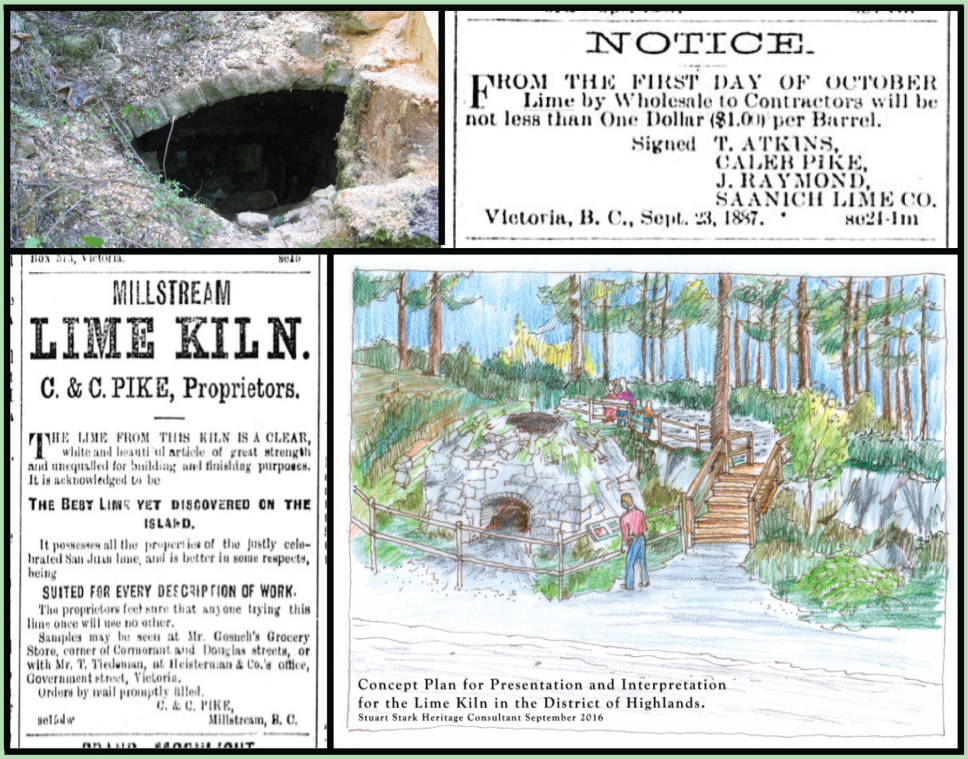
The Highlands Lime Kiln: A Rare Survivor



NOTICE.

FROM THE FIRST DAY OF OCTOBER Lime by Wholesale to Contractors will be not less than One Dollar ($1.00) per Barrel.

Signed T. ATKINS,
CALEB PIKE,
J. RAYMOND,
SAANICH LIME CO.

Victoria, B. C., Sept. 23, 1887. s021-1m

Box 374, Victoria. s040

MILLSTREAM

LIME KILN.

C. & C. PIKE, Proprietors.

THE LIME FROM THIS KILN IS A CLEAR, white and beautiful article of great strength and unequalled for building and finishing purposes. It is acknowledged to be

THE BEST LIME YET DISCOVERED ON THE ISLAND.

It possesses all the properties of the justly celebrated San Juan lime, and is better in some respects, being

SUITED FOR EVERY DESCRIPTION OF WORK.

The proprietors feel sure that anyone trying this lime once will use no other.

Samples may be seen at Mr. Gosnell's Grocery Store, corner of Cormorant and Douglas streets, or with Mr. T. Tiedeman, at Heisterman & Co.'s office, Government street, Victoria.

Orders by mail promptly filled.

C. & C. PIKE,
Millstream, B. C.

se15dw

Concept Plan for Presentation and Interpretation for the Lime Kiln in the District of Highlands.
Stuart Stark Heritage Consultant September 2016

September 2016

STUART STARK & Associates

Heritage Building Restoration Consultants

Research, Planning, Design, Coordination and Implementation for Historic and Traditional Building Interiors and Exteriors

909 WOODHALL DRIVE, VICTORIA, B.C. V8X 3L7 CANADA
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STUART STARK & ASSOCIATES IS A DIVISION OF CHARLES RUPERT DESIGNS LIMITED

The Highlands Lime Kiln – A Rare Survivor

Contents:

Introduction and Intent of this report:

This report is intended to aid in the preservation of the historic Highlands lime kiln, one of only two examples of a very rare type of early industrial building in Greater Victoria. The kiln is situated beside the Highlands District offices, off Millstream Road, District of Highlands, Vancouver Island, B. C. The limekiln is located partially on District Land, and partially on private land owned by Ecoasis Development LLP.

A meeting was held onsite on August 11, 2016 with Laura Beckett, Municipal Planner for the District of Highlands; members of the Heritage Committee; Ryan Mogensen, Land Development Manager, Ecoasis Development, the representative of the owner of the adjacent land (which the lime kiln partially sits on); and Stuart Stark, Heritage Consultant. Discussion centered on providing a suitable context for the lime kiln.

A further meeting was held onsite on Thursday September 1, 2016 between Ryan Mogensen, Land Development Manager; and Stuart Stark, Heritage Consultant, to further discuss possible areas of land required for the preservation of the lime kiln.

The report includes a brief history of lime kilns in Victoria; an overview of how lime kilns work; and specific history of lime kilns in the Highlands. Recommendations for immediate conservation work (tree and brush removal) are included; as is a concept sketch showing how the kiln could look when visitor access is introduced.

The author has written this report with a view to the future preservation of the lime kiln; including potential future access for preservation and visitors; and providing an appropriate physical setting; while allowing for the reality of a site that is divided between private and public land. It is expected that the report will be used for further discussion between the District of Highlands; and Ecoasis Development LLP.

Acknowledgements:

It is acknowledged that this report has been generously paid for by Ecoasis Development LLP, through Ryan Mogensen; as arranged by Laura Beckett, Municipal Planner for the District of Highlands. Mr. Mogensen's cooperative assistance throughout the meetings is gratefully acknowledged.

Some historic information has been supplied through Daphne Allen, from notes kept by Nancy McMinn, which she used in her article "White Gold in the Highlands" in *The Highlander*, Fall 1999 issue (the Newsletter of the *Highlands District Community Association*).

Thank you for this assistance.

Please note that the terms "Lime Kiln; and "limekiln" can be used interchangeably.

The following Statement of Significance had already been prepared for the Lime Kiln by the District of Highlands:

Statement of Significance

DESCRIPTION OF HISTORIC PLACE

The Lime Kiln is situated at 1980 Millstream Road, in the District of Highlands, British Columbia. The kiln location is marked by a pile of loosely arranged rocks and earth on the east side of the main parking lot in front of the District of Highlands municipal office. About six feet up the rubble bank is an arch of brickwork with an opening, approximately 50 inches at its widest, leading into the rock and brick-lined access chamber of the kiln. The extent of the larger kiln structure, approximately 15 feet wide in front, can be identified by the lapped rock work remains of the two front corners of the kiln, in line with the partially blocked access. The historic place consists of all surviving elements of the lime kiln as well as the mound, surrounding rock rubble and overburden.

HERITAGE VALUE

The Lime Kiln is valued because it provides historical evidence of the important role lime burning played in the economic history of the Highlands District. Lime was used for making calcium oxide (commonly known as quick-lime), a component of the plaster and mortar used in early construction methods. This kiln was in operation between 1887 and 1907, providing work to various Highlands pioneers. The Lime Kiln is also valued as a rare example within the region of a specific type of kiln construction. Although it has the same basic footprint as the more structurally intact Atkins Lime Kiln on Hart Road in View Royal, it is likely that the burning area of the Highlands kiln had less volume, and consisted of a rock and brick limestone/fuel reservoir of lower vertical height, without a metal casing. Park of the kiln foundation on the east side was likely formed by a natural rock outcrop, which probably also served as the loading point for limestone and fuel. Two large reinforcing steel rods that likely helped stabilize the main reservoir are visible on the surface at the site. The access to the kiln eye, or grate, of the Lime Kiln demonstrates outstanding design in its construction. The curved brick work inside the access is completely intact, and well integrated with rock and steel elements to create the grate, the area where lime was collected after burning. The grate and eye are about 20 inches wide, and are located about six feet inside the entry to the access area. Source: District of Highlands Municipal Office

CHARACTER-DEFINING ELEMENTS

Key character-defining elements of the Lime Kiln include: - Scale and location of the kiln - Remaining structural elements of the rock kiln base - Remaining rock rubble surrounding the kiln and partially blocking the kiln access - The brick and stonework forming the access archways and grate structure - The steel components of the grate structure - The steel reinforcing rods located on each side of the access - The overburden areas to the east, and on each side of the kiln access

What are Lime Kilns?

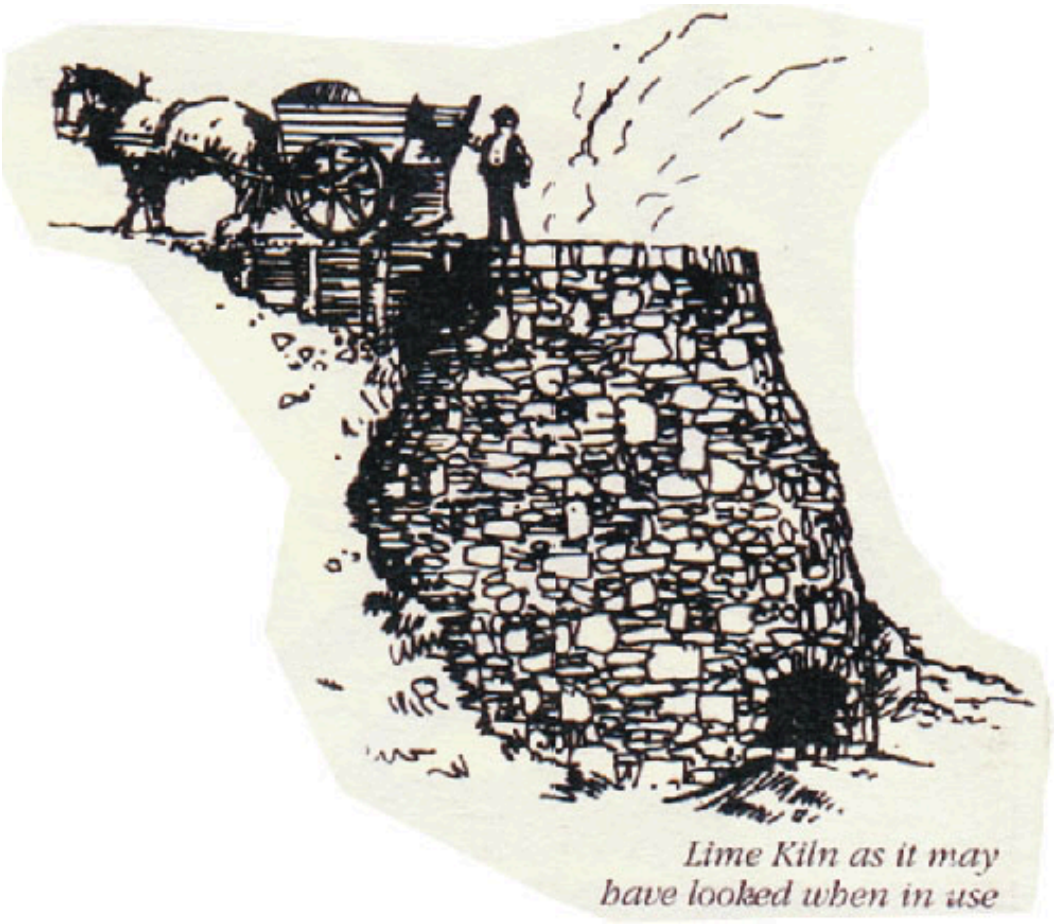


Illustration of a draw kiln, similar to the Highlands limekiln.
(Limekiln at Pitlochry, Scotland. Courtesy of www.highlandperthshire.com)

Limekilns were a very necessary part of life during the mid to late 19th century in Victoria, and around the world, as the main product of the kilns – *quicklime* (calcium oxide) – was an essential part of making mortar, used in the construction of masonry buildings; and of lime plaster.

For an industrial use that was so commonplace, and so relied on during Victoria times, amazingly little was written about how the kilns were used. It was a skill that was handed down by an apprenticeship system, with the skills being passed on verbally.

Used since at least Roman times, quicklime was produced in limekilns by burning limestone, using coal or wood as fuel within the kiln.

One rare source that explains how lime kilns were operated, is contained in an article [abridged and edited for this report] published in the *Industrial Archaeology Review* (Vol X1, no1, Autumn 1988).

The article quoted A.B. Searle, a furnace technologist, who wrote in 1935:

> Lime kilns were usually operated by a two man team, the 'quarryman' and 'burner'. The division of work between them is obvious from their titles and in each case required skill. Although an apparently simple process, ‘burning’ in a static kiln was, like most processing, something of an instinctive art.

Choosing the correct-sized lumps of rock was important.

> In order to achieve economic operation it was necessary to ensure that the gas flow through the kiln was evenly distributed across it, something which required great skill when placing and selecting the kiln 'fill'. The size of the stones was important, for when too large they increase the burning time, whilst if too small they impede gas flow. Although it is very unlikely the 'burners' understood the scientific background to their work they were obviously aware of the advantages of adding a diluent gas, because it was a common practice to feed the kilns wet limestone.
>
> Successful production of 'quick lime' requires achieving the correct temperature [in the kiln], which is a function of the amount of carbon dioxide present in the gas leaving the kiln. Carbon dioxide is released during the conversion of limestone into lime and is also produced when the fuel [coal or wood] containing carbon is used. An advantage of using wood instead of coal is that it gives off more inert gas than coal, thus reducing the carbon dioxide concentration. Although allowing extra air to enter would reduce the concentration of carbon dioxide present and thus the necessary temperature it would at the same time increase the temperature of the fuel and add to the risk of 'overburning'. Significant 'overburning' could make the lime unsuitable for subsequent processing. Overburning produces a glazed surface on the lumps, which hinders or even prevents 'slaking' with water. Unless the lime reacted with water it was useless for producing mortar for buildings or 'slaked lime' (Calcium Hydroxide).

After the lime was ‘calcined’ [dried out], the lime dropped through a grate at the base of the kiln. The now-dry – but still hot – *quicklime* was drawn out (through the ‘drawhole’) by the use of ten or twenty-foot long rods. It was packed into barrels and prepared for shipping. As the quicklime is removed from the base of the kiln, further layers of limestone could be added at the top of the kiln, allowing for a continuous operation.

A.B. Searle’s 1935 article continues:

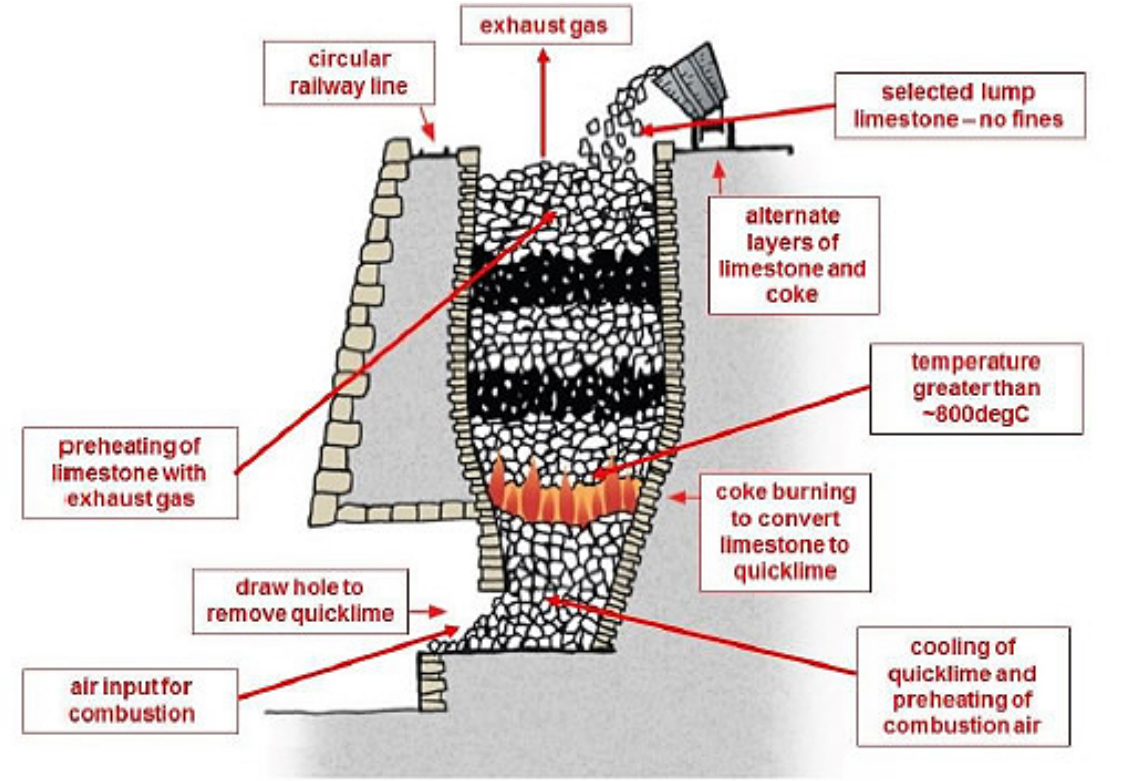
> Whilst the quarryman worked a day shift (in the 1920s 7.30am to 5.00pm) the ‘burner’ worked when required, even at night if 'topping up' [adding coal and limestone] was necessary. The ‘burner's’ job also included removing the newly burnt 'quick lime' and general attention to kiln operation. Work on the lime kilns was arduous, hot and dusty. The gases leaving the top of a continuously operating kiln must have made manual charging [adding more stone to the kiln] an

exhausting and unpleasant operation, although the top layer was cool. Gas leaving a coal-fired kiln was not toxic but could induce nausea. [Another source said that the smoke from lime kilns was said to be pervasive and "acrid" in smell].

Removing the newly burnt lime from the base of the kiln had an element of danger, because it was both hot and caustic and in those days protective clothing was very primitive. The work was often seasonal when not supplying industrial undertakings requiring a continuous supply of lime.

Small limekilns – as at the Highlands kiln – were often built on the side of a hill to facilitate loading. To keep the newly produced quicklime dry, there was often a wooden shelter at the base of the kiln.

The illustration below shows a similar type of kiln to that in the Highlands, though this one shows a tramway being used to fill the kiln, instead of a horse and wagon, as at the Highlands kiln. The fuel used at the Highlands kiln was probably wood, based on an article in the Colonist in 1891. (Colonist April 19, 1891)



early continuous operation lime kiln – apart from the feeding system the principles apply equally to a field kiln

After the stone was burnt, the newly-produced quicklime was drawn out of the ‘drawhole’ by the ‘burner’, using rods 10 or even 20 feet long. It was then packed into barrels for storage and transportation.

Before it is used as a key ingredient for mortar or plaster, quicklime is hydrated, that is, combined with water, when it is known as slaked lime, and is produced according to the chemical reaction: $CaO + H_2O = HCaO + \rightarrow Ca(OH)_2$.

"Dry slaking" is when quicklime is slaked with just enough water to hydrate the quicklime, but remains as a powder and is referred to as hydrated lime. In "wet slaking", enough water, but not too much, is added to hydrate the quicklime to a form referred to as lime putty, used in making lime plaster, or as the base for lime mortar.

A Brief History of Lime Kilns in Greater Victoria

NOTICE.

THE SUBSCRIBERS HAVING LEASED from the Government those extensive Lime Quarries in the vicinity of Craig Flower, would respectfully inform the public that they are now prepared to deliver Lime to any part of the city at reasonable rates. All orders left at Mr. W. F. Saywood's or Lester & Gibbs' will be thankfully received and promptly attended to.

May 7th. F. RICHARDS & CO.

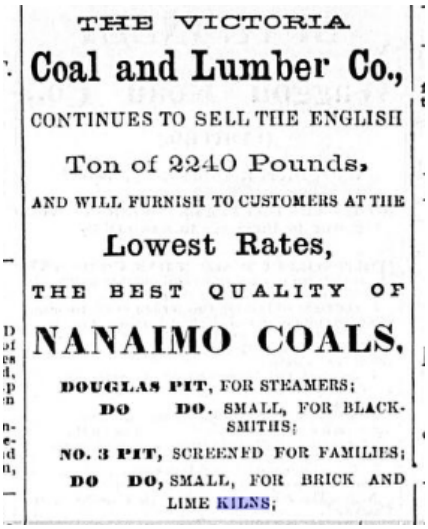
The first notation of Lime production in Victoria (Colonist May 7, 1859)

There is a notation in the Colonist of “extensive Lime Quarries” and the ability to “deliver lime” from the vicinity of Craigflower in May of 1859. By November of 1860, the first shipment of fifty barrels of lime was made to Victoria from the kiln at San Juan Island. It was the “first shipment of lime ever made to Victoria”, “except from San Francisco”, (Colonist November 24, 1860) though 200 barrels of Vancouver Island lime, from an unknown location, were being sold that same month. (Colonist November 24, 1860)

To compete with imports, by 1861 there was a lime kiln “with a frontage of 120 feet on the harbor, with another frontage of 120 feet on Lime Street” [in Vic West] … “On this property is a lime kiln with excellent Limestone, and its position on the water’s edge, affords superior advantages for the shipment of lime.” (Colonist November 21, 1861) (Note: Lime Street no longer appears on City maps, but “Lime Bay” shows near Spinnaker’s Pub)

There was “an excellent Lime Quarry with two good kilns” at Colwood Farm by August of 1862 (Colonist August 12, 1862); and two others (which may be the same kilns) “on Esquimalt Harbour” (Colonist March 28, 1862).

Coal was being sold as fuel for brick and limekilns in Victoria in 1863. See ad from the *Colonist* below:


THE VICTORIA
Coal and Lumber Co.,
CONTINUES TO SELL THE ENGLISH
Ton of 2240 Pounds,
AND WILL FURNISH TO CUSTOMERS AT THE
Lowest Rates,
THE BEST QUALITY OF
NANAIMO COALS.
DOUGLAS PIT, FOR STEAMERS;
DO DO. SMALL, FOR BLACK-SMITHS;
NO. 3 PIT, SCREENED FOR FAMILIES;
DO DO, SMALL, FOR BRICK AND LIME KILNS;

Colonist, April 4, 1863

Lime for mortar and plaster was required in a growing city where brick buildings were replacing wooden Colonial structures. By 1869, limekilns were prevalent locally. Prior to 1869 there was a limekiln on San Juan Island, which was a main supplier of "excellent quality" lime, producing sixty barrels a day, supplying Victoria, Seattle, Portland "and the Sound". (Colonist September 2, 1876)

Several limekilns became established around what is now Greater Victoria. Kilns are known to have existed at View Royal (extant); Atkins Road; Thetis Lake; Craigflower; Victoria Harbor (on Lime Street); "several in the Highlands"; and at Saanich (at the present Butchart Gardens). There were undoubtedly others.

The only other known extant lime kiln in Greater Victoria is located on Hart Road in View Royal. It retains its metal stack surrounding a circular brick structure.

Hart Road Lime Kiln: Left: Stuart Stark photo 2008 Right: Robert Duffus photo 1977

The Highlands Lime Kiln

Box 573, Victoria. se15

MILLSTREAM

LIME KILN.

C. & C. PIKE, Proprietors.

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THE BEST LIME YET DISCOVERED ON THE ISLAND.

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SUITED FOR EVERY DESCRIPTION OF WORK.

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Orders by mail promptly filled.

C. & C. PIKE,
Millstream, B. C.

se15dw

(Colonist September 15, 1886)

The earliest reference to a limekiln in the Highlands (above) appears in the *Colonist* on September 15, 1886. The *Millstream Lime Kiln*, with "The Best Lime Yet Discovered On The Island" had as its proprietors C. and C. Pike, (Caleb and Charles), well-known Highlands pioneers.

In December 21, 1887 a lime kiln was marked on a "Survey for C. Pike", east of Millstream Road in Section 12. (Survey notebook field notes. See Appendix for map)

The Highlands lime kilns – W.H. Mathews reported there were "several" in the Highlands – were supplied from the Millstream deposit of limestone – reported to be 1000 metres long and 300 metres wide – and located 2 kilometers east of Mount Finlayson on the east side of Millstream Road. There were two recorded quarries, 320 metres apart, prior to 1908. (Mathews, W.H.: Calcareous Deposits of the Georgia Strait Area 1947; Calcareous Deposits of Southwestern British Columbia. 1957; BC Department of Mines).

NOTICE.

FROM THE FIRST DAY OF OCTOBER Lime by Wholesale to Contractors will be not less than One Dollar ($1.00) per Barrel.

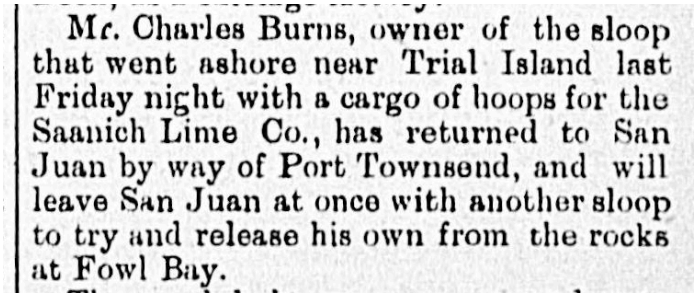
Signed T. ATKINS,
CALEB PIKE,
J. RAYMOND,
SAANICH LIME CO.

Victoria, B. C., Sept. 23, 1887. se24-1m

Joint marketing by several local lime kilns (Colonist September 27, 1887)

Only a year after being established – in 1887 – the lime kiln operated by Caleb Pike (Highlands); joined with T. Atkins (View Royal); J. Raymond (limekiln operator near Esquimalt Harbour); and the *Saanich Lime Co.* (Wriglesworth, Tod Inlet, Saanich); to sell lime in what appears to be a cooperative venture.

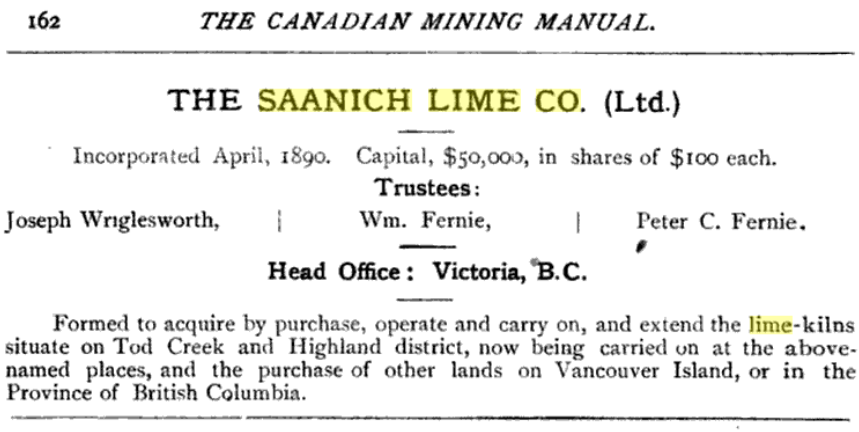
By this time, the *Saanich Lime Company* at Tod Inlet had been established by Joseph Wriglesworth. He would become a big player in local lime, representing San Juan lime, as well as local production. He even sent a sample of Saanich Lime to the *Colonial and Indian Exhibition* in London in 1887. Wriglesworth also operated a family grocery store and a saloon, which he had opened in 1878.



Mr. Charles Burns, owner of the sloop that went ashore near Trial Island last Friday night with a cargo of hoops for the Saanich Lime Co., has returned to San Juan by way of Port Townsend, and will leave San Juan at once with another sloop to try and release his own from the rocks at Fowl Bay.

(Colonist, November 10, 1888)

In 1888, a ship went ashore near Trial Island, carrying a shipment of hoops for the *Saanich Lime Co*. This indicates that the company, like most limekilns, had its own cooperage, making barrels to hold the lime produced in the kilns. The location of the cooperage is unknown, but likely to be at Tod Inlet.



162 *THE CANADIAN MINING MANUAL.*

THE SAANICH LIME CO. (Ltd.)

Incorporated April, 1890. Capital, $50,000, in shares of $100 each.

Trustees:

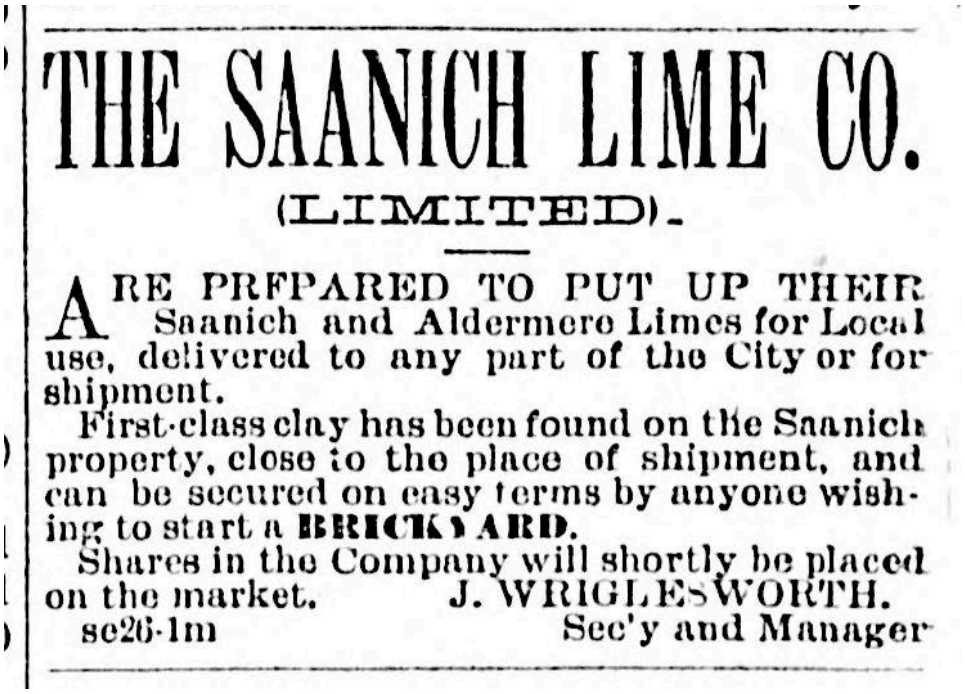
Joseph Wriglesworth, | Wm. Fernie, | Peter C. Fernie.

Head Office: Victoria, B.C.

Formed to acquire by purchase, operate and carry on, and extend the lime-kilns situate on Tod Creek and Highland district, now being carried on at the above-named places, and the purchase of other lands on Vancouver Island, or in the Province of British Columbia.

Saanich Lime Co. Canadian Mining Manual 1890

By 1890, the *Saanich Lime Co. Ltd.* had been incorporated, with Joseph Wriglesworth being one of the three company trustees. The company joined the properties both at Tod Creek and in the Highlands, each having limekilns.



THE SAANICH LIME CO.

(LIMITED).

ARE PREPARED TO PUT UP THEIR Saanich and Aldermere Limes for Local use, delivered to any part of the City or for shipment.

First-class clay has been found on the Saanich property, close to the place of shipment, and can be secured on easy terms by anyone wishing to start a BRICKYARD.

Shares in the Company will shortly be placed on the market. J. WRIGLESWORTH.

se26-1m Sec'y and Manager

Colonist October 15, 1890 p4

For the first time in 1890, the newly expanded *Saanich Lime Co.* refers to its Highlands lime kiln as being at "Aldermere". *Aldermere* was a house owned by Dr. Hanington. It was situated a few hundred yards west of the present Highlands lime kiln. (Davyd McMinn information)

By 1891, a joint stock company had been formed to amalgamate 435 acres of property at Tod Stream, Saanich Arm; with 220 acres in the Highlands District. A long article in the *Colonist* explained the plans for the company; as well as listing the works at both Tod Inlet and in the Highlands.

On the 220 acres in the Highlands there were "25 acres of limestone"; also "excellent timber, utilized in making of the lime", indicating they were using wood as fuel, instead of coal. The Highlands property was "two miles from the E&N Railway, from a point on which the lime is shipped to Victoria and other places."

The article states there "are two draw-kilns, of the latest pattern, and capable of burning 130 barrels of lime per day; the quarries are close to the kilns." One can assume from this description that there was one kiln (and quarry) in the Highlands and another at Tod Inlet, where "there is also a substantial wharf, with 14 feet of water". At Victoria, there was a wooden warehouse on "leasehold ground, capable of holding 600 barrels" of lime. (Colonist April 19, 1891)

In 1893, Joseph Wriglesworth had been appointed sole agent for several lime kilns, including the *Saanich Lime Co.* which then included the Highlands lime kiln(s):

NOTICE.

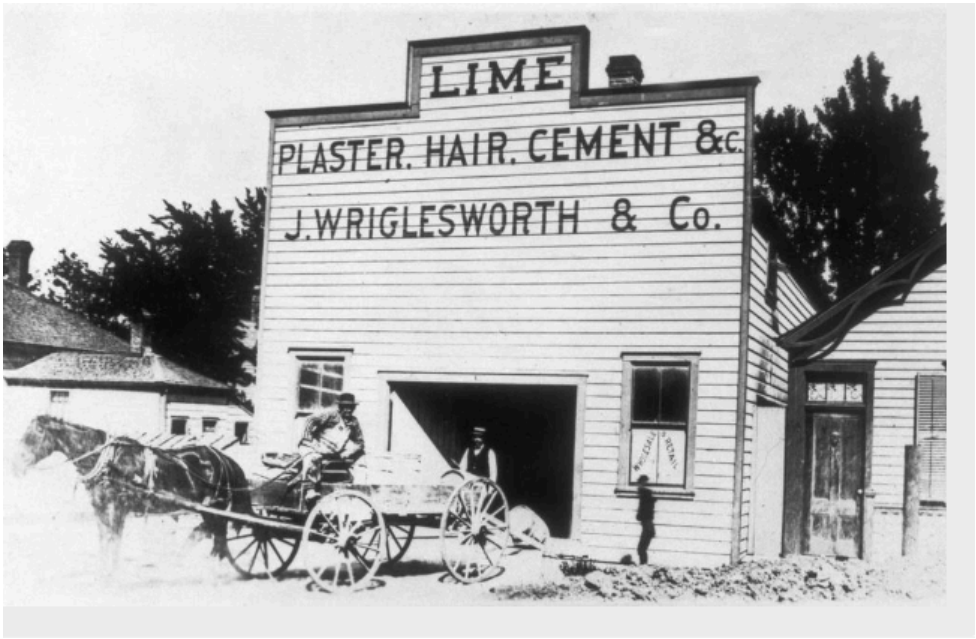
We, the undersigned, hereby announce that J. WRIGLESWORTH has been appointed sole agent for the sale of our Lime.

AIKINS BROS.
J. RAYMOND.
BODDY & JONES.
SAANICH LIME CO.

no22-1m

(Colonist December 12, 1893)

A photograph exists of Wriglesworth's warehouse:

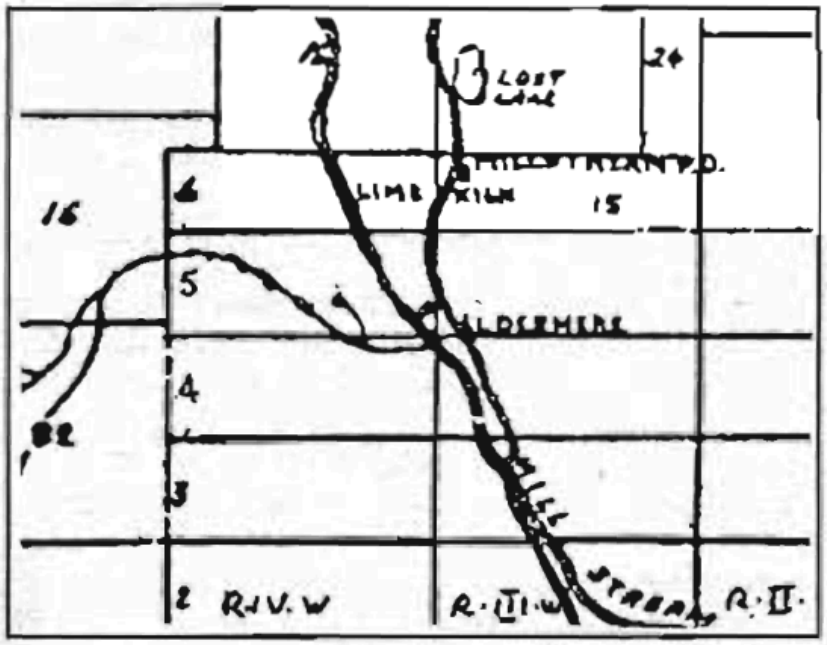


Loading barrels of lime at J. Wriglesworth & Co.
Probably 127 Yates Street, SE corner at Blanshard
BC Archives A-03469 (Address: Williams Directory 1890; 1894)

117-123 Dominion hotel, Stephen Jones, prop
Blanchard Street intersects.
127 Wriggleworth, Joseph
Saanich Lime Co
129 Wrigglesworth, Walter
Wrigglesworth, William
Wrigglesworth, Chas
Wrigglesworth, Edward L
135 Summer, Joseph

Listing for J. Wriglesworth and the Saanich Lime Co. at 127 Yates Street
(William's Directory 1894). Note: the Directory spelled his name incorrectly.

An 1895 *Map of the South-eastern Districts of Vancouver Island*, compiled by the Hon. G.B. Martin, Chief Commissioner of Lands and Works, shows a lime kiln located in the Highlands. The Millstream P.O. [Post Office] is marked with a square just below the "M". It appears that the Lime Kiln is also marked with a square just below the "L", but that square appears to be mostly obscured by the dark line denoting Millstream Creek.



1895 map showing lime kiln on Millstream Road

In 1896 there was reference in the *Colonist* to the production of the two kilns of the *Saanich Lime Co.* The Saanich kiln was producing 75 barrels a day. In the Highlands – where they had 230 acres – the article says there was more than one kiln: "with the capacity of the kilns there being 50 to 60 barrels a day". (Colonist April 5, 1896) (This may have been a typo, but the kiln shown on the map is a different location from the existing kiln, so the article may well be accurate)

No further references can be found about the *Saanich Lime Co.* after 1896. The works at Tod Inlet were acquired by Robert Butchart in 1904, when he established the *Vancouver Portland Cement Company*. Quarrying continued there until 1912, when the stone was exhausted, and the works moved to Bamberton.

Further mentions of the lime kiln at Aldermere are not found, though there may be a clue that it was still in use after 1906. See the section on Gartcraig Bricks at the Aldermere Lime Kiln, below, on Page 15.

In 1947 W. H. Mathews wrote about the Millstream limestone deposit, and its history. He refers to quarrying "prior to 1908", and the existence of "two quarries, both abandoned". Further, he states: "the remains of an old lime kiln can be found near the northern quarry."

His entry is reproduced below. See the paragraph under *"Development and Operation"*

Millstream Deposit.

Location and Accessibility.—A limestone-deposit occurs on Millstream Road in the Highland District, 2.5 to 2.9 miles north of Langford Station on the Esquimalt & Nanaimo Railway 8 miles west of Victoria.

Geology.—This deposit is reported to be 1,000 feet wide and 3,000 feet long (Clapp, 1917, p. 104) and is surrounded by greenstone and intrusive bodies. Part of the limestone is fine-grained, part recrystallized. This recrystallized limestone shows textural variations apparently related to stratification. This banding at one point near the south-west end of the deposit dips 40 degrees north-west, at another point in the southern of two old quarries the banding dips about 20 degrees south-east. Overburden is absent on knolls but deep in the intervening hollows.

Analyses.—The analyses of two samples, free of dyke-rock, each composed of a series of chips taken at 5-foot intervals across 50 feet in the northern quarry, are as follows:—

	Insol.	R_2O_3.	Fe_2O_3.	MnO.	MgO.	CaO.	P_2O_5.	S.	Ig. Loss.	H_2O.
North sample	3.3	0.27	0.089	0.017	1.97	52.7	0.010	0.002	41.4	0.32
South sample	0.5	0.04	0.200	0.004	3.08	52.1	0.013	0.025	43.8	0.14

Development and Operation.—Limestone is reported to have been quarried in the Highland District, probably from this deposit, prior to 1908. Two quarries, both abandoned, have been opened in this deposit, 2.9 and 2.7 miles respectively north of Langford Station. Each of these quarries has a curved face 60 to 100 feet long and up to 20 feet high. The remains of an old kiln can be found near the northern quarry.

(W.H. Mathews. Calcareous Deposits of the Georgia Strait Area. Department of Mines. 1947)

Millstream (Highland) NTS: 92B/05E
MINFILE No.: 92B 025 Latitude: 48°28′55″
Map No.: L051 Longitude: 123°30′25″

The Millstream deposit is located 2 kilometres east of Mount Finlayson on the east side of Millstream Road, 13 kilometres west-northwest of Victoria.

Fine-grained, banded, partly recrystallized limestone is contained in a lens 1000 metres long and 300 metres wide in greenstone within the Wark gneiss. The banding dips from 40° northwest to 20° southeast. Numerous dikes intrude the deposit. Irregular lenses and masses of white-weathering wollastonite are reported to occur in the limestone. An analysis reported by Mathews and McCammon (1957) is given in Table 12.

Limestone was produced from two quarries 320 metres apart, prior to 1908. It was burnt on site in several kilns to produce lime. Quarrying was suspended because higher transportation costs made it uneconomic to compete with similar operations located near tide-water.

Undated (post 1957) *Geological Survey Branch Report* on the Millstream Limestone Deposit page 48; that references W. H. Mathews' reports of 1947 and 1957.
This entry refers to "Several kilns" and "Quarrying was suspended because higher transportation costs made it uneconomic to compete with similar operations near tide-water."

Gartcraig Bricks at the Aldermere Lime Kiln

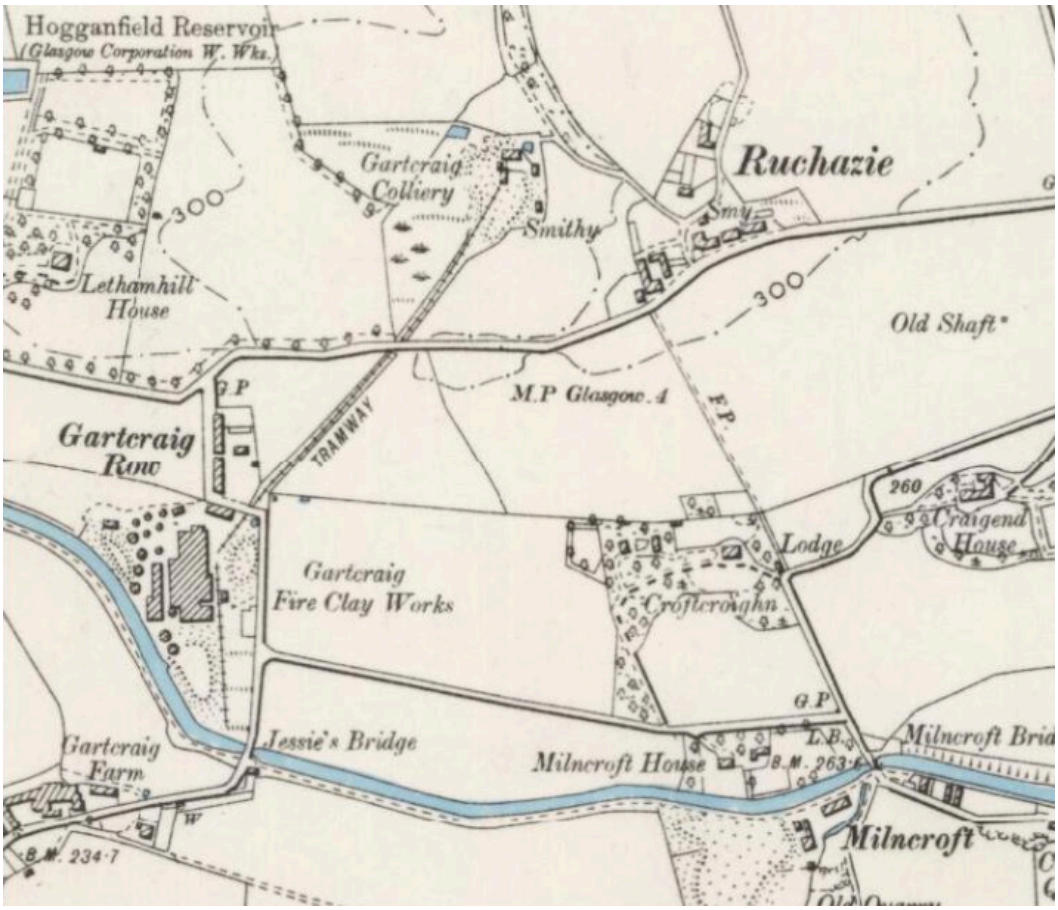
Around the site of the Highlands lime kiln, and among the rubble, can be found yellow firebricks. Probably from the collapsed chimney of the kiln, they can be identified, and add further information about the kiln and its possible dates of use.

A broken brick with the partial embossed name “GARTCRAIG”
from the Aldermere (Highlands) limekiln. Photographed September 1, 2016.

Illustration of a whole GARTCRAIG firebrick found in Buenos Aries, Argentina. They were manufactured in Scotland between 1876 and 1927, in an area northwest of Glasgow, bordering the Monkland Canal, near the village of Ruchazie.

These bricks were shipped all over the world, including California, South America, Australia, Hawaii, etc. and were particularly suited to limekilns.

In Canada, they have been found in Quebec, Ontario, and Nova Scotia. In British Columbia, they have been found in Creston; and at Burton (Upper Arrow Lakes), as well as in the Highlands.



The GARTCRAIG Fire Clay Works bordering the Monkland Canal, near the village of Ruchazie, northeast of Glasgow, Scotland. (Ordnance Survey Map 1897-98)

(Colonist August 4, 1906)

In 1906, the Robert Ward Co. imported a large quantity of GARTCRAIG firebricks and Fireclay from Scotland to the Victoria market. He sold this shipment over a period of around six months.

It is likely that the GARTCRAIG bricks at the Aldermere (Highlands) limekiln came from this shipment. Although the *Gartcraig Fireclay Company* existed from 1876 to c1927, the only mention in the *Colonist* of anyone importing these bricks from Scotland dates from 1906. It is likely that the kiln was refurbished at that time, given the local availability of the bricks, though the kiln appears to have been abandoned before WW I.

Although it is possible that the bricks had been imported at the time of the construction of the Highlands kiln(s) in 1886 – as the bricks were being manufactured in Scotland as early as 1876 – it is more likely they date from c1906.

The Lime Kiln Today

The lime kiln outside the Highlands District Offices has been recognized for its historic importance for many years. Residents have written about it; cleared the biggest trees that threatened its survival, and placed barbed wire over the dangerous opening at the top of the kiln, to keep people away.

The lime kiln is currently in a ruinous state, covered with brush, and with trees growing nearby and on top of the structure, which threaten its long-term stability. Nevertheless, the main structure survives.

Because of its rarity and its historic importance – being only one of two kilns known to have survived in the Capital Region – the current stakeholders involved with the lime kiln have embarked on planning for the preservation of the kiln. The kiln presently straddles property owned by both the District and a private development company, so discussions have taken place regarding establishing important buffer zones, to ensure the kiln's future protection.

A **Statement of Significance** has been prepared for the Lime Kiln. It is reproduced at the beginning of this report.

Protection of the Lime Kiln – Heritage Register

Recognizing its historic importance, the Lime Kiln was included on the District's Community Heritage Register when it was established by Council Resolution on December 2, 2013. Several important heritage sites – including the Lime Kiln – were added at that time:

1) THAT Council establish the District of Highlands Community Heritage Register, as attached, and add the following properties to it:

1) Caleb Pike Heritage Park
2) Caleb Pike House
3) Teacherage
4) Replica of the Gregory House
5) Old Dairy
6) Old School House
7) Lime Kiln
8) Millstream Lake Road / Ross Durrance Road
9) Second Lake Dam;

2. THAT Council endorse further consultation with owners of privately held heritage resources;

3. FURTHER THAT Council forward consideration of establishing a Heritage Committee, as suggested in the Heritage Task Force's second report, to discussions regarding advisory committee restructuring

The lime kiln is also on the Canadian Register of Historic Places:
http://www.historicplaces.ca/en/results-resultats.aspx?m=2&ProvinceId=100004&Location=highlands

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Establishing a Buffer Zone around the Kiln

Protecting an historic resource can be equated to the conservation of an endangered animal species. Both need an appropriate environment for them to successfully survive.

In the case of an historic site like the lime kiln, there needs to be enough property surrounding the site to allow for a number of factors:

1. The first consideration is providing enough land to protect the actual building or structure. Having a property line that actually runs through the centre of the historic structure – as has happened at the lime kiln – will require appropriate negotiation to protect the integrity of the kiln itself.

2. Secondly, there needs to be enough land to allow access for conservation, preservation, or restoration work to be undertaken on the structure. Space must be allowed for access to the site for people and equipment to safely move around the property while working. Trees must be able to be felled; scaffolding may have to be erected; and materials delivered; should a restoration (or even conservation) project be undertaken in the future.

3. Thirdly, there needs to be enough space to safely allow public visits to the site, so people can appreciate and learn about the historic site. Safe access is important, both for the visitors; and for the continued protection of the site itself. Visitors must be able to get close enough to 'experience' the site, and to see it clearly; but not close enough to be able to actually touch and easily damage the fragile historic resource that is being preserved. Enough space should be provided for school groups for example; or for a bus tour of history enthusiasts. All-important photography vistas need to be considered as well. Pathways, and necessary access points – like stairways to reach the higher elevations at the back of the site; and open space around copy panels – need to be considered. Nearby parking must be available as well.

4. Finally – and importantly – almost every historic site requires an aesthetic surrounding, in order to give a semblance of its former setting. Beyond the necessary public access areas, there should be a buffer zone that blocks the view of nearby modern facilities. Visitors should be able to imagine the original setting of the historic site. A thickly planted buffer of trees and bushes would work well, to block views of nearby buildings and parking. Keeping a selection of mature trees on the site (where they are not endangering the historic resource itself) would assist in providing this aesthetic buffer.

Possible Buffer Zones to protect the Lime Kiln

Two meetings were held with stakeholders to discuss possible protective buffer zones for the Lime Kiln.

Discussion mainly centred around the back of the lime kiln, on the privately-owned property above the kiln, where wagons would bring the broken limestone to load it into the top of the kiln to be burnt. An area that would allow an imaginary horse and wagon to the top of the kiln would allow the visitor to correctly interpret – through the use of copy panels and illustrations – how the kiln worked.

However, research has also shown that an area in front of the kiln – the current driveway to the District offices – would be required to be protected, in order to properly show where and how the quicklime was removed from the kiln through the drawhole, which now faces the driveway. General research indicates that at most lime kilns of this type, the 'burner' would use rods some 10 to 20 feet long, in order to 'draw' the quicklime from the kiln. Additionally, many kilns had a wooden porch or shed at the front to prevent the quicklime from coming into contact with rain, as well as for packing the quicklime into barrels. Protecting this front, lower area from further development (driveway widening; paving; digging for services; adding sidewalks) and keeping a safe buffer in front of the kiln is as important as providing a buffer at the rear.

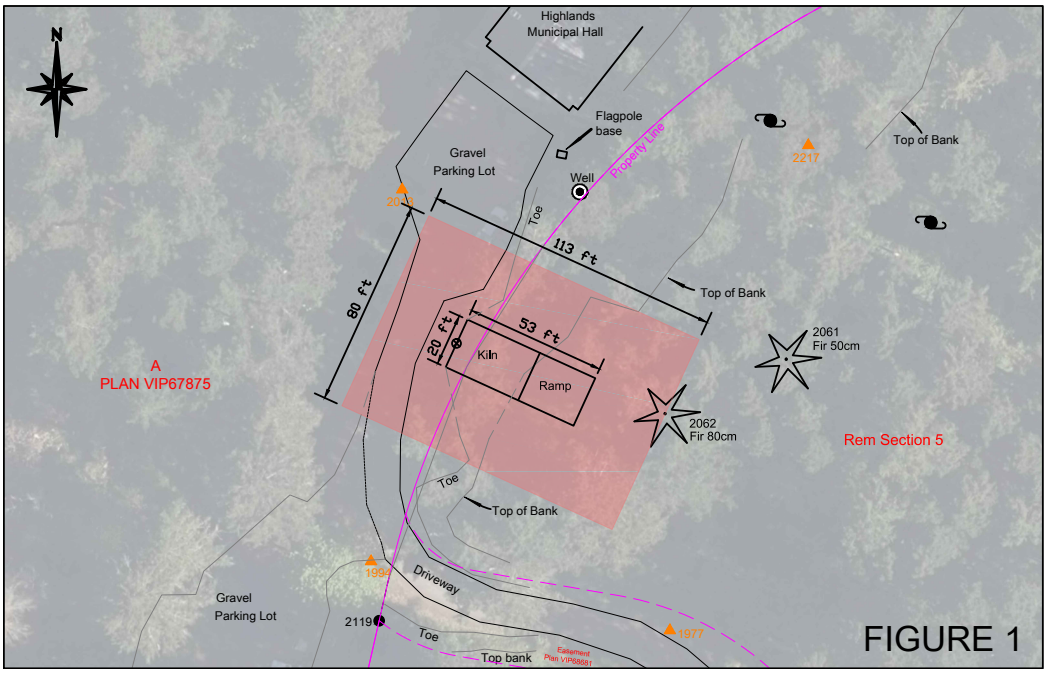
Providing visitor access would entail keeping them off the kiln itself by the use of simple fencing. Because of the change of elevation, with the kiln being built up against the rock face, visitor access to the top of the kiln would be easily provided by a simple wooden staircase, connecting to a gravel or bark-mulch pathway at the top and bottom of the stairway. It is very likely that such a rough staircase existed while the kiln was in operation, to allow quick access for the 'burner' to assist the 'quarryman', or vice versa.

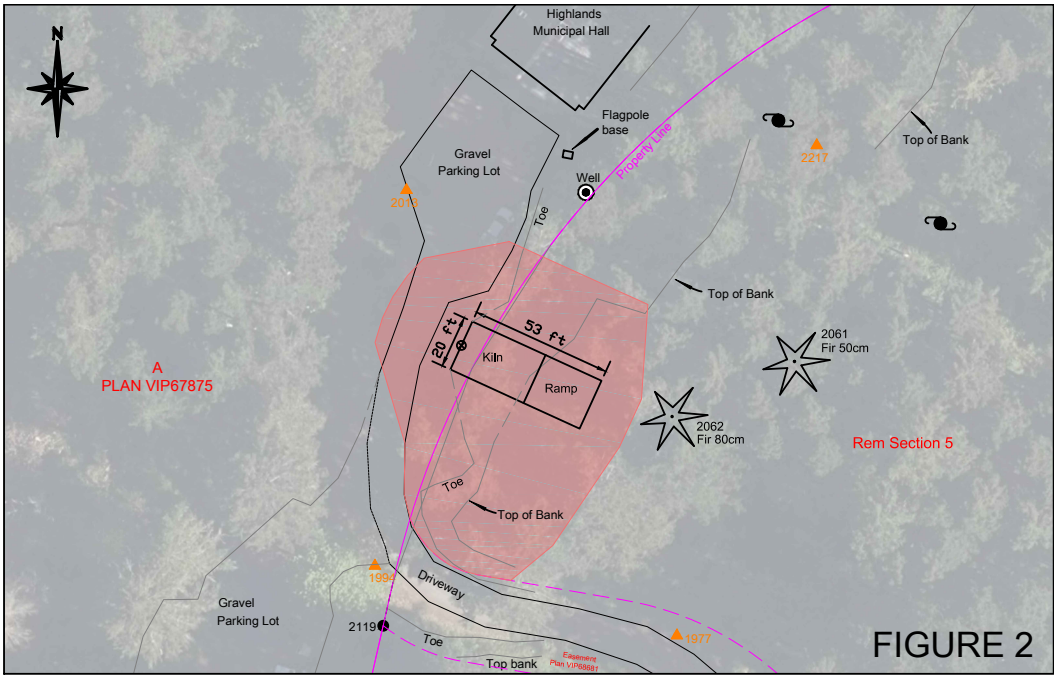
At the top of the stairway, access to near the kiln top should be provided, but fenced off. A copy panel or two would explain the workings of the kiln. The area at the top of the kiln should be cleared to approximate a driveway access as would have been used by the 'quarryman' with his horse and wagon, bringing the limestone rocks to the kiln. A wide gravel (crushed limestone) area would be suitable here.

Beyond this interpretive area should be a buffer of trees and bushes, to block the sight of modern intrusions of cars or buildings.

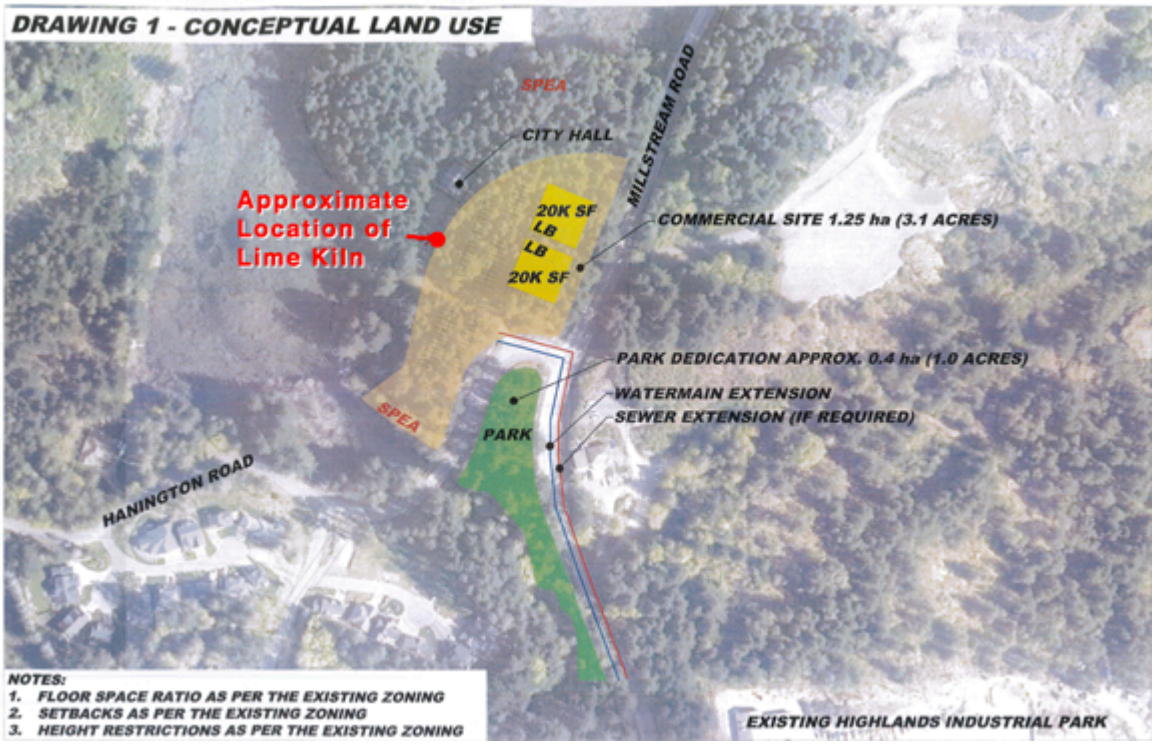
Possible Buffer Zones shown on Maps

These maps have been kindly provided by Ryan Mogensen, after joint discussion onsite with the Heritage Consultant on September 1, 2016. The maps provide discussion options between the District and Ecoasis Developments. They clearly show two possibilities for a good buffer zone around the Lime Kiln. As a comment for consideration, in Figure 2, it may be good to 'bulge' the rear line to include the large fir tree #2062, considering the lower change of ground level that occurs immediately behind that tree.





Context of the Lime Kiln Site in the Neighbourhood



This planning map from the District of the Highlands shows some of the Conceptual Land Uses that might occur in the neighbourhood of the Lime Kiln. Thought should be given to how the Lime Kiln site – if conserved and opened to public visits – might be integrated into other potential developments.

Conservation of the Lime Kiln: Existing conditions

It is recommended that a Historic Archaeological Excavation and Study be completed on the Lime Kiln.

Parts of the limekiln have collapsed, and such a study, when carefully undertaken by professional archaeologists, should be able to determine much more about the history and use of this particular limekiln. For example, such an investigation should be able to tell if there was a wooden or stone ramp to access the top of the kiln. Evidence may exist of ventilation holes in the kiln, or other construction details. The front of the kiln may reveal evidence of original wooden porches or sheds.

However, it is important that no damage be accidentally inflicted on the site before such an archaeological study can be completed.

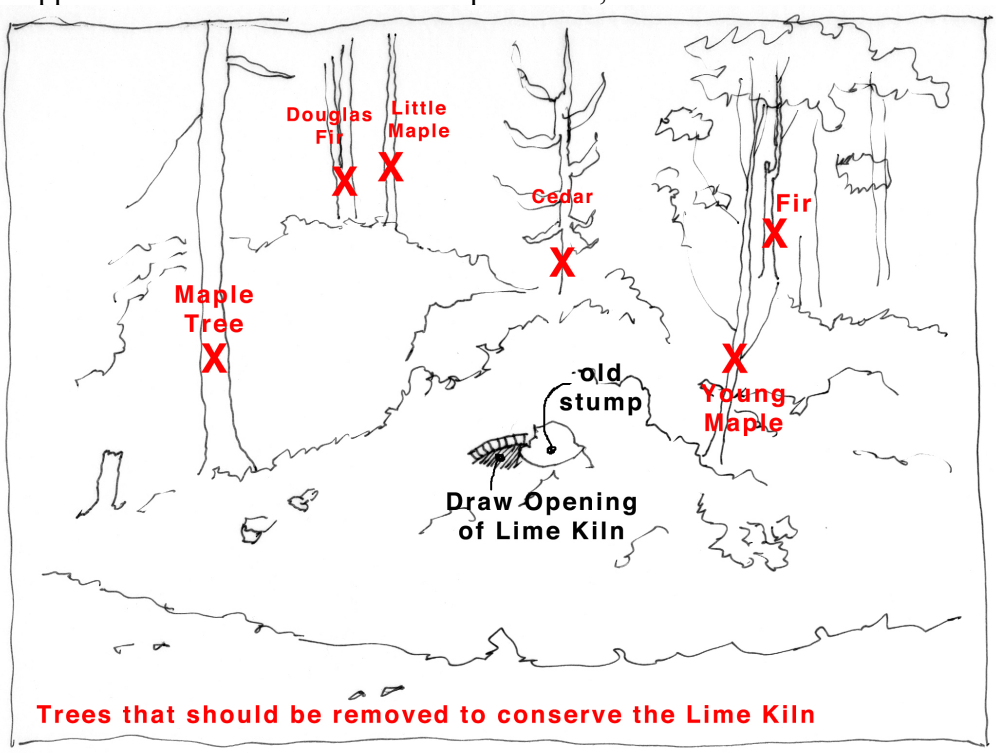
Currently, there is damage happening to the kiln structure. Trees have grown up on, and near, the structure itself. Their roots are damaging the integrity of the structure. Therefore, certain trees need to be removed to prevent further damage. However, the roots should **not** be removed before an archaeological study is undertaken.

Small bushes should also be trimmed back or cut down for the same reasons. Anything growing on the sides of the kiln itself should be removed. The area behind the top of the kiln, where a wagon might have unloaded, should also be cleared of bushes by cutting them down. There may be evidence beneath the soil, important to an archaeological investigation, which should not be disturbed by digging.

The intent of this work is to stabilize the site, and prevent any further, on-going deterioration, before important historic information can be obtained.

Tree and Brush Removal

Current appearance of the Lime Kiln on September 1, 2016.



Trees should be closely cut down, leaving their roots intact, until after an archaeological excavation can be conducted. Brush should also be removed from the kiln and kiln area by cutting, not digging.

Concept Sketch for presentation of the Lime Kiln as a Historic Site

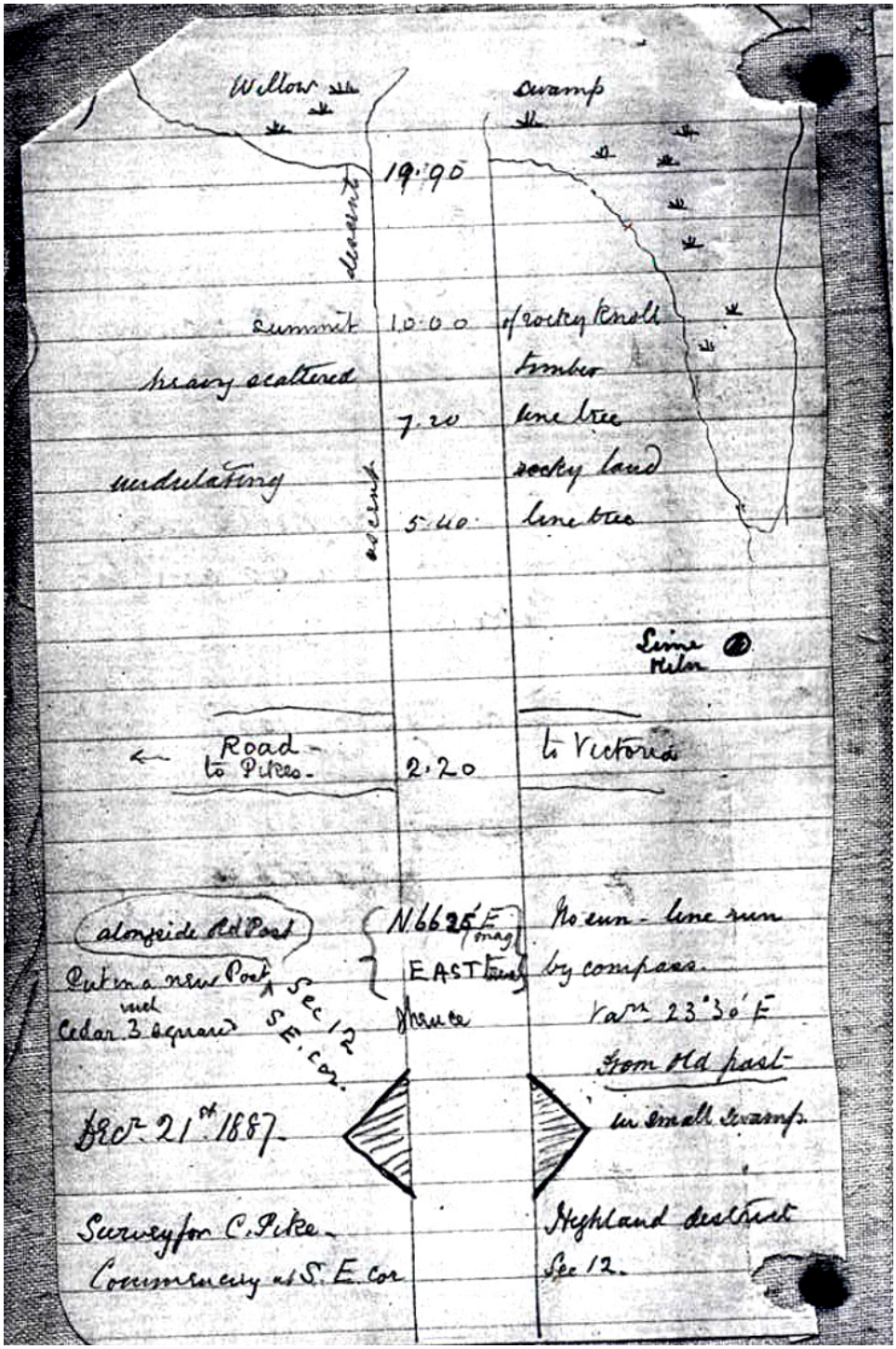
Visitor access to the Lime Kiln is an important consideration, should it be conserved as a historic site. It will require conservation and preservation work to ensure its survival into the future. Ensuring a reasonable protective buffer zone – as outlined in this report – will allow such preservation work to be accomplished.

The buffer zone will also allow visitor access, while protecting the lime kiln from direct wear and tear. Simple signage can educate visitors about the historic importance of the kiln, explaining its history and how it was used.

A wooden staircase would allow visitors access to the top of the kiln, where the ‘quarryman’ used to unload limestone from a wagon, and load it into the top of the kiln. Another sign up behind the kiln could explain the quarrying and burning process.

Appendix:

Survey noted for C. Pike from December 21, 1887, showing the location of a lime kiln to the east of Millstream Road (labelled “Road to Pikes” and “to Victoria”.
North is to the left of the page.



Two Photographs of the Highlands Lime Kiln from 2007:

Photos: Stuart Stark 2007