Industrial Placement
Interim Progress Report 2

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with

Griffon Hoverwork Ltd.
Design Department
SOUTHAMPTON

28th July 2014 to 24th July 2015

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SUMMARY

LIST OF SYMBOLS, ACRONYMS AND TECHNICAL TERMS

12000TD	A twelve tonne payload hovercraft, currently being built, that will operate as a passenger ferry from Southsea, Portsmouth to Ryde, Isle of Wight.
Archived parts	Redundant parts used in a previous version of an assembly, kept for traceability.
BOM	Bill of materials. It consists of the raw materials, sub-assemblies, sub-components, parts and the quantities of each needed to manufacture an end product
DXF file	A file compatible with all CAD software used in the industry that gives a 2D representation of a part.
eDrawing	A file compatible with all CAD software used in the industry that gives a 3D representation of a part.
GRP	Short for 'glass-reinforced plastic', this is a strong, lightweight material that the wheelhouse was fabricated from. It is also known as fiberglass.
Installation drawing	A multi-page drawing created to help with the installation of a complex part into the craft. Commonly used in Stage 2, and to a lesser degree, Stage 3.
Lloyd's Register	This organization inspect, provide quality assurance and certifications for ships and other vehicles in the machine industry.
OEM components	Short for 'original equipment manufacturer', these are parts brought in from external companies to use in the hovercraft.
Passenger cabin	The area in which passengers were situated while the craft was in operation.
Production job card	A document that gives the detail of the job to be performed in the production facility.
SolidWorks	The CAD modelling software currently used by the company.
12000TD Build Stage 2	Officially called "Module Outfitting", this stage covers the creation of cabin parts, such as decks, engine frames and wheelhouses.
12000TD Build Stage 3	Officially called "Hovercraft Integration", this stage covers the installation of several parts designed in Stage 2, as well as electrical, thermal and protective work done on the craft. By the end of this, the hovercraft should be nearly complete.
Wheelhouse	The area from which the craft is piloted.
Work package	Created and controlled by one detail designer, this is a folder that consists of an assembly, all the parts needed to make this assembly and CAD drawings. It also contains DXF files, eDrawings, PDF's and archived parts, as well as a production job card and a BOM. Each task generally assigned is a work package relating to a specific craft.

INTRODUCTION

Griffon Hoverwork Ltd. is a British hovercraft manufacturer based in Merlin Quay, Southampton since the beginning of 2011.[1] Created from the merger of Griffon Hovercraft Ltd. and Hoverwork Ltd. in 2009 by the Bland Group, Griffon are at the forefront of hovercraft development and currently have over 200 craft operating in 40 countries spanning five continents.[2] These craft are used in a variety of applications such as search and rescue, passenger ferries and military operations, as well as other non-standard uses such as cricket pitch covers and crop sprayers.[3]

WORK, PROJECTS AND ASSIGNMENTS

Griffon Hoverwork have been going through some tough times in the period since the last report was written, and a number of redundancies have been made throughout the company – including my senior industrial supervisor, Jason Mardell. Further cuts have also been made in the modelling department, as the total number of people in this department is now four (including myself and another placement student). As a result of this, there hasn't been as much original design work in this period, as a lot of the work assigned has been picked up from departing employees, as well as finishing off work packages by producing CAD drawings to release to production.

A selection of some of the projects undertaken in this period is detailed below. Some assembly drawings are also included in ***Appendix A***.

FIT MAIN CABIN DECK (12000TD – STAGE 2)

One of the most important jobs picked up was the completion of the main cabin deck of the hovercraft. Using a unique 'planking' system, the design of this was for the floor to securely clip together, negating the need to rivet every plank. When picked up, the front of the planking needed a redesign as the front end of the craft had been changed. This eventually ballooned into a remodeling job, as the BOM every model produced was not working due to how this component had been previously modelled. An installation drawing was also produced.

FABRICATE MAST (12000TD – STAGE 2)

Another job picked up was converting the current mast model, which was to hold several pieces of important navigation equipment, into a production model that complied with Griffon's internal standards. As well as this, an assembly drawing showing how this unique design was meant to be put together had to be produced. This is a job that will be carried over to Stage 3, which will include the fitting of brought in parts to the mast.

DRAWINGS & OEM COMPONENTS (12000TD – STAGE 2)

As man power was down, the design office was unintentionally split into two sections; designers and CAD drawing production. As a result of this, the majority of the work done in this period was drawing up designs to send to production. Because a lot of these designs were unique, a lot of work packages in Stage 2 came with an installation drawing to help Production. Examples of these can be seen in ***Appendix A***.

OEM components are parts brought from an external buyer, which then required a model to see if they were appropriate for the craft. These parts involved liaising with the electrical engineers, as the majority of items modelled were electronic components.

WHEELHOUSE JIG (12000TD – STAGE 2)

One of the few original designs in this period was a jig for the wheelhouse tub used in the craft. Because the wheelhouse is made of GRP, a mold was to be made which allowed this to be created. However, contained within the wheelhouse were holes for four mounts which would later be used when lifting the wheelhouse onto the hovercraft. The position of these holes was critical – if they were out by a small amount, then the wheelhouse wouldn't fit onto the mounts designed earlier on the hovercraft. The role of the jig therefore, was to maintain the position of these mounts while the mold was being made.

To make this design slightly harder, only stock metal was to be used in the design and fabrication of this part. This created difficulty, as quite often the required size wasn't available.

STRUCTURAL FIRE PROTECTION (12000TD – STAGE 3)

One of the most important jobs at the beginning of Stage 3 was the fitting of structural fire protection to the wheelhouse. As this is a key part of the craft in terms of safety, there was an engineering standard that had to be closely followed whilst designing this part of the craft. This is a part that will also be surveyed by the Lloyd's Register.

CONCLUSION/REFLECTION ON THE PLACEMENT SO FAR

With circumstances rapidly changing in this time period, a lot of work was produced in a short period of time. Saying this, this allowed me to work with Production a lot more, as a lot of the work I produced in this time period directly affected what happened on the shop floor. I also think that some of the drawings produced in this time period were the best I've ever done.

I think that my personal development has increased a lot during the last couple of months, as I begin to see how the Design Office directly affects the actions of production, especially with regard to tolerancing and giving clear instructions on drawings. I also had a chance to produce drawings for a sales proposal to Nigeria, as well as mentoring incoming work experience students for the duration of their stay with the company.

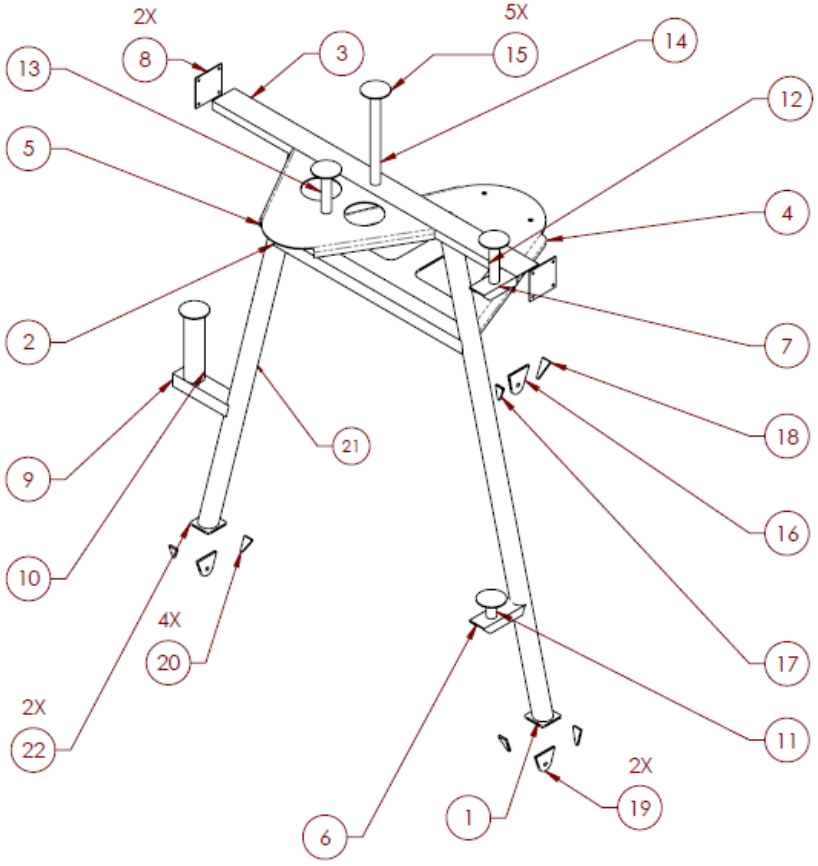
Stage 2 required the most work of any of the four build stages of the hovercraft; in early January, the modelling department started to move onto Stage 3. This should take a lot of pressure off the modelling department, as the majority of the work in this stage consists of installing OEM and electrical components. I am also due to start running the ECR system in February.

REFERENCES

1. http://en.wikipedia.org/wiki/Griffon_Hoverwork
2. http://www.griffonhoverwork.com/about-us.aspx
3. http://www.shippingandmarine.co.uk/article-page.php?contentid=15908&issueid=454

APPENDIX A

ITEM NO.	PART No.	REV	DESCRIPTION	Qty	PBS No.	NOTES
1	12000-22-02-0010-01-01	A	PORT MAST SUPPORT PIPE	1	140	
2	12000-22-02-0010-01-02	A	MAST CROSS CHANNEL	1	140	
3	12000-22-02-0010-01-03	A	MAST TOP CROSS CHANNEL	1	140	
4	12000-22-02-0010-01-04	A	MAST SAT ANTENNA BASE	1	140	
5	12000-22-02-0010-01-05	A	MAST HOVER LIGHT BASE	1	140	
6	12000-22-02-0010-01-06	A	MAST LOWER NUC LIGHT CHANNEL	1	140	
7	12000-22-02-0010-01-07	A	MAST UPPER NUC LIGHT CHANNEL	1	140	
8	12000-22-02-0010-01-08	A	MAST FABRICATION VHF ANTENNA MOUNTING PLATE	2	140	
9	12000-22-02-0010-01-09	A	MAST FABRICATION AIS ANTENNA CHANNEL	1	140	
10	12000-22-02-0010-01-10	A	MAST FABRICATION AIS ANTENNA SUPPORT PIPE	1	140	
11	12000-22-02-0010-01-11	A	MAST FABRICATION LOWER NUC LIGHT SUPPORT POST	1	140	
12	12000-22-02-0010-01-12	A	MAST FABRICATION UPPER NUC LIGHT SUPPORT PIPE	1	140	
13	12000-22-02-0010-01-13	A	MAST FABRICATION MAST HEAD LIGHT SUPPORT POST	1	140	
14	12000-22-02-0010-01-14	A	MAST FABRICATION ANCHOR LIGHT SUPPORT POST	1	140	
15	12000-22-02-0010-01-15	A	MAST FABRICATION NAV LIGHT BASE	5	140	
16	12000-22-02-0010-01-16	A	MAST FABRICATION SUPPORT POST ATTACHMENT LUG	1	140	
17	12000-22-02-0010-01-17	A	MAST FABRICATION SUPPORT POST ATTACHMENT WEB	1	140	
18	12000-22-02-0010-01-18	A	MAST FABRICATION SUPPORT POST ATTACHMENT WEB	1	140	
19	12000-22-02-0010-01-19	A	MAST FABRICATION WHEELHOUSE ATTACHMENT LUG	2	140	
20	12000-22-02-0010-01-20	A	MAST FABRICATION WHEELHOUSE ATTACHMENT WEB	4	140	
21	12000-22-02-0010-01-21	A	STBD MAST SUPPORT PIPE	1	140	
22	12000-22-02-0010-02-02	A	MAST FABRICATION SUPPORT POST BASE PLATE	2	140	



GENERAL NOTES:

1. SEE SUB-ASSEMBLY AND/OR PART DRAWINGS FOR FURTHER DETAILS
2. ASSUME CONCENTRIC RELATIONS BETWEEN CIRCULAR SHEET AND PIPE UNLESS STATED OTHERWISE
3. ASSUME MID-POINT RELATIONS BETWEEN PIPE AND CHANNEL UNLESS STATED OTHERWISE
4. WIRING HOLES TO FACE AFT. ROTATE PIPE IF NECESSARY

GENERAL TOLERANCE NOTES:

1. TOLERANCES IN ACCORDANCE WITH GHES-009

WELDING NOTES:

1. WELD IN ACCORDANCE WITH GHES-008 CLASS 3
2. ALL WELDS TO BE CONTINUOUS UNLESS STATED OTHERWISE
3. ALL GAPS TO BE FILLED WITH WELD WHERE APPROPRIATE

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	INITIALS	DATE	NOTES
DRAWN	IA	14/11/2014	
APPROVED	AP		

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES

DIMENSIONAL TOLERANCES:

MACHINED COMPONENT:	±0.25
FABRICATED COMPONENT:	±0.50
SMALL ASSEMBLY (<300mm):	±0.50
LARGE ASSEMBLY (<1000mm):	±1.00
LARGE ASSEMBLY (>1000mm):	±2.00
ANGULAR:	±0.5°

THIRD ANGLE PROJECTION

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SCALE:1:6

SHEET 1 OF 4

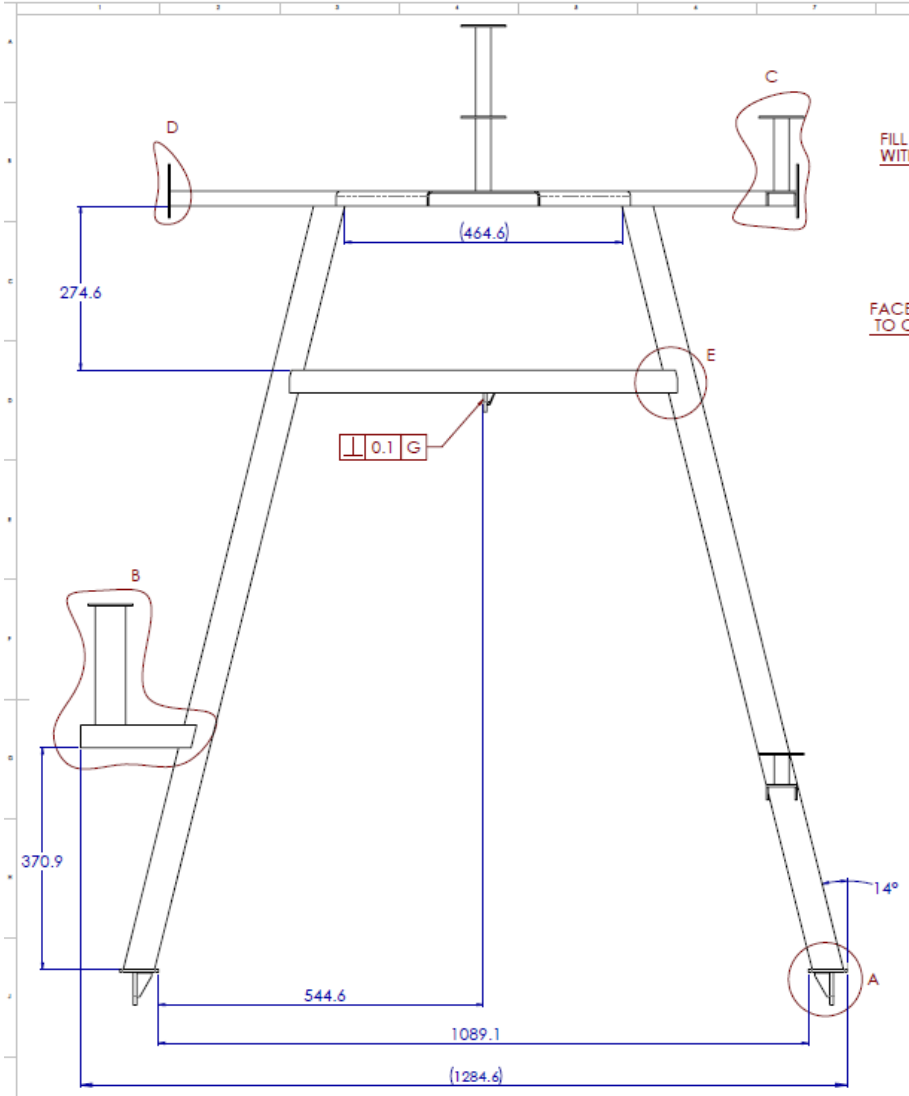
REVISIONS

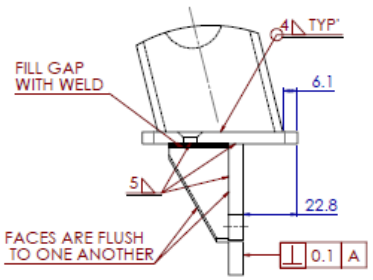
REV.	DATE	DESCRIPTION	REVISED BY	APPROVED
A	05/11/2014	NEW ISSUE	IA	AP

REVISION:	PAPER SIZE:	WEIGHT (Kg):
A	A1	9.88

PART NO:
12000-22-02-0010-01

TITLE:
MAST MAIN FABRICATION





DETAIL A
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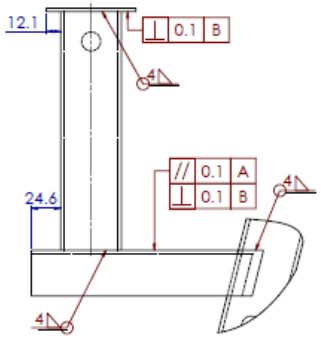

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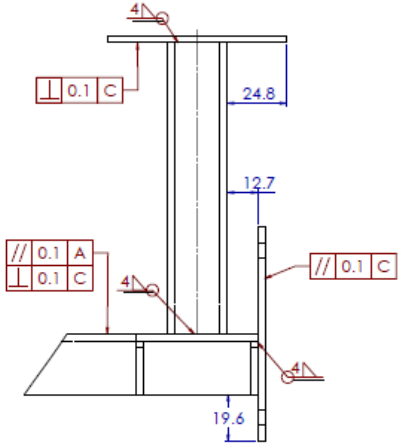

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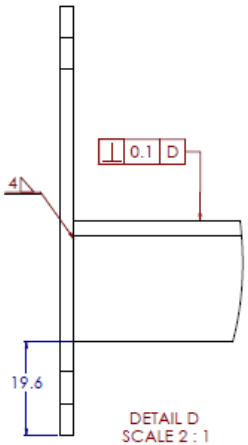

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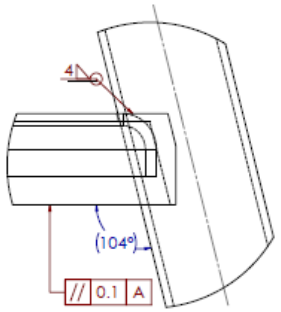

DETAIL E
SCALE 1 : 1

WELDING NOTES:

1. WELD IN ACCORDANCE WITH GHES-008 CLASS 1
2. ALL WELDS TO BE CONTINUOUS UNLESS STATED OTHERWISE
3. ALL GAPS TO BE FILLED WITH WELD WHERE APPROPRIATE

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	INITIALS	DATE	NOTES
DRAWN	IA	14/11/2014	
APPROVED	AP		

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DIMENSIONAL TOLERANCES:
MACHINED COMPONENT: ±0.25
FABRICATED COMPONENT: ±0.50
SMALL ASSEMBLY (<300mm): ±0.50
LARGE ASSEMBLY (<1000mm): ±1.00
LARGE ASSEMBLY (>1000mm): ±2.00
ANGULAR: ±0.5°

THIRD ANGLE PROJECTION

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SCALE:1:4

SHEET 2 OF 4

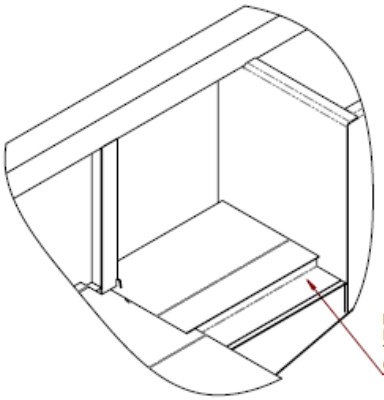
REVISION:	PAPER SIZE:	WEIGHT (Kg):
A	A1	9.88

PART NO:
12000-22-02-0010-01

TITLE:
MAST MAIN FABRICATION

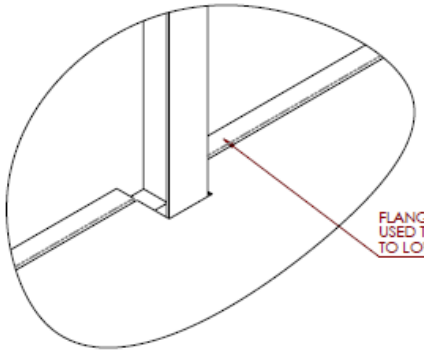
SHEET GUIDE:

SHEETS 1-3: WP 12000-10-02-0021 - FIT MAIN CABIN DECK
SHEET 4: WP 12000-10-02-0023 - FIT WATERTIGHT HATCHES



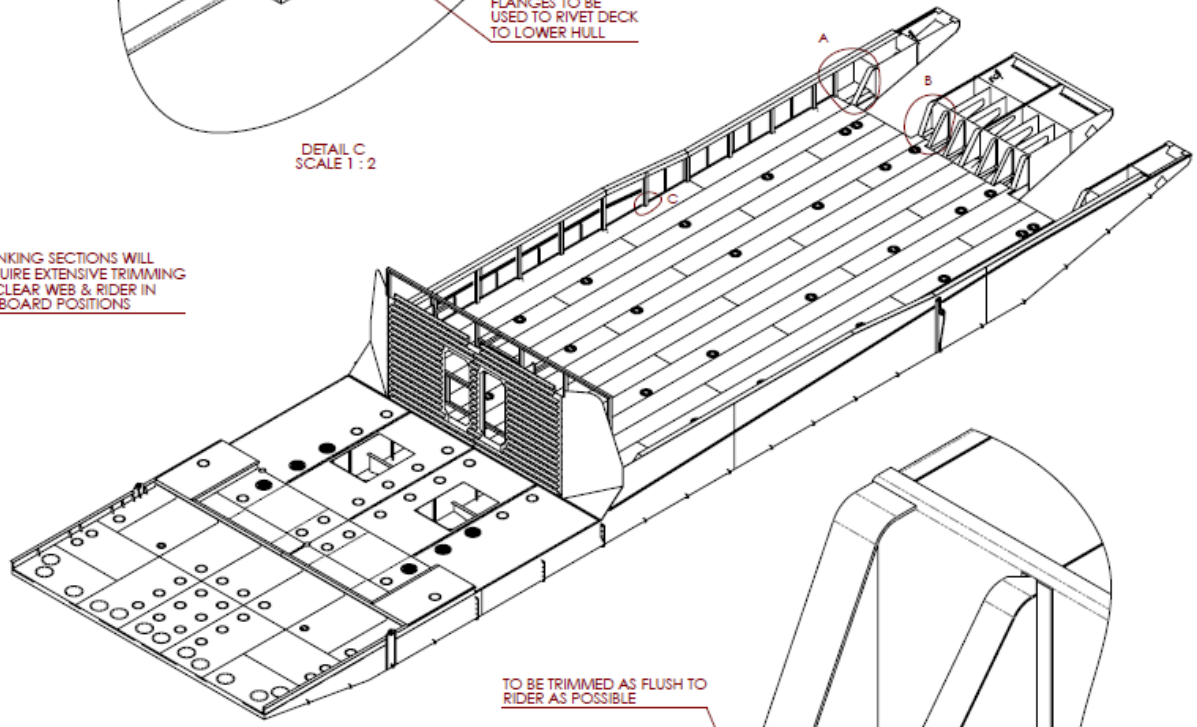
PLANKING SECTIONS WILL REQUIRE EXTENSIVE TRIMMING TO CLEAR WEB & RIDER IN OUTBOARD POSITIONS

DETAIL A
SCALE 1 : 5
WEB & RIDER HIDDEN FOR CLARITY



FLANGES TO BE USED TO RIVET DECK TO LOWER HULL

DETAIL C
SCALE 1 : 2



TO BE TRIMMED AS FLUSH TO RIDER AS POSSIBLE

DO NOT TRIM DUE TO LANDING FOR WHEELHOUSE PILLAR POST BASE FLANGE

TRIM DECK AROUND WEBS TO SUIT CRAFT VARIATION

DETAIL B
SCALE 1 : 3

GENERAL NOTES (MAIN CABIN DECK):

1. SEE SUB-ASSEMBLY AND/OR PART DRAWINGS FOR FURTHER DETAILS
2. MAIN CABIN DECK IS TO BE BONDED TO LOWER HULL - DO NOT WELD
3. ADHESIVE BOND IN ACCORDANCE WITH GHES-010
4. TOLERANCES IN ACCORDANCE WITH GHES-009
5. RIVET IN ACCORDANCE WITH GHES-011
6. REFERENCE DIMENSIONS MAY VARY SLIGHTLY DUE TO SHRINKAGE IN HULL, SO MAIN CABIN DECK MAY BE TRIMMED TO FIT CRAFT WHERE APPROPRIATE
7. FOR FURTHER WASHER SPACING DETAIL, PLEASE SEE GHDOC-004924
8. FIRST SECTIONS TO BE INSTALLED ON STBD SIDE OF CRAFT, WORKING TOWARDS PORT
9. ENSURE ALL FLOOR SECTIONS ARE FULLY SUPPORTED WITH A SUITABLE LANDING. ANY AREAS WHICH REQUIRE ADDITIONAL CLOSING PANELS ARE TO BE RIVETED OR BONDED WHERE POSSIBLE
10. STAGGER PLANKING JOINTS AT 2M INTERVALS
11. SEE DRAWING 12000-STG-2-CSSI FOR CRITICAL POSITIONS OF WHEELHOUSE PILLAR FLANGES - DO NOT TRIM CABIN FLOOR IN THIS AREA.

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DRAWN	IA	02/12/2014	
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DIMENSIONAL TOLERANCES:

MACHINED COMPONENT:	±0.25
FABRICATED COMPONENT:	±0.50
SMALL ASSEMBLY (<300mm):	±0.50
LARGE ASSEMBLY (<1000mm):	±1.00
LARGE ASSEMBLY (>1000mm):	±2.00
ANGULAR:	±0.5°

THIRD ANGLE PROJECTION

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SHEET 1 OF 3

REVISIONS

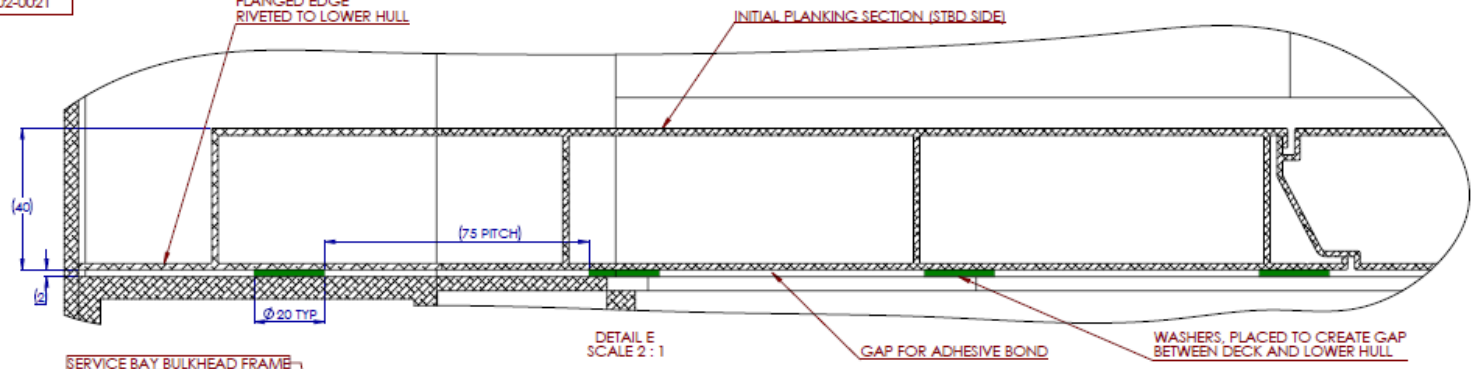
REV.	DATE	DESCRIPTION	REVISED BY	APPROVED
A	12/11/2014	NEW ISSUE	IA	CWB
B	01/12/2014	UP ISSUE TO ACCOMODATE DECK CHANGE	IA	CWB

REVISION:	PAPER SIZE:	WEIGHT (Kg):
B	A0	5573.48

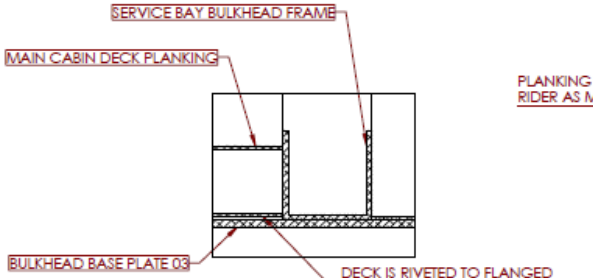
PART NO: 12000-10-02-DECK

TITLE: STAGE 2 MAIN CABIN DECK INSTALLATION

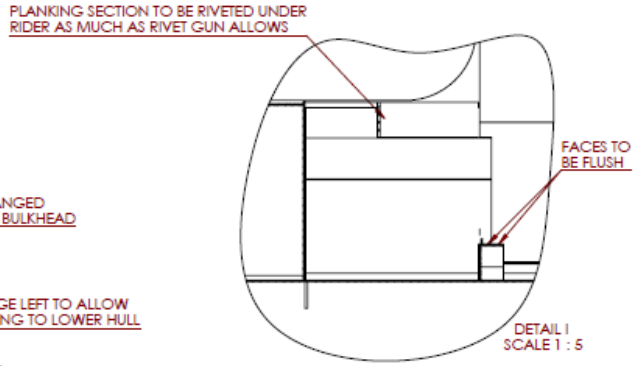
TO BE USED IN CONJUCTION WITH WP 12000-10-02-0021



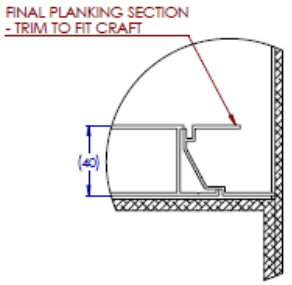
DETAIL E
SCALE 2 : 1



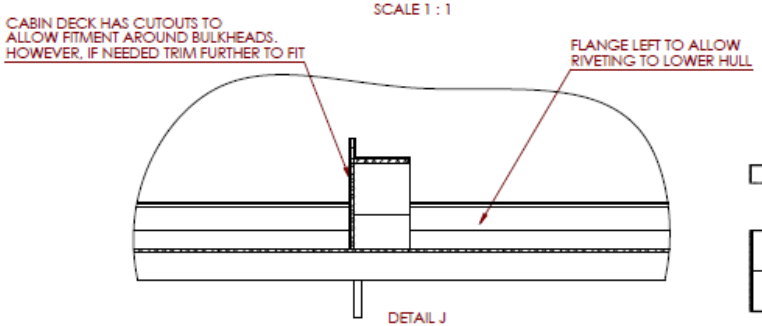
CROPPED SECTION F-F
SCALE 1 : 1



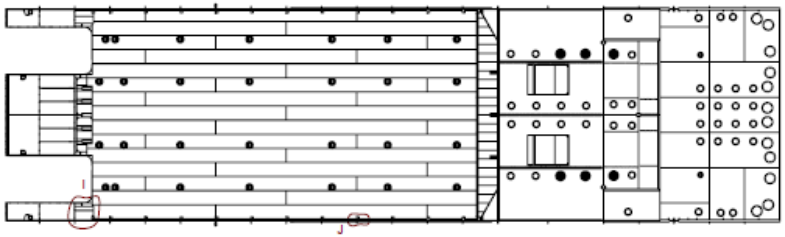
DETAIL I
SCALE 1 : 5



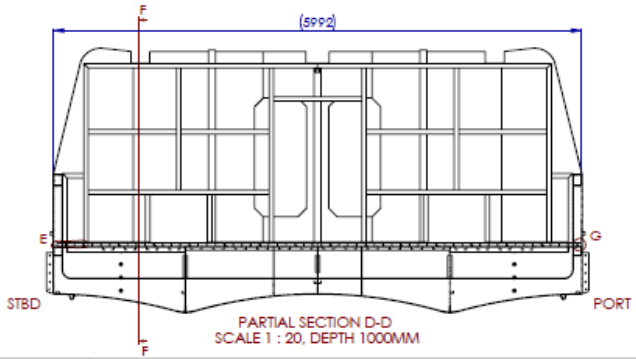
DETAIL G
PORT SIDE FACING AFT
SCALE 1 : 1



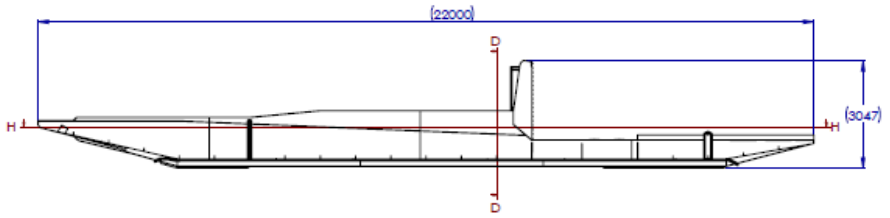
DETAIL J
SCALE 1 : 2



SECTION H-H



PARTIAL SECTION D-D
SCALE 1 : 20, DEPTH 1000MM



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	INITIALS	DATE	NOTES
DRAWN	IA	02/12/2014	
APPROVED	ADMIN		

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DIMENSIONAL TOLERANCES:

MACHINED COMPONENT:	±0.25
FABRICATED COMPONENT:	±0.50
SMALL ASSEMBLY (<300mm):	±0.50
LARGE ASSEMBLY (<1000mm):	±1.00
LARGE ASSEMBLY (>1000mm):	±2.00
ANGULAR:	±0.5°

THIRD ANGLE PROJECTION

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SCALE:1:50

SHEET 2 OF 3

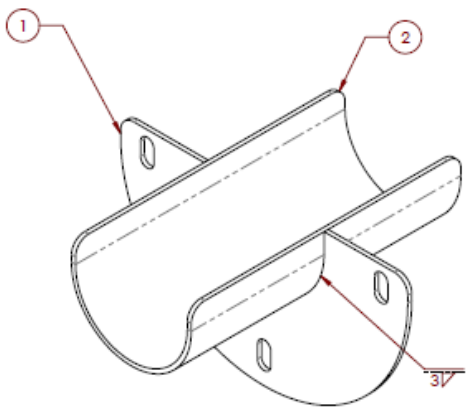
REVISION:	PAPER SIZE:	WEIGHT (Kg):
B	A0	5573.48

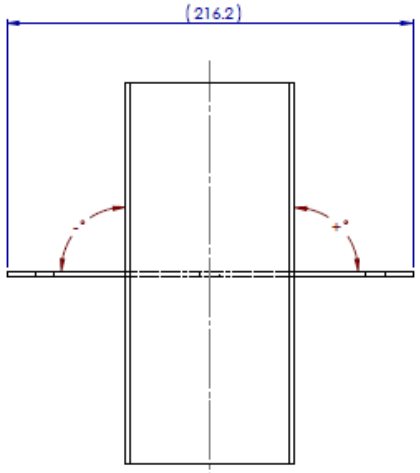
PART NO:
12000-10-02-DECK

TITLE:
STAGE 2 MAIN CABIN DECK INSTALLATION

ITEM NO.	PART No.	REV	DESCRIPTION	Qty	PBS No.	NOTES
1	12000-12-02-0003-09-01	A	SUPERSTRUCTURE BEAM TO LONGITUDINAL FLANGE PLATE	1	133	
2	12000-12-02-0003-09-02	A	SUPERSTRUCTURE BEAM TO LONGITUDINAL SADDLE PLATE	1	133	

Angle ID #	Craft Frame Ref	° from X axis	° from Y axis	° from Z axis
NEUTRAL	FRAME 3	0	0	0
1	FRAME 2	0	-3	-3
2	FRAME 4	0	-3	+2
3	FRAME 2	0	0	-3
4	FRAME 3	0	-3	-1
5	FRAME 4	0	0	+2
6	FRAME 5	0	-2	+3
7	FRAME 2	0	+3	-3
8	FRAME 3	0	+3	-1
9	FRAME 4	0	+3	+2
10	FRAME 5	0	+2	+3
11	FRAME 1	0	-4	-5
12	FRAME 0.5	0	-5	-14
13	FRAME 1	0	+4	-5
14	FRAME 0.5	0	+5	-14



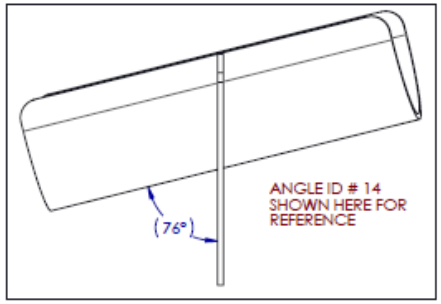


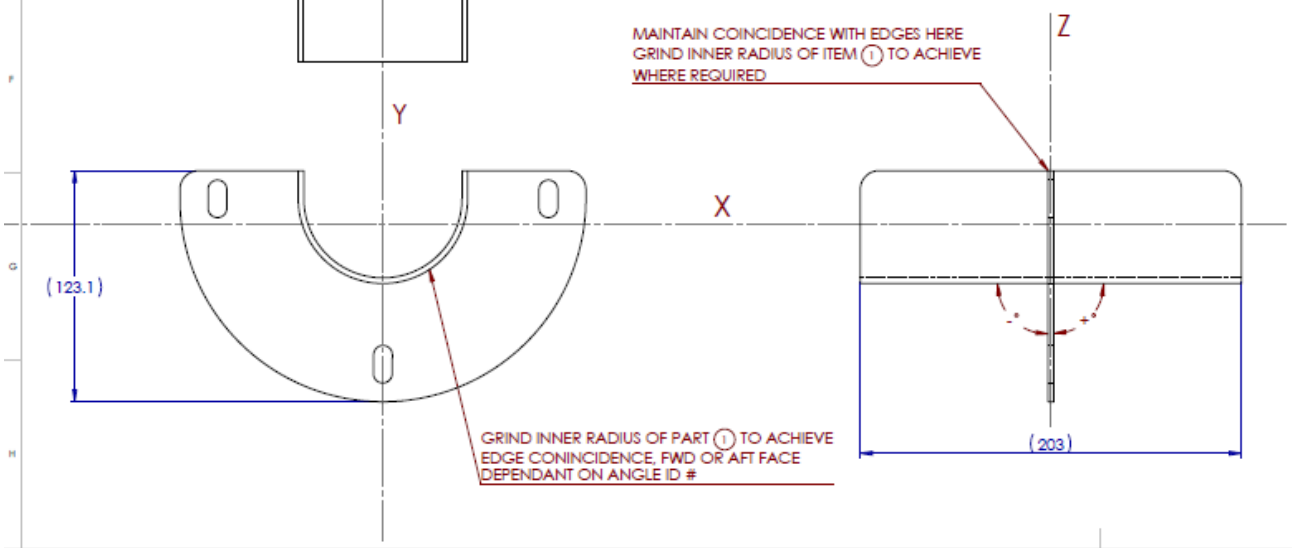
GENERAL NOTES:

1. SEE SUB-ASSEMBLY AND/OR PART DRAWINGS FOR FURTHER DETAILS
2. EACH ANGLE ID # REFERS TO A SPECIFIC POSITION/S USED WITHIN THE CRAFT. SEE INSTALLATION DRAWING 12000-STG2-CSSI FOR FULL DETAILS INCLUDING QUANTITIES.

WELDING NOTES:

1. WELD IN ACCORDANCE WITH GHES-008 CLASS 1
2. ALL WELDS TO BE CONTINUOUS UNLESS STATED OTHERWISE





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	INITIALS	DATE	NOTES
DRAWN	IA	16/10/2014	
APPROVED	ADMIN		

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES

DIMENSIONAL TOLERANCES:

MACHINED COMPONENT:	±0.25
FABRICATED COMPONENT:	±0.50
SMALL ASSEMBLY (<300mm):	±0.50
LARGE ASSEMBLY (>1000mm):	±1.00
LARGE ASSEMBLY (>1000mm):	±2.00
ANGULAR:	±0.5°

THIRD ANGLE PROJECTION

DO NOT SCALE
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SHEET 1 OF 1

REVISIONS				
REV.	DATE	DESCRIPTION	REVISED BY	APPROVED
A	13/10/2014	NEW ISSUE	IA	CWB

REVISION:	PAPER SIZE:	WEIGHT (Kg):
A	A2	0.40

PART NO: 12000-12-02-0003-09

TITLE: SUPERSTRUCTURE BEAM LOWER CONNECTION WELDED ASSY

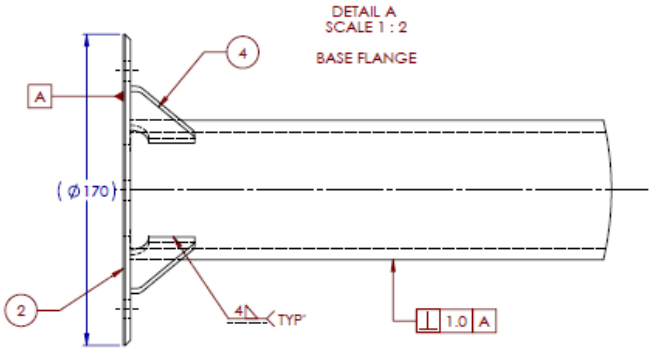
ITEM NO.	PART No.	REV	DESCRIPTION	Qty	PBS No.	NOTES
1	12000-12-02-0006-01-01	A	WHEELHOUSE PILLAR AFT POST	1	133	
2	12000-12-02-0006-01-02	A	WHEELHOUSE PILLAR POST BASE FLANGE	1	133	
3	12000-12-02-0006-01-03	A	WHEELHOUSE PILLAR POST UPPER FLANGE	1	133	
4	12000-12-02-0006-01-04	A	WHEELHOUSE PILLAR WEB PLATE	4	133	
5	12000-12-02-0006-01-05	A	WHEELHOUSE PILLAR WEB PLATE B	4	133	

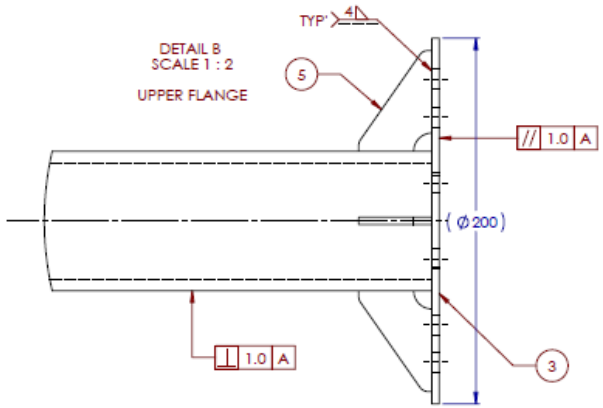
GENERAL NOTES:

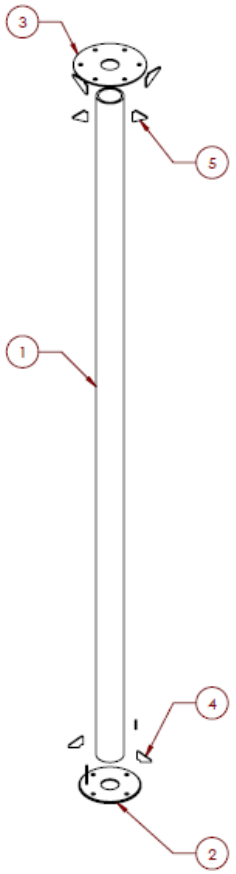
1. SEE SUB-ASSEMBLY AND/OR PART DRAWINGS FOR FURTHER DETAILS
2. CONSULT TEAM LEADER PRIOR TO MANUFACTURE & CHECK THAT CRAFT IS WITHIN TOLERENCE - POST MAY REQUIRE TRIMMING OR EXTENDING TO SUIT APPLICATION.
3. PILLAR IS FITTED WITH THE AID OF SHIMS, SEE INSTALLATION DRAWING 12000-STG2-CSSI FOR FURTHER DETAILS. THE ADDITION OF EXTRA SHIMS TO A MAXIMUM HEIGHT OF 10mm IS AN ACCEPTABLE ALTERNATIVE TO EXTENDING THE POST MATERIAL.

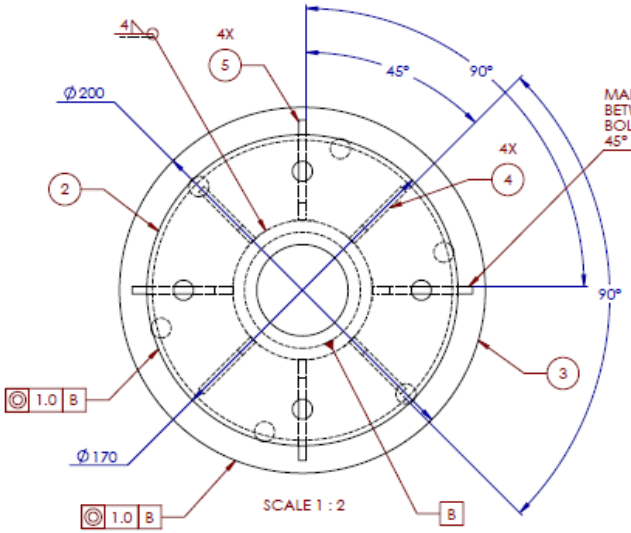
WELDING NOTES:

1. WELD IN ACCORDANCE WITH GHES-008 CLASS 1
2. ALL WELDS TO BE CONTINUOUS UNLESS STATED OTHERWISE
3. OVERALL HEIGHT DIMENSION MUST BE MAINTAINED WITH THE EXCEPTION OF GENERAL NOTES 2 & 3.
4. NOTE ORIENTATION OF CHAMFERED EDGE WHEN POSITIONING BASE FLANGE

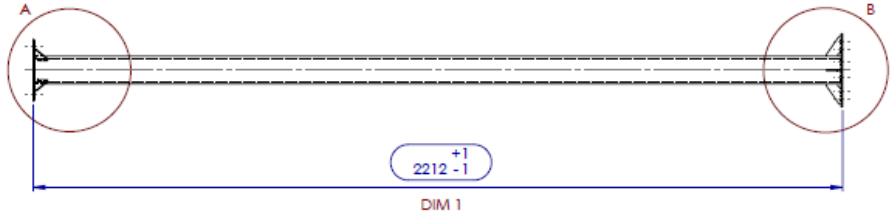








MAINTAIN OFFSET OF FLANGE HOLES/WEBS BETWEEN BASE & UPPER POSITIONS FOR BOLT CLEARANCE WHEN ASSEMBLED. 45° ANGLE NOT CRITICAL.



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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES

DIMENSIONAL TOLERANCES:

MACHINED COMPONENT:	±0.25
FABRICATED COMPONENT:	±0.50
SMALL ASSEMBLY (<300mm):	±0.50
LARGE ASSEMBLY (<1000mm):	±1.00
LARGE ASSEMBLY (>1000mm):	±2.00
ANGULAR:	±0.5°

THIRD ANGLE PROJECTION

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REVISIONS

REV.	DATE	DESCRIPTION	REVISED BY	APPROVED
A	17/10/2014	NEW ISSUE	IA	CWB

REVISION:	PAPER SIZE:	WEIGHT (Kg):
A	A2	8.89

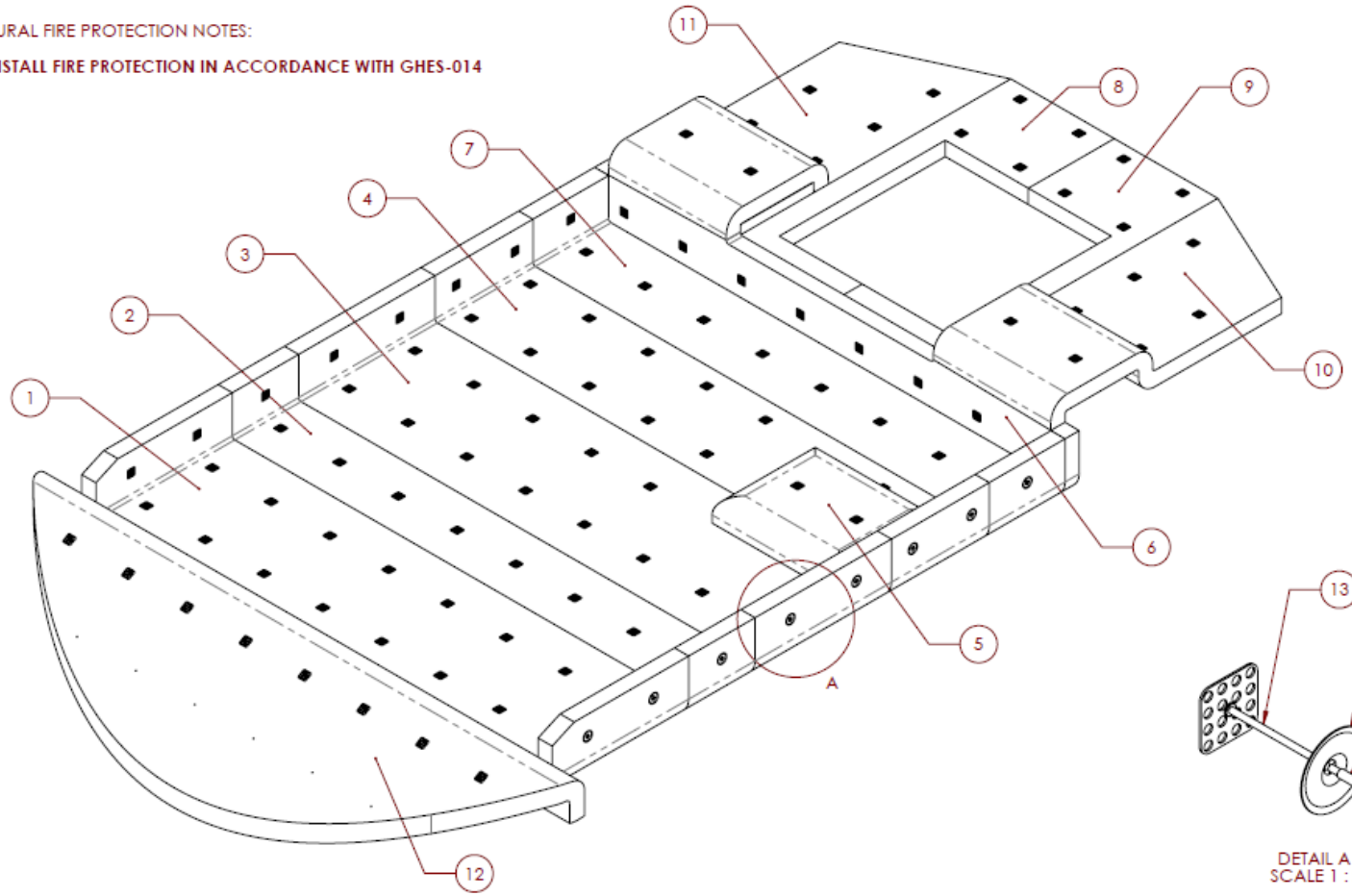
PART NO: 12000-12-02-0006-01

TITLE: WHEELHOUSE PILLAR AFT POST WELDED ASSEMBLY

ITEM NO.	PART No.	REV	DESCRIPTION	Qty	PBS No.	NOTES
1	12000-22-03-0007-01	A	WHEELHOUSE STRUCTURAL FIRE PROTECTION 1	1	190	
2	12000-22-03-0007-02	A	WHEELHOUSE STRUCTURAL FIRE PROTECTION 2	1	190	
3	12000-22-03-0007-03	A	WHEELHOUSE STRUCTURAL FIRE PROTECTION 3	1	190	
4	12000-22-03-0007-04	A	WHEELHOUSE STRUCTURAL FIRE PROTECTION 4	1	190	
5	12000-22-03-0007-05	A	WHEELHOUSE STRUCTURAL FIRE PROTECTION 5	1	190	
6	12000-22-03-0007-06	A	WHEELHOUSE STRUCTURAL FIRE PROTECTION 6	1	190	
7	12000-22-03-0007-07	A	WHEELHOUSE STRUCTURAL FIRE PROTECTION 7	1	190	
8	12000-22-03-0007-08	A	WHEELHOUSE STRUCTURAL FIRE PROTECTION 8	1	190	
9	12000-22-03-0007-09	A	WHEELHOUSE STRUCTURAL FIRE PROTECTION 9	1	190	
10	12000-22-03-0007-10	A	WHEELHOUSE STRUCTURAL FIRE PROTECTION 10	1	190	
11	12000-22-03-0007-11	A	WHEELHOUSE STRUCTURAL FIRE PROTECTION 11	1	190	
12	12000-22-03-0007-12	A	WHEELHOUSE STRUCTURAL FIRE PROTECTION 12	1	190	
13	HDWR-2534	A	BIGHEAD, NAIL, Ø3 x 100, 32mm SQUARE BASE, 316 STAINLESS	133	N/A	
14	HDWR-2536	A	BIGHEAD, NAIL, Ø3mm ENCAPSULATED SPRING CLIP, 316 STAINLESS	133	N/A	
15	HDWR-2537	A	BIGHEAD, NAIL, Ø3mm TIP	133	N/A	

STRUCTURAL FIRE PROTECTION NOTES:

1. **INSTALL FIRE PROTECTION IN ACCORDANCE WITH GHES-014**



DETAIL A
SCALE 1 : 2

FIRE INSULATION HIDDEN FOR DETAIL

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DRAWN	IA	17/12/2014	
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DIMENSIONAL TOLERANCES:
MACHINED COMPONENT: ±0.25
FABRICATED COMPONENT: ±0.50
SMALL ASSEMBLY (<300mm): ±0.50
LARGE ASSEMBLY (>1000mm): ±1.00
LARGE ASSEMBLY (>1000mm): ±2.00
ANGULAR: ±0.5°

THIRD ANGLE PROJECTION

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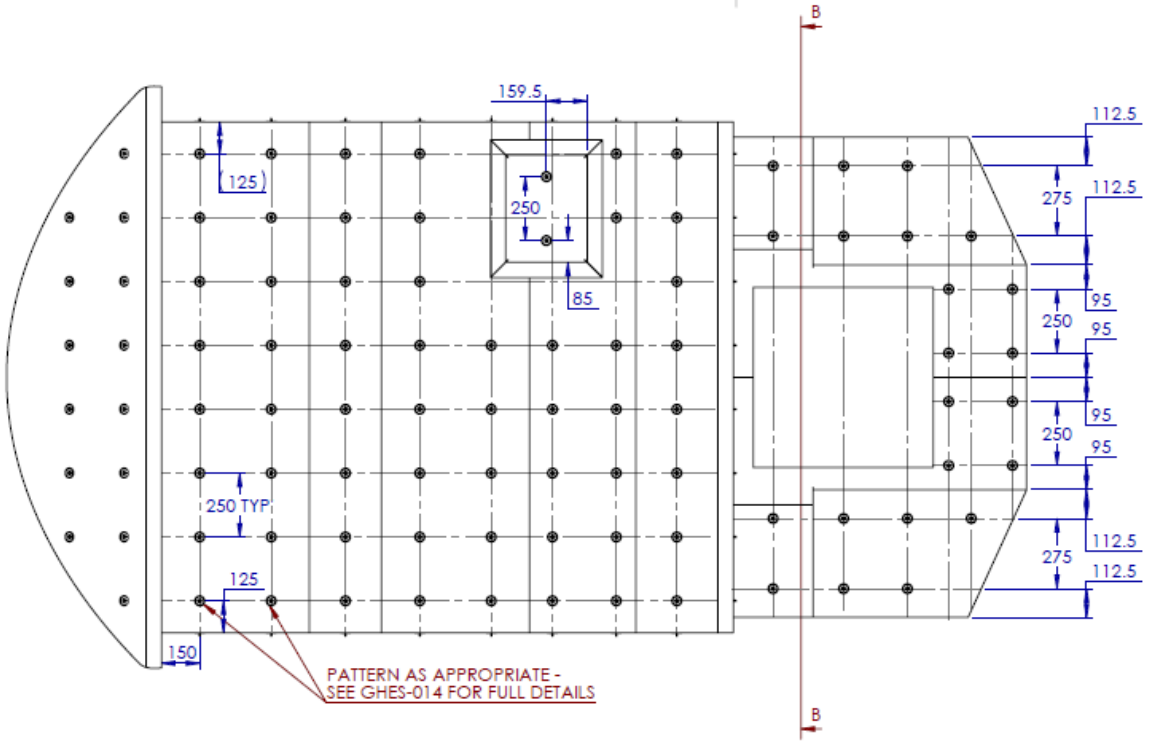
SHEET 1 OF 3

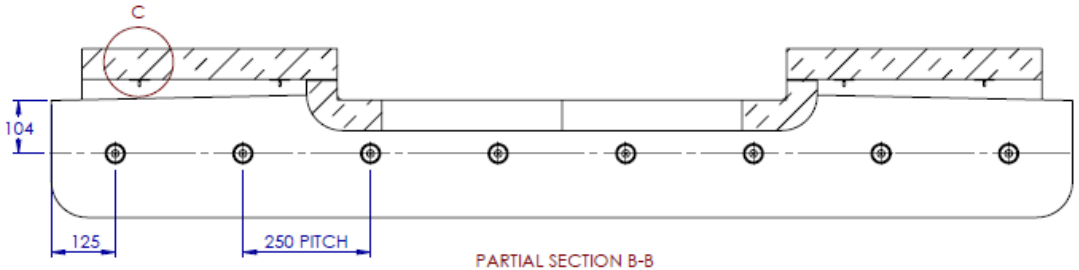
REVISIONS				
REV.	DATE	DESCRIPTION	REVISED BY	APPROVED
A	15/12/2014	NEW ISSUE	IA	CWB

REVISION:	PAPER SIZE:	WEIGHT (Kg):
A	A3	68.38

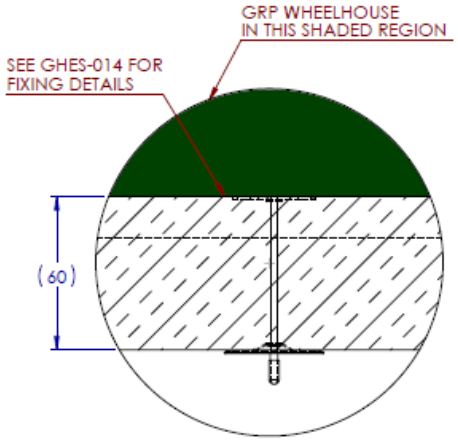
PART NO: 12000-22-03-0007

TITLE: STRUCTURAL FIRE PROTECTION - INSTALLATION





PARTIAL SECTION B-B
DEPTH 300MM
SCALE 1 : 10



DETAIL C
TYPICAL PIN ARRANGEMENT
SCALE 1 : 2

GENERAL NOTES:

1. **FIT IN ACCORDANCE WITH GHES-014**
2. PIN POSITION SHOWN FOR GUIDANCE/BOM GENERATION ONLY
3. PINS SPECIFIED IN BOM OVERLENGTH - TRIM EXCESS PRIOR TO FITTING RUBBER TIP
4. DUE TO CERTIFICATION, 60MM THICKNESS **MUST** BE MADE UP OF TWO 30MM THICK BLANKETS
5. FIRE INSULATION FOR SUPERSTRUCTURE TUBES, CONNECTIONS & ROOF PANELS ARE FITTED IN A SEPERATE WP

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DIMENSIONAL TOLERANCES:

MACHINED COMPONENT:	±0.25
FABRICATED COMPONENT:	±0.50
SMALL ASSEMBLY (<300mm):	±0.50
LARGE ASSEMBLY (<1000mm):	±1.00
LARGE ASSEMBLY (>1000mm):	±2.00
ANGULAR:	±0.5°

THIRD ANGLE PROJECTION

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SHEET 2 OF 3

REVISION:	PAPER SIZE:	WEIGHT (Kg):
A	A3	68.38

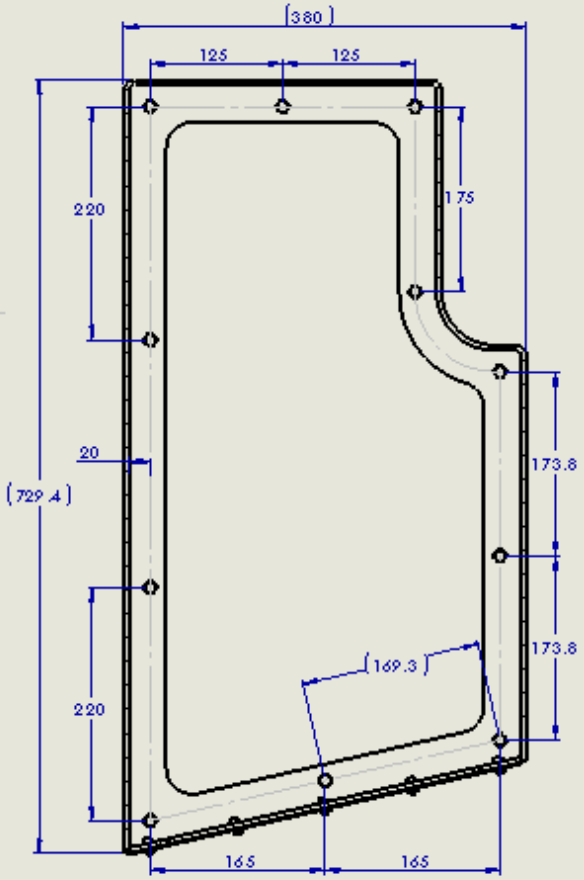
PART NO:
12000-22-03-0007

TITLE:
STRUCTURAL FIRE PROTECTION - INSTALLATION

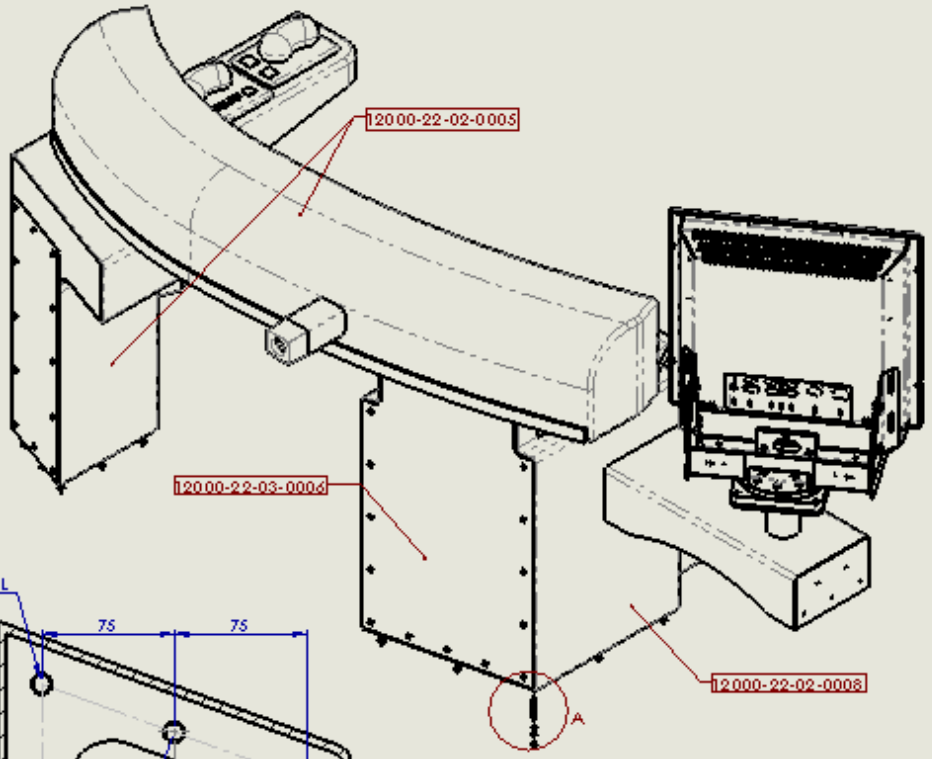
ITEM NO.	PART No.	REV	DESCRIPTION	Qty	PBS No.	NOTES
1	BMC06HX045A4	A	BOLT M6 x 45mm HEX HEAD A4 STAINLESS	19	N/A	
2	NMC06NYA4	A	NUT M6 NYLOC A4 STAINLESS	19	N/A	
3	WM06AA4	A	WASHER M6 FORM A A4 STAINLESS	38	N/A	

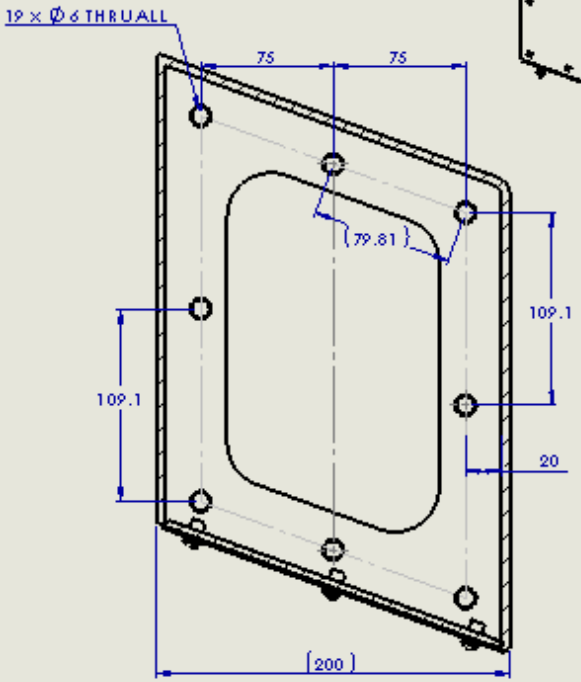
GENERAL NOTES:

1. THIS WP (12000-22-03-0011) MUST BE CARRIED OUT BEFORE STRUCTURAL FIRE PROTECTION IS INSTALLED (12000-22-03-0007)
2. SIZES MAY BE INCREASED TO M8 ONLY IF M6 IS UNABLE TO PROPERLY SECURE GRP CONSOLES
3. HOLES ON BOTH CONSOLES ARE THE SAME SIZE
4.

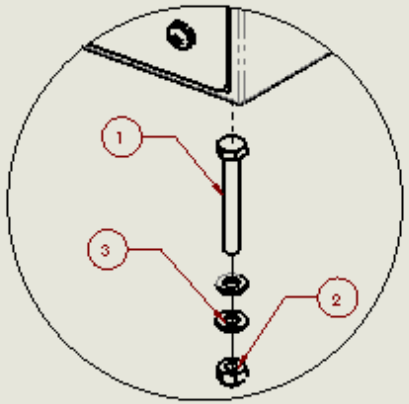


SECTION VIEW OF 12000-22-02-0008
SCALE 1 : 5





SECTION VIEW OF 12000-22-02-0005
SCALE 1 : 3



DETAIL A
TYPICAL FASTENING DETAIL
SCALE 1 : 2

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SCALE: 1:10

SHEET 1 OF 1

REVISIONS				
REV.	DATE	DESCRIPTION	DRAWN BY	APPROVED
A	01/02/13	NEW ISSUE	IA	CWB

REVISION:	PAPER SIZE:	WEIGHT (KG):
A	A3	61.43

PART NO: 12000-22-03-0011

TITLE: INSTALL CONSOLES TO WHEELHOUSE TUB