EXHIBIT F

PRESURVEY NOTIFICATION FORM

Applicant/Permittee's Mailing Address
TerraSond Limited
801 NW 42nd St. Suite 215

Seattle, WA 98107

Date: 4/19/2016

Jurisdiction: Federal _____ State X Both ____

If State: Permit #PRC PRC 9007.9

Region: Region I

Area: Santa Monica Bay

GEOPHYSICAL SURVEY PERMIT

Check one: X New survey _____ Time extension of a previous survey

TerraSond Limited (Applicant/Permittee) will conduct a geophysical survey offshore California in the survey area outlined on the accompanying navigation chart segment. If you foresee potential interference with commercial fishing or other activities, please contact the person(s) listed below:

FEDERAL WATERS (outside 3 nautical miles)

1) Applicant's representative
2) Federal representative (e.g., Bureau of Ocean Energy Management [BOEM] or National Science Foundation [NSF])

NOTE: Any comments regarding potential conflicts in Federal waters must be received by the Applicant's Representative and lead Federal agency within ten (10) days of the receipt of this notice.

STATE WATERS (Inside 3 nautical miles)

1) Permittee's representative
2) CSLC representative

NOTE: Any comments regarding potential conflicts in State waters should be received as soon as possible by the Permittee's representative, no more than fifteen (15) days after the receipt of this notice.

1. Expected Date of Operation May 11th- May 31st
2. Hours of Operation 7 am - 7pm Daylight hours 12 hr maximum
3. Vessel Name S/V JAB
4. Vessel Official Number 1217549
5. Vessel Radio Call Sign N/A
6. Vessel Captain's Name Brayton Pointner
7. Vessel will monitor Radio Channel(s) 16
8. Vessel Navigation System DGPS

9. Equipment to be used Multibeam Echosounder (MBES), Side Scan Sonar (SSS), Sub-bottom Profiler (SB), Magnetometer (Mag)

   a. Frequency (Hz, kHz) MBES 400kHz, SSS 400kHz, SB 2-16kHz, Mag Passive

   b. Source level (dB re 1 μPa at 1 meter (m) [root mean square (rms)]) 201 to 223 dB

   c. Number of beams, across track beamwidth, and along track beamwidth
   MBES- 512 beams, 0.5°x1°, SSS 0.5° x 50°, SB 20°@2-12kHz

   d. Pulse rate and length MBES Rate 20 pings/sec length 10 to 30 microseconds

   e. Rise time N/A

   f. Estimated distances to the 190 dB, 180 dB, and 160 dB re 1 μPa (rms) isopleths
   See table below

   g. Deployment depth 2m to 65m meters below the water surface

   h. Tow speed 3-4 knots

   i. Approximate length of cable tow 8m-260m

Applicant's Representative:
Kathleen Mildon
801 NW 42nd St. Suite 215
Seattle, WA 98107

California State Lands Representative
Richard B. Greenwood
Statewide Geophysical Coordinator
200 Oceangate, 12th Floor
Long Beach, CA 90802-4331
(562) 590-5201

BOEM Representative
Joan Barminski
Chief, Office of Reservoir & Production
770 Paseo Camarillo
Camarillo, CA 93010
(805) 389-7707

Other Federal Representative (if not BOEM):

EXHIBIT G

California State Lands Commission Presurvey Notice Requirements for Permittees to Conduct Geophysical Survey Activities

All parts of the Presurvey Notice must be adequately filled out and submitted to the CSLC staff a minimum of twenty-one (21) calendar days prior to the proposed survey date to ensure adequate review and approval time for CSLC staff. Note that one or more of the items may require the Permittee to plan well in advance in order to obtain the necessary documentation prior to the Notice due date (e.g., permits from other State or Federal entities).

Please use the boxes below to verify that all the required documents are included in the Presurvey Notice. If "No" is checked for any item, please provide an explanation in the space provided. If additional space is needed, please attach separate pages.

Yes	No	
☒	☐	Geophysical Survey Permit Exhibit F
☒	☐	Survey Location (including a full-sized navigation chart and GPS coordinates for each proposed track line and turning point) Explanation: _____
☐	☒	Permit(s) or Authorization from other Federal or State agencies (if applicable) Explanation: Not Applicable
☒	☐	21-Day Written Notice of Survey Operations to Statewide Geophysical Coordinator/
☒	☐	U.S. Coast Guard Local Notice to Mariners/
☒	☐	Harbormaster and Dive Shop Notifications Explanation: _____
☒	☐	Marine Wildlife Contingency Plan Explanation: _____
☒	☐	Oil Spill Contingency Plan Explanation: _____
☒	☐	Verification of California Air Resources Board's Tier 2-Certified Engine Requirement Explanation: _____
☒	☐	Verification of Equipment Service and/or Maintenance (must verify sound output) Explanation: _____
☐	☒	Permit(s) or Authorization from California Department of Fish and Wildlife for surveys in or affecting Marine Protected Area(s) (if applicable) Explanation: Not Applicable

NOTE: CSLC staff will also require verification that current biological information was obtained and transmitted as outlined in Section 5 of this permit.

TERRASOND LIMITED
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Seattle, Washington 98107 USA
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Exhibit F – Further Information

Estimated Distances to the dB Levels Table

Sounder System Frequency (kHz)	Frequency (kHz)	Source Level (dB peak)	RL 160 dB rms (meters)	RL 180 dB (rms) (meters)	RL 190 dB (rms) (meters)
Reson Seabat 7125 multibeam	400	223	75m	57m	26m
EdgeTech 3100 w/ 216	2-15	201	130m	10m	6m
Edgetech 4200	400	211	140m	47m	22m

Pre-Survey Equipment Verification

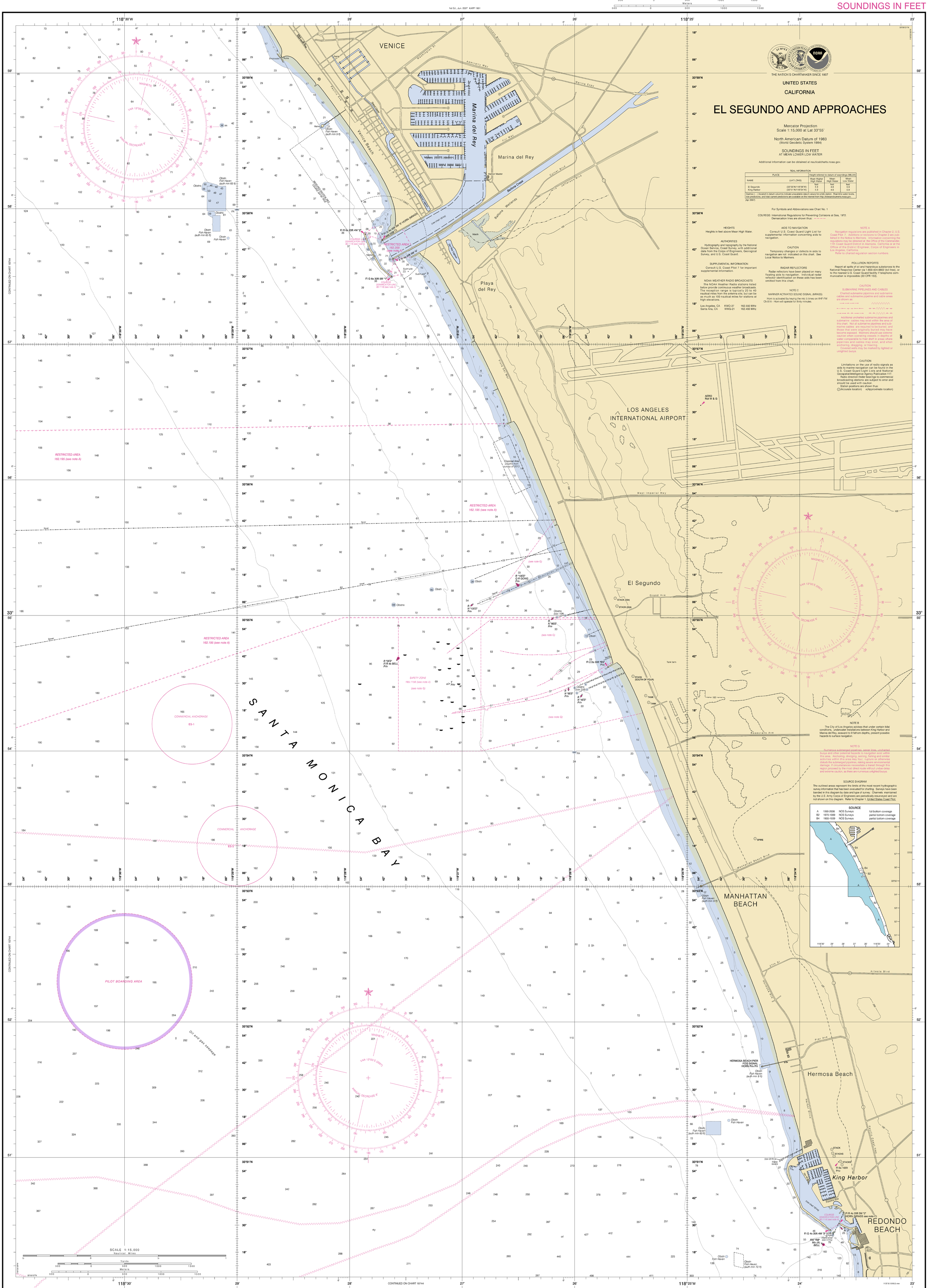
TerraSond will be conducting a series of equipment and systems checks prior to commencing the multibeam, side scan and sub-bottom surveys.

- During mobilization all cables and connections will be checked for physical integrity before being connected to the sensor. This is assessed by examining the cables for damage and inspecting the connectors for viability.
- All cables will be tested for ground faulting before the cable is connected to the sensor.
- The survey crew upon mobilizing the multibeam, side scan and sub-bottom will complete the systems self check and health verification. The system health provided by Edgetech software for the side scan and sub-bottom will be monitored during data acquisition as well. This provides information on the voltage in real time.

SCALE 1:15,000
Nautical Miles
Yards
Meters

1st Ed., Jun. 2007 KAPP 1901

SOUNDINGS IN FEET



THE NATION'S CHARTMAKER SINCE 1807

UNITED STATES

CALIFORNIA

EL SEGUNDO AND APPROACHES

Mercator Projection
Scale 1:15,000 at Lat 33°55'

North American Datum of 1983
(World Geodetic System 1984)

SOUNDINGS IN FEET
AT MEAN LOWER LOW WATER

Additional information can be obtained at nauticalcharts.noaa.gov.

TIDAL INFORMATION

PLACE		Height referred to datum of soundings (MLLW)		
NAME	(LAT./LONG)	Mean Higher High Water	Mean High Water	Mean Low Water
		feet	feet	feet
El Segundo	(33°55'N/118°26'W)	5.3	4.6	0.9
King Harbor	(33°51'N/118°24'W)	5.3	4.6	0.9

Dashes (- - -) located in datum columns indicate unavailable datum values for a tide station. Real-time water levels, tide predictions, and tidal current predictions are available on the Internet from http://tidesandcurrents.noaa.gov.
(Apr 2007)

For Symbols and Abbreviations see Chart No. 1

COLREGS: International Regulations for Preventing Collisions at Sea, 1972.
Demarcation lines are shown thus: — — — —

HEIGHTS
Heights in feet above Mean High Water.

AUTHORITIES
Hydrography and topography by the National Ocean Service, Coast Survey, with additional data from the Corps of Engineers, Geological Survey, and U.S. Coast Guard.

SUPPLEMENTAL INFORMATION
Consult U.S. Coast Pilot 7 for important supplemental information.

NOAA WEATHER RADIO BROADCASTS
The NOAA Weather Radio stations listed below provide continuous weather broadcasts. The reception range is typically 20 to 40 nautical miles from the antenna site, but can be as much as 100 nautical miles for stations at high elevations.

Los Angeles, CA	KWO-37	162.550 MHz
Santa Ana, CA	WWG-21	162.450 MHz

AIDS TO NAVIGATION
Consult U.S. Coast Guard Light List for supplemental information concerning aids to navigation.

CAUTION
Temporary changes or defects in aids to navigation are not indicated on this chart. See Local Notice to Mariners.

RADAR REFLECTORS
Radar reflectors have been placed on many floating aids to navigation. Individual radar reflector identification on these aids has been omitted from this chart.

NOTE C
MARINER ACTIVATED SOUND SIGNAL (MRASS)
Horn is activated by keying the mic 5 times on VHF-FM Ch 81A - Horn will operate for thirty minutes.

NOTE A
Navigation regulations are published in Chapter 2, U.S. Coast Pilot 7. Additions or revisions to Chapter 2 are published in the Notice to Mariners. Information concerning the regulations may be obtained at the Office of the Commander, 11th Coast Guard District in Alameda, California or at the Office of the District Engineer, Corps of Engineers in Los Angeles, California.
Refer to charted regulation section numbers.

POLLUTION REPORTS
Report all spills of oil and hazardous substances to the National Response Center via 1-800-424-8802 (toll free), or to the nearest U.S. Coast Guard facility if telephone communication is impossible (33 CFR 153).

CAUTION
SUBMARINE PIPELINES AND CABLES
Charted submarine pipelines and submarine cables and submarine pipeline and cable areas are shown as:

Additional uncharted submarine pipelines and submarine cables may exist within the area of this chart. Not all submarine pipelines and submarine cables are required to be buried, and those that were originally buried may have become exposed. Mariners should use extreme caution when operating vessels in depths of water comparable to their draft in areas where pipelines and cables may exist, and when anchoring, dragging, or trawling.
Covered wells may be marked by lighted or unlighted buoys.

CAUTION
Limitations on the use of radio signals as aids to marine navigation can be found in the U.S. Coast Guard Light Lists and National Geospatial-Intelligence Agency Publication 117.
Radio direction-finder bearings to commercial broadcasting stations are subject to error and should be used with caution.
Station positions are shown thus:
⊙(Accurate location) ○(Approximate location)

NOTE B
The City of Los Angeles advises that under certain tidal conditions, underwater installations between King Harbor and Marina del Rey, seaward to 9 fathom depths, present possible hazards to surface navigation.

NOTE G
Numerous submerged pipelines, sewer lines, uncharted buoys and other potential hazards to navigation exist within this area. Anchoring, dredging, seining, fishing and similar activities within this area may foul, rupture or otherwise disturb the submerged pipelines, risking severe environmental damage. If circumstances necessitate a transit through this region, proceed by the most direct route without undue delay and extreme caution, as there are numerous unlighted buoys.

SOURCE DIAGRAM
The outlined areas represent the limits of the most recent hydrographic survey information that has been evaluated for charting. Surveys have been banded in this diagram by date and type of survey. Channels maintained by the U.S. Army Corps of Engineers are periodically resurveyed and are not shown on this diagram. Refer to Chapter 1, United States Coast Pilot.

SOURCE

A	1990-2008	NOS Surveys	full bottom coverage
B2	1970-1989	NOS Surveys	partial bottom coverage
B4	1900-1939	NOS Surveys	partial bottom coverage

CAUTION
This chart has been corrected from the Notice to Mariners (NM) published weekly by the National Geospatial-Intelligence Agency and the Local Notice to Mariners (LNM) issued periodically by each U.S. Coast Guard district to the dates shown in the lower left hand corner. Chart updates corrected from Notice to Mariners published after the dates shown in the lower left hand corner are available at nauticalcharts.noaa.gov.

NOAA encourages users to submit inquiries, discrepancies or comments about this chart at http://www.nauticalcharts.noaa.gov/staff/contact.htm.

SOUNDINGS IN FEET

Published at Washington, D.C.
U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE
COAST SURVEY

FATHOMS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
FEET	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102
METERS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

El Segundo and Approaches
SOUNDINGS IN FEET - SCALE 1:15,000

Coordinate Table

ROUTE: 1

Latitude1,Longitude1,Latitude2,Longitude2,Length,Azimuth,Name

33;56;40.56112 N,118;26;44.25994 W,33;56;41.23935 N,118;27;03.45829 W,494.32,269.88,1
33;56;41.23935 N,118;27;03.45829 W,33;56;42.71679 N,118;27;33.88479 W,784.04,270.79,1
33;56;42.71679 N,118;27;33.88479 W,33;56;39.78522 N,118;31;06.58775 W,5472.28,266.53,1

ROUTE: 2

Latitude1,Longitude1,Latitude2,Longitude2,Length,Azimuth,Name

33;56;22.74349 N,118;26;37.22970 W,33;56;23.67461 N,118;27;03.58579 W,678.66,269.88,2
33;56;23.67461 N,118;27;03.58579 W,33;56;25.37120 N,118;27;38.52432 W,900.35,270.79,2
33;56;25.37120 N,118;27;38.52432 W,33;56;22.50687 N,118;31;06.34961 W,5347.09,266.53,2

ROUTE: 3

Latitude1,Longitude1,Latitude2,Longitude2,Length,Azimuth,Name

33;56;25.67875 N,118;26;37.42934 W,33;56;26.60207 N,118;27;03.56452 W,672.96,269.88,3
33;56;26.60207 N,118;27;03.56452 W,33;56;28.26213 N,118;27;37.75108 W,880.97,270.79,3
33;56;28.26213 N,118;27;37.75108 W,33;56;25.38659 N,118;31;06.38930 W,5367.96,266.53,3

ROUTE: 4

Latitude1,Longitude1,Latitude2,Longitude2,Length,Azimuth,Name

33;56;37.60659 N,118;26;43.51498 W,33;56;38.31189 N,118;27;03.47952 W,514.05,269.88,4
33;56;38.31189 N,118;27;03.47952 W,33;56;39.82586 N,118;27;34.65805 W,803.42,270.79,4
33;56;39.82586 N,118;27;34.65805 W,33;56;36.90550 N,118;31;06.54806 W,5451.42,266.53,4

ROUTE: 5

Latitude1,Longitude1,Latitude2,Longitude2,Length,Azimuth,Name

33;56;34.62225 N,118;26;41.92617 W,33;56;35.38444 N,118;27;03.50076 W,555.51,269.88,5
33;56;35.38444 N,118;27;03.50076 W,33;56;36.93493 N,118;27;35.43131 W,822.81,270.79,5
33;56;36.93493 N,118;27;35.43131 W,33;56;34.02577 N,118;31;06.50837 W,5430.55,266.53,5

ROUTE: 6

Latitude1,Longitude1,Latitude2,Longitude2,Length,Azimuth,Name

33;56;28.66701 N,118;26;39.12881 W,33;56;29.52953 N,118;27;03.54326 W,628.65,269.88,6
33;56;29.52953 N,118;27;03.54326 W,33;56;31.15306 N,118;27;36.97782 W,861.58,270.79,6
33;56;31.15306 N,118;27;36.97782 W,33;56;28.26632 N,118;31;06.42899 W,5388.82,266.53,6

ROUTE: 7

Latitude1,Longitude1,Latitude2,Longitude2,Length,Azimuth,Name

33;51;39.06239 N,118;24;16.91194 W,33;51;36.97939 N,118;24;40.83358 W,619.36,261.48,7
33;51;36.97939 N,118;24;40.83358 W,33;51;23.01936 N,118;27;50.03542 W,4891.19,262.40,7

ROUTE: 8

Latitude1,Longitude1,Latitude2,Longitude2,Length,Azimuth,Name

33;51;47.56811 N,118;24;20.43365 W,33;51;45.70406 N,118;24;41.84061 W,554.24,261.48,8
33;51;45.70406 N,118;24;41.84061 W,33;51;31.75177 N,118;27;50.93557 W,4888.29,262.40,8

ROUTE: 9

Latitude1,Longitude1,Latitude2,Longitude2,Length,Azimuth,Name

33;51;30.58236 N,118;24;13.09520 W,33;51;28.25471 N,118;24;39.82661 W,692.13,261.48,9
33;51;28.25471 N,118;24;39.82661 W,33;51;14.29109 N,118;27;49.07926 W,4892.64,262.40,9

ROUTE: 10

Latitude1,Longitude1,Latitude2,Longitude2,Length,Azimuth,Name

33;51;33.43151 N,118;24;14.10935 W,33;51;31.16293 N,118;24;40.16226 W,674.55,261.48,10
33;51;31.16293 N,118;24;40.16226 W,33;51;17.20121 N,118;27;49.38863 W,4891.91,262.40,10

ROUTE: 11

Latitude1,Longitude1,Latitude2,Longitude2,Length,Azimuth,Name

33;51;44.65908 N,118;24;20.10720 W,33;51;42.79584 N,118;24;41.50493 W,554.00,261.48,11

33;51;42.79584 N,118;24;41.50493 W,33;51;28.84166 N,118;27;50.62617 W,4889.01,262.40,11

ROUTE: 12

Latitude1,Longitude1,Latitude2,Longitude2,Length,Azimuth,Name

33;51;41.85155 N,118;24;18.61511 W,33;51;39.88761 N,118;24;41.16925 W,583.95,261.48,12
33;51;39.88761 N,118;24;41.16925 W,33;51;25.93155 N,118;27;50.31677 W,4889.74,262.40,12

ROUTE: 13

Latitude1,Longitude1,Latitude2,Longitude2,Length,Azimuth,Name

33;51;39.10557 N,118;24;16.41606 W,33;51;36.97939 N,118;24;40.83358 W,632.20,261.48,13
33;51;36.97939 N,118;24;40.83358 W,33;51;23.02144 N,118;27;50.00738 W,4890.46,262.40,13

ROUTE: 14

Latitude1,Longitude1,Latitude2,Longitude2,Length,Azimuth,Name

33;51;36.24821 N,118;24;15.49614 W,33;51;34.07116 N,118;24;40.49792 W,647.33,261.48,14
33;51;34.07116 N,118;24;40.49792 W,33;51;20.11132 N,118;27;49.69800 W,4891.19,262.40,14

ROUTE: 15

Latitude1,Longitude1,Latitude2,Longitude2,Length,Azimuth,Name

33;56;31.14605 N,118;31;06.46868 W,33;56;34.05024 N,118;27;35.75107 W,5421.36,86.53,15
33;56;34.05024 N,118;27;35.75107 W,33;56;32.45698 N,118;27;03.52201 W,830.56,90.85,15
33;56;32.45698 N,118;27;03.52201 W,33;56;31.66553 N,118;26;41.11911 W,576.85,89.88,15

ROUTE: 16

Latitude1,Longitude1,Latitude2,Longitude2,Length,Azimuth,Name

33;51;46.17820 N,118;24;20.54398 W,33;51;44.33022 N,118;24;41.76630 W,549.46,261.48,16
33;51;44.33022 N,118;24;41.76630 W,33;51;42.63811 N,118;25;03.58450 W,564.25,262.13,16

ROUTE: 17

Latitude1,Longitude1,Latitude2,Longitude2,Length,Azimuth,Name

33;56;30.26537 N,118;26;40.43410 W,33;56;31.08135 N,118;27;03.53142 W,594.73,269.88,17
33;56;31.08135 N,118;27;03.53142 W,33;56;32.06630 N,118;27;25.52809 W,566.69,270.53,17

ROUTE: 18

Latitude1,Longitude1,Latitude2,Longitude2,Length,Azimuth,Name

33;56;33.24097 N,118;26;41.77561 W,33;56;34.00980 N,118;27;03.53825 W,560.36,269.88,18
33;56;34.00980 N,118;27;03.53825 W,33;56;34.99316 N,118;27;25.49549 W,565.67,270.53,18

ROUTE: 19

Latitude1,Longitude1,Latitude2,Longitude2,Length,Azimuth,Name

33;56;36.18763 N,118;26;42.29772 W,33;56;36.93825 N,118;27;03.54510 W,547.08,269.88,19
33;56;36.93825 N,118;27;03.54510 W,33;56;37.91925 N,118;27;25.44636 W,564.22,270.53,19

ROUTE: 20

Latitude1,Longitude1,Latitude2,Longitude2,Length,Azimuth,Name

33;56;27.23820 N,118;26;37.63318 W,33;56;28.15291 N,118;27;03.52459 W,666.68,269.88,20
33;56;28.15291 N,118;27;03.52459 W,33;56;29.14465 N,118;27;25.66915 W,570.51,270.53,20

ROUTE: 21

Latitude1,Longitude1,Latitude2,Longitude2,Length,Azimuth,Name

33;56;24.31231 N,118;26;37.69880 W,33;56;25.22446 N,118;27;03.51777 W,664.82,269.88,21
33;56;25.22446 N,118;27;03.51777 W,33;56;26.21856 N,118;27;25.71829 W,571.95,270.53,21

ROUTE: 22

Latitude1,Longitude1,Latitude2,Longitude2,Length,Azimuth,Name

33;56;39.17980 N,118;26;44.10829 W,33;56;39.86670 N,118;27;03.55195 W,500.64,269.88,22
33;56;39.86670 N,118;27;03.55195 W,33;56;40.84611 N,118;27;25.41374 W,563.20,270.53,22

ROUTE: 23

Latitude1,Longitude1,Latitude2,Longitude2,Length,Azimuth,Name

33;51;37.74061 N,118;24;16.23984 W,33;51;35.61287 N,118;24;40.67528 W,632.66,261.48,23
33;51;35.61287 N,118;24;40.67528 W,33;51;33.90980 N,118;25;02.62803 W,567.75,262.13,23

ROUTE: 24

Latitude1,Longitude1,Latitude2,Longitude2,Length,Azimuth,Name

33;51;40.29957 N,118;24;20.58659 W,33;51;38.51865 N,118;24;41.03894 W,529.53,261.48,24
33;51;38.51865 N,118;24;41.03894 W,33;51;36.81882 N,118;25;02.95236 W,566.73,262.13,24

ROUTE: 25

Latitude1,Longitude1,Latitude2,Longitude2,Length,Azimuth,Name

33;51;43.35721 N,118;24;19.20641 W,33;51;41.42444 N,118;24;41.40262 W,574.68,261.48,25
33;51;41.42444 N,118;24;41.40262 W,33;51;39.72909 N,118;25;03.26019 W,565.28,262.13,25

ROUTE: 26

Latitude1,Longitude1,Latitude2,Longitude2,Length,Azimuth,Name

33;51;34.92481 N,118;24;14.84260 W,33;51;32.70708 N,118;24;40.31162 W,659.43,261.48,26
33;51;32.70708 N,118;24;40.31162 W,33;51;30.99274 N,118;25;02.41198 W,571.57,262.13,26

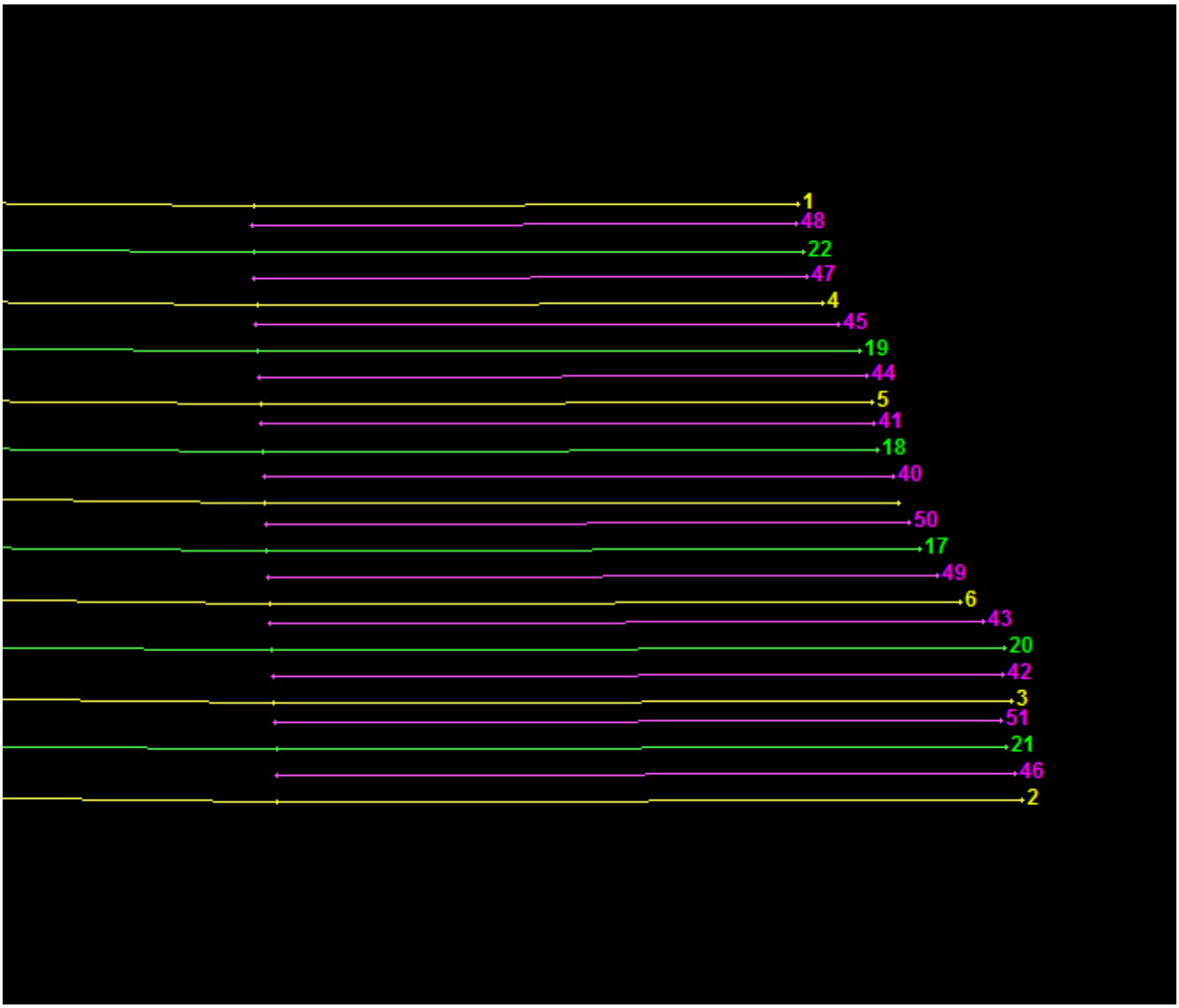
ROUTE: 27

Latitude1,Longitude1,Latitude2,Longitude2,Length,Azimuth,Name

33;51;32.09341 N,118;24;13.62456 W,33;51;29.80129 N,118;24;39.94797 W,681.56,261.48,27
33;51;29.80129 N,118;24;39.94797 W,33;51;28.08247 N,118;25;02.10416 W,573.02,262.13,27

Route 28	33;51;39.82054 N,118;24;17.20105 W,33;51;37.75426 N,118;24;40.93056 W,614.38,261.48,28
Route 29	33;51;41.28847 N,118;24;18.33470 W,33;51;39.30402 N,118;24;41.12452 W,590.05,261.48,29
Route 30	33;51;42.61337 N,118;24;18.86203 W,33;51;40.65761 N,118;24;41.32223 W,581.51,261.48,30
Route 31	33;51;44.10968 N,118;24;19.66977 W,33;51;42.20736 N,118;24;41.51619 W,565.62,261.48,31
Route 32	33;51;45.41447 N,118;24;20.42794 W,33;51;43.56340 N,118;24;41.68591 W,550.38,261.48,32

Route 33	33;51;46.97842 N,118;24;20.45893 W,33;51;45.11315 N,118;24;41.87988 W,554.60,261.48,33
Route 34	33;51;36.97538 N,118;24;16.14105 W,33;51;34.84604 N,118;24;40.59489 W,633.14,261.48,34
Route 35	33;51;38.52461 N,118;24;16.34105 W,33;51;36.39579 N,118;24;40.78885 W,632.98,261.48,35
Route 36	33;51;34.18242 N,118;24;14.48166 W,33;51;31.94025 N,118;24;40.23124 W,666.70,261.48,36
Route37	33;51;35.67810 N,118;24;15.29658 W,33;51;33.49000 N,118;24;40.42519 W,650.62,261.48,37
Route 38	33;51;31.34142 N,118;24;13.37377 W,33;51;29.03446 N,118;24;39.86759 W,685.97,261.48,38
Route 39	33;51;32.86231 N,118;24;13.89926 W,33;51;30.58421 N,118;24;40.06153 W,677.38,261.48,39
Route40	33;56;32.45289 N,118;26;41.30307 W,33;56;33.23790 N,118;27;03.52383 W,572.15,269.88,40
Route 41	33;56;34.03449 N,118;26;41.86610 W,33;56;34.79974 N,118;27;03.52748 W,557.75,269.88,41
Route 42	33;56;26.46943 N,118;26;37.70736 W,33;56;27.38200 N,118;27;03.53825 W,665.12,269.88,42
Route 43	33;56;28.05328 N,118;26;38.33393 W,33;56;28.94384 N,118;27;03.54189 W,649.08,269.88,43
Route 44	33;56;35.40874 N,118;26;42.08567 W,33;56;36.16734 N,118;27;03.55876 W,552.90,269.88,44
Route 45	33;56;37.00108 N,118;26;42.95260 W,33;56;37.72918 N,118;27;03.56241 W,530.67,269.88,45
Route 46	33;56;23.53206 N,118;26;37.44801 W,33;56;24.45355 N,118;27;03.53144 W,671.63,269.88,46
Route 47	33;56;38.40617 N,118;26;44.04490 W,33;56;39.09579 N,118;27;03.56561 W,502.62,269.88,47
Route 48	33;56;39.97876 N,118;26;44.35293 W,33;56;40.65763 N,118;27;03.56927 W,494.78,269.88,48
Route 49	33;56;29.47418 N,118;26;39.87389 W,33;56;30.31044 N,118;27;03.54508 W,609.51,269.88,49
Route 50	33;56;31.06785 N,118;26;40.77848 W,33;56;31.87228 N,118;27;03.54873 W,586.31,269.88,50
Route 51	33;56;25.10814 N,118;26;37.85468 W,33;56;26.01539 N,118;27;03.53507 W,661.25,269.88,51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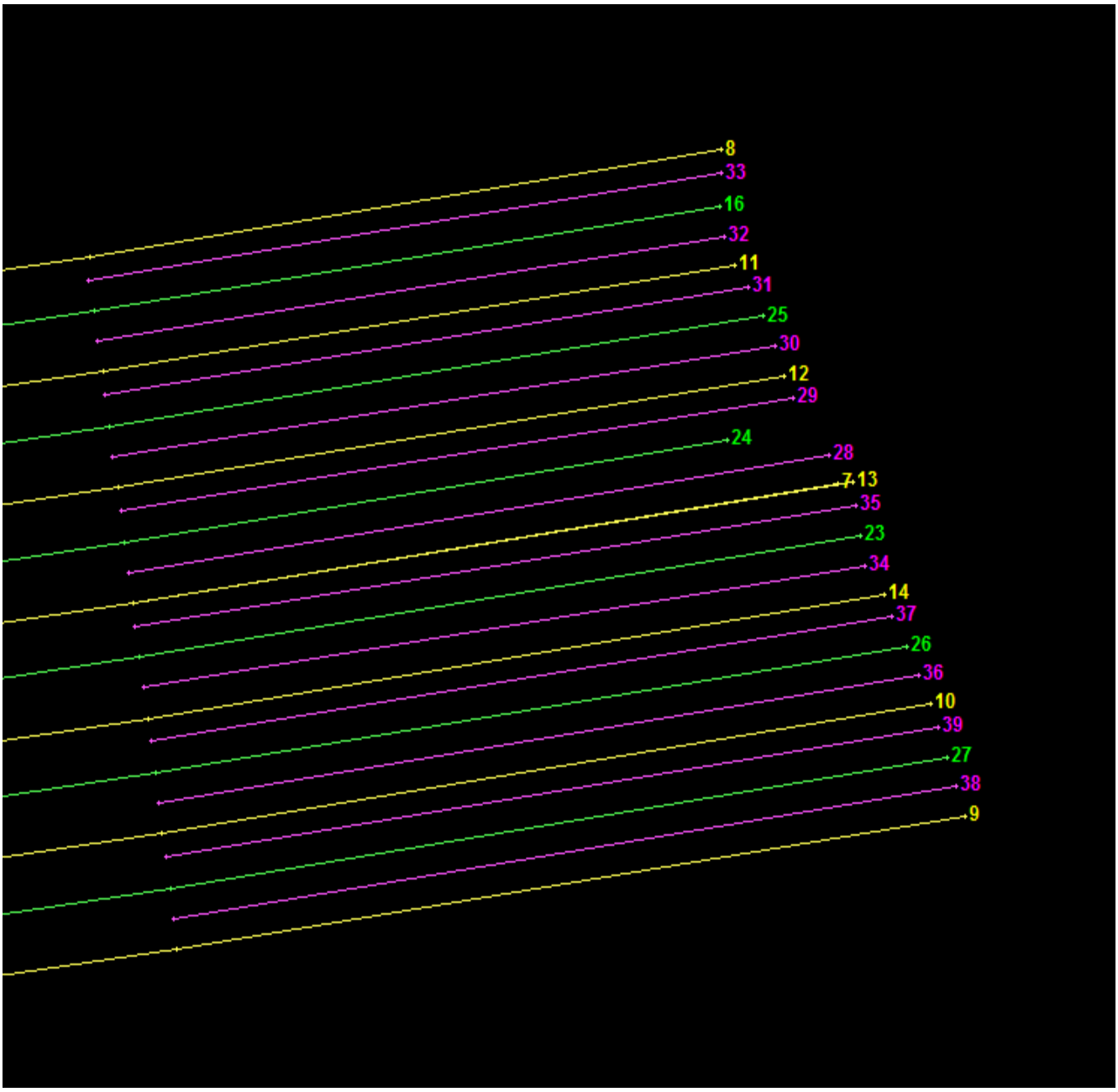
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TERRASOND LIMITED
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Seattle, Washington 98107 USA
+1.206.420.8304 • +1.206.420.8305 Fax • www.terrasond.com

April 14 2016

Commander
11th Coast Guard District
Building 50-2
Coast Guard Island
Alameda, CA 94501-5100

Attention: **Local Notice to Mariners**

Subject: Notice to Mariners for a Geophysical Survey off the Coast of Santa Monica, CA

1. **NAME OF FIRM:** TERRASOND LIMITED
   801 NW 42nd Street, Suite 215
   Seattle, Washington 98107
   +1.206.420.8304 •
   +1.206.420.8305 Fax

2. **TYPE OF OPERATION:** Multi beam, side scan, magnetometer and sub-bottom survey of proposed cable route from nearshore to approximately 3 NM offshore by 500m wide (see attached figure)

3. **LOCATION/POSITION INFORMATION:** See attached figure

4. **START AND END DATES:** Operational window will be from May 11th-31st. This survey will be weather dependent. The actual amount of time to collect the geophysical survey data will only take approximately 5 days. Survey operations will be during daylight hours only.

5. **VESSEL INVOLVED:** Survey Vessel "JAB"

6. **RADIO:** **YES** NO **VHF-FM FREQ's MONITORED:** 16 and 71

7. ***OTHER PERTINENT INFORMATION:***

   Side scan and sub-bottom surveys will be conducted from the survey vessel "JAB." Survey equipment will submerged and towed behind the vessel at a distance of 10' -390'. Caution should be exercised and radio contact is requested when passing the Survey Vessel "JAB."

POC NAME AND TELEPHONE NUMBERS:

1. Brayton Pointer, Captain SV 805-746-4242
2. Kathleen Mildon, Project Manager 206-330-6442

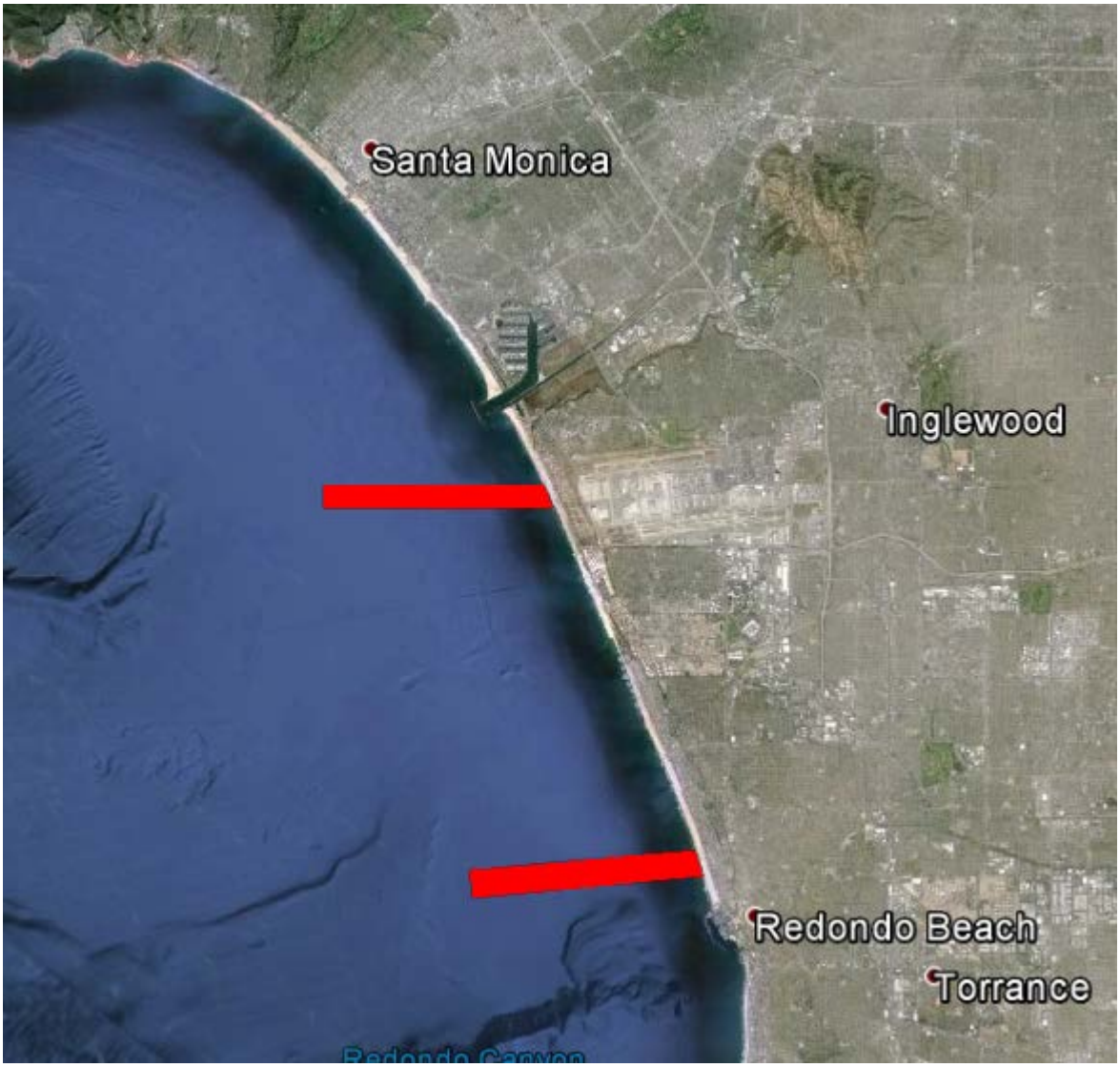

Figure 1 - Survey area's in red

Notifications Sent - 4/19/2016

Tuesday, April 19, 2016 12:22 PM

Send

To... waterfront@redondo.org

Cc...

Subject Notification to Vessels

Attached JAB NTM.pdf (150 KB)

Good Afternoon,

TerraSond will be completing a geophysical survey in the area and would like to notify vessels in the area of our schedule. If you would please post the attached notice on your bulletin board we would appreciate it.

Please feel free to call me with any questions or concerns.

Regards,

Kathleen Mildon, PLS, C.H.
Project Manager

TerraSond
Precision Geospatial Solutions ®
801 NW 42nd Street Suite 215, Seattle, Washington 98107
206-420-8304 Office 206-420-8305 FAX
kmildon@terrasond.com www.terrasond.com
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Notification of Survey Vessel in the Area - Message (HTML)

FILE MESSAGE INSERT OPTIONS FORMAT TEXT REVIEW ADOBE PDF

Paste Cut Copy Format Painter Clipboard | Calibri (Bo 11 Basic Text | Address Book Check Names Names | Attach File Attach Item Signature Include | Assign Policy Follow Up High Importance Low Importance Tags | Zoom Zoom | Apps for Office Add-ins

Send

To... dive@ScubaDiveLA.com; sendkdive@aol.com; info@btwdive.com; customerservice@divensurf.com

Cc...

Subject Notification of Survey Vessel in the Area

Attached JAB NTM.pdf (150 KB)

Good Afternoon,

TerraSond will be completing a geophysical survey in the area and would like to notify Divers in the area of our schedule. If you would please post the attached notice on your bulletin board we would appreciate it.

Please feel free to call me with any questions or concerns.

Regards,

Kathleen Mildon, PLS, C.H.
Project Manager

TerraSond
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kmildon@terrasond.com www.terrasond.com
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padre associates, inc.
ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

MARINE WILDLIFE CONTINGENCY PLAN

BATHYMETRIC, SIDE SCAN SONAR, AND SUB-BOTTOM PROFILER SURVEYS
ALPINE OCEAN CABLE LANDING SURVEY
OFFSHORE LAX and HERMOSA BEACH, CALIFORNIA

Prepared for:

Terrasond
801 NW 42nd Street
Seattle, Washington 98107

Prepared by:

Padre Associates, Inc.
369 Pacific Street
San Luis Obispo, California 93401

April 2016

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APPENDICES

APPENDIX A: MARINE WILDLIFE MONITOR RESUMES

1.0 INTRODUCTION

This Marine Wildlife Contingency Plan (MWCP) has been developed for Terrasond in support of a bathymetric multibeam, side-scan sonar, and sub-bottom profiler survey in the Santa Monica Bay offshore of LAX and Hermosa Beach, California (Figure 1). This MWCP has been prepared in accordance with the requirements in the existing California State Lands Commission (CSLC) issued Low-Energy Offshore Geophysical Permit PRC 9007.9. This MWCP is designed to reduce or eliminate adverse impacts to marine wildlife resources within the survey area.

This MWCP is specific to the equipment and activities that are proposed for the survey. The proposed monitoring and mitigations have been successfully used in agency-approved MWCPs for similar offshore surveys in southern California marine waters, and have been shown to be effective in reducing or eliminating potential impacts to marine mammals and turtles (marine wildlife).

1.1 PURPOSE AND OBJECTIVES

The proposed survey will utilize multibeam bathymetry and simultaneous side-scan sonar system to document the seafloor conditions within the survey area. In addition, data collection with the sub-bottom profiler will begin after completion of the multibeam and side scan sonar survey. The survey will be completed by Terrasond in accordance with requirements specified by Alpine Ocean's statement of work.

1.2 PROPOSED SURVEY ACTIVITIES AND AREA

The survey is anticipated to take six days (three days for multibeam and side scan sonar survey, and three days for the the sub-bottom profiler) and will utilize the survey vessel (SV) *JAB*, a 13 meter (m) (43 foot [ft]) jet powered catamaran designed specifically for hydrographic surveying. The vessel will be mobilized in Redondo Beach Harbor and will transit to the survey area on the morning of the survey. The survey will be completed during daylight hours (no nighttime operations are proposed). The vessel will return to the Redondo Beach Harbor at the completion of the survey.

The proposed survey area is located within state waters out to the three nautical mile line. The survey areas will consist of inshore (3 m to 15 m [9 to 50 ft] depth) and shallow water (greater than 15 m [50 ft] depth) areas each with a corridor width of 500 m (1,640 ft).

1.3 SURVEY EQUIPMENT

Table 1.3-1 details the survey equipment used to collect the required data:

Table 1.3-1. Survey Equipment and Frequency

Sounder System Frequency (kHz)	Frequency (kHz)
Reson Seabat 7125 multibeam	400
EdgeTech Sub-bottom 3100 w/ 216	2-15
EdgeTech 4200 side-scan sonar	400

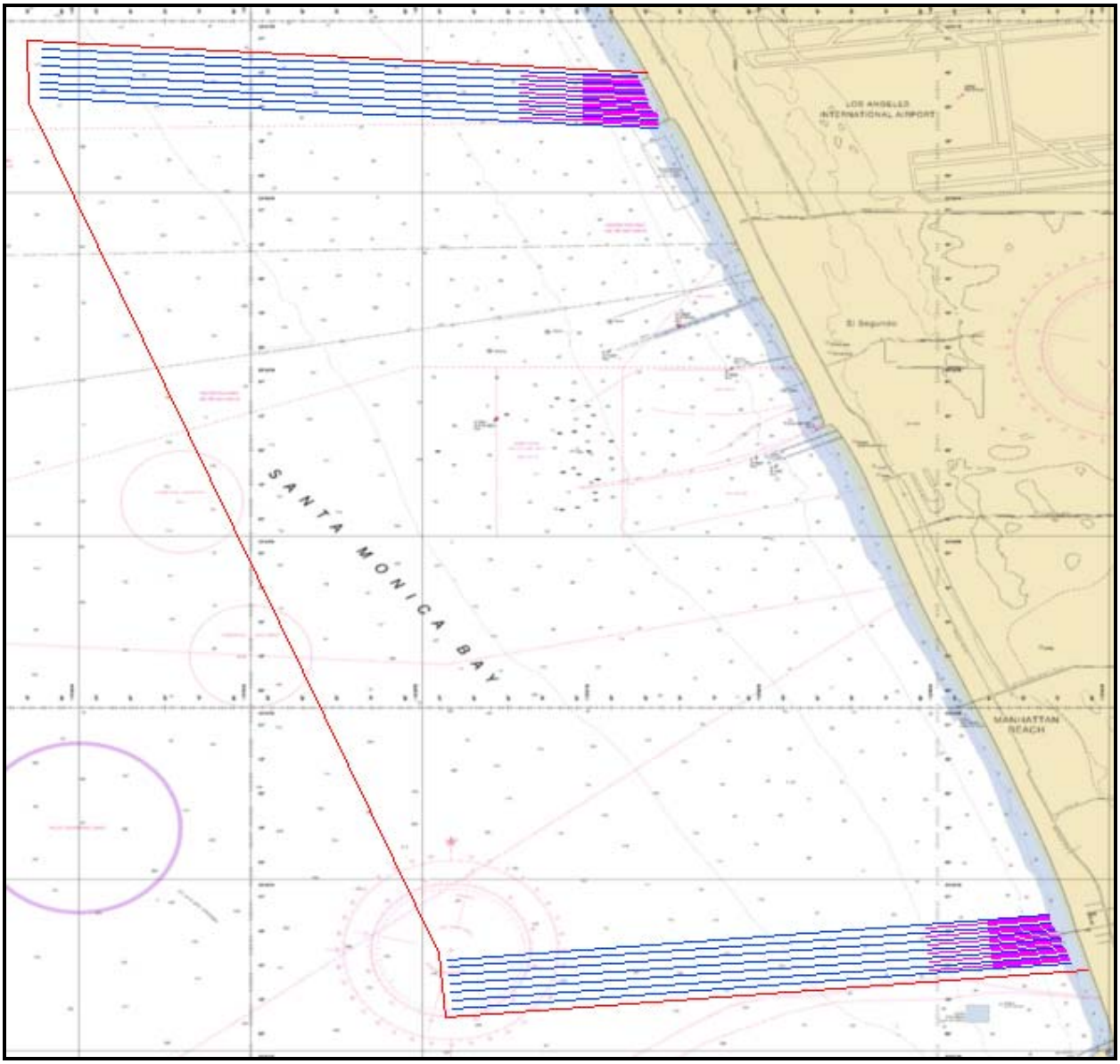


Figure 1. Project Area

2.0 MARINE WILDLIFE

Multiple species of marine turtles, cetaceans (whales, dolphins, and porpoises, pinnipeds (seals and sea lions), and fissipeds (sea otter) have been recorded along the Southern California coast (Table 2.0-1). Most of the recorded species can occur within the survey region, although seasonal abundances of these taxa vary; pinnipeds and some dolphins are year-round residents (Table 2.0-2). Other species are migratory, such as the gray whale (*Eschrichtius robustus*), or seasonal, such as the blue and humpback whales (*Balaenoptera musculus* and *Megaptera novaeangliae*, respectively) and therefore are more abundant during specific months. Within the Project region, resident, seasonal, and migrant taxa could be expected to occur.

Table 2.0-1. Abundance Estimates for Marine Mammals and Reptiles within Southern California (California/Mexico Border to Point Conception)

Common Name ***Scientific Name***	**Population Estimate**	**Current Population Trend**
REPTILES		
Cryptodira		
Olive Ridley turtle *Lepidochelys olivacea*	1.1 million (Eastern Tropical Pacific DPS)	Stable
Green turtle *Chelonia mydas*	20,112 (Eastern Pacific DPS)	Stable
Loggerhead turtle *Caretta caretta*	7,138 (California)	Decreasing
Leatherback turtle *Dermochelys coriacea*	361 (California)	Decreasing
MAMMALS		
Mysticeti		
California gray whale *Eschrichtius robustus*	18,017 (Eastern North Pacific Stock)	Fluctuating annually
Fin whale *Balaenoptera physalus*	2,589 (California/Oregon/Washington Stock)	Increasing off California
Humpback whale *Megaptera novaeangliae*	1,876 (California/Oregon/Washington Stock)	Increasing
Blue whale *Balaenoptera musculus*	1,551 (Eastern North Pacific Stock)	Unable to determine
Minke whale *Balaenoptera acutorostrata*	202 (California/Oregon/Washington Stock)	No long-term trends suggested
Northern Pacific right whale *Eubalaena japonica*	31 (based on photo-identification) (Eastern North Pacific Stock)	No long-term trends suggested
Sei whale *Balaenoptera borealis*	83 (Eastern North Pacific Stock)	No long-term trends suggested
Odontoceti		
Short-beaked common dolphin *Delphinus delphis*	343,990 (California/Oregon/Washington Stock)	Unable to determine
Long-beaked common dolphin *Delphinus capensis*	76,224 (California Stock)	Unable to determine
Dall's porpoise *Phocoenoides dalli*	32,106 (California/Oregon/Washington Stock)	Unable to determine
Pacific white-sided dolphin *Lagenorhynchus obliquidens*	21,406 (California/Oregon/Washington Northern and Southern Stock)	No long-term trends suggested
Risso's dolphin *Grampus griseus*	4,913 (California/Oregon/Washington Stock)	No long-term trends suggested

Table 2.0-1. Abundance Estimates for Marine Mammals and Reptiles within Southern California (California/Mexico Border to Point Conception)

Common Name ***Scientific Name***	**Population Estimate**	**Current Population Trend**
Short-finned pilot whale *Globicephala macrorhynchus*	465 (California/Oregon/Washington Stock)	No long-term trends suggested
Striped dolphin *Stenella coeruleoalba*	8,231 (California, Oregon, Washington)	No long-term trends suggested
Baird's beaked whale *Berardius bairdii*	466 (California, Oregon, Washington)	No long-term trends suggested
Cuvier's beaked whale *Ziphius cavirostris*	4,481 (California, Oregon, Washington Stock)	No long-term trends suggested
Mesoplodont beaked whales	389 (California, Oregon, Washington)	No long-term trends suggested
Bottlenose dolphin *Tursiops truncatus*	684 (California/Oregon/Washington Offshore Stock)	No long-term trends suggested
	290 (California Coastal Stock)	No long-term trends suggested
Northern right whale dolphin *Lissodelphis borealis*	6,019 (California/Oregon/Washington Stock)	No long-term trends suggested
Sperm whale *Physeter macrocephalus*	751 (California/Oregon/Washington Stock)	No long-term trends suggested
Dwarf sperm whale *Kogia sima*	Unknown (California, Oregon, Washington)	No long-term trends suggested
Pygmy sperm whale *Kogia breviceps*	271 (California/Oregon/Washington Stock)	No long-term trends suggested
Killer whale *Orcinus orca*	162 (Eastern North Pacific Offshore Stock) 354 (West Coast Transients)	No long-term trends suggested
Pinnipedia		
California sea lion *Zalophus californianus*	153,337 (U.S. Stock)	Unable to determine; increasing in most recent three year period
Northern fur seal *Callorhinus ursinus*	6,431 (California - San Miguel Island Stock)	Increasing
Guadalupe fur seal *Arctocephalus townsendi*	3,028 (Mexico Stock) Undetermined in California	Increasing
Northern elephant seal *Mirounga angustirostris*	74,913 (California Breeding Stock)	Increasing
Pacific harbor seal *Phoca vitulina richardsi*	26,667 (California Stock)	Stable
Fissipedia		
Southern sea otter *Enhydra lutris nereis*	2,944**	Unable to determine

Source: Allen, 2011; NMFS, 2015a,b; and USGS, 2015

* Estimates are based on known data of the population of nesting females for eastern Pacific Distinct Population Segments.

** Estimate provided by USGS, 2015

Table 2.0-2. California Marine Wildlife Species and Periods of Occurrence within Southern California (California/Mexico Border to Point Conception)

Family Common Name	Month of Occurrence[1]											
	J	F	M	A	M	J	J	A	S	O	N	D
REPTILES												
Cryptodira												
Olive ridley turtle (T)[2]												
Green turtle (T)[2]												
Leatherback turtle (E)[2]												
Loggerhead turtle (T)[2]												
MAMMALS												
Mysticeti												
California gray whale												
Blue whale (E)												
Fin whale (E)												
Humpback whale (E)												
Minke whale												
Sei whale (E)												
Northern right whale (E)												
Odontoceti												
Dall's porpoise												
Short-beaked common dolphin												
Long-beaked common dolphin												
Pacific white-sided dolphin												
Risso's dolphin												
Short-finned pilot whale												
Bottlenose dolphin												
Northern right whale dolphin												
Sperm whale												
Dwarf sperm whale												
Pygmy sperm whale												
Baird's beaked whale												
Cuvier's beaked whale												
Mesoplodont beaked whales												
Killer whale												
Pinnipedia												
Northern fur seal[3]												
Guadalupe fur seal												
California sea lion												
Northern elephant seal[4]												
Pacific harbor seal												
Fissipedia												
Southern sea otter (T)[5]												

Rare with uniform distribution | Not expected to occur due to seasonal distribution | More likely to occur due to seasonal distribution | Present Year Round

(E) Federally listed endangered species.
(T) Federally listed threatened species.
(1) Where seasonal differences occur, individuals may also be found in the "off" season. Also, depending on the species, the numbers of abundant animals present in their "off" season may be greater than the numbers of less common animals in their "on" season.
(2) Only a small percent occur over continental shelf (except near San Miguel rookery, May-November).
(3) Common near land during winter breeding season and spring molting season.
(4) Only nearshore (diving limit 100 feet).

Sources: Bonnell and Dailey,1993; NMFS, 2015a,b; and NCCOS, 2007; and Allen, 2011

2.1 PINNIPED HAUL-OUTS AND ROOKERIES

The proposed Project activities will not occur near any known pinniped haul-out and/or rookeries (Figure 2). The closest haul-out/rookery is located approximately 56 kilometers (km) [35 miles (mi)] north of the active nearshore Project area.

LEGEND:

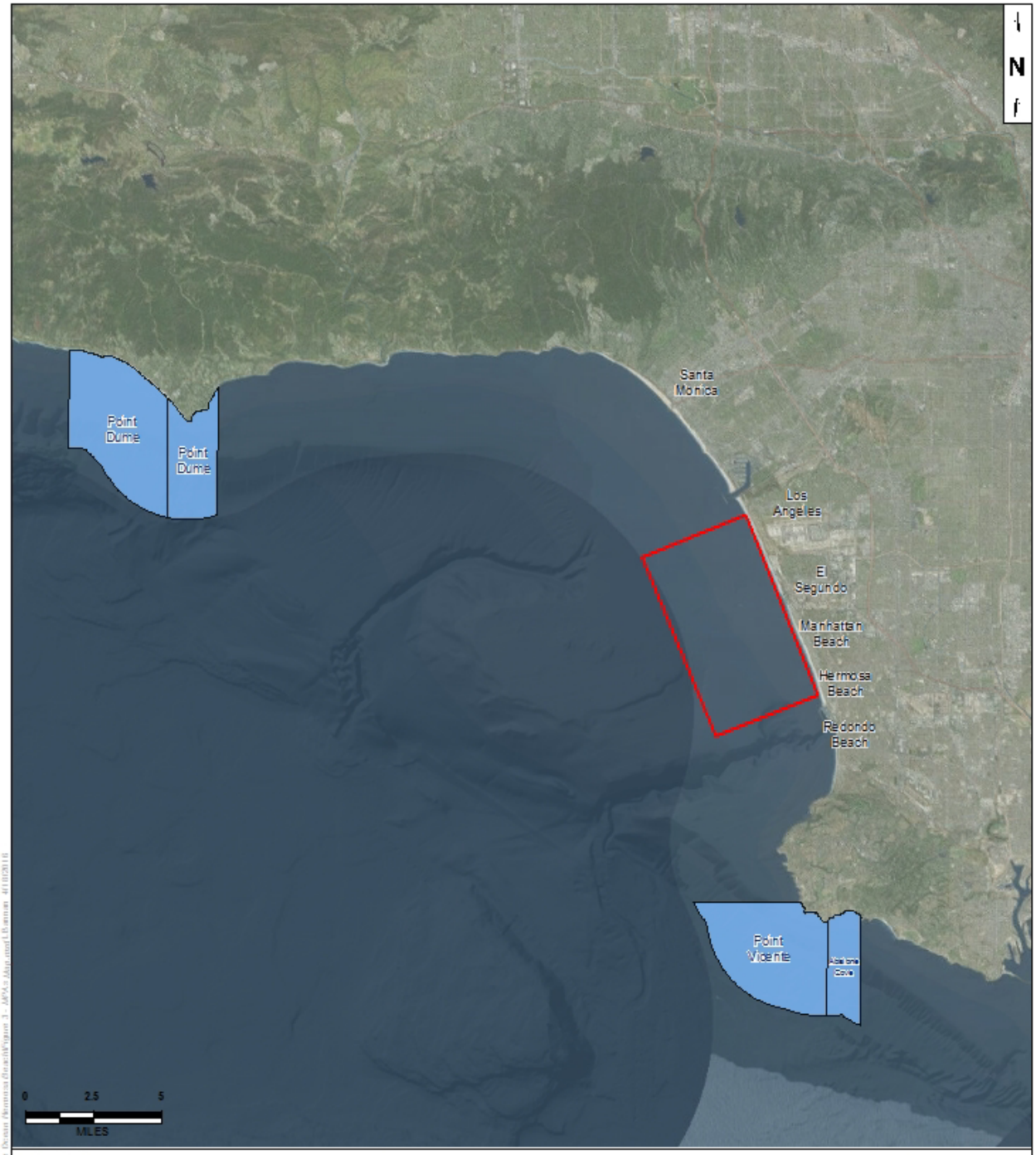
Survey Area

Source: ESRI Online Imagery Map, NOAA
Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
Notes: This map was created for informational and display purposes only.

padre associates, inc. ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS	PROJECT NAME: TERRASOND ALPINE OCEAN HERMOSA BEACH BATHYMETRIC SURVEY LOS ANGELES COUNTY, CA	PINNIPED HAUL-OUTS AND ROOKERIES	FIGURE 2
	PROJECT NUMBER: 1402-2401 / DATE: April 2016		

3.0 MARINE PROTECTED AREAS

The proposed survey area does not fall into a designated Marine Protected Area (MPA). The closest MPA is located approximately 10 km (km) [6 mi] south of the survey area (Figure 3).



LEGEND:

Marine Protected Area (MPA)

Survey Area

Source: ESRI Online Imagery Map, NOAA
Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
Notes: This map was created for informational and display purposes only.

padre associates, inc. ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS	PROJECT NAME: TERRASOND ALPINE OCEAN HERMOSA BEACH BATHYMETRIC SURVEY LOS ANGELES COUNTY, CA	MARINE PROTECTED AREAS	FIGURE 3
	PROJECT NUMBER: 1402-2401 / DATE: April 2016		

4.0 ONBOARD MONITORING AND OTHER MITIGATIONS

4.1 MARINE WILDLIFE MONITORS

In accordance with the CSLC-issued geophysical and geologic sampling permit, one qualified marine wildlife monitor, approved by NOAA Fisheries, (refer to Appendix A for monitor qualifications) will be onboard the vessel throughout the period of the vessel transit and multibeam and side-scan sonar activities. During sub-bottom profiler activities, two marine wildlife monitors, approved by NOAA Fisheries, will be onboard the vessel throughout the period of the vessel transit and data collection activities.

4.2 VESSEL TRANSIT

Following mobilization, the survey vessel will transit between Redondo Beach Harbor and the survey area. During vessel transit to and from the survey area, there is a potential for encountering marine wildlife and therefore onboard monitoring will occur.

During transit periods, marine wildlife monitor(s) will be positioned on the vessel so that the monitor(s) will have a clear view of the area of ocean that is in the direction of the course of travel. Monitor(s) will observe marine wildlife and will institute measures to avoid potential collisions with those animals. To minimize the chance of collision with or disturbance of marine wildlife, the vessel will maintain a minimum distance of 91 m (300 ft) from marine wildlife in accordance with CSLC-issued geophysical and geologic sampling permit. If marine wildlife monitor(s) should observe a marine mammal or reptile within the path of the transiting vessel, the monitor(s) will immediately report that observation to the vessel operator who will, unless those actions will jeopardize the safety of the vessel or crew, slow the vessel and/or change course in order to avoid contact.

When whales are in the survey area and/or are observed proximal to the vessel during transit periods the vessel operator will observe the following guidelines:

- Maintain a minimum distance of 100 m (330 ft) from sighted whales;
- Refrain from crossing directly in front of or across the path of sighted whales;
- Transit parallel to whales and maintain a constant speed that is not faster than the whale's speed;
- Avoid positioning the vessel in such a manner to separate a female whale from her calf;
- Do not use the vessel to herd or drive whales; and
- If a whale engages in evasive or defensive action, slow the vessel and move away from the animal until the animal calms or moves out of the area.

4.3 FISHING GEAR CLEARANCE

In addition to submitting the required Notice to Mariners that will alert commercial fishers of pending on-water activities prior to the start of each survey day, the vessel will traverse the proposed survey corridor to note and record the presence of deployed fishing gear. The type and location of fishing gear (buoys) will be noted, and the California Department of Fish and Wildlife (CDFW) Southern District Enforcement Office will be contacted. No survey lines will be completed within 30 m (100 ft) of any observed fishing gear. The survey crew will not remove or relocate any fishing gear; removal or relocation will only be accomplished by the owner or by an authorized CDFW agent (Table 4.2-1).

Table 4.2-1. Fishing Gear Contact Information

Enforcement Dispatch Desk California Department of Fish and Wildlife, Southern District	California Department of Fish & Wildlife, Marine Division
(562) 598-1032	(831) 649-2870

4.4 SURVEY MONITORING

Three days prior to the initiation of the survey, Padre marine scientists will contact NOAA Fisheries Long Beach office staff and local private whale-watching operations to acquire information on the recently-observed composition and relative abundance of marine mammals offshore El Segundo and the surrounding area. That information will be conveyed to the vessel operator and crew prior to departure for the survey area.

The onboard monitor(s) are responsible for observations during vessel transit will also be responsible for monitoring during the data collection efforts. Monitoring will be completed using binoculars while located at a high vantage point onboard the survey vessel.

As specified in the CSLC-issued geophysical and geologic sampling permit, a safety zone will be monitored when the sub-bottom profiler is operating. During multibeam and side-scan survey operations a safety zone will not be required because the equipment will be operating at greater than 200 kilohertz. Safety zones for each equipment proposed for the survey is provided in Table 4.3-1.

Table 4.3-1. Safety Zone Radii for Survey Equipment

Equipment Type	Safety Zone (radius, m)
Multibeam Echosounder	0
Side-Scan Sonar	0
Sub-bottom Profiler	130

At the time of equipment start-up equipment will be ramped up, any marine wildlife that enter the Project area will be noted. If any animals show behavioral changes during equipment start-up, either the equipment will be shut down until the animal(s) move out of the area, or after 15 minutes of the animal(s) remaining in the Project area, the equipment will be “ramped up” to full power.

During survey activities, the onboard monitor will observe for marine wildlife within the equipment-specific safety zone radius when survey equipment is operating. The onboard monitor will have the authority to recommend halting data collecting operations if marine wildlife is observed within the safety zone, and is reacting to the survey-generated activities. The monitor will also have the authority to recommend continuation or cessation of operations during periods of limited visibility based on the observed abundance of marine wildlife. Periodic reevaluation of weather conditions and reassessment of the continuation/cessation recommendation will be completed by the onboard monitor. With the incorporation of these measures and the other mitigation measures discussed below, the proposed offshore survey activities are unlikely to have a high potential to injure and/or disturb marine wildlife.

4.5 MITIGATION MEASURES

The following operation-related actions will be implemented in accordance with CSLC permit requirements:

1. Survey operator shall use a “soft start” technique at the beginning of survey activities each day (or following a shutdown) to allow any marine mammal that may be in the Project area to leave before the sound sources reach full energy. The survey operator will initiate each piece of equipment at the lowest practical sound level, increasing the output no greater than six (6) decibels (dB) per 5-minute period;

2. During operations, if an animal’s actions are observed to be “irregular” the monitor will have the authority to recommend the cessation of data collection until the animal moves out of the Project area. If the behavior is observed, the equipment will be shut-off and will be restarted and ramped-up to full power or will not be started until the animal(s) is/are outside of the Project area;

3. The monitor will have the authority to recommend halting data collecting operations if a large concentration of diving birds/sea birds is observed in the immediate vicinity; and

4. Unless the safety of the vessel or crew would be in jeopardy, avoidance measures instituted during vessel transit will be implemented during geophysical data collection as well.

5. Survey operator shall follow, to the maximum extent possible, the guidelines of Zykov (2013) as they pertain to the use of subbottom profilers and side-scan sonar, including:

    a. Using the highest frequency band possible for the subbottom profiler;

b. Using the shortest possible pulse length; and

c. Lowering the pulse rate (pings per second) as much as feasible.

With the incorporation of the mitigation measures presented in this document, the proposed offshore survey activities are unlikely to cause injury and/or disturb marine wildlife.

5.0 RECORDING AND REPORTING PROCEDURES

5.1 OBSERVATION RECORDING

The onboard monitor will record observations on pre-printed forms and will photodocument observations whenever possible. The completed forms will be used as the primary data sources for the post-survey report (see Section 5.3 below) which will be provided to the CSLC and/or other agencies if requested.

5.2 COLLISION RESPONSE

If a collision with marine mammal or reptile occurs, the vessel operator must document the conditions under which the accident occurred, including the following:

- Location (latitude and longitude) of the vessel when the collision occurred;
- Date and time of collision;
- Speed and heading of the vessel at the time of collision;
- Observation conditions (e.g., wind speed and direction, swell height, visibility in miles or kilometers, and presence of rain or fog) at the time of collision;
- Species of marine wildlife contacted (if known);
- Whether an observer was observing for marine wildlife at the time of collision; and
- Name of vessel, vessel owner/operator (the company), and captain or officer in charge of the vessel at time of collision.

If a collision occurs, the vessel should stop, if safe to do so. However, the vessel is not obligated to stand by and may proceed after confirming that it will not further damage the animal by doing so. The vessel will then communicate by radio or telephone all details to the vessel's base of operations (Table 5.2-1).

Table 5.2-1. Collision Contact Information

Federal	State	State
Justin Viezbicke Stranding Coordinator National Marine Fisheries Service Long Beach, California (562) 980-3230	Enforcement Dispatch Desk California Department of Fish and Wildlife Los Alamitos, California (562) 598-1032	California State Lands Commission Division of Environmental Planning and Management Sacramento, California (916) 574-0748

The Marine Mammal Protection Act (MMPA) requires that collisions with or other Project-related impacts to marine wildlife will be reported promptly to the National Marine Fisheries Service (NMFS) Stranding Coordinator. From the report, the NMFS Stranding

Coordinator will coordinate subsequent action, including enlisting the aid of marine mammal rescue organizations, if appropriate.

From the vessel's base of operations, a telephone call will be placed to the National Marine Fisheries Service West Coast (California) Stranding Coordinator in Long Beach, to obtain instructions. Alternatively, the vessel captain may contact the NMFS Stranding Coordinator directly using the marine operator to place the call or directly from an onboard telephone, if available to:

National Marine Fisheries Service
West Coast Stranding Coordinator
501 West Ocean Blvd, Suite 4200
Long Beach, CA 90802
(562) 980-3230
Contact: Justin Viezbicke

Email: justin.viezbicke@noaa.gov

It is unlikely that the vessel will be asked to stand by until NMFS or CDFW personnel arrive; however, this will be determined by the NMFS Stranding Coordinator. According to the MMPA, the vessel operator is not allowed to aid injured marine wildlife or recover the carcass unless requested to do so by the NMFS Stranding Coordinator.

Although NMFS has primary responsibility for marine mammals in both state and federal waters, the CDFW will also be advised that an incident has occurred in state waters affecting a protected species.

5.3 MONITORING REPORT

A technical report will be prepared documenting the Project activities, observations of marine wildlife, and a summary of encounters with any marine mammals and/or turtles, and subsequent actions taken during the survey. The report will be submitted to Terrasond within two weeks of completion of field data collection. Terrasond will then submit the monitoring report to the appropriate agencies.

6.0 6.0 REFERENCES

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Bonnell, M.L., and Dailey, M.D.. 1993. Ecology of the Southern California Bight: A Synthesis and Interpretation. Berkeley, CA: University of California Press.

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National Marine Fisheries Service 2015b. Status of Marine Turtles Website: http://www.fisheries.noaa.gov/pr/species/turtles/ Updated March 30, 2015 accessed on April 15, 2016.

NOAA National Centers for Coastal Ocean Science (NCCOS). 2007. A Biogeographic Assessment off North/Central California: In Support of the National Marine Sanctuaries of Cordell Bank, Gulf of the Farallones and Monterey Bay. Phase II - Environmental Setting and Update to Marine Birds and Mammals. Prepared by NCCOS's Biogeography Branch, R.G. Ford Consulting Co. and Oikonos Ecosystem Knowledge, in cooperation with the National Marine Sanctuary Program. Silver Spring, MD. NOAA Technical Memorandum NOS NCCOS 40. 240 pp.

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APPENDIX A

MARINE WILDLIFE MONITOR RESUMES

Jennifer Klaib

Project Marine Biologist

EDUCATION:

B.S. Aquatic Biology (Marine Emphasis)
University of California – Santa Barbara, 2006.

QUALIFICATIONS:

- Biological Surveying and Monitoring
- Biological Resource Surveys/Reports
- Contingency Plans
- Restoration and Mitigation Plans
- Permit Compliance Monitoring
- Permit Applications
- Agency Communications
- Off-Shore Marine Mammal Monitoring
- Wildlife Rescue and Relocation

Ms. Klaib joined Padre Associates, Inc. in 2006. As a marine biologist with Padre she has experience in environmental assessments of coastal and offshore development projects, monitoring of construction impacts on biological resources, and in the permitting of coastal projects. Ms. Klaib is responsible for biological surveys, permit compliance monitoring, contingency plans, permit applications, environmental sensitivity trainings, sensitive species surveys, water quality sampling, and wildlife rescue and relocation.

Ms. Klaib has also worked for the Marine Science Institute at the University of California – Santa Barbara where she participated in subtidal and rocky intertidal field research associated with long-term monitoring of biological resources on the Channel Islands and in San Diego County. She also has 6 years of supervisonal experience in marine mammal rescue and rehabilitation with the Santa Barbara Marine Mammal Center.

MARINE PROJECT EXPERIENCE SUMMARY:

Ms. Klaib has over 2,000 hours of offshore monitoring experience and is a National Oceanic and Atmospheric Administration (NOAA) Fisheries-qualified marine mammal monitor. Ms. Klaib was responsible for monitoring the effects of construction on marine mammals and turtles during geophysical surveys throughout the California coast, for the PG&E deep seismic surveys offshore Point Buchon, during the installation of pile-supported piers at South Bay Boat Yard in San Diego Bay, and during the replacement of a power cable offshore of Carpinteria.

Ms. Klaib has worked with agencies to design and implement Aerial Monitoring Plans, to monitor the distribution of cetaceans, pinnipeds, and turtles offshore of central California. Ms. Klaib has participated in aerial surveys where she observed and recorded species, location, and abundance of cetaceans, pinnipeds, and turtles offshore of California.

Ms. Klaib has participated in construction monitoring activities for the Calleguas Municipal Water District Hueneme Outfall Replacement Project, AT&T AAG Fiber

Optic Cable Project, the US Coast Guard Floating Dock Repair Project (San Diego Sector), Fifth Avenue Landing/Water Transportation Center Marina Enhancement Project and during the installation of pile-supported piers at South Bay Boat Yard in San Diego Bay. She was responsible for monitoring the effects of construction on marine mammals, turtles and marine avifauna. Ms. Klaib also participated in turbidity monitoring activities for the later projects and for the PG&E pipeline remediation project in the Sacramento and San Joaquin rivers (delta region), ensuring permit compliance. She has also participated in post-construction monitoring of the recovery of surf grass (*Phyllospadix spp*) at the decommissioned Cojo Marine Terminal near Point Conception.

Prior to joining Padre Associates, Ms. Klaib participated in field studies that included monitoring of the effects of demolition of offshore oil and gas facilities in Santa Barbara Channel on fish, marine mammals and birds. The involvement included the collection and identification of fish species as well as recording aerial and shipboard observations of marine mammals.

ENVIRONMENTAL DOCUMENTATION:

Ms. Klaib's NEPA experience includes preparation of technical sections for environmental assessment documents for a proposed liquefied natural gas facility off the coast of California; for a proposed marina expansion; and for a proposed hydrogen gas pipeline between the cities of Martinez and Benicia in the Carquinez Straits area of San Francisco Bay. She has also participated in the preparation of permit applications and application support packages for shipyard and marina expansion projects in San Diego Bay.

Ms. Klaib's experience in CEQA projects includes preparation of environmental documents consisting of mitigated negative declarations (MND), initial studies, environmental assessments, monitoring reports, technical reports and environmental impact reports (EIR).

Ms. Klaib has experience in the development of monitoring plans, including the observation and reporting protocols that focus on the documentation of marine operations, oil spill prevention, and marine mammal and bird mitigation compliance.

BIOLOGICAL OPINIONS / PERMITS:

CDFG Scientific Collecting Permit (No. SC-12730) authorizing *sacrifice* of marine aquatic plants, and marine/tidal invertabrates.

CERTIFICATIONS:

Certified SCUBA Diver (SSI, 2002)
Certified AAUS Research Diver (2003)
Certified *Caulerpa* Survey Specialist (2008)
40-Hr. Hazardous Waste Certification (HAZWOPER)
1st Aid, CPR, and Oxygen Administration Certified (Bi-annual Refresher)
Offshore Survival/Helicopter Underwater Egress *Training (*H.U.E.T) (2008)
NOAA Basic Aviation and Aviation Health Safety Course (2012)
Confined Space Attendant and Entrant
Passive Acoustic Technician (2014)

Resume

Michaela Hoffman

Project Marine Biologist

EDUCATION: B.S. Biology with a Concentration in Marine Science and Fisheries, California Polytechnic State University, San Luis Obispo, 2009

EXPERIENCE: Ms. Hoffman joined Padre in 2011 and has five years of experience as a field biologist. Ms. Hoffman's focus has been primarily in aquatic and marine biology. During her time at Padre, Ms. Hoffman has acquired enough sea-time as a marine wildlife monitor to be an approved Protected Species Observer by the National Oceanic and Atmospheric Administration (NOAA). Ms. Hoffman is responsible for mitigation monitoring of protected terrestrial and marine species, preparing support documents for environmental permit applications, preparing wildlife contingency plans, conducting biological resource surveys and habitat assessments, conducting protocol-level surveys for protected species, and implementing restoration plans. Ms. Hoffman's field experience extends to both onshore and offshore construction projects, as well as numerous remediation and restoration sites.

Representative projects Ms. Hoffman has participated in include:

San Luis Obispo Tank Farm Remediation, Restoration, and Development Project, San Luis Obispo County, California. In support of the Biological Assessment for the project, Ms. Hoffman participated in several protocol-level surveys for both state and federally protected species including, California Red-legged frog (*Rana draytonii*), burrowing owl (*Athene cunicularia hypugaea*), and large vernal pool branchiopods (*Branchinecta* sp., *Streptocephalus* woottoni, *Lepidurus packardi*). In addition, Ms. Hoffman managed the Surface Hydrocarbon Inspection and Monitoring Program for two years which consisting of weekly surveys for oiled wildlife, and if found, the rescue and recovery of oiled wildlife under the guidance of the California Department of Fish and Wildlife (CDFW). In support of operational maintenance on the project site, Ms. Hoffman conducts on-going, seasonal nesting bird surveys and biological clearances for sensitive and protected species.

Point Buchon Ocean Bottom Seismometer Project, Offshore San Luis Obispo County, California State Waters. Ms. Hoffman was responsible for monitoring marine wildlife during the seismic geophysical surveys and ocean bottom seismometer deployments offshore San Luis Obispo County in 2011 through 2015. In support of the project, Ms. Hoffman prepared a Marine Wildlife Contingency Plan and submitted survey completion reports to National Marine Fisheries Service (NMFS) and California State Lands Commission (CSLC).

Cayucos Pier Restoration Project, San Luis Obispo County, California. Ms. Hoffman was responsible for marine wildlife and ocean water quality monitoring during the demolition and reconstruction of the Cayucos Pier. Ms. Hoffman conducted marine wildlife monitoring during pile driving operations to mitigate for potential noise impacts to marine mammals and sea turtles. In addition, Ms. Hoffman prepared final project completion reports for the County of San Luis

Obispo.

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Offshore Power System Reliability Project B, Santa Barbara Channel, California State and U.S. Federal Waters. Ms. Hoffman participated in environmental compliance monitoring during the recovery and deployment of replacement power cable along the ocean floor within the Santa Ynez offshore field unit. In support of the project, Ms. Hoffman prepared a Marine Wildlife Monitoring and Contingency Plan, including protections for marine mammals, reptiles and pelagic birds.

CERTIFICATIONS, PERMITS AND TRAINING:

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National Association of Underwater Instructors (NAUI) Master SCUBA Diver. September 2015.

Divers Alert Network (DAN) CPR/AED and First Aid and Emergency Oxygen Administration for Diving Accidents Certified, September 2015.

Standards of Training Certifications and Watchkeeping (STCW) Certified Personal Survival Techniques, Cal Maritime Academy, September 2011

Certified SCUBA Diver, PADI December 2008

Guadalupe Dunes Restoration Project Biological Opinion. Ms. Hoffman is authorized to independently monitor, survey, handle and relocate California Red-Legged frogs (CRLF) within the Guadalupe Oil Field Remediation and Restoration Project.

USFWS Endangered Species Act 10(a)(1)(A) Recovery Permit authorizing the take federally protected vernal pool branchiopods in conjunction with surveys for the purpose of enhancing their survival.

California Red-Legged Frog Workshop, presented by Trish Tartarian, May 2014.

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Taxonomy and Ecology of Branchiopods of California and Oregon, presented by Christopher Rogers, December 2012.

PROFESSIONAL AFFILIATIONS:

California Central Coast Chapter of the Wildlife Society, member.

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Jennifer Klaib

Project Marine Biologist

EDUCATION:

B.S. Aquatic Biology (Marine Emphasis)
University of California – Santa Barbara, 2006.

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Passive Acoustic Technician (2014)

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Michaela Hoffman

Project Marine Biologist

EDUCATION: B.S. Biology with a Concentration in Marine Science and Fisheries, California Polytechnic State University, San Luis Obispo, 2009

EXPERIENCE: Ms. Hoffman joined Padre in 2011 and has five years of experience as a field biologist. Ms. Hoffman's focus has been primarily in aquatic and marine biology. During her time at Padre, Ms. Hoffman has acquired enough sea-time as a marine wildlife monitor to be an approved Protected Species Observer by the National Oceanic and Atmospheric Administration (NOAA). Ms. Hoffman is responsible for mitigation monitoring of protected terrestrial and marine species, preparing support documents for environmental permit applications, preparing wildlife contingency plans, conducting biological resource surveys and habitat assessments, conducting protocol-level surveys for protected species, and implementing restoration plans. Ms. Hoffman's field experience extends to both onshore and offshore construction projects, as well as numerous remediation and restoration sites.

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Certified SCUBA Diver, PADI December 2008

Guadalupe Dunes Restoration Project Biological Opinion. Ms. Hoffman is authorized to independently monitor, survey, handle and relocate California Red-Legged frogs (CRLF) within the Guadalupe Oil Field Remediation and Restoration Project.

USFWS Endangered Species Act 10(a)(1)(A) Recovery Permit authorizing the take federally protected vernal pool branchiopods in conjunction with surveys for the purpose of enhancing their survival.

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Western Burrowing Owl Workshop, presented by Dr. Lynn Trulio, July 2014.

Fairy Shrimp of California Identification Course, presented by Mary S. Belk March 2013.

Taxonomy and Ecology of Branchiopods of California and Oregon, presented by Christopher Rogers, December 2012.

PROFESSIONAL AFFILIATIONS:

California Central Coast Chapter of the Wildlife Society, member.

TERRASOND LTD.
OIL SPILL PREVENTION AND RESPONSE PLAN
CALIFORNIA STATE LANDS COMMISSION OFFSHORE GEOPHYSICAL SURVEY PERMIT APPLICATION

1.0 INTRODUCTION

TerraSond Ltd. (TerraSond) is applying for a California State Lands Commission (CSLC)-issued non-exclusion geophysical survey permit for data collection within the marine waters shoreward of the State 3-Mile Limit. This Oil Spill Prevention and Response Plan (OSPRP) has been prepared at the request of the CSLC and in support of TerraSond's application.

TerraSond's surveys will be conducted from petroleum-fueled vessels ranging from 14 to 45 ft. Onboard petroleum products will include fuel (diesel or gasoline) and lubricants with a maximum expected volume of 500 gallons. Survey equipment will electric-powered and will utilize onboard or portable generator power. Fuel for the electrical generators is included in the 500 gallon maximum volume of onboard petroleum products.

2.0 POTENTIAL SPILL SOURCES

Potential spill sources of hydrocarbons and other materials are expected to be limited to leakage or spillage of fuel or lubricants from the survey vessel or from portable generator, if needed.

2.1 SPILL DEFINITION - MINOR VS. MAJOR

For purposes of this OSPRP, a minor spill is defined as 5 barrels (210 gallons) or less and a major spill is defined as more than 5 barrels. The largest single source of petroleum would be the fuel tank for the survey vessel which would be expected to be less than 12 barrels (500 gallons). Due to the short-term nature of work activities and limited equipment that will be necessary to accomplish a survey, a major oil spill is not expected to occur.

2.2 VESSEL EQUIPMENT LEAKAGE

TerraSond will be chartering the S/V *Jab* a 43 ft aluminum survey vessel that has engine oil for each of the two main engines and a diesel fuel tank. Other survey vessels that could be used by TerraSond would be 40 ft or less in length and would have up to 500 gallons of petroleum products onboard.

3.0 SPILL PREVENTION MEASURES

To prevent equipment leakage during survey operations, TerraSond and/or the vessel operator will require that the following best management practices be implemented:

1. Employees and subcontractors will be educated on the potential dangers to humans and the environment from spills and leaks, and in spill prevention and cleanup.

2. Any oil or hazardous materials and wastes stored onboard will be in contained and appropriately labeled/identified (secondary containment will be used if appropriate).

3. Implement prevention measures so that spills would not enter drains (e.g., placement of absorbent material around drain).

4. Place drip pans at all potential drip and spill locations.

5. Reuse, recycle or properly dispose of any collected liquids or soiled absorbent material.

6. Conduct routine cleaning, inspection, and maintenance of the work area and equipment.

7. All onboard equipment will be in good working condition and be inspected daily for leaks.

8. Any equipment observed to be leaking will immediately repaired or drained.

9. All vessel fueling will occur at the King Harbor docking facility (no cross fueling will be allowed).

Specific vessel containment measures will be based on the amount and type of petroleum onboard and could include double-walled fuel tanks, containment pans under onboard generators and petroleum-fueled survey equipment and hydraulic fluid containers.

In the event of a spill, the vessel and survey crew will take the appropriate actions to contain and clean up the spill, as described further below.

4.0 OIL SPILL RESPONSE

4.1 OIL SPILL RESPONSE TEAM

The S/V Jab operator is HAZWOPER certified and renews yearly. The S/V Jab is certified for standby with Clean Ocean. The vessel operator has conducted multiple Oil spill response drills and will conduct one with the TerraSond's survey crew before survey operations ensue. The onsite response team is responsible for reporting, containing, and cleaning any petroleum spill up using onsite equipment and procedures.

4.2 ONSITE RESPONSE EQUIPMENT

The onsite spill response team will have access to an appropriate quantity of sorbent pads, boom and other spill containment and recovery equipment, which will be maintained onsite during survey activities. The equipment is stored readily available in the bow of the S/V *Jab.* In the event of a spill, the onsite Project Supervisor will immediately cease exercise operations, as necessary, in order to initiate spill containment and cleanup. The type and amount of onsite equipment will be based on the vessel's fuel and lubricant supply and other onboard petroleum-powered equipment.

4.3 NOTIFICATION

An important step in the response procedure is notification of an incident. Notification is essential to alert company management, obtain assistance and cooperation of agencies, mobilize resources, and comply with local, state, and federal regulations. The order of notification is based on the premise that those parties who can render assistance in controlling or minimizing the impacts of an incident be notified before those that are remote from the incident (see Table 1).

Table 1. Emergency Agency Notification Matrix

Type of Emergency	Agencies to be Notified	Telephone	Notification Criteria	Information to Report
Oil Spill to Marine Waters	California Office of Emergency Services	(800) 852-7550	All spills to water	*1. Your name and phone number* *2. Location of release or threatened release, facility name* *3. Date and time of release or threatened release* *4. Location of threatened waterway* *5. Substance and quantity involved and any inhalation hazards or explosive vapor hazards, if known* *6. Description of what happened/ cause (don't speculate)* 7. Prevailing sea conditions: • Wave height • Size and appearance of slick • Direction of slick movement • Speed of movement, if known 8. Prevailing weather conditions: • Wind speed • Wind direction • Air temperature 9. Measures taken or planned by personnel on scene • For containment • For cleanup 10. Current condition of the facility 11. Any casualties?
	National Response Center	(800) 424-8802		
	USCG-Los Angeles/Long Beach Response	(310) 521-3782		
	State Lands Commission	(562) 499-6312		
	California Department of Fish and Game/ OSPR	(800) 645-7911		
	California Coastal Commission	(415) 904-5200		
	Oiled Wildlife Care Network (If wildlife is impacted)	(530) 752-4167 or (877) 823-6926		
Medical Emergencies	Fire Department/ Ambulance	**911**	Medical assistance and/or transport required	1. Type of injury 2. Location 3. Condition 4. Action taken 5. No. of victims
	California Occupational Safety and Health Administration CalOSHA	(415)737-2931		

The notification process encompasses the following categories:

- Emergency Agency notification
- Company notification/onsite spill response team activation
- Cleanup contractors (if required)
- Notification of other interested parties
- Periodic progress updates and reports (if necessary)

4.3.1. Emergency Agency Notification

4.3.1.1 All Spills

Notification of all spills must be provided first to the **local emergency response agency/fire department (911)** and then the **Governor's Office of Emergency Services**, California State Warning Center (phone listed in Table 1), in the event of a significant spill or threatened release of oil or hazardous materials. Such conditions include, but are not limited to, the following scenarios as defined by the California Office of Emergency Services Hazardous Materials Unit:

- Discharges or threatened discharges of oil in marine waters (including harbors).

- Any spill or other release of one barrel of more of petroleum products to an onshore area.
- Discharges of oil, petroleum products, any hazardous substance, or sewage into or on any waters of the State.
- Discharges that may threaten or impact water quality.

The information to be provided in the notifications is as described in Table 1 above, (items 1 through 5 [in *italics*] for all spills).

4.3.1.2 Marine Spills

The Lempert-Keene Seastrand Oil Spill Prevention and Response Act (SB 2040) and the State of California Oil Spill Contingency Plan requires notification of the California Office of Emergency Services when oil spills occur or threaten to occur from facilities, vessels, or pipelines into California marine waters. The California Code of Regulations implementing SB 2040 requires that the specific information shown in Table 3 be given to the agencies when making notifications.

All actions, including agency notification, should be recorded on the Event Log. A regulatory agency address directory is provided in Table 2. Essential agency notifications are further assured by the California Office of Emergency Services and the National Response Center, since they will notify related state and federal agencies. If a spill impacts navigable waters, notification of the National Response Center is mandatory and normally results in simultaneous notification of the U.S. Coast Guard. However, it is recommended that a call be made to the local U.S. Coast Guard Marine Safety Office as identified in Table 1.

Table 2. Addresses of Regulatory Agencies

NATIONAL RESPONSE CENTER c/o U.S. Coast Guard (G-OPF) Rm 2611 2100 Second Street SW Washington, D.C. 20593 **MINERALS MANAGEMENT SERVICE** Pacific OCS Regional Office & Camarillo District Office 770 Paseo Camarillo Camarillo, CA 93010 **U.S. COAST GUARD MSO, San Francisco** **NATIONAL MARINE FISHERIES SERVICE** 650 Capital Mall Sacramento, CA 95814	**CALIFORNIA DEPARTMENT OF FISH AND GAME** **Office of Spill Prevention and Response (OSPR)** 1700 K Street Sacramento, CA 95814 **CALIFORNIA OFFICE OF EMERGENCY SERVICES** 3650 Schriever Avenue Mather, CA 95655 **CALIFORNIA DIVISION OF SAFETY AND HEALTH** 1655 Mesa Verde Avenue, Room 150 Ventura, CA 93003 **CALIFORNIA STATE LANDS COMMISSION** 200 Oceangate, Suite 900 Long Beach, CA 90802 **CALIFORNIA COASTAL COMMISSION** 45 Fremont, Suite 2000 San Francisco, CA 94105-2219

4.3.2 Company Notification

TerraSond requires that all emergencies be brought to the attention of management. The Onsite Project Supervisor will notify by radio or telephone appropriate TerraSond management with an initial assessment of the extent and nature of the spill, and will activate additional company resources, if necessary. All oil spill emergency reporting will follow the TerraSond HSE Incident Reporting procedures, attached to this report.

4.4 MARINE SPILL SCENARIOS AND RESPONSE PROCEDURES

4.4.1 Minor and Major Spills

This scenario consists of minor and major spillage of fuel or lubricants (less than 5 barrels and 5 barrels or more, respectively) from the survey vessel or associated support equipment. In this case, response will consist of deployment of sorbent boom and/or sorbent pads that are part of the onsite inventory. An appropriate amount of containment and recovery equipment (sorbent boom and pads) will be stored on the survey vessel. Table 3 lists the response procedures for a minor marine spill.

4.4.2 Major Spills

For purposes of this OSPRP, a major spill is defined as any spill greater than 5 barrels. Exercise activities do not have the potential to generate a major oil spill, however for planning purposes a major spill could occur with the rupture of the main fuel tank of the survey vessel. In the event of a major spill and after the procedures for a minor spill have been completed, the Onsite Project Supervisor will request assistance if needed.

Table 3. Marine Oil Spill Response Procedures

Responsible Person	Action
Vessel Operator	• Assess the spill size and type of material spilled. • Take action to contain the spill and prevent further spillage. • Inform the CMWD Project Manager as soon as possible as to the source of the spill, type of material spilled and status of control operations. • Maintain surveillance of source and oil slick. • Assist the onsite response team in implementing clean up procedures including deployment of the sorbent pads and/or boom and proper storage and disposal of oily debris.
TerraSond Onsite Project Supervisor	• Account for all personnel and ensure their safety. • Determine if there is a threat of fire or explosion. • If a threat of fire or explosion exists, suspend all control and/or response operations until the threat is eliminated. • Assess the spill situation to determine the status of response operations, estimate spill volume, estimate speed, and direction of oil slick movement and determine resource needs. • Mobilize the onsite oil spill response team. • Notify appropriate agencies as identified above. • Supervise response and clean up operations. • File written reports to appropriate agencies.

4.4.3 Sensitive Resources and Habitats

The appropriate Area Contingency Plan (ACP) will be used to identify and locate the sensitive resources. Resources as listed by priority in the ACP and locations with a First Priority Sensitivity Ranking will be the focus of initial protection. A spill from the vessel would be responded by onboard resources utilizing available onboard equipment to initiate oil recovery the discharged petroleum.

Verification of California Air Resources Board's Tier 2-Certified Engine Requirement

S/V Vessel JAB

The Survey Vessel *JAB with Theory Marine* will be utilized as the primary data collection platform for this project. The JAB is a 43' jet powered survey catamaran. This vessel is currently available for the proposed survey schedule in late April through mid-May.

Figure 1 - S/V JAB

VESSEL SPECIFICATIONS:
OVERALL LENGTH: 44 FEET
BEAM: 15.5 FEET
DRAFT: 3 FEET
MAIN PROPULSION: (2) CUMMINS QSC 8.3 LITER 500 HP COMMERCIAL DIESEL ENGINES
DRIVES: HAMILTON 322 JET DRIVES
FUEL CAPACITY: 600 GALLONS DIESEL
TOP SPEED: 34 KNOTS
CRUISE SPEED: 27 KNOTS
ELECTRICAL GENERATION: (1) 8KW WESTERBEKE MARINE GENERATOR, (1) NORTHERN LIGHTS 25 KW THREE PHASE GENERATOR
CRANE: HYDRAULIC ACTUATED 1000LB SWL RATED STERN MOUNTED A FRAME WITH PULLMASTER PL2 HYDRAULIC WINCH
WINCHES: VARIETY OF HYDROGRAPHIC AND MECHANICAL WINCHES AVAILABLE
BRIDGE EQUIPMENT: FURUNO RADAR, CHARTPLOTTER, ECHOSOUNDER, DGPS, VHF,AIS, SATELLITE WEATHER, AUTOPILOT
SAFETY EQUIPMENT: ALL USCG REQUIRED EQUIPMENT, EPIRB
SANITATION: FULLY ENCLOSED ELECTRIC HEAD WITH HOLDING TANK
GALLEY: MICROWAVE, REFRIGERATOR, SINK WITH PRESSURE WATER

Figure 2 - Main Engine 1

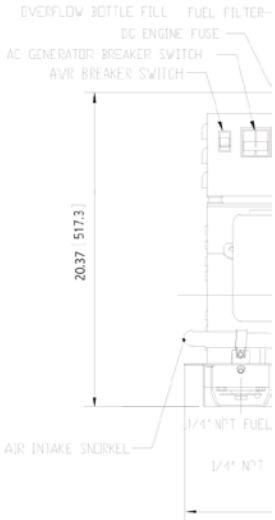
Figure 3 - Main Engine 2

NORTHERN LIGHTS

M673L3 - 6 kW/5 kW

AC Output[1]	
6 kW	60 Hz, 1800 RPM, 1 Ph, 1.0 PF, 120-240 V/25 A, 120 V/50A
5 kW	50 Hz, 1500 RPM, 1 Ph, 1.0 PF, 220 V/22.7 A
Voltage regulation	±5%
Lugger L673L Engine	
Type	Vertical inline 3 cylinder diesel
Displacement	46.4 in^3 (0.761 ltr)
Bore/Stroke	2.64/2.83 in (67/72 mm)
HP @ RPM	10.1/1800 8.4/1500
Approx. fuel use	
1800 RPM @ full load[2]	0.59 gph (2.2 lph)
1800 RPM @ half load[2]	0.32 gph (1.2 lph)
1500 RPM @ full load[2]	0.50 gph (1.9 lph)
1500 RPM @ half load[2]	0.28 gph (1.1 lph)
Installation Data & Weight	
Wet exhaust elbow	1.5 inch (38 mm) OD
Raw water inlet	3/4 inch (19 mm) OD
Fuel inlet and return	1/4 inch NPT
Approximate dry weight	377 lbs (171 kg)

1. Based on SAE J1995 and ISO 3046. 2. Actual fuel consumption will vary depending on operating conditions.



M673L3 Overall
Sound Enclosur

Dimensi
Contact de

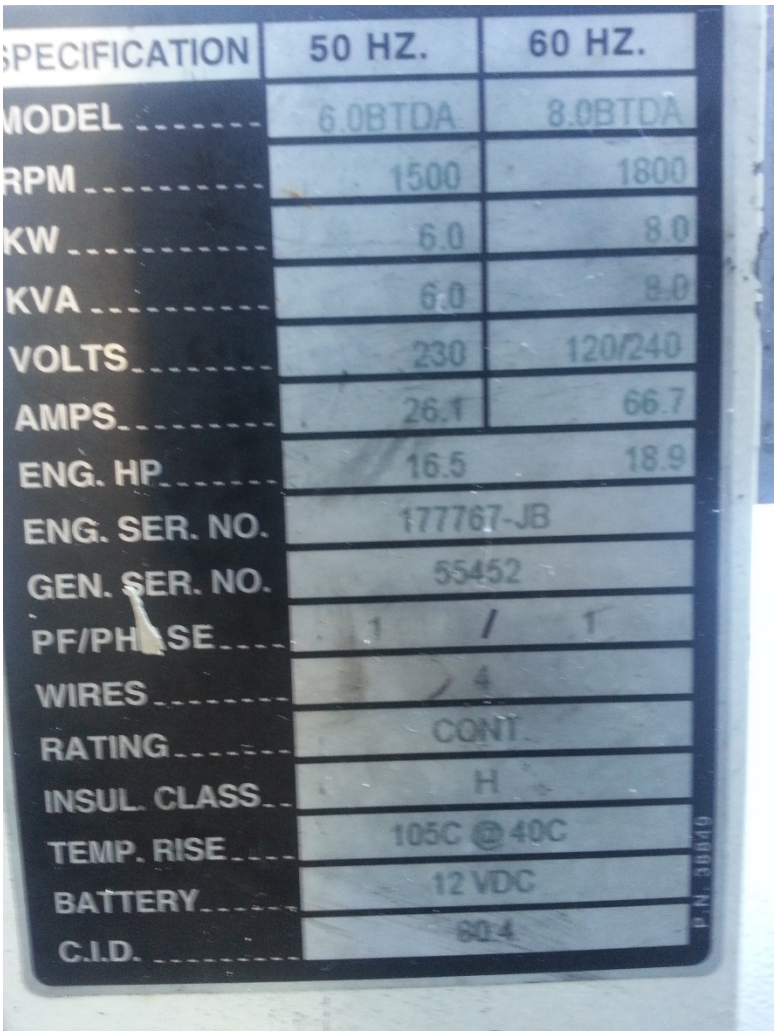
Engine Block

- Four cycle, 3 cylinder, liquid cooled, naturally aspirated, overhead valve diesel.
- Swirl combustion chambers improve fuel efficiency and reduce smoke.
- Glow plugs for quick cold starting.

Cooling System

- Freshwater cooling.
- Heat exchanger or keel cooled.
- One-piece heat exchanger, expansion tank and liquid cooled exhaust manifold. Fewer troublesome hoses and gaskets. Cast iron to resist corrosion and electrolysis.

Figure 4 – Generator



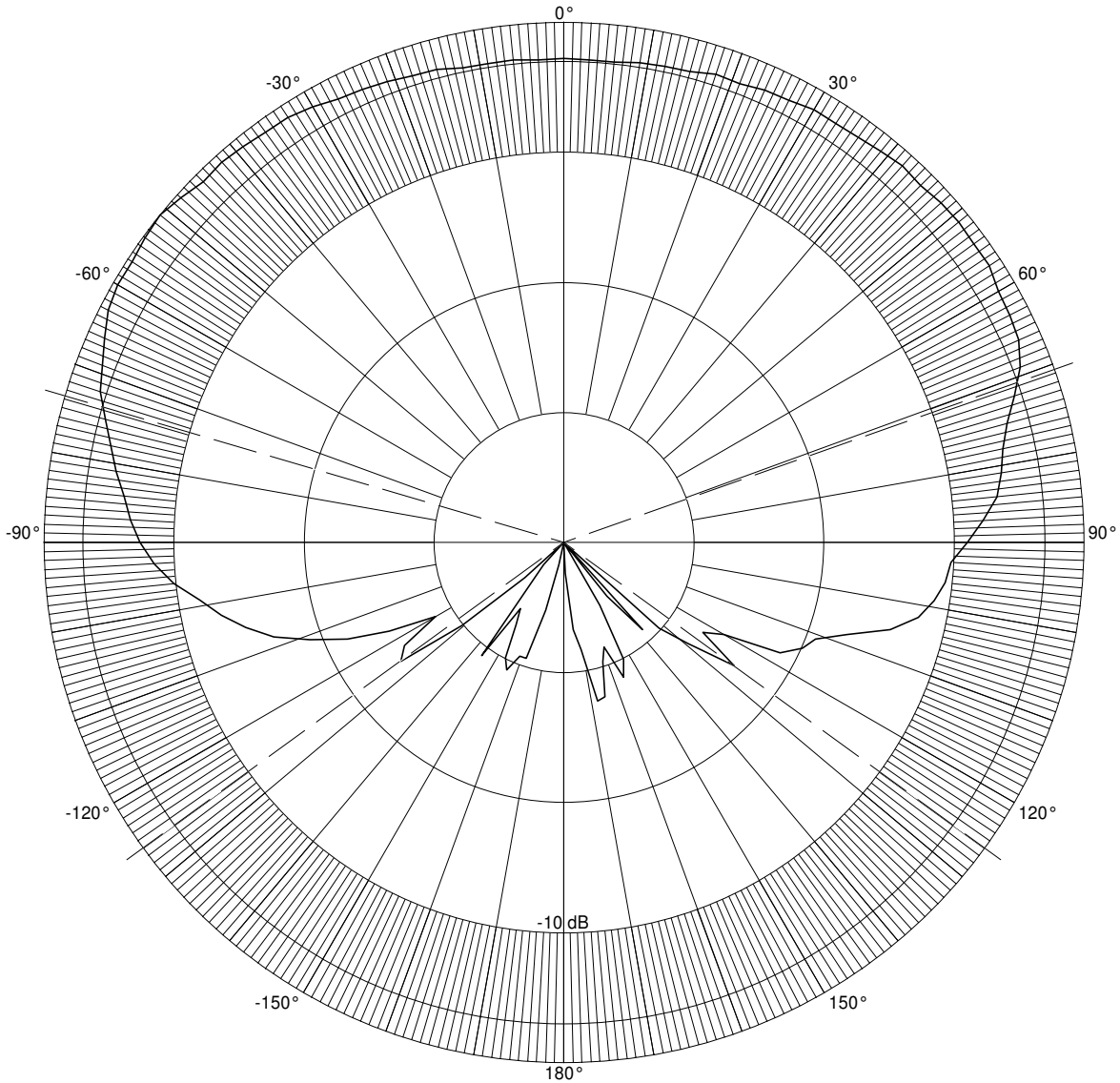
SPECIFICATION	50 HZ.	60 HZ.
MODEL	6.0BTDA	8.0BTDA
RPM	1500	1800
KW	6.0	8.0
KVA	6.0	8.0
VOLTS	230	120/240
AMPS	26.1	66.7
ENG. HP	16.5	18.9
ENG. SER. NO.	177767-JB	
GEN. SER. NO.	55452	
PF/PHASE	1 / 1	
WIRES	4	
RATING	CONT	
INSUL. CLASS	H	
TEMP. RISE	105C @ 40C	
BATTERY	12 VDC	
C.I.D.	80.4	

P.N. 38949

Figure 5 - Hydraulic Motor

PROJECTOR DIRECTIVITY

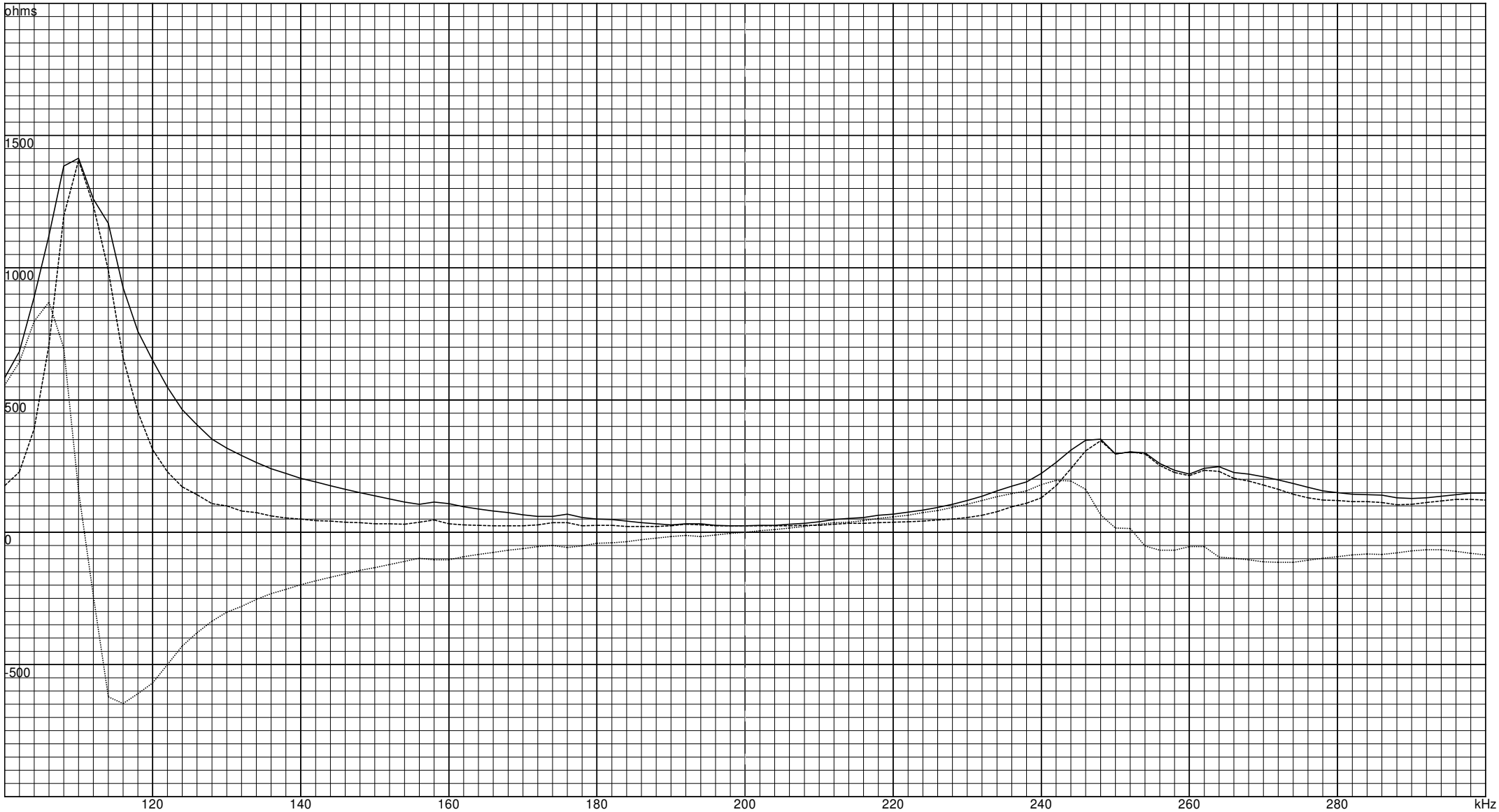
Under Test:	85000327	Amplitude:	5.0 Vrms	Temperature:	22.12°C
S/N:	4605043	Pulse Width:	400.0 µs	Depth:	1.2 m
Reference:	TC4034	Angle:	-180.0° to 180.0°	Distance:	3.00 m
Date:	2006-10-02	Frequency:	230.00 kHz	Tested by:	HHP
Session, Run:	4327, 3				
Max TR:	164.0 dB re 1µPa/V at 1m				
W:	144.2°				
SL Left:	-126.0°, -24.5dB dB re 1µPa/V at 1m				
SL Right:	126.0°, -23.8dB dB re 1µPa/V at 1m				
Comment:	Horizontal. Measured in nearfield.				



IMPEDANCE SUMARY

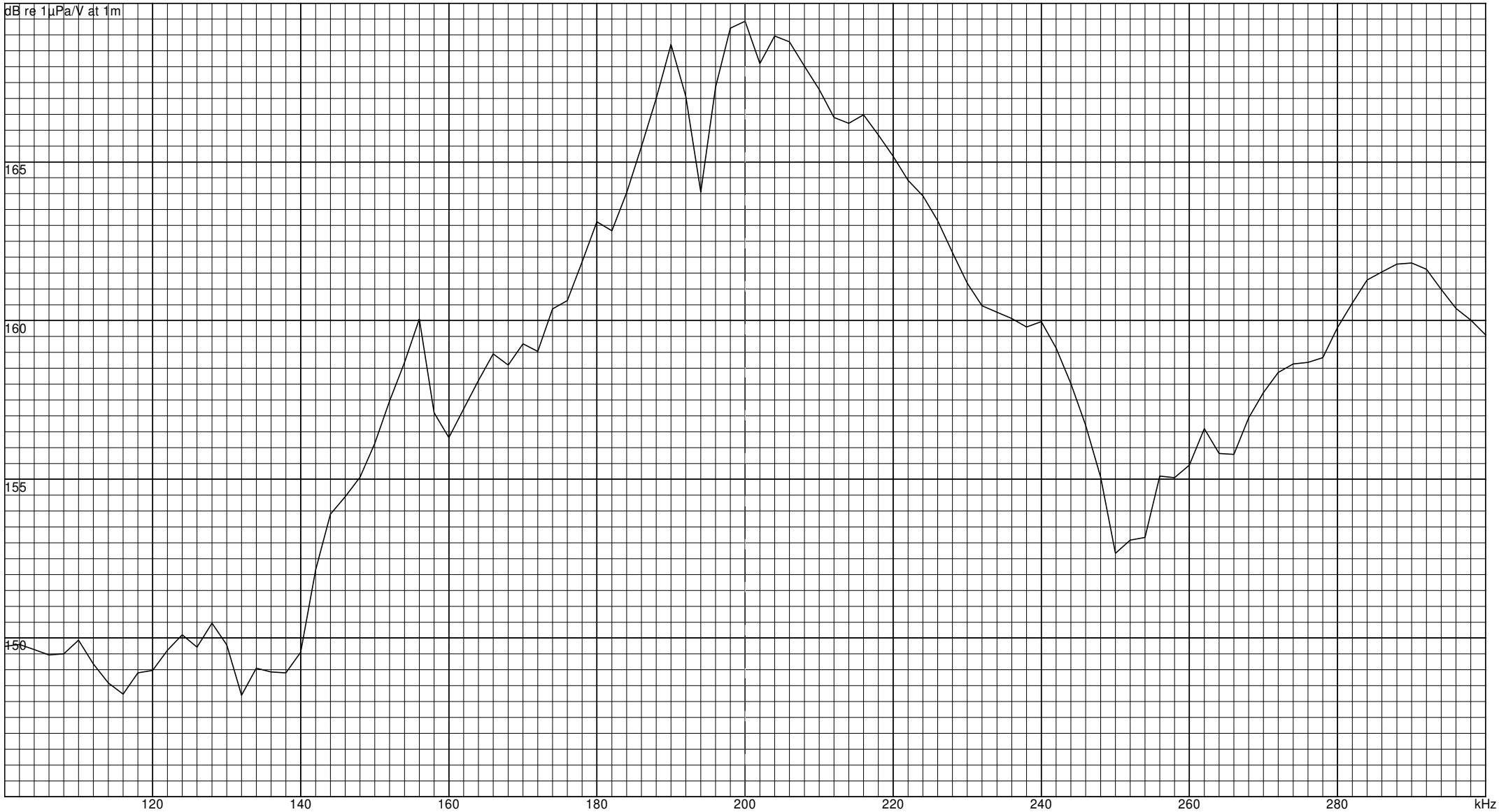
Under Test:	85000327	Amplitude:	5.0 Vrms	Temperature:	22.12°C
S/N:	4605043	Pulse Width:	400.0 µs	Depth:	1.2 m
		Rep Rate:	50.0 ms	Cal Resistor:	27.0 ohms
Date:	2006-10-02	Averages:	4	Tested by:	HHP
Session, Run:	4327, 5				
200.00 kHz:	Z:24.4 Ohm, Ph:1.2 deg, R:24.4 Ohm, X:0.5 Ohm				
Comment:					

——— 4605043\Impedance\1\Impedance\Try 1
--------- 4605043\Impedance\1\Resistance\Try 1
····· 4605043\Impedance\1\Reactance\Try 1



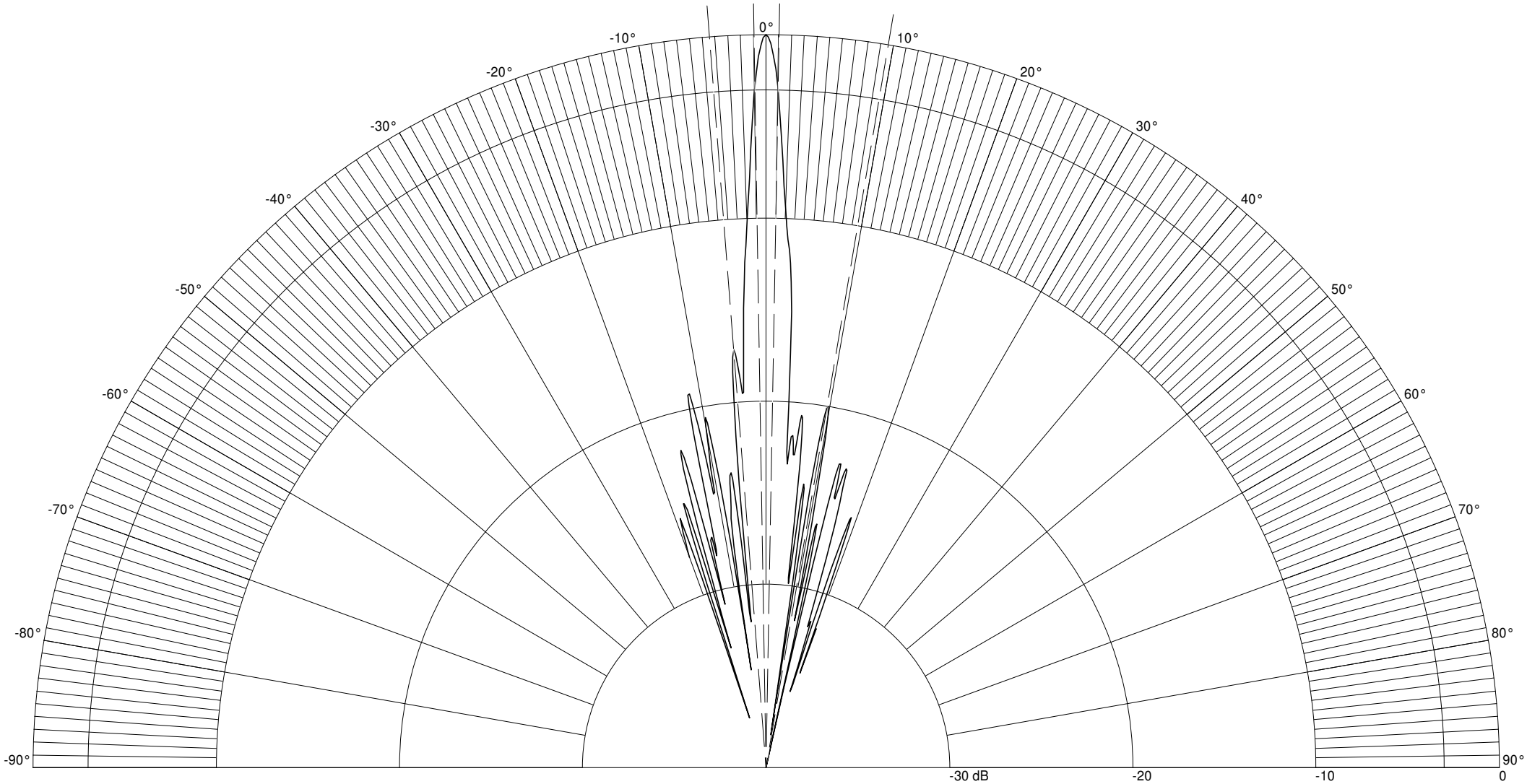
PROJECTOR SENSITIVITY

Under Test:	85000327	Amplitude:	5.0 Vrms	Temperature:	22.12°C
S/N:	4605043	Pulse Width:	400.0 µs	Depth:	1.2 m
Reference:	TC4034	Rep Rate:	50.0 ms	Distance:	3.00 m
Date:	2006-10-02	Averages:	8	Tested by:	HHP
Session, Run:	4327, 4				
200.00 kHz:	169.43 dB re 1µPa/V at 1m				
Comment:	Measured in nearfield.				



PROJECTOR DIRECTIVITY

Under Test:	85000327	Amplitude:	5.0 Vrms	Temperature:	22.12°C
S/N:	4605043	Pulse Width:	400.0 µs	Depth:	1.2 m
Reference:	TC4034	Angle:	-90.0° to 90.0°	Distance:	3.00 m
Date:	2006-10-02	Frequency:	230.00 kHz	Tested by:	HHP
Session, Run:	4327, 9				
Max TR:	161.1 dB re 1µPa/V at 1m				
W:	2.0°				
SL Left:	-4.4°, -17.1dB dB re 1µPa/V at 1m				
SL Right:	9.6°, -20.0dB dB re 1µPa/V at 1m				
Comment:	Vertical. Measured in nearfield.				

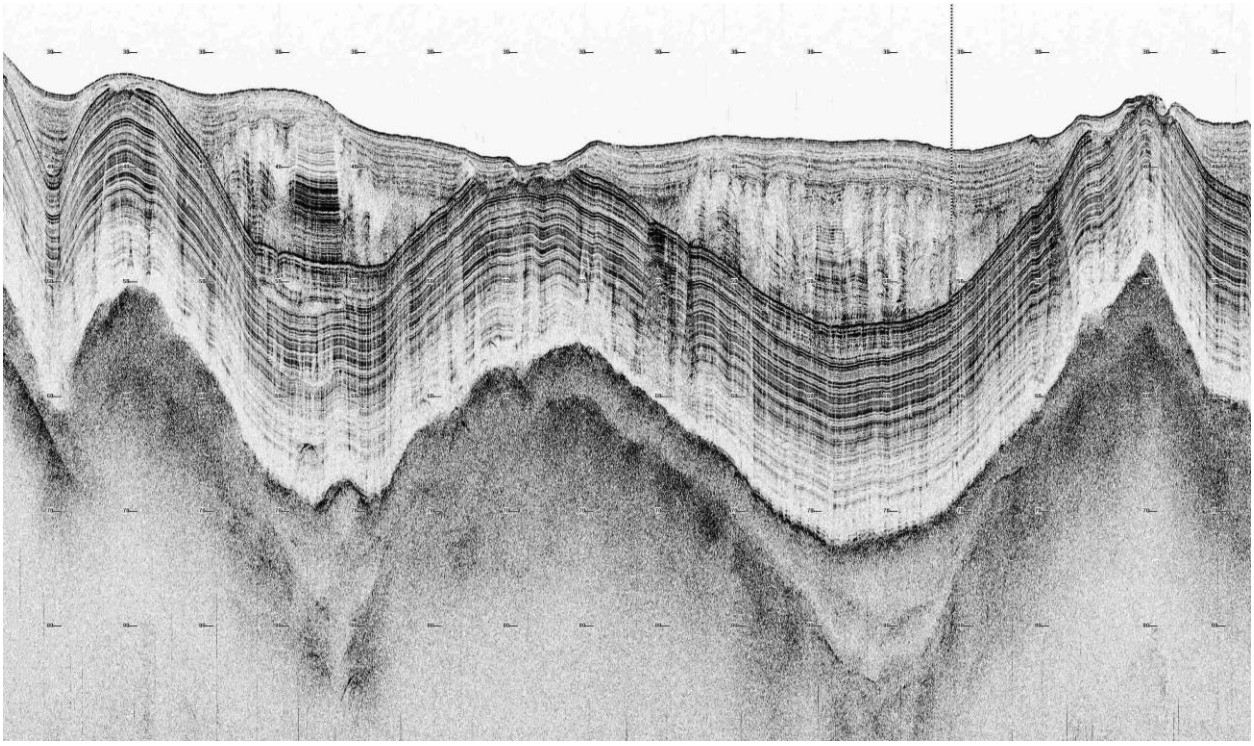


ACOUSTIC LEVELS OF EDGETECH SUB-BOTTOM SONAR SYSTEMS

APPLICATION NOTE

0016183_REV_A

January 2015



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SECTION 1: METHODOLOGY

The purpose of this document is to dispel confusion when discussing acoustic levels of underwater survey equipment, and to describe how EdgeTech calculates acoustic levels for its various sonar equipment. The first section of the document describes how the measurements are made. The second section of this document will provide a table with the acoustic levels of the various systems. Transducer and system specifications can be found in the appendix.

Sound is a pressure wave travelling through some medium, in this case water. There are two main types of sounds found in the ocean, impulsive and continuous. Impulsive sounds have a steep rise with a high peak at the beginning of the sound pulse followed by a rapid decay back to ambient pressure. Examples of impulsive sounds are air guns, pile driving, explosions, etc. On the other hand, continuous sounds have a transmission duration that is long relative to the harmonic period of the signal. Continuous does not necessarily denote a constant sound as it could also be a varying or even an intermittent sound (e.g., sonar ping).

Time series pressure graphs can have amplitudes measured in various ways. Typically they are peak (P_P), peak-to-peak (P_{PP}), and root-mean-squared (P_{rms}). These amplitude values can be applied to both impulsive and continuous signals.

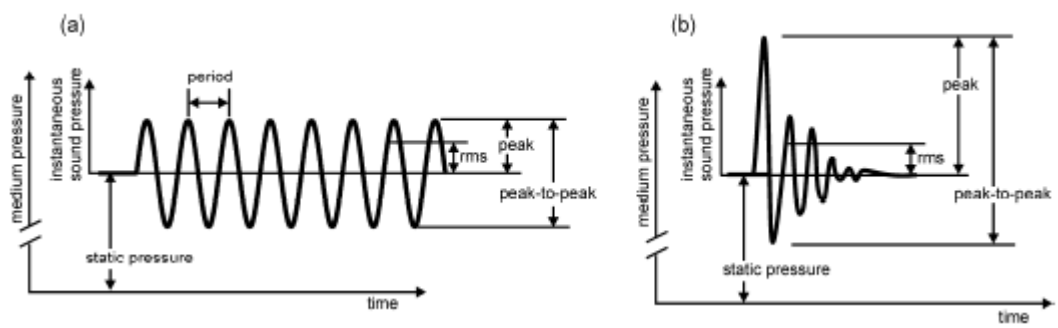

Figure 1-1: Comparison of Continuous vs. Impulsive Signals, shown in (a) and (b) respectively [2]

For all standard EdgeTech SB systems, the transmission pulse is a linear frequency modulated (LFM) sinusoidal pulse that is Gaussian or rectangular weighted. For these systems, the transmission duration is much longer than the period of the pulse, making them continuous sources. For example, a 216 SB pulse may be 20ms long, but the period at the beginning of the pulse (around 2 kHz at the start of the FM sweep) is 0.5ms and will get shorter as the pulse transmission progresses. Examples of both types of standard SB pulses are shown below.

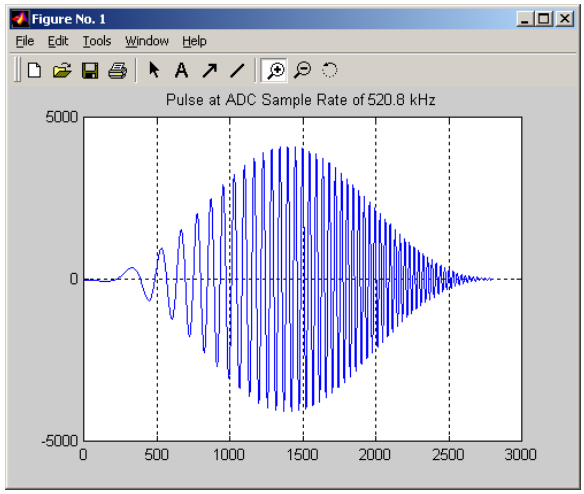

Figure 1-2: Gaussian Weighted SB Pulse

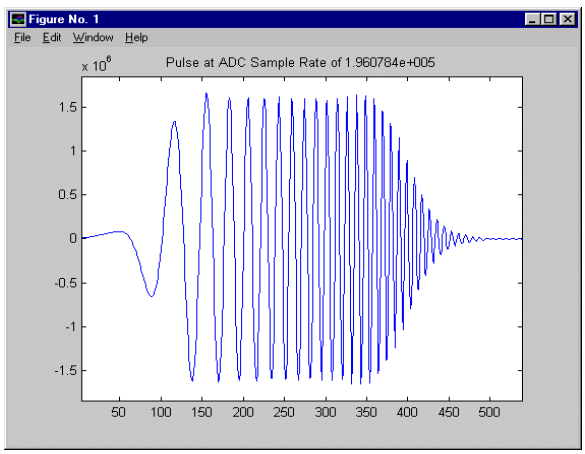

Figure 1-3: Rectangular Weighted SB Pulse

Considering EdgeTech SB transmission pulses to be continuous sources, there are a couple basic relationships between the three amplitude values:

$$P_{PP} = 2P_P = 2\sqrt{2} * P_{rms}$$

Equation 1-1

All references and calculations from this point on will be performed using the rms values, unless otherwise noted. It will also be assumed that calculations refer to the far-field region of the transducer

The output Sound Pressure Level, SPL, for any given transducer is a function of:

Transmit Voltage Response, TVR (dB re 1uPa/V @ 1m)

Frequency, f

Input Voltage, V

Where:

$$SPL_{rms} = TVR_f + 20\log(V_{rms}) = TVR_f + 20\log\left({V_{pp}}/{2\sqrt{2}}\right)\ dB\ re\ 1\mu Pa\ @\ 1m$$

Equation 1-2

V_{PP} is the peak-to-peak voltage measured at the input to the transducer in question. The chart in section II shows the voltages for different system configurations. TVR_f is the value of the voltage response at a given frequency. For the purposes of these calculations, TVR values will be taken at the frequency, f, where the magnitude of the TVR is at a maximum. An example TVR graph is shown below.

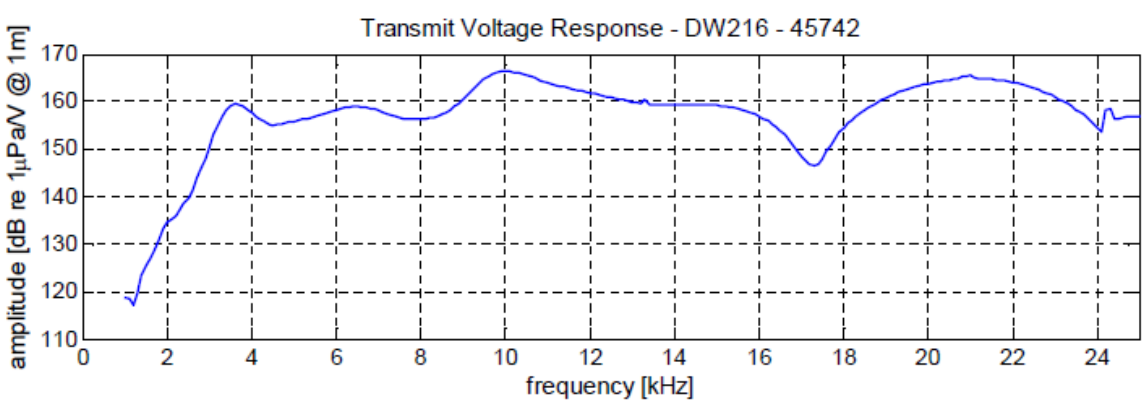

Figure 1-4: Example TVR plot. (The TVR value would be taken at f=10 kHz for this graph).

Exposure Level, EL, is the time average of mean squared sound pressure. In order to calculate EL, the transmit pulse length, T, must be known.

$$EL = 10log_{10}\left(\frac{P_{rms}^2 T}{P_{ref}^2 T_{ref}}\right) = SPL + 10log_{10}\left(\frac{T}{T_{ref}}\right)\ dB\ re\ 1\ \frac{\mu Pa}{\sqrt{Hz}}\ @\ 1m$$

Equation 1-3

Assuming T_{ref}= 1 second will allow the EL to be calculated in 1 Hz bands.

Example:

The following example will calculate the SPL_{rms} and EL for the 216 SB system on a 2000-DSS. This system uses the same DW216 transducer from figure 4. From the TVG plot and table in the appendix:

$$V_{PP} = 80V$$

$$TVR_{10kHz} = 166\ dB\ re\ 1\mu Pa\ @\ 1m$$

$$T = 0.020\ s$$

Therefore:

$$SPL_{rms} = 166 + 20\log\left({}^{80}/_{2\sqrt{2}}\right) = 166 + 29 = 195\ dB\ re\ 1\mu Pa\ @\ 1m$$

And

$$EL = SPL + 10log_{10}(0.020) = 195 - 17 = 178\ dB\ re\ 1\ \frac{\mu Pa}{\sqrt{Hz}}\ @\ 1m$$

SECTION 2: TABLE OF VALUES

The following table provides a succinct summary of values for various EdgeTech Sub-Bottom Sonar Systems:

ENERGY SOURCE	MODEL	VPP OUTPUT (V)	MAX FREQUENCY RANGE (KHZ)	LONGEST PULSE LENGTH (MS)	FREQUENCY SWEEP OF LONGEST PULSE (KHZ)	MAX PING RATE OF LONGEST PULSE (HZ)	SPL_RMS IN DB RE 1UPA @ 1M	EL_RMS IN DB RE 1UPA\(HZ)^0.5 @ 1M
SB – 3200 Rack Amp	424	180	4-24	10	4-24	10	204	184
SB – 3100 Portable Amp	424	80	4-24	10	4-24	6	197	177
SB – 3200 Rack Amp	216	180	2-15	20	2-15	10	200	183
SB – 3100 Portable Amp	216	80	2-15	20	2-15	6	193	176
SB – 3200 Rack Amp	512i	200	0.5-12	100	0.5-2.7	1.5	198	188
SB – Bottle Amp	2000 DSS	80	2-15	40	2-8	3.75	195	181
SB – Bottle Amp	2000 CSS	80	0.5-12	100	0.5-2.7	1.5	191	181
SB – 2200 Bottle Amp	106	80	1-10	66	1-2.5	1.52	194	182
SB – 2200 Bottle Amp	216	80	2-15	40	2-8	3.75	195	181
SB – 2200 Bottle Amp	424	80	4-24	10	4-24	6	197	177
SB – 2205 Bottle Amp	106	80	1-12	66	1-2.5	2.27	194	182
SB – 2205 Bottle Amp	216	80	2-15	40	2-8	3.75	195	181
SB – 2205 Bottle Amp	424	80	4-24	10	4-24	15	197	177
SB – Rack Amp	3300 HM (single transmitter)	180	2-15	100	2-5	1	200	190

Table 2-1: Table of Values

APPENDIX A: UNH CALIBRATION REPORT

The following pages are a report by the Center for Coastal and Ocean Mapping / Joint Hydrographic Center University of New Hampshire.

Center for Coastal and Ocean Mapping/Joint Hydrographic Center
University of New Hampshire

CALIBRATION REPORT

Edgetech Transducers:

- 106Short, S/N 45582
- DW106, S/N 45881
- DW216, S/N 45782
- DW424, S/N 42732
- KT216A2, S/N 45895
- Hullmount106

May 2013

Written by: Carlo Lanzoni

1. *Introduction*

Measurements to compute the transmit voltage response (TVR) and impedance of 6 single-beam electro-acoustic transducers from Edgetech were performed in the acoustic tank of the Chase Ocean Engineering Laboratory (COEL) at the University of New Hampshire. The transducers under test are designed to operate at low frequencies for deep water surveys. The acoustic tank has dimensions of 18 m long, 12 m wide, and 6 m depth. The transducers were placed approximately at the center of the tank at 3 m depth to minimize possible interference from acoustic multipath from the tank side sidewalls, bottom and water surface. The TVR tests employed a Reson 4034 hydrophone placed on the maximum response axis (MRA) of the transducer under test at acoustic ranges varying from 2 m to 4 m. The tests were conducted employing sinusoidal signals with frequencies ranging from 0.5 kHz to 30 kHz and pulse length of 10 cycles or less. The number of cycles was kept at a minimum to minimize the effects of multipath acoustic interferences.

2. *Impedance Measurements*

The impedance measurements were performed by adding a resistor of 120 Ω in series with the transducer terminals and applying variable frequency sinusoidal signals of 4 volts peak-to-peak (Vpp) from a function generator to the circuit and measuring the applied voltage and the corresponding circuit current from the measured voltage drop on the resistor. This was performed by the LabVIEW code *Impedance (Resistor to GND).vi*, were the voltage source and the voltage across the resistor were measured from the data acquisition board analog inputs. The code uses the measured voltages to compute the voltage drop and current across the transducer under test and then computes the impedance of the transducer for each applied frequency. The LabVIEW code saves the transmitted and received waveforms, the values of impedance for each frequency value used in the tests, a metadata file (.txt) with the parameters used in the code for the measurements, and a log file (.log) which can be used in the LabVIEW code to check the parameters used for each test. Figure 1 shows the setup for impedance measurements. Table 1 shows the parameters used for the impedance measurements and table 2 shows the description of the recorded files.

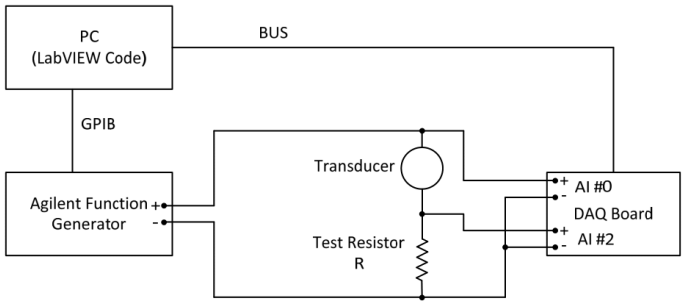

Figure 1 – Impedance measurements setup.

Table 1 – Impedance measurement parameters.

	Frequency Range (kHz)	Applied Voltage (Vpp)
106Short, S/N 45582	0.5 – 15	4
DW106, S/N 45881	1 – 15	4
DW216, S/N 45782	1 – 30	4
DW424, S/N 42732	1 – 30	4
KT216A2, S/N 45895	1 – 25	4
Hullmount106	0.5 – 15	4

Table 2 – Recorded files.

File	Description
Elem0.mat	Values for: impedance magnitude, impedance phase, impedance real, impedance imaginary, conductance, susceptance, frequency, current phase, supply voltage phase, and supply voltage magnitude.
AutoLogFile.log	Front panel data of LabVIEW code (can be read from the same LabVIEW code).
Metadata.txt	Text file with the measurement parameters used in the tests.
Waveforms#.mat	Waveforms from the source and from the test resistor (Matlab format). #: 0 to (number of total measurements – 1)
TXWaveform#.bin	Waveform from source in binary format. #: 0 to (number of total measurements – 1)
RXWaveform#.bin	Waveform from test resistor in binary format. #: 0 to (number of total measurements – 1)

3. Transmit Voltage Response Measurements

The transmit voltage response measurements employed a power amplifier to transmit signals from the function generator. The signal received by the Reson TC4034 hydrophone was filtered and amplified by a low-noise filter amplifier and then sent to the data acquisition board. The LabVIEW code *Frequency Response.vi* was used to control the TVR measurements, setting up the function generator to transmit sinusoidal pulses with varying frequency and 1 volt peak-to-peak (Vpp) which were amplified by the power amplifier with a gain of 10x before applying the signal to the transducer under test. A pre-defined number of pings was used for each frequency value, which were averaged to provide good quality data. The code was setup to select the central part of the received pulse to compute the root-mean square (RMS) values of the received and transmitted signals. These values are used later to compute the TVR curves of the transducers under test. The LabVIEW code saves the transmitted and received waveforms, the RMS values of the transmitted and received signals, a metadata file (.txt) with the parameters used in the code for the measurements, and a log file (.log) which can be used in the LabVIEW code to check the parameters used for each test. Figure 2 shows the setup used for the TVR measurements. Table 3 shows the parameters used in the TVR measurements and table 4 shows the description of the recorded files.

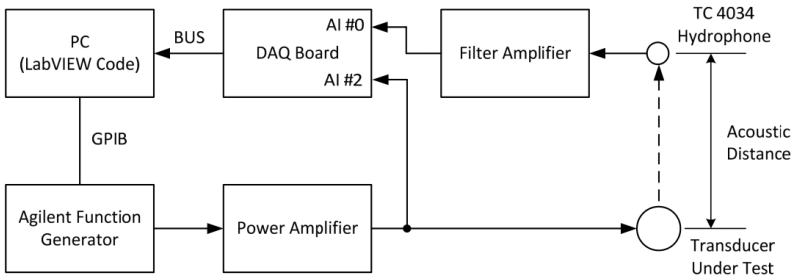

Figure 2 – TVR measurements setup.

Table 3 – TVR measurement parameters.

	Frequency Range (kHz)	Pulse Length (# cycles)	# of Pings per Freq. Setting	Applied Voltage (Vpp)	Range (m)
106Short, S/N 45582	0.5 – 15	10	5	1 x 10	2
DW106, S/N 45881	0.5 – 15	10	5	1 x 10	2
DW216, S/N 45782	1 – 25	8	5	1 x 10	4
DW424, S/N 42732	1 – 30	10	10	1 x 10	4
KT216A2, S/N 45895	1 – 25	10	10	1 x 10	4
Hullmount106	0.5 – 15	10	5	1 x 10	2

Table 4 – Recorded files for TVR measurements.

File	Description
FreqResponse.mat	CH0_RMS : transmitted voltage (Volts rms) (Matlab format) CH1_RMS: received voltage (Volts rms) (Matlab format) Frequency: frequency (kHz) (Matlab format)
Tx_Name1_Rx_Name2_AutoLogFile.log	Front panel data of LabVIEW code (can be read from the same LabVIEW code). Name1: name of transducer under test Name2: name of hydrophone
Tx_Name1_Rx_Name2_Metadata.txt	Text file with the measurement parameters used in the tests. Name1: name of transducer under test Name2: name of hydrophone
WaveformsM_N.mat	Transmitted and received waveforms (Matlab format). M: 0 to number of total frequency steps – 1 N: 0 to total number of pings – 1
TXWaveformM_N.bin	Waveform from source in binary format. M: 0 to (number of total frequency steps – 1) N: 0 to (total number of pings – 1)
RXWaveformM_N.bin	Waveform from test resistor in binary format. M: 0 to (number of total frequency steps – 1) N: 0 to (total number of pings – 1)
	Obs: all recorded waveforms need gain correction.

4. *Results*

Figures 3 to 8 show the measurement results for impedance and transmit voltage response for each transducer under test.

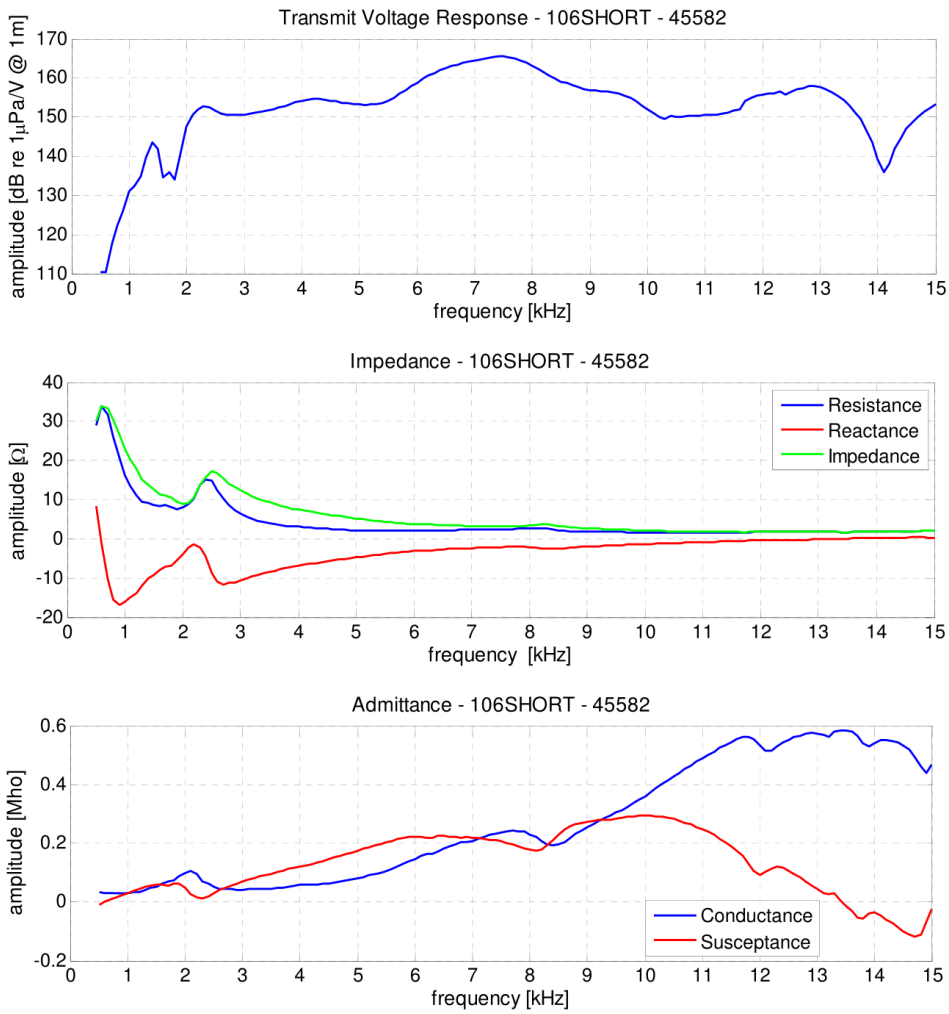

Figure 3 – TVR, impedance, and admittance results for Edgetech 106SHORT S/N: 45582.

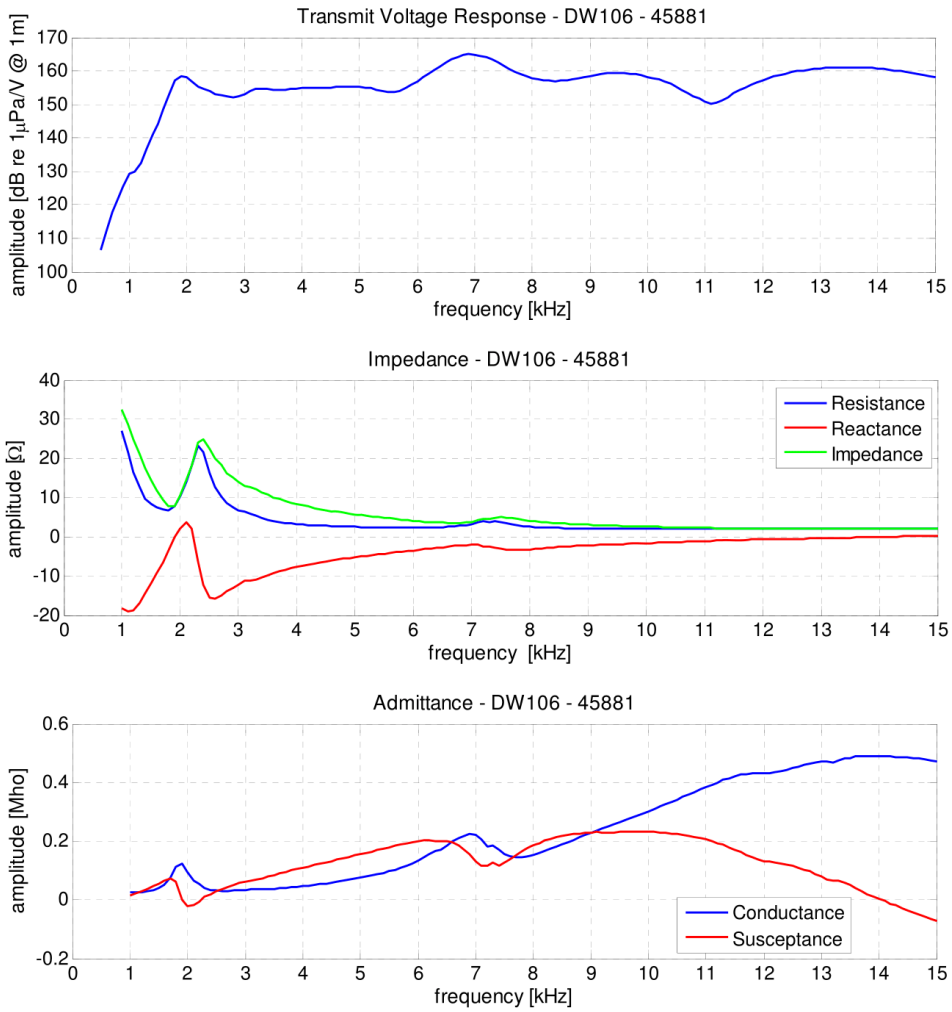

Figure 4 – TVR, impedance, and admittance results for Edgetech DW106 S/N: 45881.

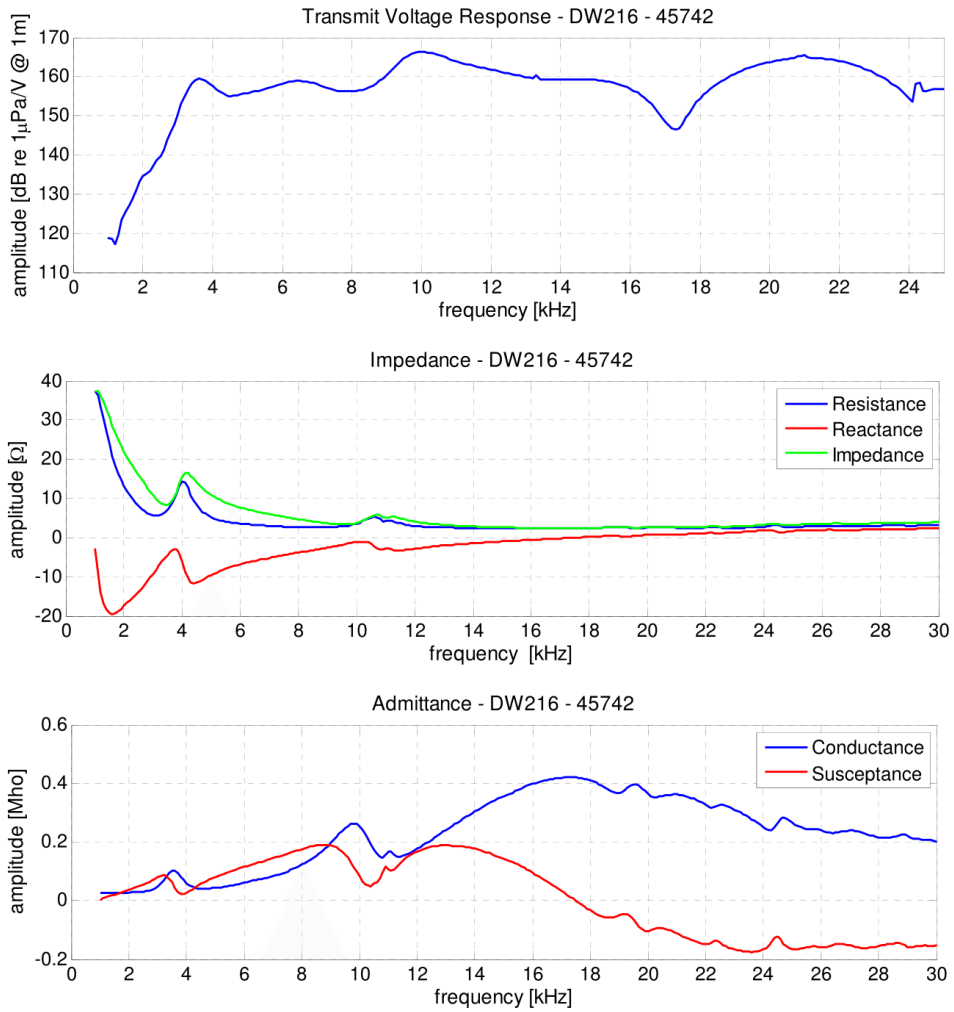

Figure 5 – TVR, impedance, and admittance results for Edgetech DW216 S/N: 45742.

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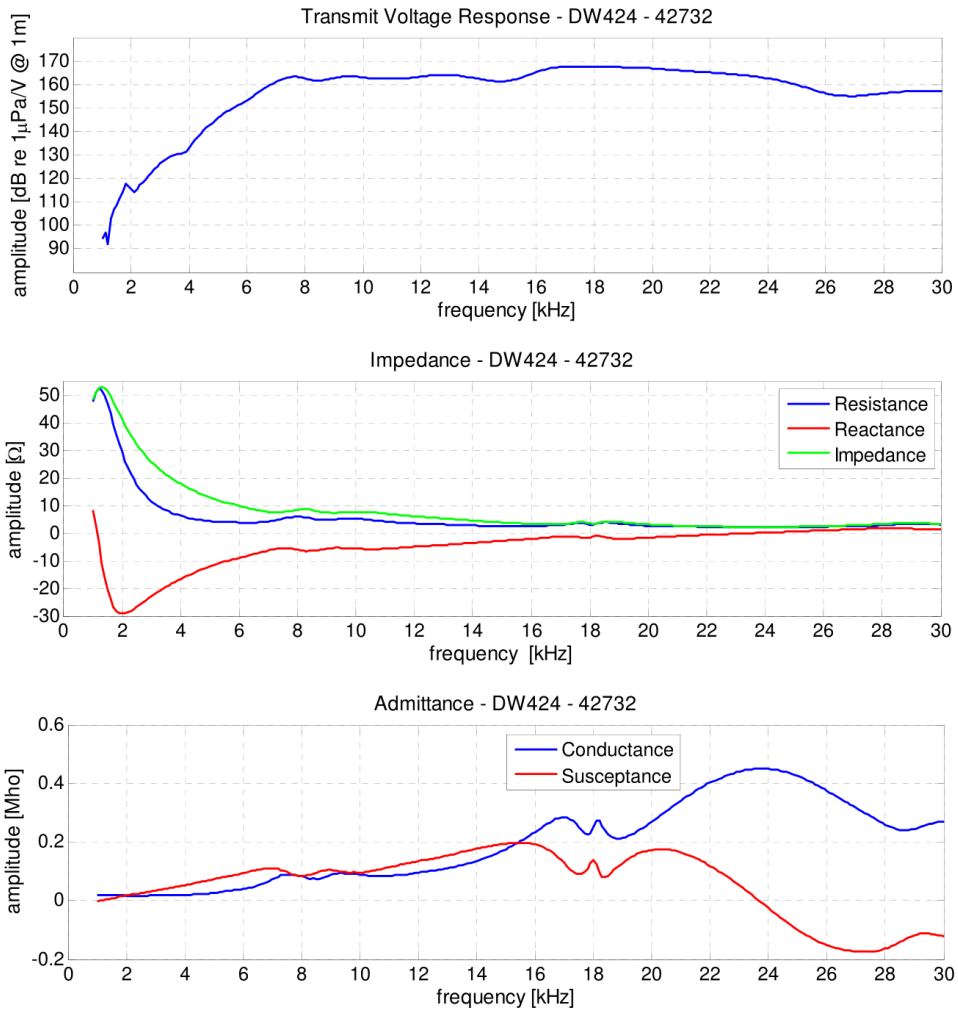

Figure 6 – TVR, impedance, and admittance results for Edgetech DW424 S/N: 42732.

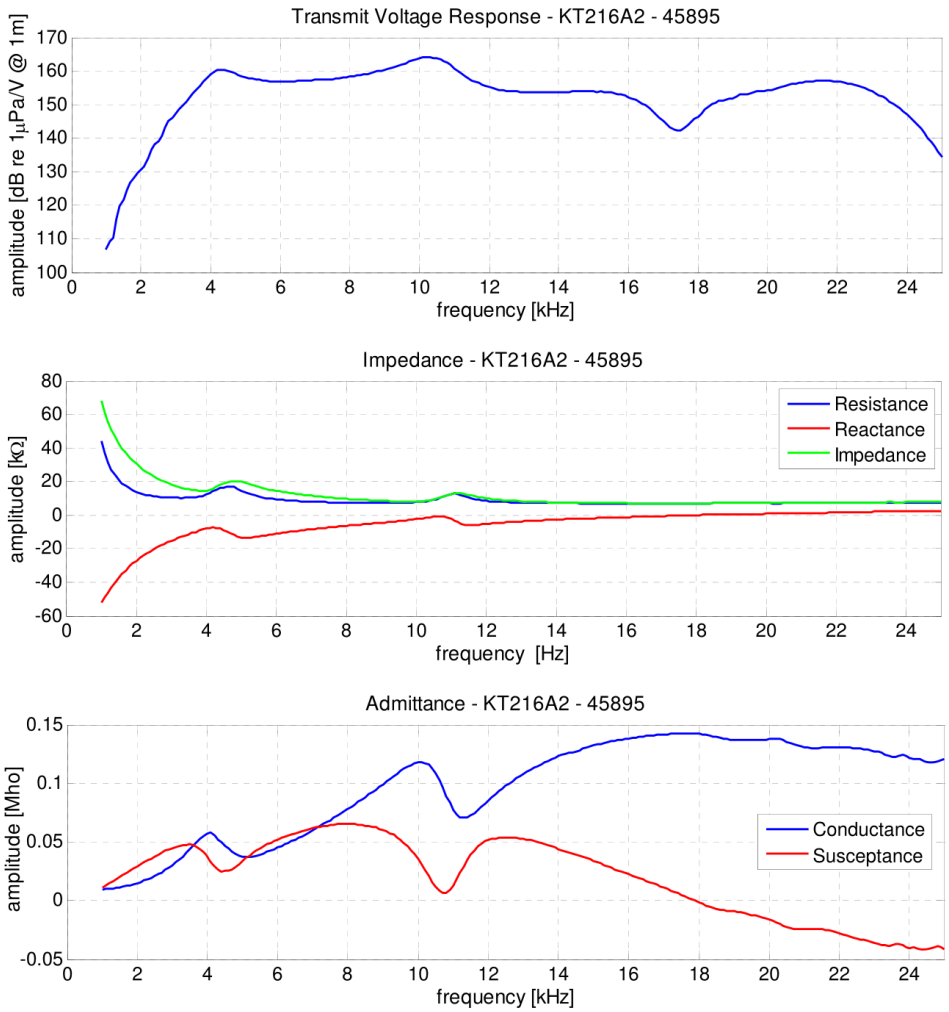

Figure 7 – TVR, impedance, and admittance results for Edgetech KT216A2 S/N: 45895.

8

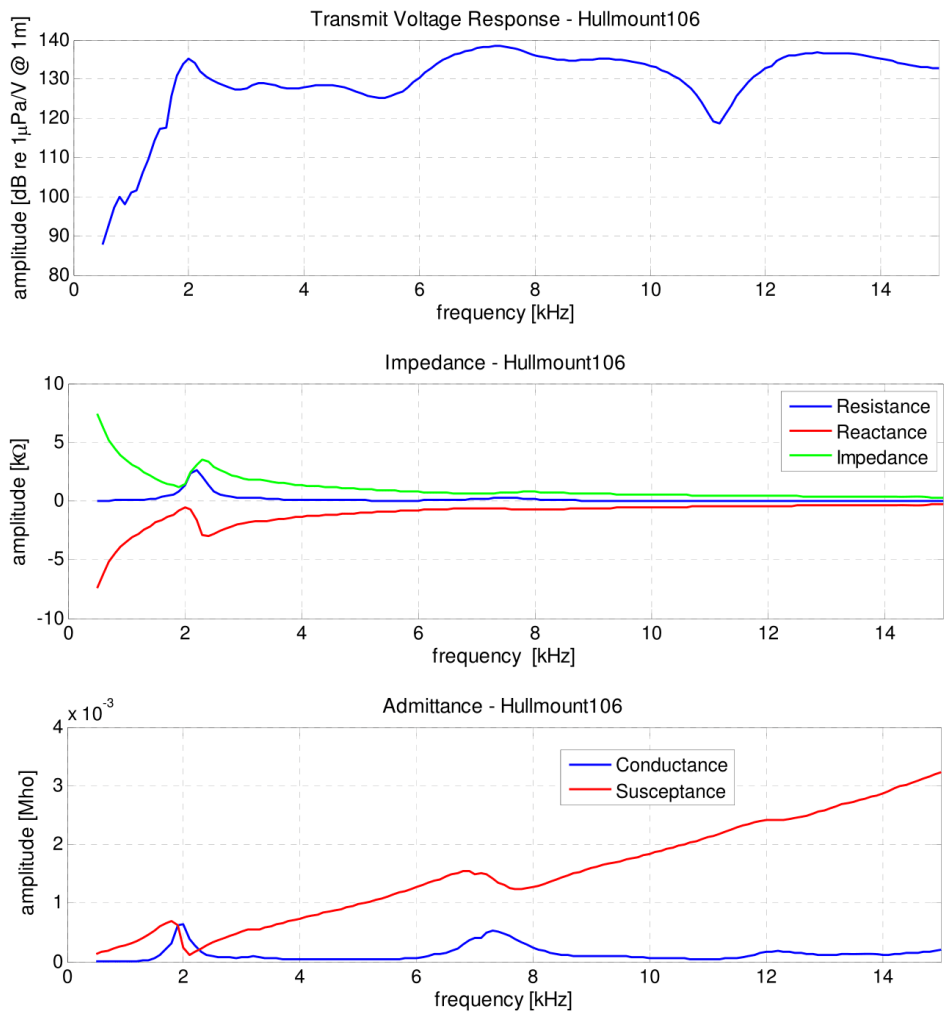

Figure 8 – TVR, impedance, and admittance results for Edgetech Hullmount106.