



MINJASAFNIÐ Á AKUREYRI  
AKUREYRI MUSEUM

# ARCHAEOLOGICAL INVESTIGATIONS AT GÁSIR, 2002

## A Preliminary Report



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**FS180-01072**  
**Reykjavík, September 2002**

## INTRODUCTION

This document represents only the first stage of reporting for archaeological work at Gásir in 2002. Following the completion of the post-excavation process, a further report will follow in January 2003.

### *General Background*

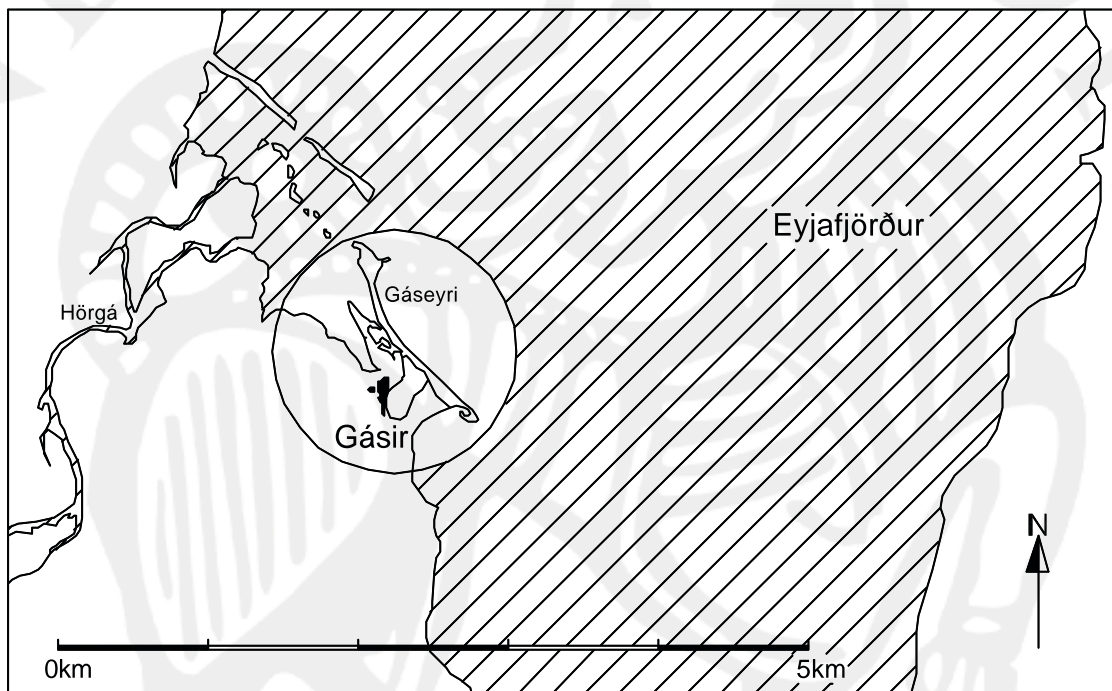


Figure 1 - Site Location

The trade site Gásir is located at the southern edge of the Hörgá river delta, on the western shore of Eyjafjörður, 11km north of Akureyri. The low lying area of surviving archaeology is protected from the open water of Eyjafjörður by a system of sandbars and mudflats. A great number of broadly sub-rectangular earthworks up to 2m tall are clearly visible to the west of an area of salt marsh, itself protected from the sea by a large sandbar. The visible archaeological remains lie in a zone of grass and low shrub, between 1m and 7m above sea level. The land rises quite sharply to the south of the site, to a height of circa 16m above sea level, where the land is now utilised for pasture/hay production by the modern farm of Gásir. Higher areas of the site that have no visible archaeology are heavily thufurised.

Gásir (or Gásar, Gæsir, Gáseyrr, Gás(a)-eyri etc.) is mentioned in connection with trade and transport in various sagas and annals regarding the 12<sup>th</sup> to 14<sup>th</sup> centuries. The earliest known documentary source for such activity may be dated to 1163, and is from *Prestssaga Guðmundar góða*;

*“En um várit eftir fýstist Ari út hegat ok gaf jarl honum knörr með rá ok reiði. Hann varð vel reiðfari ok kom skipi sínu at Gásum...”*<sup>1</sup>

The role of Gásir as a focus of commerce is clearly evident for this period. One example of many may be found in *Guðmundar saga dýra*, and dated to 1191;

*“Þann vetr váru skip at Gásum. Ok um sumarit var kaupstefna mikil.”*<sup>2</sup>

The role of Gásir as a conduit of communication is also noted, in *Íslendinga saga*, during the year 1232;

*“Leið svá fram til þess, er Magnús biskup kom út at Gásum með bréfum Sigurðar erkibiskups, þeim er Guðmundi biskupi buðu af embætti sínu.”*<sup>3</sup>

The latest reference is to be found in *Gottskálks annal*, dating apparently to 1391;

*“...[a ship]..... kom norðr a Gaseyri og hafði þat legit j Hialltlandi”*<sup>4</sup>

Whilst these documents are a valuable resource for shedding further light on archaeological research at Gásir, they are of limited value in determining the full chronology of the site, or the true nature and scope of the various activities taking place there. The information about Gásir in these documents is largely incidental – the site, and its function, is a detail in stories focused elsewhere. Gásir disappears from the historical record at the end of the 14<sup>th</sup> century, but this may only reflect the paucity of the historical record from the following period. The later development of Akureyri must eventually eclipse Gásir as the major regional trading centre.

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<sup>1</sup> Jón Jóhannesson, Magnús Finnbogason and Kristján Eldjárn, 1946, page 119.

<sup>2</sup> Op cit., page 177

<sup>3</sup> Op cit., page 337.

<sup>4</sup> Gustav Storm, 1888, page 367

The archaeology of Gásir has been investigated on a number of previous occasions. An antiquarian interest in Gásir has long been apparent;

- \* Ólafur Olavíus 1775-77
- \* Sóknarlýsing 1839 (Parish descriptions)
- \* Kristian Kaalund 1875
- \* Daniel Bruun 1898
- \* Brynjúlfur Jónsson 1900
- \* Premierløjtnant F. Froda 1902
- \* Daniel Bruun og Finnur Jónsson 1907

The first detailed survey of the site was conducted by Premierløjtnant F. Froda in 1902 on behalf of Daniel Bruun, and excavation was first undertaken in 1907 by Daniel Bruun and Finnur Jónsson. These investigations focused on the church at Gásir, and upon a group of structures at the eastern edge of the site. More recently, four trial trenches were excavated by Margrét Hermanns-Auðardóttir and Bjarni F. Einarsson during the summer of 1986. This previous work documented the uniqueness of the site, and indicated the tremendous complexity of surviving archaeological deposits at Gásir.

At the initiative of Minjasafnið á Akureyri, further work was undertaken at Gásir during July 2001. Fornleifastofnun Íslands undertook a topographical survey of the site and a re-assessment of previous work at Gásir, including the re-excavation of earlier trenches<sup>5</sup>. In addition, an assessment of geophysical survey techniques at the site was carried out by Tim Horsley (University of Bradford, UK).

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<sup>5</sup> Roberts, 2002



The continuing archaeological investigations at Gásir by Fornleifastofnun Íslands form the core of a five year project aimed at typifying remains from the full functional and chronological extent of the site. The project also aims to enhance the presentation and development of the site as a focus of public interest and amenity.

Owing to the tremendous scale and complexity of the surviving remains, only selected portions of the archaeology have been targeted for intrusive investigation. This work commenced in 2001 with the re-excavation of areas examined in 1907 by Daniel Bruun and Finnur Jónsson <sup>6</sup>. The archaeological excavation conducted in 2002 was a direct continuation of this work.



*View of the excavations in 1907, by Daniel Bruun.*

It is hoped that this aspect of the work will see its completion with the excavation of a 20-25m wide transect from east to west, across the extent of visible archaeology (Area A). A number of other areas are also targeted for investigation, addressing other aspects of site use and site formation.

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<sup>6</sup> Bruun, 1928, pgs 114-125

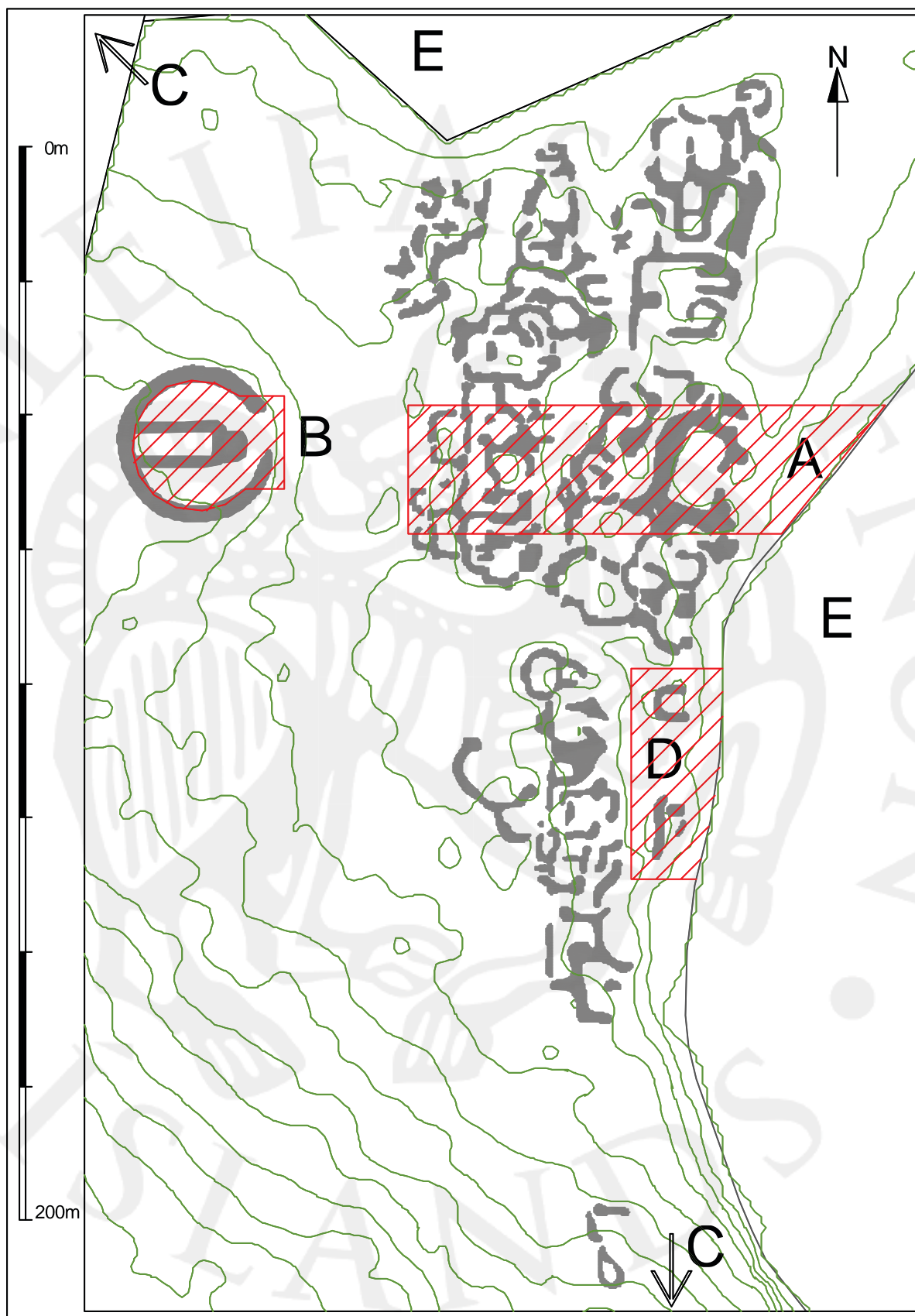


Figure 2 – Study Areas

## *Excavation Outline*

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- A Primary excavation area across the area of earthworks. Scheduled for excavation from 2001 until 2006.
- B The church and churchyard. Scheduled for investigation in 2004 and 2005.
- C Limited investigation of isolated structures elsewhere within the farm of Gásir. Scheduled for 2003.
- D Examination of structures affected by coastal erosion. Scheduled for 2006.
- E Evaluation of potential maritime aspects of the site. Undertaken in 2002.

Inevitably, each new discovery will influence the precise targeting of these investigations, and modifications to this outline will be made as circumstances dictate.

## *Research Agenda*

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Issues under investigation include;

When was the site in use?

When did trading commence at Gásir ?

When did this activity cease, and why?

Were all parts of the site utilised simultaneously?

If not, how did the locus of occupation change over time?

Is there earlier and/or later activity for other purposes?

What is the nature of the structures at Gásir?

Are they primarily built of turf and stone, or are they sunken buildings?

Do construction methods change over time?

Are these structures temporary or permanent?

Were they occupied by local traders, foreign traders, or both?

What is the nature of trade at Gásir?

What items are being imported, and from where?

What items are being exported, and to where?

Does the nature of trade change over time?

Is this activity seasonal or permanent?

What other activities may be discerned?

What, if any, items are being manufactured and/or processed at Gásir?

If so, are these activities localised to only parts of the site?

What role does the church at Gásir have?

Does it serve only the traders, does it have a wider congregation?

Does the churchyard contain inhumations?

What relationship does Gásir have to the community?

Does Gásir serve only the local region, or is it a focus for more widespread commerce?

Is there any formal control or maintenance of the site or its trade, and if so, exercised by what authority?

What effect does trade at Gásir have for its immediate neighbours?

As the project progresses, supplementary questions will no doubt arise.

The primary method of investigation is one of archeological excavation. This commenced in 2001, following on from non-intrusive field survey (both topographic and geophysical). Broader aspects of environmental change, and landscape morphology will be addressed in collaboration with the University of Edinburgh, and the University of Stirling, Scotland. Targeted industrial and functional features of the site will be analysed in collaboration with the University of Stirling. Historical and regional issues will be integrated as the project progresses. Extensive field surveys of the archaeology of Eyjafjörður have already been undertaken by Fornleifastofnun Íslands, on behalf of Minjasafnið á Akureyri, thus providing an invaluable resource for this process of regional integration.

The excavation methodology employs a modified version of single-context recording developed by Fornleifastofnun Íslands, along with a strategic sampling programme for environmental remains (Garðar Guðmundsson FSÍ, Professor Paul Buckland and Dr Eva Panagiotakopulu, University of Sheffield). Artefactual analyses will be co-ordinated by Dr Colleen Batey, University of Glasgow, and Natascha Mehler, Römisch-Germanische Kommission des Deutschen Archäologischen Instituts.



## *Acknowledgements*

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Excavation at Gásir in 2002 was made possible by generous grants from Ríkisjóður and the Kristnihátíðarsjóður. We are most grateful for this support and for the support and co-operation of a large number of individuals and institutions.

The site was excavated by Mary Alexander, Guðlaugur Árnason, Ally Becket, Bruno Bersson, Craig Cessford, Marta Dulnicz, Louise Felding, Oddgeir Hansson, Jón Óskar Jónsson and H. M. Roberts (director).

The excavation was directed by the author, and the project was managed for Fornleifastofnun Íslands by Orri Vésteinsson, on behalf of Minjasafnið á Akureyri. Public relations were managed by Kristín Sóley Björnsdóttir of Ferðamálasetur Íslands, assisted by Barabara Guðnadóttir of FSÍ. The project was administered for Fornleifastofnun Íslands by Ólög Þorsteinsdóttir.

The artefacts were processed by Sigríður Þorgeirsdóttir, and recorded by the author. Alix Sperr illustrated a selection of the finds.

An evaluation of possible maritime remains was conducted by Flemming Rieck and Jørgen Dencker of the Danish National Museum's Institute of Maritime Archaeology (Nationalmuseets Marinarkæologiske Undersøgelser).

Magnús Á. Sigurgeirsson continued his study of the tephra profile for the site and its environs.

Ian Simpson, Amanda Thomson, and Paul Adderley (University of Stirling) sampled a potential industrial feature for further study.

Guided tours of the site were provided by Ingibjörg Magnúsdóttir for Minjasafnið á Akureyri and Ferðamálasetur Íslands. In total, 859 local and international guests took advantage of this opportunity.

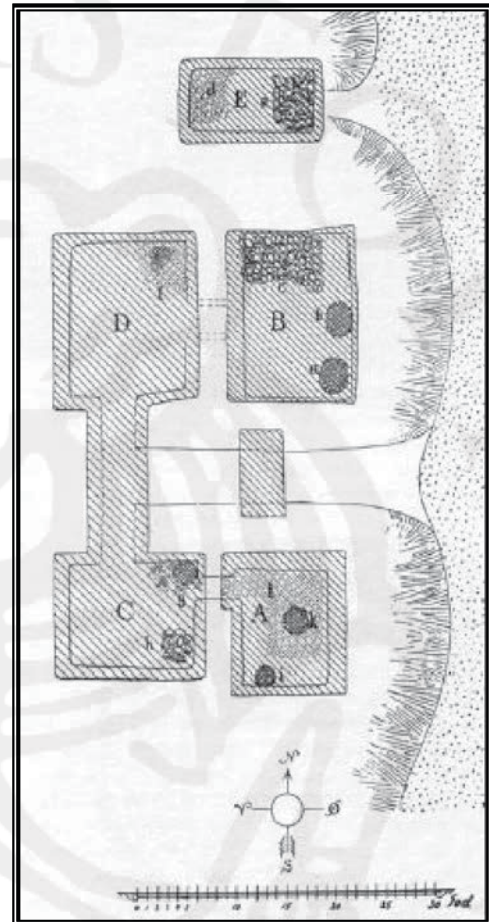
Our thanks are due to Guðrún Kristinsdóttir, Sigurður Bergsteinsson, and staff of Minjasafnið á Akureyri for their encouragement and co-operation. We would also like to thank Vegagerðin á Akureyri for the loan of surveying equipment.

We would especially like to thank Friðrik Gylfi Traustason and Guðrún Björk Pétursdóttir, the farmers at Gásir, for their kind co-operation.

## RESULTS

### *Summary of Key Findings - Excavation*

Whereas the results of the 1907 excavation provided some indications of what might be found, the interpretation of that work and its impact upon the surviving remains are in a number of ways problematic. Bruun and Jónsson identified 5 cells or rooms, and for at least one of these (“Rum B”) it is recognised that the results imply several (apparently 4) levels of activity. The published plan of these structures is however at best schematic, and does not correlate entirely happily with the remains discovered in 2001-2002. As an example, whereas Bruun does note the stone surface at the north of “Rum B”, he fails to indicate the very similar surfaces apparent in “Rum C” or “Rum D”. His interpretation may approximate to one of the later phases of activity in this area (see below), but conflates evidence from a number of levels. Also, the approach taken to excavation in 1907 has unfortunately destroyed a number of crucial relationships between these and other structures. Furthermore, no less than 8 testpits were excavated through the basal layers of these structures, as deep as the current water table, and these seemingly went unrecorded. The level of truncation discovered must add significantly to the complexity of excavation and interpretation in the areas affected. Conversely, this intrusion does offer a window into the lower levels of the archaeology, and confirms our suspicions about the depth and complexity of surviving remains. This factor has, for instance, highlighted the likelihood of encountering water logged remains, and allows for timely consideration of the logistical issues that will ensue.



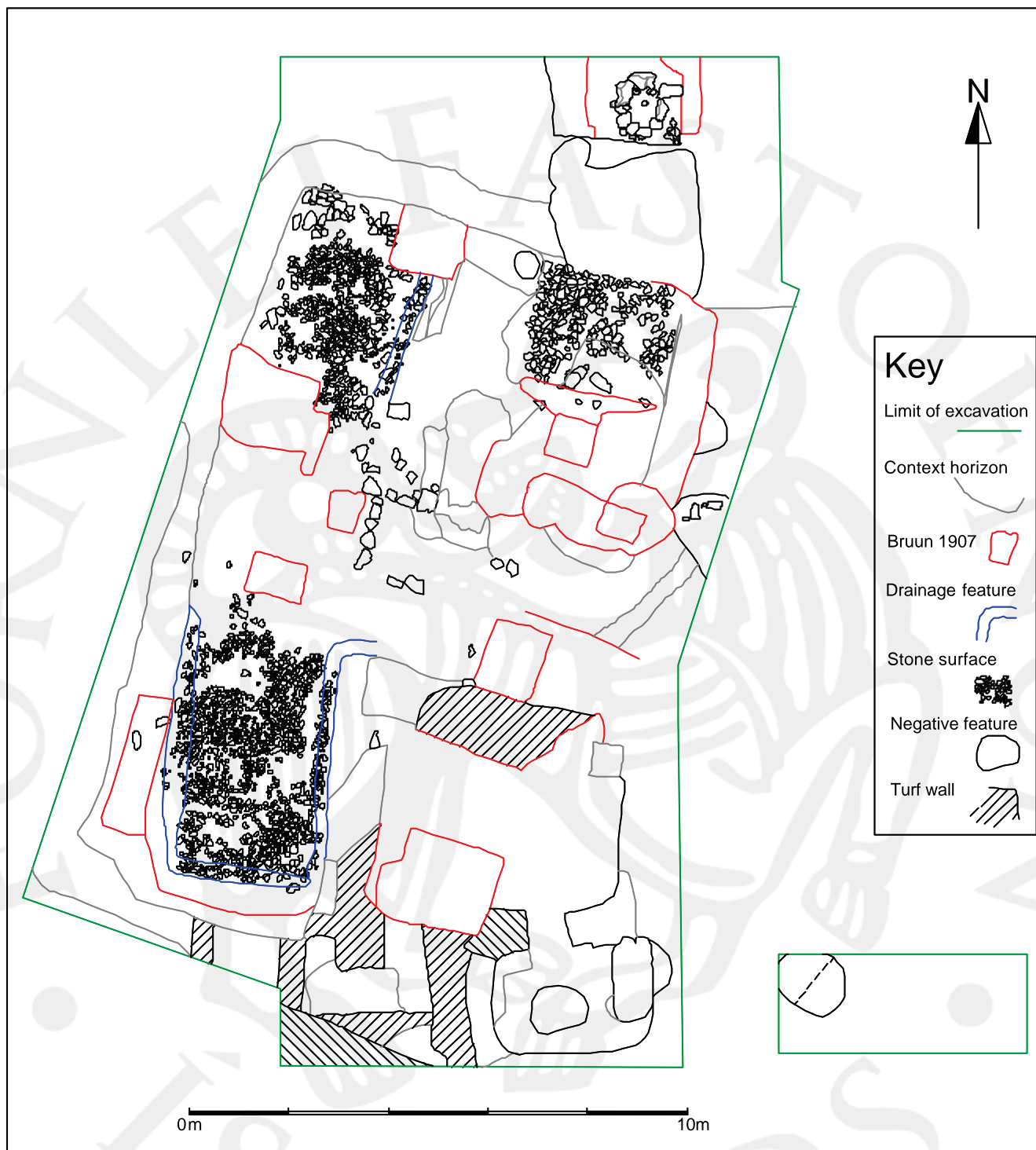
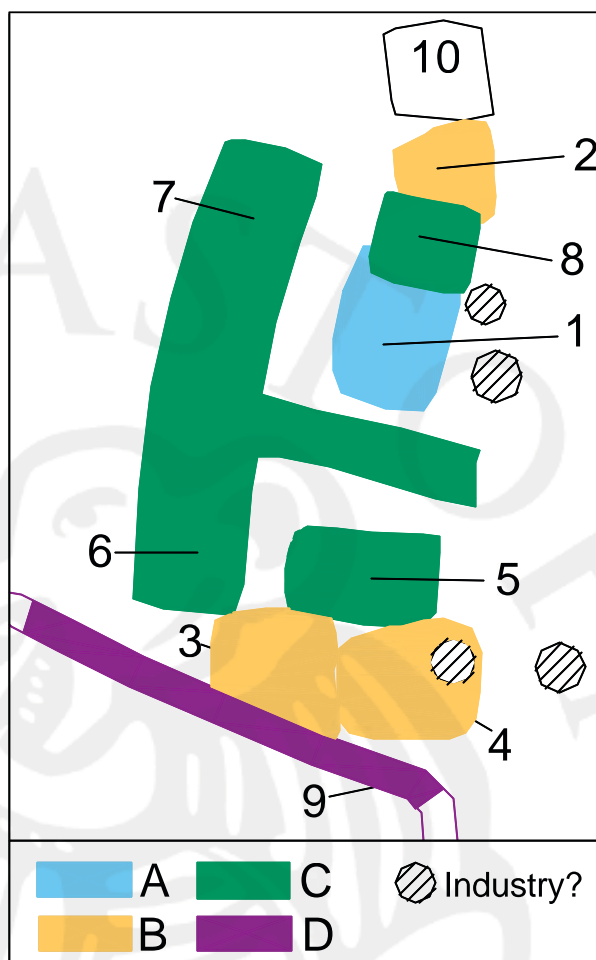


Figure 3 – Excavation Area A, 2002

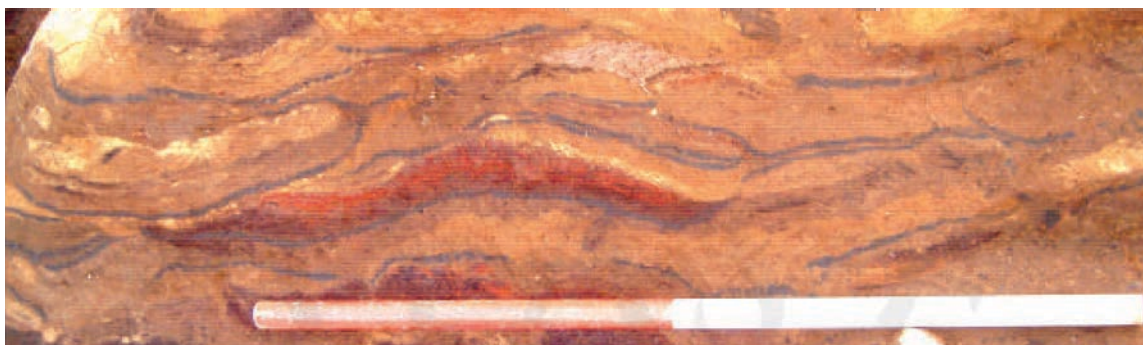
Excavation in 2002 has revealed an exceptionally complex sequence of remains, representing *at least* 10 separate rooms or cells, belonging to a *minimum* of four major phases of activity. Each of these phases includes many individual episodes of deposition, activity, repair and modification. Additionally, some features cannot as yet be securely phased, and remains from further earlier phases await continued excavation.

**A** – The earliest levels thus far recorded. As yet represented only by the outline of a large sunken feature, likely to be a room or cell. Further deposits exposed beneath room 7 are likely to belong to this phase of activity.



**B** – 2 is a large sunken feature or pit, measuring 3m x 3m, and circa 1.2m in depth. The purpose of this construction is unclear, but the feature contained extensive deposits of peat ash and some iron slag. The relationship of this feature to Structure 10 requires further study. Structure 3 remains only partially excavated – this space is defined by clear turf walls to the east and west, and occupational deposits now coming to light are suggestive of smithing. Structure 4 is a hybrid structure, partially dug down, and then reinforced with turf blocks around its rim. This structure included a large ovoid pit, partially filled with wet organic material including fish bone, and a shallow temporary hearth. Together these features occupied the majority of the available space – therefore it seems that this room functioned for processing, rather than occupation. An entrance leading north from Structure 4 had been blocked, and this blocking was truncated by the digging of Structure 5. Structure 4 was also seen to truncate parts of earlier turf buildings, as yet unexcavated.





*Detail of turf in the eastern wall of Structure 3*

C – This phase of activity most closely corresponds to the results published by Daniel Bruun. Structure 5 was found to contain traces of the hearths noted by Bruun, but so little survived of these deposits that the interpretation of this structure remains problematic. Deposits probably associated with phases A and B were seen to continue beneath this structure. A turf wall at the northern edge of this structure is likely to belong to this phase, but truncation has removed any concrete relationship.

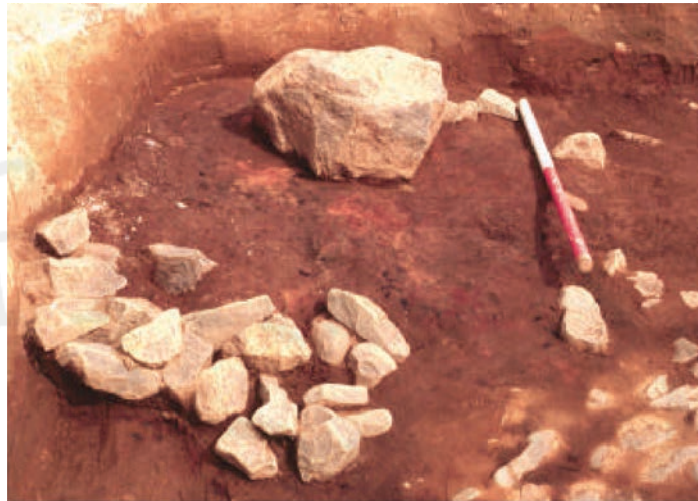


Rooms 6 and 7, and a putative passage leading from them to the east appear to represent one episode of construction. Taken together, rooms 6 and 7 form a sunken building measuring in total some 14.5m in length, up to 3.5m in width, and up to 2m in depth. The floors of these structures were formed by rough surfaces of small angular stones, typically 10-15cms in size. The perimeters of these surfaces were marked by shallow stone filled drains, up to 20 cms deep. As surviving these surfaces seem to form a

very uneven and uncomfortable floor. It is believed that a further temporary surface of some kind would have lain over this foundation, although traces of such were largely absent.

Traces of burning were apparent in the south eastern corner of room 6, but not convincing evidence for a hearth. The remains of a more substantial hearth were

discovered in the northwestern corner of room 7. This raised structure, approximately 1m<sup>2</sup> was built of small angular stones, filled with peat ash, and found to contain patches of burnt shell.



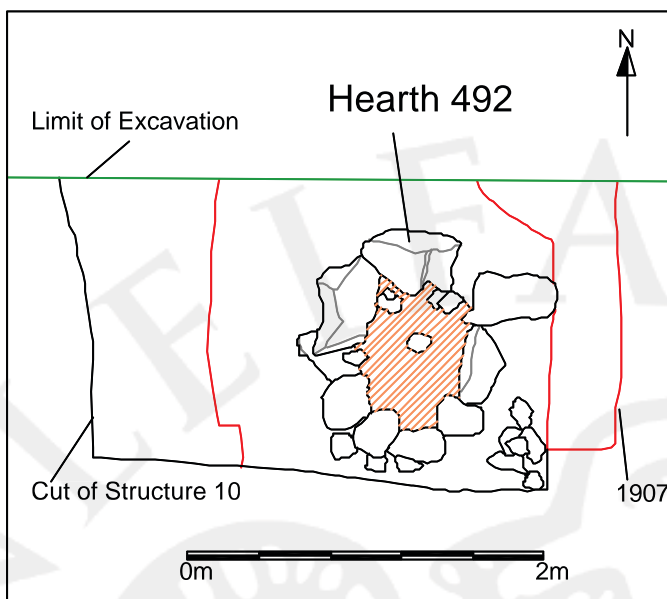
Structure 8 was largely exposed both by Daniel Bruun, and by excavation in 2001 (A more detailed description of these remains may be found in that report<sup>7</sup>) Further work in this area suggests that the stone surface therein belongs to a phase of activity most likely to correspond to rooms 6 and 7, although here again truncation in 1907 obscures important relationships.

**D** – This phase of activity is thus far only represented by a very late turf wall (9), running east-west, along the southern edge of the excavated area. This structure clearly sits over the phase “B” remains, and appears to be stratigraphically later than phase “C”. This wall is interpreted as the northern limit of a group of rooms or structures located to the south of Area A. A study of the apparent surface topography suggests a large sub-rectangular structure, perhaps 10-12m in length. This wall survived to a height of some 60cms, and was built from large rhomboidal turf blocks, possibly “*kvía-hnaus*”. To investigate this structure more fully will require a redesign of the current excavation plan, although this may be merited if one considers the apparent lateness of these remains.

**Unphased** – Structure 10 is the remaining parts of “Rum E” as excavated in 1907. Although this group of features requires much more investigation, the removal of the backfill from this area revealed the well preserved remains of a stone built hearth, not noted as such in the 1907 report.

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<sup>7</sup> Roberts 2002 – pages 7-13, see structure A-1



This hearth was constructed from a ring of large angular stones, that showed signs of burning. The interior peat ash fill of this feature awaits excavation once the full extent of this structure becomes apparent.

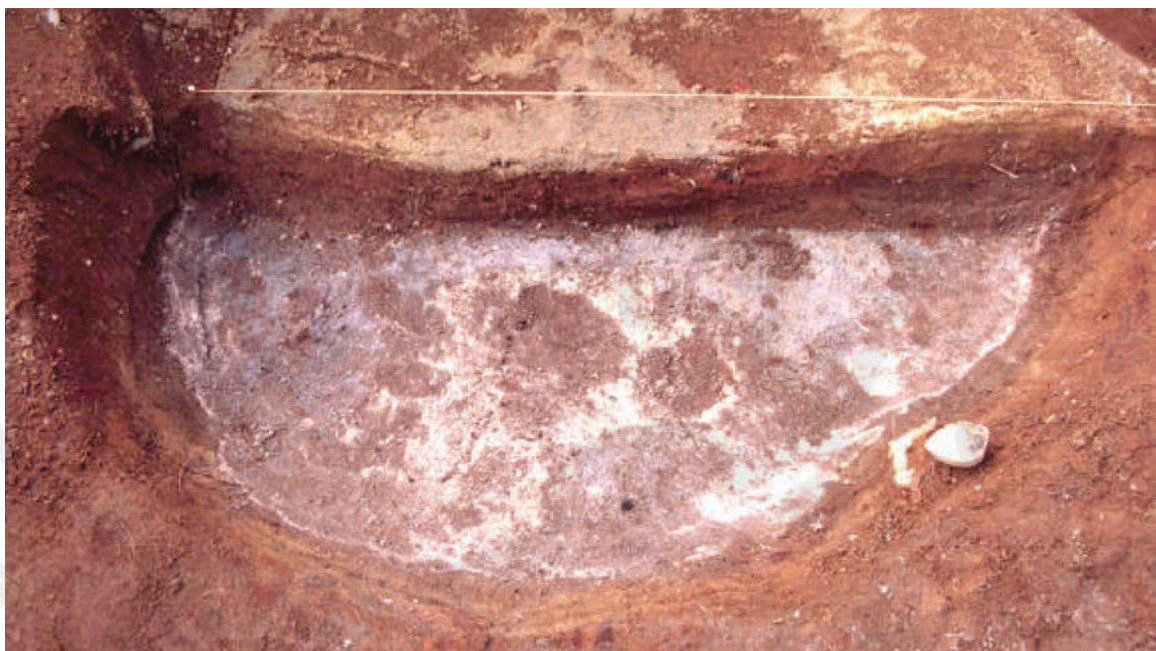
After excavation in 1907, this area had been backfilled by a very large quantity of fire cracked rock. Unfortunately, it

is no longer clear what, if any, relationship these rocks had with either the hearth or any other feature. The relationship of structure 10 to the other buildings in this area will require further work.

**Industry** – In addition to the structural evidence recovered from this years work at Gásir, a number of hearth features came to light that had no clear relationship to any structures. It is noted that these features are concentrated on the eastern, seaward side of the structural remains. These features belong to a phase of activity concurrent with the construction and occupation of structural phases C and D.

Of particular interest is a hearth feature identified in a small trench to the south east of the main area. This trench was excavated to define the limit of structural activity, and indeed no building elements were discovered. Upon excavation, the hearth showed a number of unusual features. The fills of this features contained lenses of sand with a pale to bright yellow colour. Additionally, a yellow or white staining could be seen to extend beyond the edges of the pit, along with the reddening effects associated with heat. The yellowish deposits encountered bore a strong resemblance to sulphur (numerous lumps of which had been discovered elsewhere) – our hypothesis is that this pit was used for the processing or purification of mineral sulphur for export.





In order to test this hypothesis, help was sought from Dr. Ian Simpson of Stirling University, who visited the site along with Amanda Thomson and Paul Adderley. This feature was recorded in close detail and samples have been taken for ongoing chemical and physical analyses.

#### *Evaluation of Maritime Remains*

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It is in the nature of a coastal trading site that the possibility exists for the survival of a maritime element to the archaeology. Such a possibility was noted in 2001, and steps taken to begin to address this question.

Flemming Rieck and Jørgen Dencker of the Danish National Museum's Institute of Maritime Archaeology (Nationalmuseets Marinarkæologiske Undersøgelser), kindly agreed to undertake a preliminary study of this question.

Flemming and Jørgen joined the team at Gásir for a period of two weeks, and undertook a programme of systematic coring and sampling. Four main transects were laid out in order to test the spread of sub-surface anthropological materials from the visible archaeological monument out towards the wetland areas to both the north and the east. This process demonstrated quite clearly that the anthropogenic content of deposits drops away very rapidly. Coring produced a series of soil profiles that will be of considerable use in mapping the formation processes of the site, but little of



promise was discovered that might merit maritime excavation. It seems that the cyclical action of riverine and oceanic currents may have removed any such remains. The possibility still exists that maritime artefacts await discovery elsewhere in this zone, but a detailed investigation of the most likely areas has not produced any definable targets for further study. A detailed report on this aspect of the project will follow in due course.

### *Finds and Samples*

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Excavation at Gásir in 2002 produced an assemblage of artefacts, both unusual in its nature and meriting considerable further study.

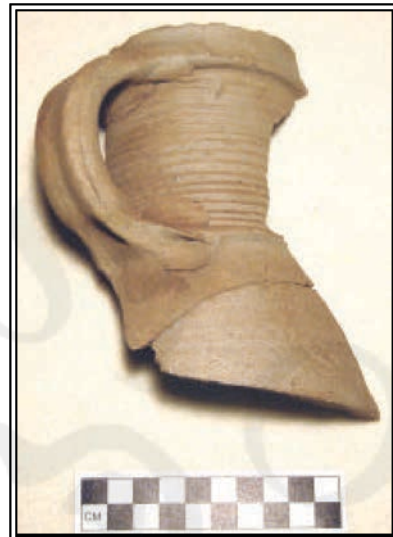
Amongst the most interesting of these are the pottery fragments, several pieces of mineral sulphur, and fragments of unworked schist. These groups are taken to be indicative of boths import and export from Gásir.

In addition to the recovery of artefacts, environmental samples were recovered from all deposits displaying potential. Significant quantities of unworked animal bone, ferric slag, other vitrified material, and stone were also recovered for identification and further analyses. A total of 28 soil samples were taken for environmental analysis.

<b>Material</b>	<b>Quantity (Count)</b>	<b>Comments</b>
Iron	114	Includes 2 knives, 1 buckle and 42 nails or bolts
Cu alloy	27	Includes vessel fragments
Pottery	18	8 pieces of stoneware, 5 pieces green glaze, 3 crucible fragments, 1 redware, 1 unknown
Leather	8	Awaits further study
Textile/hair	7	Cloth, felt, threads
Worked bone	4	1 stake, 1 pin head, 1 wedge, 1 unknown
Sulphur	24	Largest piece weighs 129g
Worked stone	22	Inc. 9 fragments of baking plate, 6 whetstones
Glass	1	Re-melted green glass object
Wood	6	Inc. pin head

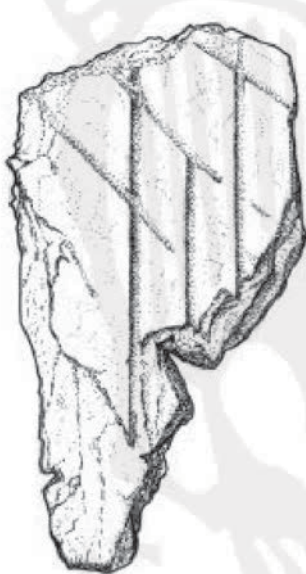
All of the artefacts will require considerable further study as the project progresses, but a few preliminary observations may be made.

**Pottery** – although these are mostly very small pieces, they are surprisingly unabraded. The assemblage includes one large piece of jug, possibly of Siegburg stoneware, (F <02-096>, see right) plus a joining sherd. The other fragments of stoneware are of a similar fabric, and prior to further analysis may be described as germanic stonewares. The fragments of green glazed pottery are reminiscent of Grimston ware.



**Iron** – although many of these objects are indeterminate, some of the nails/bolts maybe upon further study prove to be associated with ship building/repair.

**Organics** – the preservation of this class of artefacts in as yet non-waterlogged contexts is very encouraging for future recovery.



*Find <02-120>, a fragment of baking plate.*

**Worked stone** – along with the whetstones and baking plates, 4 small pieces of quartz(?) were recovered that have polished surfaces. As an interim hypothesis these are believed to be of use for the finishing of metal goods.

**Sulphur** – the presence of large quantities of sulphur is of particular interest. This is thought to indicate that Gásir served as a trade centre for areas (eg. Mývatnssveit) where sulphur may be mined, and not only Eyjafjörður.

Conservation of the artefacts will be undertaken by Jannie Ebsen of Þjóðminjasafn Íslands.

Several different lines of research contribute to the dating of the archaeological remains thus far excavated. In the framework of known historical evidence (suggestive of occupation in the 12<sup>th</sup>-14<sup>th</sup> centuries, see above) further information can be obtained from a study of the artefacts, from the study of isochronic tephra strata, and from the radiometry of Carbon 13/14 isotopes.

The stoneware pottery recovered this year awaits detailed study, but is suggestive of manufacturing dates in the later 14<sup>th</sup> or 15<sup>th</sup> centuries. If the green-glazed pottery is confirmed as Grimston Ware, this would suggest a date range from the late 12<sup>th</sup> to the 14<sup>th</sup> century. Few if any of the other artefacts are typologically dateable. Radiometric dating will be undertaken as the project progresses, and samples have been taken for this purpose. Tephrochronology studies by Magnús Á. Sigurgeirsson are ongoing (see Appendix 1). So far, one particular tephra horizon is of clear value. The excavated remains at Gásir can all be shown to be later than a clear dark blue grey tephra, dated to 1300AD. At least four major structural phases, forming in places up to 2m of complex deposition, must all date to the 14<sup>th</sup> century *or later*. Another tephra horizon one might expect at Gásir (the “A” later, or V-1477) is not yet apparent within the excavation. The absence of this layer may in itself be suggestive of continued activity into the later 15<sup>th</sup> century.

At this time we are unable to provide a concrete proof for occupation at Gásir forward into the 15th century, or backwards into the Viking period. We are, nonetheless, inclined to the view that mounting evidence will extend the demonstrable chronology of the site.

## CONCLUSIONS AND FURTHER WORK

Excavation at Gásir in 2002 has successfully demonstrated the potential for further study. The complexity of the site, its scale, the richness of the artefactual assemblage and the quality of preservation all promise to shed new light on the history and economy of not only Eyjafjörður, but also of Iceland as a whole, and of its role in the North Atlantic community throughout the medieval period.

The scale and complexity of this work will demand a considerable investment of time and resources to fully capitalise upon that potential. The site is of considerable interest to both the local and wider community, as was eloquently demonstrated by the great number of visitors to the excavation.

Work in 2002 has brought to light a number of features and artefacts that are indicative of industrial and technological activity at Gásir. This new evidence changes our view of the site, and open new lines of research. We must now also consider the possible importance of Gásir as a centre for specialised craft work, and its possible role as a proto-urban settlement. That Gásir did not subsequently develop into a significant settlement begs many questions that only further investigation can begin to answer.

In order to expand upon what has already been achieved, it is proposed that excavation work at Gásir in coming years is conducted at a larger scale. The excavation area opened this year encompassed an area of 250m<sup>2</sup>, and was dug to a depth of between 1m and 2.4m. Significant remains within this area still await attention. Additionally, it is proposed that work commences on undisturbed deposits to the west of this area, encompassing an additional 400m<sup>2</sup> of complex structural archaeology.

In order to achieve this goal it is proposed that the excavation work is undertaken by a team of 12-15 individuals for a period of 10-12 weeks in the years 2003-2006.



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# Appendix 1

## Fornleifarannsókn á Gásum í Eyjafirði 2002

### Gjóskulagagreining

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Gjóskulög voru skoðuð í tengslum við fornleifarannsóknir á Gásum, n.t.t. á Gáseyri, þann 8. ágúst 2002. Könnuð voru gjóskulög í sniðum á uppgraftarsvæðinu og í skurðbökkum í nágrenni þess. Mæld snið eru sýnd á mynd 1. Lögð var sérstök áhersla á að kanna hvort gjóskulagið V-1477, öðru nafni a-lagið, væri í torfi búðarústanna á Gáseyri. Vísbendingar um slíkt höfðu komið fram við athuganir árið áður (Magnús Á. Sigurgeirsson 2001). Vera þess í torfinu myndi gefa ótvírætt til kynna að einhver umsvif hefðu verið á staðnum um og eftir 1500, nokkru síðar talið hefur verið. Greint er frá niðurstöðum þessara athugana hér. Gjóskulag sem á síðasta ári var greint sem G~1320 hefur nýlega verið efnagreint. Niðurstöðurnar gefa tilefni til endurskoðunar á fyrri greiningu. Varðandi almenna umfjöllun um gjóskulög í Eyjafirði og nágrenni vísast til fyrri greinargerða (Magnús Á. Sigurgeirsson 1993, 2001).

#### Efnagreining á gjóskulaginu G~1320

Greining gjóskulagsins G~1320 á Gáseyri byggir á fyrri athugunum höfundar á gjóskulögum í Eyjafjarðardal (Magnús Á. Sigurgeirsson 1993). Við bæinn Tjarnir í innnaverðum Eyjafjarðardal er gjóskulag sem samkvæmt efnagreiningu reyndist vera frá eldstöð í Vatnajökli. Aldur lagsins var ekki þekktur var hann því reiknaður út með tilliti til jarðvegsþykkunar. Samkvæmt því gat lagið hafa verið frá því um 1320, gróft áætlað. Gjóskulagið er fremur auðþekkt í Eyjafirði sökum litarins, sem er yfirleitt blágrár. Þetta sama gjóskulag fannst sumarið 2001 á milli torflaga í búðartóftunum á Gáseyri, eina óraskaða lagið þar (þ.e. in situ) og því afar mikilvægt við aldursgreiningu tóftanna. Efnagreining gjóskunnar staðfestir upptök gjóskunnar úr eldstöð í Vatnajökli en auk þess reynist vera ísúr gjóska í laginu, að öllum líkindum upprunnin frá Heklu (fyrstu sex greiningar í töflu 1). Þegar útbreiðsla einstakra Heklulaga er skoðuð með hliðsjón af aldri lagsins beinast öll spjót að Heklugosinu árið 1300. Uppruni ísúru gjóskunnar er að öllum líkindum úr þessu gosi. Í ljósi þessa er eðlilegt að nefna þetta gjóskulag H-1300 en ekki G~1320 eins og fyrr var gert. Gjóskulagið H-1300 er allskýrt í jarðvegssiðum í Skagafirði og Mývatnssveit og á að vera til staðar í Eyjafirði einnig.

Tafla 1. Efnasamsetning gjósku í G~1320 (einstök gjóskukorn).

SiO <sub>2</sub>	TiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	FeO	MnO	MgO	CaO	Na <sub>2</sub> O	K <sub>2</sub> O	P <sub>2</sub> O <sub>5</sub>	Summa
65,42	1,01	14,06	6,44	0,16	0,62	3,67	4,22	2,13	0,31	98,03
62,36	1,15	16,77	6,62	0,15	0,39	4,75	5,07	1,57	0,60	99,43
61,26	0,82	19,24	5,60	0,12	0,64	6,23	4,88	1,20	0,50	100,49
60,82	0,60	19,39	6,72	0,18	1,13	6,02	5,23	0,93	0,33	101,36
62,04	0,88	18,87	5,67	0,12	0,50	5,68	5,22	1,42	0,40	100,81
62,47	1,24	12,51	10,83	0,30	1,47	4,16	3,43	1,97	0,80	99,17
49,93	2,12	14,81	10,11	0,15	7,79	12,83	2,32	0,11	0,23	100,41
46,74	3,68	13,63	14,22	0,19	5,49	11,03	2,73	0,49	0,48	98,66
46,08	3,70	13,67	14,32	0,21	5,60	11,06	2,79	0,52	0,40	98,33
45,89	4,23	13,06	15,95	0,22	4,95	10,38	2,46	0,65	0,49	98,28
45,38	2,80	14,67	13,91	0,17	6,42	10,47	2,66	0,36	0,25	97,09
47,00	2,55	16,16	13,36	0,18	7,10	11,38	1,88	0,51	0,27	100,39
46,97	2,88	16,31	13,26	0,18	7,05	11,44	1,92	0,48	0,32	100,79

### **Könnun á gjóskulögum í torfi**

Sérstök athugun var gerð á því hvort gjóskulagið V-1477 (nefnt a-lagið) fyndist í yngsta torfi búðatóftanna á Gáseyri. Vera þess í torfi myndi gefa mikilvægar vísbendingar um lágmarksaldur rústanna. Engin gjóskulög hafa til þessa fundist öröskuð í jarðvegi ofan á búðatóftunum. Eitt af sýnunum sem tekið var árið 2001 sýndi nokkur einkenni a-lagsins (byggt á smásjárskoðun) og var út frá því dregin sú niðurstaða að a-lagið væri í torfi (Magnús Á. Sigurgeirsson 2001). Þetta tiltekna sýni var nú endurskoðað. Til viðbótar voru tekin þrjú sýni úr hugsanlegu a-lagi í torfi, bæði frá vestur- og austurenda uppgraftarsvæðis (snið I og II á mynd 1). Í stuttu máli er niðurstaðan sú að öll þessi sýni reyndust vera úr H-1300. Endurskoðun á eldra sýninu leiddi í ljós að greining þess sem a-lagið er heldur vafasöm. Talsvert er af fokefni í sýninu, núnum kristal og bergbrotum, sem gerir greiningu þess erfiðari en ella. Einnig er nokkuð um gráleit vikurkorn sem gætu verið úr H-1300. Útkoman úr þessu er því sú að ekki hefur tekist að staðfesta að a-lagið sé í torfi búðatóftanna. Hins vegar er ekki ennþá hægt að útiloka að gjóskulagið sé í torfinu, mikilvægt er að fylgjast vel með gjósku í torfi samhliða áframhaldandi uppgrefti.

### **Borsýni tekin vegan neðansjávarrannsókna**

Nokkur sýni voru tekin af dönskum vísindamönnum úr meintum gjóskulögum úr borkjörnum vegna neðansjávarrannsókna við Gáseyri. Sýni þessi voru skoðuð í smásjá.

“Gásir 172-173 under top niveau”: Gjóskublandið fokefni, sennilega úr gjóskulaginu neðar.

“Gásir tephra, 173-174.5 under top niveau”: Gjóska. Mestmegnis móbrúnt glerkurl, einnig gjallkorn, mjög illa aðgreind gjóska. Ekki er um H-1300 að ræða heldur eitthvert basískt gjóskulag sem ekki verður greint frekar með þessari aðferð. Ekki er óhugsandi að sýnið sé úr einu af lögum Landnámssýrpu.

“Gásir 175.5-177.5 under top niveau”: Fokefni blandað gjósku, ekki úr gjóskulagi.

### **Gjóskulög í nágrenni Gása**

Gjóskulög voru könnuð í skurðbökkum í næsta nágrenni Gása. Ágætt snið fannst í framræsluskurði um 300 m sunnan Gásabýlisins (snið III á mynd 1). Auk gjóskulagsins H-1300 eru þarna H-1104 og V-1477. Einnig er í sniðinu gjóskulag sem líklega er frá 18. öld.

### **Helstu niðurstöður**

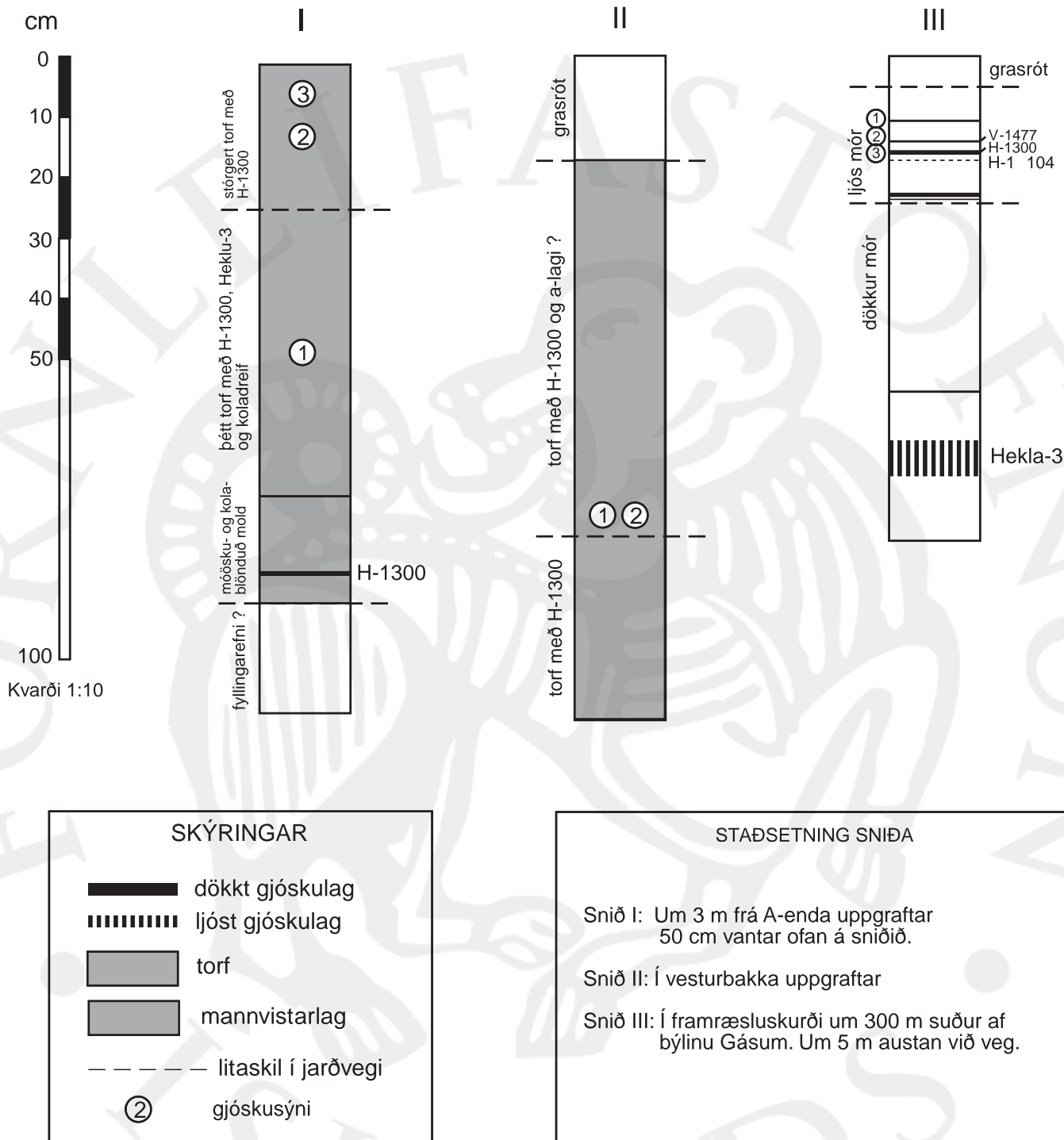
Efnagreining á gjóskulagi sem árið 2001 var greint sem G~1320 staðfestir að í því eru gjóskukorn með Heklusamsetningu. Lagið er því eðlilegast að nefna H-1300 framvegis. Þrátt fyrir nokkra leit að a-laginu í yngsta torfi búðatóftanna á Gáseyri hefur ekki tekist að staðfesta veru þess þar enn sem komið er. Endurskoðun á sýni frá árinu 2001 úr meintu a-lagi leiðir í ljós að greining þess hefur verið vafasöm. Enn hefur því ekki tekist að finna gjósku með ótvíræð einkenni a-lagsins í torfi á Gáseyri.

### **Heimildir**

Magnús Á. Sigurgeirsson 1993: Gjóskulög í innanverðum Eyjafjarðardal. Jarðfræðafélag Íslands, Vorráðstefna, dagskrá og ágrip, bls. 41-42.

Magnús Á. Sigurgeirsson 2001: Fornleifarannsókn á Gásum í Eyjafirði. Gjóskulagagreining. Greinargerð 01/03, 3 bls.

Sigurður Þórarinnsson 1968: Heklueldar. Sögufélag, Reykjavík, 185 bls.



Mynd 1. Snið mæld á Gáseyri þann 8. ágúst 2002.