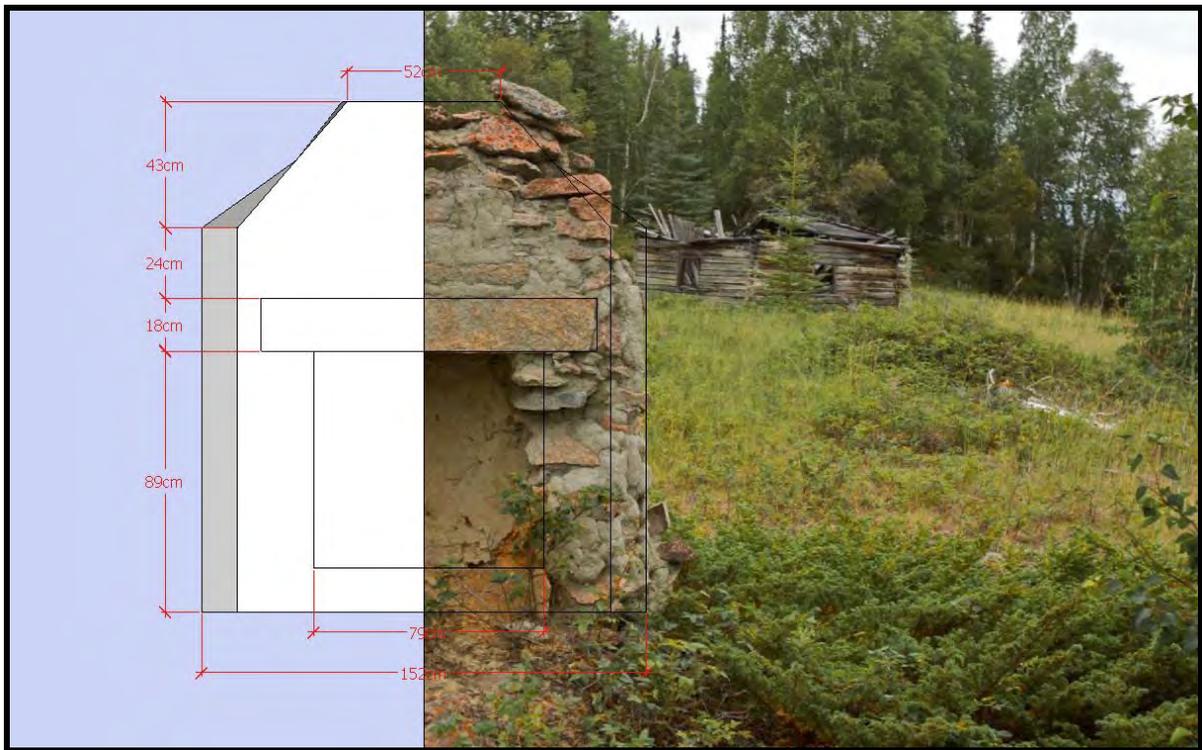


# TLICHO CHIMNEY PROJECT

July 13, 2010



Prepared by Carter Clarkson

In association with:  
The Tlicho Government, De Beers Canada & the University of British  
Columbia

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# 1 INTRODUCTION

The Tlicho Chimney Project was created by the partnership between the Tlicho Government, De Beers Canada and the University of British Columbia. The goal of the project was to produce documentation that will assist in the future reconstruction/replication of a traditional chimney by the Tlicho people.

*In the 1850s when the fur trade eventually reached the Tlicho, trading posts and support buildings were built. These log buildings designs and notches were brought in from the early experiences of building out of logs. These buildings required heat, so local rocks and clay material were used to build fireplaces and chimneys. These were the technologies brought in from further south accompanying the pioneers who went into the hinterland to set up trading posts.*

*When the Tlicho first entered the trading posts, they observed the buildings and the fireplaces and eventually they replicated within their harvesting areas what they saw for their own trading Chiefs. Most of the trading posts log buildings and fireplaces no longer exist except for the Tlicho replicas. In other words the design has been kept alive by the Tlicho, and these log buildings with the fireplaces still exist on Tlicho lands.*

*These monuments are in danger of eventual collapse and vandalism. The Tlicho landscape has preserved a living design that goes back at least 160 years. When it eventually leads to a project to build a replica, it may very well include masonry expertise to facilitate with the community. The era of the stone fireplaces is very deeply imbedded into Tlicho memory and history.*

*-John B Zoe*

The purpose of this paper is to provide accurate drawings, photographs and descriptions that will aide in the future construction of a chimney using traditional knowledge, tools and techniques.

## 2 LOCATION (“The Site”)

The chimney that was documented is located approximately 23 kilometers southeast (N150°E) of Gamètì, Northwest Territories (Figure 2.1)

Latitude: 63°56' N  
Longitude: 117°7' W



Figure 2.1 *Spatial Data Warehouse – Geospatial Portal*. Map. GNWT. Web. 15 July 2010.  
<[http://maps.gnwtgeomatics.nt.ca/portal/thematic\\_maps.jsp](http://maps.gnwtgeomatics.nt.ca/portal/thematic_maps.jsp)>.

### 3 DOCUMENTATION

On July 13, 2010 Carter Clarkson, a University of British Columbia Mining Engineering Student and five Tlicho elders and guides departed Gamètì, Northwest Territories. The party of six traveled by boat 21 kilometers southeast to reach the archeological site of the Tlicho chimneys. Participants traveled in two, 17' aluminum boats powered by 4-stroke, 40 horsepower Yamaha engines.

#### 3.1 PARTICIPANTS

John B. Zoe	Project Lead
Alphonse Apples	Elder
Joe L Zoe	Elder
Edward Rabesca	Guide
Leon Apples	Guide
Carter Clarkson	Student

#### 3.2 EXTENT OF DOCUMENTATION

During the time spent at the site John B. Zoe provided a brief tour of the area covering the inhabited area including the cabin and chimney remains and the burial site. Following the tour, John B Zoe selected a specific chimney and it was documented.

- The chimney was first photographed with a Canon 40D digital SLR camera and Canon 430 EXII Speedlite Flash in RAW format
- The chimney was then measured using a metric measuring tape and ruler and measurements were recorded on paper
- Upon arrival back in Yellowknife the measurements were drafted into SketchUP creating a digital 3D model.
- Some observations to follow may include the opinion of the individual documenting the chimneys

## 4 MATERIALS

### 4.1 MORTAR

It is suspected that the mortar used in the construction of the chimney was clay retrieved from the nearby lake shore. For future construction the clay would need to remain saturated with water until it was needed. This would ensure the clay could be molded and no voids would be created. The chimney that was documented had a much higher ratio of mortar to rock than is seen in most traditional chimney/fireplace building (Figure 4.1). This could lead to the assumption that the clay mortar was more prevalent than rocks of satisfactory size and dimension.



Figure 4.1

## 4.2 ROCKS

The chimney consisted of granitic rocks, the majority of which were relatively flat with square edges (Figure 4.2) and would have been chosen from the surrounding area. Larger rocks would have been used to construct a level base.



Figure 4.2

A key design feature of the chimney was the large rock over the opening in the fire place (Figures 4.3 and 4.4) hereon known as the “keystone”. This feature was prominent in the other chimneys located on the site and is key to the structure and functionality of the chimney design. Locating such a rock would be one of the key components in constructing a chimney. The rock selected would need to meet a variety of specifications including being wide enough to span the fireplace opening and thin enough for the chimney shaft to rise behind it.

With the size and weight of the keystone comes the need for a strong supporting structure below the rock on either side of the fireplace opening. During construction there should be an emphasis placed on ensuring the columns either side of the fireplace opening are constructed with a close attention to detail to limit voids between the mortar and rocks and to ensure a sufficient supporting structure.



Figure 4.3



Figure 4.4

## 5 CONSTRUCTION TECHNIQUES

The chimney that was documented appeared to have been constructed in the corner of a cabin (now deteriorated) and consisted of a matrix of overlapping granitic rocks cemented in place by clay. Detailed accounts of the actual methods of construction and order of construction are not available; therefore the following are hypothesized construction techniques. See *Section 6 - Appendix A* for technical drawings and *Section 7 - Appendix B* for additional photographs.

### 5.1 BASE

The chimney that was documented appeared to be located on an esker and therefore the base was constructed on sand. The material that a chimney is built on is very important and it is suggested any future chimney construction takes place on an adequate base with sufficient bearing capacity and permeability or drainage such as bedrock, aggregate or sand. It is advised to avoid building on soil, especially soil with high organic matter content. If the ground beneath the proposed chimney can be compacted, do so to reduce uneven settling in the future.

### 5.2 CABIN CONSTRUCTION

After observing the only chimney that remains upright within a standing cabin, it appeared as though the chimney had been constructed after the walls of the cabin were erected (Figure 5.1). Therefore, the walls of the cabin would aid in the construction of the chimneys and determine their final shape and structure. It would be essential the cabin be built on solid ground and as level and square as possible.

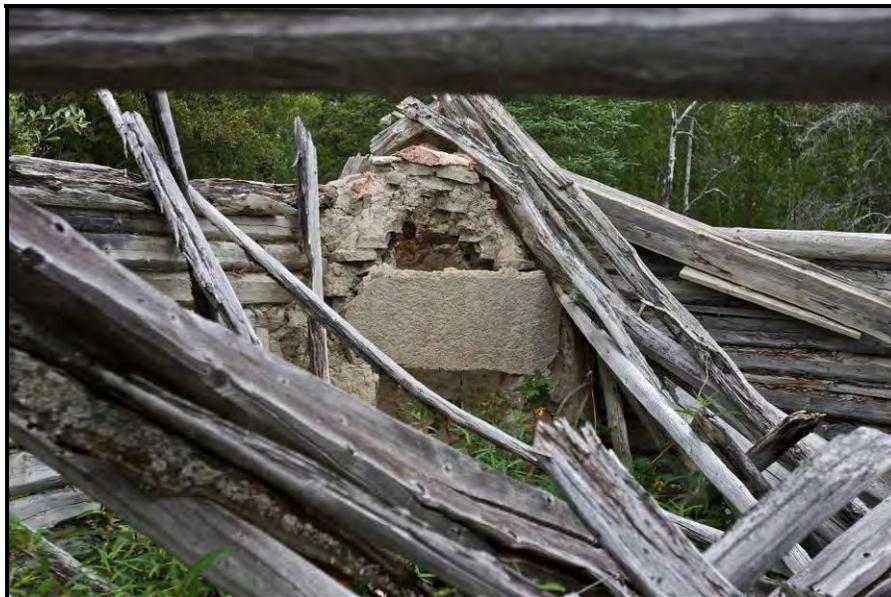


Figure 5.1

### ***5.3 MATERIAL COLLECTION***

It is important all materials are collected prior to the construction phase. This includes ensuring an adamant supply of clay which, if possible should be kept in the water until it is needed. This will ensure it maintains its natural level of adhesiveness and ability to easily mold to the rocks. As mentioned previously, collecting a keystone of the right size and dimensions is vital to the successful construction of a chimney.

### ***5.4 BODY OF CHIMNEY***

Throughout construction, ensure adequate amounts of mortar are placed between each rock. Construct the body in layers, starting at the back and leaving an area for the firebox. Ensure the columns on either side of firebox are robust. Work up level by level until the height of the top of the firebox is reached, leaving a space at the top of each pillar for the keystone. Once the firebox has been constructed, line the interior with a thick layer of clay (Figure 5.4).



Figure 5.4

### 5.5 KEYSTONE

Once the body has been built up to the height of the keystone, place the keystone spanning the firebox and cement in place with clay (Figure 5.5)



Figure 5.5

### 5.6 TOP OF CHIMNEY

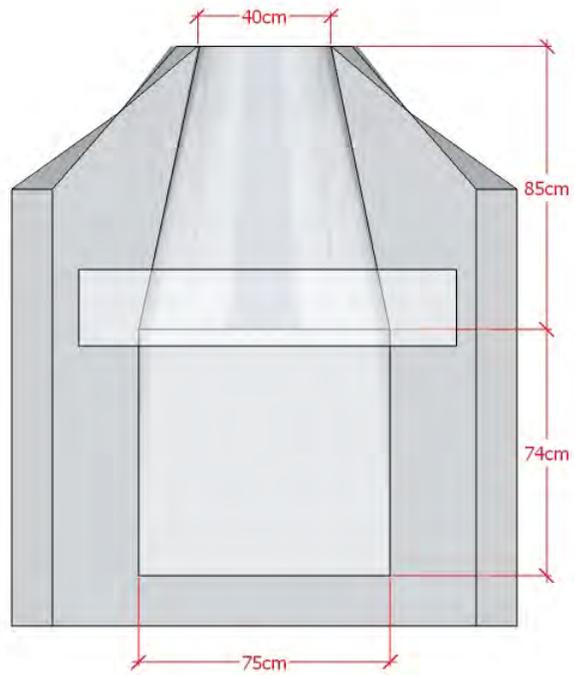
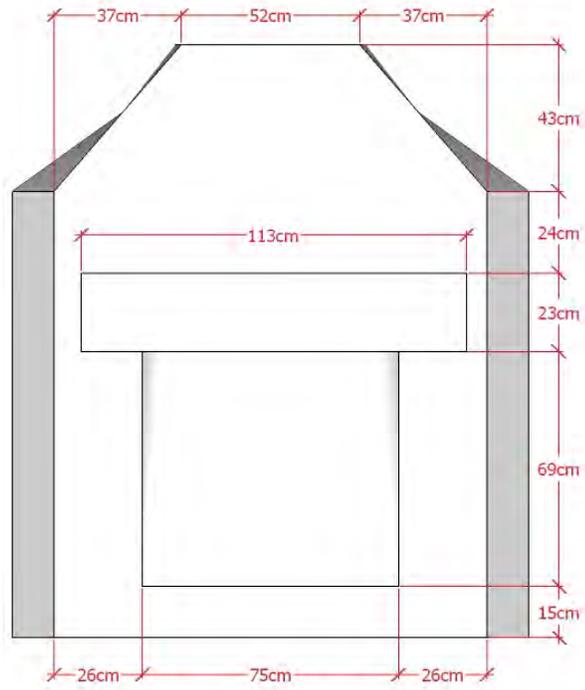
Continue building the chimney up layer by layer. During this portion of construction ensure a smooth transition from the interior of the firebox to the round chimney and an adequate layer of clay is lining the chimney (Figure 5.6). It should be noted there is an option to install a metal rod across the middle of the interior of the chimney for future use to hang cooking utensils. The chimney must extend through the roof of the cabin.



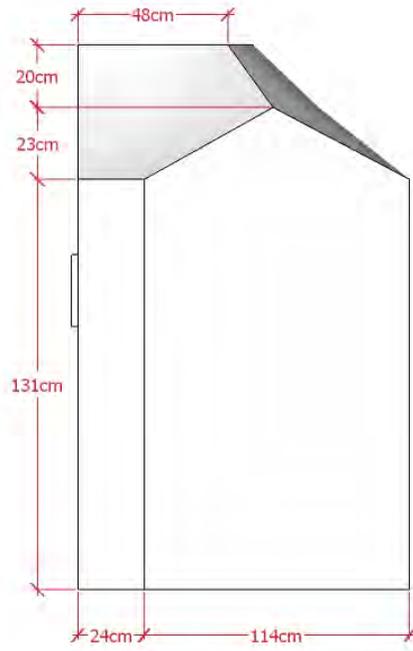
Figure 5.6

## 6 APPENDIX A – TECHNICAL DRAWINGS

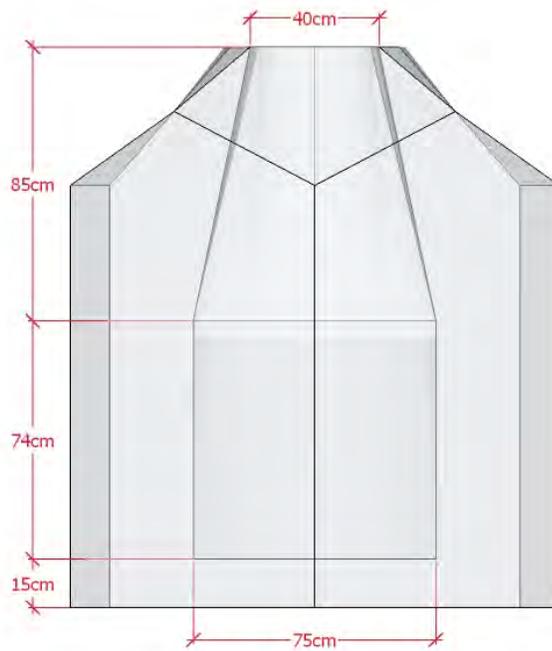
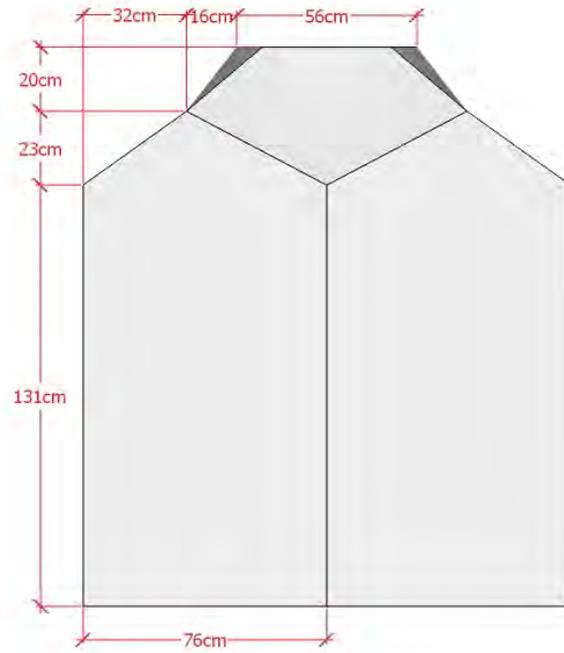
## 6.1 FRONT ELEVATION



## 6.2 SIDE ELEVATION

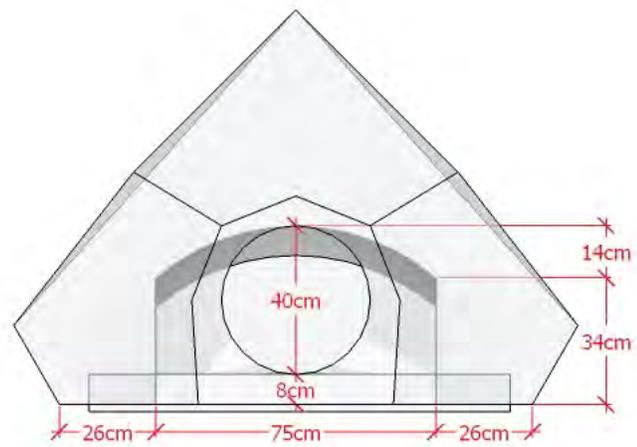
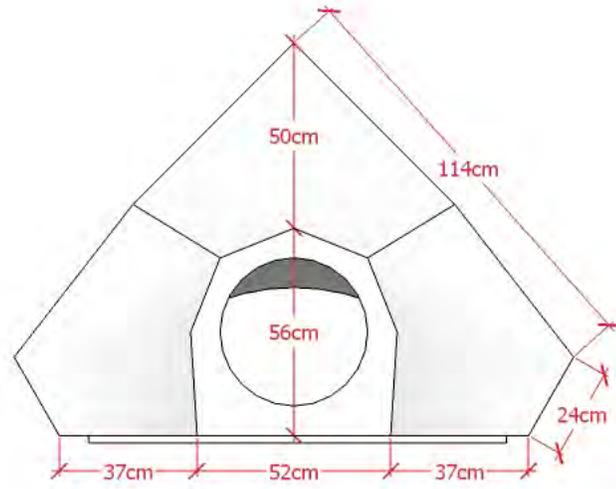


### 6.3 REAR ELEVATION

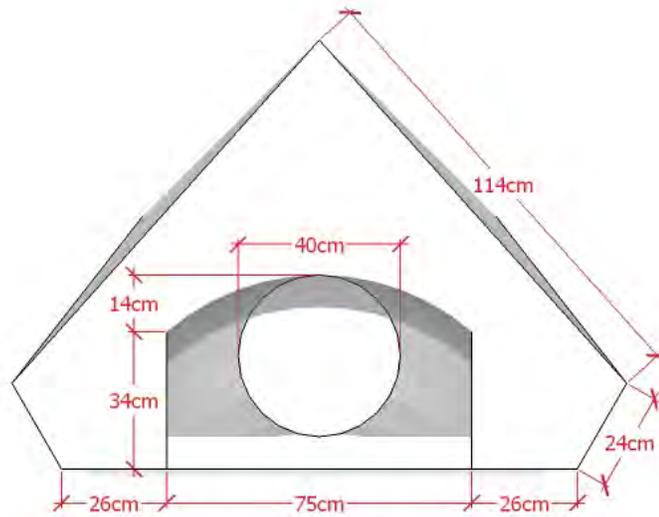
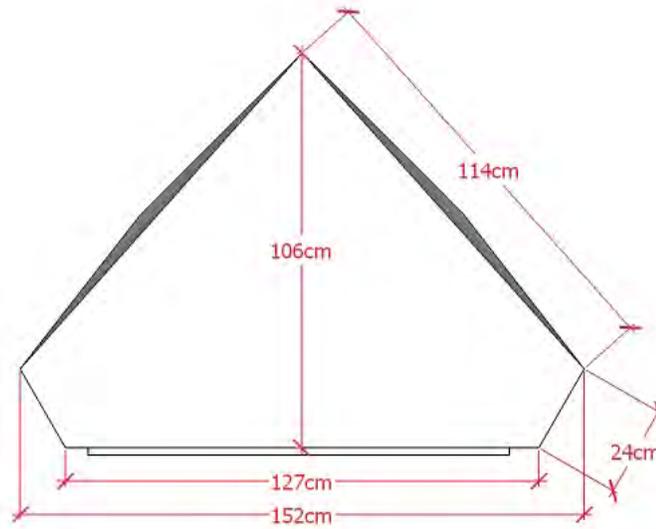


6.4

## 6.4 TOP VIEW

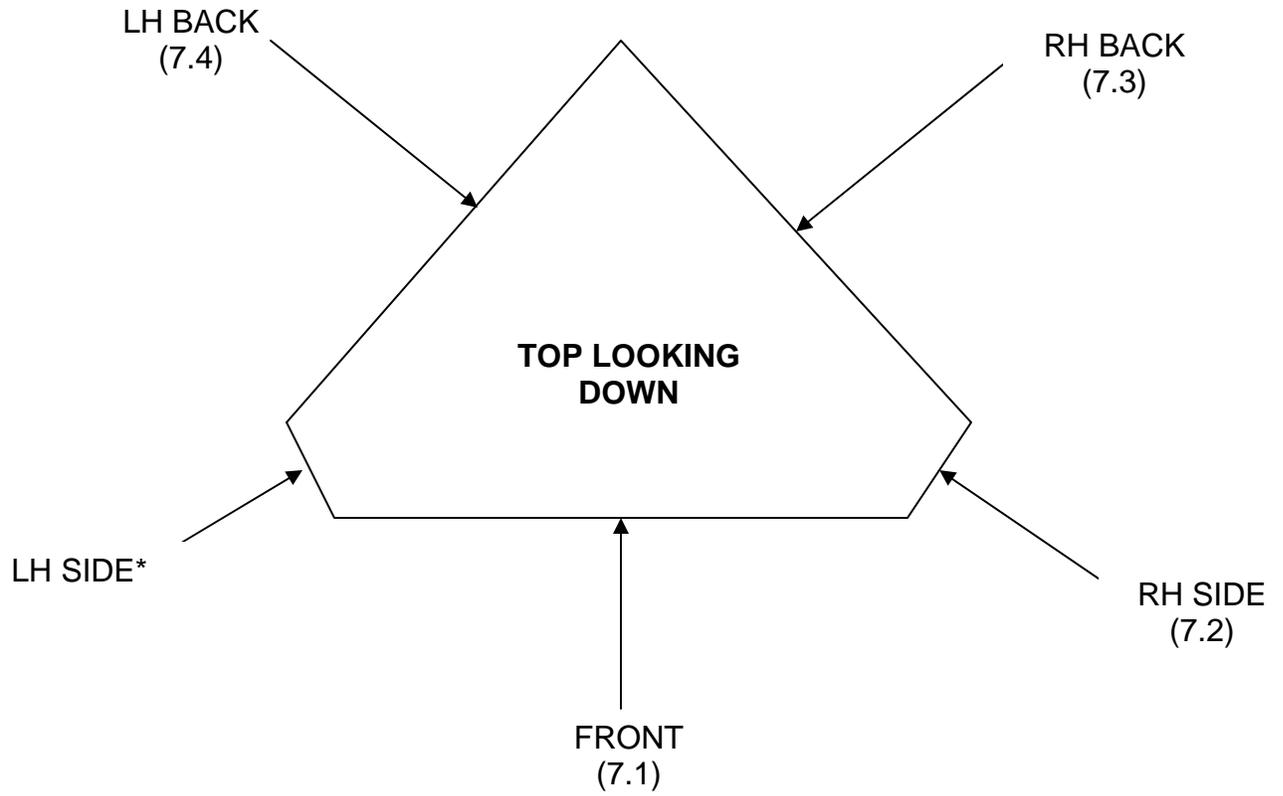


## 6.5 BOTTOM VIEW



## 7 APPENDIX B – PHOTOGRAPHS

## VIEW POINTS



\*Unable to photograph left hand (LH) side due to tree growth

7.1 FRONT



7.2 RH SIDE



7.3 RH BACK



7.4 LH BACK



7.5 *INSIDE LOOKING UP CHIMNEY*



7.6 OUTSIDE LOOKING DOWN CHIMNEY



7.7 CHIMNEY TOP



## 7.8 FIREBOX



7.9 KEYSTONE DETAIL (1)



7.10 KEYSTONE DETAIL (2)



7.11 KEYSTONE DETAIL (3)



7.12 MORTAR & ROCK DETAIL – RH BACK

