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IEM Report

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Subject	**Weekly Monitoring Report – SRP Submarine Cable Diver Burial Activities**		
Client	Eversource Energy	**Date**	December 19, 2019
Project	Independent Environmental Monitoring, Little Bay Submarine Cable Installation, Seacoast Reliability Project		
Project No.	E2X85301	**File**	Daily Monitoring Report_SRP Little Bay IEM_Diver Burial 12-8 to 12-14
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Copies to	Gregg Comstock, NH DES David Price, NH DES Chris Nash, NH DES Kurt Nelson, Eversource Energy Pamela Munroe, NH SEC		

Weather Observations

Sunday, December 8, 2019			**Est. Tides:** 9:37 a.m. High; 3:47 p.m. Low	
TIME	**WIND (DIRECTION AND SPEED [mph])**	**VISIBILITY (NM)**	**PRECIPITATION (PREV. 24H)**	**COMMENTS**
07:00	6 W gusts to 16	>5 NM	-	8 ˚F; sun
13:00	10 SW gusts to 18	>5 NM	-	30 ˚F; sun
16:00	10 SW gusts to 24	>5 NM	-	28 ˚F; sun
Monday, December 9, 2019			**Est. Tides**: 10:18 a.m. High; 4:32 p.m. Low	
TIME	**WIND (DIRECTION AND SPEED [mph])**	**VISIBILITY (NM)**	**PRECIPITATION (PREV. 24H)**	**COMMENTS**
07:00	8 SW gusts to 10	>5 NM	-	39 ˚F; rain
13:00	9 SW gusts to 10	>5 NM	-	45 ˚F; rain
16:00	14 S gusts to 10	>5 NM		48 ˚F; rain

Tuesday, December 10, 2019			**Est. Tides:** 10:56 a.m. High; 5:13 p.m. Low	
TIME	**WIND (DIRECTION AND SPEED [mph])**	**VISIBILITY (NM)**	**PRECIPITATION (PREV. 24H)**	**COMMENTS**
07:00	12 SW gusts to 20	>5 NM	0.5”	48 ˚F; rain
13:00	12 SW gusts to 15	>5 NM	-	52 ˚F; rain
16:00	10 SW gusts to 20	>5 NM	-	50 ˚F; rain
Wednesday, December 11, 2019			**Est. Tides**: 5:16 a.m. Low; 11:35 a.m. High	
TIME	**WIND (DIRECTION AND SPEED [mph])**	**VISIBILITY (NM)**	**PRECIPITATION (PREV. 24H)**	**COMMENTS**
07:00	8 NW gusts to 14	>5 NM	0.5”	28 ˚F; snow
13:00	5 W gusts to 7	>5 NM	-	30 ˚F; sun
16:00	3 W gusts to 6	>5 NM	-	27 ˚F; sun
Thursday, December 12, 2019			**Est. Tides**: 5:55 a.m. Low: 12:13 p.m. High	
TIME	**WIND (DIRECTION AND SPEED [mph])**	**VISIBILITY (NM)**	**PRECIPITATION (PREV. 24H)**	**COMMENTS**
07:00	8 W gusts to 15	>5 NM	0.10”	21 ˚F; clear
13:00	8 W gusts to 14	>5 NM	-	30 ˚F; clear
16:00	5 W gusts to 8	>5 NM	-	28 ˚F; clear
Friday, December 13, 2019			**Est. Tides**: 6:35 a.m. Low; 12:54 p.m. High	
TIME	**WIND (DIRECTION AND SPEED [mph])**	**VISIBILITY (NM)**	**PRECIPITATION (PREV. 24H)**	**COMMENTS**
07:00	8 S gusts to 10	>5 NM	-	21 ˚F; cloudy
13:00	8 S gusts to 18	>5 NM	-	41 ˚F; cloudy
16:00	8 S gusts to 15	>5 NM	-	39 ˚F; cloudy

Saturday, December 14, 2019			**Est. Tides**: 7:19 a.m. Low; 1:53 p.m. High	
TIME	**WIND (DIRECTION AND SPEED [KTS])**	**VISIBILITY (NM)**	**PRECIPITATION (PREV. 24H)**	**COMMENTS**
07:00	10 SE gusts to 10	>5 NM	2 – 3”	50 ˚F; cloudy
13:00	5 SE gusts to 9	>5 NM	-	50 ˚F; cloudy
16:00	2 SW gusts to 2	>5 NM	-	48 ˚F; cloudy

Summary of Work Activities

Day/Date	Work Description
Sunday, December 8, 2019	Diver burial on west and east sides of Little Bay. West side diver burial – 0935 start, 1430 finish – using large pump and nozzle to jet in denser sediments. East side diver burial (normal pump and jet nozzle) – 0955 start, 1553 finish. Water quality monitoring using one vessel for the duration of diver burial including pre- and post- hand-jetting monitoring. No drone. Mackworth turbidity barriers in place on west and east side.
Monday, December 9, 2019	Diver burial on west and east sides of Little Bay. West side diver burial with larger pump and nozzle – 0830 start, 1428 finish. East side diver burial with normal pump and nozzle – 0805 start, 1615 finish. Water quality monitoring using one vessel for the duration of the diver burial including only post-activity hand-jetting monitoring. Drone flying in morning prior to rain (approximately 0930). Mackworth turbidity barriers in place on west and east side. West side barrier, north end, shifted off-shore. Mackworth Env installed Type I silt curtain to fill gap at shoreline.
Tuesday, December 10, 2019	Diver burial on west and east sides of Little Bay. West side diver burial with large pump and nozzle – 0810 start, 1003 finish – west side cable burial 100% complete. East side diver burial with normal pump and nozzle – 0750 start, 1556 finish.

Day/Date	Work Description
	Water quality monitoring using one vessel for the duration of the diver burial including pre- and post- hand-jetting monitoring. Drone flying. Mackworth turbidity barriers in place on east and west tidal flats. Partial failure of east side turbidity barrier when southern segment broke free of anchors.
Wednesday, December 11, 2019	Two dive teams conducting hand-jetting on eastern tidal flat within turbidity barrier. Dive Teams A and B start on eastern tidal flat at 0823, both dive teams 1621 finish. Two water quality monitoring vessels: one for the east side diver burial and one for the removal of the turbidity barrier on the western tidal flat. Drone flying. Mackworth Env removing the turbidity barrier from the western tidal flat beginning with northern end to make room for work barge to install concrete mattresses.
Thursday, December 12, 2019	Two dive teams conducting hand-jetting on eastern tidal flat within turbidity barrier with large and normal hand jet equipment. Dive Team A starts on eastern tidal flat at 0819. Dive Team B starts on eastern tidal flat at 0825. Both dive teams 1615 finish. Two water quality monitoring vessels: one for the east side diver burial and one for the removal of the turbidity barrier on the western tidal flat. No drone flying. Mackworth Env removing all of the turbidity barrier from the western tidal flat by releasing barrier from anchors and hauling onto small barge and waste container. Later pulled all anchors.
Friday, December 13, 2019	Two dive teams conducting hand-jetting on eastern tidal flat within turbidity barrier. Dive Team A starts on eastern tidal flat at 0904. Dive Team B starts on eastern tidal flat at 0910. Both dive teams 1609 finish. One water quality monitoring vessel on the east side of Little Bay. Drone flying.

Day/Date	Work Description
	Mackworth turbidity barrier in place on eastern tidal flat. Southern end of turbidity barrier lost an anchor line and the barrier drifted north with tide and obstructed diver. Durocher tied off barrier to dive barge so work could continue.
Saturday, December 14, 2019	Two dive teams conducting hand-jetting on eastern tidal flat within turbidity barrier. Dive Team A starts on eastern tidal flat at 1018. Dive Team B starts on eastern tidal flat at 1018. Both dive teams 1505 finish because the turbidity barrier broke free with the current and drifted north. One water quality monitoring vessel on the water. No drone flying. Mackworth turbidity barrier anchored to the diver barge. Mackworth Env on site to monitor barrier. At 1505, barrier broke free of its southern anchors and drifted northern around the point of Beswick Property.

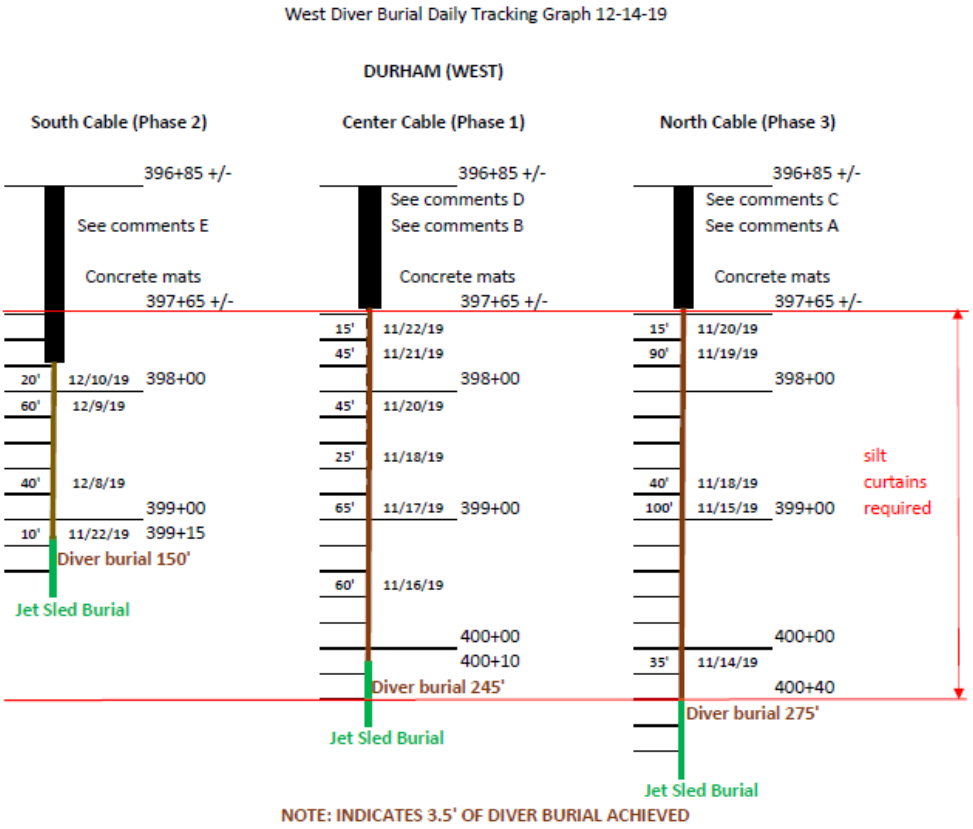
			DIVER BURIAL TRACKING (provided by Durocher Marine - see daily tracking graph below)						
			Durham (west)			Gundalow Landing (east)			
#	Day	Sta. Start	South Cable (Phase 2)	Center Cable (Phase 1)	North Cable (Phase 3)	South Cable (Phase 2)	Center Cable (Phase 1)	North Cable (Phase 3)	Daily Total
			39915	40010	40040	44240	44185	44175	
19	Sun	12/08/19	40	0	0	0	50	0	90
20	Mon	12/09/19	60	0	0	0	20	20	100
21	Tue	12/10/19	10	0	0	0	0	30	40
22	Wed	12/11/19	0	0	0	80	0	40	120
23	Thu	12/12/19	0	0	0	50	40	0	90
24	Fri	12/13/19	0	0	0	0	50	30	80
25	Sat	12/14/19	0	0	0	30	0	15	45
26	Sun	12/15/19							
		TOTAL	**120**	**250**	**280**	**460**	**480**	**500**	**2090**
		Sta. Stop	**39780**	**39760**	**39760**	**44700**	**44665**	**44675**	
		% Complete	**100%**	**102%**	**102%**	**100%**	**93%**	**95%**	**+/-**

Diver Burial Total (ft.)	2130	100%
Completed to Date (ft.)	2090	98%
Diver Burial Balance	40	2%

Average Feet./Day	83.6
Days to Complete	1.0
Est. Completion Date	12/15/19

East Side Burial Graph (through December 14, 2019, Durocher Marine)

West Side Burial Graph (through December 14, 2019, Durocher Marine)



Summary of Observations

Item	Observations and Notes
1	**Diver burial (hand jetting)** – See table above for contractor tracking of cable burial. East side diver burial – all activity within turbidity barrier except for periods when turbidity shift offshore and/or broke free. East side barrier system a failure from an installation and structural perspective but seems to effectively contain turbidity. West side diver burial – all activity within turbidity barrier until completion on December 10, 2019.
2	**Water quality monitoring –** Weather monitored for 72 hours before scheduled diver burial water quality monitoring events. Close communication with contractor and water quality teams whenever wind forecasts called for winds greater than 15 mph leading up to work days. No weather cancellations but wind conditions were closely monitored by IEM, Normandeau and Durocher. Swift ebb tide currents preventing divers on east side channel burial and resulting in 1 – 3 hour breaks on the east side. Water quality team taking breaks when possible.

Item	Observations and Notes
	No exceedances reported throughout duration of the week. Elevated reading (12-8-19) of 14 NTU at Station 10 on west side during hand jetting with gap in turbidity barrier when it impinged on dive barge. Readings returned to normal at next reporting. Normandeau did respond to all incidents when the turbidity barriers shifted and required adjustment, failed/broke free of anchors, was impinged by dive barge or was reefed and removed. No exceedances of state water quality standards reported during any of these barrier-related events. Turbidity readings during hand-jetting indicate very low increases in turbidity above background on both east and west sides. Normandeau providing daily water quality summaries to NH DES for previous day's events. IEM able to view activity for Gundalow landing with binoculars and by work boat. IEM able to monitor western side diver burial from the shore and Getchell Property. Drone imagery continues to be useful to observe hand jetting activity. Drone continues to be used to guide the water quality monitoring team to run transects to "find" the plume with instruments. Water quality team did not detect elevated levels that could define a plume based on drone images. Any plume developed from hand jetting on the eastern channel edge quickly dissipated due to tidal forces.
3	**Turbidity Barrier/Western Tidal Flat** – The turbidity barrier on the western tidal flat shifted north with the tide on December 8, 2019 and impinged under the diver barge causing it to sink under water surface. Nearfield (500') water quality monitoring stations reported elevated turbidity but not an exceedance. On December 9, 2019, the western side turbidity barrier required repositioning. The northern end had shifted, or was moved, offshore resulting in a gap nearshore. Mackwork Env installed a section of Type I Silt Curtain across the gap. West side diver burial was completed on December 10, 2019 at 1003. Dive team from west side relocated to east side to assist with diver burial on eastern tidal flat. On December 11, 2019, Mackworth began first reefing of the western barrier by pulling the bottom of the barrier up by 4 – 12 inches from the bay floor. IEM and DES agreed to no "waiting period" between reefing and when removal of the barrier could take place. Mackworth performed second reefing of the western barrier over a one-hour period and then released the anchors on the northern leg to remove this section to make room for the Durocher Marine concrete mattress installation process. Entire turbidity barrier was removed from western tidal flat on December 12, 2019.
4	**Turbidity Barrier/Eastern Tidal Flat** – Beginning on December 10, 2019, the eastern turbidity barrier showed signs of installation and structural problems. About midday on 12/10/19, the southern side of the barrier drifted north over the southern and center cables preventing diver burial. During a fast ebbing tide, the westernmost segment of the barrier was submerged by tidal forces resulting in a "spill" of surface turbidity to the west outside of the barrier that was observed by Durocher Marine and the Doucet drone. (Normandeau water quality vessels tested the water near the plume and no exceedances were reported to the IEM.)

Item	Observations and Notes
	The turbidity barrier on the eastern tidal flat began to fail on December 13, 2019 when the turbidity barrier broke free of one or more of its southern anchors. Durocher Marine recovered the detached barrier and tied it off to a dive barge. Also, on December 13, 2019, the southern shore end of the turbidity barrier was moved to accommodate shoreline stabilization work, which resulted in a gap at the shoreline. Mackworth Env was on site to fix the detached barrier and to place a Type I silt curtain at the gap with the shoreline. At 1505 on December 14, 2019, the turbidity barrier on the eastern tidal flat completely failed when it broke free of its southern anchors and drifted over the cable to the point of the Beswick Property where is gathered around the rocks and Beswick dock. Eversource and its contractors requested of the IEM if work could proceed without a turbidity barrier. The IEM issued an email directing Eversource and its contractors to install a serviceable and safe turbidity curtain to contain the diver burial work area as soon as possible prior to resuming diver burial on the eastern tidal flat.

Turbidity Data Reports and Photographs

Turbidity (NTU) Reported and Photographs
Per NH DES, Normandeau is providing daily water quality summaries via email for hand-jetting activities.

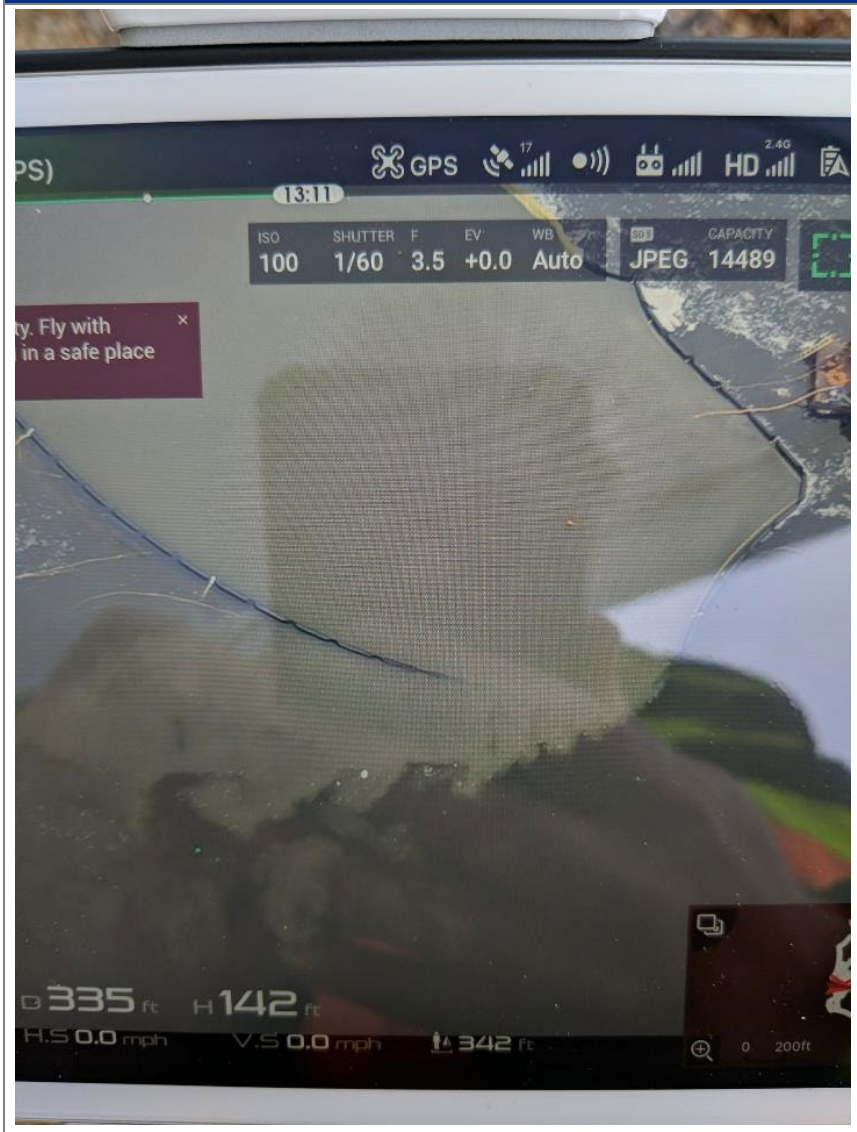
Turbidity (NTU) Reported and Photographs

View from Getchell Property, Durham, NH showing Mackwork Env staff adjusting northern end of the turbidity barrier on the west side of Little Bay because it moved, or was moved, offshore resulting in a gap at the shoreline (12-9-19).

Turbidity (NTU) Reported and Photographs

View from Getchell Property (Durham, NH) at the start of concrete mattress installation on the western tidal flat (12-11-19).

Turbidity (NTU) Reported and Photographs



Photograph from Tuesday, December 10, 2019 of Doucet Survey drone monitor capturing turbidity plume spill at the western end of the turbidity barrier located on the eastern side of Little Bay. Water quality monitoring immediately adjacent to the barrier reported elevated turbidity but no exceedances of state water quality standards for turbidity were reported from the boundary stations.

Turbidity (NTU) Reported and Photographs

Turbidity barrier on eastern tidal flat had been relocated to allow for shoreline backfilling and stabilization within the cable trench. IEM requested that the gap at the shoreline be repaired. Mackworth Env was unable to pull the barrier ashore and use Type I silt curtain to fill the gap.

Summary of Work Stops, Modification and Other Operational changes requested by the IEM during Operations

Item	
1	IEM submitted an email to NH DES (on 12-14-19) providing input regarding the complete failure of the turbidity barrier on the eastern tidal flat and Eversource's request to continue work without it. Since permit conditions require that a silt curtain be in place during diver burial, Eversource and its contractors will install a silt containment system on the eastern tidal flat on 12/15 or 12/16.
2	No water quality exceedances of the BSAL were reported.
3	IEM made daily requests to Eversource and its contractors to monitor the state of the turbidity barriers (east and west) and make any repairs or adjustments if gaps or shifts appeared.

Action Items

Item	
1	Install silt contain system to replace failed turbidity barrier. Continue diver burial on eastern tidal flat with two dive teams.

I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that, based on reasonable investigation, including my own inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate, and complete to the best of my knowledge and belief.

Signed: _____ _____

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Dated: December 19, 2019