

# Lower Keflavík: Geophysical Prospection and Coring Interim Report 2012-2016



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*Photo on front page – Core from Lower Keflavik showing floor deposit.*



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## SKAGAFJÖRÐUR HERITAGE MUSEUM

The Skagafjörður Heritage Museum is a center for research on local history and cultural heritage in the Skagafjörður region, North Iceland. It is affiliated with the National Museum of Iceland and its main exhibition at the old turf farm of Glaumbær is one of the most visited national heritage tourist attractions. The Archaeological Department of the museum was established in 2003 and engages in contract and research driven archaeology both within and outside the region. The core long-term research programs center on fundamental issues surrounding the settlement and early medieval church history of Skagafjörður and the North-Atlantic region with a focus on developing methodological and theoretical approaches to the geography of early Christian cemeteries. The department is involved in multifaceted interdisciplinary collaboration with Icelandic and international institutions and specialists. Its research portfolio includes bioarchaeology, early metal production, settlement studies, as well as the methodological aspects of archaeological surveying.

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## **FISKE CENTER FOR ARCHAEOLOGICAL RESEARCH**

The Andrew Fiske Memorial Center for Archaeological Research at the University of Massachusetts Boston was established in 1999 through the generosity of the late Alice Fiske and her family as a living memorial to her late husband Andrew. As an international leader in interdisciplinary research, the Fiske Center promotes a vision of archaeology as a multi-faceted, theoretically rigorous field that integrates a variety of analytical perspectives into its studies of the cultural and biological dimensions of colonization, urbanization, and industrialization that have occurred over the past one thousand years in the Americas and the Atlantic World. As part of a public university, the Fiske Center maintains a program of local archaeology with a special emphasis on research that meets the needs of cities, towns, and Tribal Nations in New England and the greater Northeast. The Fiske Center also seeks to understand the local as part of a broader Atlantic World.

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## **SKAGAFJÖRÐUR CHURCH AND SETTLEMENT SURVEY**

The Skagafjörður Church and Settlement Survey (SCASS) seeks to determine if the settlement pattern of the 9th-century colonization of Iceland affected the development of the religious and economic institutions that dominated the 14th century. The research builds on the combined methods and results of two projects. One has focused on Viking Age settlement patterns. The other has been investigating the changing geography of early Christian cemeteries. Together, the research seeks to understand the connections between the Viking settlement hierarchy and the Christian consolidation.

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## 1.0 INTRODUCTION

Keflavík is one of the most northern farms on Hegranes. “Keflavík” means driftwood bay. The name of the island is probably derived from the nickname of the supposed first settler of the region, Havardr hegri, translated into English as Havard the heron, (Pálsson and Edwards 1972:90; Zoëga and Bolender 2016; Zoëga, et al. 2015). To the north of Keflavík are the waters of Skagafjörður, with the northerneastern border a beach (probably the actual keflavík), and the rest of the northern border of the farm are sea cliffs. To the northwest is the farm of Utanverdunes and to the southeast is Helluland. The farm south of Keflavík is Garður (Figure 1). The central part of the farm’s fields is in a 300 m wide north-south running valley that drains to the north. Today the farm buildings are on high on a ridge on the east side of the valley, but the main farmmound, barn, and other activity areas are directly opposite, on the west side ridge. The eastern part of the main farmmound contains a Viking Age and medieval churchyard and is currently being investigated (Zoëga and Bolender 2016; Zoëga, et al. 2015). The results presented here cover the investigation the area in the center of Keflavík’s fields, between the modern houses and the main farmmound, termed Lower Keflavík. The defining feature of Lower Keflavík is a visible tun wall that runs for about 200 m (Figure 2). For coring purposes, the area defined as Lower Keflavík is about 14,950 m<sup>2</sup> (starting at N 581790 and going 115 m north to E581905 and starting at 477290 and going 130 m east to 477420. This area, either defined by the tun wall, or the strict dimensions above, does not appear to be associated either with the main, farmmound or the medieval churchyard.

Keflavík first appears in the historical record in 1374 as a property belonging to the bishop’s see at Hólar. A medieval cartulary dating to 1394 recounts that a priest was paid for his service at Keflavík, which suggests that there might have been a chapel (Sigurðardóttir 2012). The existence of an early Christian cemetery at Keflavík was confirmed in 2013 and is currently under investigation (Zoëga and Bolender 2016; Zoëga, et al. 2015). This 2013 church was abandoned long before the 1394 mention, hinting that this site may be complex and potentially other churches. In 1713 the farm was worth 20 hundreds (Magnússon and Vídalín 1930:64) and the same again 130 years later (Johnsen 1847:277) and neither land survey source mentions a church. Magnússon and Vídalín (1930) do mention other potential farms at Keflavík: Vík, Grønagerði or Grottakot, Þrægerði, Litla-Keflavík, and an unnamed old farm. Thw western border of Lower Keflavík is about 40 m from the cemetery

excavations, which are at the eastern base of the main farm mound and it is unclear if the Lower Keflavík area is associated with any of the places mentioned by Magnússon and Vídalín (Zoëga and Sigurðarson 2009). Recent work on the outlying farmssteads at Keflavík (Catlin and Steinberg 2016; Catlin, et al. 2017) suggest that most of these mentioned farms are not associated with the Lower Keflavík area.

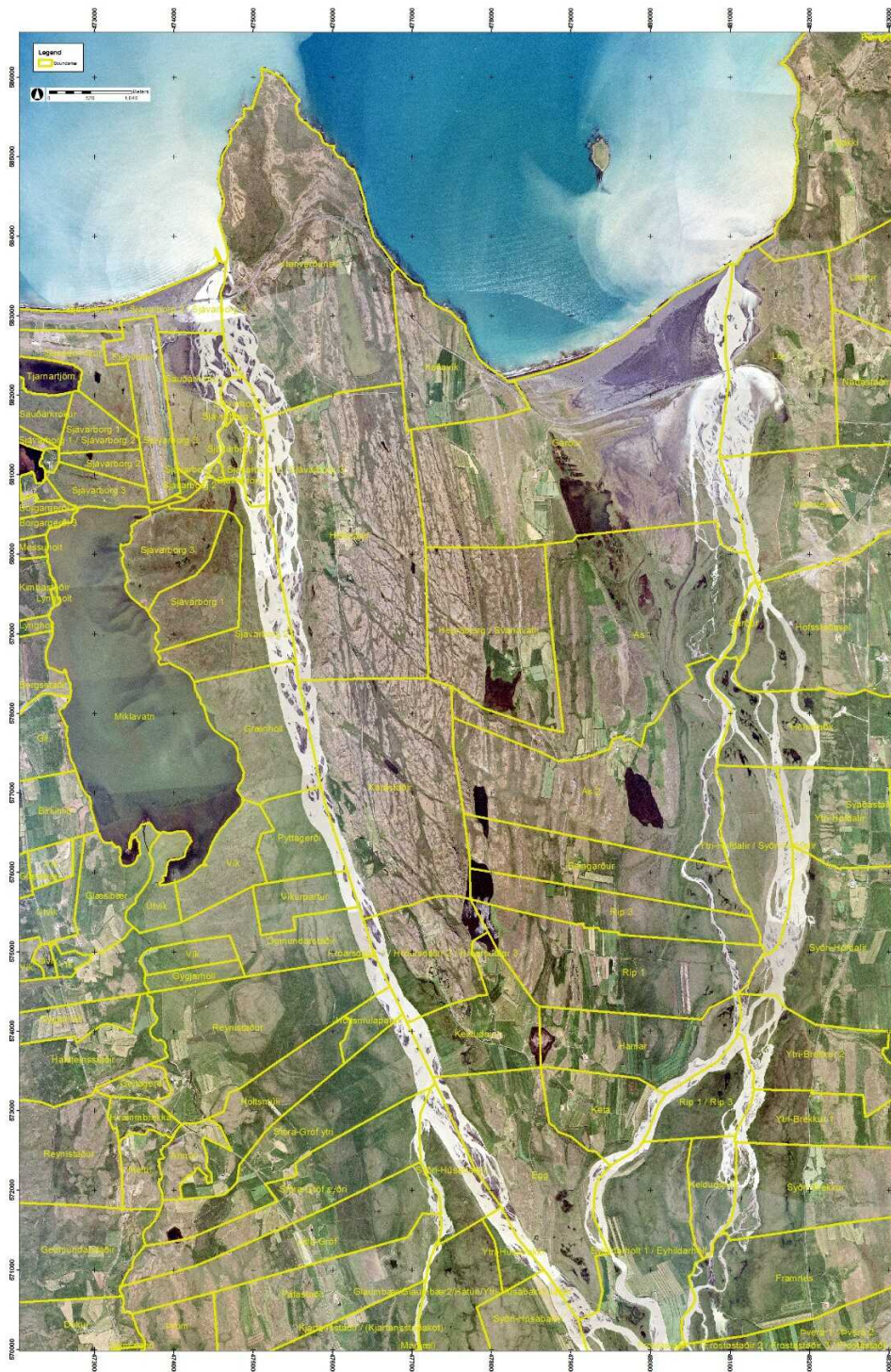


Figure 1. Air photo of Hegranes showing modern farm boundaries in yellow.



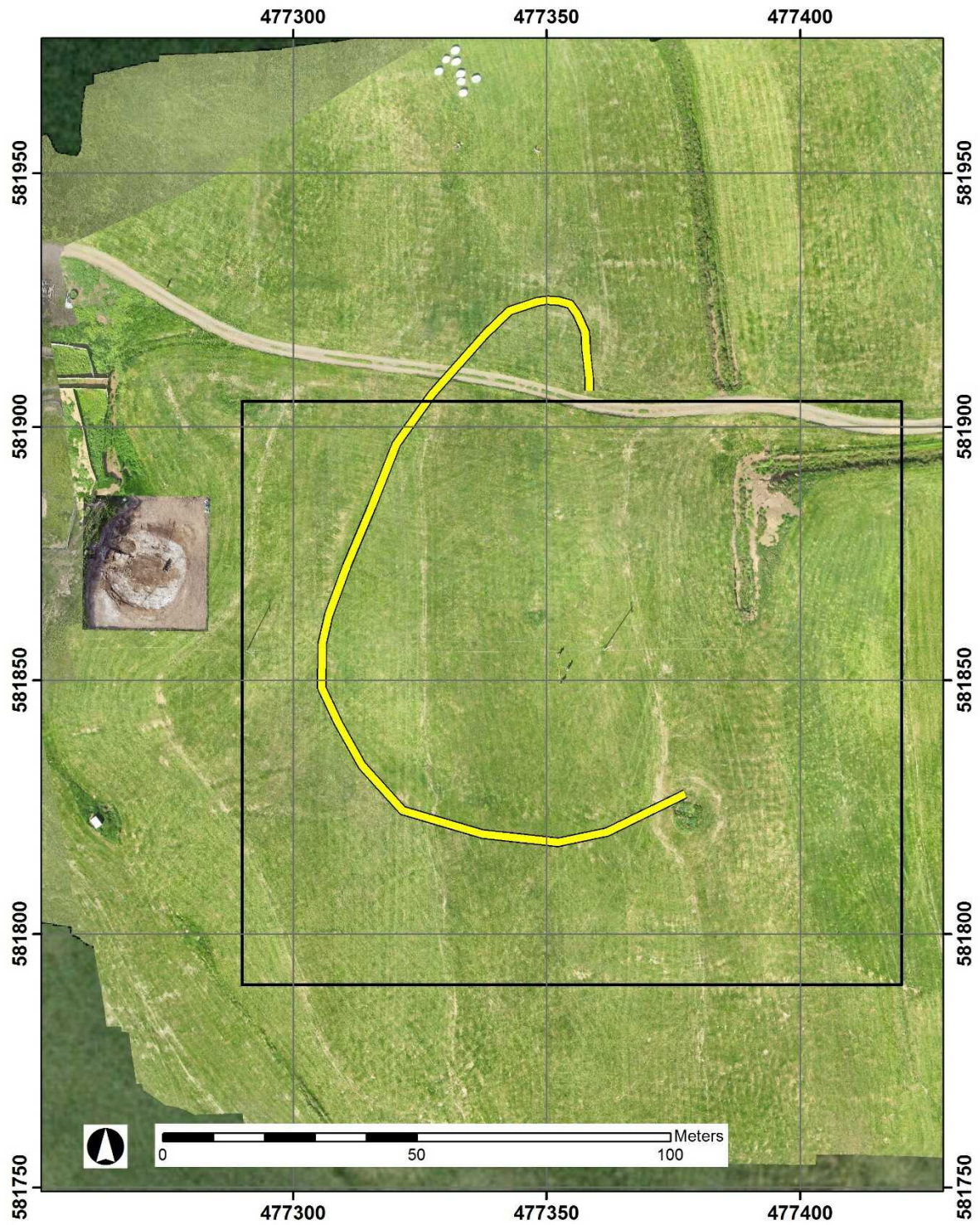


Figure 2. Kite photograph of Lower Keflavík with tun boundary wall in yellow and defined area in black. The churchyard associated with the western farmmound is also shown.

## 1.1 Geology and tephra

The geology of the region is characterized by Upper Tertiary basic and intermediate extrusive basalts (Feuillet, et al. 2012) overlain by morainic glacial till (Decaulne, et al. 2016). The area was deglaciated by 6100 yr cal.BP and then subject to uplift (Cossart, et al. 2014).

Hegranes is probably a large rock drumlin, flyggberg, or *rôche moutonnée* formation (e.g., Neil 2002), with a long gradual south-side slope and a more sudden fall off on the north with many areas of plucked bedrock on that side of the island. The natural stratigraphy of the near surface of the region consists of a rapidly formed sediment and soil with intermixed tephra layers, along with gravel layers and lenses of glacial origin. The soil is a brown andosol that derives from aeolian sediments of volcanic origin, but is not the direct product of eruptions (Arnalds 2004, 2008; Arnalds, et al. 1995). The andosol is non-cohesive but has an extremely high water-retention capacity (Arnalds 2008).

The settlement and church survey relies heavily on tephra layers preserved in the soil. Skagafjörður has an early tephra sequence that allows for a fine-grained chronology of the changes in early settlement patterns (Larsen, et al. 2002). While tephra deposition can vary over small distances (Davies, et al. 2010) the basic tephra sequence is found throughout Skagafjörður and allows for a common dating system among farms and farmsteads (Þórarinnsson 1977).

### ❖ Historic:

- Hekla A.D. 1766. A black tephra usually found in turf or in the upper 10 cm of the soil sequence.
- Hekla A.D. 1300: A gray-blue to dark black tephra (Larsen 1984; Larsen, et al. 1999; Larsen, et al. 2002; Larsen, et al. 2001; Sveinbjarnardóttir 1992).
- Hekla A.D. 1104 (H1). This white or yellowish-white tephra is the most consistent in Skagafjörður (Eiriksson, et al. 2000; Þórarinnsson 1967) and is readily identifiable in both natural and cultural stratigraphic sequences.

### ❖ Landnám sequence (LNS):

- Vj~1000 tephra. A blue to bluish-black layer whose source has not been determined but is likely to be either from a Grímsvötn and/or Veiðivötn eruption dated to

approximately A.D. 1000 (Boygles 1999; Ólafsson 1985; Sigurgeirsson 1998; Wastegard, et al. 2003). Preliminary analysis of the composition of volcanic glass shards by scanning electron microprobe (SEM) has identified a mixture of shards from both volcanic sources.

- The mid-10th century layer (~950). This blue-green layer that is sporadically found is currently an un-sourced and undated layer that lies between the LNL and Vj~1000. There are several potential candidates for this layer, including the large A.D. 934 ±2 eruption of Eldgjá. (Fei and Zhou 2006; Hammer, et al. 1980; Thordarson, et al. 2001) or an A.D. 933 ±6 green tephra layer identified in the Lake Mývatn area from Veidivötn, termed V-Sv ~950 (Sigurgeirsson, et al. 2013). Preliminary analysis by SEM has identified shards primarily from the Grímsvötn source.
- “Landnám” or “settlement” layer (LNL, LTL, also designated as 871). The layer is so-named for its association with the earliest settlements in Iceland (Dugmore and Newton 2012)) and is dated to A.D. 871 ±2, (Grönvold, et al. 1995; Zielinski, et al. 1997, [A.D. 877 ±4]). The tephra originates from the Vatnaöldur fissure swarm associated with the Torfajökull and Bárðarbunga volcanos (Dugmore and Newton 2012; Larsen 1984). In general, this layer consists of two distinct tephras—an olive-green tephra overlying a white tephra. However, in Skagafjörður, only the green portion is present (cf. Hallsdóttir 1987). In many cases this layer and surrounding layers are tightly spaced in a brown organic rich soil matrix associated with the environmental changes of colonization.
- Black tephra below the LNL (K800). The earliest tephra in this sequence is a dark black layer probably from the Katla volcano, but is not well dated (Wastegard, et al. 2003). It is usually labeled K800 in profiles.

❖ Prehistoric:

- Hekla 3 (H3). A thick (generally 2-3 cm) white or whitish-yellow tephra dating to about 950 B.C. (Dugmore, et al. 1995).
- Hekla 4 (H4). A thick (generally 1-3 cm) white or yellowish-white tephra dating to about 2300 B.C. (Eiriksson, et al. 2000).

## **1.2 Farmstead stratigraphy**

Chronological phasing of farmstead sizes primarily relies on two tephra layers: the white Hekla A.D. 1104 (H1) and the dark Hekla A.D. 1300. These layers are the most commonly found in cores and often the easiest to identify of the historical tephtras. H1 is presented twice as often as Hekla A.D. 1300. Using these tephra layers to date cultural deposits allows for the chronological phasing of farmstead sizes and for farmstead sizes to be compared across contemporary temporal horizons. Their presence also allows for the identification of changes in the size of individual farmsteads. Other tephra layers are used to help identify the overall stratigraphic sequence in the soil cores and to associate specific layers with historical periods. Deposits categorized by these temporal phases are based on whether or not they contained “farmstead” material. The resulting chronology allows for the estimation of farmstead size for three primary periods:

- Pre-A.D. 1104
- A.D. 1104-1300
- Post-A.D. 1300

## **1.3 Farmstead deposits identified in coring**

To determine the location and area of farmstead deposits, the results of cores were divided into three simple categories: “yes,” “no,” and “maybe” based on the presence of cultural material above or below specific tephra layers (Steinberg, et al. 2016). Small and infrequent anthropogenic inclusions in soils – such as ash, charcoal, and bone – are common near farmsteads and other activity areas. These are good indicators that an activity area or domestic site may be nearby but we do not count infrequent inclusions as contributing to the areal extent of the farmstead. Higher concentrations of anthropogenic inclusions, midden deposits, turf, and floors are included in farm mound deposits.

For the “Pre-A.D. 1104” period a “Yes” cores presented cultural deposits below the H1 (or an earlier) tephra. “Maybe” cores indicated early cultural deposits, as determined by depth or association with another tephra such as the 1766 or 1300 tephra, but without the presence of a clearly defined H1 tephra layer. The absence of the H1 in a context of a cultural deposit is mostly because it was not preserved or the core did not penetrate deeply enough to encounter it (i.e., refusal within more recent deposits). A “no” core resulted when no cultural layers

were present in the core or where there was no cultural layer below the H1. Almost all “no” cores had the H1, or some other tephra that allowed for the assessment of this important negative evidence. The same logic was used for the “A.D. 1104-1300” and the “Post-A.D. 1300” farmstead distributions based on coring.

For the purposes of the coring survey, farmstead or farm mound deposits include:

- Turf deposits: any evidence for a turf structure, including collapsed or levelled turf, are considered evidence of farm buildings. The organic content and percentage of soil in turf deposits is variable. Sometimes tephra layers are present in turf, which can provide a terminus post quem (TPQ) date for the deposit. Dating turf deposits is not without difficulties. As a rule, a turf farmstead deposit containing a tephra layer is a positive farm mound location (yes) for the period(s) after the latest identified tephra. In the absence of in situ tephra, the rest of the deposit is characterized as a potential farm mound (maybe). For example, in a core with turf including what was identified as the H 1300 tephra as the only "farmstead deposit" would be coded as "Yes" for post-1300 but also "Maybe" for the pre-1104 and 1104-1300 phases because of the inherently uncertainty of a field identification of a single dark tephra.
- Low density cultural layers (LDC): defined by anthropogenic inclusions amounting to 10-50% of the soil matrix. These are assumed to result from indistinct and extensive depositional events that suggest regular activity typical of farmsteads or other farm production areas. Sometimes this deposit has a “mixed” character.
- Middens: defined by anthropogenic inclusions amounting to more than 50% of the soil matrix that suggest the regular deposition of household or production area waste. Middens are the result of distinct and intensive depositional events associated with purposeful disposal. In both LDC and Midden layers that are punctuated by tephra layers, for purposes of farm mound dating, the deposits are assumed to be continuous, occurring immediately before and after the date of the tephra deposition. For example, in a midden deposit with only H1 present, surrounded on either side by midden, both “Pre 1104, and “1104-1300” would be positive (“yes”) while “Post-A.D. 1300” would be “maybe.”



- Floor: characterized by dense, compacted, and/or greasy cultural layers indicative of floors, extramural activity areas, or areas of intense deposition of organic materials. These deposits are often thin but are very distinct.

A farmstead's perimeter for a given time period was determined by the results of the plotted cores taken around a site. The perimeter was plotted half way between a "yes" and "no" core, or on a "maybe" core between a "yes" and "no" core. The continuous area within the perimeter was calculated to produce the maximum possible area of a farmstead.

#### **1.4 Previous archaeological work**

In 2008 the visible surface features within the tun wall of Lower Keflavík were mapped and tested as part of the Skagafjörður Church Project (Figure 3). The main goal of this work was to identify churchyards, therefore special attention was given to circular surface features. Two distinct circular features were identified along with an indistinct circular slump. Additionally an east-west long feature, consistent with a turf structure, was also identified. Trench 2008-1 showed only ephemeral signs of turf. Trench 2008-2 makes clear that, at least that part of the defining tun wall was constructed before the 1104 tephra fell (Figure 4). Trench 2008-3 identified a substantial turf deposit mixed with midden under a well-preserved H1 (Zoëga and Sigurðarson 2009:22). Trench 2008-4 had clear domestic deposits, characterized by peat ash, charcoal and animal bones, again, below a well-defined H1. Trench 2008-5 had substantial peat ash and wood ash deposits (Figure 5), along with degraded turf, suggesting a smithy or some sort of iron working deposit.

Some previous geophysics has already been reported on (Bolender, et al. 2013) but will be reanalyzed here in light of the intensive and extensive coring at Lower Keflavík. Trench 2015-6 is part of Ramona Steel's Master's thesis work, and will not be reported on here, but the stratigraphy and dating observed in trench 2008-2 is entirely consistent with 2015-6 (Figure 4).

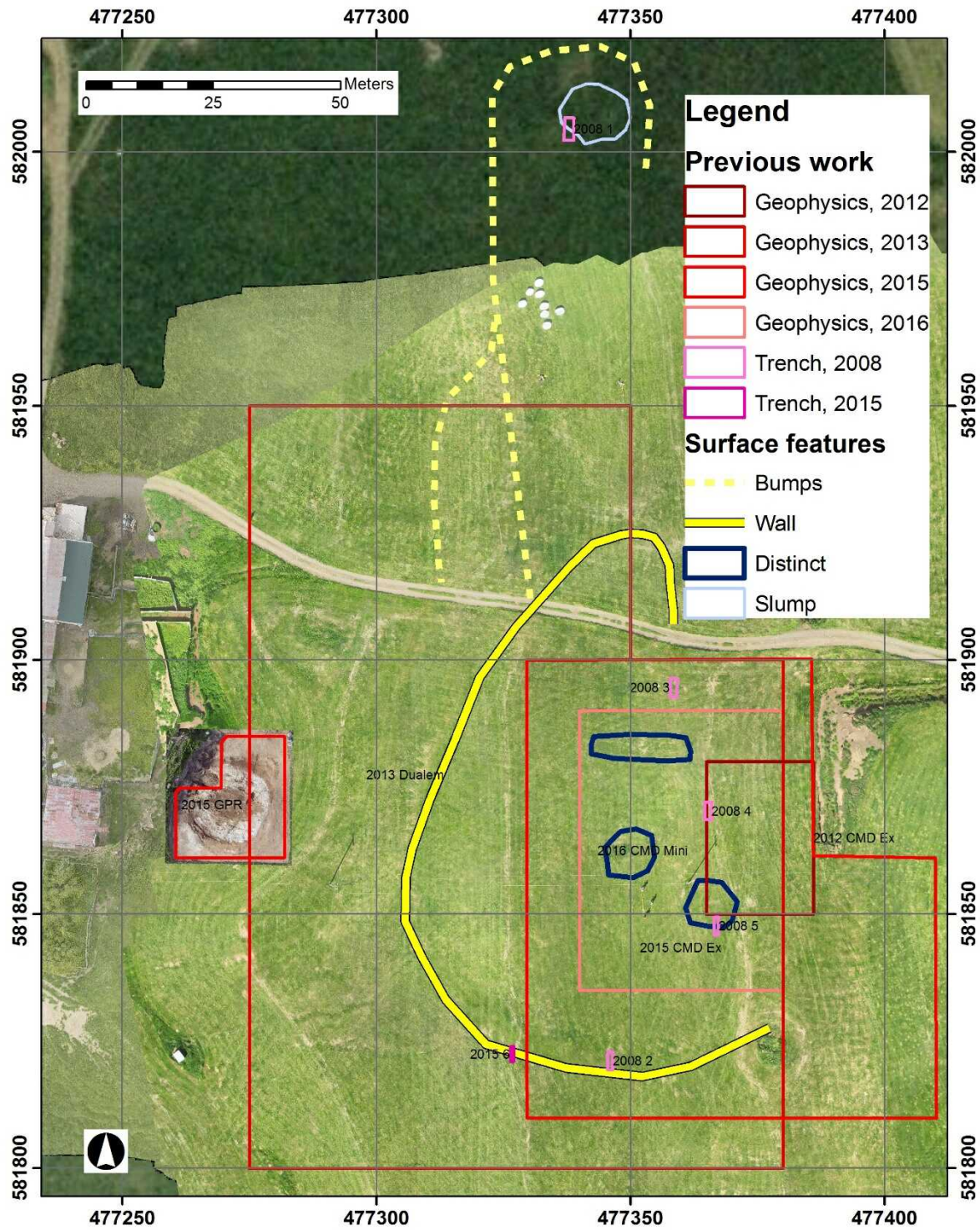


Figure 3. Location and areas of archaeological work and distinct surface features at Lower Keflavík





Figure 4. West sidewall of trench 2008-2 showing H1 on top of turf wall.



Figure 5. North sidewall of trench 2008-5 peat ash and wood ash deposits.

## **2.0 LAND SURVEYING AND ESTABLISHMENT OF GRIDS**

All land-survey data were collected based on the ISN93 coordinate system. Core locations were determined in several ways. For only a few cores that were taken well away from the center of Lower Keflavík, the internal GPS receiver in the iPhones or iPads that were used to record the coring data was used. Many of these cores were taken in 2015. Within Lower Keflavík, most cores were collected on rough 10 x 10 m grid spacing that were located by pacing. Judgmentally placed cores were originally located with an iPad and then by either a Topcon Hiper SR DGPS or a Trimble Geo XH which was equipped with a Zepher antenna in order to improve upon the accuracy of the locational data. The 2016 cores transect lines were placed using the geophysical grid.

The geophysical grid was initially established using a Topcon Hiper SR DGPS using the ISMAR differential station at Stoð ehf in Sauðárkrókur, which yields about 1 cm horizontal accuracy and 2 cm vertical accuracy. The original GPS points were re-measured with the Topcon GPT 9005A auto tracking pulse total station to ensure consistency across different total-station set ups. The corner points of the survey area and internal grids at intervals of 50 × 50 meters were flagged using the total station. Additional flags were laid out at intervals of 10 × 10 m using fiberglass measuring tapes that were stretched between the stations established by the DGPS. The eastern and western baselines of the entire grid were flagged at 1-m intervals using alternating colors. Additional lines of alternating flags running east to west were laid out 10 m apart to help guide the surveying.

## **3.0 GEOPHYSICAL METHODOLOGIES**

The use of geophysical methods in support of archaeological investigations is widely established (e.g., Gaffney and Gater 2003; Linford 2006). For the 2016 study, frequency-domain electromagnetics (FDEM) was applied over northern portions of the assembly site. Summarized below are the geophysical methodologies that were used. Appendix A provides a general overview of FDEM operations.

### **3.1 Site Conditions and Geophysical Targets**

The natural stratigraphy of the region consists of soil with intermixed tephra layers, along with gravel layers and lenses of glacial origin. At Lower Keflavík, the ground surface is relatively smooth but there are a few thufurs or frost heaves (e.g., Grab 2005), as well as the ephemeral remnants of archaeological remains, do create some topographical relief.

There are several potential geophysical targets associated with the Viking Age archaeological remains at Lower Keflavík. For this survey, the most important targets are usually found in a central farmstead. The most common include: longhouses, middens, barns, pit houses, outbuildings, and churches. Other features, that are not necessarily buildings, include animal pens and boundary walls, that can, less frequently, be identified using maps of geophysical readings. Geophysical techniques are most effective for predicting the location of buried archaeological structures and deposits without surface sign where the deposits are substantial and are of a single component. Furthermore, the archaeological remains must have physical properties that make them distinct from the surrounding environment. Finally, the geophysical techniques work best where the remains have a well-defined interface with an original surface. Generally, geophysical techniques are contraindicated when the remains are ephemeral, or in disturbed contexts, or part of a complex palimpsest-like deposit.

The two main targets for the geophysical survey are long houses and churchyards. Long houses are distinguishable by their geometry, with two slightly bowed 2 m thick turf walls that are between 4 and 8 m apart. Thus far, we have not identified a central fireplace or hearth with geophysical techniques, but these fire features are a key part of longhouse structures.

Other archaeological remains (e.g., booths, walls) are expected to consist of compacted turf blocks overlying a stone foundation. In some cases, the turf will be placed directly on the ground or on a prepared surface. From a geophysical perspective, measureable contrasts between stones and soil and between compacted turf and soil are anticipated (i.e., contrast in apparent ground conductivity and in-phase for FDEM).

In general, churchyards consist of a small central church that is surrounded by a cemetery, which is enclosed by a circular wall. The churches are often only 3 × 4 m in size and constructed of wood with stone foundation. The wall is typically between 15 to 30 m in

diameter and composed of compacted turf overlying a stone foundation or gravel base. Graves may be found throughout the enclosed cemetery including under the church.

Graves can be a difficult geophysical target to detect but differential fill, breaks in soil stratigraphy, and the interfaces along the sides and bottom of grave shafts might be detectable (Bevan 1991; Conyers 2005, 2006; Doolittle and Bellantoni 2010; Jones 2008; King, et al. 1993). In some instances, the direct detection of skeletal remains is possible (Damiata, et al. 2013; Damiata, et al. 2017; Schultz 2008; Schultz and Martin 2011).

### **3.2 Frequency-Domain Electromagnetic Surveying**

There were several overlapping geophysical surveys at Lower Keflavík conducted over multiple years. In 2012, an FDEM survey using the CMD Explorer was conducted over a 20 × 30 m grid, which was primarily intended to test the unit (Figure 3). In 2013, an expanded reconnaissance survey was conducted over a 150-x200 m grid using the DueLEM to test the efficacy of that instrument. One objective of this early work was to directly compare geophysical to the exposed archaeological remains, especially the visible tún wall. In 2015, a third FDEM survey was conducted, this again with the CMD Explorer. Finally, in 2016, a fourth survey was conducted using the CMD Mini. This last survey proved to be the most efficacious.

#### **3.2.1 Equipment and Field Procedures**

The FDEM surveys were conducted using a host of multi-sensor conductivity meters: GF Instruments' CMD Explorer (Figure 6), a Dualem-21 (Figure 7) and a CMD-MiniExplorer (Figure 8). Unlike traditional EM meters-that have a single transmitter and receiver coil, the multi-sensor instruments have multiple receiver coils at different lengths from the transmitter coil (i.e., dipole lengths) thus sensing different volumes (and total depths from the ground surface) of the subsurface. One of the major advantages of these systems is that the different readings from the same location can be compared and filtered to isolate anomalies (cf. Saey, et al. 2009; Simpson, et al. 2009). Thus, maps of archaeological features that produce subtle changes in moisture content can be produced more easily. Multi-sensor instruments have significant advantages over single sensors as they can potentially distinguish the depth of features causing anomalies. Having an approximate depth of specific anomalies can greatly aid in interpretation (Bonsall, et al. 2013). Maps and figures of FDEM readings are labeled with the component and dipole length. Thus, C1 and IP1 present quadrature phase and in-

phase data from the shortest dipole length, and shallowest depth of interrogation while C3 and IP3 present quadrature phase and in-phase data from the longest dipole length, and greatest depth of interrogation. Both quadrature phase (bulk ground conductivity - C) and in-phase (related to bulk ground magnetic susceptibility - IP) components were recorded for each of the three dipole lengths (i.e., six simultaneous readings were recorded for each “measurement”).

The CMD Explorer operates at 30 kHz over three separate dipole lengths (i.e., a single transmitter [TX] located at one end of the unit and three separate receivers [RX] located at varying distances along the boom). By increasing dipole length, a greater volume and depth of soil can be sensed. When operated in the vertical dipole mode, the dipole lengths of 1.48, 2.82 and 4.49 m provide depths of interrogation of approximately 2.2, 4.2 and 6.7 m (i.e.,  $\sim 1.5X$  the dipole length), respectively, relative to the level of the sensors. For the 2013 CMD Explorer survey it was operated in the vertical dipole mode with the boom carried at hip level oriented perpendicularly to the direction of the east-west transects that were walked from east to west along contiguous transects that were separated by 0.5 m. For the 2015 CMD Explorer survey, the unit was operated in the vertical dipole mode with the boom carried at hip level oriented parallel to the direction of the east-west transects that were walked from east to west along contiguous transects that were separated by 0.5 m. In both cases the sampling rate was set to 10 Hz (i.e., 10 samples per second), which yielded a spacing between measurements of  $\sim 0.06$  m while walking at a normal pace. Note that surveying was guided by color-coded PVC flags that were placed every 10 meters along transects separated by 1 m. The true location of a measurement was determined by fiducial markers that were placed into the data stream by the operator and assuming linear interpolation between markers.

The DualEM-21 has four dipole lengths (1.0 m, 1.1 m, 2.0 m and 2.1 m) with receivers oriented both horizontally (1.0 m and 2.0 m) and vertically (1.1 m and 2.1 m) relative to a horizontally oriented transmitter coil (i.e., horizontally coplanar and perpendicular geometries). The instrument was mounted on sled and dragged parallel to survey transects bi-directionally. Transects were 1 m apart. The DualEM collects data at a fixed rate of time, and therefore during survey a given fiducially must be reached exactly in the allotted time. In most cases we used 1 m/sec and collected data approximately at 0.01 m intervals.

CMD Mini, like the larger CMD explorer operates at 30 kHz over three separate dipole lengths with a single TX located at one end of the unit and three separate RX located at



dipole lengths of 0.32, 0.71 and 1.18 m which provide depths of interrogation of approximately 0.5, 1.0 and 1.8 m, respectively, relative to the level of the sensors. For the 2016 CMD Mini survey, the unit was operated in the vertical dipole mode with the boom carried at foot level oriented parallel to the direction of the east-west transects that were walked from east to west along contiguous transects that were separated by 0.5 m. The sampling rate was set to 10 Hz (i.e., 10 samples per second), which yielded a spacing between measurements of  $\sim 0.06$  m while walking at a normal pace. Again, surveying was guided by color-coded PVC flags that were placed every 10 meters along transects separated by 1 m.



Figure 6. Using the CMD Explorer at Hegranesthing in 2015 before the church excavation.





Figure 7. Electromagnetic surveying with the DualEM-21 (pictured at Stóra-Seyla). Damiata, keeps track of the distance, while Steinberg right, pulls unit at an even pace along the ground surface.



Figure 8. Using the CMD Mini at Keflavík in 2015 before the church excavation.

### 3.2.2 Data Processing

The raw data were initially corrected to properly adjust for the starting and ending locations of each transect. As a check on quality control for the CMD, the average spacing of measurements for each fiducial segment along a given transect (i.e., every 10 m) was calculated to ensure the spacing between measurements was approximately 0.07 m or less. The data were then processed using Oasis Montaj mapping software to produce color-contoured maps. The processed data were also archived into a database for future use.

### 3.2.3 Results

The 2012 CMD Explorer results at Lower Keflavík were covered a small area and showed little structure to the data (Figure 9 and Figure 10). Operating the unit perpendicular to the transect does not yield high resolution of contrasts on archaeological scales.

The 2013 DualEM results were mixed. The horizontal C, especially sensor 1 (Figure 11) seems to be very sensitive to surface metal. The C horizontal sensor 2, vertical C sensor 1 and vertical C sensor 2 (Figure 12) all show little structure to the data, while all of the IP data shows substantial structure, especially the tún walls (Figure 13 and Figure 14). Most importantly, in light of the CMD mini, discussed below, horizontal C sensor 1 & 2 & vertical IP sensor 2 both suggest important structure to the data that was not identified until the 2016 results of the CMD mini survey. Conversely, the tún walls do not present well in the C components, and where they do appear, they are slightly higher (more conductive) than the surrounding environment. In the IP, the tún walls present as high anomalies surrounded by low IP regions. This pattern would suggest that the tún walls at Lower Keflavík do not contain rocks, in contrast to the visible tún walls at neighboring Hegranesþing (Damiata, et al. 2016) from about the same time period.

The 2015 CMD Explorer C readings suggest almost no structure (Figure 15) while the IP readings suggest substantial structure (Figure 18). Unfortunately, other than the visible tún wall, we have not been able to associate the patterns seen in the IP data with specific archaeological components. Again, as discussed below, CMD Mini and coring data suggests that all of the CMD Explorer readings are deep and may be picking up variations in the ubiquitous gravel layer that generally begins about 55 cm bgs.

The 2016 CMD Mini C readings do not exhibit any discernable archaeological structure (Figure 17) and the central area generally appears as a low. While IP 1 and 2 show little

interpretable structure, IP 3 shows obvious structure (Figure 18). In the IP3 two quasi-parallel low anomalies can be seen in the center of the survey area, running about 30 m north-south separated by about 8 m east-west. Separating these two low linear anomalies is a distinct high. This anomaly geometry is consistent with a longhouse. To complete the picture, running out east at N 581865 is a break in the eastern low conductivity anomaly, consistent with an entrance to the longhouse. To the north, running east-west at the N 581862 line is a low conductive anomaly, which may be another wall.



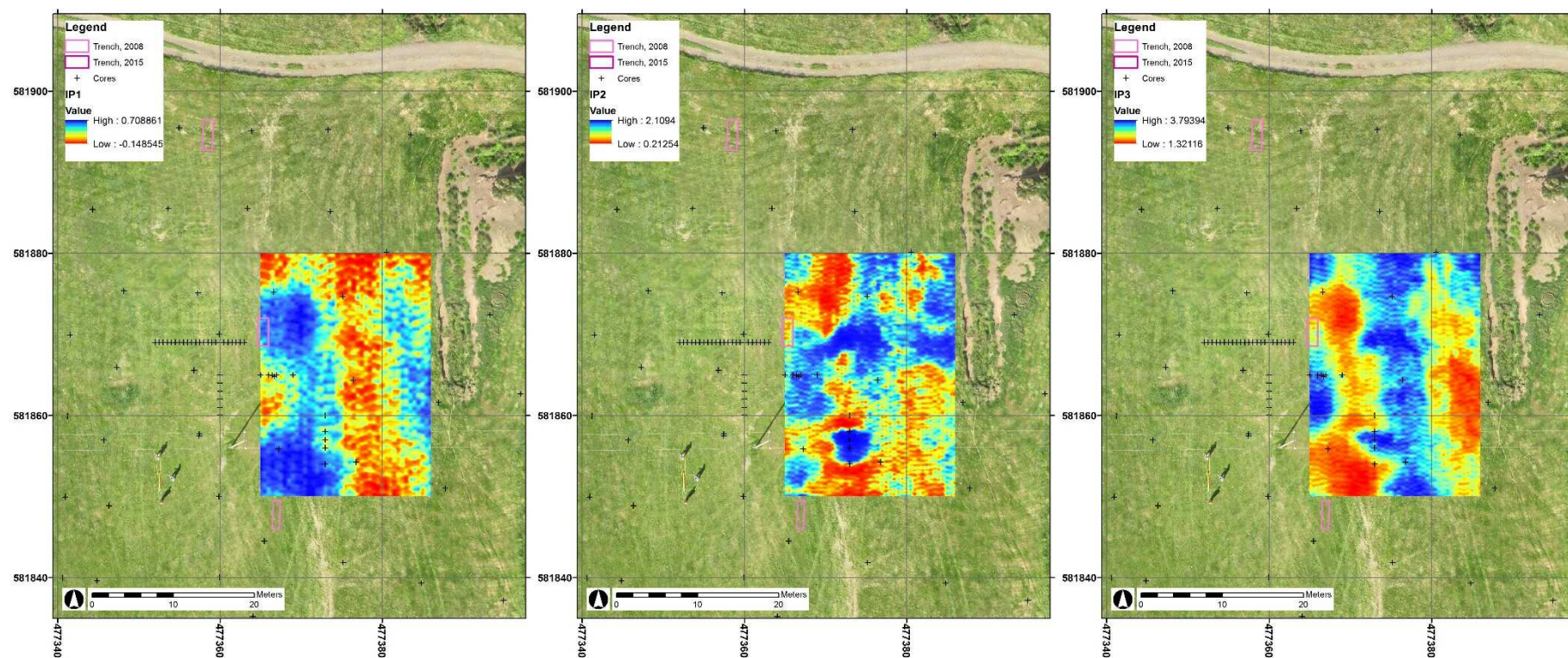


Figure 9. Apparent ground conductivity maps (mS/m) from CMD Explorer in 2013. Left: C3 image. Middle: C2 image. Right: C1 image. Note the three operators of the DualEM to the left of the survey area.

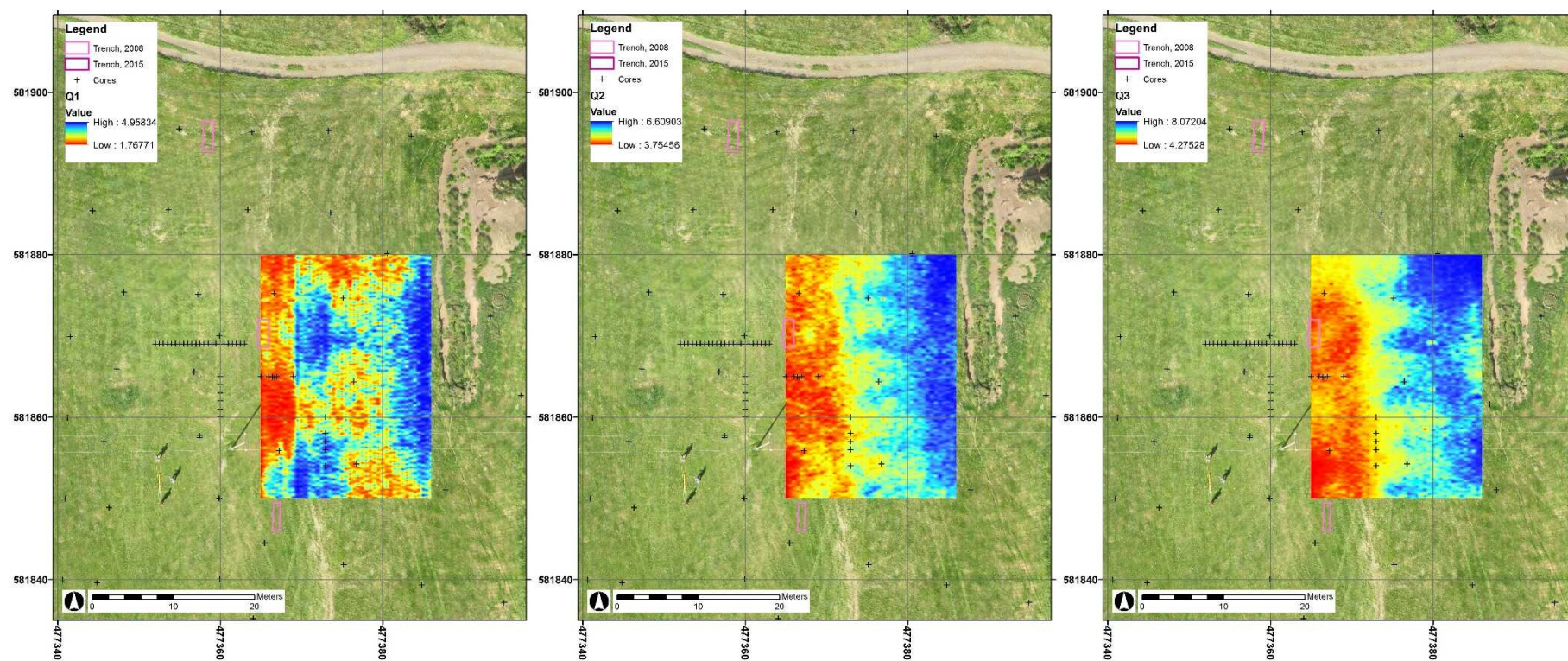


Figure 10. In-phase component maps (ppt) from CMD Explorer in 2013. Left: IP3 image. Middle: IP2 image. Right: IP1 image.



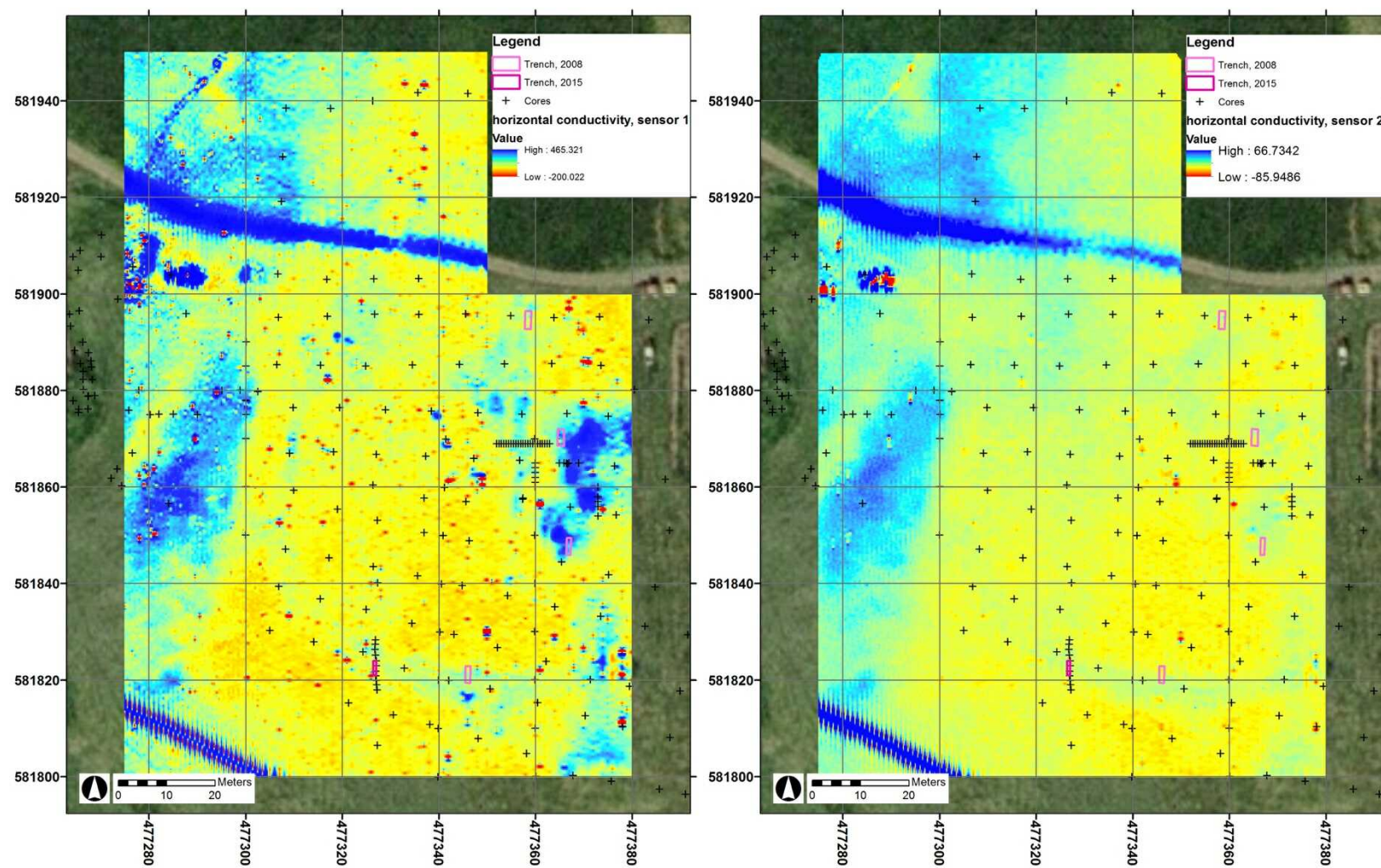


Figure 11. Horizontal bulk ground conductivity maps (mS/m). Left: Horizontal sensor 1 Right: Horizontal sensor 2.

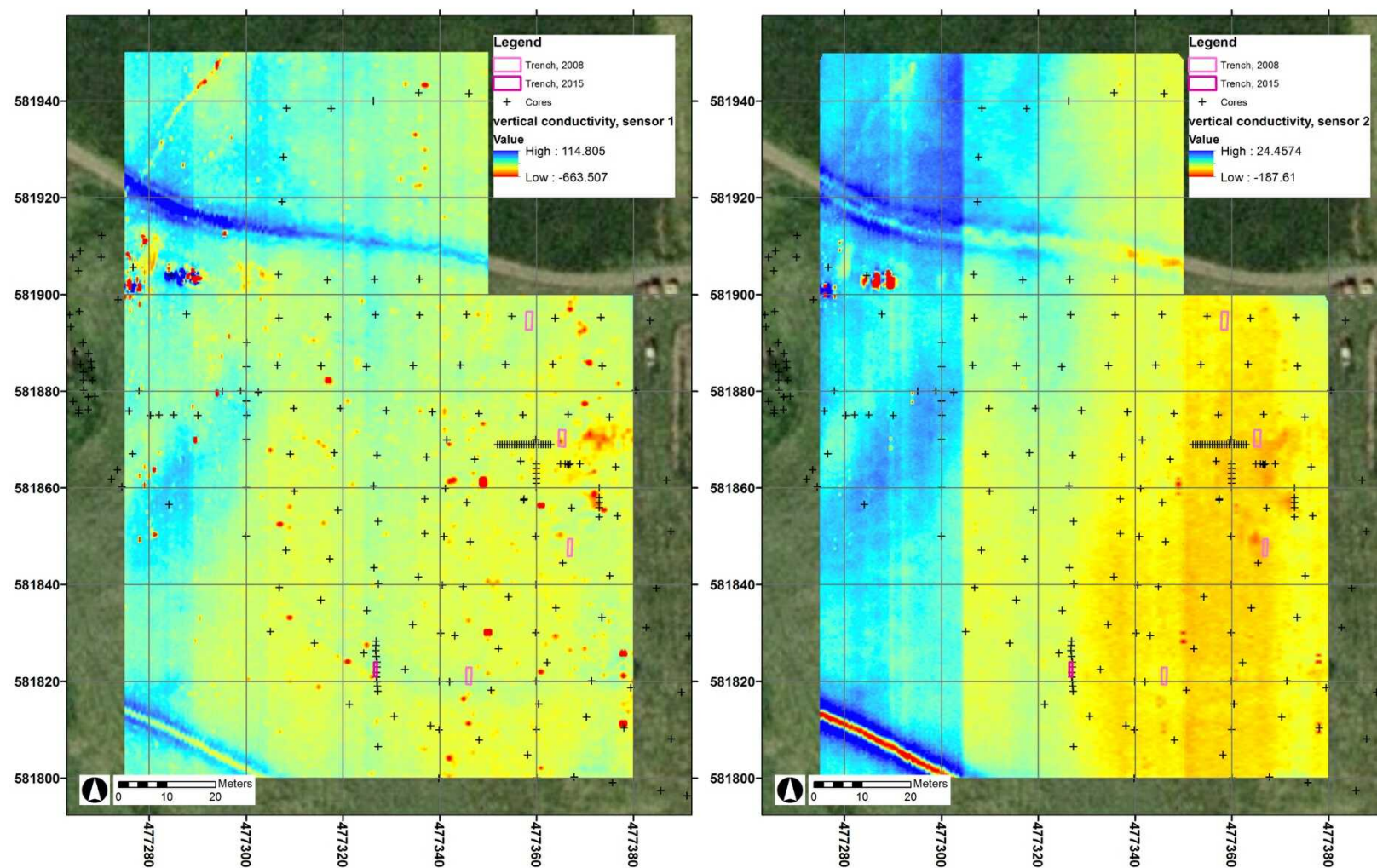


Figure 12. Vertical bulk ground conductivity maps (mS/m). Left: Vertical sensor 1 Right: Vertical sensor 2.



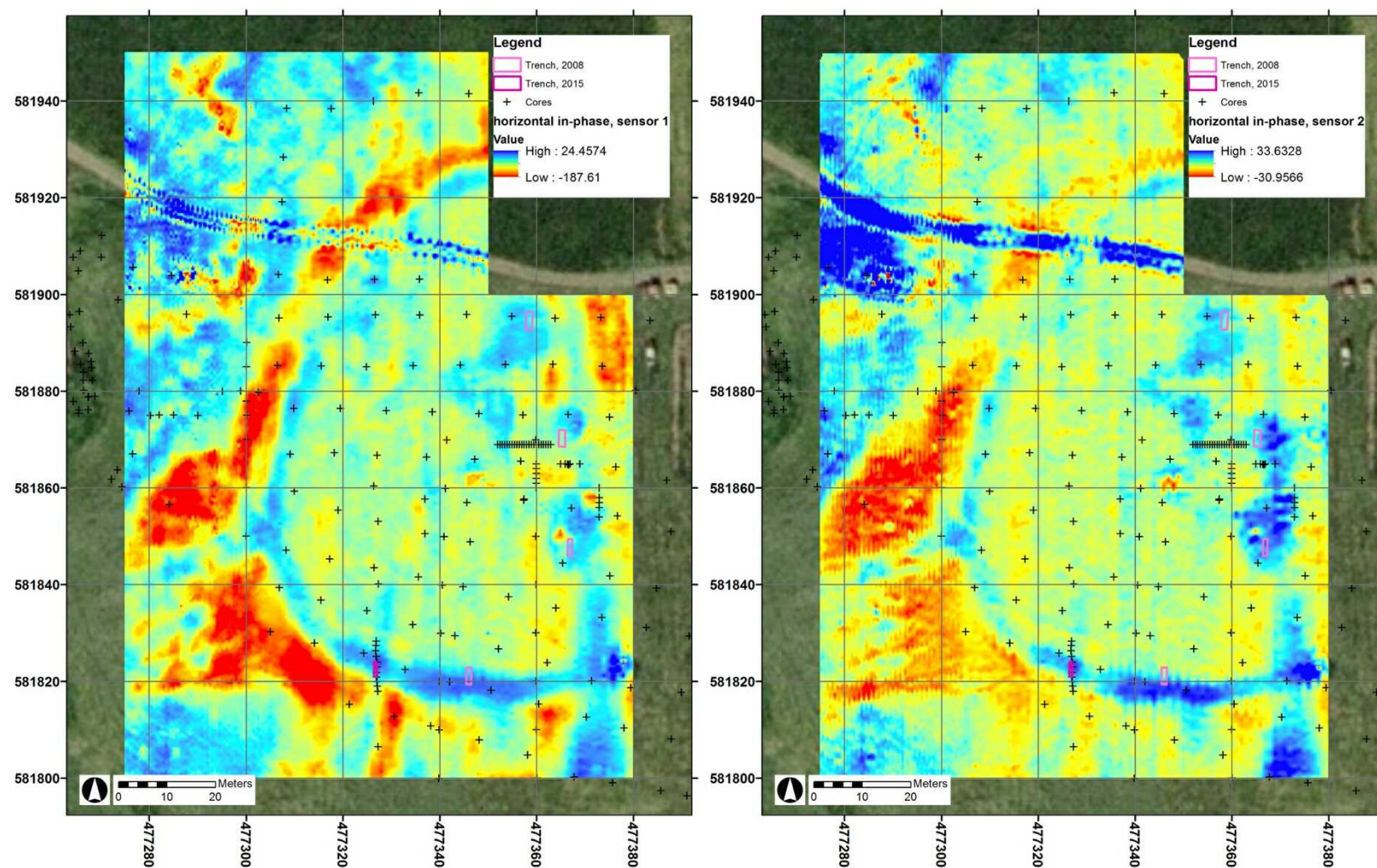


Figure 13. Horizontal IP maps (ppt). Left: Horizontal sensor 1 Right: Horizontal sensor 2.



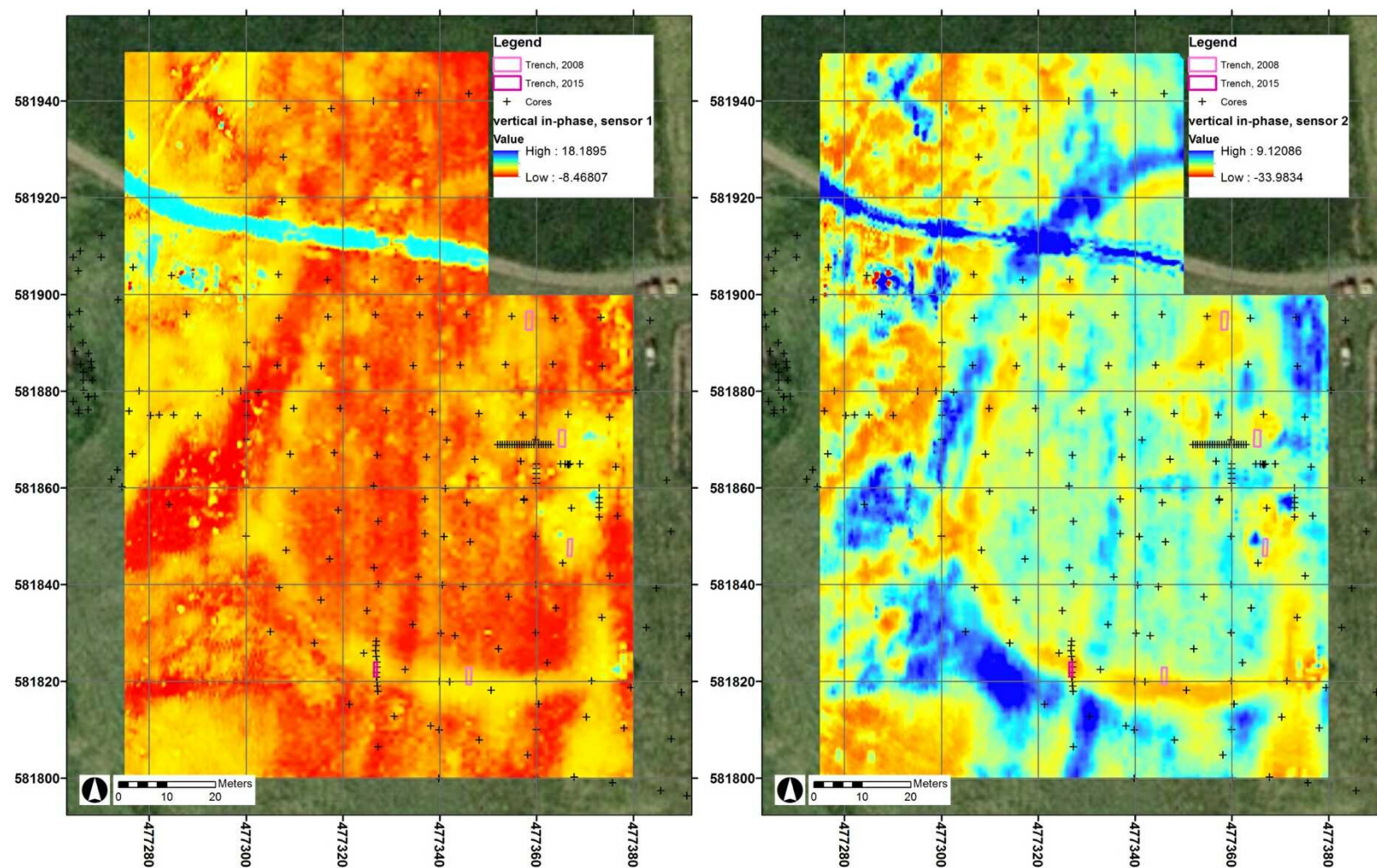


Figure 14. Vertical IP maps (ppt). Left: Vertical sensor 1 Right: Vertical sensor 2.

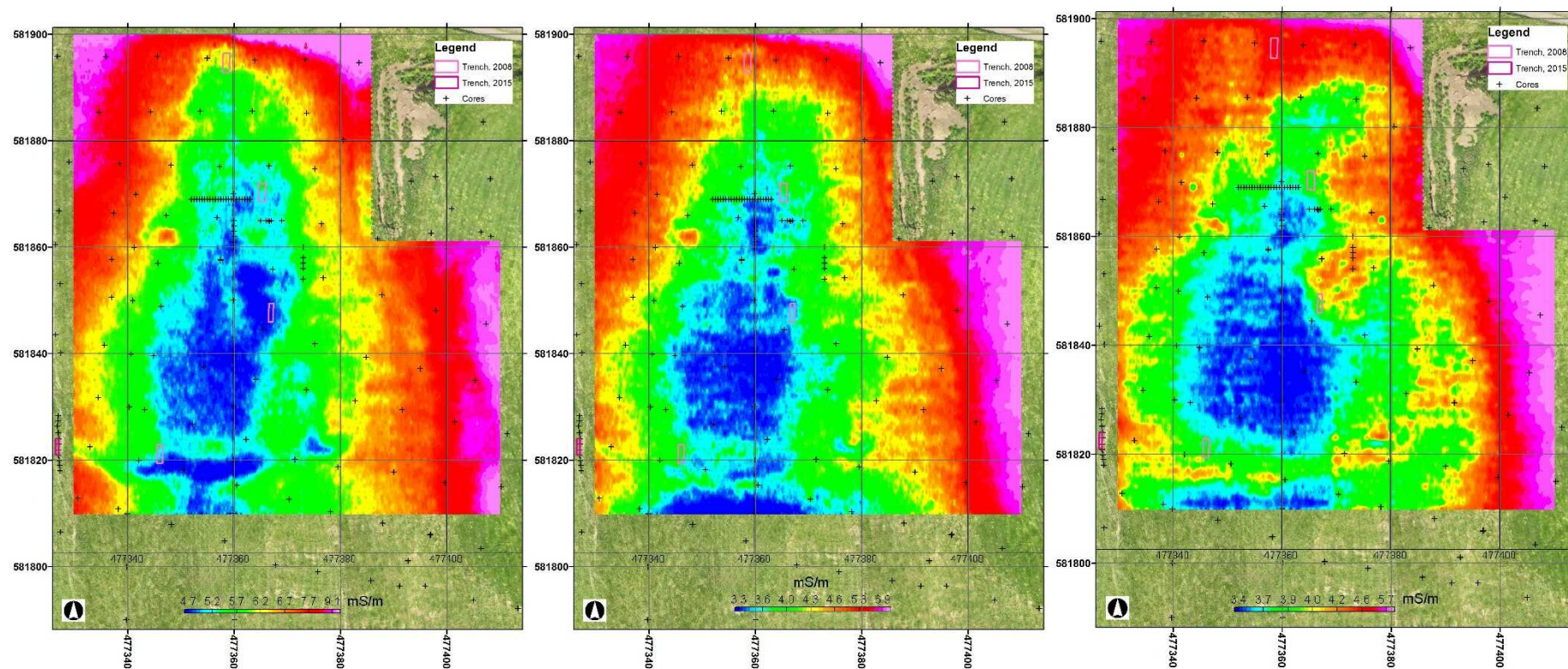


Figure 15. Apparent ground conductivity maps (mS/m) from CMD Explorer in 2015. Left: C3 image. Middle: C2 image. Right: C1 image.



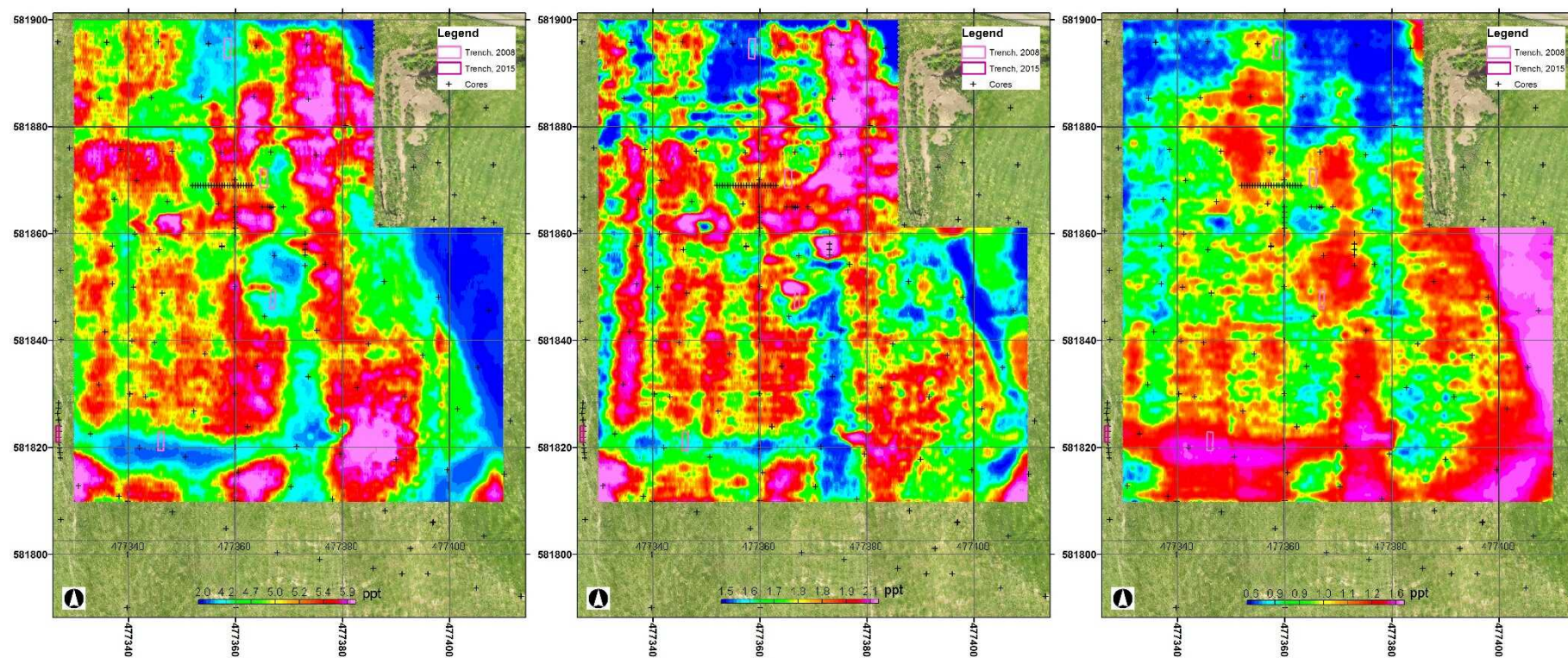


Figure 16. In-phase component maps (ppt) from CMD Explorer in 2015. Left: IP3 image. Middle: IP2 image. Right: IP1 image.



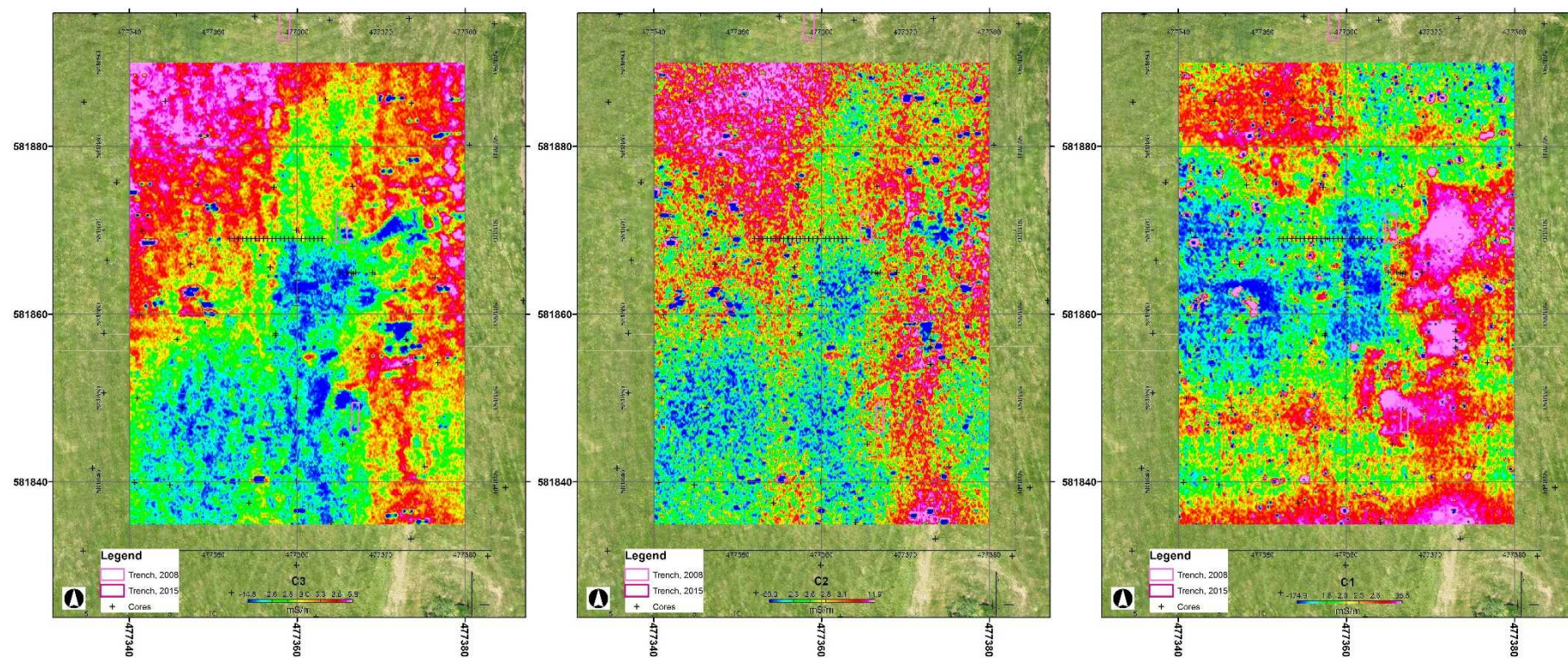


Figure 17. Apparent ground conductivity maps (mS/m) from CMD Mini in 2016. Left: C3 image. Middle: C2 image. Right: C1 image.



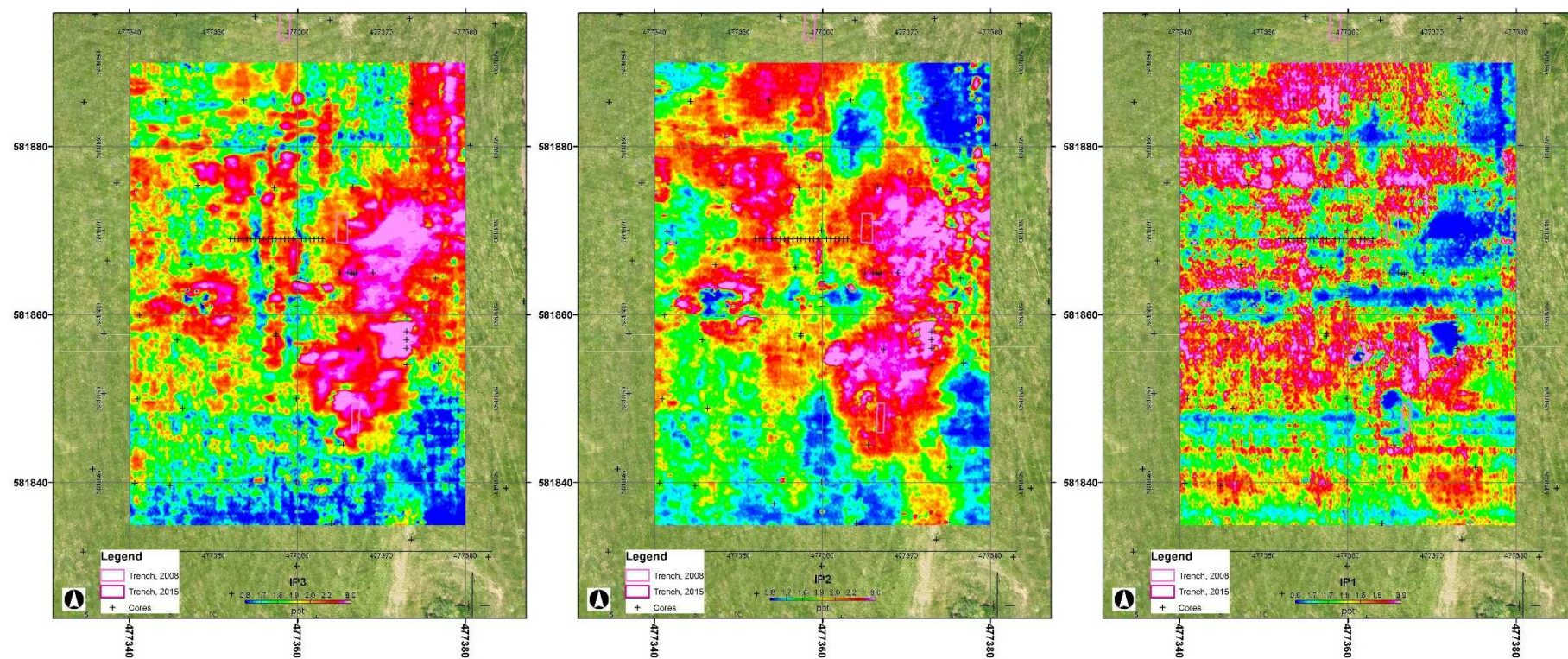


Figure 18. In-phase component maps (ppt) from CMD Mini in 2016. Left: IP3 image. Middle: IP2 image. Right: IP1 image.

## 4.0 CORING

At Lower Keflavík, 207 cores were taken during the 2013, 2015, and 2016 field seasons. There were 66 cores that revealed turf deposits. At seven coring locations, all concentrated in the same area, distinct floor deposits were encountered. Overall, 125 cores contained some sort of cultural deposit (60%) while 82 had none. Many of the cores taken in 2015 (164) were taken on a 10 × 10 m grid (79%) as part of the broad coring survey of the farm, while the rest were judgmentally placed based on previous coring, geophysical results or surface topography.

As for tephra layers, 4 cores encountered an in situ 1766 tephra (less than 2%), which is normally very difficult to identify in cores (e.g., of the 8962 cores taken in Skagafjörður by the SCASS and SCAS teams, about 641 (7%) contained this tephra). Along the same lines, 19 cores encountered the 1300 tephra (9%). exactly the average that are presented in Skagafjörður as a whole). In situ H1 tephra layer was the most common identified. It appeared in 90 different cores (43%), while H3/H4 was in 104. Four cores encountered an in situ dark tephra from between the H1 and the time of settlement, all of them identified in the field as the “1000” layer. Six cores revealed a distinct LTL and 17 others the LNS, which appeared as a dark distinct mixed layer.

The cores taken in Lower Keflavík bottom out at an average of 56.1 cm (SD=16.9) below the ground surface onto gravel. The overall average for cores for the SCASS survey is 62.6 cm (SD=94) suggesting that Lower Keflavík is a consistent, but shallow deposit, relative to other areas, especially given its substantial cultural activity. In fact, the 125 cores that contained cultural material averaged only a few cm deeper than the area as a whole (avg 58.1, SD 18.3), while for the whole SCASS survey, the average core with cultural material is almost 17 cm deeper than those without (Avg =79.3 cm, SD=38.9).

Based on the 2016 CMD mini, results, especially IP3 (Figure 18 left) a series of cores were judgmentally placed in order to test the hypothesis that the low conductivity anomalies outlined a structure with an eastern entrance (Figure 19). The first sequence was across the potential structure, with 50 cm spacing, located so that, moving from west to east, starting at core 163909 and ending at 163931, the cores would encounter extramural deposits, turf wall, floor, turf wall, and finally extramural deposits. The second sequence was placed across a

potential entrance, starting at core 163932 and going through 163937, designed to encounter turf wall, floor, and turf wall moving from south to north. Both of these sequences were confirmed.

Across the potential house, cores 163909 and 163910 had LCD, while 163911 and 163912 had LDC and midden. Core 163914 had obvious turf deposits which continued to Core 163915. Core 163916 (Figure 21) and core 163917 (Figure 21) have thick floor which, with a few exceptions continue through core 163924 (Figure 23) which has a lighter, thinner floor. Core 163923 which has only LCD deposits (but floor deposits on either side) would have been unremarkable, except that it has a clear in situ H1 over the cultural deposit perhaps indicating that the whole deposit is pre 1104. Cores 163925 (Figure 25), 163926, and 163927 all have turf deposits that cross cut the potential east wall. Continuing east, Cores 163928- through 163931 have mostly LCD, and midden deposits, with some turf, suggesting an extramural deposit.

Moving north, along the east edge of the probable structure, and across a potential entrance, with 1 m spacing, core 163932 had distinct turf deposits. Cores 163933 and 163934 had turf and LCD deposits. The most substantial floor at 17 cm thick and 30 cm bgs was core 163935 (Figure 26). Turf deposits completed the northern part with cores 163936 and 163937 back into a potential wall.

The results of both of these sequences suggest that, in this relatively flat field in Lower Keflavík, (Figure 27) there is a distinct and well preserved structure. Across the center of the structure, the cores created a LCD-turf-floor-turf-LCD pattern. The relationship of this probable structure to the tún wall and other features, including the visible bumps nearby (Figure 3), is still unclear. While the structure is clearly before AD 1104, it is not yet possible to refine the establishment or abandonment date any further.



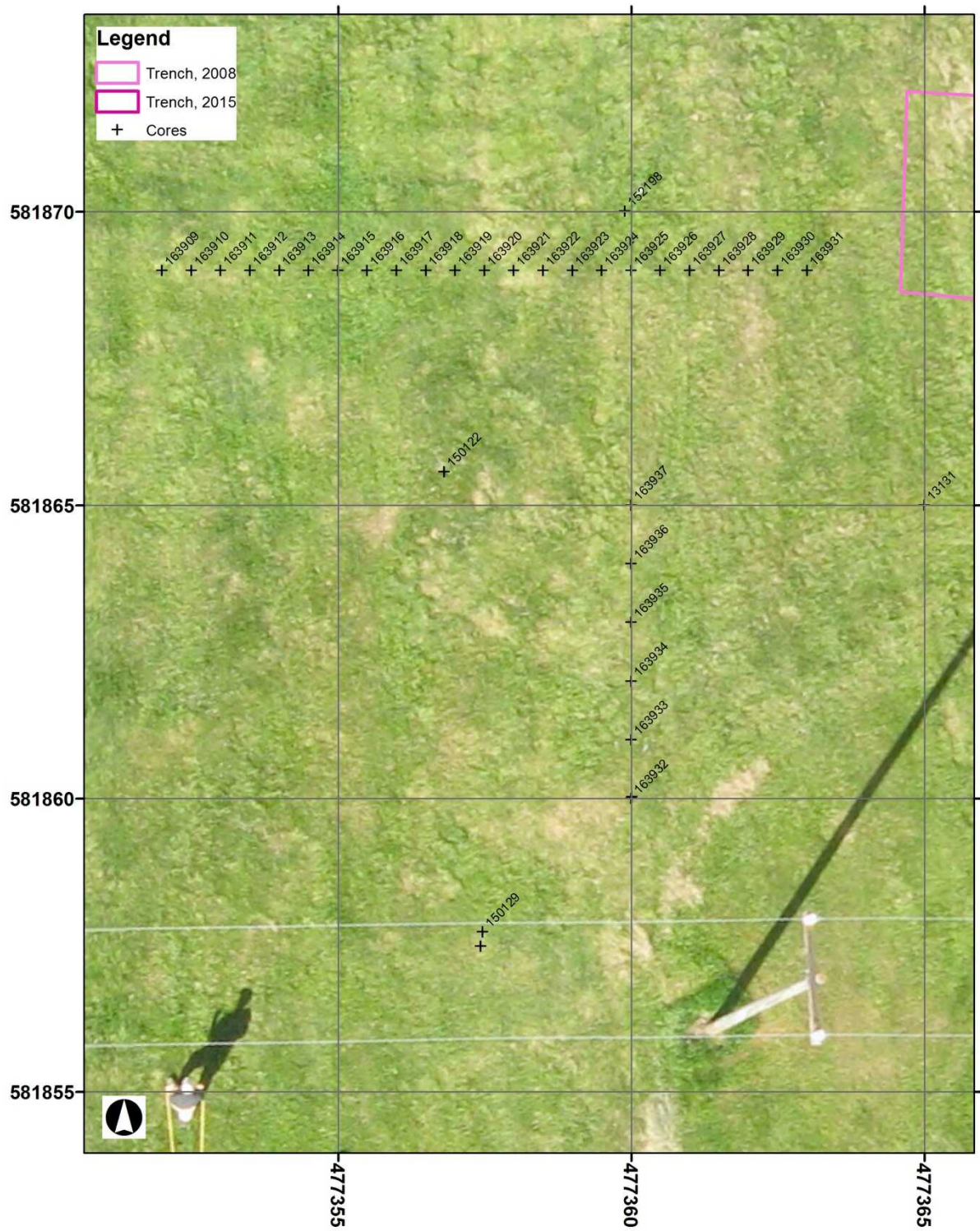


Figure 19. Core sequences at Lower Keflavík





Figure 20. Core 163916 showing floor from 22-30 cm bgs.



Figure 21. Core 163917 showing floor from 26-34 cm bgs. Below the floor was 11 cm of LDC, 12 cm of aeolian deposit, which bottomed out on gravel at 57 cm bgs.



Figure 22. Core 163923 showing LDC from 27-45 cm bgs, clearly under an in situ H1 at 20 cm bgs. Below the LDC was 3 cm of aeolian deposit, which bottomed out on gravel at 48 cm bgs.



Figure 23. Core 163924 showing floor from 28-31 cm bgs. Below the floor was 24 cm of aeolian deposits, which had an in situ H3 at 39 cm bgs. The aeolian deposit bottomed out on gravel at 55 cm bgs.





Figure 24. Core 163925 showing Turf from 20-39 cm bgs, under an ephemeral in situ H1 at 16 cm bgs. Below the turf was 5 cm of aeolian deposit, which bottomed out on gravel at 44 cm bgs.



Figure 25. Core 163927 showing Turf from 20-37 cm bgs, under an ephemeral in situ H1 (visable in the center of the core at the top) at 16 cm bgs. Below the turf was 4 cm of aeolian deposit (which contained in situ H3/H4)), which bottomed out on gravel at 41 cm bgs.



Figure 26. Core 163935 showing floor from 30-47 cm bgs (which continued into the next core barrel). Above the floor was an 8 cm LDC deposit with an in situ H1 at 21 cm bgs. The floor rested on gravel at 47 cm bgs.





## 5.0 SUMMARY AND CONCLUSIONS

Geophysical surveys were conducted at Lower Keflavík in 2012, 2013, 2015, and 2016 and cores were taken in 2014, 2015 and 2016. By combining the cores and geophysical results it is possible to get a distinct picture of the main structure. This structure defined by the contrast of the low IP (blue) readings and the high IP pink readings can be outlined to form a structure consistent with a 25 m long, 8 m wide north-south running longhouse (Figure 28). There may also be a structure with its long axes running east-west north of the potential longhouse. The longhouse has a distinct entrance facing east, in the southcentral part of the long house. Generially high IP readings are associated with midden depoists, of which there are several, again also to the east.

Using the outline from the IP3 CMD mini readings, specific sensors from the DualEM may have picked up this ephemeral structure. Most interesting, the Horizontal C 1 sensor seems to have picked up the probable floor deposit (Figure 29) while the Vertical IP sensor 2 (Figure 30) seems to have outlined some parts of the floor and more specifically the potential east entrance. This is remarkable, since the DualEM survey was conducted north-south, bi-directionally. Both the DualEM and CMD Mini readings, along with the cores, suggest that the midden may be to the east of the probable longhouse.

The discovery of this potential structure does not seem to have changed the overall area (top right in Figure 31) of the mass of deposits that defined the mound area of Lower Keflavík (Bolender, et al. 2013). While there are post 1104 deposits in the area (bottom two images in Figure 31), there is no evidence that those much spottier deposits are associated with the potential pre-1104 structure outlined here.

The nature of these results, suggest that, although there is a substantial natural gravel deposit underlying all of Lower Keflavík, the structure outlined here contains almost no stone deposits. The underlying gravel is probably responsible for much of the contrasts seen in the deeper readings, such as those from the CMD Explorer. If the potential structure does not contain stones, the CMD Mini was able to bring out a very subtle contrast associated with this all-turf structure.



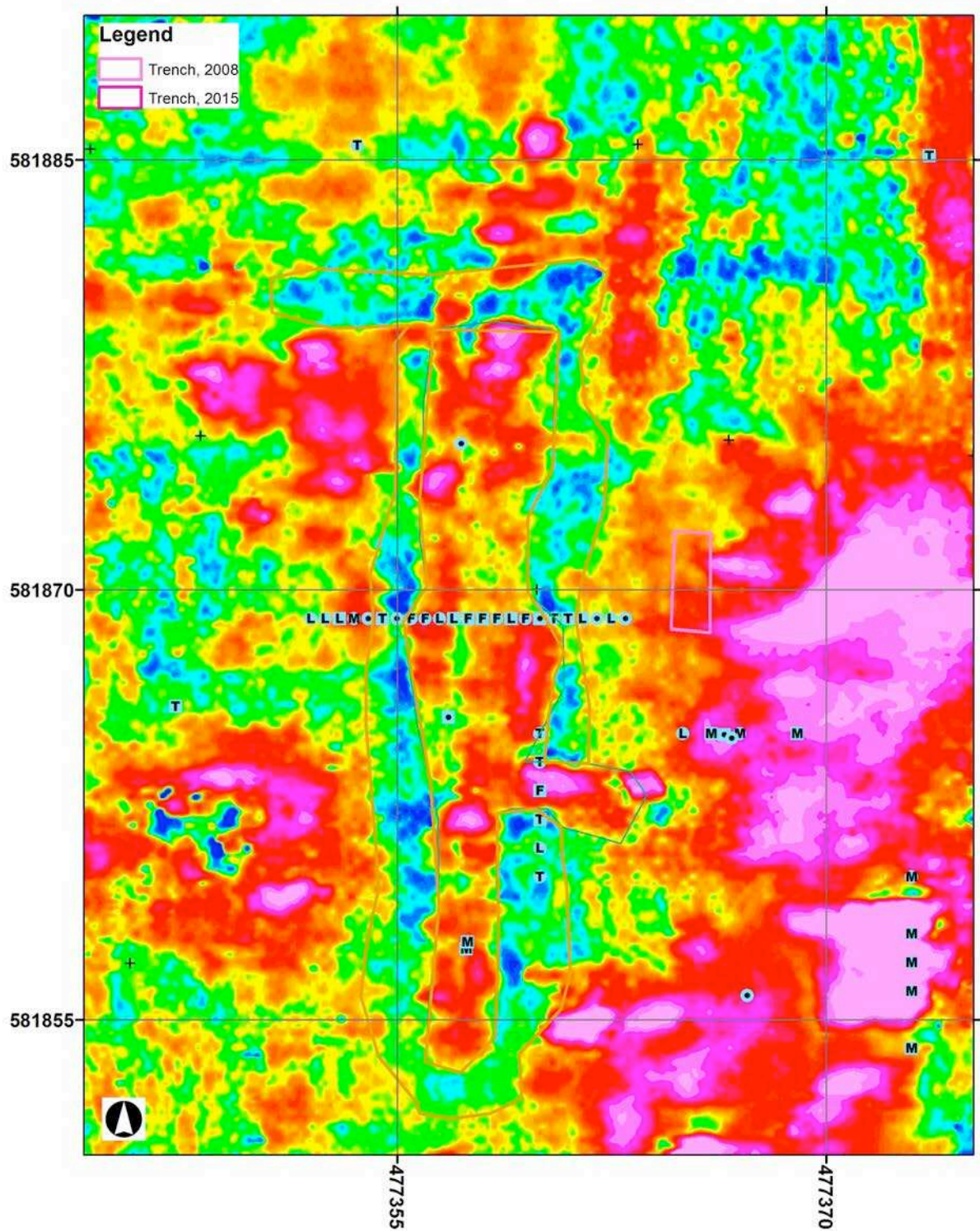


Figure 28. 2016 CMD Explorer IP3 with pre-1104 coring results test trenches, and potential outline of structure.



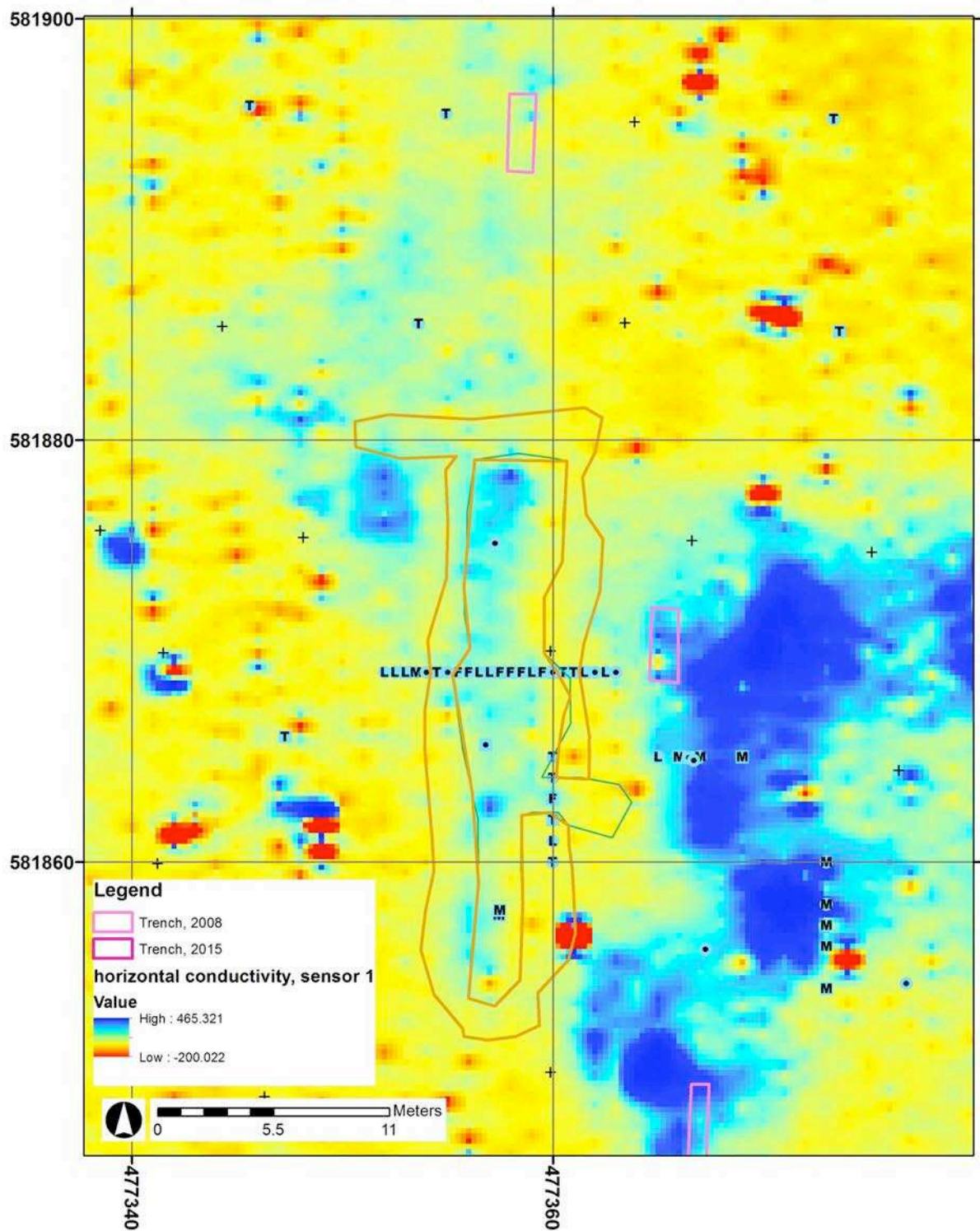


Figure 29. Horizontal C sensor 1 with Pre-1104 coring results, test trenches, and potential outline of structure.

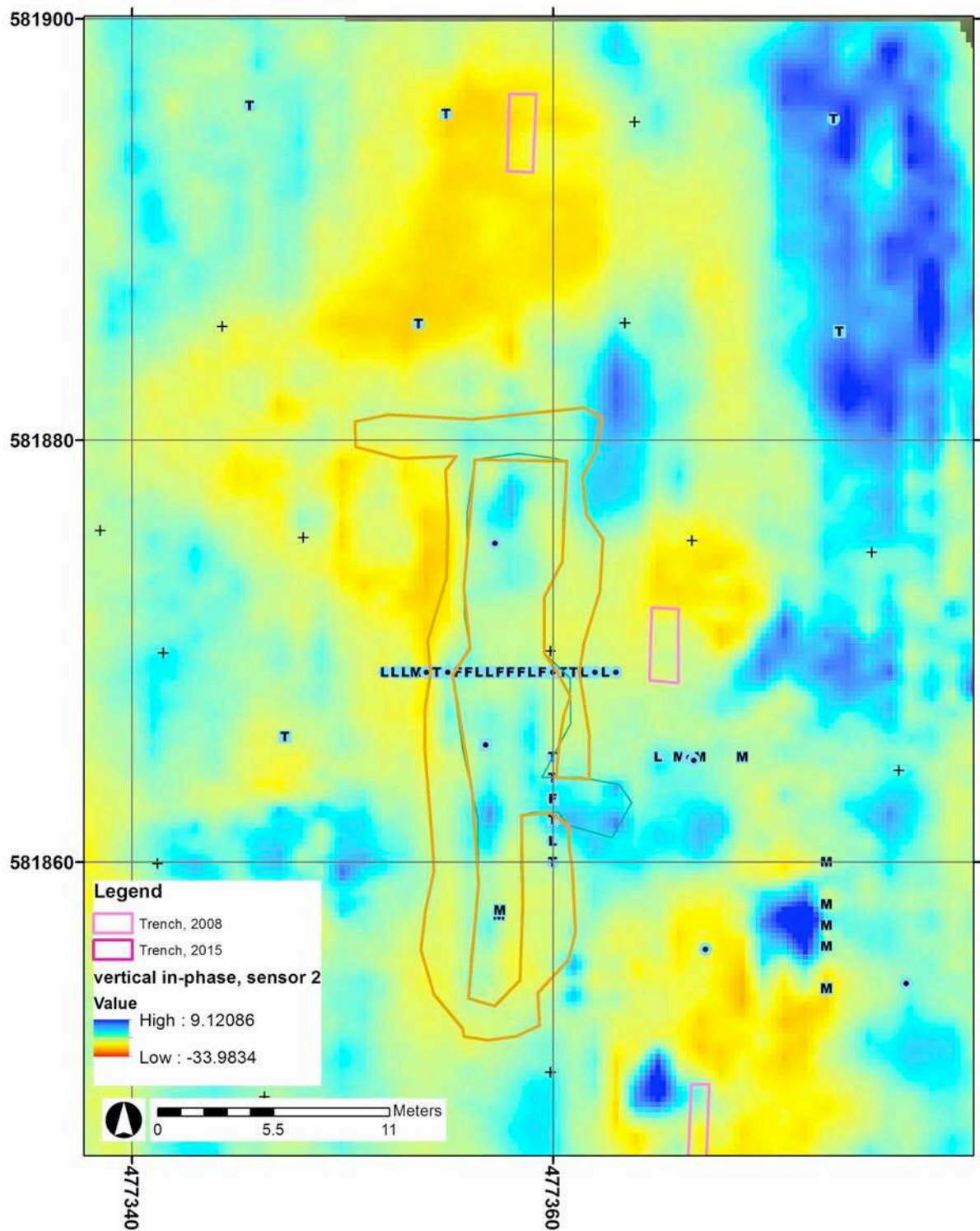


Figure 30. Vertical IP sensor 2 with Pre-1104 coring results, test trenches, and potential outline of structure.



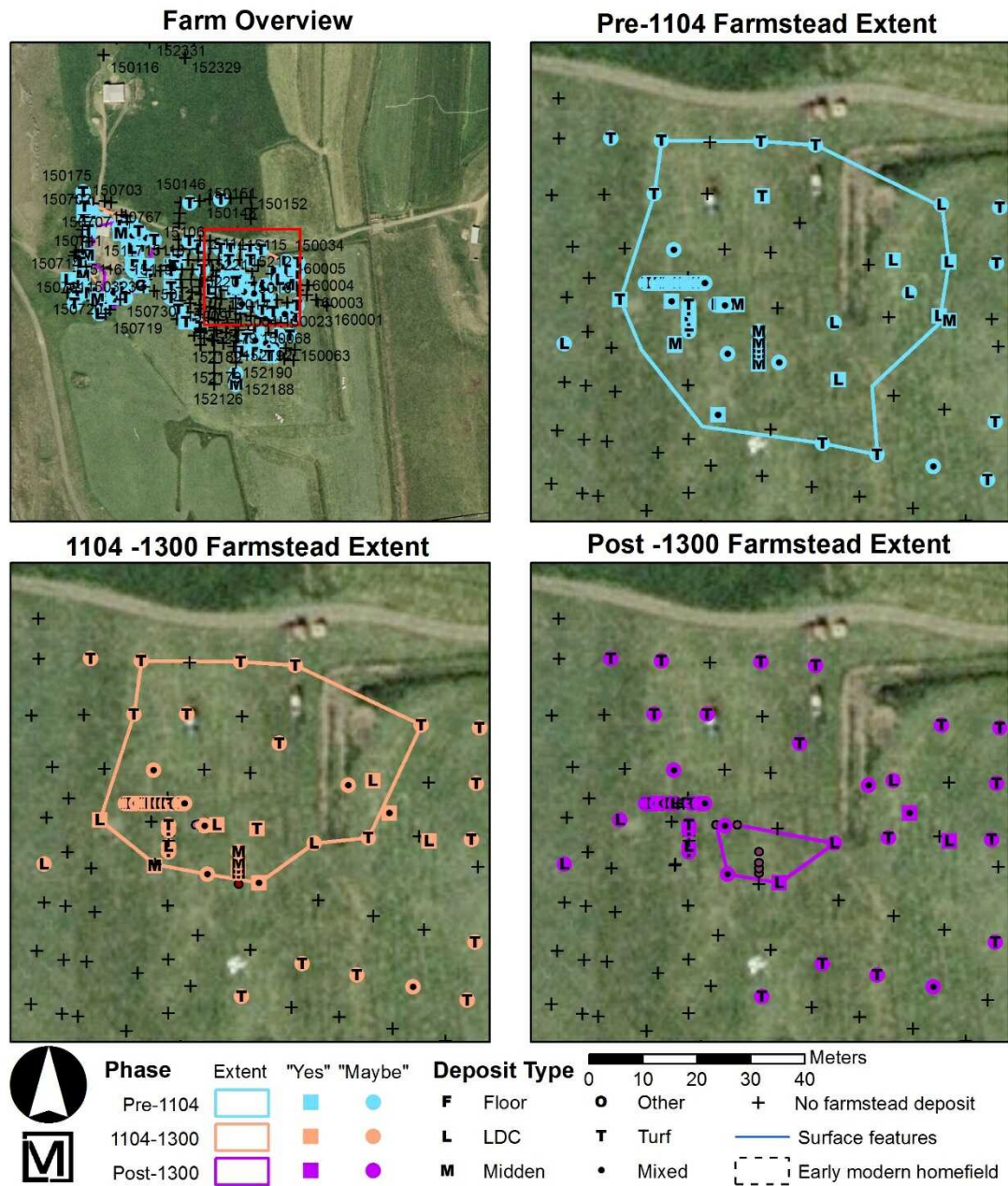


Figure 31. Farm mound sizes for different time periods based on coring at Lower Keflavík.

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## **APPENDIX A – BASIC PRINCIPLES OF FREQUENCY-DOMAIN ELECTROMAGNETICS**

The frequency-domain electromagnetic (FDEM) method is an active non-destructive geophysical method that is used to obtain shallow subsurface information. In the EM method, a time-varying magnetic field is generated by driving an alternating current through either a loop of wire or a straight wire that is grounded at both ends. Induced or eddy currents with flow within any conductive solid or fluid material that is present beneath the area of investigation. The eddy currents, in turn, generate their own magnetic fields such that at any point in space, the total magnetic field is the superposition of the primary field due to the source current and secondary fields due to the eddy currents, as schematically illustrated in Figure B1. By discriminating between primary and secondary fields, variations in the EM properties of the ground can be discerned.

EM instruments measure both out-of-phase (quadrature) and in-phase components of the induced magnetic fields. The former is a measure of the bulk apparent ground conductivity; the latter is related to magnetic susceptibility and is particularly sensitive to the presence of metallic objects. Bulk apparent ground conductivity reflects true conductivity when the subsurface is homogeneous and isotropic, which is rarely the case in practice. For heterogeneous conditions, it represents an integrated effect of all the conductivity within the volume of ground being sensed. It does not, however, represent an average conductivity and in fact can be lower or higher than the lowest or highest subsurface conductivities, respectively. A lateral variation in the components is indicative of lateral changes in properties. The conductivity is particularly sensitive to fluid content and dissolved salts or ions. Accordingly, wet sands, clays and materials with high ion content generally have high bulk apparent ground conductivity; dry sands and crystalline rocks have low bulk apparent ground conductivity.

Ideally, EM surveys are conducted in archaeological investigations to find conductive targets in resistive environments such as middens and rammed-earth walls. Although more subtle and difficult to detect, resistive targets such as buried stone walls and foundations can also be detected through EM surveying.

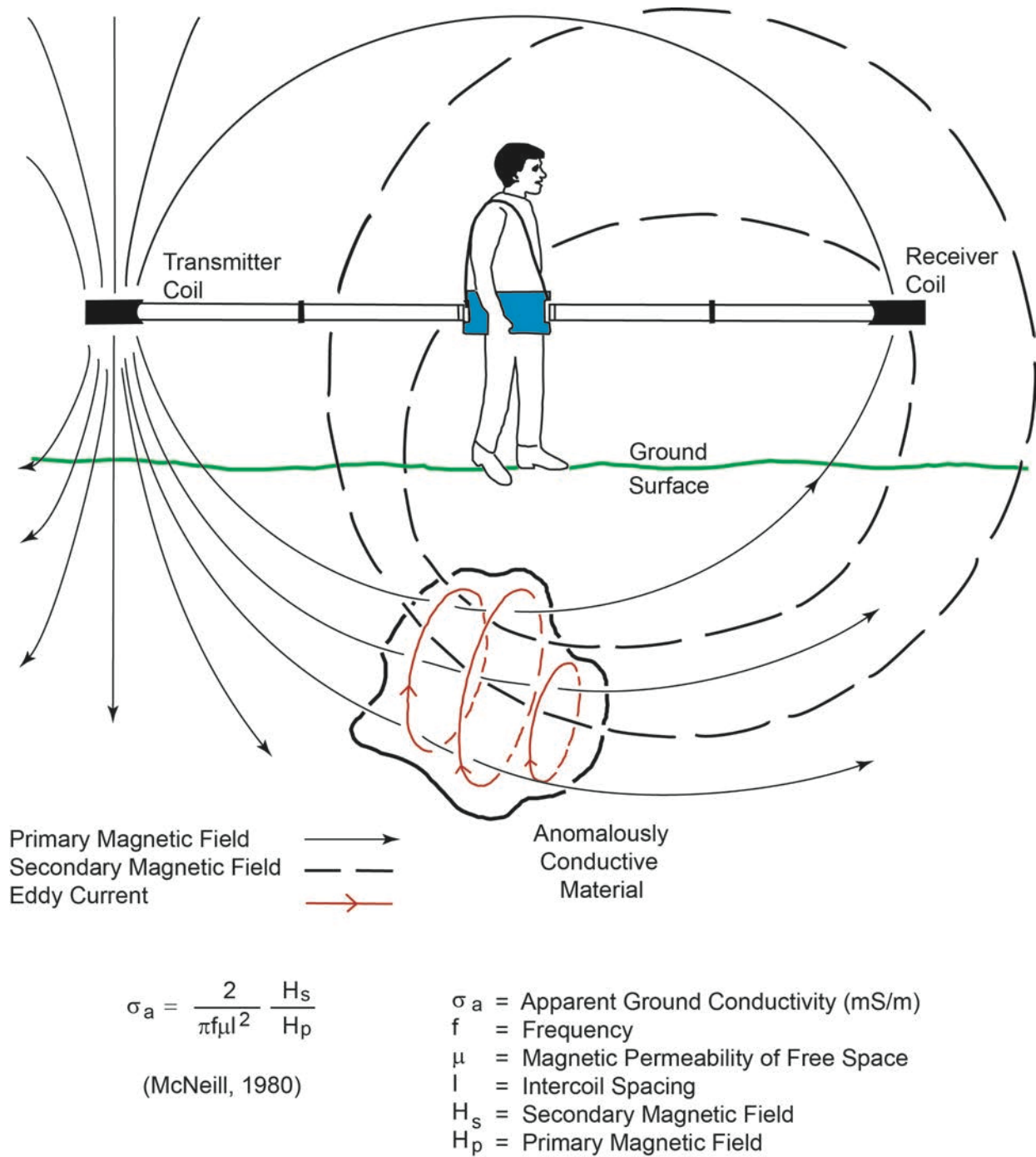


Figure A1. Schematic diagram illustrating the principles of FDEM.



## APPENDIX B – CORING DATA

Table 1. Coring locations

| Core Number | End Depth | ISNet East | ISNet North |
|-------------|-----------|------------|-------------|
| 13131       | 60        | 477365     | 581865      |
| 13132       | 60        | 477366     | 581865      |
| 13133       | 70        | 477367     | 581865      |
| 13134       | 70        | 477369     | 581865      |
| 13135       | 90        | 477373     | 581854      |
| 13136       | 80        | 477373     | 581856      |
| 13137       | 80        | 477373     | 581857      |
| 13138       | 70        | 477373     | 581858      |
| 13139       | 65        | 477373     | 581860      |
| 15000       | 50        | 477391.626 | 581829.427  |
| 15100       | 100       | 477383.541 | 581894.645  |
| 15101       | 40        | 477373.355 | 581895.248  |
| 15001       | 60        | 477382.752 | 581831.145  |
| 15102       | 44        | 477363.888 | 581895.108  |
| 15002       | 63        | 477373.573 | 581833.212  |
| 15103       | 56        | 477354.937 | 581895.494  |
| 15003       | 54        | 477364.078 | 581835.177  |
| 15104       | 55        | 477345.598 | 581895.869  |
| 15104       | 55        | 477345.598 | 581895.869  |
| 15105       | 39        | 477335.934 | 581895.756  |
| 15105       | 39        | 477335.934 | 581895.756  |
| 15004       | 59        | 477354.278 | 581837.49   |
| 15200       | 80        | 477300.103 | 581890.067  |
| 15201       | 80        | 477300.071 | 581880.012  |
| 15202       | 40        | 477300.054 | 581870.048  |
| 15203       | 45        | 477300.032 | 581860.058  |
| 15005       | 60        | 477344.843 | 581839.617  |
| 15106       | 58        | 477326.756 | 581895.846  |
| 15006       | 52        | 477335.611 | 581841.623  |
| 15204       | 55        | 477300.003 | 581850.053  |
| 15107       | 56        | 477316.925 | 581895.351  |
| 15007       | 52        | 477326.459 | 581843.555  |
| 15205       | 80        | 477295.093 | 581880.011  |
| 15108       | 53        | 477306.814 | 581895.162  |
| 15206       | 55        | 477300.034 | 581885.053  |
| 15008       | 52        | 477317.262 | 581845.307  |
| 15207       | 45        | 477300.098 | 581875.052  |
| 15109       | 33        | 477306.492 | 581885.347  |
| 15009       | 63        | 477308.288 | 581847.16   |
| 15208       | 40        | 477302.523 | 581879.794  |
| 15110       | 59        | 477315.553 | 581885.25   |
| 15209       | 65        | 477298.879 | 581880.08   |
| 15010       | 59        | 477309.986 | 581859.378  |
| 15210       | 46        | 477300.062 | 581878.001  |
| 15111       | 40        | 477324.898 | 581885.058  |

| Core Number | End Depth | ISNet East | ISNet North |
|-------------|-----------|------------|-------------|
| 15211       | 55        | 477375.157 | 581874.68   |
| 15011       | 57        | 477319.053 | 581855.423  |
| 15112       | 56        | 477334.592 | 581885.311  |
| 15212       | 70        | 477366.605 | 581875.226  |
| 15012       | 42.2      | 477327.279 | 581853.118  |
| 15113       | 44        | 477344.289 | 581885.39   |
| 15013       | 50        | 477336.963 | 581850.59   |
| 15213       | 68        | 477357.254 | 581875.11   |
| 15114       | 72        | 477353.627 | 581885.533  |
| 15014       | 46        | 477346.304 | 581848.853  |
| 15214       | 70        | 477348.137 | 581875.374  |
| 15115       | 42        | 477363.419 | 581885.56   |
| 15215       | 57        | 477338.482 | 581875.704  |
| 15216       | 40        | 477329.005 | 581876.016  |
| 15217       | 57        | 477319.459 | 581876.459  |
| 15218       | 75        | 477309.846 | 581876.456  |
| 15016       | 51        | 477365.459 | 581844.499  |
| 15219       | 58        | 477309.098 | 581866.991  |
| 15220       | 40        | 477318.243 | 581867.312  |
| 15221       | 40        | 477327.077 | 581866.782  |
| 150018      | 40        | 477375.198 | 581841.836  |
| 150120      | 45        | 477337.337 | 581866.393  |
| 150121      | 55        | 477347.271 | 581865.944  |
| 150019      | 50        | 477384.848 | 581839.328  |
| 150122      | 61        | 477356.814 | 581865.569  |
| 150020      | 40        | 477394.989 | 581837.18   |
| 150123      | 63        | 477366.462 | 581864.951  |
| 150021      | 104       | 477405.374 | 581834.955  |
| 150124      | 57        | 477366.708 | 581864.827  |
| 150022      | 110       | 477415.41  | 581832.508  |
| 150125      | 45        | 477376.447 | 581864.352  |
| 150023      | 42        | 477416.897 | 581843.229  |
| 150024      | 105       | 477407.395 | 581845.587  |
| 150126      | 43        | 477376.799 | 581854.241  |
| 150025      | 62        | 477397.978 | 581848.081  |
| 150026      | 55        | 477387.801 | 581851.023  |
| 150127      | 67        | 477367.257 | 581855.853  |
| 150027      | 63        | 477386.978 | 581861.617  |
| 150028      | 74        | 477397.086 | 581862.647  |
| 150029      | 100       | 477406.433 | 581862.876  |
| 150128      | 59        | 477357.433 | 581857.479  |
| 150030      | 104       | 477416.172 | 581862.265  |
| 150129      | 60        | 477357.469 | 581857.723  |
| 150130      | 56        | 477345.673 | 581856.972  |
| 150032      | 72        | 477417.112 | 581872.737  |
| 150131      | 40        | 477336.967 | 581857.708  |
| 150033      | 91        | 477417.724 | 581882.989  |
| 150034      | 104       | 477406.859 | 581883.511  |

| Core Number | End Depth | ISNet East | ISNet North |
|-------------|-----------|------------|-------------|
| 150035      | 25        | 477408.208 | 581872.835  |
| 150132      | 49        | 477326.413 | 581860.425  |
| 150036      | 110       | 477397.891 | 581873.246  |
| 150133      | 56        | 477373.62  | 581885.166  |
| 150037      | 50        | 477401.521 | 581827.207  |
| 150134      | 66        | 477306.697 | 581904.166  |
| 150038      | 92        | 477411.354 | 581824.947  |
| 150039      | 46        | 477410.258 | 581814.984  |
| 150040      | 40        | 477399.62  | 581815.757  |
| 150135      | 45        | 477316.84  | 581903.034  |
| 150041      | 37        | 477390.026 | 581817.751  |
| 150042      | 56        | 477379.568 | 581818.715  |
| 150043      | 68        | 477371.415 | 581820.109  |
| 150044      | 45        | 477362.255 | 581823.889  |
| 150136      | 50        | 477326.556 | 581903.173  |
| 150045      | 57        | 477352.195 | 581826.763  |
| 150137      | 52        | 477335.871 | 581903.195  |
| 150046      | 91        | 477350.649 | 581818.222  |
| 150047      | 50        | 477343.158 | 581829.476  |
| 150138      | 50        | 477380.562 | 581880.174  |
| 150314      | 80        | 477290.039 | 581875.02   |
| 150048      | 53        | 477334.466 | 581831.76   |
| 150049      | 58        | 477324.986 | 581834.659  |
| 150139      | 42        | 477315.496 | 581836.846  |
| 150140      | 43        | 477306.852 | 581839.422  |
| 150050      | 40        | 477305.016 | 581830.303  |
| 150051      | 52        | 477314.155 | 581827.949  |
| 150052      | 68        | 477324.299 | 581825.879  |
| 150053      | 53        | 477332.873 | 581822.486  |
| 150054      | 80        | 477342.094 | 581819.95   |
| 150055      | 46        | 477360.522 | 581815.312  |
| 150056      | 54        | 477370.356 | 581812.64   |
| 150057      | 61        | 477378.122 | 581810.35   |
| 150058      | 55        | 477387.945 | 581808.128  |
| 150059      | 80        | 477396.852 | 581805.922  |
| 150060      | 69        | 477396.957 | 581806.038  |
| 150061      | 38        | 477406.472 | 581803.411  |
| 150062      | 67        | 477414.907 | 581801.953  |
| 150063      | 33        | 477413.412 | 581792.165  |
| 150064      | 36        | 477405.025 | 581793.682  |
| 150065      | 58        | 477395.948 | 581796.361  |
| 150153      | 58        | 477385.755 | 581797.409  |
| 150066      | 61        | 477392.741 | 581801.099  |
| 150067      | 42        | 477391.14  | 581796.348  |
| 150068      | 67        | 477375.764 | 581799.043  |
| 150069      | 69        | 477367.824 | 581800.269  |
| 150070      | 43        | 477358.235 | 581804.823  |
| 150071      | 40        | 477338.176 | 581810.829  |

| Core Number | End Depth | ISNet East  | ISNet North |
|-------------|-----------|-------------|-------------|
| 150072      | 37        | 477348.19   | 581807.891  |
| 150073      | 40        | 477321.343  | 581815.301  |
| 150074      | 13        | 477330.636  | 581812.806  |
| 152180      | 42        | 477339.848  | 581799.983  |
| 152181      | 40        | 477339.903  | 581809.957  |
| 152182      | 73        | 477339.974  | 581820.006  |
| 152183      | 40        | 477340.26   | 581829.967  |
| 152184      | 40        | 477340.605  | 581839.93   |
| 152185      | 40        | 477340.928  | 581849.953  |
| 152186      | 40        | 477341.211  | 581859.935  |
| 152187      | 50        | 477341.497  | 581869.934  |
| 152190      | 39        | 477360.073  | 581790.045  |
| 152191      | 40        | 477360.094  | 581800.065  |
| 152192      | 50        | 477360.019  | 581810.043  |
| 152193      | 59        | 477359.945  | 581820.056  |
| 152194      | 39        | 477359.913  | 581830.066  |
| 152195      | 40        | 477359.934  | 581840.022  |
| 152196      | 40        | 477359.883  | 581850.015  |
| 152197      | 50        | 477360.012  | 581860.026  |
| 152198      | 40        | 477359.894  | 581870.014  |
| 152567      | 50        | 477327.357  | 581840.141  |
| 152568      | 50        | 477326.911  | 581828.361  |
| 152569      | 45        | 477326.864  | 581827.409  |
| 152570      | 40        | 477326.769  | 581826.375  |
| 152571      | 63        | 477326.905  | 581825.176  |
| 152572      | 60        | 477327.056  | 581824.022  |
| 152573      | 74        | 477327.052  | 581822.993  |
| 152574      | 64        | 477326.969  | 581821.834  |
| 152575      | 65        | 477326.96   | 581820.9    |
| 152576      | 45        | 477327.098  | 581819.937  |
| 152577      | 45        | 477327.16   | 581819.066  |
| 152578      | 40        | 477327.26   | 581817.994  |
| 152579      | 50        | 477327.322  | 581806.484  |
| 160000      | 100       | 477393.3214 | 581872.3973 |
| 160004      | 104       | 477417.3657 | 581857.2105 |
| 160005      | 70        | 477408.3256 | 581862.0169 |
| 160006      | 100       | 477400.9375 | 581867.2221 |
| 163909      | 51        | 477352      | 581869      |
| 163910      | 45        | 477352.5    | 581869      |
| 163911      | 50        | 477353      | 581869      |
| 163912      | 51        | 477353.5    | 581869      |
| 163913      | 55        | 477354      | 581869      |
| 163914      | 75        | 477354.5    | 581869      |
| 163915      | 50        | 477355      | 581869      |
| 163916      | 47        | 477355.5    | 581869      |
| 163917      | 57        | 477356      | 581869      |
| 163918      | 40        | 477356.5    | 581869      |
| 163919      | 50        | 477357      | 581869      |



| Core Number | End Depth | ISNet East | ISNet North |
|-------------|-----------|------------|-------------|
| 163920      | 43        | 477357.5   | 581869      |
| 163921      | 51        | 477358     | 581869      |
| 163922      | 45        | 477358.5   | 581869      |
| 163923      | 48        | 477359     | 581869      |
| 163924      | 55        | 477359.5   | 581869      |
| 163925      | 44        | 477360     | 581869      |
| 163926      | 47        | 477360.5   | 581869      |
| 163927      | 41        | 477361     | 581869      |
| 163928      | 55        | 477361.5   | 581869      |
| 163929      | 50        | 477362     | 581869      |
| 163930      | 50        | 477362.5   | 581869      |
| 163931      | 48        | 477363     | 581869      |
| 163932      | 48        | 477360     | 581860      |
| 163933      | 50        | 477360     | 581861      |
| 163934      | 47        | 477360     | 581862      |
| 163935      | 47        | 477360     | 581863      |
| 163936      | 43        | 477360     | 581864      |
| 163937      | 44        | 477360     | 581865      |

Table 2. Tephra layers in cores

| Core Number | Depth | Tephra Layer | Description |
|-------------|-------|--------------|-------------|
| 13131       | 37    | LNS          |             |
| 13131       | 45    | H3           |             |
| 13132       | 23    | H1           |             |
| 13133       | 50    | H3           |             |
| 13133       | 55    | H4           |             |
| 13134       | 25    | H1           |             |
| 13134       | 47    | LNS          |             |
| 13134       | 60    | H3           |             |
| 13135       | 20    | H1           |             |
| 13136       |       |              |             |
| 13136       | 60    | H3           |             |
| 13136       | 65    | H4           |             |
| 13137       | 30    | LNL          |             |
| 13137       | 50    | H3           |             |
| 13137       | 55    | H4           |             |
| 13138       | 50    | H3           |             |
| 13138       | 60    | H4           |             |
| 13139       | 55    | H3           |             |
| 15000       | 45    | H3           | possible    |
| 15001       | 27    | H3           |             |
| 15001       | 31    | H4           |             |
| 15002       | 26    | H1           | disturbed   |
| 15002       | 31    | LNL          |             |
| 15002       | 31    | LNS          |             |
| 15002       | 33    | H3           |             |

| Core Number | Depth | Tephra Layer | Description   |
|-------------|-------|--------------|---------------|
| 15003       | 30    | H1           |               |
| 15004       | 26    | H1           |               |
| 15005       | 23    | H1           |               |
| 15005       | 28    | H3           | cryotubated   |
| 15006       | 24    | H3           |               |
| 15007       | 25    | LNS          |               |
| 15007       | 27    | LNL          |               |
| 15007       | 30    | H3           |               |
| 15008       | 28    | H3           |               |
| 15009       | 26    | H1           |               |
| 15009       | 40    | LNS          |               |
| 15009       | 43    | H3           |               |
| 15010       | 40    | LNL          |               |
| 15011       | 25    | H3           |               |
| 15011       | 28    | H4           |               |
| 15013       | 23    | H1           |               |
| 15014       | 23    | H1           |               |
| 15014       | 36    | H3           |               |
| 15016       | 20    | H1           | possible      |
| 15016       | 46    | 1000         | possible      |
| 15101       | 34    | H3           |               |
| 15102       | 20    | H1           |               |
| 15102       | 31    | H3           |               |
| 15103       | 49    | H3           |               |
| 15104       | 26    | H3           | diffuse       |
| 15104       |       |              |               |
| 15104       | 67    | H3           |               |
| 15104       |       |              |               |
| 15105       |       |              |               |
| 15105       |       |              |               |
| 15106       | 27    | H3           | mixed with ad |
| 15107       | 23    | LNS          |               |
| 15107       | 28    | H3           |               |
| 15108       | 32.5  | H1           |               |
| 15108       | 35    | unknown      | black         |
| 15109       | 28.5  | H1           |               |
| 15110       | 27    | H1           | speck         |
| 15110       | 37    | H3           |               |
| 15111       | 22    | H1           |               |
| 15112       | 18    | H1           |               |
| 15112       | 29    | H3           |               |
| 15113       | 24.5  | LNL          |               |
| 15113       | 24.5  | LNS          |               |
| 15113       | 35    | H3           |               |
| 15200       | 13    | H1           |               |
| 15200       | 68    | H3           |               |
| 15201       | 20    | H1           |               |
| 15201       | 30    | LNS          |               |

| Core Number | Depth | Tephra Layer | Description |
|-------------|-------|--------------|-------------|
| 15201       | 55    | H3           |             |
| 15202       | 29    | H1           |             |
| 15202       | 32    | 1000         |             |
| 15202       | 32    | 1000         |             |
| 15203       | 8     | 1766         |             |
| 15203       | 19    | 1300         |             |
| 15203       | 25    | H1           |             |
| 15205       | 22    | 1300         |             |
| 15205       | 35    | H1           |             |
| 15206       | 28    | LNS          |             |
| 15206       | 38    | H3           |             |
| 15207       |       | LNS          |             |
| 15207       | 22    | 1300         |             |
| 15207       | 25    | H1           |             |
| 15207       | 30    | 1000         |             |
| 15208       | 33    | H1           |             |
| 15209       | 7     | 1766         |             |
| 15209       | 22    | H1           |             |
| 15209       | 37    | LNS          |             |
| 15210       | 5     | 1766         |             |
| 15210       | 20    | 1300         |             |
| 15211       | 28    | H1           |             |
| 15211       | 31    | H3           |             |
| 15212       | 25    | H1           | diffuse     |
| 15212       | 26    | LNS          |             |
| 15212       | 55    | H3           |             |
| 15214       | 28    | H1           |             |
| 15214       | 32    | H3           |             |
| 15215       | 3     | 1766         | possible    |
| 15215       | 35    | H3           |             |
| 15217       | 33    | H3           |             |
| 15218       | 43    | H1           |             |
| 15218       | 44    | LNS          |             |
| 15218       | 50    | H3           |             |
| 15219       | 22    | H1           |             |
| 15219       | 35    | H3           |             |
| 15220       | 26    | H3           |             |
| 150022      | 8     | 1300         |             |
| 150022      | 31    | H3           |             |
| 150024      | 29    | H3           |             |
| 150025      | 27    | H3           |             |
| 150026      |       |              |             |
| 150026      | 22    | H1           | ephemereal  |
| 150026      | 32    | H3           |             |
| 150026      | 35    | H4           |             |
| 150027      | 37    | H3           |             |
| 150027      | 42    | H4           |             |
| 150028      | 22    | H1           |             |

| Core Number | Depth | Tephra Layer | Description  |
|-------------|-------|--------------|--------------|
| 150028      | 45    | H3           |              |
| 150028      | 61    | H4           |              |
| 150029      | 29    | H1           |              |
| 150029      | 34    | LNL          |              |
| 150029      | 42    | H3           |              |
| 150029      | 51    | H4           |              |
| 150030      | 21    | H1           |              |
| 150030      | 28    | LNS          |              |
| 150030      | 42    | unknown      | light grey   |
| 150030      | 48    | H3           |              |
| 150032      |       |              |              |
| 150032      | 25    | H3           |              |
| 150033      | 48    | H3           |              |
| 150034      | 21    | H1           | possible     |
| 150034      | 42    | H3           |              |
| 150034      | 58    | H4           |              |
| 150035      | 24    | H1           |              |
| 150035      | 31    | H3           |              |
| 150035      | 43    | H4           |              |
| 150036      | 9     | 1300         |              |
| 150036      | 21    | H1           | weak         |
| 150036      | 24    | H1           | weak         |
| 150036      | 25    | H1           | strong       |
| 150036      | 49    | H3           |              |
| 150036      | 81    | H4           |              |
| 150037      | 30    | unknown      | white        |
| 150037      | 34    | unknown      | white        |
| 150038      | 34    | unknown      | yellow/white |
| 150038      | 39    | H3           |              |
| 150039      | 14    | unknown      |              |
| 150040      | 22    | H3           |              |
| 150040      | 30    | H4           |              |
| 150042      | 17    | H1           |              |
| 150042      | 23    | H1           |              |
| 150042      | 36    | H3           |              |
| 150044      | 27    | H3           |              |
| 150046      | 44.5  | 1300         |              |
| 150046      | 61    | LNS          |              |
| 150046      | 74    | H3           |              |
| 150046      | 87    | H4           |              |
| 150047      | 30    | H3           |              |
| 150048      | 32    | H3           |              |
| 150049      | 21.5  | H1           |              |
| 150049      | 30    | H3           |              |
| 150049      | 35    | H4           |              |
| 150050      | 22    | H1           |              |
| 150051      | 23    | H1           |              |
| 150052      | 58    | H3           |              |



| Core Number | Depth | Tephra Layer | Description                     |
|-------------|-------|--------------|---------------------------------|
| 150053      | 25    | H3           |                                 |
| 150053      | 30    | H4           |                                 |
| 150054      | 22    | H1           |                                 |
| 150054      | 30    | H3           |                                 |
| 150054      | 51    | H4           |                                 |
| 150055      | 19.5  | H1           |                                 |
| 150056      | 34    | H3           |                                 |
| 150056      | 40    | H4           |                                 |
| 150057      | 40    | H3           | fades at 44mm                   |
| 150059      | 53    | H3           |                                 |
| 150059      | 60    | H4           |                                 |
| 150060      | 46    | H3           |                                 |
| 150060      | 55    | H4           |                                 |
| 150061      | 31    | H1           |                                 |
| 150063      | 17    | H3           |                                 |
| 150064      | 22.5  | H1           | thufurized?                     |
| 150065      | 44    | H3           |                                 |
| 150065      | 51    | H4           |                                 |
| 150066      | 38    | H3           |                                 |
| 150068      | 27.5  | 1300         |                                 |
| 150068      | 50    | unknown      |                                 |
| 150069      | 34    | 1300         |                                 |
| 150069      | 43    | H1           | LDC above and below.            |
| 150070      | 22    | H1           |                                 |
| 150071      | 21    | H1           |                                 |
| 150072      | 18    | H1           | disturbed tephra layer          |
| 150120      | 31    | H3           |                                 |
| 150121      | 19    | 1300         |                                 |
| 150121      | 24    | H1           |                                 |
| 150121      | 35    | H3           |                                 |
| 150122      |       |              |                                 |
| 150122      | 20    | H1           | speck                           |
| 150123      | 19    | 1300         |                                 |
| 150123      | 40    | unknown      | black                           |
| 150125      | 18    | 1300         |                                 |
| 150125      | 23.5  | H1           | in turf                         |
| 150126      | 26    | 1300         |                                 |
| 150127      | 62    | unknown      | black                           |
| 150128      | 23.5  | 1300         | speck                           |
| 150128      | 27    | H1           | thufurized                      |
| 150128      | 33    | unknown      | dark black with green sparklies |
| 150129      | 26    | H1           |                                 |
| 150129      | 34    | unknown      | dark black with green sparklies |
| 150130      | 30.5  | 1300         |                                 |
| 150130      | 35    | H3           |                                 |
| 150131      | 29    | H3           |                                 |
| 150131      | 33    | H4           |                                 |

| Core Number | Depth | Tephra Layer | Description    |
|-------------|-------|--------------|----------------|
| 150132      | 27    | H3           |                |
| 150132      | 30    | H4           |                |
| 150133      | 17    | H1           |                |
| 150134      | 29    | 1300         |                |
| 150134      | 40    | H3           |                |
| 150134      | 43    | H4           | mixed<br>speck |
| 150136      | 21    | H1           |                |
| 150136      | 34    | H3           |                |
| 150137      | 18    | H1           |                |
| 150137      | 28    | H3           |                |
| 150137      | 42    | H4           |                |
| 150138      | 37    | H1           | questionable   |
| 150139      | 30    | H3           |                |
| 150139      | 33.5  | H4           |                |
| 150314      | 31    | H1           |                |
| 150314      | 38    | 1000         |                |
| 150314      | 65    | H3           |                |
| 150314      | 80    | H4           |                |
| 152180      | 16    | H1           |                |
| 152182      | 55    | H3           |                |
| 152183      | 21    | H1           |                |
| 152183      | 27    | H3           |                |
| 152183      | 30    | H4           |                |
| 152184      | 26    | H1           |                |
| 152184      | 35    | H3           |                |
| 152185      | 19    | H1           |                |
| 152185      | 28    | H3           |                |
| 152185      | 33    | H4           |                |
| 152186      | 22    | H1           |                |
| 152187      | 33    | H3           |                |
| 152187      | 36    | H4           |                |
| 152191      | 17.5  | H1           |                |
| 152191      | 30    | H3           |                |
| 152191      | 32    | H4           |                |
| 152192      | 18    | H1           |                |
| 152192      | 33.5  | LNS          |                |
| 152193      | 19    | H1           |                |
| 152193      | 48    | H3           |                |
| 152193      | 51    | H4           |                |
| 152194      | 18    | H1           |                |
| 152194      | 28    | H3           |                |
| 152195      | 18.5  | H1           |                |
| 152195      | 28    | H3           |                |
| 152195      | 32    | H4           |                |
| 152196      | 22    | H1           |                |
| 152196      | 34    | H3           |                |
| 152197      | 20    | H1           |                |
| 152197      | 41    | H3           |                |

| Core Number | Depth | Tephra Layer | Description             |
|-------------|-------|--------------|-------------------------|
| 152197      | 42    | H4           |                         |
| 152198      | 27    | H3           |                         |
| 152198      | 32    | H4           |                         |
| 152568      | 25    | H1           |                         |
| 152569      | 23    | H1           |                         |
| 152570      | 22    | H1           |                         |
| 152570      | 33    | H3           |                         |
| 152570      | 37    | H4           |                         |
| 152571      | 23    | 1300         |                         |
| 152571      | 48    | H3           |                         |
| 152573      | 50    | H3           |                         |
| 152575      | 22    | H1           |                         |
| 152577      | 23    | H1           |                         |
| 152579      | 18    | H1           |                         |
| 152579      | 30    | H3           |                         |
| 160000      | 55    | H1           | Boggy                   |
| 160000      | 95    | H3           |                         |
| 160004      | 12    | 1300         |                         |
| 160004      | 28    | LNS          | No tephra, questionable |
| 160004      | 44    | H3           |                         |
| 160005      | 12    | H1           |                         |
| 160005      | 31    | H3           |                         |
| 160006      | 29    | 1300         |                         |
| 160006      | 49    | H3           |                         |
| 160006      | 58    | H4           |                         |
| 163911      | 22    | H1           |                         |
| 163914      | 15    | H1           |                         |
| 163914      | 65    | H3           |                         |
| 163919      | 25    | H1           |                         |
| 163920      | 38    | H1           |                         |
| 163921      | 28    | H1           |                         |
| 163923      | 20    | H1           |                         |
| 163924      | 39    | H3           |                         |
| 163925      | 15    | H1           |                         |
| 163927      | 16    | H1           |                         |
| 163927      | 39    | H3           |                         |
| 163928      | 24    | H1           |                         |
| 163933      | 38    | H3           |                         |
| 163934      | 19    | H1           |                         |
| 163935      | 21    | H1           |                         |
| 163937      | 40    | H3           |                         |

Table 3. Stratigraphic layers in cores.

| Core Number | top depth | bottom depth | Category             | Description | Tephra in Turf |
|-------------|-----------|--------------|----------------------|-------------|----------------|
| 13131       | 0         | 20           | Top Soil             |             |                |
| 13131       | 20        | 35           | Low Density Cultural |             |                |
| 13131       | 35        | 60           | Aeolian Deposit      |             |                |
| 13131       | 60        | 60           | Gravel               |             |                |
| 13132       | 0         | 20           | Top Soil             |             |                |
| 13132       | 20        | 30           | Low Density Cultural |             |                |
| 13132       | 30        | 45           | Midden               |             |                |
| 13132       | 45        | 60           | Aeolian Deposit      |             |                |
| 13132       | 60        | 60           | Gravel               |             |                |
| 13133       | 0         | 20           | Top Soil             |             |                |
| 13133       | 20        | 40           | Low Density Cultural |             |                |
| 13133       | 40        | 45           | Midden               |             |                |
| 13133       | 45        | 70           | Aeolian Deposit      |             |                |
| 13133       | 70        | 70           | Gravel               |             |                |
| 13134       | 0         | 20           | Top Soil             |             |                |
| 13134       | 20        | 30           | Low Density Cultural |             |                |
| 13134       | 30        | 45           | Midden               |             |                |
| 13134       | 45        | 70           | Aeolian Deposit      |             |                |
| 13134       | 70        | 70           | Gravel               |             |                |
| 13135       | 0         | 20           | Top Soil             |             |                |
| 13135       | 20        | 57           | Midden               |             |                |
| 13135       | 57        | 65           | Low Density Cultural |             |                |
| 13135       | 65        | 90           | Aeolian Deposit      |             |                |
| 13135       | 90        | 90           | Gravel               |             |                |
| 13136       | 0         | 20           | Top Soil             |             |                |
| 13136       | 20        | 55           | Midden               |             |                |
| 13136       | 55        | 80           | Aeolian Deposit      |             |                |
| 13136       | 80        | 80           | Gravel               |             |                |
| 13137       | 0         | 20           | Top Soil             |             |                |



| Core Number | top depth | bottom depth | Category             | Description | Tephra in Turf |
|-------------|-----------|--------------|----------------------|-------------|----------------|
| 13137       | 20        | 30           | Midden               |             |                |
| 13137       | 30        | 80           | Aeolian Deposit      |             |                |
| 13137       | 80        | 80           | Gravel               |             |                |
| 13138       | 0         | 20           | Top Soil             |             |                |
| 13138       | 20        | 28           | Low Density Cultural |             |                |
| 13138       | 28        | 35           | Midden               |             |                |
| 13138       | 35        | 70           | Low Density Cultural |             |                |
| 13138       | 70        | 70           | Gravel               |             |                |
| 13139       | 0         | 20           | Top Soil             |             |                |
| 13139       | 20        | 30           | Low Density Cultural |             |                |
| 13139       | 30        | 35           | Midden               |             |                |
| 13139       | 35        | 45           | Low Density Cultural |             |                |
| 13139       | 45        | 65           | Aeolian Deposit      |             |                |
| 13139       | 65        | 65           | Gravel               |             |                |
| 15000       | 0         | 45           | Aeolian Deposit      |             |                |
| 15000       | 45        | 50           | Aeolian Deposit      | River       |                |
| 15001       | 0         | 6            | Root Mat             |             |                |
| 15001       | 6         | 37           | Aeolian Deposit      |             |                |
| 15001       | 37        | 39           | Gley                 |             |                |
| 15001       | 39        | 60           | Other                | River       |                |
| 15002       | 0         | 5            | Root Mat             |             |                |
| 15002       | 5         | 16           | Aeolian Deposit      |             |                |
| 15002       | 16        | 25           | Turf                 |             |                |
| 15002       | 25        | 63           | Aeolian Deposit      |             |                |
| 15003       | 0         | 8            | Root Mat             |             |                |
| 15003       | 8         | 53           | Aeolian Deposit      |             |                |
| 15003       | 53        | 54           | Gravel               |             |                |
| 15004       | 0         | 7            | Root Mat             |             |                |
| 15004       | 7         | 49           | Aeolian Deposit      |             |                |
| 15004       | 49        | 50           | Gravel               |             |                |
| 15004       | 50        | 59           | Sand                 |             |                |

| Core Number | top depth | bottom depth | Category        | Description | Tephra in Turf |
|-------------|-----------|--------------|-----------------|-------------|----------------|
| 15005       | 0         | 15           | Root Mat        |             |                |
| 15005       | 15        | 43           | Aeolian Deposit |             |                |
| 15005       | 43        | 60           | Aeolian Deposit |             |                |
| 15006       | 0         | 7            | Root Mat        |             |                |
| 15006       | 7         | 18           | Aeolian Deposit |             |                |
| 15006       | 18        | 50           | Aeolian Deposit |             |                |
| 15006       | 50        | 52           | Sand            |             |                |
| 15007       | 0         | 14           | Root Mat        |             |                |
| 15007       | 14        | 22           | Disturbed       |             |                |
| 15007       | 22        | 52           | Aeolian Deposit |             |                |
| 15008       | 0         | 13           | Root Mat        |             |                |
| 15008       | 13        | 22           | Disturbed       |             |                |
| 15008       | 22        | 40           | Aeolian Deposit |             |                |
| 15008       | 40        | 45           | Aeolian Deposit |             |                |
| 15008       | 45        | 52           | Sand            |             |                |
| 15009       | 0         | 16           | Root Mat        |             |                |
| 15009       | 16        | 25           | Disturbed       |             |                |
| 15009       | 25        | 63           | Aeolian Deposit |             |                |
| 15009       | 63        | 63           | Rock            |             |                |
| 15010       | 0         | 16           | Root Mat        |             |                |
| 15010       | 16        | 20           | Disturbed       |             |                |
| 15010       | 20        | 59           | Aeolian Deposit |             |                |
| 15010       | 55        | 59           | Aeolian Deposit | Sandy       |                |
| 15011       | 0         | 11           | Top Soil        |             |                |
| 15011       | 11        | 18           | Disturbed       |             |                |
| 15011       | 18        | 47           | Aeolian Deposit |             |                |
| 15011       | 47        | 54           | Aeolian Deposit |             |                |
| 15011       | 54        | 57           | Aeolian Deposit | Sandy       |                |
| 15011       | 57        | 57           | Rock            |             |                |
| 15012       | 0         | 12           | Top Soil        |             |                |
| 15012       | 12        | 21           | Disturbed       |             |                |

| Core Number | top depth | bottom depth | Category             | Description               | Tephra in Turf |
|-------------|-----------|--------------|----------------------|---------------------------|----------------|
| 15012       | 21        | 35           | Aeolian Deposit      |                           |                |
| 15012       | 35        | 42.2         | Aeolian Deposit      |                           |                |
| 15012       | 42.2      | 42.2         | Gravel               |                           |                |
| 15013       | 0         | 14           | Root Mat             |                           |                |
| 15013       | 14        | 21           | Disturbed            |                           |                |
| 15013       | 21        | 43           | Aeolian Deposit      |                           |                |
| 15013       | 43        | 50           | Aeolian Deposit      |                           |                |
| 15013       | 50        | 50           | Gravel               |                           |                |
| 15014       | 0         | 10           | Root Mat             |                           |                |
| 15014       | 10        | 41.5         | Aeolian Deposit      |                           |                |
| 15014       | 41.5      | 46           | Aeolian Deposit      |                           |                |
| 15016       |           | 17           | Disturbed            |                           |                |
| 15016       | 0         | 10           | Root Mat             |                           |                |
| 15016       | 17        | 29.5         | Aeolian Deposit      |                           |                |
| 15016       | 29.5      | 31           | Turf                 |                           |                |
| 15016       | 31        | 34           | Aeolian Deposit      |                           |                |
| 15016       | 34        | 35           | Midden               |                           |                |
| 15016       | 35        | 40           | Low Density Cultural |                           |                |
| 15016       | 40        | 43           | Midden               |                           |                |
| 15016       | 43        | 49           | Aeolian Deposit      |                           |                |
| 15016       | 49        | 51           | Low Density Cultural |                           |                |
| 15100       | 0         | 6            | Root Mat             |                           |                |
| 15100       | 6         | 31           | Disturbed            |                           |                |
| 15100       | 31        | 59           | Turf                 |                           | H1             |
| 15100       | 59        | 72           | Clay                 |                           |                |
| 15100       | 100       | 100          | Rock                 |                           |                |
| 15101       | 0         | 15           | Root Mat             |                           |                |
| 15101       | 15        | 22           | Turf                 |                           |                |
| 15101       | 22        | 34           | Aeolian Deposit      |                           |                |
| 15101       | 35        | 40           | Subsoil              | Subsoil (Sterile/Natural) |                |
| 15101       | 40        | 40           | Rock                 |                           |                |

| Core Number | top depth | bottom depth | Category        | Description | Tephra in Turf |
|-------------|-----------|--------------|-----------------|-------------|----------------|
| 15102       | 0         | 14           | Root Mat        |             |                |
| 15102       | 14        | 38           | Aeolian Deposit |             |                |
| 15102       | 38        | 44           | Subsoil         |             |                |
| 15103       | 0         | 19           | Root Mat        |             |                |
| 15103       | 19        | 31           | Aeolian Deposit |             |                |
| 15103       | 31        | 44           | Turf            | Irony       | H3/H4          |
| 15103       | 44        | 49           | Aeolian Deposit |             |                |
| 15103       | 52.5      | 56           | Subsoil         |             |                |
| 15103       | 56        | 56           | Rock            |             |                |
| 15104       | 0         | 11           | Root Mat        |             |                |
| 15104       |           |              |                 |             |                |
| 15104       | 0         | 10           | Root Mat        |             |                |
| 15104       |           |              |                 |             |                |
| 15104       | 10        | 80           | Aeolian Deposit |             |                |
| 15104       |           |              |                 |             |                |
| 15104       | 11        | 23           | Disturbed       |             |                |
| 15104       |           |              |                 |             |                |
| 15104       | 23        | 26           | Turf            |             |                |
| 15104       |           |              |                 |             |                |
| 15104       | 26        | 34           | Aeolian Deposit |             |                |
| 15104       |           |              |                 |             |                |
| 15104       | 34        | 40           | Subsoil         |             |                |
| 15104       |           |              |                 |             |                |
| 15104       | 40        | 55           | Subsoil         |             |                |
| 15104       |           |              |                 |             |                |
| 15104       | 55        | 55           | Rock            |             |                |
| 15104       |           |              |                 |             |                |
| 15105       | 0         | 21           | Root Mat        |             |                |
| 15105       |           |              |                 |             |                |
| 15105       | 21        | 28           | Disturbed       |             |                |
| 15105       |           |              |                 |             |                |



| Core Number | top depth | bottom depth | Category             | Description | Tephra in Turf |
|-------------|-----------|--------------|----------------------|-------------|----------------|
| 15105       | 28        | 33           | Aeolian Deposit      |             |                |
| 15105       |           |              |                      |             |                |
| 15105       | 33        | 39           | Subsoil              |             |                |
| 15105       |           |              |                      |             |                |
| 15105       | 39        | 39           | Rock                 |             |                |
| 15105       |           |              |                      |             |                |
| 15106       | 0         | 13           | Root Mat             |             |                |
| 15106       | 13        | 20           | Disturbed            |             |                |
| 15106       | 20        | 27           | Low Density Cultural |             |                |
| 15106       | 27        | 35           | Aeolian Deposit      |             |                |
| 15106       | 35        | 58           | Subsoil              |             |                |
| 15106       | 58        | 58           | Rock                 |             |                |
| 15107       | 0         | 12           | Root Mat             |             |                |
| 15107       | 12        | 18           | Disturbed            |             |                |
| 15107       | 18        | 31           | Aeolian Deposit      |             |                |
| 15107       | 31        | 56           | Subsoil              |             |                |
| 15107       | 56        | 56           | Rock                 |             |                |
| 15108       | 0         | 15           | Root Mat             |             |                |
| 15108       | 15        | 22           | Disturbed            |             |                |
| 15108       | 22        | 53           | Aeolian Deposit      |             |                |
| 15108       | 53        | 53           | Rock                 |             |                |
| 15109       | 0         | 19           | Root Mat             |             |                |
| 15109       | 19        | 30           | Aeolian Deposit      |             |                |
| 15109       | 30        | 33           | Turf                 |             |                |
| 15110       | 0         | 15           | Root Mat             |             |                |
| 15110       | 15        | 25           | Disturbed            |             |                |
| 15110       | 25        | 44           | Aeolian Deposit      |             |                |
| 15110       | 44        | 59           | Subsoil              |             |                |
| 15110       | 59        | 59           | Rock                 |             |                |
| 15111       | 0         | 19           | Root Mat             |             |                |
| 15111       | 19        | 30           | Aeolian Deposit      |             |                |

| Core Number | top depth | bottom depth | Category             | Description | Tephra in Turf |
|-------------|-----------|--------------|----------------------|-------------|----------------|
| 15111       | 30        | 40           | Subsoil              |             |                |
| 15112       | 0         | 11           | Root Mat             |             |                |
| 15112       | 11        | 21           | Disturbed            |             |                |
| 15112       | 21        | 34           | Aeolian Deposit      |             |                |
| 15112       | 34        | 56           | Subsoil              |             |                |
| 15112       | 56        | 56           | Rock                 |             |                |
| 15113       | 0         | 14           | Root Mat             |             |                |
| 15113       | 14        | 18           | Disturbed            |             |                |
| 15113       | 18        | 35           | Aeolian Deposit      |             |                |
| 15113       | 35        | 44           | Subsoil              |             |                |
| 15114       | 0         | 13           | Root Mat             |             |                |
| 15114       | 13        | 49           | Turf                 |             | LNL/LNS        |
| 15114       | 49        | 72           | Subsoil              |             |                |
| 15114       | 72        | 72           | Rock                 |             |                |
| 15115       | 0         | 14           | Root Mat             |             |                |
| 15115       | 14        | 20           | Disturbed            |             |                |
| 15115       | 20        | 33           | Turf                 |             | H1             |
| 15115       | 33        | 42           | Subsoil              |             |                |
| 15115       | 42        | 42           | Rock                 |             |                |
| 15200       | 0         | 10           | Root Mat             |             |                |
| 15200       | 10        | 80           | Aeolian Deposit      |             |                |
| 15201       | 0         | 10           | Root Mat             |             |                |
| 15201       | 10        | 20           | Disturbed            |             |                |
| 15201       | 20        | 29           | Aeolian Deposit      |             |                |
| 15201       | 29        | 32           | Aeolian Deposit      | Soil        |                |
| 15201       | 32        | 40           | Low Density Cultural |             |                |
| 15201       | 40        | 70           | Aeolian Deposit      |             |                |
| 15201       | 70        | 80           | Gravel               |             |                |
| 15202       | 0         | 15           | Root Mat             |             |                |
| 15202       | 15        | 38           | Aeolian Deposit      |             |                |
| 15202       | 38        | 40           | Gravel               |             |                |

| Core Number | top depth | bottom depth | Category        | Description     | Tephra in Turf |
|-------------|-----------|--------------|-----------------|-----------------|----------------|
| 15203       | 0         | 15           | Root Mat        |                 |                |
| 15203       | 15        | 35           | Aeolian Deposit |                 |                |
| 15203       | 35        | 38           | Turf            |                 |                |
| 15203       | 38        | 45           | Gravel          |                 |                |
| 15204       | 0         | 20           | Root Mat        |                 |                |
| 15204       | 20        | 40           | Aeolian Deposit | reworked tephra |                |
| 15204       | 40        | 45           | Turf            |                 |                |
| 15204       | 45        | 50           | Aeolian Deposit |                 |                |
| 15204       | 50        | 55           | Gravel          |                 |                |
| 15205       | 0         | 15           | Root Mat        |                 |                |
| 15205       | 15        | 75           | Aeolian Deposit | Irony           |                |
| 15205       | 75        | 80           | Gravel          |                 |                |
| 15206       | 0         | 12           | Root Mat        |                 |                |
| 15206       | 12        | 55           | Aeolian Deposit |                 |                |
| 15206       | 55        | 55           | Gravel          |                 |                |
| 15207       | 0         | 15           | Root Mat        |                 |                |
| 15207       | 15        | 36           | Aeolian Deposit |                 |                |
| 15207       | 36        | 43           | Turf            |                 |                |
| 15207       | 43        | 45           | Gravel          |                 |                |
| 15208       | 0         | 15           | Root Mat        |                 |                |
| 15208       | 15        | 33           | Aeolian Deposit |                 |                |
| 15208       | 33        | 38           | Turf            |                 |                |
| 15208       | 38        | 40           | Aeolian Deposit |                 |                |
| 15209       | 0         | 15           | Root Mat        |                 |                |
| 15209       | 15        | 60           | Aeolian Deposit |                 |                |
| 15209       | 60        | 65           | Gravel          |                 |                |
| 15210       | 0         | 15           | Root Mat        |                 |                |
| 15210       | 15        | 22           | Plow Zone       |                 |                |
| 15210       | 22        | 45           | Aeolian Deposit |                 |                |
| 15210       | 46        | 46           | Gravel          |                 |                |
| 15211       | 0         | 12           | Root Mat        |                 |                |

| Core Number | top depth | bottom depth | Category             | Description | Tephra in Turf |
|-------------|-----------|--------------|----------------------|-------------|----------------|
| 15211       | 12        | 50           | Aeolian Deposit      |             |                |
| 15211       | 50        | 55           | Sand                 |             |                |
| 15212       | 0         | 12           | Root Mat             |             |                |
| 15212       | 12        | 67           | Aeolian Deposit      |             |                |
| 15212       | 67        | 70           | Gravel               |             |                |
| 15213       | 0         | 11           | Root Mat             |             |                |
| 15213       | 11        | 30           | Aeolian Deposit      |             |                |
| 15213       | 30        | 45           | Low Density Cultural |             |                |
| 15213       | 45        | 54           | Turf                 |             | unknown        |
| 15213       | 54        | 68           | Midden               |             |                |
| 15214       | 0         | 15           | Root Mat             |             |                |
| 15214       | 15        | 37           | Aeolian Deposit      |             |                |
| 15214       | 37        | 50           | Sand                 | River       |                |
| 15214       | 50        | 60           | Aeolian Deposit      |             |                |
| 15214       | 60        | 70           | Gravel               |             |                |
| 15215       | 0         | 16           | Root Mat             |             |                |
| 15215       | 16        | 57           | Aeolian Deposit      |             |                |
| 15216       | 0         | 15           | Root Mat             |             |                |
| 15216       | 15        | 20           | Aeolian Deposit      |             |                |
| 15216       | 20        | 30           | Turf                 |             |                |
| 15216       | 30        | 40           | Aeolian Deposit      |             |                |
| 15217       | 0         | 15           | Root Mat             |             |                |
| 15217       | 15        | 47           | Aeolian Deposit      |             |                |
| 15217       | 47        | 57           | Gravel               |             |                |
| 15218       | 0         | 15           | Root Mat             |             |                |
| 15218       | 15        | 35           | Turf                 |             |                |
| 15218       | 35        | 65           | Aeolian Deposit      |             |                |
| 15218       | 65        | 75           | Gravel               |             |                |
| 15219       | 0         | 14           | Root Mat             |             |                |
| 15219       | 14        | 53           | Aeolian Deposit      |             |                |
| 15219       | 53        | 58           | Gravel               |             |                |



| Core Number | top depth | bottom depth | Category             | Description | Tephra in Turf |
|-------------|-----------|--------------|----------------------|-------------|----------------|
| 15220       | 0         | 12           | Root Mat             |             |                |
| 15220       | 12        | 40           | Aeolian Deposit      |             |                |
| 15221       | 0         | 15           | Root Mat             |             |                |
| 15221       | 15        | 40           | Aeolian Deposit      |             |                |
| 150018      | 0         | 14           | Root Mat             |             |                |
| 150018      | 14        | 29           | Disturbed            |             |                |
| 150018      | 29        | 35           | Aeolian Deposit      |             |                |
| 150018      | 35        | 40           | Aeolian Deposit      |             |                |
| 150019      | 0         | 9            | Root Mat             |             |                |
| 150019      | 9         | 18           | Disturbed            |             |                |
| 150019      | 18        | 28           | Turf                 |             |                |
| 150019      | 28        | 38           | Turf                 |             |                |
| 150019      | 38        | 49           | Aeolian Deposit      |             |                |
| 150019      | 49        | 50           | Aeolian Deposit      | Sandy       |                |
| 150020      | 0         | 15           | Root Mat             |             |                |
| 150020      | 15        | 22           | Turf                 |             |                |
| 150020      | 22        | 32.5         | Turf                 |             | unknown        |
| 150020      | 32.5      | 40           | Disturbed            |             |                |
| 150020      | 40        | 40           | Rock                 |             |                |
| 150021      | 0         | 7            | Root Mat             |             |                |
| 150021      | 7         | 21           | Disturbed            |             |                |
| 150021      | 21        | 25           | Low Density Cultural |             |                |
| 150021      | 25        | 80           | Turf                 |             |                |
| 150021      | 80        | 104          | Gley                 |             |                |
| 150022      | 0         | 6            | Root Mat             |             |                |
| 150022      | 6         | 14           | Disturbed            |             |                |
| 150022      | 14        | 40           | Turf                 |             | H3/H4          |
| 150022      | 40        | 100          | Bog                  |             |                |
| 150022      | 100       | 110          | Gley                 |             |                |
| 150023      | 0         | 6            | Root Mat             |             |                |
| 150023      | 6         | 40           | Turf                 |             |                |

| Core Number | top depth | bottom depth | Category             | Description | Tephra in Turf |
|-------------|-----------|--------------|----------------------|-------------|----------------|
| 150023      | 40        | 42           | Gravel               |             |                |
| 150024      | 0         | 7            | Root Mat             |             |                |
| 150024      | 7         | 19           | Aeolian Deposit      |             |                |
| 150024      | 19        | 105          | Bog                  |             |                |
| 150025      | 0         | 7            | Root Mat             |             |                |
| 150025      | 7         | 16           | Disturbed            |             |                |
| 150025      | 16        | 22           | Aeolian Deposit      |             |                |
| 150025      | 22        | 50           | Bog                  |             |                |
| 150025      | 50        | 62           | Gley                 |             |                |
| 150025      | 62        | 62           | Gravel               |             |                |
| 150026      | 0         | 7            | Root Mat             |             |                |
| 150026      | 7         | 14           | Disturbed            |             |                |
| 150026      | 14        | 22           | Aeolian Deposit      |             |                |
| 150026      | 22        | 30           | Low Density Cultural |             |                |
| 150026      | 30        | 55           | Aeolian Deposit      |             |                |
| 150026      | 55        | 55           | Gravel               |             |                |
| 150027      | 0         | 4            | Root Mat             |             |                |
| 150027      | 0         | 16           | Aeolian Deposit      |             |                |
| 150027      | 16        | 23           | Aeolian Deposit      |             |                |
| 150027      | 23        | 32           | Low Density Cultural |             |                |
| 150027      | 32        | 43           | Aeolian Deposit      |             |                |
| 150027      | 43        | 58           | Aeolian Deposit      | Mottled     |                |
| 150027      | 58        | 63           | Gravel               |             |                |
| 150028      | 0         | 6            | Root Mat             |             |                |
| 150028      | 6         | 22           | Turf                 |             |                |
| 150028      | 22        | 30           | Aeolian Deposit      |             |                |
| 150028      | 30        | 74           | Bog                  |             |                |
| 150029      | 0         | 6            | Root Mat             |             |                |
| 150029      | 6         | 19           | Disturbed            |             |                |
| 150029      | 19        | 29           | Aeolian Deposit      |             |                |
| 150029      | 29        | 32           | Low Density Cultural |             |                |

| Core Number | top depth | bottom depth | Category             | Description | Tephra in Turf |
|-------------|-----------|--------------|----------------------|-------------|----------------|
| 150029      | 32        | 100          | Bog                  |             |                |
| 150030      | 0         | 6            | Root Mat             |             |                |
| 150030      | 6         | 19           | Turf                 |             | H1             |
| 150030      | 19        | 42           | Aeolian Deposit      |             |                |
| 150030      | 42        | 104          | Bog                  |             |                |
| 150030      | 104       | 104          | Gravel               |             |                |
| 150032      | 0         | 8            | Root Mat             |             |                |
| 150032      | 8         | 22           | Turf                 |             |                |
| 150032      | 22        | 67           | Bog                  |             |                |
| 150032      | 54        | 58           | Sand                 |             |                |
| 150032      | 58        | 72           | Bog                  |             |                |
| 150033      | 0         | 6            | Root Mat             |             |                |
| 150033      | 6         | 18           | Disturbed            |             |                |
| 150033      | 18        | 28           | Turf                 |             |                |
| 150033      | 28        | 91           | Bog                  |             |                |
| 150034      | 0         | 5            | Root Mat             |             |                |
| 150034      | 5         | 23           | Turf                 |             | H1             |
| 150034      | 23        | 38           | Low Density Cultural |             |                |
| 150034      | 38        | 104          | Bog                  |             |                |
| 150035      | 0         | 7            | Root Mat             |             |                |
| 150035      | 7         | 19           | Disturbed            |             |                |
| 150035      | 19        | 25           | Low Density Cultural |             |                |
| 150035      | 25        | 27           | Iron Pan             |             |                |
| 150035      | 27        | 34           | Aeolian Deposit      |             |                |
| 150035      | 34        | 100          | Bog                  |             |                |
| 150036      | 0         | 5            | Root Mat             |             |                |
| 150036      | 5         | 9            | Disturbed            |             |                |
| 150036      | 9         | 20           | Aeolian Deposit      |             |                |
| 150036      | 20        | 36           | Low Density Cultural |             |                |
| 150036      | 36        | 110          | Bog                  |             |                |
| 150037      | 0         | 7            | Root Mat             |             |                |

| Core Number | top depth | bottom depth | Category             | Description | Tephra in Turf |
|-------------|-----------|--------------|----------------------|-------------|----------------|
| 150037      | 7         | 21           | Disturbed            |             |                |
| 150037      | 21        | 45           | Bog                  |             |                |
| 150037      | 45        | 50           | Gravel               |             |                |
| 150038      | 0         | 8            | Root Mat             |             |                |
| 150038      | 8         | 24           | Disturbed            |             |                |
| 150038      | 24        | 92           | Bog                  |             |                |
| 150039      | 0         | 8            | Root Mat             |             |                |
| 150039      | 8         | 30           | Turf                 |             |                |
| 150039      | 30        | 46           | Bog                  |             |                |
| 150039      | 46        | 46           | Gravel               |             |                |
| 150040      | 0         | 7            | Root Mat             |             |                |
| 150040      | 7         | 14           | Low Density Cultural |             |                |
| 150040      | 14        | 22           | Aeolian Deposit      |             |                |
| 150040      | 24        | 40           | Bog                  |             |                |
| 150040      | 40        | 40           | Rock                 |             |                |
| 150041      | 0         | 12           | Root Mat             |             |                |
| 150041      | 12        | 17           | Disturbed            |             |                |
| 150041      | 17        | 37           | Aeolian Deposit      |             |                |
| 150041      | 37        | 37           | Rock                 |             |                |
| 150042      | 0         | 9            | Root Mat             |             |                |
| 150042      | 9         | 17           | Aeolian Deposit      |             |                |
| 150042      | 17        | 28           | Low Density Cultural |             |                |
| 150042      | 28        | 40           | Aeolian Deposit      |             |                |
| 150042      | 40        | 56           | Aeolian Deposit      |             |                |
| 150043      | 0         | 10           | Root Mat             |             |                |
| 150043      | 10        | 26           | Disturbed            |             |                |
| 150043      | 26        | 41           | Aeolian Deposit      |             |                |
| 150043      | 41        | 68           | Aeolian Deposit      |             |                |
| 150043      | 68        | 68           | Rock                 |             |                |
| 150044      | 0         | 15           | Root Mat             |             |                |
| 150044      | 15        | 23           | Disturbed            |             |                |

| Core Number | top depth | bottom depth | Category        | Description | Tephra in Turf |
|-------------|-----------|--------------|-----------------|-------------|----------------|
| 150044      | 23        | 45           | Aeolian Deposit |             |                |
| 150044      | 45        | 45           | Rock            |             |                |
| 150045      | 0         | 12           | Root Mat        |             |                |
| 150045      | 12        | 22           | Disturbed       |             |                |
| 150045      | 22        | 57           | Aeolian Deposit |             |                |
| 150045      | 57        | 57           | Rock            |             |                |
| 150046      | 0         | 19           | Root Mat        |             |                |
| 150046      | 19        | 23           | Disturbed       |             |                |
| 150046      | 23        | 91           | Aeolian Deposit |             |                |
| 150047      | 0         | 15           | Root Mat        |             |                |
| 150047      | 15        | 19           | Disturbed       |             |                |
| 150047      | 19        | 50           | Aeolian Deposit |             |                |
| 150047      | 50        | 50           | Rock            |             |                |
| 150048      | 0         | 15           | Root Mat        |             |                |
| 150048      | 15        | 53           | Aeolian Deposit |             |                |
| 150049      | 0         | 15           | Root Mat        |             |                |
| 150049      | 15        | 25           | Disturbed       |             |                |
| 150049      | 25        | 36           | Aeolian Deposit |             |                |
| 150049      | 36        | 58           | Subsoil         |             |                |
| 150049      | 58        | 58           | Rock            |             |                |
| 150050      | 0         | 12           | Root Mat        |             |                |
| 150050      | 12        | 22           | Disturbed       |             |                |
| 150050      | 22        | 40           | Aeolian Deposit |             |                |
| 150050      | 40        | 40           | Rock            |             |                |
| 150051      | 0         | 10           | Root Mat        |             |                |
| 150051      | 10        | 23           | Disturbed       |             |                |
| 150051      | 23        | 27           | Turf            |             |                |
| 150051      | 27        | 52           | Aeolian Deposit |             |                |
| 150051      | 52        | 52           | Rock            |             |                |
| 150052      | 0         | 15           | Root Mat        |             |                |
| 150052      | 15        | 23           | Disturbed       |             |                |



| Core Number | top depth | bottom depth | Category             | Description | Tephra in Turf |
|-------------|-----------|--------------|----------------------|-------------|----------------|
| 150052      | 23        | 53           | Aeolian Deposit      |             |                |
| 150052      | 53        | 58           | Turf                 |             |                |
| 150052      | 58        | 68           | Aeolian Deposit      |             |                |
| 150053      | 0         | 14           | Root Mat             |             |                |
| 150053      | 14        | 25           | Disturbed            |             |                |
| 150053      | 25        | 53           | Aeolian Deposit      |             |                |
| 150054      | 0         | 10           | Root Mat             |             |                |
| 150054      | 10        | 22           | Disturbed            |             |                |
| 150054      | 22        | 80           | Aeolian Deposit      |             |                |
| 150055      | 0         | 14           | Root Mat             |             |                |
| 150055      | 14        | 19.5         | Disturbed            |             |                |
| 150055      | 19.5      | 46           | Aeolian Deposit      |             |                |
| 150055      | 46        | 46           | Rock                 |             |                |
| 150056      | 0         | 14           | Root Mat             |             |                |
| 150056      | 14        | 25           | Turf                 |             |                |
| 150056      | 25        | 54           | Aeolian Deposit      |             |                |
| 150056      | 54        | 54           | Rock                 |             |                |
| 150057      | 0         | 12           | Root Mat             |             |                |
| 150057      | 12        | 16           | Disturbed            |             |                |
| 150057      | 16        | 28           | Turf                 |             | unknown        |
| 150057      | 28        | 40           | Low Density Cultural |             |                |
| 150057      | 40        | 61           | Aeolian Deposit      |             |                |
| 150058      | 0         | 9            | Root Mat             |             |                |
| 150058      | 9         | 14.5         | Disturbed            |             |                |
| 150058      | 14.5      | 18           | Turf                 |             |                |
| 150058      | 18        | 34           | Low Density Cultural |             |                |
| 150058      | 34        | 36           | Iron Pan             |             |                |
| 150058      | 36        | 55           | Aeolian Deposit      |             |                |
| 150059      | 0         | 8            | Root Mat             |             |                |
| 150059      | 8         | 33           | Turf                 |             | H3/H4          |
| 150059      | 33        | 71           | Bog                  |             |                |

| Core Number | top depth | bottom depth | Category             | Description | Tephra in Turf |
|-------------|-----------|--------------|----------------------|-------------|----------------|
| 150059      | 71        | 75           | Aeolian Deposit      |             |                |
| 150059      | 75        | 80           | Gravel               |             |                |
| 150060      | 0         | 7            | Root Mat             |             |                |
| 150060      | 7         | 29           | Turf                 |             |                |
| 150060      | 29        | 34           | Aeolian Deposit      |             |                |
| 150060      | 34        | 36           | Midden               |             |                |
| 150060      | 36        | 38           | Aeolian Deposit      |             |                |
| 150060      | 38        | 69           | Bog                  |             |                |
| 150061      | 0         | 10           | Root Mat             |             |                |
| 150061      | 10        | 26           | Turf                 |             |                |
| 150061      | 26        | 38           | Bog                  |             |                |
| 150061      | 38        | 38           | Rock                 |             |                |
| 150062      | 0         | 9            | Root Mat             |             |                |
| 150062      | 9         | 67           | Bog                  |             |                |
| 150062      | 67        | 67           | Rock                 |             |                |
| 150063      | 0         | 8            | Root Mat             |             |                |
| 150063      | 8         | 13           | Disturbed            |             |                |
| 150063      | 13        | 31           | Bog                  |             |                |
| 150063      | 31        | 33           | Aeolian Deposit      |             |                |
| 150063      | 33        | 33           | Rock                 |             |                |
| 150064      | 0         | 12           | Root Mat             |             |                |
| 150064      | 12        | 17           | Disturbed            |             |                |
| 150064      | 17        | 36           | Aeolian Deposit      | Mottled     |                |
| 150064      | 36        | 36           | Rock                 |             |                |
| 150065      | 0         | 16           | Root Mat             |             |                |
| 150065      | 16        | 24           | Disturbed            |             |                |
| 150065      | 24        | 36           | Aeolian Deposit      | Mottled     |                |
| 150065      | 36        | 37           | Low Density Cultural |             |                |
| 150065      | 37        | 39           | Aeolian Deposit      | Mottled     |                |
| 150065      | 39        | 41           | Midden               |             |                |
| 150065      | 41        | 58           | Bog                  |             |                |

| Core Number | top depth | bottom depth | Category             | Description | Tephra in Turf |
|-------------|-----------|--------------|----------------------|-------------|----------------|
| 150066      | 0         | 13           | Root Mat             |             |                |
| 150066      | 13        | 17           | Low Density Cultural |             |                |
| 150066      | 17        | 25           | Aeolian Deposit      |             |                |
| 150066      | 25        | 33           | Aeolian Deposit      | Mottled     |                |
| 150066      | 33        | 61           | Bog                  | Mottled     |                |
| 150066      | 61        | 61           | Rock                 |             |                |
| 150067      | 0         | 10           | Root Mat             |             |                |
| 150067      | 10        | 16           | Disturbed            |             |                |
| 150067      | 16        | 25           | Aeolian Deposit      | Mottled     |                |
| 150067      | 25        | 31           | Turf                 |             |                |
| 150067      | 31        | 39           | Aeolian Deposit      |             |                |
| 150067      | 39        | 42           | Bog                  |             |                |
| 150068      | 0         | 13           | Root Mat             |             |                |
| 150068      | 13        | 15           | Disturbed            |             |                |
| 150068      | 15        | 27.5         | Aeolian Deposit      |             |                |
| 150068      | 27.5      | 40           | Turf                 |             |                |
| 150068      | 40        | 67           | Aeolian Deposit      |             |                |
| 150069      | 0         | 11.5         | Root Mat             |             |                |
| 150069      | 11.5      | 19           | Disturbed            |             |                |
| 150069      | 19        | 26           | Turf                 |             |                |
| 150069      | 26        | 37           | Aeolian Deposit      |             |                |
| 150069      | 37        | 57           | Low Density Cultural |             |                |
| 150069      | 57        | 69           | Aeolian Deposit      |             |                |
| 150070      | 0         | 11           | Root Mat             |             |                |
| 150070      | 11        | 15           | Disturbed            |             |                |
| 150070      | 15        | 43           | Aeolian Deposit      |             |                |
| 150070      | 43        | 43           | Rock                 |             |                |
| 150071      | 0         | 18.5         | Root Mat             |             |                |
| 150071      | 18.5      | 40           | Aeolian Deposit      |             |                |
| 150071      | 40        | 40           | Rock                 |             |                |
| 150072      | 0         | 16           | Root Mat             |             |                |

| Core Number | top depth | bottom depth | Category             | Description | Tephra in Turf |
|-------------|-----------|--------------|----------------------|-------------|----------------|
| 150072      | 16        | 27           | Disturbed            |             |                |
| 150072      | 27        | 37           | Aeolian Deposit      |             |                |
| 150072      | 37        | 37           | Rock                 |             |                |
| 150073      | 0         | 11           | Root Mat             |             |                |
| 150073      | 11        | 20           | Disturbed            |             |                |
| 150073      | 20        | 40           | Aeolian Deposit      |             |                |
| 150073      | 40        | 40           | Rock                 |             |                |
| 150074      | 0         | 12           | Root Mat             |             |                |
| 150074      | 0         | 13           | Aeolian Deposit      |             |                |
| 150074      | 12        | 21           | Disturbed            |             |                |
| 150074      | 13        | 13           | Rock                 |             |                |
| 150074      | 21        | 35           | Aeolian Deposit      |             |                |
| 150074      | 35        | 35           | Rock                 |             |                |
| 150120      | 0         | 12           | Root Mat             |             |                |
| 150120      | 12        | 20           | Disturbed            |             |                |
| 150120      | 20        | 45           | Aeolian Deposit      |             |                |
| 150120      | 45        | 45           | Rock                 |             |                |
| 150121      | 0         | 13           | Root Mat             |             |                |
| 150121      | 13        | 17           | Disturbed            |             |                |
| 150121      | 17        | 25           | Low Density Cultural |             |                |
| 150121      | 25        | 28           | Turf                 |             |                |
| 150121      | 28        | 40           | Aeolian Deposit      |             |                |
| 150121      | 40        | 55           | Subsoil              |             |                |
| 150121      | 54        | 55           | Gravel               |             |                |
| 150122      | 0         | 10           | Root Mat             |             |                |
| 150122      | 10        | 21           | Disturbed            |             |                |
| 150122      | 21        | 32           | Turf                 |             |                |
| 150122      | 32        | 40           | Low Density Cultural |             |                |
| 150122      | 40        | 61           | Turf                 |             | H1             |
| 150123      | 0         | 13           | Root Mat             |             |                |
| 150123      | 13        | 20           | Disturbed            |             |                |

| Core Number | top depth | bottom depth | Category             | Description | Tephra in Turf |
|-------------|-----------|--------------|----------------------|-------------|----------------|
| 150123      | 20        | 26           | Low Density Cultural |             |                |
| 150123      | 26        | 40           | Midden               |             |                |
| 150123      | 40        | 52           | Turf                 |             |                |
| 150123      | 52        | 58           | Subsoil              |             |                |
| 150123      | 58        | 63           | Gravel               |             |                |
| 150124      | 0         | 14           | Root Mat             |             |                |
| 150124      | 14        | 20           | Disturbed            |             |                |
| 150124      | 20        | 27           | Low Density Cultural |             |                |
| 150124      | 27        | 35           | Midden               |             |                |
| 150124      | 35        | 54           | Turf                 |             |                |
| 150124      | 54        |              | Subsoil              |             |                |
| 150124      | 54        | 57           | Gravel               |             |                |
| 150125      | 0         | 12           | Root Mat             |             |                |
| 150125      | 12        | 22           | Disturbed            |             |                |
| 150125      | 22        | 35           | Turf                 |             |                |
| 150125      | 35        | 45           | Subsoil              |             |                |
| 150126      | 0         | 13           | Root Mat             |             |                |
| 150126      | 13        | 21           | Disturbed            |             |                |
| 150126      | 21        | 30           | Low Density Cultural |             |                |
| 150126      | 30        | 36           | Turf                 |             |                |
| 150126      | 36        | 43           | Subsoil              |             |                |
| 150127      | 0         | 12           | Root Mat             |             |                |
| 150127      | 12        | 18           | Disturbed            |             |                |
| 150127      | 18        | 44           | Turf                 |             | H1             |
| 150127      | 44        | 49           | Aeolian Deposit      |             |                |
| 150127      | 49        | 53           | Midden               |             |                |
| 150127      | 53        | 67           | Low Density Cultural |             |                |
| 150128      | 0         | 21           | Root Mat             |             |                |
| 150128      | 21        | 28           | Aeolian Deposit      |             |                |
| 150128      | 28        | 31           | Low Density Cultural |             |                |
| 150128      | 31        | 33           | Aeolian Deposit      |             |                |



| Core Number | top depth | bottom depth | Category             | Description               | Tephra in Turf |
|-------------|-----------|--------------|----------------------|---------------------------|----------------|
| 150128      | 37        | 52           | Midden               |                           |                |
| 150128      | 52        | 59           | Aeolian Deposit      |                           |                |
| 150128      | 59        | 59           | Rock                 |                           |                |
| 150129      | 0         | 20           | Root Mat             |                           |                |
| 150129      | 20        | 24           | Disturbed            |                           |                |
| 150129      | 24        | 38           | Aeolian Deposit      |                           |                |
| 150129      | 38        | 47           | Midden               |                           |                |
| 150129      | 47        | 58           | Aeolian Deposit      |                           |                |
| 150129      | 58        | 60           | Gravel               |                           |                |
| 150130      | 0         | 14           | Root Mat             |                           |                |
| 150130      | 14        | 35           | Aeolian Deposit      |                           |                |
| 150130      | 35        | 52           | Subsoil              |                           |                |
| 150130      | 52        | 56           | Gravel               |                           |                |
| 150131      | 0         | 15           | Root Mat             |                           |                |
| 150131      | 15        | 19           | Aeolian Deposit      |                           |                |
| 150131      | 19        | 26           | Low Density Cultural |                           |                |
| 150131      | 26        | 40           | Aeolian Deposit      |                           |                |
| 150132      | 0         | 13           | Root Mat             |                           |                |
| 150132      | 13        | 20           | Disturbed            |                           |                |
| 150132      | 20        | 49           | Aeolian Deposit      |                           |                |
| 150132      | 49        | 49           | Rock                 |                           |                |
| 150133      | 0         | 16           | Root Mat             |                           |                |
| 150133      | 16        | 21           | Disturbed            |                           |                |
| 150133      | 21        | 29           | Turf                 |                           |                |
| 150133      | 29        | 35           | Aeolian Deposit      | Subsoil (Sterile/Natural) |                |
| 150133      | 35        | 56           | Aeolian Deposit      | Subsoil (Sterile/Natural) |                |
| 150133      | 56        | 56           | Rock                 |                           |                |
| 150134      | 0         | 12           | Root Mat             |                           |                |
| 150134      | 12        | 24           | Disturbed            |                           |                |
| 150134      | 24        | 64           | Aeolian Deposit      |                           |                |
| 150134      | 64        | 66           | Gravel               |                           |                |

| Core Number | top depth | bottom depth | Category        | Description | Tephra in Turf |
|-------------|-----------|--------------|-----------------|-------------|----------------|
| 150135      | 0         | 14           | Root Mat        |             |                |
| 150135      | 14        | 32           | Turf            |             | H1<br>1300     |
| 150135      | 32        | 45           | Aeolian Deposit |             |                |
| 150135      | 45        | 45           | Rock            |             |                |
| 150136      | 0         | 10           | Root Mat        |             |                |
| 150136      | 10        | 19           | Disturbed       |             |                |
| 150136      | 19        | 50           | Aeolian Deposit |             |                |
| 150136      | 50        | 50           | Rock            |             |                |
| 150137      | 0         | 5            | Root Mat        |             |                |
| 150137      | 5         | 17           | Disturbed       |             |                |
| 150137      | 17        | 52           | Aeolian Deposit |             |                |
| 150137      | 52        | 52           | Rock            |             |                |
| 150138      | 0         | 15           | Root Mat        |             |                |
| 150138      | 15        | 20           | Disturbed       |             |                |
| 150138      | 20        | 33           | Turf            |             | 1300           |
| 150138      | 33        | 40           | Aeolian Deposit | Mottled     |                |
| 150138      | 40        | 50           | Aeolian Deposit |             |                |
| 150138      | 50        | 50           | Rock            |             |                |
| 150139      | 0         | 12           | Root Mat        |             |                |
| 150139      | 12        | 20           | Disturbed       |             |                |
| 150139      | 20        | 42           | Aeolian Deposit |             |                |
| 150139      | 42        | 42           | Rock            |             |                |
| 150140      | 0         | 14           | Root Mat        |             |                |
| 150140      | 12        | 18           | Disturbed       |             |                |
| 150140      | 18        | 29           | Turf            |             | H1             |
| 150140      | 29        | 43           | Aeolian Deposit |             |                |
| 150140      | 43        | 43           | Rock            |             |                |
| 150153      | 0         | 12           | Root Mat        |             |                |
| 150153      | 12        | 18           | Disturbed       |             |                |
| 150153      | 18        | 31.5         | Aeolian Deposit |             |                |

| Core Number | top depth | bottom depth | Category        | Description               | Tephra in Turf |
|-------------|-----------|--------------|-----------------|---------------------------|----------------|
| 150153      | 31.5      | 34           | Midden          |                           |                |
| 150153      | 34        | 44           | Aeolian Deposit | Subsoil (Sterile/Natural) |                |
| 150153      | 44        | 58           | Gravel          |                           |                |
| 150314      | 0         | 20           | Plow Zone       |                           |                |
| 150314      | 20        | 80           | Aeolian Deposit |                           |                |
| 152180      | 0         | 10           | Root Mat        |                           |                |
| 152180      | 10        | 15           | Disturbed       |                           |                |
| 152180      | 15        | 32           | Aeolian Deposit |                           |                |
| 152180      | 32        | 42           | Subsoil         |                           |                |
| 152180      | 42        | 42           | Rock            |                           |                |
| 152181      | 0         | 11           | Root Mat        |                           |                |
| 152181      | 11        | 19           | Disturbed       |                           |                |
| 152181      | 19        | 40           | Aeolian Deposit |                           |                |
| 152182      | 0         | 17           | Root Mat        |                           |                |
| 152182      | 17        | 20           | Disturbed       |                           |                |
| 152182      | 20        | 59           | Aeolian Deposit |                           |                |
| 152182      | 59        | 73           | Subsoil         |                           |                |
| 152182      | 73        | 73           | Rock            |                           |                |
| 152183      | 0         | 7            | Root Mat        |                           |                |
| 152183      | 7         | 19           | Disturbed       |                           |                |
| 152183      | 19        | 35           | Aeolian Deposit |                           |                |
| 152183      | 35        | 40           | Subsoil         |                           |                |
| 152184      | 0         | 15           | Root Mat        |                           |                |
| 152184      | 15        | 26           | Disturbed       |                           |                |
| 152184      | 26        | 35           | Aeolian Deposit |                           |                |
| 152184      | 35        | 40           | Subsoil         |                           |                |
| 152185      | 0         | 17           | Root Mat        |                           |                |
| 152185      | 17        | 19           | Disturbed       |                           |                |
| 152185      | 19        | 36           | Aeolian Deposit |                           |                |
| 152185      | 36        | 40           | Subsoil         |                           |                |
| 152186      | 0         | 14           | Root Mat        |                           |                |

| Core Number | top depth | bottom depth | Category        | Description | Tephra in Turf |
|-------------|-----------|--------------|-----------------|-------------|----------------|
| 152186      | 14        | 26           | Disturbed       |             |                |
| 152186      | 26        | 40           | Aeolian Deposit |             |                |
| 152186      | 40        | 40           | Rock            |             |                |
| 152187      | 0         | 17           | Root Mat        |             |                |
| 152187      | 17        | 39           | Aeolian Deposit |             |                |
| 152187      | 39        | 50           | Subsoil         |             |                |
| 152187      | 50        | 50           | Rock            |             |                |
| 152190      | 0         | 14           | Root Mat        |             |                |
| 152190      | 14        | 33           | Disturbed       |             |                |
| 152190      | 33        | 39           | Aeolian Deposit |             |                |
| 152190      | 39        | 39           | Rock            |             |                |
| 152191      | 0         | 15           | Root Mat        |             |                |
| 152191      | 15        | 33           | Aeolian Deposit |             |                |
| 152191      | 33        | 40           | Subsoil         |             |                |
| 152192      | 0         | 11           | Root Mat        |             |                |
| 152192      | 11        | 18           | Disturbed       |             |                |
| 152192      | 18        | 38           | Aeolian Deposit |             |                |
| 152192      | 38        | 50           | Subsoil         |             |                |
| 152192      | 50        | 50           | Rock            |             |                |
| 152193      | 0         | 14           | Root Mat        |             |                |
| 152193      | 14        | 22           | Disturbed       |             |                |
| 152193      | 22        | 55           | Aeolian Deposit |             |                |
| 152193      | 55        | 59           | Subsoil         |             |                |
| 152193      | 59        | 59           | Rock            |             |                |
| 152194      | 0         | 16           | Root Mat        |             |                |
| 152194      | 16        | 22           | Disturbed       |             |                |
| 152194      | 22        | 29           | Aeolian Deposit |             |                |
| 152194      | 29        | 39           | Subsoil         |             |                |
| 152194      | 39        | 39           | Rock            |             |                |
| 152195      | 0         | 16           | Root Mat        |             |                |
| 152195      | 16        | 19           | Disturbed       |             |                |

| Core Number | top depth | bottom depth | Category        | Description | Tephra in Turf |
|-------------|-----------|--------------|-----------------|-------------|----------------|
| 152195      | 19        | 38           | Aeolian Deposit |             |                |
| 152195      | 38        | 40           | Subsoil         |             |                |
| 152196      | 0         | 12           | Root Mat        |             |                |
| 152196      | 12        | 20           | Disturbed       |             |                |
| 152196      | 20        | 36           | Aeolian Deposit |             |                |
| 152196      | 36        | 40           | Subsoil         |             |                |
| 152197      | 0         | 13           | Root Mat        |             |                |
| 152197      | 13        | 18           | Disturbed       |             |                |
| 152197      | 18        | 50           | Aeolian Deposit |             |                |
| 152197      | 50        | 50           | Rock            |             |                |
| 152198      | 0         | 9            | Root Mat        |             |                |
| 152198      | 9         | 17           | Disturbed       |             |                |
| 152198      | 17        | 35           | Aeolian Deposit |             |                |
| 152198      | 35        | 40           | Subsoil         |             |                |
| 152567      | 0         | 19           | Root Mat        |             |                |
| 152567      | 19        | 22           | Disturbed       |             |                |
| 152567      | 22        | 33           | Aeolian Deposit |             |                |
| 152567      | 33        | 50           | Subsoil         |             |                |
| 152567      | 50        | 50           | Rock            |             |                |
| 152568      | 0         | 14           | Root Mat        |             |                |
| 152568      | 14        | 20           | Disturbed       |             |                |
| 152568      | 20        | 32           | Aeolian Deposit |             |                |
| 152568      | 32        | 50           | Subsoil         |             |                |
| 152568      | 50        | 50           | Rock            |             |                |
| 152569      | 0         | 16           | Root Mat        |             |                |
| 152569      | 16        | 23           | Disturbed       |             |                |
| 152569      | 23        | 40           | Aeolian Deposit |             |                |
| 152569      | 40        | 45           | Subsoil         |             |                |
| 152569      | 45        | 45           | Rock            |             |                |
| 152570      | 0         | 15           | Root Mat        |             |                |
| 152570      | 15        | 22           | Disturbed       |             |                |



| Core Number | top depth | bottom depth | Category        | Description | Tephra in Turf   |
|-------------|-----------|--------------|-----------------|-------------|------------------|
| 152570      | 22        | 39           | Aeolian Deposit |             |                  |
| 152570      | 39        | 40           | Subsoil         |             |                  |
| 152570      | 40        | 40           | Rock            |             |                  |
| 152571      | 0         | 14           | Root Mat        |             |                  |
| 152571      | 14        | 23           | Disturbed       |             |                  |
| 152571      | 23        | 51           | Aeolian Deposit |             |                  |
| 152571      | 51        | 63           | Subsoil         |             |                  |
| 152571      | 63        | 63           | Rock            |             |                  |
| 152572      | 0         | 10           | Root Mat        |             |                  |
| 152572      | 10        | 24           | Disturbed       |             |                  |
| 152572      | 24        | 39           | Turf            |             | LNL/LNS<br>H3/H4 |
| 152572      | 39        | 50           | Aeolian Deposit |             |                  |
| 152572      | 50        | 60           | Subsoil         |             |                  |
| 152572      | 60        | 60           | Rock            |             |                  |
| 152573      | 0         | 9            | Root Mat        |             |                  |
| 152573      | 9         | 14           | Disturbed       |             |                  |
| 152573      | 14        | 52           | Turf            |             | LNL/LNS<br>H3/H4 |
| 152573      | 52        | 55           | Aeolian Deposit |             |                  |
| 152573      | 55        | 74           | Subsoil         |             |                  |
| 152573      | 74        | 74           | Rock            |             |                  |
| 152574      | 0         | 15           | Root Mat        |             |                  |
| 152574      | 15        | 22           | Disturbed       |             |                  |
| 152574      | 25        | 49           | Aeolian Deposit |             |                  |
| 152574      | 49        | 64           | Subsoil         |             |                  |
| 152574      | 64        | 64           | Rock            |             |                  |
| 152575      | 0         | 16           | Root Mat        |             |                  |
| 152575      | 16        | 25           | Disturbed       |             |                  |
| 152575      | 25        | 40           | Aeolian Deposit |             |                  |
| 152575      | 40        | 65           | Subsoil         |             |                  |

| Core Number | top depth | bottom depth | Category             | Description | Tephra in Turf |
|-------------|-----------|--------------|----------------------|-------------|----------------|
| 152575      | 65        | 65           | Rock                 |             |                |
| 152576      | 0         | 10           | Root Mat             |             |                |
| 152576      | 10        | 22           | Disturbed            |             |                |
| 152576      | 22        | 45           | Aeolian Deposit      |             |                |
| 152576      | 45        | 45           | Rock                 |             |                |
| 152577      | 0         | 7            | Root Mat             |             |                |
| 152577      | 7         | 23           | Disturbed            |             |                |
| 152577      | 23        | 45           | Aeolian Deposit      |             |                |
| 152577      | 45        | 45           | Rock                 |             |                |
| 152578      | 0         | 7            | Root Mat             |             |                |
| 152578      | 7         | 21           | Disturbed            |             |                |
| 152578      | 21        | 40           | Aeolian Deposit      |             |                |
| 152578      | 40        | 40           | Rock                 |             |                |
| 152579      | 0         | 11           | Root Mat             |             |                |
| 152579      | 11        | 18           | Disturbed            |             |                |
| 152579      | 18        | 32           | Aeolian Deposit      |             |                |
| 152579      | 32        | 50           | Subsoil              |             |                |
| 152579      | 50        | 50           | Rock                 |             |                |
| 160000      | 0         | 10           | Root Mat             |             |                |
| 160000      | 10        | 25           | Turf                 |             |                |
| 160000      | 25        | 34           | Low Density Cultural |             |                |
| 160000      | 34        | 35           | Midden               |             |                |
| 160000      | 35        | 100          | Bog                  |             |                |
| 160004      | 0         | 10           | Root Mat             | Boggy       |                |
| 160004      | 10        | 28           | Aeolian Deposit      | Mottled     |                |
| 160004      | 28        | 55           | Bog                  | Striated    |                |
| 160004      | 55        | 88           | Bog                  | Mottled     |                |
| 160004      | 88        | 100          | Gley                 | Irony       |                |
| 160004      | 100       | 104          | Gravel               | Irony       |                |
| 160005      | 0         | 8            | Root Mat             |             |                |
| 160005      | 8         | 13           | Low Density Cultural | Mottled     |                |

| Core Number | top depth | bottom depth | Category             | Description | Tephra in Turf |
|-------------|-----------|--------------|----------------------|-------------|----------------|
| 160005      | 13        | 13.5         | Midden               |             |                |
| 160005      | 13.5      | 30           | Low Density Cultural | Striated    |                |
| 160005      | 30        | 70           | Bog                  | Rooty       |                |
| 160006      | 0         | 12           | Root Mat             |             |                |
| 160006      | 12        | 20           | Turf                 |             |                |
| 160006      | 20        | 35           | Low Density Cultural |             |                |
| 160006      | 35        | 100          | Bog                  | Striated    |                |
| 163909      | 0         | 8            | Root Mat             |             |                |
| 163909      | 8         | 19           | Disturbed            |             |                |
| 163909      | 19        | 28           | Aeolian Deposit      |             |                |
| 163909      | 28        | 50           | Low Density Cultural |             |                |
| 163909      | 50        | 51           | Aeolian Deposit      |             |                |
| 163909      | 51        | 51           | Rock                 |             |                |
| 163910      | 0         | 10           | Root Mat             |             |                |
| 163910      | 10        | 25           | Disturbed            |             |                |
| 163910      | 25        | 45           | Low Density Cultural |             |                |
| 163910      | 45        | 45           | Gravel               |             |                |
| 163911      | 0         | 12           | Root Mat             |             |                |
| 163911      | 12        | 21           | Disturbed            |             |                |
| 163911      | 21        | 45           | Low Density Cultural |             |                |
| 163911      | 45        | 50           | Midden               |             |                |
| 163911      | 50        | 50           | Gravel               |             |                |
| 163912      | 0         | 12           | Root Mat             |             |                |
| 163912      | 12        | 20           | Disturbed            |             |                |
| 163912      | 20        | 45           | Low Density Cultural |             |                |
| 163912      | 45        | 50           | Midden               |             |                |
| 163912      | 50        | 51           | Aeolian Deposit      |             |                |
| 163912      | 51        | 51           | Gravel               |             |                |
| 163913      | 0         | 10           | Root Mat             |             |                |
| 163913      | 10        | 22           | Disturbed            |             |                |
| 163913      | 22        | 39           | Low Density Cultural |             |                |

| Core Number | top depth | bottom depth | Category             | Description | Tephra in Turf |
|-------------|-----------|--------------|----------------------|-------------|----------------|
| 163913      | 39        | 45           | Turf                 |             |                |
| 163913      | 45        | 55           | Aeolian Deposit      |             |                |
| 163913      | 55        | 55           | Gravel               |             |                |
| 163914      | 0         | 12           | Root Mat             |             |                |
| 163914      | 12        | 22           | Disturbed            |             |                |
| 163914      | 22        | 53           | Turf                 |             |                |
| 163914      | 53        | 75           | Aeolian Deposit      |             |                |
| 163914      | 75        | 75           | Gravel               |             |                |
| 163915      | 0         | 9            | Root Mat             |             |                |
| 163915      | 9         | 20           | Disturbed            |             |                |
| 163915      | 20        | 40           | Low Density Cultural |             |                |
| 163915      | 40        | 45           | Turf                 |             | LNL/LNS        |
| 163915      | 45        | 50           | Aeolian Deposit      |             |                |
| 163915      | 50        | 50           | Gravel               |             |                |
| 163916      | 0         | 12           | Root Mat             |             |                |
| 163916      | 12        | 22           | Disturbed            |             |                |
| 163916      | 22        | 30           | Floor                |             |                |
| 163916      | 30        | 40           | Low Density Cultural |             |                |
| 163916      | 40        | 42           | Floor                |             |                |
| 163916      | 42        | 45           | Low Density Cultural |             |                |
| 163916      | 45        | 47           | Aeolian Deposit      |             |                |
| 163916      | 47        | 47           | Gravel               |             |                |
| 163917      | 0         | 12           | Root Mat             |             |                |
| 163917      | 12        | 26           | Disturbed            |             |                |
| 163917      | 26        | 34           | Floor                |             |                |
| 163917      | 34        | 45           | Low Density Cultural |             |                |
| 163917      | 45        | 57           | Aeolian Deposit      |             |                |
| 163917      | 57        | 57           | Gravel               |             |                |
| 163918      | 0         | 15           | Root Mat             |             |                |
| 163918      | 15        | 25           | Disturbed            |             |                |
| 163918      | 25        | 31           | Low Density Cultural |             |                |

| Core Number | top depth | bottom depth | Category             | Description | Tephra in Turf |
|-------------|-----------|--------------|----------------------|-------------|----------------|
| 163918      | 31        | 34           | Midden               |             |                |
| 163918      | 34        | 40           | Low Density Cultural |             |                |
| 163918      | 40        | 40           | Gravel               |             |                |
| 163919      | 0         | 15           | Root Mat             |             |                |
| 163919      | 15        | 25           | Disturbed            |             |                |
| 163919      | 25        | 45           | Low Density Cultural |             |                |
| 163919      | 45        | 50           | Gravel               |             |                |
| 163920      | 0         | 15           | Root Mat             |             |                |
| 163920      | 15        | 25           | Disturbed            |             |                |
| 163920      | 25        | 39           | Low Density Cultural |             |                |
| 163920      | 39        | 40           | Floor                |             |                |
| 163920      | 40        | 43           | Low Density Cultural |             |                |
| 163920      | 43        | 43           | Gravel               |             |                |
| 163921      | 0         | 15           | Root Mat             |             |                |
| 163921      | 15        | 28           | Disturbed            |             |                |
| 163921      | 28        | 37           | Low Density Cultural |             |                |
| 163921      | 37        | 39           | Floor                |             |                |
| 163921      | 39        | 48           | Low Density Cultural |             |                |
| 163921      | 48        | 51           | Aeolian Deposit      |             |                |
| 163921      | 51        | 51           | Gravel               |             |                |
| 163922      | 0         | 13           | Root Mat             |             |                |
| 163922      | 13        | 25           | Disturbed            |             |                |
| 163922      | 25        | 37           | Low Density Cultural |             |                |
| 163922      | 37        | 39           | Floor                |             |                |
| 163922      | 39        | 45           | Aeolian Deposit      |             |                |
| 163922      | 45        | 45           | Gravel               |             |                |
| 163923      | 0         | 15           | Root Mat             |             |                |
| 163923      | 15        | 20           | Disturbed            |             |                |
| 163923      | 20        | 27           | Aeolian Deposit      |             |                |
| 163923      | 27        | 45           | Low Density Cultural |             |                |
| 163923      | 45        | 48           | Aeolian Deposit      |             |                |



| Core Number | top depth | bottom depth | Category | Description | Tephra in Turf |
|-------------|-----------|--------------|----------|-------------|----------------|
| 163923      | 48        | 48           | Gravel   |             |                |