

DELOS – EVK3-CT2000-0041
Deliverable No 5 for WP1.1
LCS in IT – UB part
Based on the brief questionnaire

This document summarizes the information collected for DELOS WP1.1 “Inventory of engineering properties of LCS”.

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IT Map UB part

The map of Italy below shows the identification numbers we gave to each region (e.g. Tuscany is n° 11) in agreement with partners UR3/MOD, in order to have a unique numeration.



NUMBER	REGION'S NAME
1	VENETO
2	EMILIA-ROMAGNA
3	MARCHE
4	ABRUZZO
5	MOLISE
6	PUGLIA
7	BASILICATA
8	CALABRIA
9	CAMPANIA
10	LAZIO
11	TOSCANA
12	LIGURIA
13	SICILIA
14	SARDEGNA

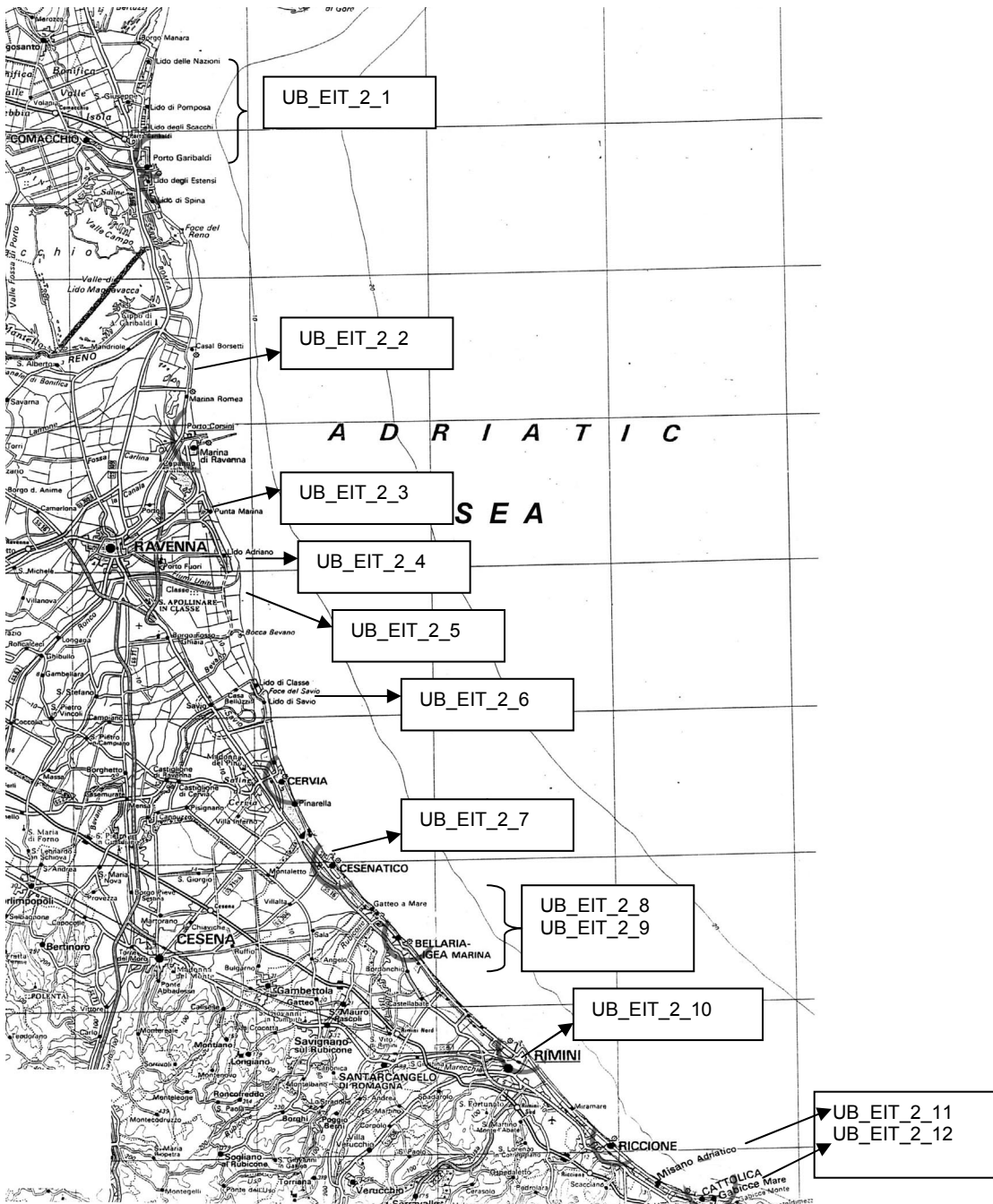
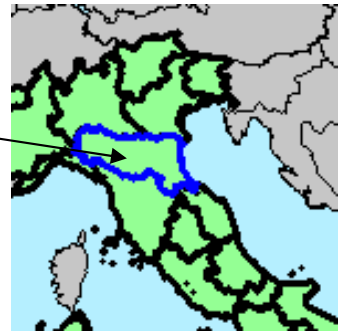
The table below shows the identification number files and the location name.

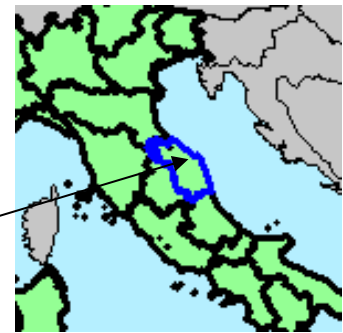
The identification file name has been changed from "UB_EIT_location number" to "UB_EIT_region number_location number". Within each region the location number goes from north to south.

IDENTIFICATION NUMBER	REGION	LOCATION
2_1	EmiliaRomagna (UB_EIT_2_)	From porto Garibaldi to Lido delle Nazioni
2_2		Casal Borsetti
2_3		Punta Marina
2_4		Lido Adriano
2_5		Lido di Dante
2_6		Lido di Savio-Lido di Classe
2_7		Cesenatico
2_8		S. Mauro-Gatteo
2_9		Bellaria-Igea Marina
2_10		Rimini
2_11		Misano
2_12		Cattolica
3_1	Marche (UB_EIT_3_)	Gabicce
3_2		Gabicce
3_3		Casteldimezzo di Pesaro
3_4		Fiorenzuola di Focara
3_5		San Marino di Pesaro
3_6		Pesaro
3_7		Pesaro
3_8		Pesaro-Fano
3_9		Fano
3_10		Metaurilia
3_11		Marotta
3_12		Senigallia
3_13		Marina di Montemarciano
3_14		Rocca Priora di Falconara Marittima
3_15		Falconara Marittima-Torrette di Ancona
3_16		Ancona
3_17		Portonovo
3_18		Sirolo and Numana
3_19		Scossicci-Portorecanati
3_20		Porto Potenza Picena
3_21		Fontespina-Porto Civitanova
3_22		Porto S.Elpidio to Casabianca di Fermo
3_23		From Lido di Fermo to Porto S.Giorgio.
3_24		Marina Palmense di Fermo.
3_25		Marina di Altidona
3_26		Pedaso
3_27		Marina di Campofilone

3_28		Cupramarittima
3_29		Grottammare (North of Tesino river mouth)
3_30		Grottammare (South of Tesino river mouth)
3_31		San Benedetto del Tronto - Porto d'Ascoli
6_1	Puglia (UB_EIT_6_)	Bisceglie
6_2		Bisceglie
6_3		Bari
6_4		Brindisi
11_1	Toscana (UB_WIT_11_)	Marina di Massa
11_2		Marina di Pisa
11_3		Prato_Ranieri
11_4		Follonica
12_1	Liguria (UB_WIT_12_)	Ventimiglia
12_2		Bordighera
12_3		San Remo
12_4		Arma di Taggia
12_5		Santo Stefano

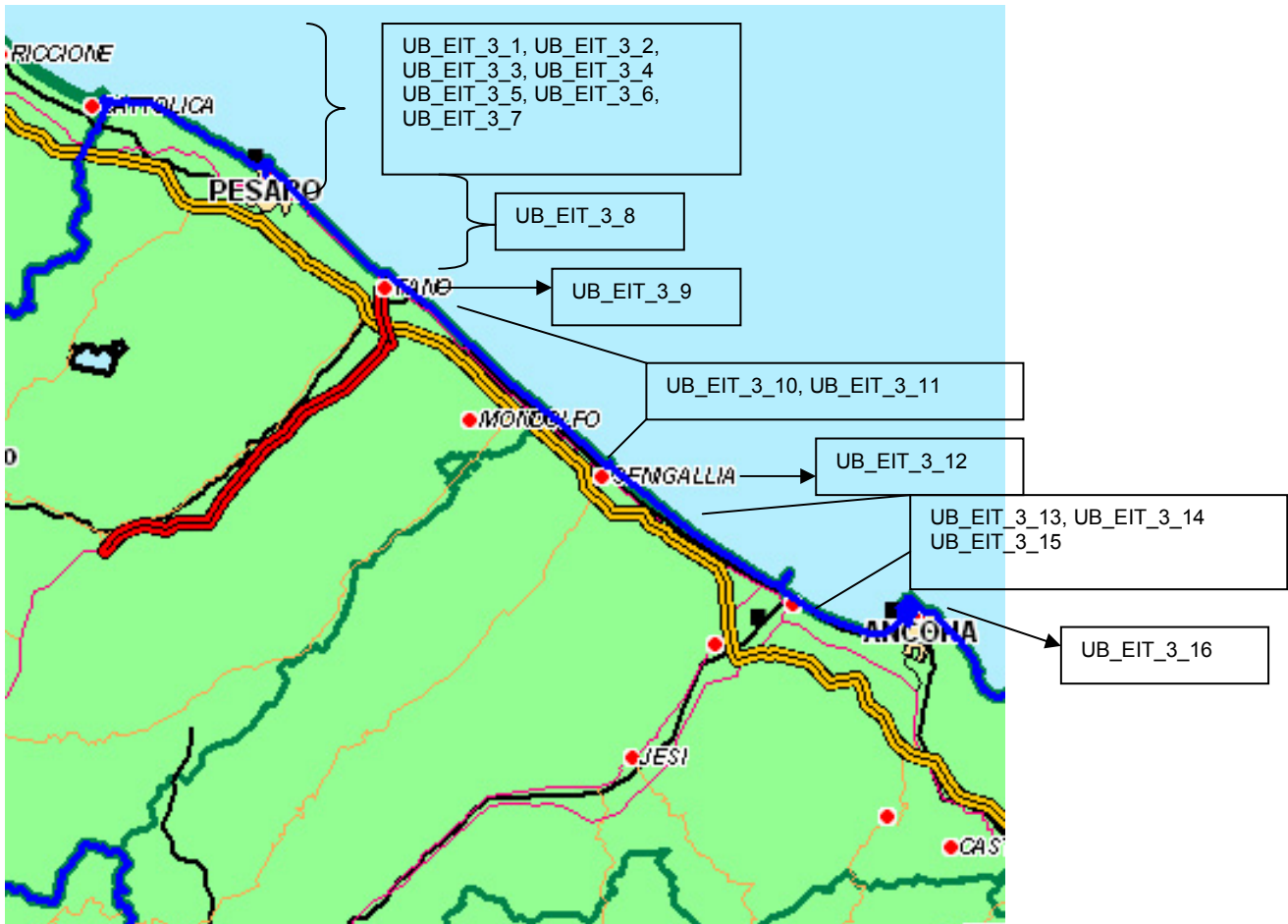
EMILIA- ROMAGNA



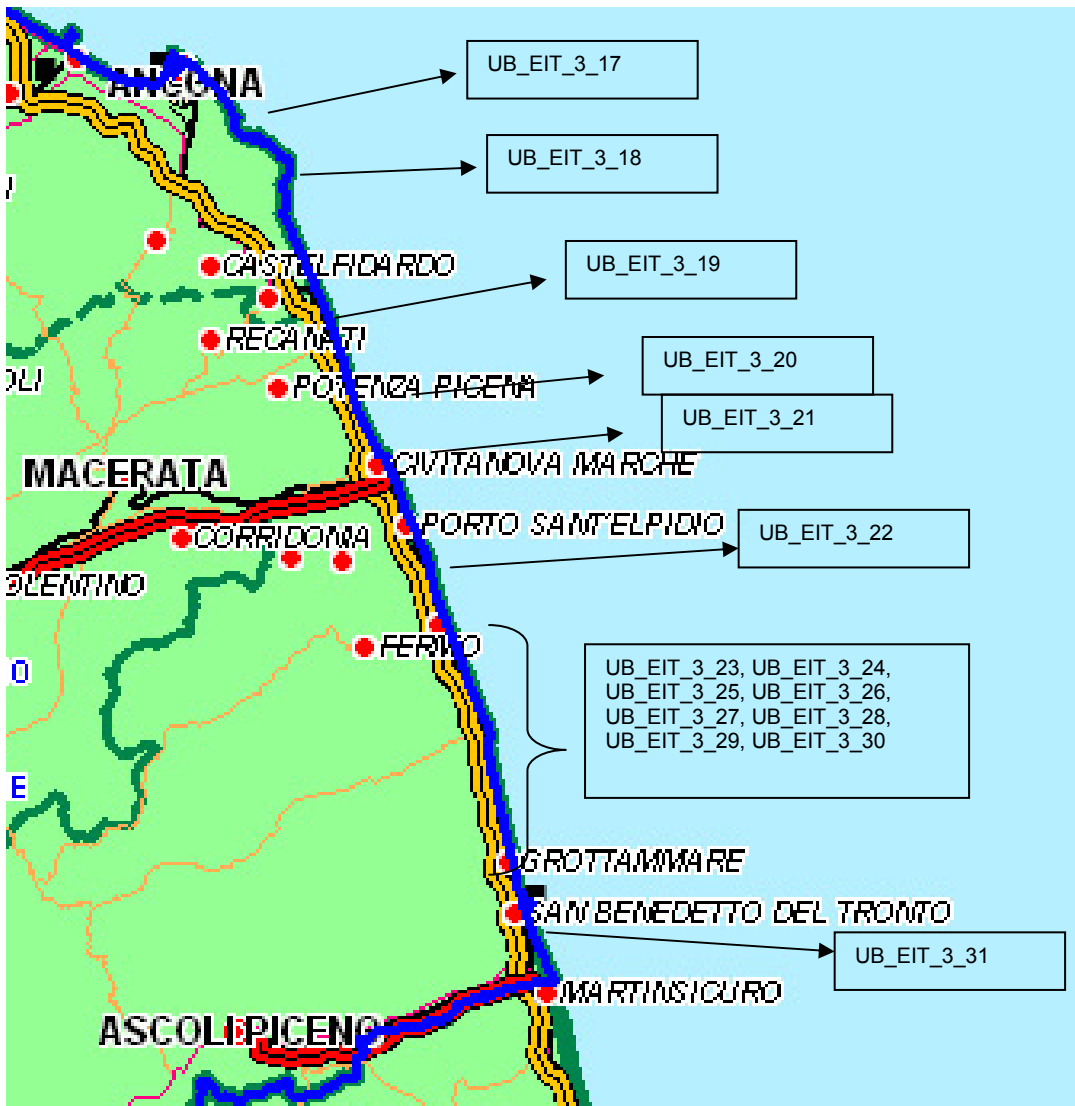


MARCHE

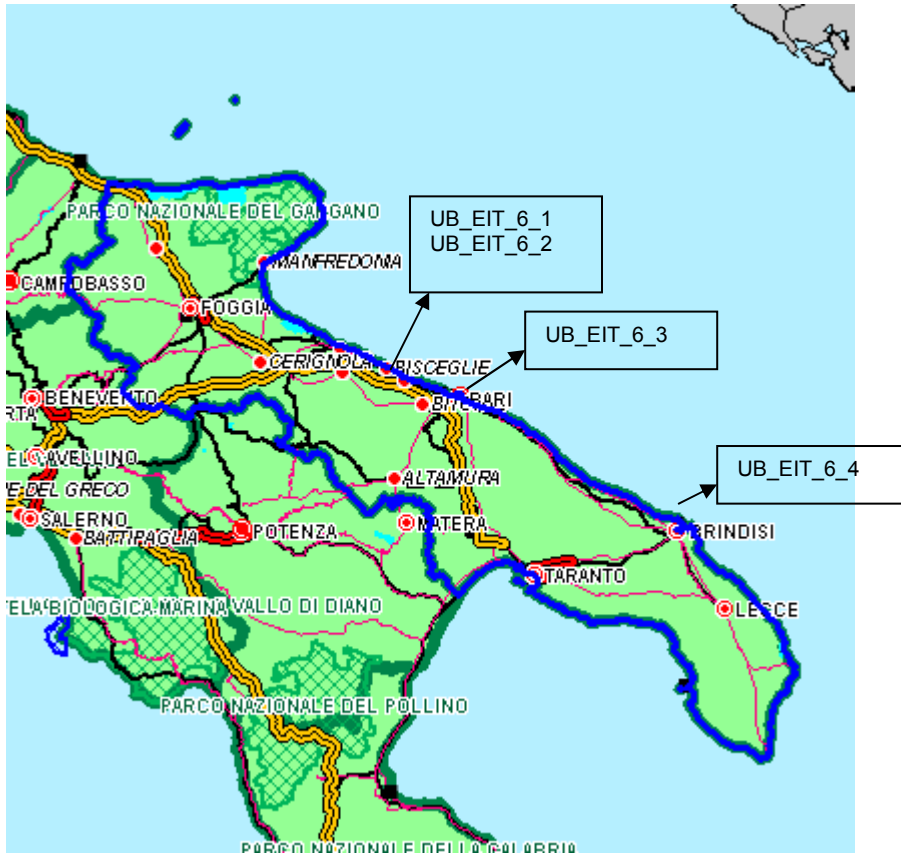
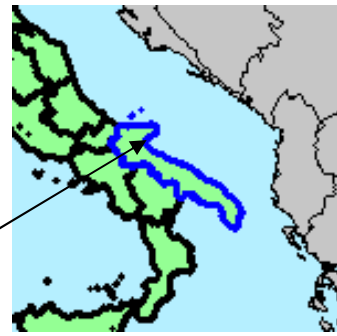
MARCHE - NORTH



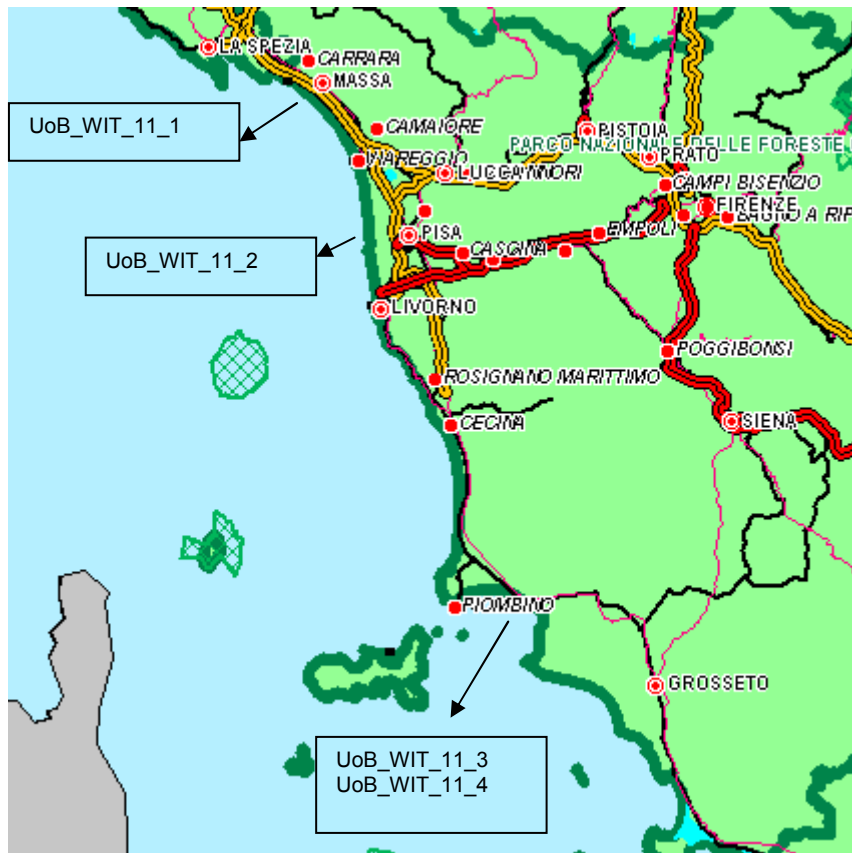
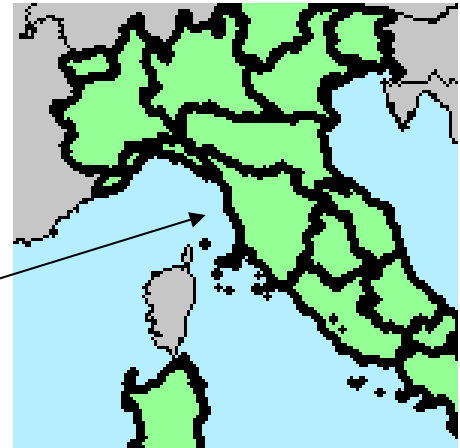
MARCHE - SOUTH

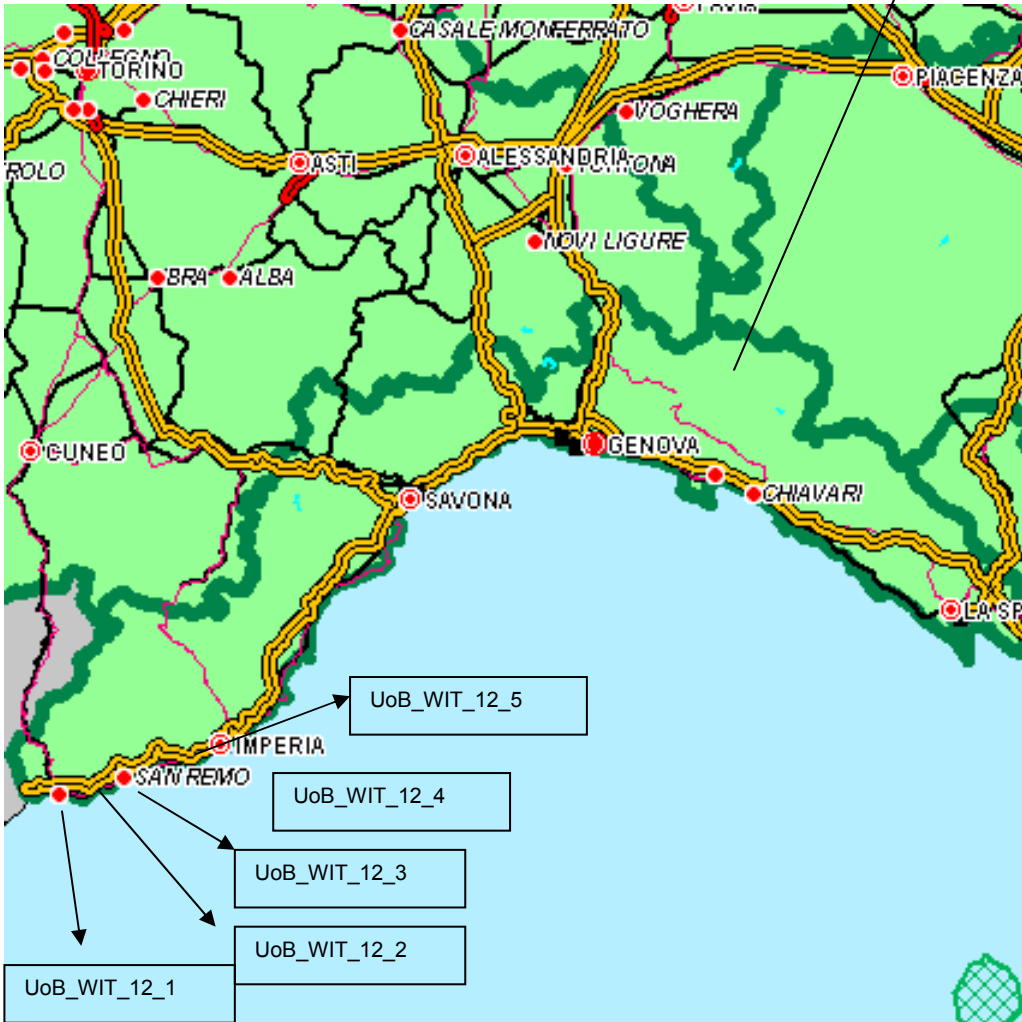
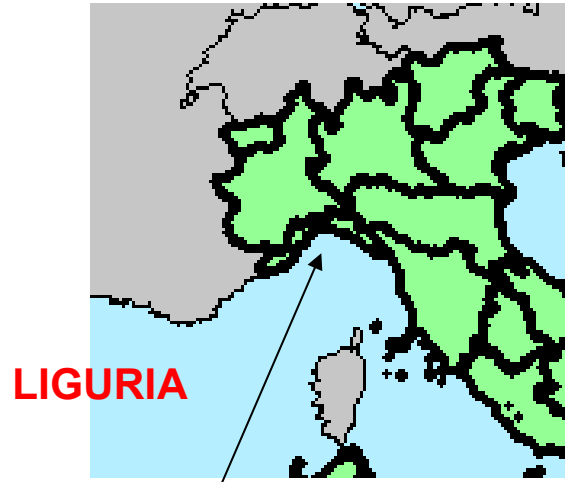


PUGLIA



TOSCANA





UB_EIT_2_1, From Porto Garibaldi to Lido delle Nazioni (FE)

Main motive for building the LCS

Beach erosion

Impacts on bio-environment

Not known yet.

Socio-economic impact

Not known yet.

System Layout (dimensioned sketch)

9 km of beach protected by emerged breakwaters. Each element is about 100m long with gaps 30-50m wide and distance from the beach of about 150m.

Typical cross section (dimensioned sketch)

Not know

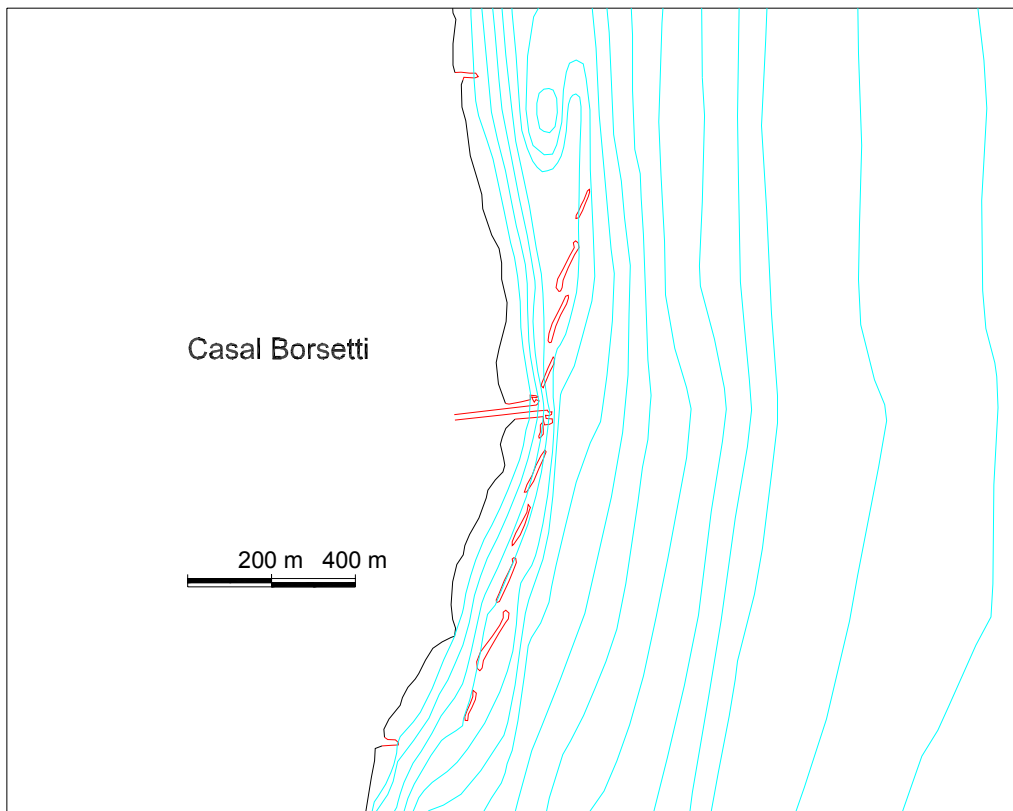
Indication of water level variations

The tidal range is about $\pm 0.4\text{m}$

Existence of detailed information

There's no further informations.

UB_EIT_2_2, Casal Borsetti, at the north side of Ravenna harbour.



Main motive for building the LCS

Coast erosion, protection of recreational facilities.

Impacts on bio-environment

Not known yet.

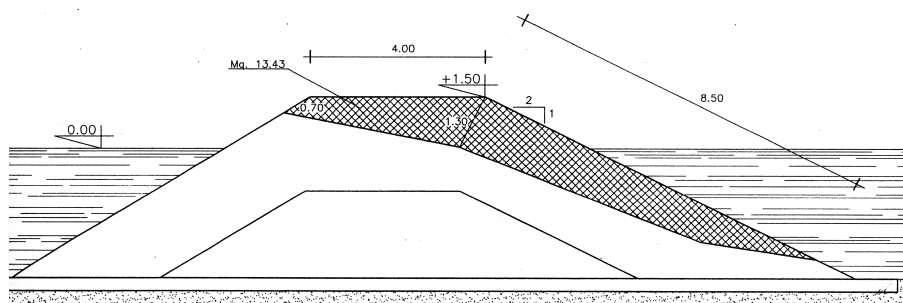
Socio-economic impact

Not known yet.

System Layout (dimensioned sketch)

10 elements: 6 in the south side and 4 in the north side of the channel mouth “Canale in destra Reno.”

Typical cross section (dimensioned sketch)



Indication of water level variations

The tidal range is about ± 0.4 m

Existence of detailed information

It is possible to have further informations.

UB_EIT_2_3, Punta Marina.

The construction was completed during spring 2001

Main motive for building the LCS

Coast erosion, protection of recreational facilities.

Impacts on bio-environment

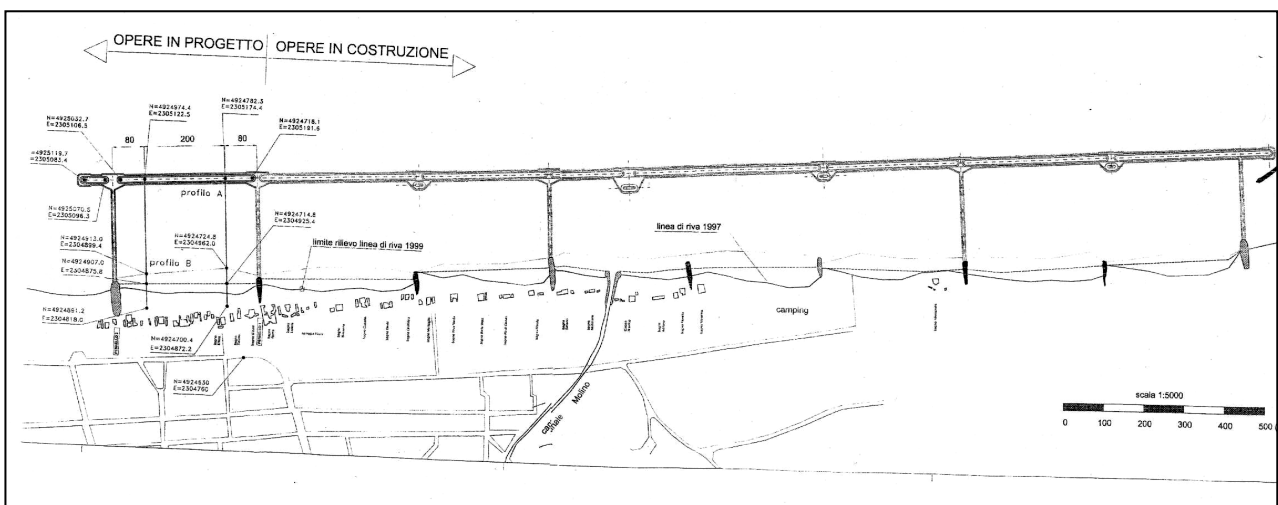
Not know yet.

Socio-economic impact

Not known yet. It will have a very positive economic impact because there wasn't beach at all in front of many bars and and beach facilities. Now they have a restored beach, by nourishment, protected by LCS.

System Layout (dimensioned sketch)

See map below.



Typical cross section (dimensioned sketch)

See figure at the end of the next page.

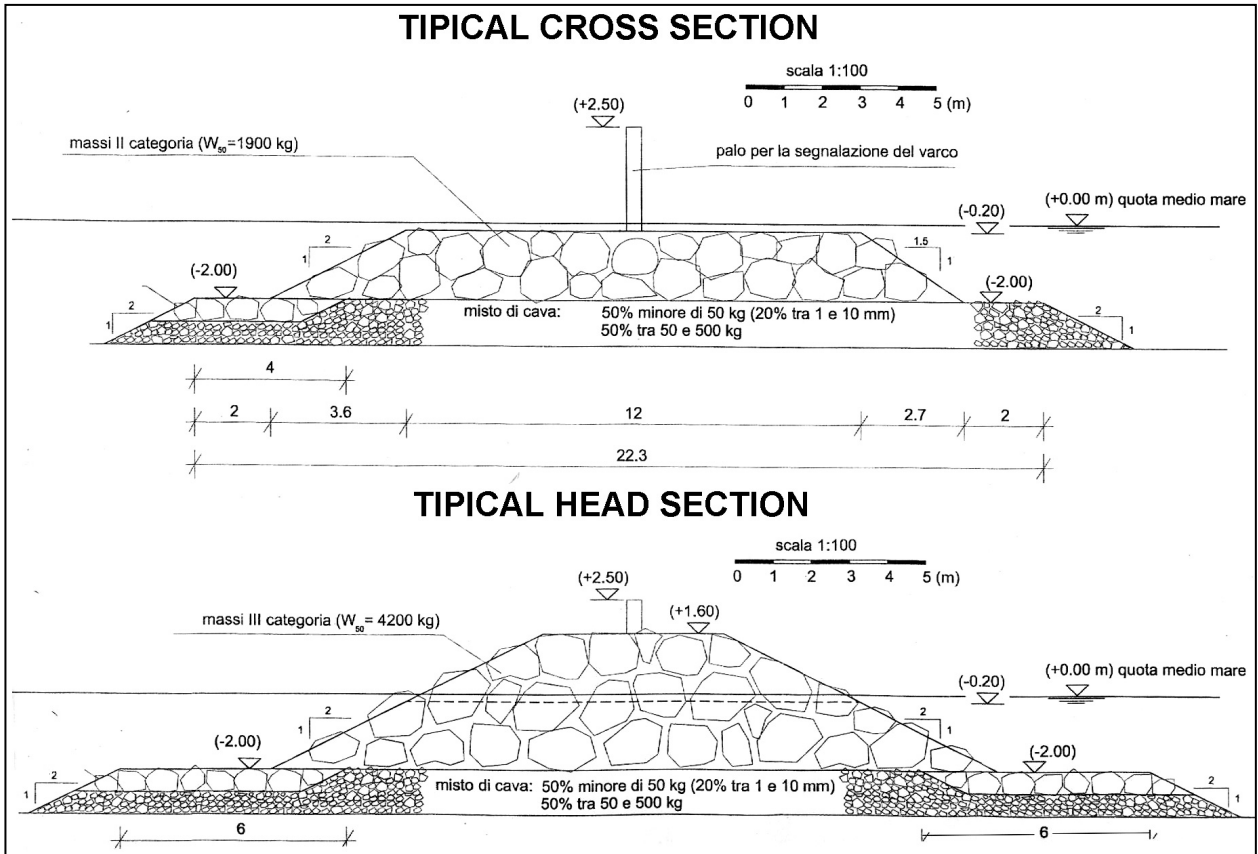
Indication of water level variations

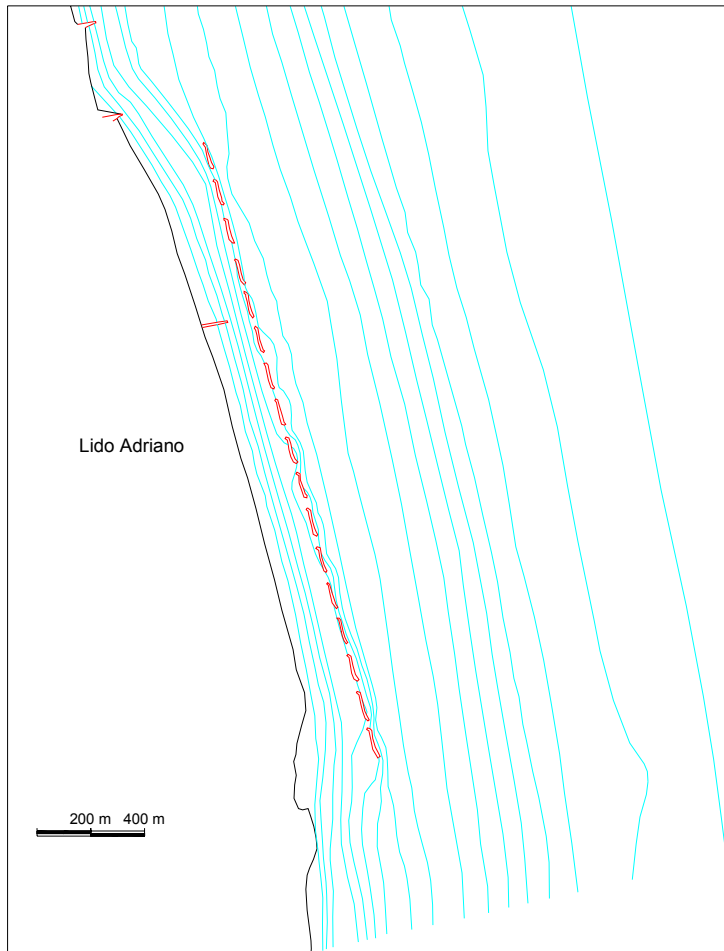
The tidal range is about $\pm 0.4\text{m}$

Existence of detailed information

It is possible to have further informations.

The structure will be monitored.



UB_EIT_2_4, Lido Adriano, at the north side of the Fiumi Uniti river mouth (Ravenna).

(Depth isolines are shown, from -0.5 to -8.5 m every 0.5 m)

Main motive for building the LCS

Coast erosion, protection of recreational facilities and buildings.

Impacts on bio-environment

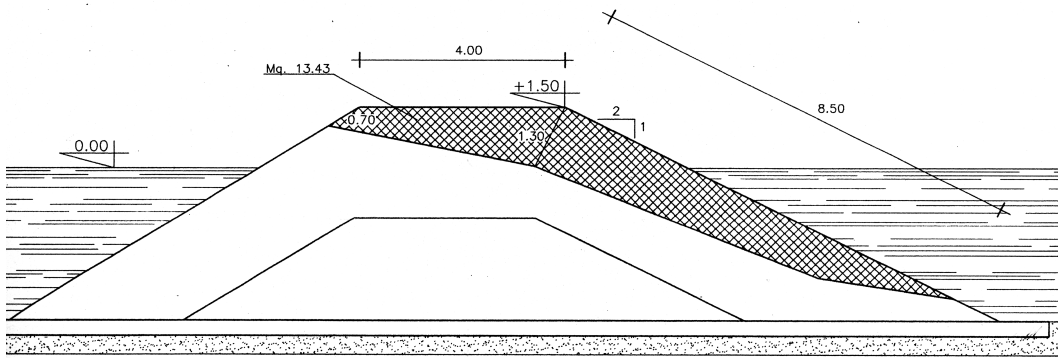
Not known

Socio-economic impact

Not known

System Layout (dimensioned sketch)

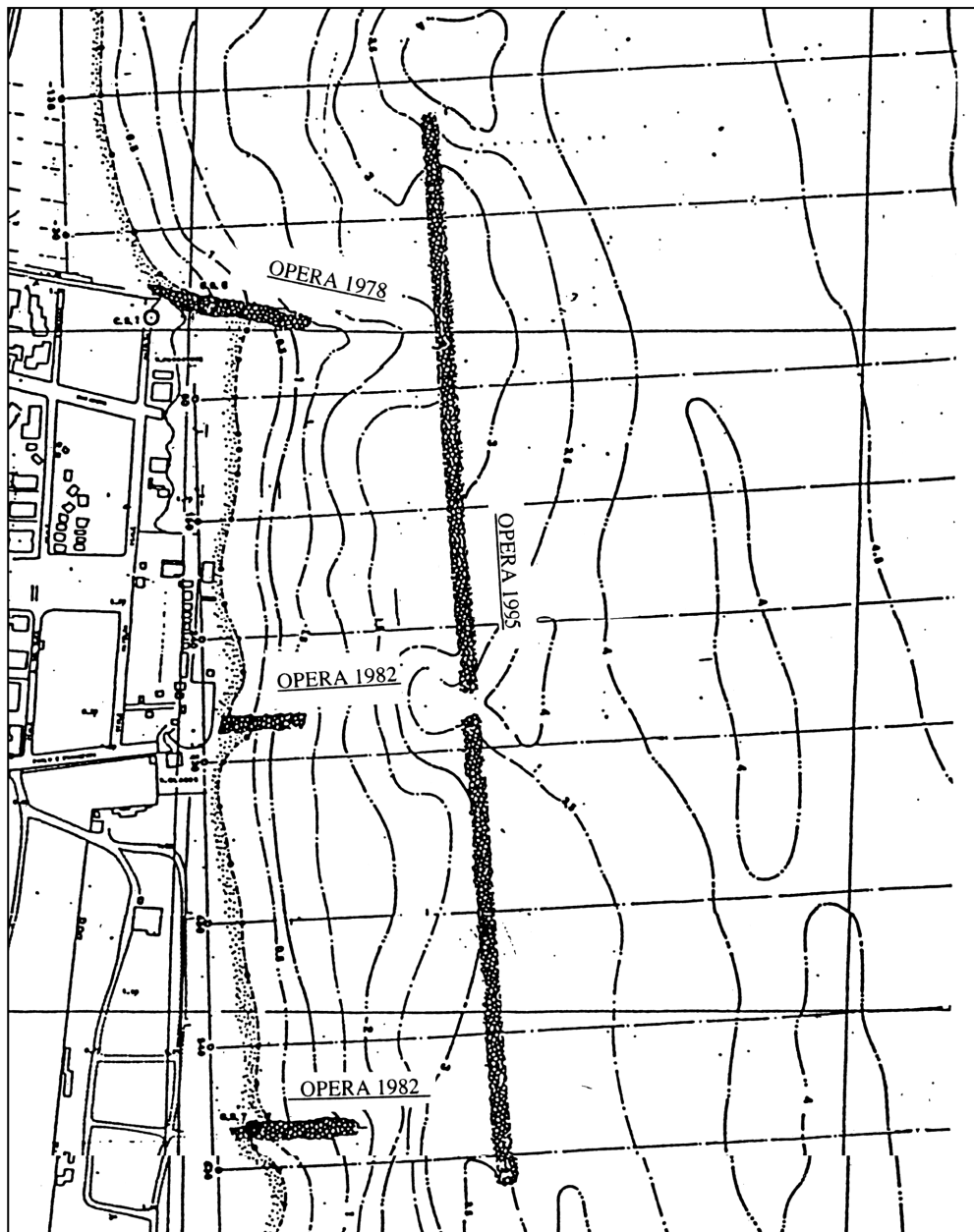
17 emerged elements, 100m long each one, with gaps about 40m wide. Distance from the beach is about 180m.

Typical cross section (dimensioned sketch)**Indication of water level variations**

The tidal range is about $\pm 0.4\text{m}$

Existence of detailed information

It is possible to have further informations.

UB_EIT_2_5, Lido di Dante (Ravenna)**Main motive for building the LCS**

Coast erosion and protection of recreational facilities.

Impacts on bio-environment

The structure is monitored and it has been colonized by different species of organism. Turbidity has also been observed but it's difficult to understand if it's due to the LCS or renourishment made in the area.

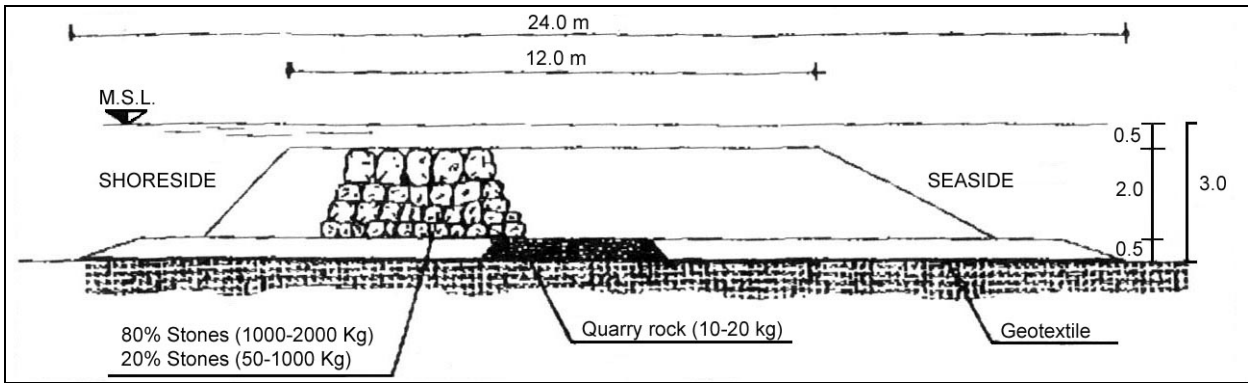
Socio-economic impact

Recreational activities were preserved with the construction of the LCS

System Layout (dimensioned sketch)

One element 770m long at crest level, with one gap 30m wide and 1m deep from crest level. The LCS is about 180m far from the beach.

Typical cross section (dimensioned sketch)



Indication of water level variations

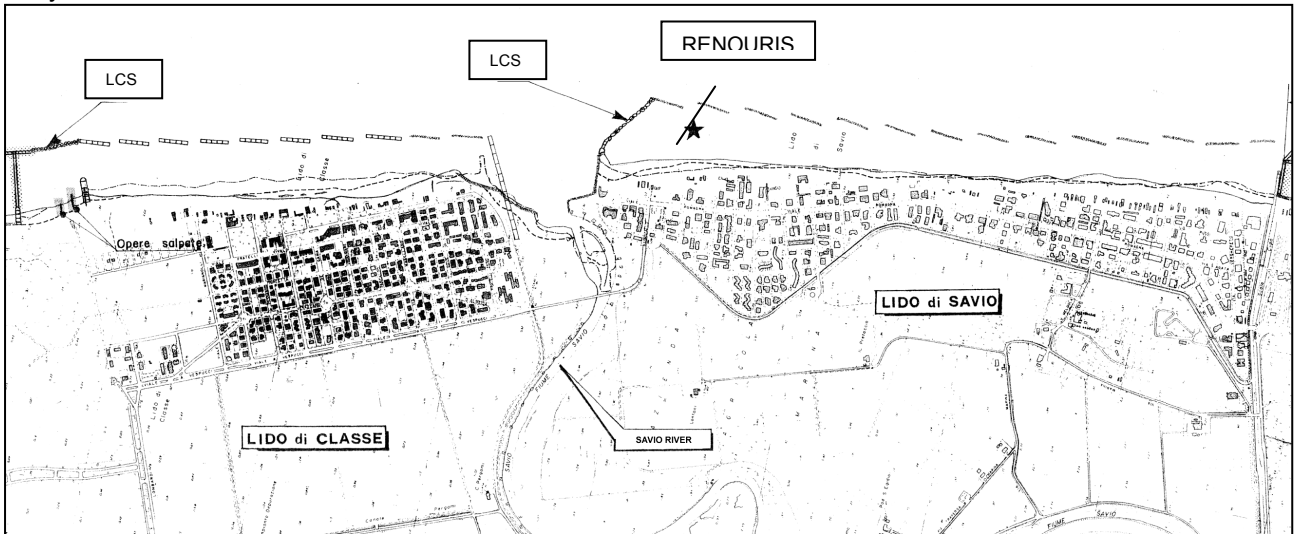
The tidal range is about $\pm 0.4\text{m}$

Existence of detailed information

A lot of more information are available

UB_EIT_2_6, Lido di Classe and Lido di Savio.

They are two stretch of coast around the mouth of Savio river, with recreational facilities.



Main motive for building the LCS

Buildings protection from coastal erosion

Impacts on bio-environment

Not known

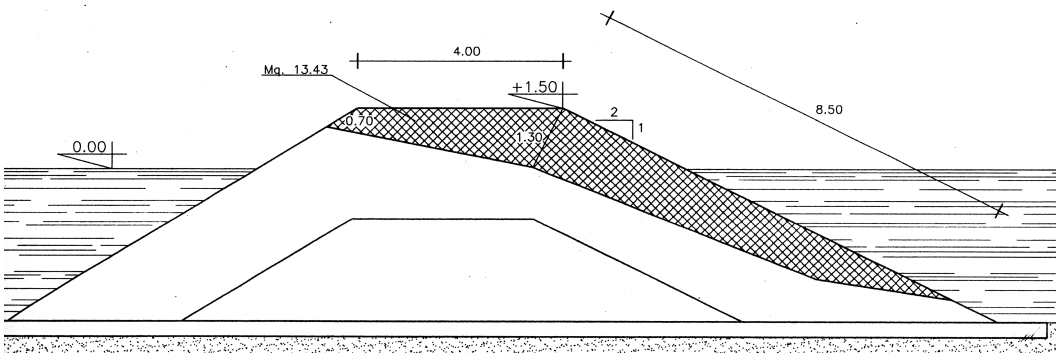
Socio-economic impact

Not known

System Layout (dimensioned sketch)

25 elements (15 in the south of the river and 10 in the north side), about 100m long, with gaps 50m long. Distance from the beach is about 100m.

Typical cross section (dimensioned sketch)



Indication of water level variations

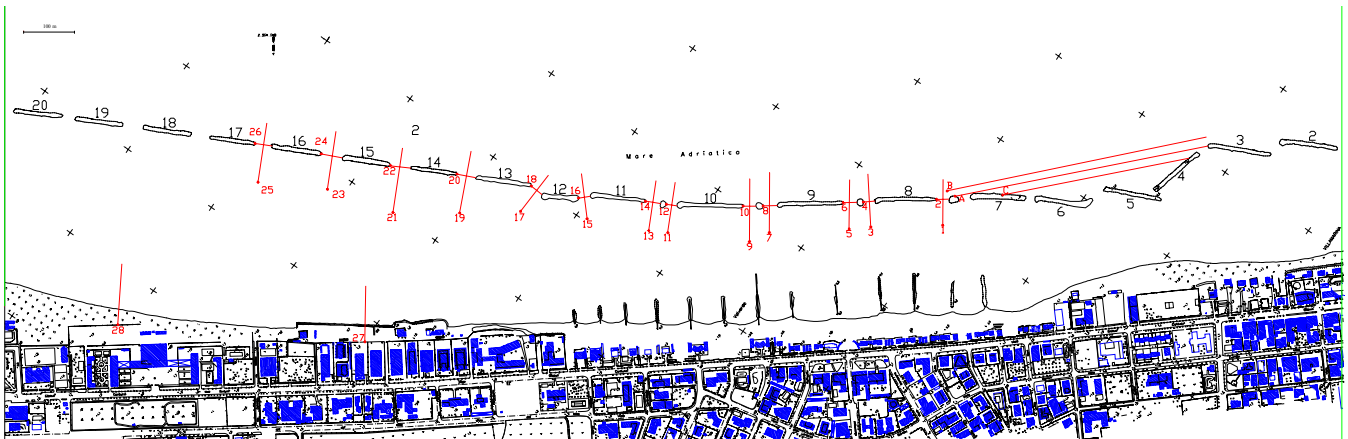
The tidal range is about $\pm 0.4m$

Existence of detailed information

It is possible to have further informations.

UB_EIT_2_7, CESENATICO.

4500m of beach protected by emerged breakwaters in the south side of the harbour.



Main motive for building the LCS

Coast erosion, protection of recreational facilities.

Impacts on bio-environment

Sometimes problems of water quality during Summer time.

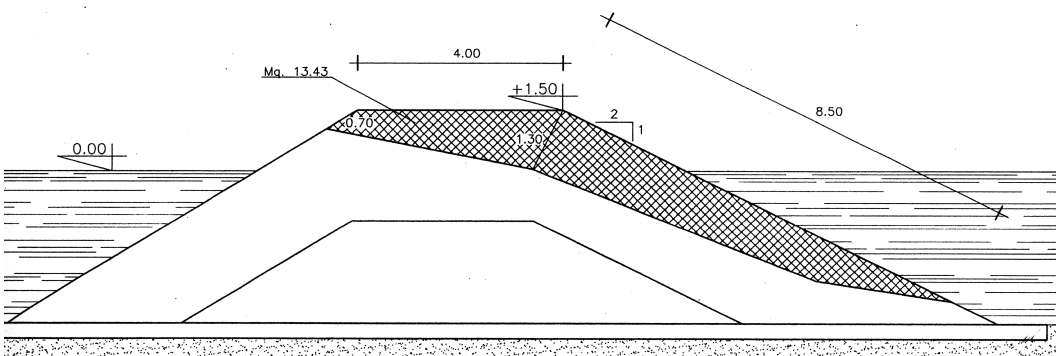
Socio-economic impact

Not known.

System Layout (dimensioned sketch)

About 4.5 Km of break waters, 100m long, alternated with atolls. Distance from the beach about 220 m.

Typical cross section (dimensioned sketch)



Indication of water level variations

The tidal range is about $\pm 0.4m$

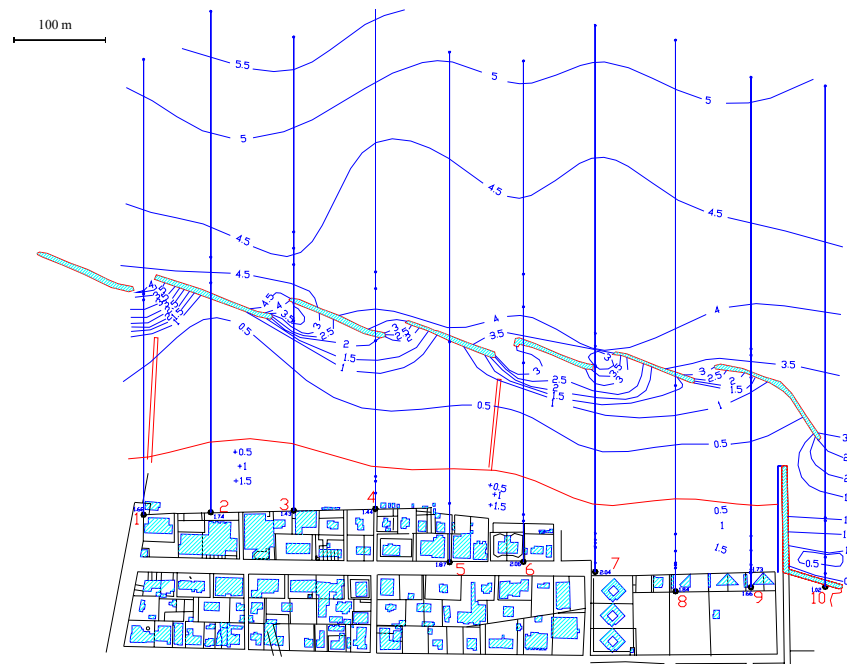
Existence of detailed information

It is possible to have further informations.

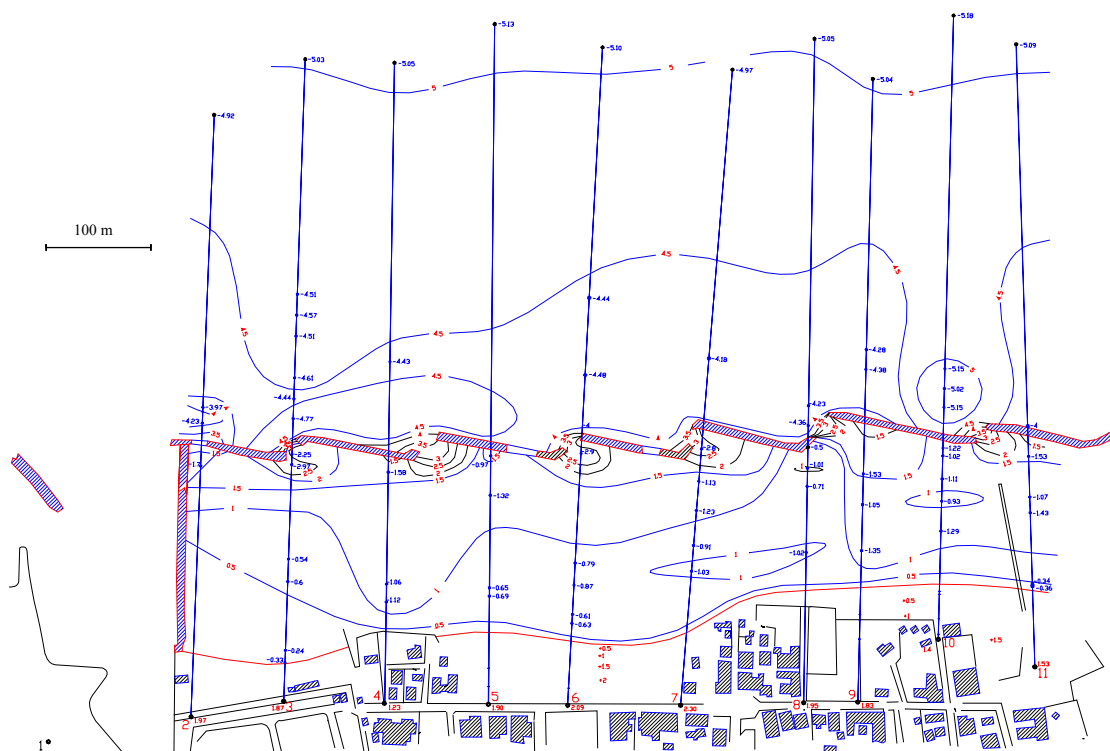
UB_EIT_2_8, GATTEO-SAN MAURO (RN)

Beach around a mouth river.

North side of the river:



South side of the river:



Main motive for building the LCS

Coast erosion, protection of recreational facilities.

Impacts on bio-environment

Problems of water quality during summer times, due to close rivers mouth, too.

Erosion of the beach

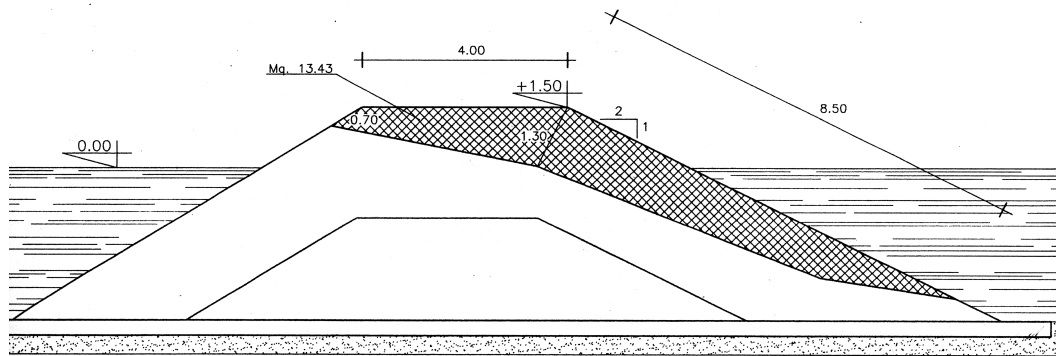
Socio-economic impact

Not known.

System Layout (dimensioned sketch)

14 elements, 100m long with gaps 20-25m wide. Angle to the normal to the coastline is about 80°. Distance from the beach between 150 and 200m.

Typical cross section (dimensioned sketch)



Indication of water level variations

The tidal range is about $\pm 0.4\text{m}$

Existence of detailed information

No specific further informations

UB_EIT_2_9, BELLARIA-IGEA MARINA (RN)

6.7km of beach protected by a continuous series of emerged breakwaters.

Main motive for building the LCS

Coast erosion, protection of recreational facilities.

Impacts on bio-environment

Erosion in localized points
Problems of water and sediment quality

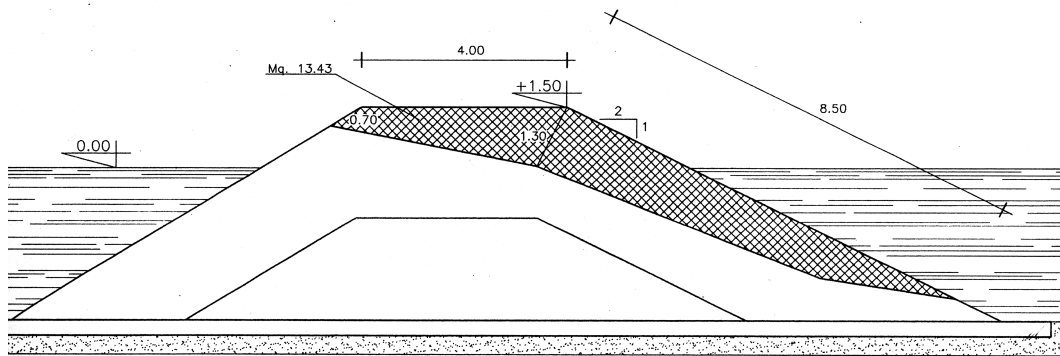
Socio-economic impact

Not known.

System Layout (dimensioned sketch)

See drawing below (with scale reference). 54 elements, about 100m long with a little harm, with a different orientation, about 20m long . Distance from the beach around 100m in the north side and 200m in the south side. Orientation to the normal to the coast line about 75°. Gap's length: 25m

Typical cross section (dimensioned sketch)



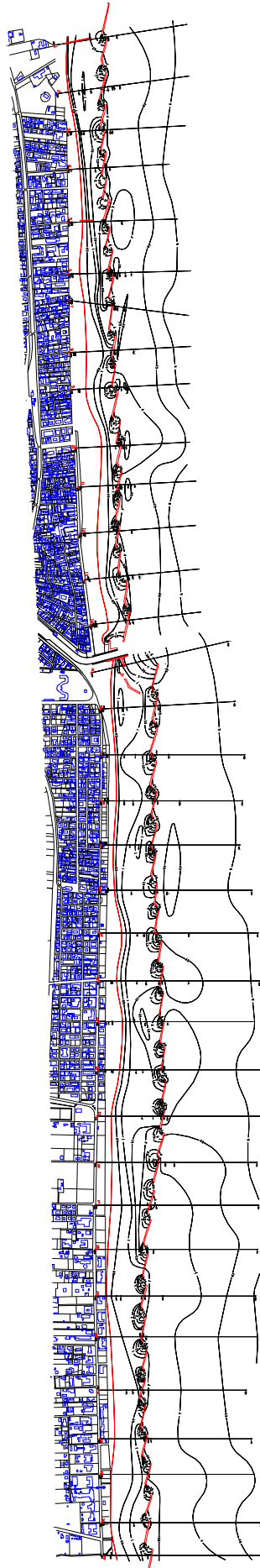
Indication of water level variations

The tidal range is about $\pm 0.4\text{m}$

Existence of detailed information

No specific further informations

0 Km 0,5 Km 1,0 Km



UB_EIT_2_10, RIMINI

7.5km of beach in the north side of the harbor channel protected by emerged breakwaters

Main motive for building the LCS

Coast erosion, protection of recreational facilities.

Impacts on bio-environment

Problems of water and sediment quality; tombolo formations due to very close location of the breakwaters later moved offshore-ward with positive effects.

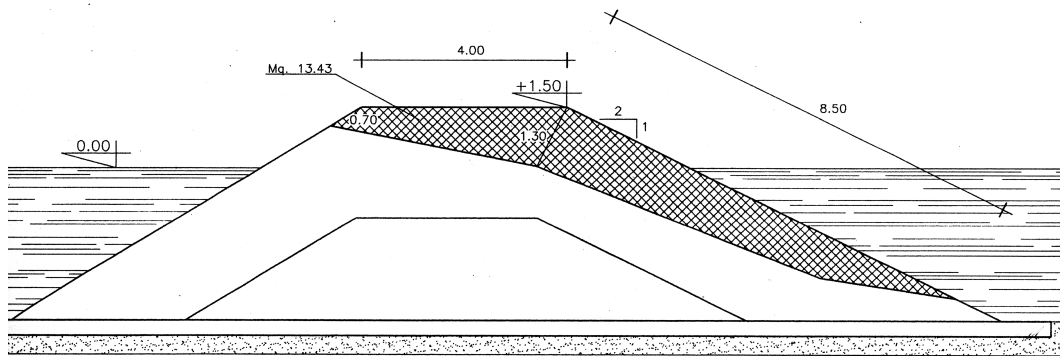
Socio-economic impact

Not known.

System Layout (dimensioned sketch)

Elements 100m long, with gaps of about 30-40m and orientation to the normal to the coastline of about 80°. The maximum distance from the beach is 150m, but close to the harbor there has been formation of tombolo, so now the system is, in some case, attached to the beach. A stretch of 1700m has been rebuilt farther and parallel to the beach.

Typical cross section (dimensioned sketch)



Indication of water level variations

The tidal range is about $\pm 0.4\text{m}$

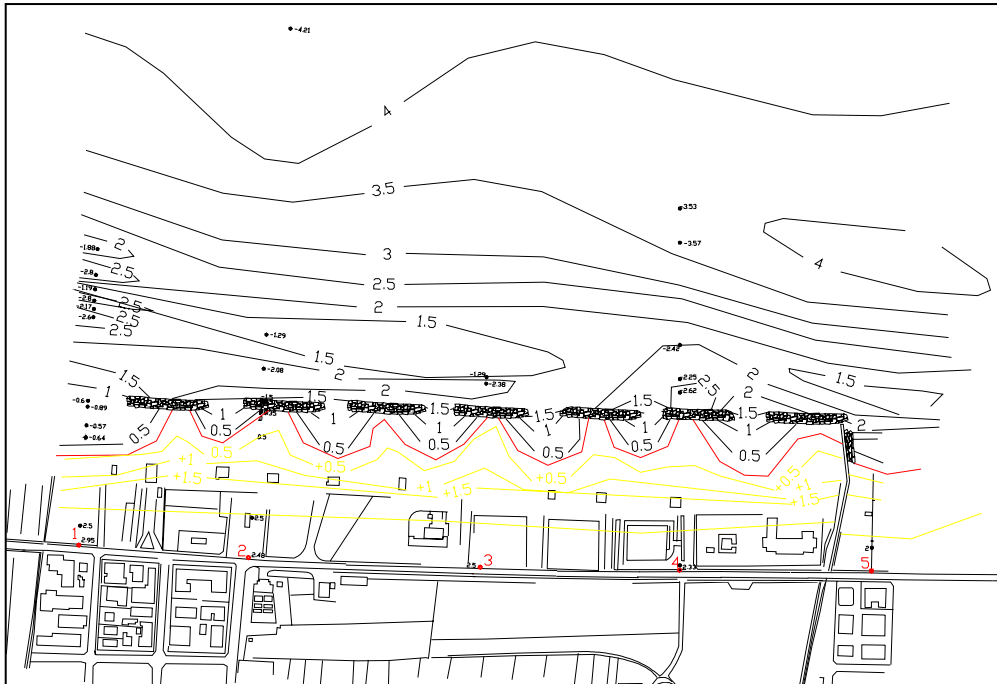
Existence of detailed information

No specific further informations



UB_EIT_2_11, MISANO (RN)

700m of beach protected by emerged breakwaters



The red line is the coastline.

Main motive for building the LCS

Coast erosion, protection of recreational facilities.

Impacts on bio-environment

Tombolo formations and water and bottom sediments quality problems.

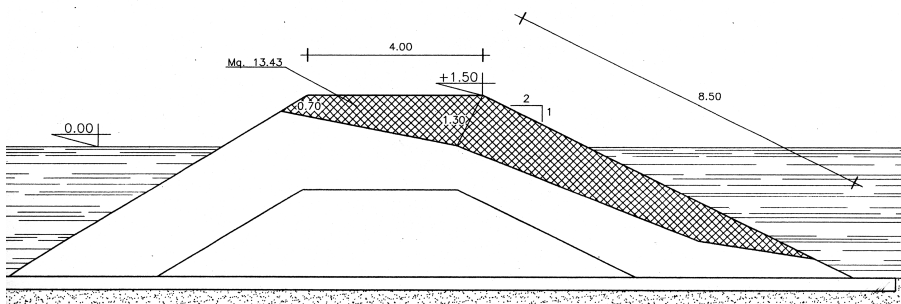
Socio-economic impact

Not known.

System Layout (dimensioned sketch)

7 elements, 100m long (see map above)

Typical cross section (dimensioned sketch)



Indication of water level variations

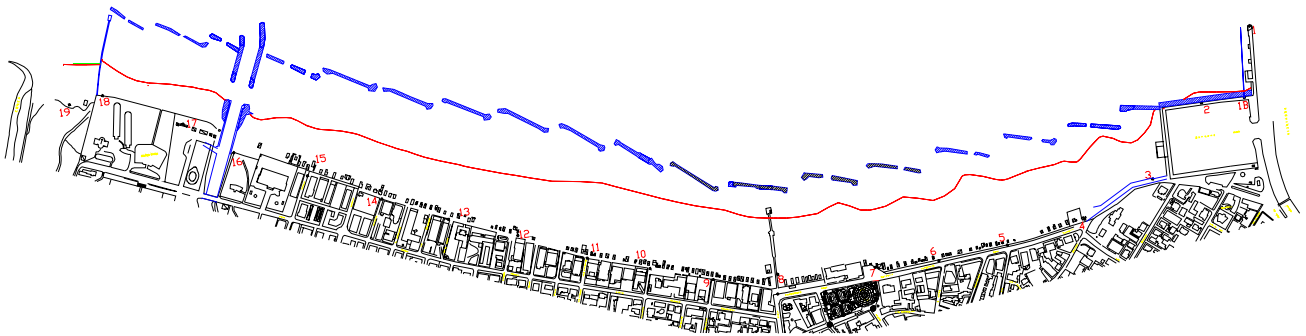
The tidal range is about ± 0.4m

Existence of detailed information

Bathymetry and cross sections available

UB_EIT_2_12, CATTOLICA

2100m of beach protected by emerged breakwaters



Main motive for building the LCS

Coast erosion, protection of recreational facilities.

Impacts on bio-environment

Water and bottom sediments quality problems.

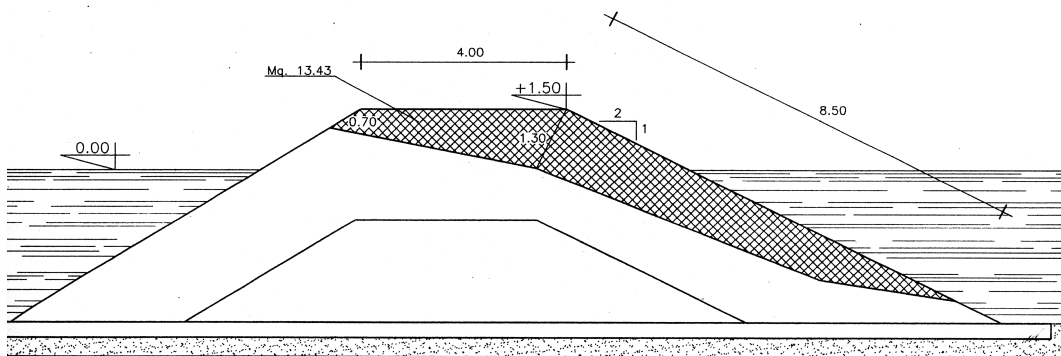
Socio-economic impact

Not known.

System Layout (dimensioned sketch)

18 elements, 100m long. Distance from the beach between 50 and 100m

Typical cross section (dimensioned sketch)



Indication of water level variations

The tidal range is about $\pm 0.4\text{m}$

Existence of detailed information

More information are available (bathymetry and cross sections)

UB_EIT_3_1, Gabicce Mare

The beach is situated between the Cattolica harbour and the cliffs of the Punta Gabicce headland.

Main motive for building the LCS

Coastal erosion, protection of recreational facilities.

Impacts on bio-environment

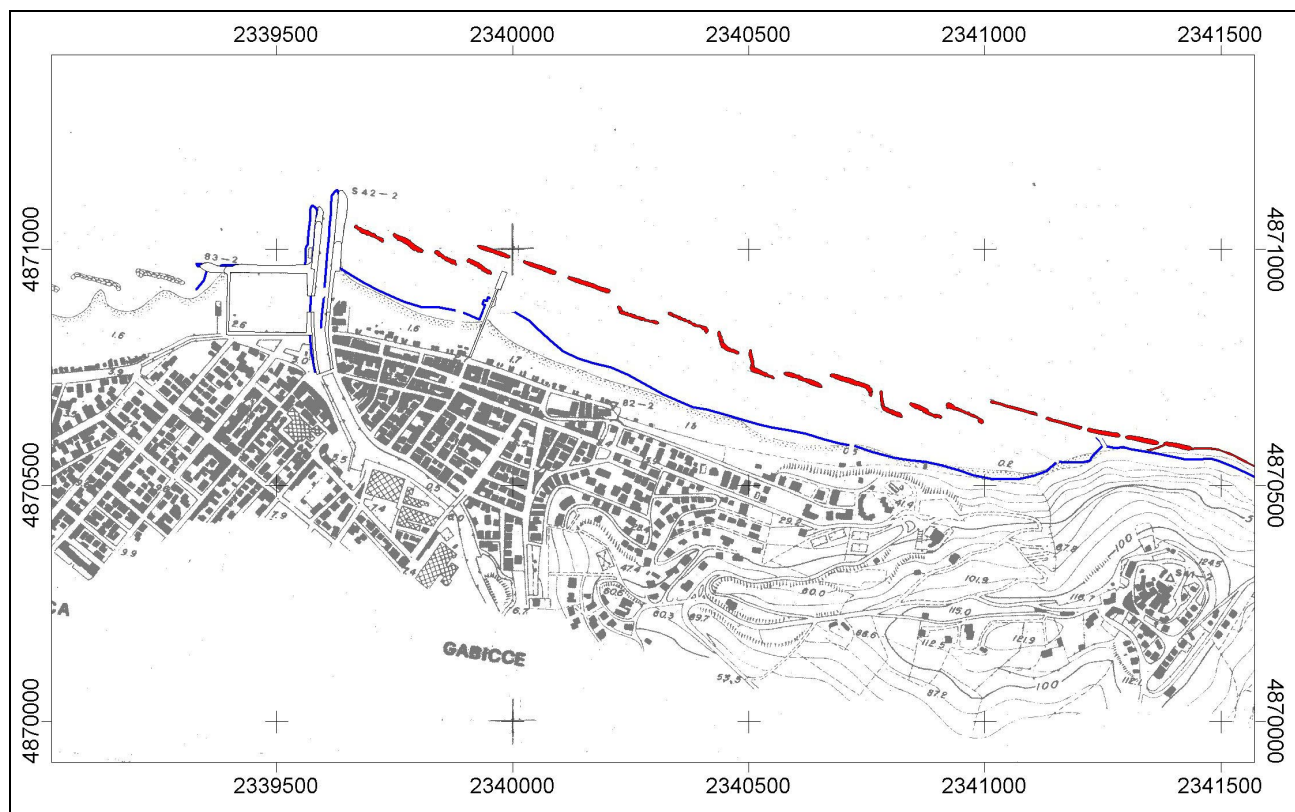
Not known.

Socio-economic impact

Turistic and recreational facilities were enlarged with the building of the LCS.

System Layout (dimensioned sketch)

21 emerged elements, about 80m long, with gaps about 20m long. Distance from the beach is about 100m.



Typical cross section (dimensioned sketch)

The crest elevation is 0.5-1m and the berm width is 3-5m. The water depth is about 2.5m.

Indication of water level variations

The tidal range is about ± 0.4 m. There is a quite relevant surge during southeastern storms.

Existence of detailed information

It is difficult to obtain further informations.

UB_EIT_3_2, Gabicce mare

The coastal area is the northern part of the S.Bartolo cliffs and is situated between the Punta Gabicce headland and the Vallugola marina.

Main motive for building the LCS

Cliff protection.

Impacts on bio-environment

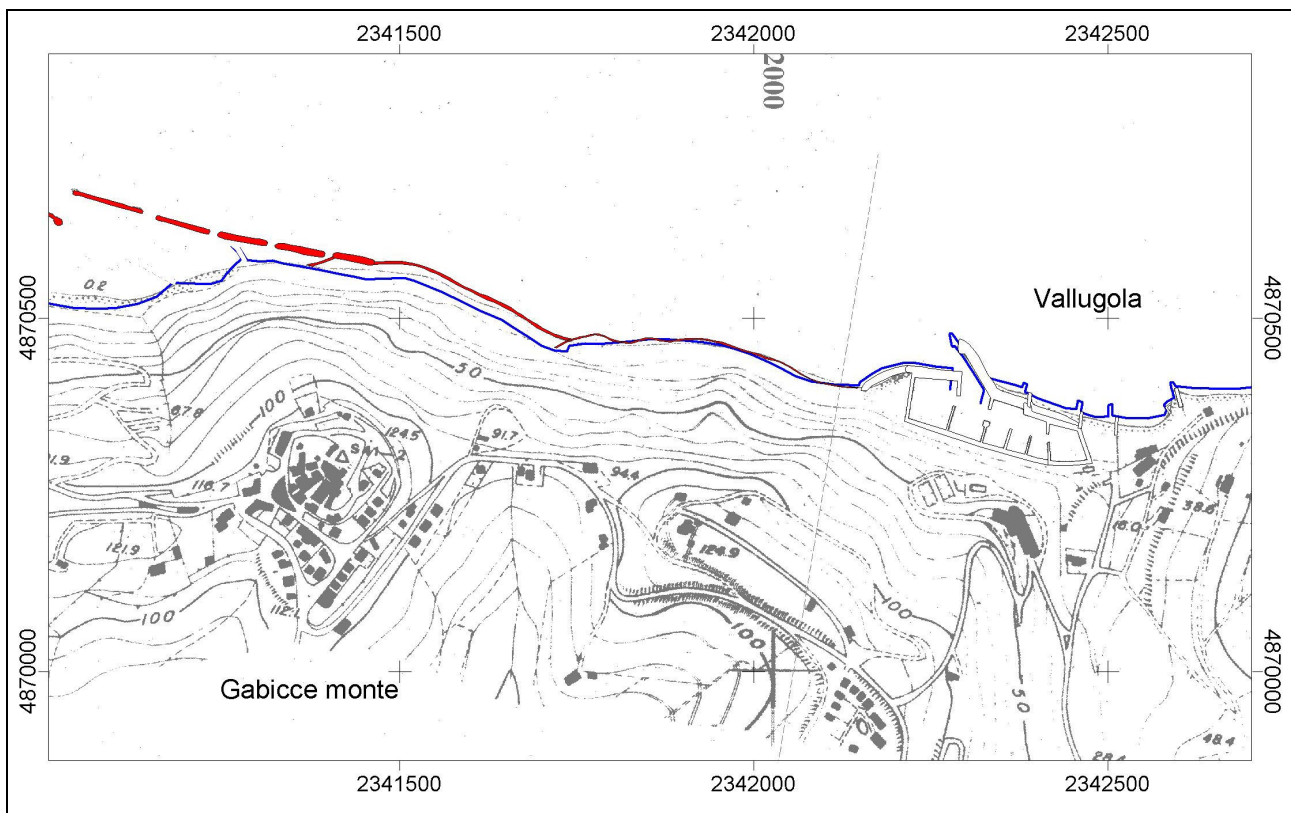
Not known.

Socio-economic impact

Not known.

System Layout (dimensioned sketch)

A continuous submerged breakwater about 700m long. Its distance from the coast is 10-20m.

**Typical cross section (dimensioned sketch)**

Not known.

Indication of water level variations

The tidal range is about ± 0.4 m. There is a quite relevant surge during southeastern storms.

Existence of detailed information

It is difficult to obtain further informations.

UB_EIT_3_3, Casteldimezzo di Pesaro.

Main motive for building the LCS

Cliff protection.

Impacts on bio-environment

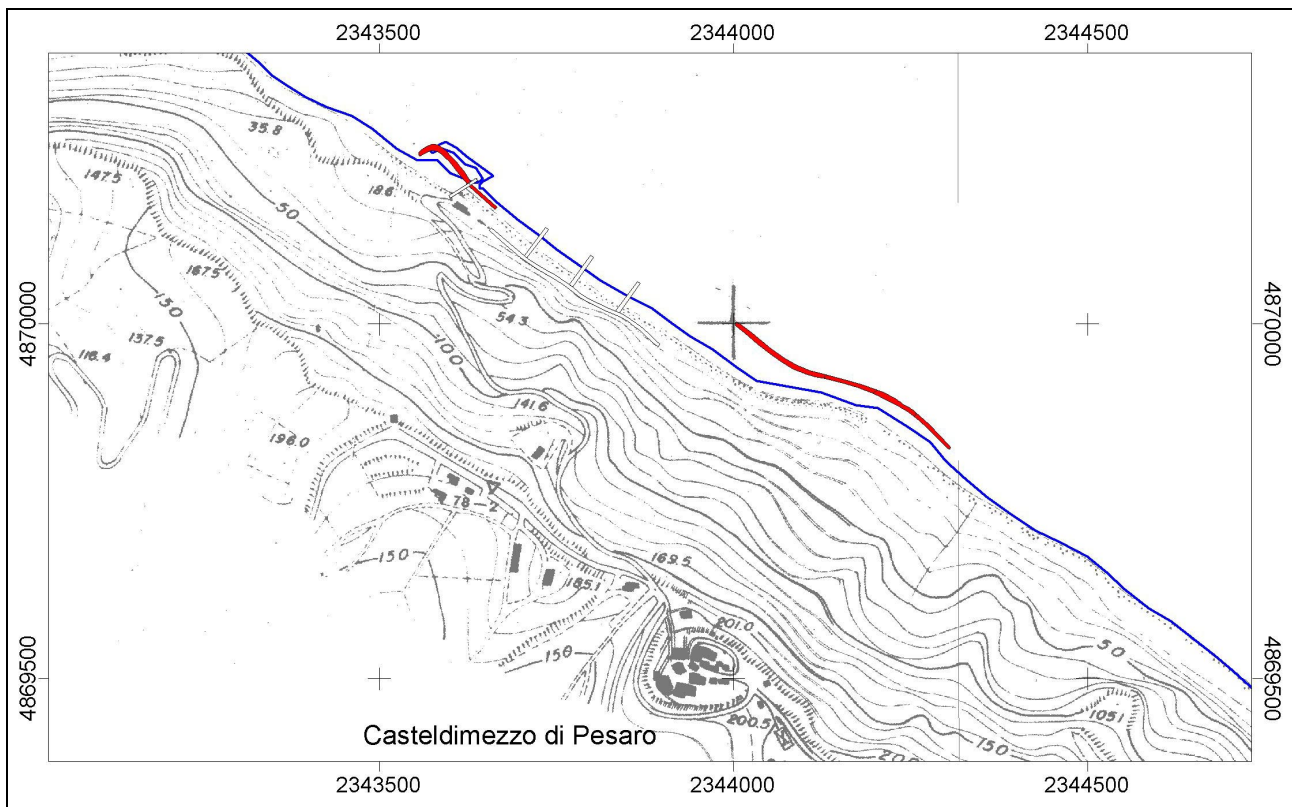
Not known.

Socio-economic impact

Not known.

System Layout (dimensioned sketch)

A continuous breakwater about 350m long. Its distance from the coastline is about 20m.



Typical cross section (dimensioned sketch)

The emergence is about 1m and the coast berm is about 3m wide.

Indication of water level variations

The tidal range is about ± 0.3 m. There is a quite relevant surge during southeastern storms.

Existence of detailed information

It is difficult to obtain further informations.

UB_EIT_3_4, Fiorenzuola di Focara di Pesaro.

Main motive for building the LCS

Cliffs protection to the North of Pesaro.

Impacts on bio-environment

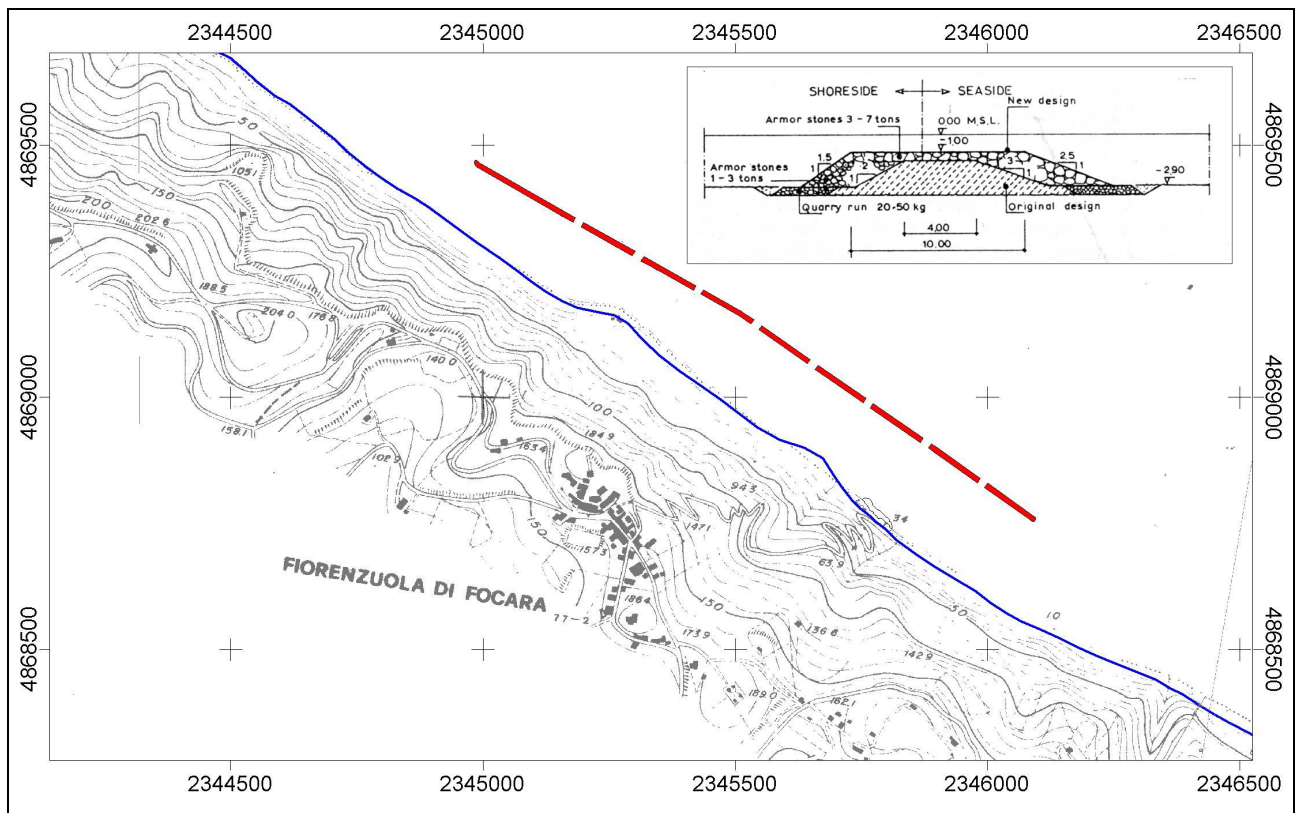
The structure has been subjected to damage from wave attack and were rebuilt few years later using a larger section and a smaller submergence. Then the central elements became emerged breakwaters.

Socio-economic impact

Not known.

System Layout (dimensioned sketch)

See map below. The protected coast is about 1.3 km long.



Typical cross section (dimensioned sketch)

See the map above for the submerged elements. The emergence of the central elements is now about 1m.

Indication of water level variations

In the area there is no tide of concern. There is a quite relevant surge during southeastern storms.

Existence of detailed information

It is difficult to obtain more information.

UB_EIT_3_5, S.Marina di Pesaro.

Main motive for building the LCS

Cliff protection.

Impacts on bio-environment

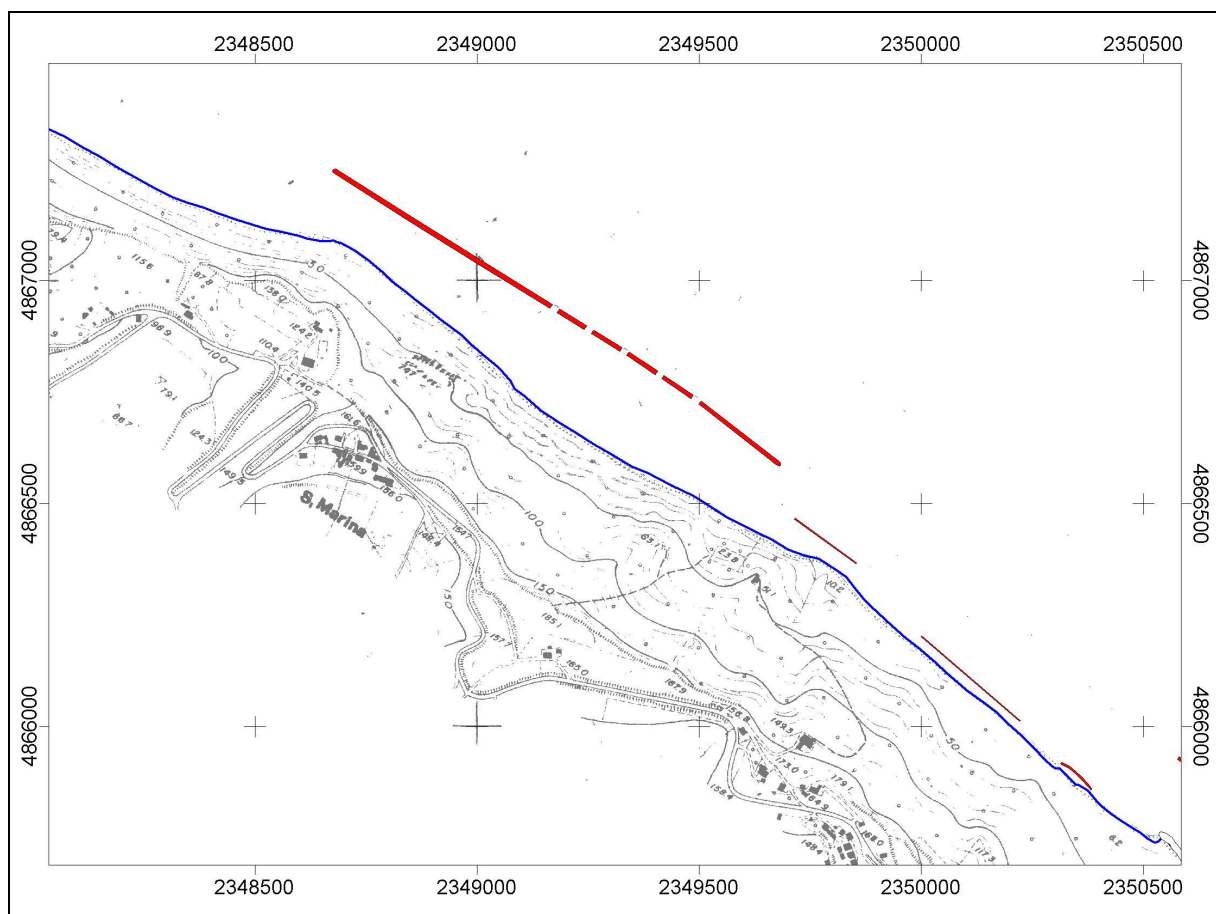
In the northern part some submerged breakwaters were rebuilt as emerged.

Socio-economic impact

Not known.

System Layout (dimensioned sketch)

A group in the North consists of 6 breakwaters about 180m long each, with gaps about 20m long at about 150m from the coastline. In the southern part there are 3 isolated emerged breakwaters 80-100m long each.



Typical cross section (dimensioned sketch)

The crest of the emerged elements are about 1m above the sea level and it is about 2m wide. The crest berm of submerged is at the -0.8m and 3m wide. The water depth is 3-3.8m.

Indication of water level variations

In the area there is no tide of concern. There is a quite relevant surge during southeastern storms

Existence of detailed information

It is difficult to obtain further informations.

UB_EIT_3_6, Pesaro, the beach called Baia Flaminia

Main motive for building the LCS

Restoration of the beach after storm damage and protection of recreational facilities from the sea storms.

Impacts on bio-environment

Not known.

Socio-economic impact

Not known.

System Layout (dimensioned sketch)

5 emerged breakwaters connected to the groin at the mouth of Foglia river and followed by a LCS 370m long made of 2 elements. The gap in the LCS is 40m wide. The LCS is 180m far from the beach.

Typical cross section (dimensioned sketch)

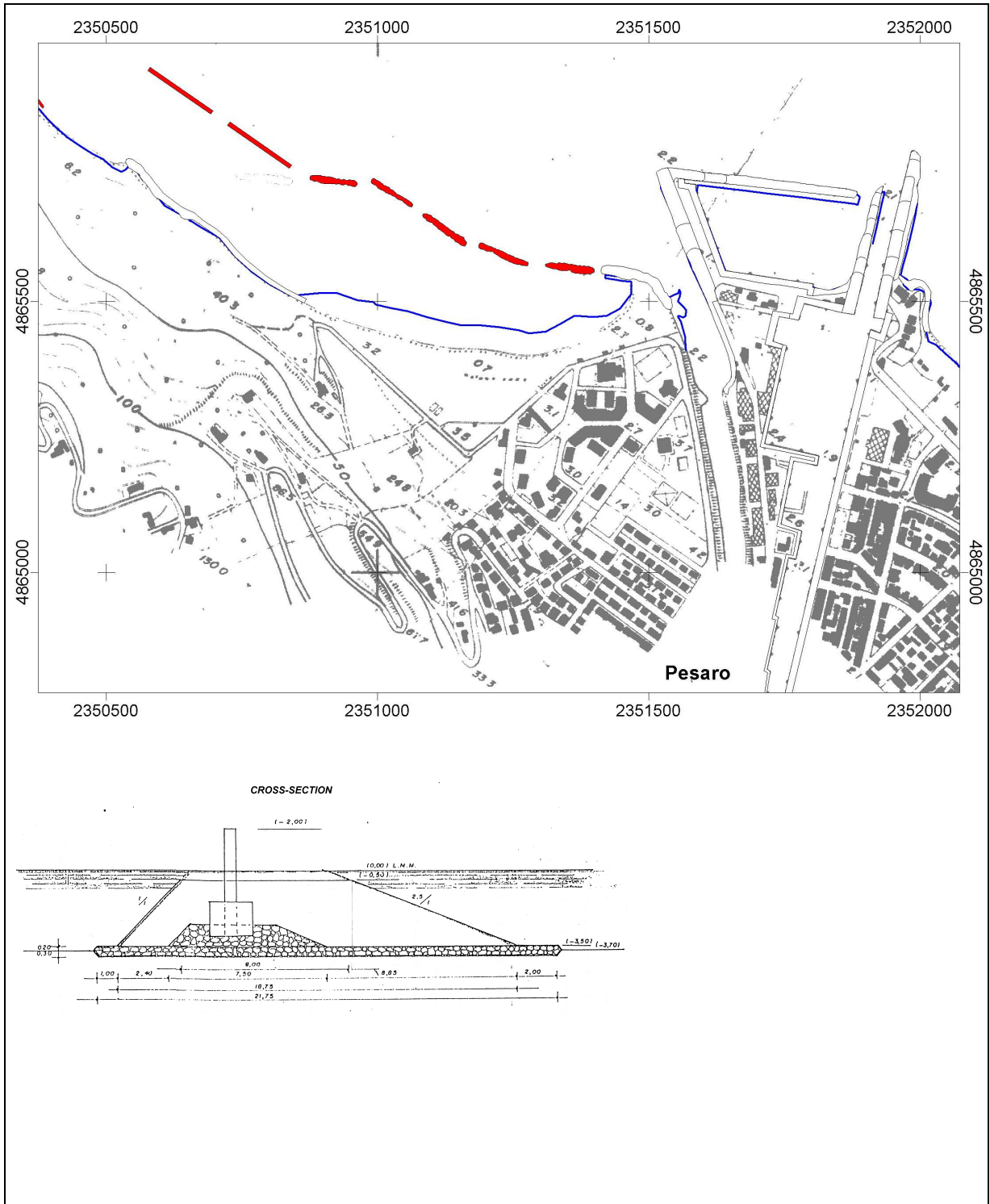
LCS's crest is 0.5m deep, and the water depth is 3–3.5m. The offshore slope is 1/2.5 and the onshore slope is 1/1.

Indication of water level variations

In the area there is no tide of concern. There is a quite relevant surge during southeastern storms

Existence of detailed information

It is difficult to obtain more information.



UB_EIT_3_7, Pesaro, the beach in front of the town centre.

Main motive for building the LCS

Coastal erosion, protection of recreational facilities.

Impacts on bio-environment

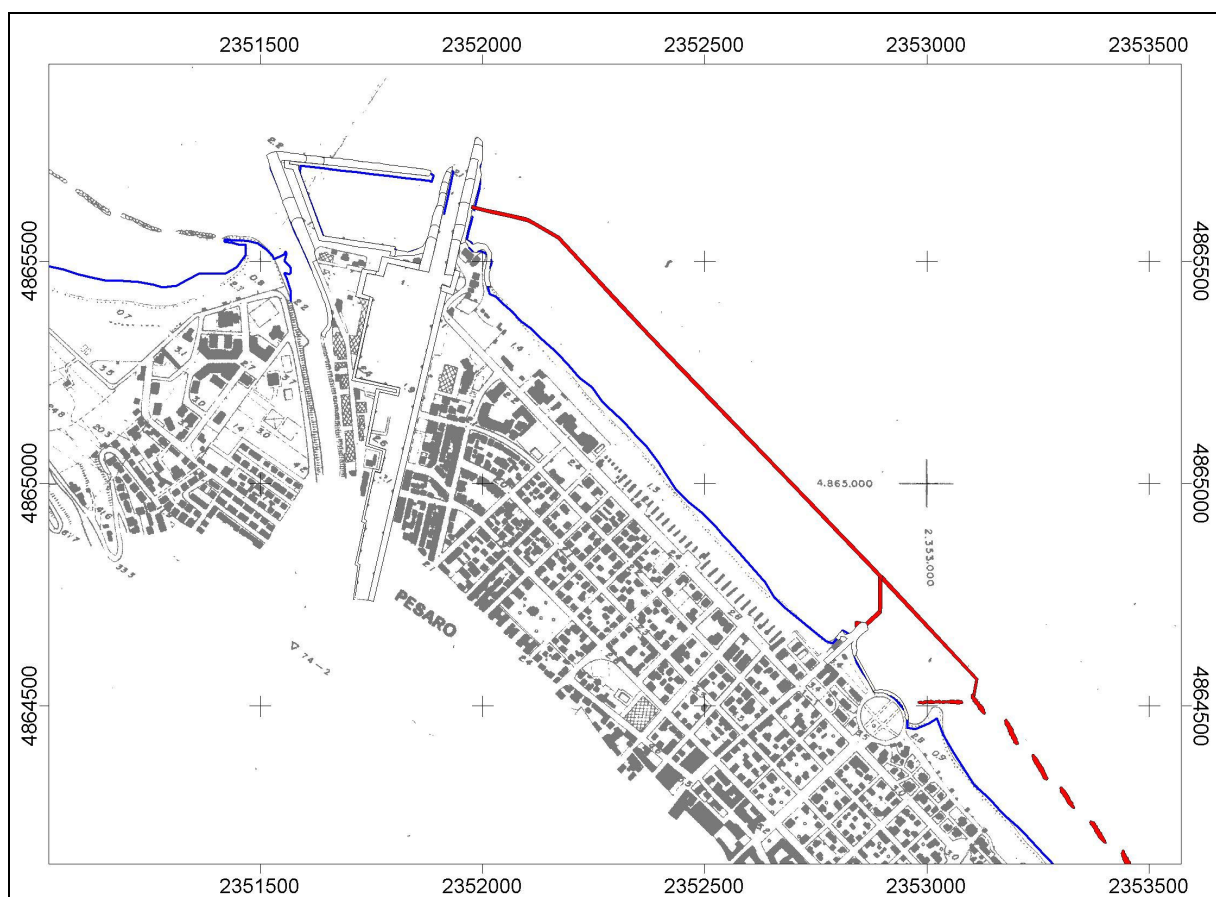
Not known.

Socio-economic impact

Not known.

System Layout (dimensioned sketch)

A continuous submerged breakwater about 1.5 km long. The distance from the beach is about 200m. The LCS is connected in the northern part to the harbour groin, in the southern part it is aligned with the existing emerged breakwaters.



Typical cross section (dimensioned sketch)

The water depth is 2.5-3m.

Indication of water level variations

In the area there is no tide of concern. There is a quite relevant surge during southeastern storms.

Existence of detailed information

It is difficult to obtain further informations.

UB_EIT_3_8, Pesaro-Fano

Main motive for building the LCS

Coast erosion, protection of railway and recreational facilities.

Impacts on bio-environment

In some areas there are problems of water and sediment quality and tombolo formations.

Socio-economic impact

Not known.

System Layout (dimensioned sketch – see map below)

About 10km of emerged breakwaters, 70-100m long with gaps 20-30m long; the distance from the coastline is variable up to 100m and in some case they are attached to the beach. In a stretch of 1200 m, actually protected by a seawall, new LCS are being planned.

Typical cross section (dimensioned sketch)

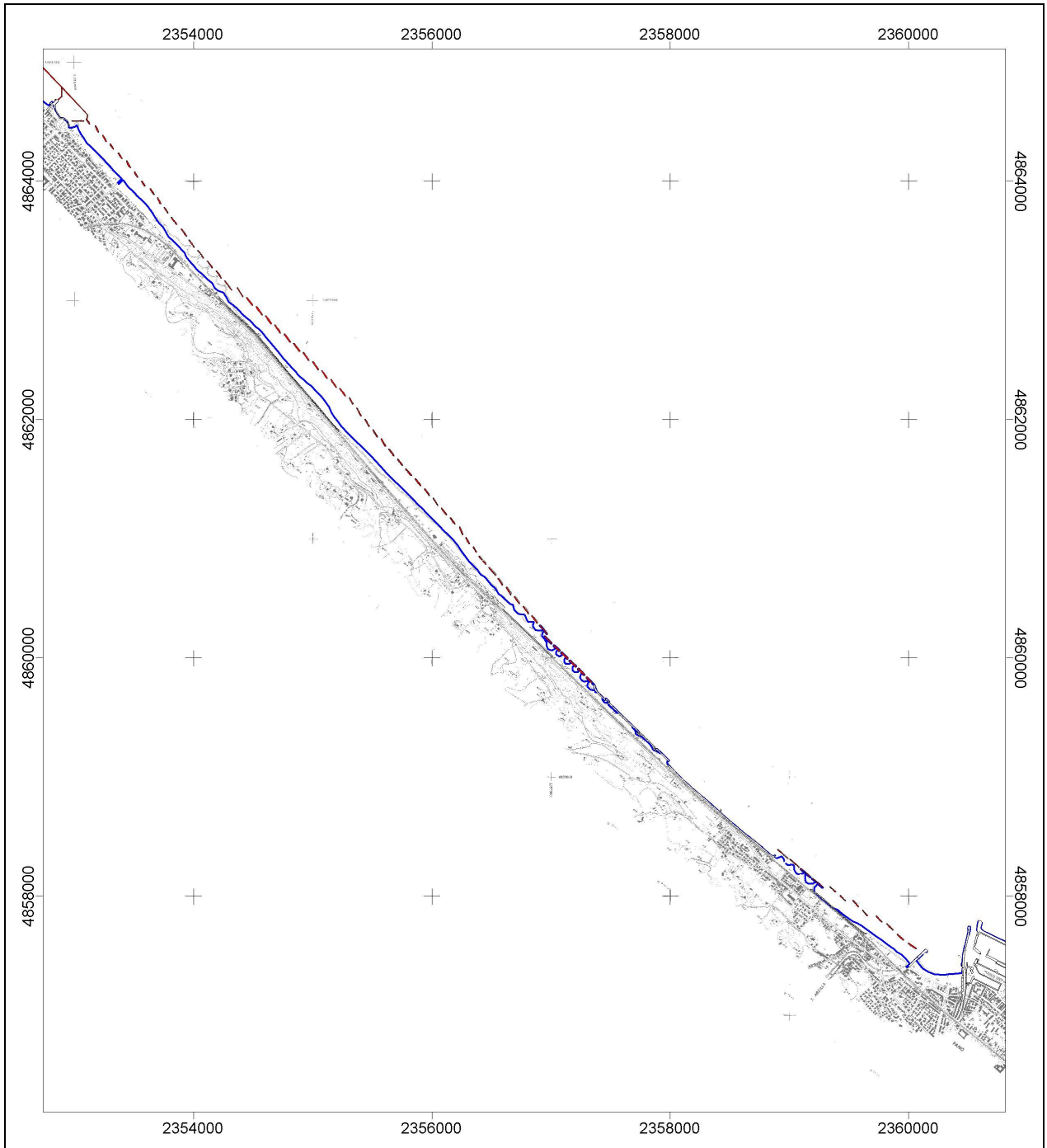
The emergence is about 1m and the crest width is about 3m. The water depth is 2-3m. The offshore slope is about 1/2, the onshore one is about 1/1.

Indication of water level variations

In the area there is no tide of concern. There is a quite relevant surge during southeastern storms.

Existence of detailed information

It is difficult to obtain further informations.



UB_EIT_3_9, Fano, from Sassonia to Metauro river mouth

Main motive for building the LCS

Coast erosion, protection of sea-front way (in the northern part) and recreational facilities.

Impacts on bio-environment

Not known.

Socio-economic impact

Not known.

System Layout (dimensioned sketch – see map below)

Northern part: 10 submerged elements, about 100m long each with gaps about 40m long and distance from the coastline about 180m.

Southern part: 11 emerged elements about 60m long each with gaps about 40m long and distance from the coastline 60-120m.

Typical cross section (dimensioned sketch)

Northern part: the submergence is about 0.5m, some crest berms are 3m wide and the other are 10m wide. The water depth is about 3.3m. The slopes are 1/2.5 offshore and 1/1.5 onshore.

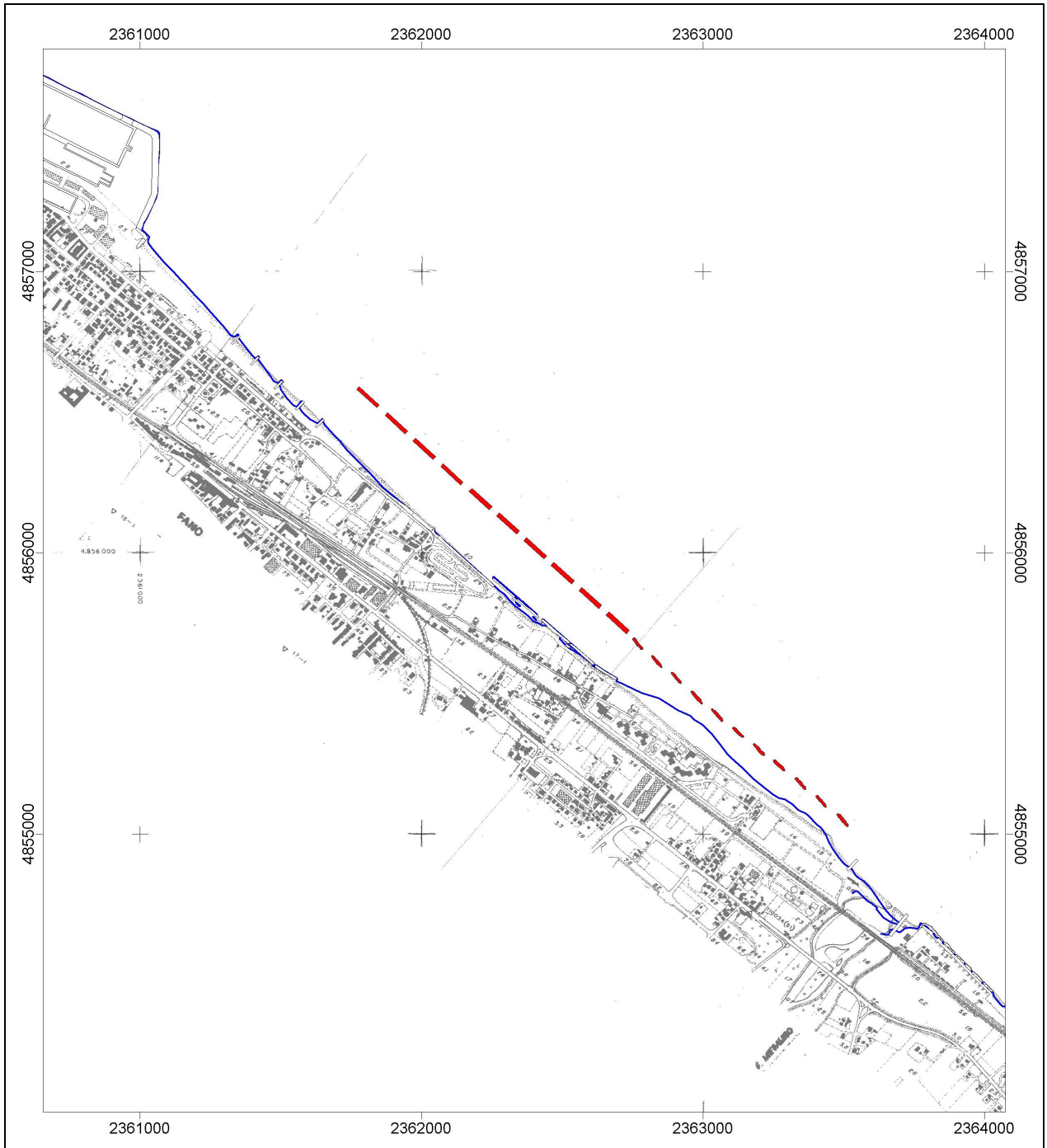
Southern part: the emergence is about 1m, the berm width is about 3m.

Indication of water level variations

In the area there is no tide of concern. There is a quite relevant surge during southeastern storms.

Existence of detailed information

It is difficult to obtain further informations.



UB_EIT_3_10, Metaurilia di Fano

Main motive for building the LCS

Coast erosion, mainly protection of the railway and in the second order of the recreational facilities.

Impacts on bio-environment

Problems of water and sediment quality and tombolo formations.

Socio-economic impact

The LCS aid the protection of the railway from sea storms on a coastal stretch.

System Layout (dimensioned sketch – see map below)

In the North there are 4 emerged elements about 80m long with gaps about 30m long and 30-60m far from the shoreline.

Continuing southwards there are 7 emerged elements about 200m long (the first two are 250m long) with gaps about 15m long and about 20m far from the primary shoreline. In few years the beach had a great advance with the formation of wide tombolos and now it arrives to the longest barriers.

Typical cross section (dimensioned sketch)

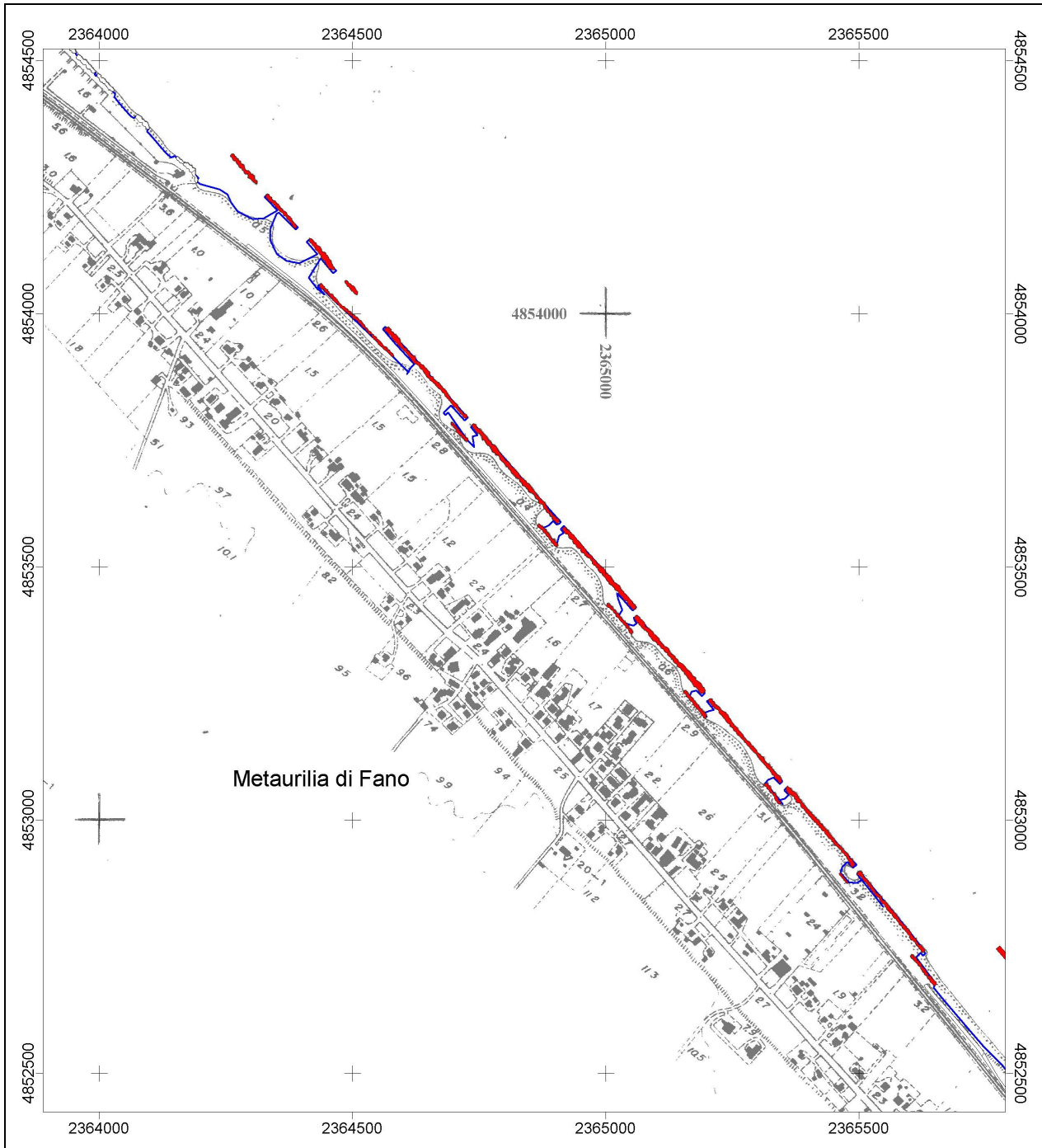
The crest berm emergence is about 2m and its width is about 4.5m.

Indication of water level variations

In the area there is no tide of concern. There is a quite relevant surge during southeastern storms.

Existence of detailed information

It is difficult to obtain further informations.



UB_EIT_3_11, Marotta, From Torrette di Fano to the Cesano river mouth

Main motive for building the LCS

Coast erosion, protection of buildings (“le vele”), of sea-front ways and recreational facilities.

Impacts on bio-environment

There is a salient in front of the centre of Marotta.

Socio-economic impact

The LCS aid to defend from sea storms some buildings near the beach (“le vele”).

System Layout (dimensioned sketch)

About 10km of mainly submerged breakwaters, that are still being planned for the large part.

The oldest ones are: a pair of elements (the northern emerged) about 25m long with a gap of about 10m and 20m far from the central beach of Marotta; 3 submerged elements about 150m long with gaps about 35m long and 200m far from the beach of the southern part of Marotta (“le vele”), and a toe structure of a perched beach, 640m long in front of Torrette di Fano at a distance of about 65m from the coastline.

The recent LCS plan consists of submerged breakwaters about 250m long, with gaps about 60m long at a distance of 200-260m from the coastline. The distance is about 140m for the northern elements.

Typical cross section (dimensioned sketch)

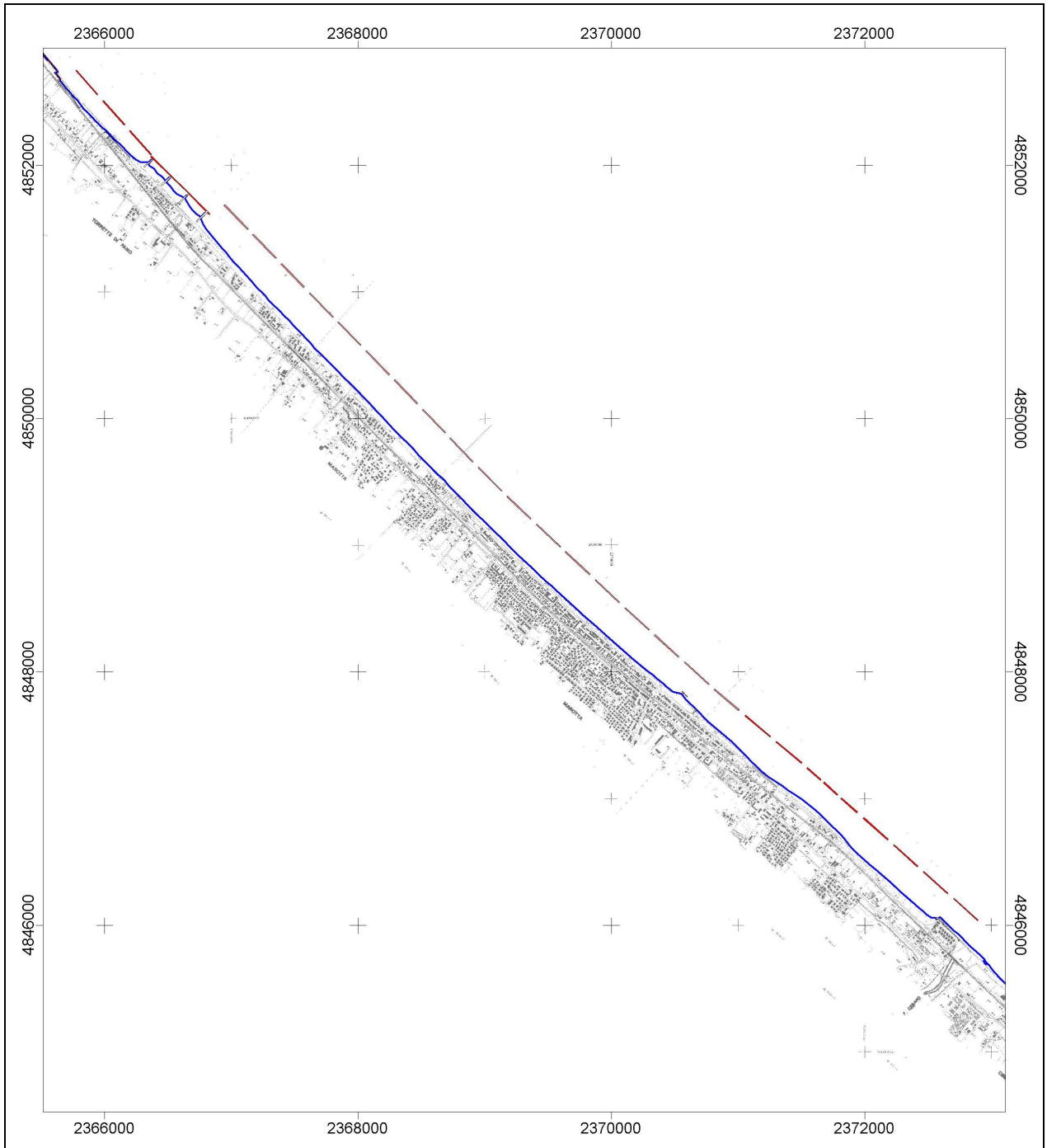
Most of the submerged structures have about 0.5m as the submergence of the crest berm with width of about 10m. The slopes are 1/2.5 offshore and 1/1.5, or 1/1, onshore. The water depth is about 3m. The submergence of the toe structure of the perched beach is 1.3m, the crest berm is 2m wide and the water depth is about 2.5m. Both side slopes are 1/1.5.

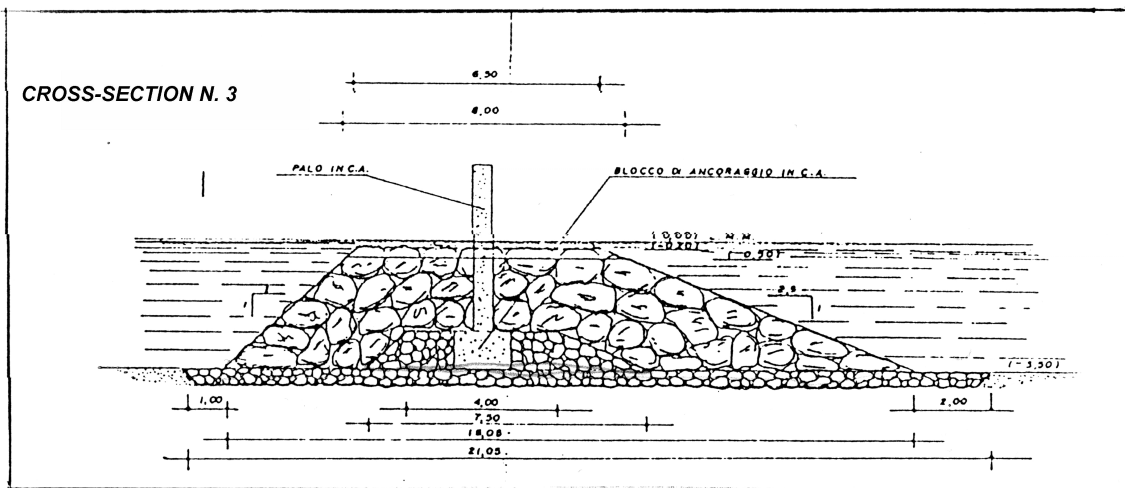
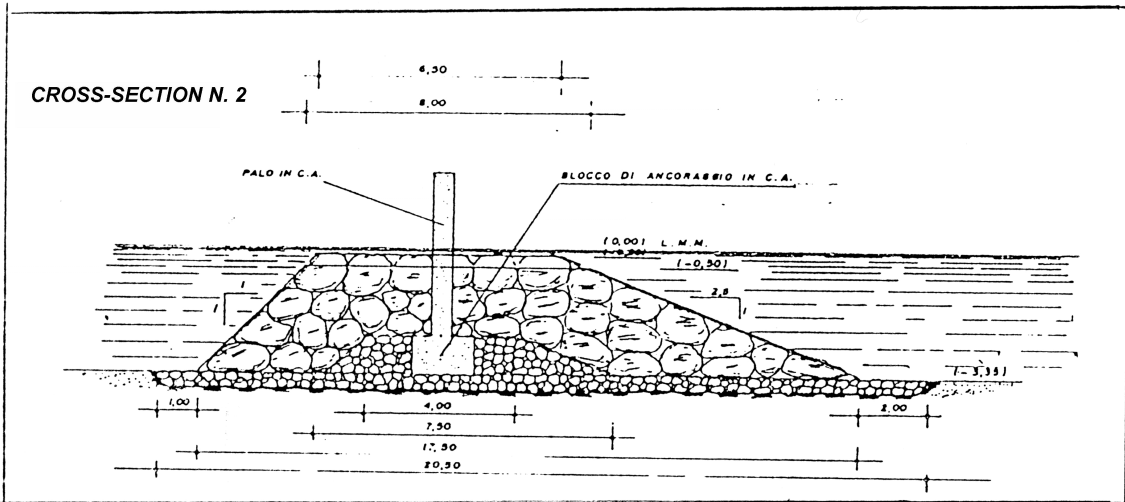
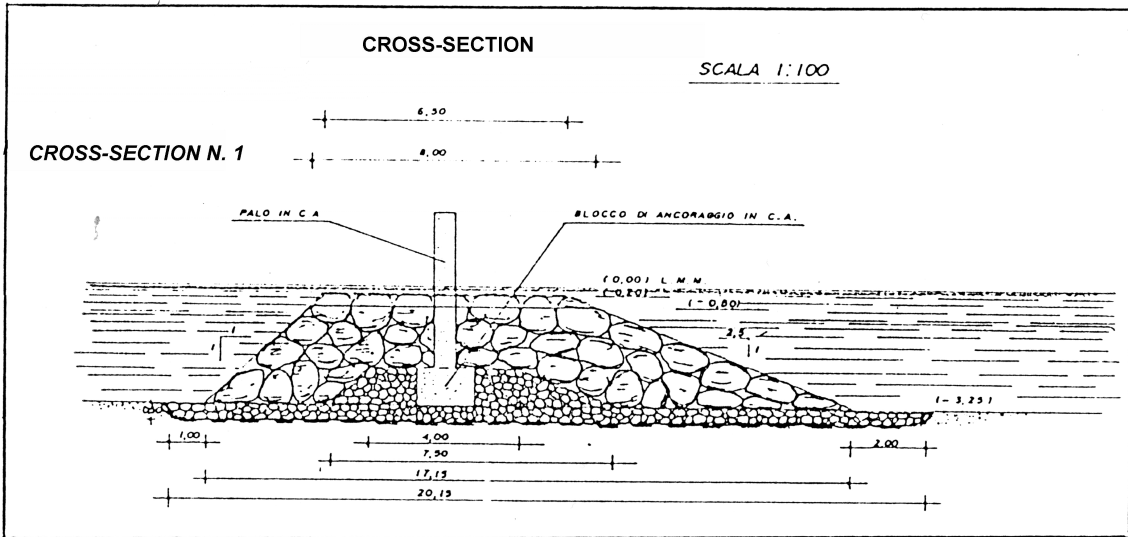
Indication of water level variations

In the area there is no tide of concern. There is a quite relevant surge during southeastern storms.

Existence of detailed information

It is difficult to obtain further informations.





UB_EIT_3_12, From Cesano di Senigallia to the Senigallia harbour.

Main motive for building the LCS

Coast erosion, protection of buildings, sea-front way and recreational facilities.

Impacts on bio-environment

Formation of tombolos in front of Cesano di Senigallia..

Socio-economic impact

Not known.

System Layout (dimensioned sketch)

About 5 km protected by breakwaters. In the northern extreme there are 4 submerged elements about 80m long, with gaps about 20m long and about 150m far from the coastline. Continuing southwards there are 6 emerged elements about 70m long with gaps 10-30m long and distance as far as 60m from the shoreline. In the central stretch there are 34 emerged elements 40-75m long with gaps 35-50m long and 110-210m far from the coastline. In the southern extreme there is an other series of submerged elements about 80m long each with gaps about 25m long and distance from the beach about 150m or more.

Typical cross section (dimensioned sketch)

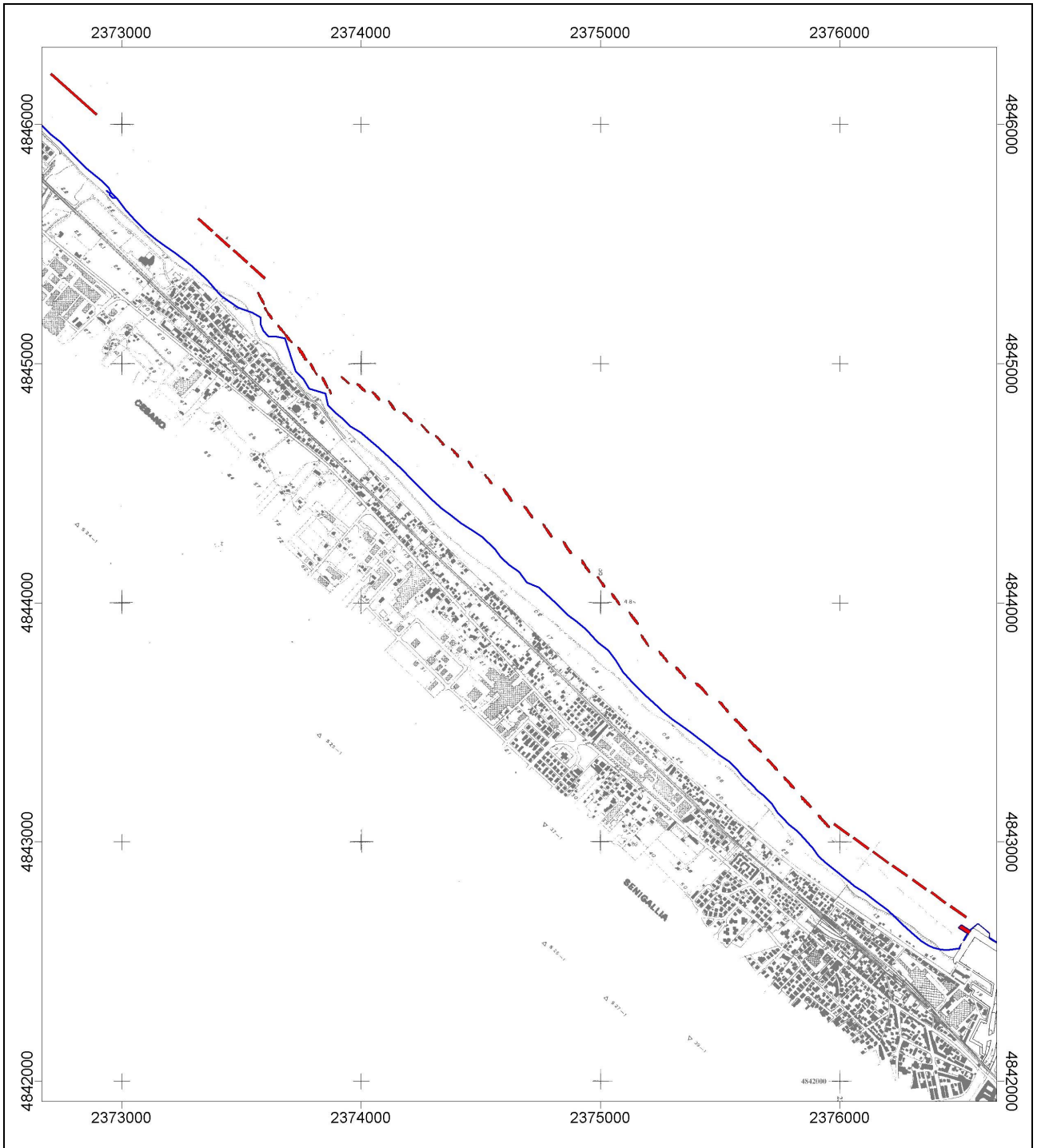
The submerged elements have the crest berm at the -0.5m and about 10m wide. The slopes are 1/2.5 offshore and 1/1.5 onshore. The emerged breakwaters have the crest berm about 3m wide and at about the +1.5m above the sea level. The water depth is from 2 to 3.5m.

Indication of water level variations

In the area there is no tide of concern. There is a quite relevant surge during southeastern storms.

Existence of detailed information

It is difficult to obtain further informations.



UB_EIT_3_13, Marina di Montemarciano

Main motive for building the LCS

Coast erosion, protection of sea-front way and recreational facilities.

Impacts on bio-environment

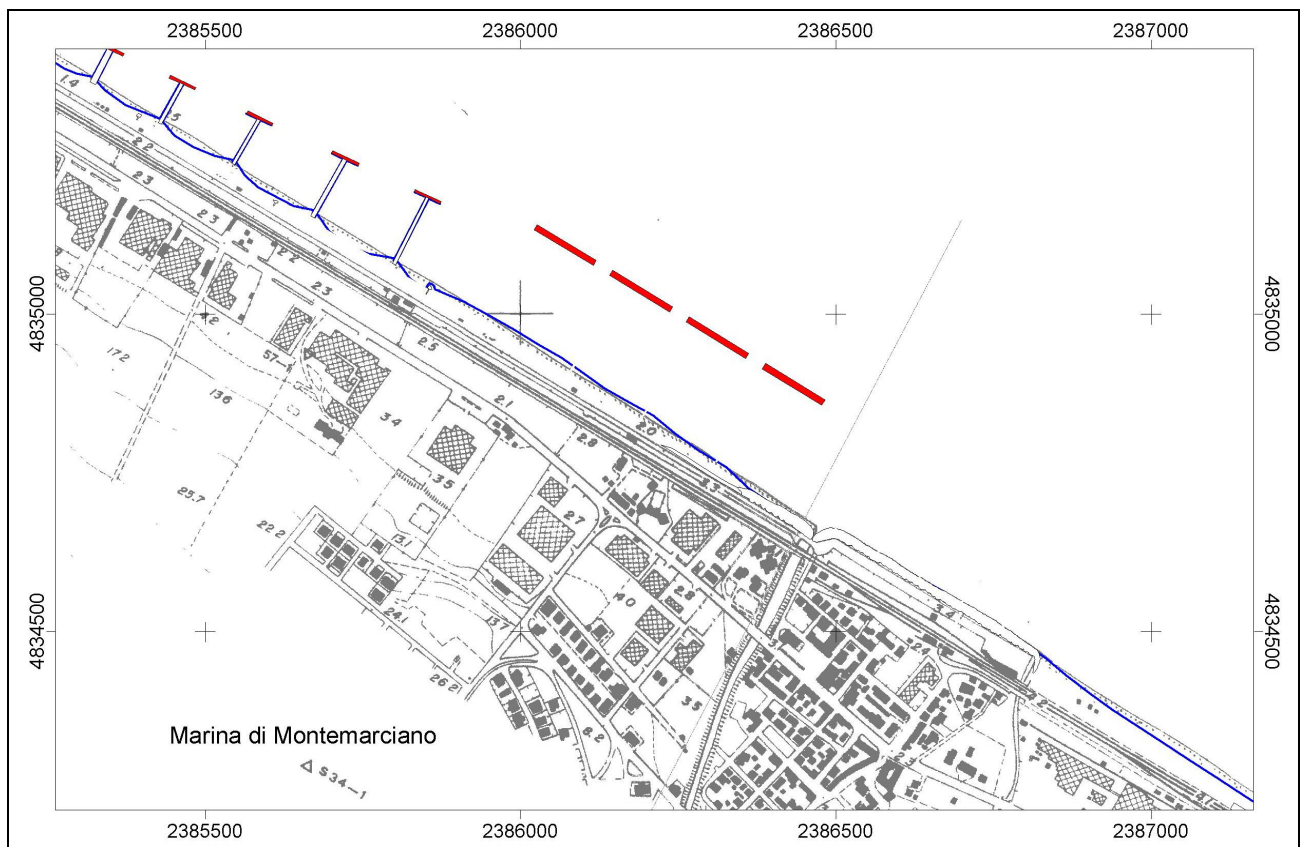
Not known.

Socio-economic impact

Not known.

System Layout (dimensioned sketch)

4 submerged elements 110m long each with gaps 30m long and about 150m far from the coastline.



Typical cross section (dimensioned sketch)

The submergence is about 1m and the crest berm is 10m wide. The water depth is about 3.7m. The offshore slope is 1/2.5, the onshore one is 1/1.5.

Indication of water level variations

In the area there is no tide of concern. There is a quite relevant surge during southeastern storms.

Existence of detailed information

It is difficult to obtain further informations.

UB_EIT_3_14, Rocca Priora di Falconara Marittima

Main motive for building the LCS

Coast erosion, protection of buildings and recreational facilities.

Impacts on bio-environment

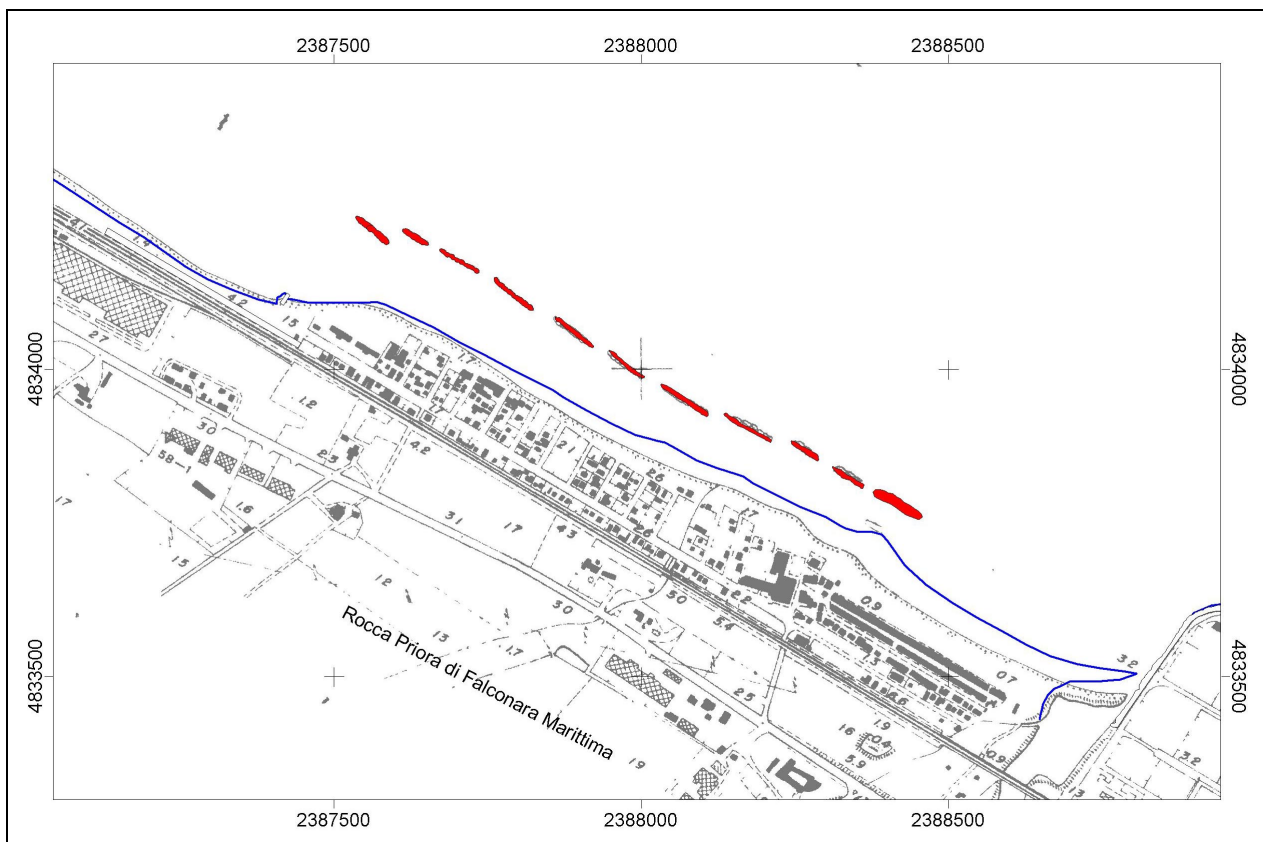
Not known.

Socio-economic impact

Not known.

System Layout (dimensioned sketch)

11 emerged elements 50-90m long each, with gaps 20-30m long and 70-110m far from the shoreline.



Typical cross section (dimensioned sketch)

The emergence is about 1m and the crest berm width is 3m and the water depth is about 3m.

Indication of water level variations

In the area there is no tide of concern. There is a quite relevant surge during southeastern storms.

Existence of detailed information

It is difficult to obtain further informations.

UB_EIT_3_15, From Falconara Marittima to Torrette di Ancona

Main motive for building the LCS

Coast erosion, protection of the railway and recreational facilities.

Impacts on bio-environment

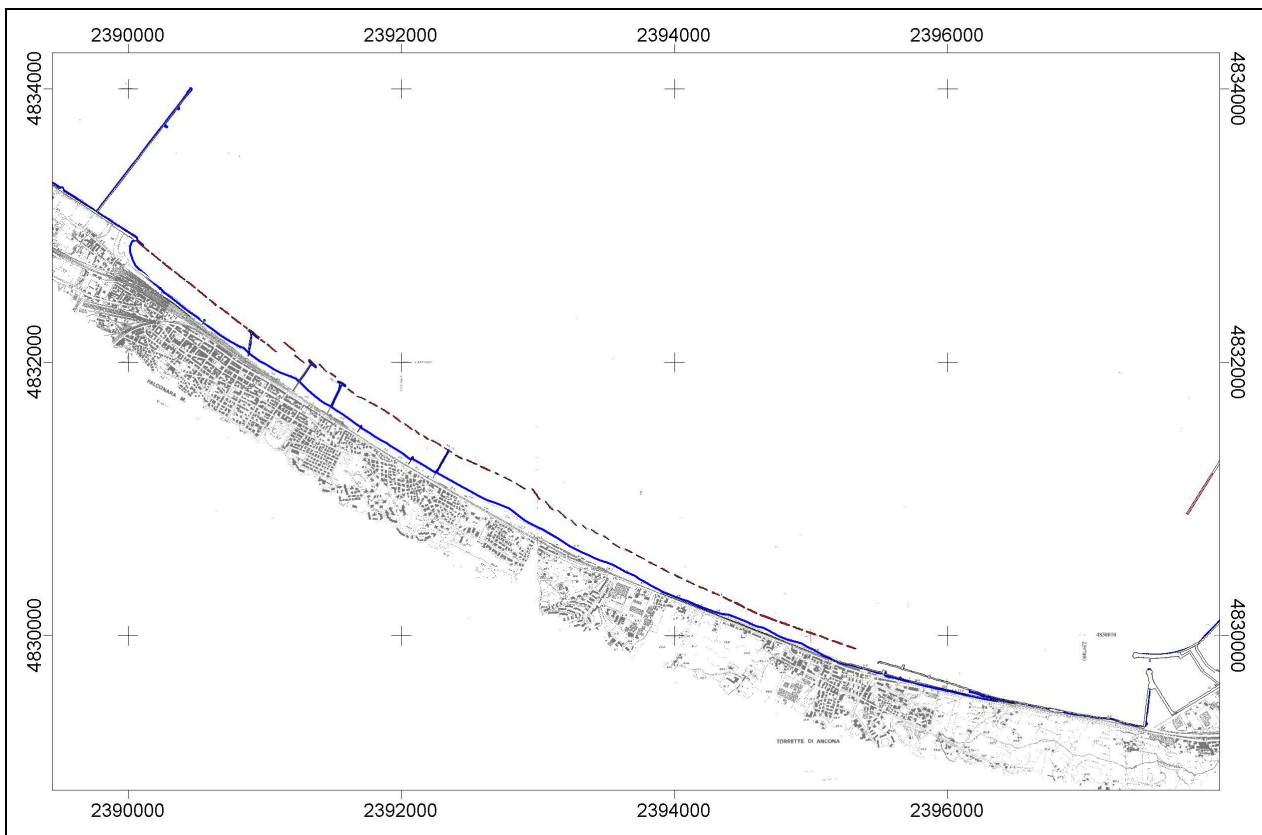
Not known.

Socio-economic impact

The LCS aid the defence from the sea storms of long coastal stretch of the railway and the recreational facilities were enlarged.

System Layout (dimensioned sketch)

About 7 km of emerged breakwaters. Each element is 45-100m long, the gaps are 15-35m long and the distance from the coastline is 80-180m. The southern one is about 500m long and is connected to the coastline.



Typical cross section (dimensioned sketch)

The emergence is about 1.5m and the crest berm width is about 3m.

Indication of water level variations

In the area there is no tide of concern. There is a quite relevant surge during southeastern storms.

Existence of detailed information

It is difficult to obtain further informations.

UB_EIT_3_16, Ancona, from the port to Passetto

Main motive for building the LCS

Cliff and civil infrastructures protection from the sea storms.

Impacts on bio-environment

Not known.

Socio-economic impact

The LCS aid the defence of some civil infrastructures.

System Layout (dimensioned sketch)

2 isolated emerged structures about 100m long. Their distances from the coastline are about 20m and 65m respectively.



Typical cross section (dimensioned sketch)

Their emergences are about 0.8m and 1.5m respectively. Their crest berms are about 3m wide.

Indication of water level variations

In the area there is no tide of concern. There is a quite relevant surge during southeastern storms.

Existence of detailed information

It is difficult to obtain further informations.

UB_EIT_3_17, Portonovo di Ancona.

Main motive for building the LCS

Protection from sea storms of historical buildings.

Impacts on bio-environment

Not known.

Socio-economic impact

The LCS aid the protection from the sea storms of some historical structures.

System Layout (dimensioned sketch)

3 series of isolated and submerged elements randomly mound at a distance from the coastline of about 20m all around the area to defend.

it is not possible to represent them adequately in a map.

Typical cross section (dimensioned sketch)

The submergences are from 0 to 1.5m. The section is not representable in any adequate figure.

Indication of water level variations

In the area there is no tide of concern. There is a quite relevant surge during southeastern storms.

Existence of detailed information

It is difficult to obtain further informations.

UB_EIT_3_18, Sirolo and Numana

Main motive for building the LCS

Coast erosion, protection of cliff and recreational facilities.

Impacts on bio-environment

Not known.

Socio-economic impact

Not known.

System Layout (dimensioned sketch)

2 stretches of alternated emerged and submerged structures, their lengths are from 100m to 350m. Their distances from coastline are from 20m to 80 m.

Typical cross section (dimensioned sketch)

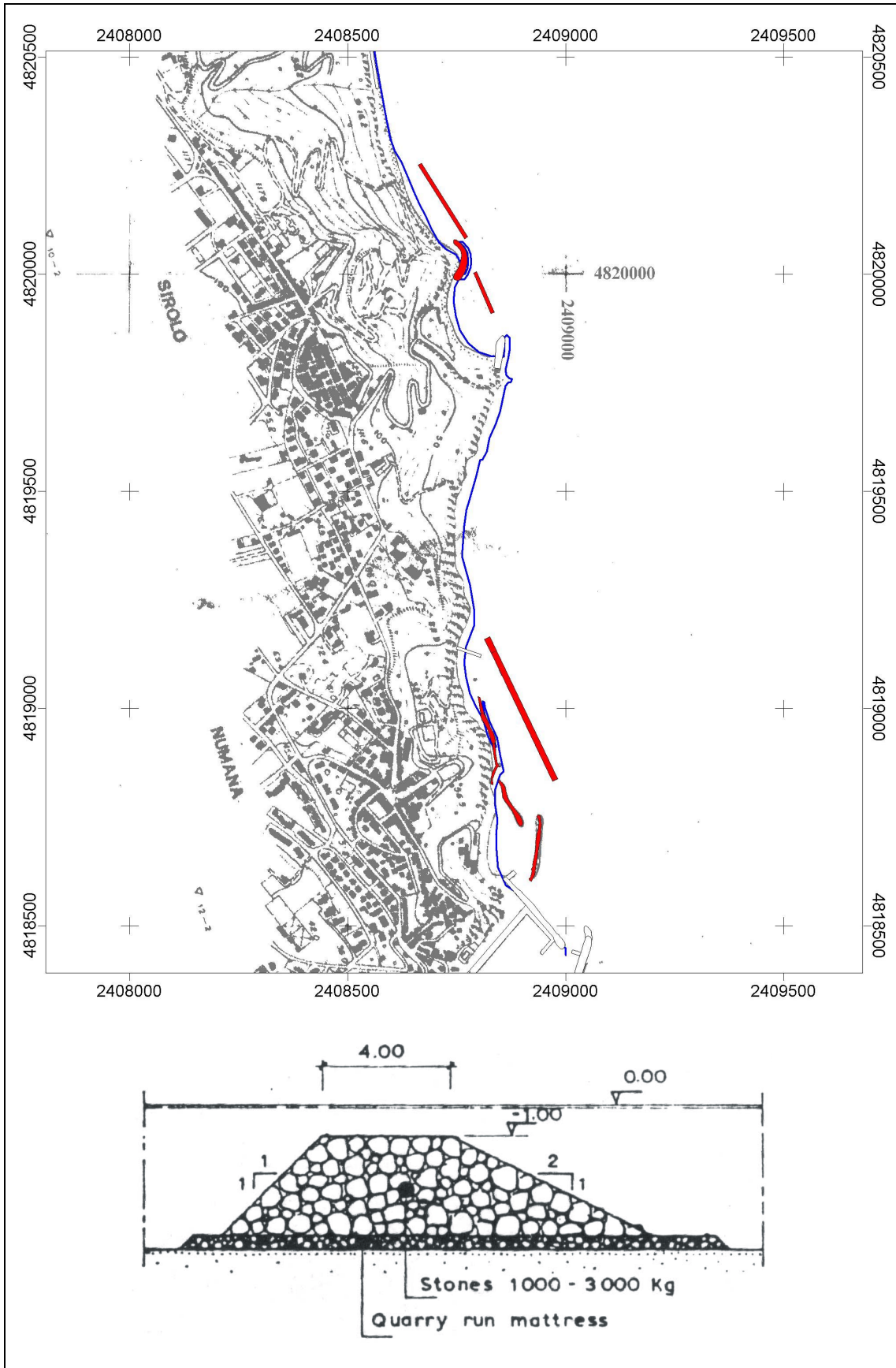
The emerged elements have the crest berms at about the +1.3m and about 3m wide. The crest berms of the submerged elements are at the –1m and about 4m wide. The water-depth is 3.5-5m. The offshore slope is 1/2, the onshore one is 1/1. Some submerged structures after damage were rebuilt using a larger section and a smaller submergence (about 0.5m).

Indication of water level variations

In the area there is no tide of concern. There is a quite relevant surge during southeastern storms.

Existence of detailed information

It is difficult to obtain further informations.



UB_EIT_3_19, from Scossicci to Portorecanati

Main motive for building the LCS

Coast erosion, protection of sea-front ways and recreational facilities.

Impacts on bio-environment

Formation of tombolos for some emerged structures.

Socio-economic impact

The LCS aid to defende the sea-front ways.

System Layout (dimensioned sketch)

About 2.6 km of emerged and submerged elements, experimental type too. The emerged ones are 40-90m long at a distance from the coastline of 30-60m. The submerged ones are 70-280m long, 40-200m far from the shoreline. Gaps between the various elements are 15-40m long.

Typical cross section (dimensioned sketch)

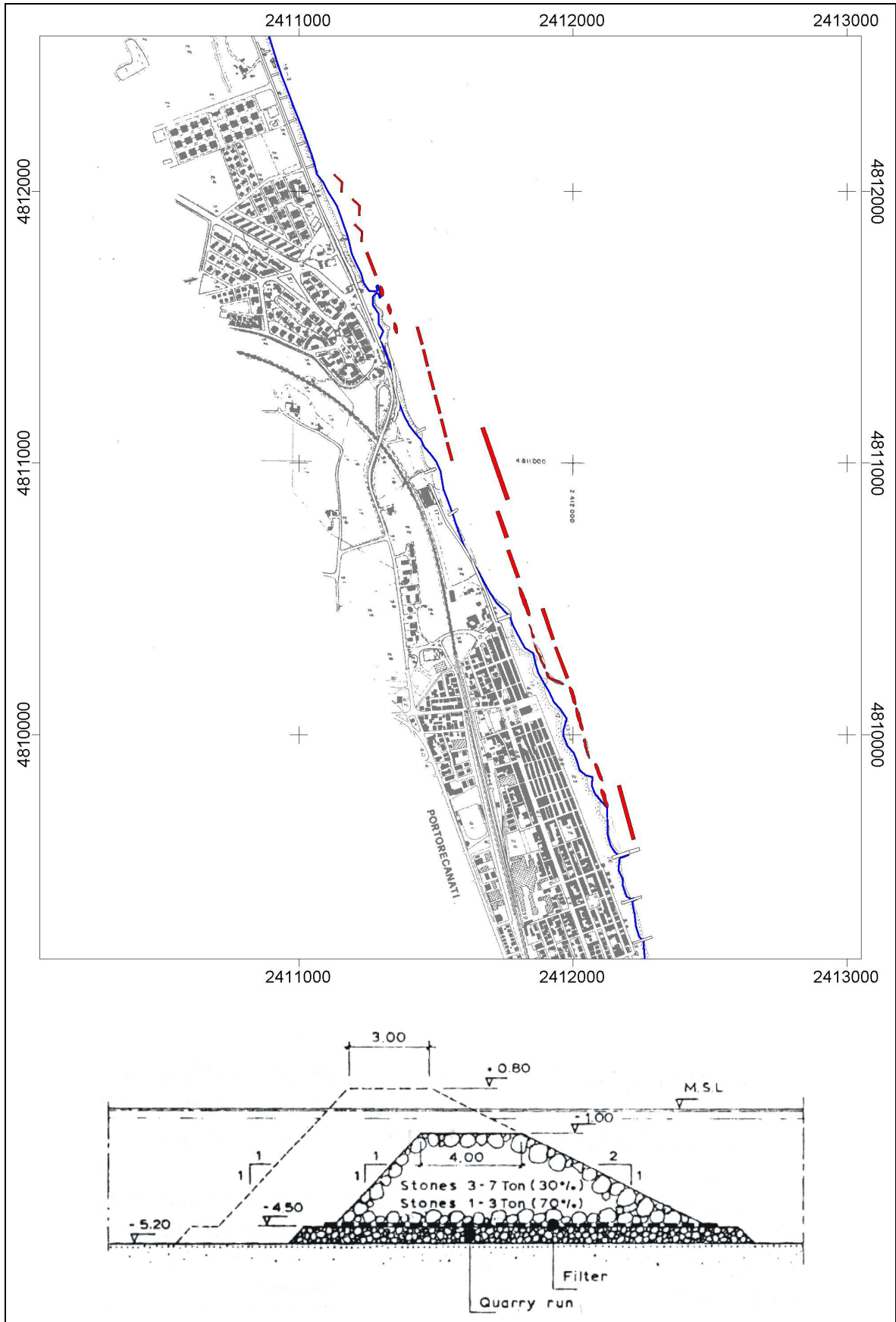
The crest berms of the emerged structures are about at the +1.3m and about 3m wide. For the submerged the oldest crest berms are at the -1m and 4m wide, mound on a water depth of 3-6m. Some of these structures were rebuilt using larger section (berm width of 6-8m) and smaller submergence (about 0.5m), the same of the more recent structures. The slopes are about 1/2 both side for the more recent ones and 1/3 offshore 1/1 onshore for the oldest ones.

Indication of water level variations

In the area there is no tide of concern. There is a quite relevant surge during southeastern storms.

Existence of detailed information

It is difficult to obtain further informations.



UB_EIT_3_20, Porto Potenza Picena

Main motive for building the LCS

Coast erosion, protection of railway infrastructures, of Fosso Pilocco mouth (northern part) and of recreational facilities.

Impacts on bio-environment

Formation of great salients for the northern and the southern structures.

Socio-economic impact

The LCS aid to defend from the sea storms the railway infrastructures.

System Layout (dimensioned sketch)

In the northern part there are 4 emerged elements about 75m long, with gaps about 40m long and 45-80m far from the coastline. Continuing southwards are being planned 15 submerged breakwaters in alignment with the previous structures. Continuing southwards again there are 11 emerged elements, still aligned with the previous ones, about 85m long, with gaps about 35m long and 100-120m far from the coastline. The 11 elements in the southern part, in front of the centre and the railway station of Porto Potenza Picena, are the oldest breakwaters. These are 30-50m long, with gaps 20-30m long and a distance from the coastline of 20-40m.

Typical cross section (dimensioned sketch)

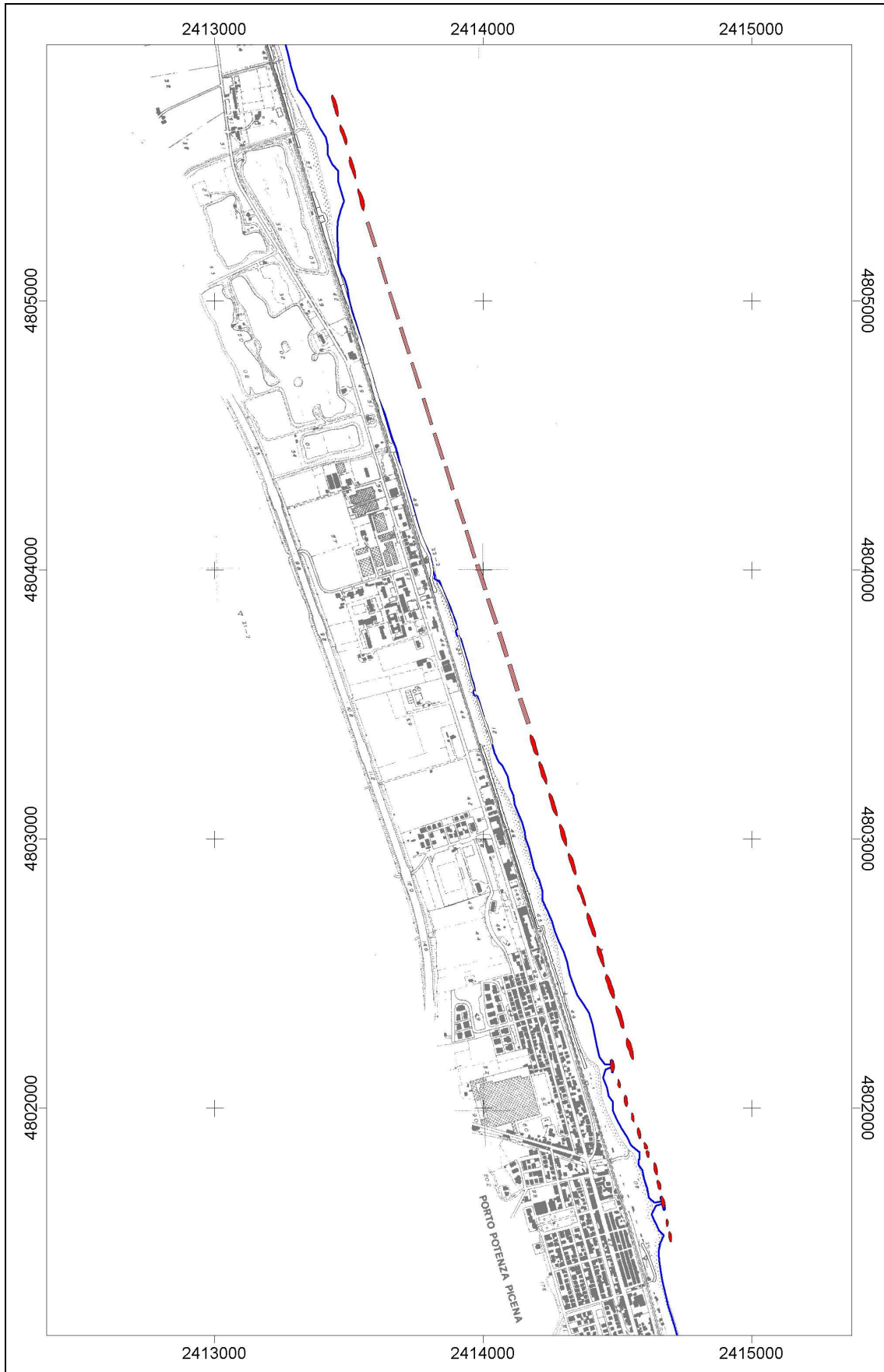
The emergence is about 1.5m, the crest berm is about 4m wide.

Indication of water level variations

In the area there is no tide of concern. There is a quite relevant surge during southeastern storms.

Existence of detailed information

It is difficult to obtain further informations.



UB_EIT_3_21, from Fontespina to Porto Civitanova

Main motive for building the LCS

Coast erosion, protection of railway, of sea-front way and of recreational facilities.

Impacts on bio-environment

Problems in such case with the formation of tombolos and salients.

Socio-economic impact

Not known.

System Layout (dimensioned sketch)

There is a northern stretch about 400m long of 5 emerged breakwaters, two of experimental type, about 50m long each, with gaps about 35m long and at a distance from the shoreline of about 60m. Continuing northwards are being planned 5 new breakwaters and continuing southwards are being planned 2 new breakwaters in alignment with the previous structures.

Continuing southwards there is a stretch, 2 km long, with 6 emerged barriers, 1 submerged barrier, with 3 isolated emerged elements onshore, and 8 emerged elements as far as the harbour.

The emerged elements are 50-120m long each and the gaps are 30-40m long while the submerged one is 600m long. The distance from the beach for the emerged structures is variable from 50m to 10m because of the tombolos formation; for the submerged one is 120m.

Typical cross section (dimensioned sketch)

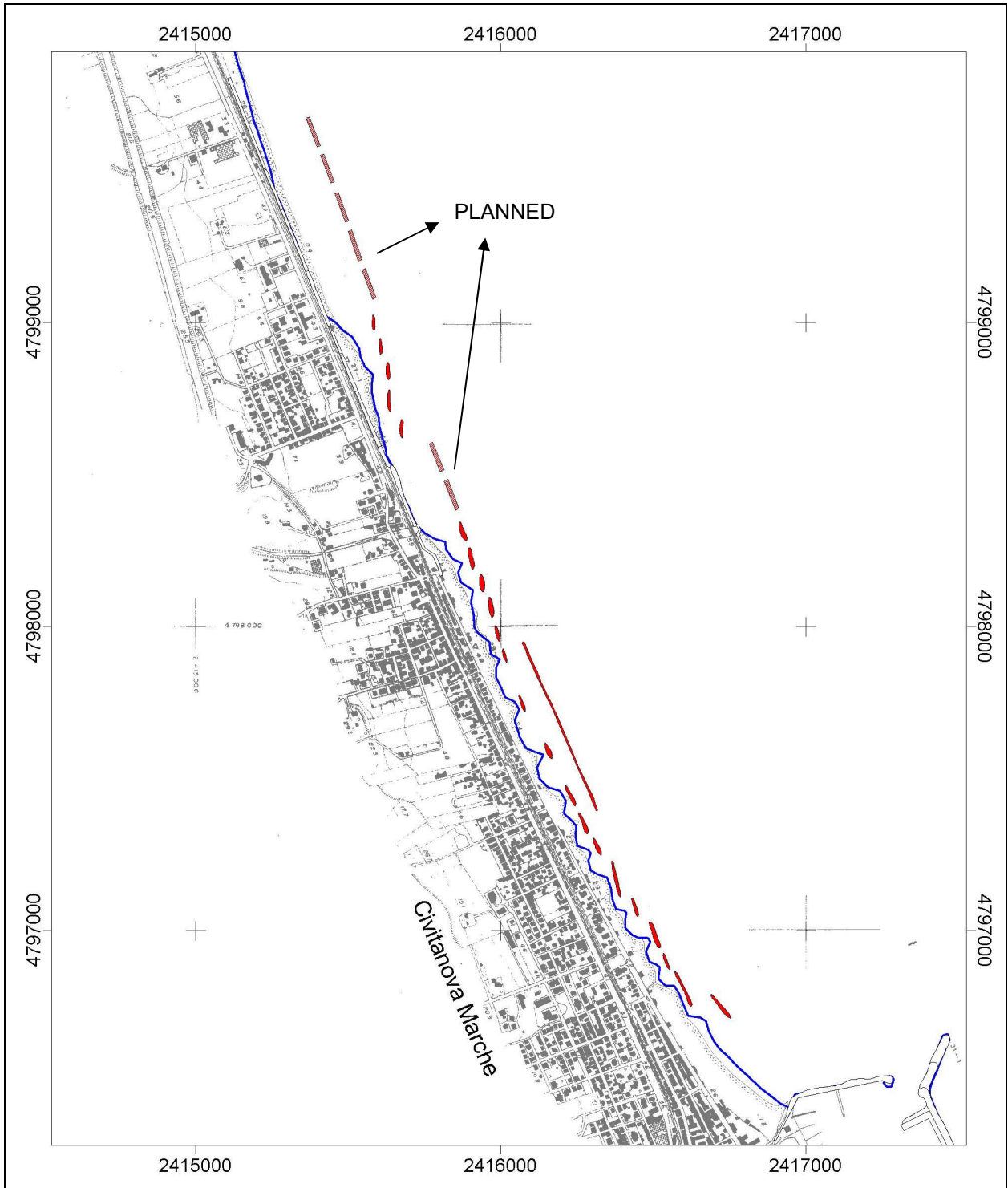
The crest berms of the emerged barriers are at about the +1m and about 4m wide. For the submerged structures the crest berms are at the -1m and 3m wide. The water depth is about 3m for all the barriers and the slope are about 1/3 offshore and 1/1 onshore.

Indication of water level variations

In the area there is no tide of concern. There is a quite relevant surge during southeastern storms.

Existence of detailed information

It is difficult to obtain further informations.



UB_EIT_3_22, From Porto S.Elpidio to Casabianca di Fermo

Main motive for building the LCS

Coast erosion and complementary structures for artificial beach nourishments.

Impacts on bio-environment

Not known.

Socio-economic impact

Not known.

System Layout (dimensioned sketch)

There are 2 toe submerged structures of perched beaches, about 750m long each, about 40m far from the coastline (one is to the North of the Tenna river mouth and the other is at the southern extreme part of the stretch, in front of Casabianca di Fermo).

In the central part of the stretch there are 6 submerged breakwaters 80m long with gaps 40m long at distance from the shoreline of about 160m. Continuing northwards and southwards 2 new submerged elements, 50m and 350m respectively long, are being planned.

Typical cross section (dimensioned sketch)

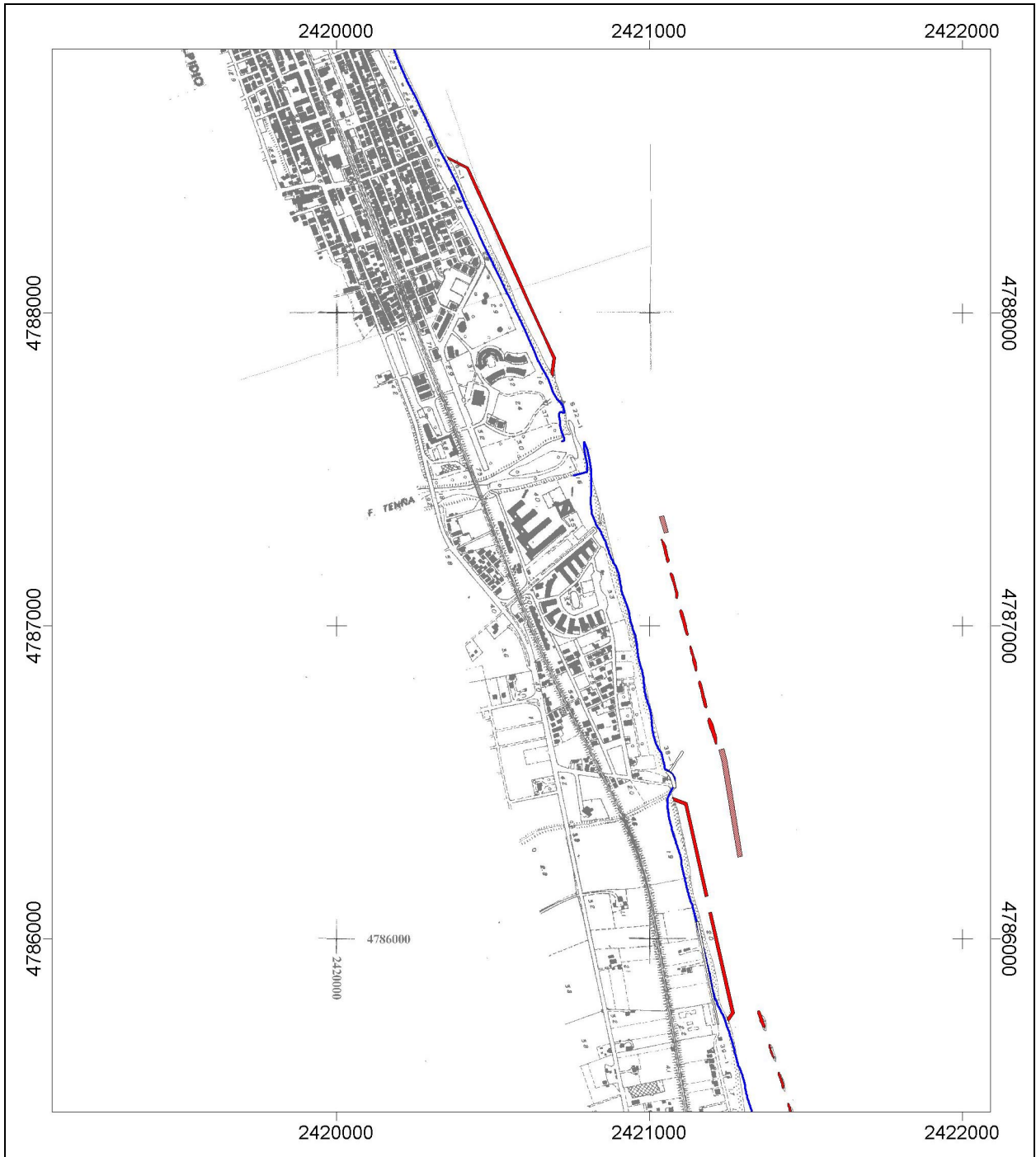
The submergence is about 1m for the 2 toe structures with crest berms 3m wide on water depth of 2-3m. The 6 barriers have crest berms at the -0.5m and about 4.5m wide. The water depth is about 4m. The slopes of all the barriers are 1/3 offshore and 1/1 onshore.

Indication of water level variations

In the area there is no tide of concern. There is a quite relevant surge during southeastern storms.

Existence of detailed information

It is difficult to obtain further informations.



UB_EIT_3_23, from Lido di Fermo to Porto S.Giorgio

Main motive for building the LCS

Coast erosion, protection of sea-front way and recreational facilities.

Impacts on bio-environment

Not known.

Socio-economic impact

Not known.

System Layout (dimensioned sketch)

5.7km of emerged breakwaters about 50-70m long with gaps 30-40m long (about 100m in front of Bocca di Rivo ditch mouth) and 50-180m far from the beach.

Typical cross section (dimensioned sketch)

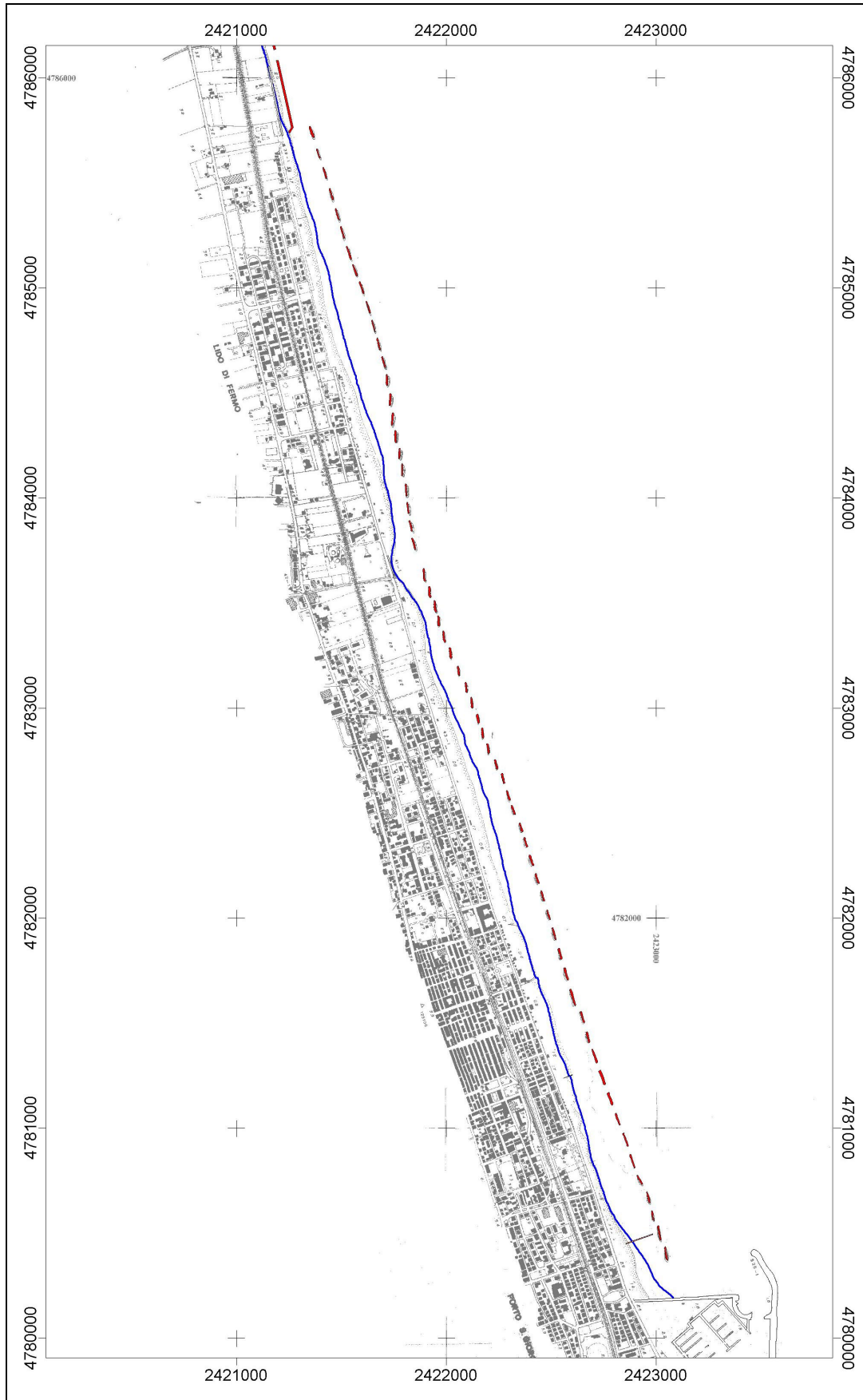
The emergence is about 1.5m and the crest berm is about 3m wide. The water depth is 2-3m.

Indication of water level variations

In the area there is no tide of concern. There is a quite relevant surge during southeastern storms.

Existence of detailed information

It is difficult to obtain further informations.



UB_EIT_3_24, Marina Palmense di Fermo

Main motive for building the LCS

Coast erosion, protection of recreational facilities from sea storms attack.

Impacts on bio-environment

Not known.

Socio-economic impact

Not known.

System Layout (dimensioned sketch)

A series of 8 submerged elements about 100m long each, with gaps about 40m long and distance from the shoreline of about 150m.

Typical cross section (dimensioned sketch)

The submergence is about 0.5m, and the crest berm is about 4.5m wide. The water depth is about 3m. The offshore slope is 1/3, the onshore one is 1/1.

Indication of water level variations

In the area there is no tide of concern. There is a quite relevant surge during southeastern storms.

Existence of detailed information

It is difficult to obtain further informations.

UB_EIT_3_25, Marina di Altidona

Main motive for building the LCS

Aid to the railway defence from sea storms.

Impacts on bio-environment

Not known.

Socio-economic impact

The LCS aid to defend the railway.

System Layout (dimensioned sketch)

There are 2 series of emerged breakwaters 500m and 260m respectively long. The northern one consists of 7 elements about 80m long each, with gaps about 25m long and about 100m far from the coastline.

Continuing northwards 6 new submerged breakwaters are being planned.

The southern stretch (near the Aso river mouth) consists of 3 emerged elements about 70m long each, with gaps about 30m long and about 70m far from the coastline.

Typical cross section (dimensioned sketch)

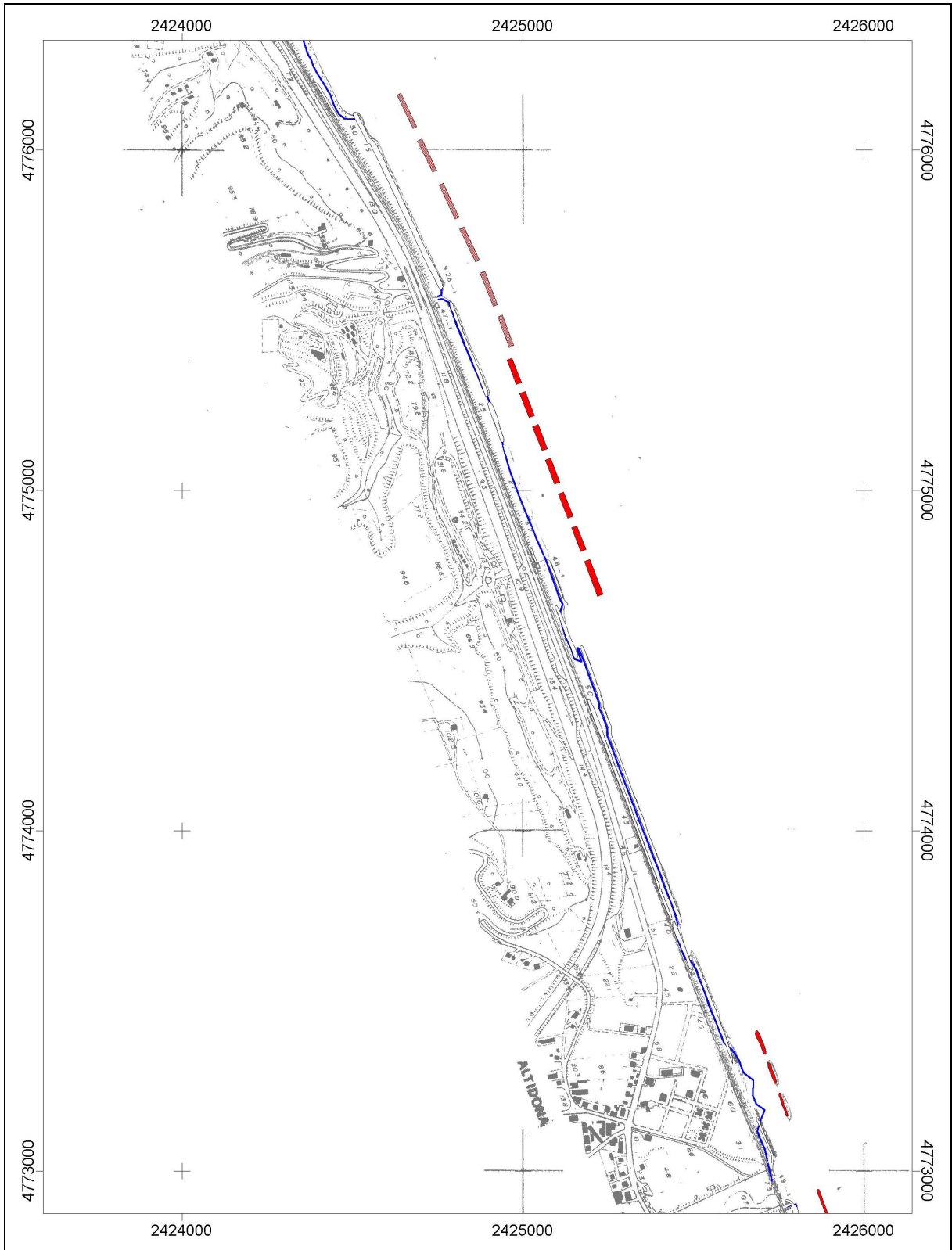
The emergence is about 1.5m, and the crest berm is about 4m wide. The water depth for the southern stretch is 3.5m. For the northern structures the water depth is about 4m.

Indication of water level variations

In the area there is no tide of concern. There is a quite relevant surge during southeastern storms.

Existence of detailed information

It is difficult to obtain further informations.



UB_EIT_3_26, Pedaso

Main motive for building the LCS

Coast erosion, sea storms defence of railway infrastructures and protection of recreational facilities.

Impacts on bio-environment

Not known.

Socio-economic impact

The LCS aid to defend the railway infrastructures.

System Layout (dimensioned sketch)

A northern stretch about 1km long consists of 3 submerged breakwaters and 4 emerged southwards. Their lengths are from 80 to 300m for the emerged ones and 60-150m for the submerged ones. Gaps are 20-40m long. Their distances from the coastline are 20-150m.

The southern stretch consists of 3 emerged elements 100m, 30m and 20m respectively long with gaps about 10m long. They are distant about 15m from the coastline. In this part 8 new breakwaters are being planned that will be aligned with the other existing in front of Marina di Campofilone.

Typical cross section (dimensioned sketch)

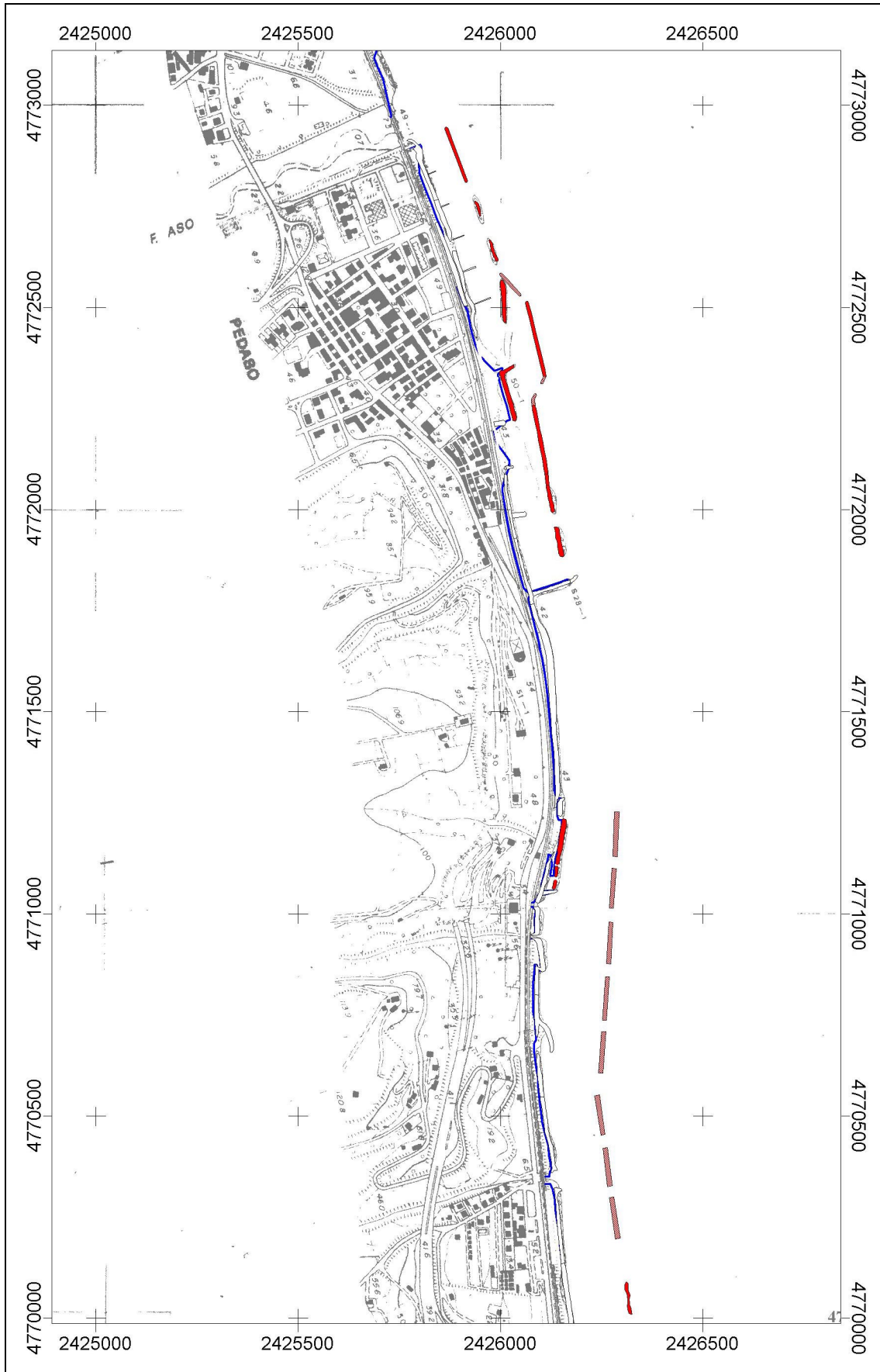
The crest berm of the emerged elements is about at the +1m and about 3m wide. For the submerged elements the crest berm is about at the -0.5m and about 10m wide. The water depth is from 3 to 5m.

Indication of water level variations

In the area there is no tide of concern. There is a quite relevant surge during southeastern storms.

Existence of detailed information

It is difficult to obtain further informations.



UB_EIT_3_27, Marina di Campofilone

Main motive for building the LCS

Coast erosion, sea storms defence of railway and protection of recreational facilities.

Impacts on bio-environment

Not known.

Socio-economic impact

In the northern part the LCS aid to defend the railway.

System Layout (dimensioned sketch)

About 1.2 km protected by 9 emerged elements about 80m long each with gaps of 20-50m long and 1 submerged breakwater 100m long in the southern part. This barriers are distant about 120m from the coastline.

Typical cross section (dimensioned sketch)

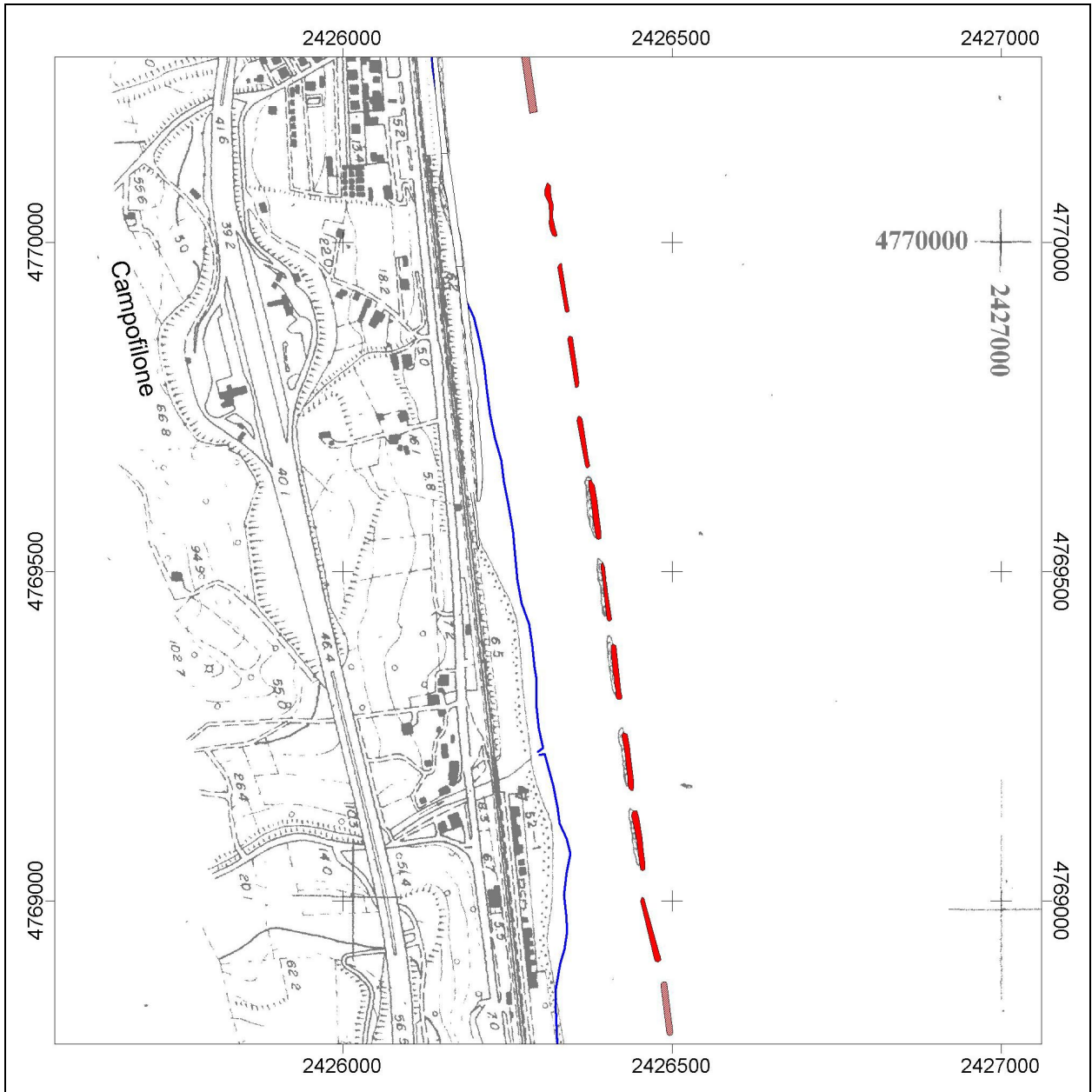
The crest berms emerge 0.5-1.3m and are wide about 3m. For the submerged structure the crest berm is about at the -0.5m and about 10m wide. The water depth is about 4m.

Indication of water level variations

In the area there is no tide of concern. There is a quite relevant surge during southeastern storms.

Existence of detailed information

It is difficult to obtain further informations.



UB_EIT_3_28, Cupramarittima

Main motive for building the LCS

Coastal erosion, protection of railway infrastructures and recreational facilities.

Impacts on bio-environment

Not known.

Socio-economic impact

Not known.

System Layout (dimensioned sketch)

About 6km of breakwaters mostly emerged. For the northern part are being planned other 7 new barriers. The elements are 50-100m long each with gaps 25-50m long. The 5 submerged elements are 110-180m long. The breakwaters are distant from the coastline 100-180m.

Typical cross section (dimensioned sketch)

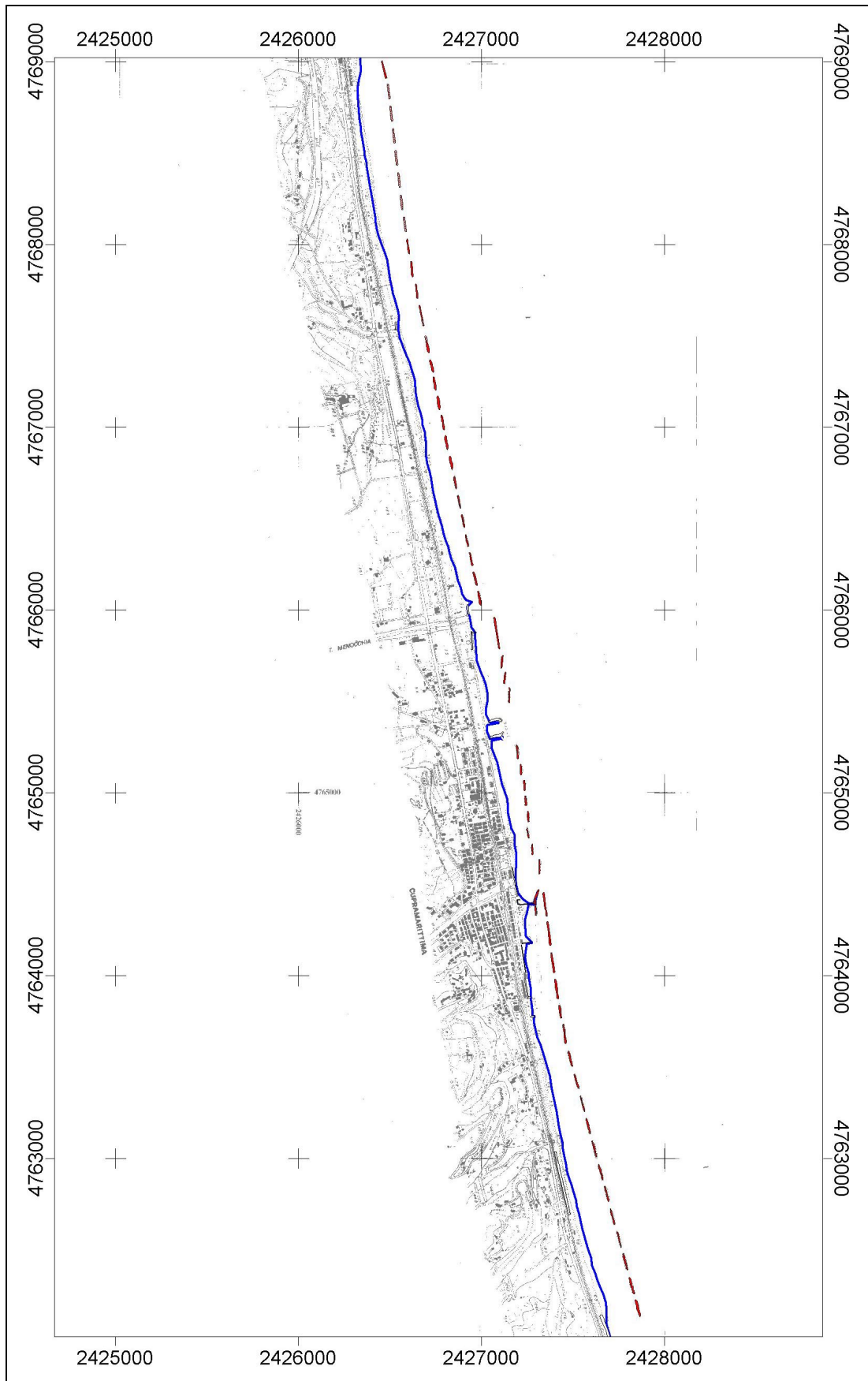
The berms emerge 1-1.5 m and are about 3 m wide. For the submerged ones the berms are about at about the -0.5m and about 10m wide. The water depth is 3-3.5m.

Indication of water level variations

In the area there is no tide of concern. There is a quite relevant surge during southeastern storms.

Existence of detailed information

It is difficult to obtain further informations.



UB_EIT_3_29, Grottammare, the part to the North of Tesino river mouth**Main motive for building the LCS**

Coastal erosion, protection of recreational facilities and of an artificial beach fill.

Impacts on bio-environment

Not known.

Socio-economic impact

Not known.

System Layout (dimensioned sketch)

The central part consists of 10 submerged elements 90m long each with gaps 15-25m wide and distance from the beach about 150m. The extreme parts consist of 4 emerged breakwaters each. These elements are 50-100m long each with gaps about 20-40m long and far from the beach from 60 to 90m.

Typical cross section (dimensioned sketch)

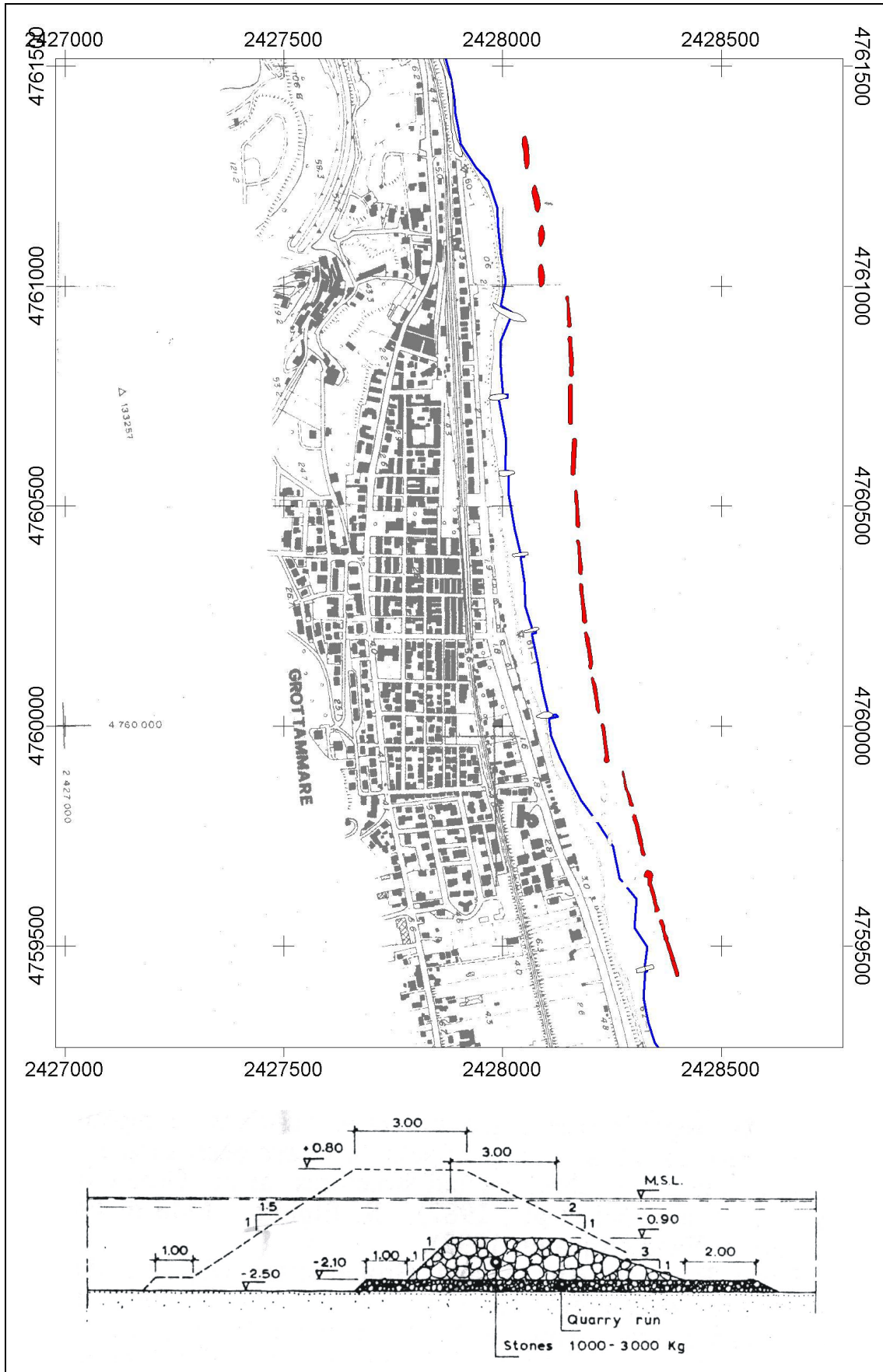
The submerged barriers have berms at the -0.90m about 3m wide at a water depth of 2.4-3m. The offshore slope is 1/3 and the onshore slope is 1/1. The emerged breakwaters are on 2.5-3m of water depth.

Indication of water level variations

In the area there is no tide of concern. There is a quite relevant surge during southeastern storms.

Existence of detailed information

It is difficult to obtain further informations.



UB_EIT_3_30, Grottammare, the part to the South of Tesino river mouth

Main motive for building the LCS

Coastal erosion, protection of recreational facilities and toe protection of an artificial beach nourishment.

Impacts on bio-environment

Not known.

Socio-economic impact

Not known.

System Layout (dimensioned sketch)

The northern stretch, 550m long, is protected by an old semi-submerged structure complementary to a gravel perched beach about 50m wide. Continuing southwards there are 3 submerged breakwaters about 250m long with gaps about 50m long that are distant about 150m from the beach. New submerged barriers are being planned for the northern part to substitute the old semi-submerged one.

Typical cross section (dimensioned sketch)

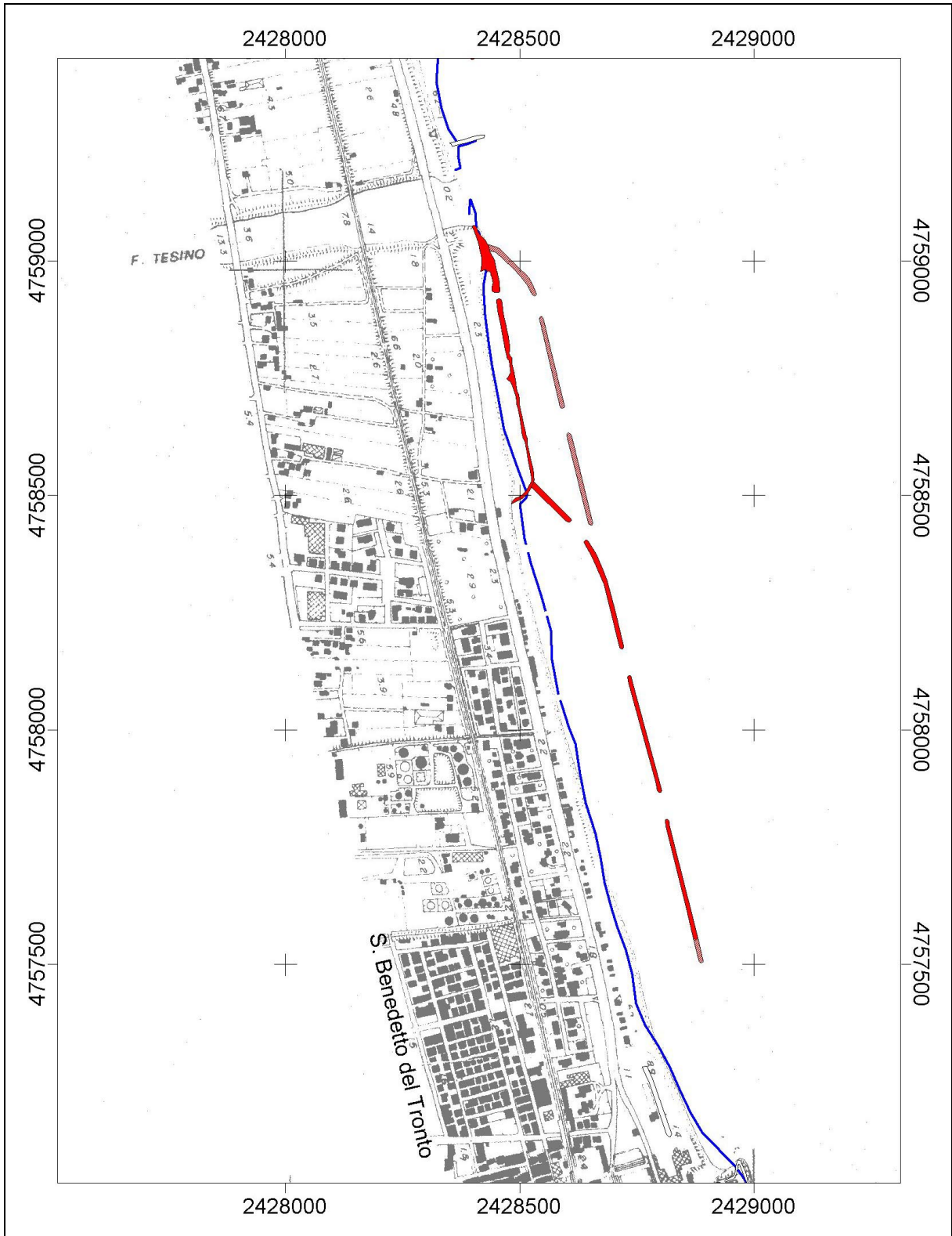
The crest berm of the semi-submerged barrier is at the 0m and is about 4m wide. It was built at the water depth of 1.6m and the slope is 1/1 both side. The other breakwaters have the berm at the -0.5m, about 10m wide. The water depth is about 3m.

Indication of water level variations

In the area there is no tide of concern. There is a quite relevant surge during southeastern storms.

Existence of detailed information

It is difficult to obtain further informations.



UB_EIT_3_31, from San Benedetto del Tronto to Porto d'Ascoli**Main motive for building the LCS**

Coastal erosion, protection of recreational facilities.

Impacts on bio-environment

Not known.

Socio-economic impact

Not known.

System Layout (dimensioned sketch)

About 4.5 km of longitudinal defence structures. The northern part consists of 9 submerged elements 80m long each with gaps about 15m and the distance from the shoreline is 170m. Continuing southwards there are about 3.5 km of emerged breakwaters 60-150m long with gaps 25-50m long; their distance from the shoreline is 100-150m, that becomes 60-100m at Porto d'Ascoli.

Typical cross section (dimensioned sketch)

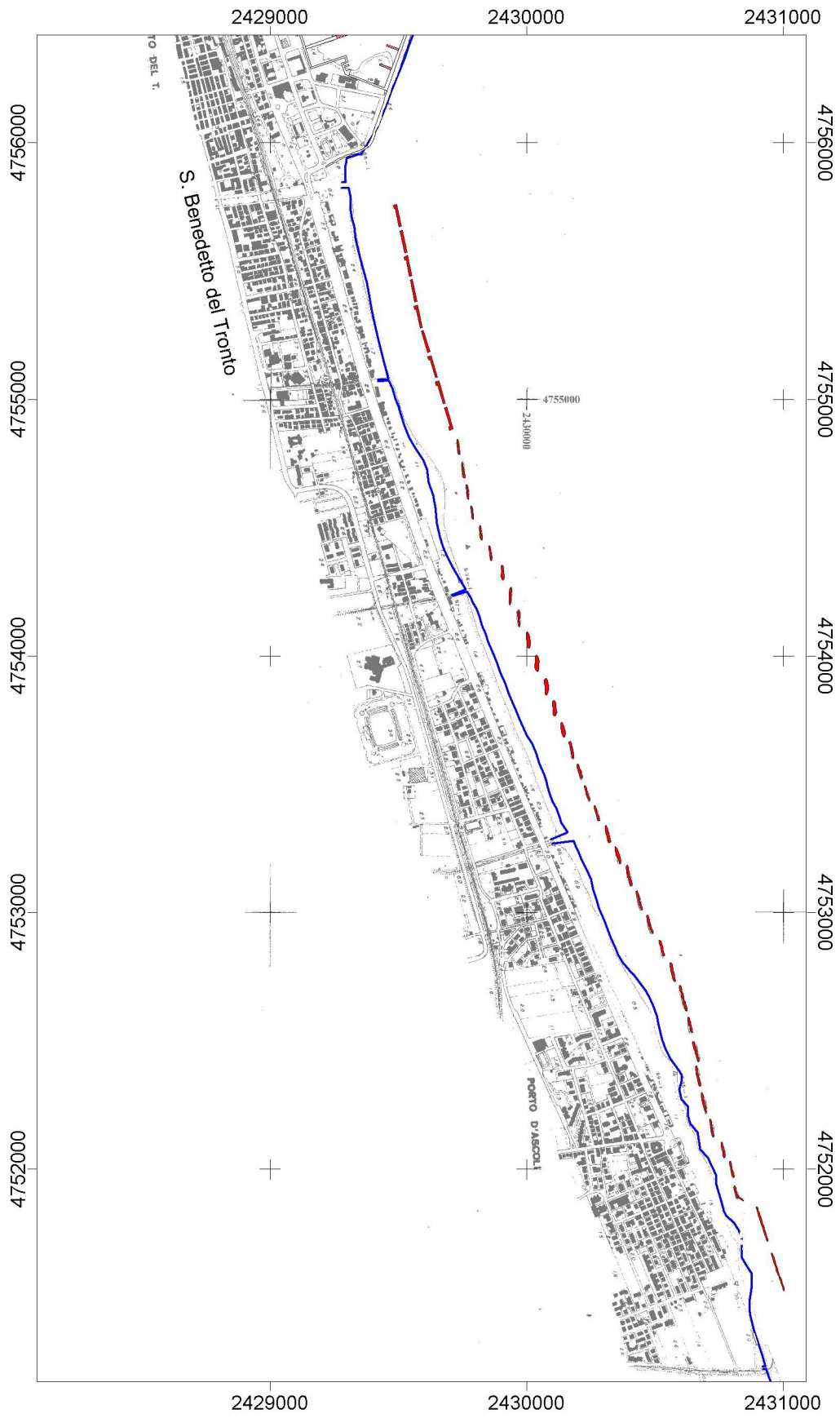
The crest berm of the submerged elements is at the -0.90m and about 3m wide. The water depth is about 2.5m. The offshore slope is 1/2, the onshore one is 1/1. For the emerged barriers the crest berm is at the +1-1.5m and about 3m wide.

Indication of water level variations

In the area there is no tide of concern. There is a quite relevant surge during southeastern storms.

Existence of detailed information

It is difficult to obtain further informations.



UB_EIT_6_1, Bisceglie, Puglia

Type of coastline and bottom

Rocky, sandy-rocky

Main motive for building the LCS

coastal erosion, danger for private villas and damage with interruption of the road

Impacts on bio-environment

Not known

Socio-economic impact

Recreational activities have increased a lot after the LCS was built

System Layout (dimensioned sketch)

Construction date: 1993

Number of LCS breakwaters = 5

Minimum distance from the shoreline = 67 m

Width = 10 m

Minimum length = 55 m

Maximum length = 65 m

Gap width = 30 m

Typical cross section (dimensioned sketch)

Rc = - 0.15 m to the swl

Water depth ranging from 2.30 m to 4.50 m

Indication of water level variations

Usually the tide in the area varies ± 0.25 meters.

Existence of detailed information

More detailed information can be given by request



UB_EIT_6_2, Bisceglie, Puglia

Type of coastline and bottom

Rocky, sandy-rocky

Main motive for building the LCS

coastal erosion, danger for private villas and damage of the road

Impacts on bio-environment

Not known

Socio-economic impact

Recreational activities have increased a lot after the LCS was built

System Layout (dimensioned sketch)

Construction date: 2000

Number of LCS breakwaters = 2

Minimum distance from the shoreline = 76 m

Maximum distance from the shoreline = 107 m

Crest Width = 3.70 m

Minimum length = 170 m

Maximum length = 200 m

Gap width = 72 m

Typical cross section (dimensioned sketch)

Rc = + 0.80 m to the swl

Seaside slope = 1:2

Landside slope = 3:4

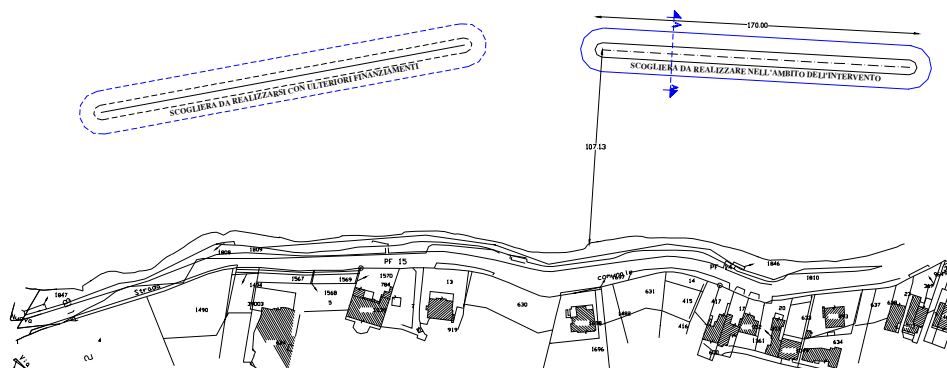
Water depth ranging from 3.90 m to 4.50 m

Indication of water level variations

Usually the tide in the area varies ± 0.25 meters.

Existence of detailed information

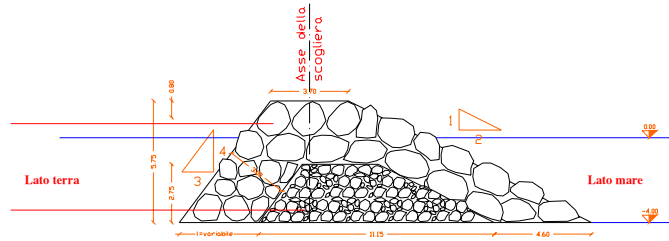
detailed information can be given by request



SCOGLIERA DISTANZIATA SEZIONE A-A

Mantella realizzata con scogli di 2° categoria (1000±3000 Kg)

Nucleo realizzato con scogli di 1° categoria (1000 Kg)



UB_EIT_6_3, Bari, Puglia

Type of coastline and bottom

Rocky, sandy-rocky

Main motive for building the LCS

Reduce the heavy impact of waves at an important littoral road

Impacts on bio-environment

Not known

Socio-economic impact

Recreational activities have increased a lot after the LCS was built
A sandy beach appeared at the rear of the last LCS to the South (see photo 1)

System Layout (dimensioned sketch)

Construction date: 1985
Number of LCS breakwaters = 15
Minimum distance from the shoreline = 100 m
Width = 12 m
Minimum length = 100 m
Gap width = 30 m

Typical cross section (dimensioned sketch)

Rc = 1.0 m to the swl
Water depth ranging from 3.30 m to 4.50 m

Indication of water level variations

Usually the tide in the area varies ± 0.25 meters.

Existence of detailed information

More detailed information can be given by request





UB_EIT_6_4, Brindisi, Puglia

Type of coastline and bottom

sandy, sandy

Main motive for building the LCS

coastal erosion, danger for private villas and damage of the road

Impacts on bio-environment

Not known

Socio-economic impact

Recreational activities have increased a lot after the LCS was built
Creation of a sandy beach, tombolos

System Layout (dimensioned sketch)

Construction date: 1992
Number of LCS breakwaters = 6
Distance from the original shoreline = 100 m
Crest Width = not known
Length = 125 m
Gap width = 20 m

Typical cross section (dimensioned sketch)

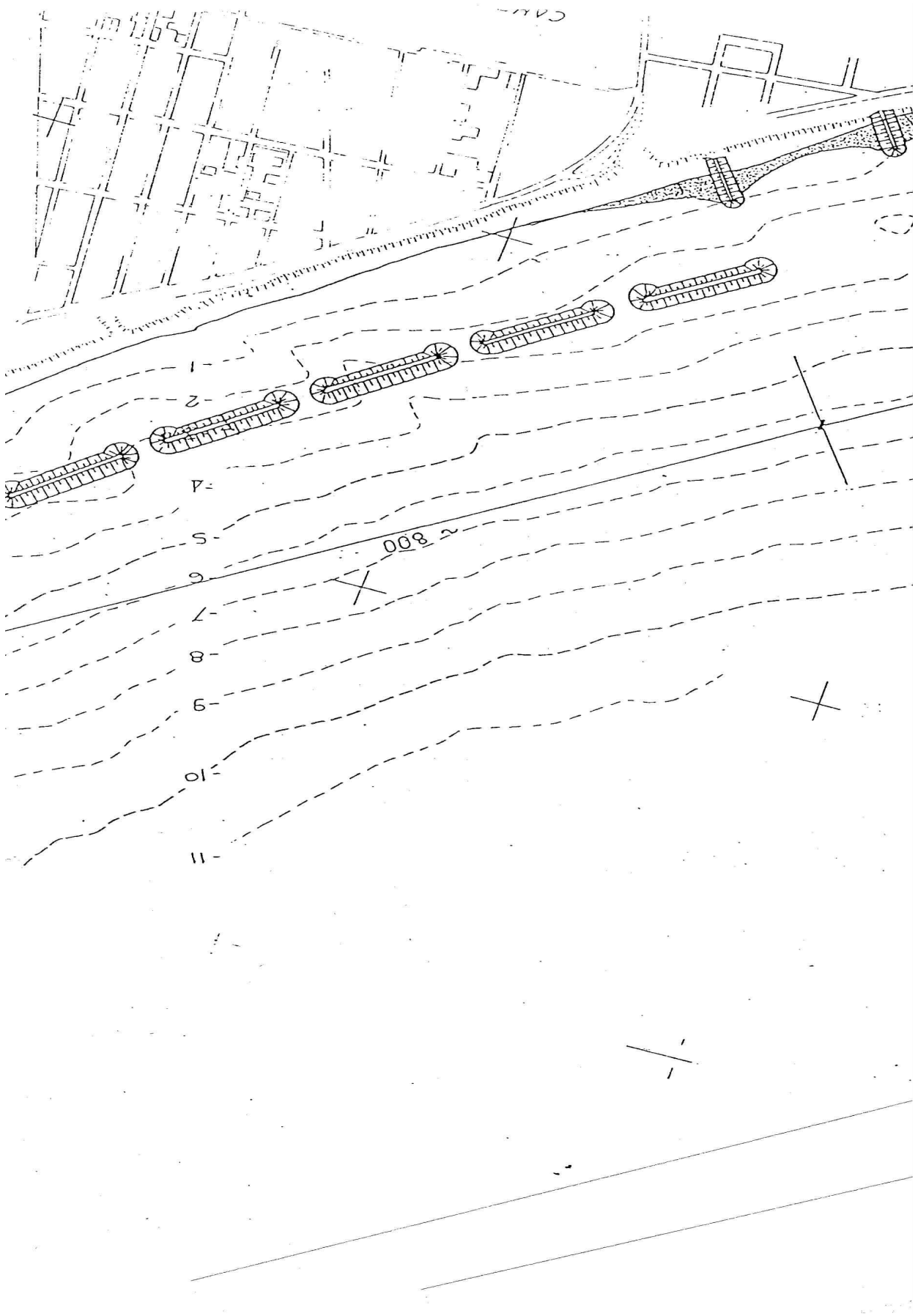
Rc = + 2.50 m to the swl
Water depth ranging from 2.50 m to 3.50 m

Indication of water level variations

Usually the tide in the area varies ± 0.25 meters.

Existence of detailed information

detailed information can be given by request



UB_WIT_11_1, Marina di Massa, Tuscany

Location

Marina di Massa is located in Tuscany, on the West coast of Italy and it represents a district of the city of Massa. The beach is characterized by a fine sand, amber or grey coloured.

Main motive for building the LCS

The eastern part of Marina di Massa shore is formed by nourishment works, because the coast was eroded after the construction of the sea defensive works for Marina di Carrara harbour (which is northerly as to Marina di Massa).

Impacts on bio-environment

Not known.

Socio-economic impact

It is possible that recreational activities have increased after the LCS were built because they represent a barrier to the wave motion and calm water basins are created in their inner side, so that the bathing is surer.

System Layout (dimensioned sketch)

The LCS consist of a series of ten structures parallel to the shore. The distances from the shoreline are about (from left to right): 45 m, 90 m, 90 m, 90 m, 72 m, 54 m, 90 m, 63 m, 36 m, 108 m.

The gaps between each structure are: 27 m, 27 m, 18 m, 18 m, 27 m, 18 m, 9 m, 45 m, 27 m, 18 m.

The lengths of the structures respectively are: 180 m, 180 m, 225 m, 225 m, 225 m, 180 m, 495 m, 180 m, 90 m, 315 m. The 495 m long structure is intersected by a 200 m long pier perpendicular to the shoreline which is part of the system.

Typical cross section (dimensioned sketch)

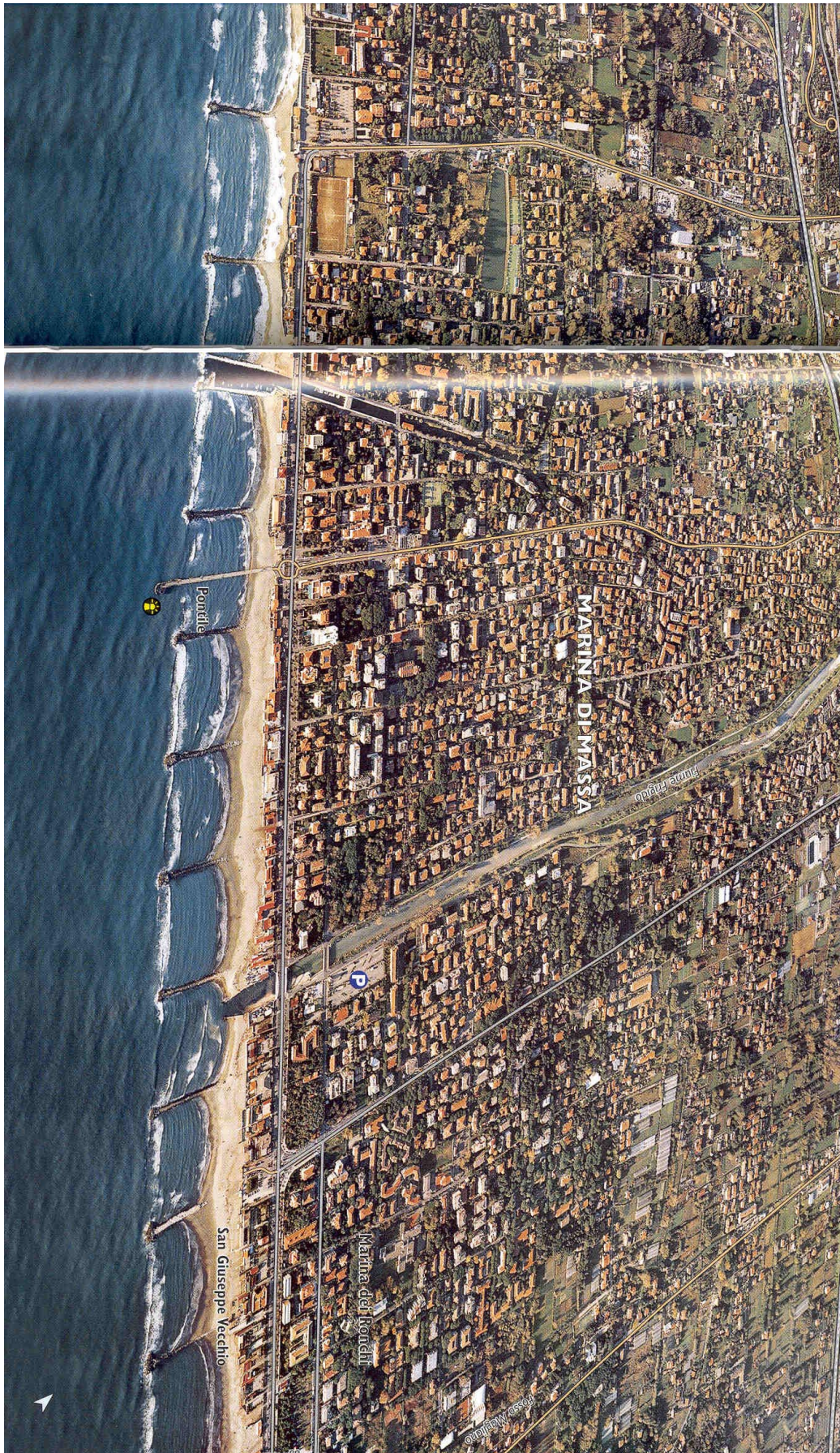
The water can reach 5 m of depth.

Indication of water level variations

The tide in the area varies ± 0.2 meters.

Existence of detailed information

Detailed information can be given by request.



UB_WIT_11_2, Marina di Pisa, Tuscany

Location

Marina di Pisa is located in Tuscany, on the West coast of Italy and it represents the beach of the city of Pisa. The shore is characterized by fine dark sand and it is in course of re-establishment, but in many part it is still very narrow.

Main motive for building the LCS

In the past the sandy shore experienced an heavy erosion and it was reduced to a narrow strip of sand. So it was decided to build many LCS and groynes to let the sand come back

Impacts on bio-environment

Not known.

Socio-economic impact

Recreational activities have increased after the LCS were built because a lot of calm and shallow water basins were created so that the bathing is surer for children and for who is not able to swim.

System Layout (dimensioned sketch)

The LCS consist of a series of ten structures parallel to the shore and two groynes perpendicular to the shore which are part of the system.

The distances from the shoreline are about: 45 m, 45 m, 54 m, 45 m, 45 m, 45 m, 45 m, 54 m, 55 m, 45 m.

The gaps between each structure are: 27 m, 27 m, 18 m, 18 m, 9 m, 18 m, 9 m, 9 m, almost attached.

The lengths of the structures respectively are: 360 m, 180 m, 243 m, 216 m, 180 m, 180 m, 243 m, 216 m, 135 m, 180 m.

Typical cross section (dimensioned sketch)

The water depth is very shallow, sometimes it is less than 3 meters. Dangerous sandbanks of irregular shape can be created after sea-storms caused by south-west wind.

Indication of water level variations

The tide in the area varies ± 0.2 meters.

Existence of detailed information

Detailed information can be given by request.



UB_WIT_11_3, Prato Ranieri, Tuscany

Location

Prato Ranieri is located in Tuscany, on the West coast of Italy and its pine-wood is part of the Natural Reserve 'Tomboli of Follonica'. The reserve is relevant thanks to the presence of an important littoral environment of sandy dunes. Fine, amber-colored with grey reflexes sand dominates the coast everywhere.

Main motive for building the LCS

Coast erosion.

Impacts on bio-environment

Not known.

Socio-economic impact

Recreational activities may have increased after the LCS were built because the shore is well sheltered by the breakwaters, creating surer places for the bathers.

System Layout (dimensioned sketch)

In Prato Ranieri, the LCS consist of a series of eight structures. In six cases, the distance from the shoreline has been covered by sand that has created tomboli, more or less pronounced. For the other two structures, the distance from the shoreline respectively is: 45 m and 54 m.

The gaps among the structures are: 54m, 4,5 m, 18 m, 18 m, 27 m, 126 m, 36 m.

The lengths of the structures are: 54 m, 45 m, 32 m, 63 m, 63 m, 90 m, 63 m, 54 m.

Typical cross section (dimensioned sketch)

As a minimum the approximately freeboard by MWL (R_C), the width, the height and the water depth should be given.

Indication of water level variations

The tide in the area varies ± 0.2 meters.

Existence of detailed information

Detailed information can be given by request.



UB_WIT_11_4, Follonica, Tuscany

Location

Follonica is located in Tuscany, on the West coast of Italy and its beach, sheltered at the ends by the two headlands of Piombino and Punta Ala, is characterized by golden, very fine sand that lies on a quite narrow strip of land.

Main motive for building the LCS

Coast erosion.

Impacts on bio-environment

Not known.

Socio-economic impact

Recreational activities have increased after the LCS was built.

System Layout (dimensioned sketch)

The LCS form a system of eight structures parallel to the shore.

The distances from the shoreline are about: 45 m, 27 m, 27 m, 36 m, 36 m, 54 m, 54 m, 45 m. In all cases, the distance is shortened due to the initial phase of the formation of tomboli.

The gap among the structures are: 36 m, 27 m, 32 m, 36 m, 90 m, 36 m, 36 m.

The lengths of the structures are: 72 m, 72 m, 72 m, 72 m, 72 m, 72 m, 72 m, 81 m.

Typical cross section (dimensioned sketch)

The ground slopes down very gently, without sudden subsidences.

Indication of water level variations

The tide in the area varies ± 0.2 meters.

Existence of detailed information

Detailed information can be given by request.



UB_WIT_12_1, Ventimiglia, Liguria

Location

Ventimiglia is located in Liguria, on the West coast of Italy and it is characterized by the socio-economic influence of the nearby French frontier.

Main motive for building the LCS

Coast erosion.

Impacts on bio-environment

Unknown.

Socio-economic impact

Recreational activities have increased a lot after the LCS was built.

System Layout (dimensioned sketch)

The system of LCS is made by three main structures parallel to the shoreline and a smaller one nearer to the coast, located between the first and the second barrier if starting from North-West and going to North-East. The distances from the shorelines at the two tips respectively are: 60 m and 93,5 m (34 m connected with the of the tombolo cusp); 51 m and 42,5 m (34 m connected with the tombolo cusp); 76,5 m and 85 m (34 m connected with the tombolo cusp); 110,5 m at the two tips. The lengths of the structures respectively are: 212,5 m; 68 m; 246,5 m, 153 m. The gaps between the tree main structures respectively are: 102 m and 127,5 m.

Typical cross section (dimensioned sketch)

Not available.

Indication of water level variations

In the area there is no tide of concern..

Existence of detailed information

Information can be given by request.



UB_WIT_12_2, Bordighera, Liguria

Location

Bordighera is located in Liguria, on the West coast of Italy and it is characterized by the socio-economic influence of the nearby French frontier.

Main motive for building the LCS

Coast erosion.

Impacts on bio-environment

Unknown.

Socio-economic impact

Recreational activities have increased a lot after the LCS was built.

System Layout (dimensioned sketch)

The system of LCS is made by seven parallel structures. The distances from the shorelines respectively are between 30 and 100 m.

The lengths of the structures respectively are about 200 m.

The LCS are very close one to the other (see figure).

Typical cross section (dimensioned sketch)

Not available.

Indication of water level variations

In the area there is no tide of concern..

Existence of detailed information

Information can be given by request.



UB_WIT_12_3, San Remo, Liguria

Location

San Remo is located in Liguria, on the West coast of Italy, and it represents a very important destination for the foreign elitist tourism.

Main motive for building the LCS

Coastal erosion.

Impacts on bio-environment

Unknown.

Socio-economic impact

Recreational activities may have increased a lot after the LCS was built thanks to the protected areas created and the very shallow water.

System Layout (dimensioned sketch)

The system of barrier is made by two sub-systems parallel to the shore: the first one composed by 5 barriers and the second one by 3 barriers and 3 groynes which are part of the scheme.

The distances from the shoreline for the first system are: 25.5 m and 59.5 m (17 m in correspondence with the tombolo cusp); 42.5 m (one end is attached to the shore); 42.5 m and 34 m; 42.5 m and 136 m (34 m in correspondence with the tombolo cusp); 170 m for both the ends.

The lengths of the structures are: 102 m, 85 m, 161.5 m, 144.5 m and 76.5 m.

The gaps between the structures are: 42.5 m, 17 m, 85 m and 17 m.

The distances from the shoreline for the second system at the two tips are: 85 m and 93.5 m; 85 m and 102 m; 102 m and 93.5 m.

The lengths of the structures are: 110.5 m, 127.5 m and 93.5 m. The lengths of the groynes are: 34 m, 34 m and 68 m.

The gaps between the structures are: 25.5 m, 25.5 m.

Typical cross section (dimensioned sketch)

Not available.

Indication of water level variations

In the area there is no tide of concern.

Existence of detailed information

A lot of detailed information can be given by request.



UB_WIT_12_4, Arma di Taggia, Liguria

Location

Arma di Taggia is located in Liguria, on the West coast of Italy, and it is characterized by a very wide and sandy beach.

Main motive for building the LCS

Coastal erosion.

Impacts on bio-environment

Unknown.

Socio-economic impact

Recreational activities may have increased a lot after the LCS was built.

System Layout (dimensioned sketch)

The system is formed by 7 barriers.

The distances from the shoreline at the two types: 51 and 17 m; 25.5 and 59.5 m; 76.5 and 76.5 m (59.5 m in correspondence with the tombolo cusp); 85 and 59.5 m; 59.5 and 59.5 m; 17 and 34 m; 68 and 59.5 m.

The lengths of the structures are: 42.5 m, 42.5 m, 85 m, 59.5 m, 51 m and 127.5 m.

The gaps between the structures are: 85 m, 93.5 m, 76.5 m, 85 m, 51 m.

Typical cross section (dimensioned sketch)

Not available.

Indication of water level variations

In the area there is no tide of concern.

Existence of detailed information

Detailed information can be given by request.



UB_WIT_12_5, Santo Stefano al Mare, Liguria

Main motive for building the LCS

Coastal erosion.

Impacts on bio-environment

Unknown.

Socio-economic impact

Recreational activities may have increased a lot after the LCS was built.

System Layout (dimensioned sketch)

The system is made by 10 barriers.

The distances from the shoreline at the two tips are: 51 and 42.5 m; 34 and 42.5 m, 68 and 59.5 m, 42.5 and 68 m (34 in correspondence with the tombolo cusp), 51 m, 68 and 68 m (34 in correspondence with the tombolo cusp), 85 m and 85 m, 76.5 and 42.5 m, 17 and 25.5 m, 17 and 17 m.

The lengths of the structures are: 110.5 m, 110.5 m, 102 m, 102 m, 102 m, 110.5 m, 102 m, 102 m, 85 m, 93.5 m.

The gaps among the structures are: 51 m, 51 m, 102 m, 51 m, 51 m, 42.5 m, 34 m, 59.5 m.

Typical cross section (dimensioned sketch)

Not available.

Indication of water level variations

In the area there is no tide of concern.

Existence of detailed information

Detailed information can be given by request.

