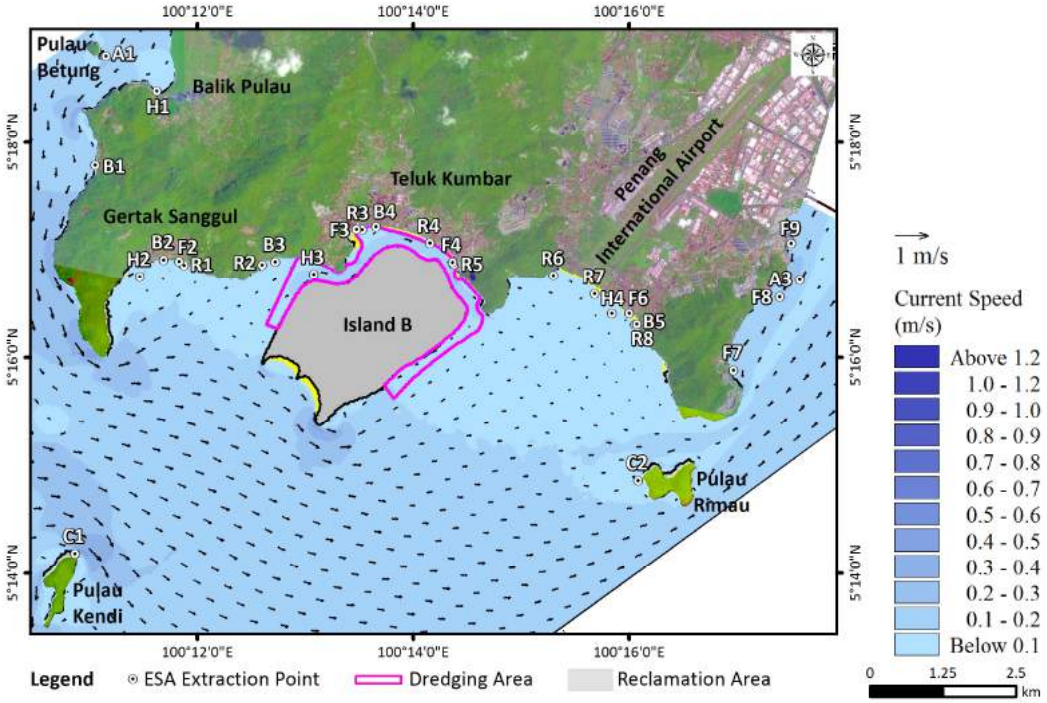
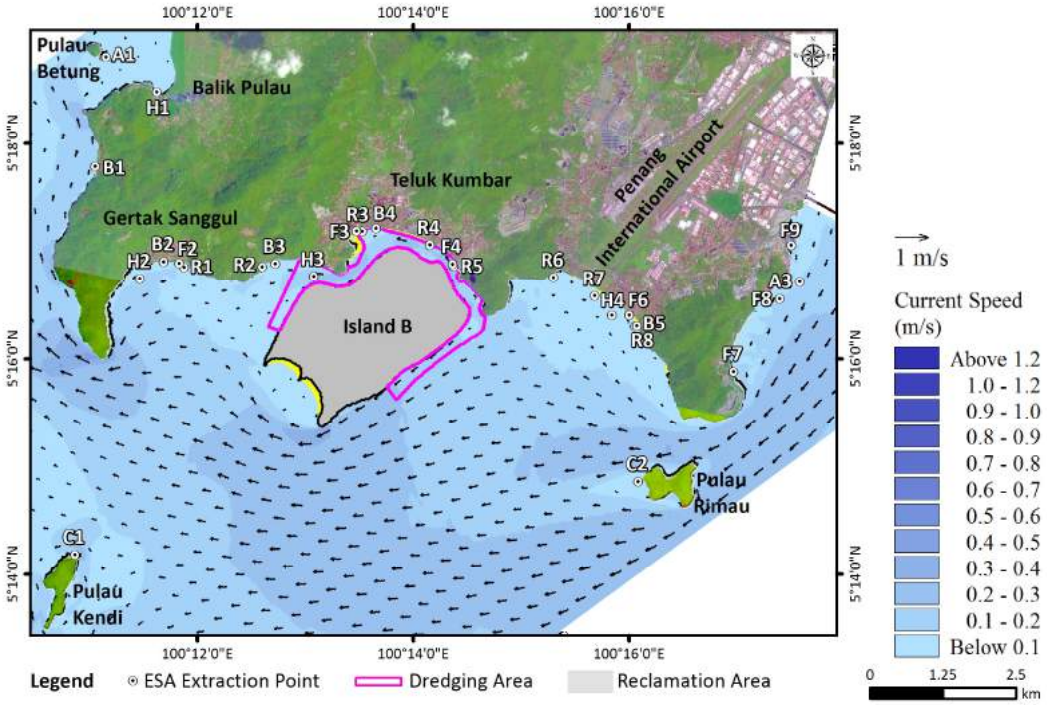
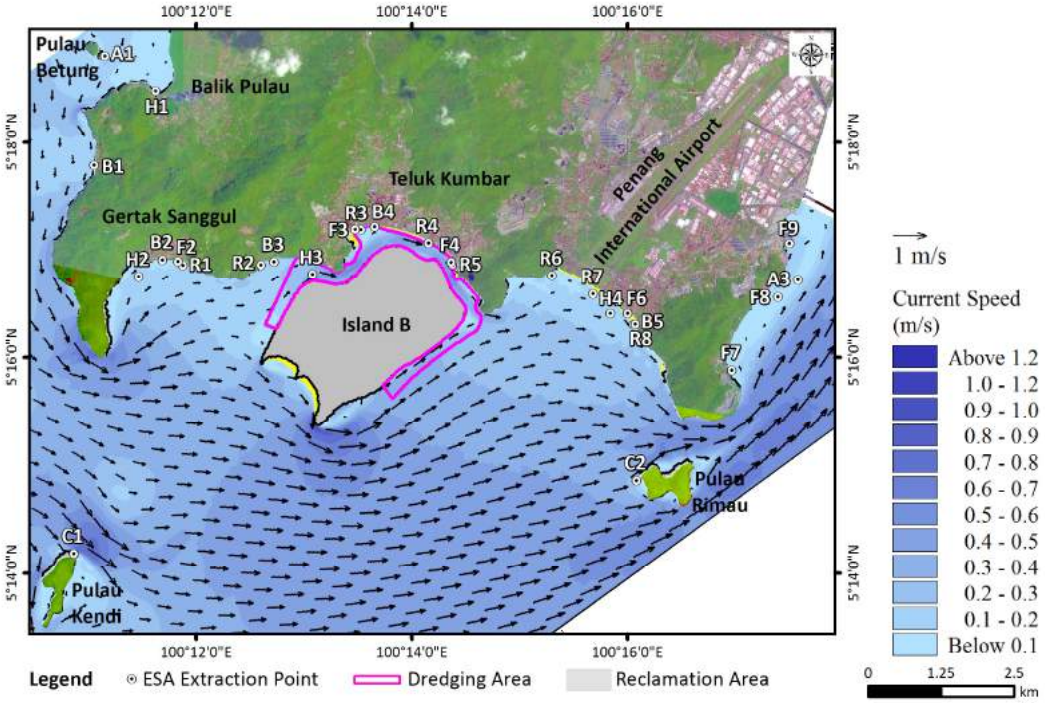


c) Neap period: Flood flow

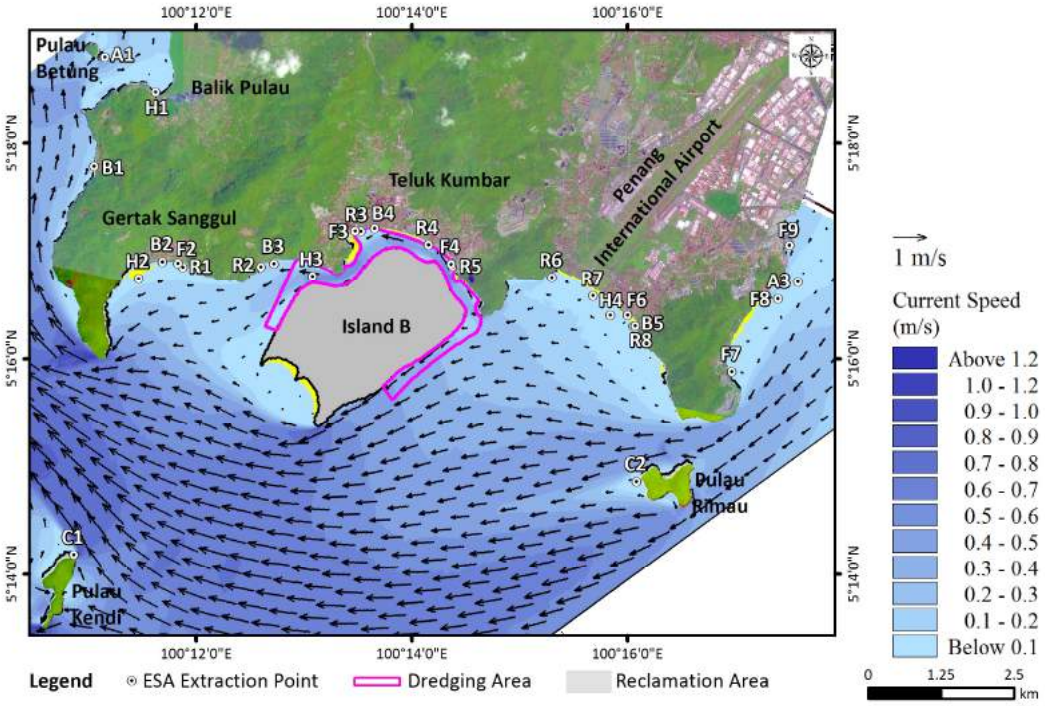


d) Neap period: Ebb flow

F7.14 Flow pattern during spring and neap periods for Scenario 2 condition (Northeast Monsoon condition) (cont'd)

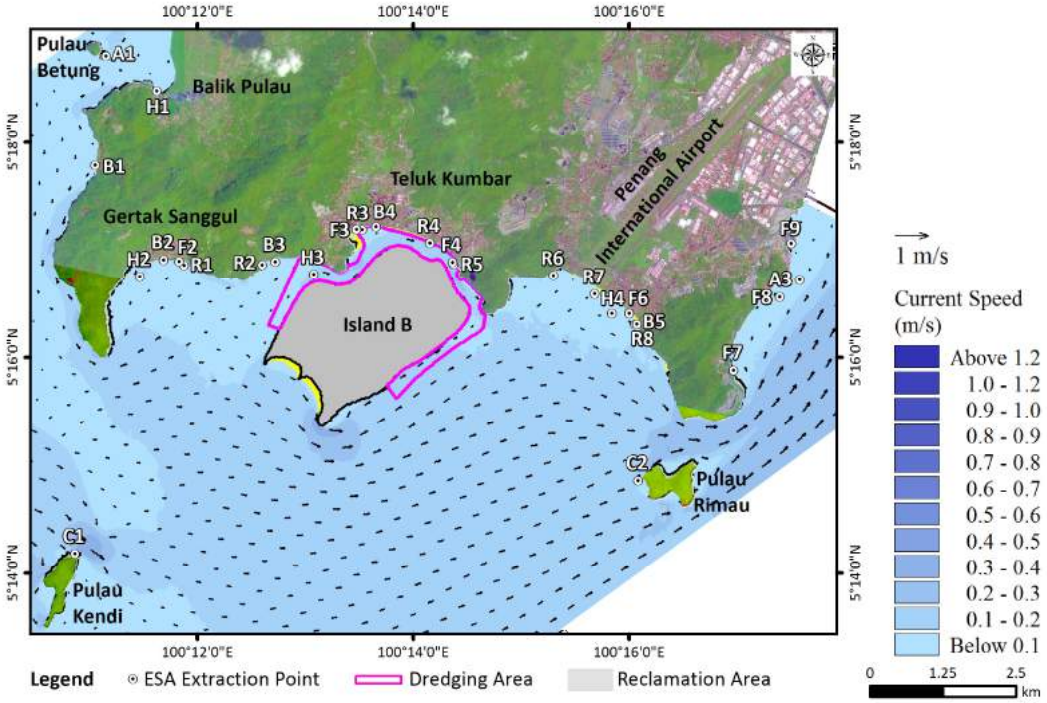


a) Spring period: Flood flow

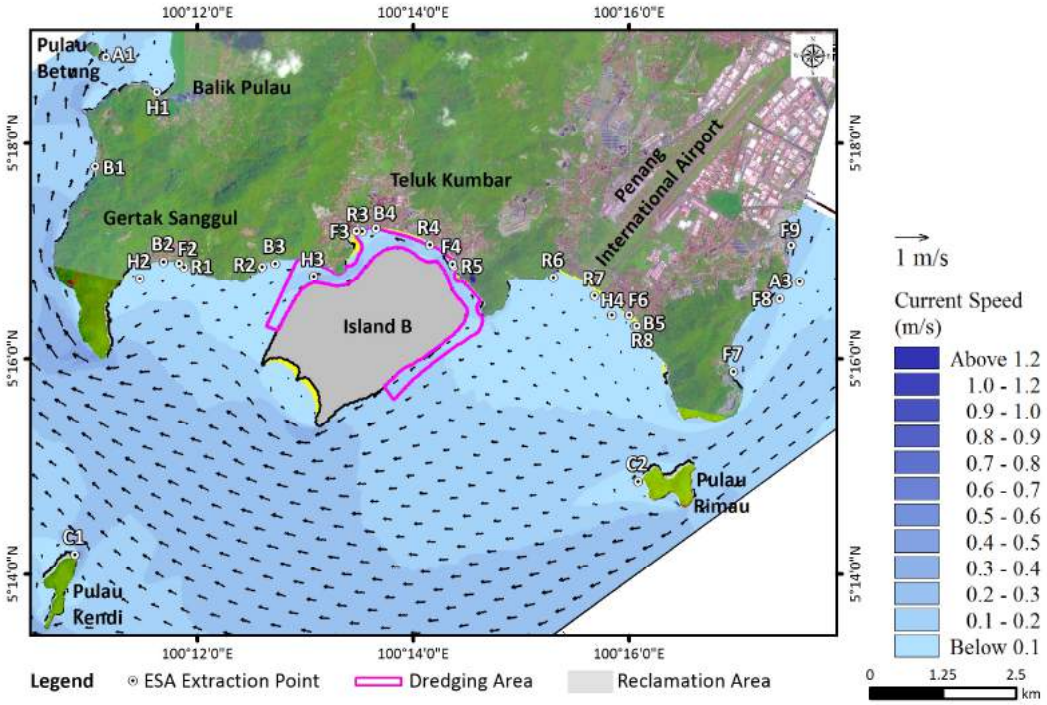


b) Spring period: Ebb flow

F7.15 Flow pattern during spring and neap periods for Scenario 2 condition (Southwest Monsoon condition)

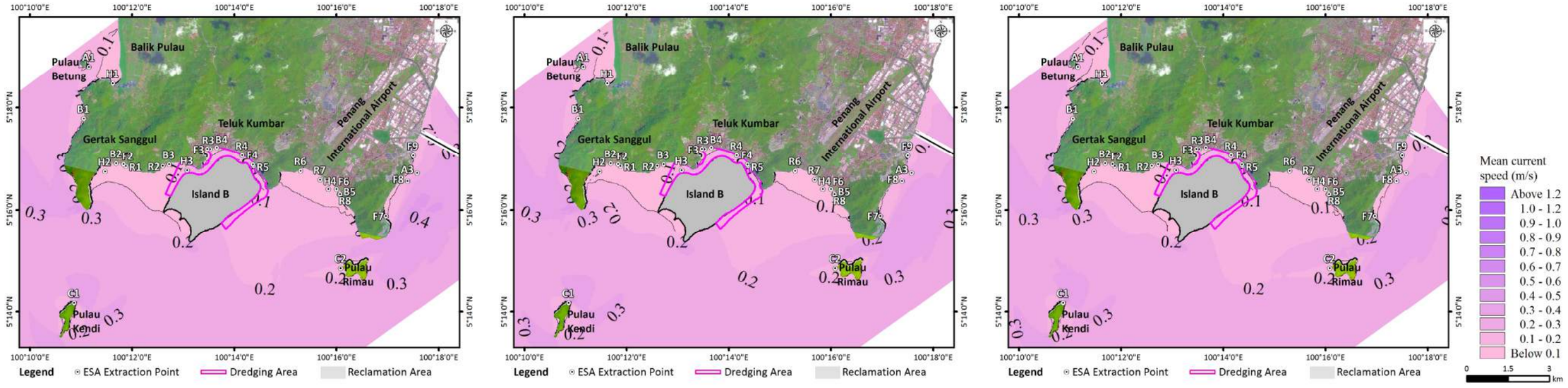


c) Neap period: Flood flow



d) Neap period: Ebb flow

F7.15 Flow pattern during spring and neap periods for Scenario 2 condition (Southwest Monsoon condition) (cont'd)



a) Mean current speed: Pure tide

c) Mean current speed: Northeast Monsoon

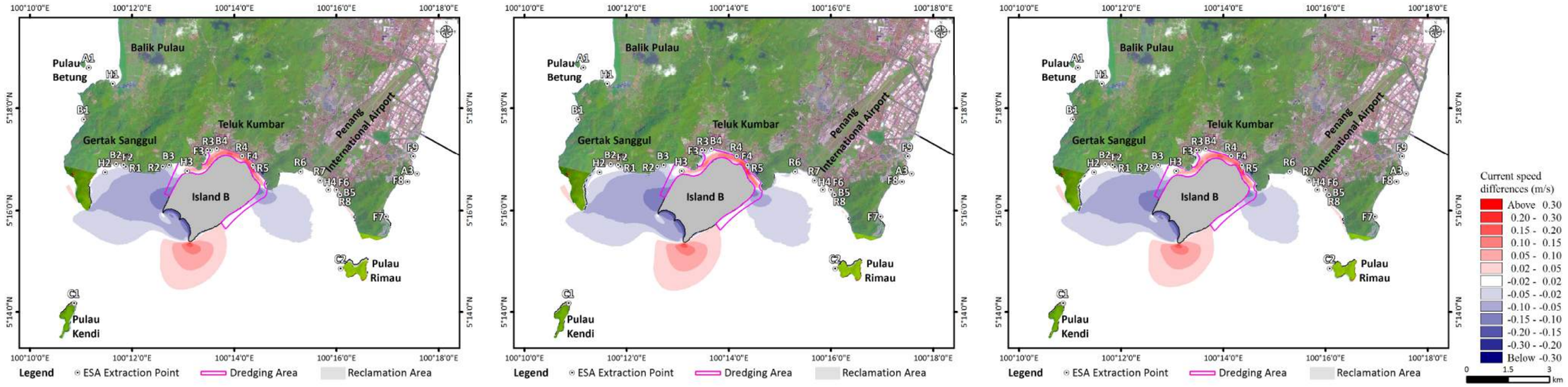
e) Mean current speed: Southwest Monsoon

b) Maximum current speed: Pure tide

d) Maximum current speed: Northeast Monsoon

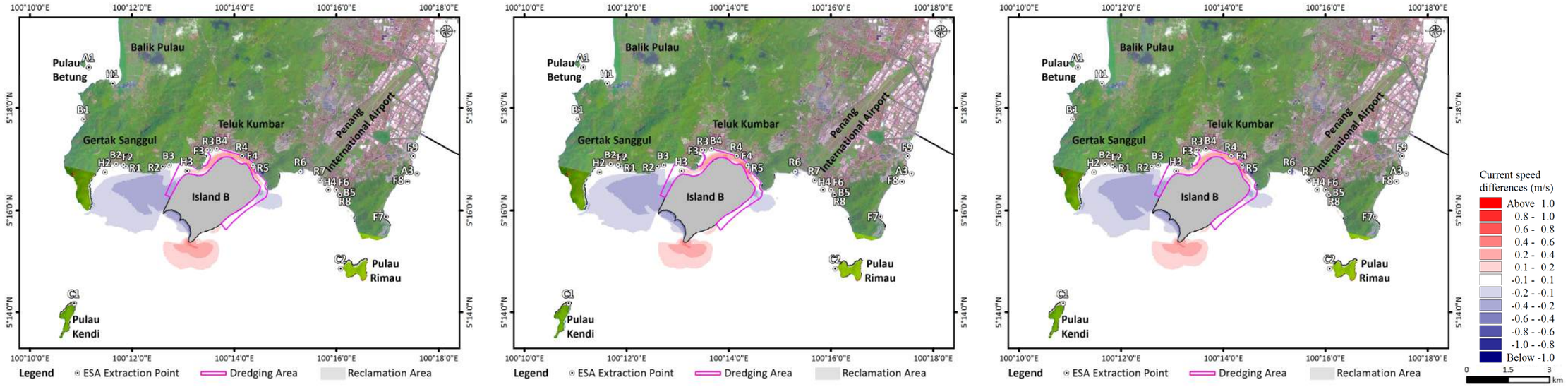
f) Maximum current speed: Southwest Monsoon

F7.16 Mean and maximum current speed plots for Scenario 2 condition



a) Pure tide condition b) Northeast Monsoon condition c) Southwest Monsoon condition

F7.17 Changes in mean current speed, Scenario 2 vs. existing condition



a) Pure tide condition b) Northeast Monsoon condition c) Southwest Monsoon condition

F7.18 Changes in maximum current speed, Scenario 2 vs. existing condition

T7.11 Comparison of mean and maximum current speed at the ESAs between baseline condition and Scenario 2

Point	Location	Baseline Condition		Scenario 1						Remarks
				Mean			Maximum			
		Mean Speed (m/s)	Maximum Speed (m/s)	Speed (m/s)	Difference (m/s)	Difference (%)	Speed (m/s)	Difference (m/s)	Difference (%)	
R1	Sungai Gertak Sanggul	0.08	0.21	0.05	-0.03	-38	0.13	-0.08	-38	Decrease in current speed may induce sluggishness
R2	Sungai Gemuruh	0.10	0.25	0.09	-0.01	-10	0.21	-0.04	-16	Decrease in current speed may induce sluggishness
R3	Sungai Teluk Kumbar	0.06	0.13	0.16	0.10	167	0.43	0.30	231	Increase in current speed may induce erosion. Refer to *Section 7.3.8*.
R4	Sungai Mati	0.03	0.07	0.03	0.00	0	0.13	0.06	86	Increase in current speed may induce erosion. Refer to *Section 7.3.8*.
R5	Sungai Batu	0.03	0.15	0.08	0.05	167	0.27	0.12	80	Increase in current speed may induce erosion. Refer to *Section 7.3.8*.
R6	Sungai Bayan Lepas	0.05	0.12	0.04	-0.01	-20	0.12	0.00	0	Insignificant Impact
R7	Bayan Lepas Main Drain	0.06	0.16	0.07	0.01	17	0.21	0.05	31	Increase in current speed may induce erosion. Refer to *Section 7.3.8*.
R8	Sungai Ikan Mati	0.05	0.15	0.07	0.02	40	0.21	0.06	40	Increase in current speed may induce erosion. Refer to *Section 7.3.8*.
C1	Pulau Kendi	0.25	0.99	0.24	-0.01	-4	0.99	0.00	0	Insignificant impact
C2	Pulau Rimau	0.14	0.42	0.14	0.00	0	0.42	0.00	0	Insignificant impact
H1	Sungai Pulau Betung	0.01	0.03	0.01	0.00	0	0.02	-0.01	-33	Insignificant impact
H2	Gertak Sanggul	0.06	0.24	0.05	-0.01	-17	0.26	0.02	8	Insignificant impact
H3	Teluk Kumbar	0.12	0.31	0.16	0.04	33	0.45	0.14	45	Insignificant impact
H4	Permatang Damar Laut	0.06	0.15	0.06	0.00	0	0.16	0.01	7	Insignificant impact

T7.11 Comparison of mean and maximum current speed at the ESAs between baseline condition and Scenario 2 (cont'd)

Point	Location	Baseline Condition		Scenario 1						Remarks
				Mean			Maximum			
		Mean Speed (m/s)	Maximum Speed (m/s)	Speed (m/s)	Difference (m/s)	Difference (%)	Speed (m/s)	Difference (m/s)	Difference (%)	
A1	Pulau Betung	0.16	0.47	0.16	0.00	0	0.46	-0.01	-2	Insignificant impact
A2	Sungai Pulau Betung	-	-	-	-	-	-	-	-	No data (upstream location)
A3	Batu Maung	0.22	0.56	0.22	0.00	0	0.55	-0.01	-2	Insignificant impact
F1	Sungai Pulau Betung	-	-	-	-	-	-	-	-	No data (upstream location)
F2	Gertak Sanggul	0.04	0.04	0.02	-0.02	-50	0.08	-0.09	-53	Decrease in current speed may induce sedimentation. Refer to *Section 7.3.8*.
F3	Teluk Kumbar	0.03	0.03	0.02	-0.01	-33	0.08	-0.19	-70	Decrease in current speed may induce sedimentation. Refer to *Section 7.3.8*.
F4	Sungai Batu	0.04	0.04	0.15	0.11	275	0.38	0.23	153	Increase in current speed may induce erosion. Refer to *Section 7.3.8*.
F5	Permatang Tepi Laut	-	-	-	-	-	-	-	-	No data (upstream location)
F6	Permatang Damar Laut	0.06	0.06	0.06	0.00	0	0.17	0.00	0	Insignificant impact
F7	Teluk Tempoyak Besar	0.08	0.08	0.08	0.00	0	0.25	-0.01	-4	Insignificant impact
F8	Teluk Tempoyak Kecil	0.19	0.19	0.19	0.00	0	0.54	0.01	2	Insignificant impact
F9	Batu Maung	0.16	0.16	0.16	0.00	0	0.43	0.00	0	Insignificant impact

c) Scenario 3

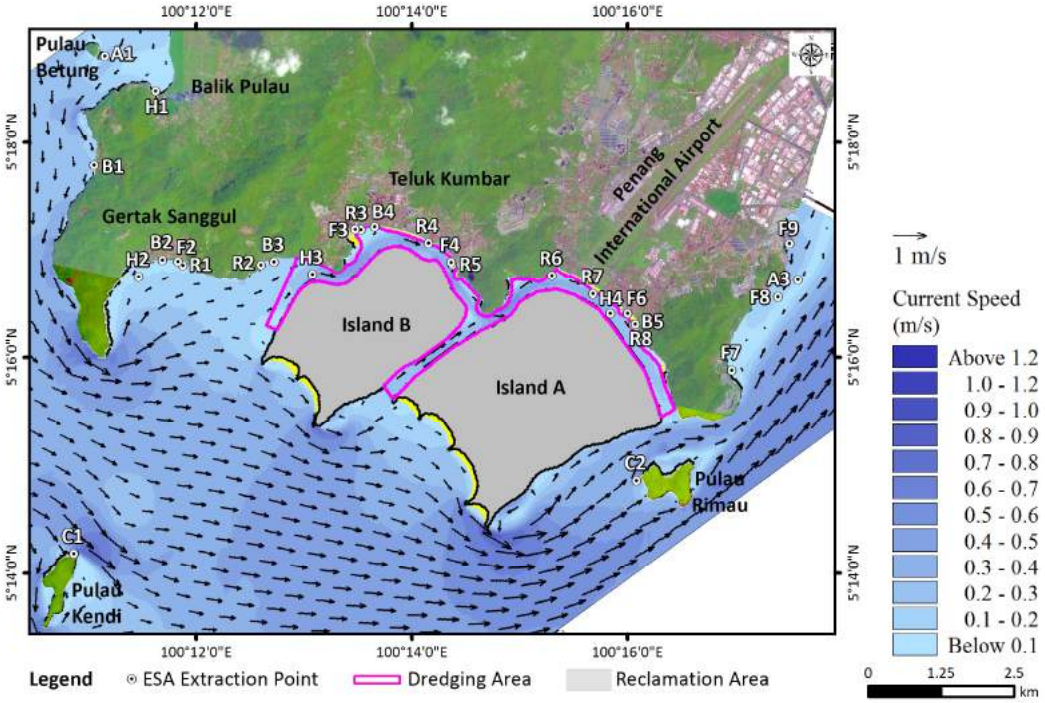
F7.19 to F7.21 show the current flow conditions around the Project site after the implementation of Scenario 3 during spring and neap periods for all climatic conditions. The mean and maximum current speeds for climatic conditions are shown in F7.22.

The changes in mean and maximum current speeds between Scenario 3 and the existing conditions are illustrated in F7.23 and F7.24 respectively. It is observed from these figures that the increase in the mean and maximum current speeds in the channel between Island B and the foreshore of Teluk Kumbar is slightly reduced to 0.1 and 0.2 m/s in respect to the observations in Scenario 2. The mean and maximum current speeds in the channel between Island A and the coastline of Permatang Damar Laut is predicted to increase by 0.1 and 0.2 m/s respectively.

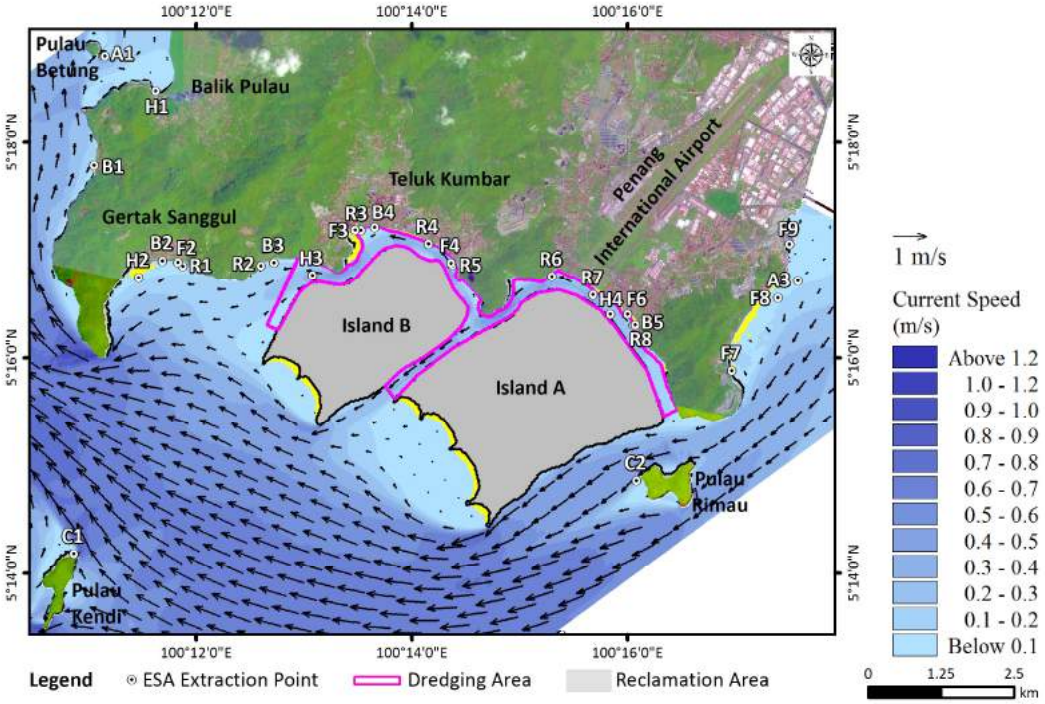
The mean and maximum currents off the southern coastline of both reclaimed islands are expected to reduce by 0.15 and 0.4 m/s respectively, mainly due to the headlands. There is a localised increase in current speed near the southern-most headland of Island A by up to 0.15 and 0.4 m/s in the mean and maximum values respectively. With the presence of Island A, the increase in the mean current speed at the southern-most headland of Island B is reduced to 0.1 m/s.

Changes in current speeds are observed around Pulau Rimau. The mean current speed is reduced by 0.1 m/s to the north and south of the island; increased by 0.15 m/s to the west of the island; and increased by 0.05 m/s to the east of the Pulau Rimau. The maximum current speed is reduced by up to 0.2 m/s to the north of the island and increased by 0.4 m/s to the west of the island.

The comparisons of the mean and maximum current speeds between the baseline and Scenario 3 are tabulated in T7.12.

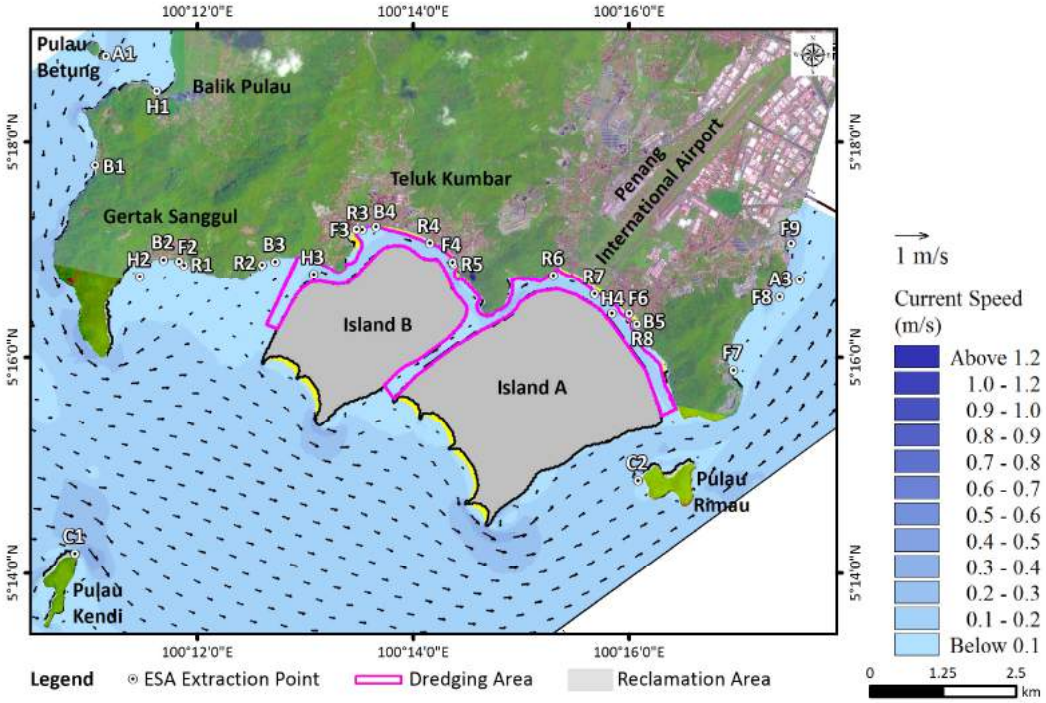


a) Spring period: Flood flow

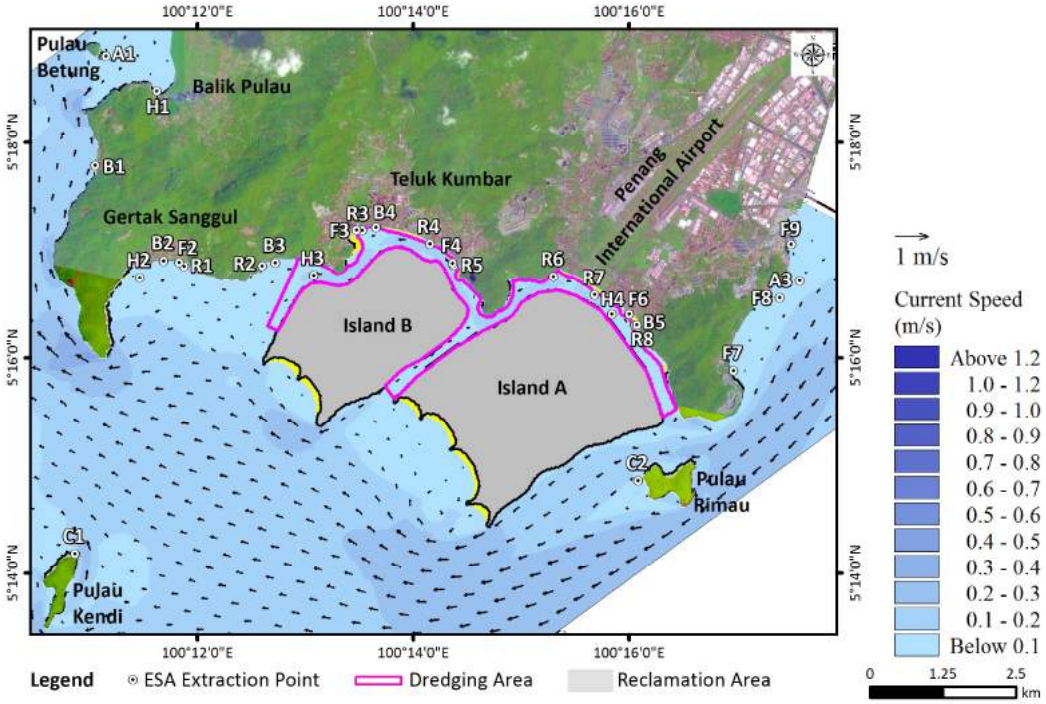


b) Spring period: Ebb flow

F7.19 Flow pattern during spring and neap periods for Scenario 3 condition (pure tide condition)

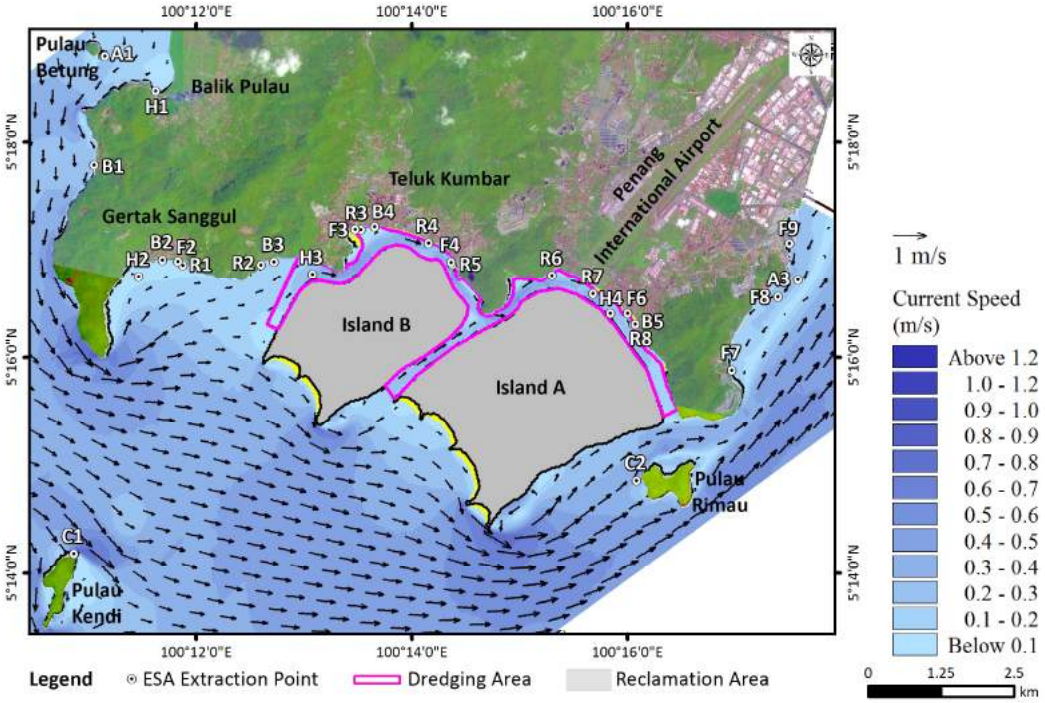


c) Neap period: Flood flow

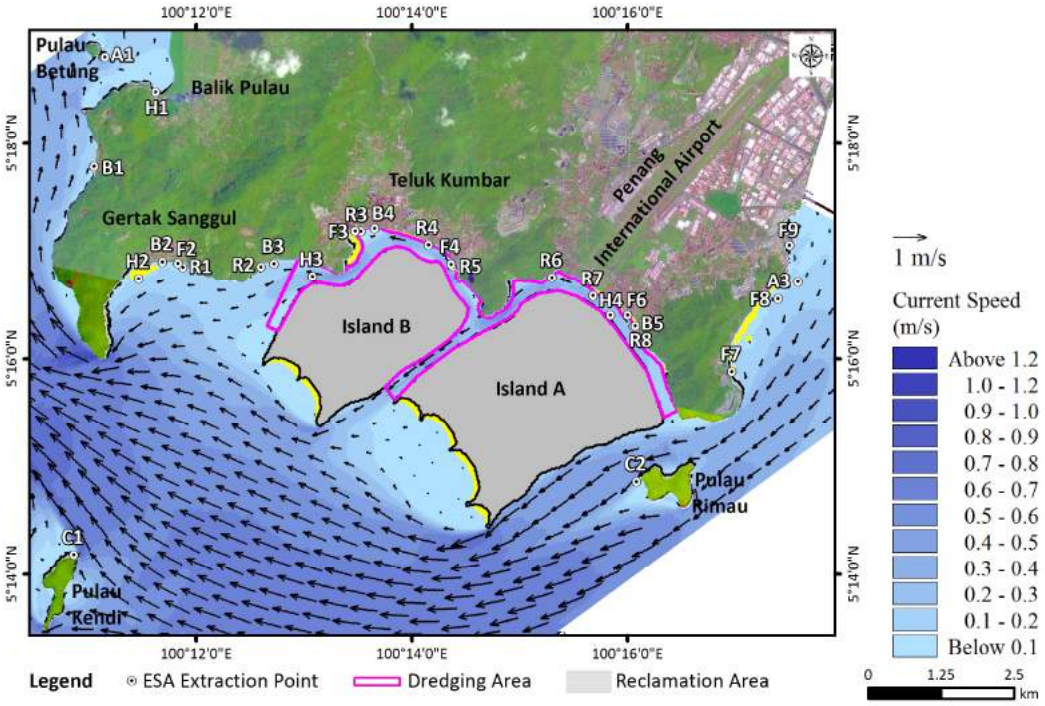


d) Neap period: Ebb flow

F7.19 Flow pattern during spring and neap periods for Scenario 3 condition (pure tide condition) (cont'd)

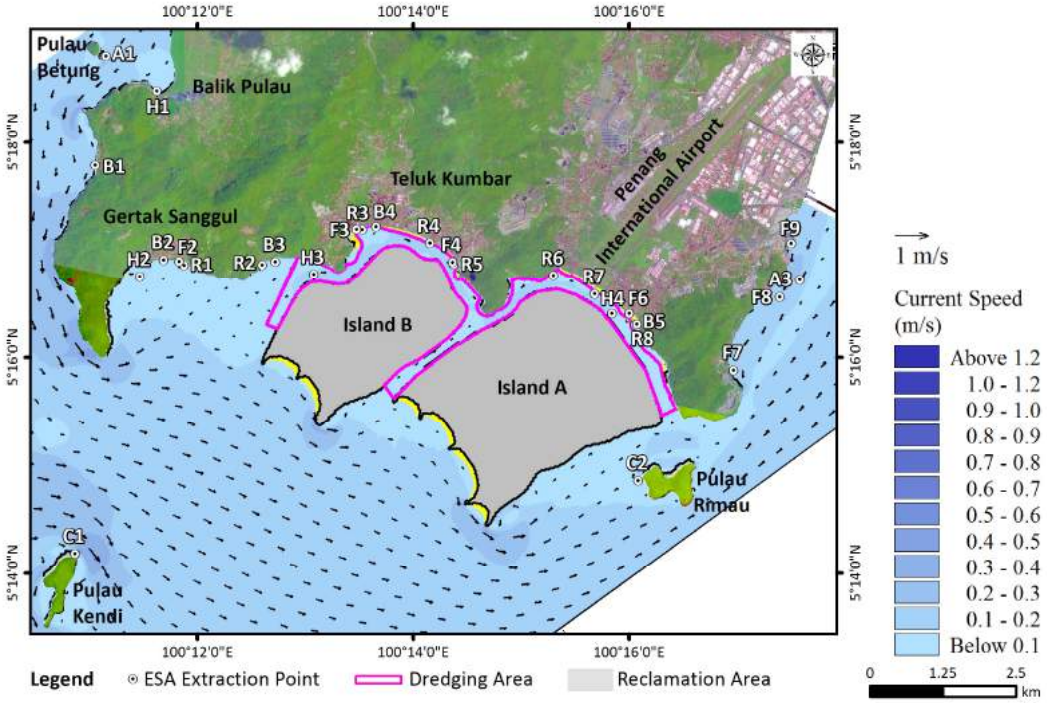


a) Spring period: Flood flow

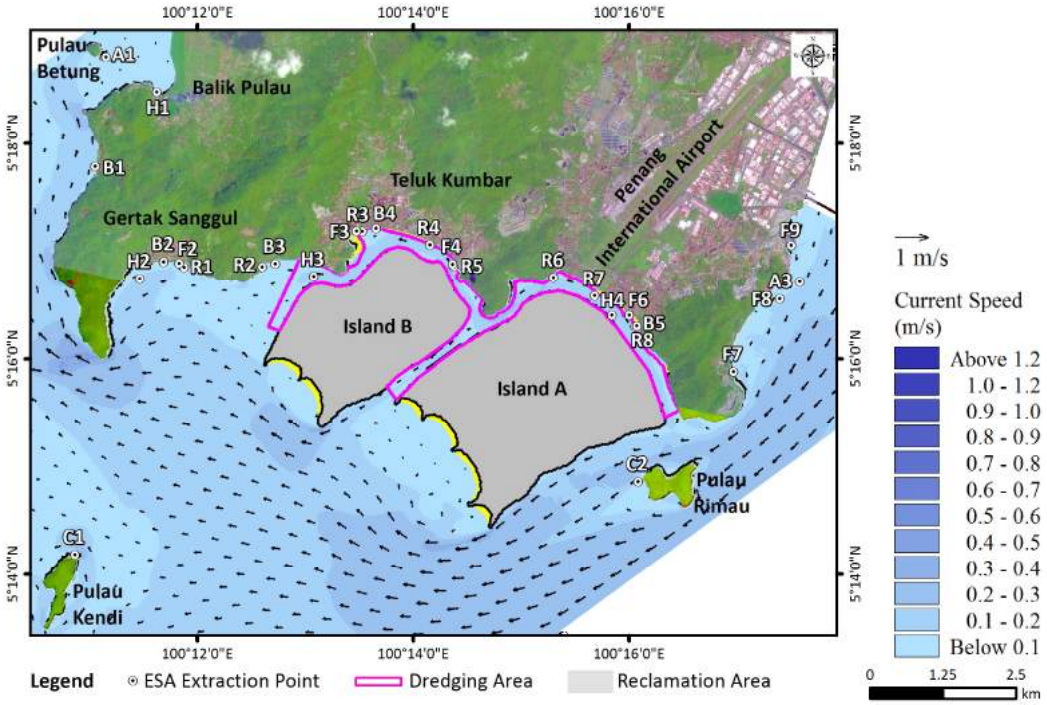


b) Spring period: Ebb flow

F7.20 Flow pattern during spring and neap periods for Scenario 3 condition (Northeast Monsoon condition)

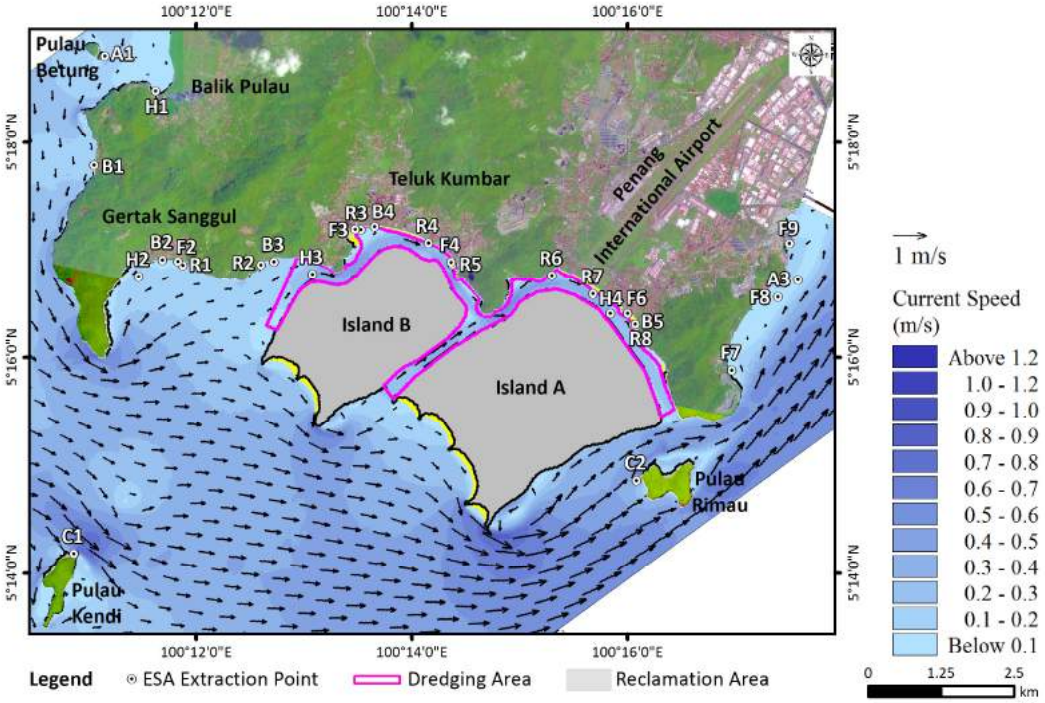


c) Neap period: Flood flow

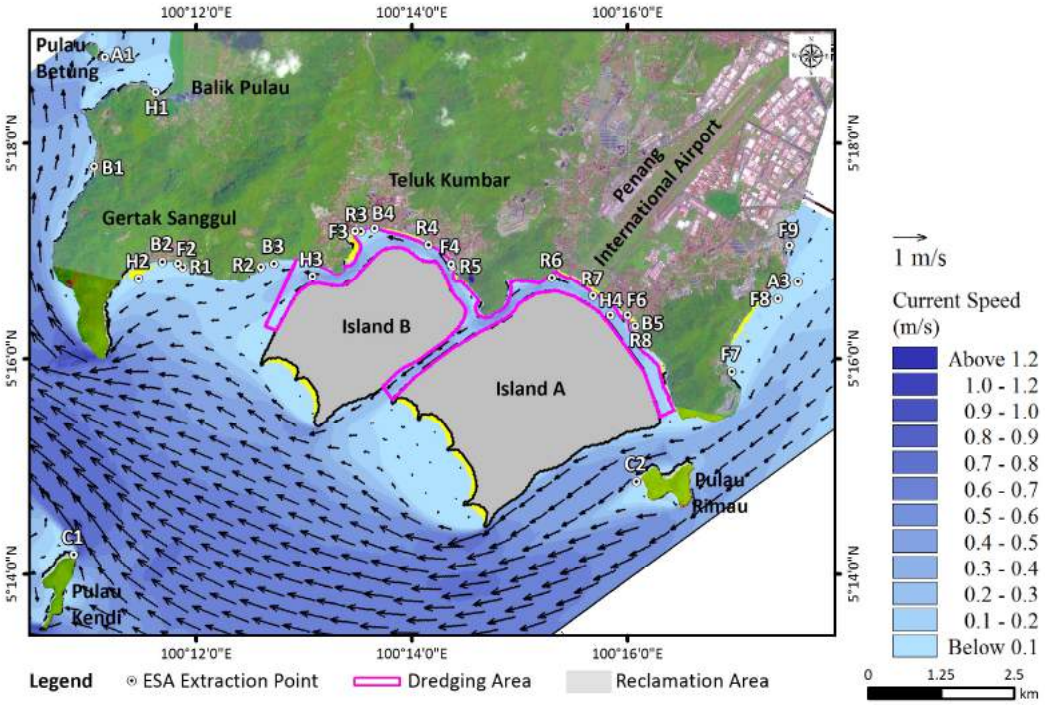


d) Neap period: Ebb flow

F7.20 Flow pattern during spring and neap periods for Scenario 3 condition (Northeast Monsoon condition) (cont'd)

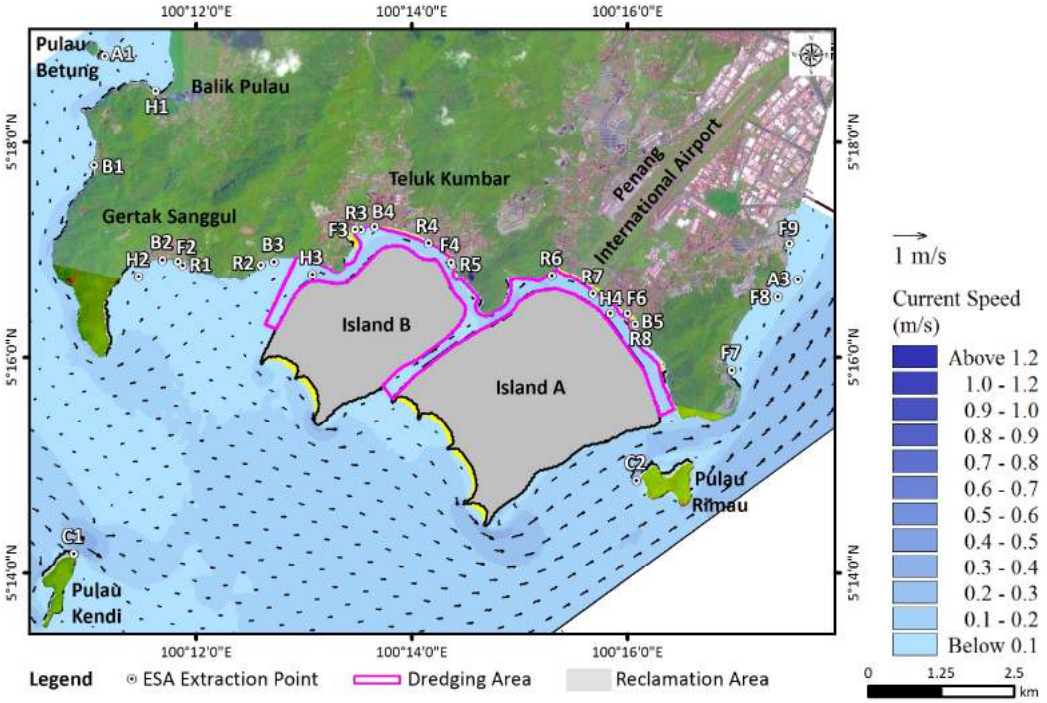


a) Spring period: Flood flow

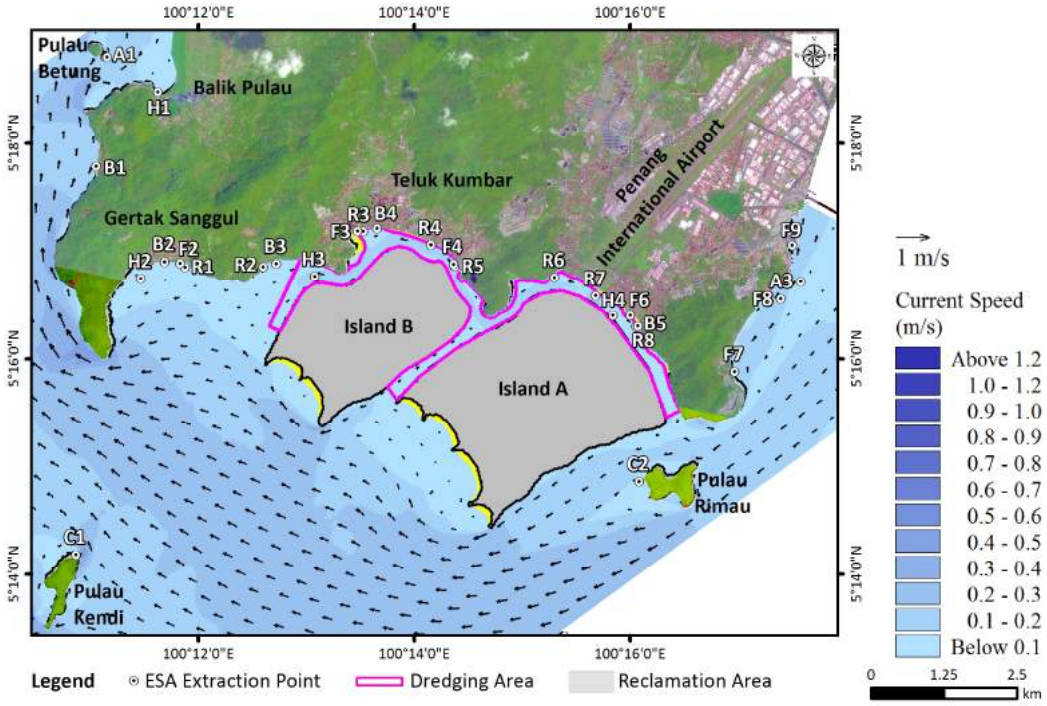


b) Spring period: Ebb flow

F7.21 Flow pattern during spring and neap periods for Scenario 3 condition (Southwest Monsoon condition)

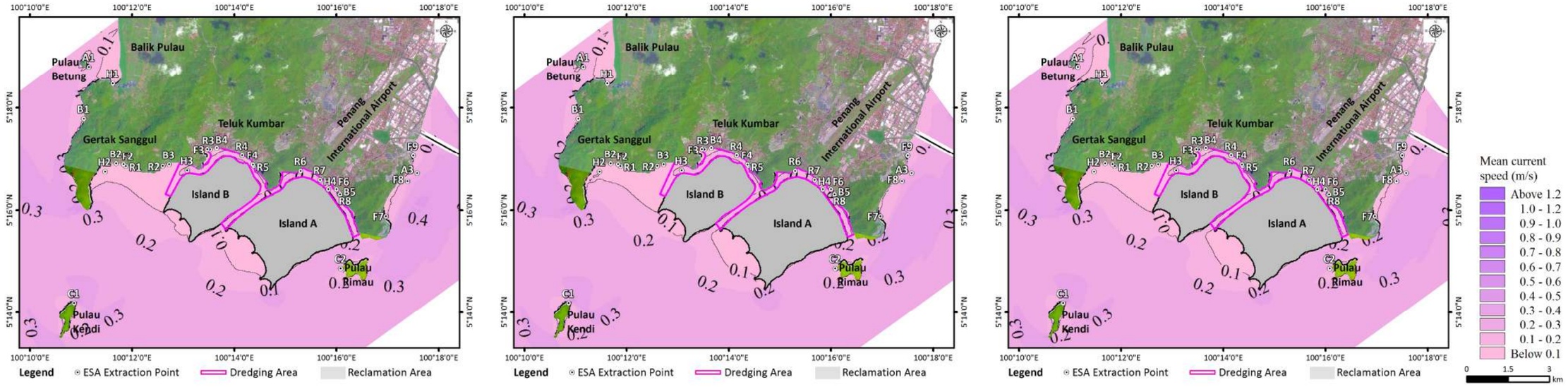


c) Neap period: Flood flow



d) Neap period: Ebb flow

F7.21 Flow pattern during spring and neap periods for Scenario 3 condition (Southwest Monsoon condition) (cont'd)



a) Mean current speed: Pure tide

c) Mean current speed: Northeast Monsoon

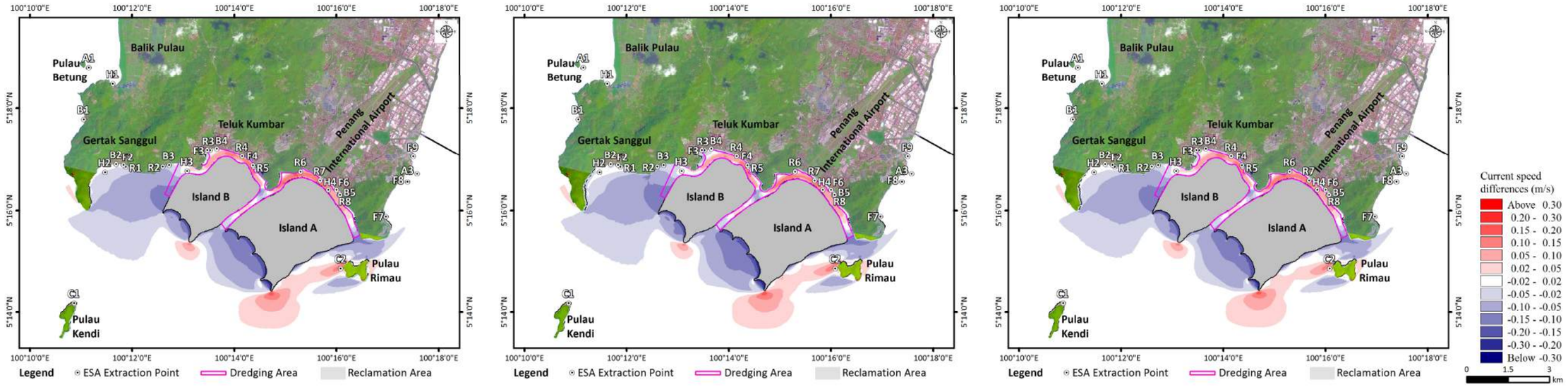
e) Mean current speed: Southwest Monsoon

b) Maximum current speed: Pure tide

d) Maximum current speed: Northeast Monsoon

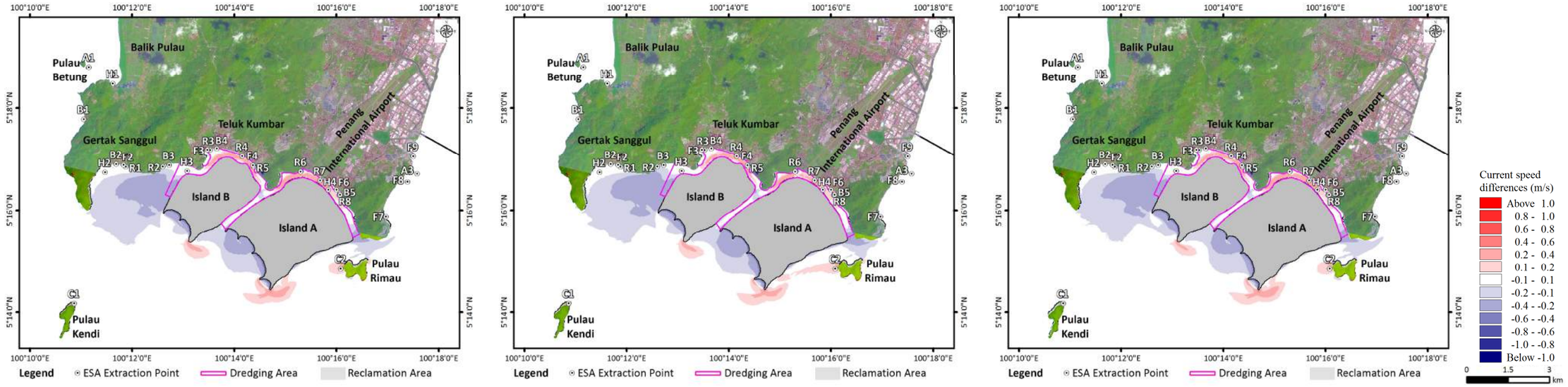
f) Maximum current speed: Southwest Monsoon

F7.22 Mean and maximum current speed plots for Scenario 3 condition



a) Pure tide condition b) Northeast Monsoon condition c) Southwest Monsoon condition

F7.23 Changes in mean current speed, Scenario 3 vs. existing condition



a) Pure tide condition b) Northeast Monsoon condition c) Southwest Monsoon condition

F7.24 Changes in maximum current speed, Scenario 3 vs. existing condition

T7.12 Comparison of mean and maximum current speed at the ESAs between baseline condition and Scenario 3

Point	Location	Baseline Condition		Scenario 1						Remarks
				Mean			Maximum			
		Mean Speed (m/s)	Maximum Speed (m/s)	Speed (m/s)	Difference (m/s)	Difference (%)	Speed (m/s)	Difference (m/s)	Difference (%)	
R1	Sungai Gertak Sanggul	0.08	0.21	0.05	-0.03	-38	0.11	-0.10	-48	Decrease in current speed may induce sluggishness
R2	Sungai Gemuruh	0.10	0.25	0.08	-0.02	-20	0.19	-0.06	-24	Decrease in current speed may induce sluggishness
R3	Sungai Teluk Kumbar	0.06	0.13	0.14	0.08	133	0.39	0.26	200	Increase in current speed may induce erosion. Refer to *Section 7.3.8*.
R4	Sungai Mati	0.03	0.07	0.03	0.00	0	0.11	0.04	57	Increase in current speed may induce erosion. Refer to *Section 7.3.8*.
R5	Sungai Batu	0.03	0.15	0.07	0.04	133	0.23	0.08	53	Increase in current speed may induce erosion. Refer to *Section 7.3.8*.
R6	Sungai Bayan Lepas	0.05	0.12	0.18	0.13	260	0.42	0.30	250	Increase in current speed may induce erosion. Refer to *Section 7.3.8*.
R7	Bayan Lepas Main Drain	0.06	0.16	0.20	0.14	233	0.45	0.29	181	Increase in current speed may induce erosion. Refer to *Section 7.3.8*.
R8	Sungai Ikan Mati	0.05	0.15	0.09	0.04	80	0.23	0.08	53	Increase in current speed may induce erosion. Refer to *Section 7.3.8*.
C1	Pulau Kendi	0.25	0.99	0.24	-0.01	-4	0.97	-0.02	-2	Insignificant impact
C2	Pulau Rimau	0.14	0.42	0.23	0.09	64	0.64	0.22	52	Insignificant impact
H1	Sungai Pulau Betung	0.01	0.03	0.01	0.00	0	0.02	-0.01	-33	Insignificant impact
H2	Gertak Sanggul	0.06	0.24	0.05	-0.01	-17	0.18	-0.06	-25	Insignificant impact
H3	Teluk Kumbar	0.12	0.31	0.13	0.01	8	0.37	0.06	19	Insignificant impact

T7.12 Comparison of mean and maximum current speed at the ESAs between baseline condition and Scenario 3 (cont'd)

Point	Location	Baseline Condition		Scenario 1						Remarks
				Mean			Maximum			
		Mean Speed (m/s)	Maximum Speed (m/s)	Speed (m/s)	Difference (m/s)	Difference (%)	Speed (m/s)	Difference (m/s)	Difference (%)	
H4	Permatang Damar Laut	0.06	0.15	0.16	0.10	167	0.39	0.24	160	Insignificant impact
A1	Pulau Betung	0.16	0.47	0.16	0.00	0	0.46	-0.01	-2	Insignificant impact
A2	Sungai Pulau Betung	-	-	-	-	-	-	-	-	No data (upstream location)
A3	Batu Maung	0.22	0.56	0.22	0.00	0	0.55	-0.01	-2	Insignificant impact
F1	Sungai Pulau Betung	-	-	-	-	-	-	-	-	No data (upstream location)
F2	Gertak Sanggul	0.04	0.04	0.02	-0.02	-50	0.07	-0.10	-59	Decrease in current speed may induce sedimentation. Refer to *Section 7.3.8*.
F3	Teluk Kumbar	0.03	0.03	0.02	-0.01	-33	0.07	-0.20	-74	Decrease in current speed may induce sedimentation. Refer to *Section 7.3.8*.
F4	Sungai Batu	0.04	0.04	0.12	0.08	200	0.35	0.20	133	Increase in current speed may induce erosion. Refer to *Section 7.3.8*.
F5	Permatang Tepi Laut	-	-	-	-	-	-	-	-	No data (upstream location)
F6	Permatang Damar Laut	0.06	0.06	0.13	0.07	117	0.31	0.14	82	Increase in current speed may induce erosion. Refer to *Section 7.3.8*.
F7	Teluk Tempoyak Besar	0.08	0.08	0.08	0.00	0	0.25	-0.01	-4	Insignificant impact
F8	Teluk Tempoyak Kecil	0.19	0.19	0.19	0.00	0	0.53	0.00	0	Insignificant impact
F9	Batu Maung	0.16	0.16	0.16	0.00	0	0.43	0.00	0	Insignificant impact

d) Scenario 4

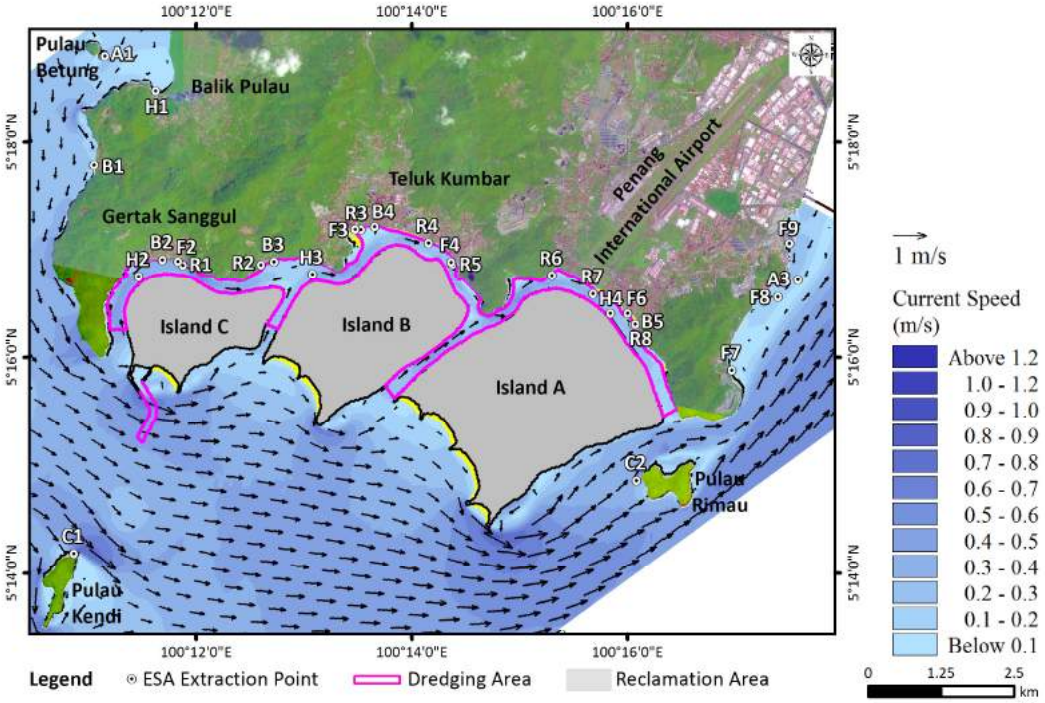
Current flow conditions in Scenario 4 for the pure tide, Northeast Monsoon and Southwest Monsoon conditions are shown in F7.25 to F7.27. The mean and maximum current speeds for all climatic conditions are shown in F7.28.

The changes in mean and maximum current speeds between Scenario 4 and the existing conditions are shown in F7.29 and F7.30 respectively. From these figures, there is a localised increase in the mean and maximum current speeds near the marina breakwater of Island C by 0.1 and 0.2 m/s. As it protrudes further into the faster current flow path as compared to the headland of Tanjung Gertak Sanggul, there is a reduction in current speed near Tanjung Gertak Sanggul up to 0.15 and 0.6 m/s in the mean and maximum values respectively.

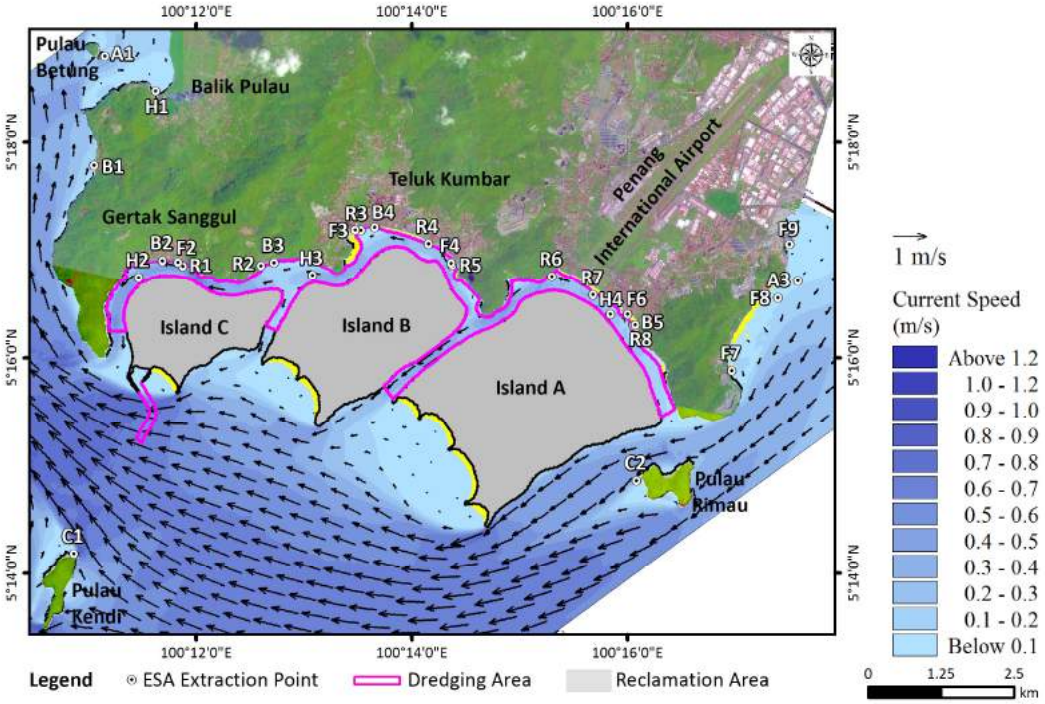
The dredged channel between the coastline of Gertak Sanggul and Island C is predicted to experience an increase in the mean current and maximum current speeds by up to 0.15 and 0.4 m/s respectively.

The changes in current speeds along the southeastern edge of Island A and Pulau Rimau are very similar to those in Scenario 3, given that the Island C is distant from these islands to induce any changes around them.

The comparison of the mean and maximum current speeds between the baseline and Scenario 4 is tabulated in T7.13.

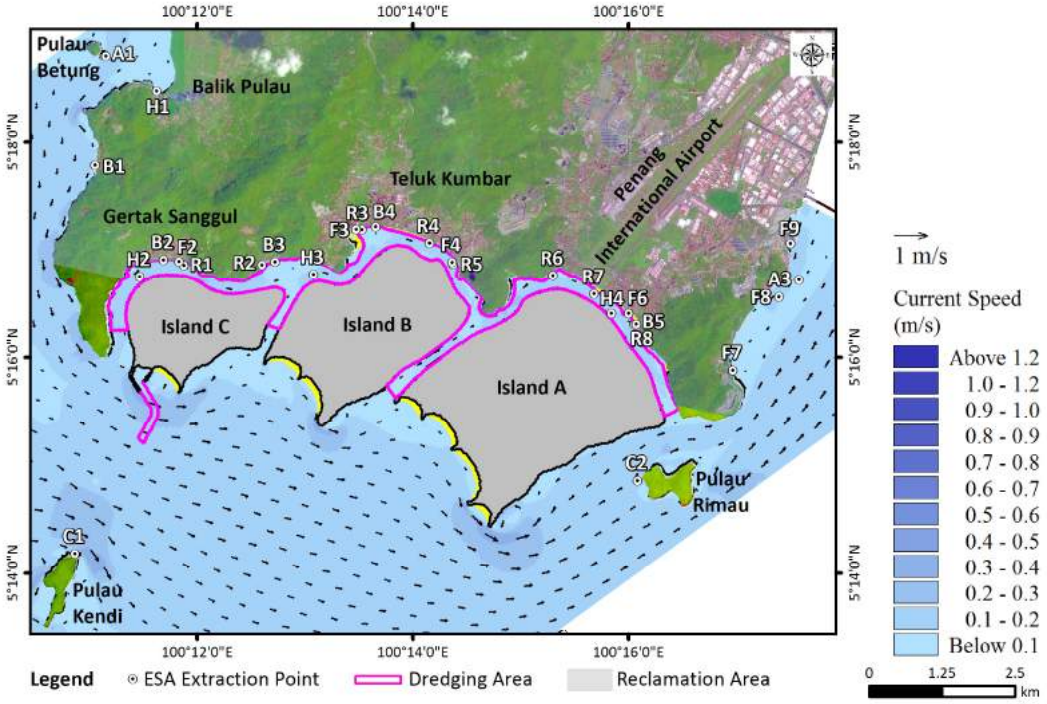


a) Spring period: Flood flow

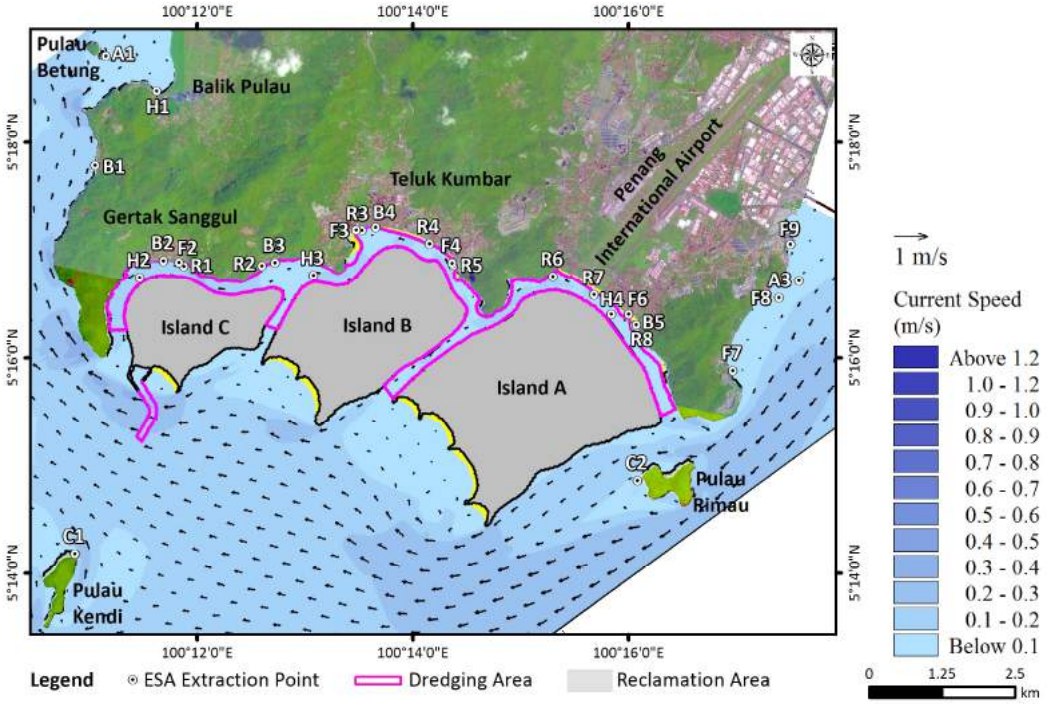


b) Spring period: Ebb flow

F7.25 Flow pattern during spring and neap periods for Scenario 4 condition (pure tide condition)

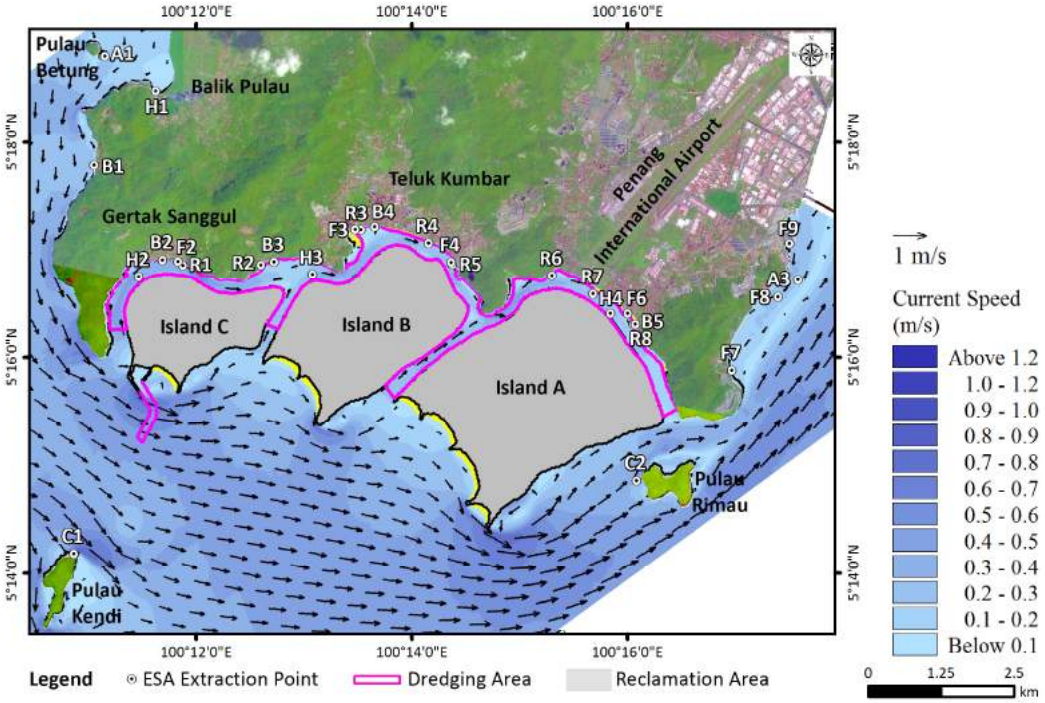


c) Neap period: Flood flow

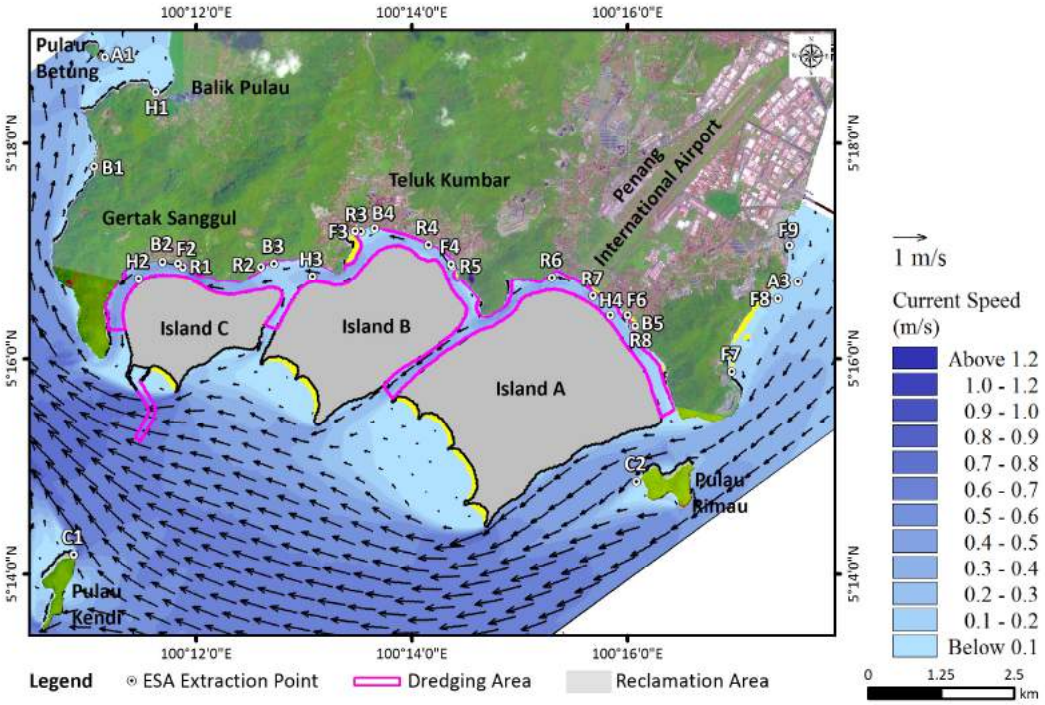


d) Neap period: Ebb flow

F7.25 Flow pattern during spring and neap periods for Scenario 4 condition (pure tide condition) (cont'd)

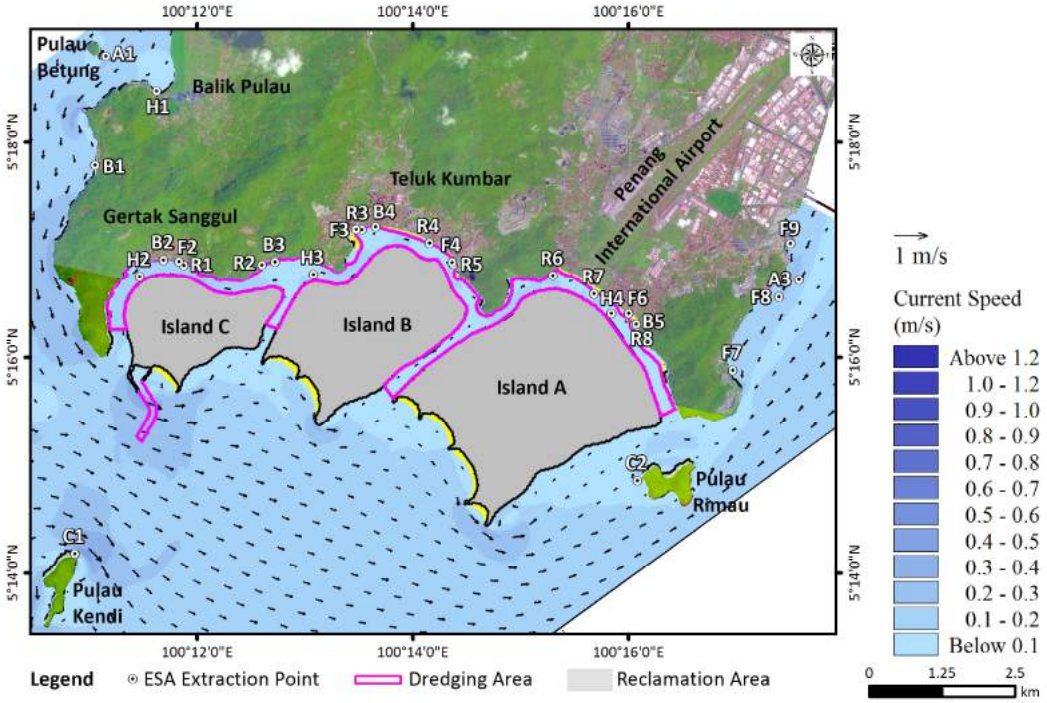


a) Spring period: Flood flow

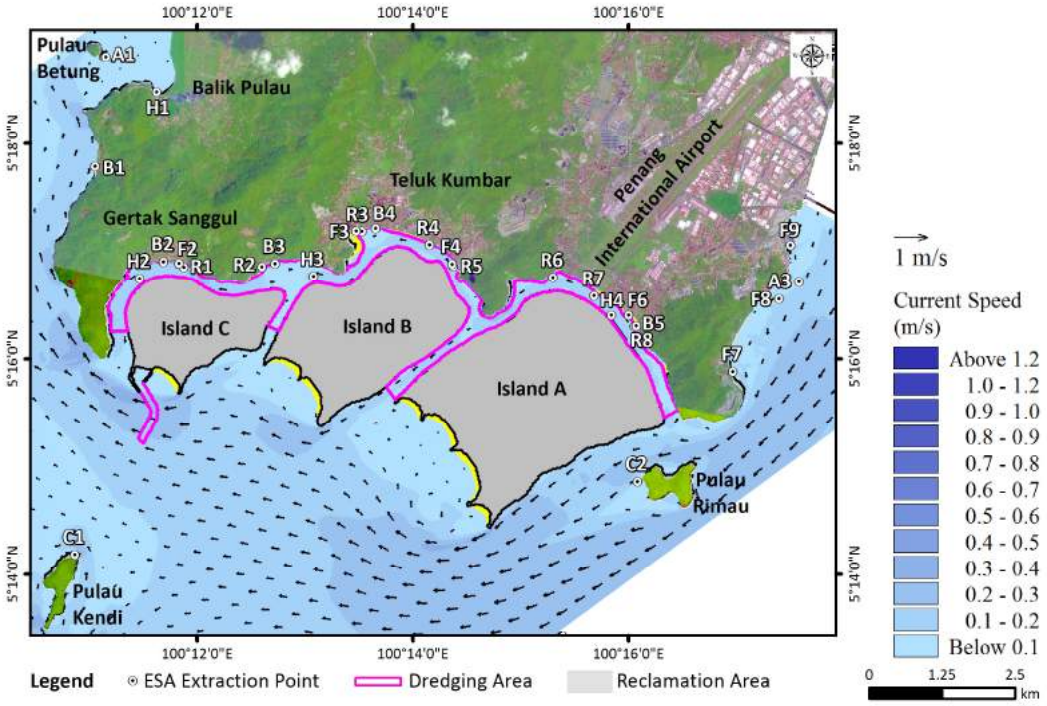


b) Spring period: Ebb flow

F7.26 Flow pattern during spring and neap periods for Scenario 4 condition (Northeast Monsoon condition)

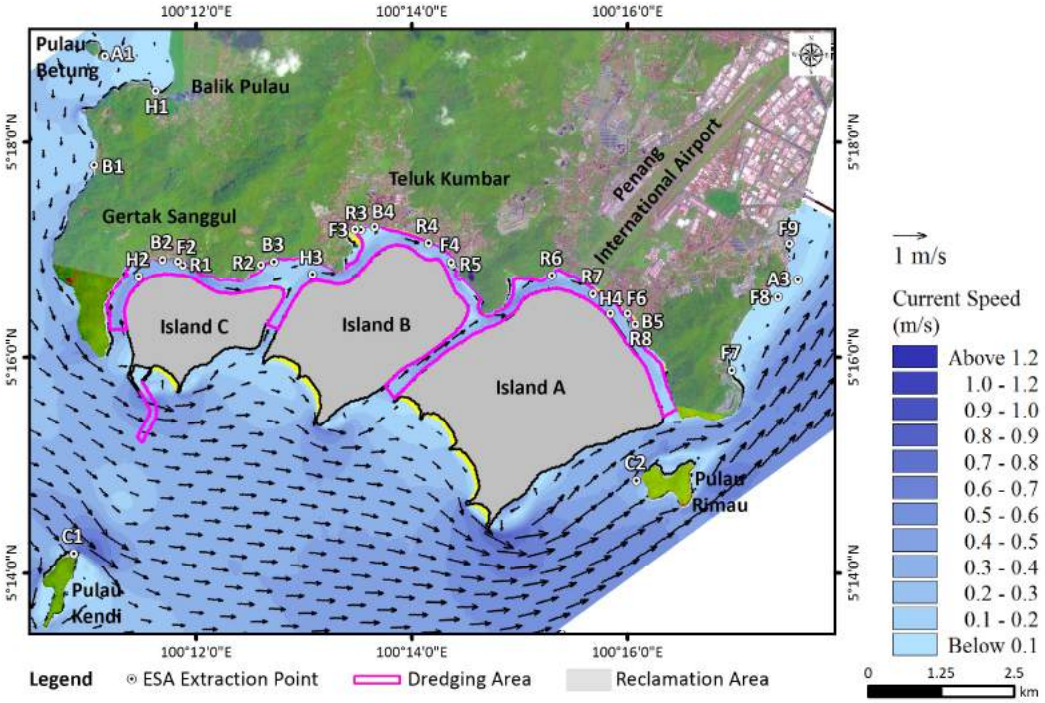


c) Neap period: Flood flow

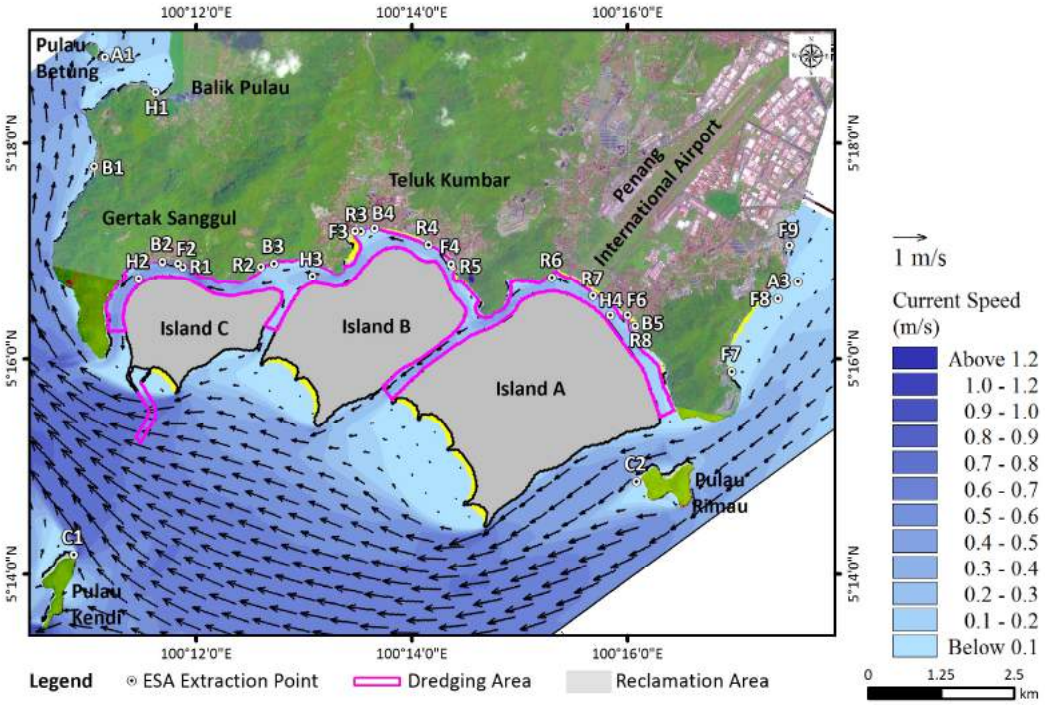


d) Neap period: Ebb flow

F7.26 Flow pattern during spring and neap periods for Scenario 4 condition (Northeast Monsoon condition) (cont'd)

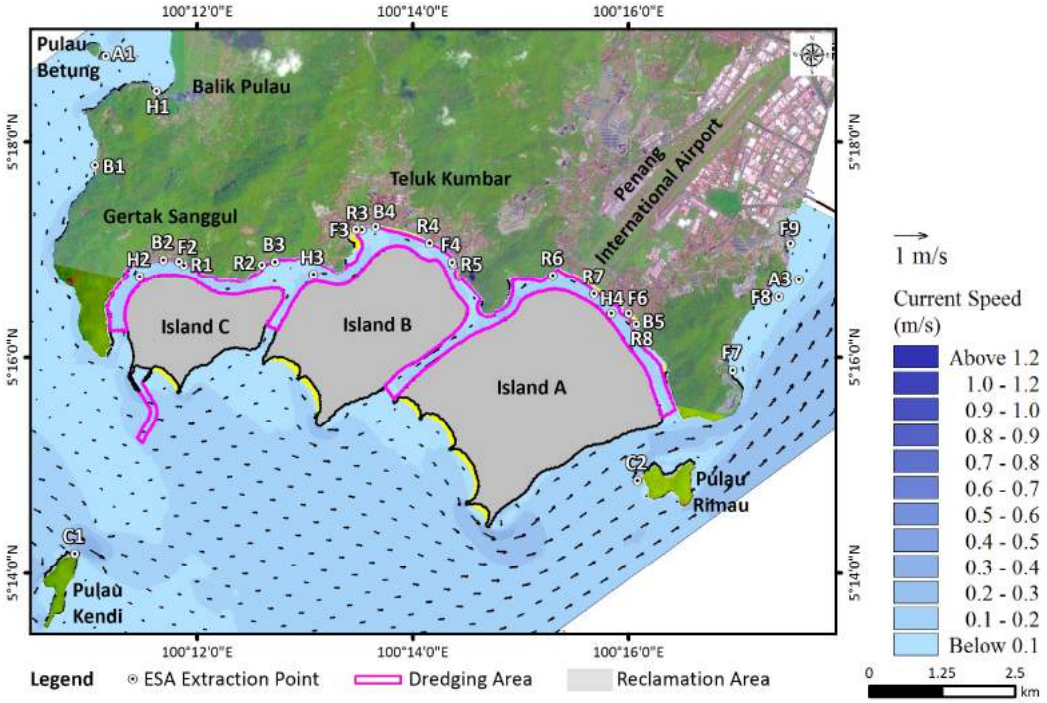


a) Spring period: Flood flow

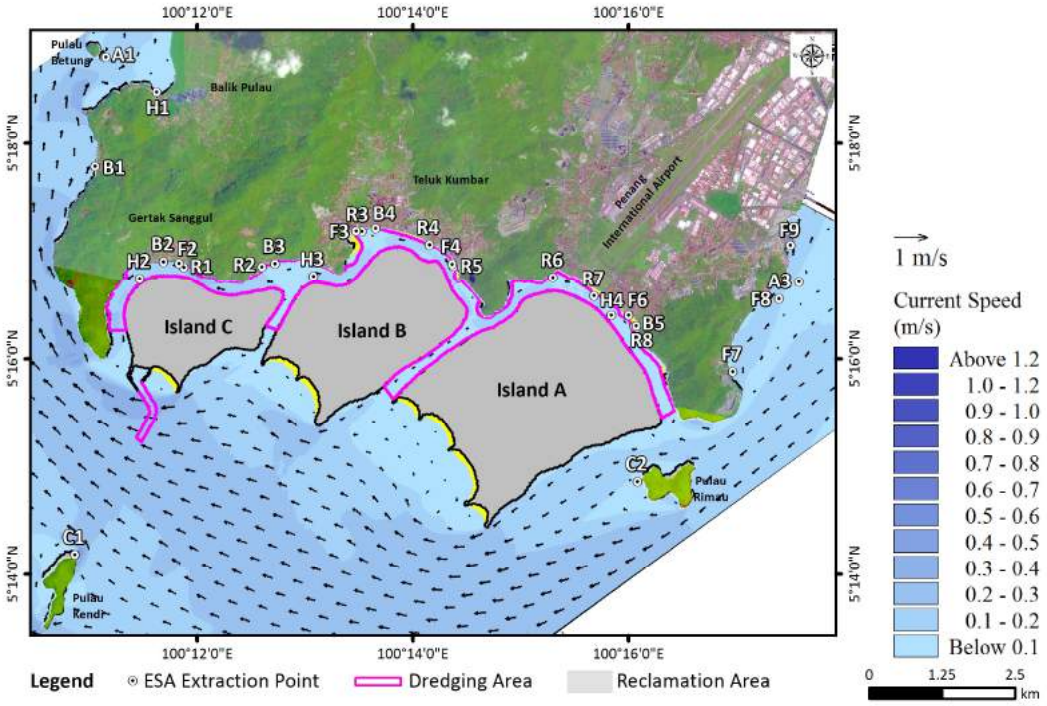


b) Spring period: Ebb flow

F7.27 Flow pattern during spring and neap periods for Scenario 4 condition (Southwest Monsoon condition)



c) Neap period: Flood flow



d) Neap period: Ebb flow

F7.27 Flow pattern during spring and neap periods for Scenario 4 condition (Southwest Monsoon condition) (cont'd)