



Transportation Research Division



NovaChip on Route,5, Hiram, RLM 45

Interim Report 11-02

NovaChip Pilot Project

Route 5, Waterboro, Hiram & Brownfield

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Introduction

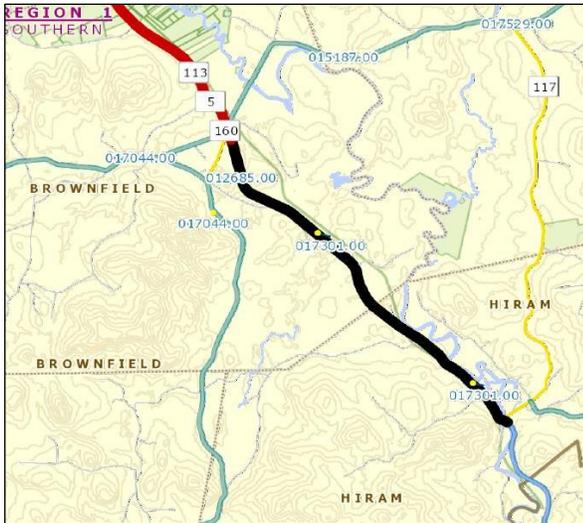
In July & August, 2010, MaineDOT conducted experimental applications of NovaChip on 16 miles of highway in western Maine. Novachip is a proprietary pavement process that applies an ultrathin, gap-graded, hot mix wearing course over a polymer rich asphalt emulsion in one pass using a self-priming paver. The process quickly secures the NovaChip to the existing surface and allows for minimal traffic delays. The polymer rich asphalt emulsion migrates into existing cracks to seal and fill them. The asphalt emulsion bonds the NovaChip material to existing pavement. The placement operation moves along quickly using a specialized paver that places material directly behind the spray bar. A 10 ton steel roller follows the placement to seat the stone immediately after the placement.¹



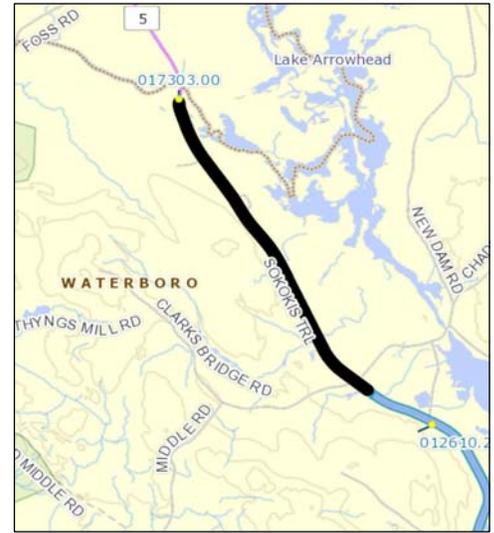
¹ NovaChip Whitepaper, March 1, 2010 by Richard Crawford.

Project Location

The sections chosen for the NovaChip experimental were estimated to have good rideability, favorable IRIs and low rutting. The network data indicated that IRI values ranged from 50 to 140 inches/mile. The existing PCRs ranged from 3.2 to 4.2, and the rut depths ranged from 0.1 to 0.3 inches in either wheel path with 0.1 being the typical depth. All three trial sites are located on Route 5, specifically: Brownfield to Hiram (7.06 miles, beginning at the intersection of Denmark Rd/Depot St. And extending 7.06 mi to the intersection of Main St./Portland St.);



Hiram to Brownfield (6.37 miles, beginning 0.11 of a mile north the intersection of Main St./Pequawket Trail and extending 6.37 miles to the intersection of Denmark Rd./Depot St.); Waterboro (2.5 miles, beginning at Chadbourn Ridge Rd., extending 2.58 mi. to 0.22 mi from the Limerick/Waterboro town line). The corresponding project numbers are STP-1729(900)X, STP-1730(100)X, and STP-1730(300)X. These locations are shown on the two location maps.



Before/After NovaChip Placement

Previous to this project, MaineDOT had used NovaChip only on Interstate projects. This rural two lane highway project was undertaken to gain experience with this promising technology and to determine how non-interstate applications would perform over time. This trial project led to some lessons learned that were not anticipated. The project is discussed in more detail in the Construction Report, dated February 2011, which is also available



on the MaineDOT website. The following photo shows before and after views at the north end of the project.

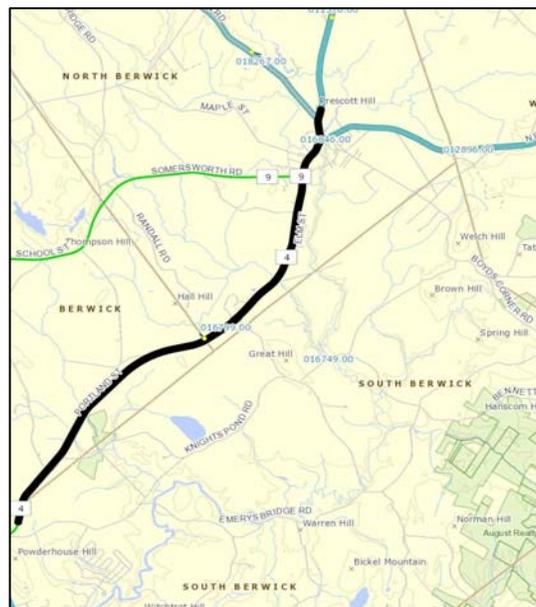
The photo on the next page shows the same section in 2011, a year later. Some signs of wear are evident.



Interim Monitoring

This trial application was considered a success. Several lessons were learned that should be applied to future NovaChip trials. The Construction Report mentioned above summarizes that information. This NovaChip pilot is being observed for performance over a five year period. This report includes data from the Departments ARAN.

In this report the NovaChip pilot is compared to a similar section of highway that was also completed in 2010 with a $\frac{3}{4}$ inch HMA overlay. The $\frac{3}{4}$ inch overlay completed on Route 4 between North Berwick and South Berwick, WSN 016799.00, is used as a comparison site in this report. The location of that overlay project is shown on the location map at right. For that project the 9.5 mm HMA material alone cost \$73,295 per mile. The material cost for the Novachip pilot project was \$81,862 per mile.



Photos

The following series of photos compare NovaChip to a comparable $\frac{3}{4}$ inch HMA overlay. Both series of photos are from the ARAN network collection files taken in 2011. At that time both projects were one year post paving.



Route 4 North Berwick area, 3/4 Inch HMA Overlay



Route 5 Waterboro NovaChip



Route 4 North Berwick area, 3/4 Inch HMA Overlay



Route 5 Waterboro NovaChip



Route 5 Brownfield NovaChip



Route 5 Brownfield NovaChip RLM 50.1



Route 5 Brownfield NovaChip RLM 49.4



Route 4 North Berwick, 3/4 Inch HMA Overlay, RLM 5.1



Route 4 North Berwick, 3/4 Inch Overlay at North Berwick

Conclusions/Recommendations

The visual comparison between the NovaChip sections and HMA placed during the same construction season is only an observation comparison without empirical data or analysis. In addition, this observational report does not include any analysis of possible differences in traffic volume or characteristics. Based on the limited observations presented here, some of the NovaChip sections have more longitudinal cracking and deterioration than the HMA sections on Route 4, which were paved during the same year as the NovaChip treatment. It is not known, however if the HMA sections had the same pre-paving condition in 2010, as the NovaChip sections. The choice of appropriate treatment for a given pavement condition remains a critical issue in pavement preservation. The NovaChip sections are showing areas of wheelpath cracking, transverse cracking, and other deterioration after one year of service. These areas should be observed in the future to watch for worsening conditions.

Prepared by:

Bill Thompson
Transportation Planning Specialist
Maine Department of Transportation
16 State House Station
Augusta, Maine 044333-0016
Tel. 207-624-3277
e-mail: william.thompson@maine.gov

Reviewed By:

Dale Peabody
Transportation Research Engineer
Maine Department of Transportation
16 State House Station
Augusta, Maine 04333-0016
Tel. 207-624-3305
e-mail: dale.peabody@maine.gov