

Attachment 2

SPECIFICATIONS - NORDHAVN 68			
A.		BASIC STRUCTURE	
		General Dimensions	
		LOA	68'-01/2"
		LWL	63'-2"
		BEAM	20'-4"
		BWL	20'-0"
		DRAFT (NO LOAD)	6'-2"
		DISPLACEMENT (NO LOAD)	156,075 LBS.
		Cp	.54
		D/L	278
		A/B	2.49
		WATER CAPACITY	575 GALLONS
		FUEL CAPACITY	3200 GALLONS
		BLACK WATER CAPACITY	150 GALLONS
		GRAY WATER CAPACITY	150 GALLONS
	1.	Hull lamination schedule per construction plan # N64-00-CP01 the area below water line to use "Isophthalic" gelcoat and vinylester resin for the first three (3) layers. Deck lamination schedule per construction plan #N68-00-CP01. Construction plans pertaining to structure to be based on standards set by the AMERICAN BUREAU OF SHIPPING	
	2.	Standard gelcoat colors from Arocoat and CCP color chart. Gelcoat for deck and superstructure to be Ferro brand "Ultra" white:	
		A.	Hull- Arocoat Gray # 340
		B.	Deck and deck house - Ferro Ultra white
		C.	Boot top - Arocoat Dark blue # 348
		D.	Non-skid - CCP Gray # A110 to be "Gibco" non-skid pattern
		E.	Exhaust stack/flybridge - Ferro Ultra White
	3.	Coring:	
		A.	Cabin side (vertical surfaces): Klegecell # R75 varying degrees of thickness
		B.	Cabin top and deck (horizontal surfaces): Baltec or equivalent vertical end grain balsa, 1" thick
		C.	Hull: solid series of laminates
	4.	Deck/hull joint: (see notes drawing #N68 -00-CP01)	
		A.	Between deck and hull flange: 3M 5200
		B.	Inside of joint: Three (3) layers M. & W.R. (where accessible)
		C.	Mechanical fastening: 3/8" X 14 thru-bolt on 8" centers
		D.	Teak cap: Across stern only, varnished
	5.	Longitudinal Stringers	
		A.	Hull: Seven (7) full length each port and starboard (total of 14), engine beds and floor stringers per dwg # N64-00-CP01
		B.	Deck: per design drawing #N68-00-CP01
	6	Ballast: APPROX. 11,000lbs lead fixed per machinery layout drawing. 2000 lbs of lead ingots supplied loose by builder. Vessel trimmed to suit during commissioning.	
B.		STANDARD MACHINERY DETAILS	
	1.	Main Engine: Detroit Diesel Series 60 14L model #6062HK11 with continuous duty rating of 400 hp @ 1800 rpm, keel cooled with dry exhaust & 24 volt starting. Ta-Shing to supply main engine	
		A.	Gear Box: Twin Disc #5114, w/ 3.43:1 reduction
		B.	Engine Instrument Panel: Three (3) EDM (Electronic Display Module) instrument panels with alarm that will monitor Tachometer, Station active, Engine oil pressure, Engine water temp, Fuel consumption GPH, System voltage, Gear oil temp, Gear oil pressure, Alarm on/off button and five step illumination control. The following display choices are available by selection from the EDM menu as standard: Trip fuel consumption, Engine load, Turbo boost, ECM voltage, Fuel pressure, Fuel temp, Smoke control status and Total fuel used.
		C.	Alternator: 100 amp 24VDC belt driven

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	D.	Engine Controls: DDEC IV Electronic controls with brushed S/S finish six (6) stations: wheel house, fly bridge and aft deck, P&S Portuguese bridge and engine room
	E.	"Air Sep" crankcase ventilation
	F.	Two (2) 4D batteries connected in series for 24V start
	G.	Engine bed to have 3/16" stainless steel cap
	H.	Stainless steel rail around engine
	I.	Engine to be mounted on (4) Soundown reilient mounts or MTU Detroit Diesel equivalent.
2.		Propeller: Hungshen "Silent" to be highest quality available 42" x TBD" 4 blade left hand rotation
3.		Propeller Shaft: Aquamet 22HT 3-1/2" diameter
	A.	Taper details: Standard SAE
	B.	Spurs line cutter on main engine shaft
4.		Stern tube: FRP
	A.	Bearing: Rubber cutlass type at aft end
	B.	Stuffing Box: Bronze-traditional
	C.	Use "T" bolt clamps in lieu of hose clamps at the stuffing box.
5.		Keel Coolers
	A.	Charged Air & Gear circuit Keel cooler: R.W. Fernstrum Model #D1693W-E1-S1
	B.	Jacket water circuit: R.W. Fernstrum Model #D869-E1
6.		Fuel Filter: One (1) Racor 75-900MAC duplex with 2 micron filter elements in addition to secondary engine mounted filter
7.		Engine cooling system to be filled with engine manufacturer's specified mixture of coolant/antifreeze
8.		Engine room floors: All engine room floors and structural members to be FRP with white gel coated surfaces
9.		NOISE CONTROL -
	A.	Hull Damping - Area above the propeller rotation plane to be treated with two (2) layers of E-A-R Specialty Composites Isodamp CN Tiles (CN-62), alternating between resin and chopped glass to form a constrained layer damping system to be the inboard side of the shell plate. Installed as per figure 1.
	B.	Engine room ceiling and fwd bulkhead treated with 2" of sound down lead foam and 2" of 3M Thinsulate. Inboard tank sides, aft bulkhead, underside of deck, forward side of engine room bulkhead and ventilation ducts to be treated with 2" of sound down lead foam and 2" of 3M Thinsulate and covered with white aluminum panels by Soundown.
	C.	Salon/galley cabin sole to have 2" Nida Core" core system and 1/4" Soundown "decoupler" layer
	D.	Engine room hatches to have rubber gasket and lock down mechanism
	E.	Two S/S supports for salon cabin sole filled with lead shot for vibration absorpction and mounted on Soundown rubber mounts
	F.	Soundown Quite Pro lining covering engine room intake and exhaust ventilating ducts, 1" thick secured with epoxy and mechanical fasteners
	G.	Insulated bulkheads in living areas using 1" thick 3M "Thinsulate" between panels
10.		Engine Room Ventilation: (See Air Conditioning Systems and Ventilation Systems)
11.		Dry exhaust system: 6" I.D. per PAE design
	A.	Harco Muffler 6" with 6" inlet flange and 8" outlet flange. Inlet flange to be welded on. Pt #----- PAE to supply
	B.	Custom exhaust blanket for engine room portion of exhaust
	C.	Exhaust piping under blanket is to be wrapped first with fiberglass tape
	D.	Stainless steel wrinkle belly sections per design
	E.	Soft mounted with Soundown mounts and spring hanger mounts per design. PAE to supply hanger mounts and spring mounts
12.		Wing engine: Lugger #668D
	A.	"V" drive Hurth marine gear 2.5:1 ratio
	B.	Heat exchanger cooled
	C.	1-3/4" diameter shaft Aquamet 22HT
	D.	Spurs line cutter on wing engine shaft
	E.	Gori 3 blade folding propeller size TBD. PAE to supply.

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	F.	100 amp 24V alternator
	G.	Twin Disc electronic controls dual station. PAE to supply
	H.	Electronic front PTO 24 volt to operate hydraulics
	I.	Two "Group 31" batteries in series for 24V start
	J.	20 gallon day tank per PAE design
	K.	Racor 900 MA fuel filter with 2 micron filter element in addition to engine mounted filter between day tank and engine
	L.	Dual station panels, W/H and F/B
	M.	Engine bed to have 3/16" thick stainless steel cap
13.		Generator Northern Lights model #M864W 25KW 120/240vac 60hz. Includes sound enclosure.
	A.	Wet exhaust system using gen-sep
	B.	24V start
	C.	Alternator: 20 amp
14.		ABT hydraulic system per ABT quote #10615, to include following:
	A.	38 hp bow and stern thrusters using 12" tunnels with proportional controls at 5 stations
	B.	Hydraulically powered anchor wash pump- 180 GPM
	C.	Hydraulically powered 180 GPM emergency bilge pump with manifold system and plumbing to 4 bilge areas
	D.	TRAC #300 digital stabilizer system with 12 sq. ft. fins and dual station control. Stainless steel kelp cutters fwd. of fins tied to bonding system. Ta Shing to supply kelp cutters 3/8" thick X 4 " tall.
	E.	One (1) Maxwell VWC 4500 windlasses with dual station controls
	F.	Two (2) hydraulically powered Electrodyne 24 VDC alternators 250 amps each for a total of 500 amps
15.		Install vise in engine room at work bench
C		AIR CONDITIONING SYSTEM AND VENTILATION SYSTEMS
1.		Air Conditioning:
	a.	7 air handler zones operated by 6 remote mounted compressors with SMX controls. Seven zones are:
		FN7C-P/EHBO7C - Stbd. Guest Cabin - 7,000 BTU
		FN7C-P/EHBO7C - Port Guest Cabin - 7,000 BTU
		FN10C-P/EHBO10C -Engineroom - 10,000 BTU
		FN10C-P/EHBO10C - Owner's Cabin - 10,000 BTU
		FN30C-P/EHBO16C - Salon/Galley - 30,000 BTU (2 zones)
		FN24C-P/EHBO12C - Wheelhouse - 24,000 BTU (2 zones)
	b.	Cruisair Sea Water Pump P3000BXT
	c.	Controller: 6 Cruisair SMX ONLINE
2.		Heating: Above standard air-conditioning is "reverse cycle" for heating. Also, each air handler is equipped with an inductive "heat strip" for use in cold water situations where the reverse cycle system is not efficient.
2.		ENGINE ROOM VENTILATION SYSTEM
	A.	Two (2) Intake Blowers - Dayton #3C964 230VAC 50/60HZ rated at 2000 CFM @ 0.0" SP @ 60 Hz. Two (2) louvered vents on aft deck wings with screened blower inlet.
	B.	One (1) Exhaust Blower - Dayton #5C198 230VAC 50/60HZ rated at 2000 CFM @ 0.0" SP @ 60 Hz. One (1) vent on aft side exhaust stack with screened blower inlet.
	C.	Fire/Smoke Dampers – Ruskin CD36 Low Leakage Control Damper, 12"x12" Stainless Steel Rear Flanged equipped with a side mounted Honeywell H-2024 (24VDC) Fast-Acting, Two Position Actuator. One damper (1) each installed on the engine room side of each blower for easy access. Each damper will be normally open and will close on Fireboy actuation. For boats equipped with main engine dry exhaust, one (1) damper each installed on the inside of each main engine exhaust stack louvered vent opening - damper size to be compatible with stack opening.
		Auto Blower Stop and Damper Closure on Engine Room SEAIRE Actuation (See Fire Protection System)
		Note: See Noise Control item F
3.		LAZARETTE AND FORWARD MACHINERY COMPARTMENT
	A.	One (1) Exhaust Blower each compartment (2 Total) - Jabsco Model #34739-0020HD rated at 150 CFM, 24 VDC
	B.	Auto Blower Stop on Sea Fire Actuation in the compartment
4.		HEADS
	A.	One (1) Exhaust Blower each head - Jabsco Model #36740-0010 rated at 150 CFM 24VDC
	B.	One (1) Decorator Spring-Wound Mechanical Timer each head - Intermatic Model FD30M, 0-30 minutes, SPST, Grainger Stock No. 1XC26. Switches wired in blower circuit to stop fan at zero setting. PAE to supply timers.

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	5.		STATEROOMS
	A.		One (1) Supply Blower for master, forward guest staterooms (3 total). Jabsco Model #36740-0010 rated at 150 CFM, 24 VDC. On/Off wall switch for blower start and stop.
	B.		Outside air supplied from a louvered intake and ducted to the stateroom. Exhaust air from each stateroom routed to berthing passageway.
	C.		Blower located to insure minimal noise in stateroom
	D.		FIRE PROTECTION SYSTEM-
	1.		SEAFIRE Fixed System Fire Extinguishers - Three (3) Systems per PAE design# 68-00-FPS. PAE to supply.
	A.		Engine Room: One (1) SEAFIRE Model #FE-1500-M One (1) SEAFIRE Automatic Engine Shutdown System Model #131-260 24VDC for main engine, generators, engine room blowers, fire/smoke dampers One (1) SEAFIRE Manual Discharge Cable 30ft Model #135-030
	B.		Lazarette: One (1) SEAFIRE Model #FD-700-A One (1) SEAFIRE Deluxe Discharge Alarm Model #131-290
	C.		Forward Bilge (Machinery Compartment) One (1) SEAFIRE Model #FD-300-A One (1) SEAFIRE Deluxe Discharge Alarm Model #131-290
	2.		Portable Fire Extinguishers
	A.		Pilot House, Fly Bridge, Galley, Salon, and Master Stateroom: One (1) each USCG TYPE B-II (five total)
	B.		Guest Cabins: One (1) each USCG TYPE B-1 (two Total)
	3		Smoke/carbon monoxide detectors in each sleeping cabin, engineroom, salon/galley, wheel house, and lazarette. Seven (7) total.
	E.		STEERING SYSTEM
	1.		Kobel Hydraulic Steering System - 35 degree Rudder Deflection, Single Station (wheel house) Fly Bridge to have jog lever steering only.
	A.		Helm Pump x 1: Model #7012-0011B. Fly Bridge will have jog lever steering
	B.		Unbalanced Cylinders x 2: Model #7050-U12 2" Bore with 12" stroke
	C.		Safety and Bypass Valve: Model# 7020
	D.		Twin Arm Tiller Arm: Model# 7052-T
	E.		Filler Tank: Model #7002
	2.		Hydraulic lines: Seamless copper tubing 3/4" I.D. with reinforced rubber hydraulic lines to the hydraulic rams
	3.		Steering wheel: 30" stainless steel destroyer type in wheel house only
	4.		Emergency tiller: To attach to top of rudderpost and stow in lazarette - fabricated of stainless steel with 1" ID S/S eyes welded 10" in from the end of the tiller arm for attaching a block and tackle rig. 10. The emergency tiller deck plate will be accessed via locker doors on the transom inboard bulkhead. This is in lieu of creating a recess for it.
	5.		Stainless steel steering manifold located in lazarette with valving for two (2) autopilot pumps
	F.		RUDDER
	1.		Rudder stock: 3-1/2" Aquamet 22 HS
	2.		Rudder: FRP per PAE design# N64-00-RDDR
	3.		Rudder carrier shoe: Two piece fabricated 316 stainless steel per drawing #N68-00-RCS. Main piece fastened to hull by rivets. Aft piece removable so that rudder can be removed. Shoe to be tied into bonding system and to have attached zinc plate.
	4.		Rudder carrier per drawing #N68-00-RCP
	5.		Rudder stock stuffing box: Bronze traditional style

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	6.	Rudder stock tube: FRP with bronze/rubber cutlass bearing at the bottom
	A.	Use "T" bolt clamps in lieu of hose clamps at the stuffing box.
	G.	PLUMBING SYSTEM
	1.	Water Tank
	A.	Number and capacity: Two (2) totalling 575 gallons Per PAE dwg. No. N68-00-CO1
	B.	Material: Integral fiberglass with vinylester resin and FDA approved gel coated interior
	C.	Inspection plates: Appropriately positioned and sized for access
	D.	Tank air tested to 4.5 pounds per sq. inch
	E.	Tank has "Wema" level gauge
	F.	Tank baffles is spaced on 24" centers as shown in design - and removable for interior access
	G.	Exterior of tank finished in blue gel coat
	H.	Tank comply's with ABYC section H-23 for potable water systems for use on boats.
	I.	Cleanliness: Tank interior surfaces are thoroughly vacuumed and wiped down prior to final closure.
	2.	Fuel Tanks
	A.	Number and capacity: Three (3) totalling 3200 gallons with one centerline aluminum "Supply Reservoir" at 80 gallons which will gravity feed from main wing tanks.
	B.	FRP construction from male molds using Vinylester resin. To comply with all ABYC codes for diesel fuel tanks. Tanks to be coated with fire retardant gelcoat on outside to comply with ABYC section H-33.20 for fire resistance
	C.	Inspection Plates appropriately positioned for interior access by average size man. Plates to be fitted with labels that contain all information as stated in ABYC section H-33.16.3. Each internal baffle to have a removable panel to allow access to entire interior of all fuel tanks.
	D.	Fuel system to include a powder coated aluminum supply reservoir, which feeds by gravity from all fuel tanks. Top part of supply reservoir to hold approximately 2 gallons and fitted with a sight gauge with a one-gallon range and 10 th gallon marks for fuel consumption checks (supply lines are turned off and fuel is consumed from reservoir during checking process). Bottom part of reservoir to be approximately 78 gallons fitted with a drain valve at the bottom of the reservoir for water and debris purging and with a water sensor – illuminating a light and audible alarm in wheelhouse if excessive water is present. Reservoir fitted with five (5) draw spigots for main, 2 generators, wing engine and spare - mounted at lower level of reservoir but above water sensing probe. All returns from main, wing and generator plumbed into reservoir via a return manifold.
	E.	Sight gauges provided for (2) engine room tanks
	F.	Each tank to be air tested to 4.5 pounds per sq. inch
	G.	Provide baffles on 24" centers
	H.	Transfer manifold and 24vdc Orberdorfer gear pump (#OB991-43-C82) 3.5gpm fuel pump with timer switch and Racor 1000 fuel filter with 10 micron element which can transfer fuel from one tank to another and scrub fuel while transferring. Transfer is also used to fill top part of supply reservoir for consumption testing when main fuel tank level drops below the level of the testing part of the reservoir. PAE to supply pump.
	I.	System to be built per PAE design #N6800-FUEL
	J.	Exterior of tanks finished in red gel coat
	K.	Cleanliness: tank interior surfaces to be vacuumed and wiped clean before final closure
	L.	Each tank to have two (2) 1" I.D. vent lines
	M.	Each tank to have separate 2" I.D. fill pipe located a minimum distance of 18" from any ventilation openings.
	N.	All hardware that comes in contact with fuel to be bonded into the 24vdc ground system
	3.	Fuel Pipe and Hose
	A.	Supply lines from tanks to supply reservoir are 1 1/2" ID with Aeroquip brand fuel hose and swaged brass fittings
	B.	Fuel line from supply reservoir to main engine filter is 3/4" ID with Aeroquip brand fuel hose and swaged brass fittings
	C.	Fuel lines from supply reservoir to optional generator and wing engine to be 1/2" ID with Aeroquip brand fuel hose and swaged fittings
	D.	Vent lines to be fuel certified, reinforced hose 1" ID
	6.	Water Hoses
	A.	Cold water: Hose from water tanks to water pump and to accumulator to be 1" diameter reinforced and approved for potable water; Branch lines to be 1/2" Shurflo "Shurpex" brand semi rigid tubing with quick connect fittings(blue)
	B.	Hot water: Reinforced 1/2" Shurflo "Shurpex" brand semi rigid tubing with quick connect fittings (red)
	C.	Sea water hoses: Reinforced for marine use and provided with double stainless steel clamps below the water line
	D.	All hoses used shall meet the requirements for service as set out by ABYC for the system intended
	7.	Hot Water Heater System: Per PAE design #N68-00-FWS

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		A. Heater: RHEEM Vanguard Low Boy, 47 gallon with dual 240VAC elements for quick recovery (one 4500 watt, one 1000 watt). Pae to supply
8.		Thru Hulls: Bronze body, S/S Balls and Teflon seats
	A.	Grounding wire: #6 gauge green wire
	B.	Each thru hull to have a clearly visible tag indicating use.
	C.	Each thru hull to be easily accessible
9.		Fresh Water System: Per PAE design #N68-00-FWS
	A.	Main Pump: Headhunter Mach 5 Model #M5-115 - 120V with pressure regulator and Groco WSA-1000 strainer on pump inlet
	B.	Groco #PST5 accumulator tank with pressure gauge
	C.	Hose from water tanks to water pumps and to accumulator to be 1" diameter reinforced and approved for potable water
	D.	Back up Pump: Head hunter "X-Caliber" 12-24 VDC pump Model # XR-124
	E.	Filter: US water filter housing with a 5 micron sediment filter installed downstream of fresh water discharge manifold
	F.	Pump Selection Manifolds (2): Pump inlet and discharge manifolds made of stainless steel standard pipe. Supply manifold furnished with isolation ball valves from each fresh water tank, to each fresh water pump, and from the water maker. Discharge manifold furnished with isolation valves from each pump.
10.		Plumbing fixtures
	A.	Head sinks: Four (4) total, Owner's, fwd guest, stbd.guest and w/h head. Undercounter mount- HCG L 337 White oval sink.
	B.	Galley sink: Double S/S Kohler #K-3351 Pae to supply
	C.	Head faucets: Four (4)total, Grohe Model# 33170-0000 chrome
	D.	Galley, and engine room sink faucets: Two (2) total Grohe Model# 33939 1 B0 chrome/black
	E.	Aft deck and F/B faucet is folding faucet. Scandvic pt # MR4550
	F.	Engine room sink, fly bridge and aft deck sink: local made stainless steel
	G.	Shower fixtures: Three (3) All Grohe #28.049 handle, #28786 soap dish, #28.820 24" shower bar, #28.151 hose, #34.436 thermostat valve
11.		Bilge Pumps: Per PAE design #N68-00-BPS
	A.	Electric: Four (4) Par Jabsco 34600-0010 24volt 10.8GPM Diaphragm 1" diameter ports, with "Ultra Senior" 24volt auto float switch #UPS-01-24/32. One (1) in each water tight compartment.
	B.	Manual: Four (4) Edson Model #638 AL. One in each water tight compartment.
	C.	Hydraulic drive emergency pump: One (1) "Pacer" 180GPM plumbed to all water tight compartments. Manifold for emergency pump to be located in easily accessible location. Per PAE design #N68-00-BPS.
	D.	High Water Bilge Pump System - Engine Room: RULE Model 16A, 3700 GPH, 24 VAC, RULE Model #33AL High Water Bilge Alarm, and "Ultra Senior" bilge switch
	E.	High Water Bilge Alarm Panel - Pilot House per PAE design #68-00-___. High water bilge sense will come from std. Ultra Senior in each bilge compartment. Visual and audio alarm panel in pilot house.
12.		Toilets and Holding Tank System: Per PAE drawing #N68-00-HTS
	A.	Toilets to operate on vacuum principle using single Sealand #M-115 #511500 120VAC vacuum pump as the primary and a Sealand #202400 24VDC vacuum pump as back up.
	B.	All toilets, Four (4) total, to be Sealand "Magnum Opus" #234801 with "Hush Flush" and chrome trim with standard below floor mount (white).
	C.	Water supply to toilets to be fresh water only
	D.	Holding Tank: One (1)Integral FRP with vinylester resin 150 gallon holding tank
	E.	Use only PVC pipe or Sealand "Odor Safe" hose
	F.	Holding tank overboard pumps: Edson "Bone Dry" #120ELB 40GPM 120VAC electric and Edson "Bone Dry" #557BR 40GPM manual pump per drawing
	G.	Holding tank vent to use Sealand# 310002 vent filter
	H.	Deck fitting for portable evacuation facility
	I.	Holding Tank Level Monitor: Sealand 24V Tank Watch 4 Panel and Cap with Vent, 45 inch probes Part #600115, including Universal Flange (3 inch NPT) with gasket and stainless steel hardware, 24 volt "Do Not Flush" status panel #700024 and shut down relay #342490 warning system at each toilet
13.		Fresh water outlets on the foredeck, aft deck, F/B and two (2) in engine room using stainless steel "Scandvik" spigots #11204
14.		Gray Water System: Per PAE design #N68-00-GWS

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		A. Tank: One (1) Integral FRP 150 gallon tank. All sinks, showers, and air conditioning condensate to drain to tank. All drains to have "P" traps and sloped down hill run to tank. Exception: e/r sink and lower guest heads (sinks and showers) will be pumped to gray water tank. Tank equipped with electric and manual discharge pumps, level switch for pump starting, and level monitor
		B. Electric Discharge Pump: Sealand T24 Discharge Pump 24V with auto/manual switching. Pump inlet to draw with 1" of the absolute bottom of the tank. Pump to discharge overboard through anti siphon loop.
		C. Level Switch: ULTRA Junior Pump Switch (float type) Model WPS-02-24/32, 24V to auto start and stop the gray water pump in the AUTO mode. In AUTO mode, switch to start pump at 2.5 inches depth and stop pump at 1 inch depth.
		D. Level Monitor System: Headhunter 24V Tank Sentry Panel WPS-1500
		E. Manual back up pump: Edson Model #638AL
		F. Fitting provided for deck pump out.
15		"Scandvik" #10640640 aft deck shower installed on transom per PAE design
16		LPG system with two (2) 30 lb. aluminum LPG bottles with "Trident" two stage regulator and "Xintex" monitor panel #XINTX#S2A with two (2) sniffers located per PAE design #64-00-LPG. System to meet all ABYC and USCG regulations. PAE to supply.
17		Washer and Dryer: Bosch washing machine #WFR 2460 and 240vac Bosch dryer #WTA 3510 located in salon/galley portside fwd. PAE to supply.
18		FRP Sea Chest for raw water supply to various systems:
	A.	Wing engine, generator(s), water maker intake and air conditioning
	B.	Dual 2" diameter intakes port and starboard of keel using two (2) Groco #ARG2000 with Monel basket
	C.	Each intake from sea chest to have a rotary sight flow indicator with double window. McMaster Carr #4200K_(size)_____. PAE to supply.
	D.	All rubber impeller pumps to draw from the top of the chest. All centrifugal pumps to draw from the bottom of the chest.
19		Oil Change System
	A.	System utilizes a 120VAC Oberdorfer Gear Pump Model #OBN993M-F36-RC (4.8 GPM) to drain and fill engine lube oil from/cranks of main, wing, and generator(s) engines. Pump is controlled by a three (3) position switch mounted at pump location. Switch positions to be labeled "ENGINE OIL DRAIN", "OFF", "ENGINE OIL FILL".
	B.	Oil change manifold per PAE design #N68-00-OCS. Manifold, pump and control switch to be located in an accessible and comfortable location. Engine side of manifold to include isolation valves for each engine. Pump discharge/fill side to include a hose of suitable length for drawing from and discharging to a locally placed container.
	C.	Area provided in lazarette for secure storage of ten 5 gallon pails of engine or hydraulic oil.
20		Engine room sink sump system
	A.	System to be self contained 24V RULE Model RU 97-24 consisting of sump enclosure, sump pump and float switch
	B.	Sump pump to discharge to the gray water tank. Discharge to include a swing check valve.
		H. ELECTRICAL SYSTEM
	1.	A.C. SYSTEM per PAE drawing #N68-00-ACS. Vessel is fitted with two (2) 240 VAC and one (1) 120 VAC shore inlets. House shore power is fed through a 12KVA isolation transformer. For house shore power, operator may select either the 50 amp 240 VAC inlet or the 30 amp 120 VAC inlet. The wiring logic of the on board selector switch causes the 240 VAC inlet to be isolated and the 120 VAC inlet to be isolated and transformed to 240 VAC. The air conditioning may be operated from the house shore power or from its own dedicated shore power inlet which is equipped with a galvanic isolator. The air conditioning may be operated from either 50 Hz or 60 Hz current. Current is distributed through custom PAE electrical panels containing 240 VAC and 120 VAC sections, volt and amp meters and individual breakers for functions. PAE to supply Isolation Transformer.
	A.	Two (2) Trace SW4024 4KW 24 volt battery charger/inverters with remote control panels. Inverters are installed in a "series/stack" configuration enabling the vessel to have 120 VAC and 240 VAC inverted power. Electrical panel is fitted with an inverter bypass switch in the event of failure. PAE to supply Inverters.
	B.	AC Outlets are standard US format in black 120 VAC. Location shown on drawing.
	C.	All outlets in head compartment and galley are GFCI type in black
	D.	All external outlets have water proof covers
	E.	Two (2) Glendenning shore power cord retrieval systems with barrels located in the transom. One each for the 240V house shore power and air conditioning shore power. Each system to be provided with 100' of shore power cable. PAE to supply.
	F.	Std. Shore power inlets located on the port side of foredeck.
	G.	One (1) 50' 120 VAC 30 amp shore power cord. PAE to supply

Attachment 2

SPECIFICATIONS - NORDHAVN 68		
2.		DC electrical system and batteries per PAE drawing #N64-00-DCS. DC power is provided by 24 VDC and 12 VDC systems. The primary DC system is 24 volts and the secondary system is 12 volts for any equipment that is only available in 12 volts.
	A.	Standard batteries are located per PAE machinery drawing #N64-00-C01 and are provided as follows:
		1. 24 VDC house battery bank - Consists of twelve (12) 8D, 12V "Lifeline" AGM @ 255 Ah each. Two groups of six (6) batteries each are connected in parallel. The two groups are connected in series to provide a total battery bank rating of 1530 amps at 24V. Includes Link 10 battery monitor.
		2. 12 VDC power is supplied to the pilot house distribution panel by one (1) group 31 "Lifeline" AGM @ 105 Ah battery. A Xantrex 12VDC 20amp "Truecharge" battery charger charges the batteries through the inverter. PAE to supply.
		3. Main engine starting - 2-4D "Lifeline" AGM @ 255 Ah each connected in series for 24 volt starting. Switching logic to parallel with 24V house bank for emergency starting.
		4. Generator starting- 2-Group 31 "Lifeline" AGM @ 105 Ah each connected in series for 24volt starting. Switching logic to parallel with 24V house bank for emergency starting.
		5. Wing engine starting- 2-Group 31 "Lifeline" AGM @ 105 Ah each connected in series for 24volt starting. Switching logic to parallel with 24V house bank for emergency starting.
	B.	24 volt battery charging is provided in the following ways:
		1. Trace inverter/chargers provide a total of 240 amps at 24 volts
		2. Two (2) 250 amp 24 volt (12 KW total) Electrodyne alternators. Alternators are powered hydraulically. Hydraulic power is provided by either the main engine or wing engine. PAE to supply.
		3. One (1) "Charles" 80 amp charger which operates on 240 VAC-50Hz or 60Hz. This charger is a back up to the Trace inverter/charger and serves as a battery charger when the vessel is in a 50Hz environment.
		4. Main engine starting battery bank is charged from the house bank thru a diode isolator. PAE to supply.
		5. 25 KW NL generator has its own 20 amp 24V alternator which charges its starting battery
		6. Wing engine has its own 100 amp 24V alternator which charges its starting battery
3.		Battery cable: to be sized per electrical drawing and color-coded per PAE drawing #N68-00-DCS
4.		When possible wiring to be color coded per ABYC standards
5.		All wiring to be "tinned" copper
6.		All wiring connections except behind electrical panels to be sealed with "shrink wrap". Connectors to be ring type with closed end seamless construction.
7.		Lightning ground systems per PAE drawing #N_____
8.		Electrolysis control per PAE drawing #N_____
	A.	All thru hulls to be bonded together with a #6 green wire and tied into the DC ground system
	B.	All hardware mounted below water line - i.e. stuffing box, rudder shoe, rudder frame, all thru hulls, engines, and strainers to be grounded into bonding system
	C.	Three (3) zinc plates to be tied into the bonding system
	D.	"Perry nut" zinc on end of propeller shaft
9.		AC Genset - Northern Lights Model #M864K 25KW / 24VDC with sound shield providing 120/240 VAC current at 60Hz
	A.	Generator fuel filter- Racor 900MA
	B.	Gen-sep exhaust system
10.		Electrical Panels
	A.	Main AC distribution and control panel located per 6800.G01
	B.	Main DC distribution and control panel located per 6800.G01
	C.	Sub DC distribution panel in wheel house with pump monitor lights
	D.	House battery control panel located in lazarette
	E.	Engine/gen start battery and emergency parallel control panel at entrance to engine room
	F.	Generator start/stop panel in wheel house
I.		INTERIOR
		Joiner work to be 7201 style.
1.		General: Per PAE drawing #N68-00-GOI
	A.	Cushions throughout boat per drawing #N68-00-GOI with buyer's choice of factory supplied leather.
	B.	Interior steps to all teak. Corner of steps to have nonskid varnish.

Attachment 2

SPECIFICATIONS - NORDHAVN 68		
	C.	Interior lockers and drawers to be locking Timage with chrome push button
	D.	Interior overhead panels - Majilite or equivalent, vinyl covered. Removable, held in place by Velcro.
	E.	Interior door lock sets to be Mobella #3635U "Mc Coy" chromed brass with all chrome trim ring
	F.	Interior cabin doors to have door hooks
	G.	Hanging lockers to have automatic interior lights controlled by micro switch. Lined with "Camphor" wood".
	H.	Solid (non louvered) cored doors for heads and staterooms 1" thick
	I.	Interior teak woodwork including cabin sole in pilot house to be varnished with 60% gloss varnish
	J.	Salon table, pilothouse table to be varnished with high gloss varnish
	K.	All hand rails to be teak.
	L.	Structural bulkheads dividing staterooms and heads to have 3/4" furring strips on each side to allow application of 3/4" thick sound insulation. The finished bulkhead material of 3/8" thickness to be applied over this.
	M.	Mirrors are located thru out vessel as shown on interior drawings
	N.	Hull staving to match the overhead material
2		Galley
	A.	Sub zero #700TCI refrigerator/freezer with teak doors. PAE to supply.
	B.	Counter top: Granite w/ bull nosed edges
	C.	Flooring: Ceramic tile or limited selection of factory stone tile.
	D.	Cabinet paneling: Varnished teak (including appliance alcoves)
	E.	GE cooktop stainless steel LPG cooktop pt#JGP933SEFSS with stainless steel pot holder rails around cooktop. PAE to supply cooktop.
	F.	GE stainless steel electric convection wall oven 220vac pt# JK915SFSS PAE to supply.
	G.	Locker and drawer interior finish: Formica white
	H.	GE "Advantium" #SCA1001DSS convection/microwave oven with exhaust blower. PAE to supply.
	I.	GE Monogram #ZCG3500DSS 12" stainless steel trash compactor
	J.	Dishwasher 18" Miele pt # FCM9DMWH PAE to supply.
	K.	Garbage disposal Insinkerator 3/4hp #444SS. Includes Nuematic switch PAE to supply.
	L.	Stove Backsplash and area under raised bar to be lined with granite
	M.	Sub zero #700 drawer freezer with teak doors.Installed under stairway at port side . PAE to supply.
	N.	All appliances with doors to be fitted with a secure locking mechanism
3.		Main Salon
	A.	Floors: Carpet with Soundown underlayment pad. PAE to supply.
	B.	Cabinet/paneling: Varnished teak
	C.	Locker interior finish: Wood Vineer
	D.	Bar stools three (3) per PAE design
	G.	42" Sony flat screen plasma TV #KE-42TS2 on suitable "Aritex" lift system installed starboard aft corner. PAE to supply.
	H.	Bose "Life Style 28" sound system with DVD player #av-28 with interface to TV sound system. Installed at aft end of salon. PAE to supply.
	G.	Teak valance/air con soffet P&S and aft sides of salon
	H.	Two overhead teak hand rails
	I.	Teak coffee table port side with high gloss varnish
	J.	Custom built sofa along port side.
	K.	Eckornes chair on port. Side
	L.	Dining table on stbd. side with six chairs
	M.	Teak end table port side
	N.	Book shelves under stairway at fwd. End.
4.		Master Cabin
	A.	Floors: Carpet with Soundown underlayment pad. PAE to supply.
	B.	Cabinet/paneling: Varnished teak
	C.	Hanging locker interior finish: "Camphor wood" natural finish
	D.	Space for flat screen TV on lift system up to 50"
	E.	Custom chair stbd. side
	F.	Mattress: Standard king size. PAE to supply.
	G.	Book shelves as drawn
5.		Master Head
	A.	Flooring: Ceramic tile or limited selection of factory stone tile.
	B.	Counter top: Granite with bull nosed edges

Attachment 2

SPECIFICATIONS - NORDHAVN 68		
	C.	Mirrors and towel bars: As shown on drawings
	D.	Molded FRP shower stall
	E.	Cabinet/joiner work: All teak
	F.	Locker and drawer interior finish: Formica
	G.	Head exhaust blower with 30 minute timer
	H.	Toilet paper holder: chrome
	I.	Frameless glass shower door
	J.	Hanging locker and dresser as drawn
6.		Port Guest Cabin .
	A.	Floors: Carpet with pad
	B.	Cabinet/joiner work: Teak paneling with solid trim
	C.	Hanging locker interior finish: "Camphor wood" natural finish
	E.	Mattresses: Foam with buyers choice of sunbrella
7.		Guest Head Fwd.
	A.	Flooring: Ceramic tile or limited selection of factory stone tile.
	B.	Counter tops: Granite with bull nosed edges
	C.	Mirrors and towel bars: As shown on drawings
	D.	Molded FRP shower stalls
	E.	Locker and drawer interior finish: Formica
	F.	Exhaust blower with 30 minute timer. PAE to supply
	G.	Toilet paper holders: chrome
	H.	Aluminum and glass bi-fold shower door
	I.	Cabinet/joiner work: All teak
8		Pantry locker with adjustable shelves at base of steps to guest cabins
9		Starboard Guest Cabin .
	A.	Floors: Carpet with pad
	B.	Cabinet/joiner work: Teak paneling with solid trim
	C.	Hanging locker interior finish: "Camphor wood" natural finish
	E.	Mattress: Standard Queen
10		Guest Head Starboard.
	A.	Flooring: Ceramic tile or limited selection of factory stone tile.
	B.	Counter tops: Granite with bull nosed edges
	C.	Mirrors and towel bars: As shown on drawings
	D.	Molded FRP shower stalls
	E.	Locker and drawer interior finish: Formica
	F.	Exhaust blower with 30 minute timer. PAE to supply
	G.	Toilet paper holders: chrome
	H.	Aluminum and glass bi-fold shower door
	I.	Cabinet/joiner work: All teak
11		Pilot House - Layout per PAE drawing #N68-00-GOI
	A.	Floors: Teak and Spruce- varnish
	B.	Cabinet/joiner work: Varnished teak
	C.	Counter tops and instrument panel faces: Formica #909-58 matte black
	D.	Dinette table: Teak with high gloss varnish.
	E.	"U" shaped settee with chart drawers under
	F.	Helm seat - Two (2) Stidds 500N-2X2 Low Back "Slimline". Vinyl and pedestal color are buyer's choice
	G.	Chart light: Cantilupi "Rico"
	H.	Locker interior finish: Veneer or formica
	I.	Book shelves and chart drawers as shown on drawings
	J.	Hand rails: One each at the port and starboard doors
	K.	Compass- Ritchie SS 5000 5" Pae to supply
	L.	Pilot berth with 5" thick foam mattress behind settee with storage under.
	M.	Chart table with drawers and slide-out shelf for printer
	N.	Desk with large file drawers
	O.	Teak and stainless steel stairs going up to F/B as on N72

Attachment 2

SPECIFICATIONS - NORDHAVN 68		
		Wheel house Head
	A.	Flooring: Teak and spruce - varnished
	B.	Cabinetry: Varnished teak
	C.	Toilet paper holder
	D.	Exhaust blower with 30 minute timer
	E.	Counter tops: Granite with bull nosed edges
13		Forepeak (Chain Locker)
	A.	Shelves: Longitudinal FRP shelve for storage of spare anchor line
	B.	Anchor line deck hawse fitting
	C.	Two pad eyes in locker
	D.	Finish: Painted with gray gel coat
14		Laundry Area
	A.	Washer and dryer: Bosch washing machine #WFR 2460 and 240vac Bosch dryer #WTA 3510 located at fwd. end of salon/galley port side
	B.	Slide out shelf over freezer to fold clothes as per PAEdwg.no. 6800-GO1
J.		LIGHTING
1.		Main overhead lighting throughout interior: 24 volt Cantilupi "Sirio 2000". Lighting controlled by wall switches in black (approx. ____).
2.		Exterior overhead lights, F/B and side decks: 24 volt Cantilupi "Susy 105" (approx. 20)
3.		Overhead reading lights: 24 volt Cantilupi "Tebe" 2000 direction spot lights controlled from separate switches (approx. 15)
4.		Engine Room and Lazarette Lights
	A.	120 VAC fluorescent (approx. 6)
	B.	24 volt DC back-up lighting
5.		Courtesy Lights
	A.	Exterior: 24 volt Cantilupi "Storm LED" White lense # CN72815 stainless steel (approx. 26). Limited use of white LED rope lighting.
	B.	Interior: 24 volt Cantilupi "Storm LED" Red lense # CN72819 stainless steel (approx. 35) Limited use of white LED rope lighting
6.		Hanging Locker Lights and misc. Locker Lights: 24 volt AAA 00532 S/S with micro switches (approx. ____)
7.		Navigation lights and signal lights for vessels over 12m: Aqua Signal 55series
	A.	Port nav light - #55300 24 volt
	B.	Star nav light - #55200 24 volt
	C.	Stern light - #55500 24 volt
	D.	Steaming light - #55400 24 volt
	E.	Anchor light - #55000 24 volt
	F.	Restricted maneuverability lights - #55000 x 1, all around white, #55004 x 2, all around red. 24 volt.
		Stainless steel "Light Stand" per PAE design #68-00-LT
8.		Owner's cabin two (2) 24 volt Cantilupi "Vienna" chrome swing arm reading lights
9.		Deck Floodlights: Three (3) Aqua signal 120 volt/500 watt series 1069 mounted on port and starboard spreaders and fwd under side of P/B to shine on foredeck/boat deck.
10.		Port and Starboard Guest cabin reading lights: Cantilupi "Vienna" chrome swing arm reading lights x four (4)
11.		ACR dual beam electronic spot light (RCL 100D). Pt # 1930.30. Dual station remote control. Pt # 9282.3 Unit mounted on the Exhaust Stack. PAE to supply.
K.		EXTERIOR, DECK HARDWARE, and EQUIPMENT

Attachment 2

SPECIFICATIONS - NORDHAVN 68		
1.		All horizontal surfaces on deck to have Gibco non-skid pattern as shown in deck plan - standard non skid to be a contrasting color to parameter deck
2.		Stainless 316 handrails 1-1/4" diameter with electropolished bases. All rails shown on PAE drawings to be standard in addition to those specified
	A.	Transom hand rails
	B.	Rail on underside of aft deck overhang
	C.	Rail at stairs going up from side decks to foredeck P&S
	D.	Rail across the Flat section at the fwd. end of the wheel house below the windows
3.		Eleven (11) S/S 316 Hawse fittings: Four (4) Starboard side and Four (4) Port side per drawing 5" x 10" with cleats. Recessed into bulwarks where possible. One (1) on aft center line with cleat.
4.		Aritex #A251 Type 400 S/S 316 bollards one (1) centerline aft of windlass per drawing
5.		Upper rub rail cap to be 316 stainless steel 2-1/2" W x 7/16" thick fastened with flush 316 stainless steel fasteners. Stainless steel caps on upper and lower rub rails as shown in design.
6.		Lower rub rail cap to be 316 stainless steel 1-1/2" W x 5/16" thick
7.		Manship stainless steel oval ports in hull and deck as shown on design. Ports positioned as follows:
	A.	Five (5) starboard side hull 8" x 16" oval opening
	B.	Five(5) port side of hull 8" x 16" oval opening
	C.	All opening ports to be fitted with screens and deadlights
	D.	Custom Manship 12" x 34" rectangular fixed port lights w/ 3/4" thick tempered glass in owner's cabin installed horizontally P & S provide removable dead lights .Four (4) total.
	E.	Custom Manship 12" diameter opening ports holes with dead lights at fwd end of deck house over entrance to owner's cabin and in galley fwd. of the sink. P & S Two (2) total.
8.		Stainless steel 316 double bow roller - rollers to be slotted for chain. Roller to be built per PAE design N64-00-BR.
9.		Stainless steel 316 bow pulpit, rails and stanchions to be 1-1/4" diameter. Bow pulpit to have socket for 1" burgee staff. Bases to be round with fastening stud welded on bottom, except upper deck which will be fastened with flat head screw.
10.		Foredeck to have solid 316 stainless rail with lifeline in middle section. Lifeline to be 7 MM diameter 1 x 19 SS wire w/o vinyl coating, with 1-1/4" diameter stanchions. Bases to be round with fastening stud welded on bottom. All bases to have drain holes on bottom.
11.		Windshield Wipers: "Exalto" two (2) speed self-parking motor, with wash system for four (4) front windows
12.		Horn: Kahlenberg dual trumpet #D-1 with chrome finish. Pae to supply
13.		Deck hatches: Per deck plan, four (4) Lewmar 2 x #60 "Ocean Series" and 2 x #70 "Ocean Series" to include ocean air insect and privacy screens.
14.		Access to F/B from wheel house thru PCM door/hatch.
15.		Windows to be Pacific Coast Marine with 1/2" thick tempered glass.
	A.	All side windows to be tinted glass
	B.	Four wheel house opening windows to be PCM with insect screens. Port side Stbd side and two aft.
	C.	All salon and fore and aft wheel house windows to be recessed 1".
16.		Aluminum doors by Pacific Coast Marine as follows (Note: interior as well as exterior PCM doors are included in this schedule):
	A.	Wheel house--2ea, Weather Tight Dutch door, one L.H. Mortise hinge, one R.H. Mortise hinge. C.O. 21" x 73"
	B.	Salon after--1ea, Weather Tight Double door, main opening on left side, Mortise hinges. C.O. 34" x 73".
	C.	Galley --1ea, Weather Tight Dutch door, R.H. Mortise hinge. C.O. 21" x 73"
	E.	Salon port side--1ea, Weather Tight Dutch door, L.H. Mortise hinge. C.O. 21" x 73"
	F.	Engine room--1ea, Water Tight model no. PCM4170-W with sound blanket core, painted. L.H. surface mount hinge. C.O. 21" x 73".

Attachment 2

SPECIFICATIONS - NORDHAVN 68		
	G.	Lazarette--1 ea, with port hole, Water Tight model no. PCM4170-W with sound blanket core, painted. R.H. surface mount hinge. C.O. 21" x 46".
17		Boarding doors: port and starboard - opening in two pieces. Top to fold up and over and bottom to open outboard. Stern doors per drawing. Doors to have Aritex stainless steel "blind" dog lock/handles.
18		Aritex HSC 1000 kg capacity dual ram hydraulic/240VAC stamdpipe davit with 14'boom mounted on foredeck per drawing. Davit sized and positioned to launch dinghies from port and starboard side.
19		Aft deck exterior cabinet per drawing #N68-00-ADEC
	A.	Sink: S/S to drain directly overboard
	B.	Control alcove for DDEC engine control ABT bow and stern thruster jog levers, rudder angle indicator and steering jog, start/stop air horn push buttons and forward windlass control
20		Bottom treatment: Three (3) layers of epoxy barrier coat and two (3) coats of anti fouling paint
21		Portuguese bridgedeck and F/B deck to drain through scuppers 2" diameter in addition to freeing ports as shown on design.
22		Anchor well to drain through scupper 2" diameter
23		P&S storage lockers in Portuguese bridge with stainless louvers
24		FRP exhaust stack/radar mast with flag halyards port and starboard per PAE design #N64-00-EX
25		Portuguese bridge control stations port and starboard side of forward P/B. Station to be in pod at forward corners as on N72 APH with enough room for DDEC control, bow and stern thruster controls, start/stop, horn, rudder angle indicator and steering jog.
26		Flybridge per PAE design, sink, Norcold #DE-0051 drinks reefer (Ta Shing to supply reefer) , and one (1) Stidds "Slimline" helm chair #500n-2x2 white vinyl and settee with vinyl cushions and high gloss teak table. Sink to drain directly overboard. Ritchie SS 5000 compass installed. Pae to supply 1 chair, comapss and cover.
27		Stern capstan winch: one (1) Maxwell VC 2200 24v per PAE design
28		48" teak flag staff with socket for aft cap rail
29		Door to foredeck through Portuguese bridge with Aritex stainless steel dog set and custom pantograph hinges like used on N72 APH
30		Ta-Shing to make a custom double gasket FRP deck hatch per PAE design
31		Anchor: Aritex 300 lb. stainless steel plow
32		400ft. 1/2" HT chain
33		Swim ladder: Stainless steel with teak steps mounted on swim step
34		Two (2) pop-up style 10" cleats on swim step port and starboard for dinghy tie up
35		Windlass: Maxwell VWC 4500 hydraulic with band brake and 1/2" HT chain gypsy
36		Maxwell chain stopper for 1/2" diameter HT chain
37		All exterior locker doors to use stainless steel flush latches
38		All exterior locker doors to have stainless steel louvered vents
39		All exterior door keepers to be ABI #2039CH
40		Two (2) Fishing pole holders flushed into bulwarks in cockpit. One each port and starboard sides with drains
41		Stainless steel stem plate with anchor wash nozzle and Nordhavn emblem

Attachment 2

SPECIFICATIONS - NORDHAVN 68			
42			Three (3) "U" shaped rails across swim step
43			Nordhavn name plates x 2 port and starboard side per PAE design
44			40 gallon gasoline storage tank with electric pump installed in Portuguese. Pae to supply pump
45			"Flopper Stopper" system for use at anchor. System to include folding poles P&S with associated rigging and two Prime __ sq inch "wing" type flopper plates. PAE to supply
46			Marquip Sea ladder with brackets at port and starboard side of bow for access to dinghy after launching.