In-Place Recycling and Western Federal Lands

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Who is Western Federal Lands?

- Part of FHWA
- 1 of 3 Federal Lands Divisions
- Located in Vancouver, Washington
- Develop and administer construction projects
- On or access to Federal Land
- Territory includes
  - Alaska
  - Idaho
  - Montana
  - Oregon
  - Washington
  - Wyoming (Yellowstone and Grand Teton)

Our Clients

- National Park Service
- National Forest Service
- Department of Defense
- Bureau of Indian Affairs / Individual Tribes
- Local counties / agencies

Recycling History

- Started in the 1980's
- Numerous projects
- CIR, FDR, CTB, Foam
- Central plant recycling

Grand Teton National Park

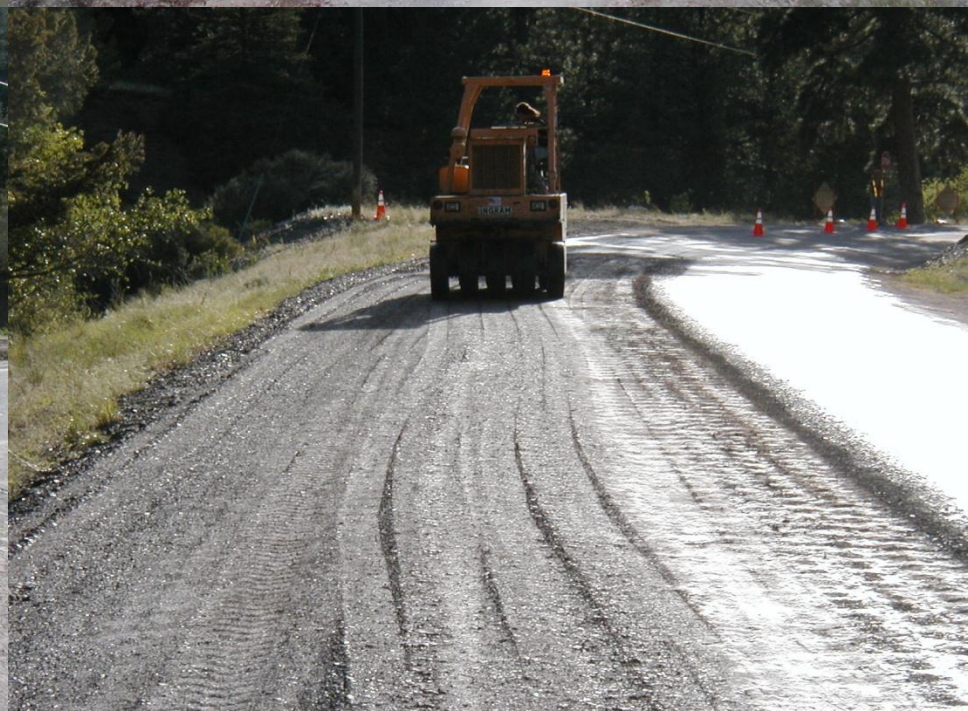
Eastside Highway -1985

Cold In-place Recycling

Lakeside – Nelson Road - 2004

Helena National Forest

Foamed Asphalt



Wise River – Polaris – 2010

Pioneer Mountain Scenic Byway

Cold In-place Recycling

Project Selection Process

- Pavement condition evaluation
- Investigation plan
- Subsurface investigation
- Testing
- Pavement Selection Team (Design, Geotech, Materials)
- Focus on re-use possibilities

Step 1 – Pavement Evaluation

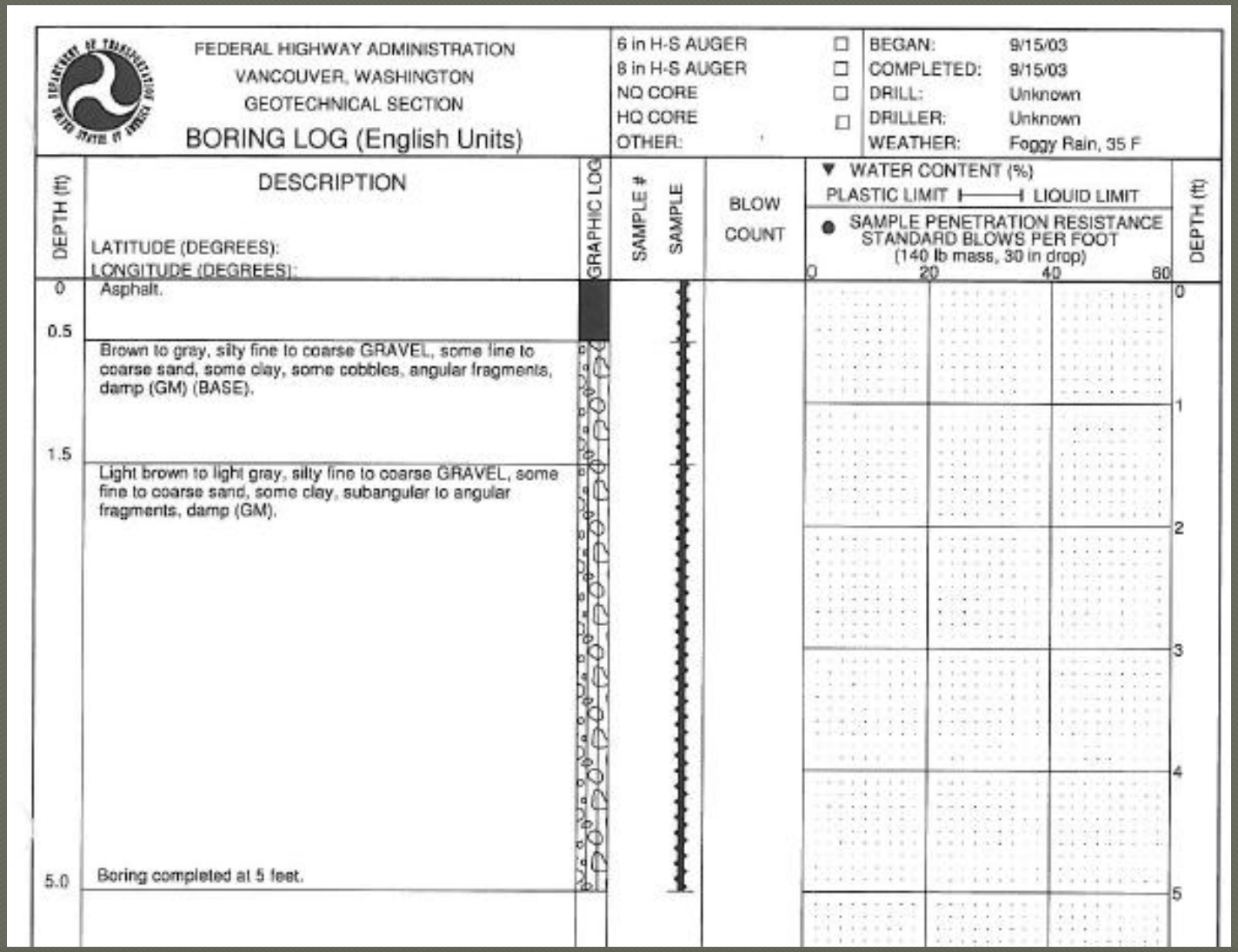
Cracking but stable pavement

Fatigue and evidence of loss of support

Step 2 – Evaluation Plan

- Review of previous construction data
- FWD
- Subsurface investigation and boring plan

Step 3 – Subsurface Investigation



FEDERAL HIGHWAY ADMINISTRATION
VANCOUVER, WASHINGTON
GEOTECHNICAL SECTION

BORING LOG (English Units)

6 in H-S AUGER	☐	BEGAN:	9/15/03
8 in H-S AUGER	☐	COMPLETED:	9/15/03
NQ CORE	☐	DRILL:	Unknown
HQ CORE	☐	DRILLER:	Unknown
OTHER:		WEATHER:	Foggy Rain, 35 F

LATITUDE (DEGREES):
LONGITUDE (DEGREES):

DEPTH (ft)	DESCRIPTION	GRAPHIC LOG	SAMPLE #	SAMPLE	BLOW COUNT
0	Asphalt.				
0.5	Brown to gray, silty fine to coarse GRAVEL, some fine to coarse sand, some clay, some cobbles, angular fragments, damp (GM) (BASE).				
1.5	Light brown to light gray, silty fine to coarse GRAVEL, some fine to coarse sand, some clay, subangular to angular fragments, damp (GM).				
5.0	Boring completed at 5 feet.				

▼ WATER CONTENT (%)
PLASTIC LIMIT ⊢——⊣ LIQUID LIMIT
● SAMPLE PENETRATION RESISTANCE
STANDARD BLOWS PER FOOT
(140 lb mass, 30 in drop)

0 20 40 60

DEPTH (ft): 0, 1, 2, 3, 4, 5

Step 4 - Testing

- Pavement – thickness/visual
- Base Materials
  - Gradation
  - Atterberg Limits
  - Sand Equivalent
  - R-Value
- Subgrade Materials
  - Gradation – Hydrometer
  - Soil composition (%sand, silt, clay)
  - R-Value

Pavement Selection Team

- Support issues / corrective action
  - Subexcavation can cause issues with replaced material
- Design constraints – profile and grade
  - In-place, stockpile, or central plant
- Re-use possibilities
- Selecting structural components

Cost Effective Solution

- Project by project basis
- Comparing construction costs
  - Haul costs
  - Additive costs
  - Available equipment / technology for mobilization
- Usually driven by material sources

Challenges

- Remote location – available contractors
- Mobilization cost
- Thin pavement layers
- Inconsistent existing condition – variability
- Curvature and grade
- Seasonal limitations

The Ideal

The Challenging – thin pavement

The Challenging – variable surface

The Challenging – support issue

The Challenging – subex condition

Coordination Efforts with Client

- Education on recycling techniques
- Obtain support
- Client assumes maintenance of completed project
- Tell the story of success
  - Reuse
  - Smoothness improvement (% improvement)
  - Structural value

Opportunity for Improvement

- Improve Prime and Sub contractor interaction
- Environmental component
- Reinforce sustainability
- Optimizing structural benefit vs. cost
- Specifications

The Future

- Changes in additives and technology
- Balance cost and structural value
- Re-use of material is vital
- Recommendations from CFL report
  - Focused on CIR quality and construction
  - Mix design and properties
  - Specification changes
  - Test methods to monitor quality

Questions??

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