Alaska Department of Transportation & Public Facilities

BIENNIAL WORK PROGRAM

Research, Development & Technology Transfer

Federal Project ID:
Federal Fiscal Years 2017/2018

FHWA December 2, 2016

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INTRODUCTION

The Research, Development and Technology Transfer program:

- Provides the Department and local governments with the latest technology, materials, and procedures for conducting our business
- Assists Department staff with problem solving by conducting literature searches to identify sources of information to solve a particular problem or assisting in the development of new design or analysis methods, specifications, and analyzing failures
- Provides a transportation-based statewide technical training program
- Provides education and technical assistance outreach to local governments and DOT&PF

Research Section Responsibilities:

- Act as the Department's representative to national research groups
- Ensure the programs meet the requirements of the Code of Federal Regulations and the Federal Highway Administration and State of Alaska Laws, regulations and policies
- Oversee outreach efforts of technology transfer staff to local communities
- Manage pooled fund studies with technical assistance from leads
- Solicit, review, and evaluate research needs from DOT&PF employees, universities, and industry and develop those of highest merit for consideration and ranking by the Expert advisors and subsequent approval by the Research Advisory Board
- Develop and manage research projects, including; principal investigator selection, budget preparation, setting schedules and contract negotiation and management, and reporting (progress and annual)
- Facilitate technical advisory committee to support and implement research
- Monitor and review Alaskan, national, and international transportation-related research for relevant and beneficial concepts and outreaches to Department staff
- Develop and execute statewide research implementation and training plans to improve Department specifications, policy, and practice related to the planning, design, construction, maintenance, and management of the state's transportation infrastructure. Work with other sections as required for implementation

Per 29 CFR 420.209, Carolyn Morehouse, Research Chief, of the State of Alaska, do hereby certify that the State of Alaska 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.

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Funding overview by task

Activity	Title	FFY17-federal	FFY17-state	FFY18 federal	FFY18 State	Total
1	Research Administration	$100,000	$25,000	$112,000	$28,000	$265,000
2	National Dues (TRB, NCHRP, *)	$471,263	0	$480,689	0	$951,952
3	Implementation of Completed Research	$80,000	$20,000	$80,000	$20,000	$200,000
4	Research Rapid Response	$80,000	$20,000	$80,000	$20,000	$200,000
5	Pooled Fund Studies	$100,000	0	$100,000	0	$200,000
6	Experimental Features Monitoring	$120,000	$30,000	$120,000	$30,000	$300,000
7	New Applied Research Projects	$680,000	$170,000	$840,000	$210,000	$1,900,000
8	Continuing Applied Research Projects	$0	0	0	$0	$0
9	Technology Transfer	$270,000	$30,000	$270,000	$30,000	$600,000
10	NHI training	$350,000	0	$350,000	0	$700,000
11	AASHTO Technical Programs Support	$170,000	0	180,000	0	350,000
	TOTALS	$2,421,263	$295.000	$2,612,689	$338,000	$5,676,046

*Dues estimate is FFY16 dues using a 2% inflation rate.

Federal Appropriation Summary and State Participation

	FFY17			FFY18			
	Federal	State Match	Total	Federal	State Match	Total	2-year Total
STIP ID 6451 - Statewide Research Program	$1,728,430	$171,570	$1,900,000	$1,928,564	$191,436	$2,120,000	$4,020,000
STIP ID 6452 - National Highway Institute Training	$318,395	$31,605	$350,000	$318,395	$31,605	$ 350,000	$700,000
STIP ID 6451 - T2	$272,910	$27,090	$300,000	$272,910	$27,090	$300,000	$600,000
STIP	$170,000	0	$170,000	$180,000	0	$180,000	$350,000
Total	$2,489,735	$230,265	$2,720,000	$2,699,869	$250,131	$2,950,000	$5,670,000

Our appropriation is $5,670,000 and the work plan is $5,676000 which is $6,046 over appropriation

Activity 1 Research Administration

Project Description
The budget for Research Administration is based on the anticipated cost of operating the research program. This account provides for:

- research staff salary and travel not directly related to projects
- developing the research program by soliciting research needs statements and selecting projects
- travel for the Research Advisory Board to attend board meetings
- early project development

Title	FFY17	FFY18
SP&R Federal 80%	$100,000	$112,000
SP&R State Match 20%	$ 25,000	$ 28,000

Events Research Administration include: Annual Open house, Research Experts meetings and STIC meetings, annual outreach to regions, headquarters staff and other stakeholders.

Activity 2 National Dues (includes TRB and NCHRP)

Project Description
The Transportation Research Board (TRB) is part of the National Academy of Sciences, Engineering and Medicine. It promotes the publication of transportation research results; hosts annual meetings each January in Washington, D.C.; sponsors committees of researchers active in specific fields; and distributes Transportation Research Reports and other publications to all member states. This project funds Alaska's annual contribution for support of the Transportation Research Board. It enables Alaska to receive all TRB publications. It also provides for unlimited literature search services through the Transportation Research Information Database (TRID) and listings of abstracts on any transportation-related topic at no additional cost to the state. Finally, it provides travel cost reimbursements to TRB's annual meeting for the TRB representative and one Alaska DOT&PF staff committee member and free registration for all DOT&PF employees who attend TRB's annual meetings. This account provides the mechanism for paying the annual billing for these services. The TRB executive board finalizes billing amounts for this program in January, and state participation agreements are sent out by TRB in March. All completed DOT&PF Research reports are available through TRB, as are all research reports from other state highway agencies.

Events Attend national research meetings: One trip per year for the TRB representative: Carolyn Morehouse – Research chief; One trip per year for TRB Panel Members: Anna Bosin and Jim Horn; One trip per year for TRB Committee Members Elmer Marx and Steve Saboundjian.

Title	FFY17*	FFY18*
National Dues (TRB, NCHRP, AASHTO*)SP&R 100%Federal	$471,263	$480,689

*assume a 2% inflation rate from our FFY16 dues

Activity 3 Implementation of Completed Projects

Overview and Objectives
When a project's research report is published and outreach is completed, the project is closed and the budget is no longer available for any continuing activities related to dissemination and implementation of results. These funds combine implementation for completed projects. The objective is to provide a resource for more effective, ongoing implementation of research findings and to ensure research is focused on high priority projects.

Implementation Plans: Each research project includes a plan which contains action items to fully implement research projects. This varies from project by project but can include trainings, manual updates, guidance documents, workshops, technical briefs, software updates, etc.

The research section does a "Look Back" at projects completed within the last 5 years to make sure projects have been implemented. The research section will document how projects have been implemented or create an implementation plan for those that have not. The goal is that no research project is a "report that sits on a shelf".

Summary Publications The research section produces newsletters and technical briefs for past projects so that project information is distributed to a wide audience within DOT.

Example Projects Implementation Plan

Expedient Permafrost Resistivity Investigation Rapid Response FFY12-14	T2-13-07	Materials & Construction	Successfully determined Capacitive-Coupled Earth Resistivity could be utilized to determine optimal locations and depth for thaw-preventions measures on roadway projects.
Long Term Monitoring of Ice-Rich Cut Slopes at Dalton Highway MP 9	T2-13-12	Materials & Construction	Designers using method for discontinuous permafrost zones
Evaluate Presawn Transverse Thermal Cracks	T2-13-13	Materials & Construction	Part of thermal cracking analysis. This coupled with an experimental feature that just finished will come up with design recommendation with specifications and standard drawing.
Evaluation Low Temperature Pavement Cracking	T2-13-17	Materials & Construction	Part of thermal cracking analysis. See T2-13-13.
Enhancing R&T Deployment through Program Recording	T2-13-20	Technology Transfer	Part of larger deployment project which is increasing technology transfer capabilities.

The following are examples of same recent projects implementation that were completed using previous years implementation funding.

Estimating Future Flood Frequency and Magnitude in Basins affected by Glacier Wastage

Many researchers within the academic community are suggesting that flood events in Alaska could become more frequent and more severe as a result of climate variability and/or change. In light of these projections, the Alaska DOT&PF has supported research aimed at quantifying those changes and at identifying variables or processes that hydraulic engineers should consider when designing hydraulic structures. Our implementation of this research involved the distribution of the report to DOT&PF's hydraulic engineering staff for general information and potential consideration for design.

A webinar was held on December 1, 2014 to discuss project details, all hydrologists from Central Region, Northern Region and Southcoast Region were invited. The report is available online at: http://www.dot.alaska.gov/stwddes/research/assets/pdf/4000-119.pdf

Plastic Strain Limits for Reinforced Concrete

The report provides numerical values for concrete and steel strain that are associated with several performance objectives – minimal damage, repairable damage and ultimate capacity prior to collapse.

Strain limits for concrete filled pipe piles have been included in the Bridge and Structures Manual. Phase 1 of the strain limits project generated similar recommendations for conventionally reinforced concrete columns.

Table 18-1
Seismic Steel Pipe Pile Material Properties

Property	Notation	API 5L X52 PSL 2	ASTM A709 Grade 50T3	ASTM A53 Grade B
Specified minimum yield stress (ksi)	f_y	52.2	50	35
Expected yield stress (ksi)	f_{ye}	60	55	55
Expected tensile strength (ksi)	f_{ue}	78	78	78
Expected yield strain	ε_{ye}	0.0021	0.0019	0.0017
Onset of strain hardening	ε_{sh}	0.015	0.015	0.015
Onset of pipe wall buckling strain	ε_{cr}	0.022-(D/t)/9000	0.022-(D/t)/9000	0.022-(D/t)/9000
Reduced ultimate tensile strain	ε^{R}_{su}	0.026	0.026	0.026
Ultimate tensile strain	ε_{su}	0.12	0.12	0.09
Overstrength factor	λ_{mo}	1.2	1.2	1.4

A seminar was held on July 28-31, 2014 to discuss project, all structural design engineers were invited. The report is available online at:
http://www.dot.alaska.gov/stwddes/research/assets/pdf/4000-072v1.pdf
http://www.dot.alaska.gov/stwddes/research/assets/pdf/4000-072v2.pdf
http://www.dot.alaska.gov/stwddes/research/assets/pdf/4000-072v3.pdf

Title	FFY17	FFY18
SP&R Federal 80%	$80,000	$80,000
SP&R State Match 20%	$20,000	$20,000

Activity 4 Research Rapid Response

Principal Investigator: Various
Project Manager: Carolyn Morehouse, P.E.
Completion Date: Varies

Description The Rapid Research Response program supports a portfolio of research projects, technology transfer, and workforce development to rapidly respond to opportunities to improve practices, procedures, and processes within the department as they arise and on an ad hoc basis. The account is funded through a revolving line item in the section's work program entitled "Rapid Research Response".

The research response project funds the following:

•Generally short term, high priority research projects to provide or address urgently needed information and or problems.

•Augment existing research projects to take advantage of unforeseen opportunities where timing is of the essence. During the course of a research project, the researchers may identify a previously unforeseen opportunity or method worthy of exploration to enhance the research and provide more useful results. The "Rapid Response" funds allow timely response to such opportunities.

•Research coordination and advisory services with national, university, and other state research programs.

•Unique and timely research and technology demonstration efforts.

•Policy-related research to address the immediate needs of decision-makers.

Benefits to the State: DOT&PF can conduct research in a short period of time with quick results for immediate implementation.

Example Projects from Rapid Response FFY14-16

Project Title	**Project #**	**Amount**
Fly Ash Mix Design	T2-14-15	$26,000
Specialized Testing Asphalt/AKDOT&PF Asphalt Binders (AUTC/Queens University)	64006	$26,015
Eagle Monitoring	64006	$33,000

Title	**FFY17**	**FFY18**
SP&R Federal 80%	$80,000	$80,000
SP&R State Match 20%	$20,000	$20,000

Activity 5 Pooled Fund Studies

Pooled Fund Studies FFY2017-FFY2018
Principal Investigator: Varies
Funding: $100,000 (SP&R)
Completion Date: various

Benefits to the State: When significant or widespread interest is shown in solving transportation-related problems, research, planning, and technology transfer may be jointly funded by several federal, state, regional, and local transportation agencies, academic institutions, foundations, or private firms as a pooled fund study. The FHWA Transportation Pooled Fund (TPF) Program allows federal, state, and local agencies and other organizations to combine resources to support transportation research studies.

ADOT&PF participates in the following pooled fund studies. Details and status are available at http://www.pooledfund.org/.

ADOT&PF anticipates $100,000 annually in pooled funds so there will be additional pooled fund projects added to this program task. $50,000 per year has not been decided yet.

Title	Study ID	Lead Agency	Alaska Lead	Funding	Project Website
Roadside Safety Research for MASH Implementation	TPF-5(343)	WA	Jeff Jeffers	$25,000	http://www.pooledfund.org/Details/Study/592
Aurora Program	TPF-5(290)	Iowa	Lisa Idell-Sassi	$25,000	http://www.pooledfund.org/Details/Study/532
FFY 2018 Funding					
Roadside Safety Research for MASH Implementation	TPF-5(343)	WA	Jeff Jeffers	$25,000	http://www.pooledfund.org/Details/Study/592 Jeff Jeffers
Aurora Program	TPF-5(290)	Iowa	Lisa Idell-Sassi	$25,000	http://www.pooledfund.org/Details/Study/532

Activity 6 Experimental Features

Project Manager: Varies
Funding: $300,000
Completion Date: varies

The Federal Highway Administration (FHWA) Experimental Features Program encourages innovation in state highway design and construction. Experimental features incorporated into highway projects under this program are eligible for construction federal funding participation, which is normally limited to more proven and conventional items. Another advantage of the experimental feature program is that if an experimental feature fails for any reason, its repair or replacement is also eligible for federal funding Experimental features are often physical objects, however, can also be a new technique for using conventional materials. The RD&T2 Program maintains this task to support monitoring and evaluation of Experimental Features for a time period requested by FHWA, normally 3-5 years.

Benefits to the State: DOT&PF can conduct research and evaluate experimental features during construction and monitor results.

FFY 17 Microsurfacing- Experimental Feature Manager: Anna Bosin, P.E.

Objectives: The main objectives of the proposed study are 1) test various mix designs using 64-40 asphalt binder for Alaskan application, 2) install an Experimental Feature application, and 3) monitor the site(s) post-construction for life-cycle cost-effective evaluation.

Proposed Task:
Task1: Review mix design options using Alaskan Asphalt Binder 64-40 and test samples for wear and adhesion;
Task 2: Assuming positive test results, chose optimal mix design for inclusion in CR Capital Project;
Task 3:Coordinate with design and construction efforts to incorporate Experimental Feature into Capital Project as well as 3-year post construction monitoring plan that includes inspection and review of PMS data collected annually with adjacent control comparison(s);
Task 4: Complete cost-effective analysis and create report with recommended implementation.

Professional Services: DOT&PF

Milestones/Accomplishments:
Contract start date – January 2018
Task 1-2 will be complete by Spring, 2018
Task 3 will be complete by Summer, 2018
Task 4 will be complete by Winter, 2021
Final Report expected Winter 2021

Title	FFY17	FFY18
SP&R Federal 80%	$120,000	$120,000
SP&R State Match 20%	$ 30,000	$ 30,000

Activity 7 New Alaska Applied Research Projects

Summary of New projects for FFY17/18

Category	*Title*	*FFY17 Federal Funding*	*FFY17 State Match*	*FFY18 Federal Funding*	*FFY18 State Match*
Materials	Lab & Field Eval of Modified Asphalt Binder in AK pavements	$48,000	$12,000		
Materials	Survey and Econ Analysis of Pavement Impacts from studded tire use in AK	$60,000	$15,000		
Materials	NHS Innovative Pavement Design Research for Pavement Management System	$120,000	$30,000		
Materials	High Abrasion Resistant & Long Lasting Concrete	$40,000	$10,000		
Safety	Identification of Ped-Involved Risk Locations and Cost Effective Solutions			$80,000	$20,000
Safety	Effects of Pavement Surface Characteristics on Crash Frequency & Severity			$60,000	$15,000
Safety	Development of Standardized Sampling Methods, Data Collection and Design Guidelines for Vulnerable Road Users	$72,000	$18,000		
Safety	Analysis of Motorcycle Crash Severity Outcomes in the Pacific Northwest			$80,000	$20,000
Bridges & Structures	Pre-stressed Losses in Decked Bulb-tee Girders			$240,000	$60,000
Bridges & Structures	Examination of the Variability in Grout Cube Specimen Test Results	$80,000	$20,000		
	Planned Projects	$420,000	$105,000	$460,000	$115,000
	Projects to be selected by RAB	$260,000	$65,000	$380,000	$95,000
	Total Task 7	**$680,000**	**$170,000**	**$840,000**	**$210,000**

PROPOSED PROJECTS FFY2017 TO FFY2018

MATERIALS

Lab & Field Evaluation of Modified Asphalt Binders and Mixes for AK pavements

Objectives: To conduct laboratory and field evaluation of the performance of various modified asphalt binders and mixes, and to quantify the performance benefits of these modified materials.

Proposed Task:
Task 1: Materials Collection. Asphalt binders will be collected from suppliers and DOT&PF field projects for the project sampling and analysis.

Task 2: Characterization. Binder characterization will evaluate rutting and low temperature cracking of modified binders.

Task 3: Laboratory Evaluation: Tests will be performed to evaluate rutting resistance and low-temperature cracking performance of asphalt mixtures. The tests include tensile strength and tensile creep compliance properties along with thermal cracking analyses.

Task 4: Field Survey. Pavement surveys will include recently constructed sections in Fairbanks and downtown Anchorage. Identify and track of any distress occurring. Rutting and crack data will be extracted from DOT&PF's Pavement Management System.

Task 5: Data Processing and Analysis. The binder and mixture performance data along with the field survey data will be synthesized to: evaluate whether modified binder's improves rutting resistance; perform a comprehensive low temperature performance analysis; and, complete a preliminary cost comparison of paving jobs with Alaskan HMA mixtures with neat binder and modified binders.

Task 6: Final Report. The report will include laboratory and field evaluation results; conclusions and recommendations. Workshop will be held to communicate results to the professional community.

Professional Services:
UAF & Center for Environmentally Sustainable Transportation in Cold Climates (CESTiCC)

Milestones/Accomplishments:
Start date ~January 2017
Task 1-3 will be complete by Winter 2017
Task 4-5 will be complete by Summer 2018
Task 6 Final Report expected Fall 2019

Cost Information:

Funding Type	***FFY17***
SP&R funding(80% Federal/20% state match)	$60,000
Match Funding provided by CESTiCC and Industry	$179,999

Survey and Economic Analysis of Pavement Impacts from Studded Tire Use in Alaska

Objectives: The main objectives of the proposed study are 1) Collect comprehensive studded tire tax revenue and compare to the pavement costs associated solely by studded tire use, 2) Survey the current tire options in Alaska and their published testing results to draw conclusions for ratios of studded/non-studded tire use currently on the road system;

Proposed Tasks:

Task 1: Collect a minimum of five years of studded tire tax revenue data;
Task 2: Collect a minimum of five years of tire distribution data in Central and South Coast Regions;
Task 3: Update previous surveys of tire options in Alaska for Consumers and the tire's friction benefits;
Task 4: Conduct updated comprehensive pavement life-cycle cost review that includes pavement marking wear, traffic control, capital improvement costs, and traffic delays.
Task 5: Compare the inflow of tax revenue to the impact of studded tire use on Alaska's road system.

Professional Services: University of Alaska, Anchorage

Milestones/Accomplishments:

Contract Start Date – February 2017
Task 1&2 will be complete by May, 2017
Task 3 will be complete by September, 2018
Task 4 will be complete by December, 2018
Task 5 will be complete by January, 2019
Final Report expected June 15, 2019

Cost Information:

Funding Type	***FFY17***
SP&R(80% Federal/20% state match)	$75,000

NHS Innovative Pavement Design Research for Pavement Management System

Objectives: Using HPMS database at a start, obtain pavement structure information in order to provide the software platform designers adequate information for the modeling to be customized for Alaskan roadways. This may represent a significant data management task, depending on the format of the data.

Proposed Task:

Task 1: Review "as-built" construction plans, QA reviews of construction projects, and any additional data available for CR and NR for the NHS interstate systems, followed by NHS Non-Interstate Systems to create an excel database of pavement structure information;
Task 2: Coordinate effort with pavement software designing consultant, statewide pavement engineer, and regional materials engineers to optimize data necessary for the software development.

Professional Services: In house with support for UAA or UAF as needed.

Milestones/Accomplishments:

Contract start date – March 2017

Task 1 will be complete by August 2017
Task 2 will be complete by September 2017
Final Report expected Spring 2018

Cost Information:

Funding Type	FFY17
SP&R(80% Federal/20% state match)	$150,000

High Abrasion-resistant and Long-lasting Concrete

Objectives: To implement high abrasion-resistant concrete paving by identifying and selecting concrete mix designs to provide the lowest cost at the longest performance.

Proposed Task:
Task 1: Optimize and finalize mix design by refining existing mix designs (i.e. silica fume mix designs developed for abrasion resistance) provided to ADOT&PF. This will be achieved by producing different mixes with varying key parameters (e.g., silica fume content) and conducting a series of lab tests. Lab tests will include three categories: 1) workability (slump), 2) mechanical properties including flexural strength and shrinkage, and 3) durability tests including wear resistance (prall test), freeze thaw durability, resistivity – concrete's ability to resist chloride ion penetration, and frost sale scaling resistance after freezing-thawing cycle;
Task 2: Construct field test sections for field review of constructability methods. Central Region Highway Design section will help to identify candidate test sites.
Task 3: If lab and test section(s) perform above thresholds set by CR Materials, then an experimental feature project could be selected for application and monitoring (regular field surveys post construction for 3 years);
Task 4: Life-cycle cost analysis and comparison

Professional Services:
UAF Center for Environmentally Sustainable Transportation in Cold Climates (CESTiCC) with

Milestones/Accomplishments:
RSA start date – January 2017
Task 1 will be complete by March, 2017
Task 2 will be complete by March, 2017
Task 3 will be complete by June, 2018
Task 4 will be complete by August, 2018
Final Report expected Winter 2019

Cost Information:

Funding Type	FFY17
SP&R(80% Federal/20% state match)	$50,000
Matching funds from CESTiCC and Industry	$170,419

SAFETY

Identification of Pedestrian-Involved Collision Risk Locations and Cost-Effective Solutions

Objectives: Using pedestrian crash records in Anchorage and Seattle, this research has three objectives: (1) identify clusters of injured pedestrians using a Geographic Information System (GIS), (2) investigate the effect of personal and environmental factors on pedestrian injury risk, and (3) propose cost effective countermeasures to reduce the risk of severe injury crashes.

Proposed Task:
Task 1: Review Anchorage and Seattle crash data and geospatially map areas for review;
Task 2: Develop models to relate collected urban characteristics and contributing factors (human behavior and trip generator) to crash data;
Task 3: Produce a report with countermeasures, trends, analysis results which can be used when planning safety improvement projects.

Professional Services: UAA and PACTrans

Milestones/Accomplishments:
Contract start date – January 2018
Task 1 will be complete by Spring, 2018
Task 2 will be complete by Spring, 2019
Task 3 will be complete by Winter, 2019
Final Report expected Spring 2020

Cost Information:

Funding Type	FFY18
SP&R(80% Federal/20% state match)	$100,000
PACTrans	*$100,000

*Anticipate Pactrans Match Money of $100K

Effects of Pavement Surface Characteristics on Crash Frequency and Severity

Objectives: Traffic crashes can occur due to a loss of care or control in driving on worn pavement surfaces. The main objectives of the proposed study are 1) to formulate a relation between pavement surface characteristics including rutting, PSR and IRI and crash frequency and severity, 2) Develop models for desirable pavement rehabilitation as a function of pavement surface characteristics, crash frequency and severity (Criteria for roadway maintenance).

Proposed Tasks:
Task1: Select a variety of corridors in consultation with DOT&PF with 5 or more years of rutting data for analysis;
Task2: Combine and analyze crash, vehicle, highway, traffic and pavement surface characteristics data. Availability of data for crashes currently limited 2000-2013 crash database. DOT&PF's CARE crash portal may be online by the time this contract is underway;
Task 3: Gather and compare significant rain and snow deposit events data over time for the selected corridors;
Task 4: Develop models to relate pavement surface characteristics especially rutting and rut profiles to crash data;
Task 5: Produce a prediction model which can be used when planning safety improvement projects (ultimately a crash reduction factor by eliminating ruts measured in the field);
Task 6: Develop life-cycle estimates for rutting development versus increase in crash frequency and severity. Includes final report with recommendations and presentation to DOT&PF

Responsible Parties: University of Alaska Anchorage

Milestones/Accomplishments:
RSA start date – January 2018
Tasks 1-2 will be complete by Summer, 2018
Task 3 will be complete by Fall, 2018
Task 4-5 will be complete by Summer, 2019
Task 6 will be complete by Winter, 2019
Final Report expected Spring 2020

Cost Information:

Funding Type	**FFY18**
SP&R(80% Federal/20% state match)	$75,000

Development of Standardized Statewide Sampling Methods, Data Collection, and Design Guidance for Vulnerable Road Users

Objectives:
1. Develop standardized survey protocols for and documentation of safe practices;
2. Review connectivity of vulnerable user facilities and/or routes with consideration of trip generators and destinations; and
3. Develop a set of suitable context sensitive design alternatives for non-motorized and non-traditional vehicles and modes of travel to include in statewide planning and design efforts.

Proposed Task:
Task 1: Comprehensive literature review;
Task 2: Survey of other western state DOTs' design guidelines for highway projects and to determine what guidance on data collection may already exist;
Task 3: Method consideration for statewide sampling by mode and facility type;
Task 4: Material development for design alternatives to be incorporated in preconstruction manual and design guidelines. Includes final report and presentation to DOT&PF.

Professional Services:
University of Alaska, Fairbanks (UAF)

Milestones/Accomplishments:
RSA start date – January 2017
Task 1 will be complete by Spring, 2017
Task 2 will be complete by Fall, 2017
Task 3 will be complete by Spring, 2018
Task 4 will be complete by Winter, 2018
Final Report expected Spring 2019

Cost Information:

Funding Type	FFY17
SP&R(80% Federal/20% state match)	$90,000

*Potential match of an extra $60K from UAF's research funds

Analysis of Motorcycle Crash Severity Outcomes in the Pacific Northwest

Objectives: The objectives of this study are (a) identify the trend of motorcycle crashes, (b) identify causal factors, and (c) propose effective countermeasure to reduce the frequency of severe injury and fatal crashes.

Proposed Tasks:
Task1: Review NW states crash data, select road corridor geometry with roadside characteristics, traffic data, and pavement surface conditions collected by PMS annually;

a. Availability of Alaska crash data is currently 2000-2013 crash database; however DOT&PF's CARE crash portal may be online by the time this contract is underway.

Task 2: Develop models to relate collected characteristics and contributing factors to crash data;
Task 3: Produce a report with countermeasures for inclusion in the SHSP, trends, analysis results which can be used when planning safety improvement projects.

Professional Services:
University of Alaska, Anchorage (UAA)

Milestones/Accomplishments:
RSA start date – January 2018
Task 1 will be complete by Summer, 2018
Task 2 will be complete by spring, 2019
Task 3 will be complete by Winter, 2019
Final Report expected Spring 2020

Cost Information:

Funding Type	FFY18
SP&R(80% Federal/20% state match)	*$100,000

*Anticipate $100K match funds from PACtrans

BRIDGES & STRUCTURES

Pre-stressed Losses in Decked Bulb-Tee Girders

Objectives: Study the actual losses of concrete beams. The results may be used for designing future girders allowing for fewer girder lines and longer bridge spans.

Proposed Tasks: A five year study of decked bulb-tee girders could be used to measure the pre-stress losses of actual girders
Task 1 Construct girders and measurement of girders
Task 2 Measure prestress loss during the 5 year study period
Task 3 Analyze data and compare to AASHTO LRFD Bridge Design Specifications

Professional Services: TBD

Milestones/Accomplishments:
RSA start date – January 2019
Task 1 will be complete by June, 2019
Task 2 will be complete by June, 2024
Task 3 will be complete by December, 2024
Final Report expected Winter 2024

Cost Information:

Funding Type	FFY2018
SP&R(80% Federal/20% state match)	$300,000

Examination of the Variability in Grout Cube Specimen Test Results

Objectives: The objective would be to identify the issues and revise the test process to improve test results and reduce the scatter in the data.

Proposed Task: Coordinate with other state DOT's and testing companies and then use that information to establish a plan to improve test results.
Task 1 Literature Search
Task 2 Develop lab strategy based on Literature Search
Task 3 Lab testing
Task 4 Review results to determine if more testing is needed
Task 5 Prepare Final Report and Recommendations

Professional Services: University of Fairbanks and Northern Region

Milestones/Accomplishments:
Contract start date – January 2017
Task 1 will be complete by May, 2017
Task 2 will be complete by July, 2017
Task 3 will be complete by May, 2018
Task 4 will be complete by June, 2018
Task 5 will be complete by December 2018
Final Report expected Winter 2018

Cost Information:

Funding Type	FFY2017
SP&R(80% Federal/20% state match)	$100,000

Activities 8 Continuing Alaska Applied Research Projects

This is a list of our continuing projects. All have individual federal agreements that will be modified if scope, schedule or budget changes.

State #	Federal #	Project Title	Comment
63701	4000096	Performance of Dust Palliatives on Unpaved Roads in Rural AK	Financial closure in process
60742	4000111	Structural Monitor & Condition Assess of Chulitna River Brdg.	Financial closure in process
61105	4000113	Experimental Features	Will be completed FFY18
61923	4000119	Estimating Future Flood Freq & Magn in Basins/Glacier Waste	Financial closure in process
61972	4000121	Use of LIDAR to Evaluate Slope Safety	Financial closure in process
62084	4000122	Review of Power Sources for AK DOT Rd Weather Info Sys-PH I	Financial closure in process
63039	4000128	Value of Depressed Medians on Divided Highways in Alaska	Will be completed FFY17
63031	4000129	Evaluate Presawn Transverse Thermal Cracks	Financial closure in process
63041	4000130	Wicking Fabric Design Specification	Financial closure in process
63068	4000132	Optimizing Highway Patrol Investment Levels	Will be completed FFY18
64006	4000133	Rapid Research Response FFY2014 - FFY2016	Will be completed FFY17
64203	4000134	Seismic Load Path Effects in RC Bridge Columns	Will be completed FFY18
64236	4000135	Underwater Pile Driving Noise Study	Will be completed FFY17
64238	4000136	Haines Highway Debris Flow Source Study	Financial closure in process
64234	4000137	Character of AK Hotmix Asphalt Contain Reclaimed Asphalt Pavement	Will be completed FFY17
64230	4000138	Geotechnical Asset Mgmt Thru Thermal Modeling - Dalton	Will be completed FFY19
83974	4000142	Seismic Repair of Reinforced Concrete Bridge Substructures	Will be completed FFY19
83980	4000143	Modeling Passing Lane Behavior on 2-Lane Highways	Will be completed FFY17
83988	4000144	AASHTOWARE Investigation	Will be completed FFY18

State #	Federal #	Project Title	Comment
64321	4000145	Wavetronix Radar Detection	Will be completed FFY19
64319	4000147	Tencate Wicking Fabric	Will be completed FFY17
60541	4000149	Improving Quality	Financial closure in process
60548	4000150	Yukon River Bridge Testing and Screening Materials - Stage II	Financial closure in process
76287	4000152	Pile Extension Pier Pushover Software	Will be completed FFY18
76289	4000153	Developing Guideline for 2 Dimensional Model Review & Accept	Will be completed FFY18
HFHWY00007	4000154	Paperless NEPA	Will be completed FFY18
HFHWY00004	4000155	Field Evaluation of Precut Cracks	Will be completed FFY17
HFHWY00003	4000156	Frequency and Potential Severity of Red Light Running in ANC	Will be completed FFY18
HFHWY00005	4000157	Dust Control Product Mix Design & Quality	Will be completed FFY18
HFHWY00002	4000158	Catastrophic Icefall Hazard Assessment, Phase 1	Financial closure in process
HFHWY00001	4000159	Steel Fiber Reinforced Concrete in Cold Regions	Will be completed FFY18
HFHWY00006	4000160	RWIS Power Sources - Phase 2	Financial closure in process
HFHWY00038	4000161	TRANSVERSE SEISMIC DESIGN OF BRIDGES WITH PRE-CAST DECK	Will be completed FFY19
HFHWY00039	4000162	DURABILITY OF GROUTED SHEAR STUD CONNECTIONS AT LOW TEMP	Will be completed FFY19
HFHWY00046	4000164	FFY16-18 RESEARCH & TECHNOLOGY TRANSFER DEPLOYMENT	Will be completed FFY19
HFHWY00049	4000165	STEEL FIBER REINFORCED RUBBERIZED CONCRETE Experimental Feature Monitoring	Will be completed FFY20
HFHWY00050	4000167	BALD EAGLE NESTING DURING CONSTRUCTION RESEARCH	Will be completed FFY18
HFHWY00051	4000168	ICEFALL HAZARD EVALUATION	Will be completed FFY17
60537	LTAP038	Technology Transfer Program CY2015	Financial closure in process
NFHWY00052	LTAP039	TECHNOLOGY TRANSFER PROGRAM CY2016	Financial closure in process
62725	4000127	Reinforced Concrete Filled Pipe Piles in Soils	Will be completed FFY17

State #	Federal #	Project Title	Comment
63440	4000090	Unstable slope management program	Will be completed FFY18
62467	4000126	Unstable Slope Management Program - Stage II	Will be completed FFY18

Activity 9 Technology Transfer

Objective Local Technical Assistance Program (LTAP) is a national network of centers funded by FHWA. LTAP's mission is to foster a safe, efficient, and environmentally sound surface transportation system by improving skills and increasing knowledge of the transportation workforce and decision makers. Each LTAP center adapts its program to address the unique challenges faced by the customers it serves. LTAP's primary focus is on:

- training events and programs
- newsletters and tech briefs
- library services

Funding Type	FFY17	FFY18
40% SP&R (federal)l	$120,000	$120,000
10% SP&R (state match)	$ 30,000	$ 30,000
50% LTAP funding Federal	$150,000	$150,000

Activity 10 National Highway Institute Training

Objective Provides transportation-related education programs to AK DOT&PF employees to help improve the quality of the state's highway system by enhancing economic growth, improving public safety and quality of life, and promoting environmental stewardship. This is accomplished by technology transfer to the planning, design, construction, and maintenance personnel working for Alaska's transportation infrastructure.

Funding Type	FFY17	FFY18
NHI Funding (SP&R 100% Federal)	$350,000	$350,000

Activity 11 AASHTO Technical Program Support

Objective Provides transportation-related technical support programs to AK DOT&PF employees to help improve the quality of the state's highway system by enhancing economic growth, improving public safety and quality of life, and promoting environmental stewardship.

Subscriptions the Commissioner has approved but is not limited to are listed below.

Innovation Initiative
Snow and Ice Cooperative Program (SICOP
Transportation System Preservation (TSP2
AASHTO Equipment Management Technical Services Program (EMTSP)

National Transportation Product Evaluation Program (NTPEP)
Development of AASHTO Materials Standards (DAMS)
Transportation and Civil Engineering Program (TRAC)
Load and Resistance Factor Design (LRFD)
Bridges and Structures Specification Maintenance (LFRDSM)
Transportation Curriculum Coordination Council (TC3)
Highway Safety Policy and Management Technical Service Program (SAFETY)
Operations Technical Service Program,
Environmental Technical Assistance Program (ETAP)
AASHTO Product Evaluation Listing (APEL)
Resilient & Sustainable Transportation Systems (RSTS)

Funding Type	FFY17	FFY18
NHI Funding (SP&R 100% Federal)	$170,000	$180,000