fieldhouse yacht surveys

PUFFIN II

Pre-purchase Survey

Completed for

Mike Chapman,
27 Hyde Road,
Bognor Regis,
West Sussex,
PO20 4PQ

On Friday 17th August 2020 and Friday 24th August 2020

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TABLE OF CONTENTS

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Law and Jurisdiction

This document is to be construed under English Law and English Law shall be used in interpreting the document and for resolving all claims or disputes arising out of or connected with the document.

1. INTRODUCTION

1.1. This is to certify that Nic Fieldhouse, Principal Surveyor of Fieldhouse Yacht Surveys and Consulting Ltd, carried out a pre-purchase survey on PUFFIN II in accordance with instructions received from Mike Chapman of 27 Hyde Road, Bognor Regis, West Sussex.

1.2. The primary aim of this document is to report on the factual condition of PUFFIN II at the time of the survey. Where the equipment has been inspected or tested and found to be in an unsatisfactory condition, recommendations for rectification, repair or replacement will be detailed in this report. These recommendations will be assigned one of the five categories detailed in Section 7. For clarity, all recommendations will be printed in upper case and red font thus: RECOMMENDED.

1.3. Where reference is made to the condition, this must be considered in relation to the age of the vessel.

1.4. The vessel was inspected whilst she was ashore on the hard-standing at Brighton Premier Marina on Friday 17th August 2020. Here engine and transmission were tested whilst she was afloat and tied to a pontoon berth at Brighton Premier Marina on Friday 24th August 2020.

1.5. The survey was conducted by Nic Fieldhouse, Principal Surveyor of Fieldhouse Yacht Surveys and Consulting Ltd.

1.6. The survey was carried out in accordance with Fieldhouse Yacht Surveys Standard Terms and conditions and with relevant codes of practice published by the International Institute of Marine Surveying.

1.7. Those present during the survey were:

Eur Ing Nic Fieldhouse BEng (Hons) CEng MIMechE AssocIIMS

Marine Surveyor, Fieldhouse Yacht Surveys.

Address 5 Sheepdown Close, Petworth, West Sussex, GU28 0BP

Email nic@fieldhouse-yacht-surveys.com

2. SUMMARY

2.1. PUFFIN II was seen to be a good example of a 1984 (as stated on the Broker's information sheet) Moody 29 - a bilge keel sailing vessel. The GRP hull seemed to be in good structural condition, with a good cosmetic finish. There was some hull blistering of the hull and rudder blade beneath the waterline.

2.2. The deck moulding, masthead rig, engine, domestic services and interior finish were generally all in serviceable condition. The space heater installation was very poorly installed.

2.3. Once the recommendations detailed below have been addressed, there is no reason why PUFFIN II should not give good service.

2.4. TYPE A2 RECOMMENDATIONS

2.4.1. There were thirty two **type A2 recommendations** that must be implemented before the vessel is taken cruising. Please refer to Section 7 for a full description of the categories of recommendations used in this report.

2.4.2. The laminated wooden tiller was free of softening or delamination, but was in very poor cosmetic condition. The varnish coatings were flaking off. The stainless steel attachments to the rudder blade were free of corrosion, damage or distortion, but the bolts that secured the brackets to the timber tiller arm were loose. It is RECOMMENDED (type A2 recommendation) that these fasteners are tightened (see paragraph 5.1.7.6).

2.4.3. During the engine & transmission test on Friday 24th August, it was found that the isolation valve of the engine cooling intake (item 7 in Figure 6 and Table 3) was leaking at a rate of eight drips every ten seconds. The location of the leak can be seen in Figure 8. It is RECOMMENDED (type A2 recommendation) that this leak is rectified (see paragraph 5.1.8.9).

2.4.4. The hose of the engine cooling intake (item 7 in Figure 6 and Table 3) was found to be heavily chafed at one location. This area of damage was beneath the engine and can be seen in Figure 7. The level of damage was such that the reinforcing material in the hose had almost worn through. It is RECOMMENDED (type A2 recommendation) that this hose is replaced (see paragraph 5.1.8.11).

2.4.5. The hose of the engine cooling intake (item 7 in Figure 6 and Table 3) was secured to the isolation valve with two stainless steel hose clips. One of these clips was poorly secured and was not gripping on the hose tail of the isolation valve. This hose clip can be seen in Figure 8 It is RECOMMENDED (type A2 recommendation) that both hose clips are correctly secured (see paragraph 5.1.8.12).

2.4.6. The hoses for the heads sink outlet, heads toilet inlet and two cockpit drains (items 4, 5, 13 and 14 in Figure 6 and Table 3) were located close to or below the waterline and were only secured with a single stainless steel screw clip. It is RECOMMENDED (type A2 recommendation) that where the hose tail of the valve or skin fitting is long enough to accept two clips, all hoses that have a skin fitting located near to or below the waterline should be fitted with two hose clips at each end. These clips should be manufactured from marine grade stainless steel. This recommendation also applies to the clips that attach the hoses to the toilet in the heads compartment (see paragraph 5.1.8.14).

2.4.7. In the cockpit area there was one small storage locker located beneath the aft end of the port seat. This locker was specifically equipped as a LPG gas cylinder storage locker. See section 5.6.5 for details of the inspection of the gas locker. The locker lid was supported by two brass hinges. The aft hinge was broken. The chrome-plated brass latch & padlock were in good working order. It is RECOMMENDED (type A2 recommendation) that the broken hinge is repaired or replaced (see paragraph 5.3.4.2).

2.4.8. The outboard motor was briefly tested. The engine fired up but was not run long enough to assess its full condition. The small amount of fuel inside the integral fuel tank appeared to be very old. The three-blade plastic propeller was in very good condition, with no wear of the blade edges. The paint coatings of the engine were in very good condition, with no deterioration of the coatings on the leg or on the parts beneath the plastic cover. All links and pivots were clean. It is RECOMMENDED (type

A2 recommendation or before the engine is used) that the motor is serviced (see paragraph 5.3.8.2).

2.4.9. At the time of survey the white Dacron, Jeckells mainsail was stowed beneath its storage cover, on the boom. The sail was inspected without hoisting. The single-stitched cloth was clean, but with some evidence of mildew. The sail was free of significant wear or stretching, but with some rot of the cloth & stitching at the clew due to UV exposure. The aluminium headboard, plastic mast sliders, reefing eyes and batten pockets were in good order and free of significant wear. No cloth repairs were noted. It is RECOMMENDED (type A2 recommendation) that the cloth & stitching of the clew are repaired (see paragraph 5.4.8.1).

2.4.10. At the time of survey the white Dacron, Lucas genoa was stowed inside the cockpit locker. The sail was partially unfolded and inspected. The triple-stitched cloth was free of significant stretch and generally in serviceable condition. The blue UV strips were in serviceable condition, but with some fading. The clew eye was in good order and free of deformation. The tack tape and head tape were worn and degraded. Small (2" diameter) repair patches were found at the tack cloth and also approximately half-way up the luff. It is RECOMMENDED (type A2 recommendation) that the head & tack tape are replaced (see paragraph 5.4.8.2).

2.4.11. There was a very minor oil leak on the engine. This was found on the underside of the engine, port side. The leak appeared to be from the 'banjo' connection that secured a rubber hose to the sump. The other end of the rubber hose was connected to the hand-pump that was installed for the purpose of pumping out the engine oil. It is RECOMMENDED (type A2 recommendation) that this leak is rectified (see paragraph 5.5.1.14).

2.4.12. The engine control panel also included warning lamps for oil pressure, water temperature, alternator output, glow plug function and low battery. The acrylic screen that covered the control panel (and speed & depth instruments) was crazed & scratched, decreasing the visibility of the instruments. When the ignition was on, all lamps functioned. Once the engine was running, all lamps extinguished, except for the alternator output lamp, which stayed on during the running of the engine. It is RECOMMENDED (type A2 recommendation) that the operation and functioning of the alternator is tested when the engine is serviced. The clear acrylic screen should be replaced (see paragraph 5.5.1.21).

2.4.13. It is RECOMMENDED (type A2 recommendation) that the engine is serviced without delay. All fluids and filters should be changed. Due to the age of this engine and the lack of service history, this work should include a service of the heat exchanger, to ensure that the cooling pipes are free of scaling or blockage. Ensure that the pencil anode on the engine heat exchanger is checked every six months and replaced annually. The alternator belt should be replaced (see paragraph 5.5.1.30).

2.4.14. The diesel fuel was tested by taking three small samples from the tank, accessed via the fuel tank filler cap. All samples were found to contain particles of brown debris. One of these samples can be seen in Figure 10. A layer of sediment was also found lying in the bottom of the glass bowl of the primary fuel filter. In consideration of the possible age of the diesel fuel and the dirt deposits, it is RECOMMENDED (type A2 recommendation) that the fuel tank and fuel lines are emptied of all fuel. Both fuel filters should be replaced. The new fuel should be treated with a diesel additive, such as Soltron. See https://www.force4.co.uk/soltron-enzyme-fuel-treatment-m.html for further information on this product (see paragraph 5.5.2.2).

2.4.15. During the engine & transmission test on Friday 24th August and whilst the engine was running in gear and at medium speed, the inboard shaft seal was found to leak approximately one drop of water every five seconds. This rate of leaking continued even after the grease pump handle had been turned through two revolutions. On this type of shaft seal, the rate of leakage should be approximately one to two drops of water per minute. It is RECOMMENDED (type A2 recommendation) that that the packing screw on the stern bearing is adjusted in order to decrease the rate of leaking to an acceptable level. Note that the adjustment screw was nearing the end of its travel, therefore the flax material within the seal may need to be replaced in the next few seasons (see paragraph 5.5.3.8).

2.4.16. The bitter end of the anchor chain was spliced to a 17.6 metres of 16 mm diameter warp. This warp was in good condition. The bitter end of the warp was tied up into a monkey's fist, to prevent it from pulling out of the locker. It is RECOMMENDED (type

A2 recommendation) that the bitter end of the warp is modified so that it is tethered to the inside of the locker by multiple loops of a short length of line that could easily be cut in an emergency (see paragraph 5.6.1.4).

2.4.17. A Simpson Lawrence Hyspeed, manually operated windlass was securely mounted to the base of the anchor well via a solid timber block. The windlass body was in fair cosmetic condition, but the ratchet mechanism was seized. It is RECOMMENDED (type A2 recommendation) that the winch mechanism is serviced (see paragraph 5.6.2.1).

2.4.18. Connected to one of the LPG butane gas cylinders was a manual isolation valve. From the valve, a length of hose lead the gas supply to a pressure regulator, mounted on the inside of the locker. The rubber hose was manufactured in March 2010. Gas hose should be replaced every five years. There was no evidence of cracking or degradation of the hoses. It is RECOMMENDED (type A2 recommendation) that these hoses are replaced by a maximum length of one metre of appropriately labelled gas hose. The hose should be marked to BS 3212 type 2 or BS 3212:1991 or BS EN 1763 class 2/3/4. This work should be performed by a qualified gas technician, such as those listed on the gas safety register. This recommendation also applies to the armoured gas hose behind the galley stove (see paragraph 5.6.5.6).

2.4.19. There was no date on the LPG pressure regulator to indicate its age but it is likely that the regulator was much older than ten years. It is RECOMMENDED (type A2 recommendation) that the regulator is replaced with a new one of marine grade (see paragraph 5.6.5.7).

2.4.20. PUFFIN II had a 12 volts d.c. electrical system, with an engine starting battery and a single battery for services. Both batteries were 110 Amp hours capacity. The batteries were located beneath the starboard quarterberth, forward end. Both batteries were stowed inside a single moulded GRP case which was secured to the hull structure. The GRP case was secure and in good order. The batteries were held down by a large steel cross bar, but this bar was not secured. It is RECOMMENDED (type A2 recommendation) that the steel hold-down bar is secured with a threaded screw (see paragraph 5.6.8.1).

2.4.21. A transom mounted stern light was attached to the pushpit. The lens of this unit was crazed and the outer body was distorted. A steaming light unit was mounted on the mast. These two lights were tested and found to function. A bicolour light was mounted on the pulpit. This lamp did not function. It is RECOMMENDED (type A2 recommendation) that the transom light is replaced and the bicolour lamp repaired (see paragraph 5.6.9.1).

2.4.22. PUFFIN II was equipped with a Plastimo Contest compass, mounted to the starboard bulkhead in the cockpit. The lens was yellowing. Half of the damping fluid was missing. It is RECOMMENDED (type A2 recommendation) that this compass is replaced (see paragraph 5.6.10.1).

2.4.23. A NASA SX35 VHF / DSC radio unit was installed at the chart table. The serial number of this radio was 410960. This unit powered up but was not tested for transmission. During reception of a channel 16 message, a lot of hiss was heard over the message. It is RECOMMENDED (type A2 recommendation) that the radio installation is overhauled. A new aerial & cable may be required (see paragraph 5.6.10.2).

2.4.24. One Whale Gusher 10, manual diaphragm bilge pump was mounted in the cockpit sole, just aft of the hinging locker lid. The handle was stowed inside the saloon. The inlet of the manual bilge pump was located beneath the sole boards of the saloon, just forwards of the engine compartment. It was correctly fitted with a strum box, but the aluminium body of the strum box was broken. The pump was tested by placing the inlet in a bucket of water. The pump did not work at all. It is RECOMMENDED (type A2 recommendation) that the bilge pump handle is tethered in order to prevent its loss in the event of a capsize. The strum box should be replaced. The pump should be serviced (replacement of all seals & valves) (see paragraph 6.1.1).

2.4.25. It is RECOMMENDED (type A2 recommendation) that two buckets (with lanyards) are stowed on board. These should be between 9 and 14 litres in capacity (see paragraph 6.1.3).

2.4.26. There was no fog horn found on board. It is RECOMMENDED (type A2 recommendation) that one is stowed on board. If the fog horn is of the aerosol,

compressed gas type, a spare cylinder should be carried on board (see paragraph 6.2.1).

2.4.27. Three fire extinguishers were found on board. These are summarised in Table 4. It is RECOMMENDED (type A2 recommendation) that all of the units are serviced or replaced. Each unit should be fitted with a pressure gauge. The 600 gramme units should be replaced with 1 kg units (see paragraph 6.3.1).

2.4.28. There was one fire blanket loosely stowed in the saloon. It is RECOMMENDED (type A2 recommendation) that it is secured to a bulkhead, positioned within two arm lengths of the cooker (see paragraph 6.3.6).

2.4.29. There was no first aid kit found on the vessel. It is RECOMMENDED (type A2 recommendation) that one is procured and stowed on board (see paragraph 6.4.1).

2.4.30. There was no Carbon Monoxide alarm installed on PUFFIN II. It is RECOMMENDED (type A2 recommendation) that one is procured and mounted in an appropriate location. It is suggested that the alarm is mounted in the saloon at a position that is approximately 1' below the level of the coachroof. Note that the air space closest to the coachroof is considered to be 'dead space' and the sensor will not function so well in this area.

Refer to the following website for details of alarms that are approved as meeting BS EN 50291-2. These are best suited for boats:

http://www.boatsafetyscheme.org/stay-safe/carbon-monoxide-(co)/co-alarms-save-lives/ (see paragraph 6.5.1).

2.4.31. No horse shoe lifebuoys were found on board. One flotation lamp was found in the saloon. This lamp was not fitted with any batteries. It is RECOMMENDED (type A2 recommendation) that two horse shoe lifebuoys are carried on board, each stowed on a stainless steel frame. One of the lifebuoys should be fitted with a self-igniting light and a buoyant lifeline at least 18 metres in length (see paragraph 6.7.1).

2.4.32. One gas-inflating dan buoy, called a Jon Buoy, was stowed beneath the bunk of the starboard quarterberth. This apparatus was clean, dry and free of UV degradation. The serial number of the buoy was DB204174861. The carbon dioxide cylinder was securely mounted and free of corrosion. The lamp battery of this unit expires in March 2022. It is RECOMMENDED (type A2 recommendation) that when the vessel is at sea, this unit should be suitably mounted on the pushpit (see paragraph 6.7.2).

2.4.33. No emergency flares were found on the vessel. It is RECOMMENDED (type A2 recommendation) that a set of flares (size and quantity appropriate to the sea areas and sea states expected to be encountered) is procured and stowed ready for use (see paragraph 6.8.1).

2.5. TYPE C RECOMMENDATIONS

2.5.1. There were twenty seven **type C recommendations** that do not require immediate attention but are to be dealt with within a specified time period:

2.5.2. Small, very shallow, domed shaped blisters in the gel-coat were found to be distributed over much of the hull below the waterline, with approximately 5 to 10 blisters per 200 mm square of hull area. These blisters were approximately 2 to 10 mm in diameter, but the majority were less than 5 mm in diameter. It is likely that these blisters were more pronounced when the vessel was freshly lifted. A number of the blisters were broken and opened up by the surveyor. These blisters contained a very small amount of fluid that had a foul smell but also with a faint smell of vinegar. This evidence suggests that the blisters have occurred due to hydrolysis within the hull moulding, commonly termed as 'osmosis'. The glass fibres within the inspected blisters were well coated with resin. Figure 5 shows an example of one of the larger blisters. None of the opened up blister cavities were deep, indicating that the blisters had developed just beneath the gel-coat. Referring to the publication 'Repairs to Blisters in Glass Fibre Hulls [British Plastics Federation, October 1984], these blisters are of type 3B. This type of blister leaves the laminate more susceptible to the ingress of moisture. Whilst not of immediate significance to the integrity of the hull, to leave blisters of this type to develop over a number of years could lead to a localised weak area in the hull. Development of more blisters of this kind can not be ruled out and the size of the existing blisters may increase in size. It is RECOMMENDED (type C recommendation with an implementation time of one year) that all blisters greater than 5 mm in diameter are

broken open and the cavity cut back to sound laminate. The laminate should then be thoroughly cleaned & dried. If the cavities are deep, the exposed surfaces should then be repaired layers of GRP cloth and finished with a gel-coat. If the cavities are shallow they can be filled with epoxy filler (see paragraph 5.1.3.3).

2.5.3. It is RECOMMENDED (type C recommendation with an implementation time of one year) that the paint coatings on the keel are removed. The loose stopping compound on the hull-to-keel joins and all corrosion deposits on the keel surfaces should be removed. The stopping compound should then be replaced and all iron surfaces should be treated with a rust inhibitor, followed by several coats of keel paint (see paragraph 5.1.6.4).

2.5.4. The rudder blade was found to be free from weeping, splits, impact damage or cracks, except for some small chipping on the lower aft corner. The gel-coat was found to be in very poor condition, with an extensive covering of small blisters. The gel-coat of these blisters was found to be very soft, indicating that this gel-coat was in need of replacement. It is RECOMMENDED (type C recommendation with an implementation time of one to two years) that that the gel-coat below the waterline (and extending approximately 50 mm above the waterline) is removed. The blade should then be dried for several months, ideally upside down and in an indoor environment. An epoxy gel-coat should then be applied to the treated surfaces (see paragraph 5.1.7.2).

2.5.5. The skin fittings were all in serviceable condition, but the plywood backing plate of the heads sink outlet and heads toilet inlet (items 4 and 5 in Figure 6 and Table 3) were found to be rotten and loose. These backing pads help to support the hull in the region of the skin fittings, protecting the GRP from any lateral loads that might be applied to the isolation valve. It is RECOMMENDED (type C recommendation with an implementation time of six months) that these backing pads are replaced. All other plywood backing pads should be regularly checked and replaced if these are found to be rotting (see paragraph 5.1.8.4).

2.5.6. The PVC skin fitting of the manual bilge pump outlet (item 15 in Figure 6 and Table 3) was currently in serviceable condition, but the exposed parts were found to be weakened due to UV exposure. It is RECOMMENDED (type C recommendation with an implementation time of two years) that this skin fitting is replaced (see paragraph 5.1.8.6).

2.5.7. All valves must be regularly exercised in order to prevent them from seizing. The isolation valves of the heads inlet and heads outlet (items 5 and 6 in Figure 6 and Table 3) were seized in the open position. It is RECOMMENDED (type C recommendation with an implementation time of one week) that that these valve are un-seized. If they do not free up adequately, the valves should be replaced (see paragraph 5.1.8.8).

2.5.8. The hoses of the cockpit drains and manual bilge pump (items 13, 14 and 15 in Figure 6 and Table 3) were very old and have hardened with age. It is RECOMMENDED (type C recommendation with an implementation time of two to three years) that these hoses are replaced (see paragraph 5.1.8.13).

2.5.9. The electrical connection between the pear anode and the propeller shaft, the skin fitting of the engine cooling intake and the skin fitting of the galley sink drain was tested with a multimeter and the resistance found to be less than 1.0 Ω in all cases. The electrical connection between the anode and the stern bearing was tested with a multimeter and the resistance found to be greater than 200 Ω. The recommended maximum resistance is 1.0 Ω. Inspection of the internal parts of the studs and the attached wiring of the pear anode (located beneath the timber grate in the bottom of the port cockpit locker) found that the wiring terminals and anode studs were partially submerged in a quantity of standing water. This water will corrode the wires and terminals. It is RECOMMENDED (type C recommendation with an implementation time of six months that due to the high resistance in this wire, the wiring between the anode and the stern bearing is overhauled. The water should be removed from this locker. The cause of the water ingress should be investigated and rectified (see paragraph 5.1.9.3).

2.5.10. The bulkheads, semi-bulkheads and locker frames were secured to the hull & deck by GRP tabbing. The integrity of the tabbing was inspected and found to be free of de-bonding, cracks or movement, except for one location: It was found that beneath the timber trim strip that concealed the joint between the forepeak bulkhead and the coachroof, the GRP tabbing was loose, having de-bonded from the plywood. The

length of the damaged area was 210 mm. It is RECOMMENDED (type C recommendation with an implementation time of six months) that this tabbing is re-bonded using an epoxy resin. Whilst this task is being performed, the tension in the babystay wire should be relaxed, to allow the coachroof in this region to move back to its 'un loaded' condition. Additional strength to the joint can also be provided by the use of stainless steel bolts or wood screws & penny washers fastened though the tabbing and plywood (see paragraph 5.2.4.2).

2.5.11. In addition to the use of GRP tabbing to secure the bulkheads to the hull, some areas of bulkhead-to-hull join were reinforced with steel coach bolts. Many of these steel fasteners were heavily corroded, particularly at locations beneath the sole boards (near to mast compression post) and also at the starboard, top corner of the forepeak bulkhead, where the plywood was connected to the upper edge of the topside. It is RECOMMENDED (type C recommendation with an implementation time of two years) that all corroded coach bolts are replaced. Particular attention should be given to the coach bolts along the lower edge of the primary bulkhead, located close to the mast compression post (see paragraph 5.2.4.3).

2.5.12. Each cast iron keel was fastened to the hull by a number of pairs of 1" diameter carbon steel studs. Where accessible for inspection, each stud was found to be secured by a single nut. Each pair of studs & nuts was supported by a large rectangular (7" x 2" x 5/16") carbon steel backing plate. These fasteners were located beneath the port & starboard saloon seats. The majority of the fasteners were concealed beneath the fixed GRP mouldings of the two fresh water tanks, also installed beneath the port & starboard saloon seats. Only the forward two pairs of studs, nuts & backing plate on each side of the vessel could be accessed for inspection. The accessible studs, nuts and backing plates were hammer tested and found to be securely fastened. The visible surfaces of these fasteners were previously coated with a white paint. These paint coatings were cracked and missing in many areas. The exposed steel surfaces were corroded, but with no evidence of heavy wasting or flaking of rust. In consideration of the age of the vessel and the likelihood that the remainder of the fasteners (concealed beneath the two fresh water tanks) have never been inspected or painted, It is RECOMMENDED (type C recommendation with an implementation time of one to two years) that the two fresh water tanks are lifted to allow the other fasteners to be inspected. One of the central fasteners on each keel should be withdrawn for inspection. Photographs of the withdrawn fasteners should be taken, together with evidence of their exact location. If the exposed threads are found to be wasted, all fasteners should be replaced. Once the inspection has been completed and before the water tanks are replaced, all metal plates, studs and nuts should be cleaned of rust and protected with paint (see paragraph 5.2.6.2).

2.5.13. On PUFFIN II, moisture levels in the deck and coachroof moulding were measured at regular intervals, paying particular attention to the laminate adjacent to deck fittings. All readings were found to be low, apart from the regions of the deck moulding around both port & starboard shroud chain plates. At these locations, moisture readings were found to be high (moisture readings were up to 30). Refer to section 5.1.4 for a description of the moisture measuring process). Water ingress around these chain plates could not be ruled out. It is also possible that moisture has entered the balsa or plywood core of the deck moulding at these locations, via the cut-out holes of the shroud chain plates. This moisture ingress could eventually lead to the de-bonding of the interfaces between the core and the adjoining laminate. Impact tests with a plastic headed hammer gave no indications of loss of stiffness of these four regions. Due to the fixed interior trim panels surrounding the majority of these chain plates (interior access was only possible in the holding tank storage locker and behind the heads sink), the internal surfaces of the decks in these areas could not be accessed for inspection. It is RECOMMENDED (type C recommendation with an implementation time of one to two years) that inspection holes are cut into the plywood trim panels concealing all four shroud chain plates in the saloon (but not the structural plywood bulkhead). The exposed surfaces should then be inspected to determine if water has been leaking into the vessel from around the chain plates. It may be necessary to re-seal each of the chain plates to prevent further water ingress. At the same time that this work is being performed, the condition of the exposed chain plates and fasteners should be inspected for evidence of corrosion, distortion or other damage. If no surface water can be detected, this may indicate that the core material within the laminate of the side decks is wet. If this is the case, the chain plates should be removed and the exposed deck holes should be carefully inspected with a spike to determine if the plywood or balsa core within the laminate is saturated with water. If the core is found to

be wet or de-bonded from the inner or outer skins, the damaged core sections should be repaired. Refer to the Fiberglass Boat Repair & Maintenance manual by West System. Section 5.1.3 of the manual describes the re-bonding delaminated skin when the core is wet. This manual can be found through the following link:

http://www.westsystem.com/wp-content/uploads/Fiberglass-Manual-2015.pdf (see paragraph 5.3.2.6).

2.5.14. There was one locker space beneath the forward end of the cockpit sole. This locker gave access to the aft end of the engine, the grease pump of the propeller shaft seal, the propeller shaft seal and the primary fuel filter. The GRP lid had some cracking around the hinges. The starboard hinge was very stiff and poorly secured to the deck moulding. The lifting latch was broken. The bonded rubber seal of the hatch was loose in places. It is RECOMMENDED (type C recommendation with an implementation time of one year) that the hinges, latch and cracked moulding are repaired. The rubber seal should be re-bonded (see paragraph 5.3.4.4).

2.5.15. One small, inward opening, chrome-plated bronze & glass window was set into the side of the the starboard cockpit seat, looking out to the cockpit from the quarterberth. This window had been bonded shut. When pushed open, the rubber seal was found to be broken. It is RECOMMENDED (type C recommendation with an implementation time of two months) that the seal is replaced (see paragraph 5.3.7.3).

2.5.16. The 620 mm high side stanchions were constructed from solid tapered aluminium. These posts were mounted to the aluminium toe rails via cast aluminium brackets and two stainless steel bolts per post. The stanchions and bases were found secure and in good order. They were fitted with twin stainless steel, 4 mm diameter, 1 x 19 construction safety wires. The tension of the starboard upper wire was slightly loose and in need of adjustment. The forward ends of the wires were secured to the pulpit with swaged stainless steel fittings. The aft ends of the wires were secured to the pushpit via swaged stainless steel fittings and lengths of cord. These cords were old and degraded. It is RECOMMENDED (type C recommendation with an implementation time of six months) that these lengths of cord are replaced (see paragraph 5.3.8.6).

2.5.17. The six post pushpit was constructed in two halves from 1” diameter tubular stainless steel and was found secure and in good order. An entry point was provided through the pushpit. This was closed off by a single rope, terminated with a snap shackle. The rope and shackle were found to be secure, but the rope was old and degraded. It is RECOMMENDED (type C recommendation with an implementation time of six months) that this lengths of rope is replaced (see paragraph 5.3.8.7).

2.5.18. The mooring warps on PUFFIN II were very worn and have been significantly weakened. It is RECOMMENDED (type C recommendation with an implementation time of one month) that these are replaced (see paragraph 5.3.8.9).

2.5.19. The Proctor boom was in good condition, with no significant wear of the anodised coating. The cast aluminium gooseneck was in poor condition. The rivets that secured the castings to the mast and to the boom were secure and free of damage. The vertical stainless steel pivot pin was seized. There was a large gap between the bearing surfaces of this vertical pivot, with significant wear of the lower bearing surface. These defects are shown in Figure 9. It is RECOMMENDED (type C recommendation with an implementation time of six months) that the seized pivot pin is released. The gooseneck should be disassembled and all parts cleaned & lubricated. The excessive play in the pivots should be taken up by a combination of nylon and stainless steel washers (see paragraph 5.4.1.3).

2.5.20. Three winches (Lewmar 7 & 8, single-speed, non self-tailing) were mounted on the mast, between the boom and foot. All three winches were dry & stiff. It is RECOMMENDED (type C recommendation with an implementation time of one year) that these are serviced (see paragraph 5.4.7.2).

2.5.21. The aft end of the rubber exhaust hose, located at the aft end of the port cockpit locker, was comprised of two lengths of hose, joined by a short length of 2” diameter stainless steel pipe. A smaller diameter length of stainless steel pipe was welded to this pipe, forming a ’T-piece’. This fabrication was most likely the anti-siphon coolant feed for the vessel’s previous engine and is now redundant. This fabrication was found to be currently in good working order, but with some corrosion of the welded joint. These fabrications are known to corrode and fail, allowing a small but steady stream of coolant water into the vessel. It is RECOMMENDED (type C recommendation with an

implementation time of two years) that this T-piece is removed and replaced by a straight length of 2" diameter stainless steel pipe (see paragraph 5.5.1.28).

2.5.22. The fuel tank filler hose and fuel tank breather hose were constructed from reinforced hose, but these were not of diesel fuel grade. It is RECOMMENDED (type C recommendation with an implementation time of two years) that these hoses are replaced. The new hose should be marked to denote suitability for use with diesel fuel and marked to show fire resistance. They should be manufactured in accordance with BS EN ISO 7840 or an equivalent standard. Hoses marked to SAE J 1527 and DIN 4798 are also acceptable (see paragraph 5.5.2.3).

2.5.23. The fuel lines of the fuel supply and fuel return were mostly constructed from reinforced fuel hose, suitably manufactured in accordance with BS EN ISO 7840. The two 150 mm long lengths of supply & return hose that were nearest to the engine were found to be unlabelled, with one of these covered in a fabric braid. It is RECOMMENDED (type C recommendation with an implementation time of two years) that these lengths of braided or unmarked hose are replaced with the same hose specified in paragraph 5.5.2.3 (see paragraph 5.5.2.4).

2.5.24. A calorifier was installed beneath the cockpit sole, aft end. The copper cylinder of this calorifier was lagged using polystyrene beads, held within polyethylene bin liner material, held together with tape. The unit was secured in place by the filler hose & deck cap and also by a quantity of expanding spray-foam insulation material. The copper was not plumbed into the engine and was not fitted with a 240 volts a.c. immersion heating element. It is RECOMMENDED (type C recommendation with an implementation time of six months) that that the calorifier and hoses are removed and discarded (see paragraph 5.6.3.6).

2.5.25. Referring to the observations in paragraphs 5.6.6.2 to 5.6.6.5, it was considered that the Trumatic gas powered space heater was very poorly installed. It is RECOMMENDED (type C recommendation with an implementation time of one month or before it is used) that the Trumatic space heater is correctly installed and serviced by an authorised Trumatic technician or is entirely removed from the vessel. Do not attempt to use the heater until the apparatus has been correctly installed (see paragraph 5.6.6.6).

2.5.26. The Broker's details described a 2019 Webasto heater unit (disconnected). No such heater was found on board. A Xin Mai Zhong car heater, model XMZ-1 was loosely stowed inside the port cockpit locker. It was determined that this heater was not suitable for a marine installation. The fuel supply hose was not manufactured in accordance with BS EN ISO 7840 or an equivalent standard. The un-lagged steel silencer of the exhaust pipe was not of marine quality and was not thermally lagged. It is RECOMMENDED (type C recommendation with an implementation time of one month) that this heater assembly is discarded (see paragraph 5.6.6.7).

2.5.27. Shore power was connected to the vessel via a domestic type of plug, connected to the end of a length of 13 Amp cable and loosely stowed inside the port cockpit locker. The cable was routed to a 240 volts a.c. master switch unit, mounted on the forward end of the quarterberth bunk frame. This unit housed the breakers to isolate the shore power. The RCD 'test' button was tested but did not function. Shore power was distributed to conventional domestic 13 amp sockets. These sockets were tested with a socket test device, which determined that they were correctly wired. It is RECOMMENDED (type C recommendation with an implementation time of one month) that the shore supply cable in the cockpit locker is correctly installed using a marine grade, bulkhead-mounted plug connection. The master switch unit should be further investigated to determine why the RCD test switch did not function (see paragraph 5.6.8.7).

2.5.28. The black outer sheath of the shore power cable (that runs between the vessel and the shore-side power facility) was found to be damaged, due to pinching of the cable when closing the port cockpit locker lid. The strands of the earth wire were exposed. It is RECOMMENDED (type C recommendation with an implementation time of one day) that this cable is repaired or replaced (see paragraph 5.6.8.8).

2.6. TYPE D RECOMMENDATIONS

2.6.1. There were two **type D recommendations** whose repair may be left to the owner's convenience:

2.6.2. There were a few gel-coat chips along the port & starboard topsides, approximately one metre aft of the stem and positioned along the sharp, upper edges of the topside. Similar chipping was also found on the port side, next to the cockpit. There was some exposed laminate in these areas. Some of these chips had been repaired to a poor standard with gel-coat. Small gel-coat chips & repairs were noted on the stem and on both of the aft corners. It is RECOMMENDED (type D recommendation) that these damaged areas are repaired with colour-matched gel-coat (see paragraph 5.1.2.5).

2.6.3. The cockpit floor, seats and coaming were all in fair cosmetic condition. There were numerous small chips and scratches in the gel-coat. There was some fine crazing in the gel-coat surfaces, due to long-term UV exposure. There was some gel-coat damage due to abrasion from the jib sheets, located inboard of the port & starboard pulley blocks that lead the jib sheets to the primary winches. Similar gel-coat wear was found next to the aft, port mooring cleat. It is RECOMMENDED (type D recommendation) that the abraded gel-coat is repaired (see paragraph 5.3.4.1).

3. SCOPE & LIMITATIONS

3.1. The vessel was inspected whilst she was ashore on the hard-standing at Brighton Premier Marina on Friday 17th August 2020. Here engine and transmission were tested whilst she was afloat and tied to a pontoon berth at Brighton Premier Marina on Friday 24th August 2020. For the shore-based part of the survey, there was good, all-round access to the exterior of the hull. The only minor obstructions were those presented by the single shore under the bow and the single shore under each of the aft quarters.

3.2. At the time of survey on 17th August the ambient temperature was approximately 22°C, with clear skies and a light wind. There was no rainfall during the survey or during the previous day.

3.3. I was informed by the Broker that prior to the survey on Friday 17th August, the vessel had been ashore for approximately three days.

3.4. Internal inspection was limited to the areas that are normally accessible directly or through lockers, inspection hatches, removable panels, etc. No part of the vessel was dismantled; no bolts were removed for inspection and no linings removed, except in order to gain access to the parts of the hull structure beneath the four screwed down plywood sole boards in the saloon. Additionally, the two plywood side panels in the forward end of the forepeak were unfastened and removed in order to gain access to the internal parts of the two anchor locker well drains. Consequently, any part of the vessel, her equipment or fittings, which were unexposed or inaccessible, cannot be confirmed to be free from defect.

3.5. All tanks were inspected where visible but not internally inspected and they have not been pressure tested. Their contents have not been tested for contamination (except for the dip-testing of the diesel fuel tank).

3.6. Window hatches and external doors have not been tested for water tightness.

3.7. We have not inspected fibreglass laminate, woodwork or other parts of the structure which are covered, unexposed or inaccessible and we are, therefore, unable to report that any such part of the structure is free from defects, rot or deterioration.

3.8. The vessel and her equipment were not assessed for design or suitability for any particular purpose, or compliance with any rules, regulation, standard or code.

3.9. Note that the terms “serviceable” or “serviceable condition”, as used in the report, means that the item remained usable, despite possible wear or deterioration. The item may nevertheless require maintenance or replacement in due course.

3.10. No dismantling of the engine took place and so the internal condition of the engine cannot be commented upon. Components hidden from view, such as the sump, crankshaft, camshafts, pistons, valves and cylinder head gaskets could not be examined for latent defects. No compression tests of the cylinders took place. Comments can only be made with regard to the general condition of the engine on the day of the inspection. No guarantee can be made regarding the life expectancy of the engine.

4. THE VESSEL

4.1. DETAILS

Name	PUFFIN II
Yard Number	xxx, stamped into aluminium plate at chart table
Mould Number	xxx, moulded into upper, port corner of transom and also on deck moulding, located at the aft end of the cockpit sole
Craft Identification Number	xxx, moulded into upper, starboard corner of transom
Lloyds Build Registration Number	PLY xxx
SSR Number	xxx
Built by	Marine Projects Ltd, Plymouth, England
Model	Moody 29
Type	Bilge keeled Bermudian Sloop
Build date	1984 (Broker's information sheet)
Engine manufacturer & Model	Lombardini LDW_1003_M
Engine type	4 stroke, three cylinder diesel, naturally aspirated
Engine power	Maximum 27 hp (Broker's data sheet states 30 hp)

Table 1: Vessel Details

4.1.1. PUFFIN II was seen to be a Moody 29 - a masthead rigged sailing yacht with cast iron bilge keels. She was built by Marine Projects Ltd, Plymouth, England in 1984.

4.1.2. The hull of PUFFIN II was moulded in one piece with hand laid GRP, made up of polyester resin, mixed-strand fibreglass mat and woven rovings, finished with a white pigmented gel-coat. The bilge keels were made from cast iron and were fastened to the hull with carbon steel studs and nuts. The hull was seen to be stiffened internally by GRP Internal Moulding and GRP longitudinal stringers & transverse frames.

4.1.3. The cockpit, deck and superstructure were of moulded GRP with a balsa or plywood core. Hull to deck join was of the in-turned flange type. The deck moulding was finished with a white pigmented gel-coat.

4.1.4. PUFFIN II had a balanced transom hung rudder constructed from a foam filled GRP moulding. She had a self-draining cockpit and tiller steering. She had a masthead sloop rig, featuring a deck-stepped mast, a slab-reefed mainsail and a roller furling genoa.

4.1.5. The accommodation of PUFFIN II was well laid out, with a double berth and enclosed heads forward. The saloon had seats on each side. The galley space was on the port side, at the base of the companionway steps. There was a quarter berth under the starboard cockpit seat, with a chart table forward of the berth and aft of the starboard saloon seating.

4.1.6. PUFFIN II was fitted with a Lombardini LDW_1003_M, three cylinder diesel engine, with fresh water cooling, driving through a Technodrive TMC40 reduction gearbox. Engine control was via a single lever, giving forward and reverse gears and throttle control, mounted on the port side of the cockpit seating. There was one welded mild steel fuel tank installed inside the port cockpit locker.

4.2. VESSEL'S NAME

4.2.1. PUFFIN II had her name positioned on the starboard side of her transom in black coloured self-adhesive lettering. This text was in good cosmetic condition and clearly readable. Her name was also applied in large white lettering to the two blue canvas cockpit spray dodgers.

4.3. DIMENSIONS

Dimension	Metres	Feet / inches
Length Overall	9.04	29 feet and 8 inches
Length on Waterline	7.62	25 feet and 0 inches
Beam	3.20	10 feet and 6 inches
Draft	1.07	3 feet and 6 inches
Displacement	3,311 kg	7,300 lb
Ballast	1,247 kg	2,750 lb

Table 2: Vessel Dimensions (Yachtsnet.co.uk)

4.4. YARD NUMBER

4.4.1. The vessel's Yard Number was xxx. This number was stamped into an aluminium plate, which was fastened to the side of the starboard quarterberth, next to the chart table. This plate is shown in Figure 1.

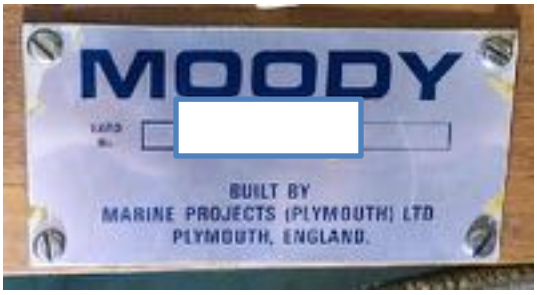

Figure 1: Yard Number on Builder's Plate

4.5. MOULD NUMBER

4.5.1. The vessel's Mould Number was xxx. This number was moulded into the upper, port corner of the transom and also on the deck moulding, located at the aft end of the cockpit sole. The number of the transom is shown in Figure 2.

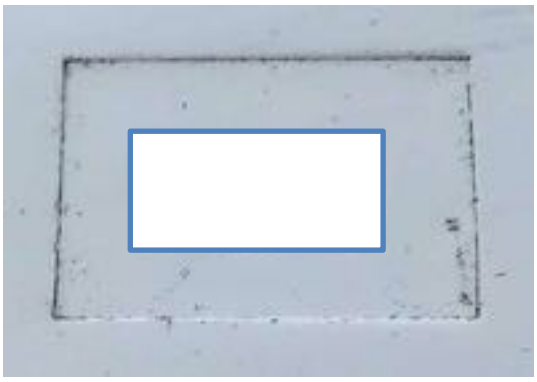

Figure 2: Mould Number on hull & deck mouldings

4.6. CRAFT IDENTIFICATION NUMBER

4.6.1. The vessel's Craft Identification Number was moulded into upper, starboard corner of transom. The number was xxx, as shown in Figure 3. This number suggests that the vessel may have been built in 1982. The correct build date will be stated on the Builder's Certificate, if this document still exists.

4.6.2. This Craft Identification Number (or the Mould Number or the Yard Number) should match the numbers detailed on the Builder's Certificate and any Bills of Sale found within the vessel's documentation.

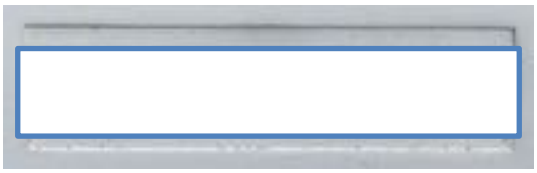

Figure 3: Craft Identification Number

4.7. Part III Registration (Small Ships Register)

4.7.1. The vessel's SSR number was xxx. This number was applied to the port side of the transom with black PVC numbers. The SSR certificate was not seen during the survey. This certificate may have expired.

4.8. Lloyd's Build Registration Number

4.8.1. This number was PLY xxx and was stamped onto a metal plaque, which was fastened to the side of the starboard quarterberth, next to the chart table. This plate is shown in Figure 4.

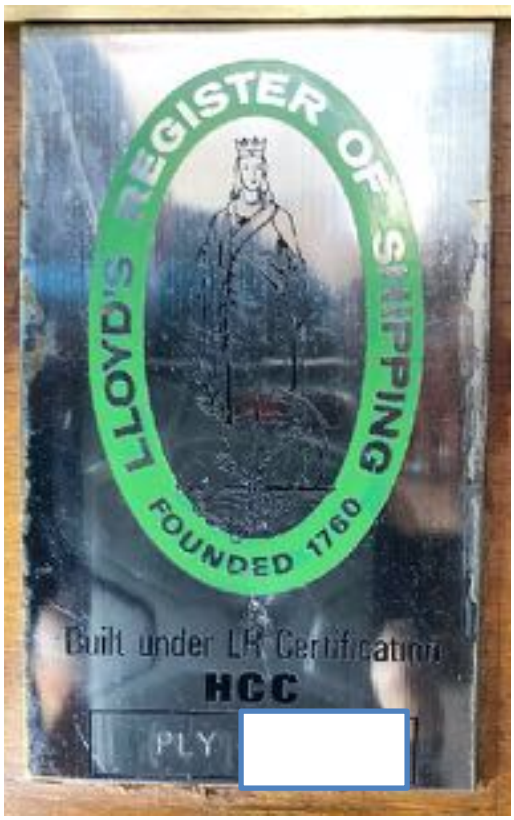

Figure 4: Lloyd's Register of Shipping plaque

4.9. Bills of Sale

4.9.1. A total of three Bills of Sale were inspected. When arranged in chronological order, they showed the trail of ownership from NAME & ADDRESS to NAME & ADDRESS.

4.9.2. All of the Bills of Sale detail the vessel's name as PUFFIN II. Only one Bill of Sale referred to the identification number PLY_xxx, which is the Lloyd's Registration Number (section 4.8).

5. THE SURVEY

5.1. HULL EXTERIOR

5.1.1. Material & Details of Construction

5.1.1.1. The hull of PUFFIN II was moulded in one piece with hand laid GRP, made up of polyester resin, mixed-strand fibreglass mat and woven rovings, covered with a white pigmented gel-coat. The bilge keels were made from cast iron and were fastened to the hull with carbon steel studs and nuts.

5.1.1.2. The hull was sighted from a distance fore and aft and visually inspected all round. Her lines were symmetrical, fair and true, with no signs of distortion, hard spots or flat areas.

5.1.2. Topsides

5.1.2.1. The topsides were finished with unpainted, white-pigmented gel-coat. The raised topside of the hull moulding was finished with a 180 mm wide, blue painted line, running along the top of both topsides and across the transom. This paint had been applied to a fair standard. The paint was faded but in acceptable cosmetic condition.

5.1.2.2. There was one 15 mm wide cove line on each topside, running the length of the hull. The blue painted cove lines were very worn, faded and in poor cosmetic condition.

5.1.2.3. A single wide boot topping line ran along each topside, positioned just above the top edge of the antifouling. This 110 mm wide blue line had been applied with hard antifouling. This was in good cosmetic condition, but in need of a new coat of hard antifouling.

5.1.2.4. The topsides were inspected visually. The gel-coat was in good condition, with no signs of major trauma or stress cracking. The gel-coat retained a good level of gloss but would benefit from a clean and a further application of polish. There were small cosmetic chips, scuff and scratch marks from mooring fenders, especially on the port beam. None of these had penetrated the gel-coat.

5.1.2.5. There were a few gel-coat chips along the port & starboard sides, approximately one metre aft of the stem and positioned along the sharp, upper edges of the topside. Similar chipping was also found on the port side, next to the cockpit. There was some exposed laminate in these areas. Some of these chips had been repaired to a poor standard with gel-coat. Small gel-coat chips & repairs were noted on the stem and on both of the aft corners. It is RECOMMENDED (type D recommendation) that these damaged areas are repaired with colour-matched gel-coat.

5.1.3. Hull Below the Waterline

5.1.3.1. The blue ablative type antifouling paint below the waterline was very worn and in need of a new treatment. The build-up of layers of antifouling was low, with a small amount of flaking of previous layers.

5.1.3.2. The entire hull was visually inspected, except where surfaces were hidden behind the two lifting slings. Additionally, the antifouling was scraped off in a number of areas in order to inspect the condition of the underlying gel-coat. No evidence of significant scratching or chipping of the hull was found. There was no evidence of softening of the gel-coat, as found in the gel-coat of the rudder blade. See paragraph 5.1.7.2 for details of the condition of the gel-coat of the rudder blade.

5.1.3.3. Small, very shallow, domed shaped blisters in the gel-coat were found to be distributed over much of the hull, with approximately 5 to 10 blisters per 200 mm square of hull area. These blisters were approximately 2 to 10 mm in diameter, but the majority were less than 5 mm in diameter. It is likely that these blisters were more pronounced when the vessel was freshly lifted. A number of the blisters were broken and opened up by the surveyor. These blisters contained a very small amount of fluid that had a foul smell but also with a faint smell of vinegar. This evidence suggests that the blisters have occurred due to hydrolysis within the hull moulding, commonly termed as ‘osmosis’. The glass fibres within the inspected blisters were well coated with resin. Figure 5 shows an example of one of the larger blisters. None of the opened up blister

cavities were deep, indicating that the blisters had developed just beneath the gel-coat. Referring to the publication 'Repairs to Blisters in Glass Fibre Hulls [British Plastics Federation, October 1984], these blisters are of type 3B. This type of blister leaves the laminate more susceptible to the ingress of moisture. Whilst not of immediate significance to the integrity of the hull, to leave blisters of this type to develop over a number of years could lead to a localised weak area in the hull. Development of more blisters of this kind can not be ruled out and the size of the existing blisters may increase in size. It is RECOMMENDED (type C recommendation with an implementation time of one year) that all blisters greater than 5 mm in diameter are broken open and the cavity cut back to sound laminate. The laminate should then be thoroughly cleaned & dried. If the cavities are deep, the exposed surfaces should then be repaired layers of GRP cloth and finished with a gel-coat. If the cavities are shallow they can be filled with epoxy filler.

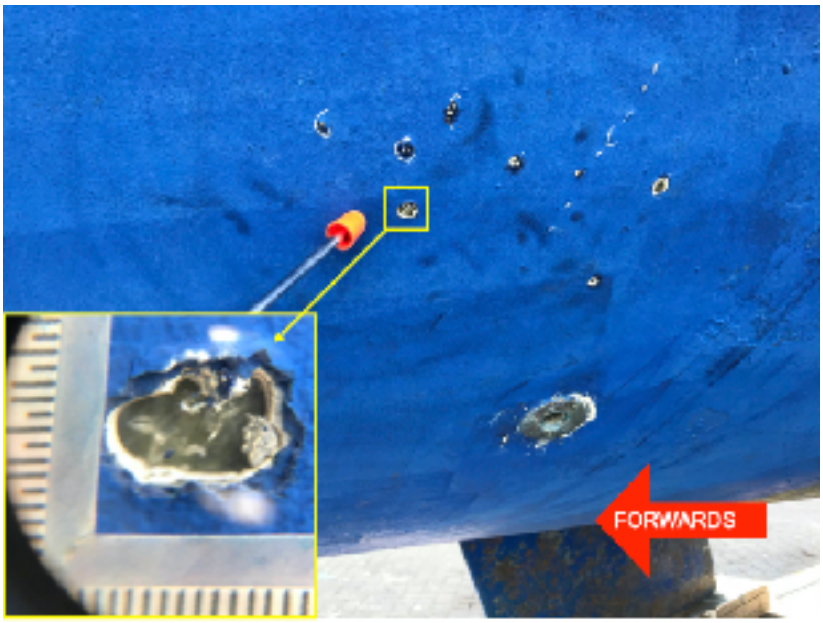

Figure 5: One of the larger blisters found on the port beam, opened up by the Surveyor.

5.1.3.4. On the day of the survey, a number of the vessel's documents were found on board. One of these was an invoice for the repair of 'ongoing osmosis work'. This invoice was dated 11th September 2003. This invoice provided evidence that the hull blistering has been in progress for at least seventeen years.

5.1.4. Moisture Readings

5.1.4.1. Moisture readings were taken using a Tramex Skipper Plus capacitance type moisture meter. The meter was set to range 2, which measures deep into the layup. Figures quoted are from the meter's percentage H_20 scale. Note that by convention, moisture meters are calibrated for timber, so the percentage moisture readings are not directly applicable to GRP. The true moisture content of GRP is very approximately 10% of those quoted.

5.1.4.2. Readings were taken both above and below the waterline in order to obtain a comparison. Note that high moisture content is not generally a structural defect and is to be expected in older boats. Where some moisture has been absorbed, the likelihood of moisture related problems occurring are higher. When this occurs, the actual state of the laminate cannot be completely guaranteed without destructive testing and chemical analysis. The opinion given in this survey report is based on all the evidence available at the time but without destructive testing.

5.1.4.3. Moisture readings taken on the topsides were between 12 and 15, which indicate a low moisture level.

5.1.4.4. Readings taken of the hull below the waterline were generally between 20 and 25, but with some readings up to 30 in the lower bilges. These readings indicate that the hull laminate below the waterline has a high moisture content. These high readings may be partly attributed to the short period since PUFFIN II was lifted out of the water.

Additionally, the older orthophthalic resins used prior to the mid 1990's tend to retain moisture for a long period.

5.1.4.5. To limit the moisture levels in the hull laminate, the boat should ideally be stored ashore for a few months each winter. The owners should endeavour to keep the bilges as dry as possible. Sources of any leakage into the vessel should be found and cured. When the vessel is to be left unattended for more than a few days, the sole boards and internal locker covers should be opened up to allow the moisture in the bilges to evaporate.

5.1.5. Hammer Testing of Hull Surfaces

5.1.5.1. In order to identify any areas of delamination or poorly resinated laminate, the exterior surfaces of the hull were then tested with a small plastic-headed hammer. The test gave sound returns with no indications of softening, poor lay-up or delamination of the GRP.

5.1.6. Keels

5.1.6.1. The bilge keels were found to be constructed from cast iron and fastened to the hull using carbon steel studs and nuts. See section 5.2.6 for details of the inspection of the keel studs and fastenings.

5.1.6.2. The bilge keels were hammer tested and no evidence of filler material or deep pitting was found. The paint coatings on all exposed surfaces of the keels were in very poor condition, with loose or missing paint and surface corrosion developing beneath these coatings.

5.1.6.3. The hull to keel joins were inspected. The mounting face of each keel was set into a recess in the hull moulding. The stopping compound on the edges of the join of both keels was cracked, with corrosion developing beneath.

5.1.6.4. It is RECOMMENDED (type C recommendation with an implementation time of one year) that the paint coatings on the keel are removed. The loose stopping compound on the hull-to-keel joins and all corrosion deposits on the keel surfaces should be removed. The stopping compound should then be replaced and all iron surfaces should be treated with a rust inhibitor, followed by several coats of keel paint.

5.1.7. Rudder & Steering

5.1.7.1. PUFFIN II had a balanced transom hung rudder constructed from a foam filled GRP moulding.

5.1.7.2. The rudder blade was found to be free from weeping, splits, impact damage or cracks, except for some small chipping on the lower aft corner. The gel-coat was found to be in very poor condition, with an extensive covering of small blisters. The gel-coat of these blisters was found to be very soft, indicating that this gel-coat was in need of replacement. It is RECOMMENDED (type C recommendation with an implementation time of one to two years) that that the gel-coat below the waterline (and extending approximately 50 mm above the waterline) is removed. The blade should then be dried for several months, ideally upside down and in an indoor environment. An epoxy gel-coat should then be applied to the treated surfaces.

5.1.7.3. Moisture measurements were taken of the blade. These were found to be very high, which is typical of rudder blades constructed using this method.

5.1.7.4. The rudder hangings consisted of two sets of stainless steel pintles and gudgeons. The hangings and fastenings were inspected from outside of the vessel and found to be free of significant corrosion. Each of the brackets was secured to the rudder with two A4-grade stainless steel bolts & nyloc nuts and secured to the transom with two stainless steel bolts. All fasteners were hammer tested and found to be well secured.

5.1.7.5. The gudgeons and pintles were secured by a ½" diameter stainless steel pivot pin. The lower end of this pin was suitably locked with a stainless steel nut and stainless steel split pin. There was very minor wear in all of the bearing surfaces. The pivot pin was free of significant corrosion.

5.1.7.6. The laminated wooden tiller was free of softening or delamination, but was in very poor cosmetic condition. The varnish coatings were flaking off. The stainless steel

attachments to the rudder blade were free of corrosion, damage or distortion, but the bolts that secured the brackets to the timber tiller arm were loose. It is RECOMMENDED (type A2 recommendation) that these fasteners are tightened.

5.1.7.7. A stainless steel plate was secured to the blade, located just beneath the lower gudgeon & pintle assembly. This prevented the rudder blade from excessive pivoting, which could lead to damage of the rudder or bearings

5.1.8. Skin Fittings and Valves

5.1.8.1. Figure 6 and Table 3 below show the location and function of the skin fittings, together with the condition of the valves, hoses and clips. The items in red text in Table 3 indicate a defect or poor condition of the items and are addressed in the recommendations below.

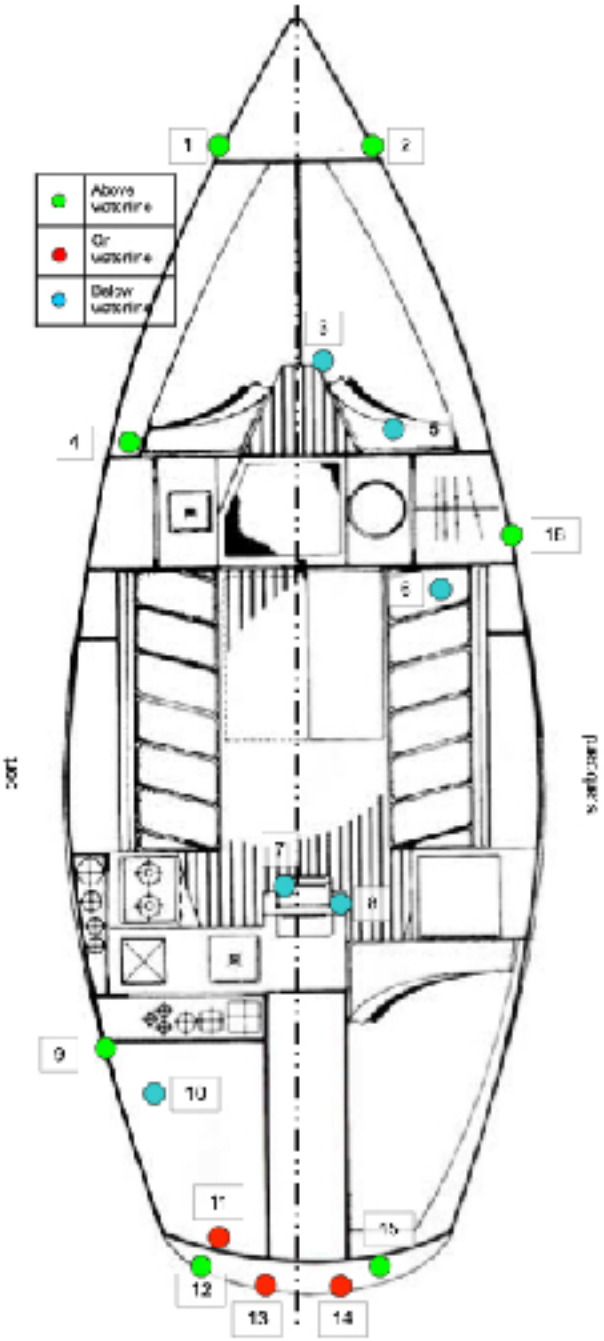

Figure 6: Location of skin fittings (plan view looking from above)

#	Function	Above / Below WL	EXTERNAL		INTERNAL							
			Skin Fitting		Valve			Hose		Clips		
			Mat.	Cond.	Type	Mat.	Cond.	Reinf.	Cond.	#	Mat.	Cond.
1	Foredeck well drain, port	A	PVC	✓	None			✓	✓	1	ss	✓
2	Foredeck well drain, starboard	A	PVC	✓	None			✓	✓	1	ss	✓
3	Depth transducer	B	PI	✓	N/A							
4	Heads sink outlet	B	Br	✓ Rotten ply	Ball	Br	✓	✓	✓	1	ss	✓
5	Heads inlet	B	Br	✓ Rotten ply	Ball	Br	Seized else good	✓	✓	1	ss	✓
6	Heads outlet	B	Br	✓	Ball	Br	Seized, minor corrosion else good	✓	✓	2	ss	✓
7	Engine cooling intake	B	Br	✓	Ball	Br	✓	✓	✓	2	ss	1 loose clip
8	Speed transducer	B	PI	✓	N/A							
9	Engine anti-siphon vent	A	PI	✓	None			✓	✓	1	ss	✓
10	Galley sink outlet	B	Br	✓	Ball	Br	✓	✓	✓	2	ss	✓
11	Engine exhaust & coolant outlet	WL	GRP	✓	None			✓	✓	2	ss	✓
12	Cabin heater outlet	A	PI	X melted	None			Poorly installed, exhaust pipe not clamped to heater				
13	Cockpit drain port	WL	GRP	✓	None			✓	✓ old	1	ss	✓
14	Cockpit drain starboard	WL	GRP	✓	None			✓	✓ old	1	ss	✓
15	Manual bilge pump outlet	A	PVC	old ✓	None			✓	✓ old	1	ss	✓
16	Holding tank vent	A	Br	✓	None			✓	✓	1	ss	✓

WL	Waterline	PI	Plastic
Mat.	Material	ss	Stainless steel
Cond.	Condition	ms	Mild Steel
Br	Bronze or Brass	DZR	Dezincification resistant Brass

Table 3: Function and condition of skin fittings, valves, hoses and clips

5.1.8.2. No skin fittings or valves were dismantled as part of the survey but the following tests were performed:

Examination from outside and inside the vessel

All valves opened and closed to their full extent

The through-hull fittings, hose clips and valve bodies were hammer tested

The fittings were aggressively tested to assess their security of attachment to the hull

Where accessible, hose clips were inspected and hoses were aggressively tested

5.1.8.3. All fittings on or below the waterline were bronze or dezincification resistant brass (apart from the plastic speed impeller & depth transducer) and showed no signs of dezincification.

5.1.8.4. The skin fittings were all in serviceable condition, but the plywood backing plate of the heads sink outlet and heads toilet inlet (items 4 and 5 in Figure 6 and Table 3) were found to be rotten and loose. These backing pads help to support the hull in the region of the skin fittings, protecting the GRP from any lateral loads that might be applied to the isolation valve. It is RECOMMENDED (type C recommendation with an implementation time of six months) that these backing pads are replaced. All other plywood backing pads should be regularly checked and replaced if these are found to be rotting.

5.1.8.5. The plastic skin fitting of the cabin heater exhaust (item 12 in Figure 6 and Table 3) had melted. The stainless steel exhaust pipe of this unit was not clamped to the body of the heater with any hose clip or pipe clamp. Refer to section 5.6.6 for details of the recommendation relating to the LPG fuelled space heater.

5.1.8.6. The PVC skin fitting of the manual bilge pump outlet (item 15 in Figure 6 and Table 3) was currently in serviceable condition, but the exposed parts were found to be weakened due to UV exposure. It is RECOMMENDED (type C recommendation with an implementation time of two years) that this skin fitting is replaced.

5.1.8.7. All hoses located below the waterline were fitted with an isolation valve. There was reasonably clear access inside the vessel to all valves, except for the galley sink drain, located towards the bottom of the port cockpit locker (item 10 in Figure 6 and Table 3). Ensure that access to this valve is not hampered by excessive equipment inside this locker.

5.1.8.8. All valves must be regularly exercised in order to prevent them from seizing. The isolation valves of the heads inlet and heads outlet (items 5 and 6 in Figure 6 and Table 3) were seized in the open position. It is RECOMMENDED (type C recommendation with an implementation time of one week) that that these valve are un-seized. If they do not free up adequately, the valves should be replaced.

5.1.8.9. During the engine & transmission test on Friday 24th August, it was found that the isolation valve of the engine cooling intake (item 7 in Figure 6 and Table 3) was leaking at a rate of eight drips every ten seconds. The location of the leak can be seen in Figure 8. It is RECOMMENDED (type A2 recommendation) that this leak is rectified.

5.1.8.10. All other valves were in good working order and operated normally. The visible parts of the valves were free of significant corrosion.

5.1.8.11. The hose of the engine cooling intake (item 7 in Figure 6 and Table 3) was found to be heavily chafed at one location. This area of damage was beneath the engine and can be seen in Figure 7. The level of damage was such that the reinforcing material in the hose had almost worn through. It is RECOMMENDED (type A2 recommendation) that this hose is replaced.

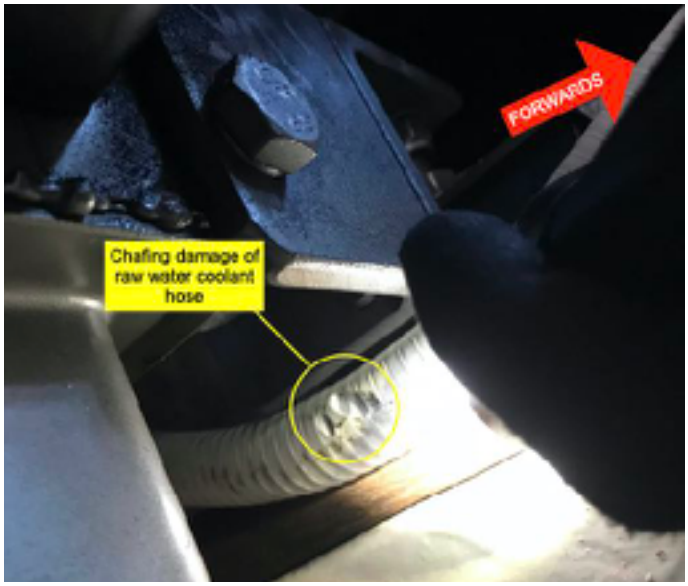

Figure 7: Chafing damage of engine cooling intake hose

5.1.8.12. The hose of the engine cooling intake (item 7 in Figure 6 and Table 3) was secured to the isolation valve with two stainless steel hose clips. One of these clips was poorly secured and was not gripping on the hose tail of the isolation valve. This hose clip can be seen in Figure 8 It is RECOMMENDED (type A2 recommendation) that both hose clips are correctly secured.

Figure 8: Isolation valve & hose of engine cooling intake

5.1.8.13. The hoses of the cockpit drains and manual bilge pump (items 13, 14 and 15 in Figure 6 and Table 3) were very old and have hardened with age. It is RECOMMENDED (type C recommendation with an implementation time of two to three years) that these hoses are replaced.

5.1.8.14. The hoses for the heads sink outlet, heads toilet inlet and two cockpit drains (items 4, 5, 13 and 14 in Figure 6 and Table 3) were located close to or below the waterline and were only secured with a single stainless steel screw clip. It is RECOMMENDED (type A2 recommendation) that where the hose tail of the valve or skin fitting is long enough to accept two clips, all hoses that have a skin fitting located near to or below the waterline should be fitted with two hose clips at each end. These clips should be manufactured from marine grade stainless steel. This recommendation also applies to the clips that attach the hoses to the toilet in the heads compartment.

5.1.9. Anodes

5.1.9.1. A pear anode (200 mm between fastening centres) was through-bolted to the hull, positioned on the port side of the hull and 650 mm forwards of the stern bearing. The anode was secured to the hull with two galvanised steel studs. Each stud was secured with two nuts. The studs and nuts had some minor surface corrosion but were in serviceable condition. The anode was approximately 20% wasted.

5.1.9.2. The surface of the anode was coated in a deposit of white Zinc Hydroxide, which reduces the efficiency of the anode. Ensure that this white deposit is cleaned off whenever the vessel is lifted ashore or whenever she is dried out on a beach.

5.1.9.3. The electrical connection between the anode and the propeller shaft, the skin fitting of the engine cooling intake and the skin fitting of the galley sink drain was tested with a multimeter and the resistance found to be less than 1.0 Ω in all cases. The electrical connection between the anode and the stern bearing was tested with a multimeter and the resistance found to be greater than 200 Ω. The recommended maximum resistance is 1.0 Ω. Inspection of the internal parts of the studs and the attached wiring of the pear anode (located beneath the timber grate in the bottom of the port cockpit locker) found that the wiring terminals and anode studs were partially submerged in a quantity of standing water. This water will corrode the wires and terminals. It is RECOMMENDED (type C recommendation with an implementation time of six months that due to the high resistance in this wire, the wiring between the anode and the stern bearing is overhauled. The water should be removed from this locker. The cause of the water ingress should be investigated and rectified.

5.1.9.4. All anodes should be inspected annually and renewed if more than 50% wasted.

5.2. HULL INTERNAL STRUCTURE

5.2.1. Access to Hull

5.2.1.1. Within the heads and forepeak accommodation, there were a number of removable sole boards. These were all lifted in order to inspect the internal hull and stiffening structure. The four screwed down plywood sole boards in the saloon were unfastened and removed in order to gain access to the hull structure in this area.

5.2.1.2. Access to the hull structure was also gained by lifting the seats in the saloon area, lifting the bunk covers in the forepeak & quarterberth and also via the engine compartment.

5.2.1.3. The parts of the hull that were concealed beneath the fixed carpet linings of the saloon & forepeak and the fixed panels of the heads & galley area could not be accessed for inspection, therefore their condition could not be fully assessed.

5.2.2. Hull Internal Structure

5.2.2.1. A Hull Internal Moulding of GRP was located in the area that stretched from beneath the forepeak bunk to the aft end of the starboard quarterberth and spanned athwartships to finish behind the saloon seats. This Internal Moulding was bonded to the hull and strengthened & stiffened the hull moulding. The moulding also supported the sole boards of the saloon and provided the sole & toilet mounting in the heads compartment.

5.2.2.2. This Internal Moulding was bonded to the internal surface of the hull. The exposed surfaces of the Internal Moulding were finished in beige gel-coat. The visible gel-coat surfaces of the internal moulding were in good condition, but with surface scratches. Where accessible, the Internal Moulding was inspected and no evidence of significant cracking or other damage was noted.

5.2.2.3. Beneath the Hull Internal Moulding the hull was seen to be stiffened internally by foam-filled glass fibre longitudinal stringers and transverse frames. These top hat section reinforcements were 2” moulded x 3” sided and were bonded to the hull with layers of GRP cloth. Further reinforcing was provided by bulkheads, semi-bulkheads and the bases of the furniture. In areas that could be accessed for inspection, there was no evidence of separation of the stringers or frames from the hull.

5.2.2.4. Within the lockers and bilges, the interior hull surfaces were finished with a beige paint. In the lower bilges these coatings were worn and flaking. The hull surface located

immediately forwards of the engine compartment was found to have some dirt staining that indicated that up to 50 mm of standing water had been resting in these parts of the bilges. At the time of survey on Friday 17th August, these areas were found to be dry. Due to the leak in the isolation valve of the engine cooling intake (described in paragraph 5.1.8.9), the bilge space at the forward end of the engine was found to be wet during the survey on Friday 24th August. Due to the leak from the propeller shaft seal (described in paragraph 5.5.3.8), the area of the bilge beneath the shaft seal was also found to be wet.

5.2.3. Mast Compression Post

5.2.3.1. A timber mast compression post supported the coachroof and transferred the mast compression load to the hull and keels of PUFFIN II. This post was made up of two lengths of 3" wide x 2" deep solid hardwood, one positioned on each side of the primary bulkhead. Where accessible for inspection, the two halves of the post were inspected and found to be free of damage from water ingress and well secured to the adjacent bulkhead. Where the base of the post was secured to the hull, the GRP tabbing was found to be free of any evidence of movement or damage.

5.2.4. Bulkheads & Semi-bulkheads

5.2.4.1. Where accessible for inspection, the plywood bulkheads were found to be free of significant deterioration from moisture ingress, but with some evidence of degradation of the forepeak bulkhead. This was exhibited as darkening of the surface of the plywood at floor level and around the door opening. Some of the timber and melamine veneer was also loose, due to degradation of the adhesive. Inspection with a steel spike found no evidence of significant softening or rot of the plywood. The cause of the water ingress that has lead to this degradation could not be determined, but it may have been caused by condensation whilst the vessel was used as a place of residence. Water ingress via the babystay chain plate cannot be ruled out. During wet weather, this area of the bulkhead should be inspected for evidence of water ingress.

5.2.4.2. The bulkheads, semi-bulkheads and locker frames were secured to the hull & deck by GRP tabbing. The integrity of the tabbing was inspected and found to be free of de-bonding, cracks or movement, except for one location: It was found that beneath the timber trim strip that concealed the joint between the forepeak bulkhead and the coachroof, the GRP tabbing was loose, having de-bonded from the plywood. The length of the damaged area was 210 mm. It is RECOMMENDED (type C recommendation with an implementation time of six months) that this tabbing is re-bonded using an epoxy resin. Whilst this task is being performed, the tension in the babystay wire should be relaxed, to allow the coachroof in this region to move back to its 'un loaded' condition. Additional strength to the joint can also be provided by the use of stainless steel bolts or wood screws & penny washers fastened though the tabbing and plywood.

5.2.4.3. In addition to the use of GRP tabbing to secure the bulkheads to the hull, some areas of bulkhead-to-hull join were reinforced with steel coach bolts. Many of these steel fasteners were heavily corroded, particularly at locations beneath the sole boards (near to mast compression post) and also at the starboard, top corner of the forepeak bulkhead, where the plywood was connected to the upper edge of the topside. It is RECOMMENDED (type C recommendation with an implementation time of two years) that all corroded coach bolts are replaced. Particular attention should be given to the coach bolts along the lower edge of the primary bulkhead, located close to the mast compression post.

5.2.5. Engine Bed

5.2.5.1. The engine bed was constructed from a GRP moulding, finished with white coloured gel-coat and beige paint. It was bonded to the hull with GRP tabbing. Full access to this moulding was limited by the proximity of the engine and the poor access around the sides of the engine. Where accessible for inspection, it was examined and found to be sturdily built, free of cracks or deformation and securely bonded to the hull.

5.2.6. Keel Studs

5.2.6.1. None of the keel studs were removed for inspection. Consequently, the parts of the fasteners that were unexposed or inaccessible cannot be confirmed to be free from defect.

5.2.6.2. Each cast iron keel was fastened to the hull by a number of pairs of 1" diameter carbon steel studs. Where accessible for inspection, each stud was found to be secured by a single nut. Each pair of studs & nuts was supported by a large rectangular (7" x 2" x $^{5}/_{16}$") carbon steel backing plate. These fasteners were located beneath the port & starboard saloon seats. The majority of the fasteners were concealed beneath the fixed GRP mouldings of the two fresh water tanks, also installed beneath the port & starboard saloon seats. Only the forward two pairs of studs, nuts & backing plate on each side of the vessel could be accessed for inspection. The accessible studs, nuts and backing plates were hammer tested and found to be securely fastened. The visible surfaces of these fasteners were previously coated with a white paint. These paint coatings were cracked and missing in many areas. The exposed steel surfaces were corroded, but with no evidence of heavy wasting or flaking of rust. In consideration of the age of the vessel and the likelihood that the remainder of the fasteners (concealed beneath the two fresh water tanks) have never been inspected or painted, It is RECOMMENDED (type C recommendation with an implementation time of one to two years) that the two fresh water tanks are lifted to allow the other fasteners to be inspected. One of the central fasteners on each keel should be withdrawn for inspection. Photographs of the withdrawn fasteners should be taken, together with evidence of their exact location. If the exposed threads are found to be wasted, all fasteners should be replaced. Once the inspection has been completed and before the water tanks are replaced, all metal plates, studs and nuts should be cleaned of rust and protected with paint.

5.3. DECK AND EXTERNAL FITTINGS

5.3.1. Hull / Deck Join

5.3.1.1. The deck was joined to the hull by the in-turned flange joining method. The external joint was concealed behind aluminium toe rails running the full length of the vessel. The join across the transom was concealed beneath an aluminium trim strip. The toe rails were bolted through the hull to deck join at 150 mm intervals, with additional strength & water proofing provided by a white sealing compound. Internally, the stainless steel securing bolts were secured by single nuts, each supported by a penny washer. There was some corrosion of the penny washers.

5.3.1.2. Inspection of the interior faces of the join was limited to the heads compartment, anchor chain locker and the cockpit locker. As far as could be ascertained, the hull to deck joint appeared to be sound and in areas that could be accessed for inspection, there was no evidence of water ingress to the vessel interior through this joint.

5.3.2. Deck Moulding

5.3.2.1. The deck moulding was a plywood or balsa cored GRP composite, finished with white pigmented gel-coat. It incorporated the decks, coachroof and cockpit. The base & sides of the anchor well, located on the foredeck, were constructed from a separate GRP moulding, bonded to the deck moulding with a white adhesive paste. The internal parts of the deck moulding that were concealed beneath the fixed vinyl linings of the decks & coachroof could not be accessed for inspection, therefore their condition could not be fully assessed. Where accessible for inspection, the moulding was found to to be in good structural condition, with no signs of damage or delamination.

5.3.2.2. The gel-coat was in good cosmetic condition, but with some scuff and scratch marks. The gel-coat generally retained a good level of gloss and appeared to be well polished. There was evidence of UV degradation in parts of the cockpit. This was exhibited as fine crazing of some the gel-coat surfaces, particularly in the corners of the seating and bridgedeck.

5.3.2.3. Gel-coat stress cracks were found around the perimeter of the foredeck well and immediately aft of the anchor windlass, port side.

5.3.2.4. The integrity of the deck structure was checked by applying the Surveyor's weight to

the deck surface. No excessive deformation was noted.

5.3.2.5. Particular attention was paid to the condition of the coachroof around the mast foot. No cracks or deformation were noted in the gel-coat or underlying structure. The was no vertical deck deformation in the regions of the shroud chain plates. Paragraph 5.2.4.2 describes the loose GRP tabbing between the forepeak bulkhead and the forward end of the coachroof, located in the region of the babystay chain plate. The was no evidence that the coachroof in this region was being deformed upwards by the tension of the babystay.

5.3.2.6. On PUFFIN II, moisture levels in the deck and coachroof moulding were measured at regular intervals, paying particular attention to the laminate adjacent to deck fittings. All readings were found to be low, apart from the regions of the deck moulding around both port & starboard shroud chain plates. At these locations, moisture readings were found to be high (moisture readings were up to 30). Refer to section 5.1.4 for a description of the moisture measuring process). Water ingress around these chain plates could not be ruled out. It is also possible that moisture has entered the balsa or plywood core of the deck moulding at these locations, via the cut-out holes of the shroud chain plates. This moisture ingress could eventually lead to the de-bonding of the interfaces between the core and the adjoining laminate. Impact tests with a plastic headed hammer gave no indications of loss of stiffness of these four regions. Due to the fixed interior trim panels surrounding the majority of these chain plates (interior access was only possible in the holding tank storage locker and behind the heads sink), the internal surfaces of the decks in these areas could not be accessed for inspection. It is RECOMMENDED (type C recommendation with an implementation time of one to two years) that inspection holes are cut into the plywood trim panels concealing all four shroud chain plates in the saloon (but not the structural plywood bulkhead). The exposed surfaces should then be inspected to determine if water has been leaking into the vessel from around the chain plates. It may be necessary to re-seal each of the chain plates to prevent further water ingress. At the same time that this work is being performed, the condition of the exposed chain plates and fasteners should be inspected for evidence of corrosion, distortion or other damage. If no surface water can be detected, this may indicate that the core material within the laminate of the side decks is wet. If this is the case, the chain plates should be removed and the exposed deck holes should be carefully inspected with a spike to determine if the plywood or balsa core within the laminate is saturated with water. If the core is found to be wet or de-bonded from the inner or outer skins, the damaged core sections should be repaired. Refer to the Fiberglass Boat Repair & Maintenance manual by West System. Section 5.1.3 of the manual describes the re-bonding delaminated skin when the core is wet. This manual can be found through the following link:

http://www.westsystem.com/wp-content/uploads/Fiberglass-Manual-2015.pdf

5.3.2.7. When PUFFIN II was afloat and tied to a pontoon (during the second part of the survey on Friday 24th August 2020), a small amount of standing water was found on her port side deck, immediately inboard of the aluminium toe rail. The was no standing water on her starboard side deck. This indicated that she had a slight list to port. This should be rectified by transferring some heavy items from the port cockpit locker to one of the locker spaces beneath the bunk of the starboard quarterberth.

5.3.3. Cockpit

5.3.3.1. The cockpit floor, seats and coaming were all in fair cosmetic condition. There were numerous small chips and scratches in the gel-coat. There was some fine crazing in the gel-coat surfaces, due to long-term UV exposure. There was some gel-coat damage due to abrasion from the jib sheets, located inboard of the port & starboard pulley blocks that lead the jib sheets to the primary winches. Similar gel-coat wear was found next to the aft, port mooring cleat. It is RECOMMENDED (type D recommendation) that the abraded gel-coat is repaired.

5.3.3.2. In the cockpit area there was one small storage locker located beneath the aft end of the port seat. This locker was specifically equipped as a LPG gas cylinder storage locker. See section 5.6.5 for details of the inspection of the gas locker. The locker lid was supported by two brass hinges. The aft hinge was broken. The chrome-plated brass latch & padlock were in good working order. It is RECOMMENDED (type A2 recommendation) that the broken hinge is repaired or replaced.

5.3.3.3. There was one large storage locker located beneath the port seat. The two chrome-

plated brass hinges of this locker were in good order. The locker was secured with two chrome-plated brass latches. These latches functioned correctly and were free of damage. This locker gave access to the fuel tank isolation valve, the shore power socket and the space heater unit. Dirty water was found at the bottom of this locker. The shape of the bilge space was such that this water could not easily drain into the central bilges. This water should be removed and the area thoroughly ventilated.

5.3.3.4. There was one locker space beneath the forward end of the cockpit sole. This locker gave access to the aft end of the engine, the grease pump of the propeller shaft seal, the propeller shaft seal and the primary fuel filter. The GRP lid had some cracking around the hinges. The starboard hinge was very stiff and poorly secured to the deck moulding. The lifting latch was broken. The bonded rubber seal of the hatch was loose in places. It is RECOMMENDED (type C recommendation with an implementation time of one year) that the hinges, latch and cracked moulding are repaired. The rubber seal should be re-bonded.

5.3.3.5. The diesel filling point was located on top of the port cockpit seat.

5.3.3.6. A manual diaphragm bilge pump was mounted in the cockpit sole, aft end. See section 6.1 for a description of the bilge pump.

5.3.4. Chain Locker & Bulkhead

5.3.4.1. The anchor locker was accessed from a plywood door, located in the forepeak. The door was in serviceable condition.

5.3.4.2. The plywood bulkhead of this locker was inspected and found to be adequately attached to the hull & deck mouldings and free of damage. Chain from two locker was fed to the deck through a hole in the body of the windlass.

5.3.4.3. Water entering the chain locker drained into the internal bilges of the vessel.

5.3.5. Deck Covering

5.3.5.1. The slip-resistant surfaces of the decks, coachroof, cockpit floor and seats were provided by a rough texture moulded into the gel-coat. This was found to be in good condition, with minor wear. The surfaces were finished with a grey paint. All were in good cosmetic condition.

5.3.6. Hatches, Windows & Ventilation

5.3.6.1. One forward hinging Lewmar hatch (480 x 470 mm opening) was installed in the roof of the forepeak compartment. This size meets the recommendation for the minimum dimension to allow escape in an emergency, which is 380mm [BS EN ISO 9094-1:2003, Small Craft - Fire Protection]. It was found to be securely attached and showed no signs of water ingress. The hinges, latches, rubber seal and hold-open stay were in good working order and free of damage. The aluminium frame was in good condition. The acrylic window was in serviceable condition, but with minor crazing.

5.3.6.2. There were four fixed, long & narrow acrylic windows in the sides of the coachroof. The forward two windows extended into the heads compartment. These were sealed into the coachroof sides. The aluminium frames & stainless steel bolts were in good cosmetic condition. The blue-tinted acrylic material in each window was free of crazing. The windows were found to be re-sealed to an acceptable standard with silicone sealant. At the time of survey, there was no evidence of leaking around these windows.

5.3.6.3. One small, inward opening, chrome-plated bronze & glass window was set into the side of the the starboard cockpit seat, looking out to the cockpit from the quarterberth. This window had been bonded shut. When pushed open, the rubber seal was found to be broken. It is RECOMMENDED (type C recommendation with an implementation time of two months) that the seal is replaced.

5.3.6.4. Access to the main cabin was from the cockpit hatch, located on the centreline of the cockpit. The sliding GRP hatch and single-piece locking plywood washboards were inspected and found to be in good condition, but the external parts of the washboard were in need of a new varnish treatment. The hatch was locked by a hasp & staple assembly. The hasp & staple were very rusty. These should be replaced with a stainless steel assembly, secured with stainless steel bolts.

5.3.6.5. Three fixed stainless steel ECS vents were mounted on the vessel: One in the forepeak hatch, one in the heads and one above the saloon table. These vents were found to be secure and free of damage.

5.3.7. Deck Fittings and Equipment

5.3.7.1. There were four large aluminium mooring cleats: One on each side of the anchor well, and one at each of the aft corners. These were secured through the deck moulding. All were inspected and found to be adequately secured to the deck. For a vessel of this size, consideration should be given to installing deck cleats at the vessel's mid-ships.

5.3.7.2. There were two fairleads on the foredeck and one at each of the aft corners. These were fitted to each end of the toe rail extrusions. They were in good condition and free of damage or deformation.

5.3.7.3. Two hardwood grab rails were located on top of the saloon coachroof. They were in serviceable condition, securely mounted and with all wooden plugs intact.

5.3.7.4. Two tubular stainless steel grab handles were mounted on the outside of the cockpit bulkheads, on either side of the companionway hatch. They were tested with the surveyor's weight and were found secure and in generally good order.

5.3.7.5. The four post pulpit was constructed from 1" outside diameter tubular stainless steel. It was mounted to the toe rails via cast aluminium brackets. Each bracket was secured to the toe rail with two stainless steel bolts. The stainless steel pulpit and cast aluminium mounting brackets were in good order and free of damage.

5.3.7.6. The 620 mm high side stanchions were constructed from solid tapered aluminium. These posts were mounted to the aluminium toe rails via cast aluminium brackets and two stainless steel bolts per post. The stanchions and bases were found secure and in good order. They were fitted with twin stainless steel, 4 mm diameter, 1 x 19 construction safety wires. The tension of the starboard upper wire was slightly loose and in need of adjustment. The forward ends of the wires were secured to the pulpit with swaged stainless steel fittings. The aft ends of the wires were secured to the pushpit via swaged stainless steel fittings and lengths of cord. These cords were old and degraded. It is RECOMMENDED (type C recommendation with an implementation time of six months) that these lengths of cord are replaced.

5.3.7.7. The six post pushpit was constructed in two halves from 1" diameter tubular stainless steel and was found secure and in good order. An entry point was provided through the pushpit. This was closed off by a single rope, terminated with a snap shackle. The rope and shackle were found to be secure, but the rope was old and degraded. It is RECOMMENDED (type C recommendation with an implementation time of six months) that this lengths of rope is replaced.

5.3.7.8. A four step, hinging, welded stainless steel and plastic boarding ladder was secured with four stainless steel bolts to the hull moulding on the port side of the transom. It was found to be adequately secured and free of cracks or distortion. When folded down, the ladder extended below the waterline by 250 mm. It was considered that this distance was sufficient to allow a person in the water to climb back on board.

5.3.7.9. The mooring warps on PUFFIN II were very worn and have been significantly weakened. It is RECOMMENDED (type C recommendation with an implementation time of one month) that these are replaced.

5.3.8. Outboard Motor

5.3.8.1. The two-stroke, 3.3 horsepower Mariner outboard motor was mounted on the vessel's pushpit, port side. The outboard motor was manufactured in 2006 and its serial number was 0P407541.

5.3.8.2. The outboard motor was briefly tested. The engine fired up but was not run long enough to assess its full condition. The small amount of fuel inside the integral fuel tank appeared to be very old. The three-blade plastic propeller was in very good condition, with no wear of the blade edges. The paint coatings of the engine were in very good condition, with no deterioration of the coatings on the leg or on the parts beneath the plastic cover. All links and pivots were clean. It is RECOMMENDED (type A2 recommendation or before the engine is used) that the motor is serviced.

5.4. RIGGING AND SAILS

5.4.1. Mast & Boom

5.4.1.1. The Proctor deck-stepped mast could not be ascended with safety, so the rig was examined as far as possible from the deck. The lower part of the mast was in sound condition, with no sign of significant corrosion or physical damage. The grey anodised protective coating was in good cosmetic condition. There was minor corrosion of the aluminium where stainless steel hardware has been attached to the mast, most notably where the aluminium heel was riveted to the base of the extrusion.

5.4.1.2. The cast aluminium deck plate was closely inspected and found to be free of cracks and was securely mounted to the coachroof with four stainless steel bolts. Note that the deck plate had provision for two further mounting bolts, but these were not installed.

5.4.1.3. The Proctor boom was in good condition, with no significant wear of the anodised coating. The cast aluminium gooseneck was in poor condition. The rivets that secured the castings to the mast and to the boom were secure and free of damage. The vertical stainless steel pivot pin was seized. There was a large gap between the bearing surfaces of this vertical pivot, with significant wear of the lower bearing surface. These defects are shown in Figure 9. It is RECOMMENDED (type C recommendation with an implementation time of six months) that the seized pivot pin is released. The gooseneck should be disassembled and all parts cleaned & lubricated. The excessive play in the pivots should be taken up by a combination of nylon and stainless steel washers.

5.4.1.4. An invoice was found on the vessel which showed that the rigging of PUFFIN II had been inspected in April 2012 by Holman Rigging, Chichester. The brief report noted that the gooseneck bracket was very worn. It is likely that no attempt has been made to address the wear noted during the inspection of 2012.

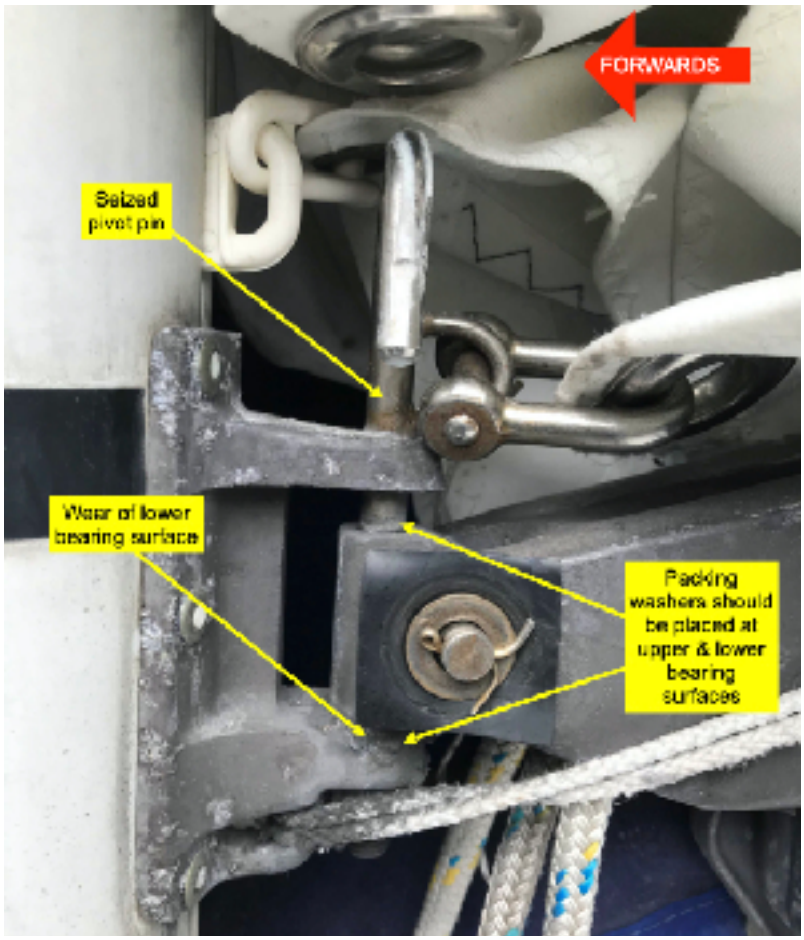

Figure 9: Worn bearing surfaces of gooseneck

5.4.1.5. A grey anodised, Forespar, triple-section, telescopic aluminium whisker pole was found on the port side of the foredeck. The extrusions were in good condition and free of distortion or dents. The stainless steel end pins and tube extension mechanisms functioned well.

5.4.2. Shroud Chain Plates

5.4.2.1. The stainless steel chain plates of the cap shrouds and single lower shrouds were of the straight plate variety that pass through a slot in the deck moulding and were through-bolted to the internal structure. The plate dimensions were ⅜" x 1¼". All four were closely examined from the side decks and found to be free of cracks and generally free of corrosion.

5.4.2.2. Internally the cap shroud chain plates were found to be adequately secured to the internal bulkheads. Each was secured with five stainless steel bolts. Where accessible for inspection (heads compartment), the fasteners of the port & starboard plates were hammer tested and found to be secure, free of significant corrosion and with no evidence of undue strain on the mountings. In the saloon, the internal parts of the cap shrouds and the lower shrouds were hidden behind bonded and screwed plywood trim panels, therefore their condition could not be assessed. See paragraph 5.3.2.6 for details of the recommendation relating to the inspection of the inaccessible parts of these chain plates. There was no evidence of water ingress around the deck cut-outs of these chain plates.

5.4.3. Forestay, Babystay & Backstay Chain Plates

5.4.3.1. The forestay deck plate and bow roller fabrication was formed from ⅜" welded stainless steel plate, bolted through the deck moulding by four fasteners. An additional strap extended down the stem and was bolted through the hull by three stainless steel fasteners. Inspection from the anchor chain locker showed that two of the four deck fasteners were supported by a stainless steel plate. The other two bolts of the deck fasteners were backed by small plain washers. The three bolts that ran down the stem were also supported by small plain washers. These internal fasteners could not be accessed for hammer testing. All visible parts of the fasteners were free of significant corrosion. The sheave of the anchor roller was seized.

5.4.3.2. The baby stay chain plate was constructed from ⅜" x 1¼" stainless steel plate and passed through a slot in the top of the coachroof. The external parts were examined and found to be free of cracks and generally free of corrosion. The internal parts were hidden behind the bonded linings of the coachroof, therefore their condition could not be assessed. There was no evidence of recent water ingress around the coachroof cut-out of this chain plate, but the discolouration of the bulkhead described in paragraph 5.2.4.1 may be related to a past leak of this chain plate. See paragraph 5.2.4.2 for details of the recommendation relating to the repair of the GRP tabbing that secured the underlying bulkhead to the coachroof.

5.4.3.3. The backstay chain plate was constructed from ⅜" x 1¼" stainless steel plate. This plate was positioned just to starboard of the centreline of the transom. It was secured through the GRP of the transom with three A4-70 grade stainless steel bolts. The external parts of the plate and fasteners were hammer tested and found to be secure, free of significant corrosion and with no evidence of undue strain on the mountings. From inside the port cockpit locker, it could be seen that all three fasteners were supported with one large stainless steel backing plate. These were visually inspected and found to be free of visible corrosion.

5.4.4. Jib Furling Mechanism

5.4.4.1. The Plastimo roller furling equipment was tested as far as practical and found generally in good working order. The drum was examined and no defects were seen in either the bearings or in the rigging screw attachment. The equipment sounded slightly stiff. If this does not free-up with use, the upper and lower drum should be cleaned by pouring warm water over the drums and through the bearings.

5.4.4.2. The aluminium alloy luff extrusion appeared to be straight and with no kinks.

5.4.5. Standing Rigging

5.4.5.1. An invoice was found on the vessel which showed that the rigging wires (not including the forestay wire) of PUFFIN II had been replaced in September 2004 by Holman Rigging, Chichester. Another invoice from Holman Rigging showed that the forestay wire was replaced in June 2017. To be safe, stainless steel standing rigging should be replaced every ten years on a cruising yacht. If the rigging wires are likely to be more than ten years old, they should be carefully monitored for evidence of cracks in the swaged fittings and for evidence of broken, worn or pitted wire. Consideration should be made for the likelihood that replacement will be necessary in the near future. Even in the absence of problems, replacement of rigging wires that are more than ten years old should be considered before embarking on major offshore passages or extended cruises.

5.4.5.2. The masthead standing rigging was formed from 1x19 stainless steel wire, with swaged terminals secured to the chain plates by toggles and bottle screws.

5.4.5.3. The standing rigging comprised 6 mm diameter single lower shrouds and 6 mm diameter cap shrouds passing over single spreaders. There was a 6 mm diameter single backstay terminating on the transom and a 6 mm diameter babystay secured to the forward end of the coachroof. The forestay (stated as being 6 mm diameter on a Holman rigging invoice) was formed by the headsail reefing foil.

5.4.5.4. The swaged terminals at deck level were inspected and appeared to be free from any bending or distortion that might occur during their manufacture. As far as could be ascertained, the bottle screws and toggles appeared to be in serviceable condition, with no signs of bending, splitting, cracking or other failure, but with evidence of corrosion developing within the swaged fittings at deck level. The split pins that were fitted to the bottle screws to prevent the threads from unwinding were secure. Split pins are not very effective at preventing the threads from unwinding. Consideration should be given to replacing these with lengths of Monel seizing wire.

5.4.5.5. As far as could be ascertained, those parts of the shrouds and stays that could be inspected from the deck appeared to be serviceable.

5.4.6. Running Rigging, Travellers, Cars

5.4.6.1. The running rigging that was stored on the vessel was inspected and showed only minor signs of wear. These all remain serviceable.

5.4.6.2. Barton headsail sheet leads were mounted on travelling cars on the side decks. The aluminium tracks were securely mounted. The nylon blocks were in serviceable condition and secured to the tracks by aluminium sliders. All were in good working order.

5.4.6.3. The aluminium IYE mainsheet track and car were securely mounted to the bridgedeck. These were in serviceable condition.

5.4.7. Winches, Jammers, Travellers

5.4.7.1. Two primary winches (Lewmar 30, two-speed, non self-tailing, but with add-on rubber tailers) were located on the cockpit coaming. They were found to be adequately secured and in good working order.

5.4.7.2. Three winches (Lewmar 7 & 8, single-speed, non self-tailing) were mounted on the mast, between the boom and foot. All three winches were dry & stiff. It is RECOMMENDED (type C recommendation with an implementation time of one year) that these are serviced.

5.4.8. Sails

5.4.8.1. At the time of survey the white Dacron, Jeckells mainsail was stowed beneath its storage cover, on the boom. The sail was inspected without hoisting. The single-stitched cloth was clean, but with some evidence of mildew. The sail was free of significant wear or stretching, but with some rot of the cloth & stitching at the clew due to UV exposure. The aluminium headboard, plastic mast sliders, reefing eyes and batten pockets were in good order and free of significant wear. No cloth repairs were noted. It is RECOMMENDED (type A2 recommendation) that the cloth & stitching of the clew are repaired.

5.4.8.2. At the time of survey the white Dacron, Lucas genoa was stowed inside the cockpit locker. The sail was partially unfolded and inspected. The triple-stitched cloth was free of significant stretch and generally in serviceable condition. The blue UV strips were in serviceable condition, but with some fading. The clew eye was in good order and free of deformation. The tack tape and head tape were worn and degraded. Small (2" diameter) repair patches were found at the tack cloth and also approximately half-way up the luff. It is RECOMMENDED (type A2 recommendation) that the head & tack tape are replaced.

5.4.8.3. A very old double-stitched, white Dacron Lucas jib was stowed beneath the forepeak bunk. The sail was partially unfolded and inspected. The cloth was clean & dry, but with a musty smell. The cloth was worn and well used. The head & tack tapes and clew eye were in good order.

5.4.8.4. The blue canvas mainsail cover was in good working order, but was not adjusted correctly on the boom. This cover was positioned too far forwards, exposing the clew cloth of the mainsail to UV light. This cover should be adjusted.

5.4.8.5. The two clear windows of the blue canvas sprayhood were in acceptable condition, but with some discolouration of the panels along their lower edge, due to UV exposure. The cloth was dirty and in need of a clean. The stainless steel support frame was adequately installed to the coachroof and free of distortion.

5.5. PROPULSION

5.5.1. Engine & Transmission

5.5.1.1. PUFFIN II was fitted with a Lombardini LDW_1003_M, three cylinder diesel engine, with fresh water cooling, driving through a Technodrive TMC40 reduction gearbox. Engine control was via a single lever, giving forward and reverse gears and throttle control, mounted on the port side of the cockpit seating.

5.5.1.2. An invoice was found on the vessel which showed that the engine & gearbox of PUFFIN II had been replaced in August 2002. An invoice dated June 2016 showed that the gearbox was replaced in that year.

5.5.1.3. The serial number of the engine was 4651xxx.

5.5.1.4. The engine hours meter on the control panel read 415 hours.

5.5.1.5. Access to the engine's coolant impeller, alternator, raw water strainer, oil filter and oil dipstick were good.

5.5.1.6. The silver paint coating was in fair cosmetic condition, but with some blistering in some areas and minor corrosion beneath the exhaust elbow and beneath the raw water pump, on the aft end of the engine.

5.5.1.7. Some of the paint on the engine was found to be crinkled, with some browning of the silver colour. This may be due to an overheating event. Inspection of the paperwork on the vessel found that there was an invoice in 2011 for the repair of an overheating problem. The invoice described that the heat exchanger was found to be blocked. The only additional expenses on this invoice were a new exhaust elbow and new impeller for the raw water pump, which indicated that there was no other damage caused by the blocked heat exchanger.

5.5.1.8. The engine oil was inspected and found to be clean, free of moisture and at the correct level.

5.5.1.9. The Technodrive TMC 40PAC gearbox oil was inspected and found to be clean, free of moisture, but the oil level was slightly low. This oil should be changed during the next service.

5.5.1.10. The serial number of the gearbox was 2276xxx.

5.5.1.11. The air filter element was partially dirty. This should be replaced during the next engine service.

5.5.1.12. The vessel's engine & transmission were tested on Friday 24th August, whilst the vessel was afloat and tied to a pontoon at Brighton Marina. The engine started very readily from cold. Exhaust gases were clear and free of soot. When under load no fuming was noted in the engine space. The raw water cooling flow rate from the

exhaust outlet was good. After 40 minutes of running in gear, the body of the engine was inspected and there was no evidence of excessive heat build-up of the engine block, head, exhaust or heat exchanger.

5.5.1.13. No leaks from the fuel and exhaust systems were evident.

5.5.1.14. There was a very minor oil leak. This was found on the underside of the engine, port side. The leak appeared to be from the 'banjo' connection that secured a rubber hose to the sump. The other end of the rubber hose was connected to the hand-pump that was installed for the purpose of pumping out the engine oil. It is RECOMMENDED (type A2 recommendation) that this leak is rectified.

5.5.1.15. When the isolation valve of the engine cooling intake was open, a leak from the elbow that joined the hose to the valve was noted. The hose of the engine cooling intake was heavily chafed at one location. See paragraphs 5.1.8.9, 5.1.8.11 and 5.1.8.12 for details of the recommendations relating to the defects of the engine cooling inlet hose.

5.5.1.16. Engine control was via a single lever, giving forward and reverse gears and throttle control, mounted on the port side of the cockpit seating. This unit was found to adequately lubricated with grease and functioned with full & free movement.

5.5.1.17. Ahead and reverse gears engaged smoothly, with no noticeable 'jolting' or clunking of the gearbox. In reverse gear, some high frequency 'whining' was noted. The volume of this was not considered excessive. After the gearbox oil has been changed (as recommended in paragraph 5.5.1.30), the engine mechanic should be asked to assess the level of gearbox noise.

5.5.1.18. With the gearbox set to 'forward', the engine speed was increased to medium load. No smoking from the exhaust was noted. When the engine was run in gear and at maximum throttle, a small amount of grey smoke from the exhaust was noted. There was no evidence of black, blue or white smoke.

5.5.1.19. The cylinders were not compression tested, therefore no quantitative assessment could be made of the engine's compression condition. However, the ease with which the engine started indicated the the compression levels in each cylinder were good.

5.5.1.20. The engine control panel featured a start / stop key, an audible sounder and a numeric LED display panel. This panel was mounted on the aft face of the bridgedeck. Using a 'select' button, this display panel could be toggled between engine speed, engine hours, coolant water temperature and battery voltage. The engine speed reading did not function. The coolant water temperature and battery voltage readings functioned, but their accuracy could not be assessed. When the ignition was on (but engine not running) the audible sounder was found to function well.

5.5.1.21. The engine control panel also included warning lamps for oil pressure, water temperature, alternator output, glow plug function and low battery. The acrylic screen that covered the control panel (and speed & depth instruments) was crazed & scratched, decreasing the visibility of the instruments. When the ignition was on, all lamps functioned. Once the engine was running, all lamps extinguished, except for the alternator output lamp, which stayed on during the running of the engine. It is RECOMMENDED (type A2 recommendation) that the operation and functioning of the alternator is tested when the engine is serviced. The clear acrylic screen should be replaced.

5.5.1.22. After the engine had warmed up and whilst running at medium load for thirty minutes, the LED display of the coolant temperature was monitored. The temperature reading was found to be steady at around 84°C. When the engine was run at maximum throttle, the coolant reading quickly rose to a maximum of 86°C and steadied at this temperature. No online data for the Lombardini LDW_1003_M could be found that gave any information on the engine's operating temperature range, but it was considered that these temperatures were within normal working limits for this size & specification of marine diesel engine.

5.5.1.23. The alternator belt was suitably tensioned, but with some wear. This belt should be changed during the next service.

5.5.1.24. The four rubber isolation mounts were adequately secured to the GRP hull structure. A crow-bar test of each mount gave no indication of any deteriorating or debonding of the rubber.

5.5.1.25. The welded stainless steel exhaust elbow was found to be free of external corrosion or

evidence of cracking. During and after the testing of the engine & transmission on Friday 24th August, no leaking from the elbow or flanged joint was noted.

5.5.1.26. Engine exhaust and cooling water were discharged through armoured, flexible hose and a black thermoplastic muffler box located behind the gearbox, to a skin fitting on the port side of the transom. Where accessible for inspection, the rubber exhaust hose was found to be free of evidence of cracking or collapsing. The muffler was in good working order and free of damage or evidence of leaking.

5.5.1.27. The cooling feed to the exhaust was suitably fitted with an ant-siphon attachment. The outlet of this hose was lead through the port cockpit locker and was vented to the outside via a plastic skin fitting on the port topside (item 12 in Figure 6 and Table 3). The skin fitting was concealed beneath a small stainless steel cowl. The hoses and attachments were inspected and found to be in good working order.

5.5.1.28. The aft end of the rubber exhaust hose, located at the aft end of the port cockpit locker, was comprised of two lengths of hose, joined by a short length of 2” diameter stainless steel pipe. A smaller diameter length of stainless steel pipe was welded to this pipe, forming a ’T-piece’. This fabrication was most likely the anti-siphon coolant feed for the vessel’s previous engine and is now redundant. This fabrication was found to be currently in good working order, but with some corrosion of the welded joint. These fabrications are known to corrode and fail, allowing a small but steady stream of coolant water into the vessel. It is RECOMMENDED (type C recommendation with an implementation time of two years) that this T-piece is removed and replaced by a straight length of 2” diameter stainless steel pipe.

5.5.1.29. The sound insulation foam within the engine compartment was found to be in acceptable condition. The insulation material should be manufactured from fire resistant material, but this cannot be checked as part of a normal pre-purchase survey.

5.5.1.30. It is RECOMMENDED (type A2 recommendation) that the engine is serviced without delay. All fluids and filters should be changed. Due to the age of this engine and the lack of service history, this work should include a service of the heat exchanger, to ensure that the cooling pipes are free of scaling or blockage. Ensure that the pencil anode on the engine heat exchanger is checked every six months and replaced annually. The alternator belt should be replaced.

5.5.2. Fuel System

5.5.2.1. There was one welded mild steel fuel tank installed inside the port cockpit locker, forward end. It was adequately secured to the locker base and bulkhead with steel screws. Access to the fuel tank was limited to the upper face, aft face and port face. All other parts were obscured by the support structure or by the locker panels. The accessible parts of the fuel tank were free of damage, with minor surface corrosion. The Broker’s information sheet stated that this fuel tank was 90 litres in capacity. The fuel tank dimensions were measured and found to be 300 x 660 x 380 mm. These dimensions indicate that the fuel tank volume is 75 litres.

5.5.2.2. The diesel fuel was tested by taking three small samples from the tank, accessed via the fuel tank filler cap. All samples were found to contain particles of brown debris. One of these samples can be seen in Figure 10. A layer of sediment was also found lying in the bottom of the glass bowl of the primary fuel filter. In consideration of the possible age of the diesel fuel and the dirt deposits, it is RECOMMENDED (type A2 recommendation) that the fuel tank and fuel lines are emptied of all fuel. Both fuel filters should be replaced. The new fuel should be treated with a diesel additive, such as Soltron. See https://www.force4.co.uk/soltron-enzyme-fuel-treatment-m.html for further information on this product.

Figure 10: Brown debris in sample taken from fuel tank

5.5.2.3. The fuel tank filler hose and fuel tank breather hose were constructed from reinforced hose, but these were not of diesel fuel grade. It is RECOMMENDED (type C recommendation with an implementation time of two years) that these hoses are replaced. The new hose should be marked to denote suitability for use with diesel fuel and marked to show fire resistance. They should be manufactured in accordance with BS EN ISO 7840 or an equivalent standard. Hoses marked to SAE J 1527 and DIN 4798 are also acceptable.

5.5.2.4. The fuel lines of the fuel supply and fuel return were mostly constructed from reinforced fuel hose, suitably manufactured in accordance with BS EN ISO 7840. The two 150 mm long lengths of supply & return hose that were nearest to the engine were found to be unlabelled, with one of these covered in a fabric braid. It is RECOMMENDED (type C recommendation with an implementation time of two years) that these lengths of braided or unmarked hose are replaced with the same hose specified in paragraph 5.5.2.3.

5.5.2.5. The diesel filling point was located on top of the port cockpit seat. The cap was suitably labelled. The rubber seal was in serviceable condition and free of cracks. The tether for the filler cap was in good order.

5.5.2.6. The body of the glass bowl / paper cartridge primary fuel filter was in good condition, with all connections free of corrosion. A layer of sediment was found in the bottom of the glass bowl. This filter was installed behind the engine. It is not good practise to mount glass bowl filters in the engine space as an engine fire would break the glass bowl. Consideration should be given to the re-positioning of this filter to a location such as the port cockpit locker. See paragraph 5.5.2.2 for details of the recommendation relating to the replacement of the fuel inside this filter.

5.5.2.7. The fuel shut-off valve was located on top of the fuel tank and was accessed by lifting the port cockpit locker seat. This valve was in good working order.

5.5.2.8. There was no obvious means of measuring the level of the fuel tank. A wooden dipstick with a calibrated scale should be made and stowed in the cockpit locker. For a fuel tank with the dimensions detailed in paragraph 5.5.2.1, the dip stick should be marked at 25.3 mm intervals, with each mark representing 5.0 litres of fuel.

5.5.3. Stern Gear

5.5.3.1. The exposed section of the 1.0” diameter stainless steel propeller shaft was in good condition and as far as could be ascertained, the alignment appeared to be correct.

5.5.3.2. There was minimum wear between the propeller shaft and cutlass bearing in all

directions.

5.5.3.3. The three-blade, fixed pitch, 13” diameter bronze propeller was in very good condition, free of damage or distortion, but with minor tip wear. The propeller was securely attached to the propeller shaft.

5.5.3.4. The propeller was secured to the shaft with a bronze nut, which was locked by a stainless steel split pin. These were in serviceable condition.

5.5.3.5. The bronze stern bearing was inspected and found to be adequately secured to the hull. There was no visible evidence of dezincification of the bronze casting. The stern bearing was secured with two stainless steel bolts. Where accessible for inspection, these were found to be in serviceable condition and free of significant corrosion . It is not considered good practise to use stainless steel fasteners below the waterline as the material can suffer from pitting corrosion in an oxygen-starved environment. These fasteners should be checked regularly and replaced if they show any evidence of significant corrosion.

5.5.3.6. The inboard shaft seal was of the traditional stuffing box type and was grease lubricated. The bronze body of the seal was free of significant corrosion. The gaiter was secured by one stainless steel hose clip at each end. These were in good condition, secure and free of significant corrosion. The gaiter was visually inspected and found to be free of splitting, cracking or perishing of the rubber. Ensure that the rubber gaiter is replaced periodically and within the time limits recommended by the manufacturer.

5.5.3.7. The grease pump for the stern bearing was located behind the engine, beneath the cockpit sole and was accessed for adjustment via the hatch cover in the cockpit sole. This pump was in good working order, but was slightly loose. The unit should be securely mounted.

5.5.3.8. During the engine & transmission test on Friday 24th August and whilst the engine was running in gear and at medium speed, the inboard shaft seal was found to leak approximately one drop of water every five seconds. This rate of leaking continued even after the grease pump handle had been turned through two revolutions. On this type of shaft seal, the rate of leakage should be approximately one to two drops of water per minute. It is RECOMMENDED (type A2 recommendation) that that the packing screw on the stern bearing is adjusted in order to decrease the rate of leaking to an acceptable level. Note that the adjustment screw was nearing the end of its travel, therefore the flax material within the seal may need to be replaced in the next few seasons.

5.5.3.9. The plastic spacer of the R&D type of shaft coupling was free of damage. The bolts were secure. The bonding wire between the two halves of the coupling was secure and free of damage.

5.6. SYSTEMS AND SERVICES

5.6.1. Anchor and Chain

5.6.1.1. The 35 lb (16 kg) galvanised steel CQR anchor was in serviceable condition and free of significant corrosion. The anchor was stowed on the bow roller.

5.6.1.2. The anchor was secured to a length of chain by two galvanised steel shackles. One of these had some minor surface corrosion, but both were in good working order. The shackle bolts should be locked with Monel seizing wire.

5.6.1.3. The anchor chain was made from short plain-linked galvanised steel. Dimensions of the chain were 8 mm x 28 mm x 40 mm. The recommended length of anchor chain that should be stowed on a small craft is 45 metres, which equates to a length: depth ratio of 5:1 in 9 metres of water. [Gerr, Dave. Boat Mechanical Systems Handbook. Adlard Coles Nautical, 2009]. The length of the chain was measured and found to be 29.7 metres long. The chain was generally free of wear, but with occasional corroded links along its length and at the bitter end, where it was spliced to the anchor warp.

5.6.1.4. The bitter end of the chain was spliced to a 17.6 metres of 16 mm diameter warp. This warp was in good condition. The bitter end of the warp was tied up into a monkey’s fist, to prevent it from pulling out of the locker. It is RECOMMENDED (type A2 recommendation) that the bitter end of the warp is modified so that it is tethered to the

inside of the locker by multiple loops of a short length of line that could easily be cut in an emergency.

5.6.2. Anchor Windlass

5.6.2.1. A Simpson Lawrence Hyspeed, manually operated windlass was securely mounted to the base of the anchor well via a solid timber block. The windlass body was in fair cosmetic condition, but the ratchet mechanism was seized. It is RECOMMENDED (type A2 recommendation) that the winch mechanism is serviced.

5.6.2.2. It is suggested that a canvas cover is made and fitted over the windlass. Ensure that this cover is tethered to prevent its loss. The canvas should also extend over the chain hawse pipe, in order to prevent water from entering the bilges via the hawse pipe.

5.6.3. Fresh Water System

5.6.3.1. The filler cap for the fresh water tank was located on the starboard side deck, next to the forepeak cabin. Note that this fitting is close to the pump-out deck fitting of the black water tank. Care should be taken to prevent contamination of the fresh water tank.

5.6.3.2. There were two moulded GRP fresh water tanks. These were located beneath the port & starboard saloon seats. These were found to be adequately secured to the adjacent structure and where access allowed, were found to be free of damage.

5.6.3.3. The hoses were old. They were not constructed from food grade plastic. Consideration should be given to their replacement.

5.6.3.4. Water from the tanks was fed into a non-pressurised water system. This water system supplied cold water to one hand-operated Whale tap in the galley, and one hand-operated tap in the heads. The hand pumps were in good working order and free of leaks. The water that came out of the taps was found to be clear.

5.6.3.5. A second hand-operated Whale tap was also installed at the galley sink. The lagged pipe of this pump was not connected to anything.

5.6.3.6. A calorifier was installed beneath the cockpit sole, aft end. The copper cylinder of this calorifier was lagged using polystyrene beads, held within polyethylene bin liner material, held together with tape. The unit was secured in place by the filler hose & deck cap and also by a quantity of expanding spray-foam insulation material. The copper was not plumbed into the engine and was not fitted with a 240 volts a.c. immersion heating element. It is RECOMMENDED (type C recommendation with an implementation time of six months) that that the calorifier and hoses are removed and discarded.

5.6.4. Heads & Black Water Tank

5.6.4.1. The Jabsco manually operated sea toilet was clean and the bowl and pump were adequately attached to the GRP moulding of the heads compartment. The installation was tested when the vessel was afloat on Friday 24th August and was found to work well, but the flushing water was very smelly. The pump was free of leaks.

5.6.4.2. The brown GRP sink and brown melamine work top were in good cosmetic condition. The sink was served by a hand-operated Whale tap.

5.6.4.3. The timber grate on the sole of the compartment was in good condition. The shower tray drained directly into the bilges.

5.6.4.4. The toilet inlet and outlet hoses were of suitable material. The hose of the toilet inlet was not fitted with an anti-siphon loop, to prevent the risk of back-siphoning, it is suggested that the isolation valve of the heads inlet is kept closed when the vessel is at sea.

5.6.4.5. The hose of the toilet outlet lead into the black water holding tank, via a two-way diverter valve. The polyethylene holding tank was found to be securely mounted on a plywood shelf. The two canvas straps were in good condition, but the steel buckles of both straps were corroded.

5.6.4.6. A second diverter valve was installed, to allow the holding tank to be pumped into the sea or to be pumped into a shore-side facility. The diverter valves operated freely. The

hand pump was clean and free of damage, but could not be tested.

5.6.5. LPG Installation

5.6.5.1. In the cockpit area there was one small storage locker located beneath the aft end of the port seat. This locker was specifically equipped as a LPG gas cylinder storage locker.

5.6.5.2. Two 4.5 kg, butane gas cylinders were stored in the gas cylinder locker.

5.6.5.3. The locker base and sides were constructed from single GRP moulding, finished with a white gel-coat. The moulded GRP lid of the gas cylinder storage locker was sturdily constructed. The lockable, single chrome plated brass latch was in good working order. One of the hinges was broken. See paragraph 5.3.3.2 for details of the recommendation relating to the replacement of this hinge.

5.6.5.4. The locker was not tested for integrity but was considered to be gas-tight to a level above the pressure regulator. A locker drain hole was installed in the side of the locker in order to allow any leaked gas to escape out of the locker and into the cockpit. This gas would then escape to the outside of the hull via the two nearby cockpit drains. Unfortunately, any leaking gas could also leak into the vessel via the nearby locker opening in the cockpit sole. Consideration should be given to the sealing-up of the existing locker drain. A drain hose should then be installed in the bottom of the locker moulding. Ensure that the new hose drains to a skin fitting on the hull along a steady downward gradient, ensuring that the drain does not trap water. The skin fitting should be positioned at a level that is lower than the locker bottom and as high as practicable, but not less than 75 mm above the at-rest waterline in the fully loaded ready-for-use condition.

5.6.5.5. The locker drain was found to be clear.

5.6.5.6. Connected to one of the LPG butane gas cylinders was a manual isolation valve. From the valve, a length of hose lead the gas supply to a pressure regulator, mounted on the inside of the locker. The rubber hose was manufactured in March 2010. Gas hose should be replaced every five years. There was no evidence of cracking or degradation of the hoses. It is RECOMMENDED (type A2 recommendation) that these hoses are replaced by a maximum length of one metre of appropriately labelled gas hose. The hose should be marked to BS 3212 type 2 or BS 3212:1991 or BS EN 1763 class 2/3/4. This work should be performed by a qualified gas technician, such as those listed on the gas safety register. This recommendation also applies to the armoured gas hose behind the galley stove.

5.6.5.7. There was no date on the LPG pressure regulator to indicate its age but it is likely that the regulator was much older than ten years. It is RECOMMENDED (type A2 recommendation) that the regulator is replaced with a new one of marine grade.

5.6.5.8. From the LPG pressure regulator, copper pipe lead the gas supply through the side of the gas locker, to a 'T' junction located inside the port cockpit locker. From one branch of the 'T' junction, copper pipe lead the supply to an isolation valve, also within the locker. This isolation valve controlled the gas supply to a Trumatic E2400 space heater. The length of pipe between the 'T' junction and the heater was supported at regular intervals with stainless steel P-clips, all fitted with rubber protection sleeves. See section 5.6.6 for details of the inspection of the space heater.

5.6.5.9. From the other branch of he 'T' junction, copper pipe lead the supply forwards to the galley area. This length of copper pipe was protected and supported within polyethylene hose. The copper pipe in the galley area was connected to an isolation valve, mounted behind the cooker. It is not considered good practise to locate the valve behind the cooker as access to the valve may be difficult in the event of a galley fire. From the isolation valve, a length of flexible armoured gas hose lead the supply to the galley cooker. This hose was manufactured in February 2004.

5.6.5.10. Strong consideration should be given to installing a bubble leak tester on PUFFIN II.

5.6.5.11. The Plastimo Neptune 2500 twin hob, grill and oven installation was secured by a gimbal mechanism to the galley structure. There was no locking latch on the gimbal apparatus.

5.6.5.12. The cooker was very clean. All burners lit easily and burned with a clean blue flame. All burners were fitted with safety cut-off valves. These functioned correctly.

5.6.5.13. The installation was not further inspected or pressure tested for leaks.

5.6.5.14. Note that this survey is not any kind of gas safety certificate. This is only obtainable after comprehensive pressure testing and assessment by a qualified person listed on the gas safety register. The above recommendations should be undertaken by a qualified gas technician, such as those listed on the gas safety register. See http://www.gassaferegister.co.uk for further details.

5.6.6. Space Heater

5.6.6.1. Paragraph 5.6.5.8 describes the gas supply line to the Trumatic E2400 space heater. This unit was mounted in the aft end of the port cockpit locker.

5.6.6.2. There was no serial number on the heater unit, but an invoice dated August 2010 described the unit as a Trumatic E2400 warm air gas heater, with serial number 20350xxx.

5.6.6.3. The heater did not function. The power supply from the 12 volts d.c. batteries was connected directly from the battery, whereas it should be supplied via the fused switch panel. The power supply cabling and the control unit cabling were very poorly routed over the top of the engine, with no additional support or protection from chafing or the heat of the engine.

5.6.6.4. The plastic cover of the heater circuit board located inside the cockpit locker, was broken. It was judged that the locker environment was too damp for the circuit board. If this heater is to be overhauled, this circuit board should be re-located to a dry environment.

5.6.6.5. The connection between the stainless steel exhaust pipe and the heater unit was not secured with a pipe clamp. This pipe came off when lightly pulled. The outlet end of the exhaust pipe was connected to the transom via a thermoplastic skin fitting. This fitting had partially melted. Where the outlet end of the exhaust pipe was connected to the transom, the pipe was angled upwards. This could allow rainwater directly into the pipe, which could make its way down to the heater.

5.6.6.6. Referring to the observations in paragraphs 5.6.6.2 to 5.6.6.5, it was considered that the gas powered heater was very poorly installed. It is RECOMMENDED (type C recommendation with an implementation time of one month or before it is used) that the Trumatic space heater is correctly installed and serviced by an authorised Trumatic technician or is entirely removed from the vessel. Do not attempt to use the heater until the apparatus has been correctly installed.

5.6.6.7. The Broker's details described a 2019 Webasto heater unit (disconnected). No such heater was found on board. A Xin Mai Zhong car heater, model XMZ-1 was loosely stowed inside the port cockpit locker. It was determined that this heater was not suitable for a marine installation. The fuel supply hose was not manufactured in accordance with BS EN ISO 7840 or an equivalent standard. The un-lagged steel silencer of the exhaust pipe was not of marine quality and was not thermally lagged. It is RECOMMENDED (type C recommendation with an implementation time of one month) that this heater assembly is discarded.

5.6.7. Galley

5.6.7.1. The L-shaped galley was situated on the port side of the vessel, at the bottom of the companionway steps.

5.6.7.2. There was one top-access cool box unit located on the galley worktop, next to the single round stainless steel sink. The sink was supplied with cold fresh water via a Whale hand-pumped tap. The cool box, sink and cold water tap were in good working order and good cosmetic condition. The forward-most tap was not connected to any water tank. This should be removed.

5.6.7.3. The beige melamine galley unit was in serviceable condition, but with a small chip out of the melamine, located next to the tap.

5.6.8. Electrical System

5.6.8.1. PUFFIN II had a 12 volts d.c. electrical system, with an engine starting battery and a single battery for services. Both batteries were 110 Amp hours capacity. The batteries

were located beneath the starboard quarterberth, forward end. Both batteries were stowed inside a single moulded GRP case which was secured to the hull structure. The GRP case was secure and in good order. The batteries were held down by a large steel cross bar, but this bar was not secured. It is RECOMMENDED (type A2 recommendation) that the steel hold-down bar is secured with a threaded screw.

5.6.8.2. Both batteries were load tested and found to be in ‘good’ condition.

5.6.8.3. Where accessible for inspection, the heavy duty battery cables were found to be free of damage and securely mounted to the battery posts. The Trumatic E2400 space heater was connected directly to the domestic battery. See paragraph 5.6.6.6 for details of the recommendation relating to the proper installation of the gas heater.

5.6.8.4. The cable of the speed impeller was coiled and stowed in the lower bilge space, beneath the chart table. It is bad practise to route excessive lengths of electrical cabling in wet bilge areas.

5.6.8.5. Battery charging was from the engine alternator or from shore power through a Sterling Power Products ProSport 10 Amp automatic battery charger located beneath the bunk of the starboard quarterberth. With the shore power connected to the vessel, this charger was found to function normally.

5.6.8.6. A single rotary breaker switch controlled the output from the batteries. The handle of this switch was loose and was easy to pull off. This handle should be bonded in place, or the entire switch should be replaced. Service power was then distributed via three fused switch panels, located at the chart table. These switches were in acceptable condition, but were old and therefore likely to be unreliable. Consideration should be given to replacing these with a single trip-switch type of panel.

5.6.8.7. Shore power was connected to the vessel via a domestic type of plug, connected to the end of a length of 13 Amp cable and loosely stowed inside the port cockpit locker. The cable was routed to a 240 volts a.c. master switch unit, mounted on the forward end of the quarterberth bunk frame. This unit housed the breakers to isolate the shore power. The RCD ‘test’ button was tested but did not function. Shore power was distributed to conventional domestic 13 amp sockets. These sockets were tested with a socket test device, which determined that they were correctly wired. It is RECOMMENDED (type C recommendation with an implementation time of one month) that the shore supply cable in the cockpit locker is correctly installed using a marine grade, bulkhead-mounted plug connection. The master switch unit should be further investigated to determine why the RCD test switch did not function.

5.6.8.8. The black outer sheath of the shore power cable (that runs between the vessel and the shore-side power facility) was found to be damaged, due to pinching of the cable when closing the port cockpit locker lid. The strands of the earth wire were exposed. It is RECOMMENDED (type C recommendation with an implementation time of one day) that this cable is repaired or replaced.

5.6.9. Navigation Lights

5.6.9.1. A transom mounted stern light was attached to the pushpit. The lens of this unit was crazed and the outer body was distorted. A steaming light unit was mounted on the mast. These two lights were tested and found to function. A bicolour light was mounted on the pulpit. This lamp did not function. It is RECOMMENDED (type A2 recommendation) that the transom light is replaced and the bicolour lamp repaired.

5.6.10.Navigation Equipment

5.6.10.1. PUFFIN II was equipped with a Plastimo Contest compass, mounted to the starboard bulkhead in the cockpit. The lens was yellowing. Half of the damping fluid was missing. It is RECOMMENDED (type A2 recommendation) that this compass is replaced.

5.6.10.2. A NASA SX35 VHF / DSC radio unit was installed at the chart table. The serial number of this radio was 410960. This unit powered up but was not tested for transmission. During reception of a channel 16 message, a lot of hiss was heard over the message. It is RECOMMENDED (type A2 recommendation) that the radio installation is overhauled. A new aerial & cable may be required.

5.6.10.3. A Garmin 158i chart plotter was mounted on the coachroof, on the port side of the sliding hatch. This unit powered up and gave a position fix on the monochrome screen.

The resolution on the chart was very poor.

5.6.10.4. A Clipper speed display unit was mounted on the aft face of the bridgedeck. This unit powered up, but could not be tested with the vessel ashore or when tied to a pontoon berth.

5.6.10.5. A Clipper depth display unit was mounted on the aft face of the bridgedeck. This unit powered up and gave an output of water depth.

5.6.10.6. An Autohelm tiller pilot was stowed on board. When connected to the power supply in the cockpit, this unit did not function.

5.6.10.7. An Furuno radar display unit, model 1621 was mounted at the chart table. The serial number of this display unit was 2387-6xxx. The display unit and mast mounted scanner powered up and gave a good radar display on the monochrome screen.

5.6.10.8. A barometer was mounted on the saloon bulkhead. This was not tested.

5.6.10.9. A JVC KD-G202 radio & CD player was installed in the saloon. The radio function well.

6. SAFETY EQUIPMENT

Refer to the Boat Safety Handbook [RYA publication, 2012, ISBN 978-1-906435-53-0]. This book gives recommendations and advice concerning the selection and installation of safety equipment.

6.1. BAILING / BILGE PUMPING

6.1.1. One Whale Gusher 10, manual diaphragm bilge pump was mounted in the cockpit sole, just aft of the hinging locker lid. The handle was stowed inside the saloon. The inlet of the manual bilge pump was located beneath the sole boards of the saloon, just forwards of the engine compartment. It was correctly fitted with a strum box, but the aluminium body of the strum box was broken. The pump was tested by placing the inlet in a bucket of water. The pump did not work at all. It is RECOMMENDED (type A2 recommendation) that the bilge pump handle is tethered in order to prevent its loss in the event of a capsize. The strum box should be replaced. The pump should be serviced (replacement of all seals & valves).

6.1.2. Consideration should be given to installing a second manual bilge pump or an electric bilge pump.

6.1.3. It is RECOMMENDED (type A2 recommendation) that two buckets (with lanyards) are stowed on board. These should be between 9 and 14 litres in capacity.

6.2. DETECTION EQUIPMENT

6.2.1. There was no fog horn found on board. It is RECOMMENDED (type A2 recommendation) that one is stowed on board. If the fog horn is of the aerosol, compressed gas type, a spare cylinder should be carried on board.

6.2.2. An aluminium, rain-catcher type of radar reflector was stowed inside the forepeak.

6.2.3. There was one motoring cone and one anchor ball found on board.

6.3. FIRE FIGHTING EQUIPMENT

6.3.1. Three fire extinguishers were found on board. These are summarised in Table 4. It is RECOMMENDED (type A2 recommendation) that all of the units are serviced or replaced. Each unit should be fitted with a pressure gauge. The 600 gramme units should be replaced with 1 kg units.

Type	Location	Date Stamp	Pressure Gauge
1 kg automatic, clean agent	Engine compartment	Service due August 2017	Green
600 gramme BC dry powder	Next to chart table	Expires end 2020	None
1 kg 600 gramme BC dry powder dry powder	Forward of galley, in saloon	Expires end 2020	None

Table 4: Fire Extinguishers on board PUFFIN II

6.3.5. Most fire extinguishers have a five year service life. Ensure that the extinguishers are serviced or replaced after this five year period. Regularly shake dry powder extinguishers to prevent the powder coagulating.

6.3.6. There was one fire blanket loosely stowed in the saloon. It is RECOMMENDED (type A2 recommendation) that it is secured to a bulkhead, positioned within two arm lengths of the cooker.

6.3.7. The engine compartment was not fitted with a fire extinguisher injection port. Consideration should be given to installing one.

6.4. First Aid Kit

6.4.1. There was no first aid kit found on the vessel. It is RECOMMENDED (type A2 recommendation) that one is procured and stowed on board.

6.5. Carbon Monoxide Alarm

6.5.1. There was no Carbon Monoxide alarm installed on PUFFIN II. It is RECOMMENDED (type A2 recommendation) that one is procured and mounted in an appropriate location. It is suggested that the alarm is mounted in the saloon at a position that is approximately 1' below the level of the coachroof. Note that the air space closest to the coachroof is considered to be 'dead space' and the sensor will not function so well in this area.

6.5.2. Refer to the following website for details of alarms that are approved as meeting BS EN 50291-2. These are best suited for boats:

http://www.boatsafetyscheme.org/stay-safe/carbon-monoxide-(co)/co-alarms-save-lives/

6.6. Strong Points

6.6.1. One lifeline strong point (stainless steel pad-eye) was secured to the hull moulding, located on the aft face of the bridgedeck. This strong point was accessible from the cockpit entrance. A second pad-eye should be installed, located next to the helm position.

6.6.2. The vessel was not fitted with jackstays. Strong consideration should be given to fitting these on both side decks.

6.7. Man Overboard Recovery Equipment

6.7.1. No horse shoe lifebuoys were found on board. One flotation lamp was found in the saloon. This lamp was not fitted with any batteries. It is RECOMMENDED (type A2 recommendation) that two horse shoe lifebuoys are carried on board, each stowed on a stainless steel frame. One of the lifebuoys should be fitted with a self-igniting light and a buoyant lifeline at least 18 metres in length.

6.7.2. One gas-inflating dan buoy, called a Jon Buoy, was stowed beneath the bunk of the starboard quarterberth. This apparatus was clean, dry and free of UV degradation. The serial number of the buoy was DB204174861. The carbon dioxide cylinder was securely mounted and free of corrosion. The lamp battery of this unit expires in March 2022. It is RECOMMENDED (type A2 recommendation) that when the vessel is at sea, this unit should be suitably mounted on the pushpit.

6.8. Pyrotechnics

6.8.1. No emergency flares were found on the vessel. It is RECOMMENDED (type A2 recommendation) that a set of flares (size and quantity appropriate to the sea areas and sea states expected to be encountered) is procured and stowed ready for use.

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7. Types of Recommendations Used in This Report

The recommendations detailed within the body of this report are presented in five categories and are classified as follows:

Type A1	Structural, mechanical or other defects requiring IMMEDIATE attention i.e. those affecting structural strength, seaworthiness or safety which MUST be repaired BEFORE the vessel is relaunched at this time.
Type A2	Structural, mechanical or other defects affecting strength, seaworthiness or safety which may be repaired after the vessel is relaunched but MUST be repaired before the vessel is taken to sea.
Type B	Defects not affecting strength, seaworthiness or safety but which, by their nature, should be dealt with before putting the vessel afloat.
Type C	Structural, mechanical or other defects NOT requiring immediate attention but are to be dealt with within a specified time period.
Type D	Non-essential or cosmetic defects whose repair may be left to the Owner's convenience. All suggestions are, unless noted otherwise, of this type.

These recommendations are intended to be only a guide to necessary rectification work. Both type A and type B recommendations cover urgent remedial work to be carried out as soon as practical. Type C recommendations cover significant remedial works to be carried out within the specified time period. It should also be noted that, in some instances, defects are noted within this report without a covering recommendation. In such cases either no action is necessary or the remedy is self-evident.

8. Abbreviations Used in This Report

a.c.	Alternating current
CQR	A design of anchor
d.c.	Direct Current
DSC	Digital Selective Calling
GRP	Glass Reinforced Plastic
HP	Horse Power
IIMS	International Institute of Marine Surveyors
LED	Light Emitting Diode
LPG	Liquid Petroleum Gas
PVC	Polyvinylchloride
UV	Ultra Violet
VHF	Very High Frequency