

## Glen Sannox & 802 Monthly Report – [July 2022]

### 1.0 General

#### Executive Summary

This assessment of the overall progress for each vessel is made against the programme dates and building sequence set out within the revised level 0 programmes issued on March 23<sup>rd</sup>, 2022. The level of completion reported by FMPG against Glen Sannox is 72 percent and 47 percent for hull 802, ref August 3<sup>rd</sup>, 2022, FMPG progress update. We would point out that neither figure is measured against a project baseline and that for Glen Sannox, a complete bill of materials has yet to be agreed. The advised delivery dates remain unchanged: 801 between March and May 2023, and 802 between October and December 2023.

Both projects are operating safely with no major issues emerging to challenge the output of the production group.

For Glen Sannox (Hull 801), there is slippage in the current commissioning programme. We understand that FMPG have action plans to recover slippage in the commissioning dates and deal with known delays, however unless these are very effective; cost and scheduling targets are unlikely to be achievable in line with the current date constraints. Timely completion of the remaining electrical installation and closeout of design gap issues remain the leading indicators in the critical path analysis. The order of magnitude of delay faced in the electrical installation is reported by the Yard for this period as 26 percent against a planned programme attainment level of 65 percent. As previously informed, the principal electrical contractor has issued during this period its internal revised update to the programme through to completion, the end date of which flags a significant scheduling disconnect in relation to the current yard programmed dates. The Yard has outright rejected the schedule. A revised schedule is expected to be released during week 32. Commissioning progress is currently reported to be 10% complete, but this figure is subjective, only pre-commissioning work has begun. Progress is reportable in the background completion of critical system pipe installations needed in support of the push to start commissioning activities upon the vessels' return to the yard after the current docking period. The governance arrangements needed to expedite the slow turnaround of outstanding design gaps are still insufficient to provide insight as to when a design freeze is likely to be effective. This issue continues to be a significant risk to the project as the level of unprogrammed work remains unquantifiable.

Glen Sannox remains on schedule to complete the first of two dry docking periods. The planned return date to the shipyard is delayed by four days (now scheduled for August 9<sup>th</sup>) because of the late completion of an unrelated secondary vessel also positioned in the dock. The initial in-dock survey performed upon the vessel's arrival in dock following the completion of the vessel's high pressure water wash down was largely successful, with no major additional work items being identified other than the very poor condition of the flat bottom anti fouling coating. The planned work scope is also nearing completion. The recent inclining test results are reported as inconclusive concerning verification of the vessels' dead weight assessment. This is attributed to the number and position of multiple erroneous weight loads that may or may not have been considered in the calculated results. At the time of writing, the yard is claiming a remaining weight margin of 5T within the current weight computation. CMAL is of the opinion that the risks to the vessel not satisfying the deadweight design requirements set out in the building specification ref, section 10 Main Particulars, page 8, section 102, page 12,

and Section 105, entitled Dead Weight, are significant. Ultimately, this reduces the designed cargo carrying capacity. Although not identified as residing on the project critical path, interior and exterior passenger decks continue to be the focus of accelerated work. Subfloor levelling compound is now poured on decks six and seven, and architectural vertical panelling is now at an advanced stage on deck seven.

Outstanding Owners' observation issues and technical design office queries remain under the scrutiny of senior management, the rate of close out has slowed largely due to the ongoing design review process and commitment to the scope of dry dock works.

802 Programme is under review by FMPG senior management team. The Level 0 programme remains largely credible for Hull 802 in terms of structural work completion; however, lessons learned during the construction phase of Glen Sannox are not trickling through as a more robust pre outfitting block stage build philosophy, although we understand FMPG are undertaking design reviews (with which we are participating, and they are updating the outfitting strategy, pipe, insulation and electrical cable installation plans and start dates. As a side note, with the vessel's launch scheduled for February 2023, the time to capitalise on pre-outfitting is now, not after launch, when the vessel will be positioned at the outfitting berth, where craneage will continue to be a limiting constraint. A detailed review of hull 802 is currently underway, involving technical input from the yard, CMAL, and the principal design contractor. We would point out that this level of review is not considered in the current programme, and neither is the time frame needed to produce revised construction drawings. It is unclear what level of change can be successfully implemented without negatively impacting the cost of finishing the vessel or jeopardising the agreed-upon delivery date.

## Owners' Observation Reports 801

The information below has been updated in conjunction with FMPG to reflect the joint review conducted during this reporting period. Significant efforts have been made to ensure that the scope of all issues, as well as the cost of implementation and the impact on the programme, are fully understood.

### OOR status

	All categories	Category 1	Category 2	Category 3
Total Raised	605	368	224	13
Total Closed	450	268	179	3
Total committed	51	42	8	1
Total to close when work complete	58	43	10	5
Total still to resolve	46	15	27	4

Figures updated by Yard 3<sup>rd</sup> August 2022

**Cat 1** - Items, which relate to Safety, Quality, Maintainability and Specification requirements.

**Cat 2** - Item, which relate to poor design, quality or production.

### Key Challenges for the Shipyard

Key known Challenges for the shipyard to meet the programme:

- Installation and termination of the ship's cables.
- Completion of pipework to meet commissioning dates, including addressing pipe clashes.

- Close out of OORs.
- Closure of design gaps.
- Delivery and completion of production drawings and accuracy of production drawings.
- Availability of experienced supervisors.
- Shortage of experience trades.
- Availability of materials.
- Verify Hull 801 Deadweight.
- Lack of familiarity with final stages of finishing the vessels, surveys, documentation, certification.

## 2.0 Changes to Site Supervision Team

The core head count is seven personnel.

## 3.0 Design Changes Approved

Ongoing design changes affecting the constructability of the vessels design are driven exclusively within the Shipyard process to meet regulatory and contracted specification requirements and are not driven by CMAL request for change. All are related to outstanding technical queries and previously unidentified works. Closure of final design gaps is needed, which at this late stage of the project remains a significant risk to the project.

## 4.0 Agreed Changes to Delivery Date

Updated programme delivery dates are set out in section one above.

## 5.0 Agreed Changes to Price

(Note of changes; changes to be authorised & recorded in Contract Variation Register)

## 6.0 Changes Awaiting the Owner's Approval

(Note of changes outstanding for approval by the Owner in excess of Buyer's Representative authority as stated in Consultancy Agreement Cl. 3.4)

## 7.0 Surveys / Inspections Weeks 26-27 & 28

Verification surveys of the as-built standard are listed below. Too few call outs are currently made at this late stage of either project.

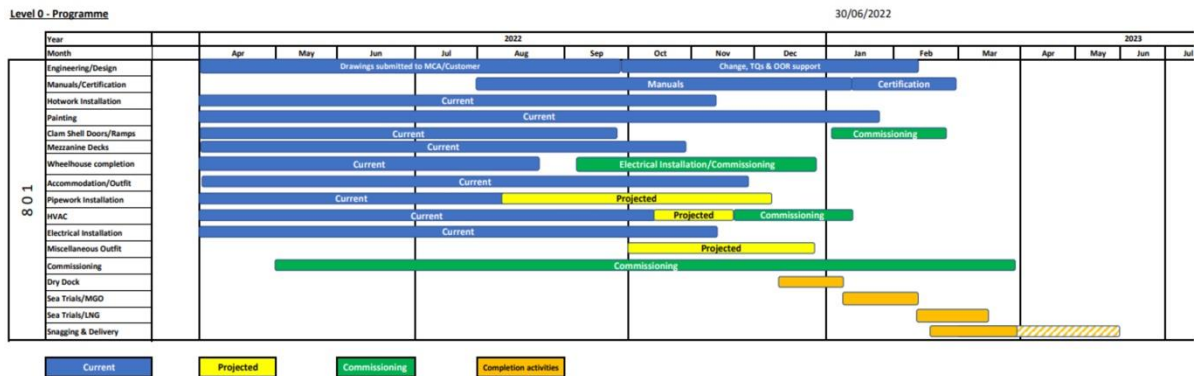
No	Survey/Inspection	Comments
1	801 - Deck 05 - Forward Mooring Deck deformation checks.	Accepted
2	801 - Deck 07 - Ad-hoc cabling surveys.	Accepted
3	801 - Bridge deckhead area pre-insulation checks continue.	Accepted
4	801 - Decks 5, 6 & 7 Ceiling height checks.	Accepted
5	801 - Port Forward external shell deformation checks (damage at quayside)	
6	802 - Forward Ramp foundation seats MPI checks witnessed.	Accepted
7	802 - A3-5/A4-5 unit butts/seams inspection survey completed.	Accepted
8	802 - Forward Mooring Bollards, Chain stoppers and Windlass seat and collision chocks surveyed.	Accepted

## 8.0 Progress Against Programme – Glen Sannox & Hull 802

Reference – August 3rd 2022 FMPG Project Report



### Level 0 Programme



The 801 project is making progress toward its objectives. However, completing background outfitting and pre-commissioning activities remains intensely time-consuming.

Commissioning has commenced and is moving in the right direction, although the start is much slower than planned.

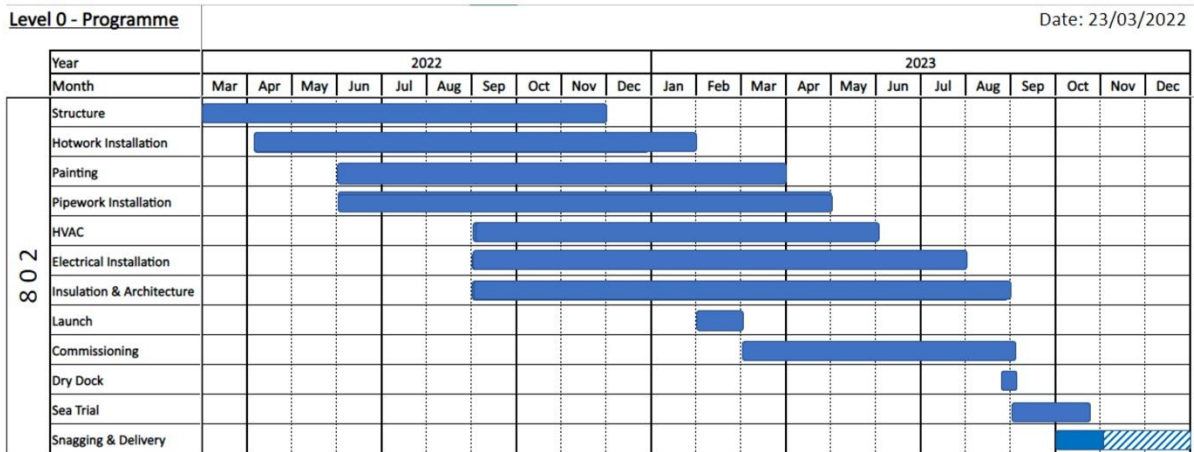
The total float of the project and how it relates to the critical path must now be carefully managed especially during the three-week docking period.



## Progress Against Programme - 802



### 802 Cardinal Date Programme



Reference - March 2022 FMPG Project Report

The majority of work focus remains structural, higher levels of outfitting await the outcome of the detailed model review that completed week 32.

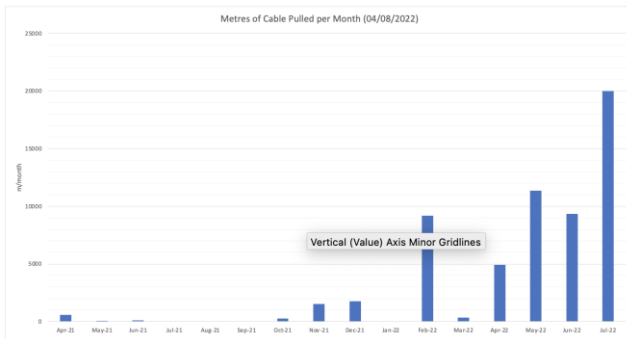
### Inspection Call Outs

The frequency with which inspections are called are made to verify completed production works, remains concerningly low. This should be seen as a significant KPI and now as a potential risk that flags the volume of work that has still to be completed. The majority of inspections calls made this period are against first fix background outfitting installation for cable containment and Class/thermal insulation installation. No call are yet made to inspect any completed system on board.

### Hull 801 Outfitting Works

#### Electrical

Cable pulling has continued throughout the vessel in both the machinery and passenger accommodation areas. The shipyard reports that circa 60,000m of cable has been installed out of a total of 242,856m, representing a 26 percent completion level. Although the meterage of installed cabling has increased this period the planned level of percentage complete should be up around 65 percent. The impact of this delay is significant as it effects almost all completion works throughout the vessel.



## 801 - Dry Dock Coating

- UHP washing removed marine growth, algae, and slime.
- Mussels and crustaceans were lower than in August/September 2020.
- The topside UHPW blasting began at 17:00 on Friday, July 15. Saturday, July 16th, Crawler Blaster began on the starboard topside, near the funnel.
- A second squad with hand-held UHPW lances focused on the bow from frame 110 on starboard to frame 110 on port.
- July 18, the whole bow, including the bow door and topside paint above the boot topping line, was removed.
- July 20, all of the starboard side, transom, and bow had their old coating removed from the transom to frame 110 on the port side. The required steel preparation standard requires removing any old and loose coating burn damage, grease oil, and other pollutants and cleaning the substrate to its original blast profile. This has been accomplished in the above categories.
- July 21, UHPW jetting or blasting to 40,000 PSI began on the port top sides from frame 20 to frame 50 from fender line to aluminium kilo connecting region on deck 5. Areas of damage and separation from 2020's prior dry-docking were highlighted for full blast cleaning with a powerful mite small spot blaster and copper slag grit.
- Work began on the starboard side Thursday morning, July 21, the blast standard was between Sa 2 and Sa2.5, a bright metal finish with an 80 to 90 micron profile.

## Miscellaneous Coating-Related Items

- The lost flat bottom tank marks were found and marked on the port and starboard sides. V9/WB/V\* will be welded back onto frame 101 (not 41) before spot blasting and painting.
- Seven docking plugs were inspected. Oil tanks, water ballast tanks, and void spaces.
- The hull's stainless-steel pins and high tensile steel bosses had no thread damage or pitting corrosion. Clean and spray Anti-Lock Thread on the plugs before reinstalling.
- The forward middle thruster pod has been removed, and a Wartsila-rebuilt pod is in the shipyard. Next Friday's report will include more refurbishment updates.
- The three sea chests were in good shape, except for burn damage on the deck head and some bulkheads from welding support pads in the Gen Room, Eng Room, and Aux Machinery Room. It will be disked and fixed, but the writer doesn't feel this would have been necessary if the yard had marked sea-chest regions as no-hot-work zones.
- When the rope protectors were removed, the bolted anodes were not suitable for purpose.

- This has caused corrosion around the main propellor bosses. These sections may be repaired and coated before leaving the dock yard, and [redacted] has approved the minimal repairs.

### **Tunnel Thrusters & Stabilisers**

- All of the bolt-on anodes in the stabiliser fin boxes are outdated, so we'll weld on new ones.
- 16 lower Tunnel Thruster Anodes P&S will be replaced in AGW13.
- Rudder anodes can be replaced in January 2023.
- All old topside coating removal and 10,000 PSI freshwater cleaning was finished by 13:10 on Tuesday, July 26.
- The first spray coat of Jotamastic surface tolerant anti-corrosive red-tone aluminium intergrade coating began at 15.30 PM.
- The coating was applied by two sprayers, one port and one starboard, who had good application skills and wet film thickness combs to ensure an even application from the spray tip to the substrate.
- Coating was applied at 280 microns wet to ensure a DFT of 180 to 200 microns.
- After checking topside DFT, we had a 220-micron average.
- The ship's vertical sides have burn and mechanical damage to repair. On the port side, 45m<sup>2</sup> had to be blasted back to bare metal and 15m<sup>2</sup> had to be sweep blasted to remove loose paint to a feathered edge.
- After washing, Jotamastic Surface Tolerant Aluminium Red tone was sprayed on.

### **1475m<sup>2</sup> Flat Bottom**

- Detachments and poor coat adherence have been addressed with the yard.
- The coatings stripped during dry dock proved this bad behaviour. We noticed the first primer coat soft 5.5 years after application, and the remaining 5 coats separated from it. This suggests solvent entrapment, or that the primer wasn't dry when the second coat was applied.
- Glossy and carbonised patches have been detected underneath removed coatings, indicating poor surface preparation.
- Grit and grime were adhered to the coating that had peeled off, suggesting it hadn't been cleansed before application.
- In order to restore these sections, the [redacted] representative recommended blasting all visible steel to SA2.5 then sweep blasting loose and detached coatings to ensure fresh coatings could adhere.
- 20% of the area was blasted, and 60 to 65% was sweep blasted.
- During dry dock, 85% (1,250 m<sup>2</sup>) of the flat bottom was stabilised.
- The remaining 15% is not thought to be sufficiently damaged to further delaminate, further adhesion testing will need to be performed.
- The flat bottom is what could be expected of a vessel five- or six-years old.
- To restore the flat bottom coating to how it was when the ship was new, the entire region must be blasted to SA2.5 and a full system applied under the correct weather conditions and overcoating times.
- All of the old topside coatings were removed, and a new comprehensive system was applied.

- After applying a two-coat anti-corrosive system (AC), a stripe coat of AC black around the black topside finish and a stripe coat of AC white around the white topside finish were applied to weld joints and problematic spray regions.
- The DFT of the anti-corrosion solution was examined before applying XP Hardtop Polyurethane. The typical readings were between 300 and 320 microns, which was a bit higher than required.
- Areas that needed treatment got XP Hardtop white and black when the weather was good. This is on FMPG Inspection papers.

### Vertical Sides and Flat Bottom Underwater Area

- It was determined to spot blast areas where the paint had fully peeled off and sweep blast other areas to a firm base.
- This resulted in spot blasting 20% of the flat bottom and sweep blasting 60 to 65%.
- After the AC system was built on bare steel, DFT checks ensured they were safeguarded. A thorough sealing coat of Jotamastic 90 W.G. Aluminium AC was applied to 80% of the flat bottom and vertical sides to keep out moisture.
- Readings on AC were 650 microns on average. After ensuring the steel was suitably protected, we sprayed on a thick coat of Seamate Tie-coat plum before spraying Seaquantum Light Red. The underwater area was coated with Seaquantum Dark Red Anti-fouling.
- DFT measurements ranged from 1250 to 2000 microns, which is not satisfactory hull surface roughness (HSR) Coatings are well-sealed and have no gaps.

### Wheelhouse Windows

The decision to reduce the dimension of the 'T' profile flat bar stiffening around the window openings has yet to be acted upon. Completion of the outstanding welding of the port side mullions has also to be acted upon.

### Clam Shell Doors

Under the guidance of the makers technician, fine tuning of the door hinge geometry is now complete, both doors now open fully. Hot work continues to fix hinge foundation points.

### LNG Bunker Tank Valve Attachments

Work by the [redacted] technician to install new equipment (control valves) in the Tank Connection Space (TCS) of Glen Sannox is ongoing, the same work on Hull 802 is rescheduled because of availability of spare gear and has yet to be started.

### 801 – Mechanical Completion in Support of Commissioning

No	Issue
1.	Flushing of the stern tubes and associated pipe work is underway.
2.	Completion of the lube oil transfer piping system
3.	Main Air Start System now complete, testing is scheduled week 32
4.	Sea Water system pipe installation scope now completed
5.	HT/LT Cooling system installation scope nearing completion by the contractor, borescope images of pipe work cleanliness sighted 17th June, particulate contamination clear. The yard will now move to complete the installation prior to pickling and flushing.
6.	Main air start system missing spool pieces still required.
7.	Emergency Generator fuel oil system upstream of the service tank



No	Issue
	now tested.
8.	Work continues to complete the remaining system installation in both main funnel areas.
9.	Ballast system pipe installation continues, shell mounted overboard still to fit.
10.	AXILOCK discussion still ongoing, decision to change out 166 couplings fitted in the forward part of the vessel looks to have been made by the yard.
11.	Glycol system has not progressed this period.
12.	Chilled water, extent of current installation under review
13.	[redacted] will attend the yard 4th – 6th July to oversee verification of the safety setting of the emergency generator, before first start up
14.	[redacted] technicians continue to perform pre-commissioning works in support of the 690V switchboard. [redacted] technicians have completed the set-up of the communications interface.

### 801 Structural Hot Work

Work continues focusing on the remaining ad hoc structural works on all decks such as the starboard side-shell fairing, belting-fenders, Panama eyes, side openings needed to fit spray removal ventilation grills as well as fitment of the handrails in way of the steering gear walkways.

### 801 – Machinery Spaces 801

The installation of general service air distribution and the remotely actuated cross-over valves between the sea water cross-over and the ballast main has been the primary focus during this reporting period. There is a design review underway that calls into question the current sizing of the main engine fuel oil booster pumps. More information will be provided as it becomes available. The ongoing fuel transfer and booster pump modifications, which are being driven by class acceptance issues, have only resulted in the fabrication of the newly dimensioned equipment seats. Several surveys have been conducted in collaboration with the yard in order to focus attention on key outstanding components of issues raised under the OOR system. Poorly positioned valves and access to maintain equipment and perform routine watchkeeping duties all necessitate a significant amount of corrective work.

### 801 - Accommodation Outfitting

Work currently focuses on the installation of insulation of deck 6 groundings in way of window boxes. Vertical paneling on deck 7 is progressing on both the port and starboard sides of the passageway. Panels are being cored on site, A class insulation is ongoing on decks 7 (rework) and 6 (new insulation). Doors continue to be fitted on deck 3 at port and starboard L11 positions and on 02dk provision store areas.

### 801 HVAC Installation

The first fix is now largely complete on decks 5,6 and 7. 6 & 7; the standard of installation remains satisfactory.

## Hull 802

### Block Fabrication

1. Consolidation work to complete erection joints of Bow Units 49/50/51 continues.
2. Deck five aluminium unit A6/5 erection onboard continues also now continues.
3. The three units forming block A8/5 have now been surveyed.
4. Fit up now complete for the port and starboard 'A' frame brackets.
5. Construction of the Forward Mooring area bulwark units 87/88 continues.
6. Fitting of Panama eyes now underway
7. Fabrication of aluminium unit A7-6 has started.

### 802 Hot Works

Structural Works Continue in the following areas:

1. Many more sub-assemblies have been lifted onboard pre fitted with pipe penetration compensation pieces already fitted despite the review process currently underway with the principal design contractor.
2. Ongoing modifications to bulkhead L11 are in progress.
3. Erection joint program continues for units A3-5 & A4/5.
4. Fitting of bimetallic interface joint to base of unit A6/5 in progress.
5. Prep-work continues base areas of Unit A4-5/A5-5/A6-5
6. Construction of units 85/86 is ongoing.
7. Unit A7-5 x3 lifted onto the vessel.
8. Fabrication of unit A9-5 nearing completion, awaiting call for survey.
9. Fabrication of unit A10-5 nearing completion, awaiting call for survey.
10. Units A5-6 now part lifted on to vessel
11. Unit A6-5 lifted onboard vessel.

### 9.0 Next Stage Payment Due

n/a

### 10.0 Forthcoming Period Events

### 11.0 Tests & Trials Due

#### Glen Sannox

Description	Date
Summer Docking	15th July to 07 August 2022
Winter Docking	23rd Jan to 31st Jan 2022
Sea Trials	25th January 2023

## Hull 802

Description	Date
Dry Docking	August - September
Sea Trials	01st October 2023

### 12.0 Risk Register Update – Glen Sannox

The risk register update shared as part of the May FMPG project report does not consider the significant threats posed by the continued risk of late cable installation (pulling/packing/termination). Consideration is only given to the reinstatement of the 27km of legacy cables removed from the vessel in February 2022. No consideration is given to the main body of cable installation that extends ship wide, totalling 200km. The current rate at which cable is pulled presents a serious threat to the project. The same concern also extends to the threat posed by the time scale to manufacture and install the remaining pipe spools needed to complete the essential systems of hull 801, ref May 2022 FMPG Project Report.

### **13.0 Safety & Environmental**

No issue to report this period

Print Name: [redacted]

Signature: **[redacted]**

Date: [12 August 2022]