American River Fish Cannery: examining the nineteenth-century commercial fishing industry in South Australia

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Contents

CHAPTER 1 – INTRODUCTION

1.1 Spatial analysis, function, and ideology

Spatial analysis in archaeology applies the interpretation and analysis of a built space to make inferences regarding its surrounding culture. By examining *why* a space was constructed the way it was, we can learn about the people who lived in, worked or enjoyed the space. This thesis will apply the basic concepts of spatial analysis to a colonial industrial site, operating under the interpretation that 'spatial organization cannot be comprehensively explained by the pragmatics of function and utility' (Tutty 2001:2). Common approaches to industrial archaeology appear to primarily focus on the built space itself, and not on the relationship between the built space and the society that created it (examples include Bell 1987; Birmingham *et al.* 1979 and Pearson 1990) (Tutty 2001:2). This thesis will examine the relationship between built space and its surrounding society through the case study of the maritime industry fish cannery site located at American River on Kangaroo Island, South Australia (35°45'45.6"S 137°47'42.4"E). This thesis aims to answer the following question:

What factors, either functional or ideological, influenced the development of the industrial spatial elements of the American River Fish Cannery?

The goal for this project is to examine the American River Fish Cannery (ARFC) site through the perspective of spatial analysis, and determine whether the spatial decisions for the built spaces are ideological or functional in nature. This will be done through the collection of field data in order to gain an understanding of the history, site layout, and use of the ARFC site, in addition to the greater maritime industry of Kangaroo Island and South Australia.

This study will be examining several spatial analysis theories as well as the history of the area through a maritime industry perspective, including examining what the spatial elements of the ARFC site can tell us about the organisation and structure of the site, as well as how the built space was conceived and manipulated, and the relation between the occupying humans and the built space itself.

In order to determine if a spatial decision was an ideological or functional one, it is important to first examine and define the concepts of such. The function of an object, as described by Tutty in their work *Ideology, function and industrial space: An analysis of the spatial organization of late nineteenth and early twentieth century jam factories* is described as 'the mode of action that renders an object useful in some way' (2001:3). In order for an object or place to be described as 'functional', it must fulfil a purpose and have a specific use. On the other hand, the concept of ideology, similarly described by Tutty (2001:3-4) as 'an object where no immediately useful relationship between that objects and its action exists'. While the distinction between ideology and function is often somewhat unclear within the field of industrial archaeology, the differences are easier to identify. Tutty (2001:3-4) notes the differences as function, the use of something being useful or profitable, and ideological, where an object has no immediate relationship between the object and its action.

American River Fish Cannery Study Area
Kangaroo Island, South Australia
~100m x ~100m
-35.7622398199853, 137.79691302350545 (GDA94: Zone 53)

Figure 1. Research area at American River, South Australia.

1.2 Research significance

The ARFC site was built during the nineteenth century under the direction of Scottish immigrant Charles Shand (Jolly 2017). Little literature exists with details on the site, making it a prime objective for potential archaeological research and analysis. Field data was gathered in order to ascertain the layout of the site, as well as to determine 'how the space was conceived and manipulated' as a nineteenth nineteenth-century industrial site (Tutty 2001:5). Although there are many maritime industrial sites around Australia (Kostoglou 1995; Prickett 2008; Lawrence and Davies 2011; Fowler 2016; Fowler 2017; Paterson 2022), the location and how it came to be can provide a lot of insight into the development of the nineteenth-century colonial industry. The presence of the cannery was predated by the following factors, which all culminated into the creation of the industrial site at American River: the Victorian gold mining boom, an influx of Chinese immigrants who preferred a fish-heavy diet, lack of refrigeration technology, the success of similar canneries in mainland South Australia, and the available technology (Kostoglou 1995; Tutty 2001; Bowen 2011; Jolly 2017). All these factors combine to create a historically relevant site, securing its historic significance by 'helping us understand the past; by contributing to the richness of the present environment' (Australia ICOMOS Burra Charter 2013). The significance of this research works in conjunction with the site, as the research will focus on both the historic and the physical remains of the site, examining its 'meaning to people through their use and associations with the place' (Burra Charter 2013).

The results that arise from the research and investigation into the ARFC site will provide a useful contribution to further analysis of the provisional spatial models of other nineteenth century colonial maritime industry sites within South Australia. This work will also offer new insights into predominantly functional spaces containing ideological elements, as well as 'how this relationship manifests itself within factory layout and design' (Tutty 2001:8).

1.3 Historical background

The ocean was a valuable resource for early colonial Australians. Although better known for the export of wool and gold at the time, maritime industries, such as sealing, whaling, and fishing provided invaluable resources for the developing colonies (Jolly 2017:52; Lawrence 2011:76). Kangaroo Island, Australia's second largest island, boasts a 540km coastline, as well as access to deep pelagic waters within the Southern Ocean (Dappert and Moffat 2006:6; Smith 2006:8). An influx of Chinese immigrants in response to the Victorian gold mining boom led to an increased demand for fish and fish products, thus resulting in a need for a renewed colonial maritime industry. During the 1860s, Chinese fish-curers attempted to establish an 'island fishing industry' on the small island of Kangaroo Island, South Australia, due to the large abundance of fish coupled with the untouched nature of the Island (Jolly 2017:52).

Fishing, whaling, and seal hunting were all viable and thriving maritime industries in the nineteenth century. Working from the banks of the American River, Charles Shand and the Ballast Head Canning Company established a fish cannery in the 1890s—it was in operation for approximately two years after which it was abandoned (Jolly 2017:60). The site is now established as an official SA Heritage site (SA Heritage ID 14743), and it is classed as 'a significant industrial archaeological area and one of the few remaining examples of a nineteenth-century industry on the island' (SA Heritage Database). Today, the cannery remains but a footprint of the original structure, consisting of some old stone-work foundations, and is situated at the end of what is now known as the 'Historic Fish Cannery Walking Trail', a hiking track of approximately 2km long along Kangaroo Island's eastern coastline (Walking SA, 2020).

1.4 Site description

The cannery site is situated on the northern shore of the American river, a large salt-water ocean inlet located on the north-eastern side of the island. The site measures approximately 100m by 100m, and it is situated on the 'western flank of the foreshore below limestone rises', sitting on course grey sand among low shrubbery (Jolly 2017:59). ARFC site is characterized by ruined remains of stone and mortar walls, which were subsequently separated into structures A through E, as well as a potential water well on site. Located roughly 3.5km north of American River township, the site is nestled between a protective hillside (to the north) and the shore (to the south) of American River on coordinates -35.7622398199853, 137.79691302350545 (GDA94: Zone 53). The main purpose of the following description is to establish the layout of the factory and the subsequent function of each structure. This will allow for a spatial analysis of the site. Main goals include identifying the kiln as well the functions of other structures and to create a detailed site plan that include any diagnostic cultural remains found during survey and excavation.

In order to analyse the site layout, it is important to consider environmental factors that may have contribute. Using McKenzie and co-authors (2004) work *Australian Soils and Landscapes: An Illustrated Compendium*, the landscape for the area can be effectively examined. The around American River can be described as ‘a rapidly drained Podosol with short-term saturation’ (302). Podosol is characterized by an accumulation of organic matter with a sandy texture and is subject to periods of heavy water saturation. The soil can be described as ‘aeolian sand’ with a soft surface condition. Soil consists of a ‘light, loamy sand’ for the first 0.12m before shifting to sand between 0.12m and 0.52m deep. ‘Light clayed sand’ extends between 0.52m and 0.95, and the water table sits below 0.95m.

American River is bordered by rocky coast, with steep hills running adjacent. This provides the site some protection whilst allowing easy access to the fish-abundant water and potential ship launching areas. Woodlands, consisting of tall, single bole trees, such as Sugar gum (*Eucalyptus cladocalyx)*, Pink gums (*E. fasciculosa*) and SA Blue gums (*E. leucoxylon* ssp. *leucoxylon*), as well as low lying shrubbery such as Common glasswort (*Salicornia*) and Glaucous glasswort (*Arthrocnemum*), protect the hills from erosion. The natural inlet conditions provide shelter to the intertidal sandy-mud flats of the area (Davies et al. 2002). The area is described as a system of lagoons, with the tidal flats being exposed or barely covered during low tide and calm waters flaking a channel that sits between 3 and 5 meters deep. The water becomes increasingly deeper as it nears Pelican Lagoon, reaching between 8 and 10 meters deep (Davies et al. 2004:171). A strong current runs east-west between American River inlet and Strawbridge Point. The American River inlet works as a natural aquatic reserve, providing a rich environment for both flora and fauna, and was declared an aquatic reserve in 1971 (*South Australian Government Gazette*. 30 November 1971:2263–2264).

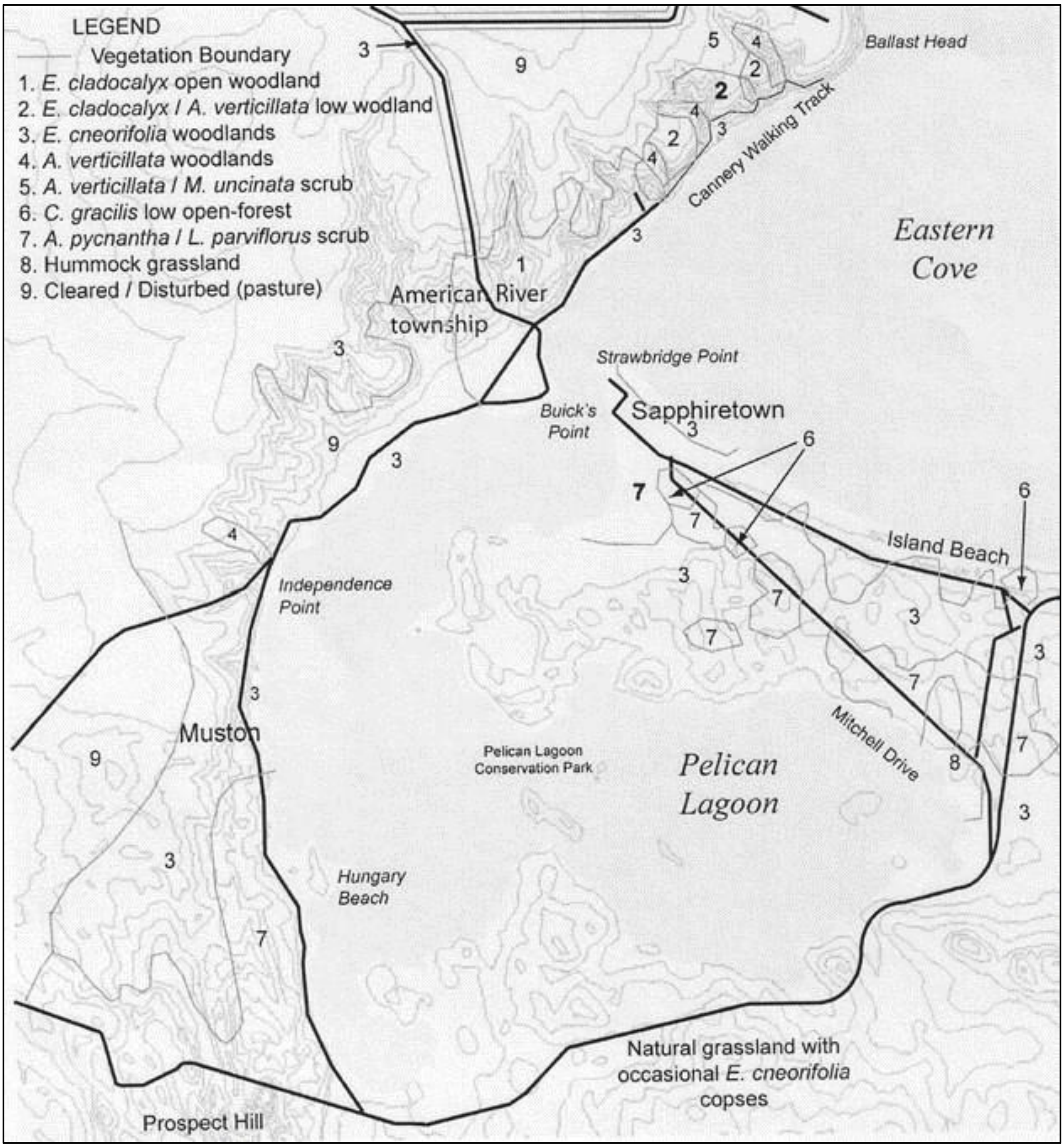


Figure 2: Topographical map of Kangaroo Island showing vegetation communities, South Australia. Retrieved from Bullers 2006.

1.5 Research objectives

The main aim of this thesis it to research and analyse in depth on the archaeological remains of the American River Fish Cannery site in order to better understand the influencing factors that shaped the site's spatial arrangement and allows for the cannery to be placed in a broader historic setting. This research will add to the corpus of South Australian sites related to the nineteenth-century colonial maritime industry.

The main aim of this thesis will be assessed via the following methods:

- The development of a model that explains the spatial organization of the American River Fish Cannery site;

- The investigation of the contributing elements that influenced the spatial aspects of the American River Fish Cannery site;
- The application of spatial analysis techniques to determine if certain elements are classified as ideological or functional; and
- An assessment to delineate the historic factors that resulted in the establishing of the American River Fish Cannery.

1.5 Chapter outline

In the second chapter of this thesis, literature related to the development of colonial maritime industry within South Australia will be explored, with a focus on Kangaroo Island. Within this chapter, the refrigeration industry in relation to the maritime industry will also be explored, as it played an important role, as well as the influence of Chinese immigrants in the colonial fishing industry. Following this, literature related to spatial analysis theory will be introduced, as well as its application in industrial sites.

In chapter three, the methods used for on site research will be explained, including collection of historical data, site surveys, excavation, photogrammetry, and limitations.

Following this, chapter four will detail the results of the archaeological field work undertaken at the American River Fish Cannery site. Results are broken down into details regarding the stonework and mortar of the factory walls, followed by details of each structure present on site (A–E), as well as excavations performed. Artefacts found on site are also detailed within this chapter, as well as spatial analysis of the site layout.

Chapter five contains the conclusion and discussion of all research conducted in regards to the American River Fish Cannery site, as well as recommendations for any potential future research at the site.

CHAPTER 2 – LITERATURE REVIEW

Maritime industries have always played a vital role in South Australia. This chapter will discuss the history and development of the commercial fishing industry within South Australia, and how it eventually resulted in the development of the American River Fish Cannery on Kangaroo Island. This chapter will also explore the influence of refrigeration technology on colonial fishing practices, we well as the impact of Chinese immigrants to Australia in response to the Victorian gold rush and how this affected fishing practices in the developing colonies. This chapter will also explore the literature regarding spatial analysis and its application for small-scale industrial sites

2.1 – Colonial maritime industry development in South Australia and Kangaroo Island

European settlers in Australia were quick to begin benefiting from the abundance of food provided by the ocean. In 1797 the merchant vessel *Sydney Cove* was wrecked while on a voyage from India to Sydney after encountering heavy, persistent storms. The ship was purposely run aground near what is now known as Preservation Island close to Tasmania (Staniforth and Nash 1998:2). The subsequent rescue party that came to the aid of *Sydney Cove* reported news regarding large colonies of seals in the Furneaux Islands, just north-east of Tasmania, which instigated the hunting of seals for their fur (Kostoglou 1995:96). In 1798 Captain Charles Bishop took the *Nautilus* and a crew to further explore the sealing opportunities, and later returned to Sydney with over 5,200 seal skins and 350 gallons of seal oil (Kostoglou 1995; Lawrence and Davies 2011:96). This resulted in increased sealing demand, and multiple sealing camps were established on King Island, off the coast of Tasmania, in 1801 (Lawrence and Davies 2011). In Lawrence and Davies (2011) work, *Sealing, Whaling and Maritime Industries*, historic sealing camps are described as containing little physical archaeological evidence. This is due to sealing groups being small and opportunistic, resulting in little traces of activity left behind (Lawrence and Davies 2011:95). There is also a possibility that maritime trades overlapped, such as in in Tasmania, where there is evidence of a well-preserved sealers' hut also being utilized as a look-out post by whalers (Kostoglou 1995:35–38; Lawrence and Davies 2011:96). Seal hunting was primarily a seasonal occupation, with the majority of hunting occurring during spring and summer months as the seals breed and stay closer to land. Hunting seals took little equipment and skill, just lots of strength and 'a strong stomach', making it a popular industry for merchants and sea captains alike (Lawrence and Davies 2011:97). Importing the seal skins to China resulted in enormous profit for those involved, with a single seal skin potentially selling for up to £1 each (Lawrence and Davies 2011:96).

In 1801 Captain Matthew Flinders and his rival, Nicholas Baudin, were engaged in a race to explore and colonise Australia. By March 20, 1802, Flinders found himself in the Southern most point of the York Peninsula Gulf (Cape Spencer). When challenged by the threat of an oncoming gale, he chose to sail further south to seek shelter, inadvertently landing on what he later named Kangaroo Island, due to the abundance of kangaroos (Monteath and West-Sooby 2010:138). Despite considerable activity in the state's southern waters, even from the early seventeenth century, Kangaroo Island remained uncharted, thus leading to Flinder's finding and exploration of the Island in 1802. Reports from Flinders and his crew regarding the favourable maritime conditions quickly reached the mainland, and as a result, a sealing camp was established in the same year (Monteath and West-Sooby 2010; Lawrence and

Davies 2011). Kangaroo Island had been previously visited by an array of characters seeking to carve out a life for themselves, including American sealers who settled on American River, runaway sailors, escaped convicts, and renegade whalers and sealers (Carter 1978). The rag-tag inhabitants of Kangaroo Island were often not looked upon favourably by the authorities of the time, who saw described them as pirates and savages (Carter 1978:6). This uncomplimentary view of the residents possibly stemmed from the brutal, primitive and perilous nature of sealing (Carter 1978:6).

Sealing remained profitable venture until approximately 1805, when seal colonies on the island began dwindling, and most sealers moved to more profitable waters around Macquarie Island in the southwestern Pacific over halfway between New Zealand and the Antarctic and Heard and McDonald Islands in the southern Indian Ocean (see Figure 3) (Lawrence and Davies 2011:96). In 1819, Captain George Sutherland sailed from Sydney to Kangaroo Island in search of salt, seals, and kangaroo skins, landing within the Bay of Shoals, and exclaiming that there was:

> *"[…] an abundance of fish of several kinds. The best we found were snapper, some weighing about 7lbs., they are excellent eating and preferable to some of our English fish. Oysters and every species of shellfish were abundant."*
>
> (Carter 1978:18; Cumpston 1970)

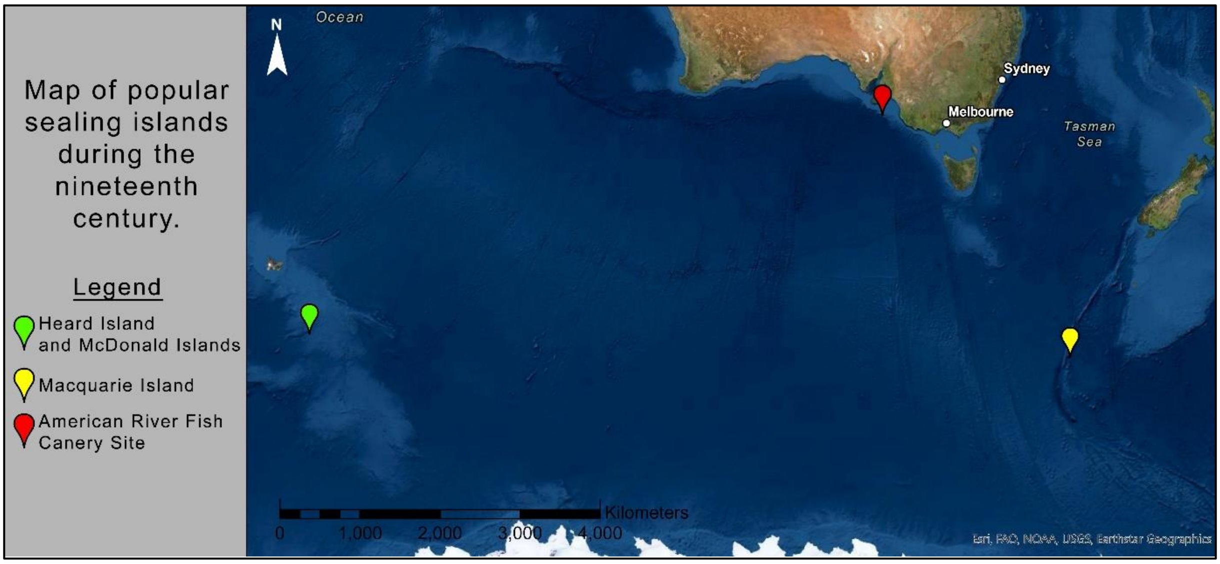


Figure 3: map of popular sealing islands, Macquarie Island, Heard Island and McDonalds Islands, in relation to the ARFC site.

Many of the Kangaroo Island sealing camps operated seasonally until about 1820, when some of the men in the sealing camps decided to settle on the island permanently (Jetty 2006; Lawrence and Davies 2011). About twelve men resided there as sealers, consisting of Englishmen, escaped convicts and runaway seamen. Sutherland mentioned how these men had plenty of fish and shellfish to eat, all of which they caught themselves from a boat.

By 1833, Captain Charles Sturt published his book *Two Expeditions into Southern Australia*, which included details from various whaling and fishing boat operators in the state's southern waters. This resulted in a surge of interest regarding the maritime industry potential of Kangaroo Island, and in 1834 the *South Australian Act* was passed in British parliament, allowing for the formation of a new settlement on Kangaroo Island (Capper 1838; Smith 2006). Within this Act, Kangaroo Island's conditions were described favourably; Nepean Bay was said to be able to accommodate possibly hundreds of vessels, with the ability for ships of 700 tons burthen to anchor within just 800 meters of the landing place (Capper 1838:14).

In London, 1835, the *South Australian Company* (SAC), sometimes just referred to as *The Company*, was established (*South Australian Register*, 16 September 1869:3). The SAC directors comprised of wealthy London merchantmen and was headed by George Fife Angas. The goal of the SAC was to oversee the economic expansion of the developing migrant colony of South Australia and to permanently increase the numbers, wealth, skill, and moral character of the colony (Capper 1838:153). A breakdown of the Companies' goals included:

> "Improvement and cultivation of their country-lands', 'The laying out of farms, the erection of suitable buildings thereon', 'The growth of wool for the European market', 'The pursuit of the whale, seal and other fisheries, in the gulfs and seas around the colony, and the curing and salting of such fish as may be suitable for exportation' and 'The establishment of a bank or banks in, or connected with, the new colony of South Australia."
>
> (Capper 1838:158–159).

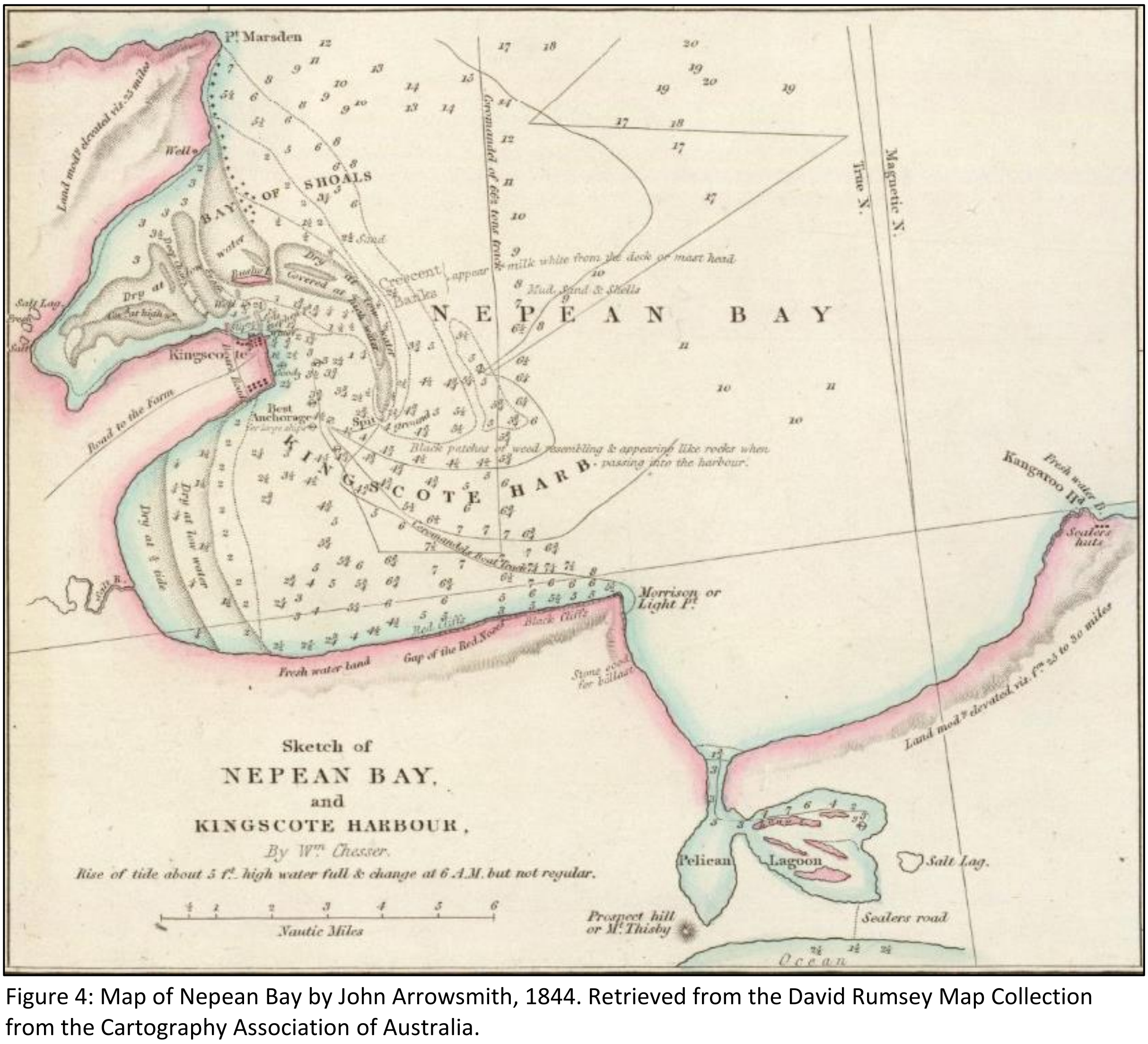


Figure 4: Map of Nepean Bay by John Arrowsmith, 1844. Retrieved from the David Rumsey Map Collection from the Cartography Association of Australia.

In 1836 the SAC acquired four ships with 116 crew to undertake whaling, sealing, and other fishing activities in the colony's waters (Carter 1978:5; Stephens 1839). The export of salted fish appeared a lucrative and promising trade and was expected to find a profitable market in Peru, Chili, and France, and was thought to become the main export product of the colony (South Australia Association 1834:8–17). The destination of these four ships, *John Pirie, Duke of York, Lady Mary Pelham*, and *Emma*, was Kangaroo Island, as determined by the new *South Australian Act*. The four ships anchored near the northern tip of Nepean Bay and begun establishing the settlement of Queenscliffe, now known as Kingscote. Within the same year, the SAC produced South Australia's first export: three barrels of salted fish, sent from Queenscliffe and destined for Tasmania. Inside these barrels were 1,359 mullets, and 275 kilograms of skipjacks' (Jolly 2017:52; Carter 1978: 20), thus beginning the Kangaroo Island maritime trade history.

By the 1840s, the SAC had established its headquarters in Kangaroo Island, with whaling stations set up not only at Kingscote, but on the mainland at Encounter Bay and Port Lincoln. The waters were described as excellent fishing grounds and it stated that fishermen commonly would catch 152 to 203 kg in one catch (Carter 1978:7). The fish that were being caught included snapper (*Chrysophrys auratus*), rock-cod (*Lotella rhacina*), bream (*Acanthopagrus australis*), mullet (*Mugil cephalus*), whiting (*Sillaginodes punctatus)*, mackerel (*Trachurus symmetricus*), 'silver fish' (possibly Silver trevally [*Pseudocaranx georgianus*]) and 'white-fleshed fish like salmon-trout' (possibly Australian Herring [*Arripis georgianus*] or Juvenile Australian Salmon [*Arripis truttaceu*]), as well as rock and bed oysters (*Saccostrea glomerata*) and prawns (*Saccostrea glomerata*) (Carter 1978:7). Other maritime industries also seemed to be in abundance; it was reported that whales frequently ventured into the bays of the colonies, as well as large sharks regularly visiting the salmon-rich shores of Kangaroo Island, with oysters appearing in abundance in deeper waters (Carter 1978:7). Although the maritime industries on the island appeared thriving, an imbalance was created for the Kangaroo Island colony due to the rate at which fish were being caught. Carter (1978:9) reflects how the European-style settlements inevitable bring dramatic changes to the local environment, resulting in interference with the fishes' breeding cycles.

The SAC had struggled to keep its headquarters viable in a location like Kingscote, with little fresh water available, poor soil quality, and a lack of reliable workers locally (Carter 1978:9). In 1839 the SAC, as directed by the company's second director, David McLaren, moved their headquarters to Adelaide, and began phasing out its maritime operations entirely. By 1840 whaling on the Island was in sharp decline, and many experienced sailors who had originally come to Kangaroo Island for whaling now found other work, such as assisting in building of ships, ferrying passengers, transporting cargos and livestock, and full-time fishing (Carter, 1978:10). With the SAC unable to hold a maritime monopoly, the fishing industry developed into 'one where a couple of mates or a family owned each boat, not as one of employee-fishermen taking orders from a big company', and Carter (1978:10) describes modern day South Australian fishing industries as operating very similarly, with a greater emphasis on family-owned fishing businesses over larger companies.

2.2 – A quick note on refrigeration and ice industry

A major issue with colonial fishing was the ability to keep the fresh fish from putrefying before the canning process could preserve them. Fresh fish are described as highly perishable starting from the moment they leave their aquatic environment, and that the importance of rapid chilling is vital to maintaining the fresh quality of the fish (Opara et al. 2007:104, 113). Once fish have been caught, they become susceptible to degradation due to several factors. These include removing the fish from the marine/aquatic environment, the 'high moisture content of fish', 'activities of microorganisms inside the gut and intestine' and physical damage from the catching and handling process (Opara et al. 2007:104). Opara and co-authors note in their 2007 (103-104) work *Postharvest Handling and Preservation of Fresh Fish and Seafood* that:

> "The consumption of fish and fishery products has been strongly influenced by improvements in postharvest handling, packaging, storage, transportation and marketing', and that 'the development and application of efficient and cost-effective postharvest technologies … are therefore important to ensure product safety and maintenance of quality throughout the supply chain from sea to plate".

One of the biggest improvements for fish preservation was the implementation of the commercial use of ice. Ice has been the most effective form of food preservation for centuries. Underground icehouses have been utilized in China as early as 1100 BC, and 'Roman emperors had ice delivered to their palaces by donkey from as far away as the Alps' (Rees 2013:20). In 1806, an American man named Frederick Tudor saw the potential value in the ice trade, and eventually set up a trade of packed ice running from Boston to multiple locations all over the world, including London and Calcutta.

The earliest mention of this trade appeared in the *Adelaide Observer* on 11 November 1843 (6), and again in the *South Australian Register* on 19 March 1850 (4), who referred to Tudor as 'the Ice-King'. It seemed as though the new South Australian colony longed for ice to deal with the brutal Australian summers. An article in the local newspaper reads:

> "Sir — I beg to send you the following *memoranda* regarding the ice trade of the United States, in hopes that the perusal may lead to an introduction of sufficient of the cooling medium to counterbalance our next hot season, with its hot winds. There can scarcely be a practical difficulty in supplying us with ice when it is already supplied to Java and Calcutta."
>
> (*Adelaide Observer,* 31 January 1851:4).

An article in the *Adelaide Observer* on 12 January 1861 (6) writes: 'A correspondent suggests that an article upon ice would be useful during the present hot weather. It might be so certainly to persons of powerful imagination—persons who can make themselves cold by thinking of a cold subject'. Although it appears that the colony did not receive access to ice until 1860: 'The public has had the opportunity…of witnessing a series of successful experiments with a large ice-making machine, the invention of Mr. Harrison of Geelong, a colony of Victoria' writes an article in *The South Australian Advertiser* (6 September 1858:3), followed by another article in 1860 (11 February 1860:1) that reads: 'Ice – better late than never', quoting how 'it is not likely that we shall despise the luxury [Harrison] is now about to offer us'. Ice is later advertised for sale at the Ice Manufactory in Adelaide, offering an ice subscription for local residents (*The South Australian Advertiser,* 18 December 1860:1). In 1862 the *South Australian Weekly Chronicle* details how ice was being sent to places further in the state, such as Port Augusta (15 February 1862:4). The first mention of the Kangaroo Island colony enjoying the effects of the cold chain appeared in an article in the *Kangaroo Island Courier* on 3 October 1908 (4), where they reported that 'Kingscote is preparing for the summer and, so that customer may not lack a supply of ice-cream, is now equipped with an ice-cream machine'.

2.3 – Charles Shand and the Kingscote Fish Preserving Company

In 1887, Charles Shand was emerging into the scene of the Kangaroo Island fishing industry. Shand, born in Scotland, was described as a hereditary fish preserver, who had fishing preserving industry roots dating back to his great-grandfather (Jolly 2017:59).

On Friday, 22 April 1887, Charles Shand was mentioned in a newspaper article published by the *South Australian Register* (p. 6). The article mentions that the efforts of Shand to establish a new fishing industry for the newly developing South Australian colony seemed 'likely to be successful'. The article goes on to describe how for the past few weeks, Shand had been busily engaged in preserving fish from the Coorong. A meeting in town hall that included several prominent figures, including the Mayor of Adelaide and the Commissioner of Crown Lands, as well as several independent merchants, ensued, where Shand showcased five varieties of fish he caught. These included kippered and fresh mullet, fresh whiting, and kippered and fresh butterfish. These samples were reported to have been prepared in a 'very attractive style', and the figures at the meeting were reported to be very pleased with the care of the industry, as well as the quality being equal to that of other imported goods, thus deemed a success to Mr. Shand. It was even declared, 'in admiration, not with an eye to fraud' that 'if the butterfish were coloured with cochineal it would substitute for salmon' (Jolly 2017:59).

The Chairman was eager move ahead and foster colonial industry, and declared that 'a better industry could not be introduced than that of fish preserving'. Shand was eager for the fish preserving industry to become properly established and asked for a grant between £250-£300, as well as the hire of one of the unemployed Murray River steamers for fishing. In response to this, Shand guaranteed that within three months of the money being paid, he would have some fish ready to sell at market, and that if the result were satisfactory a larger Company could then be formed, stating that the supply of fish of all kinds was 'almost unlimited'. Shand, eager to begin the fish preserving industry on Kangaroo Island, placed an advertisement in the *South Australian Register* on 21 July 1887 (p. 8) seeking fish:

SEPARATE TENDERS will be received by the undersigned up to Wednesday, August 3, for the supply of Net and Hooked FRESH FISH at per ton, cleaned or otherwise (cleaned preferred). Suitable premises will be provided for cleaning, and delivery taken at the Factory, American River, Kangaroo Island. The lowest or any Tender not necessarily accepted.
Tenders to be addressed to
C. SHAND,
Manager of the Kingscote Fish Preserving Co.
Lorne Chambers, 107, King William-street,
Adelaide. 200ths11

SEPARATE TENDERS will be received by the undersigned up to Wednesday August 3, for the supply of Net and Hooked FRESH FISH at per ton, cleaned or otherwise (cleaned preferred). Suitable premises will be provided for cleaning, and delivery taken at the Factory, American River, Kangaroo Island. The lowest of any Tenders not necessarily accepted. Tenders to be addressed to C. SHAND, Manager of the Kingscote Fish Preserving Co.Lorne Chambers, 107, King Willian Street, Adelaide.

Figure 5: Advertisement from the *South Australian Register* on 21 July 1887 (8) seeking fish.

Although the Kingscote Fish Preserving Company had yet to be established officially, it appeared that Shand had already opened a fish canning factory at American River. The American River Fish Cannery (ARFC) was started on the banks of the American River, nestled on the foreshore between American River and Ballast Head, and was ideal for easy access to waters abundant in whiting. In Jolly's work titled *Early Commercial Fishing on Kangaroo Island,* she describes the site as consisting of an oven and 'at least three main stone work-buildings' (2007:59). Mullet was smoked to make kipper herring, while other fish was tinned fresh and sold around Adelaide. The process of canning the fish was described as:

> "Tins of fish boiled in shallow, cast iron pans, with a small vent, left open for four hours, then sealed and boiled for a further four hours', 'heated to expel the air through a small hole … A dob of solder was then put over the hole to seal it as a vacuum."
>
> (Jolly 2017:60).

Shand would often advertise within the *South Australian Register* seeking fish or workers for his factory. It appeared that, while the majority of the business was operated on site at American River, Shand still maintained office in Adelaide. An example of this is on 23 July 1887, where he advertises wanting workers in the *South Australian Register* (1):

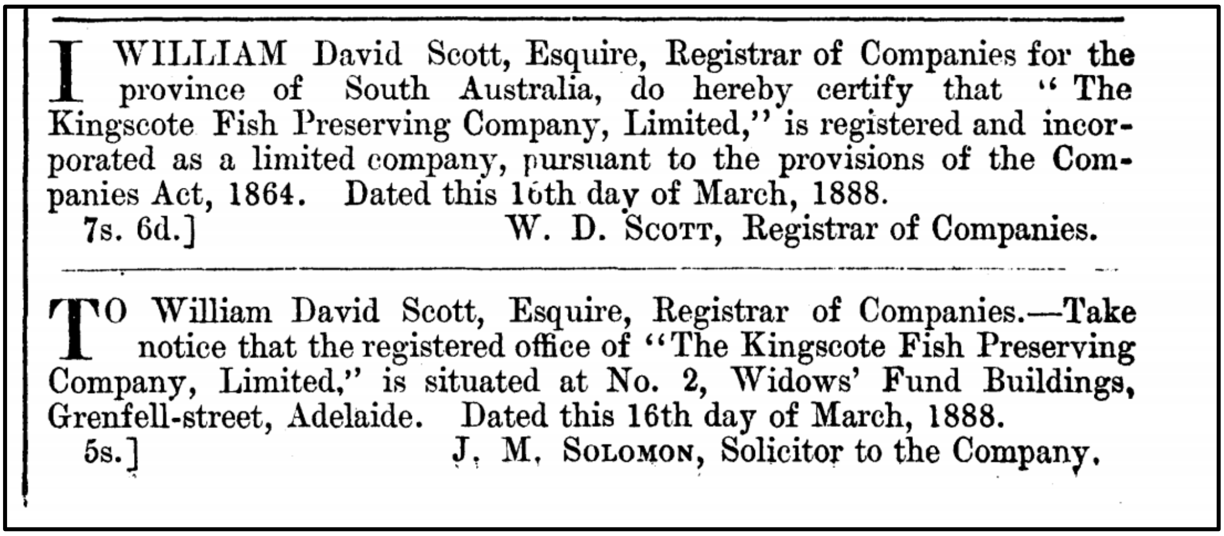
WANTED, smart BOYS to CLEAN FISH and make themselves useful at the Factory, Kangaroo Island. Apply between 12 and 2 o'clock Saturday, to Chas. Shand, Manager Kingscote Fish Preserving Company, Office, Lorne Chambers, 107, King William street.

WANTED, smart BOYS to CLEAN FISH and make themselves useful at the Factory, Kangaroo Island. Apply between 12 and 7 o'clock Saturday, to Char. Shand. Manager Kingscote Fish Preserving Company, Office, Lorne Chambers, 107, King William Street.

Figure 6: Advertisement from the *South Australian Register* on 23 July 1887 (1) seeking workers for the fish cannery.

The next mention of Shand appears in a small article in the *South Australian Register*, 11 August 1887 (3). This article details some of the events occurring in Penneshaw at the time. The author writes that the new industry of curing fish is progressing satisfactorily under the superintendence of Messrs. Shand, near the American River.

The 'Kingscote Fish Preserving Company, Limited' was officially registered (*South Australian Government Gazette*, 22 March 1888:698), about eight months after Shand's first advertisement in the *South Australian Register* seeking fish for a factory at American River:



I WILLIAM David Scott, Esquire, Registrar of Companies for the province of South Australia, do hereby certify that "The Kingscote Fish Preserving Company, Limited," is registered and incorporated as a limited company, pursuant to the provisions of the Companies Act, 1864. Dated this 16th day of March, 1888.

7s. 6d.] W. D. SCOTT, Registrar of Companies.

TO William David Scott, Esquire, Registrar of Companies.—Take notice that the registered office of "The Kingscote Fish Preserving Company, Limited," is situated at No. 2, Widows' Fund Buildings, Grenfell-street, Adelaide. Dated this 16th day of March, 1888.

5s.] J. M. SOLOMON, Solicitor to the Company.

Figure 7: Notice of registry for the Kingscote Fish Preserving Company, placed in the *South Australian Government Gazette*, 22 March 1888 (698).

On 9 April 1888, a newspaper article in the *South Australian Register* (6), containing information regarding a 'Field Naturalist' party visiting Kangaroo Island, and mentions Shand's fish preserving company; 'about 3 ¼ miles eastward from Mr. [John] Buick's [house] is the establishment of the newly formed Kingscote Fish-Preserving Company, started and managed by Mr. Charles Shand' writes the author. It is noted that there were fourteen people employed, which included seven young boys. Jolly (2007:61) mentions that the number of employees reached around thirty or forty at one time. The process employed was described in the article; the fish used were mostly mullet, snook, and whiting, and were ''kippered', 'spiced', smoked or preserved in the same way as tinned salmon or herring' (*South Australian Register,* 9 April 1888:8). The visiting Field Naturalists Party declared 'that nothing was wanting to make the fish perfectly delicious'. Fish were purchased from local fishermen, with eight boats contain two men each, all engaged in fishing for Shand's Company. The author describes how the current plant can process up to six tons of fish per week, and the current demand is for at least 20 tons, but issues with fish supply prevent getting close to enough fish. Although it was made clear that this was not due to a lack of fish in the sea – 'there are plenty of fish about' said one member of the Party with ties to the South Australian Fishing Company on the mainland, maintaining that 'there is no limit to the quantity that can be secured regularly by the use of nets and lines'. The Party Member also mentions how it seemed 'strange that with such shoals of fish there should be so few fishermen engaged in the business'.

It was reported by the *South Australian Weekly Chronicle* on 15 December 1888 (9) that a shareholder meeting took place to discuss results of the company. It was reported that, while results could not be regarded as unfavourable, they were 'not altogether what could have been desired'. It was reported that there had been great difficulties to contend with, such as irregularity in the supply of fish, the anticipation of larger hauls than actually came to hand, and the employing of more hands than were afterwards found necessary by Shand.

These issues resulted in a high cost of production, and a loss on the companies' operations, although it was anticipated that demand would be steadily on the increase due to the approaching summer season. Another reason for the loss was reported that Shand and his company was dependant on local fishermen for his supplies, but local fishermen reportedly 'got a good wind' often and therefore 'proceeded to Glenelg, where they obtained a better price' for their fish sold.

On June 24, 1889, a brief article in the *South Australian Register* (3) contained the sombre message: 'the Kingscote Fishing Company recently carried on here by Shand and Co. has collapsed, and the plant is announced for sale on Tuesday next'. No further information was provided within the article as to the factory closure.

One of the men employed at the ARFC was a Mister Harry Bates, who sailed from London to Kangaroo Island in 1860 with his family. Bates spent time fishing and farming until he eventually settled into the role of the mail run between the mainland and Kangaroo Island in 1870. Eventually, steamships took over the mail run, and Bates began work as a fisherman at the ARFC. Bates was reportedly paid two pounds for every half a ton of snapper he provided for the company, and it was said that he often caught this quantity during one night's fishing, but would also have to scale and clean this fish himself, or the cannery would not accept it (Carter 1978:20).

Another man who was employed by the ARFC was a Mister Nils Ryberg, a Swedish-born man who gained fishing experience by fishing at Glenelg in 1884. Ryberg discusses his employment under Shand, saying how he had caught over 250 dozen whiting in one haul and that the fish were then preserved (Carter 1978:20). Ryberg details how the other workers liked to have a beer cask alongside them as they worked, which, in his opinion, eventually contributed to the cannery's closure. 'There was too much beer' stated Ryberg, 'it was a badly managed concern because there was plenty of fish about them.' (Carter 1978: 20).

Although it appeared that Shand was on a successful trajectory in terms of the Kingscote Fish Preserving Company, the factory only stayed operational for approximate one year and eleven months. A combination of a seasonal trade, lack of refrigeration, poor management and alcoholism all resulted in the downfall of the Company.

2.4 – Chinese immigrant influence on South Australian fishing industry

An influx of Chinese immigrants during the 1850s, due to the gold mining boom in Victoria, resulted in an increased demand for maritime industries in Australia. Bowen (2012:1) noted in their work *Archaeology of the Chinese Fishing Industry in Colonial Victoria* that involvement of Chinese immigrants in Australia's colonial fishing industry was much greater than previously realised.

Many of these immigrants, hailing primarily from the Guangdong and Fujian provinces, were described as 'impoverished and lower-class', and were already familiar with a heavily fish-based diet (Bowen, 2011; Bowen 2012:1). Many of these immigrants also had previous maritime industry experience. According to Bowen (2011) in their work *The Merchants: Chinese Social Organisation in Colonial Australia*, Sydney- and Melbourne-based European fishermen were earning approximately £50, whereas Chinese immigrants working in

Australia's colonial fishing industry had the possibility of earning that amount daily (2011:97).

There is evidence that in some cases, the fish-curing establishments were owned and organised by Chinese merchants, who in turn staffed the operations with indebted Chinese labourers. Newspaper reports show that Chinese fish-curers were operating in all Australian states by the mid-1850s, and wherever a large number of Chinese immigrants settled, fish-curer operations were not far behind. (Bowen 2012).

Transporting fish during nineteenth century was a difficult undertaking, due to a lack of refrigeration techniques, coupled with the 'enormous demand' for fish (Bowen 2012:1). This issue with refrigeration often resulted in large quantities of fish, sometimes entire catches, to be disposed of due to putrefaction. But the Chinese immigrants solved this issue by curing the fish, thus eliminating the putrefaction issue, and allowing the fish to supply thousands of people in colonial Australia. Victoria was the first place that these fish-curing industries were established. Often, they would be set up near existing European fishing stations in order to purchase all fish caught, or in 'remote, coastal regions' in order to exploit fish-laden waters untouched by commercial fishing activity (Bowen 2012:1).

In Bowen's work, they describe these Chinese fish-curing establishments as 'micro-communities', which can further be divided into sub-categories: 'a wealthy minority of influential elite (the merchants), a broad range of middle-class workers (the merchant's aspirants) and the lower ranking workforce majority (the lower class) (Bowen 2012:5).

Within South Australia, the Chinese immigrants found themselves congregating near the Port Adelaide Wharf and Semaphore beach. A group of Chinese immigrants sailed from Melbourne to Adelaide via the Coorong, bringing with them a large fishing boat coupled with 'a remarkably long sein' fishing net (Jolly 2017:52).

The process that they used for fish curing was simple, and their use of the sein net resulted in substantial and indiscriminate fish hauls that all ended up cured. Jolly (2017:52) describes how 'the liver and roe of the fish were left attached to the catch, and subsequently throw into a casket filled with brine and left for a few days. After this process, the fish were taken to the beach and scrubbed with small, specialised brooms and dried on the rushes (likely *Juncus pallidus*, see figure 85). The cured fish were then transported via casks to Victoria and further east into the newly established goldfields (Jolly 2017:52).

An article written in *The Mercury* on 2 February 1864 (3) provides some details in regard to the Chinese immigrant's fish preserving operation in Semaphore, South Australia:

> "By the Coorong, from Melbourne, there arrived some two months back four [Chinese men], who brought a boat and a remarkably long seine, with which they located close to the Semaphore Jetty. A few days only elapsed before they had caught many bushels of the smaller finny specimens with which the shallow water of the gulf abound.
>
> …[the operation at Semaphore] exhibits at a glance the many specimens of piscatorial delicacies which abound here – herrings, garfish, mullet, whiting, ruffs, flounders, salmon, cuttlefish, squid, silver-fish, all lay in beautiful confusion, while a [Chinese man], with a long stick, walks daintily about, turning them to the genial influence of the solar rays.
>
> In order to procure a better supply, all is fish that comes to their net, as well as any other kinds purchasable at £6 per ton. This offer enlisted some Europeans, who have driven a fair trade in consequence, bringing to the Semaphore Jetty beautiful samples of the finer description of schnapper, which are immediately weighed and taken charge of by the curer.

> There appears to be one [man] amongst them who directs the whole operation, and whenever any inquiries are made he, in rather indifferent English, is remarkably willing to afford information."
>
> (*The Mercury*, Hobart, Tasmania. 2 June 1864:3)

Although the Chinese fishermen on Semaphore beach were producing many casks of dried fish, the local residents soon complained about the 'effluvia' from the drying fish becoming an issue, and subsequently lowering beachfront house value (Jolly 2017:53). This resulted in the Chinese fishermen becoming banned from Semaphore beach by the South Australian Marine Board, and by 1868 all fishing huts had been removed. Many of the Chinese fishermen ended up further north, in Moonta and Edithburgh (Jolly 2017:53).

But not all Chinese fishermen stayed on the mainland. Reports of the abundance of fish, as well as easy access to salt on Kangaroo Island circulated around the South Australian Chinese fishing community, and by 1866 their activity in American River was described, with irony by the *South Australian Register* as a bustling industrial centre (Jolly 2017:53; *South Australian Register*, 20 June 1866:3). In 1869 a pastor, who took passage to Kangaroo Island for pastoral duties, made the observation that 'that at American River there were only the Willson and son and Buick families, with a few persons, Chinese and others, engaged in fishing and catching wallaby' (Jolly 2017:53; *South Australian Register* Friday 28 May 1869, p. 3).

John Buick, a prominent figure in Kangaroo Island history, settled on the island in 1854. Reports from the *South Australian Register* (6 May 1876:6) noted that a lone Chinese man was living on Buick's property, who had built a hut out of branches bound together. It was thought this man was probable what remained of the 'Chinese Company of Wau-hop', that in February 1868 continued to pursue its fishing operations at American River. The company comprised of two cutters and employed four or five English fishermen, and were said to be paid about £6 per ton for deliveries of fresh schnapper of which many tons of salted and cured fish were sent to Melbourne (Jolly 2017:53; *South Australian Register* 27 February 1868:3). The man living on Buick's property was known as Fok Sin, Folkson, Old Folkson, or Folkstone, and spent his days fishing on the American River and tending to the Buick's garden. An observer reported that he 'appears to be doing a good trade in opossum rugs and salt fish. His hut is certainly a curiosity, and shows the ingenuity of the [Chinese immigrants] …', '…the residents … think to [make] him understand [English] better by speaking to him in pigeon English, which he takes good-humouredly' (*South Australian Register* Tuesday 6 May 1879:6).

There are also reports of Fok Sin assisting the Buick couple around the property with gardening, and John Buick even attributed the fantastic growth of his flowers, fruit, and vegetable gardens to him. He was also reported to often help Mrs. Buick with hide tanning. Another report from 1881 by the Chief Inspector of Oyster Fisheries, William Randall, says that he recalled 'seeing an elderly Chinese who had been engaged in the canning factory inside Ballast Head and remained behind when the fishing company wound up' (Jolly 2017:55).

Fok Sin appeared to be quite the mystery to the inhabitants of American River. An article regarding this character appeared in the South Australian *Register News-Pictorial*:

"[The Buicks] were a charming, hospitable, old couple …They possessed a fruit, flower, and vegetable garden; the like of it could not be bettered in Adelaide. It was started by a [Chinese man], whom Mr. Buick found one morning on his premises. Nobody knew where he came from. He spoke Chinese only, and could not give any account of himself."

"…he was either thrown overboard from a passing ship, or jumped overboard and swam ashore. He started to dig the garden. Mr. Buick got him some seeds and trees, and in a short time he created an oasis in the wilderness. He snared wallabies, tanned their skins and made beautiful rugs, one of which I bought for £3."

"Every year the Chinese gardener disappeared for four weeks, without leave. At the end of that time, one morning he would be seen digging in the garden again. Nobody even found out what became of him in the interval."

(The Register News-Pictorial Thursday 31 January 1929:8)

It was reported that he had been buried in an unmarked grave near the American River jetty, with an apricot and apple tree standing in the corner of a nearby field still known as 'Chinaman's Garden'. A local legend also stated that 'the [Chinese man] was buried with a belt of gold sovereigns, and although the reopening of his grave has been [made more than once], the exact spot is not known' (Jolly 2017:56). It was estimated that Fok Sin died in 1905, although an exact record could not be found.

2.4 – Spatial analysis theory

The study of spatial analysis can be broken down into a simple concept: *why is the current space the way it is?* Analysing the archaeological components of a space can provide insight into 'the organization of production' in order to understand the 'nature of social hierarchies…' (Bagwell 2006:29). In Cutting's (2003:1) work, *The Use of Spatial Analysis to Study Prehistoric Settlement Architecture*, she explains the use of spatial analysis, or *spatial syntax*, on architecture when examining a site. Spatial analysis, originally developed by architects, is primarily used as a means of design improvement in regards to buildings and open spaces, relying on a base understanding of the relationship between spatial configuration and purposeful movement. Examining the spatial architecture of past societies provides material evidence in direct correlation to the society which inhabited the space—the way the society 'constructed their built environment in ways to suit their biological and social needs' (Cutting 2003:2). Although many schools of thought employ spatial analysis, such as architects, archaeologists, and anthropologists, most would agree that 'there is something to be learnt about individuals or groups from the way people construct, organize and furnish their physical spaces' (Cutting 2003:2–3). Spatial analysis falls under an analytical and structuralist approach, operating under the belief that 'there exist underlying rules or laws' which are used to 'give meaning to people's myths, concepts and cultural behaviour' (Cutting 2003:3). Spatial syntax really focuses on the concept of humans as physical objects moving through a finite area; people use space both consciously and reflexively, and the way spaces are designed will change how people move through them, therefore changing the behaviour of people in those spaces (Cutting 2003:3).

In Taylor's work, *Quantitative Methods in Geography: An Introduction to Spatial Analysis* (1977:286), he uses the example:

> What if we locate a new shopping centre five miles to the north of the of a particular central business district? What effect will this have on sales? Where will the shoppers at the new centre come from?

This example explores the concept of why a 'bult space' is constructed the way it is, where it is, and the ramifications it has on the community it is bult in (Bagwell 2006). It is important to consider the symbiotic relationship between built space and human behaviour, as human nature influences the organisation of built space, and in return the built spaces influence human behaviour (Bagwell 2006:29).

Examining spatial patterns can help identify data related to non-random distribution of artefacts, such as data 'pertaining to the social organization of a particular society' (Rood 1982:27). Space, and the use of space, is heavily influenced by its surrounding cultural values (Rood 1982:21). Examining spatial syntax requires one to draw on several fields of knowledge, Cutting (2003:2–3) explains, from environmental determinism to social evolution, in order to properly grasp how and why people lived as they did. According to Buttimer (1969:419), social spaces can be broken down into a hierarchy, starting with family space-relationships, with a focus on domestic interactions, followed by neighbourhood space, which encompasses daily and local movements. Next is economic space, with a focus on employment, and lastly the urban space, which encompasses all spaces mentioned (Buttimer 1969:419, Rood 1982:22).

Bagwell, in her piece titled *Specialization, Social Complexity and Vernacular Architecture: A Cross-Cultural Study of Space Construction* suggests examining the built space in the same way one would examine an artifact; by focusing on who and by what method the space was produced (2006:29). When analysing space, there are three main factors to consider. The first examines what the space contains: examining what a room contains in order to extrapolate the function of the room, therefore allowing inferences regarding social organization. Secondly, this method examines the shape of the built space, which is usually a direct reflection of function (Bagwell 2006). Finally, examining how the bult space functions as a boundary, differentiating spaces and as well as acting as interpersonal regulation. Using these three factors, it is possible to perform spatial analysis on a site and gain understanding of the space in regard to social hierarchies.

Within the school of spatial analysis and interpretation, there exists several theoretical approaches that have been developed, as explained in Clarke's work. The most relevant theoretical approaches will be explained.

Clarke's work *Spatial Information in Archaeology* (1997) discusses the first principle, that of Anthropological Spatial Theory. Clarke (1997:18) states that the patter of distribution of archaeological artefacts can provide data which pertains to the social organization of a particular society. Although Clarke stresses that the data collected must be gathered using quantitative methods and 'testable hypothesis' that are rooted in anthropological or mathematical theories, as well as implementing behavioural and structural theories (Rood 1982:27). Implementing this theory into the spatial analysis will help tie the functional and ideological components of the research question by examining the data collected through an anthropological and behavioural lens.

The next principle, Economic Spatial Theory, employs the ‘principal of least effort’ theory, as coined by Zipf in their 1965 work *Human Behaviour and The Principle of Least Effort*. This principle theorizes that an organism (in this case, humans) will expend the least average rate of work. When broken down and applied, the theory explicates that man will make choices that minimize cost/energy expenditure and maximize gains (Rood, 1982:27). This theoretical framework will provide a good backbone when examining spatial data at an industrial site, such as the American River Cannery. The cannery site being analysed could be considered an ‘economic’ space when applying Buttimer’s (1969:419) social space hierarchy theory, therefore the Economic Spatial Theory principles must be considered in the analysis process.

The next theory to be examined is Site Catchment Analysis, was originally developed as a way to examine small scale hunter-gather and agricultural economics. The theory, which was expanded by Vita-Finzi and Higgs (1970:2), made the assumption that a human group will eventually make use of resources within their territory, within their available technological capacity. An example of this, given by Vita-Finzi and Higgs (1970) in their work *Site Catchment Analysis: Proceedings of the Prehistoric Society*, is that an inhabited territory with a large space for grazing will always result in the exploitation of grazing animals. This theory considers the natural availability, abundance, spacing, seasonality and location of natural resources such as plants, animals, and minerals. This approach is especially relevant to the research question, as the location of the Cannery site would have been carefully considered in conjunction to the abundance and availability of natural resources (fish).

According to Sams (2013), a built space can be examined using three basic dimensions: formal dimensions (physical characteristics), relational dimensions (human activity and human interactions between built spaces) and historical dimensions (links within a built space from the successive use of said built space). In Cutter’s (2002:3) work, she specifically focuses on the use of access analysis in her spatial analysis. The first stage, she explains, employs computer software to ‘produce quantitative descriptions of the connective properties of defined spaces’, specifically examining how they are linked together. The second stage involves the interpretation of results, using an ‘interpretative framework’ that has been developed from direct observation of how people utilize space.

Patterns, defined as ‘potential movement’ and ‘non-movement’ are analysed to identify relationships between spaces, as well as functional activities, ease of access and privacy. These patterns can then be utilized to develop relevant social theories, such as social organization, gender domains, and social complexity (Cutting 2002:3,6). Cutting mentions that it is important to examine the building plans in terms of ‘a person walking around and using the buildings and open spaces’, as not all features would be used simultaneously (p. 13). This school of thought introduces Cutting’s main takeaway of access analysis—that it should be used, ‘not only as a quantitative technique’ but also used as a ‘tool to think with’ (pp. 17,18). This concept implores archaeologists to use an access analysis perspective for research and examine how everyday people carried about their daily lives within the buildings being excavated; examine how people would have entered each space, used the space outside, relate to the neighbouring space and move between buildings across spaces (p. 19).

2.5 – Spatial analysis for small-scale colonial fishing industry sites

In Bowen's work, Material Evidence for *Early Commercial Fishing Activities on the Far South Coast of New South Wales* (2004) and *Archaeology of the Chinese Fishing Industry in Colonial Victoria* (2012), he examines small-scale colonial maritime industrial sites within Australia. He notes several site indicators of material evidence for fishing technology: Launch maintenance; Net making/mending rack; Net tanning; Net drying racks; Fish storage box; Fish cleaning platform; and Associated Structures.

The first mentioned, launch maintenance, is comprised of slipways, generally fashioned out of local hardwood and steel spikes, and is designed to hold the launch out of water for required maintenance. Some physical indicators left by the installation of the slipways would include foliage removal, often completed with an axe; steel or wooden track runners or wheels; barer timbers placed parallel to shore, which span from below low tide to above high tide; copper nails from construction and maintenance; pitch or oil-based paint which was used to protect timbers; and a capstan used to secure rope or chain (Bowen 2004:81).

The next physical indicator Bowen (2004) mentions is a net making and mending rack. Fishing nets were comprised of natural fibres until around 1940, typically cotton or hemp, which requires significant maintenance. To assist with the net maintenance, large racks were fashioned, comprised of two tall, upright timber poles, spaced to allow nets to be strung up (p. 82). The top of the nets would contain cork or glass floats, and was pulled between the two poles, and the bottom of the net, usually containing lead sinkers, was tied low down on the poles.

Next, Bowen (2004) talks about net tanning racks. Due to the use of natural fibres in the nets, they required tanning every two weeks. This process was completed using natural tannins found in local tree bark, particularly grey ironbark (*Eucalyptus paniculata*), swamp sheoak *(Casuarina glauca)*, black wattle (*Acacia mearnsii*) and Red Bloodwood (*Corymbia gummifera*). The process of removing the bark, especially from larger trees, left significant scarring on the tree's trunk. Within the fishing community, Bowen (2004:82) notes that it was considered bad to cut down established gum trees or to remove too much bark, which resulted in only strips being taken from the gum trees. The bark was then chopped up and boiled with the netting fibres, leaving them stained brown from the tannins and reportedly making them temporarily resistant to sea water and jelly-fish acid. The tanks used for tanning required a hearth pit close to the shoreline, and stone, brick or concrete stands for the tank to rest on.

Net drying racks were also imperative to the fishing site and provides potential physical indicators. Due to the natural composition of the net fibres, they required drying out between each use otherwise they risk them developing rot. Drying racks, constructed from local hardwood, were situated close to shore so as to easily hang them up to dry after each use. According to Bowen (2004:82), the racks consisted of 'a framework of upright and horizontal poles each approximately 100 mm in diameter. The height of drying racks varied as did the length, and average construction may be 1.5 m high and between 6 m and 12 m in length.

A fish storage box was also a necessary component of an industry fishing site. The storing and preserving of fish were the greatest issues faced by colonial fishermen, as it was common for entire days' worth of catches to be lost to purification.

To combat this, fish storage boxes were installed on site, usually comprised of rammed concrete, and built at the base of a large, shady tree close to shore. The construction process usually involved two wooden beams about 150 mm wide, 19 mm thick placed parallel to each other, the centre of which was filled with a course sand, small stones and gravel from the immediate vicinity, mixed with a small amount of concrete, make up the materials used in the construction of iceboxes (Bowen 2004:85), and ‘packed down by ramming the concrete with the flat end of a crowbar or purposely designed tool called a tamper’ (Bowen 2014: 83). The box was usually filled with ice, if available, and fish were unloaded from a launch directly into the box. Bowen (2004:85) notes that the absence of an ice box at a fishing site may mean that the site is very early in commercial fishing history.

Fish cleaning platforms were also of great importance for fishing industry sites. These structures were usually constructed a few meters within the water to allow for ease of gutting and washing. Bowen (2014:83) notes that fish cleaning platforms had similar construction characteristics to jetties, as they both require upright posts held in place with mortar and a platform that sits above the high tide mark. The defining characteristic, however, would be the size, as cleaning platforms were much smaller in all aspects in comparison to a jetty.

Bowen also notes several other associated structures that could be present at fishing sites, in particular those involved in preservation methods. This includes ice factories from the early 1900s, which were often seen linked to fishing industries due to the sheer amount of ice required to keep fish from spoiling. An alternative to this method (catch, clean, preserve in ice) would be the use of fish pens, which kept the fish alive as a way of preservation. This method was particularly deployed for salmon, as salmon enter the areas in great numbers during spawning season.

In summary, it is important to consider the American River fish cannery within the surrounding historical context in order to perform an accurate analysis of the site. From the blossoming maritime industries of the newly developed colony, the goals of the South Australian Company, the influx of Chinese immigrants to Australia to the slow arrival of refrigeration techniques, all resulted in the rise and fall of the Ballast Head canning company on the shores of American River.

CHAPTER 3 – METHODS

This chapter details the methodologies applied to the study ofthe American River Canning factory site. A combination of historic resources and archaeological field methods were used in order to provide the appropriate historic context and undertake spatial analysis . The ARFC site was surveyed and excavated in April 2021 as part of a field practicum by Flinders University Maritime Archaeology Program students, under the supervision of Wendy Van Duivenvoorde, Heather Burke, and Justine Buchler. During the week-long field school, a detailed survey was performed, followed by a preliminary excavation in select areas, as well as numerous archaeological illustrations and photography to complete photogrammetric models.

3.1 – Historic data collection

The historic data collected for this research project primarily focused on the actual fish cannery site, and specifically the factors that led up to its creation. It was important to have a solid understanding of the industrial climate that resulted in the cannery being erected. The majority of the historical sources and data relevant to the American River Fish Cannery were retrieved from archival newspaper sources accessed via Trove.nla.gov.au. These newspapers include the *Adelaide Observer* (1843–1904); *The South Australian Advertiser* (1858–1889); *South Australian Register* (1839–1900); *South Australian Weekly Chronicle* (1881–1889); *The Mercury* (1860–1954); and *The Register News-Pictorial* (1929–1931). In addition, the *South Australian Government Gazette* (1839–present) was accessed via governmentgazette.sa.gov.au.

These newspaper articles were used to establish a timeline of the ARFC site, as well as a historical overview of colonial fishing activities in South Australia. It was also important to garner an understanding of the South Australian Company (SAC) plans for the newly colonized state. This research was achieved by examining legislation documents and other published information from the SAC that includes their proposal for the South Australian colony.

Due to the site being small, remote, and rural, often the only information available was what was written in local newspapers that would report the progress of the colony at the time. This means that the information gathered could contain potential biases, and details may have been excluded or altered in order to make the colony expansion appear more favourable for the SAC and the general public. There did not seem to have been much interest in the ARFC site in most South Australian papers, as papers preferred to report on events on the mainland as opposed to the seemingly small and remote Kangaroo Island. Often articles written about the new colony on Kangaroo Island were phrased in a way that made the Island seem mysterious and dangerous (Carter 1987:6), rather than reporting the facts and details of the local industry.

Another important method employed would be the comparison between other similar sites within Australia. For this research, Trove.nla.gov.au was again utilized in order to gather information on other canning factories at the time. This will provide valuable information to use to compare to the ARFC site.

3.2 – Site survey

To begin, a pedestrian survey was performed over the entirety of the site area. The survey was undertaken by eight surveyors, spaced approximately 4m apart and covered an approximate 100m area, running from west to east of the site. The pedestrian survey was then repeated in a similar fashion running east to west to ensure that the entire area was correctly examined and surveyed. Any potential cultural remains were flagged and numbered, as well as notes taken on any potential boat launch locations along the shoreline, south adjacent to the site. The cultural remains were catalogued, and their GPS locations were gathered using a FlexLine Total Station. This means that the resulting distribution patterns of artefacts could be further analysed spatially in order to better understand how the site was used.

The five main structures were also located and labelled in the survey (labelled site A–E). The remaining structures consisted mainly of rubble stone walls, and their preserved dimensions were surveyed using the FlexLine Total Station gathering GPS coordinates in the corners of each building, as well as potential doorway/entrances, and the corners of all excavation grids.

This process resulted in a complete survey of the cannery area, with GPS points gathered for all significant features. With this data, a full map of the site can be completed and spatially analysed, and a site layout can be created (see Figure ### in Chapter 4).

3.3 – Archaeological illustrations

Plan and profile view illustrations were completed of structure B, D and E to capture the stonework and wall dimensions. These illustrations were completed in the field using a baseline offset method, which was adapted when necessary. This was especially true for site D, which was the assumed cold room. This structure was built into the side of the hill, which made traditional surveying techniques difficult. Illustrations were especially important for structure D, as the shape and location of the structure made other recording methods difficult or impossible. Copies of all illustrations from the ARFC site were taken photographically and later scanned digitally.

Illustrations were then imported into the computer software Autodesk AutoCAD and recreated digitally. This provided clean, crisp field drawings that clearly show the construction of the structures as well as the impact of the surrounding organic material, such as soils and mosses.

3.4 – Photogrammetry

Photogrammetry is the process of using 2D photos to create an accurate 3D model. Detailed photogrammetric photosets were taken of structures B-E, using both NIKON D3400 cameras as well as a DJI Mavic drone to capture arial views (McCarthy *et al.* 2019). All photos taken were recorded on a photo sheet that included the date, location, and photo number within the sequence (Fig. 84). The photos were later imported into the program Agisoft Metashape to create a detailed and to-scale models of each structure. This process is also advantageous for further structure analysis post fieldwork, as the photosets capture all details of the structure walls. Once the models were completed in Agisoft Metashape, they were imported into 3D modelling software Blender, which allowed the lighting to be manipulated to best show the models. Models were then rendered through an orthographic camera in Blender to create planner and profile views of each structure. This allowed for the structures to be examined orthographically at any angle, providing a base for further analysis.

3.4 – Archaeological excavation

Archaeological excavations of the American River Fish Cannery site (35°45'45.6"S 137°47'42.4"E) were undertaken by Flinders University archaeology students in select areas on the site. Locations of excavation included areas that were suspected as high foot traffic areas, such as doorways, as well as areas that contained structure remnants of unknown function (Burke *et al*. 2020). Trenches were small and acted as a basis for possible further excavation in the future. Any artefacts found were recorded using artefact record sheets, as well as their coordinates recorded using a FlexLine Total Station. All trenches were recorded using context sheets as well as photographs. Below is a table (figure 8) detailing the different trenches, their locations, as well as dimensions. All trench plans were photographed and scanned so as to preserve the data. The images were then imported into Autodesk AutoCAD and digitized to create a clean digital vector image. Opening and closing photographs were also taken of each trench. Data extracted from this process was stored and managed within the geographical information software by ERSI ArcGIS. This data was then added to the final site layout. Structures A and B and remain unexcavated to date.

Trench 1	
Structure C	Square 1A – no excavation
	Square 1B – 70cm x 1m, context 6
Trench 2	
Structure C	40cm x 1m
Trench 3	
Structure E	1m x 1m
Trench 4	
Southeast of Structure D and E	1m x 1m, 18cm deep

Figure 8: table showing trench details.

3.6 – Limitations of the study

The study was limited due to several factors. The main limitation was simply the time that was available for fieldwork. Due to the fieldwork acting as a field practicum for Flinders University archaeology students, the timeframe was constrained to one week for field work. This meant that limited excavations could take place, resulting in only four trenches being constructed.

CHAPTER 4 – RESULTS

The ARFC site is characterized by ruined remains of stone and mortar walls, which were subsequently labelled as Structures A through E. Located roughly 3.5km north of American River township, the site spans a 100 by 100m area and is nestled between a hillside (to the north) and the shore (to the south) of American River on -35.7622398199853, 137.79691302350545 (GDA94: Zone 53). The main goal of the following analysis is to establish the layout of the factory and the subsequent function of each structure. This will allow for the site to be spatially analysed. Main goals include identifying the kiln as well the functions of other structures and to create a detailed site plan that include any diagnostic cultural remains found during survey and excavation.

4.1 – Archaeological data

The ARFC site contained five (A–E) ruins of structures made from stone presumably gathered from the nearby shoreline. Figure 9 (below) shows the site plan with the remaining walls of the stone build structures, as well as the location of the trenches. The location of trenches was chosen by considering possible high foot traffic and use locations (trench 1 and 3), as well as a visible distribution of cultural remains at the site (Trench 2 and 4).

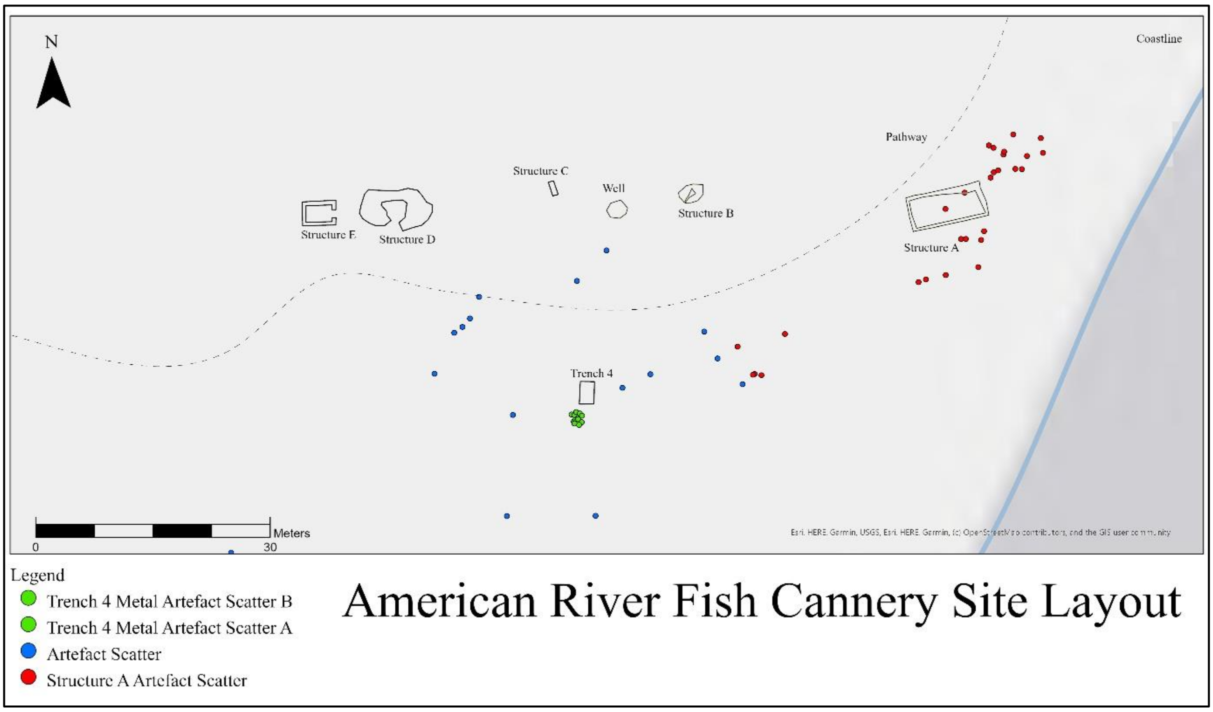


Figure 9: Site layout created using Flexline Total Station and Esri ArcGIS.

4.1.1 Stone walls and mortar

Stone walls and fences became common in the Australian landscape after the arrival of colonial farmers, as Aboriginal people tended to have 'little sense of property ownership' and the marking of it (Munday 2012:6). Mid-nineteenth century rural fences focused on function and cost, and with a lack of forestry area in South Australia, coupled with an overabundance of white ants, stone walls and fences were the popular choice (Munday

2012). Kangaroo Island boasts an abundance of limestone and rocky coasts, providing perfect wall building materials for the ARFC site. Using the descriptions provided in Shadmon (1989:81) work *Stone: An Introduction*, the walls at the ARFC site can be classified as 'rubble' type, utilizing the natural irregular local 'field stones' that were either not cut, or minimally so, in order to fit together to create a wall (Shadmon 1989:139). The stones appear to originate from 'fairly parallel, well bedded layers', resulting in requiring minimal treatment or shaping. Shadmon (1989) describes field-stones as 'any loose stones' sourced locally to the site, where 'collection requires no special skill or equipment', and stones are then used 'whole or roughly broken'.

In Munday's (2012:7) work *Those Dry-Stone Walls*, he describes dry-stone walls as stone walls that have no mortar, either having never been built with mortar or that the mortar has now weathered away completely, or it was the same as the parent material and what little remains is now barely noticeable. Although many of the walls located at the ARFC site do not come under the classification of dry-stone walls provided by Munday due to the presence of mortar, many of the same principles apply. Three distinct types of mortar can be seen on the structures at the ARFC site. The first type, as seen in Structure A, is a dark grey (5YR 3/1 on the Munsell colour chart) and has visible shell and small stone components. The second type of mortar used on site appears in Structure B and E and is a medium brown (5YR 6/2 on the Munsell colour chart) and features an earthen consistency with small gravel pieces appear throughout. The final type of mortar used appears in Structure C and D and is a bright, almost white grey (10YR 8/1) (see figure 10). It has added matter such as gravel and tiny shells which are clearly visible, and this mortar has been applied thickly to the inner walls, covering the stone wall facing completely in some areas.

Mortar present in Structure A.
Dark grey (5YR 3/1 on the Munsell colour chart) in colour and has visible shell and small stone components. Not visible elsewhere on site.

Mortar present in Structure C and D
Bright, almost white grey (10YR 8/1 on the Munsell colour chart). Visible additives such as gravel and tiny shells, applied thickly to the inner walls.

Mortar present in Structure B and E.
a medium brown (5YR 6/2 on the Munsell colour chart) and features an earthen consistency with small gravel pieces appear throughout.

Part of Structure C.
Distinct green colour (ranging between 5G 8/6, 5G 9/2 and 5G 4/4 1 on the Munsell colour chart) that does not appear anywhere on site. Present inside small rock overhang.

Figure 10: Comparison of mortar types on site.

An outlier to all the structures is part of Structure C. Directly adjacent east of the two main rock wall sections is the small stone overhang, which is a distinct green colour (ranging between 5G 8/6, 5G 9/2 and 5G 4/4) that was only observed here—it does not appear anywhere on site.

4.1.2 – Structure A

Structure	Coordinates	Length (cm)	Width (cm)	Wall th. (cm)	Height (cm)
A	210,292.43E 6,037,634.83N	333.89	162.17	17.98	32.33 (varies due to degradation)

Figure 11: Table showing Site A details.

A rectangular shaped structure situated on the eastern most side of the research area, situated approximately 20m southeast of the American River shoreline, and located approximately 30m east of Structure B. This structure is the largest on the site, but shows sign of significant collapse on the north, east and west walls, with southern wall showing the least sign of damage. Stone scatter within the structure's boundaries suggest the possibility of an inner wall that has since collapsed entirely. The walls of this structure are comprised of presumably local field-stones gathered from the nearby shoreline, and the stones are held together with a dark grey coloured mortar with visible additives such as small shell and gravel.

Low, dense shrubbery has overgrown several areas, most significantly the northeast, east and south walls, making archaeological fieldwork difficult without significant alteration to the natural growth.

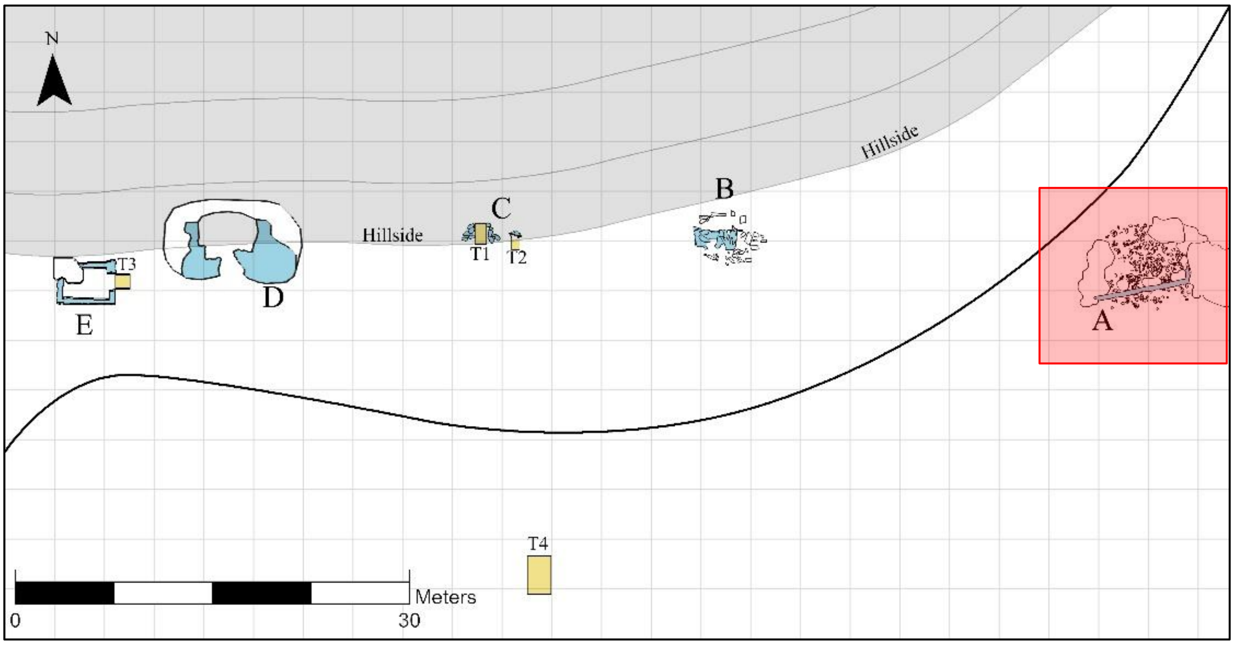


Figure 12: Location of Structure A within research area.

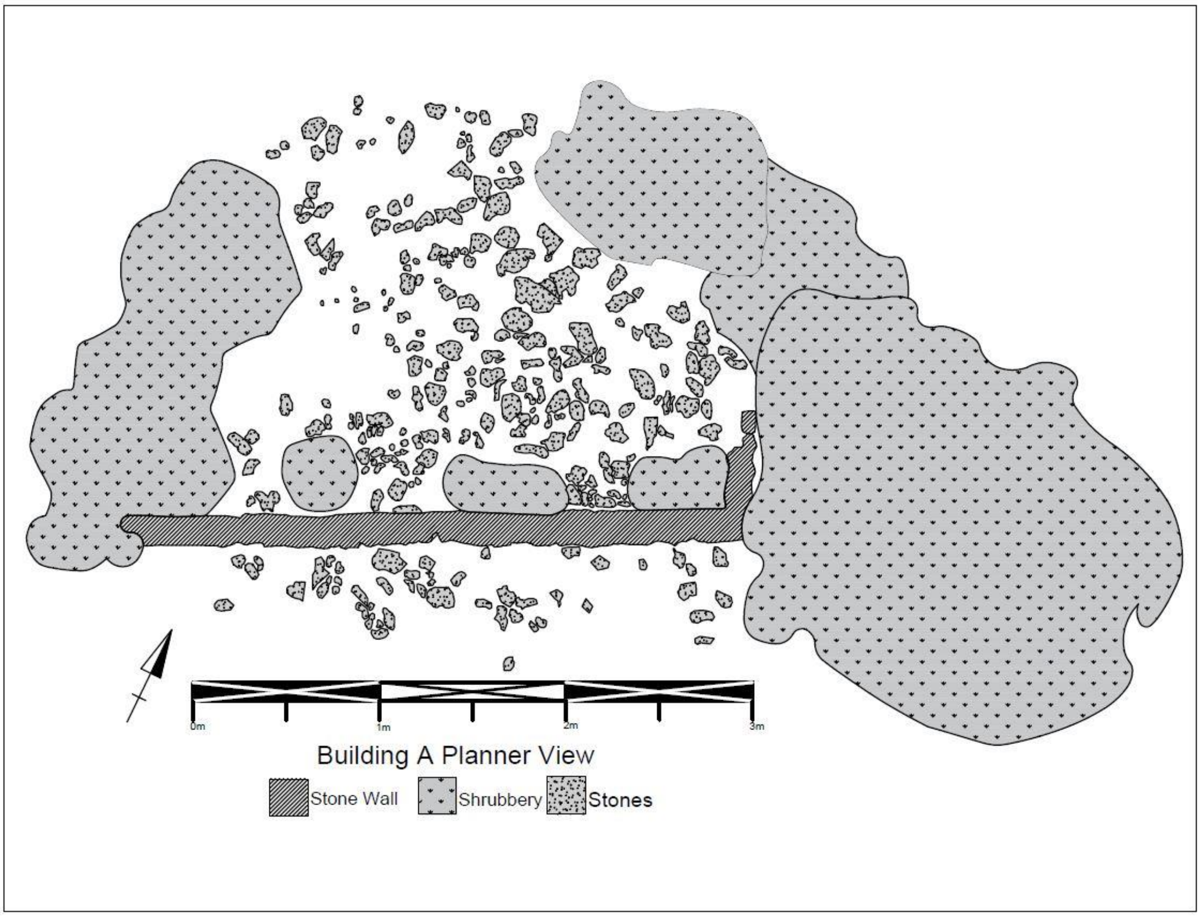


Figure 13: Planner view illustration of Structure A.

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Figure 14: Aerial photo of Structure A taken using a DJI Mavic drone. Photo taken by Justine Buchler.

Figure 15: Structure A, southern wall.

4.1.3 – Structure B

Structure	Coordinates	Length (cm)	Width (cm)	Wall thickness (cm)	Height (cm)
B	210,260.29E 6,037,636.36N	97.2	45.12	22.47	63.54

A small, solid rectangular structure situated in the northeast of the research area. Structure

Figure 16: Table showing Site B details.

B is situated approximately 30m west of Structure A, and approximately 18m east of Structure C. This structure is comprised of stacked, assumedly locally sourced field-stones from the nearby shoreline. Large stones are stacked in a way that resembles a small horseshoe shape, leaving an approximate gape of 60cm in the middle of the southeast side without stone to create a small alcove. Brown (5YR 6/2 on the Munsell colour chart) mud-like mortar has been used for this structure, similar to Structure E, and features an earthen consistency with small gravel pieces throughout.

Many of the stones appear to be underneath a layer of earth, and although much of the surrounding debris was cleared, it is uncertain if parts of the original shape of the structure remains buried. Stones scattered around the structure appear to be similar and could potentially be remnants of the original walls, but due to the close proximity to their original origin, the American River shoreline, it can be hard to tell without additional excavation being performed.

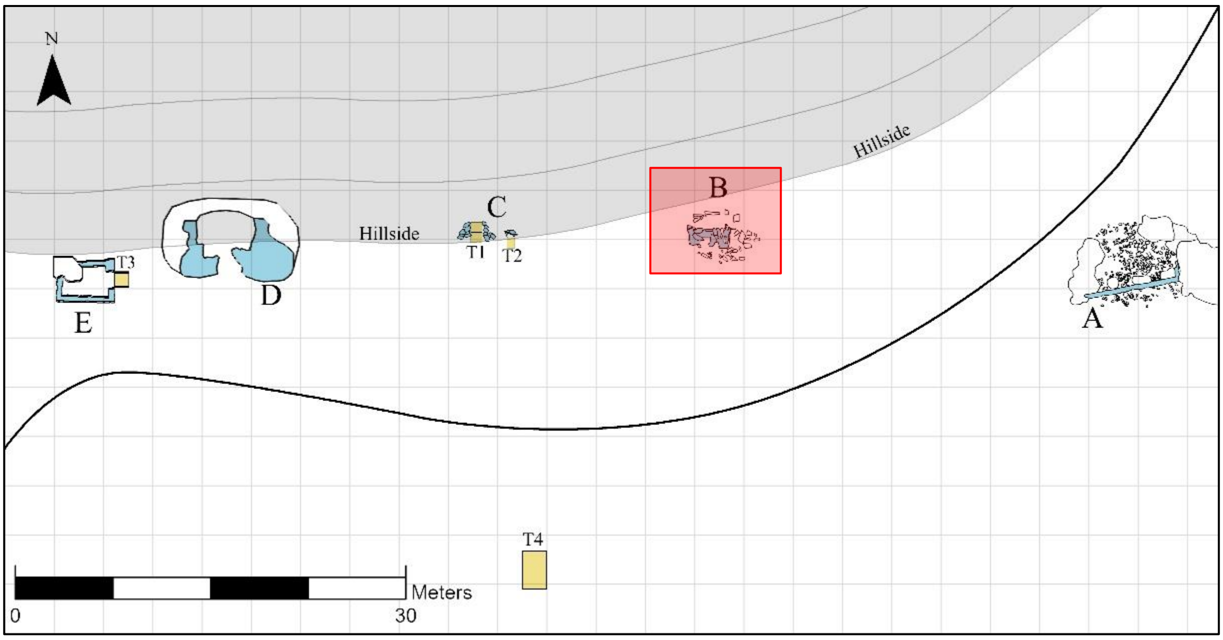

Figure 17: Location of Structure B within research area.

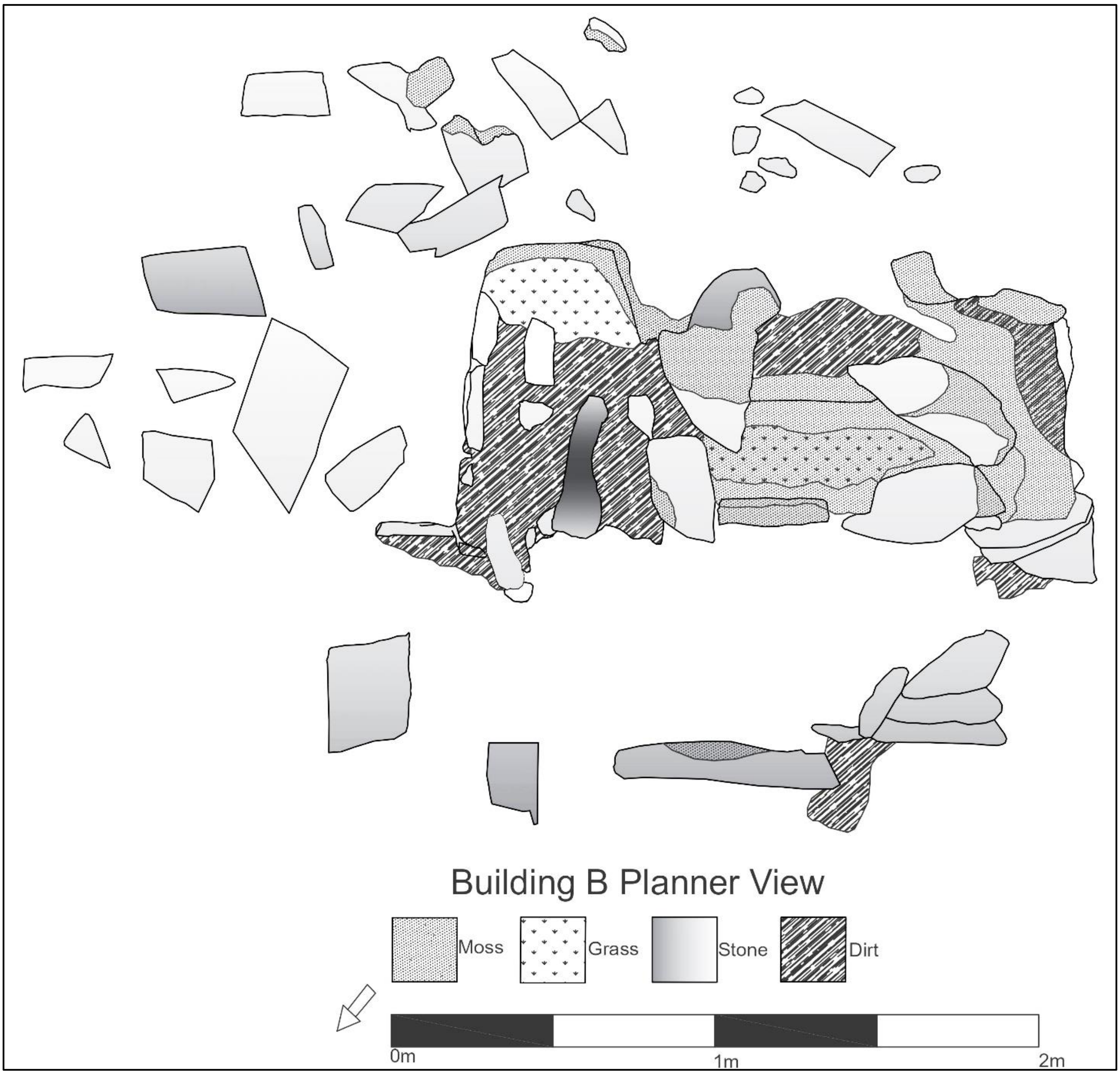

Figure 18 a: Planner illustration of Structure B.

Figure 18 b: Planner photogrammetric model of Structure B.

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Figure 19: photo of Structure B. Photo taken by Flinders University archaeology student Emma Webb

4.1.4 – Structure C

Structure	Coordinates	Length (cm)	Width (cm)	Wall thickness (cm)	Height (cm)
C	210,242.45E 6,037,636.95N	207.7	89.4	42.49	63.54

Figure 20: Table showing Site C details.

Structure C is located in the northeast of the research area and is comprised of presumably locally sourced field-stones from the nearby shoreline. Located approximately 18m west of Structure B, and approximately 15m east of Structure D, it sits in the hillside just east of the suspected water well. This structure is comprised of two distinct parts. The first being two rows of stone nestled into the northern hillside, separated by an approximate 75cm gap. The stone rows follow the angle of the hillside at approximately 30 degrees heading north. Mortar is visible on the rows of stone, and is a similar consistency and colour as the mortar used on Structure D. This mortar is a light white-grey colour (10YR 8/1 on the Munsell colour chart) and contains visible additives such as small shells and pieces of gravel. It appears as though this mortar was placed thickly and even covers some of the stones on the inside sides of the rows, but much has corroded away. Approximately 25cm east of the rows of stones lies another stone conglomerate situated in the hillside, with a large, flat stone creating an overhang, leaving a ~10cm space between the stone and the ground. The stones within this small overhang are a distinct green resembling copper patina (ranging between 5G 8/6, 5G 9/2 and 5G 4/4 1 on the Munsell colour chart). This colour does not appear anywhere else on site, only within the small overhang of Structure C. Some of the same mortar used in the row structure appears to be in use here, but there is such a small amount remaining that it is difficult to see its application.

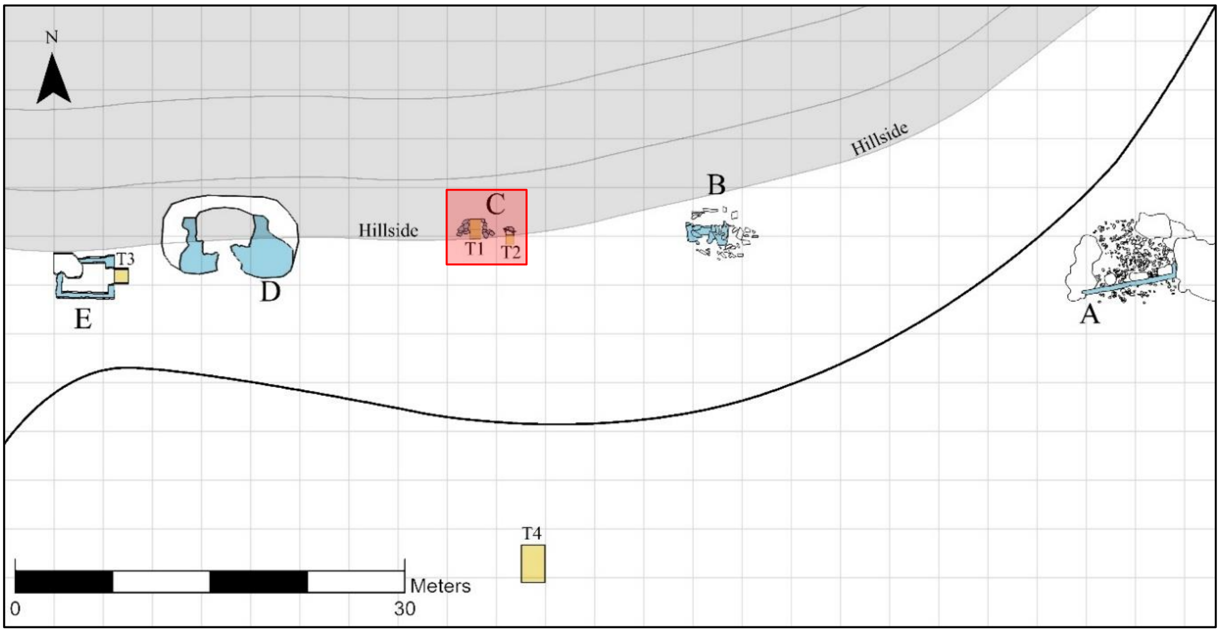

Figure 21: Location of Structure C within research area.

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Figure 22: photo of Structure C. Photo taken by Flinders University archaeology student Emma Webb.

4.1.5 – Structure D

Structure	Coordinates	Length (cm)	Width (cm)	Wall thickness (cm)	Height (cm)
D	210,210.01E 6,037,633.03N	514.28	384.95	91.29	204.22

Figure 23: Table showing Site D details.

This structure has a bowl-like shape and is nestled into the northern hillside. The field-stone walls extend back in a northern direction until they meet the hill, with the back of the structure either disappeared into the earth of the hill completely, or being comprised of the hill originally. Earth is also built up on the outer faces of the wall to resemble a mound. Notably different mortar was used for this structure, and is lighter in colour and comprised of organic matter such as shells. The shape of the structure, coupled with the outer layer of earth, shows evidence of a potential cool room. Situated ~5m east of structure E and ~15 west of structure C.

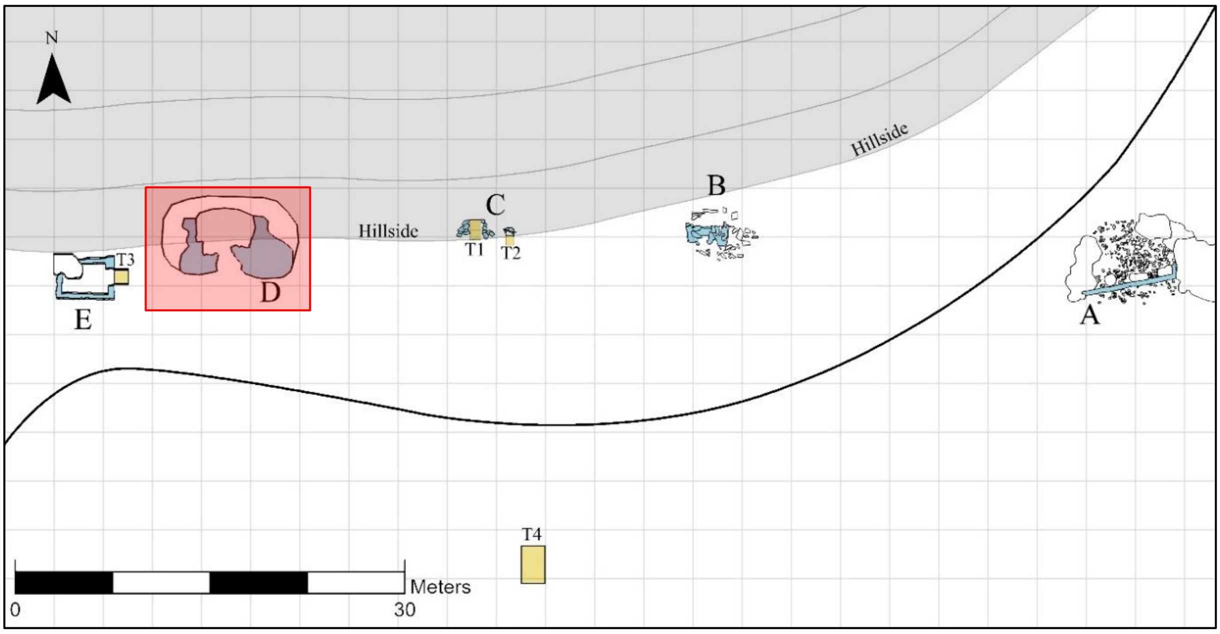

Figure 24: Location of Structure D within research area.

Figure 25: Photo of southern wall of Structure D.

Figure 26: Photogrammetric model of Structure D, planner view.

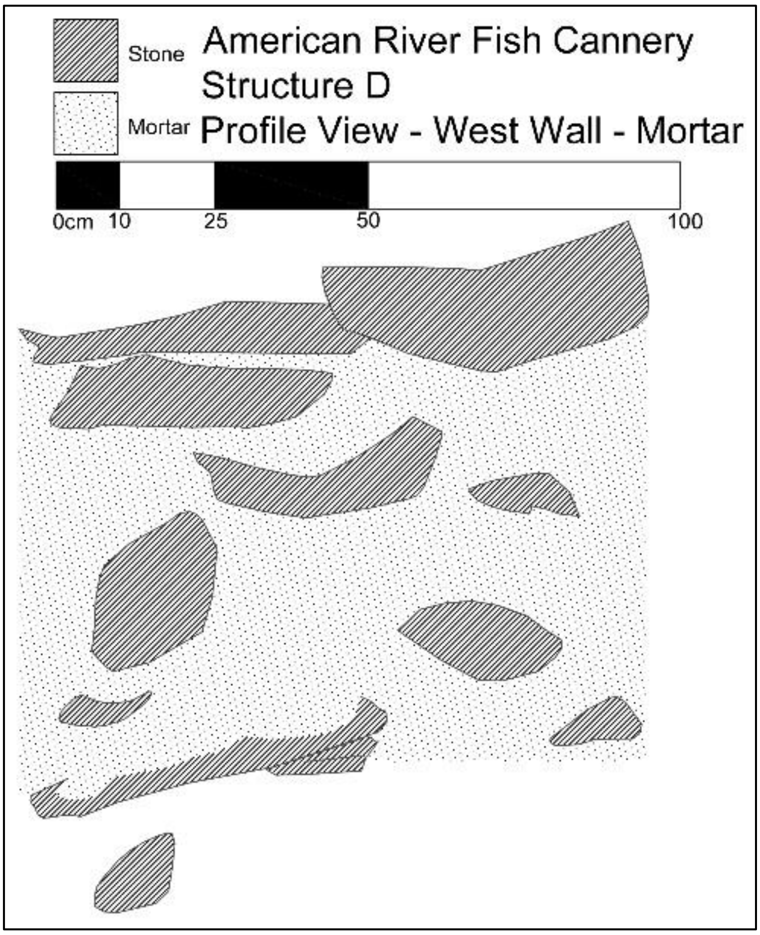

Figure 27: Illustration of western wall of Structure D, with a focus on stone and mortar layout.

4.1.6 – Structure E

Structure	Coordinates	Length (cm)	Width (cm)	Wall thickness (cm)	Height (cm)
E	210,210.01E 6,037,633.03N	434.33	323.53	44.63	68.24

Figure 30: Table showing Site E details.

The most defined structure within the research area. A rectangular structure with a 101cm gap that would have functioned as an entrance. Made from presumably locally sourced field-stones and held together by a red-brown mud mortar. Situated ~5m west of structure D.

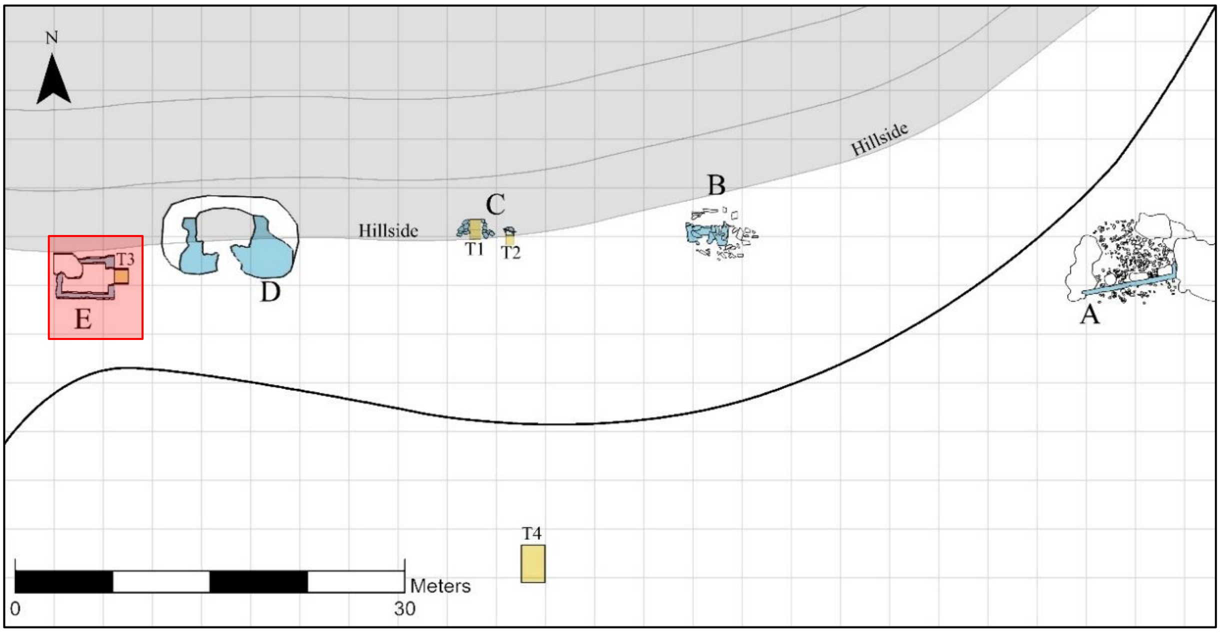

Figure 31: Location of Structure D within research area.

Figure 32: Eastern wall of structure D.

Figure 33: Southern wall of structure D.

Figure 34: Interior western wall of structure D.

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Figure 35: Aerial view of structures D (right) and E (left). Photo taken with DJI Mavic drone by Justine Buchler.

Figure 36: Photogrammetric model of structure E, planner view.

Figure 37: Photogrammetric model of structure E, perspective view of interior southern wall.

Figure 38: Photogrammetric model of structure E, perspective view of interior northern wall.

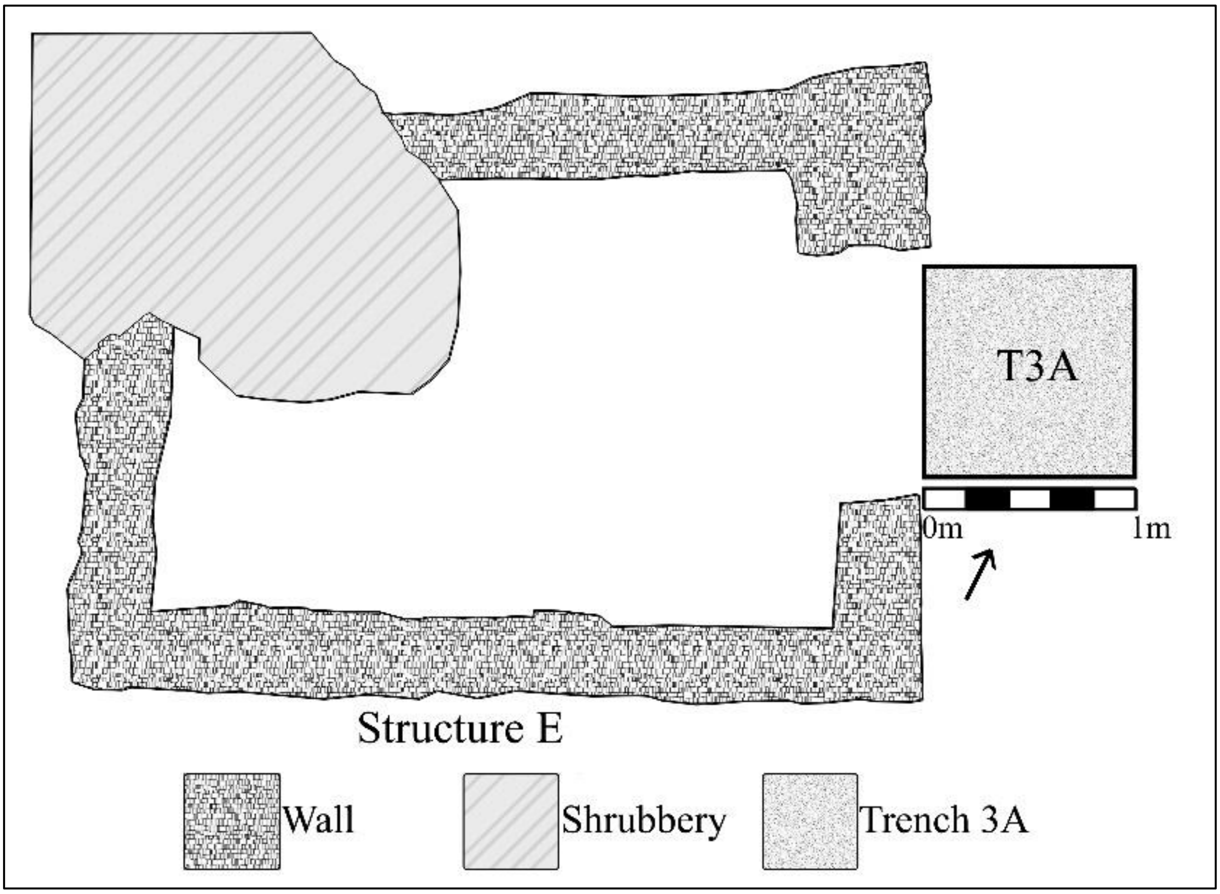

Figure 39: Planner illustration of structure E that shows the location of trench 3A.

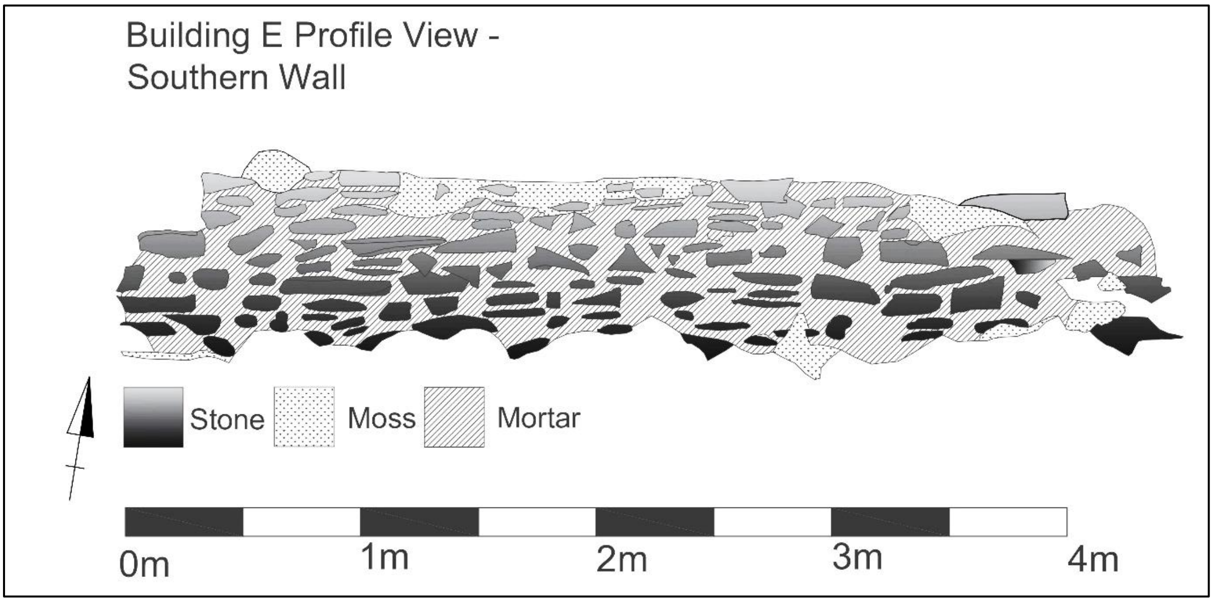

Figure 40: Illustration of structure E wall, southern wall.

4.2 – Trenches

Trench 1 and 2

Three small trenches (T1A, T1B and T2) were established at this structure during the field school. This structure was chosen as a candidate for trench excavations due to the unique appearance of the walls going into the hillside, as well as the presence of the overhanging section. Trenches T1A and T1B were placed between the two stone walls heading into the hillside, and trench 1B was placed at the opening of the overhang (see figure 41). Trench 1A and 1B measured 75cm by 80cm each, while T2 measured 25cm by 35cm as per the opening of the overhang. Trench T1A had context 1 reported but no further excavations were carried out due to time contraints. T1B, however, was excavated to context 6.

Mckenzie and co-athours (2004) label the soil morphology area of Kangaroo Island as 'PO3–Parapanic, Pipey, Semiaquic Podsol', and will be reffered to as PO3 onwards. Another important soil morphology label includes the costal areas of South Australia, notibly the York Peninsula area, and is reffered to as 'CA1–Shelly Calcarosol', and will be refferd to as CA1 onwards. This data will be used for a comparison to better analyse the soil morphology of the different trench contexts.

Context 1 (average of 1.3cm deep) included a base of dark brown loamy sand, which consistant with the data from Mckenzie and authors' (2004:302) work. The soil morphology profile for PO3 for the A1 horizons (0.00–0.12m depth) is described as 'black' (2.5Y 2/0) and as a light, loamy, single-grain sandy consistancy. In comparison, context 1 was reported to be a black brown (5YR 2/1) colour, with a loamy sand consistancy, which fits in conjunction with the data (see figure 44 for colour comparison). There is also evidence of yellow sand areas along the northern boundary as well as grey clay along the southern boundary. The soil pH for this context tested at an 8.5, which is signifigantly more alkaline than the Kangaroo Island PO3 A1 horizon area, which was reorted by Mckenzie *et al* (2004:302) as resting between 4.6

and 4.1. This difference in pH suggests a dry climate where ‘evaporation excedeeds rainfall for most of the year’, resulting in the alkaline levels from soluble salt accumulate ‘through weathering of primary materials’ (14). Another cause for the alkalinity would be the proximity to the saltwater inlet, resulting in a build up of soluble salts in the soil.This is where the comparison to other soil morphologies in South Australia comes in, as the pH for the CA1 (calcarosol soil) A1 horizon area is reported to sit betwee 8.1 and 7.7, which is closer to the pH recorded for this context. This soil moephology for CA1 involves high levels of calcium carbonate, particularly in the A1 horizons, or upper 0.2m level. Another featue of the CA1 soil is the presence of ‘illite, kaolinite and various amounts of randomly interstratified material in their clay fraction’ (142). This description is consistant with the presence of a grey clay within the southern border of the trench. In the centre of the trench lies a field-stone, which appears to be similar to the stones that structure is comprissed of, but smaller in size. This field-stone was subsequently removed in order to continue the excavation process. Small stones and organic matter such as roots are dispersed throughout the soil.

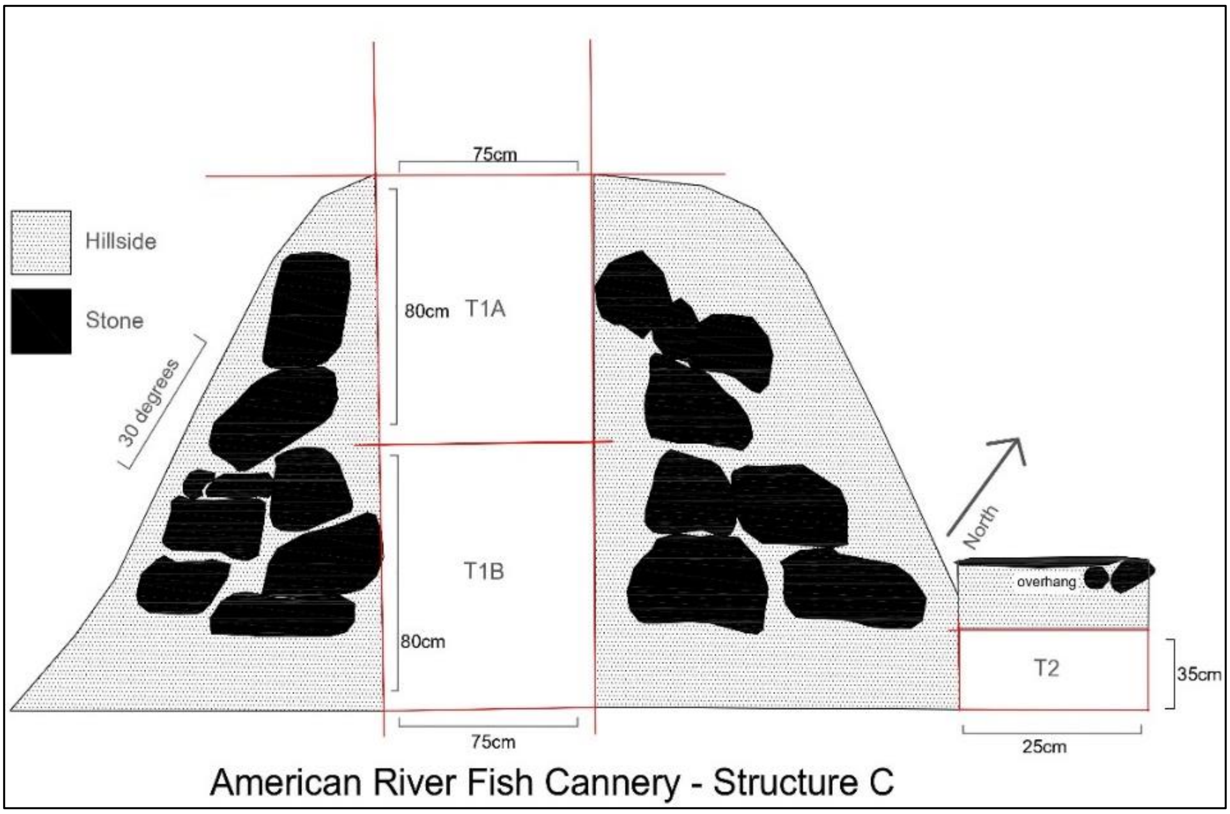

Figure 41: Illustration of locations of trenches within Structure C (not to scale).

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Figure 42: Trench 1B context 001 with field-stone in centre. Photo by Flinders University archaeology Emma Webb.

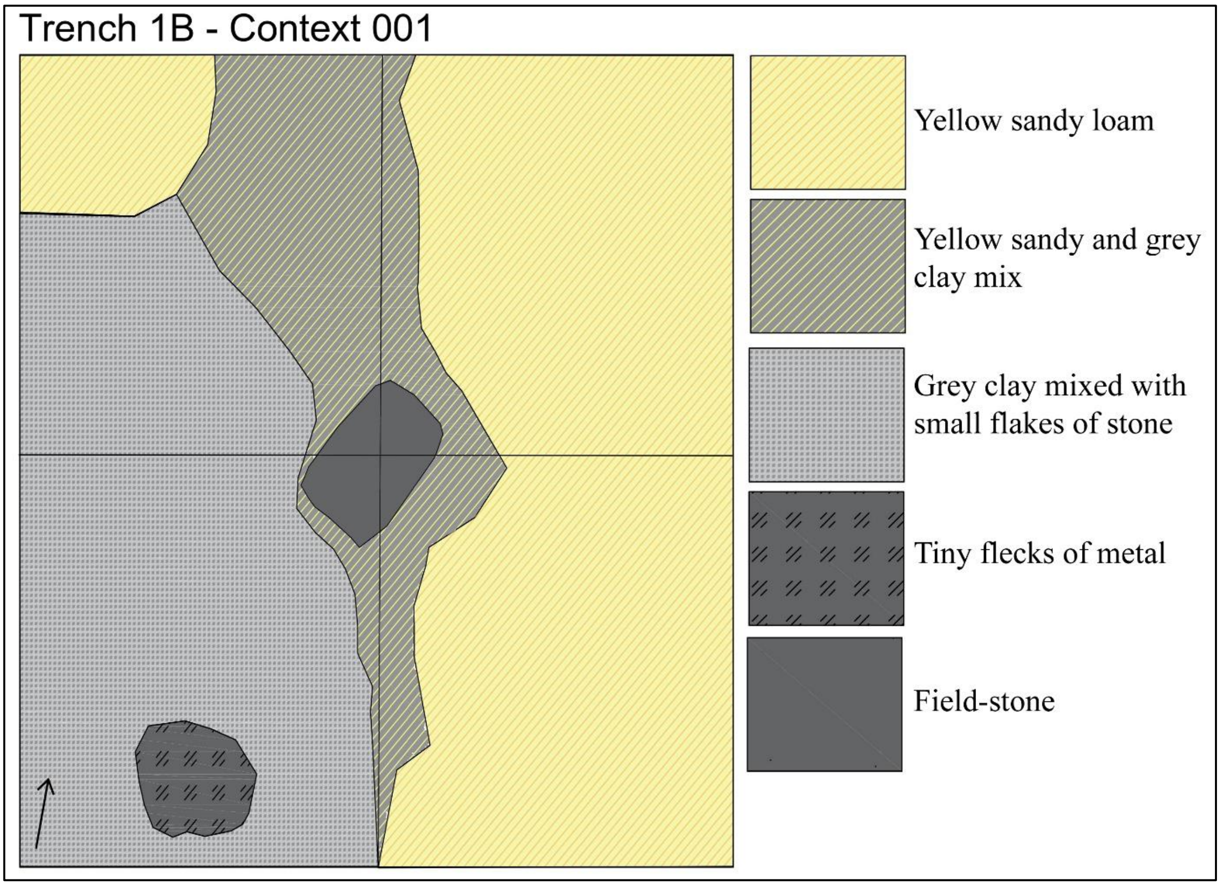

Figure 43: Trench 1B context 001 field illustration.

Figure 44: T1B – context 001 soil colour comparisons. Comparing with McKenzie *et al* (2004) soil profiles for areas PO3 (Kangaroo Island) and CA1 (Yorke Peninsula).

Context 2 (average of 1.3cm deep) consists of a moderate brown (5YR 4/4) silty loam, with hard grey clay featuring on the northern side of the trench. This is not cosistant with the data from Mckenzie *et al* (2004:145,302) work, which describes the A2 horizon (0.12-0.3m depth) for the PO3 area as being white sand (2.5Y 8/0). Comparing the soil colour with the CA1 area profile again, the colour of A2 horizons (0.02-0.22m depth) reveals a closer similarity (see figure 45 for colour comaprison). The textural description also follows closer to the data for the CA1 area, in contrast with the Kangaroo Island PO3 area, which was described on site and in Mckenzie *et al*s work as ‘loamy sand’ (144), as opposed to the PO3 area where the soil is described as sandy. The pH also follows more closely with the CA1 area, resting at quite a high alkalinity level of 9 pH, which is slightly higher than the CA1 reporting of 8.3 pH, but much higher than the PO3 data, which was reported to sit at around 4.3 pH. It is also important to note that this pH reading for T1B is also much higher than other samples collected on site (see figure 58), such as trench 3A context 001, which measured at 6.5 pH. This data indicates that the pH around Structure C is higher than both the Kangaroo Island PO3 area as well as other samples taken on site, which can be attributed to several reasons. The first being that the rest of the Kangaroo Island area experiences higher precipitation levels and an environment where ‘rainfall exceedes evaporation for several months’, as well as more organic breakdown within the soil (see figure 57). Although this explains the inconsistancies between T1B and the data recorded by McKenzie *et al* (2004:302), it dosent account for the difference between T1B and T3A, located roughly 25m south. Another find of note within context 002 would be finding small shards of charcoal, approximately 2cm in size. This indicates that organic matter was burned within the area, which supports the theory that there was either a firepit close by, or remenants from a firepit were dumped close by.

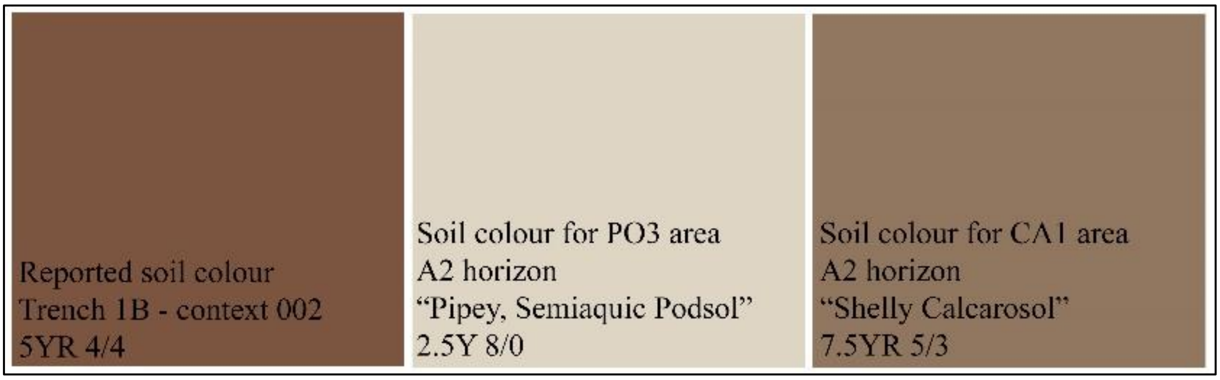

Figure 45: T1B soil colour comparison from context 002 comparing with McKenzie *et al* (2004) soil profiles for areas PO3 (Kangaroo Island) and CA1 (Yorke Peninsula).

Figure 46: T1B excavated to context 002.

Figure 47: Trench 1B context 002 field illustration.

Context 3 (average of 2cm deep) was described as dense, crumble, clay-like brown soil (10 YR 4/2) in the northern corner of the trench. Yellow-brown solil was also reported with a consistany closer to clay than sand. Small pieces of charcoal were found throughout this context along with various organic matter such as tree roots and small shells. The soil within this context measured as 8.5 pH, which is consistant with the other high alkalinity readings from this trench. McKenzie *et al* (2004) reported the PO3 levels for the A3 horizons (0.12 – 0.3m) as 4.7 pH, which follows the pattern for being signifigantly more acidic than the readings from T1B. Colour comparison also shows a deviation from the reported colour (see figure 48). Within this context small pockets of grey coloured soil were found, which possible indicates ash mixed in with the soil, in conjunction with more small pieces of charcoal. Soil was also noted to be highly compacted and very difficult to excavate.

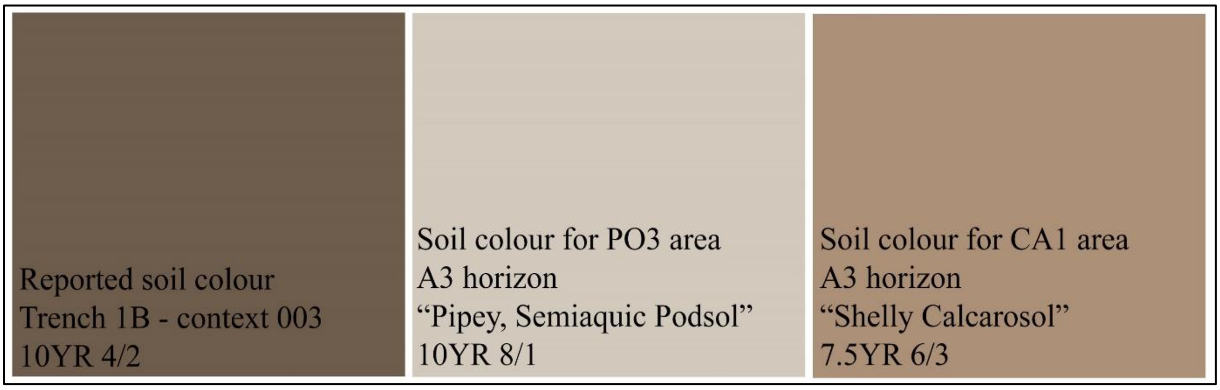

Figure 48: soil colour comparison from context 003 comparing with McKenzie *et al* (2004) soil profiles for areas PO3 (Kangaroo Island) and CA1 (Yorke Peninsula).

Context 4 (average of 1.8cm deep) was described as grey toned (10YR 4/2) rocky soil with a crumbly texture. Pieces of white mortar (10P 9/1) appear in this context following the angle of the hillside, as well as large fragments of charcoal near the eastern boundary of the trench. Small stones and shells are also dispersed throughout this context. Comparind the colour with the PO3 and CA1 area data, the soil colour now matches neither areas (see figure 49 for comparison). Similar coloured soil can be seen in McKenzie *et al* (2004:182) data collected for area CH9, which is described as ‘Bleached-mottled eutrophic, brown chromosol’. This soil is common in the Adelaide Hills reigon, and is often seen in ‘slopes of undulating low hills’. This soil profile begins with sandy loam and eventually becomes medium to light clay. The pH levels for context 4 was reported as 8.5 which, in comparison to the same horizon levels at PO3 (4.9 pH) and CA1 (9 pH) areas, seems to fit closer with CA1.

Figure 49: soil colour comparison from context 004 comparing with McKenzie *et al* (2004) soil profiles for areas PO3 (Kangaroo Island) and CA1 (Yorke Peninsula) and CH9 (Adelaide Hills area).

Context 5 (average 4.5cm deep) consists of greyish-brown (5YR 3/2) clay base interspersed with gravel, rocks and pieces of charcoal, as well as a base of mortar running through the middle. This context also included many small snail shells, some of which showed signs of being partially burnt, as well as ocre red stones. The soil was described as resting between slightly hard and hard. Charocal flecks were located on the southern side. Most notibly, a metal artefact was located alon the northern side of the trench, which will be later examined in section 4.3. Colour comparisons show a signifigant desaturation levels in comparison to previous data from PO3, CA1 and CH9. This is potentially due to the presence of ash throughout the soil, which is supported by the freagments of charcoal found within the trench. The soil pH level for this context sits at 9, which again is signifigantly more alkaline than the reported data (McKenzie *et al* 2004; ASRIS pH mapping 2014).

Figure 49: soil colour comparison from context 005 comparing with McKenzie *et al* (2004) soil profiles for areas P03 (Kangaroo Island) and CA1 (Yorke Peninsula) and CH9 (Adelaide Hills area).

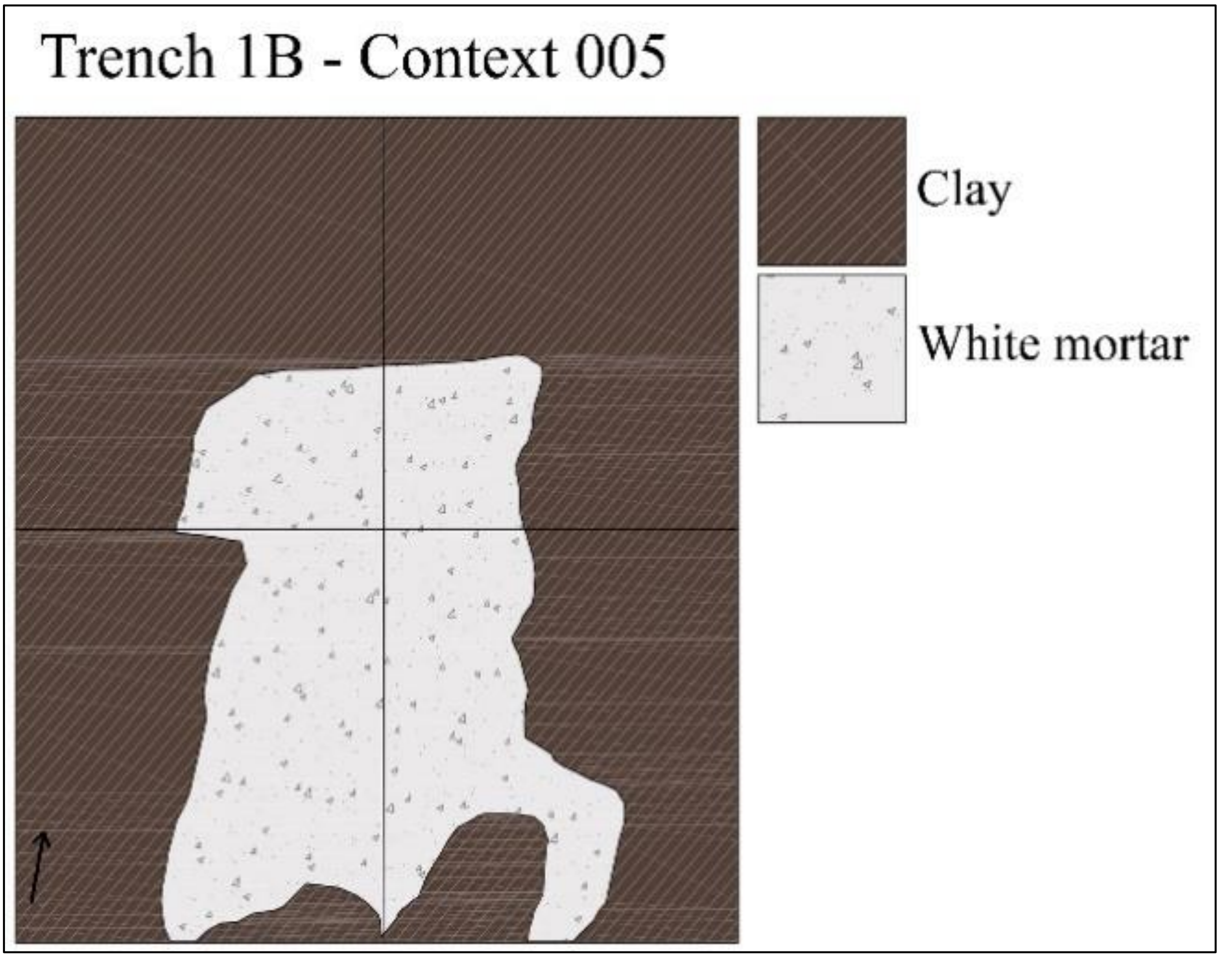

Figure 50: Trench 1B context 005 field illustration.

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Figure 51: Field work supervisor Heather Burke and Flinders University archaeology student Ayaka Nguyen excavating T1B context 005. Photo by Flinders University archaeology student Emma Webb.

The final context for trench 1B is context 6 (average 1.2cm deep). This context was described as as a mixture of yellow brown (10YR 2/2) clay and silty loam, with most of the trench being taken up by mortar that was revealed in previous contexts. The color of this context is also consistantly desaturated in comparison with the other soil areas. The soil pH levels were reported as 8.5, which is slightly less alkaline than the previous context.

Figure 52: soil colour comparison from context 006 comparing with McKenzie *et al* (2004) soil profiles for areas P03 (Kangaroo Island) and CA1 (Yorke Peninsula) and CH9 (Adelaide Hills area).

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Figure 53: Flinders University archaeology students Ayaka Nguyen and Jake Allen excavating T1B context 006. Photo by Flinders University archaeology student Emma Webb.

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Figure 54: Final closing photo for T1B context 006. Photo taken by Flinders University archaeology student Emma Webb.

By combining all evidence gathered from trench 1B and all of its separate contexts, and comparing it to relevant data (McKenzie *et al* 2004; ASRIS pH mapping 2014) it is possible to conclude that the pH for the soil in this particular trench is unusally alkaline (see figures ____ through 55–58 for pH comparisons). Higher alkalinity levels are a result of a breakdown of stone containing minerals such as calcium, magnesium, potassium and sodium. This suggests that the location of T1B was an area that was subject to a lot of foot traffic. Another possibility would be that the area adjacet was used as some kind of oven or fire pit. Evidence to supoprt this include fragments of charcoal found and possible ash mixed with the soil, which would result in a more alkaline pH reading as well as the more desaturated colour. It was also common practice from the 1860s to add calcium chloride to the cooking water, which 'raised the temperature of the water and increased the reliability of the canning process' (Busch 1981:97). This chemical is a type of salt, which would also explain the increase in pH if the water was discarded in the area. The presence of mortar following the angle of the hill suggests that that part of the structure was used as some kind of footpath, ramp, or enterance to a building that is no longer present. The function of the small rocky overhang directly adjacent that shows green discolouration is still undetermined, and would require chemical analysis for further answers.

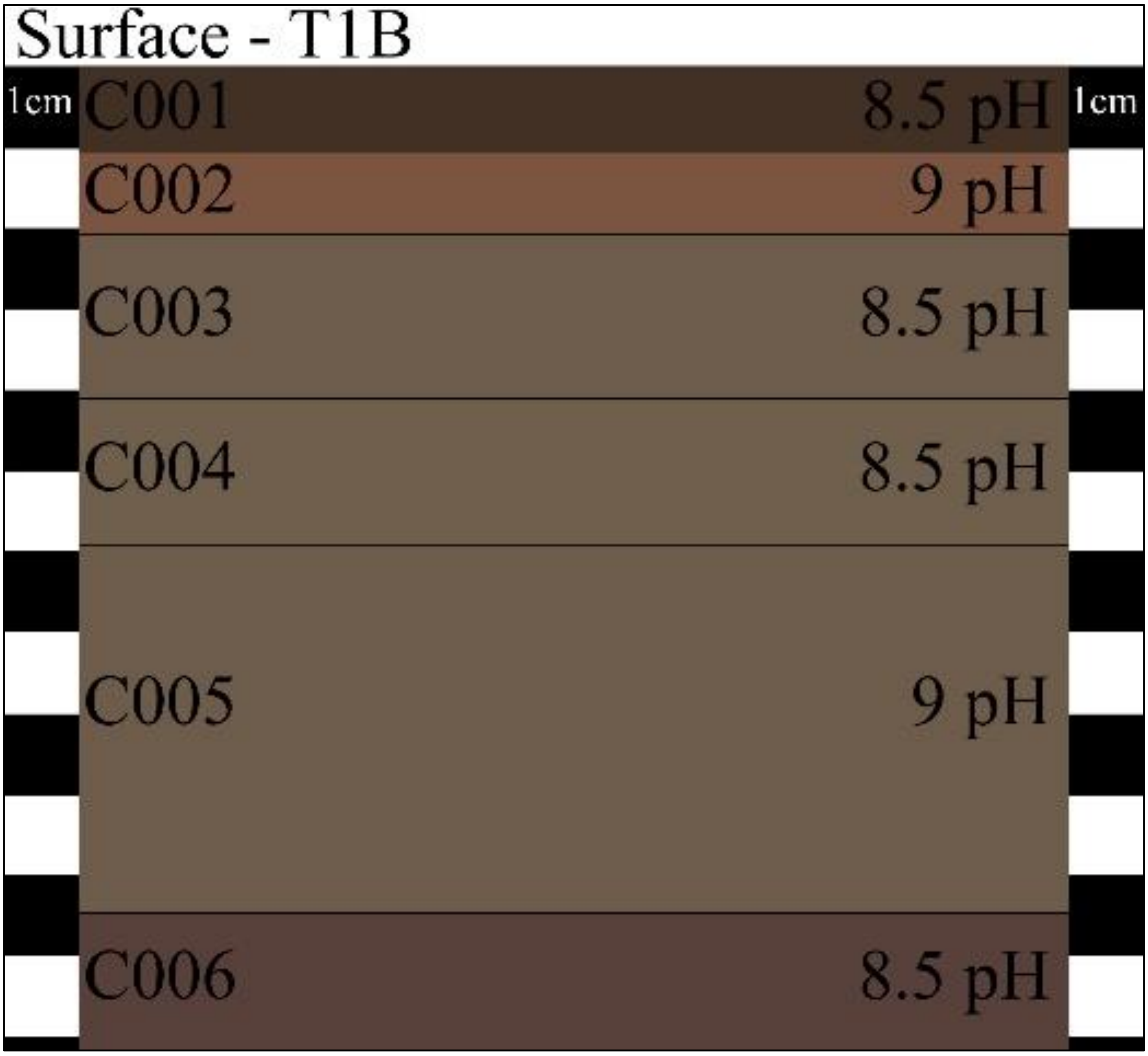

Figure 55: Illustration showing variations in colour and pH in comparison with context depth for trench 1B.

Trench 3

A 1m by 1m trench was constructed on the eastern wall of the structure, near the doorway. This location was chosen due to the increased chance for doorways or other high foot traffic areas to have cultural remains. This trench was labelled T3A and was excavated to context 1 only (average 4.5cm deep), due to time constraints for the field school. The soil colour for this context was reported as a deep brown (10YR 2/2). This colour matches the colour reported for T1B context 1, so it can be seen that the colour is fairly consistent between trenches. The pH levels, however, were reported as 6.5 pH, which is more acidic than what was reported for T1B (see figure 58 for pH comparisons). This is more in line with previous data collected in the area (McKenzie et al 2004; ASRIS pH mapping 2014)

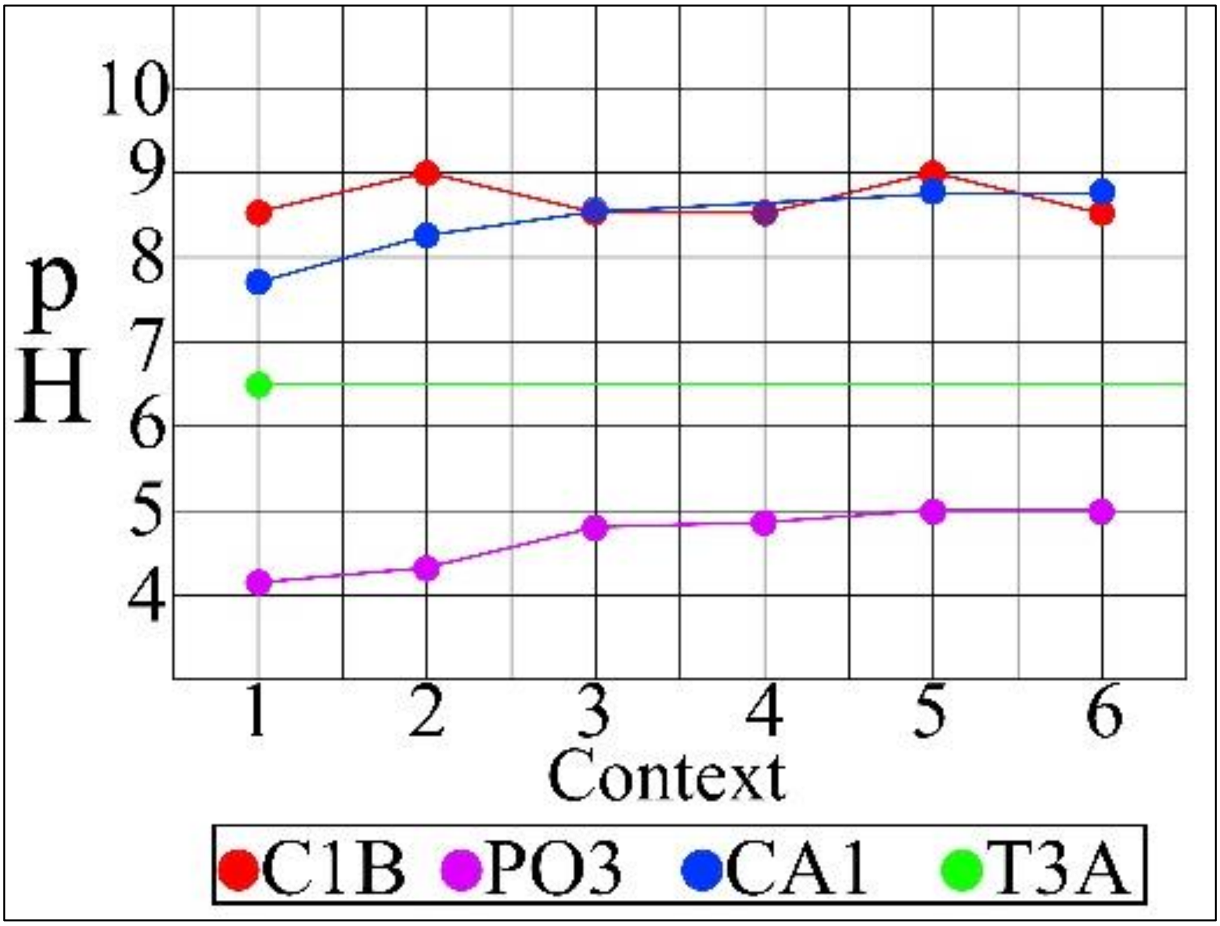

Figure 56: Graph depicting variations in pH and depth in comparison with soil data retrieved from McKenzie *et al* (2004) soil profiles for areas P03 (Kangaroo Island) and CA1 (Yorke Peninsula) and CH9 (Adelaide Hills area).

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Figure 57: Map showing pH scale across South Australia. Data provided by Australian Soil Resource Information System (ASRIS) and Commonwealth Scientific and Industrial Research Organisation (CSIRO).

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Figure 58: diagram demonstrating context pH on a pH scale, in comparison to soil data retrieved from McKenzie *et al* (2004) soil profiles for areas P03 (Kangaroo Island) and CA1 (Yorke Peninsula) and CH9 (Adelaide Hills area).

4.3 – Artefacts

During the 5 days of field school, a total of 873 individual artefacts were recovered of multiple categories. The following is a brief breakdown of the artefacts recovered. Artefacts were catalogued using the Heritage Victoria Catalogue Template on Microsoft Excel. This catalogue required the following data for artefact cataloguing and was modified slightly for site relevance: object name, object form, accession number, site name, site number, minimum number vessels, number of parts, object description, area, trench, feature/context, context description, function, sub-function, date excavated, material, sub-material 1–3, portion, percentage complete, body colour, length (mm), height (mm), width (mm), depth (mm), diameter, weight (g) and current location. All artefacts recovered during this field school are being stored at Flinders University, South Australia.

Metal

Of all the artefacts recovered, the metal disks were the most prevelant, making up 72.4 per cent of all artefacts. These small round metal disks were located where Trench 4 was placed. They are identicle and measure 40mm by 40mm with a radius of 20mm, and a thickness of 3mm. The total weight for the disks recovered is 4953.75g, with an individual disk weight 9.1g, making the total number of disks recovered approximately 544.36. The disks range from 100 per cent complete to indeterminate fragments. The metal disks appear to be made from an iron alloy and show signs of severe weathering and discolouration (2.5YR 2/5), with some disks forming a solid conglomeration together. It is predicted that these disks are apart of the canning process, perhaps to seal the steam hole once the boiling process is finished.

A total of 8 metal artefacts were found, totalling 0.9 per cent of all artefacts recovered. Of these metal artefacts, 37.5 per cent were classified as metal sheathing, possibly part of ship fittings. One of the sheathing artefacts were found in trench 2, while the rest were found trench 4. The total weight for the sheathings came to 378.8, making the average weight per piece 126.26g.

A total of 26 nails were collected from the site, totalling 2.97 per cent of artefacts recovered. A vast majority (22) were recovered from trench 4, with only one being recovered from trench 2 and 1B respectively. The nails recovered were comprised of a highly corroded iron alloy, and were all brown in colour. Of the 26 nails, 19.23% (5) were categorised as 100% complete, though all varied in size and shape. 3.84% (1) were categorised as being between 10–25% complete, 19.23% (5) were categorized as being between 26–50% complete, 23.07% were categorized as being between 50–75% complete, 19.23% (5) were categorized as being 75–90% complete, 7.7% (2) were categorized as being 90–100% complete, and another 7.7% (2) were indeterminate in their completeness. The total weight for the nail artefacts recovered was 184.2g, making each nail 7.08g on average. The heaviest nail found was in trench 4, weighing 26.7g and only being 50–75% complete. The lightest nail recovered that was 100% complete weighed in at 0.7g.

Another metal artefact, a metal washer comprised of iron alloy, was recovered from trench 4. The washer measured 24x14mm, with a width of 4mm. The total weight of the washer came to 1.8g, and was reported to be between 50–75% complete.

A fragment of wire was also recovered from trench 4, comprised of iron alloy and brown in colour. The wire was 120mm in length and weighed 19.7g.

Figure 59: Metal disk artefacts found on site in various levels of degradation.

Figure 60: Various metal nails found on site.

Figure 61: Metal artefacts found on site.

Figure 62: Metal artefacts found on site.

Figure 63: Metal artefacts found on site.

Figure 64: Metal wire artefact found on site.

Figure 65: Metal artefact found on site.

Figure 66: Metal artefact found in trench 4.

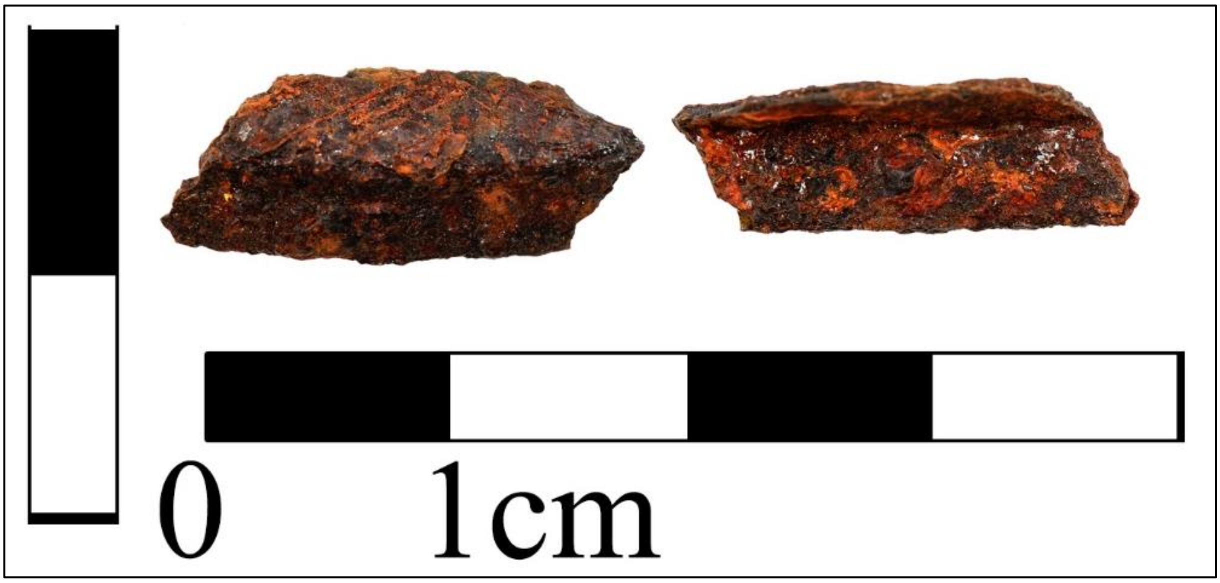


Figure 67: Metal artefact found on site, possibly metal sheathing.

Glass

Glass sherd artefacts formed 1.9 percent of all artefacts recovered, with an approximate Minimum Number of Vessels (MNV) totalling 3. The total weight of the glass sherds recovered is 98.1g. It is predicted that the glass recovered are from bottles. The colours for the glass consist of two different shades of olive green (10Y 4/4; 7.5GY 3/6), and one colourless set.

Figure 68: Green coloured glass sherds found on site.

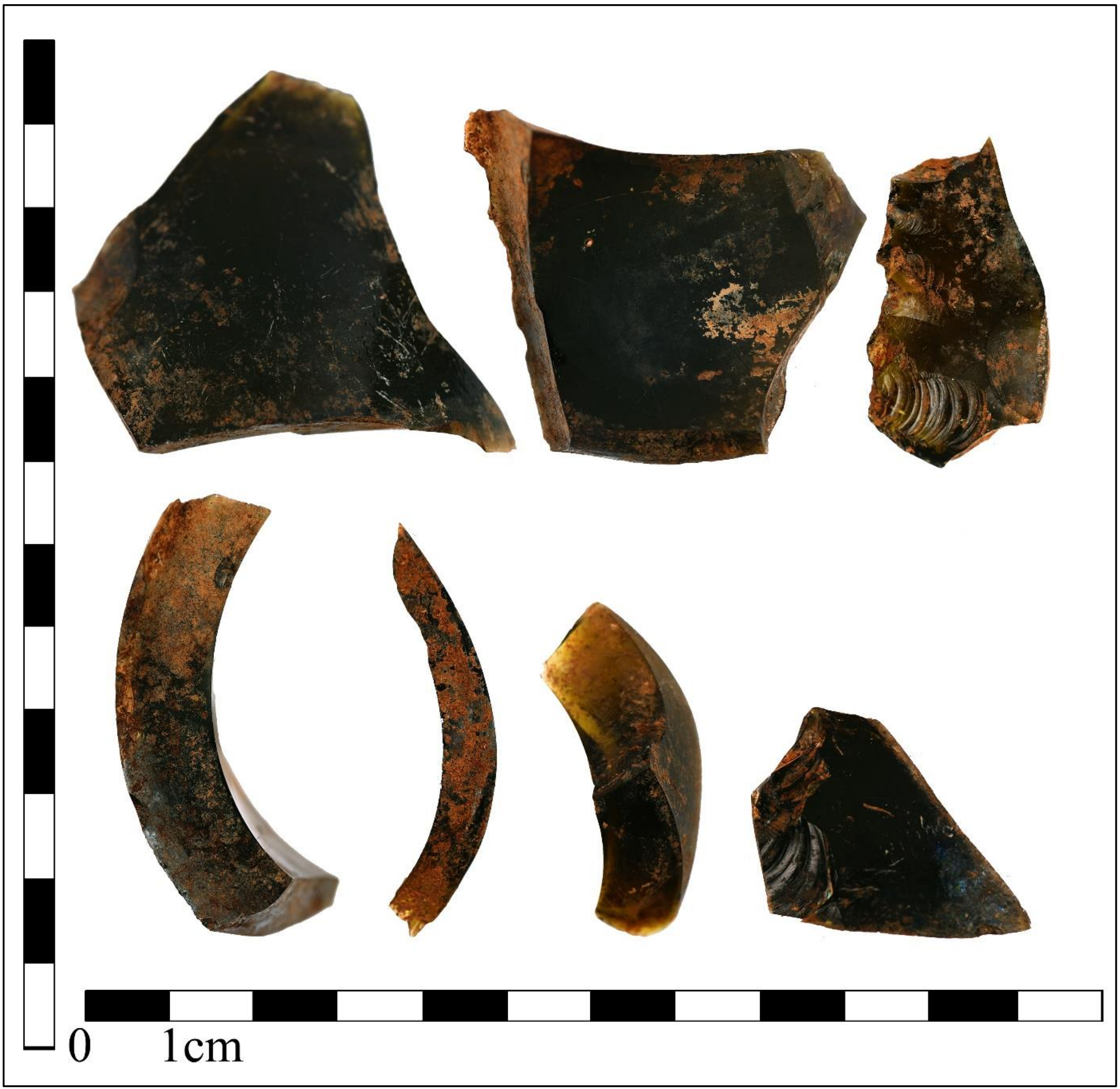


Figure 69: Green coloured glass sherds found on site.

Charcoal

Charcoal fragments recovered came to 0.6 per cent of total artefacts, with 6 pieces being recovered from both trenches 4 and 1B. The total weight for the charcoal fragments was 3.8, making each fragment, on average, approximately 0.63g.

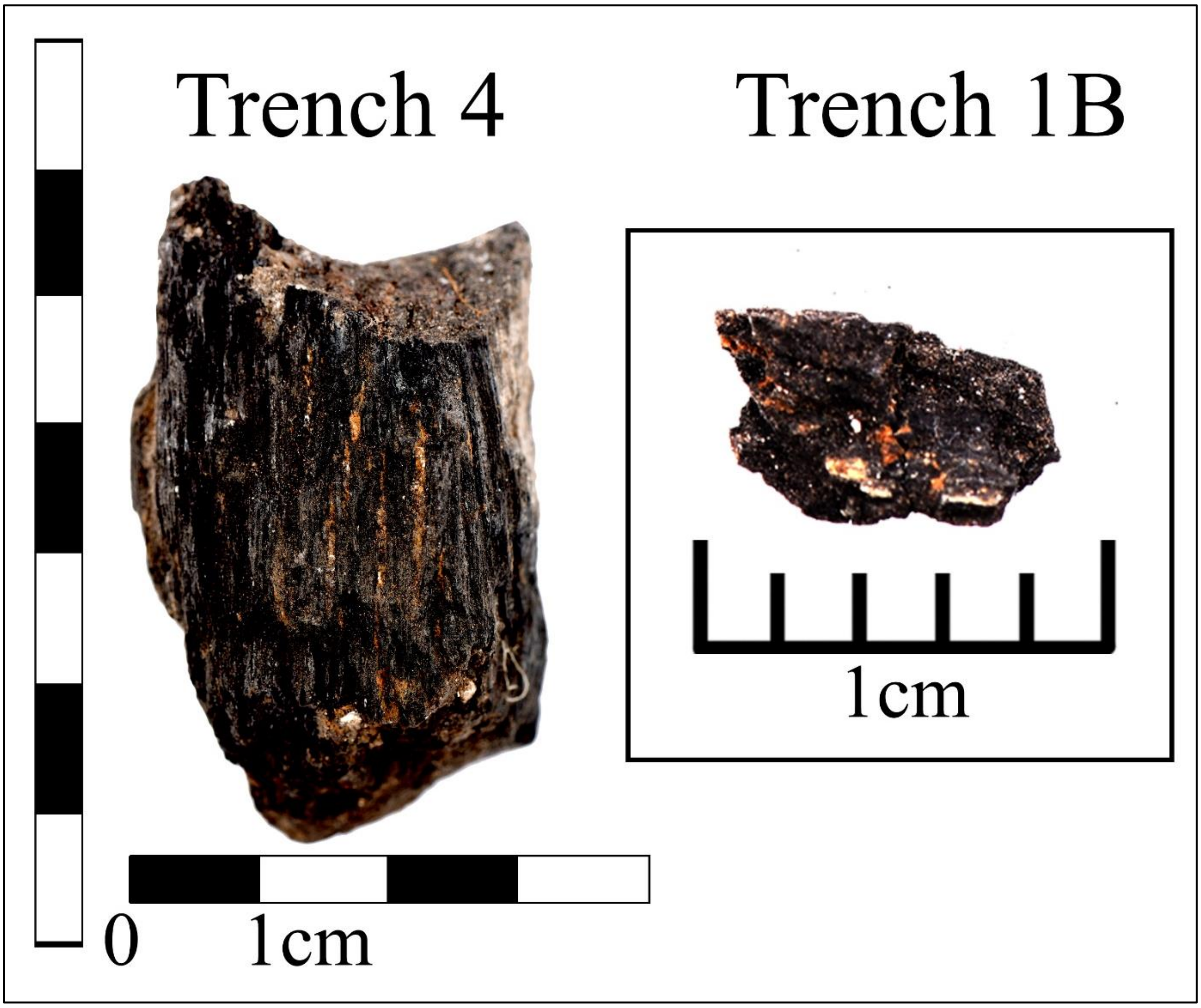


Figure 70: Charcoal fragments from trench 1B and 4.

Brick

Brick sherds made up 0.6 per cent of artefacts recovered, with 6 shards being recovered from trench 1B. The total weight of brick shards found is 9.8g, averaging 1.63g each. The red brick sherds found do not match any of the structures on the site, which are all comprised of assumably local field-stones.

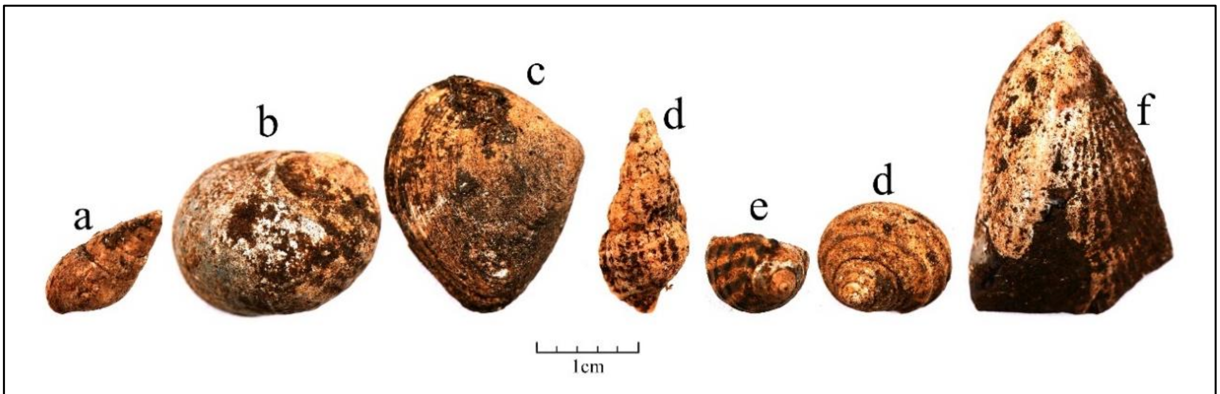
Mortar

A total of 78 mortar fragment were recovered from both trenches 1B and 2, totalling 8.93 per cent of all artefacts recovered. Of the 78 fragments, 67 were recovered from trench 1B, while 11 fragments were recovered from trench 2. The total weight of all the mortar fragments came to 662.8, which means each piece totalled 8.5g each. All mortar recovered was white in colour, matching the mortar found on structure C and D.

Figure 71: mortar fragments recovered from trench 1B and 2, matching mortar from structure C and D.

Shells

A total of 43 shell pieces were discovered on site, making up 4.9 per cent of artefacts found. Shells were recovered across both trench 1B and trench 4, with the majority, 40 or 93.2% being from trench 1B. The shells found ranged from a white to a brown colour, and weighed 0.88g each on average. Using multiple sources (Davies *et al* 2002; Crawford 2020; Queensland Museum Network 2020; Beechey 2020) an attempt was made to identify the shells that were recovered Trench 4, with the data being presented in figure 72. After identification, it was important to identify where the shells are commonly found, as any non-local shells would be considered diagnostic. It was found that the shells were all endemic to Australia, as well as being commonly found in the Kangaroo Island area (Beechey 2020).



a) *Hinea brasiliana* (yellow-coated clusterwink); b) *Polinices duplicatus* (moon snail); c) *katelysia scalarina* (sand cockle); d) *Fusus schoutanicus;* e) *Turbo undulatus* (turban shell); f) *Crossea concinna;* g) *Brachidontes erosus* (Beaked Muscle).

Figure 72: Shell assemblage gathered from site. An attempt to identify shells were made using data from Davies *et al.* 2002, Crawford 2020, Queensland Museum Network 2020 and Beechey 2020.

Wood

A total of 7 wood samples were collected, making up 0.8 per cent of artefacts recovered. 5 samples were taken from trench 4 while one sample was taken trench 1B. The total weight for the wood samples came to 10.8g, which meant that the average sample weighs 1.54g each. Most wood found can be associated with the surrounding flora, with no indication that the samples are cultural remains.

4.4 – Tin can artefact analysis

The method for canning used on site was the 'hole-and-cap' method, where tins of fish were boiled and sealed with a dob of solder (Jolly 2017:60; Busch 1981:95; Rock 1987:12). The construction method for theses cans was completed completely by hand, and involved a piece of tin plating being 'bent into shape on a roller and the overlapping edges were soldered together' (Busch 1981:96). After this process, two round disks were cut for the top and bottom and soldered to the body, leaving a circular hole about an inch in diameter where the food was fed through and later capped (Busch 1981:96). This style of can manufacturing was very prevalent during the nineteenth century, with the style of canning changing very little during this time. In order to examine some of the artefacts found at the American River cannery site, it is important to examine similar can designs from the same time period so as to better understand the function of artefacts found.

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Figure 73: Examples of "hole-and-cap" style can, from Rock's (1987) work *A Brief Commentary on Cans*:7;12.

Below are four examples of nineteenth century cans, which are a part of the Jim Rock Can Collection assemblage, presented by the Southern Oregon University Laboratory of Anthropology, made available by Southern Oregon University Hannon Library and presented on the Southern Oregon Digital Archives (SODA) (https://soda.sou.edu/).

Can Type 1 – Jim Rock Historic Can Collection – Southern Oregon Digital Archives

Type:	Meat tin			
Shape:	Oblong			
Material:	Tin plate			
Closure:	Hole-in-cap			
Seam:	Double seam	Side seam		
Dimensions:	Height: 1.74cm	Length: 7.93cm	Width: 6.19cm	Cap Diameter: 4.92 cm
Date:	ca. 1872			

Figure 74: Table with details of can type 1 from Jim Rock's historic can collection presented by the Southern Oregon Digital Archives.

Figure removed due to copyright restriction.

Figure 75: Photos of can type 1 from Jim Rock's historic can collection, retrieved from the Southern Oregon Digital Archives.

Can Type 2 – Jim Rock Historic Can Collection – Southern Oregon Digital Archives

Type:	Can		
Shape:	Cylindrical		
Material:	Tin plate		
Closure:	Hole-in-cap		
Seam:	Lap side seam		
Dimensions:	Height: 11.74cm	Diameter: 9.04cm	Cap Diameter: 5.71cm
Date:	ca. 1880s		

Figure 76: Table with details of can type 2 from Jim Rock's historic can collection presented by the Southern Oregon Digital Archives.

Figure removed due to copyright restriction.

Figure 77: Photos of can type 2 from Jim Rock's historic can collection, retrieved from the Southern Oregon Digital Archives.

Can Type 3 – Jim Rock Historic Can Collection – Southern Oregon Digital Archives

Type:	Corn Can		
Shape:	Cylindrical		
Material:	Tin plate		
Closure:	Hole-in-cap		
Seam:	Lock side seam		
Dimensions:	Height: 11.58cm	Diameter: 8.57cm	Cap Diameter: 4.76cm
Date:	ca. 1880s		

Figure 78: Table with details of can type 3 from Jim Rock's historic can collection presented by the Southern Oregon Digital Archives.

Figure removed due to copyright restriction.

Figure 79: Photos of can type 3 from Jim Rock's historic can collection, retrieved from the Southern Oregon Digital Archives.

Can Type 4 – Jim Rock Historic Can Collection – Southern Oregon Digital Archives

Type:	Meat Can			
Shape:	Oblong			
Material:	Tin plate			
Closure:	Hole-in-cap			
Seam:	Lap side seam			
Dimensions:	Height: 1.58cm	Height: 8.25cm	Width: 5.87cm	Cap Diameter: 4.92cm
Date:	ca. 1872			

Figure 80: Table with details of can type 4 from Jim Rock's historic can collection presented by the Southern Oregon Digital Archives.

Figure removed due to copyright restriction.

Figure 81: Photos of can type 4 from Jim Rock's historic can collection, retrieved from the Southern Oregon Digital Archives.

Of the 4 nineteenth-century cans selected from the collection for comparison, the two cans especially designed for meat were cans 001 and 004, both of which feature an oblong shape. The size of the cap for both cans came to 4.92cm, which is only 9.2mm larger than the metal disks found in trench 4. Based on this comparative data, it is predicted that the metal disk artefacts discovered on site were a part of the hole-and-cap sealing process for canning.

Figure 82: Example of metal disk scatter found on site. One large mostly intact disk can be seen, with smaller broken shards of similar disks scattered around.

4.5 – Summary of site layout

The research area and extent of the ARFC site is approximately 100m by 100m. This site has two primary physical boundaries affecting the site layout, the steep hillside to the north, and the shoreline to the south. The five buildings on site run relatively straight from east to west along the base of the hill, with the entrances sitting along the same axis line. There appears to be a close relationship between structure E and structure D, due to the combination of proximity and doorway location. Due to the shape of structure D in conjunction with the mortar style, as well as the personal communication provided by Gladys Thomas (2021), it is predicted that this structure functioned as a cool room. Thomas, a resident of Kangaroo Island, writes that the 'cellar was dug out of the side of the hill but was not cool enough to keep unprocessed fish for very long'. Therefore, this can be predicted that structure E, situated with the doorway facing east to the entrance of structure D, was a storeroom or preparation room with a relation to the cool room that would be structure D (see figure 83).

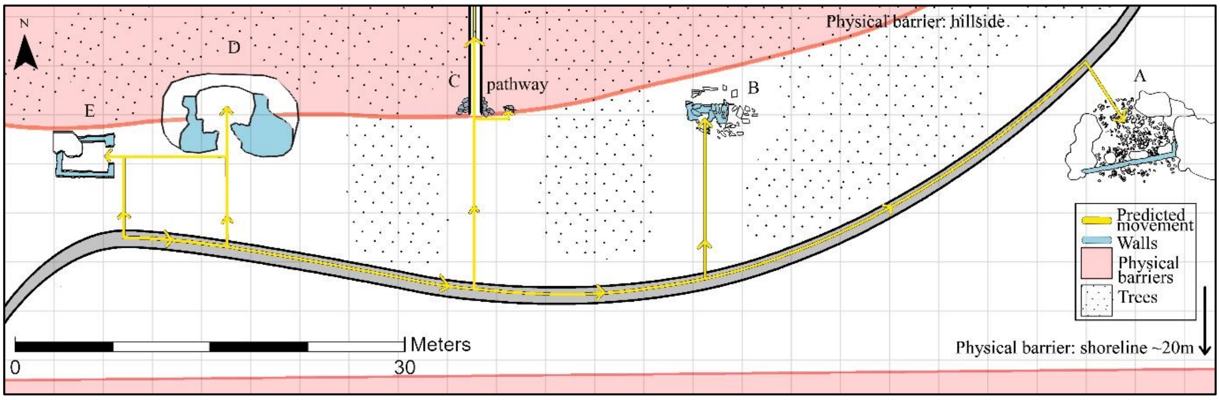

Figure 83: Map of predicted movement within the ARFC site.

Structure C creates a break in the physical barrier of the hillside via the mortar pathway discovered while excavating trench 1B. Further excavation is needed to see the extent of this pathway, as well as to determine where it is connected to. Dense trees lay between D and C, rerouting the predicted movement to the indicated pathway.
The function of structure B is still unknown, and further excavation around the area is required. It is predicted that the surrounding stones were once part of the structure, but without further analysis a definitive conclusion cannot be made. While neighbouring structure C, there is no direct pathway to the structure due to dense trees. This indicates that a direct pathway between C and B would not be necessary, otherwise a path may have been created. It is predicted that structure B could have been used as an oven or chimney, but the lack of physical evidence such as burn marks, as or charcoal were not present, which indicates again that further investigation is needed. A oven would have been required to be located very nearby to the other work areas, which makes structure B a possible candidate (Tutty 2001:107).

Structure A contained the highest amount cultural remains compared to the other structures. A majority of the surface artefact scatter around this area was glass sherds. As previously stated by cannery worker Nils Ryberg, beer and other alcohol was prevalent on site, and is even partly owed as its downfall (Carter 1978:20). The presence of a higher quantity of cultural remains, coupled with the buildings size and shape indicate that it may have functioned as a place for the workers to rest, eat and drink. The south-eastern wall would have acted as a windbreaker for the prevalent south-eastern winds that are common in the area, therefore also providing a safe place on the site in case of inclement weather or strong winds.

A boat launch area would have also been present at the site, due to the fishing activities required for the factory, but this has yet to be discovered. A survey of the shoreline was performed but further analysis would be required.

It is predicted that the can soldering took place outside, or perhaps under a temporary shelter that is no longer present. This is due to the high amounts of metal cap disks found in trench 4 throughout each context, indicating that they were used often in that area.

In regards to spatial organisation and the relationship between function and form, it can be said that the ARFC site suggests an emphasis on function and productivity. It doesn't appear that the workers stayed on site, as it was noted by in the *South Australian Register* (9 April 1888:6) that there were fourteen people working there, and none of the structures indicated a workers sleep area. It would have also been predicted that more cultural remains related to the home, such as ceramics, cutlery or vessels would have been discovered. While glass sherds were located, the amount doesn't seem to indicate long-term living within the area for fourteen men who had a penchant for drinking.

The ARFC site is different from most industrial sites, as it doesn't appear to have a 'main house', where management can oversee the workers, nor does it have surrounding walls. The main house was a common occurrence on industrial sites, acting as a division of labour between workers and management as well as a vantage point to oversee the workers. Walls around industrial factories act as an enforcing perimeter for the site, keeping a visual border between the factory and the outside world (Jones 1982), as well as a way to manipulate and control access (Tutty 2001:116). It is possible that due to the natural topology of the landscape, coupled with the remoteness of the site, that Shand felt that walls were not needed. It is unclear what the division of labour looked like within the ARFC, but the lack of enforcing architecture indicates that all the staff shared labour (Tutty 2001:115).

CHAPTER 5 – CONCLUSION

The aim for this thesis was to identify the factors that influenced the development of the American River Fish Cannery site, through either an ideological or functional lens. While the spatial organisation of the site leans towards purely functional, it is not possible to make any definitive conclusions until further field work has been completed. The historical lead up to the development of the site required many factors to come together: Captain Flinders mapping the coast of Kangaroo Island, the establishment of the South Australian Company, reports reaching the mainland of an abundance of fish, the influx of Chinese immigrants, and many other factors.

The development of a simple site plan based on GIS data and further analysis has shown how the canning factory may have been used by those that occupied the space by focusing on natural physical barriers and built space ideologies. The research shows how the site may have functioned, and while the site plan is still in infant stages of development, it provides an example of how a small-scale nineteenth century maritime industry site within South Australia may have functioned.

5.1 Discussion

This thesis set out to answer the following question:

What factors, either functional or ideological, influenced the development of the industrial spatial elements of the American River Fish Cannery?

One of the aims of this research was to attempt to explain the spatial organization of the American River Fish Cannery site. This was done by examining previous literature that relates to spatial analysis of industrial sites and employing similar analytical methods to data collected from the ARFC site. By combining previous literature with the data collected and examined at the ARFC site, an attempt was made to examine the functional spaces and predictive movement patterns at the factory. This data culminated in the results displayed in section 4.5, as displayed by a predictive site use map (figure 83). Although basic analysis was performed, limited data from the ARFC site meant that a detailed spatial analysis would only be possible with further research and excavation of the site, as detailed below in section 5.2.
Another aim for this research was to investigate the contributing elements that influenced the spatial aspects of the ARFC site. This aim, similar to the previous aim, was done by exploring previous literature and employing similar techniques to the ARFC site. Contributing elements to the spatial aspects were detailed in section 4.5. Results shown via a predictive movements map (figure 83) that shows contributing elements that had the potential to influence the way the factory was developed and used. Similarly to the previous aim, in order to achieve a better understanding of the spatial elements of the site, further investigation is needed, as detailed in section 5.2.
Another aim of this research was to explore spatial elements to determine if they had functional or ideological applications within the site. Using work from Tutty (2001), who explored similarly small-scale factories in Adelaide, South Australia, using a spatial analytic lens, elements of the site were analysed for function. Comparisons to other common factory elements were analysed and an emphasis on functionality was discovered for the site. Many elements of the ARFC site were decidedly practical, as detailed in section 4.5. Although an

analysis of the functionality of the site was performed, much the same as the previous aims, further research and investigation is required, as detailed in section 5.2.
The final aim of this research was to delineate the historic factors that resulted in the establishing of the American River Fish Cannery. Of all the aims, this was the most successful. Using many different sources, such as historic newspapers and pervious literature, a historic timeline of events was able to be constructed. This timeline shows the events the led to the construction of the factory, from a macro (the founding of South Australia as a colony) to a micro (personal quotes from workers at the ARFC site) point of view. While more research will always be useful, it is believed that the accurate and detailed timeline detailed in chapter 2 successfully delineated the historic factors that resulted in the establishment of the American River Fish Cannery.

5.2 Recommendations for future research

In order to consolidate the results of the investigation, further archaeological evidence is required. Future research should focus on more building plan reconstruction in order to further ascertain the exact layouts and functions of each structure. While informed predictions can be made about each structure on site, further excavation would help to solidify the functions.

Some recommendations for future investigate would include:

- Erecting a trench at structure A in order to search for further cultural remains and other clues about the buildings function and use.
- Extending the previously excavated trenches at structure C in order to ascertain the extent of the mortar path that was discovered, as well as figuring out where it may lead to. This would be an important factor as it influences how the site was used and how its inhabitants moved around it. An estimation was made within the provided site layout (figure 83) but further examination of physical evidence is required.
- Erecting a trench at structure B in order to ascertain the function of the structure. While predictions were made in regards to the function, little evidence was provided to back up the claim.
- Locating the boat launch site. This would allow for more information to be added to the site layout, as well as influencing how the site was used and moved through. It is also important to examine this site for any important cultural remains. Ideally, a maritime survey along the shore of the research site would be conducted, as well as trenches adjacent to the boat launch site.

In summary, it is hoped that the results of the research conducted around the American River Fish Cannery site within this thesis has resulted in a greater understanding of nineteenth century colonial maritime industry sites within South Australia. The research conducted has allowed for a thorough historic timeline to be developed for the site as well as the field work allowing for the creation of a site layout. While further investigation is required to fully understand the American River Fish Cannery site, it is hoped that this preliminary research will act as a backbone to further research conducted.

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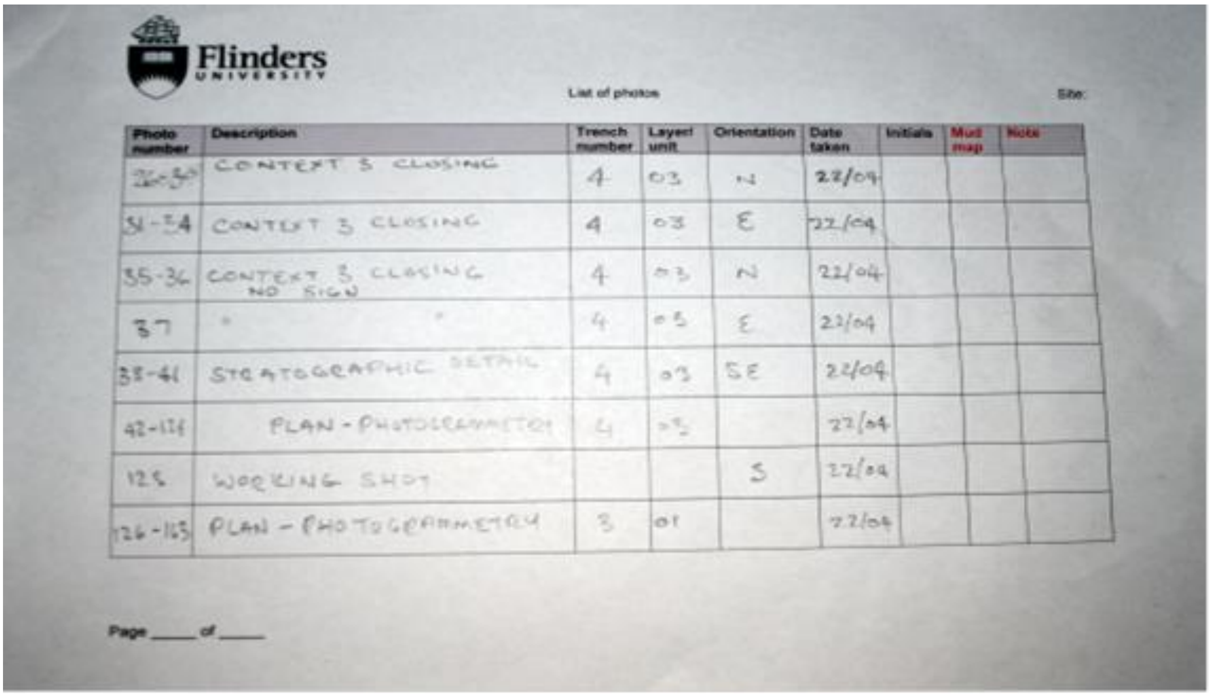
APPENDICES



Flinders University

List of photos

Site:

Photo number	Description	Trench number	Layer/ unit	Orientation	Date taken	Initials	Mud map	Note
26-30	CONTEXT 3 CLOSING	4	03	N	22/04			
31-34	CONTEXT 3 CLOSING	4	03	E	22/04			
35-36	CONTEXT 3 CLOSING NO SIGN	4	03	N	22/04			
37	" "	4	03	E	22/04			
38-41	STRATOGRAPHIC DETAIL	4	03	SE	22/04			
42-124	PLAN - PHOTOGRAMMETRY	4	03		22/04			
125	WORKING SHOT			S	22/04			
126-163	PLAN - PHOTOGRAMMETRY	3	01		22/04			

Page ____ of ____

Figure 84: Example of photography recording sheet used by Flinders University archaeology students on field school.

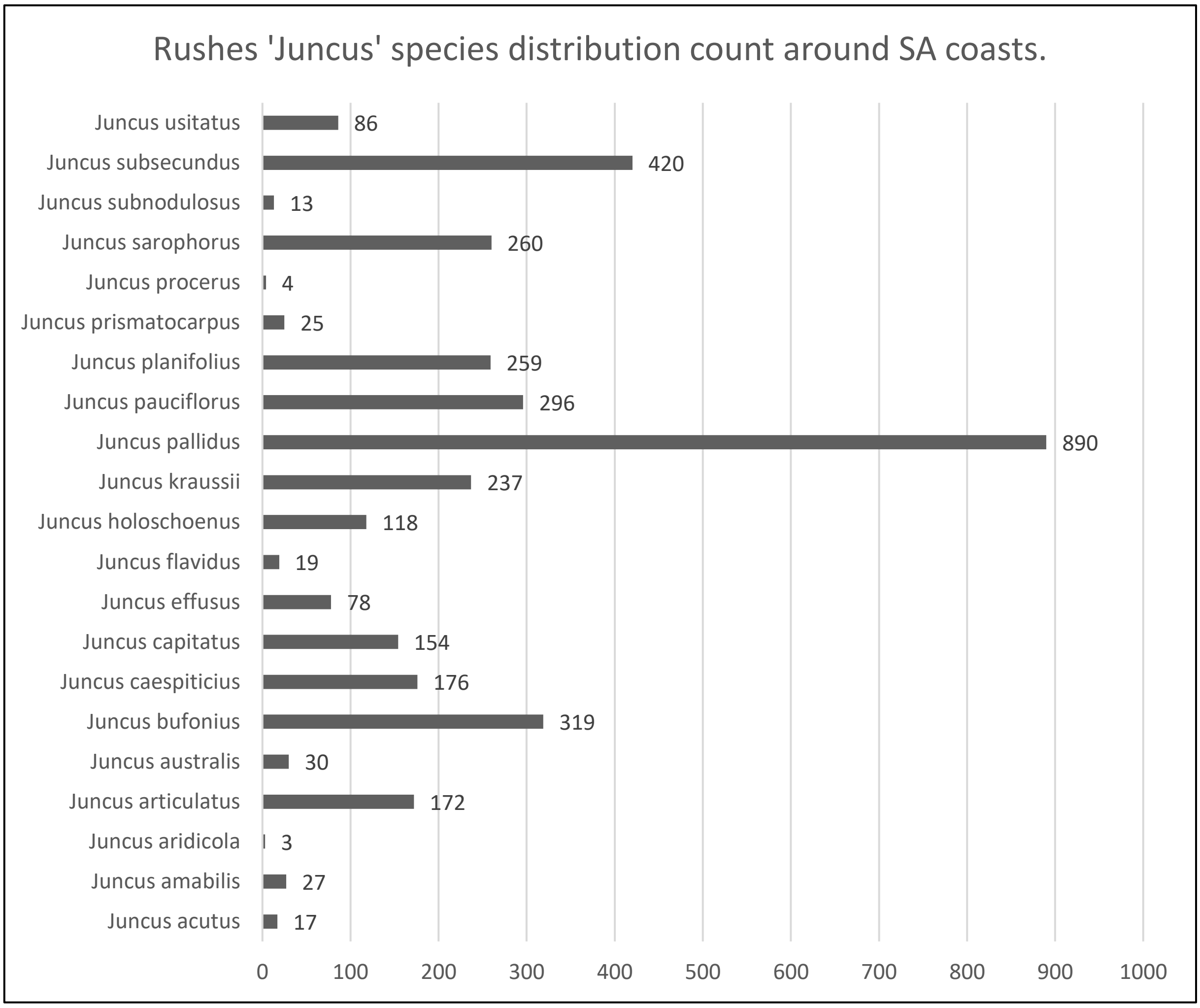


Figure 85: 3,603 species of rushes surveyed along the SA coast. Most common type shown to be *Juncus pallidus* (890 samples), followed by *Juncus subsecundus* (420 samples). Data retrieved from Atlas of Living Australia (ala.org.au) 12 July 2022.