Basis for scoping consultation

2026-02-10

VATTENFALL

Summary

Upcoming applications and the consultation process

Vattenfall AB (hereinafter Vattenfall) is planning to establish new nuclear power on the Värö peninsula in Varberg municipality. The operations will help to meet the increasing demand for fossil-free electricity that is expected as a result of the increasing electrification of society. Nuclear power can deliver large amounts of fossil-free electricity and also contribute with support services that make the entire electricity system more robust and reliable. Electricity from nuclear power therefore constitutes an important piece of the puzzle for the future Swedish electricity supply.

The planned new nuclear power plant on the Värö Peninsula will consist of three or five modular reactors[1] with a total electrical output of around 1,500 MWe and are expected to produce around 12 TWh of electricity per year. Modular reactors are a new reactor type that is based on well-known and proven light water technology. The reactors are designed with a focus on safety, efficiency and environmental considerations.

The planned new nuclear power plant requires a permit under the Environmental Code and the Nuclear Activities Act (1984:3). The upcoming permit application under the Environmental Code will include a permit for the construction and operation of the nuclear reactors, but not their future decommissioning. The permit application will also include a permit for the handling and storage of nuclear waste and spent nuclear fuel, the construction and operation of emergency power generators, and the manufacture of hydrogen, sodium hypochlorite and concrete. The permit application may also include port operations. The permit application will also include a permit for the water operations required for the construction and operation of the operations, such as the extraction of seawater for use as cooling water, work and construction of facilities in water areas, including work for the possible construction of a supplementary port, and the drainage of groundwater. The permit application may also include a so-called Natura 2000 permit and an exemption from the Species Protection Regulation.

Vattenfall is now carrying out the third stage of the consultation process regarding new nuclear power on the Värö Peninsula. For this stage, the consultation document has been supplemented based on the fact that Vattenfall has chosen to proceed with two suppliers for modular reactors for the continued design and thus decided against suppliers of large-scale nuclear reactors. As a result of this selection, Vattenfall has been able to develop the descriptions of the operations and deepen the investigations required for the upcoming applications. The document has also been supplemented with information about a possible supplementary port and information that the applied for operations will include handling and storage of spent nuclear fuel and nuclear waste within the operational area. Vattenfall has also started the company Videberg Kraft AB, which will be the company that applies for a permit for the operation and then constructs, owns and operates the nuclear power plant.

[1]Modular reactors are also called SMRs, small modular reactors, where “small” refers to the lower thermal power obtained compared to large-scale reactors.

The consultation covers questions about the location, scope, design and environmental effects of the planned activity, as well as how serious chemical accidents can be prevented and limited. The consultation aims to give local residents, the public, authorities and other stakeholders the opportunity to provide views on upcoming permit applications and associated documentation.

The planned operations

The establishment of the operations will begin with ground preparation measures to create a foundation to build on. These earthworks will give rise to soil and rock masses that will primarily be utilized within the project and secondarily transported to recipients for reuse, recycling or disposal. Blasted rock masses may be crushed into smaller fractions before reuse in the project.

After the ground preparation measures, foundation work will begin and work will be done to erect the nuclear reactors (including the reactor building, turbine building, and certain service buildings), other buildings (such as local switchgear and offices) and building structures for the cooling water. These works require large quantities of concrete, and in order to reduce transport to and from the operational area, concrete production is planned to take place on site. Construction will be carried out partly through site-built functions, partly by assembling modules together at another location and then lifting them onto site. Modules with process equipment will gradually be added and then connected together. The nuclear reactors will be erected and commissioned sequentially, that is, one by one.

Vattenfall is investigating the conditions for establishing a supplementary port in the northern part of the operational area with the main aim of reducing the need for road transport during the construction period. A design for a port that includes a breakwater, quay, port basin with turning zone and a port platform on land is currently being investigated. The construction of a port will require work both on land and in water. On land, the work could include blasting and excavating rock and soil and filling with fill materials to create a foundation. In water, the work could include filling and laying out stone material, concrete elements and concrete caissons, piling, sheet piling, dredging and blasting. Vattenfall will investigate the detailed conditions for, and the need for, a supplementary port before the permit applications are submitted to the review authorities.

The nuclear power reactors are the central part of the planned operations. In the reactors, electricity is produced through nuclear fission. During nuclear fission, heat is released that is used to convert water in the reactor into steam, which in turn is used to drive a turbine and thereby generate electricity. Vattenfall has evaluated both modular reactors and large-scale reactors, and as mentioned above, Vattenfall has decided to proceed with modular reactors. Regardless of which of the two suppliers is chosen, the reactor models will be based on well-known and proven light water technology and will be equipped with the latest in performance and safety.

During the operation of the facility, seawater will be led to the facility for use as cooling water. The need for seawater is estimated at approximately 70 m^3 per second. The intake point is planned to be located in the northern part of the operational area. To avoid fouling in the intake pipes, the water may need to be treated with sodium hypochlorite, which may be manufactured on site. Used cooling water will be returned to the sea either via existing or new infrastructure.

The plant will also be equipped with backup power systems to ensure that there is electrical power for the reactors and other prioritized plant parts if the external power supply is cut off. These systems will mainly consist of backup power units in combination with batteries. The backup power units will be tested regularly and will have a total installed power input of approximately 80-130 MWth.

During operation of the nuclear power plant, both conventional waste (which can be both non-hazardous and hazardous) and nuclear waste (radioactive waste) are generated. During operation, spent nuclear fuel is also generated. Nuclear waste and spent nuclear fuel are planned to be stored within the operational area for further handling and final disposal at another location. Final disposal of nuclear waste and spent nuclear fuel is not included in the planned operations.

A location investigation has been carried out at an early stage to identify the best possible location for the planned operations, taking into account that the purpose of the operations should be achieved with the least possible intrusion and nuisance to human health and the environment. The location investigation studied, evaluated and compared several possible locations in Sweden based on several different criteria. Taking into account a combined assessment of all criteria, the location alternative Ringhals-Väröhalvön and the alternative Biskopshagen are considered to be the most favourable for the planned operations and the alternative that meets the purpose with the least intrusion and nuisance to human health and the environment.

Upcoming environmental impact assessment and expected consequences

The scope of an environmental impact assessment should be adapted to the environmental impact and other effects that the activity entails. The environmental impact assessment is therefore planned to focus on the subject areas of the natural environment, landscape, waste, impact on groundwater and surface water, marine natural environment, transports, noise, outdoor recreation and risk and safety.

During the construction of the planned operations, areas with high to very high natural values will be used, which will result in the loss of natural values. The operations will also require that part of an existing nature reserve be abolished, which will affect both the natural environment and the public's opportunities for outdoor recreation. The construction work will also cause noise and vibrations, emissions to air and water, impacts on groundwater conditions and changes in the landscape. Construction work in water may affect marine species and biotopes. The impact during the construction phase also consists of relatively extensive transports to and from the area, which, among other things, generates noise and emissions to air.

During the operational phase, the environmental impact of the operation is expected to consist mainly of limited emissions to air and water. Both conventional and nuclear waste will be generated. Transports will occur, but these will be fewer than during the construction phase. The operation will be subject to Seveso legislation due to the chemicals that are planned to be handled in the operation. The operation will also involve radioactive substances in the form of uranium fuel in the reactor. The activities will be designed and operated in accordance with the regulations of the Swedish Radiation Safety Authority, which ensures a high level

of safety in the operation and that the risk of unexpected events is kept as low as possible.

New nuclear power for a fossil-free society

The project is driven by the need to provide fossil-free and plannable electricity production that can strengthen security of supply and contribute to stability in the electricity system. Sweden faces a challenge to achieve the goals of net zero emissions by 2045 and completely fossil-free electricity production by 2040. The planned operations represents an opportunity to contribute to a fossil-free society while strengthening the security of supply in the electricity system. The project therefore represents an important step in securing Sweden's long-term energy supply and enabling continued electrification and industrial development, which leads to maintained and developed welfare for Sweden.

Reading instructions

Vattenfall is now carrying out the third stage of the consultation process regarding new nuclear power on the Värö Peninsula. Since the previous consultation, Vattenfall has chosen to proceed with two suppliers for modular reactors for the continued design and has thus deselected suppliers of large-scale nuclear reactors. As a result of this selection, Vattenfall has been able to develop the descriptions of the operations and deepen the investigations required for the upcoming applications. The operational area has been adjusted and a smaller area within the nature reserve, compared to what was previously stated, will be used. Vattenfall has also started the company Videberg Kraft AB, which will be the one to apply for a permit for the operations and then build, own and operate it. See also section 1.

An additional question at this stage of the consultation process concerns the storage within the operational area of spent nuclear fuel and nuclear waste that arises during the plant's operational life. The background to this question is that the state has not yet decided how nuclear waste and spent nuclear fuel from new nuclear power will be disposed of. For the time being, Vattenfall plans that all spent nuclear fuel and nuclear waste generated during the operation of the nuclear power plant will be able to be stored within the operational area pending continued and final management. See also sections 3.5 and 3.6.

Another issue that has arisen is that Vattenfall is investigating the conditions for establishing a supplementary port in the northern part of the operating area. The main purpose of the port would be to reduce road transports of surplus materials during the construction period. No decision has yet been made and Vattenfall will investigate the detailed conditions for a supplementary port before the permit applications are submitted to the review authorities. See also section 3.7.

The additional information, as well as information presented at earlier stages of the consultation process, has been incorporated into this version of the consultation document.

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Administrative information

Administrative tasks	
Operator as per the Environmental Code and licensee according to the Nuclear Activities Act (1984:3)	Vattenfall AB Videberg Kraft AB
Corporate reg. number	556036-2138 (Vattenfall AB) 559517-0571 (Videberg Kraft AB)
Address:	Vattenfall AB, 169 92 Stockholm
Contact person Vattenfall AB:	Helene Åhsberg, 070-561 87 28 helene.ahsberg@vattenfall.com
Properties:	Varberg Skällåkra 6:3, 6:4, 6:17, 8:18 and 9:15 Varberg Biskopshagen 1:7 and 3:2 Varberg Skällåkra S:2, S:4 and S:12
Activity codes (preliminary)	40.30 (nuclear reactor) 90.460 (treatment of high-level radioactive waste/storage of radioactive waste) 90.470 (processing/storing spent nuclear fuel, etc.) 24.24-i (manufacture of gases) 24.30-i (manufacture of salts) 40.50-i (incinerator) 10.50 (crushing) 63.10 (port) 26.110 (manufacture of concrete)
County:	Halland
Municipality:	Varberg
Regulatory body:	County Administrative Board of Halland County (environmental protection and water operations) Swedish Radiation Safety Authority (radiation protection, nuclear safety and nuclear non-proliferation)

WSP Sverige AB has been commissioned to produce the consultation document, which is based on information about the operations provided by Vattenfall.

1. Introduction

1.1. Background

Sweden has a goal of having zero net emissions of greenhouse gases into the atmosphere by 2045. Sweden imports 130 TWh of fossil fuels annually, where oil accounts for more than 100 TWh and is supplemented by coal, coke and natural gas (Swedish Energy Agency, 2025). Sweden now faces an opportunity to achieve climate goals while strengthening competitiveness through extensive electrification of industry and the transport sector. Electricity demand is expected to increase significantly to enable increased electrification of society. The Swedish Parliament has also adopted a target that electricity production in Sweden will be completely fossil-free by 2040 (Prop. 2023/24:105). To meet the expected electricity demand, Vattenfall believes that all available fossil-free power sources need to be expanded. Nuclear power can produce large amounts of electricity using small amounts of fuel on a small surface area and will therefore be an important part of the fossil-free electricity system that meets Sweden's increased electricity demand.

Vattenfall is now working to develop new nuclear power on the Värö Peninsula. In the spring of 2025, Vattenfall AB started the company Videberg Kraft AB, which is intended to become the operator under the Environmental Code and the licensee under the Nuclear Activities Act for the planned operations. In the autumn of 2025, Vattenfall entered into an agreement with nine companies within the industrial consortium Industrikraft regarding co-investment and cooperation regarding new nuclear power in Sweden. ABB, AlfaLaval, Boliden, Hitatchi Energy, Höganäs AB, SSAB, Saab, Stora Enso and the Volvo Group have jointly acquired 20 percent of the shares in Videberg Kraft AB. The government has also previously announced that the state also intends to become a partner in Videberg Kraft AB. In December 2025, Videberg Kraft AB submitted an application for state support for investment in new nuclear power to the government. The work to build up Videberg Kraft AB's organization will take place gradually and will begin in 2026.

The work to develop new nuclear power on the Värö Peninsula is still being carried out by Vattenfall, and therefore it is Vattenfall that is conducting this consultation. After the consultation, it is planned that the results and documentation from the development work conducted so far (and the associated personal data processing) will be transferred to Videberg Kraft AB, which will continue the work to produce an environmental impact assessment and apply for a permit in accordance with the Environmental Code and the Nuclear Activities Act regarding new nuclear power on the Värö Peninsula.

1.2. The purpose of the operations

The purpose of the planned operations is to produce fossil-free and plannable electricity with new nuclear power on the Värö Peninsula in Varberg Municipality. The production is to be in place by the mid-2030s. The plannable production will also contribute to stabilizing the electricity grid. Electricity cannot be stored to any great extent and there must be a power balance for the electricity system to function. This means that the production of electricity at any given time needs to be equal to its consumption.

There are two types of electricity generation; plannable and non-plannable. Nuclear power and hydropower are both plannable energy sources in the sense that electricity generation is predictable and can be planned in advance, which helps to strengthen the security of supply of the power system. Wind power and solar power are weather-dependent and therefore non-plannable energy sources, as production depends on the weather and cannot be planned in advance.

The location on the Värö Peninsula, see Figure 1, is designated as of national interest for energy production, thermal power and electricity distribution, and is adjacent to the existing Ringhals nuclear power plant and the transmission network. Vattenfall also assesses that the closure of Ringhals 1 and 2 will make it possible to connect new electricity production without major investments in the transmission network.

The site is strategically located on the west coast, between the metropolitan regions of Gothenburg and Malmö, where the need for electricity is high and is expected to increase due to the increasing electrification of society. As a result of the existing operations at the Ringhals nuclear power plant, there is already infrastructure at the site that can be co-utilized for new nuclear power operations.

In addition, Vattenfall has had and still has a good collaboration with Varberg Municipality and the region has developed expertise among subcontractors and authorities regarding nuclear power operations. This makes the Värö Peninsula suitable as a first location in Sweden to establish new nuclear power to meet the needs in the country described above.

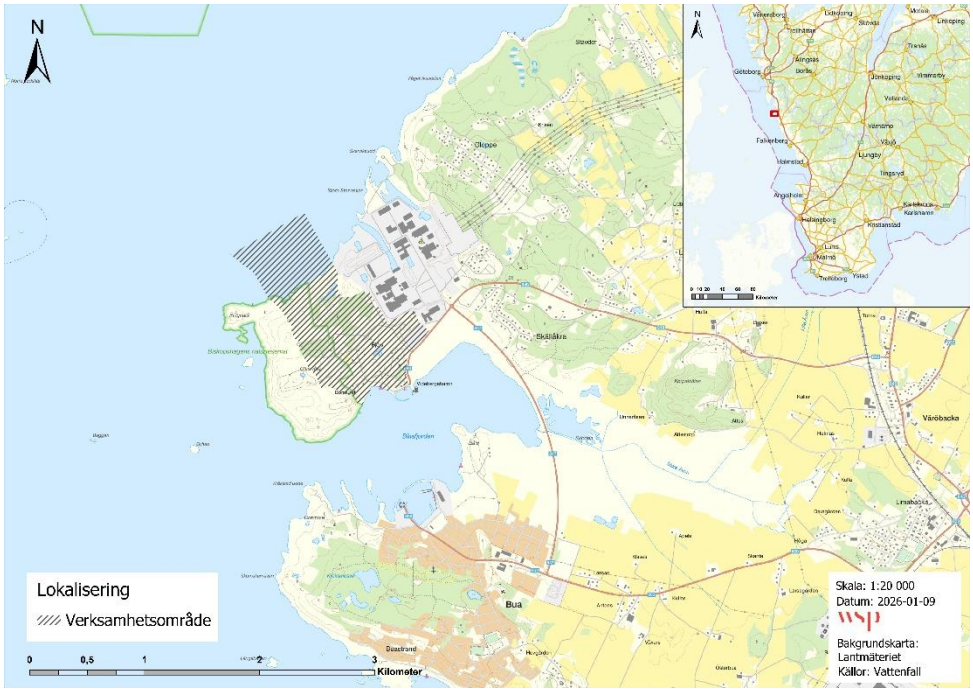

Figure 1. Overview map of planned operational area.
Lokalisering – Localisation
Verksamhetsområde - Operational area

1.3. Purpose of the document

The planned operation is subject to a permit according to Chapters 9 and 11 of the Environmental Code and shall, according to Section 6 of the Environmental Assessment Regulations (2017:966), be assumed to have a significant environmental impact. The planned operations is also subject to a permit according to the Nuclear Activities Act (1984:3). No investigation consultation is required for activities that may be assumed to have a significant environmental impact, and no such consultation has been carried out for the planned operations. The present document constitutes the basis for the consultation that is to be carried out according to Chapter 6 of the Environmental Code.

The main purpose of the consultation is to exchange information with and give local residents, the public, authorities, organizations and other stakeholders the opportunity to submit comments on the content of upcoming permit applications, the environmental impact statement and associated documentation, as well as to consult on the location, scope and design of the activities and the environmental effects that the activities may be expected to have.

Since the planned operations will be covered by the Act (1999:381) on Measures to Prevent and Limit the Consequences of Serious Chemical Accidents, the so-called Seveso Act, the consultation shall, in accordance with Chapter 6, Section 29 of the Environmental Code, also include how serious chemical accidents resulting from the activity can be prevented and limited. The consultation also concerns factors in the environment that may affect the safety of the activity, in accordance with Section 13 of the Seveso Act, with particular focus on the distances to other activities covered by the Seveso legislation.

Since the operation may have a significant impact on a nearby Natura 2000 area, the consultation also includes the question of the need for a so-called Natura 2000 permit (Chapter 7, Section 28 a of the Environmental Code). The upcoming environmental impact assessment will contain data to enable the assessment of the need for and, where applicable, the granting of such a permit.

The planned operations is of such a nature that, according to the Convention on Environmental Impact Assessment in a Transboundary Context (SÖ 1992:1), the so-called Espoo Convention, it is subject to an obligation to also consult with the neighbouring countries concerned. Consultations under the Espoo Convention are carried out both with regard to the planned applications for permits for the construction and operation of the nuclear power plant and with regard to the planning procedure under the Planning and Building Act (2010:900). The Espoo Consultation is coordinated by the Swedish Environmental Protection Agency, and Vattenfall has an ongoing dialogue with the Swedish Environmental Protection Agency regarding the design and implementation of the Espoo Consultation.

2. The permit process

2.1. The course of the permit process

New nuclear facilities must be authorized both in accordance with the Nuclear Activities Act and the Environmental Code. According to the current procedure, an application for a permit for a new nuclear facility must be submitted to the Swedish

Radiation Safety Authority, which prepares the case in accordance with the Nuclear Activities Act, and to the Land and Environmental Court, which prepares the case in accordance with the Environmental Code. The cases are then forwarded to the Government, which decides on the admissibility issue in accordance with the Environmental Code and issues a permit in accordance with the Nuclear Activities Act. The Land and Environmental Court then issues a permit in accordance with the Environmental Code. Both the application in accordance with the Nuclear Activities Act and the application in accordance with the Environmental Code must include an environmental impact statement and must be preceded by a consultation in accordance with Chapter 6 of the Environmental Code. Figure 2 below illustrates the course of the permitting process and at which stages it is possible to submit comments.

Several investigations regarding the conditions for new nuclear power are underway in Sweden and proposals for, among other things, changes to the licensing process are being prepared within the Government Offices. Vattenfall plans based on existing legislation and adapts to the changes that are ultimately decided. The results of the investigations may change the process described in Figure 2 before the applications are submitted.

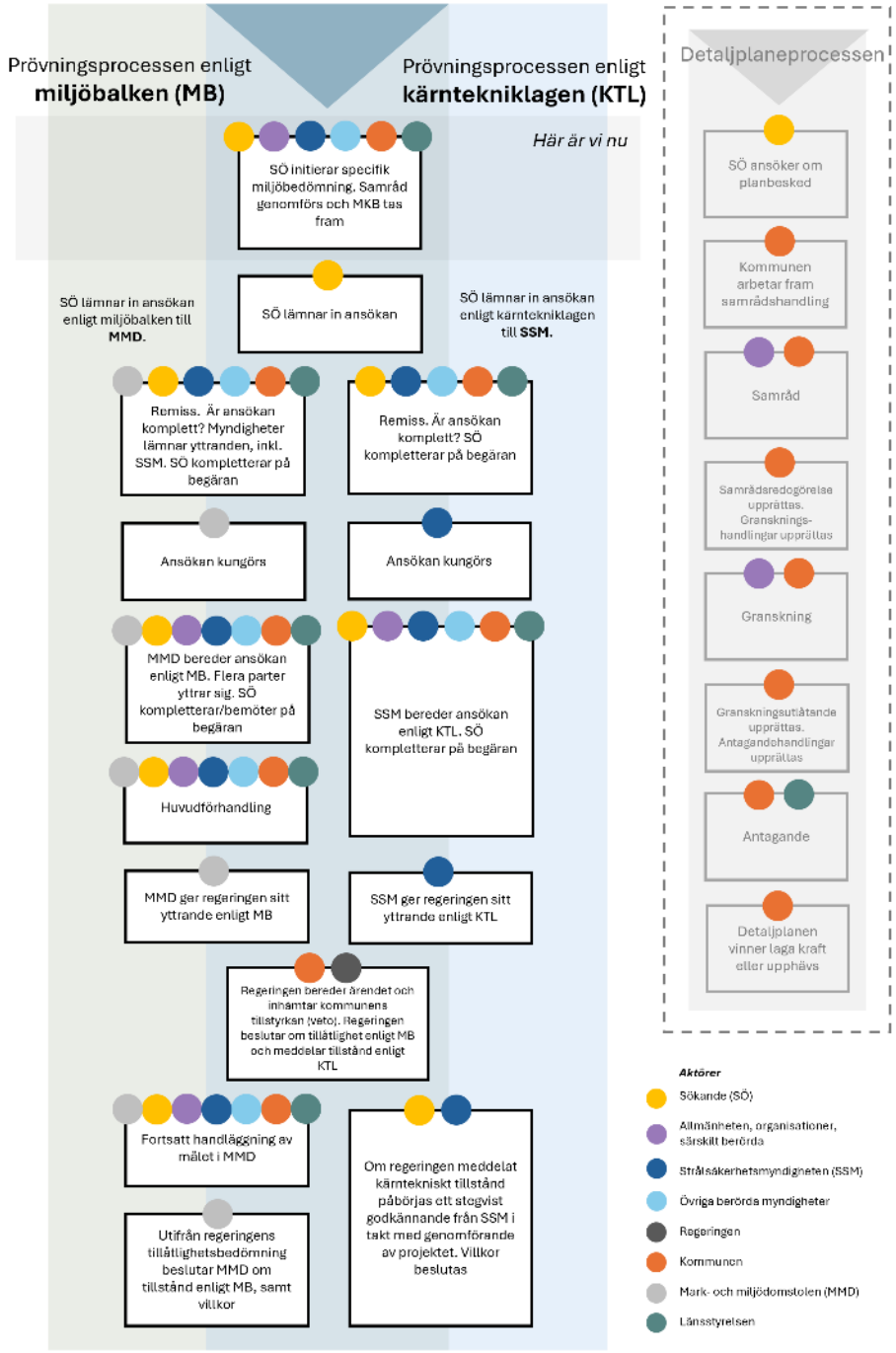

Figure 2. The stages of the permitting processes according to the Environmental Code and the Nuclear Activities Act. The process for adopting a new zoning plan runs in parallel and is therefore also illustrated.

2.2. Scope and delimitation of permit applications

The application for a permit according to Chapter 9 of the Environmental Code concerns the construction and operation of a new nuclear power plant with three or five nuclear reactors with a total electrical output of approximately 1,500 MWe, corresponding to a total thermal output of approximately 4,100–4,400 MWth. The upcoming permit application under the Environmental Code covers the construction and operation of the nuclear power reactors, but not the future decommissioning of the new nuclear power reactors.

When operating a nuclear power plant, waste is generated that is either classified as conventional waste (non-radioactive waste) *or* classified as nuclear waste. During operation, spent nuclear fuel is also generated, which is not classified as nuclear waste before it is placed in a final repository. The question of how a comprehensive system for the disposal of nuclear waste and spent nuclear fuel from new nuclear power in Sweden should be designed has recently been investigated (SOU 2025:104), but the state has not yet made any decisions on the matter. For the time being, Vattenfall is therefore planning to store all spent nuclear fuel and nuclear waste generated during the operation of the nuclear power plant within the operating area.

The permit applications cover the management and storage of nuclear waste within the operational area in preparation for, or pending, continued management and final disposal at another location. The management of nuclear waste is described in Section 3.5. The permit applications also cover the management and storage within the operational area of spent nuclear fuel that arises during the planned operating life of the facility. The management of spent nuclear fuel is described in Section 3.6. The permit applications do not cover any storage at another location or other management of nuclear waste and spent nuclear fuel that takes place at another location. The permit applications also do not cover the final disposal of nuclear waste and spent nuclear fuel.

The construction of a supplementary port may also be considered. The port will mainly contain the following principal structures: breakwater, quay, port platform and port basin with turning zone.

The planned operations is considered to be mainly covered by the following provisions of the Environmental Assessment Regulations (2013:251) (MPF):

- **Chapter 21, Section 7**, Permit requirement A and activity code **40.30** apply to nuclear power reactors or other nuclear reactors.
- **Chapter 29, Section 58,** Permit requirement A and activity code **90.460** applies to treating high-level radioactive waste, disposing of radioactive waste or storing radioactive waste.
- **Chapter 29, Section 59,** Permit requirement A and activity code **90.470** applies to processing, storing, final disposal or otherwise handling spent nuclear fuel, nuclear waste or other radioactive waste in accordance with the Nuclear Activities Act (1984:3) or the Radiation Protection Act (2018:396), if the handling is not subject to a permit in accordance with Section 58.

- **Chapter 12, Section 24,** Permit requirement B and activity code **24.24-i** apply to facilities for producing a maximum of 20,000 tonnes of gases per calendar year through chemical or biological reactions on an industrial scale.

- **Chapter 12, Section 30,** Permit requirement B and activity code **24.30-i** apply to facilities for the production of a maximum of 20,000 tonnes of salts per calendar year through chemical or biological reactions on an industrial scale.

- **Chapter 21, Section 9,** Permit requirement B and activity code **40.50-i** apply to combustion plants with a total installed input of at least 50 megawatts but no more than 300 megawatts.

- **Chapter 24, Section 1,** Permit requirement B and activity code **63.10** apply to ports where traffic is permitted for vessels with a gross tonnage of more than 1,350. The permit requirement does not apply to
  1. ports for the Armed Forces, or
  2. ferry quay with a maximum of ten planned vessel calls per calendar year.

- **Chapter 14, Section 13,** Notification obligation C and activity code **26.110** apply to facilities for the production of more than 500 tonnes of
  1. concrete or lightweight concrete per calendar year, or
  2. products made of concrete, lightweight concrete or cement per calendar year.

- **Chapter 4, Section 6,** Notification obligation C and activity code **10.50** apply to facilities for sorting or crushing rock, natural gravel or other types of soil
  1. within an area covered by a zoning plan or area regulations.

The application also includes permits according to Chapter 11 of the Environmental Code for the water operations that will be required for the construction and operation of the facility, such as the diversion of seawater for cooling water purposes, the construction of facilities in water areas including the port, the diversion of groundwater, the filling of dams and water bodies within the area and infiltration into the ground.

The operation may require a permit in accordance with Chapter 7, Section 28 a of the Environmental Code (a so-called Natura 2000 permit). This is provided that the operation is assessed to have a significant impact on a nearby Natura 2000 area. Vattenfall is investigating the impact of the operation on a nearby Natura 2000 area and the need for a Natura 2000 permit as part of the work on the application documents. It is also assessed that it may be relevant to apply for a permit in accordance with the Cultural Environment Act (1988:950) and an exemption from the Species Protection Regulation (2007:845).

In addition to permits under the Environmental Code, as mentioned above, permits under the Nuclear Activities Act are also required for the nuclear facilities. This will be handled through a separate application in parallel with the environmental code review. Figure 3 illustrates an example of which issues, according to existing legislation, must be reviewed within the framework of the environmental code review and the review under the Nuclear Activities Act, as well as which issues overlap between the different reviews. A joint environmental impact statement for

both reviews will be produced and this scoping consultation refers to a joint consultation for both reviews.

Figure 3. Differences and overlap in parallel testing according to the Environmental Code and the Nuclear Activities Act.

The operations will be covered by the Seveso Act and the associated regulation (2015:236) on measures to prevent and limit the consequences of serious chemical accidents (Seveso regulation) as well as additional regulations due to the chemicals that are planned to be handled in the operations, see also sections 7.7 and 7.19.

The operation is deemed to be covered by a number of i-codes according to the Environmental Assessment Regulation, which means that the operation constitutes a so-called industrial emissions operation according to Chapter 1, Section 2 of the Industrial Emissions Regulation (2013:250). Since the operation is covered by the Industrial Emissions Regulation, a status report must be prepared and included in the application.

In order to ensure the operation of the operation, among other things, there is a need for backup power, see section 3.4. The planned backup power units will each have an installed input power of less than 15 MW, which means that the operation is not covered by the Regulation (2013:252) on large combustion plants (cf. Sections 6 and 36 of the Regulation, which states that plants below 15 MW shall not be counted together). Planned backup power units instead mean that the operation is covered by the Regulation (2018:471) on medium-sized combustion plants.

2.3. Related questions

The operations will also be covered by the Radiation Protection Act (2018:396), Act (2003:778) on protection against accidents with associated regulations and the Protective Security Act (2018:585).

Large parts of the planned operational area are subject to detailed planning. The planned operations mean that existing zoning plans need to be revised and/or replaced with a new or several zoning plans. The process of revising and/or replacing existing zoning plans takes place separately and in parallel with the upcoming permit process. Within this work, the shore protection regulated according to Chapter 7 of the Environmental Code will also be handled. In addition,

a building permit is required according to the Planning and Building Act for the establishment of the operation.

In addition, areas in the Biskopshagen nature reserve will be used for the operation and will therefore need to be claimed. The issue of the cancellation of the nature reserve and compensation is being handled in a separate matter.

3. Planned operations

In this chapter preliminary and general information about the planned operations is presented. Work is currently underway to investigate the technical and economic conditions for the planned operations, which will form the basis for the more detailed design.

The nuclear power reactors constitute the central part of the planned operations. The planned operations mainly concern the construction and operation of three or five modular reactors[2] for electricity production. The number of reactors depends on the supplier that is chosen.

Below is a description of the construction and then the characteristics of the nuclear reactors, how cooling water is supplied, the need for backup power, how waste and spent nuclear fuel are intended to be handled, additional port operations and the production of sodium hypochlorite and hydrogen. In addition, it describes how control, monitoring and supervision of the planned operations will be carried out.

Illustrations of what the planned operational area may look like are shown in Figure 4 and Figure 5. Please note that these are early, preliminary illustrations that are subject to change.

[2] Modular reactors are also referred to as SMRs, small modular reactors, where “small” refers to the lower thermal power obtained compared to large-scale reactors.

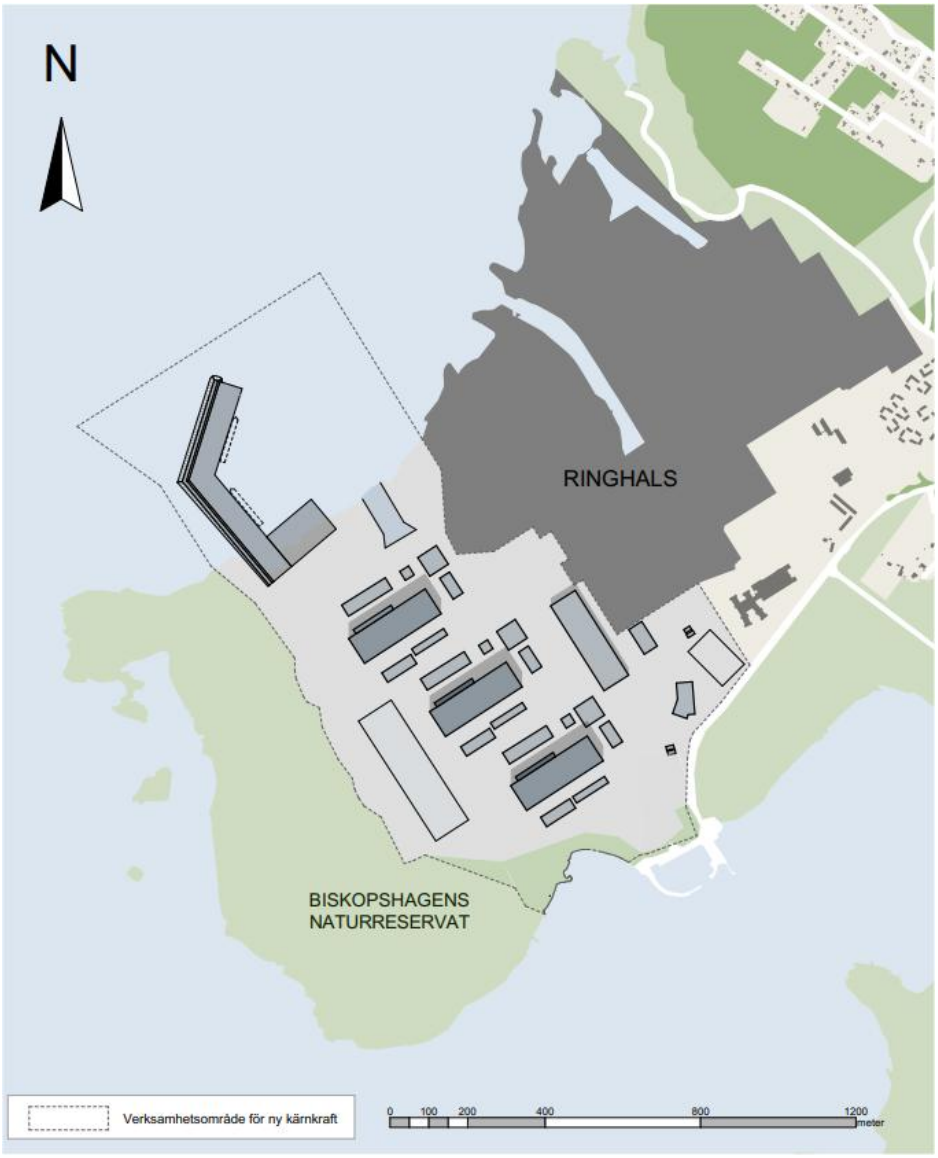

Figure 4. Illustration of the operational area for a supplier with three modular nuclear power reactors and the possible port.

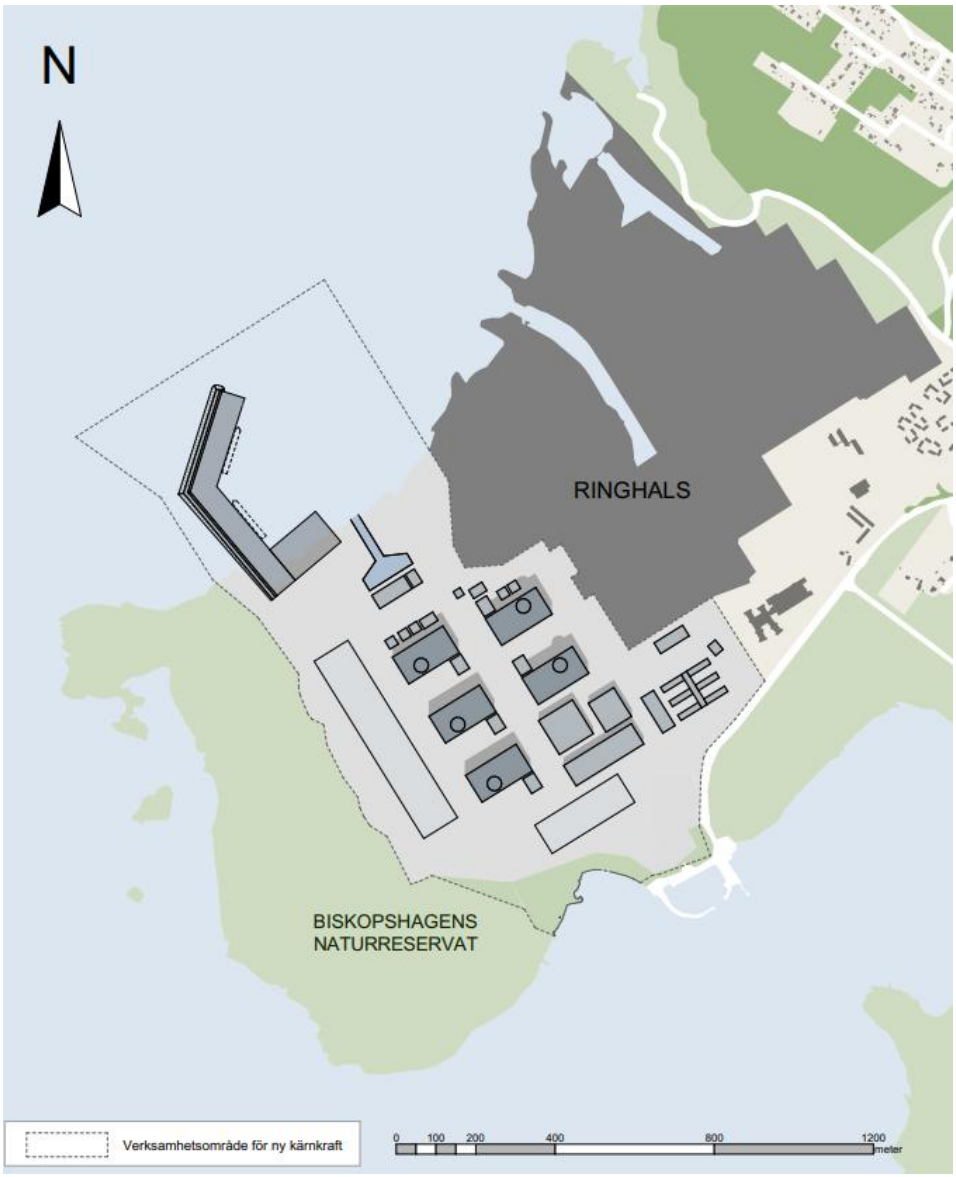

Figure 5. Illustration of the operational area for a supplier with five modular nuclear power reactors and the possible port.

3.1. Construction

Construction of the planned port facility and land preparation works is expected to begin in the late 2020s, provided that the necessary permits have been issued and investment decisions have been made. Start-up of the first nuclear power reactor could take place in the mid-2030s when it is completed, despite construction ongoing in other parts of the operating area.

Construction will continue 24 hours a day, seven days a week. The construction site will be fenced and lit throughout the construction phase.

Assuming that construction takes place sequentially, it is estimated that approximately 4,000 people could be employed simultaneously during the construction phase. During shift changes, more people could temporarily be present on the construction site.

3.1.1. Ground preparation measures

The construction of the planned operations begins with ground preparation measures to create a level and stable foundation with the correct height. This work includes, for example, blasting into the bedrock, construction of structures for cooling water, reactors and other facilities, as well as filling and levelling the area. The ground level varies across the area, between approximately 4 and 30 meters above sea level. The levelled ground level on which the nuclear power plant will be located takes into account normal variations in water level due to prevailing weather conditions and expected sea level rises caused by climate change. The ground level for the nuclear reactors will be more than 4.1[3] meters above normal sea level.

In connection with the planned earthworks, rock will be blasted out and the blasted rock will need to be crushed into smaller fractions for various uses within the project. It is estimated that this will involve several million tonnes of rock over several years. The crushers that will be used will be powered by electricity from the fixed power grid or electricity from diesel generators. Larger blocks of rock that do not fit in the pre-crusher will be broken using, for example, hydraulic hammers mounted on an excavator. Crushers and hydraulic hammers will be placed behind shielding embankments or similar to reduce noise pollution as much as possible. Dust control will also be carried out if necessary to reduce dust pollution. Internal transport of blasted rock and crushed material will be carried out using wheel loaders and dump trucks.

The soil and rock masses that arise during the construction phase will primarily be utilized within the project, or transported to nearby reception facilities where the masses will primarily be reused, secondarily recycled and as a last resort deposited. Special precautions will be taken during all earthworks in the event that contaminated masses are encountered. Contaminated masses will be handled appropriately in collaboration with the supervisory authority.

In connection with the ground preparation measures, the construction site will be provided with connections to water and electricity.

3.1.2. Foundation and construction of buildings

After the ground preparation measures, construction will begin, which consists of laying the foundations and erecting buildings in the form of, among other things, reactor buildings and turbine buildings. The nuclear power reactors will be founded at a depth of approximately 15–40 meters below ground level. This may mean that groundwater needs to be drained during the construction phase.

During the construction phase, large quantities of concrete will be required for the construction of the new nuclear power plant with associated buildings and installations. The concrete is produced in one or more concrete plants using the

[3] The County Administrative Board's recommended planning height for new construction, (Varberg, 2025b)

raw materials aggregate, cement, water and additives. The raw materials are mixed according to specific recipes, which gives the concrete different qualities and properties. The ready-mixed concrete is then transported to the location where the concrete is to be cast.

Depending on the suitability of the rock to form concrete aggregate and the specific quality requirements for the concrete for different parts of the facility, parts of the excess rock that arises during the ground preparation measures will be used for concrete production. By using excess rock in concrete production, the number of heavy transports to and from the area is reduced. If necessary, aggregate will be transported to the concrete stations from external rock or gravel pits. The water used for concrete production can consist of municipal water or desalinated seawater. The majority of the excess water that arises in the production process is planned to be reused as flushing water that can possibly be recirculated in a closed system with its own sedimentation basins. The cement, the binder in the concrete, is delivered to the operating area via truck or ship and stored in silos. Different binders are used to adapt the concrete for different areas of use. Additives are used in the concrete to obtain the desired properties such as consistency, frost resistance and setting time.

After the backfill is completed, the base plate is cast and the nuclear reactor is then built to full height. The construction process for modular reactors is based partly on site-built functions, partly on modules being assembled at another location and then transported and lifted to site. Gradually, modules with process equipment are added and then connected to obtain a finished reactor. Additional functions are added to the plant, such as turbine buildings, service buildings, local switchgear, cooling system buildings, offices, staff buildings, etc. Construction materials and plant components will be transported to the site by truck and/or ship.

Since several nuclear reactors are planned to be built, the construction will take place sequentially. When the first nuclear reactor has reached a certain level of completion, work on the subsequent nuclear reactor will begin, meaning that construction of one reactor will begin first and after about a year the next reactor will begin while construction of the first reactor continues.

In addition to the above, workshops for maintenance and service, new storage and warehouse buildings and premises for other support activities that may be needed, such as rescue services and security, to be built. Coordination with Ringhals AB regarding preparedness may take place in cases where it is possible and considered appropriate.

The maximum building height is estimated to reach a height of approximately 50 meters above ground level, excluding the chimney, which is estimated to reach a total height of approximately 65 meters above ground level.

3.1.3. Construction of port

To transport away excess masses and to transport bulk materials and general cargo to the facility, a supplementary port may be established. The port will, if applicable, be located in the northern part of the operational area and will need to be constructed at the beginning of the construction phase.

The planned port will consist of, among other things, a breakwater extending north/northwest and a quay. The total extent of the port area in water including

breakwater, quay, harbour platform and harbour basin with turning zone is estimated at approximately 8.5 hectares. The port will be dimensioned for vessels with a length of approximately 100–125 meters. If a supplementary port is included in the upcoming application, the main design of the port will be determined prior to the submission of the application documents. A preliminary illustration is shown in Figures 4 and 5.

The construction of a port involves work on land and in water, see also 3.1.4. Before the port area on land is constructed, a road will be constructed to the supplementary port to provide access to the area. The construction of the road and the port area on land will begin with blasting and excavation of rock and soil. The area may then be filled with fill materials to create a foundation. Fill materials may also be placed in the sea to expand the land area. In connection with the construction work, electricity and water pipes will be connected to the port. The management of stormwater generated within the port area will be investigated and reported in the application documents.

The construction of the breakwater is planned to be carried out from the water using work vessels. The coastal area where the port is located is exposed to waves and currents, and the purpose of the breakwater is therefore to create a protected environment when arriving, departing, docking and when unloading and loading ships. The breakwater is planned to be built from rock material from blasting of rocks on land and in water, and will be constructed with a slope base, embankment and erosion protection. The exact design and alignment of the breakwater need to be investigated as consideration must be given to the height, frequency and angles of the waves.

The quay can either be built from concrete elements or concrete caissons, blasted rock masses and sheet piling or by piling and sheet piling. The quay will be dimensioned for truck traffic and equipped with a crane for unloading and loading and/or conveyor belts. The level of the upper edge of the quay will be related to future sea level rises.

The port basin is designed in such a way that ships can turn in the basin. Calling ships require a water depth of approximately ten meters, which is why dredging will be necessary to ensure sufficient water depth in the port basin and at the quay. Dredging may also be necessary outside the port area along, for example, entrance routes and turning space. To facilitate the navigation of ships into port, various navigation marks are erected.

3.1.4. Water operations during construction

A new channel or tunnel will be built to take seawater into the cooling water system in the nuclear reactors. The intake is planned to be located in the northern part of the operational area. Depending on needs and conditions, work in water can be carried out by blasting, excavation, dredging, filling and/or casting or similar measures. During the construction phase, the water area around the intake point is blocked off with a sheet pile or embankment, a so-called coffer dam, after which the area inside the sheet pile or embankment is drained and construction work for, among other things, the shaft begins.

Regarding the outlet tunnel, Vattenfall is investigating the possibility of using the existing tunnel from Ringhals 1 and 2. However, relevant investigations assume that a new tunnel may need to be built. A new tunnel can be driven by using a

tunnel boring machine or by blasting the tunnel out. At the tunnel mouth in the sea, an area of sheet piling, known as a coffer dam, will be built during parts of the construction period to enable completion of the tunnel and the tunnel mouth. This measure includes both construction of a new tunnel or inspection of the existing tunnel. These measures, linked to the cooling water system, will involve work in water.

Groundwater will be drained, among other things, in connection with excavation, which may occur down to approximately 15–40 meters below the ground surface. The extent to which groundwater will be drained is currently being investigated. The drained groundwater will either be infiltrated into the ground or released into the recipient after treatment.

Filling of smaller water areas within the operational area will be carried out. Infiltration of, for example, groundwater and stormwater into the ground will take place. Stormwater will also be managed through, for example, stormwater networks, sedimentation ponds and oil separators. See further description in sections 7.15 and 7.16.

Also the construction work of the port, as described in section 3.1.3, constitutes water operations. Work in water connected to the port can, depending on needs and conditions, be carried out by blasting, excavation, dredging, filling and/or casting or similar measures. Dredging of the port basin can be carried out by blasting, hydraulic fracturing or digging with a bucket depending on whether the bottom is hard or soft.

When working in water, protective measures will be taken if necessary, including at the intake to Ringhals 3 and 4.

3.1.5. Storage and assembly areas

During the construction phase, temporary storage and assembly areas will be needed within the operational area, including adjacent to the new port. The areas are needed for purposes such as reception and logistics, as well as processing and storage of excavated materials.

3.2. Nuclear reactors

3.2.1. Production of electricity with nuclear power

The nuclear reactors form the central part of the planned operations. The nuclear reactors will be equipped with the latest in performance and safety but will be based on proven light water technology, which means that enriched uranium is used as fuel and water is used as coolant and moderator.

In Swedish nuclear power plants there are currently two types of light water reactors: boiling water reactors (BWR) and pressurized water reactors (PWR). The principle is the same for both types of reactor, that is, water is heated using nuclear fission. A neutron is sent towards a uranium atom whose nucleus is split and new neutrons are released. These can in turn split more uranium nuclei and a chain reaction occurs. During the nuclear fission, heat is released that is used to convert the water in the reactor into steam, which can be used in a turbine plant to generate electricity.

In a boiling water reactor the uranium fuel in the reactor vessel is split, which generates heat. The control rods regulate the effect depending on the position and water flow. The heat generated from the nuclear fission causes the water to boil and steam to form. The steam is directed to the turbine plant, which causes one or more turbines to rotate. A generator is connected to the turbine shaft and electrical energy is generated during the rotation. With the help of cooling water from the sea, the steam is cooled down and converted into water in the condenser. The water is pumped back into the reactor to cool the fuel again. Cooling water from the sea is released back into the sea. The process is illustrated in Figure 6.

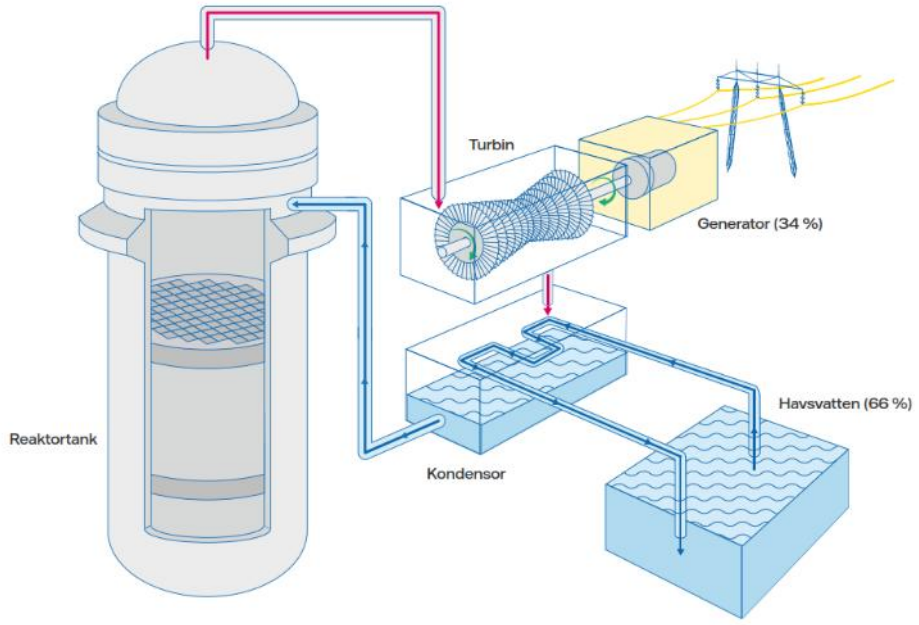

Figure 6. Schematic diagram of a boiling water reactor. The numbers in the figure correspond to the energy distribution.
Reaktortank – Reactor tank
Turbin – Turbine
Generator – Generator
Havsvatten – Seawater
Kondensor – Condenser

In a pressurized water reactor there are two cooling water circuits; a primary circuit and a secondary circuit. The control rods regulate the power depending on the position and water flow. The water in the primary circuit is heated by nuclear fission in the reactor vessel but is prevented from boiling by maintaining high pressure in the reactor vessel. The water from the primary circuit heats the water in the secondary circuit in a heat exchanger, also called a steam generator.

The water in the secondary circuit boils and the steam produced is directed to one or more turbines. Low-pressure steam from the turbine is then directed to the condenser for cooling with the help of cooling water from the sea, after which the condensate formed is pumped back to the steam generator. The water in the primary circuit is pumped back to cool the core again. Cooling water from the sea is released back into the sea. The process is illustrated in Figure 7.

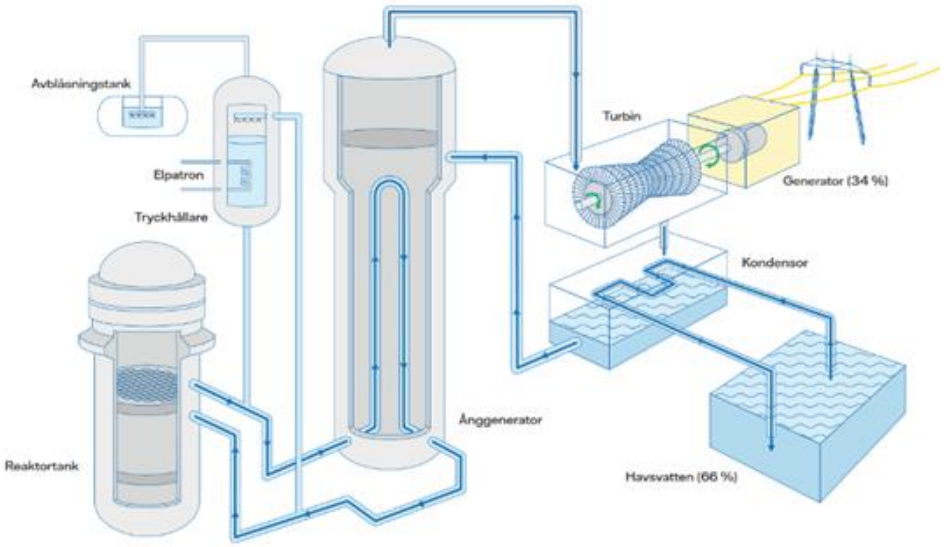

Figure 7. Schematic diagram of a pressurized water reactor. The numbers in the figure correspond to the energy distribution.

3.2.2. Evaluated and planned reactor types

Light water technology is currently available as large-scale reactors and modular reactors. Vattenfall has evaluated both of these designs and has decided to proceed with light water reactors of the modular reactor type.

Modular reactors are designed with a focus on modularity, scalability and simplicity. The basic idea is that the components are assembled in the factory and then transported as finished modules to the construction site, where they are assembled. This construction method shortens the total construction time and reduces the need for on-site manufacturing facilities. Common to the evaluated reactor types is that they are based on reliable, proven technology with further modernizations. Modern reactors exhibit simplified but durable and reliable design solutions and utilize standardized components to a greater extent compared to existing nuclear power reactors.

Modular reactors are characterized by a lower power output per reactor compared to a large-scale reactor. The modular reactors that Vattenfall has evaluated have an electrical output of approximately 300–500 MWe (corresponding to a thermal output of approximately 900–1,400 MWth), which can be compared to the large-scale reactors that have been evaluated, which have an electrical output of approximately 1,200–1,400 MWe (corresponding to a thermal power of approximately 3,500–4,500 MWth). Several modular reactors can be placed next to each other to achieve higher electrical power.

A smaller reactor has less fuel, which gives a lower residual effect (heat generated by radioactive decay after the reactor is shut down). The reactor can withstand a long time without external power supply to cool the fuel if an incident were to occur. This is made possible by passive safety systems for emergency cooling of the reactor and the reactor containment. Read more about nuclear safety and radiation protection in section 3.2.4.

3.2.3. Function and technical characteristics

The modular reactors that are relevant for the planned operations will be based on light water technology. The nuclear power reactors may either consist of boiling water or pressurized water reactors, see section 3.2.1.

The nuclear reactors will be independent of each other, but will share service functions such as seawater intake, maintenance workshops and possible waste management. The operation of the nuclear reactors will be managed by an on-site operating organization. Operation includes recurring fuel changes.

A modular reactor consists of the following parts, among others:

- Reactor building with reactor containment, reactor tank with fuel core. The reactor building also contains a pool for storing spent nuclear fuel.
- Turbine building with steam turbines, generator and condenser.
- Cooling water system, which is used to cool the condenser and other heat-generating systems within the reactor. Read below under section 3.3.
- Electrical, control and instrumentation systems, which include systems for grid connection and electricity distribution within the reactor, including backup power, as well as non-nuclear control and instrumentation, control, monitoring and protection functions.
- Support functions required to enable operation of the reactor, such as cooling systems for components, waste management, water systems, sampling, storage and extinguishing water management.

Vattenfall expects that the nuclear power plant's total electrical output will amount to around 1,500 MWe (corresponding to a total thermal output of around 4,100–4,400 MWth) and that it will generate approximately 12 TWh of electricity per year. Table 1 presents technical characteristics for planned operations based on the reactor types being investigated.

Table 1. Summary of technical characteristics.

Technical characteristics	
Electrical power	Up to approximately 1,500 MWe
Thermal power	Approximately 4,100–4,400 MWth
Annual electricity production	Approximately 12 TWh
Number of reactors	3 or 5
Fuel quantity uranium dioxide	Approximately 255 tonnes in total for all reactors
Annual consumption of uranium dioxide	Approximately 40 tonnes in total for all reactors
Operating cycle	Approximately 12–18 months. Time intervals of up to 24 months may occur
Operating time	About 60 years

Technical characteristics	
Sea cooling water flow	Approximately 70 m^3/s
Construction height reactor building	Approximately 50 m above ground level
Construction height of turbine building	Approximately 50 m above ground level
Chimney height	Approximately 65 m above ground level

3.2.4. Nuclear safety and radiation protection

The safety of a nuclear reactor is based on the so-called defence in depth principle, which aims to avoid the harmful effects of ionizing radiation. These issues are regulated by the Nuclear Activities Act and the regulations issued by the Swedish Radiation Safety Authority. The defence in depth principle applies several successive technical, organisational and manual measures to minimise the spread of radioactive substances to the environment and the harmful effects of ionizing radiation.

Defence in depth as The Swedish Radiation Safety Authority defines it as divided into five levels:

1. Prevent operational disruptions and other errors through quality design, stable operation and adapted maintenance.

2. Detect and control operational disturbances so that they do not lead to accidents and that the nuclear reactor can be returned to normal operation.

3. Minimize the consequences of accidents and prevent extensive fuel damage.

4. Ensure that radioactive releases caused by accidents with extensive fuel damage are as low as possible and reasonable.

5. Mitigate the consequences of radioactive releases.

The design of the nuclear reactor and how the operations are organized contribute to the development of defence in depth and are together important for maintaining radiological safety and radiation protection.

The nuclear reactor is designed with several physical barriers, which are part of the defence in depth to prevent or delay the spread of radioactive substances to the environment. The principle of multiple barriers means that if one barrier fails, the next one takes over. Around the nuclear fuel in the core there are four physical barriers:

- The fuel (which binds most of the radioactive substances).

- The fuel cladding tube.

- The reactor tank with associated piping system.

- The reactor containment.

The effectiveness of the physical barriers is ensured by the safety functions of the nuclear reactor, which are:

- Reactivity control, for example the ability to quickly stop the reactor.
- Heat removal from reactor and fuel storage.
- Containment of radioactive material, shielding of radiation, control of planned radioactive releases and limitations of accidental radioactive releases.

Safety functions occur to varying degrees in the defence-in-depth levels. They are fulfilled, among other things, by systems and components that are manufactured and controlled with strict quality requirements.

The capacity of the nuclear reactor's barriers and safety functions is verified through a safety analysis and is reported by the licensee in a radiation safety report. This also reports consequences in the form of emissions to the environment during normal operation, operational disruptions and accidents.

In addition to the barriers above, there are other devices in the structure that prevent and limit exposure to ionizing radiation. This is achieved by the building being equipped with thick radiation shields made of concrete or lead. In addition, physical protection that protects against theft and other unauthorized handling of nuclear material and other radioactive substances will be installed. The physical protection also prevents access to the facility by unauthorized persons.

The operations will be designed based on current requirements. Any effects regarding ionizing radiation during normal operation and unexpected events will be described and assessed in a future environmental impact assessment.

3.3. Water operations

The planned operations will require cooling water to condense steam to water, to cool components and for room cooling. The cooling water will consist of seawater, which will be taken from a surface water intake planned to be located in the northern part of the operation area. The operation will require an intake of seawater of approximately 70 m^3 per second.

To prevent larger objects such as driftwood and ice from being brought in from the sea through surface water intakes, a foam beam that protrudes a short distance below the water surface will be built at the intake point. The cooling water will be led into a basin and then filtered in several stages to remove unwanted material such as seaweed, fish and jellyfish. Larger material is separated through a cleaning grid or similar, while smaller particles are separated using a fine grid followed by a screening machine. The organic debris that accumulates in the grids and screening machines is collected in channels that are flushed with seawater. The flushing water will be returned to the sea as much as possible. However, periodically, mainly during summer and autumn or during storms, large amounts of organic debris accumulate and to prevent this from being recirculated back into the intake building, it may be necessary to drain the cleaning into special basins.

The water may also need to be chemically treated with sodium hypochlorite or equivalent to control biological fouling on walls and equipment in the tunnels or pipes. Sodium hypochlorite also has the advantage of preventing slime growth in coolers and thus not affecting the efficiency of the reactor cooler. Dosing is planned to take place during the warm period of the year when fouling is most prevalent. Mechanical cleaning may also be required. The manufacture of sodium hypochlorite is described in section 3.8.

After the basin and filtration, the water will be led via a cooling water channel, tunnel or pipelines to the turbine building for condensation of steam. After the condenser, the cooling water will be led back to the sea, either through a newly constructed tunnel or through the existing tunnel from Ringhals 1 and 2. The more detailed location and design of the discharge device is currently being investigated.

When constructing deep shafts during the construction phase, intruding groundwater will be drained away and the groundwater level will be lowered. The shafts will be sealed as far as possible to minimize groundwater lowering. The reactor structure itself is sealed, so groundwater levels will be able to recover after it is built. However, some groundwater drainage cannot be ruled out even when the nuclear reactor is completed. In that case, drainage will be done using pumps, through which the water is led up to ground level and connected to the facility's stormwater system, see further description in section 7.15.

3.4. Backup power

To ensure electrical power to the reactors and other prioritized plant parts if the external power supply is cut off, backup power systems are added in the form of, for example, batteries and backup power units.

The backup power can be powered by diesel, gasoline or HVO and consists of a combustion engine with a generator to produce electricity. The backup power systems will be tested a number of times per year and will have an installed input power of less than 15 MW each and a total electrical output of approximately 30–50 MWe, corresponding to an installed input power of 80–130 MWth. The exact number of backup power units will be determined later but is currently estimated to be approximately 10–20 for the entire nuclear power plant.

3.5. Waste management

During the operation of the nuclear power plant, waste that is radioactive is generated. This is called nuclear waste. All waste that arises within so-called controlled areas (i.e. where there is a risk of ionizing radiation) is handled as if it is radioactively contaminated. Nuclear waste is classified based on two criteria; activity content and the amount of long-lived nuclides according to the international standards of the International Atomic Energy Agency (IAEA). Measurements are made regarding the radioactivity of the waste, which forms the basis for its classification. If the contamination level after measurement is below the limit values prescribed by the Swedish Radiation Safety Authority, the material can be cleared, which means that the rules that follow from the Radiation Protection Act do not need to be applied to the waste, and that it can therefore be handled as conventional waste. Waste that arises outside a controlled area is handled as conventional waste without any special controls, see also section 7.10.

The nuclear waste generated in the operations is planned to be handled and stored within the operations area pending further handling and final disposal, see section 2.2. The handling is designed based on the classification of the waste and aims, among other things, to meet requirements regarding further handling, transport and reception at other storage and future final disposal. Examples of handling methods are volume reduction with the aim of optimizing the degree of compaction, evaporation, stabilization and packaging.

3.6. Management of spent nuclear fuel

Nuclear fuel used for energy production is replaced during the shutdowns that occur at regular intervals. An operating cycle for the current operation is approximately 12–18 months, after which part of the fuel is replaced at corresponding intervals. Time intervals of up to 24 months may occur. When the fuel is removed, a so-called residual effect remains for a very long time, which means that special measures must be taken with regard to the handling and storage of spent nuclear fuel.

Spent fuel storage begins when the spent fuel elements are lifted out of the reactor and placed in fuel pools adjacent to the reactor for cooling. There, the fuel elements will remain for a number of years to cool.

Continued storage of spent nuclear fuel within the operational area may take place in so-called dry storage in special containers that are designed to provide adequate radiation protection. Storage in dry storage is an internationally accepted method. The dry storage is dimensioned with space for spent nuclear fuel that is planned to be produced during the entire operating life of the facility. The dry storage will be designed with physical protection that will prevent theft, sabotage and the spread of radioactive material. There are currently no specific regulations for physical protection of dry stored fuel since the system does not yet exist in Sweden. The more detailed design of the dry storage is currently being investigated and the design will need to follow the regulations issued by the Swedish Radiation Safety Authority.

If a new central interim storage facility for spent nuclear fuel is established in Sweden, the spent nuclear fuel will be transported away from the operational area. Since the state has not decided whether a central interim storage facility will be established, there needs to be a possibility to store the spent fuel that arises during the plant's operating time within the operational area.

3.7. Port operations

The supplementary port, if it becomes relevant, is intended to be used by ships that can have a gross tonnage of more than 1,350. The gross tonnage indicates the size of the ship and is based on the total enclosed space of the ship, i.e. the volume of all enclosed spaces. The port will be dimensioned to be able to handle around two to three calls per day during the most intensive construction phase. The number of ship calls will then amount to up to 1,200 per year. The port will be dimensioned for ships with a length of around 100–125 meters. If smaller ships are used, there is capacity for more calls per day. Two approaches enable different calling options in different wind directions and weather conditions, see Figure 20 in section 7.12. Ships calling at the port may use a tugboat and/or pilot for safer

calling and/or departure. With a view to facilitating docking, the port and associated quay will be positioned so that ships can berth at the leeward quay.

The port will be able to receive bulk materials, cargo and components for the construction of the new nuclear power plant. Space will be available for storage and warehousing before further transport within the operating area.

Discharge from the port will mainly consist of excess material generated during the initial ground preparation work. Later, during operation of the nuclear power plant, spent nuclear fuel and nuclear waste may be transported out of the port.

The port may offer certain port services at the quay, such as fresh water and waste reception. The possibility of receiving and handling wastewater may be included in the port services.

3.8. Sodium hypochlorite production

To avoid biological fouling in the system that supplies the facility with cooling water from the sea, sodium hypochlorite will be used and dosed after the mechanical purification system at the cooling water intake, see section 3.3. Sodium hypochlorite may be manufactured on site or the product may be purchased and transported to the operation.

Sodium hypochlorite is produced by electrolysis of a salt solution. The salt solution is produced either by mixing salt (sodium chloride) with water or by using filtered seawater. The salt solution is pumped into an electrolyser where chloride ions are oxidized to chlorine gas and water is reduced to hydroxide ions, leading to an alkaline solution of sodium hydroxide. The chlorine reacts with sodium hydroxide to form sodium hypochlorite. All chemical processes take place integrated in the electrolyser and no concentrated chlorine gas is handled outside the system. The electrolyser also produces hydrogen gas, which is vented to the atmosphere. The hydrogen gas may contain small amounts of contaminants such as chlorine gas and hydrochloric acid in aerosol form, which means that the hydrogen gas produced is not suitable for use in other parts of the plant.

Sodium hypochlorite is led to an intermediate storage tank so that it can then be dosed into the cooling water. The intermediate storage tank allows continued operation of the cooling water system in the event of, for example, maintenance or operational disruptions at the electrolyser. The dosage to the cooling water can be optimized by measuring the excess chlorine where the cooling water leaves the plant. In this way, the discharge of sodium hypochlorite into the sea can be minimized.

3.9. Hydrogen production

To avoid corrosion in the reactor, materials with a low carbon content are used and hydrogen gas is dosed into the feed water. The hydrogen gas reduces the oxygen content in the water, which counteracts corrosion processes in the metal components of the reactor. Hydrogen gas may be produced on site or purchased and transported to the plant.

Hydrogen is produced by electrolysis of completely desalinated water. In the electrolyser, water is split into hydrogen and oxygen. The oxygen is vented to the

atmosphere while the hydrogen is compressed and temporarily stored in a gas container before the hydrogen is dosed to the feed water. The temporary storage allows continued operation of the reactor in the event of, for example, maintenance or a malfunction of the electrolyser.

3.10. Control and monitoring

3.10.1. Control according to the Environmental Code and Seveso legislation

According to the Environmental Code, the responsibility for protecting human health and the environment from damage and inconvenience caused by an environmentally hazardous activity lies with the person who carries out the activity. This means that the prescribed controls are carried out by the operator and that the regulatory authority exercises supervision over this. In addition, an activity that is subject to a permit according to Chapter 9 or Chapter 11 of the Environmental Code is covered by the Regulation (1998:901) on self-inspection by operators.

Activities covered by the Seveso Act and its higher level of requirements must, according to Section 10 of the same Act, draw up a safety report with associated documents in accordance with Section 9 of the Seveso Regulations. An activity covered by its lower level of requirements must, according to Section 7 of the Seveso Regulation, draw up an action programme and submit the corresponding information that is part of a notification according to Section 4 of the same Regulation.

The County Administrative Board of Halland County will be the supervisory authority for the environmentally hazardous activities, the Seveso activities and the water activities. The Swedish Radiation Safety Authority will also be the supervisory authority for parts of the environmentally hazardous activities.

The operator according to the Environmental Code will draw up a proposal for a self-monitoring program for the external environment. The program will report on how the environmental impact of the operation, as well as the conditions decided by the Land and Environmental Court, will be followed up. The control covers the construction period and the operating period.

3.10.2. Control according to the Nuclear Activities Act and the Radiation Protection Act

Anyone who carries out activities involving ionizing radiation is responsible for safety and radiation protection and must carry out prescribed controls. The Swedish Radiation Safety Authority supervises this.

The licensee will establish a local environmental monitoring program that will include procedures for monitoring releases of radioactive substances, a sub-program for monitoring radioactive substances in the environment, procedures for measuring external gamma radiation and procedures for collecting local meteorological data. The sub-program for monitoring radioactive substances in the environment must be approved by the Swedish Radiation Safety Authority before it can be applied.

Radiological consequences for the environment and people in the vicinity of the nuclear power plant as a result of releases of radioactive substances will be evaluated.

4. Related activities

The following section describes activities that are related to the planned operations, but are not covered by it.

4.1. External storage and assembly areas

During the construction phase, temporary storage and assembly areas will be needed outside the operational area. Areas are needed for purposes such as reception and logistics as well as processing and storage of excavated materials. The exact location of the temporary storage and assembly areas has not yet been decided, but these areas may need to be located in the immediate area or at locations in neighbouring municipalities. Roads and assembly areas will be asphalted or otherwise hardened.

Additional space in the immediate area is needed for, for example, parking spaces, crew sheds and temporary accommodation for the contractors hired during construction.

4.2. Grid connection

The planned operations will produce electricity for the Swedish transmission grid. The connection points to the existing 400 kV switchyard are located approximately 1.5 kilometers east of the planned operational area.

To connect the operation to the transmission grid, additional switchgear is needed. Switchgear will be built within or outside the operation area and connect it to outgoing lines that in turn connect to the transmission grid at the existing 400 kV switchgear east of the Ringhals nuclear power plant. Connection to the transmission grid is through underground cables, overhead lines or a combination of these.

Possible locations for the planned connections to the transmission network and switchgear for the operation are illustrated in Figure 8.

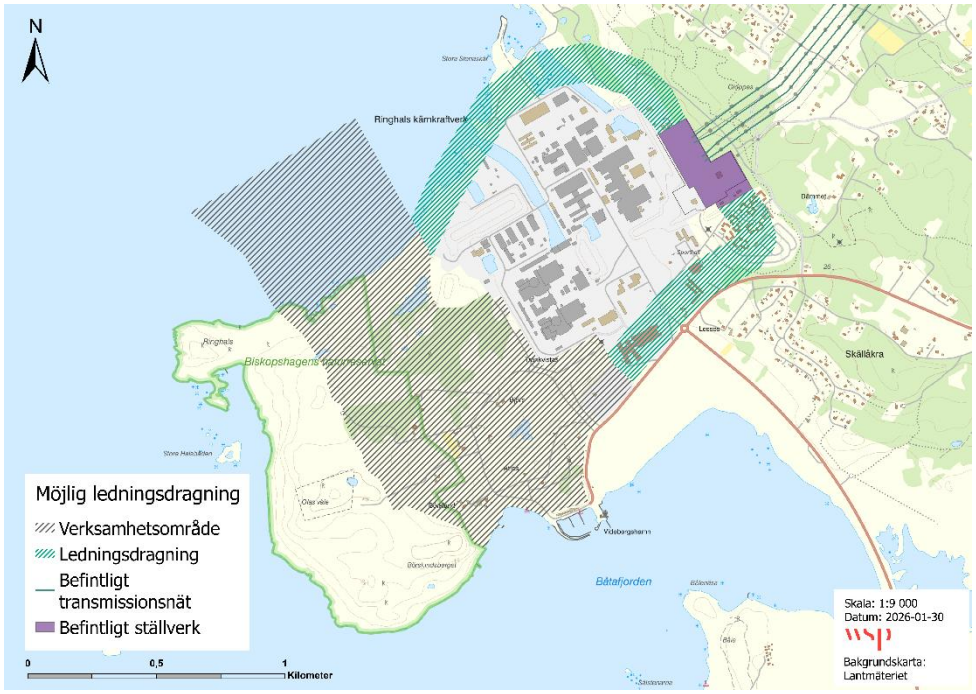

Figure 8. Illustration of possible connections to switchgear and transmission networks.
Verksamhetsområde – Operational area
Ledningsdragning – Line routing
Befintligt transmissionsnät – Existing transmission grid
Befintligt ställverk – Existing switchyard

In addition to connection to the 400 kV network for the output of electrical power, connection to the 132 kV network may be required to obtain an independent input. The line will be laid underground or via overhead lines from nearby 132 kV switchyards.

Grid connection as above will be subject to separate assessment according to, among other things, the Electricity Act (1997:857).

4.3. Continued management of spent nuclear fuel and nuclear waste

The government commissioned a special investigator to review current regulations to facilitate new nuclear power by, among other things, analysing the system for the disposal of nuclear waste and spent nuclear fuel and the need for adaptation and development for the management of waste from new reactors.

In September 2025, the inquiry submitted the interim report “New nuclear power in Sweden – a comprehensive system for the management of radioactive waste” (SOU 2025:104) to the government. The starting point for the inquiry’s work has been to establish a coherent system for the management of nuclear waste and spent nuclear fuel that can address the main problems and challenges that are considered to affect the efficiency, effectiveness and clarity of the waste system in the short and long term. The inquiry proposes, among other things, that a new national waste organization be established to develop a strategy for the management of radioactive waste, and that the strategy be approved by the government. It is proposed that licensees for new nuclear reactors be required to

be part of the national waste organization. The inquiry also proposes that the licensees concerned, as a starting point, implement the final disposal of spent nuclear fuel jointly.

Exactly what a new regulatory framework for the management of nuclear waste and spent nuclear fuel will look like, or how a new waste system will be designed, has not yet been decided by the state. A new central interim storage facility for spent nuclear fuel from new reactors may be established. However, it is possible that storage of spent nuclear fuel pending final disposal may take place locally at each facility.

The current system for the disposal of nuclear waste and spent nuclear fuel, operated by Svensk Kärnbränslehantering AB, only covers existing nuclear power reactors. When fully developed, the system will consist of, among other things, a transport system with ships, a central interim storage facility for spent nuclear fuel with an encapsulation section and several final repositories for different types of nuclear waste. The final handling of spent nuclear fuel is carried out according to the so-called KBS-3 method, which involves encapsulating the fuel in copper canisters and placing it in the Swedish bedrock with a buffer consisting of bentonite. Permits have been granted under both the Environmental Code and the Nuclear Activities Act for the encapsulation and final disposal of spent nuclear fuel and nuclear waste from existing nuclear power according to the KBS-3 method.

Such management of spent nuclear fuel that takes place after storage within the operational area, such as possible continued storage at another location, encapsulation and final disposal, is not covered by the permit applications for new nuclear power and will therefore not be subject to an impact assessment within the framework of the permit applications. It will be technically possible to final dispose of the spent nuclear fuel that arises from the operations according to the principles of the KBS-3 method. The principles for final disposal according to the KBS-3 method will be described in outline in the application documents.

4.4. Decommissioning

The operating life of planned reactors is estimated to be approximately 60 years. When electricity production ceases, decommissioning work will begin. Decommissioning refers to everything from decommissioning a reactor, removal of spent fuel, phased demolition, cleaning, storage and removal of demolition material and nuclear waste to restoration of the area. The operator is required to have a preliminary plan for decommissioning, and such a plan will therefore be developed within the framework of the application under the Nuclear Activities Act. The purpose of the plan is to ensure that radiation protection aspects such as radiation doses, releases of radioactive substances and waste quantities are taken into account during decommissioning. The plan will be described in brief in the environmental impact assessment.

The immediate environmental impact during the demolition phase consists of noise, dust and emissions to air from demolition work and transport. Large amounts of demolition waste will be generated, mainly conventional construction waste but also nuclear waste.

Decommissioning of a nuclear reactor is an activity that is itself subject to a permit under the Environmental Code. The applied operation under the Environmental Code therefore does not include future decommissioning of the operation, but this

will, when relevant, be handled in a separate procedure. Decommissioning will therefore not be included in the impact assessments of the planned operations, but will be described in outline in the application documents.

Public investigations regarding new nuclear power, including decommissioning, are currently underway in Sweden (for example Dir. 2025:89) and proposals for regulatory changes have been reported (for example SOU 2025:104). Vattenfall will monitor the continued development and results of the investigations.

5. Alternative

5.1. Zero option

An environmental impact assessment must, among other things, include a description of how the current state of the environment is expected to change in the future if the planned operations does not take place, a so-called *zero alternative*. The purpose of reporting the zero alternative is to provide a basis for evaluating what change the operation or measure will bring about from an environmental point of view.

The zero alternative in this case is that the planned operations is not established at the site.

One consequence of the operation not coming to fruition is that the planned addition of plannable and fossil-free electricity production from the operation in the mid-2030s will not occur. This means an increased risk that the production of electricity in Sweden will not be sufficient to meet the increased demand that is estimated to exist in the coming decades as a result of the increasing electrification of society.

5.2. Alternative localization

According to the Environmental Code's location principle (Chapter 2, Section 6), for an activity or measure that uses a land or water area, a suitable location must be selected, taking into account that the purpose can be achieved with the least interference and inconvenience to human health and the environment. According to Section 17 of the Environmental Assessment Regulation, the environmental impact assessment must, among other things, contain information about possible alternative locations and the reasons why the selected location has been chosen over other alternatives. A location study has been carried out to identify a suitable location for the planned operations in accordance with the location principle. Considerations have also been made between conflicting interests in accordance with the Planning and Building Act.

Initially, theoretically possible and suitable locations were identified, taking into account current legislation. As a first delimitation, all eight locations that the Swedish Energy Agency has identified as being of national interest for energy production-thermal power were used as an initial selection of alternatives. In a first step, the areas were evaluated based on five criteria that are considered to constitute fundamental conditions for the location at a national level. These criteria constitute absolute requirements that need to be met for the alternative to be

practically and technically possible. These criteria are: (1) location within electricity area 3 or 4, (2) close to the coast, (3) suitable location for plannable electricity production and grid connection according to schedule, (4) available area and (5) available transport infrastructure.

The three location alternatives that met all criteria: Oskarshamn, Barsebäck and Ringhals-Väröhalvön were further studied at an in-depth national level, where the suitability of each location alternative was evaluated based on several different indicators, both operational-related and health- and environment-related parameters. Indicators have been developed based on the project's purpose, statutory protection, technical requirements and public interests. Examples of indicators include land use, impact on national interests/protected areas, electricity needs, planning conditions and distance to urban areas. Ringhals-Väröhalvön was assessed to be the most favourable location for the establishment of a new first nuclear power plant.

Finally, a closer evaluation of the local conditions within the selected location alternative was carried out in order to identify a suitable location from a local perspective. Six alternative areas within the location alternative Ringhals-Väröhalvön were evaluated. Five of these areas are located in Lingome, north and east of the existing nuclear power plant Ringhals, and one in Biskopshagen, southwest of the existing nuclear power plant. The evaluation shows that the Biskopshagen alternative is the area that is considered to have the most favourable conditions, among other things linked to the fact that the distance to housing and sensitive buildings is longer than for the alternatives in Lingome and linked to the position stated in the municipality's new comprehensive plan that is being developed.

Considering the objective that the production of fossil-free and plannable electricity with new nuclear power should be in place by the mid-2030s, the Ringhals-Väröhalvön and the Biskopshagen area are considered to be the most favourable for the planned operations and the alternative that meets the objective with the least intrusion and inconvenience to human health and the environment. The completed location investigation will be included in its entirety in the application documents and described in more detail in the environmental impact assessment.

A possible supplementary port is intended to be located on the northern part of the Värö Peninsula. The proposed location has been chosen with a view to minimizing the extent of dredging and blasting and to be able to use the masses that are well taken up in the project as much as possible. The port's location also provides a certain natural protection from wind in terms of the dominant wind direction. With a view to facilitating docking, the quay has been positioned so that ships can dock with it in the lee.

At an earlier stage, the possibilities for establishing a port at another location, in Båtafjorden, west of the existing port of Videbergshamn, were investigated. The existing port is a marina and a port connected to Ringhals AB with a quay for RoRo vessels. Båtafjorden is a shallow bay, and the location next to Videbergshamn was therefore not considered optimal, among other things with regard to the prevailing depth conditions.

Alternative port locations, seen from a local perspective, will be reported in the environmental impact assessment.

5.3. Alternative design

According to Chapter 2, Section 3 of the Environmental Code, the best possible technology shall be used to prevent an activity from causing damage or inconvenience to human health and the environment. Evaluation of various suppliers for the nuclear facility is ongoing. In the upcoming environmental impact assessment, alternative technologies and designs are planned and reported as follows:

- Reactor type options
- Cooling water intake options
- Spent fuel storage options
- Backup power and fuel options
- Alternative purification techniques
- Alternative design of areas within the operational area
- Alternative port design

The planned activity is considered to be covered by a number of i-codes, see section 2.2. The activity is therefore also considered to be covered by the Industrial Emissions Regulation.

In order for combustion plants to be covered by the conclusions on best available techniques for large combustion plants (BAT-LCP), the criterion stated is that the total installed input power must be at least 50 MW. When assessing the total power, a total of the installed input power must be made for all combustion units that have an installed input power of at least 15 MW. Planned backup power units will each have an installed input power of less than 15 MW, which means that the activity is not considered to be covered by the BAT-LCP. The planned operations is instead covered by the Medium Combustion Plant Regulation (FMF) which implements Directive (2015/2193/EU) on the limitation of emissions of certain pollutants into the air from medium combustion plants (MCP Directive).

The operation is considered to be covered by the conclusions on best available techniques for the production of chlor-alkali (BAT-CAK) due to the production of sodium hypochlorite and hydrogen gas, which were published in 2013 (European Commission, 2013).

The operation is also considered to be covered by the BREF documents Energy Efficiency and Industrial Cooling Systems. The BREF document Energy Efficiency was adopted in February 2009. The document is a cross-cutting document covering energy efficiency in several different industrial sectors. The aim is to provide general indications on energy efficiency techniques that can be considered as a suitable reference point (European Commission, Joint Research Centre, 2009). The BREF document Industrial Cooling Systems was adopted in December 2001. The document is a cross-cutting document covering the use of cooling systems in several different industrial sectors. The document only covers cooling systems that use air and/or water for heat exchange (European Commission, Joint Research Centre, 2001).

Any applicable and relevant parts of conclusions on best available techniques under the Industrial Emissions Directive (2010/75/EU) will be reported in the

application according to the Environmental Code and in the environmental impact assessment.

6. Environmental conditions

6.1. Overall environmental description

The operations are planned to be located within a few properties, directly west and southwest of the Ringhals nuclear power plant, on the Värö peninsula in Varberg municipality. The majority of the area is owned by Vattenfall. The other properties that are not currently owned by Vattenfall include a permanent residence, a holiday home and a property with pasture land. The planned operational area and its surroundings are shown in Figure 9. The operational area in the figure includes construction, which is why the area is larger than the area that is considered required for future operation of the nuclear operations. In addition, temporary storage and assembly sites outside the operational area may be needed during the construction phase.

Overlapping with the proposed operational area is the urban area defined by Statistics Sweden as “Ringhals, Skällåkra and Lingome ” (SCB, 2023). In the immediate area, approximately 1–1.5 km from the operational area, is also the area of Gloppe. Bua is an urban area located on the other side of the Båtafjorden, just over a kilometer from the planned operational area. The nearest preschool and school are located in Bua, approximately 2.5 kilometers south of the operational area. There is also a landscaped playground and sports field. The nearest retirement home is located in Limabacka, approximately 4.5 kilometers southeast of the planned operational area. The urban area of Väröbacka is located just over 4.5 kilometers from the planned operational area.

In Båtafjorden is Videbergshamn, which consists of a recreational harbour and a harbour belonging to Ringhals AB. The part of the harbour belonging to Ringhals AB is mainly used for the export of nuclear waste and spent nuclear fuel, but is also used for other types of goods and by other companies. There is a public road between the Ringhals nuclear power plant and the harbour.

Traffic in the immediate area consists mostly of transport to and from the Ringhals nuclear power plant and the neighbouring community of Bua. The nearest major road is the E6 between Malmö and Gothenburg, located approximately six kilometers east of the planned operations. Road 848, road 850 and road 847 run from road E6 to the planned operation area. A fairway for maritime traffic extends towards the port of Ringhals. National interests for communication are shown in Figure 13.

Figure 9. Map of the operational area and surroundings.
Verksamhetsområde – Operational area
Preliminärt utsläpp kylvatten - Preliminary cooling water discharge
Preliminärt intag kylvatten - Preliminary intake of cooling water
Vårdinrättning - Care facility
Idrottsplats - Sports centre
Äldreboende - Retirement home
Lekplats – Playground
Skola/Förskola - School/Preschool

6.2. Planning document

6.2.1. Comprehensive plan

The planned operational area is located within an area designated as "*Ringhals nuclear power plant and surrounding area*" in the Comprehensive Plan for the Municipality of Varberg, adopted on 15 June 2010. According to the comprehensive plan, in the surrounding areas of Lingome, western Båtafjorden and northern Biskopshagen, very restrictive measures shall be observed when examining buildings and other measures with regard to the nearby nuclear power plant. The County Administrative Board of Halland County shall therefore, with regard to the protection area around Ringhals nuclear power plant and the health and safety of the residents, particularly examine issues of building permits and prior approval in these areas. Figure 10 shows part of the land and water use map for the current comprehensive plan.

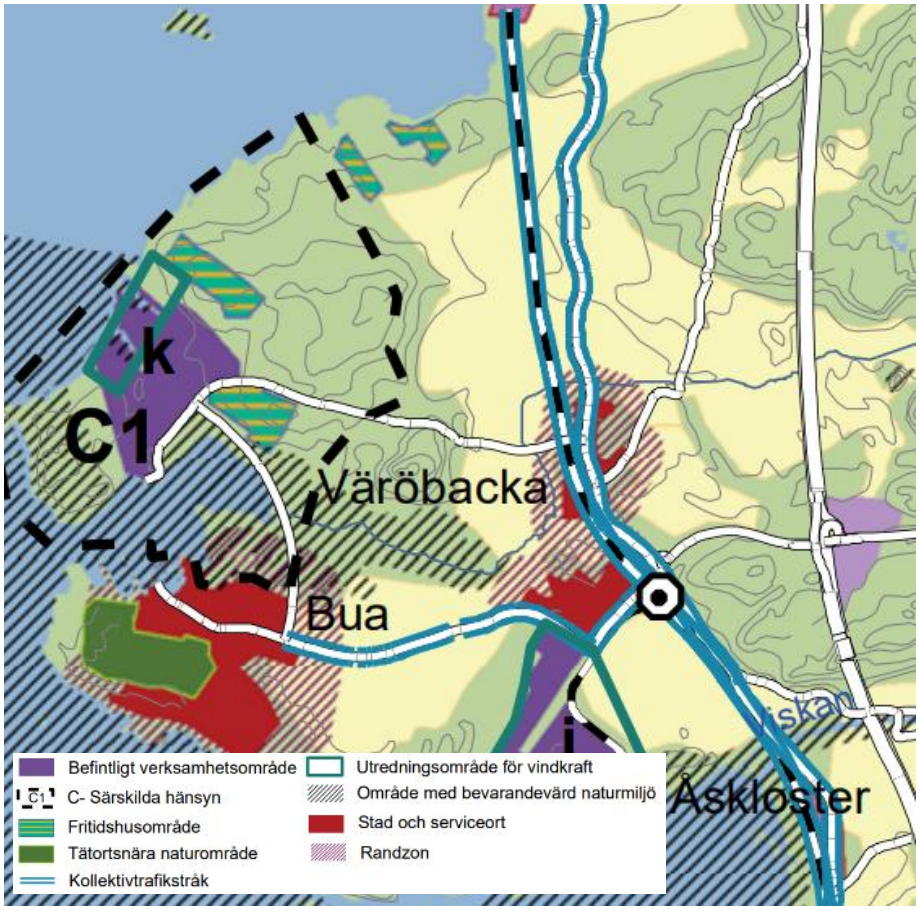

Figure 10. Land and water use map (Comprehensive plan for Varberg Municipality, revised by WSP).
Befintligt verksamhetsområde - Existing operational area
C- Särskilda hänsyn - C- Special considerations
Fritidshusområde - Holiday home area
Tätortsnära naturområde - Nature area close to the city centre
Kollektivtrafikstråk - Public transport route
Utredningsområde för vindkraft - Study area for wind power
Område med bevarandevärd naturmiljö - Area with a natural environment worth preserving
Stad och serviceort - Town and service centre
Randzon - Peripheral zone

Varberg Municipality is currently working on a new comprehensive plan that is planned to be reviewed and adopted in 2026 and will extend until 2050. The land and water use map for the new comprehensive plan that is currently being prepared shows that the area around Ringhals nuclear power plant is designated as a development area, a focus for development for larger operations. It is also clear from the new comprehensive plan that there is an investigation area for wind power (hatched purple area in Figure 10) at Ringhals nuclear power plant, that there is already a larger operation (Ringhals AB) and that there is a continuous residential development to the northeast of this area (orange marked area in Figure 11 (Varberg Municipality, 2025a).

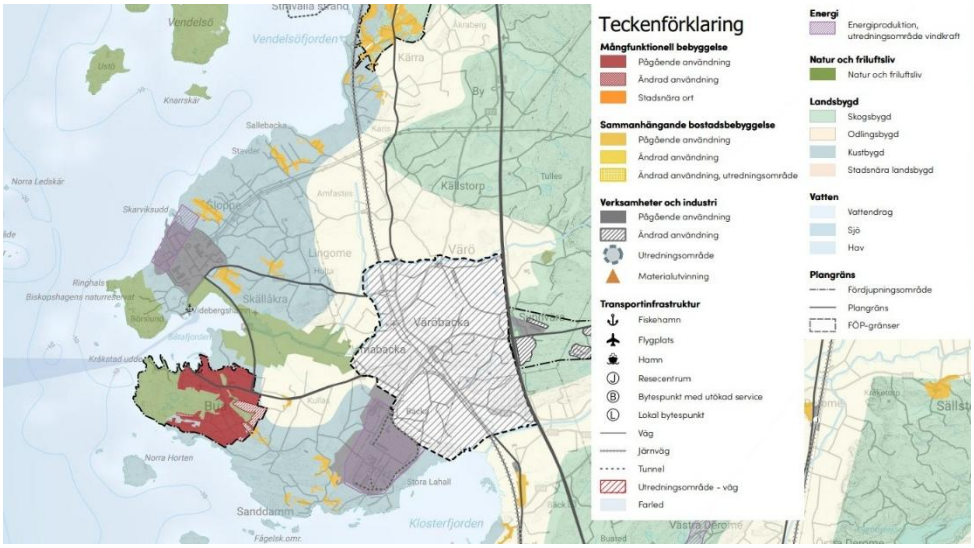

Figure 11. Clipping of the land and water use map in the Varberg municipality's comprehensive plan. Note that the development area around Ringhals mentioned in the text above is not included in the figure (Varberg municipality, 2025a).

On 2017-02-14, Varberg Municipality adopted a detailed comprehensive plan for the Northern Coast, which covers the area for planned operations. The goal of the detailed comprehensive plan is long-term sustainable development and to enable a good living environment, a good business environment and to protect and make accessible nature and recreational areas. The detailed comprehensive plan includes a plan proposal with specifically designated development areas. The nearest designated development area from the planned operational area is Bua.

6.2.2. Zoning plans

Large parts of the planned operational area are covered by the current zoning plan for Ringhals (VÄ56). Parts of the coastal area covered by VÄ56 were updated with a new zoning plan in 2010 to enable the establishment of wind power (VÄ94). The zoning plans are presented in Figure 12.

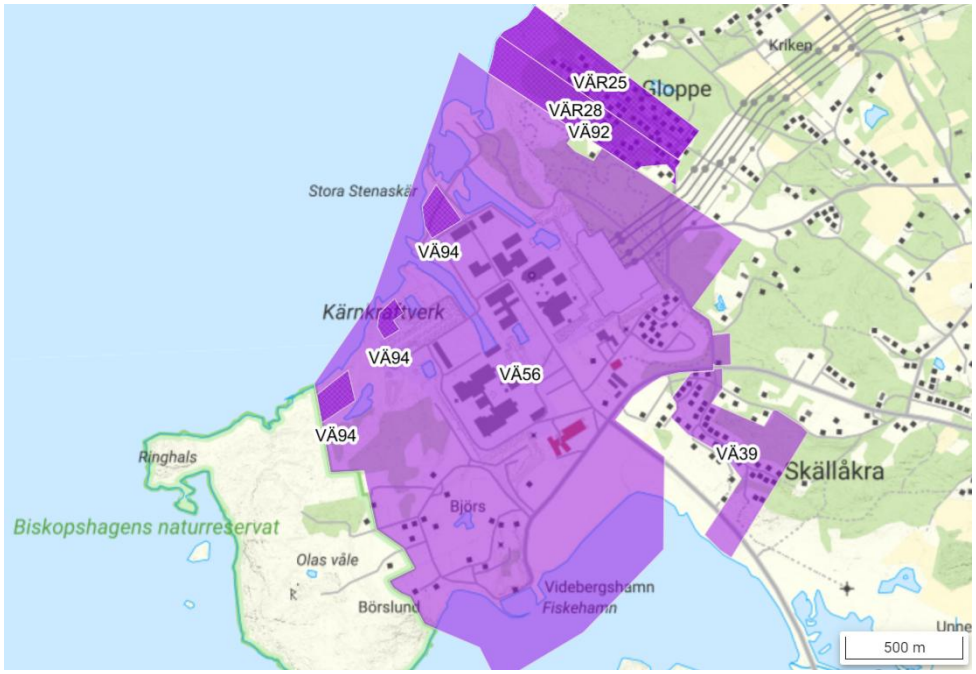

Figure 12. Existing zoning plan area (Varberg Municipality, 2025).

Varberg Municipality has begun the process of developing a zoning plan to enable the planned operations. Since the zoning plan can be assumed to have significant environmental impact, a strategic environmental assessment will be carried out and an environmental impact assessment will be drawn up. Consultations regarding the scope and level of detail of the environmental impact assessment were carried out in November 2025 with the County Administrative Board of Halland. A proposal for a consultation document with an associated environmental impact assessment regarding amendments to the zoning plan is planned to be put out for consultation during the first quarter of 2027.

6.3. National interests

The Environmental Code contains provisions on how land and water should be protected and used. Certain areas are classified as national interest, either to protect the areas from exploitation or to ensure that they can be used for a specific, important purpose. Within and in the immediate vicinity of the planned operational area, there are national interests according to Chapters 3 and 4 of the Environmental Code, see Figure 13 and Table 2.

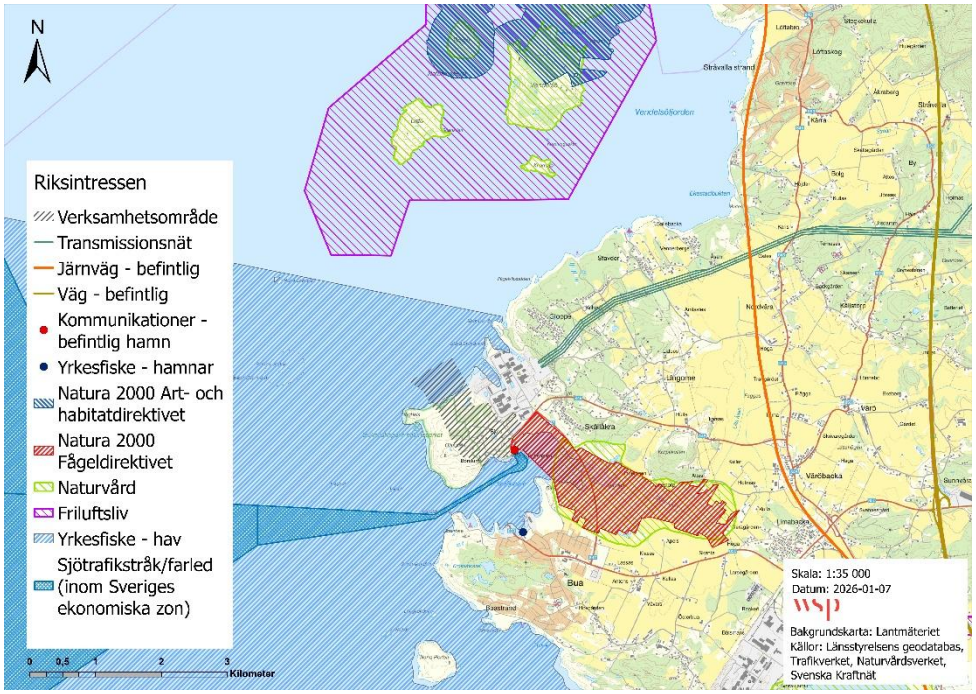

Figure 13. Designated national interests within and in the immediate area surrounding the planned operations. National interests that cover the entire area shown have been excluded from the map. National interests for mobile outdoor recreation and highly developed coast, as well as national interests for communication, MSA areas for Landvetter airport, are therefore not visible in the map. National interests for energy production and energy distribution are classified and the extent of these areas is therefore not shown in the map.
Riksintressen - National interests
Verksamhetsområde - Operational area
Riksintresse Friluftsliv - National interest Outdoor life
Riksintresse Naturvård - National interest Nature conservation
Natura 2000 – Fågeldirektlvet - Natura 2000 - Birds Directive
Riksintresse Kommunikationer – sjöfart/farled - National interest Communications - shipping/ waterway
Riksintresse Kommunikationer - befintlig hamn - National interest Communications - existing harbour
Riksintresse Yrkesfiske – hamn - National interest Commercial fishing – harbour
Riksintresse Yrkesfiske – hav - National interest Commercial fishing – sea

Table 2. Overview of national interests within and in the immediate area surrounding planned activities.

National interest	Name	Distance from planned activity	Description of the protection value
Energy production (Chapter 3 of the Environmental Code)	Ringhals-Värö Peninsula, Varberg	Overlapping	The Ringhals/Värö peninsula consists of a land and water area that enables large energy and power supply, has a strategic location for energy conversion and is of great importance for security of supply. The area's strategic location and access to infrastructure also enables it to contribute important balance and regulatory power to the system.
Energy distribution (Chapter 3 of the Environmental Code)	Ringhals	Overlapping	Connection lines from areas of national interest for energy production to the transmission grid.
Active outdoor life (Chapter 4 of the Environmental Code)	Halland's coastal area	Overlapping	Area with particularly high values for tourism and active outdoor activities.
Highly exploited coast (Chapter 4 of the Environmental Code)	Halland's coastal area	Overlapping	Coastal and archipelago area with great conservation value. Establishment of environmentally disruptive facilities may take place in places where similar activities already exist.
Commercial fishing (Chapter 3 of the Environmental Code)	South Nidingen	Overlapping	Fishing area for lobster and herring/sapporo.
Communications - Aviation (Chapter 3 of the Environmental Code)	MSA area Landvetter	Overlapping	Area of influence for flight obstacles.
Communications - Shipping/Fairway (Chapter 3 of the Environmental Code)	The entrance to Ringhals	Adjacent	Public waterway.

National interest	Name	Distance from planned activity	Description of the protection value
Communications – Port (Chapter 3 of the Environmental Code)	Ringhals harbour	Adjacent	Port of central importance.
Natura 2000 area bird directive SPA (Chapter 4 of the Environmental Code)	Båtafjorden	Adjacent	The area aims to preserve or restore a favourable condition for the species that formed the basis for the designation of the area. Priority conservation values consist of coastal meadows with rich bird life. Priority birds are waders and terns.
Commercial fishing (Chapter 3 of the Environmental Code)	Bua	Approximately 800 m	Fishing port.
Nature conservation (Chapter 3 of the Environmental Code)	Klosterfjorden – Getterön	Approximately 800 m	Outstanding examples of coastal landscapes that particularly well demonstrate the development of the landscape. Threatened or vulnerable biotopes and species. Very rich plant and animal life.
The civilian part of the Swedish National Defence Force, MSB (Chapter 3 of the Environmental Code)	The electricity transmission network	About 1 km	Land and water areas for all lines and stations in the electricity transmission network.
Outdoor recreation (Chapter 3 of the Environmental Code)	Onsalalandet-Kungsbackafjorden-Tjolöholm	Approximately 2.5 km	Enriching experiences in natural and/or cultural environments. Outdoor activities and thus enriching experiences. Water-related outdoor activities and thus enriching experiences.
Nature conservation (Chapter 3 of the Environmental Code)	Vendelsö archipelago	Approximately 3.5 km	An area that particularly well demonstrates the development of both the natural and cultural landscape.

National interest	Name	Distance from planned activity	Description of the protection value
Communications – railway (Chapter 3 of the Environmental Code)	West Coast Line	Approximately 4 km	TEN-T core network Railway used for freight traffic, long-distance passenger traffic. Railway that connects facilities of national interest.
Communications - road (Chapter 3 of the Environmental Code)	E20 through Halland	Approximately 6.5 km	TEN-T core network Functionally prioritized road network for freight transport and long-distance passenger transport. Recommended route for dangerous goods.

6.4. Natural environment

There are a number of protected natural areas and areas with high natural values overlapping with and in the vicinity of the planned operational area, see Figure 14 and Table 3.

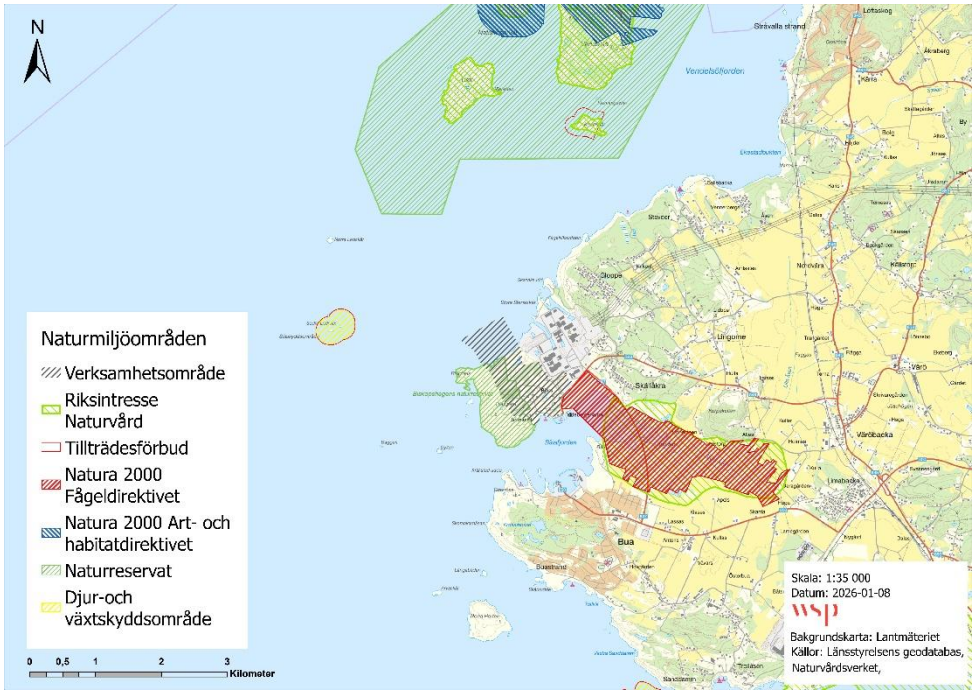

Figure 14. Natural areas worthy of protection within or in the immediate vicinity of planned activities.

Table 3. General description of areas with protected nature in the immediate area or within the area of planned activities.

Type of area protection	**Name**	**Distance from planned activity**	**Description of the protection value**
Nature reserve	Biskopshagen	Overlapping	The area is approximately 83 hectares in size and aims to preserve biodiversity (vascular flora), meet the need for an area for outdoor recreation, and to care for and preserve valuable natural environments.[4]

[4] As part of the preparations for the planned activities, Vattenfall has, through a separate process, submitted a request to the County Administrative Board of Halland County to cancel part of the Biskopshagen nature reserve.

Type of area protection	Name	Distance from planned activity	Description of the protection value
Natura 2000 area (bird directive SPA)	Båtafjorden	Adjacent	The area is approximately 255 hectares in size and aims to preserve or restore a favourable condition for the species that formed the basis for the designation of the area. Priority conservation values consist of coastal meadows with rich bird life. Priority birds are waders and terns.
National interest in nature conservation	Klosterfjorden - Getterön	Approximately 800 m	The area contains a well-preserved and varied, open cultural landscape of great value. The area includes representative natural pastures such as coastal meadows, heather heath, shrub-rich outback and open pasture. Here, plant communities rich in species and individuals with traditionally favoured species are found.
Nature reserve	Vendelsö Islands	Approximately 2.5 km	The area includes valuable grazing landscapes and geology with terrace-like rock and rauk formations built up of charnockite, a weathered gneiss variety that is unique to Halland, as well as high marine values in the form of eelgrass meadows.
Animal and plant protection area	Södra Ledskär	Approximately 2 km	Seal protection area.
National interest in nature conservation	Vendelsö Archipelago	Approximately 3.5 km	An area that particularly well demonstrates the development of both the natural and cultural landscape.

During 2023, on behalf of Vattenfall, the company Naturcentrum conducted a natural value inventory of, among other things, the planned land area in accordance with the Swedish Standard (SS 199000:2023). The purpose of the inventory was to identify, delimit and assess the area's biotopes based on their natural values.

The identified natural value biotopes have been classified into four levels (classes 1–4) based on their relative importance for biodiversity. The classification is based on an overall assessment of species values and biotope values, in accordance with the accepted methodology according to the current standard. The inventory also includes additions on in-depth species inventories and identification of generally protected biotope conservation areas. See the completed natural value inventory in Figure 15 with delimited natural value biotopes with associated status classifications.

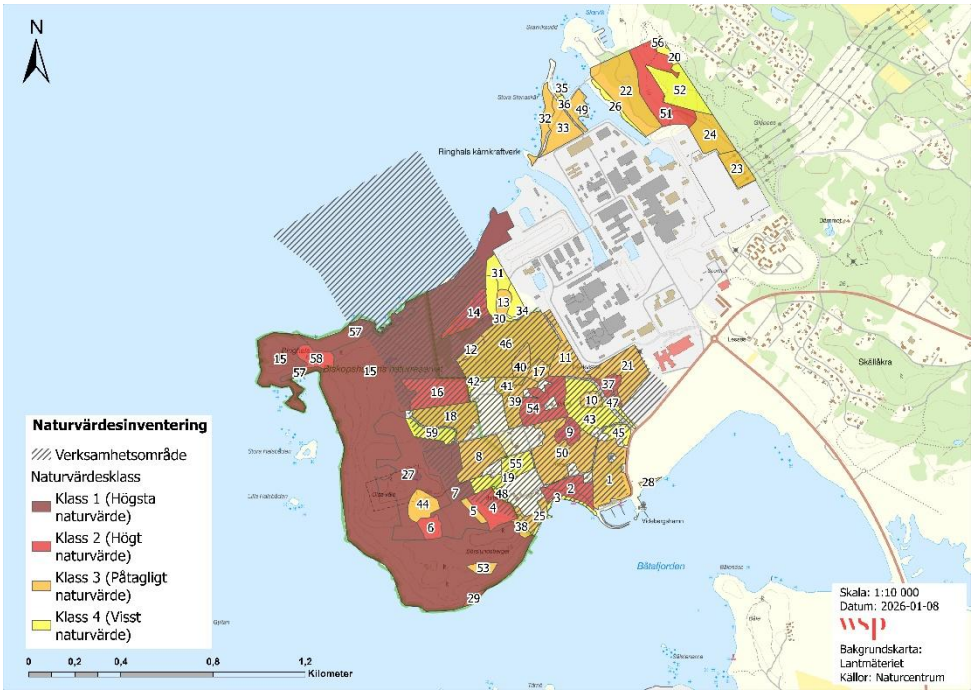

Figure 15. Completed natural value inventory with delimited natural value biotopes and associated status classifications within and adjacent to the operational area. Source: Naturcentrum.

Within the planned operational area there are a number of smaller water bodies and wetlands. A wetland in the southeastern part of Biskopshagen Nature Reserve is listed in the wetland inventory as class 2, with high natural value. In Varberg Municipality's Nature Conservation Program, which is used as a basis for community planning and nature conservation work, a wetland area located northeast of Biskopshagen Nature Reserve is mentioned (Varberg Municipality, 2007). The wetland area overlaps the planned operational area.

The results from the natural value inventory are integrated into the planning of the operations and form the basis for the upcoming environmental impact assessment.

6.4.1. Protected species

SLU's Species Data Bank assesses the survival conditions of various species and then draws up a red list that is published every five years. The status of the red-listed species is classified as critically endangered, endangered, vulnerable or near threatened. According to the Species Portal's search service, several red-listed species have been found within an area of approximately one square kilometer around the planned operational area over the past ten years. Species that are protected under the Species Protection Regulation have also been found in the

area, including vascular plants, amphibians, mammals, reptiles, birds and insects (SLU Species Data Bank, 2025).

In-depth investigations will be carried out to assess the potential impact of the operation on these (and other) species and whether the operation requires an exemption from the Species Protection Regulation. The investigations will be included in the application documents.

6.5. Marine natural environment

A general description of areas with protected nature in the immediate area or within the area of planned activities is presented in Figure 14 and Table 3.

The Vändelsöarna archipelago is a body of sea water that extends from the northern tip of the Värö Peninsula to the tip of the Ölmanäs Peninsula. The waters around the northern tip of the Värö Peninsula are home to a variety of marine biological life. North of the Värö Peninsula, at a distance of approximately 2.5 kilometers from the planned operational area, lies the Vendelsöarna nature reserve. The waters outside the Vendelsöarna contain different types of marine environments, such as eelgrass meadows, exposed clay and sand bottoms and algae-covered rocks, all of which are home to different marine species.

Two species of seal occur in the sea area around the Värö Peninsula; harbour seal and grey seal. Approximately two kilometers northwest of the planned operational area is the Södra Ledskär seal protection area, where access is prohibited during the period 15 May to 15 July. The seal protection area is designated for harbour seals. The harbour seal belongs to the population in Skagerak-Kattegat, which is classified as least concern (LC) according to the SLU Species Data Bank, and the population currently has a favourable conservation status.

The grey seal has no permanent population near the Värö Peninsula but occurs sporadically in small numbers. The individuals recorded during inventories probably belong to the reproducing population that is most closely found in the Baltic Sea. The grey seal is also classified as least concern (LC) according to the SLU Species Data Bank.

In the sea area around the Värö Peninsula, porpoises from both the Baltic Sea and North Sea populations are likely to occur, as the management boundary between these during the summer months runs north of Anholt and towards Falkenberg. The species is protected according to Annexes 2 and 4 of the EU's Species and Habitats Directive and protected according to Section 4 of the Species Protection Regulation. Both the Baltic Sea and North Sea populations are classified as least concern (LC) according to the SLU Species Data Bank.

On behalf of Vattenfall, WSP has conducted a marine biological survey of the bottom environments in the waters within and outside the planned operational area in 2024 and 2025. Preliminary results from the survey show that the bottom environment closest to the shoreline in the northern part of the Värö Peninsula mainly consists of hard bottom and the proportion of sand increases with distance from land. The impact on the seabed from waves and ocean currents is high as the area is close to land and exposed. The sediment survey around the Värö Peninsula generally shows low levels of pollutants.

Preliminary results indicate a predominantly viable species composition or species lacking classification according to the Swedish Red List. The species composition can be assumed to be normal for the marine area and the species probably occur in large parts of the Kattegat. No invasive alien species of flora or epifauna were observed.

Inventory of porpoises and lobsters is ongoing and preliminary results indicate frequent occurrence of lobsters and porpoises. The results will be compiled and included in the application documents. Supplementary inventories or investigations of the bottom environment may be carried out in connection with the supplementary port.

6.6. Cultural environment

Varberg Municipality's cultural environment program from 2016 identifies important cultural environments within the municipality. The cultural environment program shows that the Ringhals area has cultural and historical values from a social, industrial and architectural historical perspective, among other things. Bua village and the Vendelsöarna are also identified as important cultural environments.

There is no national interest in cultural environment protection in the vicinity of the planned operations. The nearest, Nidingens Fyrplats, is over ten kilometers north of the operation.

Within the planned operational area, a number of ancient remains and other cultural remains, including stone settings and settlements, that may be affected have been identified, see Figure 16. There are also a number of ancient remains and other cultural remains within the Biskopshagen nature reserve (National Antiquities Board, 2025). Ancient remains are traces of abandoned human activity that occurred before the year 1850. All ancient remains, even those that are not known, are protected under the Cultural Environment Act. Other cultural and historical remains are traces of human activity that occurred during and after the year 1850. Other cultural and historical remains do not have the same protection as an ancient remains, but must be shown consideration and care.

An archaeological inventory (step 1) has been carried out in the area of the planned activity. The inventory was carried out in 2014 and the County Administrative Board has assessed the data as sufficient, which is why a new inventory was not necessary. Archaeological investigations (stage 2) have also been carried out in parts of the area and more are to be carried out.

Voluntary marine archaeological investigations at the planned cooling water intake and port, as well as at any new cooling water discharge, have also been carried out and are being compiled. These will be included in the application documents.

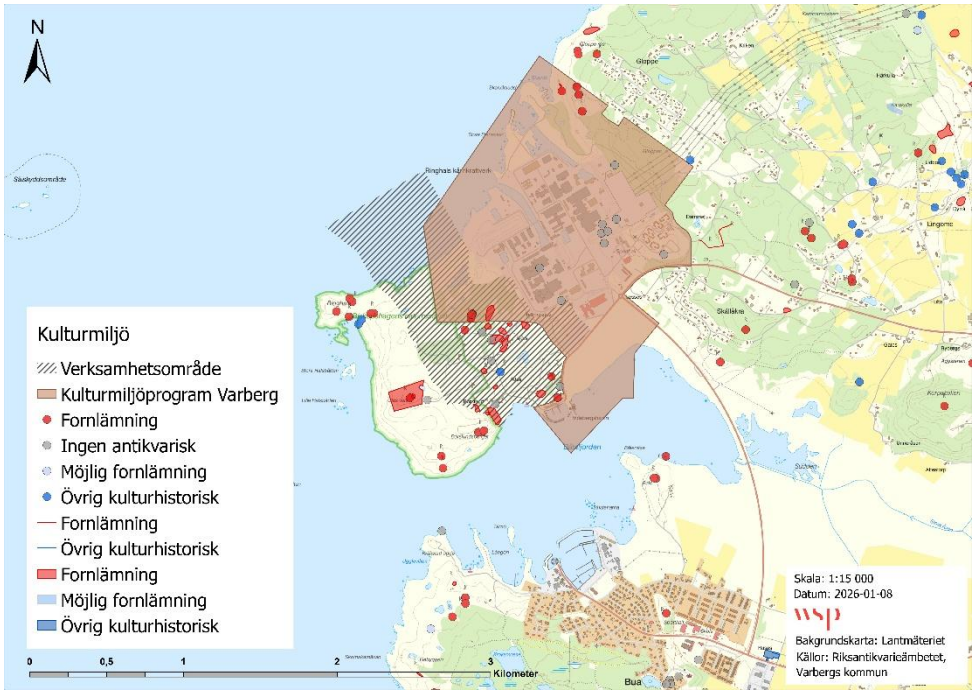

Figure 16. Identified cultural values within and in the immediate area surrounding the planned operations.

Kulturmiljö - Cultural environment
Verksamhetsområde - Area of activity
Kulturmiljöprogram Varbergs kommun - Cultural environment programme Varberg municipality
Fornlämning, punkt - Ancient monument, point
Fornlämning - Ancient monument
Ingen antikvarisk bedömning - No antiquarian assessment
Möjlig fornlämning - Possible ancient remains
Övrig kullurhlslorisk lämning - Other cultural-historical remains
Fornlämning, ytor - Ancient monument, surfaces
Fornlämning - Ancient monument
Möjlig fornlämning - Possible ancient monument
Övrig kulturhistorisk lämning - Other cultural-historical remains

6.7. Outdoor recreation

The coastal area of North Halland is a recreational area for residents and tourists. There are good opportunities for swimming, fishing, outdoor activities and nature experiences. The entire operational area is within the national interest for mobile outdoor recreation. The national interest extends from the border with Skåne in the south to Gothenburg in the north.

The planned operational area also overlaps with the Biskopshagen Nature Reserve, which, among other things, aims to: recreation and outdoor activities. There are no marked trails, but the area is relatively easy to hike. The cultural landscape and the cultural and ancient remains found within the reserve constitute important places for outdoor recreation.

In the surrounding area there is also Videbergshamn with a swimming area and fishing opportunities.

6.8. Landscape and light

The planned operations will use land areas that were previously partly undeveloped. The area for the planned operations consists of open land, with mountains in the northern part of the area and a more open agricultural landscape with housing in the southern part. There are also deciduous and pine forest areas, often in mountainous terrain, in the landscape. The height above sea level varies greatly within the area. The areas with agricultural land are located at approximately 2–20 meters above sea level, while the mountain peaks reach 30 meters above sea level in some places.

West of the planned operational area is the Biskopshagen Nature Reserve. The nature reserve contains natural pastures in the southern part and drier and nutrient-poor rocklands (heather landscape) in the northern parts. In the depressions there are wetlands and in the areas close to the shore there are shingle fields, rock outcrops of shale and various smaller water-filled depressions, so-called rock pools.

Directly east of the planned operational area has been the Ringhals nuclear power plant since the 1970s. The power plant area is approximately 100 hectares in size with buildings of varying heights. The power plant and its associated harbour are illuminated in the evening and at night for safety reasons.

6.9. Geology and soil conditions

The bedrock within and near the planned operational area consists mainly of gneisses with a dominant granitic to granodioritic composition. The rock quality is classified as generally good (COWI, 2015). The soil depth within the area varies between 0–15 meters with the deepest soil depths in the southern part of the area. The soil types consist of both clay and organic soils as well as friction soils of sand and moraine.

The planned operational area is not located within any designated risk area for landslides, rockfalls or erosion according to the Swedish Geotechnical Institute's mapping service (SGI, 2025). A number of minor landslide caution areas along certain stretches of coast in the immediate vicinity of the planned operational area are designated in the Geological Survey of Sweden's map service (SGU, 2025a). A smaller such area also exists on the coast within the northern part of the planned operational area. These are areas where there may be conditions for landslides in clay and silt soil. The stability of the soil will be investigated further within the framework of the preparation of the application documents and any risks linked to this will be managed during construction of the facility.

Historical photographs show that the planned operational area has been primarily agricultural. The County Administrative Board's EBH map (2025) of suspected and confirmed contaminated areas shows that in connection with the planned operational area there are two areas classified in risk class 3 (moderate risk), see Figure 17. These areas are called "Industrial landfills" and "Ports - recreational marinas, boat parking areas". In addition, there is an uninvestigated area called "Wastewater treatment plant".

WSP has conducted investigations related to contaminated soil on behalf of Vattenfall. The investigations show that analysed soil samples generally have

levels below the current guideline values for less sensitive land use, MKM, except for one shallow soil sample where lead contamination occurred at levels just above the current guideline value.

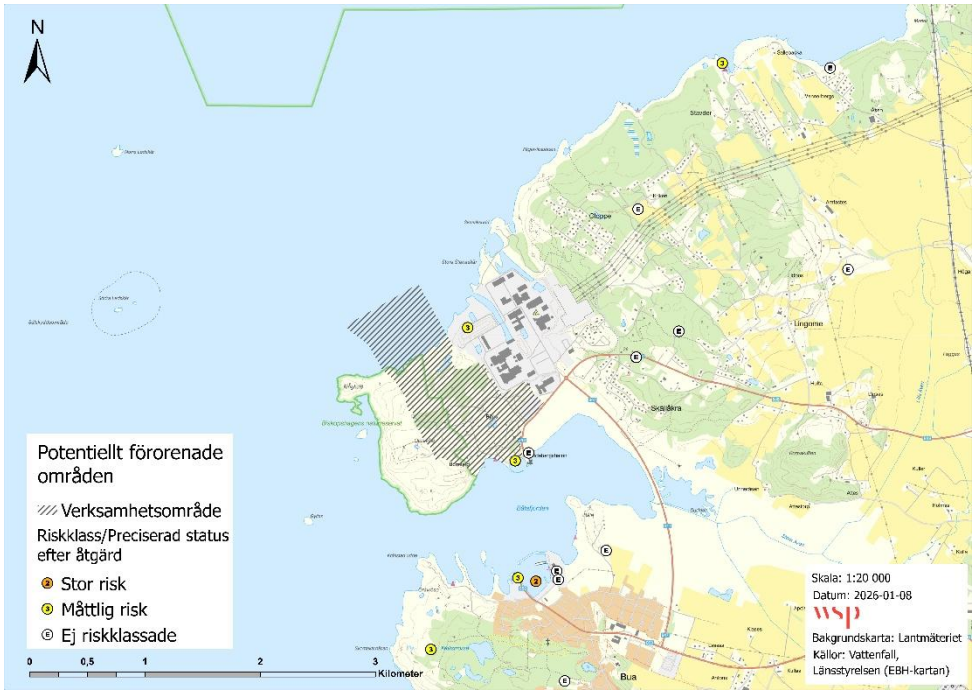

Figure 17. Map of potentially contaminated areas.

Potentiellt förorenade områden - Potentially contaminated sites
Verksamhetsområde – operational area
Riskklass/Preciserad status efter åtgärd - Risk class/specified status after action
Stor risk - High risk
Måttlig risk - Moderate risk
Ej riskkklassade - Not classified as risk

6.10. Surface water

The northern tip of the Värö Peninsula borders two surface water bodies, coastal waters; *the Vändelsö archipelago* (SE571720-120640) and *the Northern Central Halland Coastal Waters* (SE570000-120701). Both water bodies are classified as having moderate ecological status and do not achieve good chemical status. The possibility of achieving the quality requirement of good chemical status in both water bodies is covered by exemptions with less stringent requirements for brominated diphenyl ethers and mercury and mercury compounds, as it is deemed impossible to reduce the concentrations of these substances to the level required for good status. For tributyltin there is a deadline for achieving good status by 2027, with the reason that it is deemed technically impossible to achieve good status earlier (VISS, n.d.).

In connection with the revision of the EU Water Framework Directive, the division of water bodies will change. The geographical distribution of the surface water body *Northern Central Halland Coastal Waters* will change when *Båtafjorden* becomes a separate surface water body according to the preliminary division. The surface water body *Stora Även* (SE635268-127900) also flows into Båtafjorden,

with a status classification of moderate ecological status and does not achieve good chemical status. The impact on relevant quality factors for the status classification in the current and preliminary water bodies will be reported in the environmental impact assessment. Figure 18 shows the decided water bodies in the operational area and the surrounding area.

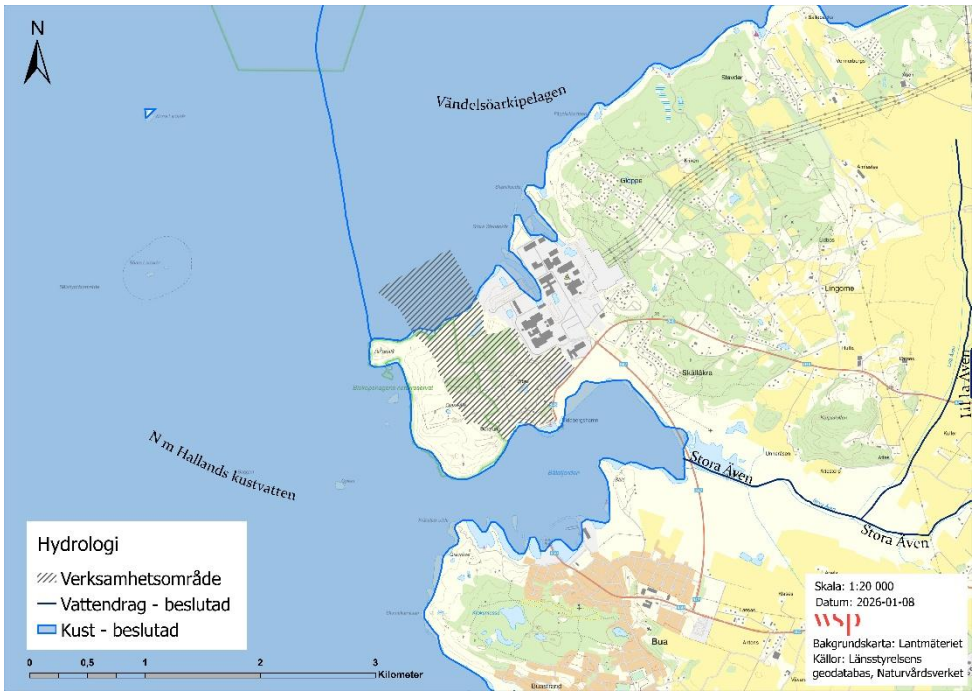

Figure 18. Decided water bodies in the operational area and surrounding area.

According to Ringhals' latest annual environmental monitoring report, the activity levels measured in environmental samples from the Ringhals area are very low or below detection limits (Ringhals AB, 2024). The samples in which these nuclides have been detected were collected at the two sampling stations closest to Ringhals' discharge point to water. Further compilation of radiological mapping of existing radiation levels including known releases of radioactive substances in the surrounding area will be reported in the form of a compilation of measurements from Ringhals AB and other relevant investigations, for example from Lund University.

6.11. Groundwater

There is no designated groundwater body within the planned operational area. The nearest groundwater body (230800014) is located next to Veddige, just over eleven kilometers east of the operational area.

According to SGU's mapping service, the nearest reported well/individual water source is in Skälåkra, approximately one kilometer from the planned operational area (SGU, 2025b).

6.12. Air recipient

Halland County is one of Sweden's most vulnerable areas in terms of sulphur and nitrogen deposition, mainly caused by foreign emission sources. In Halland County,

monthly measurements of air concentrations of nitrogen dioxides, ammonia and sulphur dioxide have been carried out within the framework of the Krondroppsnätet since 2001 at a measuring station approximately eighty kilometers from the planned operational area. The results of the measurements show that the air concentrations of nitrogen dioxides at the measuring station have decreased in line with the decrease in reported emissions of nitrogen oxides from both Sweden and the EU as a whole. The concentrations of sulphur dioxide at the same measuring station have decreased to a lesser extent than the reported emissions from Sweden and the EU (IVL, 2024).

Air quality measurements in central Varberg were carried out in 2023. The measurements showed that levels of particles and nitrogen oxides fell below applicable environmental quality standards for air (Ensucon, 2024).

According to Ringhals' latest annual environmental monitoring report, the activity levels measured in environmental samples from the Ringhals area are very low or below detection limits (Ringhals AB, 2024). The samples in which these nuclides have been detected were collected at the two sampling stations closest to the Ringhals air release point. Further compilation of radiological mapping of existing radiation levels including known releases of radioactive substances in the surrounding area will be reported in the form of a compilation of measurements from Ringhals AB and other relevant investigations, for example from Lund University.

7. Expected environmental impacts

Chapter 6 of the Environmental Code states that environmental effects mean direct or indirect effects that are positive or negative, temporary or permanent, cumulative or non-cumulative and that arise in the short, medium or long term on the environment or human health. Environmental effects are not limited geographically, they can arise both in the immediate area and far away and within and outside Sweden's borders.

The following section presents preliminary environmental impacts resulting from the construction and operation of the planned activity. The descriptions are based on the two alternatives under consideration and preliminary environmental impacts are described for the alternative that generates the greatest need for space or generates the greatest environmental impact.

7.1. Land use

7.1.1. During construction

Planned operations require a larger land area during construction than the land area required for the operation of the facility. In addition, temporary storage and assembly areas outside the operational area may be utilized during the construction phase. These may be located in the immediate area or in neighbouring municipalities. Most of the temporary storage and assembly sites will be restored after the construction phase.

During all ground works, special precautions will be taken in the event that contaminated materials are encountered. Contaminated materials will be handled

appropriately in collaboration with the regulatory authority in accordance with the Environmental Code.

7.1.2. During operation

The nuclear reactors are designed for an operating time of approximately 60 years. Neither during this time nor during the subsequent decommissioning will the land be usable for other purposes.

7.2. Landscape and light

7.2.1. During construction

During construction, the planned operations will involve the gradual transformation of the landscape through earthworks. The establishment will take place in a landscape that is currently affected by large and tall buildings and power lines at the Ringhals nuclear power plant.

Since the construction site will be lit in the evening and at night, disturbances from light may occur.

If it is decided to establish a supplementary port, this will also affect the landscape in the northern part of the operating area.

7.2.2. During operation

During operation, the operational area including the port area and ships will be illuminated for safety reasons. This may affect the landscape through light pollution. The design and extent of lighting will be investigated and adapted as far as possible to minimize the impact on people and the environment.

The facilities consist partly of reactors that are blasted into the rock, partly of facilities above ground. The visual impact of the completed facility on the landscape is to some extent dependent on the suppliers' design. The maximum height of the facility may be on par with the existing installations/buildings of the Ringhals nuclear power plant.

A landscape image analysis and light pollution analysis will be produced.

7.3. Natural environment

7.3.1. During construction

During construction, land will be used, including parts of the Biskopshagen nature reserve[5]. The use means that there will be a physical impact on land areas and that current land use will disappear. Within this area, inventories have identified several natural value biotopes with high natural values. The operation will use land areas, which will result in the loss of natural values. The extent of the impact on the

[5] As part of the preparations for the planned operations, Vattenfall has, through a separate process, submitted a request to the County Administrative Board of Halland County to cancel part of the Biskopshagen nature reserve.

biotopes, as well as the overall consequences of the operation for the natural environment, are being investigated and will be reported in the upcoming environmental impact assessment.

Otherwise, it is assessed that disturbances during the construction phase may arise in the form of, for example, noise, dust, vibrations and light. If the activity is assessed to have a significant impact on the environment in the nearby Natura 2000 area Båtafjorden, a permit is required in accordance with Chapter 7, Section 28 a of the Environmental Code. This will be investigated in more detail and if it is assessed that there is a risk of significant impact, a Natura 2000 permit will be applied for.

Several inventories, including bird inventories and bat inventories, have been carried out and the results will be attached to the upcoming application.

Impact factors being investigated include:

- habitat loss through both permanent and temporary land acquisition, which affects the habitats of many species,
- noise including noise from transport which is primarily assessed to affect birds,
- light pollution which mainly affects bats and birds,
- groundwater lowering which affects groundwater-dependent natural environments,
- traffic, which can lead to increased mortality if dispersal routes are crossed by traffic, as well as possible disturbance to birds.

7.3.2. During operation

The planned operations will generate, among other things, light, noise and transport on road 847 through the Natura 2000 area. It is being investigated whether these transports, light pollution and noise from operations may have a significant impact on the environment in the Natura 2000 area Båtafjorden and how the Biskopshagen Nature Reserve as well as protected species within the operation area and in the surrounding area will be affected by the operation.

Inventories and impact factors specified in 7.3.1 are also relevant during the operation of the business.

7.4. Cultural environment

7.4.1. During construction

There are known ancient remains and other cultural and historical remains in the area that may be affected by the establishment. The seabed that is planned to be used will be investigated through a marine archaeological investigation. The presence of ancient monuments and any impact on them will be investigated further.

If any remains are at risk of being affected by the construction, a permit under the Cultural Environment Act will be sought. If additional ancient remains are found during excavation, this will be handled in accordance with the provisions of the Cultural Environment Act.

The public is expected to have access to Biskopshagen Nature Reserve and its remains during the majority of the construction phase. During the construction phase, access may be temporarily and briefly restricted in order to carry out certain work. However, these restrictions are not expected to have any real impact on accessibility to the cultural environment.

7.4.2. During operation

After the nuclear power plant is built, no further impact on the cultural environment is expected.

When in operation, Vattenfall intends that public access and accessibility to unused parts of the Värö Peninsula and its cultural environment will not be made impossible. However, the experience of the cultural environment and the connections between the natural environment and the cultural environment may be impaired as a result of part of the Biskopshagen nature reserve being used by the operation.

The context of the cultural historical values from a social, industrial and architectural historical perspective, among other things, that are identified in Varberg Municipality's cultural environment program may change when modern technology is built in the area.

7.5. Outdoor recreation

7.5.1. During construction

The public is expected to have access to the Biskopshagen nature reserve for outdoor recreation during the majority of the construction phase. However, during construction there may be a need to temporarily and briefly restrict access in order to be able to carry out certain work steps. The available area will be reduced and the experience of outdoor recreation will change due to, for example, noise, traffic and lighting. In the parts of the nature reserve that will need to be used for the operation, it will not be possible to practice outdoor recreation.

7.5.2. During operation

When in operation and during decommissioning, the land within the operational area will not be available for public use for outdoor recreation and leisure. Vattenfall assesses that public access and accessibility to unused parts of the Biskopshagen nature reserve will not be impeded during the operation phase of the facility, and the opportunity to practice outdoor recreation in these areas will remain.

7.6. Raw materials

7.6.1. During construction

The use of resources during construction will be based on circular principles, which aim to reduce resource use and utilize resources in a sustainable manner. The use of primary raw materials and resources will be minimized and, where possible, supplemented with reused or recycled resources.

During construction of the plant, large quantities of construction materials will be required. It is estimated that approximately 1,000,000 m^3 of concrete will be required for the construction of the new nuclear power plant with associated buildings and installations. In addition, raw materials such as steel, aggregates/gravel and certain metals such as copper and aluminium will be used.

If a port is built, its design will determine how much material is needed for its construction. It is estimated that up to 800,000 m^3 of blasted rock may be needed for the construction. If the breakwater and quay are constructed by piling and sheet piling, a significantly smaller amount of blasted rock is required. Blasted rock from the masses generated within the operational area will mainly be used. In addition to blasted rock, steel, reinforcement, concrete, asphalt and friction materials such as bearing layers will mainly be needed.

7.6.2. During operation

Uranium dioxide is used as fuel in the reactors. The nuclear fuel will be transported to the facility and replaced during the shutdowns that will occur at regular intervals, see also section 3.6. Fuel consumption is estimated to be a maximum of 40 tonnes of uranium dioxide per year for the entire operation.

7.7. Chemical products

7.7.1. During construction

During construction, a large number of chemical products will be used. In addition to pure construction materials, there will be explosives, paints, welding gases, fuels and maintenance chemicals.

Routines for storage, handling of chemicals and disposal of chemical residues will be developed and will be in effect during the construction and operation phases.

7.7.2. During operation

Operation and maintenance of the plant will require several different chemical products, but which ones have not yet been investigated in detail. As for operating chemicals, these depend partly on the choice of reactor technology and supplier. Examples of the operating chemicals that may be used in the largest quantities at the plant and the area of application of the products are presented in Table 4.

Table 4. Reporting of the chemical products that are estimated to be consumed in the largest quantities at the plant. Consumption may change depending on the final reactor technology/supplier.

Chemical product	Annual consumption	Area of application
Nitrogen gas (100%)	2,000 tonnes	Inerting, pressurization, leak testing
Hydrogen (100%)	15 tonnes	Hydrogen chemistry in process water, oxygen reduction
Hydrazine 5%	200 tonnes	Oxygen reduction
Ammonium hydroxide 30%	500 tonnes	pH control
Sodium hypochlorite[1] 14%	2,500 tonnes	Prevent fouling in cooling water channels
Sodium hypochlorite[1] 100%	4,000 m^3	

[1] Concentration and consumption amount depend on whether sodium hypochlorite is manufactured within the operational area or purchased externally.

Additional operating chemicals will be added, such as boric acid, nitric acid, sulphuric acid, sodium hydroxide, etc. The chemicals are used, among other things, for the production of completely desalinated process water, preventing corrosion and cleaning electrolysers. In addition, maintenance chemicals such as various lubricating oils, greases, solvents, cleaning agents and similar products will be added. Vehicle service and handling of fuel for transport and backup power units will be carried out.

All handling of chemical products will comply with applicable legal requirements and all liquid chemicals will be stored safely using embankments or equivalent. The production premises are equipped with concrete floors and floor gutters where any spills can be collected.

All unloading and loading will take place on paved surfaces, and covers will be available to cover outdoor stormwater drains. Larger volumes of liquid chemical products will be stored in tanks, and unloaded and loaded by tanker truck that connects to fixed pipelines outside adjacent to the tanks. Collection materials will be available for handling spills.

Substitution of chemical products to chemicals that are less environmentally and health hazardous will be implemented whenever possible.

7.8. Energy use

7.8.1. During construction

During the construction phase, electricity will be used for construction, including for cranes, lighting, drills, crushers and other tools. Concrete production also requires electricity to operate, for example, mixers, pumps, conveyor belts and heating. As a first measure during the construction phase, construction power will be established in the area. Electricity will also be used in the areas that constitute temporary areas and are used, for example, for workshops, offices and similar functions. The electricity used will come from the local distribution network on the Värö Peninsula. The power requirement for electricity during the construction phase of the nuclear reactors is estimated to be approximately 26 MW. In addition, there is the electricity consumption required to possibly build a port.

Fuels, mainly in the form of diesel, for work vehicles will be used. It is estimated that the annual fuel use for vehicles during the construction phase of the nuclear reactors is approximately 4,000 tonnes. In addition, there is a need for fuel for port construction. The possibility of using electric transports and more sustainable fuels, with the aim of minimizing greenhouse gas emissions, will be investigated.

7.8.2. During operation

To operate the plant, electrical energy is required, which is primarily taken from the plant's own production. Secondly, when the plant is shut down, the plant will be supplied via an external network. Thirdly, if an external network is not available, supply will be via backup power units powered by diesel and/or biofuels and batteries. Backup power units for, for example, a server hall may also be required. Maximum electricity use for operating reactors with an output of around 1,500 MWe is estimated to be approximately 190 MW of electrical power.

Internal and external transports will use diesel, fuel oil or electricity. The possibility of using electric transports and more sustainable fuels, with the aim of minimizing emissions, will be investigated. In addition, there is the electricity consumption required to operate a port.

7.9. Water use

7.9.1. During construction

Municipal water will be used for work such as concrete pouring, flushing, cleaning and the like. Alternatively, desalinated seawater will be used. Municipal water will also be used for sanitary purposes in construction sheds, offices and residences.

The water will be taken from the municipal network via a temporary network that will be built up as the area is occupied. The water supply will mainly be via water points where hoses can be connected. The average consumption during the construction phase of the nuclear power plant is estimated to be approximately 400 m^3 per day, higher consumption of approximately 2,500 m^3 per day may occur during certain work steps such as concrete production. In total, the water use during the construction phase for all reactors is estimated to be approximately 800,000 m^3. The water requirement for the construction of the port depends on the final design and the need for concrete for the port structures.

7.9.2. During operation

Municipal water will be used in operation to supply the reactors with process water and to moderate the fission process. Desalinated seawater may also be used. The water used in a nuclear reactor must meet strict purity requirements. The water will therefore need to undergo a demineralization process, via ion exchange or osmosis treatment, to remove salts and humic substances before use. To reduce water use, a large part of the process water will be purified and reused during the operation phase. Municipal water will also be used as fill water for pumps, for extinguishing any fires, sanitary water, drinking water and for cleaning purposes. The use of water for the operation of the operation is estimated to be approximately 500 m^3 per day. In total, the use of water is estimated to be approximately 200,000 m^3 per year.

Seawater will be used to cool the nuclear facility. The cooling water consumption, in the form of seawater, is estimated to be approximately 70 m^3 per second, which corresponds to approximately 2,250,000,000 m^3 annually. The estimated annual use of seawater is based on a conservative assumption of continuous operation all year round.

7.10. Waste

7.10.1. During construction

Waste management during construction will be based on the EU waste hierarchy and circular principles, which aim to reduce resource use and waste, and promote the reuse and recycling of materials in a sustainable manner. Excavated materials arising in the area will be utilized within the project to the extent possible, see section 3.1. A waste management plan will be developed.

Examples of waste fractions that will arise during construction are concrete, asphalt, wood, packaging waste and insulation. Waste will be sorted at source at sorting stations. Collection will take place in containers and thus stored separately from each other for further handling by an authorized recipient. Hazardous waste will be stored protected from the weather. Construction waste will be managed with a focus on recycling and reuse, and in accordance with applicable regulations to minimize the impact on human health and the environment.

Examples of estimated waste quantities that will arise during the construction of the nuclear power plant are shown in Table 5. Additional waste types and quantities will be added.

Table 5. Estimated waste quantities during construction of the nuclear power plant (tonnes).

Waste type	**Quantity (tonnes)**
Concrete	120,000
Asphalt	21,000
Resin	4,000
Wood	10,000
Sludge	300
Mixed waste	400
Fiberglass	100

In addition to the waste generated during construction of the nuclear power plant, waste will also be generated during construction of the port. Dredging will be carried out. Estimated dredged material amounts to approximately 270,000 m^3 but may vary depending on design and location.

The pollutant content of the masses will be investigated and the handling will be adjusted accordingly. Depending on the pollutant content, the masses may be reused or transported away for disposal. It may also be relevant to apply for an

exemption according to Chapter 15 of the Environmental Code for dumping within the framework of a future application. If this is the case, a location investigation and benthic fauna investigations will be carried out. The investigation will be attached to the upcoming environmental impact statement.

7.10.2. During operation

Waste management in the planned operations will be based on the EU waste hierarchy and circular principles. The priority order according to this means that waste should first be prevented, secondly reused, thirdly recycled, fourthly energy recovered and finally landfilled. The waste that nevertheless arises in the operations, after preventive measures, will be managed and classified based on established routines depending on the type of material and the amount of radioactivity.

Nuclear waste will be managed with safety as the highest priority and in accordance with applicable laws and regulations. The waste that will arise during operation is considered to be of the same nature as the waste that arises at other nuclear power plants in Sweden. Estimated annual amounts of nuclear waste during the operation of the entire operation are up to approximately 900 m^3 per year.

In addition to nuclear waste, conventional waste will be generated. This waste can consist of both hazardous and non-hazardous waste and consists of, among other things, packaging material, office supplies, plastic, wood, scrap metal and household waste. Waste will be stored in containers, receptacles or environmental cabinets intended for the purpose. Hazardous waste will be stored protected from precipitation on a sealed, embanked surface or with a corresponding safety system that enables the collection of any spillage. The waste that is submitted for external treatment will be transported and disposed of by a qualified waste contractor. Estimated amounts of conventional waste during the operation of the nuclear power plant amount to approximately 60 tonnes annually.

In addition, waste in the form of organic debris will be generated. Seawater for cooling will be filtered from fish, mussels, jellyfish and seaweed. Water containing separated organic debris will be removed using flushing pumps. The water will contain varying amounts of organic debris. During periods with low amounts of organic debris, this will be returned directly to the sea. In the case of large amounts of organic debris, the water with organic debris will instead be dewatered. This is done to avoid large amounts of organic debris being returned to the cooling water which is then taken back into the plant. After dewatering, the organic debris can be used as a resource, depending on its content.

In addition to the waste generated during the operation of the nuclear power plant, waste will also be generated from port operations and from ships calling at the port. Examples of waste types that may arise from ships are engine room waste (sludge), toilet waste and food waste. The port is obliged to receive waste from ships that normally call at the port and reception facilities for this waste will be available. Maintenance dredging in the port may be required.

7.11. Noise and vibrations

7.11.1. During construction

During construction, noise disturbances will occur in the immediate vicinity of the operational area. Work steps at the beginning of the construction phase will, among other things, give rise to vibrations and a higher noise level, especially during crushing, rock drilling, sheet piling, blasting and handling of explosives. An increased proportion of transport will also generate noise.

A noise investigation will be carried out as a basis for assessing the noise levels caused by the operation and any need for measures to ensure that the Swedish Environmental Protection Agency's general advice on noise from construction sites is adhered to. Noise from traffic to and from the construction site will be assessed based on the guideline values applied for traffic noise.

Work in water, such as dredging and ship traffic, will cause underwater noise. An underwater noise study will be carried out to assess the impact on the marine environment, see section 7.17.

During construction, vibrations are expected to be mainly caused by blasting, but may also arise from transport. Vibrations resulting from the activities will be investigated and the results presented in the environmental impact statement.

7.11.2. During operation

Noise sources in the form of transport, ventilation systems, testing of safety valves, backup power and similar activities will give rise to some noise in the immediate area. The noise investigation to be carried out will assess how the planned activities relate to the guideline values stated in the Swedish Environmental Protection Agency's guidance for industrial noise and the possible need for protective measures.

As a result of sequential construction and commissioning, noise from the construction site and operational noise will occur simultaneously.

During port operations, noise may be generated from loading and unloading of, for example, various bulk materials, goods, masses and large components. In addition, ship movements including idling may give rise to noise, as may work machines, forklifts and trucks that will be used in the port.

During operation, vibrations are expected to occur primarily during transport. The assessment is that vibrations during operation are low.

7.12. Transport

7.12.1. During construction

The planned operational area is located on the coast, which means that parts of the transport flow can be handled by sea. There are also major roads such as the E6 road in close proximity to the peninsula, as well as a well-developed industrial railway infrastructure in western Sweden. Overall, this means that the transport strategy for the planned operations is based on three parts:

- Ship transport - Large and heavy components, prefabricated modules and bulk materials that exceed the dimensions and weight limits for roads and railways. It may also be necessary to transport excess masses by ship.
- Truck transport - Light to medium-heavy transports such as consumables and special transports that need to be on site quickly. Removal of excavated materials.
- Rail transport - Medium-heavy local transport or transport within the EU. The material is reloaded at transhipment points onto trucks and driven to the site.

If a supplementary port is built, a larger number of ship calls may become relevant, which in turn means that the number of road transports will decrease correspondingly. The transport figures given in the following section represent a worst-case scenario for both the number of ship transports and the number of land transports.

7.12.1.1. Truck and rail transport

During the construction of the nuclear power plant, transport of soil and rock materials, construction materials and plant components to and from the operational area will be carried out. There are existing roads to and within the area, however, some roads may need to be strengthened to accommodate road transport to and from the area during construction.

The main transport routes will be road 848 or road 847, via roads 845 and 850 respectively and exit 56 to road E6, see Figure 19. Consideration will be given to the fact that road 847 passes through the Natura 2000 area Båtafjorden. Road E6/E20 is classified as a primary route for the transport of dangerous goods and there is no groundwater body along these roads.

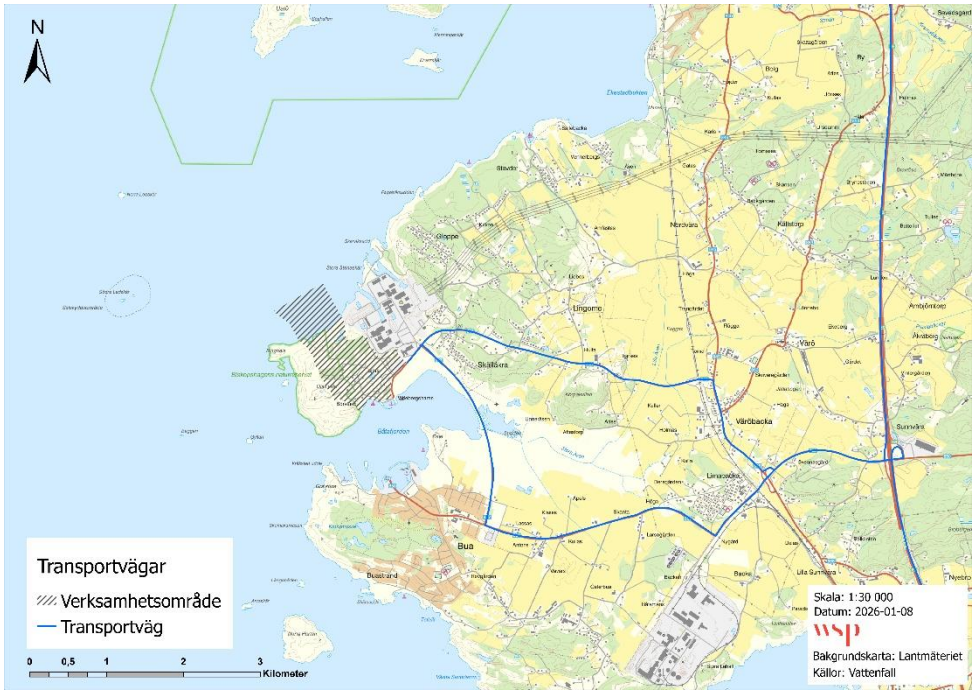

Figure 19. Overview map of possible transport routes for truck transport.

Transportvägar – Transport routes
Verksamhetsområde - operational area
Transportväg - transport route

The foundation and ground preparation phase is expected to involve an intensive period of truck transport for the transport of excavated materials and rock material. These transports are expected to mainly take place during the first half of the construction phase. After the foundation and ground preparation phase, transports will mainly consist of large and heavy components.

Preliminary road transports estimates are approximately 5,600–13,300 truck and bus movements per month, equivalent to approximately 180–440 per day, during the busiest month of the construction period. Bus transport to and from the site for personnel is included in the figures above.

During the construction phase, the number of personnel will amount to a maximum of approximately 4,000 (during shift changes, the number of personnel on site may temporarily increase further), while the average level of personnel is estimated to amount to approximately 1,500 people. Some of these will be overnight in the immediate area. However, it is likely that many will live in the immediate region, from Gothenburg in the north to Halmstad in the south and inland. This means that transport via the West Coast Line and along the Borås Line needs to be prioritized because the construction site is cramped and the amount of parking will be limited. In order to handle transport from the hubs along the West Coast Line and Borås Line, coordinated transport can be deployed at the hubs.

Vattenfall is currently conducting investigations regarding logistics and the choice of transport modes to minimize the impact on the local community and road network. The distribution between the number of road, rail and ship transports may therefore change. To minimize the number of transports, logistics will be planned for a high fill rate and trucks will be filled both for inbound and outbound transport to the extent possible and appropriate.

7.12.1.2. Ship transport

For larger transports, Videbergshamn, or alternatively the supplementary port, is planned to be used. Videbergshamn is covered by Ringhals AB's environmental permit. The permit describes that the port can sometimes also be used by other operators after Ringhals' approval.

The location of the operational area in close proximity to other existing ports such as the ports of Halland or the Port of Gothenburg also enables sea transport via these ports, which have permits for handling, among other things, containers, bulk, RoRo, steel and sheet metal products and liquid bulk.

For ship transport, it is estimated that a total of approximately 1,200 ship calls will be needed during the construction phase, which on average gives up to 20 ship calls per month.

For a supplementary port, there are two possible entry routes, which are illustrated in Figure 20.

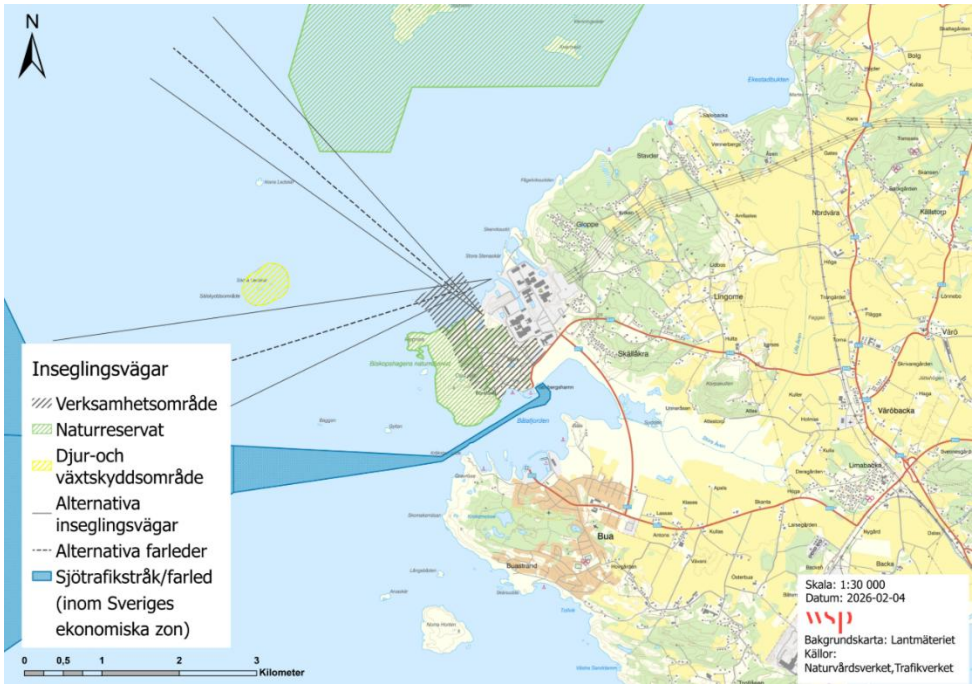

Figure 20. Illustration of possible preliminary approaches to the port.

Inseglingsvägar - Shipping routes
Verksamhetsområde - operational area
Naturreservat – Nature reserve
Djur- och växtskyddsområde - Animal and plant protection area
Alternativa inseglingsvägar - Alternative shipping routes
Alternativa farleder - Alternative fairways
Sjötrafikstråk / farled (inom Sveriges ekonomiska zon) - Maritime traffic corridor / fairway (within Sweden's economic zone)

7.12.2. During operation

The number of goods transported to the facility is estimated at approximately 2,000 transports per year. This translates into approximately six transports per day. Transports of spent nuclear fuel and nuclear waste from the facility may take place via ship, truck or train.

The number of operating personnel is estimated at approximately 600 full-time employees. It is desirable to transfer passenger transport to buses to the greatest extent possible, which in this case would correspond to a need for approximately twelve buses. It is likely that passenger transport will also take place by car. Taking into account some carpooling, passenger transport by car is assumed to amount to approximately 300 cars per day.

The main transportation route will be the same as during the construction phase.

7.13. Emissions to air

7.13.1. During construction

During the construction phase, work machinery and transport will generate emissions of, among other things, carbon dioxide, nitrogen oxides, sulphur dioxide and particles into the air. The possibility of using electric transport and more sustainable fuels, with the aim of minimizing emissions, will be further investigated.

Smaller amounts of solvents will be released from building materials, degreasing, paints, and more.

Construction-related dust can periodically cause disturbances in the immediate surroundings. Dust generation is expected primarily during the initial construction work, for example during blasting and handling of rock masses. Construction-related dust may have negative effects on the flora of the area but is primarily a work environment issue. To reduce dust generation, several different protective measures can be taken if necessary. Examples of measures include watering or salting gravel roads and areas, watering storage areas, vehicle beds and connecting water to nozzles on crushing machines and conveyor belts if such are used.

Air emissions will also be generated from the ships' engines when the ships are at berth and during arrival and departure. The emissions consist mainly of nitrogen oxides, sulphur oxides, carbon dioxide and particles. Emissions at the port depend, among other things, on the type of ship fuel used, the number of calls and how long the ships are at berth. The type of ship and its age can also play a role in terms of emissions to air.

7.13.2. During operation

The operation of the reactors results in low emissions of radioactive substances into the air. The air is led through a purification plant that captures radioactive particles before being released via the reactor chimney/exhaust path. These emissions are not considered to lead to any negative effects, either in the immediate area or in another country. Radiological environmental consequences resulting from planned activities, that is, radiation doses to a representative member of the public, activity concentrations in the environment and dose rates to reference animals, reference plants and representative organisms, will be calculated and assessed in accordance with the requirements of the Swedish Radiation Safety Authority[6]. The assessments will include the total exposure of the public and the environment from all existing and expected nuclear activities affecting the same geographical area.

Air emissions will be generated from transport to, from and within the operational area, from ship engines when they are at berth and during recurring test runs of emergency power units. The emissions will primarily consist of carbon dioxide, nitrogen oxides, sulphur dioxide and particulate matter. Estimated emissions from emergency power units amount to approximately 500 tonnes of carbon dioxide and 10 tonnes of nitrogen oxides annually.

[6]SSMFS 2021:5

7.14. Climate impact

7.14.1. During construction

The construction of the planned operations will require materials such as steel, concrete and other energy-intensive construction materials and inputs. Transport and construction machinery will consume diesel and other fuels. Logistics will be planned to optimize transport, both in terms of transport mode and to ensure that as few transports as possible are empty.

To minimize the impact on the climate during construction, the project will focus on resource conservation. The use of resources with a lower climate footprint, such as recycled materials, as well as electric transportation and more sustainable fuels, will be investigated and implemented where possible.

7.14.2. During operation

Electricity production at a nuclear power plant is fossil-free. From a life cycle perspective, the climate impact of a nuclear power plant is low and carbon dioxide emissions amount to 5.71 grams per kWh, which is lower than the corresponding figure for both wind and hydropower (Vattenfall, 2025; 2005). The majority of greenhouse gas emissions are linked to upstream and downstream processes such as the production of nuclear fuel and materials for the infrastructure required for the distribution of electrical energy (Vattenfall, 2016). The operation of the nuclear power plant itself accounts for a smaller part of the carbon dioxide emissions. Emissions of substances during the operation of the plant that contribute to the greenhouse effect, eutrophication and acidification in the form of nitrogen dioxides, carbon dioxide and sulphur dioxide are generated primarily during transport to and from the plant and during test runs of backup power plants.

To minimize the impact on the climate during operations, the business will work actively to conserve resources. Resources with a lower climate footprint, such as recycled materials, electric transportation and more sustainable fuels, will be used where possible.

7.15. Groundwater

7.15.1. During construction

Since the facility is being founded below the current groundwater level, the construction of the facility, with its associated infrastructure, will require the removal of groundwater by pumping.

Vattenfall will carry out supplementary investigations to assess the impact on public and private interests as a result of the groundwater diversion. The results of the investigations will, among other things, report an assessed area of impact as a result of the groundwater diversion, within which any impact on public or private interests may arise, and whether protective measures are deemed necessary to prevent negative impacts on public or private interests.

A preliminary impact area for the drainage of groundwater during the construction phase is presented in Figure 21. The impact area has been conservatively designed, which means that it has been designed to be larger than the final impact

area. This procedure is the practice at this stage, when the final location and design of the facility have not been determined. The calculations carried out are therefore based on conservative choices, where the assumed groundwater lowering at planned facilities is maximized, which gives a largest estimated spread of groundwater lowering around the objects. It is assumed that all groundwater lowering that is made is permanent and that all objects that affect the groundwater level interact simultaneously and permanently. The preliminary impact area has then been demarcated as shown in the figure. The groundwater lowering is greatest in the central parts of the impact area and decreases towards the edges.

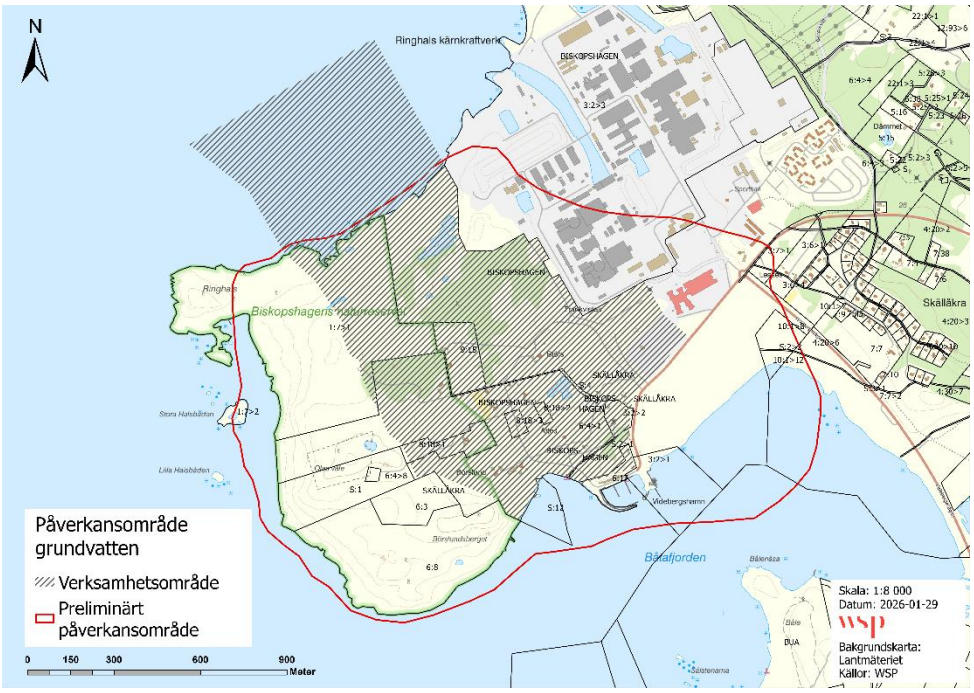

Figure 21. Preliminary area of impact for groundwater drainage during construction.

Verksamhetsområde - operational area

Preliminärt påverkansområde - Preliminary area of impact

The preliminary area of impact extends into the sea. This does not mean that seawater will definitely enter the groundwater, but only that the groundwater pressure in the rock or in the soil layers on top of the rock may decrease. Depending on the current level of groundwater pressure, a possible decrease in groundwater pressure may mean that the outflow of groundwater from the rock or soil layers to the sea will be less, or that seawater may begin to flow into the soil layers or the rock. This will be investigated further when the final location and design of the facility is determined.

Linked to the preliminary area of impact, public and private interests will be inventoried to establish a current situation for future inspections. Part of the inventory includes, for example, groundwater-dependent ecosystems, the foundation of buildings and pipelines, or water level and water quality in individual wells.

7.15.2. During operation

The basic design of the reactors includes sealing of the structure in order to prevent groundwater intrusion. Provided that sealing is carried out according to the design requirements, no drainage of groundwater by pumping is deemed necessary after the plant is completed. Since the plant will be founded in the rock below the current groundwater level, groundwater infiltration cannot be ruled out. If groundwater infiltration occurs, the infiltrating groundwater must be drained to ensure the operational reliability and integrity of the plant. Drainage will then be carried out using pumps and the water is led up to ground level and then drained via the stormwater system.

After pumping during the construction phase is completed, the groundwater level in the operational area may recover, provided that there is no infiltration of groundwater into the completed facility. Depending on the design of the facility in terms of ground levels and conduit shafts, some groundwater discharge may remain during the operational phase. However, any potential impact area for the operational phase is assessed to be smaller than for the construction phase.

Regular monitoring of groundwater levels around the facility will be included as part of the self-monitoring program for the external environment.

7.16. Surface water

7.16.1. During construction

The seawater in the immediate area will be turbidized during blasting, dredging and construction of a new cooling water intake and a possible new cooling water outlet. The impact and the need for any measures to minimize the impact on benthic flora and fauna and the marine environment will be investigated.

Bilge water generated during the construction process may contain suspended material in the form of fine fractions formed during blasting or handling of masses and smaller amounts of drill cuttings. Residues of nitrates from explosive spills or from possible oil spills from work machines may also occur. Bilge water will be collected and led to a balancing pond or other technical solution for pre-sedimentation and then on to sedimentation equipment equipped with oil separation before being diverted to a recipient. The dimensioning of the disposal of bilge water depends largely on the amount of intruding water and the amount of precipitation. The sludge generated in the sedimentation equipment will be disposed of by an approved contractor in accordance with applicable regulations.

Stormwater will be collected and led to a settling pond or other technical solution for pre-sedimentation and, if necessary, oil separation before discharge to the recipient. Stormwater may also be directly infiltrated into the ground.

7.16.2. During operation

The operation will result in discharges to water in the form of cooling water, process water and stormwater. Discharges of water from the operation will either occur to the *Vändelsö archipelago water body* or to *the Northern Central Halland Coastal Waters*. Both water bodies have moderate ecological status and do not achieve good chemical status. The impact on relevant quality factors for the status

classification will be reported in the environmental impact statement. The operation's impact on the preliminary water body *Båtafjorden* will also be reported.

7.16.2.1. Cooling water

To reduce biological fouling in the cooling water system, chlorination of the cooling water tunnels may be carried out by environmentally adapted dosing of sodium hypochlorite. When using sodium hypochlorite some part will be discharged with the cooling water.

At surface water intakes, the water temperature varies throughout the year between approximately 0 and 25 ºC. The cooling water circulating within the plant will, when released back into the sea, have a temperature of approximately ten degrees warmer than when the water was taken in. In the sea, the heated cooling water will be mixed with the surrounding seawater, which means that the thermal effect of the discharge is reduced.

7.16.2.2. Process water

When the reactor is in operation, process water is generated in the form of leakage water, drainage water, flushing water when replacing ion exchangers and in connection with cleaning. Process water will be collected in different tanks depending on the risk of activity and contaminant content, which makes it possible to purify the water based on the degree of contamination. Drainage from areas with a risk of oil spills will be equipped with oil separators to prevent oil from being carried with the water to the purification plant. The process water is purified in several stages through filtration, membrane separation with reverse osmosis, ion exchange, evaporation and degassing. After purification, a larger part of the water can be reused in the process. Smaller amounts of purified process water, estimated at approximately 500 m^3 per year, need to be discharged and are then discharged via the cooling water outlet. Before the discharge is discharged to the recipient, the water will be checked.

Small amounts of process and maintenance chemicals such as boron, lye, sulphuric acid and metals may also be carried with the process water/cooling water into the sea. Typical metal concentrations in outgoing process water based on data from Vattenfall are shown in Table 6. The table also shows estimated outgoing quantities after mixing with cooling water.

Table 6. Typical metal concentrations (µg/l) and outgoing amounts (kg/year) Source: Vattenfall AB.

Subject	**Concentration (µg/l)**	**Annual amount (kg/year)**
Lead	0.7	<0.5
Cadmium	0.35	0.2
Copper	62	<5
Chromium	1.3	<1
Mercury	0.07	<1
Nickel	25	<1
Zinc	320	10

Small amounts of radioactive substances will be carried with the purified process water into the sea. These releases may give rise to a limited content of radioactive substances in surface water and sediment and a limited radiation dose to humans via ingestion of fish and shellfish. Radiation doses to a representative member of the public, activity concentrations in the environment and radiation dose rates to reference animals, reference plants and representative organisms will be calculated and assessed in accordance with the requirements of the Swedish Radiation Safety Authority[7]. The assessments will include the total exposure of the public and the environment from all existing and expected nuclear activities affecting the same geographical area.

7.16.2.3. Stormwater

The majority of the operational area will be paved. Stormwater from paved surfaces will, after treatment, be diverted to the water body *Northern Central Halland Coastal Waters* via stormwater pipe and the outlet tunnel for cooling water. From the southern part of the operational area, discharge of treated stormwater may occur via a pipe from the sedimentation pond to the preliminary water body *Båtafjorden*. Stormwater from the supplementary port will be diverted to the water body *Vändelsö archipelago*. Stormwater from unpaved surfaces will infiltrate into the ground.

A stormwater investigation will be carried out. The possibility of constructing open stormwater systems and the need for, for example, oil separators are being investigated. These stormwater facilities (for example, ditches) mean that a slower drainage is created and are more tolerant of variations in flows. Examples of other possible treatment techniques being investigated are crushing ditches, sedimentation tanks, well filters and underground tanks with filters.

7.17. Marine natural environment

7.17.1. During construction

The construction of the planned operations will require work in and under the water surface. Intakes for cooling water will be constructed, which will require dewatering by sheet piling and pumping. Construction of a new outlet tunnel may also be required, which will entail corresponding work in water.

The construction of a port involves work in water and will include blasting, dredging, piling and/or sheet piling, sinking of material to the bottom and possibly backfilling. All of the work described above can cause sediment to spread into the water. In addition, dumping of materials can also cause some sediment to spread and cloudiness in the vicinity of the dumping site.

The works will have a physical impact on the pristine seabed and will cause, among other things, underwater noise and vibrations. The construction works may have an impact on marine species and biotopes in the affected area. Among other things, underwater noise may affect porpoises, seals and fish, and sediment dispersion may affect benthic fauna and flora, as well as fish.

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Marine inventories will be carried out within the water area that is assessed to be affected. Investigations regarding underwater noise will be carried out. Within the framework of the environmental impact assessment, marine geological conditions will also be mapped and the impact of a port on oceanographic conditions will also be investigated. In anticipation of any need for dredging, sediment dispersion modelling will be carried out. The extent of the impact on these environments, as well as the overall consequences of the activity for the marine natural environment, will be investigated and will be reported in a forthcoming environmental impact assessment.

7.17.2. During operation

Intake and discharge of cooling water, among other things, may affect the marine environment, including fish, crustaceans, and flora and fauna on the seabed, and will be investigated within the framework of the work on the applications.

Operation of planned port activities may change the hydromorphological conditions in the sea, which may affect and change the conditions for marine species and biotopes in the surrounding area. Pollution in sediments may increase as a result of port operations. In addition, ship movements may cause underwater noise, sediment dispersion and turbidity.

Two entry routes are seen as possible, one of which overlaps with the Vendelsö nature reserve, which are considered to be valuable marine areas with high marine biological natural values.

An analysis of the port's impact on oceanographic conditions will be carried out, determining sediment dispersion and turbidity during port operation. The analysis is attached to the application documents and forms the basis for assessing the impact on the aquatic environment and sediments resulting from port operation.

7.18. Vulnerability to climate change

7.18.1. During construction

Construction takes place over a shorter period and may be affected by temporary weather phenomena, but is not affected by climate change in the longer term.

7.18.2. During operation

Nordic nuclear power is generally considered to be well-equipped to deal with the consequences of climate change, as nuclear power generation is affected by few weather and climate-related factors compared to the production of other forms of energy. However, weather-related events can affect operations and security of supply, as well as have financial consequences. Examples of such weather-related events include lightning strikes, which can cause disruptions to the grid. (Unger, et al., 2021).

Climate change in the form of increased sea temperatures can lead to increased occurrence of marine organisms that cause clogging of cooling water pipes. Increases in sea temperatures can also lower thermal efficiency and thus lead to reduced electricity production. Sea level rise is also a factor to consider. (Unger, et al., 2021).

The planned operations will be located at an altitude higher than 4.1 meters above normal sea level. The rise in sea level is therefore not considered to require additional protective measures.

Other external events that will be taken into account in the continued work include the risk of landslides, earthquakes, torrential rain, storms and fires during prolonged droughts.

The port area, quay and breakwater will be built above future sea level. In extreme weather conditions such as strong winds and storms, the difficulties in constructing the quay may increase.

7.19. Risk and safety

7.19.1. During construction

To reduce the risk of environmental accidents such as releases to the surrounding land and water environments during the construction phase, necessary risk assessments will be carried out and procedures and protective measures will be taken. Equipment for cleaning up chemical and fuel spills will be readily available.

The reactors are planned to be constructed and commissioned sequentially. Construction work will continue within the operational area while parts of the plant are in operation. Risks associated with this will be analyzed. Risks associated with the nearby operations at Ringhals nuclear power plant and other Seveso operations will also be analyzed in the upcoming environmental impact assessment.

7.19.2. During operation

7.19.2.1. Risks covered by the Environmental Code

According to Section 6 of the Regulation on Self-Monitoring by Operators, the operator must continuously and systematically investigate and assess the risks of the operation from a health and environmental perspective.

Planned operations carry a risk of small-scale incidents and accidents. This could include spills of chemicals, breakdowns of treatment equipment, etc. These risks linked to the Environmental Code will be analysed so that adequate protective measures can be taken.

7.19.2.2. Seveso Act

A preliminary assessment indicates that the planned activity is covered by the Seveso Act. The Seveso Act regulates activities where large quantities of specified hazardous substances or substances with specified hazardous properties are present. The Act has two levels of requirements. If the quantity present exceeds the lower limit quantity, the activity is covered by the lower level of requirements. If the quantity of hazardous substances present exceeds the higher limit quantity, the activity is covered by the higher level of requirements. It is currently being investigated whether the applied activity will constitute a Seveso activity at a higher or lower level of requirements. The Seveso Act does not apply to hazards

associated with ionizing radiation arising from the substances. These hazards are managed in accordance with the Nuclear Activities Act and associated regulations.

If planned operations are covered by the higher level of requirements, a safety report with associated appendices will be prepared and included in the application in accordance with the Environmental Code. If planned operations are covered by the lower level of requirements, an action program and risk analysis will be developed and included in the application in accordance with the Environmental Code.

The present consultation also constitutes a so-called Seveso consultation in accordance with Chapter 6, Section 29, second paragraph of the Environmental Code and below are described risks and possible measures to prevent and limit possible serious chemical accidents. The consultation also concerns factors in the environment that may affect the safety of the operation in accordance with Section 13 of the Seveso Act.

Hazardous substances, risks and protective measures

During the operation, substances with environmentally hazardous and health hazardous properties and substances that are considered to be capable of constituting a physical hazard according to the Seveso legislation may be relevant. Examples of chemicals that may be handled in such quantities that the Seveso Act becomes applicable are hydrazine, hydrogen gas, sodium hypochlorite, acetylene, diesel and LPG. Based on the properties of the hazardous substances and experience from the Ringhals nuclear power plant (Räddningstjänsten Väst, 2025; 2014), the following risks may be relevant:

- Hydrazine is a chemical substance used to prevent corrosion in pipe systems. Hydrazine is corrosive, toxic, carcinogenic and very toxic to aquatic organisms. Leakage of hydrazine can form toxic fumes. The extent to which dispersion can occur depends in part on prevailing weather conditions and the size of the leak. In the event of a spill of hydrazine that crystallizes, a fire can occur on contact with organic material. Examples of protective measures that may be taken include the necessary embankments, continuous leak monitoring, sprinkler systems and daily patrols.

- The production of hydrogen gas may be relevant within the operational area. Hydrogen is a flammable substance. The greatest consequences linked to the handling of hydrogen gas are that an explosion occurs or that a jet flame from an ignited gas cylinder leads to damage to personnel and the facility. The transport of hydrogen gas may also be relevant to the operational area, which entails a risk of leakage and ignition in the event of accidents. In the event of an accident, this can cause jet flames or explosions with serious consequences. Examples of protective measures to minimize the risks associated with hydrogen handling are hydrogen detection and daily patrols.

- Risks associated with handling acetylene and LPG are primarily related to fire. Examples of protective measures include fire alarms and access to fire extinguishers.

- Diesel leakage can lead to contamination of soil and water. Examples of protective measures that may be taken include the necessary embankment and access to an absolute or equivalent for collection.

- Sodium hypochlorite may be manufactured within the operational area. The manufacturing involves, among other things, the risk of emissions that could cause serious consequences for the hydrological natural environment. When sodium hypochlorite and hydrochloric acid are mixed, chlorine gas is formed. Separated embankments and well-functioning alarm routines are examples of preventive measures.

In addition to those listed above, various protections are installed for conventional risks such as fire, leakage, explosions and turbine failures.

For fire protection, fire cells will be installed where required. Monitoring with detectors connected to the central control room which is manned 24/7 and local fire brigade will be present at the facility. Duplicated fire pumps will be installed to supply fire water networks and sprinklers at locations that are particularly important to protect from a reactor safety perspective.

For leaks from transformers with large amounts of oil and for diesel tanks, collection devices will be available in the form of embankments that will allow any leakage to be collected.

To prevent the occurrence of explosions, explosive equipment will be placed in areas with a low risk of ignition. Special procedures will be in place for working on these systems.

To prevent turbine failures, the systems are built with high quality standards. Monitoring is extensive to identify errors early. The turbines are also laid out so that if parts should come loose, this will not negatively affect the safety of the facility.

Environmental factors

As part of the work of identifying and assessing risks, all Seveso operations must, in accordance with Section 13 of the Seveso Act, investigate which environmental factors can affect the safety of the operation. Environmental factors include both man-made circumstances and natural factors. Special consideration must be given to other Seveso operations in the vicinity. The nearest Seveso operation is the adjacent nuclear power plant Ringhals. The risks at the Ringhals nuclear power plant are considered to be of the same nature as for planned operations since approximately the same/similar hazardous substances are used there.

Other Seveso operations in the vicinity consist of Södra Cell Värö and the Lahall power plant, located approximately five kilometers from the planned location. At Södra Cell Värö, various hazardous substances are used for the production of paper pulp. The risk inventory carried out for Södra Cell's operations shows that there is no risk that an unwanted event within the factory area could have serious consequences for personal safety or the environment outside the operational area. The Lahall power plant is a reserve power plant for Svenska kraftnät and the Ringhals nuclear power plant. The plant handles fuel in the form of diesel and the greatest risk identified is leakage of fuel into the surrounding environment (Räddningstjänsten Väst, 2025). Otherwise, there are no Seveso operations or other industrial operations in the vicinity that are considered to constitute relevant environmental factors.

Accidents related to the transport of dangerous goods could be an environmental factor. The nearest recommended route for dangerous goods is the E6/E20 road approximately six kilometers east of the planned location. The West Coast Railway extends approximately four kilometers east of the planned location.

Natural environmental factors are described in more detail in section 7.18 and include, for example, floods and lightning strikes. Intentional vandalism is also an environmental factor that will be taken into account.

7.19.2.3. Radiation safety and radiological risks

The operator's radiation safety work is a central part of the assessment according to the Nuclear Activities Act. The Swedish Radiation Safety Authority sets requirements for radiation safety and monitors that those who operate nuclear power plants comply with applicable regulations and requirements.

The concept of radiation safety encompasses radiation protection, safety and physical protection. Radiation safety has the highest priority in a nuclear operation. The purpose of all safety work is to prevent and mitigate the consequences of an accident, so that human health and the environment are protected against the undesirable effects of radiation now and in the future. The operation's radiation safety work shall be maintained at as high a level as is practically possible and shall be further developed based on operational experience and taking into account scientific and technical developments. In accordance with the principle of defence in depth, the safety of a nuclear facility shall be ensured by several successive protective mechanisms that are independent of each other. This principle covers both the functional and structural safety of the facility, see section 3.2.4. When designing a nuclear facility, possible operational disruptions and accidents must also be taken into account. In addition, all fissile material is recorded and controlled in accordance with the international Non-Proliferation Treaty in order to prevent unauthorized access to the material.

In a nuclear operation, radioactive substances occur in the form of uranium fuel in the reactor. In the event of an unexpected event, radioactive substances may be released from the reactor. In the environmental impact assessment, the consequences of an unexpected event with a core meltdown at the relevant location will be calculated for Sweden and surrounding countries. Doses will be evaluated up to a distance of at least 800 kilometers.

The environmental impact statement will report the assumptions that have been assumed for the calculations, the risks that have been assessed, and the results of the calculations.

8. Upcoming environmental impact assessment

8.1. Proposal for scoping

A scoping of the content of the environmental impact assessment involves a focus on essential issues and aspects that are to be assessed for impact. The scope of

an environmental impact assessment should be adapted to the environmental impact and other effects that the activity entails.

The environmental impact assessment is therefore planned to focus on the aspects of the natural environment, landscape, waste, impact on groundwater and surface water, marine natural environment, transport, noise, outdoor recreation and risk and safety. Land use, energy and water use, cultural environment, other area protection, raw materials and chemical products, vibrations, emissions to air, climate impact and vulnerability to climate change will also be described and assessed. Consequences for environmental objectives and environmental quality standards are described throughout.

The environmental impacts of planned operations will be compared with a zero alternative, which means that the planned operations are not established on the site.

Geographically, the impact assessment will be mainly limited to the area directly affected by the planned activity. However, the geographical delimitation for each aspect may vary and will be highlighted to the extent deemed necessary.

In terms of time, the environmental effects are assessed in the short, medium and long term.

- **The short term** consists of the construction phase, which corresponds to approximately 10 years.
- **Medium term** is up to between 25 and 30 years.
- **Long term** corresponds to the facility's operating time until decommissioning.

8.2. Assessment criteria

The starting point of the environmental impact assessment is to report the environmental effects that arise as a result of planned activities and to assess the consequences of these for human health and the environment. The environmental impact assessment is qualitative but is mainly based on certain frameworks that are referred to here as assessment criteria. By applying the assessment criteria, the environmental effects of the planned activities can be put in relation to the value of each aspect. Assessment criteria for each aspect will be reported in the environmental impact assessment.

The environmental impact assessment uses the terms environmental *impact,* environmental *effect* and environmental *consequence*. The impact and/or consequence can be both direct and indirect and relate to the value of the environmental effect, but can also be related to national, regional and local environmental objectives, environmental quality standards and national guideline values, limit values and current practices.

The impact, effect and consequence of the planned activity can be explained as follows:

- Environmental impact is the actual change in environmental and health aspects, for example the expansion/construction of an operation.

- Environmental effect is a change in environmental quality caused by an impact, such as noise.

- Environmental consequence is the consequence of the environmental effects for some interest. The consequence is most often expressed as a value judgment, for example the impact on water and the risk of spreading pollutants in water. The consequence can be of a direct or indirect nature at a national, regional and/or local level.

To avoid or reduce negative consequences, various measures (protective measures) are proposed where necessary.

The assessment is made by weighing the value of the environmental impact and the extent of the planned measure. The degree of impact is described according to a five-point scale: *positive consequence, insignificant consequence, small negative consequence, moderate negative consequence* and *large negative consequence*. The assessment is made in relation to the zero alternative.

There is always a certain amount of uncertainty in the assessments of effects and consequences. Uncertainties include, for example, unforeseen findings or conditions. The upcoming environmental impact assessment is based on information and data that has been known during the process.

8.3. Assessment basis

The assessment of environmental impacts is based on various relevant legal, or otherwise accepted, objectives, guidelines, benchmarks and regulations. Examples of assessment data that will form the basis for the assessments in the environmental impact assessment are presented below. Additional assessment data is presented under each environmental aspect in the environmental impact assessment.

- **The UN Sustainable Development Goals**
  In September 2015, UN member states committed to 17 global goals to achieve sustainable development.

- **Environmental quality goals**
  The environmental quality goals specify the state of the Swedish environment that environmental work should lead to. The milestone goals clarify the societal changes that are necessary to achieve the generational goal and one or more environmental quality goals.

- **Environmental quality standards**
  According to Chapter 5 of the Environmental Code, an environmental quality standard shall specify the pollution levels or disturbance levels to which people can be exposed without risk of significant harm or which the environment or nature can be burdened with without risk of significant harm. When granting permits under the Environmental Code, it shall be ensured that the permit does not contribute to any environmental quality standards being exceeded.

- **Radiological mapping**
  Data for seeing background levels of radioactive substances.

- **Radiation Protection Regulation and ordinance**
  Representative person:

Dose limit: 1 mSv/year, refers to the total annual dose that an individual may be exposed to from all activities involving ionizing radiation (Swedish Radiation Protection regulation (2018:506))

Radiological acceptance criterion for reactors: 0.1 mSv/year (SSMFS 2021:5, according to update that comes into force on March 1, 2026)

- **Swedish Environmental Protection Agency**
  Guidance on industrial and other operational noise, General advice on noise from construction sites

- **IPS** (Swedish Association for Process Safety)
  Guide to risk criteria and other equivalent risk criteria

- **Varberg Municipality**
  Comprehensive plan, in-depth comprehensive plan for the Northern Coast, ongoing new comprehensive plan and current and ongoing detailed plans

- **Swedish Transport Administration**
  Measurements of annual average daily traffic

- **Chemicals Inspectorate PRIO database**

- **REACH candidate list**

- **EU Waste Hierarchy and circular economy**

- **Halland Coastal Water Control**
  Investigations in the recipient

8.4. Suggested table of contents

Proposals for the design of the upcoming environmental impact assessment are shown in the table of contents below, Table 7. The description in the table should be seen as an example of an account of the delimitation of the environmental impact assessment and not as an absolute design. The table of contents is based on the current provisions in Chapter 6 of the Environmental Code and the Environmental Assessment Regulation, the Nuclear Activities Act and other provisions that are relevant to the current activity. In addition to an environmental impact assessment, the application according to the Environmental Code will consist of a main submission including an account linked to the general rules of consideration, a technical description, an action program/safety report and a status report, all with associated appendices.

Table 7. Suggested table of contents for the environmental impact assessment.

Summary
A non-technical summary of the environmental impact statement.
Introduction
Administrative information and background to the application.
Sustainable development
Brief account of the planned activities and their connection to sustainable development.
The planned operations
Summary of the technical description.
Overall area description

Overall	Overall description of environmental conditions.
Plan conditions	Description of planning conditions with regard to the comprehensive plan, detailed comprehensive plan and zoning plans. Assessment of the compatibility of the activity with applicable zoning plans.
Localization and options	
Location	Description of the location.
Zero option	Description of the zero alternative.
Alternative localization	Alternative locations are reported.
Alternative design	Reporting on alternative technologies and designs for the planned operations. The reporting on alternative technologies will focus on the design of necessary facilities and measures that are relevant based on environmental impact. Reporting linked to BAT-CAK and the REF documents Energy Efficiency and Industrial Cooling Systems.
Method for Environmental Impact Assessment	
Scoping	Explanation of the boundaries of the environmental impact assessment.
Assessment criteria	Review of the assessment criteria used in the environmental impact assessment.
Basis for assessment	Brief description and list of examples of supporting documents.
Impact assessment	
Land use	Reporting of available information about the properties and geotechnical conditions. Assessment of the impact of the operation on land use.
Landscape and light	Description of how the landscape looks today and how this will change as a result of the planned activity. Assessment of the impact of the activity on the landscape and with regard to light pollution.
Natural environment	Description of affected natural environments and protected species in the vicinity of the operation. Assessment of the impact of the operation on these areas and assessment of whether the operation may significantly affect the environment in the nearby Natura 2000 area.
Cultural environment	Description of affected cultural environments in the vicinity of the activity. Assessment of the activity's impact on these. A summary of the cultural environment inventory will be reported in the application documents.
Outdoor recreation	Description of affected areas in the vicinity of the operation. Assessment of the operation's impact on these.
Other area protections	Description of other area protections, such as National Interest for Communications, commercial fishing, etc. in the vicinity of the operation. Assessment of the operation's impact on these.
Raw materials	Reporting on existing raw materials and their handling. Assessment of the impact of handling on human health and the environment, as well as from a resource perspective.

Chemical products	Reporting of existing chemical products and their handling. Assessment of the impact of handling on human health and the environment, as well as from a resource perspective.
Energy use	Reporting on the energy supply and use that planned activities need during the construction phase and for their operation and assessment of energy use from a resource perspective.
Water use	Reporting on the water supply and use that planned activities need during the construction phase and for their operation, and assessment of water use from a resource perspective.
Waste	Reporting on the types of waste generated in the operation. Assessment of how waste management affects human health and the environment.
Noise	Accounting and calculation of noise sources from planned activities. Assessment of the possibility of including the Swedish Environmental Protection Agency's guidelines (report 6538) for industrial noise and general advice regarding noise from construction sites (NFS 2004:15). Cumulative effects with respect to Ringhals nuclear power plant will be described.
Vibrations	Reporting of risk analysis with regard to blasting-induced vibrations during the construction phase and assessment of the possibility of containing specified guideline values.
Transport	Reporting the number of transports that planned activities generate during construction and operation in comparison with traffic measurements on affected transport routes and reporting the noise generated from transports. Assessment of the impact of transports on human health and the environment. Cumulative effects with respect to Ringhals nuclear power plant will be described.
Emissions to air	Reporting of the emissions to air from planned activities including estimated radiological consequences during normal operation. Assessment of the impact of the emissions on environmental quality standards and human health and the environment. Cumulative effects with respect to emissions from Ringhals nuclear power plant will be described.
Climate impact	Reporting and assessment of planned activities' climate-impacting emissions.
Groundwater	Reporting of the impact on groundwater from planned activities. A hydrogeological modelling will be included in the application documents. The assessment of the impact on human health and the environment.
Surface water	Reporting of the impact on the recipient from discharges to water, work in water and port operation from planned activities including estimated radiological consequences during normal operation. Assessment of the impact on human health and the environment and environmental quality standards. Cumulative effects with respect to the Ringhals nuclear power plant will be described.

Marine natural environment	Reporting of the impact on the natural environment from discharges to water, work in water and port operations from planned activities. Assessment of the impact on the marine natural environment and protected species in the vicinity of the activities. Cumulative effects with respect to the Ringhals nuclear power plant will be described.
Vulnerability to climate change	Reporting of natural environmental factors that may affect the planned activities. Assessment of the impact of climate change and external events.
Risk and safety	Reporting of risks linked to the Environmental Code, the Seveso Act and risks linked to the nuclear facility, i.e. estimated radiological consequences in the event of unexpected events. Assessment of the risk profile of the operation and its potential impact on human health and the environment. Cumulative effects with respect to Ringhals' operations will be described. A risk and safety analysis linked to the Environmental Code and the Seveso Act will be included in the application documents.
Overall assessment	
Overall assessment of the environmental aspects listed above.	
Reporting of expertise	
Description of expertise according to Section 15 of the Environmental Assessment Regulation.	
References	

The following investigations are planned as a basis for future applications under the Environmental Code. The investigations will cover relevant parts of the planned activities, during both the construction and operational phases. These investigations may be supplemented with further investigations and surveys.

- Natural value inventory
- Natura 2000 investigation
- Species inventories and species protection studies
- Marine inventories
- Archaeological investigation
- Marine archaeological investigation
- Location investigation
- Rock/geotechnical investigation
- Hydrogeological investigation
- Stormwater investigation
- Modelling water/cooling water investigation
- Landscape and light analysis
- Noise investigation
- Investigation into underwater noise
- Radiological consequences resulting from normal operation and unexpected events
- Action program or safety report including annexes (Seveso)
- Risk analyses Environmental Code and Seveso
- Firefighting water investigation
- Status report
- Mass management plan
- Outdoor recreation
- Vibration investigation blasting
- Air quality
- Traffic investigation

If a port will be included in the upcoming application according to the Environmental Code, further investigations are planned as a basis, including:

- Sediment modelling
- Geotechnical and geophysical survey
- Hydrodynamic modelling
- Investigation for dumping
- Nautical risk analysis

9. The consultation process

Vattenfall has carried out consultations for the planned operations in several stages and the process is now continuing with follow-up consultations as a result of additional information and updated conditions.

The consultation began early with an initial consultation meeting with the County Administrative Board of Halland County, Varberg Municipality and the Swedish Radiation Safety Authority. As a second step in the consultation process, Vattenfall offered in 2025 a larger circle of authorities, organizations, particularly those concerned and the public for consultation.

Within the framework of the consultation, Vattenfall has also held thematic consultation meetings with the County Administrative Board of Halland County, the Swedish Environmental Protection Agency, the Swedish Radiation Safety Authority and the Swedish Civil Contingencies Agency. The meetings have focused on in-depth topics linked to natural value inventories, species protection, radiology and the scope of the environmental impact assessment. The information provided at these meetings has been incorporated into this document. During the consultation process, planning work has progressed and the planned activities have been specified in terms of scope and design. For this reason, Vattenfall now intends to continue the consultation process in a third stage. The consultation is being carried out with an expanded consultation circle, taking into account the establishment of a supplementary port and along transport routes linked to the connection of traffic to major roads. The present document constitutes the basis for this third consultation. The consultation will take place both in writing and through consultation meetings that are planned to be held during the first half of 2026. As with the previous consultation in 2025, the invitation to each consultation event will be made via advertising and via direct mailing to those particularly affected and to organizations that Vattenfall deems to be affected or have an interest in the planned operations. Affected organizations have been selected based, among other things, on experience from previous permit reviews for nearby operations or similar operations.

Those particularly affected are currently assessed to consist of property owners, users, residents, business owners, well owners and other rights holders (for example, holders of rights of way and easements) within the area marked in Figure 22. Consultation area for those particularly affected and adjacent to road 850 up to road E6 and just beyond road E6. The islands closest to the planned access roads, including properties on Vendelsö, are considered to be included in the circle of particularly affected areas.

Those included in the consultation group are considered to be particularly affected by the operation, including through noise, air emissions, groundwater impact, road and sea transport, visual impact, etc. The group also includes actors with projects that are at a stage where planning or assessment is underway within the area that may be affected by the planned operations. In addition, Södra Cell AB (Värö mill), Lahall power plant and Ringhals AB (Ringhals nuclear power plant) are considered to be particularly affected based on the requirements of the Seveso legislation linked to environmental factors.

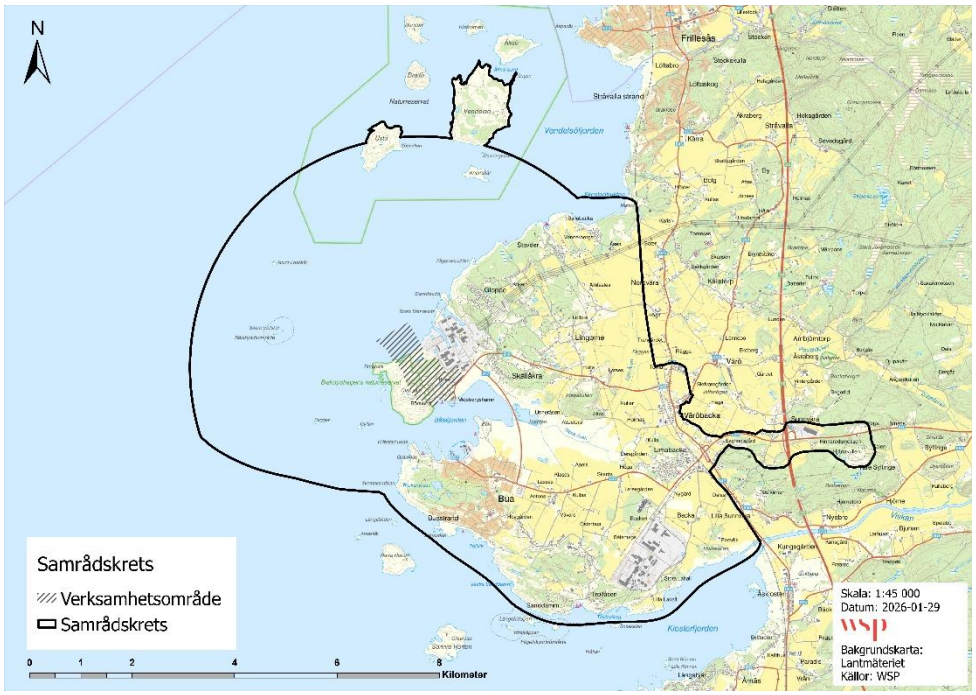

Figure 22. Consultation group for particularly affected parties.

Verksamhetsområde – operational area

Samrådskrets - Consultation group

Further information about the planned operations can be found at www.vattenfall.se/kraftdialog. This also includes this consultation document, information about dates for consultation meetings, etc.

9.1. Handling of received comments

The results of the views expressed during the consultation will be taken into account in the continued work on the application and the environmental impact assessment. The views will be compiled and attached to the application documents in a consultation report.

9.2. Processing of personal data

Vattenfall AB with corporate registration number 556036-2138, Evenemangsgatan 13, Solna and 08-739 50 00, is the data controller for all personal data processing that takes place within the framework of this consultation and upcoming reviews of permit applications for the construction and operation of new nuclear power with associated activities on the Värö Peninsula in the municipality of Varberg (hereinafter collectively referred to as the "permit reviews").

See below in section 9.2.4for information on change of controller due to planned transfer.

9.2.1. How Vattenfall collects personal data

The personal data that Vattenfall processes is collected directly from you when you provide information to Vattenfall within the framework of the permit reviews. Vattenfall will also collect personal data from courts, authorities (such as the Swedish National Land Survey) and other public registers.

9.2.2. How Vattenfall processes personal data

Vattenfall processes your personal data in accordance with applicable data protection legislation. This means, among other things, that Vattenfall needs to have a legal basis for processing personal data. Table 8 describes (i) the types of personal data that Vattenfall processes, (ii) for what purposes, (iii) the legal basis on which Vattenfall supports the processing and (iv) the retention period.

Table 8. Processing of personal data

Categories of personal data	Purpose	Legal basis	Storage period
Contact information (e.g. name, address, email and telephone number), property - name and other personal - information that you provide in connection with submitting your comments, or that Vattenfall collects in accordance with the above, within the framework of the permit reviews.	Vattenfall processes your personal data for the purpose of fulfilling Vattenfall's obligations to carry out and document consultations and to conduct permit assessments.	(i) Fulfillment of Vattenfall's legal obligations to carry out and document consultations in accordance with the Environmental Code and the Act (1984:3) on Nuclear Activities. (ii) Vattenfall's legitimate interest in conducting the permit reviews and in responding to comments within the framework of the permit reviews.	Personal data is saved as long as the permit tests are ongoing.
Contact information (e.g. name, address, email and telephone number), property name and other personal data that you provide in connection with submitting your comments, or that Vattenfall collects in accordance with the above, within the framework of the permit reviews.- name and other personal data that you provide in connection with submitting your	Vattenfall processes your personal data in order to enable Videberg Kraft AB to continue to carry out and document consultations and conduct permit assessments.	(i) Vattenfall's legitimate interest in implementing a transfer of operations and ensuring continuity in the permit reviews. (ii) Videberg Kraft AB's legitimate interest in continuing to conduct permit assessments and fulfil related legal obligations.	Personal data is saved as long as the permit tests are ongoing.

comments, or that Vattenfall collects in accordance with the above, within the framework of the permit reviews.			

9.2.3. With whom does Vattenfall share personal data?

Vattenfall will share your personal data with the competent court for the relevant permit reviews as well as with authorities involved in the permit reviews when required by law, regulation, court or authority decision, all for the purpose of fulfilling Vattenfall's legal obligations.

Vattenfall will also share your personal data with other companies within the Vattenfall Group and suppliers who perform services on Vattenfall's behalf in order for Vattenfall to be able to fulfil Vattenfall's legal obligations, such as IT suppliers, printers and external consultants, legal advisors, experts and specialists.

9.2.4. Transfer of personal data in the event of a change of data controller

Vattenfall plans to transfer the project that runs the permit processes to Videberg Kraft AB, org. no. 559517-0571, Evenemangsgatan 13, Solna. In the event of such a transfer, your personal data will be transferred to Videberg Kraft AB, which will then become the new data controller for the processing of your personal data. The new data controller will be bound by corresponding obligations regarding the processing of personal data.

The purpose of such a transfer is to enable the new data controller to continue conducting permit assessments, fulfil legal obligations under the Environmental Code and the Nuclear Activities Act (1984:3), and to maintain contact with interested parties within the framework of the project.

You will be informed specifically if and when there is a change in the data controller. Your rights under applicable data protection law remain unchanged even after such a transfer. You can exercise your rights against the new data controller by contacting helene.ahsberg@vattenfall.com.

9.2.5. Your rights

You have several rights in relation to Vattenfall's processing of your personal data. Information about your rights and how you can exercise them is described below. Please note that your rights only apply to the extent that they are provided for under applicable data protection legislation and are therefore limited in some cases.

9.2.6. The right of access

You have the right to know what personal data Vattenfall processes about you. You also have the right to access such personal data through a so-called register extract and further information about the processing.

9.2.7. Right to rectification

You have the right to request that incorrect or incomplete personal data that Vattenfall processes be corrected or supplemented.

9.2.8. Right to erasure

You have, in certain cases, the right to have your personal data that Vattenfall processes deleted. The right to deletion applies if the personal data is no longer necessary to process for the purpose for which it was collected or if the personal data is processed based on your consent and you choose to withdraw your consent. However, Vattenfall will not delete your personal data if your personal data is needed for Vattenfall to be able to fulfil a legal obligation, if it is still necessary to process for the purpose for which it was collected or if Vattenfall's interest in continuing to process the data outweighs your interest in having it deleted.

9.2.9. Right to file a complaint

If you have objections or comments about Vattenfall's processing of your personal data, you have the right to contact or file a complaint with the Swedish Data Protection Authority (IMY), Box 8114, 104 20 Stockholm, telephone 08-657 61 00, e-mail imy@imy.se, website www.imy.se.

9.2.10. The right to object

You have the right to object to the processing of your personal data based on a balancing of interests. If Vattenfall cannot demonstrate that there are compelling and legitimate reasons to continue processing the personal data, Vattenfall must cease the processing.

9.2.11. The right to restrictions

You have the possibility to demand restriction of the processing of your personal data provided that (i) you have objected to the processing and are awaiting Vattenfall's assessment of whether Vattenfall's legitimate interest outweighs it, (ii) you do not believe that the data that Vattenfall has about you is accurate, (iii) the processing is unlawful but you object to the deletion of the personal data, or (iv) Vattenfall no longer needs the personal data for the purposes for which it was collected and you need it to, for example, assert legal claims. By requesting a restriction of processing, you have, at least for a certain period of time, the possibility of stopping Vattenfall from using the personal data for purposes other than, for example, defending Vattenfall's legal claims.

9.2.12. Data Protection Officer

Vattenfall has a registered Data Protection Officer. For more information about this privacy policy, how we process your personal data or if you would like to get in touch with the Data Protection Officer, please contact us via dpo.nordics@vattenfall.com.

9.2.13. Other

Further information about Vattenfall's processing of your personal data, including further information about your rights, can be found in Vattenfall's privacy policy https://group.vattenfall.com/se/site-assets/personuppgifter-hos-vattenfall.

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