Dry Dock 1 (P-381) Modernization – LOA Application Revisions Memo

BLUF: Project modifications and shifting Fleet submarine schedules require resequencing certain activities associated with the construction at Dry Dock 1 to accommodate the modifications and meet the new vessel docking demands. Certain activities authorized under the existing IHA (87 FR 19886; April 6, 2022) for the first year of P-381 construction activities will be shifting to the LOA time period while certain activities requested in the LOA application will be shifting to the IHA period. This memo summarizes those changes and identifies impacts to production days and estimated takes of marine mammals resulting from these schedule shifts to aid NMFS in any necessary revisions to the current LOA request and pending Draft Rule.

Reasoning for Necessary Schedule Changes

Modifications were required for the project to be complete and were not part of the scope upon award of the project, one of which affects the schedule for activities in the LOA application. This modification incorporated updated concrete code requirements that led to longer durations to install drilled shafts and construct the dry docks.

Additionally, the Navy submarine fleet schedule has changed since award resulting in necessary resequencing of work. This sequencing minimizes the schedule increases and supports the future needs of the Navy. The following narrative summarizes the requested changes to the LOA application and the impacts to its respective take estimates. Please note that no new pile sizes or processes are being added to the authorization request.

Summary of Schedule Changes

Two activities covered under the existing IHA (87 FR 19886; April 6, 2022) will not be completed during the first year of P-381 construction, so some of those activities will require coverage under the requested LOA. These activities are the Center Wall, Install Foundation Support Piles (Activity ID # A1 through A4) and DD1 N Entrance, Install Temporary Cofferdam (Activity ID # R).

The location of the future center wall requires reinforcement to allow placement of the large pre-cast monolith structures forming the separation between the two new dry docking positions. Specifically, the floor of the existing basin must be able to provide an adequate foundation for the pre-cast monoliths that will make up the dry dock interiors and center wall. The basin floor will be reinforced by excavating 18, 78-inch diameter shafts throughout the footprint of the center wall that will be filled with concrete to create the structural support piles for the center wall. The shafts will be excavated using a cluster drill consisting of multiple down-the-hole (DTH) mono-hammers (refer to Section 1.4.3 of the LOA application). Before the cluster drill is deployed, a 102-inch diameter rotary drill (Figure 1-4 of the LOA application). The rock socket would be excavated using a 102-inch diameter rotary drill (Figure 1-4 of the LOA application). The rock socket would be filled with concrete and a second 78-inch diameter casing would be installed inside the 102-inch casing and set in the concrete. No drilling is required to install the second casing. The 102-inch diameter outer casing would then be removed with a rotary drill (Activity ID A1 through A4; LOA application section 1.3.1 Dry Dock and Gantry Crane Support).

The conversion of the existing west closure wall to the Dry Dock 1 North entrance requires reinforcement of the section of the west closure wall that will become the new dry dock entrance. The existing west closure wall structure will be surrounded by a temporary cofferdam. The cofferdam will be constructed with 48, 28-inch wide, Z-shaped sheet piles. The sheet piles will be installed using an initial

vibratory set followed by driving with impact hammers to refusal (Activity ID R; LOA Application Section 1.3.1-Temporary Structures).

Three activities included in the request for an LOA will begin earlier than the proposed effective date for the LOA, and are covered under the existing IHA (87 FR 19886; April 6, 2022). Therefore, only a portion of those activities will require coverage in the requested LOA, and the proposed number of construction days for these activities has been decreased. These activities are the Berth 1, Mechanical Rock Removal at Basin Floor (Activity ID #10), Removal of Berth 1 Emergency Repair Sheet Piles (Activity ID # 20), and Removal of Berth 1 Emergency Repair Tremie Concrete (Activity ID # 21). The activities are described in detail in the existing LOA application.

A detailed summary of the changes is included below in Table 1 and a revised accounting of all LOA activities is provided in Table 2.

Activity	Method and Size or	Change and New Dates	IHA/LOA Change Result	Revised Production	Currently Status of Activity
	Amount			Days	
Center Wall, Install	Current: 38, 102-inch	Move operation end	No additional	IHA – Reduce from 38	Covered in IHA, but would require
Foundation Support	drilled casings (rotary)	date later.	production days or	to 20 days	coverage under LOA also to
Piles (Activity ID # A1	Change: 20	Current: Mar 2022	change in method, just	LOA – Add 18 days	accommodate schedule shifting
through A4)	Current: 38, 102-inch	through Mar 2023	schedule shift	IHA – Reduce from 38	later. Currently four of these
	drilled sockets (rotary)	Change: Mar 2022		to 20 days	casings have been partially drilled,
	Change: 20	through Aug 2023		LOA – Add 18 days	with none completely done yet.
	Current: 38-102-inch			IHA – Reduce from 38	
	drilled casings (rotary)	IHA: 20 casings /		to 20 days	Production days shown as "LOA" to
	Change: 20	sockets / shafts		LOA – Add 18 days	the left reflect what would need to
	Current: 38, 78-inch	LOA: 18 casings /		IHA – Reduce from 247	be added to the LOA request for
	drilled shafts (cluster	sockets / shafts		to 130 days	this activity.
	DTH)			LOA – Add 117 days	
	Change: 20				
DD1 N Entrance, Install	Impact / Vibratory	Move operation end	No additional	IHA – Reduce from 12	Covered in IHA, but would require
Temporary Cofferdam	Hammer	date later.	production days or	to 6 days	coverage under LOA to
(Activity ID # R)	Current: 96, 28-inch	Current: Dec 2022	change in method, just	LOA – Add 6 days	accommodate schedule shifting
	sheet piles	through Mar 2023	schedule shift		later.
	Change: 48 sheets	Change: Feb 2023			
	under existing IHA and	through May 2023			Production days shown as "LOA" to
	48 sheets under				the left reflect what would need to
	requested LOA				be added to the LOA request for
					this activity.
Berth 1, Mechanical	Hydraulic Rock	Move operation start	Shift 15 production	IHA – Add 15 days, 200	Hydraulic rock hammering was
Rock Removal at Basin	Hammering	date earlier, for some	days to the IHA from	су	included in the issued IHA so this
Floor (Activity ID # 10)	500 cubic yards (cy)	work to be included in	the current LOA	LOA – Reduce from 40	would not be a new activity from
		the issued IHA.	application	to 25 days, 300 cy	the LOA into the IHA, just additional
		Current: Apr 2023			production days.
		through Sept 2023			
		Proposed: Feb 2023			Production days shown as IHA
		through Sept 2023			reflect the number of days that
					would need to be shifted earlier
					into an IHA amendment and days
					shown as LOA are what would

Table 1: Summary of Schedule Changes

					remain in the current LOA
Removal of Berth 1 Emergency Repair Sheet Piles (Activity ID # 20)	Vibratory Extraction Current: 216, 28-inch sheet piles Change: 108 under IHA and 108 under requested LOA	Move operation start date earlier, for some work to be included in the issued IHA. Current: Aug 2023 through Mar 2024 Change: Jan 2023 through Jul 2023	Shift 18 production days to the IHA from the current LOA application	IHA – Add 18 days LOA – Reduce from 36 to 18 days	The existing IHA covers vibratory installation of 28-inch sheet piles but not removal. However, the same proxy source level was used for both installation and extraction of this pile type/size. Production days shown as IHA reflect the number of days that would need to be shifted earlier into an IHA amendment and days shown as LOA are what would remain in the current LOA application.
Removal of Berth 1 Emergency Repair Tremie Concrete (Activity ID # 21)	Hydraulic Rock Hammering 1,000 cubic yards (cy)	Move operation start date earlier, for some work to be included in the issued IHA. Current: Aug 2023 through Mar 2024 Change: Jan 2023 through Aug 2023	Shift 15 production days to the IHA from the current LOA application	IHA – Add 15 days, 500 cy LOA – Reduce from 30 to 15 days, 500 cy	 Hydraulic rock hammering was included in the issued IHA so this would not be a new activity from the LOA into the IHA, just adding production days. Production days shown as IHA reflect the number of days that would need to be shifted left into an IHA amendment and days shown as LOA are what would remain in the current LOA application.

Activity ID	Activity	Total Amount and Estimated Dates (Construction years)	Activity Component	Method	Daily Production Rate	Total Production Days
A1	Contor Wall - Install		Install 102-inch diameter outer casing	Rotary Drill	1 shaft/day 1 hour/day	18
A2	Foundation Support	18 drilled shafts	Pre-drill 102-inch diameter socket	Rotary Drill	1 shaft/day 9 hours/day	18
A3	1 1103	Apr-25 to Aug-25	Remove 102-inch outer casing	Rotary Drill	1 casing/day 15 minutes/casing	18
A4			Drill 78-inch diameter shaft	Cluster drill DTH	6.5 days/shaft 10 hours/day	117
R	Dry Dock 1 North Entrance - Install Temporary Cofferdam	Install 48 sheet piles <i>Apr-23¹ to May-23</i>	28-inch wide Z- shaped sheets	Impact with initial vibratory set	8 sheets/day 5 minutes and 300 blows/pile	6
1	Berth 11 – Remove Shutter Panels	Remove 112 panels Apr-23 ¹ to May 23 (Const. year 2)	Concrete shutter panels	Hydraulic rock hammering	5 hours/day	56 ²
2	Berth 1 – Remove Sheet Piles	Remove 168 sheet piles Apr -23 ¹ to Jun 24 (Const. years 2, 3)	25-inch-wide Z- shaped	Vibratory extraction	4 piles/day	42 ²
3	Berth 1 – Remove Granite Block Quay Wall	2,800 cy Apr -23 ¹ to Jun 24 (Const. years 2, 3)	Removal of granite blocks	Hydraulic rock hammering	2.5 hours/day	47 ²
4	Berth 1 - Top of Wall Removal for Waler Installation	320 lf Apr -23 ¹ to Jun 24 (Const. years 2, 3)	Mechanical concrete removal	Hydraulic rock hammering	10 hours/day	74 ²
5	Berth 1 – Install southeast corner Support of Excavation (SOE)	Install 28 sheet piles Apr 23 – Jul 23 (Const. year 2)	28-inch-wide z-shaped	Impact with initial vibratory set	4 piles/day 5 minutes/pile and 300 blows/pile	8 ³
6	Berth 11 - Mechanical Rock Removal at Basin Floor	700 cy Apr -23 ¹ to Aug 23 (Const. year 2)	Excavate Bedrock	Hydraulic rock hammering	12 hours/day	60 ^{2,3}
7	Berth 11 Face - Mechanical Rock Removal at Basin Floor	Drill 924 relief holes Apr -23 ¹ to Aug 23 (Const. year 2)	4-6 inch diameter holes	DTH mono- hammer	27 holes/day 22 min/hole	35 ²
8	Install Temporary cofferdam extension	Install 14 sheet piles Apr 23 to Jun 23 (Const. year 2)	28-inch-wide z-shaped	Impact with initial vibratory set	4 piles/day 5 minutes/pile and 300 blows/pile	4
9a			Set 102-inch diameter casing	Rotary drill	1 shaft/day 1 hours/day	16
9b	Gantry crane Support Piles at Berth 1 West	Apr 23 to Aug 23	Pre-drill 102-inch rock socket	Rotary drill	1 shaft/day 9 hours/day	16
9c		(Const. year 2)	Remove 102- inch casing	Rotary drill	1 casing/day 15 minutes/casing	16

Table 2: Revised In-Water Construction Table for Requested LOA

Activity ID	Activity	Total Amount and Estimated Dates (Construction years)	Activity Component	Method	Daily Production Rate	Total Production Days
9d			72-inch diameter shafts	Cluster drill DTH	5 days/shaft 10 hours/day	80
10	Berth 1 - Mechanical Rock Removal at Basin Floor	300 cy Apr 23 ¹ - to Sep 23 (Const. year 2)	Excavate Bedrock	Hydraulic rock hammering	13 cy/day 12 hours/day	25 ^{,3}
11	Dry Dock 1 North Entrance - Drill Tremie Tie Downs	Drill 50 rock anchors Apr -23 ¹ to Oct 23 (Const. year 2)	9-inch diameter holes	DTH mono- hammer	2 holes/day 5 hours/hole	25 ²
12	Center Wall – Install Tie-In to Existing West Closure Wall	Install 15 sheet piles Apr -23 to Dec 23 (Const. year 2)	28-inch wide Z- shaped	Impact with initial vibratory set	4 piles/day 5 minutes/pile and 300 blows/pile	4
13a			Set 102-inch diameter casing	Rotary drill	1 shaft/day 1 hours/day	20
13b	Dry Dock 1 North – Temporary Work	Drill 20 shafts May 23 to Nov 24	Pre-drill 102- inch rock socket	Rotary drill	1 shaft/day 9 hours/day	20
13c	Trestle Piles	(Const. years 2, 3)	Remove 102- inch casing	Rotary drill	1 casing/day 15 minutes/casing	20
13d			84-inch diameter shafts	Cluster drill DTH	3.5 days/shaft 10 hours/day	70
14	Dry Dock 1 North- Remove Temporary Work Trestle Piles	Remove 20 piles May 23 to Nov 24 (Const. years 2, 3)	84-inch diameter drill piles	Rotary drill	1 day/pile 15 minutes/pile	20
15a			Set 84-inch casing	Rotary Drill	1 shaft/day 1 hours/day	18
15b	Dry Dock 1 North –	Drill 18 shafts May 23 – Nov 24	Pre-drill 84-inch rock socket	Rotary drill	1 shaft/day 9 hours/day	18
15c	(Diving Board Shafts)	(Const. years 2, 3)	Remove 84-inch casing	Rotary drill	1 casing/day 15 minutes/casing	18
15d			78-inch diameter shaft	Cluster drill DTH	7.5 days/shaft 10 hours/day	135
16a			Set 102-inch diameter casing	Rotary drill	1 shaft/day 1 hours/day	20
16b	Wall Support Shafts for Dry Dock 1 North	Drill 20 shafts	Pre-drill 102-inch rock socket	Rotary drill	1 shaft/day 9 hours/day	20
16c	(Berth 11 face and head wall)	(Const. years 2, 3)	Remove 102- inch casing	Rotary drill	1 casing/day 15 minutes/casing	20
16d			Drill 78-inch diameter shaft	Cluster drill DTH	7.5 days/shaft 10 hours/day	150
17a	Foundation (Floor)	Drill 23 shafts Jun 23 to Nov 24	Set 126-inch diameter Casing	Rotary drill	1 shaft/day 1 hours/day	23
17b	Shafts for Dry Dock 1	(Const. years 2, 3)	Pre-drill 126-inch rock socket	Rotary drill	1 shaft/day 9 hours/day	23

Table 2: Revised In-Water Construction Table for Requested LOA

Activity ID	Activity	Total Amount and Estimated Dates (Construction years)	Activity Component	Method	Daily Production Rate	Total Production Days
17c	North (foundation support piles)		Remove 126-inch casing	Rotary drill	1 casing/day 60 minutes/casing	23
17d			Drill 108-inch diameter shafts	Cluster drill DTH	8.5 days/shaft 10 hours/day	196
18	Berth 11 End Wall - Remove Temporary Guide Wall	Remove 60 sheet piles Jul 23 to Aug 23 (Const. year 23)	28-inch wide Z- shaped	Vibratory extraction	8 piles/day 5 minutes/pile	10 ³
19	Remove Berth 1 southeast corner SOE	Remove 28 sheet piles Jul 23 to Sep 23 (Const. year 2)	28-inch-wide z-shaped	Vibratory extraction	8 piles/day 5 minutes/pile	5 ³
20	Removal of Berth 1 Emergency Repair Sheet Piles	Remove 108 sheet piles Apr 23 ¹ to Jul 23 (Const. year 2)	28-inch-wide z-shaped	Vibratory extraction	6 piles/day 5 minutes/pile	18
21	Removal of Berth 1 Emergency Repair Tremie Concrete	500 cy Apr 23 ¹ to Aug 23 (Const. year 2)	Mechanical concrete removal	Hydraulic rock hammering	4 hours/day	15
22	Center wall foundation -Drill in monolith Tie Downs	Install 72 rock anchors Aug 23 to May 24 (Const. years 2, 3)	9-inch diameter holes	DTH mono- hammer	2 holes/day 5 hours/hole	36
23	Center Wall – Remove tie-in to existing west closure wall (Dry Dock 1 North) ⁴	Remove 16 sheet piles ⁴ Aug 23 to Aug 24 (Const. years 2, 3)	28-inch-wide z- shaped	Vibratory extraction	8 piles/day 5 minutes/pile	3 ³
24	Center wall East- sheet pile tie-in to Existing Wall	Install 23 sheet piles Aug 23 to Oct 24 (Const. years 2, 3)	28-inch wide z-shaped	Impact with initial vibratory set	2 piles/day 5 minutes/pile and 300 blows/pile	12
25	Remove tie-in to West Closure Wall (Dry Dock 1 West)	Remove 15 sheet pile Dec 23 to Dec 24 (Const. years 2, 3)	28-inch wide z- shaped	Vibratory extraction	8 piles/day 5 minutes/pile	3 ³
26	Remove Center wall East- sheet pile tie-in to Existing Wall (Dry Dock 1 West)	Remove 23 sheet piles Dec 23 to Dec 24 (Const. years 2, 3)	28-inch wide z-shaped	Vibratory extraction	8 piles/day 5 minutes/pile	12 ³
27	Dry Dock 1 north entrance - Remove Temporary Cofferdam	Remove 96 sheet piles Jan 24 to Sep 24 (Const. years 2, 3)	28-inch wide z-shaped	Vibratory extraction	8 piles/day 5 minutes/pile	12
28	Remove temporary cofferdam extension	Remove 14 sheet piles Jan 24 to Sep 24 (Const. years 2, 3)	28-inch wide z-shaped	Vibratory extraction	8 piles/day 5 minutes/pile	2

Table 2: Revised In-Water Construction Table for Requested LOA

Activity ID	Activity	Total Amount and Estimated Dates (Construction years)	Activity Component	Method	Daily Production Rate	Total Production Days
29a			Set 102-inch diameter casing	Rotary drill	1 shaft/day 1 hours/day	20
29b	Dry Dock 1 West -	Drill 20 shafts Apr 24 to Feb 26	Pre-drill 102- inch rock socket	Rotary drill	1 shaft/day 9 hours/day	20
29c	Trestle Piles	(Const. years 3, 4)	Remove 102- inch casing	Rotary drill	1 casing/day 15 minutes/casing	20
29d			84-inch diameter shafts	Cluster drill DTH	3.5 days/shaft 10 hours/day	70
30	Dry Dock 1 West - Remove Temporary Work Trestle Piles	Remove 20 piles Apr 24 to Feb 26 (Const. years 3, 4)	84-inch diameter piles	Rotary drill	1 day/pile 15 minutes/pile	20
31a			Set 102-inch diameter casing	Rotary drill	1 shaft/day 1 hours/day	22
31b	Wall Support Shafts for	Drill 22 shafts	Pre-drill 102- inch rock socket	Rotary drill	1 shaft/day 9 hours/day	22
31c	1 face)	(Const. years 3, 4)	Remove 102- inch casing	Rotary drill	1 casing/day 15 minutes/casing	22
31d			78-inch diameter shaft	Cluster drill DTH	7.5 days/shaft 10 hours/day	165
32a			Set 126-inch casing	Rotary Drill	1 shaft/day 1 hours/day	23
32b	Foundation (Floor) Shafts for Dry Dock 1	Drill 23 shafts Jun 24 to Feb 26 (Const. years 3, 4)	Pre-drill 126- inch rock socket	Rotary drill	1 shaft/day 9 hours/day	23
32c	West (foundation support piles)		Remove 126- inch casing	Rotary drill	1 casing/day 15 minutes/casing	23
32d			Drill 108-inch diameter shaft	Cluster drill DTH	8.5 days/shaft 10 hours/day	196
33a			Set 84-inch casing	Rotary Drill	1 shaft/day 1 hours/day	18
33b	Dry Dock 1 West -	Drill 18 shafts	Pre-drill 84-inch rock socket	Rotary drill	1 shaft/day 9 hours/day	18
33c	(Diving Board Shafts)	(Const. years 3, 4)	Remove 84-inch casing	Rotary drill	1 casing/day 15 minutes/casing	18
33d			Drill 78-inch diameter shaft	Cluster drill DTH	7.5 days/shaft 10 hours/day	135
34	Dry Dock 1 North - Tie Downs	Install 36 rock anchors Jul 24 to Jul 25 <i>(Const. years 3, 4)</i>	9-inch diameter holes	DTH mono- hammer	2 holes/day 5 hours/hole	18
35	Dry Dock 1 West – Install Tie Downs	Install 36 rock anchors Dec 25 to Dec 26 (Const. years 4, 5)	9-inch diameter hole	DTH mono- hammer	2 holes/day 5 hours/hole	18
Total ex	cavated holes/drilled	1,118/198/580				

Table 2: Revised In-Water Construction Table for Requested LOA

Notes: 1 - - These activities began in construction year 1

2 - These activities began in year 1. ONLY the number of production days occurring in construction years 2 through 6 are presented.

3 - Additional production days have been added to account for equipment repositioning

4 - Sheet piles were installed in construction year 1

Source: 381 Constructors, 2022.

Acoustic Modeling and Take Analysis: As a result of the schedule changes described above and shown in Tables 1 and 2, revised take estimates for the LOA have been calculated based on the isopleth distances provided in Tables 3 and 4. Revised takes are presented in Table 5 for the activities that are affected by schedule shifts described above.

Table 3. Calculated Maximum Distances Corresponding to MMPA Thresholds for Underwater Sound from Impulsive Noise (DTH, Impact Pile Driving,
Hydraulic Rock Hammering)

						Level A (PTS Ons	et) Harassment	Level B (Behavioral) Harassment
Activity ID	Figure Number	Activity	Purpose	Count and Size/Duration	Total Production Days	Harbor Porpoise Distance to 155 dB SEL _{cum} Threshold/Area of Harassment Zone	Phocids Distance to 185 dB SEL _{cum} Threshold/Area of Harassment Zone	Harbor Porpoise and Phocids 160 dB RMS (120 dB DTH) Threshold/ Area of Harassment Zone
A4	IHA 6-1	DTH Cluster Drill	Foundation Support Piles for Center Wall	18, 78-inch shafts	117	84,380.4 m/ 0.417417 km ²	37,909.7 m/ 0.417417 km ²	39,811* m/0.417417 km ²
R	IHA 6-5	Impact Pile Driving	Install Sheet Piles for Dry Dock 1 North Entrance and Temporary Cofferdam	48, 28-inch Z-shaped sheets	6	1,568.6 m/ 0.417417 km ²	704.7 m/ 0.364953 km ²	2,512 m/0.417417 km ²

* This distance varies from similar activities in the application due to updated guidance from NMFS on the proxy for Level B harassment. The distances in the application were calculated based on previously issued guidance that was not available at the time of submission.



Figure 6-1 from IHA Application. Level A Injury (PTS Onset) and Level B (Behavioral) Harassment Zones from DTH Cluster Drill of 78-inch Shafts (Impulsive)



Figure 6-5 from IHA Application. Level A Injury (PTS Onset) and Level B (Behavioral) Harassment Zones from Impact Pile Driving for 28-inch Z-Shaped Sheets (Impulsive)

Table 4. Calculated Maximum Distances Corresponding to MMPA Thresholds for Underwater Sound from Non-Impulsive Noise (Rotary Drilling and Vibratory Pile Driving/Extracting)

						Level A (PTS Ons	Level B (Behavioral) Harassment	
Activity ID	Figure Number	Activity	Purpose	Count and Size	Total Production Days	Harbor Porpoise Distance to 173 dB SEL _{cum} Threshold/Area of Harassment Zone	Phocids Distance to 201 dB SEL _{cum} Threshold/Area of Harassment Zone	Harbor Porpoise and Phocids Distance to 120 dB RMS Threshold/Area of Harassment Zone
A1	6-9	Rotary Drill	Center Wall Foundation Pile – Install Outer Casing	18, 102-Inch Borings	18	2.1 m/ 0.000014 km ²	1.3 m/ 0.000005km ²	1,848 M/0.417417 Km²
A2	6-9	Rotary Drill	Center Wall Foundation Pile –Pre-Drill Socket	18, 102-Inch Borings	18	8.9 m/0.000248 km ²	5.4 m/ 0.000091 km²	1,848 M/0.417417 Km ²
A3	6-9	Rotary Drill	Center Wall Foundation Pile –Remove Outer Casing	18, 102-Inch Borings	18	0.8 m/ 0.000002 km ²	0.5 m/ 0.000001 km ²	1,848 M/0.417417 Km²
R	6-9	Vibratory Pile Driving	Install Sheet Piles for Dry Dock 1 North Entrance and Temporary Cofferdam	48, 28-Inch Z-Shaped Sheets	6	19.4 m/0.001041 km ²	8.0 m/0.0002 km ²	13,594 M 0.417417 Km ²



Figure 6-9 from IHA Application. Level A Injury (PTS Onset) and Level B (Behavioral) Harassment Zones from Rotary Drilling for 102-inch Casings and Borings (Non-Impulsive/Continuous)

	Piscataqua River	
Note: Sound propagation distances may not be reached whe	ere ensonified areas would be truncated due to enco	untered land masses
and anthropogenic structures that would prevent the noise fi	rom reaching the full extent from the in-water noise s	source.
28-inch Z-shaped Sheets Vibratory Pile-Driving Level A (PTS onset), (Non-Impulsive/Continuous)	Notional Source Point Region of Influence	
173 dB SEL _{CUM} (19.4 meters [64 feet]) Harbor Porpoise	Closure Wall	
201 dB SEL _{CUM} (8 meters [26 feet]) Phocids		
Level B (Behavioral), (Non-Impulsive/Continuous)		0 100 200 N
120 dB RMS (13,594 meters [44,600 feet]) Harbor Porpoise and Phocids		Meters Source: ESRI (aerial photo)

Figure 6-11 from IHA Application. Level A Injury (PTS Onset) and Level B (Behavioral) Harassment Zones from Vibratory Pile Driving 28-inch Z-Shaped Sheets (Non-Impulsive/Continuous)

Activity ID	Activity	Total Amount and Estimated Dates (Construction years)	Activity Component	Method	Daily Production Rate	Total Production Days	Calculated Takes	Revised Total Production Days	Revised Takes
10	Berth 1 - Mechanical Rock Removal at Basin Floor	500 cy (300cy) Apr 23 ¹ - to Sep 23 (Const. year 2)	Excavate Bedrock	Hydraulic rock hammering	13 cy/day 12 hours/day	40	HP=1(A)/0(B) HS=50(A)/0(B) GS=3(A)/0(B)	25	HP=0(A)/0(B) HS=31(A)/0(B) GS=2(A)/0(B)
20	Removal of Berth 1 Emergency Repair Sheet Piles	Remove 216 (108) sheet piles Aug 23 to Mar 24 (Const. year 2)	28-inch-wide z-shaped	Vibratory extraction	6 piles/day 5 minutes/pile	36	HP=0(A)/1(B) HS=0(A)/45(B) GS=0(A)/3(B)	18	HP=0(A)/0(B) HS=0(A)/23(B) GS=0(A)/2(B)
21	Removal of Berth 1 Emergency Repair Tremie Concrete	1,000 cy (500 cy) Aug 23 to Mar 24 (Const. year 2)	Mechanical concrete removal	Hydraulic rock hammering	4 hours/day	30	HP=1(A)/0(B) HS=38(A)/0(B) GS=3(A)/0(B)	15	HP=0(A)/0(B) HS=19(A)/0(B) GS=1(A)/0(B)
A1			Install 102- inch diameter outer casing	Rotary Drill	1 shaft/day 1 hour/day	N/A	N/A	18	HP=0(A)/0(B) HS=0(A)/23(B) GS=0(A)/2(B)
A2	Center Wall - Install Foundation	18 drilled shafts Apr-23 [*] to Aug- 23	Pre-drill 102- inch diameter socket	Rotary Drill	1 shaft/day 9 hours/day	N/A	N/A	18	HP=0(A)/0(B) HS=0(A)/23(B) GS=0(A)/2(B)
A3	Support Piles	(Const. year 2)	Remove 102- inch outer casing	Rotary Drill	1 casing/day 15 minutes/casing	N/A	N/A	18	HP=0(A)/0(B) HS=0(A)/23(B) GS=0(A)/2(B)
A4			Drill 78-inch diameter shaft	Cluster drill DTH	6.5 days/shaft 10 hours/day	N/A	N/A	117	HP=2(A)/0(B) HS=147(A)/0(B) GS=10(A)/0(B)
R	Dry Dock 1 North Entrance - Install	Install <mark>48</mark> sheet piles	28-inch wide Z-shaped sheets	Impact	8 sheets/day 300 blows/pile	N/A	N/A	6	HP=0(A)/0(B) HS=7(A)/0(B) GS=0(A)/0(B)

Table 5: Revised Take Estimate for Requested LOA

Activity ID	Activity	Total Amount and Estimated Dates (Construction years)	Activity Component	Method	Daily Production Rate	Total Production Days	Calculated Takes	Revised Total Production Days	Revised Takes
	Temporary	Apr 23 [*] to May-							
	Cofferdam	23							
		(Const. year 2)							
	Dry Dock 1	Install 48 sheet							HP=0(A)/0(B)
	North Entrance	piles	28-inch wide		9 choots/day		N/A	6	HS=0(A)/8(B)
R	- Install	Apr 23 [*] to May-	Z-shaped	vibratory	5 minutos (nilo	N/A			GS=0(A)/1(B)
	Temporary	23	sheets		5 minutes/pile				
	Cofferdam	(Const. year 2)							
							HP=2(A)/1(B)		HP=2(A)/0(B)
Totals						106	HS=88(A)/45(B)	256	HS=204(A)/100(B)
							GS=6(A)/3(B)		GS=13(A)/9(B)

Schedule shifts in the LOA application will result in an additional 150 production days during the first year of the LOA period from April 1, 2023 – March 31, 2024 (i.e., the second year of P-381 construction activities). No activities would extend beyond the first year of the LOA. The resulting calculated take adjustments for the LOA request result in 0 additional Level A and 1 less Level B take for harbor porpoise; 115 additional Level A and 55 additional Level B takes for harbor seal; and 7 additional Level A and 6 additional Level B takes for gray seal. However, the harbor and gray seal Level B takes were previously adjusted to account for group size and observation data. Since the revised calculations were still less than this adjusted amount, no changes to the adjusted Level B take request have been made and the increases in production activities would only affect the number of Level A takes requested during the first year of the LOA period. Table 6 summarizes the calculated and requested takes for year 1 of the LOA (i.e. the second year of P-381 construction activities). The addition of these takes would not alter the conclusions made in the LOA application with regards to effects to species (See Chapters 7, 9, and 10 of the application).

Species	Initial R Calculated	equested Takes (Raw)	Initial Requested Calculated Takes (Adjusted using observation and group size data)		Revised Cal (R	culated Takes aw)	Revised Red Takes (observation	quested Calculated Adjusted using and group size data)
	Level A	Level B	Level A (PTS	Level B	Level A (PTS	Level B	Level A (PTS	Level B
	(PTS Onset)	(Behavioral)	Onset)	(Behavioral)	Onset)	(Behavioral)	Onset)	(Behavioral)
Harbor porpoise	13	3	13	3	13	2	13	3
Harbor seal	880	528	883	1,047 ²	998	583	998	1,047 ²
Gray seal	60	34	60	70 ²	67	40	67	70 ²
Hooded seal	5 ¹	5 ¹	5 ¹	5 ¹	5 ¹	5 ¹	5 ¹	5 ¹
Harp seal	5 ¹	5 ¹	5 ¹	5 ¹	5 ¹	5 ¹	5 ¹	5 ¹

Table 6 Total Revised Take by Species for Construction Year 2

Notes: HP = harbor porpoise; HS = harbor seal; GS = gray seal.

1. To guard against unauthorized take, assume take of 1/month of construction from January through May when these species may occur

2. Level B takes for these species have been increased as described in Chapter 6.14.2 of the LOA application and, therefore, do not correspond with the calculated raw number of takes presented in Table 6-12 of the LOA application.

A: STATIONARY SOURCE:	Non-Impulsive, Co	ntinuous								
VERSION 2.2: 2020										
KEY										
	Action Proponent Provided	Information								
	NMFS Provided Information	(Technical Guidance)								
	Resultant Isopleth									
	•								 	
STEP 1: GENERAL PROJECT INFORMATIC								 	 	
PROJECT TITLE	Year 1 IHA P-381 multi mission Dry Dock 1 PNSY									
PROJECT/SOURCE INFORMATION	Rotary drilling to set 102-in diameter outer casing for center wall foundation support piles (Apr 2023 - Aug 2023)	Activity ID A1								
Please include any assumptions										
PROJECT CONTACT										
STEP 2: WEIGHTING FACTOR ADJUSTME	NT	Specify if relying on source- specific WFA, alternative weighting/dB adjustment, or if using default value.								
Weighting Factor Adjustment (kHz) [¥]	2	use 2 for drilling per intro tab								
[¥] Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab		† If a user relies on alternativ	e weighting/dB adjustm	nent rather than relying u	upon the WFA (sour	ce-specific				
		However, they may override	additional support and o	ow 47), and enter the n	ew value directly.					
				ooppoint					 	
STEP 3: SOURCE-SPECIFIC INFORMATION	N									
Source Level (L _{rms})	169									
Duration of Sound Production (hours) within 24-h period	1									
Duration of Sound Production (seconds)	3600		NOTE: The User Spre	eadsheet tool provides a	means to estimates	distances			 	
10 Log (duration of sound production)	35.56		associated with the Te	chnical Guidance's PT	S onset thresholds.	Mitigation and				
Propagation loss coefficient	15		monitoring requiremer	its associated with a Ma	arine Mammal Prote	ction Act (MMPA)				
			authorization or an En	dangered Species Act (ESA) consultation of	or permit are				
			independent managen	nent decisions made in	the context of the pr	oposed activity and	1			
			comprehensive effects	analysis and are been	and the score of the	Technical Guidance	<u>`</u>			

			comprehensive effects	s analysis, and are beyo	ind the scope of the	Technical Guidanc	C		 	1
			and the User Spreads	heet tool.						
RESULTANT ISOPLETHS										
	Hearing Group	Low-Frequency	Mid-Frequency	High-Frequency	Phocid	Otariid				
		Cetaceans	Cetaceans	Cetaceans	Pinnipeds	Pinnipeds				
	SEL _{cum} Threshold	199	198	173	201	219				
	PIS Isopleth to threshold (meters)	2.3	0.1	2.1	1.3	0.1				

A: STATIONARY SOURCE:	Non-Impulsive, Co	ntinuous								
VERSION 2.2: 2020										
KEY										
	Action Proponent Provided	Information								
	NMFS Provided Information	(Technical Guidance)								
	Resultant Isopleth									
STEP 1: GENERAL PROJECT INFORMATIC										
PROJECT TITLE	Year 1 IHA P-381 multi mission Dry Dock 1 PNSY									
PROJECT/SOURCE INFORMATION	Rotary drilling 102-in diameter socket for center wall foundation support piles (Apr 2023 - Aug 2023)	Activity ID A2								
Please include any assumptions										
PROJECT CONTACT										
STEP 2: WEIGHTING FACTOR ADJUSTME	NT	Specify if relying on source- specific WFA, alternative weighting/dB adjustment, or if using default value.								
Weighting Factor Adjustment (kHz) [¥]	2	use 2 for drilling per intro tab								
[¥] Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab		† If a user relies on alternativ	e weighting/dB adjustn	nent rather than relying t	upon the WFA (sour	rce-specific				
		or default), they may override However, they must provide a	e the Adjustment (dB) (additional support and o	row 47), and enter the n documentation supportir	ew value directly.					
		, ,	11			<u></u>			 	
STEP 3: SOURCE-SPECIFIC INFORMATION	N									ļ
Source Level (L _{rms})	169									
Duration of Sound Production (hours) within 24-h period	9									
Duration of Sound Production (seconds)	32400		NOTE: The User Spre	eadsheet tool provides a	means to estimates	s distances				
10 Log (duration of sound production)	45.11		associated with the Te	echnical Guidance's PT	S onset thresholds.	Mitigation and				
Propagation loss coefficient	15		monitoring requiremen	nts associated with a Ma	arine Mammal Prote	ction Act (MMPA)				
			authorization or an Er	dangered Species Act ((ESA) consultation of	or permit are		 	 	
			independent manager	nent decisions made in	the context of the pr	oposed activity and	1			
			comprehensive effect	e analysis and are heve	and the scope of the	Technical Guidance	2			

			comprehensive encer	s analysis, and are beyo	ind the scope of the				
			and the User Spreads	heet tool.					
RESULTANT ISOPLETHS									
	Hearing Group	Low-Frequency	Mid-Frequency	High-Frequency	Phocid	Otariid			
		Cetaceans	Cetaceans	Cetaceans	Pinnipeds	Pinnipeds			
	SEL _{cum} Threshold	199	198	173	201	219			
	PTS Isopleth to threshold (meters)	10.1	0.6	8.9	5.4	0.4			

A: STATIONARY SOURCE:	Non-Impulsive Co	ntinuous									
				1							
KEY											
	Action Proponent Provided	Information									
	NMFS Provided Information	(Technical Guidance)									
	Resultant Isopleth										
STED 1. CENEDAL DRO JECT INFORMATIC											
STEP 1. GENERAL PROJECT INFORMATIC											
PROJECT TITLE	Year 1 IHA P-381 multi mission Dry Dock 1 PNSY										
PROJECT/SOURCE INFORMATION	Remove 102-in diameter outer casing for center wall foundation support piles (Apr 2023 - Aug 2023)	Activity ID A3									
Please include any assumptions											
PROJECT CONTACT											
STEP 2: WEIGHTING FACTOR ADJUSTME	NT	Specify if relying on source- specific WFA, alternative weighting/dB adjustment, or if using default value.									
Weighting Factor Adjustment (kHz) [¥]	2	use 2 for drilling per intro tab									
[¥] Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab		† If a user relies on alternative	e weighting/dB adjustm	nent rather than relying	upon the WFA (sour	ce-specific					
		However, they must provide a	additional support and (documentation supportin	ng this modification.						
				1							
SIEP 3: SOURCE-SPECIFIC INFORMATION	۷ 										ļ
Source Level (L _{rms})	169										
Duration of Sound Production (hours) within 24-h period	0.25										
Duration of Sound Production (seconds)	900		NOTE: The User Spre	eadsheet tool provides a	a means to estimates	s distances			 		
10 Log (duration of sound production)	29.54		associated with the Te	echnical Guidance's PT	S onset thresholds.	Mitigation and			ļ		
Propagation loss coefficient	15		monitoring requiremer	nts associated with a Ma	arine Mammal Prote	ction Act (MMPA)					
			authorization or an En	idangered Species Act (ESA) consultation of	or permit are			 		
			independent manager	ment decisions made in	the context of the pr	Technical Guidana	0				

			comprehensive encou	s analysis, and are beyo	ind the scope of the			1	4
			and the User Spreads	heet tool.					
RESULTANT ISOPLETHS									
	Hearing Group	Low-Frequency	Mid-Frequency	High-Frequency	Phocid	Otariid			
		Cetaceans	Cetaceans	Cetaceans	Pinnipeds	Pinnipeds			1
	SEL _{cum} Threshold	199	198	173	201	219			
	PTS Isopleth to threshold (meters)	0.9	0.1	0.8	0.5	0.0			

A.1: Vibratory Pile Driving (STATIONARY SOURCE: Non-Impulsive, Continuous)

VERSION 2.2: 2020

KE Y	
	Action Proponent Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isopleth

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	Year 1 IHA P-381 multi mission Dry Dock 1 PNSY	
PROJECT/SOURCE INFORMATION	DTH drilling of 38, 78-inch diameter shafts - foundation support piles for center wall (Apr 2023 - Aug 2023)	Activity ID A4
Please include any assumptions		
PROJECT CONTACT		

STEP 2: WEIGHTING FACTOR ADJUST	MENT	specify if relying on source- specific WFA, alternative weighting/dB adjustment, or if using default value
Weighting Factor Adjustment (kHz) [¥]	2	

^{*} Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 48), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

STEP 3: SOURCE-SPECIFIC INFORMATION

Sound Pressure Level (<i>L</i> _{rms}), specified at "x" meters (Cell B30)	195.2
Number of piles within 24-h period	1
Duration to drive a single pile (minutes)	600
Duration of Sound Production within 24-h period (seconds)	36000
10 Log (duration of sound production)	45.56
Transmission loss coefficient	15
Distance of sound pressure level (<i>L</i> _{rms}) measurement (meters)	10

NOTE: The User Spreadsheet tool provides a means to estimates distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring

requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.

RESULTANT ISOPLETHS

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL _{cum} Threshold	183	185	155	185	203
PTS Isopleth to threshold (meters)	70,839.1	2,519.5	84,380.4	37,909.7	2,760.2

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds	
а	1	1.6	1.8	1	2	
b	2	2	2	2	2	
f ₁	0.2	8.8	12	1.9	0.94	
f ₂	19	110	140	30	25	NOTE: If user decided to override the
С	0.13	1.2	1.36	0.75	0.64	they need to make sure to download
Adjustment (-dB)†	-0.01	-19.74	-26.87	-2.08	-1.15	to ensure the built-in calculations fu

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1 + (f/f_1)^2]^a [1 + (f/f_2)^2]^b}\right\}$$

	in the second	
	in the second	
	in the second	

E.1: IMPACT PILE DRIVING (STATIONARY SOURCE: Impulsive, Intermittent)

VERSION 2.2: 2020

KEY	
	Action Proponent Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isopleth

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	Year 1 IHA P-381 multi mission Dry Dock 1 PNSY	
PROJECT/SOURCE INFORMATION	impact install of 48, 28-inch sheets DD1N entrance, Temp cofferdam (Apr 2023 - May 2023)	Activity ID R
Please include any assumptions		
PROJECT CONTACT		

	Specity it relying on source-
	specific WFA alternative
,	weighting/dB adjustment.
	or if using default value

STEP 2: WEIGHTING FACTOR ADJUSTMENT	г	or if using default value
Weighting Factor Adjustment (kHz) [¥]	2	

^{*}Broadband: 95% frequency contour percentile (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 73), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

STEP 3: SOURCE-SPECIFIC INFORMATION

NOTE: METHOD E.1-1 is PREFERRED method when SEL-based source levels are available (because pulse duration is not required). Only use method E.1-2 if SEL-based source levels are not available (because pulse duration is not required).				
E.1-1: METHOD TO CALCULATE PK AND SE	L _{cum} (SINGLE STRIKE EQUIVALEN)	PREFERRED METHOD (pulse duration not needed)		
Unweighted SEL _{cum (at measured distance)} = SEL _{ss} + 10 Log (# strikes)	214.8			

SEL_{cum}

Single Strike SEL _{ss} (<i>L _{E ,p, single strike}</i>) specified at "x" meters (Cell B32)	181
Number of strikes per pile	300

РК	
L _{p,0-pk} specified at "x" meters (Cell G29)	211
Distance₊of L _{p,0-pk} measurement (meters)	10

226.0

Number of piles per day	8
Transmission loss coefficient	15
Distance of single strike SEL _{ss} (<i>L_{E,p, single}</i> _{strike}) measurement (meters)	10

L _{p,0-pk} Source level

RESULTANT ISOPLETHS*

*Impulsive sounds have dual metric thresholds (SELcum & PK). Metric producing largest isopleth should be used.

	Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
	SEL _{cum} Threshold	183	185	155	185	203
	PTS Isopleth to threshold (meters)	1,316.9	46.8	1,568.6	704.7	51.3
	PK Threshold	219	230	202	218	232
	PTS PK Isopleth to threshold (meters)	2.9	NA	39.8	3.4	NA

"NA": PK source level is \leq to the threshold for that marine mammal hearing group.