Inverclyde council

AGENDA ITEM NO: 12

Report To:	**Environment & Regeneration Committee**	**Date:**	**29 October 2020**
Report By:	**Corporate Director Environment, Regeneration & Resources**	**Report No:**	**ENV/029/20/AM**
Contact Officer:	**Alan McClintock**	**Contact No:**	**01472 712444**
Subject:	**Comet Replica – Condition Survey**		

1.0 INTRODUCTION

1.1 This report updates the Committee on the results of the condition survey that was commissioned to assess the current condition of the Comet Replica situated in Port Glasgow Town Centre.

2.0 SUMMARY

2.1 The original Comet was constructed in 1812 and was the first steam powered commercially successful passenger ship built in Europe. It ran aground and sank in 1820. The replica Comet was constructed in 1962 and was originally sea worthy but made only one return sailing before it was placed on dry land as an exhibit.

2.2 The replica has been continuously exposed through its history to all elements of the weather and steadily deteriorated. Structural repairs were undertaken in 2009 when the vessel was decanted to the Ferguson ship yard and cosmetic repairs were undertaken in 2016 when it was painted and a tonneau cover was placed over the open structure to prevent rain ingress. Unfortunately deterioration has continued.

2.3 A survey and condition report was commissioned to assess the current condition of the replica Comet and to consider feasible options of repair. The outcome of the study confirms that the extent of timber decay in the hull is severe to the extent that economic refurbishment of this aspect of the ship is not feasible. There are options open to the Council in respect of how the vessel could be restored and the manner in which it may be displayed in the future. This needs to consider the long term strategy for the vessel.

2.4 It is proposed that officers work with the Port Glasgow Regeneration Forum, potentially through a working group, to explore and cost options for the vessel. This is with a view to reporting back to this Committee in early 2021.

3.0 RECOMMENDATION

3.1 That the Committee approves officers to work with the Port Glasgow Regeneration Forum to consider and cost options for the refurbishment and display of the Comet.

Scott Allan
Corporate Director
Environment, Regeneration
& Resources

4.0 BACKGROUND

4.1 **The Original Comet**
The original PS (Paddle Steamer) Comet was constructed for Henry Bell in 1811, by John Wood, a Port Glasgow shipbuilder, and completed on January 18, 1812. The first passenger vessel built in Europe, PS Comet was a wooden vessel of some 30 tons, about 40 feet in length, and 10 feet in beam, and originally fitted with four paddle wheels, arranged as two on each side, driven by an engine rated at three horsepower. The two sets of twin paddle wheels were later replaced by single wheel on each side, and the length has been reported as having been extended by 20 feet to increase her capacity.

4.2 The boat was put into service on a 24 mile route between Greenock and Glasgow, departing Greenock on Mondays, Wednesdays, and Fridays, returning on Tuesdays, Thursdays, and Saturdays. On December 13, 1820, PS Comet was returning to Glasgow from Inverness. While sailing near Oban, she was grounded on to the rocks at Craignish Point, and wrecked.

5.0 THE REPLICA COMET

5.1 The construction of a replica Comet was conceived as a celebration of the 150th anniversary of the original Comet inaugural sailing. The hull was built by George Thomson and Son of Buckie, renowned for their building of heavy wooden boats for fishing and leisure use. On completion, the hull was transported by road to Lithgow Ltd of Port Glasgow to be fitted out. While drawings of the hull still existed, no drawings remained of the engine. Fortunately, a similar engine contemporary to the period of the original was on display in a local museum, allowing representative drawings to be prepared, and a reproduction engine built.

5.2 In 1962 Comet Week commenced with a service at Port Glasgow's Newark Parish Church on August 26. The celebrations were to include a memorial service at the grave of John Woods (builder of the 1812 Comet), a civic dinner, and a parade of floats accompanied by men from both the Royal Navy and the United States Navy prior to the sailing.

5.3 After the commemorative trip a collection was taken and more than 1,000 members of the public paid to go aboard the vessel. The intention had then been to use the money to set up a Comet Museum in Port Glasgow to house the boat.

5.4 The replica Comet was taken out of the water and installed over a pond near the town centre in Port Glasgow. The pond was in the middle of a car park, and eventually drained. Since then, the boat has been refurbished and returned to an upgraded display area, fenced and floodlit on a raised plinth. It remained open to the elements and continued to be adversely affected by the inclement weather.

5.5 The replica Comet, located in the upgraded display area, remained exposed to the elements. Over the years the timber deteriorated and a further overhaul was required. The replica was transported to the nearby Fergusons ship yard in Port Glasgow in 2009 when £73,000 was invested in the structural repair. It was returned to the display site where it remained open to the inclement weather.

5.6 In 2016, a community project undertook cosmetic repairs to the hull (mostly paint work) and a tonneau cover was introduced to prevent rain ingress into the interior rather than constructing an overhead canopy. This proved ineffective and the timbers continued to rot.

5.7 In 2019, Inverclyde Council commissioned a Naval Architect to undertake a condition survey of the replica Comet. The Condition Report was submitted to the Council in December 2019 and is appended to this report. The general conclusion is that the vessel is beyond economical repair. A restoration would potentially involve significant ‘new build’ utilising components from the current vessel such as the replica engine.

5.8 There are alternatives open to the Council in respect of restoration and future display. There is an opportunity to develop a strategy for the long term to ensure that any actions are future proofed. This potentially could be through the method of construction of a replica or the

manner of display.

5.9 It is proposed that officers work with the Port Glasgow Regeneration Forum, potentially through a working group, to discuss and develop potential options with associated cost estimates. This is with a view to reporting back to this Committee in early 2021.

5.10 In view of current physical conditions affecting the Comet structure, especially at the mast or funnel location, the Committee is asked to note that due to further deterioration parts of the vessel may require to be temporarily dismantled as a health and safety precaution for the public.

6.0 IMPLICATIONS

6.1 **Finance**

Financial Implications:

One off Costs

Cost Centre	Budget Heading	Budget Years	Proposed Spend this Report	Virement From	Other Comments
Comet Restoration EMR (03029)	PTOB	2019/20	£7,500		Condition Survey and Fees
Comet Restoration EMR (03029)	PTOB	2020/21	£3,000		Dismantling of funnel.
TBC					This will be reviewed through the options appraisal. Allowing for expenditure above there remains a balance of £39,000 in the EMR.

Annually Recurring Costs/ (Savings)

Cost Centre	Budget Heading	With Effect from	Annual Net Impact	Virement From (If Applicable)	Other Comments
N/A TBC					This will be reviewed through the options appraisal

6.2 **Legal**

None

6.3 **Human Resources**

None

6.4 **Equalities**

Equalities

(a) Has an Equality Impact Assessment been carried out?

	YES
x	NO – This report does not introduce a new policy, function or strategy or recommend a substantive change to an existing policy, function or strategy. Therefore, no Equality Impact Assessment is required

(b) Fairer Scotland Duty

If this report affects or proposes any major strategic decision:-

Has there been active consideration of how this report's recommendations reduce inequalities of outcome?

	YES – A written statement showing how this report's recommendations reduce inequalities of outcome caused by socio-economic disadvantage has been completed.
x	NO

(c) Data Protection

Has a Data Protection Impact Assessment been carried out?

	YES – This report involves data processing which may result in a high risk to the rights and freedoms of individuals.
x	NO

6.5 **Repopulation**

The Comet is an iconic display for the Inverclyde community.

7.0 CONSULTATIONS

7.1 The CMT has been consulted on this report.

8.0 BACKGROUND PAPERS

8.1 General Condition Survey on Comet Replica (appended).

General Condition Survey

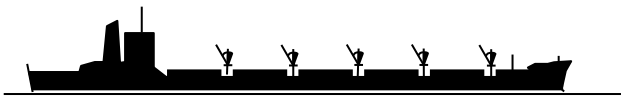
on

Comet Replica

Project No:	**2090/00**
Client:	**Inverclyde Council**
Date:	**25/11/2019**

I K Macleod & Associates Ltd

Naval Architects & Offshore Engineers



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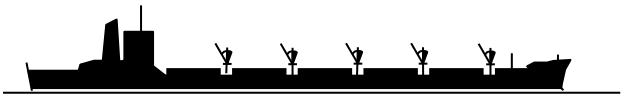

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1. CONDITIONS OF SURVEY

This is to certify that the undersigned, at the request of Inverclyde Council, did survey the *Comet* in the pedestrian area of Pot Glasgow from Monday the 4th to Wednesday the 6th of November 2019.

The surveyor; Iain K Macleod was present at the survey. Alan McClintock from Inverclyde Council was present for a time on the afternoon of Tuesday 5th November 2019.

The vessel was in a suitable condition for survey other than the compartment aft of the aft cabin and the forward cabin, there was no access to the compartment aft of the aft cabin as it was sealed. The fore cabin could not be accessed as the access door was inoperable and could no be opened.

No machinery was run during the survey, the steam engine is completely siezed.

The purpose of the survey was to establish the general condition for the purposes of arresting the decay in the vessel, outline a strategy for the repair and replacement, outline a strategy for ongoing maintenance and to provide costs for repair options.

This survey is a factual report on the inspection carried out. The opinions expressed are given in good faith as to the condition of the vessel as seen at the time of survey. It implies no guarantee, no safeguard against latent defects, subsequent defects, or defects not discovered at the time of survey in timber/metal or areas of the vessel which are covered, unexposed, or not accessible to the surveyor internally due to the installation of non-removable linings and internal structures.

This survey is personal and confidential to my client, and has no extended warranty if disposed of to a third party for any purpose.

This report does not address stability, vessel performance or overall design and no warranty is conveyed under these heads.

25th November 2019

[redacted]

I K Macleod

2. PRINCIPAL PARTICULARS

Vessel Name:	*Comet*
Vessel Type:	Replica of the 1811/1812 Vessel
Built:	1962, Hull - Thompsons Of Buckie, Engine – John G Kincaid
Length Overall:	15.3m
Beam:	3.45m, 4.85 over Paddle Boxes
Depth:	1.75m moulded, (excluding keel)
Draught:	1.14m approx., displacement about 22 tonnes
Machinery:	Kincaid Single cylinder steam engine, one Rankin and Blackmore Wagon type Boiler, externally fired, natural draught
Sail Area:	One Square sale, area not known
Funnel/Mast Height:	10.27m above the bottom of the keel

Historical Information

Historical information for the original Comet is held at the Glasgow University Archives, the Archive was visited on Monday 4th Nov, pictures of some of the archive material is contained in appendix 1. It should be noted that there are two lines plans held in the archive (they are not the same, when the laser scan of the vessel is compared to the original drawings, there is a good but not exact correspondence).

3. GENERAL

3.1 Arrangement

General

The vessel is of all wood construction. The hull form is round bilged.

Below decks, the vessel is arranged as follows, reading from aft to forward;

- Aft compartment - inaccessible
- Aft Cabin (4 berths)
- Machinery space, small area at aft end of machinery space for wood or coal bunkers
- Forward Cabin – inaccessible

The vessel was also scanned with a Leica High Definition Laser Scanner, there is now a 3 dimensional point cloud of the vessel.

Aft Cabin

Aft cabin is accessed from the main deck via recessed semi circular steps. There is a deck house over the cabin, The access steps are rotten and the deck head of the deck house has collapsed. The original main deck planking has been replaced with plywood at some point, the ply wood is completely rotten in some places and it is possible to go through the deck as the wood is so rotten. There are mould spores throughout the aft cabin. The vessel was completely covered with a canvas type cover from the top of the bulwarks. There has been no air circulating through the aft cabin or any part of the hull other than those areas of the hull where the hull planking has rotted away/been smashed, thus allowing air in.

Plywood main deck and aft cabin access steps

Aft cabin rotten collapsed deck head

Aft cabin deck head

Aft cabin deck house – mould spores

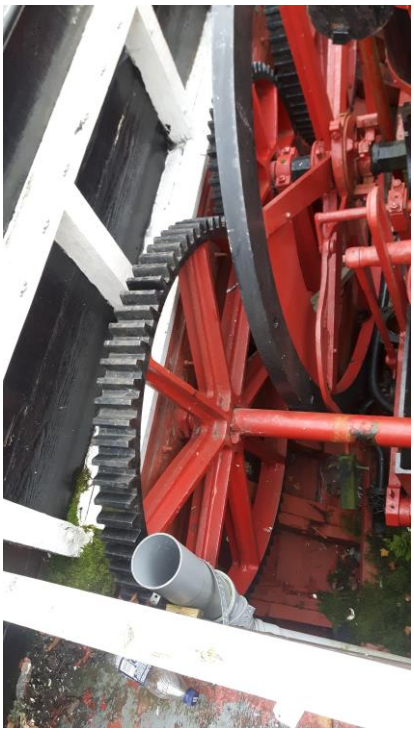
Aft cabin, scaffolding poles – possibly left from last maintenance period

Engine room

The engine room/machinery space can be accessed from the forward or aft ends via vertical ladders. The boiler is on the port side and the single cylinder steam engine on the starboard side. The funnel is mounted atop the boiler and it was also the mast to carry the single square sail. Part of the deck above the engine room is open, the open part is bounded by a solid bulwark/coaming about 550mm high, this bulwark/coaming is in a very rotten condition, detached at the aft starboard side and is beyond repair.

The funnel is bent in a fore and aft plane and is sloping to port (possibly due to the boiler foundations being rotten, the twisted hull in the longitudinal direction is not helping either).

The machinery as not been run since the 1960's and is all completely seized. The after gear wheel for the aft paddle no longer meshes with the engine driven gear wheel and all driving gear wheels are out of alignment, possibly due to the machinery foundations being rotten and the twist in the hull. Timber bearings in the hull for the paddle shafts are all rotten.



Engine room looking aft

Engine room looking forward starboard side

Engine room Aft Starboard, rotten beam shelf and rotten beam shelf stringer

Engine room aft starboard, rotten detached bulwark

A network of PVC sewer pipes has been arranged to drain the cover, these are brought together to one pipe which exits through the hull in the starboard side of the engine room adjacent to the keel. The PVC piping is supported on a temporary structure of 4”x2” timber.

Single Cylinder Steam Engine

Forward Cabin

There was no access to the forward cabin. There was no ventilation to the forward cabin, the main deck above the forward cabin is particularly dangerous and it is easily possible to step through the main deck plywood.

Rotten ply wood deck forward.

3.2 History

The vessel was built as a replica of the original 1811/1812 Comet in 1962 to commemorate the 150th anniversary of the original vessel. The boiler and steam engine were built in Greenock and the Hull in Buckie by Thompsons. The replica vessel did sail on the River Clyde when it was built and is reported to have achieved a speed of 5 knots.

The replica vessel has been on display in the open air at Port Glasgow since the 1960's. The replica vessel was taken to Fergusons Shipyard in 2009 for refurbishment, the vessel was then returned to the pedestrian area in Port Glasgow.

A canvas type cover was put over the vessel at bulwark level to try and protect the hull from the weather, drains were built into the cover and the drains fed into a pipe in the engine room that exited the hull adjacent to the keel on the starboard side approximately midships.

The Comet is a critically important historical vessel as it was the first seagoing mechanically propelled vessel. It is vitally important that the history associated with the vessel and its machinery be preserved and part of that should be a replica of the vessel.

Sadly the current replica is in such a poor material condition it is pointless trying to repair it. The machinery is seized, however the machinery and paddles could be removed, renovated and fitted to a new replica hull. A new replica hull is required.

3.3 Current Situation

The vessel is mounted behind a secure steel fence in Port Glasgow town centre pedestrianised area, there is no public access on board the vessel. The vessel is open to the elements and the West of Scotland weather which generally consists of a lot of rain and wind with very cold spells in the winter.

Comet Replica Port Glasgow

Comet Replica Port Glasgow

Comet Replica Port Glasgow

4. HULL CONSTRUCTION

4.1 General

The hull is planked with 40mm larch planks on transverse sawn oak frames at 14" centres. Much of the planking has been replaced with very short lengths of plank, there are running butts on adjacent planking strakes. Some of the planking has completely disintegrated on the port side in the forward engine room. Upwards of 90% of the planking is rotten. Caulking missing in many areas, it is possible to see daylight between the plank joints.

Rotten planking port side

Rotten planking starboard side

An unbalanced traditional rudder is mounted on the sternpost.

The hull transverse framing is of sawn oak frames approximately.. 70/80mm thick, depth of frames varies, about 230mm at the keel 150mm at the bilge and 110mm on the stanchions. Frame spacing at approximately 14" centres. Some frames are

doubled, others are doubled only at the joints. Frame sisters/doublers are typically 50mm thick.

Framing in the engine room, rotten bilge stringer, rotten beam shelf, rotten beam shelf stringer

4.2 Hull Scantlings – Centreline Structure

Keel

240mm deep 100mm sided in forepart and most other parts

Keelson or Hog

Seems only to be fitted in machinery space, 145mm x160mm, rotten

Sternpost

No access to measure

4.3 Scantlings - Side/Bottom Structure

Planking

40mm throughout, very rotten, short lengths of planks and some planking completely disintegrated.

Bilge Stringer

150mm x 50mm, rotten midships

Beam Shelf

170mm x 50mm, beam shelf stringer 130 x 50mm, rotten midships.

4.4 Scantlings - Framing

Frames in Way of Engine Room

Single (mostly) with 50mm doublers/sisters on joints
230mm deep at keel, 150mm at turn of bilge, 110mm deep at bulwark stanchions, frames at 14" centres.

At frame butts, a 50mm sister/doubler is side bolted.

Timber Heads/Stanchions on Deck

Size about 110 deep by 70/80 thick, spaced at 28", ie every second frame. The base of almost every bulwark stanchion is rotten.

4.5 Scantlings - Deck Beams

Beams in Way of Hold

Spacing varies 14", 17", 22"
125mm deep at centre, about 100 deep at sides, 70/75mm thick, thicker beams at ends of openings for the deck houses and engine room to carry the longitudinal carlings

Half/Quarter beams

These are fitted on either side of the aft deck house and the walkway on the main deck port side above the machinery space, size about 100 deep by 70 thick.

4.6 Scantlings - Misc Deck and Other Fittings

Rudder

100mm thick, in relatively good condition

4.7 Condition - Underwater Hull

The hull is in a very bad state of repair and it is pointless trying to repair it. The hull as revealed by the laser scans is also severely twisted in a longitudinal direction.

4.4 Condition - Stem, Deadwood & Sternpost

The stem, stern post and keel where accessible are in reasonable condition (there are some soft portions), however as the rest of the hull (planking, frames, bilge stringer, deck, beam shelf, stanchions and bulwarks) are in such a bad condition it is not worth saving them.

4.5 Condition – Bulwark Planking and Paddle Boxes

Bulwarks are planked with 4 strakes of timber, the lowest strake is 125x 40mm, the second lowest strake 180x15mm and the top two strakes 110x15mm, bulwark capping is 130x45mm. In common with the hull planking the bulwark planking is mostly rotten, this is also true of the paddle boxes.

4.6 Deck Structures

General

The main deck including the hatch carlings and deck beams is not original. The plywood deck possibly dates from the 2010 Fergusons refit. The plywood deck is rotten in many places and so soft it is possible to step through it.

Deck Supporting Structure

The deck supporting structure consist of oak deck beams and carlings.

Deck beams are fitted in a range of sizes, the deck beams are thick at either end of any opening. The dimensions of the beams and carlings are substantial and in line with those to be expected for a traditional working vessel of these dimensions.

Seen from below, the beams are in generally satisfactory condition. This does not preclude the possibility of decay starting on the upper side below the plywood decking.

There is one deck plank about 30thick cut around the bulwark stanchions port and starboard (ie around the perimeter of the main deck), this is rotten.

Beam Knees

Beam knees of oak are fitted at bulkheads and in way of openings.

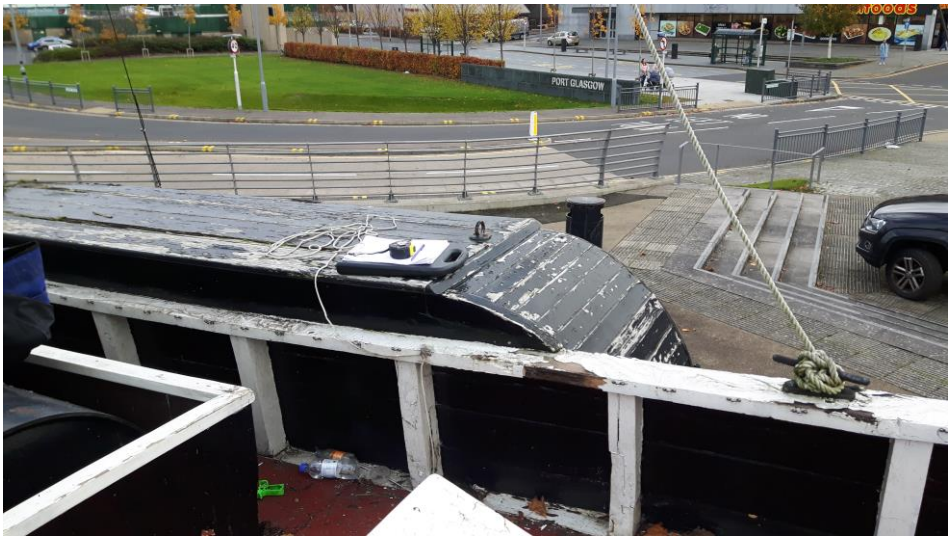
Carlings

Heavy carlings are fitted fore and aft each side of the aft cabin deck house and in way of the port side walkway above the engine room.

Coamings

Coamings/bulwark is fitted in way of the open area of the engine room, these are rotten and detached from the bulwarks starboard aft, they should be replaced.

Bulwarks aft



Bulwarks port side

5. COATINGS & CATHODIC PROTECTION

5.1 Underwater hull Coatings

All coatings are in a poor condition with flaking paint, structure under the coatings are in such poor condition, the coatings are irrelevant.

5.2 Topsides Coatings

All coatings are in a poor condition with flaking paint, structure under the coatings are in such poor condition, the coatings are irrelevant.

5.3 Deck Coatings

All coatings are in a poor condition, structure under the coatings are in such poor condition, the coatings are irrelevant.

5.4 Anodes

There are no anodes, in all probability there were no anodes fitted on the original vessel or this replica.

Typical coatings and plywood strip to keep planking in place in the stern

6. SPARS, RIGGING & SAILS

6.1 Main/Fore Mast

The main mast is the funnel, the mast is bent and is leaning to port. One yard for the square sail fitted to the funnel, no access to inspect it. Yard should be secured so that there is no possibility of it falling. Funnel has four rope stays to the bulwarks, no reliance should be put on these stays due to the poor material condition of the vessel. There are also four stays from the perimeter fencing attached to the funnel, they were quite taut, however there is no maintenance history for the any of stays so it is essential they are all replaced so that there is no possibility of the funnel falling down.

Action Replace all funnel stays as soon as possible

6.2 Bow Sprit Jib Boom/Flying Jib Boom

This has partially broken off and the remaining part is rotten, again this should be secured/trimmed so that no rotten part can fall off and injure a passer by/member of the public.

Action Secure bow sprit/jib boom so that there is no possibility of it falling outside the perimeter fence.

6.3 Running Rigging and Standing Rigging

No running rigging. Standing rigging, four stays attached to the steel perimeter fence. Square sail yard on the funnel, not clear how this is held in place, absolutely critical it is held in place securely in case it falls.

Action Secure square sail yard to funnel mast so that it cannot fall down

6.4 Sheaves, Blocks and Travellers

All blocks have wooden shells, condition of blocks for the mast stays is poor.

Mast/funnel and yard

Broken bowsprit/jib boom projecting over perimeter fence

7. HULL OUTFITTING

7.1 Mooring Equipment

The vessel is fitted with mooring posts aft port and starboard and one large transverse mooring bit forward, bulwark mounted timber fairleads are fitted, these are rotten. One manual mooring windlass fitted forward, parts of the timber are rotten, metal work seized.

7.2 Anchors, Warps, Fenders

No anchors, warps or fenders fitted.

7.3 Deckhouses

Two deckhouses fitted, aft deck house is in very poor condition, forward deck house was inaccessible.

7.4 Covers and Tarpaulins

The vessel has covers to go over the whole of the main deck foot print, these covers are very dirty and the stiching is rotting, the covers are fitted with drains. The covers should not be refitted to the vessel unless there is adequate ventilation, having said that, the material condition of the vessel is so poor it is almost irrelevant if covers are fitted or not.

Timber windlass

8. INTERIOR OUTFITTING

8.1 General

The interior of the vessel has minimal outfitting.

The aft cabin is fitted with 4 bunks, bench seats and a table, most of the outfitting is plywood.

Aft cabin

Aft cabin

8.2 Ventilation

There is no ventilation on the vessel and it is now too late to fit any ventilation as the material condition is so poor.

9. PROPULSION & STEERING GEAR

9.1 Main and Auxiliary Engines

Main engine

The main engine is a John G Kincaid single cylinder steam engine, powered by a saddle type boiler. Engine is completely seized. It is thought the engine, boiler, paddles and gearing could be removed from the vessel and fitted in a new replica, the boiler, engine, paddles etc would require stripping, cleaning, preserving and reassembly to ensure longevity. While it is probably not worth returning the machinery to working condition it is definitely worth returning the machinery to display condition, possibly having the machinery (engine and paddle wheels) driven by an electric motor.

9.2 Paddle Wheels

There are two paddle wheels on each side of the vessel, the paddle wheels are in okay condition. The gear wheels driving the paddle wheels are no longer meshing or not meshing correctly due to the twist in the hull and the rotten machinery foundations. Most of the timber in the paddle boxes is rotten..

10. CONCLUSIONS

10.1 General

This Comet is of immense importance as it represents the first sea going mechanically propelled vessel. The original vessel sank, this replica built in the early 1960's is now beyond repair. The machinery can probably be removed, stripped down, cleaned, preserved and put back together for display purposes, possibly driven by an electric motor to show how it works.

10.2 Condition

The condition of the vessel is very poor, the vessel is twisted, upwards of 90 % of the hull planking is rotten, as is the deck, machinery foundation, lower transverse bulkheads, beam shelf, bilge stringer, beam shelf stringer and up to 40% of the frames. Machinery has not been run since the 1960's. Looking forward, it would be best to remove the machinery from the vessel (overhaul the machinery), build a new hull and fit the machinery to it. Any such new replica should be stored in a purpose built climate controlled building.

10.3 Immediate Safe Guard Work

In the immediate term the major risk would be from a part falling from the vessel and injuring a member of the public, to this end it is important to secure or remove the bowsprit/jib boom, replace the funnel stays and secure the square sail yard to the funnel.

10.4 Maintenance Plan for Existing Vessel

It is unfortunately too late for a maintenance plan for the existing vessel, the existing vessel is beyond repair, the best that can be hoped for is that the machinery can be removed and used on a new replica vessel.

10.5 Costs

As the existing vessel is beyond repair, two shipyards have been approached for guideline prices for building a new replica hull out of larch planking on sawn oak framing. The estimated costs when available will be transmitted to the council.

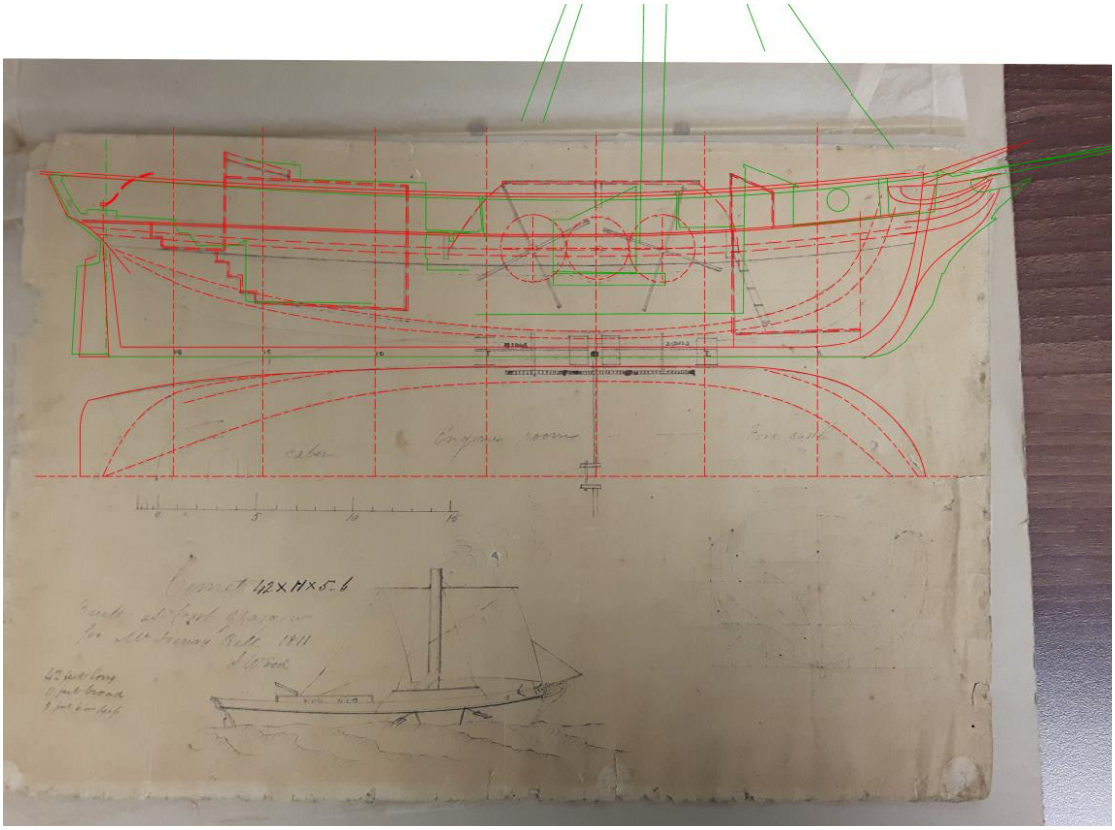
11. RECOMMENDATIONS

On the basis of this survey report the following recommendations are made:

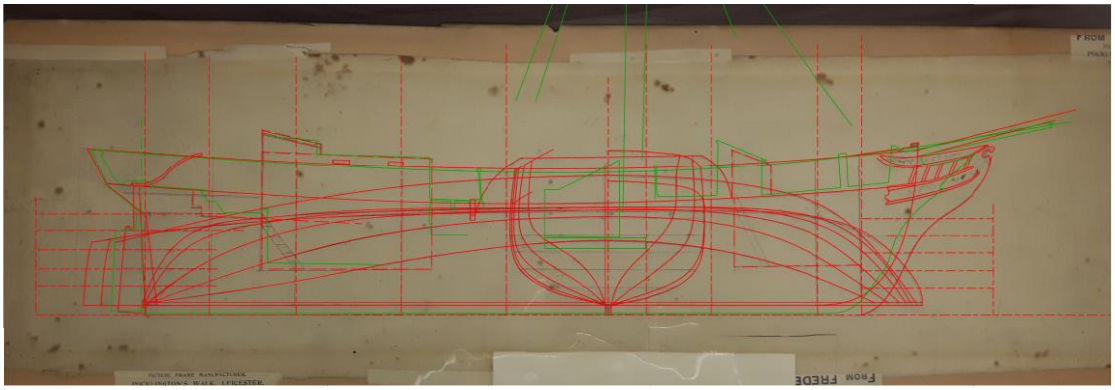
1. Secure square sail yard to funnel mast so that it cannot fall down (6.3)
2. Bowsprit/jib boom should be secured/trimmed so that no rotten part can fall off and injure a passer by (6.2)
3. Replace all funnel stays as soon as possible (6.1)
4. The existing replica is beyond repair, it should be possible to remove the machinery and fit it to a new replica vessel.
5. Any new replica vessel should be stored in a climate controlled building

APPENDIX 1

Information From Glasgow University Archives



Drawing 1 from Glasgow University Archives, original drawing outline in red laser scan outline in green. Replica is close but a bit longer than the original vessel (if in fact the replica was based on this drawing).



Drawing 2 from Glasgow University Archives, original drawing outline in red laser scan outline in green. Replica close but a bit shorter than the original vessel (if in fact the replica was based on this drawing).

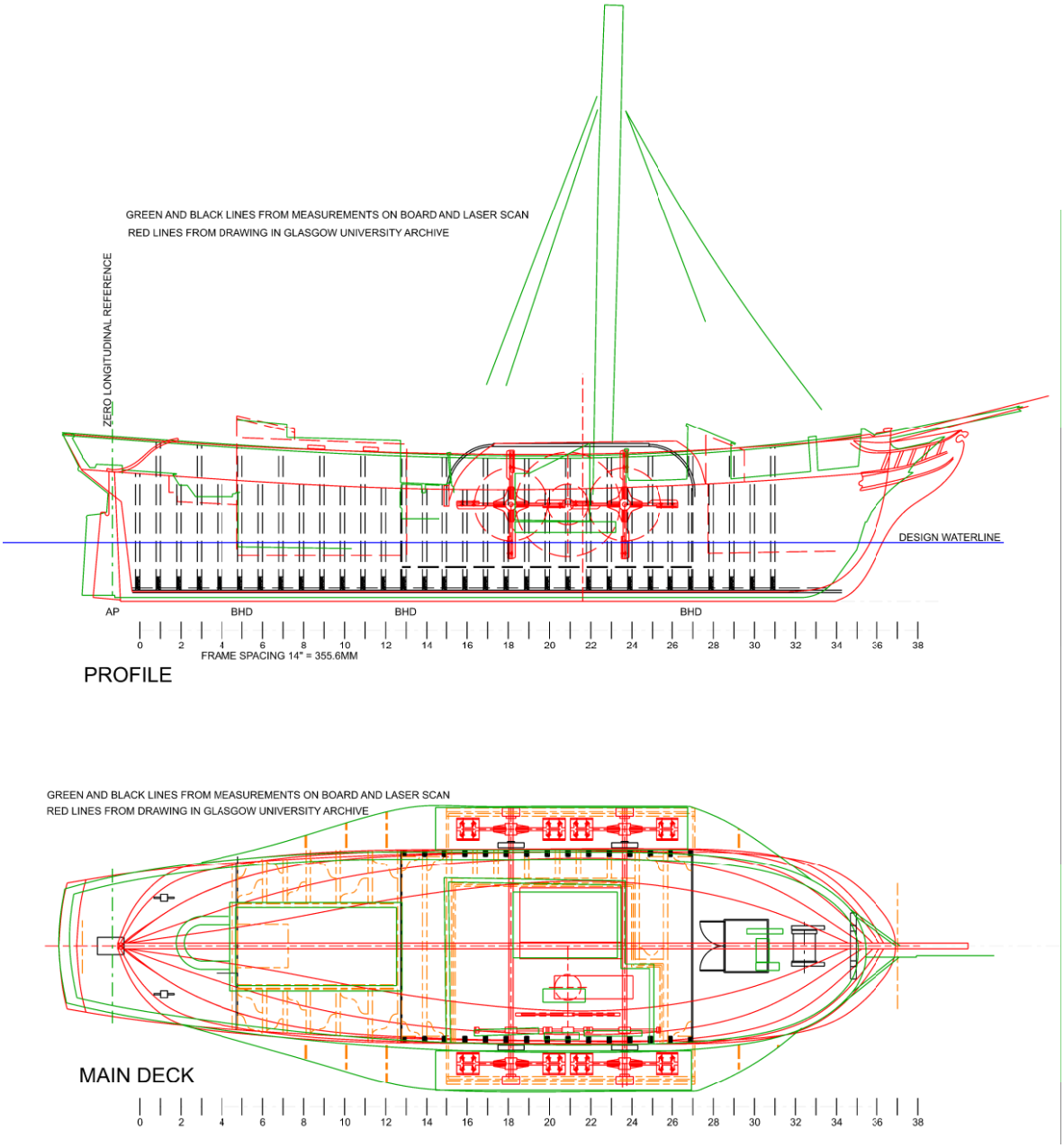
APPENDIX 2

PHOTOGRAPHS DURING SURVEY

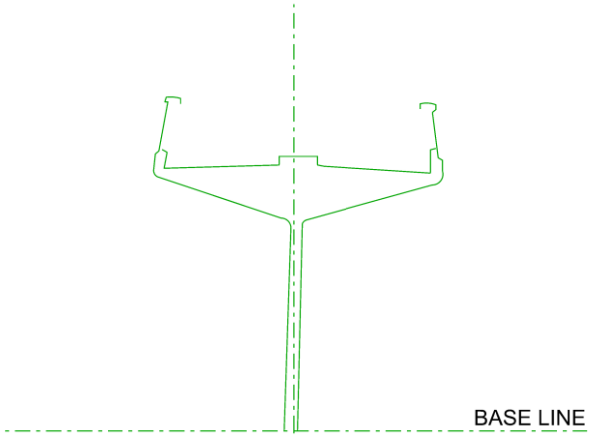
There are a lot of photos they have been uploaded to a drop box to which Inverclyde Council Have Access

APPENDIX 3

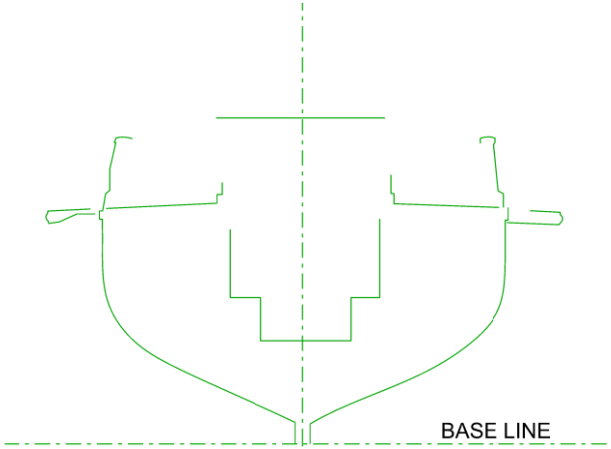
SKETCHES & LASER SCAN



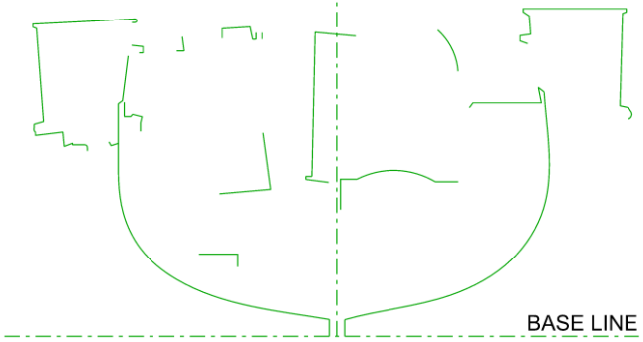
The above is based on drawing 2 from the Glasgow University Archives



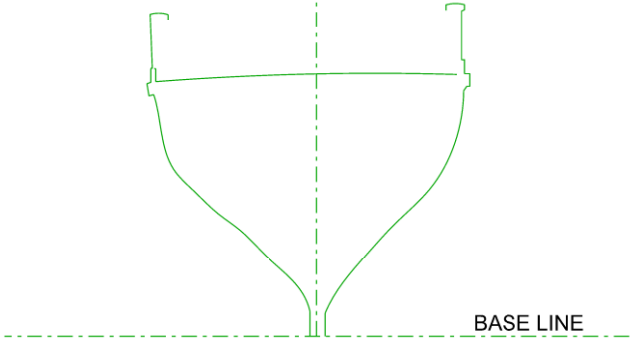
SECTION ZERO METRES FROM AP



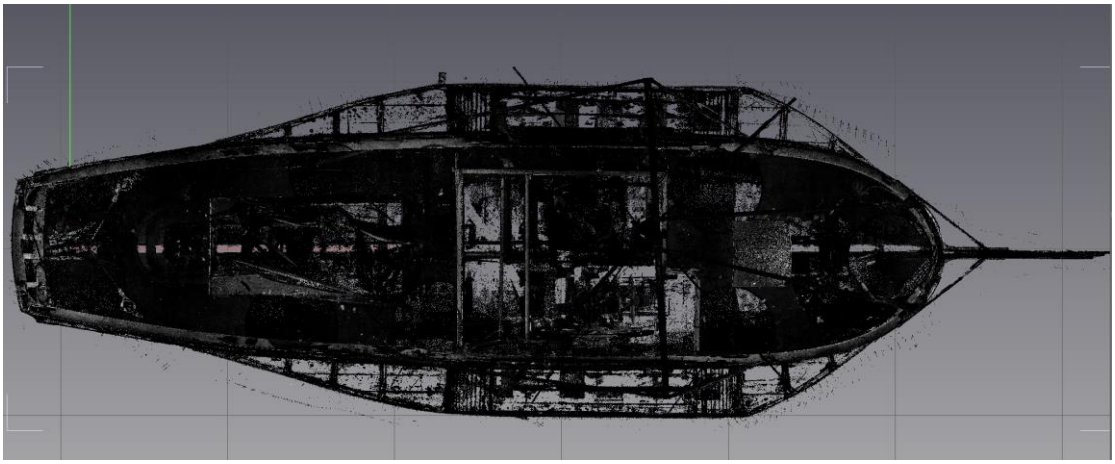
SECTION 4 METRES FROM AP



SECTION 8 METRES FROM AP



SECTION 12 METRES FROM AP

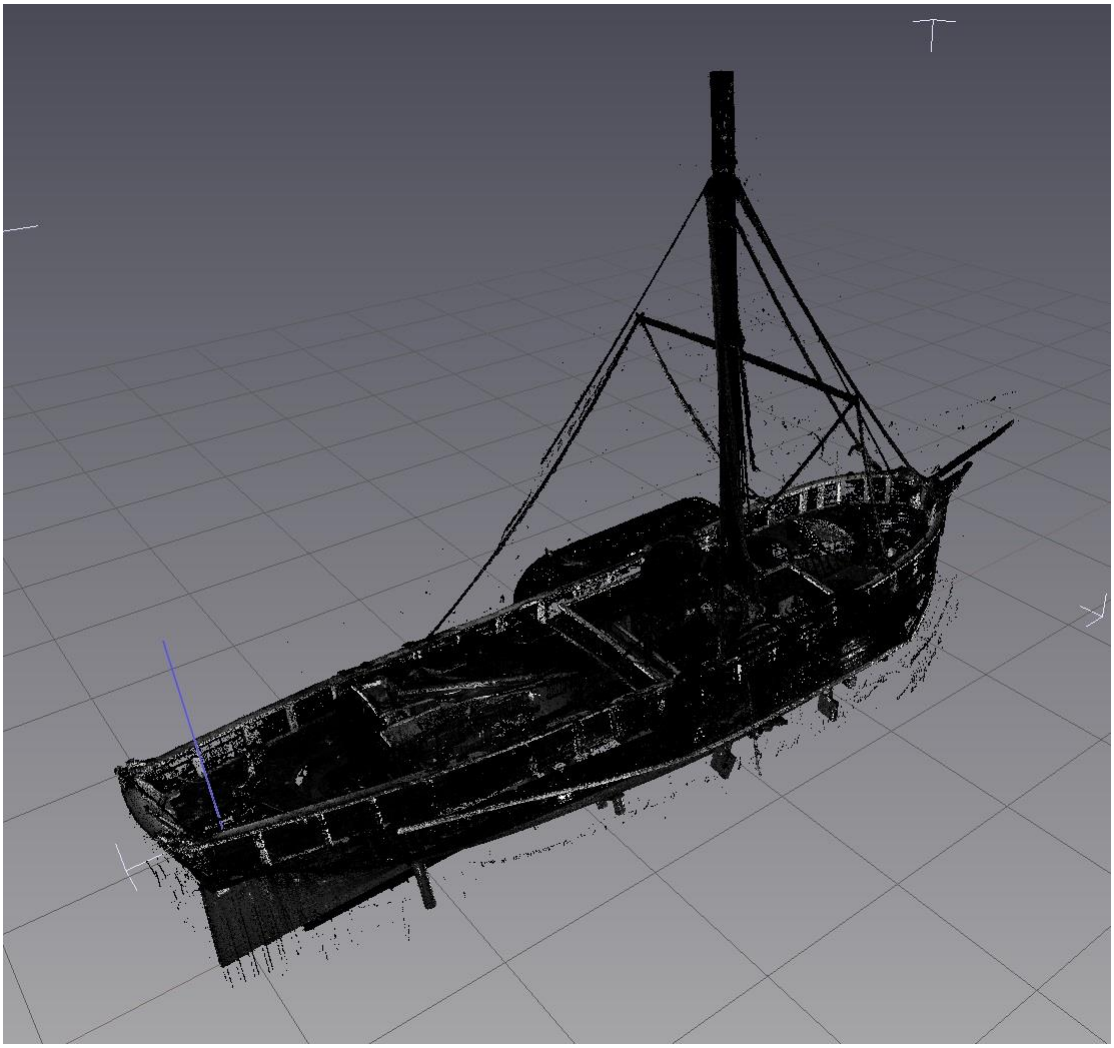


Composite plan

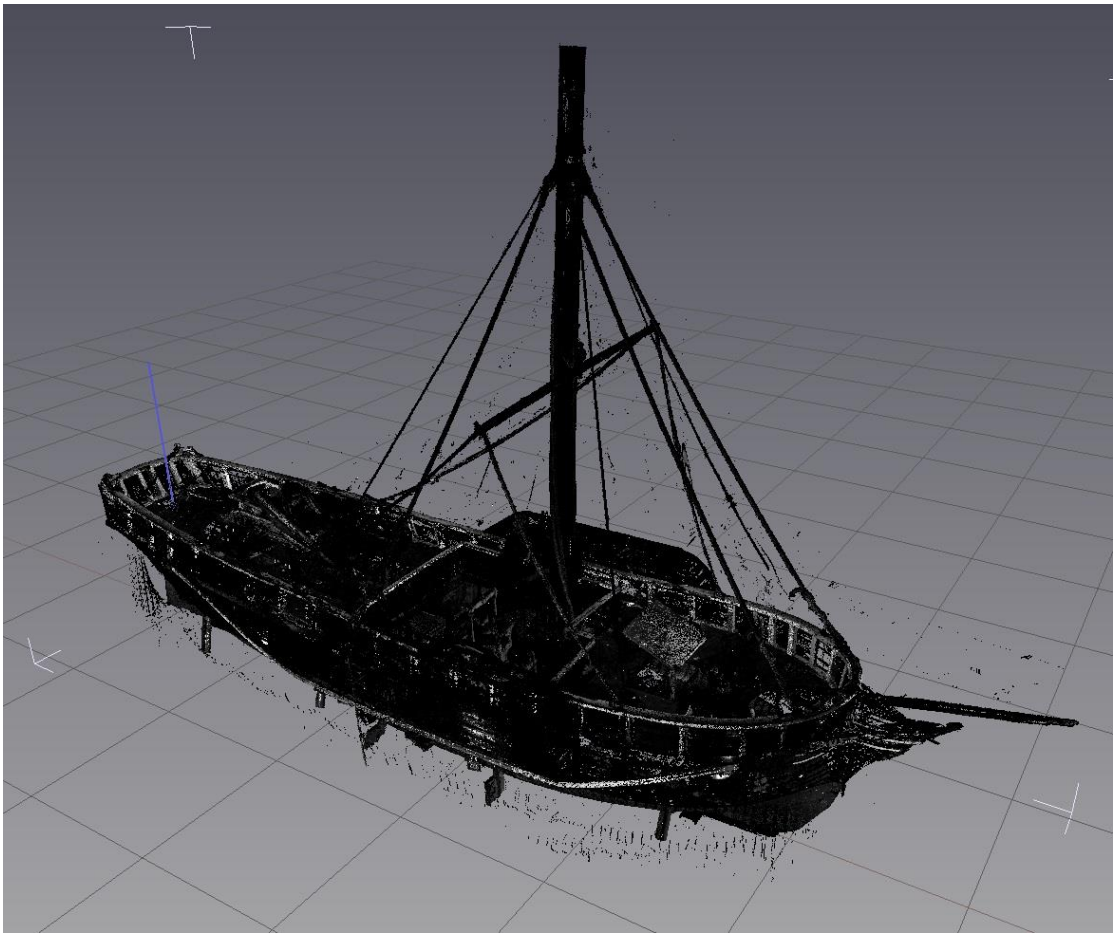
External profile

View from the bow looking aft

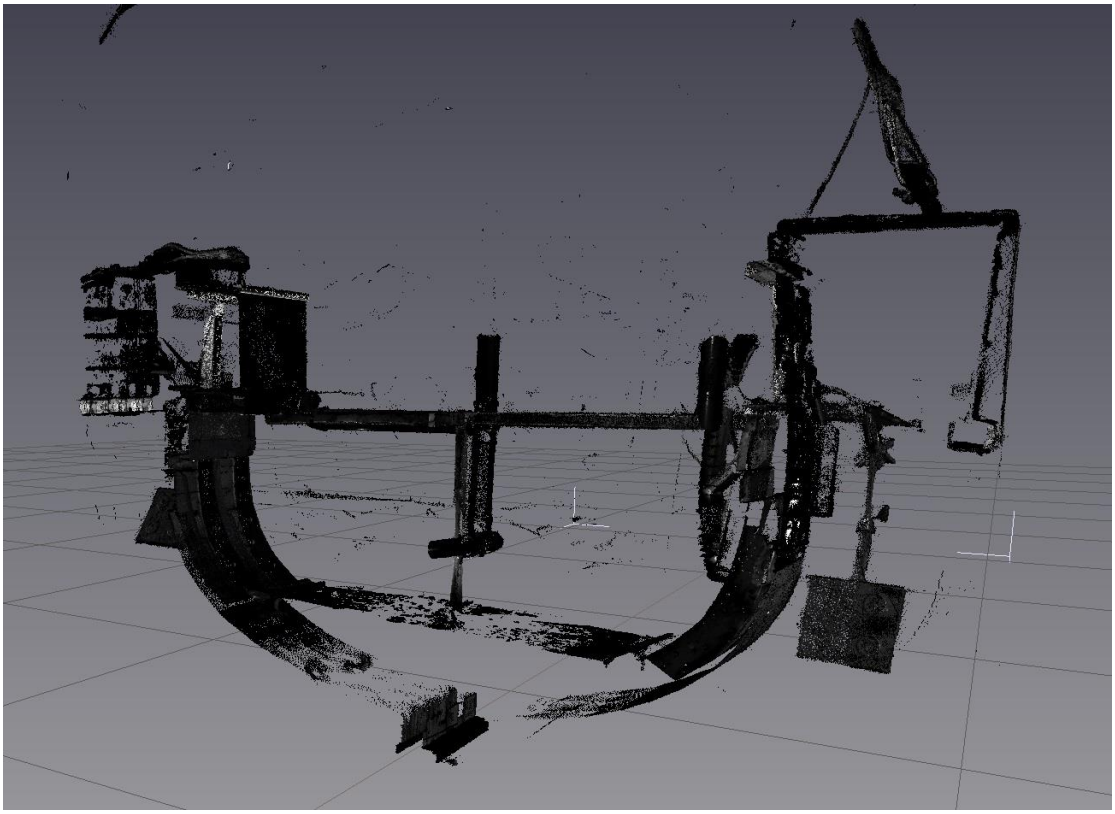
View from stern looking forward



Composite iso view

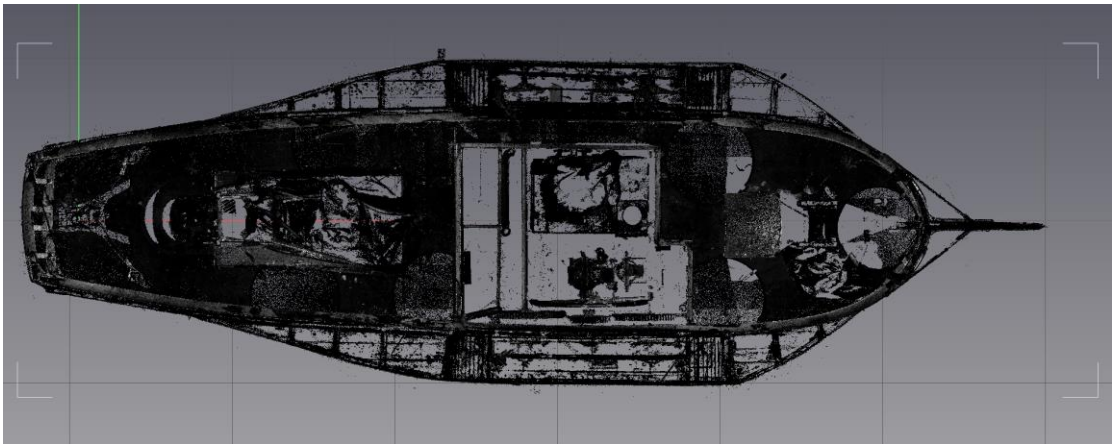


Composite iso view

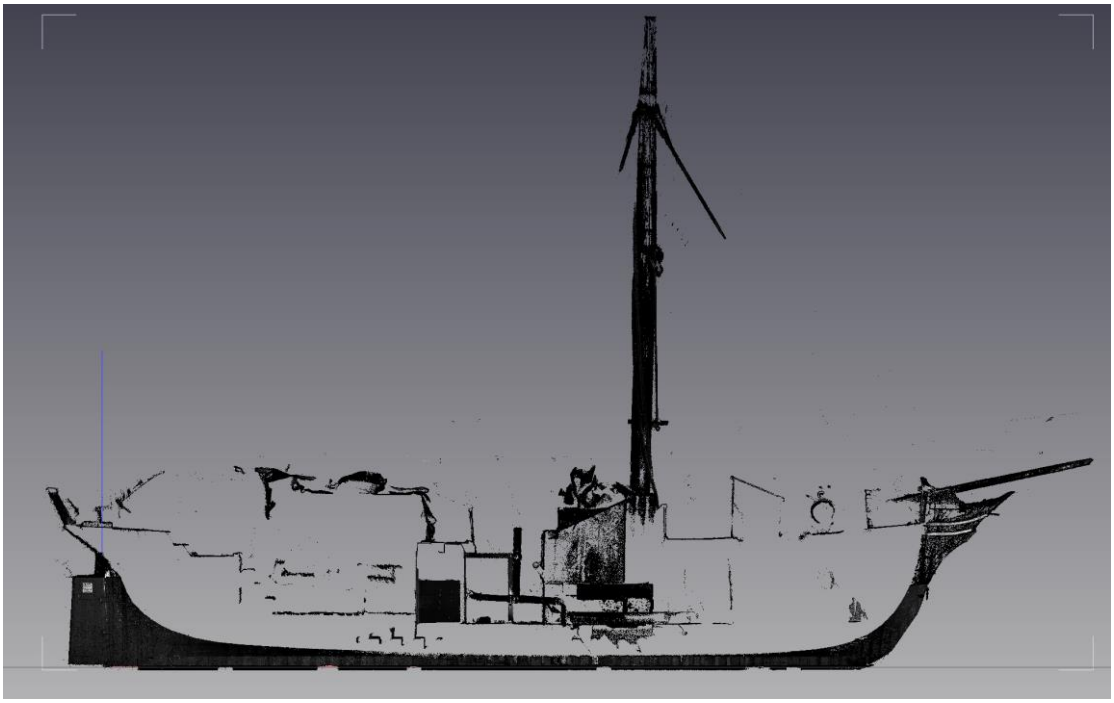


Iso view in way of rear paddle wheel

Iso view in way of engine



Horizontal section main deck to bulwark top



Longitudinal section near the centre line