Sand Mining Road Impacts

Committee of the Board
February 7, 2012

This presentation is available at the Winona County website www.co.winona.mn.us under Departments > Public Works > Highway > Reports and Documents.
Roadway Impacts

• Traffic Congestion
• Safety Concerns
• Pavement Deterioration

On:
• State Highways (Interstate, U.S., Mn Highways)
• County Highways aka County Roads
  – County State-Aid Highways (state-aid & local funding)
  – County Highways (local funding only)
• City Streets
• Town Roads
Pavement Impact

1 Legal Truck is equivalent to 9600 cars

1 Truck Overloaded 20% is equivalent to 19,000 cars

Source: Minnesota Truck Weight Education Program
Williston, North Dakota experience.

http://www.msnbc.msn.com/id/21134540/vp/45150953#45150953
January 2012

Proposed Mining Sites

County Road Usage

- 3.80 Miles
- 2.90 Miles
- 2.65 Miles
- 3.68 Miles
- 10.22 miles
- 6.57 Miles
- 5.26 Miles
- 3.97 Miles
21.5 Miles on County Roads
Minnesota Highway Users Tax Distribution Fund

2012 total $1,751,350,667

2012 Winona County State-Aid Apportionment

$4,912,970

0.28% of total

Roughly $3 per $1,000 of state road user taxes

$28.05 per $10,000 of taxes
County State-Aid Highways

• Financed by both state-aid and local funding.
  – State-aid amount is fixed by MN constitution and statutes.
  – Any incremental increase in costs, if not collected from mine operations, will be borne by local taxpayers (or by shifts from other projects which are ultimately borne by local taxpayers).
What are others doing about this?

• We queried County Engineers for the other 86 Minnesota counties.
• Multiple conversations with southeastern MN and western WI counties.
• Planning Director Jason Gilman hosted a January 12, 2012 roundtable attended by staff and elected officials from area counties.
Best Practices: Managing Interactions between Local Authorities and Major Traffic Generators

Significant hauling of heavy loads puts your roadway surface at risk of damage. Leveraging the experience of several County Engineers, the Local Road Research Board recently funded the development of an online document that presents step-by-step guidelines for Minnesota county engineers on how to interact with developers of “wind farms” (technically known as large wind energy conversion systems or LWECS) regarding road-related issues. Construction of LWECS requires hauling of a significant number of heavy loads on local roadways, potentially causing damage to the roadway surface. This document provides county engineers with guidance on how to work with LWECS developers to preserve the roadway surfaces. The committee that provided input for this document was comprised of Minnesota county engineers that are currently going through or have completed this process along with Mn/DOT and regional planners.

This document contains a wide range of information contained in a single, downloadable interactive document. The document allows easy access to the following content:

- Web links and reports
- Sample ordinances, permits, agreements and maps
- Traffic calculator to quantify the traffic impact on roads
- Policy options to recapture roadway maintenance costs
- Experience from current or past projects
- Research information

County engineers in other states, other road authorities, and wind power developers themselves also may find this information valuable. While this tool is focused on LWECS’s, it is broad enough that it could also be used when a county is dealing with any other enterprise that impacts the roads under its jurisdiction.

The interactive document discussed above can be downloaded here:

**Major Traffic Generators Interactive Document (in zip format)**
[Right mouse click, ‘Save As’ and unzip to your own folder.]

In addition, the Traffic Calculator Tool (to help quantify impacts to roads) can be found here:

**Major Traffic Generators-Impact Tool (in xls format)**
[save to your folder. Once opened, you must enable macros so spreadsheet will work as intended.]

NOTE: A final report, #2010RIC11, is expected soon.

http://www.lrrb.org/trafcalc.aspx
1D7. Detail: Permit/Fee

Before a county can go further, it must decide on a methodology for assessing and recouping the costs of road damage caused by wind farm development. Four methodologies are in common use:

1. Charge per-use fees.
2. Charge a blanket “haul route” fee for the entire development project.
3. Quantify and charge for damage by calculating the number of ESALs construction activity will take out of the road’s intended life. Click **CALCULATOR** for a tool that can be used to calculate the amount of damage done to asphalt-surfaced roads by wind farm development.
4. Conduct pre- and post-construction assessments of the road, including some combination of the items listed in 2B2a [link] through 2B2f [link] of this document. This information allows the county to charge for the actual cost incurred to restore the road to the previous (or other agreed-upon) condition.

However, none of the above four methods can stand on its own to assess and recoup costs of road damage. Often, counties choose one method from among 1-3 above — and possibly 4 as well. But each county must define its own strategy. The steps shown in the remainder of this document may or may not apply to a given project, depending on which methodology is chosen.
January 3, 2012 Road & Bridge Committee
Consensus – focus on:

• Aggregate Tax, or
• A similar per Ton or per Cubic Yard concept.
• Keep it straightforward.
298.75 AGGREGATE MATERIAL REMOVAL; PRODUCTION TAX.

Subdivision 1. Definitions. Except as may otherwise be provided, the following words, when used in this section, shall have the meanings herein ascribed to them.

(a) "Aggregate material" means:

(1) nonmetallic natural mineral aggregate including, but not limited to sand, silica sand, gravel, crushed rock, limestone, granite, and borrow, but only if the borrow is transported on a public road, street, or highway, provided that nonmetallic aggregate material does not include dimension stone and dimension granite; and

(2) taconite tailings, crushed rock, and architectural or dimension stone and dimension granite removed from a taconite mine or the site of a previously operated taconite mine.

Aggregate material must be measured or weighed after it has been extracted from the pit, quarry, or deposit.

(b) "Person" means any individual, firm, partnership, corporation, organization, trustee, association, or other entity.

(c) "Operator" means any person engaged in the business of removing aggregate material from the surface or subsurface of the soil, for the purpose of sale, either directly or indirectly, through the use of the aggregate material in a marketable product or service.

(d) "Extraction site" means a pit, quarry, or deposit containing aggregate material and any contiguous property to the pit, quarry, or deposit which is used by the operator for stockpiling the aggregate material.

(e) "Importer" means any person who buys aggregate material excavated from a county not listed in paragraph (f) or another state and causes the aggregate material to be imported into a county in this state which imposes a tax on aggregate material.

(f) "County" means the counties of Pope, Stearns, Benton, Sherburne, Carver, Scott, Dakota, Le Sueur, Kittson, Marshall, Pennington, Red Lake, Polk, Norman, Mahnomen, Clay, Becker, Carlton, St. Louis, Rock, Murray, Wilkin, Big Stone, Sibley, Hennepin, Washington, Chisago, and Ramsey. County also means any other county whose board has voted after a public hearing to impose the tax under this section and has notified the commissioner of revenue of the imposition of the tax.

(g) "Borrow" means granular borrow, consisting of durable particles of gravel and sand, crushed quarry or mine rock, crushed gravel or stone, or any combination thereof, the ratio of the portion passing the (#200) sieve divided by the portion passing the (1 inch) sieve may not exceed 20 percent by mass.

Subd. 2. Tax imposed. (a) Except as provided in paragraph (e), a county that imposes the aggregate production tax shall impose upon every operator a production tax of 21.5 cents per cubic yard or 15 cents per ton of aggregate material excavated in the county except that the county board may decide not to impose this tax if it determines that in the previous year operators removed less than 20,000 tons or 14,000 cubic yards of aggregate material from that county.

The tax shall not be imposed on aggregate material excavated in the county until the aggregate material is transported from the extraction site or sold, whichever occurs first. When aggregate material is stored in a stockpile within the state of Minnesota and a public highway, road or street is not used for transporting the aggregate material, the tax shall not be imposed until either when
the aggregate material is sold, or when it is transported from the stockpile site, or when it is used from the stockpile, whichever occurs first.

(b) Except as provided in paragraph (e), a county that imposes the aggregate production tax under paragraph (a) shall impose upon every importer a production tax of 21.5 cents per cubic yard or 15 cents per ton of aggregate material imported into the county. The tax shall be imposed when the aggregate material is imported from the extraction site or sold. When imported aggregate material is stored in a stockpile within the state of Minnesota and a public highway, road, or street is not used for transporting the aggregate material, the tax shall be imposed either when the aggregate material is sold, when it is transported from the stockpile site, or when it is used from the stockpile, whichever occurs first. The tax shall be imposed on an importer when the aggregate material is imported into the county that imposes the tax.

(c) If the aggregate material is transported directly from the extraction site to a waterway, railway, or another mode of transportation other than a highway, road or street, the tax imposed by this section shall be apportioned equally between the county where the aggregate material is extracted and the county to which the aggregate material is originally transported. If that destination is not located in Minnesota, then the county where the aggregate material was extracted shall receive all of the proceeds of the tax.

(d) A county, city, or town that receives revenue under this section is prohibited from imposing any additional host community fees on aggregate production within that county, city, or town.

(e) A county that borders two other states and that is not contiguous to a county that imposes a tax under this section may impose the taxes under paragraphs (a) and (b) at the rate of ten cents per cubic yard or seven cents per ton. This paragraph expires December 31, 2014.

Subd. 3. Report and remittance. (a) By the 14th day following the last day of each calendar quarter, every operator or importer shall make and file with the county auditor of the county in which the aggregate material is removed or imported, a correct report under oath, in such form and containing such information as the auditor shall require relative to the quantity of aggregate material removed or imported during the preceding calendar quarter. The report shall be accompanied by a remittance of the amount of tax due.

(b) If any of the proceeds of the tax is to be apportioned as provided in subdivision 2, the operator or importer shall also include on the report any relevant information concerning the amount of aggregate material transported, the tax and the county of destination. The county auditor shall notify the county treasurer of the amount of such tax and the county to which it is due. The county treasurer shall remit the tax to the appropriate county within 30 days, except as provided in paragraph (c).

(c) The proceeds of the tax on aggregate material as defined in subdivision 1, paragraph (a), clause (2), must be remitted to the commissioner of Iron Range resources and rehabilitation to be deposited in the taconite area environmental protection fund under section 298.223, and used for the purposes of that fund.

Subd. 4. Auditor estimate; statement of objections. If the county auditor has not received the report by the 15th day after the last day of each calendar quarter from the operator or importer as required by subdivision 3 or has received an erroneous report, the county auditor shall estimate the amount of tax due and notify the operator or importer by registered mail of the amount of tax due.
so estimated within the next 14 days. An operator or importer may, within 30 days from the date of mailing the notice, and upon payment of the amount of tax determined to be due, file in the office of the county auditor a written statement of objections to the amount of taxes determined to be due. The statement of objections shall be deemed to be a petition within the meaning of chapter 278, and shall be governed by sections 278.02 to 278.13.

Subd. 5. **Failure to file and pay; penalty.** Failure to file the report and submit payment shall result in a penalty of $5 for each of the first 30 days, beginning on the 15th day after the last day of each calendar quarter, for which the report and payment is due and no statement of objection has been filed as provided in subdivision 4, and a penalty of $10 for each subsequent day shall be assessed against the operator or importer who is required to file the report. The penalties imposed by this subdivision shall be collected as part of the tax and credited to the county revenue fund. If neither the report nor a statement of objection has been filed after more than 60 days have elapsed from the date when the notice was sent, the operator or importer who is required to file the report is guilty of a misdemeanor.

Subd. 6. **Penalties; removal of aggregate if previous tax not paid; false report.** It is a misdemeanor for any operator or importer to remove aggregate material from a pit, quarry, or deposit or for any importer to import aggregate material unless all taxes due under this section for all previous reporting periods have been paid or objections thereto have been filed pursuant to subdivision 4.

It is a misdemeanor for the operator or importer who is required to file a report to file a false report with intent to evade the tax.

Subd. 7. **Proceeds of taxes.** (a) All money collected as taxes under this section on aggregate material as defined in subdivision 1, paragraph (a), clause (1), shall be deposited in the county treasury and credited according to this subdivision.

(b) The county auditor may retain an annual administrative fee of up to five percent of the total taxes collected in any year.

(c) The balance of the taxes, after any deduction under paragraph (b), shall be credited as follows:

1. **42.5 percent to the county road and bridge fund** for expenditure for the maintenance, construction and reconstruction of roads, highways and bridges;

2. **42.5 percent to the general fund of the city or town in which the mine is located**, or to the county, if the mine is located in an unorganized town, to be expended for maintenance, construction and reconstruction of roads, highways and bridges; and

3. **15 percent to a special reserve fund which is hereby established**, for expenditure for the restoration of abandoned pits, quarries, or deposits located within the county.

If there are no abandoned pits, quarries or deposits located within the county, this portion of the tax shall be used for any other unmet reclamation need or for conservation or other environmental needs.

Subd. 8. **Examination of records; maintenance of records.** The county auditor or its duly authorized agent may examine records, including computer records, maintained by an importer or operator. The term "record" includes, but is not limited to, all accounts of an importer or operator. The county auditor must have access at all reasonable times to inspect and copy all
business records related to an importer's or operator's collection, transportation, and disposal of aggregate to the extent necessary to ensure that all aggregate material production taxes required to be paid have been remitted to the county. The records must be maintained by the importer or operator for no less than six years.

Subd. 9. Tax may be imposed; St. Louis County towns. (a) If the St. Louis County Board does not approve Laws 1997, chapter 231, article 8, section 12, as provided in Laws 1997, chapter 231, article 8, section 18, each of the following towns in St. Louis County may impose the aggregate materials tax under this section: the towns of Alden, Brevator, Canosia, Duluth, Fredenburg, Gnesen, Grand Lake, Industrial, Lakewood, Midway, Normanna, North Star, Rice Lake, and Solway.

(b) For purposes of exercising the powers contained in this section, the "town" is deemed to be the "county."

(c) In those towns located in St. Louis County that impose the tax under this section, all provisions in this section shall apply to those towns, except that in lieu of the distribution of the tax proceeds under subdivision 7, all proceeds from this tax shall be retained by each of the towns that impose the tax.

(d) A tax imposed under this subdivision is effective in the town that approves it the day after compliance by the town with the requirements of section 645.021, subdivision 3.

Subd. 10. MS 2006 [Never effective, 2006 c 259 art 12 s 14]

Subd. 11. Tax may be imposed; Otter Tail County. (a) If Otter Tail County does not impose a tax under this section and approves imposition of the tax under this subdivision, the town of Scambler in Otter Tail County may impose the aggregate materials tax under this section.

(b) For purposes of exercising the powers contained in this section, the "town" is deemed to be the "county."

(c) All provisions in this section apply to the town of Scambler, except that all proceeds of the tax must be retained by the town and used for the purposes described in subdivision 7.

(d) If Otter Tail County imposes an aggregate materials tax under this section, the tax imposed by the town of Scambler under this subdivision is repealed on the effective date of the Otter Tail County tax.

History: 1980 c 607 art 19 s 5; 1Sp1981 c 1 art 10 s 17-19; 1982 c 523 art 13 s 1; 1983 c 342 art 14 s 1; 1984 c 652 s 1; 1986 c 403 s 1,2; 1993 c 375 art 9 s 41,42; 1995 c 264 art 16 s 15; 1996 c 471 art 13 s 15; 1997 c 231 art 8 s 12-15; 1Sp2001 c 5 art 6 s 35,36; 2003 c 127 art 14 s 11; 2006 c 259 art 12 s 14; 2008 c 154 art 8 s 15-17; art 16 s 8; 2008 c 366 art 6 s 36-39; 2009 c 88 art 12 s 10
ESAL – Equivalent Single Axle Load

**ESAL Defined:** One ESAL represents a single standardized load application. Each ESAL is known to cause a quantifiable and standardized amount of damage to the pavement structure equivalent to one pass of a single 18,000-pound, dual-tire axle with all four tires inflated to 110 psi.

What is an ESAL?
THE CALCULATIONS

If you think this equation is complicated...It is

Generalized Fourth Power Law

\[
\left( \frac{30,000 \ lb}{18,000 \ lb} \right)^4 = 7.7
\]

Flexible Pavement ESAL Equation

\[
\frac{W_x}{W_18} = \left[ \frac{L_{18} + L_{2s}}{L_x + L_{2x}} \right]^{4.79} \left[ \frac{10 / G \beta_x}{10 / G \beta_{18}} \right]^{4.33}
\]

http://training.ce.washington.edu/WSDOT/Modules/04_design_parameters/04-3_body.htm#esal

Jackson County Highway Department
## ESAL Typical Load Equivalency Factors

<table>
<thead>
<tr>
<th>Axle Type</th>
<th>Axle Load (kN)</th>
<th>Axle Load (lbs)</th>
<th>Load Equivalency Factor (from AASHTO, 1993)</th>
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<td>(kN)</td>
<td>(lbs)</td>
<td>Flexible</td>
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<tr>
<td>Single axle</td>
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<tr>
<td>8.9</td>
<td>2,000</td>
<td>44.5</td>
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<tr>
<td>44.5</td>
<td>10,000</td>
<td>10,000</td>
<td>0.011</td>
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<tr>
<td>62.3</td>
<td>14,000</td>
<td>14,000</td>
<td>0.042</td>
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<td>80.0</td>
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<td>89.0</td>
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<td>133.4</td>
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<td>Tandem axle</td>
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<td>8.9</td>
<td>2,000</td>
<td>44.5</td>
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<td>222.4</td>
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<td>50,000</td>
<td>5.03</td>
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</table>

http://training.ce.washington.edu/WSDOT/Modules/04_design_parameters/04-3_body.htm#esal
MINNESOTA DEPARTMENT OF TRANSPORTATION
THE COUNTY OF WINONA
CONSTRUCTION PLAN FOR BITUMINOUS RECLAMATION, BITUMINOUS MILLING
BITUMINOUS SURFACING, AGGREGATE SHOULDERING
BETWEEN LEVISON AND WYATTVILLE (GEOGRAPHIC LOCATION)
STATE PROJ. NO. 85-625-58
GROSS LENGTH 33,455.55 FEET, 6.336 MILES
BRIDGES-LENGTH 390.00 FEET, 0.022 MILES
R/R EXCEPTIONS-LENGTH 90.00 FEET, 0.002 MILES
NET LENGTH 33,364.55 FEET, 6.310 MILES

1.4 CSAM 25 WHICH IS 1875' SOUTH OF R. OF SEC13, T 106 N, R. 9 W
H 25.4 CSAM 25 NEAR THE CENTER OF 106 NORTH, R. 9 W

INCLUDED IN THIS PROJECT HAVE BEEN R.R. EXCEPTIONS
STA 530+38.85 - STA 530+47.85

BEGIN S.A.P. 85-625-58
C.P. 0903 CSAM 25
STA 558+17.90

END S.A.P. 85-625-58
C.P. 0903 CSAM 25
STA 491+78.3 = 493+73

10+00 = 475+00

GRADED IN 2007 UNDER S.A.P. 85-625-55

LOCAL AGENCY SIGNATURES:
I HEREBY CERTIFY THAT THIS PLAN WAS
PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT
I AM A FULLY LICENSED PROFESSIONAL ENGINEER UNDER THE
LAWS OF THE STATE OF MINNESOTA.

APPROVED DATE: 4-10-07

INDEX

 SUBJECT

 SHEET   TITLE

 B 1    ESTIMATED QUANTITIES
 B 2    TYPICAL SECTION
 B 3    LANE USAGE
 B 4-5   TRAFFIC CONTROL

THIS PLAN CONTAINS 6 SHEETS
# Jackson County Construction Cost Trends

## Jackson County Rural Construction Costs Per ESAL / MILE

<table>
<thead>
<tr>
<th>Roadway</th>
<th>Construction Year</th>
<th>Location</th>
<th>Length</th>
<th>Project</th>
<th>Cost Per 20 year Design</th>
<th>$ cost per ESAL per Mile</th>
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</thead>
<tbody>
<tr>
<td>CSAH 34</td>
<td>2000-2001</td>
<td>Hwy 71 to East County Line</td>
<td>6.89</td>
<td>$2,618,066</td>
<td>$379,980.55</td>
<td>$2.11</td>
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<td>CSAH 34</td>
<td>2003-2004</td>
<td>West County Line to CSAH 9</td>
<td>7</td>
<td>$2,505,991</td>
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<td>CSAH 34</td>
<td>2004-2005</td>
<td>CSAH 9 to Hwy 86</td>
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<td>$3,601,303</td>
<td>$514,471.86</td>
<td>$6.63</td>
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<tr>
<td>CSAH 34</td>
<td>2006-2007</td>
<td>Hwy 86 to HWY 71</td>
<td>9</td>
<td>$5,754,281</td>
<td>$639,364.56</td>
<td>$8.37</td>
</tr>
</tbody>
</table>

### Cost per ESAL / Mile Forecasted for Year 2010

$11.51
Assumptions for Funding Scenario

• Based on typical existing pavements with current 500 ADT and designed for 110,529 ESALs; pavement cost based on reclaiming and asphalt paving at $200,000/mile.

• 2 sand mines; 70 + 60 = 130 truckloads/day; 6 days/week; 7 months/yr; 23 tons on 80,000 lb truck that is 2.4 ESALs; trucks travel 10 miles on county roads.
Paving New Asphalt Over Reclaimed Asphalt
Approximately $200,000 per mile.
Funding Scenario

<table>
<thead>
<tr>
<th>Project Type</th>
<th>Cost/Mile</th>
<th>Design ESALs</th>
<th>Cost/Mile/ESAL</th>
<th>Cost/Mile/Ton 1</th>
<th>Cost/Ton 2</th>
<th>Truckloads/Year 3</th>
<th>Ton/Year 3</th>
<th>Road Cost/Year</th>
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<tbody>
<tr>
<td>Reclaim and Pave Asphalt</td>
<td>$200,000</td>
<td>110,529</td>
<td>$1.81</td>
<td>$0.19</td>
<td>$1.89</td>
<td>23,725</td>
<td>545,675</td>
<td>$1,030,318</td>
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</table>

<table>
<thead>
<tr>
<th>Mine Share</th>
<th>Taxpayer Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>$/Ton</td>
<td>% of Levy</td>
</tr>
<tr>
<td>$0.00</td>
<td>$0 0% $1,030,318 100% 6.1%</td>
</tr>
<tr>
<td>$0.06375</td>
<td>$34,787 3% $995,531 97% 5.9%</td>
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<tr>
<td>$0.25</td>
<td>$136,419 13% $893,899 87% 5.3%</td>
</tr>
<tr>
<td>$0.50</td>
<td>$272,838 26% $757,480 74% 4.5%</td>
</tr>
</tbody>
</table>

Notes:
1. Assuming 23 Tons on an 80,000 lb semi that is 2.4 ESALs.
2. Assuming 10 miles on County Roads (County Highways and County State-Aid Highways).
3. Assuming 2 mines, 70 + 60 = 130 truckloads/day; 6 days/week; 7 months/yr; 23 tons/truck.
4. Based on 2012 levy $16,972,674.
5. Aggregate Tax amount per ton to the County Road & Bridge Fund is $0.06375 per ton.
6. Based on current traffic of 500 vehicles per day; 20-year design; traffic grows to 550 vehicles/day during the 20 years.

<table>
<thead>
<tr>
<th>Project Type</th>
<th>ESALs</th>
<th>Percent of Pavement Life Consumed in One Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Traffic</td>
<td>5,526</td>
<td>5%</td>
</tr>
<tr>
<td>Sand Trucks</td>
<td>56,940</td>
<td>52%</td>
</tr>
</tbody>
</table>
Things to Keep in Mind

• Cost/Mile/ESAL will vary with the pavement and project type.
  – Cost/Mile/ESAL would be more for a $700,000/mile reconstruction project (including grading) designed for the same 500 vehicles/day.
  – Cost/Mile/ESAL would be less for a $1,000,000/mile project designed for several million ESALs.

• Increasing the number of mines keeps the mine and taxpayer % shares the same, but the % of Levy required for the taxpayer share increases.

• Decreasing the miles on county roads while keeping the $/ton the same increases the mine % share. And vice versa.
Proposed General Approach

• As roads need rebuilding, use a design that is efficient in cost/ESAL and able to withstand unknown increases in heavy traffic.
  – Cash flow projects with a combination of collected fees, state-aid advance, reserves, and bonding.
  – Refund/pay off projects with collected fees and/or increased property tax (per board policy).

• As turn lanes/bypass lanes are needed, retrofit on existing roads, or include in reconstruction projects as applicable.
  – Funded by mine operations.

• Township roads used for quarry access are maintained by the quarry (blading, dust control, adding rock).