

# **PUBLIC HEARING**

June 22, 2023

5:30 p.m.

Hearing Held in Council Chambers and via Electronic  
Communications

## **Bylaw 1607/22 – Resource Extraction Amendments**

### **VERBAL SUBMISSIONS**

1.	Kirsty Stewart	Opposed
2.	Anita Power	Opposed
3.	Janice Nolte	Opposed
4.	Tim Cholewa	Opposed
5.	Marc Therrien	Unidentified
6.	Phil Soetaert	In Favour
7.	Sid Chadi	Opposed
8.	Jerry Madro	Opposed
9.	Laura Cline on behalf of SIL	Opposed
10.	Shannon Cory	Unidentified

### **WRITTEN SUBMISSIONS**

1.	Rakesh Mehra	Opposed
2.	William R Rudko	Opposed
3.	Miles Chuchmuck	Opposed
4.	Erwin Rutsch	Opposed
5.	Fern Mulyk	Opposed
6.	Vivianne Pambrun	Opposed
7.	Sid Chadi – Fourcha Group	Opposed
8.	Pam Tidsbury and Brian McBride	Opposed
9.	Rick and Beverley Reid	Opposed
10.	Neil Yakimets	Opposed
11.	Rose Domshy	Opposed
12.	Heidelberg Materials	Opposed
13.	Curt Klassen	Opposed
14.	Colleen Grant and June Van Brabant	Opposed

15. Sil Industrial Minerals	Opposed
16. Janice Nolte	Opposed
17. Carol Shaw	Opposed
18. John and Sandy Stevenson	Opposed
19. John Zaffino	Opposed
20. John and Albina Pratt	Opposed
21. Miles Court and Dorreen Pedley	Opposed
22. Sherril Cholewa	Opposed
23. Wally Benjamin Clarke	Opposed
24. Dave and Melissa Hobson	Opposed
25. Raymond and Sharon Dragon	Opposed
26. Warren Lusk and Susan Gillespie-Lusk	Opposed
27. David Wayne Carter	Opposed
28. Jessica Bussemakers	Opposed
29. Caesar Diogo and Fiona Henderson	Opposed
30. Bryce Wooley	Opposed
31. Darcy and Melissa McCutcheon	Opposed
32. Jerry and Sheree Madro	Opposed
33. Gabrielle Madro	Opposed
34. Candace Stoppa	Opposed
35. Patricia Pelrine	Opposed
36. Tim Cholewa	Opposed
37. Jan and Leanne Cosby	Opposed

**From:** [Rakesh Mehra](#)  
**To:** [Legislative Services](#)  
**Cc:**  
**Subject:** Resource Extraction.  
**Date:** June 6, 2023 10:06:57 AM

Severed in line with section 17 of the FOIP Act

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Dear Sir/ Madam


- The increased setbacks for silica extraction inhibit landowners from deriving economic benefit from their property and reduces or eliminates the indirect benefits to the County and other business by limiting that income to landowners.
- The County is limiting their own ability to benefit from silica sand extraction due to reduced Community Aggregate Payment (CAP) levies, which could be used to bring benefits to communities and programs within the County.
- Impacts from silica sand operations and sand and gravel operations can be mitigated using the same or very similar strategies which can be effective for both types of operations. However, different setbacks implies there are differences in the effectiveness of mitigation, even though silica extraction is typically less intensive than sand and gravel operations because it requires less overburden removal (less equipment work), doesn't involve washing or crushing on site, and usually requires less ground area to be disturbed at one time to yield more resource.
- It is recognized that the proposed setbacks in the Natural Resource Extraction district can be reduced via the Direct Control district, but there is no certainty on what setback would be determined after an operator has already invested money in to the various studies and technology required to achieve the performance standards.
- Thanks.
- Best regards.
- Rakesh Mehra
- President
- 1272977 Alberta Ltd.

To whom it may concern:

I am writing this letter in response to the proposed changes to the Resource extraction bylaw changes. The changes will have a negative effect on my ability to benefit financially from the potential sale of this needed resource. The county outlines that the distance should be increased to protect livestock. What type of livestock do they have in mind - avian? The extraction process of sand is done in the most efficient manner, no stockpiling. The product is moved to the processing plant immediately, with limited change to the aesthetics of the property. There seems to be a concern about sand having a health affect on people. I don't see any signs at playgrounds or golf courses warning people about the health hazards of sand located at these facilities. At the march 15/ 2023 meeting I heard individuals ask for compensation because they area affected by the extraction of gravel in their area. One individual asked for a reduced tax rate due to the activity. If these changes are adopted I will ask for compensation for the lost income that is incurred by these changes. I would like to also say that the county receives a levy on this aggregate that benefits this county. I have read newspaper articles that state energy companies are not paying taxws on their leases. The County of Sturgeon is affected by this as are many other municipalities.

Thank you,

William R Rudko



**From:** [Miles Chuchmich](#)  
**To:** [Legislative Services](#)  
**Subject:** Sturgeon County Bylaw Change Bylaw 1607-22  
**Date:** June 19, 2023 9:15:34 AM

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As owner of property that will be affected by the proposed bylaw changes here are my thoughts for your consideration.

The increased setbacks for silica extraction will inhibit me, and other landowners from deriving economic benefit from our own property, intruding on our ability to enjoy our land.

This reduction in industry reduces or eliminates the indirect benefits to the county and other business, by limiting that income to us landowners.

The county is also limiting their own ability to benefit from Silica Sand extraction due to reduced community aggregate payment levees, which could be used to bring benefits to communities and programs within the county. Impact from Silica, Sand operations and sand and gravel operations can be mitigated using the same or very similar strategies which can be effective for both types of operations, however, different setbacks implies there are differences in the effectiveness of mitigation Even though silica extraction is typically less intensive than sand and gravel operations, because it requires less overburden removal and less equipment work. It doesn't have washing or crushing on site and usually requires less ground area to be disturbed at one time to yield more resources. Silica Sand extraction also has less of impact to noise and dust, as there is no processing that happens on site which is different for gravel operations.

Based on this I recommend the setbacks remain the same as gravel and not be increased for Silica

Sent from my iPhone  
Miles Chuchmich  
Owner of affected Property in Redwater

Severed in line with section 17 of the FOIP Act

**From:** [Erwin Rutsch](#)  
**To:** [Legislative Services](#)  
**Subject:** Proposed Bylaw changes  
**Date:** June 20, 2023 10:14:24 AM

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Good Evening Council,

I am a landowner that is affected by the proposed bylaw that would require an 800 M setback for properties under consideration for Sand extraction operations and I would like to express my concern. The process of changing this bylaw began before the pandemic and has since been delayed and changed several times. The essence of this bylaw change was to recognize that concerns that adjacent landowners may have can be mitigated by industry through the use of industry best practices. It has now become something that penalizes industry and sterilizes resources that the county and population can benefit from through economic activity such as jobs and taxes.

The bylaw as proposed would preclude our property from being considered as there are dwellings within the 800 M radius. This results in the loss of my ability to enjoy the natural resources on my property and is in direct contradiction of property rights statutes.

As a landowner and taxpayer of Sturgeon County we are looking forward to the possibility of our Sand being mined. This income would provide a source of retirement income and I believe the reclamation following mining would leave the property in better condition than it is now.

Thank you,

Erwin Rutsch

Regards

Erwin Rutsch

Erwin Rutsch.  
NW

Edmonton, AB.  
T6B 1A6

Legislative Services  
County of Sturgeon

RE: Proposed changes to By-Law 1607/22 Natural Resources Extraction Sturgeon County

As a land owner in Sturgeon County I **do not support** the new proposed additions to this by-law.

You propose:

#1 - Implement "split Setback. There are no dwellings on my property nor on any of the surrounding properties. This will impact any income from resource extraction.

#2 - Notification radius. As my land is across the road from Natural resources Redwater there is no one to notify. Also no dwellings are on the adjacent properties.

The by-law would impact any income that I seek to profit from my property. Also the county will receive less levies that could benefit the communities and programs within the Sturgeon County. Extracting natural resources by SIL will be less intensive, not requiring machinery for washing or crushing on site.

Why is silica sand being targeted?

Respectively Fern Mulyk  
SW30-57-20-W4



June 21, 2023

Sturgeon County  
9613-100 Street,  
Morinville, AB T8R 1L9

Attention: Sturgeon County

Re: , Bylaw 1607/22

I am the owner of 26432 Twp Rd 544, Sturgeon County and I **oppose** the Land Use By-law 1607/22 the creation of a New Resource Extraction Direct Control District.

Sturgeon County wants to

- Amend the existing Resource Extraction land use district by:
  - adding transportation performance standards
  - adding groundwater management requirements and management plans
  - adding community consultation and communication requirements
  - removing the allowance to reduce the prescribed setbacks if agreed to in writing by area residents.

AND

- Add a new Resource Extraction Direct Control District to the Land Use Bylaw that allows for:
  - exact setbacks to be determined on a case-by-case basis at the redistricting stage.
  - built-in flexibility where the regulations can be adapted to the land and its characteristics.
  - a process that allows for public input at the public hearing stage and confirmation of relevant regulations by Council prior to third reading of the relevant bylaw
  - a full range of enhanced performance standards applied on a case-by-case basis as Council deems appropriate.

I am against the new “Resource Extraction Direct Control District to the Land Use Bylaw” which will allow for Resource Extractors to be closer to residential properties, roadways, and/or waterways at Sturgeon County’s discretion (“exact setbacks to be determined on a case-by-case basis “). On a case-by-case basis Right now, there are established holdbacks that are only negotiable by adjacent affected Landowners (Area Residents) and the Resource Extractors themselves. The new proposed Resource Extraction Direct Control District will shift the power of the Landowner (Area Residents) to Sturgeon County and allow the County to decide at will if the Resource Extractor can be closer to residences, roadways, and waterways. Unsurprisingly I have not read or heard of the “*exact setbacks to be determined on a case-by-case basis*” setbacks being possibly farther than the 400 metres minimum (single home) if “*determined* “ by Surgeon County as that doesn’t meet the “if supported by an economic, environmental and quality of life assessment” (Note: Economic is the first priority). The exact wording is Operators (Resource Extractors) could apply for REDUCED Setback Distances. This already favours the Resource Extractor and Sturgeon County, and not the Area Resident/Landowner. I am sure not one Area Resident/Landowner has complained of being too far away from a Resource Extraction Site.

Sturgeon County says that they want to balance the needed economic benefits with protecting the environment and residents' quality of life. The adding of Transportation Performance Standards, Groundwater Management, and Community Consultation/Communication is necessary but below ground aquifers health is missing and important for Area Residents/Landowners.

- In the new **resource extraction direct control (RE DC) land use district**, on a site-specific basis:
  - Operators could apply for reduced setback distances (compared to the resource extraction (RE) land use district) if supported by an economic, environmental, and quality of life assessment. If approved by Council, **additional measures could apply** and would suit the land's unique characteristics, such as topography, shelter belts, roadways and more.
  - What will Council use to determine the additional measures? Could apply? Does that mean it is optional vs mandatory? If it is mandatory – who is enforcing any of those measures that could apply?

Measures related to traffic management, noise, hours of operation, air quality, hauling, water/groundwater management **and more, could be applied** to reduce the operation's impact on the environment and nearby landowners and properties.

#### **TRAFFIC:**

What specific scientific measures will Council be using to address the high-volume truck and trailer traffic on the roadways and intersections? Will there be a lower speed limit? Will there be enforcement of trucks with air brakes? Will there be increased bylaw enforcement in that area of increased traffic? Is there a traffic plan at all? What is it? Is the increased traffic at intersections safe now? Is there a plan to review traffic before each project?

#### **NOISE:**

Under section 12 of By-Law 1607/22 (being amended) sub section (a) *The developer shall "prevent noise from becoming an annoyance to adjacent landowners at the request of and to the satisfaction of the Development Authority"*. The Development Authority not the Landowner has the final say as to what is acceptable. Will scientific Noise Surveys be completed to determine Noise impacts on residents and livestock health and stress levels? How do you know the effects right now on livestock and residents? What baseline research/studies have been completed to ensure the levels are not high already. What enforcement will Sturgeon County provide for not acceptable levels? What engineering solutions do you have if sound levels are high and can't meet bylaw/legislative requirements? Who will be responsible for enforcing that these get completed? And what happens when there is no solution and noise levels remain high above the bylaw/legislative levels?

**AIR QUALITY/DUST:**

Will Air Quality studies be completed by an approved scientific company to monitor Silica sand and fine dust health effects? Crystalline Silica is a known Type 1 carcinogen. **Exposure to crystalline silica can cause a number of health problems, including silicosis, lung cancer, chronic obstructive pulmonary disease and emphysema, as well as pulmonary tuberculosis**". Will residents get a chance to say when they want air quality studies? Many companies wait until it is a nonwindy day to complete studies so the levels are low. Will the residents get a chance to pick the days that the monitoring occurs? Who hires the monitoring companies? The Resource extraction companies? For residents closer to extraction are permanent air quality /wind sensors set up? Gravel pit operations in and around Calgary include warning signs that alert all that enter the site that it's a "crystalline silica work area" and that respirators are required. However, no signs are currently posted. Who is protecting the resident's health & safety and these homes that are within 300m of the centre of the pit and crushing plant. There are currently no wind sensors in place to monitor particulate matter in any direction, so the concentration of crystalline silica is currently not known. There are no baseline scientific studies/research that show how much Crystalline silica is currently blowing in the wind. The gravel roads also produce silica. It has only been last year that dust control was applied to the gravel road (we live on a major haul route). It is not a permanent solution, but it has only been addressed in the past year.

**Water:**

Will scientific studies of ground and aquifer water be conducted? (Our well went dry and was not part of the monitoring program, we are situated close to a current Extraction Resource Production Site) What resources are out there for residents who now have a dry well from production right now that has not been addressed and solved? Who will pay for dry wells and how long do residents go without a well? What is the current process for residents who have a dry well? We don't know that process? Will all this testing be ongoing? Will residents receive water quality reports monthly or yearly to ensure no contamination has occurred? Who will pay for these studies. Will the area residents be allowed to review these studies. What will enforcement look like if the Resource Extractors fail to comply or exceed the recommendations of the studies? What input does the residents have? Enforcement is not included in the bylaw except for renewal of permit.

**Communication Plan:**

What modes of communication should residents expect? Quarterly, monthly and in what form Brochures, email notices, emergency response situations closest to site. What happens when effective communication is not occurring and is non-transparent? What happens if sturgeon county and the resource extraction company can't find a solution to address residents concerns? Will there be a mediator? Will there be a separate board (third party to assist) There is currently no written communication or community engagement that has occurred throughout the past two years while this bylaw has been on the table. Why does effective communication have to be written into the bylaw. Many companies do engage with local residents (i.e., oil and gas, they do it without it written into a bylaw). What happens if this does not occur? Enforcement? Or is it

wait for a 5-year permit to renew? Landowners and Area Residents who are impacted by Resource Extractors will suffer possible injury or ill health due to increased traffic or water/silica/noise stress. Without effective communication and transparency now, how does this bylaw protect residents? Health and Environment?

The amended By-Law 1607/22 takes the area residents and affected landowners' voices and power away from dealing with Resource Extractors and Sturgeon County. It does not do a very good job of defining enforcement and penalties for contravening these By-Laws. The By-Law also does not clearly state who will pay for the possible numerous scientific studies (Noise, Air Quality, Water, dry wells and Traffic, etc.), who will have access to these studies, and the frequency of the studies.

Sincerely,

Vivianne Pambrun, Landowner, Sturgeon County

**From:** Sid Chadi <[sidchadi@fourchagroup.com](mailto:sidchadi@fourchagroup.com)>  
**Sent:** Wednesday, June 21, 2023 10:28 AM  
**To:** Reegan McCullough; Larry Andrews  
**Subject:** Setback- Sturgeon County Draft Bylaw

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Good Morning Reegan,

Larry has asked me to forward you our comments on the upcoming public hearing set for tomorrow, June 22.

Please see the email below with our concerns regarding the existing residences that have already mined on the adjoining properties (Berube).

Let me know if you're available today for a quick telephone call. I can be reached at 780-445-8343.

Many thanks,

Sid Chadi  
Chief Executive Officer  
Fourcha Group  
11610 111 Avenue NW  
Edmonton, AB T5G 0E1  
T 780.441.3508  
C 780.445.8343



----- Forwarded message -----

**From:** Mike Chadi <[mike@fourchagroup.com](mailto:mike@fourchagroup.com)>  
**Date:** Wed, May 24, 2023 at 10:45 AM  
**Subject:** Sturgeon County Draft Bylaw  
**To:** Larry Andrews; Sid Chadi

Please find attached Sturgeon's draft bylaw as currently drafted.

Few issues to note:

While the setback has been reduced from 800 metres to 400 metres, reading the draft bylaw as it currently stands will still require us to proceed with the County's newly proposed Direct Control ("DC") zoning approach.

There are two ways to mitigate this and hopefully arrive at a position where we can pursue the less onerous Resource Extraction ("RE") zoning as opposed to the DC path.

(1) We can seek to have the County maintain the section they are proposing to strike out in its entirety (Subparagraph 11.2.4(c)(ii) - Schedule "A"). This will allow us the flexibility to make "a provision...in writing" with the resident within the 400 m setback and proceed with an application under the RE regulations. This option is somewhat problematic because it presumes that we would have to negotiate and compensate the Berube residence due to its proximity within the setback.

The option with the biggest windfall for us would be to carve out a limited exception for those dwellings that are currently or have previously been located within 400 m to an existing or previously mined property.

I would propose the following language:

"Notwithstanding Subparagraph 11.2.4(c)(i), *natural resource extraction*, and *secondary processing* may be permitted within 400 m (1,312.3 ft) of an existing dwelling where the existing dwelling is already located within 400 m from the operating area of existing lands permitted for *natural resource extraction* and / or *secondary processing*.

Once you've had an opportunity to review, perhaps we can discuss next steps further.

Best,

Mike

--

Mike C. Chadi  
Legal Counsel  
11610 111 Ave NW  
Edmonton, AB T5G 0E1  
Office: 780.441.3508  
Cell: 780.909.7777

**FOURCHA**  
GROUP Creating Communities

**From:** [Pam Tidsbury](#)  
**To:** [Legislative Services](#)  
**Subject:** Changes to mineral extraction setbacks.  
**Date:** June 21, 2023 9:55:02 PM

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Sturgeon County  
Legislative Services

I am writing this letter in regards to the proposed changes for the extraction of Silica Sand in the County of Sturgeon.

The proposed changes to the setbacks for Silica Sand mining from 400m to 800m will effectively eliminate most, if not all, smaller properties from the benefits of selling Silica Sand from their property.

We are one of those properties. As pensioners, we have been waiting for over two years now while this issue goes back and forth multiple times, waiting for some kind of approval. Meanwhile, our home, in need of dire repairs, continues to deteriorate with every passing year. If an 800m setback is legislated, our property will no longer be a viable venture for Sil to even consider mining operations.

Not only is this grossly unfair for the landholder, it is also unfair for any company trying to do Silica Sand extraction in the County of Sturgeon. I would like to also know why Silica Sand only and not all mineral extractions would be subject to an 800m setback?

I would like to conclude, that your consideration not be given only to acreage developments, large landholders and mining companies but also to those with smaller landholdings, who are very much in need of the income that can be generated from the sale of simple sand off their own property.

Yours truly,

Pam Tidsbury  
Brian McBride

**From:** [Rick Reid](#)  
**To:** [Legislative Services](#)  
**Subject:** Resource Extraction - Bylaw 1607/22, Public Hearing , June 22, 2023  
**Date:** June 22, 2023 11:07:59 AM

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To: Mayor - A Hnatiw and Councillors - D Derouin, K Toms, M McLennan, N Comeau, D Stang and J Berry

We are resident landowners / stakeholders in division 6 of Sturgeon county, and have been following the proposed Resource Extraction bylaw review for numerous years now, up until recently have been in favor of the proposed changes for the DC - RE 1 Resource Extraction - Direct Control 1. (Still in favor if all setbacks are equal at 400M)

As the proposals have progressed and changed over time, it was reasonable to arrive at 400m setbacks for all parties and properties involved, as this would be a FAIR situation for all land owners and stakeholders. As I / we were unable to attend the last council meeting relating to this bylaw, we were not only surprised, but shocked to see that the proposed setbacks for Sand / Gravel and Silica Sand projects had been differentiated and that the Silica sand projects be severely penalized by increasing proposed setbacks to 800 meters.

We have heard many comments and arguments why adjacent land owners to the properties containing the Resources, would like to eliminate the extraction process altogether, or at least have extensive setbacks. I / we understand their concerns, but we are not trying to tell them what to do with their properties, while, by increasing setbacks, we the landowners with resources are being restricted, impeded and penalized as to what we may do on our OWN PROPERTY. When increasing the required setbacks, we are affected by the possible loss of revenue, devaluation of property values and control of our wholly OWNED ASSETS. In our case the removal of the Silica Sand would enhance the Agricultural potential of the land and as such be beneficial in the present and for the foreseeable future..

I / we have heard various reasons the proposed setbacks for Silica Sand projects, have been increased over Sand and Gravel, but have had no specific or scientific proof that they are valid, and in fact the process for mining / crushing Sand and Gravel, On Site will produce more dust, specifically fine dust, noise, and overall disruption than the requirement to load Silica Sand onsite and haul it to a process facility.

With the proposed Bylaw 1607/22, It is to be noted that the mining and reclaiming process for all properties involved will have tighter restrictions and upgraded practices, than current, that will enhance overall environmental outcomes and reduce impacts on / for residents in the areas of concern, this again is true with all setbacks equal at 400m.

Recap - It is only fair and equitable if Sturgeon County keeps the setbacks equal at 400m and that the DC - RE 1 Resource Extraction - Direct Control be implemented.

Please consider our points of concern thoroughly before making the final Bylaw



recommendations, thank you.

Sincerely

Rick and Beverley Reid

## Melodie Steele

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**From:** Yakimets, Neil  
**Sent:** June 22, 2023 12:42 PM  
**To:** Legislative Services  
**Subject:** Bylaw 1607/22

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Dear Council:

I am writing in regards to the proposed bylaw 1607/22. The RERR Final Report states its goal is to open up access to more sand & gravel while maintaining or improving our natural environment and the human health, safety, and quality of life of residents living near new pits. It is at odds that the goal is to increase access while increasing the set back requirements. Additionally, due to the similar nature of Sand and Gravel and Silica Sand, having two different set backs does not make sense.

Sturgeon County promotes itself as Community, Innovation, and Ambition. Community is not supported without jobs and other revenues. Having set backs of 400 meters to 800 meters does not support either. A significant or entire portion of many properties that can potentially be mined will be reduced. With the setback extending further into the property, it also affects the amount of material that can be extracted from the remainder or the minable area due to angle of remaining material that must be left in place to support the banks of the set back.

With a large amount of resource having to be left in place the county and other levels of government will experience a significant reduction in revenues. Cap levies will be reduced. Property taxes to the county will be reduced if less properties are zoned industrial, as the tax base is predominately derived from non residential sources. Revenues to the Alberta and Federal government will be reduced through lower income taxes. There will also be less spinoff to various other companies with the demand for parts and services decreasing. The decrease in available materials will also lead to an increase in costs for the county, its residents, and its businesses. Gravel for roadways will become more expensive. Sand and gravel for construction will become more expensive. With a decrease in revenue and an increase in cost, the quality of life and programs offered will decrease for residents. Extractors also frequently provide road maintenance in the areas of their operations. Will less operations occurring, this cost savings to the county will be reduced or disappear, further increasing county costs.

The regulatory environment including the significant reduction of the amount of extraction due to setbacks, extended RERR timeline, and long timelines for Development permits decreases the competitiveness of the Country and the Province. We have a large market for materials in Canada yet we continue to import these items such as Silica Sand from different counties and countries, it is disheartening to see the economic benefits such as jobs, taxes and capital investment go to other jurisdictions due to regulatory red tape.

Direct Control land use districts may help to provide larger benefit from extracted resources. However, there is a lack of clarity on the guidelines for what operating under Direct Control will look like. This adds risk to operators and may affect actual resource extracted if the controls are excessive.

Having two different significantly set backs for a similar resources does not make sense. The difference between the set back for silica sand and for sand & gravel is double. 800 meters is roughly the width of a ¼ section. Having this set back effectively eliminates most properties from the potential for extraction. Leaving the resource in place does not provide benefit for the community, the land owner, the resource extractor, or the county. Nor does it remove the implied

hazard of the material. Sand extraction is much less intensive than a gravel crushing operation. The sand is only removed from the site, not processed there. It is processed off site in a different county where necessary controls are in place. This results in a large decrease in dust creation, noise, and road use as compared to gravel operations. Gravel operations involve additional equipment to process the gravel on site. Crushers and conveyors are deployed and add significantly to the noise of the operations as well as increase road use to bring in and remove the equipment. It also involves an increase in dust, especially fine dust, from the crushing function and exposure on the conveyors. So why are Sand operations being treated differently than Sand and Gravel when they clearly have less of an impact to surrounding landowners???

Extraction cannot occur prior to the company applying to the Province of Alberta for Registration under the Province of Alberta Environmental Protection and Enhancement Act. The Province reviews the application and the activity plan of the operation prior to completing the application. The province employs professionals specifically trained in the environment that review and the applications. They can approve a plan, require changes to a plan be made, or deny a plan. If a plan is approved by the province, it has already undergone a high level review process with resource unavailable to most other jurisdictions. Does the County have the expertise to make decisions based on the various areas of expertise like the province does?

The extended timeline between multiple levels of government result in an arduous process for permitting. We have been in discussions with an operator in the area since 2017. This affects how we move forward with the property and our lives, not to mention the corporation. The setback described may limit the extraction from the property by 25% or more. Our property is fairly remote for the density of population within the county. There is one residence within 400 meters and three more residences within 800 meters of the property. All of the mentioned residences cannot see our property. There is significant forest between the potential extraction area and the residences which would significantly reduce potential noise. The forest also has a significant ability to remove dust from the atmosphere. Large setbacks on this property do not make a lot of sense. Working with Sil, we have established large areas on the property of natural forest growth that are not to be disturbed. From a farming perspective, the land is marginal and is affected by several low areas. The low areas make for varying conditions year to year and can greatly affect seeding area, in addition to difficulty utilizing the farming equipment efficiently. The plan Sil has had approved by the provincial government would result in two proper wetlands on the property while improving the remaining farmland by removing obstacles to be navigated around. Overall this allows for maximum resource extraction, while maintaining natural forested areas, improved farming, upgraded wetlands, and biodiversity. Changing setbacks can affect the established plan approved by Alberta Environment on a property that will have minimal effect on local residence while reducing revenues for the county and the long term quality of life for its residents.

Thanks,

Neil Yakimets

## Melodie Steele

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**From:**  
**Sent:** June 22, 2023 1:03 PM  
**To:** Legislative Services  
**Subject:** 800 meter setback.

Severed in line with section 17 of the FOIP Act

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Hi:  
What's the purpose of the 800 meter setback?

This will impact Silica sand extract within the county (per SIL Industrial Minerals)

Rose Domshy,  
Part owner of 160 acres (Mer 4, Range 20, TP 57, Sec 30 qtr SE.

Severed in line with section 17 of the FOIP Act



June 22, 2023

Sturgeon County  
9613 – 100 Street  
Morinville, AB T8R 1L9

**RE : Comments on Proposed Bylaw 1607/22 – Resource Extraction Amendments to Land Use Bylaw 1385/17**

Dear Mayor and Council,

Heidelberg Materials Canada Limited (Heidelberg Materials) is one of North America's leading manufacturers of cement, aggregates, and ready-mixed concrete. At Heidelberg Materials, we are placing sustainability, including the wellbeing of the communities in which we operate, at the core of what we do. Our vision is to build a more sustainable future that is net zero, safe and inclusive, nature positive, and circular and resilient.

In the Villeneuve area, we operate several resource extraction pits and a processing facility. We directly employ approximately 60 people at our processing facility, an additional 40 people during extraction and reclamation operations, and an additional 85 third-party haulers.

Overall, we applaud Sturgeon County's efforts during its Resource Extraction Regulatory Review (RERR) to understand regulatory impacts to the County, residents, industry, the environment, and the local economy. Please accept the following comments as part of the public input process for the March 15, 2023 public hearing for proposed *Bylaw 1607/22* which proposes amendments to *Land Use Bylaw 1385/17* (LUB) related to resource extraction.

a) Setbacks

- *Bylaw 1607/22* proposes the removal of clause 11.2.4 (c)(ii) which allows for a reduced setback to existing dwellings in the RE – Resource Extraction District provided the resident of such dwelling has agreed in writing.

Since the establishment of this provision under the *Calahoo-Villeneuve Area Structure Plan* in 2001, Heidelberg Materials has successfully operated within reduced setbacks to several residents with their written consent to prevent the sterilization of hundreds of thousands of tonnes of sand and gravel, develop unique mitigations, and improve reclamation outcomes. We believe that, in some situations, this provision can efficiently support the responsible development of aggregate resources without the need for

expanded impact assessment and monitoring requirements as proposed in the DC – RE 1 Resource Extraction – Direct Control District 1. We understand requirements within the DC – RE 1 district can be applied at the discretion of the County and that an application accompanied by written support of the adjacent landowner may have less conditions applied; however, this discretionary process creates uncertainty.

- Suggestion: Maintain clause 11.2.4 (c)(ii) in the Land Use Bylaw as an option for operators and residents to consider within the RE – Resource Extraction District. This would still allow for redistricting to the RE – Resource Extraction District within 400m of individual dwellings if the resident and operator can come to an individual agreement.
- We support the reduction of setbacks from multi-lot subdivisions to be equal to that of single dwellings for consistency, and lack of evidence that impacts differ between the two types.
- Given the above, we also do not feel there has been any factual evidence presented that supports increased setbacks applied to Silica Sand operations or in proximity to livestock operations. Heidelberg Materials is supportive of consistent and reasonable setbacks and is concerned that identifying any specific type of operation or neighbouring activity will only complicate the regulations and future applications.
  - Suggestion: Remove the increase in setbacks for silica sand operations and proximity to livestock operations.
- Resource extraction is a non-relocatable activity; however, secondary processing can be reasonably relocated to minimize potential impacts. Heidelberg Materials would be supportive of increased setbacks for processing activities and believes this would balance concerns of surrounding landowners while reducing resource sterilization.
  - Suggestion: Establish increased setbacks, up to 600m, for secondary processing.

### b) Community Communications

- Heidelberg Materials is committed to being a good neighbour. Engaging with local communities helps us to understand and address the social and environmental impact of our operations which helps ensure our activities are sustainable and have a positive impact on local communities.

Overall, we are supportive of the community communication requirements proposed by *Bylaw 1607/22*; however, we noticed some duplication that may fatigue the community. Sections 11.2.15 and 11.3.12 require both annual community events and semi-annual landowner communications. Also, the requirement to report back to the County when a County representative is required to be in attendance is redundant.

- Suggestion: Revise Sections 11.2.15 and 11.3.12 to require a site-specific community engagement plan, in a form acceptable to the Development Authority.

c) Approval Timelines

- Sections 11.2.16 and 11.3.16 indicate that Development Permits for natural resource extraction and secondary processing will be issued for five years and will require a renewal every five years thereafter until a reclamation certificate is received from the Provincial Government. This is a very short timeframe given the lifespan of pits in the municipality is closer to ten years and the reclamation certificate process alone takes at least three years. Frequent renewals are fatiguing to the community and require significant County and industry resources. If the land use has been approved and the operator is meeting the conditions of their permit, we do not see the value in frequent permit renewal processes. Industry requires certainty of operating conditions for the duration of their operation.
  - Suggestion: Revise Sections 11.2.16 and 11.3.16 to reflect a more appropriate approval timeline. Heidelberg Materials suggests removing the time limit on development permits is more appropriate and aligns with provincially issued approvals and adjacent municipalities. The development permit application should provide an estimated lifespan expectancy which can be considered during the initial development permit review and approval.

Thank-you for the opportunity to provide comments. If you require clarification, please feel free to contact the undersigned.

Sincerely,



**Dale Soetaert**  
Land Manager, AB & NE.BC  
Heidelberg Materials  
Phone: 780-423-6307  
Email: dale.soetaert@heidelbergmaterials.com



**Lauren Greenhough**  
Environment & Sustainability Manager, N.AB & NE.BC  
Heidelberg Materials  
Phone: 780-420-2552  
Email: lauren.greenhough@heidelbergmaterials.com

## Sturgeon Valley Sod

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**From:**

Severed in line with section 17 of the FOIP Act

**To:**

LEGISLATIVE SERVICES STURGEON COUNTY

Re : Bylaw 1607/22

I am part owner of 26432 – Twp Rd 544 Sturgeon County and I oppose The land Use -By- Law 1607/22 the creation of a new Resource Extraction Direct Control District.

I feel that, Sturgeon County should not use their discretion to allow extraction closer to residents than the distance that was put into effect to begin with. As a homeowner in the extraction area, we are dealt with traffic, dust, noise and then they can extract gravel closer because Sturgeon County sees fit. I feel that you are taking our rights away as home owners.

Regards  
Colleen Grant  
June Van Brabant



**From:** [Laura Cline](#)  
**To:** [Legislative Services](#)  
**Subject:** Sil Industrial Minerals - Bylaw 1607/22 Public Hearing Submission  
**Date:** June 22, 2023 3:15:07 PM  
**Attachments:** [All\\_sil\\_YH\\_Sure\\_Ready\\_233934b1-cc66-471f-bbce-3a84d0873528.png](#)  
[June 22 RERR Public Hearing Letter Submission.pdf](#)

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Hello,

Please find attached Sil's submission in regards to the Bylaw 1607/22 Public Hearing.

In the interest of not providing a document that is well over 100 pages with attachments, I had removed the appendices from the supporting study attached to the our written submission. A folder containing the fulsome, referenced articles can be accessed at the below link for convenience, but I did not want to send them all as a submission with the expectations anyone would review such a massive document. All the documents are referenced at the end of my submission and can be accessed publically online by anyone wishing to review, except the one report which is appended to the attachment for submission.

[https://ftp.sureway.ca/public/folder/by04T\\_hRi0yBinMjiG8wXA/RERR](https://ftp.sureway.ca/public/folder/by04T_hRi0yBinMjiG8wXA/RERR)

Kind regards,

**Laura Cline** | Land and Environment Manager  
D: 780.486.6336 | C: 780.914.1113  
9175 14 Street, Edmonton, AB | T6P 0C9  
E: [laura.cline@sureway.ca](mailto:laura.cline@sureway.ca) | [sil.ab.ca](http://sil.ab.ca)



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**Bylaw 1607/22: Resource Extraction Regulatory Review  
Public Hearing – June 22, 2023**

Sil Industrial Minerals is a member of Sureway Construction Group of Companies, and one of Alberta's largest proppant producers, maintaining numerous privately owned and leased land investments in Divisions 5 and 6 in Sturgeon County for the intended purpose of natural resource extraction.

Sil opposes the recommendations of Bylaw 1607/22 to implement a split setback for natural resource extraction activities within the County.

**Pit 56 Serink:**

Sil has previously avoided making specific comments regarding individual properties or livestock setbacks, specifically turkey, however at this time we feel it pertinent to provide some information relating to Pit 56 (the property adjacent to the turkey farm), as we are concerned that the contention surrounding our 2017 development permit application for Pit 56 is perhaps influencing a decision that will impact the entire municipality and within it, millions of tonnes of silica sand beyond the boundaries of this property. We recognize the concern and contention surrounding this previous pursuit, however we implore the County to consider all of the information relating to this application, not limited to the concerns of those opposed. *Supporting information is included in Attachment A.*

- In 2017, Sil pursued a development permit for a quarter section of land located between a turkey farm operation and a multi-lot subdivision.
- During the public consultation process, we had heard a number of typical concerns pertaining to natural resource extraction operations, and some atypical concerns pertaining specifically to the adjacent turkey farm. As a result of the consultation process, we adjusted our application to include multiple mitigation strategies and provided a significant amount of scientific data relating to both industrial operations adjacent to turkey farms, and human health impacts relating to silica extraction.
  - We committed to leaving almost half the volume of resource in the ground in order to eliminate concerns about an end-pit-lake exposing the adjacent operation to avian flu.
    - This would further eliminate neighbor concerns regarding impacts to their water wells as we would not be mining in the water table.
  - We obtained approval from Alberta Transportation to relocate the access of the pit 450m away from the existing access to increase the distance from the adjacent turkey farm.
  - We proposed limited operating hours: Monday to Friday, 7am to 5pm, no weekends or holidays; and further offered to time operations with the adjacent turkey farm to align with timing that would allow new birds to become accustomed to noise.
  - We adjusted the proposed setbacks to ensure equality for the multi-lot subdivision and the turkey farm to the south by implementing a standard 100m setback from both sides.
  - We engaged an epidemiologist with over 36 years of experience in conducting and evaluating research in to the health effects of silica, resulting in a literature review that

indicated that there is no increased risk of health concerns for those living adjacent to silica operations (Hessel, 2016).

- As a result of the appeal process, we presented a number of examples from other jurisdictions of:
  - gravel pits in close proximity to turkey and/or poultry farms;
  - turkey and/or poultry farms operating adjacent to active railway tracks;
  - and cited multiple relevant publications that did not indicate that adjacent industrial noise or dust was an imminent concern for turkey operations.
  - Further, there are endless examples of turkey farms and many other livestock operations existing adjacent to agricultural activities of varying intensities; an industry which is known to generate its fair share of dust and noise at various times of the year.
- Further, we had shown that we have had and continue to have success operating a gravel pit in an adjacent County, directly adjacent to a multi-lot subdivision, and showed how average noise levels collected during operational periods at said gravel pit are within or below the range of average ambient average noise levels measured at Pit 56.

I want to clarify, it is not our intent to pursue an application for this pit in the immediate future as a result of any outcome of this bylaw. To substantiate this, we have numerous leases with landowners in Sturgeon County, all of whom are tax paying individuals, who have been waiting patiently for an outcome to this review, as the ability to operate their property is impacted. We have obligations to these landowners to work towards permitting and operation of their properties judiciously, and therefore can shift our focus from this particularly contentious property for the foreseeable future.

- On this note, I would point out that there are a number of tax paying landowners whose ability to derive benefit from the resource on their property is being jeopardized because of the concerns relating to this specific pit.

Again, we implore the County to consider the impact of the RERR and any future livestock setback policy on all future natural resource extraction activities within the municipality, and the respective landowners, not limited to this one unique property of which there is significant surrounding contention.

### **Silica Sand Extraction Operations:**

It appears there are significant concerns about the activities that occur within a silica sand extraction operation which appear to be influencing the decisions on appropriate setbacks. A silica sand pit consists of the following activities:

- Rigorous review by Alberta Environment (AEPA).
- Topsoil salvage of the first two cuts.
- Excavation of the sand directly in to highway trucks, which haul the material immediately offsite.
- There is no stockpiling of sand on site.
- There is no processing, washing, or crushing of materials on site.
  - This means 24/7 operations are not necessary.
- Progressive reclamation occurs as soon as practicable, minimizing topsoil storage.
- Typically, mining is done in the winter time, under frozen conditions, for only 2 to 3 months of the year.

- Reclamation to large, deep water bodies is not always necessary, this is typically due to the depth of the deposit in some areas of the County. These large deep water bodies have excellent reclamation and wildlife opportunities, but are not necessary in every pit.
  - o However, operators do have obligations to reclaim wetlands if they are disturbed. A resulting large water body may actually be a wetland complex.

### **Silica Sand Safety:**

Silica sand has a contentious reputation because of the perceived relation to potential health complications. However, what differentiates silica sand from other sands is simply the content of silicon dioxide in the material. Silicon dioxide is a naturally occurring compound, and exists in all types of sand, including beach sand and playground sand. Its presence is not restricted to what is referred to as “silica sand”. The silicon dioxide content of a sand deposit provides the necessary crush strength and hardness required for use in things like frac sand and sand blasting.

- All soils are made up of sand, silt, and clay particles, and all soil contains some level silica. The concern relating to silica or silicon dioxide is that, at incredibly small particle sizes, the silicon dioxide can become respirable at sizes smaller than 10 microns, and potentially result in lung complications.
- Inhalation of respirable particles is not limited to the compound silicon dioxide.
- Within any soil or earthen material, clay and silt particles have a size range of 1 to 62 microns, with sand being greater than 62 microns.
  - o This means that clay and silt particles make up the entire range of respirable particles sizes, and inherently, silica sand itself cannot be respired.

Given that the deposits we target are sandy and coarse in nature, the silt and clay contents are very low in comparison to other soils. For reference, the more silty or clayey a silica sand deposit, the less desirable it is for mining. In addition, it takes a significant amount of energy to crush silicon dioxide into small enough particles that they can become respirable or hazardous to human health, as crush strength of the compound is what makes it so valuable for its intended uses. The processes involved in silica sand mining do not generate enough energy to crush the sand particles; if it did, there would be no value in mining the sand (Krumenacher and Orr, 2015).

It should be noted that silicosis becomes a concern due to exposure at occupational levels, not at environmental levels. Occupational exposure levels means exposure to elevated levels of respirable sized particles for 8 hours a day, 40 hours a week, for many years. Numerous monitoring datasets from industrial sand facilities have shown that these facilities are not substantial sources of ambient respirable silica (Institute for Wisconsin’s Health, 2016). Further, a study published by The Heartland Institute indicates that “residences near mines are typically exposed to more dust from gravel roads and agricultural fields than from sand mine processes” (Krumenacher and Orr, 2015).

This is further supported by studies from the Wisconsin Industrial Sand Association (2013) and the U.S. EPA (1996). The 2018 literature review completed by Dr. Patrick Hessel (2018) evaluates many of these and other studies, and summarizes that there is no increased risk of silica-related health effects on residents who live near silica mining and processing facilities. *These studies have been attached to my written submission in Appendix B.*

Thus, if a 400m setback is deemed appropriate for sand and gravel extraction, then it should be considered appropriate for silica sand extraction. Once again, we implore the County to consider the relevant science pertaining to air quality and particulate matter adjacent to silica extraction pits prior to implementing a setback that will affect millions of tonnes of silica resources throughout the County.

### **Economic Impacts:**

Aggregates are a valuable, non-renewable, and non-relocatable resource. In a 2013 survey conducted by the Alberta Association of Municipal Districts and Counties (AAMDC), Sturgeon County indicated that they do not have a strategic aggregate reserve to fulfill future public works, maintenance, and construction needs over the next 15 to 20 years. This survey was completed 10 years ago, meaning that aggregate resources to fulfill needs are estimated to be dwindling within the County over the next 5 to 10 years. This is further supported by a review of the “Alberta Sand and Gravel Deposits with Aggregate Potential” dataset made available by the Alberta Geological Survey (2004) which would suggest unsterilized sand and gravel reserves in the County may be scarce. In fact, Council’s original direction to Administration on June 25, 2019 was to review current extraction setbacks [...] to ensure Sturgeon County is sustainably extracting a diminishing resource in the County.

The aggregate industry provides many benefits for Sturgeon County and its residents, including:

- Community Aggregate Payment Levy at \$0.40/tonne of aggregate.
  - These funds help keep taxes low and fund community services.
- Contribution to industrial tax base, but does not require tax based services such as snow removal and other municipal services.
- Creation of equipment operating and trucking jobs, incentivizing direct, indirect benefits via income cash flow into the community.
- Local sources keep costs of aggregate low for both the County and local consumers.
- As sand and gravel reserves dwindle, the reduction in benefits via CAP and property tax income, and increase in aggregate costs for County projects will need to be supplemented.
  - These deficits would be likely to result in tax increases for rate payers to bare.

Using the same Alberta Geological Survey data (2004), it is estimated that Sturgeon County has around 100 million tonnes of recoverable silica sand deposits within the County. Silica sand extraction provides the all the same economic benefits previously listed. With this estimate, silica sand reserves have the potential to generate around \$20 million in CAP levies at net present value. While the recoverable reserve number is an estimate based on best available data, the intent is to illustrate the magnitude of potential; future CAP levy values are in the \$10s of millions, not single millions, and this does not yet account for industrial property tax income and other direct and indirect benefits of jobs and cash flow within the municipality.

This volume estimate is based on the following:

- An overlay of the AGS Aggregate Potential data set with “Map 143 – Surficial Geology of Edmonton” to distinguish potential silica deposits from other types of deposits.
  - We estimate that only about 20% of the potential silica sand deposit located within the AGS Sand Potential areas are developable, due to the following limiting factors:
    - Exclusion of lands within parks and natural areas (such as the Redwater Natural Area)

- Incompatibility of lands due to pipelines and oil/gas facilities and their associated setbacks
- Incompatibility of lands due to other civil features & developments (roads/railways/power lines/subdivisions/industrial facilities)
- Exclusion of lands due to unfavorable topographic and/or geologic conditions
- Of the lands that are considered developable, we have utilized an average sand depth of 2m to generate an approximate resource volume for these lands, which is based on:
  - The average depths of sand on Sil's properties in the County.
  - Other regional geologic data and industry averages.

However, under the proposed setback for silica sand of 800m from a residence or subdivision, an astonishing 90% of Sturgeon County's silica sand resource would be conditionally sterilized, forcing almost every application for silica sand extraction activities through the Direct Control district process, and requiring hundreds of thousands in background studies not required by Alberta Environment, with no clarity or certainty on what setbacks might actually be determined to be appropriate, if any.

Sil Industrial Minerals is significantly, and solely impacted by this proposed setback, as we are not aware of any other silica sand or industrial sand producers in the municipality. The proposed split setback targets and conditionally sterilizes an overwhelming volume of our own future resource. Currently:

- Sil has potential reserves in 18 properties within Sturgeon County, either via private ownership or lease agreements. These properties are situated in both Divisions 5 and 6.
- Under the proposed 800m setback for silica, 15 of the 18 prospective future extraction projects are impacted.
  - Of the 15 impacted properties, 11 are 100% conditionally sterilized.
  - This equates to a total of 84% of Sil's potential future resource within Sturgeon County being impacted and conditionally sterilized by the proposed bylaw.
  - All but three of Sil's prospective future pits would be subject to the Direct Control district zoning, with no certainty on setback outcome.
  - This would result in us having to eliminate some potential projects all together because the return on investment is far too uncertain under the Direct Control district.
- In addition, the proposed bylaw unfairly impacts numerous landowners who would like to see an income and benefit from the natural resources on their property, and whose properties may become inoperable due to uncertainty of setbacks.
- For those 11 properties completely impacted, we are not even given the option to consider avoidance techniques or reduction in project size to pursue the NRE zoning.
  - Consider the administrative burden on the County by forcing all Sil's applications through the onerous Direct Control process.

In the next couple decades or even much sooner, silica sand may be the County's primary CAP contributor, but the proposed bylaw is severely restrictive of silica sand operations.

Over the last few years, Sil has:

- invested significant capital in exploration;
- engaged landowners;
- and employed residents of Sturgeon County and municipalities within;

We have spent many years working within Sturgeon County and administration, and we wish to continue to do so to find an achievable outcome of the RERR that benefits everyone; industry, the municipality, landowners, and residents alike. However restrictive policies may force us to look to other, less restrictive municipalities based on economic viability and impacts of the proposed bylaws. As one of Sturgeon County's largest contributor of CAP levies, with what we had considered a prosperous and mutually beneficial future in Sturgeon County, we are disappointed to see the County consider such an impactful and discriminatory bylaw that would not only severely limit our ability to operate within the County, but impact the County and its residents by depriving itself of millions of dollars of CAP levies and many other benefits that come with silica sand extraction. Further, Sil strongly encourages the County to review all relevant information and base their decisions and direction on available science regarding appropriate setbacks from both silica sand and livestock operations.

**Wording Clarification:**

Currently, the proposed wording in bylaw 1607/22 is concerning, as it implies that silica sand extraction may not be considered within 800m of an existing dwelling even under the Direct Control district:

Section 11.2.4(c) (Natural Resource Extraction District) states:

*(iv) Notwithstanding Subparagraph 11.2.4(c)(i), natural resource extraction of silica sand shall not be located less than 800m (2,624.6ft) from the outside wall of an existing dwelling or the district boundary of a multi-lot subdivision, hamlet, or area subject to an approved planning document that includes residential development.*

Section 11.3.4(b) (DC-RE1) states:


*(b) Council is to consider the proposal operating area of natural resource extraction and/or a secondary processing use against the impacts to adjacent land uses to determine a suitable setback that is less than:*

*(ii) 400m (1,312.3ft) from the outside wall of an existing dwelling to the nearest edge of the operating area of a natural resource extraction and secondary processing use.*

*(iii) In the case of the extraction of silica sand, 800m (2,624.6ft) from the district boundary of a multi-lot subdivision, hamlet, or area subject to an approved planning document that includes residential development.*

The absence of the wording "existing dwelling" in Section 11.3.4(b)(iii) suggests that under no circumstances would a silica extraction activity be considered within 800m of a dwelling, even under direct control, given the term "existing dwelling" 's presence in the other components of the bylaw. We sincerely hope this is a mistake or wording oversight that can be corrected as appropriate in order to avoid further confusion should the bylaw proceed.

Sincerely,



Laura Cline  
Sil Industrial Minerals



**Attachments:**

## Attachment A: Supporting Information

- Livestock Impacts

## Attachment B: Supporting Information

- Silica Studies and Related Health Impacts

**References:**

“Code of Practice for the Care and Handling of Hatching Eggs, Breeders, Chickens, and Turkeys” – *National Farm Animal Care Council* (2016).

“On-Farm Program” – *Turkey Farmers of Canada* (2018).

“Management of Noise on Poultry Farms” – *BC Ministry of Agriculture and Food* (1999).

“Crystalline Silica” – *Wisconsin Industrial Sand Association* (2013).

“Ambient Levels and Noncancer Health Effects of Inhaled Crystalline and Amorphous Silica” – *United States Environmental Protection Agency* (1996).

“Health Impact Assessment of Industrial Sand Mining in Western Wisconsin” - *Institute for Wisconsin’s Health* (2016).

“Environmental Impacts of Industrial Silica Sand (Frac Sand) Mining” – *Krumenacher and Orr* (2015)

“The Potential for Silica-Related Health Effects among those Living Near Silica Mining and Processing Facilities” – *Hessel* (2018).

“Got Gravel? Strategies to Secure Gravel for Rural Municipalities” – *Alberta Association of Municipal Districts and Counties* (2013).

“Alberta Sand and Gravel Deposits with Aggregate Potential” – (*Alberta Geologic Survey*) *Edwards and Budney* (2004). <https://ags.aer.ca/publication/dig-2004-0034>

“Map 143 – Surficial Geology Edmonton 83H” – (*Alberta Research Council*) *Bayrock* (2005) <https://ags.aer.ca/publication/map-143>

# Attachment A:

Livestock Impacts

# Livestock (Turkey Farm) Concerns

- Sil has reached out to the following groups/associations to attempt to gain some knowledge on the potential impacts of construction/mining activity adjacent to a turkey farm, however there does not seem to be much information available suggesting the turkey farms are incompatible with these specific adjacent land uses.
  - Alberta Turkey Producers
  - Turkey Farmers of Canada
  - Poultry Partners
  - Alberta Agriculture
  
- Sil has reviewed several documents regarding turkey farming practices, and has uncovered very little related to noise management or relating piling up of turkeys to noise generated by adjacent land uses.

# Livestock (Turkey Farm) Concerns

- Turkey Airsacculitis

- From our research, the causes of turkey airsacculitis are not related to adjacent activities. Causes include:

- Poor air quality/ventilation related to poor litter management
- Excessive temperatures
- Poor drinker management
- Improper vaccines
- Secondary pathogens

# Livestock (Turkey Farm) Concerns

## • Noise/Piling

- We have not seen any submissions with science/facts provided to support these claims
- From our research:
  - Noise has not been clearly determined to be a cause of piling
    - **From National Farm Animal Care Council re: noise:**

### REQUIREMENTS

*Birds must be handled at all times in such a manner that minimizes stress or injury. Birds must not be carried solely by the head, neck, one wing, or tail feathers.*

### RECOMMENDED PRACTICES

- a. minimize time holding or carrying birds
- b. carry birds in an upright position
- c. wear clothing of uniform appearance during the whole production cycle to minimize excitement of the birds when personnel enter the facilities
- d. perform routine activities consistently
- e. ensure that the movement of people and equipment within the barn is quiet and smooth
- f. give an easily perceptible signal to the birds before entering the barn to prevent them from being startled. This practice is particularly important when the light intensity or noise is greater outside the barn than inside
- g. release chickens by setting them down on their feet or from low heights that enable them to land normally, feet first. Avoid releasing in such a way that requires flying
- h. carry heavy turkeys by both legs and one wing, and release gently on the floor on their breasts
- i. gently set small turkeys down on their feet or their breasts.

### Note:

- It does not require silence outside of the barn
- It doesn't recommend any decibel limitations outside the barn
- Discussion surrounds alerting turkeys inside the barn if noise inside the barn is less than outside

# Livestock (Turkey Farm) Concerns

- Noise/Piling

- From our research:

- Noise is not even cited as an audit or health criteria anywhere in Turkey Farmers of Canada On-Farm Programs, a program of audits and practices to receive Provincial Certification

# Livestock (Turkey Farm) Concerns

## • Noise/Piling

- We have not seen any submissions with science/facts provided to support these claims
- From our research:
  - Noise has not been clearly determined to be a cause of piling
    - **From National Farm Animal Care Council, there are only a number of discussions regarding piling:**

### *RECOMMENDED PRACTICES*

- a. monitor hatchability and cull rates. Take steps to identify and remedy significant deviations from expected rates
- b. do not drop chicks and poults from heights exceeding 15 cm (5.9 in) onto a hard surface or 30 cm (11.8 in) onto a soft surface
- c. move hatching trays with live chicks or poults smoothly. Tip trays to remove chicks, poults, and hatch residue in such a way that the chicks and poults do not **pile** or become trapped.

### Note:

- No references between noise and pile ups
- Piling is associated with handling, loading, transporting, hatching
- Piling is associated with temperature control

# Livestock (Turkey Farm) Concerns

- Noise/Piling

- From National Farm Animal Care Council, there are only a number of discussions regarding piling:

## 2.6

### Holding, Loading, and Transporting Chicks and Poults

It is important that stress is minimized throughout the transport process and that chicks and poults arrive at their final destination in good condition.

The federal requirements for animal transport are covered under the *Health of Animals Regulations, Part XII* (Transportation of Animals) (10).

A separate Code of Practice for transportation, which applies to vehicles transporting animals on public roads and highways, is available on the National Farm Animal Care Council's website. Refer to *Appendix K - Resources for Further Information*. However, hatcheries typically manage the entire transportation process due to the fact that they own and operate specialized equipment and employ the drivers; therefore, the condition of chicks and poults during transport falls within the scope of this Code, as well. This Code also applies to situations where non-specialized equipment is used for the transport of chicks and poults.

Chicks and poults possess energy and water reserves in the form of the yolk sac, which serves to sustain chicks and poults for a period of time after hatch (11) (12). Depending on the strain, these reserves can sustain chicks and poults for up to 72 hours and, along with appropriate thermal conditions during transport, help to protect chick and poult health (11) (12).

It is the responsibility of the hatchery to ensure that chicks and poults are fit for the intended journey. Fit chicks and poults are those in good physical condition and health that are expected to reach their destination in good condition.

#### REQUIREMENTS

***Boxes with chicks or poults must be moved smoothly and in such a way that the chicks or poults do not pile or become trapped.***



# Livestock (Turkey Farm) Concerns

- Noise/Piling

- From National Farm Animal Care Council, there are only a number of discussions regarding piling:

## 7.4

### Catching and Loading/Unloading Equipment and Containers

It is important that the equipment and containers that are used and the procedures in place for loading and unloading birds minimize stress and/or injury to the birds.

#### **REQUIREMENTS**

*The design, construction, space, state of repair, and use of containers and equipment must allow the birds to be loaded, conveyed, and unloaded in ways that minimize stress and/or injury.*

*Conveyors used for loading containers of live birds must prevent tilting of containers that causes birds to **pile** up.*

# Livestock (Turkey Farm) Concerns

- **Noise/Piling**

- **From National Farm Animal Care Council, there are only a number of discussions regarding piling:**

## 2.6 Holding, Loading, and Transporting Chicks and Poults

- Boxes with chicks or poults must be moved smoothly and in such a way that the chicks or poults do not **pile** or become trapped.
- Boxes containing chicks or poults must not be thrown or dropped.
- Chicks and poults that are deemed unfit for transport must be cared for or euthanized.
- Appropriate environmental conditions must be maintained throughout the transport process to ensure that chicks and poults arrive at their final destination in good condition.
- Chicks and poults must be able to stand erect during transport.

## 7.4 Catching and Loading/Unloading Equipment and Containers

- The design, construction, space, state of repair, and use of containers and equipment must allow the birds to be loaded, conveyed, and unloaded in ways that minimize stress and/or injury.
- Conveyors used for loading containers of live birds must prevent tilting of containers that causes birds to **pile** up.

# Livestock (Turkey Farm) Concerns

- Noise/Piling

- From National Farm Animal Care Council, there are only a number of discussions regarding piling:

## REQUIREMENTS

*Catching crews must be supervised by a competent individual.*

*Birds must be handled in such a manner that minimizes stress and/or injury. Birds must not be carried solely by the head, neck, one wing, or tail feathers.*

*Producer or a competent designee must be readily available to provide assistance throughout the catching and loading process.*

*All catching and loading equipment must be operated by competent personnel.*

*The catching area must promote safe and humane handling and catching (e.g. lift or remove feeders and waterers prior to catching).*

*Birds must be in an upright position after being loaded into containers.*

*Containers with birds must be handled, moved, and securely positioned on vehicles in a manner that minimizes stress and/or injury to birds.*

*Birds must be loaded in containers in such a way that permits all of them to rest on the floor at the same time when evenly distributed, while preventing excessive movement within the container.*

*Parts of birds must not protrude from containers in any way that can cause injury or impede movement.*

## RECOMMENDED PRACTICES

- ensure that a farm representative (e.g. owner, worker) observes the catching and loading process to ensure humane handling of the birds and intervenes as necessary
- adjust barn fans and other equipment to prevent air from blowing on birds loaded on trucks in cold weather conditions
- ensure that catching and loading take place in a timely and efficient manner to minimize bird stress
- lower the light intensity where possible or use blue light during catching to reduce stress on the birds
- use corralling to control movement and prevent overcrowding of birds
- locate containers as close to the birds as possible to minimize handling
- ensure that birds are caught and carried appropriately for their species and weight and catcher capabilities
- minimize passing of birds among handlers
- monitor worker fatigue as it can negatively affect bird welfare
- move heavy turkeys in small groups to help prevent piling and exhaustion
- during hot weather, avoid loading during the hottest part of the day. When possible, arrange to load birds during the night
- protect birds from becoming wet during loading and unloading in cold conditions
- check the load and surrounding area for loose birds before the vehicle moves.

# Livestock (Turkey Farm) Concerns

- Noise/Piling

- From National Farm Animal Care Council, there are only a number of discussions regarding piling:

*Section 3 - Housing and Environment*

Conversely, signs that indicate a temperature is too low include:

- crowding around the heat source
- feather ruffling
- rigid posture
- trembling
- huddling or piling on top of each other
- distress vocalization.

# Livestock (Turkey Farm) Concerns

- Noise/Piling

- From National Farm Animal Care Council, there are only a number of discussions regarding piling:

## REQUIREMENTS

*Facilities must be prepared (i.e. heat, clean, feed, water, bedding) in advance of receiving chicks and poults so that they can be placed promptly after arrival.*

*Farm personnel must be present at the time of delivery and placement and must assess the physical condition of the chicks and poults.*

*Steps must be taken to prevent chicks and poults from becoming chilled or overheated during the unloading process.*

*Chicks and poults, as well as boxes with chicks or poults, must be kept, treated, and handled in ways that prevent injury and minimize stress.*

*Chicks and poults, as well as boxes with chicks or poults, must not be dropped from heights that may cause injury.*

## RECOMMENDED PRACTICES

- do not drop chicks and poults from heights exceeding 15 cm (5.9 in) onto a hard surface or 30 cm (11.8 in) onto a soft surface
- inspect chicks and poults immediately upon arrival. Document any problems and provide feedback to the hatchery
- provide supplementary feed and water sources (e.g. trays or paper, jugs or bottles) to ensure that chicks and poults can locate feed and water easily
- monitor chicks and poults to ensure that they can access feed and water
- check chicks more than twice daily during brooding. Poults may need to be checked more frequently
- increase the frequency of monitoring if any of the following are observed: huddling or piling, inactivity, numerous flip-overs (poults), high early mortality, or problems with equipment
- prevent chicks and poults from crowding or piling on top of each other in the corners of floor pens
- confirm brooding area temperatures at chick/poult level

### Additional recommended practices for poults

- use circular or oval brooder rings for the first seven days of life
- ensure that heaters are suspended above the centre of each brooder ring.

## “Management of Noise on Poultry Farms” – BC Ministry of Agriculture and Food (1999)

- An excerpt from the Management of Noise on Poultry Farms Fact Sheet indicates that
  - Readings taken from outside the turkey barns (15-20m) range from **44 to 63 dB**
  - Sound levels within the barn can range from **50 to 90 dB** during the day time.
- Noise monitoring during periods of activity at a Yellowhead Aggregates pit (an affiliate of Sil) in Parkland County **average 40.67 dBA** during the day, measured approximately ~15m from the limit of activity.

## WHAT ARE NORMAL NOISE LEVELS ON POULTRY FARMS?

Scientific measurements of poultry farm noise were carried out in California, Idaho, Oregon and Texas in 1980. Noise levels on 51 poultry farms consisting of 37 cage layer farms, 3 floor layer farms with floor pens, 7 broiler farms and 4 turkey farms were measured. Readings taken outside the houses 15 to 20 meters from the buildings ranged from 44 to 63 dB. These measurements were during normal farm operation. Turkey farms had slightly higher than average sound levels and broiler farms had slightly lower than average sound levels. Sound levels inside the house ranged between 50 dB and 90 dB during the daytime. In one layer breeder house the sound levels rose from 66 dB to 83 dB when the roosters crowed.



## “Management of Noise on Poultry Farms” – BC Ministry of Agriculture and Food (1999)

- If we apply the same noise decline estimates as outlined in the Fact Sheet, the noise level 100m away from operations would be negligible:
  - At 15m: ~41 dBA
  - At 30m: ~35 dBA
  - At 60m: ~29 dBA
  - **At 120m: ~23 dBA**

## WHAT IS THE IMPACT OF SETBACK DISTANCE ON NOISE LEVELS HEARD BY NEIGHBORS?

Increasing setback distances is one method of reducing the impact of noise on neighbors.

There is a 6 dB decline when the distance between the poultry house and neighbors doubles if there are no obstacles in the way, such as walls, trees, etc.) If you are 1 meter away from the barn and move to 2 meters, the sound will drop by 6 dB, if you then move to 4 meters away the sound will decline by 12 dB. If the noise levels 1 meter from trucks and equipment is over 90 dB then the noise 128 meters away will still be 48 dB. Increasing the distance between you and your neighbors helps but is not the total solution. For specific measurements on your farm consult an acoustical engineer.



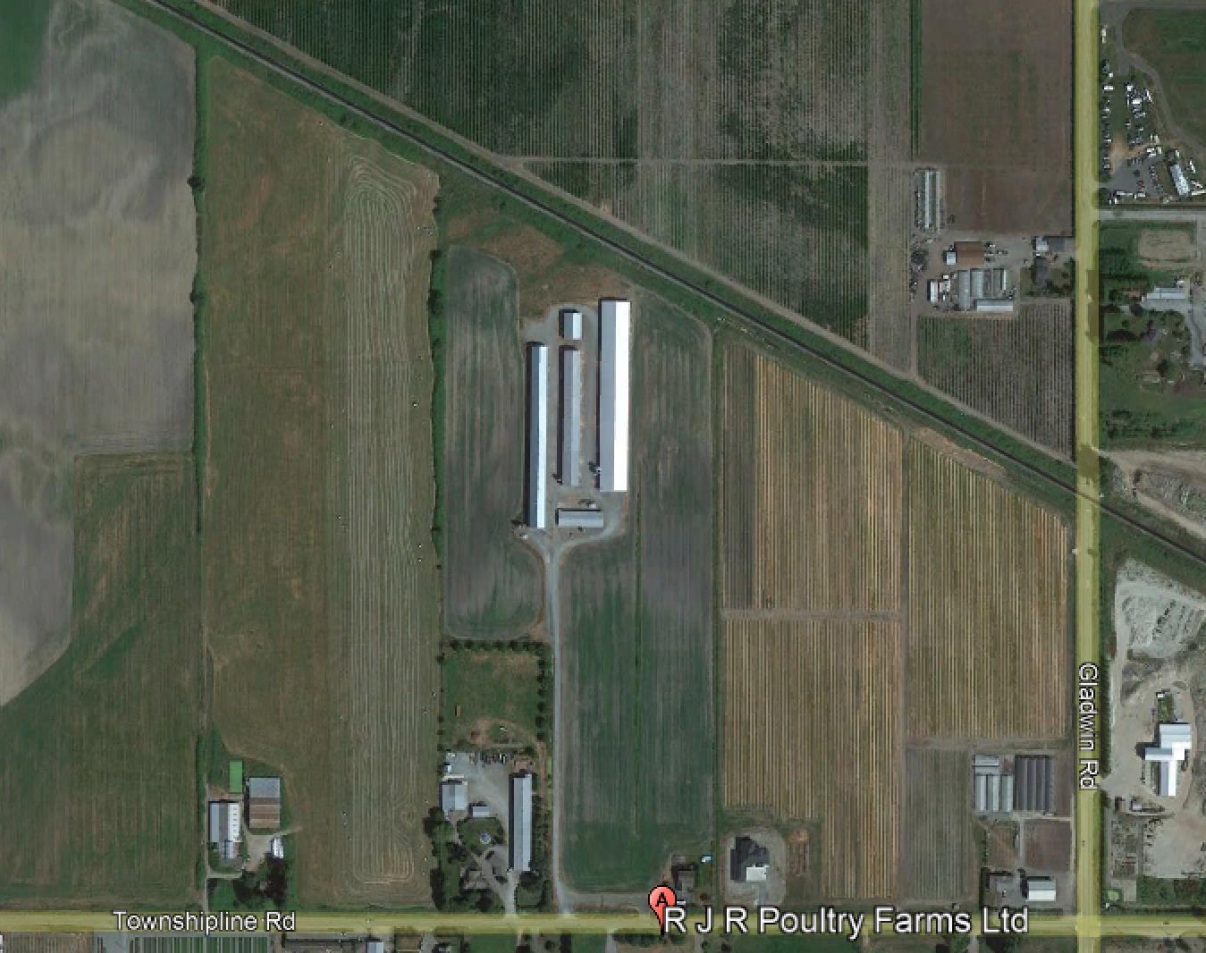
# Examples of Turkey Farms Adjacent to Aggregate Extraction and Industrial Uses

Poultry farm located directly adjacent to a railway track, near Langley, BC



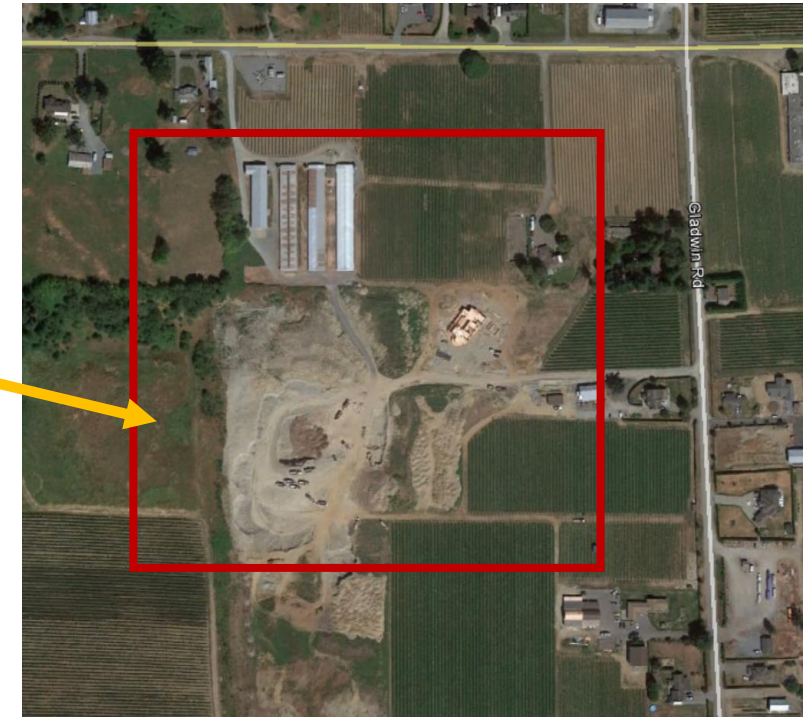
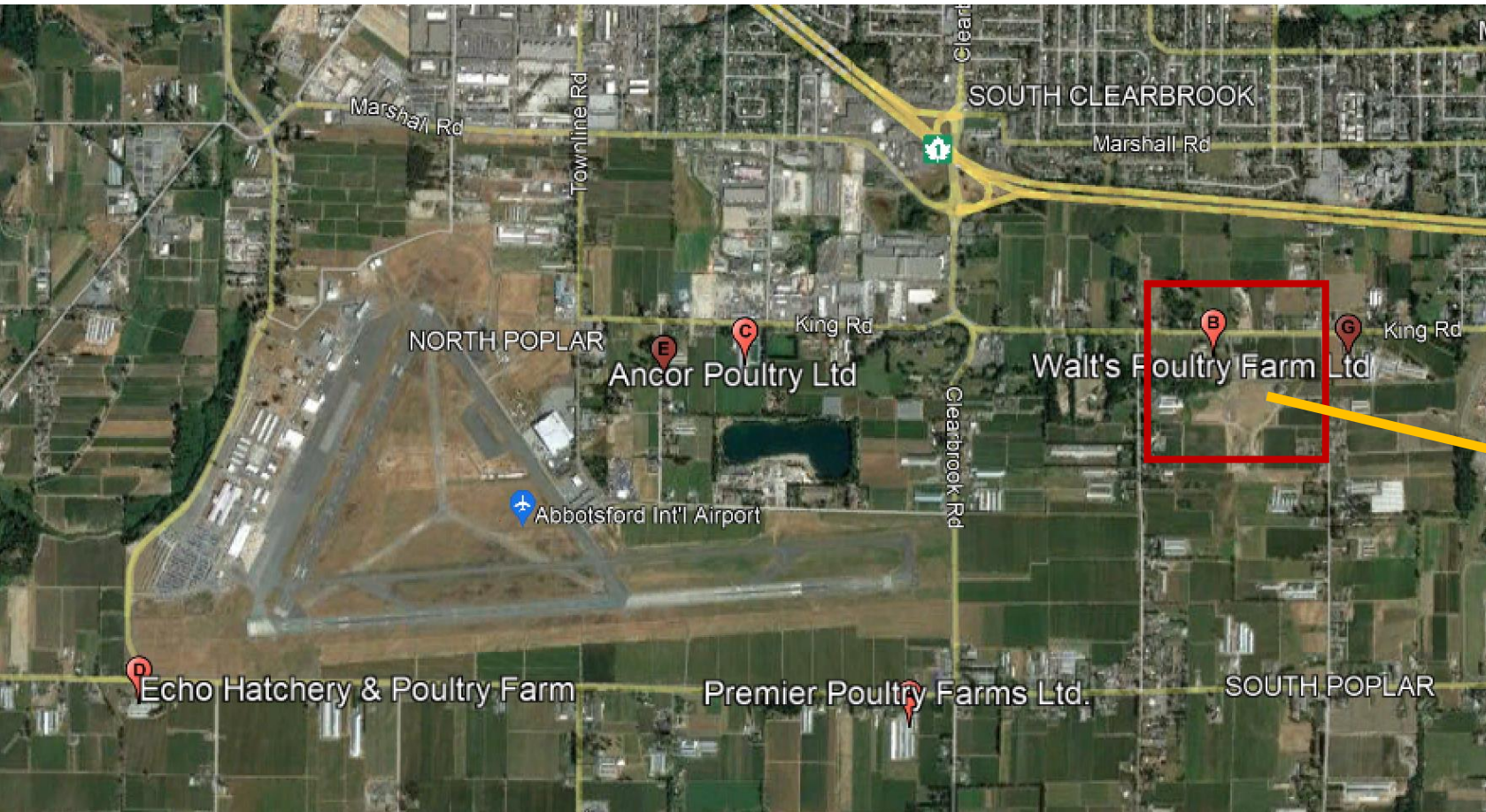
# Examples of Turkey Farms Adjacent to Aggregate Extraction and Industrial Uses

Poultry farm located directly adjacent to a railway track and agricultural uses near Abbotsford, BC



# Examples of Turkey Farms Adjacent to Aggregate Extraction and Industrial Uses

Numerous Poultry farm near Abbotsford, BC located next to an airport, intensive agriculture, and a previous gravel pit (now appears to be development).



# Examples of Turkey Farms Adjacent to Aggregate Extraction and Industrial Uses

Poultry Farm near Abbotsford, BC ~200m from extraction pits



# Examples of Turkey Farms Adjacent to Aggregate Extraction and Industrial Uses

Ontario aggregate operations surrounding a poultry farm, with an immediately adjacent rail line



# Examples of Turkey Farms Adjacent to Aggregate Extraction and Industrial Uses

Turkey farm near Sarnia, Ontario, operating amidst various intensities of agricultural operations.



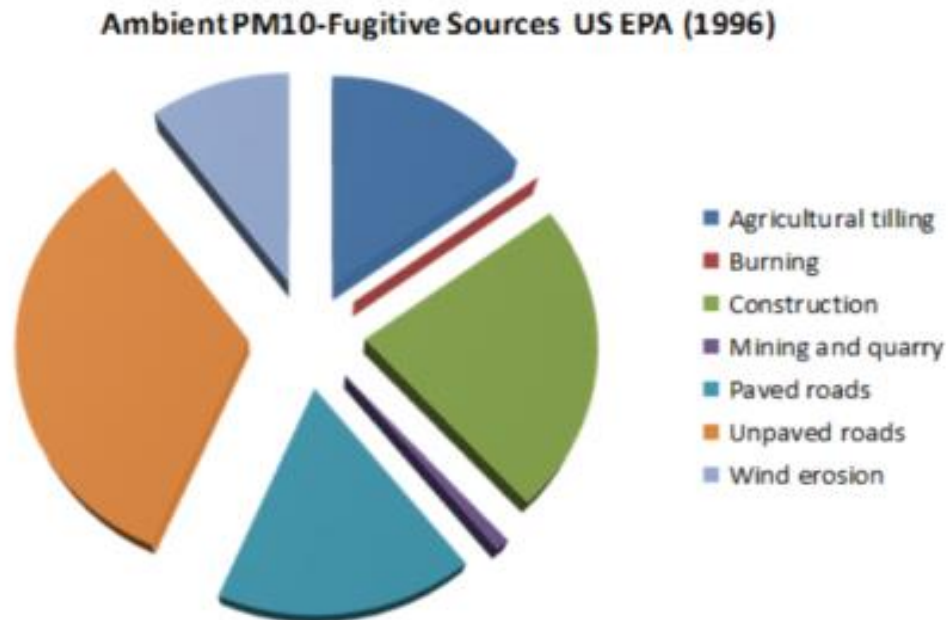
# Attachment B:

Silica Studies and Related Health Impacts

## “Crystalline Silica” – Wisconsin Industrial Sand Association (2013)

### *Is crystalline silica in the air? Where does it come from?*

Yes, because crystalline silica is so common, it is in the air at low levels nearly everywhere. In 1996, the U.S. EPA published a review of the data concerning “ambient” crystalline silica levels. Ambient crystalline silica levels are those outside of a work place; that is, the levels of crystalline silica in the air outside of the property of a plant, quarry or any other work site. The U.S. EPA reported that ambient crystalline silica levels in the United States are up to  $8 \mu\text{g}/\text{m}^3$  (micrograms per cubic meter), and estimated an average ambient silica level (measured as PM10) in urban areas of  $1.9 \mu\text{g}/\text{m}^3$ , with a range of  $0.8$  to  $5.0 \mu\text{g}/\text{m}^3$ . Based on the available particulate matter data, the U.S. EPA concluded that: (1) about 90% of ambient crystalline silica comes from fugitive dust sources, and (2) the largest fugitive dust sources are unpaved roads, paved roads, construction and agricultural tillage. The U.S. EPA concluded that mining and quarrying contribute only 1% of the ambient dust, roughly 15 times less than agriculture.





# “Ambient Levels and Noncancer Health Effects of Inhaled Crystalline and Amorphous Silica” – Environmental Protection Agency (1996)

## 5.1 INTRODUCTION

The health effects of occupational silica exposure probably have been known since humans began to mine and smelt precious ores, to make glass, and to cut stone, all of which produced high dust levels and, consequently, dust diseases in the lungs (Raffle et al., 1987). The industrial revolution brought power tools to the workplace, resulting in high dust exposures in occupations such as knife grinding, mining and tunneling, metallurgy, flint grinding, pottery making, and sandblasting. Workers in many of these dusty industries had severe respiratory diseases that shortened their lives markedly compared to employees in other trades (Raffle et al., 1987). Discovering and understanding the role that silica played in conditions variously named "miners' phthisis", "potters' rot" or "potters' asthma", or "industrial consumption" did not occur until the first decades of the 20th century. In 1915, the British physician Edgar Collis demonstrated that

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## 5.2 MECHANISMS AND MANIFESTATIONS OF OCCUPATIONAL SILICA HEALTH EFFECTS

Occupational exposure to respirable particles of crystalline silica or its polymorphs, cristobalite and tridymite, produces several well known conditions: silicosis, silicotuberculosis, enlargement of the heart (cor pulmonale), interference with the body's immune system (scleroderma), and damage to the kidneys. Information on silica health effects was obtained from the work of several experts (Ziskind et al., 1976; Seaton, 1984; Peters, 1986; Silicosis and Silicate Disease Committee, 1988; Balaan and Banks, 1992), from which much of the material in this section is drawn. Silica-related health effects are likely to be detected among active or retired workers in the following industries: abrasives and blasting; boiler and tank scaling; brick, tile, and clay production; cement production; ceramics; coal mining; diatomaceous earth calcining; enameling; farming; foundry work; glass making; metal ore mining and milling; paint blending; pharmaceuticals; quarrying and tunneling; sandblasting; scouring powder manufacturing and use; silica flour fillers; and synthetic mineral fibers production (Peters, 1986). There may be as many as 2 to 4.3 million U.S. workers either currently or previously exposed to silica on the job

(National Institute for Occupational Safety and Health, 1991).

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TABLE 3-3. NATIONAL AND CALIFORNIA ESTIMATES OF PM<sub>10</sub> EMISSIONS FOR SELECTED INDUSTRIES AND FUGITIVE ACTIVITIES<sup>a</sup>

Sources	National		California
	NAQETR <sup>b</sup> (1992)	NAPEE <sup>c</sup> (1990)	CEI <sup>d</sup> (1989)
Construction and demolition	9.6	NA	0.2690
Paved roads	7.2	NA	0.6020
Unpaved roads	13.8	NA	0.0370
Ceramic, etc.	NA	0.368	NA
Metallurgy	NA	0.265	0.0020
Quarrying and mining	0.4	1.410	0.0007
Agriculture	6.2	6.720	0.1710
Power plant	NA	0.419	0.0040
Forest fires	NA	0.600	0.0370
Wind erosion	4.2	10.700	0.0130

<sup>a</sup>Teragrams = one trillion (10<sup>12</sup>) grams.

<sup>b</sup>National Air Quality Emissions Trends Report, 1992 (U.S. Environmental Protection Agency, 1993).

<sup>c</sup>National Air Pollutant Emissions Estimates, 1940 to 1990 (U.S. Environmental Protection Agency, 1991a).

<sup>d</sup>California Emissions Inventory (California Air Resources Board, 1991).

NA = Data not available.

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**Sand mining/quarrying is not the only source of silica emissions across the landscape, and is certainly not the highest contributor of silica to ambient air quality**

# “Ambient Levels and Noncancer Health Effects of Inhaled Crystalline and Amorphous Silica” – Environmental Protection Agency (1996)

## Paved and Unpaved Roads

### 3.2.3 Unpaved Roads

As shown in Table 3-3, there is an estimated 13.9 Tg/year of PM<sub>10</sub> emissions from unpaved roads throughout the United States; within California, the estimated release is 0.037 Tg/year.

The surfaces of unpaved roads are the major contributor to particulate emissions (unlike paved roadways in which silt loading is the major contributor). Different types of unpaved roadways (industrial, construction, public, and private) emit particles at different rates, largely

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### 3.2.2 Paved Roads

Table 3-3 indicates that PM<sub>10</sub> emissions estimates from paved roads are 7.0 Tg/year nationally and 0.602 Tg/year within California. In 1989, California contributed about 8.4% of the nation's total fugitive particulate emissions from paved roadways, a percentage similar to

California's proportion of the U.S. population. Crystalline silica emissions derived from paved roads result primarily from reentrainment of soil rather than from other environmental factors.

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Vehicular carry-out from unpaved areas is reported to be the largest single contributor to paved roadway particulate emissions (Cowherd et al., 1977). Similar to construction activities,

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Other factors influencing paved road emissions are silt content of the surrounding soils (which affects silt loading), frequency of mechanical cleaning of streets, deicing materials and applications, and the asphalt or concrete composition of the street surface (Cowherd et al., 1988). Asphalt streets have been associated with higher silt loading and retention than concrete-surfaced streets. This is likely related to the greater porosity and surface roughness of asphalt roads. As a road ages, surface conditions deteriorate, and, as might be anticipated, particulate emissions increase. Freeways, highways, collector streets, and local streets all show differences in emissions rates. If all other factors are constant, quantities of dust generated from unpaved roadways are greater than quantities from paved roadways (Cowherd et al., 1988).

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TABLE 3-3. NATIONAL AND CALIFORNIA ESTIMATES OF PM<sub>10</sub> EMISSIONS FOR SELECTED INDUSTRIES AND FUGITIVE ACTIVITIES<sup>a</sup>

Sources	National		California
	NAQETR <sup>b</sup> (1992)	NAPEE <sup>c</sup> (1990)	CEI <sup>d</sup> (1989)
Construction and demolition	9.6	NA	0.2690
Paved roads	7.2	NA	0.6020
Unpaved roads	13.8	NA	0.0370
Ceramic, etc.	NA	0.368	NA
Metallurgy	NA	0.265	0.0020
Quarrying and mining	0.4	1.410	0.0007
Agriculture	6.2	6.720	0.1710
Power plant	NA	0.419	0.0040
Forest fires	NA	0.600	0.0370
Wind erosion	4.2	10.700	0.0130

<sup>a</sup>Teragrams = one trillion (10<sup>12</sup>) grams.

<sup>b</sup>National Air Quality Emissions Trends Report, 1992 (U.S. Environmental Protection Agency, 1993).

<sup>c</sup>National Air Pollutant Emissions Estimates, 1940 to 1990 (U.S. Environmental Protection Agency, 1991a).

<sup>d</sup>California Emissions Inventory (California Air Resources Board, 1991).

NA = Data not available.

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# “Ambient Levels and Noncancer Health Effects of Inhaled Crystalline and Amorphous Silica” – Environmental Protection Agency (1996)

## Agricultural Operations

### 3.2.8 Agricultural Operations

Agricultural PM<sub>10</sub> emissions include fugitive and process-stream emissions; Table 3-3 shows that the estimated national emissions are 6.720 Tg/year. Table 3-5 provides a description of different farming activities that create particulate emissions. It should be noted that, in agriculture, fugitive emissions greatly exceed process-stream emissions, and variability in crystalline silica emissions will be determined primarily by underlying soil geology and regional climatic conditions.

From Table 3-5, it can be noted that the California estimate of PM<sub>10</sub> emissions from cattle feedlots was greater than that for the entire nation. Although California may have a majority of the nation's feedlots, its emissions cannot exceed the national total. This discrepancy highlights difficulties in comparing values from various agencies when classification systems are not uniform.

Factors governing the variability of dust emissions from agriculture tilling are soil moisture content, inherent soil characteristics such as silt and clay content, tilling implement characteristics such as speed and type, and wind (Cowherd et al., 1974). Interrelated with agricultural particulate emissions are wind-erosion emissions. Depending on the reporting agency's classification of data, assignment to specific categories may not be uniform.

TABLE 3-5. CONTRIBUTING SUBSOURCE ACTIVITIES TO AGRICULTURAL PM<sub>10</sub> EMISSIONS FOR 1989

Sources	National		California
	NAQETR <sup>a</sup> (Tg/year)	NAPEE <sup>b</sup> (Tg/year)	CEI <sup>c</sup> (Tg/year)
Tillage	6.3	6.300	0.157
Fuel consumption	NA	0.069	0.0002
Burning	NA	NA	0.014
Cattle feedlots	NA	0.019	0.027
Feed and grain milling	NA	0.046	
Grain elevators	NA	0.035	NA
Total		6.469	0.198

<sup>a</sup>National Air Quality Emissions Trends Report 1990 (U.S. Environmental Protection Agency, 1991b).

<sup>b</sup>National Air Pollutant Emissions Estimates, 1940 to 1990 (U.S. Environmental Protection Agency, 1991a).

<sup>c</sup>California Emissions Inventory (California Air Resources Board, 1991).

NA = Data not available.

TABLE 3-3. NATIONAL AND CALIFORNIA ESTIMATES OF PM<sub>10</sub> EMISSIONS FOR SELECTED INDUSTRIES AND FUGITIVE ACTIVITIES<sup>a</sup>

Sources	National		California
	NAQETR <sup>b</sup> (1992)	NAPEE <sup>c</sup> (1990)	CEI <sup>d</sup> (1989)
Construction and demolition	9.6	NA	0.2690
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Quarrying and mining	0.4	1.410	0.0007
Agriculture	6.2	6.720	0.1710
Power plant	NA	0.419	0.0040
Forest fires	NA	0.600	0.0370
Wind erosion	4.2	10.700	0.0130

<sup>a</sup>Teragrams = one trillion (10<sup>12</sup>) grams.

<sup>b</sup>National Air Quality Emissions Trends Report, 1992 (U.S. Environmental Protection Agency, 1993).

<sup>c</sup>National Air Pollutant Emissions Estimates, 1940 to 1990 (U.S. Environmental Protection Agency, 1991a).

<sup>d</sup>California Emissions Inventory (California Air Resources Board, 1991).

NA = Data not available.

# “Ambient Levels and Noncancer Health Effects of Inhaled Crystalline and Amorphous Silica” – Environmental Protection Agency (1996)

## Wind Erosion

### 3.2.11 Wind Erosion

Nationally, there were an estimated 10.7 Tg/year of PM<sub>10</sub> emissions due to wind erosion in 1989 and 0.013 Tg/year within California (Table 3-3). Wind erosion is the process of particulate aerosol generation from air currents moving over soil. Nationally, fallow agricultural cropland presents the greatest surface area for the action of wind erosion (Cowherd et al., 1988). Particles and crystalline silica also may be released from wind blowing over open storage piles and from industrial discharge. Wind-related industrial emissions most commonly are associated with fugitive releases and, thus, may be overlooked within estimates of industrial particulate emissions.

Wind erosion particulate emissions vary due to soil parameters, climatic factors, geographic features, vegetation type, and farming practices (Cowherd et al., 1974). Because many of these emissions are related to bare ground surface, fallow agricultural land is an important source. Productive agricultural land is also important; emissions factors have been developed that describe the variability of particulate emissions from wind erosion due to crop variety (U.S. Environmental Protection Agency, 1977; Gillette and Passi, 1988). Native vegetation usually provides better protection against wind erosion than do agricultural crops. Additionally, in the agricultural

TABLE 3-3. NATIONAL AND CALIFORNIA ESTIMATES OF PM<sub>10</sub> EMISSIONS FOR SELECTED INDUSTRIES AND FUGITIVE ACTIVITIES<sup>a</sup>

Sources	National		California
	NAQETR <sup>b</sup> (1992)	NAPEE <sup>c</sup> (1990)	CEI <sup>d</sup> (1989)
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Agriculture	6.2	6.720	0.1710
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Forest fires	NA	0.600	0.0370
Wind erosion	4.2	10.700	0.0130

<sup>a</sup>Teragrams = one trillion (10<sup>12</sup>) grams.

<sup>b</sup>National Air Quality Emissions Trends Report, 1992 (U.S. Environmental Protection Agency, 1993).

<sup>c</sup>National Air Pollutant Emissions Estimates, 1940 to 1990 (U.S. Environmental Protection Agency, 1991a).

<sup>d</sup>California Emissions Inventory (California Air Resources Board, 1991).

NA = Data not available.

# “Ambient Levels and Noncancer Health Effects of Inhaled Crystalline and Amorphous Silica” – Environmental Protection Agency (1996)

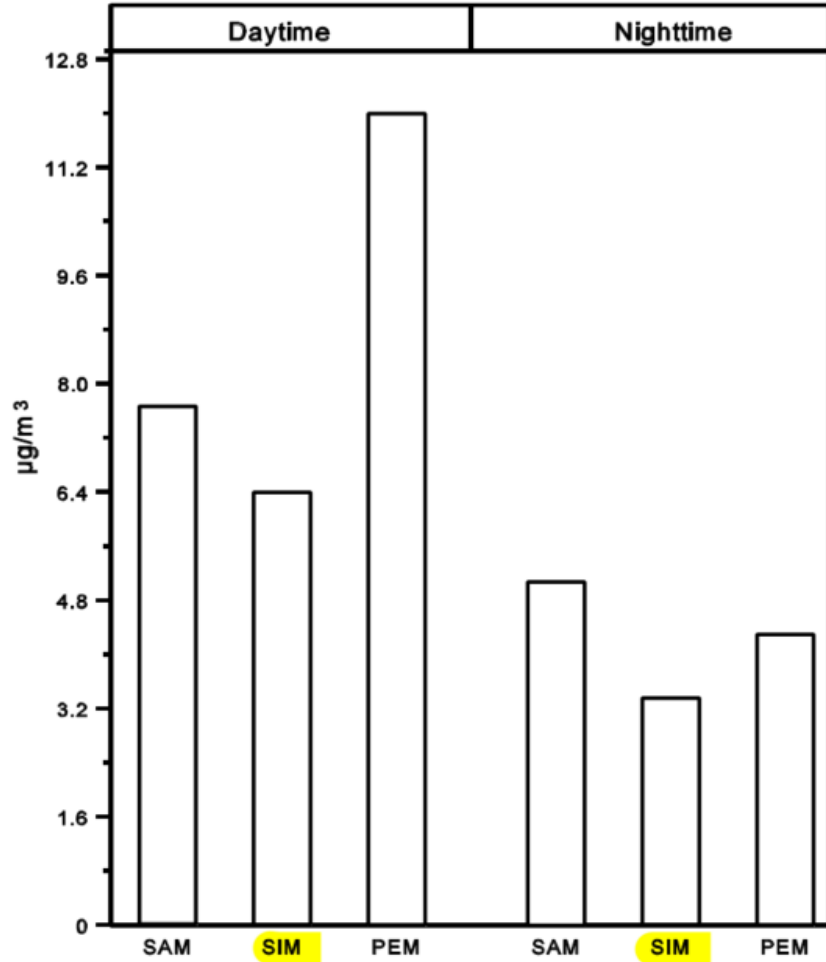


Figure 3-3. Mean outdoor stationary ambient monitor (SAM), stationary indoor monitor (SIM), and personal exposure monitor (PEM) silicon (<10 μm particle size) concentrations for 178 residents of Riverside, CA.

TABLE 3-8. AMBIENT QUARTZ CONCENTRATIONS FROM HIGH-VOLUME FILTER SAMPLES COLLECTED AT 10 U.S. CITIES

Site	Sample I.D.	Collection Date	Filter Load (μg cm <sup>-3</sup> )	TSP (μg/m <sup>3</sup> )	Quartz (μg/m <sup>3</sup> )	Quartz (wt %)	Error (wt %)
Akron, OH	GSWS	10/24/80	251.7	58.9	15.8	26.9	6.2
Boston, MA	GCRM	07/02/80	236.3	58.6	9.5	16.2	1.7
	GSXS	09/12/80	205.2	50.3	7.6	15.2	3.8
Cincinnati, OH	GRP	10/06/80	365.0	86.3	8.3	9.6	2.4
Dallas, TX	GJLE	04/21/80	279.8	69.4	3.6	5.2	0.6
	GJJE	05/03/80	209.2	51.8	3.9	7.6	5.3
El Paso, TX	GHUM	03/04/80	181.3	41.0	4.3	10.6	0.0
	GVOR	12/05/80	263.0	65.2	2.3	3.5	0.4
Hartford, CT	GGUN	02/21/80	380.5	102.9	12.0	11.7	4.1
	GPYY	08/31/80	213.5	50.7	5.1	10.1	5.9
Pasadena, CA	GJOQ	05/03/80	262.5	65.1	2.9	4.4	1.1
	GLZY	06/20/80	434.0	102.0	2.2	2.2	2.4
	GRDG	07/26/80	450.0	102.6	1.6	1.6	0.8 <sup>a</sup>
Philadelphia, PA	GFXJ	01/25/80	293.7	71.7	1.2	1.7	0.2
	GGPP	02/06/80	226.7	56.8	4.0	7.0	3.6
	GHZV	03/04/80	358.7	88.7	3.2	3.6	1.4
	GIPM	03/28/80	248.0	66.6	2.1	3.2	0.6
	GJPU	04/18/80	277.0	65.3	2.7	4.2	1.5
	GRMK	08/01/80	483.2	115.8	10.0	8.6	4.0 <sup>a</sup>
North Phoenix, AZ	GRWU	09/24/80	323.5	87.2	13.9	15.9	4.2
Portland, OR	GUQK	11/23/80	226.3	56.1	0	0	-

<sup>a</sup>Variance error for single analysis.

Unit labels edited to reflect Davies et al (1984) results

Source: Davis et al. (1984).

# “Ambient Levels and Noncancer Health Effects of Inhaled Crystalline and Amorphous Silica” – Environmental Protection Agency (1996)

**TABLE 3-9. SUMMARY OF PM<sub>10</sub> MEASUREMENTS AND ASSOCIATED SILICA LEVELS FROM SELECTED STUDIES**

References	Mean PM <sub>10</sub> or Mean Respirable Dust Concentration (µg/m <sup>3</sup> )	Silica Concentrations Reported (µg/m <sup>3</sup> )	Silica as a Percent of PM <sub>10</sub>
University of California at Davis (1992)			
Harvester	1,040 <sup>a</sup>	30	2.9
Crop burn	353 <sup>a</sup>	30	8.5
Tractor	3,170 <sup>a</sup>	80	2.5
Davis et al. (1984)			
Fine (MMAD < 2.5 µm)	24.9	0.29	0.1
Coarse (MMAD 2.5 to 15 µm)	38.6	3.53	7.2
Goldsmith (1991)			
Site No. 1	18.9 <sup>b</sup>	1.33	7
Site No. 2	18.2 <sup>b</sup>	1.11	6
Green et al. (1990)	140 to 160 <sup>c</sup>	1 to 23.8 <sup>d</sup>	0.85 to 17.5
Grobbelaar and Bateman (1991)	349 to 844 <sup>a</sup> TWA <sup>e</sup>	3.2 to 13 TWA <sup>e</sup>	0.01 to 3.2

<sup>a</sup>Respirable-sized particles ≤ 5 µm.

<sup>b</sup>PM<sub>10</sub> or particle ≤ 10 µm.

<sup>c</sup>Green did not provide a measurement of PM<sub>10</sub>, but rather a measure of TSP and measurements of percent respirability. From Green's figures, the PM<sub>10</sub> is being estimated at 85% of the TSP.

<sup>d</sup>The range was calculated using Green's average respirability of 85% multiplied by high and low crystalline silica percentages, multiplied by the high and low TSP measurements reported.

<sup>e</sup>Comparable to NIOSH recommended exposure limit of 50 µg/m<sup>3</sup> for threshold limit value-time-weighted average.

Table 3-9 summarizes the available data for simultaneous crystalline silica and PM<sub>10</sub> or respirable dust measurements (in micrograms per cubic meter) from various researchers. Review of the relationship between paired measurements will aid in the initial development of a mathematical link between crystalline silica and PM<sub>10</sub>. The percentage of crystalline silica within air samples can vary from near zero to 60%. The highest value, 60%, was found only in dust storms in foreign countries (Saiyed et al., 1991). Similar levels within U.S. dust storms have been difficult to quantify (Gillette, 1992a). Crystalline silica emissions from agricultural activities ranged from 3 to 17% (Green et al., 1990; University of California at Davis, 1992). Industrial processes, such as quarrying, produce crystalline silica concentrations in the 6 to 12% range (Goldsmith, 1991; University of California at Davis, 1992). The research reviewed suggests that a possible upper-bound estimate of crystalline silica near agricultural sites might be approximately 17%.

The consolidation of silica fraction data by industrial activity was considered as a possible refinement of estimates of crystalline silica percentages in PM<sub>10</sub>. Plausible upper-bound crystalline silica percentages for available activities are 17% for activities involving the burning of agricultural materials; 17.5% for farming activities involving soil manipulation such as plowing and discing; and 7% for quarrying activities (Table 3-9). Other studies, however, indicate that the fraction of silica in PM<sub>10</sub> samples will be determined more by the composition of the local environment (soil, rock sediment, etc.) than by the activity pursued. Muir (1994) notes the higher fraction of silica in the respirable dust of South African gold mines (reported to be 30% by

# “Ambient Levels and Noncancer Health Effects of Inhaled Crystalline and Amorphous Silica” – Environmental Protection Agency (1996)

Although there are limited and dated direct measurements of crystalline silica levels in the United States, there is enough indirect evidence to indicate that average ambient levels (<15  $\mu\text{m}$  aerodynamic diameter) in U.S. metropolitan areas generally have ranged between 1 and 3  $\mu\text{g}/\text{m}^3$  and, in most circumstances, are not likely to exceed an 8- $\mu\text{g}/\text{m}^3$  annual average. Higher levels are possible in certain primarily occupational or agricultural settings. Better quality estimates can be developed as large data sets of paired  $\text{PM}_{10}$ /silica measurements emerge from California's new silica monitoring. Correlation analysis and linear regression analysis may be appropriate to examine the relationship between crystalline silica and  $\text{PM}_{10}$  and aid in developing an algorithm to describe the link between crystalline silica and  $\text{PM}_{10}$ . As an understanding of other variables (e.g., differences in soil and climate) is gained, multiple regression techniques may be used to refine estimates of ambient crystalline silica levels.

An estimate of the ambient background crystalline silica concentration in rural Alberta, Canada, can be calculated using Green et al. (1990) dust parameters. The mean background TSP level from Green et al.'s (1990) Alberta study ranged from 40 to 80  $\mu\text{g}/\text{m}^3$ , with an average near 60  $\mu\text{g}/\text{m}^3$ . Seventy percent of the collected dust was considered respirable (i.e., mass of particles with diameters <5  $\mu\text{m}$ ). If half of the remaining 30% of the collected dust is between 5 and 10  $\mu\text{m}$ , then  $\text{PM}_{10}$  would be 85% of the TSP. The average crystalline silica fraction was about 6% of TSP. Combining all of these parameters results in an estimated Alberta respirable crystalline silica level of 3  $\mu\text{g}/\text{m}^3$ . This estimate appears high relative to the average levels, both measured and estimated, reported for larger ( $\leq 10$  and  $\leq 15$   $\mu\text{m}$  aerodynamic diameter) particle size ranges in the United States in Table 3-10, particularly considering evidence that much airborne silica is nonrespirable (Verma et al., 1994; Davis et al., 1984).

The fraction of dust found to be silica in an occupational setting may not be representative of the ambient environment. Depending on the composition of the dust, the crystalline silica may settle out faster or slower as the dust is dispersed from the site. In this regard, the 7% upper-bound silica fraction estimated by Goldsmith (1991) for two quarry sites in central coastal California may provide a better estimate of ambient exposures because it is based on measurements taken at sites distant from the source and closer to the potentially exposed population.

# “Ambient Levels and Noncancer Health Effects of Inhaled Crystalline and Amorphous Silica” – Environmental Protection Agency (1996)

## 3.7 CONCLUSION

As can be seen from Figure 3-1, several areas in California, Arizona, and New Mexico did not attain the PM<sub>10</sub> NAAQS due, in part, to fugitive dust emissions. Data from Goldsmith (1991) indicate that a reasonable estimate of the crystalline silica fraction in off-site fugitive dust from quarrying activities might be 7%, and data from Davis et al. (1984) indicate that average and upper-bound estimates of the crystalline silica fraction within total dichotomous mass (<15 μm d<sub>ae</sub>) samples from 22 metropolitan areas are 5 and 10%, respectively. Because these estimates were calculated directly from ambient measurements, and because TDM samplers are likely to collect a higher silica fraction than PM<sub>10</sub> samplers, 10% is considered a reasonable upper-bound estimate of the silica fraction within PM<sub>10</sub> samplers.

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## 5.2.4 Sequelae of Silicosis, Including Tuberculosis, Silico-Tuberculosis, Cor Pulmonale, and Other Conditions

This section is included in order to provide a complete discussion of health effects associated with silica exposures. It should be recognized, however, that the effects and interactions discussed have been noted only following high-level occupational exposures to silica (principally in mining environments). There is little evidence available relevant to the potential for low-level ambient exposures to cause similar effects.

Page 5-5, 5-6



# “Ambient Levels and Noncancer Health Effects of Inhaled Crystalline and Amorphous Silica” – Environmental Protection Agency (1996)

## 7. ESTIMATION OF POTENTIAL HEALTH RISK FROM AMBIENT SILICA EXPOSURES, USING DATA FROM OCCUPATIONAL STUDIES

To approximate the silicosis risk associated with ambient exposures from these curves, ambient levels must first be adjusted to approximate 8-h occupational exposure equivalents. In Chapter 3, average and high ambient concentrations of crystalline silica in the United States were estimated to be 3 and 8  $\mu\text{g}/\text{m}^3$ , respectively. Consistent with EPA dose-response assessment methods (U.S. Environmental Protection Agency, 1994a), continuous (24-h) exposure to 3 and 8  $\mu\text{g}/\text{m}^3$  are assumed to pose the same health risk as 8-h occupational exposures to 8.4 and 22.4  $\mu\text{g}/\text{m}^3$ , respectively (continuous exposures = TWA occupational exposures  $\times$  [5 days/7 days]  $\times$  [10  $\text{m}^3$  air breathed at work/20  $\text{m}^3$  total air breathed in a day]). A 70-year exposure to these occupational equivalents would result in cumulative silica exposures of 0.6 and 1.6  $\text{mg}/\text{m}^3 \times \text{years}$ , respectively (cumulative exposure = occupational equivalent exposure  $\times$  70 years). The South African, Canadian, and South Dakota studies predict a cumulative silicosis risk of very close to 0% for a cumulative silica exposure of 0.6  $\text{mg}/\text{m}^3 \times \text{years}$ . However, the estimates of cumulative risk diverge at higher cumulative exposure levels. Page 7-1, 7-2

Further, the general public may not be exposed to as much freshly ground or fractured quartz particles as are miners. Freshly ground quartz has been found to be much more cytotoxic than aged quartz because grinding or fracturing quartz particles is thought to break the silicon-oxygen bonds, generating silicon and silicon oxide radicals on the surface of the particles. These surface radicals decay as fractured silica dust is aged (Vallyathan et al., 1988, 1995; Page 8-5

South African miners from exposures at or below 1  $\text{mg}$  crystalline silica/ $\text{m}^3$  years is close to 0%. Using a high estimate of 10% for the crystalline silica fraction in  $\text{PM}_{10}$  from U.S. metropolitan areas, 1  $\text{mg}$  crystalline silica/ $\text{m}^3$  years is the highest CSE expected from continuous lifetime exposure at or below the annual  $\text{PM}_{10}$  NAAQS of 50  $\mu\text{g}/\text{m}^3$ . Thus, current data suggest that, for healthy individuals not compromised by other respiratory ailments and for ambient environments expected to contain 10% or less crystalline silica fraction in  $\text{PM}_{10}$ , maintenance of the 50  $\mu\text{g}/\text{m}^3$  annual NAAQS for  $\text{PM}_{10}$  should be adequate to protect against silicotic effects from ambient crystalline silica exposures.

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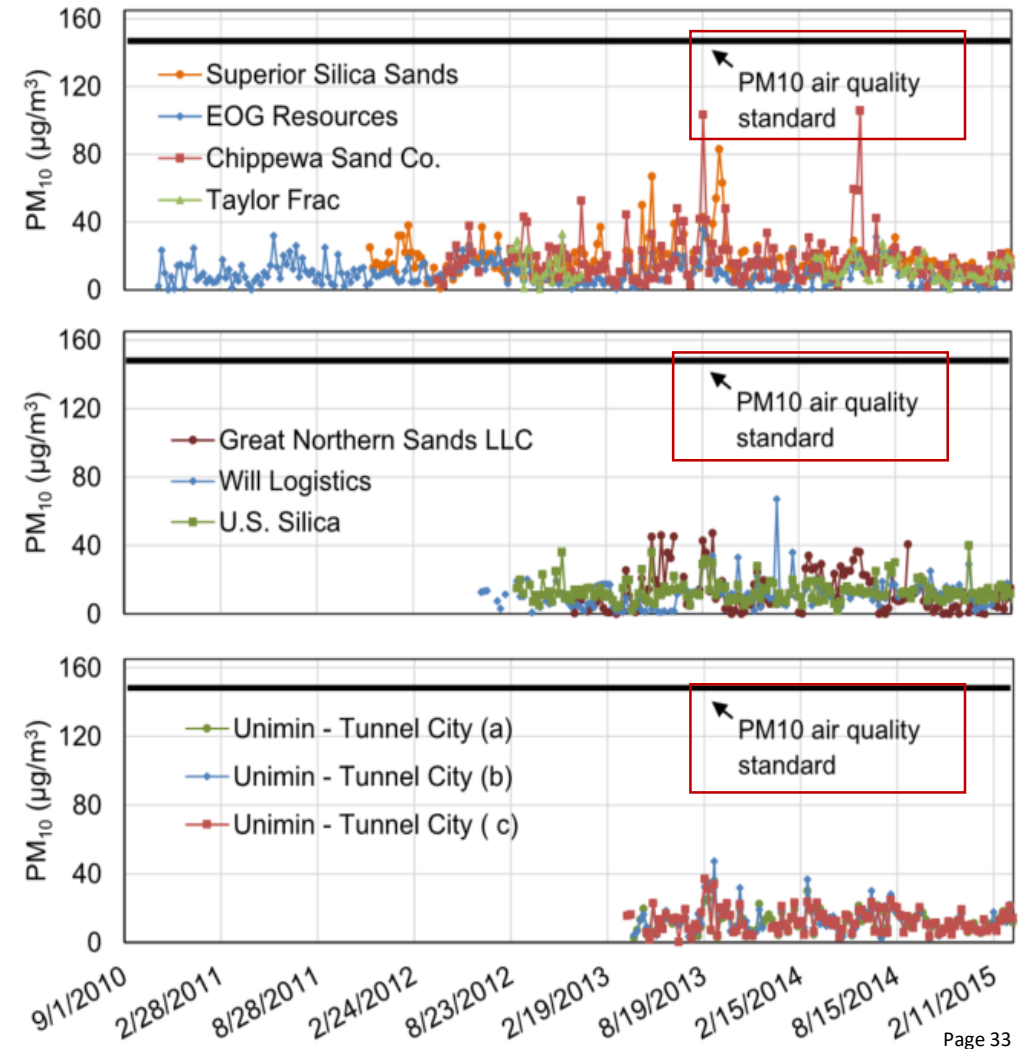
### RESPIRABLE CRYSTALLINE SILICA

In addition to the level of particulate matter, stakeholder representatives also expressed concern about how much of the particulate matter in ambient air is composed of crystalline silica (the silica fraction) and whether the silica particles are small enough to be inhaled past the upper airway and into the lungs (respirable silica). Prolonged exposure to substantial levels of respirable crystalline silica, such as occupational exposure, may lead to silicosis, lung cancer, and other airway diseases.<sup>3</sup> The health risks from prolonged respirable crystalline silica exposure are most common among workers in occupations associated with cutting, grinding, or crushing of silica grains, such as sandblasting, stone quarrying, and others. Silicosis and silica-related diseases are considered an occupational health hazard for those exposed to high levels of respirable crystalline silica dust over extended periods of time, often many years.<sup>4</sup><sup>5</sup> Environmental exposure (exposure to levels of respirable crystalline silica that are commonly present in ambient air) have not been associated with a high risk for respiratory illness. Respirable crystalline silica concentrations below published chronic reference levels are commonly present in ambient air, and can come from sources as diverse as agriculture, unpaved roads, and construction activity.<sup>6</sup> Silica is one of the most common minerals in the earth's crust and is not unique to industrial sand, or the Midwest.<sup>7</sup>

### RESPIRABLE SILICA MONITORING AT INDUSTRIAL SAND FACILITIES

To address community concern for potential health impacts from respirable crystalline silica, studies have been conducted in western Wisconsin to sample for and test the amount of crystalline silica in respirable particulate matter. In Chippewa and Barron County, PM4 samples were collected simultaneously at upwind and downwind locations near three industrial sand mines and one sand processing plant for over two years.<sup>23</sup> The air samplers were operated in accordance with U.S. EPA procedures and National Institute for Occupational Safety and Health (NIOSH) standards. Over two years, 2,128 24-hour samples were collected at four locations. All samples were analyzed for silica content. The annual average of the values measured were compared to the California Office of Environmental Health Hazard Assessment (OEHHA) 70-year chronic (long-term) reference exposure level (REL) of 3.0  $\mu\text{g}/\text{m}^3$ . The annual average respirable crystalline silica concentrations at all facilities evaluated were well below (less than 10%) the REL for ambient respirable crystalline silica. This health-based value represents the level below which health effects are unlikely in sensitive populations. Adverse health effects are not anticipated from exposure to respirable crystalline silica below this level, even if the exposure occurs over a lifetime.

PM10 at Wisconsin industrial sand facilities



The results of the Chippewa and Barron County study are similar to that of a respirable crystalline silica study conducted near sand facilities in Maiden Rock, Sparta, and Downing, Wisconsin.<sup>24</sup> In this study, 657 24-hour samples were collected and analyzed for silica content. The results indicated that average respirable crystalline silica concentrations at all three locations were within the range of local background concentrations and well below (less than 20%) the California OEHHA REL of 3.0 µg/m<sup>3</sup>. Results from these locations were also compared to data collected at Cataract Green, a green field planned to be developed as a mine in the future. There was no mining or agricultural activity at or around Cataract Green. The respirable crystalline silica data from the Cataract Green control site were similar to the data collected at the sand facilities. In addition, no sampling sites demonstrated significant differences in respirable crystalline silica concentration that could be attributed to wind speed.

Respirable crystalline silica has also been measured near industrial sand facilities in Minnesota. The Minnesota Department of Health recently adopted the chronic REL of 3 µg/m. Average values of respirable crystalline silica from two separate studies—a 17-month study near the Shakopee Sands facility and a nine-month study at the Jordan Sands facility—did not exceed this REL.<sup>25, 26</sup> Respirable crystalline silica

sampling was also conducted in the communities of Winona, MN and Stanton, MN. The Winona monitor measured air quality impacts that may be associated with mining-related truck traffic and activities. Stanton does not have any industrial sand related facilities or transportation, but is a rural area with unpaved roads and farm fields. This site served to measure background concentrations. There were more days of detectable levels of respirable crystalline silica at Stanton than Winona, though average respirable silica concentrations in both locations were a fraction of the REL.<sup>27</sup>

Overall, the respirable crystalline silica concentrations measured in Minnesota are very similar to those measured in Wisconsin. These results provide independent confirmation of the Wisconsin respirable crystalline silica concentrations: multiple facilities in various locations sampled by different technicians indicate similar levels of respirable crystalline silica that are below health-based exposure levels.

Industrial sand facilities are not sources of respirable crystalline silica at levels that pose a community-level health hazard.

### HOW WILL INDUSTRIAL SAND MINING IMPACT AIRBORNE RESPIRABLE CRYSTALLINE SILICA?

Airborne respirable crystalline silica is a well-established occupational health hazard in industries where workers could be regularly exposed to fractured silica particles small enough to travel deep into the lungs.<sup>29</sup> As a result, industrial sand mine workers are regularly monitored for respirable crystalline silica according to Mine Safety and Health Administration (MSHA) regulations.<sup>30</sup> It is important to note that the risk for *community* exposure to respirable crystalline silica is different from

*occupational* exposure. Silica sand is desirable for oil and gas production due to its extreme hardness, and this hardness is one of the reasons for low concentrations in ambient air. Because of the natural hardness of silica, very high levels of energy are needed to fracture the grains into respirable size. Stockpiles, loading facilities, and processing facilities are the most likely sources of respirable crystalline silica; however, numerous monitoring datasets from industrial sand facilities in Minnesota and Wisconsin indicate that these facilities are not substantial sources of ambient respirable crystalline silica. Rather, these studies have indicated that the risk of community exposure near an industrial sand facility is the same as exposure regionally.<sup>31</sup>

## Air Quality

One of the most widely cited environmental concerns associated with industrial sand mining is air quality, especially as it pertains to particles of crystalline silica small enough to be inhaled, particles measuring below 10 micrometers in diameter. Prolonged exposure to such particles, known as respirable crystalline silica (RCS), can cause silicosis, a preventable but potentially fatal lung disease, in occupational settings.<sup>9</sup>

The concentrations of dust at a typical industrial sand mining operation are far lower than what is considered an occupational health hazard. Most sand handling is done when the sand is wet or moist, and workers who may be exposed to dust are not in confined buildings near the source of dust, where concentrations may be relatively high if building ventilation is inadequate. Residences near mines are typically exposed to more dust from gravel roads and agricultural fields than from sand mine processes.<sup>14</sup>

The best available air monitoring studies show respirable crystalline silica concentrations in Wisconsin and Minnesota have been within the range of normal “background levels” and far below levels considered hazardous.

Although silicosis is an occupational hazard for workers in industries that involve exposure to RCS, fears of a public outbreak of the disease as a result of sand mining have not been supported by air monitoring data gathered by the Minnesota Pollution Control Agency (MPCA), the Wisconsin Department of Natural Resources (WDNR), or studies conducted by Dr. John Richards of Air

Control Techniques (ACT), whose research has provided the best available dataset on RCS levels near sand mines and processing sites in Wisconsin.

Advocacy reports such as *Communities at Risk* have relied on anecdotal evidence (which can be subject to cherry-picking of data and other biases) in their discussions of the public health risks of silicosis due to RCS associated with industrial silica sand mining. That report left local citizens without objective, scientific evidence on the health risks posed by sand mining operations, causing some to become unnecessarily alarmed.

Below, we summarize the best available air monitoring studies, which show RCS concentrations in Minnesota and Wisconsin have been within the range of normal “background levels” and far below the levels considered hazardous by MPCA.

After collecting 1,176 days – more than three years – of sampling data at the eight locations, ACT found ambient air concentrations for PM4 crystalline silica particles were well within the range of background concentrations in agricultural, rural, and urban areas throughout the United States. The PM4 crystalline silica concentrations, when detected, were less than 10 percent of the California reference exposure level of three micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ), meaning emissions of silica dust at these facilities were far below concentrations considered conservatively protective of human health. (See Figure 1.)

Richards also conducted upwind/downwind monitoring at the eight locations, allowing researchers to determine whether differing concentrations of PM4 crystalline silica at each monitor were the result of activity at the frac sand facility. The vast majority of samples showed no observed difference in ambient crystalline silica concentrations between the upwind and downwind monitors. Where concentrations did differ, the differences were small and well below



## Conclusion: Sand Mining Doesn't Hurt Air Quality

The data compiled by Richards at ACT and MPCA, which together comprise about 2,000 samples from Minnesota and Wisconsin, indicate industrial sand operations do not generate hazardous levels – or anything approaching hazardous levels – of small silica particles in the ambient air near these operations. This research provides a positive starting point for understanding the real and perceived risks of mining, processing, and transporting industrial sand in the Upper Midwest. These findings are important, and they should not be surprising.

The reason the sand in the Upper Midwest is sought-after for hydraulic fracturing is because it is well-rounded, has a high crush strength (meaning it is strong and resistant to fracturing), and is well-sorted. PM4 silica particles are generally created by processes that fracture silica particles into smaller pieces; the industrial sand mining process does not and cannot do that, or there would be no industrial sand business. Doing so would be analogous to a tomato farmer smashing all the tomatoes during harvest.

PM4 silica particles are generally created by processes that fracture silica particles into smaller pieces; the industrial sand mining process does not and cannot do that, or there would be no industrial sand business.

Additional information will be valuable in assessing the potential public health impact, from an air quality perspective, of industrial sand mining. Air quality monitoring should continue. At present, fears of a public outbreak of silicosis are simply not supported by the available data gathered from recent and ongoing ambient air monitoring studies conducted at nine active and one proposed industrial sand operation in Wisconsin and two communities in Minnesota. With respect to air quality, frac sand mining does not put the public's health at risk.

## “The Potential for Silica-Related Health Effects Among Those Living Near Silica Mining and Processing Facilities” – Hessel (2018)

Studies of ambient levels of respirable silica near silica mining and processing operations

have found levels well below the existing standards. Average levels well below 1  $\mu\text{g}/\text{m}^3$

have typically been reported. These studies have also measured background levels of

ambient, respirable silica and found no significant impact of the silica operations.

Sources of background, ambient silica include agricultural activities, roadways, and wind erosion, among others.

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Ambient air quality standards typically use data from occupational settings and apply a variety of assumptions to arrive at a level deemed protective of the most sensitive subsets of the general population. The fact that fence line measurements of respirable silica at silica mining and processing facilities are well below allowable ambient levels must be kept in mind when exploring the health effects of silica exposures in occupational studies

## “The Potential for Silica-Related Health Effects Among Those Living Near Silica Mining and Processing Facilities” – Hessel (2018)

Accelerated silicosis can occur in workers after 10 or more years of exposure to very high levels of silica dust. These sorts of levels are seldom seen anymore due to dust control measures in industrial settings. In the past, workers with accelerated silicosis have been found among miners, tunneling workers, and sandblasters. Cases of acute and accelerated silicosis essentially do not occur outside occupational settings and are not relevant to the present discussion.

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Chronic silicosis can occur in workers exposed to fairly high levels of silica dust for extended periods of time. Even among workers with heavy exposures (in mines, tunnels, and foundries, and in sandblasting operations), silicosis seldom occurs before 20 years of consistent, high occupational exposure.

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Based on the observed levels of crystalline silica measured near silica mining and processing facilities and the existing research on the health effects of exposure to crystalline silica, it is my opinion that there will be no increased risk of silica-related health effects on residents who live near these facilities.

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## “The Potential for Silica-Related Health Effects Among Those Living Near Silica Mining and Processing Facilities” – Hessel (2018)

### Nonmalignant Respiratory Disease

Nonmalignant respiratory disease is typically measured in epidemiologic studies by the presence of persistent cough and phlegm (chronic bronchitis), emphysema (abnormal enlargement of the distal airspaces), airflow limitation or asthma. Asthma is not a

recognized health effect related to silica exposure. Numerous studies have been

conducted to evaluate lung conditions and lung symptoms in workers exposed to silica.

Asthma has not been suggested as a problem. In fact, there was a controlled study (Wiles et al, 1982) in which workers were exposed to silica in an exposure chamber and their lung function was measured before and after exposure to look for an asthma-like reaction.

None was found.

**The Potential for Silica-Related Health Effects**  
**Among Those Living Near**  
**Silica Mining and Processing Operations**

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28 April 2018

## **Executive Summary**

Questions have been raised regarding the potential for silica-related health effects among those living near silica mining and processing operations in Alberta. Specifically, there have been concerns regarding the possible risk of silicosis, cancer, chronic obstructive pulmonary disease, tuberculosis, autoimmune diseases and renal diseases. The literature on potential relationships between these diseases and silica exposure was undertaken. To provide context, studies that have measured fence line levels of silica at silica mining and processing operations are presented.

Studies of ambient levels of respirable silica near silica mining and processing operations have found levels well below the existing standards. Average levels well below  $1 \mu\text{g}/\text{m}^3$  have typically been reported. These studies have also measured background levels of ambient, respirable silica and found no significant impact of the silica operations.

Sources of background, ambient silica include agricultural activities, roadways, and wind erosion, among others.

Silicosis has historically been a problem in occupational settings with high, long-term exposures to crystalline silica without appropriate personal respiratory protection and/or dust suppression. Chronic silicosis is the type most often seen in occupational settings and occurs typically after 20 or more years of work in very dusty environments.

“Environmental silicosis” is virtually non-existent. There is no evidence in the published literature suggesting a risk of silicosis from exposure levels that have been measured near silica mining and processing operations. The levels of ambient silica near silica mining

and processing facilities are orders of magnitude lower than those found to induce silicosis in occupational settings. There is no risk of silicosis among people living in the vicinity of these facilities.

Studies of lung cancer in relation to silica exposures in occupational settings have been inconsistent (McDonald and Cherry, 1999). Importantly, studies that have looked at the change in risk of lung cancer in relation to change in exposure to crystalline silica have generally not found that risk of lung cancer increases as silica exposure increases (Soutar et al, 2000; Hessel et al, 2000). Even among those who believe that silica exposure may increase risk of cancer, it is generally accepted that exposures that do not pose a risk of silicosis do not pose a risk for cancer (American Thoracic Society, 1997). Emissions of crystalline silica from silica mining and processing facilities does not have an effect on cancer risk for area residents.

The term “nonmalignant respiratory disease” includes a number of conditions, including chronic bronchitis, emphysema, and airflow limitation. Some of the studies of bronchitis among workers exposed occupationally to silica have demonstrated an increased risk while others have not. Similarly, some, but not all studies of emphysema have demonstrated a correlation with silica exposures. An extensive review of the literature on the relationship between silicosis and airway limitation found that it was only workers with very high levels of silicosis that demonstrated airflow limitation. The levels of silica exposure (intensity and duration) required to induce advanced silicosis are many orders

of magnitude higher than those experienced by residents who live near silica mining and processing facilities.

Silica exposure and silicosis are well-known to increase the risk of tuberculosis in occupational groups. There are no data suggesting that ambient silica exposure levels comparable to those reported in the region of silica mining and processing facilities carry any risk for tuberculosis.

There is fairly extensive literature on two autoimmune diseases: scleroderma and rheumatoid arthritis. The majority of studies have demonstrated positive relationships with silica dust exposure and/or silicosis. It should be noted that these studies have been conducted among heavily-exposed occupational groups. It is highly unlikely that these results are relevant to residents living near silica mining and processing operations.

A number of studies have been done looking at renal disease in occupational groups exposed to silica. The disease categories have varied among studies, and many studies did not report results for renal disease (suggesting no dramatic results). The results of the studies have not been consistent, with some risk estimates slightly high and others slightly low. These are the sorts of results seen when there is no underlying relationship between an exposure and a disease. There is no reason to believe that those living in the vicinity of silica mining or processing operations are at any increased risk of renal disease as a result of potential silica exposures.



Although exposures to silica in occupational settings have been shown to be related to some diseases or conditions considered (e.g., silicosis, tuberculosis, scleroderma), the results of studies of other conditions have been variable and not convincing (e.g., lung cancer, renal disease). It is important to note that silicosis – the only condition linked solely to silica exposure – is essentially unknown outside the occupational setting. Given the levels of silica exposure measured at these facilities, there is no suggestion that residents living near these silica mining or processing facilities are at increased risk for any of the conditions considered as result of potential exposures from the facilities.

## **Preface**

I am an epidemiologist who has spent the past 36 years conducting and evaluating research into the health effects of silica. From 1982 to 1987, I conducted research on silicosis, lung cancer, and other respiratory health effects among hard rock miners in South Africa. I continued this research in the area of occupational lung disease from 1987 to 2002 as a professor at the University of Alberta in Edmonton. For the past 16 years I have consulted with a variety of groups and organizations in the area of occupational lung disease. My CV is attached as Appendix A.

I was asked by Sil Industrial Minerals to assess the potential for silica-related health effects among those living in the vicinity of their silica mining and processing facilities. The conditions of interest were referenced on their Safety Data Sheet and include: silicosis, lung cancer, nonmalignant respiratory disease, tuberculosis, autoimmune diseases and renal disease.

## **Silica**

Silica is a mineral that makes up 12 percent of the earth's crust. The chemical formula is  $\text{SiO}_2$ , that is, the mineral contains two oxygen atoms for each silicon atom. Silica can be either crystalline or amorphous. In crystalline silica, the silicon and oxygen atoms are aligned in organized arrangements called tetrahedra. In amorphous silica, the atoms are not neatly arranged. Most of the silica in the earth's crust is in the crystalline form. The silica found in most of the products produced by Sil Industrial Minerals is crystalline silica.

## **Mining and Processing of Silica**

Silica is typically mined on the surface and processed at or near the processing site. A variety of methods are used to suppress dust throughout the processing and processing operations. Dust suppression minimizes exposures to the workers and the areas surrounding the facilities.

Studies have been conducted measuring levels of respirable silica (silica particles that are small enough to penetrate into the lungs) near silica mining facilities. Richards et al (2009) measured ambient respirable silica levels upwind and downwind from three sand and gravel plants in California. It was necessary to collect both upwind and downwind samples because there are other sources that emit silica, including farming operations, roads (both gravel and paved), wind erosion and other industrial sources. They collected

all particles 4  $\mu\text{m}$  or less and then measured the amount of silica in the samples. Particles 4  $\mu\text{m}$  or less can be inhaled deeply into the lungs.

All of the measured silica levels were below the California Reference Exposure Level (REL) of 3  $\mu\text{g}/\text{m}^3$ . The authors noted that all of the values above 2  $\mu\text{g}/\text{m}^3$  were located upwind of the facilities. There was no measurable effect of the facilities on ambient respirable silica levels.

Richards and Brozell (2015) measured fence line respirable (4  $\mu\text{m}$  or less) silica levels at three facilities in Wisconsin that mined “frac sand” and one facility that processed the sand. They used multiple samplers per facility and situated them so that downwind conditions would normally be captured. The use of multiple samplers also allowed them to compare downwind with upwind levels of silica. They found that the ambient levels were less than 10 percent of the California REL of 3  $\mu\text{g}/\text{m}^3$ . There were very small differences in the downwind and upwind silica levels. The authors stated: “These very small upwind-to-downwind concentration increases and decreases indicate that the sand mining and processing facilities contribute very little, if anything, to the ambient respirable crystalline silica concentrations.”

The authors also measured silica levels on days when there were dominant crosswinds (i.e. days when none of the samplers would have been downwind of the facilities). They assumed that the levels measured on these days would represent the local background concentrations. The levels measured during the “crosswind days” were similar to the

average concentrations reported for the entire data set. The authors stated: “This similarity suggests that the fence line concentrations of respirable crystalline silica are within the local background concentration range.”

To further evaluate the effect of background levels on their results, they compared the variations in the levels measured at one of the facilities to levels measured by the Wisconsin Department of Natural Resources 23 kilometers from the facility. There was very close correlation between the local and distant silica measurements, further supporting the contention that the vast majority of the measured silica was background, rather than being produced by the facility.

The authors summarized data obtained near silica mining facilities, including “frac sand” facilities. The results were similar to those reported by Richards and Brozell (2015) i.e. no measurable effect of silica mining or processing operations at the fence line.

These data are important in evaluating the potential for silica-related health effects in areas near silica mining and processing facilities. Studies of silica-related health effects have been conducted in occupational settings, where exposures were much higher than ambient levels. For example, Minnesota has a Health Based Value for Ambient Air for silica of  $3 \mu\text{g}/\text{m}^3$  (Minnesota Department of Health, 2013). The “critical effect” considered was silicosis and the “critical study” relied on for setting this level was a study of underground gold miners in South Africa, where silica exposure levels were orders of magnitude greater than those measured in outdoor air.

Ambient air quality standards typically use data from occupational settings and apply a variety of assumptions to arrive at a level deemed protective of the most sensitive subsets of the general population. The fact that fence line measurements of respirable silica at silica mining and processing facilities are well below allowable ambient levels must be kept in mind when exploring the health effects of silica exposures in occupational studies

### **Silica-Related Health Effects**

Previous studies of workers exposed to amorphous silica have not found health problems. Studies of workers exposed to crystalline silica have shown that people occupationally exposed to high levels of silica over an extended period of time without proper protective equipment and/or dust suppression methods can develop silicosis. Silicosis has been recognized as an occupational disease for centuries. More recently, scientists have questioned whether people exposed to silica on the job are at increased risk of developing lung cancer, tuberculosis, autoimmune diseases and diseases affecting the kidneys.

### **Silicosis**

Silicosis refers to the formation of small, typically round nodules in the lungs of people exposed to crystalline silica dust (Balaan and Banks, 1998). There are three kinds of silicosis that are recognized. Acute silicosis can develop after two to five years of frequent exposure to extremely high levels of silica dust. Cases of acute silicosis have been documented among underground miners working in uncontrolled conditions with no respiratory protection, in tunneling workers, and in sandblasters. Acute silicosis is

extremely rare. Given the consistent, high exposures necessary for the induction of acute silicosis, it is not relevant to the present discussion.

Accelerated silicosis can occur in workers after 10 or more years of exposure to very high levels of silica dust. These sorts of levels are seldom seen anymore due to dust control measures in industrial settings. In the past, workers with accelerated silicosis have been found among miners, tunneling workers, and sandblasters. Cases of acute and accelerated silicosis essentially do not occur outside occupational settings and are not relevant to the present discussion.

Chronic silicosis can occur in workers exposed to fairly high levels of silica dust for extended periods of time. Even among workers with heavy exposures (in mines, tunnels, and foundries, and in sandblasting operations), silicosis seldom occurs before 20 years of consistent, high occupational exposure.

The risk of silicosis increases with the total amount of exposure to silica dust. Studies have shown that, except for advanced levels of silicosis, silicosis does not have an effect on lung function or on people's ability to exercise (Gamble et al, 2004; Wiles et al, 1992). These advanced levels of chronic silicosis are not found outside the occupational setting.

It has been shown in occupational studies, that among people with the same amount of total exposure, those who get their exposures over a shorter time (and therefore, at higher

exposure concentrations) have a greater chance of developing silicosis. In other words, as the exposure concentration decreases, the risk of silicosis goes down even if the duration of exposure is higher. This has important implications for the evaluation of the potential for silicosis risk near silica mining and processing facilities because the allowable concentrations for ambient air (not occupational exposures) have been set by extrapolating the results of occupational studies without considering the accelerated “fall-off” in risk of silicosis as the concentration of silica decreases. It should also be repeated that allowable concentrations of silica in ambient air have been set using significant margins of safety to prevent silicosis. The ambient standards, therefore, have two very important built-in safety factors:

- Allowable concentrations of crystalline silica were set by extrapolating from studies of heavily-exposed occupational groups, without considering the reduction in risk of silicosis per unit of exposure with decreasing exposure levels, and
- After extrapolating from occupational studies, significant safety factors were added.

Additional evidence for the lack of silicosis risk from silica mining and processing facilities comes from an informative occupational study of workers in granite quarries in Vermont (Graham et al, 1991). The workers were in the industry for an average of 18 years (many for more than 40 years) at levels of silica exposure that averaged  $60 \mu\text{g}/\text{m}^3$ , or 20 times higher than the REL of  $3 \mu\text{g}/\text{m}^3$  and more than 200 times the fence-line levels measured in the two studies referenced above (Richards et al, 2009; Richards and

Brozell, 2015). Twelve percent of the silica measurements in the quarries were higher than  $100 \mu\text{g}/\text{m}^3$ , over 30 times higher than the REL. Only seven of the 972 chest x-rays of the workers (less than one percent) showed changes consistent with silicosis. Even in studies of people not exposed to silica at all, the percent with x-ray changes consistent with silicosis is usually higher than this (things other than silica, such as infectious diseases and other dusts can cause small, rounded opacities on the chest x-ray). Thus, even among workers exposed to levels of silica dust 200 times higher than the measured fence-line levels, silicosis is virtually unknown.

It should be added that outside the occupational setting, silicosis is virtually unknown. A study in the vicinity of a slate pencil factory in India found very high levels of ambient silica and a high prevalence of non-occupational silicosis among the residents (Bhagia, 2012). A necropsy study of 32 Bedouin men and 22 Bedouin women found silica particles and fibrosis in 46 of the subjects – more commonly among the women (Bar-Ziv and Goldberg, 1974). The authors noted that there were no relevant symptoms. Neither of these studies is relevant to the question of the potential for silicosis among residents living in the vicinity of silica mining and processing facilities, but they point to the virtual lack of silicosis outside the occupational setting.

## **Cancer**

The International Agency for Research on Cancer (IARC) convened a working group to discuss the carcinogenicity of crystalline silica in 1986 (IARC, 1987). The working group concluded that there was sufficient evidence for the carcinogenicity of crystalline



silica in experimental animals and limited evidence in humans. In 1996, IARC convened another working group to discuss the carcinogenicity of silica (IARC, 1997). On this occasion the working group voted that there was sufficient evidence for the carcinogenicity of crystalline silica in the forms of quartz and cristobalite (two forms of crystalline silica) in both humans and experimental animals. According to one member of the working group, they had “considerable difficulty in reaching a decision” (McDonald and Cherry, 1999). Reflecting the inconsistencies in the data, the working group noted that “carcinogenicity was not found in all industrial circumstances” (IARC, 1997). This statement reflected the ambiguity in the underlying data and underscored the lack of consensus on this issue. To quote one participant, the working group debate “finally end[ed] in a narrow vote, reflecting the majority view of the experts present at that particular time.” (McDonald, 2000).

Following the publication of the more recent IARC monograph (IARC, 1997), Soutar and colleagues from the Institute of Occupational Medicine in Edinburgh, Scotland and the University Paris Val de Marne in Paris, France, published a review of the studies that were considered by the IARC working group to be the least confounded (Soutar et al, 2000). They noted that the “descriptive studies” (standardized mortality ratio (SMR) studies) frequently but not invariably suggested an excess of lung cancer, but that exposure-response studies failed to confirm that the cause of the excess risk was exposure to silica. They pointed to lifestyle factors (especially smoking) and socioeconomic status as possible explanations, and they noted that comparison populations in the SMR studies were usually inappropriate (i.e., the mortality patterns of silica-exposed populations were

compared to the mortality patterns of the general population). In this connection, they observed that lung cancer mortality within Britain varies by geography and social class from half to twice the national rate, and that the lung cancer excesses reported in studies of silica-exposed populations should be considered against this background of variability.

While they chose not to give an opinion regarding the carcinogenicity of silica, they noted that the exposure-response studies that did not find associations between silica exposure and lung cancer were powerful enough to demonstrate relationships between silica exposure and both silicosis and tuberculosis. They, therefore, concluded that anything but a small risk would have been observed by these studies. They described their own study of silica exposure in British coal miners (Miller et al, 1998) as having “immensely detailed longitudinal and continuous dust measurement programs” and indicated that they could not demonstrate a relationship between silica exposure and lung cancer. They felt that the nature of their study and the quality of the data gave it an excellent chance of observing an association between silica exposure and lung cancer if the association existed.

At about the same time, a review of the IARC decision was published by a North American group that I headed (Hessel et al, 2000, attached as Appendix B). We conducted an in-depth review of the epidemiologic studies and established *a priori* that we would rely most heavily on studies that were not confounded by smoking or exposure to occupational carcinogens, were free from significant bias, incorporated a quantitative exposure-response analysis, and used appropriate referent groups. We, therefore,

included some studies that were excluded by the IARC working group and excluded some of the studies that IARC had included. The exclusions were mainly SMR studies in which mortality rates were compared to the general population with no smoking data or exposure-response analyses. The inclusions were studies that had smoking data and exposure-response analyses. Some of these were studies of underground miners. The IARC working group had not considered them to be especially informative because they felt that confounding by radon exposures was possible. However, many of these studies did not demonstrate associations between silica exposure and lung cancer. Therefore, the only way the results could have been confounded by radon was if radon levels were high in settings where dust levels were low, and vice versa. This is unlikely to have been the case. It is more likely that jobs with high dust exposure also had high radon exposures, as both types of exposure would be high near the work face.

We noted that the high-quality studies with available smoking data did not find excess lung cancer mortality among silica-exposed populations. Further, as in the report by Soutar et al (2000), we noted a lack of exposure-response relationships in studies that explored them.

We also reviewed the mechanistic data and observed that silica is not directly genotoxic. Moreover, we noted that the only animal species that produced lung tumors in response to silica was the rat (this point was also raised by Soutar et al, 2000). No effect was seen in studies of mice, hamsters, or guinea pigs. We cited increasing evidence that the rat is an inappropriate model for assessing the carcinogenicity of non-fibrous particles, noting

that lung tumors have been induced in the rat by a variety of particles, even those known to be non-carcinogenic in humans (e.g., titanium dioxide). For this reason, it is widely believed that the carcinogenic response in the rat is a specific and even unique phenomenon peculiar to that species (Mauderly, 1997).

Unlike Soutar et al (2000), we clearly stated that we disagreed with the vote of the IARC working group. Applying the criteria of Hill (1965) to the body of epidemiologic and mechanistic evidence, we concluded that there was not an association between silica exposure and lung cancer. Risk estimates, even when elevated, were only modestly elevated, the data were not consistent, exposure-response relationships were not found, and the mechanistic data did not suggest that silica was carcinogenic, undermining biological plausibility.

Since the release of the IARC Monograph (IARC, 1997), a number of studies of lung cancer in silica-exposed workers have been published. Some of these studies have suffered shortcomings similar to the earlier studies. However, others have addressed specific limitations, either quantitatively or qualitatively. In general, the studies were of a higher quality than those published prior to the 1996 IARC meeting. Some of these studies are reviewed briefly in Appendix C, with special emphasis on whether and how the authors have dealt with methodological issues.

The inconsistent results of these studies have made it difficult for various governmental agencies to determine whether they should consider silica to be a carcinogen, and

scientists are not in agreement on whether silica causes cancer. Nonetheless, a number of governmental agencies have labeled silica as a carcinogen based on occupational studies. These studies have been conducted in populations with silica exposures that are orders of magnitude higher than those experienced by residents living in the vicinity of silica mines and processing facilities. The levels of silica exposure experienced by local residents have never been shown to pose a risk of lung cancer.

### **Tuberculosis in Relation to Silica Exposure and Silicosis Disease**

The increased risk of tuberculosis among workers with silicosis has been well established. A large study based on mortality data from the United States found that among males age 15 and over who died from 1979 to 1991, 4.2 percent with a mention of silicosis on their death certificate also had tuberculosis compared with only 0.2% of those without mention of pneumoconiosis on their death certificate (Althouse et al, 1995).

Goldsmith et al (1995) found that those who had been compensated for silicosis in California were 56 times more likely to die from tuberculosis than all US white males. Several studies on South African mineworkers with silicosis demonstrated an increased incidence of tuberculosis (Kleinschmidt and Churchyard, 1997; Cowie, 1994; Hnizdo and Murray, 1998). Italian workers compensated for silicosis had a SMR of 5.85 (95 percent confidence interval: 3.03-11.30) for tuberculosis (Scarselli et al, 2011).

Studies have also demonstrated an increased risk of tuberculosis among silica-exposed workers who did not develop silicosis, including Danish foundry workers (Sherson and

Lander, 1990), South African gold miners (Cowie, 1994), Chinese workers in tungsten, tin and iron/copper mines, and potteries (Chen et al, 2012) and Zambian copper miners (Ngosa and Naidoo, 2016).

Although the associations between tuberculosis and both silica exposure and silicosis, have been well-established, it must be remembered that the populations that have been studied include heavily-exposed industrial workers.

### **Nonmalignant Respiratory Disease**

Nonmalignant respiratory disease is typically measured in epidemiologic studies by the presence of persistent cough and phlegm (chronic bronchitis), emphysema (abnormal enlargement of the distal airspaces), airflow limitation or asthma. Asthma is not a recognized health effect related to silica exposure. Numerous studies have been conducted to evaluate lung conditions and lung symptoms in workers exposed to silica. Asthma has not been suggested as a problem. In fact, there was a controlled study (Wiles et al, 1982) in which workers were exposed to silica in an exposure chamber and their lung function was measured before and after exposure to look for an asthma-like reaction. None was found.

Epidemiologic studies of the relationship between nonmalignant respiratory disease and both silica dust exposure and silicosis were summarized by the National Institute for Occupational Health in their Hazard Review (NIOSH, 2002). Their summary of the

studies examining bronchitis is presented in Appendix D. Studies looking at emphysema are presented in in Appendix E.

The studies of bronchitis (Appendix D) showed varying and inconsistent results, with some studies suggesting that silica-exposed workers are at increased risk of bronchitis symptoms. The studies of emphysema came primarily from South Africa. Emphysema is best detected pathologically (although one study used computed tomography). There has been a long history of post-mortem examination of the lungs of miners in South Africa. It was noteworthy that some studies (Appendix E) found associations with silica exposure and not silicosis and others found the opposite. However, most studies found an association with one or the other.

I was involved in an extensive review of the literature on the relationship between silicosis and lung function (Gamble et al, 2004). The paper is included as Appendix F. It can be seen that at low levels of silicosis (ILO category 1), there was no loss of lung function detected. The data for category 2 silicosis were equivocal, and those with category 3 or progressive massive fibrosis showed a definite loss of lung function.

Rushton (2007) reviewed the literature on “chronic obstructive pulmonary disease” and occupational exposure to silica, considering pulmonary symptoms, mortality, emphysema and lung function. Average levels of respirable silica in the workplaces examined ranged from 0.04 to over 5 mg/m<sup>3</sup> – far higher than level measured at the fence lines of silica mining and processing plants. The author concluded that most studies showed some

indication of increased risk of chronic obstructive pulmonary disease in workers exposed occupationally to silica. However, it was concluded that: “In the absence of silicosis...a disabling loss of lung function would not occur until between 30 and 40 years exposure.”

### **Relationship between Silica Dust Exposure and Autoimmune Disease**

Scleroderma is an autoimmune disease affecting (hardening) the connective tissues. A number of studies have looked at scleroderma in workers exposed to silica. I was involved in a study of scleroderma in South African gold miners (Sluis-Cremer et al, 1985). The case-control study compared 79 cases of scleroderma with an equal number of controls matched by year of birth and administrative status. There was no difference in silicosis between cases and controls. However; the cases had higher lifetime exposures to silica on the job. This difference was related to the average intensity of exposure.

An expert committee of the National Institute of Environmental Health Sciences in the US reported findings regarding autoimmune disease and environmental exposures (Miller et al, 2012), concluding that silica-exposed workers are at an increased risk of developing scleroderma. They cited a meta-analysis (McCormic et al, 2010) that included three occupational cohort studies and nine case-control studies. The meta-relative risk was 2.24 (95 percent confidence interval: 1.65-3.31) for the case-control studies and 15.49 (95 percent confidence interval: 4.54-52.87) for the cohort studies. These results are comparable to a more recent meta-analysis that found a meta-relative risk of 2.81 (95 percent confidence interval: 1.86-4.23) for 15 case-control studies and 17.52 (95 percent confidence interval: 2.31-3.83 for four cohort studies (Rubio-Rivas et al, 2017).



The relationship between silica exposure, silicosis, and rheumatoid arthritis has also been studied extensively in occupational settings. My colleagues and I studied 157 gold miners and an equal number of controls (Sluis-Cremer et al, 1986). We found that the cases were more likely to have silicosis (OR = 2.84, p = 0.0001). The results could not be explained on the basis of silica exposure.

A recent review of the literature on the relationship between occupational exposures and rheumatoid arthritis cited a large number of studies showing an increased risk of rheumatoid arthritis among occupational groups exposed to silica (Murphy and Hutchinson, 2017).

There appears to be fairly consistent evidence that silica exposures and/or silicosis can predispose workers to scleroderma and rheumatoid arthritis. It should be remembered, however, that these studies were conducted in occupational groups.

### **The Relationship between Silica Dust Exposure and Renal Disease**

Epidemiologic interest in the relationship between silica exposure and end-stage renal disease is relatively recent. Most of the cohort mortality studies that have examined the relationship between silica and lung cancer and/or silicosis and lung cancer, were able to assess the relationship between renal disease and both silica exposure and silicosis. The Table summarizes the results of more than four dozen studies that examined mortality (one considered morbidity) among workers exposed to silica or groups of silicotics. Over half of the studies did not report results related to end-stage renal disease. The studies

that included some relevant information generally presented data for a group of conditions that would have included end-stage renal disease along with many other diseases (e.g., genitourinary diseases). Several studies analyzed the results for acute and chronic renal diseases separately. A few observations are warranted.

1. The fact that most studies did not report data that would be potentially relevant is important. In presenting the results of a cohort mortality study it is impossible to list the results for all causes of death. However, during the analysis of such studies, a number of analyses are generally conducted, the results are screened, and “interesting” results are typically included in the report. The fact that so many of the studies did not report results related to renal disease would suggest (but certainly not prove) that the investigators did not find elevated risk estimates for end-stage renal disease or groups of causes that would have included end-stage renal disease.

2. It is worth noting that whereas Steenland et al (2002) found a positive exposure-response relationship between estimated silica exposure and renal disease among industrial sand workers, McDonald et al (2005) reported a negative exposure-response relationship results for an overlapping group of industrial sand workers.

3. The relative risk estimates vary greatly among studies. Among those studies that examined an exposure-response relationship, one of the studies by Steenland et al (2001b) found a positive relationship while the other two (Calvert et al, 2003; McDonald et al, 2005) found negative relationships with silica exposure. Calvert et al (2003) also reported a significantly decreased risk of chronic renal failure among those whose death certificates listed silicosis.

First Author/Year	Population Studied	Disease Category	ICD Codes	Observed Cases	Relative Risk Estimate	Confidence Interval	Total Deaths
Adzersen, 2003	Foundry workers	Genitourinary	580-629	29	0.90	0.44-2.41	3,972
Ahlman, 1991	Sulfide ore miners	Not reported					102
Amandus, 1991	Dusty trades workers	Chronic & unspecified renal failure	582-584	2 (white) 0 (non-wht)	1.4 0		486
Anjelkovich, 1990	Foundry workers	Not reported					836
Armstrong, 1979	Gold and coal miners	Not reported					554
Attfield, 2004	Granite workers	Not reported					Not listed
Brown, 1997	Hospitalized silicotics	Urinary disease	Not listed	9	1.6	0.7-3.1	795
Brown, 2005	Industrial sand workers	Genitourinary	Not listed	9	0.99	0.45-1.87	727
Calvert, 2003	Workers exposed to silica	Acute renal failure	Not listed	No significant trend with exposure			4,839,231
		Chronic renal failure	Not listed	Significant negative trend with exposure			
	Silicosis on death certificate	Acute renal failure	Not listed	Not listed	0.67	0.32-1.39	
		Chronic renal failure	Not listed	Not listed	0.18	0.06-0.56	
Carta, 1994	Metal miners	Urinary diseases	Not listed	2	0.95	0.11-3.44	187
Carta, 2001	Compensated silicotics	Urinary system	580-599	12	1.97	1.13-3.43	579
Chan, 2000	Compensated silicotics	Genitourinary	580-629	0	0	-	286
Checkoway, 1997	Diatomaceous earth workers	Genitourinary	Not listed	10	1.06	0.51-1.94	749
Chen, 1990	Iron ore miners	Not reported					490
Chen, 1992	Miners and pottery workers	Not reported					6,192
Cherry, 2013	Pottery workers	Non-malignant renal disease	581-3, 5-9	14	4.00	1.91-5.87	1,904
Chiyotani, 1990	Hospitalized pneumoconiosis patients	Not reported					581
Cocco, 1994	Lead and zinc miners	Urinary diseases	580-599	29	1.60	1.07-2.29	1,205
Coggiola, 2003	Talc miners and millers	Not reported					880
Cooper, 1992	Taconite miners and millers	Not reported					1,058

First Author/Year	Population Studied	Disease Category	ICD Codes	Observed Cases	Relative Risk Estimate	Confidence Interval	Total Deaths
Costello, 1995	Crushed stone workers	Not reported					661
Davis, 1983	Granite workers	Genitourinary	580-629	15	1.3	0.8-2.1	969
de Klerk, 1998	Gold miners	Not reported					1,386
Dong, 1995	Refractory brick workers	Not reported					390
Fillmore, 1999	Population exposed to silica	Not reported					515,054
Finkelstein, 1987	Compensated silicotics	Not reported					757
Forastiere, 1989	Compensated silicotics	Genitourinary	Not listed	9	1.0	0.46-1.9	594
Goldsmith, 1995	Compensated silicotics	Not reported					421
Graham, 2004	Granite workers	Not reported					2,539
Infante-Rivard, 1989	Compensated silicotics	Not reported					565
Jakobsson, 1993	Cement workers	Not reported					495
Kauppinen, 2003	Road paving workers	Genitourinary	Not listed	1	< 0.61		231
Koskela, 1994	Granite workers	Not reported					296
Kurppa, 1986	Compensated silicotics	Renal disease	580-593	7	1.17	0.34-2.87	667
McDonald, 2005	Industrial sand workers	Nephritis, nephrosis	580-589	18	2.80, inverse trend w/ exposure		1,021
Merlo, 2004	Graphite electrode workers	Not reported					541
Moshhammer, 2004	Dust-exposed workers	Not reported					1,610
Ng, 1990	Compensated silicotics	Genitourinary	580-629	2	0.49	0.06-1.77	356
Pinkerton, 2004	Uranium mill workers	Chronic renal disease	Not listed	8	1.35	0.58-2.67	810
		Acute renal disease	Not listed	1	0.86	0.02-4.79	
Puntoni, 1988	Refractory brick workers	Diabetes and Acute nephritis	250 580	2	0.24	0.02-0.86	73
Rapiti, 1991	Ceramics workers	End-stage renal disease	Not listed	6	3.21	1.17-6.98	Morbid
Reid, 1996	Gold miners	Renal failure	580-589	24	1.64	1.05-2.43	2,032

First Author/Year	Population Studied	Disease Category	ICD Codes	Observed Cases	Relative Risk Estimate	Confidence Interval	Total Deaths
Rosenman, 1995	Compensated silicotics	Not reported					292
Sponholtz, 2016	General population	Chronic kidney disease	403-4, 583,86,87, 90.0, 90.8, 93.9	547 cases, 508 controls	1.70	0.84-3.44	
Starzynski, 1996	Compensated silicotics	Nephritis, nephritic syndrome, nephrosis	580-589	3	1.43	0.29-4.18	1,712
Steenland, 1995	Gold miners	Chronic kidney disease	582-3,5-7	11	1.25	0.62-2.23	1,551
		Acute kidney disease	580-1,584	2	1.19	0.14-4.29	
Steenland, 2001b	Industrial sand workers	Chronic renal disease	582-3,5-7	36	1.61	1.13-2.22	1,073 (multiple cause)
		Acute renal disease	580-1,584	16	2.61	1.49-4.24	
Thomas, 1989	Pottery workers	Not reported					578
Wang, 1996	Silicotics in metallurgy	Not reported					974
Xu, 1996	Iron and steel workers	Not reported					8,887
Zambon, 1987	Compensated silicotics	Not reported					878

4. The variability of risk estimates for renal disease among populations exposed to silica suggests that other characteristics of the populations or the work environments may be affecting risk of renal disease. Well-known risk factors for renal disease include hypertension, diabetes, hyperlipidemia, socioeconomic status and obesity, among others. These factors have not been considered in the occupational studies to date.

At present it is not possible to conclude that silica dust exposure is related to renal disease. The variability of risk estimates across studies suggests that other factors (occupational or non-occupational) may be implicated. However, if the results of epidemiologic studies of highly exposed workers show no clear indication of an increased risk of renal disease, it can be stated with confidence that those living in the vicinity of silica mines and processing facilities would not be at any increased risk of renal disease.

## **Conclusions**

There has been much research and regulatory activity in the area of silica-related health effects over the last few decades. In some jurisdictions, allowable levels of silica exposure in occupational settings have been reduced and the use of protective equipment has been required in situations where exposures cannot be reduced by technological means. Allowable ambient exposure levels for silica have been set in some jurisdictions, incorporating significant safety margins for known and suspected health effects. Most jurisdictions have based their standards for ambient silica on the risk of silicosis – a condition that is virtually unknown outside the occupational setting. The levels of silica

dust found near silica mining and processing facilities are a fraction of this very low reference level.

Based on the observed levels of crystalline silica measured near silica mining and processing facilities and the existing research on the health effects of exposure to crystalline silica, it is my opinion that there will be no increased risk of silica-related health effects on residents who live near these facilities.

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June 22, 2023

Sturgeon County  
9613-100 Street,  
Morinville, AB T8R 1L9  
Attention: Sturgeon County

Re: Bylaw 1607/22

I am the owner of SW-29-54-26 W4 Sturgeon County and I **oppose** the Land Use By-law 1607/22 the creation of a New Resource Extraction Direct Control District.

**Ground watering monitoring** since 2001 is excellent program the reports are very profession done but the problem is that us as residents in the sand and gravel extraction area have not had any communication about this service. Since finding out about these reports at the end of 2022 year I have went through some of the reports to find out why our well went dry. Water sources are extremely valuable for property owners.

In 2009 Annual Groundwater Monitoring Report (p. 22) states that four wells situate top north east of the resource extraction area on the map were in rapid decline since 2007. (copy included) They concluded that the River level changes are not affecting the water levels in the monitoring wells. Of the four the worst was the monitoring well MW07-4-14 (copy included) which is the closest to us. These four wells make up group 5 reclaimed pits. Gravel pit activities such as dewatering, drawing down, and pumping water out from near by pits can greatly influence residence wells. There have been Water Act or Environmental Protection and Enhancement Act permits for a pit that is close proximately about 200 meters to the northeast of us since 2000 and onwards some with no expire dates (which I have included copies of.) According to a Professional Geoscientist being in close proximity to the dewatering, draw down would have a negative impact which could dry up wells that are close by the pit such as ours.

Gravel extraction can influence one's property for many future years as we did not know of the activities that were occurring dewatering in the pit to the northeast of us. As well in the 2013 Annual Groundwater Monitoring Report the executive summary states "an effort should be made to include water wells with the highest risk of being impacted by dewatering". There was no effect made from the gravel organization that was dewatering from the pit to the northeast to identify at risk wells. Being social responsible should be a concern but in this case wasn't. How many more residents in the sand and gravel extracting distract have this problem and do not know about the well monitoring program and other activities such as dewatering and or draw down in pit close by them that can negatively affect their wells?

### **Traffic and noise**

Alberta highway traffic data officer July 6, 2020 Directional Traffic count report on Township Road 544 commented that "lots of gravel and rock products hauling." (copy included)  
We are in close proximity to highway 44 on township road 544. Alberta traffic counts

In 2022 east on Township road 544 from the summer period of May 1 to September 30 inclusive that an average summer day 430 vehicle pass by our place of these 73% are single unit trucks and tractor trailer units. West on Township road 544 530 vehicle with 78% single unit trucks and tractor trailers units being on the highway most will be using engine retarder brakes that is going to causing higher levels of noise. As of March 31, 2023 Alberta Safety Code Part 16 states The threshold for conducting a Noise Exposure Assessment is 82 dBA (Decibels). We have done a noise monitoring from an an app on our phones that was 84.5 decibels. There is nothing being done to monitor this issue and when or if there is will there be a third party monitoring will we get the reports or will Sturgeon County have the gravel organization to control this. If the gravel organization controls this will the results be correct and reports transparent or will the monitoring be done on a rainy day when truck traffic is not present or during the winter months when extraction to closed for the season. When is the last traffic and noise monitoring Sturgeon County has done on Township Road 544. Presently Sturgeon County had to hire an employee to monitor the road use by law with gravel organization.

### **Air quality monitoring**

South of our house 300 meters to the is a stock pile of sand and is increasing year over year. When we get a southeast wind that blows we get a sand and dust particulars in the air right towards our place. No monitoring has ever been done for this problem and this problem will not go away. Will third party monitoring occur and will residents that are affect get reports and when will this monitoring be done on a none windy day or from a different direction.

In conclusion it is very disappointing that there was such a useful program as the groundwater monitoring and resident in the sand and gravel extraction area are not informed and as well at risk residential wells should have been identified. Where is the transparency, accountability and integrity to home owners in this area.

Who is going to pay for noise, air quality, traffic monitoring and by whom will this be done by. Are the reports going to be transparent and easy to find. By-Law 1607/22 does not address these issue as well the frequency of the studies. who will have access to reports and studies.

I am against the new Resource Extraction direct Control District Land Use Bylaw as interaction with gravel organization has negatively impacted our family's property for decades. It has been only in 2022 that we have had proper road dust control in front of our residence.

Sincerely,

Janice Nolte  
Landowner  
SW-29-54-26 W4  
Sturgeon County, AB

Severed in line with section 17 of the FOIP Act



## Reference

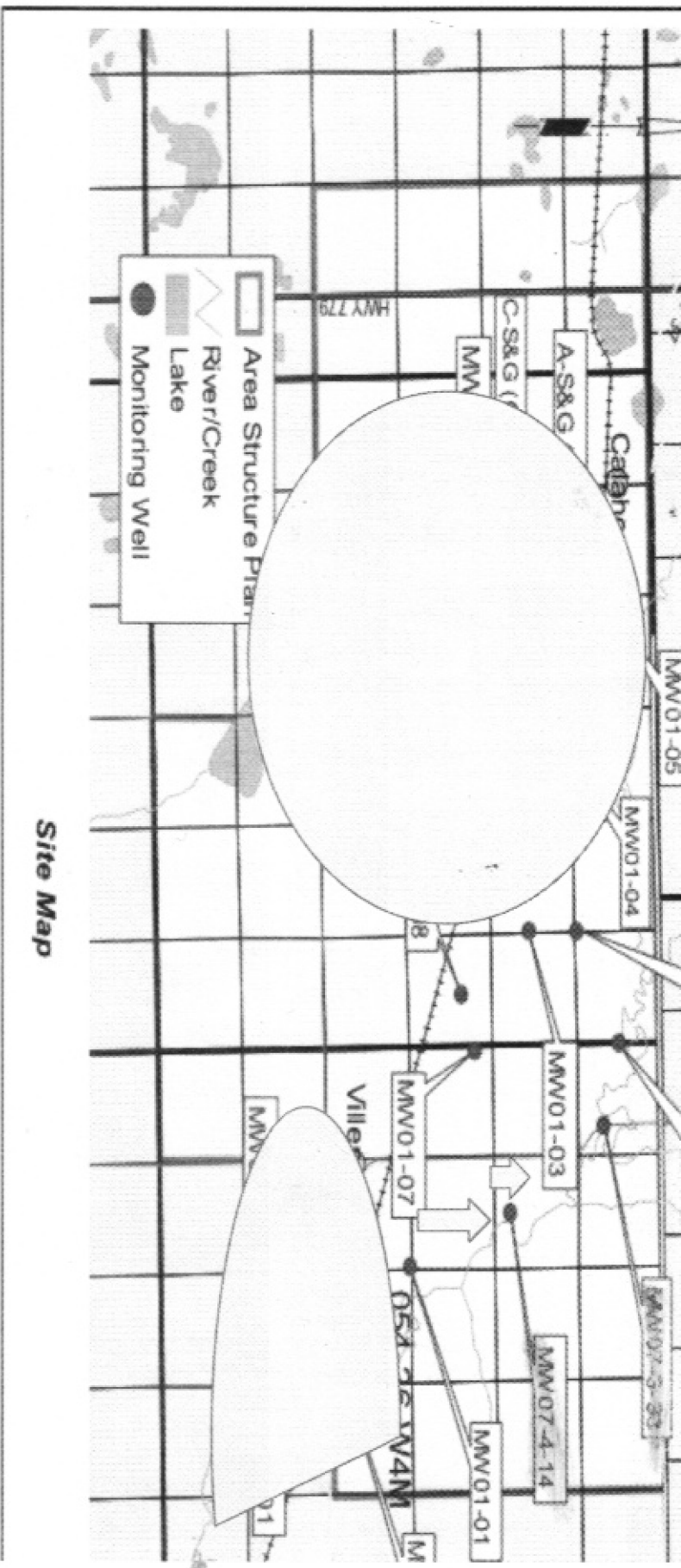
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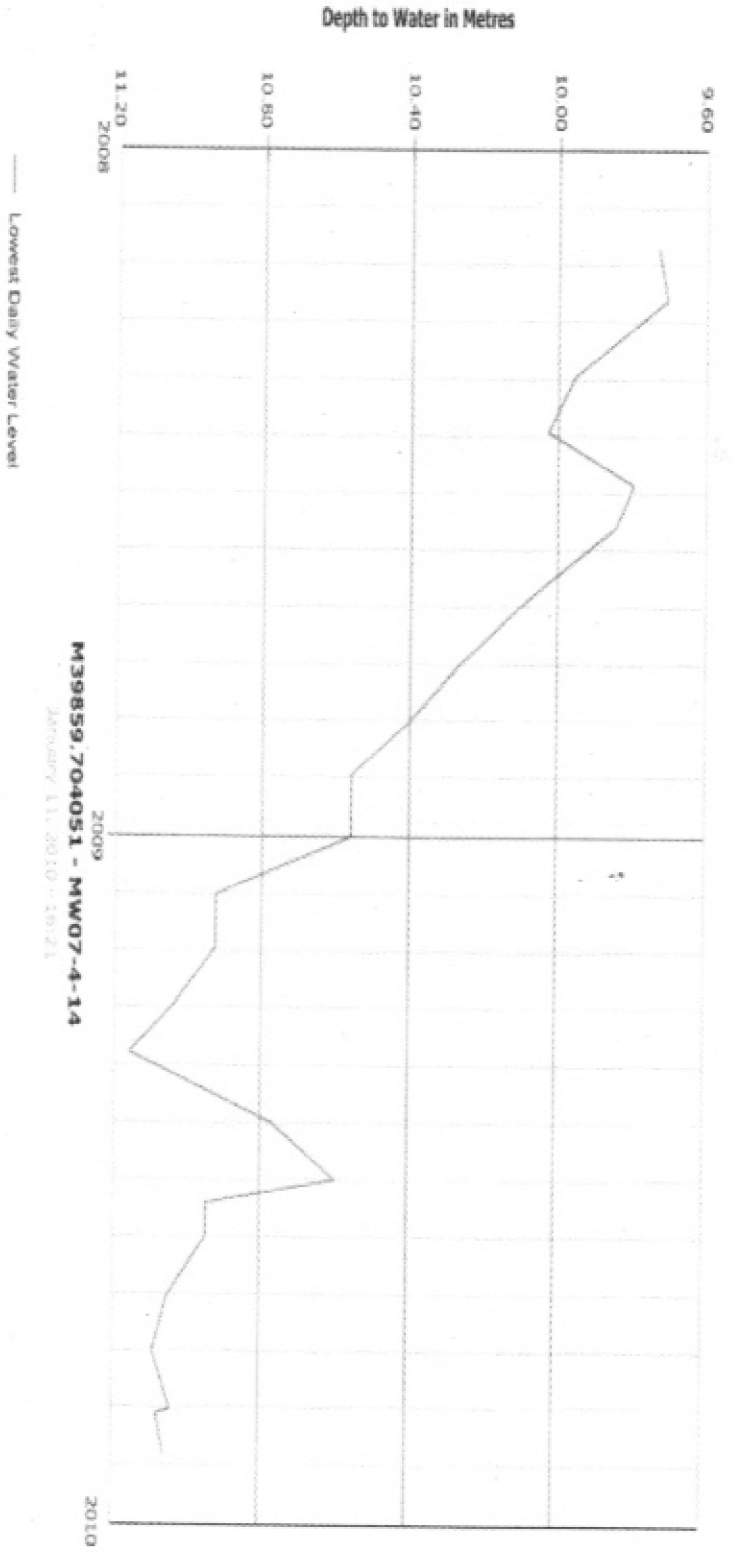
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**Site Map**



(2009 Annual Groundwater Monitoring Report pg 119)



**PROVINCE OF ALBERTA**  
**ENVIRONMENTAL PROTECTION AND ENHANCEMENT ACT**  
**S.A. 1992, c.E-13.3, as amended**

APPLICATION NO. 001-72308

APPROVAL NO. 72308-01-00

EFFECTIVE DATE. March 20, 2000

EXPIRY DATE. March 19, 2010

APPROVAL HOLDER. Inland Aggregates Limited

Pursuant to Division 2, of Part 2, of the Environmental Protection and Enhancement Act, S.A. 1992, c.E-13.3, as amended, approval is granted to the approval holder subject to the attached terms and conditions for the following activity:

the opening up, operation and reclamation of a pit on W 29-54-26-W4M and NE 30-54-26-W4M.

Designated Director under the Act .....

Date .....

**REGISTRATION  
PROVINCE OF ALBERTA**

**ENVIRONMENTAL PROTECTION AND ENHANCEMENT ACT  
R.S.A. 2000, c.E-12, as amended**

REGISTRATION NO.: ..... 72308-02-00 .....

APPLICATION NO.: ..... 002-72308 .....

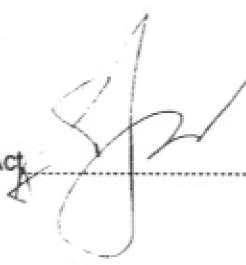
EFFECTIVE DATE: ..... July 17, 2009 .....

REGISTRATION HOLDER: ..... Lehigh Hanson Materials Limited .....

**Registration is issued for the following activity:**

The construction, operation or reclamation of a pit located in the ~~W1/2-29-54-26-W4M~~  
and NE-30-54-26-W4M as described in the Activities Plan submitted with the registration  
application.

Designated Director under the Act



Date Signed ..... July 17, 2009 .....



Environment  
and Parks

Operations  
111 TwinAtria Building  
4999-98 Avenue NW  
Edmonton, Alberta T68 2X3  
Telephone 780-427-7617  
www.aep.alberta.ca

File No. 003-00072308  
004-00072308

November 27, 2018

Jessica Sabel  
Lehigh Hanson Materials Limited  
15015-123 Ave  
Edmonton, AB T5V 1J7

Dear Jessica Sabel,

**Re: 5 Year Report – Pit 41 - Registration No. 72308-02-01 & 72308-02-02**  
**W 29 & NE-30-054-26 W4M**

Thank you for submitting the Updated Activities Plan and 5 Year Report for the above mentioned pit. The reports have been reviewed and the file updated.

Please note, any changes to the activities plan must be submitted to Alberta Environment and Parks for authorization prior to commencement. If you have any associated *Water Act* authorizations, please ensure they are also up to date.

If you have any questions, please contact Elise Neumann, Reclamation Approvals Coordinator, at 780-643-0636 or at [elise.neumann@gov.ab.ca](mailto:elise.neumann@gov.ab.ca)

Yours truly,

Mohammad Habib, M.Sc., P. Eng.  
Approvals Manager  
Red Deer - North Saskatchewan Region  
(Designated Director under the Act)

cc: Regulatory Approvals Center (RAC)  
Michele Corry, Aspen Land Group Inc.

**APPROVAL  
PROVINCE OF ALBERTA  
WATER ACT, R.S.A. 2000, c. W-3, as amended**

APPROVAL No.: 00386440-00-00

FILE No.: -00264050

WATERBODY: aquifer, surface water runoff, and end pit water bodies

ACTIVITY LOCATIONS: N½ 23 and NW 24 of 54-27-W4M, and  
N½ 19, NW 20 and SW 29 of 54-26-W4M

EFFECTIVE DATE: November 30, 2017

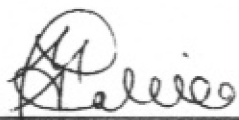
EXPIRY DATE: November 29, 2042

APPROVAL HOLDER: Lehigh Hanson Materials Ltd.

Pursuant to the *Water Act*, R.S.A. 2000, c. W-3, as amended, an approval is issued to the Approval Holder that relates to sand and gravel operations for the following activities:

- 1) Construct and carry out maintenance of end pit water bodies
- 2) Carry out gravel pit dewatering

subject to the attached conditions.

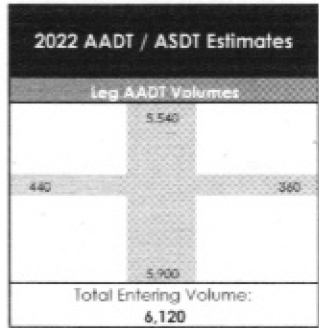
Designated Director under the Act:   
Mohammad Habib, P.Eng.

Date Signed: November 20, 2017

Reference Number:  
70000232

Intersection of:  
44 & TWP RD 544 19-54-26-  
400000000

North On: 44	Vehicle Type	Volume	%
	A: Passenger Vehicle	4,532	81.8%
	B: Recreational Vehicle	236	4.3%
	C: Bus	3	0.1%
	D: Single Unit Truck	225	4.1%
	E: Tractor Trailer Unit	544	9.8%
	<b>AADT</b>	<b>5,540</b>	
	<b>ASDT</b>	<b>6,490</b>	



From North			
2,760			
	Right	Thru	Left
	10	2,740	10
A	2	2,249	6
B	0	114	0
C	0	2	0
D	7	104	4
E	1	271	0

To North		
2,780		
	Left	Thru
A		2,275
B		122
C		1
D		110
E		272

To West	
210	
	Volume
A	44
B	0
C	1
D	22
E	143

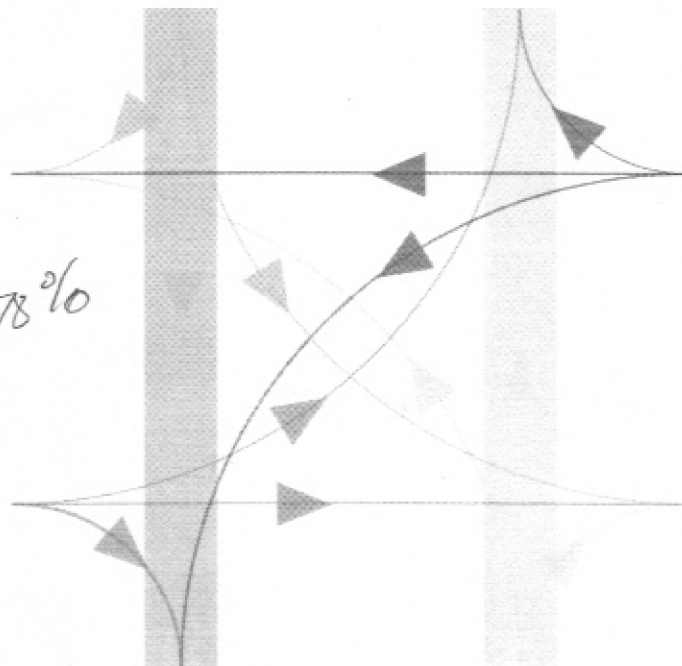
From East			
190			
Left	Thru	Right	
90	90	10	
A	32	10	10
B	0	0	0
C	0	1	0
D	57	8	0
E	1	71	0

West On: Twp Rd 544	Volume	%
A	97	22.0%
B	0	0.0%
C	1	0.2%
D	50	11.4%
E	292	66.4%
<b>AADT</b>	<b>440</b>	
<b>ASDT</b>	<b>530</b>	

East On: Twp Rd 544	Vehicle Type	Volume	%
	A	96	26.7%
	B	0	0.0%
	C	1	0.3%
	D	125	34.7%
	E	138	38.3%
	<b>AADT</b>	<b>360</b>	
	<b>ASDT</b>	<b>430</b>	

From West			
230			
	Left	Thru	Right
	20	80	130
A	6	8	39
B	0	0	0
C	0	0	0
D	13	7	8
E	1	65	83

To East	
170	
	Volume
A	44
B	0
C	0
D	60
E	66



To South		
2,960		
	Left	Thru
A	2,320	
B	114	
C	2	
D	169	
E	355	

From South			
2,940			
Left	Thru	Right	
110	2,750	80	
A	32	2,259	30
B	0	122	0
C	0	1	0
D	7	97	49
E	71	271	1

South On: 44	Vehicle Type	Volume	%
	A: Passenger Vehicle	4,641	78.7%
	B: Recreational Vehicle	236	4.0%
	C: Bus	3	0.1%
	D: Single Unit Truck	322	5.5%
	E: Tractor Trailer Unit	698	11.8%
	<b>AADT</b>	<b>5,960</b>	
	<b>ASDT</b>	<b>7,010</b>	

**ABBREVIATIONS:**

AADT: Annual Average Daily Traffic.  
Average daily traffic expressed as vehicles per day for the period from January 1 to December 31 (inclusive), 365 days.

ASDT: Average Summer Daily Traffic.  
Average daily traffic expressed as vehicles per day for the period from May 1 to September 30 (inclusive), 153 days.

**NOTE:**  
Coloured line thickness corresponds to turning movement volume.



**DIRECTIONAL TRAFFIC COUNT SUMMARY**

HIGHWAY: 44 REFERENCE NO.: 70000232 INTERSECTION OF: 44 & TWP RD 544  
 LATITUDE (degrees): 53.697151 LONGITUDE (degrees): -113.812041 LEGAL DESCRIPTION: 19-54-26-400000000  
 DAY & DATE OF COUNT: MONDAY, JULY 06, 2020 COUNT DURATION: 12 HOURS (7:00 AM TO 7:00 PM)

INTERVAL	APPROACHING INTERSECTION																TOTALS														
	FROM THE EAST ON TWP RD 544								FROM THE WEST ON TWP RD 544																						
	LEFT		THROUGH		RIGHT		LEFT		THROUGH		RIGHT		LEFT		THROUGH			RIGHT													
7:00-7:15 AM	1						3								4			1	1	10											
7:15-7:30	1						2								1					3	7										
7:30-7:45							2								2					5	9										
7:45-8:00							3								1					3	7										
8:00-8:15						1								1	4					7	7										
8:15-8:30	1						3								2					6	6										
8:30-8:45							2								1					5	5										
8:45-9:00							1							1	2					1	7										
9:00-9:15							1	3							2	1				3	11										
9:15-9:30							2								2					5	10										
9:30-9:45							2							1	3	1				1	9										
9:45-10:00							2								2	1				1	8										
10:00-10:15	2						4								2	1				1	13										
10:15-10:30							2	2							1	1				1	12										
10:30-10:45	2						1								1	2	1			1	13										
10:45-11:00							2	3							1	3				4	16										
11:00-11:15							2								2					3	12										
11:15-11:30	1						2								1	2				2	11										
11:30-11:45							1	2							5					1	8										
11:45-12:00 PM							2	3							1	1				1	9										
12:00-12:15	2						1								2					1	10										
12:15-12:30							2								3					5	5										
12:30-12:45							3								1	1	4			4	15										
12:45-1:00							2								2					5	11										
1:00-1:15	1						2								2	1				1	12										
1:15-1:30							7								1	2	1			2	7										
1:30-1:45							1								1	2				3	10										
1:45-2:00	1						1	1							3					3	13										
2:00-2:15	1						2								1					1	8										
2:15-2:30	1						1								1					1	7										
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2:45-3:00							1								2					4	9										
3:00-3:15	1																			1	2										
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3:30-3:45	1																			2	7										
3:45-4:00	1						4													2	7										
4:00-4:15							1								1					2	7										
4:15-4:30	2																			3	5										
4:30-4:45																				1	3										
4:45-5:00	1														1					1	3										
5:00-5:15	1						2													3	3										
5:15-5:30	1														1					1	3										
5:30-5:45	1						7								1					4	4										
5:45-6:00	2						1													1	4										
6:00-6:15							2								1					1	6										
6:15-6:30															1					1	1										
6:30-6:45	1														3	1				3	7										
6:45-7:00 PM	1						1								1					2	9										
VEH CLASS	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	TOTALS					
TOTALS	29			52	1	8			7	7	63	5			6			14	7	6	6	62	37	7	90	395					
	EL					ET					ER					WL					WT					WR					

LOCATION DIAGRAM ENCLOSED (Y/N): YES  
 WEATHER CONDITIONS: SUN AND CLOUDS  
 RECORDER(S): JEREMY DANIEL  
 ROAD SURFACE CONDITIONS: BARE  
 COMMENTS: LOTS OF GRAVEL AND ROCK PRODUCTS HAULING

VEHICLE CLASSES		
A: PASSENGER VEHICLES	B: RECREATION VEHICLES	C: BUSES
D: SINGLE UNIT TRUCKS	E: TRACTOR TRAILER COMBINATIONS	

Carol Shaw,

Wednesday, June 21, 2023

To whom it may concern at Legislative Services,

My apologies for not being able to attend this hearing but I would like to voice my grave concerns regarding proposed bylaw changes regarding Silica Sand Extraction that will have a detrimental impact on my wellbeing. I am a 78 year old-widow whose husband passed away 9 years ago leaving my home and land for me in hopes of easing any financial burdens that I may face now and in the future.

With that in mind, I have been negotiating with the Sureway Construction Group during the past 5 years to extract Silica Sand from my property. It has been a long and extremely frustrating process due to attaining permits, gathering samples, surveys, etc. However, I fully understand and respect the need of the county to address all environmental concerns and to that end I believe we have taken every precautionary step necessary to ensure the safe extraction of sand from my property.

This process was fully complete until Covid hit putting everything we did on hold. I cannot emphasize enough the joy I experienced knowing that at long last work on my property is scheduled to proceed this winter but now, as I understand it, this may never happen because of the proposed bylaw changing the setback from Silica Sand extraction to 800m instead of the 400m that is required for any other Natural Resource.

Please consider the significant impact that this will have on me, landowners, and indeed those companies involved in the removal of Silica Sand from all other properties. Is it not reasonable to consider that this resource should be categorized within the same family as gravel and removal of such (i.e. sand and gravel) would fall within the umbrella of removal rather than mining companies. Also, please bear in mind that this resource is being removed from my property and processed on theirs and compliance regarding any environmental concerns there are, I am sure, fully addressed.

Again, I apologize for not being able to attend this meeting in person, but I ask that you take my situation and concerns into consideration.

Thank you for your time,

Carol Shaw.

June 17, 2023

Sturgeon County Resource Extraction Regulatory Review Board  
9613-100St  
Morinville, Ab. T8R 1L9

The undersigned residents of Waterdale Park Subdivision are strongly opposed to any proposed Resource Extraction within 800m to the property line of Waterdale Park Subdivision (NE-06-57-21-W4M) for the purpose of mining sand or Resource Extraction, which would have diminished quality of life and enjoyment to the property of the residents.

We are urging our elected members of council to reject any application put forth to amend the 800m buffer zone to multi-lot country residential subdivisions, which was established by Sturgeon County in the Land Use Bylaw 11.2.4. There has obviously been a recognized need to maintain this distance and none of the proposed mitigation efforts are satisfactory to offset the negative impacts this will create and to avoid any conflict between residents and industry.

We as residents purchased our land in a quiet, peaceful subdivision away from industry to be able to enjoy the healthy country lifestyle. We deem having Resource Extraction within 800m a personal attack on that lifestyle for the following reasons:

- We as residents will not have the ability to escape the constant noise from the resource extraction pit and associated equipment and trucks such as equipment exhaust noise, equipment backup beeper alarms, engine brake noise, dewatering equipment that runs 24/7, as well as the lights from the extraction activity.
- We as residents want to be able to spend time outside in our acreages and subdivision whether it be spring/summer/fall/winter without the risk of contamination from the silica sand and dust which can cause: Silicosis, Acute Silicosis which is fatal, Lung Cancer, Increased autoimmune diseases, Corneal eye abrasions, Silica exposure can aggravate people with bronchitis, emphysema, asthma, and chronic pulmonary disease
- We as residents know once the land is cleared and an extraction pit is opened there is no control over the wind direction which in turn means silica will be in our yards, covering our vehicles/ vents and motors, homes and furnace vents.
- We as residents are concerned about the reduction of property values due to the unsightly industrial wasteland of a Resource Extraction pit in close proximity to the Subdivision owners. All present homeowners have a considerable investment tied up in our homes and properties and we bought with confidence that Sturgeon County would protect us from losing that investment, as well as having a construction site so close to our subdivision will discourage future residential development in the area.

- We as residents fear that there will be a negative impact on local ecosystems and water wells in the adjacent area.
- We the residents do not want to see setbacks less than 800m to the subdivision due to the fact that the first 100m to the south of Waterdale Park is composed of small shrubs, willows and a wetland where in winter there are no leaves on the trees and the construction would be clearly visible and heard by residents.
- We the residents are concerned with the addition of 130 trucks per day, which works out to one truck either pulling in or out of the approach every 3 minutes on an already busy highway right next to our subdivision especially in the winter months as well as the extreme deterioration of Vinca Bridge which we all use to commute to Fort Saskatchewan.
- We as residents would like you to take a look at the topography maps and see the whole sand belt of silica sand that runs for miles through the zoned Industrial Heartland with land that is for sale and landowners more than willing to get out of the Heartland and willing to sell their land and properties.
- We the residents voted in our Sturgeon County Council and expect the elected officials to look after the entire county of residents as equals as a Resource first, and not focus on Resource Extraction which seems to be a priority.
- We the residents are also concerned about the negative impact such as Resource Extraction would have on the Agriculture Poultry Farm just south of our subdivision.

In closing, We the Residents of Waterdale Park Subdivision have considerable concerns and have been fighting a battle against Resource Extraction since May 2010. This is having a negative impact on the residents and diminished quality of life as we are subjected to needless stress to defend our health and homes for a buffer that needs to be upheld by the board for the "beauty and serenity" that the county promises. We have been through appeal after appeal. How many times are we going to be subjected to go through this? We are not paid to prepare and attend meetings, as well as having to take time off work and time from our families. This is not beneficial to our subdivision and Resource Extraction within 800m could be potentially harmful to the residents and pets.

**\*We DO NOT want to see any bylaw amendment changes in the setback of 800m between Resource Extraction and our Multi lot Subdivision.**

**\*We are also opposed to council voting to approve a reduction in the 800m setback (or) the reduction in the 800m setback would have to be under a mutually consenting agreement between the party asking for the reduction and the party within the 800m area.**

**Comments:**

June 17, 2023

Resident: John Zuffino

Waterdale Park Subdivision Lot #: 16

Address: 57604 Hwy 25 #41

Sign:

Severed in line with section 17 of the FOIP Act

June 17, 2023

Sturgeon County Resource Extraction Regulatory Review Board  
9613-100St  
Morinville, Ab. T8R 1L9

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**Comments:**

We are in full support and total agreement of this letter for all the reasons already stated.

We are requesting our elected councillors to protect us citizens of this county, our homes, our health, and our environment.

We believe what is being proposed is unwarranted.

**June 17, 2023**

**Resident:** John Pratt  
Albina Pratt

**Waterdale Park Subdivision Lot #:** 29

**Address:** 57104 - Hwy 28 / #29

**Sign**



June 17, 2023

Sturgeon County Resource Extraction Regulatory Review Board  
9613-100St  
Morinville, Ab. T8R 1L9

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Comments: I agree with every statement outlined  
in this letter

June 17, 2023

Resident: Miles Court, Doreen Pedley

Waterdale Park Subdivision Lot #: 19 Ivan Road

Address:

Severed in line with section 17 of the FOIP Act

Sign:

June 17, 2023

Sturgeon County Resource Extraction Regulatory Review Board  
9613-100St  
Morinville, Ab. T8R 1L9

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Comments:

June 17, 2023

Resident: Sherril Cholewa

Waterdale Park Subdivision Lot #: 21

Address:

Sign:

Severed in line with section 17 of the FOIP Act

June 17, 2023

Sturgeon County Resource Extraction Regulatory Review Board  
9613-100St  
Morinville, Ab. T8R 1L9

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Comments:

Please leave us alone.  
and let us retire. in our  
Homes that we bough  
to enjoy, I don't want  
to move, or be forst  
to move. over your Plans

June 17, 2023

Resident:

Wally Benjamin Clarke.

Waterdale Park Subdivision Lot #:

12.

Address:

38 Ivan Road.  
57104 HWY 38

Sign:

June 17, 2023

Sturgeon County Resource Extraction Regulatory Review Board  
9613-100St  
Morinville, Ab. T8R 1L9

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We are urging our elected members of council to reject any application put forth to amend the 800m buffer zone to multi-lot country residential subdivisions, which was established by Sturgeon County in the Land Use Bylaw 11.2.4. There has obviously been a recognized need to maintain this distance and none of the proposed mitigation efforts are satisfactory to offset the negative impacts this will create and to avoid any conflict between residents and industry.

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- We as residents are concerned about the reduction of property values due to the unsightly industrial wasteland of a Resource Extraction pit in close proximity to the Subdivision owners. All present homeowners have a considerable investment tied up in our homes and properties and we bought with confidence that Sturgeon County would protect us from losing that investment, as well as having a construction site so close to our subdivision will discourage future residential development in the area.

- We as residents fear that there will be a negative impact on local ecosystems and water wells in the adjacent area.
- We the residents do not want to see setbacks less than 800m to the subdivision due to the fact that the first 100m to the south of Waterdale Park is composed of small shrubs, willows and a wetland where in winter there are no leaves on the trees and the construction would be clearly visible and heard by residents.
- We the residents are concerned with the addition of 130 trucks per day, which works out to one truck either pulling in or out of the approach every 3 minutes on an already busy highway right next to our subdivision especially in the winter months as well as the extreme deterioration of Vinca Bridge which we all use to commute to Fort Saskatchewan.
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**Comments:**

June 17, 2023

Resident: Corlee Caouette

Waterdale Park Subdivision Lot #: 35

Address: #35 57104 Hwy 38

Sign:

Severed in line with section 17 of the FOIP Act

June 17, 2023

**Sturgeon County Resource Extraction Regulatory Review Board  
9613-100St  
Morinville, Ab. T8R 1L9**

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**Comments:**

June 17, 2023

Resident: Dave + Melissa Hobson

Waterdale Park Subdivision Lot #: 36

Address: 57104 hwy 38

Sigr

June 17, 2023

Sturgeon County Resource Extraction Regulatory Review Board  
9613-100St  
Morinville, Ab. T8R 1L9

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**Comments:**

June 17, 2023

Resident: RAYMOND and SHARON DRAGON

Waterdale Park Subdivision Lot #:

40

Address:

57104 - HWY 38  
#40 IVAN ROAD  
waterdale Park

Sign

June 17, 2023

Sturgeon County Resource Extraction Regulatory Review Board  
9613-100St  
Morinville, Ab. T8R 1L9

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**Comments:**

June 17, 2023

Resident: Warren Lusk and Susan Gillespie-Lusk

Waterdale Park Subdivision Lot #: 28 and 29

Address:

Severed in line with section 17 of the FOIP Act

Sign:

June 17, 2023

**Sturgeon County Resource Extraction Regulatory Review Board  
9613-100St  
Morinville, Ab. T8R 1L9**

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**Comments:**

June 17, 2023

Resident: David Wayne CARTER

Waterdale Park Subdivision Lot #: 30

Address:

#11 IVAN Rd.

Sign



June 17, 2023

Sturgeon County Resource Extraction Regulatory Review Board  
9613-100St  
Morinville, Ab. T8R 1L9

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**Comments:** Major concerns as this subdivision is the only ideal spot for truckers to re-route if they missed their turn. Speeding trucks who are trying to make up time.

June 17, 2023

**Resident:** Jessica Bussemakers

**Waterdale Park Subdivision Lot #:** 14

**Address:**

Severed in line with section 17 of the FOIP Act

**Sig:**

June 17, 2023

Sturgeon County Resource Extraction Regulatory Review Board  
9613-100St  
Morinville, Ab. T8R 1L9

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**Comments:**

It is very frustrating as a Sturgeon County tax payer and Waterdale Park Subdivision resident, that we have to continuously defend our homes and property against the proposed Resource Extraction within 800m of our property. I choose to live in the country for a clean quality of live and peaceful living. I am strongly opposed to any amendment to alter the 800m buffer zone. I encourage all elected members of council to empathize <sup>with</sup> us residents and reject any application to amend this buffer zone.

June 17, 2023

Resident: Caesar Diogo & Fiona Henderson

Waterdale Park Subdivision Lot #: 7

Address: 7 Ivan Rd.

Sig

June 17, 2023

Sturgeon County Resource Extraction Regulatory Review Board  
9613-100St  
Morinville, Ab. T8R 1L9

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We are urging our elected members of council to reject any application put forth to amend the 800m buffer zone to multi-lot country residential subdivisions, which was established by Sturgeon County in the Land Use Bylaw 11.2.4. There has obviously been a recognized need to maintain this distance and none of the proposed mitigation efforts are satisfactory to offset the negative impacts this will create and to avoid any conflict between residents and industry.

We as residents purchased our land in a quiet, peaceful subdivision away from industry to be able to enjoy the healthy country lifestyle. We deem having Resource Extraction within 800m a personal attack on that lifestyle for the following reasons:

- We as residents will not have the ability to escape the constant noise from the resource extraction pit and associated equipment and trucks such as equipment exhaust noise, equipment backup beeper alarms, engine brake noise, dewatering equipment that runs 24/7, as well as the lights from the extraction activity.
- We as residents want to be able to spend time outside in our acreages and subdivision whether it be spring/summer/fall/winter without the risk of contamination from the silica sand and dust which can cause: Silicosis, Acute Silicosis which is fatal, Lung Cancer, Increased autoimmune diseases, Corneal eye abrasions, Silica exposure can aggravate people with bronchitis, emphysema, asthma, and chronic pulmonary disease
- We as residents know once the land is cleared and an extraction pit is opened there is no control over the wind direction which in turn means silica will be in our yards, covering our vehicles/ vents and motors, homes and furnace vents.
- We as residents are concerned about the reduction of property values due to the unsightly industrial wasteland of a Resource Extraction pit in close proximity to the Subdivision owners. All present homeowners have a considerable investment tied up in our homes and properties and we bought with confidence that Sturgeon County would protect us from losing that investment, as well as having a construction site so close to our subdivision will discourage future residential development in the area.

- We as residents fear that there will be a negative impact on local ecosystems and water wells in the adjacent area.
- We the residents do not want to see setbacks less than 800m to the subdivision due to the fact that the first 100m to the south of Waterdale Park is composed of small shrubs, willows and a wetland where in winter there are no leaves on the trees and the construction would be clearly visible and heard by residents.
- We the residents are concerned with the addition of 130 trucks per day, which works out to one truck either pulling in or out of the approach every 3 minutes on an already busy highway right next to our subdivision especially in the winter months as well as the extreme deterioration of Vinca Bridge which we all use to commute to Fort Saskatchewan.
- We as residents would like you to take a look at the topography maps and see the whole sand belt of silica sand that runs for miles through the zoned Industrial Heartland with land that is for sale and landowners more than willing to get out of the Heartland and willing to sell their land and properties.
- We the residents voted in our Sturgeon County Council and expect the elected officials to look after the entire county of residents as equals as a Resource first, and not focus on Resource Extraction which seems to be a priority.
- We the residents are also concerned about the negative impact such as, Resource Extraction would have on the Agriculture Poultry Farm just south of our subdivision.

In closing, We the Residents of Waterdale Park Subdivision have considerable concerns and have been fighting a battle against Resource Extraction since May 2010. This is having a negative impact on the residents and diminished quality of life as we are subjected to needless stress to defend our health and homes for a buffer that needs to be upheld by the board for the "beauty and serenity" that the county promises. We have been through appeal after appeal. How many times are we going to be subjected to go through this? We are not paid to prepare and attend meetings, as well as having to take time off work and time from our families. This is not beneficial to our subdivision and Resource Extraction within 800m could be potentially harmful to the residents and pets.

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**Comments:**

June 17, 2023

Resident: Bryce Woolley

Waterdale Park Subdivision Lot #: 8

Address:

8 Ivan Road  
Redwater, AB T0A 2W0

Sign:

June 17, 2023

Sturgeon County Resource Extraction Regulatory Review Board  
9613-100St  
Morinville, Ab. T8R 1L9

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Comments:

As a new resident to Waterdale Park the last thing we want in our Back yard is a extraction Pit we moved here for Peace and quiet and a peaceful country life style.

June 17, 2023

Resident: Darcy & Melissa McEutcheon!

Waterdale Park Subdivision Lot #: 37

Address: 37 Ivan Rd

June 17, 2023

Sturgeon County Resource Extraction Regulatory Review Board  
9613-100St  
Morinville, Ab. T8R 1L9

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3

Sturgeon County Resource Extraction  
Regulatory Review Board.

Comments:

We're trusting the county to maintain the 800m distance & the councillors to vote in favor of maintaining the 800m & yet we find ourselves, once again defending our properties while the County tries to resource from our subdivision. <sup>bylaw.</sup>

This is setting a terrible precedence other companies to try & do something similar in the future. See Petition regarding Range Rd 220 Reconstruction & Paving.

June 17, 2023

Resident: Jerry & Sheree Madro

Waterdale Park Subdivision Lot #: 25 & 27

Address: 25 Iran Road  
Redwater, AB  
T0A 2W0

Sign:

June 17, 2023

Sturgeon County Resource Extraction Regulatory Review Board  
9613-100St  
Morinville, Ab. T8R 1L9

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**Comments:**

June 17, 2023

Resident: Gabrielle Madro

Waterdale Park Subdivision Lot #: 25

Address: 25 Ivan Rd, Redwater, AB, TQA 2W0

June 17, 2023

Sturgeon County Resource Extraction Regulatory Review Board  
9613-100St  
Morinville, Ab. T8R 1L9

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**Comments:**

We do not want or need SIL in our back yard. We dont want to lose the Value in our property, nor do we want to lessen the quality of our homes and lives. We built our acreages to escape the non sense and noise.

NO TO SIL... GO AWAY.

June 17, 2023

Resident: Candace Stoppe

Waterdale Park Subdivision Lot #: 10

Address:

34 Ivan Rd.

June 17, 2023

Sturgeon County Resource Extraction Regulatory Review Board  
9613-100St  
Morinville, Ab. T8R 1L9

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**Comments:**

would you like SIL in your backyard? Probably  
NOT - Neither do we. Time to move on to  
another area where people don't reside.  
We DO NOT want to have you as a neighbor.

June 17, 2023

**Resident:**

**Waterdale Park Subdivision Lot #:** 2

**Address:**

4 Ivan Road

**Sign:**



June 17, 2023

Sturgeon County Resource Extraction Regulatory Review Board  
9613-100St  
Morinville, Ab. T8R 1L9

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- We as residents would like you to take a look at the topography maps and see the whole sand belt of silica sand that runs for miles through the zoned Industrial Heartland with land that is for sale and landowners more than willing to get out of the Heartland and willing to sell their land and properties.
- We the residents voted in our Sturgeon County Council and expect the elected officials to look after the entire county of residents as equals as a Resource first, and not focus on Resource Extraction which seems to be a priority.
- We the residents are also concerned about the negative impact such as, Resource Extraction would have on the Agriculture Poultry Farm just south of our subdivision.

In closing, We the Residents of Waterdale Park Subdivision have considerable concerns and have been fighting a battle against Resource Extraction since May 2010. This is having a negative impact on the residents and diminished quality of life as we are subjected to needless stress to defend our health and homes for a buffer that needs to be upheld by the board for the "beauty and serenity" that the county promises. We have been through appeal after appeal. How many times are we going to be subjected to go through this? We are not paid to prepare and attend meetings, as well as having to take time off work and time from our families. This is not beneficial to our subdivision and Resource Extraction within 800m could be potentially harmful to the residents and pets.

**\*We DO NOT want to see any bylaw amendment changes in the setback of 800m between Resource Extraction and our Multi lot Subdivision.**

**\*We are also opposed to council voting to approve a reduction in the 800m setback (or) the reduction in the 800m setback would have to be under a mutually consenting agreement between the party asking for the reduction and the party within the 800m area.**

**Comments:**

This babbler has affected my quality of life. I blame the county and no one else for allowing this to go on so long. I started for us in 2010. Where do I submit my bill for my time spent. I figure about 20K should cover it!!

June 17, 2023

**Resident:**

Tim Cholewa

Waterdale Park Subdivision Lot #: 23

**Address:**

June 17, 2023

Sturgeon County Resource Extraction Regulatory Review Board  
9613-100St  
Morinville, Ab. T8R 1L9

The undersigned residents of Waterdale Park Subdivision are strongly opposed to any proposed Resource Extraction within 800m to the property line of Waterdale Park Subdivision (NE-06-57-21-W4M) for the purpose of mining sand or Resource Extraction, which would have diminished quality of life and enjoyment to the property of the residents.

We are urging our elected members of council to reject any application put forth to amend the 800m buffer zone to multi-lot country residential subdivisions, which was established by Sturgeon County in the Land Use Bylaw 11.2.4. There has obviously been a recognized need to maintain this distance and none of the proposed mitigation efforts are satisfactory to offset the negative impacts this will create and to avoid any conflict between residents and industry.

We as residents purchased our land in a quiet, peaceful subdivision away from industry to be able to enjoy the healthy country lifestyle. We deem having Resource Extraction within 800m a personal attack on that lifestyle for the following reasons:

- We as residents will not have the ability to escape the constant noise from the resource extraction pit and associated equipment and trucks such as equipment exhaust noise, equipment backup beeper alarms, engine brake noise, dewatering equipment that runs 24/7, as well as the lights from the extraction activity.
- We as residents want to be able to spend time outside in our acreages and subdivision whether it be spring/summer/fall/winter without the risk of contamination from the silica sand and dust which can cause: Silicosis, Acute Silicosis which is fatal, Lung Cancer, Increased autoimmune diseases, Corneal eye abrasions, Silica exposure can aggravate people with bronchitis, emphysema, asthma, and chronic pulmonary disease
- We as residents know once the land is cleared and an extraction pit is opened there is no control over the wind direction which in turn means silica will be in our yards, covering our vehicles/ vents and motors, homes and furnace vents.
- We as residents are concerned about the reduction of property values due to the unsightly industrial wasteland of a Resource Extraction pit in close proximity to the Subdivision owners. All present homeowners have a considerable investment tied up in our homes and properties and we bought with confidence that Sturgeon County would protect us from losing that investment, as well as having a construction site so close to our subdivision will discourage future residential development in the area.

- We as residents fear that there will be a negative impact on local ecosystems and water wells in the adjacent area.
- We the residents do not want to see setbacks less than 800m to the subdivision due to the fact that the first 100m to the south of Waterdale Park is composed of small shrubs, willows and a wetland where in winter there are no leaves on the trees and the construction would be clearly visible and heard by residents.
- We the residents are concerned with the addition of 130 trucks per day, which works out to one truck either pulling in or out of the approach every 3 minutes on an already busy highway right next to our subdivision especially in the winter months as well as the extreme deterioration of Vinca Bridge which we all use to commute to Fort Saskatchewan.
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Comments:

ALSO ALL THE WILDLIFE WE SEE EVERYDAY  
WILL NOT STAY AROUND IN THEIR NATURAL HABITAT ONCE THIS  
COMPANY STARTS CONSTRUCTION AND STARTS OPERATING,  
MY STANCE ON THIS PROJECT WILL NEVER CHANGE.  
100% AGAINST HAVING THIS MONSTROSITY IN OUR BACK  
YARD AND TURNING A NATURAL HABITAT FOR WILDLIFE INTO  
A SUPER AWFUL PIT FOR THE SAKE OF SOME COMPANY FOR  
SOME SAND. I PERSONALLY WOULD THINK THIS COULD BE  
CONSIDERED ENVIRONMENTAL DAMAGE. **THINK ABOUT THAT  
FOR A MINUTE!**

June 17, 2023

Resident: JAW COSBY  
LEANNE COSBY

Waterdale Park Subdivision Lot #: 33

Address:

Severed in line with section 17 of the FOIP Act

Sign