



Nord Stream 2 Natural Gas Pipeline construction and operation in the Finnish EEZ Environmental and Technical Monitoring Quarterly Report Q2 2020

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Summary

The report presents results and preliminary findings of the environmental and technical monitoring for construction activities of the Nord Stream 2 Gas Pipeline in the Finnish EEZ for the second quarter of 2020. Monitoring is based on the Nord Stream 2 Environmental Monitoring Programme, Finland. The programme was approved on April 12, 2018 within the water permit decision (Nro 53/2018/2, Dnro ESAVI/9101/2017). It was amended with a decision by Uusimaa ELY Centre on November 8, 2019. In accordance, during 2020, water quality and currents were monitored at three stations at the Sandkallan long term monitoring site, but no longer at the Control sites in eastern and western Gulf of Finland.

Sitowise Oy prepared this report based on data and reports provided by Nord Stream 2 AG and its' monitoring and technical contractors. All findings are preliminary and final conclusions will be reported in the annual report 2020 to be published in May 2021.

The only remaining construction activity in Finnish EEZ during the second quarter was post-lay rock placement. By the end of Q2, the total number of finalized berms was 441 and the total volume of rock installed was 1,513,800 m³. Post-lay rock placement was completed on May 30, 2020. With that, all construction activities have been completed in the Finnish EEZ.

Environmental monitoring continued during Q1 and Q2 at Sandkallan. Data was collected and monitoring equipment recovered on May 14, 2020, when more than four weeks had passed since construction work was completed in the vicinity of Sandkallan. As data could not be recovered during Q1 due to winter conditions, this report presents monitoring results from December 2019 to May 2020.

There were no incidents to be notified to the Finnish authorities during the reporting period. Three notifications about completing the construction work were made to the authorities.

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Annex 2	W-PE-EMS-PFI-REP-812-WQLT01EN-05. Water quality and current monitoring in the Gulf of Finland. Long-term monitoring. Luode Consulting. September 17, 2020.

1 Introduction

The report presents results and preliminary findings of the environmental and technical monitoring for the construction activities of the Nord Stream 2 Gas Pipeline in the Finnish EEZ for the second quarter (Q2) of 2020. The environmental monitoring results cover also the first quarter (Q1) of 2020.

Nord Stream 2 AG is constructing a new offshore natural gas twin pipeline from Russia to Germany through the Baltic Sea (Figure 1). The length of the corridor is approximately 1,230 km. Parallel pipelines pass through the territorial waters and/or Exclusive Economic Zones (EEZ) of Russia, Finland, Sweden, Denmark and Germany.

In the Finnish EEZ, the route is approximately 374 km and follows the existing Nord Stream pipeline route. Pipelay of Line A in the Finnish EEZ started on September 5, 2018 and was completed on April 30, 2019, and pipelay of Line B started on May 18, 2019 and was completed in August 21, 2019.

All construction works were completed in the Finnish EEZ on May 30, 2020 /1, 2/. When construction works are completed in all countries the pipelines will to be taken into operation.

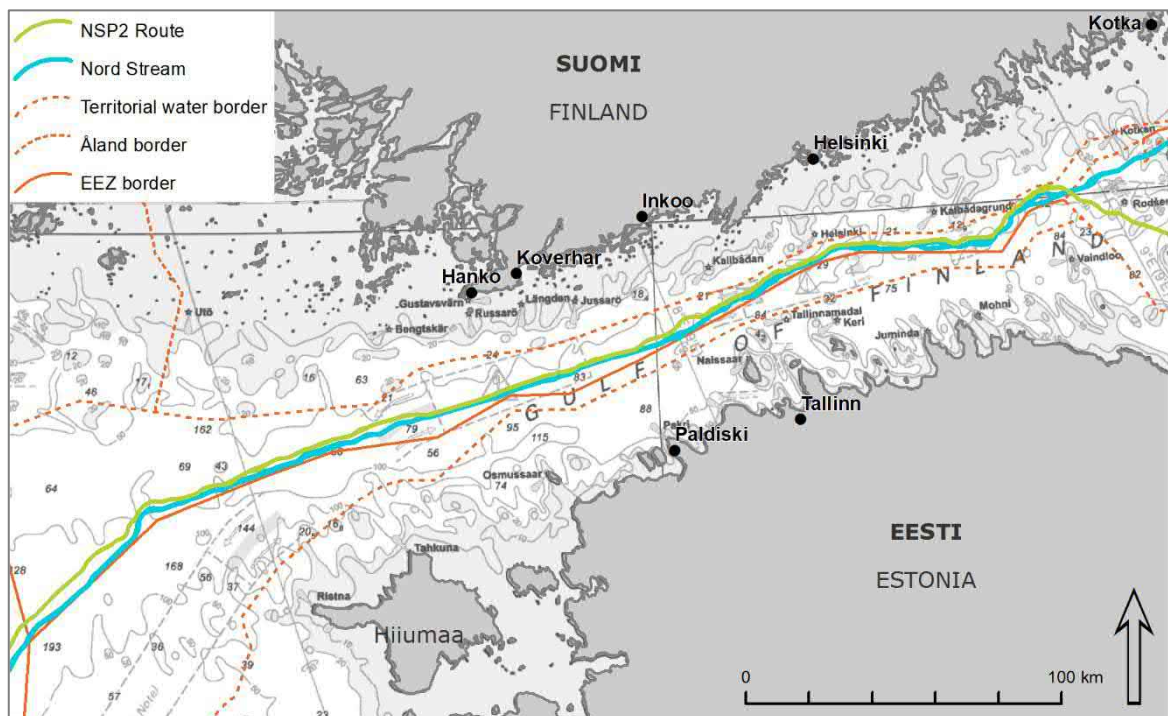


Figure 1. The Nord Stream 2 route passes through the Finnish EEZ. It is situated north of the existing Nord Stream pipelines with an exception of a short section in the east, close to Russian territorial waters.

Nord Stream 2 AG is responsible for environmental monitoring and reporting during construction and operation of the pipelines. The scope of monitoring activities is presented in the Environmental Monitoring Programme, Finland /3/. The programme has been approved within the water permit decision on April 12, 2018 (N:o 53/2018/2, Dnro

ESAVI/9101/2017). It was amended with a decision by Uusimaa ELY Centre on November 8, 2019. In accordance with the decision, during 2020, water quality and currents were monitored at three stations at the Sandkallan long term monitoring site, but no longer at the Control sites in eastern and western Gulf of Finland, which were recovered in December 2019. Monitoring is most intensive during the construction phase (Table 1).

Table 1. General schedule for monitoring activities during 2018–2023 in the Finnish EEZ (based on /3/, modified).

Monitoring target	Construction		Operation			
	2018	2019	2020	2021	2022	2023
Underwater noise	X					
Water quality and currents	X	X	X*			
Commercial fishery					X	
Cultural heritage	X		X			

* Water quality monitoring continued in 2020 until four weeks had passed after completion of construction in the vicinity of the Sandkallan monitoring site.

The supervisory authorities for monitoring of underwater noise, currents and water quality are the Southeast Finland, Uusimaa and Southwest Finland ELY Centres (the Centres for Economic Development, Transport and the Environment). For fishery monitoring, the supervisory authority is the Southwest Finland ELY Centre. For cultural heritage, the supervisory authority is the Finnish Heritage Agency.

Quarterly reports were provided three months after the end of each quarter during the construction period, and annual reports by the end of May of the following year during construction and operation. This report is the last quarterly report. The next report is the Annual Monitoring Report 2020 to be submitted in May 2021.

Quarterly reporting aims at presenting the main results from technical and environmental monitoring to the authorities. For this reason, they are concise and focused on results. Annual reports will include further data analysis, comparisons to the impact assessments presented in the EIA Report and the water permit application and more thorough discussion on the observed impacts.

2 Environmental conditions during the second quarter 2020

According to the statistics of the Finnish Meteorological Institute, April weather was average in terms of temperature and precipitation /4/. May was cooler than average, and precipitation levels were higher than normal in some places in the southern and south-western parts of the country /5/. June was hot and dry until the last day of the month, when an exceptionally strong storm, with up to 25 m/s gusts in the eastern Finland, brought heavy rain to the whole country /6/.

According to the Finnish Meteorological Institute's open data /7/, during the period of April 1 to June 30, 2020, significant wave height in the open Gulf of Finland varied between 0.1 and 3.0 m (Figure 2) and the wind speed between 0 to 18.4 m/s (Figure 3) /7/. The wave data is from an open sea wave buoy located in the Gulf of Finland approximately six kilometres north of GKP 185 (see Annex 1) and wind speed data is from a weather station located in the middle of the Gulf of Finland, the Helsinki lighthouse (see Annex 1).

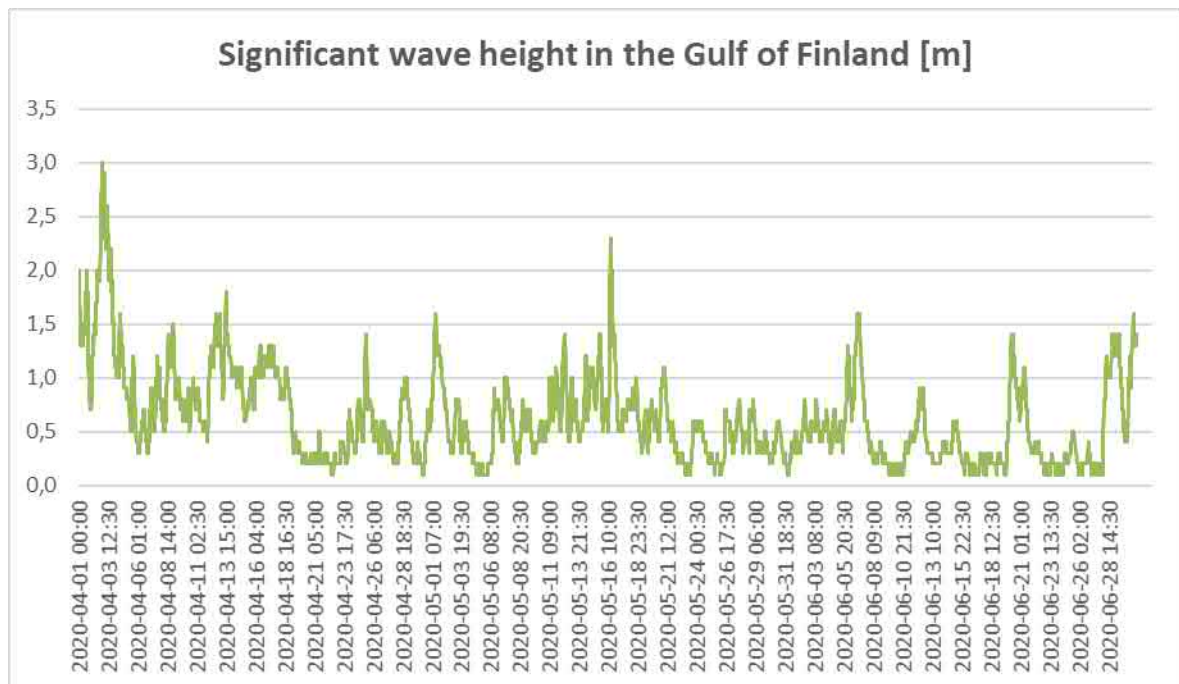


Figure 2. Significant wave height in the Gulf of Finland during the period from April 1 to June 30, 2020 /7/. The data was collected from an open sea wave buoy located in the Gulf of Finland (see Annex 1) and consists of measurements conducted every half an hour.

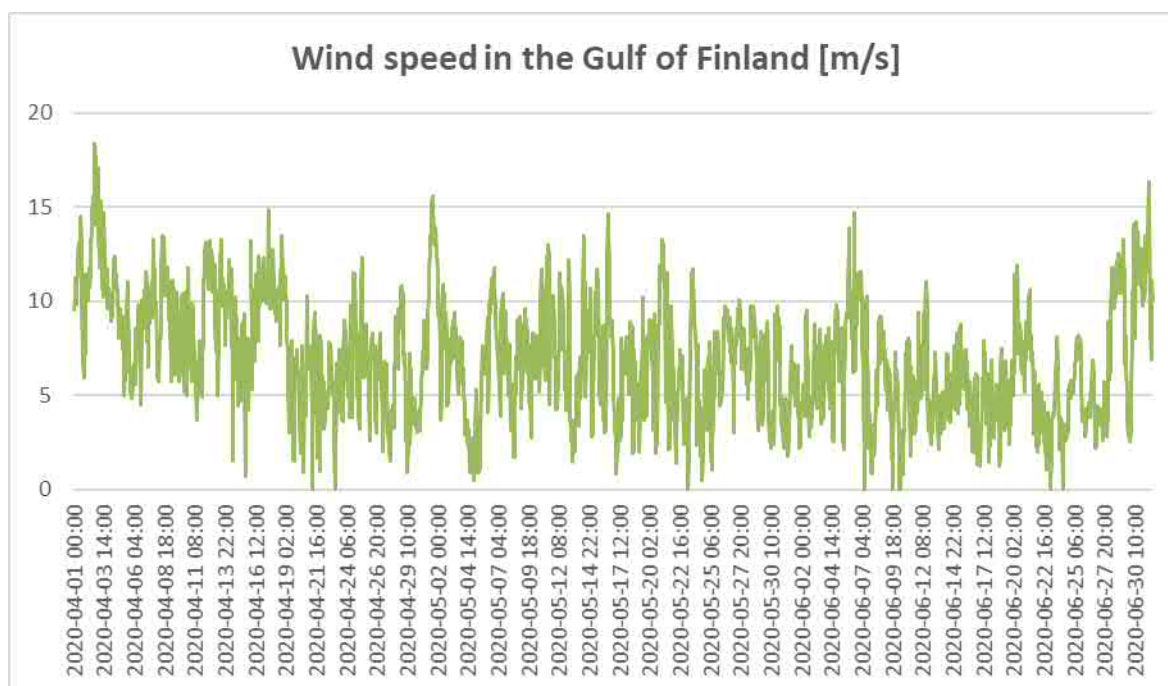


Figure 3. Wind speed in the Gulf of Finland during period from April 1 to June 30, 2020 /7/. The data was collected from the Helsinki Lighthouse weather station located in the middle of Gulf of Finland (see Annex 1) and consists of measurements conducted once an hour.

3 Construction activities during the second quarter 2020

3.1 Schedule

The only construction activity continuing in the Finnish EEZ during the second quarter was post-lay rock placement (Table 2), which was completed on May 30, 2020 /1, 2/.

Table 2. Construction activities during Q2 2020.

2020 Q2	April				May				June				
Week	15	16	17	18	19	20	21	22	23	24	25	26	27
Rock placement													

3.2 Activities during the period

Rock placement

During the second quarter of 2020, rock placement in the Finnish EEZ was rather intensive and was carried out by two vessels: Bravenes and Rockpiper /8/.

The rock placement vessel Rockpiper continued works in Finland in the beginning of April at GKP 172 proceeding from Kalbådagrund towards west until GKP 192. On April 12, works in Finland were interrupted as the ship transferred to the Swedish waters for a week.

While Rockpiper was in Sweden, rock placement vessel Bravenes visited shortly from Sweden to perform rock placement in the Finnish EEZ by completing two berms south of Inkoo (GKP 245) on April 14, 2020.

Rockpiper continued rock placement in Finland on April 20 from GKP 196 to GKP 216 until April 26. On April 28, Rockpiper took a short detour placing rock at the Swedish EEZ close to the Finnish EEZ border, and also placed rock at GKP 483. On May 1, she returned close to the previous location and continued works between GKP 218 and GKP 257. On May 11, Rockpiper returned close to the Swedish EEZ and continued the remaining rock placement work between GKP 409 and GKP 483. Last rock placement work in the Finnish EEZ was completed on May 30.

Rock placement contractors were Boskalis Offshore Contracting B.V. and Van Oord Offshore B.V. (BoVO). Contractors report the proceeding of the rock placement works in an as-built register, which is summarized in the quarterly reports.

The volume of rock used in the completed berms during the second quarter was 332,700 m³, all for post-lay rock placement /8/ (Table 3). Only Finnish rock was used. By the end of Q2, the total cumulative volume of rock used in the Finnish EEZ was 1,513,800 m³ and the cumulative number of berms was 441. The total installed amount of rock is within the permitted volume of 1.7 million m³.

Table 3. Rock placement (completed berms) during Q2, 2020. Data summarized from /8/.

Berm type	Installed volume m ³ *	Number of berms
Stress/freespan correction (post-lay)	244,800	52
In service buckling, lateral stability (post-lay)	81,700	49
Spot gravel placement for in-bottom stability (post-lay)	1,800	4
Unexploded ordnance (post-lay)	4,400	1
Total	332,700	106

* Installed volume is notified to Nord Stream 2 by contractors as tonnes (t), which is converted to cubic metres using a factor 1.5625 t/m³

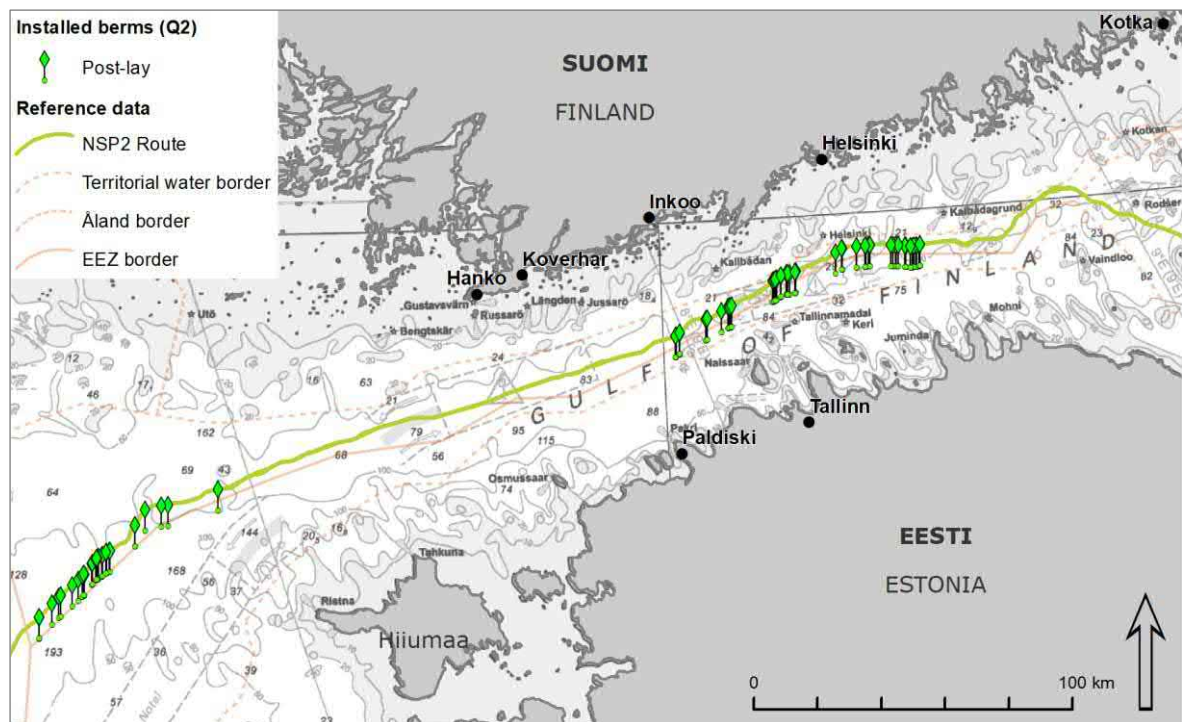


Figure 4. Rock placement during Q2, 2020.

Many berms are built in several phases (pre-lay, post-lay, possible top-ups), and the contractors report them upon completion in the as-built register. Therefore, the total number of berms is not the sum of berms reported as “completed” in the as-built register. Similarly, there is a small difference between the total installed value calculated from the latest as-built register and the total installed values calculated as the sum of Q reports. Such discrepancies will be further explained in the Annual Report 2020, to be published in May 2021.

4 Water quality and currents

4.1 Monitoring activities

Water quality and current velocity were monitored at three stations at the Sandkallan long term monitoring site. Sandkallan site consists of three separate water quality stations. One of them is equipped with profiling current meter (ADCP) measuring flow speeds and directions in separate depth layers covering the whole depth range from the bottom to the surface /9/. Water quality monitoring includes turbidity, oxygen concentration, salinity and temperature measurements in three depth layers near the seabed. The water depth at the stations varies between 49 and 67 metres.

Due to winter conditions, monitoring equipment was not serviced during Q1. Data was collected, and monitoring equipment recovered on May 14, 2020.

Table 4. Installation of monitoring equipment and final recovery of data and all monitoring equipment at water quality and current monitoring sites.

	Installed	Recovered
Control 1	17.4.2018	8.12.2019
Control 2	18.4.2018	10.12.2019
Sandkallan	18.4.2018	14.5.2020

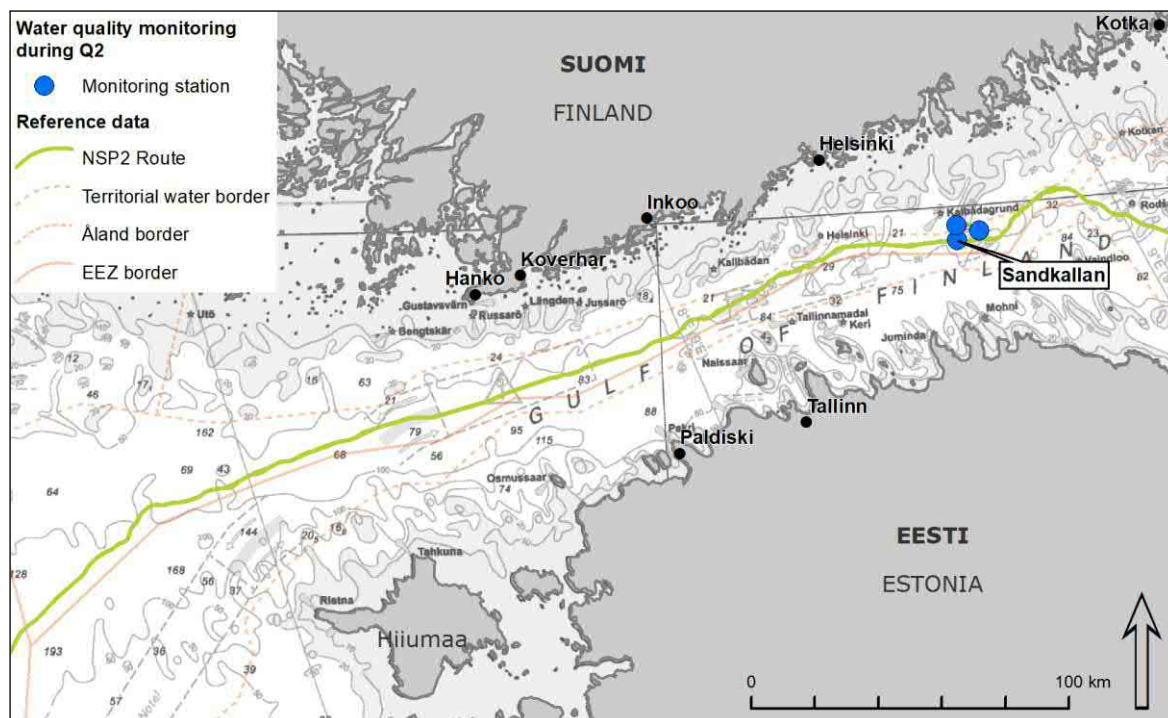


Figure 5. Water quality and current monitoring sites during Q2 2020.

4.2 Results

The results cover the period between December 2019 and May 2020. No impacts from construction activities were detected in water quality during the monitoring period (Figure 6) /10/. The highest measured single turbidity value was 8 FNU, which is within natural turbidity variation at the area. The average turbidity was below 1 FNU.

Oxygen conditions were very good at all stations. No anoxic periods were measured. Weakening salinity stratification and stormy periods during ice free winter improved mixing of the water layers, leading to an increase in oxygen concentration in the deeper water layers /10/.

The final long term water quality monitoring report has now been published and describes the impacts of the whole construction period on the water quality at the three long-term stations monitored /10/. No construction-related impacts were recorded at any station.

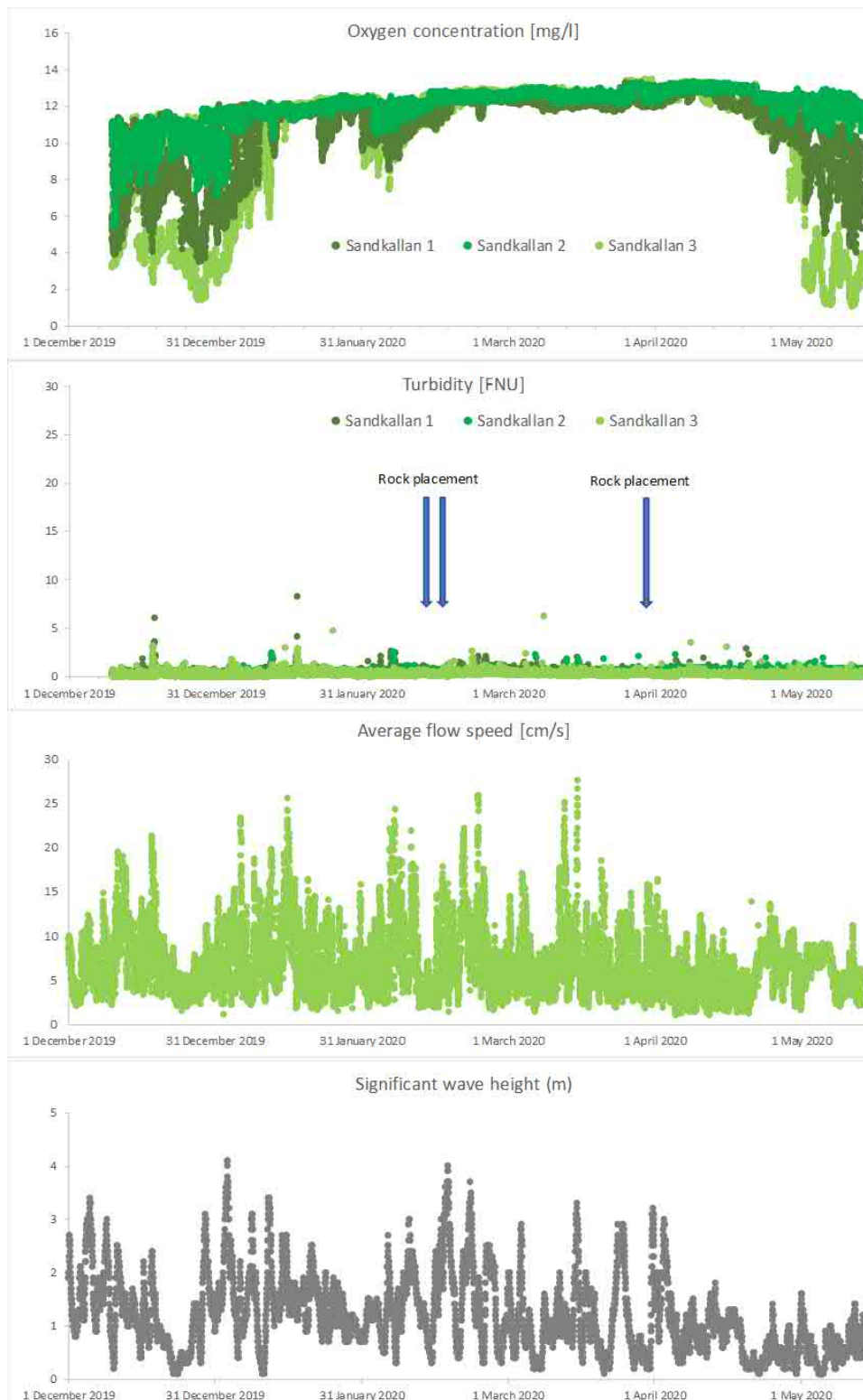


Figure 6. Oxygen concentration, turbidity and average flow speed at the monitoring stations Sandkallan 1, 2 and 3 and the significant wave height measured by the Finnish Meteorological Institute [7]. The images are combinations of all measurements carried out at the monitoring stations. They represent the depth range of 2-15 m above the seabed. Rock berm construction within the radius of 10 km of the stations is indicated by arrows.

5 Notifications

The provision 16 of the Consent to Exploit Finland's Exclusive Economic Zone request that when construction is finished in the economic zone, Nord Stream 2 AG must inform the Ministry of Economic Affairs and Employment of it, by letter, within 30 days. A notification confirming that the construction work was completed on May 30, 2020, was submitted to the Ministry of Economic Affairs and Employment, on June 25, 2020 /2/. It also informs the Ministry that further maintenance rock placement may take place after post-construction survey, planned for Q3-Q4 2020.

The provision 17 of the Consent to Exploit Finland's Exclusive Economic Zone request that Nord Stream 2 AG must submit the final position coordinates of the installed pipelines to the Ministry of Economic Affairs and Employment, the Ministry of the Environment, the Ministry of Defence, the Finnish Border Guard and the Transport and Communications Agency Traficom without delay following installation. A notification to deliver the as-laid pipeline coordinates was submitted to these authorities on July 3, 2020 /11/. The coordinates were delivered as a list and in geographical WGS-84 format.

The provision 45 of the Water permit states that a written notification of the completion of the project must be submitted within 60 days of completion to the Regional State Administrative Agency; ELY Centres for Southeast Finland, Uusimaa and Southwest Finland (responsibility area of Environment and Natural Resources); the fishery authority at the ELY Centre for Southwest Finland; the Finnish Transport and Communications Agency Traficom; and the environmental protection authorities of the cities and municipalities concerned. The completion notification must include a map indicating the final location of the natural gas pipelines with the positioning data (as-laid coordinates) for the sea area. The positioning data must be submitted in a numeric format. A notification to inform the authorities of completing the construction works in the Finnish EEZ and to show the final location of the pipeline, infrastructure crossings and main constructed rock berms on map format was submitted to the Finnish authorities on July 7, 2020 /12/. The notification also includes the pipeline coordinates as a list and in geographical WGS-84 format.

On May 25, 2020 Nord Stream 2 AG informed Finnish authorities that no further construction period monthly plans will be provided as construction works ends late May 2020 /1/. Simultaneously NSP2 informed that post-construction surveys will be performed later, and that further maintenance rock placement may be required after the survey.

6 Conclusions

Construction activities in the second quarter of 2020 in the Finnish EEZ consisted solely of post-lay rock placement. These were completed in the end of May 2020. Thereby, all construction works in the Finnish EEZ are completed. Completion of construction was notified to the authorities according to agreed procedures.

No impacts from construction activities were detected in water quality during the monitoring period (Figure 6) /10/.

Environmental and technical monitoring was carried out according to the monitoring programme. The results in this report are preliminary. The final results for the year 2020 will be presented in the Annual monitoring report 2020.

7 List of references

Literature

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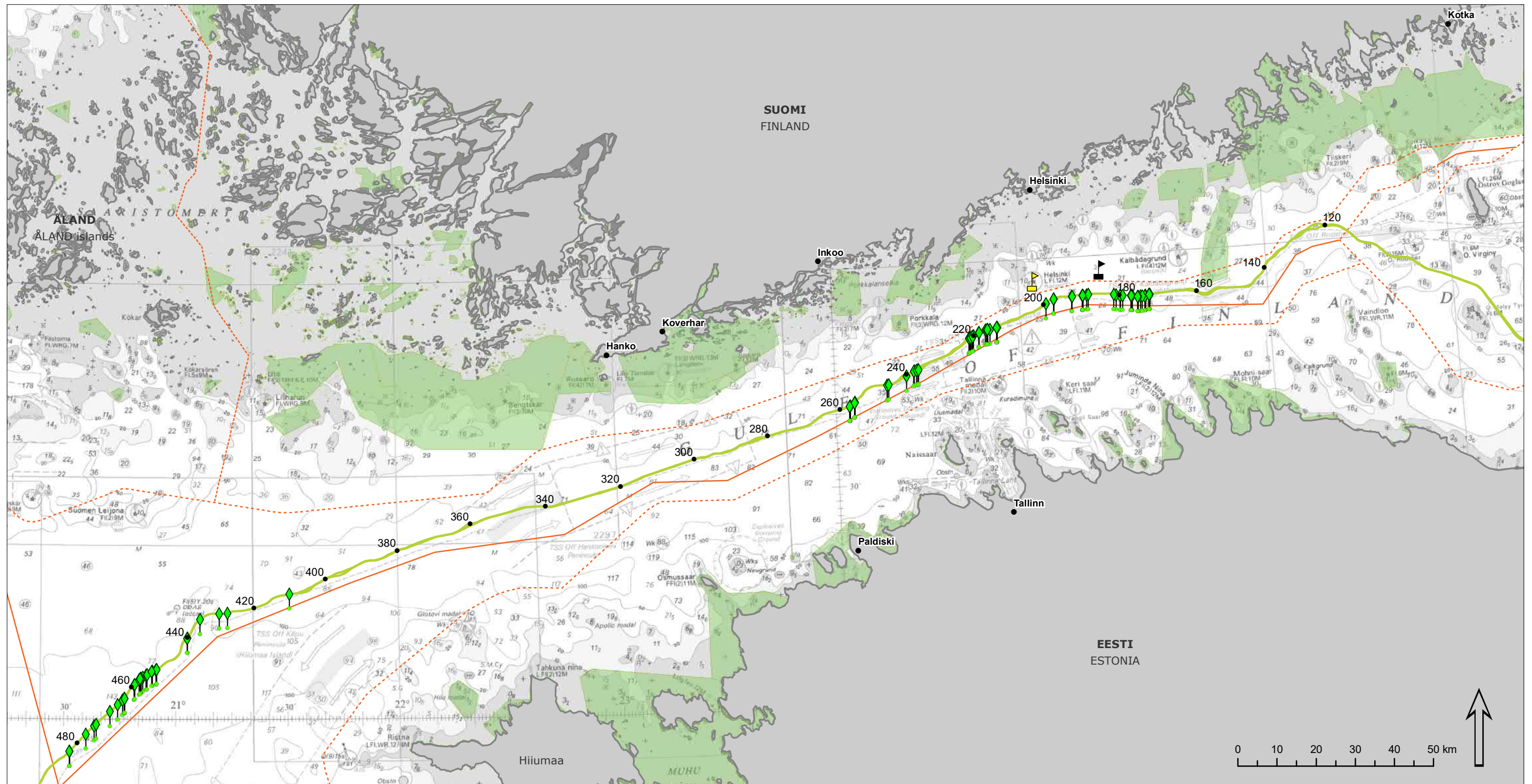
Maps and GIS data

Background admiralty charts, 2018. Charts are not to be used for navigation.

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Finnish Environmental Institute (SYKE) 2018. Natura 2000 sites. International Boundaries Research Unit (IBRU) 2010. Borders of the Exclusive Economic Zones and Territorial Waters.



Nord Stream 2 Construction activities during Q2/2020

Rock Placement

◆ Post-lay

Reference data

— NSP2 Route

• Global Kilometre Point (GKP)

🚩 Wave data

🚩 Wind data

■ Natura 2000 site (coastal and offshore areas)

--- Territorial water border

--- Åland border

— EEZ border

References:

- Limits of Exclusive Economic Zones and Territorial Waters: IBRU May 2010
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- Natura 2000 sites. EEA and SYKE 2018.

Annex 1

Version: Q2 report EN ver4
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Construction activities during Q2/2020

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