



# MDT★

## Research Programs

### FFY 2019 AT-A-GLANCE

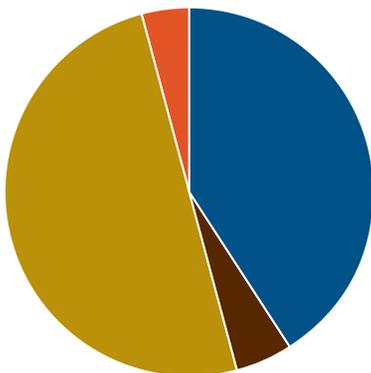
*(October 1, 2018 to September 30, 2019)*

The guiding mission of the Montana Department of Transportation (MDT) is to serve the public by providing a transportation system and services that emphasize quality, safety, cost-effectiveness, economic vitality, and sensitivity to the environment.

This publication provides an overview of research, development, and technology transfer activities for federal fiscal year (FFY) 2019 within MDT's Research Programs. These activities enhance MDT's ability to meet its mission and deliver efficient and effective transportation services.

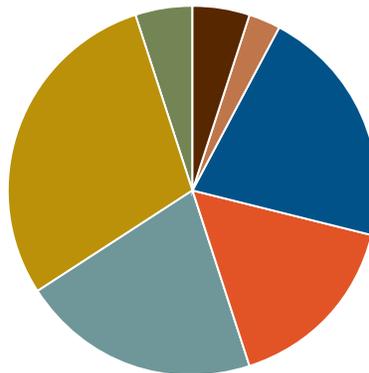
## Summary of MDT Research Programs Expenditures

**FFY 2019 Research Program Expenditures by Funding Source**  
*(includes pooled fund studies)*



- FFY 2019 SPR-B Funds Total (80% or 100%) | 41%
- FFY 2019 SPR-A Funds Total (80% or 100%) | .01%
- FFY 2019 State Total (20%) | 5%
- FFY 2019 Other Federal Funds Total | 50%
- FFY 2019 Other State Funds Total | 4%

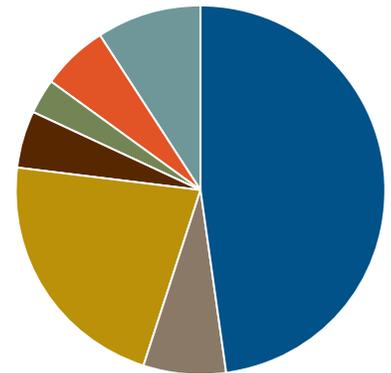
**FFY 2019 Research Program Expenditures by Project Type**



- AASHTO Technical Services Program | 5%
- LTAP | 3%
- NCHRP | 21%
- Pooled Funds | 16%
- Programs Administration\* | 21%
- Research Projects | 29%
- TRB Core Services Support | 5%

*\* Includes contracted services for research project management for two years.*

**FFY 2019 Research Project Expenditures by Subject**  
*(includes pooled fund studies)*



- Bridge/Hydraulics | 48%
- Construction | .01%
- Environmental | 7%
- Geotechnical | 22%
- Maintenance | 5%
- Materials/Data Collection & Analysis | 3%
- Safety | 6%
- Training/Technology Transfer | 9%

## Bridge and Hydraulics Research Projects

Project Number	Title	Consultant	MDT Project Manager	Start Date	End Date	Total Cost	FFY 2019 Expended
9696-700	Bridge Deck Cracking Evaluation	Wiss, Janney, Elstner and Associates	Kline	8/6/19	12/31/20	\$71,000	\$41,862
9630-628	Concrete-Filled Steel Tube to Concrete Pile Cap Connections: Further Evaluation/Improvement of Analysis/Design Methodologies (Phase IV-V)	Montana State University	Kline	7/10/18	9/30/22	\$256,000	\$35,470
9578-606	Feasibility of Non-Proprietary Ultra-High Performance Concrete (UHPC) for Use in Highway Bridges in Montana – Phase 2: Field Application	Montana State University	Kline	3/20/18	6/30/20	\$162,000	\$116,560
9790-727	Monitoring Streamflow Using Video Cameras	United States Geological Survey	Kline	8/5/19	1/31/22	\$144,000	\$28,975
9353-511	Regional Regression Equations Based on Channel-Width Characteristics to Estimate Peak-Flow Frequencies at Ungauged Sites Using Data Through Water Year 2011	United States Geological Survey	Kline	2/1/17	7/28/20	\$240,000	\$57,551
TBD	A Feasibility Study of Road Culvert Bridge Deck Deicing Using Geothermal Energy	TBD	Kline	TBD	TBD	TBD	N/A
TBD	Development of Deterioration Curves for Bridge Elements in Montana	TBD	Kline	TBD	TBD	TBD	N/A
TBD	Evaluation of Thin Polymer Overlays for Bridge Decks	TBD	Kline	TBD	TBD	TBD	N/A

## Construction Research Projects

Project Number	Title	Consultant	MDT Project Manager	Start Date	End Date	Total Cost	FFY 2019 Expended
9344-723	Effective Production Rate Estimation and Activity Sequencing Logics Using Construction Daily Work Report Data: Phase 2	Texas Transportation Institute	Sillick	6/7/19	5/31/20	\$45,000	\$0
9344-504	Effective Production Rate Estimation Using Construction Daily Work Report Data: Phase 1	Iowa State University	Sillick	1/1/17	1/31/19	\$139,528	\$5,757

## Environmental Research Projects

Project Number	Title	Consultant	MDT Project Manager	Start Date	End Date	Total Cost	FFY 2019 Expended
9596-617	Testing Wildlife-Friendly Fencing Modifications to Manage Wildlife and Livestock Movements	University of Montana	Kline	6/19/18	12/31/19	\$245,456	\$50,057
5896-423	MDT Wildlife Accommodations Process	KLJ	Sillick	3/1/16	12/31/18	\$232,968	\$31,665

STATUS KEY: Active Completed Proposed

## Implementation Projects

Project Number	Title	Consultant	MDT Project Manager	Start Date	End Date	Total Cost	FFY 2019 Expended
5896-423	MDT Wildlife Accommodations Process Implementation	N/A	Sillick	12/31/18	10/31/24	\$0	N/A

## Finance/Revenue Research Projects

Project Number	Title	Consultant	MDT Project Manager	Start Date	End Date	Total Cost	FFY 2019 Expended
TBD	Economic Benefits of Improving Montana's Transportation Infrastructure	TBD	Kline	TBD	TBD	TBD	N/A

## Geotechnical Research Projects

Project Number	Title	Consultant	MDT Project Manager	Start Date	End Date	Total Cost	FFY 2019 Expended
9389-522	Guidelines for Chemically Stabilizing Problematic Soils	Boise State University	Kline	4/21/17	2/29/20	\$170,000	\$72,671
9564-602	Large-Scale Laboratory Testing of Geosynthetics in Roadway Applications	Montana State University	Kline	2/21/18	12/31/20	\$450,000	\$151,380

## Information Services Research Projects

Project Number	Title	Consultant	MDT Project Manager	Start Date	End Date	Total Cost	FFY 2019 Expended
TBD	Analyze Business Models for Implementation and Operation of a Statewide GNSS Real-Time Network	TBD	Kline	TBD	TBD	TBD	N/A

## Materials/Data Collection and Analysis Research Projects

Project Number	Title	Consultant	MDT Project Manager	Start Date	End Date	Total Cost	FFY 2019 Expended
9577-607	Alkali-Silica Reactivity in the State of Montana	Montana State University	Kline	4/6/18	7/30/20	\$74,000	\$13,675

STATUS KEY: Active Completed Proposed

## Safety Research Projects

Project Number	Title	Consultant	MDT Project Manager	Start Date	End Date	Total Cost	FFY 2019 Expended
9679-699	Developing a Methodology for Safety Improvements on Low-Volume Roads in Montana	Montana State University	Kline	2/15/19	11/30/20	\$71,000	\$41,862
8882-309	Traffic Safety Culture Transportation Pooled Fund (TSC-TPF) Program	Montana State University	Sillick	10/1/14	9/30/22	\$1,194,000	\$220,152
TBD	Effectiveness of Highway Safety Public Education at Montana Motor Vehicle Registration Stations by Streaming a Variety of Safety Content	TBD	Kline	TBD	TBD	TBD	TBD
TBD	Icy Road Forecast and Alert (IcyRoad): Validation and Refinement Using MDT RWIS Data	TBD	Kline	TBD	TBD	TBD	TBD
TBD	Use of Fluorescent Orange Delineators in Temporary Traffic Control Work Zones	TBD	Kline	TBD	TBD	TBD	TBD

## Research (About Research) Projects

Project Number	Title	Consultant	MDT Project Manager	Start Date	End Date	Total Cost	FFY 2019 Expended
9529-589	MDT Consultant Project Management	CTC & Associates LLC	Sillick	5/21/18	6/30/20	\$246,000	\$97,899

## Annual Programs

Project Number	Title	MDT Contact	Start Date	End Date	FFY 2019 Cost
ADMINISTRATION					
8010	Administration and Conduct of Research	Sillick	10/1/18	9/30/19	\$313,903
8020	Administration and Conduct of Research	Sillick	10/1/18	9/30/19	\$45,307
8021	Administration and Conduct of Research	Sillick	10/1/18	9/30/19	\$35,917
LOCAL TECHNICAL ASSISTANCE PROGRAM					
2443-036	Montana Local Technical Assistance Program (LTAP)	Sillick	7/1/18	6/30/19	\$380,000
TRANSPORTATION RESEARCH BOARD SUPPORT					
TPF-5(397)	TRB Core Services	Sillick	10/1/18	9/30/19	\$106,800
TPF-5(419)	NCHRP	Sillick	10/1/18	9/30/19	\$483,075

**STATUS KEY:** Active Completed Proposed

# Experimental Projects

All Experimental Projects are managed by Craig Abernathy.

Pending Experimental Projects have not yet been constructed. Proposed Experimental Projects do not yet have a project assigned.

Project Number	Experimental Project Number	Title	Project Type	Construction Year	End Date
IM 15-5(124)282	N/A	3/8" Asphalt Cement Mix Placement with No Chip Seal Evaluation	Asphalt Concrete Pavement Evaluation	2017	2022
STPP 87-1(11)0	MT-15-02	3D Synthetic Geocomposite for Added Subsurface Drainage Layer in Asphalt Cement Pavement Structure Evaluation	Geocomposite Application	2016	2021
STPP-NHTSA 3-3(23)6/STPP 9-1(20)40/ Maintenance Project	N/A	Bituminous Concrete Surface Treatments Evaluation	Pavement Surface Treatments	2014	2020
N/A	MT-17-04	Centerline Rumble Strip Evaluation	Centerline Rumble Strip	2017	2022
STPP 6-1(156)99/ STPP 6-1(154)109	MT-19-02	CRS-2P and CHFRS-2P Emulsion Comparison on Chip Seal	Chip Seal (CS) Performance	2017	2020
NH 12-1(20)0, UPN 8762000	MT-15-01	Fog Seal Chip Retention Evaluation	Fog Seal on Chip Seal	2017	2022
IM 90-1(220)6	MT-18-02	Fog Seal Over Chip Seal Evaluation	Fog Seal on Chip Seal	2017	2022
HSIP 52-2(38)49 HSIP 16-2(14)47 STPP 45-1(26)0 HSIP 52-2(44)31	MT-12-10 13-01 14-05 N/A	High Friction Surface Treatments for Bridge Decks Evaluation	Poly-Carb Mark: 135 Safe-T-Seal/163 Flexogrid	2014 2014 2014 2015	2020 2020 2019 2020
STPP 86-1(55)10	MT-19-03	JOINTBOND Asphalt Joint Stabilizer	Centerline Joint Stabilizer Treatment	2019	2020
UPPIP 1017(2)7/ UPPIP 1029(4)	MT-18-03	Reinforcing Fibers in Plant Mix Asphalt Cement Evaluation	Sasobit-Aramid Fiber Reinforced Asphalt Cement	2018	2023
IM 90-1(215)0	N/A	Seal Coat Asphalt Emulsion (or Fog Seal Coating) Over Chip Seal for Improved Chip Retention Evaluation	Work Type: 183 – Resurfacing – Seal and Cover	2015	2020
UPN 9370	MT-18-02	Sinusoidal Centerline Rumble Strip Evaluation	Centerline Sinusoidal Rumble Strip	2018	2023
IM 90-1(205)59 – Work Type 312: Structure Safety	MT-13-14	Sprayroq SprayWall Polyurethane Applied Culvert Rehabilitation Evaluation	Culvert Rehabilitation	2017	2022
STPP 17-1(10)11	MT-18-05	T15 Base One Soil Stabilization Evaluation	Full-Reclamation Chemical Soil Stabilization	2018	2023
STPP 17-1(7)0	MT-13-13	TenCate Mirafi H2Ri – High-Strength Woven Geosynthetic with Wicking Capability to Mitigate Frost Heave Distress Evaluation	Frost Heave Mitigation	2016	2021
8978000 UPP 5201(24)	MT-17-03	TenCate Mirafi MPV400 Polypropylene Nonwoven Geotextile Evaluation	Milled Overlay with Paving Fabric	2017	2022
NH 92-1(12)0	MT-14-07	Centerline Contrast Striping and the Addition of High-Visibility Striping Material Evaluation	Enhanced Pavement Markings	2015	2019

**STATUS KEY:** Active Completed Pending Proposed

## Experimental Projects (continued)

Project Number	Experimental Project Number	Title	Project Type	Construction Year	End Date
BH STWD (043) - CN 6837000	MT-13-05	<a href="#">Kwik Bond 1121 Polyester Polymer Concrete Overlay Evaluation</a>	Bridge Deck Rehabilitation	2014	2019
IM 15-6(43)323 and STPS 218-1(11)0	MT-18-03	<a href="#">Crafco Mastic One Joint Sealer Evaluation</a>	Crack Seal and Pavement Repair	Pending 2019	TBD
NHIP-NHPBIP 8-4(66)86 STPP 6-1(126)57	MT-14-01	<a href="#">Electric Wildlife Deterrent Mat</a>	Wildlife Crossing Structure	Pending 2019	TBD
NH 1-6(123)355	MT-18-05	<a href="#">High Float vs. Polymer Modified Emulsion Seal and Cover With and Without a Fog Seal</a>	Fog Seal/Chip Seal Emulsion Comparison	Pending 2019	TBD
STPP 86-1(27)0	MT-17-05	Nomaflex Concrete Joint Filler Evaluation	Concrete Expansion Joint	Pending 2019	TBD
UPN 7953	MT-18-07	Reflective Cracking in Cement-Treated Bases Minimization by Microcracking Evaluation	Cement Treated Base	Pending 2019	TBD
IM 94-6(59)193	MT-18-06	Surfacing In-Slope Treatment Evaluation	Top Soil Surfacing Comparison	Pending 2020	TBD
N/A	N/A	Expanded Polystyrene Geofoam Blocks as Lightweight Fill	N/A	N/A	N/A
N/A	N/A	Prefabricated Steel Truss/Bridge Deck System	N/A	N/A	N/A
N/A	N/A	Portland Cement Concrete Pavement Over Existing Cement Treated Base	N/A	N/A	N/A
N/A	N/A	Weather-Activated Detection System	N/A	N/A	N/A
N/A	N/A	Roundabout Striping Durability	N/A	N/A	N/A
N/A	N/A	Yellow-Dyed Concrete Curbing to Replace Epoxy-Applied Curbing	N/A	N/A	N/A
N/A	N/A	Texas Underseal with Added Scrub Seal	N/A	N/A	N/A

## Transportation Pooled Fund Studies

Study Number	Title	MDT TAC Member	Lead Agency	# of Partners	Start Date	End Date	Total MDT Commitment	FFY 2019 Expended
TPF-5(299)	<a href="#">Improving the Quality of Pavement Surface Distress and Transverse Profile Data Collection and Analysis</a>	Padmos	FHWA	29	1/1/17	1/31/19	\$75,000	\$15,000
TPF-5(313)	<a href="#">Technology Transfer Concrete Consortium</a>	Needham	IA DOT	36	2/5/15	3/31/21	\$60,000	\$12,000

**STATUS KEY:** Active Completed Pending Proposed

# Transportation Pooled Fund Studies (continued)

Study Number	Title	MDT TAC Member	Lead Agency	# of Partners	Start Date	End Date	Total MDT Commitment	FFY 2019 Expended
TPF-5(316)	Traffic Control Device (TCD) Consortium	Brelin	FHWA	28	1/14/15	1/14/21 (contract)	\$50,000	\$10,000
TPF-5(349)	Western Alliance for Quality Transportation Construction (WAQTC)	Metcalfe	UT DOT	11	6/27/17	9/30/21	\$48,000	\$12,000
TPF-5(353)	Clear Roads Phase II	McBroom	MN DOT	36	1/1/17	12/30/21	\$125,000	\$25,000
TPF-5(376)	Northwest Passage Phase #4	Warren	MN DOT	6	2018	2022	\$100,000	\$25,000
TPF-5(391)	Comprehensive Field Load Test and Geotechnical Investigation Program for Development of LRFD Recommendations of Driven Piles on Intermediate GeoMaterials	Helm	WY DOT	7	2/19/19	12/31/23	\$45,000	\$15,000
TPF-5(393)	Pooled Fund for the Design, Development and Testing of a Box Beam Approach Guardrail Transition and an MGS Approach Guardrail Transition to a MASH TL-4 Three Steel Tube Bridge Rail	Stoner	WY DOT	2	Not Available	Not Available	\$250,000	\$250,000
TPF-5(394)	Western Maintenance Partnership – Phase 3	McBroom	UT DOT	6	1/2019	6/2024	\$15,000	\$5,000

## AASHTO Technical Services Programs

Title	MDT Contact	Annual MDT Funding
AASHTO Equipment Management Technical Services Program (EMTSP)	Kerttula	\$5,000
AASHTO Innovation Initiative (AII) Technical Services Program	Sillick	\$6,000
AASHTO Load and Resistance Factor Design (LRFD) Bridges and Structures Specification Maintenance (LRFDSM) Technical Services Program	Brandenberger	\$15,000
AASHTO National Transportation Product Evaluation Program (NTPEP) Technical Services Program – includes AASHTO Product Evaluation List (APEL)	Metcalfe	\$20,000
AASHTO Re:Source (formerly Materials Reference Library (AMRL) Technical Services Program)	Metcalfe	\$20,000
AASHTO Technical Service Program to Develop AASHTO Materials Standards (DAMS)	Metcalfe	\$10,000
AASHTO Transportation System Preservation Technical Services Program (TSP2)	Padmos	\$20,000

## Library Collection Analysis by Item Type

The MDT Library and technology transfer functions, managed by Bobbi deMontigny, are located within the Department's Research Programs to capture and make accessible transportation-related information, particularly that which relates to the needs of MDT staff.

Item Type	Number of Items
Book	21,602
CD	400
Digital	4,818
DVD	258
Journal	339
Kit	41
Map	5
Media-Equip	10
OverDrive	360
Pamphlet	13
<b>TOTAL</b>	<b>27,846</b>

STATUS KEY: Active Completed Proposed



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To view the MDT Research Programs Annual Reports, please visit the MDT website at [www.mdt.mt.gov/research/annual\\_report.shtml](http://www.mdt.mt.gov/research/annual_report.shtml).

## RESEARCH PROJECTS

28

Active research contracts

2

Research project reports

5

Number of new research projects in 2019

9

MDT-supported pooled fund studies

67

Active Technical Panel members

## EXPERIMENTAL PROJECTS

16

Active experimental contracts

2

Experimental project reports

2

Number of new experimental projects in 2019

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