



Appendix E: CMI Installation Manual



METHODOLOGY STATEMENT

Champlain Hudson Power Express
Shallow Water Mattress Placement
(<150ft Water Depth)
(Lake Champlain Segment)

SUBMITTED TO:

NKT HV CABLES AB.

SUBMITTED BY:

CALDWELL MARINE INTERNATIONAL
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CALDWELL MARINE INTERNATIONAL LLC. 1333 Campus Parkway, Wall Township, New Jersey 07753 PROJECT QUALITY ASSURANCE	Type: Methodology Statement Prepared By: Peter Smith Document #: Mattress Placement MOP-REV 3.0-20230327 Date: 27 March 2023 Revision No: 3.0
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DOCUMENT TITLE: Shallow Water Mattress Placement – Lake Champlain Segment

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Rev.	Description	Date	Approval
1.0	Issued to client	30 January 2023	TU
2.0	Revised per NKT comments	24 March 2023	TU
3.0	Revised per EM&CP review comments	27 March 2023	TU

Table of Contents

1 Executive Overview..... 5

2 Methodology Statement - Purpose..... 6

3 Methodology Statement - Confidentiality 6

4 Regulatory Compliance / Notifications / Liaison 6

5 CHPE Cable Protection Requirements – Lake Champlain Segment..... 7

6 Mattress Protection – Planned vs Remedial..... 7

7 Project Task Personnel 8

8 Project Mobilization – Marine Assets 10

8.1 Mattress Crane Barge (MCB) / Support Vessels 11

8.2 Mattress Feeder Barge (MFB) / Delivery Tug 15

9 Mobilization – Land Assets..... 17

9.1 Mattress Fabrication Plant..... 17

9.2 Operational Base / Storage Site – Wilcox Dock, Plattsburgh, NY..... 20

10 Operational Site Planning 22

10.1 Mattress Installation Site Reviews / Anchor Planning 22

10.2 Anchoring Componentry / Terminology 22

10.3 Anchor Plan – Mattress Crane Barge 22

11 Task Execution..... 25

11.1 Anchor Deployment / Recovery 25

11.2 Mattress Installation..... 32

12 Lake Weather Conditions / Operational Weather Limits 42

13 Environmental Protection Measures 43

13.1 Oil Pollution Prevention 43

13.2 Solid Waste Management 43

13.3 Wastewater Management 43

14 Operational Meetings..... 44

15 Documentation..... 45

16 Visitors To CMI Vessels (Non CMI Personnel) 45

Table of Figures

Figure 1 - CMI Marine Yard, Staten Island, NY 10
 Figure 2 - MCB Deck Layout (provisional)..... 13
 Figure 3 - MFB Deck Layout (Provisional)..... 16
 Figure 4 - Concrete Mattress Production Plant, Tomkins Cove, NY 17
 Figure 5 - Tomkins Cove Mattress – Site Boundary Plan 19
 Figure 6 - Wilcox Dock, Plattsburgh, NY 20
 Figure 7 - Wilcox Dock, Plattsburgh - Site Boundary Plan 21
 Figure 8 - Anchor Plan – Example 24
 Figure 9 - Anchor Deployment 'Storyboard' 29
 Figure 10 – Submar ‘Pre-Lay’ Mat Pattern 20ft(L) x 8ft(W)x 1ft(D)..... 33
 Figure 11 – Submar ‘Pre-Lay’ Mat Alternate Pattern 20ft(L) x 8ft(W)x 1ft(D) 34
 Figure 12 - Submar ‘Post-Lay’ Mat Pattern 20ft(L) x 8ft(W)x 1ft(D)..... 35
 Figure 13 – Submar Mattress Details 36
 Figure 14 - Concrete Mattress Handling / Deployment Frame (Typical)..... 38
 Figure 15 - ‘Typical’ Utility Crossing Pattern (Concrete Mattresses)..... 39

Table of Tables

Table 1 - Organization Chart - Lake Champlain Mattress Installation 9

Table of Appendices

Appendix 1 – List Of Utility Crossings To Be Protected 46
 Appendix 2 - Signed Crossing Agreements 48
 Appendix 3 - Risk Assessments - Primary Tasks 49
 Appendix 4 – Shipboard Oil Pollution Emergency Plan (SOPEP) 71
 Appendix 5 – Lake Champlain HASP 72
 Appendix 6 – Personnel Transfer Procedure 73
 Appendix 7 – Site Completion Checklists 74

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1 Executive Overview

Champlain Hudson Power Express, Inc. and CHPE Properties, Inc. (collectively, "CHPE") plan to construct, operate, and maintain a new 1,250 megawatt ("MW") high-voltage direct current ("HVDC") underwater/underground electric transmission facility ("HVDC Transmission System"). The HVDC Transmission System will interconnect with the transmission system of Hydro Quebec and will provide power to the City of New York.

The CHPE route has been carefully designed to minimize its impact on the environment. CHPE cables will be buried throughout the extent of the route. This will keep them out of public view and protect them from extreme weather and external aggression. Two five-inch-diameter power cables and one smaller fiber optic cable will be placed underwater or underground and run 339 miles from the U.S.-Canadian border, south through Lake Champlain, along and under the Hudson River, and eventually ending at a converter station that will be built in Astoria, Queens, New York.

NKT HV Cables AB (NKT) have been selected as the cable supplier for the CHPE Project and has subcontracted the following project tasks to Caldwell Marine International LLC. (CMI):

1. **CIVIL INFRASTRUCTURE:** -Land-to-Water duct installation for:
 - a. Lake Champlain Segment (southern landing only)
 - b. Upper Hudson River Segment (northern & southern landings)
 - c. Lower Hudson River Segment (northern landing)
 - d. Harlem River Segment (southern landing)

***NOTE:** HDD operations required for the installation of Land-to-Water cable landing ducts will be performed by CMI's sister company Huxted Trenchless LLC.*

2. **SUBMARINE CABLE INSTALLATION:** -
 - a. Lake Champlain Segment
 - b. Harlem River Segment

***NOTE:** The CHPE Project will require the installation of two additional submarine cable segments, namely (1) Upper Hudson River, & (2) Lower Hudson River. NKT has retained responsibility for the cable installation tasks for these two segments.*

3. **UTILITY CROSSING PROTECTION:** -
 - a. Lake Champlain Segment
 - b. Harlem River Segment

For the Lake Champlain Segment, the principal method of cable protection will be lowering of the cable bundle to a target depth below Lakebed grade level.

The following means will be utilized to attain the target depth of lowering:

- a. Primary: Plow (jet / shear)
- b. Secondary: Diver (jetting / water venturi / air venturi)

Alternate (non-burial) means of cable protection will be utilized in locations where:

- a. Cable lowering is not practically feasible e.g., utility crossings, final landing approaches etc.
- b. Full depth of lowering was not achieved by primary or secondary means.
- c. Use of alternate protection is 'planned' e.g., at utility crossing sites.
 - I. For utility crossing sites that lie in Lake water depths of <150ft, CMI proposes the use of concrete mattress protection measures.
 - II. For utility crossing sites that lies in Lake water depths of >150ft, CMI proposes to apply 'poly-shell' cladding (Uraduct or similar) to the CHPE cable product during the actual lay process. We await approval of this protection method and will address methodology in a separate, dedicated document.
 - III.

This document is provided as a means and methods statement for the installation of concrete mattress cable protection in Lake water depth of <150ft, no other methodology topics are addressed herein. The procedural guidelines set forth in this document will be closely followed when performing mattress placement works in support of the CHPE Project. All work shall be performed in a safe and expedient manner.

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2 Methodology Statement - Purpose

The Purpose of this methodology statement is to inform Construction Managers, Crew and Contractors so that Mattress Placement tasks can be performed in a safe and efficient manner. This methodology statement is considered a 'living document'. Field operations will be subject to ongoing review to identify potential improvements to methodologies. Revised methodologies will be adopted, and document updates issued, if after analysis, changes are deemed to be beneficial with respect to operational safety / efficiency.

It is duty of the Managers, Officers, Crew of CMI and our Subcontractors to familiarize themselves with, and to apply the methodologies outlined in this document.

3 Methodology Statement - Confidentiality

The contents of this mattress methodology statement are not to be shared with third parties without the express authorization of CMI.

4 Regulatory Compliance / Notifications / Liaison

- The procurement of Federal and Local Permits required for mattress installation is the responsibility of 'Others'.
 - Project tasks will be performed in strict compliance with the terms and conditions of CHPE Permits
- The procurement of signed 'Crossing Agreements' is the responsibility of 'Others'.
 - Crossing protection measures will be installed in accordance with individual designs as defined in the respective Site Crossing Agreements
 - Notifications will be issued to asset owners / operators in accordance with defined requirements of each Site Crossing Agreement
- Local Notice to Mariners (LNM) will be issued prior to the start of the marine field operations. Daily work location, minimum passing clearance request and all other relevant information will be broadcast via marine VHF radio.
- CMI vessels will be properly registered, operational personnel will be properly trained and certified to perform their required tasks.
- CMI equipment will be tested prior to usage to ensure fitness for purpose.
- Rigging will be inspected prior to use. Items that are found to have defects will be removed from service.
- Dive equipment will be properly inspected prior to use. All required certifications will be in-date at time of equipment use. Dive planning and operations will be performed in accordance with the current edition of 'CMI Dive Procedures & Safe Practices Manual' (NKT Doc #1AA0565950)
- All documents as indicated by the Master Document Register (MDR), methods statements etc. will be available in their latest approved revision on the Mattress Crane Barge (MCB)
- Copies of Project Permits will be available for reference aboard the MCB.
- Commercial passes will be procured for all CMI Tugs, Barges and chartered vessels that will transit through the Champlain Canal.
- Courtesy notifications will be provided to emergency services and law enforcement that are local to project operational sites.
- Periodic updates will be provided to NKT regarding operational progress.

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5 CHPE Cable Protection Requirements – Lake Champlain Segment

Protection requirements for CHPE Lake Champlain cabling are governed by the following:

- CHPE Project permitting:
 - a. CHPE cables require protection in Lake water depth of 150ft **SEE NOTE* or less.
 - i. Where cable burial is utilized as protection, USACE permitting requires the following:

Burial Depth in feet	Inside Shipping Channels or Narrows		Outside Shipping Channels or Narrows	
	In rock	Elsewhere	In rock	Elsewhere
USACE Permit Requirement				
Lake Champlain (in less than 150 feet water depth)	6	8	-	4
 - ii. Where concrete mattresses are utilized as cable protection:
 - Installed mattresses shall have a minimum thickness of 12 inches.
 - The separating distance between adjacent concrete block components of the mattress structure shall not exceed twelve inches.
 - b. In Lake water depths of greater than 150ft **SEE NOTE* cables may be surface laid without any additional protection.
- *NOTE: Water depth are referenced to Lower Lake Level (93.0ft NGVD29) as per NOAA charting for Lake Champlain waters.*
- Signed Utility Crossing Agreements – these are documents that are negotiated between CHPE LLC. and individual utility asset owners / operators. Utility Crossing Agreements provide details of requirements that are specific to the subject site and underlying utility. Crossing agreement stipulations may include:
 - a. Anchor / plow exclusion zones
 - b. Crossing protection design & specifications / quality of materials used therein.
 - c. A requirement for physical separation between the CHPE cables and the subject underlying utility
 - d. Minimum crossing angle between CHPE cable route and path of underlying utility
 - e. Notification schedule with respect to CHPE operational activities in vicinity of subject utility
 - f. Attendance of utility operator representatives during CHPE construction period

6 Mattress Protection – Planned vs Remedial

Planned Mattress Installation – Utility Crossings / Other Areas

Lake Champlain ‘Route Planning’ will be coordinated with NKT and will identify and demarcate areas (e.g., utility crossings, field splice deployment sites, final landing approaches etc.) where plow operations are not feasible and ‘planned’ installation of mattresses shall be performed.

‘For Construction’ issues of RPL, SLD, & charting documentation will provide clear indication regarding the geographical locations and physical extents where ‘planned’ mattress installation shall be performed.

Remedial Mattress Installation

Cable installation and plow / diver performance data will be recorded and subject to ongoing review during the Lake Champlain cable installation process. NKT will be officially notified regarding any areas where deficiencies in plow / diver protection have been identified. Mattress protection will be installed at site locations where CHPE LLC. / NKT agree to this method of remediation.

On completion of field operations, the installation data will be utilized to update ‘For Construction’ documents to properly reflect ‘As- Built’ status. CMI’s as-built documentation and charting will include full details of all installed mattresses (planned & remedial)

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7 Project Task Personnel

Please see Organization Chart in **Table 1**

CMI Head Office Management

- 1 Project Manager
- CHPE Project Safety Officer

Mattress Production Site Personnel

- 1 Construction Manager (Mattress Production Site)
- 1 Crane Operator (Mattress Production Site)
- Mattress fabrication crew / loadout (Mattress Production Site)

Mattress Crane Barge Personnel

- 1 Deck Superintendent (Mattress Crane Barge) - MCB
- 1 Surveyor (MCB)
- 1 Crane Operator (MCB)
- 2 Deckhands (MCB)
- 1 Equipment Engineer (MCB)
- Five (5) man Dive Team as per A.D.C.I. – 4.2:
 - 1 Dive Supervisor (MCB)
 - 4 Divers (MCB)
- Crew Boat Captain (Personnel Transfer Vessel)
- Crew Boat Deckhand (Personnel Transfer Vessel)
- 1 Tug Crew (MCB Support Tug)
- 1 Tug Crew (MFB Support Tug)

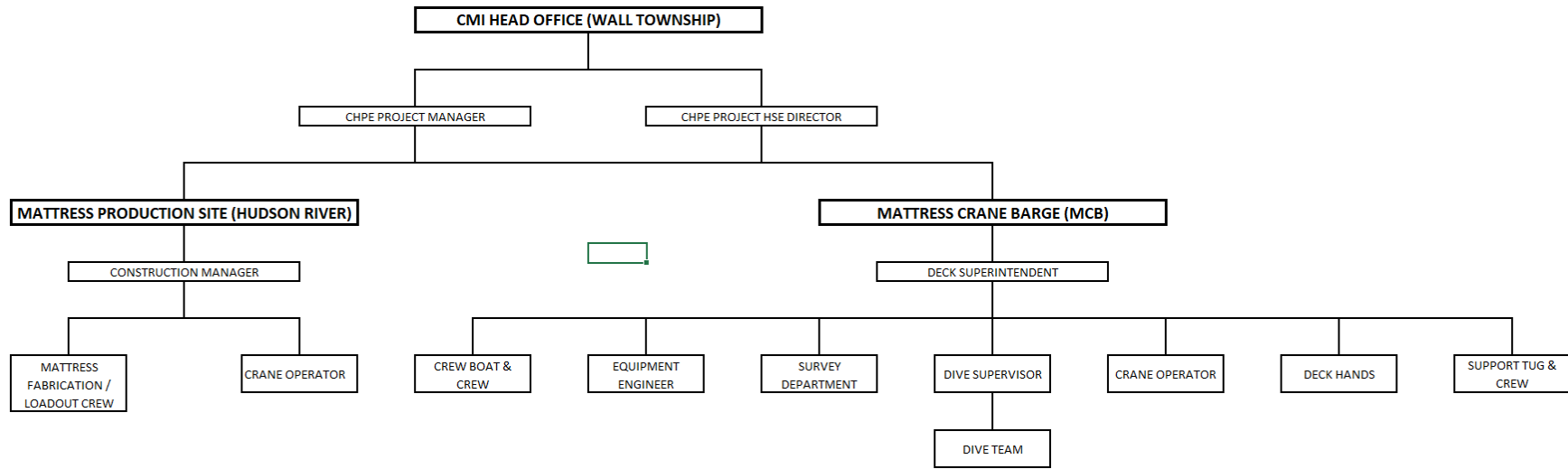


Table 1 - Organization Chart - Lake Champlain Mattress Installation

8 Project Mobilization – Marine Assets

CMI's waterfront yard at Staten Island, New York will serve as the primary location for mobilization of marine assets for Lake Champlain mattress installation tasks. – see **Figure 1**

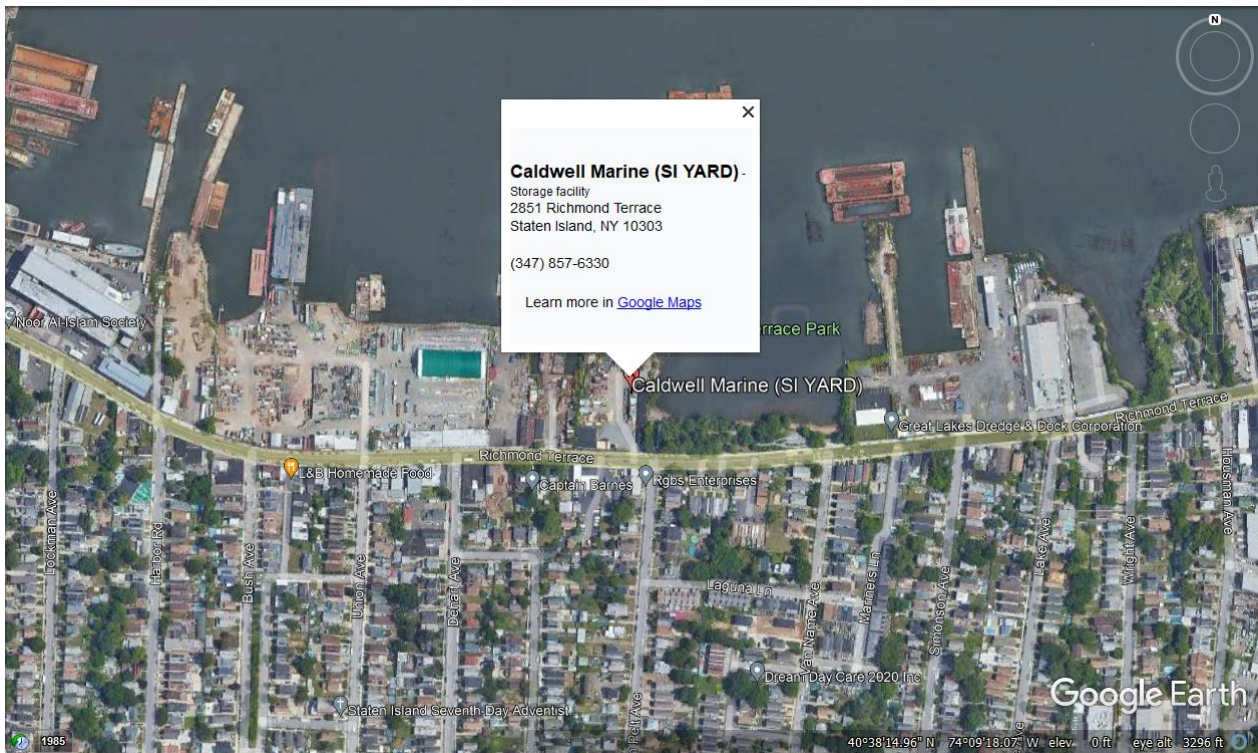


Figure 1 - CMI Marine Yard, Staten Island, NY

The following vessels will be mobilized in support of mattress installation tasks in the waters of Lake Champlain.

1. **Mattress Crane Barge (MCB)** – This vessel will be the primary operational platform for mattress installation. The vessel will be a NY State Canal compliant mono-hull deck barge that will be sourced from existing charter fleet. Provisional dimensions for this barge are: Length 165ft (50.29m) x Beam 43.5ft (13.26m) x Depth 12ft (3.66m).
2. **Work Boat(s):** The MCB will carry support work boat(s) that will be available for general support of operations. These vessels are typically outboard powered skiffs with a length of around 25ft. The workboats will be mobilized at the same time as the MCB and will be transported to site aboard the MCB.
3. **MCB Support Tug** – This tug will be a licensed, insured, and USCG inspected vessel that is dedicated to the operational support of the MCB. It will have an adequate bollard pull / horsepower rating to competently maneuver the MCB and will feature anchor handling capability.
4. **Crew Boat:** This vessel will be a licensed, insured, and USCG inspected vessel that is dedicated to the operational support of the MCB. The crew boat will be USCG certified to carry a defined number of operational personnel and Client observers. The crew boat will transit to site independently via the Champlain Canal
5. **Mattress Feeder Barge (MFB):** The mattress stock aboard the Mattress Crane Barge will be regularly replenished by a Mattress Feeder Barge. This replenishment service will serve to optimize the operational efficiency of the 'fully crewed' MCB. The vessel will be a NY State Canal compliant mono-hull deck barge that will be sourced from existing charter fleet. Provisional dimensions for this barge are: Length 180ft (54.86m) x Beam 40ft (12.19m) x Depth 12ft (3.66m).
6. **MFB Support Tug:** This tug will be a licensed, insured, and USCG inspected vessel that is dedicated to the operational support of the MFB. It will have an adequate bollard pull / horsepower rating to competently maneuver the MFB. Tug dimensions will be NY State Canal compliant

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8.1 Mattress Crane Barge (MCB) / Support Vessels

Please see MCB Deck Layout (provisional)

During mobilization the barge will be outfitted with the following listed equipment:

- Project documentation per MDR + crane lift calculation for planned crane operations (mattress handling / deployment)
- Safety equipment & supplies
- First Aid supplies
- Environmental protection equipment & supplies (spill kits etc.)
- Regulation lights and shapes
- Emergency tow line
- Crew hygiene facilities (Portable Toilets, etc.)
- Communications equipment
- Navigation Equipment – *To be calibrated / tested during mobilization trials.
 - *Differential Global Positioning Service receiver (DGPS) + correction service
 - *Handheld GNSS GPS with Real Time Kinematic (RTK) corrections
 - *DGPS mounted on boom tip of deck crane (coarse mattress positioning)
 - *Hemisphere DGPS compass
 - *Coda Octopus Positioning Sonar (fine mattress positioning)
 - * Hypack software – inputted with project data:
 - CHPE planned installation route.
 - Lake Champlain survey charting (2022)
 - Planned mattress installation patterns.
 - Locations of local utilities & associated exclusion zones
 - Planned anchor pattern / spud locations.
 - NOAA charting data
 - *Barge / Tug Radio Data Tx/Rx equipment (*Pacific Crest, or similar*)
- Manitowoc 2200 Series 2 deck service crane (*provisional*)- *Crane to be certified & inspected daily during use.*
- 4-point anchor spread – *Equipment details TBC*
 - Winches: 2 x AMCON 270 – *TBC*
 - Wires: 4 x 2000ft length – *Wire diam TBD*
 - Deck turning sheaves (as required)
 - Anchors:
 - Bow: 2 x Danforth 2500lb (*nominal*)
 - Stern: 2 x Danforth 2500lb (*nominal*)
 - Mooring buoys: Spherical steel with hawse pipe
 - Regulation mooring buoy marker lights
- Generator(s) rated for required service.
- Deck lighting – adequate illumination to enable safe performance of planned deck tasks.
- Double walled fuel tank(s)
- Mattress deployment frame(s) – *With current load test certification*
- Mattress stocks – to be regularly replenished by mattress feeder barge.
- Fendering + mooring ropes – to enable the MFB to safely secure alongside for purposes of replenishing MCB mattress stock.
- Tool / Spares container(s)
- Office / Messroom container(s)
- Support workboat(s) – outboard powered skiff(s)
- Dive spread – *Listed items to be certified / tested / inspected in accordance with CMI Dive Procedures & Safe Practices Manual & ADCI recommendations.*
 - Field copies of CMI Dive Procedures & Safe Practices Manual
 - Field copies of dive equipment certification

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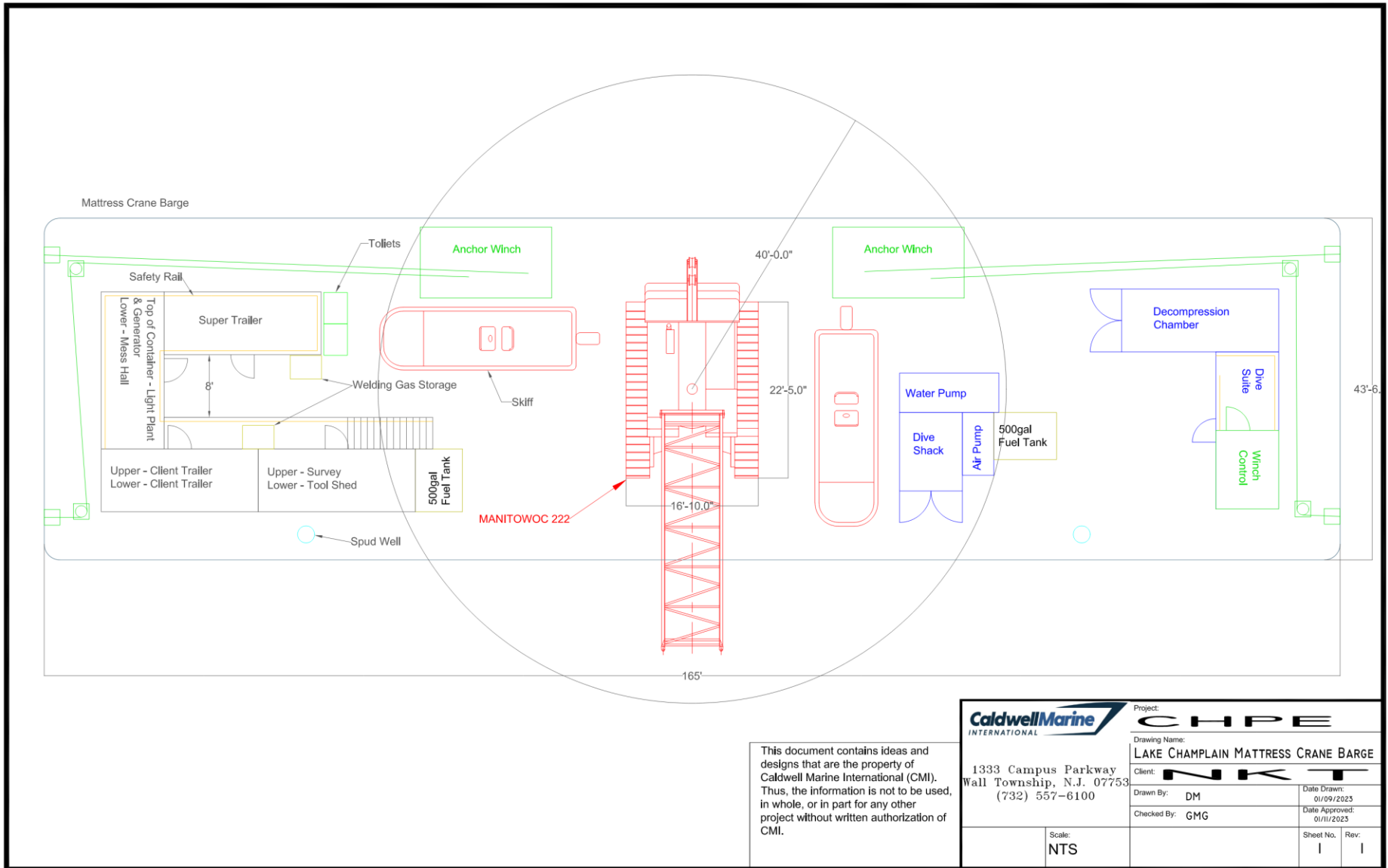
- 10' Dive Container – fully instrumented
- Diver – surface communications
- Compressors & storage bottles
- Hot water supply machine
- Umbilical
- Underwater camera (CCTV) with recorded video/audio
- Diesel propelled water pumps+ suction & delivery hoses + control manifold.
- Pressure compensated diver jetting nozzles.
- Water lift (venturi eductor)
- Air lift (venturi eductor)
- Underwater hydraulic cutter – for localized debris clearance (as required)

DIVE EQUIPMENT NOTE: Subject to approval, synthetic CPS product (Uraduct or similar) will be utilized to protect crossing sites that are in deep water areas (>150ft DOW).

The Mattress Crane Barge will not be equipped with a DP system. For this reason, the MCB equipment list currently excludes a Diver Launch & Recovery System (LARS).

*A hyperbaric chamber will be available on-site – **NOTE:** Locations of onshore emergency hyperbaric chamber(s) will be listed in the Mattress Placement Site Specific Health and Safety Plan (SSHASP) as well as the Safe Dive Plan.*

GENERAL NOTE: *On completion of mobilization, the MCB and the Support Tug will be inspected by an independent marine surveyor, and a 'Trip-in-Tow' certificate obtained prior to towed passage to the Lake Champlain cable grounds. Towed passage will be conducted in strict adherence to the terms and conditions indicated on the 'Trip-in-Tow' certificate.*



This document contains ideas and designs that are the property of Caldwell Marine International (CMI). Thus, the information is not to be used, in whole, or in part for any other project without written authorization of CMI.

		Project: CHPE	
1333 Campus Parkway Wall Township, N.J. 07753 (732) 557-6100		Drawing Name: LAKE CHAMPLAIN MATTRESS CRANE BARGE	
Client:	NKT	Drawn By:	DM
Checked By:	GMG	Date Drawn:	01/09/2023
Scale:	NTS	Date Approved:	01/11/2023
		Sheet No.:	1
		Rev.:	1

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Figure 2 - MCB Deck Layout (provisional)

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MCB Support Tug

This tug will be dedicated to the operational support of the MCB. The vessel will have an adequate bollard pull / horsepower rating to competently maneuver the MCB and be capable of deploying / recovering MCB anchors. MCB Support Tug dimensions will be NY State Canal complaint. Tug crew will be properly licensed in accordance with USCG requirements.

In addition to her primary tow / push function, the tug will be outfitted with the following:

- Inter-vessel communications gear
- Regulation lights & shapes (for tug + intended tow)
- Spare lights / batteries for pennant buoys
- Anchor-handling (deployment / recovery) gear & rigging.
- Barge / Tug Radio Data Tx/Rx equipment (Pacific Crest, or similar)
- Computer loaded with nav software (Hypack or similar) to provide 'Slave' display of MCB 'Master' with planned anchor points / site information clearly depicted.

NOTE: On completion of mobilization, the MCB and her support tug will be inspected by an independent marine surveyor, and a 'Trip-in-Tow' certificate obtained prior to towed passage to the Lake Champlain cable grounds. Towed passage will be conducted in strict adherence to the terms and conditions indicated on the 'Trip-in-Tow' certificate.

MCB Crew Boat

The MCB will be supported by a 'USCG inspected' crew boat. The crew boat will have adequate certified capacity to carry all MCB operations personnel and Client Representatives. The crew boat captain will be properly licensed in accordance with USCG requirements.

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8.2 Mattress Feeder Barge (MFB) / Delivery Tug

Copies of Signed Utility Crossing Agreements for the CHPE Lake Champlain Segment are not yet available. The total mattress count for the Lake has not yet been finalized. The MFB and delivery Tug will not be chartered / mobilized if Lake operations can be efficiently accomplished using the Wilcox Dock as a temporary storage location for interim replenishment of MCB consumables.

Mattress Feeder Barge – Please see *MFB Deck Layout (provisional) Figure 3*

The Mattress Feeder Barge will carry adequate mattress stock to perform all of Lake Champlain. The Mattress Crane Barge will be regularly replenished by a Mattress Feeder Barge. The feeder barge will be a mono-hull deck barge with dimensions that are NY State Canal compliant.

MFB Dimensions - TBC: Length 180ft (54.86m) x Beam 40ft (12.19m) x Depth 12ft (3.66m) (*provisional*)

MFB mobilization is provisionally planned to be performed at the Staten Island Yard. Due to the limited scope of mobilization work for this vessel we may perform the work elsewhere.

The barge will be outfitted with:

- Regulation lights and shapes
- Emergency tow line & rigging
- Deck pad-eyes & mattress lashings – in accordance with lashing plan
- Mooring lines & fendering

NOTE: *On completion of mobilization, the MFB and her delivery tug will be inspected by an independent marine surveyor, and a ‘Trip-in-Tow’ certificate obtained prior to towed passage to the Lake Champlain cable grounds. Towed passage will be conducted in strict adherence to the terms and conditions indicated on the ‘Trip-in-Tow’ certificate.*

MFB Delivery Tug

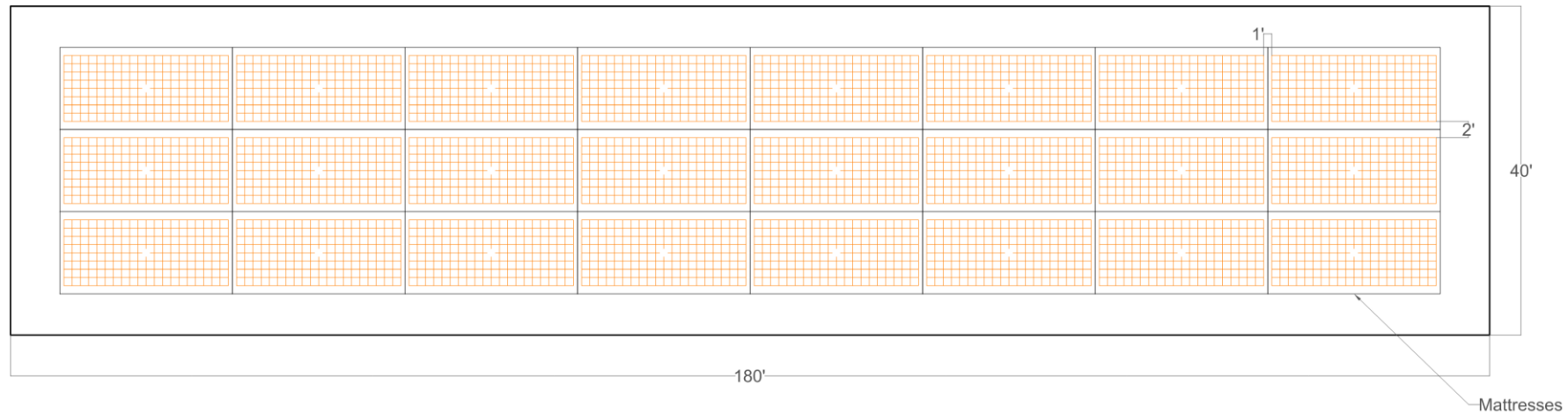
The MFB will be delivered to the Lake Champlain cable grounds by a chartered tug. Tug dimensions will be NY State Canal compliant.

The following tasks will be performed to prepare the MFB Support Tug for operational service.


- On-hire inspection of tug by independent marine surveyor
- Verify availability and satisfactory condition of regulation lights & shapes (tug and barge)
- Verify tug has adequate fuel, water, victuals for planned voyage(s) – supplement as required.
- Verify operation of all tug systems + check condition of all tow equipment
- Trip-in-Tow inspection of tug and MFB by independent marine surveyor

The MFB Delivery Tug will be released for other service after she has successfully delivered the MFB to the cable working grounds.

Mattress Feeder Barge



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 Marine International, LLC. 1333 Campus Parkway Wall Township, N.J. 07753 (732) 557-6100	Project:	CHPE
	Drawing Name:	LAKE CHAMPLAIN MATTRESS FEEDER BARGE
Scale: NTS	Client:	NK T
	Drawn By:	DM
	Checked By:	GMG
	Date Drawn:	01/09/2023
	Date Approved:	01/11/2023
	Sheet No.	1
	Rev.	1

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Figure 3 - MFB Deck Layout (Provisional)

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9 Mobilization – Land Assets

9.1 Mattress Fabrication Plant

CMI's CHPE Scope of Work with respect to mattress supply & installation has not yet been fully defined. In addition, CHPE LLC's Utility Crossing Agreement negotiations with respect to crossing protection requirements and design have not yet been concluded.

We have been in negotiations with Submar, an established US based mattress provider, to address mattress supply logistics for the CHPE Project. We have determined that a centralized mattress production site will be required to service project requirements for large scale mattress production and distribution. To this end, the riverside area on the Hudson River at Tomkins Cove, NY has been leased where a dedicated mattress production and distribution facility will be established.



Figure 4 - Concrete Mattress Production Plant, Tomkins Cove, NY

In addition to Submar's mattress production equipment the mobilized site will feature a crawler type crane – Manitowoc 222 or similar, that will be utilized for:

1. Loading mats onto the 'gearless' Mattress Feeder Barge – *principal mat delivery method*
2. Loading mats onto delivery trucks – *secondary / expedited mat delivery method.*
3. Moving mats / equipment within the mattress production site

The crane capacity lift and outreach rating will be sufficient to safely perform all anticipated tasks.

TASK: LAND SITE SET-UP – TOMKINS COVE, NEW YORK		
TASK DOCUMENTATION		
ITEM #	DESCRIPTION & MDR REFERENCE (AS APPLICABLE)	ISSUE DATE
1	Site Layout Plan	1/30/23
2	Site Specific HASP	TBD
3	Equipment manuals	TBD

TASK: LAND SITE SET-UP – TOMKINS COVE, NEW YORK	
ITEM #	SITE EQUIPMENT LISTINGS
1	Security fencing & signage (as required)
2	Site safety equipment
3	Site environmental equipment (spill kits etc.)
4	Site lighting
5	Site office(s) + communications
6	Submar concrete mattress fabrication equipment
7	Materials handling equipment: <ul style="list-style-type: none"> ○ Crawler crane (rated for service) ○ Forklift / Loadall ○ Mattress handling frame(s) ○ Rigging
8	Welding / cutting equipment
9	Tools

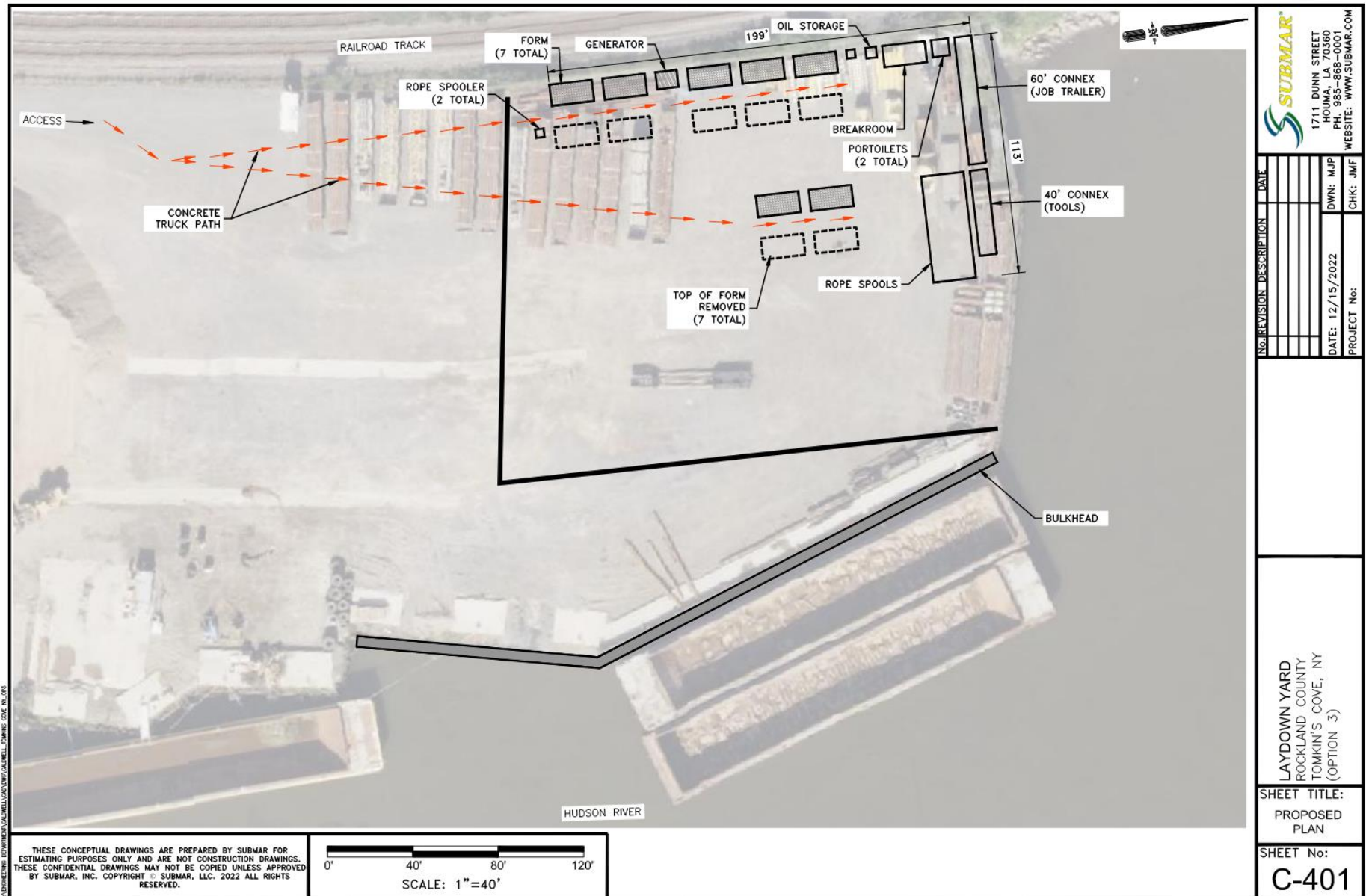


Figure 5 - Tomkins Cove Mattress – Site Boundary Plan

9.2 Operational Base / Storage Site – Wilcox Dock, Plattsburgh, NY

CMI has selected Wilcox Dock, Plattsburgh, New York as an operational base. This facility has been used as a base for previous Lake Champlain projects.

Equipment will be mobilized to Wilcox Dock in the early phases of the CHPE Project. This location will serve multiple support functions including:

- Mobilization and support of Lake Champlain CLB
- Mobilization of & support of operational vessels for PLGR / RC / Utility Crossing Protection
- Fiber Optic Cable Transfer (FO Transport Barge to Lake Champlain CLB)
- Personnel transfer staging point (primary)
NOTE: Other locations will be used when transit distance to / from Wilcox Dock is deemed excessive
- Emergency personnel transfer point.
NOTE: The Project HASP will identify other locations for use when transit distance to Wilcox Dock is deemed excessive
- Exchange / clean-out service point for sanitation equipment (Portable toilets etc.)
- Equipment / Material laydown area – If required, Wilcox Dock will be utilized as a temporary “staging” area for supply stocks of concrete mattresses etc..

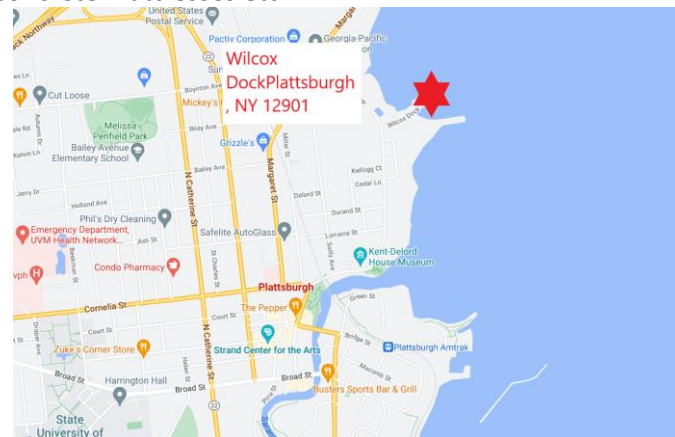


Figure 6 - Wilcox Dock, Plattsburgh, NY

TASK: LAND SITE SET-UP – WILCOX DOCK, PLATTSBURGH, NEW YORK		
TASK DOCUMENTATION		
ITEM #	DESCRIPTION & MDR REFERENCE (AS APPLICABLE)	ISSUE DATE
1	Site Layout Plan	1/30/23
2	Site Specific HASP	TBD
3	Equipment manuals	TBD

TASK: LAND SITE SET-UP – WILCOX DOCK, PLATTSBURGH, NEW YORK	
ITEM #	SITE EQUIPMENT LISTINGS
1	Security fencing & signage
2	Site safety equipment
3	Site environmental equipment (spill kits etc.)
4	Site lighting
5	Site office(s) + communications
6	Materials handling equipment: <ul style="list-style-type: none"> ○ RT crane (rated for service) ○ Forklift / LOL
7	Welding / cutting equipment
8	Tools



Figure 7 - Wilcox Dock, Plattsburgh - Site Boundary Plan

10 Operational Site Planning

10.1 Mattress Installation Site Reviews / Anchor Planning

TASK: MATTRESS INSTALLATION SITE REVIEWS		
TASK DOCUMENTATION		
ITEM #	DESCRIPTION & MDR REFERENCE (AS APPLICABLE)	ISSUE DATE
1	Master Document Register – CHPE Project	7/1/22
2	Mattress installation site listings per CHPE LLC / NKT instruction	TBD
3	Copies of signed Utility Crossing Agreements (all sites)	TBD
4	CHPE Project Permitting	7/1/22
5	Site Specific HASP	TBD
6	Method Of Procedure Document – Mattress Operations	1/30/23
7	CHPE Lake Champlain Submarine Cable Installation Route Survey Report (2022)	TBD
8	CHPE Lake Champlain Planning Charts (for construction edition)	TBD
9	CHPE Lake Champlain Planning RPL (for construction edition)	TBD
10	CHPE Lake Champlain Planning SLD (for construction edition)	TBD
11	CHPE Utility Crossing Survey Report (Lake Champlain)	TBD
12	NOAA Charting (corrected to date)	TBD
13	USCG Notices To Mariners (latest edition)	TBD
14	Lake Champlain meteorological / climate data	TBD
15	Equipment manuals	TBD

10.2 Anchoring Componentry / Terminology

See Anchor Handling procedure including analysis (NKT Doc. #1AA0544672) for complete overview of anchoring componentry / terminology.

10.3 Anchor Plan – Mattress Crane Barge

The pertinent site data for all listed crossing sites will be reviewed.

Our selection of anchoring equipment will consider numerous factors, including:

- Mattress protection design & associated barge excursion requirements needed to complete all mattress installation & as-built survey tasks.
- Depth of water
- Lakebed type (holding ground)
- Barge design factors – draft, freeboard, windage, mass, available deck space
- Meteorological factors – wind, current, tidal range
- Exclusion zones (local utilities, environmentally protected areas, protected archaeological features etc.)
- Proximity and type of local utilities
- Density and type (recreational / commercial) of local marine traffic

Unless site conditions require otherwise, CHPE anchor plans for MCB will presume use of the following equipment.

Bow

Bow anchor winch: Amcon 270 bow Anchor(s)

Anchor(s) type / size: Danforth design / 2500lb (nominal)

Wire length: 2000' (nominal)

Stern

Anchor winch: Amcon 270 Stern anchor(s)

Anchor(s) type / size: Danforth design / 2500lb (nominal)

Wire length: 2000' (nominal)

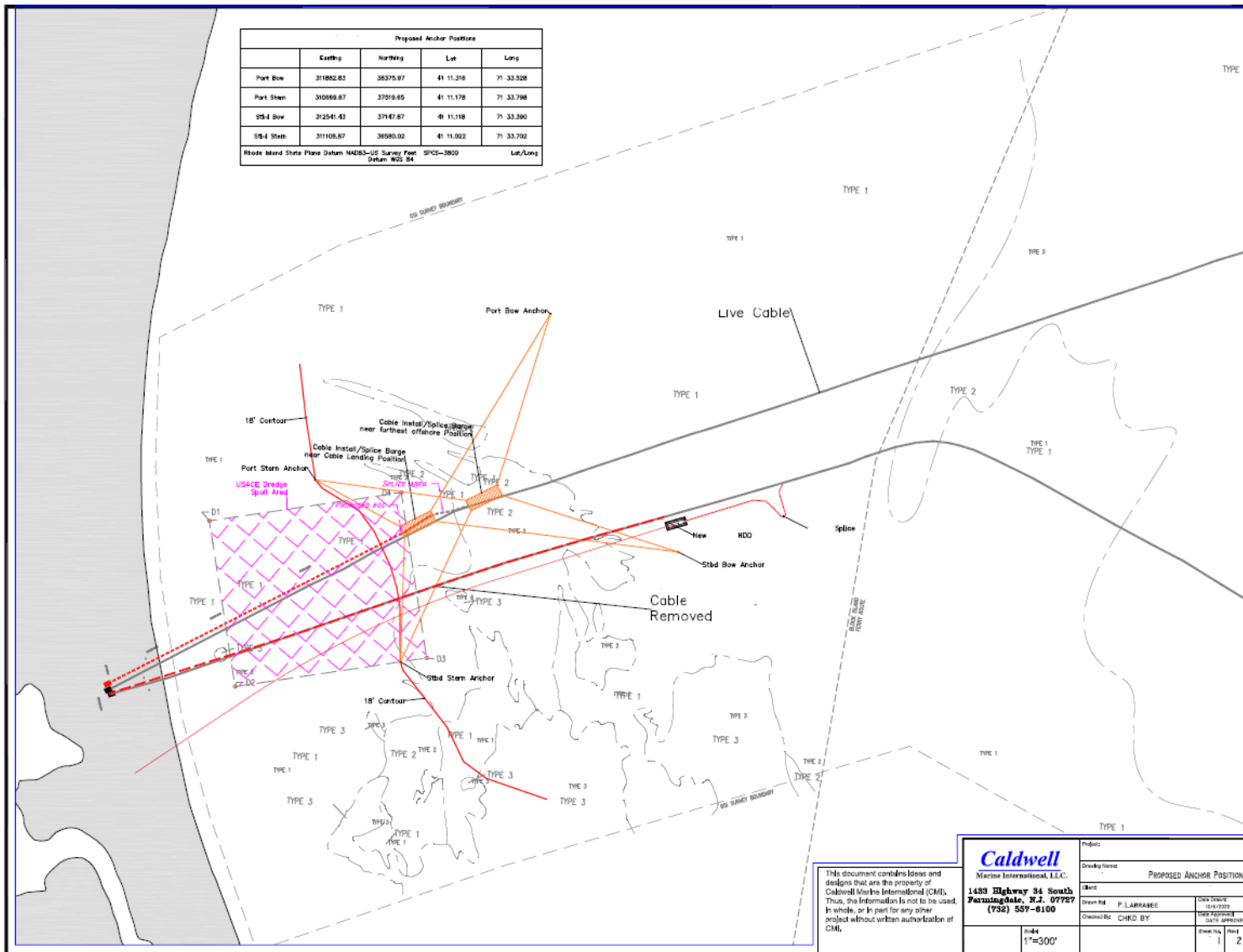
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Individual anchor plans will be generated for each work site. Anchor placement circles will be carefully chosen to maximize operational efficiency while fully complying with Crossing Agreement stipulations and respecting local exclusion zones etc. **NOTE:** *Consecutive order of anchor placement will not be defined in anchor plans as this decision is subject to site conditions at the actual time of anchoring.*

Please see **Figure 8** for redacted example of an Anchor Plan from a recent, completed cable repair project.

Pertinent information from anchor plans will be inputted into the MCB's navigation computer, this will enable the MCB Survey Team to effectively direct anchoring operations and to monitor operational progress real-time. Repeater screens and communications will be established at the following operator stations to enable proper coordination between key personnel:

- MCB winch operator hut
- MCB Support Tug wheelhouse – via radio data-link



11 Task Execution

11.1 Anchor Deployment / Recovery

TASK: ANCHOR DEPLOYMENT / RECOVERY		
TASK DOCUMENTATION		
ITEM #	DESCRIPTION & MDR REFERENCE (AS APPLICABLE)	ISSUE DATE
1	Master Document Register – CHPE Project	7/1/22
2	Mattress installation site listings per CHPE LLC / NKT instruction	TBD
3	Copies of signed Utility Crossing Agreements (all sites)	TBD
4	CHPE Project Permitting	TBD
5	CHPE Lake Champlain anchor plans (site – specific) – all Lake sites	TBD
6	Site Specific HASP	TBD
7	Method Of Procedure Document – Mattress Operations	1/30/23
8	CHPE Lake Champlain Submarine Cable Installation Route Survey Report (2022)	TBD
9	CHPE Lake Champlain Planning Charts (for construction edition)	TBD
10	CHPE Lake Champlain Planning RPL (for construction edition)	TBD
11	CHPE Lake Champlain Planning SLD (for construction edition)	TBD
12	CHPE Utility Crossing Survey Report (Lake Champlain)	TBD
13	NOAA Charting (corrected to date)	TBD
14	USCG Notices To Mariners (latest edition)	TBD
15	Lake Champlain meteorological / climate data	TBD
16	Equipment manuals	TBD

TASK: ANCHOR DEPLOYMENT / RECOVERY	
ITEM #	EQUIPMENT LISTINGS
1	Mattress Crane Barge (fully mobilized)
2	MCB Support Tug (fully mobilized)
3	Crew boat
4	Support workboats

Anchor deployment & recovery operations require good collaboration between the following parties:

- MCB Survey Team – Responsible for direction operations
- MCB Support Tug – Responsible for accurate placement of anchors
- MCB Anchor winch operator – Responsible for pay-out / pay-in of winch wires and control of wire slack / tensions in coordination with MCP Support Tug movements.
- MCB Deck Team – Responsible for rigging of anchors and pendant buoys.

The crew will verify the operational readiness of all essential equipment and a Toolbox Talk will be conducted prior to commencement of anchoring and subsequent site operations.

The topics covered during the Toolbox Talk will be adequate to ensure all parties are fully conversant with site conditions, procedural steps, operational risks, planned mitigations and their respective roles.

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Anchor Deployment

- The following operational sequence describes a typical 4-point anchor deployment operation – See also *Figure 9*. It should be noted that local site conditions may require variance of this procedure.
- The MCB & the MCB Support Tug are connected throughout via a radio data link that enables accurate placement of anchors and logging of operational events. The MCB Navigation Team control the ‘Master’ navigation screen, the MCB Support Tug and the MCB Winch Operator can view operations in real-time site via ‘Slave’ screens.
- For tug recovery purposes, buoy pendant lines are rigged to the crown of the MCB anchors. This enables the tug to easily ‘trip’ the anchor. This methodology has the added benefit that Lakebed disturbance is kept to a minimum. **NOTE:** *Anchor wires from the MCB are connected to anchors via shackles that are connected to a ring at the head of the anchor shank. This connection method enables the anchor to ‘set’ properly for maximum designed holding power.*
- At no time will anchors be dragged across the sea floor.
- Anchors will be properly secured aboard the MCB Support Tug whenever she is tasked with transporting them during deployment / recovery.

<u>TASK: ANCHOR DEPLOYMENT</u>	
<u>TASK ORDER</u>	<u>METHODOLOGY</u>
1	Issue / Update Local Notice to Mariners (LNM) to USCG & provide advance notification to authorities (ACOE, Harbor Master, Township etc.) per CHPE permitting requirements & good industry practice
2	Provide advance notification to utility asset owners per Crossing Agreement terms
3	Review project information and all Crossing Agreement requirements
4	Input site specific design and barge mooring / spud point coordinates into navigation software
5	Conduct pre-job meeting: <ol style="list-style-type: none"> a. Identify operational risks, challenges and mitigation measures. b. Verify that Mattressing Team is using current edition of all project documentation (Crossing Agreements, RPL, charting etc.) and that correct reference datums are set in navigation system. c. Familiarize all parties with proposed operations & safety measures. d. Review site information including prevailing & forecast weather. e. Review site exclusion zones requirements in conjunction with site anchor plan f. Check mattress protection design coordinates and alignments. g. Determine order of anchor placement h. Determine order of mattress placement and barge moves required to achieve plan. i. Establish communications protocols. j. Confirm emergency planning measures. k. Any other business
6	MCB Barge & Support Tug Teams to verify operational readiness of all critical barge & support tug systems, including communications
7	RESTRICT ACCESS TO BACK DECK WORKING AREA TO DEDICATED ANCHOR CREW ONLY
8	MCB Deck Team to: <ul style="list-style-type: none"> • Hang all anchors in readiness & ensure winch dogs are in, and brakes are on • Verify anchor pendant wire lengths are suitable for local site depths – adjust as necessary. • Start equipment and ensure that it is adequately ‘warmed through’ prior to commencement of work
9	<ul style="list-style-type: none"> • All stations (including tug) to confirm identity of Anchor #1 (port bow / starboard bow / port stern / starboard stern – as applicable) & agreed placement order all subsequent anchors
10	Secure support tug to barge and rig Anchor #2 on tug in readiness
HOLD AND REVIEW POINT – ONLY PROCEED IF OPERATIONAL CONDITIONS ARE FULLY SATISFACTORY	
11	MCB Navigation Team instruct Support Tug to commence approach run for deployment of Anchor #1. NOTE: <i>The MCB will self-deploy the Anchor #1 to the Lakebed. Placement of all subsequent anchors will be performed by MCB Support Tug</i>
12	MCB Navigation Team to closely monitor speed and ‘course made good’ of barge throughout Anchor #1 approach run and provide progress updates to MCB operator stations & MCB Support Tug

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13	<p>As the MCB approaches the anchor deployment position for Anchor #1, the MCB Navigation Team will verify that MCB is clear of all exclusion zones, then instruct.</p> <ul style="list-style-type: none"> • MCB Support Tug to reduce speed to the minimum required to maintain steerage. • Anchor winch operator to prepare for deployment of Anchor #1 NOTE: If there is adequate depth of water, the anchor will be lowered in the water column such that it remains above, but safely clear of, the Lakebed
14	<p>When selected barge anchor point is above target deployment position for Anchor #1 the MCB Navigation Team will instruct:</p> <ul style="list-style-type: none"> • Anchor winch operator to release brake to deploy Anchor #1 to the Lakebed. • MCB Deck Team to release Pendant Buoy #1 • MCB anchor winch operator / deck observer to monitor anchor wire lead & notify all stations when anchor is on-bottom. MCB Navigation Team will record & log time and position of anchor placement
15	<p>After the Anchor#1 has been safely deployed, MCB Navigation Team will instruct MCB Support Tug / Anchor Winch Operator to resume the MCB move towards to center point of anchor placement plan, and in the direction of Anchor #2 placement point</p>
16	<p>The MCB Navigation Team will notify all stations as the MCB approaches the center point of anchor placement plan.</p> <ul style="list-style-type: none"> • The MCB Support Tug will reduce speed to the minimum required to maintain steerage. • The Anchor Winch Operator will adjust payout speed on Anchor Wire #1 match the reduced demand.
17	<p>On arrival at the center point of anchor placement plan the MCB Navigation Team will instruct the MCB Support Tug / MCB Anchor Winch Operator to:</p> <ul style="list-style-type: none"> • Stop and hold MCB position. • Engage winch dog / brake on Anchor Wire #1 • Prepare for payout of Anchor Wire #2
18	<p>The MCB Navigation Team will then instruct:</p> <ul style="list-style-type: none"> • The MCB Support Tug to commence carrying Anchor #2 toward its planned deployment position/ • MCB Anchor Winch Operator to commence controlled payout of Anchor Wire #2 to match demand
19	<p>As the MCB Support Tug approaches the anchor deployment position for Anchor #2, the MCB Navigation Team will instruct.</p> <ul style="list-style-type: none"> • MCB Support Tug to reduce speed to the minimum required to maintain steerage. • Anchor winch operator to adjust payout speed of Anchor Wire #2 to match reduced demand
20	<p>When the MCB Support Tug arrives at the planned deployment point for Anchor #2. The MCB Navigation Team will verify that the tug is clear of all utilities & exclusion zones then instruct the MCB Support Tug to deploy Anchor #2 to Lakebed and to release Pendant Buoy #2. The MCB Navigation Team will record the position of placement for Anchor #2</p>
21	<p>When Anchor #2 has been deployed the MCB Navigation Team will instruct?</p> <ul style="list-style-type: none"> • MCB Winch Operator to tension Anchor Wire #1 & Anchor Wire #2 to 'set' both anchors and stabilize MCB position in center of moor. NOTE: MCB Navigation Team & MCB Winch Operator will monitor MCB position and wire tensions to confirm that anchors are properly 'set' • MCB Support Tug to return to MCB to receive Anchor #3 in readiness for deployment
22	<p>When the MCB Team are satisfied that Anchors #1 & #2 are properly set the MCB Navigation Team will instruct MCB Winch Operator to</p> <ul style="list-style-type: none"> • Engage winch dogs / brakes on Anchor Wire #1 & #2 • Prepare for payout of Anchor Wire #3
23	<p>The MCB Navigation Team will then instruct:</p> <ul style="list-style-type: none"> • The MCB Support Tug to commence carrying Anchor #3 toward its planned deployment position/ • MCB Anchor Winch Operator to commence controlled payout of Anchor Wire #3 to match demand speed
24	<p>As the MCB Support Tug approaches the anchor deployment position for Anchor #3, the MCB Navigation Team will instruct.</p> <ul style="list-style-type: none"> • MCB Support Tug to reduce speed to the minimum required to maintain steerage. • Anchor winch operator to adjust payout speed of Anchor Wire #3 to match reduced demand.

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25	When the MCB Support Tug arrives at the planned deployment point for Anchor #3. The MCB Navigation Team will verify that the tug is clear of all utilities & exclusion zones then instruct the MCB Support Tug to deploy Anchor #3 to Lakebed and to release Pendant Buoy #3. The MCB Navigation Team will record the position of placement for Anchor #3
26	When Anchor #3 has been deployed the MCB Navigation Team will instruct? <ul style="list-style-type: none"> • MCB Winch Operator to apply tension to Anchor Wire #3 & adjust Anchor Wires #1 & #2 as required to stabilize MCB position in center of moor. • MCB Support Tug to return to MCB and receive Anchor #4 in readiness for deployment
27	When the MCB Team are satisfied that the MCB position is stabilized, the MCB Navigation Team will instruct MCB Winch Operator to <ul style="list-style-type: none"> • Engage winch dogs / brakes on Anchor Wires #1, #2, & #3 and prepare for payout of Anchor Wire #4
28	The MCB Navigation Team will then instruct: <ul style="list-style-type: none"> • The MCB Support Tug to commence carrying Anchor #4 toward its planned deployment position/ • MCB Anchor Winch Operator to commence controlled payout of Anchor Wire #4 to match demand speed
29	As the MCB Support Tug approaches the anchor deployment position for Anchor #4, the MCB Navigation Team will instruct. <ul style="list-style-type: none"> • MCB Support Tug to reduce speed to the minimum required to maintain steerage. • Anchor winch operator to adjust payout speed of Anchor Wire #4 to match reduced demand
30	When the MCB Support Tug arrives at the planned deployment point for Anchor #4. The MCB Navigation Team will verify that the tug is clear of all utilities & exclusion zones then instruct the MCB Support Tug to deploy Anchor #4 to Lakebed and to release Pendant Buoy #4. The MCB Navigation Team will record the position of placement for Anchor #4
31	When Anchor #4 has been deployed the MCB Navigation Team will instruct? <ul style="list-style-type: none"> • MCB Winch Operator to apply tension to Anchor Wire #3 & #4 to properly set the anchors. NOTE: <i>MCB Navigation Team & MCB Winch Operator will monitor MCB position and wire tensions to confirm that anchors are properly 'set'</i>
32	With all anchors firmly 'set', the MCB Navigation Team will instruct: <ul style="list-style-type: none"> • MCB Support Tug to stand by in readiness & assume Guard Vessel duties. • MCB Winch Operator to operate winches to move MCB into planned working position for commencement of mattress installation tasks.
33	When the MCB is stabilized in the in the 'start work, position, the MCB Navigation Team will generate a 'position watch circle' to monitor the MCB position. NOTE: <i>This 'watch circle' will be updated as the MCB is progressively moved through its planned work positions</i>

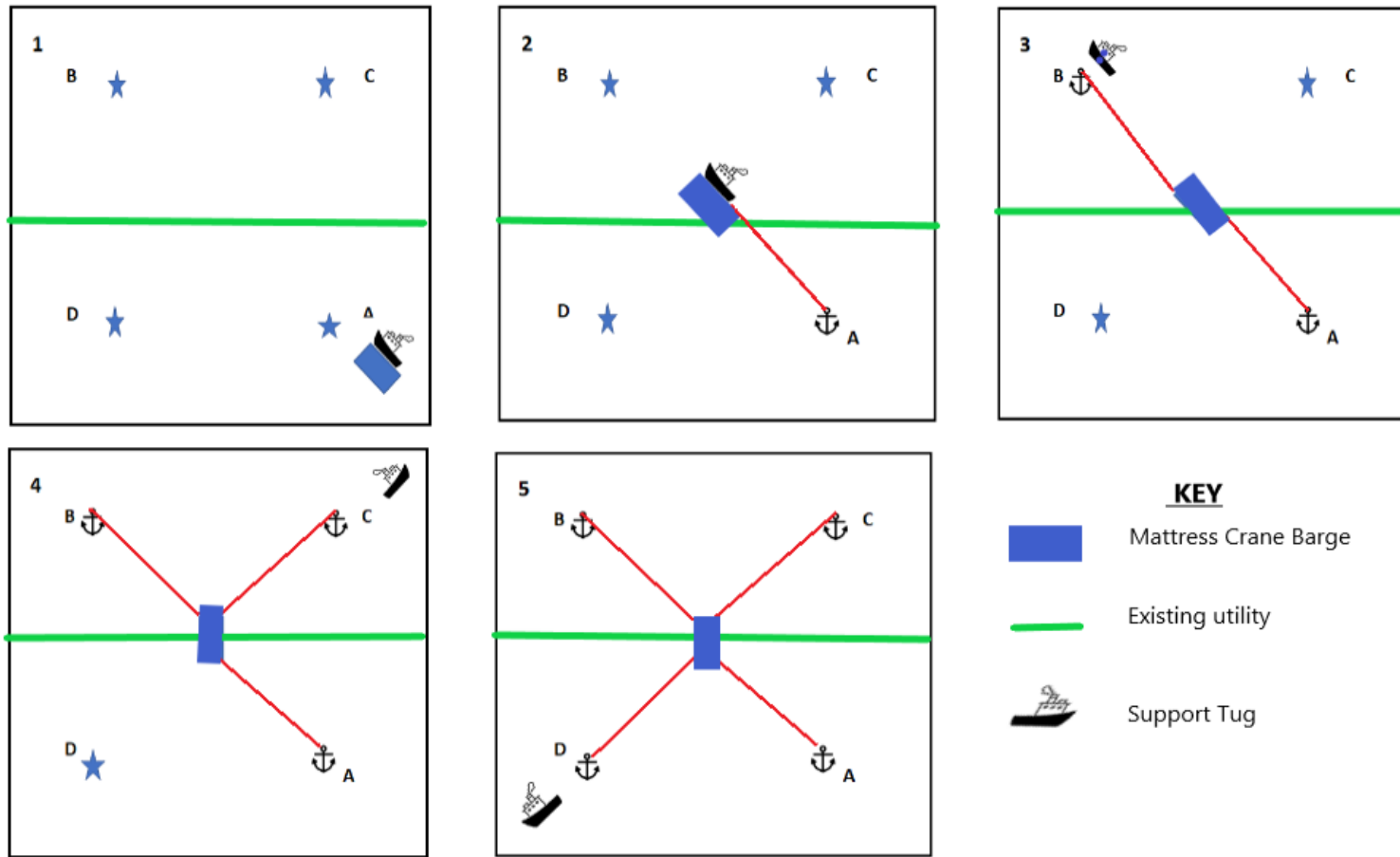


Figure 9 - Anchor Deployment 'Storyboard'

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Anchor Recovery

- The following operational sequence describes a typical 4-point anchor recovery operation. Local site conditions may require variance of this procedure.
- The MCB & the MCB Support Tug are connected throughout via a radio data link that enables accurate placement of anchors and logging of operational events. The MCB Navigation Team control the ‘Master’ navigation screen, the MCB Support Tug and the MCB Winch Operator are able to view operations in real-time site via ‘Slave’ screens.
- For tug recovery purposes, buoy pendant lines are rigged to the crown of the MCB anchors. This enables the tug to easily ‘trip’ the anchor. This methodology has the added benefit that Lakebed disturbance is kept to a minimum. **NOTE:** *Anchor wires from the MCB are connected to anchors via shackles that are connected to a ring at the head of the anchor shank. This connection method enables the anchor to ‘set’ properly for maximum designed holding power.*
- At no time will anchors be dragged across the sea floor.
- Anchors will be properly secured aboard the MCB Support Tug whenever she is tasked with transporting them during deployment / recovery.

<u>TASK: ANCHOR RECOVERY</u>	
<u>TASK ORDER</u>	<u>METHODOLOGY</u>
1	<ul style="list-style-type: none"> • Verify that all work on site has been satisfactorily completed (signed Site Acceptance document) • Verify that all necessary site positional data has been collected to enable compilation of as-built documentation
2	Conduct pre-job meeting: <ol style="list-style-type: none"> Identify operational risks, challenges and mitigation measures. Verify that Mattressing Team is using current edition of all project documentation (Crossing Agreements, RPL, charting etc.) and that correct reference datums are set in navigation system. Familiarize all parties with proposed operations & safety measures. Review site information including prevailing & forecast weather. Review site exclusion zones requirements in conjunction with site anchor plan Establish communications protocols. Confirm emergency planning measures. Any other business
3	MCB Barge & Support Tug Teams to verify operational readiness of all critical barge & support tug systems, including communications
4	RESTRICT ACCESS TO BACK DECK WORKING AREA TO DEDICATED ANCHOR CREW ONLY
5	<ul style="list-style-type: none"> • All stations (including tug) to confirm identity of recovery Anchor #1 (port bow / starboard bow / port stern / starboard stern – as applicable) & agreed recovery order all subsequent anchors
6	Secure MCB Support Tug to MCB
HOLD AND REVIEW POINT – ONLY PROCEED IF OPERATIONAL CONDITIONS ARE FULLY SATISFACTORY	
7	MCB Navigation Team will instruct: <ul style="list-style-type: none"> • MCB Support Tug to proceed to Pendant Buoy #1 in readiness for recovery. • MCB Winch Operator to standby to commence recovery of Anchor Wire #1
8	MCB Navigation Team to closely monitor speed and ‘course made good’ of tug throughout move toward recovery position for Pendant Buoy #1 and Anchor #1
9	When MCB Support Tug arrives Pendant Buoy #1 the MCB Navigation Team will instruct: <ul style="list-style-type: none"> • MCB Winch Operator to disengage winch dog & slack down tension on Anchor Wire #1 to enable tug recovery of Anchor #1 + prepare for recovery of Anchor Wire #1 • MCB Support Tug to recover Pendant Buoy #1 & Anchor #1
10	After Anchor#1 has been safely recovered to the tug the MCB Navigation Team will log the event & then instruct: <ul style="list-style-type: none"> • MCB Anchor Winch Operator to commence recovery of Anchor Wire #1 • MCB Support Tug to maintain minimum back tension on Anchor Wire #1 during recovery to MCB

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11	<p>When the MCB Support Tug arrives at MCB:</p> <ul style="list-style-type: none"> • The MCB Support Tug crew will transfer the pendant buoy and anchor to the MCB Deck Team for recovery to the MCB.
12	<p>Task items 11,12,13,14 & 15 will be repeated for recovery of Anchors #2 & #3</p>
13	<p>On completion of recovery of Anchors #1, #2, & #3 the MCB Navigation Team will instruct:</p> <ul style="list-style-type: none"> • MCB Support Tug to secure to MCB in readiness for transit to next work site. • MCB Winch Operator to commence recovery of Anchor Wire #4
14	<p>When MCB arrives Pendant Buoy #4 the MCB Navigation Team will instruct:</p> <ul style="list-style-type: none"> • MCB Support Tug to prepare to tow MCB after Anchor #4 recovery. • MCB Deck Team to recover Pendant Buoy #4 & Anchor #4, secure barge for transit to next site, affix lights / shapes for towed transit condition
14	<ul style="list-style-type: none"> • Update Local Notice to Mariners (LNM) with USCG regarding completion of work at site and planned work at future sites. • Provide update notification to authorities (ACOE, Harbor Master, Township etc.) per CHPE permitting requirements & good industry practice

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11.2 Mattress Installation

Mattress Protection Pattern

Pattern of protection measures for utility crossings are 'site-specific' and subject to:

- Compliance with Project permitting requirements.
- The approval of owners / operators of the underlying utility.
- Any further requirements of CHPE LLC., Project insurers, & NKT

Crossing patterns will be fully defined in site-specific 'Signed Crossing Agreement' documentation as negotiated between CHPE LLC. & the respective utility owners / operators. CHPE LLC. are fully responsible for all Utility Crossing protection designs.

Protection materials will be installed at listed sites in accordance with the requirements of respective signed Crossing Agreement. CMI accepts no responsibility for damages to installed CHPE cable product that may result from a deficiency in protection design or material selection.

Crossing Agreement documentation for Lake Champlain utility crossing sites has not yet been provided to CMI. For purposes of this methodology statement, we have assumed the use of the following:

- Submar 'Pre-Lay' & 'Post Lay' Concrete Mats 20ft (Length) x 8ft (Wide) x 12inch (Thick) as depicted in **Figure 10, 11 & 12**; Loop details as depicted in **Figure 13**
- Diver Release Type Mattress Deployment Frame – Please see **Figure 14**
- Typical utility crossing protection pattern – Please see **Figure 15**

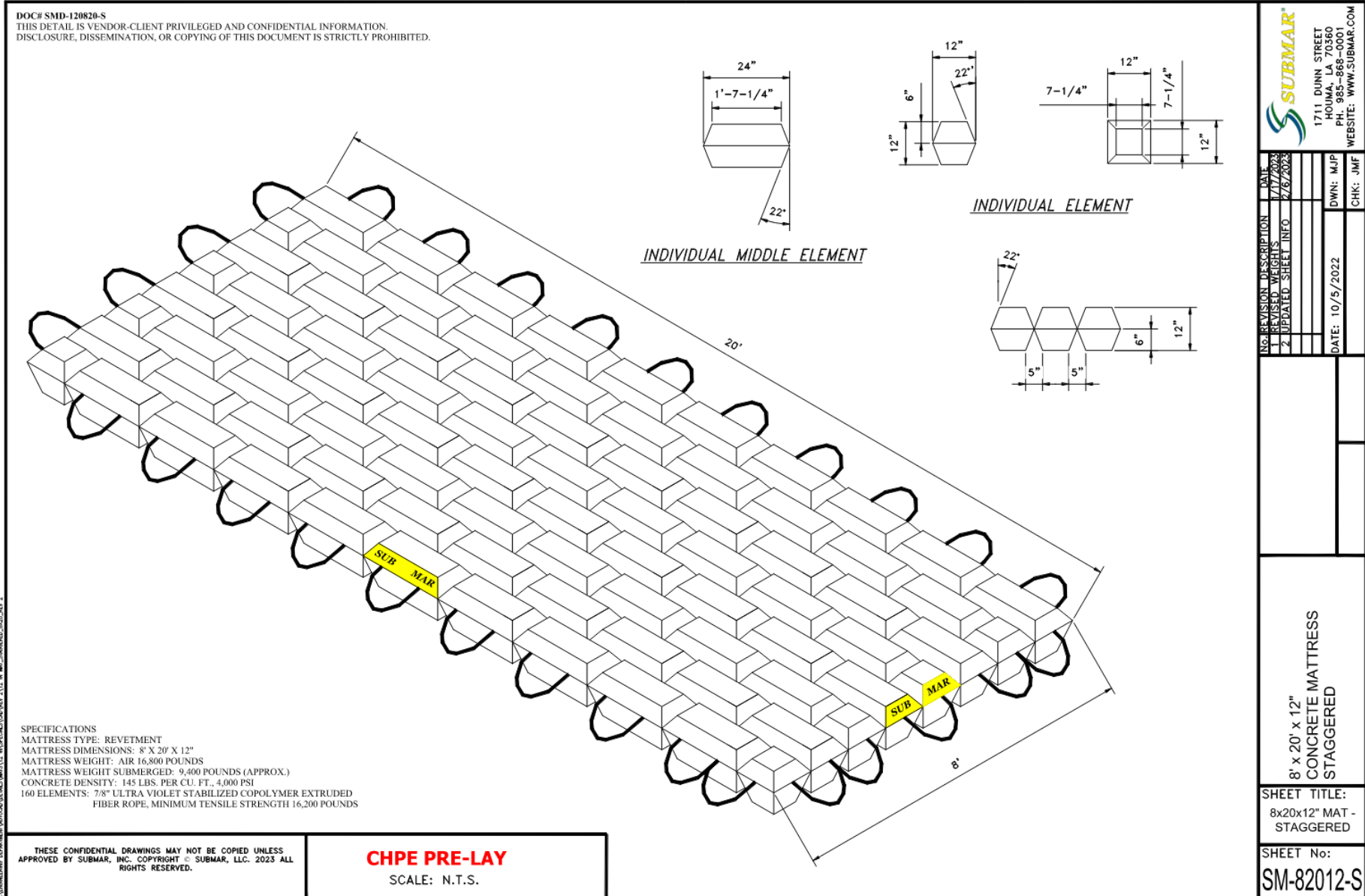
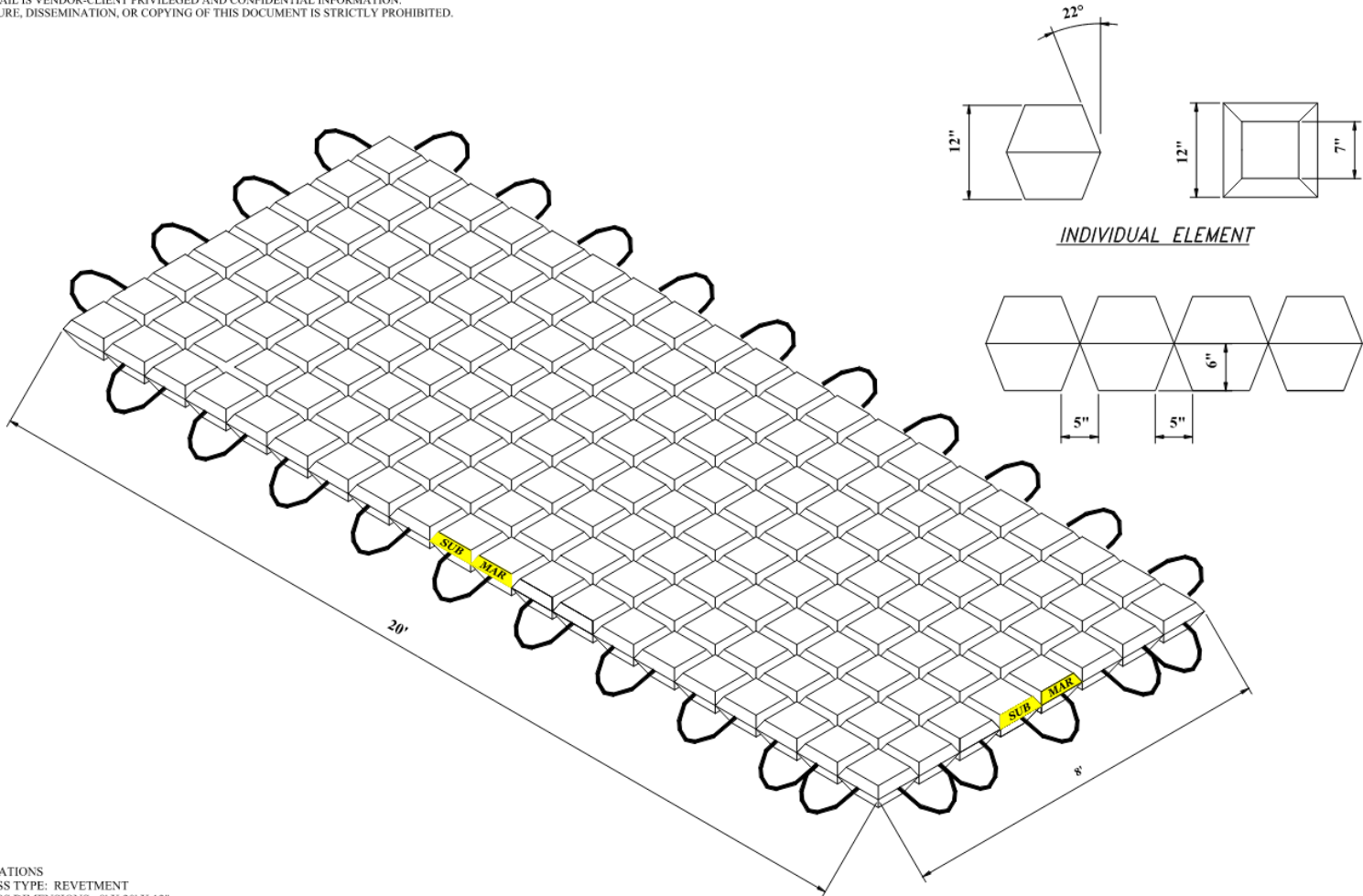


Figure 10 – Submar ‘Pre-Lay’ Mat Design 20ft(L) x 8ft(W)x 1ft(D)

DOC# SMD-120820
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SPECIFICATIONS
 MATTRESS TYPE: REVETMENT
 MATTRESS DIMENSIONS: 8' X 20' X 12"
 MATTRESS WEIGHT: AIR 13,200 POUNDS
 MATTRESS WEIGHT SUBMERGED: 7,519 POUNDS (APPROX.)
 CONCRETE DENSITY: 145 LBS. PER CU. FT., 4,000 PSI
 160 ELEMENTS: 5/8" ULTRA VIOLET STABILIZED COPOLYMER EXTRUDED
 FIBER ROPE, MINIMUM TENSILE STRENGTH 9,500 POUNDS

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CHPE PRE-LAY

SCALE: N.T.S.

		1711 DUNN STREET HOUMA, LA 70360 PH: 985-868-0001 WEBSITE: WWW.SUBMAR.COM	
NO.	REVISION DESCRIPTION	DATE	DATE
1	UPDATED SHEET INFO	7/18/2023	
2	UPDATED SHEET INFO	9/16/2023	
DATE: 6/25/2018		DWN: MJP	CHK: JMF
PROJECT No: SM-12			
SUBMAR STANDARD MAT DETAIL - 8'x20'			
SHEET TITLE: 12" CONCRETE MATTRESS			
SHEET No: SMD-120820			

Figure 11 - Submar 'Pre-Lay' Mat Alternate Design 20ft(L) x 8ft(W)x 1ft(D)

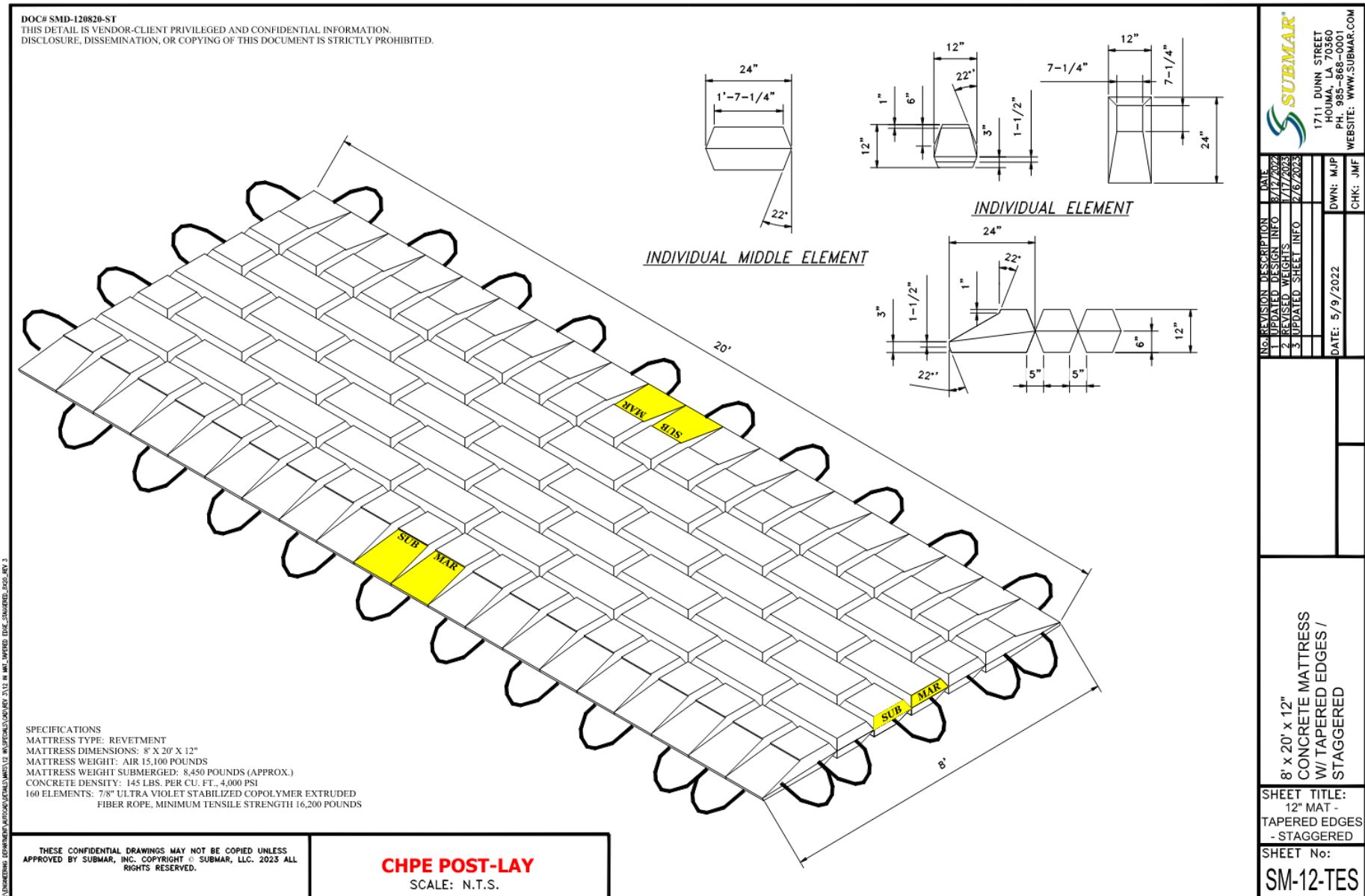
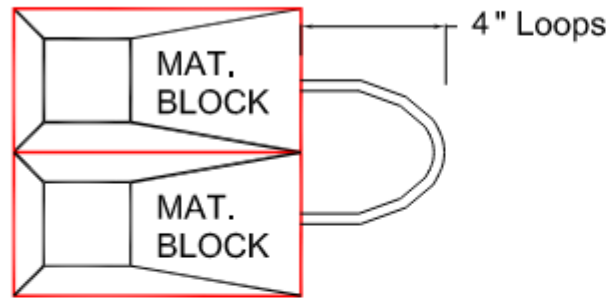
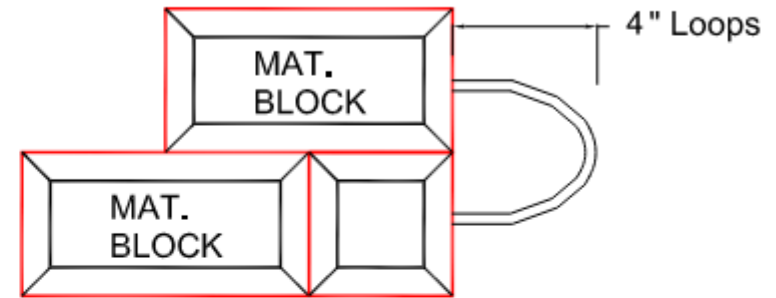


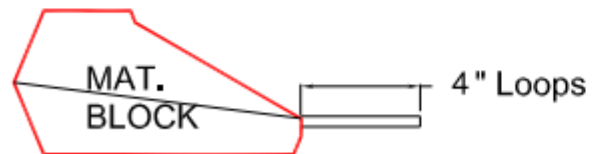
Figure 12 - Submar 'Post-Lay' Mat Design 20ft(L) x 8ft(W) x 1ft(D)



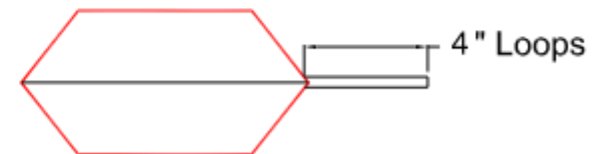
PLAN VIEW - LONG. SIDE



PLAN VIEW - SHORT SIDE



ELEVATION VIEW-LONG. SIDE



ELEVATION VIEW-SHORT SIDE

Figure 13- Submar Mattress Details

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Concrete Mattress Protection Deployment Frame

In-water deployment will be accomplished using a load rated crane and a mattress deployment frame. The crane / frame set-up will be used during all operation cycles:

- Mat loading on barge
- Mat deployment and placement on Lakebed
- Recovery of empty frame to barge for reloading.

Figure 14 depicts a simple frame design. For safe release of the mattress product on the Lakebed, the diver will perform the following sequence for each and every lifting strap.

- a. Release outboard end of strap from frame.
- b. Unthread the strap from the mattress side rope.
- c. Resecure the free strap end to the lifting frame.
- d. Verify that strap cannot snag on mattress during the subsequent frame recovery process.
- e. Observe all straps during frame recovery process and instruct surface personnel to 'ALL STOP' if any problem(s) is/are noted.

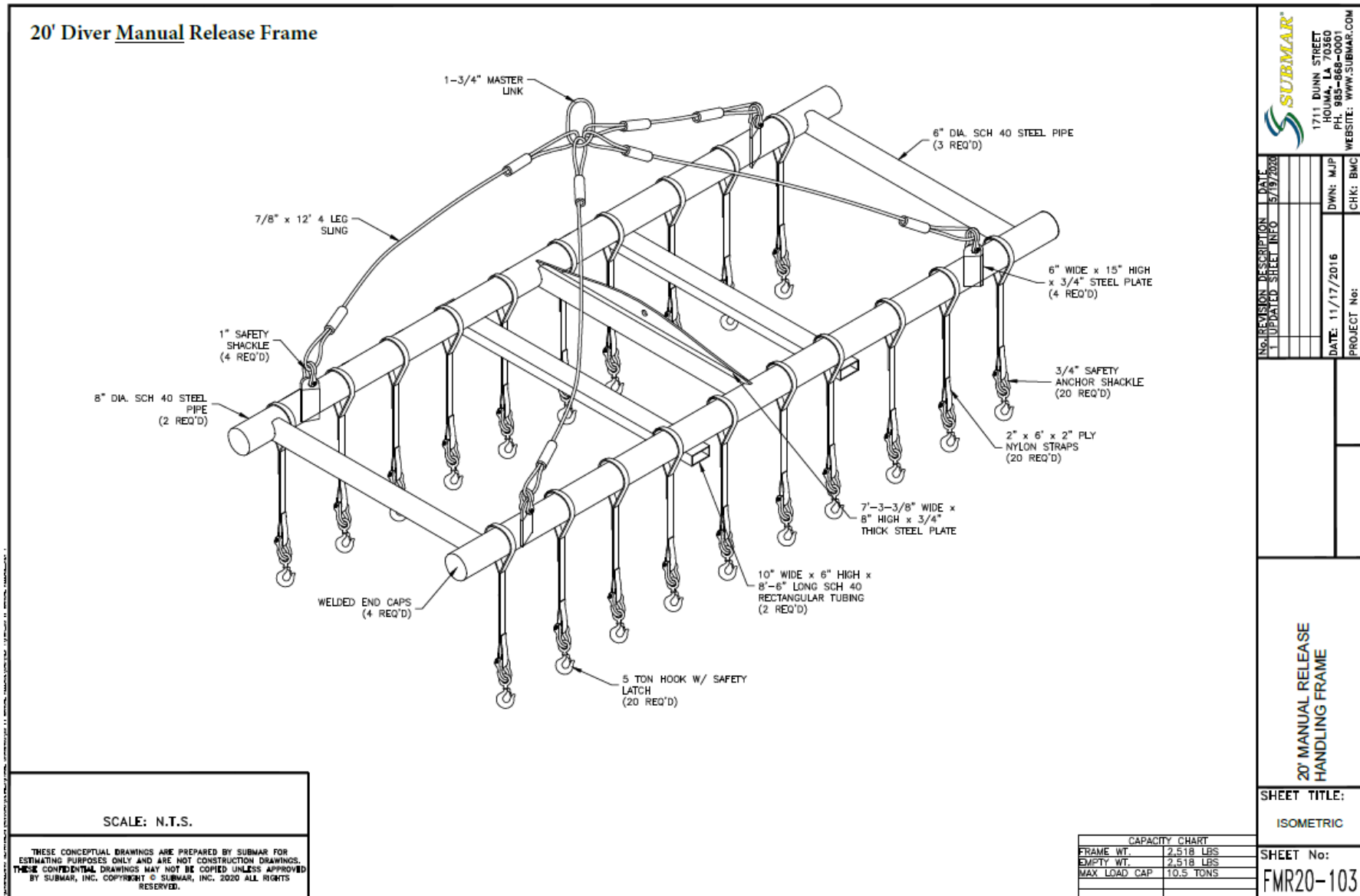


Figure 14 - Concrete Mattress Handling / Deployment Frame (Typical)

'Typical' Concrete Mattress Protection Pattern

CMI awaits details of signed Crossing Agreement terms to finalize protection pattern drawing. In the absence of this information, we have provided the following details of a 'typical' crossing pattern.

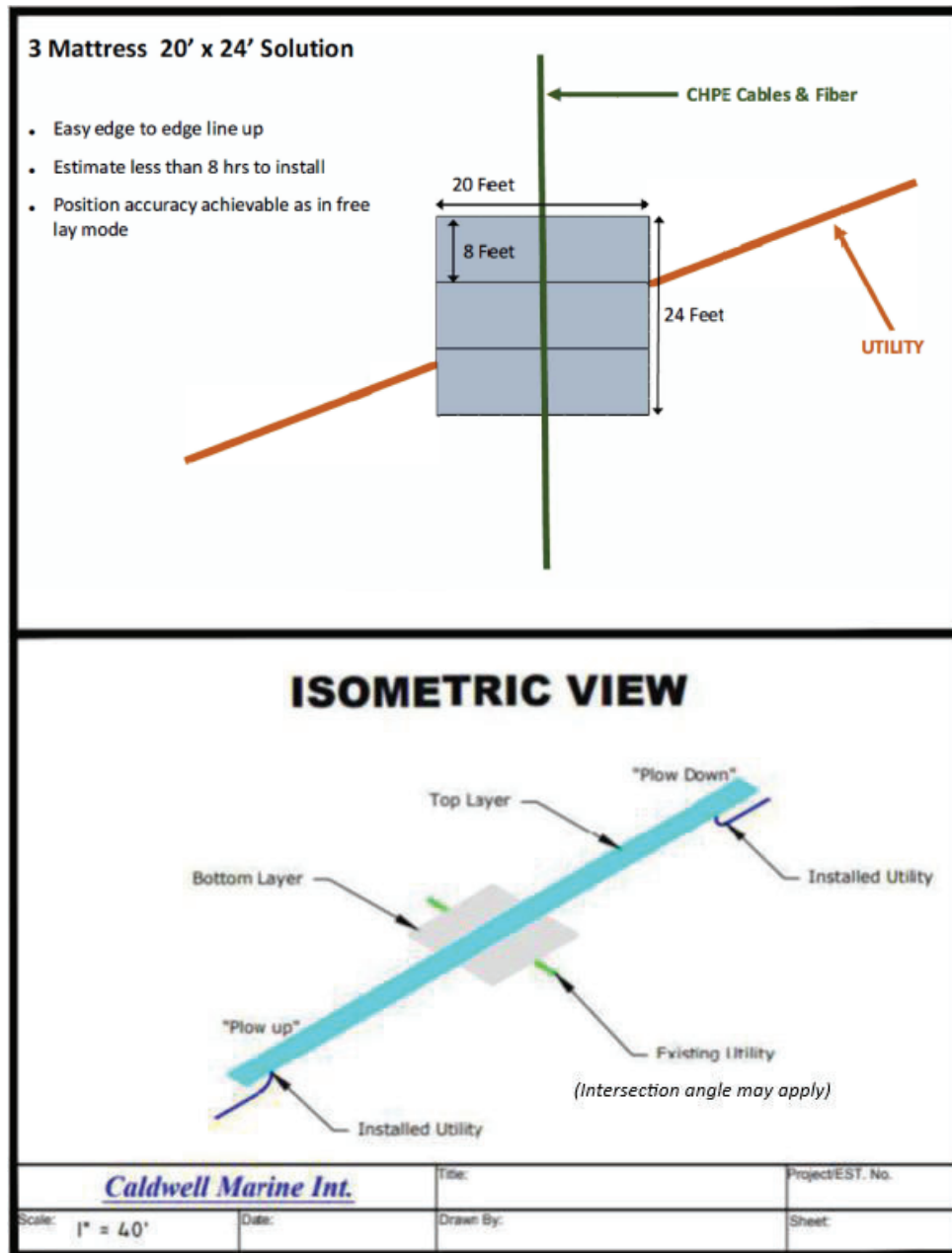


Figure 15 - 'Typical' Utility Crossing Pattern (Concrete Mattresses)

NOTE 1: In accordance with project permit requirements, minimum thickness of mattresses will be 12inch (~30.5cm)

NOTE:2 Utility crossing protection is subject to the terms of CHPE permits. The level of installed protection for Lake waters is dictated by the prevailing depth of water (DoW) at the subject crossing site:

- For crossing sites with DoW <150ft (45.72m) we will install both 'pre-lay' bottom layer mattresses & 'post-lay' top mattress layer protection. Installed cable product will be 'sandwiched' between mattress layers
- For crossing sites with DoW >150ft (45.72m) CMI proposes the use of poly-shell cladding (Uraduct or similar). We await external approval for this proposed protection method and will provide a methodology statement thereafter

TASK: UTILITY CROSSING PROTECTION – CONCRETE MATTRESS PRE & POST LAY		
TASK DOCUMENTATION		
ITEM #	FILENAME PER MDR	ISSUE DATE
1	Lake Champlain Segment RPL ('For Construction' Issue) <i>NOTE: Available after completion and approval of Lake Champlain Route Engineering</i>	TBD
2	Lake Champlain Segment SLD ('For Construction' Issue) <i>NOTE: Available after completion and approval of Lake Champlain Route Engineering</i>	TBD
3	OSI Lake Champlain Segment Charting ('For Construction' Issue) <i>NOTE: Available after completion and approval of Lake Champlain Route Engineering</i>	TBD
4	NOAA Lake Champlain Charting <i>NOTE: Current issue will be downloaded from NOAA website</i>	TBD
5	Lake Champlain Utility Crossing List <i>NOTE: Utility coordinates and associated exclusion zones will be inputted into navigation software</i>	TBD
6	Signed Crossing Agreements with detailed site requirements (protection material & quantity, positional extents, compass alignment, spud / anchor 'exclusion zones' (as applicable), asset owner notifications etc.)	TBD
7	Project Permitting	7/1/22
8	ICPC Recommendations – (Current editions)	TBD
9	Operational Risk Assessment (Concrete mattress installation)	1/30/23
10	Site Specific HASP	TBD
11	Dive Procedures and Safe Practices Manual (NKT Doc. #1AA0535954)	11/8/22
12	Dive Plan	TBD
13	Lift Plan	1/30/23
14	Environmental Protection Documentation	TBD
15	Project Master Document Register (MDR) – (Current issue)	7/1/22
16	Equipment manuals	TBD
17	Inspection & Test Plan (NKT Doc. #1AA0546453)	3/24/23
18	Personnel Transfer Procedure (NKT Doc. #1AA0545744)	3/6/23

TASK: UTILITY CROSSING PROTECTION – CONCRETE MATTRESS PRE & POST LAY	
ITEM #	EQUIPMENT LISTINGS
1	Crewboat
2	Anchor Handling Tug
3	Anchor Handling Pontoon With 'A' Frame (as required)
4	Support workboats
5	Mattress Crane Barge (MCB)– Monohull Barge / Flexi-Float Barge - TBD
6	Anchor spread / mooring spuds
7	Safety & First Aid supplies
8	Environmental protection supplies / equipment (spill kits etc.)
9	Nav spread inputted with route info incl. designated exclusion zones
10	Dive spread including instrumented control hut, diver communications & video, emergency back-up systems
11	Ancillaries – for deeper water work (as required)
12	Genset(s) rated for service
13	Double-walled fuel tanks to provide adequate working duration
14	Office container(s) – Client, NKT, CMI
15	Crew messroom container
16	Tool / Workshop / Storage container(s)
17	Portable hygiene facilities (Porta-Potti's etc.)
18	Load rated deck crane with DGPS antenna & data radio fitted to crane boom tip
19	Barge mounted Coda Octopus sonar / Mutibeam with data recording
20	Mattress deployment frame
21	Concrete mattress supplies & restocking capability
22	Tag lines + misc. rigging

The following methodology statement assumes the use of a ‘typical’ protection pattern – see **Figure** . *Actual design may differ in accordance with Crossing Agreement requirements.*

TASK: UTILITY CROSSING PROTECTION – CONCRETE MATTRESS PRE & POST LAY	
TASK ORDER	METHODOLOGY
1	Issue / Update Local Notice to Mariners (LNM) to USCG & notify provide advance notification to local authorities (ACOE, Harbor Master, Township etc.) per CHPE permitting requirements.
2	Provide advance notification to utility asset owners per Crossing Agreement terms
3	Review project information and all Crossing Agreement requirements
4	Input site specific design and barge mooring / spud point coordinates into navigation software
5	<p>Conduct pre-job meeting:</p> <ul style="list-style-type: none"> a. Review project information and all Crossing Agreement requirements b. Identify operational risks, challenges and mitigation measures. c. Verify that Mattressing Team is using current edition of all project documentation (Crossing Agreements, RPL, charting etc.) and that correct reference datums are set in navigation systems. d. Familiarize all parties with proposed operations & safety measures. e. Review site information including prevailing & forecast weather. f. Review site exclusion zones requirements g. Check mattress protection design coordinates and alignments. h. Establish communications protocols. i. Confirm emergency planning measures. j. Any other business <p>NOTE: Dive activities will be conducted according to the site-specific Dive Plan (NKT Doc. #TBD)</p>
6	RESTRICT ACCESS TO BACK DECK WORKING AREA TO DEDICATED MATTRESSING CREW ONLY
7	Move barge within previously established moor, for commencement of mattress installation operations
HOLD AND REVIEW POINT – ONLY PROCEED IF OPERATIONAL CONDITIONS ARE FULLY SATISFACTORY	
9	Attach tag lines to mattress frame to enable good control
10	Deploy diver via dive ladder and standby clear of risk from elevated load
11	<p>Rig mattress frame to crane hook and load first mattress</p> <p>NOTE: Emphasis on strict communication procedures and clarify that crane instructions must only come from the Dive Supervisor.</p>
12	Adjust crane luff and slew controls so that boom tip DGPS indicates the correct position for placement of first mat
13	Lower crane hook / mattress to planned deployment position. Hold position & check position of frame by comparison between crane DGPS & Coda Octopus sonar
14	Verify correct position and alignment of mat using Coda Octopus sonar. Adjust as necessary by means of diver intervention (diver will physically manipulate the mattress prior to touchdown)
15	<p>Move diver clear to safe vantage point, then lower mattress to Lakebed aided by real-time diver reporting</p> <p>NOTE: Control of load should be confirmed prior to moving it over a subsea asset to ensure it does not hit or slam the asset or any object is dropped.</p>
16	<p>Confirm via diver / Coda Octopus instrumentation that:</p> <ul style="list-style-type: none"> • Mat is on Lakebed & in position. • Closely butted up to adjacent mat(s) – max allowable separation = 5” • Correctly aligned with adjacent mats
17	<p>After all items in 16 are confirmed, the diver will be instructed to:</p> <ul style="list-style-type: none"> • Release all mattress lift straps. • Unthread straps from mattress side ropes. • Secured cleared straps back onto mattress deployment frame. • Notify surface personnel when frame is ready for recovery to surface
18	Diver will then be instructed to move to a safe vantage point and continue reporting while the crane operator slowly & incrementally recovers the frame back to the barge for re-loading with additional product

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19	Repeat steps 9 thru 18 with associated MCB moves within moor until design pattern for lower / upper mattress protection has been completed.
20	Record as-built positional data for installed protection limits by means of Coda Octopus sonar
21	Recover diver to deck
22	Verify satisfactory completion of task with attending Client Representative(s) / Obtain signature of Client Representative on 'Site Acceptance' document before recovering anchors and proceeding to next job site

12 Lake Weather Conditions / Operational Weather Limits

Lake Weather Conditions

The following meteorological factors apply to Lake Champlain waters:

Location:	Lake waters are categorized as 'inland'. NOTE: <i>The Lake does feature some comparatively large expanses of open water where wave heights may be elevated due to wind 'fetch'</i>
Tidal effect:	No observable tidal effect, however, Lake water levels are subject to seasonal variation.
Current strength / Direction:	Under normal conditions, Lake waters flow from south (Whitehall) to North (Richelieu River entrance). This 'general direction of flow can be temporarily affected, or even reversed, by wind effect.
Ice:	Lake water is fresh not salt. Meteorological records indicate that Lake Champlain waters are subject to freezing during colder winters.

Monitoring of Site Weather Conditions & Forecasts

During the operational periods for the MCB, the MCB Barge Superintendent / appointed alternate will monitor the current and forecast weather conditions for operational work sites and vessel transit routes. The MCB Superintendent will notify the attending NKT Representative if a temporary suspension of project activities is required due to weather (actual, or forecast).

The MCB Superintendent's primary weather forecast resource will be NOAA Marine Weather.com (Governmental). The MCB Superintendent will typically also review web-based, non-governmental resources which may include:

- <https://www.windy.com>
- <https://www.buoyweather.com/>
- <https://www.windalert.com>
- <https://climeradar.com>

Recording of Site Weather Conditions

Site weather conditions will be recorded in a dedicated section of the MCB Daily Report. Recorded values will either be derived from:

- a. Local observation, or
- b. Download from a local registered NOAA weather observation station (airport or similar)

Operational Weather Limits

Wind:	OSHA safety rules for crane operations dictate a maximum wind strength 25mph.
Current Strength:	Maximum current strength 2 knots. As noted above, Lake waters are non-tidal, we do not anticipate current strengths to even approach this limit.
Sea / Swell Height:	ANCHOR SETTING: A maximum limit of 1m will apply. MATTRESS SETTING: Work may be deferred / suspended at the discretion of MCB Superintendent & Dive Supervisor, these parties will use a limit of 0.5m as a reference baseline. NOTE: <i>The MCB crane is not heave-compensated; barge movement must be minimized to ensure that undersea movement of suspended mattress product does not exceed a safe working value.</i>

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13 Environmental Protection Measures

13.1 Oil Pollution Prevention

Please see dedicated SOPEP document for Lake Champlain.

Please see Mattress Placement in Lake Champlain site-specific Health & Safety Plan (NKT Doc. #TBD) which also provides notification requirement and contact details in the event of 'accidental release':

- The MCB will carry emergency 'spill kit(s)'
- MCB fuel stocks onboard will be kept to a practical minimum.
- MCB fuel storage vessels will feature double-wall construction.
- As an emergency contingency measure CMI has pre-arranged that US Ecology, a US based Oil Spill Removal Organization (OSRO) will be available on 'call-out' basis to provide professional clean-up support. For further details, please see: <https://www.usecology.com/>.

13.2 Solid Waste Management

Please see CMI Construction Waste Management Plan (NKT Doc. #1AA0546356).

- Disposal of waste into Lake waters is strictly prohibited by local, State & Federal law.
- Crews and contractors will be notified accordingly at the Project 'Kick-Off Meeting' and daily shift change / TBT meetings.
- New crew members/ contractors will be notified during the project and vessel familiarization processes.

The MCB will be mobilized with waste containment' bins, these bins will be feature closeable lids and heavy grade, disposable plastic liners. Bin liners will be replaced regularly and filled bags will be transported to shore for proper disposal at an approved facility.

NOTE: For concrete mattress installation operations our planning measures do not anticipate any requirement to handle 'contaminated' waste. CMI will consult with US Ecology if this circumstance should unexpectedly arise.

13.3 Wastewater Management

- Disposal of untreated wastewater into Lake waters is strictly prohibited by local, State & Federal law.
- Crews and contractors will be notified accordingly at the Project 'Kick-Off Meeting'.
- New crew members/ contractors will be notified during the project and vessel familiarization processes.

The MCB will be equipped with portable toilet units that will be sourced from a local provider.

- Soiled / clean portable toilet units will be transferred by means of crew transfer vessel / work vessels.
- Portable toilet change-out / clean-out service will be performed by the local service provider at the operational base located at Wilcox Dock, Plattsburgh, NY.

14 Operational Meetings

- **Kick-Off Meeting (Pre-Job):** A Kick-Off Meeting will be conducted in advance of field activities. The meeting agenda will include the following topics:
 - Project overview
 - Review of planning documentation including safety
 - Scope of Work
 - Team member responsibilities
 - Risk identification & mitigation measures
 - Operational scheduling
 - Task items & associated planned methodologies.
 - Protection of the environment & associated permitting requirements.
 - Non-conformance reporting & mitigation
 - Task deliverables
- **Toolbox Talk / Tailboard Meetings:** These meeting will be held at least once per shift. Additional meetings will be held when required by operational circumstance.
- **Weekly Safety Meetings:** In accordance with OSHA requirements and JAG Company policy, a weekly Safety Meeting will be held that will feature a topic selected by the company Safety Department
- **Operational Progress Meetings:** These meetings will be conducted per agreed schedule. Additional meetings will be conducted as deemed necessary, or as requested by NKT.
- **Vessel / Site Familiarization Meetings:** These meetings / orientations will be performed on an as- needed basis for all personnel / visitors that have not received prior project instruction via 'Kick-Off Meeting.'
- **Lessons Learned Meeting:** The purpose of these meetings is to analyze operational execution and determine if applied methodologies / project equipment can be refined to improve safety, and / or efficiency. Meetings will be conducted on completion of operational phases and whenever deemed potentially beneficial.

15 Documentation

- **Daily Report:** The Project Manager will submit a signed daily field report to NKT representative within 24 hours of completion of the work on the applicable day.
- **ToolBox Talks (TBT) / Safety Meetings:** Copies of ToolBox Talks & Safety Meetings will be appended to the Daily Reporting for the day in question.
- **Meeting Minutes:** Meeting minutes for all project meetings that we host will be recorded. Minutes will be distributed to attendees shortly after meetings have been concluded.
- **Accident Reporting:**
 - CMI will comply with Federal, State & Local laws and Project Permit requirements with respect to notification of authorities.
 - Attending NKT Representative(s) will be notified of an accident as soon as is practically feasible.
 - For purposes of incident investigation, CMI will promptly gather data and witness statements pertaining to the accident. A formal report will be generated, reviewed and promulgated to interested parties as soon as is reasonably practical.
 - Mitigation measures and recommendations resulting from the accident investigation will be implemented to prevent future occurrence.
- **Incident Reporting:**
 - CMI will comply with Federal, State & Local laws and Project Permit requirements with respect to notification of authorities.
 - Attending NKT Representative(s) will be notified of an incident as soon as is practically feasible.
 - For purposes of incident investigation, CMI will promptly gather data and witness statements pertaining to the incident. A formal report will be generated, reviewed and promulgated to interested parties as soon as is reasonably practical.
 - Mitigation measures and recommendations resulting from the incident investigation will be implemented to prevent future occurrence.
- **Site Completion Checklist:** The 'Site Completion Checklist' and supporting preliminary paperwork will be presented to the NKT Representative for signature as witness before the MCB recovers anchors and proceeds to the next work site.
- **As-Built Drawings:** CMI will update 'as planned' crossing protection drawings on an interim basis to reflect project progress as follows:
 - Bottom layer mats installed.
 - Top layer mats installed.
 - As completed.
- **Dive Logs:** During each diving operation, an operation log shall be maintained covering the entire operation:
 - This logbook will be a chronological record of all events that directly affect the diving operation.
 - The Diving Supervisor will ensure that the master operations log is properly updated.
 - The diving supervisor will sign all entries.
 - The logbook shall include all of the information that is listed in CMI's Dive Procedures & Safe Practices Manual, section 1.4.1 Diving Logs (*NKT Doc. #1AA0535954*).

16 Visitors To CMI Vessels (Non CMI Personnel)

All 'non CMI' project personnel must be covered by insurance coverage in accordance with CMI requirements provided under the Vessel Visitor Boarding Agreement & Sample COI (NKT Doc. #1AA0565980). Additionally, non CMI personnel that wish to visit / board CMI marine vessels are required to:

- Attend a site safety & environmental orientation meeting.
- Comply with CMI policy with respect to wearing of PPE.
 - All Project Sites: Approved type hardhat, safety toe shoes, safety glasses, gloves, ear protection
 - CMI vessels & work boats: USCG approved flotation device fitted with emergency actuated light.
- Comply with lawful commands of CMI Captains / Barge Superintendents

Appendix 1 – List Of Utility Crossings To Be Protected

Segment	Marine Route	CMI Report Item	Approx. distance from in-water HDD exit at Rouses Point [miles]	Owner	Utility	Status
ROUSES POINT TO CROWN POINT	Lake Champlain	1	MP 0.8a	Village of Rouse Point	Sewer	Utility Asset Not Found
	Lake Champlain	2	MP 0.8b	Village of Rouse Point	Sewer	Utility Asset Not Found
	Lake Champlain	3	MP 0.8c	Village of Rouse Point	Sewer	Utility Asset Clear of Route
	Lake Champlain	4	MP 0.8d	Village of Rouse Point	Sewer	Utility Asset Clear of Route
	Lake Champlain	5	MP 0.8e	Village of Rouse Point	Sewer	Utility Asset Clear of Route
	Lake Champlain	6	MP 0.8f	Village of Rouse Point	Sewer	Utility Asset Clear of Route
	Lake Champlain	7	MP 0.8g	Unknown	Sewer	Utility Asset Clear of Route
	Lake Champlain	8	MP 0.8h	Unknown	Power / Telecom	Utility Asset Not Found
	Lake Champlain	9	MP 0.8i	Village of Rouse Point	Sewer	Utility Asset Clear of Route
	Lake Champlain	10a	MP 1.2	Unknown	Power / Telecom - 2" Diameter	Utility Asset Found
	Lake Champlain	10b	MP 1.2	Unknown	Power / Telecom - 3" Diameter	Utility Asset Found
	Lake Champlain	10c	MP 1.2	Unknown	Power / Telecom - Bundle of 4 cables	Utility Asset Found
	Lake Champlain	10d	MP 1.2	Unknown	Power / Telecom - 1" Diameter	Utility Asset Found
	Lake Champlain	11	MP 7.7	Unknown	Power / Telecom - 2" Diameter	Utility Asset Found
	Lake Champlain	12	MP 23.2a	NY Power Authority	Power - PV20 - Cable 1	Utility Asset Found
	Lake Champlain	13	MP 23.2b	NY Power Authority	Power - PV20 - Cable 2	Utility Asset Found
	Lake Champlain	14	MP 23.2c	NY Power Authority	Power - PV20 - Cable 3	Utility Asset Found
	Lake Champlain	15	MP 23.2d	NY Power Authority	Power - PV20 - Cable 4	Utility Asset Found
	Lake Champlain	16	22.4c	Vermont Telephone Company	TELECOM	Utility Asset Not Found
Lake Champlain	17	22.8	Unknown	TELECOM	Unknown	
Lake Champlain	18	39.4	AT&T	TELECOM	Utility Asset Found	
Lake Champlain	19	40.1	American Telephone and Telegraph Company	POWER	Unknown	

Segment	Marine Route	CMI Report Item	Approx. distance from in-water HDD exit at Rouses Point [miles]	Owner	Utility	Status
CROWN POINT TO PUTNAM STATION	Lake Champlain	20	80.6	Town of Ticonderoga	SEWER	Unknown
	Lake Champlain	21	MP 81.6	International Paper	Wastewater Outfall - 36"	Utility Asset Found
	Lake Champlain	22	MP 83.5	International Paper	Commercial	Utility Asset Not Found
	Lake Champlain	23	MP 83.6	International Paper	Commercial	Utility Asset Not Found
	Lake Champlain	24a	84a	International Paper	Water	Utility Asset Not Found
	Lake Champlain	24b	84b	International Paper	Water	Utility Asset Not Found
	Lake Champlain	24c	84c	International Paper	Water	Utility Asset Not Found
	Lake Champlain	25	85.9	Unknown	Ferry Cable (Likely)	In Service (Likely)
	Lake Champlain	26	85.9	Town of Ticonderoga	Ferry Cable	In Service
	Lake Champlain	27	MP 85.9	International Paper	Commercial	Utility Asset Not Found
	Lake Champlain	28	MP 86.7	International Paper	Commercial	Utility Asset Not Found
	Lake Champlain	29a	MP 86.9a	AT&T	Telecom	Utility Asset Found
	Lake Champlain	29b	MP 86.9b	AT&T	Telecom	Utility Asset Found
	Lake Champlain	29c	MP 86.9c	AT&T	Telecom	Utility Asset Found
	Lake Champlain	30	87.7	American Telephone and Telegraph Company	POWER	Unknown
	Lake Champlain	31	MP 88.7	AT&T	Telecom	Utility Asset Not Found
	Lake Champlain	32	90.5	Town of Ticonderoga	Ferry Cable	Out of Service
	Lake Champlain	33	MP 91.5	Town of Ticonderoga	Ferry Cable	Utility Asset Not Found
	Lake Champlain					Unknown

**CROSSING AGREEMENT
DOCUMENTATION IS NOT
CURRENTLY AVAILABLE - TO BE
ADDED AFTER CMI RECEIPT**

Appendix 3 - Risk Assessments - Primary Tasks

Risk Ranking

To risk rank the hazard scenarios, the HAZID study will utilize the presented below in conjunction with the risk ranking analysis criteria. Likelihood numbers are multiplied by the consequence severity to which equals the Risk Magnitude. Controls are implemented to reduce both the likelihood and consequence severity.

LIKELIHOOD OF OCCURRENCE		
Very Likely	Experienced at least every month	L5
Likely	Typically experienced at least every 6 months	L4
Somewhat Likely	Typically experienced at least every 2 years	L3
Unlikely	Typically experienced at least every 10 years	L2
Very Unlikely	Typically experienced once or less every 25 years	L1

CONSEQUENCE SEVERITY				
C1	C2	C3	C4	C5
Near Miss	First Aid	Treatment by Medical Professional	Temporary disability	Permanent Disability or Fatality
Near Miss	Work Order for follow up	Repair at Maintenance Facility	Repair in Dry-dock	Out of service
Almost zero impact	Low impact	Moderate impact	High impact	Very high impact
<10k	10k - 50k	50k - 250k	250k - 500k	> 500k
No public complaints	Limited # complaint s	Negative local profile	Small / vocal minority of stakeholders critical	Many stakeholders critical

Risk Magnitude: Likelihood x Consequence				
5	10	15	20	25
4	8	12	16	20
3	6	9	12	15
2	4	6	8	10
1	2	3	4	5

Job Hazard Assessment:			General Operations			Job Hazard Assessment Number			MPLC.1.0		
Site or area being assessed			Mattress Placement – Lake Champlain			Date of assessment			1/30/23		
Assessor			Lucky Abernathy			Next review date					
Identified Hazard			Risk Evaluation			Existing control measures or safeguards in place	Observations and recommendations on control measures: 1. Do they comply with legal requirements? 2. Are the measures adequate? 3. What improvements are required?	Revised Risk Evaluation after control			Date action completed and any further action required
People affected	Hazard (potential to cause harm)	Risk	Likelihood	Severity	Risk Rating			Likelihood	Severity	Risk Rating	
Employees, contractors, vendors, suppliers, visitors	Health Hazard Toxic/Hazardous Material Use and Storage	• Chemical exposure	3	3	9	<ul style="list-style-type: none"> • Proper storage, isolation, separation, distribution and disposal • Limited authorized users • Proper signage is posted • Site personnel orientation / training highlights hazards and controls • Personal protective equipment (eye, face, hand, body, respiratory) worn as required • Toolbox Talks refresh hazard awareness. • General housekeeping is performed. • Site inspections and policy enforcement provided by Site Safety Officer 	Existing control measures or safeguards are adequate to mitigate identified risks and comply with legal requirements. Job Hazard Analysis (JHA) will be assessed after any incident or notice of non-compliance to verify controls are adequate and what improvements, if any, are necessary. Regular refresher training, jobsite inspections and program audits will be conducted to maintain compliance. No improvements are required.	1	3	3	
Employees, contractors, vendors, suppliers, visitors	Physical Hazard Heavy Equipment Operation Vehicle Traffic	• Struck by	3	5	15	<ul style="list-style-type: none"> • Operator training and certification • Trained and authorized flaggers • Trained and authorized spotters • Traffic control plan clearly identifies traffic patterns and designated routes • Speed limits posted and enforced • Limited vehicle access • Site personnel orientation / training highlights hazards and controls • Toolbox Talks refresh hazard awareness. • High visibility reflective vests worn as required at all times • Backup alarms provided on heavy equipment • Equipment maintenance • Site inspections and policy enforcement provided by Site Safety Officer 	Existing control measures or safeguards are adequate to mitigate identified risks and comply with legal requirements. Job Hazard Analysis (JHA) will be assessed after any incident or notice of non-compliance to verify controls are adequate and what improvements, if any, are necessary. Regular refresher training, jobsite inspections and program audits will be conducted to maintain compliance. No improvements are required.	2	5	10	

Job Hazard Assessment:			General Operations			Job Hazard Assessment Number			MPLC.1.0		
Site or area being assessed			Mattress Placement – Lake Champlain			Date of assessment			1/30/23		
Assessor			Lucky Abernathy			Next review date					
Identified Hazard			Risk Evaluation			Existing control measures or safeguards in place	Observations and recommendations on control measures: 1. Do they comply with legal requirements? 2. Are the measures adequate? 3. What improvements are required?	Revised Risk Evaluation after control			Date action completed and any further action required
People affected	Hazard (potential to cause harm)	Risk	Likelihood	Severity	Risk Rating			Likelihood	Severity	Risk Rating	
Employees, contractors, vendors, suppliers, visitors	Health Hazard Material Handling	<ul style="list-style-type: none"> Struck by Caught between Strain/sprain Repetitive motion Awkward posture 	4	4	16	<ul style="list-style-type: none"> Material lifting assist devices provided to limit manual material handling. Mechanical support equipment is provided to reduce or eliminate manual material handling. Site personnel orientation / training highlights hazards and controls Toolbox Talks refresh hazard awareness. (Critical) Lift plans Site inspections and policy enforcement provided by Site Safety Officer 	<p>Existing control measures or safeguards are adequate to mitigate identified risks and comply with legal requirements.</p> <p>Job Hazard Analysis (JHA) will be assessed after any incident or notice of non-compliance to verify controls are adequate and what improvements, if any, are necessary.</p> <p>Regular refresher training, jobsite inspections and program audits will be conducted to maintain compliance.</p> <p>No improvements are required.</p>	3	3	9	
Employees, contractors, vendors, suppliers, visitors	Health Hazard Weather conditions Heat Stress Cold Stress	<ul style="list-style-type: none"> Lightening Heat stroke Hypothermia 	2	5	10	<ul style="list-style-type: none"> Weather forecast and alerts are provided by Site Superintendent Climate-controlled shelter provided Site personnel orientation / training highlights hazards and controls Toolbox Talks refresh hazard awareness. Personal protective clothing worn as required at all times. Potable water provided to control heat stress. Site inspections and policy enforcement provided by Site Safety Officer 	<p>Existing control measures or safeguards are adequate to mitigate identified risks and comply with legal requirements.</p> <p>Job Hazard Analysis (JHA) will be assessed after any incident or notice of non-compliance to verify controls are adequate and what improvements, if any, are necessary.</p> <p>Regular refresher training, jobsite inspections and program audits will be conducted to maintain compliance.</p> <p>No improvements are required.</p>	1	4	4	

Job Hazard Assessment:			General Operations			Job Hazard Assessment Number			MPLC1.0		
Site or area being assessed			Mattress Placement – Lake Champlain			Date of assessment			1/30/23		
Assessor			Lucky Abernathy			Next review date					
Identified Hazard			Risk Evaluation			Existing control measures or safeguards in place	Observations and recommendations on control measures: 1. Do they comply with legal requirements? 2. Are the measures adequate? 3. What improvements are required?	Revised Risk Evaluation after control			Date action completed and any further action required
People affected	Hazard (potential to cause harm)	Risk	Likelihood	Severity	Risk Rating			Likelihood	Severity	Risk Rating	
Employees, contractors, vendors, suppliers, visitors	Health Hazard Occupational Noise Exposure	• Hearing loss	4	4	16	<ul style="list-style-type: none"> Hearing conservation program Jobsite noise monitoring, surveys, signage Site personnel orientation / training highlights hazards and controls Toolbox Talks refresh hazard awareness. Personal protective equipment (hearing protection) worn as required at all times. Audiometric testing Job rotation and limited noise exposure Equipment maintenance Site inspections and policy enforcement provided by Site Safety Officer 	<p>Existing control measures or safeguards are adequate to mitigate identified risks and comply with legal requirements.</p> <p>Job Hazard Analysis (JHA) will be assessed after any incident or notice of non-compliance to verify controls are adequate and what improvements, if any, are necessary.</p> <p>Regular refresher training, jobsite inspections and program audits will be conducted to maintain compliance.</p> <p>No improvements are required.</p>	2	4	8	
Employees, contractors, vendors, suppliers, visitors	Physical Hazard Walking/working surface	<ul style="list-style-type: none"> Slips and trips Falls on same level 	4	3	12	<ul style="list-style-type: none"> Level, graded and compacted walking surfaces are maintained throughout the worksite. Snow removal, cleaning and clearing of walking paths and surfaces. Site personnel orientation / training highlights hazards and controls Toolbox Talks refresh hazard awareness. Personal sturdy footwear worn as required at all times. Handrails, guardrails and other walking aids and climbing support General housekeeping Adequate lighting / illumination Site inspections and policy enforcement provided by Site Safety Officer 	<p>Existing control measures or safeguards are adequate to mitigate identified risks and comply with legal requirements.</p> <p>Job Hazard Analysis (JHA) will be assessed after any incident or notice of non-compliance to verify controls are adequate and what improvements, if any, are necessary.</p> <p>Regular refresher training, jobsite inspections and program audits will be conducted to maintain compliance.</p> <p>No improvements are required.</p>	2	3	6	

Job Hazard Assessment:			General Operations			Job Hazard Assessment Number			MPLC.1.0		
Site or area being assessed			Mattress Placement – Lake Champlain			Date of assessment			1/30/23		
Assessor			Lucky Abernathy			Next review date					
Identified Hazard			Risk Evaluation			Existing control measures or safeguards in place	Observations and recommendations on control measures: 1. Do they comply with legal requirements? 2. Are the measures adequate? 3. What improvements are required?	Revised Risk Evaluation after control			Date action completed and any further action required
People affected	Hazard (potential to cause harm)	Risk	Likelihood	Severity	Risk Rating			Likelihood	Severity	Risk Rating	
Employees, contractors, vendors, suppliers, visitors	Physical Hazard Hand and power tools	<ul style="list-style-type: none"> Struck by (impact) Caught between Electrical shock 	4	2	8	<ul style="list-style-type: none"> Tools are inspected, maintained, and cared for in accordance with manufacturer’s instructions and used for intended use only. Personal protective equipment (hand, eye, face, body protection) worn as required at all times Site personnel orientation / training highlights hazards and controls Toolbox Talks refresh hazard awareness. All electrical equipment, outlets, and circuits are properly grounded and free of knicks, cuts, stray wires or other damage Site inspections and policy enforcement provided by Site Safety Officer 	<p>Existing control measures or safeguards are adequate to mitigate identified risks and comply with legal requirements.</p> <p>Job Hazard Analysis (JHA) will be assessed after any incident or notice of non-compliance to verify controls are adequate and what improvements, if any, are necessary.</p> <p>Regular refresher training, jobsite inspections and program audits will be conducted to maintain compliance.</p> <p>No improvements are required.</p>	3	2	6	
Employees, contractors, vendors, suppliers, visitors	Physical Hazard Equipment pre-start	<ul style="list-style-type: none"> Damage to equipment Struck by Caught between Toxic fumes 	1	5	5	<ul style="list-style-type: none"> All machinery and equipment shall be inspected daily Machinery found to be in an unsafe condition shall be removed from service until the unsafe condition has been properly corrected. Start-up limited to trained and authorized personnel Equipment receives inspection, testing maintenance, and certification in accordance with the manufacturer’s requirements. Toolbox Talks refresh hazard awareness. Site inspections and policy enforcement provided by Site Safety Officer 	<p>Existing control measures or safeguards are adequate to mitigate identified risks and comply with legal requirements.</p> <p>Job Hazard Analysis (JHA) will be assessed after any incident or notice of non-compliance to verify controls are adequate and what improvements, if any, are necessary.</p> <p>Regular refresher training, jobsite inspections and program audits will be conducted to maintain compliance.</p> <p>No improvements are required.</p>	1	5	5	

Job Hazard Assessment:			General Operations			Job Hazard Assessment Number			MPLC.1.0		
Site or area being assessed			Mattress Placement – Lake Champlain			Date of assessment			1/30/23		
Assessor			Lucky Abernathy			Next review date					
Identified Hazard			Risk Evaluation			Existing control measures or safeguards in place	Observations and recommendations on control measures: 1. Do they comply with legal requirements? 2. Are the measures adequate? 3. What improvements are required?	Revised Risk Evaluation after control			Date action completed and any further action required
People affected	Hazard (potential to cause harm)	Risk	Likelihood	Severity	Risk Rating			Likelihood	Severity	Risk Rating	
Employees, contractors, vendors, suppliers, visitors	Physical Hazard Working in proximity to water	<ul style="list-style-type: none"> Drowning Hypothermia 	1	5	5	<ul style="list-style-type: none"> Site personnel orientation / training highlights hazards and controls Inspection and maintenance of guardrails, chain stays, and other fall prevention equipment and controls Toolbox Talks refresh hazard awareness. Site inspections and policy enforcement provided by Site Safety Officer Strict adherence to CMI 'Personnel Transfer Procedure' Personal Protective Equipment (personal flotation device) worn by all personnel at all times while working on barge, crew boats & support craft and transitioning between shore and water craft Recovery boat shall be kept in the water while personnel are working in or near water. Dock & barge ladders for enabling water ingress/egress shall be properly maintained and access thereto kept free of obstructions. 	Existing control measures or safeguards are adequate to mitigate identified risks and comply with legal requirements. Job Hazard Analysis (JHA) will be assessed after any incident or notice of non-compliance to verify controls are adequate and what improvements, if any, are necessary. Regular refresher training, jobsite inspections and program audits will be conducted to maintain compliance. No improvements are required.	1	5	5	

Job Hazard Assessment:			Storage of Materials			Job Hazard Assessment Number			MPLC2.0		
Site or area being assessed			Mattress Placement – Lake Champlain			Date of assessment			1/30/23		
Assessor			Lucky Abernathy			Next review date					
Identified Hazard			Risk Evaluation			Existing control measures or safeguards in place	Observations and recommendations on control measures: 1. Do they comply with legal requirements? 2. Are the measures adequate? 3. What improvements are required?	Revised Risk Evaluation after control			Date action completed and any further action required
People affected	Hazard (potential to cause harm)	Risk	Likelihood	Severity	Risk Rating			Likelihood	Severity	Risk Rating	
Employees, contractors, vendors, suppliers, visitors	Health and Physical Hazard Fuel storage	<ul style="list-style-type: none"> Explosion Fire Environment pollution Eye/Skin irritation Inhalation Death 	1	5	5	<ul style="list-style-type: none"> Larger fuel quantities shall be stored in approved, double-walled, tanks. Tanks are to be regularly inspected for serviceability & condition & removed from service if damage is found. Portable containers are to be regularly inspected for leaks and dents. Damaged containers are to be taken out of service & safely disposed of. Portable containers shall be kept in approved, flammable storage cabinet (s) Materials properly stored, handled, dispensed, and disposed of in accordance with manufacturer's requirements or SSHASP policy Fuel, oil & lubricant storage areas shall be: well-ventilated, clear of potential sources of combustion, clear of suspended, overhead loads and otherwise secure Fuel storage quantities shall be kept minimized so far as practical. Site inspections and policy enforcement shall be provided by Site Safety Officer Toolbox Talks refresh hazard awareness Site personnel orientation / training highlights hazards and controls SDS (Safety Data Sheets) are readily available for all items to be used on the project and consulted to facilitate segregating non-compatible materials. Product containers shall be properly labelled that clearly state proper product name of contents and possible hazards. 	Existing control measures or safeguards are adequate to mitigate identified risks and comply with legal requirements. Job Hazard Analysis (JHA) will be assessed after any incident or notice of non-compliance to verify controls are adequate and what improvements, if any, are necessary. Regular refresher training, jobsite inspections and program audits will be conducted to maintain compliance. No improvements are required.	1	5	5	

Job Hazard Assessment:			Storage of Materials			Job Hazard Assessment Number			MPLC.2.0		
Site or area being assessed			Mattress Placement – Lake Champlain			Date of assessment			1/30/23		
Assessor			Lucky Abernathy			Next review date					
Identified Hazard			Risk Evaluation			Existing control measures or safeguards in place	Observations and recommendations on control measures: 1. Do they comply with legal requirements? 2. Are the measures adequate? 3. What improvements are required?	Revised Risk Evaluation after control			Date action completed and any further action required
People affected	Hazard (potential to cause harm)	Risk	Likelihood	Severity	Risk Rating			Likelihood	Severity	Risk Rating	
Employees, contractors, vendors, suppliers, visitors	Health and Physical Hazard Storage of aerosols	<ul style="list-style-type: none"> Explosion Fire Environment pollution Death 	1	5	5	<ul style="list-style-type: none"> Aerosol stored: away from heat sources, and sources of combustion, away from other combustibles and hazardous material, away from sharp points that might puncture containers, and in well ventilated areas SDS (Safety Data Sheets) are readily available for all items to be used on the project and consulted to facilitate segregating non-compatible materials. Site inspections and policy enforcement shall be provided by Site Safety Officer Toolbox Talks refresh hazard awareness Site personnel orientation / training highlights hazards and controls Product containers shall be properly labelled that clearly state proper product name of contents and possible hazards. 	Existing control measures or safeguards are adequate to mitigate identified risks and comply with legal requirements. Job Hazard Analysis (JHA) will be assessed after any incident or notice of non-compliance to verify controls are adequate and what improvements, if any, are necessary. Regular refresher training, jobsite inspections and program audits will be conducted to maintain compliance. No improvements are required.	1	5	5	
Employees, contractors, vendors, suppliers, visitors	Physical Hazard Stacking materials	<ul style="list-style-type: none"> Caught between / struck by; Injury to personnel; death; Loss of vessel / barge stability 	3	5	15	<ul style="list-style-type: none"> Bagged, containerized, bundled materials (e.g. concrete mattresses) that are stored in tiers shall be stacked, blocked, interlocked, and the stacking height limited so that it is stable and secured against sliding or collapse. Proper safety equipment and procedures shall be employed when handling or stacking any materials Maximum stack heights will be stipulated by the Site Safety Officer, Site Superintendent or Barge Superintendent Toolbox Talks refresh hazard awareness 	Existing control measures or safeguards are adequate to mitigate identified risks and comply with legal requirements. Job Hazard Analysis (JHA) will be assessed after any incident or notice of non-compliance to verify controls are adequate and what improvements, if any, are necessary. Regular refresher training, jobsite inspections and program audits will be conducted to maintain compliance. No improvements are required.	1	5	5	

						<ul style="list-style-type: none">• Site personnel orientation / training highlights hazards and controls• Site inspections and policy enforcement shall be provided by Site Safety Officer				
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Job Hazard Assessment:			Receive/Load/Unload Mattresses (Barge Operations)			Job Hazard Assessment Number			MPLC.3.0		
Site or area being assessed			Mattress Placement – Lake Champlain			Date of assessment			1/30/23		
Assessor			Lucky Abernathy			Next review date					
Identified Hazard			Risk Evaluation			Existing control measures or safeguards in place	Observations and recommendations on control measures: 1. Do they comply with legal requirements? 2. Are the measures adequate? 3. What improvements are required?	Revised Risk Evaluation after control			Date action completed and any further action required
People affected	Hazard (potential to cause harm)	Risk	Likelihood	Severity	Risk Rating			Likelihood	Severity	Risk Rating	
Vessel crew	Physical Hazard Securing cargo on barge (e.g. Mattresses)	<ul style="list-style-type: none"> Personnel Injury (caught between, struck by) Equipment damage Material damage Environment impact 	2	4	8	<ul style="list-style-type: none"> Equipment and materials shall be securely fastened to the barge to prevent movement: Fasteners shall be comprised of: welded dogs and wedges; chains, binders and pad eyes; heavy duty straps and pad; other effective and reliable means Site inspections and policy enforcement shall be provided by Site Safety Officer Site personnel orientation / training highlights hazards and controls Toolbox Talks refresh hazard awareness Work activities restricted to trained and authorized personnel. Vessel crew shall take weather and water conditions into account prior to commencing an mattress operations 	Existing control measures or safeguards are adequate to mitigate identified risks and comply with legal requirements. Job Hazard Analysis (JHA) will be assessed after any incident or notice of non-compliance to verify controls are adequate and what improvements, if any, are necessary. Regular refresher training, jobsite inspections and program audits will be conducted to maintain compliance. No improvements are required.	2	3	6	
Vessel crew	Physical Hazard Hookup / unhook from crane rigging	<ul style="list-style-type: none"> Personnel Injury (caught between, struck by) Death Equipment damage Material damage Environment impact Lost load 	3	5	15	<ul style="list-style-type: none"> Site inspections and policy enforcement shall be provided by Site Safety Officer Rigging equipment shall be inspected by a competent person in accordance with manufacturer's guidelines (e.g. before each use, as necessary during usage) Defective rigging shall be immediately removed from service Work activities restricted to trained and authorized personnel. Toolbox Talks refresh hazard awareness Site personnel orientation / training highlights hazards and controls 	Existing control measures or safeguards are adequate to mitigate identified risks and comply with legal requirements. Job Hazard Analysis (JHA) will be assessed after any incident or notice of non-compliance to verify controls are adequate and what improvements, if any, are necessary. Regular refresher training, jobsite inspections and program audits will be conducted to maintain compliance. No improvements are required.	2	5	10	

Job Hazard Assessment:			Receive/Load/Unload Mattresses (Barge Operations)			Job Hazard Assessment Number			MPLC.3.0		
Site or area being assessed			Mattress Placement – Lake Champlain			Date of assessment			1/30/23		
Assessor			Lucky Abernathy			Next review date					
Identified Hazard			Risk Evaluation			Existing control measures or safeguards in place	Observations and recommendations on control measures: 1. Do they comply with legal requirements? 2. Are the measures adequate? 3. What improvements are required?	Revised Risk Evaluation after control			Date action completed and any further action required
People affected	Hazard (potential to cause harm)	Risk	Likelihood	Severity	Risk Rating			Likelihood	Severity	Risk Rating	
Vessel crew	Physical Hazard Moving of cargo (e.g. Mattresses) to / from staging area	<ul style="list-style-type: none"> Personnel Injury (caught between, struck by) Equipment damage Material damage Environment impact 	3	4	12	<ul style="list-style-type: none"> Equipment operators shall be aware of load they are handling, equipment overhead height restrictions, and their surroundings (personnel, other equipment, etc.) Operations shall be limited to trained and authorized riggers, crane and mobile equipment operators CMI yards shall be maintained to minimize hazards to equipment and trucks All equipment shall be properly maintained and inspected prior to use Toolbox Talks refresh hazard awareness Work activities restricted to trained and authorized personnel. Site personnel orientation / training highlights hazards and controls Barricades shall limit access to active cargo handling site Site inspections and policy enforcement shall be provided by Site Safety Officer 	Existing control measures or safeguards are adequate to mitigate identified risks and comply with legal requirements. Job Hazard Analysis (JHA) will be assessed after any incident or notice of non-compliance to verify controls are adequate and what improvements, if any, are necessary. Regular refresher training, jobsite inspections and program audits will be conducted to maintain compliance. No improvements are required.	2	3	6	
Vessel crew	Physical Hazard Crane Operations	<ul style="list-style-type: none"> Personnel Injury (caught between, struck by) Death Equipment damage Material damage Environment impact Lost load 	3	5	15	<ul style="list-style-type: none"> Crane operations on barges are subject to additional operational constraints than when operated on land. Cranes on a barge need to be as level as possible and secured to the deck as per OSHA 1926.1437. Barge stability shall be adequate for all stages of all intended lift operations. Adequate clearance shall be maintained between moving and rotating structures of the crane and fixed objects to allow the passage of employees without harm. The clearance areas shall be clearly 	Existing control measures or safeguards are adequate to mitigate identified risks and comply with legal requirements. Job Hazard Analysis (JHA) will be assessed after any incident or notice of non-compliance to verify controls are adequate and what improvements, if any, are necessary. Regular refresher training, jobsite inspections and program audits will be conducted to maintain compliance.	2	5	10	

					<p>marked as to prevent caught between hazards on the barge.</p> <ul style="list-style-type: none"> • The Crane Manufacturer shall be consulted with regard to potential derating of equipment for barge-based operations. The derated load chart shall be posted in clear view of the operator. Barge list and trim conditions shall be considered for potential additional derating of crane equipment. • The planned lift (weight & outreach) shall be safely within the capabilities of the crane equipment and rigging in derated status. • Crane operators & signalers shall be properly trained and certified. Crane operators shall be able to communicate effectively with the lift supervisor, rigger(s) flagmen and other affected personnel on the job site. • Crane equipment shall be regularly inspected and a record of inspections maintained & available for inspection. • Crane rigging shall be inspected prior to use and properly removed from service if damage is found • The lift and swing path shall be clear of personnel & obstructions and adequate clearance shall be maintained from electrical sources. • All personnel and obstructions shall be kept clear of the swing radius of the counterweight. • Tag lines shall be used to aid with control and safe placement of loads • Toolbox Talks refresh hazard awareness • Site personnel orientation / training highlights hazards and controls • Adequate warnings, signs, barricades or other means of notification shall be provided to site personnel to indicate crane operations. • Site inspections and policy enforcement shall be provided by Site Safety Officer 	<p>No improvements are required.</p>			
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Job Hazard Assessment:			Vessel Operations			Job Hazard Assessment Number			MPLC.4.0						
Site or area being assessed			Mattress Placement – Lake Champlain			Date of assessment			1/30/23						
Assessor			Lucky Abernathy			Next review date									
Identified Hazard			Risk Evaluation			Existing control measures or safeguards in place			Observations and recommendations on control measures: 1. Do they comply with legal requirements? 2. Are the measures adequate? 3. What improvements are required?			Revised Risk Evaluation after control			Date action completed and any further action required
												Likelihood	Severity	Risk Rating	
People affected	Hazard (potential to cause harm)	Risk	Likelihood	Severity	Risk Rating				Likelihood	Severity	Risk Rating				
Passengers/ vessel crew	Physical Hazards Obstacles on vessel working decks (e.g., pipes, wires, hoses); slippery surfaces; uneven terrain	• Slips, trips, and falls	3	3	9	<ul style="list-style-type: none"> • Good housekeeping will be maintained - work areas will be kept clean and uncluttered. • Deck will be maintained free of obstructions and accumulated water. • Site personnel orientation / training highlights hazards and controls • Toolbox Talks refresh hazard awareness • Site inspections and policy enforcement shall be provided by Site Safety Officer • De-icing measures shall be employed during freezing conditions to reduce slip hazards • Trip hazards (e.g. welded pad eyes, steel plates) shall be highlighted with brightly colored paint to aid identification & reduce tripping risks • Emergency equipment and lifesaving equipment must always have a clear access path and usage areas. 	Existing control measures or safeguards are adequate to mitigate identified risks and comply with legal requirements. Job Hazard Analysis (JHA) will be assessed after any incident or notice of non-compliance to verify controls are adequate and what improvements, if any, are necessary. Regular refresher training, jobsite inspections and program audits will be conducted to maintain compliance. No improvements are required.	3	1	3					
Passengers/ vessel crew	Physical Hazard Vessel illumination	• Slips, trips, and falls	2	3	6	<ul style="list-style-type: none"> • Offices, workshops, storage areas, access ways (ladders, gangways etc.), working areas, & machinery areas, etc. shall be properly illuminated, while personnel are on site • Site inspections and policy enforcement shall be provided by Site Safety Officer • Toolbox Talks refresh hazard awareness 	Existing control measures or safeguards are adequate to mitigate identified risks and comply with legal requirements. Job Hazard Analysis (JHA) will be assessed after any incident or notice of non-compliance to verify controls are adequate and what improvements, if any, are necessary. Regular refresher training, jobsite inspections and program audits will be conducted to maintain compliance. No improvements are required.	1	3	3					

Job Hazard Assessment:			Vessel Operations			Job Hazard Assessment Number			MPLC.4.0		
Site or area being assessed			Mattress Placement – Lake Champlain			Date of assessment			1/30/23		
Assessor			Lucky Abernathy			Next review date					
Identified Hazard			Risk Evaluation			Existing control measures or safeguards in place	Observations and recommendations on control measures: 1. Do they comply with legal requirements? 2. Are the measures adequate? 3. What improvements are required?	Revised Risk Evaluation after control			Date action completed and any further action required
People affected	Hazard (potential to cause harm)	Risk	Likelihood	Severity	Risk Rating			Likelihood	Severity	Risk Rating	
Passengers/ vessel crew	Physical Hazard Anchor handling / moving barge with anchor winches	• Injury or death, to personnel from moving wires under tension	3	5	15	<ul style="list-style-type: none"> • Non-essential personnel to be kept clear of mooring operations. • Use of clear & concise communications (radio / hand signals) with support tug crew, crane operator, winch operator • Personnel to stand clear of elevated loads (anchors / mooring buoys) + use of tag lines to control loads. • Personnel to be cognizant of stored energy in taut lines / wires & maintain safe distance from these items. • Mooring wires / lines may present pinch hazards, particularly during placement of eyes on bits – KEEP HANDS CLEAR • Use of barricades, chains etc. to establish exclusion zones. • Enclose winch wires in pipe – as practically feasible. • Barge layout design optimized to reduce risks to personnel. • Barge layout design to enable proper fleeting of wires onto winches. • Anchor plan design to minimize requirement to reset anchors. • Toolbox Talks refresh hazard awareness • Site inspections and policy enforcement shall be provided by Site Safety Officer • Site personnel orientation / training highlights hazards and controls 	Existing control measures or safeguards are adequate to mitigate identified risks and comply with legal requirements. Job Hazard Analysis (JHA) will be assessed after any incident or notice of non-compliance to verify controls are adequate and what improvements, if any, are necessary. Regular refresher training, jobsite inspections and program audits will be conducted to maintain compliance. No improvements are required.	3	1	3	

Job Hazard Assessment:			Vessel Operations			Job Hazard Assessment Number			MPLC.4.0		
Site or area being assessed			Mattress Placement – Lake Champlain			Date of assessment			1/30/23		
Assessor			Lucky Abernathy			Next review date					
Identified Hazard			Risk Evaluation			Existing control measures or safeguards in place	Observations and recommendations on control measures: 1. Do they comply with legal requirements? 2. Are the measures adequate? 3. What improvements are required?	Revised Risk Evaluation after control			Date action completed and any further action required
People affected	Hazard (potential to cause harm)	Risk	Likelihood	Severity	Risk Rating			Likelihood	Severity	Risk Rating	
Passengers/ vessel crew	Physical Hazard Anchor handling / moving barge with anchor winches	<ul style="list-style-type: none"> • Drowning • Hypothermia • Struck by • Caught between • Sprain/strain 	1	5	5	<ul style="list-style-type: none"> • All personnel to wear USCG approved life jackets / PFD at all times when mooring Personnel to stay clear of edge of vessel as interaction with tug / shore structures may cause sudden, unexpected vessel movement. Barge speed to be minimized when approaching docks / structures. Use of shore based mooring gang to accept barge ropes (as available) 	Existing control measures or safeguards are adequate to mitigate identified risks and comply with legal requirements. Job Hazard Analysis (JHA) will be assessed after any incident or notice of non-compliance to verify controls are adequate and what improvements, if any, are necessary. Regular refresher training, jobsite inspections and program audits will be conducted to maintain compliance. No improvements are required.	1	5	5	
Passengers/ vessel crew	Physical and Health Hazard Vessel equipment operations (vessel collision)	<ul style="list-style-type: none"> • Equipment damage • Vessel damage • Property damage • Personal injury • Explosion • Drowning • Hypothermia 	1	5	5	<ul style="list-style-type: none"> • In accordance with applicable International / Federal / State & Local Laws, vessels shall be properly equipped with navigation and communication electronics as prescribed for a vessel of their size, current operation & trade • Site inspections and policy enforcement shall be provided by Site Safety Officer 	Existing control measures or safeguards are adequate to mitigate identified risks and comply with legal requirements. Job Hazard Analysis (JHA) will be assessed after any incident or notice of non-compliance to verify controls are adequate and what improvements, if any, are necessary. Regular refresher training, jobsite inspections and program audits will be conducted to maintain compliance. No improvements are required.	1	5	5	

Job Hazard Assessment:			Vessel Operations			Job Hazard Assessment Number			MPLC.4.0		
Site or area being assessed			Mattress Placement – Lake Champlain			Date of assessment			1/30/23		
Assessor			Lucky Abernathy			Next review date					
Identified Hazard			Risk Evaluation			Existing control measures or safeguards in place	Observations and recommendations on control measures: 1. Do they comply with legal requirements? 2. Are the measures adequate? 3. What improvements are required?	Revised Risk Evaluation after control			Date action completed and any further action required
People affected	Hazard (potential to cause harm)	Risk	Likelihood	Severity	Risk Rating			Likelihood	Severity	Risk Rating	
Passengers/ vessel crew	Physical and Health Hazard Inadequate Vessel manning – Vessel collision, allision, or emergency	<ul style="list-style-type: none"> Equipment damage Vessel damage Property damage Personal injury Explosion Drowning Hypothermia 	1	5	5	<ul style="list-style-type: none"> In accordance with applicable International / Federal / State & Local Laws, vessels shall be adequately & properly manned with qualified personnel for a vessel of their size, current operation & trade Site inspections and policy enforcement shall be provided by Site Safety Officer 	Existing control measures or safeguards are adequate to mitigate identified risks and comply with legal requirements. Job Hazard Analysis (JHA) will be assessed after any incident or notice of non-compliance to verify controls are adequate and what improvements, if any, are necessary. Regular refresher training, jobsite inspections and program audits will be conducted to maintain compliance. No improvements are required.	1	5	5	
Passengers/ vessel crew	Physical Hazard Vessel instability resulting in vessel capsize; dangerous vessel list/trim condition; unsafe crane operations	<ul style="list-style-type: none"> Equipment damage Vessel damage Property damage Personal injury Explosion Drowning Hypothermia 	1	5	5	<ul style="list-style-type: none"> Vessel stability, list & trim conditions shall be calculated prior to commencement of the voyage to verify that a safe vessel condition shall prevail for the entirety of the planned voyage and for all anticipated sea conditions. Vessel stability, list & trim conditions shall be maintained in a safe condition for all crane / derrick lifting activities and throughout all stages of planned lifts. Vessels shall be adequately & properly manned with qualified personnel for a vessel of their size, current operation & trade Site inspections and policy enforcement shall be provided by Site Safety Officer 	Existing control measures or safeguards are adequate to mitigate identified risks and comply with legal requirements. Job Hazard Analysis (JHA) will be assessed after any incident or notice of non-compliance to verify controls are adequate and what improvements, if any, are necessary. Regular refresher training, jobsite inspections and program audits will be conducted to maintain compliance. No improvements are required.	1	5	5	

Job Hazard Assessment:			Vessel Operations			Job Hazard Assessment Number			MPLC.4.0		
Site or area being assessed			Mattress Placement – Lake Champlain			Date of assessment			1/30/23		
Assessor			Lucky Abernathy			Next review date					
Identified Hazard			Risk Evaluation			Existing control measures or safeguards in place	Observations and recommendations on control measures: 1. Do they comply with legal requirements? 2. Are the measures adequate? 3. What improvements are required?	Revised Risk Evaluation after control			Date action completed and any further action required
People affected	Hazard (potential to cause harm)	Risk	Likelihood	Severity	Risk Rating			Likelihood	Severity	Risk Rating	
Passengers/ vessel crew	Physical Hazard Vessel draft & air draft resulting in vessel allision; collision with/damage to overhead structures	<ul style="list-style-type: none"> Equipment damage Vessel damage Property damage Personal injury Explosion Drowning Hypothermia Electrical shock Utility strike 	1	5	5	<ul style="list-style-type: none"> Route planning & weather evaluation. NOTE: Sea / Tide conditions may potentially affect both under-keel, and overhead clearance distance Vessel selection Ballasting / De-Ballasting Use of additional voyage trips Vessels shall be adequately & properly manned with qualified personnel for a vessel of their size, current operation & trade Site inspections and policy enforcement shall be provided by Site Safety Officer Toolbox Talks refresh hazard awareness Site personnel orientation / training highlights hazards and controls 	Existing control measures or safeguards are adequate to mitigate identified risks and comply with legal requirements. Job Hazard Analysis (JHA) will be assessed after any incident or notice of non-compliance to verify controls are adequate and what improvements, if any, are necessary. Regular refresher training, jobsite inspections and program audits will be conducted to maintain compliance. No improvements are required.	1	5	5	
Passengers/ vessel crew	Physical and Health Hazard Severe Weather leading to vessel capsize	<ul style="list-style-type: none"> Equipment damage Vessel damage Property damage Personal injury Explosion Drowning Hypothermia 	1	5	5	<ul style="list-style-type: none"> Diligent monitoring of weather forecast and prevailing site conditions. Temporary cessation of site activities to seek safe shelter. Maintenance of adequate vessel stability. Site inspections and policy enforcement shall be provided by Site Safety Officer Toolbox Talks refresh hazard awareness Site personnel orientation / training highlights hazards and controls 	Existing control measures or safeguards are adequate to mitigate identified risks and comply with legal requirements. Job Hazard Analysis (JHA) will be assessed after any incident or notice of non-compliance to verify controls are adequate and what improvements, if any, are necessary. Regular refresher training, jobsite inspections and program audits will be conducted to maintain compliance. No improvements are required.	1	5	5	

Job Hazard Assessment:			Vessel Operations			Job Hazard Assessment Number			MPLC.4.0		
Site or area being assessed			Mattress Placement – Lake Champlain			Date of assessment			1/30/23		
Assessor			Lucky Abernathy			Next review date					
Identified Hazard			Risk Evaluation			Existing control measures or safeguards in place	Observations and recommendations on control measures: 1. Do they comply with legal requirements? 2. Are the measures adequate? 3. What improvements are required?	Revised Risk Evaluation after control			Date action completed and any further action required
People affected	Hazard (potential to cause harm)	Risk	Likelihood	Severity	Risk Rating			Likelihood	Severity	Risk Rating	
Passengers/ vessel crew	Physical Hazard Manually moving the rigging and loads around the deck of the barge	<ul style="list-style-type: none"> Drowning Hypothermia Struck by Caught between Sprain/strain 	3	5	15	<ul style="list-style-type: none"> Use of safe lifting practices – proper body mechanics when lifting and moving loads Use of multi-person lifts for heavier, larger or awkward loads Use of machinery for heavier, larger or awkward loads Site inspections and policy enforcement shall be provided by Site Safety Officer Toolbox Talks refresh hazard awareness Site personnel orientation / training highlights hazards and controls 	Existing control measures or safeguards are adequate to mitigate identified risks and comply with legal requirements. Job Hazard Analysis (JHA) will be assessed after any incident or notice of non-compliance to verify controls are adequate and what improvements, if any, are necessary. Regular refresher training, jobsite inspections and program audits will be conducted to maintain compliance. No improvements are required.	2	3	6	

Job Hazard Assessment:			Dive Operations			Job Hazard Assessment Number			MPLC.5.0		
Site or area being assessed			Mattress Placement – Lake Champlain			Date of assessment			1/30/23		
Assessor			Lucky Abernathy			Next review date					
Identified Hazard			Risk Evaluation			Existing control measures or safeguards in place	Observations and recommendations on control measures: 1. Do they comply with legal requirements? 2. Are the measures adequate? 3. What improvements are required?	Revised Risk Evaluation after control			Date action completed and any further action required
People affected	Hazard (potential to cause harm)	Risk	Likelihood	Severity	Risk Rating			Likelihood	Severity	Risk Rating	
Passengers/ vessel crew	Physical and Health Hazard Dive Operations for mattress installation	<ul style="list-style-type: none"> Injury or death, to personnel from improper dive procedures Drowning Hypothermia Struck by Caught between 	1	5	5	<ul style="list-style-type: none"> Strict adherence to CMI 'Dive Procedures & Safe Practices Manual' and Safe Dive Plan for Mattress Placement. An Emergency Bill will be on the dive site with the following information: Location and phone number of nearest operational recompression chamber if not located at the dive site; Location and phone number(s) of nearest hospital(s); Location and phone number of nearest USCG Rescue Coordination Center, where appropriate Keep the deck of the dive area clear of trip hazards at all times. Dive support staff working over or near water shall wear USCG approved PFD's (life jacket or work vest). PFD's to be inspected before each use. Ring buoys with at least 90 feet of line shall be provided and readily available for emergency rescue operations. Distance between ring buoys shall not exceed 200 feet. Verify diver gear, including communications system and video feed prior to diver entry into water. Ensure that diver ingress/egress area is properly illuminated and clear of obstructions prior to diver entry into the water. Ladders to be in good condition and securely fastened to vessel. Use of proper Diver / Dive Supervisor communications 	Existing control measures or safeguards are adequate to mitigate identified risks and comply with legal requirements. Job Hazard Analysis (JHA) will be assessed after any incident or notice of non-compliance to verify controls are adequate and what improvements, if any, are necessary. Regular refresher training, jobsite inspections and program audits will be conducted to maintain compliance. No improvements are required.	1	5	5	

					<ul style="list-style-type: none"> • Use of proper Dive Supervisor / Crane Operator communications • Non-essential personnel to keep clear of dive control hut and not interfere with surface / diver communications. • Each diver shall be continuously tendered while in the water, with one diver per tender, regardless of depth. • Each diver must have a reserve breathing supply available that can be turned on immediately by the diver in the event of loss of air. The reserve breathing air supply shall be of sufficient capacity to safely terminate the dive in the event of loss of primary air. 				
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Job Hazard Assessment:			Mattress Placement			Job Hazard Assessment Number			MPLC.6.0		
Site or area being assessed			Mattress Placement – Lake Champlain			Date of assessment			1/30/23		
Assessor			Lucky Abernathy			Next review date					
Identified Hazard			Risk Evaluation			Existing control measures or safeguards in place	Observations and recommendations on control measures: 1. Do they comply with legal requirements? 2. Are the measures adequate? 3. What improvements are required?	Revised Risk Evaluation after control			Date action completed and any further action required
People affected	Hazard (potential to cause harm)	Risk	Likelihood	Severity	Risk Rating			Likelihood	Severity	Risk Rating	
Vessel crew	Physical Hazard Diver/ diver umbilical entrapment	<ul style="list-style-type: none"> Injury or death, to personnel from improper dive procedures Drowning Hypothermia Struck by Caught between 	1	5	5	<ul style="list-style-type: none"> Strict adherence to CMI 'Dive Procedures & Safe Practices Manual' and Safe Dive Plan. Diver and diver rig to be kept clear of elevated loads. Diver to avoid working directly under vessel / barge hull / suspended loads Diver to carry cutting device (knife, etc.) to enable him to free himself from entanglement. Each diver shall be continuously tendered while in the water, with one diver per tender, regardless of depth. Each diver must have a reserve breathing supply available that can be turned on immediately by the diver in the event of loss of air. The reserve breathing air supply shall be of sufficient capacity to safely terminate the dive in the event of loss of primary air. 	Existing control measures or safeguards are adequate to mitigate identified risks and comply with legal requirements. Job Hazard Analysis (JHA) will be assessed after any incident or notice of non-compliance to verify controls are adequate and what improvements, if any, are necessary. Regular refresher training, jobsite inspections and program audits will be conducted to maintain compliance. No improvements are required.	1	5	5	
Vessel crew	Physical Hazard Diver struck by, crushed by mattress or deployment frame	<ul style="list-style-type: none"> Personnel Injury (caught between, struck by) Death Equipment damage Material damage Lost load 	2	3	6	<ul style="list-style-type: none"> Use of diver video feed to keep Dive Supervisor informed of sub-surface operations. Mattress deployment / recovery frame to be rigged with tag lines. Diver and diver rig to be kept clear of elevated loads. Diver to verify all deployment frame slings have been fully disconnected from mattress and to stand safely clear before verbally approving frame recovery to service. 	Existing control measures or safeguards are adequate to mitigate identified risks and comply with legal requirements. Job Hazard Analysis (JHA) will be assessed after any incident or notice of non-compliance to verify controls are adequate and what improvements, if any, are necessary. Regular refresher training, jobsite inspections and program audits will be conducted to maintain compliance. No improvements are required.	2	3	6	

Vessel crew	Physical Hazard Deck personnel struck by, crushed by mattress or deployment frame	<ul style="list-style-type: none"> Personnel Injury (caught between, struck by) Death Equipment damage Material damage Lost load 	2	3	6	<ul style="list-style-type: none"> Inspection of mattress rope condition. NOTE: Mattresses to be taken out of service and not re-used if mattress ropes deemed to be in deteriorated condition Qualified deck crew to perform and verify proper crane hook-up. Mattress deployment / recovery frame to be rigged with tag lines. Deck personnel to be kept clear of elevated loads. 	<p>Existing control measures or safeguards are adequate to mitigate identified risks and comply with legal requirements.</p> <p>Job Hazard Analysis (JHA) will be assessed after any incident or notice of non-compliance to verify controls are adequate and what improvements, if any, are necessary. Regular refresher training, jobsite inspections and program audits will be conducted to maintain compliance.</p> <p>No improvements are required.</p>	2	3	6
Vessel crew	Physical Hazard Mattress recovery rope failure; picking rope failure	<ul style="list-style-type: none"> Personnel Injury (caught between, struck by) Death Equipment damage Material damage Lost load 	2	3	6	<ul style="list-style-type: none"> Inspection of mattress rope condition. NOTE: Mattresses to be taken out of service and not re-used if mattress ropes deemed to be in deteriorated condition Qualified deck crew to perform and verify proper crane hook-up. Mattress deployment / recovery frame to be rigged with tag lines. All personnel to be kept clear of elevated loads. 	<p>Existing control measures or safeguards are adequate to mitigate identified risks and comply with legal requirements.</p> <p>Job Hazard Analysis (JHA) will be assessed after any incident or notice of non-compliance to verify controls are adequate and what improvements, if any, are necessary. Regular refresher training, jobsite inspections and program audits will be conducted to maintain compliance.</p> <p>No improvements are required.</p>			

Caldwell Marine International, LLC

Appendix 4 – Shipboard Oil Pollution Emergency Plan (SOPEP)

NKT Doc. #TBD

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Appendix 5 – Lake Champlain SSHASP

NKT Doc. #TBD

Caldwell Marine International, LLC

Appendix 6 – Personnel Transfer Procedure

NKT Doc. #1AA0545744

Appendix 7 – Site Completion Checklists

Site Completion Checklist - Pre-Lay Mattresses (Bottom Layer)				
Item	Description	Yes/No/Value (as applicable)	Initials	Comments
1	Number of bottom layer mattresses installed			
1A	Is installed mattress count in agreement with approved site remediation plan? NOTE: Any disparity between actual vs planned count to be clearly identified in <ul style="list-style-type: none"> • Comments section • Non-Conformance Report Register 			
2	Are there any separation gaps between any adjacent mattresses that exceed 12 inches? NOTE: All such instances to be clearly identified in <ul style="list-style-type: none"> • Comments section • Non-Conformance Report Register 			
2A	Are all mattresses laying flat and in contact with underlying Lakebed? NOTE: Any anomalies to be clearly identified in <ul style="list-style-type: none"> • Comments section • Non-Conformance Report Register 			
3	Have any other non-conformance issues been discovered? NOTE: Details to be provided in clearly identified in <ul style="list-style-type: none"> • Comments section • Non-Conformance Report Register 			
3A	Have NKT been properly notified of all identified non-conformance(s)			
3B	Have all non-conformances been resolved & approved by NKT			
3C	Have all 'unresolved' non-conformances been properly recorded in Non-Conformance Report Register			
4	Has the following positional information been recorded for all installed mattresses?			
4A	Corner positions for all installed mattresses			
4B	Sonar / multibeam imagery for all installed mattresses			
4C	True North alignment of installed mattress pattern			
5	Have all notifications been made with respect to site operations (commencement / progress / completion)?			
5A	Per Project Permit requirements?			
5B	Per Crossing Agreement requirements?			
5C	Per Site Planning requirements?			
5D	Per applicable Local/State/Federal laws?			
6	Have updates to Local Notice To Mariners (LNM) been submitted to USCG regarding site completion & future work			

Site Completion Checklist - Post-Lay Mattresses (Top Layer)				
Item	Description	Yes/No/Value (as applicable)	Initials	Comments
1	Number of top layer mattresses installed			
1A	Is installed mattress count in agreement with approved site remediation plan? NOTE: Any disparity between actual vs planned count to be clearly identified in <ul style="list-style-type: none"> • Comments section • Non-Conformance Report Register 			
2	Are there any separation gaps between any adjacent mattresses that exceed 12 inches? NOTE: All such instances to be clearly identified in <ul style="list-style-type: none"> • Comments section • Non-Conformance Report Register 			
2A	Are all mattresses laying flat and in contact with underlying Lakebed? NOTE: Any anomalies to be clearly identified in <ul style="list-style-type: none"> • Comments section • Non-Conformance Report Register 			
3	Have any other non-conformance issues been discovered? NOTE: Details to be provided in clearly identified in <ul style="list-style-type: none"> • Comments section • Non-Conformance Report Register 			
3A	Have NKT been properly notified of all identified non-conformance(s)			
3B	Have all non-conformances been resolved & approved by NKT			
3C	Have all 'unresolved' non-conformances been properly recorded in Non-Conformance Report Register			
4	Has the following positional information been recorded for all installed mattresses?			
4A	Corner positions for all installed mattresses			
4B	Sonar / multibeam imagery for all installed mattresses			
4C	True North alignment of installed mattress pattern			
5	Have all notifications been made with respect to site operations (commencement / progress / completion)?			
5A	Per Project Permit requirements?			
5B	Per Crossing Agreement requirements?			
5C	Per Site Planning requirements?			
5D	Per applicable Local/State/Federal laws?			
6	Have updates to Local Notice To Mariners (LNM) been submitted to USCG regarding site completion & future work			

Site Completion Checklist - Remedial Mattress Installation				
Item	Description	Yes/No/Value (as applicable)	Initials	Comments
1	Number of mattresses installed			
1A	Is installed mattress count in agreement with approved site remediation plan? NOTE: Any disparity between actual vs planned count to be clearly identified in <ul style="list-style-type: none"> • Comments section • Non-Conformance Report Register 			
2	Are there any separation gaps between any adjacent mattresses that exceed 12 inches? NOTE: All such instances to be clearly identified in <ul style="list-style-type: none"> • Comments section • Non-Conformance Report Register 			
2A	Are all mattresses laying flat and in contact with underlying Lakebed? NOTE: Any anomalies to be clearly identified in <ul style="list-style-type: none"> • Comments section • Non-Conformance Report Register 			
3	Have any other non-conformance issues been discovered? NOTE: Details to be provided in clearly identified in <ul style="list-style-type: none"> • Comments section • Non-Conformance Report Register 			
3A	Have NKT been properly notified of all identified non-conformance(s)			
3B	Have all non-conformances been resolved & approved by NKT			
3C	Have all 'unresolved' non-conformances been properly recorded in Non-Conformance Report Register			
4	Has the following positional information been recorded for all installed mattresses?			
4A	Corner positions for all installed mattresses			
4B	Sonar / multibeam imagery for all installed mattresses			
4C	True North alignment of installed mattress pattern			
5	Have all notifications been made with respect to site operations (commencement / progress / completion)?			
5A	Per Project Permit requirements?			
5B	Per Crossing Agreement requirements?			
5C	Per Site Planning requirements?			
5D	Per applicable Local/State/Federal laws?			
6	Have updates to Local Notice To Mariners (LNM) been submitted to USCG regarding site completion & future work			