

November 28, 2018

Mr. Dan Passmore

Senior Planner

Columbia Shuswap Regional District

Salmon Arm, B.C.

<input type="checkbox"/> CAO <input type="checkbox"/> Works <input type="checkbox"/> DBS <input type="checkbox"/> Fin/Adm	<input type="checkbox"/> Agenda <input type="checkbox"/> Reg Board <input type="checkbox"/> In Camera <input type="checkbox"/> Other Mtg	Ownership: File #
NOV 28 2018		
<input type="checkbox"/> Ec Dev <input type="checkbox"/> IT <input type="checkbox"/> Parks <input type="checkbox"/> SEP <input type="checkbox"/> HR <input type="checkbox"/> Other	RECEIVED <input type="checkbox"/> Staff to Report <input type="checkbox"/> Staff to Respond <input type="checkbox"/> Staff Info Oly <input type="checkbox"/> Dir Mailbox <input type="checkbox"/> Dir Circulate	Ask Sent: <input type="checkbox"/> Fax <input type="checkbox"/> Mail <input type="checkbox"/> Email

Re: Shuswap Country Estates Area C Bylaw No. 725-12

Dear Sir;

As owners of Shuswap Country Estates we would like to give a brief history to our development and confirm the following information.

We have been owners of the property since 2003 and have seen our project grow from 2 homes to the current total of 68 homes. We remain focused on providing modern, safe housing to seniors in this area. We fully endorse the introduction of zoning and building permits in the area and aim to comply to the new rules and regulations through this process. The total park development contributes approximately \$ 23,000 per year in property taxes.

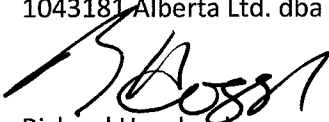
We are working very hard to complete the existing modular home park, improve the production and utilization of the farm lands, provide a community garden in 2019 for home owners and improve the surrounding area.

Please find attached a petition signed by 70 residents in the area supporting Amendment approval to the Official Community Plan Bylaw No. 725-12.

Please find enclosed a letter from Mr. Grant Smith Owner of Balmoral Farms giving us his vision for the next few years with regards to the improved use of our farm lands.

Yours truly,

1043181 Alberta Ltd. dba Shuswap Country Estates



Richard Hagglund

President

BALMORAL FARMS
2778 White Lake Road
Sorrento, BC, V0E 2W1

November 19, 2018

To: Columbia Shuswap Regional District Directors
Re: area C Official Community Plan Amendment By-Law No. 725-12

Dear Sir(s) ;

My name is [REDACTED] and I have owned property and resided at [REDACTED] since 1996.

I own and operate Balmoral Farms and I have leased farm land in the Tappen, Carlin and n Notch Hill areas of area C since 2005. I have leased part of the Shuswap Country Estates property, (the park) for farm use since 2011.

In June of 2018, I continued my lease of the farmed portion of the "park" and relocated my entire farm to the same property at 1802 Tappen Notch Hill Road . I have also purchased a home at 1802 Tappen Notch Hill Road and I and plan to move there sometime next year.

I am writing to you in support of the OCP Amendment as proposed.

At Balmoral Farms I produce "pastured beef" for the private and retail market in the Shuswap trading area as well as a small number of market calves each year. I have had an ongoing selective breeding program to develop a small herd of cattle that will produce superior quality beef from native pasture areas supplimented with mainly home raised grass forage in the winter. My beef animals are born and raised on my farm, then processed locally for sale.

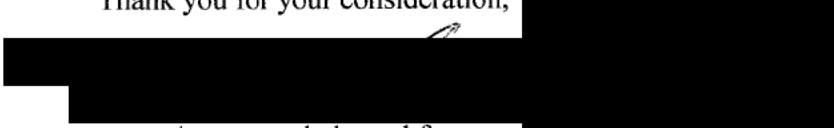
While I have experienced many diverse issues during my time with the farm I plan to continue this operation at the "park" location.

As you know, the "park" leases serviced sites for the installation of occupant owned modular homes. These homes are built to current building codes including standards of appearance etc. The modular home concept provides modestly priced detached housing opportunities for seniors, and others.

In addition, the "park", through the Balmoral Farms lease, provides me with a unique opportunity to have an operating family farm on land within the agricultural land reserve, and in conjunction with a local housing development. I would note that the housing component of the "park" is located on areas of the site that would not normally be considered "farmable", while the land on the benches below is, or will be, used as an operating farm.

Passing of the OCP amendment will regularize what already exists on the ground, and will significantly assist in maintaining the viability of Shuswap Country Estates to provide moderately priced, detached housing for seniors as well as a suitable site for a family farm that produces local, sustainable food products for consumers in the shuswap and beyond.

Thank you for your consideration,


owner/ operator, balmoral farms

PETITION

PETITION

We a group of local residents living near or at Shuswap Country Estates wish to voice Amendment approval to the Official Community Plan Bylaw No. 725-12. We feel that this Ammendment will improve the area and add much needed housing for seniors.

Address

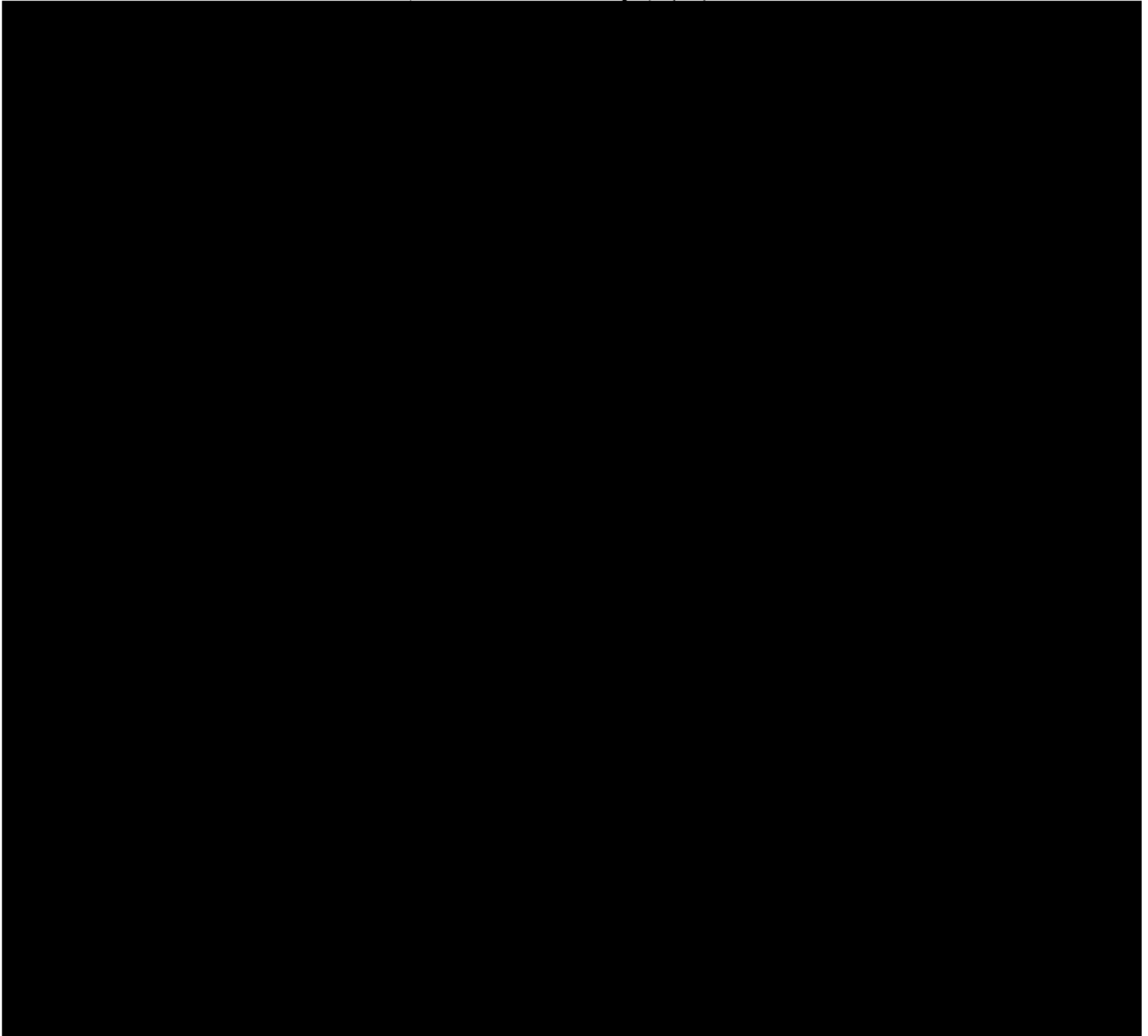
Name

Signature

PAGE 2

PETITION

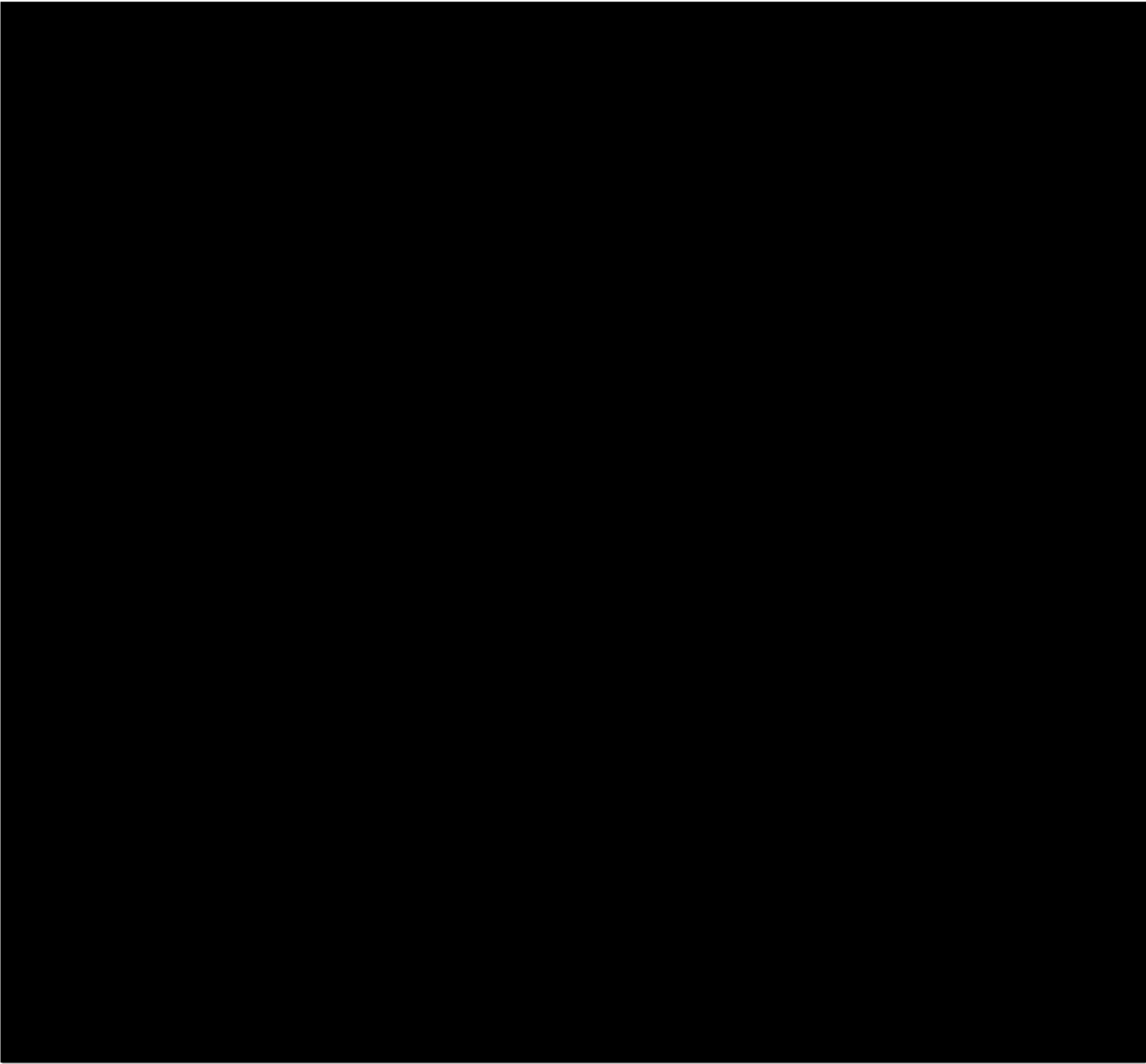
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PAGE 3

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Page 4

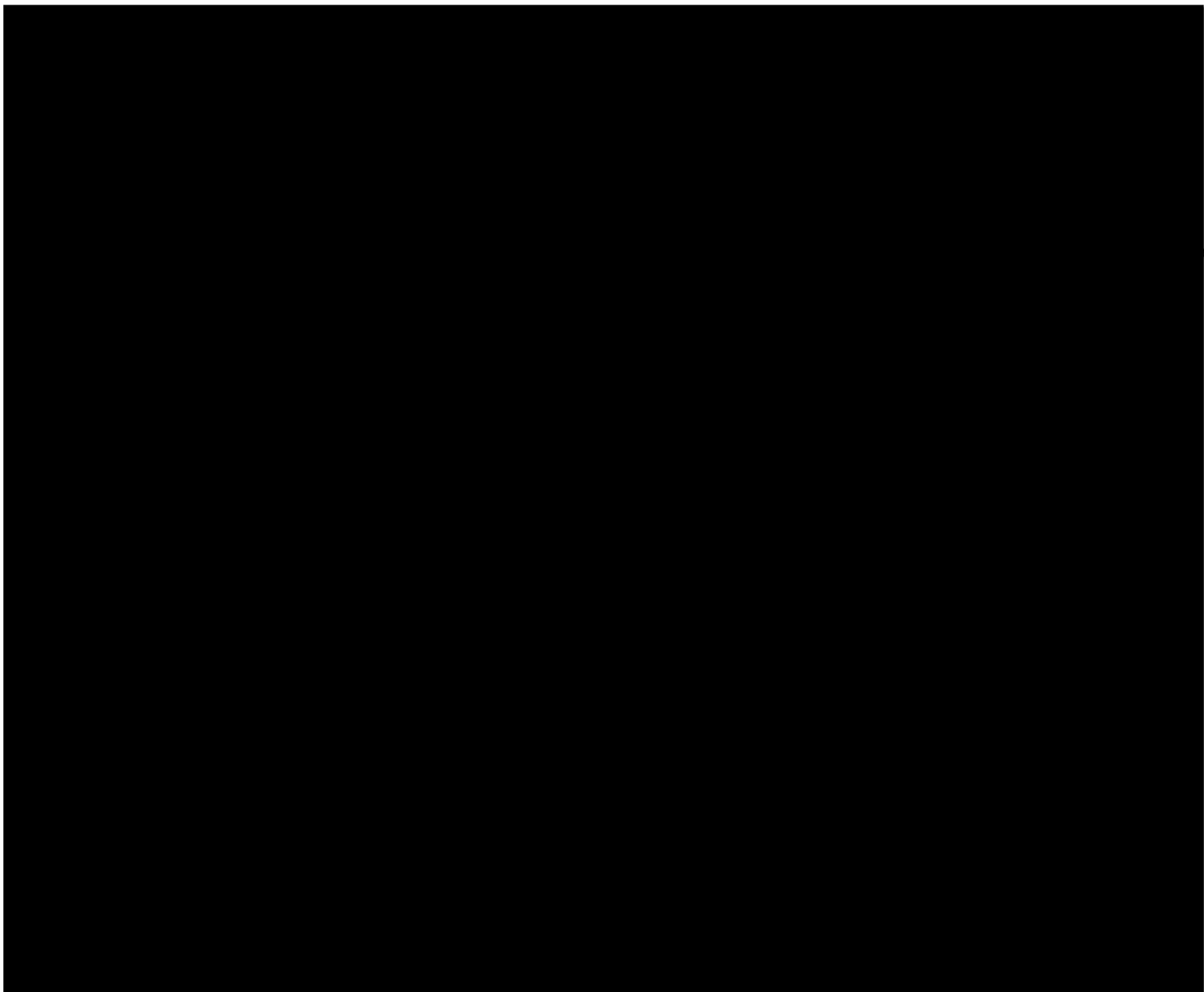
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Address

Name

Signature

A large black rectangular redaction box covers the entire area where the petition details would normally be written. The box is solid black and extends from the left margin to the right margin, and from just below the header to just above the footer.

PAGE 5

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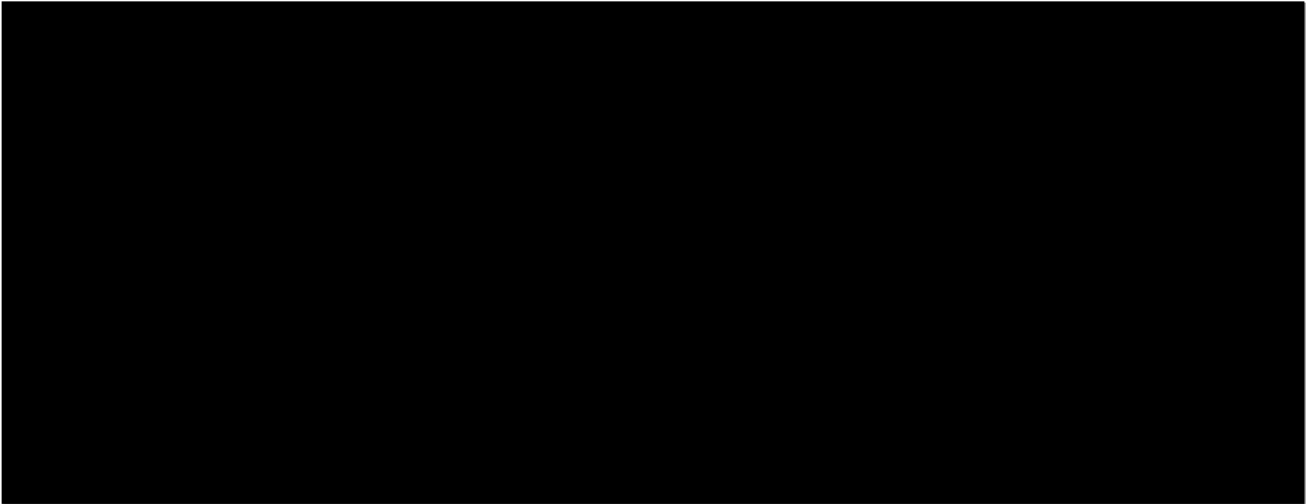
Page 6

Address

Signature

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<input type="checkbox"/> GAO	<input type="checkbox"/> Agenda	Ownership:
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NOV 28 2018		
<input type="checkbox"/> Ec Dev	<input type="checkbox"/> Staff to Report	Ask Sent:
<input type="checkbox"/> IT	<input type="checkbox"/> Staff to Respond	<input type="checkbox"/> Fax
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<input type="checkbox"/> Other		

Second Public Hearing Submission to discuss the Amendments of Bylaw No.725-12

November 28, 2018

The petition of signatures on page 2 submitted at the first public meeting July 24, 2018 still stands. That Notice of Public Hearing was only sent out to property holders within 100 meters of the subject property and these signatures, (mostly only one signature per property) represents 100% of those properties.

PETITION SUBMISSION – PROPOSED COMMUNITY PLAN AMENDMENT

We as a group of local property owners located near Shuswap Country Estates, address of 1885 Tappen Notch Hill Rd. wish to object to the proposed Community Plan Amendment of Bylaw No. 725-12. The undersigned names would be negatively impacted by this proposal so are signing this petition to say they do not want this to proceed for various reasons. Some will also give more written details of their individual circumstances.

PRINT NAME

SIGNATURE

PROPERTY ADDRESS

Dated: July 24TH, 2018

Page 1 of 1

November 28, 2018
Second Public Meeting

Presented by [REDACTED]
Spokes person for local neighbours listed on Petition dated June 24, 2018.
There most likely will be others present their specific property concerns.

Re: New Cattle Feed Lot.

In the Board Report BL 725-12 March 29, 2018 Item 3.1.2 Policies
It states, outside the Village Centre and Secondary Settlement Areas, new residential development is generally discouraged **unless co-located with an agricultural use.**

It appears the owners have taken this as a literal way to help support their expansion proposal. If you drive by the in question property now you will find approximately 50 head of cattle owned by Grant Smith being fed in a small fenced area. In the short time they have been there the area is quickly being torn up with animal traffic in the feeder areas and has become a quagmire of mud mixed with manure. From this fenced area the ground slopes all the way to the well in question at approximately a 3% downward slope. Then behind the well by approx. twenty feet the railway forms a berm of approx. 8' to stop the spring run off waters increasing the possibility of contaminating the well and our shared aquifer.

The only data I could find regarding set backs for feed lot cattle and manure storage was US and it calls for up to 1,000 Ft. set backs. Exhibit B-1

Data shows that dairy and feed lot cattle produce between 23.6 and 35.5 kg of manure per 454 kg (live weight) per day.(Exhibit B-2) So based on this, taking an average of the high and low volumes is 29.55 kg of manure per head, (approx. 50 head x 29.55 kg. per day x 180 days (Nov.–Apr.) You could expect 265,950 Kg or 266 tonnes of animal effluent on a slope headed towards their supply well that is in our shared aquifer as well. **This is especially concerning given that we believe there is at least one abandoned well in that path.** (As stated in Omega and Associates paper work), there are 6 other wells not in use on this field as well. Jayme Franklin referred to these wells at the first meeting needing sealed. There are guidelines to sealing a well properly and we would expect Franklin Engineering, (the main engineering firm in the design of this proposed expansion, to certify to the CSRD that this has been done whether the expansion happens or not. (Exhibit B-5)

As listed in documents regarding the Walkerton disaster that the abandoned wells are one of Ontario's main contributors to aquifer contamination. BC is probably no different.

Having mentioned Walkerton Ontario I will include documents showing that this Feed Lot scenario we have is very similar to what happened there.

With just a heavy rain we could be having manure washing towards the wells (in use and abandoned. (Exhibit B-3)

Walkerton Ontario is a town of 5,000 people. Well #5 was contaminated do to cattle manure.

7 people dead and 2,300 people were treated for various levels of bacterial infection. (Exhibit B-9)

And the conservative bill for this minor slip up as produced by The University of Guelph commissioned paper¹⁴, is a staggering \$64.5 million. (Exhibit B-4)

We ask that this scenario gets fixed soon but for sure before any spreading happens so as not to increase risk to all users of the aquifer, as most don't have chlorine treatment of their water.

Exhibit B-6-7-and 8 shows the area in discussion.

Re: Watterson Geoscience Technical Memo

On page 2 of the submission for the first Hearing we asked for the well in question to be given a certified flow test.

Please refer to Regular Board Meeting Report for Aug. 16, 2018. Mr. Dan Passmore directions in Item 15.5 that the "staff was to require the applicant to provide a report from a qualified professional with experience in groundwater hydrogeology which details the various water supply source wells with regard to their capacity for sustainable yield which matches the proposed development increase and potential for draw down interference on neighbouring groundwater wells."

The Technical Memo of Watterson Geoscience is not even close to what was asked for by Mr. Passmore or expected by us. There was no current flow testing of the well in question at all. The report is given from a reported flow test ten years ago. We are looking for current certified flow testing. And the second part of Mr. Passmore's request was that they monitor draw down of neighbouring wells. This was not considered at all. So we need to start again and give a true and proper analysis. To do this the well in question would need to be being flow tested for many hours and at the same time as one or more neighbours wells are being tested for draw down (the two closest neighbours will let their wells be part of this test). Then science can be applied to determine how much effect the doubling of the demand on our aquifer would be and whether it can stand this.

Referring to Technical Memo from Watterson Geoscience Inc.
Project No. 18-073. Page 2

Bullet 1. In 2008 the well was flow tested for 50 hours, 47 were at 15 US Gal... 2 hrs. at 25 with almost double the draw down at 25 Gal. With more pumping it may have gone dry. And at 30 Gal. there was significant draw down within 1hr. The report never does say what the static level is in this well. That we need to know as well.

Bullet 4 is misleading as it has to do with a bunch of calculations but has nothing to do with the actual production that well can do. The numbers above of 15, 25 and 30 US Gal. are the actual production levels tested. With the only one maintainable flow being 15 US gals.

In the second to the last paragraph it states that both Summit (the original flow test co.) and WGI (the supplier of this report) say there needs to be more testing to show that this well can supply the demand being asked for.

The water demand levels shown in this memo are much lower than anything I could find on consumption of water for households. My conservative numbers were eighty US Gal. / person/day. This works out to considerably more water than 20 gpm. So again more certification needed.

There are already water restrictions in the Estates such as no washing of your vehicle, and next to no plant watering.

██████████

Is there a reason why Summit Environmental Consultants Ltd. didn't do this report? This Memo also states it relies on info supplied by others. Who would others be?

Do to freezing weather at this time of year we suggest doing this flow testing in the latter part of April or early may when water tables are at their highest and there is no danger of freezing?

SUMMARY:

- Due to the well testing not being done properly the first time we request that local neighbours be able to review and approve the testing process prior to it being done.
- We the undersigned neighbours of the petition to the proposed new development, continue to say no to this expansion as further information is needed.
- We are looking for transparency so a more informed decision can be made.

We have not seen any detail drawings or requirements on the proposed expansion so we would ask that CSRD build in requirements such as:

- That time lines for construction are established and lived by.
- That there be proper set backs to control erosion of adjoining properties.
- In this set back there are to be trees and vegetation either left and or re planted to assist with erosion. This is along the north side of the area to be re- zoned Neighbourhood Residential.
- Damage done while blasting is in process will be SCE's responsibility.
- We reserve the right to compensation from Shuswap Country Estates, Alberta Ltd. Co. and Owners if spreading your human waste water contaminates our common aquifer. Example: Walkerton Ont.
- All abandoned wells be sealed and certified before any spreading is done.
- Your permit to spread issued in 1996 or 97 has never been used and that being 22 years later we request examining a better method i.e. injection instead of spraying.

Conclusion:

We ask the CSRD to follow one of their many mandates and under the current Act of July 25, 2018 follow the Water Sustainability Act. Chapter 15 Section 43 (a) (i, ii and iii) where it states protecting both water quality and quantity to service what is already in place.

However should the expansion be allowed to proceed without further deliberation and agreement then we the persons listed on the Petition dated July 24, 2018:
Will hold Shuswap Country Estate (SCE), its owners, Alberta Ltd. Co. and the CSRD liable for all costs that may occur do to the changes this expansion may cause.

Franklin Engineering Technical Memo

As said earlier if we are forced we ask for spreading by injection rather than spraying to put all these aerosols into the air currents. This also would reduce surface contamination for creature on that land.

If you look up Wastewater or Sludge spreading on land on the internet you will find various papers by Universities and Health Systems you will see many statements saying both these forms of disposal are dangerous to the environment and those close to it. With animals and birds crossing that land they will carry pathogens, heavy metal s etc. back to their homes.

Any document you read suggests there are cases where this has been an issue even up to death of those either eating food grown in the spreading area or just being in that area. It is stated that 200 Dairy cows through out time have been reported dyeing due to eating crops from this spreading.

With vegetable gardening universities have been testing and writing papers like not eating any produce from manured land within less than 100-180 days depending on types of soils. Below this timing they can find traces of several different things, one being Ecoli.

So do we become part of a test?

On a paper from the Agricultural Land Commission Dated Oct.31,1995. It states on page 2 The Commission has requested this inclusion into ALR to prevent any possible future encroachment of residential development on the north/east side of the road.

Then in the minutes of the Provincial Agricultural land Commission (Resolution # 765/95) it states again in Local Govt. Recommendations that all mobile homes should be on the same legal parcel and not on the ALR land.

There has been one older trailer on the North side of Notch Hill Rd. but now within the last few days there has been another new double wide manufactured home set up.

So you want to not revisit any permits that haven't ever been used and written over twenty years ago such as spreading and uphold them but where it says no mobile units on the ALR land in those same documents that shouldn't need to be followed? These papers were all re sent by Franklin Engineering for this meeting and posted on the CSRD site.

Respectfully Submitted

[REDACTED]

No wellhead protection plan: If the MDH has not yet approved a drinking water-supply management area for the well, then a 1,000-foot setback applies for new feedlot or manure storage area construction.

Approved wellhead protection plan: If the MDH has approved a drinking water-supply management area for the well, the following setbacks apply:

Vulnerable

- 1,000-foot setback: Site is in drinking water-supply management area and the land/well is designated as vulnerable.
- 200-foot setback: Site is outside of designated drinking water-supply management area.

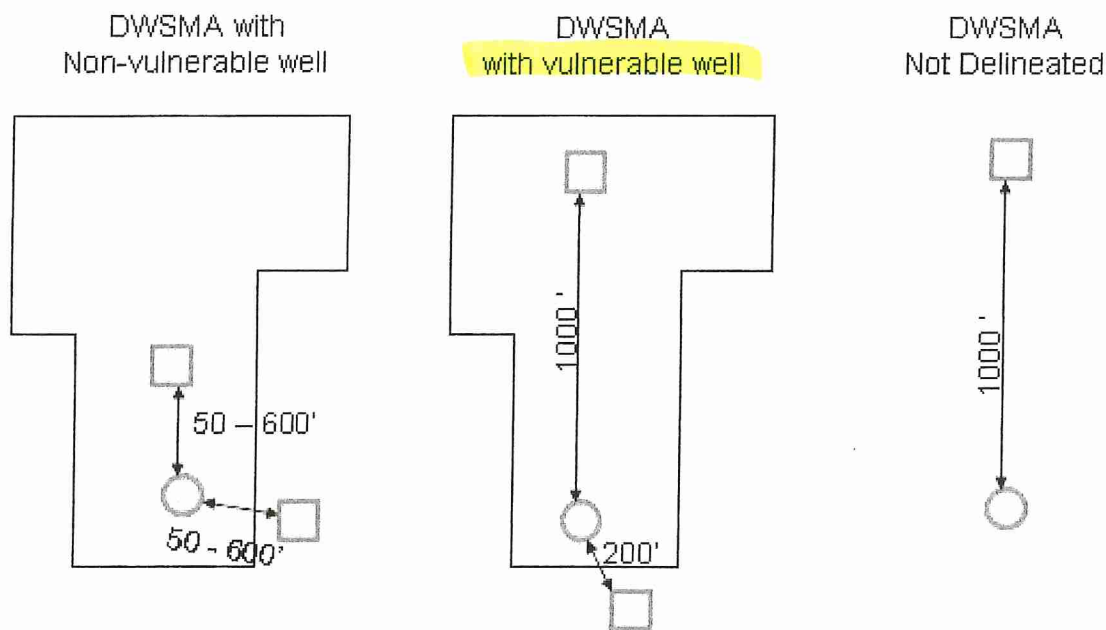
Non-vulnerable

- 50 to 600-foot setback: Site is in drinking water-supply management area and land/well is **not** designated as vulnerable. Use same setback requirements as for all other wells.

Setbacks from other public wells

Other public wells that are not considered community, school or child care center wells, must meet the well setback requirements for all water-supply wells previously described (50-foot or 100-foot for animal holding areas and 100-foot or 600-foot for manure storage areas).

Figure 2. Feedlot setbacks from community, school and child care center wells



□ New Feedlot and Manure Storage Area

○ Community, school, or child care center well

I RATE THIS WELL IN QUESTION A VULNERABLE WELL
DO TO SLOPE OF LAND TO THE WELL & RAILWAY
BERM.

EXHIBIT B-2



AMERICAN
SOCIETY FOR
MICROBIOLOGY

Applied and Environmental
Microbiology

Appl Environ Microbiol. 2004 Nov; 70(11): 6420–6427.

PMCID: PMC525133

doi: [10.1128/AEM.70.11.6420-6427.2004](https://doi.org/10.1128/AEM.70.11.6420-6427.2004)

PMID: [15528501](https://pubmed.ncbi.nlm.nih.gov/15528501/)

Escherichia coli Contamination of Vegetables Grown in Soils Fertilized with Noncomposted Bovine Manure: Garden-Scale Studies

Steven C. Ingham,^{1,*} Jill A. Losinski,¹ Matthew P. Andrews,¹ Jane E. Breuer,² Jeffry R. Breuer,² Timothy M. Wood,³ and Thomas H. Wright⁴

Department of Food Science,¹ Hancock Agricultural Research Station,² Lancaster Agricultural Research Station,³ West Madison Agricultural Research Station, University of Wisconsin—Madison, Madison, Wisconsin⁴

*Corresponding author. Mailing address: Department of Food Science, University of Wisconsin—Madison, 1605 Linden Dr., Madison, WI 53706-1565. Phone: (608) 265-4801. Fax: (608) 262-6872. E-mail: scingham@wisc.edu.

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ABSTRACT

In this study we tested the validity of the National Organic Program (NOP) requirement for a ≥ 120 -day interval between application of noncomposted manure and harvesting of vegetables grown in manure-fertilized soil. Noncomposted bovine manure was applied to 9.3-m² plots at three Wisconsin sites (loamy sand, silt loam, and silty clay loam) prior to spring and summer planting of carrots, radishes, and lettuce. Soil and washed (30 s under running tap water) vegetables were analyzed for indigenous *Escherichia coli*. Within 90 days, the level of *E. coli* in manure-fertilized soil generally decreased by about 3 log CFU/g from initial levels of 4.2 to 4.4 log CFU/g. Low levels of *E. coli* generally persisted in manure-fertilized soil for more than 100 days and were detected in enriched soil from all three sites 132 to 168 days after manure application. For carrots and lettuce, at least one enrichment-negative sample was obtained ≤ 100 days after manure application for 63 and 88% of the treatments, respectively. The current ≥ 120 -day limit provided an even greater likelihood of not detecting *E. coli* on carrots (≥ 1 enrichment-negative result for 100% of the treatments). The rapid maturation of radishes prevented conclusive evaluation of a 100- or 120-day application-to-harvest interval. The absolute absence of *E. coli* from vegetables harvested from manure-fertilized Wisconsin soils may not be ensured solely by adherence to the NOP ≥ 120 -day limit. Unless pathogens are far better at colonizing vegetables than indigenous *E. coli* strains are, it appears that the risk of contamination for vegetables grown in Wisconsin soils would be elevated only slightly by reducing the NOP requirement to ≥ 100 days.

Recent scrutiny of the role of agricultural practices in contamination of fresh vegetables with pathogenic microbes (47, 54) has led to concern about the safety of using animal manures as fertilizer in vegetable production. In the North Central region of the United States, an estimated 10.4 million dairy and feedlot cattle produce between 23.6 and 35.5 kg of manure (feces and urine) per 454 kg (live weight) per day (16). Bovine manure is a good source of macro- and micronutrients, so using it as fertilizer is an important disposal method (35), particularly for organic farmers. However, bovine manure is a well-known source of food-borne pathogenic bacteria (31, 33, 41, 64, 67), and using it without prior treatment to destroy pathogens increases the likelihood of contaminating vegetables grown in manure-fertilized soils. Composting is an accepted manure pathogen reduction treatment (58), and compost-

MANURE PRODUCTION PER ANIMAL.

Bruce-Grey-Owen Sound Health Unit

confirmed that Well 5 is subject to surface water contamination and elevated turbidity.

Environmental testing of 13 livestock farms within a four kilometer radius of the three wells, identified human bacterial pathogens in animal manure on all, but 2 farms. On nine farms, *Campylobacter* spp. were identified and, on two farms, both *E. coli* O157:H7 and *Campylobacter* spp. were found; this included a farm adjacent to Well 5. The molecular subtyping and phage-typing of the *E. coli* O157:H7 and the *Campylobacter* spp. isolates from this farm were identical to those found in the majority of the human cases. While investigators could not prove the pathogens were present prior to the outbreak, the evidence suggested the pathogens that entered Well 5 likely originated from cattle manure on this farm. A simulation model of rainfall and the drainage pattern in the vicinity of Well 5 indicated that rain falling on the barnyard and adjacent fields would have drained toward Well 5.

A series of unfortunate circumstances occurred to cause an outbreak of this magnitude. These included heavy rains accompanied by flooding, *E. coli* O157:H7 and *Campylobacter* spp. present in the environment, a well subject to surface water contamination and a water treatment system that may have been overwhelmed by increased turbidity. This situation emphasizes the importance of secure water sources and adequate water treatment in ensuring a safe water supply to a community. Bacterial monitoring can only identify a contaminated source after the contamination has spread through the water system and put the public at risk.

The Walkerton outbreak calls into question the safety of groundwater sources that may be under the influence by surface water especially under flood conditions. Historically, groundwater sources have been assumed to be secure and treated with chlorination only. However, in light of this tragedy, this approach needs to be re-evaluated. Such an evaluation should take into account all current and future pressures on land use including human population density and agricultural activities.

See all ›
13 Citations

See all ›
10 References

See all ›
1 Figure

EXHIBIT - B-4
BY UNIVERSITY OF GUELPH
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5 Concluding Remarks

The terms of reference for this study were to estimate the tangible costs of the Walkerton crisis. I present a conservative estimate of these costs of approximately \$64.5 million. The actual tangible costs could well turn out to be higher, since I attempt to be conservative whenever it is necessary to make assumptions.

The conclusion to be drawn from this study is that approximately \$64.5 million in tangible costs are at risk from any future water contamination incident of a magnitude similar to Walkerton's.²⁸ Knowing the probability of such an event would help us to predict the likelihood of incurring such a cost. Similarly, knowing the extent to which an appropriate public expenditure program could reduce that probability would help us to predict the expected benefits (cost avoidance) of the program. Such knowledge is, however, well beyond the scope of this project.

²⁸The terms of reference for this study do not include attempting to place a value on the intangible costs – the lives that might be lost or the illnesses that might result if a similar incident were to occur in the future. It is possible and appropriate to attempt such a valuation but the issues are complex. I therefore address those issues in a separate brief report in this series (Livernois, cited above).



Overview Feed Lot to Wells

Cattle Only 600' From Well
3% = 18' drop



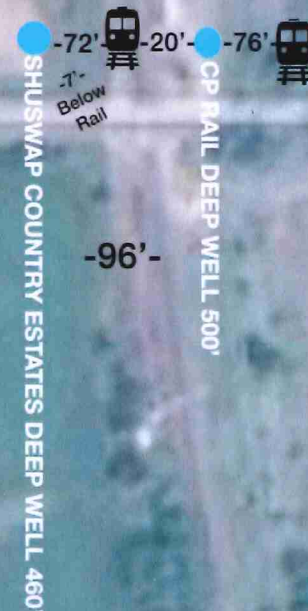
This field also has
an abandoned well
that may not be
properly sealed

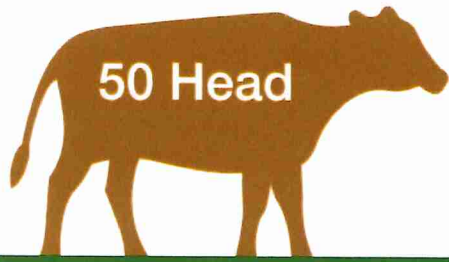


Carlin Rd

Carlin Rd

Proposed Amendment
of Bylaw No.725-12





50 Head

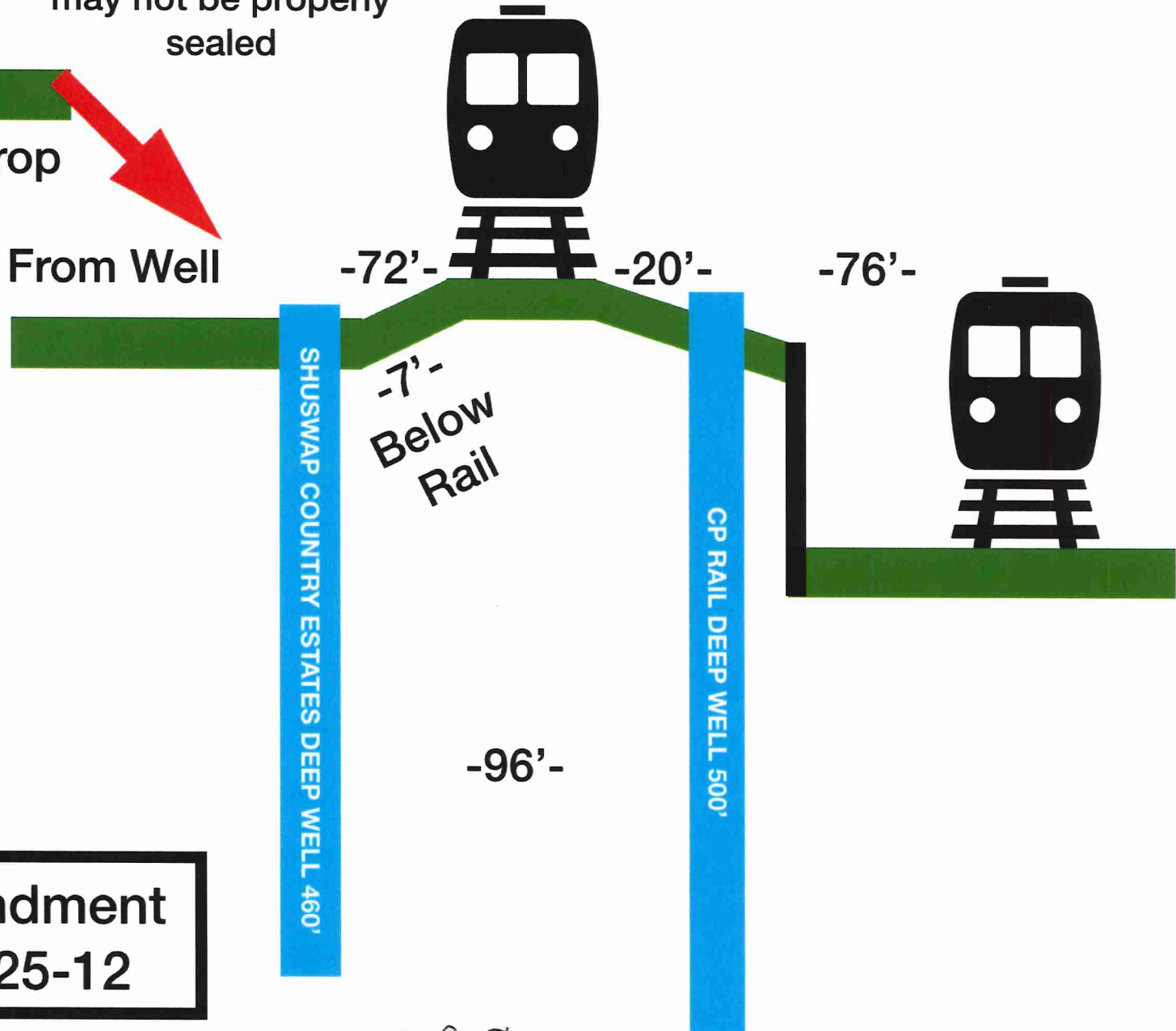
Cattle Feed Lot

3% grade = 18' drop

This field also has an
abandoned well that
may not be properly
sealed

Cattle Only 600' From Well

Cross Section
Feed Lot to Wells



Proposed Amendment
of Bylaw No.725-12

A CASE IN POINT WALKERTON'S TRAGEDY – WATER CONTAMINATION

First read the background section individually. When you have read your case, reread the background and highlight the information that will help you prepare a report and answer the questions. As a team, work to develop a report to present to the whole class.

BACKGROUND

The situation in Walkerton, Ontario, in May 2000 is nothing less than a human tragedy. The outbreak of E.coli, which has killed seven residents, and left 2,300 people sick, was shocking and frightening for the people in the area. For 6 long months the town's 5,000 residents had to rely on bottled water and treating tap water with bleach, with many going to homes of friends and relatives in neighbouring communities to bathe.

Six months after the tragedy unfolded, the town still suffered under a boil water advisory. Many people, even after the water was declared safe to drink in December of 2000, still felt uncomfortable using what comes out of the tap. Their trust and belief in the water system is seriously eroded. The Walkerton tragedy is a serious reminder of what many Canadians take for granted – the value of clean and safe drinking water.

The background articles that follow are not fictional stories made up to illustrate a point, they are the facts, as we know them to date, that are associated with the Walkerton tragedy. As you work through your assigned case questions, keep in mind that this case actually occurred here in Ontario, and that there may be students or teachers in your school who had friends or relatives in Walkerton who were personally affected by this terrible situation.

What Happened In Walkerton

Walkerton's water supply was found to be contaminated with E.coli. The contamination came after a heavy rain storm on May 12 washed cattle manure into a town well, according to evidence submitted at a judicial inquiry examining what happened. The manure contaminated the water with the E.coli intestinal bacteria, which can cause severe illness and death, and a faulty chlorinating system in the well failed to kill the bacteria.

When people began getting sick, the local Medical Officer of Health issued a boil order for the town's water on May 21, and tests two days later confirmed the presence of E.coli. By May 25, five people had died and hundreds were sick. Two more people died in the ensuing weeks as a result of their illness. The situation was made worse by the fact that the contamination went undetected, or at least unreported, for some time. The investigation into how this occurred is ongoing. The following article explains more about how manure can contaminate a well system.



The kitchen sink
Don't Use – This Walkerton kitchen has a sign on the sink that should make us all stop and think about the impact of unsafe water. Imagine how your life would change if the water we all take for granted was suddenly unsafe to use.

Old wells putting water at risk **Unsealed and forgotten, they give contaminants a speedy route to groundwater** Sonia Verma and Devin Donovan, STAFF REPORTERS

THERE ARE SEVERALL

Ontario's drinking water is threatened by more than 100,000 old wells that allow manure, chemicals and other surface contaminants to rapidly poison groundwater.

These wells – many just open holes with no covering or seal – were never plugged when their municipal or private owners abandoned them in favour of new wells. Since it costs up to \$10,000 to plug a well, many owners simply walk away – and the province has no way of knowing whether old wells are sealed unless they receive a complaint from the public.

"There are an unbelievable number of these old wells in Ontario. Years of neglect have turned the ground into Swiss cheese," says Bill Davidson, a spokesperson for the Ontario Groundwater Association, which includes well drillers, engineers and scientists.

Water tapped by wells has slowly percolated into the ground over months or years. Sand, clay, and rock filter out contaminants, making the water safer to drink.

Old wells that haven't been properly sealed provide a tunnel for contaminated water to speed past this natural filtration system and contaminate the groundwater that supplies 2.8 million Ontario residents with drinking water. Groundwater can be contaminated in a minute or less in this way, experts say.

While the problem is province-wide, it also may explain how farm run-off quickly sank into the aquifers that feed two wells in Walkerton, where contamination of the town's drinking water with the bacteria E.coli O157:H7 last May caused seven deaths and made 2,300 people ill.

Walkerton's Wells 5 & 7 showed E.coli contamination for four years, and extremely high levels of the fecal bacteria in May.

Investigators have so far located 19 old wells that may have allowed farm run-off to contaminate groundwater, which in turn contaminated the town's newer wells. The 19 old wells have been plugged since the crisis in Walkerton.

Provincial officials admit unplugged wells are a problem, but have no idea exactly how many exist across Ontario.

The best guess comes from the groundwater association, which estimates that more than 100,000 of Ontario's approximately 750,000 wells are a threat to public safety because they were not properly plugged, a procedure involving the injection of cement or a clay called bentonite into the well shaft.

It is up to the well owner to report a well has been abandoned and sealed, says Warren Lusk, senior official in the Environment Ministry's Kingston office.

As of last year, the province had 26,152 wells reported abandoned. However, the province has no way of tracking how many wells fall out of use and are not reported unless a complaint is filed with the Ministry.

Lusk says he has received only three public complaints about improperly abandoned wells this year, and admits the Ministry is unsure of the scope of the problem and the estimate of 100,000 problem wells across the province.

"I couldn't (say) if it (the estimate of 100,000 wells) is correct or not. If they are out there, the onus is on the well owner to plug and seal them off," Lusk says.

Wells are usually abandoned because the owner – town or landowner – has found a better source of water. Left unsealed, abandoned wells "may constitute a hazard to public health and safety," states a 1999 Environment Ministry circular.

The Ministry used to have a team of well inspectors who received complaints directly and enforced the well-plugging rule. Over the past decade, the unit has been reduced from about 5 inspectors to just 1.

Environmental officers such as Lusk have taken over the responsibility of addressing complaints about problem wells, but critics say their time is spread too thin to tackle the problem effectively.

Retired inspector Cliff Faulkner says the wells present an "enormous" threat to public safety. "If you poke a hole in your skin and don't cover it, it becomes infected. It's the same with wells. When you don't cover them properly, they become susceptible to contamination and can infect an entire aquifer," says Faulkner, who worked for the Environment Ministry for 33 years.

Well inspectors used to assess the construction and safety of new and problem wells. During these routine field inspections, they would often discover abandoned wells. Well owners were told how to fix the problem, a field order was issued, and the inspector would follow up.

"Now that the inspectors are gone, nobody knows how bad the situation really is," says Faulkner, who lobbied ministry officials for tougher rules and enforcement before he retired. "There was no response."

The groundwater association has also put forward proposals for more enforcement – most recently in 1997 – but also received no response from the Ministry.

Many association members are well drillers who encounter the problem every day. They say that if the Ministry does not enforce the well-plugging rule, well owners will do nothing.

Drillers interviewed by The Star told stories of finding unused wells covered by manure piles or filled with garbage, and even some with dead animals lying at the bottom.

"Some people are given a price to properly plug a well, they say that's too much and they decide to just leave it because they know nobody will check," said Terry Marquardt, president of the groundwater association.

Plugging a well can be costly – between \$1,000 and \$10,000. The Ontario Water Resources Act provides penalties for offences that lead to the contamination of groundwater, including not plugging a well. Fines range from \$100,000 for an individual to \$1 million for a town or corporation. However, with no enforcement, the regulation has no power, drillers say.

The problem is not confined to Ontario. Across Canada and in the U.S., governments are becoming more aware of the issue.

The solution is to pinpoint old wells and seal them. Doing this in Ontario is complicated because the Environment Ministry's well database does not accurately record where old wells are. There are few records of the location of wells built or abandoned before the early 1990s because the information wasn't legally required.

With few ministry staff devoted to wells, the Ministry can barely enter data for the 15,000 new wells that are built each year – leaving no time to assess the number of old wells that need plugging.

Provincial auditor Erik Peters reported in 1996 that, of the 200,000 wells built since 1984, records for only 30,000 had been entered into the database. The Ministry has recently brought its data entry up to date, but many of the records do not give the exact location of wells.

Lusk says the Ministry is working on updating the regulations governing well plugging.

The Cost of Cleaning Up Walkerton's Water

Walkerton's water situation is not only a human tragedy; it has other implications that may have a lasting effect on the town's financial well-being in the long term. While it is true that the cost of protecting water resources can be high, the cost of prevention cannot be compared to the cost of a cure.

To date, the cost of fixing the water system in Walkerton appears to add up to a whopping \$11 million. There's still no agreement on who will pay this huge bill. In addition to this sum, there is the cost of leasing the state-of-the-art treatment equipment, expected to cost about \$2 million more. Residents, already reeling from the effects of the tragedy and from the concerns about the safety of their water, are now worried about being stuck with the bill for remediation and clean up. If they end up paying the costs through sharply higher property taxes and water rates, that financial burden will hinder the town's recovery and make it harder to attract new residents and businesses, they said.

Brockton Mayor David Thomson said in an interview that he was surprised by the \$11 million figure, but he said residents have little to worry about and should "trust the people that are in charge." Provincial officials have so far refused to offer any guarantees about how much the province will pay, saying that they cannot be committed to paying anything until they see a final bill. The focus of the Province up to this point they say, has been get the clean water in the system, get the system fixed.

The government says it's waiting to see how much of the tab will be picked up by the municipality, the local public utilities commission, and their insurance companies.

To date, the province has given the town about \$6 million – but much of that has been in the form of loans. It has also said it will look at grant applications from the municipality.

THE CASE

As a team, discuss the Walkerton tragedy as it is outlined. For your own interest, you may also search for additional information in local news reports and in the archives of any newspaper.

As a group, work to develop a report for the other students in the class that offers them some background information about what happened in Walkerton. Be sure to explain how the water got contaminated.

Then, present your responses to the following questions:

- In your opinion, who should be held accountable for the water contamination in the Walkerton situation and why do you feel this way?
- How do you think this tragedy has affected the area to this point, and what future effects may be felt by the residents?
- What do you feel could be done to ensure that this sort of tragedy never happens in Ontario again?

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Address: 10 Peel Centre Drive, Brampton, Ontario L6T 4B9