
In-Place Recycling

Earth Day 2010

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There's No Place Like Home



Growth



We must

- ▶ **Recycle More**
- ▶ **Recycle More Efficiently**

***Recycled Materials
To Maintain Current
Level of Service***

30%

RAP = \$\$\$



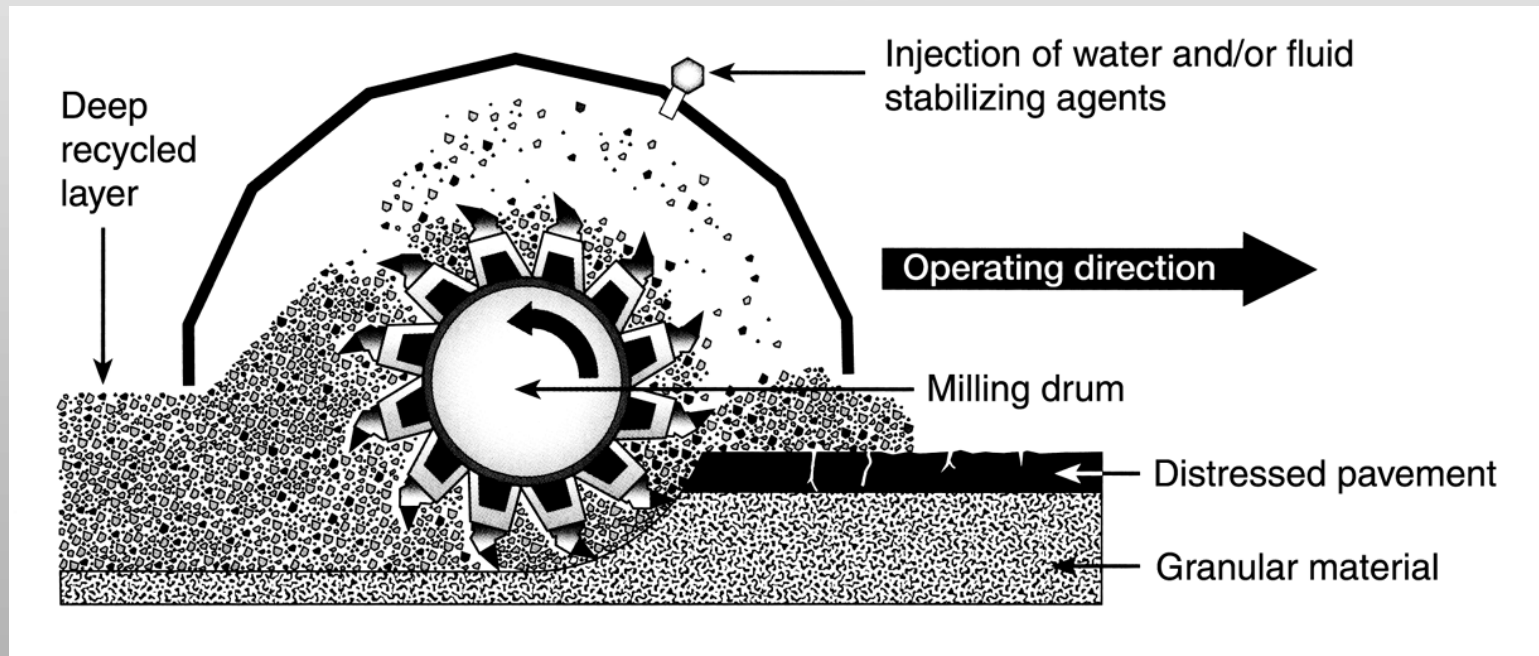


Full-Depth Reclamation



What is FDR?

- The full flexible pavement section and a pre-determined portion of the underlying materials are uniformly crushed, pulverized or blended, resulting in a stabilized base course (SBC).

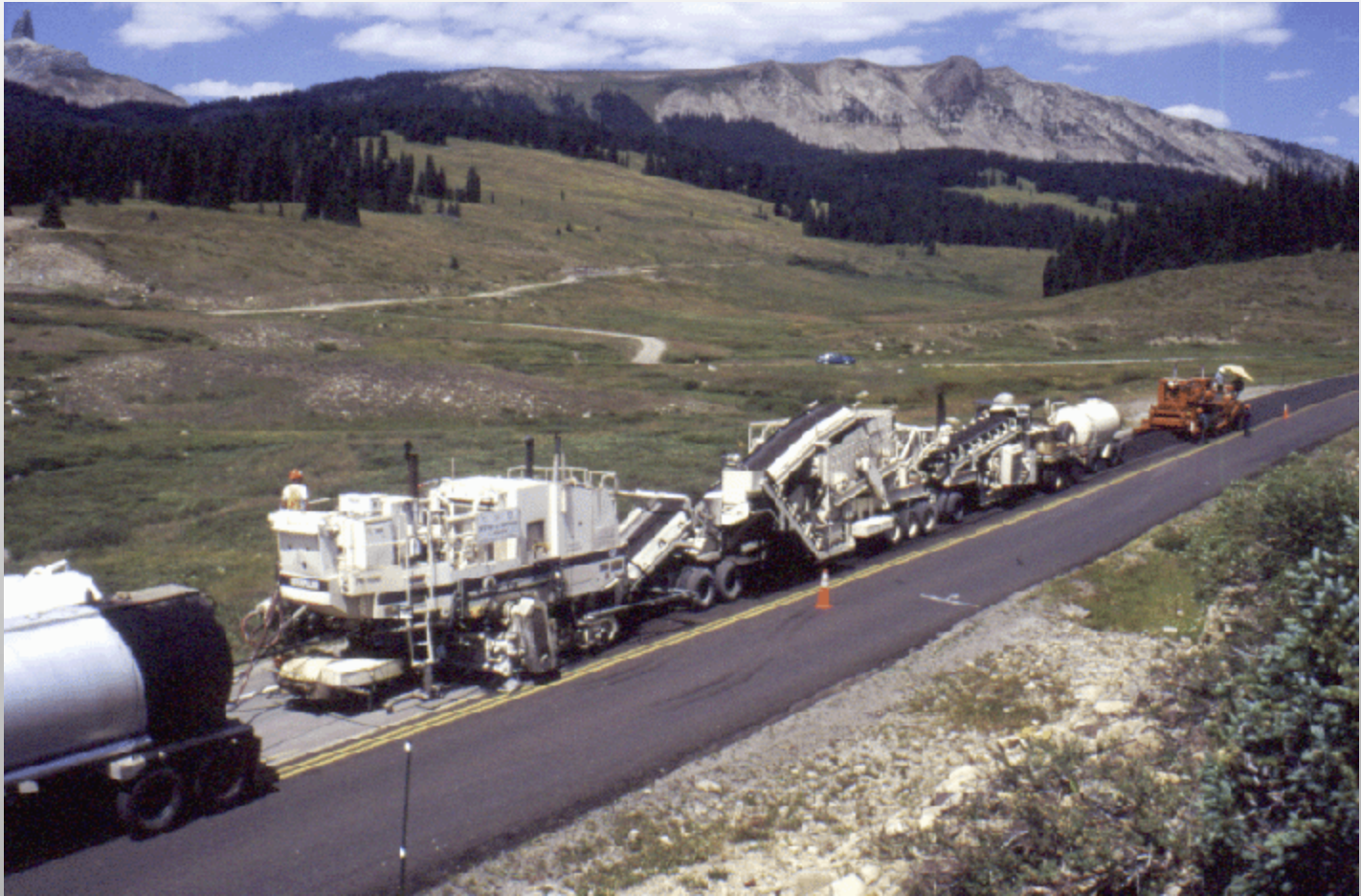


The FDR Process

- ▶ **Primary Disciplines**
 - **Pulverization**
 - **Mechanical Stabilization**
 - **Asphalt Stabilization**
 - **Chemical Stabilization**



Cold Recycling



Types of Cold Recycling



► **Cold In-Place Recycling (CIR)**

► **Cold Central Plant Recycling (CCPR)**



CIR – Multi-Unit Train



Two-Unit Train



Single Unit Train

- ▶ Small size for urban projects
- ▶ Short turning radius

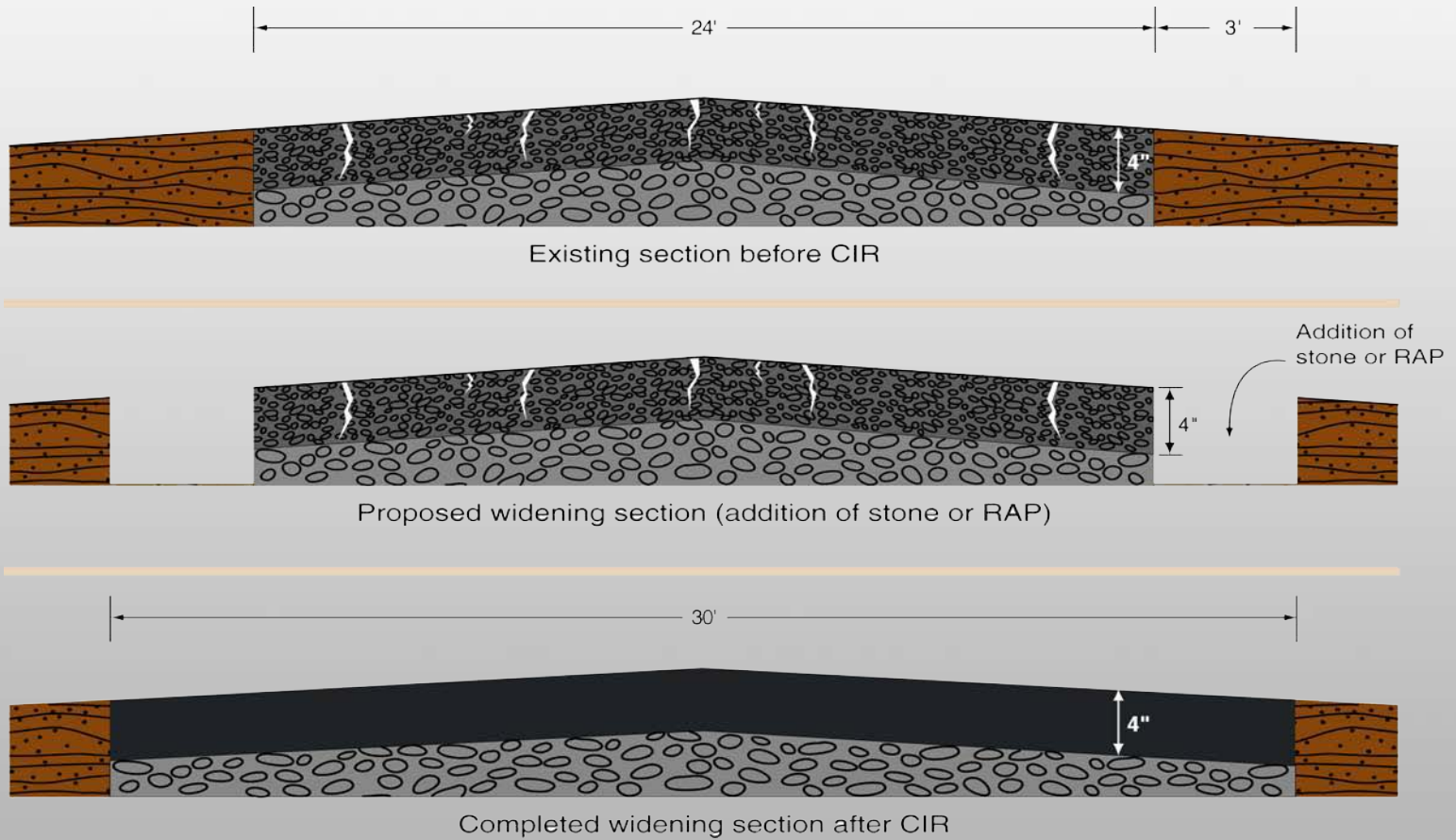


CIR - Laydown

- **Cold In-place Recycling laydown is done with the same equipment and controls as other maintenance mixes.**



Widening



Widening

Additional aggregate may be placed in the area to be widened.



CIR – Widening



Hot In-Place Recycling



Types of HIR

- ▶ **Surface Recycling**
- ▶ **Surface Repaving**
- ▶ **Remixing**

Hot In-Place Recycling

- ▶ **Treats surface to a depth of 1 inch or greater**
- ▶ **Allows several different surface treatments to be added during or after the HIR process**
- ▶ **Adds additional binder/modifier**
- ▶ **Adds additional hot mix asphalt**
- ▶ **Increase structural coefficient**

HIR Process



HIR Heating



HIR Scarification



HIR Additives



HIR Placement



Typical Surface Treatments

- **Chip Seal**
- **Slurry Seal**
- **Micro-Surfacing**
- **Cape Seal**
- **Cold Mix Overlay**
- **Hot Mix Overlay**



In-Place Benefits

- ▶ **Conserves Energy**
- ▶ **Conserves Materials**
- ▶ **Improves Mix Characteristics**
- ▶ **Cracking Eliminated/Reduced**
- ▶ **Improves Geometrics**
- ▶ **Cost Effective**
- ▶ **Saves Time**
- ▶ **May Be Performed Under Traffic**

Candidates

- ▶ **Airport Runways**
- ▶ **County Roads**
- ▶ **State & US Highways**
- ▶ **Interstate Highways**
- ▶ **City Streets**



Project Selection

- ▶ **Material Properties Evaluation**
- ▶ **Existing Road Geometrics**
- ▶ **Life Cycle Cost Analysis**
- ▶ **Environmental Impact**
- ▶ **Structural Strength**
- ▶ **Pavement Condition**
- ▶ **Road History**
- ▶ **Traffic Study**



QA / QC Plan

1. Calibration of meters
2. Gradation
3. Recycling Additive
4. Smoothness
5. Moisture
6. Density
7. RAP Gradation
8. Depth of pulverization/milling



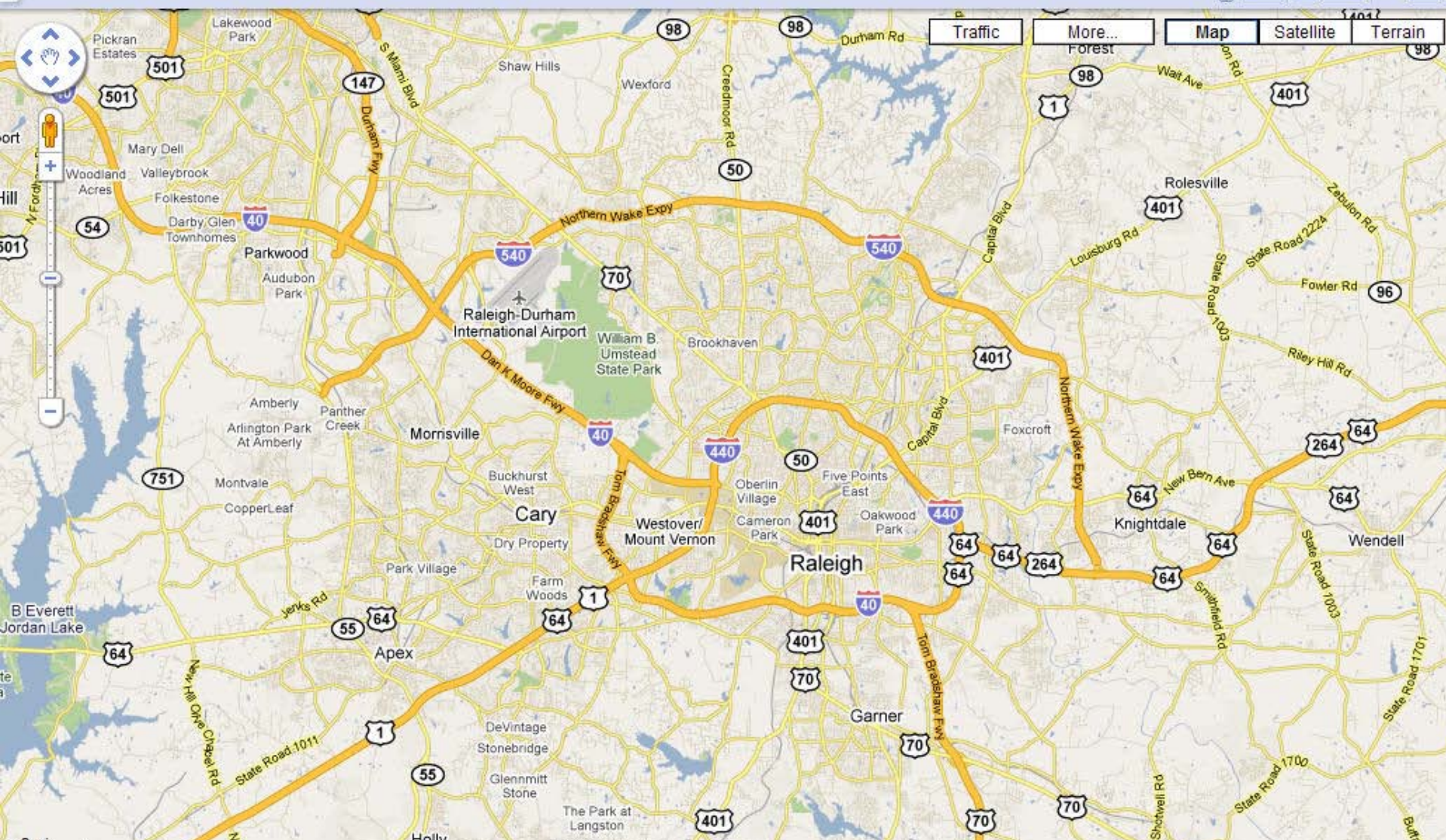
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