Montana Department of Transportation
Research Programs
November 2019

EXPERIMENTAL PROJECTS CONSTRUCTION REPORT AND ANNUAL EVALUATION

T15 Base One Soil Stabilization

Location:	Glendive District/Valley County-City of Nashua: Montana Route 117 (P-17)
Project Name:	Milk River – North
Project Number:	STPP 17-1(10)11
Experimental Project:	MT-18-05
Type of Project:	Full-Reclamation Chemical Soil Stabilization
Principal Investigator:	Craig Abernathy: Experimental Project Manager (ExPM)
Construction Date:	June/July 2018
Date of Inspection:	September 2019

Description

The project is located on Montana Route 117 (P-17) in Valley County from the north end of the Milk River bridge extending north approximately 1.91 miles to the new alignment and intersection of MT 117 and (NHS/NI) US2. Test sections will also include the old stretch of MT 117 through the town of Nashua (Front and Sargent STS).

The pavement sections located on this project were in variable condition with significant cracking, large partial and full-width patched sections and isolated repaired potholes. The pavement was generally termed as in poor to fair condition. It was decided that a full-depth reclamation was needed to restore the efficacy of the pavement and to employ a soil stabilizer to enforce the integrity of the pavement structure.

Experimental Design

The chosen soil stabilizer (SS) is Team Labs T15 Base One; a proprietary blend of Silicic Acid and Sodium Salt. Six (6) test sections were installed on the project. A road reclaimer will be used for pavement reclamation and for the homogeneous mixing/injection of the SS. The SS application rate was set at 0.005 (0.5%) gallons per square yard per inch of reclamation depth.

A Tetra Tech representative; one of the sub-contractors on the project, were on hand to assist and monitor the reclamation and application phase of the Base One soil stabilizer.

Refer to page eleven (11) for a general representation of the project sections layout.

The supplemental section on page thirteen (13) provides additional information on pavement section thicknesses.

Evaluation Procedures

Construction Documentation (June/July) 2018: As applicable the Research Section will document the construction methods and equipment, material placement, and specification conformance etc.,

Post Documentation: Research staff will conduct full site inspections annually (late fall) to document visual appearance of the pavement. In addition to include any maintenance or other Department inspection information associated with this project.

A JILS Falling Weight Deflectometer (FWD) test; conducted by the Pavement Analysis Section of the Departments Material Bureau performed after AC paving, is currently under analysis. Any information from that investigation will be added to this report when available.

Evaluation Schedule

Research will monitor and report on performance for a minimum period of five years annually, with every year up to *ten years (informally). This is in accordance with the Department's "Experimental Project Procedures". Delivery of a construction/installation report, interim, annual or semi-annual reports is required as well as a final project report (responsibility of Research). A web page will be dedicated to display all reporting from the project.

2018:	Installation/Construction Report
2019-2022:	Annual Inspections/ Annual Evaluation Reports
2023:	Final Evaluation/Final Report

*If considered the extra data collection and analysis will add value to the overall results of the project.

Process

The purpose of an experimental features report is to document the phases and events of any given project to gain the reader an understanding of the general activities required to install or incorporate the research element into an active construction or maintenance project as an in-service evaluation. This report also establishes a baseline for defining performance for any given feature under actual service conditions to determine its relative merits.

The following documentation is a general representation of the T15 Base One reclamation and application phase and subsequent paving. Unfortunately, Research was unable to be onsite to document the paving phase of the project.

September 2019 Site Inspection

The project has received a standard seal and cover (chip seal) since construction. To date no visible distress on any of the project sections was observed. The next inspection will take place in the spring of 2020.

Refer to page 10 for representative images of the project.

Pre-construction: August 2017

🡐 Representative images of pavement condition prior to reclamation. Areas of visible fatigue, distress, and excessive patching evident.

Area is north end (near US2) of Sargent St. view south towards downtown area.

🡐 Front St.; View west.

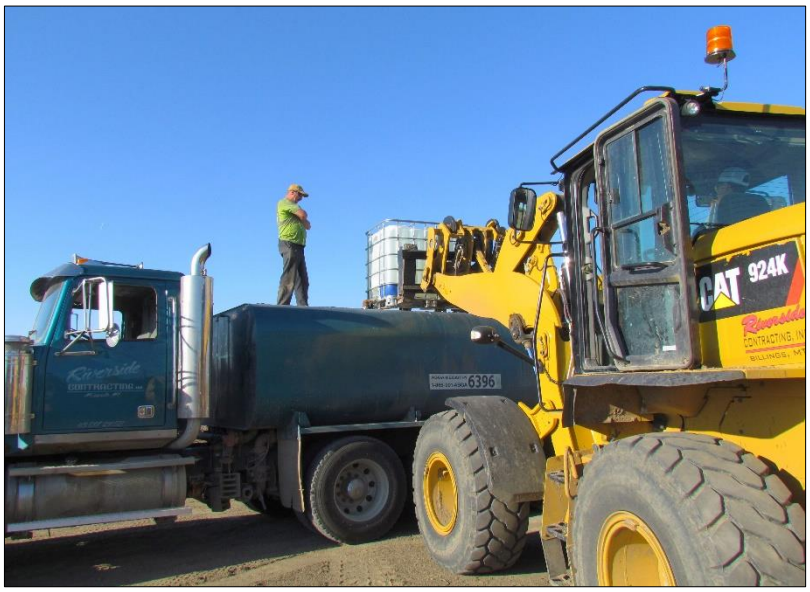
🡐 Front St. merge to MT 117: View west.

Base One Mixing and Blending Phase: July 2018

🡐 The T15 Base One was stored on-site in 275 gal. (1041 L) totes.

Note (red arrow), the totes were marked off in 25 gal. increments starting at the top to allow visual reference for the required amount of product to be added to the mixing truck.

🡐 Totes were lifted to the mixer using a payloader fitted with a fork lift.



🡐 The workman monitors the correct proportion of Base One to the water tank truck.

The Base One is added first to the tank. Then water is added, this insures adequate blending of the stabilizer to water.

🡸 A high-performance Wirtgen wr250 was utilized on the project for both reclamation of the existing pavement as well as the soil stabilization mixing phase.

This image shows the mixing phase in progress (Sargent St.).

🡸 Additional view of the Base One soil binder mixture in progress.

The wr250 uses a computer-controlled metering system to insure a homogeneous mix based on project specifications.

The Wirtgen wr250 is connected to the tank truck which doubles as the tow unit. If the tow speed varies the wr250 metering systems automatically adjust the stabilizer quantity for blending.

🡸 Rear view of the Wirtgen unit and blended base.

🡐 Completed pass (Sargent St.-view north).

Although not documented in this report; base compaction was accomplished using a nine-wheel pneumatic roller and drum roller sequentially.

🡐🡻 Representative images were taken several days after the stabilization phase was completed.

🡅 View of treated base approximately two weeks after compaction (Section 1, view south towards Milk River bridge).

🡇 Close-up of compacted base.

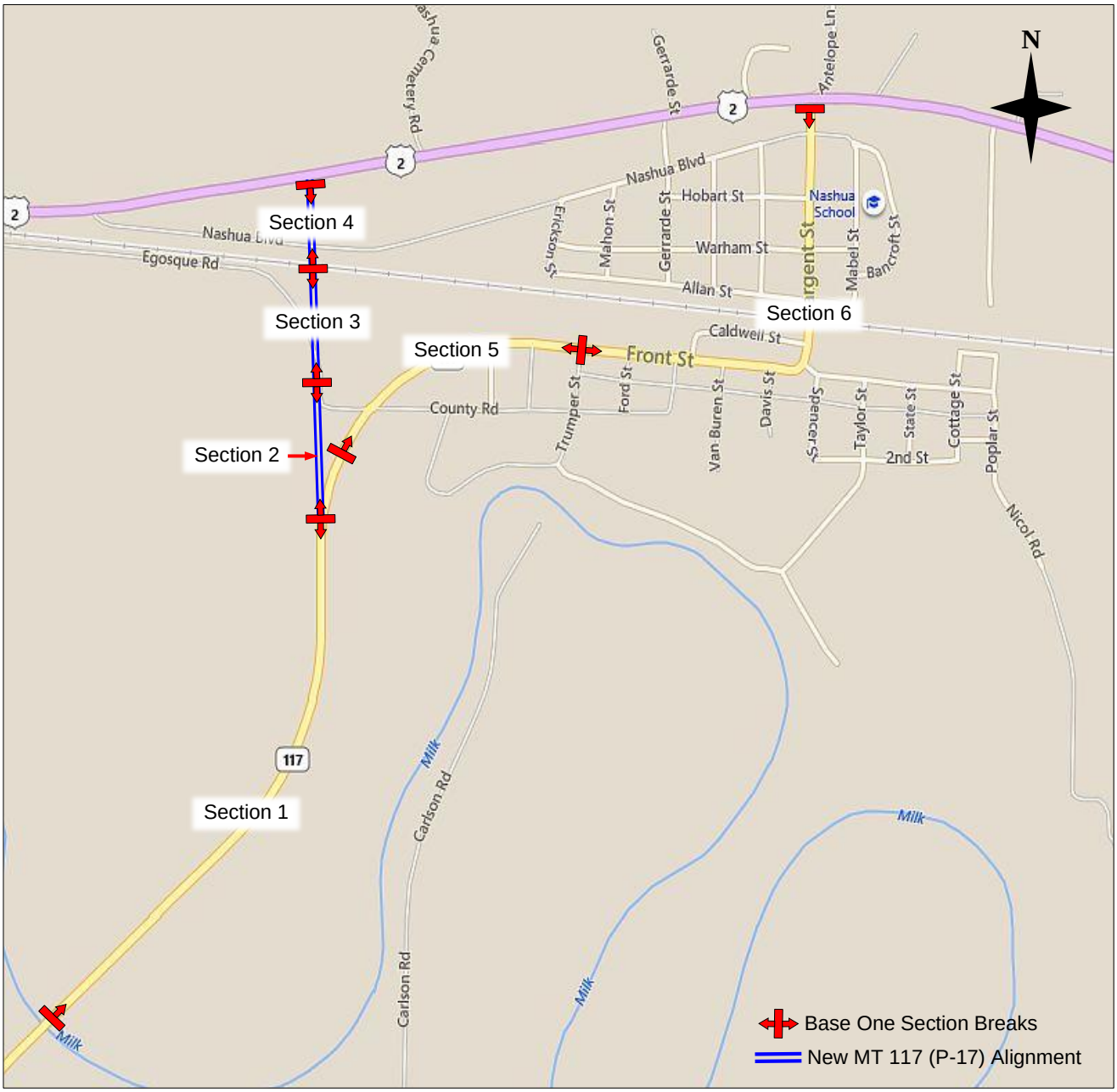
🡅 Representative image of completed paving phase of project (Section 6 - Sargent St.) view south.

September 2019 Site Inspection

🡅 Representative view of AC pavement after chip seal (Section 2, view north).

🡇 Section 6; view west, no project distress to report.

***Generalized T15 Base One Sections Diagram**



<u>City of Nashua, Montana; Valley County</u>

Section 1: 12" Full-depth Reclamation/8" Stabilization
Section 2: New base (DGAB) with 4" Stabilization
Section 3: New base (DGAB) with 4" Stabilization
Section 4: No Treatment
Section 5: New base (DGAB) with 7" Stabilization
Section 6: 8" Full-depth Reclamation/4" Stabilization

Note: All sections are delineated in the field

*****Not to scale; all values approximate

<u>Supplemental:</u> Project Sections Field Delineations

🡸 Each section is delineated by yellow markings as seen in these images.

They will be reapplied as necessary.

<u>Supplemental:</u> Section Information Supplied by Tetra Tech

Milk River North - Pavement Section Thicknesses			
Section	**Thickness (inches)**	**Material**	**Comments**
1	3.6	Asphalt	
1	6	Base 1 Stabilized Reclaimed AC/Base	
1	6	Reclaimed AC/Existing Base	Combine with lower layer for 8 inch thickness
1	6	Existing Base - Non-crushed	
1	Subgrade - 1st 1/3 of section nearest bridge	Silty Sand	
1	Subgrade - middle 1/3	PG Gravel with silt	
1	Subgrade - last 1/3	Lean Clay	
2	3.6	Asphalt	
2	4	Base 1 Stabilized Crushed Base	
2	7.4	Crushed Base - New	
2	Subgrade	Sand/Gravel Fill	
3	6	Asphalt	Bridge End - Thicker Asphalt
3	4	Base 1 Stabilized Crushed Base	
3	4.8	Crushed Base - New	
3	Subgrade	Sand/Gravel Fill	
4a	6	Asphalt	Station 644+57-646+24 - Bridge End Thick AC
4a	11.4	Crushed Base - New	Station 644+57-646+24
4a	Subgrade	Sand/Gravel Fill	Station 644+57-646+24
4b	3.6	Asphalt	Station 646+24-648+64
4b	11.4	Crushed Base - New	Station 646+24-648+64
4b	Subgrade	Sand/Gravel Fill	Station 646+24-648+64
5	3.6	Asphalt	
5	7	Base 1 Stabilized Crushed Base	
5	Subgrade	Fat Clay	
6	3.6	Asphalt	
6	4	Base 1 Stabilized Reclaimed AC/Base	
6	4	Reclaimed AC/Existing Base	Combine with lower layer for 8 inch thickness
6	10	Existing Base - Non-crushed	
6	Subgrade	Fat Clay	

Disclaimer

The use of a product and/or procedure in the course of an evaluation does not constitute an endorsement by the Department nor does it imply a commitment to purchase, recommend, or specify the product or procedure in the future.

Data resulting from an evaluation of an experimental feature is public information and will not be considered privileged. The MDT may, at its discretion, release all information developed before, during, and after an evaluation.