STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION
BUREAU OF RAIL AND TRANSIT

CHIP SEAL & RR CROSSING BICYCLE TRANSPORTATION REVIEW ROUTE 302 & KANCAMAGUS HIGHWAY (ROUTE 112)

DATE OF FIELD REVIEW: September 29, 2015

LOCATION OF REVIEW: Hart's Location, Bartlett, and Albany

Fourth Iron Bridge Parking Area – Route 302

PARTICIPANTS:

Ralph Fiore, Mount Washington Valley Bicycling Club (MWVBC), President
Sally McMurdo, MWVBC, Director
John Higgins, MWVBC, Director
Harry Mann, MWVBC, Director
Tod Powers, MWVBC, Director
Glenn Ashworth, MWVBC, Member
Bruce Miller, MWVBC, Member
Ray Mitchell, MWVBC, Member
Erik Paddleford, NHDOT, Bicycle and Pedestrian Transportation Technician
Larry Keniston, NHDOT, Intermodal Facilities Engineer (State Bicycle and Pedestrian Coordinator)

INTRODUCTION:

A chip seal treatment was recently applied to an approximate 7 mile stretch of the Kancamagus Highway (Route 112) in Albany NH. As a result, the MWVBC wrote a letter, dated August 17, 2015 (Appendix A) to Acting

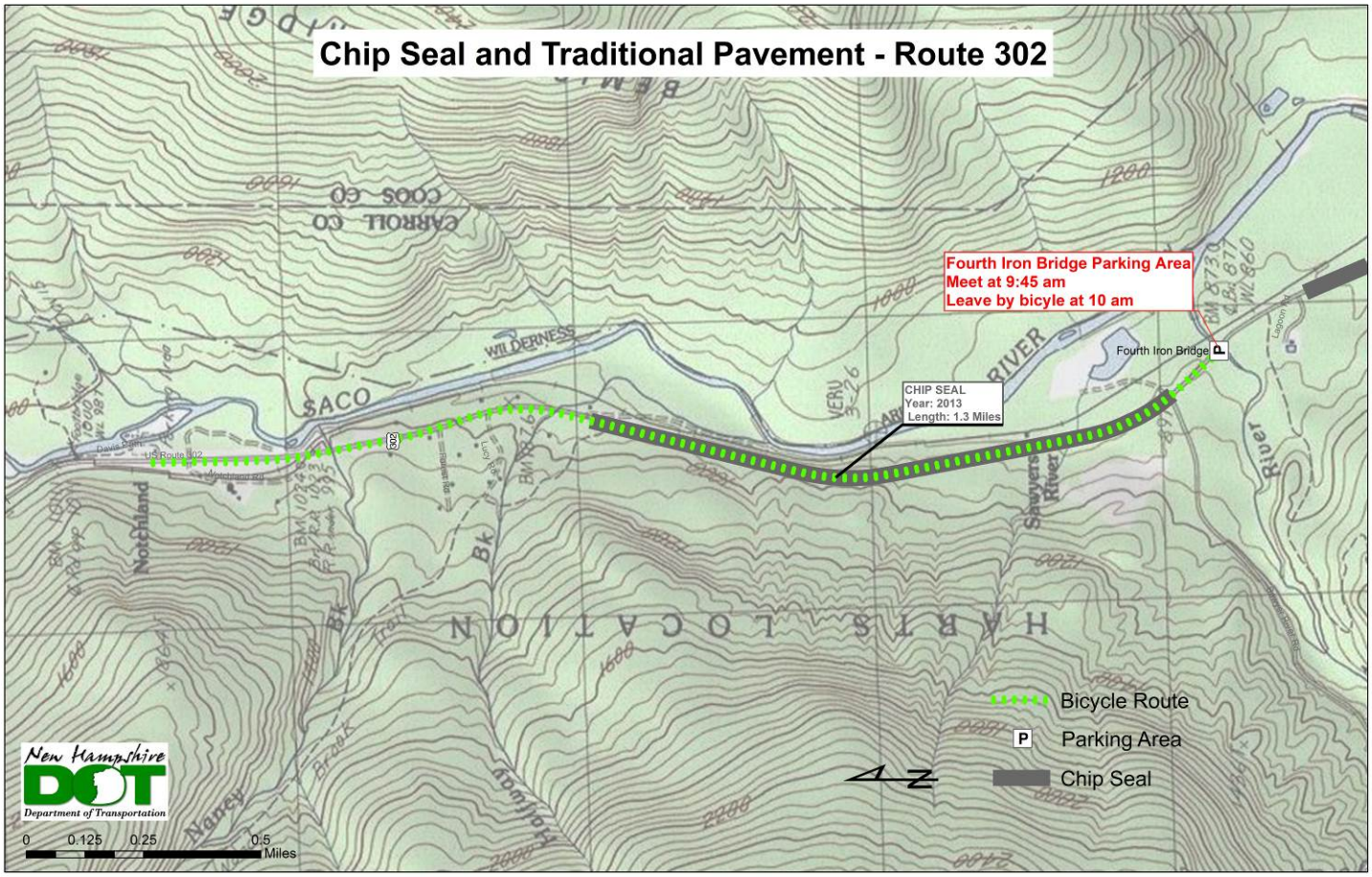
Commissioner Cass discussing the negative impacts this type of treatment has on bicycling. The Kancamagus Highway is an extremely popular bicycling route in the area and the club feels chip seal negatively affects all cyclists' experience, has a negative impact on bicycle tourism, and presents additional safety hazards not present before the chip seal treatment.

In order to mitigate some of these issues brought forth by the MWVBC in their letter, the Department tried additional treatments to the shoulder areas of the roadway. Of the approximately 7 mile project, approximately 3 miles (both shoulders) were treated with a fog seal using a cover aggregate, approximately 3 miles (both shoulders) were treated with a fog seal with no cover aggregate and approximately 1 mile was left untreated to provide a "control" section to compare against. These additional shoulder treatments were meant to smooth out the road surface by filling voids inherent in the chip seal surface in hopes of producing a more "bicycle friendly" surface. It was anticipated that the fog seal with cover aggregate would provide the smoothest surface, the fog seal would provide the next smoothest, and the untreated shoulder would be the roughest.

A bicycle field review intended to gather stakeholder feedback on the road surface, treatments, safety, and any other information that could be used to provide documentation on the suitability of chip seal to bicyclists was scheduled with members of the MWVBC. This review included bicycling on a chip seal treatment installed in 2013 on Route 302, a section of 302 with conventional pavement that was placed on the shoulder in 2006 and the travel lanes in 2009, and the section on the Kancamagus Highway installed this year with the additional shoulder treatments.

In addition to reviewing the chip seal areas, railroad crossings on route 302 were also observed and discussed. These crossings pose a risk to bicyclists due to their skew to the roadway and deteriorated pavement surfaces. Warning signs have been placed prior to the crossings to make bicyclists aware of the hazard, but additional signing and/or pavement markings are recommended to improve safety.

CHIP SEAL REVIEW NOTES:

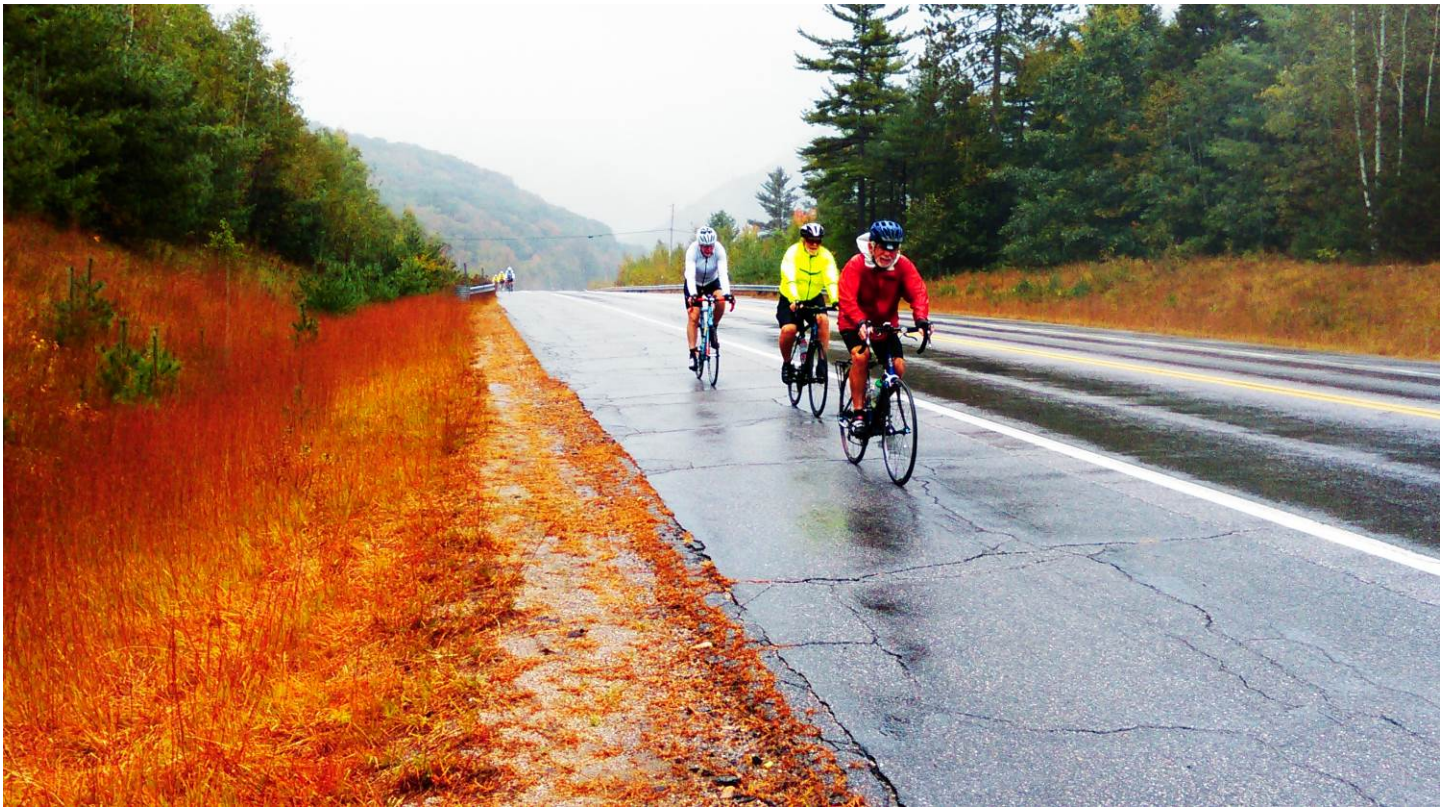


The group assembled at the Fourth Iron Bridge parking area and bicycled north from there, gaining elevation, toward the parking area just north of the Notchland Inn, approximately 2.5 miles away. Conditions were cloudy and rainy with temperatures in the low 70's. The group rode the chip seal treatment installed in 2013 that started just north of the parking area as well as the traditional pavement north of the chip seal. Evaluation forms were developed in order for review participants to provide feedback on the various road treatments. Road treatments were rated by participants for the parameters of pavement surface, vibration, resistance/ speed reduction, noise level, and the amount of aggregate/ debris present. Rating forms are included in the appendix. The chip seal here as well as the chip seal on the Kancamagus Highway both contain 18% asphalt rubber and 3/8" aggregate. This is consistent with the chip seal the Department now uses in all applications across the state.

Chip seal placed in 2013 – Route 302

It was noted that the chip sealed roadway caused bicyclists to be more inclined to ride to the left of the white line, in the travel lane, since that area was noticeably smoother and free of loose aggregate. Participants also noted increased vibration and rolling resistance contributing to bicyclists becoming fatigued more quickly. Overall, the group felt the chip seal created conditions that were less desirable for bicyclists than a comparable road paved using conventional methods.

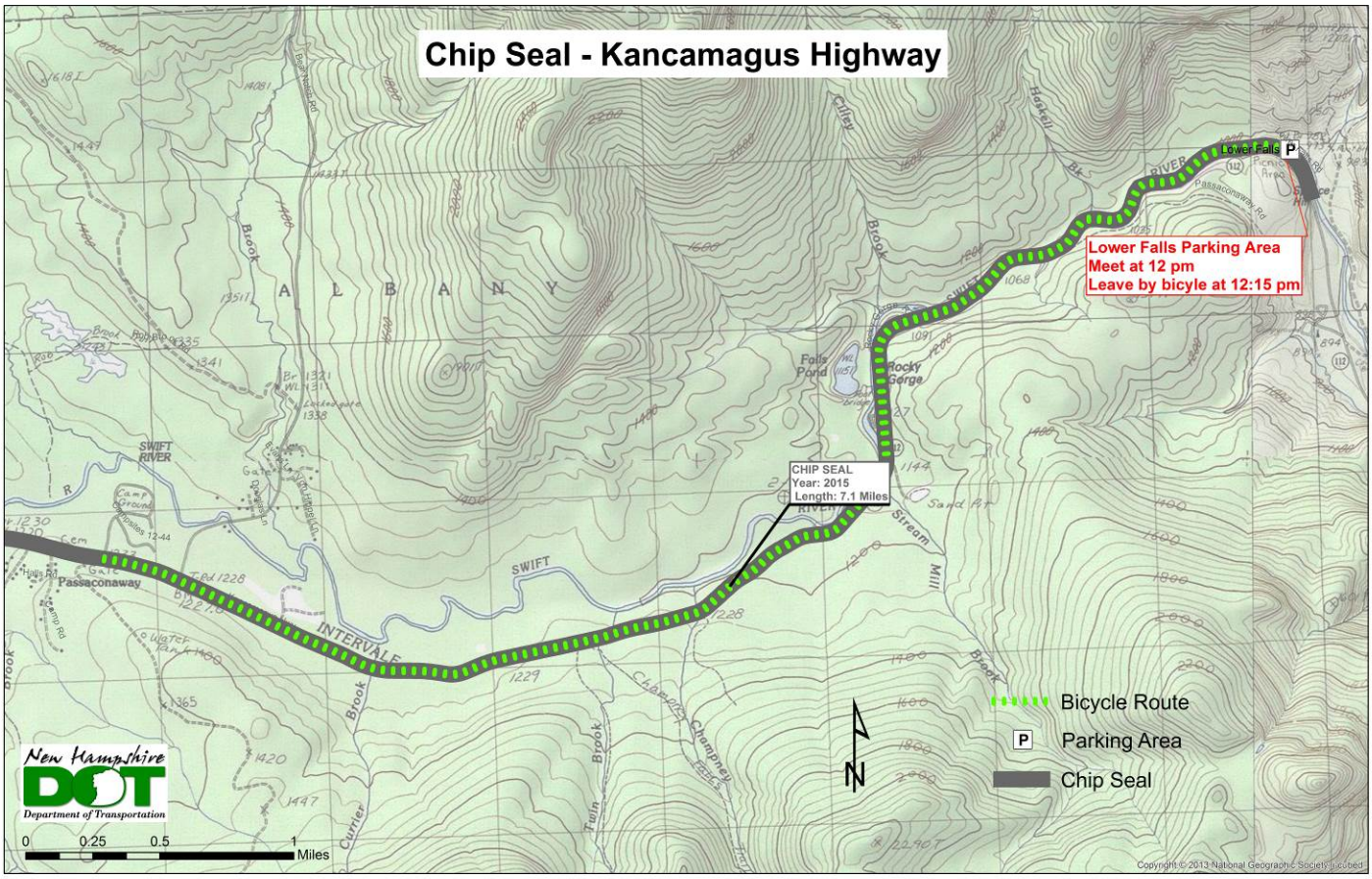
Chip seal placed in 2013 – Route 302



Conventional Pavement – Route 302 – Cracking visible in the shoulder but much preferred to the chip sealed surface

The group continued to the north riding a section of roadway with conventional pavement. The shoulder pavement dates back to 2006, the travel lanes were more recently paved in 2009. Participants commented that even with the amount of cracking present in the conventional pavement, the road surface was much more conducive to bicycling. Virtually no debris was evident in the shoulder and there was no chance of loose

aggregate present like there was with the chip seal. The group did not feel the need to ride in the travel lane, as was the case with chip seal, since the shoulder was relatively smooth and free of debris. The group turned around at the parking area just north of the Notchland Inn and descended back to the Fourth Iron Bridge parking area. Overall, participants overwhelmingly preferred the conventional asphalt surface to the chip seal. From here the group drove to Bartlett to review several railroad crossings for bicycling safety concerns (see rail crossing review section of this report). After reviewing the railroad crossing locations, the group drove to the Kancamagus Highway via Bear Notch Road.



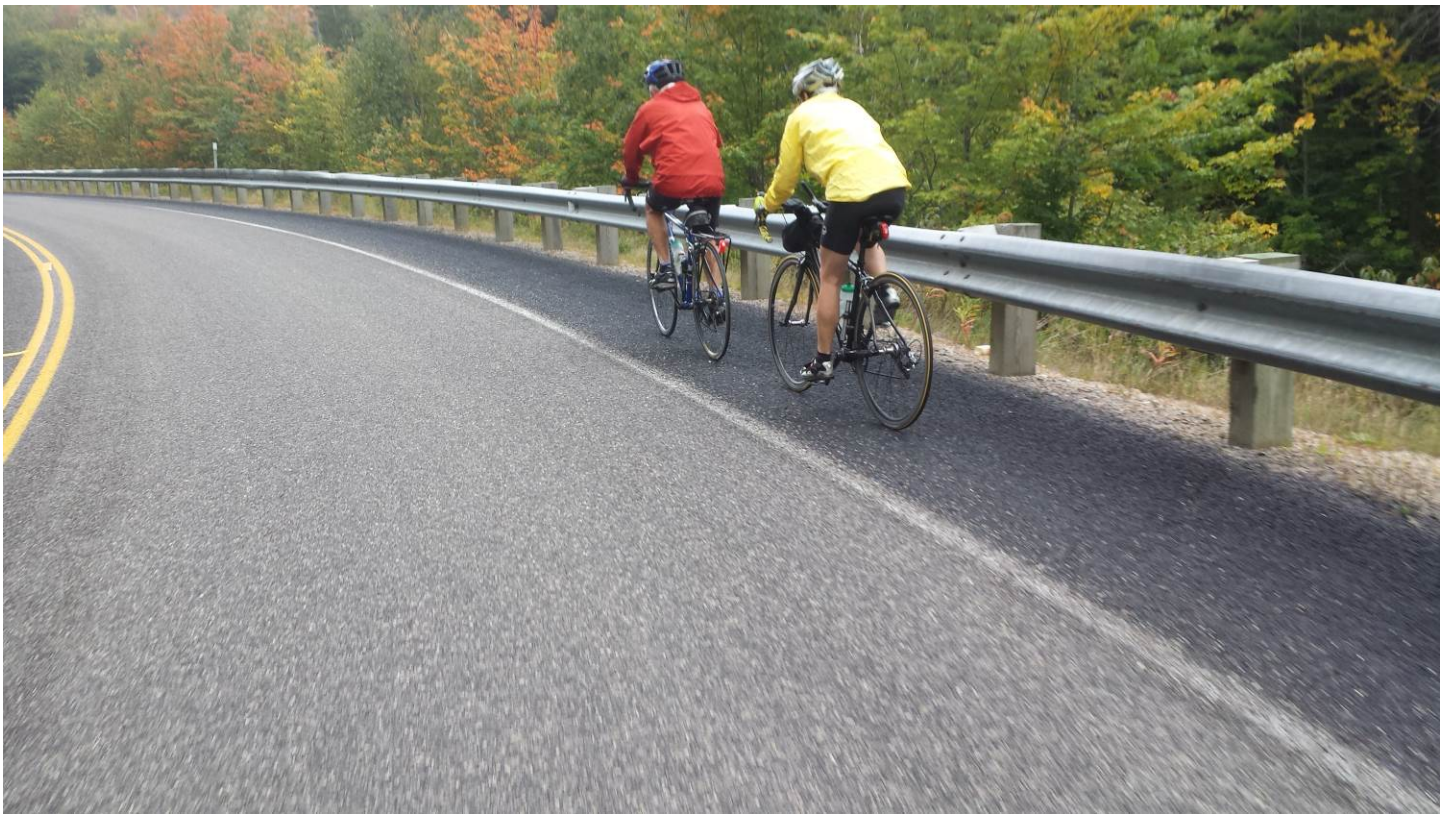
The group assembled at the Lower Falls Parking Area on the Kancamagus highway and headed west to review and evaluate the chip seal and the various shoulder treatments placed in order to decrease the roughness of the shoulder surface for bicyclists. The weather continued to be rainy with temperatures in the low 70's. Starting from the east, the first approximately 3 miles of the chip seal had shoulders treated with a fog seal and cover aggregate, the next 3 miles had shoulders treated with fog seal and the last 1 mile had no additional treatment applied to the shoulders.

The group ascended from the parking area heading west on the sand seal. Loose aggregate was observed in the shoulder area, especially on the outside of curves. Bicycling through areas of loose aggregate resulted in aggregate being carried up by the bicycle wheels and bouncing off the bicycle frame. Vehicle tires could also cause the loose debris to become airborne, potentially hitting a bicyclist. Participants were inclined to ride on the relatively smoother surface of the travel lane to the left of the white fog line. It was difficult to tell in the rain, but the treated shoulder aggregate may have been slightly tackier than the untreated aggregate in the travel lane. The group continued west riding the fog seal and continuing on to the untreated shoulder section.

Having ridden the three test sections (fog seal with cover aggregate, fog seal, and no treatment) the group thought, in general, the chip seal was a much harsher surface to ride a bicycle. All evaluation parameters generally increased or were comparable to the chip seal on Route 302 and differences between the fog seal with

aggregate, fog seal, and standard chip seal were deemed negligible. The travel lane was preferred to the shoulder area.

Chip seal placed in 2015 with fog sealed shoulder – Kancamagus Highway



Chip seal placed in 2015 with fog sealed shoulder – Kancamagus Highway

Fog Seal with Cover Aggregate – Kancamagus Highway

"Black Beauty" cover aggregate – used with the fog seal

CHIP SEAL CONCLUSIONS:

While chip seal is a sound and cost effective pavement preservation technique used by NHDOT, it should be noted that chip seal is not preferred by bicyclists for many reasons. Safety is diminished as a bicyclist is

inclined to ride in the travel lane where the surface is smoother and contains less debris than the shoulder area. This can in turn force motor vehicle drivers into oncoming traffic and/ or pass a bicyclist closer than the minimum 3-feet proscribed by state law. The rougher surface creates the need for additional effort and increases rider fatigue when compared to conventional pavement. While the Department did take steps to attempt to mitigate for the negative impacts for bicyclists that come with chip seal on the Kancamagus paving project, participants stressed that special consideration should not only be given to bicyclists in general but also to highways that have importance to bicycle tourism when a pavement preservation project is planned and implemented.

PARTICIPANT COMMENTS:

Specific comments:

Chip Seal – Route 302 – 4rth Iron Bridge Parking Area to Lucy Road

1. The car travel lane was much better than the cycle/breakdown lane, causing me to ride in the car lane…dangerous.
2. Has improved since it was first done, but still rough. Less debris in the shoulder area since I rode it in the spring. Downhill resistance was noticeable.

Conventional Pavement – Route 302 – Lucy Road to Notchland Inn

1. This was older cracked pavement, but much smoother riding than chip seal with much less vibration and easier to ride…I could stay riding in the breakdown lane.
2. Cracks were bumpy, but overall ride was smoother, rolling resistance was less. This section hasn't been repaved in quite a while.

Chip Seal – Sand Seal Shoulder Treatment – Kancamagus Highway

1. This was the worst of all sections, whether from the sand sealing, or just the original chip sealing. This was the roughest and most difficult to ride; the road next to the breakdown lane was better, but not much.
2. The worst of all the sections. Lots of vibrations, roughness, and resistance, which was worse on the downhills.

Chip Seal – Fog Seal Shoulder Treatment – Kancamagus Highway

1. Not much better than sand seal, but slightly.
2. Only slightly smoother than sand seal. Debris more noticeable on the right side. Smoother riding near, on, or to the left of the white line.
3. Water pooling at fog line area in some areas.

Chip Seal – No shoulder treatment – Kancamagus Highway

1. Somewhat better than sand seal and fog seal, but not much.
2. Much like sand seal and fog seal sections.
3. Water pooling at fog line area in some areas.

General Comments:

Very difficult and tiring to ride, especially up hill. All chip sealed sections, regardless of treatment, produced enough vibration to cause my hands and arms to "fall asleep". The downhill chip sealed segments were very dangerous as vibration caused me to lose come control of my bike, especially with continuous braking and vibration causing front wheel play. This causes me to ride in the travel lane which is unsafe at best.

This was the first time I've ridden on the Kancamagus Highway since it was chip sealed. I was shocked at how rough it was and how much rolling resistance there was. I realized that this chip seal has ruined

riding on both Route 302 in Crawford Notch and the Kancamagus Highway for me. It's just not fun anymore and too much work and discomfort. I don't even think wider tires will make it much better.

I suggest the MWVBC Board brainstorm possible solutions with DOT to improve the surface and smooth out and sweep debris. There should also be a mechanism in place where local authorities are informed of paving projects, especially chip seal, and that information is shared with all road users before the project begins so that we can give input before, not after.

The pedaling efficiency and speed is reduced by 15 to 20%, which also translates into more fatigue and less situational awareness.

After riding on the chip seal for a while and finally reaching the regular pavement, your whole body relaxes and a huge sigh of relief occurs.

Evaluation Forms:

Each participant completed an evaluation form for each of the five roadway sections reviewed that included categories for pavement surface roughness, vibration, resistance/ speed reduction, noise level, and loose aggregate/ debris present. Graphs of the results are included in the appendix. Results showed the worst surface to bicycling was the chip seal with the fog sealed shoulders with cover aggregate while the best, not surprisingly, was the conventional pavement.

The additional shoulder treatments used on this project to attempt to smooth out the shoulder surface for bicyclists were identified by participants as being worse than just the chip seal alone. It should be noted that the fog seal with the aggregate cover was anticipated to provide a smoother surface than the fog seal or untreated chip seal, but the opposite turned out to be the case. The fog seal with cover aggregate was rated as the worst surface for bicyclists, the fog seal was rated the next worst, with the untreated chip seal rated as slightly better for bicyclists than either the fog seal with cover aggregate or the fog seal.

CHIP SEAL RECOMMENDATIONS:

Various ideas on how the chip seal projects could be improved and how other pavement preservation techniques might be used were discussed with bicycle review participants and with NHDOT pavement management staff.

The following are some suggestions that could improve future pavement preservation projects:

1. Sweep shoulders again in the spring to remove aggregate dislodged during the winter maintenance season.
2. Conduct additional compaction of the shoulder areas during installation to provide a surface that is as smooth as the adjacent travel lane. This can only be undertaken for shoulder widths of 8-feet or greater.
3. Since the chip seal is placed in two passes; one pass for the travel way and one pass for the shoulder, use a smaller aggregate gradation (1/4") for the shoulder area. The smaller aggregate would, in theory, create a smoother surface.
4. The fog seals with or without cover aggregate did not appear to address bicyclists concerns in the applications used on the Kancamagus Highway. The treatments applied in this manner are not recommended to address bicyclists concerns for future chip seal applications. The contractor could try applying the fog seal using a higher application rate and could explore different means and methods for broadcasting the cover aggregate. The use of a different cover aggregate could also be tested.
5. If a list of popular/ heavily used/ tourist bicycle routes can be determined throughout the state, use another pavement preservation technique that is more "bicycle friendly" than a chip seal. Other

preservation treatments like bonded wearing course, thin lift pavement, and slurry seal may be considered.

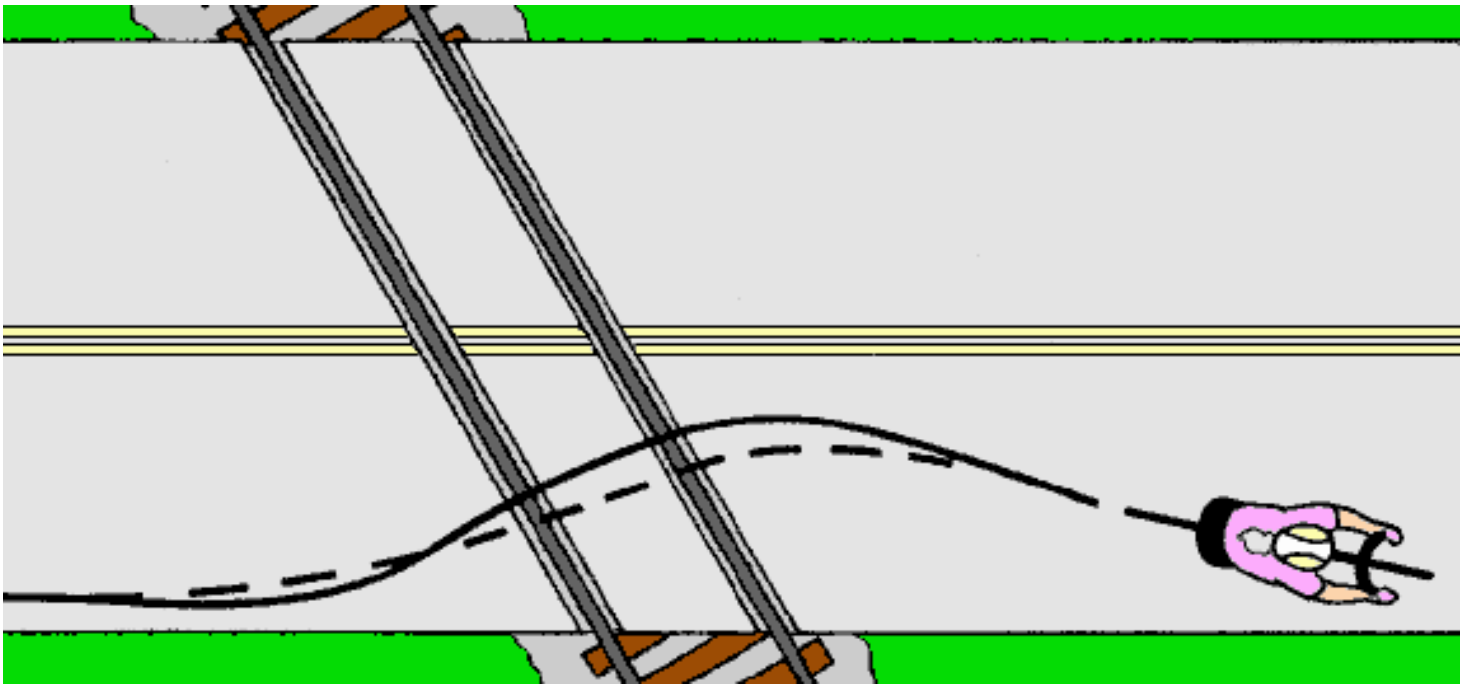
6. Use a softer grade asphalt cement (AC) for chip seals placed in the northern part of the State. The softer grade AC will expedite the wear in process by allowing the stone chips to embed deeper.

RAILROAD CROSSING REVIEW NOTES:

Several railroad crossings in Bartlett were discussed during this review including two railroad crossings on Route 302. It should be noted, however, that a third railroad crossing near Bretton Woods ski area is just as problematic for bicyclists and any improvements should include this crossing as well.

The rail road crossings are skewed making crossing safely on a bicycle difficult. Bicycle club members noted several crashes occurring over the years. Broken and cracked pavement has created large gaps adjacent to the rails, exacerbating the crossing hazard. It is recommended that bicyclists cross railroad tracks as close to perpendicular as possible to avoid having a tire get stuck in the gap adjacent to the rail, but the skew of these tracks makes perpendicular crossings difficult. To cross the tracks perpendicularly, a bicyclist would need to turn into the travel lane. Motorists on this stretch of road travel relatively fast making bicyclists less inclined to enter the travel lane to negotiate the crossing more safely. The safest way for a bicyclist to cross railroad tracks is to dismount and walk across; however signing notifying bicyclists of this maneuver are not present.

This area is a popular region for bicycle tourists and several bicycle events also occur throughout the year on this stretch of Route 302. Bicyclist of varying ability and familiarity with railroad crossings are likely in the area.



Perpendicular railroad track crossing is recommended

1. Near Pine St. and Route 302

2. Garland Ridge Road, Alpine Village Road, and Route 302

3. Attitash – Bear Peak Access Road

4. Warning sign at crossing of Garland Ridge Road, Alpine Village Road, and Route 302

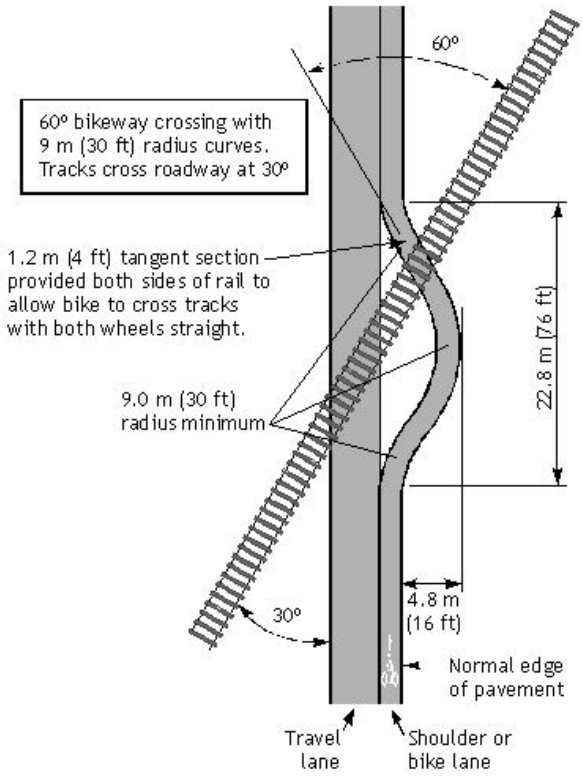
CROSSING RECOMMENDATIONS:

Participants thought more signing and/or pavement markings warning bicyclists of the hazard are needed. The sign above is considered somewhat helpful but doesn't necessarily relay how skewed the tracks are and bicyclists may not see the sign if they are concentrating on the road ahead.

One potential safety improvement could be to install a bicycle lane similar to the photo at right that would provide a bicyclist a more perpendicular crossing approach.

Additional signing informing bicyclist the safest way to cross is to dismount and walk their bicycle across the railroad tracks is recommended. Examples of suggested signing are provided below.

It was suggested that installing a "rubberized crossing" similar to what is installed at the crossing at Attitash – Bear Peak would improve the crossing for bicyclists by decreasing the gap space between the pavement and the rail in turn decreasing the chance a bicycle tire could be drawn into the rail channel.



Potential Spot Treatments and Safety Improvements

- Hills and Curves
  - Shoulder improvements
  - Signage
- Railroad crossings
  - Signage
  - Pavement Markings
- Bridges
  - Signage
- Signage
  - Wayfinding
  - Directions
  - Regulatory

Appendix

Mount Washington Valley Bicycling Club
PO Box 12
Intervale, NH 03845-0012
mwvbc@mwvbicyclingclub.org
www.mwvbicyclingclub.org

August 17, 2015

Commissioner William Cass
New Hampshire Department of Transportation
PO Box 483, 7 Hazen Drive
Concord, NH 03302-0483

Dear Commissioner Cass:

The Mount Washington Valley Bicycling Club is a 115 member cycling club located in the White Mountain area as well as a 501(c) 3 nonprofit organization. The mission of our club is "to promote safe cycling, unite cyclists and foster youth cycling throughout the Mount Washington Valley." To that end, we are voicing serious concerns regarding the decision to chip seal a 6.6 mile section of RT 112, Kancamagus Highway, from Oliverian Brook to Passaconaway Road (Reference #PP01). This section is an integral part of popular cycling routes used by Valley visitors, tour companies, local cyclists, and our club. It is identified on the NH Bicycle Map-White Mountain Region as part of "Recreational Loop 203" (Bear Notch Loop) as a scenic bike route. In addition, major fundraising events like the Tin Mountain Century, Crank the Kanc Time Trial, and Northeast Passage Three Notch Century also ride this segment.

The NH DOT's decision to chip seal this section of road and other NH cycling routes will negatively affect all cyclists' experience, impact cycle tourism, and present safety hazards.

Our overriding concerns arising from chip sealing any road regularly used by cyclists are:

1) Safety is Compromised: Our experience with the RT 302 chip sealing toward Crawford Notch (another "recommended bike route") is that chip sealing deposits loose aggregate on the side of the road where bicyclists usually ride causing a safety hazard to cyclists by causing flats or falls. Increased injuries can occur when cyclists fall on this rough pavement. Cyclists can only avoid accumulations of aggregate by swerving around it on the left risking collision with fast moving vehicles. This risk is magnified when large groups cycle on these roads.

2) Ride Quality is Diminished: Chip seal significantly increases bicycle vibration causing fatigue, it increases rolling resistance that increases pedaling effort, and it accelerates tire wear due to rough aggregate surface.

As a cycling club whose members are largely New Hampshire taxpayers, we recognize there needs to be a cost / benefit balance related to road maintenance. It is our understanding that chip seal is routinely considered for use on roads that support lower traffic volumes. However, the inherent conflict is that it is these less traveled roads that are preferred by cyclists looking to avoid vehicle traffic.

Members of our board would like to meet with you as soon as possible to discuss our concerns. In the future, we also would like to work with NH DOT and NH Bicycle and Pedestrian Transportation Advisory Committee to establish a process to discuss concerns of cyclists. We believe that our goals to promote quality of life and tourism in New Hampshire are aligned, but we believe that the execution of this vision could be improved with better input and dialogue among everyone.

Sincerely,

Ralph Fiore
President
Mount Washington Valley Bicycling Club

cc: Michelle Winters, Larry Keniston, Felice Janelle, Mary Poesse, Eric Thibodeau, Senator Jeb Bradley, Representative Edward Butler, Representative Gene Chandler, Representative Mark McConkey, Representative Susan Ticehurst

New Hampshire DOT
Department of Transportation

THE STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION

William Cass, P.E.
Assistant Commissioner

September 22, 2015

RECEIVED
SEP 24 2015
RAIL & TRANSIT

Mr. Ralph Fiore
President
Mount Washington Valley Bicycling Club
PO Box 12
Intervale, NH 03845-0012

Dear Mr. Fiore:

I received your letter dated August 17, 2015, regarding the chip seal treatment on an approximate 7 mile stretch of NH 112 (Kancamagus Highway) in Albany. Chip sealing is a widely used and proven pavement preservation treatment. Candidate roadways are selected based on a variety of factors such as climate, traffic volumes, the roadway construction and maintenance history, and roadway condition. In general, chip seals are placed on low to medium traffic volume roadways that were constructed or rehabilitated 6 to 10 years ago and are currently in good condition with limited cracking and deformations in the wheel paths (rutting).

The section of NH 112 that was chip sealed this year was selected for treatment as it fits the above criteria. It had been rehabilitated in 2005, is in good condition, and, since this section has a limited thickness of base materials under the pavement, sealing the surface to reduce water infiltration will prevent frost heave damage.

A chip seal involves spraying a thick liquid asphalt (¼") on the roadway followed by an aggregate application (chips). The aggregate is then rolled to seat it into the liquid and any remaining loose aggregate is then swept up. The liquid asphalt fills in the finer cracks and provides a water tight membrane (seal) that keeps water from entering the roadway base material and protects the underlying pavement surface from weathering and oxidation (aging). By sealing the roadway to reduce water infiltration, water related damage, such as frost heaving, is minimized.

The Department has a long history of using surface seals to preserve and maintain roads and reduce water damage. Through the 1940's, 50's, and 60's, the Department's forces applied sand seals (same process but sand is used in lieu of aggregate) on a routine cycle. Sand seals were the only resurfacing method that was used during this timeframe and were very effective, but service life was limited to 2-3 winters as the plows would abrade off the sand and gouge the underlying membrane. The sand seal program was then scaled back through the 1970's as the Department chose to outsource resurfacing activities and hot mix asphalt (HMA) became more and more readily available. Surface seals started to be reintroduced in the 1980's as a preservation treatment to again reduce water infiltration and extend the life of the underlying HMA.

The focus moved to surface sealing with aggregate to achieve a longer service life through better plow resistance. There have been many lessons learned and newer innovations and technology adopted over the years including reducing the aggregate size from a ½" to ⅜" to provide a smoother texture for cyclists and generate less tire noise, removing existing pavement markings to enhance bonding with the existing pavement, and switching to using a rubber modified asphalt vs. an emulsified asphalt for better stone retention and so loose and excess aggregate can be swept immediately after placement.

The chip seal treatment is being further refined and advanced techniques are still being developed. As you are aware, the Contractor has tried two different techniques to improve the riding surface in the shoulders on NH 112 in Albany including the following:

- Placing a thin fog seal application of emulsified asphalt on approximately 3 miles in the shoulder areas only. The fog seal will help fill in the void space between the aggregate and provide a smoother surface.
- Placing a thin fog seal application followed by a light application of manufactured sand (black beauty) on approximately 3 miles in the shoulder areas only. The fog seal combined with the black beauty application is intended to further fill in the void space and provide for an even smoother surface.

The remaining section of NH 112, approximately 1 mile, will receive no additional treatment. It will serve as the reference section. This work was completed on Tuesday September 15th. It understood that a group cycling ride has been scheduled for Tuesday, September 29th to evaluate the work and provide feedback.

We appreciated the opportunity to discuss this issue at a recent BPTAC meeting. The Department always welcomes and values input from various organizations. The Pavement Management section produces annual resurfacing maps that are then posted to the NHDOT website (http://www.nh.gov/dot/org/projectdevelopment/planning/amps/facts-figures.htm) for viewing and downloading. These maps will show the areas that are going to be resurfaced in a given year.

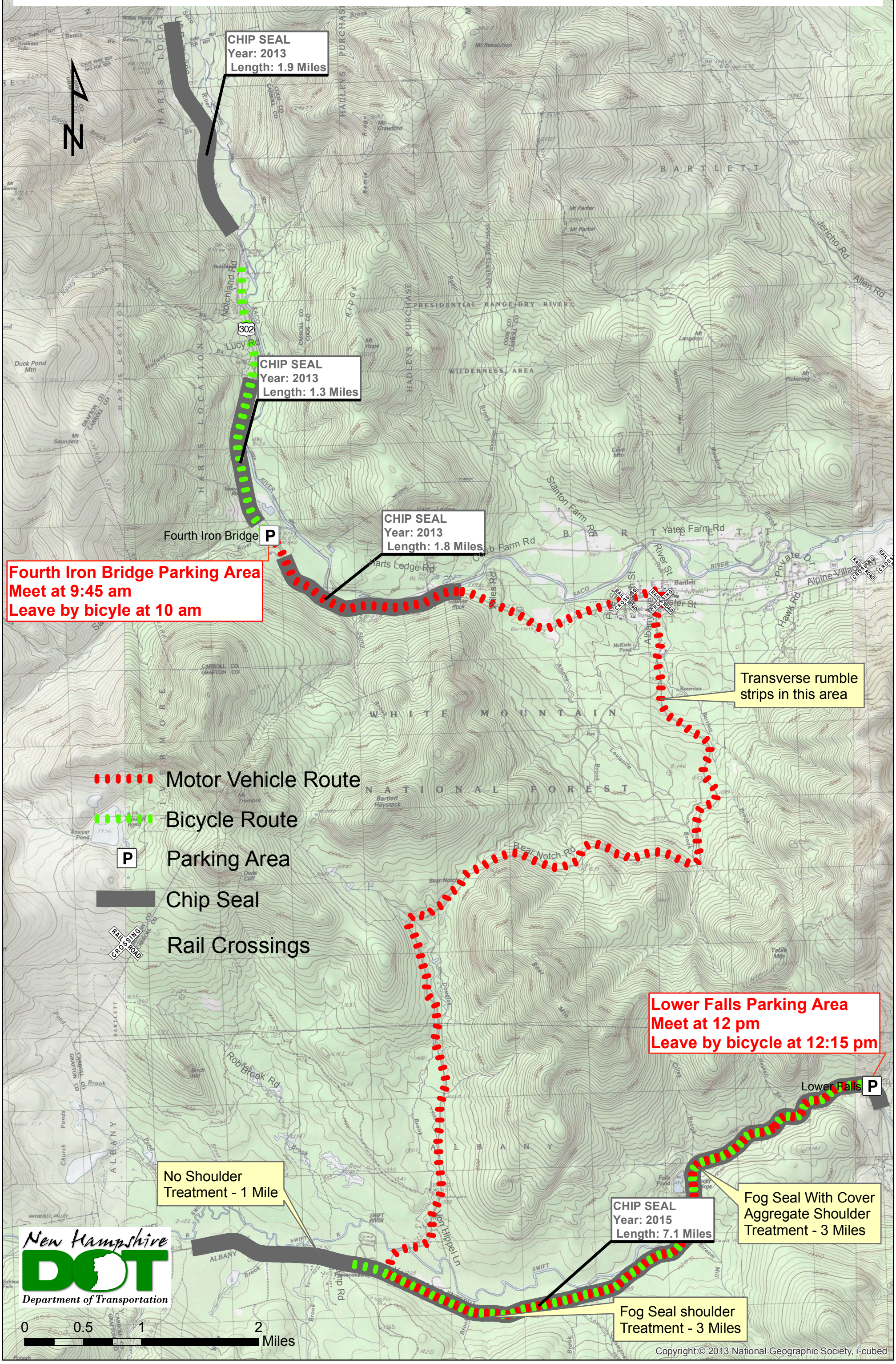
If there are any concerns or if more explanation is needed, questions can be brought forward through Larry Keniston of Rail & Transit or Eric Thibodeau of the Pavement Management Section.

Sincerely,

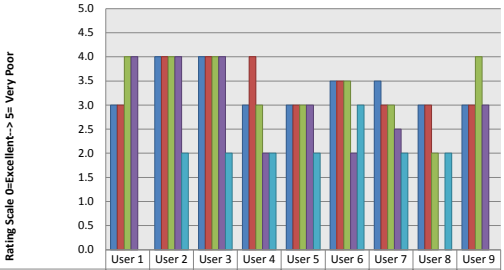
William J. Cass, P.E.
Assistant Commissioner

cc: The Honorable Jeb Bradley, NH State Senate
The Honorable Edward Butler, NH State House
The Honorable Gene Chandler, NH State House
The Honorable Mark McConkey, NH State House
The Honorable Susan Ticehurst, NH State House
Felice Janelle
Mary Poesse
Patrick Herlihy
Shelley Winters
Larry Keniston
Eric Thibodeau

Route 302 & Kancamagus Highway Chip Seal Bicycle Review

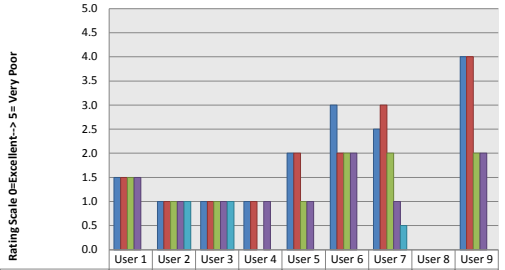


Chip Seal - Route 302 - 4th Iron Bridge Parking Area to Lucy Road



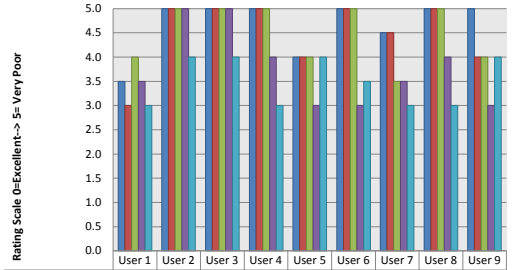
	User 1	User 2	User 3	User 4	User 5	User 6	User 7	User 8	User 9
pavement surface	3.0	4.0	4.0	3.0	3.0	3.5	3.5	3.0	3.0
vibration	3.0	4.0	4.0	4.0	3.0	3.5	3.0	3.0	3.0
resistance/ speed reduction	4.0	4.0	4.0	3.0	3.0	3.5	3.0	2.0	4.0
noise level	4.0	4.0	4.0	2.0	3.0	2.0	2.5	0.0	3.0
loose aggregate/ debris	0.0	2.0	2.0	2.0	2.0	3.0	2.0	2.0	0.0

Conventional Pavement - Route 302 - Lucy Road To Notchland Inn



	User 1	User 2	User 3	User 4	User 5	User 6	User 7	User 8	User 9
pavement surface	1.5	1.0	1.0	1.0	2.0	3.0	2.5	0	4.0
vibration	1.5	1.0	1.0	1.0	2.0	2.0	3.0	0	4.0
resistance/ speed reduction	1.5	1.0	1.0	0.0	1.0	2.0	2.0	0	2.0
noise level	1.5	1.0	1.0	1.0	1.0	2.0	1.0	0	2.0
loose aggregate/ debris	0.0	1.0	1.0	0.0	0.0	0.0	0.5	0	0.0

Chip Seal - Sand Seal Shoulder Treatment - Kancamagus Highway



	User 1	User 2	User 3	User 4	User 5	User 6	User 7	User 8	User 9
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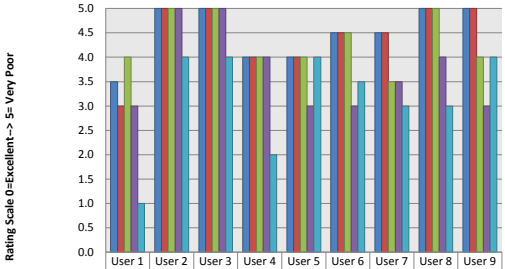
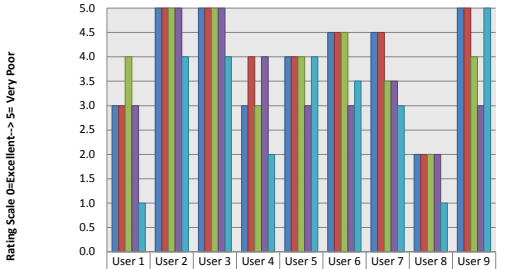
vibration	3.0	5.0	5.0	5.0	4.0	5.0	4.5	5.0	4.0
resistance/ speed reduction	4.0	5.0	5.0	5.0	4.0	5.0	3.5	5.0	4.0
noise level	3.5	5.0	5.0	4.0	3.0	3.0	3.5	4.0	3.0
loose aggregate/ debris	3.0	4.0	4.0	3.0	4.0	3.5	3.0	3.0	4.0

Chip Seal - Fog Seal Shoulder Treatment - Kancamagus Highway



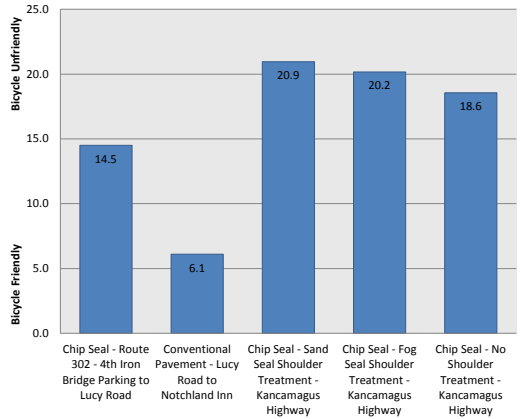
	User 1	User 2	User 3	User 4	User 5	User 6	User 7	User 8	User 9
pavement surface	3.5	5.0	5.0	4.0	4.0	4.5	4.5	5.0	5.0
vibration	3.0	5.0	5.0	4.0	4.0	4.5	4.5	5.0	5.0
resistance/ speed reduction	4.0	5.0	5.0	4.0	4.0	4.5	3.5	5.0	4.0
noise level	3.0	5.0	5.0	4.0	3.0	3.0	3.5	4.0	3.0
loose aggregate/ debris	1.0	4.0	4.0	2.0	4.0	3.5	3.0	3.0	4.0

Chip Seal - No Shoulder Treatment - Kancamagus Highway



	User 1	User 2	User 3	User 4	User 5	User 6	User 7	User 8	User 9
pavement surface	3.0	5.0	5.0	3.0	4.0	4.5	4.5	2.0	5.0
vibration	3.0	5.0	5.0	4.0	4.0	4.5	4.5	2.0	5.0
resistance/ speed reduction	4.0	5.0	5.0	3.0	4.0	4.5	3.5	2.0	4.0
noise level	3.0	5.0	5.0	4.0	3.0	3.0	3.5	2.0	3.0
loose aggregate/ debris	1.0	4.0	4.0	2.0	4.0	3.5	3.0	1.0	5.0

Average Rating



CHIP SEAL ROAD RATING FORM

NAME: Ray Metzger DATE: 9/29/15

ROAD SEGMENT	MILEAGE	PAVEMENT SURFACE	VIBRATION	RESISTANCE/SPEED REDUCTION	NOISE LEVEL	AGGREGATE DEBRIS	TOTAL SCORE
RT 302 4TH IRON TO LUCY RD	1.3 MI	3	3	4	4	0	14
RT 302 LUCY RD TO NOTCHLAND	1.2 MI	1/2	1/2	1/2	1/2	0	6
RT 112 LOWER FALLS SAND SEAL	3 MI	3/4	3	4	3/4	3	17
RT 112 FOG SEAL SECTION	3 MI	3/4	3	4	3/4	1	14.5
RT 112 NO TREATMENT	1 MI	3	3	4	3	1	14.

Rate the section of road you rode on a scale of 0 to 5, with "0" being no problem, and "5" being a significant problem:

Pavement Surface:

Very Smooth----------Very rough and bumpy

0----------5

Vibration:

None----------Extreme

0----------5

Rolling Resistance/speed reduction:

None----------Extreme

0----------5

Noise level:

None----------Extremely Noisy

0----------5

Loose aggregate debris:

None----------Frequent Debris

0----------5

CHIP SEAL ROAD RATING FORM

NAME: TOD POWERS DATE: 9/29/15

ROAD SEGMENT	MILEAGE	PAVEMENT SURFACE	VIBRATION	RESISTANCE/SPEED REDUCTION	NOISE LEVEL	AGGREGATE DEBRIS	TOTAL SCORE
RT 302 4TH IRON TO LUCY RD	1.3 MI	4	4	4	4	2	
RT 302 LUCY RD TO NOTCHLAND	1.2 MI	1	1	1	1	1	
RT 112 LOWER FALLS SAND SEAL	3 MI	5	5	5	5	4	
RT 112 FOG SEAL SECTION	3 MI	5	5	5	5	4	
RT 112 NO TREATMENT	1 MI	5	5	5	5	4	

Rate the section of road you rode on a scale of 0 to 5, with "0" being no problem, and "5" being a significant problem:

Pavement Surface:

Very Smooth----------Very rough and bumpy

0----------5

Vibration:

None----------Extreme

0----------5

Rolling Resistance/speed reduction:

None----------Extreme

0----------5

Noise level:

None----------Extremely Noisy

0----------5

Loose aggregate debris:

None----------Frequent Debris

0----------5

CHIP SEAL ROAD RATING FORM

NAME: HARRY MANN DATE: 9/29/15

ROAD SEGMENT	MILEAGE	PAVEMENT SURFACE	VIBRATION	RESISTANCE/SPEED REDUCTION	NOISE LEVEL	AGGREGATE DEBRIS	TOTAL SCORE
RT 302 4TH IRON TO LUCY RD	1.3 MI	4	4	4	4	2	
RT 302 LUCY RD TO NOTCHLAND	1.2 MI	1	1	1	1	1	
RT 112 LOWER FALLS SAND SEAL	3 MI	5	5	5	5	4	
RT 112 FOG SEAL SECTION	3 MI	5	5	5	5	4	
RT 112 NO TREATMENT	1 MI	5	5	5	5	4	

Rate the section of road you rode on a scale of 0 to 5, with "0" being no problem, and "5" being a significant problem:

Pavement Surface:

Very Smooth----------Very rough and bumpy

0----------5

Vibration:

None----------Extreme

0----------5

Rolling Resistance/speed reduction:

None----------Extreme

0----------5

Noise level:

None----------Extremely Noisy

0----------5

Loose aggregate debris:

None----------Frequent Debris

0----------5

CHIP SEAL ROAD RATING FORM

NAME: Glenn ASHWORTH DATE: 9/29/15 ?

Segment #	ROAD SEGMENT	MILEAGE	PAVEMENT SURFACE	VIBRATION	RESISTANCE/SPEED REDUCTION	NOISE LEVEL	AGGREGATE DEBRIS	TOTAL SCORE
1	RT 302 4TH IRON TO LUCY RD	1.3 MI	3	4	3	2	2	14
2	RT 302 LUCY RD TO NOTCHLAND	1.2 MI	1	1	0	1	0	3
3	RT 112 LOWER FALLS SAND SEAL	3 MI	5	5	5	4	3	22
4	RT 112 FOG SEAL SECTION	3 MI	4	4	4	4	2	18
5	RT 112 NO TREATMENT	1 MI	3	4	3	4	2	16

Rate the section of road you rode on a scale of 0 to 5, with "0" being no problem, and "5" being a significant problem:

Pavement Surface:

Very Smooth----------Very rough and bumpy

0----------5

Vibration:

None----------Extreme

0----------5

Rolling Resistance/speed reduction:

None----------Extreme

0----------5

Noise level:

None----------Extremely Noisy

0----------5

Loose aggregate debris:

None----------Frequent Debris

0----------5

#1 - Comment: CAR TRAVEL LANE much Better then Cycle Lane causing me to RIDE IN CAR LANE - 'DANGEROUS' -

#2 Older "smooth" pavement - cracked, but much smoother to Ride and much less vibration

over.

Glenn Ashworth:
Comments on Chip Seal Evaluation 9/29/15

Segment #1
The Car travel lane was much better then the cycle/breakdown lane, causing me to ride in the car lane….dangerous.
Segment #2
This was older cracked pavement, but much smoother riding then #1 with much less vibration and easier to ride…I could stay in the breakdown lane riding this.
Segment#3
This was the worst of all the sections, whether from the sand sealing, or just the original chip sealing. This was the roughest and most difficult to ride, the road next to the breakdown lane was better, but not much.
Segment #4
Not much better then #3, but slightly.
Segment #5
Somewhat better then #3, #4, but not much

General comments:
Very difficult and tiring to ride especially up hill. Segments #1, #3, #4, #5, vibration caused my hands and arms to "fall asleep"…On the down hills these segments were very dangerous as vibration caused me to lose some control of my bike, especially with continuous braking and vibration causing front wheel play. This made me ride in the road/traffic lane which is unsafe at best.

CHIP SEAL ROAD RATING FORM

NAME: Erik Paddleford DATE: 9/28/15

ROAD SEGMENT	MILEAGE	PAVEMENT SURFACE	VIBRATION	RESISTANCE/SPEED REDUCTION	NOISE LEVEL	AGGREGATE DEBRIS	TOTAL SCORE
RT 302 4TH IRON TO LUCY RD	1.3 MI	3	3	3	3	2	
RT 302 LUCY RD TO NOTCHLAND	1.2 MI	2	2	1	1	0	
RT 112 LOWER FALLS SAND SEAL	3 MI	4	4	4	3	4	
RT 112 FOG SEAL SECTION	3 MI	4	4	4	3	4	
RT 112 NO TREATMENT	1 MI	4	4	4	3	4	

Rate the section of road you rode on a scale of 0 to 5, with "0" being no problem, and "5" being a significant problem:

Pavement Surface:

Very Smooth----------Very rough and bumpy

0----------5

Vibration:

None----------Extreme

0----------5

Rolling Resistance/speed reduction:

None----------Extreme

0----------5

Noise level:

None----------Extremely Noisy

0----------5

Loose aggregate debris:

None----------Frequent Debris

0----------5

CHIP SEAL ROAD RATING FORM

NAME: Sally McMurdo DATE: 9/29/15

ROAD SEGMENT	MILEAGE	PAVEMENT SURFACE	VIBRATION	RESISTANCE/SPEED REDUCTION	NOISE LEVEL	AGGREGATE DEBRIS	TOTAL SCORE
RT 302 4TH IRON TO LUCY RD	1.3 MI	3.5	3.5	3.5	2	3	15.5
RT 302 LUCY RD TO NOTCHLAND	1.2 MI	3	2	2	2	0	9
RT 112 LOWER FALLS SAND SEAL	3 MI	5	5	5	3	3.5	21.5
RT 112 FOG SEAL SECTION	3 MI	4.5	4.5	4.5	3	3.5	20
RT 112 NO TREATMENT	1 MI	4.5	4.5	4.5	3	3.5	20

Bumpy

Not much discernible difference worse on downhill w/ vibration, tiring

Crack pavement

Water pooling by line

Rate the section of road you rode on a scale of 0 to 5, with "0" being no problem, and "5" being a significant problem:

Pavement Surface:

Very Smooth----------Very rough and bumpy

0----------5

Vibration:

None----------Extreme

0----------5

Rolling Resistance/speed reduction:

None----------Extreme

0----------5

Noise level:

None----------Extremely Noisy

0----------5

Loose aggregate debris:

None----------Frequent Debris

0----------5

Section 1: Has improved since it was 1st done, but still rough. Less debris on sides since I rode it in the spring. Downhill resistance noticeable.

Section 2: Cracks were bumpy, but overall ride was smoother, rolling resistance less. This section hasn't been repaved in quite a while.

Section 3: The worst of all the sections. Lots of vibrations, roughness, + resistance - worse on downhills.

over →

Section 4: Only slightly smoother than section 3. Debris more noticeable on far right side. Smoother riding near, on, or to the left of white line.

Section 5: Much like section 3 & 4.

This was the first time I've ridden on the Kane since it was chip-sealed. I was shocked at how rough it was and how much rolling resistance there was. I realize that this chipseal has ruined riding on both Rt 302 Crawford Notch + the Kane for me. It's just not fun anymore and too much work + discomfort. I don't even think wider tires will make it much better.

I suggest the Board brainstorm possible solutions with DOT to improve the surface, smooth it out, sweep debris. There should also be a mechanism in place where local authorities are informed of paving projects, especially chip seal, and that information is shared with all road users before the project begins so that we can give input before, not after.

CHIP SEAL ROAD RATING FORM

NAME: JOHN HIGGINS DATE: 9-29-15

ROAD SEGMENT	MILEAGE	PAVEMENT SURFACE	VIBRATION	RESISTANCE/SPEED REDUCTION	NOISE LEVEL	AGGREGATE DEBRIS	TOTAL SCORE
RT 302 4TH IRON TO LUCY RD	1.3 MI	3-4	3	3	2-3	2	14
RT 302 LUCY RD TO NOTCHLAND	1.2 MI	2-3	3	2	1	0-1	9
RT 112 LOWER FALLS SAND SEAL	3 MI	4-5	4-5	3-4	3-4	3	19
RT 112 FOG SEAL SECTION	3 MI	4-5	4-5	3-4	3-4	3	19
RT 112 NO TREATMENT	1 MI	4-5	4-5	3-4	3-4	3	19

Rate the section of road you rode on a scale of 0 to 5, with "0" being no problem, and "5" being a significant problem:

Pavement Surface:

Very Smooth----------Very rough and bumpy

0----------5

Vibration:

None----------Extreme

0----------5

Rolling Resistance/speed reduction:

None----------Extreme

0----------5

Noise level:

None----------Extremely Noisy

0----------5

Loose aggregate debris:

None----------Frequent Debris

0----------5

CHIP SEAL ROAD RATING FORM

NAME: Bruce Miller DATE: 9/29/15

ROAD SEGMENT	MILEAGE	PAVEMENT SURFACE	VIBRATION	RESISTANCE/SPEED REDUCTION	NOISE LEVEL	AGGREGATE DEBRIS	TOTAL SCORE
RT 302 4TH IRON TO LUCY RD	1.3 MI	3	3	2	N/A	2	10 Hard Rain affeted Noise
RT 302 LUCY RD TO NOTCHLAND	1.2 MI	—	—	—	—	—	—
RT 112 LOWER FALLS SAND SEAL	3 MI	5	5	5	4	3	22
RT 112 FOG SEAL SECTION	3 MI	5	5	5	4	3	22
RT 112 NO TREATMENT	1 MI	2	2	2	1	2	9

10-15% greater resistance To ride

Rate the section of road you rode on a scale of 0 to 5, with "0" being no problem, and "5" being a significant problem:

Pavement Surface:

Very Smooth----------Very rough and bumpy

0----------5

Vibration:

None----------Extreme

0----------5

Rolling Resistance/speed reduction:

None----------Extreme

0----------5

Noise level:

None----------Extremely Noisy

0----------5

Loose aggregate debris:

None----------Frequent Debris

0----------5

CHIP SEAL ROAD RATING FORM

NAME: RALPH FIORE DATE: 9/29/2015

ROAD SEGMENT	MILEAGE	PAVEMENT SURFACE	VIBRATION	RESISTANCE/SPEED REDUCTION	NOISE LEVEL	AGGREGATE DEBRIS	TOTAL SCORE
RT 302 4TH IRON TO LUCY RD	1.3 MI	3	3	4	3	0	13
RT 302 LUCY RD TO NOTCHLAND	1.2 MI	4	4	2	2	0	~~10~~ 12
RT 112 LOWER FALLS SAND SEAL	3 MI	5	4	4	3	4	20
RT 112 FOG SEAL SECTION	3 MI	5	5	4	3	4	21
RT 112 NO TREATMENT	1 MI	5	5	4	3	5	22

Rate the section of road you rode on a scale of 0 to 5, with "0" being no problem, and "5" being a significant problem:

Pavement Surface:

Very Smooth----------Very rough and bumpy

0----------5

Vibration:

None----------Extreme

0----------5

Rolling Resistance/speed reduction:

None----------Extreme

0----------5

Noise level:

None----------Extremely Noisy

0----------5

Loose aggregate debris:

None----------Frequent Debris

0----------5