERDP EI's successfully hired into LADOTD districts or sections: Section 19 –Research (LTRC), Section 24 – Road Design, Section 67 – Pavement and Geotechnical Services;
-5 ERDP EI's are still in the rotation;
-Member of TRB Committee ABG40;
-Friend of TRB Committee ABG30;
-Friend of TRB Committee ABG20,
-Member of TRAC and RIDES Advisory Board;
-President of National Transportation Training Directors;
-Member of LTRC 16-5SA "Highway Work Zone Construction Safety Research and Training: A Driving Simulator Study";
-Member of TRB Committee B0002;
-Member of TRB, TRT Subcommittee;
-Member of SLA Transportation division;
-Member of ETKN;
-Member of AASHTO RAC CCT TKN (formerly AASHTO RAC TKN);
-Continue course development for the following topics: Contract Negotiations – target date for completion is June 30, 2018; Critical Conversations and Being a Change Agent–work in progress;
-FHWA Grant awarded for $52,645. Implementation and evaluation of TRAC and RIDES Programs in Schools in the State of Louisiana. Federally funded grant – 8/1/2017-12/31/2017;
-Developing training videos for the leadership development institute;
-Researching multisite cloud based video conference solution;
-Performing maintenance, firmware updates, and system tuning as needed in the two classrooms, executive conference room and auditorium;
-Upgraded the Auditorium (Room 100) to an all-digital format, Crestron Control system, Crestron 16x16 switcher, Crestron DVP-HD for streaming video, new mounts, and upgraded audio system, video conferencing cameras, and cables;
-Replaced emergency hallway lighting batteries;
-Replaced batteries in three RAC mounted UPS systems;
-Programming new system for LTRC Administration Building conference room;
-Security system maintenance – RAID drives replaced in security camera system,
-Attended Crestron SMART GRAPHICS TRAINING (CTI— SG);
-Conducted the 2017 5-Day National Transportation Training Directors conference in Point Clear, Alabama;
-The 2018 Louisiana Transportation Conference was held February 25-28 2018 at The Raising Canes River Center Baton Rouge, LA – 1,877 attendees;
-Negotiated hotel accommodations for the 2018 Louisiana Transportation Conference held February 25-25, 2018 Belle of Baton Rouge and Hilton Inn totaled over 900 Room Nights;
-Transportation Safety Summit (LA DOTD Highway Safety) - November 2017 – Baton Rouge, LA – Crowne Plaza Baton Rouge – Sent our RFP and negotiated hotel for meeting space, overnight rooms, food/beverage, etc. – Approximately 350 people;
-Sent RFP and negotiated hotel meeting space, overnight rooms, food/beverages, etc. for the National LTAP/TTAP Association 2018 Annual Conference (LTAP) to be held at the Hotel Monteleone in New Orleans, LA – July 2018 – Approximately 200 people;
-Added 11,500 items to the LTRC Library online catalog;
-2017 – 2019 Louisiana Chapter of SGMP Board of Directors – 1st Vice President;
-2017 – 2019 Louisiana Chapter of SGMP Board Officers – Immediate Past President;
-Attend 2018 SGMP National Education Conference – Norfolk, Virginia;
-Hired two (2) new student workers; and
-Partnering with LSU with their Speed Geeking Event.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
Budget Justification for Equipment: -15k – 20k TTEC Room 100 Wireless Mic Upgrade / Re-Fit to comply with FCC reallocation of frequency bands; -25k – 30k Replace old screens in 4 smaller rooms; -15k – 25k Rack mounted phone conferencing solution for training rooms; -12k – 15k Added Cameras to Security System (5); -20k – 30k Miscellaneous Equipment Repair / Replacement (Crestron and AV Rack equipment, Displays, Projectors, projector lamps, cables, adapters, monitors, iPads, control screens, slide advancers, connectors, etc.). Budget Justification for Other: contracts for external workforce development. -Continued additions of library materials into the online catalog, -Conduct 5-Day National Transportation Training Directors conference in Chattanooga, Tennessee for approximately 75 participants and 10 vendors; -Complete development of “Being a Change Agent” for Section 17, QCIP; -Complete development of “Crucial Conversations”; -Secure contract for meeting space and overnight hotel accommodations for the 2020 Louisiana Transportation Conference – March 2020 – Location TBD – Approximately 1,600 participants and 80 vendors; -2017 – 2019 Louisiana Chapter of SGMP Board of Directors 1st Vice President; -2017 – 2019 Louisiana Chapter of SGMP Board Officers – Immediate Past President; -Place approximately 15 students in the Co-op Program in various LA DOTD districts/sections across the state; -Hire approximately 6 employees to participate in the ERDP; -TRAC and RIDES June Workshop- Registered: RIDES-12; -Organizational Culture – 47 in 4 classes; -Foundations of Leadership Development – 42 in 5 classes; -Emotional Intelligence – 42 in 5 classes; -Transformational Leadership – 19 in 2 classes; -Conduct, host, and present NLTAPA – Conference in New Orleans; -Continue to schedule Microsoft Office Course and CADD courses; -Continue to conduct training through NHI and FHWA; -Continue to conduct courses as needed and/or requested; -Fulfill individual registration requests; -Continue system upgrade in LTRC conference room in the Administration Building; -Attend Creston 201; -Wireless microphone user system upgrade to comply with FCC regulations in the auditorium (Room 100); and -Continue work on cloud based video conference solution.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Workforce Development**	**Project Status:**	**Proposed**
Funding Source:	**STP: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000255**	Project Start Date:		7/1/2018
Research Project Number:	19-1WD	Completion Date	(original)	6/30/2019
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	MaryLeah Coco			

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$1,221,759	**Total**		**$1,221,759**
	(revised)				
Est. Expended to Date			Salaries		$1,201,759
FY 2017 - 2018 Budget			Consumable Supplies & Materials		$10,000
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		$10,000
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

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 (LADOTD) 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.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Revising Construction Specialty Area and Re-Certification tests and putting into web-based testing platform;
-Completed second edition of The Mile Marker training newsletter;
-Completed Profiler Operator Certification training package;
-Completed How DOTD Works informational video;
-Converted Grammar 1 and 2 courses to web-based format;
-Completed revision of Asphaltic Concrete Paving Inspection course;
-Implemented 16 Maintenance Equipment Operation and Safety videos;
-Taught 2 Highway Plan Reading Part 1 courses and 2 Highway Plan Reading Part 2 classes;
-Taught 4 Project Management classes;
-Taught 3 Facilitation Skills classes;
-Taught 1 Superpave Mix Design and Analysis class;
-Taught 1 Structural Concrete Inspection Class;
-Managed the Structured Training Program for the department; and
-Managed the Construction Certification Program and awarded 125 construction certifications and 140 re-certifications.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
-Continue to meet with principal customers to prioritize needs to develop training courses, performance evaluations, and safe operating checklists; -Continue to develop Construction, Materials, and Maintenance courses; -Continue to refine Structured Training Programs and processes in LEO/LSO; and -Continue to develop web-based courses where appropriate.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Support for Senior Project Courses**	**Project Status:**	**Proposed**

Funding Source:	**STP: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000262**		Project Start Date:		7/1/2018
Research Project Number:	19-1TT		Completion Date	(original)	6/30/2019
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	MaryLeah Coco				

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$37,500	**Total**		**$37,500**
	(revised)				
Est. Expended to Date			Salaries		
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		$37,500

PURPOSE AND SCOPE

To provide support for senior project engineering courses up to a maximum of $7,500/university/year.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

Participation from two universities: Louisiana Tech (1 project) and the University of Louisiana at Lafayette (1 project).

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Other:
To provide support for senior project engineering courses up to a maximum of $7,500/university/year.

Proposed Activities:
Continue to provide support for senior project engineering courses.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	Technology Transfer Program and Operations (DOTD)	Project Status:	Proposed
Funding Source:	**STP: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000261**		Project Start Date:		7/1/2018
Research Project Number:	19-1TSQ		Completion Date	(original)	6/30/2019
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	MaryLeah Coco				

BUDGET STATUS

Total Budget				Estimated 2018-2019 Budget		
Total Cost	(original)	$338,656		**Total**		**$338,656**
	(revised)					
Est. Expended to Date				Salaries		$338,656
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

The objectives of this study are to:
-Disseminate information on new technologies and methodologies to the Louisiana Department of Transportation and Development (LADOTD) and other transportation-oriented;
-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.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS
-Publication chair for 2018 Transportation Conference; -Sponsorship coordinator for 2018 Transportation Conference; -Assisted in all 2017-2018 Transportation Conference committees; -Published 4 Tech Today Newsletters; -Published 2017 Annual Report; -Set up online registration for 24 NHI/other training, and 9 LTAP training classes; -Maintained LTAP website; -Maintained Safety Center web pages; -Maintained the LTRC website; -Maintained 2018 LTC Website and Mobile Site; -Photographed all LTRC events; -Maintained the LTRC Mobile App; -Filmed and produced 12 DOTD informational videos; -Filmed and produced 6 Transportation Talk videos featuring Secretary Wilson; -Edited 5 LTRC videos; -Published 10 Project Capsules; -Published 9 Final Reports; -Published 1 Tech Assistance Reports; and -Modified and reworked article for Roads and Bridges magazine.
FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
-Assist in development of all publications, website, registration, e-commerce and mobile application; -Implement new online registration system; -Develop training for new online registration system; -Continue maintenance of LTRC, LTAP and Safety Center website; -Continue to edit and distribute project capsules, technical summaries, final reports and technical assistance reports; -Publish 4 Tech Today newsletters; -Photograph all LTRC events; -Video all LTRC events; -Readily available for any special assistance requested from Secretary's office; -Attend and Assist the NLTAPA Conference; and -Attend professional development and leadership training.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**DOTD Staff Support for Workforce Development**	**Project Status:**	**Proposed**
Funding Source:	**STP: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000264**	Project Start Date:		7/1/2018
Research Project Number:	19-1SWD	Completion Date	(original)	6/30/2019
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	MaryLeah Coco			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$1,520,000
	(revised)	
Est. Expended to Date		
FY 2017 - 2018 Budget		
FY Funds	(original)	
	(revised)	
Est. FY Expenditure		

Estimated 2018-2019 Budget		
Total		**$1,520,000**
Salaries		$1,520,000
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		
Other		

PURPOSE AND SCOPE

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 (LA DOTD) personnel by non-LTRC employees. This project will not be utilized by LTRC's Section 19 or 33.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Course development and delivery of LPA training;
-LA DOTD employee structured training;
-Human Resources training, maintenance related training; and
-Meeting involvement related to LA DOTD's Transportation Training Curriculum Council.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

-Course development and delivery of LPA training;
-LA DOTD employee structured training;
-Human Resources training, maintenance related training; and
-Meeting involvement related to LA DOTD's Transportation Training Curriculum Council.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Technology Transfer & Research Implementation Support for Louisiana Universities**	**Project Status:**	**Ongoing**

Funding Source:	**STP: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**30000241**	Project Start Date:		1/1/2010
Research Project Number:	10-4AD	Completion Date	(original)	12/31/2013
Research Agency:	LTRC	Completion Date	(revised)	6/30/2019
Principal Investigator:	Tyson Rupnow			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$100,000
	(revised)	
Est. Expended to Date		$57,136
FY 2017 - 2018 Budget		
FY Funds	(original)	$10,000
	(revised)	
Est. FY Expenditure		$5,900

Estimated 2018-2019 Budget		
Total		**$10,000**
Salaries		
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		$10,000
Other		

PURPOSE AND SCOPE

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. This project provides a mechanism to fund technology transfer travel for university faculty to deliver research results to state and national audiences such as Transportation Research Board (TRB) Annual Meeting, Louisiana Transportation Conference (LTC), Louisiana Transportation Research Center (LTRC) Seminar Series, and Louisiana Department of Transportation and Development (LADOTD) Implementation meetings and training. Travel funds are dispersed on a case by case basis as it applies to providing a benefit to Louisiana.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

Continue to provide support technology transfer travel for university faculty to deliver research results to state and national audiences.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Continue to provide support technology transfer travel for university faculty to deliver research results to state and national audiences.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	Technology Transfer Program and Operations (LSU)	Project Status:	Ongoing
Funding Source:	**STP: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**30000320**		Project Start Date:		7/1/2015
Research Project Number:	08-1TSQ		Completion Date	(original)	6/30/2018
Research Agency:	LTRC		Completion Date	(revised)	6/30/2021
Principal Investigator:	MaryLeah Coco				

BUDGET STATUS

Total Budget			Estimated 2018-2019 Budget		
Total Cost	(original)	$361,546	**Total**		**$361,546**
	(revised)				
Est. Expended to Date			Salaries		$323,546
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	$15,000
	(revised)		Travel		$9,000
Est. FY Expenditure			Other		$14,000

PURPOSE AND SCOPE

The objectives of this study are to:
-Disseminate information on new technologies and methodologies to Louisiana Department of Transportation and Development (LADOTD) 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.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS
-Publication chair for 2018 Transportation Conference; -Sponsorship coordinator for 2018 Transportation Conference; -Assisted in all 2017-2018 Transportation Conference committees; -Published 4 Tech Today Newsletters; -Published 2017 Annual Report; -Set up online registration for 24 NHI/other training, and 9 LTAP training classes; -Maintained LTAP website; -Maintained Safety Center web pages; -Maintained the LTRC website; -Maintained 2018 LTC Website and Mobile Site; -Photographed all LTRC events; --Maintained the LTRC Mobile App; -Filmed and produced 12 DOTD informational videos; -Filmed and produced 6 Transportation Talk videos featuring Secretary Wilson; -Edited 5 LTRC videos; -Published 10 Project Capsules; -Published 9 Final Reports; -Published 1 Tech Assistance Reports; and -Modified and reworked article for Roads and Bridges magazine.
FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
Non-Expendable Equipment: This budget item is comprised of various items all not to exceed $5,000 on an individual basis. Other: License renewals for LTRC registration management, publication processing, program creation, and software. Proposed Activities: -Assist in development of all publications, website, registration, e-commerce and mobile application; -Implement new online registration system; -Develop training for new online registration system; -Continue maintenance of LTRC, LTAP and Safety Center website; -Continue to edit and distribute project capsules, technical summaries, final reports and technical assistance reports; -Publish 4 Tech Today newsletters; -Photograph all LTRC events; -Video all LTRC events; -Readily available for any special assistance requested from Secretary's office; -Attend and Assist the NLTAPA Conference; and -Attend professional development and leadership training.

FHWA

100% Federal Funded Program

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Effect of Increased Asphalt Pavement Density on its Durability**	**Project Status:**	**Proposed**

Funding Source:	**100% Federal**	**Budget Category:**	**Federal**

SIO:	**DOTLT1000214**	Project Start Date:		7/10/2017
Research Project Number:	18-4B	Completion Date	(original)	12/28/2018
Research Agency:	LSU	Completion Date	(revised)	
Principal Investigator:	Louay Mohammad			

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$50,000	**Total**		**$50,000**
	(revised)				
Est. Expended to Date			Salaries		$50,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The overall objective of this demonstration project is to evaluate the effects of increasing the initial in-place density of asphalt pavements on their potential field performance. Specific objectives are to: (1) Identify efficient methodology for achieving the increased in-place density of asphalt pavements with minimal additional costs and without damaging the aggregate structure, (2) Construct a demonstration pavement section that includes a control section (meeting the current minimum density requirement) and a test section (having an average of 1.5% increase in-place density), (3) Evaluate volumetric properties of laboratory and field asphalt samples, and (4) Evaluate laboratory performance characteristics of laboratory and field asphalt samples.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
-Task 1: Provide technical support for options to increase pavement density and collect relevant project data; -Task 2: Evaluate volumetric properties of both control and increased density designed asphalt mixtures, -Task 3: Collect relevant mixing plant and mixture production data; -Task 4: Monitor and collect relevant field construction data; -Task 5: Conduct in-situ density measurements and collect pavement cores from the measurement spots on both control and increased density sections; -Task 6: Conduct laboratory volumetric and performance tests (LWT, SCB, and E*) on field cores; -Task 7: Analyze test data to determine the effect of increased density on volumetric properties; -Task 8: Develop plans for monitoring long-term pavement performance; and -Task 9: Prepare a summary report.

Self-Generated Funded Research Program

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Field Monitoring and Measurements Education: A Model for Civil and Environmental Engineering**	**Project Status:**	**Ongoing**

Funding Source:	**NSF**	**Budget Category:**	**Self-Generated**

SIO:	**DOTLT1000101**	Project Start Date:		2/15/2016
Research Project Number:	16-2ST	Completion Date	(original)	8/14/2019
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Vijaya Gopu			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$337,312
	(revised)	
Est. Expended to Date		$140,000
FY 2017 - 2018 Budget		
FY Funds	(original)	$100,000
	(revised)	
Est. FY Expenditure		$80,000

Estimated 2018-2019 Budget		
Total		**$100,000**
Salaries		$30,000
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		$5,000
Other		$65,000

PURPOSE AND SCOPE

The goal of this project is to develop a model instructional program, using Structural Engineering and structural Health Monitoring as a test bed, that can be used to educate civil and environmental engineering students in the fundamental principles and technology of field monitoring and measurements (FMM) and to utilize monitoring technologist and FMM data to evaluate performance and behavior, analyze problems and design CEE systems. This goal will be achieved by: (1) developing and implementing a modular-based transportable Structural Engineering FMM Instructional Unit for CEE students in a manner that enhances the students' achievement of the traditional expected learning outcomes for the two affected courses and (2) developing a community of scholars that has an interest in and will contribute to the further development of FMM instructional materials.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

The following tasks were accomplished in Fiscal Year 2017-2018:
-PowerPoint versions of all the five foundational education modules were completed to assist the students. The remaining two modules were made available as PowerPoint files;
-The readiness exams were developed for all the four structural engineering education modules. Two of the structural engineering education modules were developed during the current fiscal year. All modules were made available as PowerPoint files;
-Mastery exams and discussion questions were developed for all the structural engineering education modules;
-A test specimen to demonstrate the deployment of sensors was prepared;
-Two workshops for faculty members at collaborating universities were held to present the modules developed and train the faculty in the use of the equipment being made available for classroom use;
-All the modules were presented in analysis courses at LSU and UL-Lafayette by the project investigators. Student feedback was sought through an online survey; and
-The investigators conducted two training sessions for the faculty at the partnering universities to cover both the foundational modules as well as the structural engineering modules.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
The following tasks will be undertaken in 2018-2019: -The e-learning versions of all the modules will be completed; -The modules will be implemented in the structural analysis classes at LSU and UL-Lafayette a second time; and -Hold an advisory board meeting to update on the project progress and carry out an evaluation and assessment of the project tasks. Justification for expenses in the "Other" category. This NSF project involves two consultants, four partner institutions (Case Western Univ., Virginia Tech, University of North Florida & Tuskegee University), and one sub-awardee (LSU). The total expenses for all these collaborators will be $65,000 in FY18-19 and justified.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Evaluation of the Effect of Homogeneity of the Binder on Performance of the Recycled Mixture**	**Project Status:**	**Proposed**

Funding Source:	**Self-Generated**	**Budget Category:**	**Self-Generated**

SIO:		Project Start Date:		6/1/2017
Research Project Number:		Completion Date	(original)	6/30/2018
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Louay Mohammad			

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$58,000	**Total**		**$45,000**
	(revised)				
Est. Expended to Date		$13,000	Salaries		$45,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The objective of the proposed research is to evaluate the effect of binder homogeneity and durability on the performance of the recycled mixtures. It is known from previous research that introducing and diffusion of the rejuvenator and aging of the mixture influence the structure of the binder film that coats aggregates. This work will provide a better understanding of the effect of these parameters of binder homogeneity and consequently, the performance of the mixture. A homogeneity index will be used as a measure of asphalt binder's homogeneity. Five samples, including one new mixture and four recycled mixtures will be tested for their rutting susceptibility, moisture resistance and fatigue cracking resistance at three aging levels. The performance of the samples will be compared and the relations between homogeneity and performance parameters will be evaluated.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

-Task 1–Assist in the Conduct Literature review;
-Task 2–Assist in the Preparation of Test Samples;
-Task 3–Assist in the Conduct Staged Extraction;
-Task 4–Conduct Performance Tests;
-Task 5–Perform Data analyses;
-Task 6–Assist in the Evaluate Simulated Aging Protocols; and
-Task 7– Assist in the Prepare Draft Final Report.

LTRC Annual Research Program
Fiscal Year 2018-2019

Title:	**Investigation of Tack Coat Materials on Tracking Performance**	**Project Status:**	**Proposed**

Funding Source:	**Wisconsin Dot**	**Budget Category:**	**Self-Generated**

SIO:		Project Start Date:		7/1/2017
Research Project Number:		Completion Date	(original)	6/30/2018
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Louay Mohammad			

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$30,000	**Total**		**$20,000**
	(revised)				
Est. Expended to Date		$10,000	Salaries		$20,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$10,000	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$10,000	Other		

PURPOSE AND SCOPE

The objective of this research is to perform a critical evaluation of the materials and application methods used in Wisconsin for tack coats in order to provide recommendations that make tack coat usage more efficient and effective. The following specific objectives have been identified by the research team: (1) Determine the proper timeliness of tack coat application with consideration given to project scope (paving times, lane closures, etc.), (2) Evaluate different tack coat materials to determine which product should be used based on prevailing climate and other project considerations (3) Evaluate other techniques, innovations, and technologies that may allow for greater efficiency relative to standard Wisconsin DOT practice, (4) Develop recommendations for Wisconsin DOT Standard Specifications, Construction Materials Manual, and Facilities Development Manual regarding tack coat usage and best-practices.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Completed Task 1: Review of current materials and practices in the State of Wisconsin contrasted with materials and practices used nationally; and
-Conducting Task 2: Validation of optimum residual asphalt application for tack coats.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

The following tasks will be performed:
-Task 3: Evaluate the tracking sensitivity of commonly used tack materials;
-Task 4: Develop an assessment methodology to evaluate the bond strength of cores for different pavement types; and
-Task 5: Prepare Draft Final Report.

Other DOTD
Funded Projects

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	**Louisiana Traffic Records Management System Support**	**Project Status:**	**Ongoing**
Funding Source:	**Safety**	**Budget Category:**	**Other DOTD Sections**

SIO:	**DOTLT1000151**	Project Start Date:		10/1/2016
Research Project Number:	17-2SS	Completion Date	(original)	9/30/2019
Research Agency:	Highway Safety Research Group	Completion Date	(revised)	
Principal Investigator:	Helmut Schneider			

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$8,291,932	**Total**		**$2,835,367**
	(revised)				
Est. Expended to Date		$4,982,000	Salaries		$2,666,588
FY 2017 - 2018 Budget			Consumable Supplies & Materials		$87,113
FY Funds	(original)	$2,750,000	Equipment	(non-expendable)	
	(revised)	$2,777,833	Travel		$40,000
Est. FY Expenditure		$2,777,833	Other		$41,666

PURPOSE AND SCOPE

This project will support the efforts to establish and maintain an effective information system that integrates all data relating to highway safety such as crash data, road inventory, COBRA data, traffic citation conviction data, driver's license history files, etc. The scope of the work includes timely collection of crash data, QA of crash information, maintaining LSU's crash database, facilitating integration of crash data with other safety data, problem identification, dissemination of information to stakeholders and the public, and Technical Assistance.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

All tasks were work on continuously during the FY and written monthly progress reports were submitted to Louisiana Department of Transportation and Development (LADOTD) and the Louisiana Transportation Research Center (LTRC).
-Task 1: Literature Review;
-Task 2: Data Collection;
-Task 3: Interim report (monthly);
-Task 4: Data Analysis; and
-Task 5 Final Report (Annual).

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
Continued Work on all tasks. Supplies budget of $87,113 -Kofax Scanning Software - $1,050 -iBackup Software - $500 -Developer Express Software - $680 -Nagios Software - $2,000 -GoTo Meeting Software - $468 -TeamViewer Software - $1,800 -CETE Software - $2,513 -RedGate Software - $1,400 -Rapid Spell Desktop Software - $199 -HDClone Software - $120 -AT Solutions Electronic LACrash Manual Software - $12,000 -AT Solutions Easy Street Draw Software License - $36,435 -Thawte Software - $350 -Kagi Software - $108 -Tableau Software - $25,000 -Tableau Desktop Software - $1,200 -Aomei Backupper Tech Software - $730 -xSQL Data Compare Software - $400 -DNS Madeeasy Software - $80 -Backup Assist Software - $80 Travel Budget of $40,000 -LACRASH support local travel - $10,000 -FARS analyst annual training - $2,000 -ATSIP Conference (6 attendees) - $12,000 -TRB Conference (2 attendees) - $4,000 -GHSA (2 attendees) - $4,000 -Lifesavers Conference (2 attendees) - $4,000 -Business Intelligence Conference (2 attendees) - $4,000 Other (Operating Services) Budget of $41,666 -Venyu Disaster Recovery Plan - $36,066 -Newspaper Clipping Service - $2,400 -Shipping Costs - $1,200 -Printing for Annual Fact Book - $2,000

Title:	**Economic Evaluation of Applicants to the Port Construction and Development Priority Program**	**Project Status:**	**Ongoing**
Funding Source:	**Port Priority Program**	**Budget Category:**	**Other DOTD Sections**

SIO:	**DOTLT1000148**		Project Start Date:		7/1/2016
Research Project Number:	17-1SS		Completion Date	(original)	12/31/2017
Research Agency:	LSU		Completion Date	(revised)	6/30/2018
Principal Investigator:	James Richardson				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$83,732		**Total**		**$86,732**
	(revised)					
Est. Expended to Date		$80,000		Salaries		$86,732
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)	$43,732		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure		$44,000		Other		

PURPOSE AND SCOPE

The main objective of this project is to perform research and analysis of the Port Priority Program applications to ensure the State is receiving the required minimum rate of return on the State's investment.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

Analyzed applications (5 to-date) as they are submitted to the Louisiana Department of Transportation and Development (LADOTD). The next submittal period closes June 1, 2018.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

This project will be extended through March 2020 to facilitate additional application submittal periods.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	**Economic Effect of Restricted Crossing U-Turn Intersections in Louisiana**	**Project Status:**	**Ongoing**
Funding Source:	**Safety**	**Budget Category:**	**Other DOTD Sections**

SIO:	**DOTLT1000213**	Project Start Date:		7/1/2017
Research Project Number:	18-1SA	Completion Date	(original)	12/31/2018
Research Agency:	LSU	Completion Date	(revised)	
Principal Investigator:	Helmut Schneider			

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$152,411	**Total**		**$76,205**
	(revised)				
Est. Expended to Date		$76,206	Salaries		$76,205
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$100,000	Equipment	(non-expendable)	
	(revised)	$76,206	Travel		
Est. FY Expenditure		$76,206	Other		

PURPOSE AND SCOPE

The purpose of this project is to assess the economic effects of J-turn installations on businesses located along those corridors. In particular, it will evaluate the impact on businesses' sales along the treatment corridors before and after the installation of the J-turns.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

-Task 1: Literature Review: Research is nearly complete. Documented findings;
-Task 2: Identify and Collect Data: Identify similar areas based on road characteristics, ADT, rural/urban, and number of business. Perform the same steps on these similar areas/business to have a compare group, and continued identifying similar sites;
-Task 3: Analyze Sales Data: Once the sales tax information is collected, the data will be analyzed. Collected sales data;
-Task 4: Design Survey: Survey drafted for review and finalization.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

-Task 1: Literature Review: Complete documentation of literature review;
-Task 2: Identify and Collect Data: Identify similar areas based on road characteristics, ADT, rural/urban, and number of business. Perform the same steps on these similar areas/business to have a compare group, complete similar site identification for group comparison;
-Task 3: Analyze Sales Data: Once the sales tax information is collected, the data will be analyzed. Analyze the data once Task 2 is complete;
-Task 4: Design Survey: Finalize survey for distribution; and
-Task 5: Conduct Survey: Distribute (designed) survey.

Title:	**CORS 911: Continuously Operating Reference Stations for the Bayou Corne Sinkhole**	**Project Status:**	**Ongoing**
Funding Source:	**emergency fund**	**Budget Category:**	**Other DOTD Sections**

SIO:	**30000980**		Project Start Date:		3/18/2013
Research Project Number:	13-9GT		Completion Date	(original)	3/17/2014
Research Agency:	LSU		Completion Date	(revised)	9/30/2018
Principal Investigator:	J. Anthony Cavell				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$350,785		**Total**		**$10,000**
	(revised)	$474,380				
Est. Expended to Date		$464,380		Salaries		$10,000
FY 2017 - 2018 Budget				Consumable Supplies & Materials		
FY Funds	(original)	$14,696		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure		$4,696		Other		

PURPOSE AND SCOPE

The fundamental objective of this project is to provide long-term monitoring of portions of HWY-70 potentially vulnerable to the Assumption Parish sinkhole. The project includes fabrication, deployment, and maintenance of five (5) continuously operating reference stations (CORS) of GPS receivers and antennae designed to actively monitor and measure surface motions of the route and its bridges. If monitoring reveals movement, implementation of remedial actions may be warranted. However, no implementation activity is currently anticipated.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

Provided monitoring information, projected cost information for next fiscal year, and drafted the Final Report.

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

Finalize Report and possibly continue monitoring.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	**Louisiana Local Road Safety Program**	**Project Status:**	**Proposed**
Funding Source:	**Safety**	**Budget Category:**	**Other DOTD Sections**

SIO:	**DOTLT1000265**	Project Start Date:		1/1/2019
Research Project Number:	19-LRSP	Completion Date	(original)	12/31/2019
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Marie Walsh			

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$310,912	**Total**		**$310,912**
	(revised)				
Est. Expended to Date			Salaries		$302,225
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		$8,687
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

To work in cooperation with the Louisiana Department of Transportation and Development's (LADOTD'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.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS
-Received, processed and evaluated 22 Local Road Safety Project applications and provided recommendations for inclusion in HSIP or additional assessment as appropriate. Seven projects are still awaiting additional information and three were determined to be ineligible. All projects accepted into the program will move through the DOTD project development process; -Crash data workshops were conducted in six of the regional coalition areas as follow up to previous efforts. Approximately 100 people participated; -Updated crash profiles with recent data were developed and distributed to all top 20 parishes; -Module on developing local road safety plans was developed and included in Crash Data Workshops.; -LRSP Program Manager attended at least one Infrastructure and Operations Focus area meeting in each of the nine coalition areas and made presentations on the Local Road Safety Program; -Technical assistance in the form of specialized data queries and analysis and countermeasure selection was provided to multiple local agencies and Regional Safety Coordinator; -Participated in DOTD local road safety data integration and accessibility efforts as well as attended three national peer exchanges on similar topics; -Served as Co-Chair of LA SHSP Statewide Infrastructure and Operations team providing technical expertise and leadership; -Participated on statewide SHSP Implementation Team; -Served on Traffic Records Coordinating Committee Executive Committee and Strategic Planning Committee; and -Attended LMA and PJAL meetings to provide information on Local Road Safety Plan.
FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
-Assist parishes and municipalities in developing projects to address at least 25% of their priority roads as identified by local road safety plans and crash data profiles; -Collect and review Local Road Safety Plans for at least five top 20 that did not have active plans; -Assist parishes in developing project concepts and applications to program at least $10 million in HSIP funds designated; -Continue in leadership roles on statewide SHSP teams and as champion for local road safety issues; -Conduct or facilitate network screening process for high priority local road intersections; -Develops and conduct intersection safety workshops in 4-6 selected locations including STEP countermeasures; and -Request and coordinate STEP Countermeasure workshop through the EDC efforts.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	**Evaluation of Crash Characteristics and Compliance with Speed and Lane Restrictions on I-10 over the Atchafalaya Basin**	**Project Status:**	**Proposed**

Funding Source:	**Safety**	**Budget Category:**	**Other DOTD Sections**

SIO:		Project Start Date:		4/2/2018
Research Project Number:		Completion Date	(original)	9/28/2019
Research Agency:		Completion Date	(revised)	
Principal Investigator:				

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$125,000	**Total**		**$100,000**
	(revised)				
Est. Expended to Date			Salaries		$100,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$10,000	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The purpose of this proposed project is to use a multi-faceted approach to examine crashes and compliance with restrictions on I-10 over Atchafalaya basin. The scope is to:
-Review prior research to ensure using the same definitions for trucks and compliance;
-Review the crash data and narratives to look for characteristics of crashes, common issues, and similarities and differences in car and truck crashes; and
-Set up a system to download and analyze publicly available traffic camera video to examine trucker compliance with travel lane and speed restrictions. Knowledge about vehicle type, vehicle speed, traffic congestion, and driver behavior like following too close, rapid deceleration, and lane switching can be derived from traffic video and would provide additional insight into factors affecting crashes and compliance.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

To be determined based on the research proposal.

Title:	**A Comprehensive Safety Study of Louisiana Roadways close to Waterways and Drainage Structures**	**Project Status:**	**Proposed**
Funding Source:	**Safety**	**Budget Category:**	**Other DOTD Sections**

SIO:			Project Start Date:		4/16/2018
Research Project Number:			Completion Date	(original)	9/17/2019
Research Agency:			Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget			**Estimated 2018-2019 Budget**		
Total Cost	(original)	$125,000	**Total**		**$100,000**
	(revised)				
Est. Expended to Date			Salaries		$100,000
FY 2017 - 2018 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$10,000	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The purpose of this project is to comprehensively investigate the magnitude of roadside crashes involving drainage structures and waterways on all types of highways with emphasis on rural two lane highways because of their inadequate roadside safety design. The scope is to:
-Document current roadside drainage design practice (including roadways adjacent to waterways without drainage structures) and existing operation conditions;
-Perform crash analysis to show the magnitude and characteristics of the crashes by type of highways at aggregate level;
-Identify locations with high risk of lane-departures crashes involved in roadside drainage structures or waterways at disaggregate level by GIS;
-valuate effectiveness of the existing crash countermeasures;
-Propose the potential targeted crash countermeasures; and
-Conduct benefit-cost analysis of crash countermeasures at identified locations.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES

To be determined based on the research proposal.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	**Exploring the Use of Pavement Markings in the Dynamic Envelope of a Railroad Crossing to Enhance Safety**	**Project Status:**	**Proposed**
Funding Source:	**Highway/Rail Safety**	**Budget Category:**	**Other DOTD Sections**

SIO:			Project Start Date:		1/1/2018
Research Project Number:			Completion Date	(original)	
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Julius Codjoe				

BUDGET STATUS

Total Budget				**Estimated 2018-2019 Budget**		
Total Cost	(original)	$100,000		**Total**		**$40,300**
	(revised)					
Est. Expended to Date				Salaries		$35,000
FY 2017 - 2018 Budget				Consumable Supplies & Materials		$500
FY Funds	(original)	$30,000		Equipment	(non-expendable)	$4,800
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

The purpose of this project is to evaluate the effectiveness of the Louisiana Department of Transportation and Development's (LADOTD's) proposed pavement markings in reducing instances of stopped vehicles within the dynamic envelope of at-grade highway-rail crossings at known locations where drivers tend to stop on the tracks. Video data will be collected for a set period before and after the pavement markings have been applied. Data analysis will be undertaken to determine types and frequency of encroachment into the dynamic envelope zone, and comparative analysis will be undertaken to evaluate the effectiveness of the pavement markings.
The literature review will be conducted nationwide. The list of locations to be experimented will be agreed with LADOTD and shall be no more than four. The mounting of traffic data collection devices, along with installation of the dynamic envelope pavement markings and accompanying signage, will be undertaken by LADOTD. The research team assumes LADOTD will obtain any special permits, including environmental clearance and permit for any installations.

FISCAL YEAR 2017 - 2018 ACCOMPLISHMENTS

None

FISCAL YEAR 2018-2019 PROPOSED ACTIVITIES
-Task 1: Perform Literature Review; -Task 2: Confirm Test Locations; -Task 3: Mount Data Collection Devices; -Task 4: Collect Pre-Installation Data; -Task 5: Install Pavement Markings and Accompanying Signage; and -Task 6: Collect Post-Installation Data.

LTRC Annual Research Program

Fiscal Year 2018-2019

2017 RPIC STATEMENTS

FINAL RANKING	PROBLEM STATEMENT TITLE
1	Development of Rating Strategies of Existing “off-system” Bridges
2	Timber Piling Rehabilitation and Repair
3	LADOTD Plan Development Consultant Contract Process Review
4	Load Rating of Existing Continuous Stringers on Louisiana’s Bridges
5	Pedestrian Crossings for High Speed Urban Arterials
6	Implementation of Roller Compacted Concrete by LADOTD
7	Louisiana's Alcohol-Impaired Driving Problem: An Analysis of Crash and Cultural Factors
8	Determine Louisiana's Roundabout Capacity
9	Retaining Wall Inventory - Geotechnical Asset Managment
10	Maintenance of Roadway Edge Drop-off Utilizing Readily Available Materials
11	Mechanistic Characterization of Asphalt Overlays for Pavement Rehabilitation and Preservation using Pavement ME Approach
12	Assessing the Economic Benefits of the Transportation Infrastructure Model for Economic Development (TIMED) Program
13	Development, Implementation and Structural Health Monitoring of a Protection System for Exterior Bridge Girders prone to Over-height Vehicle Collisons
14	Performance and Cost-Effectiveness of Preventive Maintenance Treatments and Implementation into PMS
15	Young Driver Crashes in Louisiana: Understanding the Contributing Factors to Decrease the Numbers
16	Infrastructure Funding for New Industrial and Expansion Projects is Inadequate
17	Comprehensive State of the Practice for Managing Sedimentation in Navigable Waterways
18	Influence of Internal Curing on Measured Resistivity
19	Use and Interpretation of Seismic Piezocone Penetration Testing (SCPTu) for Geotechnical Site Investigation
20	Benefit Cost Analysis of Roadway Striping in Louisiana
21	Strength Assessment of Heat-Straightened Steel Girders
22	Intersection on Horizontal Curves: Problems and Potential Solutions
23	Reduce Pedestrian Fatal Crashes in Louisiana by Improving Lighting Conditions
24	Predicting, Monitoring, and Rehabilitating Highway Embankment Slopes
25	Lacking a Cost-Effective Mobile Flood Monitoring System that Records Real-Time Off-Stream Hydrographs During Severe Floods
26	The Last Mile: Port Access in a Redeveloping New Orleans
27	Field Evaluation of Existing Concrete Overlays
28	Permitted/Protected versus Protected Left Turns
29	Assessment of Long-Term Performance of Louisiana Asphalt Pavements
30	Development of a Cyclic Semi-Circular Bend Test to Evaluate Asphalt Mixture Cracking Resistance at Intermediate Temperature.
31	Sustainable Soil-Geopolymer Road Base/Subbase
32	Identifying, Prioritizing and Managing the Largest Risks to the Louisiana DOTD’s Mission
33	Mitigating Pavement Reflective Cracking using a Ductile Fiber Reinforced Concrete Interlayer
34	Visualization and Analyzation of Big Data
35	Competing with other Transportation Modes for State (and Local) Funding

LTRC Annual Research Program

Fiscal Year 2018-2019

2017 RPIC STATEMENTS

FINAL RANKING	PROBLEM STATEMENT TITLE
36	Development of a Design Method for Determining the Optimum Water Content (OWC) and the Optimum Temperature Reduction (OTR) in Foamed WMA
37	Highway Litter Project
38	Implementing Stakeholder-Driven Freight Transportation Policy in the Gulf Coast Megaregion
39	Evaluation of Proposed Modifications to the Hamburg Wheel-Track test equipment and their impacts on Test Results and Acceptance Criteria
40	Performance Evaluation of Currently Approved "Green Products" as Cost Effective Alternatives to Naturally Occurring Stones for the Construction of Roadway Elements Structural Elements