

PennDOT's Strategic Recycling Program



SRP Background

The SRP started in 2000 and seeks recycling opportunities that recognize:

- Economic savings
- Engineering/construction advantages
- Environmental enhancement

SRP accomplishes this through:

- Reducing waste materials generated by PennDOT operations
- Review/revise existing procedures and specifications
- Evaluating performance and use opportunities
- Assessing procurement options to encourage the use



Goals and Ambitions

To recognize economic and/or engineering advantage and overall environmental enhancement of the Commonwealth through:

- Reduction of waste generated by PennDOT's operations;
- Review and revision of existing processes to enable substitution of recycled or recyclable materials/products/co-products for conventional materials;
- Evaluation of materials that may be recycled in transportation and civil engineering applications; and,
- Encourage the use of recycled materials through contracting.



Focus Areas

Research

Specifications

Projects

Outreach

Contracting

Material Research

- § Recycled Asphalt Pavement
- § Recycled Concrete Aggregate
- § Recycled Plastic Modifiers
- § Recycled Asphalt Shingles
- § Ground Tire Rubber
- § Glass Cullet
- § Other



Reclaimed Asphalt Pavement (RAP)



- 2023 NAPA report ~171M tons of RAP stockpiled
- The average RAP use was 21.9 percent down from 22.2 percent the previous year.
- Acknowledged that RAP usage reduces the need for asphalt binder and aggregate – 2023 saving roughly \$4.5B.
- **A 2025 NAPA report stated that using 22 % RAP in new asphalt mixtures save close to \$10 per ton.**



Recycled Asphalt Shingles (RAS)

- The 2023 NAPA report showcased and increase in RAS used in asphalt mixtures by 18%.
- Saved roughly 510,000 cubic yards of landfill space, and more than \$47 million in gate fees for not disposing of RAS.
- For the 2023 study the average percentage of RAS used by sector was 0.18%.

Ground Tire Rubber (GTR)

- Finley ground up pieces of used tires that can be added to asphalt pavement to help reduce cracking and stiffness of the asphalt.
- The SRP has worked in conjunction with private companies like Asphalt Plus who specialize in ground tire rubber to get their product approved by PennDOT.
- Other properties of GTR is that it produces a quieter roadway. The rubber in the Asphalt helps to reduce the noise pollution coming off the roadway.



Transportation Pooled Fund # 546

Objective:

To identify and evaluate innovative and recycled materials for use in transportation infrastructure.

Participants:

Iowa DOT, Maryland Department of Transportation State Highway Administration, Michigan DOT, Minnesota DOT, Missouri DOT, Nebraska DOT, Pennsylvania DOT, Texas DOT.

Asphalt Modifiers

- With the assistance of these modifiers, engineers and contractors should be capable of paving more roadways using higher concentrations of RAP.
- Secondary effects to incorporating asphalt modifiers include waste reduction, lower emissions, and fuel efficiency.

Vendors





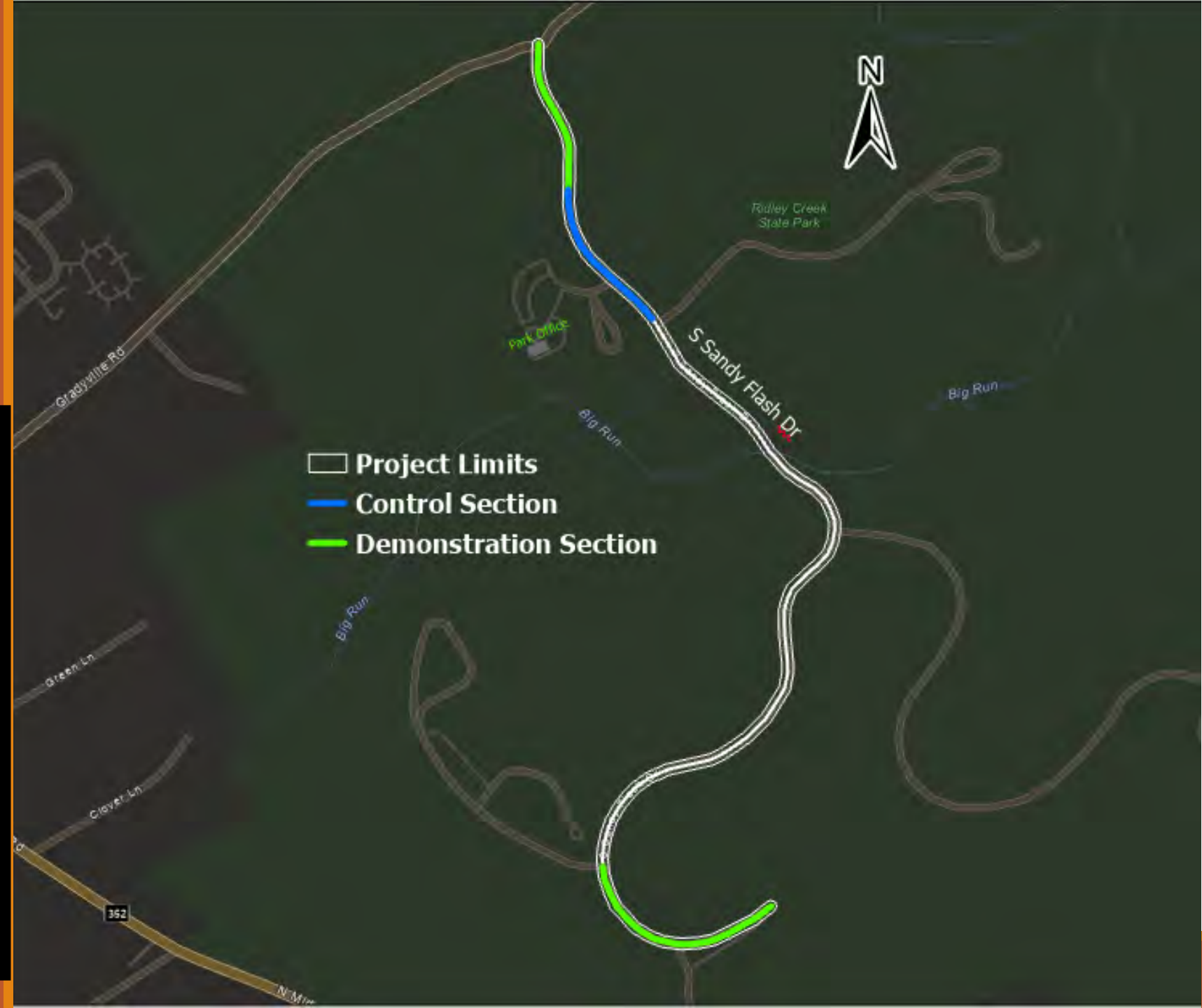
Projects

Projects

- The SRP works with Districts, municipalities, and other state agencies to implement pilots utilizing the recycled materials listed on the earlier slide.
- The SRP continue to conduct performance monitoring and progress reports for the plastic roadways.
- Currently there are three paving projects that are using recycled plastic modifiers.



Ridley Creek State Park





Sample Testing

- § Every year the SRP collects water samples from the test section (2) and the control section (2) to monitor the potential release of microplastics.
- § In the event sampling does not take place during a qualified rainstorm, then distilled water is sprayed on the surface simulating stormwater runoff.
- § To date there have been no indications of microplastics being released from the roadway.

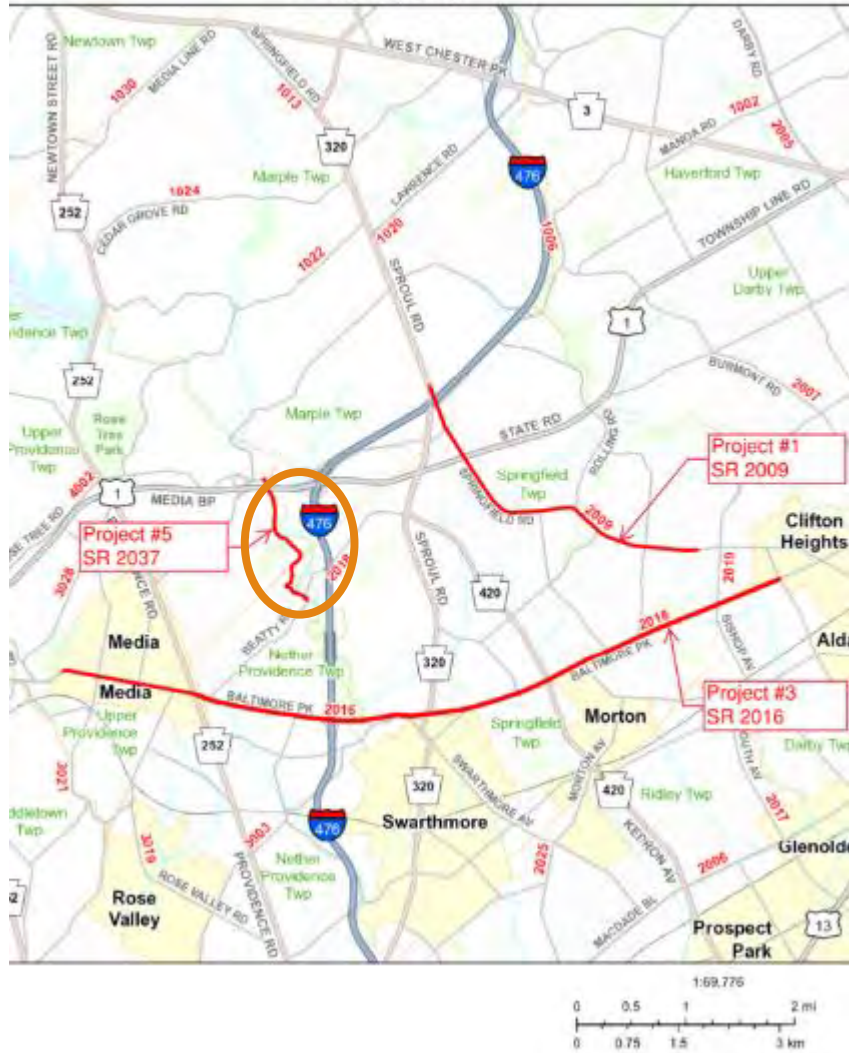
State Route 3017



- 2023 Paving used MacRebur's plastic modifier MR8.
- Lindy Paving was the contractor on-site that paved roughly 1 mile of roadway going Northbound from the intersection of Stony Battery Rd and Church Street to the intersection of Church and Bowman Rd.
- The mix consisted of 2% by total weight of the total weight.



SR 3017



Crum Creek

- § Construction began in May of 2022 and was completed in November that same year.
- § The project is approximately 1 mile long and the plastic modifier was placed the entire length of the southbound lane.
- § Like the District 8 project crumb creek utilized MacRebur's MR8 plastic modifier at .5% by total weight of the asphalt mix.
- § Performance monitoring took place the same day as RCSP and SR 3017.



Crum Creek Continued



Cold Central Plant Recycling

- § Sustainable pavement rehabilitation technique that processes RAP at a stationary or portable plant, rather than Cold In-Place.
- § Partnering with PAPA and PennDOT District 6 to find a location that meets the criteria of the pilot project.
- § Brought in an expert who worked with VDOT on their I-81 CCPR project to assist the SRP with editing Pub 408 specifications.

Current PennDOT Specifications

- Current Pub 27 specifications:

- 1) Lab testing acceptance.
- 2) No differentiating between foam and emulsion testing.

- Current Pub 242:

- 1) Structural Coefficient is 0.30

- Current Pub 408:

- 1) No section relating to foamed asphalt

- Proposed edits to Pub 27 specifications:

- 1) Field performance based acceptance.
- 2) Differentiating between foam and emulsion testing.

- Proposed edits to Pub 242:

- 1) Structural Coefficient is 0.27 (conservative side based on lab testing).

- Proposed edits to Pub 408:

- 1) Add foamed asphalt section along with identifying its range of grades

Outreach



Outreach - Things to Think About

- 1) Cost savings by incorporating 30% recycled aggregates
- 2) Low risk areas to use recycled materials i.e. multi-use trails, slow down lanes.
- 3) Stay informed on special provisions that allow the use of recycled materials.
- 4) Proposals to use more recycled material needs to come from outside PennDOT.

“Partners” In the SRP



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PROTECTION



Pennsylvania
Pavement
Pennsylvania



Thank You

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