FIELD OPERATIONS AND COMPLIANCE REPORT
for
CALIFORNIA STATE LANDS COMMISSION

GEOPHYSICAL CABLE ROUTE SURVEY

HERMOSA BEACH, CALIFORNIA

Revision	Date	Description	Prepared by	Revised by	Approved by
0	9/29/2017	Initial	EBR		EBR

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1 SURVEY INFORMATION

Project Description and Scope of Work

A geophysical inshore corridor survey was completed for a proposed subsea telecommunications cable landing in the City of Hermosa Beach. The survey was conducted from the closest, safest working distance to shore out to the 3nm State boundary.

The route survey is required to provide information for engineering, installation, and subsequent maintenance of the cable. The survey objective was to complete the acquisition of inshore geophysical survey data including; bathymetric, sidescan, sub-bottom, and magnetometer data to safely position the cable within a surveyed corridor.

Weather and Sea State

Weather and sea state during survey events are provided in table below:

Date	Weather	Sea State (Beaufort)
7/22/17	Sunny – 1-8 knts SW	(1-2) - <1.0m
7/23/17	Sunny – 1-8 knts NW	(1-2) - <1.0m
7/24/17	Sunny – 1-8 knts NW	(2) - <1.0m

Chart of Area and Tracklines

See figure below at end of section I:

GIS Trackline File

An ESRI compatible trackline file accompanies this report. WGS84 Geodetic

Date and Times of Data Collection

The data collection summary was taken from the final survey Daily Progress Reports (DPRs). The following table gives the breakdown of dates and data collection times:

Date	Start Data Collection (Local)	End Data Collection
7/22/17	08:30	17:50
7/23/17	08:15	19:00
7/24/17	08:50	14:55

Environmental Hazards Encountered

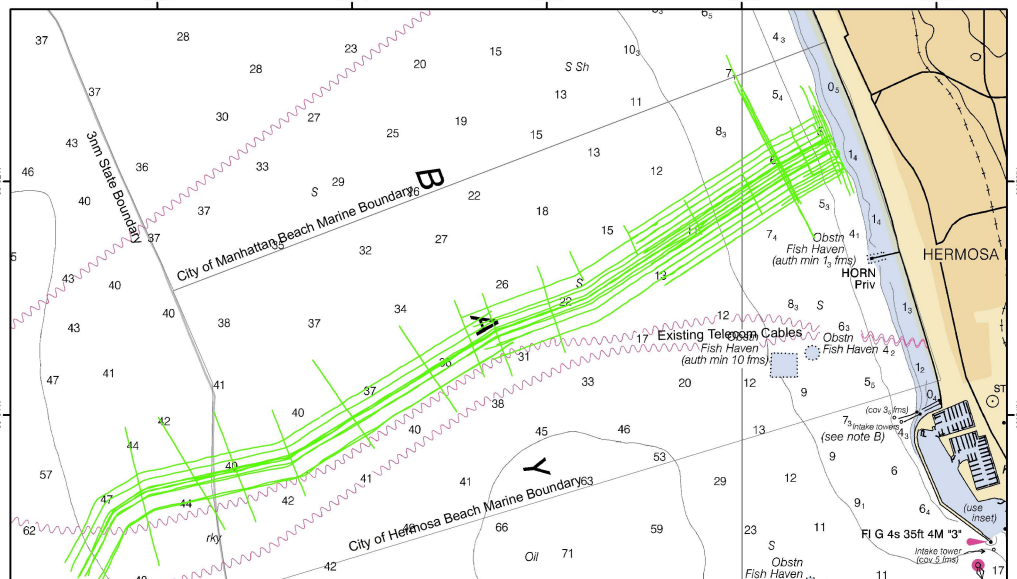
No environmental hazards were encountered.

Accident, Injury, Damage, or Loss to Property

No accidents, injuries, damage, or loss to property was sustained.

SURVEY TRACKPLOT
HERMOSA BEACH

EARTH SCIENCES & SURVEYING



Soundings in Feet

0 750 1,500 3,000 Meters

Track Line

2 BIOLOGICAL INFORMATION

This section includes Marine Wildlife Monitoring Report with field operations summary including sonar equipment shut downs and start-ups, haul out behaviour, and number of collisions.

EXHIBIT H – California State Lands Commission

Below see initialled and dated Exhibit H:

Marine Wildlife Monitoring Report

See Marine Wildlife Monitoring Post-Survey Report below prepared by Marine Mammal Consulting Group.

Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
Air Quality and Greenhouse Gas (GHG) Emissions (MND Section 3.3.3)						
MM AIR-1: Engine Tuning, Engine Certification, and Fuels. The following measures will be required to be implemented by all Permittees under the Offshore Geophysical Permit Program (OGPP), as applicable depending on the county offshore which a survey is being conducted. Pursuant to section 93118.5 of CARB's Airborne Toxic Control Measures, the Tier 2 engine requirement applies only to diesel-fueled vessels.	All Counties: Maintain all construction equipment in proper tune according to manufacturers' specifications; fuel all off-road and portable diesel-powered equipment with California Air Resources Board (CARB)-certified motor vehicle diesel fuel limiting sulfur content to 15 parts per million or less (CARB Diesel).	Daily emissions of criteria pollutants during survey activities are minimized.	Determine engine certification of vessel engines. Review engine emissions data to assess compliance, determine if changes in tuning or fuel are required.	OGPP permit holder and contract vessel operator; California State Lands Commission (CSLC) review of Final Monitoring Report.	Prior to, during, and after survey activities. Submit Final Monitoring Report after completion of survey activities.	6.13.17 EBR
	Los Angeles and Orange Counties: Use vessel engines meeting CARB's Tier 2-certified engines or cleaner; the survey shall be operated such that daily NO_x emissions do not exceed 100 pounds based on engine certification emission factors. This can be accomplished with Tier 2 engines if daily fuel use is 585 gallons or less, and with Tier 3 engines if daily fuel use is 935 gallons or less.		Verify that Tier 2 or cleaner engines are being used. Calculate daily NO_x emissions to verify compliance with limitations.			6.13.17 EBR
	San Luis Obispo County: Use vessel engines meeting CARB's Tier 2-certified engines or cleaner, accomplished with Tier 2 engines if daily fuel use is 585 gallons or less; all diesel equipment shall not idle for more than 5 minutes; engine use needed to maintain position in the water is not considered idling; diesel idling within 300 meters (1,000 feet) of sensitive receptors is not permitted; use alternatively fueled construction equipment on site where feasible, such as compressed natural gas, liquefied natural gas, propane or biodiesel.		Verify that Tier 2 or cleaner engines are being used. Inform vessel operator(s) of idling limitation. Investigate availability of alternative fuels.			—
	Santa Barbara County: Use vessel engines meeting CARB's Tier 2-certified engines or cleaner, accomplished with Tier 2 engines if daily fuel use is 790 gallons or less.		Verify that Tier 2 or cleaner engines are being used. Investigate availability of alternative fuels.			—
	Ventura County: Use alternatively fueled construction equipment on site where feasible, such as compressed natural gas, liquefied natural gas, propane or biodiesel.		Investigate availability of alternative fuels.			—

Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
MM BIO-1: Marine Mammal and Sea Turtle Presence – Current Information.	All State waters; prior to commencement of survey operations, the geophysical operator shall: (1) contact the National Oceanic and Atmospheric Administration Long Beach office staff and local whale-watching operations and shall acquire information on the current composition and relative abundance of marine wildlife offshore, and (2) convey sightings data to the vessel operator and crew, survey party chief, and onboard Marine Wildlife Monitors (MWMs) prior to departure. This information will aid the MWMs by providing data on the approximate number and types of organisms that may be in the area.	No adverse effects to marine mammals or sea turtles due to survey activities are observed.	Document contact with appropriate sources. Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder; Inquiry to NOAA and local whale watching operators.	Prior to survey.	7.19.17 10.1.17 EBR
MM BIO-2: Marine Wildlife Monitors (MWMs).	Except as provided in section 7(h) of the General Permit, a minimum of two (2) qualified MWMs who are experienced in marine wildlife observations shall be onboard the survey vessel throughout both transit and data collection activities. The specific monitoring, observation, and data collection responsibilities shall be identified in the Marine Wildlife Contingency Plan required as part of all Offshore Geophysical Permit Program permits. Qualifications of proposed MWMs shall be submitted to the National Oceanic and Atmospheric Administration (NOAA) and CSLC at least twenty-one (21) days in advance of the survey for their approval by the agencies. Survey operations shall not commence until the CSLC approves the MWMs.	Competent and professional monitoring or marine mammals and sea turtles; compliance with established monitoring policies.	Document contact with and approval by appropriate agencies. Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder.	Prior to survey.	7.19.17 10.1.17 EBR
MM BIO-3: Safety Zone Monitoring.	Onboard Marine Wildlife Monitors (MWMs) responsible for observations during vessel transit shall be responsible for monitoring during the survey equipment operations. All visual monitoring shall occur from the highest practical vantage point aboard the survey vessel; binoculars shall be used to observe the surrounding area, as appropriate. The MWMs will survey an area (i.e., safety or exclusion zone) based on the equipment used, centered on the sound source (i.e., vessel, towfish), throughout time that the survey equipment is operating. Safety zone radial distances, by equipment type, include:	No adverse effects to marine mammals or sea turtles due to survey activities are observed; compliance with established safety zones.	Compliance with permit requirements (observers); compliance with established safety zones. Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder.	Prior to survey.	7.19.17 10.1.17 EBR

Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
	<table><tr><th>Equipment Type</th><th>Safety Zone (radius, m)</th></tr><tr><td>Single Beam Echosounder</td><td>50</td></tr><tr><td>Multibeam Echosounder</td><td>500</td></tr><tr><td>Side-Scan Sonar</td><td>600</td></tr><tr><td>Subbottom Profiler</td><td>100</td></tr><tr><td>Boomer System</td><td>100</td></tr></table> If the geophysical survey equipment is operated at or above a frequency of 200 kilohertz (kHz), safety zone monitoring and enforcement is not required; however, if geophysical survey equipment operated at a frequency at or above 200 kHz is used simultaneously with geophysical survey equipment less than 200 kHz, then the safety zone for the equipment less than 200 kHz must be monitored. The onboard MWMs shall have authority to stop operations if a mammal or turtle is observed within the specified safety zone and may be negatively affected by survey activities. The MWMs shall also have authority to recommend continuation (or cessation) of operations during periods of limited visibility (i.e., fog, rain) based on the observed abundance of marine wildlife. Periodic reevaluation of weather conditions and reassessment of the continuation/cessation recommendation shall be completed by the onboard MWMs. During operations, if an animal's actions are observed to be irregular, the monitor shall have authority to recommend that equipment be shut down until the animal moves further away from the sound source. If irregular behavior is observed, the equipment shall be shut-off and will be restarted and ramped-up to full power, as applicable, or will not be started until the animal(s) is/are outside of the safety zone or have not been observed for 15 minutes. For nearshore survey operations utilizing vessels that lack the personnel capacity to hold two (2) MWMs aboard during survey operations, at least twenty-one (21) days prior to the commencement of survey activities, the Permittee may petition the CSLC to conduct survey operations with one (1) MWM aboard. The CSLC will consider such authorization on a case-by-case basis and					7.19.17 EBR

Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
	factors the CSLC will consider will include the timing, type, and location of the survey, the size of the vessel, and the availability of alternate vessels for conducting the proposed survey. CSLC authorizations under this subsection will be limited to individual surveys and under any such authorization; the Permittee shall update the MWCP to reflect how survey operations will occur under the authorization.					
MM BIO-4: Limits on Nighttime OGPP Surveys.	All State waters; nighttime survey operations are prohibited under the OGPP, except as provided below. The CSLC will consider the use of single beam echosounders and passive equipment types at night on a case-by-case basis, taking into consideration the equipment specifications, location, timing, and duration of survey activity.	No adverse effects to marine mammals or sea turtles due to survey activities are observed.	Presurvey request for nighttime operations, including equipment specifications and proposed use schedule. Document equipment use. Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder.	Approval required before survey is initiated. Monitoring Report following comple-tion of survey.	7.19.17 NO NIGHT SURVEY 10.1.17 EBR
MM BIO-5: Soft Start.	All State waters; the survey operator shall use a "soft start" technique at the beginning of survey activities each day (or following a shut down) to allow any marine mammal that may be in the immediate area to leave before the sound sources reach full energy. Surveys shall not commence at nighttime or when the safety zone cannot be effectively monitored. Operators shall initiate each piece of equipment at the lowest practical sound level, increasing output in such a manner as to increase in steps not exceeding approximately 6 decibels (dB) per 5-minute period. During ramp-up, the Marine Wildlife Monitors (MWMs) shall monitor the safety zone. If marine mammals are sighted within or about to enter the safety zone, a power-down or shut down shall be implemented as though the equipment was operating at full power. Initiation of ramp-up procedures from shut down requires that the MWMs be able to visually observe the full safety zone.	No adverse effects to marine mammals or sea turtles due to survey activities are observed.	Compliance with permit requirements (observers); compliance with safe start procedures. Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder.	Imme-diately prior to survey.	7.19.17 EBR

Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
MM BIO-6: Practical Limitations on Equipment Use and Adherence to Equipment Manufacturer's Routine Maintenance Schedule.	All State waters; geophysical operators 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: • Using the highest frequency band possible for the subbottom profiler; • Using the shortest possible pulse length; and • Lowering the pulse rate (pings per second) as much as feasible. Geophysical operators shall consider the potential applicability of these measures to other equipment types (e.g., boomer). Permit holders will conduct routine inspection and maintenance of acoustic-generating equipment to ensure that low energy geophysical equipment used during permitted survey activities remains in proper working order and within manufacturer's equipment specifications. Verification of the date and occurrence of such equipment inspection and maintenance shall be provided in the required presurvey notification to CSLC.	No adverse effects to marine mammals or sea turtles due to survey activities are observed.	Document initial and during survey equipment settings. Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder.	Imme-diately prior to and during survey.	9-19-17 EBR
MM BIO-7: Avoidance of Pinniped Haul-Out Sites.	The Marine Wildlife Contingency Plan (MWCP) developed and implemented for each survey shall include identification of haul-out sites within or immediately adjacent to the proposed survey area. For surveys within 300 meters (m) of a haul-out site, the MWCP shall further require that: • The survey vessel shall not approach within 91 m of a haul-out site, consistent with National Marine Fisheries Service (NMFS) guidelines; • Survey activity close to haul-out sites shall be conducted in an expedited manner to minimize the potential for disturbance of pinnipeds on land; and • Marine Wildlife Monitors shall monitor pinniped activity onshore as the vessel approaches, observing and reporting on the number of pinnipeds potentially disturbed (e.g., via head lifting, flushing into the water). The purpose of such reporting is to provide CSLC and California Department of Fish and Wildlife (CDFW) with information regarding potential disturbance associated with OGPP surveys.	No adverse effects to pinnipeds at haul outs are observed.	Document pinniped reactions to vessel presence and equipment use. Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder.	Monitoring Report following comple-tion of survey.	10-1-17 EBR

Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
MM BIO-8: Reporting Requirements – Collision.	All State waters; if a collision with marine mammal or reptile occurs, the vessel operator shall document the conditions under which the accident occurred, including the following: • Vessel location (latitude, longitude) 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 monitoring marine wildlife at the time of collision; and, • Name of vessel, vessel owner/operator, and captain officer in charge of the vessel at time of collision. After a collision, the vessel shall 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 immediately communicate by radio or telephone all details to the vessel's base of operations, and shall immediately report the incident. Consistent with Marine Mammal Protection Act requirements, the vessel's base of operations or, if an onboard telephone is available, the vessel captain him/herself, will then immediately call the National Oceanic and Atmospheric Administration (NOAA) Stranding Coordinator to report the collision and follow any subsequent instructions. From the report, the 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 Stranding Coordinator, NOAA National Marine Fisheries Service (NMFS), Southwest Region, Long Beach, to obtain instructions. Although NOAA has primary responsibility for marine mammals in both State and Federal waters, the California Department of Fish and Wildlife (CDFW) will also be advised that an incident has occurred in State waters affecting a protected species.	No adverse effects to marine mammals or sea turtles due to survey activities are observed.	Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder.	Monitoring Report following comple-tion of survey.	10-1-17 NO Collision EBR

Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
MM BIO-9: Limitations on Survey Operations in Select Marine Protected Areas (MPAs).	All MPAs; prior to commencing survey activities, geophysical operators shall coordinate with the CLSC, California Department of Fish and Wildlife (CDFW), and any other appropriate permitting agency regarding proposed operations within MPAs. The scope and purpose of each survey proposed within a MPA shall be defined by the permit holder, and the applicability of the survey to the allowable MPA activities shall be delineated by the permit holder. If deemed necessary by CDFW, geophysical operators will pursue a scientific collecting permit, or other appropriate authorization, to secure approval to work within a MPA, and shall provide a copy of such authorization to the CSLC as part of the required presurvey notification to CSLC. CSLC, CDFW, and/or other permitting agencies may impose further restrictions on survey activities as conditions of approval.	No adverse effects to MPA resources due to survey activities are observed.	Monitor reactions of wildlife to survey operations; report on shutdown conditions and survey restart. Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder; survey permitted by CDFW.	Prior to survey.	10.1.17 NO SURVEY IN MPA EBR
MM HAZ-1: Oil Spill Contingency Plan (OSCP) Required Information.	Permittees shall develop and submit to CSLC staff for review and approval an OSCP that addresses accidental releases of petroleum and/or non-petroleum products during survey operations. Permittees' OSCPs shall include the following information for each vessel to be involved with the survey: • Specific steps to be taken in the event of a spill, including notification names, phone numbers, and locations of: (1) nearby emergency medical facilities, and (2) wildlife rescue/response organizations (e.g., Oiled Wildlife Care Network); • Description of crew training and equipment testing procedures; and • Description, quantities, and location of spill response equipment onboard the vessel.	Reduction in the potential for an accidental spill. Proper and timely response and notification of responsible parties in the event of a spill.	Documentation of proper spill training. Notification of responsible parties in the event of a spill.	OGPP permit holder and contract vessel operator.	Prior to survey.	6.13.17 EBR
MM HAZ-2: Vessel fueling restrictions.	Vessel fueling shall only occur at an approved docking facility. No cross vessel fueling shall be allowed.	Reduction in the potential for an accidental spill.	Documentation of fueling activities.	Contract vessel operator.	Following survey.	6.13.17 EBR
MM HAZ-3: OSCP equipment and supplies.	Onboard spill response equipment and supplies shall be sufficient to contain and recover the worst-case scenario spill of petroleum products as outlined in the OSCP.	Proper and timely response in the event of a spill.	Notification to CSLC of onboard spill response equipment/supplies inventory, verify	Contract vessel operator.	Prior to survey.	6.13.17 EBR

Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
			ability to respond to worst-case spill.			
MM HAZ-1: Oil Spill Contingency Plan (OSCP) Required Information.	Outlined under **Hazards and Hazardous Materials** (above)					
MM HAZ-2: Vessel fueling restrictions.	Outlined under **Hazards and Hazardous Materials** (above)					
MM HAZ-3: OSCP equipment and supplies.	Outlined under **Hazards and Hazardous Materials** (above)					
MM BIO-9: Limitations on Survey Operations in Select MPAs.	Outlined under **Biological Resources** (above)					
MM REC-1: U.S. Coast Guard (USCG), Harbormaster, and Dive Shop Operator Notification.	All California waters where recreational diving may occur; as a survey permit condition, the CSLC shall require Permittees to provide the USCG with survey details, including information on vessel types, survey locations, times, contact information, and other details of activities that may pose a hazard to divers so that USCG can include the information in the Local Notice to Mariners, advising vessels to avoid potential hazards near survey areas. Furthermore, at least twenty-one (21) days in advance of in-water activities, Permittees shall: (1) post such notices in the harbormasters' offices of regional harbors; and (2) notify operators of dive shops in coastal locations adjacent to the proposed offshore survey operations.	No adverse effects to recreational divers from survey operations.	Notify the USCG, local harbormasters, and local dive shops of planned survey activity. Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder.	Prior to survey.	6.13.17 EBR

Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
MM FISH-1: U.S. Coast Guard (USCG) and Harbormaster Notification.	All California waters; as a survey permit condition, the CSLC shall require Permittees to provide the USCG with survey details, including information on vessel types, survey locations, times, contact information, and other details of activities that may pose a hazard to mariners and fishers so that USCG can include the information in the Local Notice to Mariners, advising vessels to avoid potential hazards near survey areas. Furthermore, at least twenty-one (21) days in advance of in-water activities, Permittees shall post such notices in the harbormasters' offices of regional harbors.	No adverse effects to commercial fishing gear in place.	Notify the USCG and local harbormasters of planned survey activity. Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder.	Prior to survey.	6.13.17 EBR
MM FISH-2: Minimize Interaction with Fishing Gear.	To minimize interaction with fishing gear that may be present within a survey area: (1) the geophysical vessel (or designated vessel) shall traverse the proposed survey corridor prior to commencing survey operations to note and record the presence, type, and location of deployed fishing gear (i.e., buoys); (2) no survey lines within 30 m (100 feet) of observed fishing gear shall be conducted. The survey crew shall not remove or relocate any fishing gear; removal or relocation shall only be accomplished by the owner of the gear upon notification by the survey operator of the potential conflict.	No adverse effects to commercial fishing gear in place.	Visually observe the survey area for commercial fishing gear. Notify the gear owner and request relocation of gear outside survey area. Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder.	Imme-diately prior to survey (prior to each survey day).	7.19.17 10.1.17 EBR
MM FISH-1: USCG and Harbormaster Notification.	Outlined under **Commercial and Recreational Fisheries** (above)					

Acronyms/Abbreviations: CARB = California Air Resources Board; CDFW = California Department of Fish and Wildlife; CSLC = California State Lands Commission; dB = decibels; kHz = kilohertz; MPA = Marine Protected Area; MWCP = Marine Wildlife Contingency Plan; MWM = Marine Wildlife Monitor; m= meter(s); NOAA = National Oceanic and Atmospheric Administration; NO_x = Nitrogen Oxide; OGPP = Offshore Geophysical Permit Program; OSCP = Oil Spill Contingency Plan; USCG = U.S. Coast Guard

SUMMARY REPORT
MARINE WILDLIFE MONITORING

Shallow Water Fiber-optic Cable Route Survey
Hermosa Beach, California

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1.0 Executive Summary

This project involved a nearshore survey of part of a proposed submarine cable route. Once the entire cable is installed, it will stretch from Hermosa Beach, California, to Asia. This cable is designated SX-NEXT (Figure 1). Off the California coast, the cable route crosses submerged lands from mean high water to 3 nautical miles (nm) offshore, then stretches into federal waters and beyond into international waters. This survey identified the makeup of the ocean floor near shore, including hard bottom areas, so such areas can be avoided when the cable is actually laid. In general, the surveyed route will place the cable in soft bottom areas where maximum burial can be achieved. Low-energy sonar was used for this survey.

MC Global BP4 is a telecommunications firm based in Napa, California that represents a consortium of large fiber-optic cable companies that will install and operate the cable. EGS Americas, Inc., an international group of survey firms, was selected to perform the survey. The Marine Mammal Consulting Group, Inc. (MMCG), of Santa Barbara, California, was selected to prepare and implement a Marine Wildlife Contingency Plan (MMCG 2015) and to report on the results of the wildlife monitoring effort.

After three days of delays for an engine replacement, the project began on 22 July 2017 and required five days to complete. A total of only three species of marine mammals was observed. The total number of animals seen was 76. No impacts were observed on any marine wildlife. The monitoring effort was effective.

2.0 Introduction

Regulatory agencies at state and federal level were concerned that survey operations might harm marine wildlife. In particular, a potential for collision between the survey vessel and marine mammals and turtles existed, as well as possible entanglement of marine wildlife in the sonar tow cable. The agencies were also concerned about potential impacts on marine wildlife from the sonar used during this project. Finally, they wanted to be assured that proper procedures were followed in the unlikely event of an oil or fuel release.

As the permit process continued, ICF International, environmental consultants for this project, contracted with MMCG, an independent firm based in Santa Barbara, California, to help with planning and implementing the marine wildlife monitoring. MMCG prepared a Marine Wildlife Contingency Plan specifically for CSLC (MMCG 2015). This report was prepared to fulfill agency reporting requirements for marine wildlife monitoring during this shallow water survey.

This report provides background on the cable route and survey schedule. It describes the mitigation monitoring methods, including briefings, watch schedules, equipment used by the monitor, communications, data recording, and reporting procedures.

In the results and discussion section, the marine wildlife sightings are listed by species and include numbers of animals observed, location, behavior, and other relevant information. This section also describes how actions were taken to avoid adverse interactions between the survey vessel and marine mammals, and the effectiveness of such actions. Anecdotal sightings of other wildlife are also discussed.

The conclusions and recommendations section summarizes the effectiveness of the monitoring and makes recommendations for similar future projects. The report includes literature citations. An appendix is provided that describes survey vessel and sonar specifications.

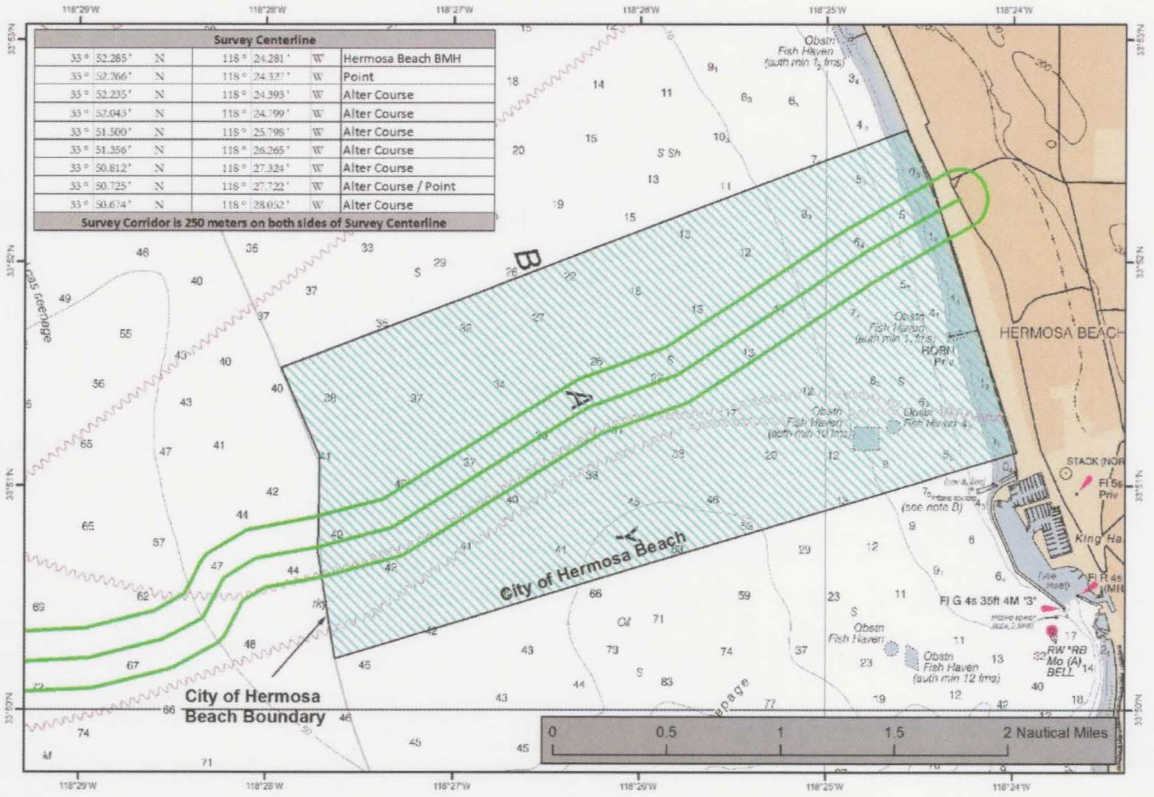
3.0 Background

3.1 Fiber-optic Cable Route off Hermosa Beach, California

Unlike many geophysical surveys, which canvas the sea floor over broad geographic areas, this survey headed from shore west-southwest approximately 2.6 nm, then gently veered slightly more to the west as it entered federal waters. The start of the survey was at 33 52.178 North, 118 24.509 West. The survey reached the limits of California State waters at 33 50.679 North, 118 28.000 West.

Rather than a box, the survey area was more like a long corridor about 500 m wide. When obstructions such as areas of high relief or existing submarine cables were encountered, the survey was widened slightly to minimize exposure to such spots. Based on the results, the in-field routing engineer decided during the survey if the Route Position List (RPL), which

Figure 1: Cable Survey Route



Source: EGS

represented the center of the cable route, needed to be adjusted within the survey corridor. Once the engineer was satisfied no cable hazards existed, a new RPL, called the In-Field Engineered Route, was created and will be discussed in a separate report (EGS in prep.).

3.2 Schedule

The survey vessel *JAB* was berthed in King Harbor, Redondo Beach, for this project. The crew and monitor simply walked from their hotel to the boat, then were transported to the survey site and back each day. The surveys began on 22 July and ended on 26 July 2017. Surveys were conducted during daylight hours only. The vessel left the dock each day at about 0800 and returned well before dark.

4.0 Mitigation Monitoring Methods

4.1 Briefings

The Marine Wildlife Contingency Plan (MMCG 2015) and numerous supporting documents, including data sheets, were provided to the MMCG monitor for review and familiarization well before the project began. Briefings were held between MMCG's principal scientist and the monitor to discuss mitigation monitoring methods. MMCG's principal scientist also provided the survey crew in advance with the Marine Wildlife Contingency Plan (MMCG 2015), along with lists of methods to be employed by them to avoid adverse impacts on marine wildlife. Consultations were held in advance between MMCG and EGS to review sonar ramp-up procedures. Before the vessel left port for the first time, the monitor met in person with the crew. The meeting(s) included the following topics:

- Legal aspects pertaining to marine wildlife protection;
- Responsibilities of crew and monitor to protect wildlife;
- Procedures for crew to follow to avoid potential impacts;
- Marine wildlife most likely to be encountered during the survey, based on NOAA data and reports from local whale watch boats;
- Copies of the Marine Wildlife Contingency Plan were always available to all crew members.

4.2 Watches

A continuous watch was kept from port en route to the survey area, within the survey area, and from the survey area back to port. Watches were generally held on the bow, which afforded the most unobstructed view.

4.3 Equipment

The monitor was required to wear a life vest and steel-toed boots. He was equipped with 7X50 waterproof, low-light, binoculars with a compass and range-finding reticule for establishing relative bearings and distances of animals from the vessel. These binoculars were calibrated for range prior to departure from port. The monitor also had a high resolution laser rangefinder. He was equipped with a handheld GPS unit as well as with a portable weather measuring device. This device recorded wind speed and direction as well as temperature. He also had a digital camera.

4.4 Communications

The monitor was equipped with a standard digital cellular telephone with voice mail and text capabilities. He also carried a handheld marine VHF radio for communications with other vessels if necessary. The handheld VHF radio also had ship-to-shore capabilities (telephone links). As a backup, the *JAB* crew also had cellular telephones and a VHF marine radio with ship-to-shore capabilities. With these extensive communications capabilities, reliable means of communications were maintained throughout the project. Reliable communications with many backups are essential for offshore operations.

4.5 Data Recording

All marine wildlife observations were recorded. Data sheets designed for this project included the date and time of each sighting, the monitor's name, and the vessel name. The location of each sighting was noted, using the monitor's handheld GPS. The genus and species of each animal was mentioned, along with the number of animals. Their behavior was noted, along with their heading if they were moving. Age categories and sex were noted when possible. Additional information, such as the direction, range and bearing of the animal(s) from the observer, along with its heading, was included. The remarks section included notes as to when each operation began and ended, and the nature of each operation (e.g., in transit, on station, ramping up, survey start and end, etc.). Anecdotal information was recorded on other wildlife, particularly sea birds, along with any association such wildlife had with marine mammals or with project operations.

Weather data were also recorded and updated periodically throughout each day. These included date, time, monitor's name, vessel's name, and location. Percentage and type of cloud cover were noted, along with visibility in meters and nautical miles. Swell direction and height were recorded, along with wind direction and velocity in knots.

Each time an alert was made or action had to be taken to prevent a potentially adverse impact, a detailed report was filled out. This both ensured that the effectiveness of such actions could be analyzed later, but also served as a record of essential information that would be needed in case an impact actually did occur. These incident reports included:

- Date;
- Monitor's name;
- Vessel's position at time of incident;
- Time animal sighted;
- Species;
- Number of animals;
- Animal's behavior;
- Closest distance of animal to vessel;
- Type of hazard (e.g., collision, sonar noise, etc.);
- Time crew notified;
- Time all-stop implemented;
- Time animal definitely clear of hazard;
- Time all-stop lifted;
- Effectiveness of all-stop;

- Crew's names and titles;
- Time MMCG and/or NOAA Fisheries notified (if impact occurred);
- Description of action taken:
- Names and titles of responding parties;
- Photographs taken? Photographer's name(s);
- Descriptive narrative of action taken (as many pages as needed).

Other details needed in the event of an adverse impact, such as weather conditions on site, and vessel name and contact numbers, were included on other forms.

4.6 Reporting

Marine mammal sighting reports, weather reports, and incident reports were transmitted daily to MMCG. Verbal communications were made by telephone daily as well.

5.0 Results and Discussion

5.1 Marine Mammal Sightings

A total of three species of marine mammals was observed. The total number of animals seen was 76. Each sighting represented anywhere from 1 to 8 animals.

Whenever possible, resightings of animals were noted. Resightings of animals were excluded from the totals presented below. In many cases, however, it was impossible to determine whether an animal or group of animals had been seen previously because both the vessel and the animals usually moved constantly. Unless individuals had distinctive markings, it was not possible to distinguish one individual from the next. Thus the total numbers of some species are likely somewhat higher than the actual number of animals present at any one time. This was particularly true of four to seven California sea lions (*Zalophus californianus*) that were hauled out on or swimming next to one of the King Harbor entrance buoys. These animals were seen every day the vessel left and returned to port.

The main purpose of the observations was detection with the goal of avoiding impacts. Counting the animals observed served only to provide an idea of the relative abundance of each species present at any one time rather than to estimate local numbers. The abundance and diversity of species was extremely low. This was not unexpected because most of the important feeding grounds, migratory routes, and pinniped rookeries are found farther offshore rather than along the mainland coast of Southern California.

Identifying species during the survey, particularly threatened and endangered species, was considered important since any impacts to these populations or stocks would have been serious. No listed species of cetaceans or pinnipeds were seen during this project, nor were any turtles or sea otters noted.

In the table below, "in transit" refers to animals seen while en route from King Harbor to the start of each day's survey operation. "On site" refers to animals seen while surveying, no matter how far away the animals were from the survey vessel; in other words, although such animals were visible during the surveys, they were not necessarily in the survey area or the hazard zone. Also, some animals were on site—in the survey area—when no sonar was deployed.

Table 1:

Marine Mammal Abundance off Hermosa Beach by Survey Dates

Species	22 July	23 July	24 July	25 July
Long-beaked common dolphin	2 on site	0	0	25 on site
Bottlenose dolphin; coastal stock	2 on site	0	0	0
California sea lion	11 in transit*	10 in transit*	11 in transit* 3 on site	12 in transit*

The total number of animals of each species follows:

Long-beaked common dolphins	27
Bottlenose dolphins	2
California sea lions	47*
Total seen	76*

*From four to seven California sea lions were seen on the harbor entrance buoy each time the vessel left and returned to port. The total number of sea lions in the area was likely a maximum a 9 (3 on site on 24 July and a maximum of six on the buoy on the way to the site that day).

5.2 Avoidance of Marine Mammal – Cable Survey Vessel Interactions

On one occasion, the crew was alerted that two long-beaked common dolphins (*Delphinus capensis*) were swiftly approaching the hazard zone. They continued on their way without pause, however.

5.3 Reactions of Marine Mammals to Operations

The animals appeared to be indifferent to the operations.

5.4 Turtle Sightings

No turtles were seen during this survey

5.5 Other Wildlife Sightings

The following bird species were recorded in the field notes:

- California brown pelican (*Pelecanus occidentalis californicus*)
- Western gull (*Larus occidentalis*)
- Heermann's gull (*L. heermanni*)
- California gull (*L. californicus*)
- Pink-footed shearwater (*Puffinus creatopus*)
- Forster's tern (*Sterna forsteri*)

- Ashy storm petrel (*Oceanodroma homochroa*)
- Double-crested cormorant (*Phalacrocorax auritus*)
- Brandt's cormorant (*P. pencillatus*)
- Pelagic cormorant (*P. pelagicus*)
- Great blue heron (*Ardea herodias*)
- Black-crowned night heron (*Nycticorax nycticorax*)

No feeding was observed with any birds. On 23 and 24 July, large groups of pink-footed shearwaters were congregated in the water (870 and 720 total each day).

5.6 Environmental Conditions

Environmental conditions were quite moderate, with visibility from 1.5 to 2.0 nm. Since operations didn't begin until well after sunrise and ended before sunset, glare was usually minimal. Swell ranged from zero to 2.0 m, with an average of about 1 m. Wind ranged from calm to a maximum of 9.9 knots. Skies were overcast with a marine layer, except cumulus clouds were present on 24 July. Temperatures ranged from 22.9 to 27.9° Celsius (73 to 82° Fahrenheit).

6.0 Conclusions and Recommendations

No adverse impacts or reports of such impacts occurred during this project. On one occasion, the monitor alerted the crew to be ready to take action, but the animals passed safely and were behaving normally. The mitigation measures proved to be effective.

MMCG recommends that the mitigation measures employed during this project be continued in similar future projects. MMCG further recommends that spotters aboard survey vessels report any marine mammals in distress, whether related to their operations or not.

7.0 Acknowledgments

MMCG sincerely thanks Chris Brungardt of ICF International for his sage advice throughout this project. MMCG also thanks Eric Roach and other EGS personnel, as well as commercial fishing representative Gerry Richter, all of whom were universally cooperative and helpful during this project. Finally, Brayton Pointner, operator of the survey vessel *JAB*, was very helpful as well as being very safety conscious.

8.0 Literature Cited

EGS. In preparation. Report to CSLC regarding nearshore survey of fiber-optic cable route off Hermosa Beach, California.

MMCG. 2015. Marine Wildlife Contingency Plan, Fiber-optic Cable Survey off Hermosa Beach, California. Prepared for CSLC.

Appendix 1: Equipment Specifications

Survey Vessel *JAB*

The 44 ft. (13.4 m) catamaran *JAB* (below) was used for this survey. *JAB* was powered by twin Cummins diesels. It had a draft of 2.5 ft. (0.75 m). It was propelled by twin jet drives and had no propellers or other exposed moving parts beneath the waterline.

Source: EGS

Sonar Equipment

Table A1: Sonar Specifications

Moonpool-mounted System	Rms Source Level (dB re. 1μPa – m)	Frequency (kHz)	Max. Ping Rate (Hz)	Pulse Length	Distances to Isopleths in Meters (dB re. 1μPa – rms)
R2Sonics 2024 (160°swath)	221	200-400	60	15-1000 us	190 dB: 26 and 19 180 dB: 57 and 35 160 dB: 164 and 80
Sub-bottom Profiler Towed System					
Edgetech DSS2000 Chirp (24°cone)	202	2-16	10	20ms	190 dB: 6 180 dB: 10 160 dB: 130
Sidescan Sonar Towed System					
Edgetech DSS2000 LF (100°swath)	213	120	25	N/A	190 dB: 13 180 dB: 51 160 dB: 210
Edgetech DSS2000HF (100°swath)	219	410	50	N/A	190 dB: 9 180 dB: 39 160 dB: 160
Sonardyne 8071 Ultra Short Baseline (USBL; cone)	188	19-36	14	N/A	190 dB: 14 180 dB: 24 160 dB: 115

Source: EGS