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MEDITERRANEAN ENGINEERING GROUP 2014

International Conference 27-28 November, Rome

Increase exchange of electrical energy between Countries in a sustainable way

THE CHALLENGE OF THE MALTA-SICILY INTERCONNECTOR

Ing. Francesco Ventura
VDP S.r.l.

vdp
Progettazione integrata - Ambiente S.r.l.

MALTA-SICILY INTERCONNECTOR

VDP Srl – FIELDS OF SPECIALIZATION

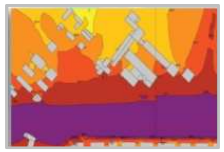
Strategic Environmental Assessment (SEA)

Environmental Authorizations

Environmental Impact Assessment (EIA)

Soil Management - Contaminated sites remediation

Environmental monitoring



Environmental Mitigation Plans

Noise barriers design

Energy and Carbon Management

MALTA-SICILY INTERCONNECTOR

THE MAIN ACTORS INVOLVED IN THE PROJECT

ITALIAN ELECTRIC NETWORK MANAGER

MALTESE ELECTRIC NETWORK MANAGER

ENVIRONMENTAL PROJECT

CABLES DESIGN AND INSTALLATION

MALTA-SICILY INTERCONNECTOR

DEVELOPMENT OF INTERCONNECTION POWER GRID AMONG MEDITERRANEAN COUNTRIES

NEEDS

ENSURE SUSTAINABLE DEVELOPMENT

BUILD AN EFFICIENT POWER GRID NETWORK

TASK

To create and foster strategic partnerships among Mediterranean countries, in order to develop initiatives aimed at improving the efficiency on use of energy resources and the respect of the environment

MALTA-SICILY INTERCONNECTOR

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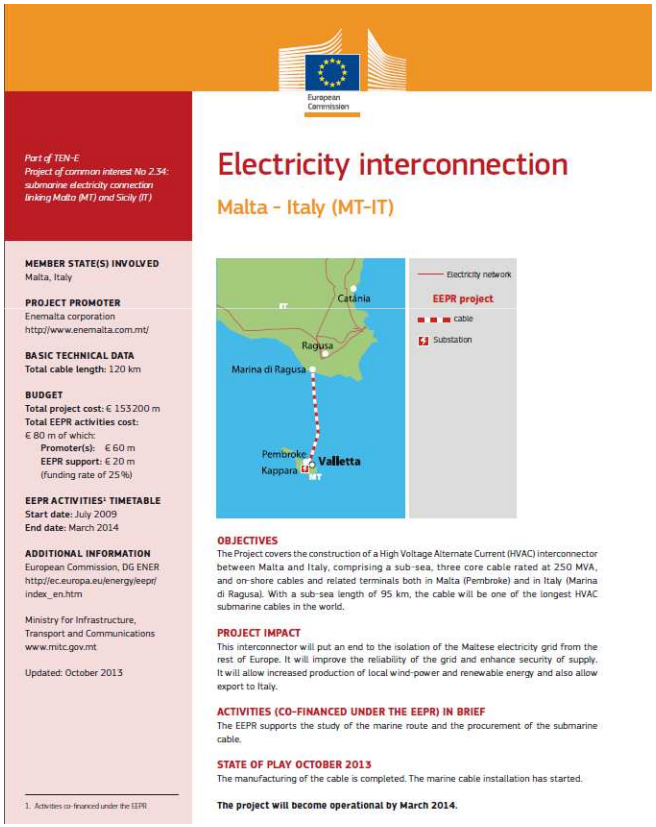
TEN-E NETWORK

Malta-Sicily Interconnector is included in the Trans-European Energy Network TEN-E as part of the TEN-E n. 2.34 project

€ 20 million financing – EEPR Program

The program "*European Energy Programme for Recovery*" EEPR, created in 2009 in accordance with EU energy policies, co-finances European projects in the energy sector able to boost economic recovery, energy security and capable to help reducing greenhouse gas emissions.



European Commission

Part of TEN-E
Project of common interest No 2.34: submarine electricity connection linking Malta (MT) and Sicily (IT)

MEMBER STATE(S) INVOLVED
Malta, Italy

PROJECT PROMOTER
Enemalta corporation
http://www.enemalta.com.mt/

BASIC TECHNICAL DATA
Total cable length: 120 km

BUDGET
Total project cost: € 153200 m
Total EEPR activities cost: € 80 m of which:
Promoter(s): € 60 m
EEPR support: € 20 m (funding rate of 25 %)

EEPR ACTIVITIES[1] TIMETABLE
Start date: July 2009
End date: March 2014

ADDITIONAL INFORMATION
European Commission, DG ENER
http://ec.europa.eu/energy/eepr/index_en.htm

Ministry for Infrastructure, Transport and Communications
www.mitc.gov.mt

Updated: October 2013

1. Activities co-financed under the EEPR

Electricity interconnection

Malta - Italy (MT-IT)

OBJECTIVES
The Project covers the construction of a High Voltage Alternate Current (HVAC) interconnector between Malta and Italy, comprising a sub-sea, three core cable rated at 250 MVA, and on-shore cables and related terminals both in Malta (Pembroke) and in Italy (Marina di Ragusa). With a sub-sea length of 95 km, the cable will be one of the longest HVAC submarine cables in the world.

PROJECT IMPACT
This interconnector will put an end to the isolation of the Maltese electricity grid from the rest of Europe. It will improve the reliability of the grid and enhance security of supply. It will allow increased production of local wind-power and renewable energy and also allow export to Italy.

ACTIVITIES (CO-FINANCED UNDER THE EEPR) IN BRIEF
The EEPR supports the study of the marine route and the procurement of the submarine cable.

STATE OF PLAY OCTOBER 2013
The manufacturing of the cable is completed. The marine cable installation has started.

The project will become operational by March 2014.

MALTA-SICILY INTERCONNECTOR

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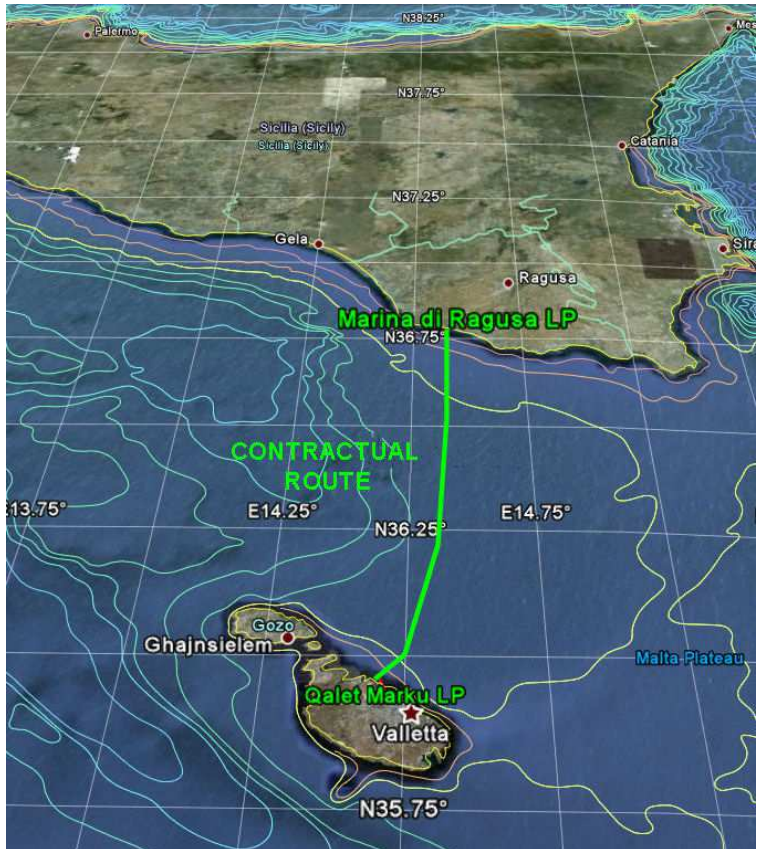
THE PROJECT

SUBMARINE LINK

Triple-pole cables, rated power 250 MVA

Underground cables and terminals connected in Malta (Maghtab) and in Italy (Marina di Ragusa)

120 KM LENGHT:
ONE OF THE LONGEST
AC CABLE CONNECTIONS
IN THE WORLD



MALTA-SICILY INTERCONNECTOR

THE OBJECTIVES

- ***Improving the security of energy supply***
  (to support economic development)
- ***Improve the network of sub-transmission in Malta***
  (needed to connect the Maltese electric network to the European one (ENTSO-E))
- ***Reduce the production of energy from fossil fuels in Malta***
  (thanks to the new station that will allow the installation of offshore wind turbines)
- ***Increase the use of Renewable Energy Sources (RES) in Sicily***
- ***Reduce emissions of Greenhouse Gases (GHG)***
  (objective in Malta for 2020)

MALTA-SICILY INTERCONNECTOR

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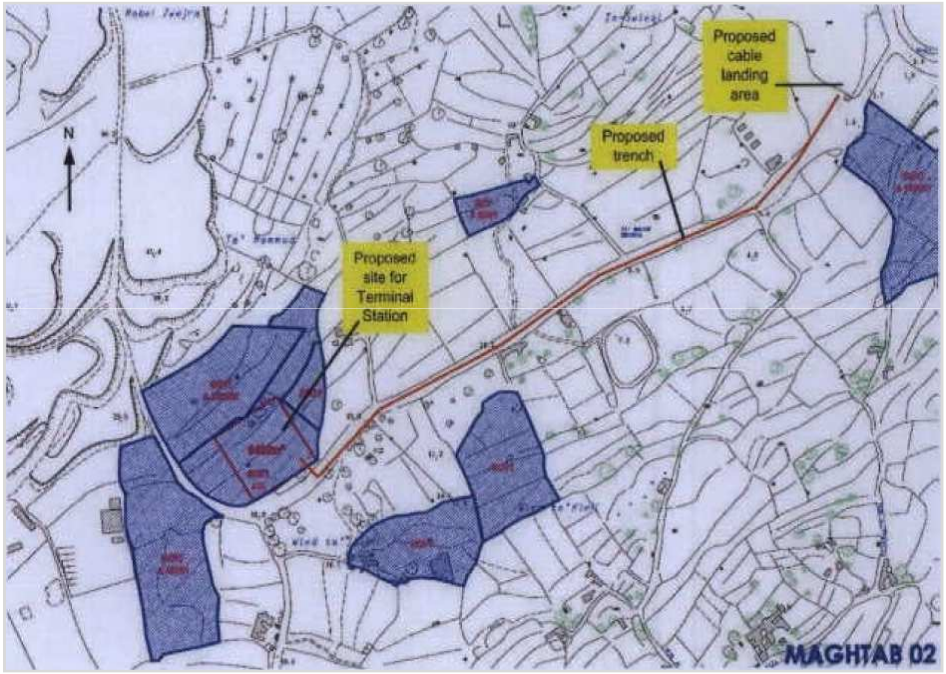
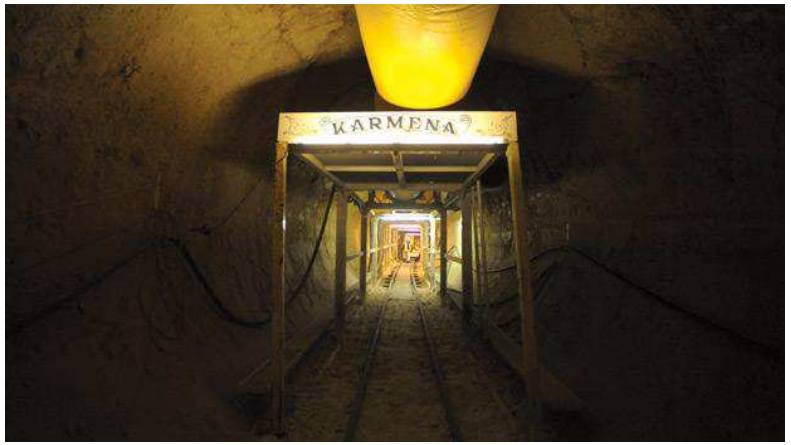
THE PROJECT: MALTESE SECTION

Land connection





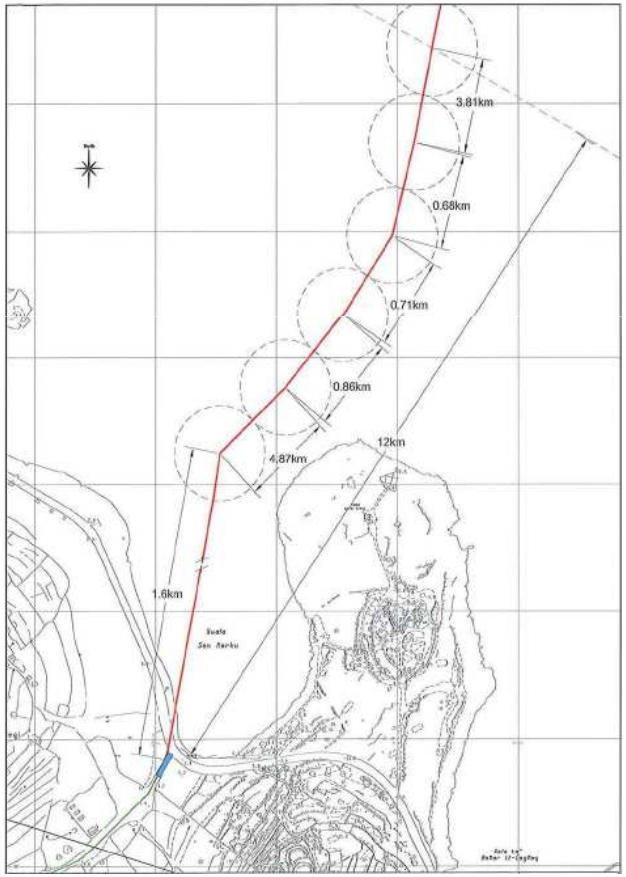
Realization of a 4 Km tunnel from the railway Terminal Maghtab to St. Andrews District Centre.

The project involves the construction of the **Terminal Station in Maghtab**, over an area of about 9.516 sqm. From the Terminal Station in Maghtab to the coast, is expected a **under road connection near Qalet Marku with underground cable of about 1 km.**

MALTA-SICILY INTERCONNECTOR

THE PROJECT: MALTESE SECTION

Marine connection



The **marine route**, developed between the Land/Sea joints in Italy and the Land/Sea joints in Malta, is approximately 97.5 km long, of which **71 km in Maltese territorial waters.**

The **landing point** on the Maltese coast:
the **bay of Qalet Marku**

MALTA-SICILY INTERCONNECTOR

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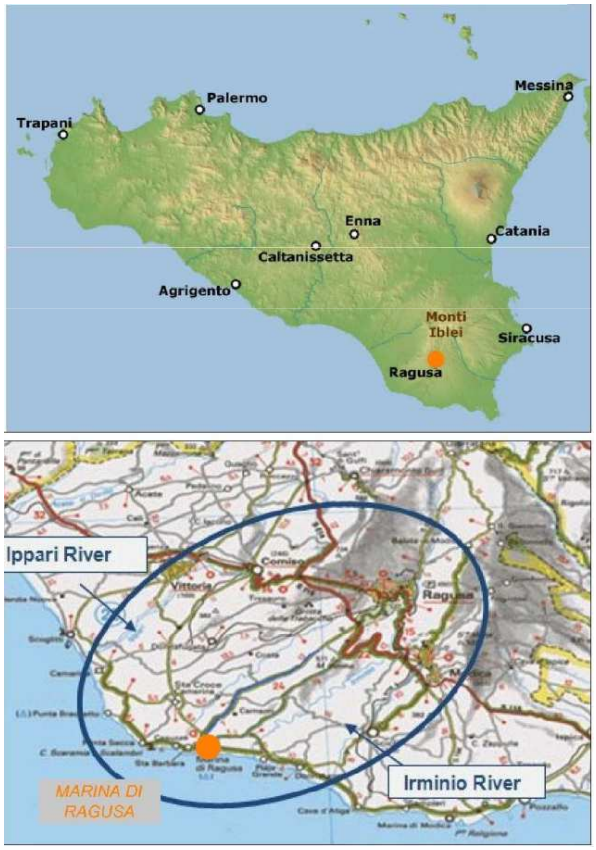
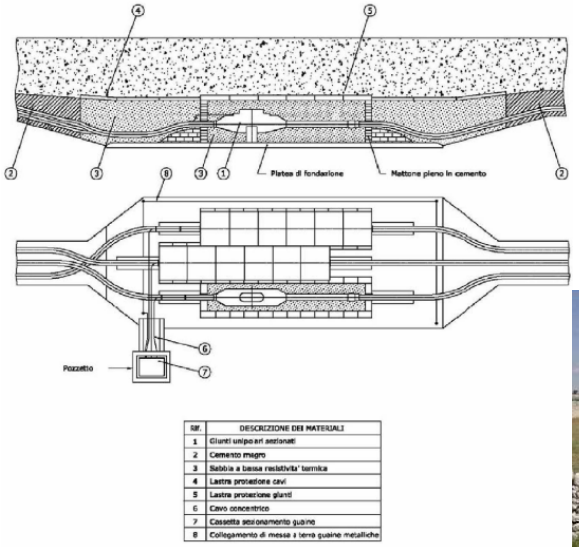
THE PROJECT: ITALIAN SECTION

Land Connection



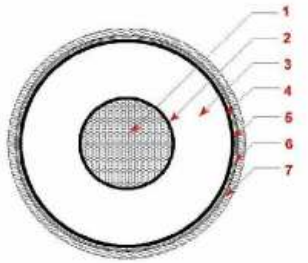
The land route, made of **double-circuit of 220 kV cables entirely underground**, has been developed in **Ragusa** town, from the existing power station to the point of landing of the marine cable near the purifier complex of Marina di Ragusa, for a total of **19 Km.**

Tipico camera giunti



NR.	DESCRIZIONE DEI MATERIALI
1	Giunti unipolari assionati
2	Cemento magro
3	Sabbia a bassa resistivita' termica
4	Lastra protezione cavi
5	Lastra protezione giunti
6	Cavo concentrico
7	Cassetta sezionamento guaine
8	Collegamento di messa a terra guaine metalliche

Tipico di un cavo terrestre unipolare 220 kV



MALTA-SICILY INTERCONNECTOR

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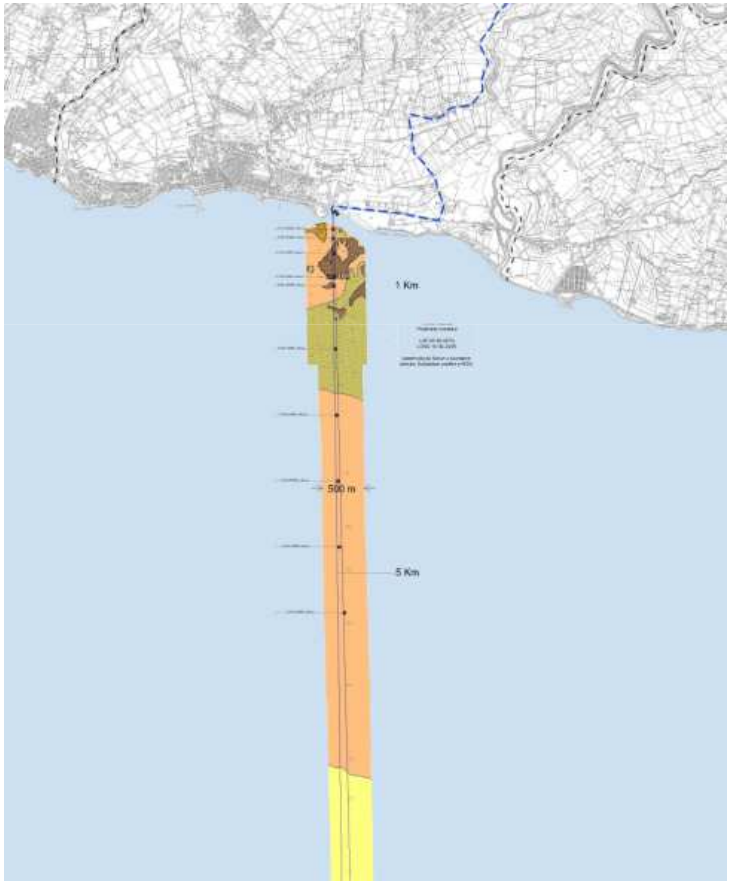
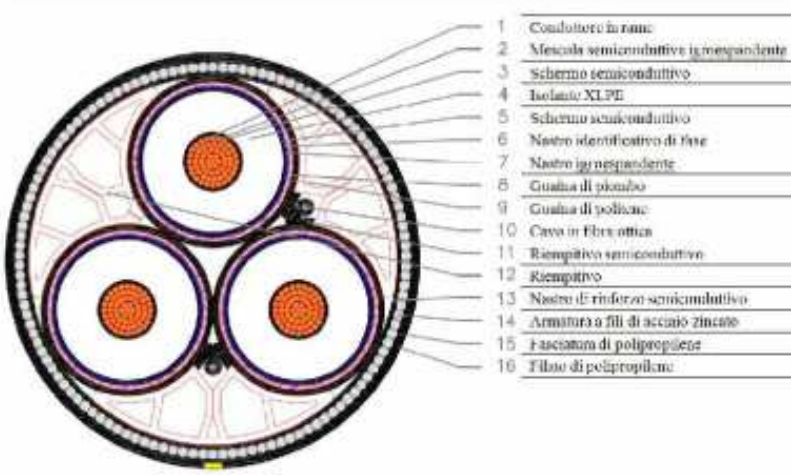
THE PROJECT: ITALIAN SECTION

Marine connection



The **marine route**, between the Land/Sea joints in Italy and Land/Sea joints in Malta, is approximately 97.5 km long, of which **26.5 km in Italian territorial waters**. It consists of **two triple-pole 220 kV cables** with 24 cm diameter .

Tipico del cavo marino a 220 kV con conduttore in rame da 630 mm2



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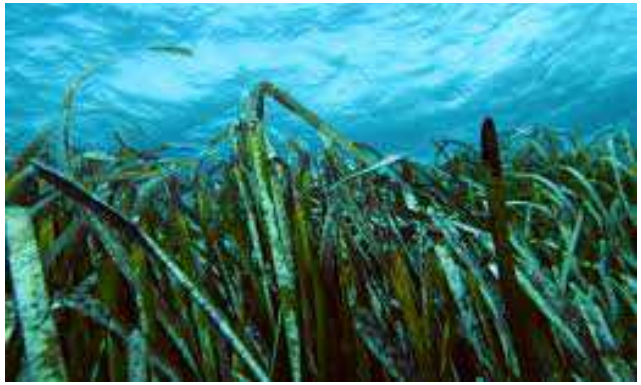
DESIGNING TOGETHER WITH THE ENVIRONMENT

Use of the best technologies to minimize environmental impacts of marine cable laying, in order to ...

Prevent possible coastal erosion.

Preserve and protect the Posidonia seagrass.



MALTA-SICILY INTERCONNECTOR

TECHNOLOGIES ADOPTED TO MINIMIZE IMPACTS

CABLES

For the Malta-Sicily Interconnector **cables with HVDC technology (High Voltage Direct Current) have been employed.** These cables are state of the art systems for transmission over long distances using overhead lines or submarine cables.

BENEFITS

This system offers various environmental benefits: "invisible" power lines, neutral electromagnetic fields, dry insulated cables and compact converter stations.

MALTA-SICILY INTERCONNECTOR

TECHNOLOGIES ADOPTED TO MINIMIZE IMPACTS

LANDING AREA

For the realization of the land/sea joints hole in the landing area, the **TOC (Controlled Horizontal Drilling)** drilling technique has been adopted. This technology guarantees that the maritime wayout of the cable does not occur in the presence of drilling mud but in presence of biodegradable material compatible with the environment.

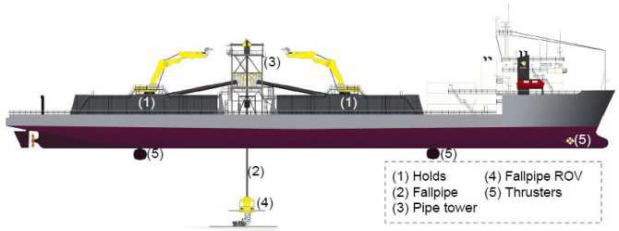
Construction site of the landing area in Marina di Ragusa (Sicily)

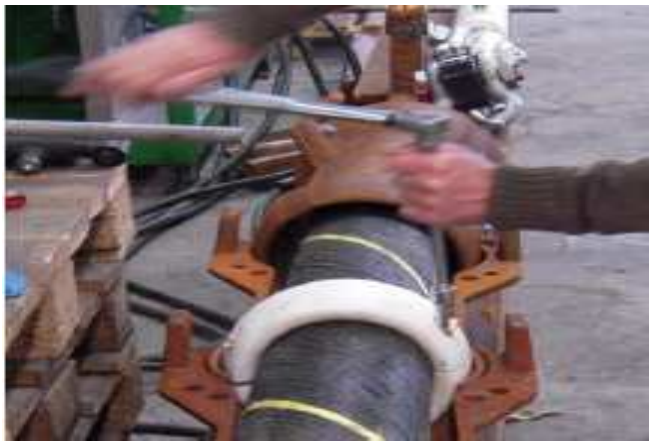
MALTA-SICILY INTERCONNECTOR

TECHNOLOGIES ADOPTED TO MINIMIZE IMPACTS

INSTALLATION

In presence of rock seabed and where the surface is covered of Posidonia Oceanica, the cables are not anchored but protected by cast iron shells **(CIS - Cast Iron Shells Installation)**. The weight of the reinforced cable prevents the movement of the cable on the seabed.





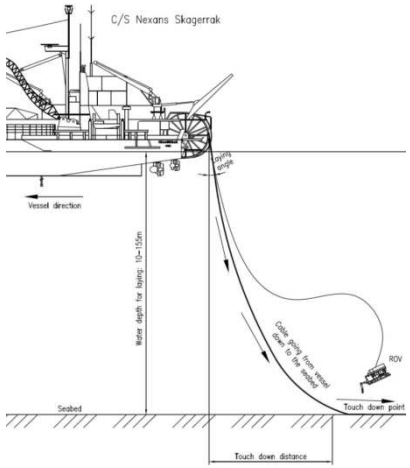
Cable laid on the seabed and protected by Cast Iron Shells Installation

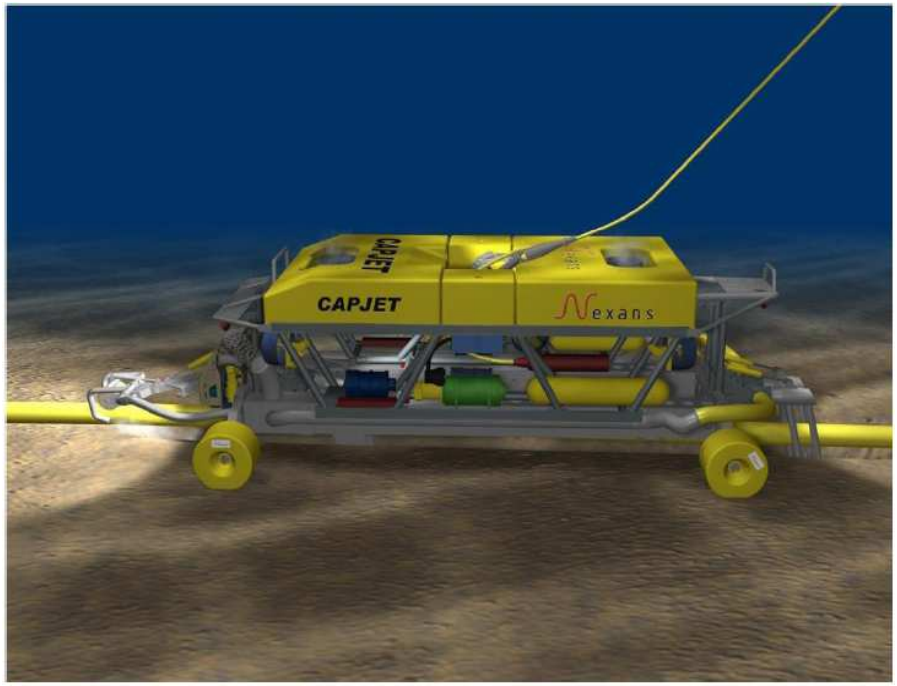
MALTA-SICILY INTERCONNECTOR

TECHNOLOGIES ADOPTED TO MINIMIZE IMPACTS

INSTALLATION

With sandy seabed, the installation technique is the **Capjet** - silting up through water jet machine. This represents the state of the art in minimizing the phenomenon of sediments suspension .





Water jet machine for the silting up of cables

MALTA-SICILY INTERCONNECTOR

TWO EIA PROCEDURES

MALTA

Environmental Impact Assessment Regulations (EIA), 2007 Arrangement of Regulations

The project is part of the Form IA Category projects of Annex II, section 2.6.2.3 of the EIA Regulations, 2007 (Legal Notice 114 of 2007- MEPA Malta Environment & Planning Authority).

ITALY

Legislative Decree 152/2006 and amendments. Part II

This type of project is specified at point 4) ANNEX II - "Projects under State jurisdiction" of Legislative Decree 152/2006 and subsequent amendments. The study has been set up for EIA in accordance with DPCM 27/12/1988.

MALTA-SICILY INTERCONNECTOR

TWO ENVIRONMENTAL IMPACT ASSESSMENTS

MALTA	EPS - Environmental Planning Statement
ITALY	SIA - Studio di Impatto Ambientale

MALTA-SICILY INTERCONNECTOR

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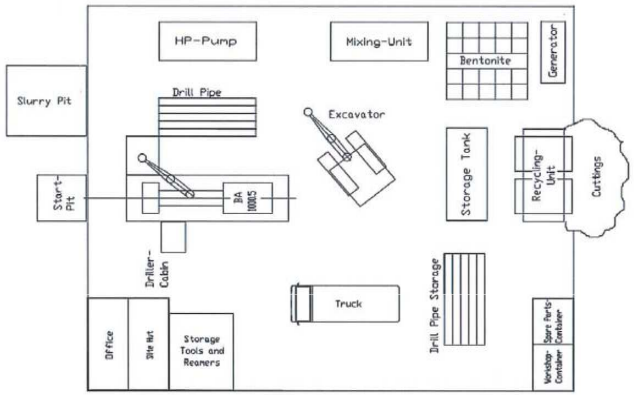
ITALIAN SECTION: KEY ENVIRONMENTAL ISSUES

- Analysis of emissions, acoustic and atmospheric emissions monitoring during construction phase.
- Environmental Monitoring Project
- Precise verification of electromagnetic fields (DPA bands)
- Mapping of biotic community and verification of impact on cetaceans
- Natural Protected Areas and "Siti Natura 2000"
- Archaeological evidences and underwater archeology
- Environmental surveys air, soil, water, marine ecosystem
- *Ante operam* Monitoring

MALTA-SICILY INTERCONNECTOR

ATMOSPHERIC EMISSIONS MONITORING DURING CONSTRUCTION PHASE



Construction site layout - landing area in Marina di Ragusa

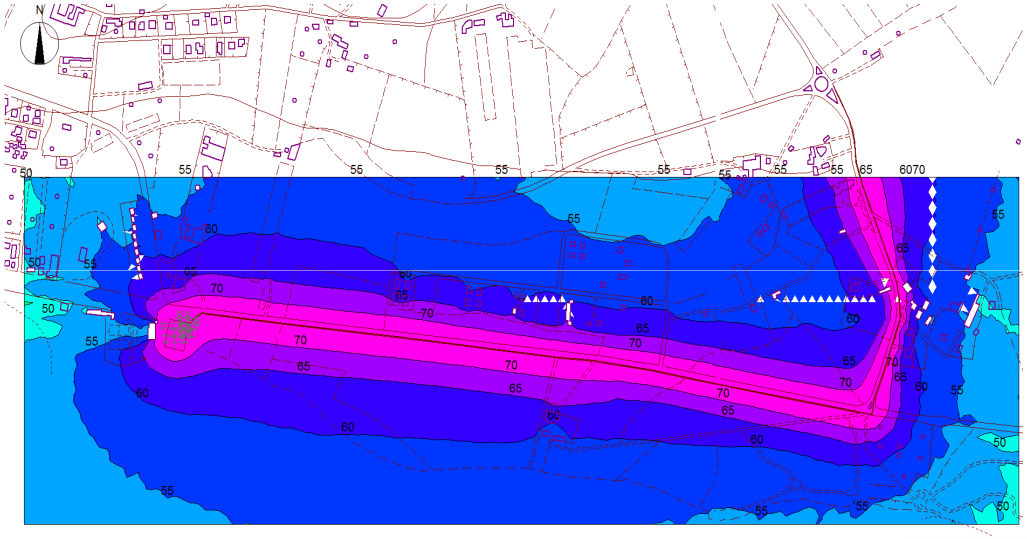
NO2 maximum isoconcentration hourly lines

ATM_01	PM10	As	Cd	Ni	Pb	NO2	SO2*
	µg/mc	µg/mc	µg/mc	µg/mc	µg/mc	µg/mc	µg/mc
20/06/2013	42,0	<0,009	<0,009	0,015	0,013		
21/06/2013	13,5	<0,009	<0,009	<0,009	<0,009		
22/06/2013	20,4	<0,009	<0,009	<0,009	<0,009		
23/06/2013	22,2	<0,009	<0,009	<0,009	<0,009		
24/06/2013	33,2	<0,009	<0,009	<0,009	<0,009		
25/06/2013	21,2	<0,009	<0,009	<0,009	<0,009		
26/06/2013	19,5	<0,009	<0,009	<0,009	<0,009		
MEDIA	24,6					10,1	<11

Air quality analysis in the existing power station in Ragusa

MALTA-SICILY INTERCONNECTOR

ACOUSTIC EMISSIONS MONITORING DURING CONSTRUCTION PHASE



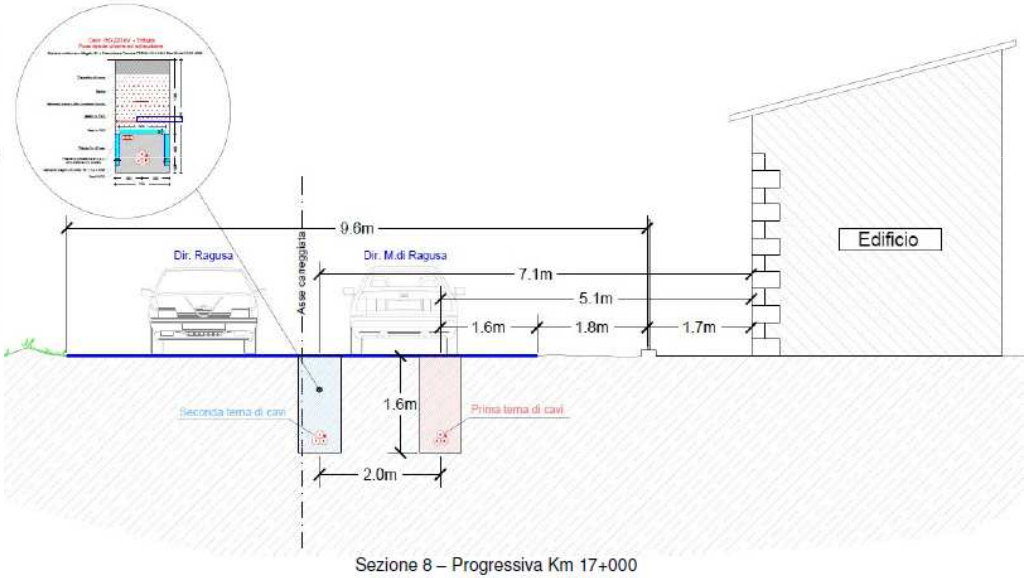
Output acoustic simulation – Software Mithra

		VALORI MEDI DELLE 24 ore [dB(A)]								
Periodo	Intervallo	LAEq	LMax	LMin	L1.00	L5.00	L10.00	L50.00	L90.00	L95.00
24		57.9	61.7	47.6	61.5	60.2	59.1	58.3	50.6	49.0
D		59.2	72.0	41.4	64,9	62.6	58.9	55.9	47.7	46.4
N		52.8	70.7	35.4	59.2	57.1	48.8	46.0	41.5	39.6

Noise pollution investigations near the SCI area

MALTA-SICILY INTERCONNECTOR

AD HOC CHECKS ON ELECTROMAGNETIC FIELDS



Sezione 8 – Progressiva Km 17+000

MALTA-SICILY INTERCONNECTOR

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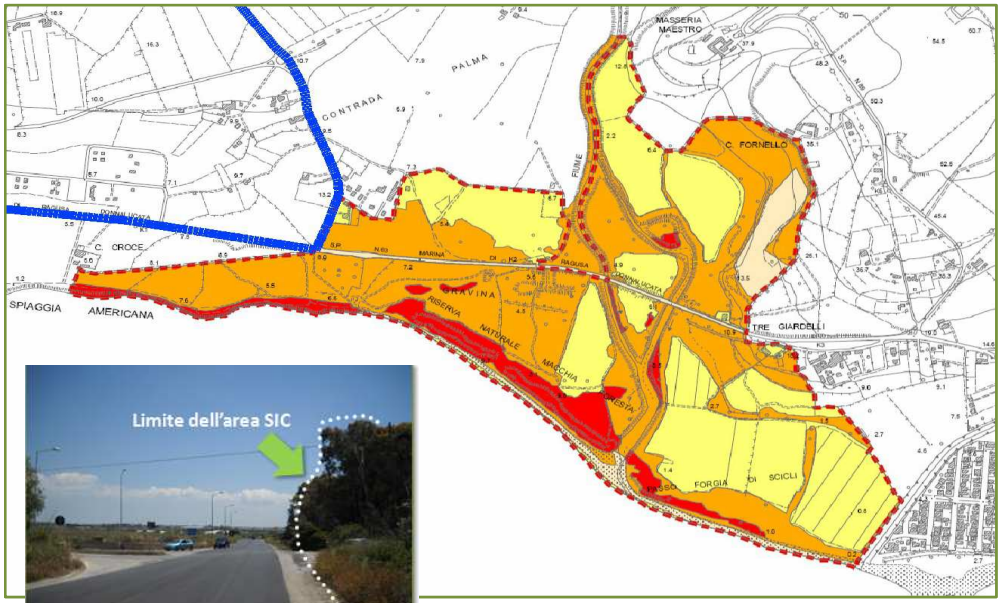
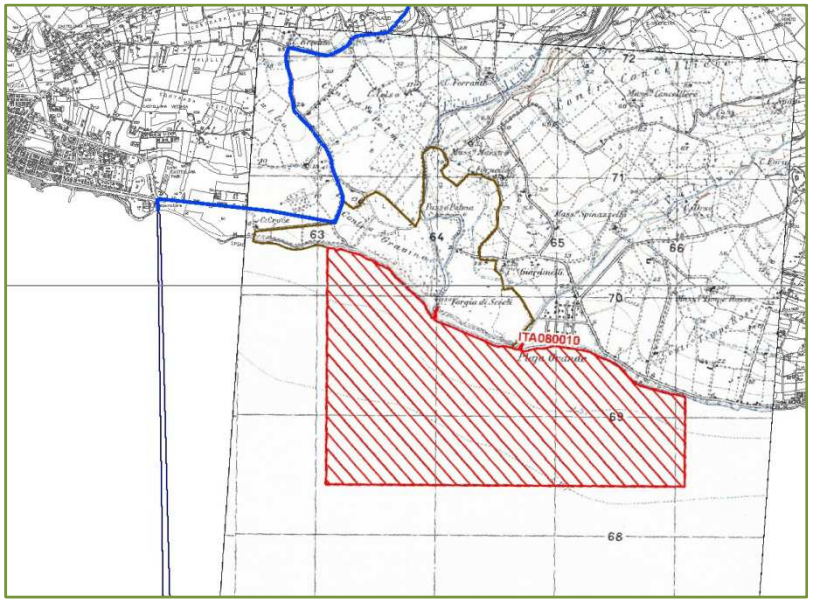
ANALYSIS OF HABITAT AND SPECIES

SIC ITA080001 "Irminio river estuary" Map of species' habitat



SIC ITA080010 "Seabed of Irminio river estuary"



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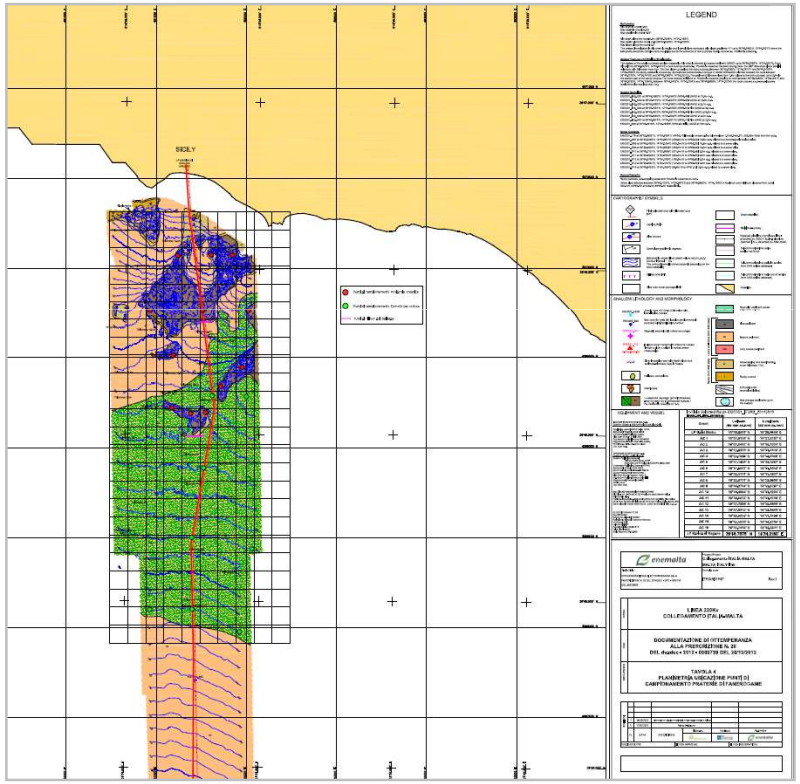
ENVIRONMENTAL MONITORING PROJECT



	SUB-COMPONENTE	ACRONIMO
ATM	Qualità dell'aria: area stazione elettrica	QDA_STZ
	Qualità dell'aria: lungo linea	QDA_LL
	Qualità dell'aria: area approdo	QDA_APP

	SUB-COMPONENTE	ACRONIMO
IDR	Piezometri	PIEZ
	Analisi fisico – chimica campioni acque	AFC

	SUB-COMPONENTE	ACRONIMO
ECO	Analisi fisico – chimica campioni acque	AFC
	Analisi fisico – chimica dei sedimenti	AS
	Analisi comunità bentoniche	ACB
	Analisi delle fanerogame	APP

	SUB-COMPONENTE	ACRONIMO
SUO	Sondaggi con prelievi campioni terreni	GEO
	Inclinometri	INC
	Analisi fisico – chimica campioni terreni	AFC

	SUB-COMPONENTE	ACRONIMO
RUM	Misure da traffico veicolare	PR_S
	Misure da attività cantiere	PR_C

	SUB-COMPONENTE	ACRONIMO
CEM	Misure determinazione valori di fondo area stazione	STZ
	Misure determinazione valori di fondo lungo linea	LL

	SUB-COMPONENTE	ACRONIMO
PAE	Rilievo fotografico contesto paesaggistico	RFP

As per today, *ante operam* and *in progress* monitoring have been completed

MALTA-SICILY INTERCONNECTOR

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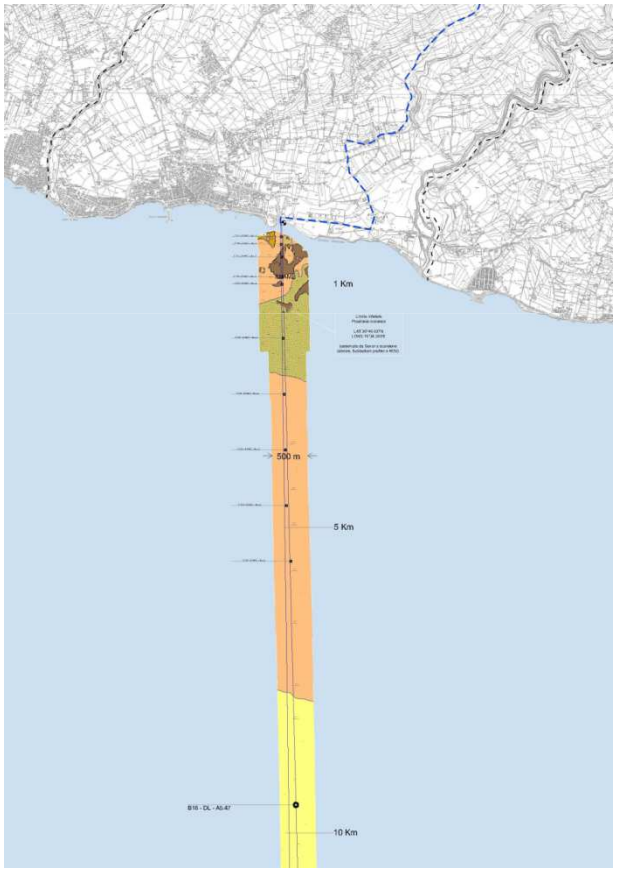
ANALYSIS OF MARINE ECOSYSTEM



Biotic community mapping

MALTA-SICILY INTERCONNECTOR

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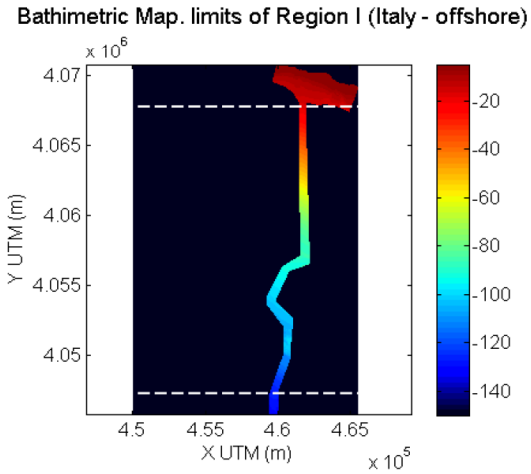
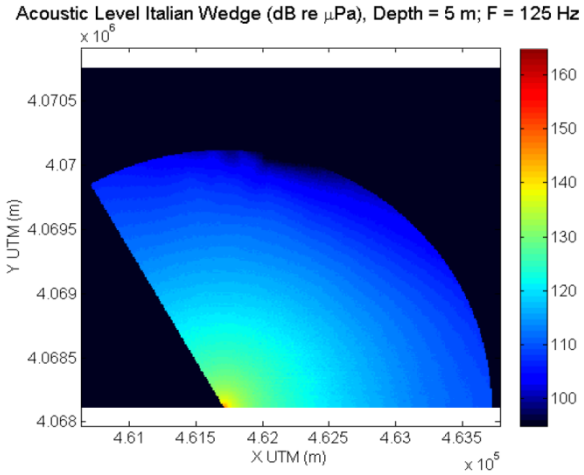
VERIFICATION OF PRESENCE OF MARINE CETACEANS

	Specie	Nome comune	Dimensioni	Habitat	Segnali acustici prevalenti (*range* di frequenza)
Misticeti	*Balaenoptera physalus*	Balenottera comune	20-25 m ca.	Pelagica; di scarpata profonda	10 Hz - 80 Hz
Odontoceti	*Physeter macrocephalus*	Capodoglio	12-18 m ca.	Di scarpata profonda	200 Hz - 32 kHz
	Ziphius cavirostris	Zifio	6 m ca.	Pelagico; di scarpata profonda	20-150 kHz
	Globicephala melas	Globicefalo	5-6 m ca.	Pelagico	1 kHz - 65 kHz
	Grampus griseus	Grampo	3,5 m ca.	Di scarpata profonda	2 kHz - 16 kHz
	Tursiops truncatus	Tursiope	3 m ca.	Costiero	4 kHz - 130 kHz
	Stenella coeruleoalba	Stenella striata		Pelagica; di scarpata profonda	4 kHz - 65 kHz
	Delphinus delphis	Delfino comune	2 m ca.	Costiero; di scarpata profonda	2 kHz - 67 kHz

Study on the definition of the restricted area for the protection of marine mammals from underwater noise





Simulation model of underwater sound propagation RAMSGEO

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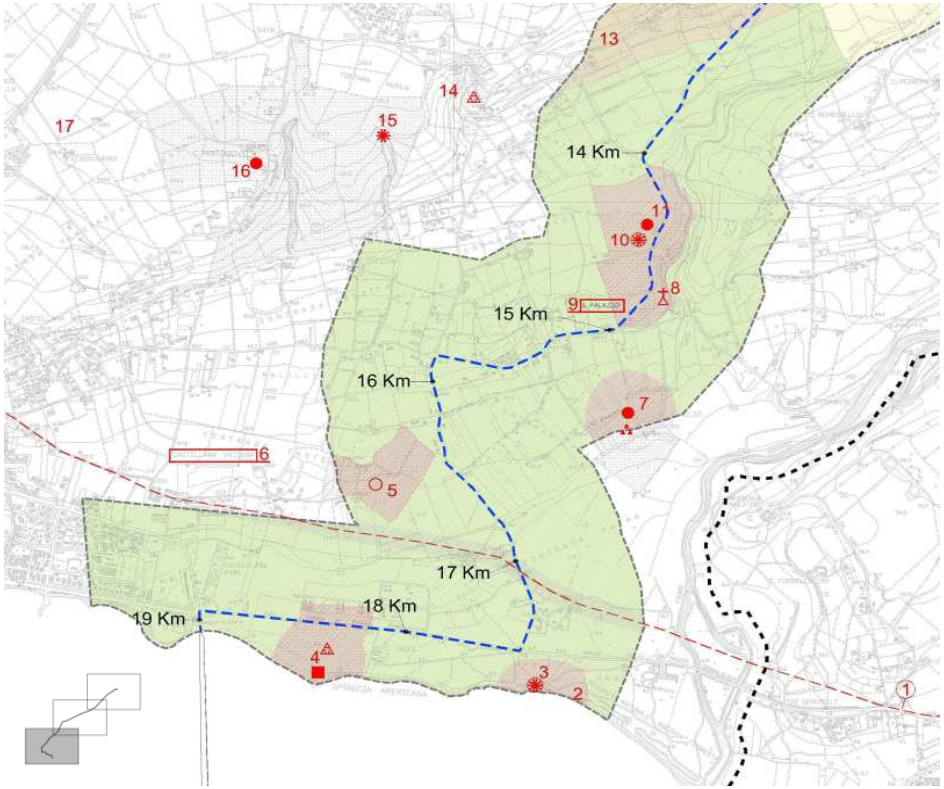
ARCHAEOLOGICAL RISK ASSESSMENT

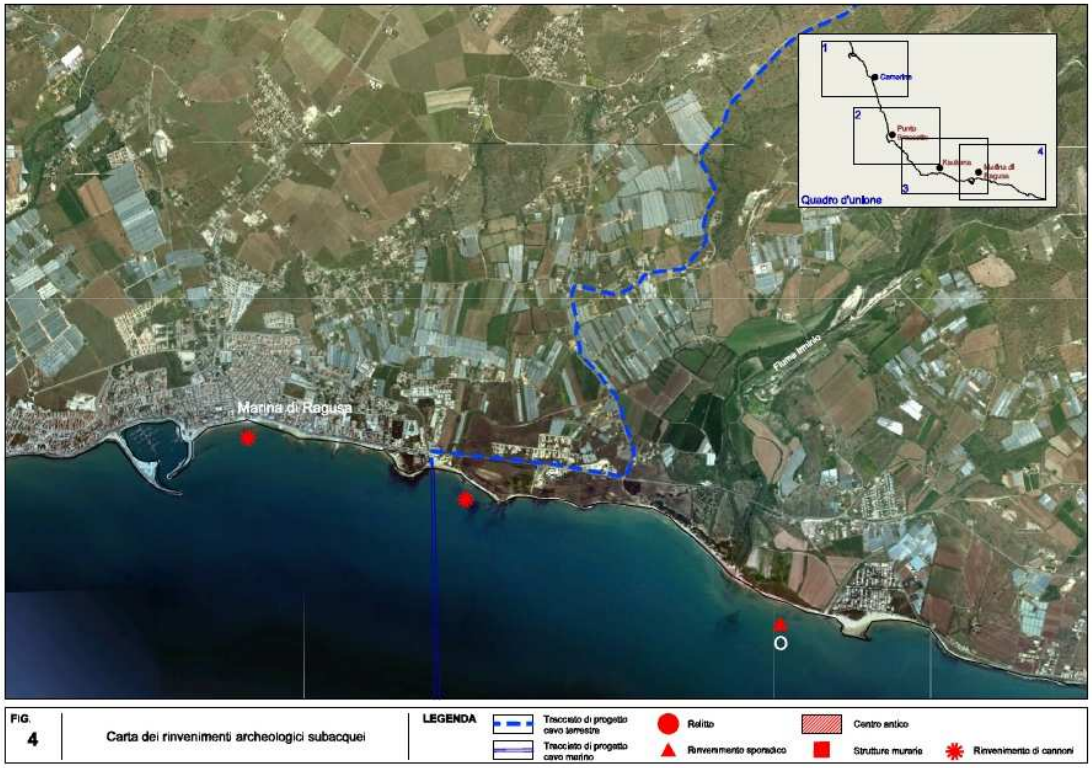


ARCHAEOLOGICAL STUDY OF LAND CONNECTION

- Identification of archaeological evidences
- Archaeological risk assessment of the area
- Archaeological risk assessment related to the connection

MALTA-SICILY INTERCONNECTOR

UNDERWATER ARCHAEOLOGY



Verification of underwater archaeological evidences using marine preliminary survey and mapping

Monitoring

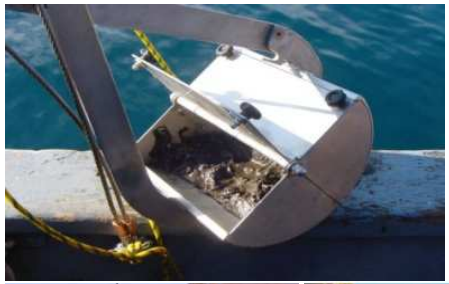
Phases of archaeological analysis of sedimentary material sampled

MALTA-SICILY INTERCONNECTOR

vdp Progettazione integrata - Ambiente S.r.l.

ENVIRONMENTAL MONITORING OF MARINE ECOSYSTEM

THE INSTALLATION OF SUBMARINE CABLE AFFECTS A SMALL PART OF POSIDONIA OCEANICA SEAGRASS



Surveys monitored:

A. Analysis of phanerogams
B. Physico-chemical analysis of water
C. Physico-chemical analysis of sediments
D. Analysis of benthic community
E. Verification of presence of marine cetaceans

MALTA-SICILY INTERCONNECTOR

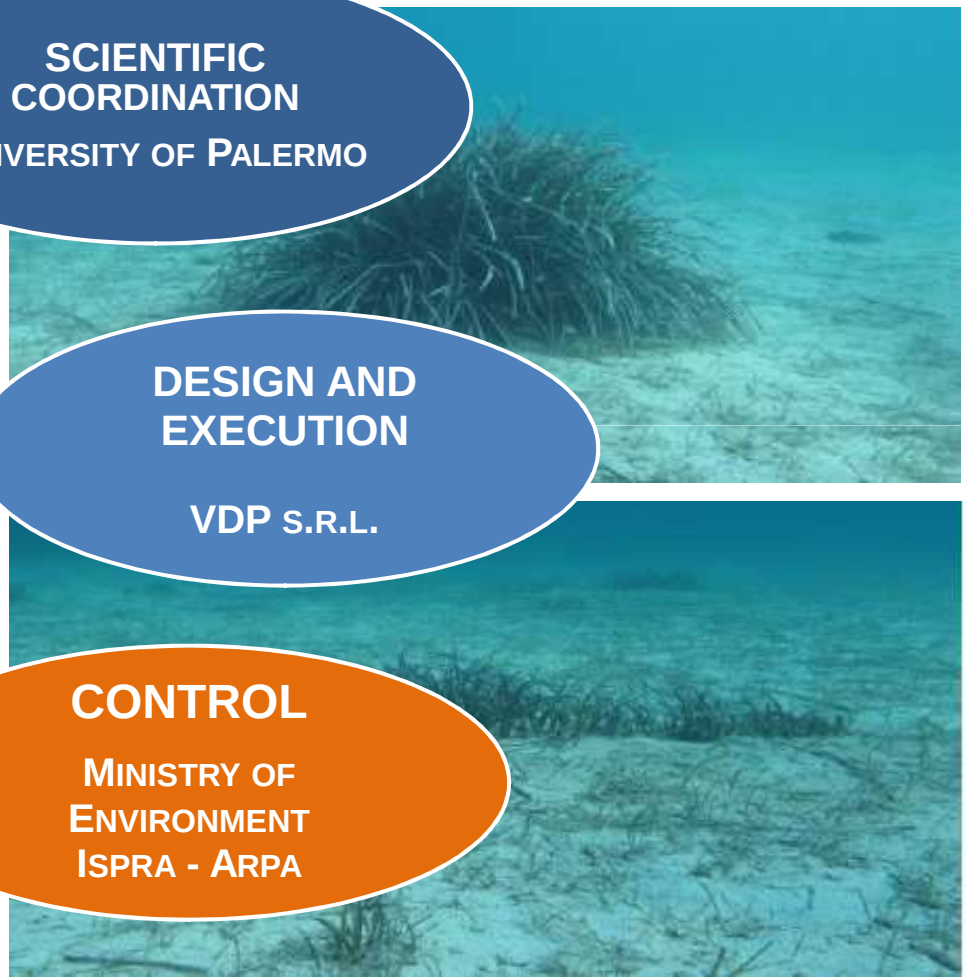
After the installation…

SCIENTIFIC COORDINATION
UNIVERSITY OF PALERMO

PROJECT FOR THE REPLANTING OF POSIDONIA OCEANICA

DESIGN AND EXECUTION
VDP S.R.L.

CONTROL
MINISTRY OF ENVIRONMENT
ISPRA - ARPA



MALTA-SICILY INTERCONNECTOR

Thank you for your attention

Francesco Ventura

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