RECOMPRESSION CHAMBER

AIR PRESSURE AND LEAK TEST
(Sheet 2 of 3)
Facility test is conducted _____

NAME PLATE DATA

Manufacturer _____

Date of Manufacture _____

Contract/Drawing No. _____

Maximum Working Pressure _____

Date of Last Pressure Test _____

Test Conducted by _____

1. Conduct visual inspection of chamber to determine if ready for test

Chamber Satisfactory_____Initials of Test Conductor

Discrepancies from visual inspection of chamber:

_____

_____

2. Close inner door lock. With outer lock door open pressure inner lock to 100 fsw (45psig) and verify that the following components do not leak:

Inner lock leak checks Initials of Test Conductor.

A. Shell penetrations and fittings	___Satisfactory
B. View Ports	___Satisfactory
C. Door Seals	___Satisfactory
D. Door Dog Shaft Seals	___Satisfactory
E. Valve Connections and Stems	___Satisfactory
F. Pipe Joints	___Satisfactory
G. Shell Welds	___Satisfactory

3. Increase inner lock pressure to 225 fsw (100 psig) and hold for 5 minutes.

Record Test Pressure_____Satisfactory (Note: Disregard small leaks at this pressure).

RECOMPRESSION CHAMBER
AIR PRESSURE AND LEAK TEST
(Sheet 3 of 3)

4. Depressurize lock slowly to 165 fsw (73.4 psig). Secure all supply and exhaust valves and hold for one hour.

Start Time_____Pressure 165 fsw

End Time_____Pressure_____fsw

If pressure drops below 145 fsw (65 psig) locate and mark leaks. Depressurize, repair, and retest inner lock.
Inner Lock Pressure drop test passed _____ Satisfactory Initials of Test Conductor.

5. Depressurize inner lock and open inner lock door. Secure in open position. Close outer door and secure.

6. Repeat tests of sections 2, 3, and 4 above when set up in accordance with section Leak test only those portions of the chamber not tested in sections 2, 3, and 4.

7. Outer Lock Checks Initials of Test Conductor

A. Shell penetrations and fittings	___Satisfactory
B. View Ports	___Satisfactory
C. Door Seals	___Satisfactory
D. Door Dog Shaft Seals	___Satisfactory
E. Valve Connections and Stems	___Satisfactory
F. Pipe Joints	___Satisfactory
G. Shell Welds	___Satisfactory

8. Maximum Chamber Operating Pressure (100 psig) Test (5 minute hold)

Satisfactory_____Initials of Test Conductor

9. Inner and Outer Lock Chamber Drop Test
   Start Time_____Pressure 165 fsw
   End Time_____Pressure_____fsw
10. All above tests have been satisfactorily completed.

_____	_____	_____
Test Conductor Date	Diving Supervisor Date	Maintenance Supervisor Date

5. Surface-Supplied Air Diving

5.1 Limits

- Surface-supplied air diving shall not be conducted at depths deeper than 190 fsw, except dives with bottom times of 30 minutes or less may be conducted to depths of 220 fsw.
- A decompression chamber shall be ready for use at the dive location for any dive outside the no-decompression limits or deeper than 60 fsw. A decompression chamber is required for dives deeper than 60 fsw when live boating.
- A bell shall be used for dives with an in water decompression time greater than 120 minutes, except when heavy gear is worn or diving is conducted in physically confining spaces.

5.2 Minimum Personnel

The minimum number of personnel comprising a dive team must take into consideration not only the direct requirements of work to be performed, but also any additional factors either known or suspected that would require more personnel to support the diving operation. Question: Looking at the ADCI Operational Guidelines Pgs 51-55 Below Ranges 0-80, 80-130 , 130-220 are different ranges and requirements than the ADCI manual. As this is not my area of exoertise, I would not be able to advise you on the above ranges but would suggest consider following current ADCI Operational gudielines

Surface Supplied Air Diving 0 – 80 fsw with no decompression:

- 1 – Diving Supervisor
- 1 – Diver
- 1 – Tender/Standby Diver

Surface Supplied Air Diving 80 – 130 fsw, or less than 80 fsw when decompression is required:

- 1 – Diving Supervisor
- 1 – Diver
- 1 – Standby Diver
- 1 – Tender

Surface Supplied Air Diving 130 – 220 fsw:

- 1 – non Diving Supervisor
- 1 – Diver
- 1 – Standby Diver
- 2 – Tenders

Working with large Crews in shallow water less than 130 fsw

- When working in shifts with 2 eight-man crew's a non-diving supervisor is required for each shift.
- When working with 2 four-man crews on the same shift at different locations on a single vessel or facility, a non-diving supervisor is required.
- When working with 2 four-man crews on different shifts on a single vessel or facility, a non-diving supervisor is not required.

5.3 General Surface Supplied Procedures

The following are minimum requirements for surface supplied air diving operations.

- Each diver shall be continuously tended while in the water.
- A diver shall be stationed at the underwater point of entry when diving is conducted in enclosed or physically confining spaces.
- Each diving operation shall have a primary breathing gas supply sufficient to support divers for the duration of the planned dive including decompression.
- Diving depth limitations are based on secondary breathing gas availability. A dive-location secondary breathing gas supply shall be provided and be capable of supporting two divers and a standby for the duration of the required decompression during an emergency.
- For dives deeper than 100 fsw or outside the no-decompression limits:
- A separate dive team member shall tend each diver in the water;
- A standby diver shall be available while a diver is in the water;
- A diver-carried reserve breathing gas supply (bailout) shall be provided for each diver when diving at all times regardless of depth, when direct ascent to the surface is not available, except when heavy gear is worn.
- For heavy-gear diving deeper than 100 fsw or outside the no-decompression limits an extra breathing gas hose capable of supplying breathing gas to the diver in the water shall be available to the standby diver.
- A separate safety harness with a positive buckling device shall be worn. The harness shall prevent any strain from being placed on the diver's mask or helmet.
- In the event that diving operations require in-closed space diving a diver shall be stationed at the underwater point of entry.
- An operational two-way voice communication system shall be used between:
- Each surface-supplied air diver and a dive team member at the dive location or bell (when provided or required);
- An operational, two-way communication system shall be available at the dive location to obtain emergency assistance.
- Decompression, repetitive, and no-decompression tables (as appropriate) shall be at the dive location.
- A depth-time profile shall be maintained for each diver during the dive including decompression.
- A means capable of supporting the diver shall be provided for entering and exiting the water.
- The means provided for exiting the water shall extend below the water surface for a minimum of three feet and be adequate to facilitate rescue of injured personnel.
- Dive team members shall be briefed on the tasks to be undertaken, safety procedures for the diving mode being used and emergency procedures.

5.4 Minimum Equipment

5.4.1 Shallow Air (0 to 80 fsw, 60 fsw when live boating)

- Adequate air source and volume tank to support two (2) divers;
- Dive location emergency air source
- Two (2)-diver umbilicals each consisting of air hose, strength member, communications cable, and pneumofathometer hose.
- 1 Set of the U.S. Navy No-decompression tables, Repetitive dive tables, and air decompression and treatment tables
- 1 Safe practices/Operations Manual;
- 1 Control station consisting of communication system and depth gauges;
- Safe means of getting a diver of the water;
- 1 Basic First Aid kit with First Aid Manual and Bag type Manual Resuscitator;
- Two Sets of diver's personal diving equipment consisting of helmet or mask, weight belt if appropriate, protective clothing, tools as required, safety harness, diver carried reserve breathing gas supply (bailout), sharp knife.
- Two time keeping devices;
- Log book and/or dive sheets

5.4.2 Deep Air (in excess of 80 fsw, 60 fsw when live boating)

- Two adequate air sources and volume tanks to support two (2) divers;
- 1 Double-lock recompression chamber;
- 1 Set air decompression and treatment tables;
- Dive location emergency air source;
- 1 Diving stage (all dives deeper than 100 fsw, outside no decompression limits, or with heavy diving gear;
- Two (2)-diver umbilicals each consisting of air hose, strength member, communications cable, and pneumofathometer hose.
- 1 Safe practices/Operations Manual;
- 1 Control station consisting of communication system and depth gauges;
- Safe means of getting a diver of the water;
- 1 Basic First Aid kit with First Aid Manual and Bag type Manual Resuscitator;
- Two sets of diver's personal diving equipment consisting of helmet or mask, weight belt if appropriate, diver carried reserve breathing gas supply (bail out), protective clothing, tools as required, safety harness, diver carried reserve breathing gas supply (bailout), sharp knife;
- Adequate supply of oxygen for recompression treatments;
- Spare parts as required;
- 2 Time keeping devices;
- Log book and/or dive sheets

5.5. Post-Dive Procedures

After the completion of any dive, the Dive Supervisor shall:

- Check the physical condition of the diver.
- Instruct the diver to report any physical problems or adverse physiological effects including symptoms of decompression sickness.
- Advise the diver of the location of a recompression chamber that is ready foruse
- Alert the diver to the potential hazards of flying after diving.
- For any dive outside the no-decompression limits, deeper than 100 fsw or using mixed gas as a breathing mixture, the Dive Supervisor shall instruct the diver to remain awake and in the vicinity of the decompression chamber which is at the dive location for at least one hour after the dive (including decompression or treatment as appropriate).

5.6 Recompression Capability

- A recompression chamber capable of recompressing the diver at the surface to a minimum of 165 fsw (6 ATA) shall be available at the dive location for:
- Surface-supplied air diving to depths deeper than 60 fsw and shallower than 220 fsw;
- Diving outside the no-decompression limits shallower than 220 fsw.
- Live boating deeper than 60 fsw .
- The recompression chamber shall be:
- Dual-lock;
- Multi-place.
- Located within 5 minutes of the dive location.
- The recompression chamber at a minimum shall be equipped with:
    - A pressure gauge for each pressurized compartment designed for human occupancy
    - A built-in-breathing-system with a minimum of one mask per occupant
    - A two-way voice communication system between occupants and a dive team member at the dive location
    - A view port for each lock
    - Illumination capability to light the interior of the chamber
    - Treatment tables, treatment gas appropriate to the diving mode, and sufficient gas to conduct treatment shall be available at the divelocation.
    - A dive team member shall be available at the dive location during and for at least one hour after the dive to operate the decompression chamber (when required or provided).

5.7 Record of Dive

The following information shall be recorded and maintained for each diving operation:

- Names of dive team members including designated person-in-charge
- Date, time, and location
- Diving modes used
- General nature of work performed
- Approximate underwater and surface conditions (visibility, water temperature and current); and

- Maximum depth and bottom time for each diver
- For each dive outside the no-decompression limits, deeper than 100 fsw or using mixed gas, the following additional information shall be recorded and maintained
- Depth-time and breathing gas profiles
- Decompression table designation (including modification); and
- Elapsed time since last pressure exposure if less than 24 hours or repetitive dive designation for each diver
- 5.7.1 Recompression Procedure Assessment
- For each dive in which decompression sickness is suspected or symptoms are evident, the following additional information shall be recorded and maintained
- Description of decompression sickness symptoms (including depth and time of onset); and
- Description and results of treatment
- The employer shall:
- Investigate and evaluate each incident of decompression sickness based on the recorded information, consideration of the past performance of decompression table used, and individual susceptibility
- Take appropriate corrective action to reduce the probability of recurrence of decompression sickness
- Prepare a written evaluation of the decompression procedure assessment, including any corrective action taken, within 45 days of the incident of decompression sickness.

5.8 Air Diving Procedures

5.8.1 Introduction

When air is breathed under pressure, nitrogen diffuses into various tissues of the body. This nitrogen uptake by the body occurs at different rates for the various tissues. It continues as long as the partial pressure of the inspired nitrogen in the circulatory and respiratory system is higher than the partial pressure of the gas absorbed in the tissues. Nitrogen absorption increases as the partial pressure of the inspired nitrogen increases, such as with increased depth. Nitrogen absorption also increases as the duration of the exposure increases, until tissues become saturated.

As a diver ascends, the process is reversed. The partial pressure of nitrogen in the tissues comes to exceed that in the circulatory and respiratory systems. During ascent, the nitrogen diffuses from the tissues to the lungs. The rate of ascent must be carefully controlled to prevent the nitrogen pressure from exceeding the ambient pressure by too great of an amount. If the pressure gradient is uncontrolled, bubbles of nitrogen gas can form in tissues and blood, causing decompression sickness.

To reduce the possibility of decompression sickness, special decompression tables and schedules were developed. These schedules take into consideration the amount of nitrogen absorbed by the body at various depths and times. Other considerations are the allowable pressure gradients that can exist without excessive bubble formation and the different gas-

elimination rates associated with various body tissues. Because of its operational simplicity, staged decompressions used for air decompression. Staged decompression requires decompression stops in the water at various depths for specific periods of time.

5.8.2 AIR Decompression Definition

The following terms are frequently used when conducting diving operations and discussing the decompression tables.

- Descent Time. *Descent time* is the total elapsed time from when the divers leave the surface to the time they reach the bottom. Descent time is rounded up to the next whole minute.
- Bottom Time. *Bottom time* is the total elapsed time from when the divers leave the surface to the time they begin their ascent from the bottom. Bottom time is measured in minutes and is rounded up to the next whole minute.
- Decompression Table. A *decompression table* is a structured set of decompression schedules, or limits, usually organized in order of increasing bottom times and depths.
- Decompression Schedule. A *decompression schedule* is a specific decompression procedure for a given combination of depth and bottom time as listed in a decompression table. It is normally indicated as feet/minutes.
- Decompression Stop. A *decompression stop* is a specified depth where a diver must remain for a specified length of time (stop time).
- Depth. The following terms are used to indicate the depth of a dive:
- *Maximum depth* is the deepest depth attained by the diver plus the pneumofathometer correction factor (Table 5- 1). When conducting scuba operations, maximum depth is the deepest depth gauge reading.
- *Stage depth* is the pneumofathometer reading taken when the divers are on the stage just prior to leaving the bottom. Stage depth is used to compute the distance and travel time to the first stop, or to the surface if no stops are required.

Pneumofathometer Correction Factors.

Pneumofathometer Depth	Correction Factor
0-100 fsw	+1 fsw
101-200	+2 fsw
201-300	+4 fsw
301-400	+7 fsw

- Equivalent Single Dive Bottom Time. The *equivalent single dive bottom time* is the time used to select a schedule for a single repetitive dive. This time is expressed in minutes.
- Unlimited/No-Decompression (No "D") Limit. The maximum time that can be spent at a given depth that safe ascent can be made directly to the surface at a prescribed travel rate with no decompression stops is the *unlimited/no-decompression* or *No "D" limit*.
- Repetitive Dive. A *repetitive dive is* any dive conducted within 12 hours of a previous dive.
- Repetitive Group Designation. The *repetitive group designation* is a letter used to indicate the amount of residual nitrogen remaining in a diver's body following a previous dive.

- Residual Nitrogen. *Residual nitrogen* is the nitrogen gas still dissolved in a diver's tissues after surfacing.
- Residual Nitrogen Time. *Residual nitrogen time* is the time that must be added to the bottom time of a repetitive dive to compensate for the nitrogen still in solution in a diver's tissues from a previous dive. Residual nitrogen time is expressed in minutes.
- Single Dive. A *single dive* refers to any dive conducted more than 12 hours after a previous dive.
- Single Repetitive Dive. A *single repetitive dive* is a dive for which the bottom time used to select the decompression schedule is the sum of the residual nitrogen time and the actual bottom time of the dive.
- Surface Interval. The *surface interval is* the time a diver has spent on the surface following a dive. It begins as soon as the diver surfaces and ends as soon as he starts his next descent.

5.8.3 Selection of Decompression Schedule

The decompression schedules of all the
tables are usually given in 10-foot depth increments and 10-minute bottom time increments. Depth and bottom time combinations from dives, however, rarely match the decompression schedules exactly. To ensure that the selected decom-pression schedule is always conservative, always select the schedule depth equal to or next greater than the maximum depth of the dive and always select the schedule bottom time equal to or next longer than the bottom time of the dive.
For example, to use the Standard Air Decompression Table to select the correct schedule for a dive to 97 fsw for 31 minutes, decompression would be selected for 100 fsw and carried out per the 100 fsw for 40 minutes (100/40) schedule.

CAUTION: Never attempt to interpolate between decompression schedules.

When planning for surface-supplied dives where the diver will be exceptionally cold or the workload is expected to be relatively strenuous, Surface Decompression should be considered. In such case, conduct decompression from the normal schedule in the water and then surface decompress using the chamber stop time(s) from the next longer schedule. When conducting dives using Standard Air Decompression Tables, select the next longer decompression schedule than the one that would normally be selected.
If the divers are exceptionally cold during the dive or if the workload is relatively strenuous, select the next longer decompression schedule than the one that would normally be selected. If the diver's depth cannot be maintained at a decompression stop, the Diving Supervisor may select the next deeper decompression table.

NOTE: Take into consideration the physical condition of the diver when deter-mining what is strenuous.

5.9 Rules During Ascent

After selecting the applicable decompression schedule, it is imperative that it be followed as closely as possible. Unless a Diving Medical Officer recommends a deviation and the

Commanding Officer concurs, decompression must be completed according to the schedule selected.

5.9.1 Ascent Rate

Always ascend at a rate of 30 fpm (20 seconds per 10 fsw). Minor variations in the rate of travel between 20 and 40 fsw/minute are acceptable. Any variation in the rate of ascent must be corrected in accordance with the procedures in paragraph 5.9.3. However, a delay of up to one minute in reaching the first decompression stop can be ignored.

5.9.2 Decompression Stop Time

Decompression stop times, as specified in the decompression schedule, begin as soon as the divers reach the stop depth. Upon completion of the specified stop time, the divers ascend to the next stop or to the surface at the proper ascent rate. Ascent time is not included as part of stop time.

Variations in Rate of Ascent Delays

in Arriving at the First Stop
Delay greater than 1 minute, deeper than 50 fsw. Add the total delay time (rounded up to the next whole minute) to the bottom time, re-compute a new decompression schedule, and decompress accordingly.
Delay greater than 1 minute, shallower than 50 fsw. If the rate of ascent is less than 30 fpm, add the delay time to the diver's first decompression stop. If the delay is between stops, disregard the delay. The delay time is rounded up to the next whole minute.

Travel Rate Exceeded
On a Standard Air Dive, if the rate of ascent is greater than 30 fpm, STOP THE ASCENT, allow the watches to catch up, and then continue ascent. If the stop is arrived at early, start the stop time after the watches catch up.

5.10 Decompression Tables

5.10.1 The Unlimited/No-Decompression

The table serves three purposes. First, the table identifies that on a dive with the depth 20 fsw and shallower, unlimited bottom time may be achieved. Second, it summarizes all the depth and bottom time combinations for which no decompression is required. Third, it provides the repetitive group designation for each unlimited/no-decompression dive. Even though decompression is not required, there is still an amount of nitrogen remaining in the diver's tissues for up to 12 hours following a dive. If they dive again within a 12- hour period, divers must consider this residual nitrogen when calculating decompression from the repetitive dive. Any dive deeper than 25 fsw that has a bottom time greater than the no-decompression limit given in this table is a decompression dive and must be conducted per the Standard Air Decompression Table.
Each depth listed in the Unlimited/No-Decompression Table has a corresponding no-decompression limit listed in minutes. This limit is the maximum bottom time that divers

may spend at that depth without requiring decompression. Use the columns to the right of the no-decompression limits column to obtain the repetitive group designation. This designation must be assigned to a diver subsequent to every dive.

5.10.2 U.S. Navy Standard Air Decompression Schedules

This manual combines the Standard Air Decompression Schedules and Exceptional Exposure Air Schedules into one table. To clearly distinguish between the standard (normal) and exceptional exposure decompression schedules, the exceptional exposure schedules have been separated by a bold line.

NOTE: Never conduct planned exceptional exposure dives.

If the bottom time of a dive is less than the first bottom time listed for its depth, decompression is not required. The divers may ascend directly to the surface at a rate of 30 feet per minute (fpm). The repetitive group designation for a no-decompression dive is given in the Unlimited/No-Decompression Table. As noted in the Standard Air Decompression Table, there are no repetitive group designations for exceptional exposure dives. Repetitive dives are not permitted following an exceptional exposure dive.

5.10.3 Repetitive Dives

During the 12-hour period after an air dive, the quantity of residual nitrogen in divers' bodies will gradually be reduced to its normal level. If the divers are to make a second dive within this period (repetitive dive), they must consider their residual nitrogen level when planning for the dive.

Upon completing the first dive, the divers are assigned a repetitive group designation from either the Standard Air Decompression Table or the Unlimited/No-Decompression Table. This designation relates directly to the residual nitrogen level upon surfacing. As nitrogen passes out of the diver's tissues and blood, their repetitive group designation changes. By using the Residual Nitrogen Timetable (Table 9- 7), this designation may be determined at any time during the surface interval.

To determine the decompression schedule for a repetitive dive using either the unlimited/no-decompression, standard air, or surface decompression table:

- Determine the residual nitrogen level just prior to leaving the surface of the repetitive dive (based on the repetitive dive depth), using the Residual Nitrogen Timetable. This level is expressed as residual nitrogen time, in minutes.
- Add this time to the actual bottom time of the repetitive dive to get the Equivalent Single Dive Time (ESDT).
- Conduct decompression from the repetitive dive using the max depth (MD) and the equivalent single dive time to select the appropriate decompression schedule. Avoid equivalent single dives requiring the use of Exceptional Exposure decompression schedules. Always use a systematic Repetitive Dive Worksheet, when determining the decompression schedule for a repetitive dive.

5.10.4 Residual Nitrogen Timetable for Repetitive Air Dives

The quantity of residual nitrogen in a diver's body immediately after a dive is expressed by the repetitive group designation assigned from either the Standard Air Decompression Schedule or the Unlimited/No-Decompression Table. The upper portion of the Residual Nitrogen Timetable is composed of various intervals between 10 minutes and 12 hours. These are expressed in hours and minutes (2:21 = 2 hours, 21 minutes). Each interval has a minimum time (top limit) and a maximum time (bottom limit). Residual nitrogen times corresponding to the depth of the repetitive dive is given in the body of the lower portion of the table. To determine the residual nitrogen time for a repetitive dive:

- Locate the diver's repetitive group designation from the previous dive along the diagonal line above the table.
- Read horizontally to the interval where the diver's surface interval lies. The time spent on the surface must be between or equal to the limits of the selected interval.
- Read vertically down to the new repetitive group designation. This corresponds to the present quantity of residual nitrogen in the diver's body.
- Continue down in this same column to the row representing the depth of the repetitive dive. The time given at the intersection is the residual nitrogen time, in minutes, to be applied to the bottom time of the repetitive dive.

5.10.5 RNT Exception Rule

An exception to this table occurs when the repetitive dive is made to the same or greater depth than that of the previous dive. This is referred to as the RNT Exception Rule. In such cases, the residual nitrogen time may be longer than the bottom time of the previous dive. A diver's body cannot contain more residual nitrogen than it was originally exposed to. To obtain the equivalent single dive time, simply add the bottom time of the previous dive to that of the repetitive dive. (All of the residual nitrogen passes out of a diver's body after 12 hours, so a dive conducted after a 12-hour surface interval is not a repetitive dive.)

5.11 Surface Decompression

Surface decompression is a technique for fulfilling all or a portion of a diver's decompression obligation in a recompression chamber instead of in the water, significantly reducing the time that a diver must spend in the water. Also, breathing oxygen in the recompression chamber reduces the diver's total decompression time.

Surface decompression offers many advantages that enhance the divers' safety. Shorter exposure time in the water keeps divers from chilling to a dangerous level. Inside the recompression chamber, the divers can be maintained at a constant pressure, unaffected by surface conditions of the sea. Divers shall be observed constantly by either the inside tender or topside personnel, and monitored for decompression sickness and oxygen toxicity.

If an oxygen breathing system is installed in the recompression chamber, conduct surface decompression according to the Surface Decompression Table Using Oxygen. If air is the only breathing medium available, use the Surface Decompression Table Using Air.

Residual Nitrogen Timetables have not been developed for Surface Decompression Repetitive Dives. Repetitive surface decompression dives may be accomplished in accordance with 5.12.

5.11.1 Surface Decompression Table Using Oxygen.

Using the Surface Decompression Table Using Oxygen (referred to as Sur D O2) requires an approved double-lock recompression chamber with an oxygen breathing system. With Sur D O2, divers ascend at a constant rate of 30 fpm. The divers are decompressed to the first decompression stop (or to the surface if there are no water stops required) at an ascent rate of 30 fpm. The travel rate between stops and from 30 fsw to the surface is also 30 fpm (:20 per 10 fsw). Minor variations in the rate of travel between 20 and 40 fpm are acceptable. Once the divers are on the surface, the tenders have three and a half (:03:30) minutes to remove the breathing apparatus and diving dress and assist the divers into the recompression chamber.

Pressurizing the recompression chamber with air to 40 fsw should take approximately 30 seconds (descent rate not to exceed 80 fpm). The total elapsed time from when the divers leave the 30 foot stop (or 30 fsw if no water stops are required) to when they reach the 40 foot recompression chamber stop must not exceed 5 minutes.

During descent in the recompression chamber, if a diver cannot clear and the chamber is at a depth of at least 20 fsw, stop, then breathe oxygen at 20 fsw for twice the 40 fsw chamber stop time. Ascend to 10 fsw and breathe oxygen again for twice the 40 fsw chamber stop time. Then ascend to the surface. This “safe way out” procedure is not intended to be used in place of normal Sur D O 2 procedures.

If the prescribed surface interval is exceeded and the divers are asymptomatic, treat them as if they have Type I decompression sickness (Treatment Table 5,). If the divers are symptomatic, they are treated as if they have Type II decompression sickness (Treatment Table 6,), even if they are only displaying Type I symptoms. Symptoms occurring during the chamber stops are treated as recurrences

Upon arrival at 40 fsw in the recompression chamber, the divers are placed on the Built-in Breathing System (BIBS) mask breathing pure oxygen. The mask should not be strapped on unless there is an inside tender with the divers, the divers must hold the mask to their face and ensure a good oxygen seal.

The designated 40-foot stop time commences once the divers are breathing oxygen. The divers breathe oxygen throughout the 40 foot stop, interrupting oxygen breathing after each 30 minutes with a 5 minute period of breathing chamber air (referred to as an “air break”). Count the air breaks as “dead time” and not part of the oxygen stop time. If the air break interval falls on time to travel, remove oxygen and commence traveling to the surface at 30 fpm. This procedure simplifies time keeping and should be used whenever using the Surface Decompression Table Using Oxygen. Remove the O 2 mask prior to leaving the 40 fsw stop for the surface.

Warning: The interval from leaving 40 fsw in the water to arriving at 50 fsw in the chamber cannot exceed 5 minutes without incurring a penalty. This is new <u>in</u> the US NAVY Dive Manual revision 7.

5.11.2 Loss of Oxygen Supply in the Chamber (40 fsw Chamber Stop)

If the oxygen supply in the chamber is lost at the 40 fsw chamber stop, have the diver breathe chamber air.

- Temporary Loss. Return the diver to oxygen breathing. Consider any time on air as dead time.
- Permanent Loss. Multiply the remaining oxygen time by three to obtain the equivalent chamber decompression time on air. If 50% helium 50% oxygen or 50% nitrogen 50% oxygen is available, multiply the remaining oxygen time by two to obtain the equivalent chamber decompression time on 50/50. Allocate 10% of the equivalent air or 50/50 time to the 40-fsw stop, 20% to the 30 fsw stop, and 70% to the 20 fsw stop. Round the stop times up to the next whole minute. Surface upon completion of the 20 fsw stop.

5.11.3 CNS Oxygen Toxicity (40 fsw Chamber Stop)

At the first sign of CNS toxicity, the patient should be removed from oxygen and allowed to breathe chamber air. Fifteen minutes after all symptoms have completely subsided, resume oxygen breathing at the point of interruption. If symptoms of CNS oxygen toxicity develop again or if the first symptom is a convulsion, take the following action:

1. Remove the mask.
2. After all symptoms have completely subsided, decompress 10 feet at a rate of 1 fsw/min. For a convulsion, begin travel when the patient is fully relaxed and breathing normally.
3. Resume oxygen breathing at the shallower depth at the point of interruption.
4. If another oxygen symptom occurs, complete decompression time on air. Multiply
5. the remaining oxygen time by three to obtain the equivalent chamber decompression time on air. Allocate 30% of the equivalent air to the 30 fsw stop and 70% to the 20 fsw stop. Surface upon completion of the 20 fsw stop.

5.11.4 Repetitive Dives.

There are no repetitive diving tables or surface interval tables for surface decompression dives. If another surface decompression dive using oxygen is planned within a 12-hour period, select the appropriate decompression schedule by:

- Adding the bottom times of all dives made in the previous 12 hours to get an adjusted bottom time, and
- Using the maximum depth obtained in the previous 12 hours.
- The equivalent single dive shall not exceed 170/40 for Sur D O 2 or 190/60 for Sur D Air.

5.11.5 Surface Decompression Table Using Air

The Surface Decompression Table Using Air (referred to as Sur D Air) should be used for surface decompression following an air dive when a recompression chamber without an oxygen breathing system is all that is available.

The total ascent times of the Surface Decompression Table Using Air exceed those of the Standard Air Decompression Table; the only advantages surface decompression using air are getting the divers out of the water sooner and maintaining the divers in a controlled, closely observed environment during decompression.

When using the Sur D Air table, all ascents are made at 30 fpm. This includes the ascent

rate from the last water stop. The time spent on the surface should not exceed 3½ minutes and the rate of descent to the first recompression chamber stop should not exceed 60 fpm. The total elapsed time for these three procedures must not exceed 5 minutes.
If the prescribed surface interval is exceeded and the divers are asymptomatic, they are treated as if they had Type I Decompression Sickness (Treatment Table 5 or 1A). If the divers are symptomatic, they are treated as if they had Type II Decompression Sickness (Treatment Table 6 or 2A), even if they are only displaying Type I symptoms.

5.11.6 Repetitive Dives.

If a second surface decompression air dive is planned within a 12-hour period, the same rule applies as for making a second Sur D O 2 dive

5.12 Exceptional Exposure

Exceptional exposure dives are those dives in which the risk of decompression sickness, oxygen toxicity, and/or exposure to the elements is substantially greater than on normal working dives. Decompression schedules for exceptional exposure dives are contained in the Standard Air Decompression Table. These exceptional exposure schedules are only used in emergencies, such as diver entrapment. Exceptional exposure dives should not be planned in advance except under the most unusual operational circumstances.

5.12.1 Surface Decompression Procedures for Exceptional Exposure Dives.

The long decompressions times associated with exceptional exposure dives impose unusual demands on a diver's endurance. There is also limited assurance that the dive will be completed without decompression sickness. These two risks can be reduced by using surface decompression techniques rather than completing decompression entirely in the water.

- Complete the entire 20 fsw in the water.
- Ascend to the surface at 30 fpm. Minor variations in the rate of travel between 20 and 40 fpm are acceptable.
- Once on the surface, the tenders have three and a half (:03:30) minutes to remove the breathing apparatus and diving dress and assist the divers into the recompression chamber.
- Pressurize the recompression chamber with air to 20 fsw at a travel rate of 60 fpm.
- Upon arrival at 20 fsw in the recompression chamber, the divers are placed on the Built-in Breathing System (BIBS) mask breathing 100% oxygen.
- The 20 foot stop time commences once the divers are breathing oxygen. Repeat the 20 fsw in-water stop time.
- The divers breathe oxygen throughout the 20-foot stop, interrupting oxygen breathing after each 30 minutes with a 5 minute air break. The air breaks count as part of the stop time.
- Ascend to 10 fsw at 30 fpm. Complete the 10 fsw in-water stop time. The divers breathe oxygen throughout the 10-foot stop, interrupting oxygen breathing after each 30 minutes with a 5 minute air break. The air breaks count as part of the stop time.

- Ascent to the surface at 30 fpm.

5.12.2 Oxygen System Failure (Chamber Stop).

If the oxygen system fails during a chamber stop, complete the remaining decompression time on air.

5.13 Diving At High Altitudes

Because of the reduced atmospheric pressure, dives conducted at altitude require more decompression than identical dives conducted at sea level. Standard air decompression tables, therefore, cannot be used as written. Some organizations calculate specific decompression tables for use at each altitude. An alternative approach is to correct the altitude dive to obtain an equivalent sea level dive, then determine the decompression requirement using standard tables. This procedure is commonly known as the "Cross Correction" technique and always yields a sea level dive that is deeper than the actual dive at altitude. A deeper sea level equivalent dive provides the extra decompression needed to offset effects of diving at altitude. If diving at altitudes above 300 feet refer to the US Navy dive manual for guidance.

5.13.1 Flying After Diving

Leaving the dive site may require temporary ascent to a higher altitude. Ascent to altitude after diving increases the risk of decompression sickness because of the additional reduction in atmospheric pressure the higher the altitude, the greater the risk. Pressurized commercial airline flights are addressed in Note 3 of Table 5-2.)

Table 5-2 gives the surface interval (hours: minutes) required before making a further ascent to altitude. The surface interval depends on the planned increase in altitude and the highest repetitive group designator obtained in the previous 24-hour period. Enter the table with the highest repetitive group designator obtained in the previous 24-hour period. Read the required surface interval from the column for the planned change in altitude.

Required Surface Interval Before Ascent to Altitude After Diving.

Repetitive Group Designator

Increase in Altitude

	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
A	00:00	00:00	00:00	00:00	00:00	00:00	00:00	**00:00**	00:00	00:00
B	00:00	00:00	00:00	00:00	00:00	00:00	00:00	**00:00**	00:00	02:11
C	00:00	00:00	00:00	00:00	00:00	00:00	00:00	**00:00**	03:06	08:26
D	00:00	00:00	00:00	00:00	00:00	00:00	00:09	**03:28**	07:33	12:52
E	00:00	00:00	00:00	00:00	00:00	00:51	03:35	**06:54**	10:59	16:18
F	00:00	00:00	00:00	00:00	001:12	03:40	06:23	**09:43**	13:47	19:07
G	00:00	00:00	00:00	01:23	03:34	06:02	08:46	**12:05**	16:10	21:29
H	00:00	00:00	01:31	03:26	05:37	08:05	10:49	**14:09**	18:13	23:33
I	00:00	01:32	03:20	05:15	07:26	09:54	12:38	**15:58**	20:02	24:00
J	01:32	03:09	04:57	06:52	09:04	11:32	14:16	**17:35**	21:39	24:00
K	03:00	04:37	06:25	08:20	10:32	13:00	15:44	**19:03**	23:07	24:00
L	04:21	05:57	07:46	09:41	11: 52	14:20	17:04	**20:23**	24:00	24:00
M	05:35	07:11	09:00	10:55	13:06	15:34	18:18	**21:37**	24:00	24:00
N	06:43	08:20	10:08	12:03	14:14	16:42	19:26	**22:46**	24:00	24:00
O	07:47	09:24	11:12	13:07	15:18	17:46	20:30	**23:49**	24:00	24:00
Z	08:17	09:54	11:42	13:37	15:49	18:17	21:01	**24:00**	24:00	24:00

Exceptional Exposure Wait 48 hours before flying

NOTE 1: When using Table 5-2, use the highest repetitive group designator obtained in the previous 24-hour period.

NOTE 2: Table 5-2 may only be used when the maximum altitude achieved is 10,000 feet or less.

NOTE 3: The cabin pressure in commercial aircraft is maintained at a constant value regardless of the actual altitude of the flight. Though cabin pressure varies somewhat with aircraft type, the nominal value is 8,000 feet. For commercial flights, use a final altitude of 8000 feet to compute the required surface interval before flying.

NOTE 4: No surface interval is required before taking a commercial flight if the dive site is at 8000 feet or higher. In this case, flying results in an increase in atmospheric pressure rather than a decrease.

NOTE 5: No repetitive group is given for air dives with surface decompression on oxygen or air. For these surface decompression dives, enter the standard air table with the sea level equivalent depth and bottom time of the dive to obtain the appropriate repetitive group designator to be used.

NOTE 6: For ascent to altitude following a non-saturation helium-oxygen dive, wait 12 hours if the dive was a no-decompression dive. Wait 24 hours if the dive was a decompression dive.

5.14 Emergency Procedures

Diving and the performance of work underwater, places a man in a situation that has inherent and unavoidable dangers. Even when using the best equipment manned by properly trained personnel, the possibility of and emergency may exist. Emergencies are by nature unexpected and differ form a routine failure in that they require prompt correct action to recover and prevent further deterioration of the situation. The emergency procedures (EP's) that follow for surface supplied diving operations outline the steps required to recover from known possible emergencies.

The cardinal rule of emergency procedures is the most difficult to follow – DON'T PANIC. While it is much easier to say than do, a panicky response will more than likely be wrong, and result in the further complication of the situation. While actions taken in an emergency must be quick, they must also be correct, and correct decisions are not made if you do not have a complete grasp on the situation. If the diver finds himself in an emergency situation, he should take time to assess the situation determine the correct action and what he can do for himself.

The following emergency procedures that may affect the health and safety of personnel are offered as minimum guidelines to assist companies in developing their own specific detailed emergency procedures. The steps that are listed may not be in order of preference.
Each emergency will dictate its own priorities. In general, every emergency will cause the dive to be aborted until the cause has been fully remedied.

.Loss of Breathing Media
1. Re-establish breathing media supply by:
• Activate topside secondary breathing media supply, or
• Diver go on bailout bottle, or
• Put breathing media to diver's pneumo hose and have the diver insert pneumo hose into helmet/mask.
2. Alert standby diver.
3. Diver goes to bell/stage.
4. If required, send Standby Diver to diver's assistance.
5. Terminate dive.

Loss of Communications
1. Attempt to establish line-pull signals.
2. Put air to diver's pneumo.
3. Alert Standby Diver.
4. Diver proceeds to downline/bell stage (if bell, attempt to use bell communications).
5. Bring diver to first stop once line-pull signals are established.
6. If required (unable to establish any form of communications with diver), send Standby Diver to diver's assistance prior to bringing diver to his first stop.
7. Terminate dive.

Fouled or Entrapped Diver
1. Avoid panic and ensure diver does not ditch equipment.
2. Diver informs topside.
3. Alert standby diver.
4. Diver determines extent of entrapment.
5. Diver attempts to free himself.
6. If required, send Standby Diver to diver's assistance.
7. When diver is free, if unable or unwilling to continue the dive, or if Standby Diver was required to go to his assistance, terminate dive.

Injured Diver in Water
1. Diver informs topside and dive is aborted.
2. Alert Standby Diver.
3. Diver determines nature and extent of injury.
Consensus Standards for Commercial Diving and Underwater Operations 3-41
4. If required, send Standby Diver down to assist diver, administer first aid, and evaluate injury. Standby Diver should remain with diver.5. Standby Diver assists injured diver to surface, following proper decompression procedures, except when severity of injury indicates a greater risk than omitting decompression.
6. Request required medical assistance and emergency evacuation (if required).
7. Monitor breathing. If breathing stops, overpressure diver's regulator, if possible.

Severance of Diver's Umbilical - Gas Hose Only
1. Put breathing media to diver's pneumo hose.
2. Diver activates bailout bottle.
3. Alert Standby Diver.
4. If required, diver inserts pneumo hose inside helmet/mask.
5. Diver returns to bell/stage.
6. Diver activates and uses emergency breathing media on bell/stage.
7. Terminate dive and follow proper decompression procedure.
8. If required, send Standby Diver down with additional bailout bottle or hose.

Severance of Complete Umbilical
1. Diver activates bailout bottle.
2. Alert Standby Diver.
3. Diver returns to bell/stage.
4. Diver activates and uses emergency gas on bell/stage.
5. If umbilical severed on deck and the end of the umbilical is still on deck, send Standby Diver down umbilical with new hose/bailout bottle. Otherwise, send Standby Diver down downline or bell stage cable.
6. Terminate dive and follow proper decompression procedure.

Fire in Equipment
1. Extinguish fire; secure equipment.
2. Determine damage and effect on diver.
3. If required, terminate dive; commence decompression.

4. Each chamber must have a means of extinguishing a fire in the interior.

Equipment Failure - Diver in the Water
1. Evaluate effect on diver.
2. Inform diver of problem and action planned.
3. Alert Standby Diver.
4. Alert deck crew.
5. Diver informs topside of his readiness.
6. Activate plan, terminate dive.

Oxygen Toxicity in Water
1. Supervisor notes signs or diver reports symptoms to topside.
2. Reduce oxygen partial pressure (switch to air).
3. Continue decompression on appropriate table unless a 50/50 nitrox mix is available for in-water decompression use.

Oxygen Toxicity during Treatment
1. Diver reports to topside.
2. Instruct diver to remove oxygen mask for 15 minutes. After all symptoms disappear, then start oxygen again. Do not count time not on oxygen. Recommence decompression where oxygen stopped.
3. If oxygen toxicity symptoms occur for the second (2nd) time, repeat Procedure 2.
4. If oxygen toxicity symptoms occur for the third (3rd) time, discontinue oxygen and immediately request medical advice and assistance from designated point of contact.

Emergency Evacuation
1. Notify diver and all surrounding personnel of emergency and terminate dive.
2. Decompress diver according to proper decompression procedures. If not possible, follow omitted decompression procedures.
3. Evacuate all unnecessary personnel to safe platform.
4. Contact management and inform them of conditions as soon as possible.
Additional emergency procedures should be developed as needed, possibly including but not limited to:
• Loss of power supplies
• Loss of SDC (bell)
• Loss of ROV
• Adverse environmental conditions, including but not limited to:
- Weather
- Sea state
Consensus Standards for Commercial Diving and Underwater Operations 3-43
Dive emergencies such as bailout, bends, omitted decompression, embolism, etc.

6 **SCUBA Diving**:

International Telecom divers do not normally conduct SCUBA diving operations. When the task can be performed using surface supplied techniques they should be employed. However the case may arise where a task can be more efficiently performed using SCUBA. In this case the techniques to be used is up to the on scene diving supervisor.

6.1 Limits

- SCUBA diving shall not be conducted at depths deeper than 130 fsw.
- SCUBA diving at depths deeper than 60 fsw requires a recompression chamber that is ready for use and on the dive location.
- Planned Decompression dives in SCUBA are not permitted.
- SCUBA dives shall not be conducted against currents exceeding one (1) knot.
- SCUBA diving is not permitted in enclosed or physically confining spaces.

6.2 Procedures

- A standby diver shall be available while a diver is in the water.
- A single diver shall be line-tended from the surface.
- Divers will be line-tended from the surface if direct access to the surface is not possible.
- A diver-carried reserve breathing gas supply shall be provided for each diver consisting of a manual reserve (J valve); or an independent reserve cylinder with a separate regulator.
- The valve of the reserve breathing gas supply shall be in the closed position prior to the dive.
- Dive team members shall be briefed on:
- The tasks to be undertaken;
- Safety procedures for the diving mode;
- Emergency procedures.

6.3 Termination of the dive

The dive shall be terminated when the divers go on reserve or have 500 psi remaining in their scuba bottles as read on the divers cylinder gauge.
If a situation arises to change the safe working conditions of the dive, either under the water or on the support craft, the dive should be aborted until the problem can be corrected.

6.4 Minimum SCUBA Equipment

Each diver shall be equipped with the following equipment:

- DOT approved and certified compressed gas cylinder
- Sharp knife
- Diving wristwatch
- Depth gage

- Weight belt, independent of the cylinder harness
- Cylinder harness with quick release
- Personnel floatation device
- Set of the U.S. Navy No-decompression tables, Repetitive dive tables, and air decompression and treatment tables

6.5 Buddy Diver Responsibilities.

The greatest single safety practice in scuba operations is the use of the buddy system. Dive partners operating in pairs are responsible for both the assigned task and each other's safety. The basic rules for buddy diving are:

- Always maintain contact with the dive partner. In good visibility, keep the partner in sight. In poor visibility, use a buddy line.
- Know the meaning of all hand and line-pull signals.
- If a signal is given, it must be acknowledged immediately. Failure of a dive partner to respond to a signal must be considered an emergency.
- Monitor the actions and apparent condition of the dive partner. Know the symptoms of diving ailments. If at any time the dive partner appears to be in distress or is acting in an abnormal manner, determine the cause immediately and take appropriate action.
- Never leave a partner unless the partner has become trapped or entangled and cannot be freed without additional assistance. If surface assistance must be sought, mark the location of the distressed diver with a line and float or other locating device. Do not leave a partner if voice communications or line-pull signals are being used; contact the surface and await assistance or instructions.
- Establish a lost-diver plan for any dive. If partner contact is broken, follow the plan.

6.6 Working with Tools

The near-neutral buoyancy of a scuba diver poses certain problems when working with tools. A diver is at a disadvantage when applying leverage with tools. When applying force to a wrench, for example, the diver is pushed away and can apply very little torque. If both sides of the work are accessible, two wrenches—one on the nut and one on the bolt should be used. By pulling on one wrench and pushing on the other, the counter- force permits most of the effort to be transmitted to the work. When using any tool that requires leverage or force (including pneumatic power tools), the diver should be braced with feet, a free hand, or a shoulder.

NOTE: When using externally powered tools with scuba, the diver must have voice communications with the Diving Supervisor.

Any tools to be used should be organized in advance. The diver should carry as few items as possible. If many tools are required, a canvas tool bag should be used to lower them to the diver as needed.

6.7 Ascent Procedures

When it is time to return to the surface, either diver may signal the end of the dive. When the signal has been acknowledged, the divers shall ascend to the surface together at a rate not to exceed 30 feet per minute. For a normal ascent, the divers will breathe steadily and naturally. Divers must never hold their breath during ascent, because of the danger of an air embolism. While ascending, divers must keep an arm extended overhead to watch for obstructions and should spiral slowly while rising to obtain a full 360-degree scan of the water column.

6.7.1 Emergency Free-Ascent Procedures

If a diver is suddenly without air or if the scuba is entangled and the dive partner cannot be reached quickly, a free ascent must be made. Guidelines for a free ascent are:

- Drop any tools or objects being carried by hand.
- Abandon the weight belt.
- If the scuba has become entangled and must be abandoned, actuate the quick-release buckles on the waist, chest, shoulder, and crotch straps. Slip an arm out of one shoulder strap and roll the scuba off the other arm. An alternate method is to flip the scuba over the head and pull out from underneath. Ensure that the hoses do not wrap around or otherwise constrict the neck. The neck straps packed with some single-hose units can complicate the overhead procedure and should be disconnected from the unit and not used.
- If the reason for the emergency ascent is a loss of air, drop all tools and the weight belt and actuate the life preserver to surface immediately. Do not drop the scuba unless it is absolutely necessary.
- If a diver is incapacitated or unconscious and the dive partner anticipates ifficulty in trying to swim the injured diver to the surface, the partner should activate the life preserver or inflate the buoyancy compensator. The weight belt may have to be released also. However, the partner should not lose direct contact with the diver. Exhale continuously during ascent to let the expanding air in the lungs escape freely.

7. Live-boating

7.1 Limits

- Diving operations involving live boating shall not be conducted: With an in water decompression time of greater than 120 minutes;
- Using surface-supplied air at depths deeper than 190 fsw, except that dives with bottom times of 30 minutes or less may be conducted to depths of 220 fsw;
- Using mixed gas at depths greater than 220 fsw;
- Live-boating is not allowed in seas which significantly impede the vessels station keeping capabilities, in periods of restricted visibility, or in other than daylight hours.

7.2 Minimum Personnel

Air Diving (0 to 60 fsw)
1 - Diving supervisor
2 Divers
2 Tenders

When crew size is eight or more at least one member will be a non-diving supervisor.
Air diving (60 to 220)
1 – non-Diving Supervisor
Divers
2 – Tenders

7.3 Vessel

The vessel shall be acceptable to the company and the diving supervisor.
A "Kill Switch" to shut the engines shall be in the vicinity of the operator of the boat.

7.4 Dynamically Positioned Diving Support Vessels

- No single fault should cause a catastrophic failure and move the vessel from its intended position.
- The operating requirements of the system shall never be allowed to exceed the vessels capabilities in any respect.
- Personnel shall be fully capable of performing the task entrusted to them.
- Minimum Equipment
- A third diving hose connected the manifold shall be available for emergency use.
- Regardless of depth, the diver will wear a bailout bottle.
- When in water decompression is required a free-floating decompression buoy or equivalent will be used.
- A device shall be used which minimizes the possibility of entanglement of the diver's hose in the propeller of the vessel.

7.4.1 Procedures

- The supervisor must be experienced in live-boating
- The vessel Captain should be experienced in live-boating to the satisfaction of the supervisor.
- The propeller of the vessel shall be stopped before the diver enters or exits the water.
- Two-way voice communication between the designated person-in-charge and the person controlling the vessel shall be available while the diver is in the water.
- A standby diver shall be available while a diver is in the water.
- A diver-carried reserve breathing gas supply shall be carried by each diver engaged in live-boating operations.
- The divers umbilical will always be in view of the tender and diving supervisor

8. Recompression Treatment

This section is a very basic overview of recompression procedures outlined in the US NAVY Dive Manual revision 7 It is the responsibility of International Telecom divers to read and understand the procedures outlined in the US NAVY Dive Manual revision 7 Volume 2

8.1 OMITTED DECOMPRESSION

Certain emergencies, such as uncontrolled ascents, an exhausted air supply, or bodily injury, may interrupt or prevent required decompression. If the diver shows symptoms of decompression sickness or arterial gas embolism, immediate treatment using the appropriate oxygen or air recompression treatment table is essential. Even if the diver shows no symptoms, omitted decompression must be addressed in some manner to avert later difficulty.

8.1.1 Ascent from 20 Feet or Shallower (Shallow Surfacing) with Decompression Stops Required

If the diver surfaced from 20 feet or shallower feels well, and can be returned to stop depth within 1 minute, the diver may complete normal decompression stops. The decompression stop from which ascent occurred is lengthened by 1 minute. If the diver cannot be returned to the depth of the stop within 1 minute and the diver remains asymptomatic, return the diver to the stop from which the diver ascended. Multiply each decompression stop time missed by 1.5. Alternatively, if the surface interval is less than 5 minutes, the diver may be placed in a recompression chamber and treated on a Treatment Table 5 (or 1A if no oxygen is available). If the surface interval is greater than 5 minutes, the diver may be placed in a recompression chamber and treated on Treatment Table 6 (or 2A if no oxygen is available). The diver should be observed for 1 hour after surfacing and/or completing treatment.

8.1.2 Ascent from 20 Feet or Shallower with No Decompression Stops Required

No recompression is required if the diver surfaces from 20 feet or shallower but was within no-decompression limits. The diver should be observed on the surface for 1 hour.

8.1.2Ascent from Deeper than 20 Feet (Uncontrolled Ascent)

Any unexpected surfacing of the diver from depths in excess of 20 feet is considered an uncontrolled ascent. If the diver is within no-decompression limits and asymptomatic, he should be observed for at least 1 hour on the surface. Recompression is not necessary unless symptoms develop.

8.1.4 Asymptomatic Uncontrolled Ascent

Asymptomatic divers who experience an uncontrolled ascent and who have missed decompression stops are treated by recompression based on the amount of decompression missed as follows:

- Oxygen Available. Immediately compress the diver to 60 feet in the recompression chamber. If less than 30 minutes of decompression (total ascent time from the tables) were missed, decompress from 60 feet on Treatment Table 5. If more than

30 minutes of decompression were missed, decompress from 60 feet on Treatment Table 6.

- Oxygen Not Available. Compress the diver to 100 feet in the recompression chamber and treat on Table 1A if less than 30 minutes of decompression were missed; compress to 165 feet and treat on Table 2A if more than 30 minutes were missed.

8.1.4 Development of Symptoms

As long as the diver shows no ill effects, decompress in accordance with the treatment table. Consider any decompression sickness that develops during or after this procedure to be a recurrence. Try to keep all surface intervals as short as possible (5 minutes or less). If an asymptomatic diver who has an uncontrolled ascent from a decompression dive has more than a 5-minute surface interval, recompress to 60 feet on Treatment Table 6 or treat on Table 2A, even if the missed decompression time was less than 30 minutes.

8.1.5 In-Water Procedure

When no recompression facility is available, use the following in-water procedure to make up omitted decompression in asymptomatic divers for ascents from depths below 20 feet. Recompress the diver in the water as soon as possible (preferably less than a 5- minute surface interval). Keep the diver at rest, provide a standby diver, and maintain good communication and depth control. Use the decompression schedule appropriate for the divers depth and bottom time. Follow the procedure below with 1 minute between stops:

- Return the diver to the depth of the first stop.
- Follow the schedule for stops 40-fsw and deeper.
- Multiply the 30-, 20-, and 10-fsw stops by 1.5.

8.1.6 Symptomatic Uncontrolled Ascent

If a diver has had an uncontrolled ascent and has any symptoms, he should be compressed immediately in a recompression chamber to 60 fsw. Conduct a rapid assessment of the patient, and treat accordingly. Treatment Table 5 is not an appropriate treatment for symptomatic uncontrolled ascent. If the diver surfaced from 60 fsw or shallower, compress to 60 fsw and begin Treatment Table 6. If the diver surfaced from a greater depth, compress to 60 fsw or depth where the symptoms are significantly improved, not to exceed 165 fsw, and begin Treatment Table 6A. Symptoms developing during the surface interval or during a period of observation on no-decompression dives are treated as Type II DCS. Consultation with a Diving Medical Doctor should be made as soon as possible. For uncontrolled ascent deeper than 165 feet, the diving supervisor may elect to use Treatment Table 8 at the depth of relief, not to exceed 225 fsw. Treatment of symptomatic divers who have surfaced unexpectedly is difficult when no recompression chamber is on site. Immediate transportation to a recompression facility is indicated if this is impossible.

8.1.7 Transporting the Patient

In certain instances, some delay may be unavoidable while the patient is transported to a recompression chamber. While moving the patient to a recompression chamber, the patient should be kept lying horizontally. Do not put the patient head-down. Additionally, the patient should be kept warm and monitored constantly for signs of blocked airway, cessation of breathing, cardiac arrest, or shock. Always keep in mind that a number of conditions may exist at the same time. For example, the victim may be suffering from both

decompression sickness and severe internal injuries.

8.1.8 Medical Treatment During Transport

Always have the patient breathe 100 percent oxygen during transport, if available. If symptoms of decompression sick-ness or arterial gas embolism are relieved or improve after breathing 100 percent oxygen, the patient should still be treated as if the original symptom(s) were still present. Always ensure the patient is adequately hydrated. Give fluids by mouth if the patient is able to take them. Otherwise, intravenous fluids should be started before transport. If the patient must be transported, initial arrangements should have been made well in advance of the actual diving operations. These arrangements, which would include an alert notification to the recompression chamber and determination of the most effective means of transportation, should be posted on the Job Site Emergency Assistant Checklist for instant referral.

8.1.9 Transport by Unpressurized Aircraft

If the patient is moved by helicopter or other unpressurized aircraft, the aircraft should be flown as low as safely possible, preferably less than 1,000 feet. Any unnecessary altitude means an additional reduction in external pressure and possible additional symptom severity or complications. If available, always use aircraft that can be pressurized to one atmosphere.

8.1.10 Communications with Chamber

Call ahead to ensure that the chamber will be ready and that qualified medical personnel will be standing by. If two-way communications can be established, consult with the doctor as the patient is being

8.2 Treatment Tables

Oxygen Treatment Tables are more effective and, therefore, preferable over Air Treatment Tables. Treatment Table 4 can be used with or without oxygen but should always be used with oxygen if it is available.

8.2.1 Treatment of Symptoms During Sur-D Surface Interval

If surface decompression procedures are used, symptoms of decompression sickness may occur during the surface interval. Because neurological symptoms cannot be ruled out during this short period, the symptomatic diver is treated as having Type II symptoms, even if the only complaint is pain.

8.2.2 Treating for Exceeded Sur-D Surface Interval

If the prescribed surface interval is exceeded but the diver remains asymptomatic, the diver is treated with Treatment Table 5, or Treatment Table 1A if no oxygen is available. If the diver becomes symptomatic, the diver is treated as if Type II symptoms were present. Any symptoms occurring during the chamber stops of Surface Decompression Tables are treated as recurrences.

8.2.3 Recompression Treatments When Oxygen Is Not Available

If no oxygen is available, select the appropriate Air Treatment Table in accordance with Use Table 1A if pain is relieved at a depth less than 66 feet. If pain is relieved at a depth greater than 66 feet, use Table 2A. Table 3 is used for treatment of serious symptoms where oxygen cannot be used. Use Table 3 if symptoms are relieved within 30 minutes at 165 feet. If symptoms are not relieved in less than 30 minutes at 165 feet, use Table 4.

8.2.3 Descent/Ascent Rates for Air Treatment Tables

The Air Treatment Tables (1A, 2A, 3, and 4 using air) are used when no oxygen is available. They are not as effective as the Oxygen Treatment Tables. The descent rate is 20 feet per minute the ascent rate is not to exceed 1 foot per minute.

8.2.4 Recompression Treatments When Oxygen Is Available

Use Oxygen Treatment Tables 5, 6, 6A, 4, or 7, the descent rate is 20 feet per minute. Upon reaching treatment depth not to exceed 60 fsw, place the patient on oxygen. For depth deeper than 60 fsw, use treatment gas if available. Additional guidelines for each treatment table are given below.

8.2.5 Treatment Table 5

Treatment Table 5 may be used for the following:
Type I (except for cutis-marmorata) symptoms when a complete neurological examination has revealed no abnormality.

- Asymptomatic omitted decompression of shallow surfacing (20 fsw or less) Asymptomatic omitted decompression of rapid ascent (from deeper than 20 fsw) if the missed decompression is less than 30 minutes

Asymptomatic divers who have exceeded surface interval limits following a Sur-D dive
Treatment of resolved symptoms following in-water recompression

- Follow-up treatments for residual symptoms
- Carbon monoxide poisoning

8.2.6 Performance of Neurological Exam at 60 fsw

After arrival at 60 fsw a neurological exam shall be performed to ensure that no overt neurological symptoms (e.g., weakness, numbness, incoordination) are present. If any abnormalities are found, the stricken diver should be treated using Treatment Table 6.

8.2.7 Extending Oxygen Breathing Periods on Treatment Table 5

Treatment Table 5 may be extended by two oxygen-breathing periods at 30 fsw. Air breaks are not required prior to an extension, between extensions, or prior to surfacing. In other words, the Diving Supervisor may have the patient breathe oxygen continuously for 60 minutes at 30 fsw and travel to the surface while breathing oxygen. If the Diving Supervisor elects to extend this treatment table, the tender does not require additional oxygen breathing than currently prescribed.

8.2.7 When Use of Treatment Table 6 is Mandatory

Treatment Table 6 is mandatory if:

- Type I pain is severe and immediate recompression must be instituted

before a neurological examination can be performed, or

- A complete neurological examination cannot be performed, or Any neurological symptom is present.
- These rules apply no matter how rapidly or completely the symptoms resolve once recompression begins.

8.2.8 Complete Relief after 10 Minutes

If complete relief of Type I symptoms is not obtained within 10 minutes at 60 feet, Table 6 is required.

8.2.9 Musculoskeletal Pain Due to Orthopedic Injury

Symptoms of musculoskeletal pain that have shown absolutely no change after the second oxygen breathing period at 60 feet may be due to orthopedic injury rather than decompression sick-ness. If, after reviewing the patient's history, the Diving Medical Officer feels that the pain can be related to specific orthopedic trauma or injury, Treatment Table 5 may be completed. If no Diving Medical Doctor is on site,TreatmentTable6 shall be used.

NOTE: Once recompression to 60 feet is done, Treatment Table 5 shall be used even if it was decided symptoms were probably not decompression sickness. Direct ascent to the surface is done only in emergencies.

8.3 Treatment Table 6

Treatment Table 6 is used for the following:

- Type I symptoms where relief is not complete within 10 minutes at 60 feet or where a neurological exam is not complete
- Type II symptoms Cutis marmorata
- Severe carbon monoxide poisoning, cyanide poisoning, or smoke inhalation
- Arterial gas embolism
- Symptomatic uncontrolled ascent
- Asymptomatic divers with omitted decompression greater than 30 minutes Treatment of unresolved symptoms following in-water treatment Recurrence of symptoms shallower than 60 fsw

8.3.1 Treating Arterial Gas Embolism

Arterial gas embolism is treated by initial compression to 60 fsw. If symptoms are improved within the first oxygen-breathing period, then treatment is continued using Treatment Table 6. Treatment Table 6 may be extended for two oxygen-breathing periods at 60 fsw (20 minutes on oxygen, then 5 minutes on air, then 20 minutes on oxygen) and two oxygen breathing periods at 30 fsw (15 minutes on air, then 60 minutes on oxygen, then 15 minutes on air, then 60 minutes on oxygen). If there has been more than one extension, the tenders' breathing period is extended 60 minutes at 30 feet.

8.4 Treatment Table 6A

Arterial gas embolism or severe decompression symptoms are treated by initial compression to 60 fsw. If symptoms improve, complete Treatment Table 6. If symptoms are unchanged or worsen, assess the patient upon descent and compress to depth of relief

(significant improvement), not to exceed 165 fsw. Once at the depth of relief, begin treatment gas (N 2 O 2 ,HeO 2) IAW Table 21-5 if available. Stay there for 30 minutes. A breathing period of 25 minutes on treatment gas, interrupted by 5 minutes of air, is recommended at depth to simplify time keeping. The patient may remain on treatment gas during ascent from treatment depth to 60 fsw since the PO 2 will continually decrease during ascent. Decompress to 60 fsw at a travel rate not to exceed 3 ft./min. Upon arrival at 60
fsw, complete Treatment Table 6. Consult with a Diving Medical Officer at the earliest opportunity. The Diving Medical Officer may recommend a Treatment Table 4. Treatment Table 6A may be extended for two oxygen breathing periods at 60 fsw and two oxygen breathing periods at 30 fsw. If deterioration is noted during ascent to 60 feet, treat as a recurrence of symptoms.

8.5 Treatment Table 4

If a shift from Treatment Table 6A to Treatment Table 4 is contemplated, a Diving Medical Doctor shall be consulted before the shift is made. Treatment Table 4 is used when it is determined that the patient would receive additional benefit at depth of significant relief, not to exceed 165 fsw. The time at depth shall be between 30 to 120 minutes, based on the patient's response.

8.6 Treatment Table 7

Treatment Table 7 is considered a heroic measure for treating non-responding severe gas embolism or life-threatening decompression sickness. Committing a patient to a Treatment Table 7 involves isolating the patient and having to minister to his medical needs in the recompression chamber for 48 hours or longer. Experienced diving medical personnel shall be on scene.

8.7 Treatment Table 8

Treatment Table 8 is an adaptation of a Royal Navy Treatment Table 65 mainly for treating deep uncontrolled ascents (see Volume 3) when more than 60 minutes of decompression have been missed. Compress symptomatic patient to depth of relief not to exceed 225 fsw. Initiate Treatment Table 8 from depth of relief. The Table 8 schedule from 60 feet is the same as Treatment Table 7.

9.0 Record Keeping Requirements:

The employer shall record the occurrence of any diving-related injury or illness, which requires any dive team member to be hospitalized for 24 hours or more, specifying the circumstances of the incident and the extent of any injuries or illnesses.

9.1 Availability of Records

Upon the request of the Assistant Secretary of Labor for Occupational Safety and Health, or the Director, National Institute for Occupational Safety and Health, Department of Health and Human Services of their designees, the employer shall make available for inspection and copying any record or document required by this standard.

Records and documents required by this standard shall be provided upon request to employees, designated representatives, and the Assistant Secretary in accordance with 29 CFR 1910.20 (a)-(e) and (g)-

- Safe practices manuals (1910.420), depth-time profiles (1910.422), recordings of dives (1910.423), decompression procedure assessment evaluations (1910.423), and records of hospitalizations (1910.440) shall be provided in the same manner as employee exposure records or analyses using exposure or medical records. Equipment inspections and testing records which pertain to employees (1910.430) shall also be provided upon request to employees and their designated representatives.
- Records and documents required by this standard shall be retained by the employer for the following period:
- Dive team member medical records (physician's reports) (1910.411) - 5 years;
- Safe practices manual (1910.420) - current document only;
- Depth-time profile (1910.422) - until completion of the recording of dive, or until completion of decompression procedure assessment where there has been an incident of decompression sickness;
- Recording of dive (1910.423) - 1 year, except 5 years where there has been an incident of decompression sickness;
- Decompression procedure assessment evaluations (1910.423) - 5 years;
- Equipment inspections and testing records (1910.430) - current entry or tag, or until equipment is withdrawn from service;
- Records of hospitalizations (1910.440) - 5 years.
- After the expiration of the retention period of any record required to be kept for five (5) years, the employer shall forward such records to the National Institute for Occupational Safety and Health, Department of Health and Human Services. The employer shall also comply with any additional requirements set forth at 29 CFR 1910.20(h).

10. Definitions

"Acfm": Actual cubic feet per minute.
"ASME Code or equivalent": ASME (American Society of Mechanical Engineers) Boiler and Pressure Vessel Code, Section VIII, or an equivalent code which the employer can demonstrate to be equally effective.
"ATA": Atmosphere absolute.
"Bell": An enclosed compartment, pressurized (closed bell) or unpressurized (open bell), which allows the diver to be transported to and from the underwater work area and which may be used as a temporary refuge during diving operations.
"Bottom time": The total elapsed time measured in minutes from the time when the diver leaves the surface in descent to the time that the diver begins ascent.
"Bursting pressure": The pressure at which a pressure containment device would fail structurally.
"Cylinder": A pressure vessel for the storage of gases.
"Decompression chamber": A pressure vessel for human occupancy such as a surface decompression chamber, closed bell, or deep diving system used to decompress divers and to treat decompression sickness.
"Decompression sickness": A condition with a variety of symptoms which may result from gas or bubbles in the tissues of divers after pressure reduction.

"Decompression table": A profile or set of profiles of depth-time relationships for ascent rates and breathing mixtures to be followed after a specific depth-time exposure or exposures.
"Dive location": A surface or vessel from which a diving operation is conducted.
"Dive-location reserve breathing gas": A supply system of air or mixed-gas (as appropriate) at the dive location, which is independent of the primary supply system and sufficient to support divers during the planned decompression.
"**Dive team":** Divers and support employees involved in a diving operation, including the designated person-in-charge.
"Diver": An employee working in water using underwater apparatus which supplies compressed breathing gas at the ambient pressure.
"Diver-carried reserve breathing gas": A diver-carried supply of air or mixed gas (as appropriate) sufficient under standard operating conditions to allow the diver to reach the surface, or another source of breathing gas, or to be reached by a standby diver.
"Diving mode": A type of diving requiring specific equipment, procedures and techniques (SCUBA, surface-supplied air, or mixed gas).
"Fsw": Feet of seawater (or equivalent static pressure head).
"Heavy gear": Diver-worn deep-sea dress including helmet, breastplate, dry suit, and weighted shoes.
"Hyperbaric conditions": Pressure conditions in excess of surface pressure.
"In-water stage": A suspended underwater platform which supports a diver in the water. **"Live-boating":** The practice of supporting a surfaced-supplied air or mixed gas diver from a vessel which is underway.
"Mixed-gas diving": A diving mode in which the diver is supplied in the water with a breathing gas other than air.

"No-decompression limits": The depth-time limits of the "no-decompression limits and repetitive dive group designation table for no-decompression air dives", U.S. Navy Diving Manual or equivalent limits which the employer can demonstrate to be equally effective.
"Psi(g)": Pounds per square inch (gauge).
"Scientific diving" means diving performed solely as a necessary part of a scientific, research, or educational activity by employees whose sole purpose for diving is to perform scientific research tasks. Scientific diving does not include performing any tasks usually associated with commercial diving such as: Placing or removing heavy objects underwater; inspection of pipelines and similar objects; construction; demolition; cutting or welding; or the use of explosives.
"SCUBA diving": A diving mode independent of surface supply in which the diver uses open circuit self-contained underwater breathing apparatus.
"Standby diver": A diver at the dive location available to assist a diver in the water.
"Surface-supplied air diving": A diving mode in which the diver in the water is supplied from the dive location with compressed air for breathing.
"Treatment table": A depth-time and breathing gas profile designed to treat decompression sickness.
"Umbilical": The composite hose bundle between a dive location and a diver or bell, or between a diver and a bell, which supplies the diver or bell with breathing gas, communications, power, or heat as appropriate to the diving mode or conditions, and includes a safety line between the diver and the dive location.
"Volume tank": A pressure vessel connected to the outlet of a compressor and used as an air reservoir.

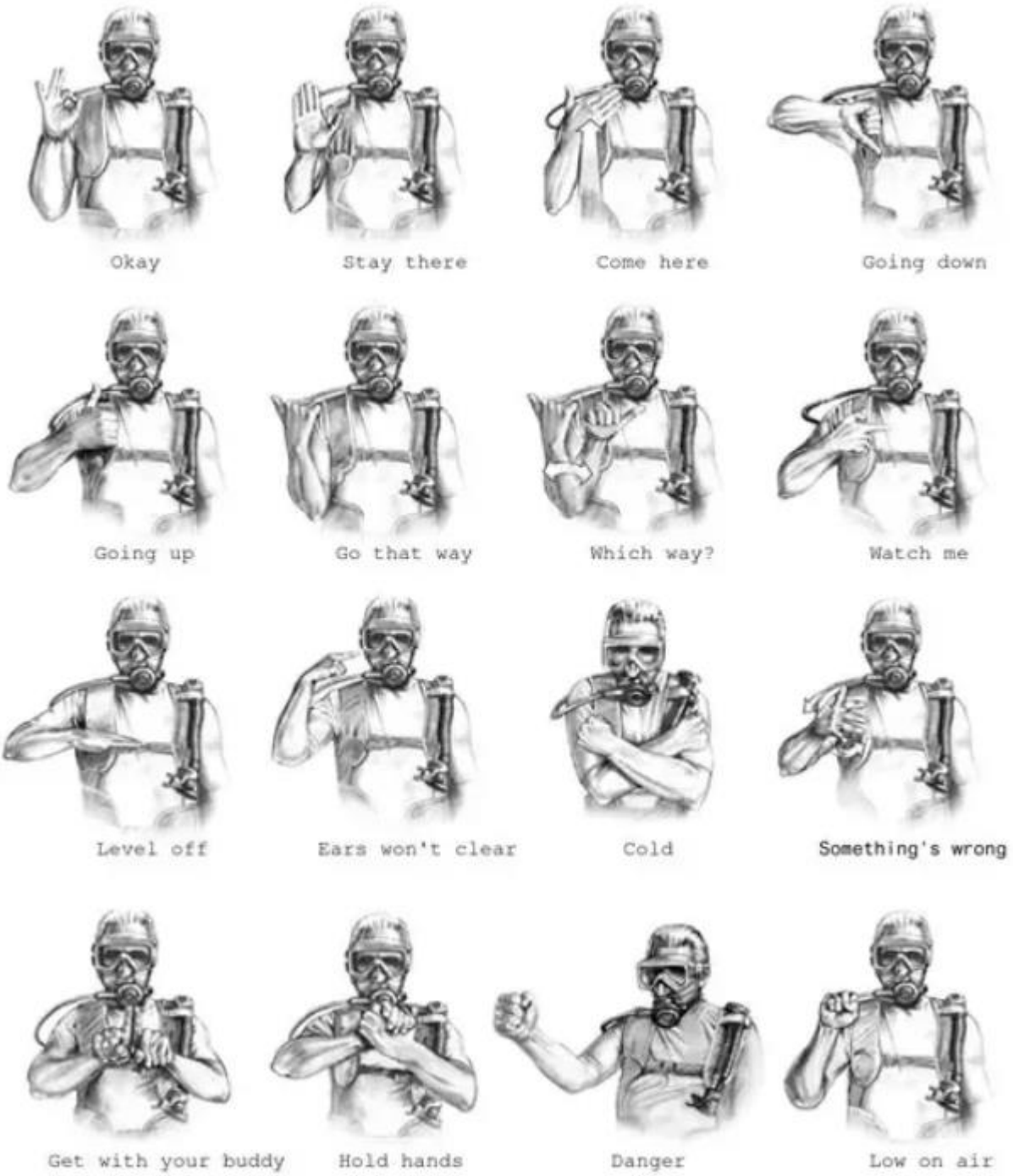
"Working pressure": The maximum pressure to which a pressure containment device may be exposed under standard operating conditions

SURFACE-SUPPLIED PREDIVE CHECKLIST

1. Verif□	**Diving Supervisor**	
	Verif□ that a reco□ □ression cha□ □er is availa□le. For all deco□ □ression dives and dives dee□er than 100 fsw a cha□ □er is re□uired on site. Chec□ First Aid / Stretcher / O2	
	Verif□ that □ro□er si□nals indicatin□ underwater o□erations □ein□ conducted are dis□la□ed correctl□.	
	Ensure that all □ersonnel concerned, or in the vicinit□, are infor□ed of divin□ o□erations	
	Deter□ine that all valves, switches, controls, and e□ui□□ent co□ □onents affectin□ divin□ o□eration are ta□□ed-out to □revent accidental shut-down or activation.	
	Verif□ that the diver and stand□□ diver are health□ and ca□a□le of □erfor□ in□ the divin□ tas□.	
	Verif□ that the divin□ s□ste□ is ali□ned □ro□erl□ and deter□ine that sufficient fuel, coolant, lu□ricants, and antifree□e are availa□le to service all co□ □onents throu□hout the o□eration	
2. Activate the Air Su□□l□	**Tender Perform the following**	
	Secondar□ Air – O□en Air C□linders verif□ □ro□er □ressure	
	Activate and ensure air throu□h divers u□ □ilical	
	Secure secondar□ air at divers console	
	Pri□ ar□ Air - Start the co□ □ressor chec□ all □etcoc□s, filler valves, filler ca□s, overflow □oints, □leed valves, and drain □lu□s for lea□a□e or □ alfunction of an□ □ind	
	Chec□ that co□ □ressor inta□e is o□tainin□ a free and □ure suction without conta□ination	
3. Attach the U□ □ilical	**Tender Perform the following**	
	Blow down the u□ □ilical. Ensure hoses are free of □ oisture, □ac□in□ □aterial, or chal□ and attach it to the Non-Return Valve.	
4. Hat the Diver	**Tender / Diver Perform the following**	
	Ensure air is on to the hat. Don the hat connect the nec□da□	
	Connect EGS to the hat. Ensure EGS c□linder valve is o□en. Verif□ EGS valve on hat is in the closed □osition	
5. Chec□ Co□ □unications	**Diver Preform the following**	
	Check Com's	
6. Tender Chec□ the Entire Ri□	**Tender Perform the following**	
	a. Soa□ and lea□ chec□ the Hel□ et □as fittin□s and connections includin□ the EGS	
	□. Chec□ Nec□ Yo□e is □ro□erl□ attached to the hel□ et and all loc□in□ □ins en□a□ed	
	c. Chec□ Safet□ Harness is □ro□erl□ ad□usted and in □ood condition	
	d. Chec□ U□ □ilical Strain Release	
	e. Chec□ EGS Hose Quic□ Disconnect	
	f. Chec□ Boots, □loves, □nife, tools and other accessories	
	□. Chec□ the hot water su□□l□ and connections	
	h. Chec□ the dr□ suit Inflation Hose Connection. Ensure the dr□ suit Inflation Valve and E□haust Valve function □ro□erl□	

Dive Tender Si□nature:_____ Date:_____

ADDENDUM # 2


Okay
Stay there
Come here
Going down
Going up
Go that way
Which way?
Watch me
Level off
Ears won't clear
Cold
Something's wrong
Get with your buddy
Hold hands
Danger
Low on air

Caldwell
Marine International

DIVE EQUIPTMENT INSPECTION INTERVALS

Primary Equipment					
Dive Spread #:					
Description:	ID #	Inspection Frequency:	Responsible Party:	Inspection Performed By:	Inspection Date:
Master Cal. Gauge		6 Mo.	CMI		/ /
Pneumo Fathometer		6 Mo.	CMI		/ /
Volume Tank		5 Yr.	CMI		/ /
Volume Tank Gauge		6 Mo.	CMI		/ /
Dive Hoses			CMI		/ /
Dive Compressor (Air)		6 Mo.	CMI		/ /
Deck Whips		6 Mo.	CMI		/ /
Dive Compressor (Gauge)		6 Mo.	CMI		/ /
Diver Helmet		1 Yr.	Diver		/ /
Diver Bail-Out Bottle (Visual)		1 Yr.	Diver		/ /
Diver Bail-Out Bottle (Hydro)		5 Yr.	Diver		/ /
First Aid Kit					/ /
					/ /
					/ /
					/ /

Back-Up Equipment					
Description:	ID #:	Inspection Frequency:	Responsible Party:	Inspection Performed By:	Inspection Date:
Dive Compressor (Air)		6 Mo.	CMI		/ /
Dive Compressor (Gauge)		6 mo.	CMI		/ /
					/ /
					/ /

It this Equipment in Safety Operation Condition? ☐ YES ☐ NO
Provide Detail(s) of any Item(s) of Concern:

Dive Supervisor Review: _____ Date: / /

CaldwellMarine INTERNATIONAL NR NORTHEAST REMSCO Construction HUXTED TRENCHLESS

‘

Caldwell
Marine International

Certificate of Calibration Verification

Reference Gauge	
Date:	Test Gauge Description:
Accuracy Grade:	Calibrating Date:

Tested Gauge			
Gauge Number:		Gauge Due Date:	
Model:		Accuracy Grade:	
Temperature: °F	Test Units:	FSW ☐	PSI ☐
Permissible Error % of span:	±1% ☐	(± 2%-±1%-2% ±) ☐	(± 3%-±2%-3% ±) ☐

1st Cycle		
Reference Gauge Up-scale	Test Gauge Reading	In Range
Reference Gauge Down-Scale	Test Gauge Reading	In Range
2nd Cycle		
Reference Gauge Up-Scale	Test Gauge Reading	In Range
Reference Gauge Down-Scale	Test Gauge Reading	In Range

Dive Supervisor Review: _____ **Date:** ___/___/___

Appendix S– Maintenance and Protection of Traffic

GENERAL NOTES

1. THE TYPICAL DETAILS DEPICTED ON THE STANDARD SHEETS AND IN THE MUTCD, REFLECT THE MINIMUM REQUIREMENTS.

2. THE CONTRACTOR MUST SUBMIT TO THE ENGINEER, IN WRITING, PROPOSED REVISIONS TO THE TRAFFIC CONTROL PLAN FOR REVIEW AND APPROVAL BY THE REGIONAL DIRECTOR OR HIS/HER DESIGNEE FIVE (5) WORK DAYS PRIOR TO THE PLANNED IMPLEMENTATION OF SUCH PROPOSED REVISIONS, EXCEPT FOR CHANGES THAT ALTER THE SCOPE OF THE TRAFFIC CONTROL PLAN. SUCH CHANGES IN SCOPE MUST BE SUBMITTED TO THE ENGINEER FOR APPROVAL BY THE REGIONAL DIRECTOR OR HIS/HER DESIGNEE THIRTY (30) WORKING DAYS PRIOR TO IMPLEMENTATION OF SUCH REVISIONS.

3. THE CONTRACTOR SHALL PROVIDE THE ENGINEER, IN WRITING, WITH THE NAMES, ADDRESSES, AND TELEPHONE NUMBERS OF STAFF WHO ARE AUTHORIZED TO SECURE LABOR, MATERIALS, AND EQUIPMENT FOR EMERGENCY REPAIRS OUTSIDE NORMAL WORKING HOURS. THE ENGINEER WILL PROVIDE THE SUBMITTED INFORMATION TO REGIONAL MANAGEMENT, THE NEW YORK STATE POLICE, THE RESIDENT ENGINEER, AND THE LOCAL POLICE.

ACTIVITY AREA

1. THE CONTRACTOR SHALL MAINTAIN A MINIMUM 500' LONGITUDINAL DISTANCE BETWEEN CONSTRUCTION OPERATIONS ON ALTERNATE SIDES OF THE ROADWAY, UNLESS OTHERWISE APPROVED BY THE ENGINEER.

2. WHEN TWO OR MORE AREAS ARE ADJACENT, OVERLAP, OR ARE IN CLOSE PROXIMITY, THE CONTRACTOR SHALL ENSURE THERE ARE NO CONFLICTING SIGNS AND THAT LANE CONTINUITY IS MAINTAINED THROUGHOUT ALL WORK AREAS.

SIGNS

1. THE LOCATIONS OF THE SIGNS SHOWN ON THE WORK ZONE TRAFFIC CONTROL PLANS AND DETAILS MAY BE ADJUSTED BASED ON SIGHT DISTANCE AND OTHER CONSIDERATIONS. THE FINAL LOCATIONS OF SIGNS ARE SUBJECT TO APPROVAL OF THE ENGINEER.

2. ANY EXISTING SIGNS, INCLUDING OVERHEAD SIGNS, WHICH CONFLICT WITH THE TEMPORARY TRAFFIC CONTROL SIGN LAYOUT SHALL BE COVERED, REMOVED, STORED OR RESET, AS APPROVED BY THE ENGINEER. ALL APPROPRIATE EXISTING SIGNS SHALL BE RESTORED TO THEIR ORIGINAL CONDITION AND/OR LOCATION UNLESS OTHERWISE REPLACED IN THIS CONTRACT.

3. SIGNS AT OR NEAR INTERSECTIONS SHALL BE PLACED SO THAT THEY DO NOT OBSTRUCT A MOTORIST'S LINE OF SIGHT.

4. ALL WARNING AND REGULATORY SIGNS SHALL BE POSTED ON BOTH SIDES OF MULTI-LANE DIVIDED HIGHWAYS, MULTI-LANE RAMPS, AND ONE-WAY STREETS. IN CASES WHERE LANE RESTRICTIONS REDUCE THE TRAVEL LANE TO ONE LANE, SIGNS SHALL BE POSTED ON THE RIGHT SIDE OF THE ACTIVE TRAVEL LANE, UNLESS OTHERWISE AUTHORIZED BY THE ENGINEER.

5. SIGNS MOUNTED ON THE MEDIAN OF DIVIDED HIGHWAYS WHERE MEDIAN BARRIER IS IN PLACE MAY BE MOUNTED ON THE BARRIER WITH A SADDLE TYPE BRACKET. LAYING THE SIGN DOWN IN A HORIZONTAL POSITION IS NOT PERMITTED.

6. THE DIMENSIONS OF WORK ZONE TRAFFIC CONTROL SIGNS ARE DESCRIBED IN THE MUTCD. ANY CHANGES TO THE DIMENSIONS SHALL BE APPROVED BY THE REGIONAL DIRECTOR OR BY HIS/HER DESIGNEE.

7. NYR9-12 MAY BE USED IN PLACE OF NYR9-11.

CHANNELIZING DEVICES

1. WHERE POSSIBLE ALL CHANNELIZING AND GUIDING DEVICES ARE TO BE PLACED SO AS TO PROVIDE A MINIMUM 2' LATERAL CLEARANCE TO THE TRAVELED WAY.

PUBLIC ACCESS

1. PROPERTY OWNERS WHOSE DRIVEWAYS WILL BE MADE INACCESSIBLE SHALL BE NOTIFIED BY THE CONTRACTOR AT LEAST 24 HOURS PRIOR TO RESTRICTING USE OF THE DRIVEWAY. FOR MULTIPLE ACCESS PROPERTIES, AT LEAST ONE DRIVEWAY SHALL BE OPEN AT ALL TIMES. ACCESS SHALL BE RESTORED TO ALL DRIVEWAYS AS SOON AS POSSIBLE.

2. SUITABLE RAMPS SHALL BE INSTALLED TO MAINTAIN SMOOTH TRANSITIONS FROM RESIDENTIAL AND COMMERCIAL DRIVEWAYS TO AND FROM THE WORK AREA.

LANE CLOSURES

1. THE CONTRACTOR SHALL LOCATE LANE CLOSURES TO PROVIDE OPTIMUM VISIBILITY, I.E. BEFORE CURVES AND CRESTS, TO THE EXTENT CONDITIONS PERMIT.

2. THE ENGINEER MAY REQUIRE THAT ALL LANES BE RE-OPENED AT ANY TIME IF THE ROUTE IS NEEDED FOR EMERGENCY PURPOSES. THIS COULD INCLUDE INCIDENTS AT LOCATIONS OUTSIDE THE CONTRACT LIMITS.

LANE WIDTHS

1. UNLESS AUTHORIZED BY THE ENGINEER, THE MINIMUM LANE WIDTHS FOR WORK ZONE TRAVEL LANES SHALL BE AS FOLLOWS: FREEWAYS AND/OR EXPRESSWAYS IS 11'. THE MINIMUM LANE WIDTH FOR ALL OTHER TYPES OF ROADWAYS IS 10'.

2. THE CONTRACTOR SHALL PROVIDE A WRITTEN NOTICE TO THE ENGINEER, A MINIMUM OF 21 CALENDAR DAYS IN ADVANCE OF PERFORMING ANY WORK THAT RESULTS IN THE REDUCED WIDTH OF AN EXISTING ROADWAY, SO THAT THE ENGINEER MAY NOTIFY THE REGIONAL PERMIT ENGINEER IN A TIMELY MANNER.

BARRIER/SHADOW VEHICLES

1. BARRIER AND SHADOW VEHICLES SHALL BE REQUIRED AS PER STANDARD SHEET TITLED "WORK ZONE TRAFFIC CONTROL LEGENDS AND NOTES".

2. NO WORK ACTIVITY, EQUIPMENT, VEHICLES AND/OR MATERIALS SHALL BE LOCATED BETWEEN THE BARRIER OR SHADOW VEHICLE AND THE ACTIVE WORK AREA (ROLL AHEAD DISTANCE).

3. THE CONTRACTOR MAY BE REQUIRED TO PROVIDE A BARRIER VEHICLE IN CONJUNCTION WITH POLICE PRESENCE IN THE WORK ZONE, TO BE INCLUDED IN THE UNIT BID PRICE FOR BASIC WORK ZONE TRAFFIC CONTROL.

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION

U.S. CUSTOMARY STANDARD SHEET

WORK ZONE TRAFFIC CONTROL GENERAL NOTES

APPROVED SEPTEMBER 18, 2008

/S/ DAVID J. CLEMENTS, P.E.
DIRECTOR, OFFICE OF TRAFFIC SAFETY AND MOBILITY

ISSUED UNDER EB 08-036

619-10

EFFECTIVE DATE: 01/08/09

FILE NAME = \\P_PWP:d0109553\619-10.dgn
DATE/TIME = 06-NOV-2008 15:03
USER = jturley

WORK ZONE TRAFFIC CONTROL SIGN TABLE

SIGN	SIGN DESIGNATION	COLOR CODE	CONVENTIONAL ROAD	EXPRESSWAY	FREEWAY
EXIT	E5-1	C	-------	72"X60"	72"X60"
ROAD WORK NEXT X MILES	G20-1	A	36"X18"	48"X24"	48"X24"
END ROAD WORK	G20-2	A	36"X18"	48"X24"	48"X24"
PILOT CAR FOLLOW ME	G20-4	A	36"X18"	-------	-------
WORK ZONE	G20-5aP	A	24"X18"	36"X24"	36"X24"
X / XX	M1-1	G	1 OR 2 DIGITS 24"X24"	36"X36"	36"X36"
XXX	M1-1†	G	3 DIGITS 30"X24"	45"X36"	45"X36"
X XX	M1-4	B	1 OR 2 DIGITS 24"X24"	36"X36"	36"X36"
XXX	M1-4†	B	3 DIGITS 30"X24"	45"X36"	45"X36"
NORTH	M3-1	SEE NOTE 3	24"X12"	36"X18"	36"X18"
EAST	M3-2				
SOUTH	M3-3				
WEST	M3-4				
DETOUR	M4-8	A	24"X12"	36"X18"	36"X18"
END DETOUR	M4-8a	A	24"X18"	24"X18"	24"X18"
DETOUR / DETOUR DETOUR	M4-9 M4-9L M4-9R	A	30"X24"	48"X36"	48"X36"
DETOUR / DETOUR	M4-9a	A	30"X24"	30"X24"	-------
DETOUR / DETOUR	M4-9b	A	30"X24"	30"X24"	-------
DETOUR / DETOUR	M4-9c	A	30"X24"	30"X24"	-------
DETOUR	M4-10L	A	48"X18"	48"X18"	48"X18"
DETOUR	M4-10R				
	M5-1	SEE NOTE 3	21"X15"	30"X21"	30"X21"
	M5-2	SEE NOTE 3	21"X15"	30"X21"	30"X21"
	M6-1	SEE NOTE 3	21"X15"	30"X21"	30"X21"
	M6-2				
	M6-3				
	M6-4				
X XX	NYM3-1	B	24"X24"	36"X36"	36"X36"
XXX	NYM3-2	B	30"X24"	45"X36"	45"X36"
XXXA	NYM3-3	B	30"X24"	45"X36"	45"X36"

WORK ZONE TRAFFIC CONTROL SIGN TABLE

SIGN	SIGN DESIGNATION	COLOR CODE	CONVENTIONAL ROAD	EXPRESSWAY	FREEWAY
STATE LAW LICENSE SUSPENDED AFTER TWO WORK ZONE SPEEDING TICKETS	NYR9-11	B	24"X42"	48"X84"	48"X84"
STATE LAW FINES DOUBLED FOR SPEEDING IN WORK ZONES	NYR9-12	B	24"X36"	36"X54"	48"X72"
RUMBLE STRIPS	NYW4-17	A	36"X36"	48"X48"	48"X48"
WET PAINT	NYW8-30	A	48"X24"	48"X24"	48"X24"
STAY IN LANE	NYW8-31	A	48"X24"	48"X24"	48"X24"
DO NOT PASS	NYW8-32	A	48"X24"	48"X24"	48"X24"
LANE CLOSED	NYW8-33	A	48"X24"	48"X24"	48"X24"
STOP	R1-1	D	36"X36"	36"X36"	48"X48"
YIELD	R1-2	E	36"X36"X36"	48"X48"X48"	60"X60"X60"
SPEED LIMIT XX	R2-1	B	24"X30" OR 30"X36" (SEE NOTE 5)	36"X48"	36"X48"
END HIGHER FINES ZONE	R2-11	B	24"X30"	36"X48"	36"X48"
END WORK ZONE SPEED LIMIT	R2-12	B	24"X36"	36"X54"	36"X54"
DO NOT PASS	R4-1	B	24"X30"	36"X48"	36"X48"
	R4-7	B	24"X30"	36"X48"	36"X48"
	R4-7c NARROW	B	18"X30"	-------	-------
	R4-8	B	24"X30"	36"X48"	36"X48"
	R4-8c NARROW	B	18"X30"	-------	-------
STAY IN LANE	R4-9	B	24"X30"	36"X48"	36"X48"
DO NOT ENTER	R5-1	E	36"X36"	36"X36"	48"X48"
PEDESTRIAN CROSSWALK	R9-8	B	36"X18"	36"X18"	-------
SIDEWALK CLOSED	R9-9	B	24"X12"	24"X12"	-------
SIDEWALK CLOSED USE OTHER SIDE / SIDEWALK CLOSED USE OTHER SIDE	R9-10L R9-10R	B	24"X12"	24"X12"	-------
SIDEWALK CLOSED AHEAD CROSS HERE / SIDEWALK CLOSED AHEAD CROSS HERE	R9-11L R9-11R	B	24"X18"	24"X18"	-------
SIDEWALK CLOSED CROSS HERE / SIDEWALK CLOSED CROSS HERE	R9-11aL R9-11aR	B	24"X12"	24"X12"	-------
STOP HERE ON RED	R10-6	B	24"X36"	24"X36"	-------
ROAD CLOSED	R11-2	B	48"X30"	48"X30"	48"X30"

WORK ZONE TRAFFIC CONTROL SIGN TABLE

SIGN	SIGN DESIGNATION	COLOR CODE	CONVENTIONAL ROAD	EXPRESSWAY	FREEWAY
ROAD CLOSED XX MILES AHEAD LOCAL TRAFFIC ONLY	R11-3a	B	60"X30"	60"X30"	-------
	W1-4L W1-4R	A	36"X36"	48"X48"	48"X48"
	W1-4bL W1-4bR	A	36"X36"	48"X48"	48"X48"
	W1-4cL W1-4cR	A	36"X36"	48"X48"	48"X48"
	W1-6L	A	48"X24"	60"X30"	60"X30"
	W1-6R	A			
	W1-8L	A (NO BORDER)	18"X24"	30"X36"	30"X36"
	W1-8R	A (NO BORDER)			
	W3-1	A[4]	36"X36"	48"X48"	48"X48"
	W3-2	A[4]	36"X36"	48"X48"	48"X48"
	W3-3	A[4]	36"X36"	48"X48"	48"X48"
BE PREPARED TO STOP	W3-4	A	36"X36"	48"X48"	48"X48"
PREP TO STOP XX	W3-5	A[4]	36"X36"	48"X48"	48"X48"
	W4-1L W4-1R	A	36"X36"	48"X48"	48"X48"
	W4-2L W4-2R	A	36"X36"	48"X48"	48"X48"

ROADWAY DEFINITIONS:

CONVENTIONAL ROAD - A STREET OR HIGHWAY OTHER THAN A FREEWAY, OR EXPRESSWAY.

EXPRESSWAY - A DIVIDED HIGHWAY WITH PARTIAL CONTROL OF ACCESS.

FREEWAY - A DIVIDED HIGHWAY WITH FULL CONTROL OF ACCESS.

COLOR CODE LEGEND

CODE	DESCRIPTION
A	BLACK LEGEND AND BORDER ON AN ORANGE BACKGROUND
B	BLACK LEGEND AND BORDER ON A WHITE BACKGROUND
C	WHITE LEGEND AND BORDER ON A GREEN BACKGROUND
D	WHITE LEGEND AND BORDER ON A RED BACKGROUND
E	RED LEGEND AND BORDER ON A WHITE BACKGROUND
F	BLACK LEGEND AND BORDER ON A FLOURESCENT YELLOW GREEN BACKGROUND
G	WHITE LEGEND AND BORDER ON A BLUE AND RED BACKGROUND

NOTES:

1. DIMENSIONS ARE SHOWN AS WIDTH X HEIGHT.
2. FOR SIGNAGE NOT SHOWN ON THESE TABLES REFER TO THE M.U.T.C.D.
3. COLORS FOR DIRECTION PLAQUES, ADVANCE TURN ARROWS, AND DIRECTIONAL ARROWS SHALL MATCH THE ROUTE OR INTERSTATE SIGN THAT THEY SUPPLEMENT AS PER THE M.U.T.C.D.
4. MULTICOLORED SYMBOL IMPOSED ON SIGN WITH BLACK LEGEND AND BORDER ON AN ORANGE BACKGROUND.
5. FOR R2-1 SIGN LARGER DIMENSIONS SHALL BE USED WHEN SIGN FACES MULTIPLE LANES ON A CONVENTIONAL ROAD.

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION

U.S. CUSTOMARY STANDARD SHEET

SIGN TABLE (SHEET 1 OF 2)

APPROVED APRIL 1, 2012

/S/ TODD WESTHUIS, P.E.
DIRECTOR, OFFICE OF TRAFFIC SAFETY AND MOBILITY

ISSUED UNDER EB 12-010

619-12

EFFECTIVE DATE: 05/03/2012

FILE NAME = 619-1201_050312.dgn
DATE/TIME = 18-APR-2012 11:00
USER = rlohse

WORK ZONE TRAFFIC CONTROL SIGN TABLE

SIGN	SIGN DESIGNATION	COLOR CODE	CONVENTIONAL ROAD	EXPRESSWAY	FREEWAY
ROAD NARROWS	W5-1	A	36"X36"	48"X48"	48"X48"
RAMP NARROWS	W5-4	A	36"X36"	48"X48"	48"X48"
	W6-3	A	36"X36"	48"X48"	48"X48"
NEXT X MILES	W7-3aP	A	24"X18"	36"X30"	36"X30"
BUMP	W8-1	A	36"X36"	48"X48"	48"X48"
PAVEMENT ENDS	W8-3	A	36"X36"	48"X48"	48"X48"
LOOSE GRAVEL	W8-7	A	36"X36"	48"X48"	48"X48"
ROUGH ROAD	W8-8	A	36"X36"	48"X48"	48"X48"
LOW SHOULDER	W8-9	A	36"X36"	48"X48"	48"X48"
NO CENTER LINE	W8-12	A	36"X36"	-------	-------
FALLEN ROCKS	W8-14	A	36"X36"	48"X48"	48"X48"
GROOVED PAVEMENT	W8-15	A	36"X36"	48"X48"	48"X48"
	W8-17	A	36"X36"	48"X48"	48"X48"
SHOULDER DROP-OFF	W8-17p	A	24"X18"	30"X24"	30"X24"
NO SHOULDER	W8-23	A	36"X36"	48"X48"	48"X48"
STEEL PLATE ON PAVEMENT	W8-24	A	36"X36"	48"X48"	48"X48"
CENTER LANE CLOSED AHEAD	W9-3	A	36"X36"	48"X48"	48"X48"
	W11-1L W11-1R	A OR F	36"X36"	36"X36"	-------
	W11-2L W11-2R	F	36"X36"	36"X36"	-------
	W11-15L W11-15R	F	36"X36"	36"X36"	-------

WORK ZONE TRAFFIC CONTROL SIGN TABLE

SIGN	SIGN DESIGNATION	COLOR CODE	CONVENTIONAL ROAD	EXPRESSWAY	FREEWAY
XX MPH	W13-1P	A	24"X24"	30"X30"	30"X30"
ON RAMP	W13-4P	A	36"X36"	36"X36"	36"X36"
NO PASSING ZONE	W14-3	A	48"X48"X36"	-------	-------
SHARE THE ROAD	W16-1P	SEE NOTE 3 A OR F	18"X24"	24"X30"	-------
XXX FEET	W16-2P	A	24"X18"	30"X24"	-------
NEXT XXX FT	W16-4P	SEE NOTE 3 A OR F	30"X24"	-------	-------
	W16-5PL W16-5PR	A	24"X18"	-------	-------
	W16-7PL W16-7PR	SEE NOTE 3 A OR F	24"X12"	30"X18"	-------
AHEAD	W16-9P	SEE NOTE 3 A OR F	24"X12"	30"X18"	-------
ROAD WORK AHEAD / ROAD WORK XXX FT / ROAD WORK X MILE	W20-1	A	36"X36"	48"X48"	48"X48"
DETOUR AHEAD / DETOUR XXX FT / DETOUR X MILE	W20-2	A	36"X36"	48"X48"	48"X48"
ROAD CLOSED AHEAD / ROAD CLOSED XXX FT / ROAD CLOSED X MILE	W20-3	A	36"X36"	48"X48"	48"X48"
ONE LANE ROAD AHEAD / ONE LANE ROAD XXX FT / ONE LANE ROAD X MILE	W20-4	A	36"X36"	48"X48"	48"X48"
LEFT LANE CLOSED AHEAD / LEFT LANE CLOSED 1500 FT / LEFT LANE CLOSED 1 MILE; RIGHT LANE CLOSED AHEAD / RIGHT LANE CLOSED 1500 FT / RIGHT LANE CLOSED 1 MILE	W20-5	A	36"X36"	48"X48"	48"X48"
2 LEFT LANES CLOSED AHEAD / 2 LEFT LANES CLOSED XXXX FT / 2 LEFT LANES CLOSED X MILE; 2 RIGHT LANES CLOSED AHEAD / 2 RIGHT LANES CLOSED XXXX FT / 2 RIGHT LANES CLOSED X MILE	W20-5a	A	36"X36"	48"X48"	48"X48"
	W20-7	A	36"X36"	48"X48"	48"X48"

WORK ZONE TRAFFIC CONTROL SIGN TABLE

SIGN	SIGN DESIGNATION	COLOR CODE	CONVENTIONAL ROAD	EXPRESSWAY	FREEWAY
	W21-1	A	36"X36"	48"X48"	48"X48"
SLOW MOVING VEHICLE	W21-4	A	36"X18"	48"X24"	48"X24"
SHOULDER WORK	W21-5	A	36"X36"	48"X48"	48"X48"
LEFT SHOULDER CLOSED / RIGHT SHOULDER CLOSED	W21-5aL W21-5aR	A	36"X36"	48"X48"	48"X48"
LEFT SHOULDER CLOSED AHEAD / LEFT SHOULDER CLOSED XXX FT / LEFT SHOULDER CLOSED X MILE; RIGHT SHOULDER CLOSED AHEAD / RIGHT SHOULDER CLOSED XXX FT / RIGHT SHOULDER CLOSED X MILE	W21-5bL W21-5bR	A	36"X36"	48"X48"	48"X48"
MOWING AHEAD	W21-8	A	36"X36"	48"X48"	48"X48"
BLASTING ZONE AHEAD / BLASTING ZONE 1500 FT / BLASTING ZONE 1/2 MILE	W22-1	A	36"X36"	48"X48"	48"X48"
TURN OFF 2-WAY RADIO AND CELL PHONE	W22-2	A	42"X36"	42"X36"	42"X36"
END BLASTING ZONE	W22-3	A	42"X36"	42"X36"	42"X36"
NEW TRAFFIC PATTERN AHEAD	W23-2	A	36"X36"	48"X48"	48"X48"
	W24-1L W24-1R	A	36"X36"	48"X48"	48"X48"
	W24-1aL W24-1aR	A	36"X36"	48"X48"	48"X48"
	W24-1bL W24-1bR	A	36"X36"	48"X48"	48"X48"

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EXPRESSWAY - A DIVIDED HIGHWAY WITH PARTIAL CONTROL OF ACCESS.

FREEWAY - A DIVIDED HIGHWAY WITH FULL CONTROL OF ACCESS.

COLOR CODE LEGEND

CODE	DESCRIPTION
A	BLACK LEGEND AND BORDER ON AN ORANGE BACKGROUND
B	BLACK LEGEND AND BORDER ON A WHITE BACKGROUND
C	WHITE LEGEND AND BORDER ON A GREEN BACKGROUND
D	WHITE LEGEND AND BORDER ON A RED BACKGROUND
E	RED LEGEND AND BORDER ON A WHITE BACKGROUND
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G	WHITE LEGEND AND BORDER ON A BLUE AND RED BACKGROUND

NOTES:

1. DIMENSIONS ARE SHOWN AS WIDTH X HEIGHT.
2. FOR SIGNAGE NOT SHOWN ON THESE TABLES REFER TO THE M.U.T.C.D.
3. WHEN USED IN CONJUNCTION WITH A BICYCLE SIGN (W11-1) OR PEDESTRIAN CROSSING (W11-2) COLOR CODE SHALL MATCH.

ERRATA 1 EFF 01/01/2021
ISSUED WITH EB 20-048

NEW YORK STATE OF OPPORTUNITY. Department of Transportation

U.S. CUSTOMARY STANDARD SHEET

SIGN TABLE
(SHEET 2 OF 2)

APPROVED APRIL 1, 2012

/S/ TODD WESTHUIS, P.E.
DIRECTOR, OFFICE OF TRAFFIC SAFETY AND MOBILITY

ISSUED UNDER EB 12-010

619-12

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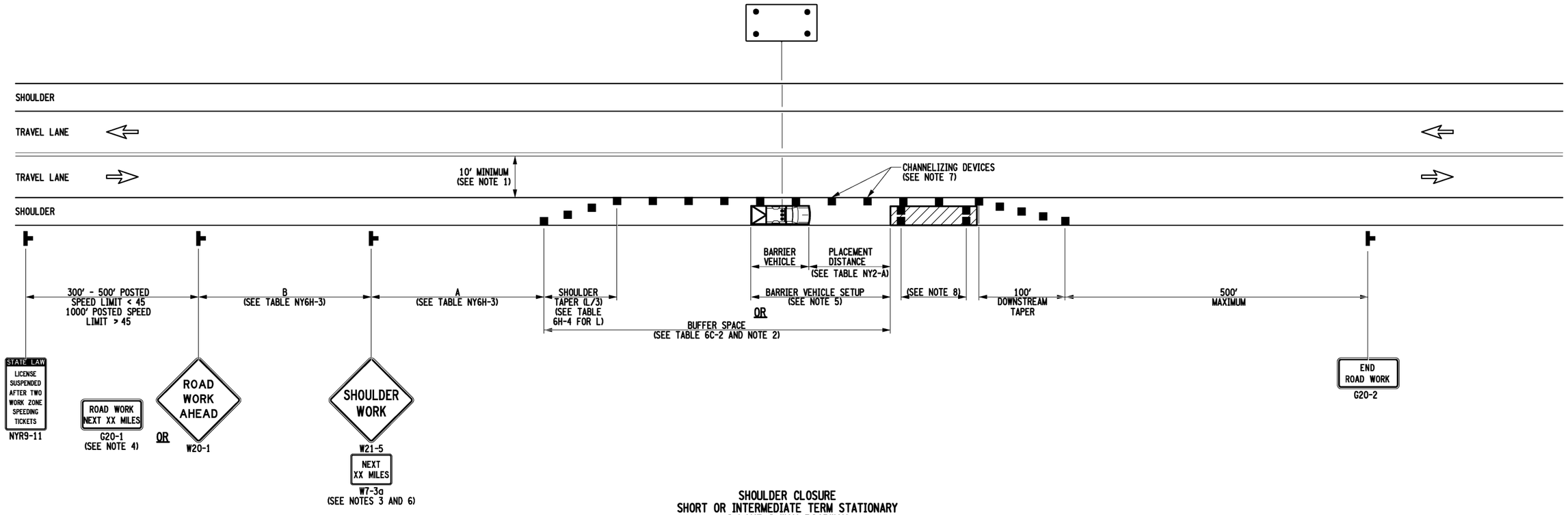


SHOULDER CLOSURE
SHORT OR INTERMEDIATE TERM STATIONARY
2-LANE 2-WAY ROADWAY
(NOT TO SCALE)

NOTES:

1. WHEN THE MINIMUM LANE WIDTH OF 10′ CANNOT BE MAINTAINED DUE TO A SHOULDER CLOSURE, USE THE DETAIL FOR SHORT OR INTERMEDIATE TERM STATIONARY FLAGGING OPERATION.
2. NO WORK ACTIVITY OR STORAGE OF EQUIPMENT, VEHICLES, OR MATERIAL SHOULD OCCUR WITHIN A BUFFER SPACE.
3. WHEN THE DISTANCE BETWEEN THE ADVANCE WARNING SIGNS AND WORK IS 2 MILES TO 5 MILES, A SUPPLEMENTAL DISTANCE PLAQUE (W7-3a) SHOULD BE USED WITH THE SHOULDER WORK SIGN (W21-5).
4. THE ROAD WORK NEXT XX MILES SIGN (G20-1) MAY BE USED INSTEAD OF THE ROAD WORK AHEAD SIGN (W20-1) IF WORK LOCATIONS OCCUR OVER A DISTANCE OF MORE THAN 2 MILES.
5. FOR BARRIER VEHICLE USE REQUIREMENTS SEE TABLES NY1-A AND NY2-A ON THE STANDARD SHEET TITLED "WORK ZONE TRAFFIC CONTROL LEGENDS AND NOTES".
6. IN THOSE SITUATIONS WHERE MULTIPLE WORK LOCATIONS EXIST WITHIN A LIMITED DISTANCE MAKE IT PRACTICAL TO PLACE STATIONARY SIGNS, THE DISTANCE BETWEEN THE ADVANCE WARNING SIGN AND WORK SHALL NOT EXCEED 5 MILES.
7. CHANNELIZING DEVICE SPACING (CENTER TO CENTER) SHALL NOT EXCEED 40′ IN THE ACTIVE WORK SPACE.
8. TRANSVERSE DEVICES SHALL BE REQUIRED (AS PER 619 STANDARD SPECIFICATIONS) WHEN A PAVED SHOULDER HAVING A WIDTH OF 8′ OR GREATER IS CLOSED FOR A DISTANCE GREATER THAN 1500′.

NOTE: SEE STANDARD SHEET TITLED "WORK ZONE TRAFFIC CONTROL LEGENDS AND NOTES" FOR LEGEND OF SYMBOLS AND/OR LETTER CODES USED IN THIS DRAWING.

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION

U.S. CUSTOMARY STANDARD SHEET

SHOULDER CLOSURE
2-LANE 2-WAY ROADWAY

APPROVED SEPTEMBER 15, 2009

/S/ DAVID J. CLEMENTS, P.E.
DIRECTOR, OFFICE OF
TRAFFIC SAFETY AND MOBILITY

ISSUED UNDER EB 09-025

619-20

EFFECTIVE DATE: 01/07/10

FILE NAME = 619-20_010710.dgn
DATE/TIME = 09-OCT-2009 10:46
USER = jturley

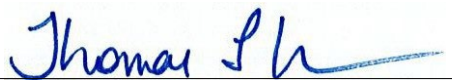
Appendix T– Site Specific Health and Safety Plan

SEGMENT 1 EM&CP
HORIZONTAL DIRECTIONAL DRILLS
AT SHORELINE CROSSINGS
ON THE
CHAMPLAIN HUDSON POWER EXPRESS
SUBMARINE CABLE SYSTEM

Site Specific Health and Safety Plan

REVISION TABLE			
REV. #	**DESCRIPTION**	**DATE**	**APPROVED**
00	Creation	02/17/22	LA
01	Revised after NKT review	05/26/22	LA
02	Revised to Reflect all four (4) HDD EAPs	07/14/22	LA
03	Revised	10/26/22	LA
04	Revised as requested	11/16/22	LA

SITE HEALTH & SAFETY PLAN APPROVAL



3/14/2022

Thomas F. Ulisse, Project Executive *Date*
Caldwell Marine

5/14/22

Brett Bailey, Project Manager *Date*
Caldwell Marine

03/14/22

Lucky Abernathy, EHS Director *Date*
Caldwell Marine

3-11-2022

Kevin J. McMahon, CIH, Prepared By *Date*

Attachments

1. SSHASP Sign-Off Form
2. Job Safety Analyses
3. Safety Data Sheets
4. Directions to Hospital
5. Incident Report
6. CALDWELL MARINE. Corp. Health & Safety Policies and Procedures Manual
7. Confined Space Entry Permit
8. Hot Work Permit
9. Safety Inspection Form
10. Emergency Action Plans
11. Monthly EHS Report
12. Site Specific Safety Orientation Form
13. Lightning Safety Procedures
14. Pandemic Response Plan

PROJECT IDENTIFICATION

Client: NKT

Project Name: CHAMPLAIN HUDSON POWER EXPRESS
Site Location: Stony Point, NY; Congers, NY; Putnam Station, NY; Cementon, NY
NY Contractor: CALDWELL MARINE.
CALDWELL MARINE. Project Manager:
CALDWELL MARINE. Project Engineer:
CALDWELL MARINE. Site Superintendent:
CALDWELL MARINE. Site Safety Officer:

1.1 GENERAL SCOPE OF WORK

The work to be undertaken is associated with State of New York Public Service Commission Case 10-T-0139 for the Champlain Hudson Power Express project for the construction of a 1250 MW high voltage direct current circuit from the Canadian Border to New York City. The cable route extends approximately 330 miles over land and marine pathways.

For informational purposes, the EM&CP process for this project will be divided into multiple segments to allow for approvals of work supporting the overall project schedule for completion.

Caldwell Marine International, LLC (CMI) will utilize a variety of heavy equipment including excavators/loaders, barges, crew boats, HDD rig, mud mixing equipment, separation plant, etc. and other equipment and hand tools during this project.

The drilling aspect of the operation will be performed by Huxted Trenchless, LLC (HUX). Caldwell Marine International, LLC (CMI) will provide marine support, permanent materials, supervision, and management of the operation.

2 INTRODUCTION

2.1. SCOPE & APPLICATION OF SSHASP

The purpose of this Site-Specific Health and Safety Plan (SSHASP) is to define the requirements and designate protocols to be followed by CALDWELL MARINE during construction activities on the **Horizontal Directional Drilling at Shoreline Crossings - Segment One EM&CP.**

Applicability extends to CALDWELL MARINE personnel, subcontractors, governmental authorities/officials, and visitors that enter the site while construction activities are occurring. For the purposes of this SSHASP, the term "site" will be used to identify construction areas associated with and around the CALDWELL MARINE work areas.

All site personnel, on-site contractors and subcontractors included (hereafter referred to as "project personnel"), will be provided with a site orientation including the site emergency response procedures and any potential fire, explosion, health, or safety and environmental hazards associated with the operations. The Site-Specific Orientation form in *Attachment 12* will be completed for each orientation given. This SSHASP summarizes those hazards, and defines protective measures planned for the site. In the event that other potential hazards arise or are recognized after the project begins, the SSHASP will be updated accordingly as discussed in Section 2.3.

This plan must be reviewed by all project personnel, and an agreement to comply with the requirements contained herein must be signed by all project personnel and visitors who may enter the work areas prior to commencement of work. See *Attachment 1*.

During development of this plan, consideration was given to current safety standards as defined by OSHA; primarily in the Construction Industry Standards, 29 CFR 1926 and General Industry Standards, 29 CFR 1910, as applicable.

In addition to this SSHASP, CALDWELL MARINE. has established a comprehensive Corporate Health & Safety Manual based on past experience, sound engineering practices, employee training and enforcement of Safety and Health regulations, to prevent incidents and injuries. A copy of the Health & Safety Manual will be available on site.

2.2 Key EHS Performance Indicators

Measuring Key Performance Indicators (KPIs) is an important part of ensuring the effectiveness and efficiency of an EHS Management System. These KPIs allow EHS professionals and company leaders to collect data and communicate trends, which can then be used to identify where further improvements are needed.

A key performance indicator is a metric that is tied to a predetermined target and represents how far it exceeds or falls below that target. KPIs provide the company with objective data about their EHS performance, ensuring adequate feedback on the effectiveness of safety initiatives and policies.

KPIs should include leading and lagging indicators of performance to be most effective. KPIs will be developed for this project which include measures of safety performance, e.g., total recordable incident rate, lost time incident rate, number of restricted and days away from work; safety inspections and action items completed; safety training and meetings completed.

The Monthly EHS Report in *Attachment 11* will be completed for each month the project is in the field.

2.3 APPLICABILITY TO VISITORS & AUTHORITIES

In addition to this Site-Specific Health & Safety Plan, visitors to the site will be expected to comply with all Federal and State requirements. All project personnel, visitors, and authorities will provide and care for their own protective equipment or arrange to acquire PPE from their employer.

In the event that any project personnel, visitor, or authority does not adhere to the provisions of the SSHASP, he/she will be requested to leave the work site or area. All non-conformance incidents will be recorded in the log by Site Supervision, or his and will be reported to CALDWELL MARINE management immediately.

2.4 IMPLEMENTATION OF CHANGES TO SSHASP

If the project team determines changes to the SSHASP are required, the SSHASP Revision Form, provided as *Attachment 1*, will be completed. The proposed revision will be reviewed by the CALDWELL MARINE Project Manager and Site Safety Officer (SSO). If the revision is acceptable, it will be signed by the key project personnel and included in the control copy of the SSHASP as maintained by the SSO. In addition, approved SSHASP revisions will be discussed during the next daily safety tailgate meeting by the SSO.

2.5 SAFETY TRAINING & EDUCATION

Training is essential to assure employees or subcontractors recognize the hazards inherent in their work and understand the means and methods used to eliminate or control hazards, including engineering methods, administrative and work practices, warning systems, and personal protective equipment. Training will also be provided

to assure that employees or subcontractors understand the proper use of work equipment and tools and how to maintain the equipment to assure continued safety.

Training will be provided before employees or subcontractors are assigned to new or different work activities and periodically to re-enforce their awareness. Where required, annual refresher training will be provided. Management is responsible for assuring safety training is made available to all employees or subcontractors as required by their specific work activities. It is the responsibility of Site Superintendent (SS) to assure that employees or subcontractors have the required training to perform their work safely. All employees and supervision will be required to attend New Hire/ Supervisor Training. This will include HSE induction and specific HSE training appropriate to the work being performed.

Employees or subcontractors will be required to have attended an initial OSHA 10-Hour class. Proof of training must be available in the form of an OSHA 10-hour "wallet" card, or a certificate of attendance submitted by the company providing the training (they must be an OSHA accepted trainer). Note: At the discretion of SSO, company employees who do not possess an OSHA 10hr card with be provided a reasonable amount of time to meet this requirement.

Initial and periodic refresher training will include at a minimum the following topics:

- Employee conduct
- Inspection of safety devices and protective equipment
- Exposure to hazardous substances
- Clothing
- Personal protective equipment
- Injuries and incident reporting
- Emergency information
- Housekeeping
- Smoking Policy
- Grounding
- Fall protection
- Excavation Safety
- Ladder Safety
- Welding, burning, cutting (i.e., Hot Work)

Daily "toolbox" talks will be held to discuss safety requirements for current work and to "refresh" awareness of general safety topics. The Site Superintendent in conjunction with safety personnel will select the most appropriate topics to review during the "toolbox" talks. Attendance at these meetings mandatory. All site personnel shall attend, and focus shall be to discuss that day's work and associated risks and mitigations. The meeting shall be documented and signed by each attending person.

3 IDENTIFICATION OF KEY PERSONNEL AND MANAGEMENT

3.1 KEY SITE PERSONNEL CONTACTS

Title	Person	Contact Phone Numbers
CALDWELL MARINE Project Executive (PE)	*Thomas F. Ulisse*	(732) 620-3470
CALDWELL MARINE Project Manager (PM)	*Brett Bailey*	(732) 620-8197
(CALDWELL MARINE.) Site Superintendent(s) (SS)	*Paul Larrabee - Water Side* *Brett Bryant - Land Side*	(732) 620-3938 (732) 620-4214
(CALDWELL MARINE.) Site Safety Officer(s) (SSO)	*Lucky Abernathy* (TBD)	(908) 433-3755 (TBD)

3.2 ROLES AND RESPONSIBILITIES

The Site Superintendent (SS) has overall responsibility for ensuring that the project is implemented according to specifications. As the representative of the general contractor, the Project Superintendent has the responsibility to follow this SSHASP and implement the steps necessary to protect the health and safety of workers on site, including review of subcontractors' safety performance. The SS will establish and ensure compliance with site control areas and procedures and coordinate these responsibilities with the Site Safety Officer. The SS has responsibility for all field activities and reviews safe work practices. The SS also assures the safety of visitors who enter the site. The SS maintains communication with the project manager, site owner representatives and other client representative(s) as required.

The SSO and SS constitute the Safety Team and are responsible for day-to-day implementation of the SSHASP and have full authority regarding health and safety issues. The SSO will make recommendations to protect the health and safety of site personnel.

It is the responsibility of all employees for the recognition, evaluation and control of potential hazards that may exist at the site during the scope of the project covered by this SSHASP. As part of these responsibilities, the Health and Safety team is responsible for day-to-day implementation of health and safety activities. The daily activities include, but are not limited to, the following:

- Implementing this SSHASP
- Completing daily safety observations including any observations by non-supervisory workers. All workers should be reporting in writing via email, or a form any safety observations that are noticed.

- Record keeping related to worker/visitor qualifications, medical surveillance, training, and exposure/air monitoring
- Selection, use and modifications to personal protective equipment
- Communication of new hazards and appropriate controls
- Conduct daily morning safety/risk meetings with all site personnel

No activities are to take place on site without the knowledge of the SSO. In the event that the SSO is unavailable, the Site Superintendent will temporarily perform the duties of the SSO.

3.3 Subcontractor Responsibilities

OSHA Rules of Construction (29 CFR 1926.16)

Subcontractors will be pre-qualified to assure they meet the safety performance criteria, have policies and procedures for the tasks undertaken, and meet the training requirements for this project. All of the subcontractor's documentation will be reviewed and approved prior to being allowed to start their work.

Subcontractors are expected to follow all requirements of this SSHASP, their own SSHASP, as appropriate, and all Federal, State, and local health and safety requirements. If non-compliance or unsafe conditions or practices are observed, the work will be stopped. The subcontractor representative will be notified, and corrective action will be required. Work will not be allowed to continue until satisfactory mitigations have been implemented. The subcontractor will determine and implement necessary controls and corrective actions and provide documentation that corrective actions were taken within necessary timeframes. If repeat non-compliance/unsafe conditions are observed, the subcontractor will be required to stop affected work until adequate corrective measures are implemented.

4 HAZARD ANALYSIS/RISK ASSEMENT

OSHA Recommended Practices for Safety and Health Programs

Work activities on this project have the potential to present hazards which can result in serious risks for injuries and/or illnesses to workers. This section reviews the potential hazardous materials and physical hazards that may be encountered when performing activities on this project and the measures to be taken to reduce the risks. Individual Job Hazard Analyses for each of the major tasks are provided in *Attachment 3*.

4.1.1 Toxic/Hazardous Substances

As with any construction site, potentially hazardous materials can be generated by typical worksite activities. Some common types may include:

- Carbon monoxide from vehicle and generator exhaust
- Fuel and lubricants (e.g., gasoline, diesel fuel, hydraulic oil)
- Miscellaneous hazardous materials, e.g., solvents, cleaning agents, pesticides, etc.)
- Silica from concrete cutting, breaking and demolition operations.

Exposures will be evaluated, and controls implemented to assure that site personnel are not exposed above allowable exposure limits to any hazardous materials used or generated on site. Engineering, administrative and personal protective equipment will be used to assure site personnel are protected. Respiratory protection will be provided, if deemed necessary, in accordance with 29 CFR 1926.134 and Section 73 of the CALDWELL MARINE.'S Corporate Health & Safety Manual, (See *Attachment 6*).

Harmful silica dust may be generated from concrete cutting, breaking, demolition or other activities with materials containing crystalline silica and can cause lung damage and long-term illness. Exposure to silica containing materials, if applicable, will be assessed and controlled to avoid exposure. Wet techniques, and isolation barriers, if feasible, will be used to reduce generation of dust. Site personnel involved in these activities will be provided with adequate respiratory protection, e.g., N-95 or filtering face piece respirators with P-100 cartridges.

As this site may utilize various contractors/subcontractors, CALDWELL MARINE will coordinate among its contractors/subcontractors to assure that all contractors receive information about the hazardous materials that may be used on this project. All contractors/subcontractors will be required to submit Safety Data Sheets (SDSs) to CALDWELL MARINE for the chemicals they use on the site so the information may be communicated to all who may be affected. A complete inventory list of chemicals, including quantities of such chemicals that will be on site at all times.

4.1.2 Hazard Communication Program

OSHA Hazard Communication (29 CFR 1926.59)

A Safety Data Sheet (SDS) is required for all hazardous materials brought on site pursuant to 29 CFR 1926.59. The SSO will maintain a central file on site, accessible to all workers, which will contain an inventory of materials and SDSs for hazardous materials on site. See *Attachment 3*.

All site personnel working with hazardous materials will be trained, before first assignment, in accordance with 29 CFR 1926.59.

Each contractor and subcontractor will ensure that initial (at the time of assignment), and periodic, Hazard Communication Training will be provided to all employees or subcontractors regarding the hazardous chemicals in their work area. Whenever a chemical that poses a new or different type of hazard enters the work area it is the responsibility of each supervisor to ensure employees or subcontractors are trained. This training will include (but is not limited to) requirements of this program and a review of the SDS for that product for the following information:

a) Methods of detection and monitoring of the compound (including monitoring devices, appearance, and odor).
b) Each physical and health hazard that the material presents.

c) Personal protective equipment, work practices, and emergency procedures (i.e., fire, first aid, chemical spill, etc.) to be followed while handling.
d) The labeling system for hazardous materials will be legible and in English, but for non-English speaking employees or subcontractors the information will be presented in their language, as it relates to the material.
e) Location of the hazard communication program, listing of hazardous materials present, SDS's and host employees or subcontractors can obtain from the Site Safety Officer (SSO) and be uses to review the appropriate hazard information.

A. Task specific procedures for informing employees or subcontractors of the hazards of non-routine tasks, such as equipment maintenance or trailer pesticide application, etc., will be implemented whenever that task involves a hazardous chemical. Each Superintendent is responsible for either training each employee or scheduling such training with a responsible person prior to performing any non-routine task.

B. Training for non-routine tasks will include:

a) Items (a) through (d) above.
b) Special precautions for the non-routine task; and
c) Other company safety procedures which are relevant to the operation, such as Lockout/Tagout and Hot Work Permits, etc.

C. It is the responsibility of the Superintendent to ensure that all employees or subcontractors working on site are informed of any hazardous chemicals that they may be exposed to while working on the project. This information will include:

a) Existing hazardous chemicals
b) Hazardous chemical emissions for processes involved in the work
c) Precautions and personal protective equipment which must be worn in the area
d) Where and how to safely store

D. The Project Manager will be responsible for all actions of the prime contractor employees or subcontractors and will ensure that the subcontractor employees or subcontractors follow all safety precautions that would be used by CALDWELL MARINE employees or subcontractors.

Documentation of Training

Training must include labeling and SDS format including:

- Type of information the employee would expect to see on the new labels, including the Product identifier: how the hazardous chemical is identified. This can be (but is not limited to) the chemical name, code number or batch number. The manufacturer, importer or distributor can decide the appropriate product identifier. The same product identifier must be both on the label and in Section 1 of the SDS (Identification).

- Signal word: used to indicate the relative level of severity of hazard and alert the reader to a potential hazard on the label. There are only two signal words, "Danger" and "Warning." Within a specific hazard class, "Danger" is used for the more severe hazards and "Warning" is used for the less severe hazards. There will only be one signal word on the label no matter how many hazards a chemical may have. If one of the hazards warrants a "Danger" signal word and another warrants the signal word "Warning," then only "Danger" should appear on the label.

- Pictogram: OSHA's required pictograms must be in the shape of a square set at a point and include a black hazard symbol on a white background with a red frame sufficiently wide enough to be clearly visible. A square red frame set at a point without a hazard symbol is not a pictogram and is not permitted on the label. OSHA has designated eight pictograms under this standard for application to a hazard category.

- Hazard statement(s): describe the nature of the hazard(s) of a chemical, including, where appropriate, the degree of hazard. For example: "Causes damage to kidneys through prolonged or repeated exposure when absorbed through the skin." All of the applicable hazard statements must appear on the label. Hazard statements may be combined where appropriate to reduce redundancies and improve readability. The hazard statements are specific to the hazard classification categories, and chemical users should always see the same statement for the same hazards, no matter what the chemical is or who produces it.

- Precautionary statement(s): means a phrase that describes recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to a hazardous chemical or improper storage or handling.

- Name, address and phone number of the chemical manufacturer, distributor, or importer. How an employee might use the labels in the workplace.

- Explain how information on the label can be used to ensure proper storage of hazardous chemicals.

- Explain how the information on the label might be used to quickly locate information on first aid when needed by employees or subcontractors or emergency personnel.

- General understanding of how the elements work together on a label.

- Explain that where a chemical has multiple hazards, different pictograms are used to identify the various hazards. The employee should expect to see the appropriate pictogram for the corresponding hazard class.

- Explain that when there are similar precautionary statements, the one providing the most protective information will be included on the label.

- Training on the format of the SDS must include information on standardized 16-section format, including the type of information found in the various sections

- For example, the employee should be instructed that with the new format, Section 8 (Exposure Controls/Personal Protection) will always contain information about exposure limits, engineering controls and ways to protect yourself, including personal protective equipment.

- How the information on the label is related to the SDS

- For example, explain that the precautionary statements would be the same on the label and on the SDS.

  Whenever training is provided to employees or subcontractors or contractors in accordance with this policy, the individual(s) responsible for providing this training will collect the names (printed), signatures and Social Security numbers of all attending individuals, and the dates and times of the training. Utilize the training roster located at the end of this program. Note that OSHA requires the employee's SSN.

  Equipment operators, general laborers, Superintendents, and management, etc., must be trained prior to being allowed to participate in or supervise field activities. The training should cover the use of personal protective equipment. The training should also cover work practices which minimize hazardous risks and safe use of engineering controls & equipment.

  Upon completion of training, forward a copy of the training roster and copies of any additional training material used to the Safety Director. Certificates of training and/or wallet cards will be produced and sent back to the location where the training was performed. These should be presented to the employees or

subcontractors for their personal records. Documentation of all training performed will be submitted to human resources for inclusion into the individual's personnel records. Maintain a copy of all training records and certificates at the facility or job site, as a record that training was performed as required by OSHA.

Labeling

It is the responsibility of each employee to ensure that, prior to use, all containers of potentially hazardous chemicals used are labeled, tagged, or marked with:

a) The identity of the hazardous material, i.e., common and/or chemical name, and Chemical Abstract Service (CAS) Registry Number, including the name that appears on the SDS
b) An appropriate hazard warning, which gives an immediate warning and summary of the more important information from the SDS. In those cases where non-English speaking employees or subcontractors are working at jobsites information will be presented in their language also.
c) **Note:** Chemical materials supplied to outside contractors by CALDWELL MARINE must be labeled, tagged, or marked as identified above.

The outside shipping container label may contain the same information as the immediate chemical container unless that label conflicts with the label(s) required by the Department of Transportation (DOT) for the transportation of hazardous materials.

An employee may transfer or place a hazardous chemical into another "secondary use." That "secondary use" container must be labeled immediately to reflect the by the employee who transfers the product.

The contents of a chemical container that is not labeled appropriately may not be used or put into service, unless it is relabeled appropriately, or the user is given specific approval from a responsible person. Labels already on any chemical container at any location, and used for any purpose, may not be removed, or defaced unless the contents of the container changes.

Signs, placards, standard operating procedures (SOP's), or similar written material may be used instead of placing a label on stationary containers, as long as the written document conveys the same information as is required on a label and is readily accessible to each applicable employee during their normal working shift. This alternate labeling procedure will only be used after review by the Safety Director

for each individual situation. Labels will be legible, in English. However, for non-English-speaking employees or subcontractors, information may be presented in their language as well.

4.2 Physical Safety Hazards

OSHA General Duty Clause, OSH Act of 1970, Section 5 (a)(1)

Construction sites may also present numerous potential physical safety hazards. As such, workers must be aware of these hazards and exercise caution at all times. All unsafe conditions must be reported immediately to the SSO. While it is important to identify and be aware of potential physical hazards and the means by which to reduce their risks, not all hazards can be predicted. Although a task-by-task analysis of potential hazards is included in the sections below, the recognition, evaluation, and control of site activities associated with the potential hazards is best accomplished by the development, use, and implementation of standard operating procedures and guidelines, as well as ongoing review of applicable standards and regulations. This Site-Specific Health & Safety Plan, as well as CALDWELL MARINE's Corporate Health and Safety Manual (*Attachment 6*), provide safe operating procedures for activities covered by the scope of work for this project.

This section assesses the physical safety hazards that may be encountered on this project. These include, but are not limited to:

- Excavations, holes, ditches, trenches, and other subsurface work
- Sharp objects, such as nails, metal piping and shards, and broken glass
- Slips/Trips/Falls
- Working near heavy equipment (Backhoes, cranes, dump trucks and other material handling equipment), vehicular traffic
- Lightning
- Electrical
- Material handling
- Hand and power tools
- Noise
- Heat and cold stress
- Fire
- Confined Space
- Hot Work

Safety/physical hazards associated with work on this project are presented in detail below.

4.2.1. Electrical

OSHA Electrical (29 CFR 1926, Subpart K)

OSHA Electrical, Wiring design and protection (29 CFR 1926.404)

Overhead power lines, downed electrical wires, and buried cables all pose a danger of shock or electrocution if contacted or severed during site operations. A minimum distance of 10 feet will be present between overhead wires and equipment. This distance will vary according to voltage; the greater the voltage, the greater the clearance between any part of the equipment and the power line Refer to ***Table 4 - Minimum Clearance from Energized Overhead Electrical Lines***. When required, a spotter will be utilized to maintain a safe distance between equipment and overhead wires. The basic rule is "Don't locate equipment in a position where it can come in contact with overhead power lines." Maintain the required distance from the lines. Overhead electrical power lines will be considered energized unless the person owning such line or operating officials of the electric utility supplying the line assures that it is not energized, and it has been visibly grounded.

Table 1 - Minimum Clearance from Energized Overhead Electrical Lines	
Nominal System Voltage	Minimum Rated Clearance
0 to 50 kV	10 Feet (3 m)
50 to 200 kV	15 Feet (4.5 m)
200 to 350 kV	20 Feet (6 m)
350 to 500 kV	25 Feet
500 to 750 kV	35 Feet
751 to 1000 kV	45 Feet
>1000 kV	(As established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution).

There are various means of insulating the wires, as well as barriers and alarms that may be available to reduce the risk of injury to workers, but the use of such devices does not change the requirements of any other applicable standards or laws. In addition, these, and other measures (such as grounding the equipment itself) may not be fully effective but may create a false sense of security. Only the utility company is authorized to de- energize, insulate, or handle the lines. No one else may attempt these operations.

Electrically powered equipment and tools may also pose a hazard. Whenever possible, workers will use low-voltage equipment with ground-fault circuit interrupters (GFCIs) and watertight, corrosion-resistant connecting cables to help minimize this hazard.

No employee will be permitted to work in the proximity of any part of an electrical power circuit unless the person is protected against electric shock by de-energizing the circuit and grounding it, or it has been locked and tagged out.

4.2.2. Heavy Equipment/Vehicle Traffic

OSHA Equipment (29 CFR 1926.600)
OSHA Operator Training, Certification, and Evaluation (29 CFR 1926.1427)

Considerations for controlling the movement of personnel and equipment in a construction area are vitally important to any project, as injuries may occur while working with or adjacent to such equipment. This category includes all operations that utilize moving heavy equipment: excavators, loaders, graders, dozers, and delivery/supply trucks. Site workers will take every precaution necessary to ensure the

safety of the public and the on-site personnel during traffic movement operations.

Site workers will adhere to all applicable standards and regulations while operating heavy equipment at the site. Operators will be trained and experienced in the use and maintenance of the equipment they are operating. Equipment will be inspected on a daily basis to identify any worn parts, and/or unsafe conditions. Any unsafe equipment will be removed from service until safety defects can be corrected. Equipment operators will not leave their machine unattended while it is running. Keys will be removed when equipment is not in use. All equipment will have electronic backup alarms. Each piece of equipment will be equipped with a minimum 5 lb. ABC fire extinguisher. No vehicles or equipment will be operated in a careless or unsafe manner. Personnel will wear high visibility reflective vests when working around equipment/vehicles. All personnel will stay a minimum of 4 ft clear of the operational area of the equipment.

During construction activities, it is often necessary to have a worker direct the operator. In these cases, close communication between the operator and the laborer is of critical importance. One designated person will give signals to the operator of both equipment and vehicles in the work area. Workers should not take any action unless they have made eye contact with the operator and clearly communicated their intentions. In addition, all machines will be equipped with back-up alarms, which are checked daily and repaired immediately. Truck traffic will be controlled by a competent flagger/spotter, as required.

4.2.3. Material Handling

OSHA Reference 29 CFR 1926.251
OSHA Electrical, Wiring design and protection (29 CFR 1926.404)

Various materials and equipment may be handled manually during project operations. Care should be taken when lifting and handling heavy or bulky items to avoid back and other joint injuries. At induction, the following fundamentals will be addressed in regard to the proper lifting techniques that are essential in preventing back injuries:

- The size, shape, and weight of the object to be lifted must first be considered. Multiple employees or subcontractors or the use of mechanical lifting devices are required for heavy objects.
- Based off the NIOSH Lifting Equation, the Occupational Safety and Health Administration (OSHA) recommends the weight limit for individual lifting be 50 pounds. When lifting more than 50 pounds, it is recommended to use a lifting device

or two or more people. Don't hold your breath while lifting.

- The anticipated path to be taken by the lifter should be considered for the presence of slip, trip, and fall hazards.
- The feet will be placed far enough apart for good balance and stability (typically shoulder width).
- The worker will get as close to the load as possible. The legs will be bent at the knees.
- The back will be kept as straight as possible and abdominal muscles should be tightened.
- Twisting motions should be avoided when performing manual lifts.
- To lift the object, the legs are straightened from their bending position.
- A worker will never carry a load that cannot be seen over or around.
-
- When placing an object down, the stance and position are identical to that for lifting. The legs are bent at the knees and the object lowered. When two or more workers are required to handle the same object, workers will coordinate the effort so that the load is lifted uniformly and that the weight is equally divided between the individuals carrying the load. When carrying the object, each worker, if possible, will face the direction in which the object is being carried. In handling bulky or heavy items, the following guidelines will be followed to avoid injury to the hands and fingers:
-
- A firm grip on the object is essential; leather work gloves will be used unless it is a sharp object. If sharp, cut resistant gloves will be used.
- The hands and object will be free of oil, grease, and water which might prevent a firm grip, and the fingers will be kept away from any points that could cause them to be pinched or crushed, especially when setting the object down.
- The item will be inspected for metal slivers, jagged edges, burrs, and rough or slippery surfaces prior to being lifted.

4.2.4 Hand and Power Tools

Hand and power tools will be used for various site activities. Procedures for using hand and power tools are as follows:

- Persons using power tools will be trained in their use.
- Ground Faults must be present on all electrical tools.
- Only tools in good condition will be used.
- Tools will be kept clean.
- Guards and shields will be kept on all tools.
- Air couplings will be secured with pins or tie-wire.
- Non-sparking tools will be used in hazardous areas, i.e., where flammables may be present.
- Task specific eye protection is critical when using power tools. At a minimum, safety glasses will be required during site operations. If projectiles are possible, full-face shields will be utilized in addition to the glasses.

4.2.5 Noise Exposure

OSHA Electrical, Wiring design and protection (29 CFR 1926.404)

Noise is generated during construction activities in such operations as transportation of materials, operation of heavy construction equipment and other construction equipment, e.g., compressors. Noise has been defined as unwanted sounds. The human ear can tolerate a certain amount of sound without any harmful effects. The OSHA standard allows 90 dB (A) for a full 8 hours and for a lesser time when the levels exceed 90 dB (A). It is usually safe to assume that if you need to shout to be heard at arms-length, the noise level is at 90 dB (A) or above. Hearing protection will be utilized by personnel operating or working around construction equipment or power tools or in marked and designated areas.

4.2.6 Excavation Safety/Protection of Underground Facilities

OSHA Specific Excavation Requirements (29 CFR 1926.651)
OSHA Requirements for Protective Systems (29 CFR 1926.652)
Pipeline Awareness Color Code Chart

This section outlines the basic hazards associated with excavation. Section 13 of CALDWELL MARINE's Corporate Health & Safety Manual, incorporated by reference in *Attachment 6* of this SSHASP, provides detailed procedures for excavation and trenching safety.

A competent person will be assigned for each excavation. The competent person will be trained and capable of identifying existing and predictable hazards in the surroundings or working conditions, which are unsanitary, hazardous, or dangerous to employees or subcontractors. The competent person will have the ability and authority to take prompt corrective measures to eliminate these conditions. The competent person will perform the following:

1. Have a complete understanding of the applicable safety standards and any other data provided.
2. Assure the proper locations of underground installations or utilities, and that the proper utility companies have been contacted.
3. Conduct soil classification tests and reclassify soil after any condition changes.
4. Determine adequate protective systems (sloping, shoring, or shielding systems) for employee protection.
5. Conduct all air monitoring for potential hazardous atmospheres if anticipated. Conduct daily and periodic inspections of excavations and trenches. Approve design of structural ramps, if used.

Prior to beginning any excavation work with mechanical equipment, the site must be marked out by the facility owner in compliance with NYS Industrial Code 753. The Site Superintendent will call in for marks At least **2 to 10 working days prior** to any mechanized work (does not include the date of the call) notice must be provided to the One-Call Notification System, which will transmit the project information to involved members so that they can mark the location of any facilities at the excavation site. Call for remarks every 10 days thereafter. The One Call Number inside New York State is

811 or 800-962-7962. Notification of cancellations must be made no later than the day of the scheduled work and no earlier than 24 hours before the scheduled work date. Confirmation numbers will be kept by the Project Manager in the main office on a running log. Dig Safely New York currently allows excavators to submit Survey and Design Requests via Exactix or by calling the operations center at 1-800-962-7962.

Callers must still contact the affected companies directly; however, Dig Safely New York will identify those affected companies and inform them of the design request, and provide the caller with a contact number for those affected companies. These contacts are often engineering departments that may be able to supply "as-built" maps and charts, which are more accurate.

Utility installations, such as sewer, telephone, fuel, electric or water line, etc. that may be encountered during excavation work must be delineated prior to opening an excavation and protected, supported, removed, or relocated as per standards, as directed by the on- site Representative, and as necessary to safeguard workers while the excavation is open.

The primary hazard encountered during soil excavation is the cave in of excavation sides with possible burial or crushing of workers. Causes of cave-ins may include: (a) absence of shoring, (b) misjudgment of stability, (c) defective shoring, and (d) undercut sides. Other potential hazards include falling during access/egress, while monitoring or dismounting equipment, or stumbling into excavation. An overhead hazard can result from material, tools, rock, and/or soil falling into the excavation. When applicable, adequate shoring or sloping of sides of the excavation will be provided. Excavation/trenches will be inspected daily for changing conditions.

Excavation spoils will be kept at least 2 feet from the sides of trenches. Excavation/trenches will be protected to avoid the possibility of someone falling into them. The use of raised berms, caution signs and caution tape will be instituted to protect both the public and other personnel on the site. The excavation area will be delineated with caution tape during operations and barricaded/secured with safety fence at the end of each workday. Adequate means of exit, such as ladders, steps, ramps, or other safe means of egress, will be provided and be within 25 feet of lateral travel.

Where personnel are required to enter excavations over 4 ft in depth, sufficient stairs, ramps, or ladders will be provided to require no more than 25 ft. of lateral travel. At least two means of exit will be provided for personnel working in excavations. Where the width of the excavation exceeds 100 ft. two or more means of exit will be provided on each side of the excavation.

Adequate precautions will be taken to avoid creating hazards due to accumulating water. Surface water will be diverted to prevent it from entering the excavation. Site personnel will not be allowed to work in excavations with accumulating water unless specific measure is taken to correct conditions. The competent person will monitor conditions and assure adequate measures are taken.

Support systems such as shoring, bracing, or underpinning will be used to assure the

stability of adjacent structures, sidewalks, and pavements to protect site personnel.

Barricades, guardrail systems, fences or similar equipment will be used to guard open excavations that are over 6 feet in depth to protect site personnel from falls.

Not expected for this project, however, for trenches over 20 feet in depth a shop drawing and design calculations, certified by a Professional Engineer, will be provided.

4.2.7 Slips/Trips/Falls

OSHA Walking-Working Surfaces (29 CFR 1910.28)
OSHA Fall Protection (29 CFR 1926, Subpart M)

Slip/trip/hit/fall injuries are among the most frequent of all injuries to workers. They occur for a wide variety of reasons, but all injuries can be prevented by the following prudent practices:

- Spot-check the work area to identify hazards.
- Establish and utilize a pathway, which is most free of slip and trip hazards.
- Beware of trip hazards such as wet floors, slippery floors, and uneven surfaces or terrain.
- Carry only loads, that you can see over.
- Keep work areas clean and free of clutter, especially in storage rooms and walkways.
- Communicate hazards to on-site personnel
- Secure all loose clothing, ties, and remove jewelry while around machinery.
- Report and/or remove hazards.
- Keep a safe buffer zone between workers using equipment and tools

Fall protection is required at elevations of **6 ft. or greater**. Examples of areas where employees or subcontractors may have to be protected include but are not limited to the following:

- Leading edges
- Hoist areas
- Holes in walk surface
- Framework and reinforcing steel
- Ramps, runways, and other walkways
- Excavations
- Working over dangerous equipment/water
- Roofing work on low or steep sloped roofs
- Precast concrete construction
- Wall openings
- Scaffolds
- Aerial lifts

4.2.8 Confined Spaces

OSHA Confined Spaces in Construction (29 CFR 1926, Subpart AA)

A Confined Space is a space that is large enough and so configured that an employee can

bodily enter and perform assigned work and has limited or restricted means for entry or exit (i.e., tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry/egress) and is not designed for continuous employee occupancy. Entry means the action by which a person passes through an opening into a confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon **as any part of the entrant's body breaks the plane of an opening into the space.**

Concrete vaults, RPZ drains, and basins are potential confined spaces. In the event that site personnel are required to enter a confined space, the confined space procedures in Section 12 of CALDWELL MARINE.'S Corporate Health & Safety Manual will be followed. Procedures include hazard assessment and control, permitting, training for personnel working on confined space entries, pre-job briefing, atmospheric testing and ventilation, personal protective equipment, rescue equipment and plans. A Confined Space Entry Permit form is provided in *Attachment 7*.

Copies of personnel training records, rescue equipment/procedures and proof of rescue arrangements will be submitted to CALDWELL MARINE's SSO prior to all confined space entries.

The following personnel and roles will be assigned to each confined space entry.

1) **Entry Superintendent:** CALDWELL MARINE employees or subcontractors or contractors assigned to entry Superintendent duties must be trained and qualified in CALDWELL MARINE confined space procedures. Certification of training in hazardous atmosphere testing equipment must be obtained.
2) **Attendant (Safety Observer):** The attendant (safety observer) must be trained, qualified, and designated by to perform the duties of an entry attendant. Note: One attendant is typically required for each specific confined space; attendants are not authorized to attend multiple confined space entries unless specific provisions are made prior to entry.
3) **Authorized Entrants:** Entrants into confined space must be trained, qualified, and authorized.

Duties of Entry Superintendent:

1) The Entry Superintendent must know the hazards faced during entry, including information on the mode, signs, and symptoms and consequences of exposure. An SDS or similar written material must be kept at the work site for any material to which the authorized entrant may be exposed.
2) The Entry Superintendent must verify that the appropriate entries have

been made on the confined space entry permit and that all specified tests have been conducted.

3) Verifies, by checking, that all procedures and equipment specified by the permit are in place, before signing the permit and allowing entry.
4) Terminates the entry and cancels the permit if the confined space hazard or conditions outside the confined space pose a hazard to the entrants.
5) Verifies that rescue services are available and that the communication with rescue services is readily available.
6) Removes unauthorized individuals who enter or who attempt to enter the confined space.
7) Reviews the confined space operation at intervals dictated by the hazard and the operation to ensure compliance with this policy.
8) Determines when responsibility for a permit space entry operation is transferred.
9) Reviews the Permit-Required Confined Space work, prior to commencement with the attendant, and entrants.
10) Designates qualified individuals to act as entrants and attendants.
11) Monitor the space and inform the entrants of the potential hazards and results; they must participate in the permit review and signing. Ventilation must be used & testing must be conducted before entry & during work.

Duties of Attendant:

1) The attendant must know the hazards that may be faced during entry, including information on the mode, signs, symptoms, and consequences of exposure.
2) An attendant must be on duty outside the confined space for the duration of entry operations.
4) The attendant must be aware of possible behavioral effects of hazard exposure in authorized entrants.

5) The attendant must maintain an accurate count of authorized entrants in the permit space and ensure that the entrants are properly identified and authorized on the permit.
6) The attendant must insure, by head count, that all authorized entrants have departed the confined space prior to closing out the permit or departing the confined space.
7) The attendant will contact emergency responders utilizing 9-1-1 if the attendant feels the entrants may need assistance to escape from hazards or may have displayed the effects of the hazards of the confined space.
8) The attendant will prevent unauthorized entry to the confined space.
9) The attendant will not attempt to rescue by entry into the confined space. Non-entry rescue attempt only is allowed.
10) The attendant will not vacate the area, for any reason, or perform any duty, which would prevent or inhibit the ability to communicate with the entrants.
11) The attendant will evacuate the confined space if:

a) The attendants detect a condition outside (i.e., an alarm, leak, etc.) which may endanger the entrants or any alarm condition on continuous monitoring equipment
b) The attendant detects a behavioral or symptomatic change in the entrant(s).
c) The attendant must leave the site or cannot comply with all the duties listed in this section.
d) The attendant cannot effectively communicate with the entrants.
e) The attendant is advised to vacate the confined space by a client representative or CALDWELL MARINE Superintendent.
f) The attendant determines that the entrant (s) is (are) not complying with personal protective equipment practices or safe work practices.

Duties of the Authorized Entrant:

1) The authorized entrant must know the hazards that may be faced during entry, including information on the mode, signs and symptoms and consequences of the exposure.
2) Properly use protective equipment and monitoring devices as specified.
3) Establish and maintain open communications with the attendant.
4) Alert the attendant if the entrant detects a prohibited or hazardous condition.
5) Alert the attendant and other entrants if the entrant notices any warning sign or change in behavior or symptom of exposure in any other entrant. The entrant will notify the entry Superintendent of the condition changes. The Superintendent will then cancel the existing permit and re-evaluate the space.
6) The entrant will immediately take action to evacuate the confined space if the entrant:
   a) Is directed to do so by the attendant, entry Superintendent or designated client representative.
   b) Detects a failure to comply with personal protective equipment requirements.
   c) Is unable to maintain effective communication with the attendant.
   d) Detects any alarm on continuous monitoring equipment.

A Confined Space Entry Permit (*Attachment 7*) will be completed as needed.

4.2.8.1 PERMIT REQUIRED CONFINED SPACE PREPARATION FOR ENTRY:

A. **Isolation:** The confined space must be removed from service and completely protected against the release of energy and material into the space.

B. All energy sources must be locked out.

C. All lines, pipes, hoses, intake vents, ducts, etc., leading to or from the confined space must be broken away in a manner which would prevent intake or through put of hazardous materials or energy: blanked, blinded, or sections removed.

D. Rotating equipment must be de-energized and locked out.

E. The confined space must be purged, flushed, ventilated, cleaned or inert to eliminate or control the hazardous atmosphere (**Note**: Inert Atmospheres create a hazard by displacing oxygen with an inert. Special care and ventilation prior to testing and entry must be exercised prior to entry. A SDS must also be provided and kept at the site for chemical-cleaning agents used in confined spaces. Confined spaces purged with steam or cleaned with hot water must be allowed time to cool to acceptable levels prior to the onset of entry).

F. Barriers to prevent pedestrian or vehicle entry, which could pose a hazard to entrants, must be erected.

G. Determine if the cover (if any) can be safely removed by the following:

1) Conduct exterior visual examination for existence of hazards, i.e., liquid, etc.
2) Test the atmosphere around the cover to determine the presence of hydrocarbons or toxic vapors.
3) Slowly open the cover to insure no existence of pressure, fluids, etc. If possible, atmospheric testing should be conducted.
4) Remove cover and visually inspect from the outside for the presence of hazards.
5) Conduct atmospheric testing in this exact manner
   (Note: Ventilation systems must be off for a minimum of 30 minutes prior to testing**):**
   a) Test atmosphere outside of confined space for oxygen content.
   b) Test atmosphere inside of confined space for oxygen content.
   c) Compare reading, a difference of –1% oxygen content inside of the confined space may represent 10,000 PPM or a toxic material.
   d) Oxygen content must be above 19.5% and below 23.5% for entry.
   e) Test for combustible gases must be below 2% LFL for entry.
   f) Test for toxic gases or vapors must read 0 Parts Per Million (PPM).

g) If testing falls outside of the parameters established above, a permit cannot be issued without elimination of hazard and retest.

h) Entrants or their representatives are to be given an opportunity to review and participate in the review and calibration of air monitoring data before entering.

i) Entrants must also be given the opportunity to participate in the permit review and signing.

H. Designate attendant and entrants as described in this procedure.

I. Provide all personal protective equipment.

J. Provide ventilation, (Refer to Section on Welding and Burning).

K. All lighting and electrical tools used in confined spaces must be connected to GFCI or reduced to 12 volts

L. All air-operated tools must be connected to breathing air quality air sources.

M. Discuss job requirements, emergency procedures and hazards with entrants, attendants, and client-designated representatives. Secure / issue proper confined space entry permit and appropriate work permit for confined space work (if required by client). Note: In spaces where multi employers are working in the same space, all of the above information will be discussed with those individuals entering the space and information gathered/discussed as to their purpose of entering the space. If for any reason it would increase the hazards to employees or subcontractors entering the space an effort to schedule different entry periods will be made.

N. Post copies of the permits; permit required confined space entry procedure, SDS and emergency procedures plan at the work site.

O. A permit required confined space may be declared and certified as a non-permit required confined space by following the procedures outlined in the Non-Permit Required Confined Space Procedure.

P. Periodic hazardous atmosphere monitoring will be conducted and logged on the confined space entry permit form.

Q. If the confined space is vacated, unattended, or recovered, visual inspection and re-testing of the space for hazardous atmosphere must be conducted.

R. Caution:

1) Hazards, such as welding fumes, electrical shock, flammable and toxic vapors, may be introduced to the confined space by work in the confined space.
2) Welding and cutting torches may not be left on and unattended. The source must be isolated prior to departing the confined space.

3) Adequate ventilation must be provided for welding, cutting, and burning work inside of confined spaces.

Employees or subcontractors or their representatives are entitled to request additional monitoring at any time.

Rescue Equipment/Procedures:

CALDWELL MARINE uses a tripod retrieval device in which the employee entering the space is "tied in" with a harness and lanyard system. The individual can be retrieved from the space by cranking the retrieval arm, therefore, hoisting the individual from the space. Under no circumstances is an individual to go inside the space to retrieve an individual. Typically, the space can be illuminated with flashlights carried by the occupying party. If not possible, other lighting arrangements will be made.

It should be noted that every time the individual leaves the confined space, testing procedures for the reentry must take place before the individual re-enters the space. These occurrences are to be documented as part of the entry permit and times including atmospheric readings are to be recorded.

The following equipment is to be provided to the crew:

- Testing and monitoring equipment including multi-gas detector (minimum: LEL/O2/CO/H2S) needed to determine if hazardous condition exist.
- Ventilation equipment to maintain gas and particulates below occupational exposure limits.
- Communication between personnel involved in the entry operation.
- Personal protective equipment insofar as feasible engineering and work practice controls does not adequately protect employees or subcontractors.
- Lighting equipment needed to enable employees or subcontractors to see well enough to work safely and to exit the space quickly in an emergency. Barriers and shields as required protecting the workers from

pedestrian and vehicular traffic.

- Ladders, needed for safe ingress and egress by authorized entrants.
- Rescue, Retrieval and Emergency equipment needed to extract or treat injured personnel, except to the extent that the equipment and or service are provided by rescue services that are immediately amiable.
- Any other equipment necessary for safe entry into and rescue from permitted spaces at our facility.
- Other equipment: Air Compressor (as required); Air Purifying Respirators (as required); Body Harness; Emergency escape breathing apparatus (as needed); Escape ladders for depths of 4 ft. or below; Extraction cable and lanyards; eye protection equipment; first aid kits; hand tools; head protection equipment; hearing protection equipment; Intrinsically safe lighting equipment (if in potential flammable/combustible atmosphere); lock out/tag out equipment (as required); Personal Protective clothing.

Arrangements will be made with public or private rescue services prior to beginning any permit required confined space work.

4.2.8.2 NON-PERMIT REQUIRED CONFINED SPACE ENTRY PROCEDURE

Determination of Permit-Required or Non-Permit Required Confined Space:
For permit-required confined spaces, CALDWELL MARINE must ensure that all exposed employees or subcontractors are made aware by posting signs or by any other effective means, of the existence and location of the danger posed by the permit-required space.

CALDWELL MARINE employees or subcontractors must consider all confined spaces meeting the definition of a confined space as a permit-required confined space, until a determination has been made by a trained, competent entry Superintendent or CALDWELL MARINE SSO.

CALDWELL MARINE employees or subcontractors will not enter the confined space until a determination has been made. Certification of non-permit required confined space determination will be provided to the CALDWELL MARINE, employees or subcontractors assigned to enter and must be kept at the job site.

Under no circumstances will CALDWELL MARINE, employees or subcontractors enter a Permit-Required Confined Space without a properly issued permit for entry. Work will not begin in the permit-required confined space until additional permits, e.g., hot work, have been issued.

B. The following steps must be taken, and the attached form be completed in determining the status of the confined space by the CALDWELL MARINE Entry Superintendent.

1) Entry covers must be safely removed.

2) A visual inspection, if possible, without entry must be performed to establish the absence of recognized hazards.

3) Install proper railing or temporary barrier that will prevent accidental fall through the opening.

4) Test internal atmosphere with a calibrated direct reading instrument for the following conditions.

5) ***NOTE: AIR MOVERS MUST BE TURNED OFF DURING ATMOSPHERIC TESTING AND THE TESTING MUST BE ACCOMPLISHED IN THE EXACT ORDER PRESENTED BELOW.***

a) Oxygen content – must be above 19.5% and below 23.5%.
b) Test for flammable gases and vapors – must be below 10% flammable limit (LFL).
c) Visually ascertain that no airborne combustible dust is present.
d) Test for the presence of H2S or other toxic contaminants.
e) **IF YOU ARE IN DOUBT OF RESULTS, CONTACT CALDWELL MARINE SSO FOR FURTHER INSTRUCTIONS**

C. The CALDWELL MARINE Entry Superintendent must complete the attached form and leave the form at the work site. In the event that multiple sites are involved, each site must be tested, and the results posted on the attached forms.

D. Ladders must be provided for egress and entry.

E. Coordinating entry operations for multi employers so that employees or subcontractors of one employer do not endanger the employees or subcontractors of any other employer.

F. A safety observer (attendant) must be assigned with clear communications capability with the non-permit confined space entrants. **THE ATTENDANT WILL NOT ATTEMPT TO RESCUE ENTRANTS WITHIN THE CONFINED SPACE BY ENTERING INTO THE CONFINED SPACE**.

G. The attendant must be knowledgeable of how to summon emergency response personnel.

H. Non-Permit Required Confined Spaces that are vacated for a period of 1 hour, suspended for any purpose, or suspected to have any change in atmosphere or condition, must be re-tested and the results annotated on the attached form.

I. Non-Permit Required Confined Spaces must be periodically monitored for changes in conditions by the Entry Superintendent.

J. Reviews of the permit space program, using the canceled permits retained for at least one year after each entry and revise the program as necessary, to ensure that employees or subcontractors are protected.

K. Failure of any re-test or changes in condition requires reclassification of the confined space as a Permit-Required Confined Space and must be noted on the attached form.

4.2.9 Welding and Cutting

OSHA 1926 Subpart J - 1926.350 Gas Welding and Cutting
OSHA 1926 Subpart J - 1926.351 ARC Welding and Cutting
OSHA 1926 Subpart J - 1926.352 Fire Prevention
OSHA 1926 Subpart J - 1926.353 Ventilation & Protection in Welding, Cutting and Heating
OSHA 1926 Subpart J - 1926.354 Welding, Cutting and Heating in Way of Preservative Coatings

Welding and cutting may be performed during the course of the project. When performed, the following requirements will be followed:

A. **Fire Prevention:**

1. Objects to be welded, cut, burned, or heated should be moved to a designated safe location when practical.
2. First aid equipment will be available at all times.
3. If the object to be welded or cut cannot be moved and if all the fire hazards cannot be removed, then guard's shields, fire blankets, etc. will be used to confine the heat, sparks, and slag and to protect the immovable fire hazards. Welding, cutting, burning, or heating operations must not be performed where the application of

4. flammable paints, compounds or heavy dust accumulation will present a hazard.
5. The proper fire extinguishing equipment and fire watch must be in place prior to the onset of work.
6. Gas supplies to torches must be shut off at a point, (preferably the source) outside of confined spaces.
7. Torches and hoses must not be left in confined spaces and excavations overnight.
8. Welding and cutting on used drums are prohibited unless the drums have been properly cleaned and purged of hazardous materials.
9. Hollow spaces, cavities and containers must be vented and purged with an inert gas before preheating, welding, or cutting.
10. In areas where either a flammable atmosphere or combustible materials may be present fire watch will be designated and will remain at the operation, plus a ½ hour after completion The fire watch is required during the following:
    a) Locations where other than a minor fire might develop.
    b) Combustible materials closer than 35ft. (10.7M) to the point of operation.
    c) Combustibles that are 35ft. (10.7M) or more away but are easily ignited.
    d) Wall or floor openings within 35ft. (10.7M) radius expose combustible materials.
    e) Combustible materials are adjacent to the opposite side of metal partitions, ceilings, or roofs.

    Note: 1. All persons performing fire watch duties will be trained in the proper use of fire extinguishing equipment and general fire watch duties.

    Note: 2. If the area has the potential for a flammable or explosive atmosphere LEL readings will be continuously monitored with a pre-calibrated instrument for that purpose.

    Note: 3 If fire hazards cannot be moved or guarded, welding and cutting operations will NOT be performed.

11. Hot work permits (*Attachment 8*) will be required for all burning, cutting, and welding operations by the Superintendent or designated SSO. A copy of the permit is attached to the end of this section.

B. **Gas Welding, Cutting and Burning.**

1. When transporting gas cylinders, they must be secured on a cradle

2. The cylinders must be secured and transported in a vertical position with the valve protective caps in place.
3. Unless cylinders are firmly secured on a special carrier intended for the purpose, regulators must be removed, and protective caps must be in place prior to movement.
4. An approved cylinder truck or chain must be sued to steady the cylinders while in use or storage.
5. The cylinder valve may be opened only when work is being performed.
6. All gas cylinders must be kept away from the actual welding or cutting operation and protected from sparks, hot slag, or flames.
7. Cylinders may not be placed where they may become a part of an electrical circuit.
8. Oxygen cylinders must be stored in an upright position, with regulators removed and safety caps installed.
9. Oxygen cylinders must be separated from fuel cylinders by a minimum of 20 feet.
10. All cylinders must be properly labeled with content and hazard warnings.
11. Cylinders must have fixed had wheels, keys, handles or a non-adjustable wrench on the valve stem.
12. Acetylene cylinders must never be opened more than 1 and 1/2 turns of the spindle
13. Before connecting a regulator to a cylinder valve, crack the valve open slightly and close to insure tight stop and no leakage. Do not stand in front of the valve when opening.
14. Fuel gas hose and oxygen hose must be easily distinguishable from each other. (Red hose for fuel gases, green hoses for oxygen and non-combustible gases black hose for inert gas and air).
15. All regulators, hoses, and valves must be kept free and clear of oil and other materials.
16. Parallel sections of oxygen and fuel hose that have been taped together must be taped with not more than 4 inches of tape each 12 inches.
17. Hoses in with noticeable or suspected defect must not be used.
18. All hoses, cables and other equipment must be kept clear of walkways and roadways.
19. Torches must be inspected each day for leaking shut off valves, hose couplings and tip connections.
20. Torches may be lit by friction lighters only.
21. All gauges, valves and pressure regulators must be in proper working order.

22. Cutting, welding, and burning may not be performed on surfaces with protective coatings applied without proper breathing zone ventilation or appropriate respiratory protection.
23. Proper protective equipment must be worn when performing welding, cutting, or burning.
24. Hoses must not be wrapped around an individual's body.
25. Workers in charge of oxygen or fuel-gas supply equipment (including distribution piping systems and generators) must be instructed and judged competent for such work.

C. **Arc Welding and Cutting.**

1. Employees or subcontractors assigned to operate arc welding equipment must be properly instructed and qualified to operate such equipment.
2. SDS for welding rods must be available in the CALDWELL MARINE. HAZCOM program.
2. Positive ventilation must be provided when welding and cutting are performed in a confined space, or respiratory protection must be provided. Proper ventilation or respiratory protection procedures must be used when evolution of hazardous fumes, gases, or dust is possible.
3. All ground connections will be inspected to ensure that they are mechanically sound and properly rated for the required current.
4. A ground return cable must have a safe current carrying capacity equal to or exceeding the specified maximum output of the arc-welding unit.
5. The frames of all arc welding machines must be grounded either through a third wire in the cable containing the circuit conductor or through a separate wire that is grounded at the source of the current.
6. Gasoline or propane fueled portable welding machines and auxiliary generators must have a positive ground before placing them in service.
7. Arc welding and cutting operations with must be screened with non-combustible or flameproof screens wherever possible.
8. Use only manual electrode holders specifically designed for arc welding and cutting.
9. All current carrying parts must be fully insulated against the maximum voltage encountered to ground.
10. All arc welding cables must be capable of handling the maximum current requirements of the work being accomplished.
11. Cables must be equipped with standard insulated connectors of a capacity at least equivalent to that of the cable.
12. Proper eye and face protection must be used when performing arc welding or cutting.

Note: 1. All employees or subcontractors assigned arc welding and cutting duties must be familiar with 29 CFR 1910.254, 29 CFR 252 (a), (b) and (c), and with fire prevention and protection, health protection and ventilation, and protection of personnel.

Note: 2. Operators of equipment should report any equipment defect or safety hazards and discontinue use of equipment until its safety has been assured. Repairs will be made only by qualified personnel.

Note: 3. Burners, welders and fire watch personnel should be licensed in accordance with jurisdiction of authority.

4.2.8 Weather & Lightning

OSHA Emergency Action Plans 1926 Subpart C 1926.35
OSHA Emergency Preparedness
OSHA Lightning Safety
OSHA Tornado Preparedness and Response

The procedures provided below will be used to protect site personnel from weather and lightning related injuries.

CALDWELL MARINE will consult the publicly available weather forecasts on a daily basis for the operation. Estimated operational limits for specific phases are shown in Table 7-1 of the Installation Manual. Lightening Safety Procedures are provided in *Attachment 13*.

Training

During one of the daily safety meetings weather emergencies will be discussed. This will be done to increase awareness to the hazards and prevention of weather and lightning related incidents.

Detection of Lightning

The Site Superintendent will be proactive in monitoring conditions that may produce thunderstorms and lightning. The weather forecast will be tracked and communicated to site personnel as often as necessary. When signs of impending storms, i.e., increasing wind, darkening skies, or lightening appear, local weather monitoring will be increased. The National Weather Service (www.nws.noaa.gov/) should be consulted frequently. Personnel will be notified when thunderstorms may impact the site.

The "flash/bang" (f/b) technique of measuring the distance to lightning will be reviewed with all personnel. The f/b technique is defined as: for each five seconds from the time of observing the lightning flash to hearing the associated thunder, the lightning is approximately one mile away.

Suspension/Resumption of Activities

All outside activities will be suspended when a lightning flash is immediately in the area, or a f/b of 20 seconds (4 miles away) is noted. Personnel may continue indoor work activities. Outdoor activities will resume when 30 minutes have passed since the last observable f/b is 20 seconds or greater.

Lightning Protection

When notification is given, all outside work activities will stop and personnel will gather in the support area for a head count and further instructions. Indoor work will continue, except for the use of electrical equipment, telephones, and computers. When a safe location is not present and personnel are caught by a sudden lightning event, employees or subcontractors should seek the lowest possible area, away from large objects which might attract lightning or fall over, e.g., trees, utility poles. The employee should assume a crouching position with their head lowered and hands over their ears. AVOID: WATER, HIGH GROUNDS, HEAVY EQUIPMENT AND TALL, ISOLATED OBJECTS.

First Aid

An employee that is struck by lightning needs immediate medical assistance (call 911). The body will not carry an electrical charge but receives a severe electrical shock and may be burned. Personnel certified in first aid/CPR should inspect for shock and burns around fingers, toes, buckles, and jewelry. Stay with the injured employee until medical help arrives.

4.2.9 Fires

If required, the SSO will establish areas approved for welding, cutting, and other hot work. Hot work must comply with the following Hot Work Procedures. A Hot Work Permit will be obtained from the SSO, if required. All personnel will be protected from welding radiation, flashes, sparks, molten metal, and slag. All welding, burning, and cutting equipment will be inspected daily by the operator. Defective equipment will be tagged and removed from service, replaced, or repaired, and re-inspected before being placed back in service. All welders will be properly trained in the safe operation of their equipment, safe welding/cutting practices, and welding/cutting respiratory and fire protection.

Where practical, all combustible material will be relocated at least 35 feet away from the hot work site. Where relocation is impractical, combustibles will be protected with flame proofed covers or otherwise shielded. At a minimum, two fully charged and operable fire extinguishers, appropriate for the type of possible fire (e.g., 10 lb. ABC), will be available at the work area. A fire watch will be required whenever hot work is performed and a minimum of 30 minutes after hot work is complete.

A hot work permit will be completed by the SSO, reviewed with personnel who will perform the hot work, and posted near the work area. The hot work permit is good only for the date issued and is valid only for the eight-hour shift for which it is issued. If at

any time during the hot work operation a change in conditions at the work site is suspected, such as a release of flammable gases or vapors in the work area, work will be stopped immediately and the SSO will be notified. Such work stoppage invalidates the hot work permit, and a new permit will be completed after inspections and tests have been performed by the SSO.

4.2.10 Dust Control

Control measures will be implemented for all operations where dust is likely to be generated. Careful planning and implementation of controls will reduce potential dust emissions. There are a number of possible construction practices which will reduce levels of airborne particulates. These include:

- Providing for a misting spray during excavation activities.
- Applying water on and sweeping haul roads.
- Spraying mist on buckets during material handling and dumping.
- Hauling materials in properly tarped or watertight containers.
- Reducing the active work area surface and limiting the number of concurrent operations.
- Avoiding dry sweeping.

4.2.11 Noise Control

Noise levels will be controlled to meet applicable OSHA standards for workers. Applicable noise ordinances will be observed nearby residents and off-site community.

5 SAFETY TRAINING AND EDUCATION

5.1. OSHA TRAINING

All site personnel will have the required OSHA training pertaining to the work they are conducting. Copies of training certificates will be available upon request. The CALDWELL MARINE. Site Superintendent will have a minimum of the OSHA 30 Hour Construction training. All laborers will have a minimum of the OSHA 10 Hour Construction training.

Content for new hire and periodic training is outlined in Section 2.4 of this Plan.
All contractors and visitors at this site are expected to comply with all applicable government safety, health, and environmental regulations, as well as company policies. Worker protection standards include, but are not limited to:

OSHA Construction Standards (29 CFR 1926), such as -

- Subpart C - General Health & Safety Provisions
- Subpart D - Occupationnel Noise Exposure (1926.52)
- Subpart E - Personal Protective and Life Saving Equipment
- Subpart F - Fire Protection

-
- Subpart G - Signs, Signals and Barricades
- Subpart J - Welding & Cutting
- Subpart M - Fall Protection

Should there be a conflict between this plan and any of the above-mentioned standards, the more stringent provisions will be followed until a proper evaluation can be made to determine the appropriate course of action.

Site Safety Orientation

All site personnel and visitors will be provided with a Site Safety Orientation when they arrive on site and before they enter a work zone. The Site Safety Orientation will be conducted by the SSO or designee and will be documented on the form in *Attachment 8.* The Site Safety Orientation will generally include an overview of the project, current activities, emergency procedures/evacuation routes, assembly areas and notification, PPE requirements, and general site rules.

5.2. TOOLBOX SAFETY MEETINGS

Site Safety Meetings, also called Toolbox Safety Meetings, will be presented to all site personnel just prior to the onset of each initial work activity and performed daily at the beginning of each shift. It will be the responsibility of the SSO or designated representative to conduct these meetings. Toolbox Safety Meetings are mandatory for all project personnel. At the conclusion of the meeting, each individual will be required to sign the Field Safety Meeting attendance log.

The SSO and SS will determine the topics based on activities to be conducted that day and any incidents or items identified during previous days. These topics will include, but are not limited to, PPE requirements, chemical hazards, physical hazards, emergency procedures, weather concerns (if applicable), injury/incidents and trends, and any other special considerations.

6. PERSONAL PROTECTIVE EQUIPMENT

OSHA Personal Protective Equipment

The SSO will assure personal protective equipment is regularly inspected by the user (e.g., before each use) and in accordance with manufacturers' recommendations. Equipment that fails inspection will be removed from service immediately and replaced with equivalent equipment.

Site personnel wearing protective equipment will be trained in the proper use, inspection, and maintenance of the equipment.

Activities on this project have been assessed for PPE requirements. Minimum personal PPE on this site includes eye protection, work boots, hard hat, and reflective vest at all times. Specific requirements include:

- Hard hat
- Safety glasses with side shields
- Face shield (when exposed to projectiles)
- Safety work boots (e.g., composite toe)
- High visibility reflective warning vest
- Hearing protection (working around heavy/noisy equipment)
- Work gloves

The need for respirators will be assessed prior to exposure to dust producing materials, e.g., concrete/silica. Workers requiring use of respirators will be evaluated to assure they are medically cleared to wear respirators and fit tested to assure an effective seal. N-95 filtering facepiece respirators, where appropriate, will be used to minimize exposure. Respirators will be maintained, and filters will be changed as necessary to assure they remain effective in protecting site personnel.

Fall protection is required at elevations of **6 ft. or greater**. Requirements for fall protection are listed in Section 4.2.7.

The SSO will ensure that each worker who is exposed to the hazards of flames (hot work) or electric arcs does not wear clothing that could increase the extent of injury. Flame retardant/resistant clothing will be designed and maintained in accordance with ASTM 1506 or NFPA 1975 requirements. Clothing made from the following types of fabrics, either alone or in blends, are prohibited: acetate, nylon, polyester, rayon. Proper inspection of PPE requires several steps depending upon specific type of PPE and its frequency of use. The different steps of inspection are as follows:

- Inspection and operational testing of equipment received from the factory or distributor.
- Inspection of equipment as it is issued to workers.
- Inspection before each use
- Inspection after use or training and prior to maintenance.
- Periodic inspection of stored equipment.
- Periodic inspection when a question arises concerning the appropriateness of the selected equipment, or when problems with similar equipment arise.
- Inspection for tears and punctures.

7 EMERGENCY ACTION PLAN & PROCEDURES

OSHA Emergency Action Plans (29 CFR 1910.38)

This section describes contingencies and emergency planning procedures to be implemented at the site. *Attachment 10* of this plan includes Emergency Action Plans for the project.

Directions to the hospital will be posted on site when this SSHASP is in effect.
Emergency procedures will be posted and covered in daily site briefings.

7.1 PRE-EMERGENCY PLANNING

The Site Superintendent will ensure that the appropriate lines of communications have been established with local hospitals, government agencies and other emergency response organizations prior to site activities. Site workers and visitors will be notified of the emergency response plan, communication systems, and evacuation routes during orientation.

7.2 PERSONNEL ROLES AND LINES OF AUTHORITY

The Site Superintendent and SSO have primary responsibility for responding to and correcting emergency situations. This includes taking appropriate measure to ensure the safety of site personnel and the public. Possible actions may involve evacuation of adjacent personnel. Additionally, they are responsible for ensuring that corrective measures have been implemented, appropriate authorities notified, and follow up investigation reports completed. All incidents involving injury to site personnel (beyond first aid), or the public and significant property damage will be reported to CALDWELL MARINE management and Engineer in Charge within 8 hours of occurrence. Major incidents involving hospitalization or fatality will be reported immediately.

7.3 EMERGENCY CONTACTS & NOTIFICATION SYSTEMS

The following table provides names and telephone numbers for emergency contact personnel. It will be posted where the nearest phones are located. In the event of any emergency situation including but not limited to Fire, Medical, Haz Mat Spill, ETC. Emergency Services will be notified so the appropriate response personnel can be activated.

All incidents involving injury to site personnel (beyond first aid), or the public and significant property damage will be reported to CALDWELL MARINE management, NKT and Engineer in Charge within 8 hours of occurrence. Major incidents involving hospitalization or fatality will be reported too all personnel listed above immediately. Initial Incident Investigation reports will be completed within 24 hours.

Organization/ Responsibility	Contact	Telephone
Police		911
Fire		911
Hospital (see Attachment 4)	Attachment 4	Attachment 4
US Coast Guard	VHF-FM Channel 16 (156.8 MHz), dial 911 Northern New England -Lake Champlain Emergency: (207) 767-0303 Sector New York - Hudson River Emergency: (718) 354-4353	
(CALDWELL MARINE) Project Manager	See Page 9	See Page 9
(CALDWELL MARINE) Site Superintendent	See Page 9	See Page 9
(CALDWELL MARINE.) Site Safety Officer	See Page 9	See Page 9
Engineer in Charge	See Page 9	See Page 9

7.4 EMERGENCY EQUIPMENT & FACILITIES

The following emergency equipment will be available:

- First aid kit
- Fire extinguishers near areas of welding and torch burning; outside flammable liquid storage areas
- Portable eye wash near any areas of chemical use or splashing
- Mobile phone and/or two-way radio
- Oil absorbing spill pads and booms

Successful communications between personnel on site is essential. The following communications systems may be used to communicate in the event of an emergency.

- . Two-way radios on appropriate channel
- . Air horns (see below)
- . Cellular phone or hardwired phone

Air Horn Alerts

Signal	Definition
One long blast	Attention
Two long Blasts	Leave when possible
Three long Blasts	Leave area IMMEDIATELY (EMERGENCY Situation)
Repeated Short Blasts	Send Backup Support

Fire and Other Emergency Events

When a fire or emergency event is discovered:

Activate the nearest fire alarm (if installed) or sound the emergency signal on the project by **three long blasts** of the air horn.
Notify the local Fire Department by calling 9-1-1
Notify your Superintendent immediately.

Fight the fire ONLY if:

The Fire Department has been notified.
The fire is small and is not spreading to other areas.
Escaping the area is possible by backing up to the nearest exit.
The fire extinguisher is in working condition and personnel have been trained to use it.

Upon being notified about the emergency, site personnel must:

Leave the affected area using the designated evacuation routes. Assemble in the designated area established in advance. Remain outside the affected area until the Superintendent and or designated authority announces that it is safe to reenter. The Superintendent or supervisor will account for all employees or subcontractors using the project's employee roster or attendance record to ensure all employees or subcontractors evacuated the area. In the event an employee is unaccounted for, the emergency response agency will be notified of the missing employee.

7.5 Directions to Hospital

A map with directions to the nearest hospital is displayed in *Attachment 4.* Copies of the

map will be posted in the site trailer. The SSO or designated alternative will drive the hospital route before field activities begin to verify that the route is acceptable and unobstructed by other construction activities.

7.6 First Aid and Medical Attention

Medical personnel will be made available for advice and consultation on matters of occupational health and provisions will be made prior to beginning the project for prompt medical attention in case of serious injury.

First aid supplies will be available at the project trailer and made available as needed. The contents of the first aid kit will be in a weatherproof container with individual sealed packages for each type of item and will be checked before being sent out to the job site and at least weekly to ensure that the expended items are replaced.

A telephone for contacting necessary ambulance service will be provided.

A portable eye wash will be maintained in any area where employees or subcontractors may be exposed to corrosive materials or materials which could injure the eyes.

8 FIRE PROTECTION & PREVENTION

OSHA 1926 Subpart J - 1926.352 Fire Prevention

8.1 General Requirements

A fire protection program will be maintained throughout all phases of the project. Access to all available firefighting equipment will be maintained at all times and will be conspicuously located. All firefighting equipment will be periodically inspected and maintained in operating condition. Defective equipment will be immediately replaced.

A "No Smoking On-Site" policy is in effect on this site for all personnel. Failure to comply with this policy will result in action to assure that future non-conformances will not occur. There will be no designated smoking areas on the site.

8.1.2 Fire Extinguishers

A fire extinguisher, rated not less than 10B, will be provided within 50 feet of wherever more than 5 gallons of flammable or combustible liquids or 5 pounds of flammable gas are being used on the jobsite. This requirement does not apply to the integral fuel tanks of motor vehicles. Travel distance from any point of the protected area to the nearest fire extinguisher will not exceed 100 feet and will be protected from freezing.

Portable fire extinguishers will be inspected periodically and maintained in accordance with *Maintenance and Use of Portable Fire Extinguishers*, NFPA No.

10 and OSHA 1926.150. Fire extinguishers which have been listed or approved by a nationally recognized testing laboratory (e.g., UL, FM Global), will be used.

The Site Superintendent or designee will conduct a visual inspection of fire extinguishers on at least a monthly basis.

8.1.3 Fire Alarm Devices

An alarm system, e.g., cell phone, will be established on the site so the local fire department can be alerted for an emergency. Site personnel will be alerted via 3 long blasts on an air horn. The alarm code and reporting instructions will be conspicuously posted at phones and at employee entrances.

8.1.4 Ignition Hazards

Electrical wiring and equipment for light, heat, or power purposes will be installed in compliance with the requirements of OSHA 1910.26, Subpart K, *Electrical*.

Internal combustion engine powered equipment will be located so that the exhausts are well away from combustible materials.

Smoking will be prohibited at or in the vicinity of operations which constitute a fire hazard and will be conspicuously posted: "No Smoking or Open Flame."

Portable battery powered lighting equipment, used in connection with the storage, handling, or use of flammable gases or liquids, will be of the type approved for the hazardous location.

8.1.5 Open Yard Storage

Combustible materials will be kept stable and no higher than 20 feet. Method of piling will be solid wherever possible and in orderly and regular piles. No combustible material will be stored outdoors within 10 feet of a building or structure.

Driveways between and around combustible storage piles will be at least 15 feet wide and maintained free from accumulation of rubbish, equipment, or other articles or materials. Driveways will be so spaced that a maximum grid system unit of 50 feet by 150 feet is produced.

The entire storage site will be kept free from accumulation of unnecessary combustible materials. Weeds and grass will be kept down, and a regular procedure provided for the periodic cleanup of the entire area. When there is a

danger of an underground fire, that land will not be used for combustible or flammable storage.

Portable fire extinguishing equipment, suitable for the fire hazard involved, will be provided at convenient, conspicuously accessible locations in the yard area. Portable fire extinguishers, rated not less than 2A, will be placed so that maximum travel distance to the nearest unit will not exceed 100 feet.

8.2 Flammable and Combustible Liquids

8.2.1 General Requirements

Only approved containers and portable tanks will be used for storage and handling of flammable and combustible liquids. Approved metal safety (e.g., UL, FM Global) cans will be used for the handling and use of flammable liquids in quantities greater than one gallon, except that this will not apply to those flammable liquid materials which are highly viscid (extremely hard to pour), which may be used and handled in original shipping containers. For quantities of one gallon or less, only the original container or approved metal safety cans will

be used for storage, use, and handling of flammable liquids.

Flammable or combustible liquids will not be stored in areas used for exits, stairways, or normally used for the safe passage of people.

8.2.2 Storage Outside Buildings

Storage of containers (not more than 60 gallons each) will not exceed 1,100 gallons in any one pile or area. Piles or groups of containers will be separated by a 5-foot clearance. Piles or groups of containers will not be nearer than 20 feet to a building.

Within 200 feet of each pile of containers, there will be a 12-foot-wide access way to permit approach of fire control apparatus.

The storage area will be graded in a manner to divert possible spills away from buildings or other exposures or will be surrounded by a curb or earth dike at least 12 inches high. When curbs or dikes are used, provisions will be made for draining off accumulations of ground or rainwater, or spills of flammable or combustible liquids. Drains will terminate at a safe location and will be accessible to operation under fire conditions.

Outdoor portable tank storage:

i. Portable tanks will not be nearer than 20 feet from any building. Two or more portable tanks, grouped together, having a combined capacity in excess of 2,200 gallons, will be separated by a 5-foot-clear area. Individual portable tanks exceeding 1,100 gallons will be separated by a 5-foot-clear area.
ii. Within 200 feet of each portable tank, there will be a 12-foot-wide access way to permit approach of fire control apparatus.

Storage areas will be kept free of weeds, debris, and other combustible material not necessary to the storage.

Portable tanks, not exceeding 660 gallons, will be provided with emergency venting and other devices, as required by chapters III and IV of NFPA 30-2018, *The Flammable and Combustible Liquids Code*.

Portable tanks, in excess of 660 gallons, will have emergency venting and other devices, as required by chapters II and III of *The Flammable and Combustible Liquids Code*, NFPA 30-2018.

At least one portable fire extinguisher having a rating of not less than 20-B units will be located not less than 25 feet, nor more than 75 feet, from any flammable liquid storage area located outside.

At least one portable fire extinguisher having a rating of not less than 20-B:C units will be provided on all tank trucks or other vehicles used for transporting and/or dispensing flammable or combustible liquids.

8.2.3 Dispensing Liquids

Areas in which flammable or combustible liquids are transferred at one time, in quantities greater than 5 gallons from one tank or container to another tank or container, will be separated from other operations by 25-feet distance or by construction having a fire resistance of at least 1 hour. Drainage or other means will be provided to control spills. Adequate natural or mechanical ventilation will be provided to maintain the concentration of flammable vapor at or below 10 percent of the lower flammable limit.

Transfer of flammable liquids from one container to another will be done only when containers are electrically interconnected (bonded).

Flammable or combustible liquids will be drawn from or transferred into vessels, containers, or tanks within a building or outside only through a closed piping system, from safety cans, by means of a device drawing through the top, or from a container, or portable tanks, by gravity or pump, through an approved self-

closing valve. Transferring by means of air pressure on the container or portable tanks is prohibited.

The dispensing units will be protected against collision damage. Dispensing devices and nozzles for flammable liquids will be of an approved type.

8.2.4 Handling Liquids at Point of Final Use

Flammable liquids will be kept in closed containers when not actually in use.

Leakage or spillage of flammable or combustible liquids will be disposed of promptly and safely.

Flammable liquids may be used only where there are no open flames or other sources of ignition within 50 feet of the operation, unless conditions warrant greater clearance.

8.2.5 Service and Refueling Areas

Flammable or combustible liquids will be stored in approved closed containers, in tanks located underground, or in aboveground portable tanks.

The tank trucks will comply with the requirements covered in the *Standard for Tank Vehicles for Flammable and Combustible Liquids*, NFPA No. 385-2022.

The dispensing hose will be an approved type, and the dispensing nozzle will be an approved automatic-closing type without a latch-open device.

Clearly identified and easily accessible switch(es) will be provided at a location remote from dispensing devices to shut off the power to all dispensing devices in the event of an emergency.

Heating equipment of an approved type may be installed in the lubrication or service area where there is no dispensing or transferring of flammable liquids, provided the bottom of the heating unit is at least 18 inches above the floor and is protected from physical damage.

Heating equipment installed in lubrication or service areas, where flammable liquids are dispensed, will be of an approved type for garages, and will be installed at least 8 feet above the floor.

There will be no smoking or open flames in the areas used for fueling, servicing fuel systems for internal combustion engines, receiving or dispensing of flammable or combustible liquids. Conspicuous and legible signs prohibiting

smoking will be posted.

The motors of all equipment being fueled will be shut off during the fueling operation.

Each service or fueling area will be provided with at least one fire extinguisher having a rating of not less than 20-B:C located so that an extinguisher will be within 75 feet of each pump, dispenser, underground fill pipe opening, and lubrication or service area

9 SECURITY, ILLUMINATION and HOUSEKEEPING

OSHA General Duty Clause

9.1 ILLUMINATION

Site operations will cease in time to permit personnel to exit the work area and secure the site prior to dusk. Conversely, operations will not begin until lighting is adequate at dawn. If work schedules require work outside of these parameters, then portable light plants sufficient to provide adequate lighting will be provided. (Headlights from vehicles and equipment generally do not provide sufficient illumination to conduct work safely.)

Construction areas, ramps, runways, corridors, offices, shops, and storage areas will be lighted to not less than the minimum illumination intensities listed in the Table below.

MINIMUM ILLUMINATION INTENSITIES IN FOOT-CANDLES

Foot-Candles	Area of Operation
5	General construction area lighting.
3	General construction areas, concrete placement, excavation and waste areas, access ways, active storage areas, loading platforms, refueling, and field maintenance areas.
5	Indoors: warehouses, corridors, hallways, and exit ways.
5	Tunnels, shafts, and general underground work areas: (Exception: minimum of 10 foot-candles is required at tunnel and shaft heading during drilling, mucking, and scaling. Bureau of Mines approved cap lights will be acceptable for use in the tunnel heading)

10	General construction plant and shops (e.g., batch plants, screening plants, mechanical and electrical equipment rooms, carpenter shops, rigging lofts and active storerooms, mess halls, and indoor toilets and workrooms.)
30	First aid stations, infirmaries, and offices.

For areas or operations not covered above, refer to the American National Standard A11.1-1965, R1970, or latest edition, *Practice for Industrial Lighting*, for recommended values of illumination.

9.2 HOUSEKEEPING & SANITATION

To minimize potential accidents the site will be maintained in a generally clean condition. Waste materials will be disposed of in approved waste containers or roll-offs.

The site will be set up so as to be reasonably free from significant safety hazards. Wires and hoses will be positioned so they do not obstruct or present a safety hazard in walkways and evacuation routes.

An adequate supply of potable water will be provided. Portable containers used to dispense drinking water will be capable of being tightly closed and equipped with a tap. Any container used to distribute drinking water will be clearly marked as to the nature of its contents and not used for any other purpose. Where single service cups (to be used but once) are supplied, both a sanitary container for the unused cups and a receptacle for disposing of the used cups will be provided.

Toilets will be provided for employees or subcontractors according to the following table:

Number of employees or subcontractors	**Number of Toilets**
20 or less	1
20 or more	1 toilet seat and 1 urinal per 40 workers.
200 or more	1 toilet seat and 1 urinal per 50 workers.

Under temporary field conditions, provisions will be made to assure not less than one toilet facility is available. The requirements for sanitation facilities will not apply to mobile crews having transportation readily available to nearby toilet facilities. Washing facilities will be maintained in a sanitary condition with adequate soap or hand sanitizer.

10 INSPECTION PROGRAM

Work areas will be inspected on a periodic basis. The SSO or alternate will utilize a checklist when performing these inspections. Inspections will be documented at least weekly and kept available for inspection with the SSO records. Site should be inspected for hazards daily by all personnel and reported as per policy. A Construction Safety Inspection Checklist form is included in *Attachment 9.*

11 TRAFFIC CONTROL

Manual on Uniform Traffic Control Devices (MUTCD)

Protection of the public and site personnel working on roadways during this project are of the highest concern. Minimizing impacts to traffic is also a primary concern. Objectives for maintaining safety and reducing traffic concerns include:

1. Providing a high level of safety for workers, motorists, pedestrians, bicyclists and persons with disabilities in the highway work zone
2. Minimizing congestion and community impacts by maintaining acceptable levels of service as close as possible to preconstruction levels.
3. Providing a feasible design of highway traffic control during highway operations.
4. Providing contractors with access to the roadway that is adequate to complete the work efficiently while meeting the quality requirements of the contract.
5. Keeping the cost as low as possible, consistent with safety and an appropriate degree of convenience for the public.

11.1 Flagger Training

New York State Department of Transportation requires that all flaggers be adequately trained in flagging operations by recognized training programs, including the American Traffic Safety Services Association, the National Safety Council, unions, or construction industry associations, or by an individual who holds a current certification as a flagger training instructor from such a program. Prior to the start of flagging operations, CALDWELL MARINE or its subcontractors will provide to a list of certified flaggers to be used in the operation, identifying the source of flagger training for each individual. When requested, flaggers will demonstrate their competency in flagging procedures. Flaggers not competent in flagging procedures will be retrained or replaced at once.

12 MATERIAL HANDLING, STORAGE, USE AND WASTE DISPOSAL

EPA Land, Waste and Cleanup Topics

The following procedures provide a process for waste management planning and promote the development of more coherent and appropriate waste management. It is the responsibility of each individual on site to follow CALDWELL MARINE. policies and procedures for managing waste.

1. CALDWELL MARINE will estimate the waste that will be generated prior to work being performed so that the need for containers and waste removal can be determined. Trash and scrap materials will be considered waste.

2. Waste materials will be properly stored and handled to minimize the potential for a spill or impact to the environment. During outdoor activities, receptacles will be covered with a tarp to prevent dispersion of waste materials and to control the potential for run-off.

3. CALDWELL MARINE will properly segregate waste materials to ensure opportunities for reuse or recycling.

4. All site personnel will be instructed on the proper disposal method for wastes. This will include general instruction on disposal of non-hazardous wastes, trash, scrap materials, and waste oils. If wastes generated are classified as hazardous, employees or subcontractors will be trained to ensure proper disposal. This training will be conducted during the site orientation and conducted by the Site Superintendent or his designee.

5. Waste management planning will be continuously reviewed and revised to assure site safety and to meet regulatory requirements.

Section 8 of this SSHASP outlines storage and handling requirements for potentially flammable and combustible materials to prevent the possibility of fires.

General materials storage and disposal requirements for this project include the following:

1. All materials stored in tiers must be stacked, racked, blocked, interlocked, or otherwise secured to prevent sliding, falling or collapse.
2. When a difference in road or working levels exist, means such as ramps, blocking or grading will be used to ensure safe movement of vehicles between two levels.
3. Non-compatible materials will be segregated in storage.
4. All bagged materials will be stacked by stepping back the layers and cross keying the bags at least every 10 bags high.
5. All used lumber will have all nails withdrawn before stacking.
6. All structural steel, poles, pipe, bar stock and other cylindrical materials, unless racked, will be stacked, and blocked to prevent spreading or tilting.
7. All scrap lumber, waste materials and rubbish will be removed from the immediate work area, as the work progresses.

8. Disposal of waste material and debris by burning is forbidden.
9. Storage areas will be kept free from accumulation of materials that constitute hazards from tripping, fire, explosion, or pest harborage. Vegetation control will be exercised when necessary.

The work area will be surrounded by a silt fence.

Specific procedures for handling of spoil piles, HDD cuttings, and Drilling Fluids are provided in the CALDWELL MARINE project Installation Manual.

Section 74 of CALDWELL MARINE's Corporate Health & Safety Manual (*Attachment 6)* provides detailed procedures for rigging and hoisting of materials. All such procedures will be closely adhered.

13 SIGNS, SIGNALS AND BARRICADES

OSHA Specifications for accident prevention signs and tags (29 CFR 1910.145)

Signs, signals, and barricades are important, if not critical, to the safety of the construction workers. Several important definitions are applicable to this subpart:

Barricade means an obstruction to deter the passage of persons or vehicles.

Signs are the warnings of hazard, temporarily or permanently affixed or placed, at locations where hazards exist.

Signals are moving signs, provided by workers, such as signalers, or by devices, such as flashing lights, to warn of possible or existing hazards.

Tags are temporary signs, usually attached to a piece of equipment or part of a structure, to warn of existing or immediate hazards.

13.1 Accident Prevention Signs and Tags

13.1.1 General

Signs and symbols will be visible at times when work is being performed and will be removed or covered promptly when the hazards no longer exist.

13.1.2 Danger Signs

Danger signs will be used only where an immediate hazard exists.

Danger signs will have red as the predominating color for the upper panel; black outline on the borders; and a white lower panel for additional sign wording (see accompanying figure).

13.1.3 Caution Signs

Caution signs will be used only to warn against potential hazards or to caution against unsafe practices.

Caution signs will have yellow as the predominating color; black upper panel and borders; yellow lettering of "caution" on the black panel; and the lower yellow panel for additional sign wording. Black lettering will be used for additional wording.

Standard color of the background will be yellow, and the panel, black with yellow letters. Any letters used against the yellow background will be black. The colors will be those of opaque glossy samples as specified in Table 1 of American National Standard ANSI Z53.1-1967 (see accompanying figure).

13.1.4 Exit Signs

Exit signs, when required, will be lettered in legible red letters, not less than 6 inches high, on a white field and the principal stroke of the letters will be at least three-fourths inch in width.

13.1.5 Safety Instruction Signs

Safety instruction signs, when used, will be white with green upper panel with white letters to convey the principal message. Any additional wording on the sign will be black letters on the white background (see accompanying figure).

13.1.6 Directional Signs

Directional signs, other than automotive traffic signs specified in the paragraph below, will be white with a black panel and a white directional symbol. Any additional wording on the sign will be black letters on the white background.

13.1.7 Traffic Signs

Construction areas will be posted with legible traffic signs at points of hazard.

All traffic control signs, or devices used for protection of construction workers will conform to AASHTO MUTCD 2010 Edition, *Manual on Uniform Traffic Control Devices.*

13.1.8 Accident Prevention Tags

Accident prevention tags will be used as a temporary means of warning employees or subcontractors of an existing hazard, such as defective tools, equipment, etc. They will not be used in place of, or as a substitute for, accident prevention signs.

Specifications for accident prevention tags similar to those shown below will apply.

Basic Stock (Background)	Safety Colors (Ink)	Copy Specification (Letters)
White	Red	Do Not Operate
White	Black and Red	Danger
Yellow	Black	Caution
White	Black	Out of Order Do Not Use

13.1.9 Additional Rules

American National Standards Institute ANSI Z35.1-1968, *Specifications for Accident Prevention Signs*, and ANSI Z35.2-1968, *Specifications for Accident Prevention Tags*, contain rules which are additional to the rules prescribed in this section. The employer will comply with these ANSI standards with respect to rules not specifically prescribed in this subpart.

13.2 SIGNALING

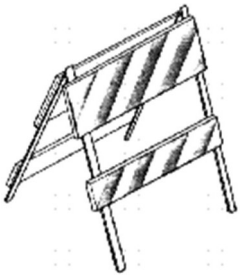
13.2.1 Signalers

When operations are such that signs, signals, and barricades do not provide the necessary protection on or adjacent to a highway or street, signalers or other appropriate traffic controls will be provided.

Signaling directions by signalers will conform to AASHTO MUTCD 2010 Edition, *Manual on Uniform Traffic Control Devices.*

Hand signaling by signalers will be by use of red flags at least 18 inches square or sign paddles, and in periods of darkness, red lights.

Signalers will be provided with and will wear a red or orange warning garment while flagging. Warning garments worn at night will be of reflectorized material.



13.2.2 Crane and Hoist Signals

Regulations for crane and hoist signaling will be found in applicable American National Standards Institute standards and CALDWELL MARINE Safety Manual.

13.3 BARRICADES

Barricades for protection of employees or subcontractors will conform to AASHTO MUTCD 2010 Edition, *Manual on Uniform Traffic Control Devices,* portions relating to barricades. Pedestrian barricades will be of the type pictured below or equivalent.

Pedestrian Barricade

ATTACHMENT 1

Plan Acknowledgement & Revision Forms

ATTACHMENT 1

The following individuals acknowledge that they have read and understand this Site-Specific Health and Safety Plan:

Print Name	Signature	Company	Date

Site Specific Health & Safety Plan
Revision Form

Project Name: _____ **Project No.** _____

Amendment No. _____ **Date:** _____

Amendment Revises: Page:_____ **Section:** _____

Task(s) Amendment Affects*:

_____

_____

*(*Attach new/revised Job Safety Analyses*)

Reason For Amendment:

_____

_____

_____

_____

Amendment:
(Attach separate sheet(s) as necessary)

_____

_____

_____

_____

_____

_____

_____

_____

_____

Completed by: _____ **Approved by:** _____

_____ _____

ATTACHMENT 2

JOB SAFETY ANALYSES

JOB SAFETY ANALYSIS FOR HANDING DRILL STEM – LOAD/UNLOAD				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Loading/Unloading HDD Drill Stem	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects	Hard hats, safety glasses, hearing protection, cut resistant/work gloves, safety shoes/boots; high visible vest for all tasks in this JSA	
	Strains/Sprains Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment to move large, awkward loads	Cut Resistant or Leather gloves	
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85dBA 8 HR TWA	Hearing Protection	
	Slips, Trips, Falls	• Clear walkways, work areas of equipment, vegetation, excavated material, tools, and debris • Mark, identify, or barricade other obstructions		
	Caught In/ Between Moving Parts	• Identify and understand parts of equipment which may cause crushing, pinching, rotating or similar injuries • Assure guards are in place to protect from these parts of equipment during operation • Provide and wear proper work gloves when the possibility of crush, pinch, or other injury may be caused by moving/stationary edges or objects • Maintain all equipment in a safe condition • Keep all guards in place during use • De-energize and lock-out machinery before maintenance or service		
Powered Industrial	Struck	• Personnel will know transport route and how		

JOB SAFETY ANALYSIS FOR HANDING DRILL STEM – LOAD/UNLOAD				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Trucks (for lifting materials)	By/Struck Against Overhead Hazards	equipment will be transported prior to the move; the pathway will be made clear of any obstacles. • Trained/certified personnel will operate the forklift. Training verification will be on site and a copy or certification will be available. • Forklifts will be inspected by the operator prior to use and transport of equipment. • Slings and shackles will be adequately rated for lifting and transporting materials and equipment • Rigging equipment (i.e., slings, chackles, etc..) will be inspected prior to and during use by the competent person. • Loads will be slightly lifted off the ground to test rigging & detect any shift before lifting load. • Spotters/Flaggers will be utilized when equipment is transported. Spotter will observe for any overhead hazards when transporting equipment. • Areas where forklifts will be in operation will be free from excess materials and a clear path will be in place. • Personnel will stay clear of forklift during transport. 		

JOB SAFETY ANALYSIS FOR CONFINED SPACE ENTRY – FRAK TANK/BARGE				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Confined Space Entry	Slips, Trips, Falls	• Clear walkways, work areas of equipment, vegetation, excavated material, tools, and debris around space • Mark, identify, or barricade other obstructions • Evaluate fall hazards above 4 ft.; use fall protection equipment (harness/lanyard), standard guardrails or other fall protection systems when working on elevated platforms above 6 ft. • Use 'heavy duty industrial' (type IA) fiber glass ladders • Secure straight/extension ladders	Hard hats, safety glasses, hearing protection, work gloves, safety shoe/boots; high visible vest (applies to all tasks for this JSA unless otherwise noted)	
	Fire/ Explosion	• Eliminate sources of ignition from the work area • Prohibit smoking • Provide ABC (or equivalent) fire extinguishers in all work, flammable storage areas and with fuel powered generators and compressors • Store flammable liquids in well ventilated areas • Prohibit storage, transfer of flammable liquids in plastic containers • Post "NO SMOKING" signs • Store combustible materials away from flammables • Store all compressed gas cylinders upright, caps in place when not in use • Separate Flammables and Oxidizers by 20 feet minimum	Portable fire extinguisher	LEL/O_2 Meter
	Flammable, Toxic, Oxygen deficient Atmospheres	• Test confined space atmosphere for flammable/toxic vapors, and oxygen deficiency • Obtain Confined Space Entry Permit signed by Supervisor/Safety Officer • De-energize, lock-out and tag all energized equipment • Establish rescue plan and resources • Review emergency procedures before work commences • Review hazardous properties of possible contaminants with entrants and attendant	Portable ABC fire extinguisher	LEL/O_2/CO/ H2S meter

JOB SAFETY ANALYSIS FOR CONFINED SPACE ENTRY – FRAK TANK/BARGE				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
		• Provide attendant outside space • Wear proper level of PPE for the type of atmospheric contaminants • Use body harness, safety belt with tripod winch for possible rescue		
	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present • Review hazardous properties of possible contaminants with workers before operations begin • Monitor breathing zone air to determine levels of contaminants	Tyvek coveralls, nitrile gloves, latex, or neoprene boots (see Section 5.0 HASP)	LEL/O_2/CO/ H2S meter
	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use	Leather or cut resistant gloves	
	High/Low Ambient Temperature	• Monitor for Heat/Cold stress • Provide fluids to prevent worker dehydration • Follow work/rest schedule in the safety plan	Insulated Clothing (subject to ambient temperature)	Meteorological Equipment

JOB SAFETY ANALYSIS FOR CRANES / HOISTING / RIGGING ACTIVITIES				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Rigging Activities	Overhead Utilities	• Identify all utilities around the site before work commences • Utility clearance shall conform with 29 CFR 1926.955 Guard or de-energize electrical sources before crane operations begin	Hard hats, safety glasses, hearing protection, work gloves, safety shoe/boots; high visible vest for all tasks in this JSA	
	Rigging Equipment	• Identify the proper rigging equipment for the type of lift • Inspect rigging devices to verify slings, chains, straps are free from defects and rated for the lift weight • Prohibit use of equipment with missing documentation tags, or defective equipment • Ensure taglines are free of knots and defects • Review rigging techniques, positioning of load, tag lines with workers involved in rigging activities • Use qualified riggers. Training verification will be kept onsite. • Loads will be slightly lifted off the ground to test rigging & detect any shift before lifting load.	Cut Resistant or Leather gloves	
	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects	Cut Resistant or Leather gloves	
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads	Cut Resistant or Leather gloves	
Hoisting and Lifting Crane Operation Inspections		• Verify the crane annual inspection and maintenance log • Perform required daily crane inspections, of wire ropes sheaves, drums, rigging hardware and attachments	Cut Resistant or Leather gloves	

JOB SAFETY ANALYSIS FOR CRANES / HOISTING / RIGGING ACTIVITIES				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
		• Perform daily inspection of mechanical, hydraulic operations crane • Use manufacture's inspection checklist		
Hoisting and Lifting Pre-lift Meeting		• Hold mandatory pre-lift meeting and complete lift worksheet • Determine if the lift is a critical lift • Assign lift or critical lift supervisor and a signaler for the lift • Calculate lift / load capacities using crane operations manuals and load capacity charts • Review lift hand signals with operator, signaler, supervisor, and work crew		
Crane Operation	Struck By/ Against Heavy Equipment	• Wear reflective warning vests when exposed to vehicular traffic • Isolate crane swing areas • Make eye contact with operators before approaching equipment • Prohibit all personnel from work activities in the blind swing areas of the crane • Test lift objects if center of gravity or similar critical factors are uncertain • Never lift any object if weights are unknown • Never stand under a suspended load	Warning vests, hard hat, safety glasses; safety shoes/boots	
Tag Lines	Cut/Lacerations	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by tag lines • Prohibit looping / winding tag lines around hands or body • Prohibit positioning, moving load using tag lines	Cut Resistant or Leather gloves	
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) Assess noise level with sound level meter if possibility exists that level may exceed 85dBA 8 HR	Hearing Protection	

JOB SAFETY ANALYSIS FOR CRANES / HOISTING / RIGGING ACTIVITIES				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
		TWA		
	Slips, Trips, Falls	• Clear walkways, work areas of equipment, vegetation, excavated material, tools, and debris • Mark, identify, or barricade other obstructions		
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads	Cut Resistant or Leather gloves	
	Struck By/Struck Against Overhead Hazards	• Provide detailed lift plans along with this JHA; lift plan will contain a cut sheet of the crane being used, copy of annual inspections, copy of current crane operator license, weights of loads, and percentage of crane capacity being used during the lift) prior to crane coming on site. • The weight of lifts will not exceed 75% of the crane's capacity. • Spill kit will accompany crane while on site. • Barricade swing radius using caution tape and safety cones. • Complete Safe Work Permits (e.g., Crane Lift) • Use certified crane operators. • Use qualified and competent persons to conduct all assembly/disassembly of crane components. • Place poly boards under crane outriggers. • Outriggers fully extended. • Inspect each crane prior to use by the operator. • Use a qualified signal person for all lifts. Training verification will be onsite. • Restrict location of boom so that it is not within 20 ft of overhead lines.		

JOB SAFETY ANALYSIS FOR CRANES / HOISTING / RIGGING ACTIVITIES				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
		• Use two-way radios for communication during each lift. • Stay clear of load. Nobody shall place any part of their body under a suspended load. • Use tag lines to control loads. • Suspend the lift if wind exceeds 25 MPH or at first sign of lightening		

JOB SAFETY ANALYSIS FOR DIVING OPERATIONS		
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**
Diving Operations	Drowning Respiratory and circulatory problems; lack of air Decompression sickness (DCS, the "bends") Nitrogen narcosis Hypothermia	• Follow all requirements in OSHA's Commercial Diving standards (29 CFR Part 1910, Subpart T) • Perform a site-specific risk assessment with the involvement of the diving crew before each dive. • Each dive team member will have the experience or training necessary to perform assigned tasks in a safe and healthful manner. Divers will be medically qualified. • All dive team members will be trained in cardiopulmonary resuscitation and first aid (American Red Cross standard course or equivalent). A properly stocked First Aid kit and AED will be immediately available. Emergency and rescue plans will be available before each dive. • Have appropriate breathing air gas mixtures. Routine periodical inspection and testing of cylinders. Analysis of oxygen fraction of gas before use, particularly if cylinder has been stored for a long time. Periodic air quality testing of compressors. • Divers must follow strict decompression procedures. • A DPIC will be at the dive location in charge of all aspects of the diving operation. • Diving with two (2) divers in the water requires a minimum of four (4) dive team members as follows: designated person-in-charge (DPIC), a standby diver, and two (2) divers • Two (2) divers must be in continuous visual contact of each other or connected by a buddy line. The two (2) divers do not require a tending line to the surface unless they are required to work against a current exceeding one (1) knot. • When required or deemed necessary, one (1) tending line to the surface is sufficient when the two (2) divers are connected by a buddy line. • The standby diver can be the DPIC provided that he/she is a qualified diver, and that the fourth dive team member is trained and capable of performing all necessary functions of the DPIC while the DPIC is in the water as the standby diver. • The standby diver can also be the tender provided that he/she is a qualified diver; in this case the DPIC would assume tending duties when the standby diver is in the water. • De-energize, lockout, tagout all equipment being serviced or repaired. Equipment Specific LOTO procedure and A Safe Work Permit will be used.

JOB SAFETY ANALYSIS FOR EXCAVATION LOADER/MUD PIT/SAETY FENCE				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Excavation/Mud Pit/Safety Fence/Backfilling	Underground/ Overhead Utilities	• Identify all utilities around the site before work begins • Cease work immediately if unknown utility markers are uncovered • Use manual excavation within 2 feet of known utilities • Utility clearance shall conform with 29 CFR 1926.955 (high voltage >700 kv) 15 feet phase to ground clearance; 31 feet phase to phase clearance	Hard hats, safety glasses, hearing protection, work gloves, safety shoe/boots; high visible vest (applies to all tasks for this JSA unless otherwise noted)	
	Excavation Wall Collapse	• Construct diversion ditches or dikes to prevent surface water from entering excavation • Provide good drainage of area adjacent to excavation • Collect ground water/rainwater from excavation and dispose of properly • Store excavated material at least 2 feet from the edge of the excavation; prevent excessive loading of the excavation face • Provide sufficient stairs, ladders, or ramps when workers enter excavations over 4 feet in depth • Place ladders no more than 25 feet apart laterally • Treat excavations over 4 feet deep as potential confined spaces if located in area of potential contaminants • Monitor atmosphere for flammable/toxic vapors, and oxygen deficiency if contamination possible • Slope, bench, shore, or sheet excavations over 5 feet deep if worker entry is required • Assign a competent person to inspect, decide soil classification, proper sloping, correct shoring, or sheeting • Inspect excavations (when personnel entry is required) daily, whenever conditions change		LEL/O2 meter (if potential contaminants)

JOB SAFETY ANALYSIS FOR EXCAVATION LOADER/MUD PIT/SAETY FENCE				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
	Struck By/ Against Heavy Equipment	• Wear reflective warning vests when exposed to vehicular traffic • Isolate equipment swings areas		
		• Make eye contact with operators before approaching equipment • Understand and review hand signals		
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads		
	Slips, Trips, Falls	• Clear walkways, work areas of equipment, vegetation, excavated material, tools, and debris • Mark, identify, or barricade other obstructions • Use heavy duty industrial (type IA) ladders • Secure straight/extension ladders		
	Caught In/ Between Moving Parts	• Identify and understand parts of equipment which may cause crushing, pinching, rotating or similar injuries • Assure guards are in place to protect from these parts of equipment during operation • Provide and use proper work gloves when the possibility of crush, pinch, or other injury may be caused by moving/stationary edges or objects • Maintain all equipment in a safe condition • Keep all guards in place during use • De-energize and lock-out machinery before maintenance or service		
	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use	Cut resistant gloves	

JOB SAFETY ANALYSIS FOR EXCAVATION LOADER/MUD PIT/SAETY FENCE				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85dBA 8 HrTWA	Ear plugs	Sound Level Meter
	High/Low Ambient Temperature	• Monitor for Heat/Cold stress in accordance with Safety Plan • Provide fluids to prevent worker dehydration • Follow work/rest schedule in Safety Plan	Insulated Clothing (subject to ambient temperature)	Meteorological Equipment or Weather App

JOB SAFETY ANALYSIS FOR RECEIVING EQUIPMENT/MATERIALS				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Rigging Activities	Overhead Utilities	• Identify all utilities around the site before work commences • Utility clearance shall conform with 29 CFR 1926.955 Guard or de-energize electrical sources before crane operations begin	Hard hats, safety glasses, hearing protection, work gloves, safety shoe/boots; high visible vest (for all tasks in this JSA; additional PPE noted as need)	
	Rigging Equipment	• Identify the proper rigging equipment for the type of lift • Inspect rigging devices to verify slings, chains, straps are free from defects and rated for the lift weight • Prohibit use of equipment with missing documentation tags, or defective equipment • Ensure taglines are free of knots and defects • Review rigging techniques, positioning of load, tag lines with workers involved in rigging activities • Use qualified riggers. Training verification will be kept onsite. • Loads will be slightly lifted off the ground to test rigging & detect any shift before lifting load.	Cut Resistant or Leather gloves	
	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects	Cut Resistant or Leather gloves	
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads	Cut Resistant or Leather gloves	
Crane Operation	Struck By/ Against Heavy Equipment	• Wear reflective warning vests when exposed to vehicular traffic • Isolate crane swing areas • Make eye contact with operators before approaching equipment		

JOB SAFETY ANALYSIS FOR RECEIVING EQUIPMENT/MATERIALS				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
		• Prohibit all personnel from work activities in the blind swing areas of the crane • Test lift objects if center of gravity or similar critical factors are uncertain • Never lift any object if weights are unknown • Never stand under a suspended load		
	Cut/Lacerations	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by tag lines • Prohibit looping / winding tag lines around hands or body • Prohibit positioning, moving load using tag lines	Cut Resistant or Leather gloves	
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85dBA 8 HR TWA	Hearing Protection	
	Slips, Trips, Falls	• Clear walkways, work areas of equipment, vegetation, excavated material, tools, and debris • Mark, identify, or barricade other obstructions		
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads	Cut Resistant or Leather gloves	
	Struck By/Struck Against Overhead Hazards	• Provide detailed lift plans along with this JHA; lift plan will contain a cut sheet of the crane being used, copy of annual inspections, copy of current crane operator license, weights of loads, and percentage of crane capacity being used during the lift) prior to crane coming on site.		

JOB SAFETY ANALYSIS FOR RECEIVING EQUIPMENT/MATERIALS				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
		• The weight of lifts will not exceed 75% of the crane's capacity. • Spill kit will accompany crane while on site. • Barricade swing radius using caution tape and safety cones. • Complete Safe Work Permits (e.g., Crane Lift) • Use certified crane operators. • Use qualified and competent persons to conduct all assembly/disassembly of crane components. • Place poly boards under crane outriggers. • Outriggers fully extended. • Inspect each crane prior to use by the operator. • Use a qualified signal person for all lifts. Training verification will be onsite. • Restrict location of boom so that it is not within 20 ft of overhead lines. • Use two-way radios for communication during each lift. • Stay clear of load. Nobody shall place any part of their body under a suspended load. • Use tag lines to control loads. • Suspend the lift if wind exceeds 25 MPH or at first sign of lightening		
Forklift Operation	Struck By/Struck Against Overhead Hazards	• Personnel will know transport route and how equipment will be transported prior to the move; the pathway will be made clear of any obstacles. • Trained/certified personnel will operate the forklift. Training verification will be on site and a copy or certification will be available. • Forklifts will be inspected by the operator prior to use and transport of equipment. • Slings and shackles will be adequately rated for lifting and transporting materials and equipment		

JOB SAFETY ANALYSIS FOR RECEIVING EQUIPMENT/MATERIALS				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
		• Rigging equipment (i.e., slings, chackles, etc..) will be inspected prior to and during use by the competent person. • Loads will be slightly lifted off the ground to test rigging & detect any shift before lifting load. • Spotters/Flaggers will be utilized when equipment is transported. Spotter will observe for any overhead hazards when transporting equipment. • Areas where forklifts will be in operation will be free from excess materials and a clear path will be in place. • Personnel will stay clear of forklift during transport.		

JOB SAFETY ANALYSIS FOR SITE PREP/MARK OUTS/GRADING/SILT FENCE		
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**
Site preparation, mark outs, grading, silt fence	Struck by/ Against Heavy Equipment & Materials, Vehicular Traffic	• Wear hard hat, safety glasses, safety shoes, work gloves, high visibility vest, hearing protection • Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Understand and review hand signals for signaling operators
	Slips, Trips, Falls	• Clear walkways and work areas of equipment, tools, debris, vegetation, and other materials • Mark, identify, or barricade other obstructions
	Handling Heavy Objects	• Plan movement of materials to take shortest route • Use mechanical lifting equipment (e.g., backhoe/loader; trucks) to move large, awkward loads • Observe proper lifting techniques • Obey sensible lifting limits (e.g., 60 lb. per person for manual lifting)
	Underground/ Overhead Utilities	• Identify all utilities around the site before work commences • Cease work immediately if unknown utility markers are uncovered • Use manual excavation within 2 feet of known utilities • Utility clearance shall conform with 29 CFR 1926.955
	Excavation Hazards	• Follow all excavation/trenching safety practices if excavation is over 4 feet deep. • Store excavated material at least 2 feet from the edge of the excavation; prevent excessive loading of the excavation face • Assign a competent person to inspect, decide soil classification, proper sloping, the correct shoring, or sheeting • Inspect excavations (when personnel entry is required) daily, any time conditions change
	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use of power tools

JOB SAFETY ANALYSIS FOR CHAIN SAW/CHOP SAW		
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**
Survey work area/objects to be cut	• Slip, Trip & Fall • Struck by vehicles and other mobile equipment	• Wear hard hat, safety glasses, safety shoes, work gloves, high visibility vest • Walk cautiously and observe pathway. Walk around, step over or clear pathway of obstacles, defects, and obstructions. • Identify objects to be cut and proper saw for the task
Check and fill fluid levels in saw; inspect saw for damages and leaks	• Splash or spilling of gas/oil mixture • Saw could stall-out while cutting causing a kick-back when re-started in cut • Fire could occur if fuel mixture leaked	• Wear hard hat, safety glasses, safety shoes, work gloves, high visibility vest • Replace and close fluid tank caps on both saw and supply containers after use • Maintain fluid level and right mixture (in accordance with manufacturer specification) to avoid stalling-out during the cut • Do not use saw if leak is detected. Take saw out of service and have repaired before re-using
Check cutting blade/chain for proper type, wear/tear & wear pattern, installed properly for direction of rotation and secured	• Cuts/Lacerations	• Wear hard hat, safety glasses, safety shoes, high visibility vest • Wear gloves if handling blade/chain to inspect it • Make sure blade is straight and tight and correct for type of material being cut. Check manufacturer's requirements for type of blade to use • Check blade/chain for defects; know what to look for to determine if defective; check manufacturer's manual; replace blade/wheel/chain when defects are detected
Ensure blade guard is properly in place	• Struck by particles of metal and other debris • Cuts/Lacerations	• Adjust guard so that rear section is flush with the work piece and spatter and sparks from object being cut will be led away from the user • Never remove or pin back guards during operation
Start-up saw	• Cuts/Laceration - Lose control of saw	• Wear hard hat, safety glasses, safety shoes, high visibility vest, hearing protection • Wear chain saw chaps when operating chain saw • Place saw on firm ground, ensure blade/wheel/chain is clear

JOB SAFETY ANALYSIS FOR CHAIN SAW/CHOP SAW		
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**
		of obstructions. Secure saw with hand using firm grip on front handle and placing foot on base handle (if saw equipped with base handle).
Cutting operation	• Strain, sprain • Struck by debris • Cuts/lacerations and other injuries from saw kickback/flying debris • Hearing loss • Carbon Monoxide exposure	• Avoid bending at the waist by squatting, using a wide stance, and/or using support by resting arm on knee. Face forward to avoid twisting. Keep the work close to avoid reaching. • Wear safety hard hat, safety shoes, safety glasses or goggles, and a face shield. Keep body away from path of sparks • Let the saw do the work • Support object being cut to prevent it from moving and pinching the blade • Review the saw manual for proper cutting technique • Never start to cut with the upper quadrant (12 o'clock to 3 o'clock position) of the blade (kickback zone) • Hold the machine with firm grip using 2 hands and stand off to side of saw while cutting • Keep good balance and firm foothold • Always cut at maximum speed • Stand at comfortable distance from the work piece • Never cut above shoulder height • Be alert to movement of the object which could cause the cut to close and pinch the blade • To prevent kickback avoid removing blade and re-entering to make cut • Do not wear any loose clothing, jewelry or other articles which could become entangled in the saw • Wear hearing protection (plugs or muffs) • Only use gas powered saw in a well-ventilated area to avoid overexposure to carbon monoxide. Use mechanical ventilation (blowers), in poorly ventilated areas.

JOB SAFETY ANALYSIS FOR WELDING/BURNING/CUTTING				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Welding, cutting, burning	Fire or Explosion Struck by/Against	• Complete Hot work permit. • Conduct air monitoring if in any area with flammable/combustible materials. • Do not weld near flammable material. Move flammables at least 35 feet away or protect them with flame-proof covers. • Do not weld on drums, tanks, or any closed containers unless a qualified person has tested it and declared it or prepared it to be safe. • Store acetylene and oxygen cylinders at least 20 feet apart when stored; or five-foot-high fire barrier when on cart together • Keep valve caps in place when not in use/stored. Do not lift cylinders by valve caps.	Hard hats, safety glasses, hearing protection, work gloves, safety shoes/boots; high visible vest (applies to all tasks for this JSA; additional PPE as noted)	LEL/O2 meter
	Inhalation of fumes	• Use enough forced ventilation or local exhaust at the arc to remove fumes from breathing area. • Use welding helmet that has fresh air supply. • Keep your head out of the fumes and do not breathe fumes.	Welding helmet: respirator if fumes are not controlled	
	Sparks could burn eyes, hands, clothes	• Wear welder's cap, eye protection, face shield, gloves, apron • If welding outside with breeze, use wind break and line of sight barrier to protect passers-by.	Leather/flame resistant gloves	
	Eye burns	• Use welding helmet with correct shade of filter.	Welding helmet	

JOB SAFETY ANALYSIS FOR WELDING/BURNING/CUTTING				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
		• Use welding curtain to shield other employees and visitors from arc rays.		

JOB SAFETY ANALYSIS FOR RIGGING UP DRILL/EQUIPMENT HANDLING/HOSE MANAGEMENT				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Rigging Activities	Overhead Utilities	• Identify all utilities around the site before work commences • Utility clearance shall conform with 29 CFR 1926.955 Guard or de-energize electrical sources before crane operations begin	Hard hats, safety glasses, hearing protection, work gloves, safety shoe/boots; high visible vest for all tasks in this JSA; additional PPE as noted	
	Rigging Equipment	• Identify the proper rigging equipment for the type of lift • Inspect rigging devices to verify slings, chains, straps are free from defects and rated for the lift weight • Prohibit use of equipment with missing documentation tags, or defective equipment • Ensure taglines are free of knots and defects • Review rigging techniques, positioning of load, tag lines with workers involved in rigging activities • Use qualified riggers. Training verification will be kept onsite. • Loads will be slightly lifted off the ground to test rigging & detect any shift before lifting load.	Cut Resistant or Leather gloves	
	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects	Cut Resistant or Leather gloves	
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads	Cut Resistant or Leather gloves	
Hoisting and Lifting, Crane Operation Inspections		• Verify the crane annual inspection and maintenance log • Perform required daily crane inspections, of wire ropes sheaves, drums, rigging hardware and attachments	Cut Resistant or Leather gloves	

JOB SAFETY ANALYSIS FOR RIGGING UP DRILL/EQUIPMENT HANDLING/HOSE MANAGEMENT				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
		• Perform daily inspection of mechanical, hydraulic operations crane • Use manufacture's inspection checklist		
Hoisting and Lifting Pre-lift Meeting		• Hold mandatory pre-lift meeting and complete lift worksheet • Determine if the lift is a critical lift • Assign lift or critical lift supervisor and a signaler for the lift • Calculate lift / load capacities using crane operations manuals and load capacity charts • Review lift hand signals with operator, signaler, supervisor, and work crew		
Crane Operation	Struck By/ Against Heavy Equipment	• Wear reflective warning vests when exposed to vehicular traffic • Isolate crane swing areas • Make eye contact with operators before approaching equipment • Prohibit all personnel from work activities in the blind swing areas of the crane • Test lift objects if center of gravity or similar critical factors are uncertain • Never lift any object if weights are unknown • Never stand under a suspended load		
Tag Lines	Cut/Lacerations	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by tag lines • Prohibit looping / winding tag lines around hands or body • Prohibit positioning, moving load using tag lines	Cut Resistant or Leather gloves	
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85dBA 8 HR	Hearing Protection	

JOB SAFETY ANALYSIS FOR RIGGING UP DRILL/EQUIPMENT HANDLING/HOSE MANAGEMENT				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
		TWA		
	Slips, Trips, Falls	• Clear walkways, work areas of equipment, vegetation, excavated material, tools, and debris • Mark, identify, or barricade other obstructions		
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads	Cut Resistant or Leather gloves	
	Struck By/Struck Against Overhead Hazards	• Provide detailed lift plans along with this JHA; lift plan will contain a cut sheet of the crane being used, copy of annual inspections, copy of current crane operator license, weights of loads, and percentage of crane capacity being used during the lift) prior to crane coming on site. • The weight of lifts will not exceed 75% of the crane's capacity. • Spill kit will accompany crane while on site. • Barricade swing radius using caution tape and safety cones. • Complete Safe Work Permits (e.g., Crane Lift) • Use certified crane operators. • Use qualified and competent persons to conduct all assembly/disassembly of crane components. • Place poly boards under crane outriggers. • Outriggers fully extended. • Inspect each crane prior to use by the operator. • Use a qualified signal person for all lifts. Training verification will be onsite. • Restrict location of boom so that it is not within 20 ft of overhead lines.		

JOB SAFETY ANALYSIS FOR RIGGING UP DRILL/EQUIPMENT HANDLING/HOSE MANAGEMENT				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
		• Use two-way radios for communication during each lift. • Stay clear of load. Nobody shall place any part of their body under a suspended load. • Use tag lines to control loads. • Suspend the lift if wind exceeds 25 MPH or at first sign of lightening		
Equipment Handling, Hose Management	Struck by/ Against Heavy Equipment & Materials Vehicular Traffic	• Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Understand and review hand signals for signaling operators		
	Slips, Trips, Falls	• Clear walkways and work areas of equipment, tools, debris, vegetation, and other materials • Mark, identify, or barricade other obstructions		
	Falls from Elevated Heights	• Use standard guardrails when working on elevated platforms or PFAS (harness/lanyard); anchorage points for fall arrest systems must support each worker. • Use heavy duty industrial (type IA) ladders; tie-off all straight/extension ladders. • Install/inspect scaffolds according to manufacturer's requirements. • Train operators using aerial lifts		
	Handling Heavy Objects	• Plan movement of materials to take shortest route • Use mechanical lifting equipment (e.g., backhoe/loader; trucks) to move large, awkward loads • Observe proper lifting techniques • Obey sensible lifting limits (e.g., 60 lb. per person for manual lifting)		
	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects	Cut Resistant or Leather Work Gloves	

JOB SAFETY ANALYSIS FOR RIGGING UP DRILL/EQUIPMENT HANDLING/HOSE MANAGEMENT				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
		• Maintain all hand and power tools in a safe condition • Keep guards in place during use of power tools		
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85dBA 8 HR TWA		

ATTACHMENT 3

Safety Data Sheets

(Added as Brought to the Project)

ATTACHMENT 4

Directions to Hospital

(See Emergency Action Plans – Attachment 10)

ATTACHMENT 5

Incident Investigation Report

INJURY REPORT – FORM # 1

(Completed by Investigating Supervisor)

Report Only ☐

Complete Within 8 Hours or Before End of Shift
email to: safety@jaginc.co

Investigation #	
Work Comp#	

Location: _____

Date of Incident:	**Time of Incident:** ☐ AM ☐ PM
Date Reported:	**Shift:** ☐ 1 ☐ 2 ☐ 3 ☐ OTHER
Location of Incident:	**Length of Shift:** ☐ 8 ☐ 10 ☐ 12 ☐ OTHER

Type of Incident: ☐ Injury ☐ Illness ☐ Near Miss ☐ Other: _____

Incident Description:

PERSON INVOLVED

1. **Name of Person involved:**
2. **Employment Status:** ☐ Employee ☐ Sub-Contractor ☐ General Public
3. **Date of Hire/Assignment:**
4. **Job Title/Craft/Position:**
5. **Department:**
6. **Manager/Supervisor:**
7. **Gender:** ☐ Male ☐ Female
8. **How long in Current Position:** Yrs. Months
9. **List the possible witnesses of the incident – Attach witness statement (Form #2):**
10. **Photographs taken** ☐ Yes ☐ No **(PICTURE MUST BE TAKEN WHENEVER POSSIBLE)**
11. **Is the employee involved employed anywhere other than Prestige Industries?** ☐ Yes ☐ No
    If yes, where and what does s/he do?
12. **What day of the week did the incident occur?** ☐ M ☐ Tu ☐ W ☐ Th ☐ F ☐ Sa ☐ Su
13. **What consecutive day of the employee's work week was it?** ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7
14. **Was the employee working overtime at the time of the incident?** ☐ Yes ☐ No
15. **Was the employee doing their regularly assigned/scheduled job duties?** ☐ Yes ☐ No
    If "NO", then please explain

NOTE: Multiple Injuries – If more than one person is injured in an incident, a separate incident form will need to be completed for each person. Keep all the information for these incidents together and submit as one package.

JAG COMPANIES

INJURY / ILLNESS

1. What type of injury / illness occurred?

☐ Abrasion ☐ Amputation ☐ Bruise ☐ Concussion ☐ Dislocation
☐ Fracture ☐ Foreign Body ☐ Laceration ☐ Sprain/Strain ☐ Loss of Consciousness
☐ Other:

2. To what part (s) of the body? ☐ Right ☐ Left ☐ Both

☐ Right ☐ Left ☐ Both

3. What was the initial type of treatment was provided? ☐ First Aid ☐ Medical Clinic ☐ Hospital
☐ None - Not Needed or Requested at Time of Incident

Name and Location of treating facility: _____

4. Was the injury/illness reported in a timely manner? ☐ Yes ☐ No

If not, why?

5. Onset of condition ☐ Gradual ☐ Sudden

6. Has the employee experienced a similar injury, pain, or discomfort previously?

☐ Yes ☐ No ☐ Unknown

If "Yes" explain

7. Did the incident result in a lost time accident? ☐ Yes ☐ No ☐ Unknown

If Yes, what was the date of the last day worked?

8. Has the person to been assigned light duty or job transfer? ☐ Yes ☐ No ☐ Unknown

9. When was the employee sent for post incident drug & alcohol test? ☐ Yes ☐ No

Supervisor (print):	Signature:	Date:
Time of this Report: ☐ AM ☐ PM		

INCIDENT INVESTIGATION FORM REPORTING PROCEDURES		
FORM(s) TO COMPLETE	**BY WHOM**	**BY WHEN**
Incident Report– Form # 1	Investigating Supervisor	Within 8 hour or End of shift
Incident Statement –Form # 2	Person Involved in Incident	Within 24 hours
Incident Investigation-Form #3	Witness / Description - Extension for Form 1 or 2	Within 24 hours

SCAN and SEND FORMS VIA EMAIL TO: Safety@jaginc.co

Call EH&S Director ASAP with Details of the Incident - Lucky Abernathy at (908) 433-3755

NOTE: Initial report within 8hrs and a complete report with Incident Statement(s) within 24hrs

INCIDENT STATEMENT – FORM# 2

Complete within 24 email to: Safety@jaginc.co

STATEMENT FORM

Company: _____ **email to: Safetey@jaginc.co**

Statement By:	☐ Person/Employee Involved	☐ Employee Witness	☐ Manager/Supervisor	
	☐ Witness	☐ Contractor	☐ Temporary	☐ Visitor
Name:	**Date of Incident:**		***Time of Incident:***	

STATEMENT

Print Name:	**Signature:**	**Date:**
Supervisors Review:	**Date:**	

INCIDENT INVESTIGATION FORM # 3

(Completed by Investigating Supervisor)

Complete within 24 Hours or before end of shift
email to: Safety@jaginc.co

Company:	**Investigation #** / **Work Comp#**
Date of Incident:	**Time of Incident:** ☐ AM ☐ PM
Type of Incident:	☐ Injury ☐ Illness ☐ Property Damage ☐ Other: ☐ Fire ☐ Near Miss ☐ Equipment Damage
Incident Description:	

PERSON INVOLVED

1.	**Name of Person(s) involved**
2.	**Employment Status** ☐ Employee ☐ Temporary ☐ Sub-Contractor ☐ Visitor
4.	**Job Title/Position**
5.	**Department**
6.	**Manager/Supervisor**

ROOT CAUSE ANALYSIS

1. What unsafe acts and or conditions contributed to the incident?

- ☐ Failure to Lockout/tagout
- ☐ Lack of training or knowledge
- ☐ Improper guarding
- ☐ Poor housekeeping
- ☐ Not wearing PPE
- ☐ Wearing unsafe clothing
- ☐ Inattentiveness / distraction
- ☐ Over exertion / pushing / pulling
- ☐ Defective tool / equipment
- ☐ Willful disregard of safety policy
- ☐ Failed to recognize hazard
- ☐ Other:

Other – please explain:

2. What are the root causes(s) of the incident?
(Please list or describe)

3. Did the person(s) involved violate a Company safety rule/regulation? ☐ **Yes** ☐ **No**

If so, which one and describe?

JAG COMPANIES

Name: **DOI:**

EQUIPMENT / MATERIAL ANALYSIS N/A ☐

1. **Was the equipment/machine/tool involved suited for the purpose?** ☐ Yes ☐ No

   If No, please explain

2. **Was the equipment/machine/tool involved in good condition?** ☐ Yes ☐ No

   If No, please explain

3. **Were the safeguards in place?** ☐ Yes ☐ No

   If No, please explain

ENVIRONMENT N/A ☐

1. **Was the area where the incident occurred well lit?** ☐ Yes ☐ No

   If No, please explain

2. **Walking/Working Surface:** ☐ Slippery ☐ Wet ☐ Dry ☐ Level ☐ Not level ☐ Cracked ☐ N/A

   Other:

CORRECTIVE ACTIONS N/A ☐

1.
2.
3.

Supervisor (print)		Signature		Date	

INCIDENT INVESTIGATION FORM REPORTING PROCEDURES		
FORM(s) TO COMPLETE	**BY WHOM**	**BY WHEN**
1. Incident Report	Investigating Supervisor	Within 8 hour or end of shift
2. Incident Statement	Person involved in incident	Within 24 hours
3. Incident Statement	Witness or description extension for Form 1 or 2	Within 24 hours

SCAN and SEND FORMS VIA EMAIL TO: Safety@jaginc.co

NOTE: Initial report within – 8hrs and a complete report with Incident Statement(s) within 24hr.

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FIRST AID LOG – FORM # 4 Week of / /

Submit to Safety@jaginc.co Monthly

THIS FIRST AID LOG IS TO BE COMPLETED FOR ANY INJURY REPORTED TO A SUPERVISOR OR ANY FIRST-AID TREATEMENT PROVODED BY THE SUPERVISOR

Employee Name: *Jose Nunes* **Date:** *11/11/11* **Time:** *10:30* **X AM** ☐ **PM**
Type of Injury: *Cut right hand* **Description of Injury:** *Jose was opening a can with a screwdriver and cut his hand.*
The palm of his had was cut about ½" across
Treatment Given: *Cleaned the cut and put on a band-aid. Told Jose to check in with me in the morning.*
Person Treating: *John Smith*

1) Employee Name: **Date:** **Time:** ☐ **AM** ☐ **PM**
Type of Injury: **Description of Injury:**
Treatment Given:
Person Treating:

2) Employee Name: **Date:** **Time:** ☐ **AM** ☐ **PM**
Type of Injury: **Description of Injury:**
Treatment Given:
Person Treating:

3) Employee Name: **Date:** **Time:** ☐ **AM** ☐ **PM**
Type of Injury: **Description of Injury:**
Treatment Given:
Person Treating:

4) Employee Name: **Date:** **Time:** ☐ **AM** ☐ **PM**
Type of Injury: **Description of Injury:**
Treatment Given:
Person Treating:

5) Employee Name: **Date:** **Time:** ☐ **AM** ☐ **PM**
Type of Injury: **Description of Injury:**
Treatment Given:
Person Treating:

JAG COMPANIES

EQUIP/GL INCIDENT REPORT # 5

Complete Within 8 hours or before the End of Shift
email to: Safety@jaginc.co

Report Only	☐
Investigation #	

Company:		**Vehicle # :**	
Date of Incident:	**Time of Incident:**	☐ AM ☐ PM	
Date Reported:		**Shift:**	☐ 1 ☐ 2 ☐ 3 ☐ OTHER
Incident Location:		**Length of Shift:**	☐ 8 ☐ 10 ☐ 12 ☐ OTHER
City:	**State:**		

What day of the week did the incident occur : ☐ Mon ☐ Tue ☐ Wed ☐ Thur ☐ Fri ☐ Sat ☐ Sun

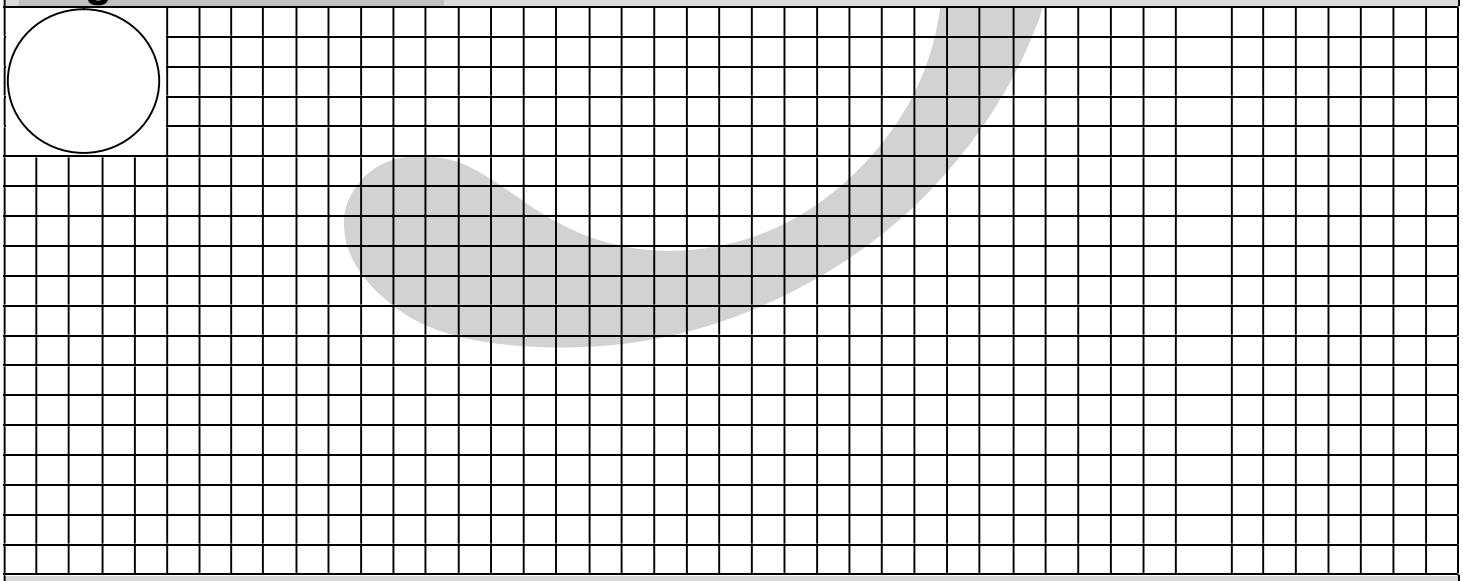
Type of Incident: ☐ Motor Vehicle Accident ☐ Equipment Damage ☐ Property Damage ☐ Theft ☐ Fire ☐ Near Miss ☐ Unsafe Condition ☐ Other:

Incident Description:

Accident / Incident Description

Driver/Operator Name:	**How long in Current Position:** Yrs. months
Employment Status: ☐ Employee ☐ Temporary ☐ Contractor ☐ Owner Operator	
Any Injuries: ☐ Yes ☐ No * ☐ Fatality If so, Who:	**Was anyone removed from the scene by ambulance?** * ☐ Yes ☐ No If so, Who:
Was any vehicle towed: * ☐ Yes ☐ No	**Which vehicle:** ☐ Yours ☐ Other driver ☐ Both
Was a police report made: ☐ Yes ☐ No	**Report # :** **Was Driver ticketed:** * ☐ Yes ☐ No
Other Driver's Insurance Information : **Name:**	**Insurance:** **Unavailable:** ☐
Other Vehicle Make: **Model:**	**Ins. Carrier :** **Policy #**
List the possible witnesses of the incident: 1)	2) 3)
Photographs taken: ☐ Yes ☐ No **(PICTURES MUST BE TAKEN!!!!)** **If not, why:**	

Diagram of Incident :



Provide a drawing of the roadway configuration and all vehicles or objects that were invoilved in the incident.

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Accident / Incident Description - Continued

Incident Occurred during:	☐ Loading ☐ Unloading ☐ In route (driving) ☐ Backing up ☐ Moving Forward ☐ Excessive Speed ☐ Unexpected Movement ☐ Unsafe Operation ☐ Turning ☐ Other :
Vehicle Type:	☐ Forklift ___ Ton ☐ Tractor ☐ Trailer ☐ Straight Truck (26,000 or below) ☐ Auto ☐ Other
Weather Conditions:	☐ Clear ☐ Rain ☐ Snow ☐ Wind ☐ N/A (In-side) ☐ Sun Glare ☐ Other
Road Conditions:	☐ Dry ☐ Wet ☐ Snow covered ☐ Icy ☐ Dark ☐ Other
Damage to:	☐ Tire/wheels ☐ Cab ☐ Body _____ (Location) ☐ R ☐ L ☐ Windshield ☐ N/A ☐ Drive Train ☐ Frame/Suspension ☐ Bumper - ☐ Front ☐ Rear ☐ Other

Note: If the DOT driver received a ticket or answered yes to two (2) or more of the questions above with an asterisk (*) by it, then the driver must report for a Post-Accident Drug/ Alcohol Testing directly!!!

When was the Post Incident Drug & Alcohol Test done:

DOT D & A Test: ☐	**NON- DOT D & A Test:** ☐	**If a test was not performed, Why?**
Date:	**Time:** ☐ AM ☐ PM	**Location:** **State:**

Reminders for the Drivers:

- ☐ Completer drivers report of accident
- ☐ Protect the vehicle and cargo
- ☐ Set warning devices and move to A Safe location
- ☐ Discuss the incident with ONLY proper authorities
- ☐ Obtain information i.e. Other vehicle info/witness names and numbers etc.
- ☐ Pictures, Pictures, Pictures

Driver/Operator (print):	**Signature:**	**Date:**
Supervisor (print):	**Signature:**	**Date:**

INCIDENT INVESTIGATION FORM REPORTING PROCEDURES		
FORM(s) TO COMPLETE	**BY WHOM**	**BY WHEN**
Equipment Incident Report– Form # 5	Investigating Supervisor	Within 8 hour or End of shift
Incident Report – Form # 1	Supervisor (If Employee Injury Involved)	Within 8 hour or End of shift
Incident Statement –Form # 2	Person involved in incident	Within 24 hours
Incident Investigation-Form #3	Witness / Description extension for Parts 1 or 2	Within 24 hours

SCAN and SEND FORMS VIA EMAIL TO: Safety@jaginc.co

NOTE: Initial report within 8hrs/end of shift and a complete report with Incident Statement(s) etc. within 24hrs.

Attachment 6

CALDWELL MARINE
Corporate Health & Safety Policies and Procedures Manual

(Incorporated by Reference)

Attachment 7

Confined Space Entry Forms

Caldwell
Marine International

CONFINED SPACE ENTRY PERMIT

LOCATION and DESCRIPTION of Confined Space:

PURPOSE of Entry:

DEPARTMENT:

SUPERVISOR:

Permit Type: □ **Specific Entry** □ **Duration of Job** □ **Annual** □ **Special/Hot Work**

Hazards: □ **O_2** □ **Flammability** □ **Toxic Chemical (specify)-**
□ **Other (specify)-**

KEY PERSONEL (Initialed by Individual)

Authorized Entrants	Attendant(s)	Rescue Personnel
	1st -	
	2nd -	

ENTRY CHECKLIST

Item	YES	N/A	Item	YES	N/A
Lockout - De-energize/electrical			**Lifelines**		
Lockout - Mechanical/valves			**Fire Extinguisher(s)**		
Purge - Flush and Vent			**Rescue Personnel Available**		
Positive Ventilation			**Lighting**		
Secure Area, Barriers in Place			**Protective Clothing**		
Emergency SCBA at Site			**Oxygen Meter**		
Escape Harness			**Combustible Gas Meter**		
Tripod Emergency Escape Unit			**Chemical Detector**		

Special Precautions & Equipment:

Air Monitoring

Test Parameter	Permitted Condition	Perform Test		Initial Results	2	3	4	5
		YES	NO		Time	Time	Time	Time
% Oxygen	19.5 - 23%							
% of LEL	< 10 %							
% of CO	< 25 %							
Hydrogen Sulfide	< 10 %							

[QUALIFIED PERSON] has verified that all the above conditions have been satisfied and authorizes work to proceed as specified:

Name: _____ **Title:** _____ **Date:** _____

Attachment 8

Hot Work Permit

HOT WORK PERMIT

Date: _____ Time: _____

Location: _____

Issued To: _____

Site Safety Officer (if applicable): _____

Supervisor: _____

Do not cut or use open-flame or spark producing equipment until the following precautions have been taken.

Protective Equipment to be used: _____

Fire Watch Assigned: _____

(Initial Each of The Following)

_____ The location where the work is to be done has been personally examined.

_____ Any available fire protection systems are in service.

_____ There are no flammable dusts, vapors, liquids, or unpurged tanks (empty) in the area.

_____ Explosive meter reading <10%. 1st Reading: _____ 2nd Reading: _____ Additional readings: _____

_____ All combustibles have been moved away from the operation, or otherwise protected with fire curtains or equivalent.

_____ Ample portable fire extinguishing equipment has been provided.

_____ Arrangements have been made to patrol the area for at least 30 minutes after the work has been completed.

_____ The phone number for the local Fire Department is: _____

NOTE: This form is to be filled out in its entirety by the responsible person performing the "HOT WORK." It must be approved by the Health and Safety Officer and the client prior to beginning the project.
This permit expires 24 hours after the designated "start time." If work is to continue another permit must be issued.

Company:	Date:
Responsible Person:	Start Time:
Work to be performed:	End Time:
Location (area, room, etc.):	Equipment:
Is it possible to perform this work in the shop? Yes No	Other:

Place a checkmark if the following items have been completed.

Flame or spark-producing equipment to be used has been inspected and found in good repair.	
Sprinklers, where provided, are in commission and will not be taken out of service while this work is being done.	
There are no combustible fibers, dusts, vapors, gases, or liquids in the area. Tanks and equipment previously containing such materials have been purged. The absence of gases or vapors has been verified by a combustible gas detection instrument. If there is a possibility of a leak developing in nearby piping, equipment, or tanks, this area is to be continuously monitored. Call Site Safety if assistance is needed to test area at (specify phone #):_____	
Fire alarms will not be taken out of service while work is being performed. If alarm system must be inactivated during work, then client will be contacted prior to taking alarm out of service so that a suitable "Fire Watch" can be coordinated. *Under no circumstances will fire alarms be taken out of service without contacting client.*	
The work will be confined to the area or equipment specified on this permit.	
Surrounding floors have been swept clean and, if combustible, wet down.	
Contractor has ample portable fire extinguishers available and trained personnel to use them.	
All combustibles have been relocated 35 feet from the operation and the remainder protected with metal guards or flame-proofed curtains or covers (not ordinary tarpaulins).	
All floor and wall openings within 35 feet of the operations have been tightly covered.	
Responsible personnel have been assigned to provide a "Fire Watch" for dangerous sparks in the work area, as well as on floors above and below while work is being performed.	
Arrangements have been made to provide a "Fire Watch" to patrol the area, including floors above and below, during any lunch or rest period and for at least one-half hour after the work has been completed.	

I attest that the above precautions have been taken:	
Name of Person Responsible for performing Hot Work:	
Site HSO Approval (name):	
Date:	

Attachment 9

Safety Inspection Form

Inspected By: _____ Date: _____

Worksite Information	Yes	No	N/A
Posting of OSHA and other work-site warning posters?			
First aid equipment properly stocked?			
Work site injury records being kept?			
Emergency telephone numbers conspicuously posted?			
Emergency Information (evacuation, muster points, etc.) posted?			
Safety Meetings conducted periodically? When was last meeting?			

Describe violation, location, and corrective actions taken:

_____

_____

_____

Housekeeping and Sanitation	Yes	No	N/A
Are emergency lights fully operational?			
Regular disposal of waste and trash?			
Passageways and walkways clear?			
Waste containers provided and used?			
Sanitary facilities adequate and clean?			
Adequate supply of water?			
Adequate lighting?			
Trash receptacle for drinking cups?			
Are handrails and stair treads in good repair?			
Is smoking restricted to certain locations?			
Are electrical cords and plugs in good condition?			
Is a clearance of 3' maintained around hot water heaters, electric breaker panels, heating units, and fire sprinkler riser?			
Are electric circuit breakers free of obstructions?			
General neatness of working areas:			

Describe violation, location, and corrective actions taken:

_____

_____

_____

Fire Prevention	Yes	No	N/A
Fire instruction to personnel?			
Fire extinguishers identified, accessible, and fully charged?			
"No Smoking" signs posted and enforced where needed?			
Good housekeeping?			
Storage use and handling of flammable liquids properly done?			
Fire hazards checked?			
Is gasoline contained only in UL listed containers?			

Describe violation, location, and corrective actions taken:

_____

_____

_____

Handling and Storage of Materials	Yes	No	N/A
Are materials properly stored and stacked?			
Are passageways clear?			
Shelves in stockrooms in good repair and properly anchored.			
Stacks on firm footing, not too high?			
Are employees lifting loads correctly?			
Are materials protected from weather conditions?			
Flammable liquids not stored in areas used for exits or stairways?			

Describe violation, location, and corrective actions taken:

_____

_____

_____

Hand Tools	Yes	No	N/A
Proper tool being used for each job?			
Neat storage, safe carrying?			
Inspection and maintenance?			
Electric tools are grounded?			

Describe violation, location, and corrective actions taken:

_____

_____

_____

Personal Protective Equipment	Yes	No	N/A
Eye protection?			
Respirators and mask?			
Helmets, hoods, head protection?			
Gloves, aprons, sleeves?			
Hearing protection?			
Safety harnesses and lifelines?			
Shirts are to be worn?			
Back support belts?			

Describe violation, location, and corrective actions taken:

_____

_____

_____

Hazardous Materials	Yes	No	N/A
Is a binder containing SDS for supplies containing hazardous chemicals available to employees before using?			
Are "Safety Data Sheets" being available on request signs posted in conspicuous locations?			
Is the hazardous waste inventory log maintained?			
Are hazardous waste storage areas inspected weekly?			
Is the hazardous material dispositioning log maintained?			
All containers clearly identified?			
Proper storage practices observed?			
Proper storage temperatures and protection?			
Proper type and number of extinguishers nearby?			
Are there any visible dust or fumes that could be of a concern?			

Describe violation, location, and corrective actions taken:

_____

_____

_____

Unsafe acts and/or practices observed:

_____

_____

_____

Site Supervisor_____Date: _____

Safety Inspector _____Date: _____

Attachment 10
Emergency Action Plans

JOB EMERGENCY ACTION PLAN

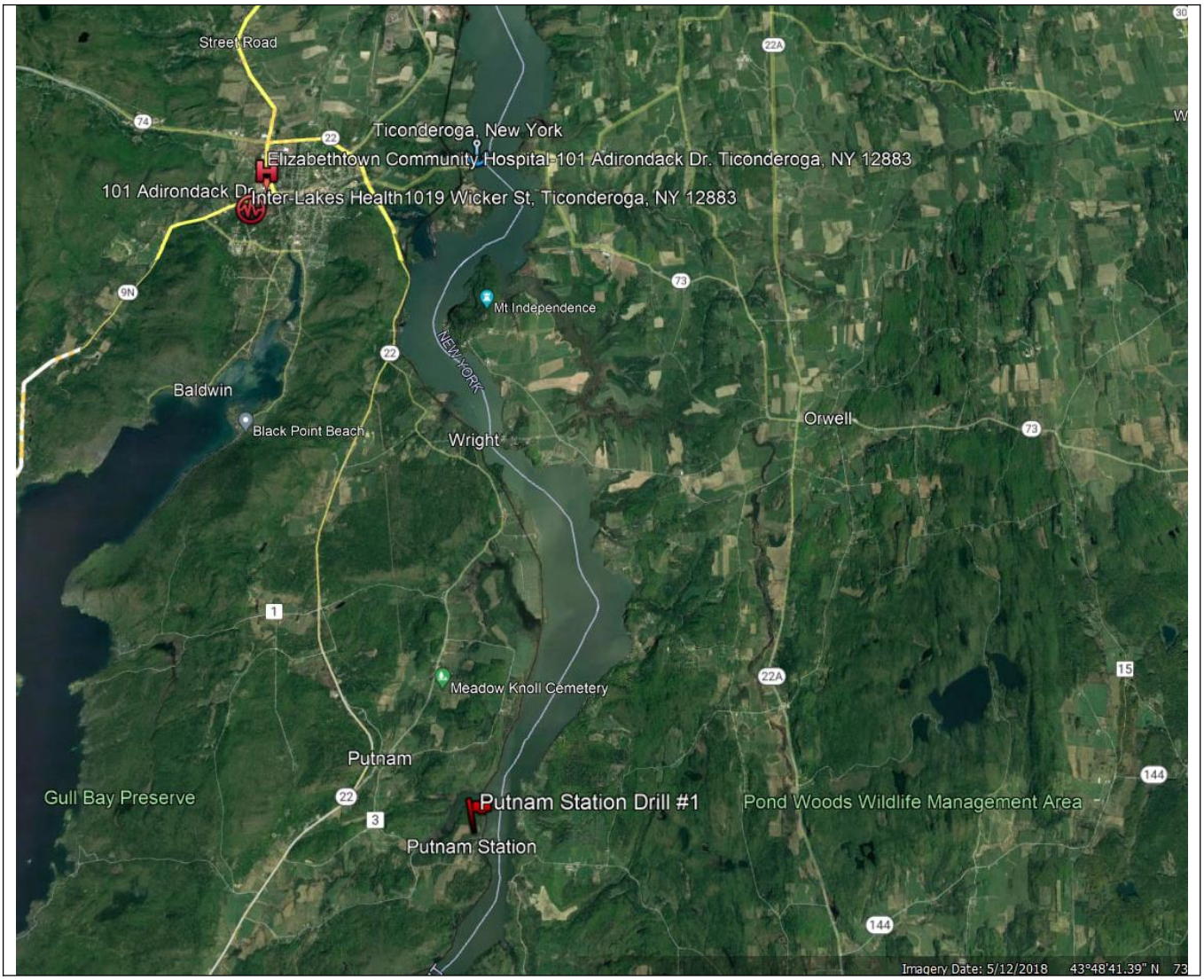
JOBSITE DETAILS			
Date: 07/12/22	**Project Owner:** CHPE, LLC	**Contractor:** CMI/ECI	
Project Name: CHPE HDD			**Job No:** 1229
Project Address: Putnam Station Drill #1 - 523 Co Rd 3 100 Alpha Blvd Catskill, NY 12414			
PM: Thomas Ulisse	**Cell:** 732 620 3470	**Supt:** Brett Bryant	**Cell:** 732 620 4214

EMERGENCY CALLING INFORMATION – 911		(*Local numbers are required, even if 911 is used.*)
Department	***Name***	***Telephone Number***
POLICE	**Putnam Valley Sheriff's Department**	**845 225 4300/911**
FIRE DEPARTMENT	**Putnam Volunteer Fire Dept.**	**518 547 9982/911**
FIRST AID / NON-EMERGENCY	**Rockland Urgent Care**	**845 429 4000**
HOSPITAL / EMERGENCY	**Montefiore Nyack Hospital**	**845 348 2000**
POISON CONTROL	**NY Poison Control**	**800 222 1222**
SPILL RESONSE	**Clean Harbors**	**800 645 8265**
OSHA	**** Corporate Safety Director will Initiate Any/All Contact with OSHA****	
DIVE HOSPITAL	**Jacobi Medical Center 234 East 149th St. Bronx, NY**	**718 579 5000**
Other:		

OWNER / CONTRACTOR CALLING INFORMATION		
Role	***Name- Address***	***Telephone***
OWNER: CHPE, LLC		
OWNER'S ENGINEER:		
GENERAL CONTRACTOR: NKT INC.	**Michael Hennsler**	**(917) 287-3989**
SUBCONTRACTOR: ECI DRILLING, LLC	**John Langford**	**(936) 5224-0852**
SITE SAFETY REPRESENTATIVE:	**Lucky Abernathy**	**(908) 433-3755**

JOB EMERGENCY ACTION PLAN

EVACUATION POINT(s)



JOB EMERGENCY ACTION PLAN

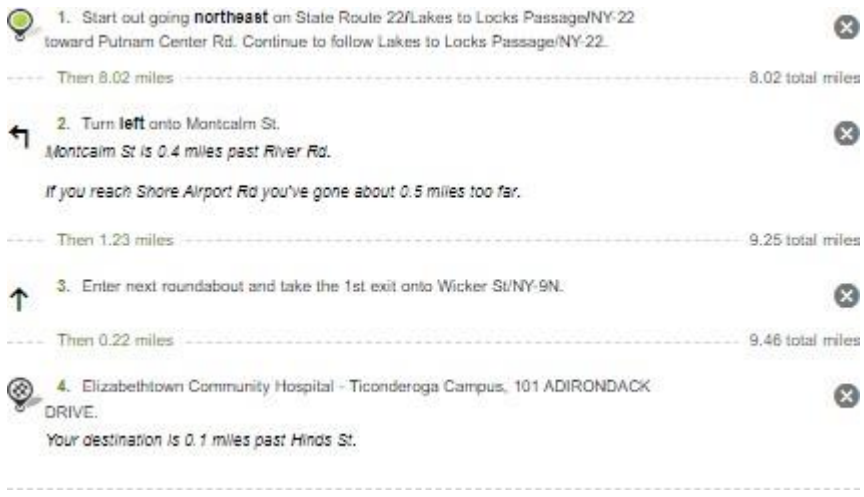
HOSPITAL - Emergency

Work Related Incidents/Accidents:

Any injured employee requiring assistance beyond first aid should obtain immediate attention at the address provided herein:

Transport to the nearest Emergency Room

Elizabethtown Community Hospital
101 Adirondack Dr.
Ticonderoga, NY 12883
845-348-2000



After emergency care has been given to an injured employee, notify the Safety Director ASAP @ (908) 433-3755.

A written incident report must be submitted within 24 hours of the occurrence to Safety@Jaginc.co

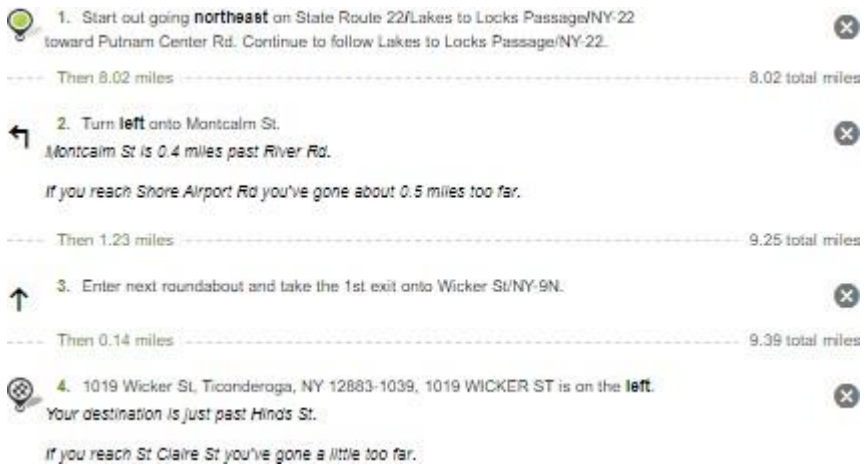
JOB EMERGENCY ACTION PLAN
OC DOCTOR – Non Emergency

Work Related Incidents/Accidents:

Any injured employee requiring assistance above and beyond first aid should obtain immediate attention at the address provided herein:

Transport to the Occupational Medical Provider

Inter-Lakes Health
1019 Wicker St,
Ticonderoga, NY 12883
845-429-4000



After medical care has been given to an injured employee, notify the Safety Director ASAP @ (908) 433-3755.

A written incident report must be submitted within 24 hours of the occurrence to Safety@Jaginc.co

JOB EMERGENCY ACTION PLAN

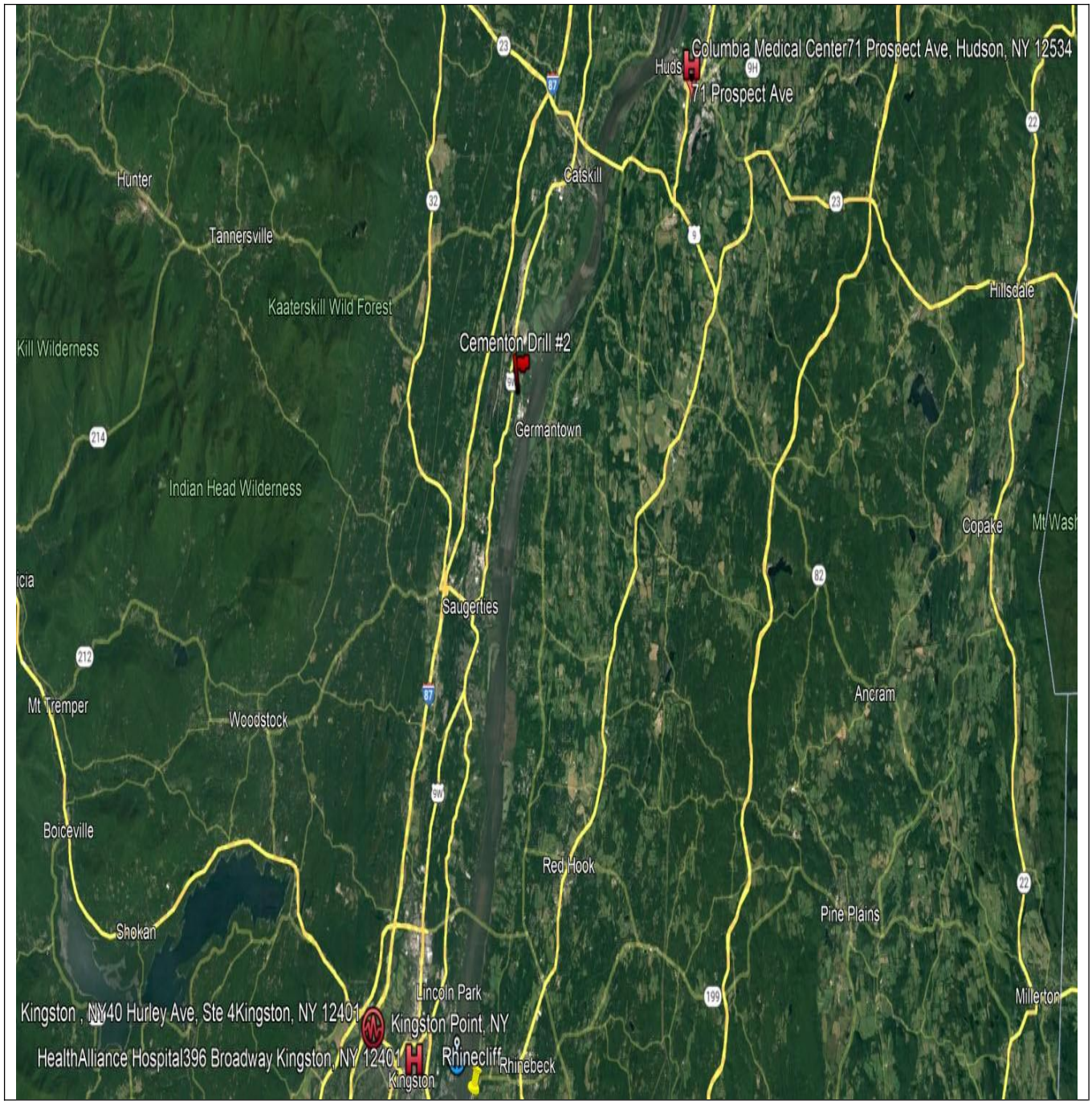
JOBSITE DETAILS			
Date: 07/12/22	**Project Owner:** CHPE, LLC	**Contractor:** CMI/ECI	
Project Name: CHPE HDD			**Job No:** 1229
Project Address: Cementon Drill #2- 523 Co Rd 3 Putnam Station, NY 12861			
PM: Thomas Ulisse	**Cell:** 732 620 3470	**Supt:** Brett Bryant	**Cell:** 732 620 4214

EMERGENCY CALLING INFORMATION – 911		(*Local numbers are required, even if 911 is used.*)
Department	***Name***	***Telephone Number***
POLICE	**Catskill Village Police**	**518 943 2244/911**
FIRE DEPARTMENT	**Malden West Camp Station**	**845 246 3287/911**
FIRST AID/ NON-EMERGENCY	**Emergency One-Kingston, NY**	**845 331 3131**
HOSPITAL / EMERGENCY	**COLUMBIA MEMORIAL HEALTH**	**518 828 760171**
POISON CONTROL	**NY Poison Control**	**800 222 1222**
SPILL RESONSE	**Clean Harbors**	**800 645 8265**
OSHA	**** Corporate Safety Director will Initiate Any/All Contact with OSHA****	
DIVE HOSPITAL	**Jacobi Medical Center 234 East 149th St. Bronx, NY**	**1-718-579-5000**
Other:		

OWNER / CONTRACTOR CALLING INFORMATION		
Role	***Name- Address***	***Telephone***
OWNER: CHPE,LLC		
OWNER'S ENGINEER:		
GENERAL CONTRACTOR: NKT INC.	**Michael Hennsler**	**(917) 287-3989**
SUBCONTRACTOR: ECI DRILLING, LLC	**John Langford**	**(936) 5224-0852**
SITE SAFETY REPRESENTATIVE:	**Lucky Abernathy**	**(908) 433-3755**

JOB EMERGENCY ACTION PLAN

EVACUATION POINT(s)



JOB EMERGENCY ACTION PLAN

HOSPITAL - Emergency

Work Related Incidents/Accidents:

Any injured employee requiring assistance beyond first aid should obtain immediate attention at the address provided herein:

Transport to the nearest Emergency Room

Prospect Ave
Hudson, NY 12534
818 828 7601

1. Start out going **north** toward Lehigh Rd.
Then 0.42 miles — 0.42 total miles
2. Take the 1st **left** onto Lehigh Rd.
Then 0.18 miles — 0.60 total miles
3. Turn **left**.
Then 0.16 miles — 0.76 total miles
4. Take the 1st **right** onto US Highway 9W/US-9W N.
If you are on US Highway 9W and reach Alpha Rd you've gone about 0.3 miles too far.
Then 4.78 miles — 5.54 total miles
5. Turn **right** onto W Bridge St/US-9W N.
Then 0.56 miles — 6.09 total miles
6. Turn **slight right** onto W Bridge St/NY-385.
W Bridge St is just past Grandview Plz.
Then 0.88 miles — 6.97 total miles
7. Turn **left** onto Spring St/NY-385.
Spring St is just past Liberty St.
If you reach Prospect Ave you've gone a little too far.
Then 0.56 miles — 7.53 total miles
8. Turn **right** onto Rip Van Winkle Bridge/NY-23 (Portions toll).
Rip Van Winkle Bridge is just past Gardiner St.
Then 1.57 miles — 9.10 total miles
9. Enter next roundabout and take the 2nd exit onto Rhinebeck-Hudson Rd/NY-23/NY-9G.
Then 0.47 miles — 9.56 total miles
10. Turn **left** onto NY-9G/NY-23B.
If you are on State Route 23 and reach Conway Rd you've gone about 0.3 miles too far.
Then 2.79 miles — 12.35 total miles
11. Turn **right** onto Warren St.
Warren St is just past Cherry Aly.
If you are on N 3rd St and reach Prison Aly you've gone a little too far.
Then 0.78 miles — 13.13 total miles
12. Turn **left** onto Prospect Ave.
Prospect Ave is just past 5th St.
If you reach Worth Aly you've gone about 0.2 miles too far.
Then 0.24 miles — 13.37 total miles
13. 71 Prospect Ave, Hudson, NY 12534-2907, 71 PROSPECT AVE is on the **left**.
Your destination is 0.1 miles past Rossman Ave.

After emergency care has been given to an injured employee, notify the Safety Director ASAP @

(908) 433-3755.

A written incident report must be submitted within 24 hours of the occurrence to Safety@Jaginc.co

Caldwell Marine International, LLC

HUXTED TUNNELING

DRILLING INTERNATIONAL

JOB EMERGENCY ACTION PLAN

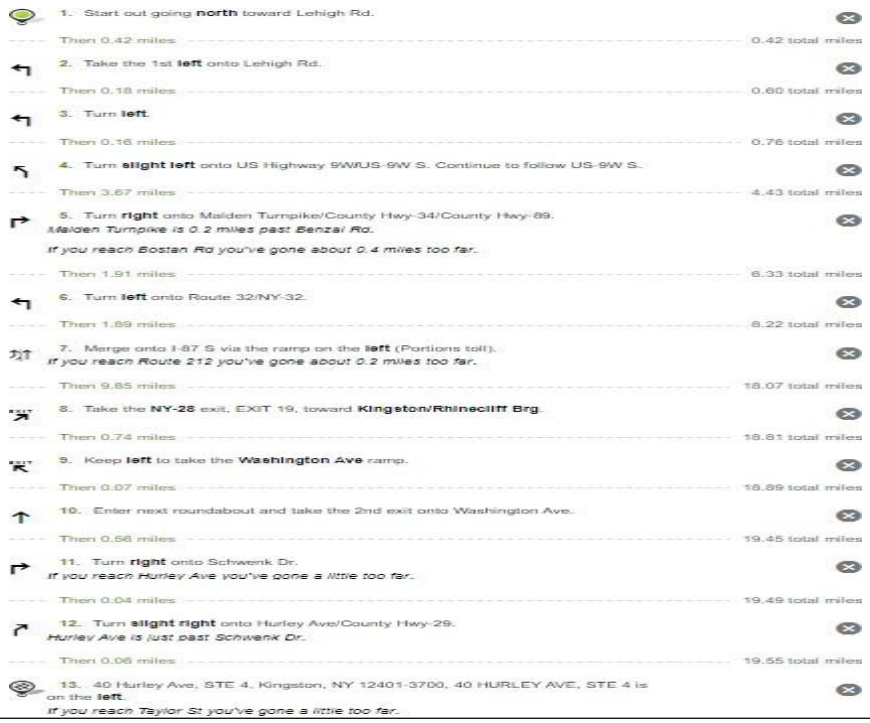
OC DOCTOR – Non Emergency

Work Related Incidents/Accidents:

Any injured employee requiring assistance above and beyond first aid should obtain immediate attention at the address provided herein:

Transport to the Occupational Medical Provider

Emergency One, Kingston, NY
40 Hurley Ave, Ste 4
Kingston, NY 12401
(845) 338-5600



After medical care has been given to an injured employee, notify the Safety Director ASAP @ (908) 433-3755.

A written incident report must be submitted within 24 hours of the occurrence to Safety@Jaginc.co

Caldwell Marine International, LLC

HUXTED TUNNELING

DRILLING INTERNATIONAL

JOB EMERGENCY ACTION PLAN

JOBSITE DETAILS			
Date: 03/04/22	**Project Owner:** CHPE,LLC	**Contractor:** CMI/ECI	
Project Name: CHPE HDD			**Job No:** 1229
Project Address: Drill #3 - Stony Point – 1 Elm Ave, Tompkins Cove, NY			
PM: Thomas Ulisse	**Cell:** 732 620 3470	**Supt:** Brett Bryant	**Cell:** 732 620 4214

EMERGENCY CALLING INFORMATION – 911		*(Local numbers are required, even if 911 is used.)*
Department	***Name***	***Telephone Number***
POLICE	**Stony Point Police Dept.**	**845-786-2422/911**
FIRE DEPARTMENT	**West Haverstraw Fire Dept.**	**845-947-2800/911**
FIRST AID / NON-EMERGENCY	**Rockland Urgent Care**	**845-429-4000**
HOSPITAL / EMERGENCY	**Montefiore Nyack Hospital**	**845-348-2000**
POISON CONTROL	**NY Poison Control**	**1-800-222-1222**
SPILL RESONSE	**Clean Harbors**	**1-800-645-8265**
OSHA	**** Corporate Safety Director will Initiate Any/All Contact with OSHA****	
DIVE HOSPITAL	**Jacobi Medical Center 234 East 149th St. Bronx, NY**	**1-718-579-5000**
Other:		

OWNER / CONTRACTOR CALLING INFORMATION		
Role	***Name- Address***	***Telephone***
OWNER: CHPE,LLC		
OWNER'S ENGINEER:		
GENERAL CONTRACTOR: NKT INC.	**Michael Hennsler**	**(917) 287-3989**
SUBCONTRACTOR: ECI DRILLING, LLC	**John Langford**	**(936) 5224-0852**
SITE SAFETY REPRESENTATIVE:	**Lucky Abernathy**	**(908) 433-3755**

JOB EMERGENCY ACTION PLAN

EVACUATION POINT(s)

JOB EMERGENCY ACTION PLAN

HOSPITAL - Emergency

Work Related Incidents/Accidents:

Any injured employee requiring assistance beyond first aid should obtain immediate attention at the address provided herein:

Transport to the nearest Emergency Room

Montefiore Nyack Hospital
160 N Midland Avenue
Nyack, NY 10960
845-348-2000

Head south on Elm Ave	
Turn left onto N Liberty Dr	167 ft
Turn right onto Wayne Ave	0.3 mi
Turn slightly right onto W Main St	1.4 mi
Turn right onto Route 210	0.2 mi
Turn left onto Palisades Interstate Pkwy	1.5 mi
Keep right and leave the freeway at exit 9E towards I-87 South/I-287 East/New York City	9.9 mi
Enter the freeway I-287 E/I-87 S from the right	0.5 mi
Keep right and leave the freeway at exit 11 towards South Nyack/US-9W/Nyack	2.8 mi
Turn left onto Route 59	0.2 mi
Turn left onto N Highland Ave	0.4 mi
Turn right onto 5th Ave	0.4 mi
Turn right onto N Midland Ave	0.1 mi
Turn right	344 ft
Turn left	82 ft
Your destination is in front of you	157 ft

After emergency care has been given to an injured employee, notify the Safety Director ASAP @ (908) 433-3755.

A written incident report must be submitted within 24 hours of the occurrence to Safety@Jaginc.co

Caldwell Marine International, LLC

HUXTED TUNNELING

DRILLING INTERNATIONAL

JOB EMERGENCY ACTION PLAN
OC DOCTOR – Non Emergency

Work Related Incidents/Accidents:

Any injured employee requiring assistance above and beyond first aid should obtain immediate attention at the address provided herein:

Transport to the Occupational Medical Provider

Rockland Urgent Care
89 South Route 9W
West Haverstraw, NY 10993
845-429-4000

After medical care has been given to an injured employee, notify the Safety Director ASAP @ (908) 433-3755.

A written incident report must be submitted within 24 hours of the occurrence to Safety@Jaginc.co

JOB EMERGENCY ACTION PLAN

JOBSITE DETAILS			
Date: 03/04/22	**Project Owner:** CHPE, LLC	**Contractor:** CMI/ECI	
Project Name: CHPE HDD			**Job No:** 1229
Project Address: Drill #4 Congers – 152 Rte. 9W Congers, NY			
PM: Thomas Ulisse	**Cell:** 732 620 3470	**Supt:** Brett Bryant	**Cell:** 732 620 4214

EMERGENCY CALLING INFORMATION – 911		*(Local numbers are required, even if 911 is used.)*
Department	***Name***	***Telephone Number***
POLICE	**Rockland Lake Police**	**845-268-6200/911**
FIRE DEPARTMENT	**Congers Fire Dept.**	**845-268-6562/911**
FIRST AID / NON-EMERGENCY	**Walk-in Medical Urgent Care**	**845-678-3434**
HOSPITAL / EMERGENCY	**Montefiore Nyack Hospital**	**845-348-2000**
POISON CONTROL	**NY Poison Control**	**1-800-222-1222**
SPILL RESONSE	**Clean Harbors**	**1-800-645-8265**
OSHA	**** Corporate Safety Director will Initiate Any/All Contact with OSHA****	
DIVE HOSPITAL	**Jacobi Medical Center 234 East 149th St. Bronx, NY**	**1-718-579-5000**
Other:		

OWNER / CONTRACTOR CALLING INFORMATION		
Role	***Name- Address***	***Telephone***
OWNER: CHPE,LLC		
OWNER'S ENGINEER:		
GENERAL CONTRACTOR: NKT INC.	**Michael Hennsler**	**(917) 287-3989**
SUBCONTRACTOR: ECI DRILLING, LLC	**John Langford**	**(936) 5224-0852**
SITE SAFETY REPRESENTATIVE:	**Lucky Abernathy**	**(908) 433-3755**

JOB EMERGENCY ACTION PLAN

EVACUATION POINT(s)

JOB EMERGENCY ACTION PLAN

HOSPITAL - Emergency

Work Related Incidents/Accidents:

Any injured employee requiring assistance beyond first aid should obtain immediate attention at the address provided herein:

Transport to the nearest Emergency Room

Montefiore Nyack Hospital
160 N Midland Avenue
Nyack, NY 10960
845-348-2000

Head south on Elm Ave	
Turn left onto N Liberty Dr	167 ft
Turn right onto Wayne Ave	0.3 mi
Turn slightly right onto W Main St	1.4 mi
Turn right onto Route 210	0.2 mi
Turn left onto Palisades Interstate Pkwy	1.5 mi
Keep right and leave the freeway at exit 9E towards I-87 South/I-287 East/New York City	9.9 mi
Enter the freeway I-287 E/I-87 S from the right	0.5 mi
Keep right and leave the freeway at exit 11 towards South Nyack/US-9W/Nyack	2.8 mi
Turn left onto Route 59	0.2 mi
Turn left onto N Highland Ave	0.4 mi
Turn right onto 5th Ave	0.4 mi
Turn right onto N Midland Ave	0.1 mi
Turn right	344 ft
Turn left	82 ft
Your destination is in front of you	157 ft

After emergency care has been given to an injured employee, notify the Safety Director ASAP @ (908) 433-3755.

A written incident report must be submitted within 24 hours of the occurrence to Safety@Jaginc.co

Caldwell Marine International, LLC

HUXTED TUNNELING

DRILLING INTERNATIONAL

JOB EMERGENCY ACTION PLAN
OC DOCTOR – Non-Emergency

Work Related Incidents/Accidents:

Any injured employee requiring assistance above and beyond first aid should obtain immediate attention at the address provided herein:

Transport to the Occupational Medical Provider

Walk-In Medical Urgent Care

236 South Main Street
New City, NY 10906
845-678-3434

Head north on N Route 9W	
Turn left onto Route 304	1.6 mi
Turn right onto 3rd St	3.4 mi
Turn left onto S Main St	0.2 mi
Turn left	0.2 mi
Your destination is on the right	135 ft

After medical care has been given to an injured employee, notify the Safety Director ASAP @ (908) 433-3755.

A written incident report must be submitted within 24 hours of the occurrence to Safety@Jaginc.co

Attachment 11
HSE Monthly Report

HEALTH, SAFETY & ENVIRONMENT – MONTHLY REPORT

Project:			
Project Number:			**Month:**
Employee-hours	Total Carried:	Current Month:	Project Total:
Employee/Visitor O n -Boarding	Total Carried:	Current Month:	Project Total:
Daily JAGs (Job Action Guide)	Total Carried:	Current Month:	Project Total:
Weekly Toolbox Topics	Total Carried:	Current Month:	Project Total:
Safety Inspection Performed	Total Carried:	Current Month:	Project Total:
Safety S t a n d -Down/Time-Outs	Total Carried:	Current Month:	Project Total:
Near Miss	Total Carried:	Current Month:	Project Total:
First Aid	Total Carried:	Current Month:	Project Total:
Medical Treatment (Off-Site)	Total Carried:	Current Month:	Project Total:
Restricted Duty	Total Carried:	Current Month:	Project Total:
Lost Time	Total Carried:	Current Month:	Project Total:
Environmental Incidents	Total Carried:	Current Month:	Project Total:
Asset/Equipment D a m a g e	Total Carried:	Current Month:	Project Total:
Management Of Change	Total Carried:	Current Month:	Project Total:

Incident Status Up-Date

Date:	Location:	Incident #:	Title:	Category:	Status: Open/ Close

Prepared By:	**Signature:**	**Date:**

Attachment 12

Site Specific Safety Orientation Form

JAG COMPANIES

SITE SPECIFIC SAFETY ORIENTATION

Contractor / Subcontractor:	Project Number:
I have attended the site orientation and understand and furthermore I accept the site rules and regulations presented.	
Printed Name:	**Trade:**
Address:	**Telephone Number:**
Emergency Contact Person & Telephone Number:	**Driver's License Number:**

MEDICAL QUESTIONS – This information is medical and is considered confidential.
All questions are voluntarily requested to assist in the event of an emergency.

1. **Do you have any known allergies?** ☐ No ☐ Yes If yes, describe: _____
2. **Are you on any medications?** ☐ No ☐ Yes If yes, describe: _____
3. **Do you have first aid training?** ☐ No ☐ Yes If yes, exp. date: _____

SAFETY RULES AND REGULATIONS

☐ Review of Federal Regulations & Requirements	☐ Work Permit
☐ Emergency Response / Alarms	☐ Scaffolding / Tag System
☐ First Aid Station / Location / Training	☐ Ladders
☐ Reporting ACC / INC / Injuries / Hazards	☐ Riggers – Responsibilities
☐ Worker Responsibilities	☐ Preventive Maintenance Program
☐ Foreman Responsibilities	☐ Excavations
☐ Management Responsibilities	☐ Barricades
☐ Worker Right to Know	☐ Signage / Flagging
☐ Site Hazards	☐ Welders Responsibilities / Work Protection, etc.
☐ HNIS / MSDS – Training / Locations	☐ Fire Extinguishers / Locations / Inspections
☐ Communication Systems	☐ Torches / Cutting Equipment / Safeguards / Flash Arrestors
☐ Traffic Patterns / Parking / Security	☐ Proper Storage / Transporting Cylinders
☐ Safety Meetings	☐ Inspection of Hoses / Coupling etc.
☐ Smoking / Alcohol / Drugs	☐ Equipment Safeguards
☐ Zero Tolerance Rules	☐ Grinders / Disc Rated
☐ Equipment Inspection / Certification	☐ Electrical Cords / Connectors / Overhead Lines
☐ Equipment Hazards	☐ Hand Tools / Power Tools
☐ Lockout Program	☐ Rowdiness / Horseplay
☐ P.P.E. Eyes / Ears / Head / Hands / Feet	☐ Good Housekeeping / Sanitation
☐ Safety Harness / Lanyards	☐ Other:
☐ Confines Space / Training	☐ Other:

Attendee's Signature:	**Date:**
Instructor's Signature:	**Date:**

NORTHEAST REMSCO Construction · Caldwell Marine International, LLC · HUXTED TUNNELING · EC DRILLING INTERNATIONAL

Attachment 13
Lightning Safety Procedures

Lightning Safety Procedures

Overview

The purpose of this document is to provide a guide for personal safety during thunderstorms.
A brief review of common medical problems encountered with a lightning strike and appropriate first aid treatment is also included.

References

OSHA Emergency Action Plans 29CFR 1926.35

Hazards

Direct strike - statistics show that death resulted in over 70 % of cases.
Side flash - e.g., standing near a tree - this can be as serious as a direct strike.
Contact potential - physical contact with struck object has similar consequences to direct strike.
Step voltage - lightning impulse traveling through/on ground and may pass through one limb/part and out another. Injuries include burns and paralysis, but these are usually temporary.
Surge propagation - person close to or in contact with an electrical appliance or power/communication line. Serious injury is not common, but a number of deaths have resulted from telephone usage.

Key Responsibilities

Managers and Supervisors

- Review project Emergency Action Plan (EAP), as outlined in 29 CFR 1926.35
- Review written lightning safety protocol with all outdoor workers
- Regularly monitor weather conditions and local weather forecasts prior to scheduled activities
- Monitor SkyScan EWS-PRO 2 Portable Lightning Detector and Early Warning Device
- Notify all employees about lightning safety warnings and instruct workers seek safe shelter inside.
- Suspend outdoor work activities when lightning is detected within 3-8 miles
- Inform all workers to act after hearing thunder, seeing lightning, or perceiving any other warning signs of approaching thunderstorms.
- Do not allow the resumption of outdoor work activities until 30min after the last lightning strike.

Employees

- Follow all directions and instruction of your supervisor
- When instructed, seek safe shelter ASAP
- Do not return to work until instructed to do so by supervisor.
- Employees should safely secure any work tasks being performed at the time of lightning notification and seek safe shelter inside ASAP.

Procedure/Practices

General

Lightning safety awareness should be a priority at every outdoor facility and operation, where education is the single most important means to achieving this goal.

The number one rule is that workers need to always consider their own situational safety, and those who may find themselves exposed to the risk should always recognize and anticipate their exposure to a changing or high-risk situation, and where appropriate move to a lower-risk location.

The following steps are suggested:

1. Regularly monitor weather conditions and local weather forecasts prior to scheduled activities.
2. Suspension and resumption of work activities should be planned, in conjunction with this Lightning Risk Policy
3. Understanding of SAFE shelters is essential. SAFE evacuation sites include:
    - Grounder Barge offices/lunchroom/tool containers
    - Fully enclosed metal vehicles with windows up
    - Substantial buildings
    - Low ground
4. UNSAFE SHELTER AREAS include all outdoor metal objects, like power poles, fences and gates, high mast light poles, electrical equipment, mowing and road machinery.
    - AVOID solitary trees.
    - AVOID water.
    - AVOID open fields.
    - AVOID high ground and caves.
5. If you feel your hair standing on end, and/or hear "crackling noises," you are in lightning's electric field. If caught outside during close lightning activity, immediately remove metal objects (including baseball cap, jewelry, belts, car keys etc.), place your feet together, duck your head, and crouch down low with hands on knees.
6. Wait a minimum of 30 minutes from the last observed lightning or thunder before resuming activities. Be extra cautious during this phase as the storm may not be over.
7. People who have been struck by lightning do not carry an electrical charge and are safe to handle. Apply first aid immediately if you are qualified to do so. Get emergency help promptly.
9. Suspend activities, allowing sufficient time to get to shelter. Of course, different distances to safety will determine different times to suspend activities.
10. Be aware of your surroundings and the nearest safe area.

SkyScan EWS-PRO 2 Features:

Accurate digital microprocessor with patented dual antenna receiving system

- Built-in 12-volt rechargeable power source, operating for 7+ days on a single charge
- Loud 95dB alert horn, with adjustable range setting
- Rugged weather-resistant case
- Low battery indicator on the weather detector
- Severe thunderstorm alert that warns of large storm cell approaching
- False signal filtering feature to warn against any location interference
- Accurate identification software that eliminates alerts to harmless cloud-to-cloud lightning activity
- Battery management intelligent battery recharging system.
- Case designed with battery recharger storage compartment

Attachment 14
Pandemic Response Plan

JAG Companies

Pandemic Pathogen Response Plan

VERSION 1.5 | November 1, 2020

Authored by: Rolando E. Acosta

JAG COMPANIES

JAG Companies Pandemic Pathogen Response Plan

Note: The following plan provides a general framework that any Northeast Remsco Construction, Caldwell Marine International, Huxted Tunneling, and ECI Drilling International facility/project should follow during a pandemic event. The plan is based on Federal guidelines; however, State/Local Governments, Project Owners, or specific circumstances may require a different standard of response. The Plan, in coordination with the Emergency Response Team, may be altered to support additional requirements requested/required from State/Local Governments or Project Owners or to respond to particular conditions.

1. Purpose & Goal

a. The purpose of implementing the JAG Companies Pandemic Pathogen Response Plan (the "plan") is to:
    i. (1) protect the health of our employees and their families
    ii. (2) to ensure business continuity and maintain mission-critical operations and services during a pandemic event
b. Maintaining essential business functions during a pandemic event is a challenge and the response requires flexibility based on available credible information from government agencies (federal, state, & local) and medical professionals.
c. The plan allows JAG Co. to respond to any pandemic, outbreak, or health related event effectively and efficiently.
d. Leadership is key during a pandemic event. Employees will look to management to provide leadership for JAG Co. We are committed to lead as follows:
    i. *Anticipate*: We will attempt to predict what lies ahead without succumbing to panic.
    ii. *Navigate*: We will course correct as needed in real time.
    iii. *Communicate*: We will continually maintain clear, established lines of communication with our employees.
    iv. *Listen*: We will listen to the experts, our advisors, and our employees, including information we may not want to hear. We will attempt to avoid media hype and crowd hysteria.
    v. *Learn*: We will use what we learn from this experience as a lesson for future events.
    vi. *Lead*: We will improve ourselves and elevate those around us.
e. The plan will be reviewed annually or during the initial phases of a health event as needed. Reviewers will include certain JAG Co. management personnel.

2. Key Terms & Definitions

a. **Close Contact**: Being within 6 feet of an infected person for a cumulative total of 15 minutes or more over a 24-hour period regardless of whether cloth face covers, or masks were in us.
    i. Anyone who has been exposed to COIVD-19 due to "close contact" is required to stay home for 14-days from the day of last exposure.
        1. During the 14 days, that person must always maintain a distance of at least 6 feet from others, self-monitor for symptoms, avoid contact with people at higher risk of illness, and follow CDC guidelines if they develop symptoms.
    ii. Brief interactions totaling 15 minutes over the course of 24-hours with:
        1. A person who is known to have COVID-19 (i.e., someone who has been

tested and confirmed to have COVID-19),
2. A person who developed symptoms consistent with COVID-19 two to three days after the interaction, or
3. A person currently experiencing symptoms of COVID-19.

iii. Factors to consider when evaluating close contact:
1. Proximity: closer distance increases exposure risk.
2. Duration: longer interactions increase exposure risk.
3. Symptoms: interactions with a person within two to three days of symptom onset increase your exposure risk.
4. Activity: interactions with persons coughing or shouting increase your exposure risk.
5. Location: interactions in an area that has less ventilation (indoors vs. outdoors) increase your exposure risk.

b. **Hand Hygiene**: Applies to the disinfecting of one's hands. This is usually done with soap and water, hand sanitizer, or hand wipes. It is recommended that you wash your hands for a minimum of 20 seconds with soap & water and 10 seconds with hand sanitizer/wipes.
c. **Human-to-Human Transmission:** Refers to the spread of a pathogen from one human to another by (including but not limited to): direct contact with the blood or body fluids (i.e., *saliva, urine, vomit, semen, and feces***)** of an infected person or contact with objects that have been contaminated with the blood or body fluids of an infected person.
i. The pathogen in the blood & body fluids can enter another person's body through broken skin or unprotected mucous membranes in the eyes, nose, or mouth.
ii. During outbreaks of pathogen, the disease can spread quickly and human-to-human contact must be avoided and/or eliminated.
iii. Proper disinfecting and disposal of objects is vital.
d. **Infection Control**: A broad term used to describe a number of measures designed to detect, prevent, and contain the spread of an infectious disease. Some measures include hand washing, respiratory etiquette, use of personal protective equipment (PPE), prophylaxis, isolation, and quarantine.
e. **Infectious Disease**: An infectious disease, or communicable disease, is caused by the entrance of organisms (e.g., viruses, bacteria, fungi) into the body that grow and multiply to cause illness. Infectious diseases can be transmitted by direct contact with an infected individual, their discharges (e.g., breath, cough, sneeze), or with an item touched by them.
f. **Isolation**: When sick people are asked to remain in one place (e.g., home, hospital), away from the public, until they are no longer infectious.
g. **Pandemic**: A disease epidemic that has spread across a large region, for instance multiple continents, or worldwide.
h. **Pathogen**: A bacterium, virus, or other microorganism that can cause disease.
i. **Personal Protective Equipment (PPE)**: PPE is specialized clothing or equipment worn to protect someone against a hazard including an infectious disease. It can range from a mask or a pair of gloves to a combination of gear that might cover some or all of the body.
j. **Prevention**: An action taken to reduce or eliminate the opportunities for transmission of the disease from one individual to another. We must all do our part to prevent the spread of the disease by following the procedures outlined in this process.
k. **Quarantine**: A quarantine is when people who have been in close proximity to an infected person, but appear healthy, are asked to remain in one place, away from the general public,

until it can be determined that they have not been infected.

l. **Respiratory Etiquette**: Respiratory etiquette, or good coughing and sneezing manners, is one way of minimizing the spread of pathogens which are passed from human-to-human in the tiny droplets of moisture that come out of the nose or mouth when coughing, sneezing, or talking. Healthy and sick people should cover their nose and mouth when sneezing, coughing, or blowing their nose and then put the used tissue in the trash to prevent the spread of germs.

m. **Social (Physical) Distancing**: An infection control strategy that includes methods of reducing the frequency and the closeness of contact between people to limit the spread of infectious diseases. Generally, social distancing refers to the avoidance of gatherings with many people.
    i. In the event **Social (Physical) Distancing** is not practical nor feasible during work activities, the employee will be supplied and required to wear the appropriate respiratory PPE.

n. **Work from Home (WFH)**: WFH is a consideration available for certain eligible employees as identified by the Emergency Response Team ("ERT") to work temporarily from home or a remote location. The WFH process will be followed by all identified employees:
    i. The ERT will identify employees that can or will work from home.
    ii. The ERT will notify the employee's manager and the manager will assign a virtual meeting group and meeting group leader.
    iii. Normal operating hours apply.
        1. A 30-minute lunch break will be accounted for during working hours.
    iv. OIT will coordinate and set-up the necessary technology for identified employees.
        1. OIT is available to provide all necessary support.

3. Responsibilities

a. Employer: All JAG Companies' operating companies.
    i. Create, distribute, and implement a **"Self-Assessment Checklist."**
        1. The checklist does not supersede any daily assessment protocols that may already be in place as provided by the project owner.
        2. The checklist will be provided to employees as well as prominently displayed at all Company facilities (offices, jobsites, shops, etc.).
        3. If you reply **YES** to any of the checklist questions, **STAY HOME** and immediately contact your supervisor.
    ii. Educate workers about general precautions and regularly communicate plans to limit the spread of the pathogen.
    iii. Reinforce good hygiene practices and take steps to make it easy for workers to frequently wash their hands.
        1. Install hand-sanitizing stations throughout workplaces.
    iv. Implement policies that maintain physical distance between workers.
        1. Post social distancing signs as a reminder.
        2. Instruct employees to avoid direct physical contact.
    v. Identify, clean, and sanitize high-risk transmission areas regularly.
    vi. Provide appropriate personal protective equipment (PPE)
    vii. Require sick workers to stay home and send sick workers' home.

b. Employees: For the sake of clarity, we are ALL employees.
    i. Employees must complete a self-assessment as outlined in the **"Self-Assessment Checklist"** prior to the start of EVERY shift.
        1. The checklist does not supersede any daily assessment protocols that may already be in place as provided by the project owner.
        2. The checklist will be provided to employees as well as prominently displayed at all Company facilities (offices, jobsites, shops, etc.).
        3. If you reply **YES** to any of the checklist questions, **STAY HOME** and immediately contact your supervisor.
        4. Check your body temperature and know the symptoms that may indicate an infection, specifically COVID-19. Check for the following:
            - Fever or feeling feverish
            - General soreness
            - Fatigue
            - Headache
            - Sore Throat
            - Cough
            - Change or Loss of Appetite
            - Repeated shaking with chills
            - Shortness of breath
            - Muscle pain
            - Loss of taste
            - Loss of smell
            - Diarrhea.
    ii. Employees that are or feel ill must **NOT** report to work
        1. Employee should contact their manager to discuss next steps.
        2. Any employee that reports to work with any "sick symptoms" will be sent home immediately.
        3. The employee may not return to work without clearance or a return to work note from a medical professional or approval from ERT.
    iii. Maintain good workplace hygiene, including hand washing practices and cough/sneeze etiquette.
        1. **100%** use of a "**face cover**" on **ALL** company projects, regardless of geographic location.
        2. The Safety Team is available to discuss and suggest the appropriate face covering for your project activities: cloth covering/mask, surgical mask, KN95, N95, face shield, etc.
    iv. Maintain a distance of at least six feet from other workers and limit large group interactions. Follow these same practices on and off the job as well.
        1. In the event the minimum distance of six feet is not practical nor feasible during work activities, the employee will be supplied and required to wear the appropriate respiratory equipment.
    v. Cooperate with response measures instituted by employer and those recommended by health officials at the federal, state, and local level.
    vi. Do not share other workers' phones, PPE or other work tools and equipment.
    vii. Receive recommended appropriate immunization or vaccination.

c. Office/Site Managers: Managers are responsible for implementing the protocol for employees that are symptomatic and employees returning to work after being out sick.

i. If any employee exhibits symptoms that are indicative of the pandemic, office/site management must be notified immediately. The communication should be oral or telephone first, followed by an email.
    1. Isolate the employee to the best of your ability.
    2. Provide a mask to the employee and instruct them to put the mask on immediately. Masks and other PPE will be available onsite.
    3. The Corporate Safety Director ("CSD") will speak directly with the employee to avoid any misinformation or having pertinent information "lost in translation." The CSD will manage the communications with the employee and protect the identity of the employee to best of their ability.
    4. Instruct the employee to leave work. Ask the employee to avoid public transportation if possible.
    5. Advise the employee to seek medical attention.
    6. Have the employee's workstation, work area, vehicle, tools, etc. cleaned and disinfected immediately by a cleaning service.
    7. If the diagnosis from a medical professional is that the symptoms are unrelated to the pandemic, then the employee may to return to work following review by the ERT.
    8. If the diagnosis from a medical professional is that the employee has the illness causing the pandemic, then the employee must follow the Diagnosed Individual Protocol outlined in *Section 5d* below.
    9. Check on the employee during their absence from work and encourage a return to work once they feel better and are cleared by medical professional.

ii. **Temperature Screening**
    1. To protect your co-workers and families, the company will require temperature screening for all employees returning to their workplace after being sick or quarantined.
    2. Body temperatures will be taken in a manner that is consistent with infection control and social distancing policies (six-foot separation between individuals in line) and provides privacy for those individuals being screened.
    3. Screening information will be considered confidential and protected accordingly, even while acting on that information to protect the health and safety of others in the workplace.
    4. For the purpose of the Plan, a fever is defined as subjective fever (feeling feverish) or a measured temperature of 100.4 F (38 C) or higher.
    5. An employee with a body temperature of 100.4 F (38 C) or higher may be denied from returning to their workplace after being sick or quarantined.
        - Employees who screen positive for a fever will be rechecked a second time after 15 minutes.

iii. Any thermometer or other equipment used in the temperature screening process that touches an employee or is touched by an employee should be properly disinfected between uses.

d. Emergency Response Team ("ERT"): An ERT will be responsible for investigating all

pandemic events & emergency events and evaluating the impact such event will have on JAG Co. The ERT will be responsible for providing guidance in responding to the event. The ERT will consist of some or all of the following JAG Co. employees (*the ERT may also include other JAG Co. employees*):

i. Lucky Abernathy, Corporate Safety Director JAG Companies
ii. Roly Acosta, President/CEO JAG Companies
iii. Marcelo Afonso, CFO JAG Companies
iv. Dustin Brasher, VP/GM ECI Drilling International
v. Anna Camooso, HR Manager JAG Companies
vi. Greg Goett, Counsel JAG Companies
vii. John Gutierrez, VP/Equipment Manager JAG Companies
viii. Ray Post, VP/GM Huxted Tunneling
ix. Rob Ross, VP/GM Northeast Remsco Construction
x. Jim Yuille, VP/GM Caldwell Marine International

4. Communication

a. Good communication during a pandemic event is critical to the success of our response. The company will utilize various channels of communication to keep our employees informed including telephone calls, emails, text messages, emergency text message service, letters, handouts, website, social media accounts, etc.
b. The communicator may vary, but the message will have "one voice" for consistency, clear instructions & directions, and to avoid confusion.
c. Regular communication provides:
    i. Notification of any changes in our Tiered Response Plan (*detailed in this plan*).
    ii. Clarification to any Executive Orders from Federal, State, or Local governments.
    iii. Updates on the status of the pandemic from credible sources including the Center for Disease Control ("CDC"), the World Health Organization ("WHO"), & the Occupational Safety & Health Administration ("OSHA").
    iv. Changes to our Response Plan.
    v. Prompt notification of all employees of any known exposure to COVID-19 at the worksite.

5. Pandemic Pathogen Protocol

a. International Travelers: Any employees or project personnel, including subcontractors & vendors, returning from a CDC Level 2 or 3 country must disclose their travels to their manager or project management prior to returning to work. The traveler must remain out of work for the CDC (or equivalent government agency) designated quarantine period (beginning from the date returned to the United States) even if they are not directed to quarantine by government officials. https://wwwnc.cdc.gov/travel/notices/
    i. An employee might be permitted to follow WFH process if job duties allow.
b. Domestic Travelers: Any employees or project personnel, including subcontractors & vendors, returning from domestic travel must disclose their travels to their manager or project management prior to returning to work. Notification is required regardless of travel method (i.e., air, rail, ship, road, etc.) The ERT will provide guidance that may include a CDC (or equivalent government agency) designated quarantine period (beginning from the date returned to the United States) even if they are not directed to

quarantine by government officials.

i. An employee might be permitted to follow WFH process if job duties allow.

c. Individuals directed to Quarantine by Federal, State & Local Authorities: Employees, subcontractors or vendors who are directed to quarantine by federal, state, or local authorities must remain out of work for the duration of the quarantine period.
    i. An employee might be permitted to follow WFH process if job duties allow.
d. Diagnosed Individuals: Employees, subcontractors or vendors who have been diagnosed with a pandemic pathogen must remain out of work for the CDC (or equivalent government agency) designated quarantine period starting from the date of the positive diagnosis. The individual cannot return to work unless they have been cleared by a medical professional and the ERT.
    i. An employee might be permitted to follow WFH process if job duties allow.
e. Others: Individuals who feel they are at risk for contracting a pandemic pathogen must provide a written statement to their manager explaining the reason for their concerns. Concerns might include shared residence with a diagnosed person, close contact with a diagnosed person, exposure to the pathogen in their personal life, etc. The ERT will review the statement and provide guidance that may include some period of quarantine.
    i. An employee might be permitted to follow WFH process if job duties allow.
f. These are intended as general guidelines; JAG Co. may modify or make exceptions following review and approval by the ERT.

6. COVID-19 Risk Assessment

a. The Company will conduct periodic assessments of risk levels following OSHA and CDC guidance to keep employees safe on a continuous basis.
b. OSHA classifies occupational risk to COVID-19 infections as:
    i. ***Lower Exposure Risk***: Activities that do not require contact between people know to be, or suspected of being, infective with COVID-19 nor frequent contact with (within 6 feet of) the general public.
    ii. ***Medium Exposure Risk***: Activities that require frequent and/or close contact with (within 6 feet of) people who may be infected with COVID-19, but who are not known or suspected to be infected with COVID-19.
    iii. ***High Exposure Risk***: Activities with high potential for exposure to known or suspected sources of COVID-19.
    iv. ***Very High Exposure Risk***: Activities with high potential for exposure to known or suspected sources of COVID-19 during specific medical, postmortem, or laboratory procedures.

7. JAG Companies Face Cover PPE Protocol

a. During a pandemic, company protocol is **100%** use of a "**face cover**" on **ALL** company property (office, project, shops, etc.).
b. **General Information**
    i. A face covering is a personal protective device that is worn on the face or head and covers at least the nose and mouth. A face covering is used to reduce the wearer's risk of inhaling hazardous airborne particles (including infectious agents), gases or vapors.
    ii. Information indicates that covering your nose and mouth can slow the spread of

a pathogen, including COVID-19.

iii. Lowering the covering from your nose and mouth while talking defeats the purpose of wearing the face covering since you can spread virus while you talk.
iv. Employees may be unable to wear every available face covering due to certain medical conditions.
    1. Employees should consult with the Safety Department prior to utilizing a face covering that they are unfamiliar with or uncertain of wearing.
v. An employee experiencing difficulty breathing while wearing a face covering should social distance immediate and discontinue use. The employee must report the issue to their supervisor as soon as possible.

c. **Cloth Face Covers**
    i. A cloth face cover is a material that covers the nose and mouth.
    ii. It can be secured to the head with ties or straps or simply wrapped around the lower face. It can be made of a variety of materials, such as cotton, silk, or linen.
    iii. A cloth face covering may be factory-made or sewn by hand or can be improvised from household items such as scarfs, T-shirts, sweatshirts, or towels.
    iv. Employees may provide their own cloth face covering or request a company issued cloth face cover.
    v. It is recommended that you wash your cloth face covering frequently, ideally after each use, or at least daily.
    vi. Use a bag or bin to store cloth face coverings until they can be laundered with detergent and hot water and dried on a hot cycle.
    vii. If you must re-wear your cloth face covering before washing, wash your hands immediately after putting it back on and avoid touching your face.
    viii. Do NOT share cloth face coverings nor any other PPE.
    ix. Discard cloth face coverings that:
        1. No longer cover the nose and mouth
        2. Have stretched out or damaged ties or straps
        3. Cannot stay on the face
        4. Have holes or tears in the fabric

d. **Surgical Masks**
    i. A surgical mask is a loose-fitting, disposable device that creates a physical barrier between the mouth and nose of the wearer and potential contaminants in the immediate environment.
    ii. Surgical masks are made in different thicknesses and with different ability to protect you from contact with liquids. These properties may also affect how easily you can breathe through the facemask.
    iii. If worn properly, a surgical mask is meant to help block large-particle droplets, splashes, sprays, or splatter that may contain germs (viruses and bacteria), keeping it from reaching your mouth and nose. Surgical masks may also help reduce exposure of your saliva and respiratory secretions to others.
    iv. Employees should minimize the demand for surgical masks respirators by undertaking preventative actions on the job site. That is our first line of defense.
    v. Surgical masks will be provided to employees when required.
    vi. Do NOT share surgical masks nor any other PPE.
    vii. Surgical masks are not intended to be used more than once. If your mask is damaged or soiled, or if breathing through the mask becomes difficult, you

should remove the face mask, discard it safely, and replace it with a new one.

viii. To safely discard your mask, place it in a secure waste receptacle. Wash your hands after handling the used mask.

e. **N95 Respirator Masks** (KN95 Masks are a suitable alternative under certain emergency circumstances)
   i. A N95 is a type of respirator which removes particles from the air that are breathed through it. These respirators filter out at least 95% of very small (0.3 micron) particles. N95's is capable of filtering out all types of particles, including bacteria and viruses.
   ii. Achieving an adequate seal to the face is essential. When properly fitted and worn, minimal leakage occurs around edges of the respirator when the user inhales. This means almost all of the air is directed through the filter media.
   iii. The CDC does not recommend that the general public wear N95 respirators to protect themselves from respiratory diseases, including coronavirus. Everyday preventative action prevents the spread of respiratory viruses.
   iv. To ensure N95 respirators are available when needed, employees should minimize the demand for N95 respirators by undertaking preventative actions on the job site. That is our first line of defense.
   v. N95 respirators will be provided to employees when required. An employee will be issued one (1) N95 respirator per week (or as needed) when required.
   vi. Do NOT share N95 respirators nor any other PPE.
   vii. During times of supply shortages, the CDC allows for the re-use of N95 respirators assuming it is not clogged with particulates.
   viii. The respirator should be carefully stored between uses:
      1. In a receptacle that allows for some breathability: a paper bag, a plastic container with holes in the top, a closable plastic bag with holes in it.
      2. Label respirators with the user's name before use to prevent reuse by another individual
   ix. The wearer should wash his or her hands before & after handling the respirator.
   x. Respirator users should not attempt to disinfect N95 respirators. It may create a health hazard for the user, and it may render the respirator ineffective in providing respiratory protection.
   xi. As the N95 mask gets clogged, it becomes more difficult to breathe. When this occurs, throw it out and request a new one.
   xii. Discard the mask if it is wet, dirty, deformed, or if the filter is torn.
   xiii. To safely discard your mask, place it in a secure waste receptacle.

8. Tiered Response Plan

a. The JAG CO. Tiered Response Plan outlines our temporary approach to a pandemic event to keep our employees & their families safe and maintain mission-critical operations and business continuity.

Office Response Plan

The following shall be applied to each JAG office location as may be required:

TIER ZERO ("0")

- Office opens with minimal restrictions.
- Follow the CDC Five:
    - Hands: Wash Them Often
    - Elbow: Cough into It
    - Face: Don't Touch It
    - Feet: Stay More Than 6ft Apart
    - Feel: Sick? Stay Home

TIER ONE ("1")

- Office opens with some restrictions.
- Certain eligible employees might be offered the opportunity to work temporarily from home or remote location ("home").
    - Job description must allow for productive work from home.
    - Manager approval required
    - Follow "Work from Home" Process.
- Request that all meetings be conducted via teleconference or virtual platform.
- Limit personal interactions with co-workers.
- Limit visitors to the office (vendors, subcontractors, spouse, children, etc.)
- Practice social distancing, hand hygiene, and respiratory etiquette.
- Restrict occupancy in common areas such as break or lunch areas.
- Eliminate water coolers and other shared resources (high-touch areas).
- Increase cleaning / wipe down of personal work areas, common areas and facilities.
- Nonessential business-related travel suspended.
- Use of a face covering outside of your personal workspace and where 6' of distance cannot be maintained with other employees.

TIER TWO ("2")

- Office opens with further restrictions.
- Office restricted to essential personnel and activities as well as employees where telecommunicating poses a hardship.
    - The ERT will identify essential personnel & activities as required.
- All eligible non-essential employees might be offered the opportunity to work temporarily from home.
    - Job description must allow for productive work from home.
    - ERT approval required.
    - Follow "Work from Home" Process.
- All meetings must be conducted via teleconference or virtual platform.
- Limit interactions with co-workers.
- No visitors to the office.
- Practice social distancing, hand hygiene, and respiratory etiquette.
- Restrict occupancy in common areas such as break/lunch areas to accommodate 6' social distance.
- Increase cleaning / wipe down of personal work areas, common areas and facilities.
- All business travel is suspended.
- Use of a face covering outside of your personal workspace and where 6' of distance cannot be maintained with other employees.

TIER THREE ("3")

- Office Closed.
- All eligible essential & non-essential employees might be offered the opportunity to work temporarily from home.
    - Job description must allow for productive work from home.
    - Follow "Work from Home" Process.
- All meetings must be conducted via teleconference or virtual platform.

Field/Shop/Non-Office Locations Response Plan

The following shall be applied to each JAG Companies operating location as may be required:

TIER ZERO ("0")

- Location is operational with minimal restrictions.
- Follow the CDC Five:
    - Hands: Wash Them Often
    - Elbow: Cough into It
    - Face: Don't Touch It
    - Feet: Stay More Than 6ft Apart
    - Feel: Sick? Stay Home

TIER ONE ("1")

- Location is operational with some restrictions.
- Certain eligible employees might be offered the opportunity to work temporarily from home or remote location ("home").
    - Job description must allow for productive work from home.
    - ERT approval required
    - Follow "Work from Home" Process.
- Request that all meetings be conducted via teleconference or virtual platform.
- Limit personal interactions with co-workers.
- Limit visitors to essential project personnel (owner, engineer, vendors, suppliers, subcontractors, etc.)
- Practice social distancing, hand hygiene, and respiratory etiquette.
- Eliminate water coolers and other shared resources (high-touch areas).
- Increase cleaning / wipe down of personal work areas, common areas and facilities.
- Hold separate "Toolbox Talks" or other job meetings with the various crews.
- Eat lunch separately to the extent possible.
- Reduce choke points (i.e., project entrances, portable toilet facilities, etc.).
- Use of a face covering outside of your personal workspace and where 6' of distance cannot be maintained with other employees.

TIER TWO ("2")

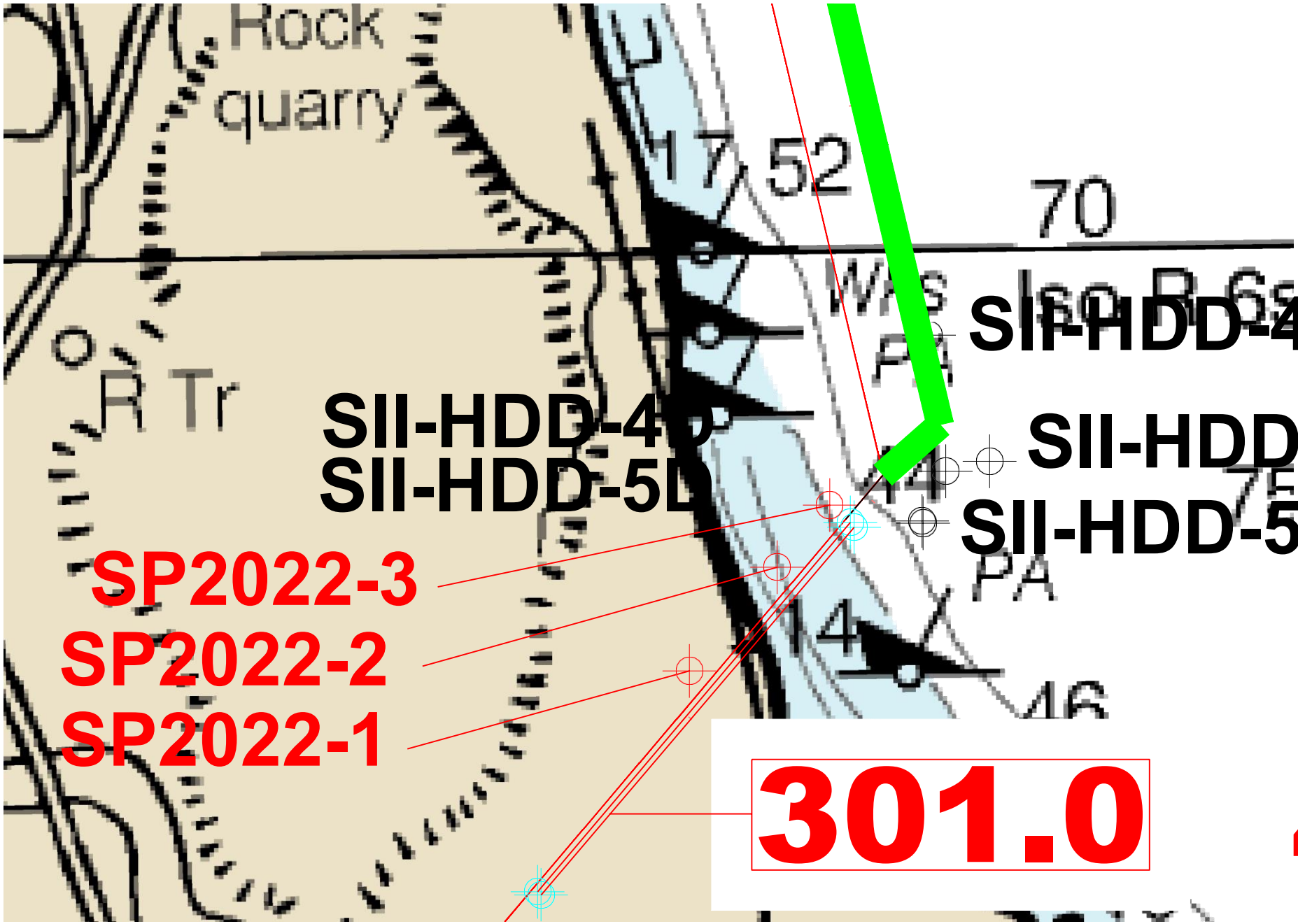
- Location is operational with further restrictions.
- Location restricted to essential personnel and activities.
    - The ERT will identify essential personnel & activities as required.

- All eligible non-essential employees might be offered the opportunity to work temporarily from home.
    - Job description must allow for productive work from home.
    - ERT approval required.
    - Follow "Work from Home" Process.
- All meetings must be conducted via teleconference or virtual platform.
- No visitors to the location except for essential personnel.
- Limit interactions with co-workers. Eat lunch separately.
- Practice social distancing, hand hygiene, and respiratory etiquette.
- Increase cleaning / wipe down of personal work areas, common areas and facilities.
- Hold separate "Toolbox Talks" or other job meetings with the various crews.
- Use of a face covering outside of your personal workspace and where 6' of distance cannot be maintained with other employees.

TIER THREE ("3")

- Location is Closed.
- All eligible essential & non-essential employees might be offered the opportunity to work temporarily from home.
    - Job description must allow for productive work from home.
    - Follow "Work from Home" Process.
- All meetings must be conducted via teleconference or virtual platform.

Appendix U– Geotechnical Borings Taken in 2022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quarry
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17
52
70
PA
14
SII-HDD-4
SII-HDD
SII-HDD-5
SII-HDD-4D
SII-HDD-5D
SP2022-3
SP2022-2
SP2022-1
301.0
4

Project: **CHPE**
Stony Point, New York
Date: 03/22/2022 to 03/25/2022
Contractor: Warren George, Inc.

Boring No.: SP-2022-1
Sheet: 1 of 3
Ground El: NA
Groundwater Depth: NA

Depth Feet	SAMPLES Number	Blows / 6"	Strata	SOIL DESCRIPTION	Classification Depth Elevation
	S-1	12-12-13-12	F	Light gray coarse to fine Sand, trace Silt, some coarse to fine Gravel	FILL/SM 3'-0"
5	S-2	16-11-11-12	S	Brown Clayey Silt, some coarse to fine Sand, trace to some coarse to fine Gravel	ML
10	S-3	11-11-14-12			13'-0"
15	S-4	10-10-8-11	G_A	Gray-brown coarse to fine Sand, little Silt, some medium to fine Gravel	SM
20	S-5	9-8-4-6			
25	S-6	13-9-11-13			
30	S-7	6-9-9-9			33'-0"
35	S-8	6-6-4-5	S	Dark gray Clayey Silt	ML/CL
40	S-9	6-5-13-27			43'-0"
45	S-10	25-21-21-17	G_T	Dark gray coarse to fine Gravel, little Silt, some coarse to fine Sand	GM
50					

Project: **CHPE**
Stony Point, New York
Date: 03/22/2022 to 03/25/2022
Contractor: Warren George, Inc.

Boring No.: SP-2022-1
Sheet: 2 of 3
Ground El: NA
Groundwater Depth: NA

Depth Feet	SAMPLES Number	Blows / 6"	Strata	SOIL DESCRIPTION	Classification Depth Elevation
			G_T	Dark gray coarse to fine Gravel, little Silt, some coarse to fine Sand	GM 53'-0"
55	S-11	27-25-28-31			
60					
65					
70					
75			D_R	Light Brown Decomposed Gneiss Bedrock	
80	S-12	27-20-29-23			
85					
90					
95					
100	S-13	100/1"			

Project: **CHPE**
Stony Point, New York
Date: 03/22/2022 to 03/25/2022
Contractor: Warren George, Inc.

Boring No.: SP-2022-1
Sheet: 3 of 3
Ground El: NA
Groundwater Depth: NA

Depth Feet	SAMPLES Number	SAMPLES Blows / 6"	Strata	SOIL DESCRIPTION	Classification Depth / Elevation
105					
110					
115					
120					
125	S-13	100/2"	D_R	Light Brown Decomposed Gneiss Bedrock	
130					
135					
140					
145					
150	S-13	100/1"			150'-1"
				End of Boring	

Project: **CHPE**
Stony Point, New York
Date: 03/01/2022 to 03/02/2022
Contractor: Warren George, Inc.

Boring No.: SP-2022-2
Sheet: 1 of 2
Ground El: Barge Deck
Groundwater Depth: NA

Depth Feet	SAMPLES Number	Blows / 6"	Strata	SOIL DESCRIPTION	Classification Depth Elevation
				Barge Deck	
				Assumed 0.0 @ 8:20AM on 3/1/22	
5				Water Line	6'-0"
10					
15				Mud Line	15'-0"
	S-1	WOR			
	S-2	WOR			
20	S-3	WOR			
	S-4	WOR			
	S-5	WOR			
25	S-6	WOR			
30	S-7	WOR			
	U-1	Push = 24"	S	Dark gray Clayey Silt	ML
35	S-8	WOR			
40	S-9	WOR			
	U-2	Push = 24"			
45	S-10	WOR			
50	S-11	WOR			

Project: **CHPE**
Stony Point, New York
Date: 03/01/2022 to 03/02/2022
Contractor: Warren George, Inc.

Boring No.: SP-2022-2
Sheet: 2 of 2
Ground El: Barge Deck
Groundwater Depth: NA

Depth Feet	SAMPLES Number	Blows / 6"	Strata	SOIL DESCRIPTION	Classification Depth Elevation
	S-11	WOR			
55	S-12	WOR			
60	S-13	WOR			
65	S-14	WOR			
			S	Dark gray Clayey Silt	ML
70	S-15	WOR			
75	S-16	WOR			
80	S-17	WOR			83'-0"
85	S-18	21-25-100/3"	G_T	Dark gray coarse to fine Gravel, little Silt, some coarse to fine Sand	GM 89'-0"
90		RUN =60" 89'-94' REC = 53% RQD = 16%	R	Dark gray Shale Bedrock (Wappinger Group):	
95		RUN =48" 94'-98' REC = 67% RQD = 54%			98'-0"
				End of Boring	
100					

Project: **CHPE**
Stony Point, New York
Date: 03/03/2022
Contractor: Warren George, Inc.

Boring No.: SP-2022-3
Sheet: 1 of 2
Ground El: Barge Deck
Groundwater Depth: NA

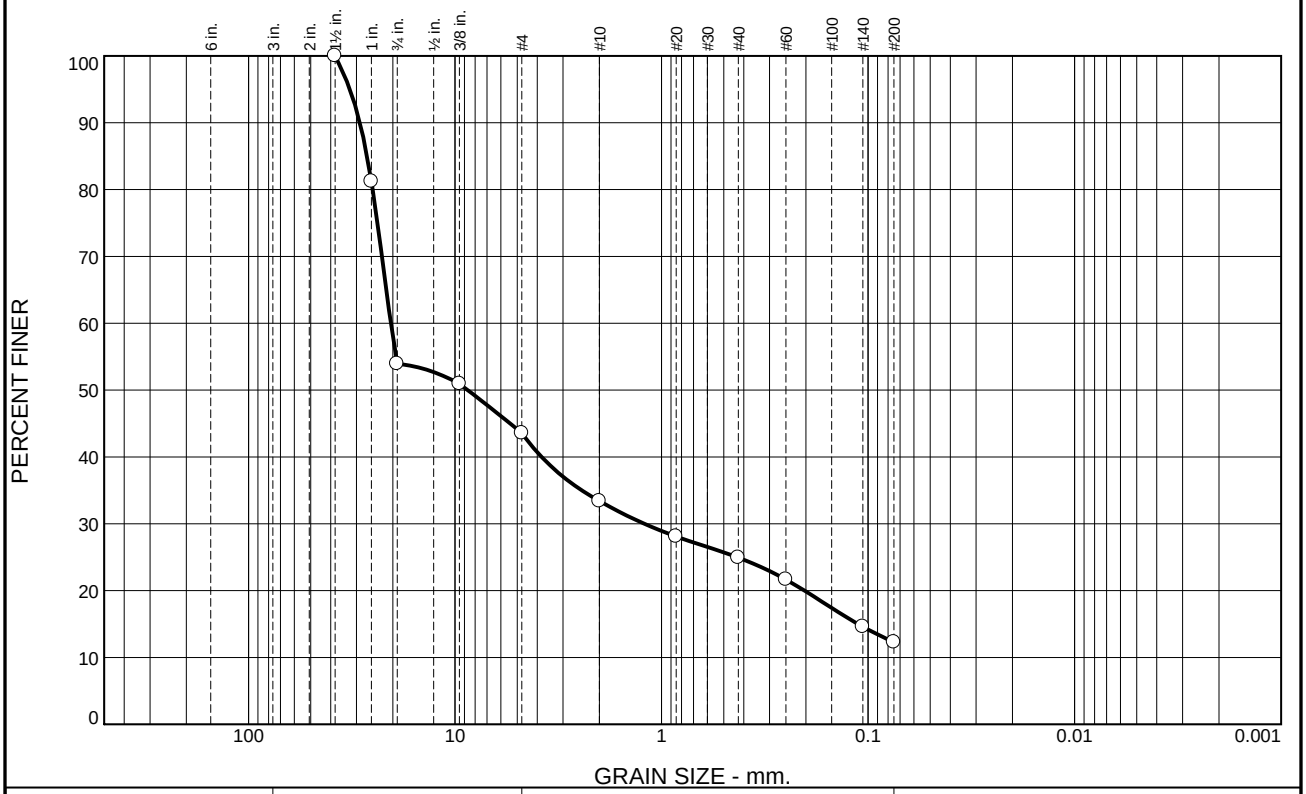
Depth Feet	SAMPLES Number	SAMPLES Blows / 6"	Strata	SOIL DESCRIPTION	Classification Depth Elevation
				Barge Deck	
				Assumed 0.0 @ 7:20AM on 3/3/22	
5				Water Line	6'-0"
10					
15					
20					
25				Mud Line	26'-0"
30					
35	S-8	WOR	S	Dark gray Clayey Silt	ML
40					
45					
50					

Project: **CHPE**
Stony Point, New York
Date: 03/03/2022
Contractor: Warren George, Inc.

Boring No.: SP-2022-3
Sheet: 2 of 2
Ground El: Barge Deck
Groundwater Depth: NA

Depth Feet	SAMPLES Number	Blows / 6"	Strata	SOIL DESCRIPTION	Classification Depth Elevation
55	U-1	Push = 24" Rec = 21"	S	Dark gray Clayey Silt	ML
60					
65					
70					
75					
80					
85					87'-0"
90		RUN =60" 90.5'-95.5' REC = 18% RQD = 0%	G_T	Dense Sand & Gravel	GM
95				*Gravel in Core Barrel	95'-6"
				End of Boring	
100					

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	46.1	10.3	10.2	8.5	12.6	12.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1	81.2		
.75	53.9		
.375	50.9		
#4	43.6		
#10	33.4		
#20	28.1		
#40	24.9		
#60	21.6		
#140	14.6		
#200	12.3		

* (no specification provided)

Material Description

Dark gray-brown silty gravel with sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 28.8782 D_{85}= 26.6592 D_{60}= 20.4584
D_{50}= 8.6896 D_{30}= 1.2105 D_{15}= 0.1119
D_{10}= C_u= C_c=

Classification

USCS= GM AASHTO=

Remarks

Sample washed on #200 sieve
USCS based on dilatancy & plasticity per ASTM D2488

Source of Sample: SP-2022-1 **Depth:** 45-47 ft.
Sample Number: S-10 **Date:** 5-12-2022

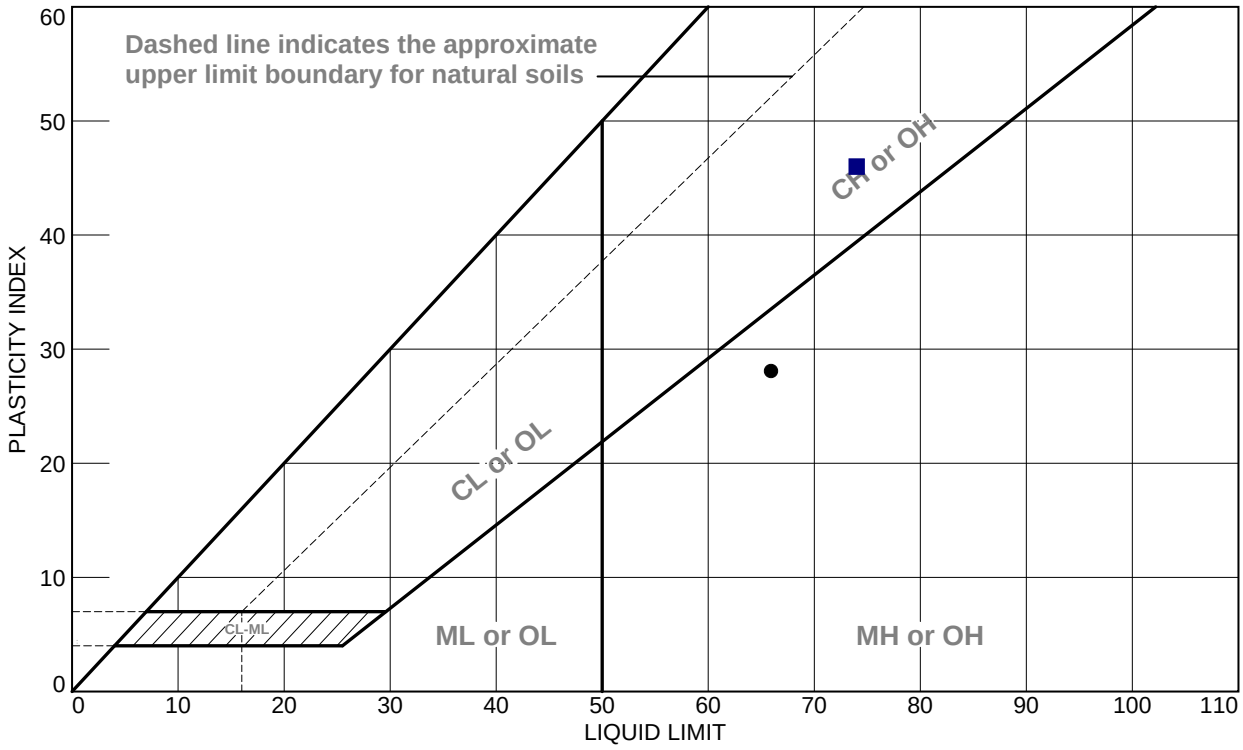
SKYLANDS TESTING, LLC

Sparta, NJ

Client: Warren George/Pillori Assoc.
Project: Champlain Hudson Power Express
Hudson Valley, NY
Project No: 22-045 **Figure**

Tested By: RS **Checked By:** VRS

ATTERBERG LIMITS REPORT



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LIQUIDITY INDEX	USCS
●	SP-2022-1	S-9	40-42 ft	52.2	38	66	28	0.5	
■	SP-2022-2	S-16	60-62 ft.	55.0	28	74	46	0.6	

SKYLANDS TESTING, LLC

Sparta, NJ

Client: Warren George/Pillori Assoc.

Project: Champlain Hudson Power Express
Hudson Valley, NY

Project No.: 22-045 **Figure**

Tested By: EH **Checked By:** VS

COMPRESSIVE STRENGTH OF INTACT ROCK CORE

Project: Warren George/Pillori Assoc. - Champlain Hudson Power Express | Job No.: 22-045
Location: Hudson Valley, NY

Tested by: ZM
Test Date: 5-5-2022 | Boring: SP-2022-2 | Core: R-2 | Depth (ft.): 95.2

Test Condition: [ ] As-received [x] Laboratory air dry [ ] Oven dry [ ] Saturated/Soaked

Moist Unit Weight (pcf): 176.0
Dry Unit Weight (pcf): 175.8
Post-Test Moisture Content: 0.1%

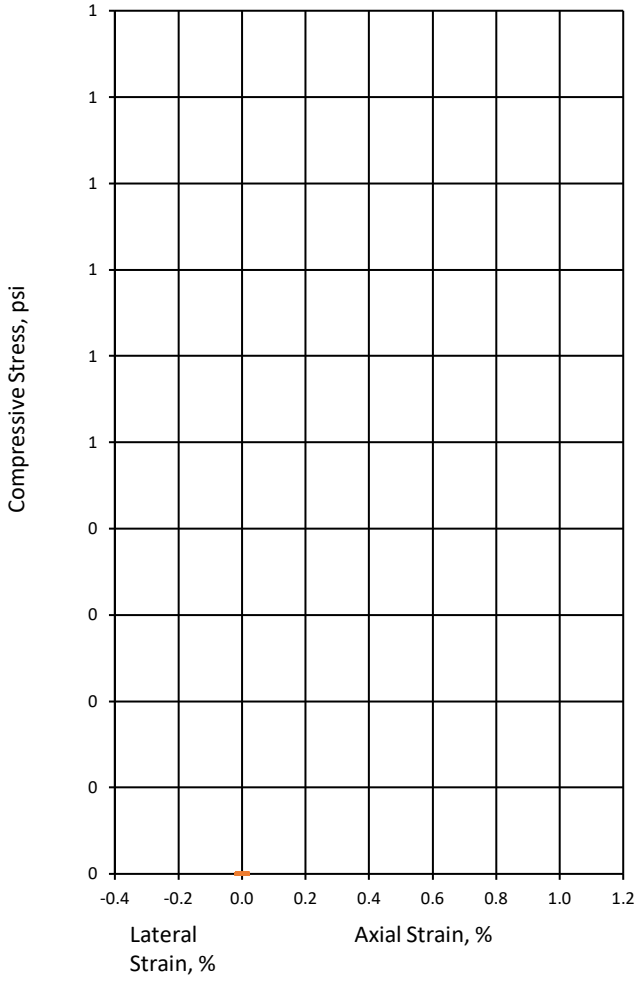
Test Method: ASTM D7012C
Stress rate, lbf/s: 120

Specimen Data

Ave. Diameter, in.: 1.981 | Area (in.^{2}): 3.082
Ave. Length, in.: 4.563 | L/D: 2.3

For any checked item(s) below, specimen not able to be prepared in accordance with ASTM D4543; results may differ from results obtained from a test specimen that met the requirement.

[ ] Side Straightness [x] End Flatness [x] End ⊥ [x] End ∥



Pre-Test

Post-Test

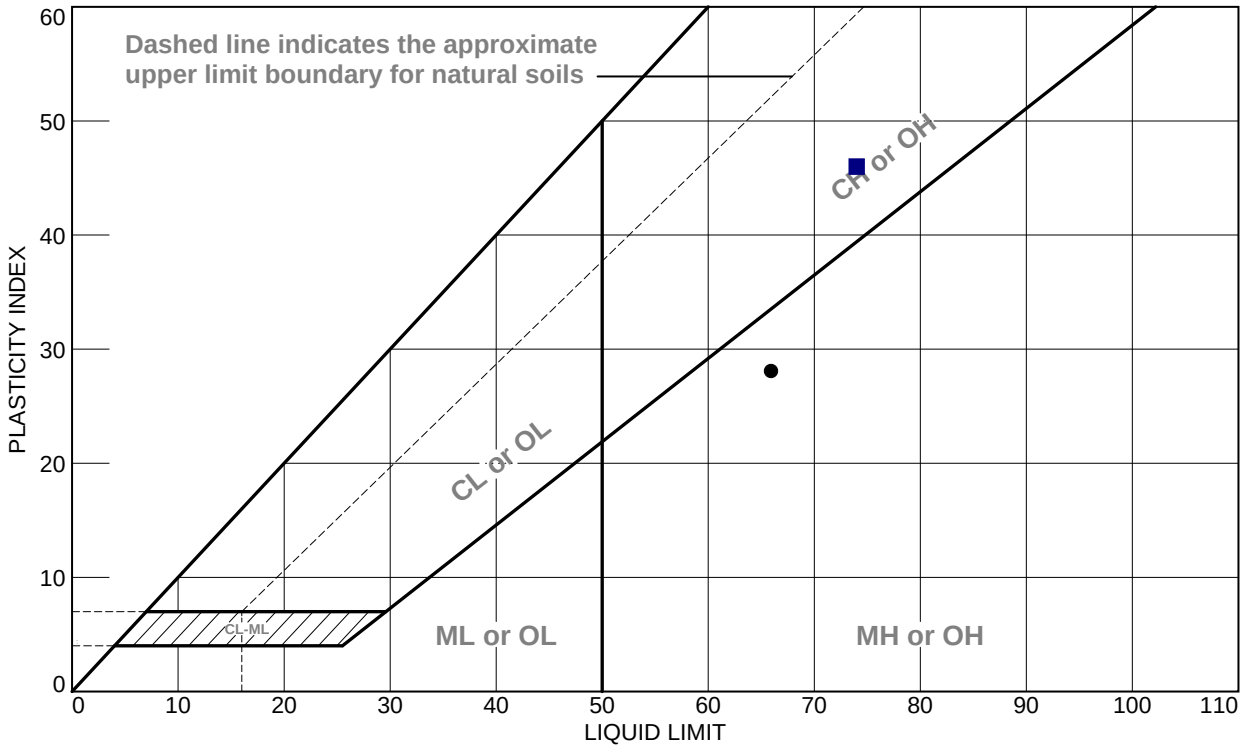
Unconfined Compressive Strength: 14,670 psi

E
Tan. Mod. at 50% UC Strength: NR
Ave. Mod. Along Linear Portion: NR

Remarks: White Marble

SKYLANDS TESTING, LLC

ATTERBERG LIMITS REPORT



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LIQUIDITY INDEX	USCS
●	SP-2022-1	S-9	40-42 ft	52.2	38	66	28	0.5	
■	SP-2022-2	S-16	60-62 ft.	55.0	28	74	46	0.6	

SKYLANDS TESTING, LLC

Sparta, NJ

Client: Warren George/Pillori Assoc.

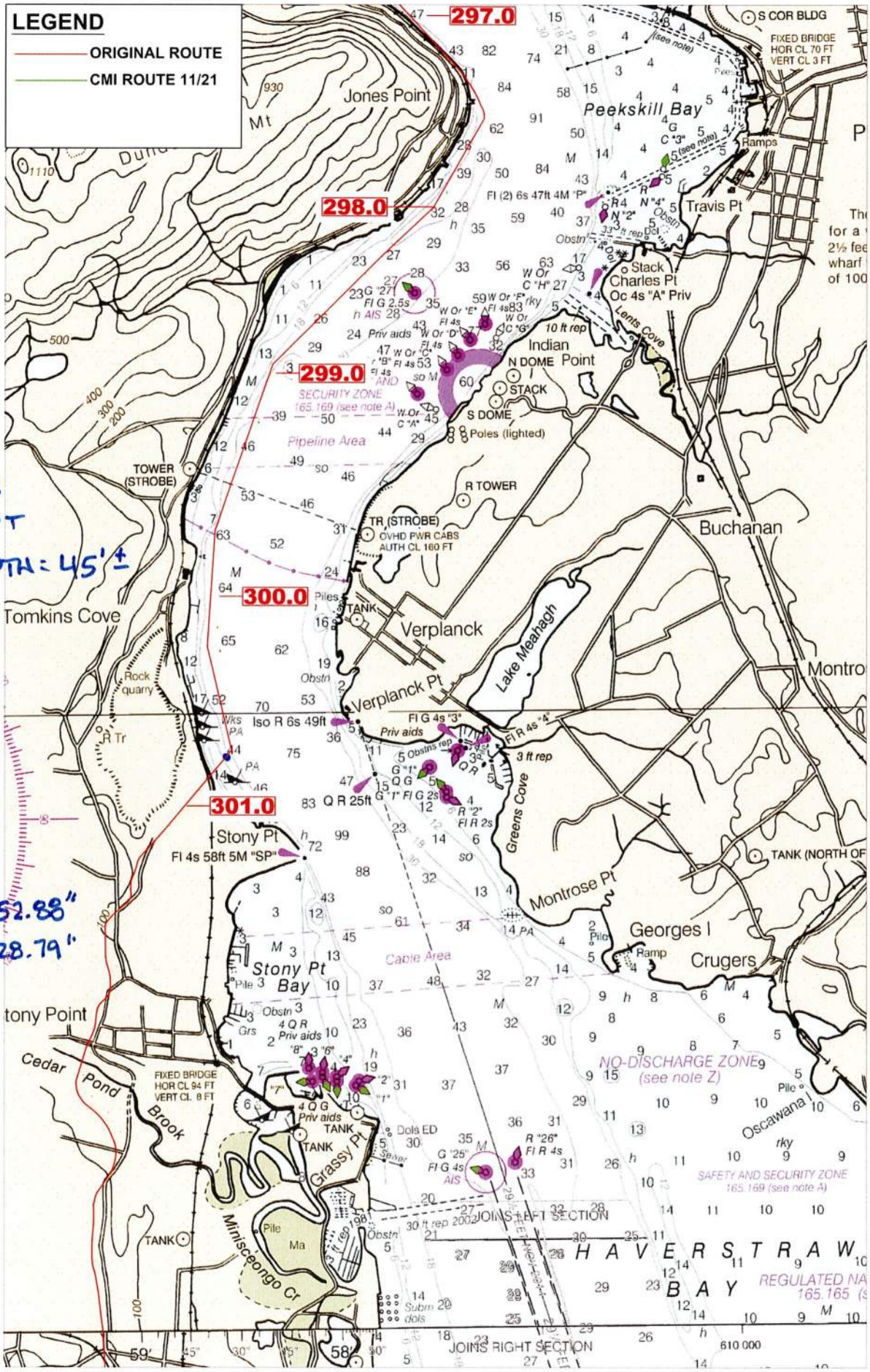
Project: Champlain Hudson Power Express
Hudson Valley, NY

Project No.: 22-045 **Figure**

Tested By: EH **Checked By:** VS

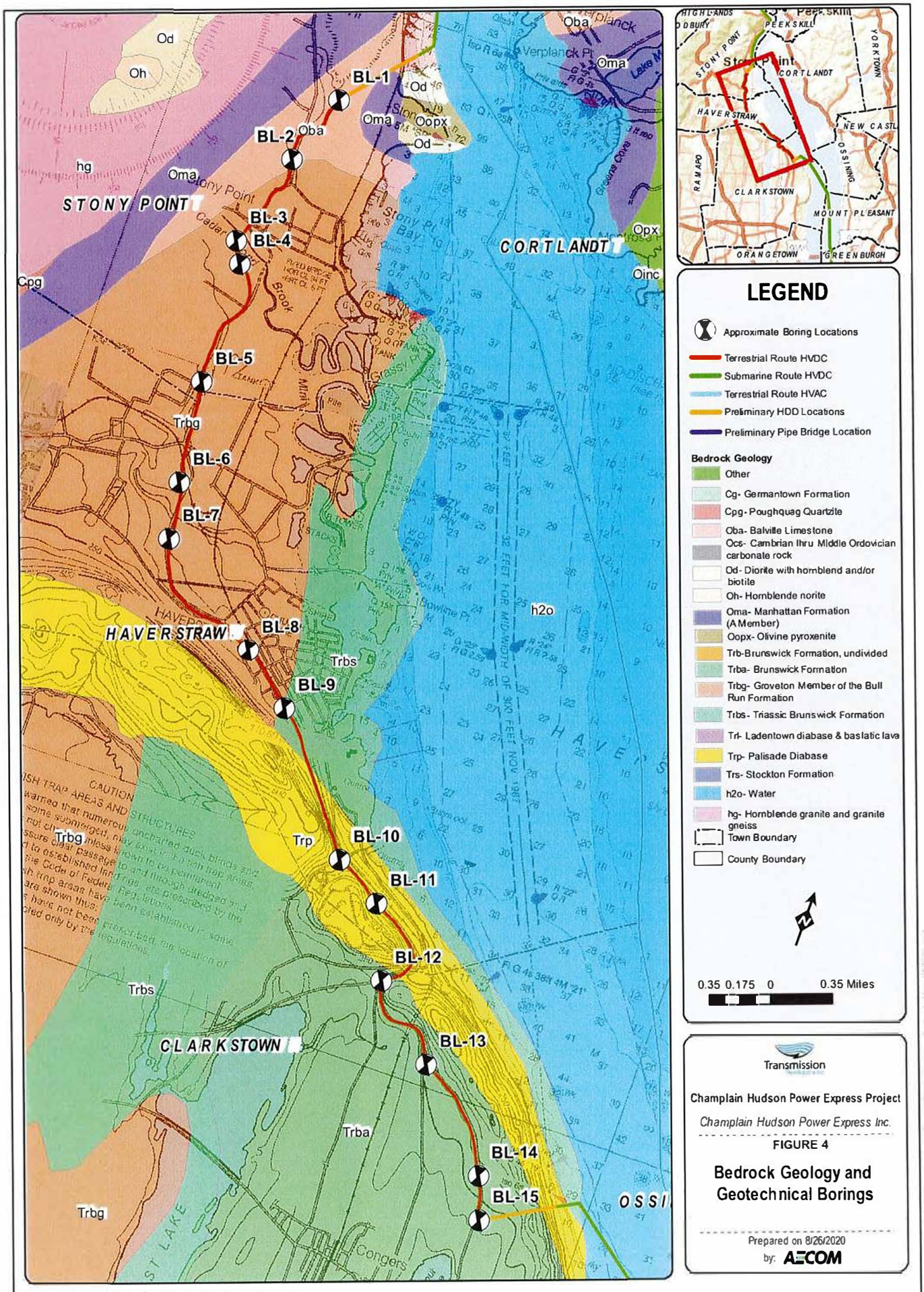
Appendix V– Previous Geotechnical Borings

CHPE - HUDSON RIVER CABLE ROUTE ADJUSTMENT



11/03/2021

SHEET 12 OF 16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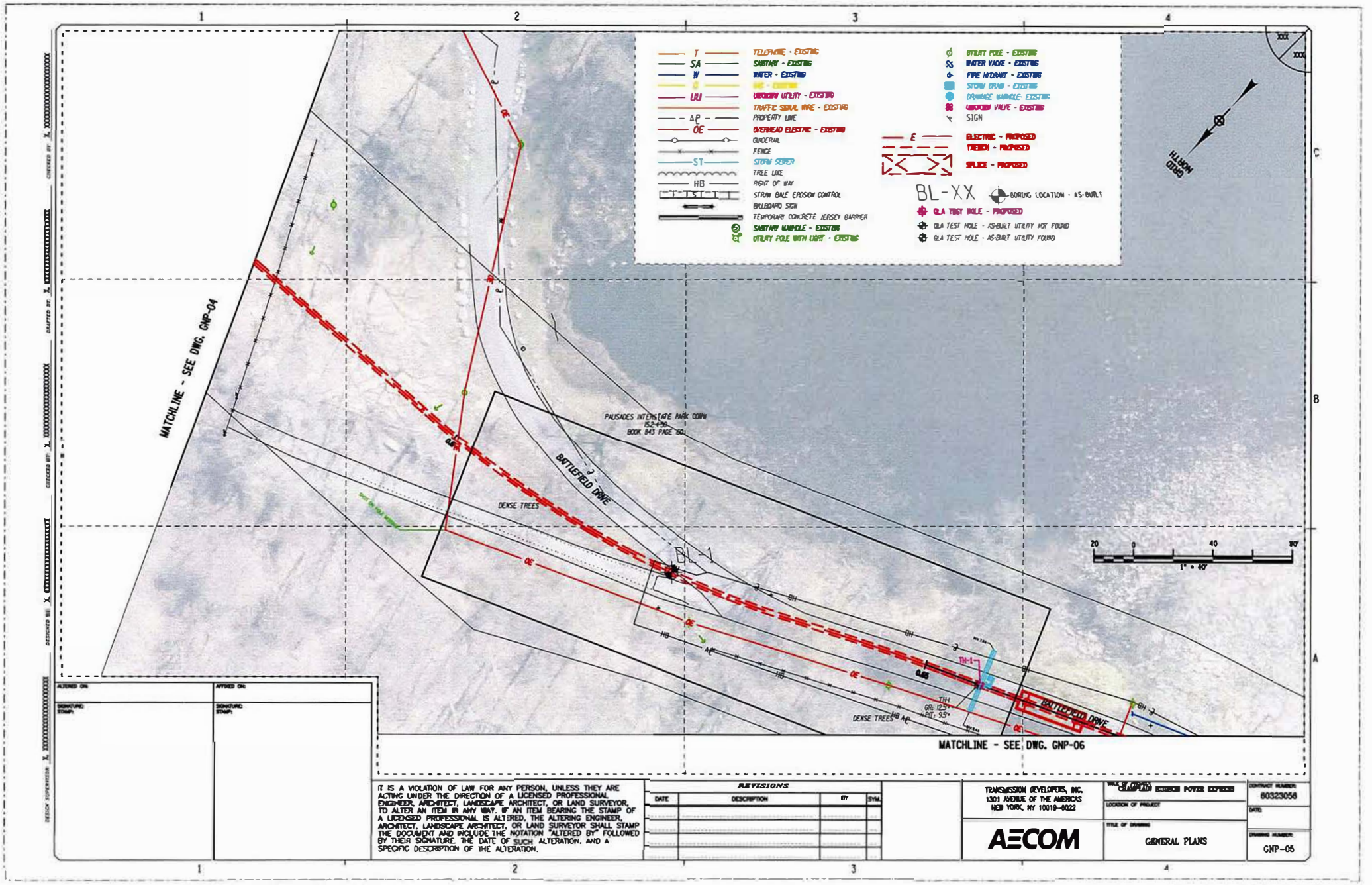
BL-2
BL-3
BL-4
BL-5
BL-6
BL-7
BL-8
BL-9
BL-10
BL-11
BL-12
BL-13
BL-14
BL-15
STONY POINT
CORTLANDT
HAVERSTRAW
CLARKSTOWN
Od
Oh
Oba
Oma
Oopx
Opx
Oinc
hg
Cpg
Trbg
Trbs
Trp
Trba
h2o
OSSI
LEGEND
Approximate Boring Locations
Terrestrial Route HVDC
Submarine Route HVDC
Terrestrial Route HVAC
Preliminary HDD Locations
Preliminary Pipe Bridge Location
Bedrock Geology
Other
Cg- Germantown Formation
Cpg- Poughquag Quartzite
Oba- Balville Limestone
Ocs- Cambrian thru Middle Ordovician carbonate rock
Od- Diorite with hornblend and/or biotite
Oh- Hornblende norite
Oma- Manhattan Formation (A Member)
Oopx- Olivine pyroxenite
Trb-Brunswick Formation, undivided
Trba- Brunswick Formation
Trbg- Groveton Member of the Bull Run Formation
Trbs- Triassic Brunswick Formation
Trl- Ladentown diabase & baslatic lava
Trp- Palisade Diabase
Trs- Stockton Formation
h2o- Water
hg- Hornblende granite and granite gneiss
Town Boundary
County Boundary
0.35 0.175 0 0.35 Miles
Transmission
Champlain Hudson Power Express Project
Champlain Hudson Power Express Inc.
FIGURE 4
Bedrock Geology and Geotechnical Borings
Prepared on 8/26/2020
by: AECOM
DATA SOURCES: ESRI, NYSDOT, NOAA, USACE, NYDOS, IDI, TRC



ALTERED ON:
SIGNATURE:
STAMP:

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IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR, TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THE STAMP OF A LICENSED PROFESSIONAL IS ALTERED, THE ALTERING ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR SHALL STAMP THE DOCUMENT AND INCLUDE THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

REVISIONS

DATE	DESCRIPTION	BY	SYM.

TRANSMISSION DEVELOPERS, INC.
1301 AVENUE OF THE AMERICAS
NEW YORK, NY 10019-6022

AECOM

TITLE OF DRAWING: CHAMPLAIN HUDSON POWER EXPRESS
LOCATION OF PROJECT:
TITLE OF DRAWING: GENERAL PLANS

CONTRACT NUMBER: 60323056
DATE:
DRAWING NUMBER: GNP-05

Aquifer / AECOM #60323056
CHPE - Rockland County Borings
LABORATORY SOIL TESTING DATA SUMMARY

BORING NO.	SAMPLE NO.	DEPTH (ft)	IDENTIFICATION TESTS								REMARKS
			WATER CONTENT (%)	LIQUID LIMIT (-)	PLASTIC LIMIT (-)	PLAS. INDEX (-)	USCS SYMB. (1)	SIEVE MINUS NO. 200 (%)	HYDRO. % MINUS 2 μm (%)	SPECIFIC GRAVITY (-)	
BL-2	S-1b	7.2-8.0	22.1	28	19	9	CL	86	17		
BL-2	S-2	8-10	18.6	27	19	8	CL	75	13		
BL-3	S-1	6-8	12.5				ML	96.1	20		
BL-3	S-2	8-10	16.3				ML	93	14		
BL-3	S-3	10-10.7	12.4				ML	66	14		
BL-5	S-1	5-7	10.6				SM	40	8		
BL-5	S-3	9-11	7.0				SM	23	4	2.728	
BL-5	S-4	11-13	8.6				SM	24	4		
BL-5	S-6	15-17	8.2				SM	22	3		
BL-6	S-1	4-6	4.1				GW-GM	7	2		
BL-7	S-1	5-7	5.1				SP-SM	8	2		
BL-7	S-3	9-11	5.3				GW-GM	10	2		
BL-7	S-4	11-13	7.5				SM	25	4		
BL-7	S-6	15-17	6.0				SM	14	2		
BL-8	S-1	6-8	17.9	35	20	15	CL	51	11		
BL-8	S-3	10-12	10.2				SM	32	6		
BL-9	S-1	6-8	10.0				SP-SM	9	2		
BL-9	S-3	10-12	7.0				SM	14	3		
BL-9	S-5	14-16	4.9				SW-SM	11	3		
BL-11	S-4	11-13	10.1				SM	24	5		
BL-12	S-1	6-8	8.9				SM	24	6		
BL-13	S-1	4.5-6.5	9.3				SM	15	4	2.722	
BL-13	S-3	8.5-10.5	6.6				SM	13	3		
BL-13	S-4	10.5-12.5	9.9				SM	19	5		
BL-14	S-1	6-8	10.0				SM	27	6		
BL-14	S-2	8-10	8.1				SM	24	5		
BL-15	S-3	9-11	9.5				SM	32	8		
BL-15	S-9	21-23	7.9				SM	26	4		
BL-15	S-14	31-33	6.1				SM	33	4		
BL-15	S-17	45-47	11.9				SM	20	3		
BL-15	S-21	65-67	8.2				SP-SM	10	1		

Note: (1) USCS symbol based on visual observation and Sieve and Atterberg limits reported.

proposed procedure does not necessarily produce laboratory samples that match field densities, GeothermUSA believes it will provide reasonable results.

3. Because GeothermUSA personnel were not in the field to select representative samples for laboratory testing, AECOM collected and shipped extra samples for potential laboratory TR testing and provided GeothermUSA field test boring logs with geologic sample descriptions. In this way, GeothermUSA was able to review the samples and select ones most appropriate for TR testing, discarding the excess.
4. Because field TR testing was not performed, no information is available regarding the ambient temperature in the ground at sample locations. Nevertheless, GeothermUSA indicated that the TR values obtained from the enhanced field sampling and laboratory TR testing program would provide reasonable and useful results, suitable for determining recommended TR design values for use by NKT to evaluate heat dissipation in cable system design.

An overview of the TR lab testing performed by GeothermUSA is presented in Table 2. Detailed results of laboratory TR testing are summarized on Table 5, including GeothermUSA's suggested design TR values for each sample tested.

GeothermUSA's summary report is attached as Appendix E. The GeothermUSA report includes suggested design TR values for each boring location, corresponding to the anticipated cable depth. These are reproduced below:

Boring ID	Milepost	Boring Depth (ft)	Cable Depth (ft)	Suggested TR (°C-cm/W)
BL-1	N/A	60.0	3.5	45
BL-2	1.08	12.0	9.80	90
BL-3	1.67	10.7	8.95	110
BL-4	1.81	16.0	9.74	45
BL-5	2.58	17.0	9.41	90
BL-6	3.18	11.0	8.66	90
BL-7	3.51	17.0	9.29	90
BL-8	4.38	12.0	7.92	90
BL-9	4.77	16.0	7.89	110
BL-10 & BL-10A	5.69	4.0	8.04	45
BL-11	6.02	13.0	6.36	90
BL-12	6.63	12.0	6.15	90
BL-13	7.24	12.5	6.57	90
BL-14	7.96	12.0	5.88	90
BL-15 & BL-15A	N/A	87.6	varies	100 or 45 depending if its in silty sand or rock

2.6 Geotechnical Laboratory Testing

Geotechnical laboratory testing was performed by TerraSense LLC. This included index testing to characterize soil, and strength and hardness tests to characterize rock. A summary of the testing is presented in Table 3.

Table 1. Summary of Test Borings

Boring ID	Completion Date	Total Depth of Boring (ft)	Depth to Top of Bedrock (ft)	Northing [1]	Easting [1]	Top of Boring Elevation [2]
BL-1	7/6/2020	60	3.3	877579.553	634487.801	16.537
BL-2	7/7/2020	12	>12	875415.701	633752.651	88.970
BL-3	7/7/2020	10.7	10.7	872536.075	632999.287	113.426
BL-4	7/7/2020	16	4.8	871905.948	633323.295	108.145
BL-5	7/8/2020	17	>17	868175.528	633428.855	128.013
BL-6	7/8/2020	11	>11	865097.101	633816.627	102.228
BL-7	7/8/2020	17	>17	863383.514	634098.781	106.175
BL-8	7/9/2020	12	>12	861016.248	637485.511	113.886
BL-9	7/9/2020	16	>16	859720.742	639084.310	116.995
BL-10 & BL-10A	7/13/2020	4	>4	855972.062	642193.725	173.236
BL-11	7/10/2020	13	>13	855114.602	643665.967	192.660
BL-12	7/13/2020	12	>12	852960.555	644583.631	233.585
BL-13	7/10/2020	12.5	>12.5	851046.588	646695.547	264.744
BL-14	7/14/2020	12	>12	848431.817	649278.128	278.475
BL-15 & BL-15A	7/23/2020	87.6	77.1	847189.449	649740.851	213.397

Notes:
(1) Coordinates in New York State Plane, NAD83
(2) Elevations in NAVD88

Table 4. Summary of Rock Parameters from Field and Laboratory Testing

Rock Type	Age	RQD (%)	Dry Unit Weight (pcf)	Mohs Hardness	Compressive Strength (psi)	Thermal Resistivity (°C-cm/W)	
						Wet	Dry
Limestone	Middle Ordovician	0 - 84	174 - 176	3 - 6	8050 - 15070	33	51
Quartzite	Middle Ordovician	84	176	4 - 5	6280	--	--
Sandstone/ Siltstone	Upper Triassic	0 - 66	155 - 162	2 - 4	2081[1] - 7940	37 - 44	56 - 64
Diabase	Upper Triassic	N/A	179 - 182	5 - 6	21640 - 25120	42	58

Notes:
(1) Estimated value from point load test

Table 7. Summary of Geotechnical Laboratory Test Results of Rock Samples

Boring ID	Sample Type	Depth (ft)	Rock Type	Water Content (%)	Dry Unit Weight (pcf)	Mohs Hardness	Unconfined Compressive Strength Test			Point Load Test		
							Compressive Strength (psi)	Axial Strain (%)	Estimated Elastic Modulus (psi)	Sample Orientation	Strength Index (Is50) (psi)	Estimated Compressive Strength (psi)
BL-1	Core	19.2 – 20.2	Limestone	0.15	176	4-5	8760	0.20	4E+06	--	--	--
	Core	31.0 – 31.7	Limestone	0.11	175	5-6	8050	0.16	5E+06	--	--	--
	Core	48.2 – 48.9	Quartzite	0.08	176	4-5	6280	0.11	6E+06	--	--	--
	Core	54.0 – 55.0	Limestone	0.13	174	3-4	15070	0.19	9E+06	--	--	--
BL-4	Core	11.3 – 11.6	Sandstone/ Siltstone	1.00	--	2-3	--	--	--	Diametral	190.0	4393
										Axial	200	4405
	Core	12.2 – 12.5	Sandstone	1.18	--	2-3	--	--	--	Diametral	90	2081
										Axial	170	3464
BL-10	Core	Outcrop[1]	Diabase	1.08	179	5-6	23820	0.41	7E+06	--	--	--
	Core	Outcrop[1]	Diabase	0.67	179	5-6	21640	0.50	5E+06	--	--	--
	Core	Outcrop[1]	Diabase	0.71	182	5-6	25120	0.44	7E+06	--	--	--
BL-15A	Core	80.4 – 80.7	Sandstone	1.09	156	--	6830	0.51	1E+06	--	--	--
	Core	81.5 – 82.1	Sandstone	--	--	3-4	--	--	--	--	--	--

Boring ID	Sample Type	Depth (ft)	Rock Type	Water Content (%)	Dry Unit Weight (pcf)	Mohs Hardness	Unconfined Compressive Strength Test			Point Load Test		
							Compressive Strength (psi)	Axial Strain (%)	Estimated Elastic Modulus (psi)	Sample Orientation	Strength Index (Is50) (psi)	Estimated Compressive Strength (psi)
	Core	83.0 – 83.6	Sandstone	0.68	155	3-4	7940	0.45	2E+06	--	--	--

Notes:
(1) Outcrop block samples cored by the geotechnical laboratory prior to testing

BORING CONTRACTOR: ADT	AECOM		SHEET 1 OF 3
DRILLER: Chris Chaillou			PROJECT NAME: CHPE - Rockland Co. Borings
SOILS ENGINEER: Roberto Lucidi			PROJECT NO.: 60323056
LOCATION: Battlefield Road, Stony Point, NY	**BORING LOG**		HOLE NO.: BL-1
			START DATE: 7/6/2020
			FINISH DATE: 7/6/2020
			OFFSET: N/A

GROUND WATER OBSERVATIONS		CASING	SAMPLER	DRILL BIT	CORE BARREL	DRILL RIG: Geoprobe
Not Encountered	TYPE	Flush joint Steel	SPLIT SPOON[1]	2-7/8" TRICONE	NQ	BORING TYPE: SPT/Rock coring
	SIZE I.D.	3.0"	2.4"	-	1.88"	BORING O.D.: 3.5"
	SIZE O.D.	3.5"	3.0"	-	2.97"	SURFACE ELEV.: 16.537
	HAMMER WT.	SPUN	140 lb	-	-	NORTHING 877579.553
	HAMMER FALL	-	30"	-	-	EASTING 634487.801

DEPTH	CORING RATE MIN/FT	SAMPLE DEPTHS FROM - TO (FEET)	SAMPLE TYPE AND NO.	PEN. in	REC. in	BLOWS PER 6 in ON SAMPLER (ROCK QUALITY DESIGNATION)				N Corr.[2]	USCS CLASS.	STRAT. CHNG. DEPTH	FIELD IDENTIFICATION OF SOILS
1.0												Sandy Fill	Grass Area
		Hand Cleared									SM		Light brown, f-m SAND, little f-m-c gravel, little silt, dry
2.0		0.0 - 3.0											TR[3]-1 (1.0'-3.0')
3.0													Too hard to hand clear at 3.0'
		3.0 - 3.3	S-1	3.0	3.0	50/3"	-	-	-	-	SM		S-1: Light brown, f-m SAND, little f-m-c gravel, little silt, dry
4.0													Could not install casing at 3.3'; drilled with tricone rollerbit to 6.0'
5.0													
6.0													Installed casing at 6.0'
	7.0											Fractured Limestone	Started coring from 6.0'
7.0		6.0 - 11.0	R-1	60.0	28.0	RQD =	0"/60"=						From 6.0' to 11.0': Light gray, LIMESTONE, fine grained, slightly weathered (II), strong (R4), intensely fractured. Loss of drilling water.
	4.0				47%	=	0%						
8.0													
	4.0												
9.0													
	7.0												
10.0													
	7.5												
11.0													Casing advanced to 11.0'
	3.0												
12.0		11.0 - 16.0	R-2	60.0	47.0	RQD =	26.5"/60"					Limestone (Balmville Fm.)	
	3.0				78%	=	44%						TR-2 (12.1'-12.6')
13.0													No recovery from 12.6' to 13.6' (drop of drill rods)
	3.0												
14.0													From 11.0' to 20.0': Light gray, LIMESTONE, fine grained, slightly weathered (II), strong (R4), highly fractured. Sealed microfractures (including microfaults) throughout. Loss of drilling water.
	4.0												
15.0													
	5.0												
16.0													
	5.0												
17.0		16.0 - 21.0	R-3	60.0	59.0	RQD =	29"/60"						TR-3 (16.3'-17.1')
	5.0				98%	=	48%						
18.0													
	6.0												
19.0													
	6.0												
20.0													

NOTES:

(1) Thick-wall ring lined drive sampler (California sampler) used for SPT samples. Rings dimensions = 2-1/2" O.D. by 2-7/16" I.D. by 6" length.

(2) Correction factor: $N_{corr}=N*(2.0^2-1.375^2)in./(3.0^2-2.4^2)in. = N*0.65$.

(3) TR = sample for thermal resistivity testing.

Soil description represents a field identification after D.M. Burmister unless otherwise noted.

The information contained on this log is not warranted to show the actual subsurface condition. The contractor agrees that he will make no claims against AECOM if he finds that the actual conditions do not conform to those indicated by this log.

SAMPLE TYPE: S= SPLIT SPOON U=SHELBY TUBE R=ROCK CORE

PROPORTIONS: TRACE=1-10% LITTLE=10-20% SOME=20-35% AND=35-50%

BORING CONTRACTOR: ADT	AECOM		SHEET 2 OF 3
DRILLER: Chris Chaillou			PROJECT NAME: CHPE - Rockland Co. Borings
SOILS ENGINEER: Roberto Lucidi			PROJECT NO.: 60323056
LOCATION: Battlefield Road, Stony Point, NY	**BORING LOG**		HOLE NO.: BL-1
			START DATE: 7/6/2020
			FINISH DATE: 7/6/2020
			OFFSET: N/A

DEPTH	CORING RATE MIN/FT	DEPTHS FROM - TO (FEET)	TYPE AND NO.	PEN. in	REC. in	BLOWS PER 6 in ON SAMPLER (ROCK QUALITY DESIGNATION)	N Corr.	USCS CLASS.	STRAT. CHNG. DEPTH	FIELD IDENTIFICATION OF SOILS
	9.0									
21.0										From 20.0' to 45.0': Light gray, LIMESTONE, fine grained, slightly weathered (II), strong (R4), highly fractured. Sealed microfractures (including microfaults) throughout. Loss of drilling water.
	3.5									
22.0		21.0 - 25.0	R-4	48.0	48.0	RQD = 29.5"/48"				
	4.0				100%	= 61%				
23.0										
	4.0									TR-4 (21.5'-22.2')
24.0										
	11.0									Heavily jointed at 24'
25.0										
	5.0									Brecciated from 25.0' to 26.0'
26.0		25.0 - 29.0	R-5	48.0	48.0	RQD = 28"/48"				
	7.0				100%	= 58%				Heavily jointed at 26'
27.0										
	6.0									
28.0										
	5.0									
29.0										
	5.0									Heavily jointed at 29'
30.0		29.0 - 30.8	R-6	22.0	22.0	RQD = 5"/22"				
	12.0				100%	= 23%				
31.0										
	4.5									TR-5 (31.7'-32.1')
32.0		30.8 - 35.0	R-7	50.0	50.0	RQD = 19"/50"				
	4.5				100%	= 38%				
33.0										
	8.0									
34.0										
	6.5									Heavily jointed at 34'
35.0										
	5.5									
36.0		35.0 - 40.0	R-8	60.0	60.0	RQD = 29"/60"				
	5.5				100%	= 48%				
37.0										
	5.0									
38.0										
	12.0									
39.0										
	4.0									
40.0										
	4.0									
41.0		40.0 - 45.0	R-9	60.0	60.0	RQD = 46"/60"				
	4.0				100%	= 77%				
42.0										
	4.0									
43.0										
	5.0									Heavily jointed at 43'
44.0										
	4.0									Change of lithology at 44.5'
45.0										

Limestone (Balmville Fm.)

NOTES:

Soil description represents a field identification after D.M. Burmister unless otherwise noted.

The information contained on this log is not warranted to show the actual subsurface condition. The contractor agrees that he will make no claims against AECOM if he finds that the actual conditions do not conform to those indicated by this log.

SAMPLE TYPE: S= SPLIT SPOON U=SHELBY TUBE R=ROCK CORE

PROPORTIONS: TRACE=1-10% LITTLE=10-20% SOME=20-35% AND=35-50%

BORING CONTRACTOR: ADT	AECOM		SHEET 3 OF 3
DRILLER: Chris Chaillou			PROJECT NAME: CHPE - Rockland Co. Borings
SOILS ENGINEER: Roberto Lucidi			PROJECT NO.: 60323056
	BORING LOG		HOLE NO.: BL-1
LOCATION: Battlefield Road, Stony Point, NY			START DATE: 7/6/2020
			FINISH DATE: 7/6/2020
			OFFSET: N/A

DEPTH	CORING RATE MIN/FT	DEPTHS FROM - TO (FEET)	TYPE AND NO.	PEN. in	REC. in	BLOWS PER 6 in ON SAMPLER (ROCK QUALITY DESIGNATION)				N Corr.	USCS CLASS.	STRAT. CHNG. DEPTH	FIELD IDENTIFICATION OF SOILS
	4.5											Quartzite (silicified zone)	From 44.5' to 49.7': yellowish white, QUARTZITE, very fine grained, slightly weathered (II), very strong (R5), highly to moderately fractured. Sealed microfractures (including microfaults) throughout. Slickensided joint planes. Loss of drilling water.
46.0		45.0 - 50.2	R-10	62.0	62.0	RQD =	52"/62"						TR-6 (46.2'-46.9')
	4.5				100%	=	84%						Change of lithology at 49.7'
47.0													
	6.0												Brecciated from 50.0' to 52.0'
48.0													
	5.5												From 49.7' to 55.0': gray, LIMESTONE, fine grained, slightly weathered (II), strong to very strong (R4-R5), moderately fractured.
49.0													
	6.0												
50.0													
	6.0												
51.0		50.2 - 55.0	R-11	58.0	58.0	RQD =	49"/58"						
	5.0				100%	=	84%						
52.0													
	4.0												
53.0													
	5.0												
54.0													
	5.0												
55.0													
	5.0												
56.0		55.0 - 60.0	R-12	60.0	60.0	RQD =	21"/60"					Limestone (Balmville Fm.)	From 55.0' to 60.0': gray, LIMESTONE, fine grained, slightly weathered (II), strong to very strong (R4-R5), highly fractured.
	5.5				100%	=	35%						
57.0													
	5.0												
58.0													
	6.0												TR-7 (58.7'-59.2')
59.0													
	5.0												
60.0													
													End of boring at 60.0' below grade
61.0													Borehole grouted
62.0													
63.0													
64.0													
65.0													
66.0													
67.0													
68.0													
69.0													
70.0													

NOTES:

Soil description represents a field identification after D.M. Burmister unless otherwise noted.

The information contained on this log is not warranted to show the actual subsurface condition. The contractor agrees that he will make no claims against DMJM Harris AECOM if he finds that the actual conditions do not conform to those indicated by this log.

SAMPLE TYPE: S= SPLIT SPOON U=SHELBY TUBE R=ROCK CORE

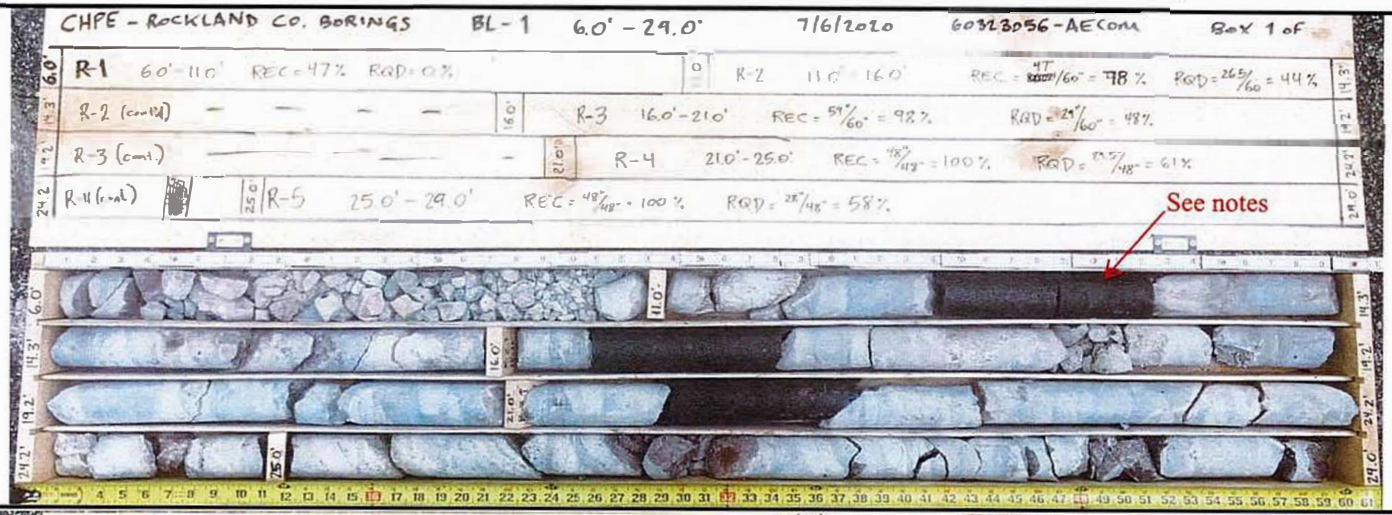
PROPORTIONS: TRACE=1-10% LITTLE=10-20% SOME=20-35% AND=35-50%

ROCK CORE PHOTOGRAPHIC LOG

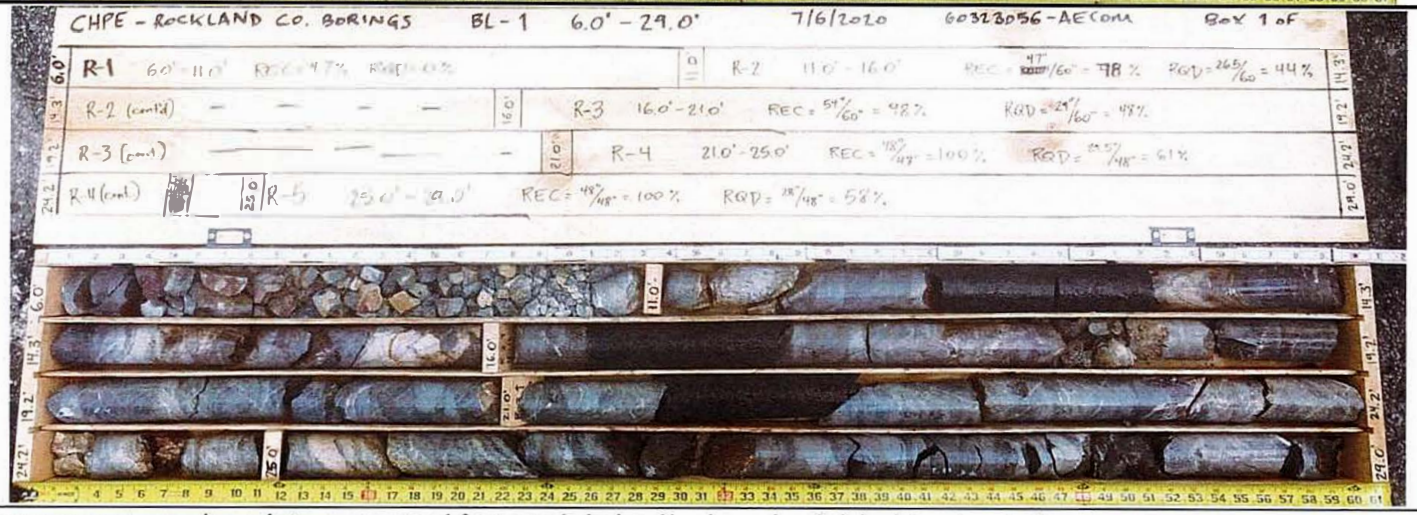
AECOM Project No: **60323056**
Project Name: **Upland Segment, Rockland County, NY, Champlain-Hudson Power Express**
Location: **Rockland County, NY**

AECOM

Boring No.	Depth (ft.)
BL-1 (dry)	6.0 to 29.0



Boring No.	Depth (ft.)
BL-1 (wet)	6.0 to 29.0



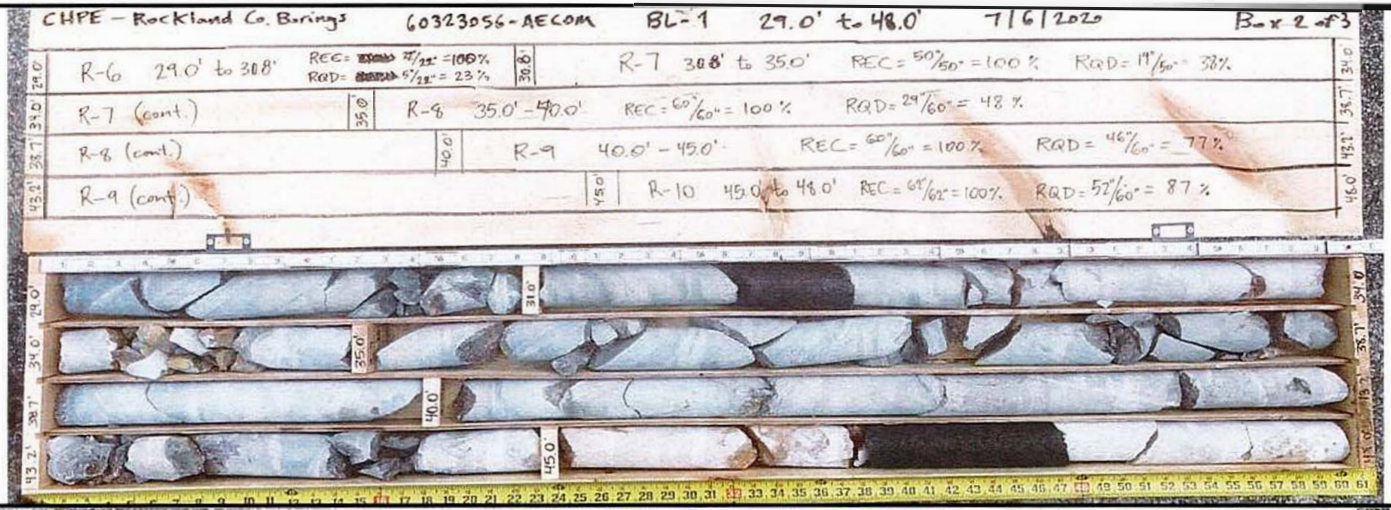
Note: Black foam inserts represent core pieces that were removed for geotechnical and/or thermal resistivity laboratory testing

ROCK CORE PHOTOGRAPHIC LOG

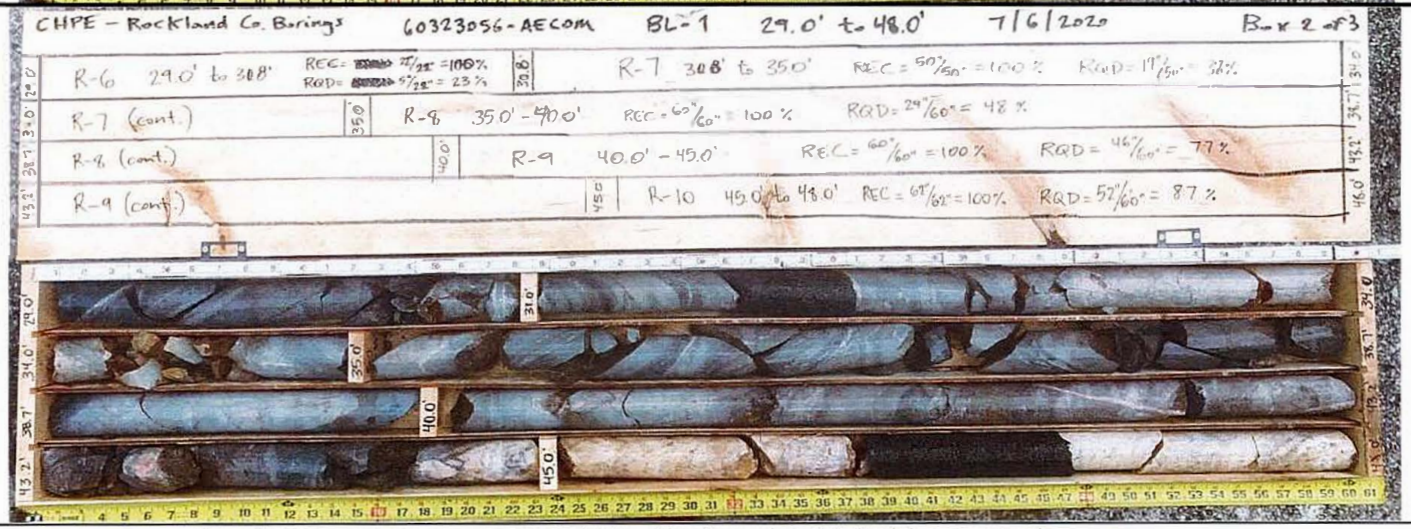
AECOM Project No: **60323056**
Project Name: **Upland Segment, Rockland County, NY, Champlain-Hudson Power Express**
Location: **Rockland County, NY**

AECOM

Boring No.	Depth (ft.)
BL-1 (dry)	29.0 to 48.0



Boring No.	Depth (ft.)
BL-1 (wet)	29.0 to 48.0

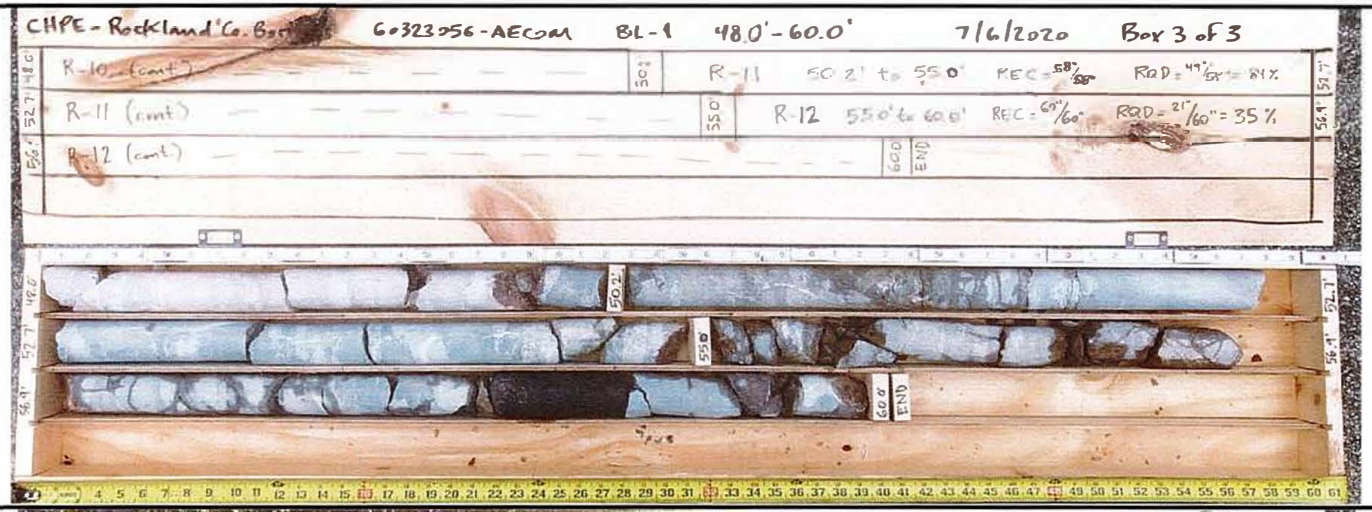


Note: Black foam inserts represent core pieces that were removed for geotechnical and/or thermal resistivity laboratory testing

ROCK CORE PHOTOGRAPHIC LOG

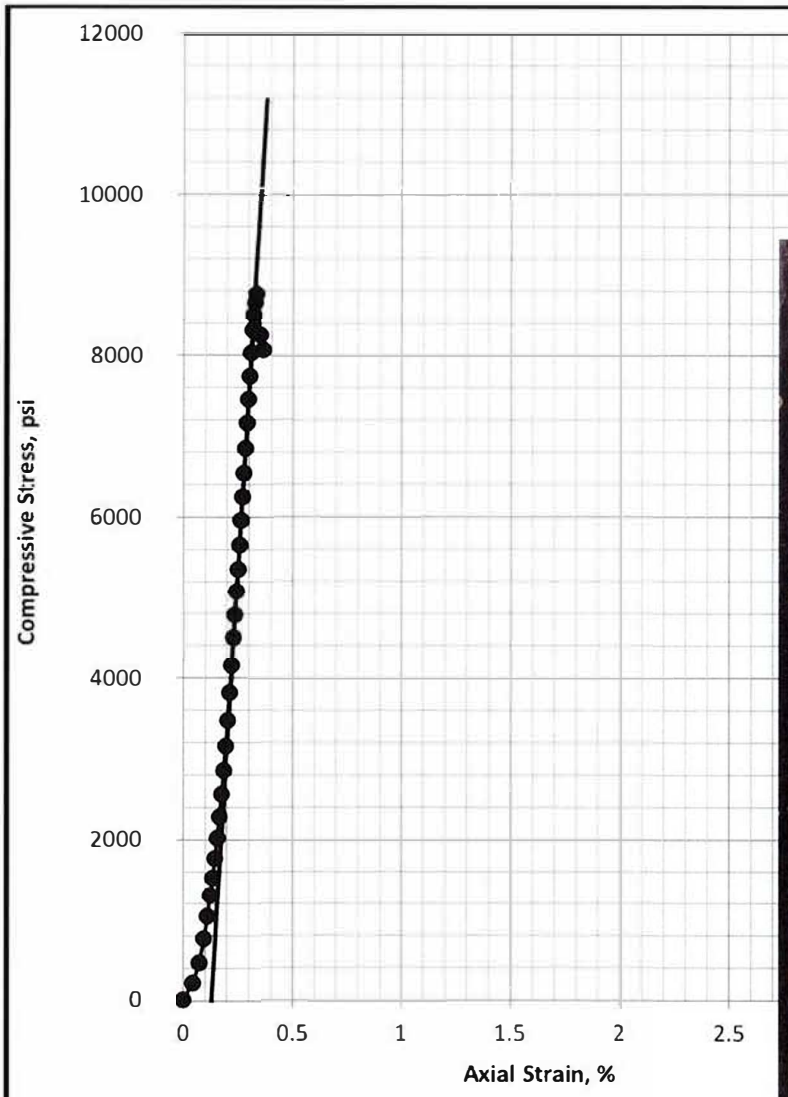
AECOM Project No: **60323056**
Project Name: **Upland Segment, Rockland County, NY, Champlain-Hudson Power Express**
Location: **Rockland County, NY**

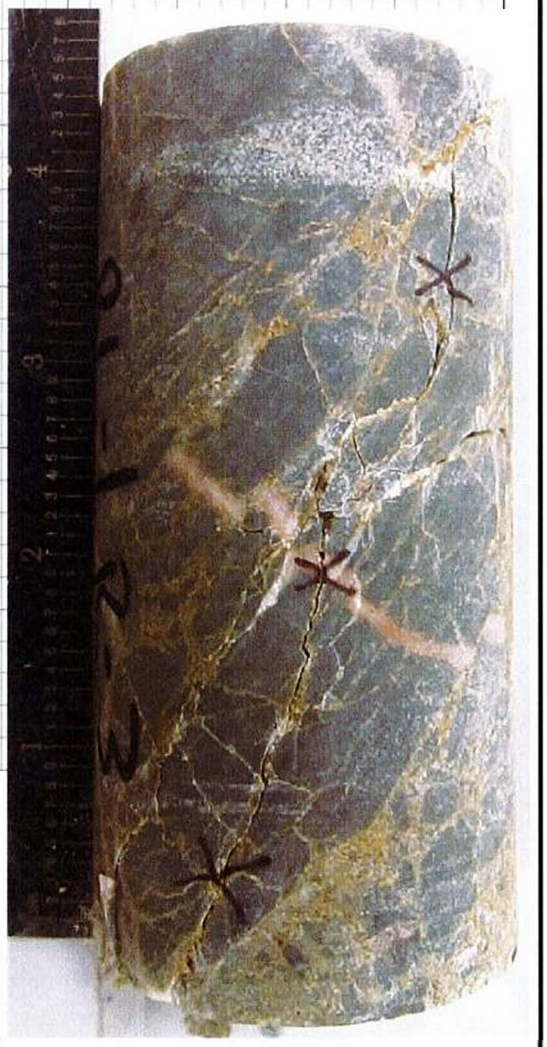
AECOM

Boring No.	Depth (ft.)	
BL-1 (dry)	48.0 to 60.0	

Boring No.	Depth (ft.)	
BL-1 (wet)	48.0 to 60.0	

Note: Black foam inserts represent core pieces that were removed for geotechnical and/or thermal resistivity laboratory testing





Specimen Information

Water Content (%)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Length (inch)	Diameter (inch)
0.15	176	176	4.420	1.960

Specimen meets ASTM D4543 shape tolerances

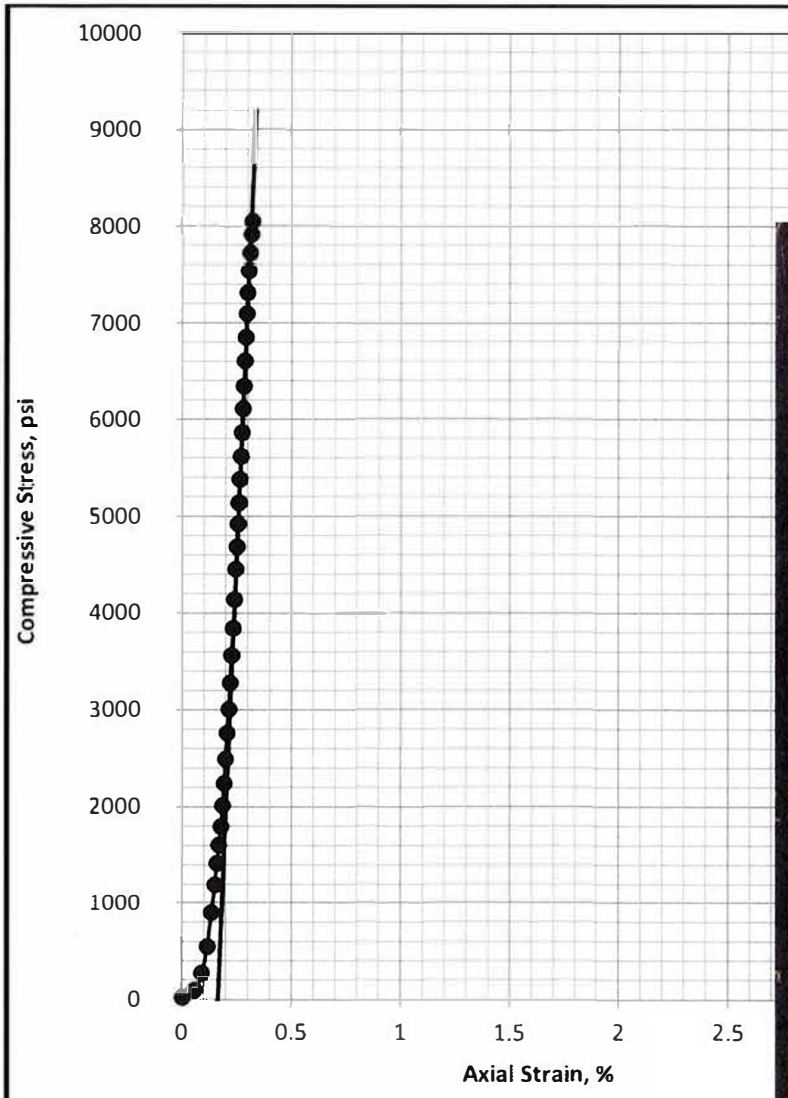
FAILURE PHOTO

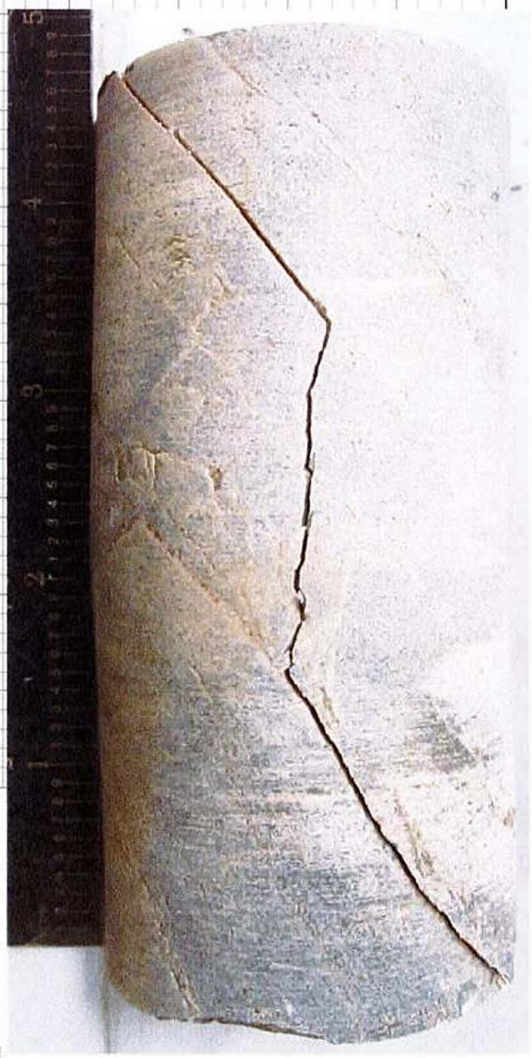
Test Summary

Strain Rate (%/min)	Corrected Strain to Peak (%)	q_u (psi)	Estimated (shown) Elastic Modulus (psi)
0.10	0.20	8760	4E+06

Test by: DM
Test Date: Aug-17-20
Reviewed by: GET

Aquifer **Project # PO 309907**	**CHPE - Rockland County Borings**	**COMPRESSIVE STRESS VS STRAIN** **UNCONFINED COMPRESSIVE STRENGTH TEST**
TerraSense, LLC **Project # 7853-20003**		**Boring: BL-1 Run: R-3** **Depth 19.3-19.7 ft.**





Specimen Information

Water Content (%)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Length (inch)	Diameter (inch)
0.11	176	175	4.520	1.966

Specimen does not meet ASTM D4543 shape tolerances for side straightness

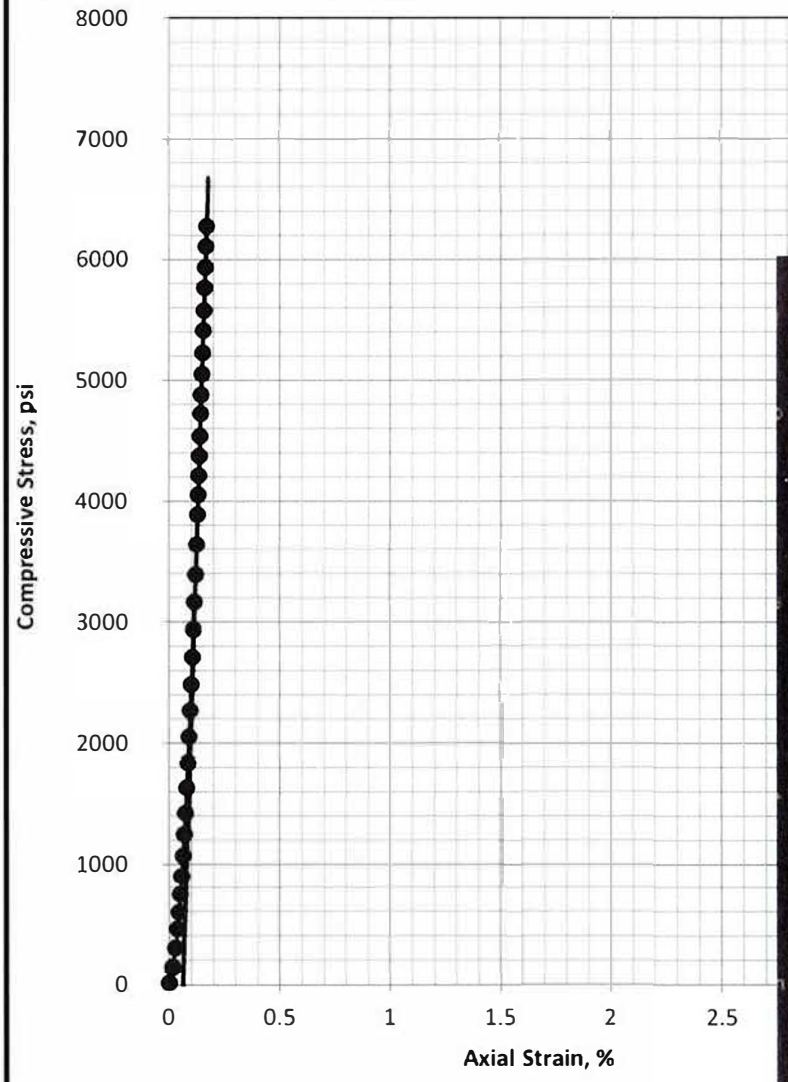
FAILURE PHOTO

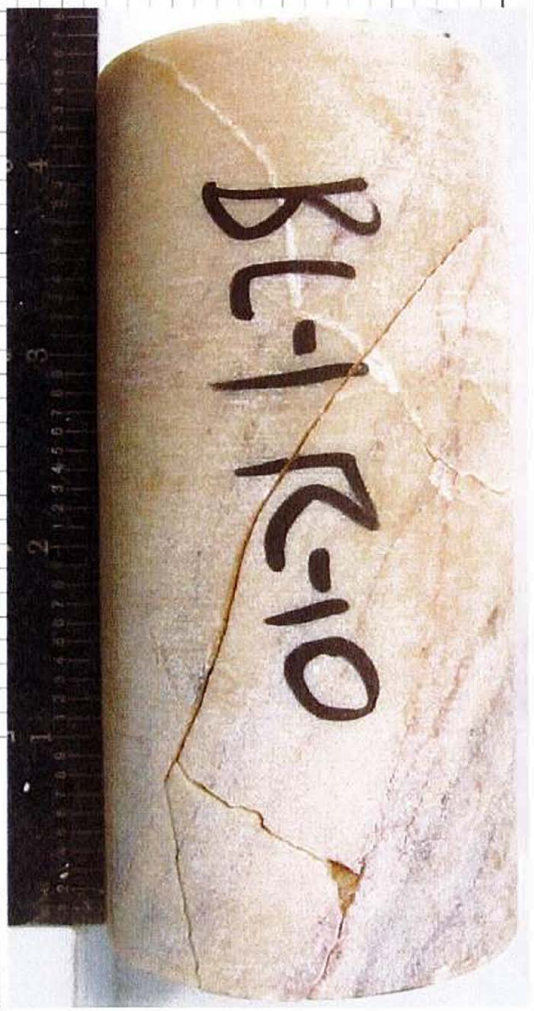
Test Summary

Strain Rate (%/min)	Corrected Strain to Peak (%)	q_u (psi)	Estimated (shown) Elastic Modulus (psi)
0.09	0.16	8050	5E+06

Test by: DM
Test Date: Aug-17-20
Reviewed by: GET

Aquifer **Project # PO 309907**	**CHPE - Rockland County Borings**	**COMPRESSIVE STRESS VS STRAIN** **UNCONFINED COMPRESSIVE STRENGTH TEST**
TerraSense, LLC **Project # 7853-20003**		**Boring: BL-1 Run: R-7** **Depth 31.1-31.5 ft.**





FAILURE PHOTO

Specimen Information

Water Content (%)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Length (inch)	Diameter (inch)
0.08	177	176	4.347	1.970

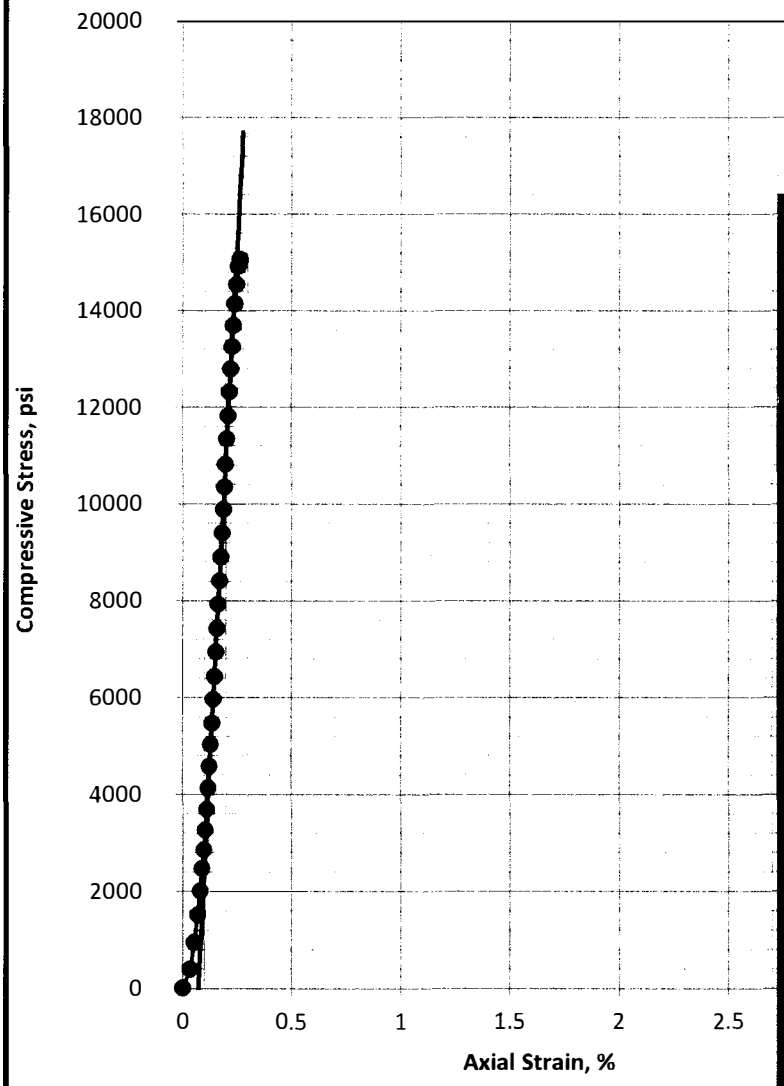
Specimen meets ASTM D4543 shape tolerances

Test Summary

Strain Rate (%/min)	Corrected Strain to Peak (%)	q_u (psi)	Estimated (shown) Elastic Modulus (psi)
0.09	0.11	6280	6E+06

Test by: DM
Test Date: Aug-17-20
Reviewed by: GET

Aquifer **Project # PO 309907**	**CHPE - Rockland County Borings**	**COMPRESSIVE STRESS VS STRAIN** **UNCONFINED COMPRESSIVE STRENGTH TEST**
TerraSense, LLC **Project # 7853-20003**		**Boring: BL-1 Run: R-10** **Depth 48.3-48.7 ft.**



Specimen Information

Water Content (%)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Length (inch)	Diameter (inch)
0.13	174	174	4.601	1.967

Specimen does not meet ASTM D4543 shape tolerances for side straightness

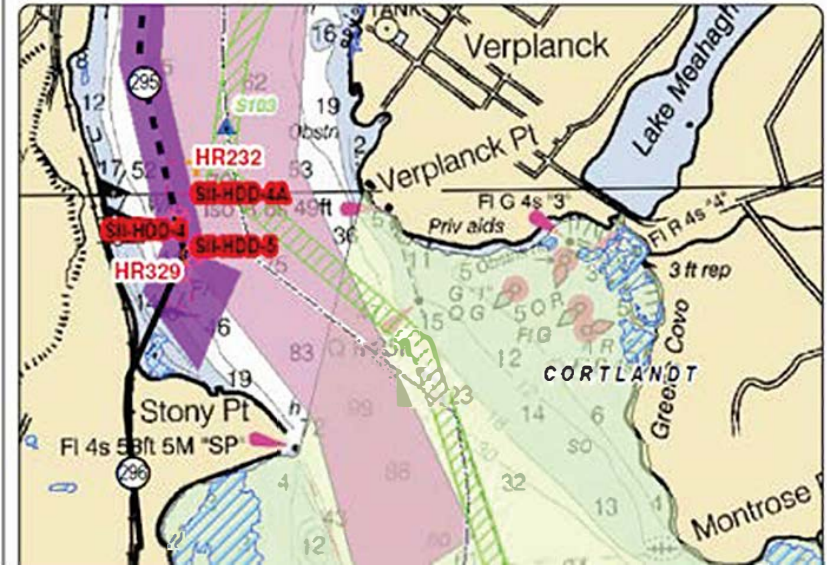
FAILURE PHOTO

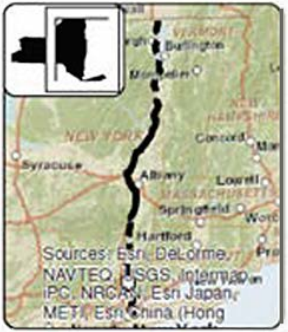
Test Summary

Strain Rate (%/min)	Corrected Strain Strain to Peak (%)	q_u (psi)	Estimated (shown) Elastic Modulus (psi)
0.07	0.19	15070	9E+06

Test by: DM
Test Date: Aug-17-20
Reviewed by: GET

Aquifer **Project # PO 309907**	**CHPE - Rockland County Borings**	**COMPRESSIVE STRESS VS STRAIN** **UNCONFINED COMPRESSIVE STRENGTH TEST**
TerraSense, LLC **Project # 7853-20003**		**Boring: BL-1 Run: R-11** **Depth 53.9-54.3 ft.**





LEGEND

1 CHPE Project Marker

Proposed CHPE Routes

- Terrestrial
- Submarine

2012 MRS Corridor

2010 MRS Corridor

STONY POINT

Hole No. SII-HDD-4D

DRILLING LOG

DIVISION: HDR CHPE

INSTALLATION: MRS Phase 2 Cable Route Survey

SHEET 1 OF 1 SHEETS

1. PROJECT: CHPE
2. LOCATION (Coordinates or Station): Hudson River N 14,982,803.8 E 1,922,341.3
3. DRILLING AGENCY: ADT
4. HOLE NO. (As shown on drawing title and file number): SII-HDD-4D
5. NAME OF DRILLER: J. Philbin
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ---- DEG. FROM VERT.
7. Penetration, ft: 52.0
8. Recovery, ft: 52.0
9. Total Recovery, %: 100.0
10. SIZE AND TYPE OF BIT: Split Spoon
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): NAVD88
12. MANUFACTURER'S DESIGNATION OF DRILL:
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 11; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES: 0
15. WATER DEPTH:
16. DATE HOLE: STARTED 11/16/2012; COMPLETED 11/16/2012
17. ELEVATION TOP OF HOLE: -53.8
18. TOTAL CORE RECOVERY FOR BORING: 100 %
19. GEOLOGIST: S. Miller

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
-53.8	0.0		Dark brown elastic silt	100	SedBox4 0.0 2.0	WOR
				100	SedBox4 5.0 7.0	WOR
-65.8	12.0			100	SedBox4 10.0 12.0	WOR
-68.8	15.0		No Data			
-73.8	20.0		Sample lost	0	SedBox4 15.0 17.0	WOR Sample lost in hole
			Dark brown, high-plasticity clay with trace shell fragments	100	SedBox4 20.0 22.0	WOR
				100	SedBox4 25.0 27.0	WOR
				100	SedBox4 30.0 32.0	WOR
				100	SedBox4 35.0 37.0	WOR
				100	SedBox4 40.0 42.0	WOR
-100.8	47.0			100	SedBox4 45.0 47.0	Blows 4-4-4-5
-103.8	50.0		No Data			
-105.8	52.0		Dark brown elastic silt	100	SedBox4 50.0 52.0	Blows 5-5-6-5

Hole No. SII-HDD-5D

DRILLING LOG	DIVISION: HDR CHPE	INSTALLATION: MRS Phase 2 Cable Route Survey	SHEET 1 OF 1 SHEETS

1. PROJECT: CHPE	10. SIZE AND TYPE OF BIT: Split Spoon
2. LOCATION (Coordinates or Station): Hudson River N 14,982,610.4 E 1,922,256.6	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): NAVD88
3. DRILLING AGENCY: ADT	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (As shown on drawing title and file number): SII-HDD-5D	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 11 / UNDISTURBED 0
5. NAME OF DRILLER: J. Philbin	14. TOTAL NUMBER CORE BOXES: 0
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED --- DEG. FROM VERT.	15. WATER DEPTH
7. Penetration, ft: 52.0	16. DATE HOLE: STARTED 11/17/2012 / COMPLETED 11/17/2012
8. Recovery, ft: 52.0	17. ELEVATION TOP OF HOLE: -41.0
9. Total Recovery, %: 100.0	18. TOTAL CORE RECOVERY FOR BORING: 100 %
	19. GEOLOGIST: S. Miller

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
-41.0	0.0		Dark brown, high-plasticity organic clay with trace shell fragments	100	SedBox5 0.0 2.0	WOR
				100	SedBox5 5.0 7.0	WOR
-53.0	12.0			100	SedBox5 10.0 12.0	WOR
-56.0	15.0		No Data			
			Dark brown elastic silt with trace organics and shell fragments	100	SedBox5 15.0 17.0	WOR
				100	SedBox5 20.0 22.0	WOR
-68.0	27.0			100	SedBox5 25.0 27.0	WOR
-71.0	30.0		No Data			
			Dark brown, high-plasticity clay	100	SedBox5 30.0 32.0	WOR
-78.0	37.0			100	SedBox5 35.0 37.0	WOR
-81.0	40.0		No Data			
-83.0	42.0		Dark brown, low-plasticity clay	100	SedBox5 40.0 42.0	WOR
-86.0	45.0		No Data			
-88.0	47.0		Dark brown, high-plasticity clay	100	SedBox5 45.0 47.0	WOR
-91.0	50.0		No Data			
-93.0	52.0		Dark brown silt with traces of fine-grained sand	100	SedBox5 50.0 52.0	WOR

STONY POINT

Hole No. SII-HDD-4

DRILLING LOG

DIVISION: HDR CHPE

INSTALLATION: MRS Phase 2 Cable Route Survey

SHEET 1 OF 1 SHEETS

1. PROJECT: CHPE
2. LOCATION (Coordinates or Station): HUDSON RIVER N 14,982,840.9 E 1,922,504.3
3. DRILLING AGENCY: AOSS
4. HOLE NO. *(As shown on drawing title and file number)*: SII-HDD-4
5. NAME OF DRILLER: M.Telesco
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED --- DEG. FROM VERT.
7. Penetration, ft: 9.8
8. Recovery, ft: 7.2
9. Total Recovery, %: 73.6
10. SIZE AND TYPE OF BIT: 3.5 in
11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)*: NAVD88
12. MANUFACTURER'S DESIGNATION OF DRILL: Vibracore
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 1; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES: N/A
15. WATER DEPTH: -61.5
16. DATE HOLE: STARTED 10/8/2012; COMPLETED 10/8/2012
17. ELEVATION TOP OF HOLE: -61.5
18. TOTAL CORE RECOVERY FOR BORING: 73.6 %
19. GEOLOGIST: M.Kwasek

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
-61.5	0.0		Grey, high-plasticity organic silt or clay with common black organic bands.	100	BS1 0.0 7.2	Bagged Sample (0-7.2')
						@0.0' Tor=.02 T/sq.ft Pen=.02 T/sq.ft
						@1.0' Tor=.02 T/sq.ft Pen=.03 T/sq.ft
						@2.0' Tor=.03 T/sq.ft Pen=.03 T/sq.ft
						@3.0' Tor=.03 T/sq.ft Pen=.05 T/sq.ft
						@4.0' Tor=.05 T/sq.ft Pen=.09 T/sq.ft
						@5.0' Tor=.03 T/sq.ft Pen=.05 T/sq.ft
						@6.0' Tor=.04 T/sq.ft Pen=.08 T/sq.ft
-68.7	7.2					@7.0' Tor=.01 T/sq.ft Pen=.03 T/sq.ft

DRILLING LOG

DIVISION: HDR CHPE

INSTALLATION: MRS Phase 2 Cable Route Survey

SHEET 1 OF 1 SHEETS

1. PROJECT: CHPE
2. LOCATION (Coordinates or Station): HUDSON RIVER N 14,983,310.5 E 1,922,278.9
3. DRILLING AGENCY: AOSS
4. HOLE NO. *(As shown on drawing title and file number)*: SII-HDD-4A
5. NAME OF DRILLER: M.Telesco
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED --- DEG. FROM VERT.
7. Penetration, ft: 9.8
8. Recovery, ft: 7.1
9. Total Recovery, %: 72.7
10. SIZE AND TYPE OF BIT: 3.5 in
11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)*: NAVD88
12. MANUFACTURER'S DESIGNATION OF DRILL: Vibracore
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 1; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES: N/A
15. WATER DEPTH: -62.3
16. DATE HOLE: STARTED 10/8/2012; COMPLETED 10/8/2012
17. ELEVATION TOP OF HOLE: -62.3
18. TOTAL CORE RECOVERY FOR BORING: 72.7 %
19. GEOLOGIST: M.Kwasek

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
-62.3	0.0		Grey elastic silt	100	BS1 0.0 7.1	Bagged Sample (0-7.1') @0.0' Tor=.02 T/sq.ft Pen=.02 T/sq.ft @1.0' Tor=.03 T/sq.ft Pen=.03 T/sq.ft @2.0' Tor=.03 T/sq.ft Pen=.05 T/sq.ft @3.0' Tor=.02 T/sq.ft Pen=.05 T/sq.ft @4.0' Tor=.04 T/sq.ft Pen=.06 T/sq.ft @5.0' Tor=.04 T/sq.ft Pen=.06 T/sq.ft @6.0' Tor=.05 T/sq.ft Pen=.08 T/sq.ft
-69.4	7.1					@7.0' Tor=.04 T/sq.ft Pen=.05 T/sq.ft

DRILLING LOG

DIVISION: HDR CHPE

INSTALLATION: MRS Phase 2 Cable Route Survey

SHEET 1 OF 1 SHEETS

1. PROJECT	CHPE
2. LOCATION (Coordinates or Station)	HUDSON RIVER N 14,982,618.7 E 1,922,252.8
3. DRILLING AGENCY	AOSS
4. HOLE NO. *(As shown on drawing title and file number)*	SII-HDD-5
5. NAME OF DRILLER	M.Telesco
6. DIRECTION OF HOLE	☒ VERTICAL ☐ INCLINED --- DEG. FROM VERT.
7. Penetration, ft	8.7
8. Recovery, ft	6.6
9. Total Recovery, %	75.4
10. SIZE AND TYPE OF BIT	3.5 in
11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)*	NAVD88
12. MANUFACTURER'S DESIGNATION OF DRILL	Vibracore
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN	DISTURBED 1 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	N/A
15. WATER DEPTH	-41.0
16. DATE HOLE	STARTED 10/9/2012 / COMPLETED 10/9/2012
17. ELEVATION TOP OF HOLE	-41.0
18. TOTAL CORE RECOVERY FOR BORING	75.4 %
19. GEOLOGIST	D.Whitesell

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
-41.0	0.0		Dark grey, high-plasticity organic clay with bands of black organic matter throughout	100	BS1 0.0 6.6	Bagged Sample (0-6.55') @0.0' Tor=.03 T/sq.ft Pen=.03 T/sq.ft
						@1.0' Tor=.04 T/sq.ft Pen=.05 T/sq.ft
						@2.0' Tor=.03 T/sq.ft Pen=.05 T/sq.ft
						@3.0' Tor=.04 T/sq.ft Pen=.05 T/sq.ft
						@4.0' Tor=.05 T/sq.ft Pen=.08 T/sq.ft
						@5.0' Tor=.04 T/sq.ft Pen=.05 T/sq.ft
						@6.0' Tor=.04 T/sq.ft Pen=.05 T/sq.ft
-47.6	6.6					

Appendix W – Time of Year Narrative for HDD

HDD: In-water work to establish steel conductor casing riser pipe

Condition 11 of the New York State Public Service Commission (NYSPSC) 401 Water Quality Certification (attached) states "The following in-water activities may be undertaken at any time: physical, biological, geotechnical and cultural resource sampling, surveying and testing, marine surveys, mobilization and demobilization of vessels and equipment used for cable installation and cofferdam construction; **cofferdam and steel casing rise pipe construction**; dredging of cofferdams provided that the walls of the cofferdam extend above mean high water during dredging; **HDD associated with either of the two foregoing items**; post-installation surveys and sampling; locating and marking utility crossings and work to effect utility crossings; and, with prior notice to the DPS, the New York State Department of Environmental Conservation ("NYSDEC"), and the New York State Department of Health ("NYSDOH") emergency maintenance work."

US Army Corps of Engineers Permit NAN-2009-01089 Special Condition R states "All regulated work shall be performed in accordance with dated permit drawings, the attached New York State-issued Section 401 of the Clean Water Act Water Quality Certificate dated 18 January 2013; and Special Conditions (A) through (OO) below which are all hereby made part of this permit."

Based on the above, steel casing rise pipe construction and the HDD associated with same can be undertaken at any time. This is consistent with Article VII BMP Section 26.2 which includes the statement "All in-water work will be conducted within the construction windows specified in the Certificate Conditions and the Water Quality Certificate."

CHPE Work in Water Window Permit Matrix

11/29/2022

Segment	Water Body	Mile Post (referenced to 2012 route)	HDD Site	Art VII CC93 Work in Water Window	Army Corps of Engineers Permit Work in Water Window	Planned Start of Construction	Planned Completion
Segment 7	Lower Lake Champlain	MP 73-101	Putnam Station	9/1 to 12/31	Null	4/29/2023	7/8/2023
Segment 9	Upper Hudson	MP 230-269	Cementon	8/1 to 10/15	7/1 to 1/14	6/11/2023*	9/5/2023
Segment 10	Mid-Upper Hudson	MP 269-296	Stony Point	9/15 to 11/30	7/1 to 1/14	7/8/2023	10/28/2023
Segment 11	Lower Hudson	MP 305-324	Congers	7/1 to 10/31	7/1 to 1/14	9/5/2023	12/23/2023

* Land work to commence. HDD not to cross water line until 7/1.

NEW YORK STATE PUBLIC SERVICE COMMISSION
401 WATER QUALITY CERTIFICATION

Pursuant to:	Section 401 of the Federal Water Pollution Control Act, 33 U.S.C. § 1341, and Article VII of the New York Public Service Law
Certification Issued to:	Champlain Hudson Power Express, Inc. CHPE Properties, Inc. Pieter Schuyler Bldg. 600 Broadway Albany, New York 12207

Location of Facility

Champlain Hudson Power Express, Inc. and CHPE Properties, Inc. (collectively, "CHPE") proposes to construct, operate, and maintain a new 1,000 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 run from the Canadian border east of the Town of Champlain, New York to Astoria, Queens, New York ("Astoria"). The approximately three hundred thirty two (332) mile HVDC Transmission System will connect with an HVDC converter station at Astoria to be owned by CHPE. From the converter station will be connected by an underground 345 kV HVAC circuit to a gas insulated switchgear substation owned or to be owned by the New York Power Authority on property owned by the Consolidated Edison Company of New York, Inc. at Astoria. A 345 kV HVAC circuit will extend from the GIS Substation to Con Edison's 345 kV Rainey Substation located on the corner of 36th Avenue and Vernon Boulevard in Queens, New York (the "Astoria-Rainey Cable"). The HVDC Transmission System and the Astoria-Rainey Cable are referred to collectively herein as the "Facility." The details and justification for the Facility are contained in the administrative record in Case 10-T-0139.

Facility Description

The record in the proceeding on CHPE's application, as supplemented, for a Certificate of Environmental Compatibility and Public Need under Article VII of the New York Public Service Law ("PSL") has fulfilled the requirements necessary to determine whether the Facility will qualify for issuance of a Water Quality Certification ("Certification") pursuant to § 401 of the Clean Water Act (33 U.S.C. §§ 1251-1387). The Facility cables will be located primarily underwater within the lake- and riverbeds of New York waterways, including Lake Champlain and the Hudson, Harlem and East Rivers, with some segments of the Facility route being sited overland. Overland Facility segments will consist primarily of cable installations buried along: (a) existing railroad rights-of-way; and (b) existing roadway rights-of-way. In addition, to cross the Hudson

River at Fort Edward, the Mohawk River at Schenectady and Catskill Creek, the cables will be located in conduits to be attached to existing railroad bridge structures.

For the overland segments of the Facility, the cables will be buried via excavated trenches or Horizontal Directional Drilling ("HDD") methods. For underwater cable installation, the primary methods for installation will be jet plowing and/or shear plowing. Underwater cable installation techniques will vary based on a number of factors, including, but not limited to, sediment type, bathymetry, and existing infrastructure crossings.

Where the overland segments of the Facility route encounter streams and/or wetlands, the following methods may be used to minimize impacts: (a) flume crossing; (b) dam and pump; (c) HDD or Jack and Bore ("J&B"); and (d) open cut. The waterbody crossing methods are further described in the Facility's Best Management Practices documentation, which is used in the preparation of the Environmental Management and Construction Plan ("EM&CP"). Adherence to the EM&CP, required to be filed for approval by the New York State Public Service Commission ("Commission") as a condition of the Public Service Law Article VII Certificate of Environmental Compatibility and Public Need ("Article VII Certificate") in Case 10-T-0139, will serve to protect these resources.

Construction of the Facility will be in accordance with the Article VII Certificate and approved EM&CP.

Certification

The Commission hereby certifies, pursuant to § 401 of the Clean Water Act (33 U.S.C. § 1341(a)(1)) and Article VII of the PSL, that the Facility, as conditioned herein, complies with applicable requirements of §§ 301, 302, 303, 306 and 307 of the Clean Water Act as amended, and applicable New York State water quality standards, limitations, criteria, and other requirements set forth in 6 NYCRR § 608.9(a) and Parts 701 through 704, provided that all of the conditions listed herein are met. This Certification is issued in conjunction with the Article VII Certificate sought by CHPE in, and based on the record of, Case 10-T-0139.

Conditions

1. No in-water work shall commence until all pre-construction conditions related to such work contained in the Article VII Certificate and any Order approving the EM&CP for each affected Segment EM&CP have been met to the satisfaction of the New York State Department of Public Service ("DPS").

2. Construction and operation of the Facility shall at all times be in conformance with: (a) the Application (as amended and supplemented) and Joint Proposal of Settlement filed in Case 10-T-0139 to the degree not superseded by the Article VII Certificate, (b) all conditions of approval contained in the Article VII

Certificate, (c) the EM&CP, and (d) all conditions incorporated in any Order approving the EM&CP in Case 10-T-0139, to the extent such documents referenced in (c) and (d) above pertain to CHPE's compliance with New York State Water Quality Standards necessary and appropriate for issuance of, and compliance with, this Certification.

3. CHPE shall provide a copy of this Certification to the United States Army Corps of Engineers ("USACE"), as well as a copy of the Application, Joint Proposal, Article VII Certificate (when issued) EM&CP and Order(s) approving the EM&CP (when issued) in Case 10-T-0139, so that the USACE will have a complete record of the conditions that apply hereto.

4. CHPE shall provide all construction contractors performing work on the Facility complete copies of this Certification, the Article VII Certificate, the approved EM&CP, and Orders(s) approving the EM&CP for each Facility segment.

Classified Streams and Wetland Crossings Installation

5. For overland installation, no site preparation work shall be undertaken until all required erosion control measures have been installed.

6. During overland cable installation in all waters of the State, including classified streams and wetlands, there shall be no visible increase in turbidity that causes a visible contrast to background conditions forty (40) feet downstream of the installed cable centerline.

7. CHPE shall employ measures sufficient to prevent contamination of the waters of the State by silt, sediment, fuels, drilling fluids, concrete, leachate or any other pollutant associated with the installation of the Facility.

8. All in-stream work, as well as any work that may result in the suspension of sediments, is prohibited in all streams designated as "C(T)" and "C(TS)" streams during the trout spawning and incubation period commencing October 1 and ending May 31st.

9. Any debris or excess materials caused by the construction of the Facility shall be immediately and completely removed from the bed and banks of all water areas and transported to an appropriate upland area for disposal.

Lake and River Installation

10. Underwater construction in Lake Champlain and the Hudson, Harlem and East Rivers (including jet-plow and shear-plow trials) and pre-installation route clearing activities (including pre-lay grapnel run and associated obstruction and debris removal) shall occur within the construction windows set forth in Table 1 in the Article VII Certificate.

11. The following in-water activities may be undertaken at any time: physical, biological, geotechnical and cultural resource sampling, surveying and testing; marine surveys, mobilization and demobilization of vessels and equipment used for cable installation and cofferdam construction; cofferdam and steel casing rise pipe construction; dredging of cofferdams provided that the walls of the cofferdam extend above mean high water during dredging; HDD associated with either of the two foregoing items; post-installation surveys and sampling; locating and marking utility crossings and work to effect utility crossings; and, with prior notice to the DPS, the New York State Department of Environmental Conservation ("NYSDEC"), and the New York State Department of Health ("NYSDOH") emergency maintenance work.

12. During the jet plow and shear plow trials and underwater cable installation, CHPE shall implement the Suspended Sediment/Water Quality Monitoring Plan (hereinafter the "Water Quality Monitoring Plan"), to be developed pursuant to the approved Suspended Sediment / Water Quality Monitoring Plan Scope of Study included as Attachment 1 to the Article VII Certificate . CHPE shall operate the jet plow and shear plow in accordance with the operating conditions determined through the jet plow and shear plow trials described in the Water Quality Monitoring Plan to minimize suspension of *in situ* sediment, subject to the limitation of Condition 14(c), below.

13. If the jet plow trials demonstrate that the preferred operating conditions result in real-time, total suspended solids ("TSS") concentrations, measured five hundred (500) feet down-current of the jet plow, exceeding the TSS concentrations at an up-current background station by more than two hundred (200) milligrams per liter ("mg/L"), CHPE shall report such conditions to the Aquatic Inspector and work with DPS and NYSDEC to evaluate and implement modifications to the plow operating conditions to further reduce *in-situ* sediment suspension associated with the single pass installation procedure. If the shear plow trials demonstrate that the preferred operating conditions result in real-time TSS concentrations, measured five hundred (500) feet down-current of the shear-plow in the southern portion of Lake Champlain (south of Crown Point), exceeding the TSS concentrations at an up-current background station by more than one hundred (100) mg/L, CHPE shall report such conditions to the Aquatic Inspector and work with DPS and NYSDEC to evaluate and implement modifications to the plow operating conditions to further reduce in-situ sediment suspension associated with the single pass installation procedure. CHPE shall not utilize the jet plow or shear plow until they have demonstrated to the satisfaction of DPS staff their ability to achieve the TSS standards established herein through test trials.

14. Water Quality

    a. During jet plow and shear plow cable installation, CHPE shall sample and

measure turbidity (in units of Nephelometric Turbidity Units ("NTU")), TSS, hardness, and the concentrations of the chemical constituents identified in the table provided in Condition 14(d) below, within the water column of Lake Champlain and the Hudson, Harlem and East Rivers outside the effects of the installation event (the up-current background station) and down-current of the operating jet plow and shear plow described in the Water Quality Monitoring Plan. Up-current samples shall be collected at a location five hundred (500) feet up-current of the cable installation outside the effect of the jet plowing and shear plowing. Down-current samples shall be collected five hundred (500) feet down-current of the jet plow and shear plow. Samples shall be collected at near-surface, mid-depth, and near-bottom at each sampling location. Measured levels of metals shall be reported both as totals and as dissolved fractions, except mercury, which shall be reported as total mercury.

b. Suspended sediment plume monitoring and water quality monitoring shall be conducted at the locations and frequency set forth in the Water Quality Monitoring Plan.

c. If, during underwater cable installation, TSS concentrations monitored or measured at five hundred (500) feet down-current of the installation exceed TSS concentrations at an up-current background station by more than two hundred (200) mg/L or more than one hundred (100) mg/L in the southern portion of Lake Champlain (south of Crown Point), the Aquatic Inspector shall be immediately notified. CHPE also must attempt to notify the NYSDEC and DPS within twenty four (24) hours of any such TSS exceedance. CHPE shall immediately employ one or more of the following environmental protection measures: changing the rate of advancement of the jet plow or shear plow, modifying hydraulic pressures, or implementing other reasonable operational controls that may reduce suspension of *in-situ sediments*. If CHPE proposes to employ mitigation measures not otherwise provided for in this paragraph, they must first consult with the DPS, NYSDEC, and the Aquatic Inspector. In the event that DPS determines that the mitigation techniques are unable to reduce TSS concentrations below the maximum allowable threshold, underwater cable installation shall be suspended and CHPE shall consult with DPS and NYSDEC regarding alternative cable installation techniques. Nothing in this subsection is intended to require that cable installation methods be modified to prevent burial of the cables in a single trench to the depths specified in the Article VII Certificate through a single installation pass.

d. During underwater cable installation, the concentrations of the chemical constituents listed below (Table 1), as measured in the samples collected five hundred (500) feet down-current of the cable installation activities, shall not exceed the greater of: (A) the levels set forth below or (B) 1.3 times the highest ambient background level measured during the prior twenty four

(24) -hour sampling period up-current of the installation at the same depth as the down-current sample.

Table 1. Underwater Cable Installation Water Quality Standards

Route Mile	Water Body Class	Contaminant	Standard	Unit	Method	Reporting Limit
0-73.5	AA	Dissolved Arsenic	340	ug/l	EPA 200.7	10
		Dissolved Copper	calculate using measured hardness and (0.96) exp(0.9422 [ln (ppm hardness)] - 1.7)	ug/l	EPA 200.7	2
		Dissolved Zinc	calculate using measured hardness and 0.978 exp(0.8473 [ln(ppm hardness)] + 0.884)	ug/l	EPA 200.7	2
73.5-101.7	B	Dissolved Arsenic	340	ug/l	EPA 200.7	10
		Dissolved Copper	calculate using measured hardness and (0.96) exp(0.9422 [ln (ppm hardness)] - 1.7)	ug/l	EPA 200.7	0.1*
		Dissolved Zinc	calculate using measured hardness and 0.978 exp(0.8473 [ln(ppm hardness)] + 0.884)	ug/l	EPA 200.7	2
228.5-272.3	A	Phenanthrene*	45	ug/l	EPA 8270C	0.02
		Dissolved Cadmium	5	ug/l	EPA 200.7	0.02*
		Dissolved Copper	200	ug/l	EPA 200.7	0.1*
		Dissolved Lead	50	ug/l	EPA 200.7	0.02*
		Total Mercury	0.7	ug/l	EPA 1669	0.001
		Total PCBs	0.09	ug/l	EPA 8082	0.005*
272.3-290.3	B	Dissolved Arsenic	340	ug/l	EPA 0.7	10
		Dissolved Cadmium	calculate using measured hardness and (0.85) exp(1.128 [ln (ppm hardness)] - 3.6867)	ug/l	EPA 200.7	0.02*
		Dissolved Copper	calculate based on measured hardness using (0.96) exp(0.9422 [ln (ppm hardness)] - 1.7)	ug/l	EPA 200.7	0.1*

		Dissolved Lead	calculate using measured hardness and {1.46203 - [ln (hardness) (0.145712)]} exp (1.273 [ln (hardness)] - 1.052)	ug/l		0.02*
		Phenanthrene*	45	ug/l	EPA 8270C	0.02
		Dissolved Mercury	1.4	ug/l	EPA 1669	0.001
		Total PCBs	0.2 per aroclor	ug/l	EPA 8082	0.005*
290.3-324.0	SB	Dissolved Arsenic	63	ug/l	EPA 200.7	10
		Dissolved Cadmium	7.7	ug/l	EPA 200.7	0.02*
		Dissolved Copper	7.9	ug/l	EPA 200.7	0.1*
		Dissolved Lead	204	ug/l	EPA 200.7	0.02*
		Phenanthrene*	14	ug/l	EPA 8270C	0.02
		Total Mercury	0.05***	ug/l	EPA 1669	0.001
		Total PCBs	0.2 per aroclor	ug/l	EPA 8082	0.005*
324.1-332.5	I	Dissolved Arsenic	36	ug/l	EPA 200.7	10
		Dissolved Cadmium	7.7	ug/l	EPA 200.7	0.02*
		Dissolved Copper	7.9	ug/l	EPA 200.7	0.1*
		Dissolved Lead	204	ug/l	EPA 200.7	0.02*
		Phenanthrene*	14	ug/l	EPA 8270C	0.02
		Total Mercury	0.05***	ug/l	EPA 1669	0.001
		Total PCBs	0.2 per aroclor	ug/l	EPA 8082	0.005*

* Assumes low level analysis, compared to standard level
** Phenanthrene will be used as an indicator for the total concentration of Polycyclic Aromatic Hydrocarbons (PAHs).
*** Standard based on General Level Currently Achievable described in TOGS 1.3.10.

e. All water quality laboratory analyses required in this Certification must be conducted by a laboratory certified by the NYSDOH.

f. If the compliance criteria described in clause 14(d) above are exceeded at any time during the installation, additional water quality sampling shall take place at the location of the exceedance as described in the Water Quality Monitoring Plan.

g. Hardness shall be measured in each water quality sample collected. The analytical results for hardness shall be applied to calculate the standards for dissolved copper, dissolved zinc, dissolved cadmium, and dissolved lead where necessary, as described in clause 14(d) above.

15. Changes in the Conditions of the Water Quality Certification, if proposed by the date on which the proposed Environmental Management and Construction Plan (EM&CP) is filed, shall be reviewed together with the proposed EM&CP. Changes in the Conditions of the Water Quality Certification shall be governed by Condition 158 of the Article VII Certificate governing changes to the approved EM&CP.

16. Nothing in this Certification shall limit either (i) the authority of the DEC to monitor the environmental and health impacts resulting from the construction and operation of the Facility and to enforce applicable provisions of the Environmental Conservation Law (including those which provide for summary abatement authority) and applicable implementing regulations governing the environmental and health impacts resulting from such construction and operation, or (ii) any defenses to such enforcement that CHPE may be able to assert under applicable law.

Certified by:

1-18-2013
Date

Floyd E. Barwig, Director
Office of Energy Efficiency and the Environment
New York State Department of Public Service
Three Empire State Plaza
Albany, New York 12223

NYSDEC, the EPC Contractor, and others as deemed appropriate to discuss and review these measures including the location of the flagging of lupine and nectar patches of potential and occupied butterfly habitat. The flagging shall be maintained until construction has been completed and all disturbed areas have been restored to their final grade.

91. Within six (6) months after the commencement of commercial operations of the Facility, the Certificate Holders shall provide a ROW maintenance plan for the Facility ROW from Route Mile 145**,** south of Scout Road in the Town of Wilton, New York to Route Mile 180, north of County Line Road in the Town of Rotterdam, New York. This plan shall include but not be limited to methods of maintenance, access routes to the ROW, seasonal construction windows, and the education of all company employees and contractors regarding all measures to avoid occupied habitat associated with Karner blue butterfly and frosted elfin butterfly. The plan shall also provide requirements for notification of the DPS Staff and NYSDEC of any planned maintenance or repair work within, or in the vicinity of occupied habitat that requires excavation or ground disturbance.

N. Underwater Cable Installation

92. All of the terms and conditions of the WQC are incorporated by reference into this Certificate as though fully set out herein. Any changes to the WQC shall be governed by the provisions of Condition 158 of this Certificate.

93. Construction within navigable waters and pre-installation route clearing activities (pre-lay grapnel run and associated obstruction and debris removal) shall occur within the construction time frames set forth in Table 1 below. After consultation with DPS Staff, the New York State Department of State ("NYSDOS"), and NYSDEC, the Certificate

Holders may seek an appropriate modification of the time frames, either in the proposed EM&CP or subject to the provisions of Condition 158 of this Certificate.

Table 1: Underwater Construction Windows in Lake Champlain, The Hudson, Harlem, and East Rivers

River Mile	Route Mile	Location	Construction Windows
	Lake Champlain		
	0 to 73	US/Canada Border to Crown Point	May 1 to August 31
	73 to 101	Crown Point to Dresden	September 1 to December 31
	Hudson River, Harlem River, East River		
107-68	229 to 269	Cementon – New Hamburg	Aug 1 - Oct 15
68-41	269 to 296	New Hamburg – Stony Point	Sep 15 - Nov 30
41-33	296 to 303	Stony Point - Rockland Lake State Park	OVERLAND
33-14	303 to 324	Rockland Lake State Park – Harlem River	Jul 1 - Oct 31
all	324 to 330	Harlem River – East River	May 15 - Nov 30

94. Commencement of in-river work within one (1) mile south of the designated Significant Coastal Fish and Wildlife Habitats ("SCFWHs") at Haverstraw Bay shall occur during the high, or flood, tide condition in order to avoid and/or minimize impacts from resuspended sediments to the SCFWH habitat of Haverstraw Bay.

95. The Certificate Holders shall use installation techniques for underwater cable installation activities that are appropriate for the prevailing substrate conditions.

a. Cable installation in the Hudson, Harlem, and East Rivers shall be designed and installed to meet the following criteria:

(i) Where the cables shall be located within the limits of the maintained