North Dakota Asphalt conference
• City of Crosby, ND Scrub Seal

• Troy Kelsey, P.E.

• Mo Henman

North Dakota Asphalt Conference
Bismarck, ND - April 10-11-2018
PROJECT SCOPE

• Seal & Cover all streets not recently paved
• Mitigate existing cracks
• Bituminous patching
PRELIMINARY FIELD REVIEW

• Review pavement conditions with City of Crosby
• Evaluate pavements and what options work best
• Explore options with the City
EVALUATE OPTIONS

• Traditional Chip Seal

VS

• Scrub Seal
TRADITIONAL CHIP SEAL

• Common practice, contractors know process
• Have to mitigate cracks before chipping operation – crack seal
• With crack seal, adding another operation to project
• Chip loss in urban environment
• Cost with two major operations may not be cost effective
• Life expectancy – 3 to 5 years
SCRUB SEAL

• Not a common practice, contractors not used to process

• Using rejuvenating emulsion (PMRE) and brushes eliminates crack-seal operation

• Eliminating crack seal, lowers overall cost

• Better chip retention with PMRE

• With one major operation eliminated, project completed early

• Add Fog Seal to enhance chip retention
### Base Bid: 2017 Street Improvements - Chip Seal

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Unit</th>
<th>Quantity</th>
<th>Estimated Unit Price</th>
<th>Estimated Total Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>General Requirements and Mobilization</td>
<td>L.S.</td>
<td>1</td>
<td>$ 76,880.00</td>
<td>$ 76,880.00</td>
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<tr>
<td>2</td>
<td>Traffic Control</td>
<td>L.S.</td>
<td>1</td>
<td>$ 30,000.00</td>
<td>$ 30,000.00</td>
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<tr>
<td>3</td>
<td>Bituminous Patching w/ 6” Aggregate</td>
<td>S.Y.</td>
<td>1,000</td>
<td>$ 75.00</td>
<td>$ 75,000.00</td>
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<tr>
<td>4</td>
<td>Crack Sealing</td>
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<td>1</td>
<td>$120,000.00</td>
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<tr>
<td>5</td>
<td>CRS-2P Emulsified Asphalt (App. Rate - 0.42 gals/sy)</td>
<td>GAL.</td>
<td>75,600</td>
<td>$ 2.30</td>
<td>$ 173,880.00</td>
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<td>6</td>
<td>Cover Coat Material CL 43 (App. Rate - 0.23 lbs/sy)</td>
<td>S.Y.</td>
<td>180,000</td>
<td>$ 0.80</td>
<td>$ 144,000.00</td>
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<tr>
<td>7</td>
<td>Fog Seal CSS-1H Emulsified Asphalt 50/50 (App. - 0.12 gals/sy)</td>
<td>GAL.</td>
<td>21,600</td>
<td>$ 1.40</td>
<td>$ 30,240.00</td>
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<tr>
<td>8</td>
<td>Miscellaneous Work</td>
<td>L.S.</td>
<td>1</td>
<td>$ 10,000.00</td>
<td>$ 10,000.00</td>
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</table>

**Estimated Total Price: $660,000.00**

### Alternate Bid: 2017 Street Improvements - Scrub Seal

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<tr>
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<th>Estimated Total Price</th>
</tr>
</thead>
<tbody>
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<td>General Requirements and Mobilization</td>
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<td>$ 15,000.00</td>
</tr>
<tr>
<td>3</td>
<td>Bituminous Patching w/ 6” Aggregate</td>
<td>S.Y.</td>
<td>1,000</td>
<td>$ 75.00</td>
<td>$ 75,000.00</td>
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<tr>
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<td>Cleaning Existing Cracks</td>
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<td>$ 9,000.00</td>
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<td>5</td>
<td>PASS-CR Emulsified Asphalt (App. Rate - 0.41 gals/sy)</td>
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<td>73,800</td>
<td>$ 3.75</td>
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<td>Cover Coat Material CL 43 (App. Rate - 0.22 lbs/sy)</td>
<td>S.Y.</td>
<td>180,000</td>
<td>$ 0.80</td>
<td>$ 144,000.00</td>
</tr>
<tr>
<td>7</td>
<td>Fog Seal CSS-1H Emulsified Asphalt 50/50 (App. - 0.12 gals/sy)</td>
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**Estimated Total Price: $640,000.00**

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**Compare Cost – Prelim. Estimate**

- Scrub Seal more cost effective, by eliminating Crack-Seal
PRESENT OPTIONS

- Look at options, compare cost/benefit
- Evaluate traditional vs. scrub seal
- Present preliminary cost estimates for both
- Present chip seal vs. scrub seal costs and what is best for City
- Make recommendation to City, the City prefers the scrub seal
PLANS TO AWARDING THE PROJECT

• Prepare plans, specifications and final estimate
• Crosby Centennial starts August 4th, project has to be finished August 2nd
• Bids due June 1st
• Three contractors bid project
• Award to Bituminous Paving, Inc.
• Preconstruction Meeting – June 21st
• Construction start date is July 17, two and half weeks to finish before Centennial
PROJECT AND SCRUB SEAL PROCESS

• Bituminous Patching Before Scrub Seal
• Scrub Seal
  • Blowing out cracks
  • Sweep, cover manholes and valves
  • Set up Distributor and Brooms
  • Shoot PMRE at application rate, adjust if necessary
  • Spread Chips at application rate, adjust if necessary
  • Roll with rubber-tired rollers
  • Sweep, reclaim chips with pick-up broom for the City
  • Fog Seal at application rate
  • Uncover manholes and valves
BITUMINOUS PATCHING

- 4” Asphalt patch, with 6” Base Course Aggregate
- Approximately 800 SY
- Subgrade Modification if necessary
- 4” Asphalt, 6” – 18” Base Course Aggregate
BLOWING OUT CRACKS

- If weeds are in cracks, need to spray 10 days prior to operation
- Cracks cleaned with compressed air to depth of 1/2”
- Necessary for rejuvenating emulsion to have a good surface to adhere to
- Sweep before Scrub Seal, cover manholes, valves
EMULSION (PMRE) APPLICATION

• Set up brooms with distributor truck
• Specified App. Rate for PMRE – 0.41 gals/SY
• Adjusted to 0.32 to 0.35 gals/SY
• Look for “wave” in front of broom
• Areas that do not have cracks to mitigate, the broom can be eliminated
CHIP APPLICATION

- Class 41 Cover Coat Material
- Can use “dirty” chips with PMRE
- Specified App. Rate for chips – 0.22 lbs/SY
- Adjusted to 0.22 to 0.25 lbs/SY
- Use pneumatic tire rollers
- Offset rollers
- Roll 3 times
- Sweep and reclaim chips
FOG SEAL (CSS-1H) APPLICATION

- Specified App. Rate for CSS-1H (50/50) – 0.12 gals/SY
- Additional 10 – 15% chip retention with fog seal
- Nice black appearance when done, good public perception
- Inexpensive
- Uncover manholes and valves
PROJECT CLOSEOUT

• Final walk-through and punch list
• Small punch list after walk-through
• A couple small areas that were missed
• Mostly manholes and valves that were covered during process
• Done in ~ 2 weeks, well before City of Crosby Centennial
• After final payment, the City saved ~ $120,000 from bid price and engineers estimate
PROJECT SUMMARY
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• Contractor had never done a scrub seal, no issues during construction

• Lower cost with better results, PMRE should extend time for next pavement maintenance project

• A fresh start with cracks on streets

• Efficient, quick process, contractor performed well

• First Scrub Seal in North Dakota

• North Dakota LTAP visited project during construction inviting other municipalities

• Montana DOT using Scrub Seals often
THANK YOU
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Mo.Henman@westernemulsions.com

- Resource list.....