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November 10, 2011

Memo

To: Winona County Board
Planning Commission

From: Winona County Planning & Environmental Services

RE: Frac Sand Questions

Dear Board Members:

This memo is meant to address questions submitted by the County Board, Planning Commission and the public since the October 20th Planning Commission meeting regarding issues relating to three proposed sand mines in Saratoga Township.

Regulatory Framework

Winona County

From what has been gathered from other jurisdictions, Winona County's zoning ordinance is well prepared to deal with unusual operations such as frac sand mining. This is due to the conditional use permit requirement in section 9.10 which includes required performance standards, however, the very nature of conditional use permitting is for a political jurisdiction to be able to adequately address the uniqueness of certain uses which may have unanticipated qualities, allowing the jurisdiction to consider and respond to issues like traffic, environmental concerns, nuisance abatement, public concern, etc.

The County regulates all extraction permits and land altering operations by conditional use permits pursuant section 9.10 of the County Zoning Ordinance. According to Dennis Martin, Manager of Mineral Potential for the Minnesota DNR, all 'Industrial Materials' such as sand, gravel and rock are governed locally and not by the State, regardless of size. The State only regulates state owned lands and reclamation for metallic or peat mines.

Extraction pit and Mines are defined in the Winona County Zoning Ordinance as:

Extraction Pit – Any artificial excavation of the earth made by mining from the natural surface of the earth of sod, soil, sand, gravel, stone or natural matter or made by turning, breaking or undermining the surface of the earth, when materials will be

removed from the property on which the excavation is being conducted. Excavations for the purpose of impounding water for agricultural purposes are exempted.

Mine - The extraction of sand, gravel, rock, black dirt, peat, soil and other material from the land and the removal thereof from the site.

State of Minnesota (DOT, MPCA)

DOT

169.81 Subd. 5. Manner of loading.
No vehicle shall be driven or moved on any highway unless such vehicle is so constructed, loaded, or the load securely covered as to prevent any of its load from dropping, sifting, leaking, blowing, or otherwise escaping therefrom, except that sand may be dropped for the purpose of securing traction, or water or other substances may be sprinkled on a roadway in cleaning or maintaining such roadway

169.81 Subd. 5b.Securing load; exceptions.
(a) The driver of a vehicle transporting sand, gravel, aggregate, dirt, lime rock, silica, or similar material shall ensure that the cargo compartment of the vehicle is securely covered if:

(1) the vertical distance from the top of an exterior wall of the cargo compartment to the load, when measured downward along the inside surface of the wall, is less than six inches; or

(2) the horizontal distance from the top of an exterior wall of the cargo compartment to the load is less than two feet.

(b) The driver shall not operate a vehicle to transport sand, gravel, aggregate, dirt, lime rock, silica, or similar material in or on any part of the vehicle other than in the cargo container. The driver shall clean the vehicle of loose sand, gravel, aggregate, dirt, lime rock, silica, or similar material before the vehicle is moved on a road, street, or highway following loading or unloading.

MPCA

Site owners and their construction operators must sign off on a National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) Construction Stormwater General Permit. As part of the application for this legal document, the owner and operator must create a stormwater pollution prevention plan (SWPPP) that explains how they will control stormwater.

United States Of America (MSHA, OSHA)

MSHA

The U.S. Labor Department's Mine Safety and Health Administration (MSHA) helps to reduce deaths, injuries, and illnesses in the nation's mines with a variety of activities

and programs. The agency develops and enforces safety and health rules applying to all U.S. mines, helps mine operators who have special compliance problems, and makes available technical, educational and other types of assistance. MSHA works cooperatively with industry, labor, and other Federal and state agencies toward improving safety and health conditions for all miners. MSHA's responsibilities are spelled out in the Federal Mine Safety and Health Act of 1977.
Source: http://www.msha.gov/MSHAINFO/FactSheets/MSHAFCT1.HTM

The 1977 act applies to all mining and mineral processing operations in the United States, regardless of size, number of employees, or method of extraction. Thus MSHA covers two-person sand and gravel pits as well as large underground coal mines and processing plants.
Source: http://www.msha.gov/MSHAINFO/FactSheets/MSHAFCT1.HTM

Roads

Issues with roads center on the amount of truck traffic generated and deterioration of the surface of public roads. Other issues such as access to public roads, weight limits, dust, etc. can be dealt with in a number of different ways on a case by case basis.

For the three current frac sand CUP applications, the routes that they are proposing to take are all designed and intended to accommodate the types of trucks and loads they are proposing. The primary concern is not that the roads aren't designed for trucks; the concern is that the cumulative effect of the large number of trucks could prematurely deteriorate the pavements.

In some cities, certain streets are designated as "truck routes" and there may be ordinances and signage that goes along with that. The County has been in communication with the City of Winona and there are truck routes designated.

In the rural portions of the county, there are not designations of truck routes. All of the trunk highways maintained by MnDOT (interstate, U.S. and Minnesota) are intended for trucks. All of the county roads are intended for trucks. To a lesser degree, the township roads are intended for trucks, mostly to handle local traffic to and from property out to the county highway or trunk highway system, or for example from a field to a farmstead.

Minnesota statutes 169.80 to 169.88
https://www.revisor.mn.gov/statutes/?id=169&view=chapter#stat.169.80 cover vehicle weight limits. Unless posted otherwise by the road authority, paved roads have a 10-ton axle limit year-round; and unpaved roads have a 5-ton axle limit during spring load restrictions, and a 9-ton axle limit otherwise.

Generally our roads that are posted 9-ton or less during spring load restrictions are posted for 9-tons the remainder of the year.

There are also around 20 bridges around the county that are load posted (for less than the statutory maximum loads) due to the physical condition of the bridge structure. It does not appear these bridges will be affected by the hauling routes proposed by the current applications.

A certified scale in order to track frequency and weights of loads may be an option to consider that could be added as a condition in order to prevent further damage to roadways.

Section 298.75 of the Minnesota Statutes provides the legal framework for aggregate taxes which could be utilized to fund road repair.

Environmental / Health Information

Air Quality

From the OSHA Factsheet on crystalline silica: Crystalline silica is a basic component of soil, sand, granite, and many other minerals. Quartz is the most common form of crystalline silica. Cristobalite and tridymite are two other forms of crystalline silica. All three forms may become respirable size particles when workers chip, cut, drill, or grind objects that contain crystalline silica. (please see the attached OSHA factsheet for more information).

From a material data safety sheet (MSDS) for silica sand:
If inhaled as dust, this product can cause irritation of the respiratory system resulting in coughing and/or sneezing. Higher exposures may cause a build-up of fluid in the lungs with severe shortness of breath. Inhalation of silica can also cause a chronic irreversible lung disorder, silicosis. Some medical reports state inhalation of silica dust may cause lung cancer. Per ACGIH, adverse effects are not likely to occur in the workplace provided exposure levels do not exceed the appropriate TLVs/PELs. See Section 8. However, because of the wide variation in individual susceptibility, lower exposure limits may be appropriate for some individuals including persons with pre-existing medical conditions.

From Wisconsin Department of Natural Resources (WDNR) special study of crystalline and amorphous forms of silica:
The main health affect concerns from silica focus on particles that are small enough to get into the deepest parts of the lung. The chronic inflammation and scarring caused by the presence of these insoluble particles in the lung and lymphatic system can exacerbate existing respiratory disease. With enough exposure, silica can cause lung damage even in people without pre-existing conditions. Although rare, if the silica exposure is high enough, there can also be adverse health effects in other organs. Based on a review of the health effects literature, most agencies believe that silicosis is the most sensitive endpoint for non-cancer health effects for potential ambient air exposures to crystalline silica. Crystalline silica has been identified as a human

carcinogen but the mechanism of how it causes cancer and the causal effect of silicosis is unknown.

As the information above suggests, silica sand when crushed or otherwise broken can become of respirable size and cause a significant health risk. The sources also suggest that the health problems associated with silica sand are rare and that levels of silica sand emission from sand mines are unknown. Only careful air monitoring and an understanding of recommended exposure levels can provide answers to this issue. See condition # 19 based on the California model and in line with air quality monitoring required for approval for other sand mines researched by Staff.

Water Resources

Generally, there can be a number of issues relating to sand mining and its effects on water quality. Typical areas of concern include mining that occurs within the water table, water appropriation and discharges, and stormwater from the site to name a few. The proposed sand mines are proposed to be well above the water table and do not anticipate any ground water within the area of operation. There are no surface waters near any of the proposed mine sites and there is no processing / washing of material proposed at the sites and so there will be no water appropriation or subsequent discharge. Storm water is addressed by the Storm Water Pollution Prevention Plan (SWPPP).

Reclamation will be important in regards to water quality since the mining could affect the soils ability to filter pollutants from the surface and the mining could allow for more intense cropping than what existed prior to the sand extraction operation.

Natural Communities

The Minnesota County Biological Survey located areas of natural communities in Winona County from 1990 to 1995 using aerial photo interpretation followed by field survey of selected sites. Natural communities are groups of native plants and animals that interact with their environment in ways that have not been greatly altered by modern human activity or by introduced organisms. The survey mapped an area consisting of the Reiman site and stretching all the way to an area adjacent to the Reps site as:

> *Dry Prairie – bedrock bluff subtype – dry prairies on this loess over bedrock on steep south – to west-facing bluffs; rock outcrops frequent;*

Long Bearded Hawkweed exists on the site and we have been able to determine that this species of plant was once on a list of rare and endangered species in Minnesota and that in 2010 the DNR listed its status as being "tracked" and it is not listed in

Minnesota Administrative Rules, Chapter 6134, Endangered, Threatened, Special Concern Species (2011). So it appears this species is no longer listed as being a threatened or endangered species in Minnesota. This information is still under review.

Winona County Sand Resources

The Geologic Atlas of Winona County is a good resource for gathering information on issues relating to the sand and gravel resources in the County. Plate number 2 of the atlas on Bedrock Geology is included with this memo. The three petitions propose to extract sand from the St. Peter Sandstone formation.

Except where eroded, the main formations of sandstone can be mined throughout the county. Practically it is likely only viable for those areas where access, little overburden, low cementation, no bluff protection regulation and a willing property owner coincide to make it financially feasible. This makes it difficult to fully identify the extent in the County, however, geological survey maps indicate the material being widely available throughout the County.

Sinkholes

The proposed sand pits are located within an area mapped on the Geologic Atlas as having low to moderate sinkhole probability. The mining will be occurring within the St. Peter Sandstone formation which the Geologic Atlas indicates is between 90 and 100 feet thick. The proposed mines will be removing approximately 60 feet off of the top of the St. Peter sandstone. The Prairie Du Chien formation that is located under the sandstone is a karst formation that has an increased potential of sinkholes.

Existing Aggregate Sites

In looking at the Winona Geological Atlas, 54 sites are identified. In 1984, 37 of the 54 were stated as "Inactive" as the status at that point in time, thus only 17 actively mined. (approximately 15-20 actively used). Approximately only half of this number (8-10) have ever received a Conditional Use Permit of any kind.

Winona County adopted zoning regulations in 1970 (fairly recent in comparative terms), thus it is logical to assume 90% or higher of all known sites existed prior to any permitting/zoning regulations. Most of these conditional use permits granted from 1970 to 2011, were only done so because they wanted to put a hot-mix plant inside, or add additional acres to their quarry "footprint".

New Sites

The current petitions being considered by Winona County represent a change in the market for silica sand that has increased demand nationally and creates unique challenges for local communities to address where previous sand extraction operations focused on low intensity local use of the product.

Additional Aggregate Mine Potential

There is no way of knowing how many mines will be proposed. Though it is quite possible that the current applications are the beginning of many such proposals, outside market forces and possible federal regulation of the oil and gas industry could affect demand and speed up or slow down the number of mines proposed. Keeping that in mind Staff has seen an increased number of inquiries regarding the permitting process for sand pits in Winona County and neighboring Counties in Wisconsin have permitted many new operations. The St. Peter formation in Winona County is close to the surface with little overburden, is poorly cemented and easily accessed which could be an indication that additional sand mine application are on the horizon.

Aesthetics

The size of the proposed mines (<20 acres) and the operational phases (< 5 acres actively mined at one time), along with appropriate reclamation can mitigate a certain amount of these concerns. Conditions may be considered for additional mitigation. However, as the number of sand mines increases aesthetics and the cumulative effect of multiple mines in the area will become more and more of an issue.

Property Values

Property values around existing quarries and sand pits in the County have not been noticeably reduced due to proximity to existing mining operations.

Information regarding the proposed petitions

Operations

The mines as proposed are for sand extraction only. Sand will be excavated and loaded into trucks and hauled to processing / loading sites. The current applications do not provide for processing such as crushing, screening / sieve, washing, and drying at these mines.

Trucks per day

All three petitions have indicated maximum 60 truck loads per day. The petitioners agent for the Reps and Reiman petitions have indicated these two sites will not be operated simultaneously but instead the Reps site will be operated and reclaimed before the Reiman site is to begin.

Hours of operation

Hours of operation consist of Monday through Friday 6 a.m. to 10 p.m. and Saturday 7 a.m. to noon. Active mining and hauling will be limited to Monday through Friday 7 a.m. to 7 p.m. and Saturday 7 a.m. to noon. The Planning Commission can impose

limitations to these hours in the form of a condition in order to mitigate potential nuisance concerns (please see the list of conditions #16 for your consideration).

cubic yards

Cubic yards of material removed is only an estimate but up to 200,000 cubic yards per year is possible on each of the proposed sites.

dust control

Condition #8 states that access roads must be conditioned or watered to control dust.

Blasting

No blasting has been proposed for the Reps or Reiman sites and a very minimal amount of potential blasting has been indicated for the Nisbit site in order to remove a thin layer of overburden.

Reclamation

Section 9.10.4 of the WCZO includes standards for reclamation once the operations cease. These standards may not however, be enforced on mining operations which may have been in existence before the adoption of the code which is why there are many old rock quarries that have not been reclaimed.

Additional conditions may be considered in order to mitigate legitimate concerns.

A performance bond of one hundred ten percent of estimated reclamation expenses may be required from the land owner. A legal agreement between the owner/operator and the County is also being drafted that will include a standard set of conditions some of which will address reclamation.

A condition has been drafted to require a land use/cover plan that includes at least as much land be restored to the natural land cover during reclamation as existed prior to mining activities. For example, if there were 2 acres of native grassland prior to mining activities there would need to be at least 2 acres of native grassland restored after mining activities are complete.

Information regarding moratorium

A moratorium is an option to consider which would allow time to study road use agreements, traffic impact study needs, reclamation needs, performance bond requirements, coordinate with other government units (State and other Counties), and receive legal review.

Intergovernmental Coordination

County Staff has been in contact with municipalities and counties throughout the region as well as state agencies in MN and WI gathering and sharing information.

Public Informational Forum

Winona County is in the process of setting up an informational forum in order to allow experts from a number of disciplines talk on the issues surrounding frac sand extraction. This meeting will be advertised as soon as arrangements can be finalized.