

A	14.11.2024	ISSUED FOR CONSTRUCTION		MCM	TT
REV.	DATE	DESCRIPTION		MOD.BY	CKD.BY
<b>REVISIONS</b>					
 		SHIP	ORKIM POWER		
		TITLE	BWTS INSTALLATION GUIDE		
SCALE N.T.S.	DRAWN CHECKED	MCM TT	DRAWING NUMBER GSPL-P1513-GE-0002	HULL NUMBER --	REV A
SIZE: A4	VERIFIED	GC	DATE:- 14.11.2024	SHEET:- 1 OF 26	

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## 1. Introduction

This report intends to describe the installation of Lees Green Ballast Treatment System retrofit on board 'ORKIM POWER'.

The ballast system is operated by two Ballast Pump of 200 m<sup>3</sup>/hr x 2 bar, located in the engine room starboard side and port side. A 1 x 350 m<sup>3</sup>/h Lees Green Ballast Treatment System is considered as per Owner's request.

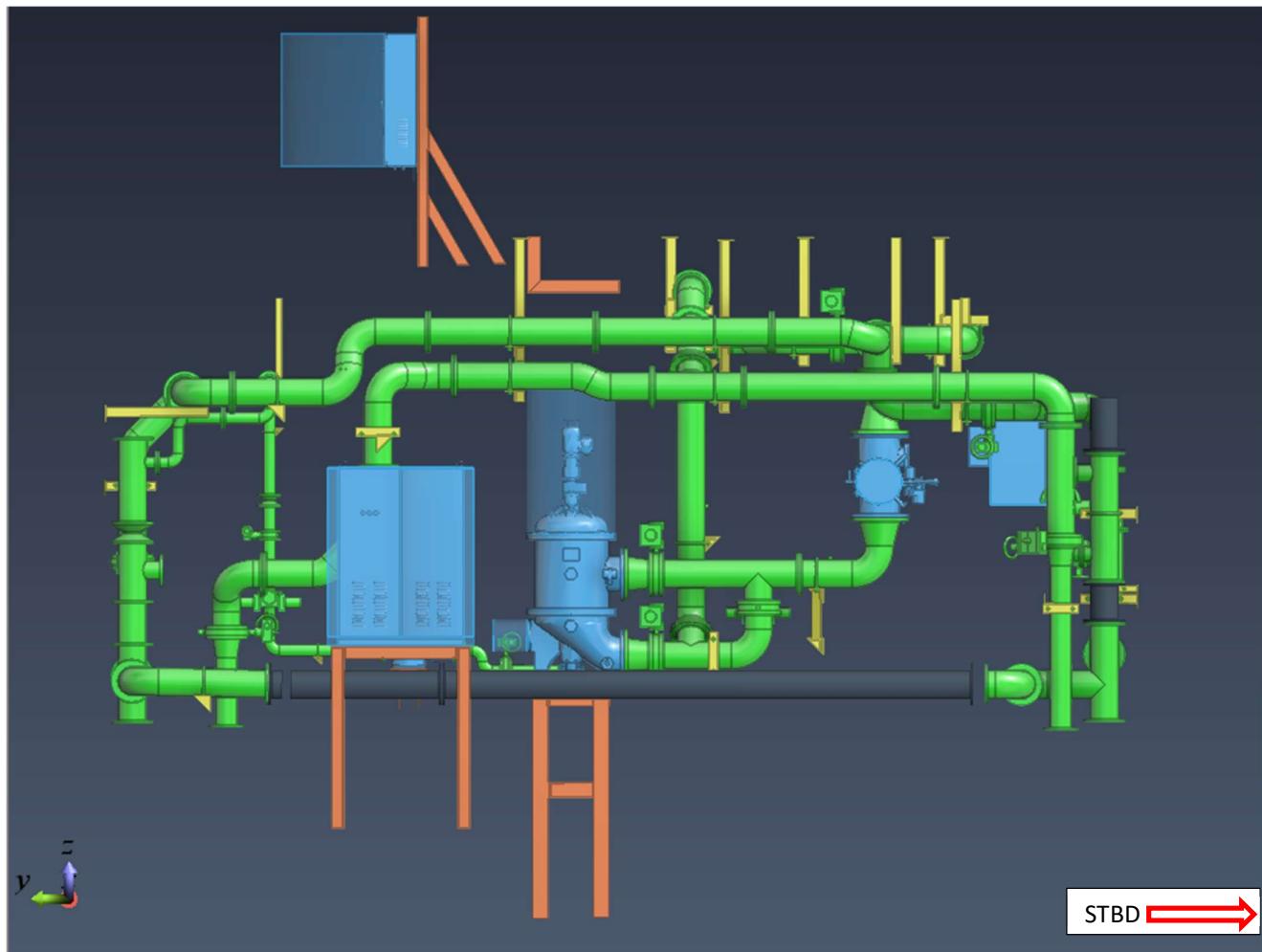
BWT system from Lees Green is integrated into the existing ballast system with some existing piping modifications.

This Lees Green BWT system consists of the following components.

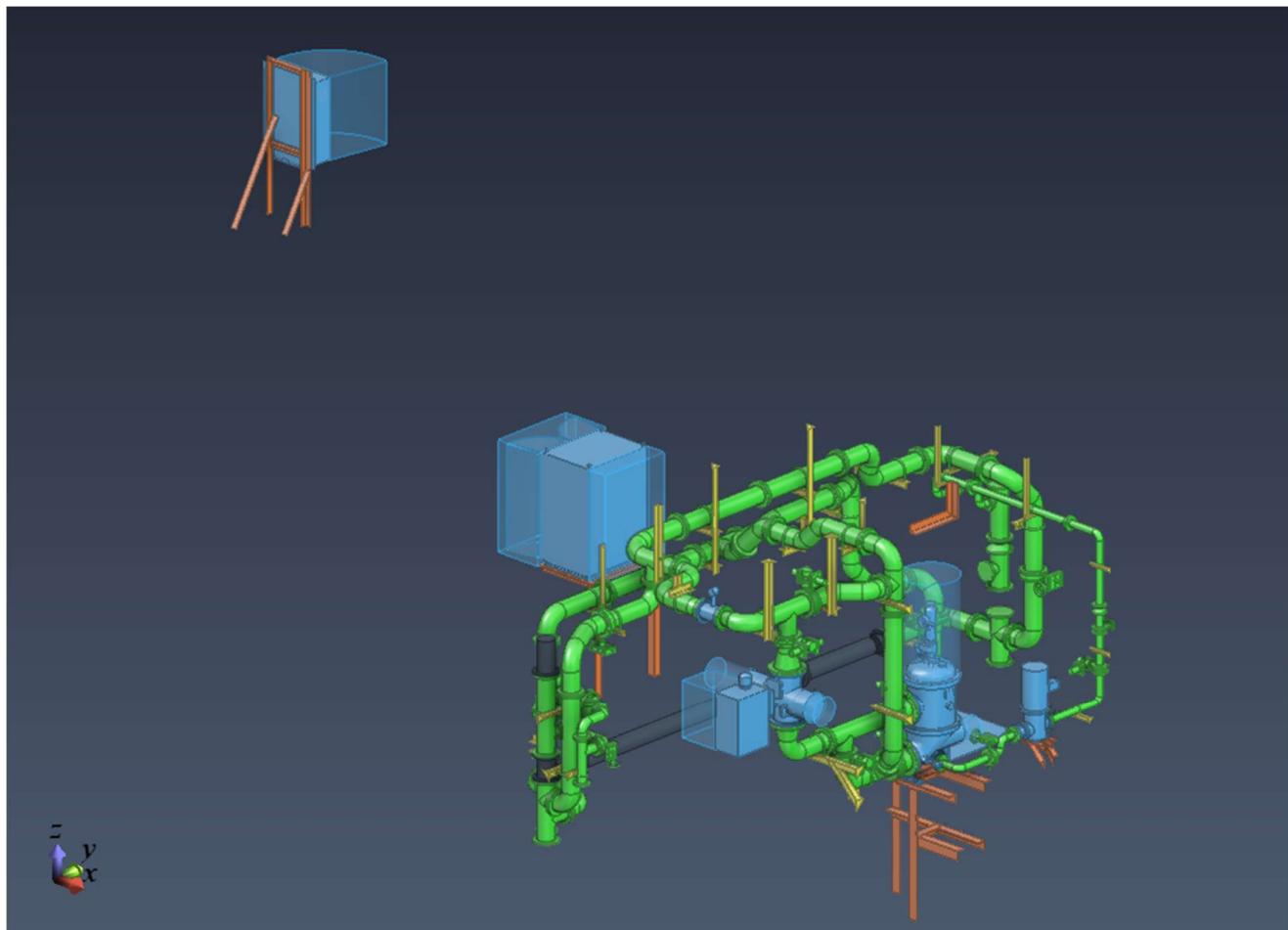
- Filter
- UV Assembly
- Back flush pump
- Control Unit
- Pressure Control Box
- Power Cabinet

The BWTS equipment Filter, U.V Assembly, Back Flush Pump and Pressure Control box are arranged in the Pump Room. Control Unit and Power Cabinet are arranged in the Engine Room.

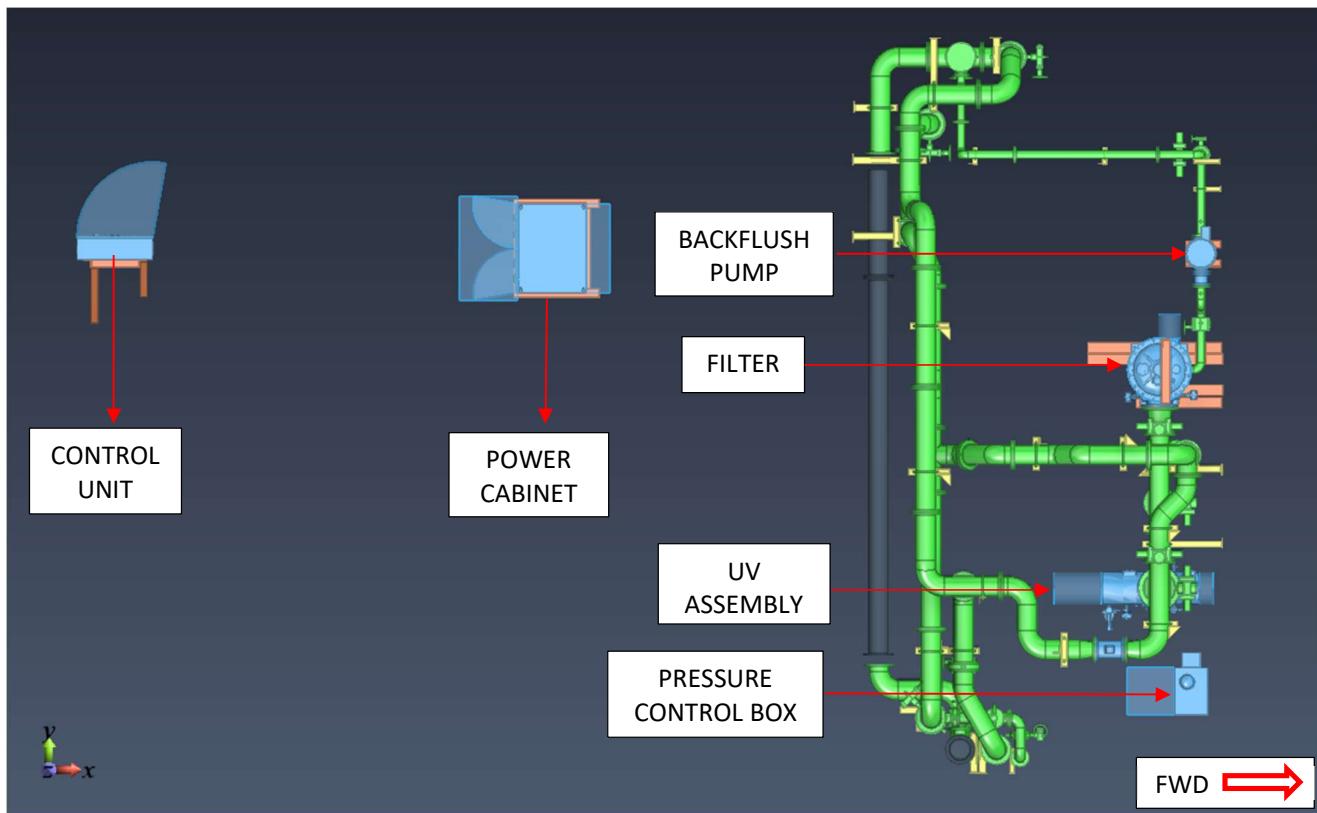
## 2. BWT System Arrangement



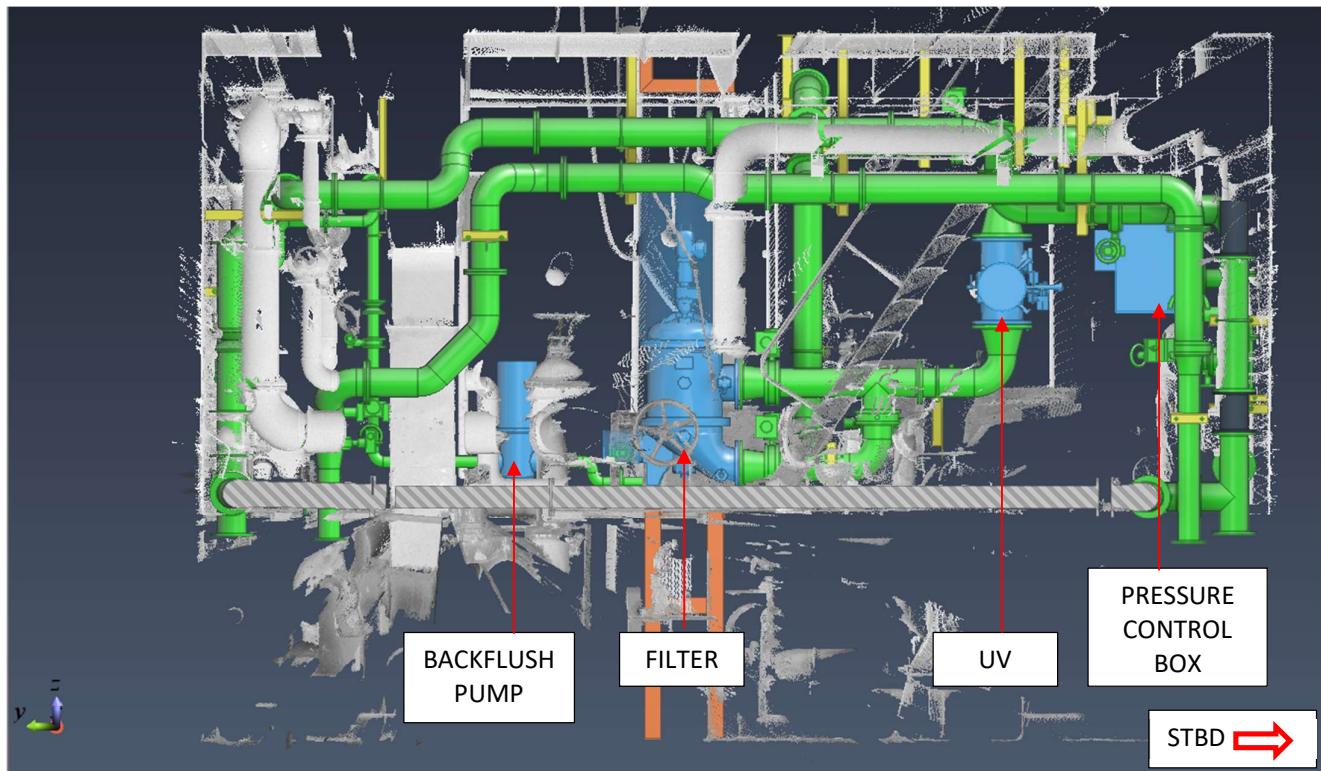
Ballast water treatment system overall layout (View looking FWD.)



Ballast water treatment system overall layout (Isometric View)

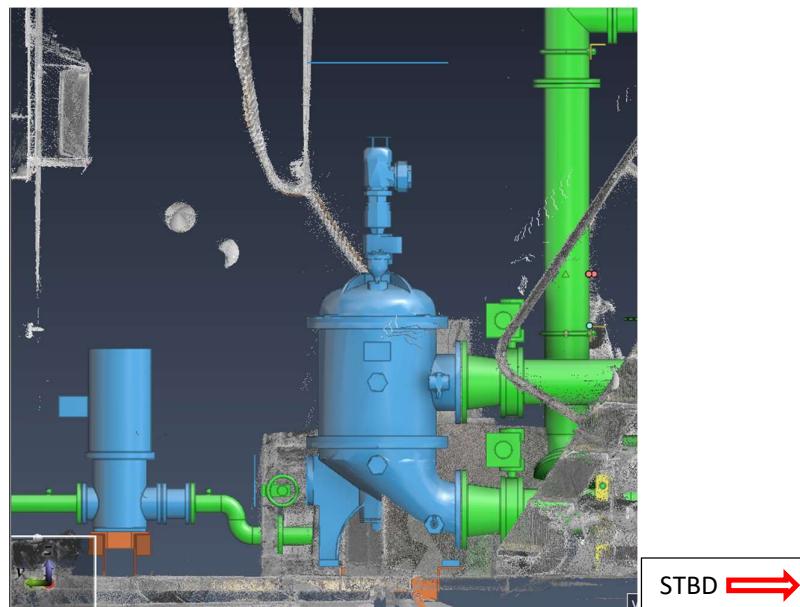


Ballast water treatment system overall layout (Plan View)



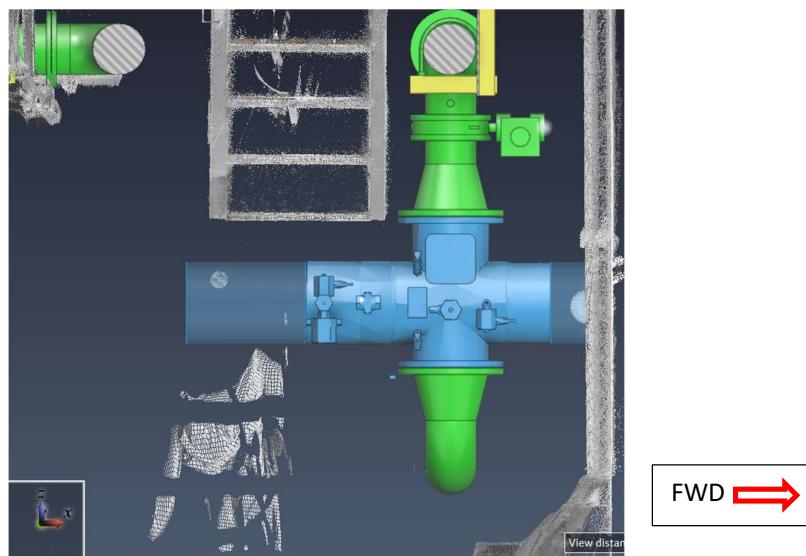
Ballast water treatment system overall layout (Looking FWD)

## 2.1 Location of Filter and Backflush pump



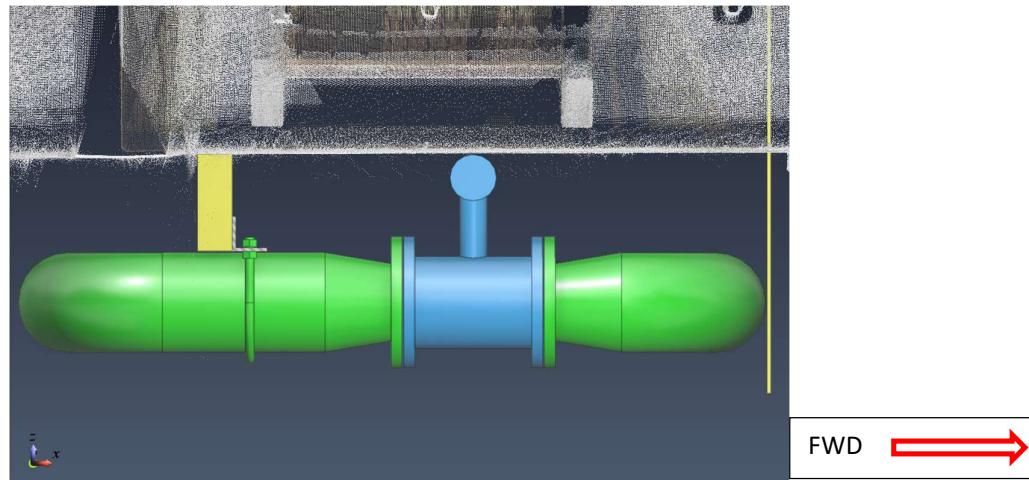
Arrangement of Filter and Back Flush Pump (View Looking Fwd.)

## 2.2 Location of UV Assembly

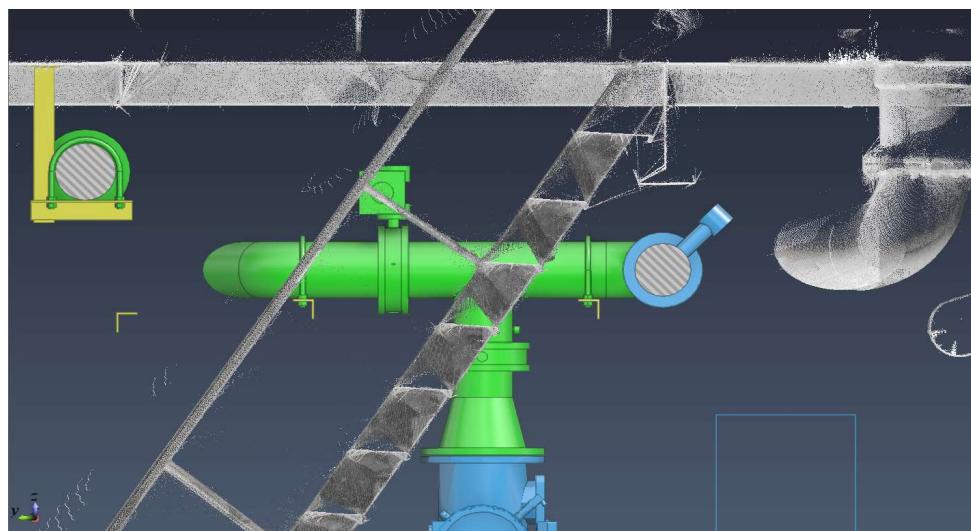


Arrangement of UV Assembly  
(View Looking Port.)

## 2.3 Location of Flow meter

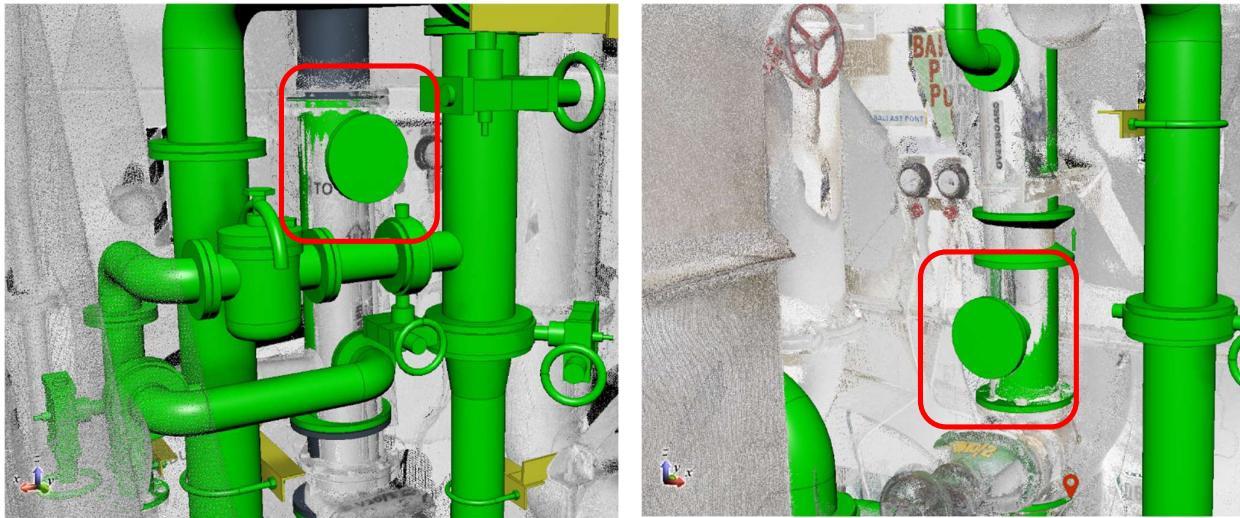


Arrangement of Flowmeter (View Looking Port)



Flowmeter Orientation (View Looking FWD)

## 2.4 Location of Sampling Point



Location of Sampling Point

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### 3. Electrical

From the Vessel's electric load analysis, it is observed that sufficient power is available for the installation of BWTS system.

BWTS Electrical equipment are placed in the model as per the available spaces. Existing switchboards need to be modified to accommodate the additional BWTS Load. Details of those are updated in the wiring diagram of power

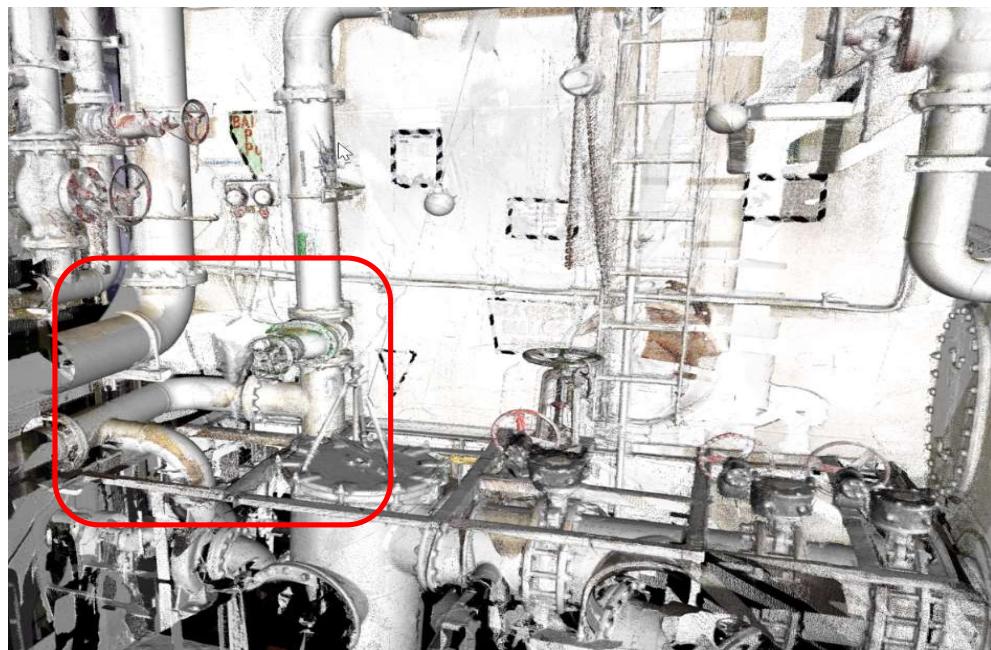


#### 4. Points to Note

- Existing Ballast Pump Port side discharge to be modified in the marked location.



(View Looking from Top, Before modification.)

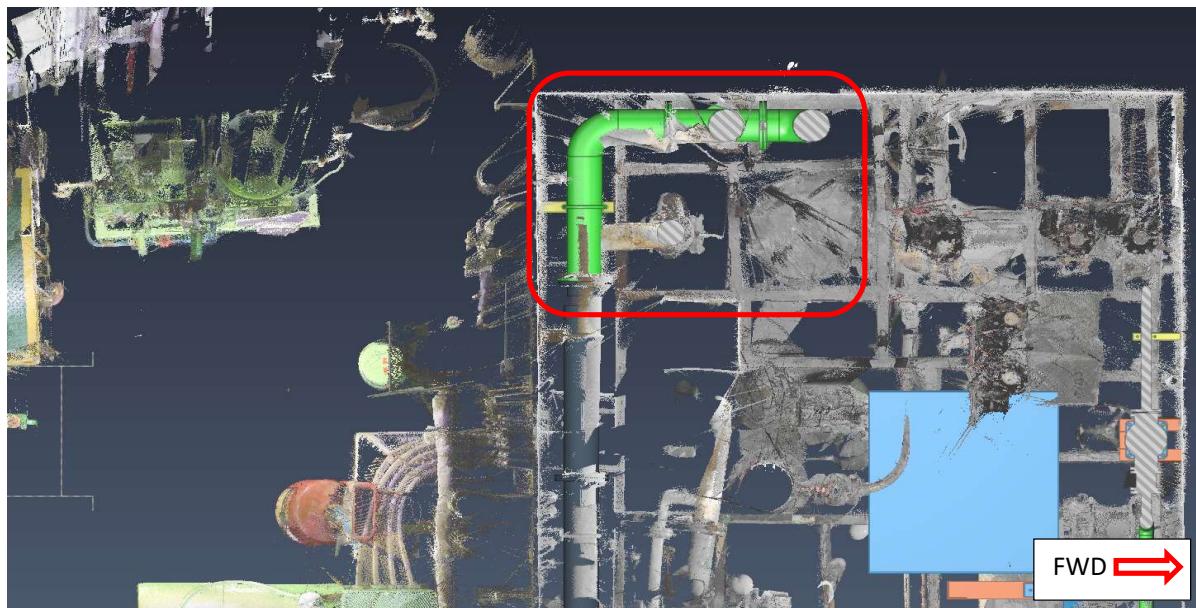


(Before modification.)



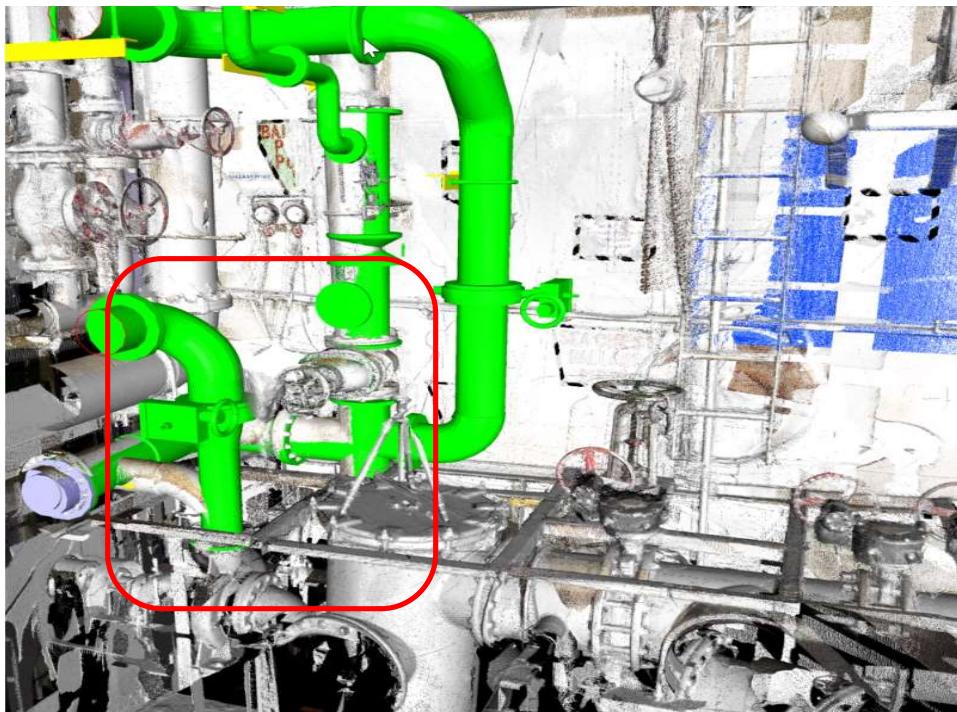
(View Looking From STBD, After modification)

FWD



(View Looking from Top. After modification)

FWD

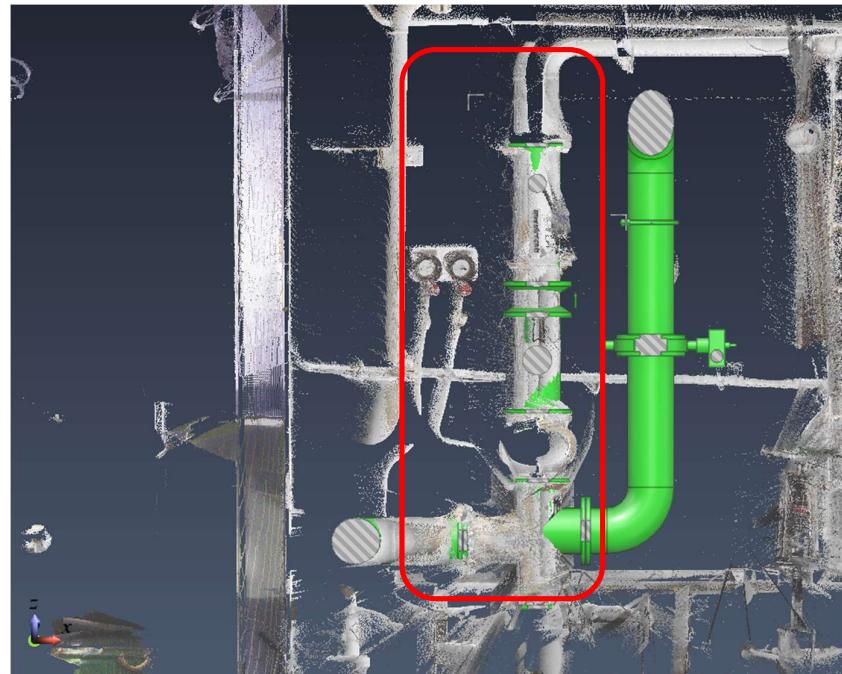


(After modification)

- Existing Port side ballast overboard pipe to be modified as shown in the marked location.



(View Looking From STBD, Before Modification)

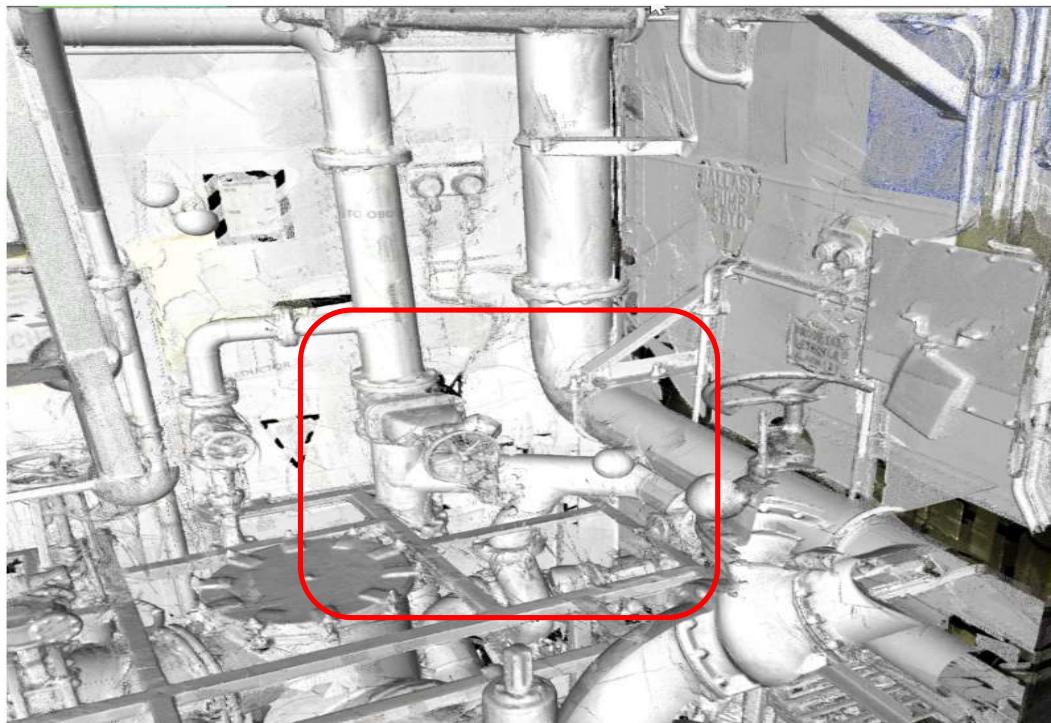


(View Looking From STBD, After Modification)

- Existing Stbd side Ballast Pump discharge side to be modified in the marked location.



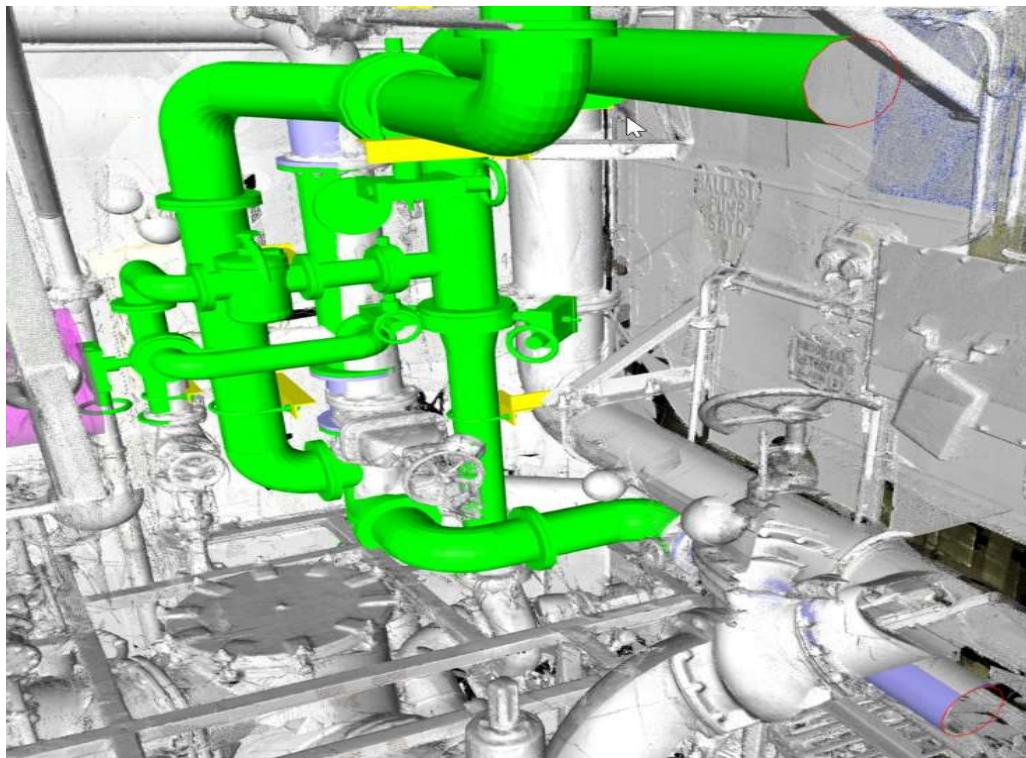
(View Looking From TOP, Before Modification)



(View Looking From TOP, Before Modification)

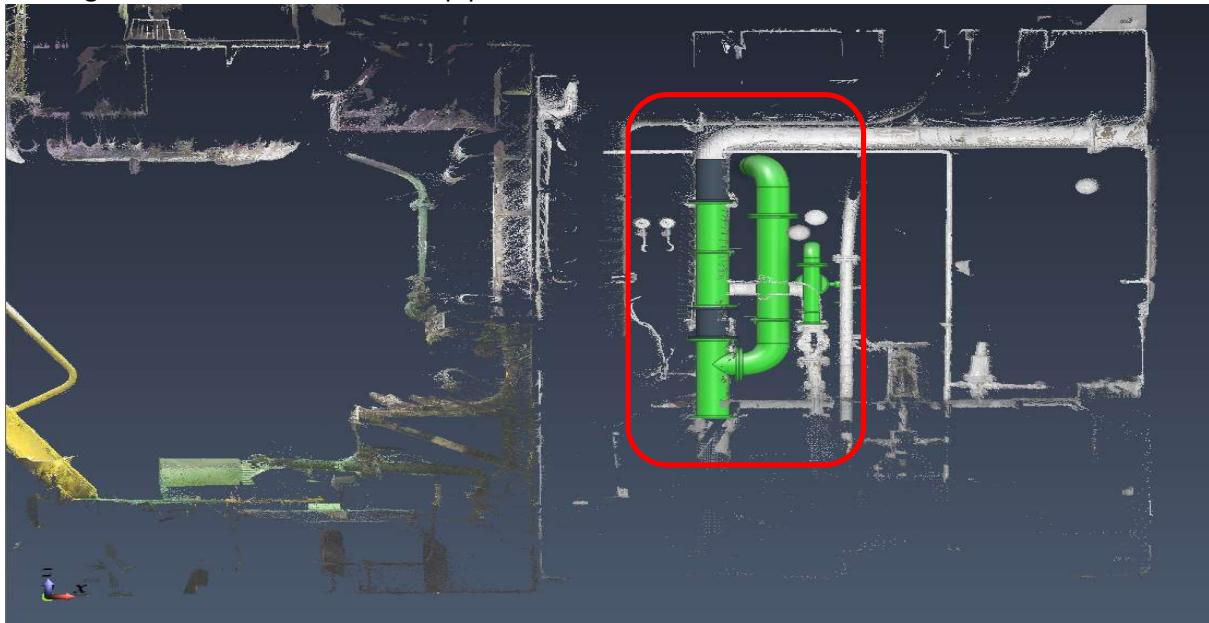


(View Looking From TOP, After Modification)

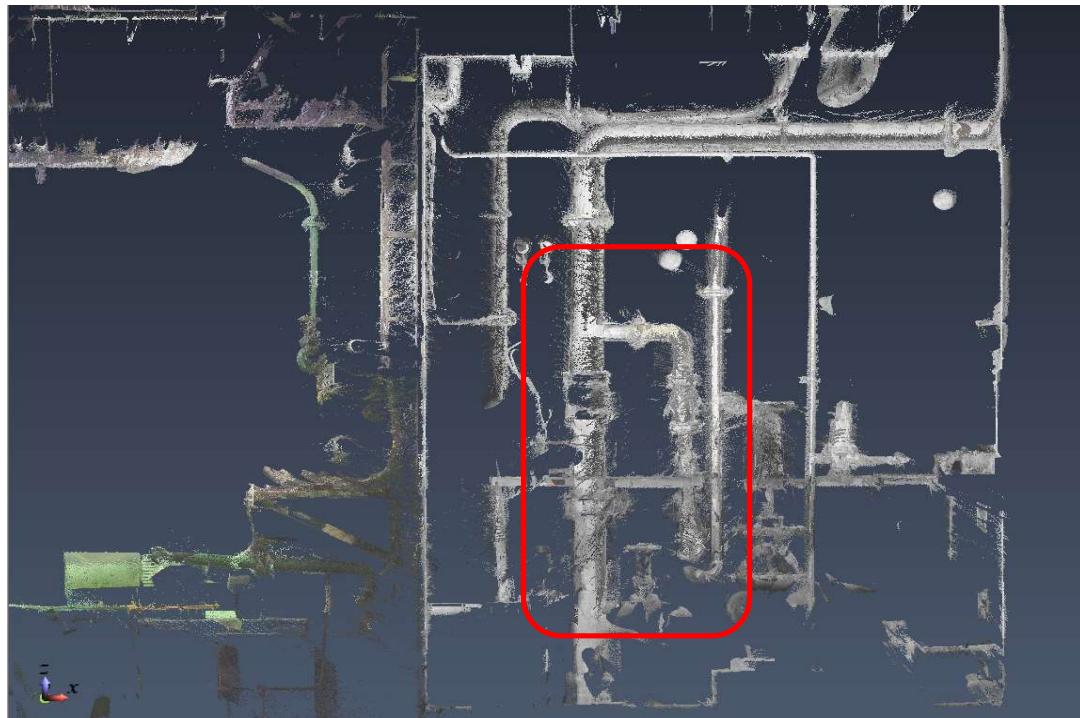


(Perspective view, After Modification)

- Existing Stbd side ballast overboard pipe to be modified as shown in the marked location.

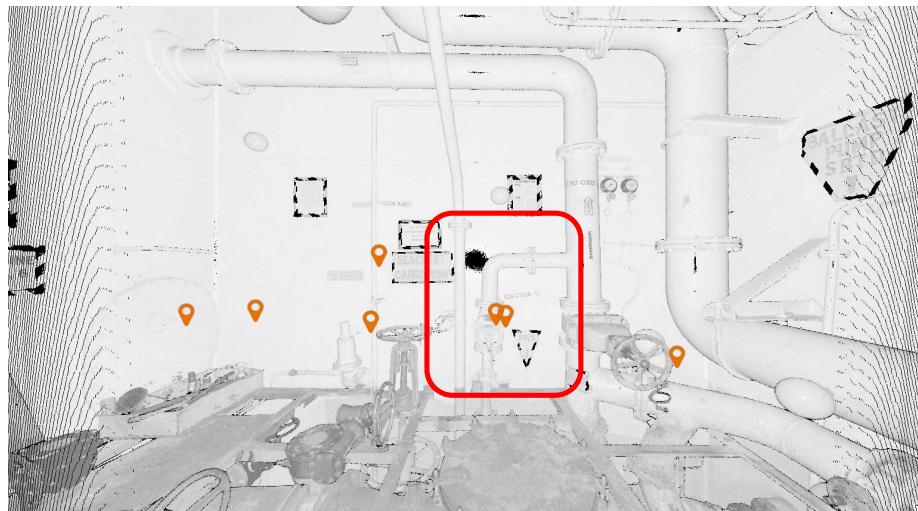


(View Looking From STBD, After Modification)

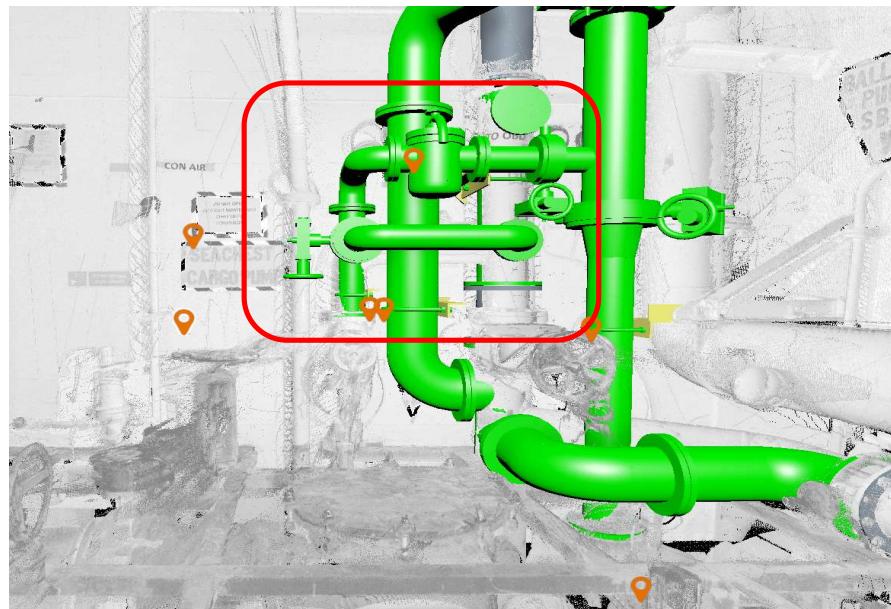


(View Looking From STBD, Before Modification)

- Existing ejector pump discharge flange to be suitably modified in the marked location.

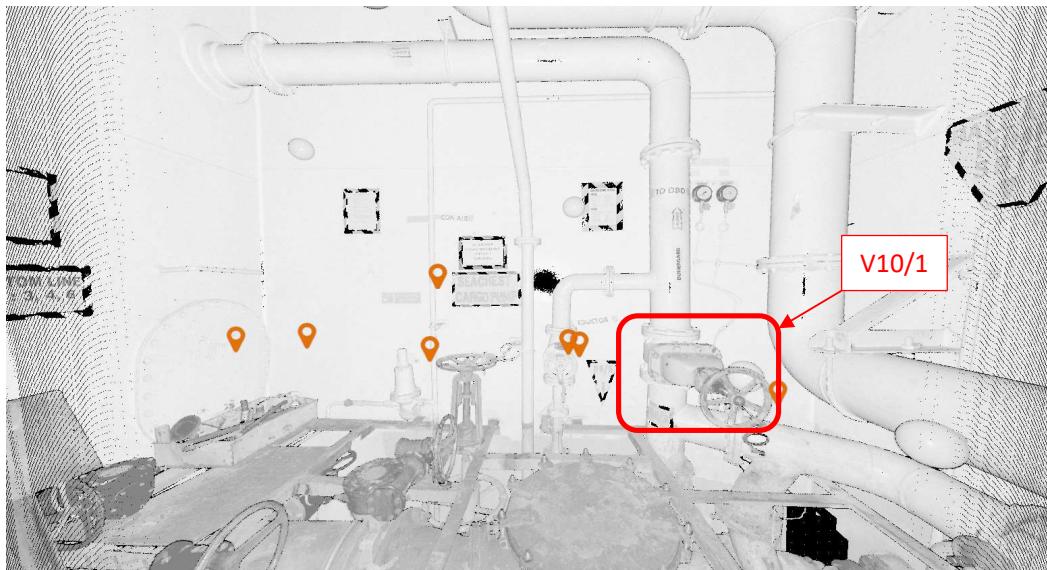


(View Looking from Port, Before Modification)

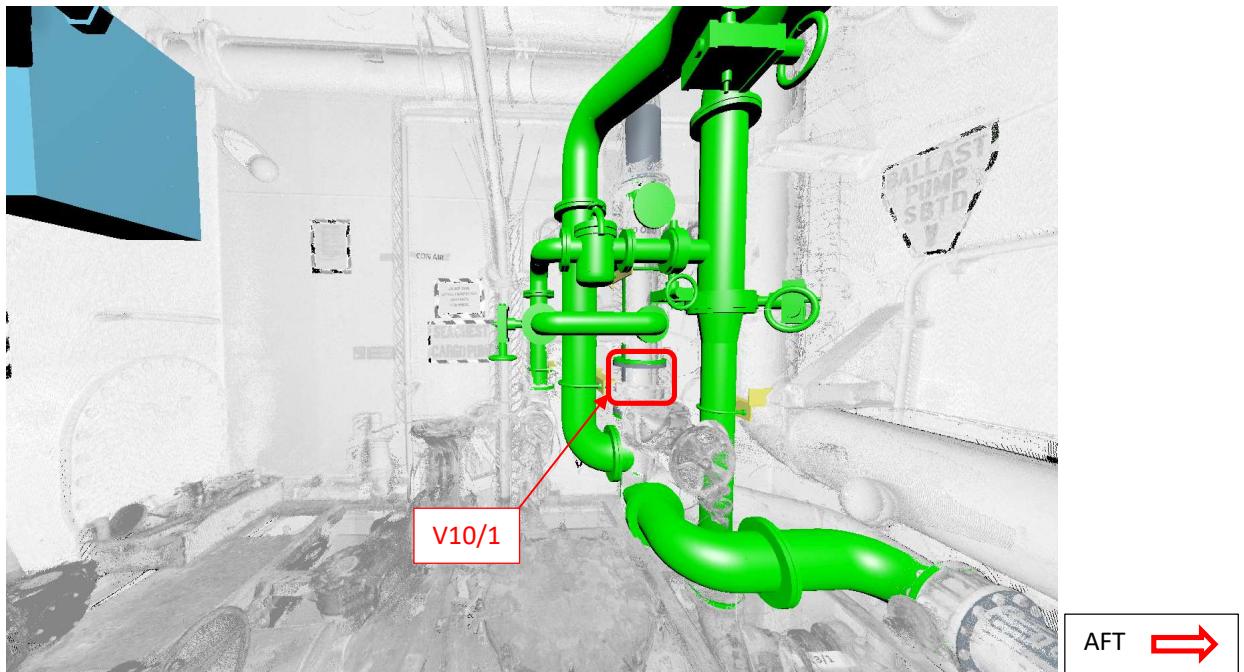


(View Looking from Port, After Modification)

- Existing valve V10/1 relocated.



(View Looking from Port, Before Modification)



(View Looking from Port, After Modification)

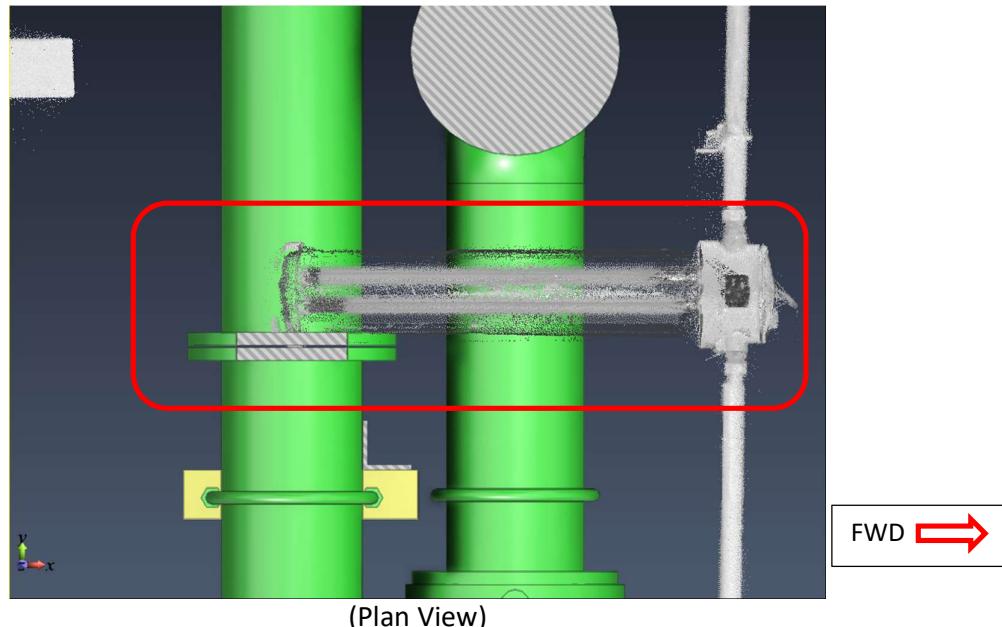
- Existing grating in way of new BWTS pipe suitably modified at site.



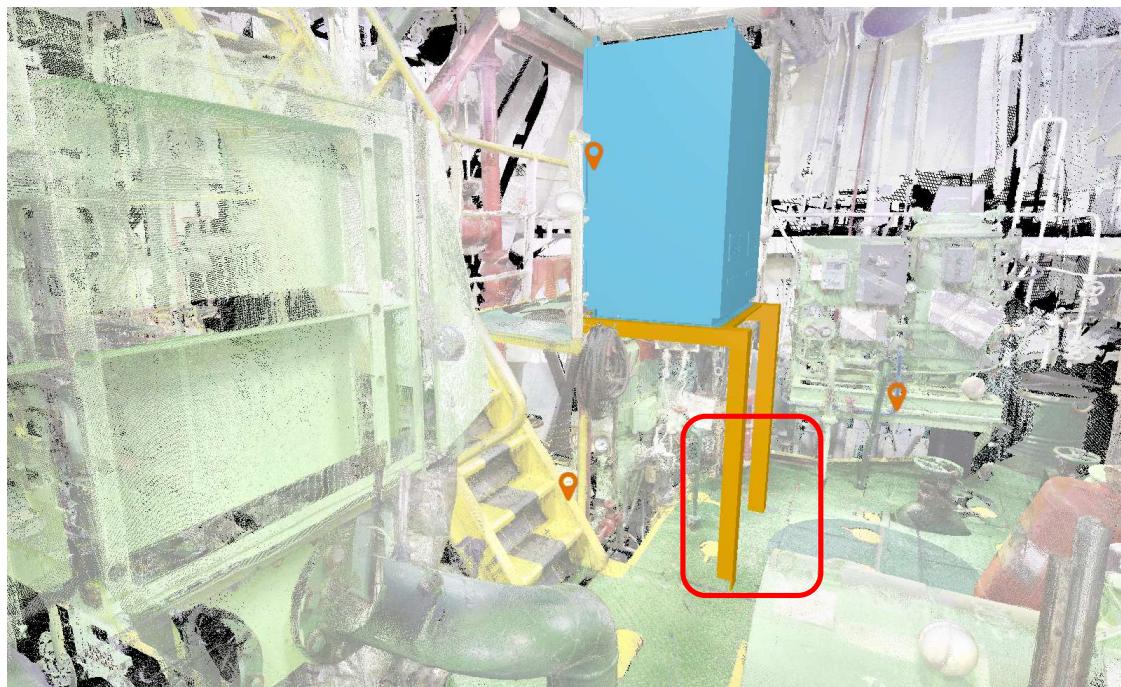
- Existing grating in way of new BWTS equipment suitably modified at site.



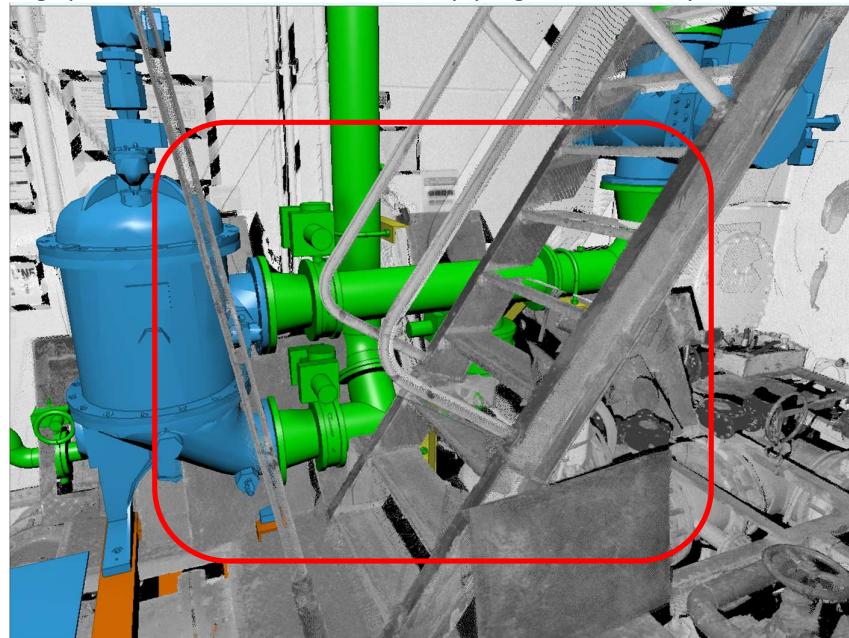
- Existing electrical light in the marked location to be suitably relocated at site



- Additional stiffening to be done suitably at site in way of the BWTS electrical cabinet foundation.

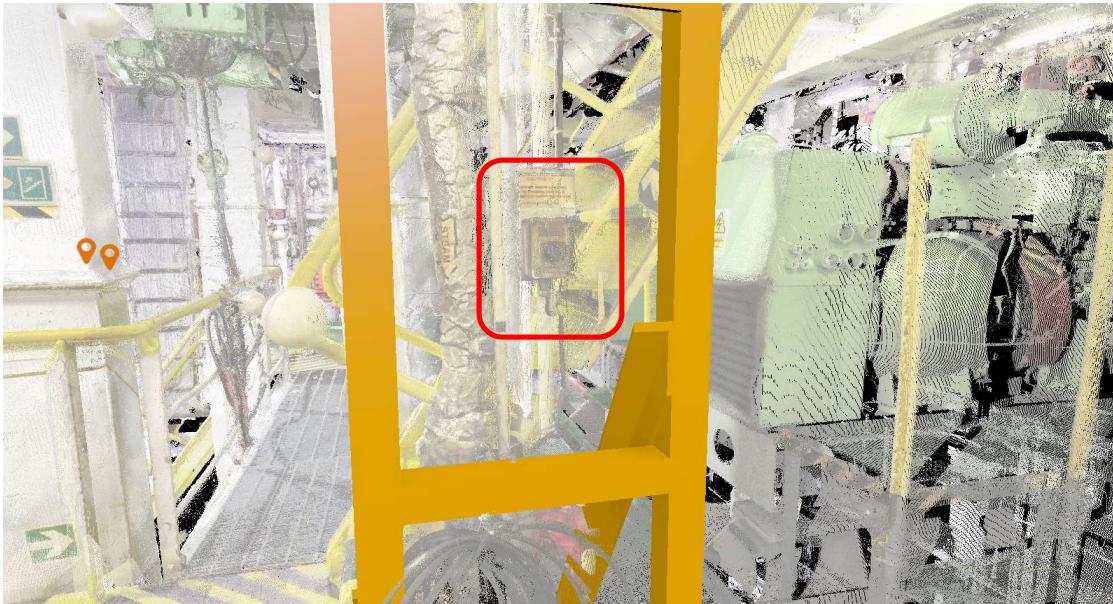


- Existing spare near Filter and associated piping to be suitably relocated onsite.

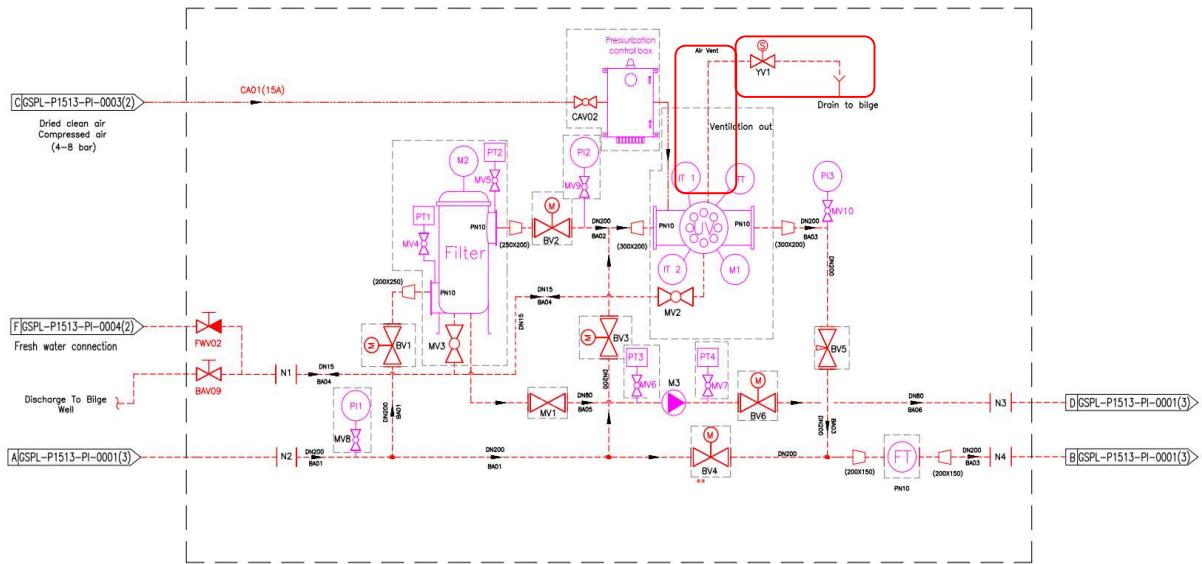


(View Looking FWD.)

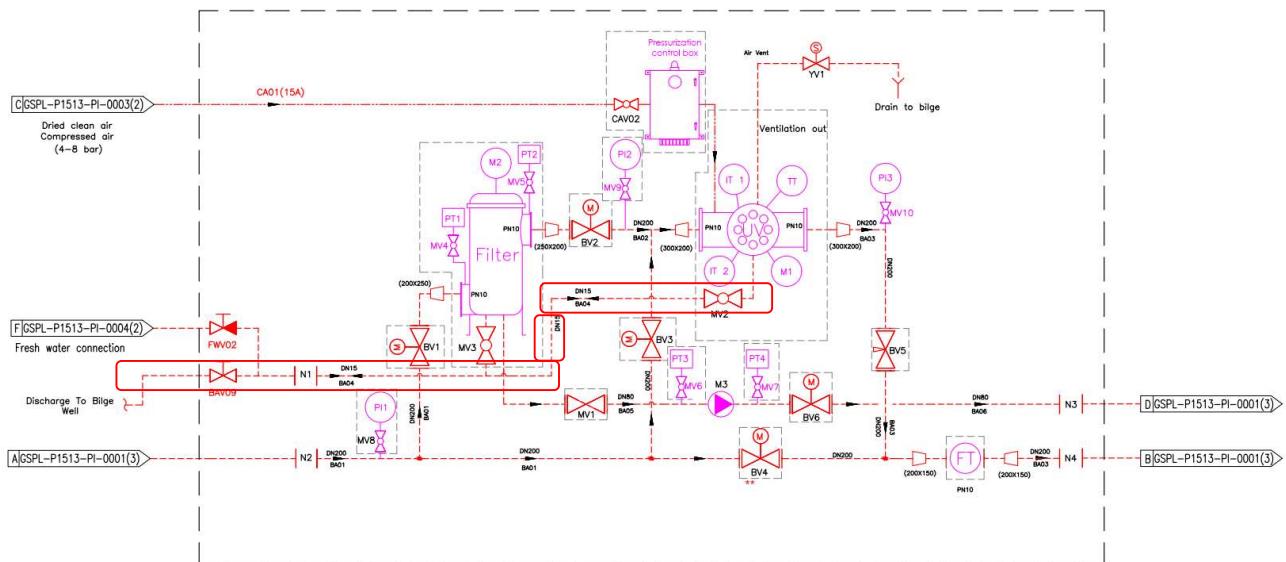
- Existing electrical switch in way of new Control unit to be suitably relocated at site.



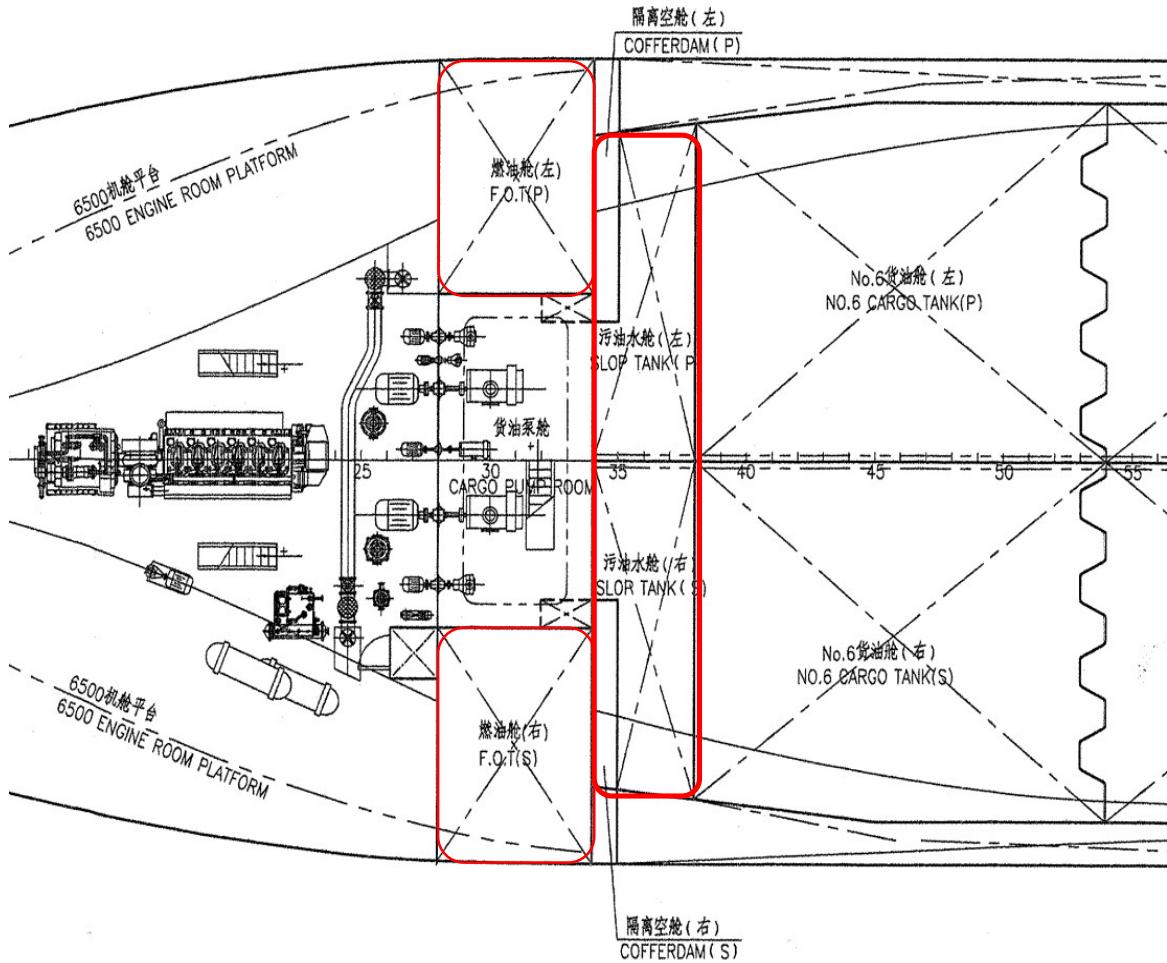
➤ Air vent line suitably routed at site



➤ BA04 line suitably routed at site



- The below marked tanks are to be made gas free, to facilitate the welding of the support for the new BWTS piping.



## 5. Remarks

- In general, existing gratings, grating supports and handrails to be modified in the areas where new BWTS equipment are placed and same shall be carried out as per site convenience.
- Some existing pipe supports to be cut and modified during the installation of new BWTS system and same to be carried out suitably at the site.

- The utility connections tapping from Fresh water and Compressed air systems as detailed in the P&ID are to be suitably Tie in and routed at the site.
- Please provide carlings as per site requirement, to the foundation area
- In general, the drain lines are suitably terminated at the site to the bilge wells.
- In the locations where valves are inaccessible, provisions are to be provided to access the valve like reach rod or small platforms suitably at the site.

## 6. Conclusion

Efforts have been made to minimize modifications to the existing ballast system as well as existing ship elements.

As the ballast Pump efficiency curve was not available, flow analysis was not able to be performed to determine the pressure loss of BWTS.

To conclude, 1 X 350 m<sup>3</sup>/h Lees Green Ballast Treatment system can be installed on board “ORKIM POWER” keeping the above-discussed points under consideration.