From:	Dominic Kazmierczak
To:	Jessica Anderson
Subject:	FW: [EXTERNAL] - Bylaw C-8090-2020 AND C-89051- 2020 (Mountain Ash Application PL 2020-0103). Gravel pits
Date:	January 27, 2021 2:52:44 PM

Submission for Mountain Ash public hearing below.

DOMINIC KAZMIERCZAK
Manager| Planning Policy

ROCKY VIEW COUNTY
262075 Rocky View Point | Rocky View County | AB | T4A 0X2
Phone: 403-520-6291
DKazmierczak@rockyview.ca | www.rockyview.ca

From: Michelle Mitton <MMitton@rockyview.ca>
Sent: January 27, 2021 2:16 PM
To: Dominic Kazmierczak <DKazmierczak@rockyview.ca>
Subject: FW: [EXTERNAL] - Bylaw C-8090-2020 AND C-89051- 2020 (Mountain Ash Application PL 2020-0103). Gravel pits

MICHELLE MITTON, M.SC
Legislative Coordinator – Legislative Services

ROCKY VIEW COUNTY
262075 Rocky View Point | Rocky View County | AB | T4A 0X2
Phone: 403-520- 1290 |
MMitton@rockyview.ca | www.rockyview.ca

From: D Reid [redacted]
Sent: Tuesday, January 26, 2021 9:33 PM
To: Legislative Services Shared <LegislativeServices@rockyview.ca>
Subject: [EXTERNAL] - Bylaw C-8090-2020 AND C-89051- 2020 (Mountain Ash Application PL 2020-0103). Gravel pits

Dear Rocky View Council:

I am writing to you in regards to the various plans to open more gravel pit mines in RVC (for example Bylaw C-8090-2020 AND C-8051- 2020 Mountain Ash Application PL

2020-0103).

I am particularly concerned with two aspects:-
- in general, the idea of operating more gravel pits near existing and well established residential is an appalling action to take.
- more specifically, the plans to a start a number of new gravel operations nearby, and just northwest of, the Big Hill Springs Provincial Park is a serious mistake.

RVC should not be allowing industrial and mining operations that will significantly interfere with well established residential communities due to noise and dust pollution, constant heavy truck traffic, road congestion, road damage, serious harm to wildlife, the overall detrimental environmental effects, visual pollution, and of course the lowering of house and property value.

Furthermore, once one industrial operation is allowed this will encourage yet more industry. If a single mine is opened it is inevitable that more will be allowed. I do not see any examination of the **cumulative effects of a number of mining operations**. Has anyone examined the cumulative effects? This must be done before any new mine operations are started.

The income that RVC gains from gravel pit operations will not cover the costs of environmental remediation, road repair and construction.

Reclamation to the original conditions before the start of mining is difficult and in my experience is never achieved. The mining and oil industry in Alberta has an appallingly poor record of environmental remediation. Just look at the numerous orphaned oil wells all over Alberta, the utter shambles of the unsuccessful attempts to remediate oil sands, and all the old abandoned open pit coal mines.

If the aquifer source of the Big Hill Springs is negatively impacted by gravel mining, the Big Hill Creek (and its various fish species) will of course also be harmed. It seems highly probable that the aquifer will be affected by the mining operations. It is impossible to repair the subsequent damage to an area of unique geological, biological and ecological interest. Damaging this special and much loved place is foolish and shortsighted.

I have read the engineering reports produced for the gravel pit companies that purport demonstrate these the mining operation will not cause environmental harm. Here I speak as a research biologist with 50 years of experience and I am most unimpressed by their scientific quality or depth of these reports. In my estimation it seems likely that the aquifer will be negatively affected by the gravel operations.

Sincerely,
David M. Reid
Professor of Biology (Emeritus).

20 Poplar Hill Place, Calgary AB T3R 1C7 (This is in the north end of the Bearspaw district)
[redacted]

Michelle Mitton

From: Aaron Hamilton [redacted]
Sent: Friday, February 5, 2021 5:00 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - Bylaw C8051-2020

Follow Up Flag: Follow up
Flag Status: Completed

Dear Rocky View County Council,

Please do NOT allow an open gravel pit anywhere near the Big Hill Springs Provincial park. This area is very environmentally sensitive. Not only will it destroy the park but the dig will also contaminat the Big Hill Creek.
This is a beautiful and special area enjoyed by thousands of Albertans all year round. We love the area!♥

I do not support this!!!!
PLEASE STOP THE GRAVEL PIT!!!

Aaron Hamilton
175 Jumping Pound TC
Cochrane Ab

Michelle Mitton

From: Alan Welch [redacted]
Sent: Friday, February 5, 2021 10:15 AM
To: Legislative Services Shared
Subject: [EXTERNAL] - Bylaw C8051-2020

Follow Up Flag: Follow up
Flag Status: Completed

Dear Sir or Madam,

I strongly **oppose** the new project called the summit pit!

I am not affiliated with any of the concerning parties, but I am a passionate Albertan who enjoys the beauty of Alberta. It saddens me immensely that beautiful areas that have been designated as parks, all of a sudden have land just outside that boundary, repurposed and in this instance to what can only be described, as a noisy, irritating eyesore and an environmental catastrophe. Not to mention the potential for harmful carcinogens being released by the dust that these pits ultimately produce.

Please do not grant this excavation your approval.

Kind regards
Alan Welch

Resident of Cochrane, Alberta

Michelle Mitton

From: Christyann Olson <colson@abwild.ca>
Sent: Sunday, February 14, 2021 11:55 AM
To: Legislative Services Shared
Subject: [EXTERNAL] - AWA Submission to Rocky View Country Aggregate Operations Land Redesignation Hearing
Attachments: 20210214_lt_awa_rocky view_county_bylaw C-80521-202 redesignation_aggregate_operations__.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Dear Reeve Daniel Henn,
Please find Alberta Wilderness Association's (AWA) letter of submission for consideration at the Rock View County Hearing on the matter of redesignation of agricultural land to allow aggregate operations on lands immediately adjacent to Big Hill Springs Provincial Park.

AWA respectfully requests that the application to redesignate the land from Agricultural, General District to Direct Control District to facilitate aggregate operations be denied

Sincere best regards,
Christyann

Christyann Olson
Executive Director

Alberta Wilderness Association
"Defending Wild Alberta through Awareness and Action"

455-12 St NW Calgary, AB T2N 1Y9
403.283.2025 www.AlbertaWilderness.ca
****

ALBERTA WILDERNESS ASSOCIATION

"Defending Wild Alberta through Awareness and Action"

Rocky View County Reeve Daniel Henn
legislativeservices@rockyview.ca

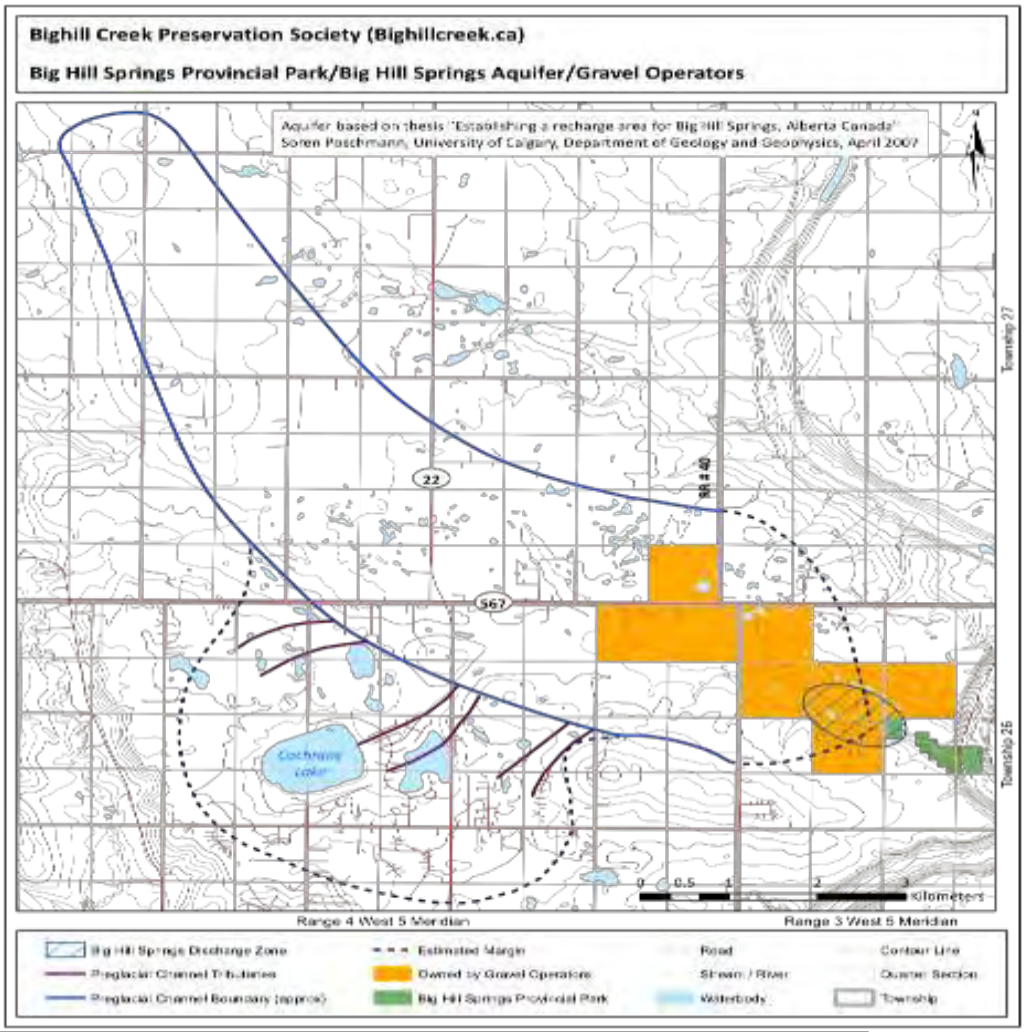
February 15, 2021

AWA Submission to Rocky View Country Aggregate Operations Land Redesignation Hearing,
Bylaw C8051-2020, PL20200031, Mt. Ash LP.

Alberta Wilderness Association (AWA), founded in 1965, works throughout Alberta towards more representative and connected protection of the unique and vital landscapes that are the source of our clean water, clean air and wildlife habitat. With more than 7,000 members and supporters AWA remains committed to ensuring protection of wildlife and wild places in Alberta for all Canadians.

It has come to our attention that Rocky View County (RVC) will consider an application for redesignation of agricultural land at a public hearing March 2, 2021, that would allow the first of four aggregate operations immediately northwest of Big Hill Springs Provincial Park.

The proposed aggregate operations would be developed on lands above the aquifer that feed the unique springs that are vital to the functioning and vitally important natural features of the park. The map on the right provided by the Bighill Creek Preservation Society clearly shows the Big Hill springs aquifer and proposed gravel operations.



Big Hill Springs Provincial Park is small in size at only 70 acres, but stands out as one of the first parks established in Alberta because of features that have drawn visitors for more than a hundred years. Its beauty is based on a variety of nationally and provincially significant features of ever greater value to a recreating public. The park is well known and used today, with at least 250,000 annual visitors. In recent years, AWA provided interpretive opportunities at the park that saw children examine the waterfall, learn how to do kick samples and examine under microscopes pond insects all helping them learn how important this welcoming little stream and waterfall area could be for them and for wildlife.

It is the unique and intriguing springs that will be in jeopardy if gravel mining is allowed on their aquifer. Surprisingly to some, Big Hill's springs are ranked in a 1984 Parks Canada survey of springs, conducted by S.J. Houseknecht, as being "*one of the top four mineral springs found in Canada,"* and yet, they have been poorly recognized or properly protected. This past year the province closed the park for a full year so work could be done to help protect the increasingly popular park and its unique and appealing water features and landscapes.

These mineral springs are truly unique in that they produce at the rate of 84 litres/second and maintain an almost constant flow and temperature throughout the year. And, over thousands of years, they have also deposited the mineral calcium onto vegetation and debris, forming an unusual rock called tufa. The tufa has built into a series of formations that the creek attractively tumbles over to the delight of visitors. These springs features are recognized as provincially and nationally significant. The springs also supply 50% of the flow in Big Hill Creek that enters the Bow River at Cochrane, bringing reliable amounts of high quality water. Such water is increasingly precious as the effects of climate change become more threatening.

The fact that the federal Department of Fisheries and Oceans have recognized the waters of Big Hill Creek around the Provincial Park and springs as critical habitat for threatened bull trout is also significant and indicates the absolute importance of maintaining the aquifer, springs, and the temperature and flow rates of water in the creek.

The park and natural landscapes in the vicinity, including the deeply incised meltwater coulee that leads downstream from the park to Cochrane, are recognized as ecologically significant in that this is one of the few existing areas protecting the Foothills-Parkland Subregion of Alberta. Today less than 2% of this subregion has any provincial protection; losing any of the protection currently afforded this natural region threatens our native biodiversity and the health of our environment. The province has made a commitment to protect 17% of our province, underrepresented natural regions like the one here need to be increased dramatically.

Equally important is the protection of connectivity. Because the park and surrounding lands remain in a relatively natural state, a wide range of wildlife is supported and allows movement through travel corridors to the Bow River Valley and Glenbow Ranch Provincial Park, as well as north to Dog Pound Creek, west to Horse Creek and beyond to Grand Valley and east through routes into the Nose Creek basin. Big Hill's valley functions as an oasis for species from the Grasslands, Parklands and Foothills ecological regions that includes an amazing blue heron colony known to be more than 100 years old and nest sites for peregrine and prairie falcons. Even sharp tail grouse leks are known in the vicinity. Other animals include moose, elk and two deer species, both black and grizzly bear and wolves have been seen in the valley in recent years. Cougar are regular residents, along with coyotes, foxes, mink, weasels, bob cats, porcupine, ground and red squirrels, garter snakes, and chorus frogs are abundant and leopard frogs are known. At least 126 species of plants are found in the area, not including mosses, fungi, lichens or liverworts, along with 132 species of birds.

It is extremely important that the natural features of Big Hill's Valley, Park and Creek be maintained as lands surrounding it are increasingly developed. It is also critical to maintain the connecting corridors integral to the area that allow for the continued flow of biodiversity and recognizes the importance of a network of connected protected areas.

Because of the many unique and fragile features of Big Hill's ancient aquifer, its springs, the rare tufa formations and the array of ecological and wildlife values the area supports, AWA respectfully submits that it would be wise to increase protection for these values and help gravel developers move operations to other less sensitive sites.

Indeed, increasing the size of Big Hill Springs Park, as has long been requested both officially and by citizens, could provide a great service to those living in the area and far beyond. The site has the possibility of becoming a valuable interpretive park that would be an important tourist attraction with lasting economic value. A value that could well exceed that of a gravel operation.

AWA respectfully requests that the application to redesignate the land from Agricultural, General District to Direct Control District to facilitate aggregate operations be denied.

Sincerely
ALBERTA WILDERNESS ASSOCIATION

Christyann Olson
Executive Director

455 12 ST NW, Calgary AB T2N 1Y9
Phone 403.283.2025 Fax 403.270.2743 awa@abwild.ca www.AlbertaWilderness.ca

Gerald Bietz
President, Bighill Creek Preservation Society
Box 31, Site 13, RR #2
Cochrane, AB, T4C 1A2
August 21, 2020

Reeve Greg Boehlke
Rocky View Council
262075 Rocky View Point
Rocky View County
T4A 0X2

Dear Mr. Boehlke:

Regarding: Mountain Ash/ Summit Gravel Extraction Proposal and Risk to Big Hill Springs Provincial Park and Bighill Creek

Commented [1]:

Bighill Creek Preservation Society was registered as an Alberta Society in 2015. We are the stewards of the municipal lands within the Bighill Creek drainage. Our overarching objective is the preservation of the unique natural and historic attributes of entire Bighill Creek watershed. To this end we have worked to develop a Watershed Plan for the entire basin. We have raised funds and carried out studies of water and sediment quality, fish populations and habitat, riparian health, terrestrial and aquatic insects, and eDNA. We have installed continuous water temperature monitoring at 12 sites. In 2020, with the University of Calgary we commenced a broader evaluation of the numerous springs which support this regionally extraordinary habitat. Due to COVID restrictions, this work has been postponed.

Big Hill Springs Provincial Park, a significant regional asset is located in the Bighill Creek drainage. In 2019 it is estimated to have received 175,000 visitors. Due to over use the Park is currently under renovation.

Studies by the University of Calgary have determined that the source waters for the Park and about 50% of the flow into Bighill Creek emanate from an aquifer which extends generally north and west of the Park. The proposed mine would be located on the aquifer and immediately adjacent the main springs which sustain the Park. Mining would remove the protective over burden, exposing the aquifer to contamination. Breaching the aquifer would require dewatering the pit, thus diminishing flows to the Park and Creek, placing in jeopardy a much loved Park, a diverse ecological system and; as the Creek flows though Cochrane, a valuable recreational/ecological asset of the town.

Earlier, when this and two other open pit gravel mines were proposed, adjacent to each other just west and north of the springs and Park, BCPS registered its concerns with RVC Council. Now, BCPS asks that RVC reject any consideration of the Mountain Ash/Summit Pit proposal due to the significant risk of damage to the aquifer underlying these mines and therefore the viability of the Park and drainage. There is possibly no more environmentally sensitive development proposal in all of RVC. To put this artifact in jeopardy for common gravel would be a travesty. In our region, gravel is virtually everywhere. It can be sourced from a less sensitive place.

As more people move into RVC the demand for parks and recreation trails such as those associated with Big Hill Springs Park and our Creek will only increase. We ask that RVC consider equally the value of the springs, the Park and area recreation when it makes any decision regarding the Mountain Ash/Summit Pit proposal or the other proposed pits.

Yours sincerely,

Gerald Bietz,
President, Bighill Creek Preservation Society
cc RVC Councillors and Jessica Anderson, RVC Planner

Michelle Mitton

From: Prez BHCE <prez4bhce@gmail.com>
Sent: Tuesday, February 16, 2021 10:21 AM
To: Legislative Services Shared
Subject: [EXTERNAL] - Fwd: for submission

Follow Up Flag: Follow up
Flag Status: Flagged

Dear Council;
Big Hill Creek Estates water coop is the water cooperative that services the15 homes located in Big Hill Creek Estates and as such is an interested party in the above noted Application. We are concerned about the possibility of an aggregate operation on land adjacent to the well we manage.
As you are aware, the Water Act and Environmental Protection & Enhancement Act in Alberta prohibit the siltation and erosion and releases that may degrade water quality. We are not satisfied that the information provided by the applicant demonstrates the appropriate due diligence in determining that an aggregate operation would not degrade the water quality of a well on adjacent land. In fact, a comprehensive study out of Finland produced by the National Board of Waters and Environment (no such study could be found for Canada though the geological states are similar) states conclusively that an aggregate operation would degrade the water quality and we have reproduced the conclusion below:
Gravel extraction causes changes in seepwater and groundwater quality as well as in the elevation of the groundwater table and its variation. Acid rain flushes the soil, increasing the quantity of dissolved salts and seepwater and groundwater quality variations. The composition of water in groundwater ponds varies in the same way as that of surface water, seasonally. The great variations in the quality of pond water increase the variations in groundwater quality. Gravel extraction increases the pollution risk of groundwater and may cause difficulties in the treatment of the water abstracted from a groundwater intake.1
If you would like a complete copy of the study, we are happy to provide as this study has been reviewed by many municipalities in Canada contemplating aggregate extraction applications.
Assuming that the groundwater in the vicinity of the aggregate operation will be negatively impacted, the well managed by Big Hill Creek Community Association will obviously be impacted.
As we are only a water coop supplying 15 residences. our financial ability to manage a problem with our water supply are limited and without a good source of water our properties are worthless.
To what degree can we hold the gravel pit operators responsible and what degree would RVC be responsible.
Who would step up and help out our community. Would the gravel pit owners and/or RVC be prepared to put up a
assurance bond payable to BHCE water coop in the event our water supply is contaminated.
In Alberta a reportable fuel spill is anything 200l and above. to put this in perspective one l of gasoline can contaminate one million litres
of water (Government of Canada n.d.)

there is the potential for this to occur. with the ground cover removed contaminants could easily contaminate our water supply and the Paskapoo aquifer from which many Albertans including our community draw our water.

RVC please remember this
You can live without food for three weeks
You can only live without water for three days
You can live without gravel forever

The bad news is water is running out … water is our most valuable resource
the one thing humans CANNOT survive without and
its becoming harder and harder to find

Wall street has begun trading water as a commodity,like gold and oil. The first water market launched on the Chicago Mercantile exchange
and there were 1.1 billion in contracts tied to water prices in California

is gravel really the thing RVC really needs. Certainly the vast majority of the gravel
will be sent to final destinations outside of RVC so are you really helping the residents of RVC?

1
Future Groundwater Resources at Risk (Proceedings of the Helsinki Conference, June 1994) IAHS Pub. No 222, 1994

At no point in this notification process was Big Hill Creek Estates water coop approached by the applicant or anyone
representing the applicant to discuss the application or the proposed project and any potential
impacts to the well we manage. We feel this was an egregious oversight and does not
demonstrate good faith in creating a positive working relationship going forward. The
application should be denied.

Sincerely,

Big Hill Creek Estates Water Coop

Michelle Mitton

From: Ken Stevenson [redacted]
Sent: February 16, 2021 12:28 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - Summit Pit concerns: Ken Stevenson
Attachments: Rocky View Council15 February 2021 -Trout work.docx

Follow Up Flag: Follow up
Flag Status: Flagged

Do not open links or attachments unless sender and content are known.

Dear Rocky View Council,

I am attaching an email submission of a signed formal letter being sent to you today (15 February 2021) with regards to the Application PL 2020031 By-Law: C-8051-2020 for the Proposal by Mountain Ash Partnership for a Gravel Extraction on what is know as their SUMMIT PIT. The gravel removal is located on the surface above the known under-ground aquifer water source of the Bighill Springs Creek in the Bighill Springs Provincial Park.

Thank you for consideration of this letter.

Yours respectfully,

Ken Stevenson
Board Member: Bighill Creek Preservation Society
148- Gleneagles View
Cochrane T4C 1W1
[redacted]

Rocky View Council
262075 - Rocky View Point
ROCKY VIEW COUNTY
Alberta, T4A 0X2

15 February 2021

Bighill Creek Preservation Society
c/o 148 – Gleneagles View
COCHRANE, T4C 1W1
Alberta

Dear Rocky View Council,

Summit Mine-Mountain Ash Partnership
Application PL 2020031, By-Law C-8051-2020
Concern for Water Quality in Bighill Springs Creek

The Bighill Creek Preservation Society was formed in 2015 by local citizens as a non-profit Society. During the past five years this Society has completed and published quality environmental studies on the creek water and the watershed. These studies have been Phase I and Phase II of detailed water/sediment studies at six sites in the creek and at two springs – one being the Bighill Springs in the Provincial Park, Aquatic Insect studies at five sites along with an eDNA profile of the creek waters, Riparian studies at three sites within the watershed, Electro-fishing through Trout Unlimited – Calgary at three sites and, recently in 2020, using temperature loggers at eleven sites to obtain vital temperature profiles of the creek.

One of the future endeavours on the Bighill Creek Preservation Society is to work with the Federal Department of Fisheries and Oceans and our Alberta Environment – Fisheries Department to assess the spawning habitat of the creek and consider the re-introduction of native Westslope Cutthroat Trout and Bull Trout. Up to the 1960's, the creek waters from the Provincial Park to the confluence of the Bow River had good numbers of these native trout. Beavers have been, and are currently active, in the Reserve Lands (County of Rocky View), the St. Franciscan Retreat Lands and the Town of Cochrane.

The Bighill Springs Creek and watershed currently is classified as very environmentally intact and of high quality. These features are very much enjoyed by visitors to the Provincial Park and through walking trails in the Reserve, the Retreat and the Town of Cochrane.

The proposed Summit Mine is located on top of the known Aquifer of the Springs which arise within the Bighill Springs Provincial Park. This proposal must not be permitted due to the real risk of severely altering the Spring waters within the Provincial Park and downstream to the Bow River.

Yours sincerely,

Ken Stevenson, Board: Bighill Creek Preservation Society

Michelle Mitton

From: Blake Johnson [redacted]
Sent: Friday, January 29, 2021 11:24 AM
To: Legislative Services Shared
Subject: [EXTERNAL] - C8051-2020

Follow Up Flag: Follow up
Flag Status: Completed

Do not open links or attachments unless sender and content are known.

I Blake Johnson write in OPPOSITION, to the Mountain Ash Limited Partnership application for an open pit gravel mine. I frequent Big Hill Springs and Creek, and it is an area far too sensitive ecological. It is unacceptable that a an open pit gravel mine like this is even being considered as it is in such close proximity to a precious water resource and a provincial park, used by thousands every year. A large crater from a mine like this would cause a recharge of springs, there fore drastically reducing a protective layer that would eventually carry mining contaminates into Big Hill Creek.

Sent from my iPhone

Michelle Mitton

From: Charlene Gale [redacted]
Sent: February 17, 2021 2:17 PM
To: Legislative Services Shared
Cc: [redacted]; Division 9, Crystal Kissel
Subject: [EXTERNAL] - Bylaw C-8051-2020
Attachments: Summit Pit Feb 2021.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Letter in opposition to Bylaw C-8051-2020 to redesignate W 1/2 -31-26-03-W05M from Agricultural, General District to Direct Control District (DC) in order to facilitate an aggregate operation.

Sincerely,
Charlene Gale

Sent from Mail for Windows 10

Gale Force Ranch

270012 Range Road 40, Rocky View County, AB, CANADA T4C 3A2
403-932-5992

February 17, 2021

Rocky View County,
Legislative Services,
262075 Rocky View Point,
Rocky View County, AB
T4A 0X2

RE: Bylaw C-8051-2020, File: PL20200031 (06731002/4)

Hello, I am Charlene Gale, Gale Force Ranch. I live on SW ¼ Section 6, Twp 27, Range 3 West of the Fifth Meridian which is directly north of the proposed Aggregate Mine on W ½ Section 31, Twp 26, Range 3, West of the Fifth Meridian.

I oppose the proposed redesignation of W ½ 31-26-03-W05M from Agriculture, General District to Direct Control District to facilitate an aggregate operation.

My Father and Grandfather bought this quarter in the 1960's, my husband and I moved here in 1984, and the land was transferred into my name a few years ago.

When we moved here, Highway 567 was an oiled road, the speed limit was 80 km/hr, but you could not drive that fast without damaging your vehicle in the many potholes. Now that it is widened and paved, the speed limit is 100 km/hr but very few drivers go that slow. Highway 567 has become a popular bypass around the city of Calgary and the traffic is often nonstop in the daytime and there is traffic throughout the night as well.

In general, I believe a landowner has the right to use his or her land however they choose, if the impact on the neighboring community is not overly detrimental. Several years ago, the company making this application

came around asking people to support, or at least to not object to this proposed gravel pit. At that time, the pit now called Hillstone (formerly called Airth Pit and Big Hill Springs pit) on NW ¼ section 36, Twp 26, Range 3, West of the 5th Meridian, was smaller and the impact on my enjoyment and use of my property was tolerable. There was dust when the wind blew from the west, noise from trucks passing by or gravel crushing and occasionally gravel dropped on the road. At that time, I was more in favour of people being allowed to use their property as they saw fit than I was against gravel pits and did sign their petition.

Since then, Hillstone has grown and the impact is much greater. The Hillstone pit is ½ mile (800 meters) away from my house. In spite of the large trees around my yard and the big berms around the pit, the dust has become more than a minor nuisance, coating our property in a brown film and probably doing much the same to our lungs and those of our livestock.

The number of trucks passing our house was almost constant between 7:30 am and 5:30 pm, 5-6 days a week this summer. Some of those trucks have either been "enhanced" to make them louder, or the drivers do not know when to shift gears! A few are so consistently loud we can identify them from inside our house with the windows and doors closed.

My opinion of gravel pits near my home has changed and I no longer feel that gravel pits are good neighbours who take the health and well being of the nearby community as seriously as they should. I therefore withdraw my former support of gravel pits. I do realize that gravel is a necessity though and so I will not object to having one pit in my area at a time, although I do wish they were better neighbours.

The proposal for the Summit pit does not say how many trucks they expect to be coming and going from the pit on a daily basis, but 100% of those trucks will be leaving and entering the pit less than 300 feet (90 meters) from my house. They will be braking and gearing down, and then getting up to speed, both loaded going out and empty coming back in. The noise and dust from this traffic will be a huge impact on our lives.

Since Highway 567 is a Correction Line, the entry to the proposed pit, at Range Road 40 on the South side of 567 is only offset from Range Road 40 on the north side of 567 by about 600 feet (180 meters), meaning there will be two intersections very close together. This will make entering or leaving Highway 567 even more difficult and dangerous than it is now. How do they intend to deal with the noise, dust and danger at the entrance to the pit on Highway 567?

The company plans to create berms along highway 567. The elevation of my yard averages about 30 feet (10 meters) higher in elevation than NW ¼ 31 and more than twice that for the SW ¼ 31, so the berms will not make much difference from my house and yard. The berms at Hillstone are very large and yet we still get the dust and noise half a mile away. At one point, I was assured that the Summit pit would also build large berms and plant trees on them on my side of 567 to stop the noise and dust from entering my property. I do not see any mention of that in the current proposal.

My well is 132 feet (37.5 meters) deep and is an incredibly good well, lots of water, although high in minerals. We use it to water livestock as well as for household use. The proposal says they will not go closer than 1 meter to the water table. Since I am higher in elevation than the pit site (30-60 feet or 10-20 meters higher), by the time they remove the topsoil and overburden and begin removing the gravel, they may be near or below the level of my well. Can they assure me that their work will not impact my well? If it does impact the quality or quantity of my water, what do they propose to fix that?

Big Hill Springs Provincial Park is really an Alberta jewel and the impact of having such a large aggregate extraction mine so close to the headwaters of the creek is alarming. The beauty and the presence of historic and prehistoric artifacts in the Park needs to be protected so future generations can also enjoy them. The water flowing through the Park continues on and enters the Bow River. Will the silt and runoff from the pit be controlled, even in heavy rain and wet years so as to not affect the Spring and creek? The proposal says the mine will not go any closer than 800 meters (1/2 mile) from the Park. Hillstone Aggregate is 800 meters

(1/2 mile) from my house and we feel the effects of that pit, how do they think the Park will not be affected at the same distance?

Large equipment and trucks, even when very well maintained, do occasionally leak toxic fluids while working or parked. How is this company planning to deal with this so that the fluids do not end up in the water table or the Big Hill Springs creek?

Although I realize that we do need gravel and the income from such industries benefits Rocky View County and the residents of the County, it does sadden me to see so much agricultural land being redesignated and opening it up for development other than agricultural use. Not only is agriculture an essential service for everyone, but agricultural areas also allow indigenous wildlife to share the area and continue to be a part of this County. Pastureland supports the grasses and herbs that have been growing here for centuries. I read recently that there is a study now being conducted to measure the amount of atmospheric carbon grasslands remove and sequester. The reclamation of the site will not restore the contours of the land or the plants and wildlife that are there now.

In conclusion, I do not support the proposed Bylaw C-8051-2020 redesignating the West ½ of Section 31, Township 26, Range 3, West of the 5th Meridian from Agricultural General to Direct Control District in order to facilitate an aggregate operation. In the future, when the Hillstone Aggregate pit is finished and has been reclaimed, I might be willing to support a new pit in this area.

Respectfully yours,

Charlene Gale,
Gale Force Ranch
270012 Range Road 40,
Rocky View County, AB
T4C 2A3
CC: B & A Planning, Crystal Kissel

Michelle Mitton

From: CINDY MANN [redacted]
Sent: Wednesday, February 10, 2021 2:09 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - Bylaw C-8051-2020

Follow Up Flag: Follow up
Flag Status: Completed

I don't know exactly where this pit will be, but rest assured that if it is within residential areas there will be push back. I live in Church Ranches and we are pulling our hair out over the Leigh High area. Honestly WTF? Where is the fairness to all of this? Surely these gravel pit people have known there is gravel there years before residential areas are allowed to be built. Why and Who is responsible for allowing this to happen? Why are residential areas allowed to be built where industrial plants are allowed. Surely there must be someone to hold responsible for this. This is extremely stressing to everyone involved. Quit allowing developers to develop residential communities in these industrial areas. This must be what is happening here!
It seems this is just a game!!!

As per Leigh High:

Key concerns with this application include:

- Serious risks to the aquifer that feeds Big Hill Springs and Creek – thereby threatening Big Hill Springs Provincial Park
  - o The Park, which sees 250,000 visitors per year, is a unique ecological and recreational asset in west Rocky View.
  - o It is also of cultural significance for the aboriginal community and of historic significance as the site of the area's first creamery and fish hatchery.
- Threatens wildlife habitat since it is in a well-used wildlife corridor featuring grizzly bears, moose, cougars, golden eagles, peregrine falcons – to name a few.
  - o Big Hill Springs and Creek also provide fish habitat for endangered bull trout and is one of the only trout spawning locations in the region.
- Traffic safety issues on Hwy 567 from additional gravel trucks.
  - o Hwy 567 is a narrow 2-lane highway with minimal shoulders. Combining that with its curving hills, there are many areas with restricted visibility – made far more dangerous as gravel truck traffic increases.
- This is Summit Pit's second application. It is to predesignate the quarter section immediately south of its first application and is proposing an MSDP to cover both quarter sections.
  - o Their initial application is currently part of the County's appeal of the successful court challenge of three gravel pits approved along Hwy 567 by the last council. Those pits were successfully challenged because they failed to adequately address cumulative impacts.
    - ▪ If the residents successfully defend against the County's appeal, the approvals of those three gravel pits will be thrown out, leaving this pit in the environmentally worst location of all those pits.
    - ▪ If the County wins its appeal – there will be four open pit gravel mines adjacent to the Provincial Park. This application expands Summit's original application.

While we fully acknowledge that our economy needs gravel, Rocky View has extremely generous aggregate reserves. As a result, it is not clear why gravel extraction should be permitted in such environmentally sensitive areas as the Summit Pit location.

Do we have to keep doing this???

Michelle Mitton

From: Cornell Wynnobel [redacted]
Sent: February 17, 2021 2:27 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - Bylaw C-8051-2020 PL202000031 (06731002/4)

Follow Up Flag: Follow up
Flag Status: Flagged

Do not open links or attachments unless sender and content are known.

We, Cornell and Muriel Wynnobel, 19 Big Hill Creek Estates, Rocky View County, vehemently oppose the above-noted bylaw to redesignate this property from Agricultural to allow for aggregate extraction. We oppose it on two fronts, the damage it will do to both our residential community and to the Big Hill Creek Provincial Park.

Although several of the issues are pertinent to both our residential area and the provincial park we will address them separately beginning with the park.

Of utmost importance is the probability of damage to the source of the spring water which is the reason the park was designated a provincial park in the first place. The aquifer which supplies the park's springs lies directly below the proposed sites for gravel extraction. Over centuries the land which protects the aquifer has developed to filter contaminants and maintain the water temperature which keeps the springs clean, flowing and at a fairly constant temperature. The removal of this protective layer of soil and gravel will destroy the filtration system and thus damage or indeed totally ruin the springs, the life blood of the park. The Paskapoo formation which is the same source as the Bearspaw pit provides the water to our area. According to a peer review document submitted by Ailsa Le May, P.Geo on January 19, 2021, the science which the aggregate company submitted, the hydrogeological study put forth with it's proposal was unworthy of credit and reliance. RVC needs to commission a peer review of the hydrogeological study before even considering this application.

This park is a sanctuary for a multitude of types of wildlife, from fish and birds to small and large mammals. It is a source of food, shelter and water for these creatures. It is one of the rare spawning grounds for the endangered Bull Trout. Remove the constant source of water or contaminate it and the park will be rendered useless. The springs feed the Big Hill Creek which ultimately runs into the Bow River.

The county has expressed its opinion that recreation is of significant importance for the residents as evidenced by asking for feedback on what is needed and desired for recreational purposes. Walking trails have shown to be of ultimate importance. This park supplies unique and exquisite walking trails with the benefit of nature, a canopy of shade, fresh water and waterfalls and historic significance.

Covid 19 should have taught us the value of natural spaces to the physical and mental health of people. Why would we ruin an existing source of this type of recreation for more gravel which exists in a multitude of places in Rocky View? How would it enhance a person's physical and mental health to walk the trails to the sounds of heavy industrial equipment and toxic silica dust rather than fresh air and the calming sounds of nature?

The access to the park is from Highway 567. How dangerous will it be trying to enter the highway with a multitude of gravel trucks speeding along the highway. I would be surprised if any one of the residents or councillors has not experiencesd problems with gravel trucks: speed, lack of courtesy, spreading gravel onto the roads and sending gravel into windshields. The tarps required by law are not adequate to prevent the gravel from escaping and are often nothing but shredded rags covering mere fractions of the load in many cases. The proposing company states about 30 - 50

trucks a day for one pit. What about the cumulative effects of 4 to 6 pits. That equals at least 200 to 300 gravel trucks. How many trips does each gravel truck make a day? Highway 567 is a two-lane highway with no significant shoulders, large, steep hills and hidden intersections, a disaster waiting to happen.

Now, on to the residential community in which we live. The objectionable qualities of this proposal are physical and mental health risks posed by dust, noise, reduced property values, probability of water contamination and just plain worry about contamination or even the loss of water supply or value of property.

Silica dust is known to be carcinogenic and travels well beyond the gravel extraction sites. The most dangerous PM2.5 (2.5 micron) particles can travel over 14 km in a 20 km/hr wind and PM10 (10 micron) particles can travel 3.7 km in the same 20 km/hr. wind. Since the winds are most frequently from the north or the west and very often well above the 20 km/hr. range, both our residential area immediately south of the proposed gravel pit and the park immediately east of the pit would be subjected to this dangerous, toxic dust on a regular basis. As the Town of Cochrane develops further north, even the residents of Sunset Ridge would be exposed to the silica dust. An Alberta Occupational Health and Safety Bulletin states "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." If you live anywhere in Rocky View, you will have witnessed top soil, snow and even roofing flying through the air on numerous occasions. This risk of illness should be considered of extreme importance in approving the application.

The noise level of the existing aggregate extraction site is already evident in our community and it is considerably farther away than the proposed site. The operation of heavy equipment and constant movement of gravel trucks will be a constant source of annoyance and stress for all residents. This has proven to be harmful to both and physical and mental health. Given the location of the sites the sound will travel up to our area. It is even possible to hear concerts in Mitford Park from up here so how much more noise is generated by the gravel extraction process. Because we are significantly above the proposed extraction site no berm will reduce the noise level for our community nor will it block the view into the heavy industrial area, or moonscaped landscape which is presently a scenic and bucolic setting. It will remain an eyesore till long after the present residents have left or died.

The effects on our water supply is of huge concern. As mentioned above, gravel mines would remove the protective filter of the aquifer allowing contaminants to seep into the aquifer. With so much heavy industry and industrial equipment right above our aquifer, there is certainly a reasonable chance of affecting our well. Our only source of water is the common well the residents of Big Hill Creek Estates share. Any contamination or depletion of volume would leave us without the vital source of clean, potable water. This is the most valuable commodity of all to humans and animals.

Our property values will be very negatively affected. We, the residents, and prospective buyers purchase acreages to enjoy the peace and tranquility of rural life including the scenes from our windows and wildlife passing through. With heavy industry looming within our sight lines and the noise and dust, who would be motivated to buy in this location?

The cumulative effect of the proposed wells including the already functioning well needs to be taken into consideration in all aspects mentioned above: water contamination, dust, noise, traffic, etc. Each well individually has an impact, but taken together they pose a huge risk to the ability to enjoy our homes and lives.

The company claims to have taken residents' concerns into consideration, but we have not seen, nor heard a word from them.

The traffic Impact assessment submitted with the proposal did not take into account the steep grades, the narrow road, the varied users, including school buses, on Highway 567.

We believe that approval of this proposal would be a failure of the Council to carry out it's responsibility to Rocky View voters and residents. A full Area Structure Plan needs to be completed before any proposals of this nature are even

considered. Such a plan must take into its analysis data, reports and scrutiny from independent experts not supported by applicants with vested interests. To not utilize independent sources would be negligent on council's part.

The pros and cons: Many significant cons have been listed above. The pros seem to be few and only benefit B & A Planning Group as there are already plenty of other gravel sources.

Do you as a council wish your legacy to be the destruction of a natural jewel, the Big Hill Springs Park and the waters it contains or the death or injury of a schoolbus load of children. When a gravel truck collides with a school bus, it will be death.

Please take these concerns carefully into consideration when you make a decision on the proposed gravel extraction operations.

Respectfully,

Cornell and Muriel Wynnobel

Michelle Mitton

From: Brooke Kapeller <bkapeller@cpaws.org>
Sent: February 17, 2021 2:06 PM
To: Legislative Services Shared
Cc: Katie Morrison
Subject: [EXTERNAL] - Bylaw C-8051-2020, PL 20200031, Application by Mt. Ash LP to Redesignate Land from Agricultural to Industrial
Attachments: RVC_Bylaw C-8051-2020_CPAWS_17Feb2021.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Hi there,

Please find the attached letter from CPAWS Southern Alberta regarding Bylaw C-8051-2020, to be heard on 2 March 2021.

Thanks,
--
Brooke Kapeller (she/her/hers)
Conservation Program Coordinator
CPAWS Southern Alberta
bkapeller@cpaws.org
403-232-6686

CPAWS Southern Alberta acknowledges that they work in the traditional territories of the Siksikaitsitapi (Blackfoot Confederacy), comprised of the Siksika, Kainai, Piikani, and Amskapi Piikani First Nations; the Tsuut'ina First Nation; the Stoney Nakoda, including the Chiniki, Bearspaw, and Wesley First Nations; the Ktunaxa Nation; and the Métis Nation of Alberta. Today, southern Alberta is home to Indigenous people from all over North America.

CPAWS
CANADIAN PARKS AND WILDERNESS SOCIETY
SOUTHERN ALBERTA CHAPTER

CPAWS Southern Alberta
88 Canada Olympic Way SW
Calgary, AB, T3B 5R5
Phone: (403) 232-6686

17 February 2021

Legislative Services, Rocky View County
legislativeservices@rockyview.ca
Rocky View County Hall
262075 Rocky View Point,
Rocky View County, AB, T4A 0X2

RE: Bylaw C-8051-2020, PL 20200031, Application by Mt. Ash LP to Redesignate Land from Agricultural to Industrial

To whom it may concern,

I am writing you today on behalf of the Canadian Parks and Wilderness Society, Southern Alberta Chapter (CPAWS). We appreciate the opportunity to provide input into the re-designation of land under the Rocky View Land Use Bylaw C-8051-2020 to allow for industrial gravel mining. CPAWS does not support this re-designation for the reasons outlined below.

For over 50 years CPAWS Southern Alberta has worked with governments, communities, recreation groups and conservation partners to improve our provincial park system, so that it prioritizes nature and protects a diversity of ecosystems. We advocate for creating and managing parks that preserve critical wildlife habitat and the movement corridors that link them, while maintaining the important ecosystem services, such as water, and ensuring quality outdoor experiences for Albertans.

As you know, the proposed site of this gravel pit is directly upstream and adjacent to Big Hill Springs Provincial Park, one of Alberta's first Provincial Parks. Industrial activity associated with gravel mining is extremely disruptive to both people and the ecological system. A large gravel pit adjacent to the Park will significantly hinder Albertans' use and enjoyment of this Park. Albertans have made it clear in the last year that they love Alberta's Parks. In the midst of the COVID-19 pandemic, Albertans flocked to these places, and when they were put at risk, Albertans stood up for our Parks. This situation is no different. The application to re-designate land to allow for an industrial development of this scale is simply unacceptable.

Gravel mining is extremely disruptive to the ecosystem, and this proposed project would be particularly disruptive. It is located on the Big Hill Springs aquifer, posing significant risk for groundwater contamination and downstream water quality[1,2]. The area that the project and the Big Hill Springs Provincial Park are located within is also important for wildlife movement and connectivity in the area. Industrial disturbances such as gravel extraction have been found to impact wildlife movements in

[1] Hatva, Tuomo. "Effect of gravel extraction on groundwater." IAHS Publications-Series of Proceedings and Reports-Intern Assoc Hydrological Sciences 222 (1994): 427-434.
[2] Bayram, Adem, and Hızır Önsoy. "Sand and gravel mining impact on the surface water quality: a case study from the city of Tirebolu (Giresun Province, NE Turkey)." Environmental earth sciences 73.5 (2015): 1997-2011.

CPAWS
CANADIAN PARKS AND WILDERNESS SOCIETY
SOUTHERN ALBERTA CHAPTER

CPAWS Southern Alberta
88 Canada Olympic Way SW
Calgary, AB, T3B 5R5
Phone: (403) 232-6686

different contexts; impacts such as noise[3], reduction in water quality, and loss of wildlife habitat are likely to affect both terrestrial and aquatic wildlife connectivity and use of the area. Finally, this area is in close proximity to federally designated Critical Habitat for Westslope Cutthroat Trout and areas in which Critical Habitat for Bull Trout may be found[4]. The region may well have at-risk native trout present.

Given the social and ecological value of this area, directly adjacent and upstream from a Provincial Park, in an ecologically sensitive area, is not the place for such industrial development. A full cumulative effects assessment of the region needs to be undertaken before any additional industrial proposals are considered.

Thank you for your consideration.

Sincerely,

Katie Morrison, M.E.Des., P.Biol.
Conservation Director
CPAWS Southern Alberta

[3] Kunc, Hansjoerg P., et al. "Anthropogenic noise affects behavior across sensory modalities." The American Naturalist 184.4 (2014): E93-E100.
[4] DFO Aquatic Species at Risk Map: https://www.dfo-mpo.gc.ca/species-especes/sara-lep/map-carte/index-eng.html

Michelle Mitton

From: Dale Seidlitz [redacted]
Sent: Sunday, February 7, 2021 10:11 AM
To: Legislative Services Shared
Subject: [EXTERNAL] - Bylaw C8051-2020 Summit Pit

Follow Up Flag: Follow up
Flag Status: Completed

Good Day

We wish to communicate our opposition to the development of the Summit Pit proposed by Mountain Ash Limited Partnership, Bylaw C8051-2020.

The Big Hill Springs Provincial Park is a very unique feature in this area and it is essential that it be protected for future generations to enjoy. Proposing new gravel operations in the watershed for the creek running through this park, or in such close proximity to this park, should not even be considered. Regardless of regulations that are put in place by the government or the monitoring efforts that are implemented, if the gravel operation does negatively impact the park, the damage cannot be undone. While we understand that the gravel beds that make a water shed what it is are attractive for mining, they do have a far greater value to our society by remaining what they are, a source of clean uncontaminated water. We should not squander this resource for the benefit of the owners of a gravel pit.

Much is currently being proposed by governments of all levels and by the citizens they represent to preserve our land, air and water and to limit the impact of climate change. Let's do our part in Rocky View County to keep the good environment that we have.

Respectfully submitted
Dale and Sandra Seidlitz
69 Green Valley Estates
Rocky View County, AB T4C 2X9
[redacted]

Michelle Mitton

From: [redacted]
Sent: February 17, 2021 8:28 AM
To: Legislative Services Shared
Subject: [EXTERNAL] - Fwd: Bylaw C-8051-2020 - OPPOSED
Attachments: Summit Pit Opposition.docx

Follow Up Flag: Follow up
Flag Status: Flagged

Rocky View Council,

In response to the Notice of Public Hearing regarding application number PL202000031 (06731002/4), our household is **OPPOSED**.

Please find attached a letter outlining the reasons for our opposition to the above noted Bylaw for inclusion in the agenda package for the Public Hearing.

Thank you for your time and consideration,

Dale, Allison and Kathryn Palmer

43 Big Hill Creek Estates

Rocky View County, T4C 2X6

To: legislativeservices@rockyview.ca

Subject: BYLAW C-8051-2020File: PL20200031 (06731002/4)

We, Dale, Allison and Kathryn Palmer of 43 Big Hill Creek Estates, Rockyview County, are in strong opposition to the consideration of BylawC-8051-2020 to redesignate NW/SW-31-26-03-W05M from Agricultural, General District to Direct Control District (DC) in order to facilitate an aggregate operation.

We are in opposition based on the following:

1. Lack of Area Structure Plan
    a. There are a variety of stakeholders in the area – residential, commercial, industrial, and a valuable Provincial Park
    b. An over-arching framework is needed to shape future development of this growing area and provide clarity and certainty to stakeholders when making investment decisions.
    c. With aggregate operations, there are many projects in the area operating or under consideration. An effective ASP would shape the approval process for these operations providing more certainty to both residents and extraction companies.
    d. There is a unique Provincial Park in the area that could be greatly affected by further extraction activities and an ASP would ensure that the area be protected.
2. Lack of Consultation
    a. The applicant determined that direct consultation would include properties within a 1.6km radius. This is bordering our community of 15 property owners who have a definite stake in the approval of this operation.
    b. The applicant has committed to the guidelines of the Big Hill Springs Aggregate Producers Group. That Group has a Joint Communication Plan of consulting and partnering with residents within a 1.5-mile radius. Why was this distance not followed in the consultation?
    c. The county was contacted about the cancellation of the initial date of the hearing and we were assured that we would be notified of the revised date. No notification was passed on leaving residents with very little time to express their opinions on the application.

3. Proximity to Residential Neighbourhoods
    a. It is a known fact that proximity to gravel extraction sites has an adverse effect on property values. While it is said that those values return to normal once extraction is complete and remediation is in place, this pit has a 40+ year lifespan. It is unacceptable that residents face these reduced property values, especially when the area around was zoned Agricultural – it's what we expected when we purchased our properties – not noisy, industrial activity that is accompanied by health risks.
    b. Fine dust particulate is a proven health risk. Our properties are within 1600m of the proposed operations and it has been shown that hazardous concentrations of fine particulate can travel within this range and beyond. The most dangerous $PM_{2.5}$ (2.5micron) particles can travel over 14km in a 20km/h wind. PM_{10}(10 micron) particles can travel 3.7km in the same 20km/h wind.
    c. Noise pollution is a fact with aggregate extraction. While berms can mitigate this to some extent, the elevation difference between the proposed operation and our residences will likely render these ineffective. This will be a 6 day a week operation (no crushing on Saturdays but other operations will continue). The applicant states that sound levels will be below 65 decibels at the property line but at our location this will still be audible and disrupt the enjoyment of the peace and quiet that we purchased our properties for. Sounds like backup alarms from equipment will carry for significant distance.
    d. Potential contamination of groundwater would be disastrous. The extraction plan calls for excavation to within one metre of the water table. At this depth there is little to no protection of the aquifer from contaminants such as chemical runoff or hazardous spills. While monitoring is required, once a problem is detected irreparable damage is already done. A very large number of residences rely water from this aquifer and any reduction in water quality would have far reaching effects. Once the water is affected, it's permanent and will render our properties valueless and uninhabitable without unacceptable costs in re-sourcing our water.
4. Proximity to Big Hill Springs Provincial Park

a. Big Hill Springs and Big Hill Creek are a valuable resource to the area. The pit is located within the watershed and aquifer that feeds the spring and creek.
b. The spring is unique in that the water flow and temperature remain nearly constant. With gravel extraction to within one metre of ground water this could greatly affect these conditions.
c. Unique and fragile mineral deposits have accumulated at the spring over thousands of years. Removal of the protective layers of soil and aggregate in the area will haver an affect on water chemistry and can upset this delicate balance.
d. There is a vast diversity of wildlife in the area of the park and development will have a negative affect on habitat and movement in the area.
e. There are currently eight quarter sections of land in the immediate vicinity of the park that are owned by aggregate extraction companies. The cumulative effects of all of these operations have not been adequately considered. While these pits may be presented as having a reduced impact on the area individually, the collective result is significantly worse (noise/dust/traffic/implications on water and the protected environment). I t is not possible to have intensive gravel operations in this area without resulting in negative affects on the park and spring.
f. The extraction site is within 850m of the park. There will be noise and dust pollution at the park. Rather than listening to the sounds of nature as people experience the park, they will hear the sounds of rock crushing and industrial equipment. Rather than breathing the fresh air, their lungs will be subjected to the dust contaminates from the pit. It would be impossible for there to be no negative impact to the wildlife and flora in the area. This was designated a provincial park for a reason and over a quarter million people visit it each year. Approving these gravel pits will render this park undesirable and a danger to the animals and plants that rely on the ecosystem.

5. Traffic
    a. It is anticipated that there will be 50 loaded trucks leaving the operation daily – this equates to 100 trips (loaded and unloaded)

entering and exiting the facility on HWY 567. This road is inadequate in its acceleration and deceleration lanes as well as the lack of passing lanes on the large hills. This traffic, combined with the truck traffic from existing pits is excessive on this road without major improvements and will cause congestive and potentially dangerous conditions. Further to the earlier point about the cumulative effect of multiple extraction operations in this area, this problem will be exacerbated as time goes on and approval of this rezoning sets a precedent for future operation as well.

The Summit Pit applicant isn't the only aggregate extraction operation up for consideration in the area. It is imperative that all of these proposed operations be considered on a consolidated basis regarding the noise/dust/traffic/impact on the environment and Provincial Park and on the water table. The cumulative impacts of the consolidated operation must be evaluated. It would be irresponsible to only evaluate each pit individually, when they will clearly eventually be one huge operation, regardless whether they are owned and operated by different companies. Once one is approved individually, precedent is set and others will surely be approved on similar basis. This will be disastrous for our neighbourhood.

Respectfully,

Dale, Allison and Kathryn Palmer

Michelle Mitton

From: Dan Brown [redacted]
Sent: Monday, February 15, 2021 11:18 AM
To: Legislative Services Shared
Subject: [EXTERNAL] - RE: Bylaw C-8051-2020
Attachments: Mountain Ash Gravel Pit Letter Feb. 2021.docx

Follow Up Flag: Follow up
Flag Status: Flagged

Dear Sir/Madam,
Please see attached my comments on the Mountain Ash Summit Pit proposal being considered under Bylaw C-8051-2000.
Kindly include these concerns and recommendations in your consideration of this proposal.
Sincerely,

D.R. Brown, B.Sc. (Geology), M.Sc.(Geology and Hydrology)
[redacted]

Sent from Mail for Windows 10

County of Rocky View Legislative Services
Rocky View County,
262075 Rocky View Point,
Rocky View County, AB, T4A 0X2

Feb. 15, 2021

Dear Sir/Madam, Re: BYLAW C-8051-2020

I am a hydrogeologist, a resident of Cochrane and a member of the Big Hill Creek Preservation Society. Over the last 20 years, my wife and I have hiked many times along Big Hill Creek and at Big Hill Springs. As a practicing hydrogeologist for over 40 years, working with both a large consulting engineering firm and a provincial environmental regulator, I have great respect for Big Hill Springs Provincial Park and the importance of a feature like the Springs. It is both an important source of water in the area and a valuable natural teaching resource for our youth and adults alike. I have worked both in physical hydrogeology, evaluating and developing groundwater resources in both Eastern and Western Canada, and in contaminant hydrogeology, investigating and restoring instances of groundwater contamination and developing groundwater management and protection plans for critical groundwater supplies.

Based on my appreciation and respect for the importance of Big Hill Springs, I recognized the potential for significant impacts from the proposed nearby Mountain Ash Summit gravel pit and, as a result, I have carefully reviewed the following documents:

- Hydrogeological Assessment Report
  Mountain Ash Limited Partnership Aggregate Operation
  NW and SW 31-26-03 W5M, Rocky View County, Alberta
  SLR global environmental solutions
  January, 2020

- The Summit Pit Project Website
  https://www.summitpit.com/

The Executive Summary of the SLR hydrogeological report states:

> "*Under the current excavation scheme the overall risk of any significant negative impacts on water resources as a result of the development are negligible. This is based on the fact that the aggregate resource will not be mined into the water table and therefore no anticipated changes are possible to the groundwater regime.*"
> (underlining mine)

The above summary statement is grossly misleading in my opinion. As even the SLR authors and the project web site indicate themselves:

- There are significant risks of direct groundwater impacts from manmade contaminants such as fuels, solvents (and dust suppressant chemicals) to be stored and handled daily on the site;
- Potentially contaminated stormwater collected from within the pits will be discharged directly from the operation to on-site groundwater infiltration pits; and
- The creation of a hydraulic sink at each of the phased pits, together with other nearby gravel pits, have the potential to significantly increase groundwater flow to Big Hill Springs by up to 10 percent on an annual average.

These potential impacts put great emphasis on **the importance of a detailed operation plan** for the pit that includes enforceable details of how and where hazardous materials would be stored and handled on the site. In my opinion, The Alberta *Code of Practice for Pits* is too general for this type of operation. The report does say that fuel storage would take place in a clay till covered area, but with no operations plan, one can't confirm the suitability of such placement. Does clay till, for example, include the completed pit areas that will be covered with some of the excavated till overburden? In addition, will ongoing re-fueling operations take place in the 5m thick till area, or directly within the pit at the excavation face where the equipment is operating?

With respect to the capture of stormwater runoff from the site and its discharge directly into the gravel aquifer, this raises a similar water quality concern and also puts an emphasis on **the importance of detailed water quality monitoring both before discharge, and in the down-gradient groundwater** (although that may be too late).

Finally, as noted above and in the SLR report, there is a **potential impact on Big Hill Springs and Big Hill Creek from a cumulative increase in flow** (up to 10% as calculated by SLR). The calculation was based on annual average flow, but did not consider short term impacts following heavy periods of rainfall and/or snowmelt? Is there a significant chance of increased flooding downstream?

In conclusion, recognizing the potential for both groundwater quality and groundwater quality impacts from the proposed Mountain Ash pit puts much more emphasis on **the importance of an assessment of the cumulative effects of the four planned gravel pits**. If the County of Rocky View has ignored this need, it is a serious dereliction of responsibility in my opinion.

I appreciate the opportunity to provide input to this process as a neighbour, a frequent recreational user of the Big Hill Springs Provincial Park and Big Hill Creek area, and a member of Big Hill Creek Preservation Society. I would be happy to discuss these concerns in more detail, should you wish.

D.R. Brown, B.Sc. (Geology), M.Sc. (Geology and Hydrology)
#114-1000 Glenhaven Way, Cochrane, AB T4C 1Y9

CC: Big Hill Creek Preservation Society
Attention: G. Bietz, President

Michelle Mitton

From: Darrin Durda [redacted]
Sent: Tuesday, February 16, 2021 8:55 AM
To: Legislative Services Shared
Cc: Division 8, Samanntha Wright
Subject: [EXTERNAL] - Bylaw C-8051-2020. Objection

Follow Up Flag: Follow up
Flag Status: Flagged

Hello Administration / Council I am writing to you today to express our objection to this gravel pit application. Some of the reasons we are against it are as follows:

Very concerned about the cumulative effects of increased heavy traffic on these roads. In particular these heavy haulers are taking shortcuts through Bearspaw in particular on Bearspaw road. This is of deep concern as our family lives along this road. These roads are not meant for sustained heavy traffic. A good number of these haulers are speeding and cannot react in time to avoid bicycles, children, cars entering the roadway and the occasional dog. I have witnessed a number of near misses over the years. There have been a number of serious accidents with these haulers rolling over and failing to stop.

The roads in Bearspaw and this end of the county were never engineered or built to support this kind of traffic. We just spent millions of dollars to rehab Bearspaw road and we can all see the problems that happen to the pavement in a short period of time. The net benefit to the county is no where near enough to repair these roads.

The intersections and approaches to these pits need to be re-developed to accommodate this heavy traffic. Who is going to pay for that ? There needs to be road bans on these county roads to force the heavy haulers onto provincial roadways.

We ae also quite concerned with the increased concentration and cumulative effects of yet another gravel pit on Big Hill Springs Provincial park, we need to protect these resources.

Sincerely,

Darrin Durda
31 Big Sky close

Michelle Mitton

From: Errol B [redacted]
Sent: February 17, 2021 8:38 AM
To: Legislative Services Shared; edmonton.goldbar@assembly.ab.ca <edmonton.goldbar@assembly.ab.ca>
Subject: [EXTERNAL] - Mountain Ash Application PL 20200031

Follow Up Flag: Follow up
Flag Status: Flagged

To whom it may concern,

As an Albertan, I am passionate about job creation. I can deeply about our fiscal well being. I'm also very aware that fresh water is painfully finite. As we look towards a future, we need to balance mining with adequate protection of fresh water. I would encourage you to consider this in your analysis. I would also beg you to consider the needs of the people who are dependent upon freshwater

If you would like to discuss more fulsomely, please don't hesitate to reach out.

Errol Barrie
Life long Albertan

Jessica Anderson

From: Michelle Mitton
Sent: August 10, 2020 11:09 AM
To: Jessica Anderson; Oksana Newmen
Cc: Sean MacLean; Legislative Services Shared
Subject: FW: [EXTERNAL] - Gravel Pit Developments

Follow Up Flag: Follow up
Flag Status: Completed

MICHELLE MITTON, M.SC
Legislative Coordinator | Municipal Clerk's Office

ROCKY VIEW COUNTY
262075 Rocky View Point | Rocky View County | AB | T4A 0X2
Phone: 403-520- 1290 |
MMitton@rockyview.ca | www.rockyview.ca

From: Foss, Tom [redacted]
Sent: August 10, 2020 10:37 AM
To: Legislative Services Shared <LegislativeServices@rockyview.ca>; Division 1, Mark Kamachi <MKamachi@rockyview.ca>; Division 2, Kim McKylor <KMcKylor@rockyview.ca>; Division 3, Kevin Hanson <Kevin.Hanson@rockyview.ca>; Division 4, Al Schule <ASchule@rockyview.ca>; Division 5, Jerry Gautreau <JGautreau@rockyview.ca>; Division 6, Greg Boehlke <GBoehlke@rockyview.ca>; Division 7, Daniel Henn <DHenn@rockyview.ca>; Division 8, Samanntha Wright <SWright@rockyview.ca>; Division 9, Crystal Kissel <CKissel@rockyview.ca>
Cc: Rocky View Gravel Watch <rockyviewgravelwatch@gmail.com>; [redacted]; Harry [redacted]; Linda Kostecky [redacted]
Subject: [EXTERNAL] - Gravel Pit Developments

Attention Councilors and Administration

I wanted to follow up with this email so that no one takes any silence or the lack of being able to attend meetings, open houses etc., as support for current or future gravel pit applications. Our quarter section is in the middle of this gravel zone and I have been approached several times to have this property mined. I do not think this is a good idea nor appropriate at this time. In the past I have written and spoken to council to express my opposition and everyone is aware of the long length of reasons why allowing new gravel pit applications is a terrible idea.

Simply put, your team is doing a great job keeping a lid on taxes, developing business and growth at a very measured and careful and safe pace. There is no shortage of gravel, there is less demand and with COVID even less. Finish with the current pits and then consider the wisdom of opening new ones as needed. This is the only way residents will ever stomach these developments.

I hope you all stay safe and please register my opposition to additional, future, current or potential gravel pit applications unless those in operation have found the end to their life and have been safely reclaimed and returned to an environmentally sound state.

Traffic grows on highway 567 and just west of the road into the Bill Hill Springs was a record number of deer and moose and coyotes killed this past year. I know as I find their carcasses on our land. Two weeks ago there was a near fatal crash on RR #35 and Highway 567 and this was turning into a road that sees at best a handful of trucks each day. The danger of allowing a gravel pit down RR #35, even with the upgrade of an intersection as required by Alberta Transportation would make this a further death zone. Traffic grows impatient as they climb the big hill and routinely slingshot into the south lane in attempt to dangerously pass. If you wish to approve gravel pits in this area, at the very least is should come with taking the hills out of Highway 567 and setting up adequate intersections and perhaps even traffic lights. Maybe the gravel pit companies would be happy to upgrade those highways and pay their fair share to the costs the residents pay when a pit is approved in close proximity to their homes.

Also, I stand opposed to the current Summit Pit Application as the cumulative effect of all these pits has not been adequately studied by Rocky View, the Alberta Government and their Health Services department.

Thanks for your time and attention to this matter. As always feel free to reach out to me should you have any further questions.

Tom

Michelle Mitton

From: Garrett L [redacted]
Sent: February 17, 2021 1:05 AM
To: Legislative Services Shared
Subject: [EXTERNAL] - NO TO MINES

Follow Up Flag: Follow up
Flag Status: Flagged

Do not open links or attachments unless sender and content are known.

Please do not let another company ruin our ecologically sensitive areas near Bighill Springs. Use the area to promote healthy environmental responsibility and protection. Run a trail from Bighill Springs to Cochrane along the Ranche RD route.

Thanks

Garrett Leggott

Michelle Mitton

From: Gary Walsh [redacted]
Sent: Saturday, February 6, 2021 9:07 AM
To: Legislative Services Shared
Cc: Crystal Kissel; Gary J Walsh; Division 9, Crystal Kissel
Subject: [EXTERNAL] - Bylaw C8051-2020 - Gravel Pit - Big Hills

Follow Up Flag: Follow up
Flag Status: Completed

Do not open links or attachments unless sender and content are known.

To whom it may Concern:

As a resident of Rocky View County that resides in the Monterra Development at Cochrane Lakes, I "STRONGLY DISAPPROVE" on the expansion or development of another gravel bit in this area.

The noise, pollution, environmental impact is too great to permit this development. Beyond the Monterra Development, the Cochrane North Development and other rural residents would be greatly impacted.

As someone who drives Secondary Rd 567, the current gravel pit in this area impacts this signal lane, no shoulder road and in the last 12 months I have windshield damages from gravel trucks that race in and out to get their next load.

Beyond the environmental , noise, air pollution, the current pit shouldn't even be re-licence thus creating another pit would negatively impact this area.

Gravel pits should never be within area's where this is current and future residential developments, which this area is with 2-3 Kms of.

This is is my total opposition of permitting this gravel pit and I strong oppose bylaw C8051-2020

Regards,

Ratepayer

Gary & Carol Walsh
38 Monterra Link
Rocky View County, AB

T4C- 0G7

[redacted]

264130 Range Road 41
Rocky View County AB T4C 2X5

Rocky View County

Dear Rocky View County,

Bylaw C8051-2020
Application Number PL 202000031 (06731002/4

We want it to be aware that the drainage from this location flows into the head water of Big Hill Creek , Big Hill Provincial Park and to the Bow River.

At this time highway 567 cannot handle any extra heavy traffic.

We are adjacent land owners of this property and depend on water for our ranching operation.

Ian & Donna Airth

Michelle Mitton

From: Jacquelyn Gray [redacted]
Sent: Monday, February 15, 2021 8:24 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - Bylaw C8051-2020

Follow Up Flag: Follow up
Flag Status: Flagged

Re Gravel Pit

I am sure you don't need all the reasons why We are against this pit & bylaw

However, please mark our family as dead set against this proposal and any future pits in the vicinity of BIg Hills SPring Park

Thanks, J Gray

Michelle Mitton

From: Jacquie Brezovski [redacted]
Sent: Tuesday, February 9, 2021 2:07 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - Bylaw C-8051-2020

Follow Up Flag: Follow up
Flag Status: Completed

Do not open links or attachments unless sender and content are known.

Dear Council,

I am opposed to the Summit Pit Application.

I am concerned with the Summit Pit Application and its proximity to Big Hill Springs Provincial Park and the increased traffic on Hwy 567.

Big Hill Springs Provincial Park is a precious ecosystem that is of environmental and historical value. According to Mountain Ash's map of wetlands, there are many natural wetlands located on their proposed Summit Pit site. I understand that Mountain Ash Limited Partnership plans to remove the majority of these wetlands and replace them with drainage ponds. These wetlands serve the purpose of filtration for the groundwater that in time drains to Big Hill Springs Creek. Mountain Ash's proposed drainage ponds are insufficient enviornmental compensation for the destruction of the wetlands. I own 40 acres with a wetland and I would not be arrogant enough to believe if I destroyed it, I could have an even better system with a manmade construct. I believe Alberta Environment and Protection would agree since they charged a neighbour $10,000 for digging into a wetland for irrigation purposes. Why then would a company be allowed to do that?

Not only will wetands be destroyed close to an envionmentally sensitive park but the mining process adds increased quantities of metals, herbicides and machinery fluids. Increased toxins plus the destruction of the wetlands filtration (even with manmade alternates) leads to an increased risk of watershed and environmental contamination. Environmental contamination is often not noticed until remediation is difficult and bodies of waters are so contaminated that people and animals become ill. As has been seen historically, companies who cause this type of contamination deny all culpability and who suffers are the people, the animals and the environment.

This is not an appropriate area for a gravel pit as it is too close to an environmentally sensitive area that is used by thousands of people a year and home to a rich diversity of wildlife and plant species. They also should NOT be allowed to destroy wetlands. Their replacement with drainage ponds while adding contaminants shows a disregard for this area.

The other significant concern is the increase in traffic. Hwy 567 is a single lane 2 way road with a small shoulder and no median. There is already a gravel pit close by which has increased the traffic on this road. According to the Mountain Ash application, 90% of their traffic will be going east. This road direction has multiple blind spot areas, huge hills and curves and is inappropriate for this heavy amount of traffic. According to the draft Rocky View County MDP , transportation is a consideration for these economic projects. This road was NOT made to accomodate so much large truck traffic especially when it is also a heavily used route for residential county traffic and school buses.

I am strongly opposed to the Summit Pit application by Mountain Ash Limited Partnerships and strongly encourage council to reject this proposal.

Thank you for your consideration.

Sincerely,
Jacquie Brezovski
272188 Range Road 42
Rocky View County, Ab
T4C3A4

Michelle Mitton

From: James Schmitt [redacted]
Sent: Tuesday, February 16, 2021 11:18 AM
To: Legislative Services Shared
Subject: [EXTERNAL] - BYLAW C-8051-2020

Follow Up Flag: Follow up
Flag Status: Flagged

To: The Municipal Clerk's Office
Re: BYLAW
From: James and Jill Schmitt
35 Big Hill Creek Estates, Rocky View County, AB T4C2X6

Purpose: To **OPPOSE** BYLAW C-8051-2020
Application Number: PL202000031 (06731002/4)

Reasoning: As long-time members of Big Hill Creek Estates, we object to BYLAW C-8051-2020, which is the application by B & A Planning Group on behalf of 1410266 Alberta Ltd.. This is on the property of NW/SW-31-26-03-W05M, and commonly known as the Summit Gravel Pit.

Our reasons for opposing this is as follows:

1. This gravel pit will cause negative environmental impacts to our water system, wetland habitats and wildlife survival. Along with this it will negatively impact the Big Hill provincial park in these same ways, which neighbors our community
2. The gravel pit will cause negative health impacts from the dust containing cilica. This by product is known to cause irreparable pulmonary issues such as COPD and asthma. It is my view that the County of Rocky View will be liable should BYLAW C-8051-2020 be approved.
3. This gravel pit is not necessary as not all gravel will be for the residents of Rocky View County.
4. The gravel pit is counter productive to the intended residential plan set forth for the Big Hill Creek Estates area as a RESIDENTIAL community.
5. The huge negative impacts of this gravel pits will drive property values downward. During these economically challenging times, why would Rocky View County push through this application for the sole benefit of 1410266 Alberta Ltd., while at the same time hurting the long-term prosperity of the Big Hill Creek Estates residents?
6. Traffic will interfere with the well-established community due constant heavy traffic, road congestion, road damage, and serious harm to wildlife.
7. Income that Rocky View County gains from this gravel pit will not cover the costs of environmental remediation, road repair, nor replacing healthy water for many residents that depend on this water source. This will all lead to higher taxes while dropping our property values. It is doubly detrimental.

Sincerely,
James and Jill Schmitt

Michelle Mitton

From: [redacted]
Sent: Sunday, February 14, 2021 12:38 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - Bylaw C-8051-2020

Follow Up Flag: Follow up
Flag Status: Flagged

The proposed Summit Pit at Range Road 40 is a serious risk to the integrity and history of the Big Hill Springs Provincial Park. Protect Alberta Parks!
There are already too many gravel pit applications in Rocky View County, especially along Big Hill Springs Road.

Please note for the record: I am totally opposed to the Master Site Development Plan for this operation.

Janet Jones
SW 31 25 2W5 144 006 377

Michelle Mitton

From: Joanne Leskow [redacted]
Sent: February 17, 2021 1:07 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - Big Hill Springs grace pit opposition

Follow Up Flag: Follow up
Flag Status: Flagged

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I am against ANY and ALL gravel pit development or presence in, near, adjacent or impacting the Big Hill Springs Park (BHSP) area and designation.
Big gravel got tossed from Bearspaw by rich landowners and they must not be allowed to set up shop here either.
Joanne
30 year resident of Rockyview and BHSP user.

Sent from my iPhone

Michelle Mitton

From: Marg or John MORCK [redacted]
Sent: Saturday, February 13, 2021 5:13 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - Reference: Bylaw C-8051-2020 (Mountain Ash Application PL 20200031)

Follow Up Flag: Follow up
Flag Status: Flagged

To Whom it May Concern in Rocky View County Council:
I just heard about the recent application to the Rocky View County from Mountain Ash Limited Partnership for an open pit gravel mine immediately northwest of the Big Hill Springs Provincial Park.

PLEASE, PLEASE, do NOT approve this application! Having such a large open gravel mine so close to the Big Hill Springs Provincial Park would have a huge negative impact on this park. We frequent this park a great deal and enjoy it every time we visit. It has great trails for walking and picnic tables for enjoying after our hike. We love its close proximity to Calgary. The Province values this park a great deal, which is evidenced by the fact that it has been closed this past summer for upgrading. We have missed it this past summer, but were confident the improvements planned would be worthwhile when it re-opened.

We, along with other members of our hiking club, the Calgary Weekend Hikers have also frequently enjoyed hiking along the Bighill Creek, south of the Park closer to Cochrane, so would hate to see any of this valuable waterway and valley damaged in any way.

When we heard about the possibility of a huge open gravel pit so close, we could hardly believe such a thing was even being considered. So PLEASE, PLEASE, do NOT approve this application!

John and Margaret Morck
123 Silver Valley Blvd NW
Calgary, AB T3B 4B7
[redacted]

Michelle Mitton

From: [redacted]
Sent: February 17, 2021 8:50 AM
To: Legislative Services Shared
Subject: [EXTERNAL] - BYLAW C-8051-2020
Attachments: FBHSPP_JF submission_Feb 12_2021 Rev1.pdf

Importance: High

Follow Up Flag: Follow up
Flag Status: Flagged

Dear Council Members;

My name is Dr. Jon Fennell and I am a professional hydrogeologist and geochemist in good standing the Association of Professional Engineers and Geoscientists of Alberta (APEGA). I am also a resident of Rocky View County and user of Big Hill Springs Provincial Parks. I have been supporting a group, Friends of Big Hill Creek Provincial Park, with their opposition of the Mountain Ash Limited Partnership (MALP) application to establish a gravel pit (the Summit Pit) in close proximity to the Park. I share a number of concerns that the "Friends" do regarding this development. I will not belabour them, as I am sure they are very similar to concerns expressed by others, but they basically boil down to the following:

Background facts:

- Big Hill Springs Provincial Park is a unique ecological setting of significant value for people and wildlife.
- The springs that form the headwaters of this park provide cool, clear water of relatively stable temperature that flows from an extensive sand and gravel aquifer system trending off towards the northwest.
- The water that flows from the springs forms Bill Hill Springs Creek, which eventually flows into the Bighill Creek system supporting up to 50% of the flow in that water course.
- The temperature regulation provided by Big Hill Springs Creek is responsible for the development of unique aquatic habitat in Bighill Creek
- Bighill Creek is identified on Fisheries and Oceans Species At Risk website as being protected for Bull Trout populations.
- There is habitat restoration potential in Bighill Creek for other cold water fish, like the West Slope Cutthroat Trout.

Issues related to MALP and other gravel mining developments:

- The MALP property is located in the sensitive headwater area of the Big Hill Springs complex, and is located at the downstream end of the large sand and gravel complex.
- MALP proposes to mine the sand and gravel from this headwater area to a depth of 1 m above the water table.
- The removal of up 20-30 m of this gravel will significantly reduce the ability of the aquifer to filter out natural and/or introduced contaminants that will occur as part of this development.
- The exposure of the sand and gravel will increase its ability to weather and release harmful trace elements into the groundwater, such as arsenic, cadmium, chromium, selenium, and others.
- Baseline investigation of the local groundwater by MALP indicates that these trace elements are already in the water, which increases the risk of further contamination during and following pit development.

- Contaminants released into the groundwater (natural or development-related, like fuels or chemicals) will flow through a significantly reduced gravel layer and into the fractured bedrock where they will move the springs and discharge with minimal attenuation.
- Once in Big Hill Springs Creek they will move down into the Bighill Creek and impact sensitive and protected the aquatic habitat, possibly triggering a Fisheries Act violation.
- Remediation of any contamination will be extremely difficult and may inadvertently impact the springs further by intercepting groundwater that would otherwise report to them.
- MALP has not assess **any** of this risk, and instead is insisting that their development will not cause harm. This insistence is unsubstantiated with any proof or modelling results and it is left up to faith. This is not a balanced of comprehensive communication to the Council members by MALP.
- This is not the only gravel development that may happen in this sensitive headwater area, as there are other gravel leases even closer to the park boundary and the springs that threaten their viability and support of Bighill Creek (i.e. cumulative effects risk)

The proposal:

- To ensure prudent and sustainable gravel mining in the area, establish a development setback around the Park and springs complex to preserve the ecological integrity and recreational value of the area.
- The proposed setback is 1.6 km around Big Hill Springs Provincial Park, where no gravel development would be allowed. This would be followed by an additional 1.6 km of gravel mining restriction to limit the excavation to within 4 m of the water table (as opposed to the usual 1 m) to ensure proper contaminant filtration capability and attenuation.
- The proposed setback distances are based on works of other that have documented impacts from sand and gravel extraction occurring around such developments.

I have attached a rather lengthy technical document to support my position, and that of the "Friends". Much of it is personal credentials, but the front material is there to provide you with the basis to make an informed decision on the MALP application (and any others that threatened the Park and the springs). Unfortunately, what has been presented by MALP does not even begin to explore the issues of their proposed development and the related risks to the environment. **If you are not inclined to read my full report, I ask that you at least read the Executive Summary** where I have outlined the main issues and recommendations (it is only 2 pages).

The recent decision made by the RVC Council to deny the Scott Pit in Bearspaw was a good and prudent decision protecting the rights of the people over profit. The use of that land for gravel extraction is clearly incompatible with the country residential setting. Denying the MALP application, and any others that want to establish in the headwater area of Big Hill Springs Provincial Park, would be an equally good and prudent decision in favour of the environment, while still allowing gravel development occur in less sensitive and important areas. To truly be sustainable, one needs to balance the economic considerations against the needs of the people and the environment, and by establishing a suitable development setback around the Park this will be achieved.

Respectfully,

Jon Fennell, M.Sc., Ph.D., P.Geol.
Water Resource Specialist
Hydrogeology | Geochemistry | Climate risk
[redacted]

Mountain Ash Limited Partnership

Summit Gravel Pit

Review of hydrogeology, geochemistry, fish and aquatics, and climate change

Prepared by:

Dr. Jon Fennell, M.Sc., Ph.D., P.Geol.
Hydrogeologist and Geochemist
Water Security | Climate Resiliency

On behalf of:

Friends of Big Hill Springs Provincial Park
and
Bighill Creek Preservation Society

For:

Rocky View County Council
Re: Bylaw C-8051-2020

February 2021

Water flows over lumpy deposits of tufa at Big Hill Springs Provincial Park

Source: By Ruben Lara - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=59716841

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Executive Summary

Mountain Ash Limited Partnership (MALP) is applying to develop an open pit gravel mine in the headwaters area of Big Hill Springs Provincial Park. This is one of many aggregate developments likely to come forward in the future given the land ownership in this area. The sand and gravel is being extracted from a buried channel system that is already being mined by Hillstone Aggregates 800 m to the west.

Big Hill Springs Provincial Park, and the spring complex that feeds water down into the fish-bearing Bighill Creek, is located roughly 800 m southeast of the MALP property. This creek is currently listed on the Fisheries and Oceans Canada "Aquatic species at risk map" possibly having bull trout (i.e. a protected species). Big Hill Springs Provincial Park (the Park) was established back in 1957 and is a cherished and unique ecological enclave located in a prairie farmland setting that receives over 250,000 visitors each year. It is so poplar that upgrades are currently underway to ensure that Park's visitors continue to enjoy its redeeming qualities.

The flow of water from the springs originates from groundwater that discharges from a buried sand and gravel-filled channel system and the underlying fractured Paskapoo Formation bedrock. The MALP site is located on top of the south-west section of the aquifer that supplies the springs. The almost constant temperature and quality of the groundwater that sustains these springs year-round is responsible for the development of unique fish habitat in Bighill Creek. Therefore any impacts to that water threaten the aquatic ecology in the local area. Similarly, local residents rely on the local groundwater for their daily consumptive needs. This will be placed at risk if subsurface development activities lead to contamination of their water wells.

MALP's proposal to the Rocky View County Council is to mine the sand and gravel from beneath their property to within 1 metre of the water table. This will remove the vast majority of the filter that protects this important aquifer system in the headwater area of the Big Hill Springs complex. In doing so this places the remaining aquifer and groundwater discharging at the springs at risk of contamination during open pit operations and post-reclamation.

The proposal submitted by MALP is lacking in critical detail and is conceptual at best. The potential issues regarding impacts to Big Hill Springs and Bighill Creek have not been sufficiently explored or communicated. This includes no evaluation of how removal of a substantial part of this aquifer might affect the local aquatic environment (and terrestrial wildlife habitat).

Despite MALP's contention that the "above water table" gravel mining operations will not adversely affect local groundwater conditions, evidence from elsewhere indicates the opposite. Studies have found increased water table elevations and notable changes to groundwater quality due to the reduced filtration from overlying sediments. It is noteworthy that the pre-mining groundwater quality reported by MALP

indicates the presence of contaminants like **arsenic, cadmium, chromium, and selenium** at concentrations above those listed for the protection of freshwater aquatic life.

Mining of the sand and gravel will expose the aquifer to atmospheric oxygen and enhanced weathering processes. This will also increase flushing of the remaining sand and gravel deposits with infiltrating waters. The removal of this essential filter will increase the risk of mobilizing fine particles, harmful trace elements like the ones already noted, and other contaminants like spilled fuels or process chemicals, into the local groundwater. Once mobilized, these contaminants will be difficult to recover before they reach fish-bearing waters and may eventually result in provincial and/or federal violations under the *Environmental Protection and Enhancement Act,* the *Fisheries Act,* or the *Species at Risk Act*.

Unfortunately, MALP has not addressed any of these critical environmental issues in their 2020 Master Site Development Plan or Hydrogeological Assessment Report (SLR 2020). As a result, the Rocky View County Council does not have enough information to make an informed decision regarding this application (including any potential future liability that could result from its approval).

There are plenty of other less environmentally-sensitive sand and gravel deposits throughout Rocky View County. Because of this, the responsible and sustainable response to MALP's application is to protect Big Hill Springs Provincial Park and the Bighill Creek system by establishing a suitable development buffer around these features.

A setback distance of at least 1.6 kilometers is therefore recommended. Also, to further protect groundwater quality in this important headwater area, sand and gravel extraction within and additional 1.6 kilometers of this setback should be restricted to at least 4 metres above the water table to ensure suitable filtration of recharging water.

Proper consideration of future climate change effects should also be addressed to protect against extreme events that may result in unintended damaging releases from the site into the area's groundwater. This important issue has also been overlooked by MALP.

Implementing these recommended land use planning steps will protect local groundwater quality that feeds the sensitive aquatic system in the area, and ensure the protection of local water wells, while still allowing prudent gravel development to occur.

Introduction

Mountain Ash Limited Partnership (MALP) has put forward a plan to develop a sand and gravel (aggregate) open pit mine near the headwaters areas of Big Hill Springs Provincial Park. The plan is to strip overburden materials and stockpile them for later use during reclamation, followed by excavation, crushing, and screening of the aggregate for transport to market. Excavation of the pit is proposed to be kept to within 1 metre of the historical high-water mark of the local water table. Despite this, there are significant environmental concerns regarding this development and how appropriately the site conditions and the operational disturbance have been assessed. The main concerns with this proposed development relate to the following:

1. Proximity to the Big Hills Springs Park (and the potential for impacts to the unique system of springs and Bighill Creek, which is fed by these springs).
2. Risk of potentially irreparable adverse impacts to groundwater quality (and associated effects to nearby receptors).
3. Potential risks for protected fish and fish habitat (including aquatic species that support fish populations known to be present in Bighill Creek).
4. Questionable success of any mitigation (including post-reclamation timeframes) that might be necessary.
5. Risks associated with climate change (and the impact to safe mine operations and reclamation efforts).
6. Cumulative effects (from other similar developments extracting gravel near the Big Hill Springs headwater area and along Bighill Creek).

The Friends of Big Hill Springs Provincial Park (FBHSPP), a local landowner group, and the Bighill Creek Preservation Society (BCPS), a local watershed group mandated to develop a watershed plan for the Bighill Creek basin, are concerned for the future of the springs should this, or any other similar development, be approved by the Rocky View County Council. Both groups would like to see a protective buffer established around this unique and popular prairie setting. To assess the appropriateness of such an initiative, the group retained Dr. Jon Fennell to review and comment on the MALP's 2020 Master Site Development Plan and associated Hydrogeological Assessment Report (SLR 2020). Dr. Fennell is a Senior Hydrogeologist, Geochemist, and Water resource Specialist with over 30 years experience in environmental and contaminated sites investigations, risk analysis, and climate change assessment. He is a registered member-in-good-standing with the Association of Professional Engineers and Geoscientists of Alberta (APEGA),

among other similar agencies in Western Canada. Further information regarding Dr. Fennell's credentials is provided in Appendix 1.

The remainder of this report summarizes the critical environmental issues that the RVC Council need to consider regarding this and any other similar developments near the Big Hill Springs Provincial Park and Bighill Creek system.

Key Findings

1. Proximity to the Big Hill Springs Provincial Park

The proposed MALP gravel pit is located in the west half of Section 31, Township 26, Range 3 West of the 5th Meridian and consists of 131 hectares (or 323 acres) of land designated as Ranch & Farm District under Rocky View County's Land Use Bylaw C-4841-97. The aggregate deposit that MALP is intending to mine is part of a large, buried sand and gravel deposit that extends towards the northwest for up to 10 km or so. This large accumulation of granular material, which ranges in thickness anywhere from less than 10 m up to almost 30 m, was formed during the last glaciation of the area and was deposited in a former valley eroded into the underlying bedrock of the pre-glacial landscape. Given the hydraulic properties of the sand and gravel aquifer it classifies as a Domestic Use Aquifer[1].

Overlying the sand and gravel deposit is anywhere from 3-6 m of glacial till consisting of clay and silt, with some sand and rocks, followed by about 30-60 cm of topsoil. Underneath the sand and gravel deposit is bedrock of the Paskapoo Formation comprising layers of sandstone, siltstone, and shale/mudstone sequences. These bedrock deposits have been subjected to fracturing and faulting as a result of deformation during formation of the Rocky Mountain foothills area and offloading of thick glacial ice between 10,000-15,000 years ago[2].

The footprint of the MALP property is located approximately 800 m from the boundary of Big Hill Springs Provincial Park, a very popular recreation spot for locals, Calgarians, and tourists visiting the area. It is a unique ecological enclave surrounded by farmlands that has considerable recreational and environmental value. The land area that is intended to be mined comprises gently rolling terrain with drainage towards the south and east across the property. The southern half of the proposed development has an abrupt change in elevation from 1292 metres above sea level (masl) to 1272 masl due to the presence of a large drainage-way leading down to the Big Hill Springs complex. Within this drainage-way is a small intermittent tributary stream located approximately 300 m to southeast of the property boundary that also leads down to the springs. This tributary is documented by SLR Consulting (Canada) Ltd. as being fed only by surface

[1] Alberta Government 2019

[2] Moran 1986

drainage (SLR 2020); however, it is very likely that groundwater in the local sand and gravel deposits, as well as the upper bedrock, discharge to this tributary stream at some point further downslope from its origin.

Big Hill Springs is a spring complex fed by the very same groundwater residing in the sand and gravel deposit that MALP intends to mine for aggregate resource. Investigative work done by SLR during the period of 2014 to 2019 found the water table to be located at a depth of up to 30 metres below surface on the upland portion of the site , and a depth of around 12 metres at the southern end where the land surface drops down into the drainage-way. The springs flow year-round at rates ranging from 0.4 to 0.1 cubic metres per second and eventually discharge into Bighill Creek – a fish-bearing water body indicated as having protected bull trout, which is a threatened species under the Species at Risk Act (SARA). The water from Bighill Creek eventually discharges into the Bow River at the Town of Cochrane. The relatively stable (and cool) temperature of the spring water (around 6°C), and its high quality (low mineralization and turbidity), has led to development of local habitat that supports various vegetation, wildlife, and aquatic species. As such, the Big Hill Springs, the established Park area, and the associated ecology are an important aspect of Bighill Creek's ability to sustain ecological viability.

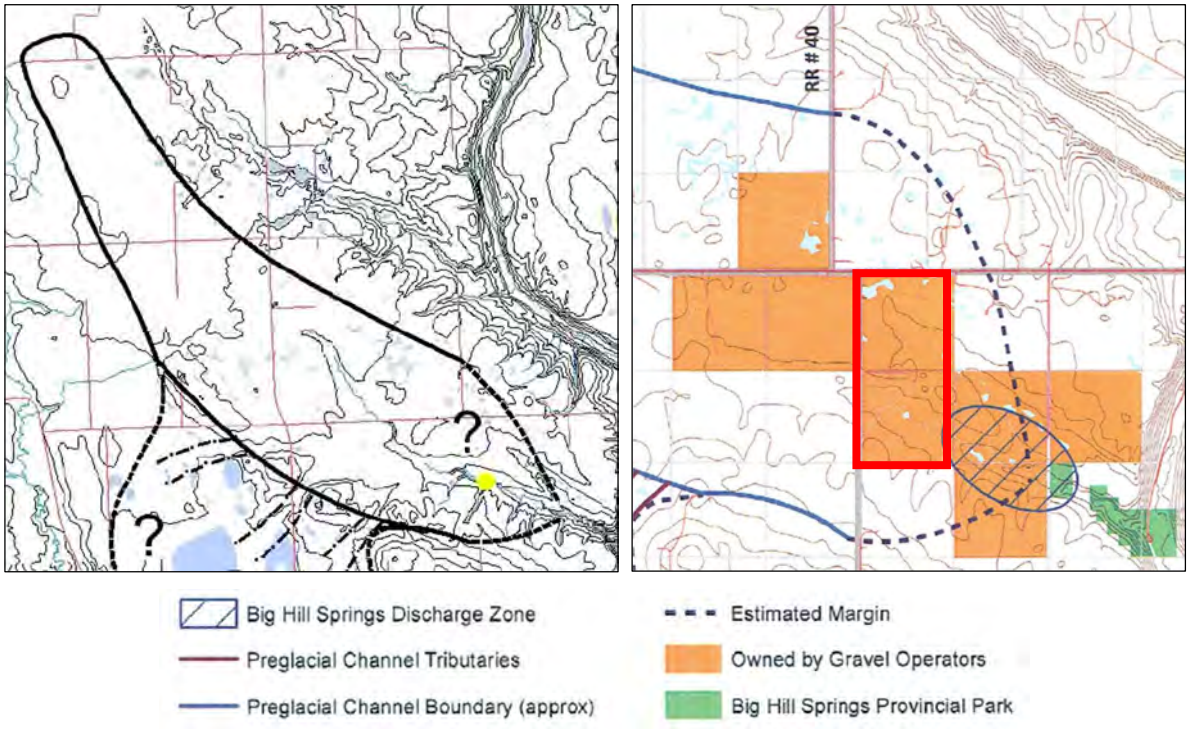

Figure 1. Mapped preglacial channel for Big Hill Springs (left)[3], where dot-dashed lines indicate extent of buried tributaries, and extent of lands owned by gravel operators near Big Hill Springs Provincial Park (right)[4] *Note: MALP property outlined in red.*

[3] Excerpt from Figure 22 of Poschmann S. (2007)

[4] Excerpt from a figure provided by Bighill Creek Preservation Society

The MALP development is not the only pressure facing the headwater area of Big Hill Springs complex. In addition to the MALP proposal there are a number of other land parcels that are currently owned by gravel operators, the locations of which are shown in Figure 1. It is clear from a review of this map that there are numerous locations where gravel could be mined, if approved, included areas right up against the Park limits and the spring complex itself. It is also clear that the MALP property itself (outlined in red) impinges on the identified discharge zone for the springs.

It is MALP's opinion that development of their sand and gravel pit will not adversely affect the quality and quantity of water reporting to the Big Hill Springs complex as they only intend to mine down to within 1 metre of the historical high-water level for the local water table. Although the final pit depth is yet to be established, MALP assumes that the operation will be a dry pit configuration, and no dewatering of the gravel will be required, thus no drawdown impact to the groundwater underneath. In fact SLR goes on to say in their technical report that the development will actually increase the recharge of water to the sand and gravel left in place, which they consider to be a "positive" effect. However, there are some significant considerations that contradict that position. These will be explained in the paragraphs and sections that follow.

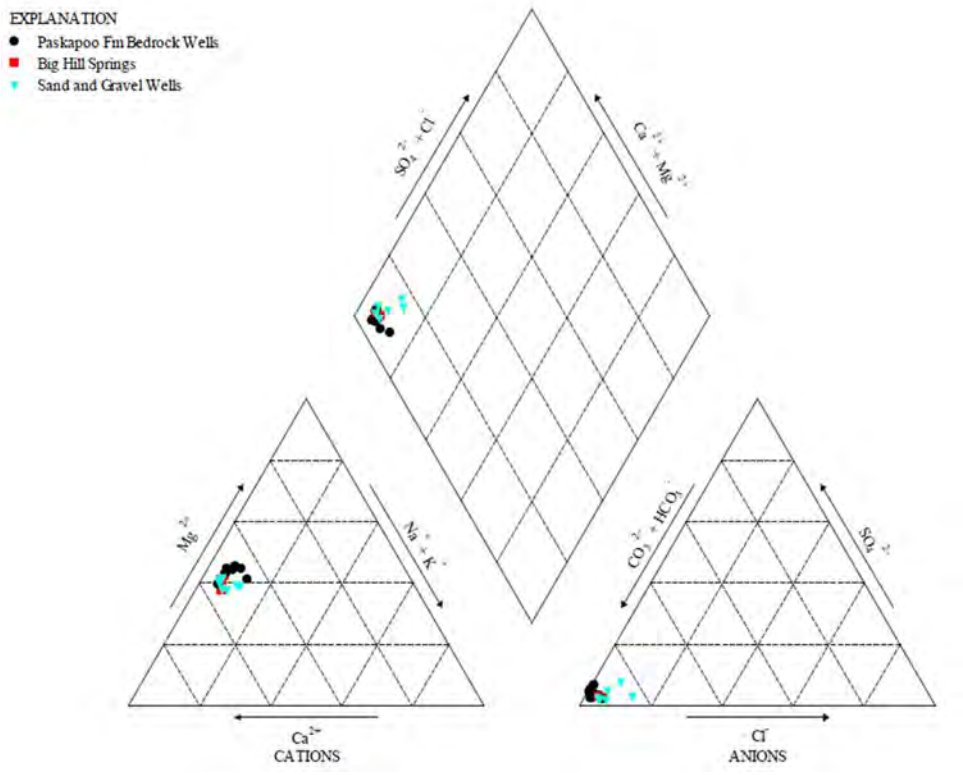

Figure 2. Piper plot showing similarity of water chemistry from various sampling locations (i.e. the sand and gravel monitoring wells established on the MALP property, nearby domestic water wells completed in the bedrock, and Big Hill Springs)[5]

[5] Figure 1 from SLR's Hydrogeological Assessment Report (2020), pdf page 19 of 335.

Results of SLR's hydrogeological assessment clearly indicate that the groundwater in the sand and gravel deposits and fractured upper bedrock, and the water discharging at the Big Hill Springs complex, are chemically the same. This is demonstrated by the similarity of major ion compositions in the Piper plot prepared by SLR (Figure 2).

Given this evidence of this hydraulic connectivity, any changes to groundwater quality or quantity within the excavated footprint of MALP's gravel pits will eventually manifest themselves at the Big Hill Springs complex and eventually Bighill Creek. Based on the calculated groundwater flow direction to the southeast and a velocity of about 300 m/year, using data from SLR (2020), the estimated travel time for groundwater to move from MALP's property to the springs is 2-3 years. This is considered a rather short timeframe for groundwater flow and places the springs at considerable risk of adverse impacts from any contaminants that might originate from pit operations or reclaimed areas. Figure 3 shows the locations of monitoring wells (MW-series) and local water wells (WW-series) used in the SLR's 2020 site assessment.

Figure 3. Location of monitoring wells and local water wells (used in the 2020 SLR Hydrogeological Assessment) and mapped water table elevations and contours[6]. *(Note: blue arrow indicates direction of flow)*

2. Risk of impact to groundwater quality

Results of the SLR (2020) investigation indicate that natural groundwater is already affected to some degree by certain metals and trace elements at concentrations above Guidelines for Canadian Drinking Water (GCDWQ)[7]. These, include:

[6] Drawing No.4 from SLR's Hydrogeological Assessment Report (2020), pdf page 43 of 335.

[7] Health Canada (2020)

- Aluminum
- Arsenic
- Barium
- Cadmium
- Chromium
- Iron
- Lead
- Mercury

It is also stated in the SLR (2020) report that the reason for detections of metals and trace elements above GCDWQ is turbidity from their wells, which ranges from below detection levels (<0.1 NTU) up to >4000 NTU (see Tables section in this report). This is a common occurrence when turbid water samples are analyzed for Total Metals, and usually results from the preservation of unfiltered water samples with laboratory-grade nitric acid. When assessing water sample collected by SLR with low turbidity values (<10 NTU), the exceedances of GCDWQ values become restricted to a lesser number of elements:

- Aluminum
- Barium
- Iron
- Lead
- Manganese

It is important to note that the groundwater beneath the area does not just support drinking water supplies. It also sustains the flow of water at Big Hill Springs, which also provides significant discharge to the fish-bearing Bighill Creek to the east. When guidelines for the protection of freshwater aquatic life, or FWAL[8], are applied to the groundwater monitoring results the following elements exhibit concentrations above long-term chronic guidelines:

- Aluminum
- Arsenic
- Cadmium
- Chromium
- Copper
- Iron
- Lead
- Selenium
- Zinc

Review of water quality at the Big Hill Springs complex itself, as reported by SLR (2020) and summarized in the Tables section of this document, does not indicate concentrations of many parameters exceeding the FWAL guidelines. Only the occasional aluminum, chromium, and selenium exceedances are noted. Similarly, results from water samples collected from Bighill Creek near the location where Big Hill Springs discharges into it, also provided in the Tables section of this report, indicate the following elements occasionally approaching or exceeding FWAL guidelines[9]:

- Aluminum
- Cadmium
- Chromium
- Iron
- Selenium

[8] Alberta Government (2018). Environmental Quality Guidelines for Alberta Surface Waters.

[9] Fouli Y. (2020)

It is therefore clear that naturally-elevated concentrations of various metals and trace elements are already present in the groundwater and surface water of the study area, and that the aquatic habitat and fish within the Big Hill Springs and Bighill Creek system are already exposed to them. The question that remains unanswered by MALP is:

> *"How will the excavation of sand and gravel at their proposed pit, exposure of the remaining sand and gravel to oxygen in the atmosphere, and enhanced recharge through a relatively thin layer of remaining sand and gravel above the water table affect the mobility of contaminants (i.e. metals, trace elements, nutrients, turbidity and any other constituents associated with their operation) into the groundwater used by local residents, and discharge that supports the Big Hill Springs, and eventually flow in Bighill Creek?"*

It is a well-known fact that when buried sediments are excavated and exposed to the atmosphere the local geochemical conditions change. The increased chance of mineral oxidation combined, with the usual wetting and drying cycles from recharge and rainfall events, work to enhance weathering and leaching reactions and ultimately the release of various constituents into the local groundwater. Table 1 provides an example of how the water quality beneath "above water table" gravel pits can change[10].

Table 1. Example of difference in natural groundwater and groundwater measured 2.5 m below above watertable gravel extraction areas *(Source: Hatva 1994)*

Parameter		Rainwater $n = 12$			Natural groundwater areas $n = 43\text{-}60$			Gravel extraction areas $n = 76\text{-}240$		
		Md	min	max	Md	min	max	Md	min	max
Temperature	°C				4.7	1.1	6.8	5.6	0.0	8.8
Acidity	pH	4.5	4.1	6.3	6.4	5.6	7.3	5.9	5.4	7.3
Conductivity	mS m^{-1}	4.0	2.0	9.0	6.0	3.0	9.0	7.0	4.0	19.0
Carbonic acid	mg l^{-1}				11.0	2.0	44.0	24.0	2.0	62.0
Bicarbonate	mg l^{-1}				25.0	15.0	38.0	20.0	8.0	45.0
Chloride	mg l^{-1}	1.0	1.0	3.5	2.0	1.0	7.0	3.0	2.0	37.0
Sulphate	mg l^{-1}	2.0	0.5	3.0	4.0	4.0	12.0	10.0	5.0	16.0
$KMnO_4$-consumption	mg l^{-1}				3.0	0.0	9.0	2.0	0.0	51.0
Hardness	°dH				1.0	0.5	1.5	1.0	0.5	3.0
Nitrate	mg l^{-1}	2.1	1.4	6.7	0.4	0.0	4.0	1.9	0.0	11.5

Note: n = number of samples; Md = median values

What is most striking about the change in median values from natural groundwater areas to gravel extraction areas is the slight increase in temperature (4.7 to 5.6°C) and reduction in pH (6.4 to 5.9), the 2 times increase in carbonic acid (11 to 24 mg/L), and 2.5 times increase in sulphate (4 to 10 mg/L). It is the carbonic acid that is of most significance given its importance in mineral weathering and other surface-related reactions involving minerals with trace elements adsorbed to their surfaces (e.g. clays). The increase in nitrate (0.4 to

[10] Hatva T. (1994)

1.9 mg/L) is evident and associated with the reduced protection to the underlying groundwater from removal of the protective soil cover. Removal of this material effectively reduces the attenuating, or filtering, capacity of the remaining material below before the infiltrating water reaches the underlying water table.

Once released into the local groundwater environment, geochemical conditions will dictate the mobility and toxicity characteristics of contaminants released. Chromium, for example, tends to be more mobile and toxic under oxygenated conditions, and exists in the hexavalent form as chromate ions (CrO_4^{2-}). Similarly, selenium exists as selenate (SeO_4^{2-}) and selenite (SeO_3^{2-}) species, with selenite being the more toxic and mobile form. Figure 4 provides Eh-pH diagrams showing the various stability fields for chromium and selenium species in water. The red dots indicate the type of Eh and pH conditions that would be expected in well-oxygenated recharge water moving through a relatively thin layer of residual sand and gravel beneath a gravel pit (like MALP's).

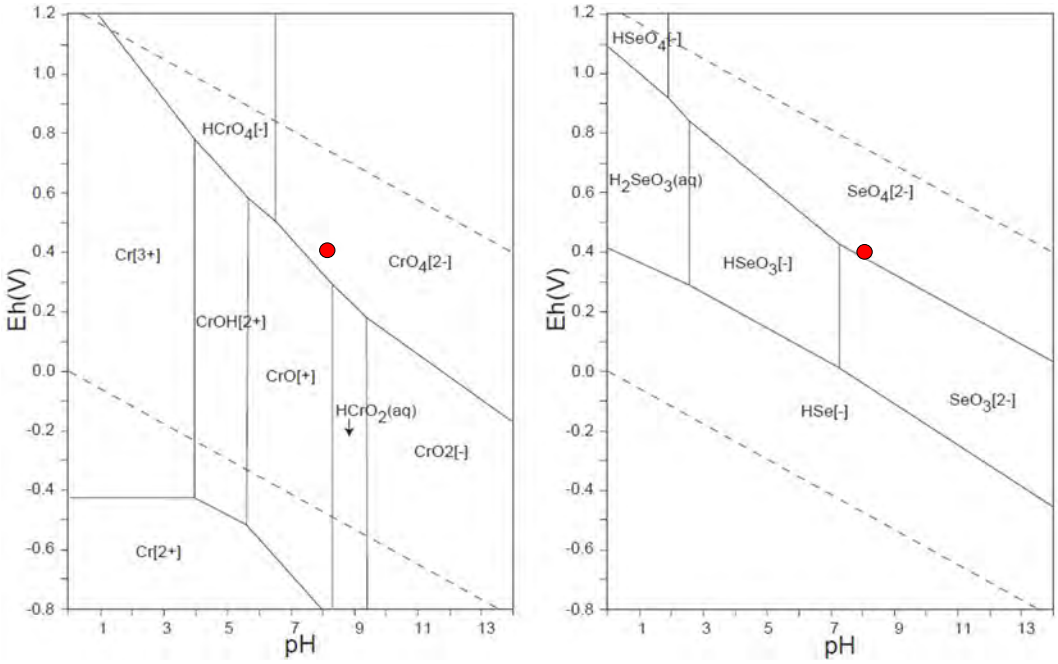

Figure 4. Eh-pH diagrams for chromium (left) and selenium (right)[11]. *(Note: red dots represent conditions expected in well-oxygenated groundwater delivered by recharge through a thin remaining layers of gravel)*

The potential for mobilization of fine particulate matter and/or colloids[12] into the groundwater as a result of MALP's mining operations also exists. Removal of the protective cover of glacial till, followed by a significant reduction in the thickness of the sand and gravel deposit, will leave a small amount of material

[11] Atlas of Eh-pH diagrams

[12] Colloids are very low diameter particles (1 nanometer, or 10^{-6} mm to 1 micrometer, or 0.001 mm) which are responsible for the turbidity or the color of water. In fast moving groundwater systems such particles can remain suspended and move considerable distances due to the physical lifting effect of the water and associated charge characteristics (positive, negative, or neutral).

above the water table. This residual sand and gravel will be exposed to increased infiltration and weathering of minerals by infiltrating runoff. The enhanced recharge of water will increase the ability to flush fine particulate matter into the underlying groundwater and eventually into the fractures of the upper bedrock. The local water table will also have a high probability of increasing above the normal range of variability. An example of the increase in groundwater levels below natural versus developed areas is provided in Figure 5.

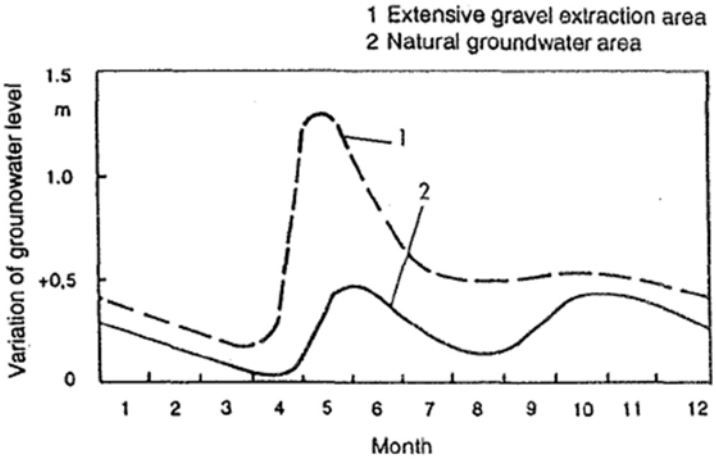

Figure 5. Example of expected increase to water table due to above water table gravel extraction operations *(Source: Hatva 1994)*

Turbidity issues have been documented at gravel pits, with measurable effects being noted as far as 1.8 km downgradient of those operating areas[13]. The following quote is taken from Mead (1995), indicating the significant distance that turbidity plumes can travel through permeable sand and gravel deposits:

> *"This DEQ study found a turbidity plume that extended more than a mile to the north (downgradient) of the gravel operation. The average turbidity of the water being discharged from the washing operation into the pond at the site was 2,737 nephelometric turbidity units (NTUs). Nearly all wells sampled within the first 6,000 feet of the turbidity plume were measured at 5 NTU or more. Many wells within the first 3,000 feet of the plume had turbidity levels of 10 NTU or more. Nearly all wells outside the plume had turbidities of 2 NTU or less."*

The most consistent position of most regarding turbidity movement within the subsurface is that the fine particles will be strained out in the pores of the granular material. However, this may not apply to the very small particles, or colloids, that can still make their way through the soil grains and continue on. For reference, Alberta's FWAL turbidity guideline for long-term exposure (>24hr) in clear running waters is

[13] Mead R.D. (1995)

2 NTUs above background levels. Based on data provided by SLR (2020), and included in the Table section of this report, the background turbidity in the groundwater beneath the MALP property is generally less than 1 NTU. Therefore the risk of increasing local turbidity values in the groundwater exists.

Another concern that has not been addressed, at all, is the potential for leaching of inorganic or organic constituents from the previously disturbed soil materials placed back over the excavated areas once mining and reclamation activities are complete. The fact that the till is clay-rich and will likely have some metals and trace elements that could be leached by infiltrating precipitation of naturally lower pH presents an additional risk. For reference, the average pH of precipitation in the Calgary area is around 6, with a minimum of around 4.9[14]. The reason for the pH values below neutral (pH 7) is the equilibration of the atmospheric moisture with carbon dioxide (CO_2) and the formation of carbonic acid (H_2CO_3). Other constituents like oxides of sulphur and nitrogen gases released from things like sour gas plants and agricultural lands development can also serve to reduce the pH through the development of sulphuric acid (H_2SO_4) and nitric acid (HNO_3). Such pH values are considered mildly acidic and therefore can enhance minerals weathering reactions.

The risk associated with the release of harmful metals and trace elements, as well as other things such as nutrients, turbidity and other site-specific contaminants (e.g. fuel spills), into the local groundwater is twofold:

i) these constituents can eventually impact local water wells, and
ii) they can eventual discharge at Big Hill Springs resulting in increased loading of nutrients and harmful constituents to Bighill Creek, thus compromising sensitive fish habitat.

3. Potential issues for fish and aquatic habitat

The presence of naturally-elevated concentrations of trace elements in the local groundwater is a clear indication that the geochemical conditions in the area are conducive the mobilization. With the exposure of the open gravel pit areas to atmospheric oxygen and increased recharge, there is increased risk to mobilize even more of these harmful trace elements into the groundwater and eventually Big Hill Springs, either in dissolved form or associated with colloidal material in a process known as "facilitated transport". As noted earlier, the groundwater that feeds the Big Hill Springs complex eventually discharges to Bighill Creek, adding up as much as 20 to 50% of its flow[15] and regulating its water temperature.

MALP's application documents fail to explore the topic of fish and fish habitat and therefore this aspect has not been considered as a "valued component" in the assessment process. A search of Fisheries and

[14] Alberta precipitation quality monitoring program website

[15] Fouli Y. (2020); BRBC (2020)

Ocean Canada website, showing the location of stream protect under the Species at Risk Act, identified bull trout, which is a protected species (Figure 6).

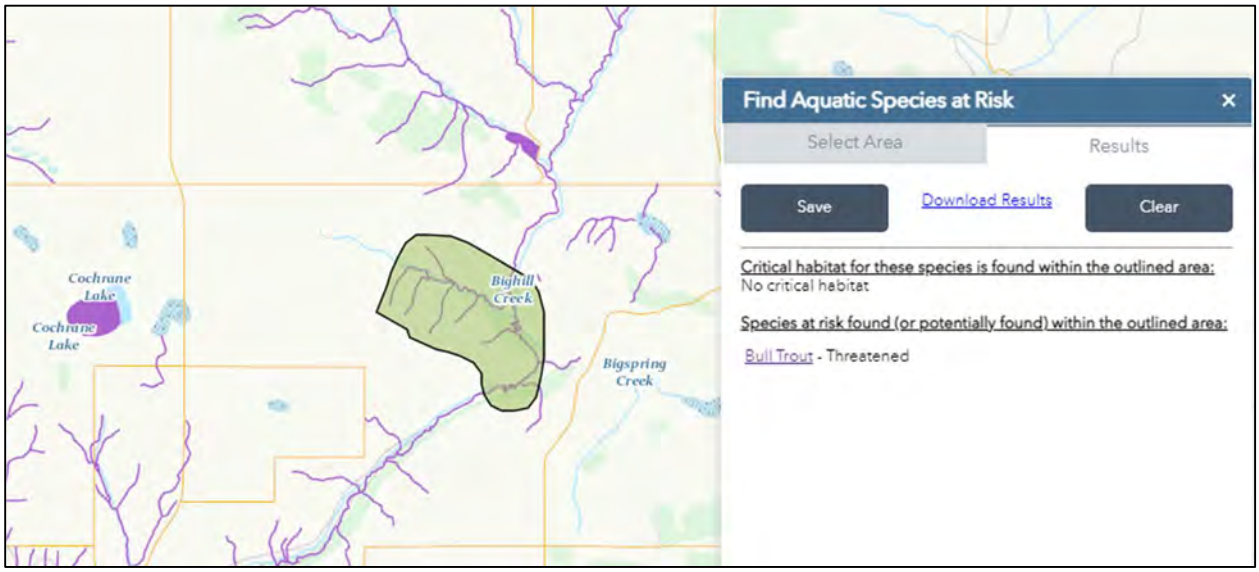

Figure 6. Excerpt from the Fisheries and Oceans Canada Aquatic species at risk map *(Note: area shown in green indicates the Big Hill Springs headwaters and the confluence with Bighill Creek)*[16]

A report prepared for the BCPS by Trout Unlimited Canada (TUC)[17] identified a number of fish species in Bighill Creek, in particular long nose dace, brook trout, brown trout, longnose/mountain/white sucker, mountain whitefish, and rainbow trout. As noted earlier, the *SARA*-protected bull trout species is also identified. At the location where discharge from Big Hill Springs enters Bighill Creek there is a significant lowering of stream water temperatures and the development of unique habitat for cooler water fish species. As noted by TUC:

> *"The highest density of Brook Trout within reach 4 occurred at the confluence of Bighill Creek and Bighill Springs Creek, likely due to the thermal preference of Brook Trout for the cold water from Bighill Springs. The water temperature in Bighill Springs Creek was dramatically colder than all other sites and only supported Brook Trout."*

Additionally, results from a 2019 biomonitoring program[18] using environmental DNA metabarcoding identified that the highest species richness is noted in this reach of Bighill Creek, underscoring the importance contributions of water from Big Hill Springs in providing unique aquatic habitat[19].

[16] Fisheries and Oceans Canada

[17] TUC (2018)

[18] Hajibabaei Lab 2019

[19] Fish habitat means water frequented by fish and any other areas on which fish depend directly or indirectly to carry out their life processes, including spawning grounds and nursery, rearing, food supply, and migration areas.

Because fish frequent Bighill Creek, the greatest risk posed by MALP's (or any other) pit development in the headwaters areas of the Bighill Creek system is the altering of groundwater quality and eventual impact to aquatic receptors from discharge of contaminants released into groundwater reporting to that water course. This has particular relevance with respect to metals and trace elements that SLR has shown to be already present at elevated concentrations in the groundwater beneath MALP's property. Spills of fuels, lubricants, and other chemicals used during the gravel mining process is also a concern.

In Alberta, the *Water Act, Environmental Protection and Enhancement Act, Wildlife Act,* and their associated regulations are the main legislative instruments that provincial regulators rely upon when reviewing development applications such as this. This review process is meant to determine:

i) if the application is sufficient and complete,

ii) whether the potential impacts to wetlands, water bodies, fish and fish habitat (as well as wildlife) are adequately described,

iii) whether proposed avoidance and mitigations are appropriate, and

iv) whether the project should be approved, modified, or rejected.

Federally, the *Fisheries Act* and *Species at Risk Act* are the main legislation that address fish-related issues (as well as vegetation and wildlife) associated with development activities. In particular, under the *Fisheries Act* no one is to create a situation where there will be harmful alteration, disruption or destruction (HADD) of fish habitat. Equally, the release of deleterious substance is forbidden. The relevant excerpts form the Act are as follows:

Section 35:

Harmful alteration, disruption or destruction of fish habitat

35 (1) No person shall carry on any work, undertaking or activity that results in the harmful alteration, disruption or destruction of fish habitat.

Section 36:

Deposit of deleterious substance prohibited

(3) Subject to subsection (4), no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water.

It is clear that MALP has failed to adequately address the potential impacts to Bighill Creek and the groundwater feeding Big Hill Springs that eventually discharges into it, and therefore the potential impacts to fish and fish habitat.

The main challenge facing the RVC Council in assessing MALP's pit application, and any other similar applications close to the Big Hill Springs complex and/or Bighill Creek itself, is the potential adverse impacts to fish or fish habitat including the aquatic species that support those fish. Allowing the development of gravel pits too close to the headwaters of Big Hill Springs, or other critical areas along Bighill Creek itself, where the release of dangerous and deleterious substances like **arsenic, cadmium, chromium, selenium**, etc. can occur may trigger a contravention of provincial and/or federal Acts. This application has yet to be reviewed by Alberta Environment and Parks (AEP) and/or the Department of Fisheries and Oceans (DFO), and therefore it is premature to approve any such application where the risk to fish and fish habitat has not been properly considered or assessed.

4. Success of any mitigation

The preceding evidence and examples of how "above water table" sand and gravel pits can alter groundwater conditions (both physically and chemically) demonstrates that it is likely that contaminants and particulate matter will be released into the local groundwater from MALP's development, should it proceed. The risk of this occurring has obviously not been assessed by MALP with appropriate calculations or geochemical modelling. Therefore it would be left up after-the-fact monitoring to detect these contaminants and signal the need for responsive actions. However, once detected these contaminants are already on the move and will require mitigation before they reach and negatively impact a nearby receptor like a water well or spring. Again, MALP has provided no evidence that they have considered this aspect, including what they would propose do in the event of such an occurrence. A more proactive stance would be appropriate considering the risks posed.

A typical approach to a contaminant release is establishing a groundwater recovery well, or wells, to intercept impacted groundwater before it can reach a receptor. Pumping effectively creates a capture zone where contaminants are pulled in and recovered to the surface where they can be dealt with accordingly. In MALP's location a recovery system operating this close to the Big Hill Springs complex would capture of groundwater that would otherwise report to (feed) those springs, and possibly local water wells. And, if the recovery wells needed to be installed in the bedrock, because of low groundwater levels below the remaining sand and gravel deposits, this could pull contaminants and particulate matter down into the fracture networks and become even more of a challenge.

If groundwater recovery is not viable, then establishing some other form of mitigation would be required. The difficulty with any type of engineered system is the ability to successfully commission that system and ensure it is functioning properly so as not to negatively affect local groundwater users or downgradient locations reliant on that same groundwater. Therefore, the best approach to ensure protection is to eliminate the risk of contamination altogether.

Establishing a suitable buffer zone both vertically and laterally within this gravel deposit would allow groundwater quality impacts to be remediated through natural processes before reaching the water table and affecting local receptors. With respect to a development setback, a distance of at least 1.6 kilometers from nearby domestic use water wells and important water features like Big Hill Springs and Bighill Creek is justified given the findings of Mead (1995), unless substantiated otherwise through a rigorous scientific review process. This would mean no gravel pit development in this setback area. The red outlined area in Figure 7 shows the proposed development setback area.

Figure 7. Proposed setback areas for gravel pit development to protect Big Hill Springs Provincial Park and Bighill Creek aquatic habitat.

Additionally, to provide added protection outside of the development setback, recommendations provided by Hatva (1994) indicate that maintenance of a vertical buffer of at least 4 metres of sand and gravel above the water table would allow for the natural filtration and remediation of any contaminants that may be released by peripheral operations. The recommended distance to extend this pit development constraint is an additional 1.6 kilometers (yellow outlined area in Figure 7). In order to stay 4 meters above the water table, or even 1 metre for that matter, will require a firm understanding of the historical high-water level for the location so as not to extend the gravel pit too deep. This critical determination has not been clearly defined by MALP for the area beneath their property.

5. Climate change considerations

There is concern that the impacts of climate change have not been addressed, at all, in MALP's development application. Figure 8 shows the anticipated change in temperature and precipitation conditions for the Calgary region based on output from 24 separate GCMs (General Circulation Models) provided by the Pacific Climate Impact Consortium through the Climate Atlas of Canada website[20].

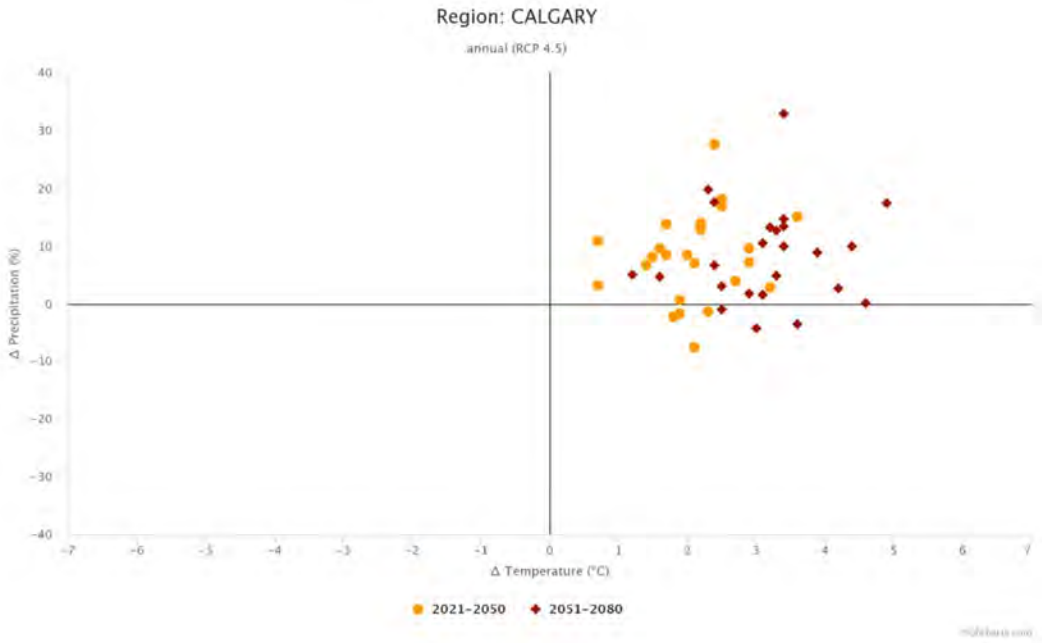

Figure 8. Anticipated change to temperature and precipitation in the Calgary region over this century (RCP 4.5 scenario)

In the majority of model cases the expectation is for an increase in precipitation anywhere from less than 5% up to as much as 35% in the coming decades. Also, a doubling of the number of days with heavy precipitation (20 mm) from 2 to 4 days is projected by the end of the century, with the extreme model cases showing up to 11 days in the latter part of this century. Convective storm activity is also expected to increase due to warmer temperatures as the ability of the atmosphere to hold water increases. Convective storms can deliver large amounts of precipitation over a short period of time and overwhelm holding pond systems if not properly designed with this in mind. Kuo et al. (2015) indicate that an overall shift in the intensity, duration and frequency, or IDF, of precipitation events in general, is expected:

> *"Future IDF curves show a wide range of increased intensities especially for storms of short durations (≤1-h). Conversely, future* ***IDF curves are expected to shift upward*** *because of increased air temperature and precipitable water which are projected to be about 2.9°C and 29% in average by 2071–2100, respectively."*

[20] Climate Atlas of Canada

This anticipated change to hydroclimatic conditions is related to a shifting of the mean towards more extreme conditions, an increase the degree of variability, and a change in symmetry relating to the major climate drivers - temperature and precipitation. This is illustrated in Figure 9. What is obvious is that as the world continues to warm, and climate conditions shift towards a new regime, the probability of extreme events, commonly described by the 10th and 90th percentiles, will adjust as a result. Therefore, gravel pit developments with operations extending out multiple decades and leaving behind landscapes in the form of reclaimed depressional areas need to consider how projected climate change will affect their design, longevity and ultimate success in reaching stated goals and regulatory requirements.

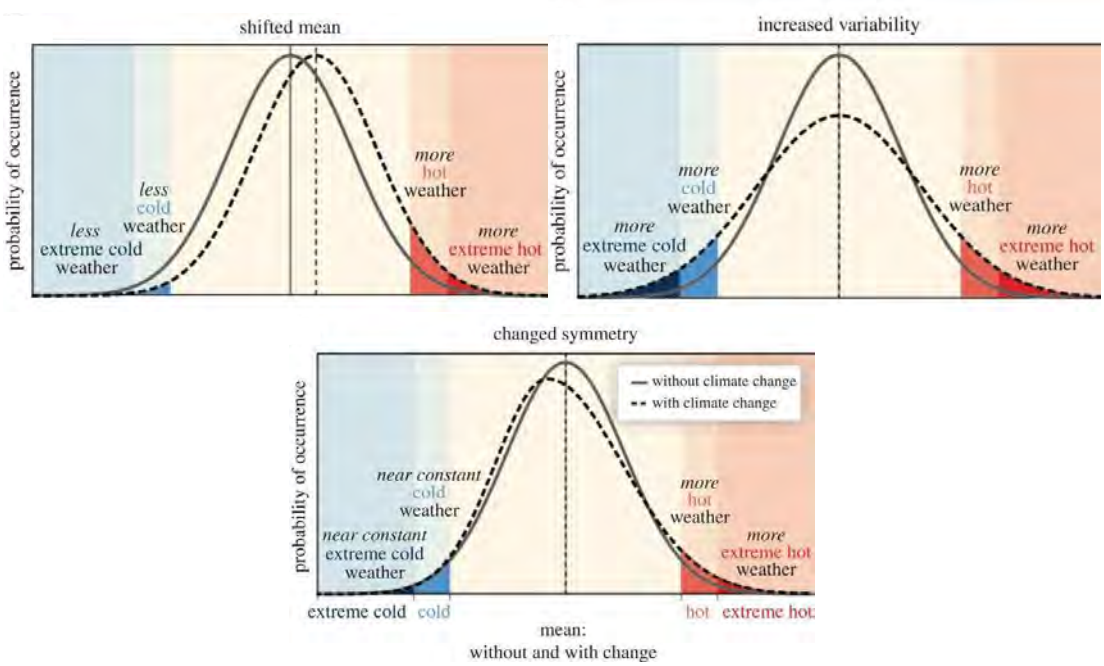

Figure 9. Example of how climate can change with a shift in mean, variability, and symmetry conditions[21]

It is my professional experience that there is a general lack of consideration for climate change in most development applications and how this might affect risk to nearby receptors. MALP's application is no different. If approved, each open pit will form a local catchment for snow melt and rainwater, thus focussing recharge into the subsurface despite all efforts to mange water out of the working areas. Ponds will need to be properly sized considering the likelihood of more extreme events, compared to current conditions, so they do not overtop and/or fail. All indications, thus far, are that normal return periods for extreme events will shorten in duration, so a 1:25-year event may become a 1:10-year event, and a 1:100 may become a 1:50, so on.

[21] Ummenhofer and Meehl 2017

It is also unclear what effect the altered landscape will have on the local watertable under future climate conditions. For the reasons outlined in this document, the focussing of recharge caused by the excavation and removal of large amounts of sand and gravel from the MALP property will:

i) threaten groundwater quality due to exposure of the aquifer,
ii) reduce the thickness of the remaining sand and gravel, and the associated filtration and contaminant attenuation capacity,
iii) increase the elevation of the water table due to enhanced recharge,
iv) increase the risk of contaminant migration into the groundwater within the remaining sand and gravel and fractured bedrock, and
v) increase the risk of adverse impact to systems receiving groundwater discharge from the pit areas.

Post-development, the reclamation landscape will continue to focus this recharge, but now over a broader area through disturbed till and topsoil on top of a reduce thickness of filtering material above the fractured bedrock. This may further exacerbate the delivery of soluble and particulate contaminants present in those reclamation materials, such as metals and trace elements and nutrients (nitrogen, organic carbon), into the underlying groundwater supplying local wells and the Big Hill Springs complex. Restoration of agricultural development and/or grazing will increase the risk of further contamination into the future as well.

A much higher water table due to enhanced recharge from capture of annual precipitation or large convective storms could also lead to water ponding on the surface leading to enhanced runoff, erosion risk, and increased sedimentation of downgradient areas like the Big Hill Springs and Bighill Creek. These are all considerations that MALP has failed to adequately assess, and therefore leads to an extreme risk of unintended consequences.

5. Cumulative effects

There is currently one operating gravel pit (Hillstone Aggregates) located about 850 m due west of the MALP property along Highway 567. That operation is extracting gravel from the same buried channel deposit that MALP intends to exploit. A number of other gravel mining developments have been proposed, or are under consideration, at the downstream end of this buried sand and gravel deposit and in headwater area for Big Hill Springs. This raises concerns regarding the cumulative effect that multiple pits would have on the water balance and water quality in this sand and gravel aquifer and the resulting impacts to connected aquatic features. In response to this concern, a legal challenge was presented to the Court of Queen's Bench in 2019 (Docket 1701 12053), and on September 16 of that same year the decision was made by Justice J.T. Eamon to set aside the RVC Council's decision to approve a Natural Resource Industrial (NRI) District within the west half of Section 31. This is exactly where the MALP property

resides. The County is presently appealing this court ruling, but it is understood that the lands still remain designated as Ranch & Farm (R&F) District.

The concern for cumulative development effects on the Big Hills Springs complex, and local water well owner, is the reason why the original court challenge to the RVC Land Use Bylaw was launched back in 2019. It is evident that a considerable amount of aggregate development would occur in the headwater area, and other parts of the extended sand and gravel deposit (see Figure 1, right image) should a change be made from R&F to an NRI District. It is also evident that the risk of adverse impacts from the MALP development will add to any impacts propagating from other nearby sand and gravel pits. As such, the effects of all developments regarding increased recharge and constituent mobilization into the groundwater sustaining Big Hill Springs and local users is a grave concern considering its value to the local environment.

This fact is the reason for the recommended 1.6 kilometer development setback (at a minimum, unless determined otherwise) and maintenance of a vertical 4 metre buffer above the water table for any other gravel pit developments within 1.6 kilometers of that development setback. The sole purpose of this strategy is to maintain the quality of the groundwater sustaining the springs and supporting aquatic habitat reliant on the delivery of good quality water of stable temperature. Such a development buffer will also protect the quality of groundwater for nearby households and farms reliant on water wells for their everyday needs. Given that there are plenty of gravel resources in other locations in the County and away from this sensitive headwater, establishing such a development buffer would:

i) preserve the quality of a well-loved provincial park and prairie spring complex,
ii) ensure that regulatory violations do not occur down the road, and
iii) not adversely affect the potential for the County to realize aggregate levies.

To achieve sustainability (i.e. the balancing of economic and environmental consideration for societal benefit) it is important to make room for, and preserve, natural landscape features and reliant ecosystems when considering the impacts of resource development projects. This can be achieved through prudent land use planning and decision-making.

Closure

It is clear that Big Hill Springs is a unique feature in Rocky View County that serves the recreational needs of residents and visitors and provides a quiet respite for many to connect with nature or relax with family and friends. It is also frequented by wildlife. The area is located between Parkland and Foothills natural regions and contains a large complex of springs feeding a tributary creek and series of small waterfalls that flow year-round over rocky terraces (and unique tufa deposits) covered with a lush growth of shrubs and grasses. The area is also the site of an historic fish hatchery. In fact, the area is so special, and regionally

unique that the government established this as a provincial park in 1957, which received over 250,000 visitors each year.

The spring complex at the headwaters of Big Hill Springs Provincial Park is sustained by groundwater that discharges from a large, buried sand and gravel aquifer deposited thousands of years ago. These sand and gravel deposits are gaining increased attention, and pressure, to be developed as aggregate by various companies. Despite the fact there are multiple other locations in Rocky View County and the immediate region where sand and gravel aggregate can be extracted, or is already being exploited, MALP (and others) are interested in establishing pits in close proximity to Big Hill Springs Provincial Park and the headwaters of the Big Hill Springs complex.

There are definite future ramifications for this type of development when considering local groundwater users and surface water bodies that receive, and rely on, the groundwater discharging from this sand and gravel aquifer. The risks of future impacts to the local groundwater are only increased due to the cumulative pressures from multiple aggregate operations that want to establish themselves in the same area. Not only is there an issue regarding changes to groundwater quality, but there is also legal liability associated with future impacts to aquatic habitat and fish in Bighill Creek, which could trigger a series of violations related to provincial and federal Acts. Establishing a development setback of at least 1.6 kilometers, and the requirement to maintain an adequate vertical buffer of undisturbed sand and gravel above the water table of at least 4 metres for any other development within 1.6 kilometers of this development setback, would manage the risks posed to the Big Hill Springs complex and the Bighill Creek system. And, in doing this will also avoid the potential for future interventions on development applications and manage the risk of regulatory violations.

It would also be a useful exercise for the RVC to conduct an overall assessment of the county area to identify locations where a similar type of gravel pit development setback would make sense to preserve important environmental assets and reliant ecosystems. This would avoid future interventions and the time and resources spent resolving them.

Respectfully submitted by,

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Hydrogeologist & Geochemist

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TABLES

Table 1. Groundwater quality in and around MALP property (SLR 2020)

Parameters	Units	FWAL criteria	Sand & Gravel monitoring wells			Bedrock wells				Big Hill Springs		
			MW14-101	MW14-103	MW19-110	WW1	WW2	WW3	WW4			
			20-Nov-14	04-Aug-15	10-Jul-19	Median	Median	Median	Median	30-Oct-14	04-Aug-15	10-Jul-19
General quality indicators												
pH	S.U.	6.5-9.0	7.9	8.0	7.8	8.1	8.0	8.0	8.0	8.2	8.2	8.1
TDS	mg/L		337	333	290	314	317	340	330	342	334	210
Hardness (calc)	mg/L		328	316	278	310	281	333	333	336	317	200
Turbidity	NTU		9.6	8	<0.10	0.3	0.8	0.23	0.60	0.8	1.07	5.1
Major ions												
Calcium	mg/L		76	73	62	69	59	71	75	74	72	48
Magnesium	mg/L		34	33	30	33	33	38	35	37	33	20
Sodium	mg/L		6	8	6	7	13	8	7	8	8	5
Potassium	mg/L		5	4	3	3	2	3	3	3	3	5
Bicarbonate	mg/L		382	375	330	363	363	385	365	376	371	240
Chloride	mg/L	120	11	9	8	4	2	8	11	10	10	8
Sulphate	mg/L	429 or greater	9	11	8	7	16	11	7	9	8	5
Nitrate-N	mg/L	3.0	1.2	1.8	1.9	1.7	0.7	1.9	3.2	2.8	3.0	1.4
Nitrite-N	mg/L		--	--	--	--	--	--	--	--	--	--
Total metals & trace elements												
Aluminum	mg/L	0.05	0.16	0.11	10.0	0.009	0.006	0.006	0.004	0.018	0.014	0.30
Arsenic	mg/L	0.0050	0.0004	0.0003	0.0084	0.0001	0.0002	0.0001	0.0002	0.0002	0.0006	0.0006
Barium	mg/L		0.424	0.332	2.20	0.283	0.128	0.223	0.225	0.304	0.313	0.210
Boron	mg/L	1.5	--	--	--	0.022	0.028	--	0.023	0.024	<0.020	<0.020
Cadmium	mg/L	0.000340	0.000016	<0.000005	0.004200	0.000013	0.000024	0.000032	0.000024	0.000032	0.000008	0.000034
Chromium	mg/L	0.001 *(assume 6+)*	--	0.002	0.019	--	--	--	0.001	--	--	0.001
Copper	mg/L	0.040	--	0.0013	0.032	0.022	0.002	0.065	0.006	--	0.0010	0.0013
Iron	mg/L	0.300	0.28	0.22	10.0	0.015	0.029	--	0.018	0.03	0.02	0.25
Lead	mg/L	0.007	0.000	--	0.019	0.001	0.001	0.003	0.001	--	--	--
Mercury	mg/L	0.000005	--	--	0.000002	--	--	--		--	--	0.000003

Parameters	Units	FWAL criteria	Sand & Gravel monitoring wells			Bedrock wells				Big Hill Springs		
			MW14-101	MW14-103	MW19-110	WW1	WW2	WW3	WW4			
			20-Nov-14	04-Aug-15	10-Jul-19	Median	Median	Median	Median	30-Oct-14	04-Aug-15	10-Jul-19
Manganese	mg/L		0.020	0.010	7.300	--	0.004	0.001	0.004	0.0019	0.0012	<0.0040
Molybdenum	mg/L	0.073	0.001	0.001	0.002	0.001	0.002	0.001	0.001	0.0014	0.0009	0.0004
Nickel	mg/L	0.120	--	0.001	0.065	--	0.001	0.002	0.001	--	<0.00050	0.0009
Selenium	mg/L	0.002	--	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.001
Thallium	mg/L	0.0008	--	--	0.0002	--	--	--		--	--	--
Uranium	mg/L	0.015	0.002	0.002	0.006	0.001	0.001	0.002	0.001	0.0020	0.0019	0.0013
Zinc	mg/L	0.030	--	--	0.140	--	0.035	0.205	0.041	--	--	--
Microbiological												
Total coliforms	MPN/100		-	<1	180	<1	<1	<1	6	-	2420	>2400
E.coli	MPN/100		-	<1	63	<1	<1	<1	<1	-	1733	1600

Notes:

1. Parameters highlighted in red indicate concentrations above published FWAL criteria (AB government 2018)
2. Average hardness of 250 mg/L (as CaCO3) used for determining metals and trace element guidelines, as required.
3. FWAL = freshwater aquatic life

Table 2. Bighill Creek water quality: 2019-2020 (Fouli 2020)

Sampling Location	Units	FWAL criteria	SITE 1 - upstream of Big Hill Springs at Hwy 567			SITE 2 – near confluence of Big Hill Springs and Bighill Creek		
			Median	Min	Max	Median	Min	Max
General quality indicators								
pH		6.5-9.0	8.1	7.8	8.3	8.1	8.0	8.5
TDS	mg/L	--	310	180	490	330	210	370
Hardness (as $CaCO_3$)	mg/L	--	280	160	430	280	180	340
Selected ions								
Sodium	mg/L	--	20	11	31	15	11	17
Chloride	mg/L	120	9.8	7.8	23	9.0	5.7	15.0
Sulphate	mg/L	429 or greater	13	7	28	13	10	14
Nutrients								
Nitrate (as N)	mg/L	3.0	0.077	0.027	.033	3.3	0.84	9.2
Total Phosphorus	mg/L	--	<0.10	<0.10	<0.10	0.10	<0.10	0.120
Total metals & trace elements								
Aluminum	mg/L	0.050	0.055	0.031	0.440	0.053	0.017	0.160
Arsenic	mg/L	0.0050	0.0010	0.0007	0.0013	0.0009	0.0002	0.0011
Barium	mg/L	--	0.165	0.120	0.260	0.200	0.130	0.280
Boron	mg/L	1.5	0.018	<0.02	0.026	0.010	<0.020	0.023
Cadmium	ug/L	0.034	0.010	<0.010	0.039	0.026	0.010	0.037
Chromium	mg/L	0.0010 *(assume 6+)*	0.0005	<0.0010	0.0013	0.0005	0.0005	0.0012
Copper	mg/L	0.040	0.0005	0.0004	0.0015	0.0007	0.0003	0.0009
Iron	mg/L	0.0300	0.410	0.240	0.830	0.240	0.170	0.580
Lead	mg/L	0.0070	0.0001	<0.0001	0.0004	0.0001	<0.002	0.0002
Manganese	mg/L	--	0.026	0.014	0.220	0.015	0.011	0.047
Molybdenum	mg/L	0.0730	0.0010	0.0003	0.0012	0.001	0.000	0.001
Nickel	mg/L	0.110	0.0008	0.0006	0.0012	0.0006	<0.0003	0.0011
Potassium	mg/L	--	5.0	3.8	7.1	4.1	3.5	6.0
Selenium	mg/L	0.0020	0.0005	0.0004	0.0013	0.0008	0.0005	0.0015

Sampling Location	Units	FWAL criteria	SITE 1 - upstream of BHS at Hwy 567			SITE 2 - confluence of BHS and Bighill Creek		
			Median	Min	Max	Median	Min	Max
Silicon	mg/L	--	4.9	2.2	8.4	4.4	3.1	7.3
Strontium	mg/L	--	0.555	0.320	0.820	0.500	0.360	0.560
Sulphur	mg/L	--	4.7	3.0	7.8	2.9	2.7	5.0
Titanium	mg/L	--	0.003	0.002	0.013	0.001	0.001	0.005
Uranium	mg/L	0.0150	0.003	0.002	0.003	0.002	0.001	0.003
Vanadium	mg/L	--	0.001	<0.001	0.002	0.002	0.002	0.002
Zinc	mg/L	0.030	0.003	0.002	0.005	0.004	0.004	0.004

Notes:

1. Parameters highlighted in red indicate concentrations above published FWAL criteria (AB government 2018)
2. Average hardness of 250 mg/L (as CaCO3) used for determining metals and trace element guidelines, as required.
3. BHS = Big Hill Springs; FWAL = freshwater aquatic life

APPENDICES

APPENDIX 1

Jon Fennell. M.Sc., Ph.D., P.Geol.

PROFESSIONAL PROFILE

Dr. Jon Fennell has been a practicing consultant in the natural resource sector for over 30 years offering support in the environmental sciences and resource management. His experience includes contaminated sites assessment, development of local and regional-scale groundwater systems, mine dewatering strategies, water supply and disposal, groundwater-surface water interaction assessment, implementation of monitoring and management systems, climate analysis and adaptation strategies, and environmental forensics including applications of:

i) remote sensing
ii) downhole, earth-based and airborne geophysical methods
iii) geochemical assessment & modelling
iv) stable and radiogenic isotopes to support source water tracing, chemical fingerprinting, and age-dating

The bulk of Jon's experience is associated with various oil & gas and mineral resource development projects in Canada and abroad. Over the last 13 years Jon has worked closely the Alberta Government through various initiatives to support the Water for Life Strategy, Land Use Framework, and Cumulative Effects Management System in the province. A primary area of focus is on developing strategies to ensure water security and communicating the importance of water knowledge as it applies to sustainable development activities.

PROJECT EXPERIENCE

International support

United Nations – Joint Caribbean Climate Change Partnership

Technical lead for the development of UNFCCC-sanctioned National Adaptation Plans for the countries of Belize and Guyana, with the goal of addressing multi-sector impacts from future climate change. Responsibilities included review of existing policies and studies supporting climate change adaptation, assessment of current adaptation plans for major economic, social, and environmental sectors, Incorporation of IPCC model results under various RCP scenarios, delivery of facilitated in-country workshops for various ministries, provision of recommendations to address gaps identified in current plans, liaison with government officials and UNDP organizers, completion of risk assessment and options analysis to identify high-value actions, preparation of capacity-building plan and 10-yr strategic plan, and risk and vulnerability assessment (including spatial aspects under various climate change scenarios – SRES and RCP).

Mexican Soda and Water Company – Monterrey Mexico

Lead for a groundwater evaluation project to supplement beverage making operations a large manufacturing plant in the city of Monterrey. Responsibilities included review of background geological, hydrogeological and geochemical information across a large study area centered on the Monterrey Metropolitan Area; assessment of structural fabric of study area including presence of major folds, faults, and other features (e.g. karst), amalgamation of background data with result from Quantum Geoelectrophysics reconnaissance program to identify prospective drilling targets, completion of a 4C

report (compare, contrast, correlate, confirm) and selection of prime drilling target for testing and evaluation.

Dept. of Environment & Resource Management – Coal Seam Gas Development, Queensland Australia

Lead for a hydrogeochemical assessment and water fingerprinting exercise in Great Artesian Basin aquifers of the Surat and Bowen basins to support Coal Seam Gas development and cumulative effects analysis. Responsibilities included a comprehensive data and information inventory to facilitate source water fingerprinting and collation of large public-domain data sets to provide a first-of-its-kind database of water quality information, review of major ions, metals and trace elements, stable and radiogenic isotopes and dissolved gases to identify recharge phenomenon, cross-formational flow characteristics and distinct water types, and statistical analysis to assess data groupings and spatial trends.

Additionally, lead for an aquifer vulnerability assessment to assess groundwater and groundwater-dependent ecosystem risks from Coal Seam Gas development in southeast Queensland. Responsibilities included development of a multi-criteria weighting and ranking system linked with GIS to display areas of highest risk to drawdown including areas users and groundwater dependent ecosystems, and facilitation of industry and government workshops to present and vet results.

Origin Energy – Coal Seam Gas Development, Queensland Australia

Groundwater lead for a large-scale coal seam gas project (up to 10,000 wells) located in the headwaters of the Murray-Darling Basin and recharge area for the Great Artesian Basin. Responsibilities included, development of a regional-scale groundwater monitoring system using vulnerability and risk mapping, design of a hydrogeological model covering a 173 000 km^2 area (using FEFLOW) to assess cumulative effects from coal seam gas development, completion of supporting Technical Report (including risk mapping, injection feasibility, model development) and Environmental Impact Statement chapter, and liaison with the Queensland Department of Environment and Natural Resources to address needs for the required Environmental Impact Assessment.

Texas Petroleum Company – Hydrocarbon Development, Columbia South America

Completion of an onsite environmental assessment of oilfield operations in support of the transfer of the Teca Nare, Cocorná, Velásques Oil Fields and the Velásquez-Galan Pipeline. Responsibilities included phase 1 site assessment of field operations, verification of site conditions at all well sites including soil and vegetation conditions prior to property transfer, assessment of baseline surface water and groundwater chemical conditions, as wells as environmental quality assessment to determine contamination from oilfield operations, and provision of summary report including recommendations.

Texas Petroleum Company – Hydrocarbon Development, Ecuador South America

Completion of a baseline groundwater and surface water study in a remote and environmentally sensitive area of the Amazon basin (headwaters area) to support a helicopter-assisted drilling program for oil and gas exploration. Responsibilities included field reconnaissance to establish the suitability of proposed drilling targets, assessment of the suitability of local surface water and groundwater sources for drilling fluid provision (quality and quantity), review of baseline soil quality, site hydrogeology, and geochemical conditions, and development of recommendations for pit construction and site preparation.

Canadian International Development Agency – Municipal works, Ecuador South America

Completion of a baseline soil and groundwater study (physical and chemical) around the City of Catamayo to determine the feasibility of siting an engineered wastewater impoundment for the treatment

of municipal sewage treatment (project funded by CIDA). Responsibilities included general site reconnaissance, collection of soil and groundwater samples for baseline geochemical quality assessment, review of hydrogeological conditions and processes relating to baseline conditions, and submission of recommendations on the suitability of the proposed location and possible approaches to rectify existing limitations.

Government of Yemen – National water supply, Yemen

Hydrogeological and geochemical support for a regional-scale study of water supply potential in the country. Responsibilities included hydrogeological and hydrogeochemical facies mapping, geochemical assessment and flow path evolution modelling, groundwater flow field assessment and modelling, sustainable yield evaluation, and groundwater age dating.

Blackbird Mine – Acid Rock Drainage assessment, Idaho USA

Completion of a hydrogeological baseline study and associated stable isotope investigation ($\delta^{34}S$, $\delta^{18}O$, and $\delta^{2}H$) to determine the source of acid mine drainage near active underground workings. Responsibilities included review of existing geochemical data and related mineral equilibria conditions (i.e. baseline and impacted), and assessment of geochemical reactions leading to ARD conditions, including biogeochemical aspects.

Government support

Alberta Environment, Oil Sands Science and Monitoring Division

Preparation of oil sands tailings pond seepage review report. Responsibilities included review of background information pertaining to oil sands produced water (OSPW) seepage research and natural bedrock groundwater discharge studies, review of industry-submitted EPEA compliance reports to assess current "state of affairs" regarding monitoring and OSPW detections, assessment of seepage management systems, review of geological pathways for OSPW migration, and development of seepage risk profiles for all active tailings ponds.

Alberta Environment and Parks (AEP)

Provision of external expert review for the Implementation Directive for the Surface Water Body Aggregate Policy (SWBAP). Responsibilities included review of relevant Government of Alberta documents relating to aggregate mining in or near surface water bodies and/or floodplain environments, use of information from relevant policies in other jurisdictions as well as studies and research (aquatic, terrestrial, river morphology, climate risk) regarding impacts of aggregate mining in floodplain areas, identification of gaps regarding goals and objectives of the approval and management process, ,review of risk assessment approach to approving aggregate mines near surface water bodies, and provision of recommendations for monitoring, evaluating and reporting, and interaction with AEP project team members and presentation of results.

Also, participation on expert hydrogeology panel to development a template for groundwater management frameworks (GMFs) in Alberta. Responsibilities included assessment of background on Alberta groundwater resources and documents highlighting existing GMFs inside and outside of Canada, review of sustainability goals and challenges with groundwater management (quantity and quality), review of prevailing concepts to groundwater management (i.e. surface water capture, risk and vulnerability assessment), identification of data needs and required infrastructure to support cumulative effects management, identification of proposed indicators using DPSIR approach, and participation in

external panel and internal AEP team of hydrogeological experts to define aspects of a standardized GMF template.

Alberta Environmental Monitoring Evaluation and Reporting Agency (AEMERA)

Assessment of Alberta's groundwater observation well network, including redundancy and gap analysis. Responsibilities included groundwater risk mapping, development of a numerical scoring scheme to prioritize monitoring wells, statistical and spatial analysis of provincial water chemistries using information from the Alberta water well information database, and development of monitoring strategy including analytes and frequency to address key development activities (e.g. hydraulic fracturing, waste disposal, large-scale groundwater extractions).

Alberta Environment (AENV)

Various projects include:

- Assistance with scoping, conceptual design and development of approach to Groundwater Management framework template
- Expert review for Implementation Directive for the Surface Water Body Aggregate Policy
- Review and comment on Groundwater Monitoring Directive (2012 draft)
- Technical assistance with development of a guidance framework to respond to the implications of thermal mobilization of constituents at in-situ bitumen recovery projects including facilitation of team workshops to communicate the physical and chemical aspects of thermal mobilization and the risks posed by in-situ operations, development of a risk-based, phased, approach to assessing thermal mobilization to address source-pathway-receptor aspects, development of a draft guidance document and interaction with the AEP communications team, and support for industry and CAPP consultation meetings to review the draft guidance document.
- Completion of vulnerability and risk mapping for the Lower Athabasca Regional Planning area and development of groundwater management framework for the mineable and thermal in situ areas.
- Completion of an inventory of existing quality and quantity issues, water supply conditions and related environmental policy.
- Participation in technical and policy-related work sessions involving various stakeholder representatives.
- Assessment of potential cumulative effects from thermal in-situ bitumen recovery operations and related activities (i.e. water withdrawal for steam generation; fluid waste injection)
- Facilitation of technical and policy-related work sessions to engage stakeholders (operators, AENV and ERCB) directly affected by changes to provincial water management.

Alberta Environment and Sustainable Resource Development (ESRD)

Various projects include:

- Development of a multi-attribute point-scoring system and ArcGIS tool to assist with optimal siting of provincial monitoring wells to address concerns regarding hydraulic fracturing (HF). Responsibilities included identification of key risks to groundwater resource from HF activities, conceptualization and construction of a subsurface risk assessment, and identification of surface access opportunities in an ArcGIS platform to identify prime locations for monitoring in active and future development areas.

- Northern Athabasca Oil Sands Region groundwater monitoring program. Responsibilities included development of sampling methodology, data evaluation process and program logistics, communication to technical team comprising oil sands operators, ERCB and AEP representatives, development of an on-line visualization tool, and client liaison.
- Review of LARP management plan, supporting Groundwater Management Frameworks and supporting guidance documents re: Thermal Mobilization of Trace Elements during In Situ Developments and Groundwater Monitoring Directive.
- Preparation of summary document for Scientific Advisory Committee of the Oil sands GW working group, and Alberta Environment.

Alberta Land Use Secretariat (LUS)

Assistance with development of land planning scenarios in NE Alberta to guide future development in the Lower Athabasca Regional Plan area pursuant to the goals of the Alberta Land-use Framework. Responsibilities included presentations to the Land Use Secretariat, Regional Planning Team and Regional Advisory Council, development and assessment of modelled results from a cumulative effects simulator, completion of groundwater modelling over a 93 000 km^2 area (using MODFLOW), and development of an approach to deal with groundwater resources in the LARP area.

Alberta Utilities Commission (AUC)

Provision of expert review support for a wind power application in the Provost AB area. Responsibilities included review of project concept and environmental implications, assessment of completeness regarding baseline hydrogeological assessment, assessment of impact analysis and proposed mitigation, identification of gaps and provision supplemental information requests.

BC Ministry of Energy, Mines and Petroleum Resources

Provision of expert review support for hydraulic fracturing review process. Responsibilities included preparation of background information pertaining to water quality risks and source-pathway-receptor aspects of hydraulic fracturing operations, provision of recommendation regarding geochemical fingerprinting (ion ratios, isotopes, NORMs), risk assessment and mapping techniques, and monitoring, and appearance at in-camera session to discuss water quality aspects with academic panel members including recommendations.

Agency support

Alberta Innovates (AI)

Provision of hydrogeological support services for the following University of Alberta research studies:

- Resolving human versus Industrial Influences on the water quality of the Lower Athabasca River (data synthesis; geophysical and geochemical assessment; isotope geochemistry source water fingerprinting, GW-SW interaction – identification and flux)
- Review of Arsenic in Alberta's groundwater (collation of multiple open source and private data bases, GIS platform design; correlation/cluster/factor analysis to determine source/cause/reasons(s), both physical and geochemical, for elevated concentrations, development of a risk mapping tool to identify existing and potential future high-risk areas and aquifer intervals)
- Predicting Alberta's Water Future (complete estimates of groundwater recharge to Alberta's 2200 sub-basins; determining groundwater use projection by major sector to 2050; assessing baseflow contributions and groundwater stress area based analytic model outputs; project changes to provincial

water supplies based on population growth, energy extraction, food production, land use, and climate variability/change; coordinate results with climate change model outputs and SWAT model outputs to generate preliminary Water Risk map for the province.

Alberta Water Research Institute (AWRI)

Preparation of a report assessing Alberta's inventory of water and its associated dynamics (natural and human-induced). Responsibilities included the development of a partnership model including participants from Universities and Institutes in Beijing, Switzerland, Edmonton, Calgary and Lethbridge, completion of a complete inventory of surface water, groundwater and fossil water (glaciers and deep groundwater) to identify current and future risks to water supplies in the province, and assessment of climate variability and change implications to provincial groundwater water resources

Canada's Oil Sands Innovation Alliance (COSIA)

Completion of a tailing pond seepage risk assessment and preparation of a peer-review journal manuscript to place suspected oil sands impacts into perspective. Responsibilities included review of individual tailings ponds established at the various operating oil sands mines in the Athabasca Oil Sands region, application of source-pathway-receptor model in relation to calculated groundwater flow velocities, stand-off distances from receptors, and natural attenuation properties to assess risk associated with each structure, and preparation of manuscript to place into context natural discharge of low-quality groundwater from bedrock formation versus oil sands seepage.

Other projects include:

- Completion of regional geochemical assessments in NE Alberta (35,000 km^2 area) supporting the Regional Water Management Initiative. Responsibilities included, collation of regional geological, hydrogeological, and geochemical data using public domain and industry information, assessment and interpretation of hydrogeological setting and of conceptual models, assessment of traditional and isotope geochemistry to determine source water chemistry to define flow path phenomena areas of aquifer interactions, statistical analysis of data to determine groupings and associations (PCA analysis), and documentation and presentation of results at various public venues.
- Completion of a water disposal assessment in NE Alberta (153,000 km^2 area) supporting the Regional Water Management Initiative. Responsibilities included collation of regional geological, hydrogeological, and water production data using public domain and industry information, development of a multi-criteria analysis approach to assessing Injection Potential and Theoretical Injection Rates based on a system of weighted and ranked physical and chemical attributes, and development of an ArcGIS platform to identify high-value disposal formations in relation to existing and planned in situ developments and pipelines
- Completion of oil sands industry study assessing the risks and benefits of landfills, salt caverns and disposal wells in liquid waste management. Responsibilities included participation in industry workshops. assessment of liquid waste management options, documentation and presentation of the results to industry members.

Cumulative Environmental Management Association (CEMA)

Assessment of baseline hydrological and hydrogeological conditions and development of a regional-scale groundwater quality monitoring network (18 000 km^2 study area) located in the Athabasca Oil Sands Region of northeast Alberta. Responsibilities included refinement of conceptual hydrogeological model, groundwater-surface water interaction assessment, assessment of quality conditions and trends (including statistical analysis), knowledge and data gap analysis, pathway identification and vulnerability assessment

for sensitive receptors, field reconnaissance and well selection, isotope interpretation ($\delta^{18}O$, $\delta^{2}H$, $\delta^{13}C$, Carbon-14), groundwater hydrograph analysis, report preparation and presentation, and liaison with government and industry representatives.

Other projects include:

- Preparation of a groundwater monitoring and management plan in support of the State of the Muskeg River Watershed report. Responsibilities included assessment of baseline groundwater quantity and quality conditions in the study area, identification of development stresses and potential short and long-term impacts, identification of proposed physical, chemical and state indicators for monitoring, and interaction in multidisciplinary team.
- Overview of historical, current, and planned groundwater initiatives in the Regional Municipality of Wood Buffalo. Responsibilities included interviews with relevant industry, government, academia, aboriginal, and non-governmental organization groups, identifying and accessing relevant studies, reports, and investigations relating to groundwater and groundwater-surface water interaction, and development of a useable database with relevant descriptors of content and results.

Lakeland Industry and Community Association (LICA)

Assessment of the current health of two large watersheds (covering over 8500 km^2) in response to changing climatic conditions, changing land use practices, and increased pressure on water resources (surface water and groundwater) by agricultural and industrial users. Responsibilities included the assessment of historical Landsat imagery, review of stream and groundwater hydrograph data, assessment of effects of climate phenomena on basin hydrology, development of a hydrogeological framework from over 11,500 water well records, and review of temporal quality data from lakes and water wells.

Petroleum Technology Alliance of Canada (PTAC)

Completion of studies and industry workshops assessing environmental net benefit of saline water use versus non-saline water use in unconventional oil and gas development and the role of collaboration in unconventional oil and gas development.

Municipal and Watershed Stewardship Groups

Butte Action Committee

Preparation for, and participation in, AEP-led Surface Water Body Aggregate Policy 2017 stakeholder review workshops. Responsibilities included consultation with stakeholder group, provision of support for Leduc workshop, review of AEP materials in advance of Airdrie workshop (AEP policies, guides, codes, risk assessment framework), review of other Canadian and International policies and guides to aggregate mining near water bodies, review of impact studies related to aggregate mine development near surface water bodies (erosion, pit capture, infrastructure risk, fisheries and riparian area impacts), assessment of climate change implications for streamflow timing and magnitude, as well as intensity, duration, and frequency of storms and related runoff, on 1:100 levels, and documentation of questions to AEP for clarification and response to AEP questions re: climate change implications.

Red Deer River Watershed Alliance (RDRWA)

Assistance with development of an Integrated Watershed Management Plan to address future development in the basin. Responsibilities included assessment of aquifer types and groundwater inventory, water use patterns, effects of land use and climate variability/change on basin storage, assessment of water quality conditions, risk and vulnerability analysis, development of beneficial

management practices, and development of a conceptual monitoring system to achieve plan goals and objectives.

South McDougall Flats Protection Society, Sundre AB

Review of proposed re-zoning for aggregate mine development in historic floodplain of Little Red Deer River in Sundre, AB. Responsibilities included review of proposed gravel pit re-zoning area, air photo assessment and delineation of paleo-floodplain. preparation and presentation of workshop materials at public forums re: pros and cons of gravel mining (including policy framework review), and support for Town Council hearing.

Town of Okotoks, AB

Assistance with review of development applications and support for ensuring water security through conjunctive use strategies. Responsibilities included expert review of development applications assessing cumulative drawdown effects and provision of recommendations to manage effects, engagement with Town official on development of a sustainable water management strategy, and provision of support for AENV and Environmental Appeal Board process.

Also, completion of a pre-feasibility study to assess aquifer storage and recovery (ASR) and managed aquifer recharge (MAR) as a solution to water supply challenges. Responsibilities included review of regulatory setting and constraints for ASR and MAR (Canada and international jurisdictions), review of ASR and MAR projects world-wide, assessment of local geological and hydrogeological conditions and identification of potential areas to facilitate ASR and MAR success, modelling to determine optimal placement of MAR system to enhance baseflow conditions, groundwater-surface water interaction assessment, and preparation and presentation of pre-feasibility summary to Town Council and Mayor.

Town of High River, AB

Lead for the development of a Water Sustainability Plan predicated on risk identification and alternative storage and management options for a large alluvial aquifer system. Responsibilities included concept and program design, execution of vulnerability mapping approach to assess risk to High River from groundwater impacts (e.g. underground storage tanks), development of conceptual hydrogeological framework, review of groundwater–surface water interaction and climate variability effects, assistance with groundwater model development, and liaison with town officials, MD Foothills official and other project stakeholders.

Tsuut'ina First Nation

Completion of flood analysis for the Redwood Meadow development on the Elbow River floodplain. Responsibilities included review of river hydrology, flood frequency, and related changes in river morphology, assistance with hydrological modelling to address groundwater flooding potential to existing and panned development areas, calculation of damage estimates associated with 5-, 20-,100-, 200- and 500-year return periods, and liaison with First Nations representatives, Government of AB, and Canadian Environmental Assessment Agency.

Industry support

Alberta Energy Company (AEC)

Preparation of an Environmental Operations Manual for all aspects of petroleum exploration and development in Alberta. Contents of the manual included environmental procedures for seismic cutline

provision and reclamation, siting and construction of drilling leases and processing facilities, siting and construction of pipeline right of ways, spill response and cleanup, and site reclamation.

Amoco Canada

Various projects include:

- Numerous gas plant and batter investigations, including the completion of geophysical surveys (EM38, EM31, and EM61), and the design, installation, testing and sampling of groundwater monitoring networks.
- Completion of environmental site assessments and landfill delineation programs for gas plant divestitures. Responsibilities included installation, testing and sampling of groundwater monitoring wells, completion of soil sampling programs, and assessment of the results to determine the liability cost associated with property transfer.
- Completion of a stable isotope study using $\delta^{34}S$, $\delta^{18}O$, $\delta^{2}H$, $\delta^{13}C$ to determine the source of anomalous groundwater sulphate concentrations (natural vs. anthropogenic), and review of fresh groundwater usage for steam injection. Responsibilities included assessment of historical monitoring well and lake level readings to evaluate local effects resulting from groundwater withdrawal.
- Sounding Lake area monitoring program to determine effects from nearby drilling activity. Responsibilities included interviews with well-owners, assessment of the water delivery system, short-term aquifer testing, sample collection using ultra-clean sampling methods, evaluation of the data, and communication of results to client and owner.

Apache Canada

Completion of watershed analysis and intake siting in support of a Water Act Application on Smoky Lake. Responsibilities included assessment of Smoke Lake watershed and water supply potential, water supply modelling to determine availability and reliability of lake water, review of historical flow data and determination of suitable IFN at outlet (i.e. Q80), review of terrestrial, fisheries and water quality data to support water diversion strategy, development of proposed monitoring and response plan, and liaison with AEP and AER representatives.

Bellatrix Exploration Ltd.

Completion of a Water Sourcing study for Rocky Mountain asset. Responsibilities included review of existing and potential water sourcing options, development MCA and of GIS tool to assess and map high-value water opportunities, and completion of a corporate water security plan.

BP Canada

Resident well sampling program to determine effects from nearby drilling programs and existing gas wells. Responsibilities included well-owner interviews, assessment of the well conditions and water delivery system, sample collection using ultra-clean sampling methods, and communication of results.

Canadian Occidental

Completion of a stable isotope studies to determine the source of sulphate impact from two large sour gas processing facilities (Balzac and Okotoks). Responsibilities included drilling, installation, and testing of monitoring wells, development of a conceptual site model , review of site-wide geochemistry (soil and groundwater), and application of $\delta^{34}S$, $\delta^{18}O$, $\delta^{2}H$, and $\delta^{13}C$ isotopes to resolve natural versus anthropogenic influences.

Devon Canada

Various projects include:

- Development of a thermal mobilization risk model to support development efforts in the Jackfish and Pike oil sands developments. Responsibilities included review and evaluation of existing geochemical data including metals and trace elements, development of conceptual site model using existing geological picks for various identified formations, design of Spatial MCA approach to map risk of thermal mobilization from artificial ground heating, and preparation of summary document and presentation at various public venues.
- Completion of detailed studies to define baseline hydrogeological and hydrological conditions in support of a CBM project in the Crowsnest Region of the eastern Rocky Mountains. Responsibilities included, completion of detailed field reconnaissance program, establishment of a spring and water well monitoring network, investigation of surface water/groundwater interactions, development of a conceptual hydrogeological framework in a mountainous area using geological and geochemical data, groundwater age dating of regional confined aquifers using radioactive isotopes (i.e. Tritium and Chlorine-36), and public and regulatory liaison.
- Hydrogeological support for D51 disposal application. Responsibilities included refinement of conceptual model and identification of hydrodynamic conditions supporting disposal water entrapment by stagnation zone using geochemical and isotope evidence.

Enerplus

Completion of a Water Security Plan for the Western Canadian assets. Responsibilities included review of asset operations and water management process, assessment of basin water risk conditions and current mitigations in place, source water and disposal opportunity assessment, and development of multi-criteria assessment (MCA) process to rank water risk profile of each asset and provide recommendations for mitigation.

Graymont Western US Inc.

Preliminary development of a mine dewatering and water management strategy for a large limestone quarry located in the eastern from ranges of the Rocky Mountains. Responsibilities included assessment of baseline hydrogeological and hydrogeochemical conditions in a mountain environment, source water fingerprinting and groundwater age-dating, fracture and lineament analysis using structural geology and geophysical analysis (GPR, borehole tele-viewer), groundwater-surface water interaction assessment (i.e., Bow River), conceptualization of dewatering strategy utilizing oriented and horizontal well technology, and issues identification and risk analysis.

Hammerhead Resources

Completion of watershed analysis, flood assessment and intake siting in support of a Water Act Application on the Smoky River. Responsibilities included assessment of Smoky River watershed and water supply potential, review of historical flow data and assessment of Q80 and Q95, flood assessment to determine 1:10 and 1:25 year event levels, review of fisheries and bank stability assessment in support of intake siting, development of proposed monitoring and response plan, and liaison with AEP and AER representatives.

Husky Oil Operations Ltd.

Completion of a water security plan for the Ansell asset, west-central Alberta. Responsibilities included review of project water profile and future requirements for hydraulic fracturing, facilitation of risk review

workshop, and review of water source opportunities and development of MCA opportunity ranking process.

Also, completion of a Water Security Plan for a 200,000 barrel per day thermal in situ oil sands operation. Responsibilities included, review of water supply and disposal needs for the duration of the planned project, risk and opportunity analysis using multi-criteria analysis to ensure viability of supply and disposal strategies, and identification of strategies to ensure project viability and project sustainability.

Imperial Oil

Various projects include:

- Completion of field and bench-scale tests to determine facilitated mobility of metals, trace elements, and dissolved organics resulting from artificial ground heating around thermal in situ wells. Responsibilities included drilling, installation, testing, and sampling (soil and water) from 22 deep (up to 90 m) monitoring wells at a newly established thermal in situ pad to determine baseline geochemistry and groundwater flow directions, tracer experiment to determine groundwater flow velocities in a deep (>80 m) confined aquifer, collection of sediment samples (under anoxic conditions) for bench-scale heating experiments to determine metals mobility and related kinetics, review of stable isotopes in groundwater and dissolved gases to determine effects of heating from in-situ thermal wells on local geochemical conditions (inorganic and organic constituents), reaction path modelling to determine processes influencing changes metals concentrations and biological activity resulting from subsurface heating, determination of activation energies for metals release, and the role of biogeochemical reactions in facilitating metals release, transport and fate modelling to determine the long-term risk of thermal mobilization of metals (and other related constituents) to the surrounding environment, and documentation of result and liaison with client and regulatory agencies.
- Design and implementation of dewatering program for large process water ponds. Responsibilities included review of site geological conditions, installation of dewatering wells, acquisition and interpretation of aquifer test data, design of dewatering system using appropriate theoretical calculations and analytical modelling solution, and development of dewatering plan and associated performance monitoring
- Completion of a regional groundwater investigation and development of a regional-scale ground water monitoring network (per EPO 95-07 requirements) in a multi-layer inter-till aquifer system in east-central Alberta. Responsibilities included assessment and interpretation of Quaternary stratigraphy, interpretation of seismic line data and geophysical borehole log analysis, regional groundwater flow mapping, geochemical facies mapping, assessment of regional arsenic concentrations, trends, and potential connection to thermal in situ development activities, groundwater age-dating and stable isotope analysis ($\delta^{18}O$, $\delta^{2}H$, $\delta^{34}S$, $\delta^{11}B$ and $\delta^{13}C$: dissolved constituents and gases), preparation of investigation report to address EPO questions (i.e. source and cause of groundwater quality issues), and liaison with regulators during investigation and EPO closure process.
- Completion of an environmental liability assessment to determine the cost of decommissioning, abandoning and restoring the area currently occupied by the Norman Wells field. Responsibilities included completion of a Phase 1 audit of production facilities and supporting infrastructure (i.e. wellheads, pipelines, satellites, batteries and former refinery), design and implementation of a late Fall field program to sample a statistically sufficient number of locations to generate realistic liability costing for field shutdown and closure, generation of a summary report, and assistance with design of liability costing model and summary reporting.

- Completion of numerous isotope studies using to determine groundwater flow rates in regional confined aquifers and the source of anomalous groundwater quality conditions and dissolved gas concentrations near a large heavy oil recovery operation using assessment of $\delta^{18}O$, $\delta^{2}H$, $\delta^{34}S$, $\delta^{11}B$ and $\delta^{13}C$ and Tritium and Carbon-14 for groundwater age-dating.
- Tritium age dating of groundwater in Norman Wells, NWT to determine vertical groundwater flow characteristics in discontinuous permafrost environment
- Development and implementation of a site characterization program at a former refinery and battery (circa 1930s) located approximately 160 km south of the Arctic Circle. Responsibilities included the design and installation of a monitoring network in discontinuous permafrost, and assistance in development of assessment programs to generate Tier II criteria in support of a human health and ecological risk assessment.
- Support for re-licensing of supply wells for oilfield injection using Alberta Environment "Water Conservation and Allocation Guideline for Oilfield Injection" and "Groundwater Evaluation Guideline." Responsibilities included, completion of field-verified surveys, review of site geological conditions, acquisition and interpretation of aquifer test data, assessment of groundwater/surface water interaction, and determination of long-term sustainable yield using analytical solutions
- Hydrogeological lead for a large oil sands mine EIA (Kearl Oil Sands Mine Project). Responsibilities include evaluation and interpretation of water well information and chemical data, defining Quaternary stratigraphy, temporal water level assessment to determine potential impact to regional groundwater quality and quantity arising from mine development and dewatering, and support at Joint Panel hearing.
- Cold Lake area monitoring program (Arsenic Investigation – 30 private residents). Responsibilities included interviews with well-owners, assessment of the water delivery system, sample collection using ultra-clean sampling methods, review of the data, and communication of results to client, well owner and Alberta Environment
- Completion of an environmental liability assessment and costing exercise in support of the sale of the Judy Creek field to PenGrowth Corp. to statistically sample a sufficient number of facilities to generate realistic liability cost for property transfer. Responsibilities included completion of Phase 1 audits of production facilities and supporting infrastructure (i.e. wellheads, pipelines, satellites, and batteries), design and implementation of winter field program to sample facilities to generate realistic liability cost for property transfer
- Conceptual model design for dewatering scheme in support of mine development. Responsibilities included assessment of geological conditions, boundary assessment, parameter selection and optimization, and assessment of model results
- Completion of a groundwater modelling study to determine the sustainable yield of a major deep freshwater aquifer in the Cold Lake area. Responsibilities included the provision of hydrogeological support for model conceptualization and design, input parameter selection, and evaluation and communication of results
- Development and implementation of a regional groundwater quality monitoring network covering an area of 1,200 km^2. Responsibilities included, regular interaction with environmental regulatory agencies and the local landowners, installation, testing and sampling of deep (up to 230 m) monitoring wells to assess potential impact to confined aquifers due to production well casing failures, design, implementation and interpretation of aquifer tests in support of groundwater remediation programs, and development of cost effective approaches towards restoring water quality conditions in deep aquifers influenced by heavy hydrocarbons and associated production fluids.

- Preparation of an AB environment approved Incident Response Plan to deal with groundwater quality issues identified during routine monitoring activities at a large heavy oil recovery scheme. Responsibilities included design of a cost-effective sampling schedule including rationalization of a 200 well monitoring network to provide a meaningful network of approx. 100 wells, and development of statistical limits for response and mitigation actions.

Japan Canada Oil Sands (JACOS)

Execution of hydrogeological section of an expansion EIA for the Hangingstone Thermal In Situ Oil Sands project. Responsibilities included development of baseline hydrogeology, EIA sections, and SIR responses, liaison with project team and governing agencies, and stakeholder consultation with First Nations and 3PC.

Also, completion of a water supply project in support of a heavy oil recovery scheme using Alberta Environment "Water Conservation and Allocation Guideline for Oilfield Injection" and "Groundwater Evaluation Guideline." Responsibilities included assessment of geophysical logs and EM survey results, design and implementation of field programs, step rate test and constant rate test data acquisition and analysis, well screen selection and well design, well efficiency assessment, and use of pertinent analytical equations to predict effect of long-term pumping.

Mobil Oil Canada

Completion of a stable isotope study to determine the source of sulphate impact from a large sour gas processing facility. Responsibilities included, drilling and installation of monitoring wells, development of a conceptual site model , review of site-wide geochemistry (soil and groundwater), and application of $\delta^{34}S$, $\delta^{18}O$, $\delta^{2}H$, and $\delta^{13}C$ isotopes to resolve natural versus anthropogenic influences.

Nexen ULC

Development of a water strategy to service the Aurora LNG project/Dilly Creek asset. Responsibilities included assessment of development trajectory with respect to water use, identification of feasible water supply source to accommodate up to 6.5 million m^3 per year of water, conceptualization of water storage strategy to reduce pressure on local water sources and minimize physical footprint of development, development of a water conveyance strategy utilizing existing rights of way, including Class 5 cost estimation, and liaison with Fort Nelson first Nations to facilitate development of baseline hydrology monitoring program and facilitation of a Section 10 water licence (following successful EAB appeal of previous licence).

Also, the design and completion of bench-scale testing to determine the mobilization of metals and trace elements under applied heating. Responsibilities included conceptual design of experimental process in collaboration with AGAT lab representatives, assessment of frozen core samples and selection of appropriate intervals for physical (grain size, mineralogy via XRD) and chemical testing (total metals, leachable metals), assessment of results from sequential batch heating experiments extending from 5-100°C for metals species released to solution, geochemical modelling of kinetic experiment results to determine activation energies of metals release, completion of attenuation experiments to determine potential for mobilized metals to re-associated with sediments under cooled conditions, and preparation of suitable documentation to present to the client and AER.

Pembina Pipeline Corporation

Provision of expert legal support to review source and cause of industrial chemical contamination at an operating gas plant. Responsibilities included review of existing site investigations, procedures, and documentation, assessment of efficacy of investigations and protocols (field and laboratory), development

of conceptual model to explain presence and movement of sulfolane in bedrock deposits, and review of risk assessment findings and provision of recommendations to close data and information gaps.

Petro-Canada

Various projects include:

- Completion of detailed regional and local baseline studies, and cumulative impact assessment, to establish regional and local hydrogeological and geochemical characteristics in support of a 30,000 bbl/d heavy oil recovery expansion (MacKay River Project). Responsibilities included defining Quaternary stratigraphy, temporal water level assessment to determine potential impact to regional groundwater quality and quantity arising from bitumen recovery operations, development of a numerical groundwater model to assess long-term effects of water withdrawal and waste disposal to support project activities, and completion of climate change assessment formed part of the assessment for project design.
- Conceptualization and design of field program to assess water supply and water disposal for two major heavy oil projects (>30,000 bbl/d). Responsibilities included selection of drilling locations based on geophysical reconnaissance, implementation of field programs, step rate test and constant rate test data acquisition and analysis, well efficiency assessment, well screen selection and well design, and use of pertinent analytical equations.
- Review of fresh groundwater use for a water flood project. Responsibilities included interpretation of historical monitoring well data to determine the effects of the groundwater withdrawal from the local aquifer.
- Assessment of long-term effects of industrial water supply wells used for a water flood scheme. Responsibilities included a review groundwater chemistry and well hydraulic data to determination sustainable production rates.
- Completion of an environmental operations audit and subsequent industrial landfill delineation to determine the source area of possible groundwater contamination. Responsibilities included completion of a comprehensive intrusive landfill delineation and soil sampling program to determine the extent and volume of landfill contamination.
- Completion of an industrial landfill delineation project to determine possible sources of groundwater contamination. Responsibilities included completion of a magnetometer survey, follow-up excavation and soil sampling near a decommissioned landfill to determine the presence, extent and volume of residual landfill material.

Procor

Review of operational history of a salt cavern storage facility including an assessment of groundwater quality near the large brine storage ponds and the potential for impact to the Regina Aquifer.

Shell Canada

Various projects include:

- Completion of watershed analysis and intake siting in support of a Water Act Application on Iosegun Lake. Responsibilities included assessment of Iosegun Lake watershed and water supply potential, water supply modelling to determine availability and reliability of supply, review of historical flow data and determination of suitable IFN at outlet (i.e. Q80), review of terrestrial, fisheries and water quality data to support water diversion strategy, development of proposed monitoring and response plan, and liaison with AEP and AER representatives.

- Hydrogeological support for Jackpine Mine Expansion EIA
- Development of Groundwater Management Plan and annual monitoring support at Shell's Muskeg River Mine. Responsibilities included review of site-wide groundwater monitoring network for applicability to EPEA Approval requirements (including gap analysis, routine monitoring and reporting per EPEA requirements, selection of indicator suites to facilitate routine monitoring, evaluation, and reporting, identification of locations with water quality concerns, development of approach to statically assessing and responding to data excursions and trends, and preparation of the GMP for consideration and acceptance by AEP.
- Support for Carmon Creek EIA and assessment of brackish water supply potential in support of heavy oil operations in the Peace River area. Responsibilities included assessment of baseline hydrogeological conditions and potential impacts from project development, preparation of climate change assessment for project development, support for SIR submissions and EIA team interactions, feasibility assessment of potential for deep formations to produce sustained supplies and conceptual well-field development, and liaison with regulatory agencies
- Development of a regional-scale ground water monitoring network in a multi-layer aquifer system in the Peace River region of Alberta. Responsibilities included assessment of Quaternary stratigraphy, interpretation of seismic line data, geophysical borehole log analysis, and geochemical facies mapping and solution chemistry analysis.
- Assistance with the development and construction of an induced infiltration groundwater supply system for the Shell Caroline Gas Plant industrial water supply project. Responsibilities included drilling and installation of large diameter water production wells, borehole geophysical logging and interpretation. sand quantification testing and analyses to determine sediment production volumes prior to pipeline construction, and liaison with client and local landowners.

Suncor Energy

Various projects include:

- Lead subsurface specialist for a multi-criteria decision analysis and life-cycle value analysis in support of a regional brine management strategy in the Athabasca Oil Sands area. Responsibilities included development of a holistic weighting and ranking approach to address triple-bottom-line assessment of treatment and disposal options for liquid and solid waste streams originating from oil sands mining and in situ assets located across a 30 000 km^2 area, facilitation of, and participation in, workshops to assess viable options for treatment and disposal including Class 4 costing, and development of a constraints mapping approach (vulnerability, risks and opportunities) using ArcGIS to assist in management and disposal options for liquid and solids waste streams.
- Development of an Athabasca River reconnaissance program to identify and sample natural groundwater-surface water interaction zones discharging waters from the Cretaceous and Devonian formations. Responsibilities included planning/execution and interpretation of a marine-based geophysical program using EM31 imaging and bathymetric readings, development of pore water sampling program including geochemical assessment of waters and source fingerprinting (major ion, trace element, dissolved organics, and stable and radiogenic isotopes), interpretation of results and presentation at various venues (government, industry.
- D51 disposal monitoring at the Firebag Thermal In Situ Project
- Thermal mobilization assessments (Firebag, Lewis, Meadow Creek)
- Development of brine water management strategy including options analysis and Class 4 costing

- Preparation of an oil sands mining closure strategy outlining goals, objectives, tasks, timelines, and consulting and research agencies to execute in support of Life of Mine Closure and Reclamation process
- Assistance with Fort Hills Operational Plan regarding preservation of McClelland Lake and wetland complex; review of physical hydrogeology and geochemical setting; assessment of numerical model design and output; review of cut-of wall design and mitigation system; review of adaptive management processes
- Review of Devonian – McMurray interactions at the North Steepbank mine expansion and assistance with investigation program design (including geochemical assessment)
- Completion of geophysical and porewater surveys on the Athabasca and Steepbank Rivers to determine contributions of natural discharge versus industry inputs
- Review of existing water supply for Steepbank and Millennium mine operations and development of contingency supply options. Responsibilities included review of past water resource evaluations, development of geophysical investigation program and interpretation of results, assessment of contingency water supply (groundwater and operations water), client consultation and liaison with Alberta Environment, and implementation of horizontal well technology to provide a secure supply of water for continued operations
- Groundwater age-dating and source area identification in support of active tailings pond seepage investigations. Responsibilities included conceptual site model design, review of traditional geochemistry to determine end-point water types, and application of Tritium, $\delta^{18}O$, $\delta^{2}H$, $\delta^{34}S$, $\delta^{11}B$ to resolve geochemical setting and potential areas of seepage
- Preparation of an AB Environment approved Groundwater Management Plan at a large oil sands mining operation. Activities included, the design of a cost-effective sampling schedule including rationalization of over 300 wells to establish a meaningful monitoring network of 150 wells, development of statistically established trigger values for response and mitigation, and lliaison with Government of Alberta during review and approval.

Syncrude Canada

Participation on expert hydrogeology panel to review Devonian investigation program for Aurora mine and assess mitigation strategies to control high risk areas (Les Gray - UBC, Carl Mendoza, - UofA, Ken Baxter - Golder, Jon Fennell - WP). Responsibilities included review of existing baseline data for active mining site, identification of high-risk areas to consider for future investigation and monitoring, participation in group workshop settings to communicate findings and accumulate input for recommendations refinement, and participation in internal panel meetings to discuss concepts and develop final recommendations.

Teck Resources Limited

Evaluation of stream response to groundwater interception in support of fisheries habitat offsetting at Line Creek Mine, BC. Responsibilities included baseline reconnaissance of Line Creek alluvial system and GW-SW water interactions with Line Creek, assessment of area springs, shallow groundwater, and creeks to determine geochemical quality and flow conditions (using drive point well technology and data logger systems), completion of ground penetrating radar survey to map thickness and morphology of alluvial deposits, water quality fingerprinting using major ion, trace elements (in particular selenium) and stable isotopes to determine interaction of groundwater environment with Line Creek, and assessment of selenium mobilization conditions related to active mine workings and development of a conceptual (passive) mitigation strategy to offset impacts to fisheries habitat.

Total E&P

Support for Joslyn North Mine EIA submission and development of a mine dewatering strategy for. Responsibilities included development of baseline hydrogeology, EIA sections and SIR responses , liaison with project team and governing agencies, joint Panel hearing support.

Also, selection and phasing of depressurization wells and associated monitoring wells, review of deep well injection potential, including geochemical compatibilities of waters, development of a performance monitoring system, selection of pipeline route, and preparation of a design-based memorandum with related costs (Class 3) of implementation and long-term operation.

Various Gas Plants, Batteries and Refineries (Alberta, British Columbia, Saskatchewan)

Completion of piezometer network design at numerous operating facilities to assess the potential impact to local groundwater quality resulting from industrial activities and extent of contaminant migration from known source areas (Imperial Oil, Shell, Mobil, Canadian Occidental); and, provision of hydrogeological services in support of a gas plant decommissioning (ongoing). Responsibilities include, well installation, testing and sampling, involvement in a site-specific risk assessment (ecological and human health), development of sampling protocols, and assessment of cost-effective remediation techniques to address various contaminant situations in both soil and groundwater.

Various Oil and Gas Facilities (Alberta, Saskatchewan)

Completion of environmental operations audits and development of waste management plans for numerous operating oil and gas facilities (Amoco, Petro-Canada, Shell). Responsibilities included review of historical operations files (spill reports, waste handling procedures, EUB and AENV records), completion of site inspections and interviews, and historical air photo analysis and interpretation.

EDUCATION

Ph.D. (Geochemistry) – University of Calgary, 2008

M.Sc. (Physical Hydrogeology and Isotope Geochemistry) – University of Calgary, 1994

B.Sc. (Geology: hard rock, sedimentology, mineralogy, structural, geochemical) – University of Saskatchewan, Saskatoon, 1985

REGISTRATIONS & AFFILIATIONS

APEGA (P.Geol. – Alberta)

EGBC (P.Geo. – British Columbia)

APEGS (P.Geo. P.Eng. – Saskatchewan)

NAPEG (P.Geol. – Northwest Territories and Nunavut)

National Ground Water Association (NGWA)

International Association of Hydrogeologists

Canadian Water Resources Association (CWRA)

Sustainable Energy Development Program (Univ. of Calgary) – External Advisory Board – 2017 to present

Bow River Basin Council (Calgary), Board of Directors (2008-2013), Chair of Monitoring and Modelling committee (2008 to 2012), Member of Legislation and Policy Committee (2006-2011), Member of Integrated Watershed Management Group (2007 to 2010)

SPECIFIC TECHNICAL EXPERTISE

- ICP-MS, GC-MS, Ion chromatography (LC-MS, HPLC, IC)
- SEM, XRD (bulk and clays), XRF, EDS and Synchrotron Light (XANES, and EXAFS)
- Isotope ratio mass spectrometry (IRMS)
- Solid-phase extraction, Alumina fraction, and sequential soil extraction
- Toxicity identification evaluation for metals and organics
- Selection of appropriate inorganic or organic analytical techniques based on Standard Methods for Water and Wastewater
- Statistical analysis (e.g. population testing, trend analysis, control charting, PCA, HCA, spatial analysis)
- Multi-criteria decision analysis (MCDA)
- Vulnerability and risk mapping
- Risk assessment (human and ecological)
- Climate tele-connections assessment, climate model analysis and impact identification, development of adaptation strategies

PUBLICATIONS

Fennell J. and Aciszewski T (2019). Current knowledge of seepage from oil sands tailings ponds and its environmental influence in northeastern Alberta. Science of the Total Environment, 686, p. 968-985.

Birks S.J., **Fennell J.W.**, Gibson J.J., Yi. Y., Moncur M.C., and Brewster M. 2019. Using regional datasets of isotope geochemistry to resolve complex groundwater flow and formation connectivity in northeastern Alberta, Canada. Applied Geochemistry, 101 (2019), p. 140-159.

Hatala R., **Fennell J.,** and Gurba G. 2018. Advances in the realm of Hydrogeophysics: The emerging role of Quantum Geoelectrophysics in Aquifer Exploration. Can. Soc. of Expl. Geoph., RECORDER October Focus - Hydrogeophysics: the Past, Present, and Future. Vo. 43, No. 6, p. 32-36.

Birks S.J., Moncur M.C., Gibson J.J., Yi Y., **Fennell J.**, and Taylor E.B. 2018. Origin and hydrogeological setting of saline groundwater discharges to the Athabasca River: Characterization of the hyporheic zone. Applied Geochem., 98, p. 172-190.

Fennell J., 2018. Predictions, perceptions and the precautionary principle: responding to climate change in a realm of uncertainty. Canadian Water Resources Association, Water News, Fall/Winter 2018. Vo. 37, No. 2, p. 6-9.

Fennell J., 2018. Water, Peace, and Global Security: Canada's Place in the World We Want (Sandford and Smakhtin, eds.), Groundwater and Canada's Future – Moving data and information to knowledge and security. Prepared for the United Nations University, Institute for Environment, Water and Health, 17 pp.

Fennell J. 2018. Poison Well: Chasing arsenic in Alberta's groundwater. Water Canada, January/February 2018, p. 20-21.

Fennell J. 2017. Let's make a deal: Canada's vital role in the Columbia River Treaty. Water Canada, September/October 2017. p. 42-43.
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CWRA Alberta Branch conference, April 2019 Red Deer: Flooding, climate change, and the need for a precautionary approach.

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Mine Water Solutions, June 2018. Total Water Management: Canada's contribution to sustainable mine development.

Canadian Water Resources Association, April 2018, Red Deer, AB. Arsenic and Alberta's Groundwater: the where and why.

Southern Alberta Institute of Technology (water Initiative), February 2018, Calgary AB. Risky business: understanding Alberta water security

Canadian Society of Unconventional Resources (CSUR), January 2018, Calgary AB. Managing through nature's extremes: ensuring water security for successful UCOG operations.

SEAWA, Nov 2017, Medicine Hat AB. Hydrology of riparian areas: the need for protection and preservation.

CWRA National Conference, June 2017, Lethbridge AB. Climate change, the Columbia River Treaty, and considerations for a successful re-negotiation.

Thermal mobilizations and the regulatory response, May 2017, Calgary AB. CHOA forum.

National Ground Water Association, March 2017, Denver CO. Advances in the realm of hydrogeophysics: the role of Quantum Geoelectrophysics in groundwater exploration

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Watertech, April 2017, Banff AB. Arsenic in Alberta's Groundwater: the where and why; Isotopes and Geochemistry:

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Watertech, April 2016, Banff AB. Predicting Alberta's Groundwater Future & An Integrated Approach to Resolving Complex Hydrogeological Settings.

Canadian Water Resources Association (CWRA), April 2016, Edmonton AB. Natural discharge and its role in Athabasca River water quality.

Canada's Oil Sands Innovation Alliance (COSIA) Water Forum, March 2016, Calgary AB. Natural discharge and its role in Athabasca River water quality.

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Underground Injection Control (GWPC), February 2016, Denver CO. Disposal in the unconventional oil and gas sector: challenges and solutions.

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International Water Conference, November 2015, Orlando FL. Disposal in the unconventional oil and gas sector: challenges and solutions.

Chemistry Industry Association of Canada, October 2015, Edmonton AB. Water Sustainability: and its importance to successful industry.

EnviroAnalysis, July 2015, Banff AB. Thermal mobilization and Arsenic: implication for the oil sands.

WaterTech, April 2015, Kananaskis AB. Smart Monitoring to address challenges of Unconventional Gas development and an approach to mapping risk related to thermal mobilization of constituents.

Canadian Water Resources Association, April 2015, Red Deer AB. Water, Energy and Canada's Future (keynote address)

Underground Injection Council, February 2015, Austin TX. Monitoring to address challenges of Unconventional Gas development (invited speaker)

National Ground Water Association, Groundwater monitoring for Shale Gas developments workshop, November 2014, Pittsburgh PA. Smart monitoring to address the challenges of Unconventional Gas Development (invited speaker)

Canadian Water Resources Association, June 2014, Hamilton ON. Water disposal in the Oil Sands: challenges and solutions and What is Water Security and Why is it Important.

Water Management in Mining, May 2014, Vancouver BC. Total Water Management: a necessary paradigm for sustainable mining.

CSPG GeoConvention May 2014, Calgary AB. Water disposal in the Oil Sands: challenges and solutions; Placing the risk of thermal mobilization into perspective; What is Water Security and Why is it Important?

WaterTech, April 2014, Banff AB. Water disposal in the Oil Sands: challenges and solutions and Placing the risk of thermal mobilization into perspective.

Canada's Oil Sand Innovation Alliance (COSIA), March 2014, Edmonton AB. Water disposal in the Oil Sands: challenges and solutions and Placing the risk of thermal mobilization into perspective.

International Assoc. of Hydrogeologists, GeoMontreal 2013, October 2013, Montreal QC. The role of subsurface heating in trace element mobility.

Oil Sands Heavy Oil Technology 2013, July 2013, Calgary AB. The role of subsurface heating in trace element mobility.

Watertech, April 2013, Banff AB. The role of subsurface heating in trace element mobility.

International Assoc. of Hydrogeologists World Congress 2012, September 2012, Niagara ON. Session Chair for Hydrogeological Issues in the Oil Sands and presenter: i) Oil Sands overview – economic and environmental setting; ii) Framing groundwater vulnerability in the oil sands: an approach to identify and discern; and iii) Climate: a driving force affecting water security in the oil sands

Water in Mining 2012, June 2012, Santiago Chile. Total Water Management: a necessary paradigm for sustainability.

BCWWA 2012 Annual Conference, April 2012, Penticton BC. The role of inventory, dynamics, and risk analysis in water management: a case study.

WaterTech, April 2012, Banff AB. Plenary Session. Bringing context to the oil sands debate: understanding the role of nature and its environmental effects.

BCWWA Hydraulic Fracturing Workshop, Fort St. John BC, March 2012. Keynote address: Striking a Balance – water resource management versus economic development (keynote address).

CONRAD 2012, March 2011, Edmonton AB. Bringing context to the oil sands debate: understanding the role of nature and its environmental effects.

Alberta Irrigation Projects Assoc., November 2011, Lethbridge AB. Managing what we have: a review of Alberta's water sources, volumes and trends (invited speaker).

Alberta Innovates Technology Talks, November 2011, Calgary AB. Dynamics of Alberta's Water Supply: a review of supplies, trends and risks.

Red Deer River Watershed Alliance Annual General Meeting, October 2011, Red Deer AB. Water in the Red Deer: volumes, patterns, trends and threats.

Land and Water Summit, October 2011, Calgary AB. Total Water Management: a necessary paradigm for water security.

CEMA Groundwater Working Group, June 2011, Fort McMurray AB. Groundwater in the oil sands: facts, concepts and management processes.

CWRA Alberta / Alberta Low Impact Development Annual Conference, April 2011, Red Deer AB. A Review of Alberta's Water Supply and trends.

WaterTech, April 2011, Banff AB. Managing what we have: a review of Alberta's water supply.

World Heavy Oil Congress 2011, March 2011, Edmonton, AB. An approach to managing cumulative effects to groundwater resources in the Alberta Oil Sands.

Engineers Australia, August 2010, Brisbane Qld. CSG development in Australia: an approach to assessing cumulative effects on groundwater (invited speaker).

Joint IAH/AIG meeting, July 2010, Melbourne Vic. Assessing the effects of coal seam gas development on water resources of the Great Artesian Basin (invited speaker).

18th Queensland Water Symposium, June 2010, Brisbane Qld. A cumulative effects approach to assessing effects from coal seam gas development on groundwater resources (invited speaker).

WaterTech, April 2010, Lake Louise AB. Regional Groundwater Monitoring Network Implementation: Northern Athabasca Oil Sands Region.

University of Calgary, December 2009, Calgary AB. What's happening to our water? A review of issues and dynamics.

CSPG Gussow Conference, October 2009, Canmore AB. Water sustainability in the Alberta Oil Sands: managing what we have (invited speaker).

Bow River Basin Council, Legislation and Policy Committee Groundwater Licensing Workshop, March 2009, Calgary AB. Groundwater: the hidden resource

BlueWater Sustainability Initiative, January 2009, Sarnia ON. Planning approaches and forensic tools for large-scale regional monitoring initiatives.

CWRA Technical luncheon session, October 2008, Calgary, AB. Water sustainability in a growing Alberta.

Bow River Basin Council, September 2008, Calgary AB. Basin Monitoring and Management Approaches.

IAH/CGS GeoEdmonton08, Edmonton AB. Coordinator and Chair of Groundwater Development Session.

North American Lake Management Society (NALMS) 2008, Lake Louise AB, Coordinator and Chair of Climate Change Effects to Lakes, Reservoirs and Watersheds section.

EcoNomics™ Luncheon, May 2008, Calgary AB. Water Sustainability in the Hydrocarbon Industry.

WaterTech, April 2008, Lake Louise AB. Effects of climate and land cover changes on basin water balances.

CWRA Annual Conference, April 2008, Calgary AB. Role of climate change and land cover on water supply sustainability.

Bow River Basin Council, March 2007, Calgary AB. Forest Hydrology and the effects of Climate Change.

ALMS/CWRA, October 2006, Lethbridge AB. Reservoir Maintenance Workshop. Climate tele-connections and their effects on basin water supplies

Bow River Basin Council, June 2006, Calgary AB. Groundwater sustainability: the invisible resource (Climate change and basin sustainability)

Engineering Institute of Canada, May 2006, Ottawa ON. CCC2006 Land use and climate change effects at the basin scale.

International Water Association, Watershed and River Basin Management Specialists Group Conference, Calgary, AB, 2005. Basin Water Management Strategies.

Burgess Shale Geoscience Foundation, August 2004 and 2005, Field BC. Water in a Changing Climate: understanding and adapting.

C-CAIRNS, October 2005, Victoria BC, Climate and Fisheries Impacts, Uncertainty and Responses of Ecosystems and Communities, Effects of Climate and the PDO on Hydrology of a Major Alberta Watershed.

North American Lake Management Society, November 2004, Victoria BC. Climate Change and Effects on Water Resources.

Canadian Institute Conference, June 2004, Calgary AB. Water Management Strategies for the Oil and Gas Industry: The challenge and approach

Canadian Society of Petroleum Geologists, Gussow Conference, March 2004, Canmore AB. Understanding the Effects of Natural and Anthropogenic Forcings on Basin Water Resources.

Alberta Environment and EUB, April 2003, Elk Point AB. Climate and Land Use Change Effects on Basin Water Resources in the Lakeland Region - East-central Alberta.

Joint CGS/IAH Conference, June 2001, Calgary AB. A Multidisciplinary Approach to Resolving Complex Hydrogeologic Systems.

Aquatic Toxicity Workshop, October 1996, Calgary AB. Use of site characterization and contaminant situation ranking to focus a risk assessment evaluation at a decommissioned sour gas plant and associated landfill.

Joint GAC/MAC Conference, April 1995, Waterloo ON. Use of geochemical modelling and stable isotopes to determine the source of groundwater quality impacts near a sour gas processing facility.

Joint GAC/MAC Conference, Edmonton AB, 1994. Assessment of depression-focused recharge as a mechanism for variable groundwater and soil chemistry.

GasRep Conference, Calgary AB, 1994. Use of stable isotopes to determine the source of water quality impacts near a sour gas processing facility.

Michelle Mitton

From: Joy West-Eklund [redacted]
Sent: Tuesday, February 9, 2021 1:26 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - BylawC8051-2020

Follow Up Flag: Follow up
Flag Status: Completed

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Dear Council Members

As a residents of Rockyview County, (not of Bearspaw) and concerned citizens, we wish to register our firm opposition to this proposal by Mountain Ash to develop a gravel pit (“Summit Pit”) .
The proximity to Big Hill Springs Provincial Park and Creek should be reason enough!
Situating a gravel pit with potentially profound environmental impact there would be clearly irresponsible.

Sincerely
Joy and Lindsay Eklund
.

Sent from my iPhone

Michelle Mitton

From: Ken Mattie [redacted]
Sent: Tuesday, February 16, 2021 9:28 AM
To: Legislative Services Shared
Subject: [EXTERNAL] - opposition to bylaw C-8051-2020
Attachments: Ken Mattie RVC Summit Opposition.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

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submitted by
Ken Mattie (signature on file)
11 Big Hill Creek estates
Feb 16 2021

To Rocky View County
please find attached my personal views and reasons why i am opposed to bylaw C-8051-2020 commonly referred to as the Summit gravel pit

Thank you for the opportunity to voice my concerns

Respectfully
Ken Mattie

Ken Mattie
11 Big Hill Creek Estates

Dear Rocky View Council

Re PL202000031 (06731002/4)

I am strongly opposed to this development …. commonly referred to as the Summit Gravel Pit!

I have resided in Rocky View County for 27 years within Big Hill Creek Estates, a community directly north of the proposed gravel pit. I have seen many changes in Rocky View County (RVC) over the 27 years including the Monterra development, the shell gas station and campground, industrial development on 567, and yes, the development of one gravel pit (now called Hillstone). For the most part, I felt RVC has done a good job with the implementation of those projects.

However, I have a great deal of concern over the direction RVC is heading with respect to the methodology used to approve these gravel pits.
It appears to me that this is an addendum to the first request back in 2014 and this request will double the size of the land holding for this previously proposed pit.

Although the documents provided in 2014 indicate (Section 8.0 Developing a concept plan through community input) Summit says that they have
reached out to the community to the "greatest extent possible". I have never heard from them. Significantly more meaningful consultation should have occurred with affected residents. And for that reason, I am opposed to this application

I believe RVC is working on a revised Aggregate Resource Plan (ARP). They should certainly consider using different methodologies and insisting on expert independent peer review of any and all applications provided by, and paid for, by the developers. Until such time as this Aggregate resource plan is completed, I suggest a moratorium on any new gravel development.

Now I would like to address some things in the Summit pit application that I found concerning.

With respect to Groundwater

As for groundwater, the community of Big Hill Creek Estates now lies within the 1.6 km radius of the new application. We are a community of 15 residences and we share a community water well where we draw our water from the Paskapoo formation. There is a large amount of evidence that suggests open pit gravel mining can have a negative impact on ground water and the aquifers they sit on top of. When I review the Scott pit application and a peer review document submitted by Ailsa Le May P. Geo submitted

Jan 19/2021, she concluded that the hydrogeological study put forth for that proposal was unworthy of credit and reliance. They also sit on top of the Paskapoo Formation. I would expect at the very least the RVC would commission a peer review of the Hydrogeological study.
Until this has been completed, this application should be rejected.

In the SLR project #203.50065.00002 report from 2016 they state “the underlying hydrological and hydraulic principles of the rainfall runoff modelling are consistent with the common county/provincial modelling techniques thus the approach is considered appropriate and accurate for the purpose of this assessment “. If their reports are supposedly consistent with the county and provincial modelling techniques, then it appears the county and province are negligent in their duties to protect the residents of Rocky View and Alberta. Until such time that these modelling techniques are corrected, no further gravel pit applications should be permitted and this pit's application should be rejected. Furthermore, the study should take into account the accumulative effects of the 4 proposed pit applications and the existing (Hillstone) pit and the total effect on ground water for the combined mining operation.

With respect to acoustical noise
Upon review of the peer review documents of the SLR submission for the recently rejected Scott pit in Bears Paw, the engineer (Mr. James Farguharson), who did the peer review clearly stated concerns with the data SLR submitted. He states “that the SLR’s report is at best very misleading, and in reality, are extremely deficient, factually incorrect and cannot be relied upon to make an objective assessment of the acoustic impacts from the proposed pit.” He further states “by not considering the potential impact to the homes further from the proposed site SLR’s report is deficient, the predictive modelling is flawed and cannot be relied upon by RVC."

SLR has provided the same report for the proposed Summit Pit and used the same modelling technique. Our community has a direct line of site into the proposed Summit pit and therefore the SLR acoustical report for that proposed site is also deficient, the predictive modelling can be assumed to be flawed and it cannot be relied upon by RVC.

With respect to traffic
Report titled Review of the traffic impact assessment report, which was submitted in conjunction with the land use redesignation application and master site development plans for Lafarge McNair and summit pits, the conclusion reached was:

1. This study has concluded that the Traffic Impact Assessment studies reviewed are narrowly focused on intersection analysis, the outcome of which depends entirely on the, input values, namely the number of trips forecast. The reports reviewed did not consider the explicit value of safety, the wide range of road users, trip types, the operating

environment or all parameters of the road network in question such as the steep grades, narrow shoulders, unforgiving roadside and hidden intersections. A comprehensive TIA approach would consider the interaction of all these factors and avoid ascribing crashes to driver error. The TIAs did not comment on operation of school buses in the same time slots as gravel trucks which may contribute to conflicts and crashes. With respect to the highway system, which has steep downgrades on reverse curves and narrow shoulders, the TIAs did not comment on road safety which is exacerbated in icy and snowy conditions. No mention was made of potential safety issues at hidden intersections, where a fatality occurred involving a gravel truck during the course of this study. Finally, the TIAs did not include a discussion of the impact of loaded gravel trucks which will slow to crawl speed on long steep grades resulting in platoons. Impatient drivers delayed on the upgrade and trapped in platoons may make risky overtaking maneuvers. In summary, a more holistic TIA approach to evaluating the impact of an increasing fleet of heavy trucks hauling aggregate on the highways of the Rocky View County would have provided a sounder basis for evaluating the Applications for the redesignation of land-use.

Once again, the submitted plans provide are misleading and in reality, were deficient and cannot be relied upon to make an objective assessment of the traffic impact from the proposed pits.

With respect to storm water drainage

In a thesis written by Soren Poschmann, titled “establishing a recharge area for Big Hill Springs Alberta Canada”:
The thesis clearly establishes that the headwater of the Big Hill Springs and Creek are clearly in the exact location of the 4 Proposed open pit aggregate extraction.
The affect of the accumulated actions of these developments is not yet understood. To risk the unique and nationally protected Big Hill Spring, one of Rocky View Counties most precious natural site is irresponsible. Over 250,000 visitors use the park annually. Of the three new pits along highway 56, the summit pit may raise the most serious environmental concerns, as it is the closest pit to Big Hill Springs Provincial Park and to the environmentally sensitive area being preserved by the nature conservancy of Canada.

In the summit pit submission even SLR published in their conclusion of the storm water drainage: “a particular emphasis has been placed on the surface water quality owing to the potential “sensitive“ nature of the local water environment”. If we can extrapolate from the misleading statements in other areas of their report we should be concerned when they use a phrase like “sensitive nature of the local water environment”. Until there is further study to better understand how the headwaters of Big Hill Springs work

this area should be protected and therefore this proposal should NOT be approved by RVC.
Just the potential traffic and environmental issues clearly show that a different approach is needed and the accumulative effects of all the proposed gravel pits in the area need to be assessed before any of these projects can be approved.
For these reasons I am apposed to this application

In Closing
In my 27 years as a Rocky View resident, I have seen many changes. For the most part RVC has, in my opinion, done a great job of reviewing the science on projects and listening to residents in planning these developments. I have faith that this proposal will be rejected until such time as the proper science has been provided and the methodology for approving gravel pits reviewed and repaired. So, until the accumulative affects for Gravel extraction in this area have been properly studied with full peer reviewed science (not just relying on reports paid for by the gravel pit owners and not independently reviewed), I stand opposed to this submission.

Respectfully submitted,
Ken Mattie

Michelle Mitton

From: Kevin Stewart [redacted]
Sent: February 17, 2021 2:04 PM
To: Legislative Services Shared
Cc: Edmonton.goldbar@assembly.ab.ca; info@bighillcreek.ca
Subject: [EXTERNAL] - Bylaw C-8051-2020 (Mountain Ash Application PL 20200031)

Follow Up Flag: Follow up
Flag Status: Flagged

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DON'T LET GRAVEL MINES RUIN BIG HILL SPRINGS

I'm nature photographer who highlights the biodiversity of the Saskatchewan River Basin.

I'm extremely concerned about the impacts of a gravel mine near the biologically & geologically important Big Hill Springs Provincial Park.

Springs are wonderful, but fragile. Efforts should work towards expanding the park to protect the springs, not destroy them.

Also, why would I spend my tourism dollars to see a place that will be destroyed?

Future visitor,

Kevin Stewart
7702-79 Ave. NW
Edmonton, AB
T6C 0P6

Sent from my iPad

Michelle Mitton

From: Laurie Larin [redacted]
Sent: Saturday, February 6, 2021 2:11 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - Bylaw C8051-2020

Follow Up Flag: Follow up
Flag Status: Completed

Do not open links or attachments unless sender and content are known.

I am opposed to the Mountain Ash proposal and to the open pit gravel mining in the area of Big Hill Springs. Please don't ruin our beautiful park that is used by hundreds of people weekly. I don't want my nature walk to be to the sounds of industrial equipment and rock crushers and instead of breathing in fresh air, breathing silica dust, a known carcinogen.

Laurie Larin
Cochrane Aberta

Michelle Mitton

From: Leah [redacted]
Sent: February 16, 2021 8:52 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - FW: Bylaw C-8051-2020 - OPPOSED
Attachments: Bylaw C-8051-2020-OPPOSED.docx

Follow Up Flag: Follow up
Flag Status: Flagged

In response to the Notice of Public Hearing regarding application number PL202000031 (06731002/4), our household is **OPPOSED**.

Please find attached a letter outlining the reasons for our opposition to the above noted Bylaw for inclusion in the agenda package for the Public Hearing.

Thank you for your time and consideration,

Leah and Mark Pearce
31 Big Hill Creek Estates
Rocky View County

Sent from Mail for Windows 10 on my Desktop

Leah and Mark Pearce
31 Big Hill Creek Estates
Rocky View County, AB T4C 2X6

[redacted]

February 12, 2021

Planning Services
Rocky View County
262075 Rocky View Point
Rocky View County, AB T4A 0X2

Re: Bylaw C-8051-2020
Encl: Mountain Ash site map

Dear Honorable Chairperson and Council Members;

In response to the Notice of Public Hearing regarding application number PL202000031 (06731002/4), the Pearce family is **OPPOSED**.

What is happening in this relatively tiny area of our community when it comes to gravel pit applications is nothing short of insanity.

"Insanity is doing the same thing, over and over again, but expecting different results." ~Albert Einstein

The area along Highway 567, as far west as Highway 22 and as far east as Hwy 766 is under immense pressure for gravel pit development primarily due to its geological characteristics and secondarily because of its proximity to an important transportation corridor (see attached map). Although, our concerns are the same as those expressed by citizens that have spoken in opposition to gravel pit development in the last seven years, each one of our concerns are multiplied by each and every additional gravel pit application that remains to be reviewed in the proximity of Highway 567.

Our concerns with this specific application, all of which will be discussed in greater detail as a video submission, include the following:

1) The effects of gravel extraction on groundwater, compounded by the proximity of current and future gravel pit development.
2) The health effects of dust, compounding due to the proximity of an existing gravel pit.
3) The impact of noise from two adjacent gravel pits, compounding due to proximity.
4) Traffic safety issues on Highway 567 due to proximity of current and future gravel pit development.
5) No consideration for decreased property values due to shortsighted development of the area.
6) Ongoing and opposing views regarding “buffer zones”
7) The silent death of the Aggregate Extraction Plan.
8) The absence of an Area Structure Plan for an area that should require one.

We are not against development; we are not against gravel pits. Two gravel pits already exist near our property, one to the north on the 567 and another to the east on Glendale Rd. Aside from the issues specific to the development of this pit, our concerns are multiplied with each additional gravel pit that is approved in the same proximity. Rocky View does not have any plan to address the concerns that a case-by-case review of each gravel pit application is lacking which is the BIGGER picture as it pertains to future impacts. With every application, everyone goes through the motions, the same motions without any real understanding of a long-term plan for responsible development of open pit mining of aggregate that considers the views of all Stakeholders.

The process for the consideration for gravel pit development is myopic, at best, and much more needs to be done to ensure that all future development within this specific area of Rocky View county is balanced and measured.

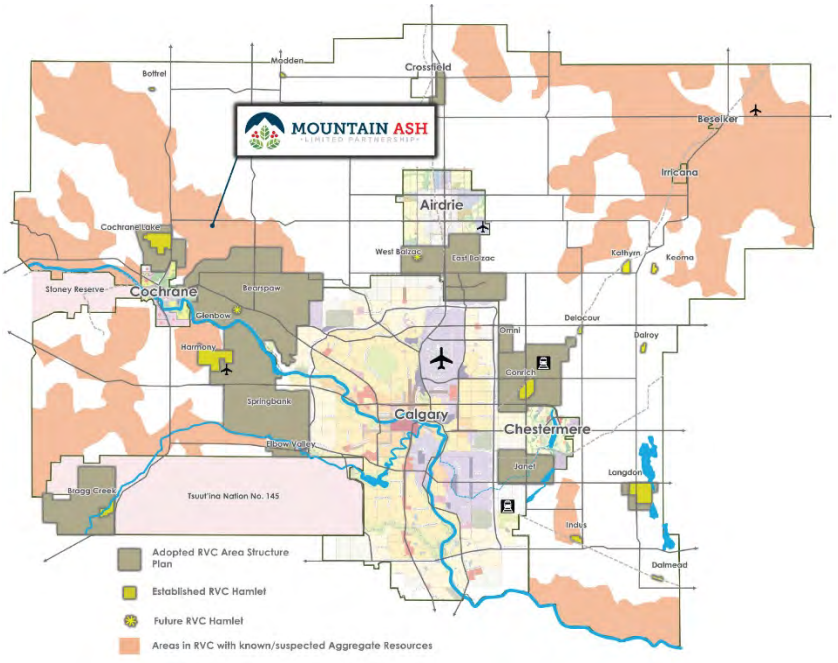
Thank you for your time and consideration.

Sincerely,

Leah and Mark Pearce

Residents, Property Owners and Taxpayers

Map illustrating area under immense pressure due to aggregate resources along Highway 22 and Highway 567.



Michelle Mitton

From: Kenneth's iPad [redacted]
Sent: Sunday, February 14, 2021 11:18 AM
To: Legislative Services Shared
Subject: [EXTERNAL] - Bylaw C-8051-2020 (Mountain Ash Application PL 20200031)

Follow Up Flag: Follow up
Flag Status: Flagged

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To Whom it May Concern:

This email is intended to request that the County of Rocky View research the effects of approving an open pit gravel mine so close to the Big Hill Springs Provincial Park. It is felt that the open pit mine could result in contamination of the Springs and all they support in this area. Perhaps a more suitable location for the mine could be made available. Please ensure the County is being environmentally conscientious in its discussions regarding designating this site for mining.

The last time my husband and I visited the park was just prior to it being closed for supposed renovations. It was an opportunity, during COVID, to access a beautiful location where many couples and families could enjoy the trails, the creek and the outdoor scenery. Although the parking lot was full that day, we were able to have a distanced visit with another couple and enjoy our lunches while not being anywhere near other visitors to the area. The Park's proximity to rural communities and cities makes it another wonderful place to gather and to enjoy the natural beauty of our Province. Please ensure that isn't put in jeopardy for current and future generations.

Linda Fulton
Concerned Alberta Citizen

Sent from my iPad

Michelle Mitton

From: Linda Hodgins [redacted]
Sent: Monday, February 8, 2021 12:28 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - Bylaw C8051-2020

Follow Up Flag: Follow up
Flag Status: Completed

Do not open links or attachments unless sender and content are known.

Mountain Ash Application
Pl 20200031
Please do not allow a gravel pit to be established and please cancel all applications As someone living in Cochrane and enjoying the natural beauty of the Big Hill Springs Park I feel there is no place for a gravel pit within 100 miles of the pristine park.
Please preserve the natural spaces for future generations Linda Hodgins

Sent from my iPhone

Michelle Mitton

From: Lori [redacted]
Sent: February 17, 2021 11:44 AM
To: Legislative Services Shared
Subject: [EXTERNAL] - Bylaw C-8051-2020 (Mountain Ash Application PL 20200031)

Follow Up Flag: Follow up
Flag Status: Flagged

Do not open links or attachments unless sender and content are known.

Hello, as a Cochrane resident for close to 20 years I am strongly opposed to any open pit gravel mining in this area. I believe it will harm the area where Big Hill Springs Provincial Park is located. My family has frequented this park for years and would not want it damaged due to gravel pit mining activity in the area.

Lori Bergeron
[redacted]

Michelle Mitton

From: Lori Skulski [redacted]
Sent: February 17, 2021 3:20 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - Bylaw C-8051-2020 (Mountain Ash Application PL 20200031)

Follow Up Flag: Follow up
Flag Status: Flagged

Do not open links or attachments unless sender and content are known.

Hi,
I'm writing to express my deep concern about the planned gravel pit excavation that will affect the aquifer that charges the main feature and associated wetlands on surface at Big Hill Springs Provincial Park.

I have experience in hydrogeology. Following an extensive career as an oil and gas geologist, I was also manager of our hydrogeology group which provided vital understanding of the interconnected groundwater and hydrocarbon system in that area.

From this background, I am fully aware that exposure of this aquifer at surface and subsequent gravel extraction from it will result in detrimental lowering of the water table, as well as exposing the unique and rare environment of Big Hill Springs, dependent for its tufa-depositing spring flow on the interconnected aquifer system, to inevitable contamination of the water resource from surface activities. Removal of the overburden and any vegetation cover will make this a certainty.

This is not a small project. This and associated planned gravel lease activities will result in a exploitation basin of approximately 2 square miles. It is large and tremendously damaging and will reduce the flow in associated Bighill Creek by half, with detrimental effects to the entire area fed by this creek system.

The impacts make this a proposal that is far beyond the abilities of Rocky View County Council to rule on in isolation and you should not be doing so. You need to require the operator to undertake an environmental impact and cumulative effects assessment done by qualified consultants.
You must not allow this damaging project to go ahead without this.

Thank you for the opportunity to comment.

Lori Skulski
Calgary

Sent from my iPad

Michelle Mitton

From: Lyse Carignan [redacted]
Sent: Monday, February 15, 2021 3:09 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - Bylaw C-8051-2020/Mountain Ash Application PL20200031
Attachments: gravelpits-mysubmissiontorvc-Feb.15-21.docx

Follow Up Flag: Follow up
Flag Status: Flagged

Bylaw C-8051-2020/Mountain Ash Application PL20200031
February 15, 2021

Legislativeservices@rockyview.ca

Bylaw C-8051-2020

Mountain Ash Application PL20200031

I am writing to you regarding the open gravel pit mines planned for the area immediately northwest of Bighill Springs Provincial Park. If these and other lands in the immediate vicinity owned by gravel companies are allowed to be developed, they would create a basin over two square miles in size.

As a landowner, I am concerned about our well water which could be affected by all developments regarding increased recharge and constituent mobilization into the groundwater sustaining Bighill Springs. Our well water comes directly from that basin which would be created by these four gravel operators.

The open pit mines would be located in the sensitive headwaters of the aquifer which feeds the springs of Bighill Springs Provincial Park and consequently the Big Hill Creek.

Gravel mines would remove the protective layers which guard the aquifer from contamination. Planned gravel excavation would remove protective layers, leaving only one meter of gravel to filter out contaminants like spilled fuel, herbicides, contaminants released by the mining process. Since the water level in the aquifer fluctuates over time, raising concerns about the adequacy of the narrow remaining filter and the potential need for pumping water from the pit directly into the Creek.

I am also concerned about the recharge of the springs and possible direct effects on the fish and aquatic species supporting them, during these mining operations. The flow would fluctuate, therefore the water temperature could rise considerably. Brook Trout could be directly affected since they thrive in the colder water of the creek closer to the springs.

In the situation where a very vulnerable and rare aquifer is concerned, where endangered species are at stake in the waters, and where clean, reliable drinking water could be impacted, there is every reason for Rocky View County to consider the cumulative impacts that multiple pits would have on the water balance and water quality in this sand and gravel aquifer and the resulting impacts to connected aquatic features, and reject them.

We have had constant delivery of good quality water of stable temperature up to now and it needs to continue.

Lyse Carignan

Land description: NW12-26-04-05

February 15, 2021

Legislativeservices@rockyview.ca

Bylaw C-8051-2020

Mountain Ash Application PL20200031

I am writing to you regarding the open gravel pit mines planned for the area immediately northwest of Bighill Springs Provincial Park. If these and other lands in the immediate vicinity owned by gravel companies are allowed to be developed, they would create a basin over two square miles in size.

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In the situation where a very vulnerable and rare aquifer is concerned, where endangered species are at stake in the waters, and where clean, reliable drinking water could be impacted, there is every reason for Rocky View County to consider the cumulative impacts that multiple pits would have on the water balance and water quality in this sand and gravel aquifer and the resulting impacts to connected aquatic features, and reject them.

We have had constant delivery of good quality water of stable temperature up to now and it needs to continue.

Lyse Carignan

Land description: NW12-26-04-05

Michelle Mitton

From: Edmonton-Gold Bar <Edmonton.Goldbar@assembly.ab.ca>
Sent: February 17, 2021 4:06 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - Re: Bylaw C-8051-2020
Attachments: Letter to Rocky View Coucil.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Please see the attached correspondence from MLA Schmidt.

Katy Campbell
Constituency Assistant
Marlin Schmidt, MLA Edmonton-Gold Bar
ph: 780-414-1015
fx: 780-414-1017

Marlin Schmidt, MLA
Edmonton-Gold Bar

Feb 17, 2021

To the Rocky View County Council:

RE: Bylaw C-8051-2020 (Mountain Ash Application PL 20200031)

In my capacity as Environment and Parks critic for the official opposition in Alberta, I have heard recently from many residents of Rocky View County with concerns related to the development application before you and the potential impacts of the referenced proposed gravel development adjacent to Big Hill Springs Provincial Park.

It is my understanding that the proposed gravel mine would be located within the channel that provides the source water for the springs in the park. This type of development will remove vegetation, top soil and up to twenty meters of the protective over burden. This could leave the aquifer vulnerable to potential degradation of the water quality entering the park, impacting the whole park ecosystem.

I recognize that it is not the role of the county to regulate the environmental impact of proposed developments such as this gravel pit. However, it is my opinion that the current provincial system for regulating the development of these pits is insufficient for protecting Big Hill Springs Provincial Park against the potential impacts the pits may cause. This is why I'm asking the County Council to consider this in weighing the decision – the Province will not be able to fulfill its usual role in this case.

Bill Hill Springs Provincial Park is an area of value to all Albertans. I urge you to carefully consider the potential impacts on the park when evaluating whether this application should go forward.

Sincerely,

Marlin Schmidt, MLA
Edmonton-Gold Bar

#100, 8925 82 Avenue, Edmonton, AB T6C 0Z2
Phone: (780) 414-1015 Email: Edmonton.GoldBar@assembly.ab.ca

Michelle Mitton

From: Meg Kenny [redacted]
Sent: Saturday, February 6, 2021 10:18 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - Bylaw C8051-2020

Follow Up Flag: Follow up
Flag Status: Completed

I oppose the gravel pit plans for Big Hill Springs and demand this does NOT go forward.

You have no right to this area and you need to say NO!

Have a conscience!

Meg Kenny

Michelle Mitton

From: Michael Foster [redacted] on behalf of Michael Foster [redacted]
Sent: Monday, February 15, 2021 12:21 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - Mountain Ash application;PL 20200031; bylaw C-8051-2020

Follow Up Flag: Follow up
Flag Status: Flagged

As a resident of Rockyview County living in the Bighill Creek valley adjacent to the Bighill creek about 2 km from Cochrane (NW 12-26-04-05), I am writing to convey my concerns with the proposed gravel pit application planned near the headwaters of the Bighill Creek springs. This would be directly adjacent to the Bighill Springs Provincial Park and could potentially directly affect the springs and the creek itself. As there already appear to be substantial gravel pits in the general area, in order to protect the springs, the park, and the quality of the creek flow which in turn affect the natural habitat here, I am urging council to reject this application permanently.
Thank you,
Sincerely,
Michael J. Foster, MD

Michelle Mitton

From: Michael Stangeland [redacted]
Sent: Friday, February 5, 2021 4:24 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - OPPOSITION to the Big Hill Springs Mountain Ash proposal

Follow Up Flag: Follow up
Flag Status: Completed

I would like to voice my OPPOSITION to the Mountain Ash proposal for the open pit gravel mining near Big Hill Springs provincial park.

If this email is not sufficient, please let me know what I need to do.

Best regards,
Michael

Michelle Mitton

From: Norene Procter [redacted]
Sent: Tuesday, January 26, 2021 10:54 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - BYLAW C8051-2020**

Importance: High

Follow Up Flag: Follow up
Flag Status: Completed

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Legislative Services Rockyview

Hi, January 26, 2021

RE: Gravel Pit Proposal from Mountain Ash Limited Parnership -Big Hill Springs & Creek & Big Hill Springs Provincial Park

I am writing you regarding the proposal for a gravel pit from Mountain Ash Limited Partnership which may cause terrible environmental destruction to Big Hill Springs and Creek and Big Hill Springs Provincial Park.

Our parks in Alberta are precious and need to be maintained in that light. People need these parks to enjoy. This is about protecting our parks for your children and grandchildren.

Open pit mining does not work well with parks where people go to enjoy nature. Lets keep Alberta beautiful and safe for future generations.

As silica dust is a carcinogen, I am strongly opposed to this project going ahead.

Thank you.
Norene Procter

Michelle Mitton

From: [redacted]
Sent: February 17, 2021 4:02 PM
To: Legislative Services Shared
Cc: Pamwight
Subject: [EXTERNAL] - Bylaw C-8051-2020 (Mountain Ash Application PL 20200031)
Attachments: Mtn Ash App PL 20200031 P Wight let.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Do not open links or attachments unless sender and content are known.

Please accept the attached letter of objection to the application.

Thank you

Pamela Wight
[redacted]

Pam Wight & Associates [redacted]; [redacted]

February 17, 2021

Reeve and Council, Rocky View County
262075 Rocky View Point
Rocky View County, AB, T4A 0X2 Legislativeservices@rockyview.ca

Re Bylaw C-8051-2020 (Mountain Ash Application PL 20200031)

Dear Reeve and Council:

I am writing in opposition to the development of an industrial gravel mine, planned for the area immediately northwest of Big Hill Springs Provincial Park (BHSPP), by Mountain Ash Limited Partnership, Summit mine.

Not only does this activity threaten our water and wildlife, but it would create a massive basin right within the area's headwaters.

Incredibly, the proposed mine is to be located in the sensitive headwaters of the ancient aquifer that feeds the springs in BHSPP, and these sensitive headwaters also flow into Bighill Creek! This alone would call for rejection of the application, since gravel mining destroys aquifers.

Were gravel mining to be allowed, the recharge of the springs would be forced through a dramatically reduced protective filter, and groundwater contaminants would contaminate the springs and eventually Bighill Creek. This in turn would impact the fish and aquatic species there.

In fact, there have been repeated calls for better protection of the springs, as well as a decade of public calls to expand the BHSPP to the north and further, in the County's own Parks and Open Space Master Plan. Indeed, this is unsurprising, since the Park is considered both to be overcrowded, and also has attributes of national significance. These include the springs, which rank among the "*top four mineral springs in Canada*" – the very springs that would be negatively impacted by the gravel mine.

As a related factor, the federal Department of Fisheries and Oceans (DFO) has ranked the springs and park area as critical habitat for the Bull Trout under the Species at Risk Act (SARA - Threatened). And besides this, the area provides habitat for diverse other Species at Risk including mammals and birds.

While not being opposed to all gravel mines, I am aware that communities, families, and working farms rely entirely on groundwater connected through the reach of the headwaters, aquifers and tributaries. In addition, the health of all our drinking water depends on healthy aquatic ecosystems such as in Bighill Creek. But with this proposal, we are at risk without science based protection and cumulative effects assessments being placed on such gravel mining projects as Summit mine.

Significant gravel deposits exist in many other locations in the region which could supply gravel without imposing significant risks to the ongoing viability of Big Hill Springs aquifer, the Park and the Creek.

Rocky View County has an obligation to maintain and protect the water quantity and quality flowing downstream. By rejecting this development application, Rocky View County would demonstrate responsible stewardship of its resources with appropriate regard to Species at Risk and communities downstream. I trust you will demonstrate leadership in this regard.

Sincerely

Pamela Wight

Michelle Mitton

From: Raymundo Wah [redacted]
Sent: February 17, 2021 12:11 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - Bylaw C-8051-2020. Summit Pit Application from Mountain Ash Ltd.

Follow Up Flag: Follow up
Flag Status: Flagged

To whom it may concern.

With all due respect, please:

No Summit Pit gravel extraction application.
No more gravel pits in our backyard.
No more dust.
No more trucks on our roads.
No more noise from blasting, crushing or heavy trucks.
No decrease to property values by living in close proximity to a pit.
No more road accidents.

Thank you very much.

Raymond Wah
24 Woodland Ridge NW

Michelle Mitton

From: Bob Betty [redacted]
Sent: February 17, 2021 1:26 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - Bylaw C-8051-2020 (Mountain Ash Application PL 20200031)

Follow Up Flag: Follow up
Flag Status: Flagged

I have reviewed material sent to me by the Bighill Creek Preservation Society concerning the potential threat to Big Hill Springs Provincial Park by a proposed gravel pit development in the aquifer that feeds the springs. Any such development must not damage a special and unique geological feature in a Provincial Park that we are privileged to have so close and available to urban populations.
I trust that your considerations will not result in risk of damage to this unique local area.
Thank you

Robert Betty
[redacted]

Michelle Mitton

From: Robert Hamilton [redacted]
Sent: Friday, February 5, 2021 4:40 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - Bylaw C8051-2020

Follow Up Flag: Follow up
Flag Status: Completed

I am writing to express my concern with regards to the Mountain Ash proposal for an open pit gravel mine near Big Hill Springs Provincial Park. As a resident of Cochrane Alberta, I have greatly enjoyed a quick drive for a quiet peaceful walk in this park on many occasions. I simply can not believe anyone would even entertain the idea of placing a gravel pit on the doorsteps of this natural treasure.

Please vote against this proposal.

Thank you for your consideration.

Sincerely,

Robert Hamilton
175 Jumping Pound Terrace
Cochrane, AB
T4C 0K5

Michelle Mitton

From: Rocky View Forward <info@rockyviewforward.com>
Sent: February 17, 2021 4:00 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - March 2, 2021 public hearing for Bylaw C-8051-2020
Attachments: rvf-summitpit-march2hearing-final.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Greetings:

Please find attached the submission in opposition to Mountain Ash's redesignation application and MSDP from Rocky View Forward.

Thanks,
Rocky View Forward

March 2, 2021 Public Hearing for Bylaw C – 8051 – 2020 Redesignation Application for NW/SW–31–26–03–W05M and Mountain Ash Limited Partnership's associated Master Site Development Plan

Submitted in Opposition by:
Rocky View Forward, February 17, 2021

Rocky View Forward is a resident advocacy group representing almost 500 families across the County. We are making this submission in opposition to Mountain Ash Limited Partnership's application to redesignate a quarter section of land south of Highway 567, east of Range Road 40 and to its application for approval of the accompanying Master Site Development Plan.

There are innumerable technical reasons for opposing this application. The concerns raised by those issues will be dealt with by many other submissions at this public hearing. Rocky View Forward concurs with the technical concerns that should result in the rejection of this application. However, rather than repeating these shortcomings, Rocky View Forward will focus on the following significant concerns:

- The history of Mountain Ash / Summit Pit applications;
- Legal constraints regarding the application; and
- The negative impact on Rocky View's tourism.

Mountain Ash / Summit Pit Application History

This is the third application dealing with what is referred to as the Summit Pit. In its first application, the pit operators applied to have 40 acres redesignated from Ranch & Farm to operate a gravel pit in the quarter section immediately north of the quarter section that is the subject of this application. At that time, they pitched their application as signalling their intent to be a good neighbour. They argued that they were only applying to redesignate 40 acres so that the community would have repeated opportunities to assess and comment on the quality of their operations as they extracted gravel from the quarter section immediately south of Highway 567. They expressed confidence that the community would see that they were responsible operators and be supportive of their subsequent applications.

Having succeeded in obtaining that initial redesignation, they returned less than a year later, before they had started operations, requesting that the remainder of that quarter section should be redesignated. Their argument at that point was that, in only having 40 acres redesignated in the original public hearing, they were now at a competitive disadvantage relative to the two other gravel operators who had successfully redesignated their entire properties at the same time. It is not clear where there "good neighbour" assurances had

gone; but council accommodated their request and approved the redesignation of the remainder of that quarter section.

Now Mountain Ash Limited Partnership is returning asking for the adjacent quarter section to also be redesignated from agricultural to aggregate extraction. It is not clear how this application fits either with their "good neighbour" assertions or with their concerns about their competitive disadvantage. As a bare minimum, the continued expansion of their applications leads one to question the trustworthiness of their assurances – earlier declarations appear to be forgotten whenever convenient. The County should, therefore, treat Mountain Ash's current application with an extra degree of skepticism.

Legal Issues Associated with this Application

The more northerly of Mountain Ash's two quarter sections south of Highway 567 is part of the County's appeal against the successful judicial review that set aside Rocky View's 2017 approvals of three gravel pits along Highway 567. The appeal court's decision has not yet been released. Until the appeal is decided, the more northerly quarter section maintains its original Ranch & Farm land use designation.

While Rocky View Forward recognizes that this redesignation application is for a separate parcel of land, it is disingenuous to pretend that the appropriateness of its redesignation is not affected by or related to the land use designation of the other quarter section. Council faces a complicated choice if it proceeds with this application before the Court of Appeal of Alberta releases its decision.

If Council assumes the County will win its appeal, then this application needs to deal with the substantive cumulative impacts that will result from three additional gravel pits suddenly getting the green light to proceed at this location. However, the application does not provide Council with any guidance on how to deal with that eventuality. Mountain Ash's application completely ignores cumulative impacts and "promises" to deal with such concerns if they become relevant.

On the other hand, if Council assumes that the lower court decision favouring the County's own residents is upheld, then Council needs to determine whether it is appropriate to redesignate this isolated quarter section that poses substantial environmental risks to the nearby Big Hill Springs Provincial Park. Council then also needs to consider the implications of this application for the other gravel pit applications that would have to be reheard.

Neither choice is a good one and suggests that the most prudent route for Council may be to defer a decision on this application until the Court of Appeal has released its decision.

At the very least, Council must not approve the Master Site Development Plan submitted alongside this redesignation application. The MSDP lays out Mountain Ash's operating plans for the two quarter sections even though half of that property does not currently have the appropriate land use designation to operate as a gravel pit. A MSDP cannot be approved for a property that does not have the land use designation needed to conduct the operations outline in the MSDP. To do otherwise would be signalling serious contempt for the legal process that the County itself has prolonged.

Negative Impact on Rocky View Tourism

Rocky View has made a commitment to encourage and enhance tourism opportunities in the County. A major part of Rocky View's attractiveness as a tourist destination is its natural environment that provides wonderful opportunities to experience the transition from the expansive prairie to the towering Rocky Mountains. The three provincial parks within the County – Big Hill Creek, Bragg Creek and Glenbow – are all excellent resources that the County should be promoting as unique and cherished features.

Big Hill Springs Provincial Park is one of the most heavily used provincial parks in Alberta. It was closed for the 2020 parks season to undergo upgrades to address that heavy usage – nearly 250,000 visitors in the 2019 season. It is scheduled to reopen this spring and is anticipating even more visitors given the dramatic increase all Alberta parks have experienced.

The Park's attractiveness focusses on the Big Hill Springs and Creek and the unique tufa rock formations that these have created over its geological history. Those are all at risk from this gravel application.

Even if one could ignore the serious risks to the springs and creek, having a gravel pit operating less than 800 metres from the Park would drastically erode its attractiveness as a tourist destination. Who wants to go out to enjoy nature next to gravel crushers and the noise and dust they unavoidably generate? Not to mention the increased traffic dangers from more gravel trucks on the hilly curves of Highway 567.

As has been pointed out repeatedly, Rocky View has extremely generous aggregate deposits. Many of these are in locations that do not put the County's residents, environment, or visiting tourists at risk. It is Council's responsibility to ensure that its gravel resources are exploited in a responsible manner. A decision on the land use suitability of any parcel of land needs to take into consideration many factors. In this case, it should be clear that the balance of those considerations does not support Mountain Ash's desire to operate a gravel pit here. As a result, the application should be refused.

Michelle Mitton

From: Rocky View Gravel Watch <rockyviewgravelwatch@gmail.com>
Sent: February 17, 2021 2:02 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - Bylaw C-8051-2020: Mountain Ash / Summit Pit Public Hearing: March 2nd
Attachments: rvgw-summitpit-publichearing-submission-final.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Greetings:

Please find attached Rocky View Gravel Watch's submission in opposition to Mountain Ash's redesignation application which is scheduled to be heard at the March 2, 2021 public hearing.

Thanks,
Rocky View Gravel Watch

Bylaw C-8051-2020: Mountain Ash Limited Partnership Redesignation Application for Summit Gravel Pit

Submission prepared by: Rocky View Gravel Watch
February 17, 2021

Rocky View Gravel Watch represents almost 200 families across the County on issues related to aggregate operations. The organization and the residents it represents are opposed to Mountain Ash Limited Partnership's application to redesignate 160 acres at the south-east corner of Highway 567 and Range Road 40 and the accompanying Master Site Development Plan.

Our submission in opposition to this application focuses on four main issues:

- Environmental risks;
- Wildlife impacts;
- Lack of cumulative impact assessment; and
- Traffic safety concerns.

Environmental Risks

As is discussed in more detail elsewhere (see Dr. Jon Fennel's submission in particular), the proposed location for the Summit Pit poses serious risks to the aquifer that provides water to Big Hill Springs and Big Hill Creek.

For a parcel of land to be suitable for use as an aggregate extraction operation, that use must not involve significant environmental risks. There are many locations in Rocky View with generous aggregate deposits that do not pose comparable risks to the environment.

In the case of Summit's location, Mountain Ash Limited Partnership proposes to extract 20 – 30 metres of gravel from above the aquifer that supplies the headwaters for Big Hill Springs and Big Hill Springs Creek, down to 1 metre above the water table. As is ably demonstrated in the technical report submitted by Dr. Jon Fennel and supported by submissions by other qualified experts, this creates material risks to the Big Hill Springs and Creek which, in turn, pose significant risks to downstream water quality.

Relying on the applicant's assertions that the risks do not exist or are not material is not appropriate – they have a strong vested interest in presenting information in a manner that is to their own advantage.

It is the responsibility of Rocky View Administration and Council to determine for themselves whether the land is environmentally sensitive and therefore not suitable for aggregate extraction. The County's own mapping prepared for the new Municipal Development Plan identifies the land in the area of this proposed gravel pit as ecologically sensitive. This, combined with information provided by independent

technical experts, clearly indicates that environmental risks at this location should preclude its use for aggregate extraction.

The environmental sensitivities of the area extend to the County's responsibility to comply with federal fisheries and species at risk legislation. Big Hill Creek is one of the few trout spawning grounds between the Rockies and Calgary. As such, it should be protected. It is also an aquatic environment that supports the endangered Bull Trout. This magnifies the County's environmental responsibilities to legal requirements under the Fisheries Act to "do no harm" to fish habitat. The technical material submitted by Mountain Ash in support of its application does not even discuss, let alone evaluate, the potential risks to the aquatic habitat. This critical omission should, on its own, be sufficient grounds to refuse the application as incomplete.

The statements in Mountain Ash's MSDP regarding the environmental and biophysical characteristics of its property contradict themselves. Their MSDP asserts that "the site does not contain any watercourses or obvious drainages that may have hydraulic connections with adjacent lands". However, on the immediately preceding page, the MSDP acknowledged that the land has "slopes falling into a natural valley system that extends to the southeast towards the Big Hill Creek". If slopes extending toward Big Hill Creek are not "drainages that may have hydraulic connections with adjacent lands", it is not clear what would satisfy that criteria. Mountain Ash's own words indicate that they are aware of, and have chosen to ignore, the risks their proposed operation will pose for Big Hill Creek.

Wildlife Corridors

The entire area around Big Hill Springs Provincial Park is a well-travelled wildlife corridor with many species attracted to the water availability from the springs and creek. The wildlife that lives and frequents the area include many threatened species that are iconic to Alberta – grizzly bears, peregrine falcons, golden eagles, prairie falcons – not to mention the moose, cougars, and many others that rely on the water source and coulees of this environmentally sensitive area.

To casually dismiss the relevance of wildlife corridors and the unmitigable damage aggregate extraction imposes on these essential corridors is foolhardy. It is also completely inconsistent with Rocky View's assertions that it values and protects the County's natural environment.

Lack of cumulative impact assessment

Mountain Ash's application assumes that it is unnecessary to address cumulative effects at this point and only makes commitments to participate in whatever the County may require on that issue in the future if the County approves additional gravel pit applications along Highway 567.

It is unclear how the County could impose after-the-fact requirements on Summit Pit's operations, or the operations of other existing pits, if it does approve additional gravel pit

operations in the immediate area. As a result, it is easy for Mountain Ash to "promise" something that they may never have to deliver.

Their approach also completely ignores the reality that there is already a gravel pit operating less than a mile away along the same highway and another pit operating slightly further away to the south-east of its proposed location. The presence of Hillstone Aggregates on Highway 567 mean that the additional truck traffic from the proposed Summit Pit will have a cumulative impact on traffic safety on the highway (see below for a detailed discussion of this issue). The presence of the Lafarge Glendale pit to the south-east means there will be cumulative impacts from two pits operating in close proximity to Big Hill Springs Provincial Park. None of these immediate cumulative impacts from the proposed Summit Pit have been addressed or even acknowledged in Mountain Ash's application.

The preparation of an "assessment of cumulative aspects of extraction activities in the area" is a requirement under the County Plan. Mountain Ash has failed to comply with this requirement and, as a result, its application should be refused.

Traffic safety issues

The Mountain Ash MSDP asserts that "Highway 567 is a provincial high load corridor and ideally suited to accommodate aggregate resource hauling activities". Mountain Ash provides no evidence to support their assertion. The validity of their assertion is thoroughly contradicted by the traffic evaluation study prepared for local residents by Mr. John Morell, P.Eng. and president of the Canadian Highways Institute. (This study has been submitted under separate cover by Mr. Harry Hodgson and should be referred to in support of the observations made here.)

Again, as with Mountain Ash's technical hydrology and biophysical impact studies, the County has a responsibility to independently evaluate the traffic impact information provided by the applicant.

Mountain Ash's traffic impact assessment focuses almost exclusively on the intersection its gravel trucks will use to access Summit Pit on the south side of Highway 567. It is proposing to upgrade the existing T-junction between southbound Range Road 40 and Highway 567. However, none of their information explains how the proposed upgrade will deal with the substantial correction line at Range Road 40 and Highway 567, with southbound Range Road 40 offset to the east from northbound Range Road 40.

Improving access to southbound Range Road 40 does not appear to do anything to address safety issues for traffic accessing northbound Range Road 40. As a result, gravel trucks entering and exiting the proposed Summit Pit location will negatively affect traffic safety at that intersection, which already has visibility issues because of the hill to the east of its T-junction at Highway 567 (something that Mountain Ash's traffic impact assessment fails to acknowledge).

Mountain Ash provides no evidence to support its assertion that Highway 567 is “ideally suited to accommodate aggregate resource hauling activities”. The evidence in Mr. John Morell’s traffic study points out that “there have been numerous accidents and a death involving gravel trucks along this section of highway”. His study also emphasizes that Mountain Ash’s traffic assessment fails to examine road safety issues over the length of its proposed truck haul routes or the characteristics of Highway 567 which include concealed intersections, steep grades, narrow to non-existent shoulders, unforgiving roadsides, and inadequate site lines at many intersections, to mention just a few of the concerns raised in his report. Mr. Morell’s evaluation of all these issues concludes that “adding more trucks is unsafe”.

Mr. Morell’s report also pointed out that the aggregate companies’ traffic impact assessments failed to address the impact on road safety from loaded gravel trucks which will slow to crawl speed on Highway 567’s long steep grades. As Mr. Morell emphasized, the backlog of vehicles logjammed behind gravel trucks has a significant negative impact on traffic safety – impatient drivers trapped behind the gravel trucks are prone to making risky passing decisions, which are made more dangerous by the limited site lines along Highway 567.

An acceptable traffic impact assessment to support the appropriateness of a proposed gravel pit must evaluate the impact its operations will have on the overall road network its gravel trucks will drive on, not just the intersection at the gravel pit. Mountain Ash’s application fails to provide any such evaluation. As a result, its application should be refused as incomplete.

Conclusions

Rocky View Gravel Watch believes that the issues discussed in this submission are more than sufficient to conclude that this application should be refused. There are many other issues discussed in other submissions that also point to the appropriateness of refusing this application. We sincerely hope that Council considers all the information presented to it for this public hearing and does the right thing – turn down this application.

Michelle Mitton

From: Ryan Carnegie [redacted]
Sent: February 17, 2021 3:26 PM
To: Legislative Services Shared
Cc: [redacted]
Subject: [EXTERNAL] - Re: Bylaw C-8051-2020 - OPPOSED
Attachments: Carnegie (7 Big Hill Creek Estates) Opposition Letter.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Please find attached a letter in response to our opposition to Bylaw C-8051-2020 for consideration in the agenda for the public hearing.

Thank you for your consideration of our opposition.

Sincerely,
Ryan and Lynette Carnegie
7 Big Hill Creek Estates
Rockyview County, AB
T4C 2X6

To: legislativeservices@rockyview.ca
Subject: BYLAW C-8051-2020 File: PL20200031 (06731002/4)

We, Ryan & Lynette Carnegie, of 7 Big Hill Creek Estates, Rockyview County, are submitting this letter to voice our strong opposition to the consideration of Bylaw C-8051-2020 to redesignate NW/SW-31-26-03-W05M from Agricultural, General District to Direct Control District (DC), in order to facilitate an aggregate operation.

We bought our property 6 years ago because of the peaceful, rural lifestyle in which we wanted to raise our family and eventually retire. A gravel and sand pit in close proximity to our community would be devastating and ruin the quality of life that we and our neighbours enjoy so much. I ask that you hear our concerns and take into careful consideration the enormous negative impact such an operation would have on the community and the environment in which we live.

Personally, having a large-scale gravel extraction operation would directly affect our community as we are directly south by less than two kilometres, with a direct line of sight to the pit. Big Hill Creek Estates sits on the highest elevation in the greater region. Because of this, as many as seven dwellings within our community (as well as a number of other individual acreages) will have a direct view of the proposed operation. We already have noise pollution, dust pollution, and visual line of sight to the already existing Big Hill Aggregates pit located just west of the proposed pit. Adding another surface mining operation will only increase these issues. It is not difficult to foresee direct and significant impacts to our air quality, serenity and most important, property values. These are all reasons why we chose to move to this area, and we trusted that our elected officials would protect our well-being and most importantly, the value of our investment.

Professionally, I have worries over the environmental impact of this pit and the larger scale plans for numerous, additional pits proposed in the area. As a professional geologist, I am extremely concerned about the groundwater impacts that numerous gravel pits would expose the quality of our groundwater to. According to the paper, “Establishing a Recharge Area for Big Hill Springs, Alberta, Canada”, written by Soren Poschmann from the University of Calgary in 2007, the proposed pit mine lies directly within the mapped “pre-glacial channel” aquifer (Figure 1) that is directly fed by the source water mainly from the area surrounding Cochrane Lake (Figure 2) and sources the springs that create the Big Hill Springs Provincial Park. As you can see on the attached figures, the discharge for the Big Hill Spring lies on the southern-most edge of the proposed open pit. Far too close to a highly protected, provincial area in my professional opinion. Additionally, the calculated age of the spring water at the Big Hill Springs Provincial Park is estimated to be approximately 6.36 years old (Poschmann, 2007) which geologically speaking is a very short recharge versus discharge time for groundwater. This would suggest that with multiple open pit gravel mines (with no soil or glacial till to act as the natural filter that we currently experience for our groundwater and the source water for the Big Hill Springs), we should expect to see a drastic, yet unknown disruption of water chemistry in the area. In the event that our opposition goes unnoticed, I have advised our water co-op to gather as much chemistry data as possible before hand so we can monitor these effects closely and hold our elected officials and owners of the mines accountable.

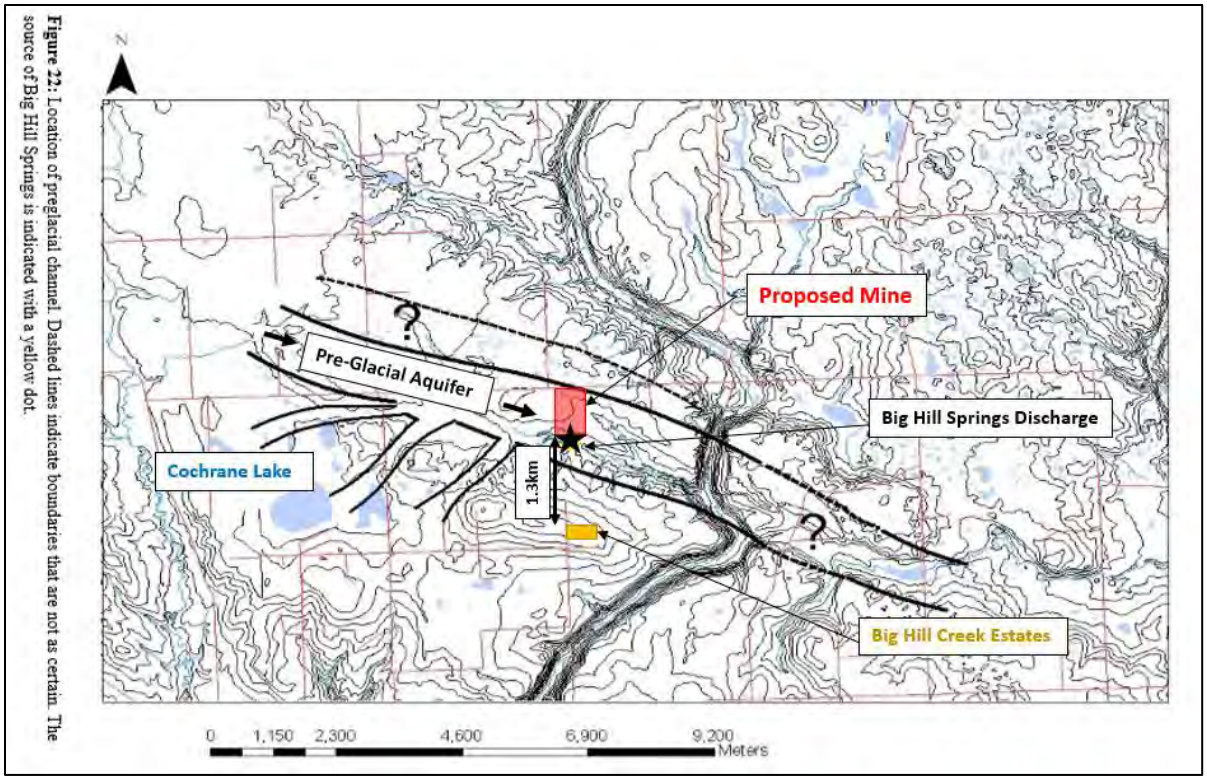


Figure #1

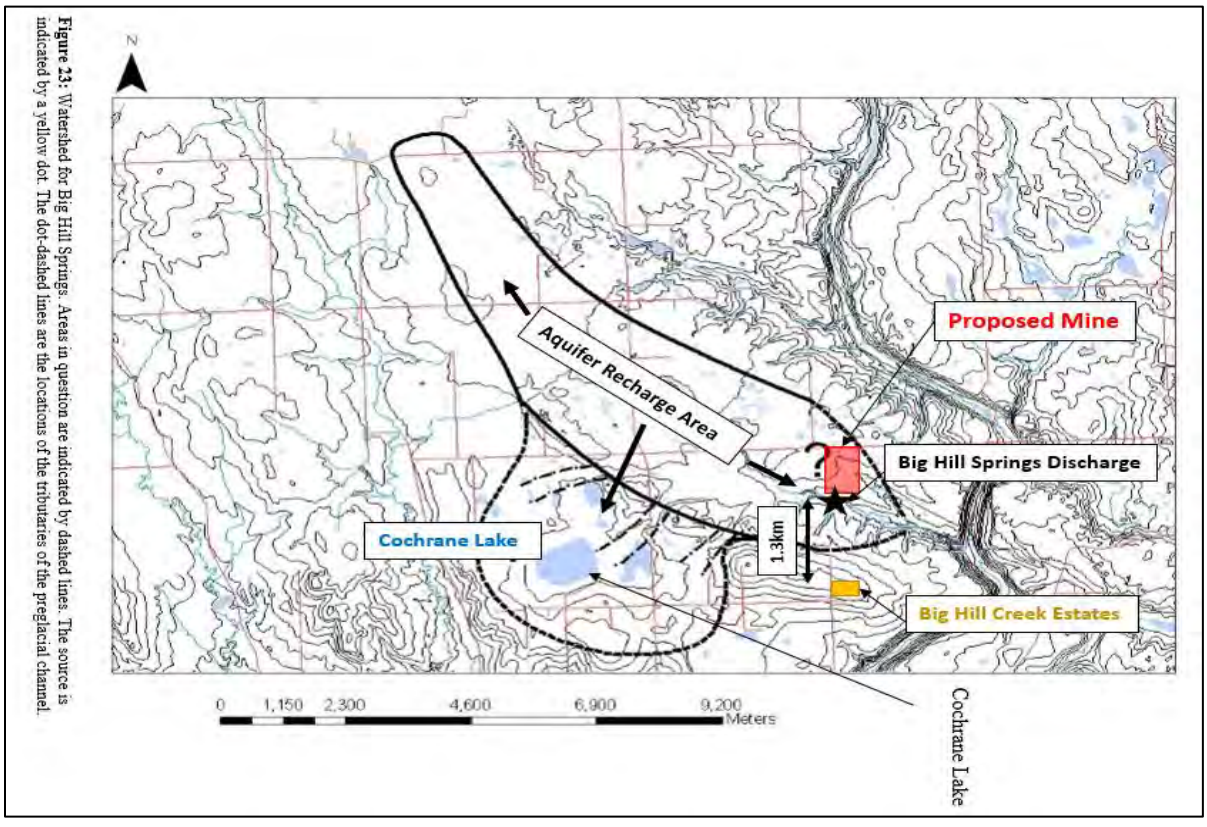


Figure #2

As landowners in the immediate vicinity of the proposed pits, these are our two main concerns for opposing the projects. While we support economic progress and development, there are also other things to consider when approving so many surface mining operations in such a little time frame.

1) **Traffic and Public Safety.** It is anticipated that there will be 50 loaded trucks leaving the operation daily – this equates to 100 trips (loaded and unloaded) entering and exiting the facility on HWY 567. This road is inadequate in its acceleration and deceleration lanes as well as the lack of passing lanes on the large hills. This traffic combined with the truck traffic from existing pits is excessive on this road without major improvements and will cause congestion and dangerous driving conditions. Multiple extraction operations in this area will be exacerbated as time goes on causing congestion, pollution, more wear and tear on the roads, and greater potential for accidents. We can attest to this section of road already being a very dangerous stretch of highway.

2) **Lack of Area Structure Plan.** There are a variety of stakeholders in the area – residential, commercial, industrial, and a valuable Provincial Park. An over-arching framework is needed to shape future development of this growing area and provide clarity and certainty to stakeholders when making investment decisions. With aggregate operations, there are many projects in the area operating or under consideration. An effective ASP would shape the approval process for these operations providing more certainty to both residents and extraction companies. There is a unique Provincial Park in the area that could be greatly affected by further extraction activities and an ASP would ensure that the area be protected. We are rightly concerned that if this application is approved, it will open this rural residential community up to even more pits. There are currently eight quarter sections of land in the immediate vicinity of the park that are owned by aggregate extraction companies. The cumulative effects of all these operations have not been adequately considered.

We understand that aggregate is a very important resource for our province and essential to communities for construction of roads, hospitals, schools, businesses, and houses, but with such a proliferation of pits, and an overabundance of gravel coming right out of quarries located on more easily accessed roads, there is no need for another gravel pit. Especially one in such close proximity to a Provincial Park. Another gravel pit would drastically affect our ability to enjoy our properties that we have invested so much money and time into, decrease our property values by as much as 30%, and destroy the quiet, peaceful community in which we live. If a permit were granted, the negative impact that this pit would have on the environment and its inhabitants is irreversible. It would compromise the health and safety of our community and ruin the character of this unique community forever.

We thank you for taking the time to hear my concerns and hope you will take them into consideration when making your decision about the future of our community.

Sincerely,
Ryan & Lynette Carnegie

Michelle Mitton

From: Sean Gregory [redacted]
Sent: Friday, February 5, 2021 9:27 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - Big Hill Springs Gravel Pit

Follow Up Flag: Follow up
Flag Status: Completed

Hello,

You cannot proceed with the gravel pit bid that is so close to an amazing piece of land. The big Hill Springs provincial park is a historic place and digging a pit in proximity to it would be a tremendous loss.

We are supposed to have serene, peaceful and amazing places that celebrate the beauty of Alberta. You cannot taint such an amazing geology example that we have so close to home.

Please consider the cries from my fellow Albertans and CANCEL this bid. It would truly be a loss to everyone who has every enjoyed the park.

Thank you for your time,

Sean Gregory

Michelle Mitton

From: Serge Tessier [redacted]
Sent: Wednesday, February 10, 2021 4:17 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - Bylaw C-7987-2019

Follow Up Flag: Follow up
Flag Status: Completed

Please see the attached letter re: Bylaw development. As residents affected by this Bylaw, we agree with all points and are not in favour of this development.

Serge and Tracey Tessier
43207 Mount View Bay
Cochrane, AB
T4C 2B2

1. Water Usage- Where will this development source their potable and grey water? The town of Cochrane has limited water rights off the Bow river. Will there be a community well to provide for the ~800 residential units?- Will the surrounding acreage communities need to opt in, with anticipated increase to current tax rate?
2. Sewage Disposal- Where will the sewage be transported to? Will it be trucked? Will it be piped into Cochrane? Cochrane currently pipes into Calgary. Is the agreement in writing?
3. Garbage Disposal- Currently the acreage communities use the community chuck-wagon. Any change to community disposal, will that result in higher taxes for the acreage communities required to opt-in to the disposal
4. Traffic- Only way into Cochrane is through Hwy 22 1A interchange which is recognized by transport Alberta as being over-capacity with an improvement in the works. Will this community be developed prior to that work being done? Will there need to be a light on the intersection of Hwy 22 and Cochrane Lake Road?
    a. For a community of 800 residential units with between 1600-2400 new residence is there a need for an emergency alternative route. Is there any development plan to access Horse Creek Road?
5. Emergency Services-
    a. Fire- Mount View Estates had a grass fire in spring of 2020, that resulted in the near loss of several houses including our own. What is the plan for a fire response to the community?
    b. Police- The current RCMP detachment is moving to vicinity of the heritage hills community in Western Cochrane. Is there discussions and agreements with the Province for requirement of additional policing to service a 'new village'.
6. Environmental- In the proposed development package I received I saw no environmental assessment of the impact to the wildlife in the area. There are multiple herds of deer, elk, moose in the area as well as coyotes, cougars, bears and lynx. What mitigation plans have been proposed to minimize impact to the wildlife?
7. Schooling- with 800 units that could result in many more school children. Is there additional school construction funds set aside for a community school or funds set aside to help augment the current existing schools.
8. Construction inconveniences- As there is only one route in and out of the development, ourselves and everyone who is west of the development will face multiple years of inconvenience, dust, noise and increased wear on our existing infrastructure. Is there a plan and funds to remediate and repair the anticipated damage. As well as a dust mitigation strategy during the dry windy days that we have the majority of the time in the area.

Sent from my iPhone

Michelle Mitton

From: Shara Hamilton [redacted]
Sent: Friday, February 5, 2021 6:03 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - Bylaw C8051-2020

Follow Up Flag: Follow up
Flag Status: Completed

To whom it may concern,

I am absolutely devastated for your plans In destroying our environment. Adding a gravel pit in and around big springs will effect the wildlife, water safety and overall beauty of this area. How dare our government think this is acceptable. Please put a STOP to the proposed plans.

Shara Hamilton
10 Patina View SW,
Calgary, AB,
T3H 3R4,
Canada

Michelle Mitton

From: Sheena Bates [redacted]
Sent: Monday, February 15, 2021 2:34 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - Bylaw C-8051-2020 (Mountain Ash Application PL 20200031)

Follow Up Flag: Follow up
Flag Status: Flagged

I am writing to express my opposition to the proposal for open pit mining so close to Big Hills Provincial Park. The location is in the headwaters of the aquifer which feeds the springs that make up the park, an aquifer that is significant and quite unique in Alberta. The province is currently spending a lot of money to fix up the park, as it is heavily used.

By allowing this project to go ahead there is real danger that permanent damage would be done to the park and its environs. We have seen, especially during this pandemic, that parks are most valued, and we do not have enough of them near large urban centres. Please don't allow anything to destroy, or potentially destroy, this unique park.

Thank you,
S Bates

Michelle Mitton

From: GRAY [redacted]
Sent: Monday, February 15, 2021 7:40 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - Big Hill Springs

Follow Up Flag: Follow up
Flag Status: Flagged

It has come to our attention, that a proposal to allow a gravel pit close to the park at Big Hill Springs, is on the books.
We can't comprehend, that a plan to allow a pit that close has even contemplated, never mind,got to this stage.
We having going there for over 10 years now and spent many enjoyable, productive and educational hours there with our family and especially our granddaughter.

After seeing the degradation caused by pits and there lasting impact on the Oak Ridges moraine in Ont and other similar area. This is not the place to allow one.
It will endanger the aquifer and have a negative and lasting impact on the area, especially the park!
Dust, noise, various leakages of dangerous chemicals and petroleum products etc.

The provincial government is spending money to upgrade the park , to bring more enjoyment to the people and also provide more protection to the environs in and around the park , from the increased visitor usage,
Allowing the pit, would undermine the whole process.

Next, would be all the heavy truck traffic in the area, in conjunction with increased visitor traffic, leading to potential safety issues on the roads & highways

In closing, No, No to this proposal and any future plans to try & open up pits or other commercial/industrial concerns around the park and over the aquifer/watershed.

Thank You, Yours
Terry Wood & family
Cochrane, AB

PS Please contact me at this email or [redacted] if you need personal details to verify , this is a legitimate letter & not part of a mass sending.

Michelle Mitton

From: Tim Jones [redacted]
Sent: Friday, February 5, 2021 5:59 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - Bylaw C8051-2020

Follow Up Flag: Follow up
Flag Status: Completed

Do not open links or attachments unless sender and content are known.

> Dear Rocky View County Council,
>
> Please do NOT allow an open gravel pit anywhere near the Big Hill Springs Provincial park. This area is very environmentally sensitive. Not only will it destroy the park but the dig will also contaminat the Big Hill Creek.
> This is a beautiful and special area enjoyed by thousands of Albertans all year round. We love the area!♥
>
> I do not support this!!!!
> PLEASE STOP THE GRAVEL PIT!!!
>
> Timothy Jones
10 patina view SW
Calgary, AB
>

Michelle Mitton

From: Velda Wheeler [redacted]
Sent: Wednesday, February 10, 2021 8:39 AM
To: Legislative Services Shared
Subject: [EXTERNAL] - bylaw C-8051-2020

Follow Up Flag: Follow up
Flag Status: Completed

Good morning
I want to express my disapproval of this application for the Summit gravel pits along Hwy 567.
I have disagreed with these pit applications in the past and continue to disagree with them.
I'm tired of having to write to you every time they apply.
I don't think they should be allowed to continue to apply. Once disapproved that should be it.
We were working on a gravel plan and council scrapped it so now we have to write to you every time.
Please! No more pits along hwy 567!
Thank you

Velda Wheeler
[redacted]

Sent from Mail for Windows 10

Michelle Mitton

From: Victoria Brilz [redacted]
Sent: February 17, 2021 3:52 PM
To: Legislative Services Shared
Cc: kvenner@bapg.ca; koberg@bapg.ca
Subject: [EXTERNAL] - Bylaw C8051-2020
Attachments: Rocky View County residents voice.pdf; ATT00001.htm

Follow Up Flag: Follow up
Flag Status: Flagged

To Whom It May Concern,

In regards to Bylaw C8051-2020, it is bewildering and concerning that responsible business professionals and trusted public representatives would consider enabling the Mountain Ash Limited Partnership to proceed with it's Summit Pit application.

As stewards of our environment, it feels irresponsible to allow a project of this nature to mine within a minimum of 1 meter above the groundwater table that feeds into the Bill Hill Spring that risks destroying one of only 2 known spawning grounds for the threatened Bull Trout and potentially destroying the trusted pristine quality of the spring water for thousands of visitors to the Big Hill Springs Provincial Park.

Perhaps a retainer to be held in trust for the irreparable damage this project could incur is a way to incentivize the business owner to conduct their business responsibly. How can we begin to put a value on this irreparable damage to nature and the health of park visitors? The retainer would be prohibitive to a financially viable model. It is time to hold business accountable and responsible for the true cost and risk to both the environment and it's profit margin.

Also, to B&A, this challenges my trust in and respect for B&A Planning group to provide responsible land use advisement. I question their advisement of other local projects in our area that impact sensitive eco-systems and a land owner's pocketbook.

I am deeply concerned with this application and opposed to it's acceptance as presented at this time.

Sincerely,
Victoria Brilz
260005 Mountain Ridge Place
Rocky View County, AB
[redacted]

Rocky View County residents voice concerns over gravel pit proposal

TYLER KLINKHAMMER

ROCKY VIEW— A collection of concerned residents have banded together to oppose a new gravel pit in Rocky View County.

Mountain Ash Limited Partnership's newest project, the Summit Pit, is currently in the application process with Rocky View County.

The parcel of land on which the gravel pit is located off of Highway 567— 800 metres from Big Hill Springs Provincial Park.

The park, nestled in a shallow valley roughly 10 km northeast of Cochrane, boasts riparian features, springs that feed the Bighill Creek, several waterfalls, the remains of a historic fish hatchery, the ruins of Alberta's first commercial creamery and hiking paths.

The watershed is a unique aquifer because it is spring-fed. The source of the stream is underground, so the temperature of the creek stays fairly constant in both the summer and winter months.

In July 2020, Alberta Parks announced it would be closing the park to visitors for much-needed refurbishments, costing roughly $1.2 million.

The park was being loved to death by the visitors and sees roughly 250,000 visitors per year according to the Big Hill Creek Preservation Society.

The Friends of Big Hill Springs Provincial Park, the name the county residents have given themselves, say the project could cause irreparable damage to the sensitive ecosystem.

"It's approximately 800 metres away, and I live about a mile and a half from a gravel pit, and I hear their noise," said Harry Hodgson, one of the concerned residents. "If it goes ahead it's going to lessen the enjoyment of the park for everybody who visits it. The dust and the noise— It's not going to allow for full enjoyment of the park and the natural environment."

Hodgson said the dust released in these kinds of operations could potentially contain silica, a known carcinogen, and a material identified by the Canadian Centre for Occupational Health and Safety as highly toxic.

"Your nature walk will be to the sounds of industrial rock crushers, and instead of breathing in fresh air, it will be silica dust," he said.

The permit Mountain Ash has submitted to Rocky View County Council is to mine within "a minimum of 1.0 metres above the groundwater table," says the company's Master Site Development Plan.

At that level, Hodgson said he is concerned the mine would remove protective layers of organic and inorganic materials which would typically act as a filter and guard the aquifer against contamination.

And while Mountain Ash has installed 10 groundwater monitoring stations in and around the mining site, the wells "would only identify harmful contaminants in the aquifer after they have already entered the groundwater and traveled toward the Park," Hodgson said.

The aquifer has also been identified as one of only two known spawning grounds for bull trout between Calgary and the Ghost Dam Reservoir. Bull trout have been identified by the province as a sensitive species, and are officially listed as a threatened species under Alberta's Wildlife Act.

Ken Venner, land use consultant with B & A Planning Group, said the Mountain Ash project has other safeguards against groundwater contamination in addition to the monitoring wells.

"If in fact there is equipment being stored on the site for any length of time, there would be requirements to store that equipment on non-permeable surface material," Venner said.

Those non-permeable surfaces, such as a layer of compacted material built on a bed of sand, are meant to absorb and mitigate the effects of spills.

Venner also noted Mountain Ash is looking into monitoring pre-existing wells on the properties to the east and south of the project.

He said there are many procedures in place to mitigate the risk involved with this sort of operation and that Mountain Ash has undertaken "best in class" procedures to ensure the safety of the operation.

"I can't 100 per cent equivocally say that there's no risk— No risk more than an agricultural operator operating a piece of farm machinery on the landscape," he said. "I think what we're dealing with, the 40-acre at a time excavation area. This is not a widespread, extensive industrial operation. It's going to be contained, it's going to be phased, there are going to be tight controls."

The south end of the southern quarter of land on which the Summit Pit is located is an area that has been earmarked as a habitat preservation area by Mountain Ash.

Venner said the area slopes down toward a natural escarpment and a regional drainage that meanders through the area.

The area has been identified as gravel-free by Mountain Ash, and provides a buffer for the landowners to the south.

An aerial view of Rocky View County.
FROM MOUNTAIN ASH LIMITED PARTNERSHIP'S MASTER SITE DEVELOPMENT PLAN

The drainage area sits directly to the west of the beginning of the Big Hill Spring, which feeds the Big Hill Creek that drains into the Bow River.

Hodgson said the entire zone is an important recharge area for the aquifer, and forcing the spring to recharge through a "dramatically reduced protective filter" could expose it to "spilled machinery fluids, herbicides and harmful metals and trace elements released by the mining process."

Rocky View County is scheduled to hold a public hearing regarding the Summit Pit application on March 2, at 9 a.m. The meeting will be broadcast live via rockyview.ca/.

If you would like to voice your opinion on this issue, you are asked to email legislativeservices@rockyview.ca and include Bylaw C8051-2020 in the subject line.

The deadline for submitting written letters for the public hearing is Wednesday (Feb. 17) at 4:30 p.m. The deadline for video submissions is Monday (March 1) at 12 p.m.

tklinkhammer@cochrane.greatwest.ca

Michelle Mitton

From: Vivian Pharis [redacted]
Sent: Tuesday, February 16, 2021 11:02 AM
To: Legislative Services Shared
Subject: [EXTERNAL] - BCPS Submission to RVC Hearing March 2, 2021 Mt. Ash LP application for land redesignation
Attachments: BCPS Submission to RVC Hearing March 2, 2021.pdf; ATT00001.txt

Follow Up Flag: Follow up
Flag Status: Flagged

Do not open links or attachments unless sender and content are known.

Dear RVC Councilors: Re: Bylaw C-8051-2020; PL 20200031

I respectfully submit the attached submission that I have spent many hours to research and write. I live at 193 Green Valley Estate, on the escarpment of Bighill Creek, just north of Cochrane. I have lived on this property for nearly 50 years, having bought land in 1971. I know this creek and park well and am also Vice President of Bighill Creek Preservation Society, a group dedicated to developing a watershed plan for the creek.

Vivian Pharis

Big Hill Springs - Not Gravel, but An Oasis on the Prairie

Submitted (PL 20200031) February 2021 by RVC resident, Vivian Pharis

Vision

Big Hill Springs Provincial Park is no ordinary park. This tiny gem was set aside in the 1950's as one of Alberta's first parks, apparently on land donated by Senator Patrick Burns. Since the 1920's people have been drawn to the prairie oasis at Big Hill Springs for picnics, fishing and camping. The attractive tumbling waters, where Grasslands meet Foothills and Parkland ecological regions, has drawn many admirers who have, between the 1950's and 2020, repeatedly called to better protect the springs and expand the park.

Over thousands of years, Big Hill's high-volume mineral springs laid down unusual tufa formations which are the foundation for uncommonly beautiful falling waters that flow on to form the main volume of Bighill Creek. Today this 70 acre park draws 1/4 million annual visitors and overuse is a constant threat. But, as the centre of a larger interpretive park and conservation area, Big Hill Springs could become a tourist attraction unique in southern Alberta.

Rare opportunities exist to expand the park north to connect to a larger conservation area, east to incorporate a picturesque buffalo jump with high interpretive value, west to properly protect and interpret the springs that rank among the top four mineral springs in Canada, and south-west for 6 km along a pathway through a sandstone-studded, steep-sided glacial coulee, leading all the way to Cochrane. Interconnecting pathways could join Big Hill and Glenbow Ranch Provincial Parks. Recreation, nature appreciation and tourism opportunities abound.

RVC's Need for Parks:

- RVC is the most populous county in Alberta; people are attracted to it for "a country lifestyle" based on proximity to nature.

- RVC reports and plans recognize that the primary recreational needs of residents are **walking paths, interconnected trails and nature appreciation,** including: 2018 County Plan, 2020 Rocky View Recreation Needs Assessment Study, 2011 Parks and Open Space Master Plan and draft 2021 Rocky View Municipal Development Plan.

- Provincial parks make up 0.4% of RVC's 1481 sq mi land base, with the 0.15 sq mi Big Hill Springs Provincial Park being the smallest, yet supporting 1/4 million annual visitors.

- The demographics of RVC are older, with almost half being 45+ years and this trend is expected to increase; older people especially recreate by walking and nature appreciation.

Big Hill's Unique Attributes:

- Big Hill Springs Provincial Park has attributes of national significance, including springs that rank amongst the "top four mineral springs in Canada", yet today they are unrecognized and neglected.

- The spring's high water volume (84 L/s), their constancy of volume, their year-around temperature constancy and the rare tufa formations that have built up over 1000's of years, bestow national and provincial significance.

- The federal Department of Fisheries and Oceans (DFO) has ranked the springs and park area as critical habitat for threatened Bull Trout under the Species at Risk Act (SARA).

- Bighill Creek Protection Society, a local watershed group working to develop a watershed plan for the Bighill Creek Basin, has conducted six different scientific assessments of the creek in the past 5 years, that support the goal of reintroducing endangered native Bull Trout and West Slope Cutthroat to the creek.

- The park is provincially unique because it is one of Alberta's only sites protecting an example of the Foothills-Parkland Subregion and supports a broad assembly of plants and animals associated with Grasslands, Foothills and Parklands.

- Bighill's steep-sided valley and open landscapes to the north, support surprising numbers of wildlife, including moose, elk, mule and white-tailed deer, black and grizzly bears, wolves, coyotes, foxes, mink, weasels, skunks, porcupines, red squirrels, ground squirrels, and in the bird world, rare piping plovers, a blue heron colony that is over 100 years old, peregrine and prairie falcon nesting sites, sharp tail grouse leks and many raptor and song bird species. Even raccoons and bob cats have been caught recently on area wildlife cameras.

Gathering water samples on Bighill Creek downstream of Big Hill Springs Provincial Park, showing buffalo jump immediately east of park.
•

- Buffalo jumps, bone piles, pictographs and lithic tools are all found in the immediate area. The area has great potential for further archaeological examination and interpretation.

- Historically, Alberta's first creamery was sited near the springs in 1891, and operated 19 years, supplying Calgary, rail lines, forestry operations and local residents.

- An early fish hatchery was built to take advantage of the reliable waters that flowed year-around and maintained a constant temperature.

- The glacial coulee that stretches about 6 km from Bighill Springs Provincial Park to Cochrane, passes through dramatic scenery where wildlife is varied and abundant. The decommissioned roadway through the coulee remains a public asset that would require little monetary outlay to open it as a walking/cycling trail. Indeed, this is a stated goal in RVC's 2011 Parks and Open Space Master Plan.

Advantages of Park Expansion:

- Provincial parks contribute to the environmental, social and economic well being of Albertans, including RVC residents wanting more local recreational opportunities.

- 2017 figures indicate provincial parks contribute $1.2 billion into Alberta's annual economy and provide 23,480 years of employment.

- Bighill Springs Provincial Park, with no advertising, draws 1/4 million visitors annually. Its proximity to Airdrie, Cochrane and Calgary put it within easy reach of over 1.5 million.

- With expansion, more trails and picnic sites, interpretive facilities for natural, historical and archaeological features, and major trails linking the park to Cochrane and to Glenbow Ranch Provincial Park, Big Hill has enormous long-term recreational, educational and tourism potential.

- The proximity of the site to three population centres and its gentle topography mean the park could operate on a year-around basis.

- The spin-off potential for local businesses due to increased tourism is substantial.

The Challenge:

- Four gravel operators have acquired eight quarter sections or two square miles of land in the immediate vicinity of Big Hill's springs and park that threaten to destroy the ancient aquifer the springs rely upon. For certain, they will impact the water to the springs. The first of these potential mines will be considered for approval at an RVC hearing March 2, 2021. RVC has a history of approving gravel operations with minimal examination of their environmental and social impacts. Gravel deposits underly much of RVC, many not associated with critical water ways.

- The public has only one opportunity to influence a county decision on a gravel operation. This comes early, at the land designation stage. If this opportunity is missed, the public has no further recourse to the remaining steps in approving new mines. The public is then left to challenge problems only if they arise during operations. In the situation where a very vulnerable and rare aquifer is concerned, where endangered species are at stake in the waters, and where clean, reliable drinking water could be impacted, there is every reason for sober second consideration of an impacting development.
-
- Calgary's mayor, Naheed Nenshi, is right now raising the alarm about declining water availability as populations increase and climate change takes a toll. He describes the need to shorten water supply lines, concentrate community living and redouble conservation efforts. There are implications for RVC. There are also obligations on counties to maintain tributary water quality and flow rates wherever possible. Putting these in jeopardy through gravel mining would be a questionable trade-off, needing thorough examination.
-

Rocky View County Parks and Open Space Master Plan:

- Two Management Plans have guided operations of Big Hill Springs Provincial Park, one from 1976 and one from 1998. These and older documented evidence have described this small park as "overused", suffering from erosion and needing expansion. Indeed, in 2011, the public again made this point through input to RVC's Parks and Open Space Master Plan, where there is a call to: "***Identify and protect Big Hill Springs Creek and the creek valley north of Big Hill Springs Provincial Parks as a conservation area; and Secure the road allowance to Big Hill Springs Provincial Parks for public access."***

- As part of the plan's **Grand Valley Foothills Concept Plan**, is a trail proposal: "*A pathway follows Big Hill Springs Road from Range Road 34 to Highway 22; a pathway starts from the City of Calgary at Nose Hill Parkway to Camden Lane and continues west to Big Hill Creek to Cochrane. A branch of this pathway follows Big Hill Creek to Big Hill Springs Provincial Park and continues north to Big Hill Springs Road.*

Conclusion:

Rocky View County has a clear need to provide greater trail and park facilities for its residents, many of whom moved here for these very amenities. County plans and various reports recommend that natural spaces be protected, interconnecting trails be developed and new parks be designated. But, despite planning exercises, reports and recommendations for action, so far little has been accomplished in the 50 years I have lived in RVC. Big Hill Springs Provincial Parks has just undergone a $1.2 million renovation that did not include expansion or protection for the vital springs. The 1998 management plan for the park contains a commitment that the park will work cooperatively with RVC for park area improvement. Expansion of this park and trail system would be a cost-effective and very responsible undertaking that could trigger a range of environmental, social and economic benefits for RVC. But, **all this will be lost if gravel pits destroy the springs, which are the golden goose, and dust and noise and truck traffic drive park visitors away.**

References:

Armstrong D, Gow and Meikle W. 1998. Big Hill Springs Provincial Park Management Plan. 25 pages.

Blogorodow P. 1976. Big Hill Springs Provincial Park Mini Master Plan. 55 pages.

Hargroup Management Consultants, 2011. Rocky View County Parks and Open Space Master Plan. 111 pages.

Houseknecht, S. 1984. Natural history study of mineral and thermal springs in Canada. Vol.1. Study commissioned by Parks Canada; Terra Environmental Consultants Ltd.

Sutherland I. 1998. Ecological Land Classification of Big Hill Springs Provincial Park. 35 pages.

Michelle Mitton

From: Vivian Pharis [redacted]
Sent: February 16, 2021 3:09 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - Wildlife Corridor Submission to Mt. Ash Hearing, March 2, 2020
Attachments: BCPS Wildlife Corridor Submission.pdf; ATT00001.txt

Follow Up Flag: Follow up
Flag Status: Flagged

Do not open links or attachments unless sender and content are known.

As per bylaw C-8051-2020, PL 20200031, Application by Mt. Ash PL for land redesignation from agricultural to industrial for the purpose of a gravel pit.

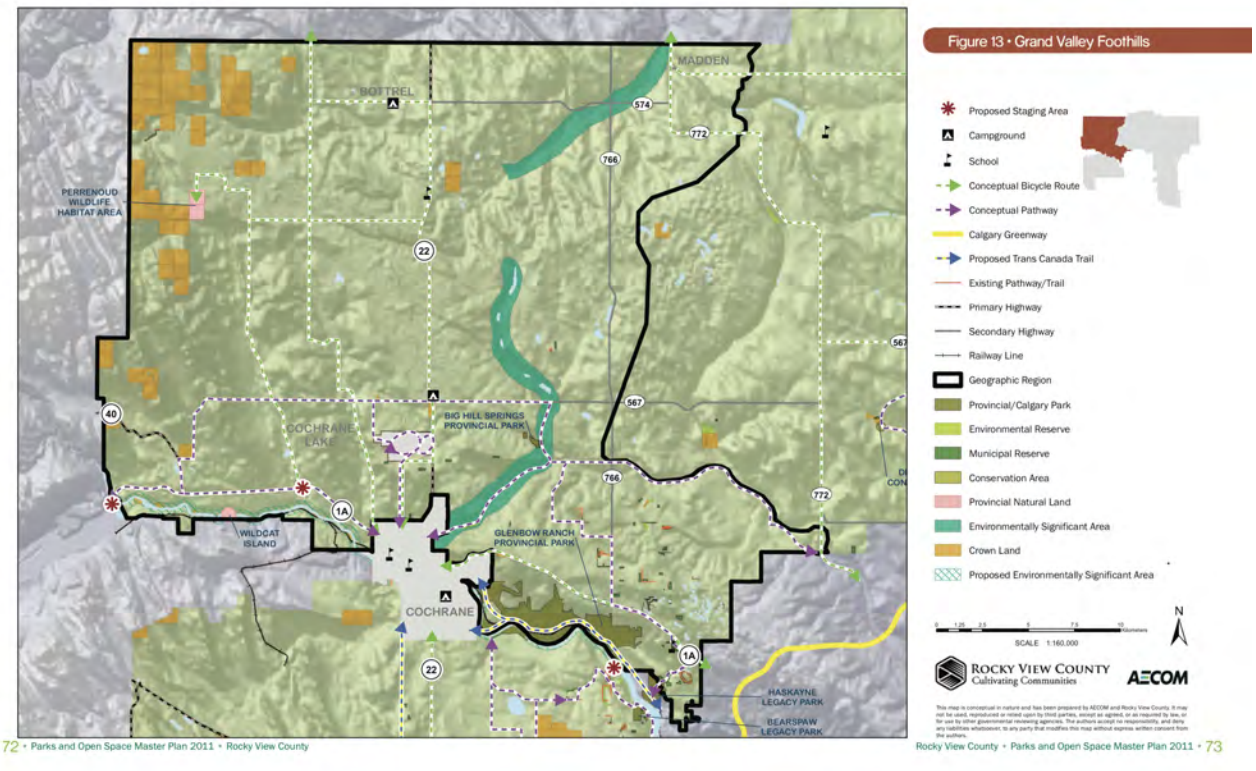
Submitted by Vivian Pharis - 193 Green Valley Estate, RVC

Submission to Bylaw C-8051-2020, PL 20200031, Application by Mt. Ash LP to redesignate agricultural land to industrial for purposes of gravel mining.

This submission is designed to show the importance of maintaining Bighill Creek, its critical springs and the provincial park that depend on the valley and the springs, as significant and rare intact habitat for the free-flow of biological organisms within Rocky View County.

Biological corridors are critical for the maintenance of ecological processes including allowing for the movement of organisms and the continuation of viable populations. By providing landscape connections between larger areas of habitat, corridors enable migration, colonisation and interbreeding of plants and animals.

The map below is taken from RVC's 2011 Parks and Open Space Master Plan, which was based on earlier work done by the provincial Environmentally Significant Areas program. It indicates the presence of a significant inter-connected environmentally sensitive corridor connecting the Bow River, up through Bighill Springs Valley and on to Nose Hill and Dog Pound drainages and interspersed natural sites amongst agricultural land.



The “Grand Valley Foothills” stand out amongst RVC’s five geographic regions as the only region with an opportunity for interconnecting wildlife and all local biological organisms with important natural landscapes. Nowhere else in RVC is there a similar critical corridor - this one is unique and precious and not the place for industrial developments.

RVC in the Global Biodiversity Context

According to the 2019 Global Risks Report, biodiversity loss and ecosystem collapse are amongst the greatest risks facing society. Biodiversity underpins human life and is responsible for ecosystem services that we fully depend upon, including food production, crop pollination, clean water, nutrient and waste recycling and regulating climate change. Humans depend on ecosystems for our economic sustainability as well as sustaining our physical and mental health.

The United Nations is calling on all countries to protect 30% of their natural landscapes by 2030 and Canada has committed to protecting 25% by 2025. Such protection has to include responsibilities at the municipalities level or it will fail. Failure means disaster for **ALL** life on this planet. RVC needs to develop policy addressing biodiversity health.

RVC Wildlife Obligations

Corridors for biodiversity serve a number of purposes including protecting wildlife and helping animal populations thrive. They function as means to decrease human-animal conflict in the form of vehicle-animal collisions and help combat the negative effects of habitat fragmentation.

There are possibilities for identifying and establishing key interconnecting corridors linking the two biologically active valleys of the Bow River and Bighill Creek. Highway 1A between Calgary and Cochrane is recognized as the most notorious large animal killing route in Alberta, because it is such an important connector between these two valleys. It is incumbent upon RVC to stop this highway slaughter and conserve wildlife through identifying, establishing and maintaining movement corridors between the two valleys and across the highway. These north-south corridors go on to connect with those identified as significant, through the length of Bighill Creek and beyond.

Threats to Bighill Creek Key Biodiversity Corridor
Today 4 gravel mines are proposed on lands immediately NW of the nationally significant springs that are the crux of Big Hill Springs Provincial Park. These springs contribute 50% of the water that flows through the creek that enriches the steep-sided coulee with its rich habitats on either side, all the way to Cochrane and the Bow River.

Industrialization of an important component of the Bighill Creek Biodiversity Corridor not only threatens the viability of the unique springs and the provincial park that depends upon them, but of critical habitat for the endangered Bull Trout, the enjoyment of thousands of park visitors and a key connection route for many wildlife and plant species that depend on the area to move through.

Rocky View County has to date neglected both its remaining natural landscapes and its residents who move to the county looking for natural spaces, interconnecting nature trails and park provisions. Four new gravel mines covering 2 square miles located on the aquifer of the springs that feed

the park, could not be in a more environmentally sensitive place in all of RVC.

Conclusion

There is no doubt in my mind and likely the minds of most RVC residents that gravel mines on rare aquifers and on the most environmentally sensitive biodiversity corridor in all of RVC, are truly inappropriate. RVC is underlain by a great deal of gravel. There have to be less sensitive sites for the mining of gravel, certainly sites that are not atop ancient aquifers or within critical wildlife corridors.

Submitted by
Vivian Pharis
193 Green Valley Estate, RVC
February 16, 2020

Rocky View County

File number 06731002/1004

Application Number PL202200031/34

On behalf of the residents of Big Hill Creek Estates, a community directly south of the proposed site.

As such we have a number of concerns about these developments:

- The current notification zone for the pits is 1.6Km's from the property line of the pit; we would like to see that zone extended south to include our community.
- Added as a member of the stock holders committee.
- Added as a member of the Good Neighbour committee.
- Added to the notification call list for times when decibels levels are expected to exceed 65 decibels. What type of noise monitoring will be in place?
- We foresee a requirement for some kind of an elevated berm c/w a shelter belt along the South elevation that should assist in mitigating dust and provide an visual backdrop. Our community is at a much higher elevation than the development and line of sight needs to be addressed.
- We are dependent on our well and as such want to be included into the well monitoring program.
- We will require access to the website for the Joint Community Commitments.

We would also respectively request the following reports

- Emission mitigation and monitoring program.
- Storm water management plan
- Hydro geotechnical impact assessment
- Erosion and sediment control plan
- Weed control plan
- President of Canadian Highways Institute – John Morrall's report on the effects of gravel pit traffic using highway 567 & 766 and the community.
- Communication plan...for neighbouring residents.
- Alberta energy regulators – directive 038 – noise control.
- Noise mitigation and monitoring plan.
- Ground water monitoring /neighbouring wells monitoring plan
- Code of best practices for the pit

If the requests listed are in public record please provide a link to the site so we may access them.

Regards,

Big Hill Creek Estates

PAT LAHEY #27

Rocky View County

File number 06731002/1004

Application Number PL202200031/34

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Big Hill Creek Estates

11 Big Hill Creek Estates

Rocky View County

File number 06731002/1004

Application Number PL202200031/34

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Big Hill Creek Estates

, 3 Big Hill Creek Estates

Rocky View County

File number 06731002/1004

Application Number PL202200031/34

On behalf of the residents of Mountain View Estates, a community directly South West of the proposed site.

As such we have a number of concerns about these developments:

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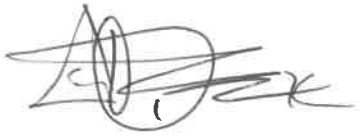

Rocky View County

File number 06731002/1004

Application Number PL202200031/34

On behalf of the residents of Big Hill Creek Estates, a community directly south of the proposed site.

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Regards,

Big Hill Creek Estates

Ryan Carnegie #7 Big Hill Creek Estates

Rocky View County

File number 06731002/1004

Application Number PL202200031/34

On behalf of Brent & Kathy Yuers, 264116 Range Road 40.

As such we have a number of concerns about these developments:

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Regards,

K Yuers

[redacted]

Rocky View County

File number 06731002/1004

Application Number PL202200031/34

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Big Hill Creek Estates

Rocky View County

File number 06731002/1004

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Regards,

Allison Palmer

Big Hill Creek Estates

Rocky View County

File number 06731002/1004

Application Number PL202200031/34

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Big Hill Creek Estates

Wayne Lovell

Rocky View County

File number 06731002/1004

Application Number PL202200031/34

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Big Hill Creek Estates

#19

CORNEL & MURIEL
WYNNOBEL

Rocky View County

File number 06731002/1004

Application Number PL202200031/34

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Big Hill Creek Estates

Kristy Heather Campbell

Rocky View County

File number 06731002/1004

Application Number PL202200031/34

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Big Hill Creek Estates

Lance Schreiner

Amanda Schreiner

Rocky View County

File number 06731002/1004

Application Number PL202200031/34

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Regards,

Mark Lowerison 51 - Big Hill creek estates.

Big Hill Creek Estates

Rocky View County

File number 06731002/1004

Application Number PL202200031/34

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Regards, #31 Big Hill Creek Estates

Big Hill Creek Estates

Leah Pearce

Mark Pearce.

Rocky View County

File number 06731002/1004

Application Number PL202200031/34

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- Ground water monitoring /neighbouring wells monitoring plan
- Code of best practices for the pit

If the requests listed are in public record please provide a link to the site so we may access them.

Regards,

Big Hill Creek Estates

Jessica Anderson

From: Michelle Mitton
Sent: November 26, 2020 2:34 PM
To: Jessica Anderson
Subject: FW: [EXTERNAL] - Opposition to proposed bylaw C-8051-2020

Follow Up Flag: Follow up
Flag Status: Completed

MICHELLE MITTON, M.SC
Legislative Coordinator | Municipal Clerk's Office

ROCKY VIEW COUNTY
262075 Rocky View Point | Rocky View County | AB | T4A 0X2
Phone: 403-520- 1290 |
MMitton@rockyview.ca | www.rockyview.ca

From: Michelle Balmer [redacted]
Sent: November 25, 2020 4:29 PM
To: Legislative Services Shared <LegislativeServices@rockyview.ca>
Cc: Pat Lahey <plahey@hopewell.com>; Prez BHCE <prez4bhce@gmail.com>; Treasurer BHCE <treasurer4bhce@gmail.com>; Les Facca [redacted]; Kevin Bartsch [redacted]
Subject: [EXTERNAL] - Opposition to proposed bylaw C-8051-2020

Do not open links or attachments unless sender and content are known.

To Whom It May Concern,

Firstly, TODAY at 4pm I received a letter from Rocky View County with a deadline of 4:30pm TODAY to object/support the above noted bylaw. This is in no way a reasonable amount of time within which to formulate a reasonable submission but I am sending this regardless to express my opposition.

My family lives at 3 Big Hill Creek Estates.
Our Legal land description is: Lot 1 Block 1 Plan 7910710 SW 1/4 Sec 30 Twp 26 Rge 3 W5
Owners: Kevin Bartsch and Michelle Balmer.
[redacted]

In addition, I am on the Executive of our Water Coop - representing 15 properties at Big Hill Creek Estates.

Please note that residents of Big Hill Creek Estates Community Association have previously provided written submissions on the proposed gravel pits described above, noting our concerns. None of our concerns have been addressed to date except to send vague website information that does not answer our questions nor address our

concerns. As such, I would expect that all residents would be able to provide submissions at the public hearing on/after December 8, 2020.

Our primary concerns with the proposed development are:

1 - Noise - we are close to the proposed pits (approx 1.5 miles) and do not feel adequate noise reduction has been considered. We live on our rural properties to enjoy the peace and serenity that nature provides. We don't wish to hear the constant hum of gravel extraction of the constant traffic of gravel trucks. We feel the need for adequate monitoring of noise levels on a continuous basis and consideration for the distance this noise travels. We also feel it's important for a visual and noise reduction berm on the south side of the proposed development.

2 - Dust - we don't wish to be exposed to potentially health-compromising dust associated with aggregate extraction. We also don't want to be sweeping off our properties regularly.

3 - Water. We rely on well water for our drinking water. It's imperative to the value of our properties and our health and safety that our drinking water quality is maintained and our aquaphor remains consistent. We believe the company should have to monitor our water - we expect a baseline measurement of both water volume and water quality and a continuous monitoring of such to assess any impact that this development is having on our aquaphor.

We have also laid out other concerns in previous communications however with 3 min to go until your submission deadline, I don't have time to reiterate them now.

Please contact me for further steps.

Sincerely,

Michelle Balmer

Jessica Anderson

From: Rhonda Pusnik
Sent: Monday, July 06, 2020 1:49 PM
To: Matthew Wilson; Dominic Kazmierczak; Jessica Anderson
Subject: FW: [EXTERNAL] - Planning Services File No. PL20200031-4

Please see below a comment submitted through the website.

Thank you,

RHONDA PUSNIK
Executive Assistant| Community Development Services

ROCKY VIEW COUNTY
262075 Rocky View Point | Rocky View County | AB | T4A 0X2
Phone: 403-520-3933 | **Cell: 403-466-5367**| Fax: 403-277-3066
rpusnik@rockyview.ca | www.rockyview.ca

From: Christine Harrison <CHarrison@rockyview.ca>
Sent: July 6, 2020 12:58 PM
To: Rhonda Pusnik <RPusnik@rockyview.ca>
Cc: Pamela Tilley <PTilley@rockyview.ca>
Subject: FW: [EXTERNAL] - Planning Services File No. PL20200031-4

Hello Rhonda,

Please see email below, I would have sent it to Belen but she is away, should I forward it to her anyway? As she is back on Wednesday?

What are your thoughts.

Thank you,
Chris.

From: Grauer, Lori [redacted]
Sent: July 6, 2020 12:52 PM
To: Questions <questions@rockyview.ca>
Cc: Division 9, Crystal Kissel <CKissel@rockyview.ca>
Subject: [EXTERNAL] - Planning Services File No. PL20200031-4

July 6,2020

To Whom it may concern

We are concerned that the county is moving forward with the approval of this land re-designation considering an appeal process is before the courts currently. Would if not be prudent on the councils part to wait until a decision has been made by the courts. Summit and several other gravel operators are all involved with this court proceeding. We would appreciate any further progress be put on hold until the courts have made a decision.

Thank you to the attention to this matter.

Doug and Lori Grauer

271004 Range Road 40
Rocky View, Ab.

[redacted]

Michelle Mitton

From: Harry [redacted]
Sent: February 16, 2021 5:18 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - Bylaw C8051-2020

Follow Up Flag: Follow up
Flag Status: Flagged

Harry Hodgson
265201 Rge Rd 35
Rocky View County, AB
T4C 3A2

I OPPOSE the Mountain Ash Summit Gravel Pit Bylaw C8051-2020.

I live less than 800 meters east of the proposed pit. I will be expected to live with the dust, noise, traffic safety issues, water concerns, property value and general reduced lack of enjoyment of my property. The dust and noise can be reduced but not eliminated. Hazardous dust and noise travels for miles. I will be expected to live with the silica dust, a known carcinogen, and the constant noise. This will lesson the enjoyment of my home if I am unable to hold a normal conversation outside while breathing in the silica dust generated.

They plan on digging a hole 25 meters, half mile wide and almost a mile long. Just by digging the hole and removing the overburden/filter material the exposed gravel from normal aggregate operations will release harmful metals and trace elements such as selenium, arsenic, lead, plus others. Studies show turbidity or worse generated by aggregate operations can travel for miles in the groundwater.

I have not been provided any insurance or guarantee from the applicant that my water well will not be affected and if they do any damage who will be responsible? If the groundwater is affected, drilling a new well is not going to fix it. Who will be responsible for providing potable water and filtering for the life of my property.

Will I be compensated if I have to sell my house for a reduced rate because nobody wants to live next to a gravel pit?

Gravel companies in the past have provided assurances if your well or property value is affected that they will compensate the landowner.
FROM MOUNTAIN ASH, NOTHING.

The application proposes to extract gravel to within three feet of the local aquifer even though the water table fluctuates by more than this amount between seasons. As a result, there are significant risks of permanent environmental damage for which there could be no effective mitigation.

Environmental damage would negatively impact local wells, the Springs, the entire Big Hill Creek drainage area, and subsequently the Bow River. These risks are too great to permit gravel extraction in such an environmentally sensitive area. Damage to these environmental resources would also cause irreparable harm to the Provincial Park and Creek.

Does not take a brain surgeon to figure out if this pit is allowed upstream within the Big Hill Spring aquifer recharge area, the spring/creek water will be affected. Killing this ecosystem within my lifetime is a distinct possibility.

TWO RECOGNIZED HYDROGEOLOGIST **EXPERTS** SAY IT SHOULDN'T GO HERE.
One in 2014 during a public hearing for another pit in this vicinity(which got turned down) and again now.

It is recommended that NO development within 1.6km and an additional 1.6km further that goes no closer than 4 meters above the high water level.

My life and visiting the Provincial Park will not be the same if a gravel is allowed to proceed approximately 800 meters away. Your nature walk and my life will be to the sounds of industrial equipment, rock crushers and instead of breathing in fresh country air, it will be silica dust.

This is one of only two provincial parks in Rocky View County and at a time when we need more natural areas, locating a gravel pit next to is inconceivable. The province is scheduled to spend $1.2 million to refurbish and your decision will be effecting 250,000 annual visitors.

The application also provides no meaningful information on the cumulative impact of multiple gravel pits. This is a critical shortcoming given that there are other gravel pits already in the general area and more have been proposed.

Rocky View County has generous gravel resources in locations that would be far more appropriate for exploitation. There is no need to satisfy the region's need for gravel by potentially destroying valuable environmental sensitive resources.

- MOUNTAIN ASH HAS **NO** DOWN STEAM WATER STUDY
- **NO** ACCUMULATIVE DUST STUDY
- **NO** ACCUMULATIVE NOISE STUDY
- **NO** ACCUMULATIVE TRAFFIC STUDY
- AND **NO** COMMUNITY SUPPORT, **STOP THE PIT NOW!**

Harry Hodgson
Local Resident

Michelle Mitton

From: Harry Hodgson [redacted]
Sent: February 16, 2021 11:58 AM
To: Legislative Services Shared
Subject: [EXTERNAL] - BYLAW C8051-2020 Traffic
Attachments: GRAVEL TRUCK OPERATIONS FINAL REPORT.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

265201 Rge Rd 35
Rocky View County, AB
T4C 3A2

I OPPOSE the Mountain Ash / Summit Pit application bylaw C8051-2020.

We have hired a traffic consultant and he reviewed the applicants traffic assessment.
Report assessment prepared by John Morrall, ENGINEER AND TRAFFIC CONSULTANT.

- PRESIDENT OF CANADIAN HIGHWAYS INSTITUTE LTD.
- EMPLOYED at the highway institute for OVER 20 YEARS
- INVOLVED IN TRAFFIC AND TRANSPORTATION with OVER 50 YEARS OF TRAFFIC EXPERTISE

"did not have sufficient information to approve the land use redesignation. "
" There has been numerous accidents and a death involving gravel trucks along this section of highway, adding more trucks with the current overall road network is UNSAFE."

Major safety issues and concerns:

- **failed to cumulatively include other nearby developments**
- **fails to look at the overall road network safety issues**
- **understated expected daily two-way trips of heavy trucks**
- **number of trips estimated still seems low**
- **understates the number of heavy trucks in the traffic stream during peak periods**
- **no mention of other critical road network issues that exist today for example:**
  concealed intersections,
  steep grades,
  inadequate intersection site distances,
  narrow shoulders,
  other road users,
  school bus operations,
  solutions for platooning

In my opinion, the applicant looks to be manipulating the data in favor of support but did not provide sufficient information to approve the land use redesignation. Adding more gravel trucks to an already busy road and having the pit entrance on range road 40 is extremely UNSAFE. Range road 40 is a correction line and the only way to safely control this intersection would be with traffic lights. This is a highway , traffic lights are not wanted. Therefore land use redesignation should be **DENIED**.

Harry Hodgson
Local Resident and member of
Friends of Big Hill Springs Provincial Park.

REVIEW OF TRAFFIC IMPACT ASSESSMENT REPORTS SUBMITTED IN CONJUCTION WITH THE LAND USE REDESIGNATION APPLICATIONS, and MASTER SITE DEVELOPMENT PLANS OF LAFARGE, MCNAIR and SUMMIT (defined within)

Prepared for: CARSCALLEN LLP

December 2017

CANADIAN HIGHWAYS INSTITUTE LTD

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CONTENTS

1.0 EXCECUTIVE SUMMARY

The focus of this report is the review of three Traffic Impact Assessment (TIA) studies accompanying three separate applications for land use redesignation within Rocky View County and to determine if the TIAs contained sufficient information to enable the County to approve the land use redesignations. The TIAs reviewed are basically an analysis of intersection operations based on given, and possibly understated, assumptions of gravel truck haul trips. The TIAs focus on single gravel pit accesses to the road network and do not take into account properly the cumulative effects of additional pits coming on-stream. More importantly, the TIAs do not account for the overall impact of gravel hauling on the safety and operations of the entire highway network including other road users such as school buses, overloads, other vehicle types and trip purposes such as the movement of farm machinery and cyclists.

In addition, the documents encompassing the TIAs and guiding the land use redesignation applications, the Aggregate Master Site Development Plans, were also reviewed. While the three developers organised themselves into the Big Hill Springs Aggregate Producers Group and attempted to produce an aligned approach to the development of the three proposed gravel pits, the Joint Transportation Strategy (JTS) still lacked in addressing overall road network concerns and seemingly still understated the number of gravel hauling trucks that would be generated by the proposed developments.

Further, this study examines the safety and operations of the highway network that would be impacted by the addition of heavy trucks generated by the proposed developments, which were not considered by the TIAs or the MSDPs. In summary, this study has concluded the following:

- The TIA reports look only at the impact of a single gravel pit development on the road network and fail to cumulatively include other nearby developments or future planned developments.
- The TIA reports focus narrowly on discreet intersections and often fail to look at the overall road network safety issues, in this case the road network that includes the complete haul routes for the gravel pits.
- The effectiveness of the TIA depends on the accuracy or the completeness of the data used to build the model. In the case of the three TIAs reviewed, potentially understated expected daily two-way trips of heavy trucks generated by the proposed development will minimize the magnitude of needed improvements to the road network.
- Planning for aggregate pits should assume a realistic maximum production even though owners may initially work at a reduced rate of production.

- Numbers provided by the developer, which form the basis of TIAs, should be closely vetted against other applicants and/or nearby operating gravel pits, if available, to ensure accuracy. Alternatively, the road authorities themselves- Rocky View County and/or the Province of Alberta- could provide these numbers to the developers.
- The JTS improved slightly over the original TIAs in estimating daily two-way truck trips generated by the gravel pit developments, however, based on comparison with operating pits and to an economic analysis the number of trips estimated still seems low.
- The JTS states estimated daily two-way heavy truck trips generated by the gravel pit developments as an average, which understates the number of heavy trucks in the traffic stream during peak periods.
- Cumulative impacts on the greater network are mentioned within the JTS, such as intersection improvements on the greater network and to the requirement for climbing lanes, however, analysis of these issues are all deferred to future subsequent development permit applications.
- There is no consideration for other critical road network issues that exist today such as concealed intersections, steep grades, inadequate intersection sight distances, narrow shoulders, other road users, school bus operations, solutions for platooning.

The TIA reports and MSDPs, submitted by the Applicants and relied upon by Rocky View County, did not have sufficient information to approve the land use redesignation.

This study has concluded that the Traffic Impact Assessment studies reviewed are narrowly focused on intersection analysis, the outcome of which depends entirely on the, input values, namely the number of trips forecast. The reports reviewed did not consider the explicit value of safety, the wide range of road users, trip types, the operating environment or all parameters of the road network in question such as the steep grades, narrow shoulders, unforgiving roadside and hidden intersections. A comprehensive TIA approach would consider the interaction of all these factors and avoid ascribing crashes to driver error. The TIAs did not comment on operation of school buses in the same time slots as gravel trucks which may contribute to conflicts and crashes. With respect to the highway system, which has steep downgrades on reverse curves and narrow shoulders, the TIAs did not comment on road safety which is exacerbated in icy and snowy conditions. No mention was made of potential safety issues at hidden intersections, where a fatality occurred involving a gravel truck during the course of this study. Finally, the TIAs did not include a discussion of the impact of loaded gravel trucks which will slow to crawl speed on long steep grades resulting in platoons. Impatient drivers delayed on the upgrade and trapped in platoons may make risky overtaking maueuvers. In summary, a more holistic TIA approach to evaluating the impact of an increasing fleet of heavy trucks hauling aggregate on the highways of the Rocky View County would have provided a sounder basis for evaluating the Applications for the redesignation of land-use.

2.0 TERMS OF REFERENCE

- Michael B. Niven and Theresa Nolan, of Carscallen LLP, requested a report focusing on the traffic impact studies submitted with the land use Applications, Bylaw C-7583-2016, and PL20150077 - MSDP - Hughes Gravel Pit (Lafarge) - (hereinafter collectively referred to as "**Lafarge**"); Bylaw C-7588-2016, and PL20160054 - MSDP – BRADI Gravel Pit (McNair Sand & Gravel) - (hereinafter collectively referred to as "**McNair**"); Bylaw C-7585-2016, and PL20150100 - MSDP – Summit Gravel Pit (Mountain Ash Limited) - (hereinafter collectively referred to as "**Summit**"), (collectively the Applications), specifically:

    1. Review of Traffic Impact Assessment (TIAs);
    2. Accuracies of the TIAs;
    3. TIA Summaries in MSDPs;
    4. Cumulative Effect of all applications;
    5. The Planning Staff Report Submitted to Council; and
    6. Rocky View Council Decisions.

In addition, the purpose of this report is to:

1. Document Highway Characteristics and Routes Used by Haul Trucks;
2. Identify all road user on highways used by Aggregate Haul Trucks;
3. Identify potential Traffic Safety Issues as with the developments that are the subject of the application; and
4. Provide a framework for a Safe Systems Approach to aggregate transportation as input to the Master Site Development Plans.

BASIS OF THIS REPORT -- meetings were held on the following dates:

1. September 9, 2017- site visit of all routes by John Morrall & Thorne Forrest;
2. September 23, 2017- all haul routes were driven and a video-log made by John Morrall & Thorne Forrest; and
3. October 20, 2017 (meeting with Theresa Nolan, Michael Niven).

A number of reports were provided by Ken Blair and Theresa Nolan and these are listed in the reference section.

3.0 DEFINITIONS

-
- (A)MSDP – (Aggregate) Master Site Development Plan
- ARP – Aggregate Resource Plan
- Two-way Trips – describes the full cycle of aggregate removal from the pit in terms of trucks arriving empty then re-entering the road network fully loaded with aggregate. For example, half of the stated number would be trucks arriving at the pit empty while the other half of the number would represent the trucks leaving full.
- Hwy – Highway
- TIA – Traffic Impact Assessment.
- LOS – Level of Service.
- ISD – Intersection Sight Distance.
- AADT – Average Annual Daily Traffic.

4.0 REFERENCES

- *County Plan,* Rocky View County, 2017.
- *County Servicing Standards*, Rocky View County, 2013.
- *Community Aggregate Payment Levy,* Municipal District of Rocky View No. 44, 2006.
- *Aggregate Site Monitoring Bylaw (not sanctioned)*, Rocky View County, n.d.
- *Development Permit Application Process*, Rocky View County, n.d.
- *Aggregate Resource Plan (draft version)*, Rocky View County, n.d.
- *Municipal Government Act, Community Aggregate Payment Levy Regulation, Alberta Regulation 196/2005,* Province of Alberta, with amendments up to and including Alberta Regulation 196/2017.
- *Geometric Design Guide for Canadian Roads*, Transportation Association of Canada, 2017.
- *Manual of Uniform Traffic Control Devices for Canada,* Transportation Association of Canada, 2014.
- *Canadian Guide to In-service Safety Reviews,* Transportation Association of Canada, 2004.
- *The Canadian Road Safety Audit Guide*, Transportation Association of Canada, 2001.
- *Highway Geometric Design Guide,* Alberta Infrastructure, Updated 1999.
- *Roadside Design Guide,* Alberta Infrastructure and Transportation, 2007.
- *Traffic Impact Assessment Guide*, Alberta Infrastructure and Transportation, 2005.
- *Hillstone Aggregates Traffic Update*, Highway 567 Intersection Review- 2017 Update, Bunt & Associates, 2017.
- *Gravel Pit Access Strategy*, Watt Consulting Group, 2017.
- *Traffic Impact Assessment, Proposed Buckley Gravel Operation, Rocky View County*, Boots Engineering Ltd, 2013.
- *Summit Resource Development, Transportation Impact Assessment*, Watt Consulting Group, 2014.
- *Hughes Gravel Pit*, *Transportation Impact Assessment*, Watt Consulting Group, 2015.

5.0 MD OF ROCKY VIEW AGGREGATE BYLAW

A study of the processes used by the County to review and approve proposals to develop aggregate mining operations will be helpful in understanding the necessity of accurate TIA reports and whether Rocky View County had sufficient and accurate information before them in order to adequately assess the land use redesignation applications. The following section develops this study by:

- Examining the justification or reasoning underlying the various County aggregate bylaws and plans;
- Reviewing the Traffic Impact Assessments (TIA) submitted by the aggregate developers as part of their proposals;
- Critiquing the TIAs;
- Reviewing the summaries of the TIAS contained within the Aggregate Master Site Development Plans (MSDP); and,
- Critiquing the aggregate bylaw approval process.

5.1. Basis of Aggregate Bylaw

A number of County documents guide the development and operation of aggregate extraction activities. The set of documents include bylaws and plans that are both ratified by the County Council or in the process of becoming ratified. To minimize the scale of this section, only select pieces of information are highlighted as they relate to the transportation network and the aggregate extraction industry.

County Plan – The County Plan guides development and services within the county. Among other topics, it identifies aggregates as an important resource, the potential impacts of extraction and support for the extraction Industry. In addition, the County Plan directs applicants for aggregate extraction to prepare an aggregate master site development plan and outlines the requirements. It is noted within section one of Appendix “C”, of the County Plan. beneath the header ”Transportation”, items ” t” through “x” are concerned with issues related to the existing transportation system including impacts on and efficiency of the existing transportation system, proximity to a paved road/provincial

Photo 1: Hwy 766 approaching Hwy 567, note the hidden intersection sign.

highway, safe access and egress and infrastructure for vulnerable road users. It is also noteworthy the County considers aggregate extraction a temporary land use because the land will be eventually be reclaimed and used for other purposes.

Rocky View County Land Use Bylaw – the Land Use Bylaw contains the regulations governing development within the County by:

- Establishing the processes for development permits, for rezoning and amendments to the bylaw;
- Regulating size and use of land and buildings;
- Classifying land use zones and determining the standards for developing each of these districts; and
- Determining the appropriate permitted and discretionary uses for each land use zone.

A development proposal for an aggregate mining operation, by way of an MSDP, would need to conform to this bylaw.

Master Site Development Plan (MSDP) – under the County Plan a MSDP must accompany an application for a land use redesignation. At present time, the Rocky View County is undertaking to produce a document entitled “Aggregate Resource Plan”, which is intended to guide the development of aggregate mining operations within the County. However, until the document is ratified, the MSDP is being used as the interim means for developers to propose aggregate mining operations. The MSDP, as provided by the Applicants Lafarge, McNair and Summit, is a detailed document that sets guidelines for long term development of a site over a specified period of time. The MSDP contains information regarding business strategies, physical site characteristics, operational aspects, community consultation and might contain additional requirements at the discretion of council.

Photo 2: example of sag curves within the road network.

Development occurs primarily through the development permit process, required for new construction, and changes to how a building or land is being used. A complete list of requirements for an MSDP can be found within Appendix “C”, sections one and four of the Rocky View County Plan.

Among the Rocky View County Plan requirements for MSDP with direct bearing on the transportation system and traffic safety are found within section one, items “t” through “x” under

the heading “Transportation”, and again in section four item 13a, which calls for the inclusion of a Traffic Impact Assessment study in the MSDP.

Aggregate Resource Plan- not ratified (ARP) – alongside several County bylaws and standards, federal and provincial codes and regulations, and guided by the South Saskatchewan Regional Development Plan, ARP is an instrument intended to guide the development of the aggregate industry within Rocky View County once it has been ratified. The document was published in draft version sometime in the early months of 2016. A final draft is not available as of the writing of this report.

The goals of the document are related to the extraction of aggregate within the County and include: balancing the needs of industry, residents and society; and managing environmental impacts responsibly. The document seeks to establish criteria for assessing and monitoring cumulative effects of aggregate development including the effects of aggregate operations on non-aggregate uses and activities within the County such as highway traffic.

For example, a County strategy for managing traffic impacts is to attempt to locate aggregate extraction activities close to current and future provincial highways to delay the requirement to upgrade County roads to a time when development is more permanent in nature as opposed to the temporary development of the aggregate resource. In addition, locating the aggregate mining operation as close as practicable to the provincial highway network keeps the aggregate activity close to the aggregate market.

From a traffic perspective, the ARP will only support aggregate resource development where proposed access arrangements would be safe and appropriate as per County Servicing Standards, the impact of the traffic generated would not be detrimental to road safety to an unacceptable degree and the highway network is able to accommodate the traffic generated by the development.

County Servicing Standards – the Servicing Standards guide design, preparation, and submission of plans and specifications for construction of new roads, water distribution systems, low-pressure sanitary sewer systems, and stormwater management facilities in Rocky View County. The servicing Standards also contain specifications for completing Traffic Impact Assessments (TIA), a study required to be included within the MSDP.

Community Aggregate Payment Levy Bylaw – a levy imposed by the County on aggregate mining operations. The levy amount is equal to $0.25 per tonne[1] of aggregate extracted and removed by means of trucking or shipping. The purpose of the levy is to offset impacts from

[1] As per the *Municipal Government Act, Community Aggregate Payment Levy Regulation, Alberta Regulation 196/2005,* Province of Alberta, with amendments up to and including Alberta Regulation 196/2017, the levy for aggregate will be increased to $0.40 per tonne as of January 1st, 2018.

aggregate mining operations on County road infrastructure. Offsets include upgrades to roads infrastructure or greater maintenance requirements.

Note: County policy of locating aggregate mining operations as close as practicable to Provincial highways minimizes the length of County roads that would require maintenance or upgrade due to impacts from aggregate mining operations. Impacts to the Provincial road network would be the responsibility of the Province.

5.2. Review of Traffic Impact Assessment (TIA) Engineering Reports

TIA reports, which accompany an application for land use redesignation, are required both by the County's MSDP and by the Province as part of their requirements for developments requesting access to their respective road networks. The purpose of the report is to study impacts on a road network by the addition of new development. A TIA generally includes a description of scope and intensity of the proposed project, a summary of projected impacts, any required mitigation measures and helps ensure that the highway can safely accommodate a proposed development.

For information, Rocky View County contains roads which fall under the jurisdiction of the County and other roads which fall under the jurisdiction of the Province. Generally speaking, numbered highways fall under provincial jurisdiction, all other roads fall under County jurisdiction. It is County policy, as stated in the not yet ratified Aggregate Resource Plan, to locate aggregate mining development as close as practicable to the Provincial highway network to minimize use of County roads. Therefore, while TIAs are a requirement by the County as part of the MSDPs, the Province will also rely on these same TIAs to help minimize impacts to their highways, as a result of aggregate development, are mitigated.

Photo 3: hidden intersection followed by a reverse curve.

Three separate land use redesignation applications were made to Rocky View County for approval, these enclosed as required by the County Plan, an MSDP and supporting technical reports. These gravel pits are the Lafarge, Summit and McNair gravel pits. Each application contained a TIA engineering report and are summarized below:

McNair – dated October, 2013, the following summaries/recommendations (paraphrased) were made: a type III intersection[2] treatment is required for the intersection of the development access with Hwy 567; road improvements will be required due to growth in background traffic not estimated traffic growth from development; Impact to the road network should be reviewed as subsequent developments are apparent as results of which are likely to differ from those impacts presented in the (McNair) report. The McNair TIA report estimated 60 daily two-way trips generated as a result of the development. Background traffic was forecasted to grow at a rate of 2.22 percent.

Summit – dated August, 2014, the following summaries/recommendations (paraphrased) were made: a type IIIa intersection treatment is required but traffic volumes should be monitored to establish if and when further upgrades to the intersection will be required. The Summit report estimated 216 daily two-way trips generated as a result of the development. Background traffic was forecasted to grow at a rate of 4.00 percent.

Lafarge – dated March 2015 the following summaries/recommendations (paraphrased) were made: a type IVc intersection treatment is required for the intersection of the development access with Hwy 567; The intersection of Hwy 1a/Hwy 766 requires signalization and a 20 metre left turn bay; The intersection of Hwy 22/Hwy 567 should be monitored to establish when signalization is requires; both of the preceding intersection improvements will be due to growth in background traffic not traffic generated by the development. The Lafarge report did not provide estimated daily two-way trips generated as a result of the development- a peak-hour volume was used instead. Background traffic volumes were estimated using a growth rate of 2.5 percent.

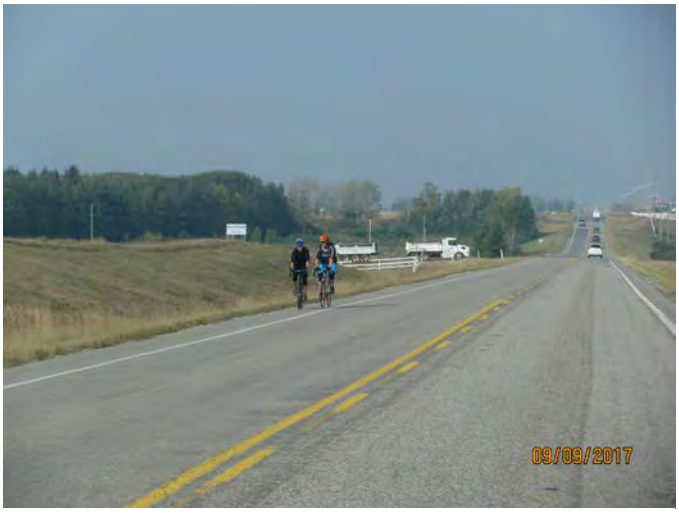

Photo 4: example of vulnerable road users and narrow road shoulders.

[2] Typical intersection treatment plans for two-lane undivided highways are specified within Alberta Infrastructure's Highway Geometric Design Guide. These treatments illustrate the normal design that is applied when such roads intersect- in this case a Provincial highway with a County access road/development access. The type of intersection treatment is selected primarily based on traffic volumes and turning movements, however, allowances can be made for intersections with special requirements such as a high number of heavy truck movements or intersections identified as accident prone, for example. There are five categories of intersection treatments each represented by a Roman numeral between I and V, inclusive. In addition, there are variations within each category, depending on application, and these are indicated by small-case alphabetic letters "a" through "d". Generally speaking, the higher the Roman numeral, the more complex the intersection layout. See Appendix 5 for more details.

Table 1- Summary of Estimated Daily Two-way Trips and Suggested Growth Rates Derived from Gravel Pit Development Applicant TIAs

Gravel Pit	Estimated Daily Two-way Trips	Background Traffic Growth Rate (%)	Consultant
Lafarge[3]	18	2.50	Watt Consulting
Summit[4]	216	4.00	Watt Consulting
McNair	60	2.22	Boots Engineering
Hillstone Aggregates[5]	234	-	Bunt & Associates

5.3. Critique of TIA's

McNair – the estimation of 60 daily two-way trips generated seems low. An economic analysis, contained in Appendix 2, suggests the breakeven point for pit operation is order-of-magnitude 120 daily two-way trips. For context, Hillstone Aggregate's pit, located on the south side of Hwy 567, generates 234 actual two-way daily trips, as per a March 01, 2017 letter from Bunt Associates to Kelham and Associates regarding warrant for intersection treatment. Understating the number of trips generated by these developments could lead to erroneous and potentially damaging analytical results, such as an understating of the volume and the proportion of trucks in the traffic volume on opening day.

Summit – perhaps the more realistic report of the three with regard to estimated daily two-way trips. It is interesting to note the discrepancy in growth rates, comparing the Lafarge and Summit TIAs, considering the pits are located in virtually the same location and the TIAs were

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[3] For the purposes of comparing the three TIAs, a circuitous calculation was used to determine a daily trips number for the Lafarge Pit using various sources. In a subsequent August 14, 2017, letter to Boots Engineering Ltd justifying the use of a type IV intersection treatment, Watt Consulting explains the combined daily two-way trips from the Hillstone, McNair and Lafarge pits combined will be no greater than 312. The estimated daily two way trips generated by the McNair pit is 60 as per their TIA report. The Hillstone pit generates an actual 234 daily two-way trips, as per a March 01, 2017 letter from Bunt Associates to Kelham and Associates regarding warrant for intersection treatment. Summing the numbers from Hillstone and McNair, and subtracting from the total number provided by Watt consulting gives: 312 - (60 + 234) = 18 daily two-way trips.

[4] Watt Consulting estimated 216 daily 2- way trips, within their August 18, 2014, TIA, being generated by the Summit Pit (4,320 tonnes/40 tonnes per trip), however, in an August 14, 2017 letter from the same consultant to Boots Engineering, the number of estimated two-way trips was stated to be 150. The more conservative number is used in the table.

[5] This number was requested from an operating pit in the area and is provided for context. The number is not derived from a TIA but from a March 01, 2017 letter from Bunt & Associates to Kelham & Associates Inc. regarding Hillstone Aggregates Traffic Update, Hwy 567 Intersection Review – 2017 Update. See Appendix 6 for details.

produced only five months apart and by the same consultant. This, the second TIA report for pits in the area, did not consider impacts on the existing road network due to the McNair development, only impacts from the Summit pit.

Lafarge – the method for establishing the number of 18 daily two-way trips, as explained in footnote 2, is circuitous in nature but demonstrates poor correlation between one, or more, of the three TIAs. As per the economic analysis contained in Appendix 2, it is difficult to imagine a gravel pit being successful with a mere 18 truckloads of gravel leaving the site each day. Again, the low number points to an understating of the volume of gravel that could be leaving this mining site and to a potentially poor correlation between the two other sites, Summit and McNair. Understating the number of trips generated by these developments could lead to erroneous and potentially damaging analytical results such as an incorrect percentage of trucks in the traffic stream and lower than actual traffic volume numbers.

The Lafarge TIA did review the overall transportation network. This approach is positive, however, the resulting analysis understates the cumulative impact because it uses truck traffic generated by the Lafarge Gravel Pit only and leaves out traffic impacts due to the other two proposed pits. The report highlights intersections, namely the Hwy 1A/Hwy766 intersection, where the LOS[6] of specific traffic movements does not meet minimum standards at 20 year operating conditions. The same analysis but with all pit generated traffic might show more turning movements breaking down and/or breaking down sooner than the 20 year horizon. Had the expected traffic generation by all three pits been considered in the TIA analysis, a more comprehensive appraisal of the cumulative impacts to the global road network would have been realized.

Photo 5: hidden intersection following horizontal curve on Hwy 567.

5.4. TIA Reports Contained Within the MSDP Submissions

Three MSDPs were submitted to the Rocky View County and, as of September, 2017, all three have been approved including land use redesignations. It was noted all three MSDP documents are contained on the Rocky View County website, however, the TIA reports were not included. A Joint Transportation Strategy (JTS) was contained within all three MSDPs. The

[6] A level-of-service (LOS) is a letter designation that describes a range of operating conditions on a particular type of facility. Six levels of service are defined using letters “A” through “F” where “A” represents best level of service and “F” presents worst operating conditions.

JTS was produced by the Big Hill Springs Aggregate Producers Group, which includes the three Applicants- McNair, Lafarge and Summit. The purpose of the JTS was to:

- Acknowledge the cumulative impacts on the volume of heavy trucks entering the traffic stream of Hwy 567.
- Include estimated number of trucks entering the traffic stream not only from the three proposed gravel pits but also from the existing pit- Hillstone Aggregates.
- Discuss the upgrade of existing intersection Hwy 567/Rge Rd 40 from a type III to a Type IVa.
- Discuss the proposed installation of a second type IVc intersection to be located 800 metres west of Range Road 40, as per Watt Consulting Group letter to Boots Engineering Ltd on August 14th, 2017. The intersection will serve as access to Hwy 567 for the McNair, Lafarge and Hillstone pits.
- Commit to the construction of an auxiliary lane connecting the two intersections.
- Estimate an average of 93 loaded trucks from the Lafarge and McNair[7] pits, and another 50 loaded trucks from the Summit pit for a total 143 loaded trucks leaving the three recently approved gravel pits daily. Double this number to obtain a total of 286 cumulative average daily two-way trips.
- State the average number of daily two-way trips generated by the existing Hillstone pit at 120.
- State a 6.1% increase to traffic volume on Hwy 567 resulting from the expected increased truck activity from the pits belonging to the Big Hill Springs Aggregate Group only.

I addition to the JTS, other information regarding transportation was noted within the body of the individual MSDPs. Each report described, in as many words, the commitment of each applicant to assist Rocky View County and Alberta Transportation to undertake or contribute to road network upgrades as a condition to future development permits.

[7] McNair Increased its annual gravel production from the 100,000 tonnes indicated in its 2013 TIA to a maximum of 300,000 tonnes as per their AMSDP. 300,000 tonnes of aggregate per year delivered 180 day per year at a rate of 33 tonnes per truck yields 50.5 gravel deliveries. Double this to account for return trip yields 101 two-way trips, which is still below the breakeven threshold suggested by the economic analysis contained within Appendix 3.

5.5. Critique of the Aggregate Bylaw Approval Process

Photo 6: type IVc intersection treatment, Hwy 567.

The JTS contained within the approved MSDPs goes a distance towards addressing impacts on the road network in a cumulative manner. However, they still don't sufficiently address all cumulative traffic safety issues that would likely be generated by the multiple proposed gravel pit developments in the area. They fall short in at least three areas:

- The estimated number of trips generated by the approved developments appears to be understated;
- The expected number of loaded trucks leaving the pits is expressed as an average; and
- The significant impacts of traffic, generated by the proposed gravel pits, on the segments of the road network outside of the proposed intersections of Hwy 567 and the development accesses are not considered.

The following is a brief discussion on these three issues:

Estimated Number of Trips – generated by the approved developments seems low compared to the economic analysis provided in Appendix 3. Accordingly, a pit would require an order-of-magnitude 120 two-way trips per day to break even. The cumulative number of estimated daily two-way trips stated for the Lafarge, McNair and Summit pits is 286, which is lower than the breakeven point. The Hillstone pit was assigned a breakeven number of 120 but, as per the *Hillstone Aggregates Traffic Update*, Highway 567 Intersection Review- 2017 Update, Bunt & Associates, 2017, the actual number of daily two-way trips from Hillstone is 234 trips per day. This analysis suggests the estimated trips are understated and, by extension, so too is the volume on the road network and the proportion of trucks in traffic as a percentage.

Expected Number of Loaded Trucks Expressed as an Average – the JTS gives daily two-way trip numbers as an average. This seems troublesome because if you average trips from a nearby operating pit, you will arrive at 108, an inherently misleading number given the maximum daily two-way load count occurs in the month of November and is equal to 237 (see Table 2) a factor of 2.2. Using a number that is an average is misleading because it ignores peak traffic periods, as demonstrated above, and, by extension, understates the actual impacts on the road network from the proposed gravel pit developments.

Table 2- From Bunt *Hillstone Aggregates Traffic Update*, Highway 567 Intersection Review- 2017 Update, Bunt & Associates, 2017

Month	Loads	Workdays	Loads per Day	Adjusted Loads per Day
January	342	25	13.68	16.42
February	247	25	9.88	11.86
March	202	25	8.08	9.70
April	507	25	20.28	24.34
May	682	29	23.52	28.22
June	1379	29	47.55	57.06
July	1277	29	44.03	52.84
August	2088	29	72.00	86.40
September	2305	29	79.48	95.38
October	2816	29	97.10	116.52
November	2463	25	98.52	118.22
December	654	25	26.16	31.39

Based on the adjusted loads per day shown above, the 90th percentile daily loads is 117 per day, which translates to 117 trips in and 117 trips out to be added to the 2017 AADT & ASDT volumes.

Impacts on Broader Road Network Not Considered – it is interesting to note the same analysis on impacts to the road network used by the TIA attached to Lafarge's original MSDP submission, which identifies potential LOS issues on certain turning movements on the Hwy 22/Hwy 567, Hwy 567/Hwy 766 and the Hwy 1A/Hwy 766 intersections, is used now with the updated and coordinated applications by Lafarge, McNair and Summit. The concern identified within section 5.3 of this report still remains: the analysis is based on the traffic generated by the proposed Lafarge pit alone. It ignores the other two pits, Summit and McNair.

In addition, other impacts on the road network that contains the haul routes for the proposed gravel pit developments, such as the requirement for truck climbing lanes, are addressed by the Big Hill Springs Aggregate Group's commitment to contribute in some way to the Province's efforts to identify essential upgrades to the network and determine when these upgrades are required. This commitment, however, is deferred to sometime in the future when the three developers might make subsequent development applications to the County. Deferring to the future, however, does not serve Rocky View County because there are safety concerns on the road network that should be addressed now, before the proposed pits come into operation, and not at some indeterminate time in the future.

6.0 ROAD USERS ON HIGHWAYS USED BY AGGREGATE HAUL TRUCKS

Transportation Impact Assessment (TIAs) should consider all road users as part of the analysis process. For example, it is noted that an in-service road safety review must consider all road users.

Photo 7: approaching large sag curve, Hwy 567.

The following are road users on the highways of interest that are also used by aggregate haulers:

- **Familiar Drivers** – these are local residents that use the highways for commuting, shopping, recreational and educational purposes. Typically, this group drive cars, SUVs, vans and pick-up trucks. As they are regular users, they know the highways and driving conditions, but some may be overconfident and overdrive (speed, take risks) the highway on occasion.

- **Unfamiliar Drivers** – these are drivers not from the region, visiting friends and relatives in the County. This group also includes tourists and truck drivers making a delivery for the first time. This group, for the most part, drive cars, SUVs, vans, pick-up trucks and RVs. While unfamiliar drivers tend to be cautious, they also may slow and brake suddenly to make a turn or not exercise enough caution when their expectations are violated at a concealed intersection or advisory speed on a reverse curve.
- **Gravel Haul Operators** – this group operates the range of vehicles shown in Appendix 4. The most common mode is the tandem with a tridem pup. While this is a group of professional drivers who are familiar with the highway, their MO is based on cost-efficient deliveries which means making deliveries on time. With respect to safety and operations, no information on driver training and vehicle inspections was available for preparation of this report.

- **Commercial Heavy Truck Operators** – this group operates a range of trucks from Single Unit Trucks (SU) to B-Trains (WB-25), which are 25 m in length and have a GVW of 63.5 t. These are also professional drivers who may or may not be familiar with the highways in the County.

- **School Bus Drivers** – this is a group of professional drivers who follow specific routes in the am and pm peak traffic periods on school days. Appendix 2 contains a drawing entitled Gravel Pit Locations and Haul Routes that describes trip distribution for school buses in the area. School bus operations are characterized by frequent stops on the highways. It is noted that school bus operations, 40 buses per am peak traffic period and another 40 buses during the pm peak period, occur at the same time as gravel haul operations and commuter trips.

- **Motorcyclists** – this group includes a range of operating skills and machines. At the low end there are scooters as shown in the photos in Appendix 3 and to the right. In general, this is a risk-taking group of drivers as demonstrated by the high number of crashes per veh-km travelled.

Photo 8: underpowered motorcycle using narrow shoulder for refuge.

- **Cyclists** – the cyclists on rural highways tend to be experienced and respectful of vehicular traffic except when they cycle in groups, side by side. Cyclists were observed on all highways during the site visits. It is noted that the cross section of the highways is inadequate for safe cycling. Cyclists require a minimum paved shoulder of 1.5 m, which is 1 more than that afforded. In terms of operations drivers should pass cyclists at an offset of 1.5 m, which means drivers must use the opposing lane to safely pass a cyclist. The highway cross sections do not allow safe cycling or the safety required for passing maneuvers.

- **Farm Machinery** – farm machinery is operated on the highways as farmers must move equipment from field to field. Typically farm machinery is over-dimensional and moves at speeds less than 50 km/h, which can pose safety and operational problems on the highways.

- **Overload Vehicles** – an existing high-load corridor utilizes Hwy 566, Hwy772, Hwy 567 and Hwy 22 between Hwy 2 and Hwy 22. Between 418 and 879 overload permits are issued for Hwy 567 alone. Similar to farm equipment, overloads often require more pavement width than conventional vehicles and because of narrow shoulders are often encroaching into the oncoming traffic lanes. Operational issues are compounded in the presence of vulnerable road users such as cyclists.

Photo 9: example of overload vehicle crossing a narrow structure on Hwy 22.

7.0 HIGHWAY CHARACTERISTICS AND ROUTES USED BY HAUL TRUCKS

The main highways in the study area used by haul trucks to/from gravel pits are as follows: Hwy 1A; Hwy 22; Hwy 566; Hwy 567; Hwy 766; and Hwy 772.

The gravel haul network is shown on a drawing entitled Gravel Pit Locations and Haul Routes in Appendix 2.

7.1. Geometrics and Laning

The highway and network for the most part is two-lane, two-way with the exception of Hwy 1A east of Glen Eagles.

The design designations for the highways of interest are: RCU-208-110; RLU- 208-110; and RLU-208-100.

Where:

RCU = Rural Collector Undivided
RLU = Rural Local Undivided
208 = two-lanes with a pavement width of 8 m
110/100 = design speed (km/h)
Lane width = 3.5 m
Shoulder width = 0.5 m
Desirable maximum gradient = 6%
Sideslope ratio: normal = 4:1
On fills = 3.1 (over 4 m)

Note: these are Alberta Infrastructure Design Standards for Rural Highways circa 1995, Highway Geometric Design Guide. While many of these highways pre-date 1995, earlier design guidelines would apply. For example, Plans & Profiles for SR No. 567:02 are dated Jan – April 1975 in which case the design designation would have been RCU-60-228 or RCU-60-226 where:

Design Speed = 60 mph
Lane Width = 12[1]
Shoulder Width = 2' or 1'
Sideslope = 3:1
Gradient Design Maximum = 7%

Photo 10: approaching intersection with poor intersection sight distance.

Source: Alberta Highways and Transport Construction Branch Design Manual 1973.

Horizontal Geometry – the gravel haul routes for the most part are tangent as shown in Appendix 2. However, the Hunt Coulee section on Hwy 567 and Hwy 772/Hwy 566 were checked with a ball-bank indicator to determine if the posted advisory speed met the Safe Curve Speed Criteria. Photos in Appendix 3 show the ball-bank indicator further information on establishing safe speeds on curves can be found in Appendix 7.

Hwy 567 -- the main east-west haul route linking aggregate pits with other highways. It is a level tangent highway with narrow shoulders except for Hunt Coulee and the long sag curve at Big Hill Springs Provincial Park.

Hunt Coulee Curve Speed Study:

Where: Posted Speed = 100 km/h
Advisory Speed = 70 km/h
Tested at = 70 km/h

CURVE	Deflection
C1	2^{o}
C2	8^{o}
C3	2^{o}

The advisory posted speed of 70 km/h is within the limit of 10^{0}. Haul trucks should not exceed 70 km/h as there is no margin of safety on curve 2.

Hwy 566 -- Hwy 566 east of the intersection with Hwy 772 has a reverse curve followed by a sharp curve with a regulatory posted speed of 60 km/h and advisory speed of 45 km/h. The curves were ball-banked at a speed of 45 km/h. Readings were 10^{0} and 20^{0} EB and 7^{0} and 14^{o} WB respectively.

The implication of the findings is that haul trucks must adhere to the advisory posted speed of 45 km//h as the ball-bank tests showed the safe curve speed on the reverse and sharp curve was exceeded. It is noted that the haul trucks are more prone to roll-overs than the test vehicle due to their high centre of gravity, which underscores the fact that haul truck drivers must exercise caution when driving through these curves.

Hwy 772 SB to Hwy 566 EB -- The posted regulatory speed when making this turn is 80 km/h. Ball-bank reading varied from $14^{0}/15^{0}$ to 20^{0}. In addition, to the advisory speed being exceeded it is noted that sight distance to check for NB vehicles, at the intersection, is limited due to the vertical crest curve. In summary, the intersection and reverse curves are a potential safety issue for EB haul trucks that are not being operated with due care and attention at a speed lower than the advisory speed.

7.2. Profile

The following highways have grades steep enough to cause a heavy truck at highway operating speeds entering the grade to drop more than 15 km/h, which is one of the key determinants for a climbing lane:

Hwy 22 north of Hwy 1A
Hwy 1A east of Cochrane
Hwy 567 at Hunt Coulee
Hwy 772 south of Hwy 567
Hwy 766 south of Hwy 567

In order to check the gradeability of these highways a profile is required. However, only the profile of Hwy 567 from Hwy 766 to Hwy 772 was available for the preparation of this report.

Appendix 4 shows the range of aggregate truck modes of transport. The most common mode of aggregate transport is the tandem truck and tridem pup[8].

For purposes of analysis a design truck of 120 g/w (200#/hp) was selected. It is noted the design truck of 180 g/w is normally used for two-lane highways in Alberta to determine the need for a climbing lane.

Photo 11: example of a tandem truck with tridem pup.

Appendix 4 shows the critical length of grade for the design truck. For example, the design truck would have a speed reduction of 15 km/h within 160 m on an 8% grade.

The controlling grade at Hwy 567 is 8% (grades vary from 4.6% to 8%). The overall length of this grade is 1,500 ft (457 m). The performance curves, shown in Appendix 4, indicate that the design truck would have a speed of 38 km/h at the crest of the curve.

Haul truck speeds were recorded for loaded and unloaded tandem trucks with a tri axle pup on the Big Hill Springs Hill and Hunt Coulee. Appendix 4 shows the GVW, Tare, direction (EB or WB), date and time as well as the speeds recorded. It is noted that speeds of loaded trucks

[8] The tandem truck with tridem pup has the following performance characteristics: GVW_{kg} : 43,500 to 45,300 (95,901 - 99,869 lbs); hp : 475 to 550 (354 – 410 kw); Mass/Power Range:106-128 g/w (174-210 # /hp).

drop to 28 km/h to 33 km/h at the crest of the grade on the S bend (Hunt Coulee). Speed reductions were not as severe on the Big Hill Springs grade.

A haul truck NB on Hwy 772 was followed from the bridge to the crest at TWP Rd 264 and the speed was observed to drop to 30 km/h. On the second hill NB on Hwy 772 the speed was observed to drop to 40 km/h. Speed for unloaded trucks were not as severe and were recorded between 65 km/h and 72 km/h on both grades. In summary, the recoded speeds of loaded trucks EB on the 8% grades confirmed the speeds estimated by the performance curves for a design truck of a mass/power of 120g/w. The slightly lower speeds of between 6 to 10 km/h indicate the observed trucks had a mass/power ratio greater than 120g/w resulting in poorer gradability performance.

7.3. Cross Section

The narrow shoulders of 0.5 m is inadequate for bicycles or disabled vehicle storage (cars are 2.1 m and trucks 2.6 m) as shown in the Photos in Appendix 3. The sideslopes of 3:1 are critical and non-recoverable for errant vehicles. The site visit indicated some sideslopes steeper than 3:1 which would likely result in a roll-over for an errant vehicle.

7.4. Intersections

With the exception of signalized intersections on Hwy 22 in Cochrane, all major intersections are either two or four-way Stop controlled as shown in the Photos in Appendix 3.

In addition, there are several intersections with minor roads having limited sight distance as shown in Appendix 3.

7.5. Passing Zones

Although the highway network is for the most part tangent, the intersections and vertical crest curves limit passing zones to approximately only 30% of the highway. Passing opportunities on the gravel haul network are severely restricted by the limited number of passing zones.

Photo 12: platooning vehicles behind a tandem truck with a quad wagon.

7.6. Auxiliary Lanes

Auxiliary lanes are additional lanes to facilitate turning, deceleration, acceleration, passing and climbing-lanes on grades. With the exception of the intersection of Hwy 567 and Hwy 766 and intersections on Hwy 22, intersections on the network do not have acceleration or decelerations lanes.

While Hwy 22 and Hwy 1A have climbing lanes out of the valley from Cochrane, the main gravel haul routes such as Hwys 567, 566, 772 and 766 have neither passing nor climbing lanes. The combination of lack of passing zones, no passing/climbing lanes and heavily loaded trucks on steep grades results in operational delays and the formation of queues on the long grades.

7.7. Crossroad and Driveway Density

Operational delays also occur at highway intersections with Range Roads, Township Roads and private driveways as these intersections do not have left-turn lanes or acceleration/deceleration lanes. Lack of auxiliary lanes results in operational delays as through traffic must slow or stop for a driver to make a left-turn for example. Vehicles turning right from the highway or turning onto the highway from a cross road will cause through traffic to slow. In some cases, these movements can cause rear-end collisions or left-turn across path collisions due to contributing factors such as following too close or misjudging gaps.

7.8. Wildlife Crossings

There are wildlife crossing signs warning drivers to expect animals suddenly crossing the highway. The wildlife crossing problem is exacerbated by the Big Hill Springs Provincial Park, which provides a refuge for wildlife.

8.0 POTENTIAL TRAFFIC SAFETY ISSUES

The following section develops a list of safety issues observed during site visits, which were not addressed within the TIAs contained within the three Applications for land use redesignation.

8.1. Traffic Operations

School Bus & Haul Truck Operations

School bus and gravel haul operations occur in the am and early pm peak traffic periods. There are 80 school bus trips daily, 40 during the am peak traffic period and 40 during the pm peak traffic period Appendix 2 contains a drawing entitled Gravel Pit Locations and Haul Routes that describes trip distribution for school buses in the area. In addition to operating in the same time periods, school buses make periodic stops on the highway, while gravel haul trucks must operate in a cost-effective mode to ensure on-time deliveries. The safety issue is frequent stops could result in rear-end collisions with school buses due to the longer braking distance of haul trucks.

Safety measures would include restricting gravel haul operations to periods outside of school bus operations. With vehicle-to-vehicle (V2V) capability school bus and gravel haul operations could co-exist in the same time periods, however, this assumes all vehicles would have V2V capability which is unlikely in the next decade.

Operations on Grades

Loaded haul trucks on the long steep grade on Hwy 567 east bound, Hwy 766 south bound and Hwy 772 south bound will slow to approximately 30 km/h at the vertical crests. As the haul trucks slow on the upgrades, platoons will form behind the trucks. The safety issue is that a speed differential of 15 km/h or more can result in rear-end crashes. As well, slow moving queues can result in risky and illegal passing maneuvers by drivers trapped in platoons over long distances.

Measures could have included, if considered, the construction of climbing lanes. While the 15 km/h speed reduction is reached on the long steep grades, it is one climbing lane warrant criteria. The other criterion includes the number of trucks, percent heavy vehicles, tractor trailers, single unit trucks and recreational vehicles. On Hwy 567, the heavy vehicle warrant of 150 veh/day is easily met. In addition, the volume warrant of 1,500 AADT for truck climbing lanes on two-lane highways with a 30% passing opportunity is easily met for Hwy 567.

In summary, the Alberta Transportation climbing lane warrant for Hwy 567 at Hunt Coulee and Big Hill Springs east bound upgrades is easily satisfied on the basis of speed reduction, heavy truck volume/day, and AADT volume warrant based on % grade, length of grade and % heavy vehicles for 30% passing opportunity.

Hidden Intersections

There are several hidden intersections on the highway network as shown in the photos in Appendix 3. The most problematic is the Hwy 567/Bearspaw Road intersection. There is a horizontal curve just east of the intersection, which conceals the intersection for WB drivers. While the intersection is correctly signed with the Concealed Intersection Sign, WB drivers do not have sufficient stopping sight distance if there is a vehicle stopped to make a WB-SB turn at the intersection. It appears the westbound ISD at this intersection is less than 300 metres[9]. In fact, lack of adequate ISD at this location could have been a contributing factor to the fatal crash on September 18, 2017, involving a gravel truck and light pickup truck.

In summary, the safety issue is a concealed intersection with insufficient stopping sight distance for heavy trucks. With the additional trucks expected with the proposed gravel pits, the safety issue will be exacerbated. In such cases a flashing beacon can warn drivers of a concealed intersection, such as the intersection of Hwy 567 and Lochend Road.

[9] It is noted that the stopping sight distance for trucks with conventional braking is 235 – 330 metres for a design speed of 100 km/h.

8.2. Vulnerable Road Users (VRU)

Cyclists contribute to the main VRU group on the highway network. It has been noted in Section 5, that the highway cross sections are inadequate for safe cycling.

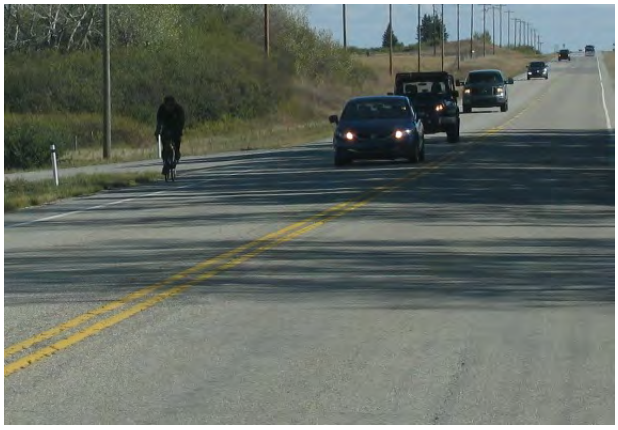

Photo 13: example of vulnerable road user and narrow road shoulders.

While rebuilding the highway network with wider shoulders and wider lanes to safely accommodate cyclists is one option, it would involve a major 4R project to achieve 3.7 m lanes and a minimum of 1.5 metre shoulders. A more cost-effective and far safer option is a multi-use trail system. It is suggested that a separate 3 m pathway within the highway right-of-way would provide the safest and most cost-effective option. Alberta Transportation guidelines for Trails in Alberta Highway Right-of-Way, Policies, Guidelines; and Standards (2015) provide the basic design guidelines for multi-use trails.

9.0 CONCLUSIONS

9.1. Rocky View Aggregate Bylaw

The TIA reports look only at the impact of a single gravel pit development on the road network and fail to cumulatively include other nearby developments or future planned developments.

The TIA reports focusses narrowly on discreet intersections and often fails to look at the overall road network safety issues, in this case the road network that includes the complete haul routes for the gravel pits.

The effectiveness of the TIA depends on the accuracy or the completeness of the data used to build the model. In the case of the three TIAs reviewed, potentially understated expected daily two-way trips of heavy trucks generated by the proposed development will minimize the magnitude of needed improvements to the road network.

Planning for aggregate pits should assume a realistic maximum production even though owners may initially work at a reduced rate of production.

Numbers provided by the developer, which form the basis of TIAs, should be closely vetted against other applicants and/or nearby operating gravel pits, if available, to ensure accuracy. Alternatively, the highway agencies, Rocky View County and Alberta Transportation, themselves could provide these numbers to the developers.

The Joint Transportation Strategy (JTS) improved slightly over original TIAs in estimating daily two-way truck trips generated by the gravel pit developments, however, based on comparison with operating pits and to an economic analysis the number of trips estimated still seems low.

The JTS states estimated daily two-way heavy truck trips generated by the gravel pit developments as an average, which understates the number of heavy trucks in the traffic stream during peak periods.

Cumulative impacts on the greater network are mentioned within the JTS, such as intersection improvements on the greater network and to the requirement for climbing lanes, however, analysis of these issues are all deferred to future subsequent development permit applications.

There is no mention of other critical road network issues that exist today for example concealed intersections, steep grades, inadequate intersection site distances, narrow shoulders, other road users, school bus operations, solutions for platooning, etc.

In summary, the TIA reports and MSDPs, submitted by the Applicants and relied upon by Rocky View County, did not have sufficient information- accuracy of the estimated truck volume numbers used to form the basis of the TIA reports and the cumulative impacts of the proposed developments on the road network- to approve the land use redesignations.

9.2. TIAs and Road Safety

This study has concluded that the Traffic Impact Assessment studies reviewed are narrowly focused on intersection analysis, the outcome of which depends entirely on the, input values, namely the number of trips forecast. The reports reviewed did not consider the explicit value of safety, the wide range of road users, trip types, the operating environment or all parameters of the road network in question such as the steep grades, narrow shoulders, unforgiving roadside and hidden intersections. A comprehensive TIA approach would consider the interaction of all these factors and avoid ascribing crashes to driver error. The TIAs did not comment on operation of school buses in the same time slots as gravel trucks which may contribute to conflicts and crashes. With respect to the highway system, which has steep downgrades on reverse curves and narrow shoulders, the TIAs did not comment on road safety which is exacerbated in icy and snowy conditions. No mention was made of potential safety issues at hidden intersections, where a fatality occurred involving a gravel truck during the course of this study. Finally, the TIAs did not include a discussion of the impact of loaded gravel trucks which will slow to crawl speed on long steep grades resulting in platoons. Impatient drivers delayed on the upgrade and trapped in platoons may make risky overtaking maueuvers. In summary, a more holistic TIA approach to evaluating the impact of an increasing fleet of heavy trucks hauling aggregate on the highways of the Rocky View County would have provided a sounder basis for evaluating the Applications for the re-designation of land-use.

Respectively submitted,

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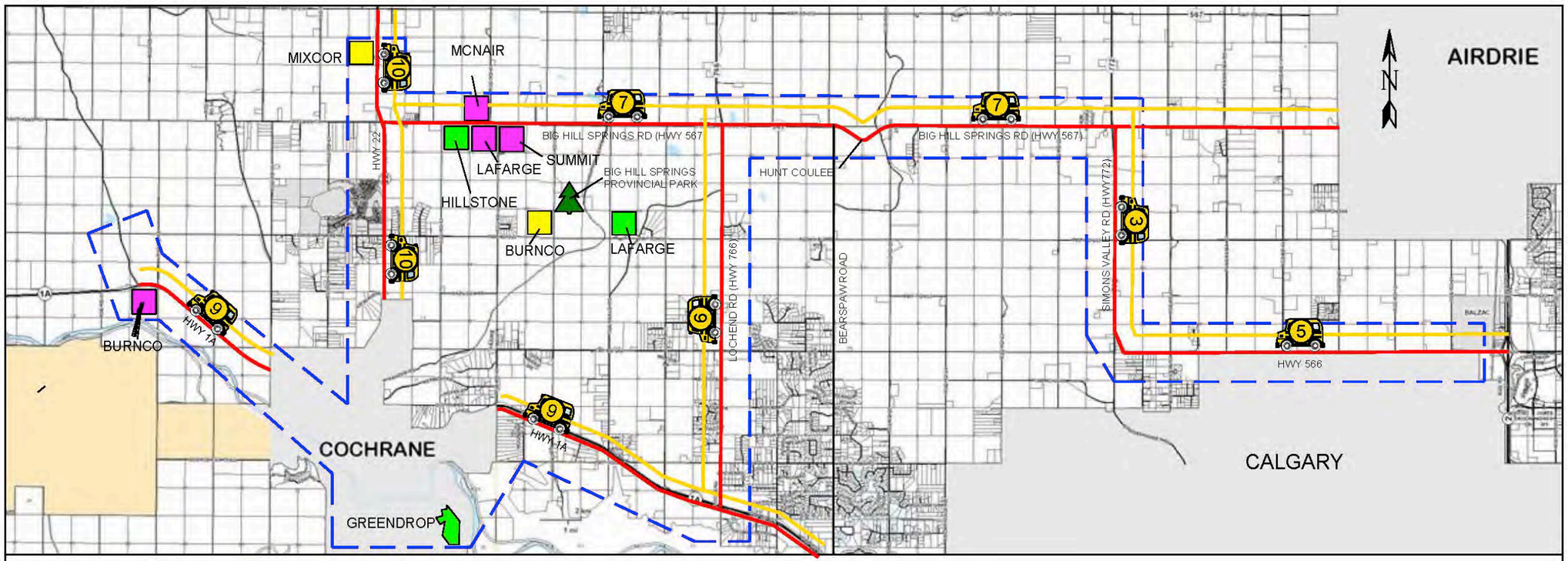
APPENDIX 1

DRAWINGS AND MAPS



LEDGEND

STUDY BOUNDARY
GRAVEL PITS - ACTIVE
GRAVEL PITS - APPROVED
GRAVEL PITS - PENDING
GRAVEL PITS - PLANNED
NO. SCHOOL BUSSES/DAY/HWY
GRAVEL PIT HAUL ROUTES

Date:	Date:	Revisions			
		Date	Rev. No.	Description	By

REVIEW OF TRAFFIC IMPACT ASSESSMENT REPORTS
SUBMITTED IN CONJUNCTION WITH
LAND USE REDESIGNATION APPLICATIONS, and MASTER SITE DEVELOPMENT
PLANS OF LAFARGE, MCNAIR and SUMMIT:

GRAVEL PIT LOCATIONS AND HAUL ROUTES

Date:	Designed:	Checked:	Scale:	Drawing No.:
17/11/17	TPF		NTS	

CANADIAN HIGHWAYS INSTITUTE Ltd

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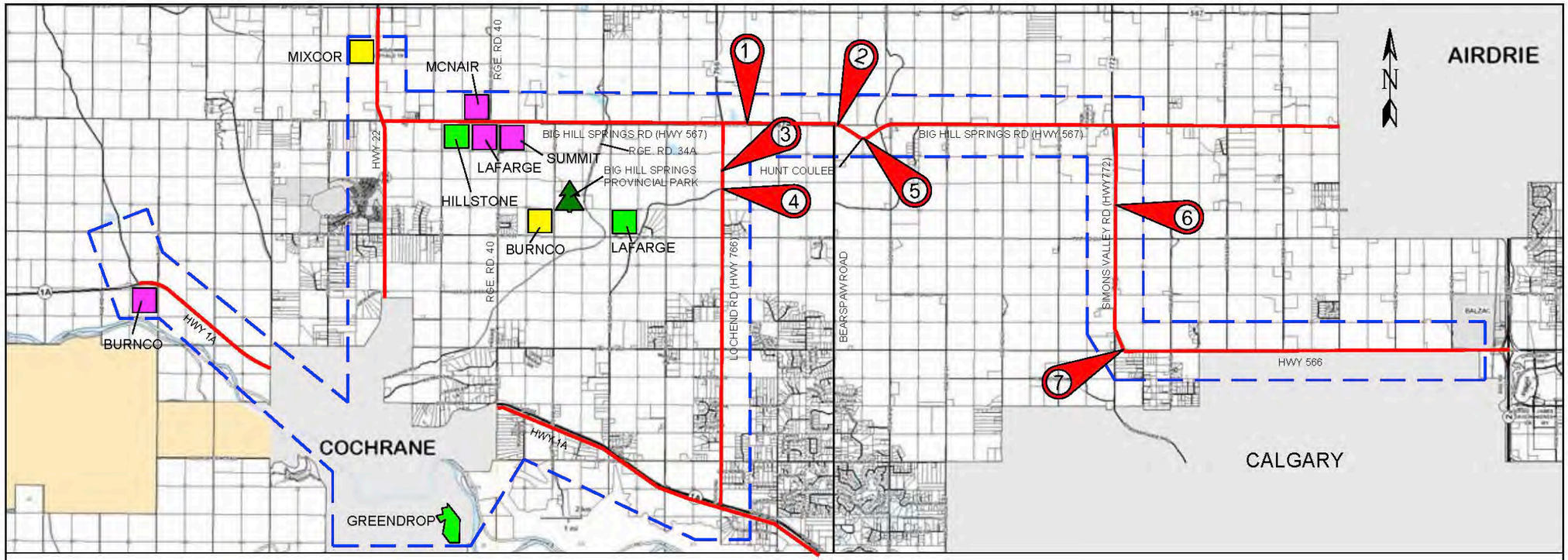

LEDGEND

- STUDY BOUNDARY
- GRAVEL PITS - ACTIVE
- GRAVEL PITS - APPROVED
- GRAVEL PITS - PENDING
- GRAVEL PITS - PLANNED
- GRAVEL PIT HAUL ROUTES
- FLAGS

FLAGS- SAFETY- OPERATIONAL ISSUES

1. SAG CURVE
2. HIDDEN INTERSECTION- FATALITY
3. SAG CURVE
4. HIDDEN INTERSECTION
5. SAG CURVE
6. SAG CURVE
7. LEFT TURN, WITH POOR SIGHT DISTANCE, LEADING INTO REVERSE CURVE , CURVE LEFT AND 45 KM/H ADVISORY SPEED

Date:	Date:	Revisions: Date	Rev. No.	Description	By

REVIEW OF TRAFFIC IMPACT ASSESSMENT REPORTS SUBMITTED IN CONJUNCTION WITH LAND USE REDESIGNATION APPLICATIONS, and MASTER SITE DEVELOPMENT PLANS OF LAFARGE, MCNAIR and SUMMIT:

SAFETY/OPERATIONAL ISSUES

Date:	Designed:	Checked:	Scale:	Drawing No.:
17/11/17	TPF		NTS	

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APPENDIX 2

ECONOMIC ANALYSIS

Gravel Pit Daily Revenues versus Daily Costs

Daily Costs		**per tonne**	**Per Hour**	**11 hour day**	
Royalty to Rockyview County		0.40		415.8	Effective 2018 Alberta Legislation
Gravel Pit Supervisor c/w vehicle			55.00	605	
Weigh Scale person			20.00	220	
5 yd3 rubber tired loader	(on-board scales)		260.00	2860	6 yd3 Lafarge 2017 rate as per their quote to City of Calgary
Stripping & Crushing Costs		3.50		3638.25	
Noise Abatement Monitoring			1.50	16.5	As per their application notes
Dust Control and Monitoring			1.50	16.5	As per their application notes
Rockyview taxes				33	$6000.00 yearly /180 working days as per their application permit
Rockyview Offsite Levy		0.10		103.95	1039.5 tonnes day x $0.10/t
Royalty to Landowner		1.50		1559.25	
Electrical power				7.00	$210.00 monthly
Telephone/fax/internet				7.00	$210.00 montly
Roadway pavement sweeping				20.00	
Reclamation, seeding		0.05		52.00	
Accounting, head office oversight		0.20		207.90	
			338.00	**9762.15**	This Total is only a single pit Input Cost

Revenue Based on Rockyview Permit Application **(McNair & Lafarge)**

63 truckloads @ 33 tonnes each	2079 t	10.00/tonne	**20,790.00**

Based on average per tonne blended price of pitrun, 25mm road gravel, 75 mm drainage rock, etc.

Therefore the Total Input Costs for both pits is $9762.15 x 2 = $19,524.30

APPENDIX 3

PHOTOS

PHOTO 1 Hidden Intersection Hwy 776

PHOTO 2 Wildlife Crossing Hwy 766

PHOTO 3 Junction Hwy 766 & Hwy 567

PHOTO 4 Junction Hwy 766 & Hwy 567

PHOTO 5 Junction Hwy 766 & Hwy 567

PHOTO 6 Junction Hwy 766 & Hwy 567

PHOTO 7 Tandem Truck & Tridem Pup

PHOTO 8 Scooters on Narrow Shoulder of Hwy 567

PHOTO 9 Scooters on Narrow Shoulder of Hwy 567

PHOTO 10 Scooters on Narrow Shoulder of Hwy 567

PHOTO 11 School Bus Sign Hwy 567

PHOTO 12 Hillstone (Big Hill Springs) Gravel Pit Hwy 567

PHOTO 13 Bicycles on Hwy 567

PHOTO 14 Greendrop Gravel Pit Hwy 22

PHOTO 15 Bicycles on Hwy 766

PHOTO 16 Bicycles on Hwy 766

PHOTO 17 Hidden Intersection Hwy 567 WB & Bearspaw Road

PHOTO 18 Hidden Intersection Hwy 567 WB & Bearspaw Road

PHOTO 19 Bicycles on Hwy 567

PHOTO 20 Hwy 567 Big Hill Springs Intersection

PHOTO 21 Hunt Coulee Hwy 567 EB

PHOTO 22 Hunt Coulee Hwy 567 EB

PHOTO 23 Hunt Coulee Hwy 567 EB

PHOTO 24 Tandem Truck & Quad Wagon

PHOTO 25 Hwy 772 & Hwy 566

PHOTO 26 Hwy 566 EB

PHOTO 27 Hwy 566 EB

PHOTO 28 Hwy 566 EB

PHOTO 29 Hwy 566 WB

PHOTO 30 Hwy 566 WB & HWY 772

PHOTO 31 Hwy 567 WB, Trucks EB

PHOTO 32 Hwy 567 WB – Long Sag Curve

PHOTO 33 Hwy 22 NB – Heavy Trucks

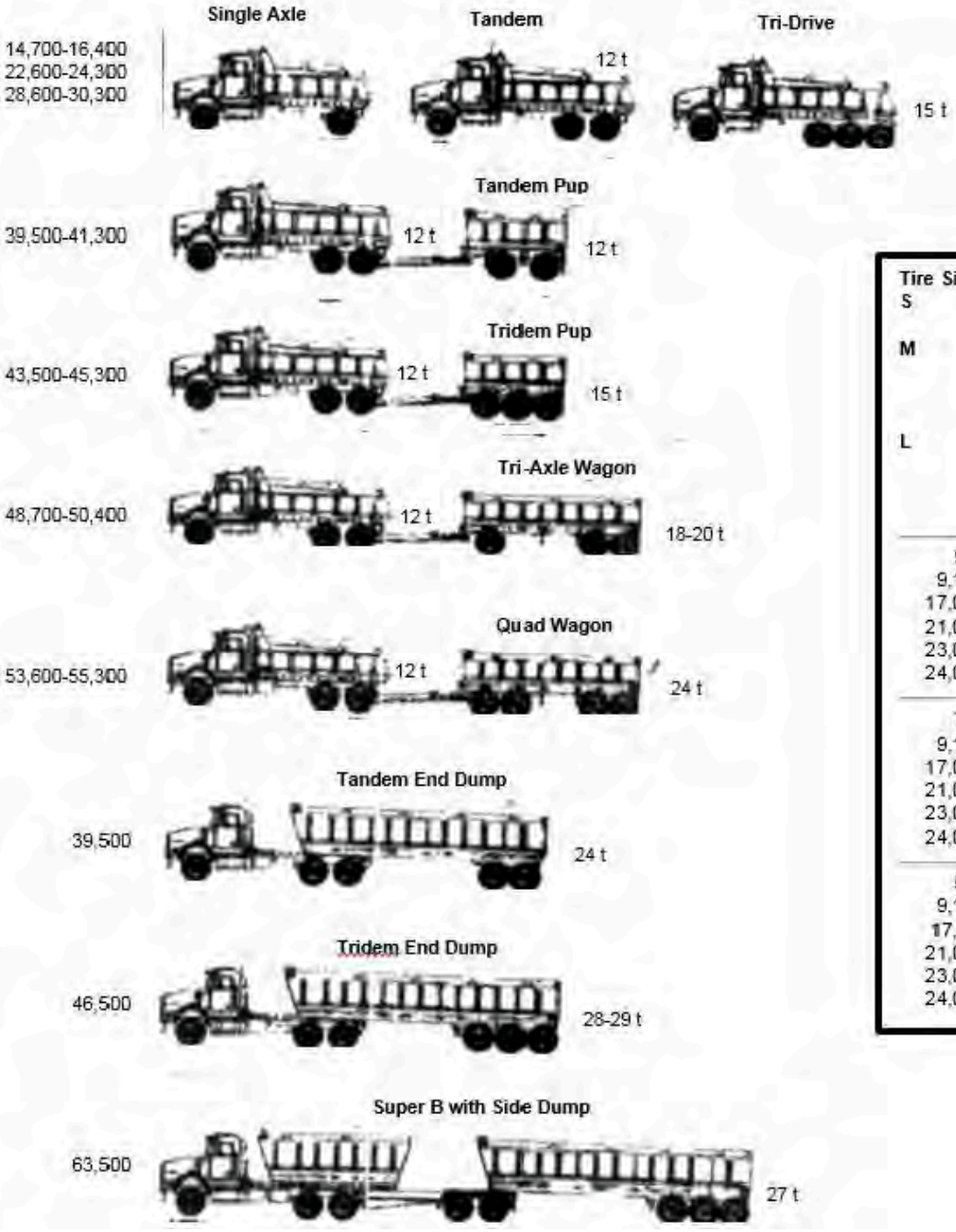
PHOTO 34 Ball-Bank Indicator

APPENDIX 4

AGGREGATE TRUCK TYPES & PERFORMANCE CURVES

AGGREGATE TRUCK MODES OF TRANSPORT

with CORRESPONDING Gross Vehicle Weights



Tire Size	
S	11R – 5,000 kg
M	12R – 6,100 kg 315 – 6,300 kg 13R – 6,600 kg
L	14R – 7,100 kg 365 – 7,300 kg 385 – 7,700 kg (Permit Required)

90% Road Ban
9,100 kg = 8,200 kg
17,000 kg = 15,300 kg
21,000 kg = 18,900 kg
23,000 kg = 20,700 kg
24,000 kg = 21,600 kg

75% Road Ban
9,100 kg = 6,800 kg
17,000 kg = 15,300 kg
21,000 kg = 15,750 kg
23,000 kg = 17,250 kg
24,000 kg = 18,000 kg

50% Road Ban
9,100 kg = 4,550 kg
17,000 kg = 8,500 kg
21,000 kg = 10,500 kg
23,000 kg = 11,500 kg
24,000 kg = 12,000 kg

Geometric Design Guide for Canadian Road
Chapter 3 – Alignment and Lane Configuration

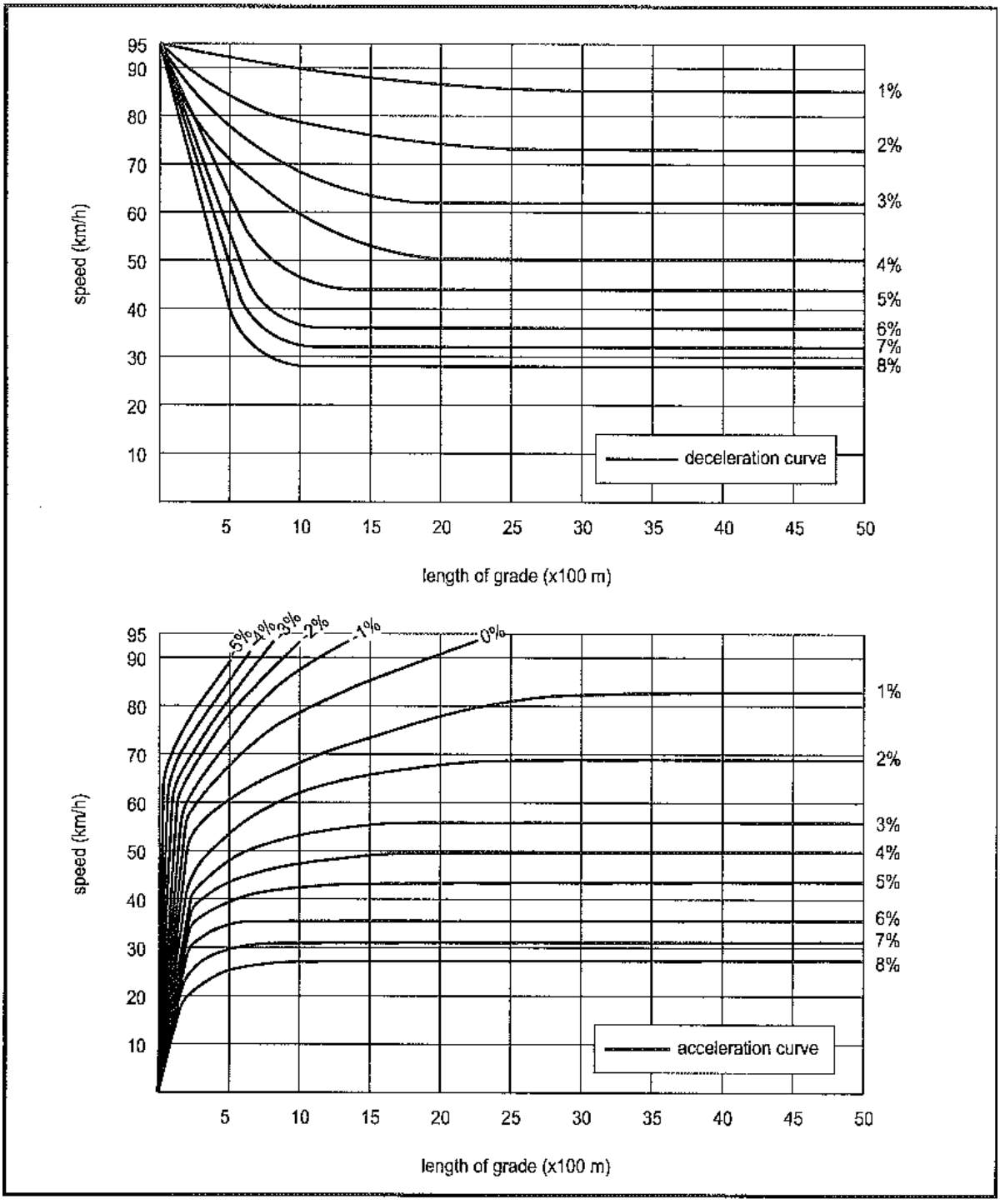


Figure 3.8.2: Performance Curves for Heavy Trucks, 120 g/W, Decelerations and Accelerations[91]

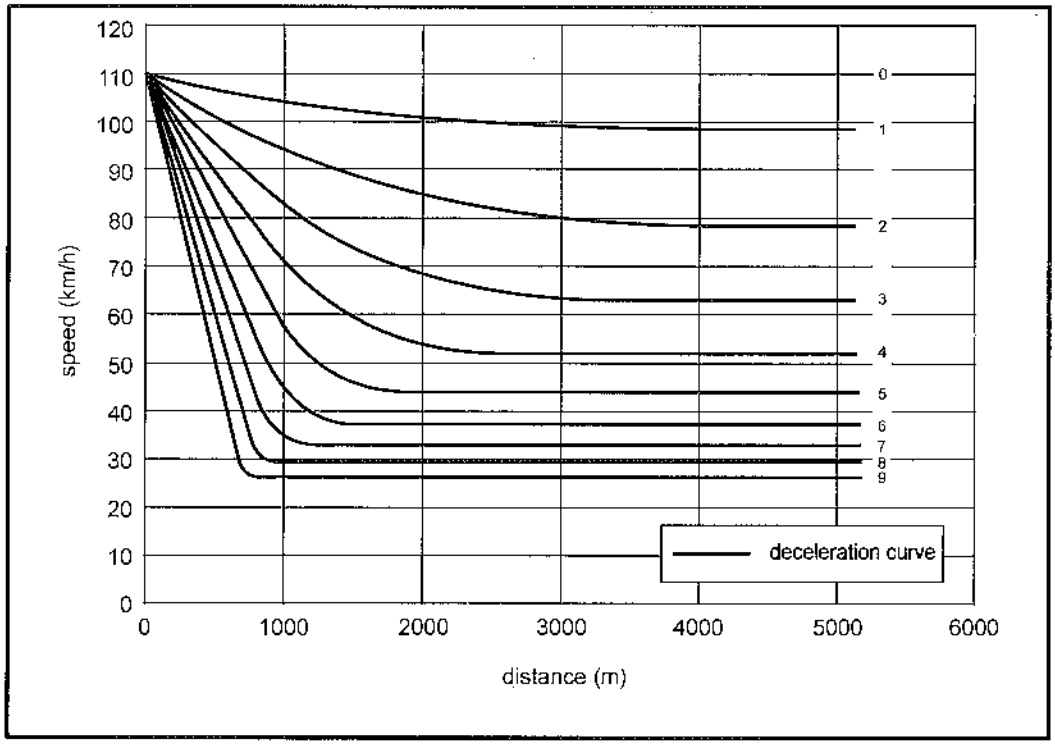


Figure 3.8.5: Performance curve for heavy trucks 120 g/W, Deceleration with 110 km/h entering speed[94]

Table 3.8.1: Lengths of Grade for 15 km/h Speed Reduction[95]

Design Truck Mass/ Power Rating	Percent Grade						
	2	3	4	5	6	7	8
60 g/W	N/A	N/A	740	410	240	190	180
120 g/W	N/A	N/A	440	280	240	200	160
150 g/W	730	360	280	220	170	140	-
180 g/W *	**550**	**340**	**260**	**210**	**160**	**120**	**-**
200 g/W	520	320	260	210	160	120	-

Notes:
1. Length of specified grade in metres at which the designated design truck speed is reduced by 15 km/h from its entry (entry speed assumed to be 95 km/h)
2. Conversion factor: 1 g/W = 1.645 lb/hp
3. Values have been rounded
4. * 180 g/W is normally used for 2 lane highway

Geometric Design Guide for Canadian Road
Chapter 3 – Alignment and Lane Configuration

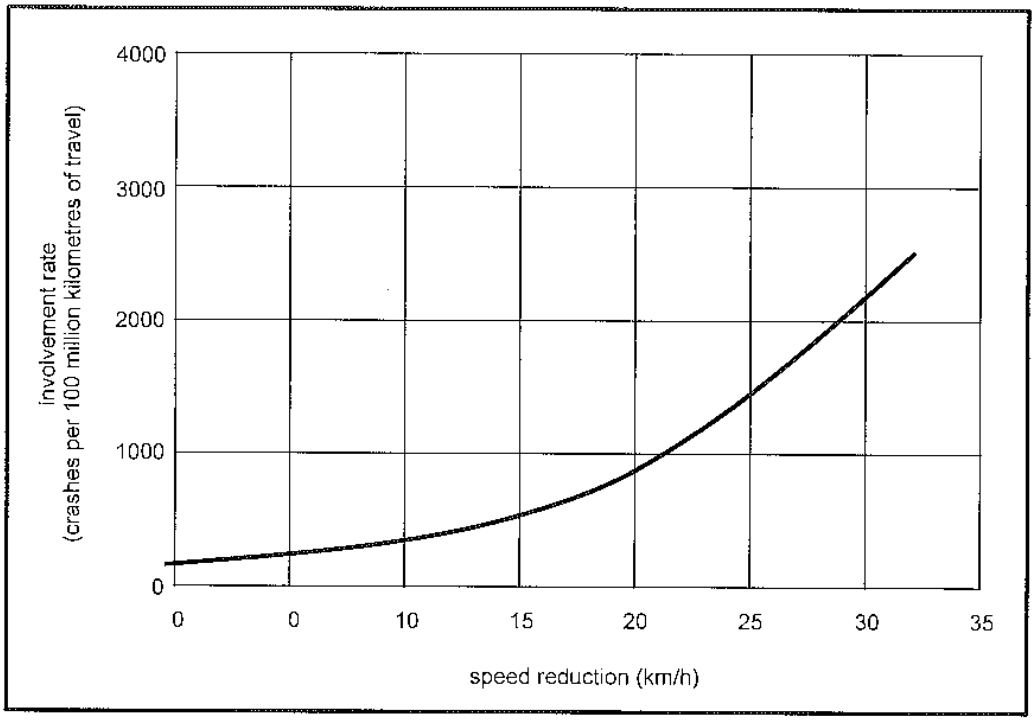


Figure 3.8.1: Collision Involvement Rate for Trucks[90]

In Situ Performance Data of Common Aggregate Hauling Truck

Coco Haulings Ltd/Aly M. Lakha November 11/2017
Mack Granite Tandem Truck with a tri axle pup

GVW	45110 Kgs	16870 Kgs	42890 Kgs	16870 Kgs	43,320 kgs	16870 Kgs	48240 kgs	16870 Kgs
Tare	16870 Kgs	16870 Kgs	16870 Kgs	16870 Kgs	16870 Kgs	16870 Kgs	16870 Kgs	16870 Kgs
Hwy 567	EB	WB	EB	WB	EB	WB	EB	WB
Time	7:19	9:15	9:23	11:20	11:28	1:20	1:28	3:40
Empty/loaded	Loaded	Empty	Loaded	Empty	Loaded	Empty	Loaded	Empty
Speed Big Hill Springs Hill	65 Khp	70 Kph	70 Kph	65 Kph	65 Kph	65 Kph	68 Kph	70 Kph
Speed S Bend	33 Kph	68 Kph	32Kph	68 Kph	29 Kph	68 Kph	29 Kph	68 Kph

Coco Haulings Ltd/Aly M. Lakha November 10/2017
Mack Granite Tandem Truck with a tri axle pup

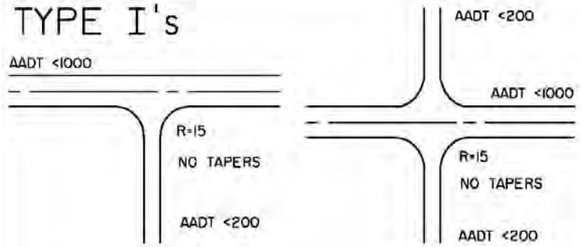
GVW	33,310 kgs	16,460 Kgs	42,890 kgs	16,460 Kgs	43,220 kgs	16,460 Kgs	43620 kgs	16,460 Kgs
Tare	16,460 Kgs	16,460 Kgs	16,460 Kgs	16,460 Kgs	16,460 Kgs	16,460 Kgs	16,460 Kgs	16,460 Kgs
Hwy 567	EB	WB	EB	WB	EB	WB	EB	WB
Time	8:03	10:15	10:25	12:30	12:41	3:05	3:16	4:25
Empty/loaded	Loaded	Empty	Loaded	Empty	Loaded	Empty	Loaded	Empty
Speed Big Hill Springs Hill	55 Kph	68 Kph	70 Kph	70 Kph	72 Kph	70 Kph	68 Kph	70 Kph
Speed S Bend	28 Kph	68 Kph	32Kph	68 Kph	32 Kph	68 Kph	29 Kph	68 Kph

APPENDIX 5

ALBERTA INFRASTRUCTURE

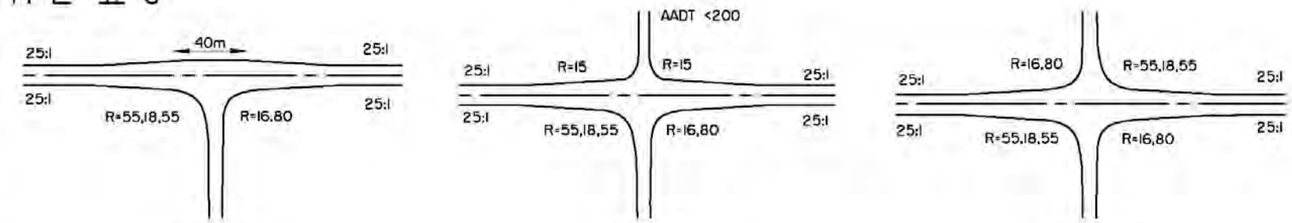
STANDARD AT-GRADE INTERSECTION LAYOUTS

TYPE I's



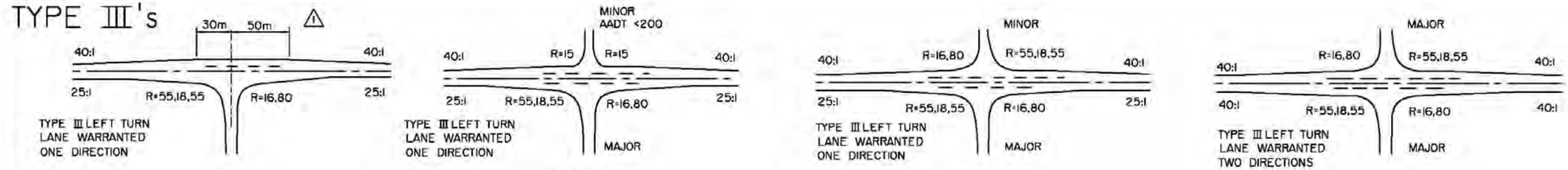
TYPE Ia TYPE Ib

TYPE II's



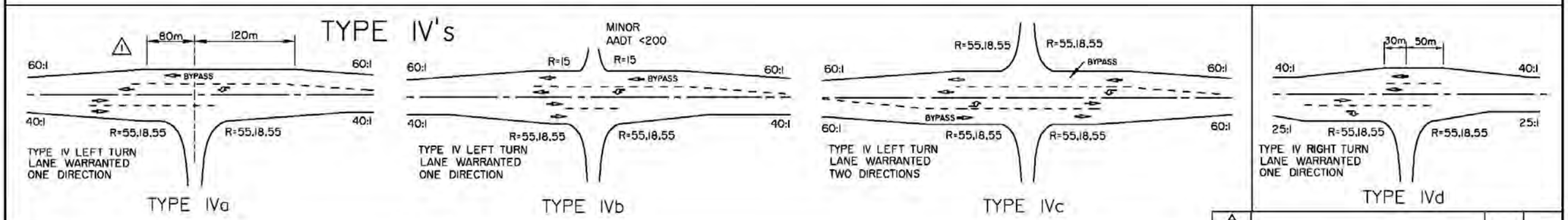
TYPE IIa TYPE IIb TYPE IIc

TYPE III's



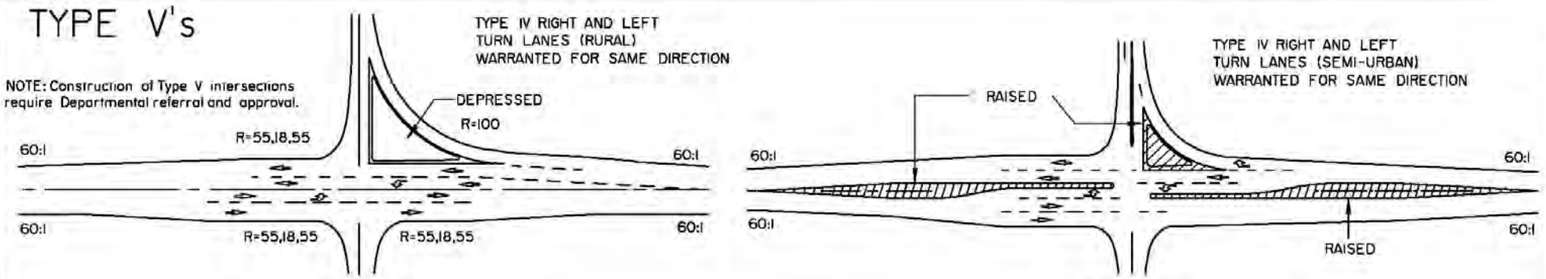
TYPE IIIa TYPE IIIb TYPE IIIc TYPE IIId

TYPE IV's



TYPE IVa TYPE IVb TYPE IVc TYPE IVd

TYPE V's



TYPE Vb TYPE Vc

NOTES:
1. This is not a pavement marking drawing.
2. This figure depicts the typical layouts used for at-grade intersections. Detailed design considerations may dictate some minor alterations for particular intersections. The tapers shown here are typical for a 110 km/h design speed on the main highway.

No.	REVISIONS	BY	DATE
2			
1	REVISED LANE DIMENSIONS	TDN	06/98

Alberta INFRASTRUCTURE

FIGURE D-7.5

Date: APRIL 1995

STANDARD AT-GRADE INTERSECTION LAYOUTS FOR TWO-LANE HIGHWAYS

Prepared By: LT	Checked By: B.K.	Scale: N.T.S.	PAGE D-111

Graphics File: debd75.man

APPENDIX 6

HILLSTONE AGGREGATES TRAFFIC UPDATE

HIGHWAY 567 INTERSECTION REVIEW – 2017 UPDATE

TRANSPORTATION PLANNERS AND ENGINEERS

bunt & associates

March 1, 2017
1397-04

Robert Kelham, P.Eng.
Kelham & Associates Inc.
70 Jewell Street
Red Deer, Alberta T4P 3W3

Dear Rob,

Re: Hillstone Aggregates Traffic Update
Highway 567 Intersection Review - 2017 Update

As requested, this is an update to the traffic work completed by Bunt & Associates in 2012 & 2015 regarding the Hillstone Aggregates site located along Highway 567, east of Highway 22. This update focuses on the warrant for the intersection treatment of the Highway 567 & Hillstone Aggregates site access intersection.

Per the previous analysis, a Type II intersection treatment was warranted at the site access. Recent traffic data was collected for the purpose of reanalyzing the intersection treatment to determine if traffic conditions have changed over the past 2 years to such an extent that alters the previous intersection treatment conclusion. The updated intersection treatment analysis is outlined in this letter.

EXISTING TRAFFIC CONDITIONS

To determine existing traffic at the site access, Bunt & Associates conducted a 48 hour vehicle turning movement count at the intersection of Highway 567 & Hillstone Aggregates site access on Tuesday February 14, 2017. The resulting AADT (Average Annual Daily Traffic) volumes were converted to ASDT (Average Summer Daily Traffic) volumes through increasing volumes proportionately with the Alberta Transportation 2015 AADT & ASDT volume counts along Highway 567 east of Highway 22. Both the AADT & ASDT volumes will be used to analyze intersection treatment in two separate scenarios.

Load counts for the year of 2016 were obtained from Hillstone Aggregates to determine the appropriate site traffic volumes to be added to the 2017 AADT & ASDT volumes and were distributed 80% to/from the east and 20% to/from the west as was done in the 2015 analysis. Monthly load data was converted to loads per day based on the average number of working days per month, assuming 25 weekdays and 4 Saturdays per month (Saturdays are worked from May - October). A concentration factor of 20% was

Bunt & Associates Engineering (Alberta) Ltd.
Suite 400 Southcentre Executive Tower - 11012 Macleod Trail SE, Calgary, AB T2J 6A5 Tel 403 252 3343 Fax 403 252 3323
Calgary Edmonton Vancouver Victoria www.bunteng.com

applied to the calculated loads per day to account for fluctuations of loads per day throughout a month. A summary of the adjusted loads per day is presented in **Table 1.**

Table 0: 2016 Adjusted Loads per Day

Month	Loads	Workdays	Loads per Day	Adjusted Loads per Day
January	342	25	13.68	16.42
February	247	25	9.88	11.86
March	202	25	8.08	9.70
April	507	25	20.28	24.34
May	682	29	23.52	28.22
June	1379	29	47.55	57.06
July	1277	29	44.03	52.84
August	2088	29	72.00	86.40
September	2305	29	79.48	95.38
October	2816	29	97.10	116.52
November	2463	25	98.52	118.22
December	654	25	26.16	31.39

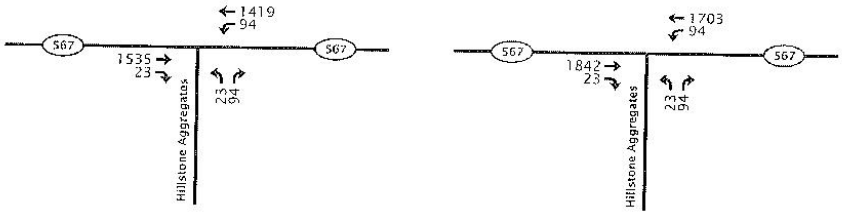
Based on the adjusted loads per day shown above, the 90th percentile daily loads is 117 per day, which translates to 117 trips in and 117 trips out to be added to the 2017 AADT & ASDT volumes.

The summarized Bunt & Associates turning movement count, Alberta Transportation traffic volume history, and Hillstone Aggregates 2016 load count are attached to this letter.

INTERSECTION TREATMENT ANALYSIS

According to the Alberta Transportation Highway Geometric Design Guide, the intersection of Highway 567 & Hillstone Aggregates site access continues to meet the warrant for a Type II intersection treatment in both the 2017 AADT & ASDT volume scenarios. Left turn warrant analysis using peak hour volumes is used to confirm the warranted intersection treatment. The AADT & ASDT volumes used in the intersection treatment analysis are presented in **Figure 1.**

Figure 1 AADT & ASDT Volumes



Left Turn Warrant

AADT & ASDT volumes were converted to peak hour volumes by dividing daily movement volumes by 10 and were then used for left turn warrant analysis. The left turn warrant analysis takes opposing vs advancing volumes and left turn percentage into consideration in determining the appropriate intersection treatment.

The results of the left turn warrant analysis confirmed that a Type II treatment continues to be warranted for this intersection in both the 2017 AADT & ASDT volume scenarios and that the conclusions found in the 2015 analysis remain unchanged.

Right Turn Warrant

To warrant an exclusive right turn lane at a two-lane highway intersection in Alberta, the following three conditions must all be met:

1. Main road AADT > 1800
2. Intersecting road AADT >900
3. Right turn daily traffic volume > 360 for the movement in question.

As only condition 1 is met in both the 2017 AADT & ASDT volume scenarios, an exclusive right turn lane is not warranted at this intersection, though is still advisable given the proportion of heavy vehicle accessing the site as was previously recommended by Bunt & Associates in the 2015 analysis.

All charts and guidelines associated with the above intersection treatment analysis are attached to this letter.

SUMMARY AND CONCLUSIONS

The purpose for the update analysis outlined in this letter was to assess if the Bunt & Associates 2015 study recommendations were still valid at the Highway 567/ Hillstone Aggregates site access intersection as a result of the existing gravel pit extraction operation and volumes on Highway 567.

Based on the updated 2016 traffic information provided by the owner, the analysis confirms that the findings from the original Bunt & Associates 2012 report and 2015 update are still valid and are re-presented here for information purposes:

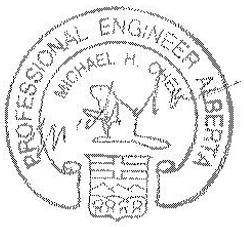
- Upgrade to a Type II intersection design given the propensity for heavy vehicles to be a dominant component of the turning vehicle flow.
- Although not technically warranted based on volume, consider the addition of a separate right turn lane if future distribution of job contracts (and therefore load destinations and return deadhead arrivals) suggests a shift to the west as the primary direction or approach.

This concludes Bunt & Associates' 2017 updated review of the existing impact of the Hillstone Aggregate Gravel Pit site on the intersection of Highway 567 and the site access east of Highway 22. Please call if you have any questions or wish to discuss any issue in further detail.

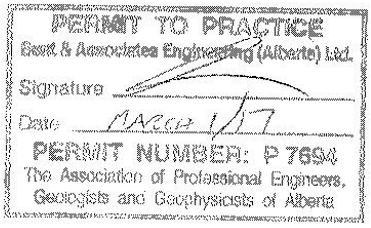
Yours truly,
Bunt & Associates

Michael Chen, P.Eng.
Senior Transportation Engineer

MC/BNJM



March 1, 2017



Intersection Turning Movement Count Summary Hillstone Aggregates Access & Big Hill Springs Road

Count Date: February 14, 2017 Tuesday
Project #: 1337-04

Peak Hour Volumes

Heavy Vehicle Percentage

Daily Traffic Volumes by Movement

Daily Traffic Volumes by Link

ALBERTA HIGHWAYS 1 TO 986
TRAFFIC VOLUME HISTORY 2006 - 2015

Alberta Transportation
Strategy and Policy Branch

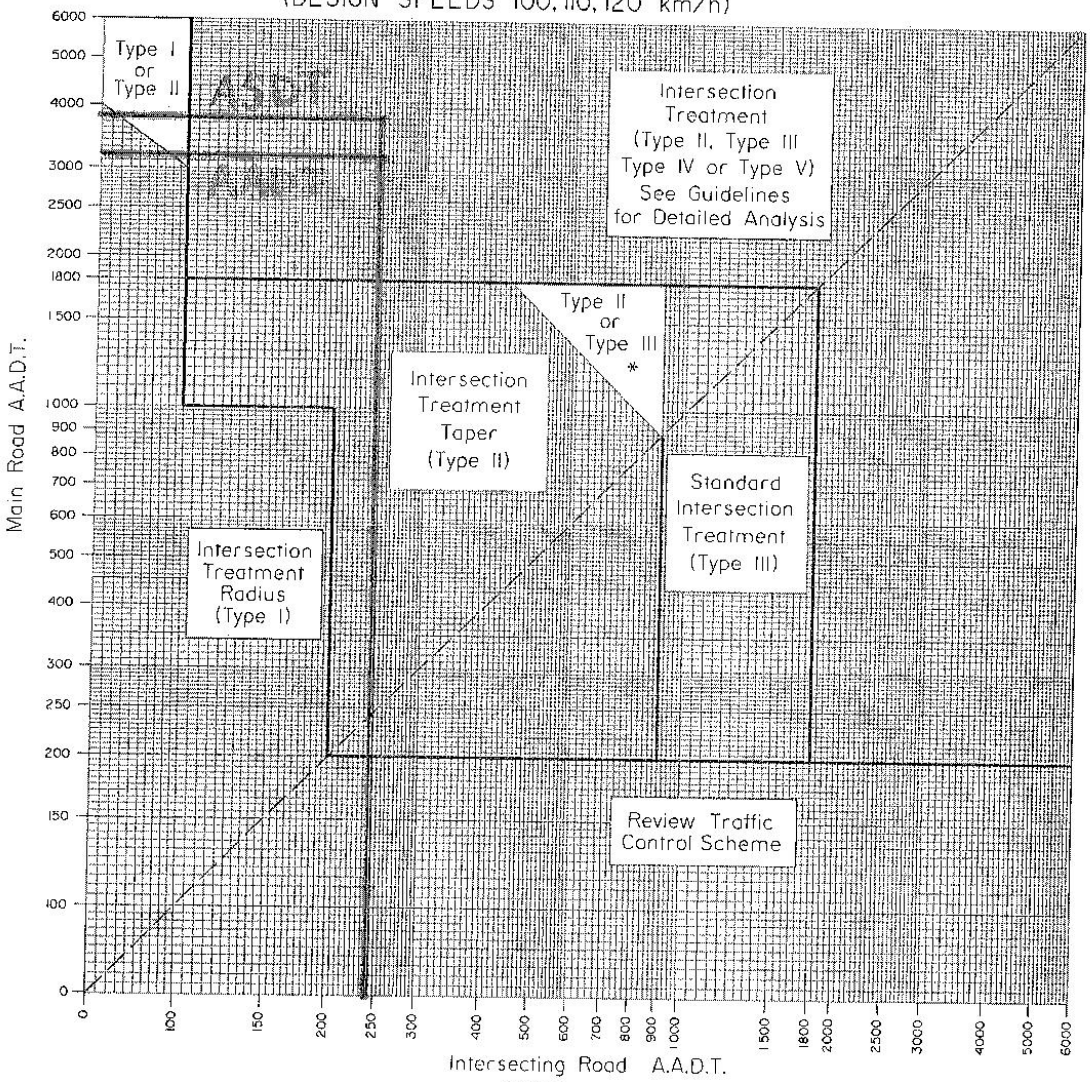
Produced: 18-Feb-2016 By CornerStone Solutions Inc.

Hwy	CS	TCS	Muni	From	2006 AADT	2007 AADT	2008 AADT	2009 AADT	2010 AADT	2011 AADT	2012 AADT	2013 AADT	2014 AADT	2015 AADT	2015 ASDT
564	4	8	Rkyv	W OF 791 EJ N OF DELACOUR								2260	2260	2260	2550
564	4	8	Rkyv	E OF 791 EJ N OF DELACOUR								1980	1980	1980	2240
564	4	8	Rkyv	W OF 9 N OF DALROY	1400	1450	1430	1450	1420	1410	1420	1460	1460	1480	1650
564	6	4	Rkyv	E OF 9 N OF DALROY	1370	1420	1390	1400	1380	1440	1470	1510	1510	1530	1730
564	6	4	WhtL	W OF 817 W OF NIGHTINGALE	1490	1550	1530	1530	1530	1690	1690	1690	1690	1690	1910
564	6	8	WhtL	E OF 817 W OF NIGHTINGALE	1070	1110	1090	1090	1090	1220	1220	1220	1220	1220	1380
564	6	8	WhtL	W OF 21 E OF NIGHTENGALE SJ	940	980	960	940	930	930	930	930	930	920	1040
564	8	4	WhtL	E OF 21 NE OF NIGHTINGALE NJ	440	480	480	480	480	700	700	700	700	700	790
564	8	4	WhtL	W OF 840 N OF STANDARD	330	330	330	360	360	400	400	400	570	570	640
564	8	8	WhtL	E OF 840 N OF STANDARD	130	130	130	280	280	320	320	320	320	320	360
564	8	8	WhtL	W OF 842 NE OF CHANCELLOR	110	110	110	110	110	320	320	320	320	320	360
564	8	12	WhtL	E OF 842 NE OF CHANCELLOR	110	110	110	110	110	330	330	330	330	330	370
564	8	12	WhtL	W OF 56 NE OF HUSSAR	180	180	180	180	180	270	270	270	270	270	300
564	10	4	WhtL	E OF 56 NE OF HUSSAR	240	250	240	230	230	300	300	300	300	300	350
564	10	4	WhtL	W OF TWP RD 260 34-25-18-400000000	170	170	170	170	130	130	130	130	130	140	170
564	10	5	WhtL	N OF RGE RD 182 34-25-18-400000000	90	90	90	90	90	90	90	90	90	90	110
564	10	5	WhtL	S OF 848 SW OF DOROTHY	80	80	80	80	80	80	80	80	80	80	90
564	10	8	WhtL	W OF 848 SW OF DOROTHY	40	40	40	40	40	40	40	40	40	40	50
564	10	8	WhtL	S OF 569 SW OF WESTERN MONARCH	120	120	120	120	120	100	100	100	100	100	120
566	2	4	Rkyv	E OF 772 W OF BALZAC	900	900	900	900	900	940	940	940	960	960	1020
566	3	4	Rkyv	W OF RGE RD 13 9-27-1-500000000	2020	2020	2020	2490	2490	2490	2490	2490	2460	2460	2620
566	3	8	Rkyv	E OF RGE RD 13 9-27-1-500000000	1920	1920	1920	5360	5360	5360	5360	5360	4260	4260	4540
566	4	10	Rkyv	W OF 2 E OF BALZAC	3250	3540	3600	8450	8990	8320	8910	9270	9670	11720	12480
566	4	12	Rkyv	E OF 2 E OF BALZAC	4310	4540	4650	11640	12400	13520	14460	15030	15690	18900	20120
566	4	14	Rkyv	W OF DWIGHT MCLELLAN TR 9-26-29-400000000							6700	6840	6920	7280	7750
566	4	14	Rkyv	E OF DWIGHT MCLELLAN TR 9-26-29-400000000							5960	6080	6150	6450	6870
566	4	14	Rkyv	W OF RGE RD 292 10-26-29-400000000							5960	6080	6150	6450	6870
566	4	14	Rkyv	E OF RGE RD 292 10-26-29-400000000							4490	4590	4620	4820	5130
566	4	16	Rkyv	W OF RGE RD 290 E OF BALZAC 12-26-29-400000000								2780	2800	2850	3220
566	4	16	Rkyv	E OF RGE RD 290 E OF BALZAC 12-26-29-400000000								2570	2580	2600	2940
566	4	16	Rkyv	W OF RGE RD 284 E OF BALZAC 8-26-28-400000000								2340	2340	2340	2650
566	4	16	Rkyv	E OF RGE RD 284 E OF BALZAC 8-26-28-400000000								2170	2170	2170	2450
566	4	16	Rkyv	W OF 791 SW OF KATHYRN	1920	1980	1980	1920	1920	1920	1940	1970	1970	1970	2230
566	4	18	Rkyv	E OF 791 SW OF KATHYRN	1840	1900	1900	1860	1860	1860	1880	1900	1900	1900	2150
566	4	18	Rkyv	W OF 9 E OF KATHRYN	1860	1920	1880	1900	1900	1800	1820	1840	1840	1850	2090
567	2	4	Rkyv	E OF 22 N OF COCHRANE	2720	2810	2830	4440	4440	4320	4380	4420	4420	4620	5490
567	2	4	Rkyv	W OF 766 NE OF COCHRANE	2520	2600	3000	3000	3000	3000	3040	3760	3760	3840	4560
567	2	8	Rkyv	E OF 766 NE OF COCHRANE	2190	2250	2840	2840	2840	2840	2880	3370	3370	3420	4060
567	2	8	Rkyv	W OF 772 W OF AIRDRIE SJ	2860	2980	3080	3080	3080	3060	3080	3080	3080	3140	3730
567	4	4	Rkyv	E OF 772 W OF AIRDRIE NJ	2320	2400	2400	2400	2400	2240	2240	2240	2280	2280	2430
567	6	10	Rkyv	W OF 791 SE OF KERSEY WJ	2300	2300	2300	2300	2300	2470	2470	2470	2470	2470	2790

HILLSTONE
AGGREGATES

Load Count 2016	
Month	Count
January	342
February	247
March	202
April	507
May	682
June	1379
July	1277
August	2088
September	2305
October	2816
November	2463
December	654
Total Loads 2016:	14962

FIGURE D-7.4 TRAFFIC VOLUME WARRANT CHART FOR AT-GRADE INTERSECTION TREATMENT ON TWO-LANE RURAL HIGHWAYS (DESIGN SPEEDS 100, 110, 120 km/h)

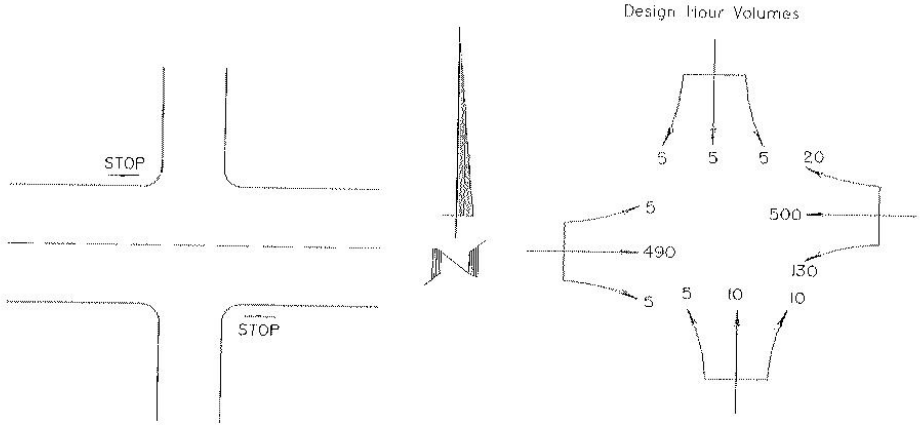


Notes:

1. If main road, or intersecting road, is <100 AADT provide Type I Intersection Treatment (15m radius), except as shown for the higher volume main roads on this chart (Type I or II zone) where engineering judgement may be used to select the appropriate treatment.
2. If main road is >4000 AADT Review Access Management
   - — — If Intersecting Road AADT is > Main Road AADT: Review Traffic Control Scheme
3. Use projected traffic volumes for design
   Sloping line is defined by Main Road AADT x Intersecting Road AADT = 800,000

Example of Chart Use

Given: Two-Lane Highway
Design Speed = 110 km/h
Percent of Trucks in Vℓ = 15%



A left turn lane with suitable storage space is being considered for left turning vehicles on the East approach.

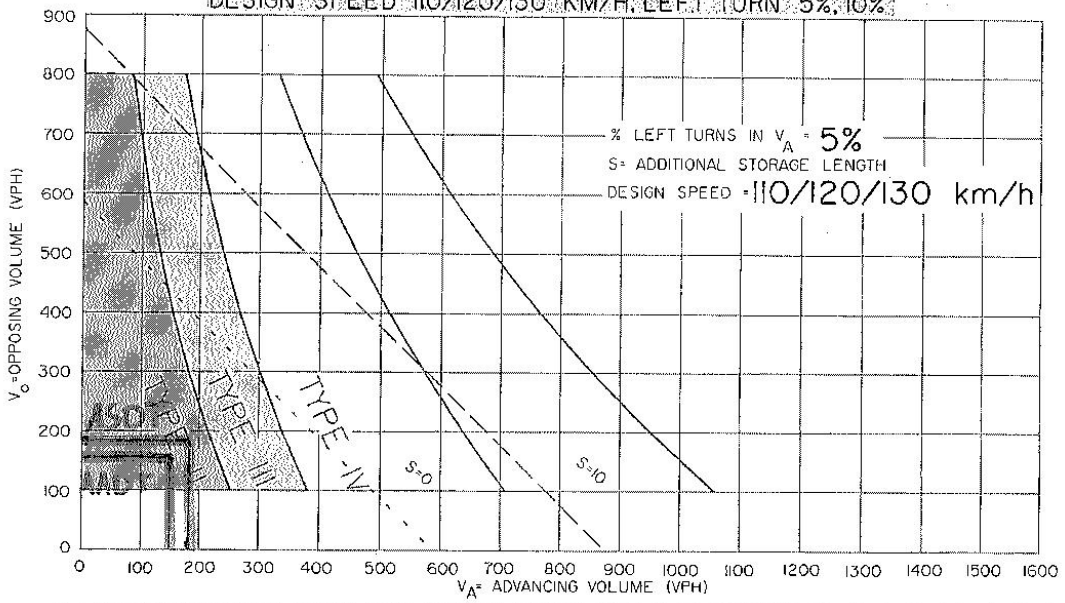
Vℓ	= 130 v.p.h.		(Number of Left Turning Vehicles Per Hour in the Advancing Volume)
Va	= 500 + 20 + 130	= 650 v.p.h.	(Advancing Volume)
L	= Vℓ /Va = 130/650	= 20%	(Proportion of Left Turns in Va)
Vo	= 490 + 5 + 5	= 500 v.p.h.	(Opposing Volume)

Entering chart with
Vo = 500 v.p.h.
Va = 650 v.p.h.
L = 20%

We find from Figure D-7.6-7b that a left turn lane is warranted and the required additional storage space is 35m. Since 15 percent of Vℓ are trucks, from Table D.7.6a, the additional storage requirements due to trucks is 10m. Therefore, a left turn is warranted for this direction and standard intersection Type IVb (Figure D-7k) should be used. An additional storage length of 45m (35m due to volume plus 10m due to trucks) should be added to the left turn lane.

The standard Type IV treatment has 15 m of storage built in due to the design speed, taper and parallel lane (see Table D.7.6b). Therefore the additional storage necessary is 30 m i.e. 45 m - 15 m.

FIGURE D-7.6-7a WARRANTS FOR LEFT-TURN LANES AND STORAGE REQUIREMENTS FOR TWO-LANE HIGHWAYS DESIGN SPEED 110/120/130 KM/H, LEFT TURN 5%, 10%



S = Additional storage length required, that is, in addition to what is shown on the appropriate Type IV standard drawing. Designers should check additional storage requirements for trucks, also see Table D.7.6a.

– – – – Traffic signals may be warranted in rural areas, or urban areas, with restricted flow.

—— —— —— Traffic signals may be warranted in "free flow" urban areas.

Notes:

1. The traffic signal warrant lines are provided for reference only. For detailed analysis of the requirements for signals, contact Roadway Engineering Branch.
2. Warrant for Type I treatment is shown in Figure D-7.4.

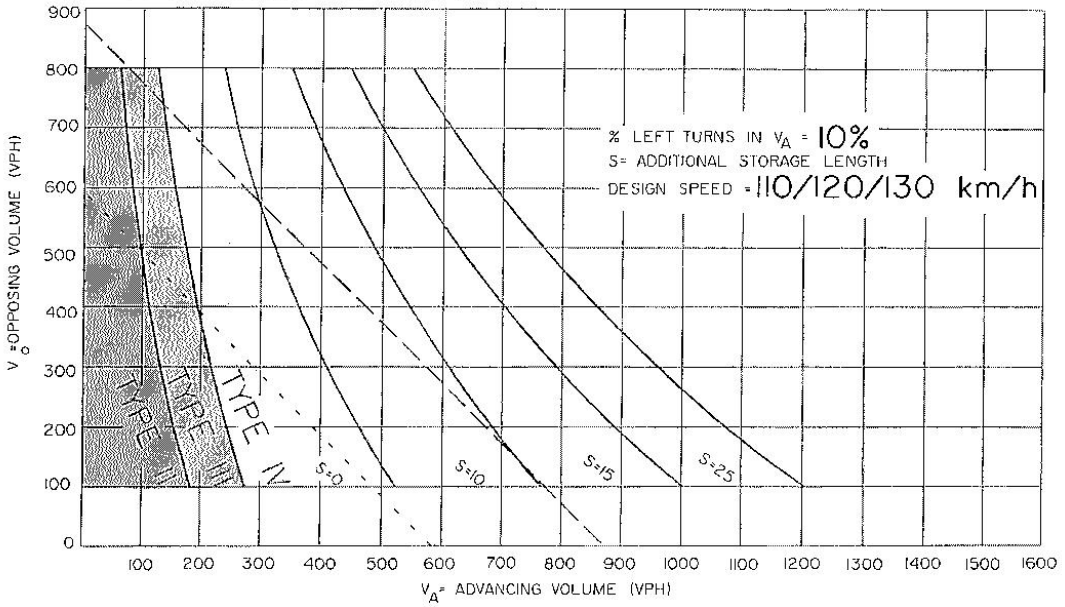


Table D.7.6.1 Warrant Probabilities

Design Speed (km/h)	Assumed 85th Percentile Running Speed (km/h)	Maximum Allowable Probability of an Arrival Behind a Left Turning Vehicle	
		Soft Conversion	Hard Conversion
130/120/110	110	0.005	0.0058
100	100	0.010	0.0089
90	90	-	0.0120
80	80	0.015	0.0151
70	70	-	0.0182
60	60	-	0.0214
50	50	-	0.0245

* Note: The odd numbers are generated due to a hard conversion from imperial units (for design speed) to metric. The odd numbers are used to produce warrant graphs which, if interpolated, would correspond exactly with the imperial graphs. The values used for 50, 60, 70 and 90 km/h are extrapolated. The current Ontario manual uses the same probabilities for each design speed as Alberta.

D.7.7 Warrant for Right Turn Lane

To warrant an exclusive right turn lane at a two-lane highway intersection in Alberta, the following three conditions must all be met:

1. Main (or through) road AADT ≥ 1800
2. Intersecting road AADT ≥ 900, and
3. Right turn daily traffic volume ≥ 360 for the movement in question.

If an exclusive right turn lane is warranted, the standard layout shown on Type IVd (Figure D-7m) should be used. Adjustment to the length of parallel lane may be required if the gradient on the main (or through) highway exceeds two percent. Refer to Table D.6.2.6.

D.7.8 Warrant for Channelization

A channelized intersection may be warranted at intersections that have high through traffic volumes (above 4000 AADT) and one or more predominant turning movements. The need for channelized treatment is site specific. However, where both left and right turn lanes are required, this is usually a good candidate for channelization. The use of channelization is suggested in this case for two reasons:

1. A six-lane flared intersection is very wide, requires additional time for crossing and can be confusing for drivers on the intersecting road.
2. With large numbers of turning movements, there could be excessive delay for vehicles on the intersecting road, which could be reduced considerably by construction of a right turn roadway.

The designer should use the principles in the design of a channelized interseciton as described in Section D.6.3.

Examples of typical channelized intersection layouts for rural and semi-urban environments are shown in Figures D-6.3.6a and D-6.3.6b, respectively.

APPENDIX 7

METHODS FOR ESTABLISHING SAFE SPEEDS ON CURVES

Alberta Infrastructure and Transportation	METHODS FOR ESTABLISHING SAFE SPEEDS ON CURVES	Issued: NOV 2004 Revised: DEC 2006 Page 1 of 4
RECOMMENDED PRACTICES	PART: TRAFFIC OPERATIONS SECTION: SUB-SECTION:	

General

Collision exposure is usually greater along horizontal curves than along tangent sections of a highway. The potential for collisions is significantly increased when the safe travelling speed along a curve is below the posted speed along a tangent segment of the highway.

The safe travelling speed at which a curve may be negotiated is normally established through ball-bank indicator testing.

The established advisory speed must be both realistic and safe, meeting drivers' expectations for a given set of geometric, operational, and environmental conditions. Motorists are advised about safe speeds along curves through the use of an Advisory Speed tab.

Ball-Bank Indicator Testing

Ball-bank indicator testing is the most common and practical way of determining advisory speeds on curves.

During testing, the device is mounted in a vehicle and ball-bank readings are taken at different speeds along a curve to determine safe travelling speed.

The centripetal acceleration developed as a vehicle travels at a uniform speed on a curve causes the ball to roll out to a fixed angle.

At any time, the ball-bank reading indicates the combined effect of a body roll, lateral acceleration angle, and superelevation as shown in Figure 1.

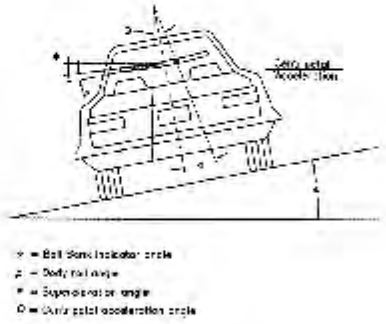


Figure 1 – The effect of the centripetal acceleration acting on a vehicle while traveling along a curve.

Usually several readings are taken at different speeds until a satisfactory speed-angle combination is obtained.

An example of a ball-bank reading is illustrated below in Figure 2.

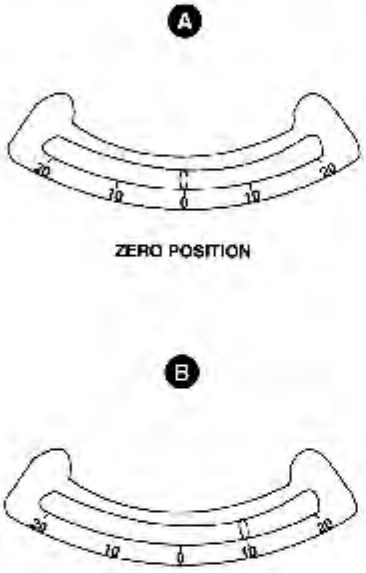


Figure 2 - A display with ball-bank indicator readings.

Table 1 shows the maximum ball-bank reading to be used when determining the maximum safe operating speed.

Table 1

Maximum Ball-Bank Reading	Maximum Safe Operating Speed (Paved surfaces)
10°	Speeds 55 to 100 km/h may be accommodated.
12°	Speeds 40 to 50 km/h may be accommodated.
14°	Speeds 30 km/h or less are accommodated. Curve should be signed for the speed at which the reading occurs.

Source: AASHTO *Policy on Geometric Design of Highways and Streets*

Note: The applicable ball-bank reading should be reduced by one (1°) degree for gravel surfaces.

Types of Ball-Bank Indicators

The two most common types of ball-bank indicators are a manual and electronic indicator.

Figure 3 - Example of a Manual Ball-Bank Indicator

A manual ball-bank indicator consists of a steel ball in a sealed glass tube. Except for the damping effect of the liquid in the tube, the ball is free to roll.

Figure 4 - Example of an Electronic Ball-Bank Indicator

The electronic ball-bank indicator unit has a digital angle display in degrees and often has a feature that allows for the transfer of data to a personal computer.

More information on ball-bank indicator testing is provided in engineering handbooks such as the *Traffic Engineering Handbook* or AASHTO *Policy on Geometric Design of Highways and Streets*.

Testing Procedure

During testing, the ball-bank indicator is mounted to the dashboard with rubber suction cups or by other stable methods. The device position is then adjusted to allow the ball to rest freely at zero degrees when the vehicle is standing on a level surface (i.e., on a tangent section).

Vehicle movement around a curve causes the ball to swing from the zero position (e.g., vehicle movement to the left causes the ball to swing to the right). The faster the vehicle moves around the curve or the sharper the curve, the greater the distance the ball swings away from the zero degree position.

The following steps should be considered during the testing procedure:

1) Testing should start well in advance of the curve being evaluated. The driver should enter the curve at a predetermined speed and should try to maintain the assumed speed throughout the curve. If possible, the car should be centered on a travel lane and driven as parallel as possible to the roadway centerline.
2) The first trial run should be made at a speed somewhat below the anticipated maximum safe speed. Subsequent trial runs are conducted at 10 km/h speed increments.
3) The curve should be driven a number of times until at least two matching ball bank readings (i.e., number of degrees) are obtained for each direction of travel. Testing should be conducted separately for each direction of travel.

Establishing Advisory Speed on a Curve

When establishing final advisory speed, consideration should be given to other factors which may be influencing the operation of vehicles around the curve. These factors include geometric conditions (e.g., available sight distances, presence of intersections, obstructions along the road), predisposition to certain collision types (e.g., run-off-road), traffic distribution (e.g., presence of trucks), environmental conditions (e.g., presence of lighting) and other site-specific operational conditions.

An advisory speed that is too high compromises safety because it increases

the potential for collisions (vehicle stability is impacted). An advisory speed that is too low may result in less driver compliance.

If lower advisory speeds are frequently exceeded by drivers without a risk, problems may arise at locations where curves are severe and the safety margin is reduced.

The average roadway operational and environmental conditions, which the advisory speed is going to represent, also have to be taken into consideration. Dry pavement provides better resistance than wet pavement against the centrifugal force encountered on curves. Also, vehicle characteristics have to be considered (i.e., trucks have a higher centre of gravity, which creates a higher potential for a vehicle roll over).

In general, advisory speeds based on conservative ball-bank indicator readings are sufficiently low to safely accommodate trucks and wet pavement conditions.

Ball-bank indicator testing and establishing safe travelling speed on a curve should be performed by qualified personnel. Proper documentation should also be provided for any future reference.

References to Standards

Recommended Practices Section: Warning Signs	Turn and Curve Signs Reverse Turn and Reverse Curve Signs Winding Road Sign
ITE	Traffic Engineering Handbook
AASHTO	Policy on Geometric Design of Highways and Streets.

Jessica Anderson

From: Harry Hodgson [redacted]
Sent: Friday, July 03, 2020 6:33 PM
To: Jessica Anderson
Cc: Division 9, Crystal Kissel; minister.municipalaffairs@gov.ab.ca
Subject: [EXTERNAL] - Summit Pit File 06731002 / 1004, Application PL20200031 / 34
Attachments: Pit Entrance Silica Warning.jpg; Summit Pit App.JPG

Jessica,

I OPPOSE this proposed expanded gravel pit.

I live less than 750 meters from the proposed pit and I will be negatively impacted. Air quality, noise, traffic and depreciated property value.

I moved here before any gravel pits were mentioned and now there is one existing and several more looking for designation to Natural Resource Extraction.

I have heard first account details from residents living next door to gravel pits in the Bearspaw area. Unable to open windows trying to keep the noise and dust out, but everything is still continuously covered in a layer of fine dust. I have heard of kids waking up in the night unable to breath and bloody noses. Unable to sit out on their deck and have a conversation due to the constant dust and noise.

Alberta gravel has a large percentage of silica. This gets introduced into the air during gravel crushing and when you and I breathe it in, it causes Silicosis. Nobody wants to live next door to a pit, the gravel companies them self are aware of this and at one time posted it at the entrance to their pits. But I live here 7/24 for 365 days a year. See attached PIT WARNING. Alberta Sand and Gravel know how bad it is, they offered Silica Hazard Awareness Sessions but I am expected to live next to the proposed pits.

There is gravel in other locations and where there will be less people opposed to a gravel pit.

This site / Summit application has been overturned by Alberta Courts and still under appeal. How can this proceed?

In the counties last decision the councilors recommended the proposed pits working with the local residents but they have done nothing to improve the situation.

I am not against development, I just believe in ONE pit at a time.

Concerned County Resident,

Harry Hodgson

Jessica Anderson

From: Michelle Mitton
Sent: January 28, 2021 5:59 PM
To: Jessica Anderson
Subject: FW: [EXTERNAL] - Public Hearing C8031-2020 and C8064-2020

MICHELLE MITTON, M.SC
Legislative Coordinator | Legislative Services

ROCKY VIEW COUNTY
262075 Rocky View Point | Rocky View County | AB | T4A 0X2
Phone: 403-520- 1290 |
MMitton@rockyview.ca | www.rockyview.ca

From: Keith Koebisch
Sent: January 28, 2021 5:50 PM
To: Legislative Services Shared
Subject: [EXTERNAL] - Public Hearing C8031-2020 and C8064-2020

Keith Koebisch
271-011 Range Rd 40
RVC

To whom it concerns,

I am writing in reference to my opposition to the two Springback ASPs. Although I am not a nearby resident of these development plans, I am still a RVC resident and will explain why am against them.

It is my belief that development and approval of ASPs has gotten seriously out of hand and that the County is more or less planning using the “shotgun method”. In other words, we will approve a couple dozen ASPs and maybe one or two will be a “hit”. We do not need a MDP to manage the ASPs rather we just need some good sound planning with the support of community and not just the desire of a landowner and developer getting together and trying to hit a home-run with an approved ASP that might not even be built and managed by them, but someone else if they get lucky. Unfortunately that has been considered “planning” by our administrators for far too long.

If the county’s residents want to grow by 15,000 in the next 20 years (not clear if that is even true) it is not logical to approve ASP’s to accommodate many multiples of that number county wide. We are not in a boom cycle now, nor will we be for just as long, if ever. Pipedreams can be expensive! When is the Balzac waterline (the first Cross Iron one) ever going to get paid and by whom? The County has a long history of getting

hosed with default payments, flooding (Langdon, Cochrane Lake etc), off-site-levies higher for existing landowners than developers, etc, etc. Bad Planning all around complicated by now seeing things through before moving on.

Where is that Glenbow, Langdon, Balzac (west)? Now we need to approve Springbank North/South and Elbow Valley. Nothing is started but we also need gravel pits and all the other stuff to build something that isn't coming in a VERY, VERY long time. And in the meantime Calgary doesn't want to grow while we are living our field of dreams. You must be joking? Sadly, someone gets to pay for these grand mistakes. It's us. Me and You!

I want off the merry-go-round. Show the community these plans are working and also see if we like it. Slow managed growth, is much better because it affords one, to have hindsight. Please stop. There is way too much of the tail wagging the dog. On top of it the rush is not appreciated at this time. Pandemic and major recession is on the horizon. We citizens are not on an election cycle. We should be taking baby steps now and getting through difficult times and not planning for the next 200 years.

My final suggestion, even though you won't likely take it, is that administration and elected officials stop having lunch with developers. We can't afford it. Every meal cost us millions, particularly when they generously pay for the meal and do the planning with their team. That team is not on the ratepayer's side and are not accountable to us.

Sincerely,

Keith

Michelle Mitton

From: Keith Koebisch [redacted]
Sent: February 16, 2021 8:59 PM
To: Legislative Services Shared; Jessica Anderson
Subject: [EXTERNAL] - Application # C-8051-2020 Ref# PL2020-0031
Attachments: Summit.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Feb. 16, 2021

Hi, Please see attachment for my letter in opposition of Mt Ash/Summit Pit Application.

Thanks,

Keith Koebisch

Keith Koebisch

271011 Range Rd. 40

Rocky View County, AB

T4C 3A2

Feb 16/2021

To: Legislative Services RVC

Ref. #C-8051-2020 PL 2020-0031

One of our Resident Cougars

Dear Councillors;

I am writing in objection to the proposed Mountain Ash/Summit gravel pit application. There are many reasons to conclude that this particular proposal would rank as the worst locations for such land use.

PROXIMITY TO PARK - The pit would come within about 800m of Big Hill Springs Provincial Park. This park is more of a Provincial Heritage Site than anything else. To me it is like a real version of what one would find at the Glenbow Museum. It is of great cultural importance to the native Indians that used the area extensively for hunting. The pioneers used the area first to gather buffalo bones. A little later it had a significant connection to the original Cochrane Ranch. The springs, which provided very cool, clean water year round, hosted the first creamery in the province and one of the first fish hatcheries. This area was significant enough to achieve "Park" status right at the beginning of the Provincial Park network.

THE SPRINGS – The spring at the Park is the largest in the coulee, which hosts many springs. Its volume, purity (only 300 TDS) and year round flow, account for some of the reasons that this spring is considered as very unique and is said to rank fourth in national importance for springs of this type. We have retained a respected hydrologist and geochemist, Dr. Jon Fennell, to review and comment on what, if any affect, the proposed gravel pit might have on the spring. His report will be presented to you, but for now let's just say that it is alarming!

TOURISM – As you may know, Big Hill Springs Provincial Park was closed for the 2020 season, in order that it may receive a $1.2 million face lift. Apparently the park is TOO POPULAR, so much so that it needs upgrades to manage all the tourists. In 2019 there were nearly ¼ million visitations. During 2020 nearly all parks in the region had a 40% increase in use due to Covid 19. So it is pretty clear that the park, once open again, will attract far more than it had previously and might well be far and beyond the previous visitations. Does anyone in their right mind think that these people will be delighted to be choking on gravel dust and listening to crushers? None of the visitors will enjoy the truck traffic and the prospects of accidents are high, given the location of the park entrance. Peak gravel season coincides

with peak tourist season, so this is a big problem. International tourists should have something to do in Alberta, rather than going directly from YYC to Banff. What does Rocky View have to offer, other than Bass Pro and Bragg Creek Provincial Park? Mr. Kamachi wouldn't want a mega pit 800m from that park, which isn't nearly as significant historically, or environmentally, speaking.

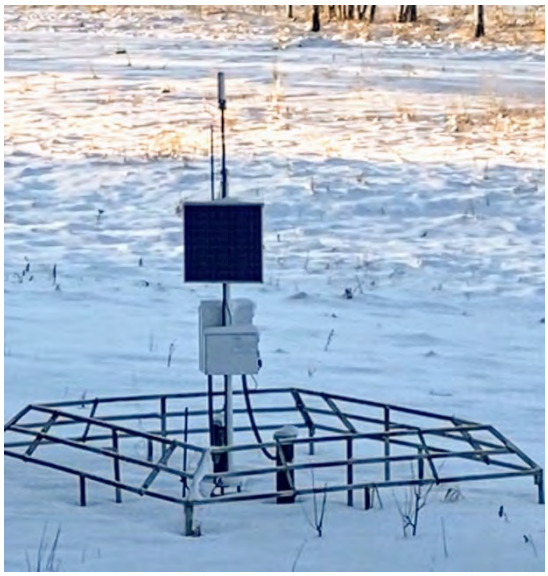
There is information that suggests that the entire coulee be afforded protection. Jo + John Hutchinsons donated 5 quarters to NCC north of #567. The smart thing would be to have a corridor from Cochrane North. It would fit nicely with Glenbow Park, the land along the Jumping Pound that I and some others donated, plus the Wineglass Ranch has been donated to another conservation project. WHERE IS ROCKY VIEW WITH PLANNING?

NIMBY – I know some of you want to write off myself and neighbours as Nimbys and activists. Forget it. We have existing pits, Hillstone and Glenbow, about a 1.5 miles away from the park. They are bad enough, given the horrible condition of Hwy 567, which isn't much more than a hard top county road. I have not written against these pits. Gravel has to come from somewhere and we put up with them, as they are the lesser evil. Ideally the County would promote small borrow pits that are earmarked to specific needs and don't last a lifetime. Spread evenly everyone shares the pain. That's called being fair.

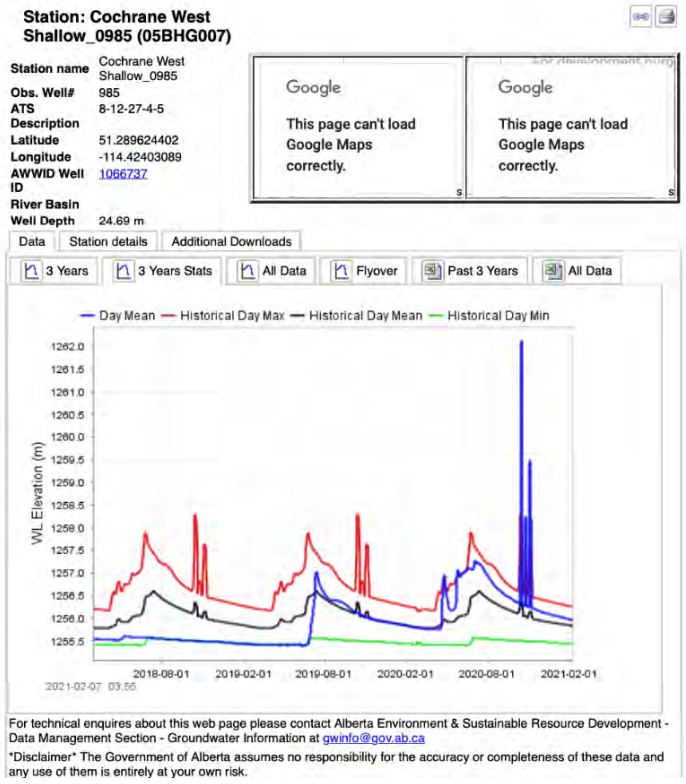
TRAFFIC – We had a Traffic Study prepared, again by a leading Alberta Expert, who has designed many large projects here and internationally. It does not take an expert to understand that this Highway is nothing to write home about. The pit intersects #567 on Range Road 40. The Range Road is FAR below the level of #567, so it has a visibility problem and you need a 4x4 to get onto it in a timely fashion in the winter. This is compounded by a few more problems: First, it is on a correction line, so the intersection is a zig-zag. Secondly, there is a slight hill just to the west of the intersection and though the highway has a double solid line, a lot of people are stupid/ignore it and pass on the right, or left, of slower traffic. It is a complicated long story of what happens next, but believe me, it is super dangerous now and accidents occur regularly. Though it is extremely rare for any vehicle to use Range Road 40 South, this is where the truck traffic for the pit would come from. Lastly pretty much all of #567 is in terrible shape. It was not made for heavy truck traffic, yet now it accommodates the existing pit, is utilized as a Calgary by-pass (unofficial "ring road") and is used by many of the commuters from Cochrane, Cochrane Lake, Water Valley etc. Major intersections along the "haul routes" exceed traffic capacity.

HYDROLOGY – As mentioned earlier, we have a detailed report explaining the significant problems this proposed pit, or others in the area, will create. I would like to add to this, with my 2 cents worth, the proposal of mining gravel to within 1 m of the water table. What level is that exactly? Am I to believe they know what level that should be with their holes in the ground and touting they got all the facts? I have smelled trouble from this industry for some time, so I allowed the Province to put two Ground Water observation wells on my property (See photo and graph). First, the applicant never even looked at this VERY reliable source of data, or overlooked it intentionally. Remember I only live a mile from the proposed mine site. What we see is that in the last 3 years the water table has nearly 4 m of change. The big change was this spring and I tell you it was not a big flood event, compared to other years. I know, because I farm and have a reliable rain gauge I look at every day. One year, I think it was 2004, we got 39 inches just the month of July.

Just the odd bad year of heavy rain, something that might happen more often with climate change, will have disastrous impacts on the pit. They don't want you to consider that. They want the money and don't give a crap about what happens, as long as they aren't on the hook. Operators like this come and go and leave communities with big bills and a mess. The environment is the least of their concerns.



Our Ground Water Observation Well



Our 2018-21 Water Table – Green: historical/ blue: observed

CUMULATIVE EFFECTS – The applicant's consultants figured that is unnecessary to address the cumulative effects, but would look them, if and when they may arise. THEY MUST BE JOKING. So there is an existing pit 800m from them and they didn't notice it? The one proposal for this new quarter section is additional to their first quarter, making it something "EXTRA". They wish to confuse issues by mixing and combining MSDP's. Interestingly they thought this whole issue of cumulative effects is "no big deal", as if they knew what the new County Plan will contain. To me they are putting the cart before the horse and are snubbing their noses at the Court of Queen's Bench Ruling that they, together with the County, LOST.

DUST & NOISE – I live a mile to the north. The prevailing wind direction favours me, except for about a month in early fall when we tend to have south winds. I indeed feel sorry for the poor folks that live downwind and the people that would like to visit the only tourist attraction we have nearby, BHSPP. I live 1.5 miles NW of the existing Hillstone Pit and there is a sizable forest between us as well, yet the noise and dust it emits is often very noticeable - bad enough that the crusher and the beeping reversal indicator can be easily heard indoors. That's something nobody should have to put up with, considering we live here, because we don't want city noises. I take howling coyotes, the odd distant motorcycle, or a gunshot any day over crushers and beeping.

SPECIES AT RISK (Leaving the most important concern for last) – Had the consultant done the slightest amount of research, or literature, review, they would have discovered that the area is home to several Species at Risk, including some covered under endangered species legislation.

It is pretty obvious, not unlike the government ground water wells, that the Provincial Park (one of the first to be established) would have an inventory of biota in the area. One would also ask neighbours and, in particular, ones that do not want a gravel cash cow.
Many of these flora and fauna can be found in the Ecological Land Classification of Big Hills Springs Provincial Park, Alberta.

Species of special Concern – Western Blue Flag, Logger Headed Shrike, Long Billed Curlew, Long Toed Salamander, Prairie Falcon and Golden Eagle.

Threatened Species – Grizzly Bear, Peregrine Falcon and Northern Leopard frog

Endangered Species – Bull Trout and Piping Plover

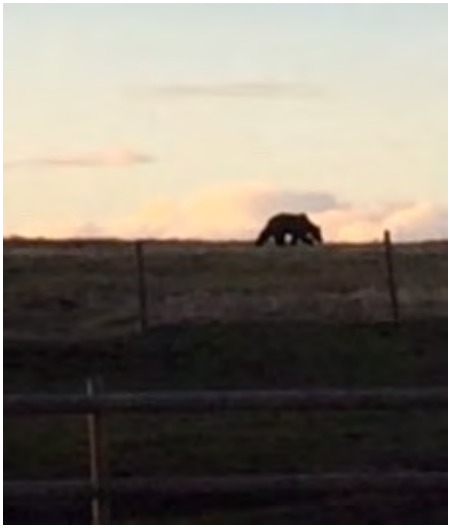
Note: Bull Trout is classified as an Endangered Fish under Alberta Wildlife Act.
Dept. of Fisheries and Oceans protects this threatened Fish and its habitat under Fisheries Act.

You may want to consider what our Hydrology Study has to say. You may also wish to think twice about bulldozing the half dozen wetlands on the mine site and buy "wetland credits". Shame, Shame, Shame. We intend to push this issue as far as needed. The good people of Rocky View and Alberta don't like the idea of disrupting above mentioned species, some of which are symbolic of Alberta itself.

Respectfully Submitted,

Keith Koebisch

Hi,
My name is Brandi Edge and I live at 271170 Range Road 40. This is the north end of RR 40 off of 567. I have been watching the Grizzly move through my place for three years now. The sow originally came through 2019. The pictures I have attached are of one of her 2 first cubs, who came through as yearlings in May 2020. I have heard that she had twins again this year. She is still traveling in this area, as we all keep tabs. This is a natural corridor to the Big Hill Springs coulee for elk, moose, cats, and bears.
Thank you,
Brandi Edge



The Feed Store:

41070 Cook Rd. Bay 7
Rocky View County, Ab
T4C 3A2, Tel. [redacted]

Mailing Address:

[redacted]

12 July 2020

Linda and Morley Kostecky
Box 7 Site 7 RR 2
Cochrane, AB T4C 1A2
[redacted]

Attn: Rocky View County Council Members

Application Number: PL2020031/34 File Number: 06731002/1004

We are writing to express our opposition to this application for land re-designation.

We have owned and operated 20 acres on SW32-26-3W5 (located 800m east of the applicant property) for the past 27 years. We chose this property because of the inherent beauty of the surrounding landscape, the abundant wildlife (drawn to nearby Big Hill Springs Provincial Park), and the agricultural lifestyle of the area. Our home is approx. 1km south of Hwy 567 – far enough that we hear very little highway noise - and because Range Road 35 is a dead-end road just 1.6 long, we have a very quiet, private location.

Since we purchased the property, we have poured "blood, sweat and tears" into improving the house and land, and we have become deeply vested in the neighboring community. It has been an outstanding location to raise our sons and run a small farming operation. However, we feel quite certain that our enjoyment in living here will be seriously curtailed if this application is approved. A re-designation of this neighboring land as Direct Control District (for yet another gravel operation) will make our property much less desirable as "country residential" if we eventually wish to sell.

The applicant property is approximately 800m directly west of our house and in clear line of sight. The strong prevailing west winds make it *impossible* to control the dust from a gravel operation. Despite the "best efforts" of the operators of the Hillstone pit (located 3.2km west) and the Glendale Road pit (located ~1.5km southeast), it is not unusual for us see huge plumes of dust rising from their locations. To illustrate, the first three attached photos were taken from our east deck showing the dust plume from the Glendale Road pit. The fourth photo shows just one of several dust plumes from the Hillstone pit, and with each expansion of that pit we notice a significant increase in the dust in our air, and on our windows, house and yard. These events indicate to us that either the operators do not follow the dust control requirements set by the province, or the operators do follow the requirements but the requirements are not sufficient to protect surrounding landowners. Either way, we are left affected by fugitive emissions from their operations. If these current pit operators are unable to prevent such dust releases, how can we reasonably expect the Summit operation to be any different? We are very apprehensive that a gravel operation located *less than a kilometer away and directly upwind* will make it impossible for us to spend quality time outdoors and also make our indoor living space less safe.

The noise from the operation of large equipment at the applicant site would be seriously noxious after so many years of the peace and quiet that we love. We spend time outside every day working with our sheep and enjoying the natural environment around us. It is very hard to imagine (and it's completely unacceptable) that we would be unable to enjoy outdoor peace and quiet except on weekends when the gravel machinery would not be operating. The portion of the pit directly west of us is also some 20m lower than our land – so their proposed sound berms will provide virtually no sound attenuation in our yard.

The impact of adding dozens of gravel trucks per day on Hwy 567 is also a major concern for us. We must travel east on that road to work in Calgary, and west to shop in Cochrane. It is well known that the highway is extremely busy (and moderately dangerous), particularly in the summer when long lines of motor homes and holiday trailers struggle to maintain speed up and down the coulee at the entrance to Big Hill Springs Provincial Park. Travelling west on Hwy 567 past the entrance to the park, the highway crests a hill, then descends into a short but significant "dip", then rises again to the flatlands beyond. Our access road (Range Road 35) is a left-hand turn at the bottom of that "dip". When a large vehicle has difficulty maintaining speed coming up (west) out of the coulee, a long line of vehicles often forms behind it. As they crest the hill, impatient drivers accelerate to pass while going through the dip. We have had many narrow escapes as we also have our left turn signal on…but we are actually slowing and braking to make the turn onto our access road. If this proposed gravel operation is allowed to proceed, this exact scenario will be repeated further west as trucks attempt to make a left turn onto the Summit property. This will only exacerbate the reckless behaviour of impatient drivers and make it even more dangerous for local residents going about our daily business. The transportation infrastructure is simply not in place to accommodate another gravel operation in the area. We strongly disagree with the applicant's comment that Highway 567 is "ideally suited" for more heavy truck traffic.

Finally, we are very frustrated that this application is proceeding before the appeal to the Court of Queen's Bench (Docket 1701- 12053) has been resolved, and with no County Aggregate Policy in place. Despite our intention to oppose this application, we are unable to be certain that we have done so effectively – since no one knows what the "rules" are in this process. It is illogical to evaluate these aggregate extraction proposals as discreet entities using a Code of Practice that does not address the cumulative effects of the "gravel mall" that seems to be emerging in our area. A 24hr call center will not be helpful to us when it will be impossible to identify which operator is at fault for an offensive issue.

In summary, we are requesting that Rocky View County deny this application for re-designation. This proposal would have a devastating impact on the use and enjoyment of our property. We have worked hard to contribute to the community life of Rocky View County for the past 27 years – we now ask Rocky View County to allow us to continue to do so for many years to come.

Sincerely,

Linda and Morley Kostecky

1 June 2017 7:20am Glendale Pit dust

1June2 2017 10:50am Glendale Pit dust

1June2017 1:25pm Glendale Pit dust

20June 2017 Hillstone dust

Calvin C. and Kim M. Rawn
C.K.R. Farms Ltd.
35095 Big Hill Springs Road
Rocky View, AB T4C 1A2

July 12, 2020

Rocky View County
Jessica Anderson
janderson@rockyview.ca
26075 Rocky View Point
Rocky View County, AB T4A 0X2

File Number: 06731002/1004
Application Number: PL20200031/34
Division 9

Attention Jessica Anderson:

We are the current landowners of NE-31-26-03-W05M which is located directly east of the subject land in the application.

Due to our close proximity to the applicant some issues have come to light. We have brought these concerns to their attention and we are hoping to reach an amicable solution on our own. Unfortunately, **we cannot support this application until the concerns are addressed.**

We would also like to bring a major area of our concern to your attention, this would be outside of the scope of their responsibilities. With the approval of this application, and other applications in our immediate area, a high concentration of traffic will become an issue for us. 90% of the truck traffic from the Summit Pit will proceed east on highway 567 directly past our driveway. And we imagine 90% of the truck traffic from the Lafarge and McNair Pits will also head this direction. Highway 567 is already a major safety concern as it is a very busy thoroughfare**. This is one more reason we cannot support this application at this point in time.** We are not opposed to future development but feel this cannot be done without major safety improvements made to Highway 567 prior to these pits becoming operational.

Yours truly,

Calvin C. Rawn

[redacted]

[redacted]

Rocky View Council
262075 Rocky View Point
ROCKY VIEW COUNTY
Alberta, T4A 0X2

8 February 2021

148 – Gleneagles View
COCHRANE, T4C 1W1
Alberta

Dear Rocky View Council,

Summit Mine – Mountain Ash Limited Partnership
Application PL 2020031
OPEN PIT GRAVEL MINE
By-Law C-8051-2020

I wish to indicate by strong disapproval of the proposed open-pit Gravel Mine as noted above. The SUMMIT PIT is one of several open-pit Gravel operations proposed near Bighill Springs Provincial Park, the upper watershed of the Bighill Springs Creek and, importantly, the known aquifer of these Nationally significant Bighill Springs. The Springs provide constant year-round flows of clear cool water to the creek, are the proven basis for a healthy valley and watershed down-stream to the Bow River in Cochrane and are the basis for our hugely popular Bighill Springs Provincial Park.

The gravel mines would remove protective over-layers of the subterranean aquifer of the Springs and would certainly adversely threaten the water flow to the Springs.

The gravel pit application by Mountain Ash Limited Partnership illustrates its irresponsible environmental concerns. This disregard for the Springs and area has to be vigorously challenged and certainly declined. With the huge presence and proliferation of gravel pits around Cochrane, it is unbelievable that the Mountain Ash Group (and likely others) would focus on the highly sensitive area of the Bighill Creek Watershed and the Bighill Springs/Aquifer.

A 'mis-judgement' by the Mountain Ash Group coupled with an approval by our Rocky View Council would be a National environmental calamity.

I sincerely hope that his Mountain Ash Gravel application for Summit Mine (and others likely to be proposed nearby) will be soundly rejected.

Yours sincerely,

Kenneth J. Stevenson

Kenneth J. Stevenson, Ph.D.
Professor Emeritus of Biochemistry, Department of Biological Science,
Faculty of Science, University of Calgary

Rocky View County
262075 Rocky View Point
Rocky View County AB
T4A 0X2
Nov 16, 2020

VIA EMAIL

RE: Bylaw C-8051-2020
Land Use Bylaw C-8000-2020
Division 9

To: Municipal Clerk:

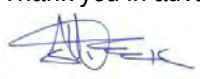
I am writing once again in strong opposition to the above captioned proposed redesignation from Agricultural, General District to Direct Control District to facilitate the creation of a gravel aggregate extraction operations for reasons stipulated below. It should be noted that this is my third letter of opposition to this proposal, the first being issued in 2018.

I am a long-term Rocky View County resident (35+ years) residing on the NW30T26R3W5M located 1.5 miles south of the location in question on rising terrain that sits approximately 100 ft. above the subject sites. I am currently impacted by two existing gravel extraction operations, one located east of Big Hill Springs Provincial Park, the other located 1/2 mile west of Range Road 40 immediately south of Highway 567. I oppose the 1410266 Alberta Ltd. application as it relates to noise, airborne particulate matter, highway traffic impact, property devaluation, and cumulate effect of multiple existing gravel pit operations on myself, my family, and existing rate payers in this part of Rocky View County.

I am asking Council to view this and future similar applications through the eyes of the residents that will bear the impact. I seriously doubt that anyone would argue that there will be no impact; the question then becomes what is reasonable given the current impact of existing operations? Multiple gravel pit operations in a relatively small area is all about individual company competitive edge, and not about the lack of current aggregate supply. I understand that Rocky View County wants to reflect an “Open for Business” philosophy, however in some cases such as this, the very premise of the rural agricultural lifestyle that comprises the vast majority of land within the County, is severely compromised. I would not have moved my family to Rocky View many years ago and contributed to the tax base for this time, had I known that this location would end up as a mining operation. It is my belief that Open for Business can still be accomplished by limiting gravel operations, and not just trying to govern them case by case with the MDP. If we do not say no at this juncture, we will never be able to say no, thus opening up the ground to everyone with a site development plan and a shovel. Is the intent that Rocky View County become the gravel mining supplier to the City of Calgary and the Town of Cochrane? Do the profits of gravel companies outweigh the rural lifestyle and property values of longtime rate payers? I ask, who profits, who loses, and who cares?

I suggest that our elected Councilors are obligated to not only look at the big picture, but also the smaller picture as well. Do the right thing for the right reasons, with the understanding that the existing gravel operations are sufficient to satisfy the demands for aggregate in the medium term. Limit gravel operations to minimize the cumulative impact of multiple open pit mining operations to residents and remain “Open for the BEST Business”.

Thank you in advance for your consideration of my views.



Larry Stock
264160 Range Road 40
Rocky View County AB
[redacted]

Rocky View County
262075 Rocky View Point
Rocky View County AB
T4A 0X2
July 02, 2020

VIA EMAIL

RE: Application File Number: 06731002/1004
Application Number: PL20200031/34
Division 9

To: Jessica Anderson:

I am writing once again in strong opposition to the above captioned proposed redesignation from Ranch and Farm district to Natural Resource Industrial District to facilitate the creation of a gravel aggregate extraction operations for reasons stipulated below. It should be noted that this is my second letter of opposition to this proposal, the first being issued in 2018.

I am a long-term Rocky View County resident (35+ years) residing on the NW30T26R3W5M located 1.5 miles south of the location in question on rising terrain that sits approximately 100 ft. above the subject sites. I am currently impacted by two existing gravel extraction operations, one located east of Big Hill Springs Provincial Park, the other located 1/2 mile west of Range Road 40 immediately south of Highway 567. I oppose the 1410266 Alberta Ltd. application as it relates to noise, airborne particulate matter, highway traffic impact, property devaluation, and cumulate effect of multiple existing gravel pit operations on myself, my family, and existing rate payers in this part of Rocky View County.

I am asking Council to view this and future similar applications through the eyes of the residents that will bear the impact. I seriously doubt that anyone would argue that there will be no impact; the question then becomes what is reasonable given the current impact of existing operations? Multiple gravel pit operations in a relatively small area is all about individual company competitive edge, and not about the lack of current aggregate supply. I understand that Rocky View County wants to reflect an “Open for Business” philosophy, however in some cases such as this, the very premise of the rural agricultural lifestyle that comprises the vast majority of land within the County, is severely compromised. I would not have moved my family to Rocky View many years ago and contributed to the tax base for this time, had I known that this location would end up as a mining operation. It is my belief that Open for Business can still be accomplished by limiting gravel operations, and not just trying to govern them case by case with the MDP. If we do not say no at this juncture, we will never be able to say no, thus opening up the ground to everyone with a site development plan and a shovel. Is the intent that Rocky View County become the gravel mining supplier to the City of Calgary and the Town of Cochrane? Do the profits of gravel companies outweigh the rural lifestyle and property values of longtime rate payers? I ask, who profits, who loses, and who cares?

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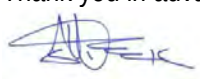
Thank you in advance for your consideration of my views.



Larry Stock
264160 Range Road 40
Rocky View County
[redacted]

July 9, 2020

Rockyview County
262075 Rocky View Point
Rocky View County, AB
T4A 0X2

RE: Mountain Ash Limited Partnership's Application PL20200031-4 -- LETTER OF SUPPORT

To Whom It May Concern:

This is a letter expressing Boothby Ranches Ltd. SUPPORT of the application for land use re-designation by Mountain Ash LP for the Summit Pit (PL2020031-4). We believe the responsible extraction of gravel in accordance with municipal and provincial regulations currently in place should be permitted to develop as local markets demand; both to reduce mileage of haul routes and to offer competitive aggregate prices to the citizens of Division 9.

Sincerely,

Dana Boothby
President

Boothby Ranches Ltd.
#3 Montenaro Bay
Cochrane, AB
T4C 0A5

Buckley Ranch Aggregate Development Inc.

July 8, 2020

Rocky View County
Planning Services Department
262075 Rocky View Point
Rocky View County, AB
T4A 0X2

Attention: Jessica Anderson – Municipal Planner (via email at janderson@rockyview.ca)

Re: MALP Application for the Summit Pit - PL20200031-4 Redesignation and MSDP

Ms. Anderson:

Buckley Ranch Aggregate Development Inc. (BRADI) is the owner of SE 1-27-4-W5M, which is in close proximity to the subject lands at NW 31-36-3 W5M and SW 31-26-3 W5M.

This application by Mountain Ash Limited Partnership (MALP) is consistent with the expectations of BRADI, that all pits (existing and proposed) maintain and be held to the same standards in their applications, approvals, and subsequent development and operations activities. Therefore, BRADI has no objections and supports these applications for land use redesignation and MSDP approval by Rocky View County.

Regards,

Michael Buckley

President

Buckley Ranch Aggregate Development Inc.

Michelle Mitton

From: Clint Giles [redacted]
Sent: Sunday, February 14, 2021 3:39 PM
To: Legislative Services Shared
Cc: Tige Brady
Subject: [EXTERNAL] - BYLAW C - 8051-2020
Attachments: Gravel Pit Support Letter.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

To Whom It May Concern,
Please see the attached letter in regard to the above subject.

Thank you,
Clint Giles

Feb. 14, 2021

BYLAW C-8051-2020

To Whom it May Concern,

My name is Clint Giles of Circle J Ranches Ltd, we farm north of 567 and our land reaches down to NW 6 - 27 - 3W5. I am writing this letter to show my support of the proposed aggregate operation.

My family has farmed in this location for four generations, we have seen many changes and growth in the area. We have never opposed any acreage development or oil and gas development or commercial development.

When you live next to a city the size of Calgary, we have always thought you have to expect changes.

We have operating gravel pits in the area already and gravel is necessary for growth. It is good for the County's tax base.

Years ago, there was gravel pit on the intersection of 567 and Range Road 34 which has been reclaimed and only the older residents, like my family knew it was there.

So in closing I am in full support for the development of the aggregate operation in question. I have been in close contact with Tige Brady and Carol and Bruce Waterman and I am confident that things will be done properly.

Sincerely,

Clint Giles (for Circle J Ranches Ltd.)

[redacted]

Dear Jessica,

My name is Clint Giles and own and farm land north of the proposed Summit Pit located at NW Section 6-27-3-W5. I have been in contact with Tige Brady, Client Representative for Mountain Ash Limited Partnership, namely Bruce and Carol Waterman whom are the owners of the proposed Summit Pit located on the west half of Section 36, Township 26, Range 3, west of the 5th meridian. I am writing this email in support of the above mentioned application.

I have had several conversations with Tige regarding this project over the last few years. The most recent application and previous applications, as presented and discussed with me, represents a holistic and responsible approach to gravel extraction in the area. MALP has made commitments with in their application to mitigate the impacts on my property both socially and environmentally. Some of these mitigative measures include, continuous 24hr noise and dust monitoring, sight and sound berm along highway 567 with landscaping, paving a portion of Range Road 40 and upgrading the intersection at RR40 and highway 567 to a Type IV intersection; most importantly an honest commitment to engage the community on an ongoing basis to ensure adverse impacts are being addressed in a timely and appropriate manner.

Regards,

Clint Giles
Circle J Ranches Ltd.

RE: Support Letter
MALP Land Use and MSDP Application – PL20200031-4

Dear Jessica,

My name is Bill Hartman and I live north of the proposed Summit Pit; My location is section 6, (160 acres SE/4 and 60 acres NE/4) of Section 6, Township 27, Range 3, west of the 5th meridian. I have been in contact with Tige Brady, Client Representative for Mountain Ash Limited Partnership, namely Bruce and Carol Waterman whom are the owners of the proposed Summit Pit located on the west half of Section 36, Township 26, Range 3, west of the 5th meridian. I am writing this email in support of the above mentioned application.

I have had several conversations with Tige regarding this project over the last several years. The most recent application and previous applications, as presented and discussed with me, represents a holistic and responsible approach to gravel extraction in the area. MALP has made commitments with in their application to mitigate the impacts on my property both socially and environmentally. Some of these mitigative measures include, continuous 24hr noise and dust monitoring, sight and sound berm along highway 567 with landscaping, paving a portion of Range Road 40 and upgrading the intersection at RR40 and highway 567 to a Type IV intersection; most importantly an honest commitment to engage the community on an ongoing basis to ensure adverse impacts are being addressed in a timely and appropriate manner.

Regards,

M Hartman

Bill Hartman July 26/2020

LAFARGE

July 10, 2020

Rocky View County
Planning Services Department
262075 Rocky View Point Rocky View County, AB T4A 0X2

Attention: Jessica Anderson, Municipal Planner

Re: Re-designation and MSDP Application - PL20200031-4 (File 06731002/1004)

Lafarge Canada Inc. is the owner of NE 36-26-4 W5M, which is directly west to the subject lands located at NW 31-36-3 W5M and SW 31-26-3 W5M. MALP has shown a great effort and commitment to work with adjacent landowners and gravel operators to mitigate and address and cumulative effects of their proposed operations. Lafarge has no objections and supports MALP's application for land use re-designation and MSDP approval by Rocky View County.

Sincerely,

J Weslowski

Jennifer Weslowski
Land Manager, GCA & WCAN Cement

Lafarge Canada Inc.
2213 – 50th Avenue S.E., Calgary, Alberta T2B 0R5
Phone: (403) 351-9022 Fax: (403) 278-6147

Volker Stevin Highways Ltd.

July 10, 2020

By EMAIL:

Rocky View County – Planning Services
Attn: Jessica Anderson (janderson@rockyview.ca)

RE: Mountain Ash Limited Partnership MSDP Application PL20200031-4

Dear Ms. Anderson,

We understand Mountain Ash Limited Partnership (“MALP”) has applied for approval of their Master Site Development Plan “The Summit Pit” (application PL20200031-4). Volker Stevin Highways Ltd (“VSH”) is currently in the process with Rocky View County to subdivide and subsequently develop a 10-acre parcel off RR40 adjacent to the proposed development of The Summit Pit.

This letter is to confirm to Rocky View County that VSH supports this application, provided that at the time a Development Permit is issued for Phase 4 and 5 (and RR40 is temporarily closed) MALP provides and maintains a temporary all weather access road to our Highway Maintenance Yard to ensure our operations are not negatively impacted.

To this end we would suggest Section 27 of the MSDP document to include a policy statement reflecting a commitment to provide alternate access to adjacent lands whenever mining of the statutory road allowance proceeds. There is currently no mention of alternate access; Section 27 only speaks to reconstructing the road post extraction.

We would like to mention we have had several constructive conversations with MALP in which they confirmed their willingness to accommodate such a temporary access road.

Please contact me directly if you have any questions.

Best regards,

Marcel Rijkens
General Manager

7175 - 12th Street SE, Calgary, AB T2H 2S6
Reception: 403-571-5800
Fax: 403-571-5875

24 HOUR EMERGENCY LINE: 1-888-VS-ROADS (1-888-877-6237)

TRICYCLE LANE
RANCHES LTD.

Main Floor, 155 Glendeer Circle SE
PO Box 1480, Station T
Calgary, Alberta T2H 2P9

www.tricyclelane.com

Tel 403.640.9355

July 13, 2020

DELIVERED VIA EMAIL

Rocky View County
262075 Rocky View Point
Rocky View County, AB, T4A 0X2

Attention: Jessica Anderson, Planning Services Department

Dear Ms. Anderson:

Re: File 06731002/1004 Application PL20200031/34

As the owner of the neighboring parcels: SE31-26-3W5, NE30-26-3W5, and SW32-26-3W5; Tricycle Lane Ranches Ltd. supports the Master Site Development Plan and redesignation from Ranch and Farm District to Natural Resource Industrial District of the subject lands in applications PL20200031/34.

Responsible aggregate resource extraction should be encouraged in this area to avoid sterilization of a valuable natural resource.

Sincerely,

Tricycle Lane Ranches Ltd.

For - Scott Burns CEO

SMB:US

Volker Stevin Highways Ltd.

February 9, 2021

By EMAIL:

Rocky View County – Planning Services
Attn: Jessica Anderson (janderson@rockyview.ca)

RE: Mountain Ash Limited Partnership MSDP Application and Land use re-designation (PL20200031-4)

Dear Ms. Anderson,

We understand Mountain Ash Limited Partnership ("MALP") has applied for approval of their Master Site Development Plan "The Summit Pit" as well as land-use redesignation (application PL20200031-4). Volker Stevin Highways Ltd ("VSH") has recently acquired a 10-acre parcel off RR40 adjacent to the proposed development of The Summit Pit.

This letter is to re-confirm to Rocky View County that VSH supports this application subject to the condition if at any point in time mining under the statutory road allowance is approved VSH would require alternate access to its property. In our letter dated July 7 we pointed out there was no mention of temporary alternate access for adjacent landowners in the MDSP; Section 27 only speaks to reconstructing the road post extraction.

We would like to mention we have had several constructive conversations with MALP in which they confirmed their willingness to accommodate such a temporary access road.

Please contact me directly if you have any questions.

Best regards,

Marcel Rijkens
General Manager

7175 - 12th Street SE, Calgary, AB T2H 2S6
Reception: 403-571-5800
Fax: 403-571-5875

24 HOUR EMERGENCY LINE: 1-888-VS-ROADS (1-888-877-6237)