



L A T E R A L

NAVAL ARCHITECTS



FREE FROM BULKHEADS

IN **COLLABORATION** WITH





LATERAL

Lateral Naval Architects provide complete engineering expertise to the superyacht industry, from project conception to delivery.

Our core competence is engineering, but our unique focus is on meaningful innovation, to enable superyachts that meet the demands of today's owners and those of the future.

We believe that meaningful innovation starts with asking new questions.





QUESTION

How can engineering
free us from the
**constraints evolved in
superyacht design?**

EVOLUTIONARY CONSTRAINTS

CONSTRAINT

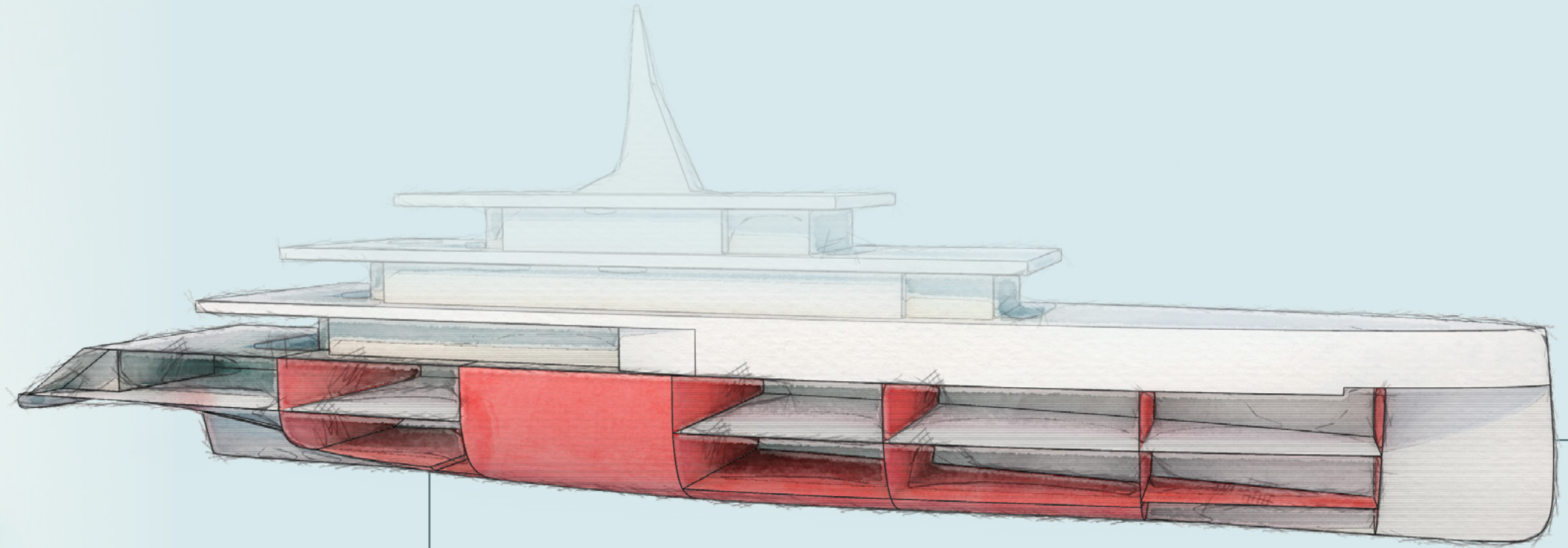
noun

A limitation or restriction.

EVOLUTION

noun

A process of continuous change through successive generations from a lower, simpler, or worse to a higher, more complex, or better state.



The development of the modern yacht has evolved over many decades. To meet regulatory requirements, naval architecture and engineering approaches have tended to follow a well-established format and, whilst every custom superyacht is unique, the technical backbone has evolved into a standardised solution.

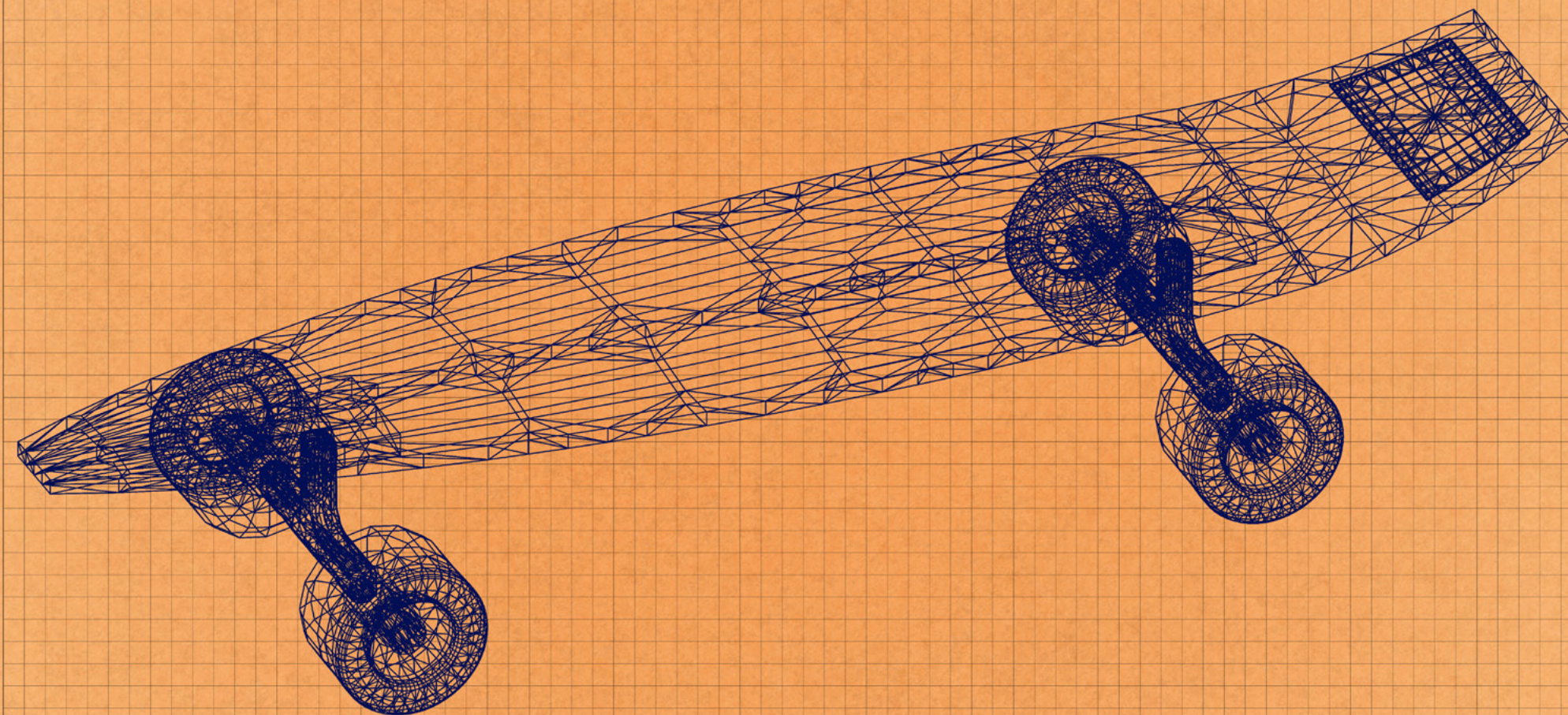
No solution is constraint free, however innovation can be achieved if the constraints are adjusted, giving new perspectives, and new possibilities.

We asked ourselves how the user experience could be elevated by creating a technical platform where, above the waterline there were no evolved constraints, no watertight bulkheads.

Could a more open plan architecture be achieved, and how would the design community innovate on such a blank canvas?



L A T E R A L



THE LATERAL SKATEBOARD

We began by imaging a skateboard.

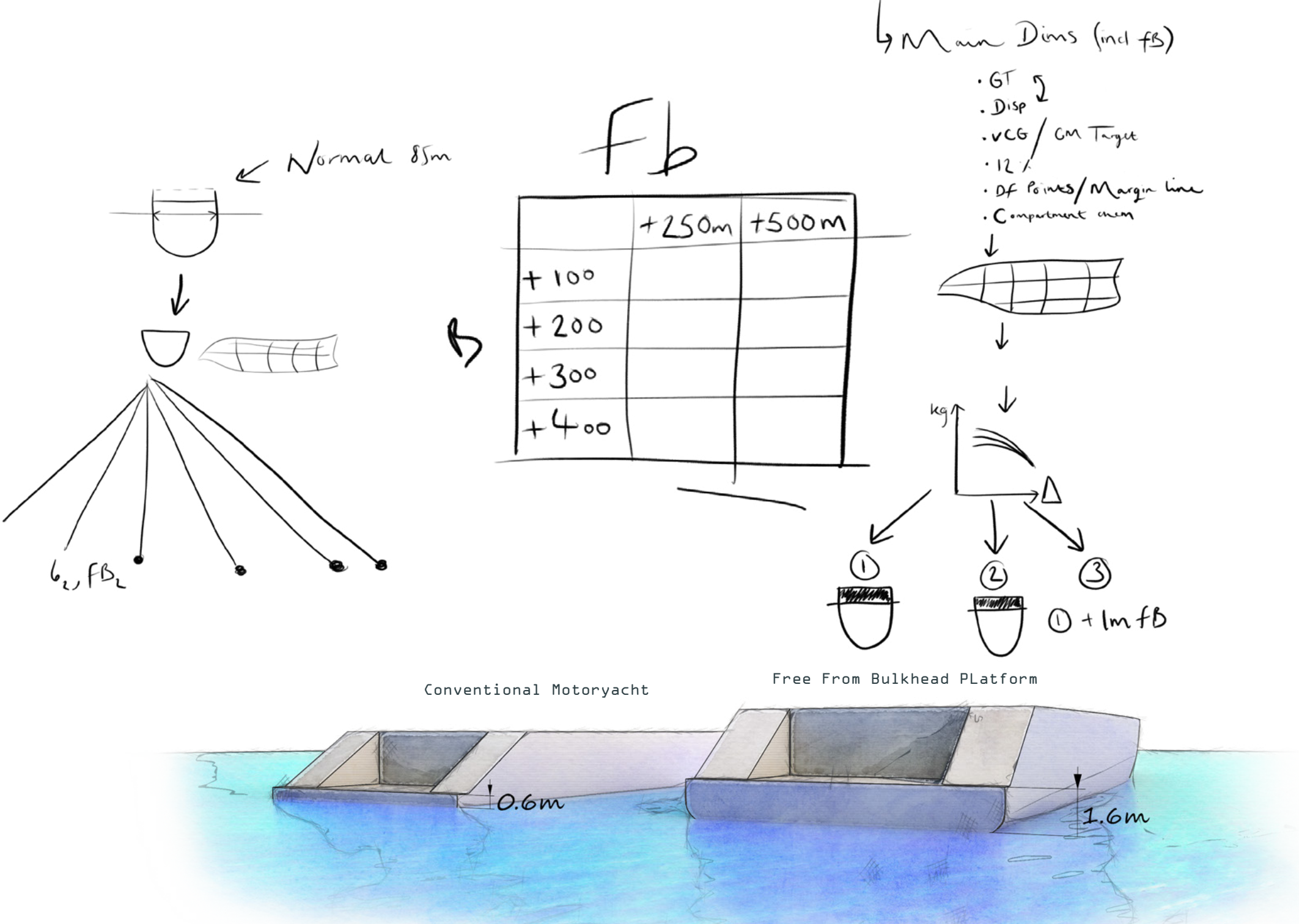
A simplistic representation of our aspired outcome; below the board's deck are all the necessary machinery, above the deck anything is possible, unconstrained by the technical parts.

RESEARCH

Removing watertight bulkheads demanded we find alternative means to meet ‘damage stability’ requirements.

Using parametric modelling, and applying some lateral thinking to our methodology, we explored an extensive matrix of possibilities, searching for the solution space of feasibility.

Our modelling incorporated boundaries to respect the multifaceted nature of superyacht naval architecture.



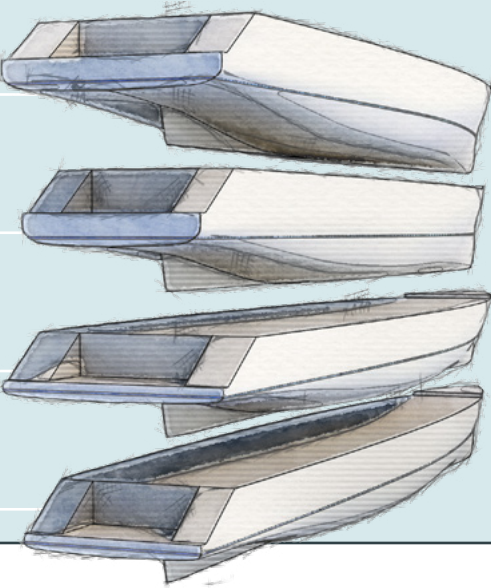
Via the alignment of a particular combination of beam and freeboard, the need for watertight bulkheads above the lower deck is negated. This also requires an unusual machinery arrangement to ensure the technical aspects of the platform can be adequately and practically packaged below the lower deck.

Both parameters

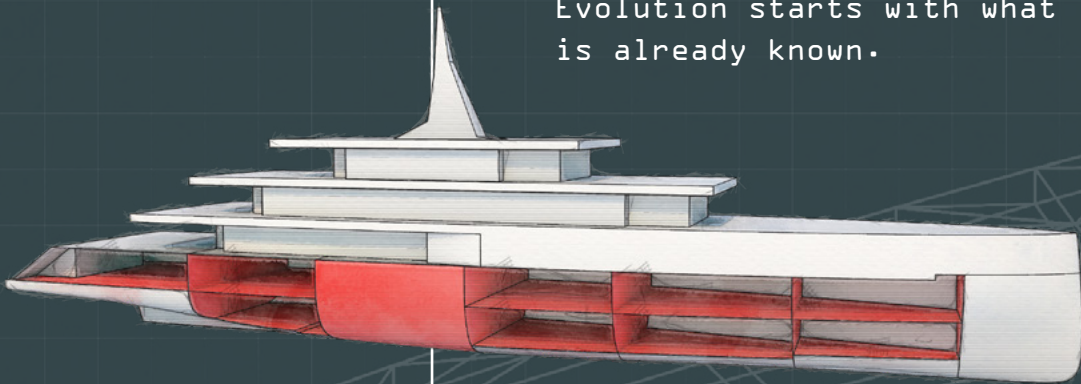
Freeboard

Beam

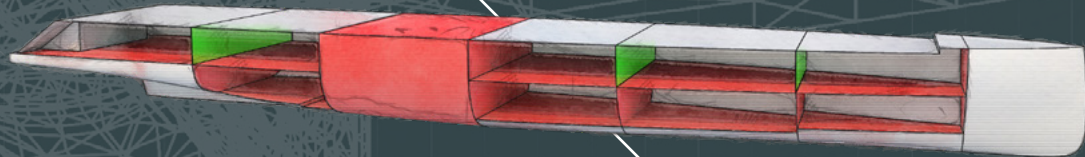
Baseline



Evolution starts with what
is already known.

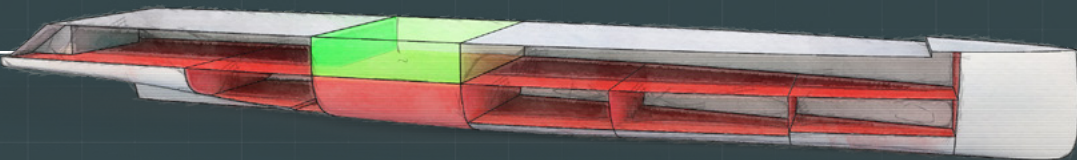


Conventional characteristics
are superseded by new ones.

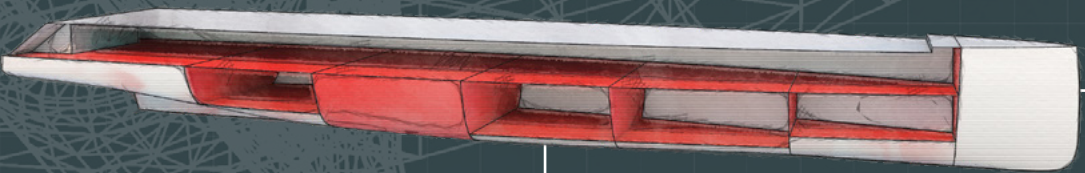


THE EVOLUTION
OF IDEAS,
DRIVEN BY INNOVATION.

Innovation brings forward improved
versions of what once was.

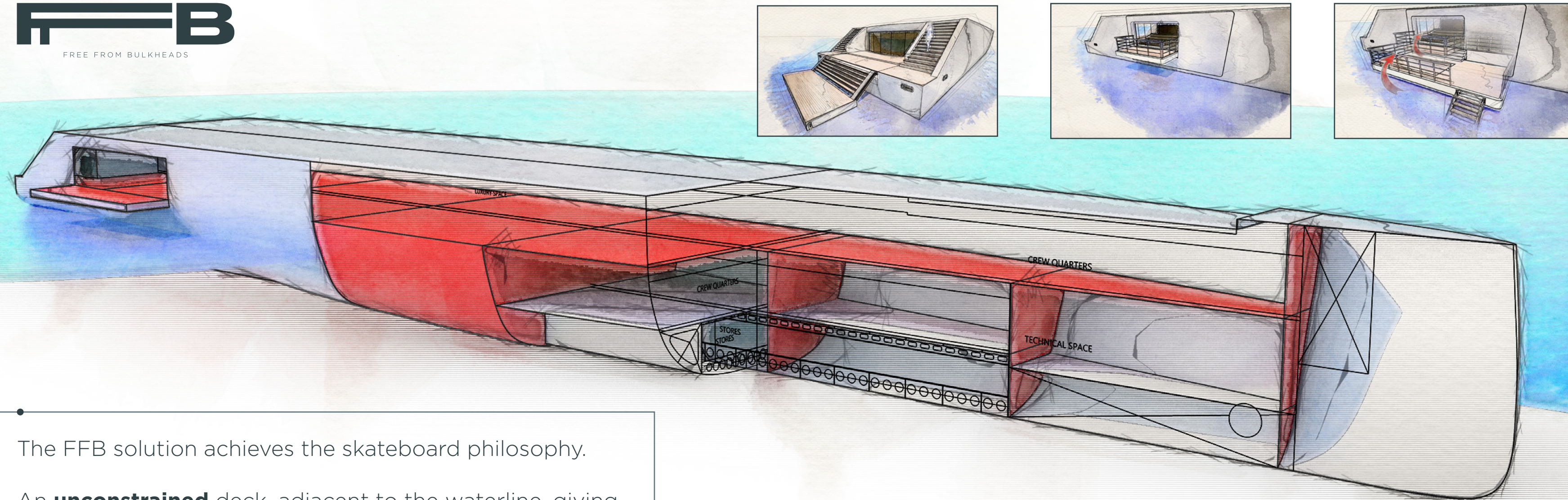


FFB
FREE FROM BULKHEADS



Innovation-driven evolution
elevates the subject to a
higher end state.





The FFB solution achieves the skateboard philosophy.

An **unconstrained** deck, adjacent to the waterline, giving the potential for greater design innovation in layout and ultimately an elevated user experience.

ALL ELECTRIC ARCHITECTURE

- Zero Emission & Silent Period in 24hr
- Battery Bank Charge Time
- Emission Free Cruise Mode Range

63% (15hrs)
2-3hrs
30nm @ 10knots

AZIMUTHING
THRUSTERS

POD FREQUENCY
DRIVES

CHARGING GENERATORS
2 X 1215kW

DC PROPULSION
SWITCHBOARD

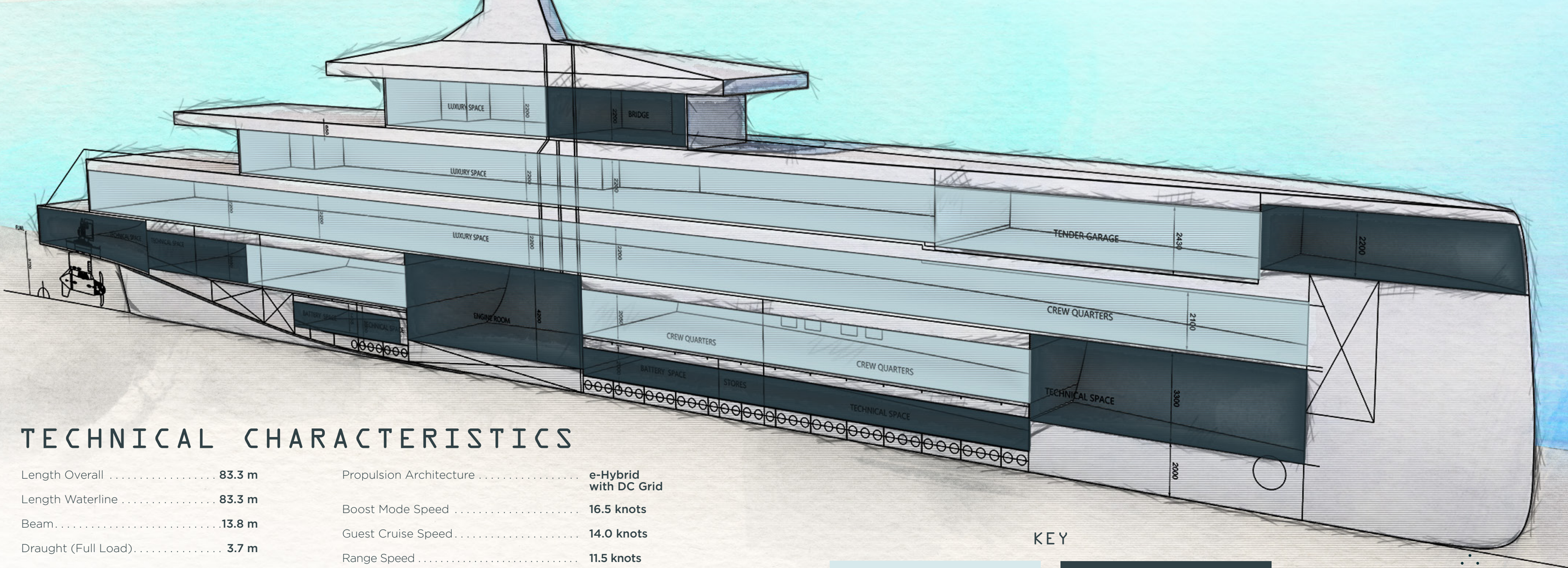
IMO TIER III
EXHAUST SYSTEM

PRIME MOVER
AFT BATTERY PACK
1.0 MWh

HOTEL AC - DC
CONVERTER

BATTERY DC - DC
CONVERTER

PRIME MOVER
FWD BATTERY PACK
3.0 MWh



TECHNICAL CHARACTERISTICS

Length Overall **83.3 m**
Length Waterline **83.3 m**
Beam **13.8 m**
Draught (Full Load) **3.7 m**
Gross Tonnage **2500**
Notation **REG Yacht Code Part A**

Propulsion Architecture **e-Hybrid
with DC Grid**
Boost Mode Speed **16.5 knots**
Guest Cruise Speed **14.0 knots**
Range Speed **11.5 knots**
Range **7000 nm**
Luxury Space **900 sq.m**

KEY

DESIGNER SCOPE

TECHNICAL SCOPE

**HOW CAN
NEW THINKING
ELEVATE
THE USER EXPERIENCE**



L A T E R A L



MICK
LEACH



MARK
SMITH

We have been very privileged and honoured over the last 10 years to work with a select few of the most experienced and demanding clients, who have chosen us, to create with them, totally bespoke masterpieces of craftsmanship exceeding 100m. Clients who have owned and chartered boats for decades, and finally chosen to start with a clean sheet of paper, and not to be confined or controlled by a shipyard's technical platform. Very few designers get this opportunity, with the majority tasked with the difficult contrast of being creative around market friendly technical platforms.

I mention this, because when we were approached by Lateral to collaborate with them on a new 80m design, they

presented a very exciting technical platform, which we feel blows a breath of fresh air, to free up the normal constraints of an 80m yacht, and allow a fresh approach. We feel it's a great opportunity to try and incorporate some of the knowledge gained in creating the bespoke Super/Megayacht! But hey, it's still a functioning yacht, so excuse us for making it real, we are not out to impress the industry with crazy concepts, we are out to give back our decades of yacht lifestyle experience, and create a flexible GA that gives owners, designers and shipyards a new breed of yacht, to breathe new life into this prime market sized Superyacht.

The key to this spark of innovation is not the single-tiered deck propulsion system, that's not new. But what is

special is the creation of a weather deck which is only 1.6m off the waterline, and the subsequent removal of watertight bulkheads on what effectively is the lower deck. Yes we still have to have an engine duct and the odd stiffener bulkhead, but otherwise we are free to layout this deck as we please.

Primarily, this means we have a guest's deck at a safe distance off the waterline, without an engine room in the middle of the deck. In our opinion, the fashionable beach club spa deck on an 80m yacht is always too near the water, and in most cases level or below the waterline, and rarely is this area accessible from the main staircase, as the engine room stops that. Normally, as this beach club area is always below weather deck, the areas have restricted window sizes, and

if access is needed to the sea, a limiting watertight shell door is required.

Our new concept allows for virtually all of the beach club/spa deck to have full height windows and doors, which need to be weather-tight. Any one of these doors or windows could be open-able to gain fresh air access to the deck and world outside, (unlike the normal lower deck beach club arrangement, which requires watertight doors and bulkheads, which of course are restricted in size and position). The deck is just the right height above the waterline, near enough to feel engaged, and far enough to be safe from rogue waves.

We think it would be a safety liability to give guests access into the sea along half the boat's length on both sides, a crew watch nightmare, as at any moment, a slip or rogue wave could take someone off and away. We prefer to control access into the sea to one area only at the aft transom. The swimming pool on the yacht of this size is normally placed on the main deck aft, and if its deep enough to swim in, it destroys the space below in the normal beach club area, either that or the beach club is pushed down below

waterline. This concept puts the pool on the beach club deck, where it should be, allowing a deeper pool, better drainage, and of course a lower centre of gravity. This in turn frees up the main aft deck to allow for more seating and entertainment areas.

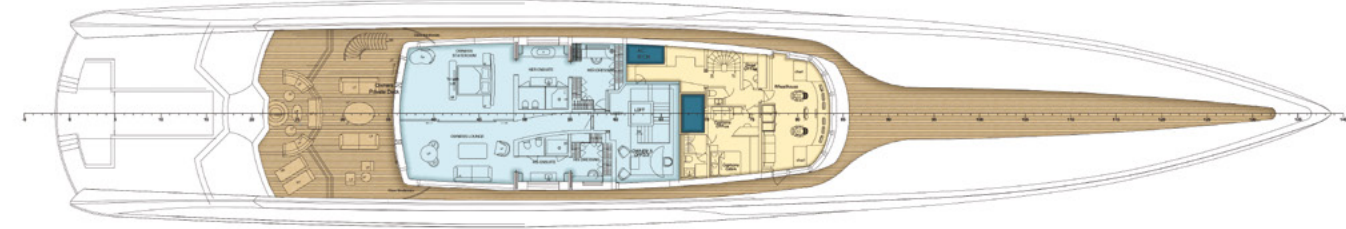
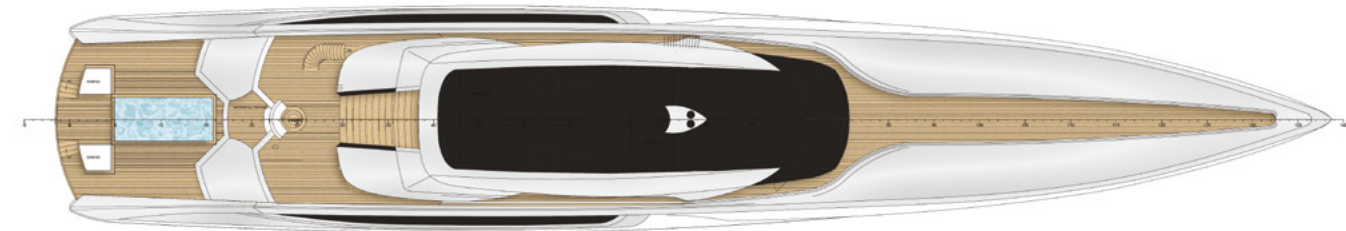
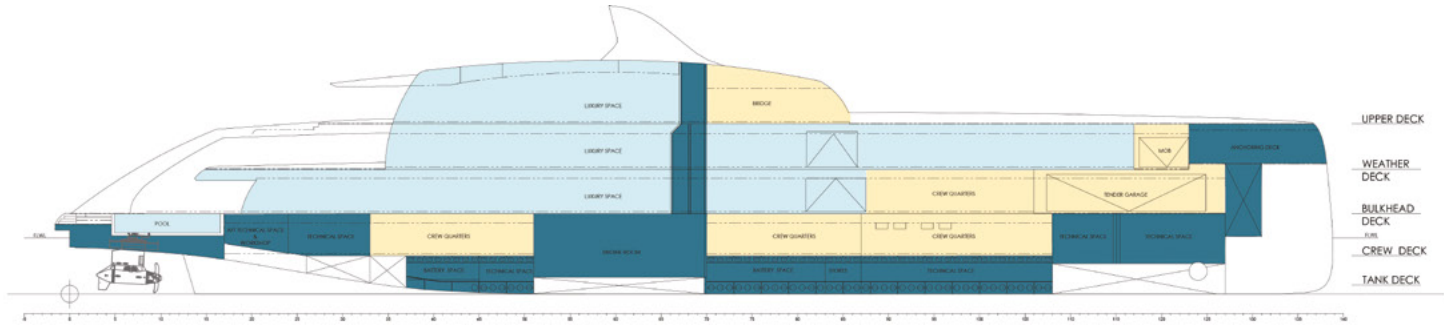
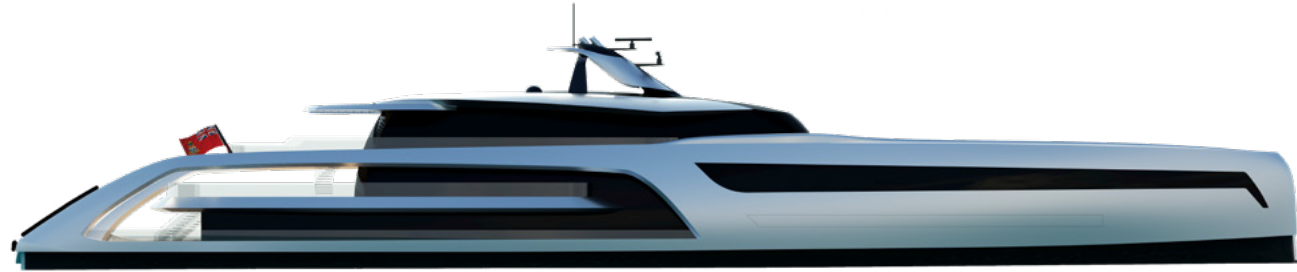
Then we have a totally unique feature on an 80m yacht, the ability to come alongside at midships, and land and dock a large tender, to give guest access to the yacht via the main staircase/entrance lobby, without disturbing guest activity anywhere in the beach club spa area. From midships, access to the beach club can be from the main internal lobby, or alternatively, the beach club/spa and pool area can be accessed on the same level via the two full length side decks. This beach club deck could be laid out in all manner of ways, and we have chosen to show it as a free and flexible space aft, with the more technical constraints of the spa area forward. The crew areas are on the traditional port side, why change?

Another unique feature is the ability to have a guest galley aft of where the engine room would be, to allow vertical access to the pantries layered above.

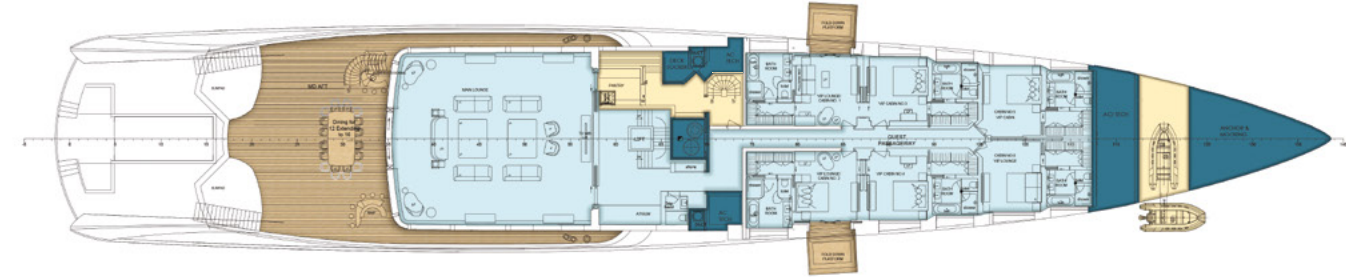
Tender garages and toy stores forward are free to be sized as required, as no constriction of compartmental zoning .

The rest of the boat can be personal, and we've chosen to lay it out for an owner with a family, and a flexible guest layout to both maximise occupancy, but also offer special VIP suites. We have chosen not to incorporate a helideck or sundeck, but options are easily achievable both on the bow, and aft on the roof of the top deck. The non-heli/sun deck option allows for giant headroom in the owners suite, and the ability to incorporate large skylights. There would also be the option to do a raised wheelhouse with owner area in its place on the deck below.

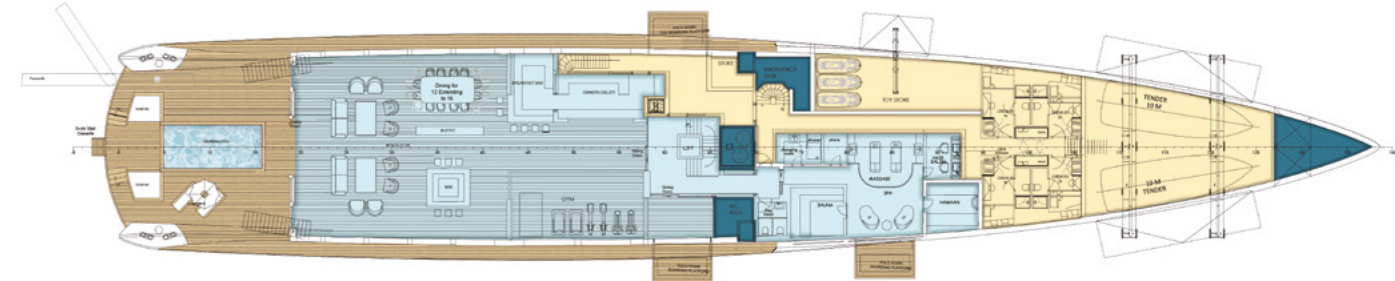
The lowered beach club/ weather deck presented a styling challenge. Consequently all the 3 aft guest decks are lower in the water, with the danger of making the boat look like its visually sinking. The unique feature we have created is a raised bow and shear line which splines in an elegant sweep aft to link with the bridge deck, and then on to the aft buttresses, and down to the waterline. Its such a powerful line, that it overrides any visual weakness created by the lowered weather deck.



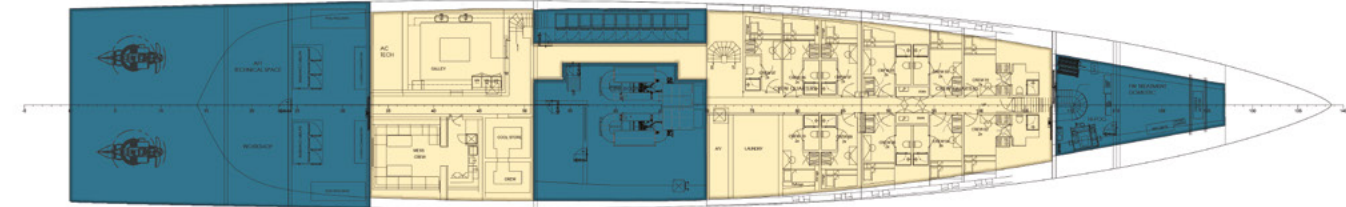
UPPER DECK



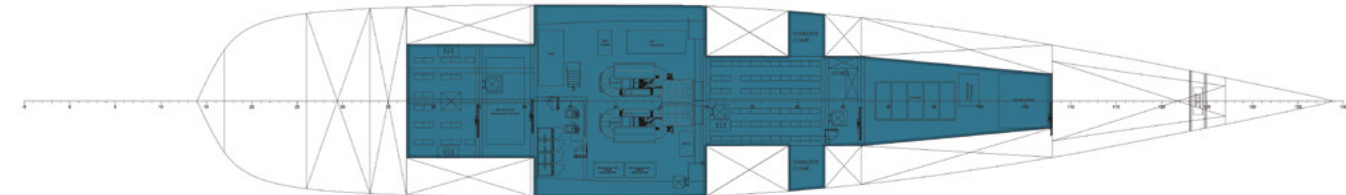
WEATHER DECK



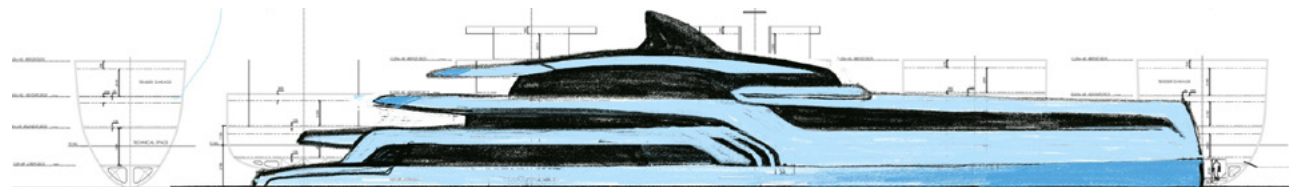
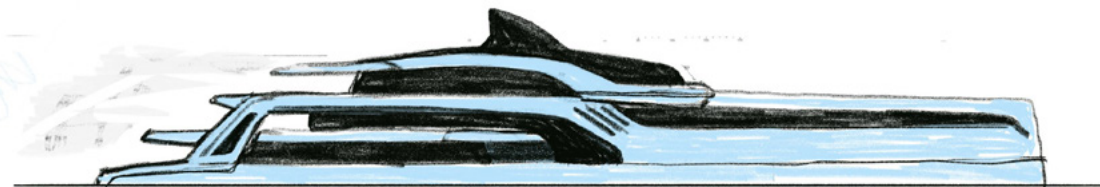
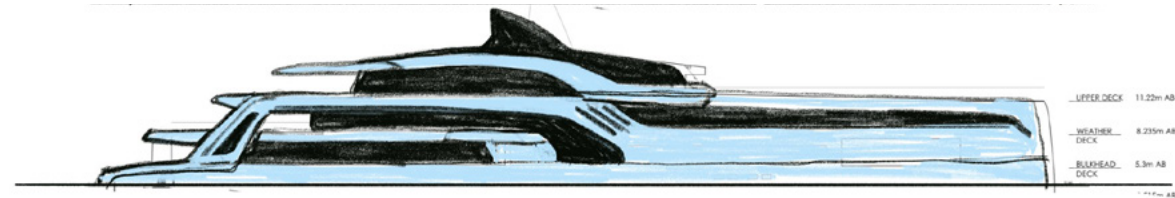
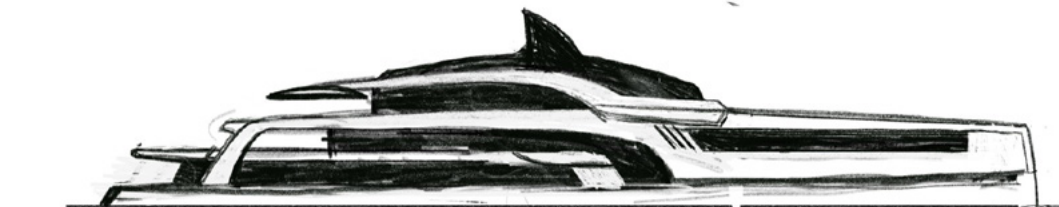
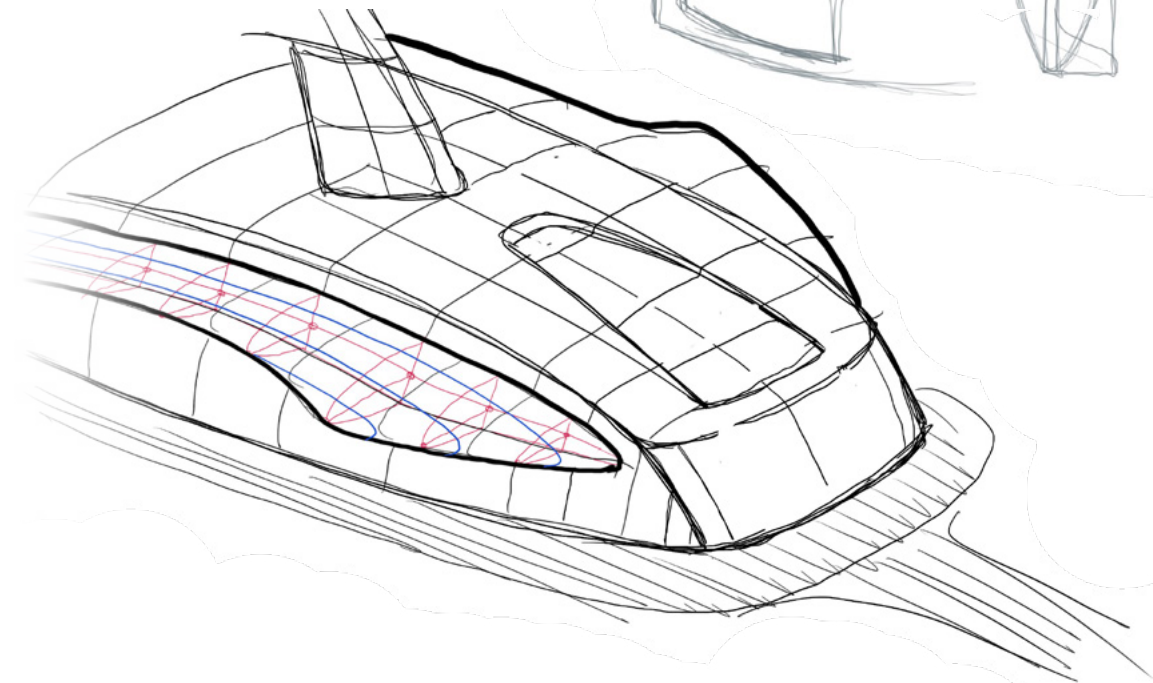
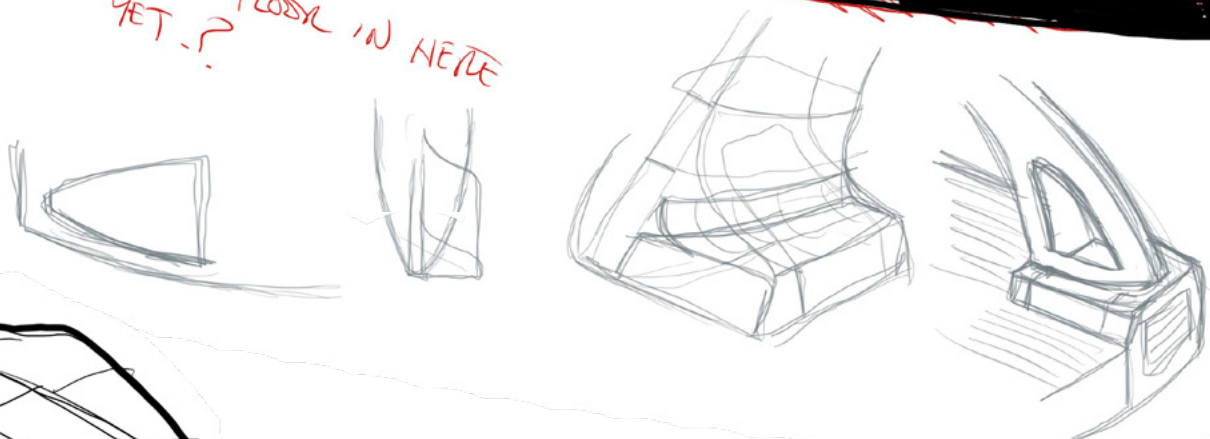
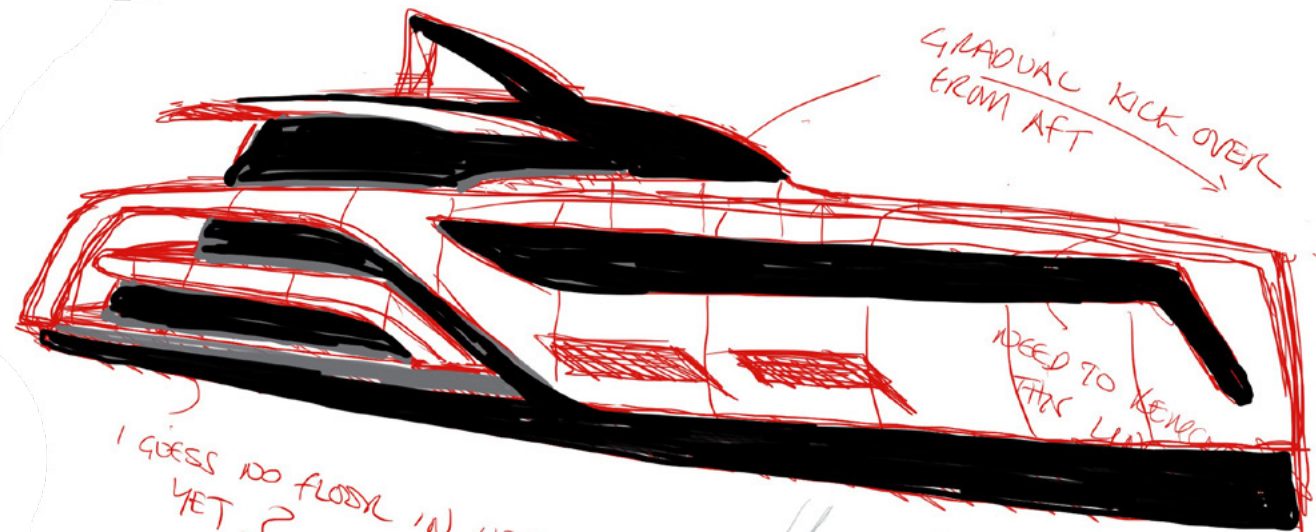
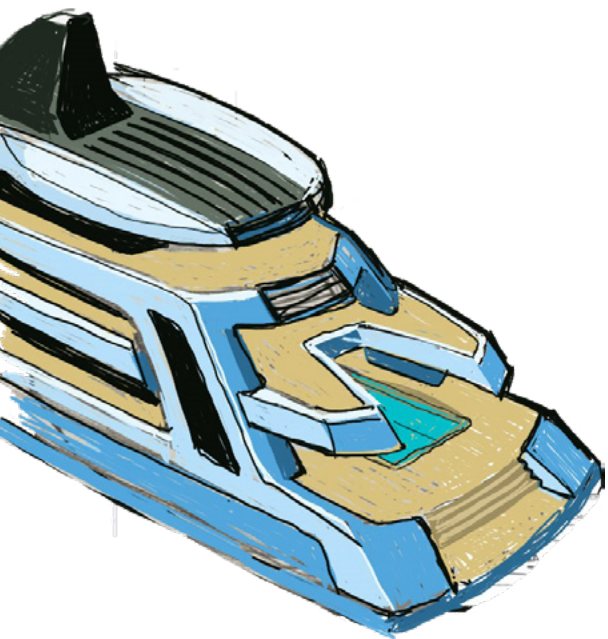
BULKHEAD DECK



CREW DECK



TANK DECK





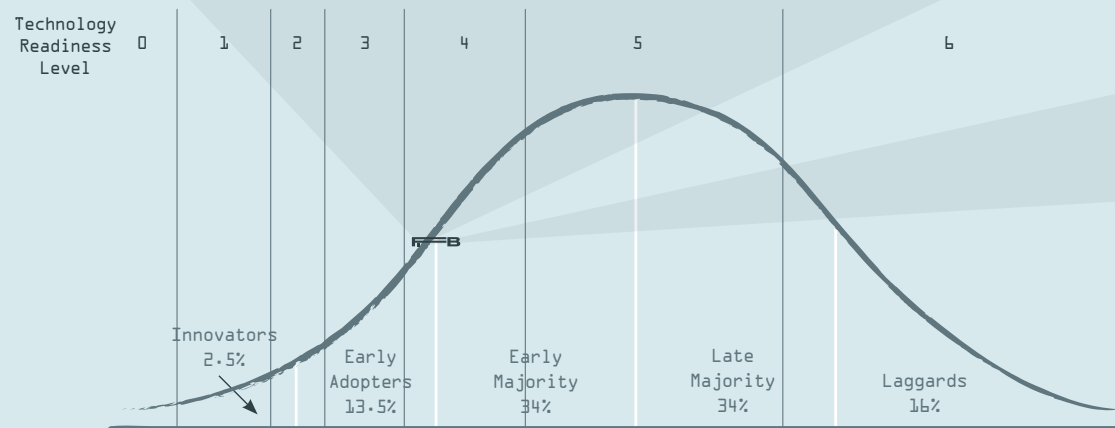
MICHAEL
LEACH
DESIGN



The use of large batteries on-board superyachts is not novel, there are many existing or in build projects utilising batteries at large scale. That said, the size of battery bank selected for the FFB platform is large compared with the size of the yacht. This is not a significant technical or commercial risk.

The innovative aspect of the Lateral e-Hybrid system is in the

holistic integration of the battery as the primary source of power and subsequent reduction in installed power and prime movers. This arrangement is in use for some commercial vessels and is a logical development of existing power management systems fitted to large yachts. It represents a low risk development that is optimising current available technology in a novel arrangement.



TECHNOLOGY READINESS LEVEL

- **TRL 0 – Blue Sky Idea**
Anecdotal concept with no analytical proof of feasibility.
- **TRL 1 – Paper Concept**
Exists only in paper proposals or academic research, analytically proven.
- **TRL 2 – Industrial Development**
Product is not being developed for a marine industry application however a test rig or prototype product exists to develop the technology to a real world application.
- **TRL 3 – Marine Product Development**
Product is not offered for sale, however a test rig or prototype product/ installation exists.
- **TRL 4 – First User**
At least 1 reference yacht, concept fully certified by authorities for marine use.
- **TRL 5 – Common Practice**
Multiple reference yachts and vendors available.
- **TRL 6 – Obsolete**
Obsolete by increased regulation or alternative technology.



ASK FURTHER QUESTIONS

Adrien Thoumazeau

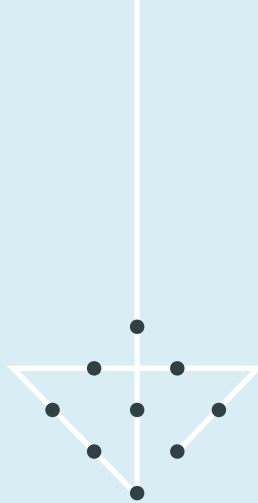
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