

## Memorandum

To: Tom Lien, Western Construction



From: Laura C. Green, Ph.D., D.A.B.T.

Date: April 11, 2017

Subject: Air quality and public health with regard to your proposed hot mix asphalt plant for Pennington County

I write to address the question, “Would the quality of outdoor air, and public health, be adversely affected by permitting your proposed hot mix asphalt (HMA) plant, at your proposed location, in Pennington County?” As you will read, based on the relevant data and analysis, the answer is “No.”

In order to address neighbors’ concerns, my colleague Dr. Edmund Crouch and I applied a standard, U.S. EPA-approved, air dispersion model (using local meteorological conditions) to the expected exhaust stack emissions from your proposed HMA plant, in order to predict “worst case” annual impacts at several locations in the neighborhood, including at the nearest mobile homes and at the Dakota Fields Soccer Complex.

As you will read, because of the prevailing winds (which arise out of both the N-NW and, less frequently, the S-SE), the incremental impacts from exhaust stack emissions from *both* your proposed HMA plant and from the existing, J&J HMA plant are (i) about the same, and (ii) acceptably small.

Using benzene as the air pollutant of interest — because benzene was mentioned as a concern at a prior Planning Commission meeting; and because large concentrations of benzene are indeed harmful to health, while small concentrations are not — our results are as follows.

First, as you may know, small concentrations of benzene are always present in outdoor air (and in indoor air), primarily because benzene is present at percent concentrations in gasoline, and is in exhaust from cars, trucks, tractors, furnaces, forest fires, etc.

Next, as shown in the Table on the last page of this memorandum, the concentration of benzene in outdoor air (as estimated by U.S. EPA<sup>1</sup>) in the census tract encompassing your proposed plant and your nearest neighbors in Pennington County averages about 0.34 micrograms of benzene/cubic meter of air — which equals 340 nanograms of benzene per cubic meter of air.<sup>2</sup> This is a very small and safe concentration.

If your HMA plant were built at the proposed site, and if it produced hot mix asphalt at the rate of 50,000 tons per year, then your plant's emissions would add, at most, about 0.012 nanograms of benzene per cubic meter of air at the Soccer Complex — which is about 0.0029% of the amount of benzene that is currently there. Clearly, such an increment would be far too small to measure, and too small to matter in terms of people's health or well being.

Interestingly, the current, incremental impact from the J & J HMA plant, at the Soccer Complex, is a bit larger — since that plant produces about 70,000 to 100,000 tons per year of hot mix asphalt, and since winds blow from that site to the Soccer Complex more often than they do from due west.

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<sup>1</sup> Per U.S. EPA (National Air Toxics Assessment, NATA 2011, <https://www.epa.gov/national-air-toxics-assessment/2011-nata-assessment-results>), the major sources of emissions of benzene into outdoor air in Pennington County are prescribed fires (129 tons of benzene emitted per year), motor vehicles (36 tons/year), wild fires (16 tons/yr), off-road gasoline engines (14 tons/yr), other stationary sources (7.3 tons/yr), and residential wood combustion (4.3 tons/yr). The major individual source among the "other stationary sources" is a wood products manufacturing facility (7.01 tons/year). By contrast, I estimate that your facility would emit 14 *pounds*/year of benzene.

<sup>2</sup> In my April 4<sup>th</sup>, 2017 presentation to the County Planning Commission, I had mistakenly cited the NATA 2011 estimated concentration of benzene (770 nanograms of benzene per cubic meter of air) in an *adjacent* census tract. The estimates for benzene concentrations in ambient air in the County vary by census tracts — from a low of about 140 nanograms/cubic meter in the west of the County, to 1,050 nanograms/cubic meter in Rapid City itself, and back down to 160 nanograms/cubic meter in the eastern portions of the County.

The impacts from your proposed HMA plant at the nearest mobile home park would be about 19 times larger than at the Soccer Complex — but would still be too small to measure and too small to be harmful to health.

Odors have also been raised as a concern. As you may know, asphalt odors are typically sulfur-based organic compounds, and the primary way to minimize these odors is to buy asphalt cement that has been manufactured from low-sulfur crude oil (so-called “sweet” crude). I understand that you currently buy asphalt made from sweet crude for your existing HMA production, and that you plan to continue doing so for your new HMA facility, should it be permitted.

I understand that you plan to site your drum mixer near the southeastern corner of the property. As such, the distances from the drum mixer to your nearest neighbor on Elkhorn Lane would be about 570 yards, and to the nearest home on Seger Drive, about 1,000 yards — although these distances depend, of course, on precisely where the HMA plant would be located. Regardless, it seems likely that your neighbors would be too far from your main operations to perceive any asphalt-related odors. And, as you know, masking agents could be added to asphalt cement, should odors in fact present a problem.

Overall, then, the data indicate that your proposed HMA plant, at the proposed location, would not (i) adversely affect air quality, (ii) pose a risk to people’s health, or (iii) present nuisance odors.

	<b>Dakota Field Soccer Complex</b>	<b>Country Village Estates</b>	<b>Elkhorn Lane</b>	<b>Seger Drive mobile homes</b>
<b>Benzene in outdoor air: concentrations and incremental impacts</b>				
Current "background" concentration	340 ng/m <sup>3</sup>	340 ng/m <sup>3</sup>	340 ng/m <sup>3</sup>	340 ng/m <sup>3</sup>
Incremental impact from Western Construction proposed HMA plant	0.010 ng/m <sup>3</sup>	0.11 ng/m <sup>3</sup>	0.18 ng/m <sup>3</sup>	0.043 ng/m <sup>3</sup>
Fraction of background	0.0029%	0.033%	0.054%	0.013%
J & J HMA plant	0.019 ng/m <sup>3</sup>	0.066 ng/m <sup>3</sup>	0.11 ng/m <sup>3</sup>	0.099 ng/m <sup>3</sup>
Fraction of background	0.0055%	0.019%	0.031%	0.029%