Meeting Demand: Transportation Needs in Montana

Impacts from Energy exploration to Montana’s Highway infrastructure

May 8th, 2013
Overview

- Background of Bakken energy exploration
- Traffic Increases and potential pavement damage due to energy exploration
- Traffic Projections-Initial and current
- Costs associated with increased commercial traffic
- Projected Population increase and total ADT
- MDT’s Efforts to date
- Other Considerations
Hydraulic Fracturing

- Hydraulic fracturing is referred to as “Fracking”
- 2 miles down, 2 miles out
- Directional drilling enables turn, long horizontal runs
- Hydraulic forces cause fractures in the oil bearing shale
- Driller pushes gel/sand (proppants) into fractures to hold them open
- Less pressure in the well hole than in the surrounding shale so oil flows into the well.
Background:
The Known Extent of the Bakken Oil Formation

Source: USGS
Background:
Statewide Map
Background: Impacted Area & Routes
Traffic:
New Bakken Well Truckload Timeline

New Bakken Well – Truckload Timeline

- Fracking Phase: 834 loads total (15 day average)
- Drilling Preparation: 75 loads (3 days total)
- Drilling Phase: 167 loads total (19 day average)
- Rig down: 50 loads (2 days total)
- Wait for Frack: (90-120 days)

- Production Equipment Move: 14 loads over 150 days
- Pit Reclamation: 36-41 total truckloads (6 loads over 76 days, 30-35 loads – emptying water, drilling fluid over 7-14 days, used 10 day average)
- Production Phase:
  - 3 trucks/day – Year 1
  - 1 truck/day – Year 2
  - Drops to 0 if pipelined – Year 4 (Day 1636), otherwise .5 trucks/day – Year 6
Increased Traffic for Study Area Routes

Traffic Growth

- MT 16, Sidney
- MT 200, Sidney
- MT S-201 Fairview
- US-2 Culbertson
## Increased Traffic: By Eastern Counties

<table>
<thead>
<tr>
<th>Interstate</th>
<th>2010</th>
<th>2011</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dawson</td>
<td>3,599</td>
<td>4,039</td>
<td>+12.2%</td>
</tr>
<tr>
<td>Wibaux</td>
<td>2,748</td>
<td>2,882</td>
<td>+4.9%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Non-Interstate National Highway System</th>
<th>2010</th>
<th>2011</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dawson</td>
<td>1,501</td>
<td>1,652</td>
<td>+10.1%</td>
</tr>
<tr>
<td>Richland</td>
<td>2,150</td>
<td>2,739</td>
<td>+27.4%</td>
</tr>
<tr>
<td>Roosevelt</td>
<td>1,623</td>
<td>1,987</td>
<td>+23.4%</td>
</tr>
<tr>
<td>Sheridan</td>
<td>722</td>
<td>1,035</td>
<td>+34.1%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Primary</th>
<th>2010</th>
<th>2011</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daniels</td>
<td>476</td>
<td>521</td>
<td>+9.5%</td>
</tr>
<tr>
<td>Dawson</td>
<td>1,279</td>
<td>1,515</td>
<td>+18.5%</td>
</tr>
<tr>
<td>Richland</td>
<td>1,304</td>
<td>2,138</td>
<td>+64.0%</td>
</tr>
<tr>
<td>Roosevelt</td>
<td>497</td>
<td>686</td>
<td>+38.0%</td>
</tr>
<tr>
<td>Sheridan</td>
<td>405</td>
<td>566</td>
<td>+39.8%</td>
</tr>
<tr>
<td>Wibaux</td>
<td>753</td>
<td>837</td>
<td>+11.2%</td>
</tr>
</tbody>
</table>
Traffic: Increased Traffic’s Effect on Eastern Montana’s Roads

The graph illustrates the comparison between normal pavement degradation and accelerated pavement degradation over a period of 20 years. The x-axis represents the years, ranging from 0 to 20, while the y-axis represents the pavement condition, ranging from 0 to 100.

- **Normal Pavement Degradation**: The blue line indicates a gradual decline in pavement condition, with a 40% drop in quality occurring after 75% of the pavement’s life. This suggests that normal wear and tear reduces the overall quality of the pavement over time.

- **Accelerated Pavement Degradation**: The red line shows a more rapid decline in pavement condition. A 40% drop in quality occurs after only 12% of the pavement’s life, highlighting the significant impact of increased traffic on the condition of Eastern Montana’s roads.

The graph underscores the importance of managing traffic to prevent accelerated degradation, which can significantly affect the lifespan and quality of roadways.
Future Projections: Initial Efforts

Sidney Hotspot Area Projected Truck Load Increase

<table>
<thead>
<tr>
<th>Projection Type</th>
<th>Truck Loads</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Projection</td>
<td>454</td>
</tr>
<tr>
<td>Med Projection</td>
<td>1006</td>
</tr>
<tr>
<td>Med-high Projection</td>
<td>2350</td>
</tr>
</tbody>
</table>

The graph shows the projected increase in truck loads for the Sidney Hotspot area. The low projection is 454, the med projection is 1006, and the med-high projection is 2350.
Initial Efforts: Upper Great Plains Transportation Institute
Potential Cost to Maintain Montana’s Infrastructure in the Glendive district

<table>
<thead>
<tr>
<th></th>
<th>Interstate</th>
<th>NHS</th>
<th>Primary</th>
<th>Secondary</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>baseline</td>
<td>$2,515,334</td>
<td>$18,062,657</td>
<td>$5,640,714</td>
<td>$1,956,605</td>
<td>$28,175,310</td>
</tr>
<tr>
<td>20-Rig Scenario</td>
<td>$2,944,222</td>
<td>$40,207,396</td>
<td>$26,792,018</td>
<td>$9,349,276</td>
<td>$79,292,912</td>
</tr>
</tbody>
</table>

* 2009 Base line data
** Costs are based on construction only.
Potential Cost to Maintain Montana’s Infrastructure in the Glendive District

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Total Annual Construction Cost</th>
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<tbody>
<tr>
<td>Baseline</td>
<td>$28,175,310</td>
</tr>
<tr>
<td>20-Rig Scenario</td>
<td>$79,292,912</td>
</tr>
<tr>
<td>40-Rig Scenario</td>
<td>$81,203,371</td>
</tr>
<tr>
<td>80-Rig Scenario</td>
<td>$85,846,242</td>
</tr>
</tbody>
</table>
Cost: Fiscal Needs by District

2012 Fiscal Needs

2013 Fiscal Needs

$230 M

$325 M
Projected Population Increase

Projected Population in MDT Glendive District
Increase to Total Traffic Based on Population increase

Project the Daily Vehicle Miles Travelled (DVMT) by County in Glendive District

Richland County
Dawson County
Custer County
Rosebud County
Roosevelt County
Valley County
Prairie County
Sheridan County
Average of rest of D4

Year
DVMT (Thousands)
Traffic Increase by Count

2011 Traffic Increase by County Compared to 2000-2010 Average

Legend
- NHS INTERSTATE growth
-10.86% - 0.52%
-0.51% - 6.53%
6.54% - 16.13%
16.14% - 37.52%

0 25 50 100 Miles
Projected Population Increase and Total Traffic

Projected Peak Average AADT by road segment in Glendive District (one lane and per hour)

Highway capacity (1500 vehicles per lane per hour)

- Sidney to Fairview
- Glendive to Sidney
- Culberston to Sidney
- Culbertson to ND Boarder
Efforts to Date: Design Changes

$5.2 million dollars added to projects that have been let.

Change in Design (Thickness of Plant Mix and Base)
Efforts to Date: Corridor studies

- MT 16 Study
- Glendive to Sidney
- Sidney to Fairview
Efforts to Date: Corridor studies

- Culbertson Study
- Focused on the routes through town-Highway 2 and Highway 16
Other Industry Impacts: Transloading Facilities (Northern Montana)

- Induced traffic from transloading facilities
- Several new/expanded facilities: Sidney, Dore, Culbertson, and Glendive (330 trucks/train load)
- Compound impact with current agriculture consolidation into 110-car facilities (trucks/train load)
Other Energy Industry Impacts: Coal Development in Southeast Montana

- Southeast Montana coal impacts are similar to N.E. Montana oil
- Otter Creek is the next intended coal tract development
  - Little supporting infrastructure
  - Tongue River Road
- If no rail, projected trucks are 1/minute on MT332
Implications

- Natural resources/energy in Montana will have significant impact on the roads
- Based on our traffic studies parts of Eastern MT will see a significant increase in oil development related traffic
- MDT has modified project pavement design to incorporate traffic and traffic mix increases
- The Bakken is not the only region that will be affected
Thanks For Your Time

- Questions