STUDIES RELATED TO THE PLANNING AREA OF KÄLLA IN LOVIISA

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1 Introduction

Fortum Power and Heat Oy (Fortum) has purchased approximately 300 hectares of land in the Källa-Hästholmen area from the City of Loviisa with a deed of sale signed on 23 June 2025. In the long term, the land areas could be suitable for emission-free electricity production or other industrial use that promotes the clean transition. (Fortum 2025)

The land areas acquired by Fortum in 2025, and the properties already owned by the company, are shown in Figure 1-1.

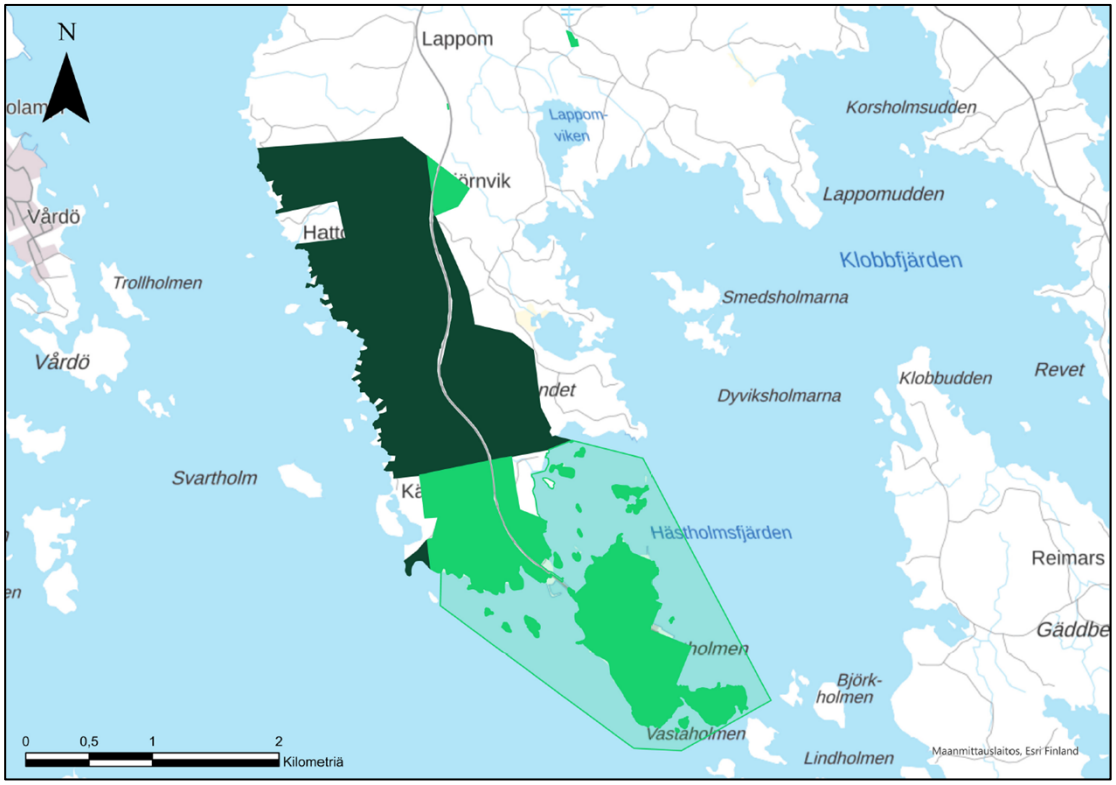

Figure 1-1. Land areas owned by Fortum in Loviisa. Map colours: light green = land previously owned by Fortum, dark green = new areas acquired in 2025. Background map: National Land Survey of Finland data (11/2025). Licence: https://www.maanmittauslaitos.fi/avoindata-lisenssi-cc40, 11.11.2025.

One alternative for future land use is new nuclear power. Fortum has extensively investigated the commercial, technological and societal prerequisites for new nuclear power in the future in both Finland and Sweden.

During the two-year study, small modular reactors (SMR) based on light water reactor technology, and traditional large reactors were evaluated. Both pressurised water reactors (PWR) and boiling water reactors (BWR) were included in the review. Depending on the technology, and the number of units to be built, the electrical output of any new nuclear power would be a maximum of 3500 MW.

If Fortum were to build new nuclear power in Loviisa in the long term, the land areas acquired would be used for nuclear power needs – either for the new nuclear power plant or as construction support areas. Fortum has not made a decision on an investment in new nuclear power. (Fortum 2025)

The development of the Källa-Hästholmen area for energy production or other industrial use requires that the area's regional plan, master plan and detailed plan are updated. (Fortum 2025)

The Helsinki-Uusimaa Regional Council has launched the preparation of a new phased regional plan (VISIO plan). The plan will be prepared as a phased regional plan for the entire region, and it will complement the legally valid plan entity with the themes of green and clean transition. (Helsinki-Uusimaa Regional Council 2025).

For the purposes of the VISION plan, the Helsinki-Uusimaa Regional Council has requested a report from Fortum on the Källa planning area in Loviisa on the following topics: geology and seismicity of the area, hydrology, other land use, network connections and transport connections, as well as population and safety zones. In addition, in accordance with the Helsinki-Uusimaa Regional Council's guidelines, the report will preliminarily examine the need for a Natura assessment due to the nearby Natura 2000 areas. This report provides a general overview of these topics based on existing data.

This report is intended to serve as part of the background material for the VISIO phased regional plan. Only when the type of the potential project is specified can its environmental impacts, and suitability for the area, be studied in more detail in the project's environmental impact assessment (EIA) procedure, and in connection with master and detailed zoning. In addition, in connection with the licensing phases under the Nuclear Energy Act (decision-in-principle, construction licence and operating licence), the Radiation and Nuclear Safety Authority (STUK) will be provided with more detailed technical documentation, and safety assessments of the plant in stages.

2 Region under consideration

This study takes a closer look at the Källa planning area on the mainland, owned by Fortum, where a potential nuclear power plant could be located. Below is a map showing the location of the planning area (Figure 2-1) and, more specifically, in an aerial photograph (Figure 2-22).

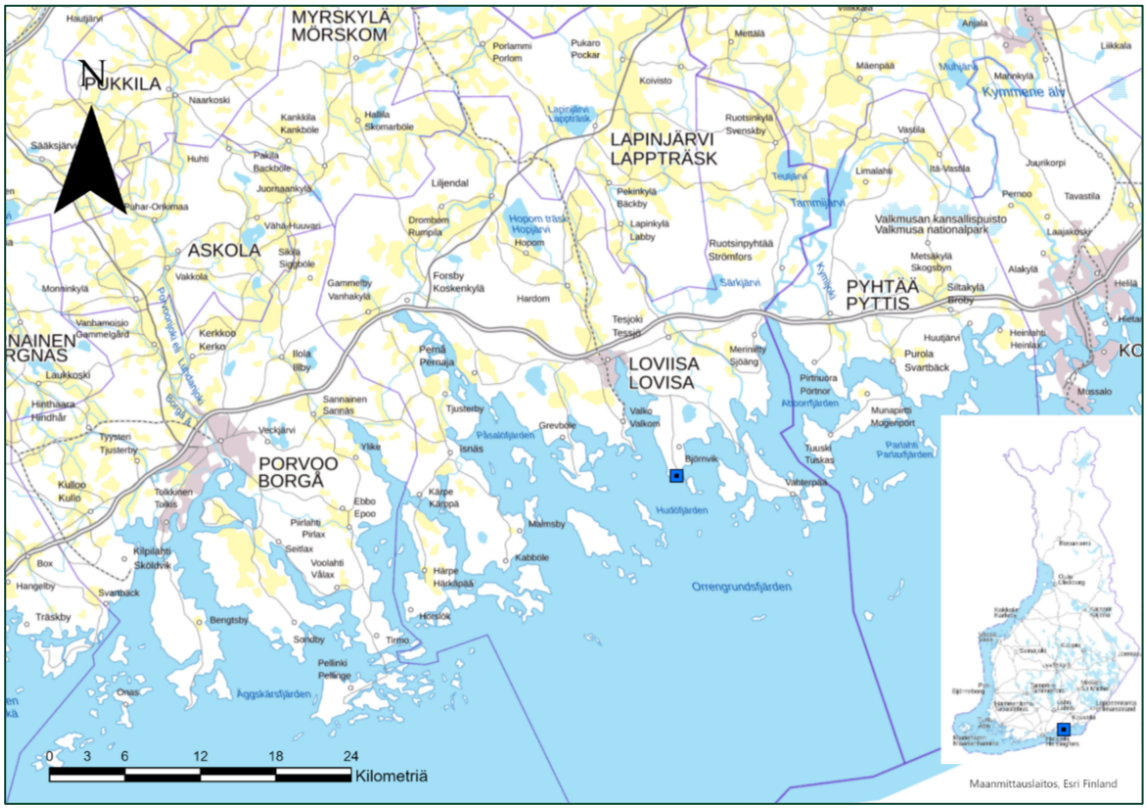

Figure 2-1. The location of Fortum's Loviisa Källa planning area. Background map: National Land Survey of Finland data (11/2025). Licence: https://www.maanmittauslaitos.fi/avoindata-lisenssi-cc40, 11.11.2025.

The area is approximately 360 hectares in size, of which 300 hectares were acquired in June 2025. At this stage, it is impossible to estimate exactly how much land would be required for the new nuclear power plant and its support functions. In total, it can be several hundred hectares within the planning area. The final need depends on a number of technical and regional solutions.

The Källa planning area is crossed by the Atomitie road, at the end of which is Fortum's Loviisa nuclear power plant on the island of Hästholmen. The island of Hästholmen is excluded from this analysis.

2.1 Overview

The northern part of the Källa planning area is located about 11 km from the city centre of Loviisa. Valko Harbour is located about 3 km on the west side of

the Källa planning area, on the other side of the Loviisanlahti bay. The area under review is located outside the urban structure and is mainly a very forested area. The Loviisa nuclear power plant's accommodation village is located in the Källa planning area, and Fortum's hydrogen production pilot plant is currently being built in the area. In addition, the Källa campsite is located on the seashore at the end of Källantie road. There are no permanent settlements in the area under review, but there are some holiday homes (Chapters 5 and 7.3).

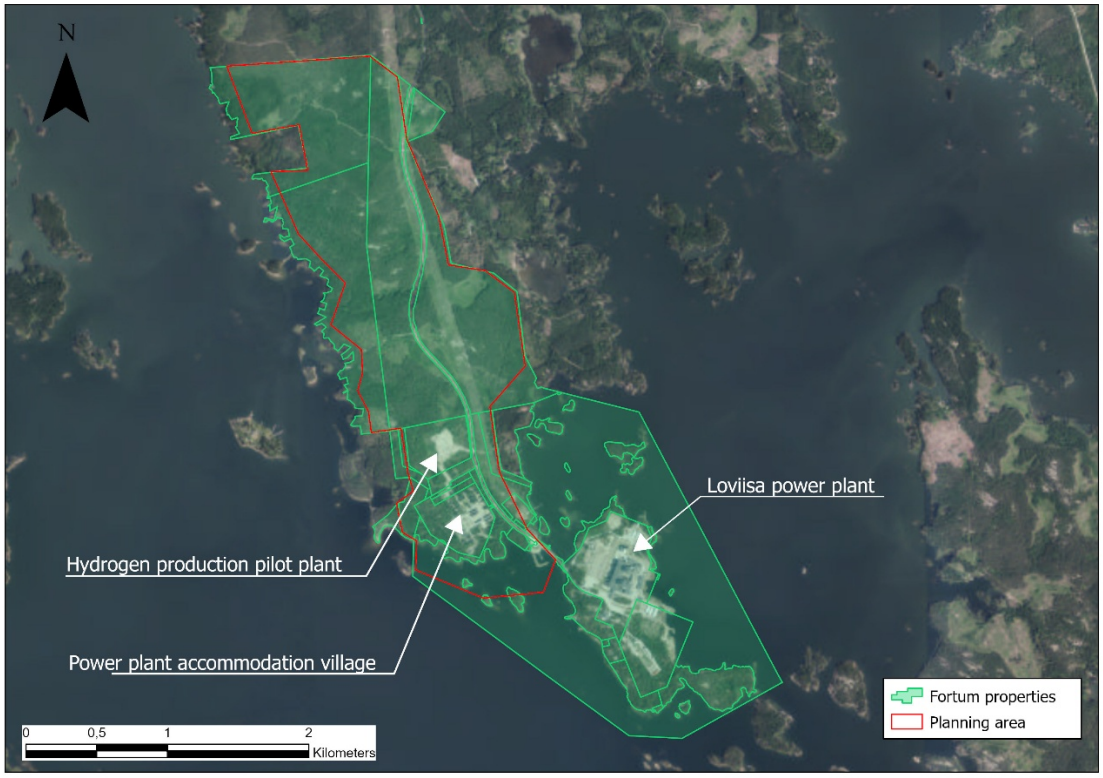

Figure 2-22. The area under review and the water and land areas owned by Fortum. Background map: National Land Survey of Finland data (11/2025). Licence: https://www.maanmittauslaitos.fi/avoindata-lisenssi-cc40, 11.11.2025.

2.2 Water bodies

The Källa planning area is located on the coast of the Gulf of Finland. To the east of the area is the bay area of Hästholmsfjärden, which is part of the Klobbfjärden water body (2_Ss_017). To the west of the area is Hudöfjärden, which is part of the Keipsalo water body (2_Ss_019). To the north of the Keipsalo water body is the Loviisanlahti bay water body (2_Ss_018), and to the south is the Loviisa-Porvoo water body (2_Su_030). The symbols of the water bodies are shown in parentheses after the name. (Fig. 2-3)

The ecological classification of Källa's nearby sea areas, which indicates the status assessment of the water area, varies by water area. In the third water

management period in accordance with the Act on the Organization of River Basin Management and Marine Management, the ecological classification was assessed as poor in the Klobbfjärden water body, as acceptable in the Loviisanlahti bay water body, and as satisfactory in the Keipsalo and Loviisa-Porvoo water bodies. (Fig. 2-3)

The Loviisa nuclear power plant procures raw water from Lappominjärvi lake, which is located about 1.3 km northeast of the northern part of the area under review. The ecological status of Lappominjärvi lake has been assessed as good (Figure 2-3).

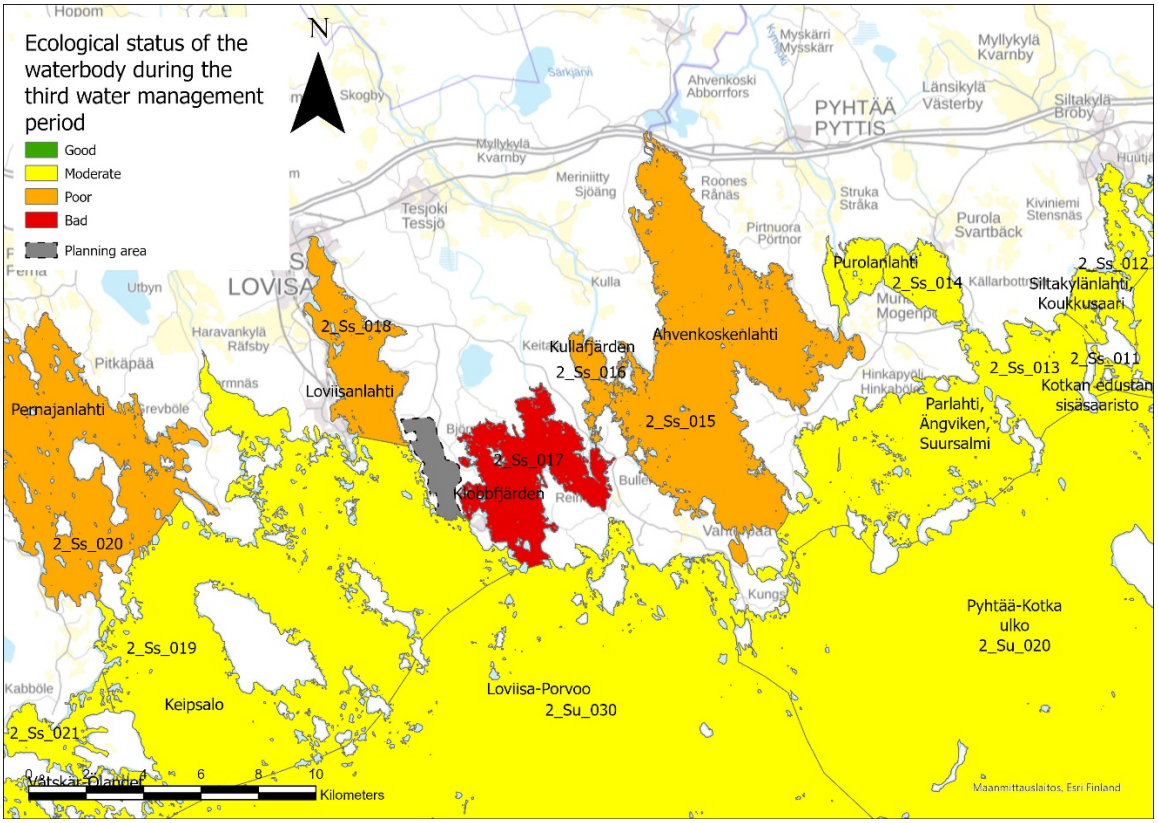

Figure 2-3. The ecological status of the water bodies near the Källa planning area during the third water management period. (Fortum 2021)

3 Geology and seismicity

The area under review is located in the coastal zone of Loviisa and it is characterised by generally flat, low-lying terrain. The area is characterised by an abundance of islands, as well as bays and long headlands that protrude deep into the mainland, with a clear northwest-southeast orientation. The bays reflect the fracture zones of the bedrock, the shapes of which have been further accentuated by the erosion of the continental ice. (Fortum 2021)

3.1 Soil

The soil consists mainly of rocky and boulder moraine (Appendix 1). In addition, there are clay, peat and sand deposits in the area. The soil layers on the seabed are mainly moraine or coarse-grained soils, gravel and sand, on top of which clay and silt have been stratified in places. (Fortum 2021)

3.2 Bedrock

The bedrock is rapakivi granite typical of the Loviisa area, which can occur in several different variants (Appendix 1). The most common variants in the area under consideration are pyterlite and viborgite.

3.3 Seismicity

Based on the surveys carried out by Fortum at the Loviisa plant site, the seismic hazard is considered to be low in the Källa planning area. The value of the peak ground acceleration of the design-basis earthquake load is at the minimum level of 0.1 g defined by the International Atomic Energy Agency (IAEA) at a recurrence level of 10^{-5} years.

3.4 Suitability of the area

In 2024, the Geological Survey of Finland (GTK) carried out a preliminary assessment of the geological suitability of potential nuclear power plant sites in Loviisa. The evaluation took into account national and international guidelines related to the topic. The assessment in question was based on already existing material, which is widely available, especially in the area of the Loviisa nuclear power plant.

Based on GTK's review, the construction conditions are mainly very good or good in the Källa planning area. However, the central part of the area is estimated to have very demanding construction conditions, related to the thick peat layer, which is mainly due to the peat bog area in the central parts of the Källa planning area, Hjortronmossen.

Based on the preliminary examinations carried out, the bedrock is suitable for the construction of new nuclear power. The seismic hazard is considered to be low in the area.

There are rock fracture zones in the Källa planning area, but due to the size of the area, it is likely that a suitable site for the construction of nuclear power plants can still be found in the area.

In addition to the stability of the bedrock, several additional studies must be carried out at a later stage on the geological and geotechnical properties of the area and the depth of the load-bearing layer, among other things, in connection with the possible construction and placement of the nuclear power plant in the area.

4 Hydrology

4.1 Cooling water

The heat generated in a nuclear power plant that cannot be utilised in energy production is usually cooled by water taken from a nearby water body, which is returned to the water body heated. The current Loviisa nuclear power plant takes its cooling water from the shore of Hudöfjärden on the west side of the island of Hästholmen and discharges the cooling water at a temperature of about 10 degrees higher to the east side of the island to the Klobbfjärden water body.

The greatest environmental impact of an operating nuclear power plant is the heat load discharged into the sea with the cooling water. Cooling water modelling is a commonly used method for assessing the impact of a nuclear power plant on waterways. There is plenty of information needed for seawater modelling in the vicinity of the Källa planning area, as a wide range of modelling and measurements have been carried out in relation to the distribution of the cooling water of the Loviisa nuclear power plant and the extent of its impact.

The choice of cooling water intake and discharge locations is influenced by many factors, such as the temperature of the water body, flow conditions, environmental impacts, and local land use and permit issues. Possible cooling water discharge and intake locations have been examined preliminarily by modelling.

4.2 Floods

The flood map can be used in risk management and land use planning (Figure 4-1). The flood-prone areas are mainly located near the coast in the Källa planning area, but the areas are relatively small. In the bays the water is shallower, and the flood-prone areas are more extensive.

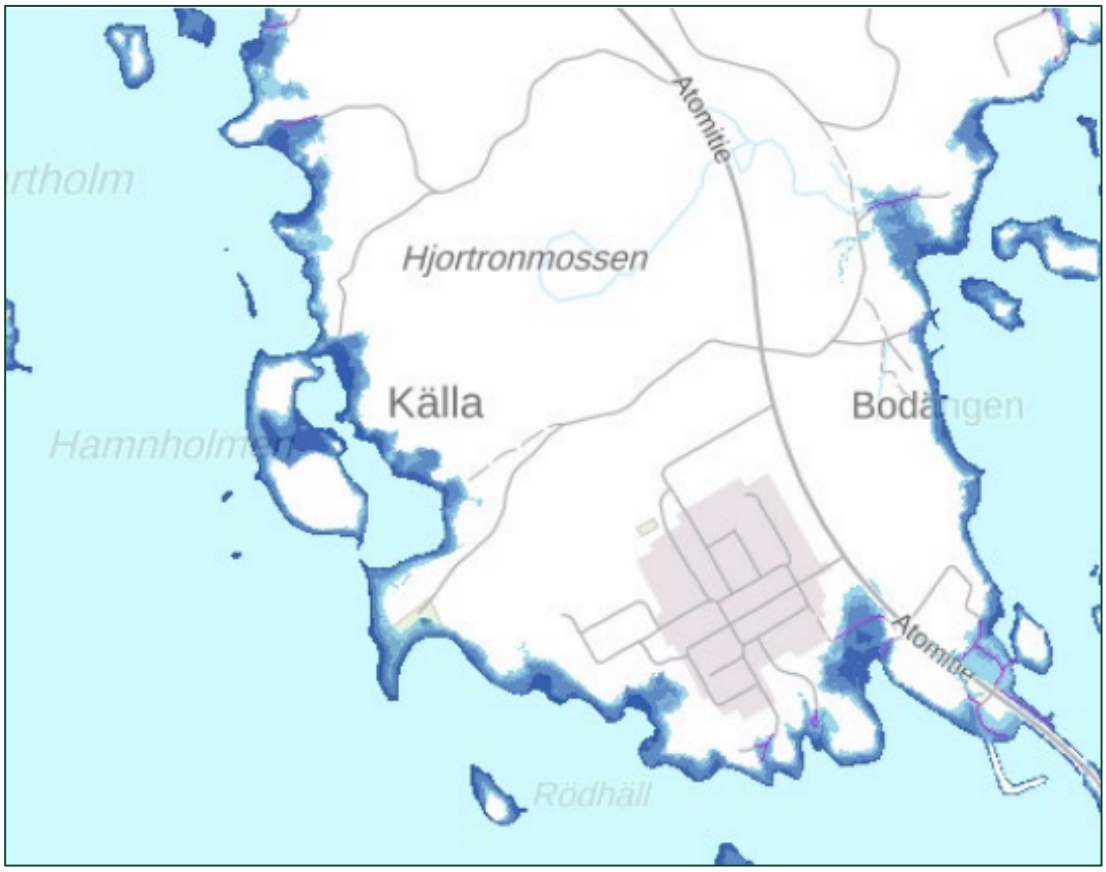

Figure 4-1. Flood map of the Källa planning area. The possibility of a very rare sea flood is likely to occur once in about 1000 years (1/1000 years). Therefore, it is extremely unlikely (0.1 %).

4.3 Groundwater areas

There are no classified groundwater areas in the Källa planning area or in its immediate vicinity. The nearest classified groundwater area (class 1) is located in Valko, being about four kilometres northwest of the Källa planning area.

4.4 Suitability of the area

Based on preliminary cooling water modelling, there are probably feasible cooling water intake and discharge combinations in the Loviisa area, and the availability of cooling water is not a problem in the area. However, more detailed modelling will be needed as the potential project progresses. The final impacts can only be assessed in more detail at a later stage of the project, when the plans and technical solutions have been specified.

When planning new activities, it must be ensured that the ecological status of the water system does not deteriorate in principle (Figure 2-3). In addition, the project should not jeopardise achieving the good status of the water body or any other status objective set for it in the river basin management plan. In

practice, the objective of good ecological status means that the natural values of water bodies, i.e. water quality, biota and ecosystem functioning, will in principle remain at the current level or improve. This will guide the design of the nuclear power plant, for example, in relation to the treatment of cooling water and the selection of intake and discharge locations. The nearby Natura 2000 areas will also be taken into account when selecting cooling water intake and discharge locations.

Flood preparation must be taken into account already when choosing the site of the plant and planning the plant. In the Källa planning area, the very rare possibility of a sea flood on the flood map means a flood situation that is likely to occur once every 1000 years (1/1000 years). Therefore, it is an extremely unlikely (0.1 %) but possible scenario.

5 Population, precautionary action zone (PAZ) and emergency planning zone (EPZ)

5.1 Population

Below are the maps showing residential, holiday and non-residential buildings in the vicinity of the Loviisa nuclear power plant and the Källa planning area (Figure 5-1) and in the immediate vicinity of the planning area (Figure 5-2). The closest urban area for denser construction to the Källa planning area is in the Vårdö-Valkolampi area, on the west side of the Loviisanlahti bay as seen from the planning area.

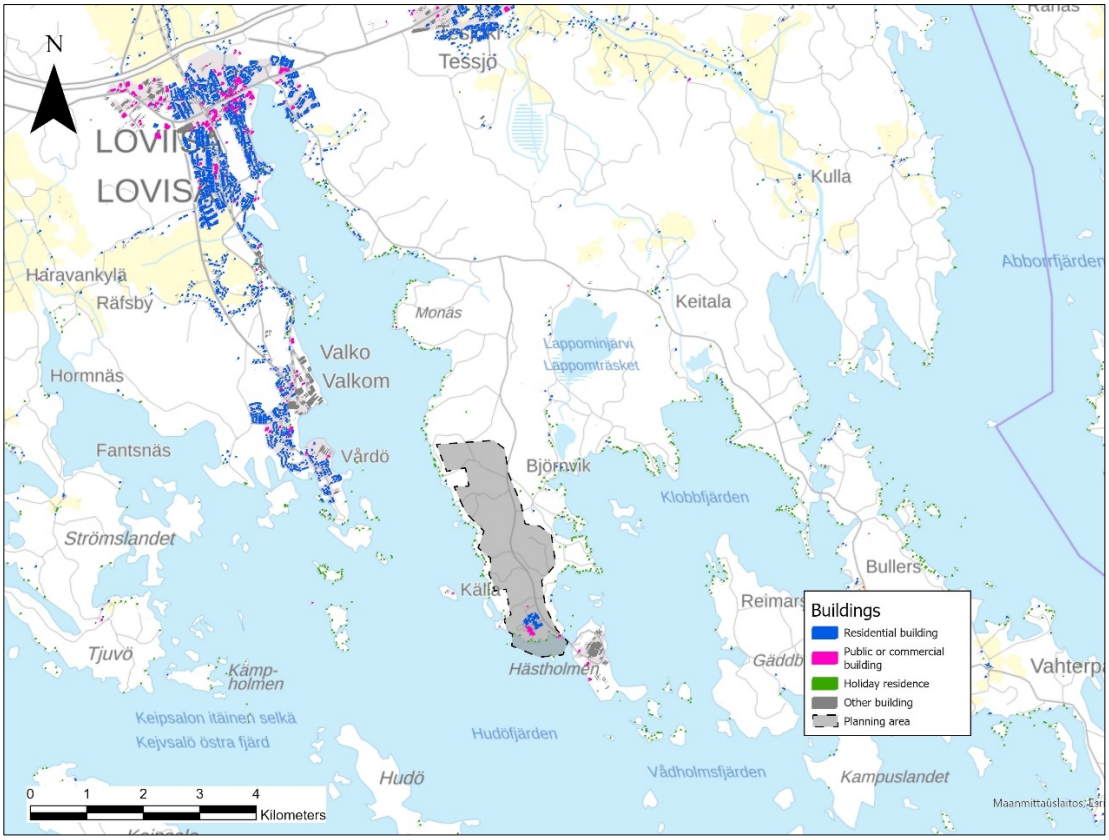

Figure 5-1. Buildings around the Källa planning area. Background map: National Land Survey of Finland data (11/2025). Licence: https://www.maanmittauslaitos.fi/avoindata-lisenssi-cc40, 11.11.2025.

There are residential buildings in the Källa planning area which are part of the nuclear power plant's accommodation village, but they are not permanently inhabited. The nearest residential buildings in private use are located in Bodängen, east of the planning area. (Fortum 2021)

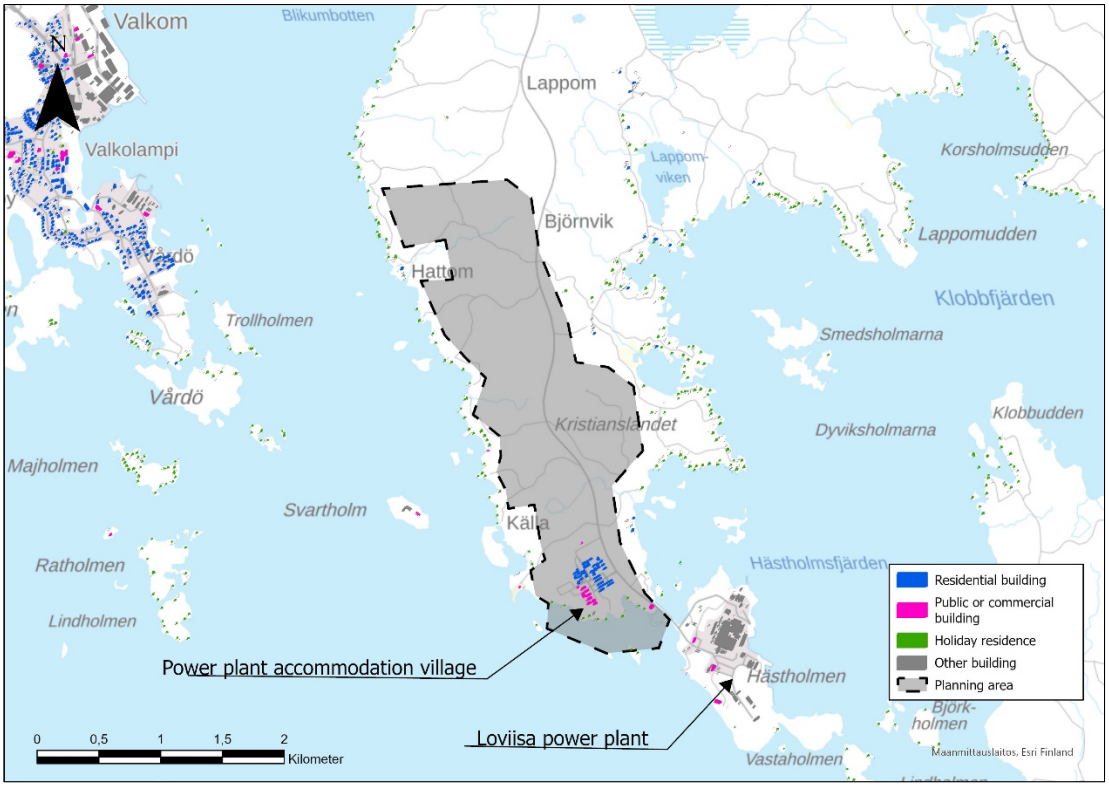

Figure 5-2. The residential and holiday buildings closest to the Källa planning area. Background map: National Land Survey of Finland data (11/2025). Licence: https://www.maanmittauslaitos.fi/avoindata-lisenssi-cc40, 11.11.2025.

The holiday houses closest to the Källa planning area are located near the coast, north of the accommodation village. The nearest recreational areas are the Källa campsite and the Svartholma sea fortress, which also has a summer restaurant (Appendix 2). There is a guest harbour next to the bridge leading to the Loviisa nuclear power plant. The nearby islands are used for recreation and hiking.

5.2 Precautionary action zone (PAZ)

There is a five-kilometre precautionary action zone (PAZ) around the Loviisa nuclear power plant in accordance with the Nuclear Energy Act, which is subject to restrictions on land use (Figure 5-3). For example, sites that are visited or have considerable number of people, such as schools, hospitals, care facilities, shops or other than significant workplace and accommodation areas related to the nuclear power plant, may not be located in the PAZ.

5.3 Emergency planning zone (EPZ)

In accordance with the Nuclear Energy Act, the emergency planning zone (EPZ) of the Loviisa nuclear power plant is 20 km (Figure 5-3). A nuclear EPZ is an area defined by the regulatory authority around a nuclear power plant where

urgent protective measures may be needed in the event of an accident. (Fortum 2021)

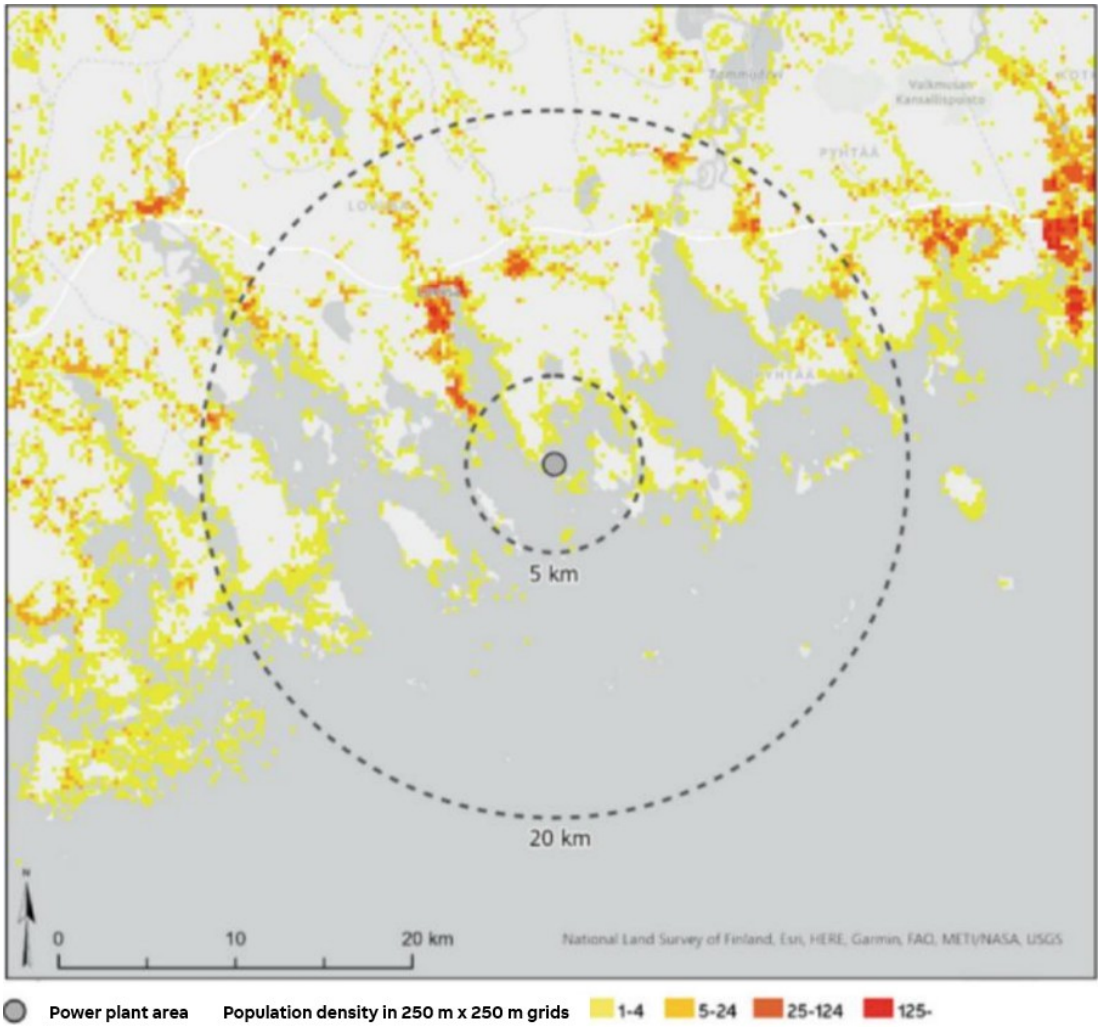

Figure 5-3. Distribution of the population at a distance of 5 and 20 km from the Loviisa nuclear power plant. (Fortum 2021)

5.4 Suitability of the area

According to the new regulation (STUK Y/2/2024), the size of the PAZ and the EPZ will be determined on a case-by-case basis based on the type of facility and the safety assessment. The map in Figure 5-4 shows an indicative outline of the potential PAZ for a new nuclear power plant (approximately 3.6 km), which is smaller in size than the current Loviisa nuclear power plant's PAZ (5 km). Therefore, there would be no changes in the PAZ compared to the current one.

At this stage, however, it is not possible to determine the exact size of these zones. The exact extent of the PAZ and the EPZ will be determined at a later stage of the project.

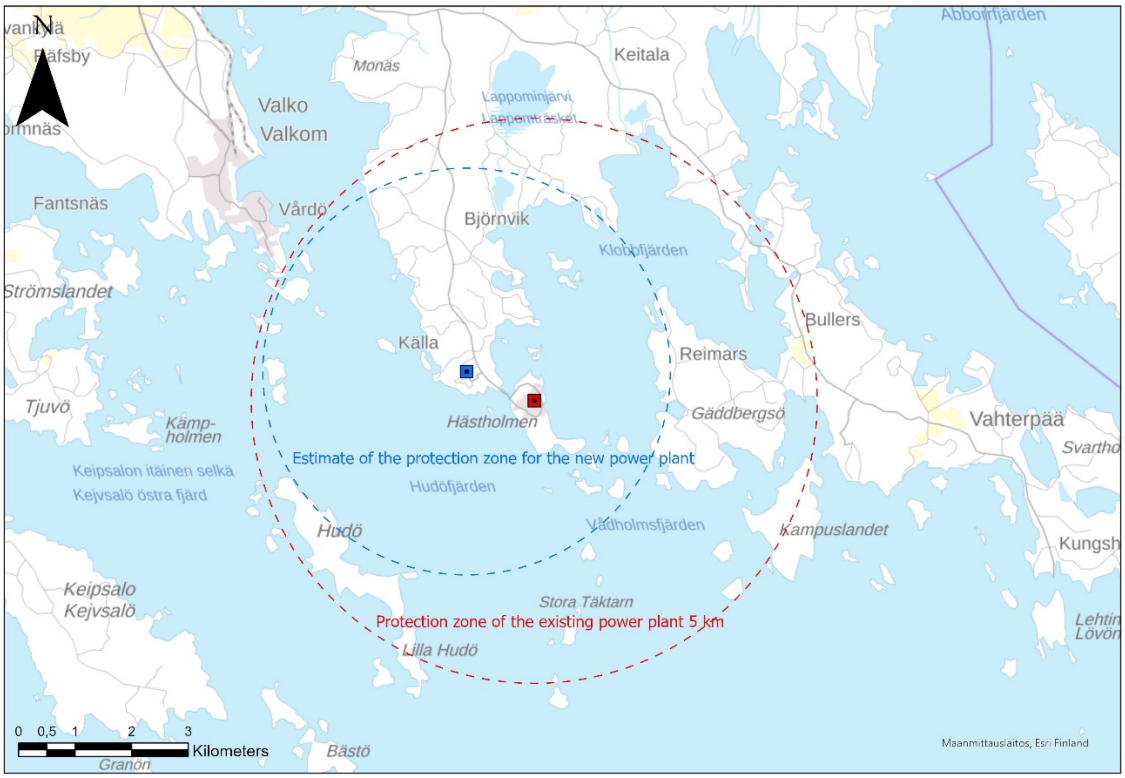

Figure 5-4. There is a precautionary action zone (PAZ) extending to a distance of five kilometres around the Loviisa nuclear power plant (the outer red dotted line). There are also outlines of a possible protection zone of about 3.6 km for the new nuclear power plant (inner blue dotted line). Background map: National Land Survey of Finland data (11/2025). Licence: https://www.maanmittauslaitos.fi/avoindata-lisenssi-cc40, 11.11.2025.

6 Electricity network connections

6.1 Existing connections

Through the Loviisa nuclear power plant's switchyard, the electricity produced at the plant is transmitted to the national grid using 400 kV power lines. The 400 kV switchgear of the Loviisa nuclear power plant is connected to the main grid as part of the 400 kV loop line circulating the coast of Southern Finland and Central Finland so that the plant is connected to Kouvola, Koria and Anttila (Figure 6-1).

A 110 kV power line connection (Hagalund-Loviisa) can also be used to supply electricity from the main grid to the nuclear power plant (Figure 6-1). In addition, the 20 kV line owned by Fortum connects the Ahvenkoski power plant to the Loviisa nuclear power plant. (Fortum 2021)

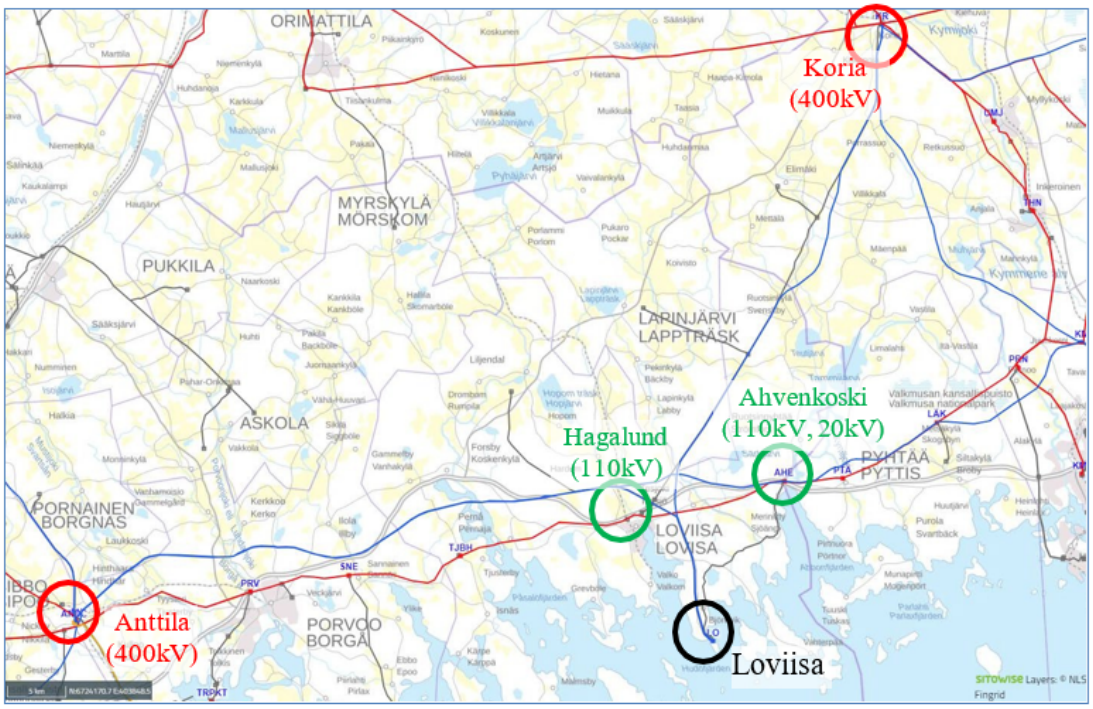

Figure 6-1. Existing electricity grid connections in the Loviisa area (blue=400kV, red=110kV, black=not owned by Fingrid (110 kV and 20 kV)).

6.2 Suitability of the area

The electricity network connection of the current nuclear power units is not sufficient for any additional nuclear power units. New power lines (110 kV and 400 kV) are needed. The number of lines required depends, among other things, on the size and number of units.

Connecting new units to the grid requires more detailed discussions with Fingrid, as Fingrid owns the 400 kV structures (lines and substations). The aim would be to use the existing power line corridors and, if necessary, widen them for new lines.

7 Other land use

The Källa planning area is mainly a forested area (Figure 7-4). In the planning area there are important areas considering land use, which are discussed in chapters 7.1–7.3.

7.1 Nature reserves

The nature reserves located in the vicinity of the planning area under review are presented in Figure 7-1. The surrounding area includes Natura 2000 areas, state-owned and privately owned nature reserves, nature conservation programme areas, the FINIBA area (Finland's important bird areas), as well as

nationally valuable bird areas and rocky areas (Environmental Administration's online service 2025a).

The Natura 2000 areas are the Källaudden-Virstholmen (FI0100080) and Pernajanlahti marine reserve and the Pernaja archipelago (FI0100078). These Natura 2000 areas are discussed in more detail in chapter 8. The Källaudden-Virstholmen area is located closest to the Källa planning area and it also extends partly to the mainland. The marine reserve of Pernajanlahti and Pernaja archipelago is located a little further out at sea and includes several nature reserves and nature conservation programme areas.

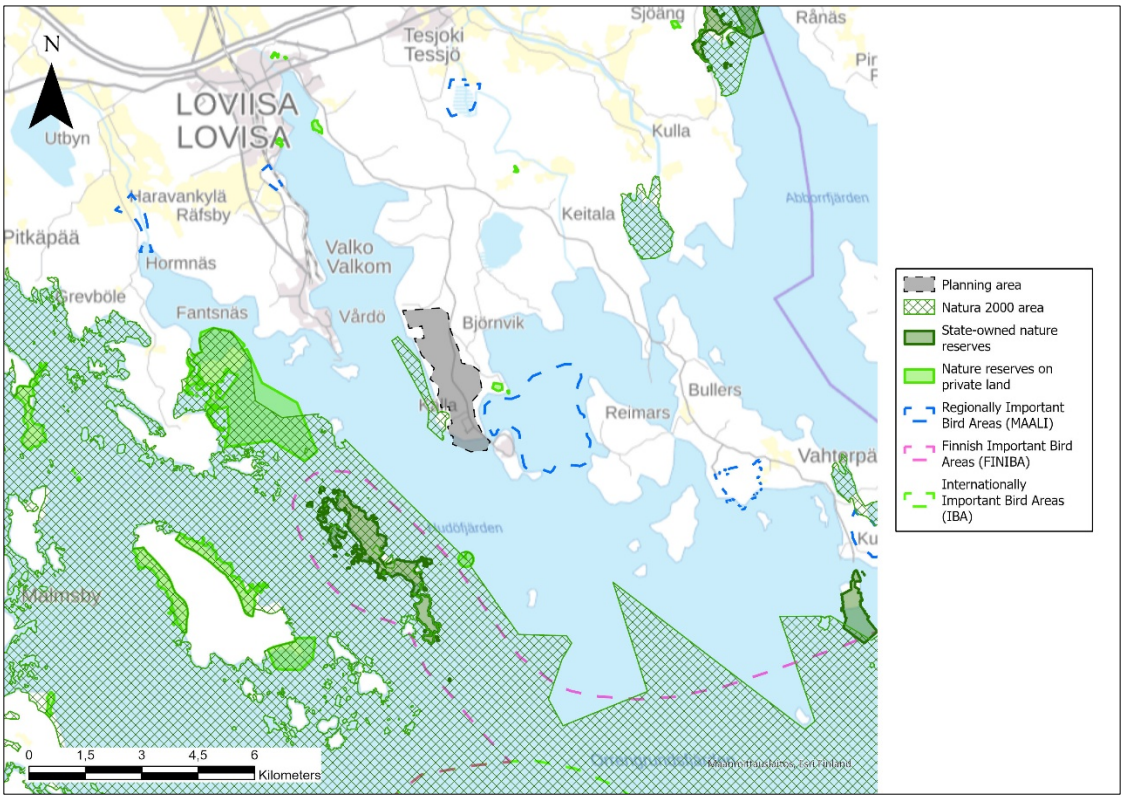

Figure 7-1. Nature reserves and important bird areas in the vicinity of the Källa planning area. Background map: National Land Survey of Finland data (11/2025). Licence: https://www.maanmittauslaitos.fi/avoindata-lisenssi-cc40, 11.11.2025.

Almost in the same area as the Källaudden-Virstholmen Natura 2000 area is the area of the ridge protection programme (HSO010010) (Figure 7-2). In addition, there are two relatively small privately owned nature reserves in the nearby area, on the other side of Atomitie road (Karhulahti beach YSA011320 and Bastuängen common forest YSA011321). (Environmental Administration Online Service 2025a)

There are no internationally important bird areas (IBA areas) or nationally important bird areas (FINIBA areas) in the immediate vicinity of the Källa

planning area, but they are located further out to sea to the south and/or southwest of the Källa planning area. The sea area east of the Loviisa nuclear power plant, Hästholmsfjärden, has been classified as a regionally important bird area (MAALI area) due to the diverse waterfowl that winter in the area (Fortum 2021).

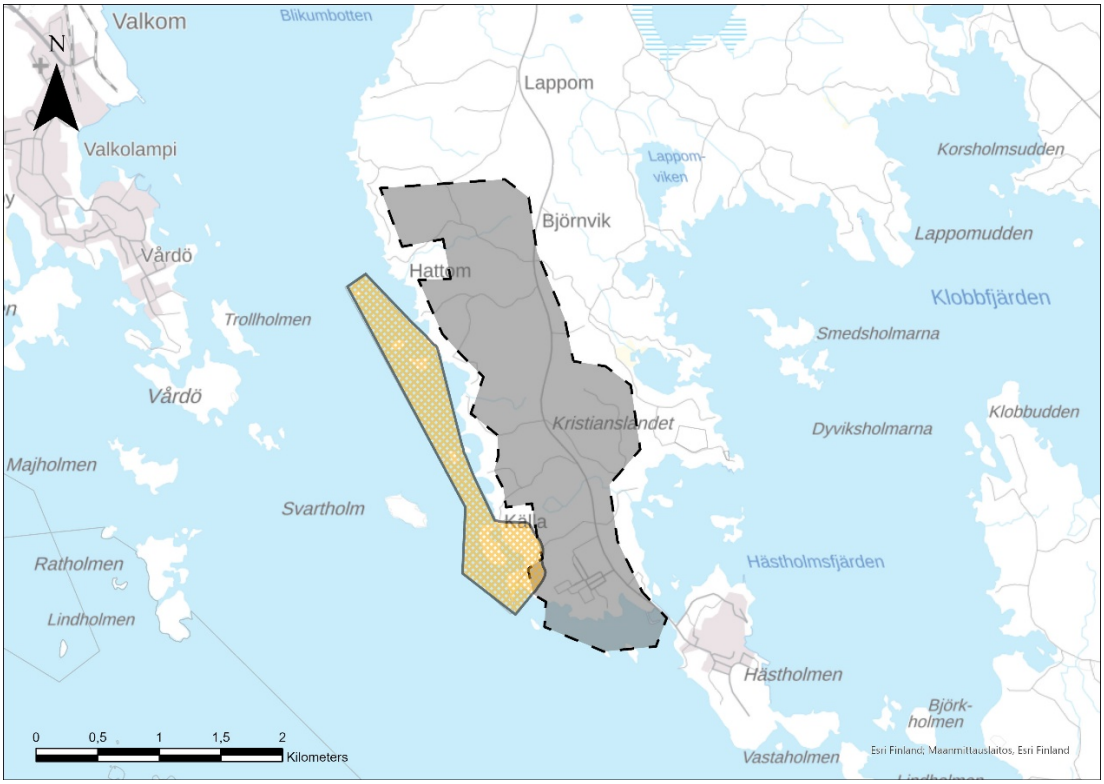

Figure 7-2. The area of the Ridge Protection Programme (HSO010010) and the Källa planning area. Background map: National Land Survey of Finland data (11/2025). Licence: https://www.maanmittauslaitos.fi/avoindata-lisenssi-cc40, 11.11.2025.

7.1.1 Suitability of the area

There are no nature reserves in the Källa planning area, but the ridge conservation area extends to a small part of the planning area. The nearby nature reserves as well as the ridge conservation area, which is partly located in the planning area, will be taken into account in the planning of the project. Due to the size of the Källa planning area, a suitable site for the construction of nuclear power plants can probably be found, taking into account the proximity of the Källaudden-Virstholmen Natura 2000 area, especially during the construction phase, as well as a sufficient buffer zone in the area. In addition, the nearby Natura areas will also be taken into account when selecting cooling water intake and discharge locations.

Due to the proximity of Natura 2000 areas, especially Källaudden-Virstholmen, it will be assessed in more detail later whether the potential project is likely to have significant adverse effects on the area's protection criteria. The need for a Natura assessment is discussed in more detail in Chapter 8.

7.2 Cultural heritage, other cultural-historical sites and landscape

To the west of the Källa planning area, there are several ancient relics, a significant built cultural environment and other cultural heritage sites (Figure 7-3).

The sea fortress on the island of Svartholma (site number 1000001910) once served as a sister fortress and outpost to the Suomenlinna sea fortress. Svartholma fortress is now a popular place to visit, which can be reached by scheduled ferry or by your own boat. There is also a summer restaurant on the island. The Svartholma sea fortress is an ancient relic protected by the Antiquities Act. The small islands between the fortress and the mainland, Hautasaari, Arestisaari and Ruutikellarisaari, have been part of the fortress operations. These islands are also protected by the Antiquities Act.

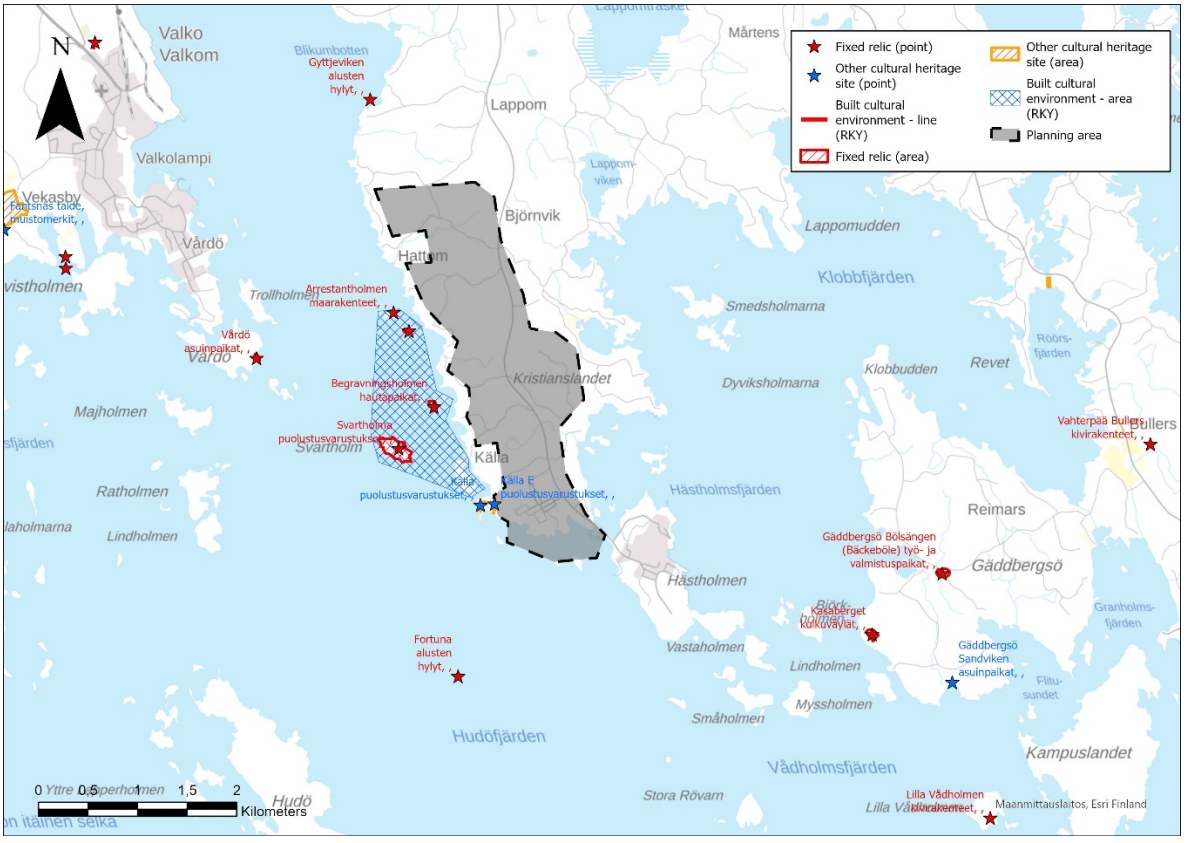

Figure 7-3. Fixed ancient monuments and cultural heritage sites in the vicinity of the Källa planning area. Background map: National Land Survey of Finland data (11/2025). Licence: https://www.maanmittauslaitos.fi/avoindata-lisenssi-cc40, 11.11.2025.

The island of Svartholma and the area of the nearby islands have been designated as a nationally significant built cultural environment (RKY). Two other cultural heritage sites have been found on the mainland south of the RKY area (site numbers 1000023656, 1000023658), which are the remains of a wartime bunker and trench and a memorial stone.

There are several natural monuments in the Källa planning area, which are trees, large stones and pits. Damaging or weakening a protected natural monument is prohibited. The Loviisa shoreline master plan includes cultural-historical sites in or near the Källa planning area, which are mainly houses. There are two cultural-historical buildings along the Källantie road, which have been designated as significant conservation sites.

The nearest known underwater relics found in the Finnish Heritage Agency's register of underwater finds are located two kilometres west of the nuclear power plant. The closest to the nuclear power plant is the wreck of the frigate Fortuna, which sank in 1822 and is located in Hudöfjärden, east of the current shipping channel. (Fortum 2021)

To the south of the island of Hästholmen lies a regionally significant cultural environment (Vådholmsfjärden), which includes islands and water areas. The Vådholmsfjärden area had a sheltered harbour in the 1790s. (Fortum 2021)

There are no nationally valuable landscape areas on the Källa planning area and in its vicinity. In the landscape region division, the Loviisa nuclear power plant and the planning area are both a part of the southern shore landscape region and the coastal region of the Gulf of Finland. In the division of landscape types in Eastern Uusimaa, where landscape regions are further divided into landscape types, the area under review is located in the landscape zone of the inner archipelago and the continental coast. In terms of landscape, the zone is very detailed and varied, which is greatly affected by the formation of bays, coves and straits between island chains and in the folds of the broken coastline. (Fortum 2021)

The Loviisa nuclear power plant has been located on the island of Hästholmen for almost 50 years, and it has thus influenced the landscape of the area for a long time. Although the nuclear power plant buildings, the chimney and masts are visible from a wide area, the forest zone on the south and west shores effectively serves as a zone that softens the view. (Fortum 2021)

7.2.1 Suitability of the area

The Källa planning area is not located in a nationally valuable landscape area. There are no significant fixed ancient relics or significant sites of built cultural environment located within the boundaries of the planning area.

However, cultural heritage and other cultural-historical sites in the area must be taken into account when planning a possible project. Possible underwater archaeological research will be discussed with the Finnish Heritage Agency.

A new nuclear power plant would inevitably change the landscape of the area to some extent, as nuclear power plant buildings are usually tall and the lights in the power plant area can be seen from afar in the dark.

The landscape impacts will be assessed in more detail in the EIA procedure of a possible project and in connection with zoning.

Figure 7-4. Oblique aerial view of Hudöfjärden north towards the Källa planning area. Fortum's accommodation village can be seen in the foreground in the photo.

7.3 Other boundary conditions for land use

In the southern part of the Källa planning area, there is Fortum's accommodation village, which is not permanently inhabited. The

accommodation village will be used especially during the maintenance of the Loviisa nuclear power plant to accommodate employees.

Fortum is building a pilot plant for clean hydrogen production (1–2 MW) near the accommodation village. The aim is to start the actual operations in early 2026. The planned operating period is two years. The plant's equipment is located in containers that can be easily moved elsewhere.

The Källa campsite is located on the seashore at the end of the Källantie road. The camp area is intended for the camp, excursion and recreational activities of the various administrative bodies of the City of Loviisa, local associations and of local communities, where youth activities are the priority.

The shoreline master plan (Loviisan rantaosayleiskaava 10.12.2008, gained legal force on 23.1.2009) and the detailed plan (Hästholmenin ydinvoimalaitosalueen asemakaavan muutos ja laajennus 21.1.2009, gained legal force on 3.3.2009) contain markings related to environmental protection in the Källa planning area or in its vicinity. Luo areas are particularly important for biodiversity because of bats, among other things. Areas dominated by agriculture and forestry have special environmental values, such as alder groves. In addition, the plans include markings related to protection green areas and local recreational areas.

7.3.1 Suitability of the area

The issues presented in this chapter must be taken into account in the planning, but based on a preliminary assessment, the area is suitable for the construction of new nuclear power.

The ownership of the Källa camp area was transferred to Fortum through the land deals, but the city has the right of possession free of charge until 12/28. After that, Fortum and the City of Loviisa will review the matter annually. The City of Loviisa is looking for a new location for the camp area.

8 Natura 2000 -network areas

The European Union's Natura 2000 network consists of Special Protection Areas (SPA) notified to the European Commission under the Council of Europe's Directive 2009/147/EC on the conservation of wild birds, i.e. the so-called Birds Directive, and Special Areas of Conservation (SAC) under the Habitats Directive (92/43/EEC), which have been laid down by a decree of the Ministry of the Environment after the European Commission or the Council of

the European Union has approved the sites in question as sites of European Union importance on the basis of the Habitats Directive.

In national legislation, provisions on Natura areas are laid down in the Nature Conservation Act (9/2023), through which the directives have been implemented, and in the decrees issued under it.

8.1 Natura assessment

Section 34 of the Nature Conservation Act contains a prohibition on weakening Natura areas: The nature values on which the protection of an area belonging to the Natura 2000 network is based on must not be significantly weakened.

In section 35 of the Act, it is prescribed that the impacts of projects and plans on Natura areas should be assessed:

"If a project or plan, either individually or in combination with other projects and plans, is likely to cause a significant deterioration in nature values of a site included in or proposed by the Government to be included in the Natura 2000 network for the conservation of which the site has been included or is intended to be included in the Natura 2000 network, the implementer of the project or the formulator of the plan shall carry out an appropriate assessment of these impacts in view of how they affect the conservation objectives of the site. The same applies to projects or plans outside the site that are likely to have significant adverse impacts extending to the site."

8.2 Natura areas near Fortum's Källa planning area

In the vicinity of the planning area, which consists of properties owned by Fortum in the Källa planning area, there are two areas of the Natura 2000 network that could be affected by the activities planned for the area, the Källaudden-Virstholmen area and the Pernajanlahti bay and Pernaja archipelago marine protected area (Figure 8-1).

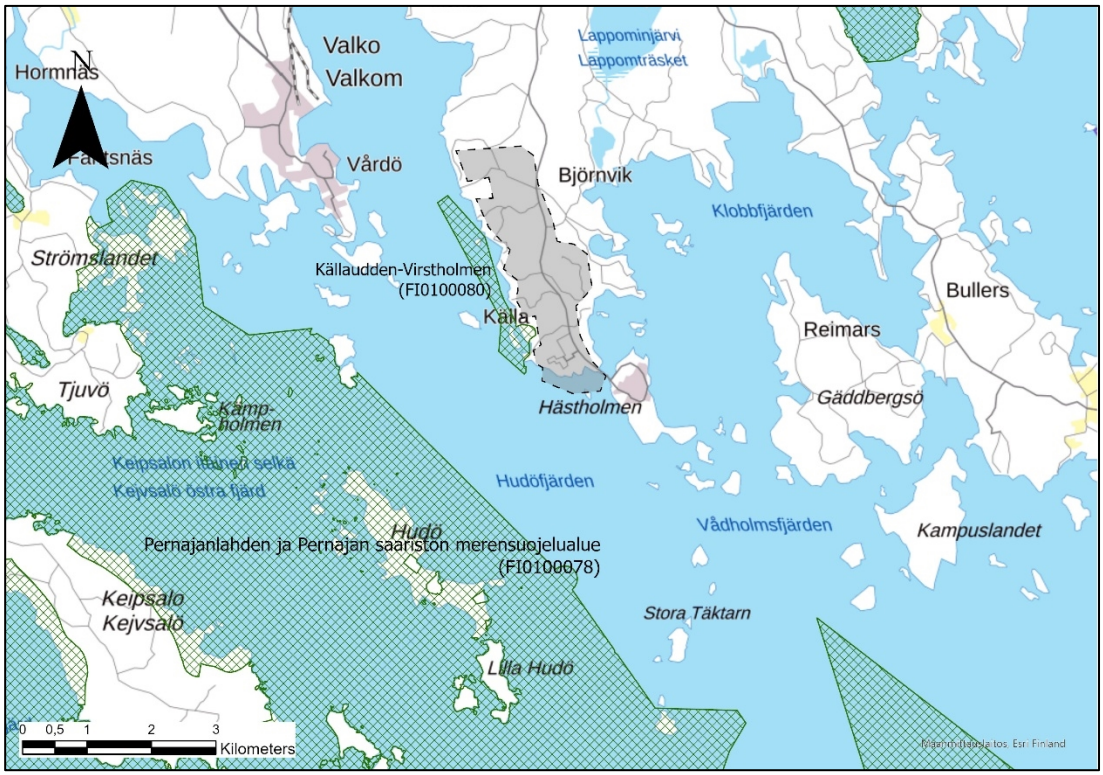

Figure 8-1. Fortum's Loviisa Källa planning area and the nearest Natura 2000 network areas. Background map: National Land Survey of Finland data (11/2025). Licence: https://www.maanmittauslaitos.fi/avoindata-lisenssi-cc40, 11.11.2025.

Källaudden-Virstholmen is a Natura area of approximately 87 hectares on the coast of Loviisa in the Gulf of Loviisa. The area is a SAC area under the Habitats Directive. The majority of the area (82.4 ha) is marine area.

Fortum's Loviisa nuclear power plant is located about 1.6 km away and the nuclear power plant's accommodation village is about 500 m from the Källaudden-Virstholmen Natura area.

Pernajanlahti Bay and Pernaja archipelago marine protected area is an extensive, 65,775-hectare marine area that begins in the west at Pikkupernajanlahti bay in Porvoo and ends in the east at the border of Loviisa and Pyhtää. On the open sea the area mainly extends to the outer border of our internal territorial waters. The area is both a SAC area under the Habitats Directive and a SPA area under the Birds Directive.

Pernajanlahti bay and Pernaja archipelago marine protected area is located at its closest distance of approximately 2.7 km from the current nuclear power plant and approximately 2.3 km from the nuclear power plant's accommodation village.

More detailed descriptions of the areas and the criteria for protection are presented in Appendices 3 and 4.

8.3 Fortum's plans for the Källa planning area

No decisions have yet been made on the construction of a new nuclear power plant or other activities in the Källa planning area, and therefore more detailed planning of the area has not begun. The following is a general description of the environmental impacts of the construction and operation of a new nuclear power plant that could be significant for nearby Natura areas.

8.3.1 Environmental impacts of construction

The construction of a nuclear power plant takes about 5-10 years, depending on the technology and size. In the first phase of the construction, the necessary civil engineering work will be carried out. The earthworks include, among other things, the removal of trees and topsoil, the excavation of the bedrock for the construction of cooling water tunnels and the power plant excavation, as well as the levelling and filling of the construction area. Possible hydraulic engineering work may include, for example, quarrying and excavation work for the construction of the fairway and the port area, as well as cooling water intake and discharge structures.

For the construction phase, various temporary buildings will be built in the area, such as office, maintenance and storage buildings, social facilities and parking areas. The plant construction itself includes the construction of the power plant and its auxiliary buildings and structures.

The measures taken to build a nuclear power plant will cover a wide area both on the ground surface and in the sea area. Fortum's Källa planning area has a total area of approximately 360 hectares. The planning of construction has not yet been started with sufficient precision to be able to say to what extent the construction will have adverse effects on the nature values of the planning area, and which parts will remain in their natural state or be landscaped. The paving of the area affects the amount and streaming of stormwater.

During the construction phase, noise, vibration and dust are periodically caused to the environment. Heavy traffic in the area will also increase significantly. The effects during construction are temporary, but significant in the sense that the construction area is extensive and the duration of the construction work is several years.

8.3.2 Environmental impacts of operations

Compared to fossil energy production, the greenhouse gas emissions of nuclear power are very low. In addition, the production of nuclear power does not generate particulate emissions or acidifying emissions into the atmosphere. Energy produced by nuclear power is very efficient in terms of land use: nuclear power plants produce a large amount of electricity in a small area.

The most significant factor affecting the environment during the operation of a seawater-cooled nuclear power plant is the intake and discharge of cooling water. The cooling water heats up about 10 degrees from the intake water as it passes through the cooling circuit. Warm discharge water can warm waterways, which in turn can affect ecosystems through other seawater quality factors and changes in them.

The effects of the heated cooling water on the species in the sea area depend, among other things, on the selected cooling water discharge locations and the depth and flow conditions of the discharge area. The discharge of cooling water is planned with the help of modelling, so that the warm water mixes with the surrounding seawater as efficiently as possible and the warming effect of the cooling water remains as small as possible.

The construction of the power plant in the Källa planning area in Loviisa would transform a predominantly fairly natural area into a built industrial area. This would bring changes to the noise levels and light conditions of the plant and its surroundings, as well as traffic volumes, among other things.

8.4 Need for Natura assessment

Fortum has not made any decisions on the operations to be located in the Källa planning area, and more detailed planning of possible projects has not been initiated. There is not yet sufficient information to assess whether the Natura 2000 areas in the vicinity of the Källa planning area, alone or in combination with other projects and plans, will be adversely affected.

It is likely that as the plans for the Fortum area become more specific, an assessment of the impacts of the planned projects on the nearby Natura areas will be carried out in accordance with section 35 of the Nature Conservation Act 9/2023, or at least a more detailed presentation of the need for an assessment.

An assessment/more detailed proposal on the need for an assessment will be made in connection with the environmental impact assessment (EIA) procedure required by the project, when the plans for the project's land use and the

location of the activities as well as the estimates of the emissions of the planned activities have been specified.

As stated in chapter 8.1, the Nature Conservation Act includes a prohibition on weakening Natura areas, according to which the nature values based on which the area is protected may not be significantly weakened. The prohibition of deterioration will be taken into account in Fortum's plans for the Källa planning area. Any new activities will be planned in such a way that they do not significantly weaken the protection criteria of the Natura areas.

9 Transport connections

9.1 Existing connections

Highway 7 runs from Helsinki to Vaalimaa via Loviisa, which is part of Finland's most important east-west route, the E18 road. The highway has junctions on the east and west sides of Loviisa. Both junctions lead along Mannerheiminkatu (regional road 170) to Saaristotie and Atomitie roads (connecting road 1583), along which the Källa planning area is located. At the end of the Atomitie road is the Loviisa nuclear power plant on the island of Hästholmen.

The nearest freight railway station is located in the port of Loviisa, Valko, which is about 20 km from Källa along the road. The railway stretches from the port of Loviisa to the City of Lahti, and only freight trains operate on this 77 km long railway section. The nearest passenger railway station is in the City of Kotka, which is about 50 km from Källa.

There are three major shipping lanes in the sea area near Källa. The route to Valko Port runs through the southwest side of the island of Hästholmen, at its closest a couple of kilometres from the shore of the island. Within a radius of ten kilometres from Källa, there is also the coastal lane of the Gulf of Finland, starting from the ports of Hamina and Kotka, and continuing as the Helsinki-Orrengrund fairway. The third shipping route to the ports of Hamina and Kotka, which is in wider use, is located a little further out at sea.

The current transport connections serve the current needs of the Loviisa nuclear power plant well. Transport connections have been examined, for example, in relation to the transport of spent fuel to Posiva's encapsulation and final disposal plant in Olkiluoto. The transport of spent nuclear fuel from Loviisa to Olkiluoto for encapsulation and final disposal will probably take place either by road or sea. (Fortum 2021)

9.2 Suitability of the area

Most of the existing infrastructure of the Loviisa nuclear power plant is dimensioned for the two existing units. In the case of the new nuclear power plant, the adequacy of transport connections will be examined in more detail, taking into account the various needs of new nuclear power.

The construction of a new road connection between road 170 and Atomitie road has received funding. According to current plans, the road construction will begin in 2026. The road construction project also supports the development of the planning area. Heavy road traffic can thus be directed to a route that does not pass through residential areas, using the new road line.

The construction of a harbour must also be considered in the planning of new nuclear power. The need for a harbour depends on the technology chosen.

10 Summary of the region's suitability for nuclear power

Geology and seismicity

- Based on the preliminary examinations carried out, the bedrock in the area is suitable for the construction of new nuclear power.
- The seismic hazard is considered to be low in the area.
- There are rock fracture zones in the Källa area, but considering the size of the area, it is still likely that a suitable site for the construction of the nuclear power plant will be found.
- Further studies will be carried out at a later stage. Additional studies are related to, among other things, the stability of the bedrock, the geological and geotechnical properties of the area, and the depth of the load-bearing layer.

Hydrology

- Based on preliminary cooling water modelling, there are likely to be feasible cooling water intake and discharge locations in the Loviisa nearby sea area, and the availability of cooling water is not a problem in the area.
- More detailed modelling of waterways will be needed as the project progresses. When planning new activities, it must be ensured that the ecological status of the water system does not deteriorate in principle. In addition, the project should not jeopardize achieving the good status of the water bodies in the area or any other status objective set for them in the river basin management plan.
- Based on the flood map, a sea flood in the Källa area is extremely unlikely. However, flood preparation must be taken into account already when choosing the site of the plant and planning the plant.
- There are no classified groundwater areas in the Källa area or in its immediate vicinity.

Population, precautionary action zone (PAZ) and emergency planning zone (EPZ)

- Based on preliminary drafts, the scope of the new nuclear power plant's precautionary action zone (PAZ) could be smaller than the current Loviisa nuclear power plant's PAZ, which means that there would be no changes in the PAZ compared to the current Loviisa nuclear power plant's PAZ.

- At this stage, however, it is not possible to determine the exact size of these zones. The exact extent of the PAZ and the EPZ will be determined at a later stage of the project.

Electricity network connections

- The electricity network connection of the current Loviisa nuclear power plant units is not sufficient for any additional units. New power lines are needed, the number of which depends, among other things, on the production capacity and number of new units.
- The connection of the new units to the grid will be discussed in more detail with Fingrid.
- The aim is to use the existing transmission line corridors and, if necessary, widen them for new lines.

Other land use

Nature reserves

- There are no nature reserves in the Källa planning area, but the ridge conservation area extends to a small part of the planning area.
- The nearby nature reserves as well as the ridge conservation area, which is partly located in the planning area, will be taken into account in the planning of the project. Due to the size of the Källa area, a suitable site for the construction of nuclear power plants can probably be found.
- Due to the proximity of the Natura 2000 areas, it will be assessed in more detail later whether the potential project is likely to have significant adverse effects on the area's protection criteria. If the risk of significant adverse effects cannot be ruled out, the Natura assessment will be carried out at a later stage.
- Nearby Natura areas will also be taken into account when selecting cooling water intake and discharge locations.

Cultural heritage, other cultural-historical sites and landscape

- The Källa planning area is not located in a nationally valuable landscape area. There are no significant fixed ancient relics or significant sites of the built cultural environment located within the boundaries of the planning area.
- However, cultural heritage and other cultural-historical sites in the planning area or its immediate vicinity must be taken into account when planning the

project. Possible underwater archaeological investigations will be discussed with the Finnish Heritage Agency.

- A new nuclear power plant would inevitably change the landscape of the area to some extent, as nuclear power plant buildings are usually tall and the lights can be seen far away in the dark.
- The landscape impacts will be assessed in more detail in the EIA procedure of a possible project and in connection with zoning.

Other boundary conditions for land use

- The Loviisa nuclear power plant's accommodation village, hydrogen production pilot plant and Källa camp area are located in the Källa area. In addition, there are areas that are particularly important for biodiversity in the area (so-called Luo areas).
- These issues must be taken into account in the planning of the project, but based on a preliminary assessment, the area is suitable for the construction of new nuclear power.
- The ownership of the Källa camp area was transferred to Fortum through the land deals, but the city has the right of possession free of charge until 12/28. After that, Fortum and the City of Loviisa will review the matter annually. The city of Loviisa is looking for a new location for the camp area.

Transport connections

- In the case of new nuclear power, the adequacy of transport connections will be examined in more detail.
- The construction of a new road connection between road 170 and Atomitie road has received funding. According to current plans, the road construction will begin in 2026. The road construction project also supports the development of the planning area. Heavy road traffic can thus be directed to a route that does not pass through residential areas, using the new road line.
- The construction of a harbour must also be considered in the planning of new nuclear power. The need for a harbour depends on the technology chosen.

11 References

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Appendix 1 Soil map and lithological map of the Källa area

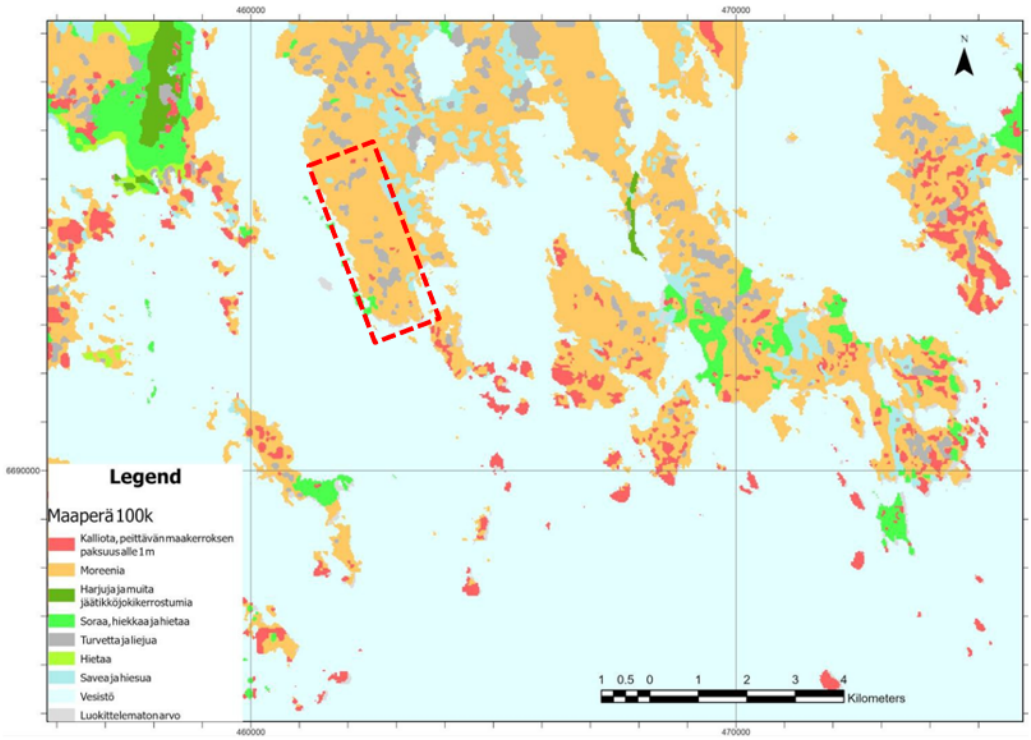

Figure 1. Soil map in the Källa planning area and its surrounding areas. The area under review is indicatively outlined by a red dotted line.

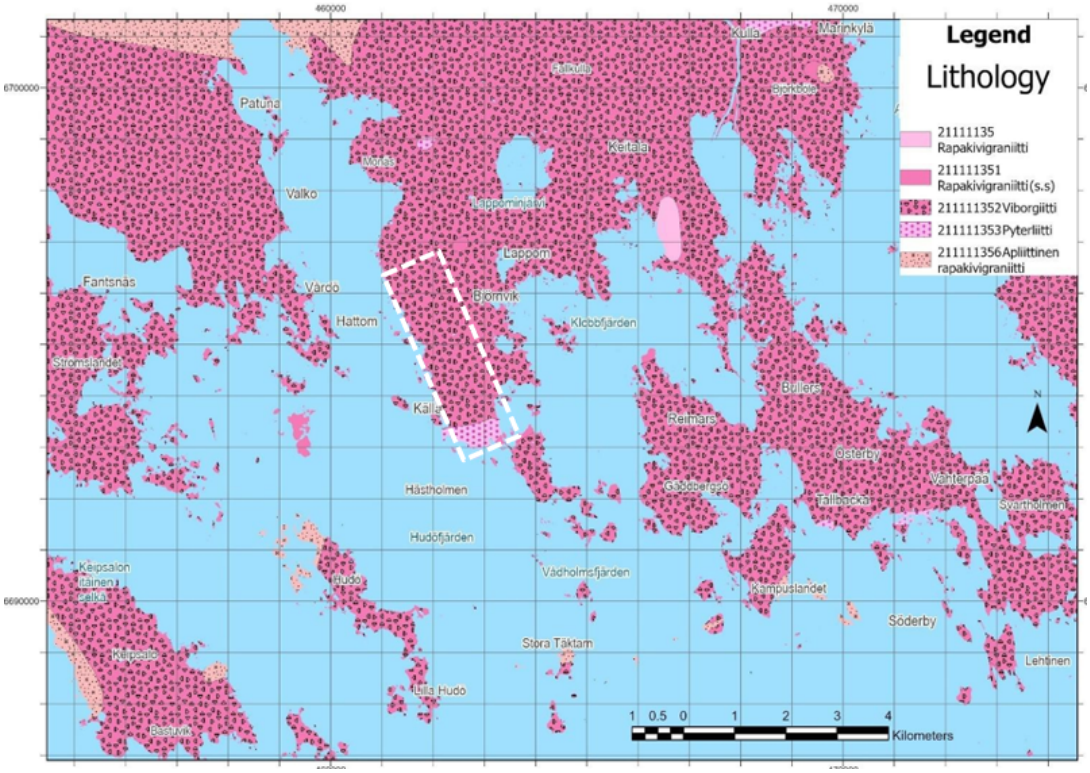

Figure 2. Lithological map of the Källa planning area and its surrounding areas. The area under consideration is indicatively outlined by a white dotted line. Lithological = description of a rock based on its physical features.

Appendix 2 Nearest sensitive sites and tourist and recreational sites

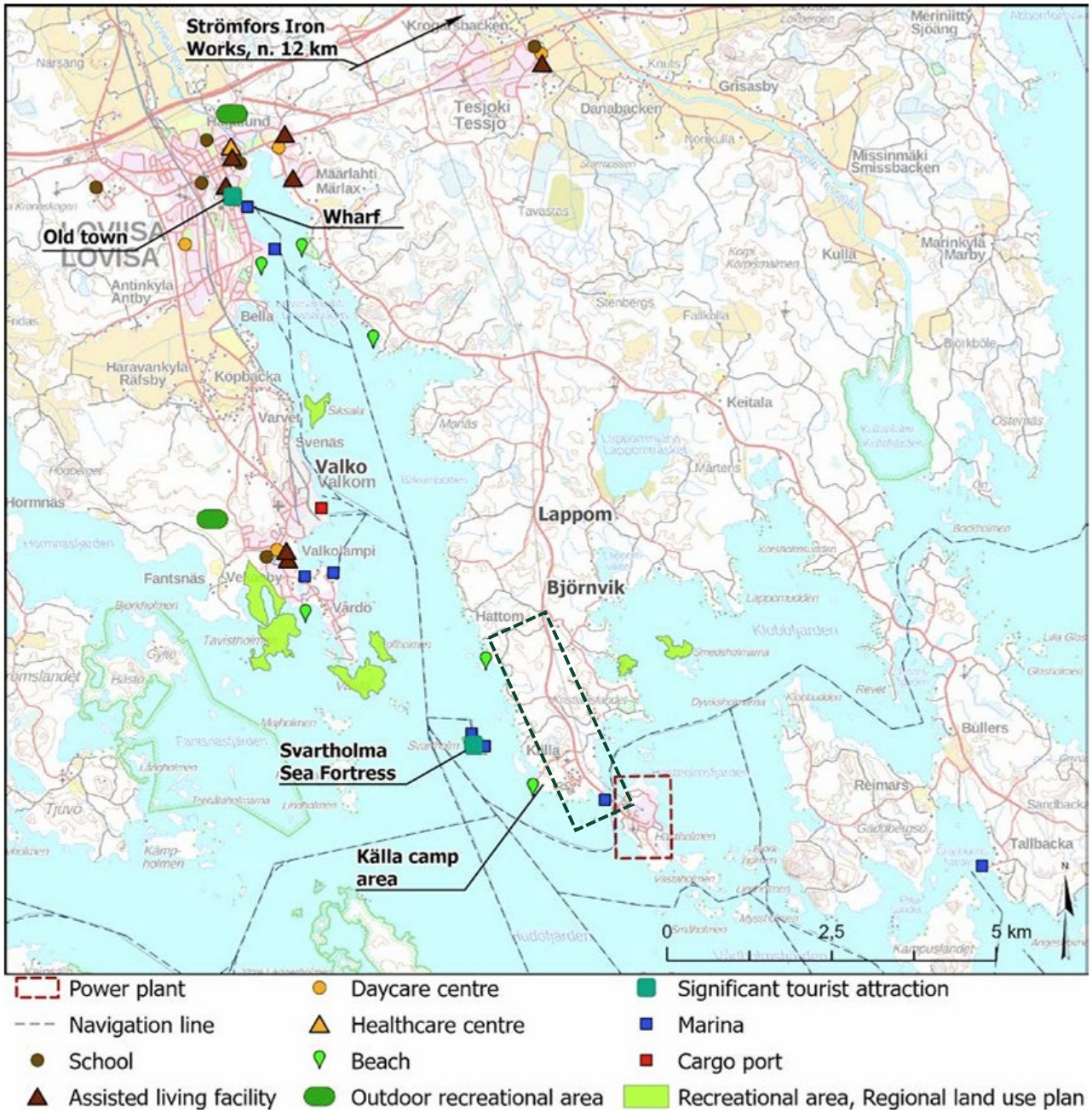

Figure 1. The nearest sensitive sites, as well as tourist and recreational sites. (Fortum 2021) The approximate location of the Källa planning area is shown with a green dotted line.

Appendix 3 Natura 2000 area: Källaudden-Virstholmen (FI0100080)

Källaudden-Virstholmen is a Natura area of approximately 87 hectares on the coast of Loviisa in the Gulf of Loviisa. The area is a Special Area of Conservation (SAC) area under the Habitats Directive (92/43/EEC). The majority of the area (82.4 ha) is marine area.

The area has a ridge section parallel to the coast, of which the highest points rise above the water level into small sandy islands. Most of the area is water area. In the southern part, there are also two ridge headlands and a flad between them. The soil in the area is sand and shingle soil. There is a large number of loose boulders on the coast, which is typical for the region.

The area is important in terms of its cultural history, and the islands are mainly owned by the state. To the west of the area is the old fortress island of Svartholm, the history of which is linked also to the islands in the Natura area. There is a fortress cemetery on Begravningsholmen island, and foundations of an old gunpowder store on Krutkällarholmen island.

The area is in recreational use, excluding the smallest islands. Lökören, Ledgrundet, Tallören, Rönnören islands and the more southern unnamed island are treeless sandbanks. There is a campsite on Källarevet island, and the nearby beach is used as a beach.

Nature and importance of the area

The Källaudden-Virstholmen Natura area is also included in the national ridge protection programme in its entirety. The area's ridge section has been found to be nationally valuable in the programme. It is representative in terms of vegetation, landscape and geomorphology, as well as due to the development brought about by land uplift.

The land uplift slowly reveals a new sandy coastal zone, where the succession development of vegetation continues. Pine forests grow on the largest islands. Källaviken, on the other hand, is a small flad, which is becoming a gloe lake due to land uplift. On the sandy seashores, there are typical plant species that are rare elsewhere (e.g. marsh spurge, sea pea, sea sandwort and Irish fleabane).

Shallow sandy seabed areas maintain representative aquatic vegetation and benthic fauna and serve as important food sources for birds. The small treeless sandbanks are abundant in birdlife, e.g. tern colonies occur. The species on the seabed in the area have not been inventoried.

The habitat types on which protection is based and their areas are presented in the table below (**Error! Reference source not found.**) and in the map (Figure 1. Habitats of the Källaudden-Virstholmen Natura area. (Pöyry 2008)).

Table 1. The habitat types and their areas which are the basis for the protection of the Källaudden-Virstholmen Natura area (SAC).

Code	Name	Area (ha)
1150	coastal lagoons	3.3
1610	the ridge islands of the Baltic Sea and the vegetation on their sandy, rocky and rocky shores, as well as underwater vegetation	67.9
1640	boreal sandy beaches of the Baltic Sea with perennial herbaceous vegetation	4.4
9080	wooded swamps in Fennoscandia	0.9
1210	annual vegetation on the shore ridges	0.9

According to the data sheet, no species listed in Annex II of the Habitats Directive or Article 4 of the Birds Directive have been observed in the area. Other important species in the data sheet are the field southernwood (*Artemisia campestris*).

The habitat types in the table are included in the area's conservation criteria, and their conservation objective is at least to maintain the significance of the area as part of the network.

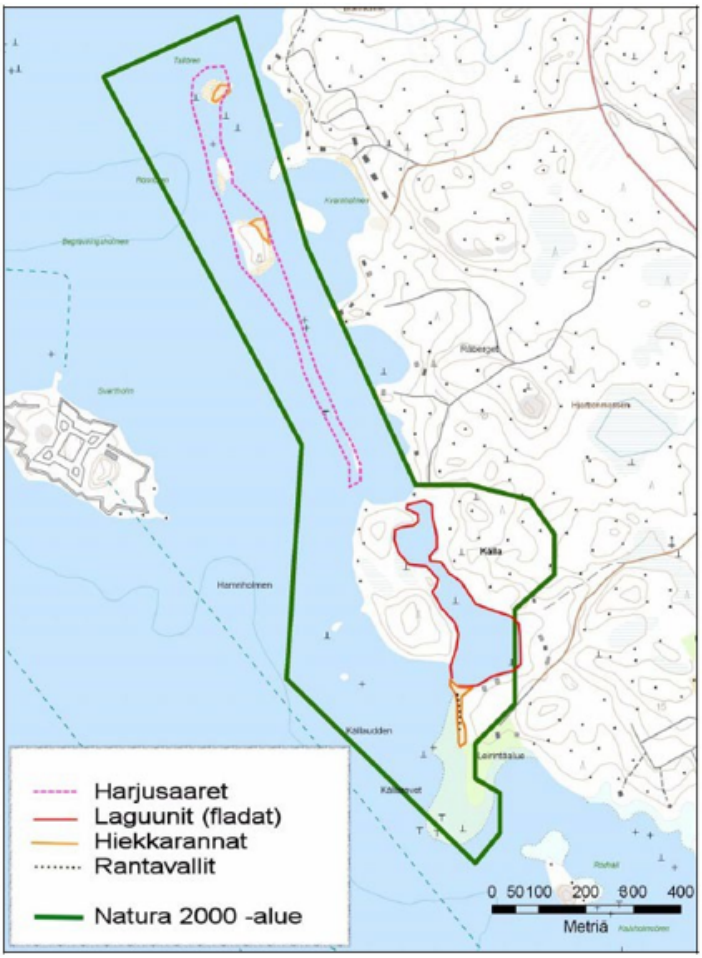

Figure 1. Habitats of the Källaudden-Virstholmen Natura area. (Pöyry 2008)

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Appendix 4 Natura 2000 site: Pernajanlahti bay and Pernaja archipelago marine protected area (FI0100078)

Pernajanlahti bay and the Pernaja archipelago marine protected area is a large marine area of 65,775 hectares that begins in the west at Pikku Pernajanlahti bay in Porvoo and ends in the east at the border of Loviisa and Pyhtää. On the open sea, the area mainly extends to the outer border of our internal territorial waters. The area is both a Special Conservation Area (SAC) under the Habitats Directive and a Special Protection Area (SPA) under the Birds Directive.

The Natura area includes the entire sea area within the demarcation. In addition, the Natura area includes the following land areas: 1. Pikku Pernajanlahti bay waterflow habitat and oak hill in Sannainen, 2. Pikku Pernajanlahti bay waterflow habitat and nature reserves on private lands, 3. Nature reserves on private and state-owned lands located in the archipelagos of Porvoo, Pernaja, Loviisa and Ruotsinpyhtää, areas acquired by the state for nature conservation purposes, shore protection programme sites, and the Hasselö grove, Gåsören and Gaddarna. Pikku Pernajanlahti bay and Pernajanlahti bay are the longest sea bays on the southern coast. Koskenkylänjoki and Ilolanjoki rivers flow into these bays. The bays in Pernaja and the archipelago in front of them form a chain of organisms of about 20 km, where the hydrological conditions vary clearly. The salinity of the water changes from almost zero to half a percent when entering the open sea. Water levels fluctuate greatly from time to time. The water quality at the bottom of the bays has deteriorated due to diffuse pollution and urban areas in the catchment area.

The bedrock in the area is granite in the west and north and rapakivi in the south and east.

The area is also very significant in terms of landscape. The area around Pernajanlahti bay is a nationally valuable landscape area in accordance with the Government Resolution.

The area will be used for the defence forces' training and shooting activities, as well as for military construction. There are structures and equipment related to the activities of the defence forces in the area. The cooling waters of the Loviisa power plant occasionally affects the temperatures and ice cover of the water in the sea area.

The Natura 2000 area forms an internationally valuable ecological entity, in which the gradation of water salinity and other environmental factors is clearly visible in the biotic communities. Pernajanlahti bay and Pikku Pernajanlahti bay are long (more than 10 km), narrow brackish water bays, where the effect of fresh river water gradually decreases as you go further out to sea. The area includes inner, intermediate and outer archipelagos as well as the open sea, so the number of habitats and species is large.

Many parts of the Natura area have been found to be of national value and are included in various conservation programmes. Several habitat types of the Habitats Directive occur in the area as notably representative, and the value of the species is emphasized by several species of the Birds Directive.

Pernajanlahti bay and Pikku Pernajanlahti bay are lush and rich in aquatic and wetland birds. They are classified as internationally valuable bird waters, and they are also important resting places for birds during migration. There are several islands in the archipelago that are very important for seabirds (e.g. Aspskär). The area is important for the protection of e.g. the Caspian tern. There are also islets where grey seals reside in the area.

The vegetation in the area is diverse. The islands are mainly rocky, but there are also very representative sandy and shingle soil beaches (e.g. Gåsören, the northeastern shore of Våtskär and the southern part of Hudö). Sandy shallow seabeds are important feeding places for birds, fish and bottom feeders.

In some places, there are representative coastal meadows on the shores. In particular, the islands in Pernaja that are part of the coastal protection programme have remained undeveloped and thus representative in terms of vegetation. There are also representative oak and linden groves on the shores (e.g. Sannainen oak hill, Baggholmen linden groves and Hasselödalen).

The habitat types on which the site is protected and their areas are shown below (**Error! Reference source not found.**) and the species on which the protection is based (**Error! Reference source not found.**).

Table 1. Marine protected area of Pernajanlahti bay and the Pernaja archipelago (SAC/SPA) habitat types and their areas on which protection is based.

Code	Name	Area (ha)
1110	Underwater sandbanks	553
1130	River deltas	200
1150	Flads, gloe lakes and lagoon-like bays	2 400
1160	Wide shallow bays	120
1170	Submerged rocks and underwater parts of rocky shores with algae zones	8 400
1210	Annual vegetation on the embankments	0,01
1220	Perennial vegetation on rocky shores	28
1230	Vegetation-covered cliffs on the Atlantic and Baltic coasts	53,8
1610	The ridge islands of the Baltic Sea and the vegetation on their sandy, rocky and stony shores, as well as underwater vegetation	35
1620	Groups of islands and islets in the outer archipelago and sea zone of the Baltic Sea	70
1630	Boreal coastal meadows of the Baltic Sea	15
1640	Boreal sandy beaches of the Baltic Sea with perennial herbaceous vegetation	15,5

1650	Boreal narrow brackish water bays of the Baltic Sea	10 900
6270	Fennoscandian dry and fresh meadows which are rich in species	1
7140	Transition mires and coastal mires	150
7160	Fennoscandian springs and spring fens	0,3
8220	Silicate rocks covered with vegetation	10
9010	Boreal natural forests	70
9020	Fennoscandian hemiboreal natural hardwood forests	2
9050	Boreal groves	25
9080	Fennoscandian flood forests	1,6
91D0	Wooded bogs	11

Table 2. Marine protected area of the Pernajanlahti bay and the Pernaja archipelago (SAC/SPA)

Code	Type	Scientific name
A298	great reed warbler	Acrocephalus arundinaceus
A200	razorbill	Alca torda
A054	northern pintail	Anas acuta
A056	shoveler	Anas clypeata
A055	garganey	Anas querquedula
A051	gadwall	Anas strepera
A039	bean goose	Anser fabalis
A169	ruddy turnstone	Arenaria interpres
A062	greater scaup	Aythya marila
A021	Eurasian bittern	Botaurus stellaris
A202	black guillemot	Cepphus grylle
A081	marsh harrier	Circus aeruginosus
A122	corncrake	Crex crex
A037	tundra swan	Cygnus columbianus bewickii
A038	whooper swan	Cygnus cygnus
A099	hobby	Falco subbuteo
A096	kestrel	Falco tinnunculus
A154	great snipe	Gallinago media
A127	crane	Grus grus
A338	red-backed shrike	Lanius collurio
A640	lesser black-backed gull	Larus fuscus fuscus
A177	little gull	Larus minutus
A066	velvet scoter	Melanitta fusca
A068	smew	Mergus albellus
A094	osprey	Pandion haliaetus

A072	European honey buzzard	Pernis apivorus
A151	ruff	Philomachus pugnax
A119	spotted crake	Porzana porzana
A063	common eider	Somateria mollissima
A190	Caspian tern	Sterna caspia
A193	common tern	Sterna hirundo
A194	Arctic tern	Sterna paradisaea
A307	barred warbler	Sylvia nisoria
A166	wood sandpiper	Tringa glareola
A162	redshank	Tringa totanus
A199	common guillemot	Uria aalge
1042	yellow-spotted whiteface	Leucorrhinia pectoralis
1364	grey seal	Halichoerus grypus
6307	Baltic ringed seal	Pusa hispida botnica

All the habitat types and species mentioned in the tables are included in the site's conservation criteria (with the exception of habitat types classified in category D in terms of representativeness and species classified in category D in terms of population importance) and the conservation objective of all of them is at least to maintain the importance of the site as part of the network.

The majority of the water areas in the Natura area are part of the water bodies that require special protection defined by the working group for the special protection of water bodies appointed by the Ministry of the Environment. In the water areas of the Natura area, the seabed, underwater nature and water quality are protected under the Water Act. The area also includes areas covered by the National Bird Water Protection Programme, the Shore Protection Programme and the National Grove Protection Programme, as well as state-owned and private nature reserves.

Sources

Natura 2000. Information Sheet. Pernajanlahden ja Pernajan saariston merensuojelualue. https://paikkatieto.ymparisto.fi/natura/2018/tietolomakkeet/FI0100078.pdf. (Referred on 29.10.2025)

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