

CONTRACT NO: 23-134

2023

C&W DIVING SERVICES, INC.

**DRY DOCK HULL CLEANING / UT
READING & UWILD SURVEY**

NASSCO

UNDERWATER INSPECTION REPORT

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C&W DIVING SERVICES, INC.
UNDERWATER ENGINEERING & CONSTRUCTION
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Inspection Date : 11/22/2023
Report Date : 11/27/2023



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C&W
DIVING SERVICES, INC.

1. GENERAL INFORMATION

Project Name: NASSCO DRY DOCK HULL CLEANING, UT READINGS & UWILD

Location: General Dynamics NASSCO Dry Dock
2749 E Harbor Dr, San Diego, CA 92113

Customer: NASSCO Shipyard San Diego, CA

Date of Report: 22nd November 2023

Type: Level II & III

Date of Inspection: 22nd November 2023



Figure 1 (Above): NASSCO FLOATING DRY DOCK

2. EQUIPMENT USED FOR THE INSPECTION

2.1 Diving System

All equipment is certified and in compliance with ADCI (Association of Diving Contractors International) Standards.

<input checked="" type="checkbox"/> Shallow Air System	Qty.	<input type="checkbox"/> Deep Air System	Qty.
Sufficient Air Compressor	1	Sufficient Air Compressor	2
HP Backup Air Supply	1	HP Backup Air Supply	1
Volume Tank	1	Volume Tank	2
2-Diver Air Manifold	1	Air Manifold	1
Communication System	2	Communication System	2
		Decompression Chambers	1
		Oxygen Supply for Treatment	2
<input type="checkbox"/> Surface Mixed-Gas System	Qty.	Surface Mixed-Gas cont...	
Sufficient Air Compressor	1	Bottom-Mix Gas Supply	2
HP Backup Air Supply	1	Decompression Gas Supply	2
Volume Tank	1	Diver Stage/Bell	1
Air Manifold	1		
Communication System	2		
Decompression Chambers	2		
Oxygen Supply for Treatment	2		

2.2 Dive Platform

<input type="checkbox"/> From Dive Van	<input type="checkbox"/> From Dive Trailer
<input type="checkbox"/> From Pier	<input type="checkbox"/> From Barge
<input checked="" type="checkbox"/> From Vessel: M/V COOPER	<input type="checkbox"/> Other (describe)

2.3 Ingress/Egress

<input type="checkbox"/> Ladder tied off	<input checked="" type="checkbox"/> Ladder fixed to vessel/barge/pier
<input type="checkbox"/> Dive Stage/Bell	<input type="checkbox"/> Walk-in entry
<input type="checkbox"/> Walk-in entry from vessel	<input type="checkbox"/> Other (describe)

2.4 Inspection Equipment

<input checked="" type="checkbox"/> Underwater Video and Light	<input type="checkbox"/> Non-Destructive Testing Equipment
<input type="checkbox"/> Remotely Operated Vehicle	<input checked="" type="checkbox"/> Ultrasonic Thickness Gauge
<input checked="" type="checkbox"/> Underwater Still Photography	<input type="checkbox"/> Topside Camcorder

2.5 Inspection Type

<input type="checkbox"/> Level 1 Inspection: Visual inspection in which no marine growth is removed
<input checked="" type="checkbox"/> Level 2 Inspection: Visual inspection in which some marine growth is removed
<input checked="" type="checkbox"/> Level 3 Inspection: Non-Destructive and/or Destructive Testing is conducted.

3. INTRODUCTION

3.1 Project

C&W Diving Services, Inc. was contracted to clean (4) 3'w x 175' long "transects" as well as clean (8) 1.5' wide x 175' long sections to take 64 UT readings of the floating dry docks hull. C&W is an ABS certified external specialist in water survey company and all work was performed under the ABS standards as well as in accordance with the U.S. Coast Guard (USCG) accepted Association of Diving Contractors International (ADCI) *Consensus Standards for Commercial Diving and Underwater Operations* (6th Ed.), the U.S. Occupational Safety and Health Administration (OSHA) 29 CFR Part 1910, *Subpart T – Commercial Diving Operations* (Dir. CPL 02-00-151; 2011), Washington State's Standards for Commercial Diving Operations (Chapter 296-37 WAC; 2008), and the *U.S. Navy Dive Manual*, Rev. 6 (April 2008).

3.2 Scope of Work

The work scope consisted of: (1) Hull clean (4) four, 3ft wide x 175ft transects with a 3-brush hydraulic hull scrubber and a 5k pressure washer for the NAVSEA visual UWILD survey. (2) Hull clean (8) 1.5ft wide x 175 sections at designated locations using 5k pressure washer to ultrasonically test underwater 64 locations in a 20ft grid with a Cygnus Diver thickness gauge.

4. INSPECTION FINDINGS

On November 22nd, 2023, C&W Diving Services, Inc. conducted the visual inspection of the NASSCO Dry Dock and performed underwater video documentation as well as still photography. The chine & transect clearings were overall in good condition. The hull of the dry dock has 65% bottom paint remaining. There are large areas of paint blistering and areas of bare metal. Several of the dry docks hull weld seems paint is missing, but in over all good condition. There were no signs of pitting in the areas of bare metal along the hull of the dry dock. The visual inspection entailed a thorough inspection of.

- A) Four 3ft wide x 175ft long transect locations on the hull of the dry dock that have had all marine growth removed.
- B) 6- Impressed Current cathodes
- C) 8- Suctions Sea Chests
- D) 8- Discharge Sea Chest
- E) 2-Fire Pump Suctions Sea Chests
- F) 2- Reference Cells
- G) Paint Condition
- H) 64 UT Readings at 8 Locations Along the Dry Docks Hull
- I) Photos

5. INSPECTION DETAILS

A. TRANSECTS

- All transects and weld joints appear to be in good condition. Transect FR 41 had 75-85% bare metal. The bottom paint that is remaining was black in color and has 10-15% blistering in the bottom paint.
- There appeared to be no pitting on any of the areas of bare metal exposed throughout the transects.
- All transects welded seems, appear to be in good condition. The weld seems that were exposed to bare metal did not appear to have any pitting and were still in good condition.

B. IMPRESSED CURRENT ANODES

- Impressed current anodes appeared to be in good working condition, with minor calcareous deposits in the anode fasteners. Dielectric shielding was in good condition. Impressed current anodes were bolted to the dock.
- Both port and starboard obsolete anodes were not present.
- Starboard Anode Locations- Frame 21-26, 76, 216
- Port Anode Locations- Frame 21-26, 76, 216

C. SUCTION SEA CHEST

- Frame 31: #6 Sea Chest- All sea chest screens had a layer of soft marine growth since they were cleaned prior to visual inspection by NASSCO divers. The gate and slide rails appeared to be in good physical condition. Scattered areas of exposed bare metal on the sea chest screen and slide rails. All welds appeared to be in good condition. There are no signs of pitting in the areas of exposed bare metal.
- Frame 41(10): #5B Sea Chest- Sea chest screens had a layer of soft marine growth since NASSCO divers cleaned the sea chest. The gate and slide rails appeared to be in good physical condition. Scattered areas of exposed bare metal on the sea chest screen and slide rails. All welds appeared to be in good condition. There are no signs of pitting in the areas of exposed bare metal.
- Frame 41(51): #5A Sea Chest- Sea chest screens had a layer of soft marine growth since NASSCO divers cleaned the sea chest. The gate and slide rails appeared to be in good physical condition. Scattered areas of exposed bare metal on the sea chest screen and slide rails. All welds appeared to be in good condition. There are no signs of pitting in the areas of exposed bare metal.

- Frame 56: #5 Sea Chest- Sea chest screens had a layer of soft marine growth since NASSCO divers cleaned the sea chest. The gate and slide rails appeared to be in good physical condition. Scattered areas of exposed bare metal on the sea chest screen and slide rails. All welds appeared to be in good condition. There are no signs of pitting in the areas of exposed bare metal.
- Frame 106: #4 Sea Chest- Sea chest screens had a layer of soft marine growth since NASSCO divers cleaned the sea chest. The gate and slide rails appeared to be in good physical condition. Scattered areas of exposed bare metal on the sea chest screen and slide rails. All welds appeared to be in good condition. There are no signs of pitting in the areas of exposed bare metal.
- Frame 146: #3 Sea Chest- Sea chest screens had a layer of soft marine growth since NASSCO divers cleaned the sea chest. The gate and slide rails appeared to be in good physical condition. Scattered areas of exposed bare metal on the sea chest screen and slide rails. All welds appeared to be in good condition. There are no signs of pitting in the areas of exposed bare metal. Last dry dock visual inspection report noted that the 3 o'clock position was missing a bolt. No hardware appeared to be missing during this visual inspection.
- Frame 191: #2 Sea Chest- Sea chest screens had a layer of soft marine growth since NASSCO divers cleaned the sea chest. The gate and slide rails appeared to be in good physical condition. Scattered areas of exposed bare metal on the sea chest screen and slide rails. All welds appeared to be in good condition. There are no signs of pitting in the areas of exposed bare metal.
- Frame 210: #1 Sea Chest- Sea chest screens had a layer of soft marine growth since NASSCO divers cleaned the sea chest. The gate and slide rails appeared to be in good physical condition. Scattered areas of exposed bare metal on the sea chest screen and slide rails. All welds appeared to be in good condition. There are no signs of pitting in the areas of exposed bare metal.

D. DISCHARGES

- Frame 36: #6 Discharge- The valve, discharge interiors and observed welds appeared to be in good condition. There were areas of exposed bare metal along the edges of the discharge opening. There were no signs of pitting in the welds and areas of exposed bare metal.

- Frame 41(45): #5B Discharge- The valve, discharge interiors and observed welds appeared to be in good condition. There were areas of exposed bare metal along the edges of the discharge opening. There were no signs of pitting in the welds and areas of exposed bare metal.
- Frame 41(51): #5A Discharge- The valve, discharge interiors and observed welds appeared to be in good condition. The discharge opening appeared to have 55% exposed bare metal. There were no signs of pitting in the welds and areas of expose. 75% soft marine growth was present in the discharge tunnel during the inspection.
- Frame 46: #5 Discharge- The valve, discharge interiors and observed welds appeared to be in good condition. The discharge opening appeared to have 60% exposed bare metal. There were no signs of pitting in the welds and areas of exposed bare metal. 60% soft marine growth was present in the discharge tunnel during the inspection.
- Frame 83: #4 Discharge- The valve, discharge interiors and observed welds appeared to be in good condition. There were areas of exposed bare metal along the edges of the discharge opening. There were no signs of pitting in the welds and areas of exposed bare metal.
- Frame 158: #3 Discharge- The valve, discharge interiors and observed welds appeared to be in good condition. The discharge opening appeared to have 60% exposed bare metal. There were no signs of pitting in the welds and areas of exposed bare metal. 60% soft marine growth was present in the discharge tunnel during the inspection.
- Frame 194: #2 Discharge- The valve, discharge interiors and observed welds appeared to be in good condition. There were areas of exposed bare metal along the edges of the discharge opening. There were no signs of pitting in the welds and areas of exposed bare metal.
- Frame 208: #1 Discharge- The valve, discharge interiors and observed welds appeared to be in good condition. The discharge opening appeared to have 65% exposed bare metal. There were no signs of pitting in the welds and areas of exposed bare metal. 80% soft marine growth was present in the discharge tunnel during the inspection.

E. FIRE PUMP SUCTION SEA CHEST

- Starboard Frame 121: Screen and bolts holding screen in place appear to be in good condition. This opening does not have a flapper/ check valve. Fire pump screen bars were covered in a layer of soft marine growth.
- Port Frame 121: Screen and bolts holding screen in place appear to be in good condition. This opening does not have a flapper/ check valve. Fire pump screen bars were covered in a layer of soft marine growth.

F. REFERENCE CELL

- Starboard Side Reference Cell Frame 187: Reference cell was completely covered over in 100% marine growth. Marine growth was removed to visually inspect the reference cell. The reference cell was in good condition and free of obstructions. All 6 circular ports inside the reference cell are free of obstructions.
- Port Side Reference Cell Frame 46: Reference cell was completely covered over in 100% marine growth. Marine growth was removed to visually inspect the reference cell. The reference cell was in good condition and free of obstructions. All 6 circular ports inside the reference cell are free of obstructions.

G. PAINT CONDITION

- 60% of the four cleaned transect locations on the dry docks hull were large areas of exposed bare metal and blistering paint. 55% of the hulls weld seems in the cleaned locations had exposes bare metal. There were no signs of pitting in any of the areas of bare metal along the dry docks hull and weld seems.

H. ULTRA THICKNESS HULL READINGS

- All UT readings were taken using the Cygnus Dive UT reader with a 2.25MHz ½” underwater remote probe. (Unit Serial #: 12077 & Transducer Serial #: 6785A). The Cygnus Dive UT reader was (Type-1) calibrated on February 2, 2023 in compliance with NCSL Z540-1, NIST 821/279484-10 & NIST 683/289870-17 by Bay Tech Marine.
- NASSCO Provided 8 UT locations 100ft apart along the dry docks hull. All UT readings were taken at 20ft off set grids.

23-134 NASSCO FLOATING DRY DOCK HULL THICKNESS READINGS USING CYGNUS DIVER UT

UNIT 3' WIDE 20' SPACING BETWEEN EACH UT READING AT EACH FRAME LOCATION

LOCTION	UT READING	FT. FROM STBD EDGE	S / CL / P	READING
UT1	UT READING 1	5 FT FROM PORT EDGE	PORT	0.62
48'-2-3/4" FROM FR 0	UT READING 2	25 FT FROM PORT EDGE	PORT	0.625
	UT READING 3	45 FT FROM PORT EDGE	PORT	0.63
	UT READING 4	65 FT FROM PORT EDGE	CL	0.59
	UT READING 5	85 FT FROM PORT EDGE	CL	0.59
	UT READING 6	105 FT FROM PORT EDGE	STBD	0.595
	UT READING 7	125 FT FROM PORT EDGE	STBD	0.625
	UT READING 8	145 FT FROM PORT EDGE	STBD	0.635
LOCTION	UT READING	FT. FROM STBD EDGE	S / CL / P	READING
UT2	UT READING 9	20 FT FROM PORT EDGE	PORT	0.645
144' 11" FROM FR 0	UT READING 10	40 FT FROM PORT EDGE	PORT	0.645
	UT READING 11	60 FT FROM PORT EDGE	PORT	0.655
	UT READING 12	80 FT FROM PORT EDGE	CL	0.645
	UT READING 13	100 FT FROM PORT EDGE	CL	0.645
	UT READING 14	120 FT FROM PORT EDGE	STBD	0.645
	UT READING 15	140 FT FROM PORT EDGE	STBD	0.645
	UT READING 16	160 FT FROM PORT EDGE	STBD	0.66
LOCTION	UT READING	FT. FROM STBD EDGE	S / CL / P	READING
UT3	UT READING 17	5 FT FROM PORT EDGE	PORT	0.64
244' 11" FROM FR 0	UT READING 18	25 FT FROM PORT EDGE	PORT	0.635
	UT READING 19	45 FT FROM PORT EDGE	PORT	0.655
	UT READING 20	65 FT FROM PORT EDGE	CL	0.655
	UT READING 21	85 FT FROM PORT EDGE	CL	0.645
	UT READING 22	105 FT FROM PORT EDGE	STBD	0.655
	UT READING 23	125 FT FROM PORT EDGE	STBD	0.65
	UT READING 24	145 FT FROM PORT EDGE	STBD	0.65
LOCTION	UT READING	FT. FROM STBD EDGE	S / CL / P	READING
UT4	UT READING 25	20 FT FROM PORT EDGE	PORT	0.45
344' 11" FROM FR 0	UT READING 26	40 FT FROM PORT EDGE	PORT	0.45
	UT READING 27	60 FT FROM PORT EDGE	PORT	0.45
	UT READING 28	80 FT FROM PORT EDGE	CL	0.455
	UT READING 29	100 FT FROM PORT EDGE	CL	0.59
	UT READING 30	120 FT FROM PORT EDGE	STBD	0.46
	UT READING 31	140 FT FROM PORT EDGE	STBD	0.455
	UT READING 32	160 FT FROM PORT EDGE	STBD	0.455

LOCTION	UT READING	FT. FROM STBD EDGE	S / CL / P	READING
UT5	UT READING 33	5 FT FROM PORT EDGE	PORT	0.45
444' 11" FROM FR 0	UT READING 34	25 FT FROM PORT EDGE	PORT	0.455
	UT READING 35	45 FT FROM PORT EDGE	PORT	0.455
	UT READING 36	65 FT FROM PORT EDGE	CL	0.59
	UT READING 37	85 FT FROM PORT EDGE	CL	0.59
	UT READING 38	105 FT FROM PORT EDGE	STBD	0.595
	UT READING 39	125 FT FROM PORT EDGE	STBD	0.455
	UT READING 40	145 FT FROM PORT EDGE	STBD	0.45
LOCTION	UT READING	FT. FROM STBD EDGE	S / CL / P	READING
UT6	UT READING 41	20 FT FROM PORT EDGE	PORT	0.45
544' 11" FROM FR 0	UT READING 42	40 FT FROM PORT EDGE	PORT	0.45
	UT READING 43	60 FT FROM PORT EDGE	PORT	0.45
	UT READING 44	80 FT FROM PORT EDGE	CL	0.45
	UT READING 45	100 FT FROM PORT EDGE	CL	0.59
	UT READING 46	120 FT FROM PORT EDGE	STBD	0.45
	UT READING 47	140 FT FROM PORT EDGE	STBD	0.45
	UT READING 48	160 FT FROM PORT EDGE	STBD	0.455
LOCTION	UT READING	FT. FROM STBD EDGE	S / CL / P	READING
UT7	UT READING 49	5 FT FROM PORT EDGE	PORT	0.45
644' 11" FROM FR 0	UT READING 50	25 FT FROM PORT EDGE	PORT	0.45
	UT READING 51	45 FT FROM PORT EDGE	PORT	0.455
	UT READING 52	65 FT FROM PORT EDGE	CL	0.585
	UT READING 53	85 FT FROM PORT EDGE	CL	0.455
	UT READING 54	105 FT FROM PORT EDGE	STBD	0.455
	UT READING 55	125 FT FROM PORT EDGE	STBD	0.445
	UT READING 56	145 FT FROM PORT EDGE	STBD	0.45
LOCTION	UT READING	FT. FROM STBD EDGE	S / CL / P	READING
UT8	UT READING 57	20 FT FROM PORT EDGE	PORT	0.62
744' 11" FROM FR 0	UT READING 58	40 FT FROM PORT EDGE	PORT	0.635
	UT READING 59	60 FT FROM PORT EDGE	PORT	0.63
	UT READING 60	80 FT FROM PORT EDGE	CL	0.625
	UT READING 61	100 FT FROM PORT EDGE	CL	0.625
	UT READING 62	120 FT FROM PORT EDGE	STBD	0.625
	UT READING 63	140 FT FROM PORT EDGE	STBD	0.625
	UT READING 64	160 FT FROM PORT EDGE	STBD	0.625



Document Title	THICKNESS GAUGE CALIBRATION CERT (TYPE-1)			
Document No.	BTER-TM-TGCCT1-0037-001			
Revision Date	9-Nov-2018	Rev No.	001	Page 1 of 1

Thickness Gauge Calibration Certificate (Type-1)

THIS IS TO CERTIFY THAT THIS INSTRUMENT HAS BEEN TESTED AND CALIBRATED.

Unit: Cygnus Dive

Unit Serial #: 12077

Transducer: 2.25MHz 1/2" UW Remote Probe

Transducer Serial #: 6785A

Test Block Increments

Instrument Readings

0.25
0.50
0.75
1.00
4.00

0.250
0.500
0.750
1.000
4.000

Test Block Type: 4-Step Block Material: 1018 Steel Block S/N: 3669 11

Test Block Type: 4 Inch Block Material: 4340 Steel Block S/N: 4236 18

Test blocks used for this calibration have been calibrated against reference standards certified by the National Institute of Standards and Technology and systems compliance in NCSL Z540-1 and traceable to NIST 821/279484-10 & NIST 683/289870-17

Technician: Kris Hepting
PRINT NAME

Calibration Date: February 2, 2023

Kris Hepting
SIGNATURE

Calibration Due Date: February 2, 2024

I. PHOTOS

PHOTO 1:

TYPICAL TRANSECT &
PAINT CONDITION



PHOTO 2:

TYPICAL TRANSECT
WELD CONDITION
WHERE BARE METAL IS
EXPOSED



PHOTO 3:

TYPICAL MARINE
GROWTH ON
TRANSECTS



PHOTO 4:

TYPICAL
IMPRESSED
CURRENT ANODE
CONDITION



PHOTO 5:

TYPICAL
DISCHARGE
CONDITION



PHOTO 6:

TYPICAL SUCTION
SEA CHEST
CONDITION



PHOTO 7:

TYPICAL FIRE PUMP
CONDITION



PHOTO 8:

TYPICAL PRIME PUMP
CONDITION



PHOTO 9:

TYPICAL REFERENCE
CELL CONDITION



Summary

C&W Diving Services is submitting the dry dock visual inspection report inspection, and 64 UT readings. UT reader certification Certificate has been attached to the report along with UT location lay out for reference. All video inspection documentation & still photography will be sent to the customer via google drive. Inspection Videos & photos can be downloaded on to a thumb drive and delivered at the customer's request.

Very Respectfully,

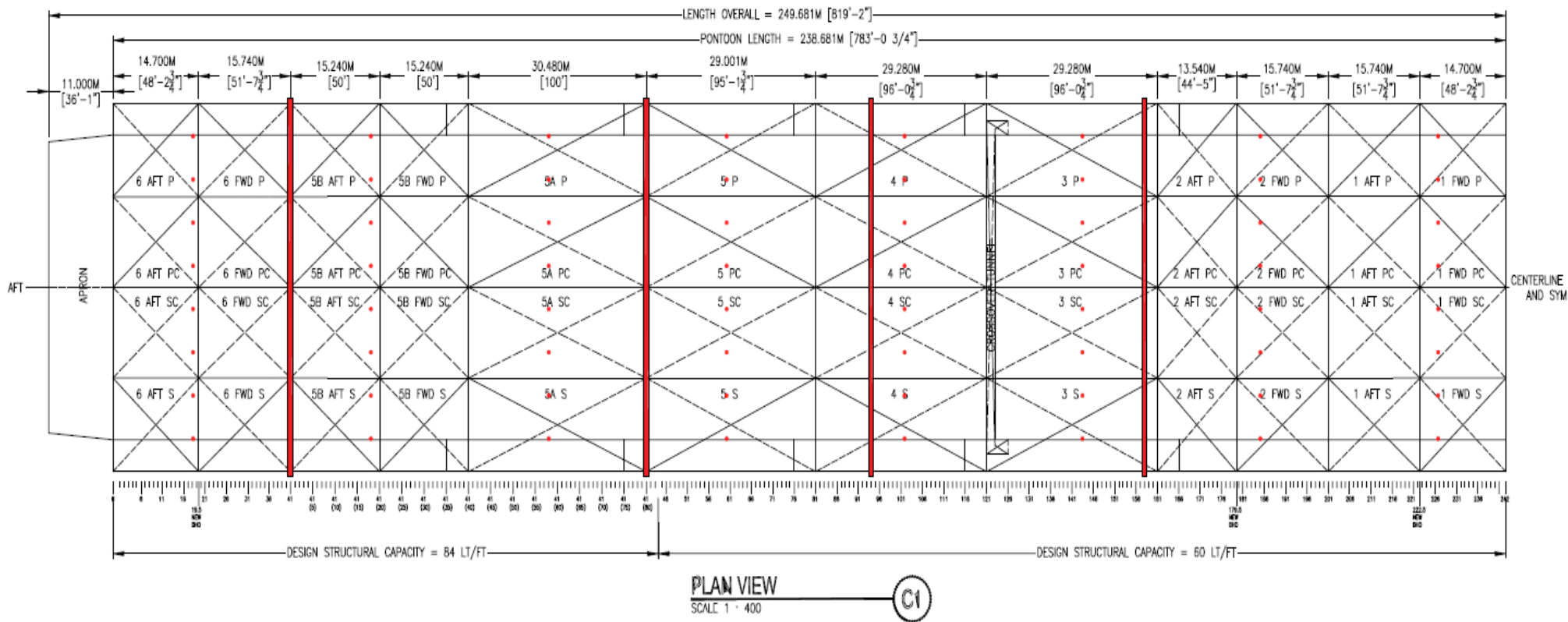


Mark Graham
C&W Diving Services
Dive Supervisor



DIVING SERVICES, INC.

UT Readings & Transect Location



- - Location for UT readings
- ▬ - Transect Location for Visual Inspection