The Highlands Lime Kiln:
A Historical Archaeological Inventory Assessment

Prepared for:

District of Highlands

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Ecoasis Development LLP

Non-Permitted Report

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Acknowledgements

A'si'em nu schala'cha. Millennia Research's office is located in the traditional and ancestral territory of the Lekwungen. As archaeologists and GIS specialists, we study the interconnections between people, material culture, land and place within the traditional and ancestral territories of many First Peoples. We gratefully acknowledge the Indigenous communities with whom we work, the living heritage of these communities, and the cultural legacy that has been shared with us. *Hay'sxw'qa si'em nakwilia*

Millennia Research would like to thank the following people for their help and co-operation during this project:

- Ben Gourley and Richard Linzey for sharing their expertise on historic era lime kilns;
- The Highlands Heritage Select Committee, especially Committee Chair Sally Gose for conceptualizing and supporting this project from beginning to end; and
- The friendly staff of the Highlands District Office.

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Introduction

In the District of Highlands near Victoria, BC, there exists the remains of a historic lime kiln, constructed in 1886 (Stark and Associates 2016). Millennia Research Limited (Millennia) was contracted by the District of Highlands to conduct a historical archaeological assessment of this lime kiln. The project area is located at 1980 Millstream Road, Victoria, BC, adjacent to the Highlands District Office parking lot. The kiln sits partially on the Highlands District Office lot, and partially on private land owned by Ecoasis Development LLP. The purpose of this study is to provide the District of Highlands with greater information about their lime kiln and its spatial extent, to enable future conservation decisions to be based in the best available knowledge.

The Lime Kiln is recorded as a recognized heritage site, and has been designated with Borden number DcRv-189. The existing report (Stark and Associates 2016) indicates that the lime kiln operated between 1887 and 1907. As such the *Heritage Conservation Act* (HCA), which provides automatic protection for recorded and unrecorded pre-1846 archaeological sites does not apply. Additionally, a permit was not required through the BC Heritage Branch, though a copy of the final report was requested (Richard Linzey, pers com, July 2019). All work was conducted in the spirit of the HCA and to its standards. Because this project concerns only historical materials, First Nations notification and a First Nations representative during field work were not required.

Field work for the project was conducted on 21 and 29 November by Cecilia Porter of Millennia. This report summarizes the results of the field work and provides management recommendations for future management of this historical feature.

Project Description and Heritage Value

When the Highlands Heritage Select Committee contacted Millennia Research Ltd requesting an archaeological investigation of the lime kiln, the scope of work included having the extent of the kiln mapped and examined, and an investigation conducted into whether any evidence of active-kiln era ancillary structures could be discerned. As such, this project consisted of surface survey and mapping, and of subsurface shovel testing of the lime kiln and surrounding area. The study was conducted as part of a broader effort undertaken by the Highlands to understand the nature and distribution of artifacts and features associated with the recorded site, in particular with reference to the Highland property boundary. The heritage value of the kiln has been assessed by (Stark and Associates 2016) and by the District of Highlands, who have found that the kiln has heritage value because of its economic significance to the area, including as a place of employment for local labourers, the rarity of the feature within the wider region, the integrity of some remnant features, and construction details and design including the carved brickwork of the arched access to the kiln eye.

Study Area

The Highlands Lime Kiln is located off the parking lot of the Highlands District Office at 1980 Millstream Road, in the Highlands District to the northwest of Victoria (Figure 1).

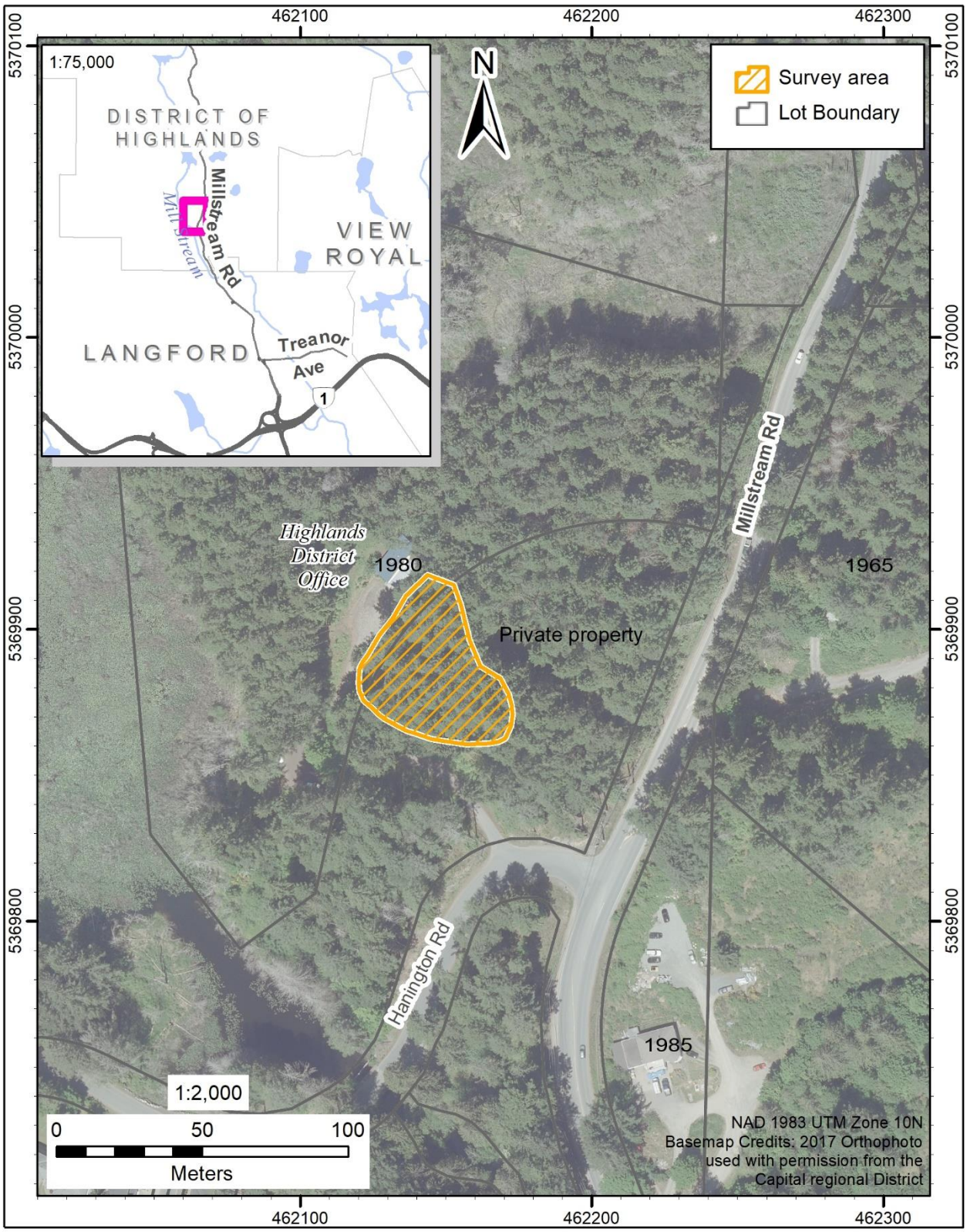

Figure 1. Overview Map

The region is characterized by rocky bluffs and is characterized by a mix of wooded park and residential areas. In the late 1880s and early 1900s the area was homesteaded by European pioneers (Allen, et al. 2008).

The specific investigation area for this project concerned the surviving lime kiln structure and the immediately surrounding area. This investigation area was approximately 20 m north-south by 60 m east-west. A short but steep hill rises approximately six metres from the western border of the project area to a fairly level forested area behind. The kiln is built into this west facing hill.

Environment

At the site of the Highlands Lime Kiln the rocky landscape is covered by a second growth forest consisting of western red cedar and Douglas fir trees, as well as shrubs such as Oceanspray, sword fern, and Oregon Grape (Figure 2). The groundcover consists of a several centimetre thick bed of moss. The environment and sea level history for the local area is well described in Allen, et al. (2008).

Figure 2. Overview of the lime kiln hillside showing kiln and vegetation. Photo taken facing east with stadia rod for scale.

Background Research

Lime kilns were large structures that heated limestone to create quicklime and were once a common and important part of the industrial landscape. For centuries, quicklime was used as the main mortar for masonry buildings, plaster for walls and white "limewash" for buildings. Lime was also used in everything from pulp, paper, smelting, agriculture, plasters and pharmaceuticals. Additionally, lime and clay were burned together to make cement. Many of the masonry buildings in downtown Victoria are built with mortar from kilns like the Highlands lime kiln. Lime kilns have been recorded across ancient Rome, through the British Isles, and they are well recorded up and down the west coast of North America. A previously commissioned report, The Highlands Lime Kiln: A Rare Survivor (Stark and Associates 2016) compiled the existing information on the Highlands Lime Kiln. There exists one other lime kiln in the immediate region, the Hart Road lime kiln in View Royal (Donald Luxton and Associates 2012). Slightly further afield there exist the Kingzett Lake Lime Kiln near Shawnigan Lake, BC (Cowichan Valley Regional District 2015), and several lime kilns on Tuxata and San Juan islands in neighbouring USA (Legacy Washington 2004; Pratt 2014).

Several general styles of lime kilns are recorded, with the most distinctive difference being between continuously burning and non-continuously burning kilns. Non continuously burning kilns were fired and then cooled before being used again or, as in the case of earth-mound kilns, deconstructed. These types of kilns sufficed for smaller operations or single construction projects, but for larger industrial operations continuously burning kilns were required. Continuously burning kilns were called vertical draw kilns. These kilns were loaded with limestone through the top of the stack and could be in constant operation. Vertical draw kilns had attached covered areas for drawing the quicklime out of the bottom and cooling it before packaging it in barrels (Ben Gourley, pers com, August 2019). This covered area was important to protect the product from rain as quicklime is reactive with water. The structures generally consisted of a wooden shed attached to the kiln, or an arched brick vault built into the front of the structure.

Vertical draw kilns also featured stoking holes part way up the sides of the chimney. These stoking holes were covered by sheltering structures and it was from here that the kilns were fed fuel, and that the fuel was kept dry (Ben Gourley, pers com, August 2019, Figure 3). Wood or coal were the most common fuel sources. The arched entry point for a stoking hole can just be seen in the stone structure from Lime Kiln Point State Park (Figure 4). Generally a lime kiln was operated by a two person crew, however on Texada and San Juan islands there existed much larger operations, such as the Roche Harbor Lime and Cement Company, which operated two large scale lime kilns at Roche Harbour on San Juan Island (Figure 5). These labourers may be poorly documented in historical records as they often comprised ethnic minorities (Ben Gourley, pers com, August 2019).

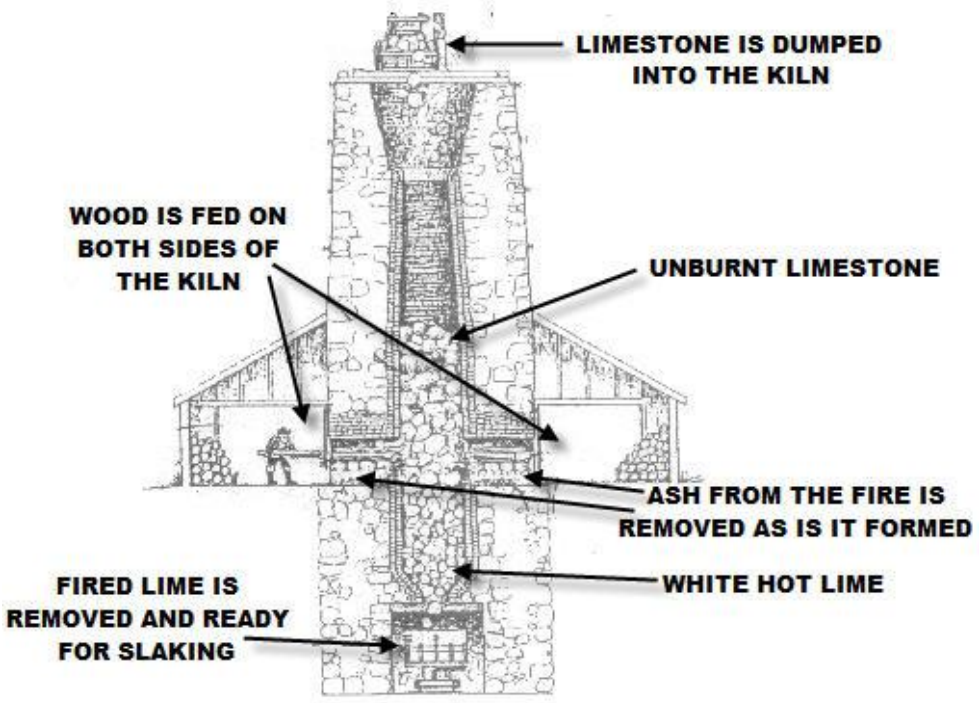

Figure 3. Cross section sketch of a vertical draw lime kiln (Grafton Lime Kiln, limehousekilns.ca).

Figure 4. Vertical draw kiln at Lime Kiln Point State Park, San Juan Island, stoking hole just visible on upper left of kiln (Photo by D'Ann Owens, 2019).

Figure 5. Large scale lime kiln operations at Roche Harbour, San Juan Island (photo by author).

Lime kilns were built primarily of limestone and volcanic greenstone. Because the kilns were built out of the material they were burning, they were lined with earth mortar and clay brick to protect the structural integrity of the kiln. Iron rods were used in the construction of these kilns to hold the structure together under the high temperatures to which it would be subjected (Ben Gourley, pers com, August 2019). Most vertical draw kilns were built into hillsides. This allowed for carts of limestone to be more easily emptied into the top of the kiln to burn down and have the quicklime available to be raked out of the draw hole at the bottom.

Though there are broad categories of lime kilns (vertical draw kilns as opposed to earth mound kilns for instance), the styles of the individual kilns vary greatly across region and time, in a classic example of vernacular architecture. The locally known kilns at Hart Road in View Royal (Donald Luxton and Associates 2012), and at Kingzett Lake near Shawnigan Lake (Cowichan Valley Regional District 2015), are both vertical draw kilns, like the San Juan Island examples above, but differ in their smaller size, and that the length of the chimney is not square masonry, but is made of a circular masonry interior with a metal clad chimney atop a square base (Cowichan Valley Regional District 2015; Donald Luxton and Associates 2012).

In consideration of the results of the background research, the field study would expect to find a vertical draw lime kiln of the Kingzett Lake (Figure 6) or Hart Road style (Figure 7). A field study could also reasonably expect to find remnant traces of other associated activity areas, such as a drying and packing shed, a stoking and wood storage shed, a loading ramp, limestone quarrying areas, or living spaces.

Figure 6. Kingzett Lake Lime Kiln, historic photograph (Shawnigan Lake Museum).

Figure 7. Hart Road Lime Kiln, historic photograph.

Methodology

The goals for the archaeological survey, as outlined in a meeting with the Highland Heritage Select Committee, included:

- Identification of the extent of the kiln area
- Identification of the remnants of the associated loading ramp
- Identification, if possible, of ancillary structures such the potential for remains of a barrel storing shed over the front of the kiln, or stoking/wood storing sheds to the sides of the kiln.
- Identification of any lime quarrying faces behind the kiln area.

The survey method devised to accomplish these goals included three-dimensional survey with a robotic Total Station of all surface features, including survey of the kiln structure, survey and mapping of the greater project area and all observed kiln related structures and objects, as well as digital documentation and photography of all physical features.

Efforts to locate remains of wooden ancillary structures included visual survey and metal detector survey to locate historic nails left behind by these buildings. The metal detector was used to identify high potential testing locations, which were subsequently subsurface tested by hand.

Results

The Highlands lime kiln is a vertical draw type kiln. The historic kiln includes features within the remnant stone kiln structure, such as the draw hole, as well as associated features such as the loading ramp foundation behind the kiln, and two small limestone quarries approximately 13 m to the east of the kiln structure (Figure 8). No pre-contact archaeological material was identified during the project fieldwork. Historic material culture identified during the project generally consisted of metal fragments, which are likely associated with the historic occupation of the area during or slightly after the operation of the lime kin. All but three historic artifacts were left *in situ.*

The distribution of artifacts and features shows that while the masonry kiln structure itself is partially on District of Highlands property and partially on privately owned Ecoasis property, the majority of artifacts and features are located on Ecoasis property.

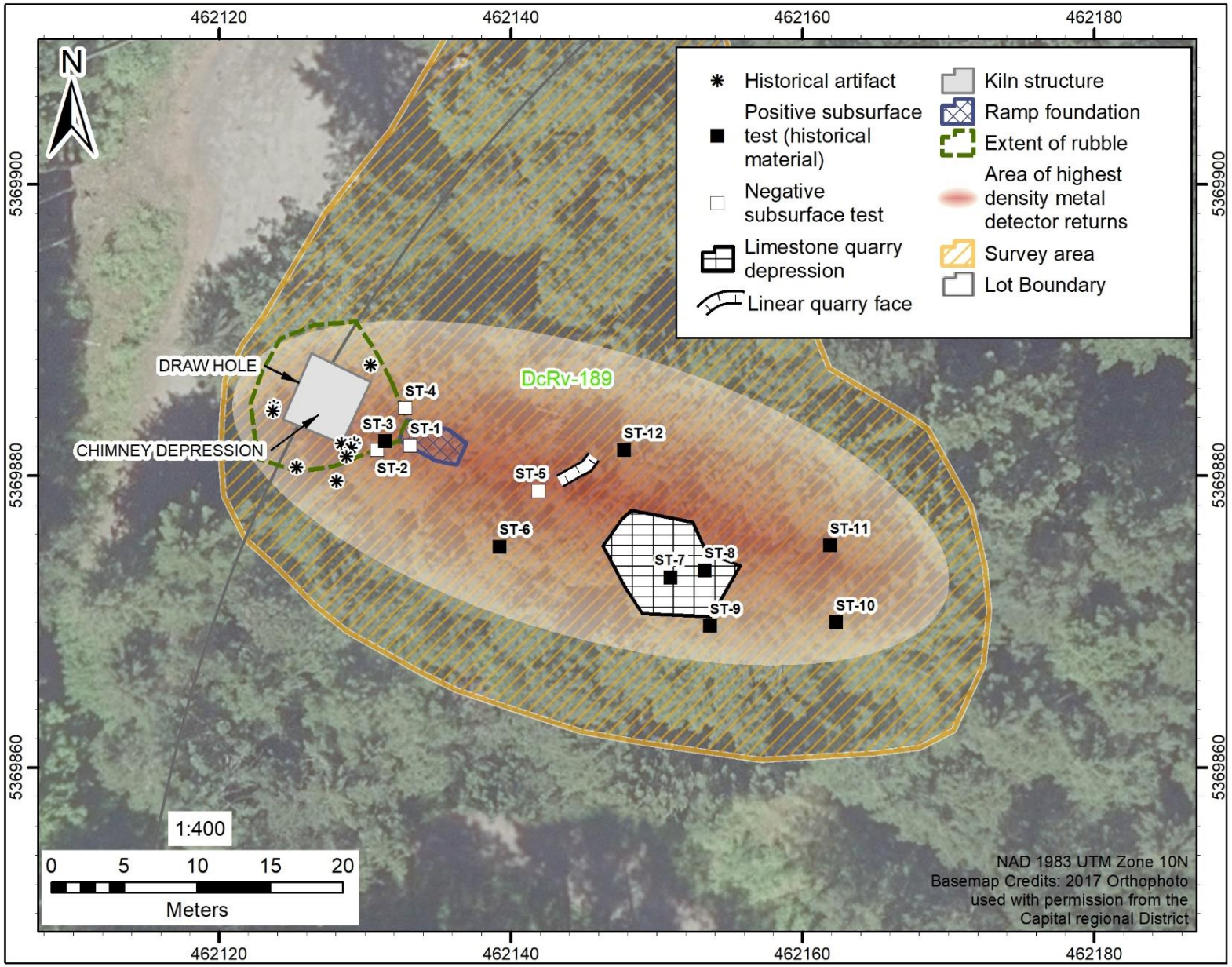

Figure 8. Highlands lime kiln survey results map.

Survey

The kiln was surveyed by a single person pedestrian crew using a robotic Total Station. The Highlands lime kiln masonry structure is 5 m square and 3.5 m tall. The ramp foundation rises approximately 6 m above the base of the kiln. Like other vertical draw kilns, the highlands lime kiln is built into a hillside. Specifically, the Highlands kiln is built into a west facing hillside (Figure 2).

Kiln Survey

The kiln is square, and measures 5 m east-west by 5 m north-south. It is 3.4 m tall. Total station points were recorded where corner blocks could be observed. The top centre of the kiln has a circular shaped collapsed area, likely the remnants of the chimney. For safety, this was not closely evaluated. The survey was unable to locate any stoking holes in the sides of the kiln structure. It is considered likely that the stoking holes exist and are simply buried under the rubble of the collapsed upper portions of the kiln.

The front drawhole (Figure 9) is now a small 53 cm high by 87 cm wide entrance but was likely a standing height entrance during the kiln's operation. This was the sheltered area where the lime was raked out to cool, though likely there would have been a wooden shed over the arched entrance, to shelter barrels of quicklime from the rain before transport (see San Juan lime kiln photos above). This shed would have been located where the parking lot is now. The drawhole inner chamber measures 2m east-west by 130 cm north-south and contains a burn box at the far rear (east end, Figure 10). The floor of the inner chamber has, like the entrance, been mostly filled in with dirt and rubble.

At the rear, east side, of the lime kiln there are the remains of the loading ramp. It appears today as a gently sloped, less treed part of the forest, leading to the top of the kiln from the back. A wooden ramp structure would have been built upon the ramp foundations. This ramp would have been used to reach the top of the kiln chimney, which would have been much taller than what remains today.

Figure 9. Front drawhole entrance.

Figure 10. Inside of the drawhole chamber. The floor has been mostly filled with dirt, rubble and some garbage.

3D Models

Survey with the robotic Total Station allowed for the production of a three-dimensional model of the lime kiln and ramp (Figure 11). The chimney is inferred, based on the chimney hole depression in the kiln structure. The loading ramp would have been built on a wooden structure on top of the ramp foundation, in order dump limestone into the top of the chimney.

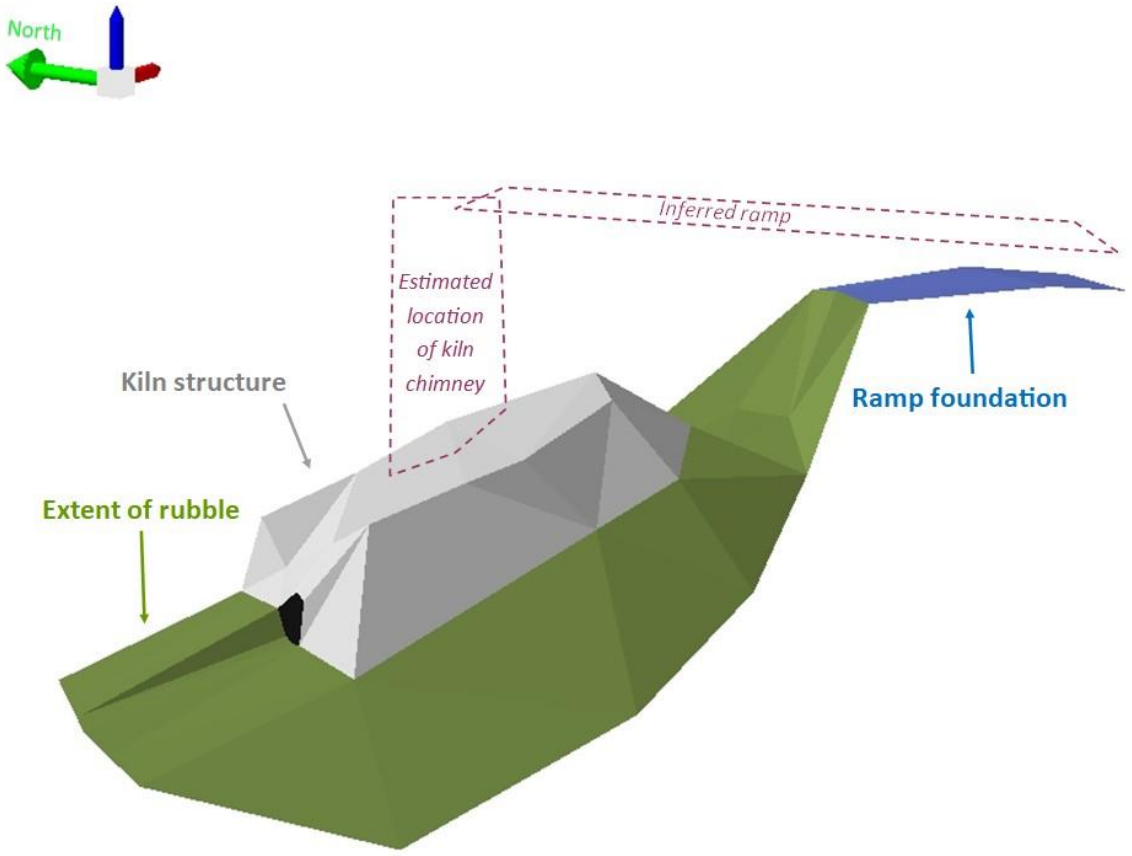

Figure 11. Three dimensional model of the Highlands lime kiln, view looking to the north.

Limestone Quarry Survey

To the east of the kiln, through the forest, two limestone quarrying areas: one smaller linear quarry face and one limestone quarry depression. The linear quarry face is located approximately 13 m to the east of the kiln structure and consists of a linear face cut into limestone. This linear quarry face was identified by lime kiln expert Ben Gourley (Ben Gourley, pers com, August 2019). It measures 3.5 m northeast-southwest and is 60 cm tall (Figure 12).

Figure 12. Smaller, linear face limestone quarry. Photo taken facing east.

The second, larger quarrying depression is located approximately 20 m to the east of the kiln structure. The southwest corner of this quarry is the deepest point and is comprised of a more or less square corner cut into limestone. The northeast corner is less square and is made up of a sloping earth ramp down into the depression. Overall this limestone quarry depression is 15 m east-west, 10 m north-south, and 1.5 m deep (Figure 13).

The straightness of these faces, cut directly into limestone, paired with the proximity to the kiln, is strong evidence that these features are quarry sources for limestone used in the Highland lime kiln. It is documented in other historical lime kilns that the operators would use the closest sources of limestone possible, and that kilns would be purposely built close to limestone seams.

Figure 13. Larger limestone quarry depression. Tree with stadia rod is located in the earth ramp. Limestone visible in vertical cuts to the right of the tree. Photo taken facing south.

Testing

In order to employ an efficient and effective testing program, a metal detector was used to seek out the highest potential testing locations. Approximately 40 metal detector positive results were temporarily flagged with green pin flags or red candy-striped flagging tape. A sample of positive metal detector results were subsurface tested.

Of the twelve subsurface tests (Figure 1), eight succeeded in recovering the piece of metal indicated by the metal detector. Four were unable to locate the metal indicated by the detector. Stratigraphy was generally uniform across the site: all tests had mossy surfaces, and shallow dark brown sediment covering an impenetrably rocky layer. Tests were intentionally spaced to cover as much of the area as possible, and targeted to investigate potential areas of interest such as the ramp foundation, the quarry area, and the ground to the sides of these areas, which may have been activity areas related to the operation of the lime kiln.

Tests were dug at the discretion of the field archaeologist, based on observations of subsurface results in the field. A judgmental testing strategy was employed, as it was not feasible to test every positive metal detector result. For instance, when there were many positive metal

detector results in a line, and two subsurface tests both revealed pieces of metal wire consistent with fencing, it was not deemed a priority to dig the other subsurface tests in that line. The metal wire extended through the limestone quarry depression (ST-7 and ST-8) and to the east (ST-9 and ST-10) but was not apparent to the west of the quarry depression (Figure 8). See Appendix A: Subsurface Test Log for details and metrics of the testing program.

Artifacts

Eight of the twelve shovel tests were positive for metal artifacts, and a further six artifacts were recorded on and around the surface of the kiln. The surface artifacts were comprised mainly of structural elements, and all were recorded and left *in situ*.

Surface Artifacts

Three fragments of Gartcraig brick were recorded on the surface of the kiln. Brick and earth mortar were commonly used to line lime kilns. As recorded in (Stark and Associates 2016), Gartcraig bricks were manufactured in Scotland between 1876 and 1927, and the only recorded shipment of Gartcraig bricks to Victoria was advertised in the Colonist newspaper on August 4th, 1906. While it is possible that these bricks are from the kiln's original 1886 construction, this author agrees with Stuart that it is most likely that the Gartcraig bricks found at the Highlands lime kiln were from the 1906 shipment of bricks from Scotland to Victoria, and are likely evidence of a refurbishment of the lime kiln at that time.

Also on the surface, metal bars were recorded protruding from the masonry base of the lime kiln (Figure 15). These were identified by Ben Gourley (site visit, August 2019) as likely part of the metal ties that were installed around the masonry structures of lime kilns to add structural soundness under the high temperatures that the kiln would reach.

Figure 14. Gartcraig brick fragments recorded on surface of kiln.

Figure 15. Metal bar on north side of kiln structure. Metal bars were installed around the masonry bases of lime kilns to add structural integrity.

Subsurface Artifacts

Eleven subsurface artifacts were recovered from shovel tests at positive metal detector finds. All subsurface artifacts were recorded and photographed, and all but three were left in-situ. Most were reburied in their tests after recording, as nothing further would be learned about them by conducting in-office analysis. The three artifacts that were collected consisted of a square nail, a piece of twisted wire, and the edge of an oblong shaped tin. Several modern style round nails were recorded and reburied.

The square nail was collected as its typology is consistent with older nails, likely from the era of the construction and operation of the kiln (Figure 16). This nail was found in ST-6, a shovel test located on the foundation of the dumping ramp (Figure 1). As all other nails

uncovered were modern round nails, this the best recovered evidence of the wooden ramp that would have led to the top of the kiln chimney.

Within the larger of the two quarries and extending out from there to the east, a dozen positive metal detector results were recorded in a line (Figure 8). These were flagged and four were tested (ST-7, 8, 9, and 10). All four contained fragments of wire. It was determined that, due to time constraints, the other positive metal detector results in the line would not be tested, as they would most likely also contain fragments of the same wire strand. These fragments were all straight, untwisted, unbarbed wire.

One fragment of wire, retrieved from ST-8 within the larger limestone quarry depression, was collected because unlike the other wire fragments, this one was twisted as if it was used to connect two pieces of wire to each other (Figure 17). This piece of wire was brought back to the office for further analysis to determine if it was wire from fencing or from a telegraph line. It is likely that wire represents the remains of a historic livestock fence; however, historic wire fences for animals were often made of two-strand twisted barbed wire, not single straight wire. While less likely, it is also possible that this could represent the remains of a telegraph wire. Though this analysis cannot be conducted with high certainty based on one isolated piece of twisted wire, desktop based research into the types of wires used in telegraph lines and the twisting methods used to attach telegraph wires to each other, indicates that the twisted piece of wire could be from a telegraph line.

Several round nails were also found along the same line as the wire fragments. Beginning in the 1900s, round wire nails become the standard. More research is needed into the paths of telegraph lines in the Highlands district, but it is likely that the round nails and wire discovered during this testing program could indicate either the route of a historical telegraph line, or the presence of a post and wire fence.

The third collected artifact is the bottom of a metal can from ST-11. It was collected due to its ovoid rather than circular shape, which may indicate a diagnostic can type (Figure 18). Consultation with other Millennia archaeologists well versed in historic debris revealed that tobacco, sardines, and baking soda were historically sold in tins with ovoid bases. As this can base was recovered from the test the furthest away (east) from the kiln and ramp, it is possible that this can indicates an activity area associated with processes of daily life, rather than with the industrial operation of the lime kiln.

All other artifacts, including the wire fragments and the modern nails, were reburied in their tests after recording. Details and metrics of all artifacts are further described in Appendix B. Artifact Catalogue.

Figure 16. Square nail from ST-6. Likely from the wooden ramp structure for dumping limestone into the kiln for burning.

Figure 17. Twisted wire from ST-8. Likely from a telegraph line or historic fence.

Figure 18. Bottom of oblong tin from ST-11. Likely a tobacco or baking soda tin.

Discussion

Given the shape and size of the Highlands lime kiln, as described above, it is likely that this kiln is consistent with the vernacular architectural style of the Kingzett Lake and Hart Road. The three kilns were built in the same era and in the same general geographic area, which are both important consideration for vernacular architectural styles. Furthermore, the base of the Highlands Kiln appears to be quite similar in size and shape to the bases of the Kingzett Lake and Hart Road kilns. It is therefore considered likely that, like the Kingzett Lake and Hart Road kilns, the Highlands kiln also had a metal clad circular chimney. Though the survey identified no remnants of this metal cladding, it is possible that the metal was scavenged or otherwise removed in the past. The survey also did not identify enough rubble to make up a taller square stone chimney such as those seen on the San Juan Islands, reinforcing the interpretation that the Highlands kiln was likely in the same style as the Kingzett Lake and Hart Road kilns.

The preliminary report by Stark and Associates (2016) contains a strong basis on which this current report builds. For instance, Stark's report gives an overview of how lime kilns work, and the current report identifies the type of kiln represented by the Highlands lime kiln. Additionally, Stark's report describes that different areas will be associated with a working kiln, such as quarry areas, the living areas of the two-man crew running the kiln, and a ramp for dumping limestone into the kiln. The current report identified two quarrying areas, a tin can bottom further back from the working areas which may indicate a living rather than industrial use of that space, and a square nail which likely represents the remnants of the construction of the wooden ramp which would have been used to reach the top of the chimney in order to dump limestone into the kiln.

Stark's report suggests that the Highlands kiln has a circular plan external mortar construction with a circular plan internal combustion chamber. However, new data allows for the evolution on previous work. Based on the data gathered in this study, it is apparent that the Highlands lime kiln consisted of square plan external mortar construction with a circular plan internal combustion chamber. This construction is characteristic of the local kiln vernacular.

Building on the associations between the Stark and Associates (2016) report and the current report, future interpretative opportunities exist for the educational and interpretive potential of the Highlands lime kiln. For instance, an informational sign could be mounted in the parking lot of the District Office near the kiln, which could describe the type of kiln and how a lime kiln operated. Historic photos of same-style kilns could be shown on the sign to illustrate how the Highlands kiln would have looked. The same sign could feature a map indicating the areas around the kiln which would have contributed to the running of a working kiln, such as the quarry area, the ramp, and where the quicklime would have been raked out and packed into casks. Furthermore, the museum at Caleb Pike Heritage Park could house an exhibit on the archaeological survey results. The square nail could be displayed, and written interpretive materials describing dating methods using different types of nails could be created. These approaches would all contribute to the educational and interpretive outreach possibilities of the site.

With consultation of the included map (Figure 8), an interpretive sign could be installed on District lands near the kiln without damage to the heritage site. Installation of a sign at the edge of the parking lot would provide easiest viewing of both the sign and the kiln, and a five to

ten metre buffer is recommended between the kiln rubble and the sign installation location to avoid possible damage or destabilization to the kiln.

Significance Assessment

The evaluation of archaeological resources is directly linked to their historic value and considers both the whole resource and its components. The archaeological site evaluation is intended to assess the relative significance of a site or sites using explicit criteria to measure these values. Several kinds of archaeological significance are recognized, including scientific, public, historic, ethnic, and economic significance. Broadly speaking, scientific significance is based upon the ability of a site to provide further data that could significantly improve our understanding of the history of a region with reference to site integrity and content. Public significance assesses whether the site is accessible to the general public and whether it contains visible features that could be appreciated by the public in an interpretive, educational or recreational capacity. Historic significance is based upon whether a site is connected with an event or person considered important in British Columbia's history, such as early exploration, settlement, land use or other aspects of cultural development. Economic significance refers to the ability of a site to create revenue (e.g., a heritage park with visitation fees). Ethnic significance refers to the traditional, social, or religious importance of a site to a particular community. Ethnic significance is best assessed by the District of Highlands community and is not considered in this report.

The Highlands lime kiln was registered as DcRv-189, a formally recognized Historic Place, in 2013 (Heritage Site Form). The heritage value of formally recognized Historic Places are determined on the basis of historical, architectural and community criteria. The site also has high public significance, as it is comprised of visible features that could easily be appreciated by the public, and has interpretive and educational opportunities.

Evaluation of Research

The pedestrian survey method employed was appropriate to identify surficial historic artifacts, deposits and features. Testing completed for the assessment targeted positive metal detector results in order to efficiently test the landform. The density, distribution and type of historic artifacts identified during the assessment are consistent with those expected to be found at a historic industrial site. The low density of historic artifacts recovered is expected for a rocky landform with shallow soil cover, particularly as part of a project including a small amount of ground-altering activity.

Recommendations

The Highlands lime kiln is recognized under the Community Heritage Register and is recorded as historic site DcRv-189 in the provincial heritage register. While, no further archaeological work is recommended in the immediate project area for the purposes of establishing the limits of artifacts and features directly associated with the kiln, it is possible that additional research questions may be raised in the future which could be partially addressed by further subsurface testing. In particular, the tin can fragment suggests the possibility of additional material culture relating to undocumented labourers who may have worked at the site.

In terms of continued protection of the kiln itself, brush removal is recommended as the most significant form of preservation. Brush and trees were cleared from the kiln prior to this archaeological assessment and keeping the kiln structure clear of growing roots will aid the conservation of its structural integrity going forward.

In the event that future ground alteration is proposed in the vicinity of the lime kiln, a professional archaeologist should be consulted in advance of project commencement. Avoidance of any impact to the kiln structure and ramp foundation associated with the kiln is recommended.

Limitations

As with any archaeological investigation involving a sampling strategy, unidentified cultural deposits may be present within the project area. On provincial land these deposits may be protected under the *Heritage Conservation Act* (*HCA*). If unanticipated archaeological remains (including but not limited to those identified as potential site types in this document) are encountered during construction or land-altering activity the developer is advised to halt work in the immediate area and contact a professional archaeologist and the appropriate regulatory agency.

The information contained in this report has been compiled specifically for the project as defined by the proponent and discussed herein. Any subsequent ground-altering projects may not be addressed by the current archaeological study and additional studies may be appropriate.

Professional Statement

The information compiled in this report has been prepared in accordance with the standards of the BC Association of Professional Archaeologists, the BC Archaeological Impact Assessment Guidelines (British Columbia Archaeology Branch 1998), and following the Treasury Board *Guide to the Management of Movable Heritage Assets* (Treasury Board of Canada Secretariat 2008) and *Policy on Management of Materiel* (Treasury Board of Canada Secretariat 2006). This report has been prepared by Millennia Research Limited staff and reviewed by a senior archaeologist (see signatories below).

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Appendix A. Subsurface test log.

Permit Number: non-permit

Coordinates in NAD83 UTM Zone 10N

Test ID	Test type	Date tested	Test result	X Coordinate	Y Coordinate	Dimensions (cm)
DcRv-189						
ST-1	Shovel test	2019-11-29	Negative	462130.47	5369886.87	30 x 30

DBS (cm)	Level result	Level description
0 - 20	Negative	Loosely-packed dark brown humus; 5-20% sub-angular cobbles

Test end rationale: Impenetrable (rocky)

Positive metal detector ping, but nothing identified in test. Material was trowel sorted before being replaced in the hole

TS point 51.

0 to 20 cm dbs

South wall.

Test ID	Test type	Date tested	Test result	X Coordinate	Y Coordinate	Dimensions (cm)
ST-2	Shovel test	2019-11-29	Positive	462130.06	5369887.45	30 x 30

DBS (cm)	Level result	Level description
0 - 5	Positive intact	Loosely-packed dark brown humus; 5-20% sub-angular cobbles; artifacts # artifacts: 1

Test end rationale: located metal object

Positive metal detector ping. One modern nail found. TS point 52

Permit Number: non-permit

Coordinates in NAD83 UTM Zone 10N

Test ID	Test type	Date tested	Test result	X Coordinate	Y Coordinate	Dimensions (cm)
DcRv-189						

ST-3	Shovel test	2019-11-29	Positive	462125.23	5369904.02	30 x 30

DBS (cm)	Level result	Level description
0 - 5	Positive intact	Loosely-packed dark brown humus; 5-20% sub-angular cobbles; artifacts # artifacts: 1

Test end rationale: Metal object reached.

TS point 53. Test excavated into side of rap foundation.

Photo taken facing east.

Permit Number: non-permit

Coordinates in NAD83 UTM Zone 10N

Test ID	Test type	Date tested	Test result	X Coordinate	Y Coordinate	Dimensions (cm)
DcRv-189						

0 to 5 cm dbs

Photo taken facing east.

ST-4	Shovel test	2019-11-29	Negative	462128.75	5369892.47	30 x 30

DBS (cm)	Level result	Level description
0 - 29	Negative	Loosely-packed dark brown humus; 5-20% sub-angular cobbles Positive metal detector ping, but nothing identified in the test.

Test end rationale: Impenetrable (rocky)

TS point 54.

Photo taken facing east.

0 to 29 cm dbs

Photo taken facing east.

ST-5	Shovel test	2019-11-29	Negative	462154.75	5369877.99	30 x 30

DBS (cm)	Level result	Level description
0 - 31	Negative	Loosely-packed dark brown humus; 5-20% sub-angular cobbles

Test end rationale: Impenetrable (rocky)

Positive metal detector ping, but nothing identified in test. Material was trowel sorted before being replaced in the hole.

Permit Number: non-permit

Coordinates in NAD83 UTM Zone 10N

Test ID	Test type	Date tested	Test result	X Coordinate	Y Coordinate	Dimensions (cm)
DcRv-189						

TS point 55.

0 to 31 cm dbs

Photo taken facing east.

ST-6	Shovel test	2019-11-29	Positive	462125.23	5369904.02	30 x 30

DBS (cm)	Level result	Level description
0 - 21	Positive intact	Loosely-packed dark brown humus; 5-20% sub-angular cobbles; artifacts # artifacts: 1

Test end rationale: Limit of development

End of a historical square nail located. TS point 56.

0 to 21 cm dbs

Photo taken facing east.

Permit Number: non-permit

Coordinates in NAD83 UTM Zone 10N

Test ID	Test type	Date tested	Test result	X Coordinate	Y Coordinate	Dimensions (cm)
DcRv-189						
ST-7	Shovel test	2019-11-29	Positive	462147.68	5369881.15	30 x 30

DBS (cm)	Level result	Level description
0 - 26	Positive intact	Loosely-packed dark brown humus; 5-20% sub-angular cobbles; artifacts In quarry. # artifacts: 1

Test end rationale: metal object reached

TS point 70.

Photo taken facing south.

0 to 26 cm dbs

South wall.

Test ID	Test type	Date tested	Test result	X Coordinate	Y Coordinate	Dimensions (cm)
ST-8	Shovel test	2019-11-29	Positive	462151.48	5369897.25	30 x 30

DBS (cm)	Level result	Level description
0 - 10	Positive intact	Loosely-packed dark brown humus; 5-20% sub-angular cobbles; artifacts # artifacts: 2

Test end rationale: metal object reached

Wire is in line with the other wire test and with the other positive metal detector pings that were left unexamined TS point 71.

Permit Number: non-permit

Coordinates in NAD83 UTM Zone 10N

Test ID	Test type	Date tested	Test result	X Coordinate	Y Coordinate	Dimensions (cm)
DcRv-189						

Photo taken facing east.

0 to 10 cm dbs

East wall.

ST-9	Shovel test	2019-11-29	Positive	462157.28	5369875.13	30 x 30

DBS (cm)	Level result	Level description
0 - 26	Positive intact	Loosely-packed dark brown humus; 5-20% sub-angular cobbles; artifacts # artifacts: 2

Test end rationale: metal object reached

Test in line with several other metal detector pings. This test contained a wire, which is consistent with a line of other points. These metal detector pings likely also contain wire fragments and will be left unexcavated due to time constraints.

TS point 72.

Showing test and several other pieces of flagging in line that indicate other metal detector pings. Likely part of the same wire.

Permit Number: non-permit

Coordinates in NAD83 UTM Zone 10N

Test ID	Test type	Date tested	Test result	X Coordinate	Y Coordinate	Dimensions (cm)
DcRv-189						

0 to 26 cm dbs

East wall.

ST-10	Shovel test	2019-11-29	Positive	462156.57	5369862.21	30 x 30

DBS (cm)	Level result	Level description
0 - 5	Positive intact	Loosely-packed dark brown humus; 5-20% sub-angular cobbles; artifacts Test in line with several other metal detector pings. # artifacts: 1

Test end rationale: metal object reached

Total Station point 73. Test in line with several other metal detector pings running east-west and generally in line with MT-9.

0 to 5 cm dbs

MT-10

Permit Number: non-permit

Coordinates in NAD83 UTM Zone 10N

Test ID	Test type	Date tested	Test result	X Coordinate	Y Coordinate	Dimensions (cm)
DcRv-189						
ST-11	Shovel test	2019-11-29	Positive	462168.54	5369880.00	30 x 30

DBS (cm)	Level result	Level description
0 - 20	Positive intact	Loosely-packed dark brown humus; 5-20% sub-angular cobbles; artifacts # artifacts: 1

Test end rationale: metal object reached

Total Station point 74.

0 to 20 cm dbs

North wall.

ST-12	Shovel test	2019-11-29	Negative	462154.07	5369884.69	30 x 30

DBS (cm)	Level result	Level description
0 - 24	Negative	Loosely-packed dark brown humus; 5-20% sub-angular cobbles Large rock in south half of test.

Test end rationale: Logistical reasons

Positive metal detector ping, but nothing identified in test .TS point 75.

Permit Number: non-permit

Coordinates in NAD83 UTM Zone 10N

Test ID	Test type	Date tested	Test result	X Coordinate	Y Coordinate	Dimensions (cm)
DcRv-189						

0 to 24 cm dbs

West wall.

Appendix B. Artifact Catalogue

Permit Number: non-permit

Coordinates in NAD83 UTM Zone 10N

DcRv-189: n= 1 Date recorded: 2019-11-29 Barcode:

Basic Group:	Historical	Length (mm):	☐ *Complete*	Weight (g):	X: 462161.30
Object:	Wire, Single Strand	Width (mm):	☑ *Complete*	Portion:	Y: 5369878.25
Material:	Metal	Thickness (mm):	☑ *Complete*		
Context:	Subsurface test ST-8, 0 to 10 cm dbs				

Comments: Pieces of metal wire. Replaced in hole.

Pieces of metal wire.

DcRv-189: n= 1 Date recorded: 2019-11-21 Barcode:

Basic Group:	Historical	Length (mm):	☑ *Complete*	Weight (g):	X: 462126.47
Object:	Architectural, Brace	Width (mm):	☑ *Complete*	Portion:	Y: 5369877.58
Material:	Metal	Thickness (mm):	☑ *Complete*		
Context:	Surface				

Comments: Likely part of the same retaining system as bar on north side of the kiln. Surface artifact left in situ.

Permit Number: non-permit

Coordinates in NAD83 UTM Zone 10N

DcRv-189: n= 1 Date recorded: 2019-11-21 Barcode:

Basic Group:	Historical	Length (mm):	☑ *Complete*	Weight (g):	X: 462120.30
Object:	Nail, Spike, Square Shank	Width (mm):	☑ *Complete*	Portion:	Y: 5369874.14
Material:	Metal	Thickness (mm):	☑ *Complete*		
Context:	Surface				

Comments: Surface artifact left in situ.

Flagging tape added by district.

DcRv-189: n= 1 Date recorded: 2019-11-21 Barcode:

Basic Group:	Historical	Length (mm):	☑ *Complete*	Weight (g):	X: 462120.55
Object:	Sheet Metal, Not Identified	Width (mm):	☑ *Complete*	Portion:	Y: 5369870.93
Material:	Metal	Thickness (mm):	☑ *Complete*		
Context:	Surface				

Comments: Surface artifact left in situ.

Permit Number: non-permit

Coordinates in NAD83 UTM Zone 10N

DcRv-189: n= 1 Date recorded: 2019-11-21 Barcode:

Basic Group:	Historical	Length (mm):	☐ *Complete*	Weight (g):	X: 462117.32
Object:	Brick, Solid	Width (mm):	☑ *Complete*	Portion:	Y: 5369872.41
Material:		Thickness (mm):	☑ *Complete*		
Context:	Surface				

Comments: Two brick fragments. Surface artifact left in situ.

DcRv-189: n= 1 Date recorded: 2019-11-21 Barcode:

Basic Group:	Historical	Length (mm):	☑ *Complete*	Weight (g):	X: 462122.45
Object:	Architectural, Brace	Width (mm):	☑ *Complete*	Portion:	Y: 5369883.47
Material:	Metal	Thickness (mm):	☑ *Complete*		
Context:	Surface				

Comments: Surface artifact left in situ.

Metal bar on north side of the kiln. Photo taken facing southeast.

Permit Number: non-permit

Coordinates in NAD83 UTM Zone 10N

DcRv-189: n= 1 Date recorded: 2019-11-21 Barcode:

Basic Group:	Historical	Length (mm):	☐ *Complete*	Weight (g):	X: 462124.37
Object:	Brick, Solid	Width (mm):	☑ *Complete*	Portion:	Y: 5369874.73
Material:		Thickness (mm):	☑ *Complete*		
Context:	Surface				

Comments: Surface artifact left in situ.

DcRv-189: n= 1 Date recorded: 2019-11-29 Barcode:

Basic Group:	Historical	Length (mm):	☑ *Complete*	Weight (g):	X: 462126.05
Object:	Nail, Iron Wire	Width (mm):	☑ *Complete*	Portion: Complete	Y: 5369876.87
Material:	Metal	Thickness (mm):	☑ *Complete*		
Context:	Subsurface test ST-2, 0 to 5 cm dbs				

Comments:

Permit Number: non-permit

Coordinates in NAD83 UTM Zone 10N

DcRv-189: n= 1 Date recorded: 2019-11-29 Barcode:

Basic Group:	Historical	Length (mm):	☐ *Complete*	Weight (g):	X: 462151.12
Object:	Wire, Single Strand	Width (mm):	☑ *Complete*	Portion:	Y: 5369867.41
Material:	Metal	Thickness (mm):	☑ *Complete*		
Context:	Subsurface test ST-7, 0 to 26 cm dbs				

Comments:

DcRv-189: n= 1 Date recorded: 2019-11-29 Barcode: F04544

Basic Group:	Historical	Length (mm):	☐ *Complete*	Weight (g):	X: 462144.00
Object:	Wire, Multiple Strand	Width (mm):	☑ *Complete*	Portion:	Y: 5369863.23
Material:	Metal	Thickness (mm):	☑ *Complete*		
Context:	Subsurface test ST-8, 0 to 10 cm dbs				

Comments: Twisted wire - likely from fencing.

Permit Number: non-permit

Coordinates in NAD83 UTM Zone 10N

DcRv-189: n= 1 Date recorded: 2019-11-29 Barcode:

Basic Group:	Historical	Length (mm):	☑ *Complete*	Weight (g):	X: 462144.01
Object:	Nail, Iron Wire	Width (mm):	☑ *Complete*	Portion:	Y: 5369850.03
Material:	Metal	Thickness (mm):	☑ *Complete*		
Context:	Subsurface test ST-9, 0 to 26 cm dbs				

Comments: One nail and one piece of wire. Nail has circular head. Both reburied in hole.

Head of nail.

DcRv-189: n= 1 Date recorded: 2019-11-29 Barcode:

Basic Group:	Historical	Length (mm):	☐ *Complete*	Weight (g):	X: 462144.01
Object:	Wire, Single Strand	Width (mm):	☑ *Complete*	Portion:	Y: 5369850.03
Material:	Metal	Thickness (mm):	☑ *Complete*		
Context:	Subsurface test ST-9, 0 to 26 cm dbs				

Comments:

Head of nail.

Permit Number: non-permit

Coordinates in NAD83 UTM Zone 10N

DcRv-189: n= 1 Date recorded: 2019-11-29 Barcode:

Basic Group:	Historical	Length (mm):	☐ *Complete*	Weight (g):	X: 462165.82
Object:	Nail, Iron Wire	Width (mm):	☐ *Complete*	Portion:	Y: 5369874.76
Material:	Metal	Thickness (mm):	☐ *Complete*		
Context:	Subsurface test ST-10, 0 to 5 cm dbs				

Comments: Nail with washer/collar found in a line of other metal detector pings. Reburied in the hole.

Nail with washer/collar.

DcRv-189: n= 1 Date recorded: 2019-11-21 Barcode:

Basic Group:	Historical	Length (mm):	☐ *Complete*	Weight (g):	X: 462113.99
Object:	Rod, Building Hardware	Width (mm):	☑ *Complete*	Portion:	Y: 5369865.72
Material:	Metal	Thickness (mm):	☑ *Complete*		
Context:					

Comments: Surface artifact left in situ.

DcRv-189: n= 1 Date recorded: 2019-11-29 Barcode: F04528

Basic Group:	Historical	Length (mm):	☐ *Complete*	Weight (g):	X: 462139.49
Object:	Nail, Iron Cut, Square Shank	Width (mm):	☐ *Complete*	Portion:	Y: 5369876.01
Material:	Metal	Thickness (mm):	☐ *Complete*		
Context:	Subsurface test ST-6, 0 to 21 cm dbs				

Comments: Historical square nail. Collected for further analysis.

DcRv-189: n= 1 Date recorded: 2019-11-29 Barcode: F04543

Basic Group:	Historical	Length (mm):	☐ *Complete*	Weight (g):	X: 462160.96
Object:	Container, Unknown	Width (mm):	☐ *Complete*	Portion:	Y: 5369878.23
Material:	Metal	Thickness (mm):	☐ *Complete*		
Context:	Subsurface test ST-11, 0 to 20 cm dbs				

Comments: Collected for further identification. Identified as an ovoid can. Tobbaco tins, baking powder tins, etc, were often ovoid like this one.

Permit Number: non-permit

Coordinates in NAD83 UTM Zone 10N

DcRv-189: n= 1 Date recorded: 2019-11-29 Barcode:

Basic Group:	Historical	Length (mm):	☑ *Complete*	Weight (g):	X: 462125.25
Object:	Nail, Iron Wire	Width (mm):	☑ *Complete*	Portion:	Y: 5369878.93
Material:	Metal	Thickness (mm):	☑ *Complete*		
Context:	Subsurface test ST-3, 0 to 5 cm dbs				

Comments: