Port City Atlas: Mapping European Port City Territories

From Understanding to Design

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DOI
10.59490/mg.73

Publication date
2023

Document Version
Final published version

Citation (APA)
Hein, C. M., van Mil, Y., & Momirski, L. A. (2023). *Port City Atlas: Mapping European Port City Territories: From Understanding to Design*. nai010 publishers. https://doi.org/10.59490/mg.73

Bristol, UK

PORT

BRS (%) 100

	BRS
Liquid	141
Dry bulk	54
Container	211
Specialized	492
General	335
Cruise ship	20
Passenger	
Other	431
Vessels	1,684

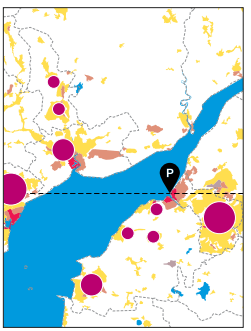
	BRS
Liquid bulk	2,547
Dry bulk	3,511
Containers	912
RoRo	937
Other	283
Cargo (t)	8,190
Passengers	0

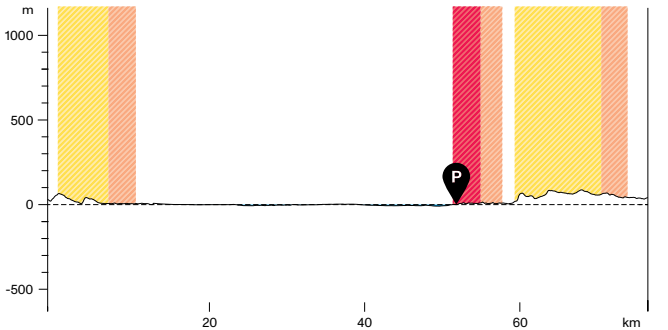
CITY

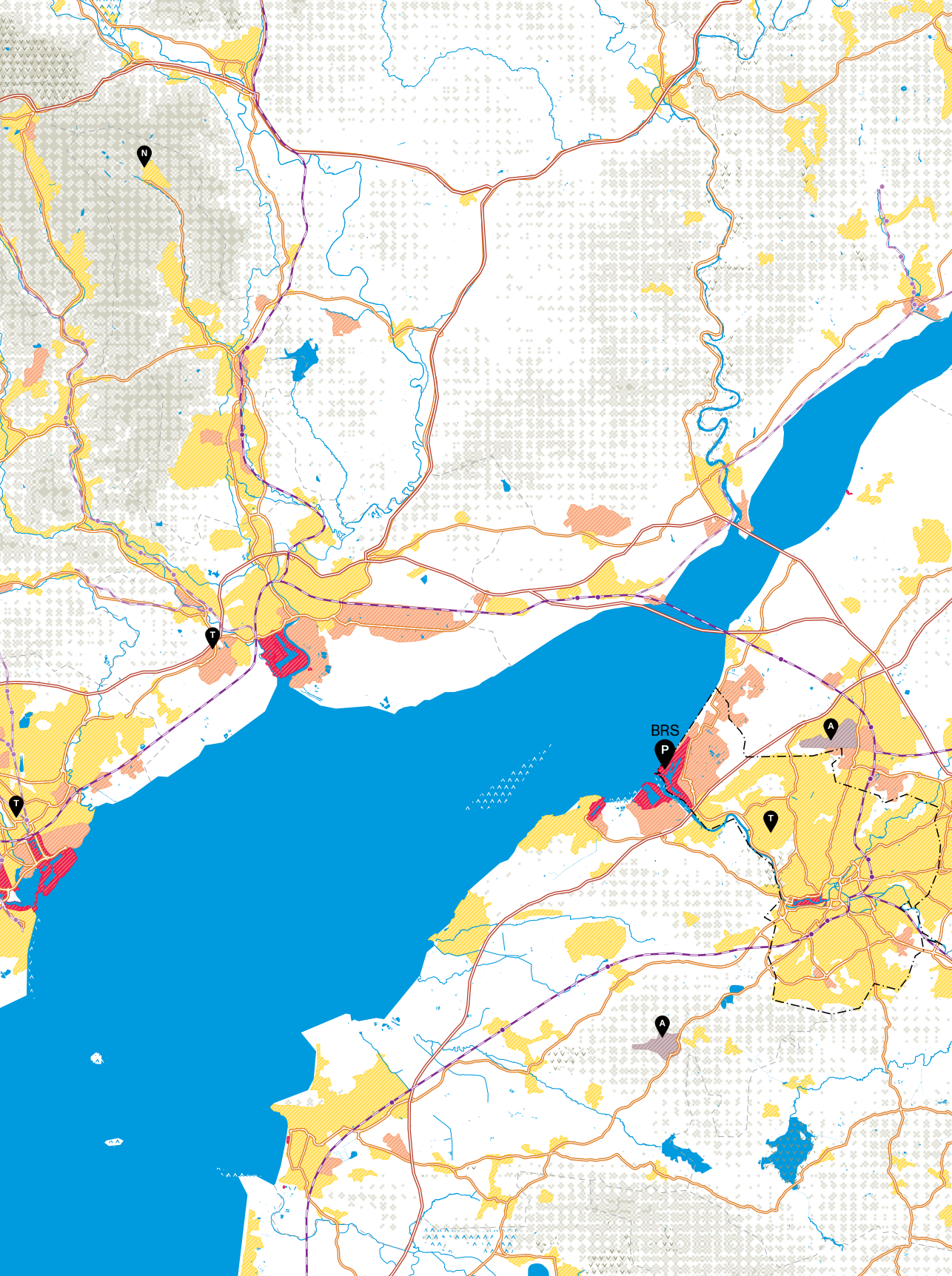
	BRS Bristol, City of
→ Capital national (km)	→ London 177
→ Capital regional (km)	→ Birmingham 125
Area (km²)	111
Built-up area (km²)	141
Density (per km²)	4,166
Population	461,329
Population structure (%)	15 65 17.7 69.4 13.0
Distribution built area (%)	B I P 87 11 2

TERRITORY

	BRS Bristol, City of
Area (km²)	111
Density (per km²)	4,224
Population	467,099
Natura2000 (km²)	M T 1,006 2



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BRS
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SOU
PME

Southampton, UK
Portsmouth, UK

River Itchen
The Solent

PORT

SOU/PME (%)

	SOU	PME
Liquid	0.8	32.7
Dry bulk		
Container		6.2
Specialized		
General		
Cruise ship		
Passenger		
Other		

	SOU	PME
Liquid bulk	2.5	46.0
Dry bulk		
Containers	3.6	6.1
RoRo	56.5	6.5
Other	30.5	8.6

	SOU	PME
Liquid	1,725	299
Dry bulk	28	
Container	854	90
Specialized	1,001	
General	467	3,031
Cruise ship	454	37
Passenger		
Other	407	
Vessels	4,936	3,189

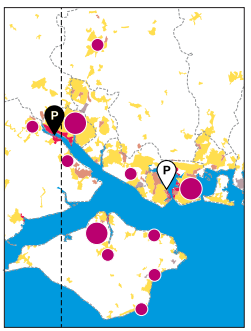
	SOU	PME
Liquid bulk	20,113	
Dry bulk	2,088	404
Containers	9,029	366
RoRo	1,821	2,635
Other	100	215
Cargo (t)	33,151	3,620
Passengers	1,807	1,754

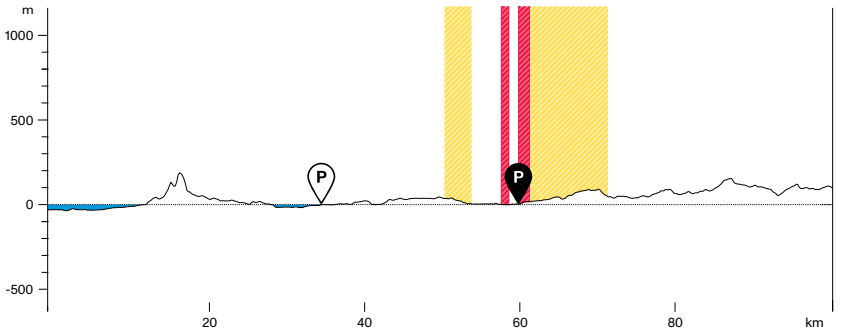
CITY

	Southampton SOU	Portsmouth PME
→ Capital national (km)	→ London 115	→ London 107
→ Capital regional (km)		
Area (km²)	130	196
Built-up area (km²)	85	121
Density (per km²)	1,937	2,760
Population	252,578	542,040
Population structure (%)	15 65 17.6 67.2 15.3	15 65 16.9 63.9 19.0
Distribution built area (%)	B A I P 88 2 4 6	B A I P 84 1 12 3

TERRITORY

	Southampton SOU	Portsmouth PME
Area (km²)	50	41
Density (per km²)	5,059	5,321
Population	254,361	216,023
Natura2000 (km²)	M T 184 3	M 436






SOU
PME
50

LEH

Le Havre, FR

Seine River

PORT

LEH (%) 100

	LEH
Liquid	1,657
Dry bulk	9
Container	2,129
Specialized	420
General	494
Cruise ship	131
Passenger	
Other	251
Vessels	5,091

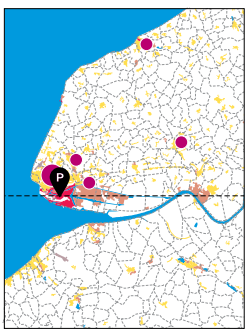
	LEH
Liquid bulk	36,132
Dry bulk	1,225
Containers	21,932
RoRo	844
Other	40
Cargo (t)	60,173
Passengers	172

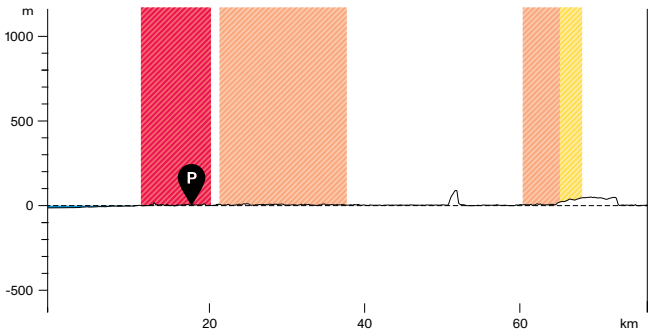
CITY

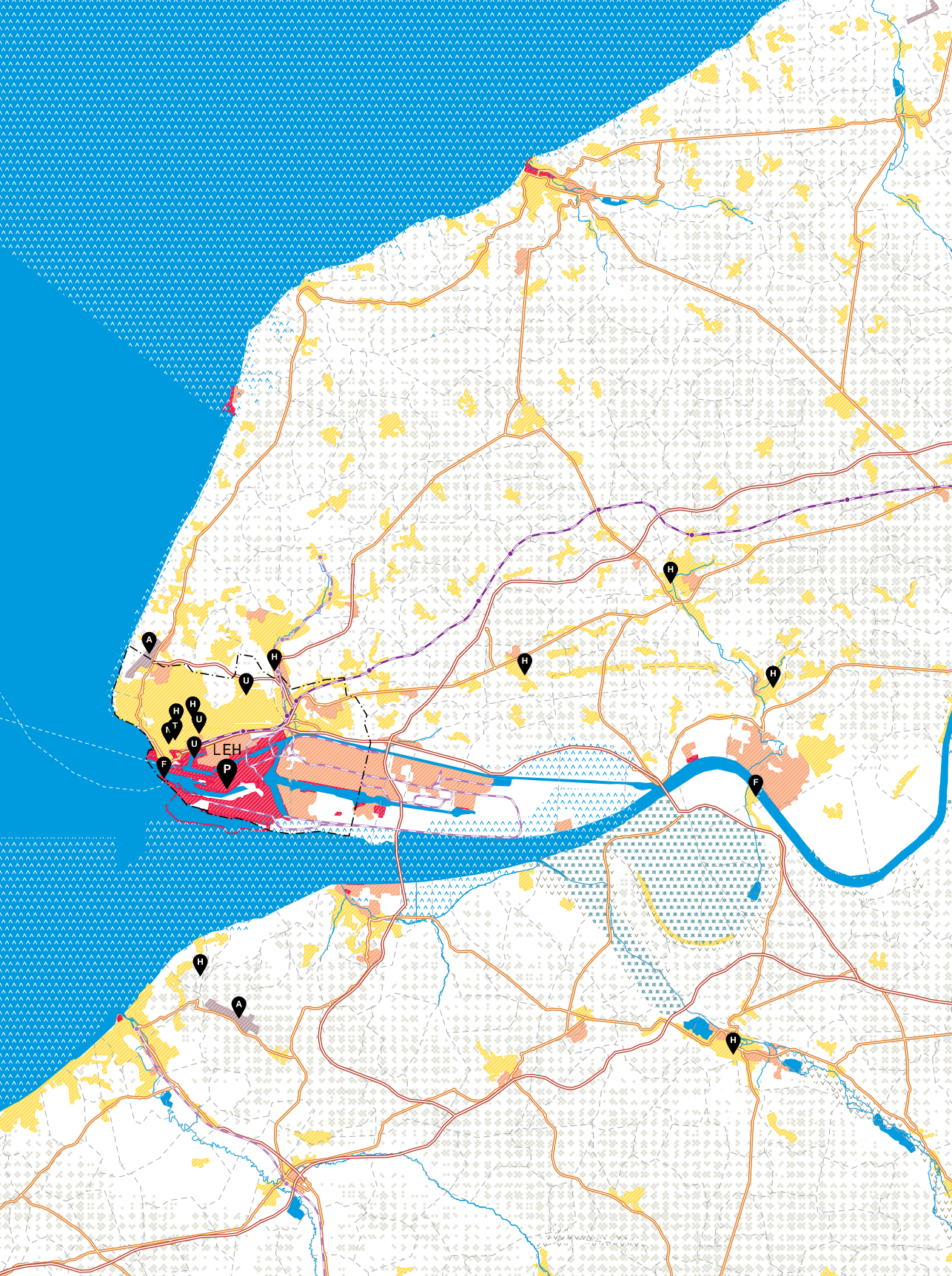
	City of Le Havre	LEH
→ Capital national (km)	→ Paris	178
→ Capital regional (km)		
Area (km²)		86
Built-up area (km²)		65
Density (per km²)		2,262
Population		195,042
Population structure (%)	15 / 65	18.7 / 62.0 / 19.3
Distribution built area (%)	B / A / I / P	45 / 1 / 34 / 20

TERRITORY

	Seine-Maritime	LEH
Area (km²)		6,301
Density (per km²)		199
Population		1,254,436
Natura2000 (km²)	M / T	2,672 / 205






LEH

Nantes Saint-Nazaire, FR

Loire River

PORT

NTE (%) 100

	NTE
Liquid	865
Dry bulk	679
Container	250
Specialized	208
General	165
Cruise ship	10
Passenger	
Other	414
Vessels	2,591

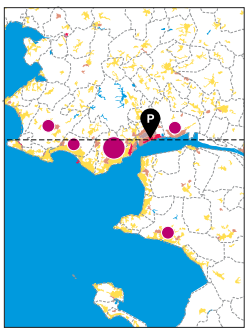
	NTE
Liquid bulk	22,633
Dry bulk	5,339
Containers	1,404
RoRo	465
Other	314
Cargo (t)	30,155
Passengers	0

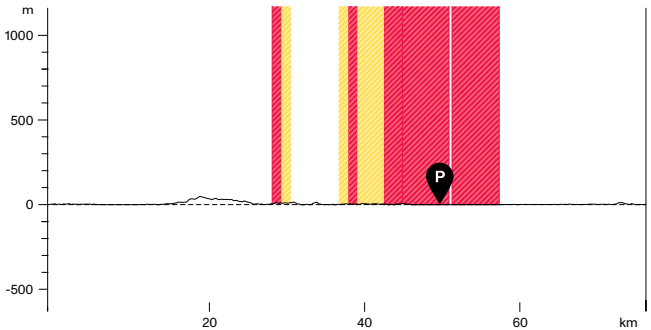
CITY

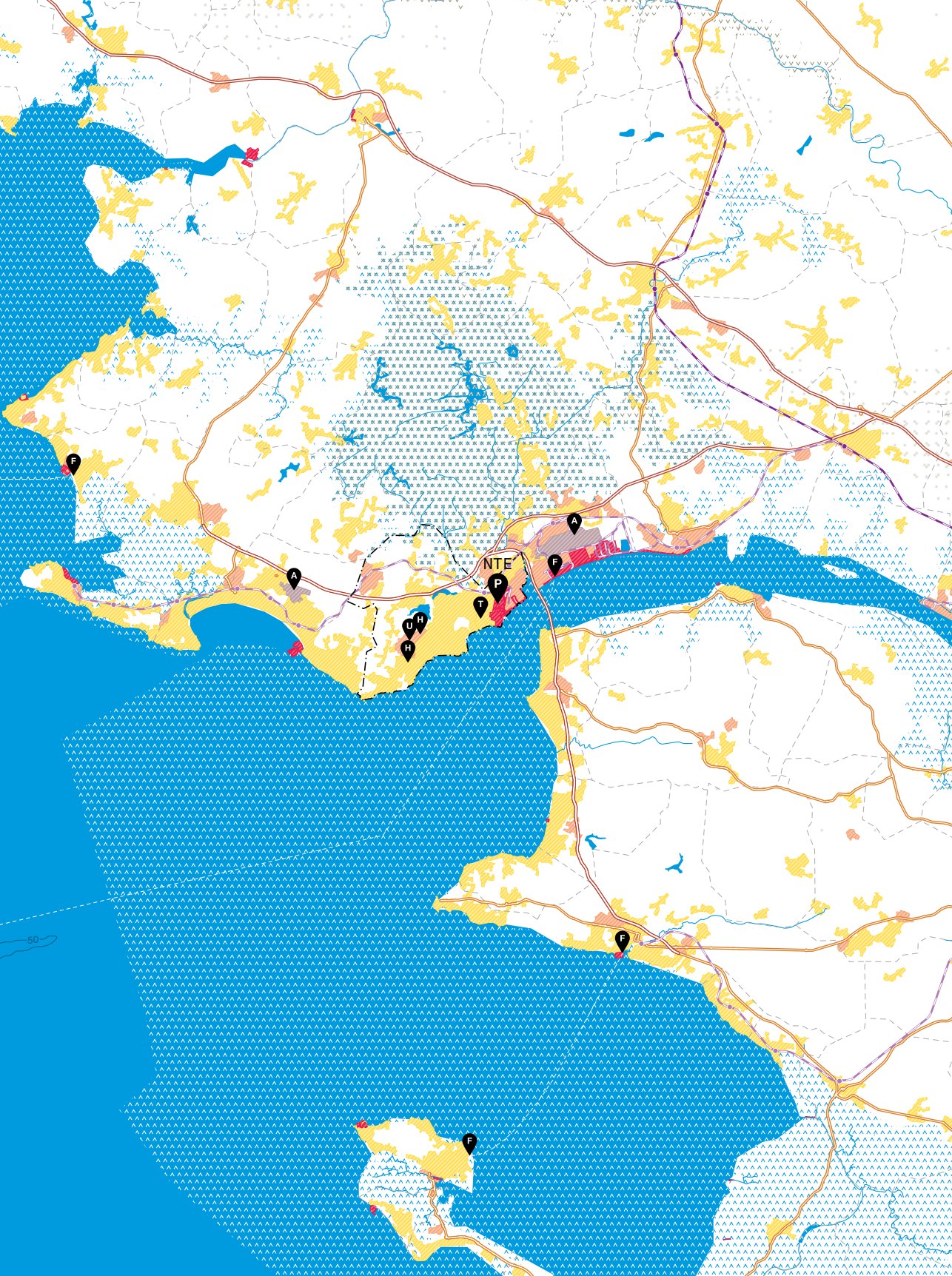
	City of Saint-Nazaire NTE
→ Capital national (km)	
→ Capital regional (km)	→ Paris 382
Area (km²)	48
Built-up area (km²)	31
Density (per km²)	1,461
Population	69,993
Population structure (%)	15 65 / 16.9 60.7 22.4
Distribution built area (%)	B I P / 70 25 5

TERRITORY

	Loire-Atlantique NTE
Area (km²)	6,876
Density (per km²)	208
Population	1,427,913
Natura2000 (km²)	M T / 4,394 625



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F
50

La Rochelle, FR

PORT

LRH (%)	LRH
Liquid	219
Dry bulk	108
Container	24
Specialized	
General	460
Cruise ship	
Passenger	
Other	31
Vessels	842

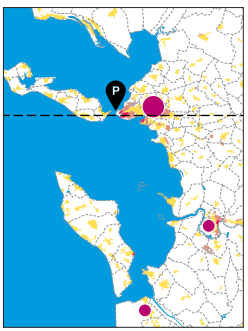
	LRH
Liquid bulk	3,174
Dry bulk	5,802
Containers	40
RoRo	
Other	744
Cargo (t)	9,763
Passengers	0

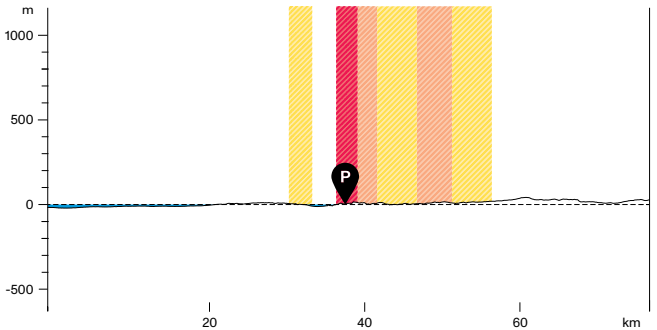
CITY

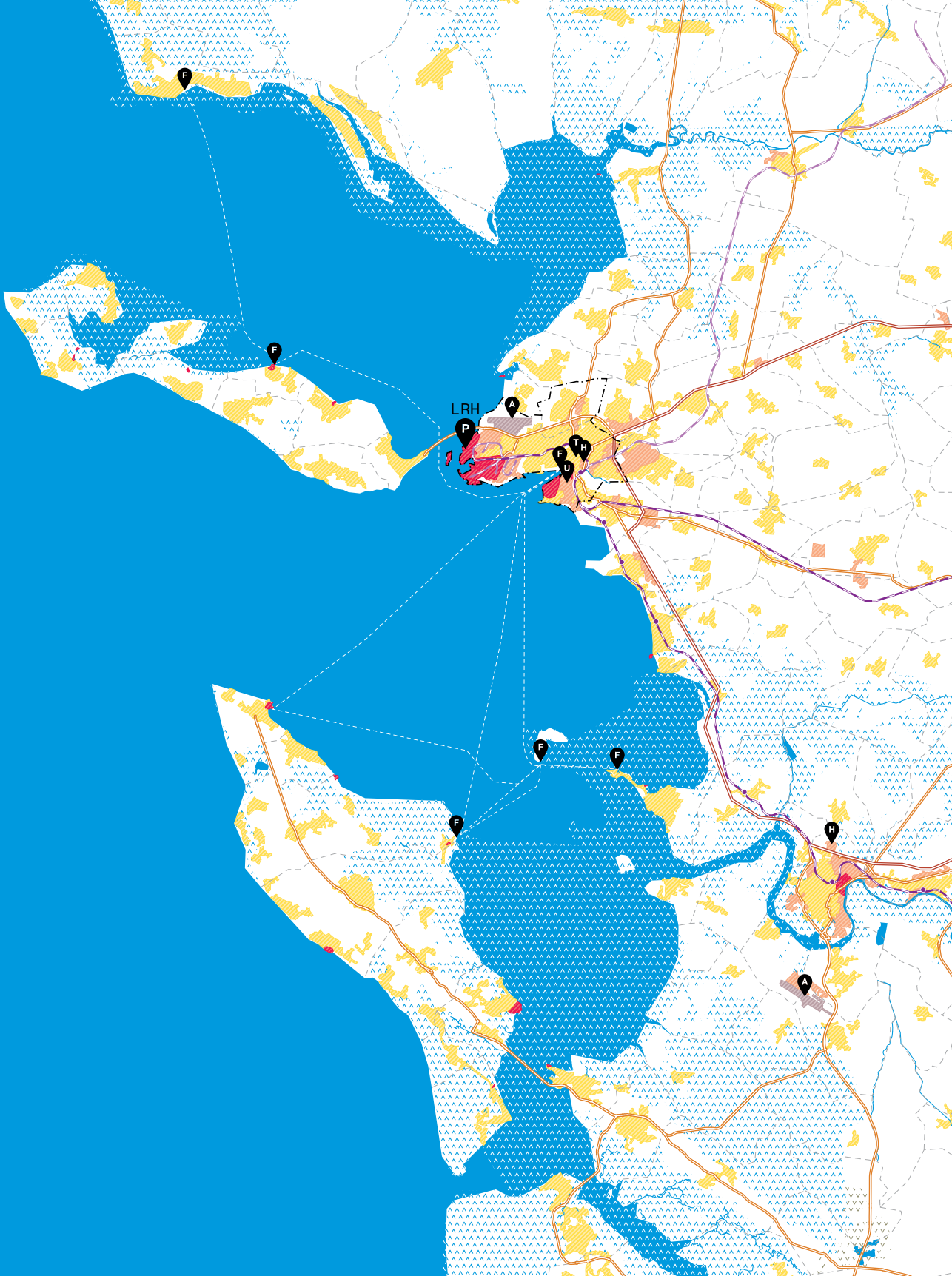
	City of La Rochelle LRH
→ Capital national (km)	
→ Capital regional (km)	→ Paris 400
Area (km²)	38
Built-up area (km²)	38
Density (per km²)	2,198
Population	82,783
Population structure (%)	15 65 13.1 62.6 24.3
Distribution built area (%)	B A I P 59 4 25 12

TERRITORY

	Charente-Maritime LRH
Area (km²)	6,877
Density (per km²)	94
Population	648,837
Natura2000 (km²)	M T 9,994 647






LRH

BOD

Bordeaux, FR

Garonne River

PORT

BOD (%) 100

	BOD
Liquid	320
Dry bulk	139
Container	49
Specialized	
General	205
Cruise ship	50
Passenger	
Other	9
Vessels	767

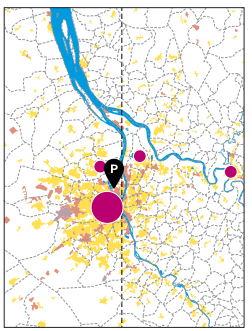
	BOD
Liquid bulk	4,727
Dry bulk	1,444
Containers	248
RoRo	
Other	80
Cargo (t)	6,499
Passengers	1

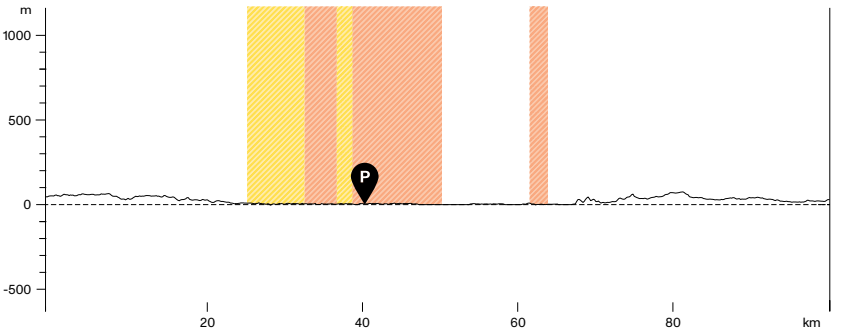
CITY

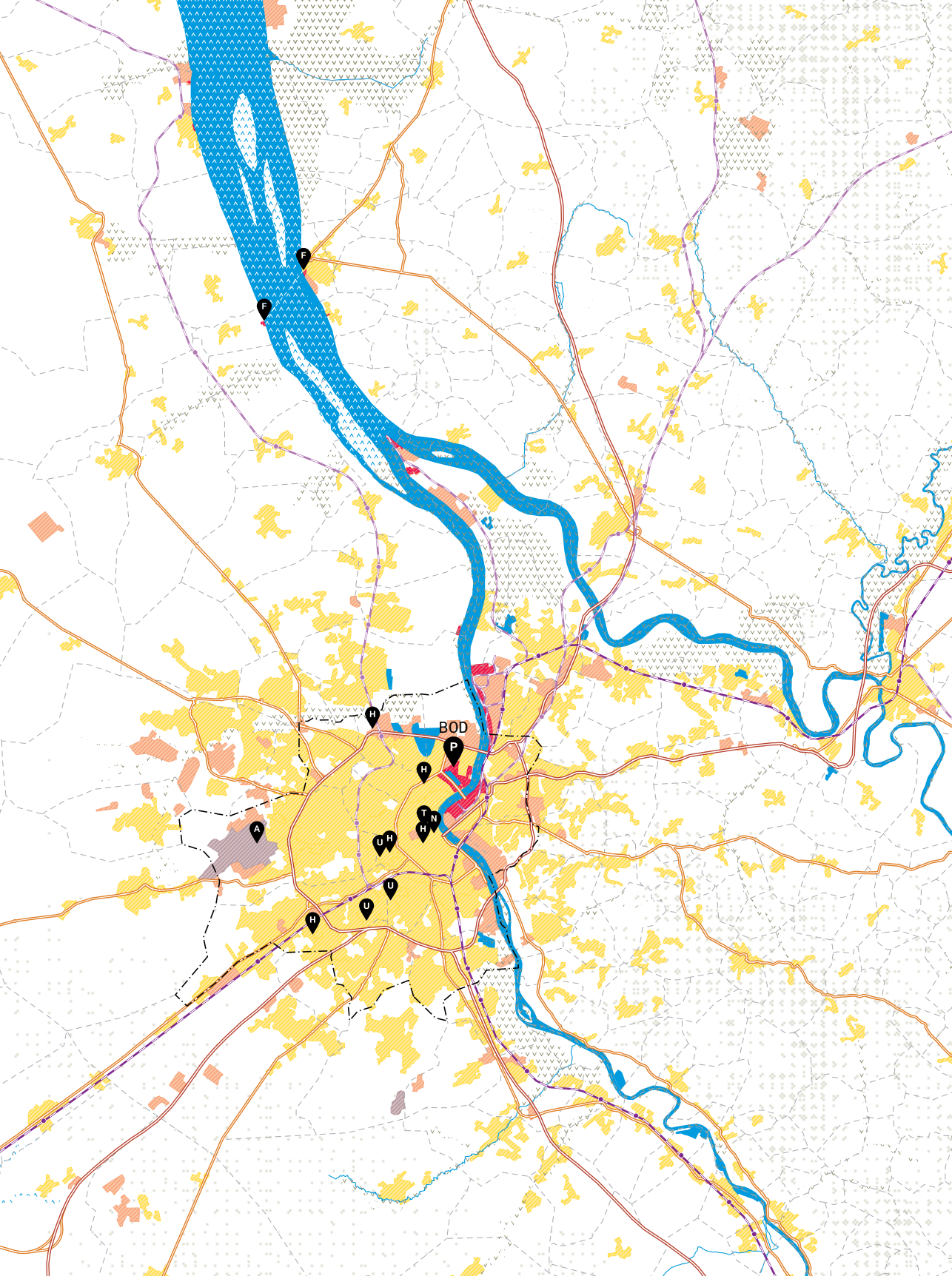
	City of Bordeaux	BOD
→ Capital national (km)	→ Paris	499
→ Capital regional (km)		
Area (km²)		246
Built-up area (km²)		133
Density (per km²)		2,642
Population		650,138
Population structure (%)	15 65	
	15.5 68.5 16.0	
Distribution built area (%)	B A I	
	87 7 6	

TERRITORY

	Gironde	BOD
Area (km²)		10,084
Density (per km²)		161
Population		1,619,190
Natura2000 (km²)	M T	
	9,111 778	






BOD

Bilbao, ES

PORT

BIO (%) 7.9

	BIO
Liquid	778
Dry bulk	500
Container	614
Specialized	
General	876
Cruise ship	59
Passenger	
Other	
Vessels	2,818

37.2 54.8

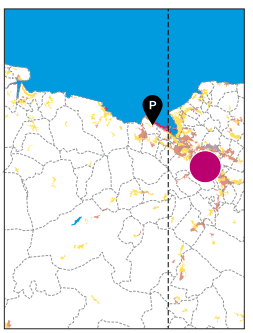
	BIO
Liquid bulk	20,822
Dry bulk	4,681
Containers	5,461
RoRo	457
Other	2,461
Cargo (t)	33,881
Passengers	107

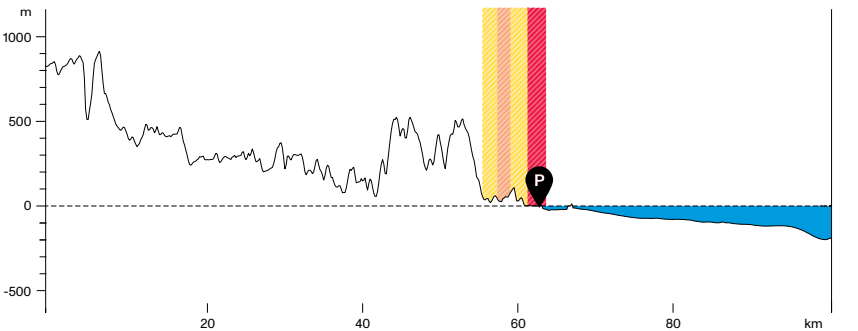
CITY

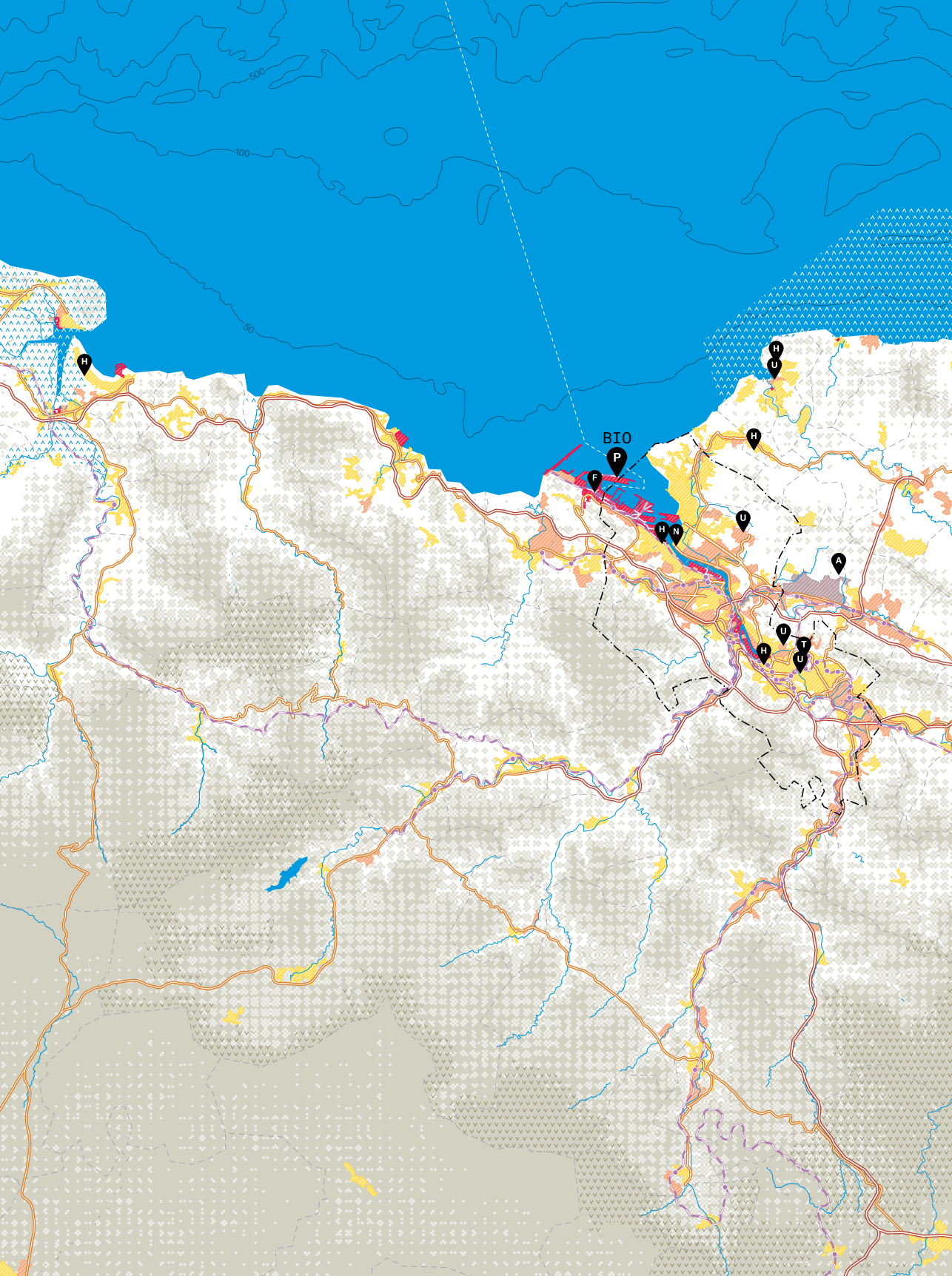
	Bilbao BIO
→ Capital national (km)	→ Madrid 332
→ Capital regional (km)	
Area (km²)	175
Built-up area (km²)	76
Density (per km²)	4,532
Population	792,617
Population structure (%)	15 65 12.0 64.0 23.9
Distribution built area (%)	B A I P 48 5 42 5

TERRITORY

	Bizkaia BIO
Area (km²)	2,213
Density (per km²)	514
Population	1,137,191
Natura2000 (km²)	M T 361 213



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Gijón, ES

Atlantic

PORT

GIJ (%) 6.5

	GIJ
Liquid	93
Dry bulk	289
Container	196
Specialized	
General	588
Cruise ship	17
Passenger	
Other	4
Vessels	1,187

11.5 82.0

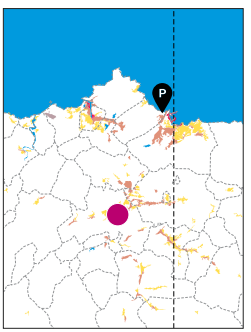
	GIJ
Liquid bulk	900
Dry bulk	14,501
Containers	851
RoRo	
Other	968
Cargo (t)	17,220
Passengers	0

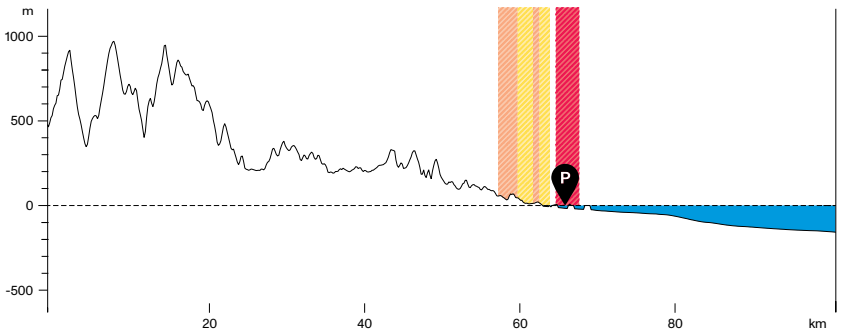
CITY

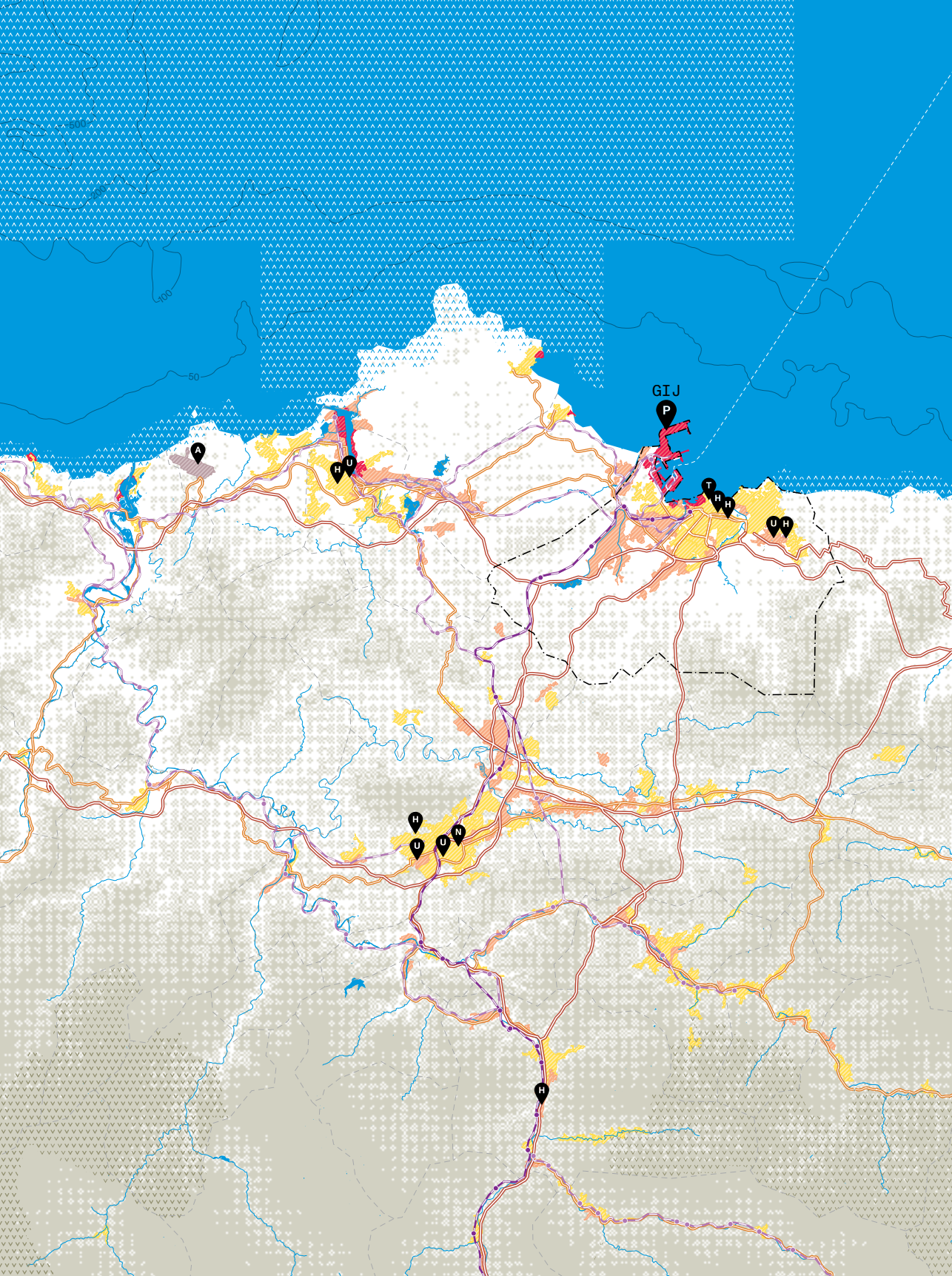
	Gijón GIJ
→ Capital national (km)	→ Madrid 387
→ Capital regional (km)	
Area (km²)	182
Built-up area (km²)	35
Density (per km²)	1,496
Population	271,780
Population structure (%)	15 65 11.3 63.1 25.5
Distribution built area (%)	B I P 50 44 6

TERRITORY

	Asturias GIJ
Area (km²)	10,602
Density (per km²)	96
Population	1,022,205
Natura2000 (km²)	M T 1,492 5,640






GIJ
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LCG
FRO

La Coruña, ES
Ferrol, ES

Ría da Coruña
Ría de Ferrol

PORT

LCG / FRO (%)

	LCG	FRO
Liquid	427	166
Dry bulk	69	124
Container		90
Specialized		
General	602	687
Cruise ship	108	14
Passenger	39	
Other		5
Vessels	1,213	1,086

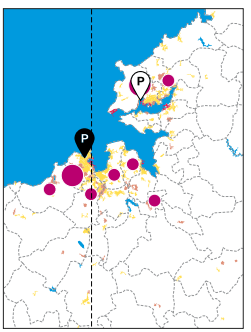
	LCG	FRO
Liquid bulk	9,104	2,312
Dry bulk	3,474	8,095
Containers		77
RoRo		6
Other	1,006	664
Cargo (t)	13,584	11,154
Passengers	1	0

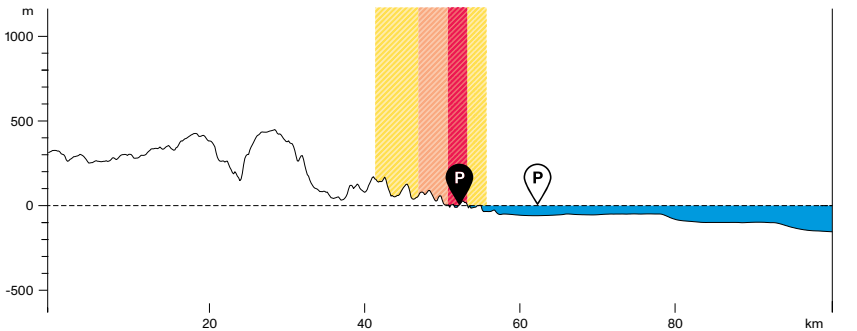
CITY

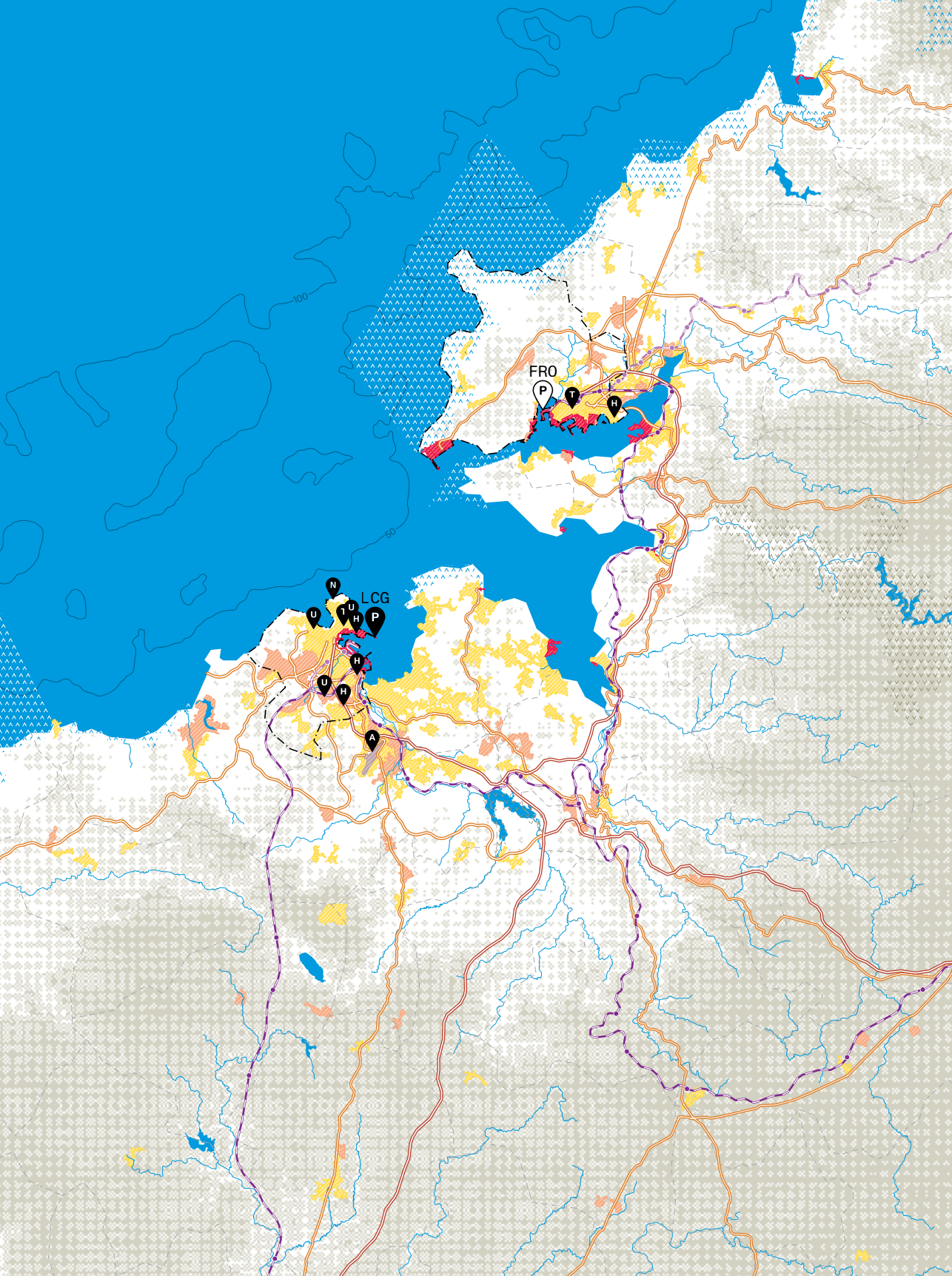
	Coruña, A (LCG)	Ferrol (FRO)
→ Capital national (km)	→ Madrid 507	→ Madrid 507
→ Capital regional (km)		→ A Coruna 21
Area (km²)	38	83
Built-up area (km²)	34	19
Density (per km²)	6,512	800
Population	245,711	66,065
Population structure (%)	15 65 / 12.3 63.4 24.4	15 65 / 10.7 61.5 27.7
Distribution built area (%)	B I P / 75 21 4	B I P / 68 21 11

TERRITORY

	A Coruña (LCG)	A Coruña (FRO)
Area (km²)	7,949	7,949
Density (per km²)	141	141
Population	1,122,006	1,122,006
Natura2000 (km²)	M T / 4,415 400	M T / 4,415 400






100
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FRO
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Leixões (Porto), PT

Douro River

PORT

LEI (%) 37.4

	LEI
Liquid	373
Dry bulk	87
Container	1,124
Specialized	17
General	853
Cruise ship	100
Passenger	
Other	
Vessels	2,550

62.6

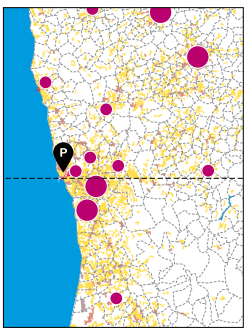
	LEI
Liquid bulk	7,758
Dry bulk	2,606
Containers	5,481
RoRo	1,047
Other	1,032
Cargo (t)	17,924
Passengers	1

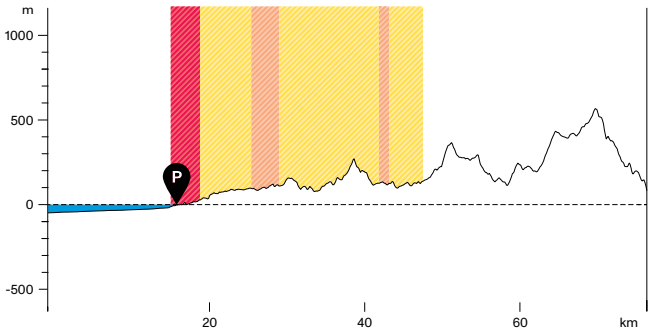
CITY

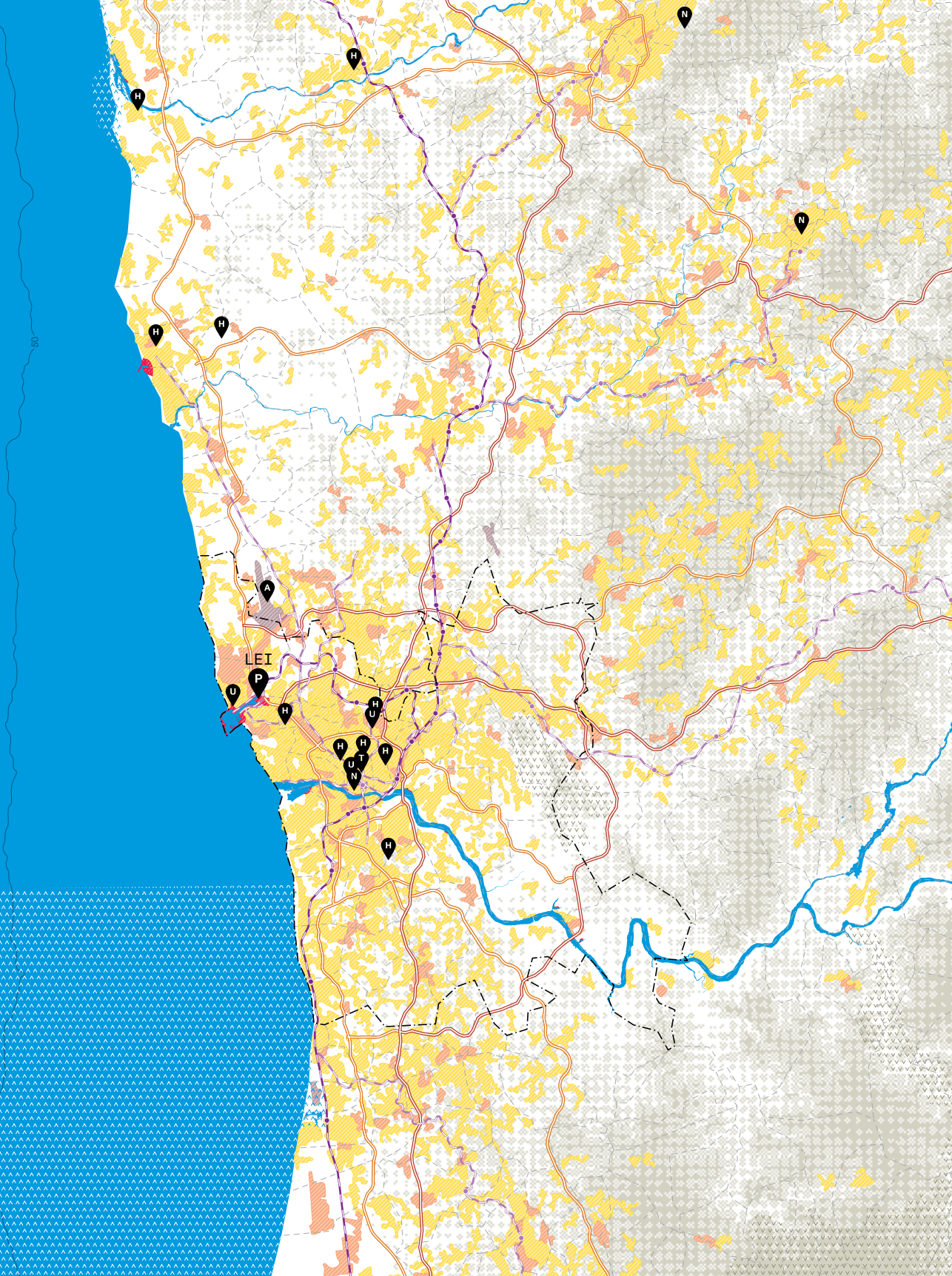
	Porto LEI
→ Capital national (km)	
→ Capital regional (km)	→ Lisboa 275
Area (km²)	479
Built-up area (km²)	255
Density (per km²)	1,986
Population	951,805
Population structure (%)	15 65 20 13.3 65.0 21.5
Distribution built area (%)	B A I P 86 1 12 1

TERRITORY

	Metropolitana do Porto LEI
Area (km²)	2,040
Density (per km²)	844
Population	1,722,374
Natura2000 (km²)	M T 2,369 426






LEI
50

LIS

SET

Lisboa, PT
Setúbal, PT

Tagus River

Sado Estuary

PORT

LIS/SET (%)	5.2	29.1	1.5	5.1	2.8	2.5	81.4	6.6	65.8

	LIS	SET
Liquid	430	159
Dry bulk	240	57
Container	844	300
Specialized	18	376
General	675	562
Cruise ship	317	
Passenger		
Other		
Vessels	2,523	1,461

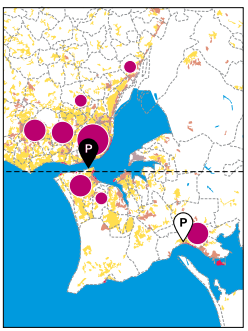
	LIS	SET
Liquid bulk	1,661	367
Dry bulk	4,925	3,446
Containers	3,710	1,136
RoRo	9	518
Other	160	1,268
Cargo (t)	10,465	6,735
Passengers	73	0

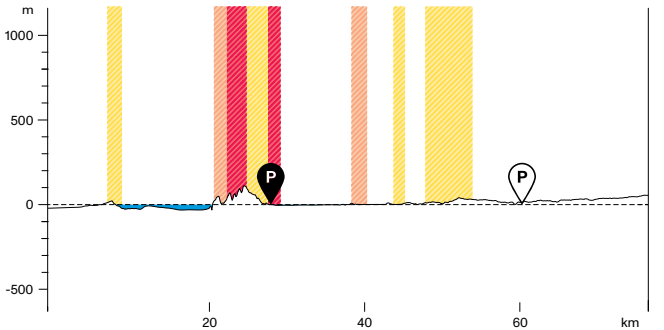
CITY

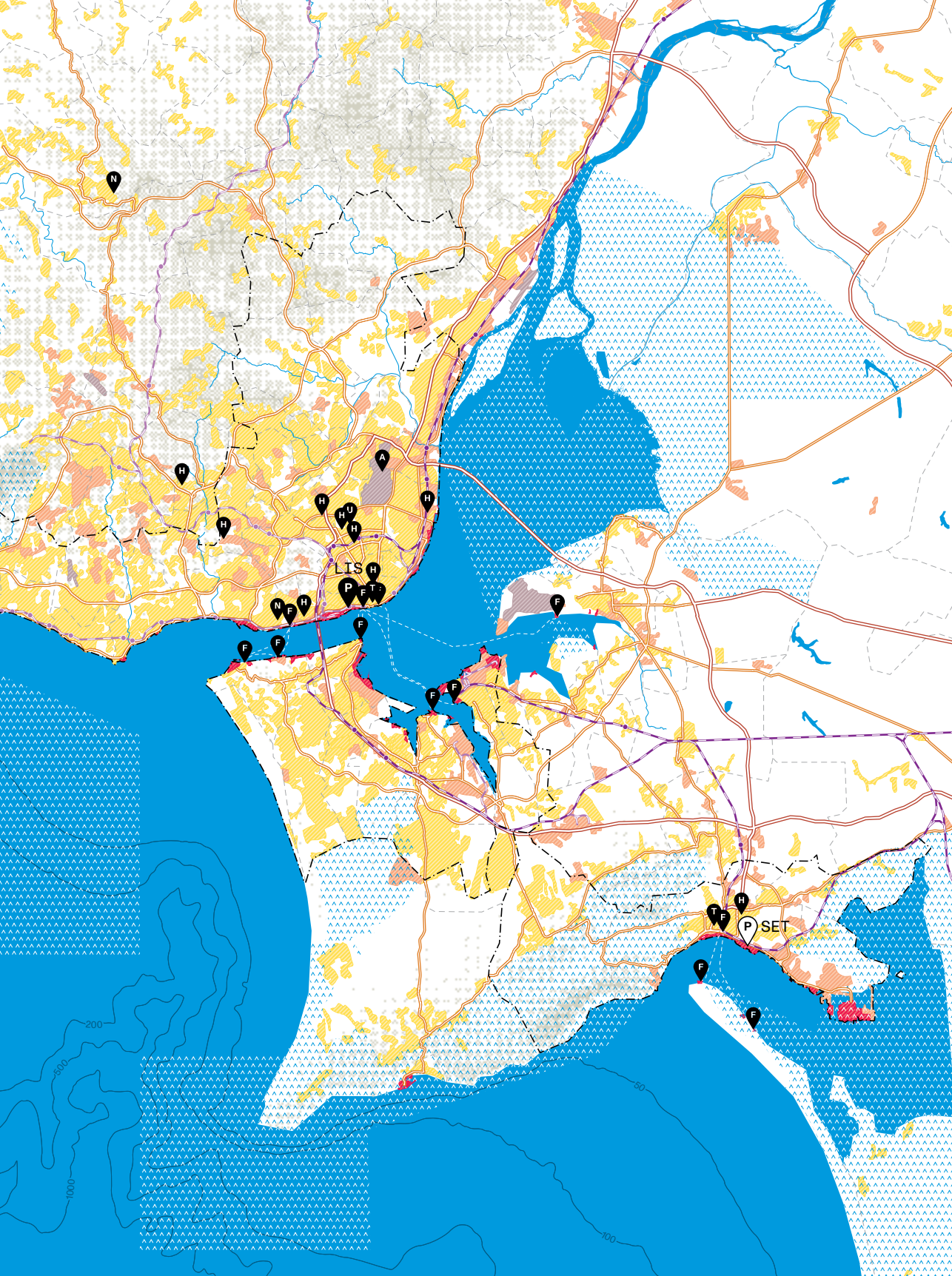
	Lisboa LIS	Setúbal SET
→ Capital national (km)	→ Lisboa 0	→ Lisboa 31
→ Capital regional (km)		→ Porto 299
Area (km²)	637	170
Built-up area (km²)	368	49
Density (per km²)	2,921	680
Population	1,859,838	115,758
Population structure (%)	15 65 15.8 60.3 23.8	15 65 15.5 62.3 22.1
Distribution built area (%)	B A I P 82 1 16 1	B I P 65 33 2

TERRITORY

	Metropolitana de Lisboa LIS	Metropolitana de Lisboa SET
Area (km²)	2,853	2,853
Density (per km²)	998	998
Population	2,846,332	2,846,332
Natura2000 (km²)	M 3,630	M 3,630






LIS
SET
200
500
1000
50
100

HUV

Huelva, ES

Odiel River

PORT

100

HUV (%)

	HUV
Liquid	1,557
Dry bulk	224
Container	108
Specialized	
General	593
Cruise ship	16
Passenger	
Other	
Vessels	2,491

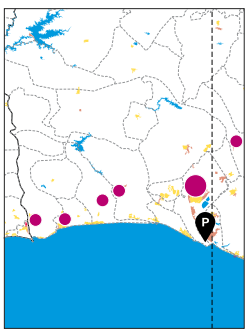
	HUV
Liquid bulk	26,696
Dry bulk	5,754
Containers	426
RoRo	223
Other	156
Cargo (t)	33,255
Passengers	43

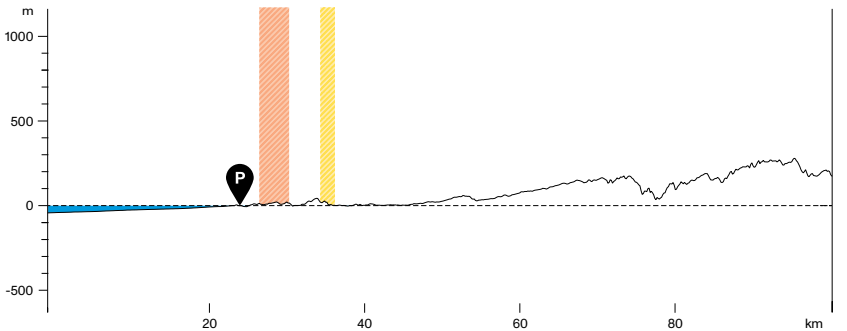
CITY

	Huelva HUV
→ Capital national (km)	
→ Madrid	451
→ Capital regional (km)	
Area (km²)	151
Built-up area (km²)	14
Density (per km²)	949
Population	143,663
Population structure (%)	15 65 15.6 66.4 17.9
Distribution built area (%)	B I 50 50

TERRITORY

	Huelva HUV
Area (km²)	10,129
Density (per km²)	52
Population	524,576
Natura2000 (km²)	M T 3,045 2,979






T
F
H
F
H
H
U
T
P
HUV
F
50
100

LPA

Las Palmas, ES

Atlantic

PORT

LPA (%) 2.5

17.8

79.8

	LPA
Liquid	1,432
Dry bulk	1,621
Container	1,915
Specialized	107
General	8,312
Cruise ship	560
Passenger	23
Other	
Vessels	13,959

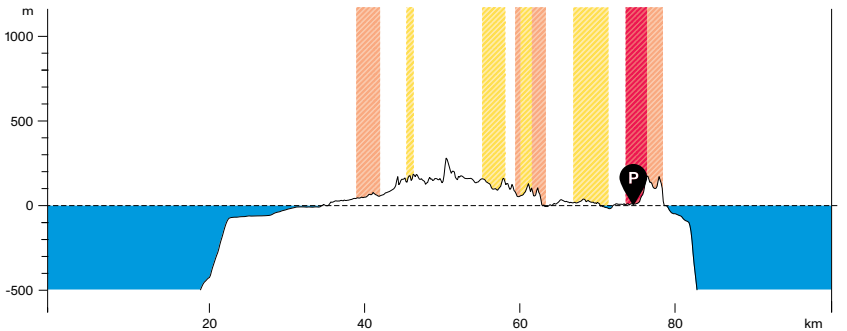
	LPA
Liquid bulk	8,072
Dry bulk	453
Containers	8,379
RoRo	2,337
Other	609
Cargo (t)	19,850
Passengers	1,994

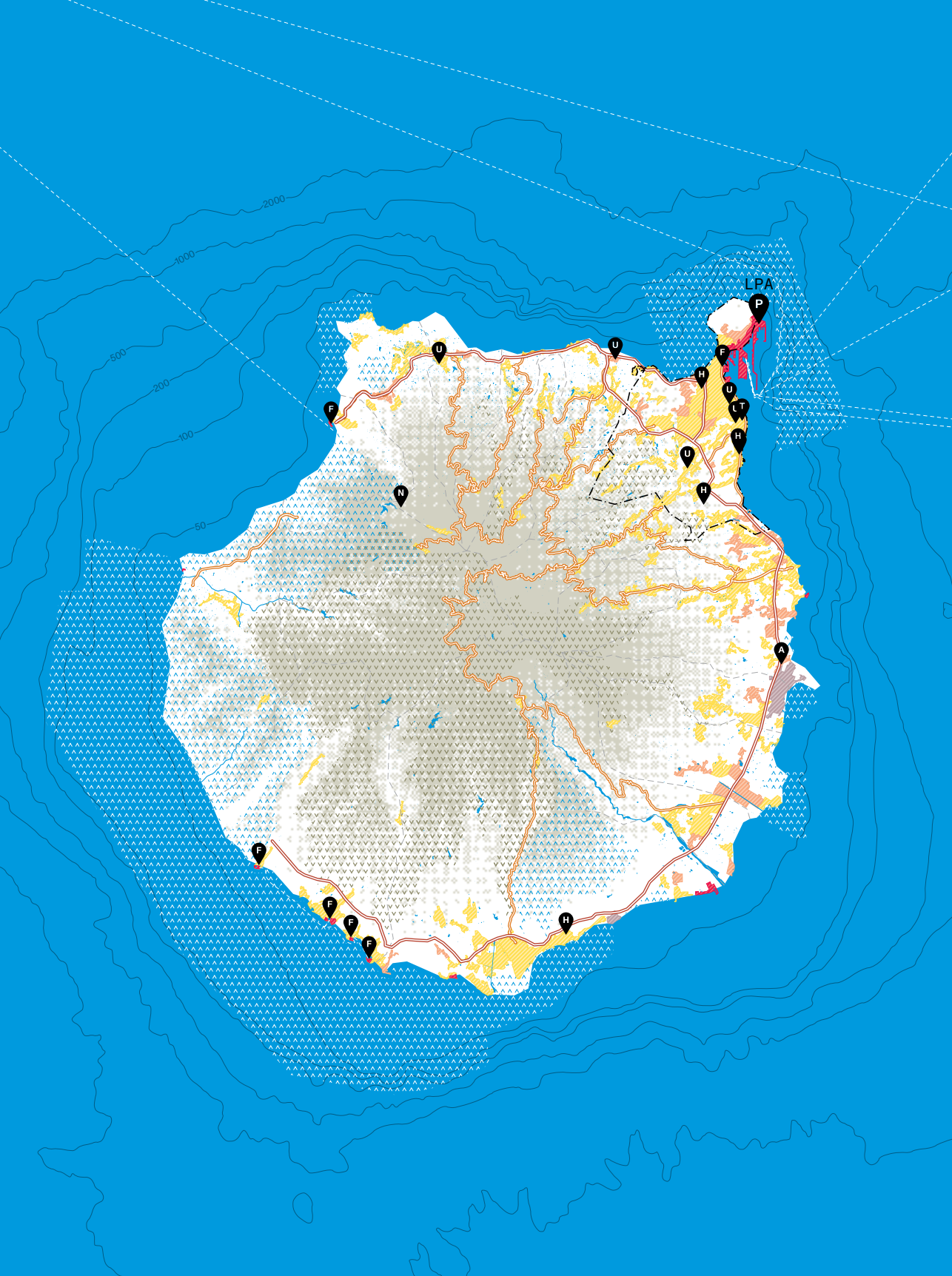
CITY

	Las Palmas	LPA
→ Capital national (km)	→ Madrid	2112
→ Capital regional (km)	→ Santa Cruz	201
Area (km²)		102
Built-up area (km²)		42
Density (per km²)		3,737
Population		379,925
Population structure (%)	15 / 65	12.4 / 69.7 / 17.9
Distribution built area (%)	B / I / P	78 / 14 / 8

TERRITORY

	Gran Canaria	LPA
Area (km²)		1,560
Density (per km²)		555
Population		865,756
Natura2000 (km²)	M / T	1,035 / 508




LPA
2000
1000
500
200
100
50

Santa Cruz de Tenerife, ES

PORT

SCT (%) 1.8 61.8 36.4

	SCT
Liquid	814
Dry bulk	149
Container	907
Specialized	18
General	6,124
Cruise ship	511
Passenger	7,623
Other	
Vessels	16,132

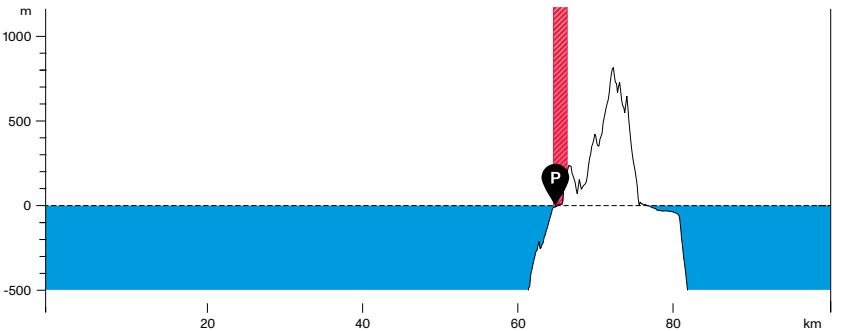
	SCT
Liquid bulk	4,812
Dry bulk	422
Containers	2,170
RoRo	2,338
Other	46
Cargo (t)	9,788
Passengers	5,615

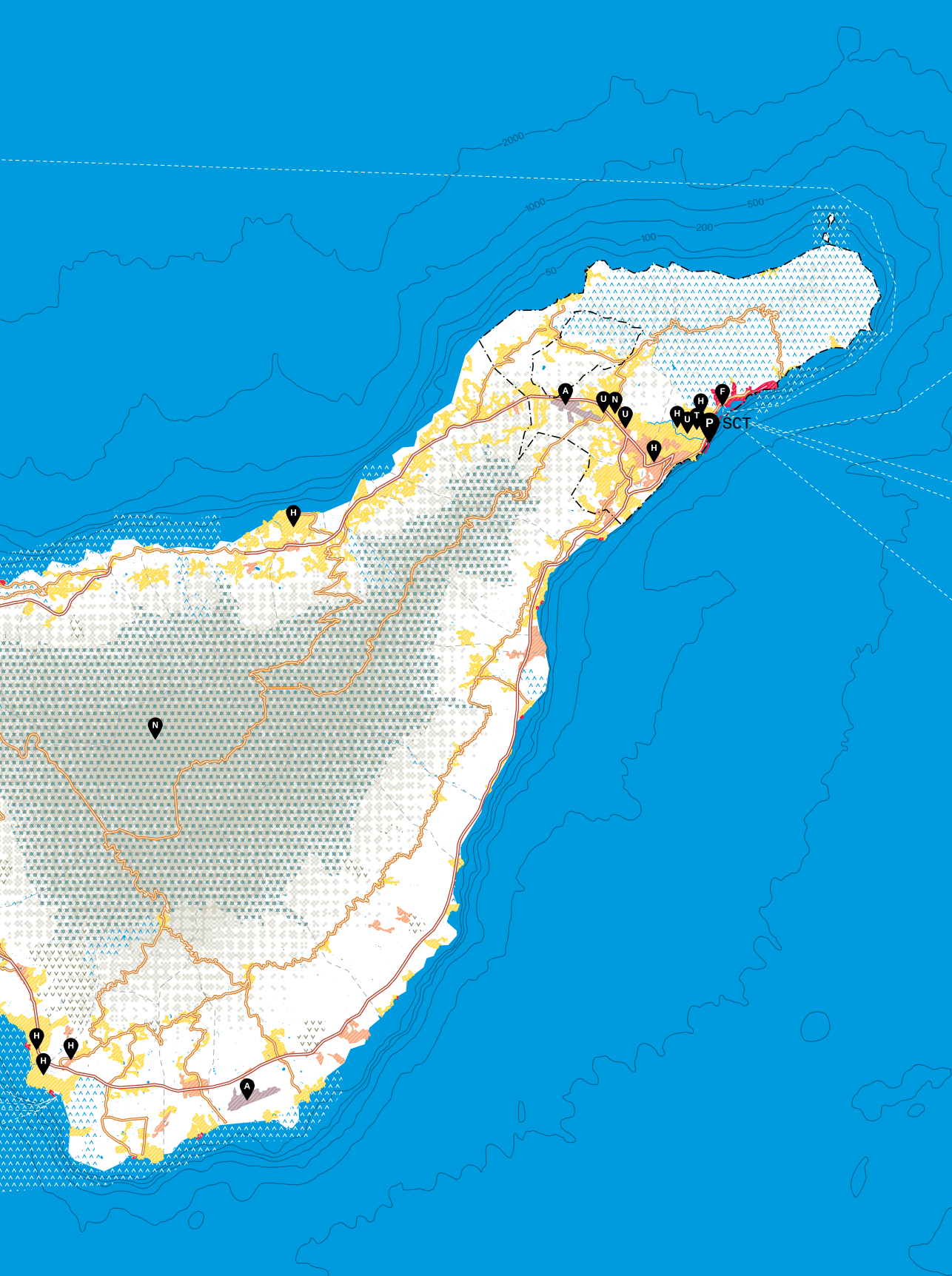
CITY

	SCT
	Santa Cruz de Tenerife
→ Capital national (km)	→ Madrid 2136
→ Capital regional (km)	→ Las Palmas 101
Area (km²)	253
Built-up area (km²)	58
Density (per km²)	1,445
Population	364,815
Population structure (%)	15 65 12.8 69.8 17.4
Distribution built area (%)	B A I P 77 4 14 5

TERRITORY

	SCT
	Tenerife
Area (km²)	2,035
Density (per km²)	467
Population	949,471
Natura2000 (km²)	M T 2,876 675




2000
1000
500
200
100
50
ŠCT

Cádiz, ES

PORT

CAD (%) 27.3 | 12.8 | 3.9 | 1.5 | 54.5

	CAD
Liquid	171
Dry bulk	66
Container	65
Specialized	
General	552
Cruise ship	333
Passenger	287
Other	
Vessels	1,193

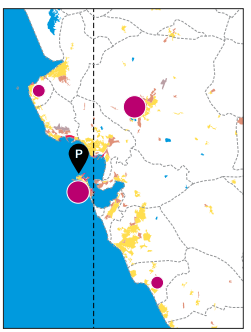
	CAD
Liquid bulk	1,332
Dry bulk	1,859
Containers	246
RoRo	419
Other	159
Cargo (t)	4,015
Passengers	25

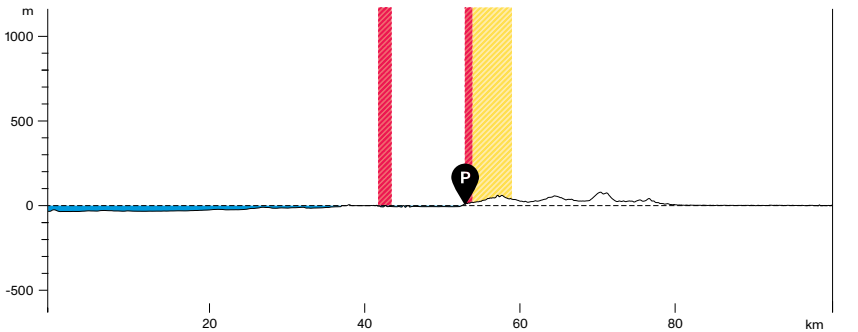
CITY

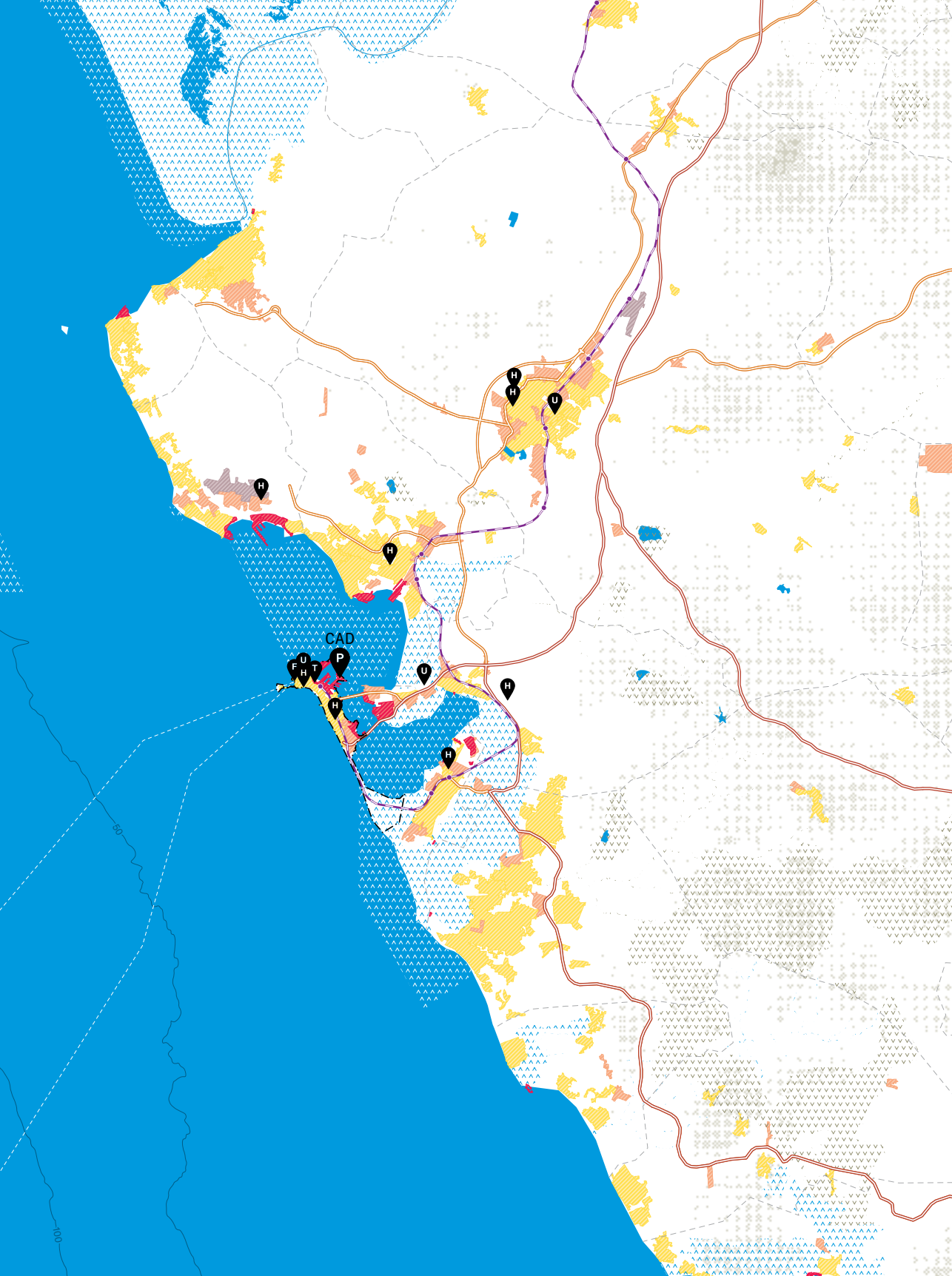
	Cádiz	CAD
→ Capital national (km)	→ Madrid	486
→ Capital regional (km)		
Area (km²)		12
Built-up area (km²)		7
Density (per km²)		9,457
Population		116,027
Population structure (%)	15 / 65	12.3 / 64.7 / 23.1
Distribution built area (%)	B / I / P	62 / 18 / 20

TERRITORY

	Cádiz	CAD
Area (km²)		7,438
Density (per km²)		168
Population		1,249,739
Natura2000 (km²)	M / T	4,820 / 931






CAD
P
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U
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T
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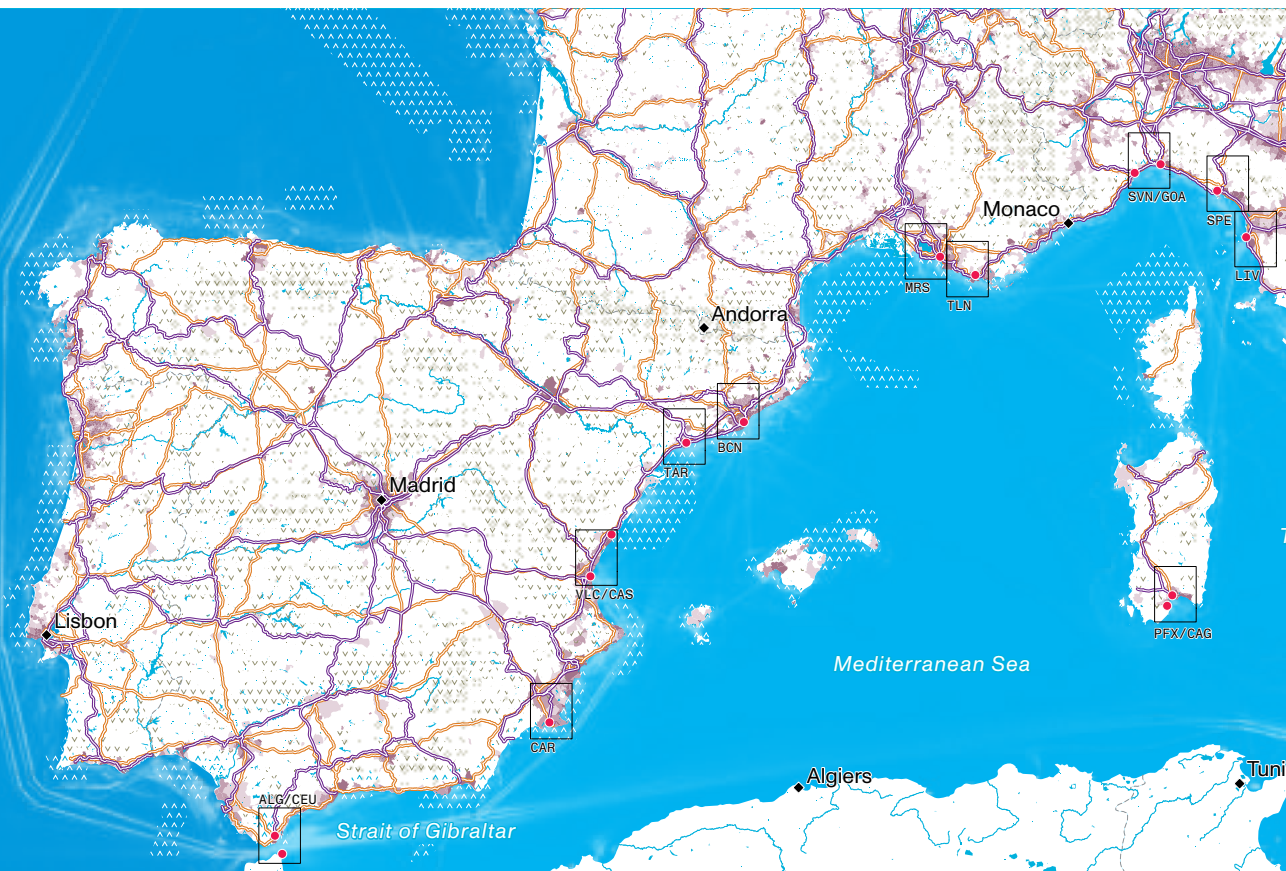
H
H
H
H
U
U
H
H
H
50
100

Mediterranean Sea Map and Statistics

ID	Port name	[1]	[2]
ALG	Algeciras, ES	89,908	6,148
CEU	Ceuta, MA	1,247	2,102
CAR	Cartagena, ES	33,933	1
VLC	Valencia, ES	65,308	757
CAS	Castellón, ES	20,265	0
TAR	Tarragona, ES	32,584	31
BCN	Barcelona, ES	54,713	3,239
MRS	Marseille, FR	74,049	1,705
TLN	Toulon, FR	1,742	1,749
GOA	Genova, IT	49,698	2,881
SVN	Savona, IT	13,450	806
SPE	La Spezia, IT	18,805	
LIV	Livorno, IT	36,262	2,941
CVV	Civitavecchia (Roma), IT	9,527	2,886
NAP	Napoli, IT	15,431	9,257
PFX	Porto Foxi, IT	28,818	
CAG	Cagliari, IT	12,680	389
PMO	Palermo, IT	10,047	2,017
SIR	Siracusa, IT	12,132	



ID	Port name	[1]	[2]
MSN	Messina, IT	7,293	11,669
MLZ	Milazzo, IT	15,469	471
GIT	Gioia Tau, IT	22,694	
REG	Reggio di Calabria, IT	4,528	10,884
TAR	Taranto, IT	17,608	
RAN	Ravenna, IT	31,351	
VCE	Venezia, IT	27,935	854
TRS	Trieste, IT	60,332	
KOP	Koper, SI	22,125	0
MNF	Monfalcone, IT	4,485	
RJK	Rijeka, HR	3,356	114
SPU	Split, HR	1,940	4,958
PIR	Peiraias (Athene), GR	56,825	9,931
PER	Perama, GR	3,699	6,939
EEU	Elefsina, GR	16,214	0
SKG	Thessaloniki, GR	15,172	2

1 Total tonnage of cargo in thousands and in relation to the other selected European ports. Eurostat, 2019.
2 Total number of passengers in thousands and in relation to the other selected European ports. Eurostat, 2019.
3 EMODnet Human Activities: Regional Advisory Councils, 2014.
4 EEA EuroGeographics EuroDEM, 2022.
5 EMODnet Human Activities, Vessel Density Map 2019.
6 ———, Environment, Natura2000 2015.
7 Based on Eurogeographics, (2020). EuroGlobalMap. Version 2020 Eurogeographics. Retrieved from https://eurogeographics.org/maps-for-europe/open-data.
8 Eurostat NUTS 1 data.
9 Eurostat Maritime transport data, 2019.
10 Natural Earth.
11 Eurostat, GISCO LAU, 2019.

Sea regions[3]
- Atlantic
- Mediterranean Sea

- Altitude in the landscape[4]
- Vessel density, yearly averages of all vessel types[5]
- Natura2000 marine area[6]
- Natura2000 terrestrial area[6]
- Main watercourse[7]
- Main land roads[7]
- Main railroads[7]
- Country border[8]

- Selected port city territory
- Selected port based on tonnage of cargo handled[9]
- Selected port based on number of passengers handled[9]
- Main port outside the EU
- National capital[10]

Population density LAU (in inhabitants per km²)[11]

300 600

0 100 km

ALG

CEU

Algeciras, ES
Ceuta, MA

Strait of Gibraltar

Strait of Gibraltar

PORT

	ALG	CEU
Liquid	2,805	1,017
Dry bulk	517	446
Container	3,440	62
Specialized	43	
General	3,312	9,551
Cruise ship		7
Passenger	18,840	7187
Other		
Vessels	28,957	11,084

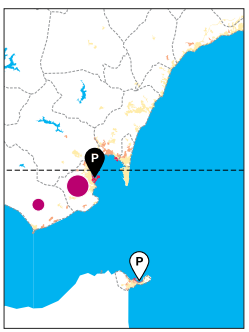
	ALG	CEU
Liquid bulk	30,703	872
Dry bulk	849	24
Containers	53,772	80
RoRo	1,251	271
Other	3,333	0
Cargo (t)	89,908	1,247
Passengers	6,148	2,102

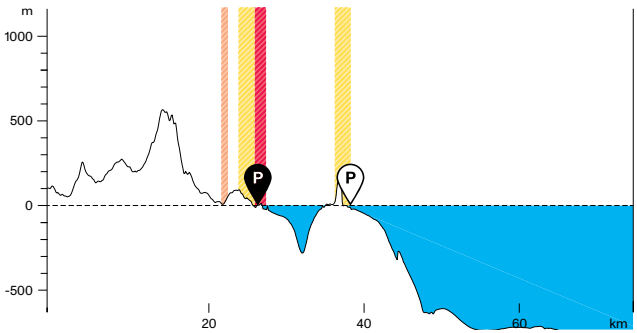
CITY

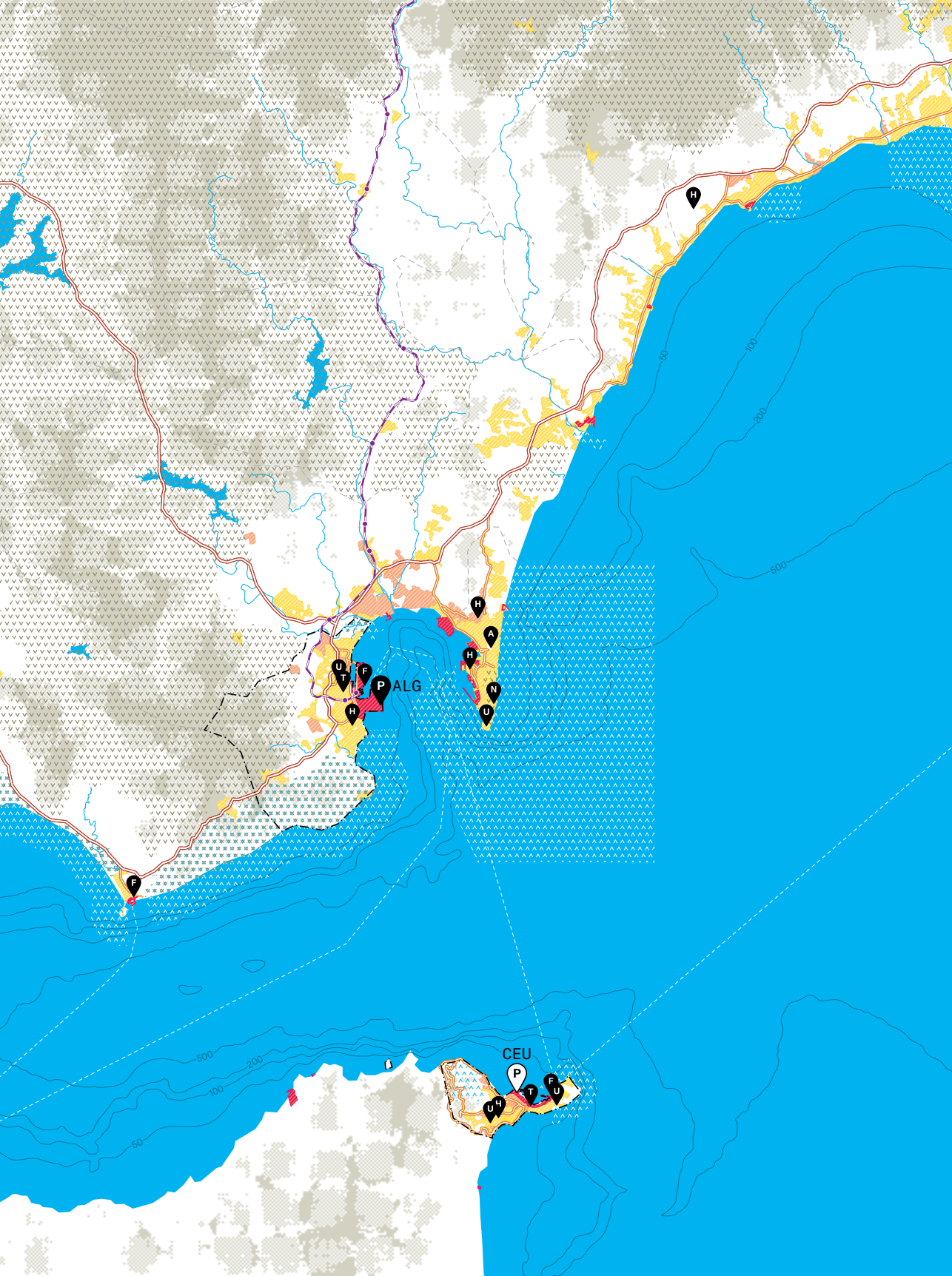
	Algeciras	ALG	Ceuta	CEU
→ Capital national (km)	→ Madrid	499	→ Rabat	249
→ Capital regional (km)				
Area (km²)		86		20
Built-up area (km²)		19		8
Density (per km²)		1,421		4,287
Population		121,957		84,777
Population structure (%)		15 65 / 17.9 66.7 15.3		15 65 / 20.9 67.7 11.5
Distribution built area (%)		B I P / 70 13 17		B I P / 63 28 9

TERRITORY

	Cádiz	ALG	Ceuta	CEU
Area (km²)		7,438		20
Density (per km²)		168		4,241
Population		1,249,739		84,829
Natura2000 (km²)		M T / 4,820 931		M / 2,233






ALG
CEU
50
100
200
500

Cartagena, ES

PORT

CAR (%)	22.8	11.0	14.4	51.7

	CAR
Liquid	942
Dry bulk	245
Container	175
Specialized	19
General	635
Cruise ship	167
Passenger	126
Other	41
Vessels	2,169

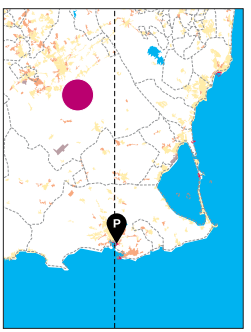
	CAR
Liquid bulk	25,982
Dry bulk	6,837
Containers	749
RoRo	78
Other	287
Cargo (t)	33,933
Passengers	1

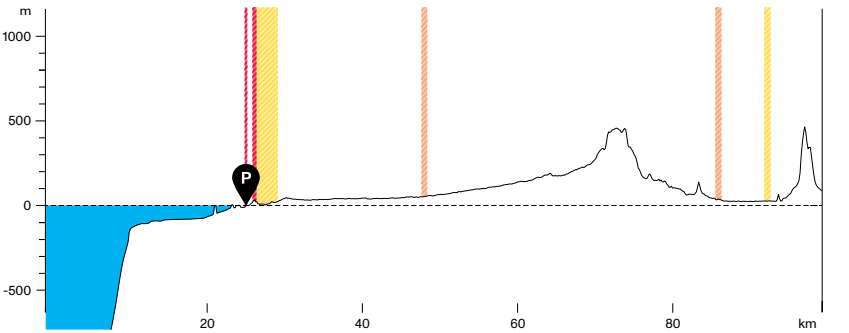
CITY

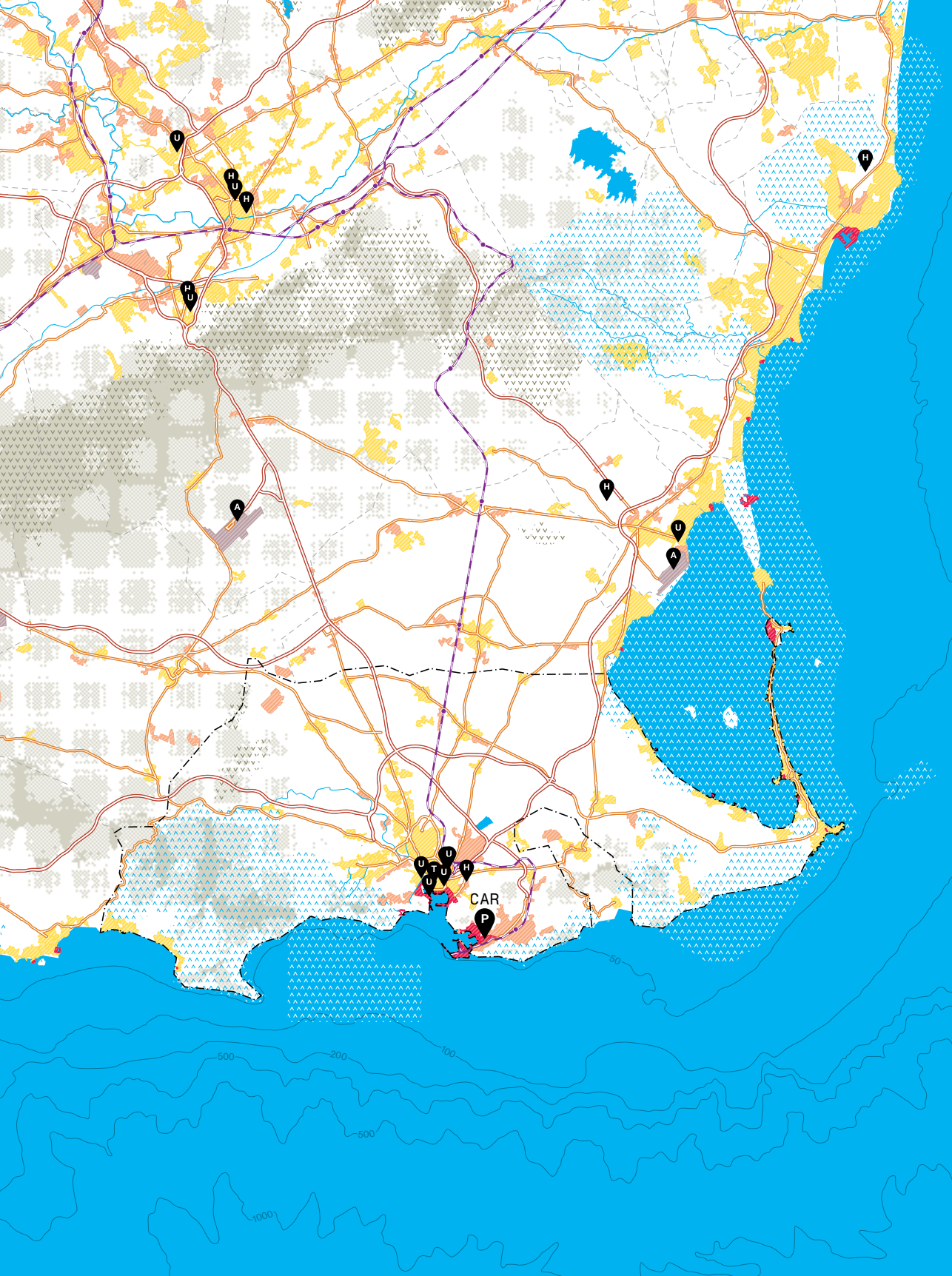
	Cartagena CAR
→ Capital national (km)	→ Madrid 392
→ Capital regional (km)	→ Valencia 215
Area (km²)	558
Built-up area (km²)	58
Density (per km²)	385
Population	214,802
Population structure (%)	15 65 17.5 66.0 16.6
Distribution built area (%)	B I P 65 31 4

TERRITORY

	Murcia CAR
Area (km²)	11,315
Density (per km²)	131
Population	1,487,663
Natura2000 (km²)	M T 4,136 3,210






CAR
50
100
200
500
500
1000

VLC

CAS

Valencia, ES
Castellón, ES

Balearic Sea

Balearic Sea

PORT

VLC / CAS (%) 71.4 13.1 1.4 25.1 31.4 2.1 55.5

	VLC	CAS
Liquid	308	531
Dry bulk	100	313
Container	3,009	558
Specialized		
General	4,263	350
Cruise ship	203	
Passenger	8	
Other		7
Vessels	7,891	1,759

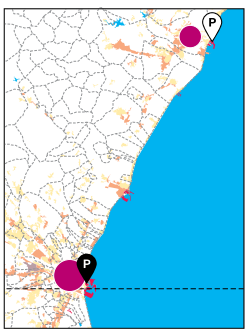
	VLC	CAS
Liquid bulk	3,120	10,603
Dry bulk	2,190	7,097
Containers	49,433	2,330
RoRo	1,532	4
Other	9,033	231
Cargo (t)	65,308	20,265
Passengers	757	0

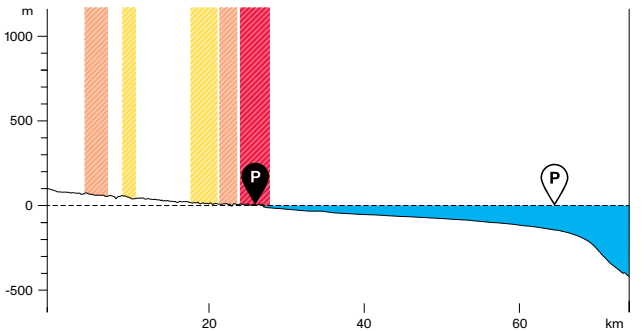
CITY

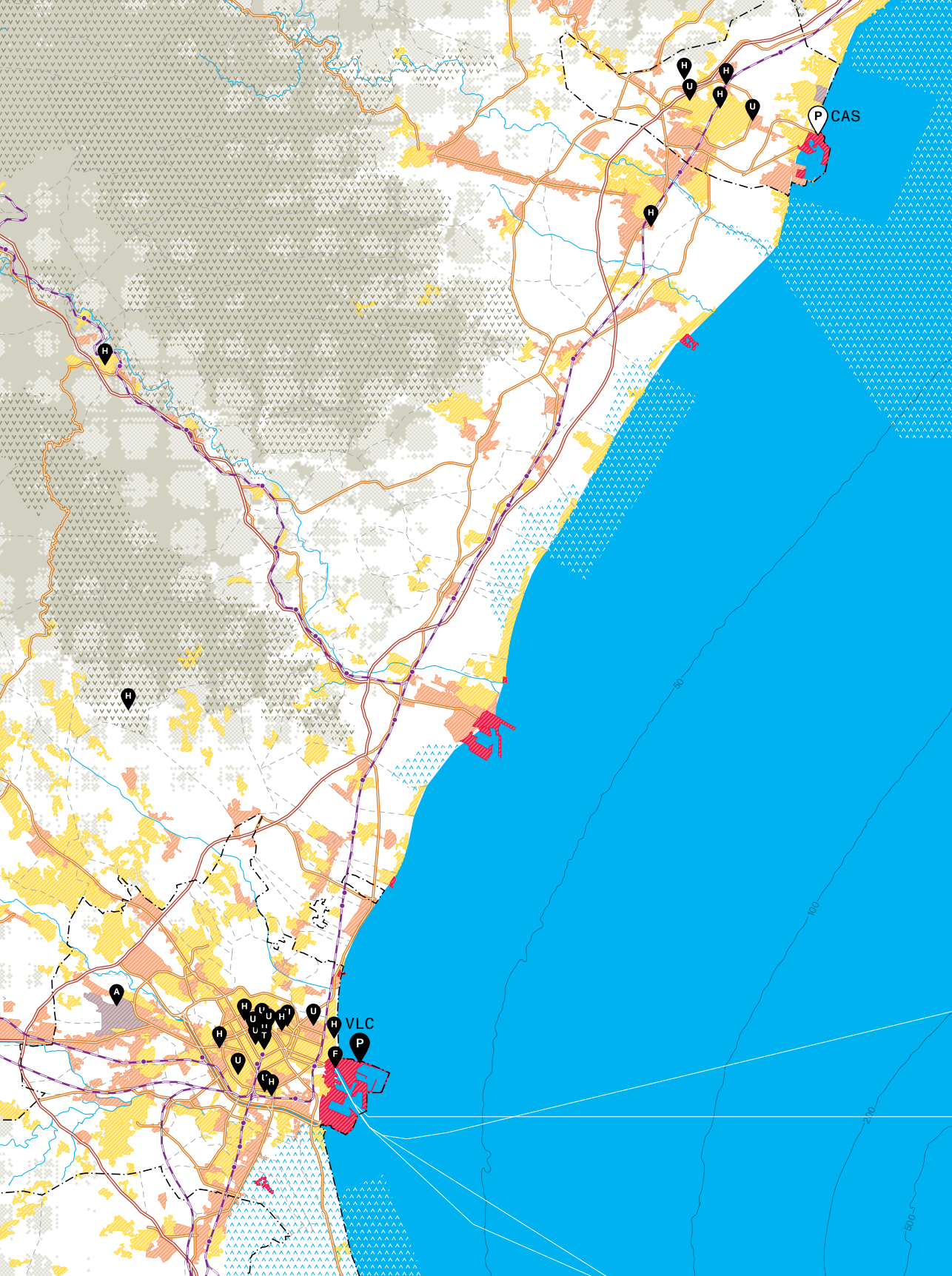
	Valencia (VLC)	Castellón de la Plana (CAS)
→ Capital national (km)	→ Madrid 309	→ Madrid 321
→ Capital regional (km)		→ Valencia 65
Area (km²)	401	109
Built-up area (km²)	191	46
Density (per km²)	3,500	1,579
Population	1,403,247	171,728
Population structure (%)	15 65 / 13.7 65.6 20.7	15 65 / 15.3 66.5 18.2
Distribution built area (%)	B A I P / 59 3 31 7	B A I P / 65 1 31 3

TERRITORY

	Valencia (VLC)	Castellón (CAS)
Area (km²)	10,808	6,634
Density (per km²)	235	86
Population	2,540,588	571,601
Natura2000 (km²)	M T / 1,881 7,282	M T / 5,183 5,229






CAS
VLC
80
100
200
600

TAR

Tarragona, ES

Balearic Sea

PORT

TAR (%) 85.5 | 7.2 | 5.0 | 2.3

	TAR
Liquid	1,231
Dry bulk	347
Container	148
Specialized	80
General	682
Cruise ship	57
Passenger	
Other	6
Vessels	2,551

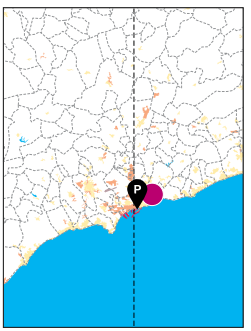
	TAR
Liquid bulk	20,412
Dry bulk	9,759
Containers	352
RoRo	340
Other	1,721
Cargo (t)	32,584
Passengers	31

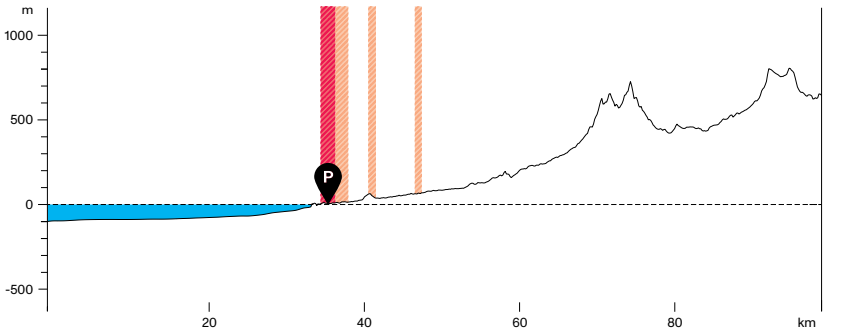
CITY

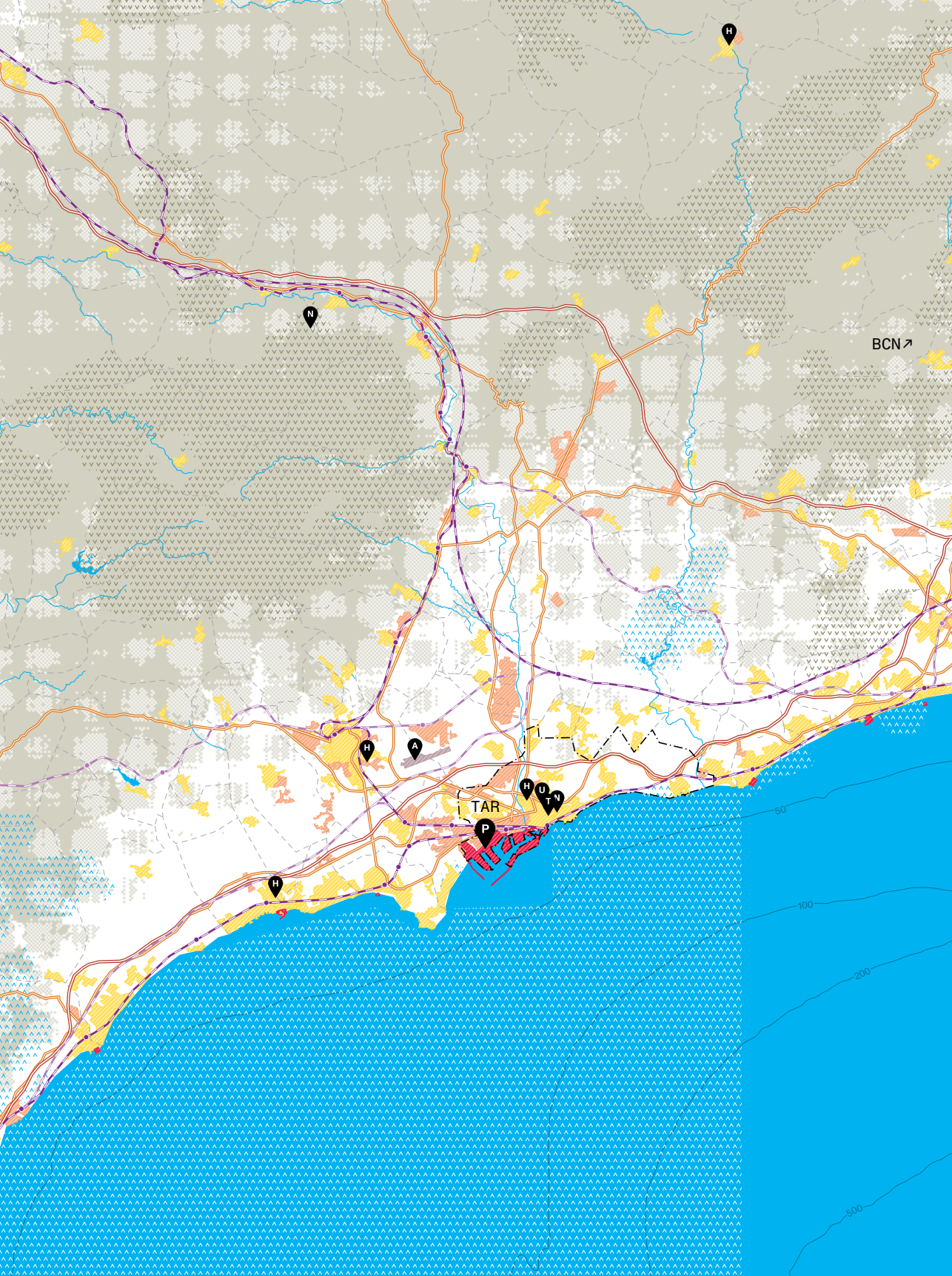
	Tarragona TAR
→ Capital national (km)	→ Madrid 424
→ Capital regional (km)	→ Barcelona 82
Area (km²)	55
Built-up area (km²)	32
Density (per km²)	2,444
Population	134,515
Population structure (%)	15 65 15.9 65.9 18.1
Distribution built area (%)	B I P 47 34 19

TERRITORY

	Tarragona TAR
Area (km²)	6,302
Density (per km²)	127
Population	802,547
Natura2000 (km²)	M T 6,146 3,148






BCN↗
TAR
50
100
200
500

Barcelona, ES

Balearic Sea

PORT

BCN (%) 13.7 64.1 22.2

	PER
Liquid	1,042
Dry bulk	98
Container	2,313
Specialized	435
General	4,213
Cruise ship	800
Passenger	
Other	
Vessels	8,901

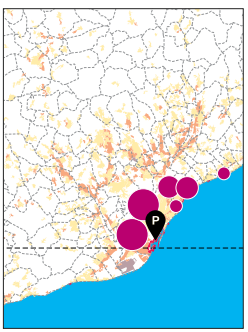
	BCN
Liquid bulk	16,134
Dry bulk	4,072
Containers	27,340
RoRo	6,340
Other	827
Cargo (t)	54,713
Passengers	3,239

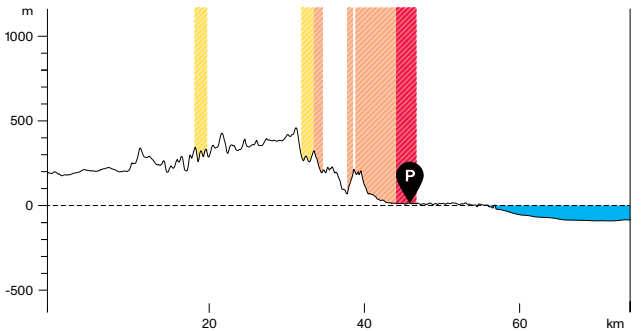
CITY

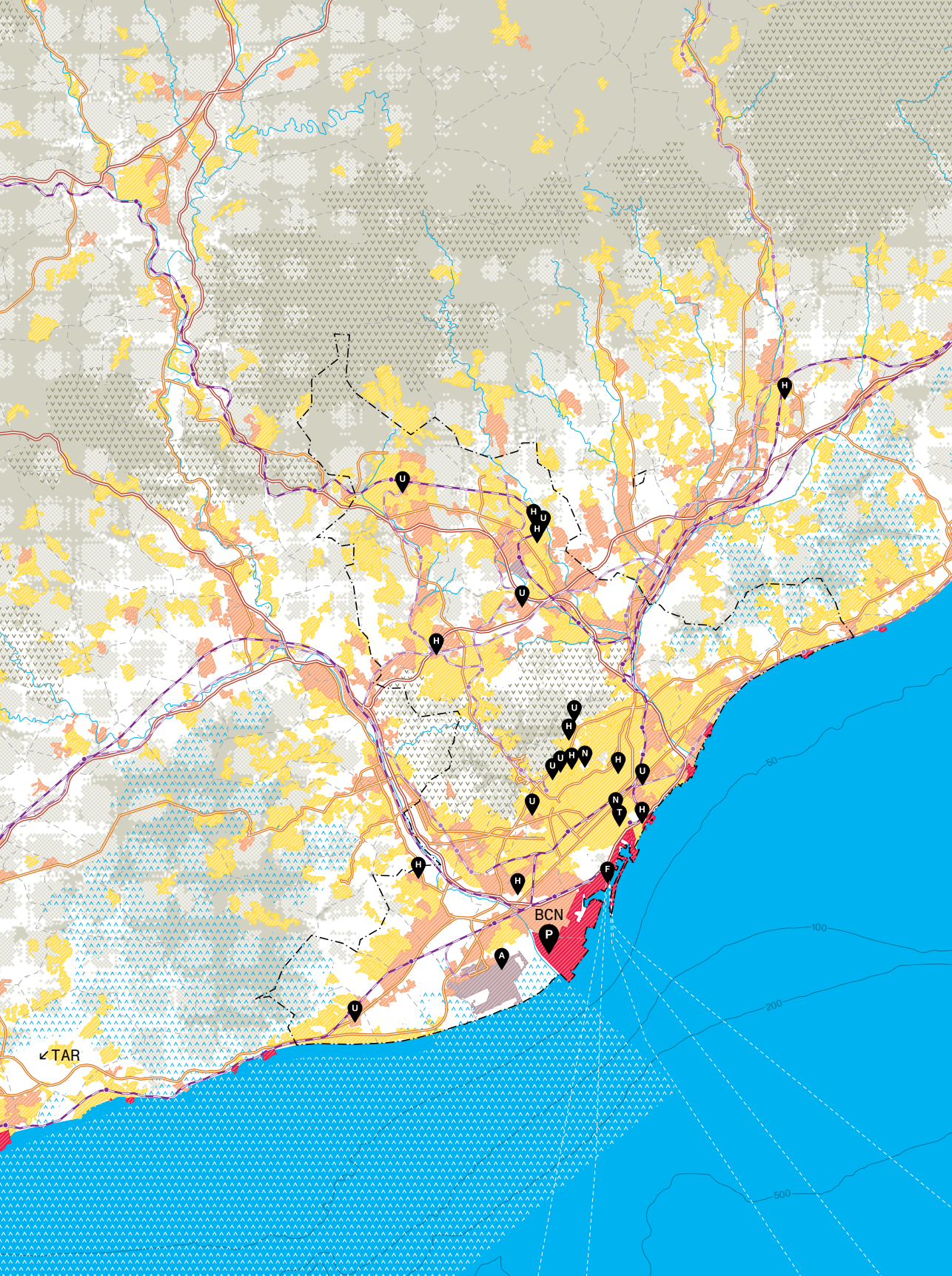
	Barcelona BCN
→ Capital national (km)	
→ Capital regional (km)	→ Madrid 507
Area (km²)	599
Built-up area (km²)	307
Density (per km²)	6,182
Population	3,701,270
Population structure (%)	15 14.7 / 65 65.7 / 65 19.5
Distribution built area (%)	B 65 / A 3 / I 30 / P 2

TERRITORY

	Barcelona BCN
Area (km²)	7,730
Density (per km²)	721
Population	5,575,204
Natura2000 (km²)	M 1,316 / T 2,067






BCN
TAR
60
100
200
500

Marseille, FR

PORT

MRS (%) 14.9

85.1

	MRS
Liquid	1,867
Dry bulk	346
Container	1,382
Specialized	184
General	2,915
Cruise ship	497
Passenger	
Other	21
Vessels	7,212

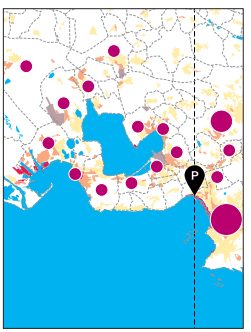
	MRS
Liquid bulk	45,563
Dry bulk	12,595
Containers	10,861
RoRo	2,489
Other	2,541
Cargo (t)	74,049
Passengers	1,705

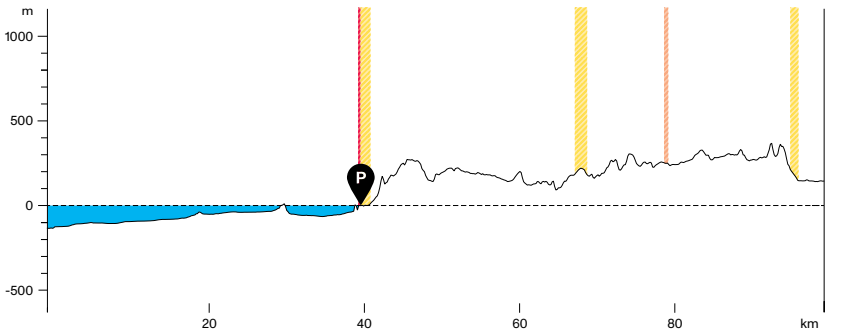
CITY

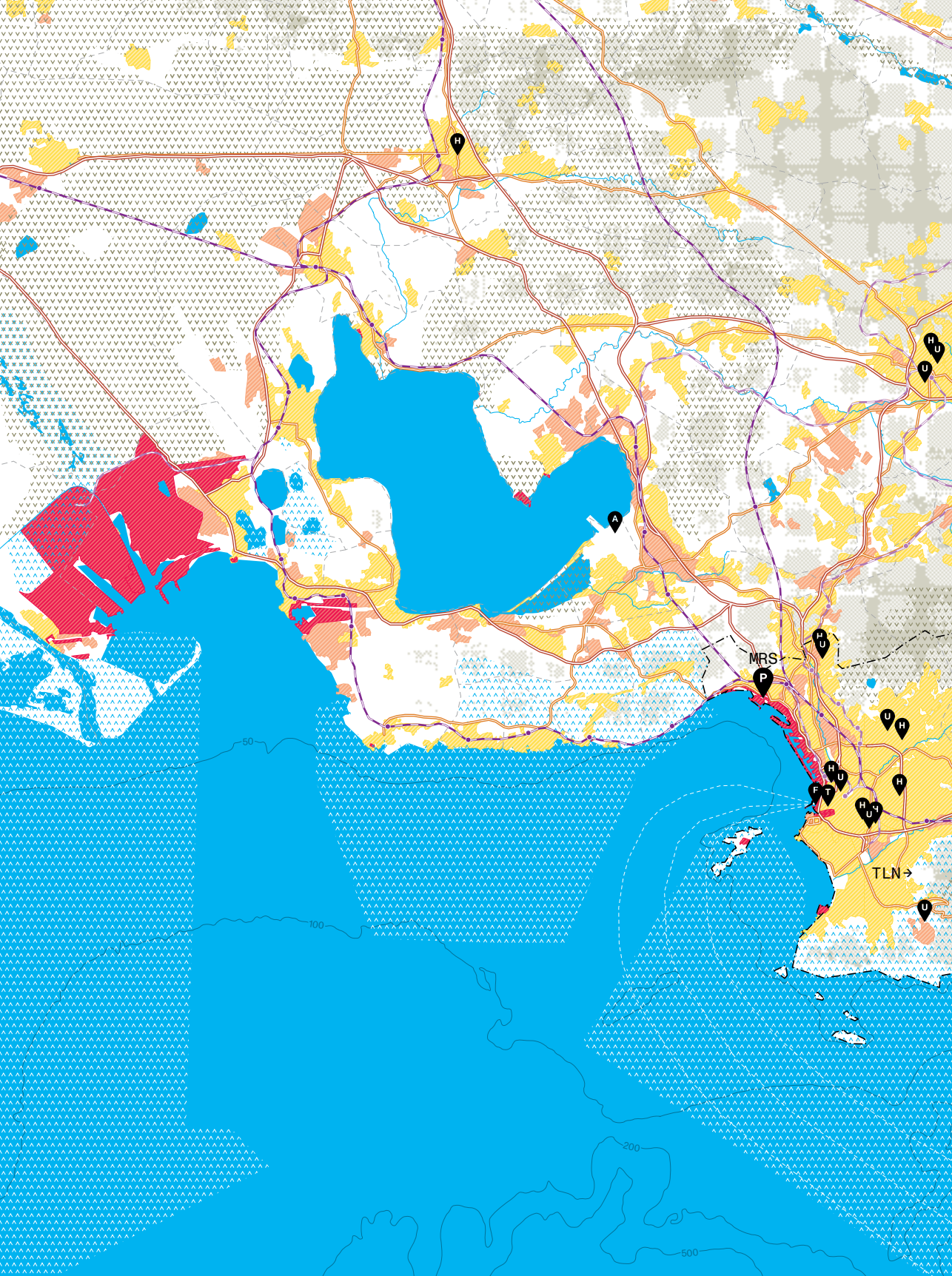
	City of Marseille MRS
→ Capital national (km)	
→ Capital regional (km)	→ Paris 661
Area (km²)	297
Built-up area (km²)	147
Density (per km²)	3,011
Population	895,431
Population structure (%)	15 65 18.3 62.6 19.1
Distribution built area (%)	B I P 88 10 2

TERRITORY

	Bouches-du-Rhône MRS
Area (km²)	5,248
Density (per km²)	389
Population	2,039,608
Natura2000 (km²)	M T 5,377 2,517






MRS
TLN
50
100
200
500

TLN

Toulon, FR

Gulf of Lion

PORT

TLN (%) 70.6

	TLN
Liquid	
Dry bulk	
Container	
Specialized	
General	
Cruise ship	
Passenger	
Other	
Vessels	1,675

0.4 29,0

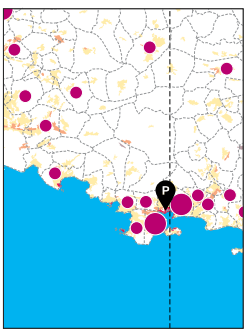
	TLN
Liquid bulk	112
Dry bulk	768
Containers	2
RoRo	860
Other	0
Cargo (t)	1,742
Passengers	1,749

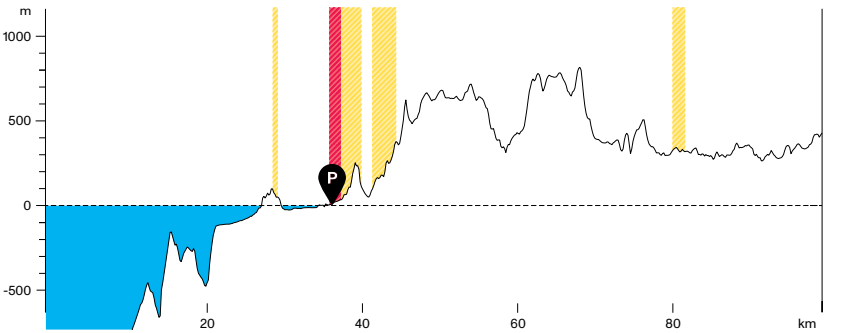
CITY

	City of Toulon TLN
→ Capital national (km)	→ Paris 695
→ Capital regional (km)	→ Marseille 48
Area (km²)	145
Built-up area (km²)	117
Density (per km²)	2,298
Population	334,333
Population structure (%)	15 65 15.7 59.4 24.9
Distribution built area (%)	B I P 79 13 8

TERRITORY

	Var TLN
Area (km²)	6,034
Density (per km²)	178
Population	1,076,711
Natura2000 (km²)	M T 3,052 1,421






←MRS
TLN
50
100
200
500
1000
2000

GOA Genova, IT — Gulf of Genoa

SVN Savona, IT — Gulf of Genoa

PORT

GOA / SVN (%) 14.2 100

8.2 77.6

	GOA	SVN
Liquid	696	175
Dry bulk	37	88
Container	1,415	176
Specialized	52	150
General	3,773	1,245
Cruise ship	348	167
Passenger		
Other	20	137
Vessels	6,458	2,021

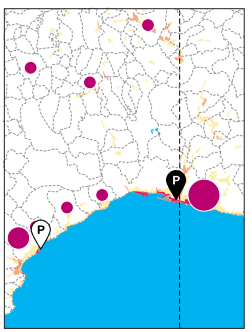
	GOA	SVN
Liquid bulk	15,835	7,561
Dry bulk	1,282	3,090
Containers	21,913	365
RoRo	10,354	2,180
Other	314	254
Cargo (t)	49,698	13,450
Passengers	2,881	806

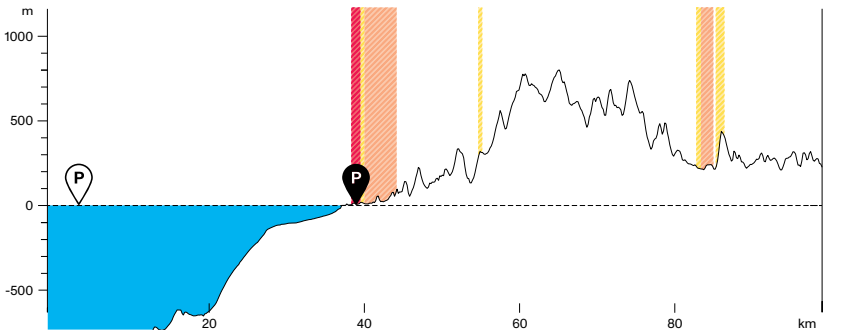
CITY

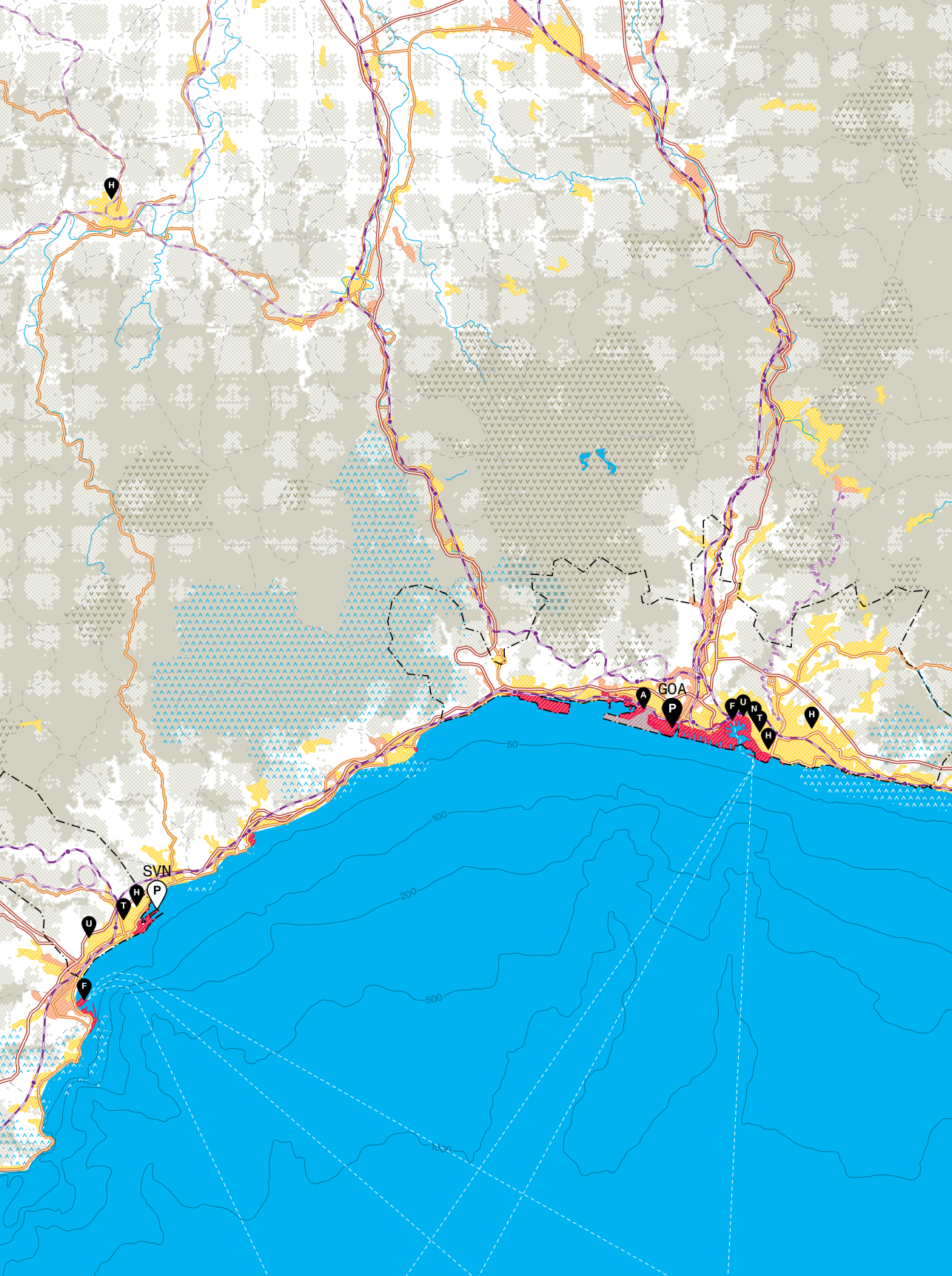
	Genova (GOA)	Savona (SVN)
→ Capital national (km)	→ Roma 403	→ Roma 421
→ Capital regional (km)	→ Milano 119	→ Milano 136
Area (km²)	240	65
Built-up area (km²)	68	15
Density (per km²)	2,372	917
Population	569,184	59,924
Population structure (%)	15 65 / 11.3 60.4 28.5	15 65 / 11.3 59.9 28.8
Distribution built area (%)	B I P / 74 10 16	B I P / 67 27 6

TERRITORY

	Genova (GOA)	Savona (SVN)
Area (km²)	1,835	1,548
Density (per km²)	453	177
Population	831,172	273,732
Natura2000 (km²)	M T / 407 352	M T / 385 249






GOA
SVN
50
100
200
500
1000

La Spezia, IT

PORT

SPE (%) 32.6

	SPE
Liquid	81
Dry bulk	12
Container	941
Specialized	
General	78
Cruise ship	210
Passenger	
Other	40
Vessels	1,362

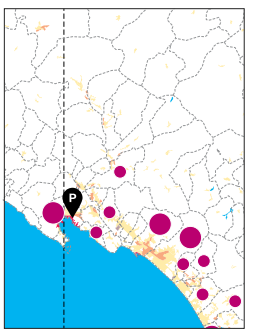
	7.7	41.9	17.8
	SPE		
Liquid bulk	2,244		
Dry bulk	421		
Containers	16,116		
RoRo			
Other	24		
Cargo (t)	18,805		
Passengers			

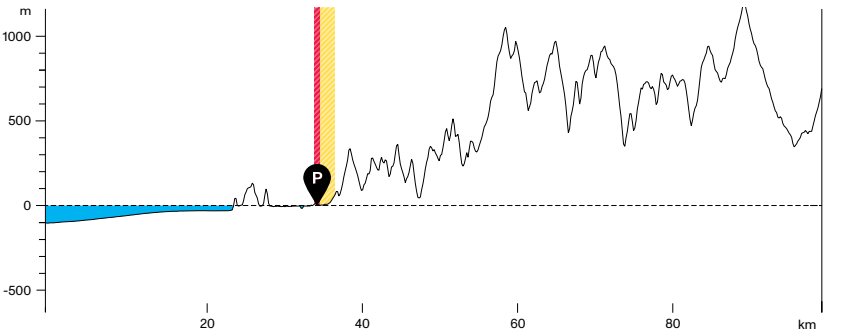
CITY

	La Spezia	SPE
→ Capital national (km)	→ Roma	326
→ Capital regional (km)	→ Milano	159
Area (km²)		51
Built-up area (km²)		17
Density (per km²)		1,803
Population		92,737
Population structure (%)	15 / 65	11.7 / 61.5 / 26.7
Distribution built area (%)	B / I / P	67 / 11 / 22

TERRITORY

	La Spezia	SPE
Area (km²)		882
Density (per km²)		247
Population		218,094
Natura2000 (km²)	M / T	143 / 106






SPE
LIV↘
50
100
200

Livorno, IT

Ligurian Sea

PORT

LIV (%) 0.5

	LIV
Liquid	564
Dry bulk	31
Container	622
Specialized	500
General	6,590
Cruise ship	328
Passenger	
Other	24
Vessels	8,659

3.5 95.9

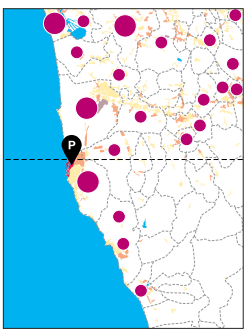
	LIV
Liquid bulk	5,547
Dry bulk	722
Containers	16,545
RoRo	13,427
Other	21
Cargo (t)	36,262
Passengers	2,941

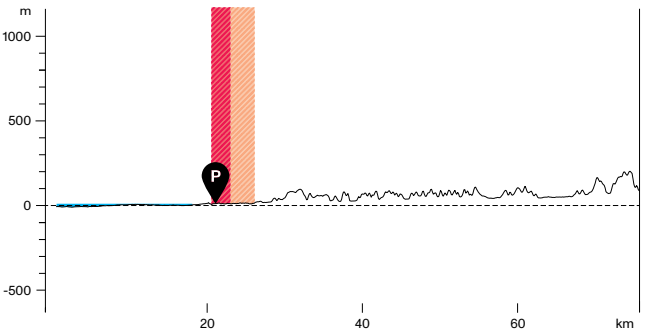
CITY

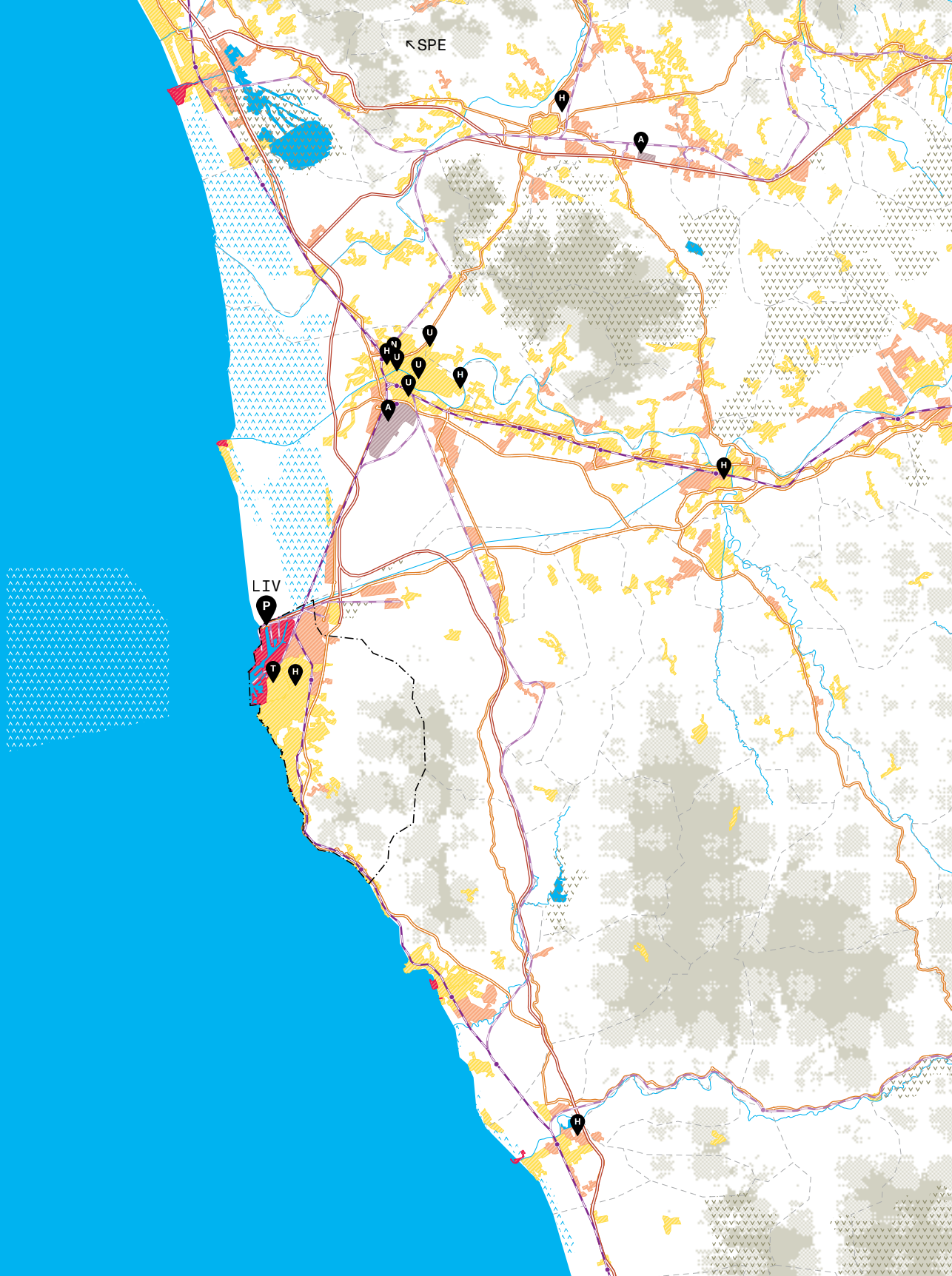
	Livorno	LIV
→ Capital national (km)	→ Roma	255
→ Capital regional (km)	→ Milano	229
Area (km²)		104
Built-up area (km²)		31
Density (per km²)		1,514
Population		157,457
Population structure (%)	15 65	
	12.2 61.6 26.1	
Distribution built area (%)	B I P	
	61 23 16	

TERRITORY

	Livorno	LIV
Area (km²)		1,215
Density (per km²)		274
Population		332,887
Natura2000 (km²)	M T	
	1,246 52	






SPE
LIV

Civitavecchia (Roma), IT

Tyrrhenian Sea

PORT

CVV (%)	46.9	3.4	4.4	45.3

	CVV
Liquid	40
Dry bulk	70
Container	227
Specialized	178
General	2,984
Cruise ship	893
Passenger	
Other	4
Vessels	4,396

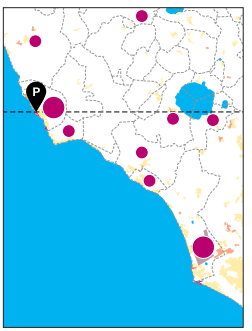
	CVV
Liquid bulk	785
Dry bulk	2,202
Containers	1,383
RoRo	5,152
Other	
Cargo (t)	9,527
Passengers	2,886

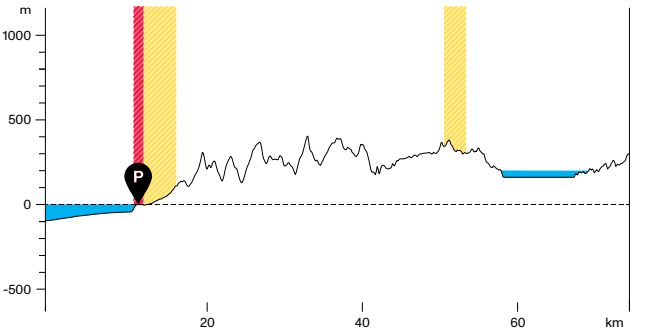
CITY

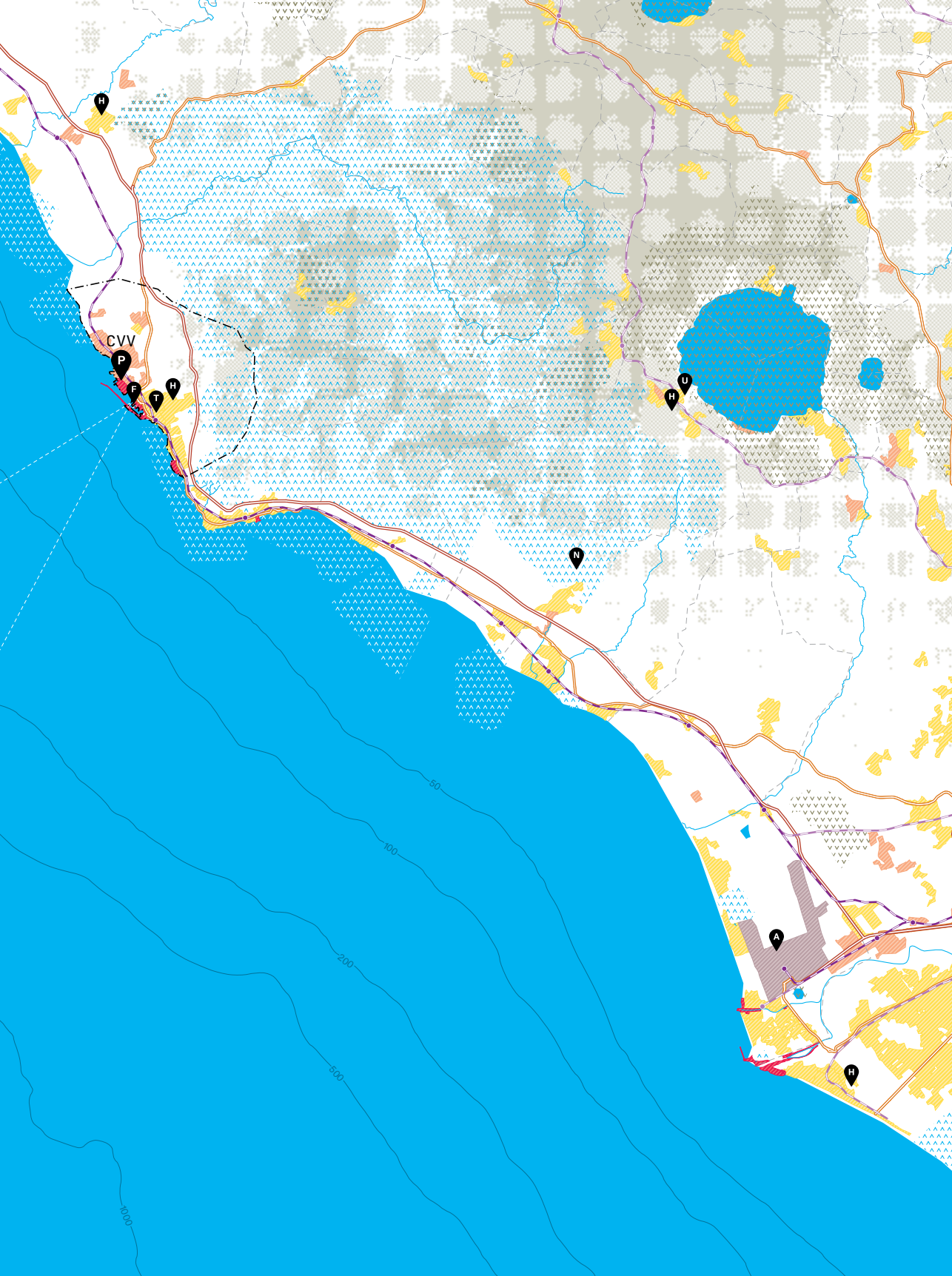
	Civitavecchia CVV
→ Capital national (km)	
→ Capital regional (km)	→ Roma 81
Area (km²)	73
Built-up area (km²)	14
Density (per km²)	721
Population	52,716
Population structure (%)	17 65 18 13.8 65.2 21.0
Distribution built area (%)	B I P 48 44 8

TERRITORY

	Roma CVV
Area (km²)	5,359
Density (per km²)	796
Population	4,263,542
Natura2000 (km²)	M T 1,263 945






CVV
P
F
T
H
H
H
U
N
A
H
50
100
200
500
1000

Napoli, IT

Gulf of Naples

PORT

	NAP (%)
	28.6
	52.1
	8.2
	11.1

	NAP
Liquid	784
Dry bulk	52
Container	486
Specialized	
General	41,536
Cruise ship	454
Passenger	3,133
Other	377
Vessels	46,822

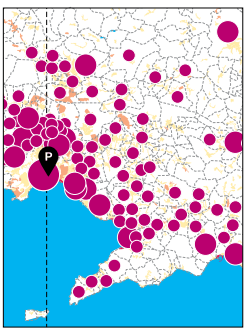
	NAP
Liquid bulk	6,323
Dry bulk	1,246
Containers	3,486
RoRo	4,161
Other	215
Cargo (t)	15,431
Passengers	9,257

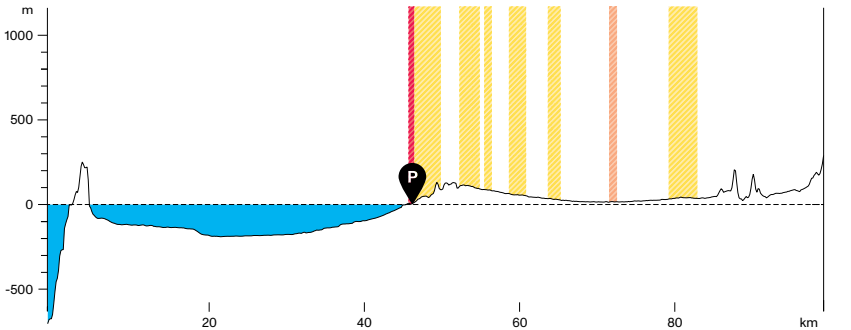
CITY

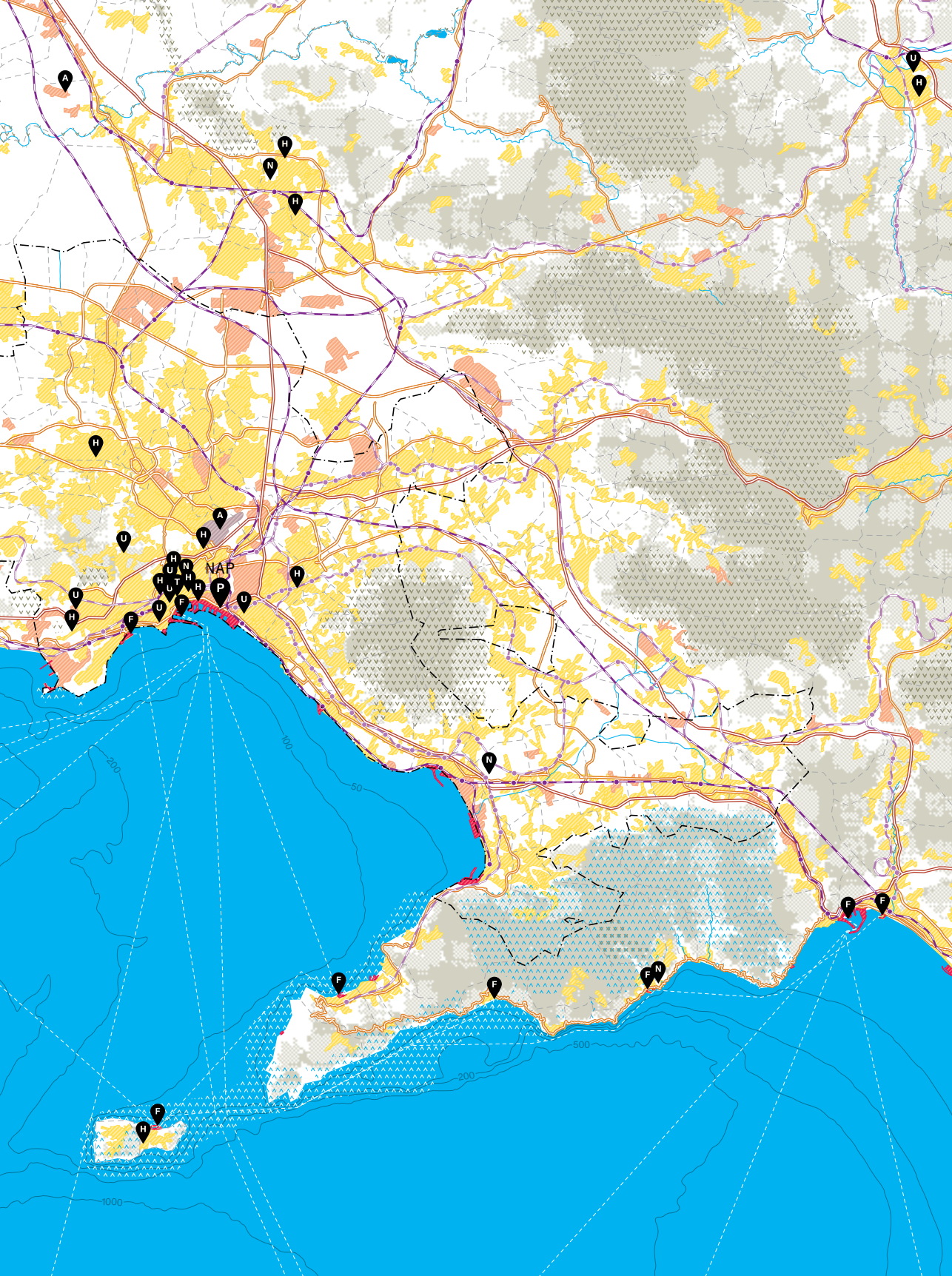
	Napoli
→ Capital national (km)	→ Roma 254
→ Capital regional (km)	
Area (km²)	849
Built-up area (km²)	359
Density (per km²)	1,124
Population	954,318
Population structure (%)	15 65 15.5 67.1 17.4
Distribution built area (%)	B A I P 83 1 15 1

TERRITORY

	Napoli
Area (km²)	1,175
Density (per km²)	2,594
Population	3,048,194
Natura2000 (km²)	M T 370 400






NAP
100
50
200
500
200
1000

PFX

CAG

Porto Foxi, IT
Cagliari, IT

Mediterranean Sea

Mediterranean Sea

PORT

PFX / CAG (%) 1.9 2.6

21.5 89.6 4.4 78.5 1.5

	PFX	CAG
Liquid	1,072	216
Dry bulk		47
Container		114
Specialized		
General		1,793
Cruise ship		109
Passenger		
Other	16	22
Vessels	1,088	2,301

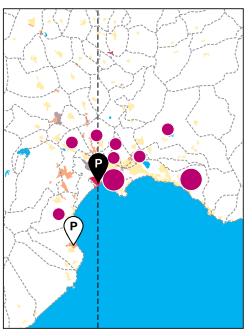
	PFX	CAG
Liquid bulk	26,721	1,057
Dry bulk		2,842
Containers	57	1,485
RoRo		5,129
Other		2,167
Cargo (t)	28,818	12,680
Passengers		389

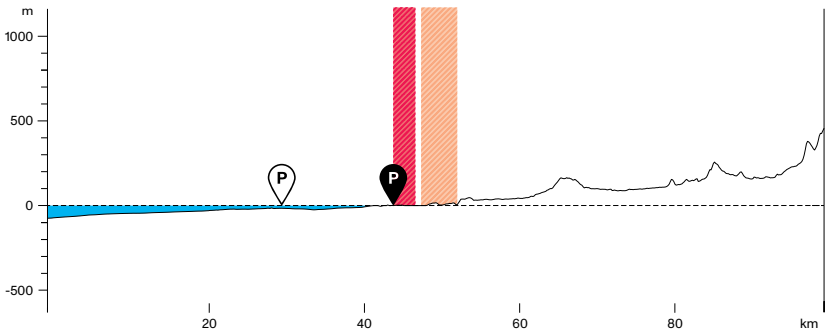
CITY

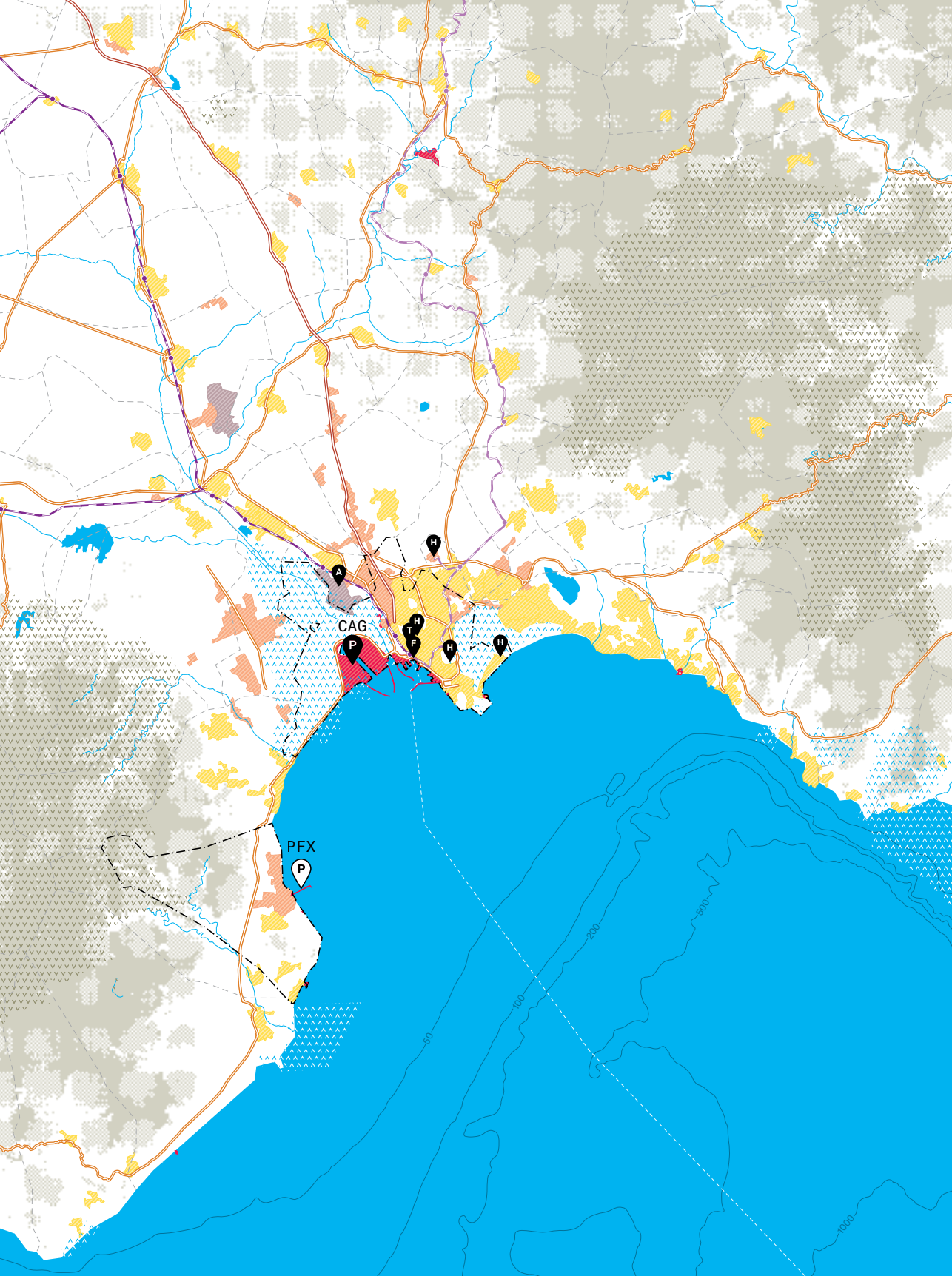
	Sarroch (PFX)	Cagliari (CAG)
→ Capital national (km)	→ Roma 564	→ Roma 544
→ Capital regional (km)	→ Palermo 503	→ Palermo 500
Area (km²)	68	84
Built-up area (km²)	8	44
Density (per km²)	77	1,808
Population	5,266	151,504
Population structure (%)	17 65 / 12.3 61.1 26.5	15 65 / 9.7 63.2 27.0
Distribution built area (%)	B I / 45 55	B A I P / 57 1 23 12

TERRITORY

	Cagliari (PFX)	Cagliari (CAG)
Area (km²)	1,249	1,249
Density (per km²)	336	336
Population	419,770	419,770
Natura2000 (km²)	M T / 378 836	M T / 378 836






CAG
PFX
50
100
200
500
1000

PMO

Palermo, IT

Tyrrhenian Sea

PORT

	PMO
PMO (%)	29.0
PMO (%)	45.9
PMO (%)	15.4
PMO (%)	9.6

	PMO
Liquid	373
Dry bulk	5
Container	59
Specialized	
General	3,289
Cruise ship	230
Passenger	913
Other	48
Vessels	4,917

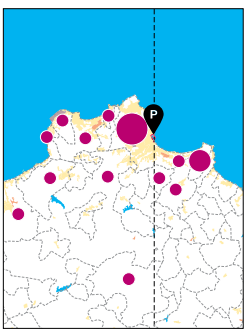
	PMO
Liquid bulk	1,798
Dry bulk	888
Containers	319
RoRo	6,646
Other	396
Cargo (t)	10,047
Passengers	2,017

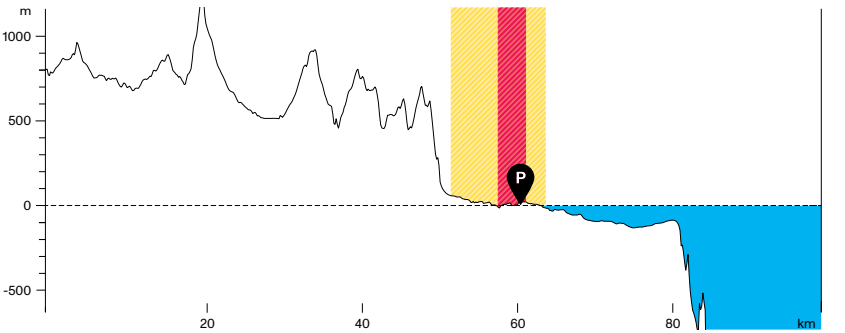
CITY

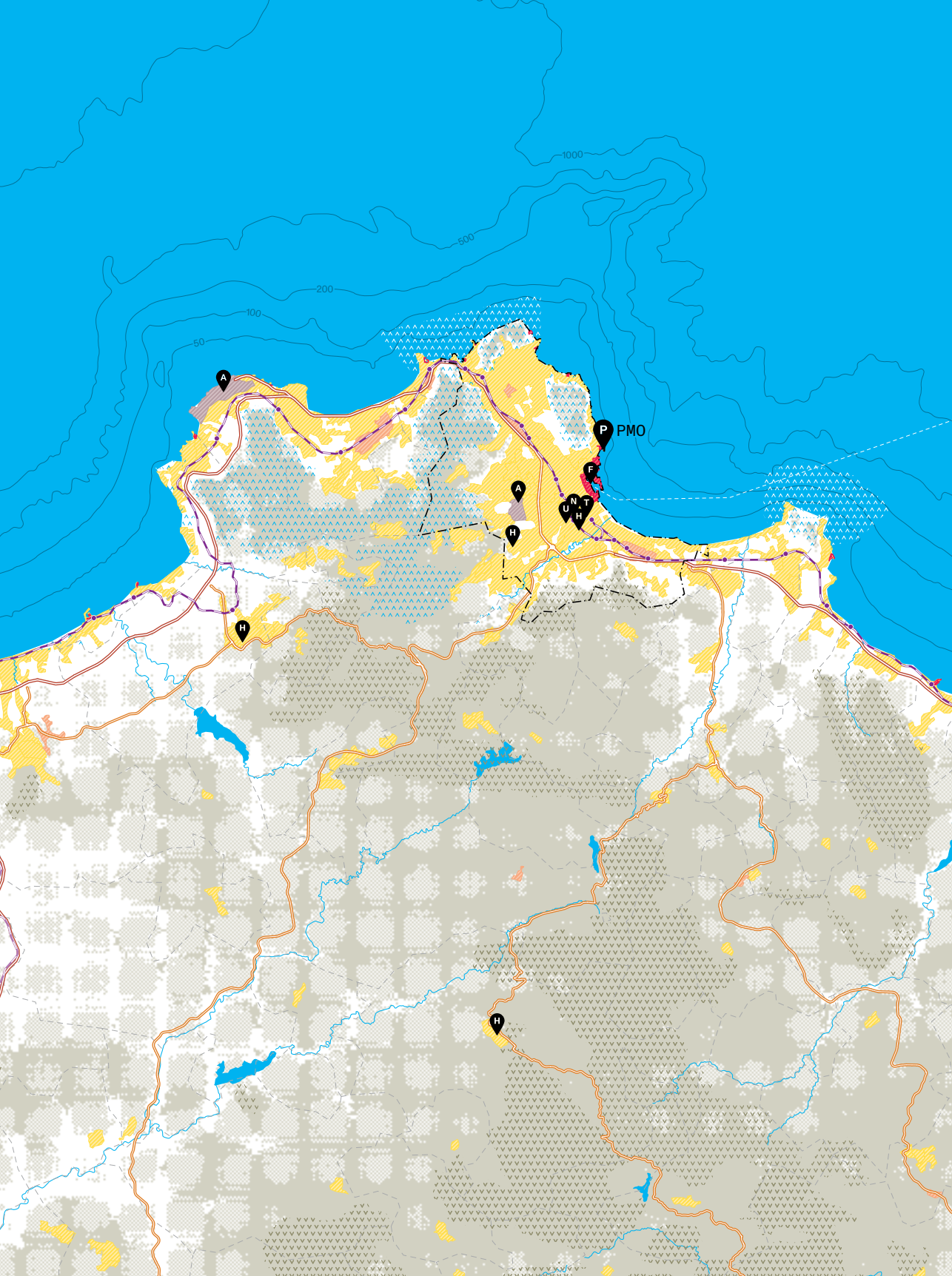
	Palermo	PMO
→ Capital national (km)	→ Roma	553
→ Capital regional (km)	→ Napoli	400
Area (km²)		160
Built-up area (km²)		122
Density (per km²)		4,077
Population		652,720
Population structure (%)	15 / 65	14.2 / 65.4 / 20.3
Distribution built area (%)	B / A I P	96 / 1 2 1

TERRITORY

	Palermo	PMO
Area (km²)		4,996
Density (per km²)		247
Population		1,231,602
Natura2000 (km²)	M / T	2,243 / 1,588






1000
500
200
100
50
A
P
PMO
F
A
U
N
T
H
H
H
H

SIR

Siracusa, IT

Ionian Sea

PORT

SIR (%) 100

	SIR
Liquid	336
Dry bulk	
Container	
Specialized	
General	
Cruise ship	
Passenger	
Other	112
Vessels	448

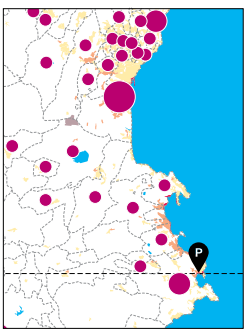
	SIR
Liquid bulk	12,132
Dry bulk	
Containers	
RoRo	
Other	
Cargo (t)	12,132
Passengers	

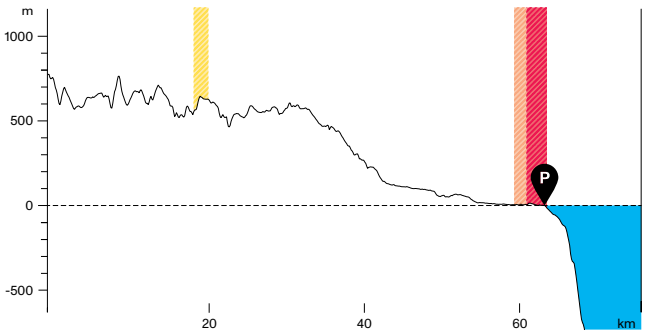
CITY

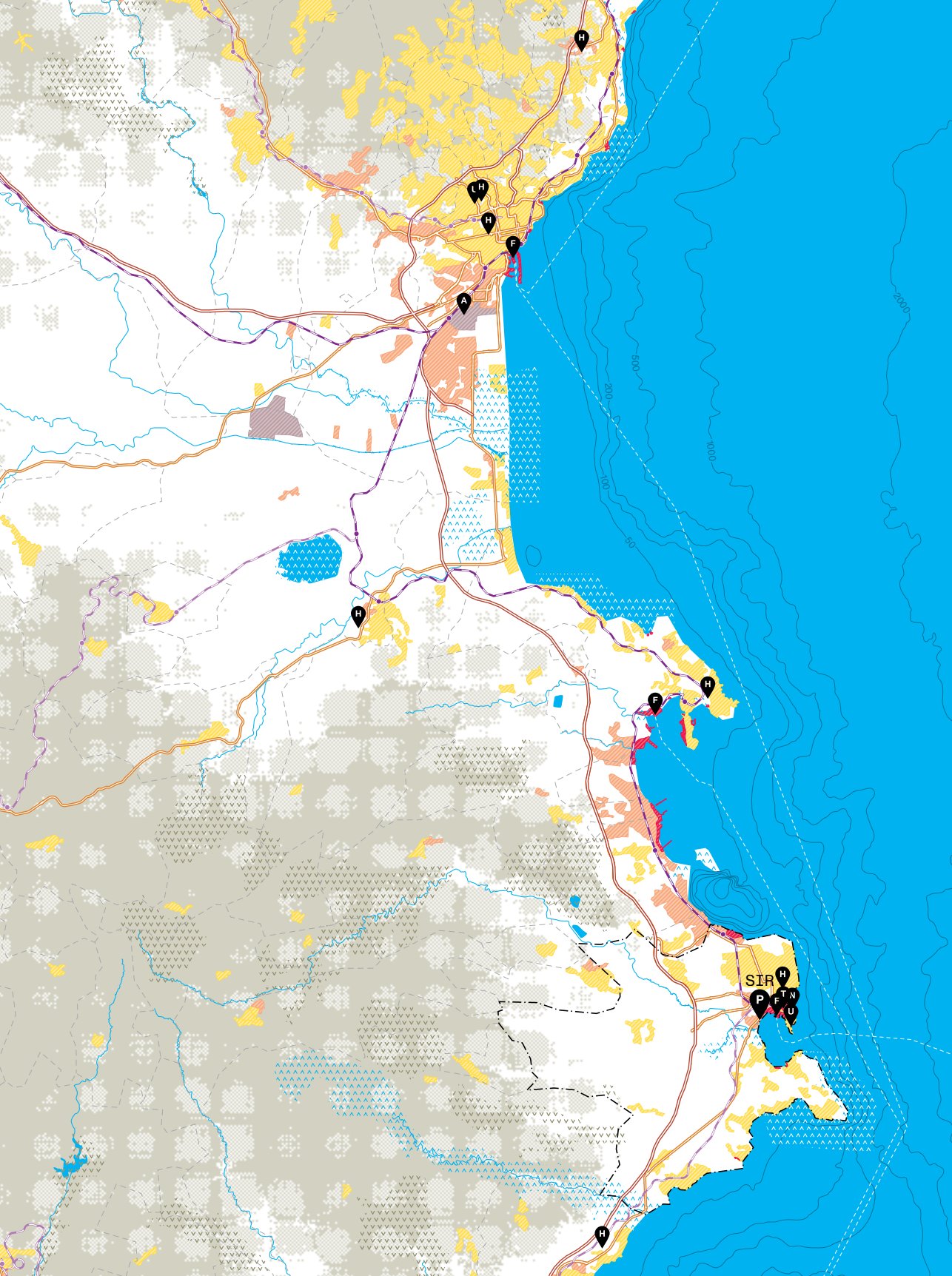
	Siracusa	SIR
→ Capital national (km)	→ Roma	764
→ Capital regional (km)	→ Palermo	262
Area (km²)		206
Built-up area (km²)		35
Density (per km²)		580
Population		119,710
Population structure (%)	15 / 65	13.6 / 64.6 / 21.7
Distribution built area (%)	B / I / P	69 / 29 / 2

TERRITORY

	Siracusa	SIR
Area (km²)		2,110
Density (per km²)		185
Population		391,400
Natura2000 (km²)	M / T	1,092 / 225






SIR
2000
500
200
100
1000
50

MSN
MLZ

Messina, IT
Milazzo, IT

Tyrrhenian Sea
Tyrrhenian Sea

PORT

MSN / MLZ (%) 98.9

100 1.1

	MSN	MLZ
Liquid	9	673
Dry bulk		7
Container		
Specialized		
General	53,379	2,661
Cruise ship	140	
Passenger	448	3,223
Other		4
Vessels	53,561	6,568

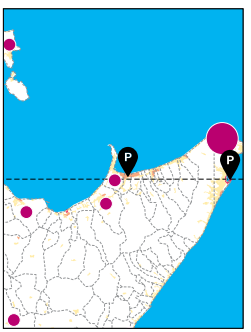
	MSN	MLZ
Liquid bulk		15,452
Dry bulk		17
Containers		
RoRo	7,293	
Other		
Cargo (t)	7,293	15,469
Passengers	11,669	471

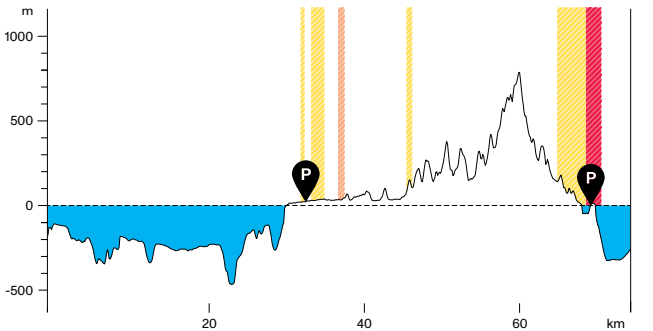
CITY

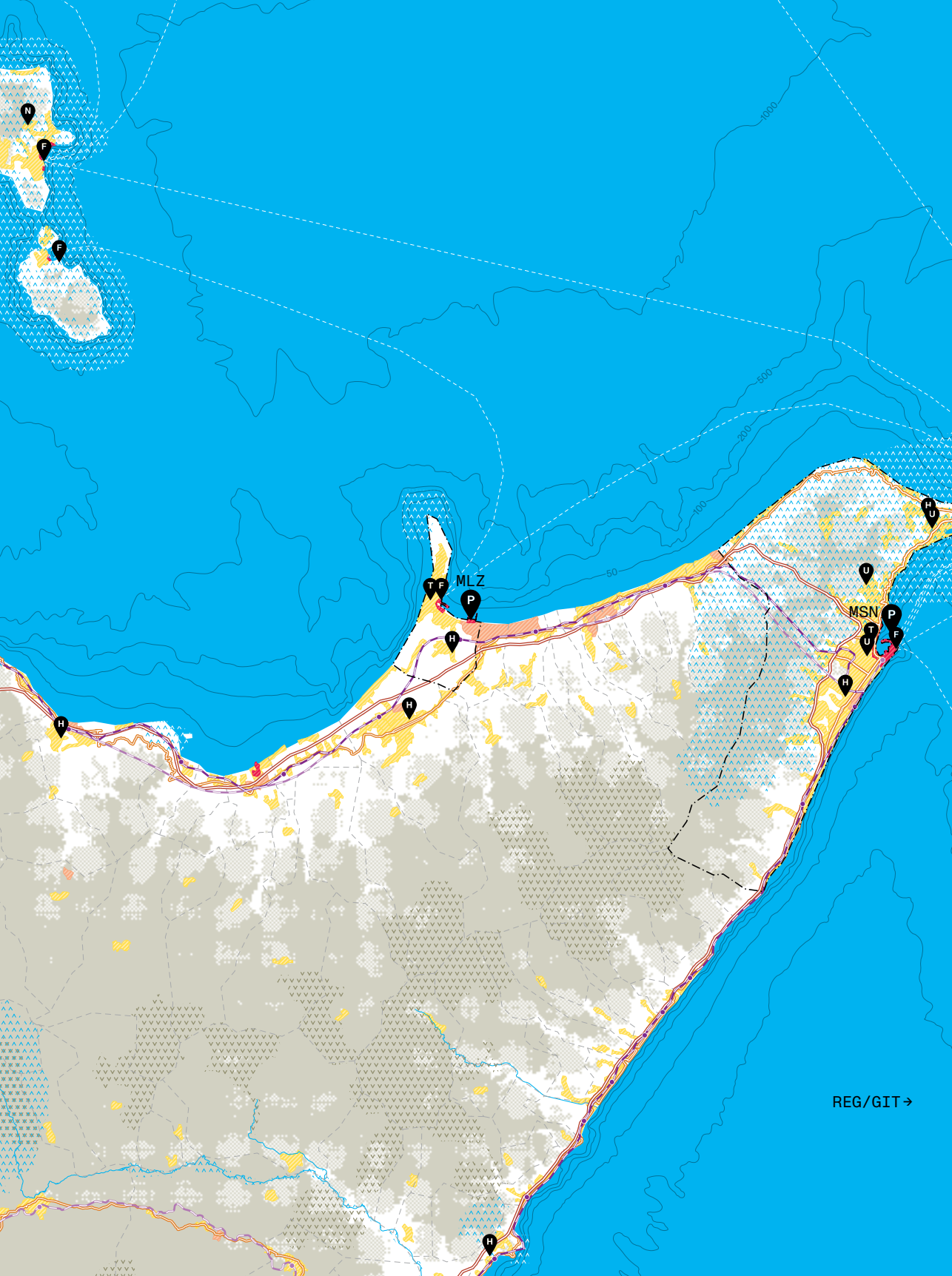
	Messina	MSN	Milazzo	MLZ
→ Capital national (km)	→ Roma	641	→ Roma	617
→ Capital regional (km)	→ Palermo	244	→ Palermo	209
Area (km²)		211		25
Built-up area (km²)		42		13
Density (per km²)		1,084		1,259
Population		229,280		31,028
Population structure (%)		15 65 12.8 64.7 22.5		17 65 12.8 66.5 20.7
Distribution built area (%)		B I P 94 3 3		B I P 66 33 1

TERRITORY

	Messina	MSN	Messina	MLZ
Area (km²)		3,247		3,247
Density (per km²)		191		191
Population		618,713		618,713
Natura2000 (km²)		M T 2,473 874		M T 2,473 874






MLZ
MSN
1000
500
200
100
50
REG/GIT→

GIT

REG

Gioia Tauro, IT
Reggio di Calabria, IT

Tyrrhenian Sea

Strait of Messina

PORT

GIT / REG (%) 97.7 2.3 100

	GIT	REG
Liquid	655	
Dry bulk	11	7
Container	1,363	
Specialized	97	
General	144	56,923
Cruise ship		11
Passenger		512
Other	8	
Vessels	2,278	56,934

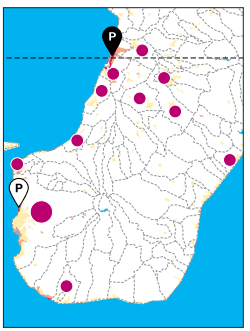
	GIT	REG
Liquid bulk	1,884	
Dry bulk	2,603	35
Containers	17,677	
RoRo	46	4,483
Other	484	
Cargo (t)	22,694	4,528
Passengers		10,884

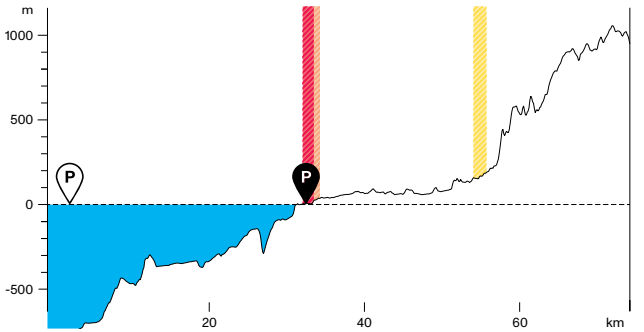
CITY

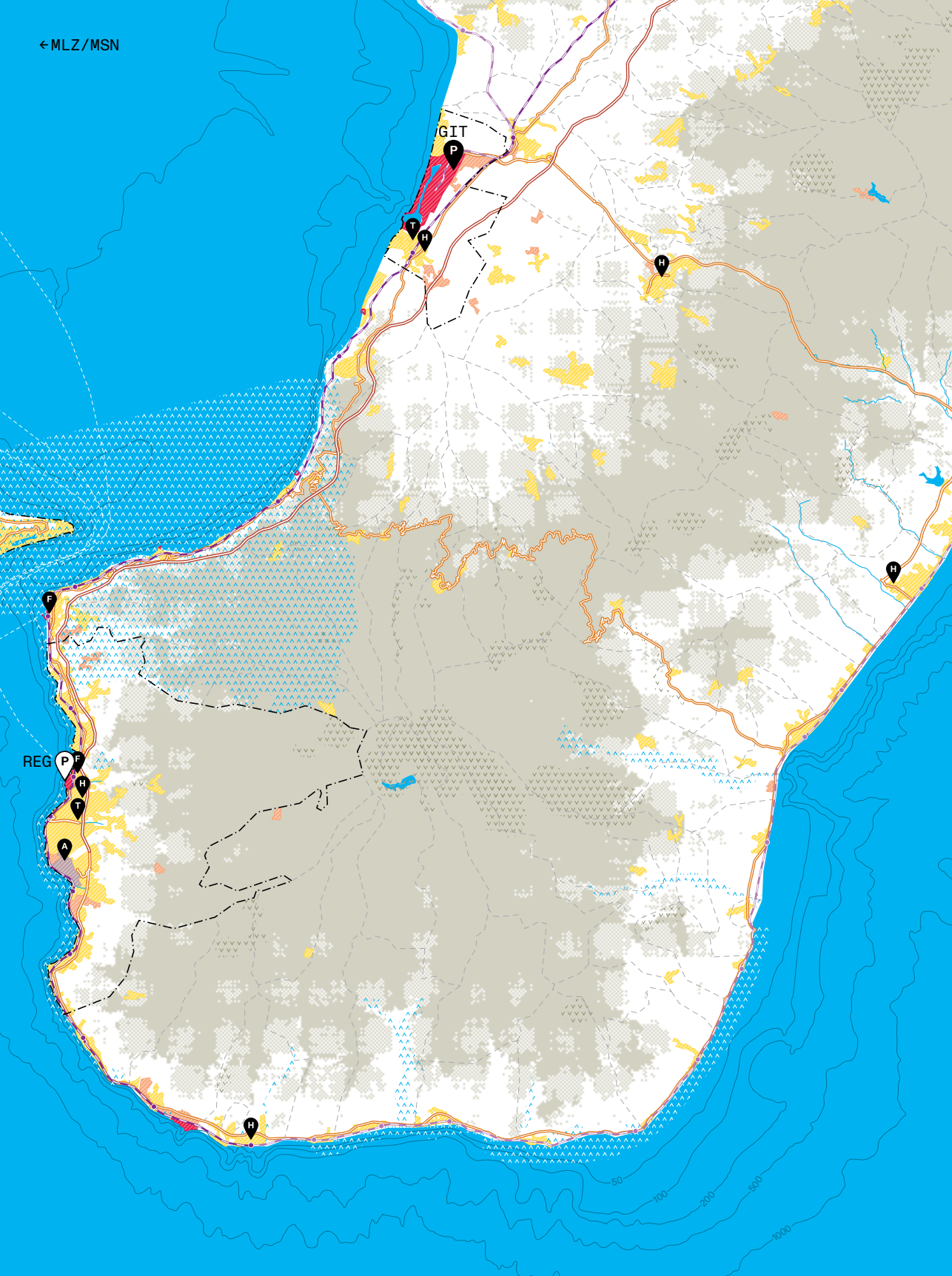
	Gioia Tauro GIT	Reggio di Calabria REG
→ Capital national (km)	→ Roma 630	→ Roma 651
→ Capital regional (km)	→ Palermo 286	→ Palermo 254
Area (km²)	38	237
Built-up area (km²)	16	40
Density (per km²)	531	744
Population	20,078	176,299
Population structure (%)	17 / 65 / 19.7 / 62.3 / 18.0	15 / 65 / 13.5 / 65.0 / 21.5
Distribution built area (%)	B / I / P 33 / 42 / 25	B / A / I / P 85 / 5 / 8 / 2

TERRITORY

	Reggio di Calabria GIT	Reggio di Calabria REG
Area (km²)	3,180	3,180
Density (per km²)	169	169
Population	536,487	536,487
Natura2000 (km²)	M 847 / T 181	M 847 / T 181






←MLZ/MSN
GIT
REG
50
100
200
500
1000

Taranto, IT

PORT

TAR (%)	34.0	24.6	40.7	0.7

	TAR
Liquid	343
Dry bulk	208
Container	12
Specialized	
General	568
Cruise ship	
Passenger	
Other	182
Vessels	1,313

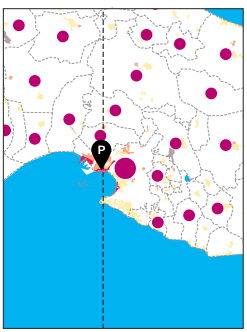
	TAR
Liquid bulk	3,925
Dry bulk	9,595
Containers	
RoRo	3,222
Other	865
Cargo (t)	17,608
Passengers	

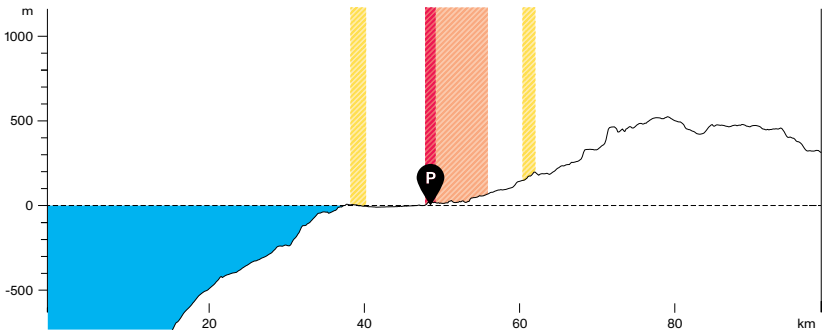
CITY

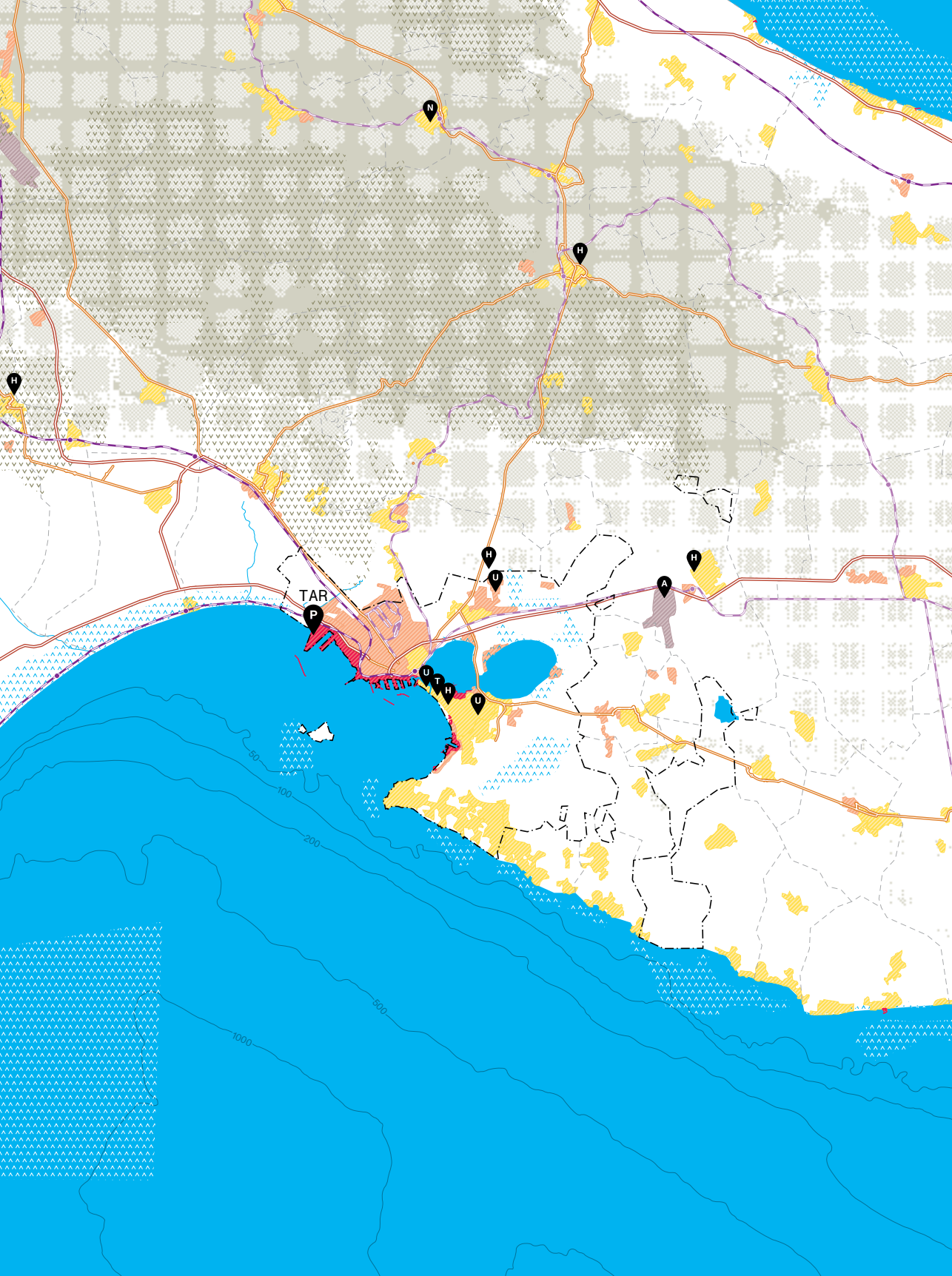
	Taranto
→ Capital national (km)	→ Roma 564
→ Capital regional (km)	→ Napoli 327
Area (km²)	247
Built-up area (km²)	83
Density (per km²)	781
Population	192,775
Population structure (%)	15 13.0 · 65 63.4 · 23.5
Distribution built area (%)	B 36 · I 52 · P 12

TERRITORY

	Taranto
Area (km²)	2,442
Density (per km²)	233
Population	568,258
Natura2000 (km²)	M 804 · T 1,755






TAR
50
100
200
500
1000

Ravenna, IT

PORT

RAN (%) 100

	RAN
Liquid	807
Dry bulk	607
Container	565
Specialized	44
General	1,325
Cruise ship	15
Passenger	
Other	719
Vessels	4,082

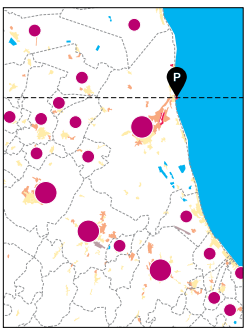
	RAN
Liquid bulk	7,970
Dry bulk	15,793
Containers	2,742
RoRo	2,740
Other	2,106
Cargo (t)	31,351
Passengers	

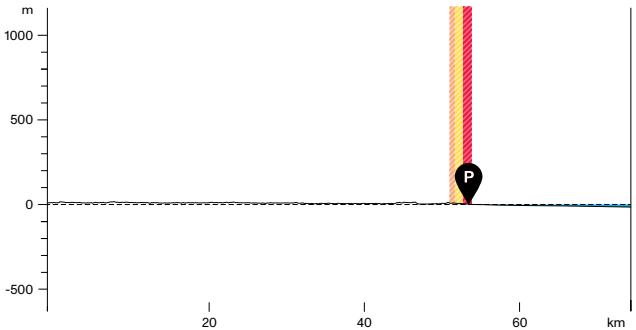
CITY

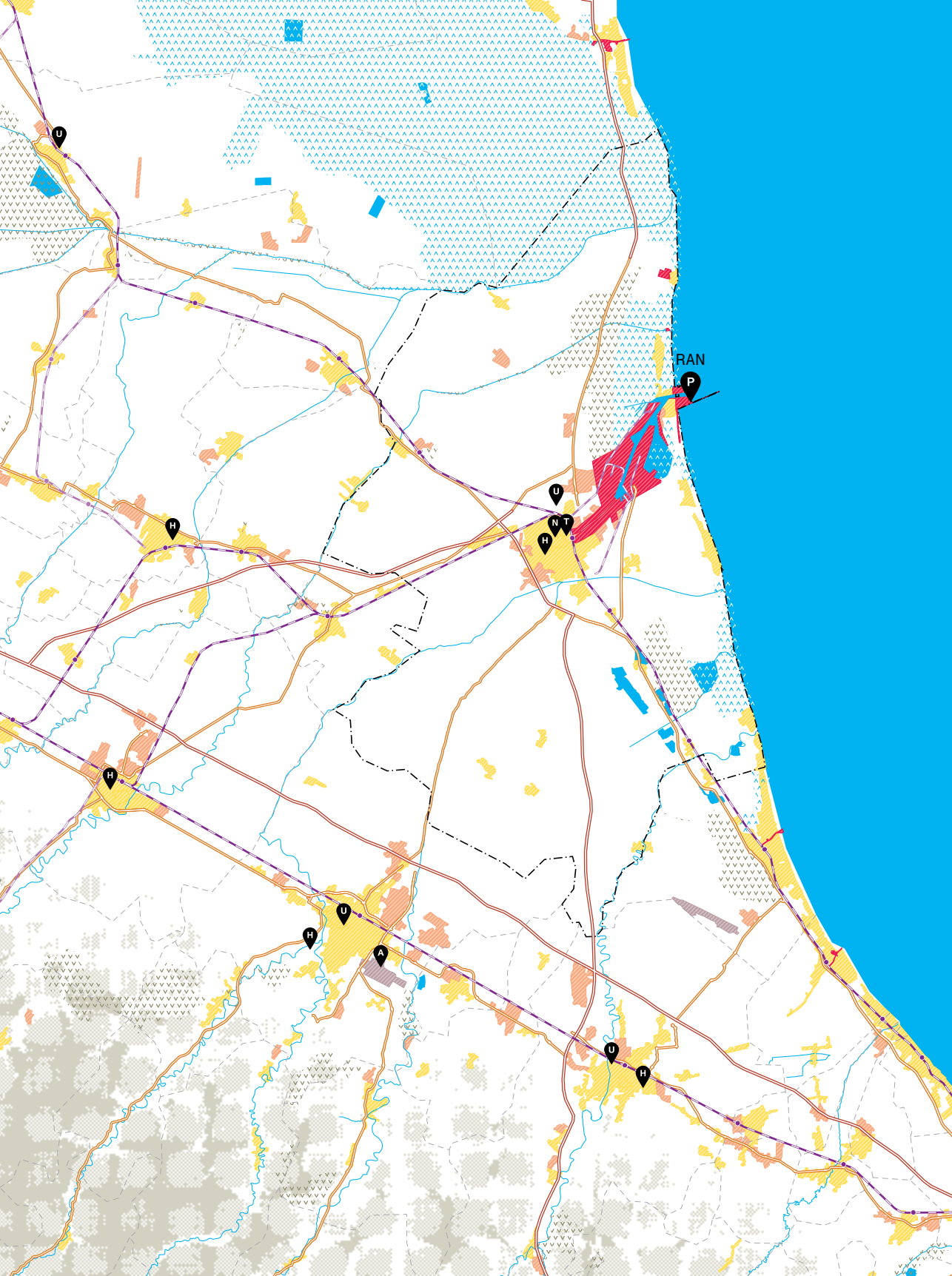
	Ravenna	RAN
→ Capital national (km)	→ Roma	594
→ Capital regional (km)	→ Milano	376
Area (km²)		653
Built-up area (km²)		58
Density (per km²)		243
Population		158,923
Population structure (%)	15 65	
	12.5 63.0 24.6	
Distribution built area (%)	B I P	
	66 31 3	

TERRITORY

	Ravenna	RAN
Area (km²)		1,859
Density (per km²)		209
Population		388,913
Natura2000 (km²)	M T	
	500 167	






RAN

VCE

Venezia, IT

Gulf of Venice

PORT

VCE (%)	76.4	1.4	2.3	2.0

	VCE
Liquid	639
Dry bulk	353
Container	945
Specialized	30
General	1,322
Cruise ship	350
Passenger	
Other	264
Vessels	3,903

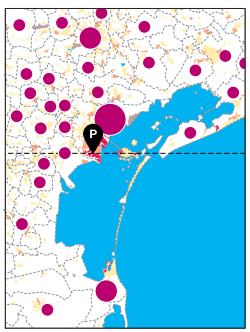
	VCE
Liquid bulk	8,447
Dry bulk	10,461
Containers	5,924
RoRo	2,186
Other	917
Cargo (t)	27,935
Passengers	854

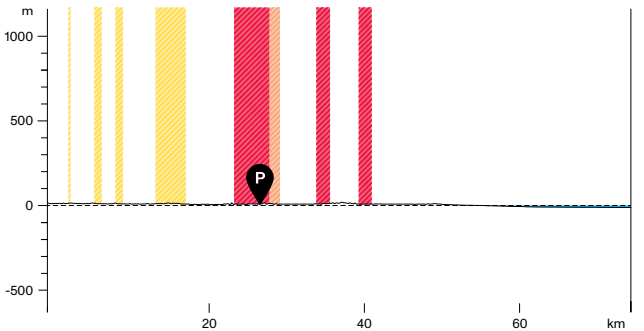
CITY

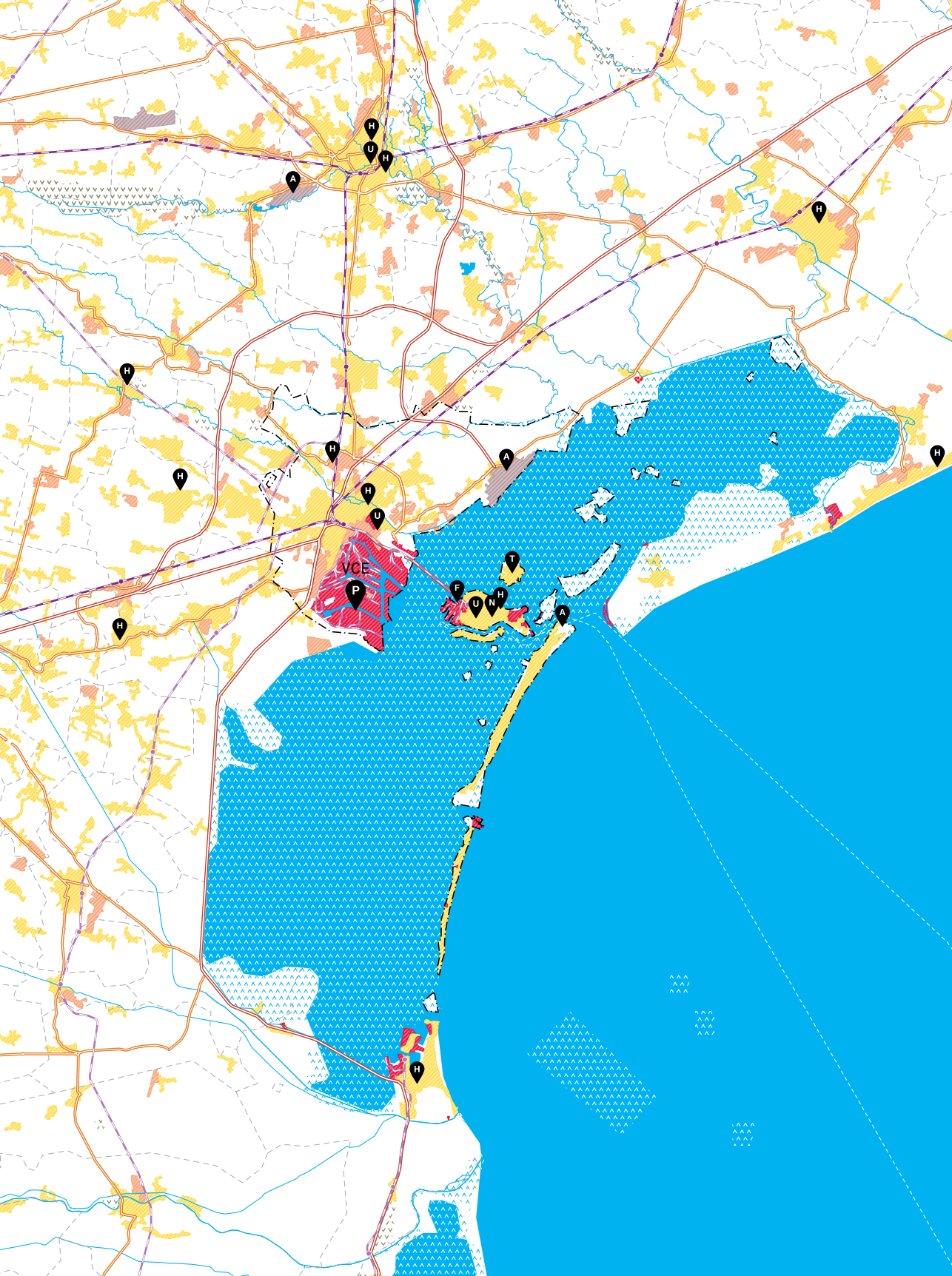
	Venezia	VCE
→ Capital national (km)	→ Roma	546
→ Capital regional (km)	→ Milano	347
Area (km²)		159
Built-up area (km²)		90
Density (per km²)		1,634
Population		259,961
Population structure (%)	15 / 65	11.5 / 60.8 / 27.7
Distribution built area (%)	B / A / I / P	65 / 2 / 18 / 15

TERRITORY

	Venezia	VCE
Area (km²)		2,003
Density (per km²)		425
Population		851,057
Natura2000 (km²)	M / T	1,908 / 49






VCE

TRS
KOP
MNF

Trieste, IT
Koper, SI
Monfalcone, IT

Gulf of Trieste
Koper Bay
Gulf of Trieste

PORT

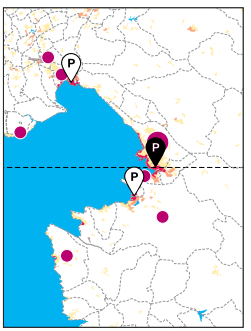
TRS / KOP / MNF (%) 83.7 92.7 0.5 14.7 7.3 5.0 1.2 95.0

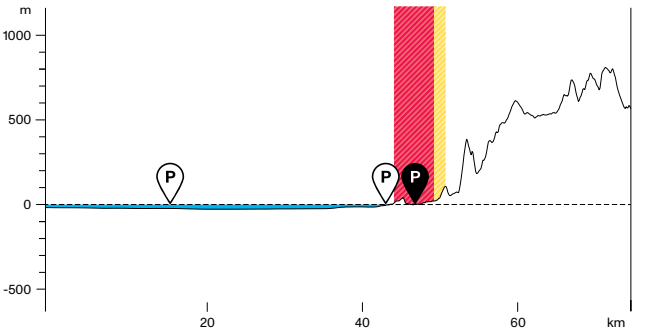
	TRS	KOP	MNF
Liquid	480	170	
Dry bulk	54	125	108
Container	654	621	10
Specialized		36	70
General	1,119	554	362
Cruise ship	55	72	
Passenger			
Other	168	71	152
Vessels	2,530	1,649	702

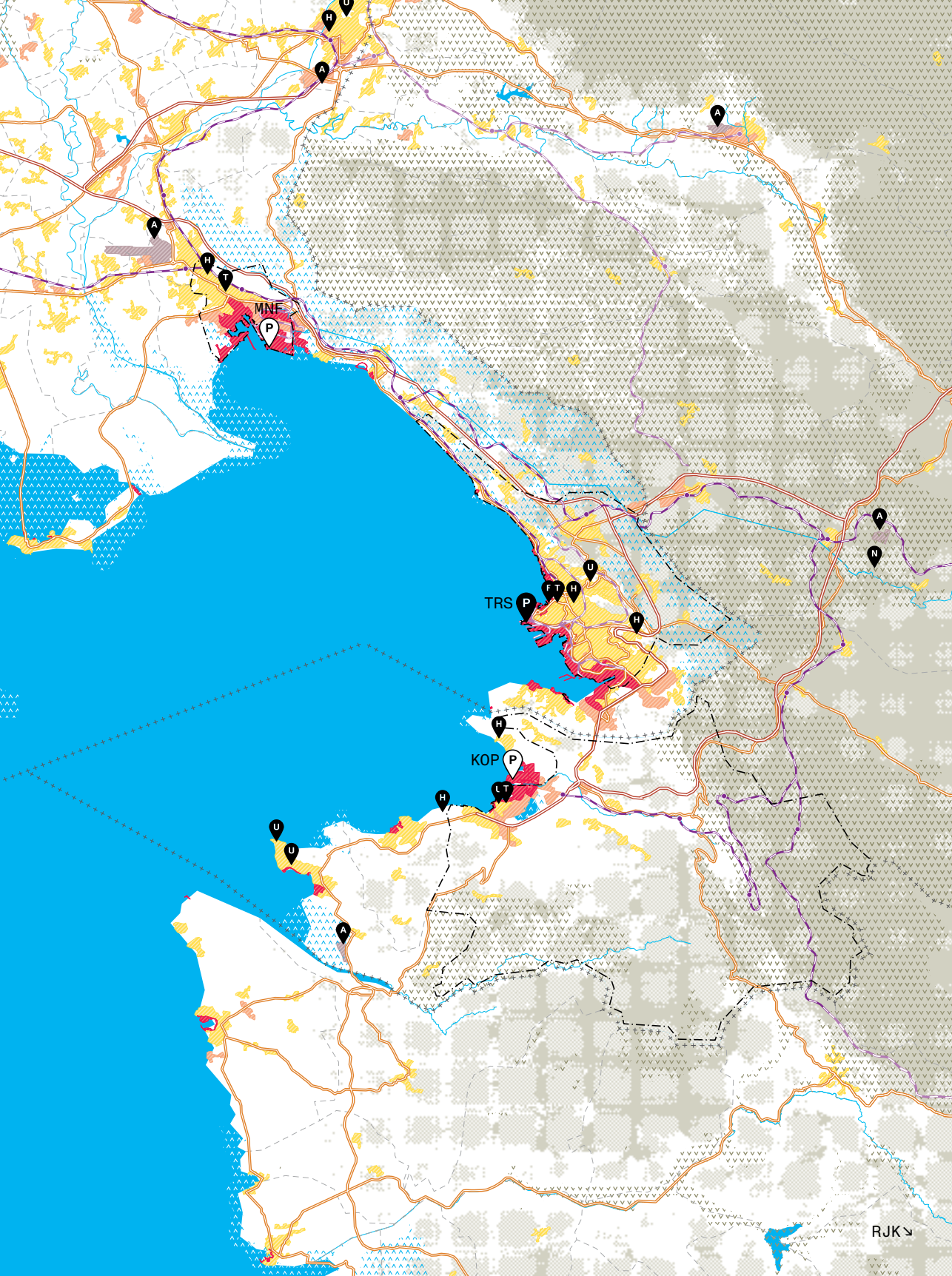
	TRS	KOP	MNF
Liquid bulk	39,883	4,288	
Dry bulk	4,300	6,368	3,725
Containers	7,886	8,970	1
RoRo	3,109	1,130	589
Other	5,154	1,359	170
Cargo (t)	60,332	22,125	4,485
Passengers		0	

CITY	TRS	KOP	MNF
	Trieste	Koper/Capodistria	Monfalcone
→ Capital national (km)	→ Roma 596	→ Ljubljana 117	→ Roma 612
→ Capital regional (km)	→ Venezia 165		→ Venezia 148
Area (km²)	85	303	20
Built-up area (km²)	37	12	19
Density (per km²)	2,386	172	1,389
Population	202,351	52,234	28,453
Population structure (%)	15 65 / 11.2 60.7 28.3	17 65 / 13.4 63.6 22.9	17 65 / 16.3 60.5 23.3
Distribution built area (%)	B I P / 75 2 23	B I P / 46 40 14	B I P / 48 20 32

TERRITORY	TRS	KOP	MNF
	Trieste	Obalno-kraška	Gorizia
Area (km²)	5,248	212	1,043
Density (per km²)	389	1,096	110
Population	2,039,608	232,405	115,016
Natura2000 (km²)	M T / 439 1,068	M T / 4,698 1,600	M T / 513 1,208






MNF
TRS
KOP
RJK↘

RJK

Rijeka, HR

Rijeka Bay

PORT

RJK (%) 15.4

5.0 79.6

	RJK
Liquid	26
Dry bulk	23
Container	311
Specialized	
General	138
Cruise ship	11
Passenger	1,144
Other	19
Vessels	1,672

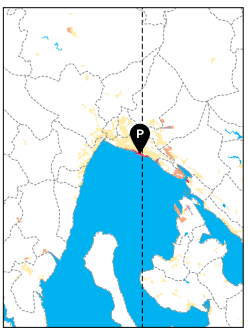
	RJK
Liquid bulk	
Dry bulk	198
Containers	2,741
RoRo	4
Other	413
Cargo (t)	3,356
Passengers	114

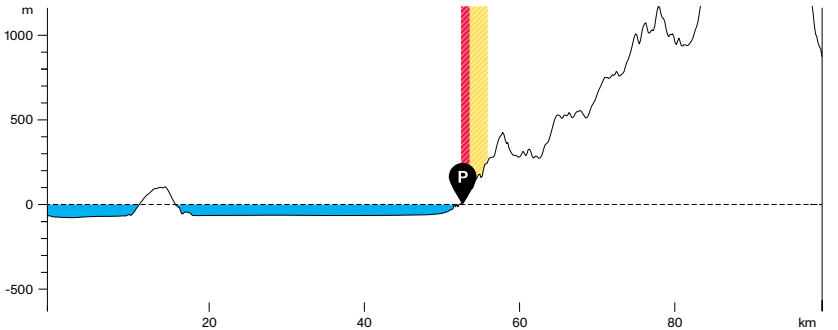
CITY

	Rijeka RJK
→ Capital national (km)	
→ Capital regional (km)	→ Zagreb 187
Area (km²)	43
Built-up area (km²)	11
Density (per km²)	2,697
Population	116,872
Population structure (%)	15 65 11.6 68.6 19.7
Distribution built area (%)	B I P 74 8 18

TERRITORY

	Primorsko-goranska županija RJK
Area (km²)	3,581
Density (per km²)	79
Population	283,405
Natura2000 (km²)	M T 9,499 1,842






↖TRS/KOP/MNF
RJK
50
50

SPU

Split, HR

Split Channel

PORT

SPU (%)

18.6 | 17.8 | 63.6

	SPU
Liquid	139
Dry bulk	222
Container	48
Specialized	
General	7,692
Cruise ship	274
Passenger	14,727
Other	43
Vessels	23,145

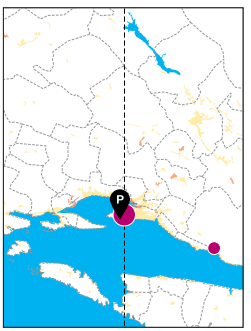
	SPU
Liquid bulk	546
Dry bulk	1,122
Containers	93
RoRo	111
Other	68
Cargo (t)	1,940
Passengers	4,958

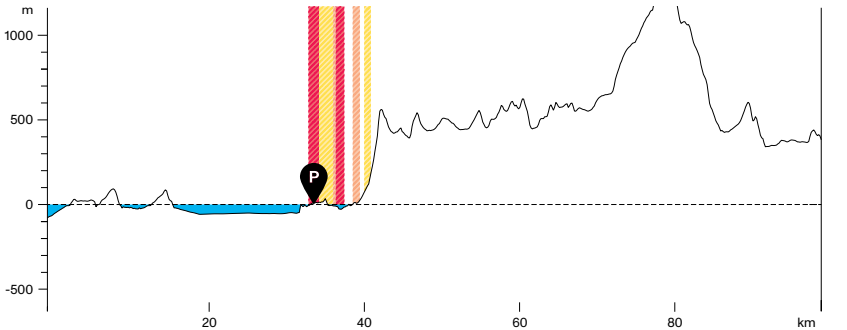
CITY

	SPU
	Split
→ Capital national (km)	
→ Capital regional (km)	→ Zagreb 364
Area (km²)	79
Built-up area (km²)	41
Density (per km²)	2,141
Population	169,489
Population structure (%)	15 65 14.9 68.2 17.0
Distribution built area (%)	B I P 90 7 3

TERRITORY

	SPU
	Splitsko-dalmatinska županija
Area (km²)	4,531
Density (per km²)	99
Population	447,723
Natura2000 (km²)	M T 5,230 1,365






SPU
50
50
50
100

PIR **Peiraias (Athens), GR** — Aegean Sea

PER **Perama, GR** — Aegean Sea

EEU **Elefsina, GR** — Aegean Sea

PORT

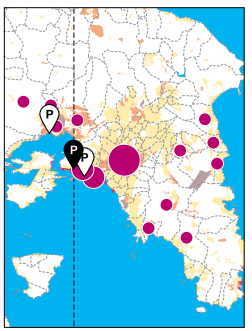
PIR/PER/EEU (%) 10.2 98.2 88.6 | 15.6 | 15.8 7.9 | 53.3 | 5.0 3.4 | 1.8

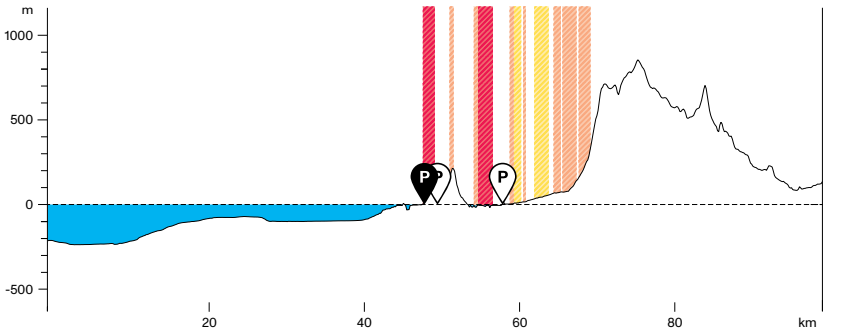
	PIR	PER	EEU
Liquid	615	1,083	1,437
Dry bulk	117		123
Container	3,481		
Specialized	966		194
General	11,460	33,129	559
Cruise ship	625		
Passenger	9,737		
Other			
Vessels	27,001	34,214	2,317

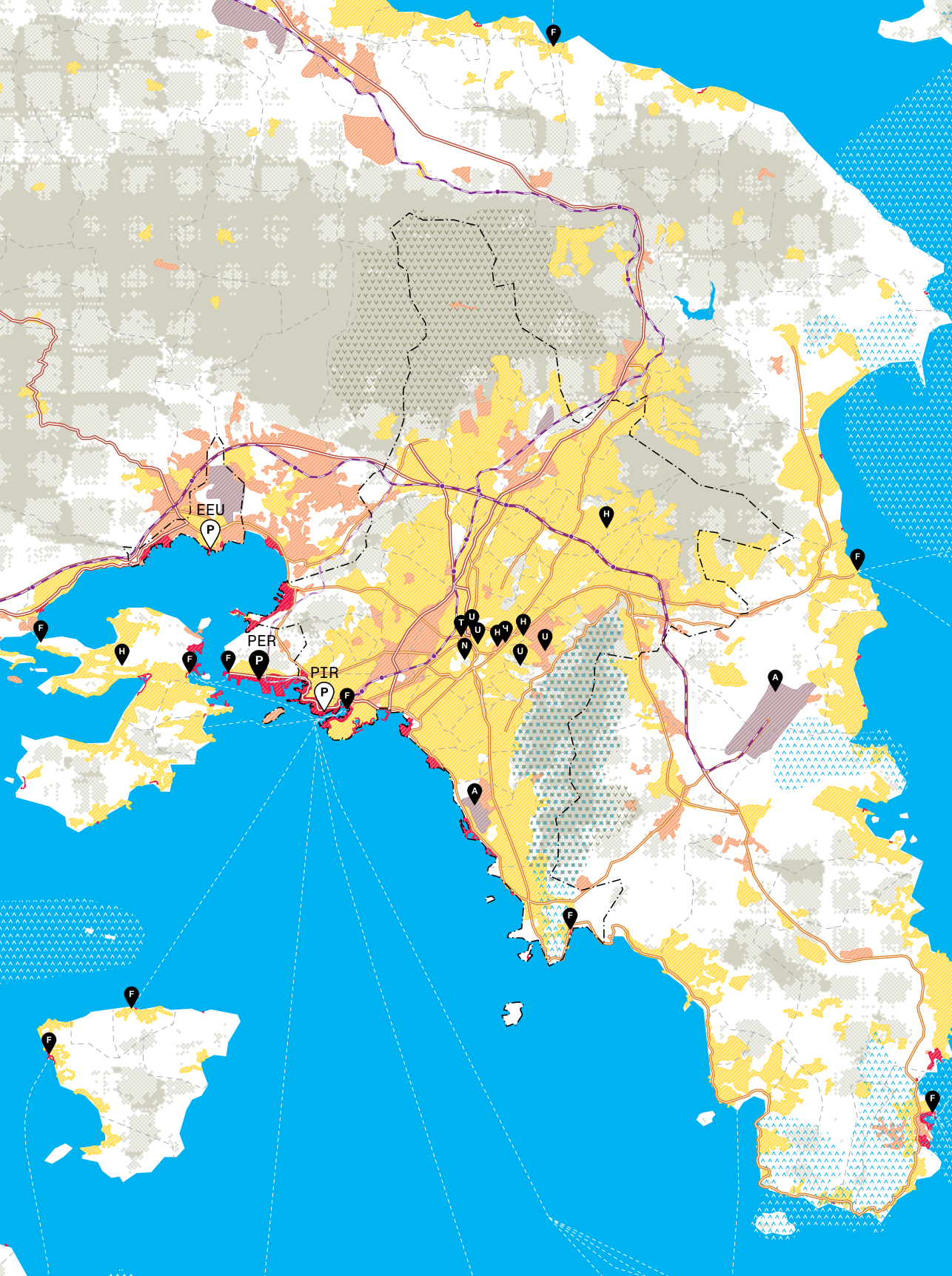
	PIR	PER	EEU
Liquid bulk	1,314	2,386	12,852
Dry bulk	353		2,733
Containers	49,866		
RoRo	5,276	1,313	46
Other	16		583
Cargo (t)	56,825	3,699	16,214
Passengers	9,931	6,939	0

CITY	PIR	PER	EEU
	Athens	Perama	Elefsina
→ Capital national (km)	→ Athens 0	→ Athens 9	→ Athens 18
→ Capital regional (km)	→ Thessaloniki 392		
Area (km²)	613	16	20
Built-up area (km²)	402	8	15
Density (per km²)	4,280	1,594	1,253
Population	2,622,404	25,389	24,910
Population structure (%)	15 65 / 13.1 69.0 17.9		
Distribution built area (%)	B A I P / 81 1 13 5	B I P / 40 5 55	B A I / 27 33 40

TERRITORY	PIR	PER	EEU
	Peiraias, Niso	Peiraias, Niso	Dytiki Attiki
Area (km²)	933.65	933.65	1,005.38
Density (per km²)	530	530	180
Population	494,908	494,908	180,485
Natura2000 (km²)	0	0	M T / 2,189 219






EEU
PER
PIR

Thessaloniki, GR

PORT

SKG (%) 100

	SKG
Liquid	405
Dry bulk	298
Container	337
Specialized	
General	534
Cruise ship	35
Passenger	
Other	
Vessels	1,585

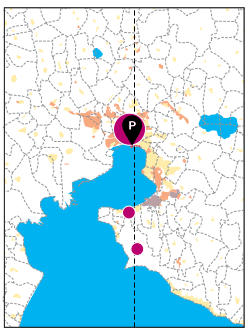
	SKG
Liquid bulk	6,618
Dry bulk	3,913
Containers	3,876
RoRo	
Other	737
Cargo (t)	15,172
Passengers	2

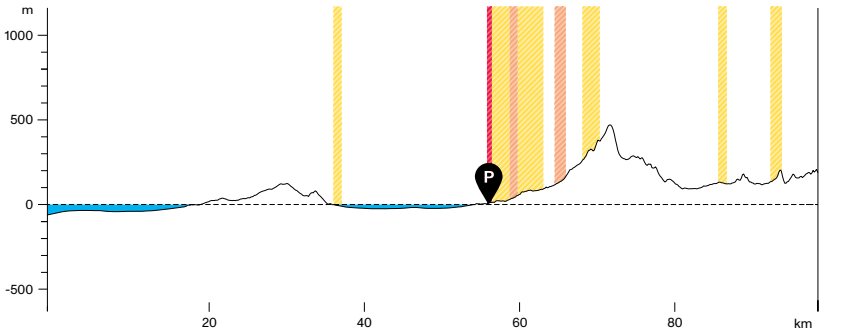
CITY

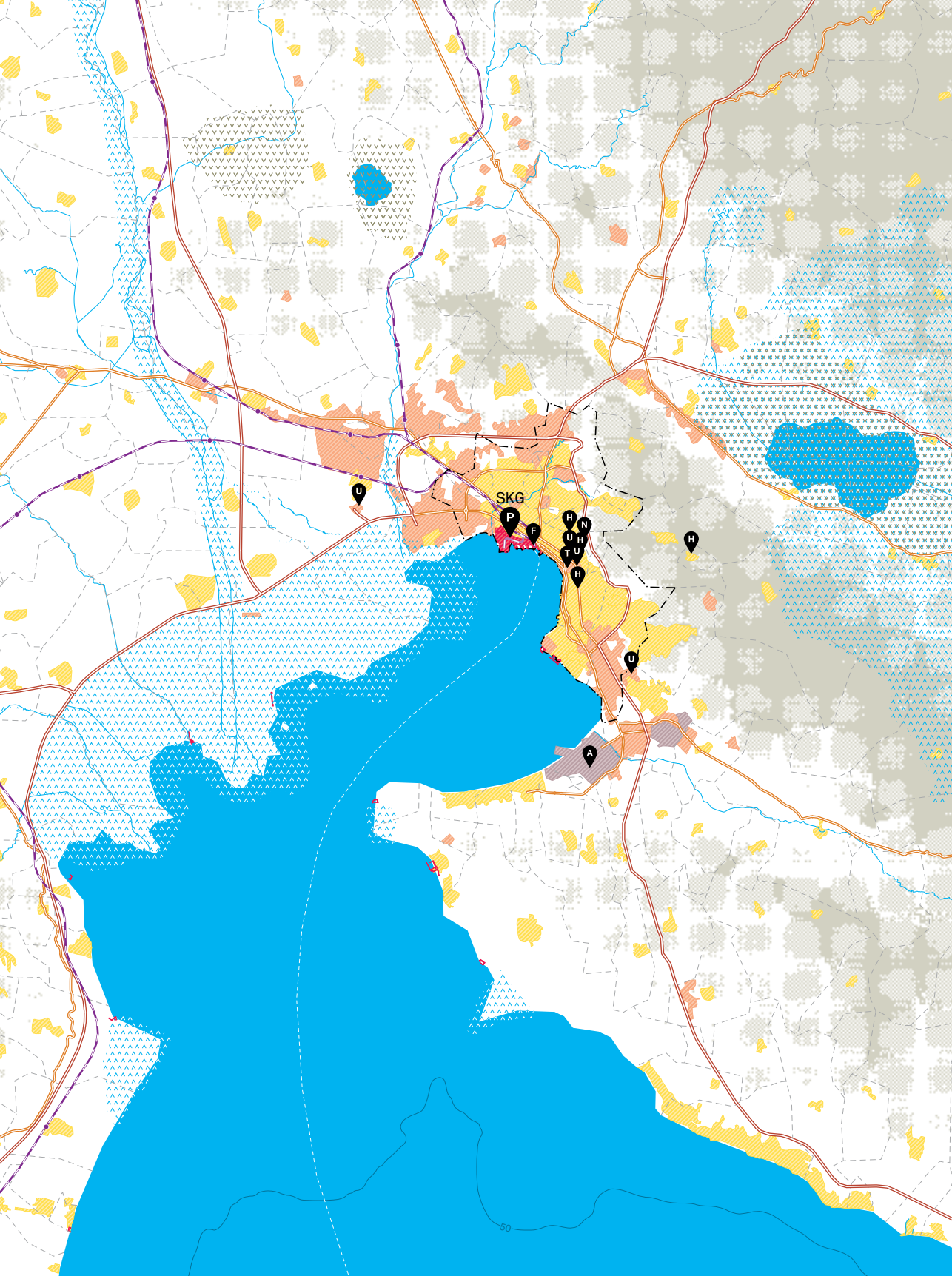
	Thessaloniki SKG
→ Capital national (km)	→ Athene 392
→ Capital regional (km)	
Area (km²)	113
Built-up area (km²)	97
Density (per km²)	6,697
Population	754,566
Population structure (%)	15 65 20 10.4 68.4 21.3
Distribution built area (%)	B I P 60 39 1

TERRITORY

	Thessaloniki SKG
Area (km²)	3,685
Density (per km²)	300
Population	1,104,690
Natura2000 (km²)	M T 2,496 353






SKG
50

III Interpreting

7 Planning Challenges and Opportunities in Port City Territories: an Analysis through Infographics and Maps

Abstract

Analysing 100 port city territories through maps and infographics, we can see both planning challenges and planning opportunities. Port authorities are continuously adapting the capacity of their ports to manoeuvre ever larger ships, handle more cargo and improve their operations. As a result, they are constantly seeking to move into adjacent empty land and taking over areas of unused land and water in the port city and port city territory, while moving out of other areas and sometimes giving land back to cities. The maps and infographics provide a basis for the interpretation of future spatial development, illustrating the relationship between the different parts of the port city territory, different relationships between port functions and their impact on the port city territory. Our maps mark the outlines between parts of the territory to help planners and authorities plan connections between ports and the European transport network of motorways and railways. Finally, citizens and planners alike can draw on these maps for co-design, negotiation or citizen science regarding the planning of the port, port city and port territory.

Introduction

Planning has long helped ports adapt to multiple changes, regardless of who or what the drivers of these changes were, whether technological, geostrategic or environmental changes in the PortCityScape or the changing role of governance and port authorities. On the sea, port authorities have added wharfs to accommodate more ships and moved to deeper waters to accommodate bigger ships; they have expanded their operational coastlines by constructing new structures, such as piers with higher platforms needed because of rising water levels caused by climate change. On land, port authorities have expanded into new territory: adding more rail lines for more and better access to the hinterland, and adding roads within the port territory to connect to national and international road networks.

Lucija Ažman-Momirski

The following sections explore current and upcoming transitions in port city territories that planners at all levels are facing. Where possible, these transitions are exemplified through our maps and infographics as shown on page 298. The maps can help identify past conditions, some future challenges, and opportunities for developments and strategic decisions. With cartographic features illustrating a territory's built-up area, the area occupied by the port and distribution of industry across the territory, the maps can help port city territory actors site new port areas without encroaching on protected areas or complicating the connection of ports to road and rail networks. Infographics and the data they contain offer an immediate territorial assessment tool planners can use to create scenarios for spatial variations in port city territories, and decision-makers (port authorities, states, city councils, citizens) can co-create new visions for port city territory change and support transformative port planning.

Maps and Infographics for Port Planning and Port City Territory Planning

The maps of the 100 leading port city territories provide information that planners can use at both the cartographic level and the analytical level. They show the relationship today between each port, port city and the rest of their port city territory (including areas on the coast) as a result of the history of port planning, urban planning and spatial planning over time. Though the spatial relations between the different parts of the port city territory vary widely among the 100 ports, we can discern some planning patterns in the maps. In some cases, the city is far from the sea and has no direct access to it at all (e.g., Ravenna, Valencia, Zeebrugge, Riga, Lübeck); usually such a city is connected to the sea by a river or marshes, so port infrastructure was planned and built inland rather than on the coast. Sometimes port development almost completely blocks access from the city to the water (e.g., Trieste, Rijeka, Esbjerg, Helsingborg, Klaipeda, Le Havre), while in other cases the contact between the urban area and the water is extended, and the city and the port share the land-water contact zone (e.g., Livorno). Planners in similar spatial predicaments can perhaps learn from each other.

The infographics offer additional information to planners on a port's predominant cargo, from dry bulk to liquid bulk to containers; on the size of a city, its built-up area and port area; as well as on the size of a territory and its degree of urbanization (e.g., according to Eurostat, a NUTS 3 territory can be urban, intermediate or rural). It is therefore possible to interpret the different relationships among port function and their impact on the port city territory, such as the handling of each type of cargo in relation to the size of the total area of the Local Administrative Unit (LAU) and use this information

for planning. In Le Havre, for example, liquid bulk throughput as shown by the infographic is 36.132 tons in an area of 86 km^2; in Milford Haven throughput is 34.051 tons in a much larger area of 1.623 km^2. This means that Milford Haven has 20 times less liquid bulk per square kilometre of total Local Administrative Unit area than Le Havre, which indicates that Le Havre is a *pollution-laden* problem location. Knowing these ratios, port and urban planners might limit industrial development in La Havre LAU, while in Milford Haven, LAU concerns about industrial pollution are not paramount and would not restrict expansion.

Planners may want to rely on the combined information from maps and infographics to limit the impact of port specialization and functions on the environment. They need to acknowledge the delineations between ports, city and territory, all of which are relevant to planning. In commercial ports, the boundaries of the port area are more clearly defined than in other kinds of ports, although those boundaries can also be permeable. Passenger ports are integrated into the city and are the domain of not only port planning, but also urban planning, as for example in Koper.[1] Cruise and ferry terminals, in particular, allow easy access to the city or its most interesting parts.

For future planning proposals, planners can look to the maps for the present configuration of port city territories. In Bristol, for example, the port is indistinguishably merged with other industrial areas; in Milford Haven, the port has expanded outside the old town into previously undeveloped land and has plenty of empty space for further expansion; while in Cairnryan, the port is located completely on its own, directly adjacent to protected areas. In Marseille, the port's further development is restricted by protected areas; in Ravenna, the port has encroached on the fabric of the city, ending the historical separation between the two areas. In Dublin, Clydeport, Liverpool, Helsingborg and Trieste, ports are completely enclosed and surrounded by the urban fabric. In each location there are thus different opportunities and challenges for the development of port city territory.

1 L. Ažman Momirski, 'Urban waterfronts in Koper: a comparison of spatial issues in the initial and current plans for Koper's port', *Annales: anali za istrske in mediteranske študije, Series historia et sociologia* 25/1 (2015), 19–32.

Land, Water and Air Access to the Port

Our maps show road and rail connections by land, access routes by water, and airports and heliports. They show one or more highway routes through each port city territory and one or more land road accesses to the port, such as in Zeebrugge, Hirtshals and Friederikshaven, Rotterdam, Bristol, Barcelona and Marseille; they also show where such accesses are missing, as in Helsinki, Szczecin, Haysham and others. Such information lets port planners strategically define the most favourable land and water entrances to the port, while planning in the larger port city area to enable access to the port.

All this is necessary, if not urgent, because traffic through the hinterland and the foreland to ports is increasing. There is little point in planning and making improvements to port facilities if land transport cannot handle the increased cargo flows. In one recent initiative to address the problem, the EU Commission connected selected seaports in the Trans-European Transport Network (TEN-T), a planned network of roads, railways, airports and waterways and also energy networks and telecommunications networks across EU territory. The TEN-T also provides grants to ports, maritime operators and hinterland transport operators to support infrastructure projects, mainly rail and inland waterways connecting ports with their hinterlands and basic port infrastructure.[2] Ports can also ask the EU Commission to update the TEN-T network, for example to extend the Baltic-Adriatic Corridor, which currently stops in Ravenna, to the entire Italian Adriatic-Ionian side of the Adriatic Sea. The maps do not only show the European infrastructural networks, but demonstrate that the main traffic bottlenecks in most ports are increasingly in the hinterland, not the coast. The maps help planners and authorities to suggest where the European transport network should run in the future.

Today, port authorities and state administration intend to integrate port and airport access,[3] which have been planned separately, and to locate airports close to ports in order to make supply chains more efficient and shorten freight transit times. Our maps identify airports near ports in the port city territories: in some cases, the airports are located either inside the port or they sit at its edge, as in Bremen, Belfast, Nantes Saint-Nazaire, Genova, Barcelona; in other cases, they are located close to the port, as we can observe in Bilbao, Le Havre and Cagliari. There are also some exceptions in which the airports are not present on the maps: on the Mediterranean, the airport of Toulon is far enough east of the city to fall outside the map; in La Spezia there is only one helipad near the port, and the nearest airport is in Pisa, which is beyond the map; for Messina and Milazzo the airport is across the channel in Reggio Calabria; and in the Baltic Sea we cannot see airports at all for Sillamäe, Skoldvik, Kalundborg and Fredericia. This means that the infrastructural links of the port city territory effectively extend beyond the map section.

Infrastructural access to the port goes beyond the land side. Planning for water entrances has to take into account sea depths, not only in the approach to the port but in the port itself, where dredging usually removes underwater sediments to accommodate larger vessels. In addition, maritime traffic also shapes port planning for access. The infographics show the total number (in thousands) of vessels and percentage of vessel types calling at each port from Eurostat Maritime transport data in 2019 (vessels in main ports by type and size of vessels). For example, maritime traffic is

2 European Commission, 'Ports' (2022). Online. Available HTTPS: https://transport.ec.europa.eu/transport-modes/maritime/ports_en.

3 J.-P. Rodrigue, *The Geography of Transport Systems* (New York: Routledge, 2020).

heaviest in the port of Santa Cruz de Tenerife in Western Waters, in Reggio di Calabria in the Mediterranean Sea, in Rotterdam in the North Sea and in Helsingborg in the Baltic Sea. Such information complements the view of the maps, which indicate the directions from which ships arrive to the port.

Environmental Issues

Both our infographics and our maps highlight environmental challenges; the first identifies the total area of terrestrial and marine Natura2000 sites in figures and the second the presence or absence of protected areas in the port city territory. The Organisation for Economic Co-operation and Development (OECD), which is an international organization working to set evidence-based international standards and find solutions to a range of social, economic and environmental challenges, defines three subcategories of environmental harms associated with ports:[4] those caused by port activities, those caused at sea by ships entering the port, and emissions from intermodal transport networks to the hinterland. Port planners and port authorities pay close attention to these harms, and to the encroachment of ports on protected areas, and accordingly take special measures in planning. As part of preparing a master plan, experts from different disciplines put together a comprehensive environmental impact assessment—aimed at preventing or reducing the harmful effects of planned activities on the environment and their consequences. These findings must be considered in the planning process. We can conclude from the maps, for example, that planners will have to take extra care in the port of Swinoujscie in Baltic Sea, which is in a difficult situation in terms of further spatial growth and planning, because it is surrounded by marine Natura2000. Similarly, most of the area around the port of Antwerp and the port of Bremen in the North Sea is protected by Natura2000 Terrestrial. Such proximity does not necessarily mean that ports cannot expand. The master plan for the port of Koper included restoration of habitats at its north side that would be damaged by port expansion. This was part of the detailed and in-depth evaluation that won the natural heritage and hydrology sectors' approval to build a third container port pier.

In many port city territories, the energy crisis has made energy production a top priority, pushing port authorities to search for alternative energy sources and planners to implement them in new designs. Another response to the crisis is European circular economy policy, which mandates that ports reform their organization of production and consumption to save energy, but the question remains how to implement the measures. One possible solution in the port city territory, with its concentration of different industries, is industrial symbiosis. This is a concept in industrial ecology (IE) that looks at the stages of the production processes

4 OECD, 'Environmental impacts of ports' (2022). Online. Available HTTPS: https://www.oecd.org/greengrowth/greening-transport/environmental-impacts-of-ports.htm.

of goods and services, and attempts to mimic a natural system through the conservation and reuse of resources.[5] IE is based on the concept of the circular economy, in which different entities form networks of actors to share resources such as materials, energy, information, services or technologies. Eco-industrial parks hosting these activities could be built in areas where ports intersect with industrial areas, as is the case in the port of Rotterdam, where the industrial waste heat of the port refinery fuels the Rotterdam city district heating system.

Waste management is one of the most important planning and environmental issues in port city territories, as resource-intensive industries here benefit from the proximity of ship loading and unloading; but this process cannot be read directly from the maps or infographics. Ports are changing their approach towards waste management. Some authors propose master plans for waste management measures and methods in ports, reporting observed pollution and defining a model for handling the waste, as they have in the Croatian ports Rijeka and Split.[6] A team of French researchers have produced an international overview of port industrial ecology initiatives, looking methodologically at case studies, types of port regions (following the typology of Ducruet et al.)[7] and port IE actors, including port authorities, local authorities, national governments, companies, and researchers.[8] The authors found that many ports in Europe are pursuing IE initiatives, including ports in the Netherlands, Belgium, the UK, Spain and France. The research revealed that ports can make an important contribution to the development of IE by including industrial symbiosis in future transitions.

Partnerships in Planning that Facilitate Transitions: Co-design, Negotiation, Citizen Science

To contribute to contemporary transitions, planners at all levels in port city territories can form multilateral partnerships and collaborations with local people and organizations: co-designing with stakeholders to ensure that outcomes meet their needs; negotiating to reach agreements on plans; and in citizen science, collaborating with citizens on scientific research projects to help solve world problems. In all such partnerships, planners should treat community members as equal collaborators in the planning process. For the most part, however, the foundations for such collaborations, relevant institutions and tools still need to be established in many port city territories.

An example of *co-design* can be found in the port of Hamburg: a maritime laboratory called homePORT, in which the port, citizens, other port stakeholders, research institutions and start-ups work together to design changes in the port.[9] Specifically, this campaign asks what will happen to port areas after the end of the container era, identifies alternative scenarios for the use of those areas and

5 M.R. Chertow, 'Industrial Ecology in a Developing Context', in: C. Clini, I. Musu, M. Lodovica Gullino (eds), *Sustainable Development and Environmental Management* (Dordrecht: Springer, 2008).

6 P. Badurina, M. Cukrov and Č. Dundović, 'Contribution to the implementation of "Green Port" concept in Croatian seaports', *Scientific Journal of Maritime Research* 31 (2017), 10–17.

7 C. Ducruet, H. Itoh and O. Joly, 'Port-region linkages in a global perspectives', *MoLos Conference 'Modeling Logistics Systems'* (Le Havre, 2012).

8 J. Cerceau, N. Mat, G. Junqua, L. Liming, V. Laforest and C. Gonzalez, 'Implementing industrial ecology in port cities: international overview of case studies and cross-case analysis', *Journal of Cleaner Production* 74 (2014), 1–16.

9 'homePORT'. Online. Available HTTPS: https://www.homeport.hamburg/.

simulates approaches for a circular economy with zero-emissions. *Negotiations* do not take place very often in port city territory planning; the restructuring and redevelopment of a port in Copenhagen is among a handful of examples of its complexity and success. Important components are participants' learning processes, cooperation and continuous adaptation of approaches to achieve better solutions.[10] In *citizen science*, citizens can be involved at any stage of planning, from defining questions, to developing assumptions, to discussing the results and answering new questions.[11] Citizens can then also initiate projects to improve local spaces. There are many opportunities for planners and communities in port city territories to use citizen science and its findings to influence local policymakers to improve public health, quality of life, social cohesion and awareness of local issues and networks.

10 L. Ažman Momirski, *Obalne preobrazbe: Izola vzhod* (Ljubljana: Fakulteta za arhitekturo, 2013).

11 'What is citizen science?'. Online. Alvailable HTTPS: https://www.citizen-science.at/en/immerse/what-is-citizen-science.

Conclusions

Our maps and infographics offer all stakeholders the opportunity to examine individual case studies in depth and with regard to the specifics of their own location and situation, as well as to identify general approaches to addressing planning issues. Port planning practice shows that no single authority controls the form of the port city territory, or its components of hinterland, foreland, port city and port. Rather, that form is shaped by a mixture of bureaucracy and market forces.[12]

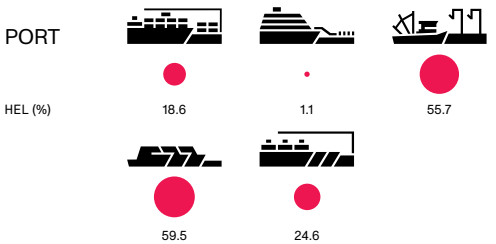
New partnerships in planning will change and shape port city areas in the future that are not yet visible on the maps. Global climate change, to which by far the largest contributors are fossil fuels—coal, oil and gas—and sea level rise, caused by global warming, are the latest in the series of changes. Other challenges and tensions facing ports and their territories are the sustainability of spatial development in line with the Sustainable Development Goals,[13] such as Goal 9—developing high-quality and reliable infrastructure—or Goal 13—strengthening resilience and adaptive capacity. Security issues caused by fears of piracy, armed robbery incidents and military combat increase the importance of these issues. Accordingly, the resulting changes are more complex than ever and the interests at play among port city territory actors have multiplied and become more diverse. For example, to become sustainable, ports must incorporate renewable energy and green chemistry, reducing or eliminating the use or generation of hazardous substances. These are changes that can only be achieved and implemented through collaborative planning by all stakeholders.

12 L. Ažman Momirski, 'The Port of Koper: the youngest modern North Adriatic port', *Portus* 4/7 (2004), 70–75.

13 United Nations, 'The Sustainable Development Goals' (2022). Online. Available HTTPS: https://www.un.org/sustainabledevelopment/.

Helsingborg, SE

Øresund



	HEL
Liquid	194
Dry bulk	150
Container	580
Specialized	
General	24,793
Cruise ship	
Passenger	4,220
Other	5
Vessels	29,942

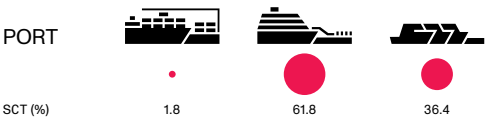
	HEL
Liquid bulk	757
Dry bulk	707
Containers	2,170
RoRo	5,052
Other	153
Cargo (t)	8,839
Passengers	7,153

CITY	HEL
	Helsingborg
→ Capital national (km)	
→ Capital regional (km)	→ Stockholm 487
Area (km²)	347
Built-up area (km²)	44
Density (per km²)	413
Population	143,304
Population structure (%)	15 65 17.8 63.4 18.7
Distribution built area (%)	B I P 72 22 6

TERRITORY	HEL
	Skåne län
Area (km²)	11,363
Density (per km²)	120
Population	1,362,164
Natura2000 (km²)	M T 2,920 351

Santa Cruz de Tenerife, ES

Atlantic

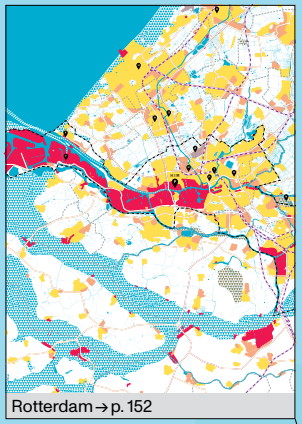


	SCT
Liquid	814
Dry bulk	149
Container	907
Specialized	18
General	6,124
Cruise ship	511
Passenger	7,623
Other	
Vessels	16,132

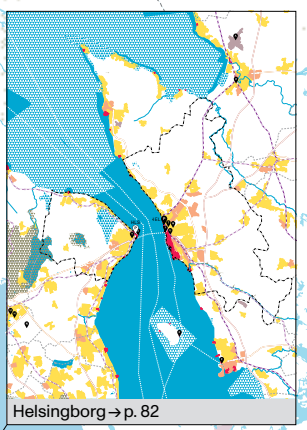
	SCT
Liquid bulk	4,812
Dry bulk	422
Containers	2,170
RoRo	2,338
Other	46
Cargo (t)	9,788
Passengers	5,615

CITY	SCT
	Santa Cruz de Tenerife
→ Capital national (km)	→ Madrid 2136
→ Capital regional (km)	→ Las Palmas 101
Area (km²)	253
Built-up area (km²)	58
Density (per km²)	1,445
Population	364,815
Population structure (%)	15 65 12.8 69.8 17.4
Distribution built area (%)	B A I P 77 4 14 5

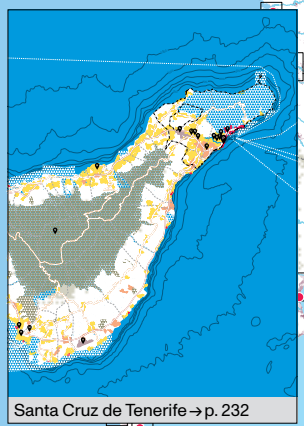
TERRITORY	SCT
	Tenerife
Area (km²)	2,035
Density (per km²)	467
Population	949,471
Natura2000 (km²)	M T 2,876 675



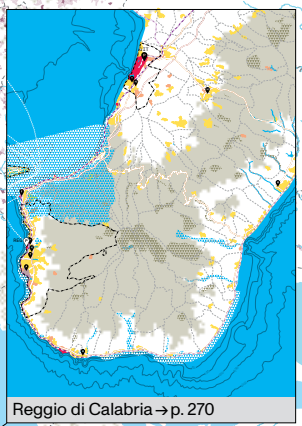
Rotterdam → p. 152



Helsingborg → p. 82



Santa Cruz de Tenerife → p. 232



Reggio di Calabria → p. 270

8 What Can We Learn from the Maps and Mapping Process about European Port City Territories?

Abstract

Maps and infographics that translate statistical and spatial data into visual forms offer a wealth of information that requires careful analysis and provides a foundation for research, planning, and sustainable development. This chapter first discusses some initial insights on the benefits of mapping port city territories in terms of the natural geographical conditions on the edge of land and water, and of man-made spatial patterns of port city relations and urban forms. These spatial conditions, clearly identifiable on the maps, give us insight into the spatial and institutional structures that characterize port city territories; thus mapping can help us address future research questions on spatial development strategies or challenges such as energy transition, mass migration and climate change. Based on the observations made during data research, we then discuss insights into data unavailability that have affected the mapping and the mapped results, and address limitations of data and lack of (detailed) data. The chapter concludes that geo-spatial mapping and other visualizations such as infographics can play a key role in the study of port city territories, and in port planning, illuminating complex governance structures and showing the different stakeholders involved in port city territories, and how the natural geographical landscape affects the performance of ports. But we also call for more, and more specific, data.

Introduction

Port city territories all host the same flows of goods and people, yet, as our atlas shows, they are distinctive and complex ecosystems that have evolved over time, connecting natural features of sea and land, urban structures focused on the port and maritime activities, complex governance structures, and actors with different interests and means of power. The uniform mapping of port city territories helps us understand these overlapping patterns, and allows us to describe, define and ultimately classify port city territories according to their spatial characteristics. By looking at (urban)

Yvonne van Mil

morphological patterns, the maps can help us answer questions about port city territories, as these first insights into the spatial and institutional structures of port city territories exemplify.

The chapter starts with the question: looking at the maps, how can we interpret the morphological patterns in the natural topography and geography of port city territories, and in their man-made features such as urban settlements and the port city relation? Second, it addresses what the complexity of data obscures. While working with European datasets, we encountered several challenges. Mapping-based research largely depends on the availability and structure of (existing) datasets and on standardized administrative units. Uniform maps allow for comparison, but also level out individual particularities. We conclude with a call for more available and more detailed data, and a greater awareness of both the possibilities and the limitations of geospatial data.

Deriving Lessons from Complex Spatial Data: How to Interpret the Morphology of 100 Port City Territories

In reality, port city territories can stretch (far) beyond our 75 by 100-kilometre map-cut-out, but this framing makes it possible to explore complex spatial and institutional relationships, as well as spatial or urban patterns. In the approach chosen for this chapter and applied in the maps on page 308, we highlighted specific map layers to explore select spatial characteristics of port city territories for specific analytical purposes. In this case we chose to focus on the natural geographical conditions on the edge of land and water, and patterns of the man-made relation between port and city, and urban patterns. These morphological patterns allow us to predict some spatial planning challenges; they also illuminate the institutional structures that influence port city territories and point to planning strategies that could improve the performance of the port.

Ports in their Natural Morphology of Land and Water

While we focus on Europe as a whole, our maps also highlight national differences. This becomes particularly clear when examining the length of the coastline in relation to the number of leading ports on our list. Countries with long coastlines have more leading port city territories than those with short coastlines—though the amount of transhipment can be much less. Rotterdam, for example, transits a larger tonnage of cargo per year than all 14 Italian leading port city territories (containing 19 ports) combined. This may be the result of national policies or path dependencies, but we found that natural geographical conditions are also a factor. Increased access to maritime waters, and thus more opportunities for port development, is not a precondition for success. The naturally present limitations and opportunities of such access can also be determinant. By examining the natural morphology of land and water,

we observe explainable differences between the four maritime waters: a maritime perspective is more insightful than a national view. France, for example, has eight leading port city territories across three waters. Almost all the ones on the Atlantic coastline (Le Havre, Nantes Saint-Nazaire and Bordeaux but not La Rochelle) are situated in an estuary or on a river, which may be due to the rougher conditions of the Atlantic Ocean. In the Mediterranean Sea, with calmer seas, fewer major rivers and deltas, but more mountains and an irregular coastline, the ports (Marseille and Toulon) are situated in a natural embayment. Dunkirk and Calais are situated on the relatively shallow North Sea where there are multiple deltas and major rivers, but these ports are in a (narrow) strait and have an engineered coastline, as natural protection to safely load and unload ships is lacking. Similar patterns in morphological conditions can also be discovered in other port city territories.

Some patterns are consistent for specific natural morphological conditions. Ports located along a coast (such as Dunkirk or Naples), often block the city's access to the sea. Such a situation can be advantageous for deep-sea ports but can be prone to disasters. Public resistance to further development is also more likely. Ports on rivers and estuaries face different challenges and have different opportunities. They can be developed on both sides of a river and have greater access to nearby territory (such as Antwerp or Hamburg), but face the risk of flooding from the hinterland and from the sea. Similar to ports on a bay (Dublin), the need for continuous dredging causes problems in terms of ecology. Ports on islands (Las Palmas) require good transport connections with the mainland, as a sizeable hinterland is often lacking.

If we read the maps along with port statistics, it becomes clear that the natural geography of port city territories affects port performance as well as the quantity of throughput: of the 15 largest cargo ports in Europe, 11 are located in an estuary or on a river, including the five largest cargo ports in Europe: Rotterdam, Hamburg, Antwerp, Amsterdam and London, all in the North Sea. Here the main river on which they are located serves as a transport connection to the fore- and hinterland, which gives them an advantage over ports that are not located on waterways. The next four largest cargo ports are located in an embayment, including Algeciras and Marseille in the Mediterranean. Most of the largest 15 passenger ports, in contrast, are on a sea strait, an engineered coast or are surrounded by islands. These ports are often closely linked by ferries. So, mapping helps us to better understand the size, function and functioning of specific ports; and that there is no point for some ports to strive to be like Rotterdam, because they are bound by the possibilities and limitations of their location.

Port City Relations in the Territory

Port cities include two key man-made morphological entities—an urban entity and a port entity—plus an institutional entity. Cities developed simultaneously with port terminals, housing and feeding workers, and many terminals were the original reason for a city's existence. Maritime activities have long been a direct driver of urban growth, resulting in a strong, albeit evolving, relationship between the port and the metropolitan area in which they are located. Sometimes the relationship is contentious, as the port continuously encroaches on nearby territories. Nonetheless, the territorial maps show that most ports are still urban, located in and closely linked to the morphology of the city. Indeed, they are connected to a central city with surrounding built-up areas (themselves tied to the city by commuting and other daily interactions),[1] as well as through infrastructure and pollution.

Looking at the scalar relationships between ports, cities and territories, we can observe several morphological patterns on the maps and read them in light of urban histories. The port can be a contiguous morphological zone, expanding (far) beyond the urban morphology of the city, but maintaining the port city relation and remaining within the administrative boundaries of the city, as for instance in Rotterdam and Barcelona. A port city can have moved several (smaller) port function to peripheral locations, some of which no longer have a physical connection with the morphology of the city where they started and are no longer within their administrative boundaries, as in Bordeaux, London and Marseille. Only a few of the 100 leading ports in terms of transhipment have no spatial relationship with an urban centre. These include the transhipment hubs Puttgarden and Sjællands Odde, and the oil port Skoldvik, which were designed and rationally planned in rural locations, away from all the limiting factors of urban areas.[2] Bremerhaven and Zeebrugge can also be included in this category.

Based on the maps, we can argue that a city near a port benefits from having control over port entities and development, for environmental, social and safety reasons. A better understanding of patterns in the scalar development of port city territories from a comparative perspective, as in this atlas, and of the intersection between spatial and social development can inspire better planning in port city territories.[3]

Urban Patterns in the Port City Territory

Ports have a huge impact on the development of a territory, spatially, socially and politically, as well as in terms of air, noise, water or land pollution. Then there is the complexity of shared and conflicting interests of port authorities. The impact of ports on their immediate urban environment calls for far-reaching coordination, even cooperation, between ports and their surrounding municipalities. The

1 P.V. Hall & W. Jacobs, 'Why are maritime ports (still) urban, and why should policymakers care?', *Maritime Policy & Management* 39/2 (2012), 189–206. Also online. Available HTTPS: DOI: 10.1080/03088839.2011.650721.

2 L. Ažman Momirski, Y. van Mil & C. Hein, 'Straddling the fence: land use patterns in and around ports as hidden designers', *Urban planning* 6/3 (2021), 136–151. Also online. Available HTTPS: doi: 10.17645/up.v6i3.4101.

3 C. Hein & Y. van Mil, 'Mapping as Gap-Finder: Geddes, Tyrwhitt, and the Comparative Spatial Analysis of Port City Regions, *Urban Planning* 5/2 (2020), 152–166. Also Online. Available HTTPS: https://doi.org/10.17645/up.v5i2.2803.

infographics show us that more than half of the leading ports are in a predominantly urban territory. About 10 per cent are in predominantly rural territories, often linked to smaller ports that act as transport hubs, or to medium-sized port cities whose community, commercial, recreational, and cultural dynamics make them territorial centres. Moreover, of these 100 leading port city territories, almost 50 per cent consist of more than one port, so that within an area of 75 by 100 kilometres, there are two or more port authorities, all with their own spatial and economic interests. Which calls for inter-port collaboration. In Italy, for example, the government merged several of such smaller port authorities in the Naples area into one larger and stronger port authority. Studying patterns of urban settlements in the territory helps us understand the complexity and difficulties of governance structures, and the distinctive conditions for cooperation between each port, city and territory; it also helps us grasp the degree of urbanization and centralization of the territories.

In the port city territories, we can discern four different morphological urban patterns on the maps: monocentric area with a single port; monocentric area with multiple ports; polycentric area with a single port; and polycentric area with multiple ports.[4] In territories with a *monocentric* urban structure, port cities have a strong centre function, such as in the single port territories Le Havre and Szczecin. Here the urban centre is in the immediate hinterland of the port.[5] Monocentric urban territories with multiple ports are port cities (mostly larger) that have deployed several port sites across or near the metropolitan area, as the result of the changed port city relationship. These include Clydeport, Bordeaux, and Aalborg. In *polycentric* port city territories, several urban cores are located near each other, often in predominantly urban territories. Multiple configurations exist in this category. The most common is a polycentric area with a single port, in which a large non-port city is connected by urban sprawl to a smaller port city, as in Piraeus, 12 kilometres from the centre of Athens, and Leixões, the port of Porto. Administratively, the port is a separate entity, but it is physically and functionally intertwined with the city. Another example of a polycentric port city territory with a single port is two large neighbouring cities of which only one has a port, such as the Liverpool-Manchester agglomeration. Polycentric territories with multiple ports involve at least two port cities in contiguity or proximity, forming a coherent entity in which cities and ports are managed by distinct municipalities and authorities.[6] Examples of this type of coastal agglomerations include Gdynia-Gdańsk, Lisbon-Setubal and Immingham, Hull & Humber. Adjacent port city territories shown in multiple territorial maps can also be considered as one polycentric entity, such as Rotterdam and Amsterdam and Bremen and Hamburg. The four different patterns are characterized

4 O. Merk et al., 'The Competitiveness of Global Port-Cities: the Case of the Seine Axis (Le Havre, Rouen, Paris, Caen)—France', *OECD Regional Development Working Papers* 07 (OECD Publishing, 2011). Online. Available HTTPS: http://dx.doi.org/10.1787/5kg58xppgc0n-en.

5 Merk et al., 'The Competitiveness of Global Port-Cities'.

6 Merk et al., 'The Competitiveness of Global Port-Cities'.

by varying degrees of independence from the surrounding urban centres in the territory, ranging from independent with agglomeration effects stemming from the port city itself to lock-in effects by the nearby metropolis.[7]

7 Merk et al., 'The Competitiveness of Global Port-Cities'.

Learning from the Mapping Process: What Does the Complexity of Data Obscure?

Not all spatial conditions that affect or concern port city territories, directly or indirectly, can easily be shown on a map, such as historic events in which a port city territory is locked in development paths, and subsequent path dependency. The lack of specific data can also obscure our ability to interpret the maps. In the mapping of 100 European port city territories, we have learned for example that we need more precise information on land cover, land use and land ownership in ports and more detailed data on the types of transport. We also need more awareness of the limitations of data restricted by administrative borders, and the accuracy of datasets. Most datasets are valuable for a specific purpose, for instance monitoring changes in land cover/land use, but often not suitable for other purposes or for combining and comparing with other data. In addition, datasets and maps are always slightly behind the current situation because it takes time to process data, and institutions revise datasets only every few years. Nonetheless, it is an exciting time in the mapping world, as more and more global and European heterogeneous datasets—such as European Commission data—are becoming openly available, due to new techniques such as satellite imagery, spatial data mining technologies, and ground-based, airborne, and seaborne measurement systems. The European Commission implemented INSPIRE directives in 2007 to establish an infrastructure of spatial data of the European Union; but the Commission has no instruments to oblige member states to provide this data. Our data research shows that many datasets are incomplete as a result, making comparative studies like ours more difficult.

Land Cover

To truly understand the role of ports in their territories, we need comprehensive datasets that identify shipping, industry and logistics-related functions. Ports are identifiable spatial structures; they are often delineated from nearby urban and rural areas by fences or other visible boundaries and have clear functions in the landscape. But this apparent clarity becomes complex when explored through the lens of land cover data.[8] The interpretation of land cover categories differs per dataset (Corine Landcover and Coastal Zone), and land cover categories in general do not match the total footprint or extent of the port. Industries located within the fences or borders of the port, for example, are categorized as industrial or

8 Ažman Momirski et al., 'Straddling the fence'.

commercial areas, and the port basins (including ships on the water surface) are not indicated as ports, but categorized as water bodies, though they are indeed part of the port. Consequently, the interwovenness of industry and port functions is not clear from the maps and a port—and the size of ships docking—may appear much smaller than it actually is. Also, uniform data showing the total areas controlled by port authorities, including the industries or fallow land et cetera within the port boundaries, is also lacking. Spatial datasets do not include property data or governance structures and maritime statistical data do not include spatial or administrative entities. As a result, the mapping cannot provide insight into the number of stakeholders in the territory or the impact of the port on its surroundings. For the planning of a sustainable future for port city territories, this knowledge is key.

Transport Networks

The online interactive map of European Transport Corridors[9] provides us insight into fore- and hinterland connections. This European Commission network consists of nine corridors, and is a selection of motorways, railways, waterways and short sea shipping routes from the comprehensive TEN-T network that connect all urban hubs in Europe to the main departure and destination points for goods and passengers. The interactive map shows that the ports of Liepaja and Esbjerg, for example, are not connected to these corridors; some ports (including Brünsbuttel) are only connected through water, and others (such as Gijon) only by rail. These kinds of insights can help us to improve the development of future sustainable connections to the fore- and hinterland. This requires that the TEN-T corridor network becomes available as geospatial data (as a download or WMS service) so that it can be integrated into our maps and surveys. In addition, we need more detailed statistical data (meaning information from smaller administrative units) on the transport of goods and people on the various types of infrastructure; this level of detail is now only available for NUTS 1 (country level) at Eurostat. This would make it possible for the impact of transport to and from the port on the territory—inhabitants, Natura2000 areas, et cetera—to be more accurately included in planning and design.

9 European Commission, 'Mobility and Transport. Interactive Map Viewer' (2018). Online. Available HTTPS: https://ec.europa.eu/transport/infrastructure/tentec/tentec-portal/map/maps.html.

Administrative Borders

To overcome the wide variation in administrative entities in size and population density, we based the classifications of port city territories on Eurostat's Urban Audit categories: Local Administrative Units (LAU), Cities and Greater Cities.[10] Another reason to use the Urban Audit as a basis is that it includes an interpretation of what it describes as the functional area of the city, which is the area we intend to show on the port city territorial maps. According

10 Eurostat, 'Applying the Degree of Urbanisation. A methodological manual to define cities, towns and rural areas for international comparisons' (2021). Online Available PDF: https://ec.europa.eu/eurostat/documents/3859598/12519999/KS-02-20-499-EN-N.pdf/0d412b58-046f-750b-0f48-7134f1a3a4c2?t=1615477801160.

to the Urban Audit, the territory would then be a Functional Urban Zone (FUZ), which is the commuter zone of a City or Greater City. But not all selected port cities meet the indicators for a City or Greater City, meaning that—based on the Urban Audit—there is no statistical data available for either the port cities or their territories. To study the territory, we therefore must rely on the Urban Type of NUTS 3 regions,[11] which often contains a much larger area than the FUZ that extends (far) beyond our map frame, and the size of NUTS regions varies greatly from nation to nation. This standardization keeps us from seeing the dynamics and diversity of port city territories. Ignoring these limitations of data can lead to premature or incorrect interpretation.

11 Eurostat, 'Applying the Degree of Urbanisation'.

Conclusion

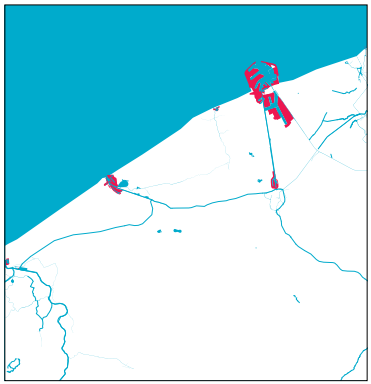
Geo-spatial mapping can help stakeholders better understand port city territories and plan their sustainable development, laying the foundation for further research. Many more relevant insights or patterns can be discovered by studying and comparing the maps and infographics in more detail. Consider the overlap of Natura2000 areas with port city territories, for example. Looking at all territorial maps, it is striking that in multiple port city territories conflicts have arisen over whether to preserve valuable maritime landscapes or to further the economic interests of the port, and economic interests often seem to be the winning force. This often means that development at port locations threatens the network of protected areas holding Europe's most valuable and endangered species and habitats.

However, there are still many steps to be taken in order to better understand these kinds of spatial impacts of ports on their surroundings and the complex spatial and institutional structures that underpin them. While our work shows that geo-spatial mapping is an essential tool for the systematic and analytical study of port city territories and a basis for knowledge-based planning and design, it simultaneously provides insight into the limitations and peculiarities of spatial and statistical data.

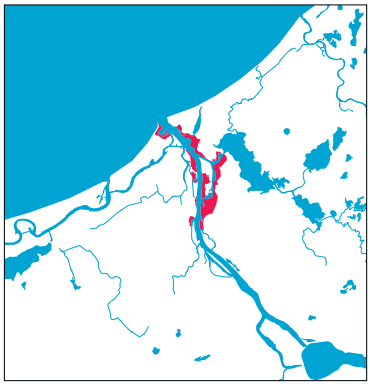
To better understand the processes that underlie spatial changes, or spatial conflicts and aligned interests in European port city territories, we therefore call for more data: more up-to-date data, including more detailed data on ownership and land use, especially of land controlled by port authorities; and more complete data, that is for all EU nations and seas, and for smaller administrative units.

Ports in their Natural Morphology of Land and Water

Situated in (narrow) straits
→ Helsingborg and Helsingør, p. 82

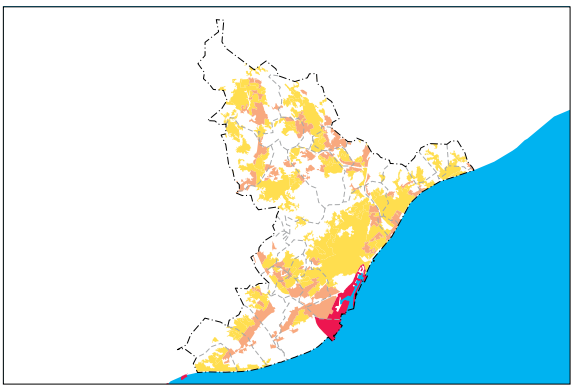


Located along the coast
→ Zeebrugge, p. 158

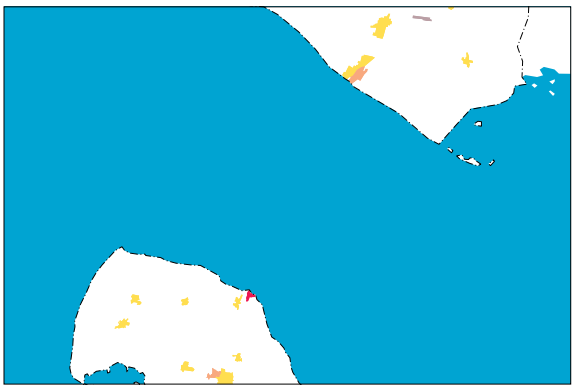


Located in a estuary or river
→ Riga, p. 104

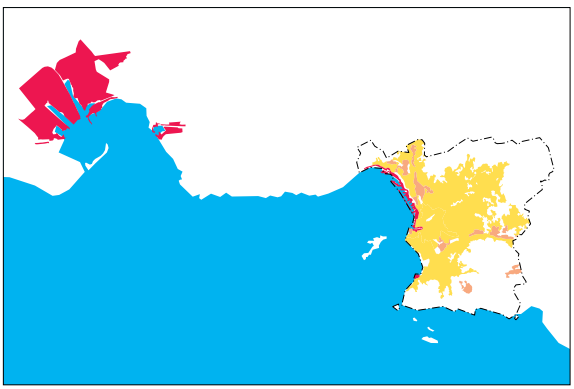
Port City Relations in the Territory



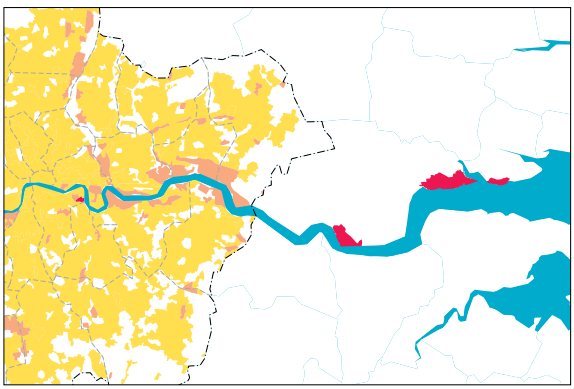
The port as a contiguous morphological zone connected to the city
→ Barcelona, p. 246



Port not interwoven with a city from their foundation
→ Puttgarden and Rødby, p. 120



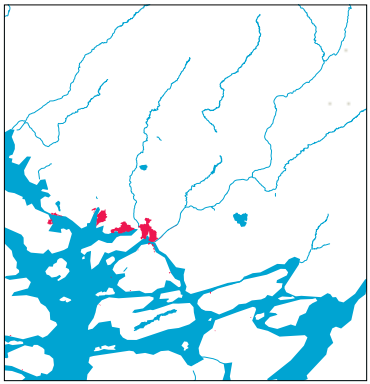
Port area not connected to the city
→ Marseille, p. 248



Port area not connected to the city
→ London, p. 166

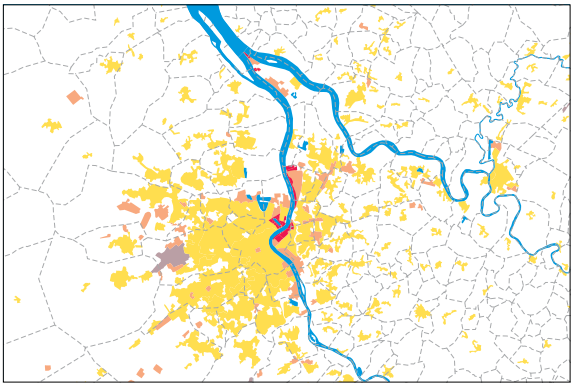
Located in a bay
→ Trieste, Koper and Monfalcone, p. 278

Located on an irregular coastline
→ Toulon, p. 250

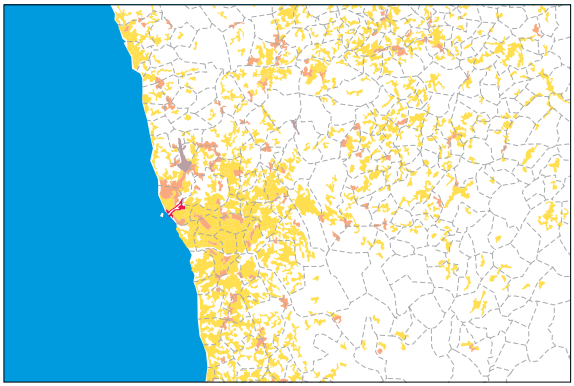


Surrounded by islands
→ Turku and Naatalin, p. 94

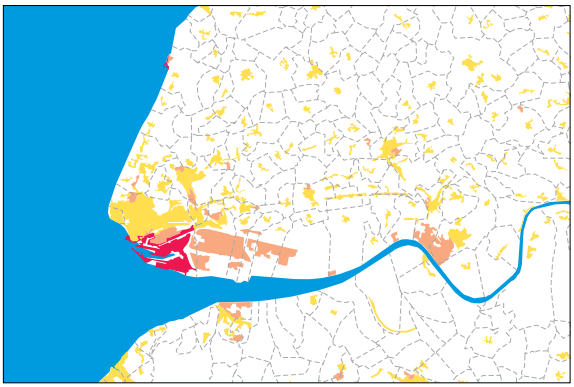
Urban Patterns in the Port City Territory



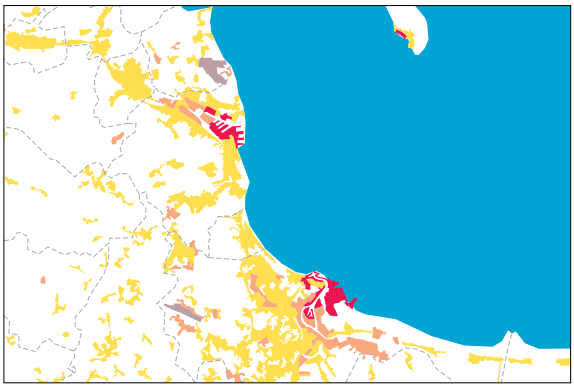
Monocentric urban territory with multiple port sites
→ Bordeaux, p. 216



Polycentric urban territories with a singel port
→ Leixões (Porto), p. 224



Monocentric urban territory with a singel port
→ Le Havre, p. 210



Polycentric urban territory with multiple ports
→ Gdynia-Gdańs, p. 112

9 Port City Territories and UNESCO World Heritage Properties: an Opportunity for Implementing the UNESCO Historic Urban Landscape Approach

Abstract

Port city territories across Europe are rich settings for natural and cultural World Heritage properties, many of them related to maritime practices. In protecting and conserving this heritage, and passing it to future generations in line with the World Heritage Convention, territories can face challenges related to water and climate change and to important logistic flows of goods and people between sea and land. On the other hand, they can also have the opportunity to support sustainable development for historic cities and settlements in these areas. To show the intersection of the interests of port city territories and World Heritage sites from a spatial perspective, this chapter focuses on two select areas of the European seas: the first area being a section of the North Sea and the Baltic Sea, the second Italy. We chose these areas for their long coasts, high number of port city territories and long maritime history, as well as their numerous World Heritage properties. In each of these maps, the article explores World Heritage properties where the Outstanding Universal Value (OUV) is specifically related to maritime practices and cultural exchanges. People and institutions protecting World Heritage properties are working to integrate World Heritage properties into their surroundings in line with the World Heritage Convention (Art.5), the UNESCO Historic Urban Landscape (HUL) policy, and the Faro Convention. In port city territories, it is important for these people and institutions to acknowledge the interests of special actors, such as strong port authorities, which can impact policymaking. The chapter invites stakeholders of port city territories to more closely explore the ways in which the protection of World Heritage properties can intersect with the dynamics of port city territories to provide a foundation for discussion.

Introduction

The unique and delicate coastline at the edge of sea and land has attracted people and stimulated urban growth over centuries. Port city territories today are places where different stakeholders and interests intersect and sometimes clash. In particular, maritime

Carola Hein

logistics, industry, urban development, and economic activities can conflict with the historic preservation and local sustainable development of coastal natural and cultural World Heritage properties. This challenge is further exacerbated by the climate crisis and related water changes. The World Heritage Convention of 1972 recognized (p. 1) that "the cultural heritage and the natural heritage are increasingly threatened with destruction not only by the traditional causes of decay, but also by changing social and economic conditions which aggravate the situation with even more formidable phenomena of damage or destruction".[1] The challenges faced by world heritage sites have not decreased over time; on the contrary. Ironically, the maritime practices, flooding, and sea level rise that all threaten the historic city partly result from modern industrial activities in port city territories. By the same token, however, natural and cultural World Heritage properties in port city territories can also be sites for strategic design and planning and for climate action. As the architect Paola Vigano phrased it in an interview: "If we want to save Venice, and I think we should save Venice, we need to save the planet".[2]

The Convention formulated goals to address these challenges and opportunities. One of these goals is "to adopt a general policy which aims to give the cultural and natural heritage a function in the life of the community and to integrate the protection of that heritage into comprehensive planning programmes" (Article 5a). The World Heritage Convention and the UNESCO Historic Urban Landscape (HUL) as well as the Faro Convention also link this heritage protection to sustainable development of local communities. HUL notably aims "at preserving the quality of the human environment, enhancing the productive and sustainable use of urban spaces, while recognizing their dynamic character, and promoting social and functional diversity".[3] These are calls for the diverse stakeholders in port city territories to act together. A port authority, often a large and powerful actor, has the mandate to control and administer the port operation.[4] But the port authority's focus on economic development and throughput has been detrimental to heritage preservation and local sustainable development. Recently, port authorities have started to pay more attention to their neighbouring cities and territories. In light of shared needs for sustainable development, these very different stakeholders can embrace an ecosystem approach to port city territories at the border between sea and land.

To explore the spatial interrelation of port city territories and World Heritage, we opted to make specific map layers that focus on their co-existence. We selected two areas of the European seas (displayed on page 310) that have long coasts, and that are home to both a large number of port city territories and World Heritage properties dating from diverse historic periods. We used two different scales for a closer analysis of the challenges and opportunities relating to World Heritage properties in port city territories. To

1 UNESCO, The World Heritage Convention. Online. Available HTTPS: https://whc.unesco.org/en/convention/.

2 Paola Vigano in the Film (6:57–7:03): *Water Ports and the UNESCO Historic Urban Landscape Approach*, Presented during the World Heritage City Lab—Historic Cities, Climate Change, Water, and Energy 16–17.12.2022, https://whc.unesco.org/en/events/1633/ Concept/script/supervision: C. Hein; Interviews/research: P. Martino, H. van de Rhee; Production/editing: BonteKoe Media, P. Tekenbroek; Voice over: M. Harrigan; Special thanks to interview partners: H. Ovink, J. Hosagrahar, P. Viganò, H. Meyer, M. Ndiaye, A. Aziz Guissé, J.P. Corten; Additional thanks to: C. van Rooijen, J. van den Boogert, A. Roders. This film has been made possible with the financial support of the Ministry of Education, Culture and Science of the Netherlands.

3 UNESCO, Recommendation on the Historic Urban Landscape, including a glossary of definitions. Online. Available HTTPS: https://en.unesco.org/about-us/legal-affairs/recommendation-historic-urban-landscape-including-glossary-definitions#:~:text=The%20historic%20urban%20landscape%20approach,promoting%20social%20and%20functional%20diversity.

4 T. Notteboom, A. Pallis and J.P. Rodrigue, *Port Economics, Management and Policy* (New York: Routledge, 2022). Also online. Available HTTPS: https://porteconomicsmanagement.org/pemp/contents/part4/port-authorities/.

show the overlap between World Heritage properties and port city territories in different maritime waters, we mapped the two areas respectively at the scales of 1 to 1,350,000 (North Sea and Baltic Sea) and 1 to 10,000,000 (Italy in the Mediterranean Sea). At these scales the maps show us the great number of World Heritage sites located in the port city territories, and raises questions about the historic connections of World Heritage properties around a shared water body. In mapping them, we found that the question of scale remains a challenge. With one exception, each World Heritage property is indicated here as a dot, as the actual extent of each property or its buffer zone would not be visible in a meaningful way at either of our chosen scales. Thus, the scale of the maps invites further, more detailed investigation into the relationship between port city territory and World Heritage property.

The one property that can be made visible at this scale is the Wadden Sea, an area of 1,143,403 hectares along the Dutch, German and Danish coast. UNESCO inscribed the Wadden Sea in 2009 as "the last remaining large-scale, intertidal ecosystem where natural processes continue to function largely undisturbed".[5] It includes Biosphere Reserves and seven so-called Ramsar sites, wetlands designated under the Ramsar Convention. The Wadden Sea is also known also for its Halligen, islands with man-made mounds where people live; the mounds are flooded several times a year, surrounding them with water so that sediment adds to the height of each island. Such practices of living with water require attention and evaluation in a time of climate change and rising sea levels. Moreover, as we can see in the maps, the Sea intersects with or gives shipping water access to several port city territories, defined in the *Port City Atlas* as including the maritime foreland as well as the hinterland. The Wadden Sea is thus part of the port city territories of Esbjerg, Brunsbüttel, Bremerhaven and Wilhelmshaven. Furthermore, it is crossed by the Elbe and Weser Rivers through which ships access the port city territories of Hamburg and Bremen. Ports' dredging and disposal of dredged material in the North Sea; ships' water, air and sound pollution; overfishing; and invasive tourism can all have a direct negative impact on natural sites and their preservation. Organizations like the German NGO Friends of the Earth (Bund für Natur- und Umweltschutz Deutschland, or BUND) regularly decry such activities.[6] Decreasing pollution—for example, through cleaner shipping or smaller ships for fishing or transport—could create healthier futures for local communities.

To be listed on the UNESCO World Heritage list, properties must be of outstanding quality and meet at least one of ten criteria of Outstanding Universal Value (OUV). To better understand how the World Heritage sites in our port city territories are related (or not) to maritime and port city networks, we set out to systematically identify the OUVs for which UNESCO selected them. We manually checked the abstracts of World Heritage properties published on the UNESCO World Heritage Centre website,[7] looking for words

5 UNESCO, Waddensee. Online. Available HTTPS: https://whc.unesco.org/en/list/1314https://whc.unesco.org/en/list/1314

6 Bedrohungen und Belastungen des Lebensraums Wattenmeer. Online. Available HTTPS: https://www.bund-hamburg.de/themen/naturschutz/wattenmeer/bedrohungen-und-belastungen-des-lebensraums-wattenmeer/.

7 UNESCO World Heritage List. Online. Available HTTPS: https://whc.unesco.org/en/list/.

associated with port functions and activities.[8] The OUV of some heritage sites in the Atlas are explicitly connected to maritime infrastructure, including wharfs, cranes and quays, canals, rail and road infrastructure, warehouses, and administrative buildings. Many other World Heritage sites are located in our port city territories but don't have an obvious link to the maritime past. Nonetheless, their preservation may be affected by it, notably in light of climate change.

8 Dai, Tianchen, Carola Hein, and Dan Baciu 'Heritage Words: Exploring Port City Terms', in: *Creative Practices in Cities and Landscapes (CPCL)* 4, no. 2 (2021): 36–59.

A First Exploration of the Relation between Port City Territories and Maritime-related World Heritage Properties

We first wanted to explore how widespread the co-existence of port city territories and World Heritage sites actually is. So, we selected an area that includes a part of North Sea and Baltic Seas centred on the Skagerrak strait. These seas surround the peninsula of Jütland and the Danish islands, spanning from the adjacent port city territories of Kent and Calais on the Straight of Dover in the West to the port city territories of Gdansk and Gdynia on the Baltic Sea in the East. This area has long been home to maritime practices and shipping-based exchange, which partly explains its density of port city territories—38 of 50 port city territories mapped in the whole *Port City Atlas*—and of World Heritage properties—23 natural and cultural sites.

Second, we wanted to see whether these World Heritage properties were selected for their maritime connections, and what those histories could tell us about port city territories. Here we can only briefly explore four select World Heritage properties that specifically mention shipping, maritime or port city functions as part of their OUV in the UNESCO World Heritage description. Each site merits further individual analysis to explore both the historic relation to shipping and maritime practices, and the challenges and opportunities of the current relation. These four World Heritage sites are: the historic cities of Lübeck and Brugge, and the cities of Amsterdam and Hamburg, located in Germany, Belgium and the Netherlands. The historic centres of the smaller cities of Lübeck and Brugge have been kept intact as the working port has been moved (in different degrees) to the nearby seaside. The larger cities of Amsterdam and Hamburg have also detached the historic areas from active shipping, with the exception of cruise shipping.

The Hanseatic City of Lübeck was listed by UNESCO as a World Heritage site in 1987 based on criterion iv: an outstanding ensemble. The city's function as a port city has played an important role in the city's historic development as "the former capital and Queen City of the Hanseatic League" that "has remained a centre for maritime commerce to this day, particularly with the Nordic countries."[9] The historic city centre is an 81.1-hectare site with a 693.8 buffer zone that encompasses the Trave and Wakenitz water-ways and the canal surrounding the city; it is detached from Travemünde, a borough of Lübeck at the mouth of the Trave River that has emerged over time as Germany's major ferry port. The further develop-ment

9 UNESCO, Hanseatic City of Lübeck. Online. Available HTTPS: https://whc.unesco.org/en/list/272

of the port along the Trave and in Travemünde continued this separation, which ultimately helps those working to preserve the historic city, as the big ships, major land infrastructure and traffic are located at some distance from it.

The Historic Centre of Brugge was inscribed on the World Heritage list in 2000, for criteria ii, iv, and vi, which emphasize the city's cultural links to other parts of the world, its typology and its artistic achievements. It covers 410 hectares and has a 168-hectare buffer zone.[10] As one of the commercial and cultural capitals of Europe, Brugge developed cultural links, plus land- and sea-based infrastructure networks, with different parts of the world. In the greater Brugge region, the 1907 construction of new port infrastructure called Zeebrugge, or the seaport of Brugge, separated the active port from the historic city. The port is today among Europe's leading ports. Meanwhile, the city government promotes sustainable tourism in the historic city.

UNESCO inscribed the seventeenth-century walled canal ring area of Amsterdam, with 198.2 hectares and a buffer zone of 481.7 hectares, in the World Heritage List in 2010 according to criteria I, ii, and iv, as a human masterpiece, a result of cultural interchange and a unique typology. It described it as a network of canals "with a medieval port that encircled the old town and was accompanied by the repositioning inland of the city's fortified boundaries, the Singelgracht". The city lost direct access to the sea with the closure of the IJ River in 1872, and today IJmuiden acts as the port of Amsterdam, hosting the Tata steel factory and large cruise ships. That site is also the access point for ships to the North Sea Canal with its large locks.[11] Cruise and leisure shipping are a challenge in Amsterdam due to the already high pressure from tourism. However, innovative activities can provide creative solutions. Plastic fishing—cleaning the waste from Amsterdam's canals—is just one approach to relating heritage preservation and maritime awareness.[12]

The Speicherstadt and Kontorhausviertel with Chilehaus in Hamburg were jointly named as a World Heritage site in 2015. It is recognized according to criteria iv as "one of the largest coherent historic ensembles of port warehouses in the world (300,000 m^2)" and is included for the Kontorhaus (office) district "featuring six very large office complexes built from the 1920s to the 1940s to house port-related businesses".[13] With 26.08 hectares and a buffer zone of 56.17 hectares, it is smaller than the other three sites, yet located in a much bigger city and integrated into ongoing maritime and urban activities. Hamburg's World Heritage property has a shorter history than the others. At the turn of the last century, the removal of port functions from the north side of the River Elbe to the south side, with the exception of cruise shipping, set the stage for the creation of a multifunctional district; here, heritage ships create new relationships between the historic city and the water. The nearby HafenCity development invokes this maritime history in names, styles, and architecture, links that are valuable

10 UNESCO, Historic Centre of Brugge Online. Available HTTPS: https://whc.unesco.org/en/list/996

11 UNESCO, Seventeenth-Century Canal Ring Area of Amsterdam inside the Singelgracht Online. Available HTTPS: https://whc.unesco.org/en/list/1349/ https://whc.unesco.org/en/list/1349/

12 Plastic Whale "Come Fishing ... for Plastics". Online. Available HTTPS: https://plasticwhale.com/plastic-fishing/.

13 UNESCO, Speicherstadt and Kontorhausdistrikt with Chilehaus. Online. Available HTTPS: https://whc.unesco.org/en/list/1467

both to remaining maritime activities, notably cruise ships, and the preservation of World Heritage property.

The four case studies briefly explored here show that even when maritime practices radically change and active ports are moved away from historic settlements, a site's historic relationship to water remains. Water constantly flows and continues to link ports and cities, opening several opportunities for stakeholders to work together: to include water in heritage management plans; to apply the UNESCO Historic Urban Landscape approach to promote inclusive local development of port city territories; and to not only preserve World Heritage properties but activate them to address the climate crisis. Port development and preservation alike require citizen participation, community-based planning, and an approach that includes socio-cultural values.

A National Approach to Port City Territories and World Heritage Properties: the Case of Italy

We then wanted to explore how port city territories and World Heritage sites interrelate in a national setting, such as Italy, where both are particularly abundant. The right site of the map (Map 114) explores port city territories and World Heritage sites in a single country—Italy—focusing on the southern waters surrounding its boot-shaped peninsula with the Tyrrhenian Sea, the Ligurian Sea, Tuscan Archipelago and Ionian Sea in the west and south, and the Adriatic Sea in the east. Italy alone is home to 14 (including the border crossing Trieste/Koper area) of the leading 25 port city territories of the Mediterranean, which may not be a surprise given its long coastlines and central location. Except for Porto Foxi & Cagliari and Gioia Tauro & Reggio di Calabria, each of these port city territories is also home to a cultural World Heritage property, in part because Italy has a long and outstanding history, and it was among the first countries to propose sites to UNESCO for World Heritage status. Three of these heritage sites are closely related to maritime and shipping practices: Venice and its lagoon (1987), Genoa: Le Strade Nuove and the system of the *Palazzi dei Rolli* (2006), and the historic centre of Naples (1995).

The descriptions of these sites on the list of the World Heritage Convention note their historic links to maritime and shipping practices, even if UNESCO did not list them for these links. For example, the description of Venice states: "Founded in the 5th century and spread over 118 small islands, Venice became a major maritime power in the 10th century."[14] The presence of the Port of Marghera in the Venice Lagoon is now highly debated, because it pollutes the water and disrupts the ecosystem of the lagoon. Nonetheless, it is notable that the Port Authority of Venice is involved in the management plan for the World Heritage property. Naples identifies itself as a port city, the "Historic Centre of Naples, one of the foremost Mediterranean port cities."[15] Nowadays, the port and the World Heritage property often come into conflict here, as both

14 (UNESCO, Venice and Its Lagoon. Online. Available HTTPS: https://whc.unesco.org/en/list/394/

15 (UNESCO, Historic Centre of Naples. Online. Available HTTPS: https://whc.unesco.org/en/list/726/)

strive to claim space along the coast and in the hinterland. The story of the construction of the metro line in the historic city documents the long history of the site, the challenges of preservation and the careful integration of the cruise ship terminal nearby into the historic urban fabric. In Genoa, the World Heritage site is "The Strade Nuove and the system of the Palazzi dei Rolli in Genoa's historic centre date from the late 16th and early 17th centuries"; the abstract links it to the period "when the Republic of Genoa was at the height of its financial and seafaring power."[16] (The World Heritage property abuts a revitalized waterfront and a partly active port with all the challenges of pollution.

16 UNESCO, Genoa: *Le Strade Nuove* and the system of the *Palazzi dei Rolli*. Online. Available HTTPS: *https://whc.unesco.org/en/list/1211*

Port authorities have the opportunity and the responsibility to work with cities and metropolitan governments as well as territorial authorities to implement the UNESCO Historic Urban Landscape approach to balance development with historic preservation of World Heritage properties. In the case of Italy, multiple ports are managed in port clusters, opening up opportunities for comprehensive approaches to protecting World Heritage. Indeed, as this chapter and these maps demonstrate, heritage sites are more than simply places to be protected from development; they can drive a better kind of development. Port city territories can mobilize their heritage, honour the maritime culture that has allowed them to thrive, and use these historic sites as foundation for sustainable and inclusive development and for climate action. This work of preserving World Heritage, and of attracting and distributing touristic flows, can also catalyse the emergence of port city territorial governance. Re-thinking existing ports and cities in sustainable ways requires investing in new infrastructure, urban developments and buildings; it also requires European-wide planning and policy-making.

Goals

Understanding, recognizing, and preserving these historic maritime connections, planners and politicians can position World Heritage properties for local sustainable development, whether as sites of education on maritime awareness or as creative hubs. Such solutions need to go beyond attracting cruise and leisure ships, which are particularly prominent in the Mediterranean. In fact, cruise and leisure shipping are not sustainable development, as they are major threats to World Heritage properties. Modern ports must also acknowledge and address the impact of their shipping, dredging, and water pollution on nearby natural World Heritage properties. Actors in port city territories need to carefully balance the positive and negative externalities of tourism on World Heritage properties. New, carefully managed forms of ecotourism and slow tourism—including non-polluting boats—could add value to preservation.[17] Stakeholders must tie new activities to their sites' preservation. Today's interventions often focus on festivals, harbour birthdays, and other tourist events that nostalgically celebrate traditional forms of shipping. It may be possible to mobilize these maritime

17 *Sustainable Tourism Charter for the Northern Lagoon in Venice*. Online. Available PDF: https://www.veneziaunica.it/sites/default/files/33.pdf

activities for broader education on maritime practices, including sustainable food from the sea.[18] More largely, in line with the UNESCO Historic Urban Landscape (HUL) approach, heritage sites can help redefine maritime culture as innovative, and focused on preservation of water-related infrastructure.

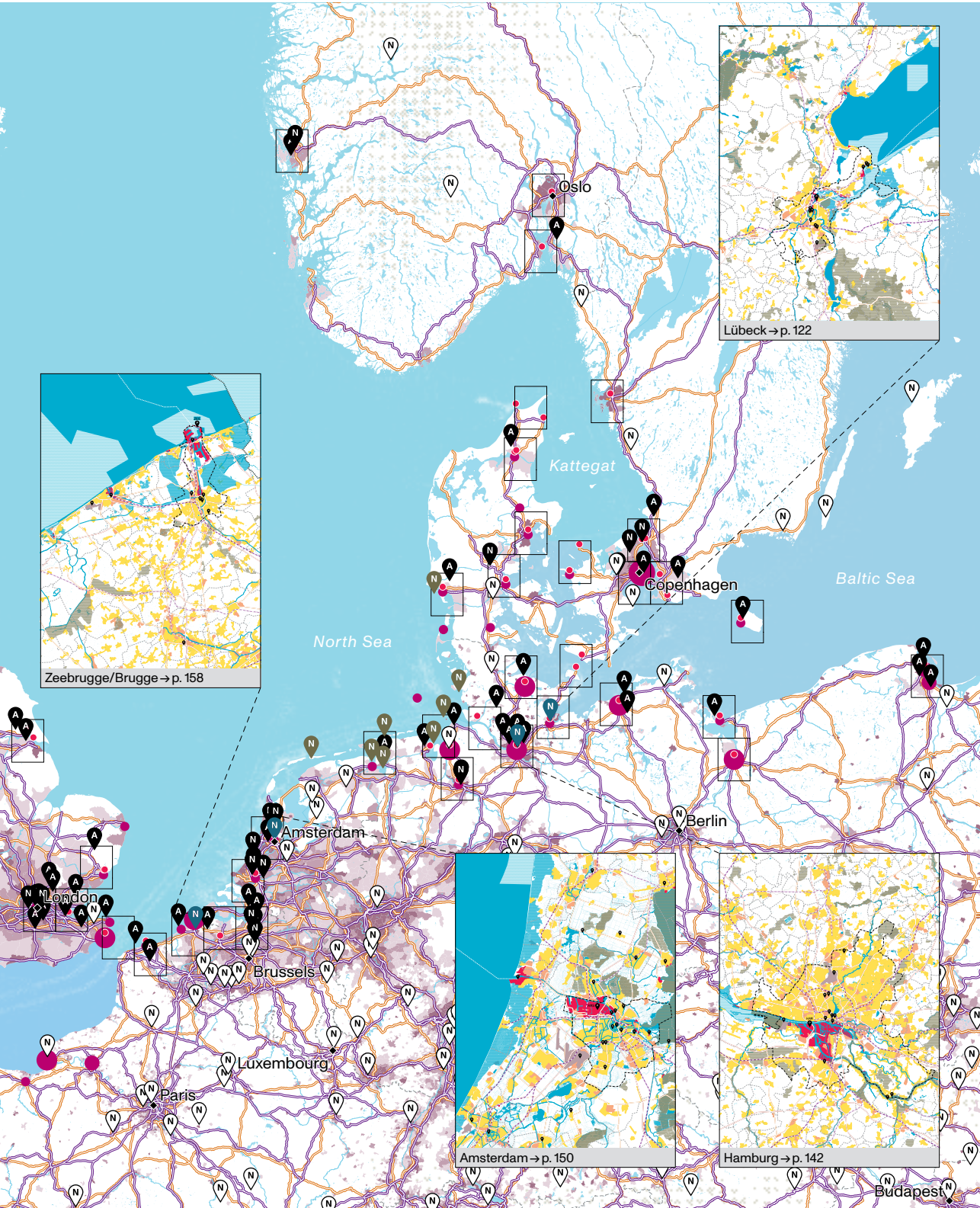
We envision a kind of heritage protection and sustainable development that is like the ecosystem approach of our Atlas: networked, multi-scalar, and understanding current conditions both as the outcome of path-dependent past developments and the frame for future transformations. Given the need for collaboration within and among port city territories, and the necessity for sustainable practices across complex territories, the *Port City Atlas* proposes conceptual and methodological innovation to complement and support other tools that are currently being developed. Providing standardized geospatial maps of port city territories as a visual foundation for discussion within their territory and across territories, it will help planners overcome siloed approaches to spatial planning. The *Port City Atlas* helps to envision tourism and creativity, mobility and connectivity on the sea and in the hinterland, a key element for port city territories and at the heart of European Union policy.

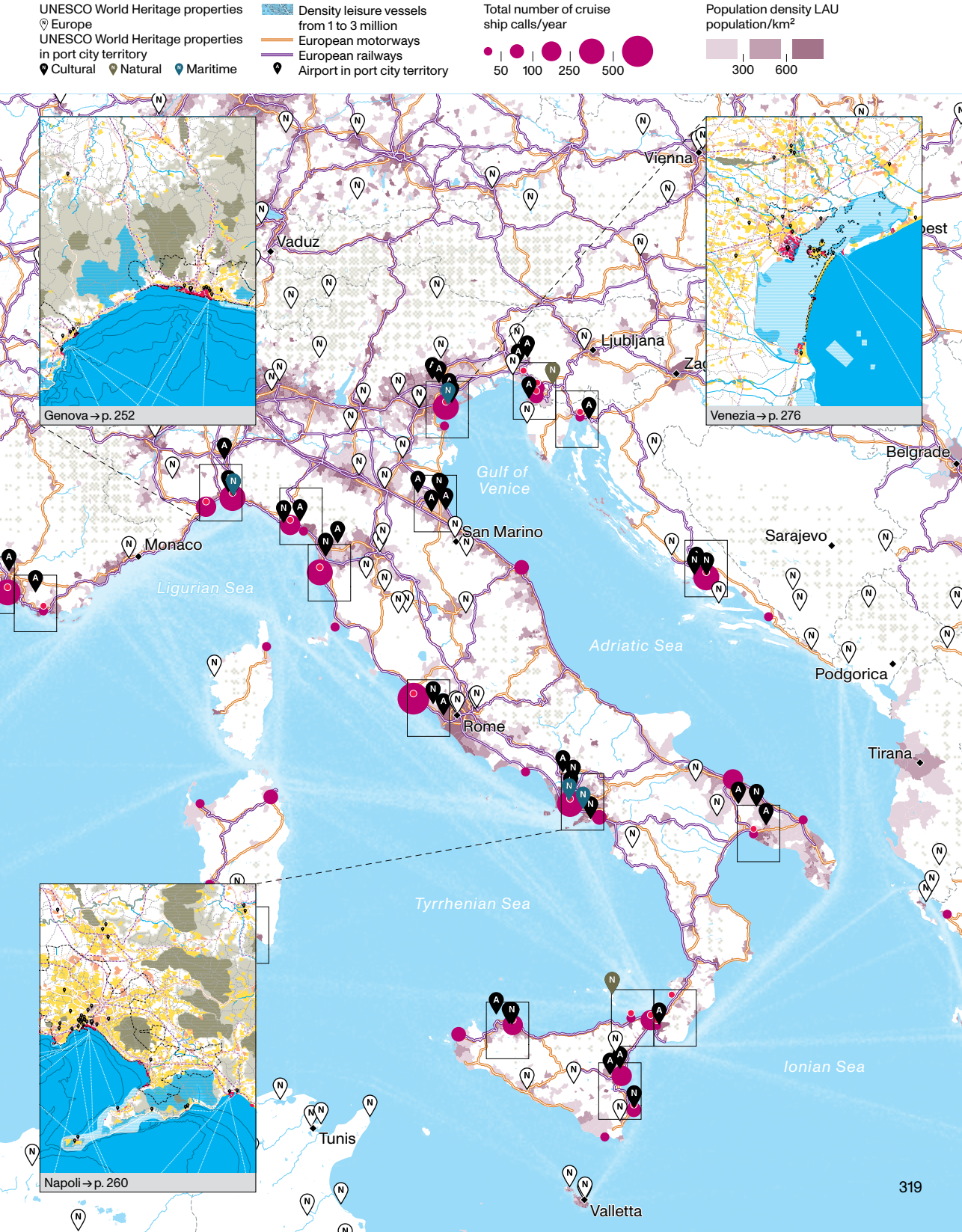
We hope that port authorities, and urban and territorial leaders will use this book as a point of discussion for conversations on shared goals. First, we suggest that stakeholders start to think of port city territories as sites where multiple domains come together: past, present and future; heritage preservation and sustainable economic development; ecological riches and climate change. The *Port City Atlas* invites these stakeholders to have conversations, to (re)imagine port, city and territory as a single spatial unit with long histories, diverse heritage and shared values. All this may require some ports (or cities) to adjust their preservation and development plans to adapt to a shared future, and specifically to adopt a maritime perspective.

Second, we hope that different port city territories will explore shared challenges and opportunities together. One positive outcome could be a partnership between communities that have shared maritime connections and World Heritage properties, engaging with historic shipping networks for contemporary (touristic) activities. Finding shared strategies to engage with underwater archaeological sites or Natura2000 sites next to working ports could be another positive outcome. Working groups on the role of shipping channels, or road- or rail infrastructure or warehousing or tourism, as part of an ecosystem approach may be developed based on this atlas. An ecosystem approach is also at the heart of the UN Sustainable Development Goals (SDG), established in 2015 to address global challenges. A better understanding of specific values or identities inherent in port cities can help stakeholders develop shared strategies as an inherent part of balanced and sustainable development in line with SDG 11.7 to protect and safeguard the world's cultural and natural heritage.

18 The European Lighthouse project *Bauhaus of the Seas Sails* explores this approach.

European Port City Territories and UNESCO World Heritage Properties




UNESCO World Heritage properties
Europe
UNESCO World Heritage properties in port city territory
Cultural
Natural
Maritime
Density leisure vessels from 1 to 3 million
European motorways
European railways
Airport in port city territory
Total number of cruise ship calls/year
50
100
250
500
Population density LAU population/km²
300
600
Genova → p. 252
Venezia → p. 276
Napoli → p. 260
Vienna
Vaduz
Ljubljana
Belgrade
Sarajevo
Podgorica
Tirana
Monaco
San Marino
Rome
Tunis
Valletta
Gulf of Venice
Ligurian Sea
Adriatic Sea
Tyrrhenian Sea
Ionian Sea

Comparative Analysis of the Port City Territory

Waterside
Port main typology
City typology
Territory typology (NUTS 3)

BALTIC SEA

ID	Port Name	W	P	C	T
HEL	Helsingborg, SE				
HLS	Helsingør, DK				
CPH	Københavns, DK				
TRG	Trelleborg, SE				
MMA	Malmø, SE				
RNN	Rønne, SE				
STO	Stockholm, SE				
LLA	Luleå, SE				
TKU	Turku, FI				
NLI	Naantali, FI				
HEL	Helsinki, FI				
SKV	Sköldvik, FI				
TLL	Tallinn, EE				
RIX	Riga, LV				
VNT	Ventspils, LV				
LPX	Liepaja, LV				
KLJ	Klaipeda, LT				
BOT	Butinge, LT				
GDN	Gdansk, PL				
GDY	Gdynia, PL				
SZZ	Szczecin, PL				
SWI	Swinoujscie, PL				
RSK	Rostock, DE				
ROF	Rødby, DK				
PUT	Puttgarden, DE				
SLM	Sillamäe, EE				
LBC	Lübeck, DE				
KEL	Kiel, DE				
FRC	Fredericia, DK				
AAR	Århus, DK				
SST	Statoil-Havnen, DK				
SJO	Sjaellands Odde, DK				

NORTH SEA

ID	Port Name	W	P	C	T
AAL	Aalborg, DK				
FDH	Frederikshavn, DK				
HIR	Hirtshals, DK				
EJB	Esbjerg, DK				
BRB	Brunsbüttel, DE				
HAM	Hamburg, DE				
BRE	Bremen, DE				
WVN	Wilhelmshaven, DE				
BRV	Bremerhaven, DE				
DZL	Delfzijl, NL				
EME	Emden, DE				
AMS	Amsterdam, NL				
RTM	Rotterdam, NL				
ANR	Antwerp, BE				
GNE	Ghent, BE				
ZEE	Zeebrugge, BE				
DKK	Dunkirk, FR				
DVR	Dover, UK				
CQF	Calais, FR				
MED	Medway, UK				
LON	London, UK				
FXT	Felixstowe, UK				
HRW	Harwich, UK				
IPS	Ipswich, UK				
IMM	Immingham, UK				
HUL	Hull, UK				
MME	Tees & Hartlepool, UK				
TYN	Tyne, UK				
FOR	Forth (Edinburgh), UK				
BGO	Bergen, NO				
TON	Tønsberg, NO				
OSL	Oslo, NO				
GOT	Göteborg, SE				

ATLANTIC

ID	Port Name	W	P	C	T
CYP	Clydeport (Glasgow), UK				
CYN	Cairnryan, UK				
BEL	Belfast, UK				
LAR	Larne, UK				
DUB	Dublin, IE				
LMK	Limerick, IE				
ORK	Cork, IE				
HYM	Heysham, UK				
LIV	Liverpool, UK				
HLY	Holyhead, UK				
MLF	Milford Haven, UK				
BRS	Bristol, UK				
SOU	Southampton, UK				
PME	Portsmouth, UK				
LEH	Le Havre, FR				
NTE	Nantes Saint-Nazaire, FR				
LRH	La Rochelle, FR				
BOD	Bordeaux, FR				
BIO	Bilbao, ES				
GIJ	Gijón, ES				
LCG	La Coruña, ES				
FRO	Ferrol, ES				
LEI	Leixões (Porto), PT				
LIS	Lisboa, PT				
SET	Setúbal, PT				
HUV	Huelva, ES				
LPA	Las Palmas, ES				
SCT	Santa Cruz de Tenerife, ES				
CAD	Cádiz, ES				

MEDITERRANEAN SEA

ID	Port Name	W	P	C	T
ALG	Algeciras, ES				
CEU	Ceuta, MA				
CAR	Cartagena, ES				
VLC	Valencia, ES				
CAS	Castellón, ES				
TAR	Tarragona, ES				
BCN	Barcelona, ES				
MRS	Marseille, FR				
TLN	Toulon, FR				
GOA	Genova, IT				
SVN	Savona, IT				
SPE	La Spezia, IT				
LIV	Livorno, IT				
CVV	Civitavecchia (Roma), IT				
NAP	Napoli, IT				
PFX	Porto Foxi, IT				
CAG	Cagliari, IT				
PMO	Palermo, IT				
SIR	Siracusa, IT				
MSN	Messina, IT				
MLZ	Milazzo, IT				
GIT	Gioia Tauro, IT				
REG	Reggio di Calabria, IT				
TAR	Taranto, IT				
RAN	Ravenna, IT				
VCE	Venezia, IT				
TRS	Trieste, IT				
KOP	Koper, SI				
MNF	Monfalcone, IT				
RJK	Rijeka, HR				
SPU	Split, HR				
PIR	Peiraias (Athene), GR				
PER	Perama, GR				
EEU	Elefsina, GR				
SKG	Thessaloniki, GR				

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Copy editing
Jean Tee

Developmental editing
Laura Helper Editorial Agency

Book and information design, map editing
SJG / Joost Grootens, Philipp Doringer, Julie da Silva

Printing and binding
Wilco Art Books, Amersfoort

Paper
Munken Print White, Magno Volume

Production
Marja Jager, nai010 publishers, Rotterdam

Publisher
Marcel Witvoet, nai010 publishers, Rotterdam

Co-publisher
TU Delft Open Publishing

Printed and bound in the Netherlands

This publication has been developed in collaboration with the Chair History of Architecture and Urban Planning, TU Delft, LDE PortCityFutures Centre and TU Delft OPEN Publishing.

TU Delft

Centre for Port City Futures
Leiden-Delft-Erasmus Universities

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This publication was made possible by financial support from: Dutch Research Council NWO (grant number 36.201.055), Chair History of Architecture and Urban Planning TU Delft, TU Delft Central Library, LDE PortCityFutures Centre, University of Ljubljana Faculty of Architecture and Van Eesteren-Fluck & Van Lohuizen Foundation.

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ISBN 978 94 6208 742 2
NUR 648, 900
BISAC ARC010000 + ARC000000
DOI: https://doi.org/10.59490/mg.73

Port City Atlas is also available as e-book (pdf):
ISBN 978-94-6208-761-3 and open access through nai010.com and TU Delft OPEN Publishing.

Port City Atlas
Mapping European Port City Territories: From Understanding to Design

Baltic Sea Århus, Fredericia, Gdansk/Gdynia, Helsingborg/Helsingør, Helsinki, Kiel, Klaipeda/Butinge, Københavns, Liepaja, Luleå, Lübeck, Riga, Rødby/Puttgarden, Rønne, Rostock, Sillamäe, Sköldvik, Statoil-Havnen/Sjaellands Odde, Stockholm, Swinoujscie, Szczecin, Tallinn, Trelleborg/Malmø, Turku/Naantali, Ventspils North Sea Aalborg, Amsterdam, Antwerp, Bergen, Bremen, Brunsbüttel, Delfzijl/Emden, Dover/Calais, Dunkirk, Esbjerg, Felixstowe/Harwich/Ipswich, Forth, Frederikshavn/Hirtshals, Ghent, Göteborg, Hamburg, Immingham/Hull, London, Medway, Oslo, Rotterdam, Tees & Hartlepool/Tyne, Tønsberg, Wilhelmshaven/Bremerhaven, Zeebrugge Atlantic Belfast/Larne, Bilbao, Bordeaux, Bristol, Cádiz, Cairnryan, Clydeport, Cork, Dublin, Gijón, Heysham, Holyhead, Huelva, La Coruña/Ferrol, La Rochelle, Las Palmas, Le Havre, Leixões, Limerick, Lisboa/Setúbal, Liverpool, Milford Haven, Nantes Saint-Nazaire, Santa Cruz de Tenerife, Southampton/Portsmouth, Algeciras/Ceuta Mediterranean Sea Barcelona, Cartagena, Civitavecchia, Genova/Savona, Gioia Tau/Reggiodi Calabria, La Spezia, Livorno, Marseille, Messina/Milazzo, Napoli, Palermo, Peiraias/Perama/Elefsina, Porto Foxi/Cagliari, Ravenna, Rijeka, Siracusa, Split, Taranto, Tarragona, Thessaloniki, Toulon, Trieste/Koper/Monfalcone, Valencia/Castellón, Venezia

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