Conservation Plan

19 February 2012

CLIPPER SHIP 'CITY OF ADELAIDE' LTD.

ABN 65 134 550 388

PATRON: HIS EXCELLENCY REAR ADMIRAL KEVIN SCARCE AC CSC RANR GOVERNOR OF SOUTH AUSTRALIA

"*… Nor is speedy progress the only aim, for in her passenger appointments every means have been taken to ensure perfection. The main saloon is a handsome appointment decorated with white and gold, and furnished with settees, tables and sideboard of solid teak."*

'Shipping Intelligence', *South Australian Register*, Adelaide, South Australia, 8 November 1864

P.O. Box 535 • Kent Town • 5071 • South Australia
Email: support@cityofadelaide.org.au
www.cityofadelaide.org.au

The CLIPPER SHIP 'CITY OF ADELAIDE' LTD. is a non-profit organisation established for the purposes of preserving the splendid clipper ship 'City of Adelaide'.

FOREWORD

H.R.H. DUKE OF EDINBURGH CONFERENCE

In September 2001, His Royal Highness The Duke of Edinburgh convened a conference in Glasgow to consider the future for the world's oldest clipper ship, the *City of Adelaide*. The Scottish Maritime Museum invited the Australian National University to provide the conference with an Australian scholarly perspective. In response, three notable historians of Australia and the Commonwealth wrote a letter which quintessentially captured the importance of the *City of Adelaide*:

> ...
>
> *The 'City of Adelaide' is an extraordinarily important part of our common heritage. As the only surviving sailing ship built to give regular passenger and cargo service between Europe and Australia, she represents a whole foundation era of Australian economic and social history. It is difficult to imagine a more vital icon of the making of modern Australia, and of the relationship between Britain and the Australian colonies. We write to assure you that your deliberations will be followed closely by the Australian community, and to emphasise that the heritage with which you are entrusted is of undoubted international significance.*
>
> *It is especially fortunate that the 'City of Adelaide' has also been the subject if exciting and penetrating historical research over the last decade. This scholarly investment could be conservatively costed at hundreds of thousands of pounds, yet it has been made freely and generously available. Such research means that we possess a detailed historical context for restoring, understanding and interpreting the 'City of Adelaide'. The fact that such a meaningful cultural and scholarly investment has already been made in the ship increases her value, heritage significance and tourist potential immeasurably.*
>
> ...
>
> Professor Geoffrey Bolton, AO, Murdoch University
> Professor David Carment, AM, Northern Territory University
> Professor Tom Griffiths, Australian National University
>
> 30 August 2001

DR. ALAN PLATT, FRED WALKER AND BOB SEXTON

Over several decades, Dr. Alan Platt, Fred Walker and Bob Sexton have amassed much of the "exciting and penetrating historical research" that exists on the *City of Adelaide* today including early versions of a Conservation Plan. This Conservation Plan makes extensive use of the work of these three notable gentlemen to the extent that referencing their valuable contributions would unduly encumber the readability of this document. Their significant contributions are duly acknowledged with sincere gratitude.

Clipper Ship 'City of Adelaide' Ltd.

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1.0 Executive Summary

In 1989, the world's oldest clipper ship was caught on a rising tide, was flooded, and written off for insurance purposes. The sinking culminated 125 years of unbroken service. From its construction in 1864, the *City of Adelaide* has served in a wide variety of roles: passenger ship, migrant ship, cargo ship, hospital ship, drill ship, and entertainment ship. From 1989, the *City of Adelaide* has been rescued (twice), stabilised and restoration commenced. This Conservation Plan for the *City of Adelaide* therefore takes up from a 'work in progress' as the ship is about to be 'rescued' for a third time.

This plan covers the principles, policies, and processes for the conservation and, in particular, the preservation of the *City of Adelaide*. This plan does not cover the details of the rescue and transportation operations, which are covered in a separate Transportation Plan. This plan only introduces some broad issues of interpretation, the main details of which are covered in a separate Interpretation Plan.

The plan is dynamic, and while providing clear steps and direction regarding necessary actions, it will be updated as appropriate.

Figure 1: The *Carrick* (*City of Adelaide*) partially submerged on the Clyde River.

2.0 Introduction

2.1 Conservation Principles

In 2010, the United Kingdom's National Historic Ships published a book titled *Conserving Historic Vessels: Volume 3 – Understanding Historic Vessels*.(1) The book is a guide for vessel custodians to navigate the complexities of conserving historic ships for future vessels. It has guided this Conservation Plan.

Conserving Historic Vessels presents ten key conservation principles:

1. Historic ships should be conserved according to their significance.
2. The aim of conservation is to retain the significance that has been identified and pass it on to future generations.
3. All aspects of significance should be dealt with in a considered and thoughtful way.
4. Rigorous maintenance is a key to good conservation practice for all vessels.
5. Make and keep records throughout, including recording all changes to the vessel and what happened to any material which has been removed.
6. When in doubt, do the absolute minimum. Conservation demands a cautious approach to change.
7. Replace like with like wherever possible.
8. Conjecture should be avoided in all conservation projects. If uncertain, don't do it.
9. The best knowledge, skills, techniques and types of management available and affordable should be employed in all types of conservation.
10. Do things in a logical order, at set out in this Conservation Plan.

These principles guide this Conservation Plan and shall guide all preservation and maintenance activities, as well as guide future editions of this plan.

2.2 Conservation Route

The *Conserving Historic Vessels* book provides a flow chart 'route' to guide the heritage vessel custodian through a logical sequence of steps in developing a Conservation Plan. That logical sequence has been used as the base structure of this document. Not all steps in the *Conserving Historic Vessels* book are included. The book includes various branches to suit different conservation choices such as preservation by record, versus conservation, versus replication.

This Conservation Plan also discusses a second Conservation Gateway where a decision on preservation, restoration, reconstruction, adaptation, or any combination of two to four of these.

The route selected for this Conservation Plan is one based primarily on preservation which will be explained in the 'Gateway' sections. Thus the route followed, and hence structure of this plan, is as follows:

- Evaluation and Acquisition.
- Stabilisation.
- Understanding.
- Assessing Significance.
- First Conservation Gateway.
- Risk Assessment.
- Second Conservation Gateway.
- Maintenance Processes.

3.0 Evaluation and Acquisition

3.1 Evaluation

The significance of the *City of Adelaide* is not in doubt. It is:

- the world's oldest surviving clipper ship,
- one of only two surviving composite clippers (the other is the *Cutty Sark*; built 1869),
- one of only four surviving sailing ships to have taken emigrants from the British Isles to any destination in the world – the others are the *Edwin Fox*, *Star of India* and *SS Great Britain* (also a steamer),
- the last survivor of the timber trade between North America and the United Kingdom,
- part of the National Historic Fleet of the United Kingdom and listed in the prestigious Core Collection of the United Kingdom.

When considering whether a vessel suitable for including on the UK's National Register of Historic Vessels, a ship needs to meet these criteria:(1)

1. What is the vessel's ability to demonstrate technological innovation?
   - ✓ The *City of Adelaide* was built in the years prior to Lloyds publishing their rules for composite ship construction and thus is an important example in the development of composite ships – see also Section 6.2.
2. Is the vessel a good example of type (vessel design) and construction?
   - ✓ The *City of Adelaide* is one of only two surviving composite clippers and is in reasonably good condition for a vessel of its age – see also Section 6.3.
3. Is the vessel a good example of a maritime function (purpose for which it was built)?
   - ✓ The *City of Adelaide* is the only surviving purpose built passenger sailing ship – see Section 6.4.
4. Does the vessel exhibit a positive aesthetic impact?
   - ✓ Clipper ships are regarded as being the most graceful of all the sailing ships. The *City of Adelaide* will need considerable husbandry to improve its cosmetic appearance – see Section 6.5.
5. Does the vessel have historical associations with significant people, places and events?
   - ✓ The *City of Adelaide* is the only surviving sailing ship built to give regular passenger and cargo service between Europe and Australia, and represents a whole foundation era of Australian economic and social history – see Section 6.6.
6. Does the vessel have significant socio-economic associations?
   - ✓ The *City of Adelaide* is regarded as a vital icon of the making of modern Australia, and of the relationship between Britain and the Australian colonies – see Section 6.7.
7. Can the percentage of the original fabric (with reference to that surviving at the end of the vessel's working life) be estimated?
   - ✓ The *City of Adelaide* has its original hull planking and composite framing and some of its deck timbers are believed to be of 19th century origin – see Section 6.8.
8. What is the vessel's age?
   - ✓ As of May 2011, the *City of Adelaide* built in 1864 is 147 years old – see Section 6.9.
9. How scarce are the examples of this vessel type or construction?
   - ✓ The *City of Adelaide* is the elder of only two surviving composite clipper ships – see Section 6.10.
10. How scarce are examples of this maritime function?
    - ✓ The *City of Adelaide* is the only surviving purpose built passenger sailing ship – see Section 6.11.

3.2 Acquisition

The acquisition of the *City of Adelaide* becomes a firm commitment to responsible stewardship and good preservation practice.

4.0 Stabilisation

4.1 Responsible Stewardship

Once acquired for preservation, responsible stewardship commences and the ship must be safeguarded from damage or loss. Measures need to be undertaken to safeguard the ship before and during preservation treatment.

The immediate stabilisation issues for the *City of Adelaide* in South Australia are identified as:

- Biohazard and pathological contaminants – primarily an Australian Quarantine and Inspection Service issue before the ship's entry to Australia.
- Structural support – primarily a transit issue, and then it becomes a structural settling issue.
- Hull planking fasteners.
- Wood rot.
- Rainwater protection.
- Drying out.
- Ultra-Violet protection.
- Public relations and public perceptions.
- Fire and vandalism protection including monitored alarms.

4.2 Biohazard and Pathological Contaminants

The main pathological concern is the risk of bird flu. Pigeons are known to have roosted in the *City of Adelaide* while the ship has been in Irvine, Scotland.

The Australian Quarantine and Inspection Service (AQIS) require a biohazard risk assessment of the hull to be undertaken before export to Australia. While bird flu is the major threat, the risk assessment will also look at fungi, insects, small animals, bird debris, weed seeds, plant material, soil and faecal contamination. An appropriately skilled service provider in Scotland should be employed with experience in pests and the pathological concerns that might be present. This is likely to cost of the order of£8k -£10k. This needs to occur in warmer Scottish months when 'bugs' are not dormant.

The ship will likely need to be cleaned for bio-hazards to meet AQIS requirements by a specialist cleaning company in Scotland with a certificate provided. Cleaning is likely to require the removal of detritus such as pigeon faecal matter and then a steam or disinfectant clean. Cleaning for biohazards is also desirable from an Occupational Health and Safety point of view for either deconstruction or removal of whole ship.

4.3 Structural Support

The 'weakest link' in the structure of the *City of Adelaide* is considered to be the fasteners that secure the thick timber planking to the iron frame. There is evidence on the clipper that these have corroded, or the adjacent iron frame has corroded, to the extent that some planks have 'sprung'. Flexing of the clipper during transport between Scotland and Australia could place stresses on the fasteners causing planks to 'spring' with the potential of loss of structural integrity in the region.

The cradle used to transport the *City of Adelaide* needs to be stiff enough to take the major flexing loads experienced during the move, without transmitting the loads to the clipper.

After location in South Australia, the clipper's structure will likely settle as gravity applies its steady force in a different direction from the 1:20 slope of the previous twenty years on the Irvine Slipway. Additionally, there will be differences in the support provided by the old cradle and that of the new cradle.

Readily applied countermeasures will need to be on hand to keep planking in place to avoid any domino effects.

4.4 Hull Planking Fasteners

Any early conservation issue will need to develop a strategy for maintaining the integrity of the planking fasteners. Such strategies might include:

- Passivating any dissimilar material corrosion problems.
- Installing modern fastening systems in as unobtrusive fashion as possible.
- Removing, melting down, and recasting existing metal components – to reinstate the original fastener by re-using the original material.

4.5 Rainwater Protection

Whereas saltwater can be beneficial for preserving timber, rainwater is an anathema and has been a problem for the *City of Adelaide* in Scotland. Recognising that South Australia's climatic conditions are not as severe as those in Scotland, rainwater protection will still be essential.

A protective cover was installed on the *City of Adelaide* in Scotland. While totally out of character for a heritage ship, it is a necessary 'medicine' to stabilise the ship.

Figure 2: The Protective Cover Installed in Scotland.

To remove the protective covering would require a costly renovation of all of the upper deck areas to make them water proof and able to manage any storm-water. It must be conservatively presumed that funds will not materialise for such work in the short term, or ever, and the covering will be a long term feature on the clipper.

With the covering also comes risk of wood rot occurring beneath the covering. Ongoing monitoring and maintenance will be necessary.

4.6 Wood Rot and Drying Out

Wet rot and dry rot flourish in humid conditions. South Australia's climate will be far more beneficial to the *City of Adelaide*, than the wet conditions in Scotland and high Adelaide temperatures can also act as a heat sterilizer. Dry warm air, on the other hand will be harmful from the perspective of the timbers drying out.

Once rot gets a toehold in wood it is difficult to cure completely -- it is like a cancer. Digging out the rotted wood will still leave spores and water in the sound wood. Commercial products sold to treat dry wood to prevent rot are completely ineffective against established rot in wet wood because they are dissolved in petroleum solvents and oil and water do not mix.(2)

There are two commonly available inexpensive materials that will kill rot in wood and prevent its recurrence. First, there are borates (borax-boric acid mixtures) which have an established record in preventing rot in new wood and in killing rot organisms and wood-destroying insects in infested wood. Second, there is ethylene glycol, most readily available as auto antifreeze-coolant. Glycol is toxic to the whole spectrum of organisms from staphylococcus bacteria to mammals.(2)

Both borate solutions and glycol penetrate dry and wet wood well because they are water-soluble; in fact, penetration by glycol is especially helped by its extreme hygroscopicity -- its strong attraction for water. For both, the fact that they are water-soluble means they are not permanent solutions to rot in wood that is continually exposed to water.(2)

Applying these chemicals in localised areas on the *City of Adelaide* may be possible, subject to Environment Protection Agency (EPA) restrictions. However, applying chemicals over large areas[1] in the outdoors environment that the the *City of Adelaide* will be displayed in is likely to be problematic because of EPA restrictions.

Saltwater is a natural biocide and, subject to EPA restrictions, might be cheaply accessed from the Port River at Port Adelaide to wet down the timber of the *City of Adelaide*.[2] However, the hull and decks of the *City of Adelaide* are not watertight and saltwater could make its way inside where it would be harmful to metal items such as the iron frames.

Wetting down the hull with a discrete saltwater drip or spay system around the periphery of the hull could offer a means of applying saltwater to serve the dual purposes of biocide treatment and a means to keep the hull planks from drying out. To do so would require the early action of re-caulking the hull to keep the water from wetting-down outside.

An early strategy for treating rot and managing drying out, along with the requisite capital investment, will need to be an early priority. Expert advice will need to be sought.

[1] Such as was undertaken on the *Vasa* and *Mary Rose.*

[2] Returning the water to the river is likely to be the main EPA issue. Recirculating, or solar desalination for watering the grounds may be necessary.

4.7 Ultra-Violet Protection

The protective covering on the *City of Adelaide* will provide ultra-violet (UV) protection to the upper surfaces of the clipper, but the cover itself will be subject to UV light and will need to be monitored.

Whether the stronger UV light in Australia poses any significant conservation risk will need to be researched and also monitored.

If UV light represents a material hazard to the clipper, potential remedies may be to:

- Paint the hull.
- Erect a tension fabric shade over the hull.

4.8 Public Relations and Public Perceptions

Public support for the *City of Adelaide* is critical for the long term success of the project. A 2000 Scottish Maritime Museum (SMM) press release, designed to instill a sense of urgency in the public at large, described the clipper as "rotting away". Since that time, the *City of Adelaide* has been branded as the "rotting hulk" and impressions have been engendered that there is not much of the ship left, and what little is left is not worth conserving. This highlights the power of the media, and how perceptions can influence the public.

After years rotting in a shipyard, our clipper finds a new champion

MAN WITH A CAUSE: Prince Philip is behind the campaign to save the remains of historic clipper City of Adelaide, rotting away on a slipway in the Port of Irvine in Scotland.

By STUART INNES

Figure 3: *The Advertiser* Newspaper Article, Adelaide, South Australia, 23 August 2001.

The transport of the *City of Adelaide* between Scotland and Australia will be an event that will attract worldwide media attention. Images and vision generated during this time will last for a long time in the archives of media organisations and in the long term memory of the public audience.

Messages generated at this time (and all times) must be very positive and demonstrate the viability of the project. This greatly increases the potential of attracting philanthropic support and attracting tourists to inspect the clipper. Media coverage and public relations therefore is one of the most critical components for the long-

term conservation of the *City of Adelaide*. Indeed, the very transfer of the *City of Adelaide* from Scotland to Australia requires government to government transactions and politicians are very sensitive to public perceptions about what public monies are spent on.

The present cosmetic appearance of the *City of Adelaide*, as shown in Figure 4, is unappealing to the broader community. Only a relatively small percentage of the public see beneath the poor cosmetic appearance and comprehend the historical significance of the ship, and its relatively good underlying structural condition. Its appearance also detracts from organisations wishing to have their brands linked to an eyesore.

Figure 4: External cosmetic appearance of the *City of Adelaide* in May 2009 (David Cook).

As clubrooms on the River Clyde in Glasgow as recently as the late 1980s, the cosmetic appearance of the clipper was maintained in modern times as shown in Figure 5. Even then, the black and white scheme does not reflect the original paint scheme.

Figure 5: As the *Carrick* on the River Clyde in the late 1980s (Gordon Hardy).

4.9 Fire and Vandalism Protection

The early installation of a commercial alarm system that can detect smoke, fire and intruder threats, as well as security fencing is an early priority.

5.0 Understanding the Ship

5.1 Conception

After having gained much experience on the London to Adelaide run with his ship the *Irene*, Captain David Bruce had the *City of Adelaide* built expressly for the South Australia trade.(3) The order for the new ship was given to William Pile, Hay, and Company of Sunderland who built the ship and launched it on 7 May 1864.

The *City of Adelaide* is frequently referred to as being owned by the British shipping firm Devitt and Moore, but they were only the managing agents in London. It was only partner Joseph Moore snr. who personally became a syndicate member, holding a quarter-share in the ship. Captain Bruce also took a quarter-share ownership. The remaining two quarter-shares were taken up by Australian interests - Harrold Brothers who were the agents in Adelaide, and Henry Martin, the working proprietor of the Yudnamutana and Blinman copper mines in the Flinders Ranges.

5.2 Principal Particulars

The *City of Adelaide*, as a passenger ship, was the equivalent of the Jumbo of the times. It main particulars are as follows:

- Length (Overall) 74.4 metres (when rigged)
- Length (Hull) 53.85 metres
- Breadth 10.14 metres
- Depth 5.64 metres

Figure 6: To-scale comparison of QANTAS' *City of Adelaide* 747 and the clipper *City of Adelaide*.

5.3 Construction

5.3.1 Hull Design

The *City of Adelaide* was specifically designed to carry both cargo and passengers on the South Australian service, and had to be capable of operating in the severe weather and sea conditions encountered in the southern oceans, especially if returning homewards via Cape Horn, as the ship did on several occasions. These factors influenced the design.

The hull was moulded to perform well in all conditions and to have good cargo capacity. The floors are moderately steep and the bilges well rounded. The entrance and run are less fine than those of the extreme clippers, such as *Cutty Sark*, and has a long almost parallel central section.

The hull is of composite construction, with the frames manufactured in wrought iron and the planking in various timbers and sheathed with a protective plating of non-ferrous metal – see Figure 7.

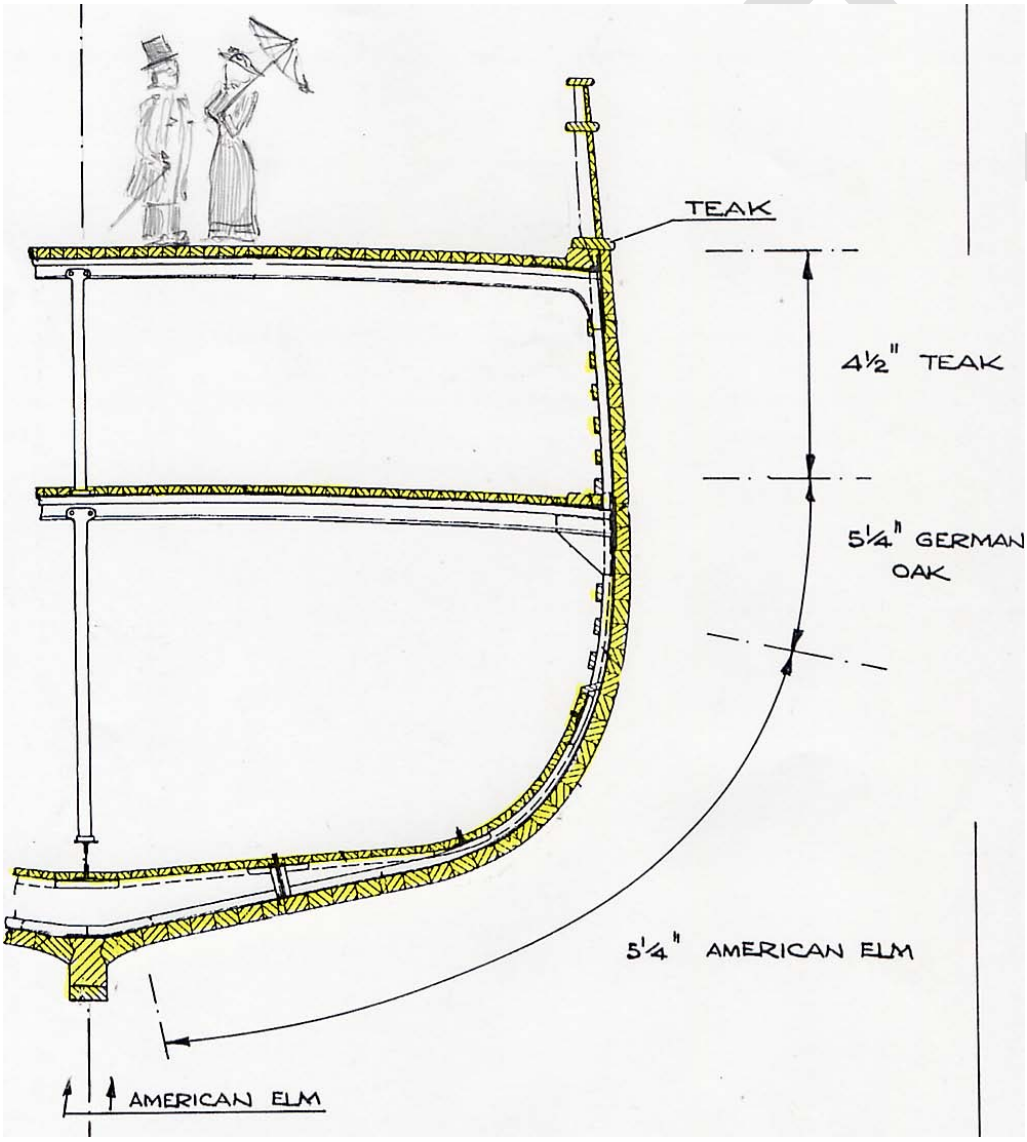

Figure 7: Timbers used in the Hull of the *City of Adelaide* (Fred Walker).

As summarised in Figure 7, a number of species of timber were used in the clipper's construction[3]:

- Keel was made of Elm and American Elm
- Main piece of the Rudder is of English Oak
- Main piece of the Windlass is of teak.
- Stem and Stern post are of English Oak
- Knight Heads and Hawse Chocks are of English Oak
- Deadwood is of American Elm, Teak and English Oak
- Planking from Keel to (possibly turn of bilge) is of American Elm
- Planking from that point to the Light Water Mark is of German Oak
- Planking from Light Water Mark to the Wales is of Teak
- Wales and Black Strakes are of Teak
- Topsides and Sheer Strakes are of Teak
- Spirketting and Plank Sheers are of Teak
- Water-ways are of Teak
- Decks are of Yellow Pine

The hull below the waterline was sheathed in yellow metal and felt in May of 1864.

The *City of Adelaide* was built at a period of experimentation in the construction method. Lloyd's Rules for the construction of composite vessels had not yet been laid down, the type being categorised as experimental, and shipbuilders were working to create their own standards for construction. That the builder William Pile was working with a new technique is clearly indicated by his design for the framing, which is built to a greater strength than other examples of the type and certainly stronger than Lloyd's later specifications for the class. There is considerable variation in the different builders' interpretations of the requirements for composite construction.

[3] Transcribed from the Lloyds Survey of 1864 by Adrian Brown of Adelaide, South Australia.

5.3.2 Sail Plan

The *City of Adelaide* was built as a ship; that is with three masts, all with square sails as common with most clipper ships.

The ship rig was converted to barque rig in 1881 for economy of crewing and maintenance costs, as was the case for many ships in the latter part of the nineteenth century.

Apart from the known change to barque rig in 1881, one other alteration to the rig occurred. The vessel as built had single topsails of standard size but with Cunningham's patent roller reefing gear, one of many inventions designed to improve handling of large topsails. This was evidently less satisfactory than the double topsails which were next introduced, and after a few years the *City of Adelaide* was converted.

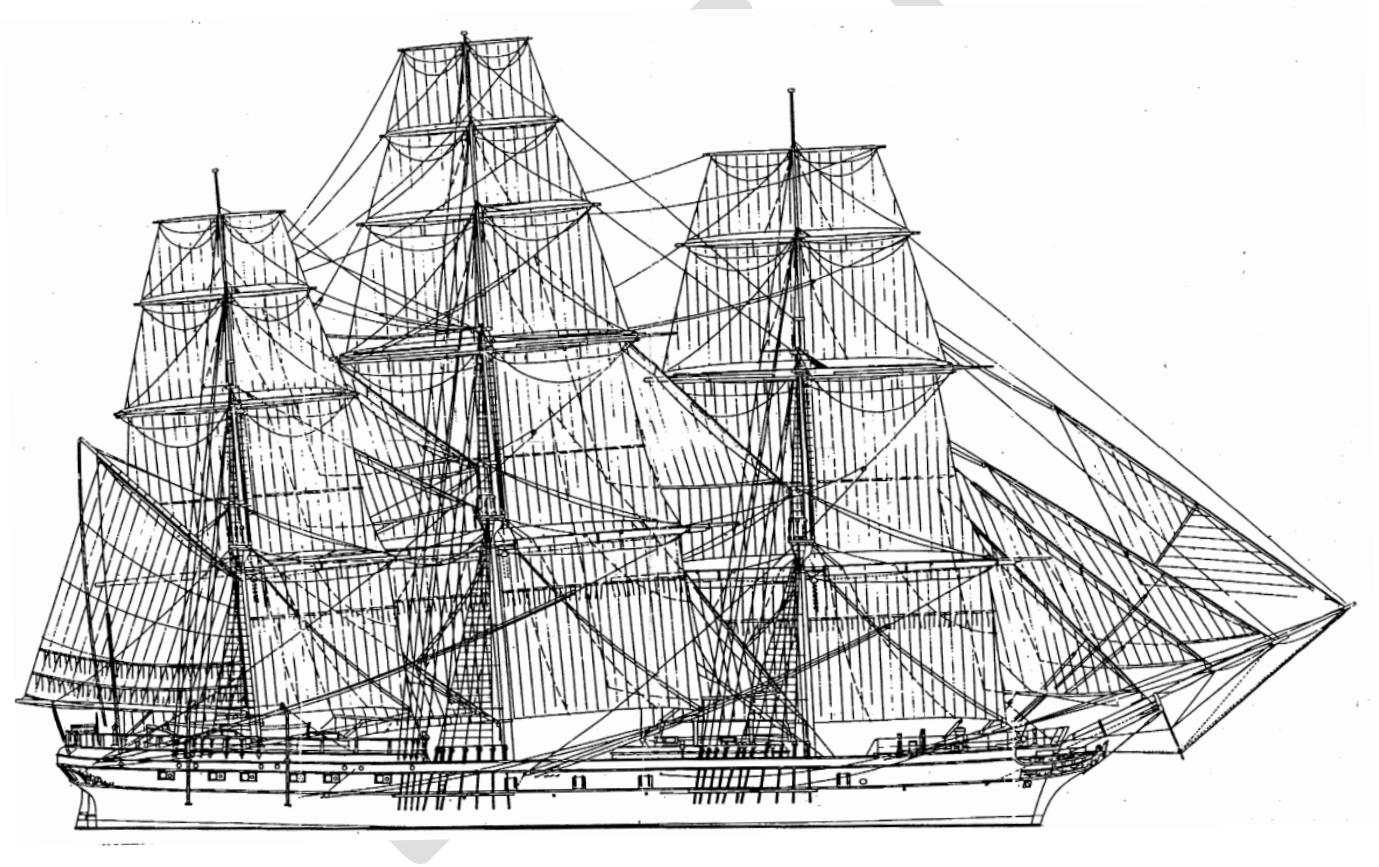

Figure 8: *City of Adelaide* Sail Plan (Bob Sexton)

5.3.3 Interior Layout

The *City of Adelaide* had fourteen first class cabins located in the poop. Forward in the between deck was the second class accommodation, and ahead of that the forecastle for the crew.

On the one voyage, when over 300 assisted passage emigrants were carried, the between deck was, as required by the law, divided into three sections, for single males, single females and families.

Documentary evidence has survived for the first class accommodation. A layout plan of the cabins and communal areas provides considerable detail – see Figure 9. There is only the barest of information for second class. Some of the *City of Adelaide* log books suggest that second class passengers shared cabins with senior members of the crew.

The evidence for the First Class cabins is partially verified from photographs of the vessel taken after its conversion into a hospital – see Figure 10. Many details of the structure are recorded, including decorative features, which clearly had not been added as part of the conversion.

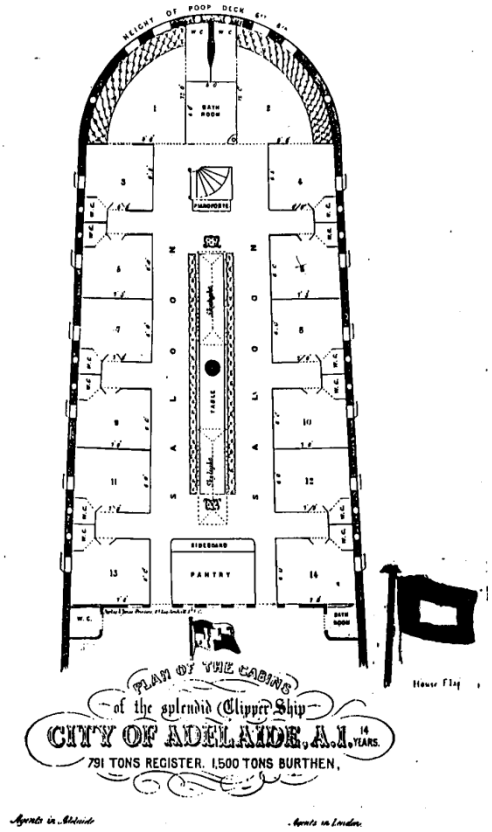

Figure 9: Plan of the Cabins

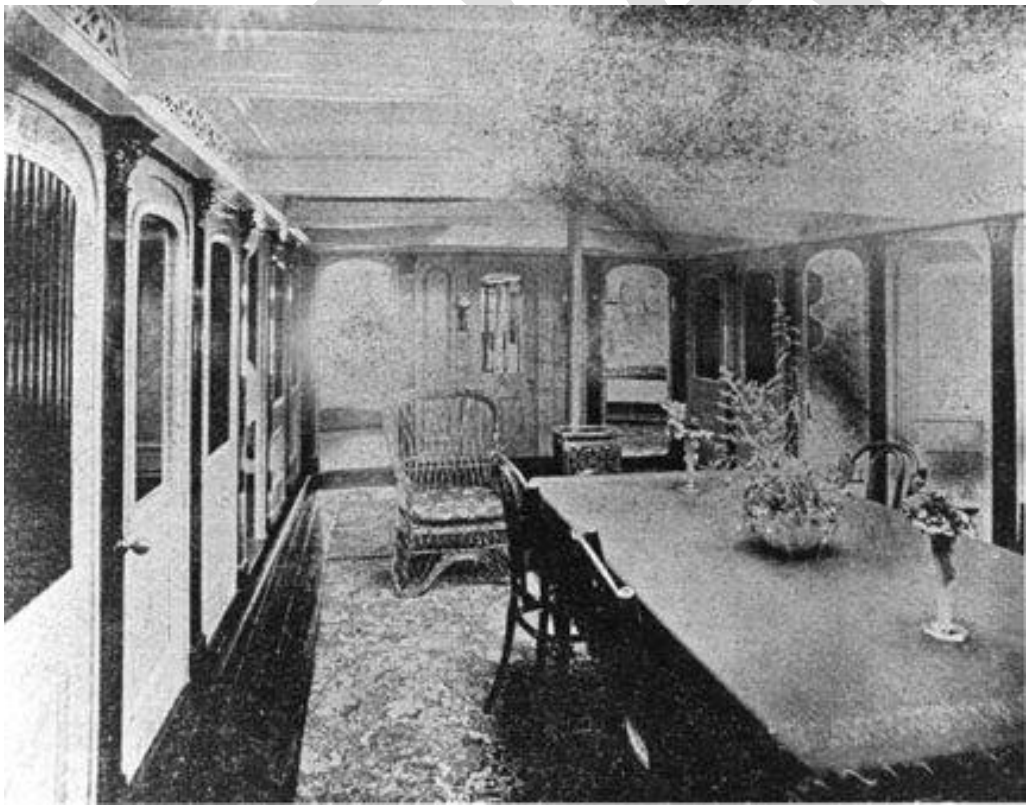

Figure 10: Photograph of Nurses Quarters in the Poop.

5.3.4 Rudder

Accidents and damage occurred on four known voyages. The *City of Adelaide* lost its rudder in heavy weather south of Kangaroo Island in November 1877, eight days out of Port Augusta en route for London. The ship was in great danger and saved only by the superb seamanship of Captain Edward Alston, who was able to bring the *City of Adelaide* around by trailing chains overboard and, after a perilous voyage through Backstairs Passage, limp into Port Adelaide for repair on Fletchers Slip.

No single piece of wood large enough for the main piece could be found for the replacement, so it was made from two pieces of grey ironbark, scarphed together, and fitted with brass fittings. Captain E.D. Alston subsequently took the ship back to England via the Cape Horn without mishap. Like the ship, the rudder still survives, and represents a major accomplishment for the shipwrights of Adelaide at the time.

In 2005, Queensland Department of Primary Industries and Fisheries (DPI&F) scientists helped British archeologists to confirm that the surviving *City of Adelaide* rudder, much damaged by time and seawater, was the one built in Adelaide in 1877. The scientists were able to confirm that the rudder was scarphed and made from Australian grey ironbark proving it to be the 1877 rudder.(4)

The replacement rudder remained in use for the rest of the clipper's working life, removed only in 1990 when the *City of Adelaide* was prepared for the move down the Clyde from Custom House Quay to Princes Dock.

Figure 11: *City of Adelaide* Rudder at Irvine Scotland, 2010 (Richard Smith).

5.4 The South Australian Trade – 1864-1887

The *City of Adelaide* made annual runs to and from South Australia for twenty-three consecutive years, playing an important role in the development of the colony. Researchers have estimated that a quarter of a million South Australians can trace their origins to passengers on the *City of Adelaide*.

At least six diaries, kept by passengers and describing respective voyages, have survived from the 23 return voyages between London and Adelaide.

On 24 August 1874, the ship was stranded on Kirkcaldy Beach near Grange, six miles south of Semaphore opposite Adelaide. Onboard at the time, were over 320 people, including one of the diarists, a Scot named James McLauchlan. An outbreak of Scarlet Fever had occurred during the voyage and seven people died. Two babies were born onboard during the voyage - one was "born dead".

Upon reaching South Australian waters at the end of this voyage, severe gales were encountered resulting in the stranding of the *City of Adelaide*. The storms also caused accidents and losses of other vessels along the South Australian coast. By coincidence, the schooner *Mayflower*, on its way from Port Broughton to Port Adelaide, lost its mate Richard Burton, 32, overboard and he drowned. He was on his way to Port Adelaide to meet his wife, Isabella, 29, who was one of the immigrants onboard the *City of Adelaide*, coming to Australia for the first time to join her husband.

A day after the stranding, the passengers were removed by steam tugs. The *City of Adelaide* was refloated on 4 September after much of the cargo had been discharged and much of the rigging temporarily removed. The ship was virtually undamaged.

The 1874 voyage was but one of twenty three such voyages. Not all were as eventful.

By the 1880s, the *City of Adelaide* was also calling at Port Augusta, South Australia, on the return voyages. At Port Augusta, copper from Henry Martin's Blinman and Yudnamutana copper mines in the Flinders Ranges, and wool from outback sheep stations would be loaded before racing to the wool sales in London.

During this time, in 1881, the ship was rerigged as a barque.

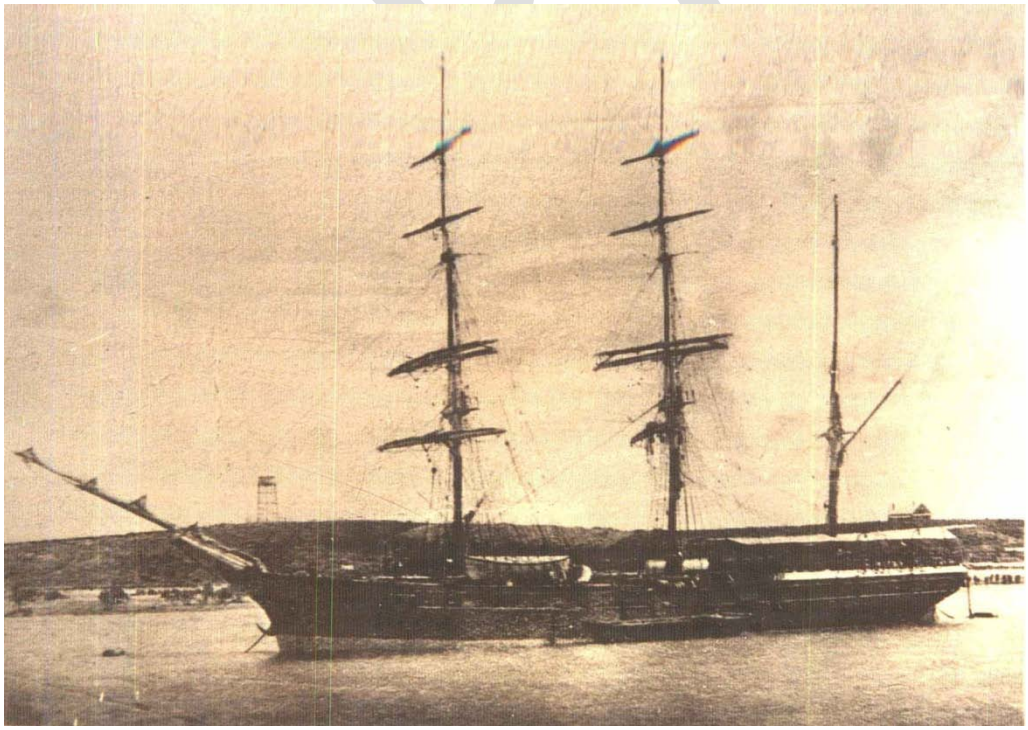

Figure 12: *City of Adelaide* at Port Augusta, South Australia, in 1883.

5.5 The Coal and Timber Trade – 1887-1893

In 1887, the *City of Adelaide* was sold to Dover coal merchant, Charles Havelock Mowll, for use in the collier trade carrying coal from Tyne to Dover.

In 1888, the *City of Adelaide* was sold to Belfast based timber merchants, Daniel and Thomas Stewart Dixon, and used to carry timber in the North Atlantic trade.

By the start of the eighteenth century, Britain had basically exhausted its supplies of the great oaks that had built the Royal Navy. The lack of large trees was especially problematic as they were a necessity for masts for both its war and merchant shipping. A thriving timber import business developed between Britain and the Baltic region but was unpopular for economic and strategic reasons. The Napoleonic Wars and a Continental blockade had a large impact on the Baltic trade and so Britain looked to the North American colonies that were still loyal.

The North Atlantic timber trade became a massive business and timber was British North America's most important commodity. In one summer, 1,200 ships were loaded with timber at Quebec City alone.

As timber is a very bulky cargo, it required many ships to carry it from North America to Britain, but there was little demand for carrying goods on the return voyages. However, there was a market for carrying migrants, and so many of the timber ships turned to the migrant trade to fill their unused capacity for the return voyages from the British Isles to British North America. Since timber exports tended to peak at the same time as conflicts in Europe, a great mass of refugees sought this cheap passage across the Atlantic. This created an unprecedented influx of new immigrants in North America.

The timber trade not only brought immigrants to British North America, but also played a very important role in keeping them there as well. While many of those disembarking from the timber trade ships would head south to the United States, many others would stay in British North America. At the peak of the trade in the 1840s, 15,000 Irish loggers were employed in the Gatineau region alone at a time when the population of Montreal was only ten thousand.

The *City of Adelaide* was homeported in Belfast and from there frequented several British North American ports. Of these ports, it would most frequently visit Miramichi, New Brunswick. Of the thousands of sailing ships involved in the timber trade between North America and the United Kingdom, the *City of Adelaide* is now the last survivor.

5.6 Isolation Hospital – 1893-1923

The *City of Adelaide* ended its sailing career in 1893, when purchased by the Southampton Corporation for £1750 to serve as a floating isolation hospital in Southampton. During one year of operation, 23 cases of Scarlet Fever were cared for.

A photograph of the *City of Adelaide* at the beginning of its service as a floating hospital (see Figure 13) show the bow to be unaltered complete with coat-of-arms of Adelaide and figurehead. A later photograph taken at the end of its service as a hospital shows the knightheads and figurehead to have gone.

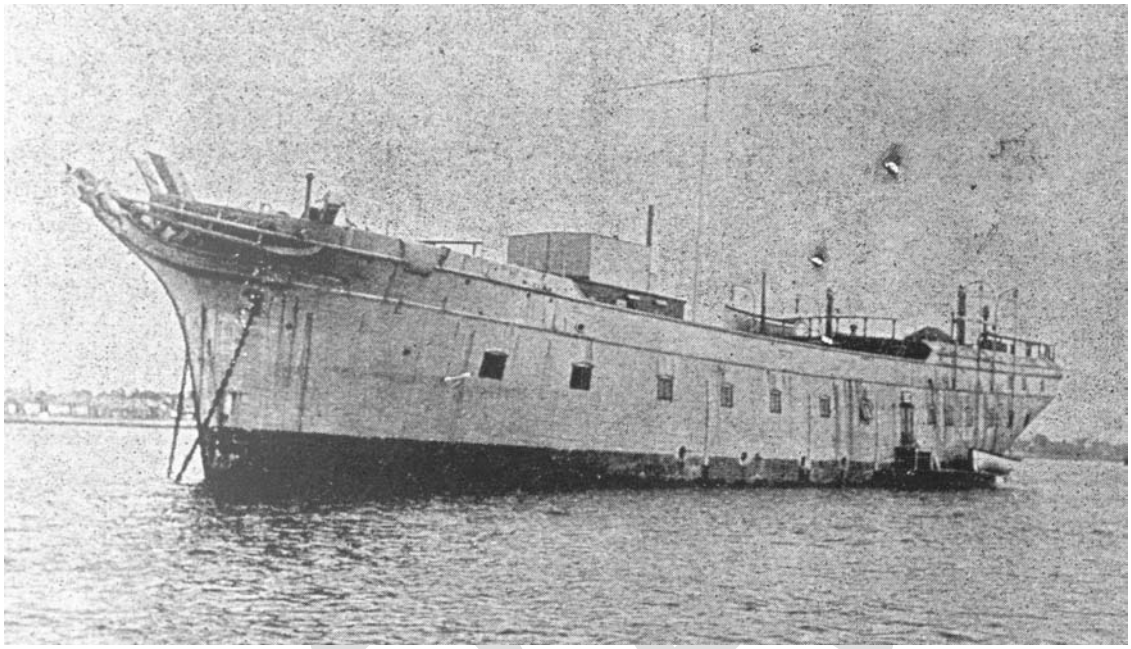

Figure 13: *City of Adelaide* as an Isolation Hospital at Millbrook, Southampton.

The conversion of the *City of Adelaide* to an Isolation Hospital involved cutting ports through the hull for access and to let light into the between deck, where the wards were built, and the addition of structures on the main deck. The existing deckhouse was probably retained, the hatchways were glazed over and accommodation was provided in the topgallant forecastle, overall enlarging the upper deck accommodation.

A water heating system and services were installed, along with improved galley and other accommodation for staff. Main deck planking, except under the poop, was renewed. The between deck portholes were altered to form square ports or windows at the deck level where the hospital wards were located.

Access to the vessel was via two large double-door entries, each served by its own landing stage. The hull was painted a uniform French grey.

No other alterations to the hull form occurred. The main and mizzen masts and rigging had earlier been removed when the *City of Adelaide* was still at Bowling on the Clyde and had been newly purchased for conversion.

Record photographs of the interior also show that some of the original first class passenger cabins had survived, completed with round arched doors and panelling, decorative columns and ventilation gratings, and were being used to provide nursing staff accommodation.

5.7 Naval Drill Ship – 1923-1948

In 1923, the *City of Adelaide* was purchased by the Admiralty and towed to Irvine, Scotland, where it was placed on the very same slipway it was to return to later in 1992. After conversion to a training ship, it was then towed to Greenock and commissioned as a Naval Drill Ship for the newly constituted Clyde Division of the Royal Naval Volunteer Reserve (RNVR). As the new cruiser *HMAS Adelaide* had been commissioned only the previous year, to avoid confusion of two British Empire ships named 'Adelaide', the clipper ship was renamed *HMS Carrick*.

Again the conversion did not, as far as is recorded, require major structural alterations to the essential hull form. The two main alterations were the installation of an orlop deck within the hold and the complete roofing over of the upper deck, along with the construction of two flying bridges and two short signal masts – see Figure 14.

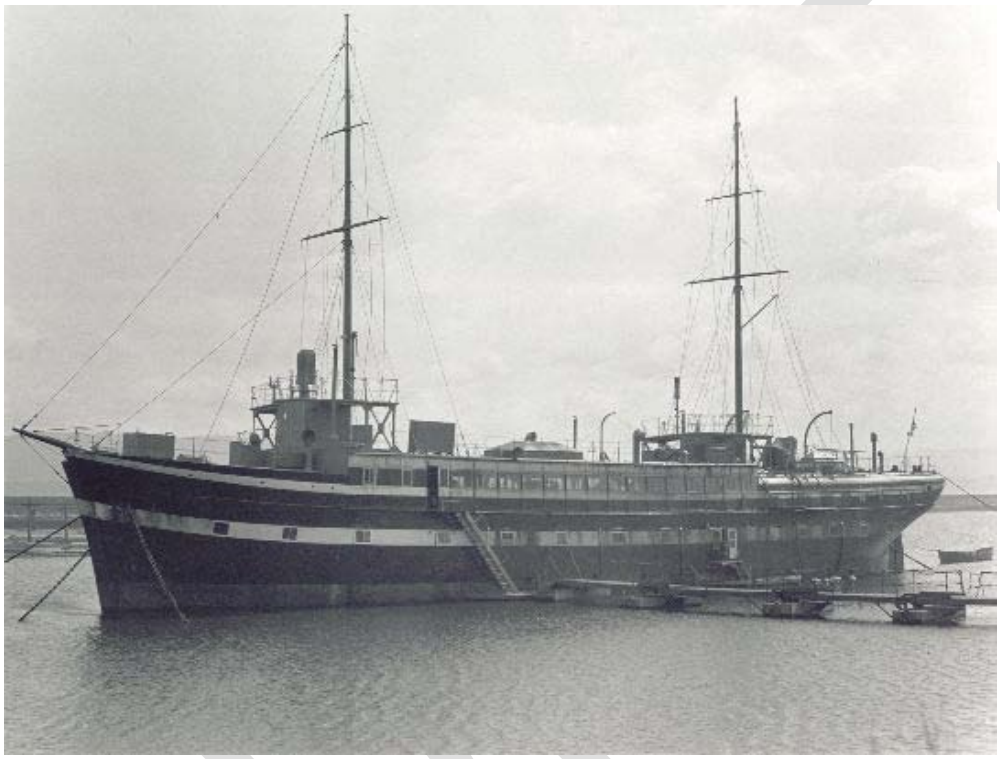

Figure 14: *City of Adelaide* after Conversion for Admiralty Use.

Circular ports were cut through the planking to admit light to the orlop deck. These were to prove to be a vulnerability in the ship's later years, as they were close to the waterline.

Examination of the hull has suggested a contraction of the coppering at this stage. The ship was fitted with 6" guns but the training undertaken on them did not involve firing practice although there are accounts that the guns were used during the Glasgow blitz.

The hull space was fully used for accommodation for ratings and officers, for drill rooms and specialist training rooms, storage, plant and service fittings. Some features of the hospital conversion were retained, notably the square ports and the double-door entrance ports.

The paint work was changed to black and white.

5.8 RNVR Clubrooms – 1948-1989

After the war, the ship was scheduled for breaking up, but through the work of Commodore the Duke of Montrose, Vice-Admiral Cedric S. Holland and Admiral Sir Charles Morgan, it was presented by the Admiralty to the R.N.V.R Club (Scotland), an organisation formed in the autumn of 1947. The towing of the *HMS Carrick* upriver, from Greenock to Harland and Wolff's shipyard at Scotstoun on 26 April 1948, was known as 'Operation Ararat'. A grant of 5,000 pounds was received from the King George's Fund for Sailors and 500 pounds was donated from the City of Glasgow War Fund.

After fitting out, *Carrick* was towed further up-river to a berth at Custom House Quay, just above Jamaica Bridge. A plaque on board commemorated the opening ceremony of the Club, which was carried out by Admiral of the Fleet Andrew Cunningham, 1st Viscount Cunningham of Hyndhope. The ship stayed there until January 1954 when the Clyde Navigation Trust decided to move it to the opposite side of the river at Carlton Place – see Figure 15.

Figure 15: *Carrick* as Clubrooms in the 1960s.

When the *Carrick* was converted to clubrooms in 1948, the principal alteration was the fitting of replacement masts. These masts were constructed of alloy metal and were shorter than the correct size for the original rig, also carrying fewer cross spars, so as to minimise risk of top-heavy weighting.

The Club members were particularly keen to have a figurehead. One, from another ship, the *Triad*, was obtained and fitted. Apart from a circular stairway cut through the main deck to link the additional top compartments with the lower decks, the structure of the Admiralty conversion was broadly retained. The vessel was fitted out with wholly new furnishings and decor to meet the requirements of the vessel's new function and the Admiralty paint scheme of black and white was also retained.

The condition of the *Carrick* in 1945-1946 was structurally sound but cosmetically poor. Several years of wartime service had imposed heavy wear and tear on the vessel. The RNVR (Scotland) Club, with what were in reality fairly limited resources, performed a valuable service nationally and internationally in ensuring the continued existence of the vessel.

In 1978 came the first major warning of the difficulties that lay ahead for the Club, when an exceptionally low tide caused movement of the timber baulks, which kept the ship clear of the quay wall. This allowed the vessel to float close under the wall and, a fender catching under the quay, it was trapped and heeled over against the wall at a list of 35 degrees. The interior was flooded and costly damage done to the interior fittings and furnishings. Survey showed that changing silting patterns on the river bed were putting severe strain on the hull and a mud bank building up amidships was causing the vessel to hog.

It was recognised after the 1978 flooding that the club would not have the resources to be able to maintain the vessel very far into the foreseeable future. Committee members, mindful of the Club's efforts to acquire and preserve the *City of Adelaide*/*Carrick* in the 1940's began attempting to find ways of securing its future and relieving themselves of the total burden of maintenance, although the broader Club membership was, not unexpectedly, unhappy about the prospect of giving up their clubhouse.

In the mid-1980's the Club was seeking advice from consultancies and had contacted various bodies with potential interest, among them the then recently established Scottish Maritime Museum, an independently run charitable trust, whose staff brought their knowledge of trust status into the discussions and assisted with the process of identifying possible options for preservation. The main effort was directed to establishing some form of body which would have as its objective the preservation of the *City of Adelaide* and which would be free and able, as the RNVR (Scotland) Club was not, to concentrate on the vessel and its requirements and on the essential fund raising.

Glasgow was, during that period, a hive of activity, with the 1988 Garden Festival up and running and preparations under way for the 1990 European City of Culture programme. There was at the time some optimism that, if a trust were established quickly, it would be able to benefit from the drive for cultural and tourism development and enterprise which so characterised contemporary activity in the city.

5.9 Flooding and Sinking – 1989

In 1989 there proved to be some need for haste, when the ship was once again flooded. The RNVR (Scotland) Club, in some desperation, took the option on their insurance of having their premises declared a total loss.

It order to facilitate the preservation of the ship itself, Glasgow District Council applied for listed building status. Historic Scotland agreed to take the unusual step of listing a historic vessel at category A. Listing was viewed as a boost to the preservation project. By 1990 a new body, the Clyde Ship Trust, had been formed and, in March of that year, had purchased the vessel. The Scottish Maritime Museum was not party to this new body, having stepped back from developments in 1989 in order to deal with a necessary restructuring resulting from changes to its own funding mechanism. The new Trust had moved away from earlier proposals for the vessel, which were based on the establishment of a maritime heritage centre at Yorkhill Quays on the north bank of the Clyde close to the Glasgow Exhibition Centre and the nearby preserved Finnieston dock crane, to focus instead on the Govan Graving Docks, a massive complex which was recognised in itself to be of considerable historic importance but which was lying derelict and without clear security of future.

Under the control of the new Trust the vessel was dismasted and prepared for removal and in August, 1990, was successfully towed downstream to Princes Dock, which had been part of the site of the 1988 Garden Festival. Unfortunately, early in 1991, for reasons which have not been clearly identified, the vessel sank at its moorings. The Clyde Ship Trust was placed in a position of embarrassment, for, being already in debt, they were unable to put forward the funds required for a major salvage operation. It became necessary for other organisations to step in to attempt to prevent the total loss of the ship.

5.10 Rescue and Initial Restoration

In January 1992, with the positive encouragement of Historic Scotland, the *City of Adelaide*/*Carrick* was acquired by the Scottish Maritime Museum. A rescue package was put together with the financial assistance of a number of bodies, notably Enterprise Ayrshire, the National Museums of Scotland, Strathclyde Regional Council and the Laing Homes Charitable Trust (Laing Homes being developers of the environs of Princes Dock). The vessel was raised in March of that same year and successfully towed to Irvine in the May.

After the *City of Adelaide*/*Carrick* had safely arrived at Irvine harbour the vessel was thoroughly checked to ensure that the hull remained sound and that no further damage would be caused by it being berthed, even temporarily, in a depth of water which was sufficiently shallow to settle the clipper on the bottom at low tides. A programme of work had been planned which operated on two fronts. The first was to set in motion the preservation and restoration. The second was to set up the means to allow public access and, accompanying access, good quality interpretation.

The programme was a large scale and complex one. The following steps had been taken:

- Removal of the 1923 additional superstructure to prepare the vessel for slipping by reducing top weight.
- Preparation of old Ayrshire Dockyard slip and installation of the Hall Russell cradle from Aberdeen. Dredging of river channel to allow vessel to be towed upstream to slip.
- Successful slipping of the vessel, September, 1993.
- Main deck sealed to protect lower decks from rain.
- Initial programme of work laid down by consultant naval architect, designed to clear the vessel of extraneous materials such as silt, cement rendering, and to begin the basic programme of research and restoration.
- Removal of orlop deck installed for the Admiralty.
- Removal of a large quantity of silt from the hull interior, the remnants of the silting and flooding when the vessel was sunk in Princes Dock, Glasgow, during 1991-1992. All bulk removed was checked for items of archaeological interest. A quantity of beer and soft drink bottles were found, likely to date from the period of conversion in the 1920's, and also a small bale of cloth, as yet unidentified.
- Removal of part of the concrete skin applied to the inner sides of the vessel at lower levels to allow examination of the timbers, the fixings and the framing.
- Removal of remaining ballast which was sorted and stacked on shore.
- Recording of the weight of all rubble and other materials removed from the ship, excluding historic artefacts, in order to facilitate the lightweight calculations for restoration.
- Geological survey of the ballast and report on materials. The bulk of the ballast is stone, mostly building rubble, characteristic of the Southampton area, which suggests it was installed in the 1890's and retained. Other materials identified include brick, possibly of Ayrshire manufacture (to be identified) and other materials which may either be of Scottish or New Brunswick origin. Further analysis of the material is required.
- Initiation of a programme of survey of timber skin and decking by specialists in timber science from the Scottish Institute for Wood Technology at Abertay University, Dundee.
- Initiation of a programme of survey of framing using an in-situ non-destructive spectrographic technique.
- Research examination in detail of the structural methods of composite construction in order to identify and distinguish original fixings and later repairs and replacements. Compilation of a dossier of details of construction evidence.

- Removal of part of metal sheathing in order to gain access to the external surface of the timbers for examination. Samples laid aside, also of lining materials, for analysis. Analysis of nail hole pattern to identify frequency of earlier recoppering work.
- Photographic recording programme maintained.
- Public access was initially offered, with minimal interpretation, while the vessel was moored in the lower part of Irvine harbour. Once the ship was slipped, an access ramp and internal walkway were constructed to allow visitors access. Access was restricted to the portions of the two upper decks which were not affected by the processes of restoration. All access, with exception of the main deck which is reached by a single flight of stairs, is suitable for visitors with mobility impairment.
- Landscaping of the slip environs and production of a graphic interpretative display housed in its own small shelter.

There was cause for concern at the slowness and drawn out progress of the restoration. A wooden hulled vessel sitting in such an exposed location as in the predominantly wet and windy climate of western Scotland was at some risk. The risk was less of the actual loss of the vessel but of the programme becoming even more drawn out and steadily becoming more invasive of the integrity of the original materials with deterioration in materials that were currently sound or more serious deterioration of that which was already fragile.

5.11 Scottish Devolution

In May 1999 Scotland regained its own parliament. A side effect of this is that previous UK funding sources for the Scottish Maritime Museum dried up. This then had a snowball effect on the Scottish Maritime Museum. An application for funding for the Museum's other major project, under the UK Heritage Lottery Fund, was rejected. Due to the eroded revenue position, the local municipality then reduced its funding, and then other grant aiding organisations adopted a similar position.

Following the restructuring of Local Government in Scotland the Scottish Maritime Museum, as an independent charitable trust, appealed to the Scottish Executive for support. The Executive commissioned a report through the Scottish Museums Council which recommended the sale of the *City of Adelaide*. The Museum began to receive government support but it was conditional on no government funds being spent on the vessel. In 1999 all work on the *City of Adelaide* stopped and the shipwrights were moved to other projects.

In May 2000 the trustees of the Scottish Maritime Museum applied to North Ayrshire Council for consent to demolish the "Listed Building" *City of Adelaide*. The Council subsequently received over 100 objections to the Museum's application to demolish the vessel. For the first time the Authority received objections from other countries. There were representations from nine significant worldwide organisations who are involved in the history and preservation of ships. Many Members of the UK and Scottish Parliaments objected as well as the Australian Foreign Minister Alexander Downer and Australian ex-Senator and diplomat Robert Hill.

The North Ayrshire Council refused demolition in February 2001. The Scottish Maritime Museum was left in a dire financial predicament with rental for the slipway beginning to accrue.

5.12 Tourist Sailing Ship Proposal

In 2003 businessman Mike Edwards donated funds for preservation and a feasibility study for the ship's restoration as a tourist adventure sailing ship for Travelsphere Limited. Edwards commissioned two surveys by Tritec extracts from which are included as Appendix A and Appendix B. In 2006, the result of the feasibility study identified that the cost to comply with current maritime passenger safety regulations for sea-going vessels would be more expensive than building a replica. The studies concluded that it would be more cost-effective to turn the *City of Adelaide* into a static exhibit. Edwards decided not to take up his original option of

acquiring the *City of Adelaide* but his charitable efforts had extended a life-line to the clipper that ultimately gave it another three years of reprieve and a protective cover to protect it from the elements.

5.13 Demolition Proposals

After three years the Scottish Maritime Museum was back in its original predicament. This predicament was worsened as volunteer organisations that had previously been campaigning to acquire the *City of Adelaide* had now been put in hiatus for three years. The Scottish Maritime Museum applied again to North Ayrshire Council to demolish the ship at an estimated cost of £650,000.

The fire on the Cutty Sark caused a postponement of a decision on the *City of Adelaide* in May 2007.

When the proposal was gazetted by the council, some 132 letters of objection were received. Some of these came from maritime-related organisations who are involved in the history and preservation of ships as well as:

On World Heritage Day, 18 April 2007, the North Ayrshire Council advised that they agreed to the deconstruction of the clipper subject to:

- Referral of the application to Historic Scotland under Section 12 of the Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997, and
- A plan for demolition be developed by a Steering Committee based on the recommendations of National Historic Ships Committee (NHSC) and be agreed in writing by North Ayrshire Council as Planning Authority and by Historic Scotland.

5.14 Demolition Tender

The Scottish Maritime Museum called for tenders for the deconstruction of the *City of Adelaide* which closed on 23 November 2009. The Adelaide based non profit organisation Clipper Ship 'City of Adelaide' Ltd. submitted a tender, but unlike other tenders, its proposal involved removing the ship as a whole.

In January 2010, the Scottish Maritime Museum received a revised proposal from Clipper Ship 'City of Adelaide' Ltd. accepted as being technically feasible by the Museum. The Trust subsequently made a planning application to North Ayrshire Council to remove the vessel. While the Trust is yet to provide evidence they have the funds to complete the project, the South Australian proposal is the only detailed proposal for the preservation of the complete vessel to have been received by the Scottish Maritime Museum.[

5.15 Australian Bid Selection

Scottish Minister for Culture and External Affairs, Fiona Hyslop announced on 28 August 2010 that the *City of Adelaide* would not be deconstructed, and that Adelaide has been identified as the preferred bidder. Extensive work will be undertaken to allow the ship to be moved and displayed in Adelaide during 2011, the 175th anniversary of the settlement of South Australia, the first stage of which was completed in December 2010.

5.16 Present Condition of the Ship

In order to better understand the ship's condition the following external reports are attached or included as Appendices.

- Appendix A – Extract from Tritec Condition Survey Report.(5)
- Appendix B – Extract from Tritec Limited Close Up Survey Report.(6)
- Appendix C – Headland Archaeology *City of Adelaide* Laser Scan Survey.(7)

6.0 Assessing Significance

6.1 Statement of Significance

The *City of Adelaide* is of major historical importance. Its status is conferred by a number of essential elements and the clipper fulfils, or largely fulfils, all ten of criteria for assessing historic ships as defined by the UK's National Register of Historic Vessels.(1) The *City of Adelaide* is of national significance specifically to the United Kingdom and to Australia and, because of its rarity, is of international significance.

6.2 Demonstration of Technological Innovation

The Clipper Age brought the development of a highly skilled set of sailors and craftsmen, and great notoriety for both the ships and crews that sailed them. Clippers were designed for speed and this resonated with the 19th Century's fascination for speed. Today they still represent some of the fastest ocean-going sailing vessels in the world.

Clippers were instrumental in opening new trade routes. The Great Clipper Races, relating to the transport of Australian wool and grain and Chinese tea to the London markets, are an enduring memory of the importance of the clippers.

Wrought iron hulled vessels were first being built in the 1820s. By the time of the launch of the *City of Adelaide* in 1864, wrought iron was a mature technology for ship hulls. However the speed of wrought iron hulls was significantly impacted by marine growth, particularly during long voyages through the tropics. Whereas wooden hulled ships could be sheathed with copper to inhibit marine growth, iron hulled ships could not because of bimetallic corrosion.

Innovation then led to the development of ships designed with wooden planking over wrought iron frames – composite construction. The wooden planking allowed the application of copper sheathing essential for fast ocean crossings while the iron frame made the ship lighter and took up less interior space than wooden framing.

Composite ships were able to get formal recognition and endorsement from Lloyds Register until 1867 when Lloyds issued their rules for composite construction. Prior to this, all composite ships were labelled "experimental". The *City of Adelaide* was built in the years prior to Lloyds publishing their rules for composite ship construction and thus is an important example in the development of composite ships. The *Cutty Sark* built in 1869 is an important example of the construction of composite clippers following the publishing of Lloyds Rules.

The technology of sail was sidelined by the development of steam powered propulsion. As a result, for commercial service, sail power drew less interest and the improvements and developments, which might have been sought if the technology had remained at the forefront of shipping trade, did not occur, and the few attempts at new developments have not, to date, drawn sufficient interest to enable them to be proven commercially viable. Sail technology has developed greatly since the 19th century but has been driven by sporting and leisure interests. Nineteenth century ship rig, therefore, represents an important stage in the technology of industrial sail power, so a vessel which was designed to be rigged in this form is itself of technological significance.

The opening of the Suez Canal in 1857 and ongoing improvements in steam ship technologies ultimately led to the brief reign of composite clippers as the fastest mode of transport between Europe and Asia. In maritime history, the composite clippers were to become the final stage in the evolution of fast commercial sailing ships and thus represent the pinnacle of sailing ship technology.

The only two remaining examples of this important era of composite clipper design are the *City of Adelaide* and the *Cutty Sark*. The *City of Adelaide* is also rather unique in that it was designed as a passenger ship – and is important in the history of migration to the Australian colonies. In May 2007, the *Cutty Sark* was nearly lost to the world when a horrific fire engulfed the ship. Composite Clippers are an endangered species on the verge of extinction. That the *City of Adelaide* and the *Cutty Sark* have survived to this day is a testament to the designers and builders of composite clippers.

6.3 Good Example of Type and Construction

The *City of Adelaide* is one of the only three large ocean-going composite built ships in the world which have survived intact and with the integrity of their structure not compromised. The others are the *Cutty Sark*, built in 1869 and preserved at Greenwich, and *HMS Gannet*, built in 1878 at Chatham. Most other known examples of the type survive only as incomplete wrecks and are severely limited in accessibility. The iron framing of the hull of *City of Adelaide* is in very good condition, and it has been argued is in better condition than that of the *Cutty Sark*.

Composite construction was a relatively short lived construction method, in comparison to wholly wooden hulled forms and to iron and steel hull construction, but it is noticeable that a high percentage of the vessels constructed in this way were renowned for quality and commercial success. They were the highest quality available, as they could preserve high value cargos and sail through the tropics without losing performance due to fouling. They were inherently more expensive than iron. Accordingly they were reserved for quality and high profitability markets. And as such they represent a peak in the skills of the shipbuilder, making the survival of good examples especially valid for the study of the history and development of naval architecture.

6.4 Good Example of a Maritime Function

The clippers as a group were significant both technologically and economically at their time of operation. They were an important element in the growth of British and Colonial trade and similar importance was carried by their equivalents in other countries.

The *City of Adelaide* has uniqueness in being the only surviving sailing ship built to give regular passenger and cargo service between Europe and Australia.

6.5 Exhibition of a Positive Aesthetic Impact

Aesthetically, the clipper was among the finest, most graceful and most spectacular types of large sailing vessels. The type is highly significant in the history of naval architecture. The allocation to the *City of Adelaide* of a category-A listing was entirely appropriate, not only in terms of the vessel's technological and historic importance, but essentially because it is a superb and high quality example of ship design and construction.

The *City of Adelaide* will need considerable husbandry to improve its cosmetic appearance.

6.6 Historical Associations with Significant People, Places and Events

The *City of Adelaide* is the only surviving sailing ship built to give regular passenger and cargo service between Europe and Australia.

It is clear that for large numbers of people in the former colonies, the establishment of their own communities' histories is of paramount importance. It should be noted that the *City of Adelaide* was not associated particularly with the great or with the peculiarly significant in the history of South Australia, but genuinely had a long running importance for the development and economic growth of the region. Its historic status in that country has grown out of its original function. The *City of Adelaide* provides material evidence of the conditions of ocean voyages of that period, including emigrant circumstances, a genuine link, which adds considerable value and realism to contemporary documentation.

Compared to some other historic ships in the public domain the *City of Adelaide* is a less well known example of a preserved vessel but this lower public profile does not however reflect its real importance. It seems likely that continued existence of the *City of Adelaide* as a 'working' vessel may have obscured the fact of its preservation.

The heavy appearance of the added superstructure on the *City of Adelaide* also concealed the quality and integrity of the surviving composite clipper hull beneath.

For twenty years service of the *City of Adelaide* as a naval drill ship in Greenock, followed by over forty years as a clubroom, located in central Glasgow, meant that, although *City of Adelaide* was a familiar feature to the local Clydeside communities, its historical significance was generally overlooked and probably not known to many people.

Beyond the West of Scotland, the *City of Adelaide* was, until recently, relatively unknown even within the world of historic ship specialists. Now, with the public attention and interest in preserving the *City of Adelaide* growing as a result of the efforts to save the ship from deconstruction the historical significance is far more widely accepted

6.7 Significant Socio-Economic Associations

The *City of Adelaide* is regarded as a vital icon of the making of modern Australia, and of the relationship between Britain and the Australian colonies.

Historically, the association of the *City of Adelaide* with the successful colonial and economic expansion of 19th century Britain and, particularly, the development of South Australia, is of primary importance. In the world today where international economics and multinational businesses appear to dominate, and yet in contradiction, nationalist aspiration and self-determinism grow apace, such an icon of that era of empire and conquest may seem slightly out of place as a monument. But self determination, while it can lead to a desire to cut threads with the past and to a political and emotional distortion of the reality of relationships, can also strengthen interest in history.

6.8 Percentage of Original Fabric Surviving

The *City of Adelaide* hull is essentially complete, with only detailed alteration (addition of ports for light and access, removal of knightheads, bulwarks and some stanchions) from the original.

Examination of the structure undertaken as part of the past restoration process has identified individual features of interest, for example, heavy timber beams along the main deck between poop and forecastle and more diagonal bracings than had been interpreted from the Lloyd's Survey report. Some errors in the underdeck diagonal bracings and in one of the diagonals to the stem have also been noted. There are no known major replacements of structural components with exception of the replacement of some hold stanchions and provision of additional beams using heavy steel sections to support the guns.

The half round and deck of the poop are thought to have been replaced, though further study is required.

Comparison of the hull itself, which has been cleared of all later fittings, with documentary evidence of the accommodation has enabled accurate identification of the original layout. Of particular note within the whole structure is the ironwork, which is remarkable in its completeness, condition and quality. The hull provides an important and excellent opportunity for the detailed study of 19th century shipbuilding techniques, craftsmanship and design.

Figure 16: The *City of Adelaide* Iron Framework in 2010 (Richard Smith).

6.9 Significance of Vessel's Age

As of May 2011, the *City of Adelaide* is 147 years old. For the thousands of (land) buildings of historic and architectural merit preserved around the world, many of great age, there are by comparison very few ships even over 120 years old. Ships are as more complex than a building in their construction and in their function and far more fragile. As a major tool of human communication and transport they have an important place in the history of human society and especially in the development of remote settlements into important nations. A well documented vessel such as *City of Adelaide* provides a tangible link with an enormously wide variety of human activities and circumstances.

6.10 Scarcity of Vessel Type or Construction

City of Adelaide is the oldest of the three composite ships and the only one to have been built prior to the establishment of the Lloyd's rules on composite construction. More than 700 composite ships were built, and the *City of Adelaide* was amongst the first 100 composite ships constructed.

The *City of Adelaide* is the only survivor of the ships built by William Pile, a recognised high quality shipbuilder. It is also a rare survivor from the period when Wearside was a world centre of shipbuilding.

The various conversions to the *City of Adelaide* are in themselves interesting and worthy of recording and research. Old ships reduced or converted into accommodation or training hulks were once common around the coasts of Britain, not only a feature of the landscape but also often an important feature in the life of the local community. Few examples of ships used in that way now survive in good condition.

6.11 Scarcity of Examples of this Maritime Function

The *City of Adelaide* is one of only two ship-rigged passenger ships in the world which have survived. The other, the iron-hulled *Star of India* (ex *Euterpe*), preserved at the San Diego Maritime Museum, California, has been restored in its barque rig converted form.

7.0 First Conservation Gateway

7.1 What is the First Conservation Gateway?

The first 'Conservation Gateway' reflects the decision point where the vessel's owner must decide upon the conservation route:

- Conservation of fabric route.
  - Conservation ashore.
  - Conservation afloat.
- Operational route.
  - Private (non commercial) operations.
  - Commercial operations.

7.2 First Gateway Decision for *City of Adelaide*

As highlighted in the Tritec Condition Survey Report (5), to restore the *City of Adelaide* to a sea-going condition, would require that:

- Virtually all ironwork be renewed.
- The majority of hull and deck planking be renewed, along with the stem, the stern and all missing major items of structure, rigging and equipment.
- The vessel be made to comply with current passenger ship regulations, life saving, structural fire protection, intact stability and damage stability, bilge pumps and piping, fire pumps and piping, steering gear and emergency steering gear, mechanical propulsion, electrical power generation and distribution, air conditioning and ventilation, navigation equipment and crew regulation requirements.

Tritec concluded that "whilst the restoration of The Clipper Ship - City of Adelaide for sea-going use is theoretically possible, the end result would be extremely expensive and so far removed from the historical vessel to make the logic of the whole project questionable." (5)

Therefore, the 'conservation of fabric route' is the logical choice for the *City of Adelaide.*

As a composite ship with iron framing and wooden hull and deck planking, the *City of Adelaide* is especially demanding when it comes to establishing the most effective conservation regime: corroded metal (especially that attacked by chlorides) requires different conditions from wood. When these conflict, metal dictates the overriding environment within which an object should be conserved. This being the case, the significantly dryer (and hotter) climate of South Australia will deliver an environment more conducive to the overall health of the ship than the much wetter and cooler climes of the United Kingdom.

Preservation of the *City of Adelaide* on land represents the means of providing greatest protection to the iron framing. Besides, to make the hull capable of floating would require some strengthening of the hull, it being made watertight, ballast re-install, bilge pumping and monitoring systems installed, and other works that the local survey authorities may dictate to permit visitors on board when afloat. Thus, afloat conservation would require loss or degradation of the historic fabric.

The *City of Adelaide* is to be conserved ashore. It is desirable to make the hull 'weather-tight' or 'water-resistant', as different to 'watertight', to keep the internal hull dry for the sake of the iron framing, and potentially permitting the wetting down of the external timber-work, desirably with salt-water – a natural biocide.

8.0 Risk Assessment

8.1 Introduction

The project's success will be measured against the following primary critical success factors:

- cost and revenue;
- preservation of the clipper ship *City of Adelaide*;
- market and stakeholder appeal; and
- sustainability.

Secondary success factors include:

- occupational health, safety and environment;
- reputation; and
- security.

A risk event can result from an occurrence or change of a particular set of circumstances. The effect is a deviation from the expected and can be positive and/or negative.

8.2 Scope

This Risk Assessment summarises the initially identified risks associated with the preservation of the *City of Adelaide* and provides visibility of them within this Conservation Plan. The actual management of these risks and other emerging risks will be undertaken under the separate Risk Management Plan and Risk Register. These documents have precedence for managing risk. In addition to ship preservation risks, these documents cover other risks such as external and internal, environmental and operational risks.

The aim of the Risk Management Plan is not necessarily to eliminate risk, rather to manage risk on an ongoing basis, maximising opportunities and minimising adversity. It provides a system for the setting of priorities when there are competing demands on limited resources.

For the purposes of completeness and readability of this Conservation Plan, this section summarises the Risk Management Plan activities required to identify, assess, analyse, treat and monitor risks.

8.3 Risk Management Process

Risk management steps in accordance with the Standard *AS/NZS ISO31000:2009 Risk Management Principles and Guidelines* are depicted in Figure 17.

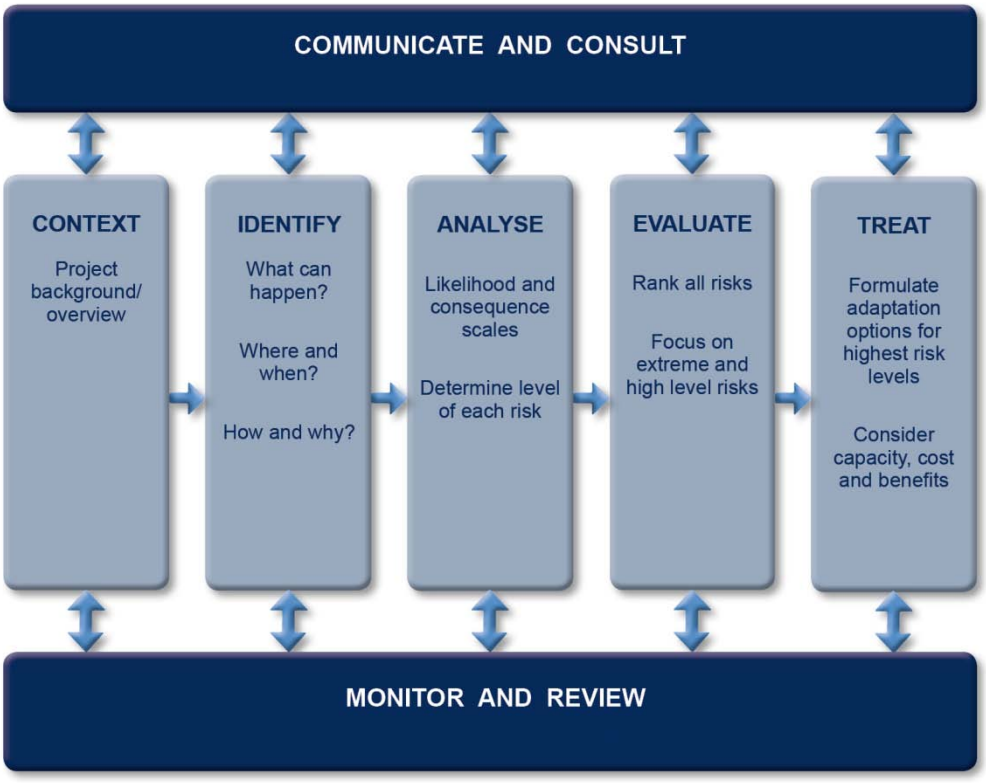

Figure 17: Risk Management Process.

8.4 Communication and Consultation

Communication and consultation are important considerations at each step of the risk management process. It involves dialogue with stakeholders with a focus on consultation rather than a one way flow of information from the decision maker to other stakeholders.

8.5 Establish the Context

Establishing the context involves articulation of objectives, risk tolerance and internal and external parameters to be taken into account when managing risk. It sets the scope and risk criteria for the risk management process including likelihood and consequence ratings used to assess risk.

8.5.1 External factors

External factors that influence operations and should be taken into consideration as part of risk identification and assessment include:

- product appeal;
- economic and political implications (state / federal / international);
- media;
- community and environment;

- natural disasters; and
- legal and regulatory obligations.

8.5.2 Internal factors

Internal factors that influence operations and should be taken into consideration as part of risk identification and assessment include:

- commercial arrangements;
- human resources;
- occupational health, safety and environment;
- financial and corporate sustainability;
- execution, delivery and process management;
- technical;
- strategic;
- political;
- reputational;
- stakeholder relations;
- environmental;
- security and fraud; and
- legal and regulatory compliance.

8.5.3 Ten Deterioration Factors Which Directly Impact the Ship

Maritime and museum conservators have identified ten universal agents that cause maritime vessels to deteriorate. Identifying and analysing exposure to and impact from any of the agents help to understand why deterioration occurs and suggest how to eliminate or mitigate risks to maritime vessels.(8)(9)

1. Custodial Neglect
    - Custodial neglect occurs when there is inadequate collection management including thorough housekeeping and routine inspections for pests, mould, and accumulation of contaminants. Most custodial neglect is benign or inadvertent until identified as a threat. The causes of custodial neglect stem from insufficient staffing combined with lack of knowledge or experience with preservation and conservation practices and standards. This risk is amplified by lack of funds for hiring additional qualified staff and educating current and new staff.
    - Custodial neglect includes lack of system and practices for collection and information management, loss of data and historical information, misplacement of objects, disassembling artefacts for storage or replacement parts.
2. Direct Physical Force
    - Any property or object can be damaged or destroyed by forces such as scraping, abrading, dropping, tearing or wearing down from repeated exposure or impact. It is not possible to completely avoid all direct physical force uniformly. It is important to minimise the impact of unavoidable direct physical force, prevent avoidable impact and mitigate the effects as possible.
3. Light and UV radiation
    - Visible light and ultraviolet (UV) radiation affect most materials and causes damage that ranges from fading and discoloration, to embrittlement and disintegration. Light damage is cumulative; repeated

exposure to strong light, sunlight, flashbulbs, spot lights, has an additive effect, causing as much damage to an artefact as extended exposure. Light damage is irreversible.

4. Water
    - The effects of water exposure can be irreversible and are very costly to remedy or reverse. An iron-framed ship is particularly susceptible to water and corrosion. Any seaside property is also vulnerable to natural disaster.
5. Temperature
    - High temperatures promote and accelerate unwanted chemical reactions resulting in deterioration or loss. Cold temperatures can reduce evaporation of moisture. Water freezing can cause structural damage.
6. Humidity
    - Incorrect and fluctuating relative humidity levels will adversely affect all materials. If too damp, substrates can soften, wood can delaminate, and iron can corrode. Mould and fungi growth can occur. If humidity is too low, organic materials such as leather, wood and textiles can become embrittled and crack or rupture. Repetitive fluctuations of humidity will cause different materials to expand and contract at different rates, resulting accelerated deterioration or loss.
7. Pests
    - Infestation and resulting damage from insects, birds, rodents, mammals, mould or fungi happens when there is inadequate collection management including thorough housekeeping and routine inspections for pests, mould, and accumulation of contaminants.
8. Contaminants
    - Gaseous pollutants such as sulphur dioxide, nitrogen dioxide, peroxide, carbon monoxide, formaldehyde, and ozone combine with moisture in the air to form acids that catalyse harmful chemical reactions in all types of materials. Particulate pollutants such as soot, dirt and dust, abrade, soil, and disfigure materials. Dust and dirt also contain gases absorbed from the atmosphere. Particulates can also support mould growth.
9. Theft or Vandalism
    - Incidents of vandalism such as graffiti, isolated theft or robbery are more likely to occur and go unnoticed when environs do not appear well - maintained or if security measures are not evident.
10. Fire
    - Unlike all the other agents of deterioration, fire can completely destroy property and valuable assets, often in minutes. Associated with fire incidents are increased damage from smoke, soot and emergency response in the form of physical impact and exposure to fire retardants.

8.6 Risk Identification

The aim of this step is to generate a comprehensive list of risks based on events that might create, enhance, prevent, degrade, accelerate or delay the achievement of objectives. This includes identifying the risks associated with not pursuing an opportunity. All staff with appropriate knowledge are required to be involved in identifying risks.

Identification includes risks whether or not their source is under the control of the organisation as well as examination of knock-on effects of consequences including cascade and cumulative effects.

The process involves identification of individual risk events by considering the context and asking the following questions, each of which becomes relevant when assessing the consequence of the risk and devising future mitigation strategies to reduce the overall risk rating:

- What can happen? - What might go wrong, or what might prevent the achievement of objectives? What events or occurrences could threaten the intended outcomes?
- How can it happen? - What can cause the risk event to happen?
- Where can it happen? - Can the risk event only happen in certain areas (ie physical location), business units or job functions?
- Why would it happen? - What are the causal factors? Understanding the causal factors is crucial to ensure that controls that are in place to address them or to ensure that appropriate future mitigation strategies are implemented to address key causal drivers.
- What is the impact? - If the risk event occurred, what impact would this have on the product, project, activity, business unit, decision? It is important to also look beyond the actual occurrence to the follow-on consequences of the event.
- Who is responsible? - Who (if anyone) has the control over this event?

8.6.1 Risk Parsing

All Identified risks are to be described using the standardised 'parsing' format:

There is a chance that … {description of the risk event} … because of … {cause} … with the consequence that … {consequence} ….

The parsing technique is used during risk identification activities. This technique will ensure that the risks identified are consistently and clearly stated, and it should also assist in identifying when the 'risk' identified is in fact an issue or an underlying cause.

8.7 Risk Analysis Process

Risk analysis involves developing an understanding of the risk. It provides an input to risk evaluation and to decisions on whether risks need to be treated, and on the most appropriate risk treatment strategies and methods. Following risk analysis an evaluation is then made to determine which risks take the highest priority with respect to management.

Risk analysis involves consideration of the causes and sources of risk, their positive and negative consequences, and the likelihood that those consequences occur. Factors that affect the consequence and likelihood should be identified. An event may have multiple consequences and can affect multiple objectives.

8.7.1 Likelihood Criteria

The likelihood of a risk is assessed using the likelihood criteria outlined in Table 1.

Table 1 Risk Likelihood Criteria.

Likelihood Rating	Rating Index	Risk Assessment	
		Probability	Description
Almost Certain	1	>75%	The event is almost certain to occur at some time over the next 12 months
Likely	2	50 – 75%	The event is likely to occur at some time over the next 12 – 24 months
Possible	3	25 – 50%	The event is possible to occur at some point within a 3 year period
Unlikely	4	5 – 25%	There is a low probability that the event may occur within a 5 year period
Improbable	5	< 5%	The event is not expected to occur and will only occur in exceptional circumstances

8.7.2 Risk Consequence Criteria

The consequence is an assessment of the impact should a risk event occur and is assessed against the project's critical success factors. The consequence criteria for risks are outlined in Table 2. Opportunities with cost savings and schedule gains are recorded as negative numbers – i.e. a cost saving is a negative loss.

Table 2 Risk Consequence Criteria for the Critical Success Factors

Consequence Rating	Rating Index	Cost and Revenue	Ship Preservation	Market/Stakeholder Appeal	Sustainability
CATASTROPHIC	1	Would cause ≥ $100k unplanned increase in cost or loss of revenue.	Severe loss of, or damage to, heritage fabric of ship.	Severe loss of product appeal. Severe impact on business reputation. Extensive negative national and International media exposure.	Inability to achieve key strategic initiatives. Indefinite interruption to operational activity.
CRITICAL	2	Would cause ≥$25k<$100k unplanned increase in cost or loss of revenue.	Significant loss of, or damage to, heritage fabric of ship.	Significant impact on product appeal, or business reputation. Extensive negative national media coverage.	Significant impact on ability to achieve some key strategic initiatives. Interruption to operational activity 7 – 28 days.
MAJOR	3	Would cause ≥$10k<$25k unplanned increase in cost or loss of revenue.	Moderate to small loss of, or damage to, heritage fabric of ship.	Moderate to small impact on product appeal and business reputation. Negative local media exposure.	Potential impact on ability to meet some key strategic initiatives Interruption to operational activity less than 7 days.
MINOR	4	Would cause ≥$1.0k<$10k unplanned increase in cost or loss of revenue.	Minor loss of, or damage to, heritage fabric of ship.	Some impact on product appeal and business reputation. Local media interest.	Minor impact on ability to achieve strategic initiatives but only minor aspects impacted. Minor interruption to non-essential operational activity.
INSIGNIFICANT	5	Would cause <$1.0k unplanned increase in cost or loss of revenue.	Insignificant loss of, or damage to, heritage fabric of ship.	Minimal impact to product appeal and business reputation. No media enquiry.	Insignificant impact on ability to achieve strategic initiatives. Minor interruptions to operational activity.

8.7.3 Overall Risk Rating

The overall risk rating is determined by plotting the likelihood and consequence on the overall risk rating matrix as per Table 3. The matrix reflects the overall risk ratings as Extreme (red), High (yellow), Medium (blue) and Low (green) with a risk index assigned to each plot point. The lower the risk index the higher the level of risk.

When undertaking the assessment the most likely case scenario against any of the consequence criteria should be used to determine the overall risk rating. If the most likely scenario is significantly distinct from a worse-case scenario assessment, then identification and assessment of the worse-case scenario risk should also be undertaken.

Table 3 Risk Rating Matrix Index

		RISK RATING				
LIKELIHOOD	Almost Certain	Extreme 1	Extreme 3	High 7	Medium 13	Low 21
	Likely	Extreme 2	Extreme 5	High 9	Medium 16	Low 22
	Possible	Extreme 4	High 6	Medium 11	Low 18	Low 23
	Unlikely	High 8	Medium 10	Medium 14	Low 19	Low 24
	Improbable	Medium 12	Medium 15	Low 17	Low 20	Low 25
		Catastrophic	Critical	Major	Minor	Insignificant
		CONSEQUENCES				

8.7.4 Controls

Capturing existing controls is relevant as part of the risk assessment process. This includes considering the effectiveness of the control environment as part of undertaking the inherent and residual risk assessment. Table 4 provides a guide when assessing the effectiveness of controls.

Table 4: Control Effectiveness

Rating	Description
Strong	The control is well documented, staff are trained in its application and the control is also audited. • Staff are highly skilled and experienced in the area. • Tools and procedures are in place and proven. • All aspects of the activity have been executed before and are well understood.
Satisfactory	The control environment is operating effectively, providing a reasonable level of assurance that objectives are being achieved. • Staff are highly skilled and experienced in the area. • Established tools and procedures are in place and have been used effectively on similar activities. • Nearly all aspects of the activity have been executed before and are well understood.
Some weaknesses	The control environment has some weaknesses / inefficiencies. Although these are not considered to present a serious risk exposure, improvements are required to provide reasonable assurance that objectives will be achieved. • Staff have skills and experience in the area. • Established tools and procedures are in place. • Most aspects of the activity have been executed before or are well understood.
Weak	The control environment is not at an acceptable standard, as many weaknesses / inefficiencies exist. Reasonable assurance does not exist that objectives will be achieved. • Staff have some of the required skills but have not applied them to an activity of this nature or magnitude. • Supporting processes are in place, but are immature or have not been applied to an activity of this nature or magnitude. • Some aspects of the activity have not been executed before or are not well understood.
Unsatisfactory	The control environment is entirely unsatisfactory offering no mitigation to the risk. • Staff is neither skilled nor experienced in the area. • Supporting processes and tools are either not in place, or are inadequate, immature and unproven. • Most aspects of the activity have not been executed before or are not well understood.

8.8 Risk Evaluation

The purpose of risk evaluation is to assist decision making, based on risk analysis, about which risks need treatment and the priority for treatment and implementation. The decision as to whether a risk is acceptable or unacceptable is referred to as risk tolerance, which is derived from the organisation's risk appetite.

CSCOAL recognises that it does not have the resources to mitigate all risks, however all risks must be evaluated in order to determine which risks need to be mitigated and the priority for doing so. When considering the priorities for risk treatment it is important to also take into account the time horizon of the risk, as risks expected to occur sooner need to be mitigated first.

Figure 18 is based on the ALARP (As Low As Reasonably Practicable) Principle and reflects CSCOAL's risk appetite and tolerance limits. Risk appetite is the amount of risk CSCOAL is willing to accept in pursuit of its objectives whilst tolerance defines the maximum amount of risk CSCOAL can retain.

CSCOAL risk tolerance is reflected by the actions required for each risk level in accordance with the overall risk rating matrix outlined in Table 3. Table 5 outlines the treatment / management priorities that apply in accordance with the overall risk rating and CSCOAL risk tolerance.

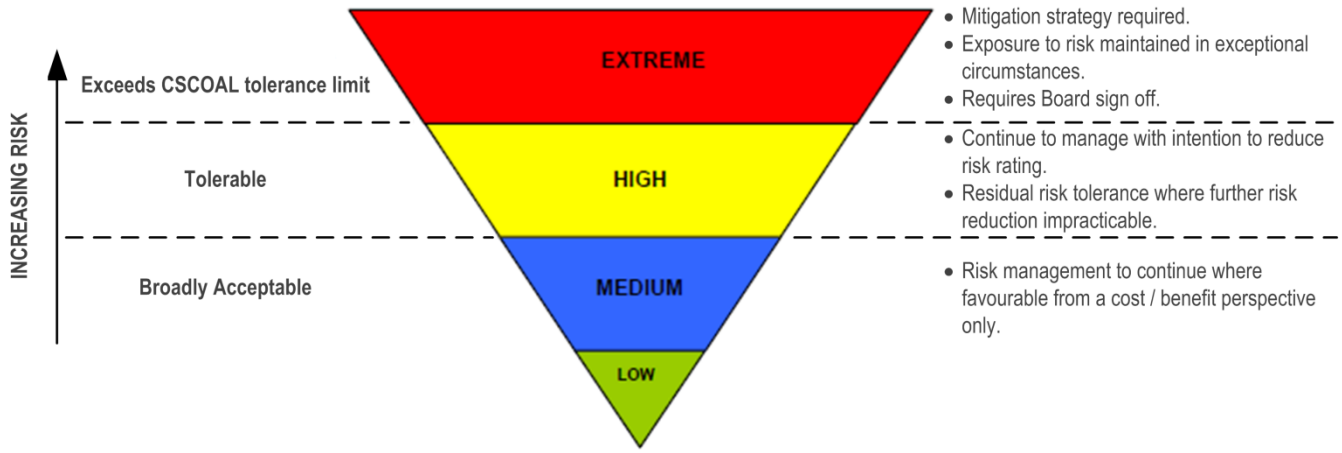

Figure 18: ALARP Principles – Risk Acceptability and Tolerances.

Table 5: Risk Tolerance and Action Required.

Risk Rating	Risk Tolerance	Description
EXTREME (1 - 5)	Exceeds Tolerance Limit Risk reduction essential or exposure to risk discounted or approved by Board.	• Risks at this level are reported immediately to the General Manager and the Board, and then managed until mitigated to an acceptable level. • Risk Action Plan required. • Board sign off. • Monthly monitoring. • Appropriate resource allocation to manage.
HIGH (6 - 9)	Tolerable Risk reduction action and continuous review required.	• Risks at this level are reported immediately to the General Manager, brought to the attention of the Board at the earliest opportunity, and managed until mitigated to an acceptable level. • Future mitigation strategies required. • Risk Action Plan required where appropriate. • General Manager sign off. • Monthly monitoring.
MEDIUM (10 - 16)	Acceptable Risk reduction action where practical and periodic review required.	• Risks at this level are reported to the Team Leader and are reviewed by the General Manager at scheduled meetings. • Further treatment assigned if necessary to prevent escalation. • Quarterly monitoring.
LOW (17 – 25)	Acceptable Periodic review.	• Risks at this level are reviewed at scheduled review meetings. • Managed via standard procedures. • Quarterly monitoring.

8.9 Risk Treatment

Risk treatment involves identifying the range of options for treating risks, assessing these options and subsequently implementing treatment plans and / or mitigation strategies. Risk treatment options are to be considered in terms of feasibility and cost effectiveness and may fall into the following broad categories:

- Avoid the Risk. This involves choosing an alternative course of action that has a more acceptable level of risk, or not proceeding with the activity. In many cases this will be the preferred option. Risks are often easier to avoid if the risk management process is commenced before significant aspects of the project plan have been locked down and people become less inclined to accept change.
- Reduce the Risk Likelihood. Implement actions to reduce the likelihood of the risk occurring. For example, if there is a risk of late delivery from sub-contractors, the supply contract could include incentive clauses for early or on-time deliveries.
- Reduce the Risk Consequences. Implement actions to reduce the consequences if the risk occurs. For example is there is a risk that sub-contractor may default on supplies, identify alternative suppliers who can be used at short notice.
- Transfer the Risk. Identify mechanisms to transfer all or part of the risk to another party. Mechanisms can include contractual measures, insurance and sub-contracting.
- Acceptance. Accept the consequence if the risk occurs particularly where the cost of mitigation action is too high or impractical. Risk acceptance of risks with a cost component will require the allocation of contingency funds to deal with the consequences of the risk if they are realised.

The aim of treating risks is to maximise the project's success by reducing risk, and maximising opportunities. A five step process is suggested for general risk treatment design for risks with a higher overall risk rating. This process is aimed primarily at the development of new measures but is also a useful basis for the assurance and assessment of existing treatment measures. The process steps include:

- Step 1 – Review causes and controls: revisit the risk analysis to ensure the risk and its causal factors are clearly understood. Review current controls against causal factors for alignment.
- Step 2 – Treatment objectives: the broad intent of risk treatment is to change the risk to a level where the benefits exceed the total cost of treatment. Consider the causes, sources or events that the treatment should target.
- Step 3 – Detailed design of treatment measures: considering their practicality and maintainability. Ensure that all stakeholders are engaged in the process and where possible measures should be designed to be 'embedded' in normal business processes and systems.
- Step 4 – Design review: check that the treatment objectives will be satisfied, that treatments are realistically capable of achieving levels of effectiveness taking into account anticipated operational conditions and that the treatments do not introduce new intolerable risks.
- Step 5 – Communication and implementation: ensure that all stakeholders including those involved in the implementation and those who might be impacted by the treatment strategy are well informed and consulted.

The low cost high benefit options should form the initial treatment choices. Selection of treatments with impacts other than cost requires the consideration of the value of changes in schedule, safety, capability or sustainability outcomes.

8.10 Monitoring and Review

Ongoing review is essential to ensure that risks identified and associated treatment options remain relevant. Factors that affect the likelihood and consequence may change, as may the factors that affect the suitability or cost of treatment options. Reviewing risks forms a key component of business planning to ensure that the risk profile is taken into consideration when determining work priorities and resource allocation.

8.11 Demonstration of Risks from Deterioration Factors

Table 6 demonstrates the ship preservation risks that have initially been identified and developed by considering the Deterioration Factors and the ranking process. The list is not intended to be exhaustive. As outlined at the beginning of this section, these are only a summary of the risks directly relating to ship preservation and do not cover the broader external and internal, environmental and operational risks relating to managing the *City of Adelaide* as a sustainable non-profit business.

Table 6: Deterioration Factors

Deterioration Factor	Risk ID#	Event	Consequence	Likelihood	Risk Index
Custodial Neglect	D1	Lack of guidelines and training for staff and volunteers.	Critical	Possible	6
	D2	Lack of Conservation Plan or Policies	Critical	Possible	6
Direct Physical Force	D3	Collapse of part/whole of ship, earthquake	Catastrophic	Improbable	12
	D4	Site-works too close	Catastrophic	Possible	6
	D5	Abrasion from visitor/staff movements	Major	Almost certain	7
Light and UV radiation	D6	Fading, structural damage	Minor	Almost certain	13
Water	D7	Storm tides, site flooding.	Major	Likely	9
	D8	Protective cover leaks	Major	Possible	11
	D9	Corrosion of frames	Critical	Almost certain	3
	D10	Rain on unprotected parts of ship	Minor	Almost certain	13
Temperature	D11	Fluctuations of temperatures result in chemical reactions	Minor	Likely	16
	D12	Timbers drying out	Critical	Likely	5
	D13	Biological activity	Major	Possible	11
Humidity	D14	Elevated levels result in corrosion	Critical	Unlikely	10
	D15	Biological activity	Critical	Possible	6
Pests	D16	Insects, rodents, birds	Major	Possible	11
	D17	Bacteria, mould	Critical	Almost certain	3
Contaminants	D18	Smog	Insignificant	Unlikely	24
	D19	Dust	Minor	Almost certain	13
	D20	Biological	Major	Almost certain	7
Vandalism	D21	Graffiti inside or out	Minor	Possible	18
	D22	Physical damage inside or out	Major	Possible	11
Fire	D23	Soot, smoke	Critical	Unlikely	10
	D24	Total loss from fire	Catastrophic	Improbable	12

8.12 Top Ten Deterioration Risks

Table 7 takes the risk rankings from Table 6 and, for the top ten risks, describes the treatment for those risks.

Table 7: Top Ten (Extreme and High) Deterioration Risks

ID#	Event	Consequence	Likelihood	Risk Index
D9	Corrosion of frames	Critical	Almost certain	3
	Detail – concern with the integrity of the planking fasteners and their attachment to the iron frames, and any failures will permit planks to spring. Mitigation – requires detailed research and analysis with expert assistance. Potential strategies might include: • Passivating any dissimilar material corrosion problems. • Installing modern fastening systems in as unobtrusive fashion as possible. • Removing, melting down, and recasting existing metal components – to reinstate fastener by re-using the original material.			
D17	Bacteria, mould	Critical	Almost certain	3
	Detail – extensive rot from exposure to elements in Scotland will continue to eat timber like a cancer. Mitigation – requires detailed research and analysis with expert assistance. Potential strategies might include: • Local treatment of timbers with borates or ethylene glycol. • Spraying salt-water, a natural biocide, on external hull.			
D12	Timbers drying out	Critical	Likely	5
	Detail – dry warm air in South Australia can make timbers dry out. Mitigation – potential of reticulating saltwater with a discrete saltwater drip or spay system around the periphery of the hull to serve the dual purposes of biocide treatment and a means to keep the hull planks from drying out. However, the hull and decks are not watertight and saltwater could make its way inside where it would be harmful to metal items such as the iron frames. Expert advise is needed.			
D1	Lack of guidelines and training for staff and volunteers.	Critical	Possible	6
	Mitigation – requires the supporting advice of a conservation professional. • Develop guidelines and training program. • Continually educate staff and management regarding the importance and rarity of the ship's fabric.			
D2	Lack of Conservation Plan or Policies	Critical	Possible	6
	Mitigation – development of this plan. Continually review and update this plan and policies.			
D4	Site-works too close	Catastrophic	Possible	6
	Detail – site-works using bulldozers or back-hoes may be required in close proximity of hull. Mitigation – erect physical barriers, and train operators of risks.			
D15	Biological activity	Critical	Possible	6
	Detail – wet rot and dry rot flourish in humid conditions. Comment – South Australia's climate will be far more beneficial than the wet conditions in Scotland for rot and high temperatures can also act as a heat sterilizer. No further mitigation strategy and this risk will be tolerated and monitored. See also Risk D2 relating to existing rot.			
D5	Abrasion from visitor/staff movements	Major	Almost certain	7
	Mitigation – erect physical barriers, covered walkways, an doorway, bulkhead protection to protect against abrasion.			
D20	Biological	Major	Almost certain	7
	Detail – faecal contamination from pigeons roosting in ship in Scotland is a biohazard risk. Mitigation – AQIS require a biohazard risk assessment of the hull to be undertaken before export to Australia. A certificate from a skilled service provider in Scotland is required. This needs to occur in warmer Scottish months when 'bugs' are not dormant.			
D7	Storm tides, site flooding.	Major	Likely	9
	Detail – extreme storm tides could inundate site with water from storm tide up river. Mitigation – if cost effective either place hull above 100 year flood level, or build bund. Caulk lower parts of hull that could be immersed.			

This summary ship preservation risk assessment concludes at this point. At the time of writing this Plan the *City of Adelaide* sits in Scotland with little access to the clipper possible. It is premature to fully assess potential risk mitigation treatments and options. Once the treatment options have been assessed and costed, the recommended treatment will be incorporated into the Risk Register, including the expected post-mitigation risk assessment. Then the post-mitigation risk assessment can be undertaken to identify the residual risk.

9.0 Second Conservation Gateway

9.1 What is the Second Conservation Gateway?

At the first Conservation Gateway, a decision was made to follow either the 'conservation of fabric route' or the 'operational route'. In the case of the *City of Adelaide* the decision was inevitably to follow the 'conservation of fabric route'. Having gained an understanding of the *City of Adelaide* and the risks to its significance, and the consequential conservation priorities, the second 'Conservation Gateway' reflects the need to choose the most appropriate conservation process or processes to apply.

Figure 19: Inside the *Edwin Fox*.

The four principal conservation processes are:(1)

- Preservation: keeping part or all of a vessel's fabric as far as possible in its existing state and retarding deterioration. Examples of projects involving the 'pure' preservation of historic ships include the *Edwin Fox* in New Zealand (Figure 19), *Vasa* in Sweden, and the *Mary Rose* in the United Kingdom. The *Edwin Fox* is a particularly good example for the *City of Adelaide* as will be expanded upon later in this Plan.
- Restoration: returning the existing fabric or part of the fabric of a vessel to a known earlier state by removing additions or re-assembling existing components with the minimum introduction of new material. The *Cutty Sark*, prior to its 2007 fire, had retained much of its original fabric although a major restoration in 1953-57 replaced much of the upper works – see Figure 21. This is often inevitable with many historic ships where the fabric is gradually replaced over time – *HMS Victory* is an example where it is said that little of the ship existing today was actually present at the Battle of Trafalgar in 1805.
- Reconstruction: returning all of the fabric or part of the fabric of a vessel to a known earlier state but is distinguished from restoration by the introduction of significant new material into the fabric. The *SS Great Britain* is an example of a ship where much new fabric has been added to the ship to reconstruct the ship as it was in an earlier state; preservation, restoration, and reconstruction all exist together on The *SS Great Britain*.
- Adaptation: modifying a vessel to suit a proposed new use. For example, Figure 20 shows a concept from a UK Engineering firm to adapt the *City of Adelaide* hull by turning it upside down and converting it to become office accommodation.

Figure 20: UK concept for *City of Adelaide* (Beckett Rankine & Buro Happold).

The conservation of most historic ships will employ more than one process, or all four of these processes.

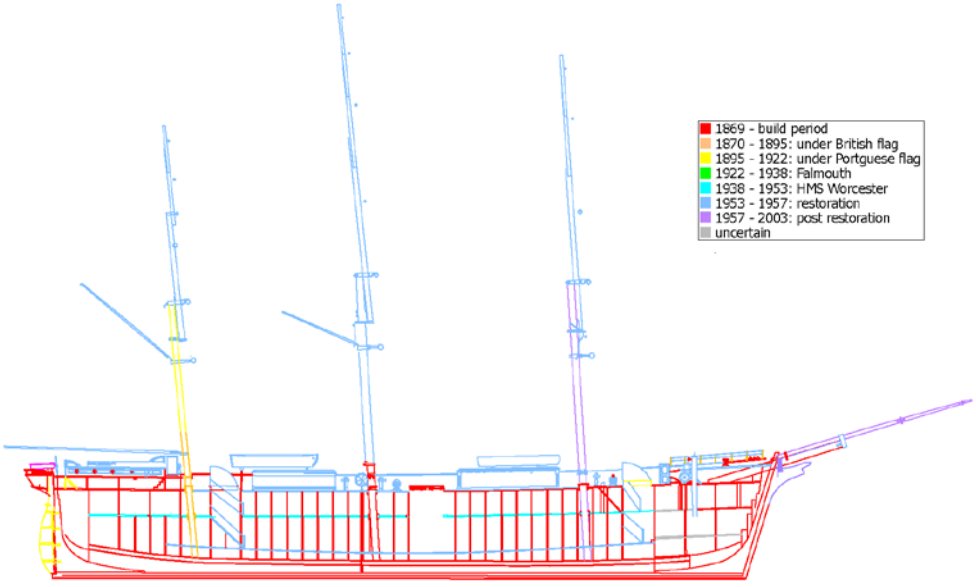

Figure 21: Age of the fabric on the *Cutty Sark*. (Adapted from (10))

9.2 Second Gateway Decision for *City of Adelaide*

The second Conservation Gateway decision has been much dictated by past events. Between 1993 and 1999, restoration activities in Scotland removed all of the fabric from the conversion of the *City of Adelaide* to an Isolation Hospital and to a Naval Drill Ship. Fundamentally what remains of the clipper, see Figure 22, is the 1864 fabric, main deck planking (except under the poop) that was replaced in 1893, and the replacement rudder installed in South Australia in 1877, but now lying apart from the clipper.

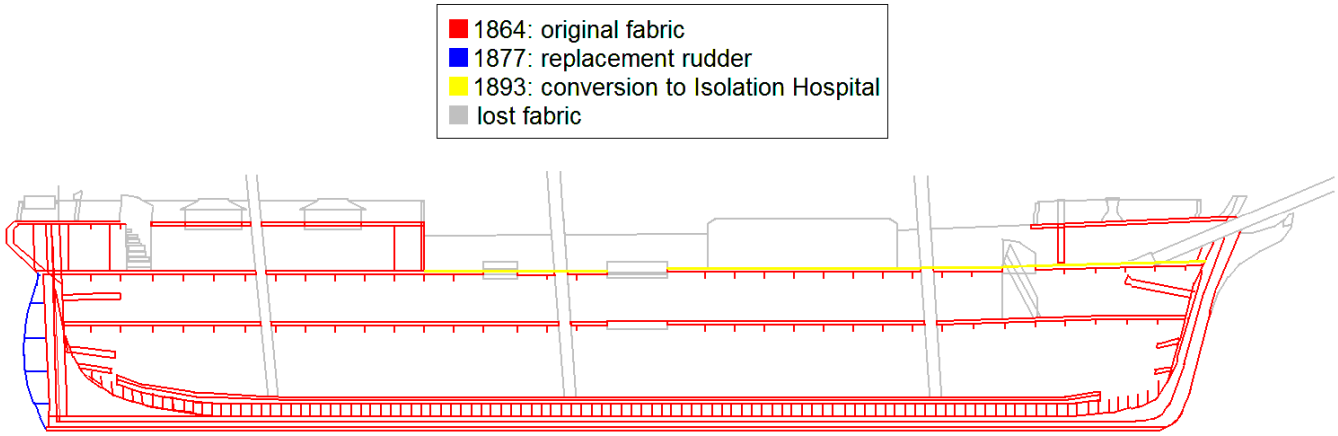

Figure 22: Age of fabric on *City of Adelaide* (subject to confirmation).

Since 1993, hull planking has dried and shrunk causing large gaps between planks. Concurrently, rain water seeping through the hull has caused much of the timber to rot. The moist and humid conditions have also been poor for the state of the iron framing, although the rate of deterioration of the framing is not known.

Thus, preservation is the logical choice for the *City of Adelaide* for the second Conservation Gateway decision. As identified in the Risk Assessment, the major focus for the *City of Adelaide* needs to be on arresting deterioration and preserving the heritage fabric that survives.

Preservation is also the most viable option, whereas reconstruction or restoration to a known period is likely to be beyond the financial capacity of the project.

As with most historic ships, that employ more than one conservation process, all four of the processes will be evident to some degree on the *City of Adelaide* but preservation will be the greatest emphasis.

9.2.1 Preservation on the *City of Adelaide*

Preservation on the *City of Adelaide* needs to prioritise:

- Keeping rainwater out of the hull – potentially by re-caulking the hull to make it weather-tight. If re-caulking is viable, materials need to be readily discernable so that old caulking can be identified from new caulking, and seams where it is applied needs to be recorded.
- Conserving the iron framing – by changing the clipper's internal environment to one that slows deterioration, and developing techniques to conserve the framing.
- Combating timber rot – through developing techniques to stop timber rot.
- Slowing the Drying of Hull Timbers – will need an early solution and pending detailed analysis might be achieved by painting the hull and/or keeping the hull planking wetted with salt-water a natural biocide.

The emphasis on preservation for the *City of Adelaide* is consistent with the model used for preserving the *Edwin Fox* in New Zealand. The *Edwin Fox* is to be used as one of the project's role models.

9.2.2 Restoration on the *City of Adelaide*

Restoration on the *City of Adelaide* needs to prioritise:

- Restoring the stem and stern – are priorities as they threaten the structural integrity of both ends of the ship.
- Restoring the weather-tight integrity – of the upper decks of the *City of Adelaide* is important to prevent rain-water seeping trough the hull.

9.2.3 Reconstruction on the *City of Adelaide*

While preservation is the greatest emphasis, there is also a need to find balance with the need to provide a satisfactory and high quality experience for the visitor to the *City of Adelaide*. Sustainability of the project and building revenue from visitors is a very important component in preserving the heritage fabric of the ship.

A program of enhancing the display by reconstructing key items of the ship, is not an immediate priority, but may include the following:

- Reconstructing the kangaroo and lion scrollwork – after restoration of the stem.
- Reconstructing the Adelaide coat of arms – after restoration of the stern.
- Reconstructing one or more First Class cabins – as lightweight self-standing units to avoid disturbing the heritage fabric.
- Reconstructing the main deck bulwarks – as a means of increasing the safety of visitors on the upper deck as well as returning the clipper's original sheer-line.
- Reconstructing stub masts, and part of the bowsprit – in painted light-weight aluminium or fibreglass to return some of the key cognitive features of a sailing ship.

9.2.4 Adaptation on the *City of Adelaide*

The visitor experience on the *City of Adelaide* needs to also meet current standards of health and safety, as do the staff and volunteers working on the clipper. Modern systems of security, services, power, lighting, heating, ventilation, etc., should not detract from the historic ambience nor damage the heritage fabric.

9.3 Recording Process

Throughout the conservation works on the *City of Adelaide*, detailed records need to be created that document the works undertaken and heritage details observed.

Reconstructed detail needs to be distinguishable from old heritage fabric and can be documented with photography, drawings or sketches supplemented by written record. A daily log of work done is a reliable method of recording reconstruction as well as being useful in assessing time and cost of future work.(1)

10.0 Maintenance Processes

Maintenance means the continuous protective care of the fabric of a vessel and should be distinguished from repair, which involves restoration of reconstruction.(1)

A Ship Maintenance Plan shall be written as a subordinate document to this Conservation Plan. The Ship Maintenance Plan shall set out a regular maintenance regime for the *City of Adelaide* and include regular environmental monitoring measurements to be recorded by staff or volunteers at various locations about the clipper.

11.0 Policy

11.1 Our Vision

Our Vision is to …

- Preserve the world heritage clipper ship *City of Adelaide*,
- Promote knowledge of this precious ship's heritage significance to South Australia, Australia and the international community,
- Enrich lives through an interpretative museum and community venue, and,
- Provide enjoyment for visitors to the maritime heritage tourist precinct of Port Adelaide and for the local community.

11.2 Our Mission

Our Mission is to save the historic clipper ship *City of Adelaide* and preserve the ship for future generations, by …

- Transporting the ship from Scotland to South Australia.
- Protecting and securing the ship on land in Port Adelaide.
- Developing an interpretive museum and community venue that educates, entertains and involves visitors.
- Providing visitors with an appreciation of …
  - the unique construction of the ship,
  - the traditional skills of the 19th century English shipbuilders,
  - the traditional skills of the crew of the ship,
  - the life on board for the passengers and crew,
  - the trade importance of the clipper ships to the fledgling colony of South Australia in transporting goods, grain, wool, wine, copper and other commodities to the European markets,
  - the great Clipper Races from Australia to the European markets.
- Linking to other related South Australian tourist destinations such as Port Augusta, Burra, the 'Copper Triangle' towns, the River Murray Paddle Steamers, the ships' graveyard, the Migration Museum, and the SA Maritime Museum.
- Creating critical mass together with other local museums, heritage organisations and community groups.

11.3 Statement of Conservation Policy

The following policies have been adapted from the extant conservation policies for museum ships contemporary to the *City of Adelaide*, namely the *Cutty Sark*(10) and the *SS Great Britain* (11). The original source of these policies is duly acknowledged.

The structure of these Statements of Conservation Policy follows that advocated in the Burra Charter (12).

Policy 1. Introduction

Policy 1.1 Scope

1.1.1 These policies summarise the principles governing the conservation of the clipper ship *City of Adelaide*. Conservation is the generic term for all the processes of looking after the ship so as to retain the heritage significance identified within it.

1.1.2 Development activities should be dictated by, firstly, conservation of the ship, secondly, sustainability of the project, and thirdly the enhancement of visitor interpretation and education facilities.

1.1.3 Future conservation and development should be undertaken in accordance with the principles, and recognising the statements of significance, within this Conservation Plan.

1.1.4 Future works will be undertaken according to the statutory controls that exist at the time.

Policy 1.2 Aims

1.2.1 The fabric of the ship should be treated in light of its historical significance.

1.2.2 Strategies to protect the iron work of the ship should be the first priority. Strategies to protect the timber work of the ship should be the next highest priority.

Policy 1.3 Associated Documentation

1.3.1 These policies should be read in conjunction with these other core management documents:

a. *City of Adelaide* Maintenance Management Plan

b. *City of Adelaide* Risk Management Plan

c. *City of Adelaide* Interpretation Plan

Policy 2. Fabric and Setting

Policy 2.1 Existing Fabric

2.1.1 As much of the fabric from the period 1864 to 1893 shall be retained as possible. Remedial treatment, where possible and where the safety of the structure is not compromised, will be presumed preferable to replacement.

2.1.2 Any changes to the fabric made in the period 1893 to 1948 which do not significantly detract from the ship's overall appearance as a clipper will be retained.

2.1.3 Intrusions and additions post 1893 will be distinguished that these are not part of the ship's structure during the working life at sea.

Policy 2.2 Monitoring

2.2.1 The fabric of the ship shall be monitored with specific regard to the caring of the fabric.

2.2.2 The environment in and around the ship shall be regularly monitored to measure ultra violet (UV) light, temperature and relative humidity)

Policy 3. Use

3.1.1 Any conservation works, large or small, will take into account the need to provide public access and the conservation works will be interpreted wherever practical. This should include specific educational and public programmes as well as information panels.

3.1.2 If physical access to the ship is not possible due to conservation works, other means for public viewing will be provided wherever possible.

3.1.3 Any commercial activities undertaken will not restrict access to the ship for substantial periods.

3.1.4 Any commercial activities undertaken will be appropriate to the ship's significance and not disturb local residents unduly.

Policy 4. Interpretation

4.1.1 So far as can be realised on land, with much of the upper-works fabric missing, the ship will have be interpreted as a passenger clipper with three classes of passengers such as around the period of 1872-1874.

Policy 5. Management

Policy 5.1 Responsibility

5.1.1 The General Manager is responsible for conservation and management decisions, for the day-to-day management of the Project and for implementation of these conservation policies.

5.1.2 If a Curator is appointed, the General Manager, should delegate conservation decisions and responsibility for implementation of these conservation policies' to the Curator.

5.1.3 Conservation decisions should be recorded and logged along with other records of the conservation works.

5.1.4 The General Manager is responsible for establishing and maintaining security for the ship.

Policy 5.2 Risks

5.2.1 In accordance with the risk levels in Risk Management Plan, risks are to be reported immediately to the General Manager and managed until mitigated to an acceptable level. If case of any doubt, the risk should be reported to the General Manager at the earliest opportunity. The General Manager will bring risks to the attention of the Board at the earliest opportunity in accordance with the risk levels defined in Risk Management Plan.

Policy 5.3 Communications

5.3.1 Communications with external organisations, including the media, shall be through the General Manager.

5.3.2 The General Manager and/or Curator, or their delegated representative, shall seek to create links with other institutions to share information relating to conservation and to employ conservation students as volunteers, through work experience or through other programs wherever possible for the benefit of the students and the Project.

Policy 5.4 Training

5.4.1 A formal skills and training program for staff and volunteers shall be established by the Curator, or by the General Manager if a Curator has not been appointed.

5.4.2 All staff and volunteers will be given training in the relevant skills and administrative procedures required to ensure that the conservation policy is adhered to and that the procedures for conservation monitoring are carried out.

Policy 6. Control of Physical Intervention in the Fabric

Policy 6.1 Preservation, Restoration, Repair and Replacement of Fabric

6.1.1 Where objects are stored outside in uncontrolled environments, efforts will be made to achieve the minimum of weather protection either by the erection of a weather shelter and/or by the application of surface treatments to the object as appropriate.

6.1.2 The improvement of the condition of objects is to be managed where this is practicable and ethical using treatments and processes carried out by staff or contractors with the appropriate qualification and/or expertise.

6.1.3 The conservation of objects shall be undertaken with reference to relevant standards and guidelines as published in appropriate literature, identified by the Project.

6.1.4 Efforts to slow down the process of decay and stabilise the condition of objects using passive or interventive techniques should be implemented as appropriate.

6.1.5 Efforts to improve environmental conditions for the ship should be implemented where the need is recognised and resources are available as appropriate. Note, tis may be either at a macro level (for example, controlling the humidity on the inside of the ship) or at the micro level (for example, avoiding electrolysis at localised places in the structure).

6.1.6 Treatments will be investigated and selected that will reduce the deterioration of the iron framework to a level that can be controlled by routine maintenance for a minimum of 25 years without further major works.

6.1.7 All treatments will be subjected to an experimental period off the ship and pilot period onboard before wide-scale application.

6.1.8 If a conservation treatment is not reversible, it must be approved by the Board.

6.1.9 Conservation materials and techniques will be approved and if necessary tested by a qualified conservator or consultant with the necessary knowledge and experience.

6.1.10 Preservation will be carried out using preventative techniques, traditional techniques and modern materials where reversible and where proven to be non-detrimental to the structure.

6.1.11 It will always be ascertained that any treatment to one material is not be detrimental to the preservation of surrounding similar or dissimilar materials.

6.1.12 Conservation materials and techniques will be approved and if necessary tested by an approved conservator or consultant with the necessary knowledge and experience.

6.1.13 Reconstruction is appropriate only where there is evidence of the fabric, dimensions and the surface finish, and will only be undertaken to enhance the understanding, social and working conditions and cultural significance of the ship.

6.1.14 Restoration and reconstruction will be subject to discussion and approval by relevant authorities including the Board and necessary consultants including the National Trust.

6.1.15 Like with like replacement is the ideal, except in circumstances where the use of a more durable modern material has no or minimal visual impact on the appearance of the vessel.

6.1.16 If a part of the fabric cannot be adequately and safely conserved it will be removed, recorded, and replaced.

6.1.17 If fabric is removed, recording will include photography and a measured drawing in sufficient detail to enable replication.

6.1.18 If removed fabric is sold, the income will be set aside specifically for preservation.

Policy 6.2 Maintenance

6.2.1 Supervision of maintenance work on the ship should be consistent, and individuals undertaking maintenance work should be competent to undertake the work.

6.2.2 The maintenance program on the ship should be subject to appropriate conservation advice at all times.

6.2.3 The ship should be kept clear of litter and rubbish. Maintenance tools, machinery and treatments (e.g. paints) should be stored off the ship.

6.2.4 The hull will be monitored regularly for dimensional changes.

6.2.5 Indicators and monitoring systems will be developed to determine environmental thresholds for the ship. These indicators will include relative humidity and temperature monitoring; moisture content in the wood and the materials in enclosed areas and visitor numbers and visitor flow, which may affect the wear and tear on the fabric (and need to be considered in the maintenance programme).

6.2.6 Maintenance, including good housekeeping, will provide systematic care for the ship in order to prevent degradation and the need for major intervention at some later stage.

6.2.7 Along with the written maintenance cycle for the fabric a Maintenance Management Plan will be prepared which will outline procedures, processes, materials and frequency of work.

6.2.8 The treatment techniques and the methods used in maintenance will be reviewed regularly and during ongoing work.

Policy 6.3 Record Keeping

6.3.1 A written and photographic record will be kept on a standard data sheet to record all conservation and restoration work and maintenance work both on the rolling maintenance programme and any which may become necessary through visitor wear and tear.

Policy 7. Constraints

7.1.1 All conservation treatments should have a minimal effect on the ship's fabric. If a choice can be made, preference will be given to treatments that have the minimum effect on the existing fabric of the ship.

7.1.2 Fair and balanced judgements are required when considering conservation work on an object with respect to the object's historic significance, rarity, cultural value, relevance and other value judgements against the practical feasibility of the work proposed.

Policy 8. Future Developments

8.1.1 The whole ship will be subject to a professional survey by a qualified surveyor at least every five years. This will inform a review of the rolling maintenance programme and the conservation and housekeeping procedures.

8.1.2 Current conservation measures should be reviewed from time to time and conduct research into new conservation methods where appropriate.

Policy 9. Adoption and Review

9.1.1 The Conservation Plan is to be ratified by the Board for adoption.

9.1.2 Adoption of the Plan will be followed by the formulation of strategies founded on the Conservation Plan and keyed to its policies.

9.1.3 The Conservation Plan should be reviewed from time to time and at least once every five years. The review should be carried out as a cooperative exercise between the Project and an individual or body such as the National Trust outside the organisation.

9.1.4 If the Plan is radically altered, a draft should be circulated to consultees, before being formally adopted by the Board.

12.0 Acronyms and Abbreviations

Abbreviation	Description
AQIS	Australian Quarantine and Inspection Service
Burra Charter	The Australia ICOMOS Charter for the Conservation of Places of Cultural Significance (12)
CSCOAL	Clipper Ship 'City of Adelaide' Ltd. ABN 65 134 550 388
DPI&F	(Queensland) Department of Primary Industries and Fisheries
EPA	Environment Protection Agency
ICOSMOS	International Council on Monuments and Sites
HMAS	Her/His Majesty's Australian Ship
HMS	Her/His Majesty's Ship
NHSC	National Historic Ships Committee
RNVR	Royal Naval Volunteer Reserve
SMM	Scottish Maritime Museum
SS	Steam Ship
UK	United Kingdom
UV	ultra violet

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14.0 Appendix A – Extract from Tritec Condition Survey Report

The following text represents an extract from the Executive Summary of *The Clipper Ship – City of Adelaide Condition Survey Report* undertaken by Tritec in July 2003.(5)

14.1 General.

This report has not considered the cost of either option, nor has it been our remit to study the market needs or requirements for either option.

Suffice to say, that our experience in these matters, tells us that it will be far more expensive to restore The Clipper Ship - City of Adelaide to a sea-going condition, rather than to build a replica from new.

All things are possible with sufficient funds and the will to bring a project to a conclusion, however many things would have to be considered before embarking on either of the project options.

Examining the detailed condition survey reports in this document, it is easy to come to the conclusion that the overall condition of the vessel is bad to poor.

This comes about using a comparative scale thus -

Wreck > Bad > Poor > Good > Very Good > As New

"Advising on her suitability for restoration to sea going standard and possible conversion for adventure cruising or similar. "'

To restore the vessel to a sea-going condition, would require that all ironwork be renewed except for the deck beams, Poop Deck radius plates and Poop deck stringers.

The majority of hull and deck planking would require to be renewed as identified in the detailed report, along with the stem, the stern and all missing major items of structure, rigging and equipment.

Coloured drawings are attached in Appendix II to demonstrate, clarify and compare the extent of new and residual hull material.

There would then be the matter of making the vessel comply with current passenger ship regulations, life saving, structural fire protection, intact stability and damage stability, bilge pumps and piping, fire pumps and piping, steering gear and emergency steering gear, mechanical propulsion, electrical power generation and istribution, air conditioning and ventilation, navigation equipment and crew regulation requirements.

All these requirements would have to be discussed and agreed with the flag state authorities (MCA or similar), or exemptions granted, and even if a sympathetic approach was taken by them with regard to the application of the rules versus historical accuracy, there can be no doubt that the end result would be a compromise in favour of safety.

We therefore conclude that whilst the restoration of The Clipper Ship - City of Adelaide for sea-going use is theoretically possible, the end result would be extremely expensive and so far removed from the historical vessel to make the logic of the whole project questionable.

"Advising on her suitability for restoration to a non-sea-going standard for museum and conference centre use or similar'

To restore the vessel to a non-sea going standard would require repairs and renewals to the ironworks on a lesser and discretionary basis.

As an example, on the *HMS Gannet* restoration project, the criteria for renewal was, that “after shot-blasting, as long as the iron structure itself remained, no matter how thin”, then, no repair was required.

The majority of hull and deck planking would still require to be renewed as identified in the detailed report, along with the stem, the stern and all missing major items of structure, rigging and equipment, however, it may be possible to save more of the existing planking, knowing that the vessel will never be subject to the rigours of storm and tempest.

Such renewals would be required for aesthetic and structural safety, and watertight integrity.

In this way, the externals of the vessel would truly represent and depict the vessel's original appearance.

Internally, the vessel could be restored, to show off the vessel's original composite construction, life below decks, cargo storage etc., whilst areas could be sympathetically set aside for conference and other related uses.

No matter where the vessel was moored or docked, there are likely to be local fire regulations and the like to comply with, however, these requirements could also be met in a manner, sympathetic to the vessel's historical past.

We therefore conclude that restoration of The Clipper Ship - City of Adelaide for non sea-going use is a far more practical and logical project, which would protect this historically important vessel for future generations and hopefully create an attraction that would enhance Travelsphere's reputation, and provide a location for use as museum, conference centre and corporate presence.

The way ahead - should the client decide to take either option forward, we would recommend that a sample area (worst apparent) of say eight (8) frames be cleared of cement boxes, copper and felt residues, and that the ironwork should be shot-blasted, and timbers sandblasted, inside and out to reveal the fabric of the vessel, and remove any ambiguity about the overall condition of the vessel.

15.0 Appendix B – Extract from Tritec Limited Close Up Survey Report

The following text represents an extract from the Executive Summary of the *SV City of Adelaide – Limited Close Up Survey Report* undertaken by Tritec in April 2004.(6)

15.1 Executive Summary

Shot-blasting and cleaning in way of the nominated section of the hull (Frs 461/2 - 5 41/2 ~,) has served to confirm the findings of the previous report, in that in order to restore the vessel to seagoing condition, virtually all ironwork, within the shot-blasted area would require renewal.

This requirement includes bottom floors and girders, main and Lower Deck frames, side and deck stringers, plus all diagonals. Only deck beams (both Main and Lower Deck) could be said to be in fair to good condition, although even these are suffering from various defects which would require remedial action.

Hull planking, except for the lower dozen or so planks either side of the keel, is in generally poor condition, and even where nominally good, is likely to be severely damaged when removed to allow structural repairs to be completed (fitting new diagonals and side stringers requires notching of planks to fine tolerances).

Corrosion and wastage within the hull framing system has reached such an advanced stage that hull planking attachments are now relatively few and far between, making it difficult to be certain that the hullform is still as built.

In effect, the remaining hull structure no longer has sufficient strength to withstand any kind of sea loading, therefore any restoration scheme would require the insertion of a structural steel framework to carry the loads imposed by sea, wind, waves, rigging, and deck fittings/personnel (crew or visitors).

Even for non-seagoing use, supporting structure would be required, although lack of sea loadings would mean that this would not need to be quite so extensive.

Extrapolation of the renewals required in the section selected for blasting and further survey of the remainder of the hull clearly suggests that the vast majority of the structural ironwork would require to be renewed, something which was identified at the previous survey.

To conclude, restoration of the vessel to either seagoing or static display standards would require major structural works, plus extensive renewals of hull timbers, in addition to re-making all accommodation and deck fittings, masts and rigging, etc, all of, which would make for a very expensive restoration project, with only a questionably small amount of the original vessel remaining.

Should it be desired to the restoration project forward, it is recommended that the most practical approach would be to carry out sufficient work to enable the vessel to be used for the static exhibition / museum / conference role only, rather than to attempt to carry out all of the works necessary to allow her to go back to sea.

16.0 Appendix C – Headland Archaeology *City of Adelaide* Laser Scan Survey

The following report was prepared by Headland Archaeology for the Scottish Maritime Museum in August 2009.(7)

Project Code: COA07
Date of report: August 2009
Client: Scottish Maritime Museum

CITY OF ADELAIDE

Laser Scan Survey

Dan Atkinson
BA(Hons) MLitt PhD AIFA

Magnar Dalland
BA BA MA MEng MIFA

Jürgen van Wessel
MA(Hons)

HEADLAND ARCHAEOLOGY (UK) Ltd