



# Arctic LNG 2 Project

ENVIRONMENTAL, SOCIAL AND HEALTH IMPACT ASSESSMENT

NONTECHNICAL SUMMARY

**Prepared by:**  
Ramboll CIS

**Date:**  
August 2020

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Issue **3**  
Date **10.08.2020**  
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Description **Nontechnical Summary**  
Ref 321000093

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## ACRONYMS AND ABBREVIATIONS

<b>ECA</b>	Export Credit Agency
<b>EIA</b>	Environmental Impact Assessment
<b>EPIV</b>	Equator Principles IV
<b>ESAP</b>	Environmental and Social Action Plan
<b>ESHIA</b>	Environmental, Socio-Economic and Human Health Impact Assessment
<b>FSUE</b>	Federal State Unitary Enterprise
<b>GAE</b>	Gydan agricultural enterprise
<b>GBS</b>	Gravity-based structure
<b>IFC</b>	International Finance Corporation
<b>ISPN</b>	Indigenous small-numbered peoples of the North
<b>LA</b>	License area
<b>LLC</b>	Limited Liability Company
<b>LNG</b>	Liquefied natural gas
<b>MBFI</b>	Municipal Budget funded institution
<b>MUE</b>	Municipal unitary enterprise
<b>NTS</b>	Nontechnical Summary
<b>OECD</b>	Organisation for Economic Cooperation and Development
<b>OGCF</b>	Oil, gas and condensate field
<b>PFHI</b>	Publicly funded health institution
<b>PFI</b>	Publicly funded institution
<b>PJSC</b>	Public Joint Stock Company
<b>PS</b>	Performance Standards
<b>RF</b>	Russian Federation
<b>SEP</b>	Stakeholder Engagement Plan
<b>SGC</b>	Stabilised gas condensate
<b>SPNA</b>	Spatially protected natural areas
<b>SR</b>	Scoping Report
<b>Tazovskiy branch of Association "Yamal - potomkam!"</b>	Tazovskiy branch of the regional group "Association of Association of Indigenous Small-numbered Peoples of the North of Yamal-Nenets Autonomous Okrug "Yamal - potomkam!"
<b>ToR</b>	Terms of Reference
<b>TS</b>	Topside
<b>YNAO</b>	Yamal-Nenets Autonomous Okrug

## TERMS AND DEFINITIONS

<b>Customer, Company</b>	Arctic LNG 2, LLC
<b>Consultant</b>	Ramboll CIS LLC, an independent environmental and social consultant
<b>Project Operator</b>	The organization responsible for managing the project at the construction, commissioning, operation and decommissioning phases (Arctic LNG 2, LLC)
<b>Stakeholders</b>	Persons or groups directly or indirectly affected by the Planned activity, as well as those who may be interested in its implementation and / or are able to influence it in a favorable or unfavorable way
<b>GBS LNG &amp; SGC Plant (Complex)</b>	The gravity-based structure complex for production, storage and offloading of liquefied natural gas and stabilised gas condensate, which includes three process trains and onshore infrastructure
<b>Process Train</b>	The gravity-based structure complex will include three process trains for the production, storage and offloading of liquefied natural gas (LNG) and stabilised gas condensate (SGC) with a stated annual capacity of about 6.6 million tons of LNG each. The total peak capacity of SGC production can be as much as 1.4 million tons per year
<b>Associated facilities</b>	Facilities that meet the following conditions: 1) they are not funded by the Project (by the planned activity); 2) they would not be built or expanded without the Project (the Planned activity fails to be implemented); 3) they ensure the viability of the Project (Planned activity)
<b>Arctic LNG 2 Project (Project)</b>	The Project, including, along with the GBS LNG & SGC Complex, construction of the Utrenniy Terminal (Port) and development of the Salmanovskoye (Utrenneye) oil and gas condensate field (OGCF)
<b>Utrenniy Terminal (Port)</b>	A section of the Sabetta seaport, the purpose of which is to provide offshore logistics for gas carriers and tankers for LNG and SGC offloading, reception and storage of processing and construction cargo
<b>Salmanovskiy (Utrenniy) license area</b>	A subsoil plot of federal importance, including the Salmanovskoye (Utrenneye) oil and gas condensate field, within which Arctic LNG 2 LLC was licensed to use the subsoil resources – License No. CFL 15745 NE dated 06.20.2014 for the exploration and production of hydrocarbons
<b>FIELD</b>	Facilities and activities involved in setting up the Salmanovskoye (Utrenneye) OGCF to ensure production and preparation of raw materials for production of LNG and SGC, and providing engineering resources to all the facilities of the Arctic LNG 2 Project
<b>Equator Principles</b>	The internationally accepted environmental and social risk management system for financial organizations, including 10 key provisions (principles) <sup>1</sup>
<b>IFC Performance Standards</b>	A set of environmental and social sustainability requirements of the International Finance Corporation which the organizations to be funded must follow throughout the lifecycle of an investment project. Available at: <a href="http://www.ifc.org/performancestandards">http://www.ifc.org/performancestandards</a>
<b>Environmental, social and health impact assessment (ESHIA)</b>	In the IFC terminology, the process of identifying, predicting and assessing the significance of favorable (positive) and adverse (negative) environmental and social project impacts, including a description of the project implementation conditions, analysis of alternative options for the Planned activity, consideration of global, transboundary and cumulative impacts including their possible quantitative representation, an impact management programme. In the terminology of the International Association for Impact Assessment (IAIA <sup>2</sup> ) - the process of identifying,

<sup>1</sup> The Equator Principles. A financial industry benchmark for determining, assessing and managing environmental and social risk in projects. The Equator Principles Association, 2020.

<sup>2</sup> Global leader among best practice networks as regards impact assessment for informed decisions concerning policies, programs, plans, and projects (<http://www.iaia.org/>).

predicting, assessing and mitigating environmental and social impacts, as well as other adverse effects of the Planned activity, before making a decision on its implementation

### **Planned activity's (Project's) area of influence<sup>3</sup>**

The land and water area, including: 1) land plots and water area sections, within which the Planned activities are directly implemented; 2) other land and water areas used or controlled by the Project's operator and its subcontractors (contractors); 3) land and water areas where the associated facilities are sited (see the corresponding definition); 4) land and water areas that may be subjected to cumulative impacts from the Planned activity; 5) land and water areas potentially affected by impacts from unplanned but predictable developments caused by project-related activities that may occur later or at a different location. The Project's area of influence does not include the area of dispersion of impacts which can be observed with a no-project version (abandonment of the Planned activity) or without the Project

### **The area of influence of air pollutant emission sources<sup>4</sup>**

For a sole air pollutant emission source it is the circumference of the largest of the two radii, the first of which is equal to ten times the distance from the source to the point of the ground level concentration of the pollutant having the greatest prevalence (among the pollutants emitted by this source), and the second one is equal to the distance from the emission source to the most distant contour line of the ground level concentration of the pollutant, equal to 0.05 one time MPC. For the totality of air pollutant emission sources it is land or water areas that include all single source influence areas within this totality, as well as the 0.05 one time MPC contour for the estimated total concentration of each pollutant emitted by the totality of sources

### **Areas with controlled habitat quality indicators**

Areas, where the existing hygienic air standards for chemical, biological and physical factors must be strictly followed. These include areas such as residential development, cottage development, sports and children's playgrounds, landscape and recreational areas, recreation areas, resorts, sanatoriums, rest homes; horticultural partnerships, collective or individual dachas and garden plots; sports facilities; educational and childcare facilities; general medical treatment and rehabilitation facilities

### **Social impact area**

Areas and communities that may experience positive and negative impacts of the planned (project related) and associated activities

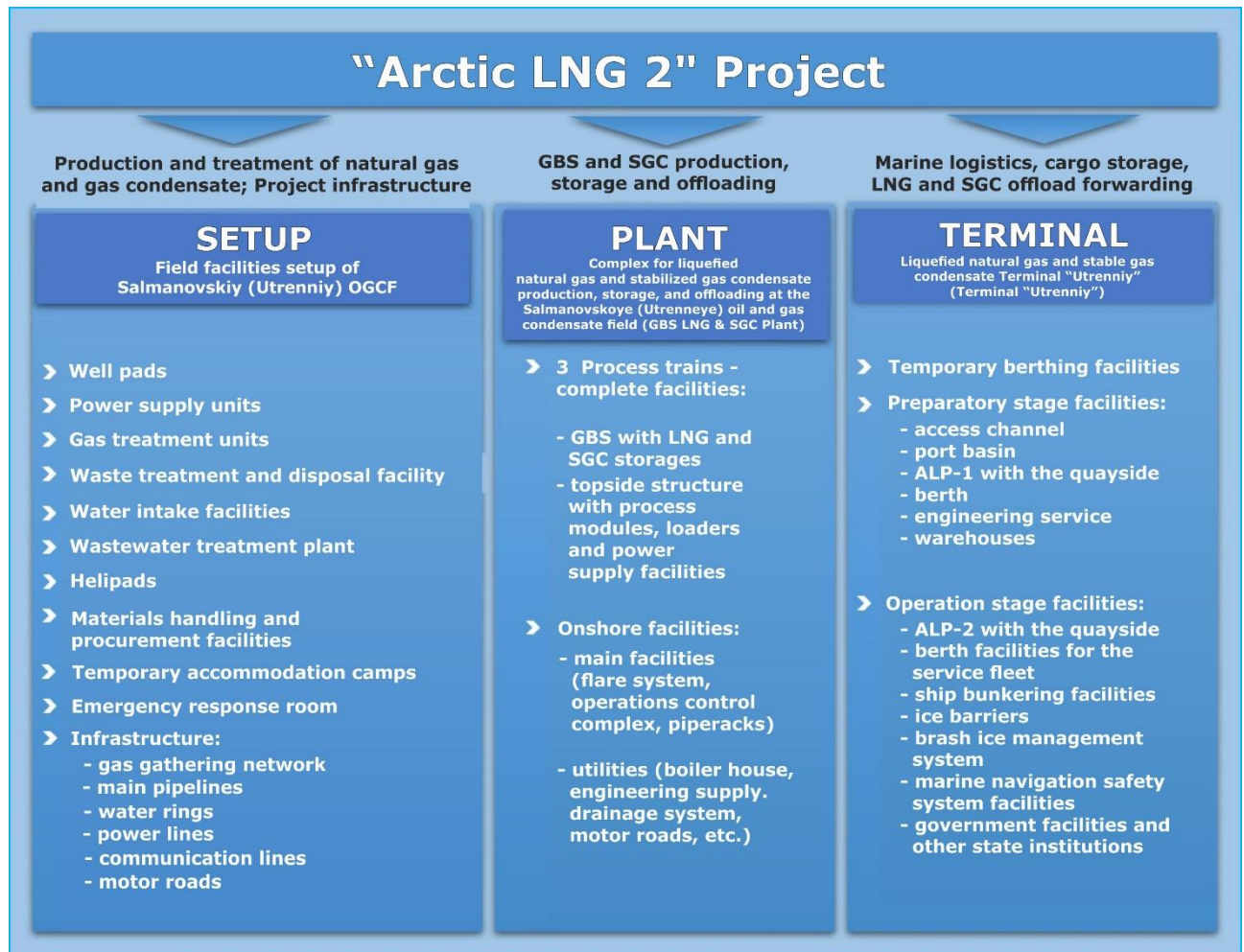
<sup>3</sup> The definition is consistent with the IFC terminology (IFC Policy & Performance Standards and Guidance Notes. Glossary and Terms - <http://www.ifc.org/>). In this and all other common cases, the term "project" is a traditional synonym of the phrase "planned activity". As applicable to the ESHIA subject, the term **Project** (capitalized in the text) covers the activity under assessment designated as "Arctic LPG 2" to include Salmanovskoye (Utrenneye) OGCF **Facilities Setup**, construction and operation of the GBS LNG & SGC **Complex**, and construction and operation of the **Port** (Utrenniy Terminal).

<sup>4</sup> In the terminology of MRR-2017 (Dispersion Modeling of Harmful Air Pollutants. Approved by the Russian Ministry of Nature Use Order 273 dated June 006, 2017).

# 1. SUBJECT OF IMPACT ASSESSMENT

## 1.1 Main Subject of Assessment

The subject of the environmental, social and health impact assessment (hereinafter ESHIA) is the **Arctic LNG 2 Project** (hereinafter the Project) operated by ARCTIC LNG 2 LLC which is a joint venture with the participation of PJSC NOVATEK, whose share is 60%, and large international oil and gas and financial corporations. The composition of the Arctic LNG 2 Project is shown in Figure 1.



**Figure 1: Facilities included in the Arctic LNG 2 Project**

The resource base of the Project is the Salmanovskoye (Utrenneye) oil and gas condensate field (OGCF) (hereinafter the Salmanovskoye (Utrenneye) OGCF) discovered in 1979 in the northern part of the Gydan Peninsula and adjoining water area of the Ob Estuary of the Kara Sea. The field includes gas, gas condensate and oil deposits and is drilled by 213 wells clustered in 20 well pads. The Arctic LNG 2 Project involves the production of gas and gas condensate; oil production is not planned.

Exploration and development of the Salmanovskoye (Utrenneye) OGCF are carried out by ARCTIC LNG 2 LLC on the basis of the license valid until 2120<sup>5</sup>; the license area boundaries are shown in Figure 2.

<sup>5</sup> License for subsoil use СЛХ 15745 НЭ dated 20.06.2014 for the purpose of exploration and production of hydrocarbons within the subsoil plot of federal significance which includes the Salmanovskoye (Utrenneye) oil, gas and gas condensate field / Consolidated National Register of Subsoil Plots and Licenses. – Russian Federal Geological Fund FA for Subsoil Use. Amendment No. 3 dated 29.03.2018.

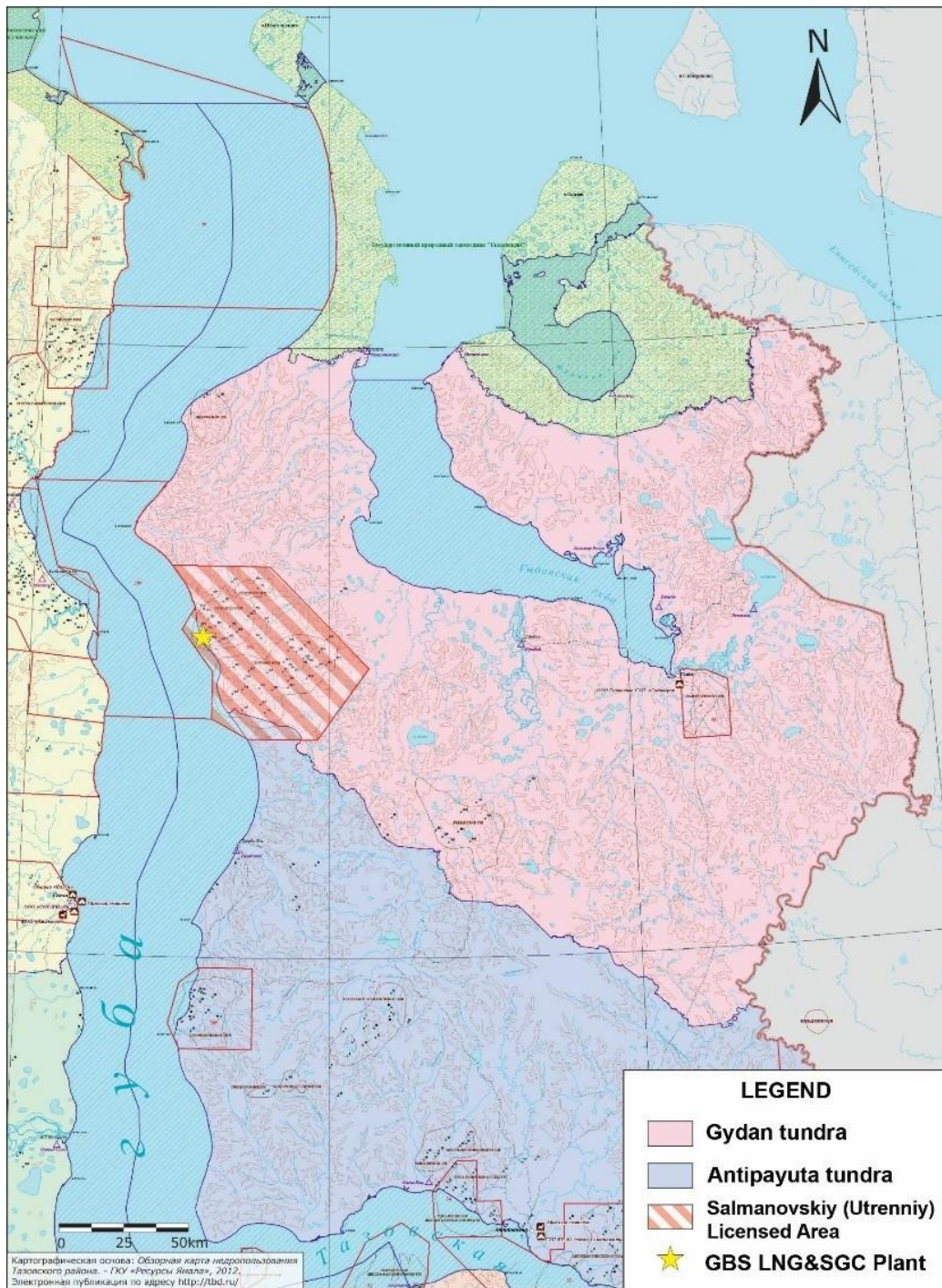


Figure 2: Section of the designed location of the Project on the subsoil use map of Tazovskiy Municipal District of YNAO







Источник тематической информации: Этнографическое обследование в Тазовском районе Томенской области на территории Утреннего месторождения. Отчет о НИР. Том 2. - Тюмень: ООО "Пургеоком", 2015.

Источник базовой карты: Обустройство Салмановского (Утреннего) нефтегазоконденсатного месторождения. Базовый вариант ситуационного плана размещения объектов. Документ (без выходных данных) предоставлен ПАО "НОВАТЭК".

Figure 4: Layout of the Project facilities in the territory of the Gydan Peninsula

## 1.2 Associated Activity

According to the IFC Performance Standard (PS 1) those facilities are regarded associated with the subject of assessment that are not funded by the project and which would not have been constructed or expanded if the project had not been implemented, and without which the project would not be viable.

Sustainable development of the Project is not possible without the associated facilities such as Utrenniy Airport that will ensure the Project accessibility by air, as well as the federal facilities of the Port that will rule out underwater engineering works (dredging and dumping) in the process of preparing the Port water area and maintaining the operational parameters, as well as of preparing the bottom section for the GBS placement.

Dimensioning requirements for the sea channel at the outlet of the Ob Estuary are dictated by the dimensions of vessels used by the Yamal LNG Project, and the cargo future traffic intensity generated by simultaneous implementation several projects; therefore, operation of this facility does not meet the association criteria of IFC, and its impacts are considered in the context of cumulative effects.

Detailed description of the associated facilities and activities is given in Section 5.7 of the ESHIA.

## 1.3 Project Categorisation

According to the categorisation adopted on the basis of the Equator Principles<sup>6</sup>, the Project maybe assigned to Category A on the basis of

- inclusion of the Complex facilities and related infrastructure in the Standard List of Category A projects;
- probability of the occurrence of potential significant and adverse impacts that in some cases may be irreversible; *and*
- sensitive nature and remoteness of the Arctic region, within which boundaries the Project is located.

Also, the Project falls within Category A in accordance with the criteria of the OECD Common Approaches: the scope and nature of potential impacts of the planned activity go beyond the immediate areas of the designed facilities location, which requires developing a hierarchy of measures to prevent, minimise and compensate for adverse impacts with account for their significance and sensitivity of recipients.

The assignment of the Project to Category A means that there is a need to develop and implement a set of measures to prevent, mitigate and compensate for those impacts on the natural and social environment that will be identified as adverse in the ESHIA process.

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<sup>6</sup> According to the Equator Principles, the category includes projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented.

## 2. ESHIA APPROACH

The most important internationally recognised modality of interaction of an economic entity with those parties whose interests are affected or may be affected by its business activity is development of materials for assessment of impact of the proposed activity on the natural and social environment (abbreviated to ESHIA) that stems from special international procedures and requirements.

Russian law provides for the need to develop and publicly discuss impact assessment materials prior to making a decision on the planned activity implementation. Findings of environmental impact assessment (EIA) are subsequently included in the environmental sections of design documentation and are subject to a state environmental expert review (those projects that are subject to SEER)<sup>7</sup> and state expert review.

The international impact assessment process based on the Equator Principles and Performance Standards of the International Finance Corporation, a member of the World Bank Group, is primarily distinguished with a more detailed consideration of social effects, expanded stakeholder engagement, especially in the context of developing measures to prevent or minimise adverse impacts on the social environment and biological diversity, and increased attention to cumulative and transboundary impacts and to final stages of the project life cycle, if relevant information is available.

### 2.1 Requirements of International Financial Institutions

In accordance with the Equator Principles, Common Approaches of the Organization for Economic Cooperation and Development (OECD) and the World Bank Guidelines, special ESHIA requirements apply to projects financed by international institutions. For example, Performance Standard 1 Assessment and Management of Environmental and Social Risks and Impacts of the International Finance Corporation (IFC)<sup>8</sup> provides for:

- identifying and assessing environmental and social risks and impacts of the planned activity;
- developing and implementing a hierarchy of mechanisms to anticipate and avoid, or where avoidance is not possible, minimise and, where residual impacts remain, compensate/offset for risks and impacts to workers, affected communities/social groups, and environment components;
- promoting improved environmental and social performance of project operator companies through the efficient use of management systems;
- ensuring effective response to grievances from social groups and other stakeholders affected by the planned activity; and
- promoting and providing necessary means for effective engagement with affected social groups throughout the project life cycle and ensuring that relevant environmental and social information on the ongoing activity is disclosed and disseminated.

### 2.2 Methodological Approach of Ramboll

The overall goal of this ESHIA is to fully and comprehensively assess possible negative impacts, positive effects and risks arising from the planned implementation of the Arctic LNG 2 Project, to develop measures to prevent, minimise and compensate for the identified environmental and social impacts, alongside with their monitoring and control.

The methodology for this ESHIA was developed and successfully applied by the Consultant to assess impacts of complex large-scale projects for obtaining credit financing from international financial institutions and export lending agencies. The methodology is based on the provisions of the European Union Directive 2011/92/EU On the Assessment of Effects of Certain Public and Private Projects on the Environment<sup>9</sup> and IFC Performance Standard 1. According to these documents, environmental and social impacts are understood to mean any changes, potential or actual, in the physical, natural or cultural

<sup>7</sup> Pursuant to the RF Federal Law No. 174-FZ dated 23.11.1995 "On the Environmental Review".

<sup>8</sup> Performance Standard 1. Assessment and Management of Environmental and Social Risks and Impacts. / Performance Standards on Environmental and Social Sustainability. – IFC, 2012. Available at [https://www.ifc.org/wps/wcm/connect/topics\\_ext\\_content/ifc\\_external\\_corporate\\_site/sustainability-at-ifc/policies-standards/](https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/)

<sup>9</sup> Directive 2011/92/EU of the European Parliament and of the European Union Council of December 13 2011 On the Assessment of Effects of Certain Public and Private Projects on the Environment (amend. by Directive 2014/52/EU of the European Parliament and of the European Union Council of April 16 2014).

environment, as well as impacts on social groups (communities, personnel, etc.) caused by the funded activity.

The ESHIA procedure stipulates for the following basic processes:

- scoping;
- stakeholder engagement, including consultations in the course of the ESHIA;
- review of the current state of the natural and socio-economic environment on the basis of available information – survey and scientific research materials, stock data, and state statistic materials;
- review of primary factors of impacts of the planned activity on the natural and social environment sourced from the Project baseline data provided by the Company and available information on analogue facilities, as well as the definition of the boundaries of the area of influence of the planned activity;
- identification and assessment of the significance of planned activity impacts on the natural and socio-economic environment and community health;
- development of mitigation measures to prevent, minimise and compensate for adverse impacts of the planned activity, as well as measures to enhance potential beneficial effects;
- development of efficient approaches to management of environmental and social aspects for all stages of the planned activity; *and*
- development of guidelines for natural and social environment monitoring and for control over the implementation of environmental and socially oriented measures and evaluation of their performance for all stages of the planned activity.

### 2.3 Documenting of ESHIA Findings

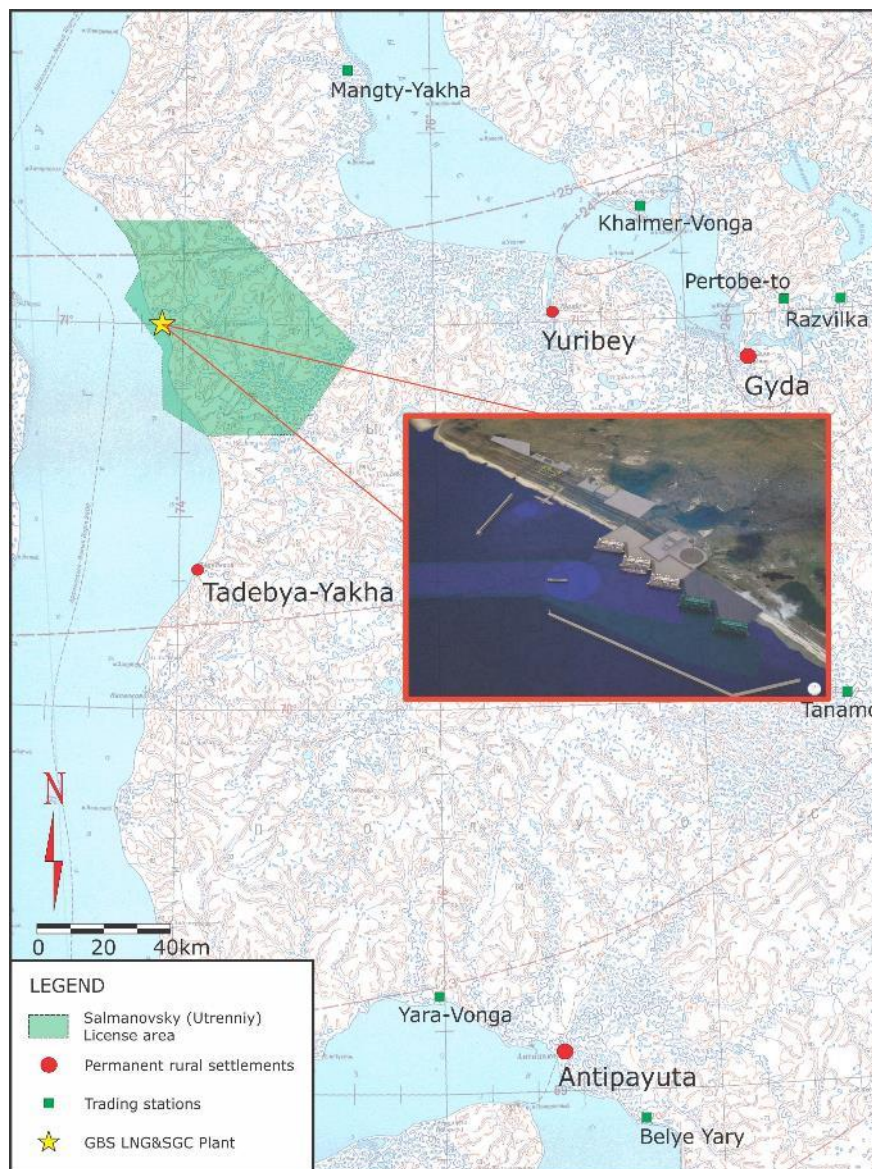
The initial ESHIA stages were scoping and consultations with stakeholders started in February – May of 2020. These activities resulted in the preparation and approval by the Company and other stakeholders of two documents – the Scoping Report and the Stakeholder Engagement Plan (SEP). The ESHIA procedure was carried out with consideration of these documents. Its findings are presented in the ESHIA Report, Nontechnical Summary (this document), and the Framework Environmental and Social Management Plan.

### 3. BRIEF DESCRIPTION OF THE PLANNED ACTIVITY

#### 3.1 Area of Planned Activity Implementation

The Arctic LNG 2 Project is designed in the territory of the Salmanovskiy (Utrenniy) license area, which is about 3 thousand sq. km in area, and is confined to the western part of the Gydan Peninsula with a small section, about 5%, protruding into the water area of the Ob Estuary (Figure 5).

Administratively, it is the territory of Tazovskiy Municipal District of the Yamal-Nenets Autonomous Okrug, the region of the Project implementation, which allows taking advantage of the gained experience in environmental support of its projects and the results of multiyear interaction with representatives of indigenous small-numbered peoples of the North, municipal administrations, business community, public and scientific organizations, and other stakeholders.



**Figure 5: Location of the Arctic LNG 2 Project in relation to the nearest settlements of Tazovskiy Municipal District of YNAO (Source – NOVATEK PJSG, 2018)**

The selected location is characterised by a considerable distance from permanent residential localities, the closest of which, within the boundaries of YNAO Tazovskiy Municipal District, are settlements Gyda (170 km) and Antipayuta (240 km) (refer to Figure 5). Meanwhile, the Project is implemented in the territory included in the list of sites of traditional residence and customary economic activities of indigenous small-numbered peoples of the North (ISPN). Migration routes of Nenets reindeer herders' families pass across the Salmanovskiy (Utrenniy) license area, though they do not set up stationary camps here.

A distance from the Project facilities to Salekhard, the YNAO administrative center, is 540 km (to the southwest) and 72 km (to the northwest) to the Sabetta seaport, near which another PJSC NOVATEK project, Yamal LNG, is underway.

### 3.2 Arctic LNG 2 Project Structure and Construction Phase

The main components of the Arctic LNG 2 Project, including the associated ones, are:

- GBS LNG & SGC Complex;
- Salmanovskoye (Utrenneye) oil and gas condensate field facilities;
- Utrenniy LNG & SGC Terminal; and
- Utrenniy Airport.

Construction of the Arctic LNG 2 Project facilities is carried out in successive stages, starting from hydrocarbon exploration within the Salmanovskoye (Utrenneye) OGCF and ending with commissioning of the third process train of the GBS LNG & SGC Complex in 2026. The majority of the field and seaport facilities will be built ahead of the Complex construction schedule.

#### The key stages of the Arctic LNG 2 Project

**2014** - LLC "Arctic LNG 2" obtained subsoil license for the subsoil area of federal significance that includes the Salmanovskoye (Utrenneye) OGCF.

**2015-2016** - *Preliminary front-end engineering design (pre-FEED)*, which identified the mixed fluid cascade process by Linde (Germany) as preferred method of liquefaction of natural gas. At the same time, GBS (gravity-based structure) was first considered as an option for the Plant construction.

**2017** - A Russian-based limited liability company LNG Novaengineering LLC was established as a joint venture of the Company and its four partners – NIPIGAZ, Linde AG, TechnipFMC and Saipem S.A. – with the main task of developing the FEED on the basis of data provided by the holders of technologies and engineering solutions. At the same time, Offshore Superfacility Construction center (OSCY, Kola Shipyard) was designed and established by subsidiary of NOVATEK - NOVATEK-Murmansk. Besides manufacturing gravity-based structures, this facility is also intended for building and maintenance of ships of various classes and functions.

**2018-2020** - Finalization of the design documentation and state expert review. Procurement of long lead items including gas turbine generators and compressors (Baker Hughes), heat exchangers (Linde), BOG compressors (Siemens), fuel gas booster compressors (Siemens). Final decision of participants of LLC "Arctic LNG 2" about the Project investments. Signing of the Engineering, Procurement and Construction Contract for the Project with TechnipFMC. Brief description of the Company's partners for the design and procurement of the main process elements is provided below.

The berth structures (Figure 6) are among the first permanent facilities in the Salmanovskiy (Utrenniy) license area. As the Project evolves, they will be integrated into the combined system of process facilities of the Plant and Utrenniy Terminal (Figure 6, boxes 4 and 5).

Further Project plans provide for phased commissioning of the FIELD facilities, as soon as the PLANT process trains are available. Commissioning of the first process train is planned for year 2023 with the following phased commissioning of the additional process capacities in 2024 and 2026.



**Figure 6: General view of the main Project facilities:**

**1 - berth (operational since 2016, will be integrated into the PORT structure); 2 - gas well site in the LA; 3 - temporary accommodation camp in the LA; 4 - GBS LNG & SGC Plant (model); 5 - one of the Plant process trains (model). Source of pictures and visualisation models - official website of NOVATEK**

### 3.3 Structure and Technologies of the Complex

The Plant will have three LNG trains with declared annual capacity about 6.6 MTPA of LNG (for one train), which will be integrated with the artificial land plot to be constructed in the Ob Estuary. The coastal area adjacent to the Complex will be used for construction and operation of auxiliary facilities and infrastructure (hereinafter the Onshore Facilities of the Complex).

The Arctic LNG 2 Project has an important technological feature which differs it from the nearby Yamal LNG Project: the Company decided to construct the LNG and SGC production facilities on a gravity-based structure. This arrangement offers the following advantages:

- Short time required for installation of the LNG & SGC Plant installation without application of expensive heavylift and transportation equipment;
- Main components of the Plant can be towed by sea to long distances;
- Main components of the Plant can be reused at other sites at a later time;
- Low failure rate of the Plant;
- Minimal land acquisition requirements for onshore facilities of the Plant;
- High energy performance;
- Minor environmental impact of the Plant (compared to other arrangements).
- impact of GBS (compared to other location alternatives).



Basic LNG and SGC production equipment and equipment of auxiliary process systems will be installed on the GBS topside decks.

It is planned to construct the gravity-based structures and their components in the dry dock of the NOVATEK-Murmansk LLC shipyard in Murmansk Region and topside (TS) modules will be manufactured at domestic (including the NOVATEK-Murmansk LLC shipyard) or overseas sites. The integration of the modules with the GBS and the first stage of pre-commissioning operations (start-up and adjustment) will be performed at the NOVATEK-Murmansk LLC shipyard. The connection to coastal infrastructure and the final pre-commissioning cycle will take place after the process train delivery and deployment on the coast of the Ob Estuary.

Transportation of the GBS in assembly with the topside to the Complex location will require engineering works to prepare individual sections on the planned route, in particular construction of the access channel and dredging in the Port internal basin.

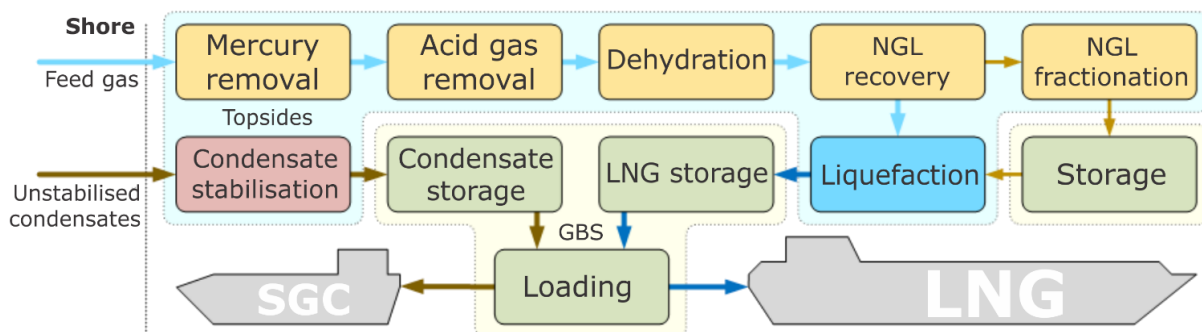
Towing through the navigation channel of the Ob Estuary will be carried out during high tide to ensure at least a 1 m clearance under the GBS bottom. When the tide drops below 0.4 m, towing will be suspended and switched to the standby mode until the favourable tide conditions reappear.

The below onshore structures of general purpose (for three process trains) will be constructed and commissioned in parallel with the first process train of the Complex:

- onshore pipe rack;
- flare unit; and
- operations control system (OCS).

An artificial land plot will be filled in the space between the GBS and the onshore structures to accommodate the berth embankment and the process rack for natural gas and gas condensate supply to the Complex.

Figure 7 illustrates the generalised configuration of the process installations of the Complex. The processes carried out in the body of the gravity-based structure are outlined by the yellow contour (additionally designated as "GBS") and the processes of the topside structures are contoured light blue ("TS").



**Figure 7: Diagram of the process train of the Complex (Source – NOVATEK PJSC, 2018)**

The basic operating processes of the Complex shown in the diagram are supplemented by functioning of auxiliary systems of refrigerant storage and circulation, LNG storage and offloading, boil-off gas compression (i.e. treatment with bringing to certain specifications), condensate storage and offloading, electricity generation, main heat transfer fluid circulation, glycol water solution circulation, fuel and technical gas supply, discharge and purge (with flare facilities), water supply and sewage, and management of solid waste of various origins.

### 3.4 Salmanovskoye (Utrenneye) OGCF Facilities Setup

The main Salmanovskoye (Utrenneye) OGCF setup facilities are:

- 191 gas condensate wells clustered in 19 well pads;
- complex gas treatment plants (CGTP) N. 1 и No. 2 and a preliminary gas processing terminal (PGPT) No. 3;
- gas gathering network (gas pipelines – flowlines);

- interfield pipelines;
- condensate pipelines;
- methanol pipelines;
- field support base;
- gas turbine power plant (GTPP);
- camp for the rotational personnel accommodation;
- water supply and sewage systems, including a wastewater treatment plant (WWTP);
- municipal solid, construction and industrial waste landfill;
- emergency rescue centre (ERC);
- helipads;
- motor roads;
- overhead power transmission lines; and
- fiber optic communications.

Due to the peculiar geological structure of the Salmanovskoye (Utrenneye) OGCF, the FIELD facilities are grouped within three producing zones – so-called domes: Northern, Central and Southern. The field is drilled by 191 wells. The gas condensate well pads are confined to the domed structures of the field.

Complex gas treatment units are designed for treatment of reservoir fluids coming from well pads to ensure the required quality of natural gas fed to the LNG Complex and to isolate gas condensate and water-methanol solution (WMS). The treated natural gas and unstable gas condensate are supplied from the CGTP via separate pipelines to the GBS LNG & SGC Complex. WMS is fed to the regeneration and recovery plant (RRP), designed as part of the CGTP and PGPT system, for methanol recovery and reuse.

In plan is to build a temporary Energy Centre No. 2 on the basis of PAES-2500 mobile automated power plants available with the company for electricity supply of drilling and construction works and dredgers before the GTPP is operational.

The gas turbine power plant consisting of six gas turbine units (five operational and one standby) with the power generating capacity 12 MW and thermal capacity 17.7 MW each will supply field development facilities with electricity and heat at the field operation phase.

The emergency rescue centre (ERC) is intended for the emergency prevention and response at the FIELD facilities, as well as for protection of construction and operating companies' personnel and property from natural and man-caused emergencies. The ERC includes 2 main facilities, viz. a firehouse and a gas safety station.

Operation of the Salmanovskoye (Utrenneye) OGCF facilities is planned on a changeover basis with rotational personnel staying in dormitories of the temporary accommodation camp (TAC). In addition to that, the TAC will have to meet accommodation needs of related facilities, namely the GBS LNG & SGC Complex and Utrenniy Terminal. Taking in account the 5% reserve, the TAC total bed capacity is estimated at 1,500, which will be achieved by construction of 10 dormitories for 150 people each.

Apart from the dormitories, the TAC will comprise a boiler house, a canteen, a laundry, warehouses, a health centre, and other facilities necessary for the personnel accommodation.

### 3.5 Utrenniy LNG & SGC Terminal (Port)

The Utrenniy liquefied natural gas and stabilised gas condensate Terminal is designed to provide marine logistics for gas carriers and tankers, LNG and SGC offloading, and for the reception and temporary storage of process and construction cargoes. The facilities and functional areas of the Port are partly part of the Project and partly federal property. However, the latter are considered in the impact assessment with the same detail, since they are associated facilities / activities in relation to the Project.

At the operation phase, the following issues are addressed: ensuring the year-round reception of vessels; LNG and SGC offloading to sea vessels; providing repair support of the GBS from the area of the Terminal; ensuring port fleet basing for the period of GBS LNG & SGC Complex and Terminal operation; reception of bulk cargo (methanol – summer navigation, diesel fuel – year-round); reception of cargo supplies for the Terminal and related facilities.

During the operation phase, it is projected to construct an embankment for the jetty and set up shore protection structures in the formed area; to create an artificial land plot 10.5 ha in area in the Ob Estuary; to build administrative facilities; to reconstruct the jetty embankment in order to change its functional purpose; to reconstruct the versatile jetty; to create a water area; to perform dredging; to construct northern and southern protective structures (ice barriers).

The completion of Utrenniy Terminal construction is scheduled for 2022. The construction cargo turnover will reach its maximum, up to 1.5 million tons, in 2021. The target cargo turnover of the Terminal during the operation period will be 19.8 million tons of LNG per year and 1.8 million tons of SGC per year – it is planned to attain these parameters from 2026.

In terms of the institutional aspect, the Terminal was included in the boundaries of the Section No. 2 of the Sabetta seaport by the RF Government Order No. 1948-r dated 31.08.2019 on modifying the seaport area boundaries and will be under management of FSUE Hydrograficheskoye Predpriyatiye (Hydrographic Enterprise, subordinate to State Atomic Energy Corporation Rosatom).

### **3.6 Utrenniy Airport**

The Utrenniy Airport (an associated facility) of local airlines is intended for year-round (operating schedule from 9 a.m. to 7 p.m.) air transportation of rotational personnel and industrial cargo to the Salmanovskoye (Utrenneye) OGCF. It is designed to receive An-12 aircraft (design type), as well as Gulfstream G550, AN-24, Mi-8, Mi-26, and aircraft of a lower class. The airport runway dimensions will be 1550x36 m. The throughput of the service and passenger terminal building of the airport is 100 passengers per hour; cargo turnover – 15 tons/day.

The airport operator will be Mezhdunarodniy Aeroport Sabetta (Sabetta International Airport) LLC (founder Yamal LNG JSC).

## 4. ALTERNATIVES

### 4.1 Geography Alternatives

Possible options for transporting hydrocarbons from the license area of the Salmanovskoye (Utrenneye) OGCF are schematically shown in Figure 8. Conventional pipeline transportation of gas and condensate, which is common for Russia, is associated with the acquisition of large land areas and, in this case, with crossing of the Ob or Taz Estuaries of the Kara Sea, which would pose risks to ecosystems. An alternative to that is construction of an integrated liquefied natural gas and stabilised gas condensate plant and subsequent offloading of both products to tankers and gas carriers for transportation to end users by sea.

Due to the Arctic location of the Salmanovskoye (Utrenneye) OGCF combined with a significant – more than 5,000 km – remoteness of gas and condensate consumers, it is expedient to use an approach where well fluid is pre-separated at on-field facilities, natural gas is then fed separately from condensate to plants of the GBS LNG & SGC Complex, where it undergoes additional treatment from acid gases and mercury and a liquid phase transfer by cooling to minus 160° C, after which it is delivered in cryocisterns of gas carrier vessels to end users.

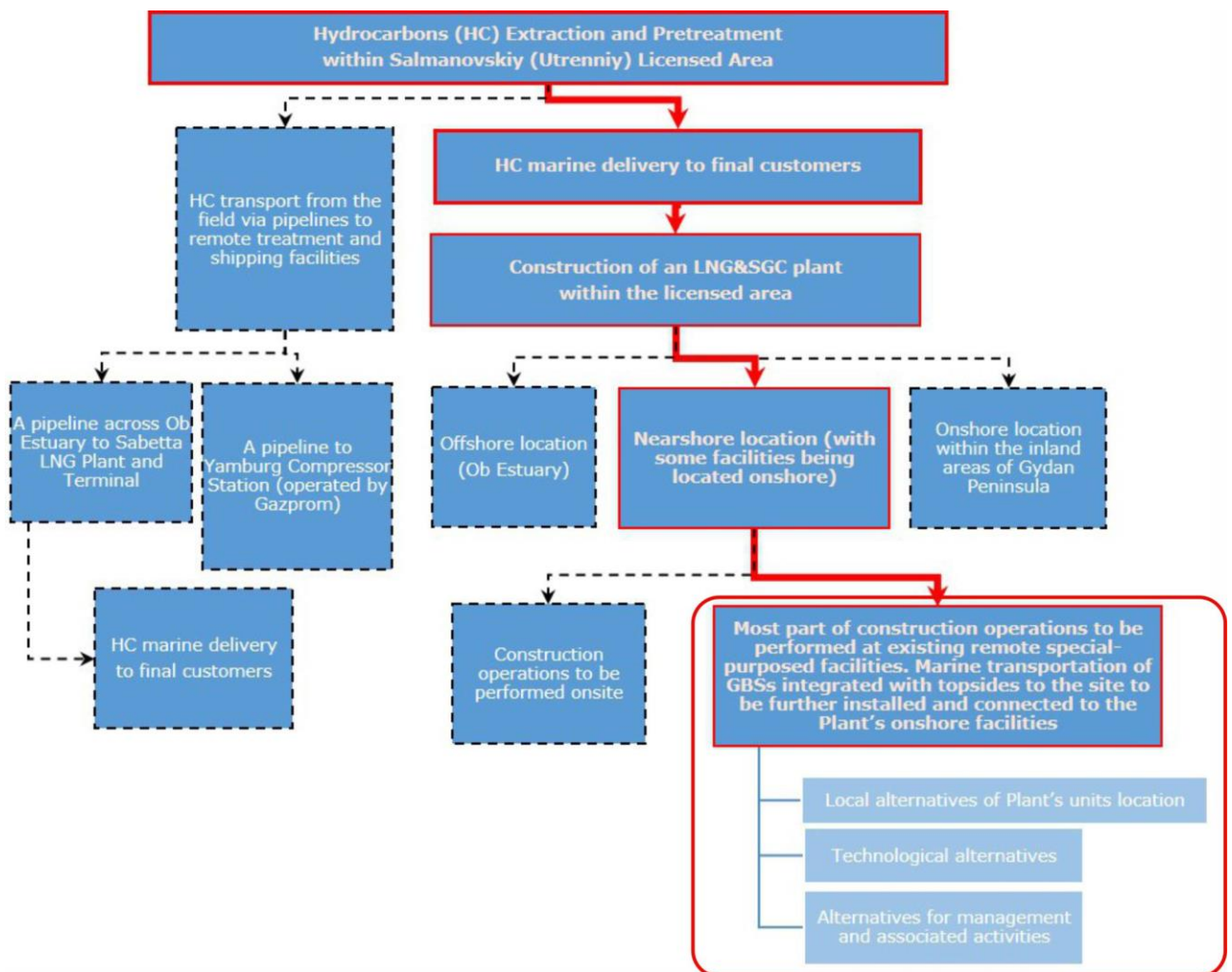


Figure 8: Project alternatives (the approved option is marked with red arrows)

The option of natural gas liquefaction plant siting nearby raw material sources and/or on the nearest seacoast is becoming ever more common globally. In Russia, an LNG plant has been in operation on the eastern shore of the Yamal Peninsula since 2017: the enterprise is part of the Yamal LNG Project operated by Yamal LNG JSC and jointly managed by NOVATEK PJSC (50.1%), TOTAL concern (20%), China National Petroleum Corporation (CNPC, 20%), and the Silk Road Fund (9.9%). There are a few more similar enterprises at various design stages in other RF regions: Pechora LNG (Nenets Autonomous Okrug), Vladivostok LNG (Primorsky Territory), Dalnevostochniy LNG (Khabarovsk Territory), Baltiyskiy LNG

(Leningrad Region), LNG-Portovaya Plant (Leningrad Region), as well as the expansion of the Sakhalin-2 Project (Sakhalin Region) and construction of the LNG-Gorskaya floating offshore plant (Leningrad Region).

The considered alternatives of the Complex siting within the license area comprised its construction offshore, onshore and in the coastal area with the offshore installation of integrated basic facilities on gravity-based structures and onshore construction of integrated auxiliary structures. The latter was considered optimal because it enables spatial integration of the Complex facilities with the Port facilities necessary to serve the needs of this option, minimises land resource demand for the Complex and, at the same time, beneficially reduces the use of the Ob Estuary area, predominantly, to its shoreside where the Complex and the Port will be located, and allows for utilising the benefits of GBS technology (for details refer to subsection 3.3).

#### **4.2 Zero Alternative (abandonment of activity)**

In relation to the Complex and the Port, the Zero Alternative (in other words, the activity abandonment) means that there is a need to implement other scenarios for the preparation and transportation of hydrocarbons of the Salmanovskoye (Utrenneye) oil and gas condensate field. The most probable of these is pipeline transport to Sabetta or in the direction of Yamburg, which will involve crossing of sensitive water areas and the land alienation over a larger area compared to the accepted option.

Complete renunciation of the Project, including development of the Salmanovskoye (Utrenneye) oil and gas condensate field, will imply that

- the results of longstanding (since the 1970s) prospecting and exploration of the field reserves will appear of no avail (and corresponding costs wasted);
- there will be no new forefront bases for development of the Russian Arctic region on the Ob Estuary coast and inland territory of the Gydan Peninsula;
- international business conditions beneficial for increasing Russian hydrocarbon exports to remote consumers will not actualise;
- national policy of the Russian Federation in the Arctic approved by the Decree of the RF President and development strategy for the Arctic region of the Russian Federation, being currently drafted, which provides for priority development of the fuel and energy sector in the north of West Siberia on the basis of the existing hydrocarbon resource potential of global significance, will not effectuate in full; and
- previously constructed production infrastructure of the field, alongside with the berth and other facilities of the FIELD, will retain their location and environmental impact parameters and require conservation or demolishing; therefore, abandoning the Project will not bring about substantial environmental and social benefits for the inland territory and water basin of the license area, Tazovskiy District and Yamal-Nenets Autonomous Okrug.

#### **4.3 LNG Technology Benefits**

Pioneering experiments in the 1910s and industrial implementation in the 1940s in the USA gave rise to development of natural gas liquefaction technology. Today, it is a globally recognised and priority trend in international gas transportation that successfully competes with pipeline gas transport systems in the conditions of long distances to end users and due to the advantageous modular buildup of supplies.

Further dissemination of this technology, in the future, is associated with the expansion of global consumption of liquefied natural gas, including its use as motor fuel, and the concomitant use of high technologies and advanced materials, which promotes development of other industries.

In Russia, the most important conditions and prerequisites for the successful application of LNG technology are:

- strengthening the position of the Russian Federation in the global market of LNG production, marine transportation, and sales;
- build-up of LNG production and offloading capacities in parallel in several RF regions where there are seacoasts and/or large hydrocarbon reserves such as Yamal-Nenets and Nenets Autonomous Okrugs, Sakhalin and Leningrad Regions, Primorsky and Khabarovsk Territories; and

- developing and fostering the Russian Arctic region where Yamal-Nenets Autonomous Okrug is one of the pivotal areas.

The first Russian natural gas liquefaction plant was launched in 2009 in Sakhalin Region with the joint participation of PJSC Gazprom and foreign companies Shell, Mitsui and Mitsubishi. At the beginning of 2020, the global liquefied gas output reached 430 million tons<sup>10</sup>. The proven benefits of the technology are:

- technological and environmental safety of LNG (it neither burns nor spontaneously ignites nor explodes; in the atmospheric conditions, it returns to gaseous state and mixes quickly with air; it is nontoxic);
- relatively low land resource demand and minimal levels of associated effects on ecosystems; and
- cost efficiency and incentives for developing technologies and regions of presence.

To date, there are 12 known gas liquefaction technology variations which differ chiefly in the natural gas cooling conditions, in the composition of refrigerants used, and in compressor equipment drives<sup>11</sup>. The most common is the propane pre-cooled process with the mixed refrigerant developed by APCI (its variation is applied to natural gas liquefaction in the Yamal LNG Project).

Another frequently used option has been in practice in Sakhalin Region – it is the cascade process with the dual mixed refrigerant (DMR) provided by Shell as one of the participants in the Sakhalin-2 Project.

For the Arctic LNG 2 Project, the Company opted for the cascade process with mixed fluid cooling (MFC) developed by Linde AG. It is based on the use of three separate cooling loops with mixed refrigerants. It is the basic process applied at Snohvit, one for the northernmost LNG plants in Europe, which has been successfully operated by Norwegian company Statoil since 2008.

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<sup>10</sup> IGU 2020 World LNG Report: International Gas Union, 2020

<sup>11</sup> Mescherin I.V., Nastin A.N. Analysis of technologies for producing liquefied natural gas in the Arctic climate // Proceedings of Gubkin Russian State University of Oil and Gas (OGU). Chemical sciences. 2016. No. 3. p. 145-157.

## 5. PROJECT IMPLEMENTATION BASELINE CONDITIONS

### 5.1 Natural Conditions

The Gydan Peninsula, until recently, belonged to the category of poorly studied areas of the Russian Arctic, which is largely due to a low development level and inaccessibility. Systematic studies of local nature began in the 1920s – 1940s by the Gydan expedition of the USSR Academy of Sciences, Russian Geographical Society, and Russian Botanical Society. The economic value of Gydan ecosystems at that time was reduced exclusively to ensuring productivity of reindeer grazing lands.

Large-scale prospecting, having been carried out here since the 1960s and 70s by joint efforts of oil and gas enterprises and profile scientific research institutes, opened a new page in the history of peninsula landscape surveying. Over the period between 1975 and 1993, 12 hydrocarbon deposits were discovered and explored within the Gydan boundaries, of which 8 were gas (Gydanskoye, Antipayutinskoye, Toto-Yakhinskoye, Minkhovskoye, Vostochno-Bugornoye, Trekhbugornoye, and Shtormovoye), 2 gas condensate (Soletskoye + Khanaveyskoye and Ladertoyskoe), and 2 oil and gas condensate deposits (Utrenneye and Geofizicheskoye).

The related environmental and geographical surveys clarified the previous results and collected new data on the peninsula and adjacent waters of the Ob Estuary. As of the mid-1990s, total disturbance of the Gydan landscapes by economic activity was estimated at hundredths of a percent, that is, in fact, this large land massif almost fully retained its natural state specific of the natural conditions such as:

- moderate continental Arctic climate with a prevalence of negative air temperatures throughout the year, excessive atmospheric humidification and accumulation of the bulk of atmospheric precipitation in the snow cover, seasonal long-term freezing of soils and grounds, atmospheric circulation close to the monsoon by nature with a predominance of northerly winds in summer and southerly winds in winter, persistent high humidity, low frequency of thunderstorms and calms, high frequency of clouds and advective fogs, high wind loads on the earth surface, and seasonal alternation of constantly high and constantly low illumination of the earth surface;
- predominantly flat terrain represented by a series of marine and lagoon-laid sand-loamy slightly drained terraces (Figure 9) complicated by a floodplain complex of modern river valleys, with the intense, up to several meters a year, abrasive-accumulative transformation of the Ob Estuary coast;
- confinement to the cryolithozone with continuous distribution of permafrost which is a regional confining stratum, has a multilayer structure with the local presence of intra-permafrost brines (cryopegs) and gas hydrates, sits close to the surface and to a large extent determines the nature of modern exogenous (terrain-forming) geological processes with the leading role of waterlogging, thermokarst and thermal erosion, solifluction (displacement of waterlogged soil along slopes), permafrost heaving, and frost cracking;

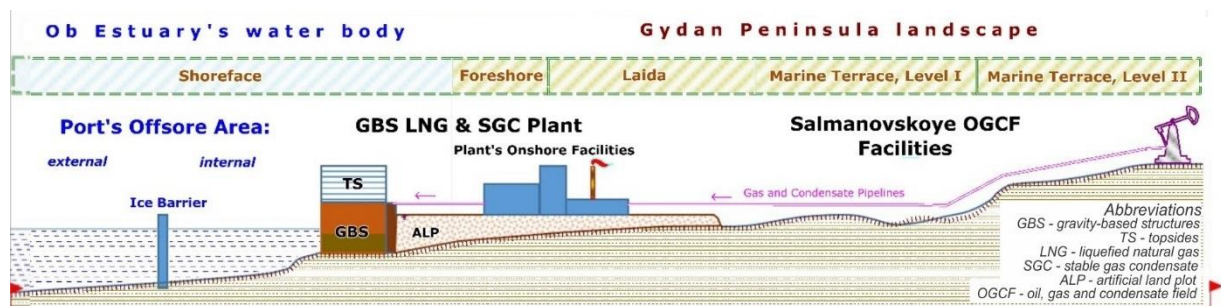


Figure 9: The Arctic LNG 2 Project position in the terrain contour

- dominant combination of tundra and bog **vegetation** with the pronounced complexity of phytocenoses due to the microrelief and nature of exogenous geological processes, relatively low biological productivity and a weak soil-forming function of higher plants, and instability and

fragmentation of the vegetation cover in areas with high activity of exogenous geological processes, i.e. cryogenic, eolian, erosion and abrasive-accumulative;

- prevalence of shallow soils unstable to anthropogenic impacts of soils related to the tundra gley and boggy types, with the characteristic topsoil complexity due to exogenous processes;
- unique water system of the Ob Estuary characterised by a complex ice and hydrological pattern developed under the influence of many factors, of which the most important are river flow, wind regime, and tidal currents. A characteristic feature of the Ob Estuary is a strong vertical gradient of salinity, i.e. difference in salinity between the upper water horizons and in-depth layers. The salinity boundary, so-called "halocline", is subject to significant seasonal migrations associated with intra-annual fluctuations in river flow. In summer, when the Ob runoff is maximum, seawater with salinity of about 30‰ penetrates the Ob Estuary to a distance up to 10 km and in winter, during the period of minimal runoff, seawater propagates to as far as 340 km southward;
- high importance of the discussed land and water areas for **biological diversity** at large given the pronounced spatial irregularity and seasonality of the presence of most species of terrestrial vertebrates and ichthyofauna; and
- predominantly local and generally insignificant **transformation of landscapes** by economic activities having the insular and irregular nature; a low, viz. close to the regional background, level of chemical pollution of natural environments, basically due to the impact of remote sources and effects of a long-range transfer of pollutants to the Arctic.

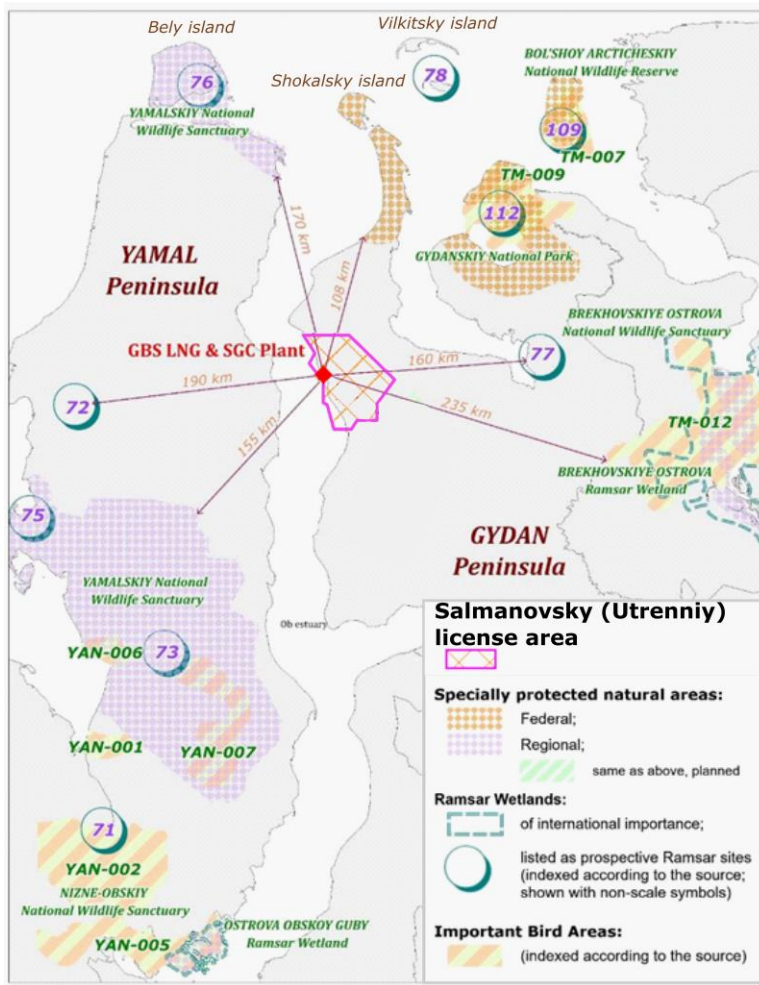
In the 2000-2010s, against the background of a generally growing interest in the Arctic and development of its resources, a series of integrated expeditions was organized. Among their tasks were ecosystem studies and natural environment sampling for a speciation analysis. Also, operational environmental monitoring data for construction of the engineering facilities and operation of the sites provide additional knowledge of the land and water areas. In particular, hydrogeochemical studies of the Messoyakha and Mongayuribey Rivers were carried out to assess the influence of the pipeline route connecting the Nakhodkinskoye field with the Yamburgskaya compressor station (with a 22-km underwater two-pipe crossing through the Taz Estuary); baseline and operational environmental monitoring conducted by Petergaz LLC in 2010 significantly improved the understanding of water ecosystems of the Taz Estuary within Tota-Yakhinskiy and Antipayutinskiy subsoil sections; Tyumen State University carried out detailed surveys of the peninsula lakes (Kremleva et al., 2012); in 2000-2009, expeditions of Gazflot LLC and Northern Department of the Hydrometeorology and Environmental Monitoring Service (Yamal-Arctic – 2013) collected extensive data on the Ob Estuary ecosystems. Recently, a large set of data on the Kara Sea ecosystems and their resistance to technological impacts was generalised in the Atlas released by Arctic Research Centre LLC with support of Rosneft in 2016.

Several comprehensive studies were dedicated to Gydan settlements and had a medical-environmental and epidemiological focus. The results were published by the Arctic Research Center (Yamal-Nenets Autonomous Okrug, Salekhard), Research Institute of Medical Problems of the Far North of RAMS (Yamal-Nenets Autonomous Okrug, Nadym), Department of Hospital Pediatrics of the St. Petersburg Pediatric Medical Academy, and Institute of Cytology and Genetics of SB RAS (Novosibirsk).

In recent years, conservation of biological diversity of the Gydan tundra landscapes has attracted much attention. Accordingly, in addition to the already existing specially protected areas, of which the Gydan Nature Reserve is the nearest to the Complex designed location (108 km NNE, refer to Figure10).

In 2016, the Government of the Yamal-Nenets Autonomous Okrug announced a launch of a comprehensive program for studying the Gydan Peninsula. Its overall goal is to avoid the mistakes of the first wave of industrial development of the region (primarily, the Yamal Peninsula) and to ensure the collection of full-fledged information on the baseline conditions of Gydan before the onset of large-scale development of its hydrocarbon deposits. The five-year scientific research program was prepared by the Arctic Research Centre in cooperation with Research Institute of Ecology and Rational Use of Natural Resources of Tyumen State University, Institute of Water and Environmental Problems, Earth Cryosphere Institute of SB RAS, Arctic and Antarctic Research Institute of Roshydromet, and other research centers and institutes of Moscow, St. Petersburg, Tyumen, Novosibirsk, and Irkutsk. Apart from the comprehensive environmental and landscape studies, the Program provides for the restoration of a state environmental monitoring network on the Gydan Peninsula.





**Figure 10: Section of the designed Complex and Port locations, as well as the Salmanovskiy (Utrenniy) LA with respect to the nearest area with the special conservation status.<sup>12</sup>**

The published results of the above scientific and applied environmental studies on the Gydan Peninsula and in the Ob Estuary waters were used for preparing the ESHIA materials, however, of main attention were the results of the pre-project engineering surveys initiated by the Company.

Their inland part was carried out stepwise for the Salmanovskiy (Utrenniy) license area (FSUE PINRO, 2012), sites of the field early development facilities (RusGazEngineering LLC, 2014; EnergoGazEngineering LLC, 2017), sites of the planned location of the Complex (jointly with the area of the regulated sanitary protection zone of 1000 m in size) and the Port (TsGEI LLC and Uralgeoproekt LLC, 2017), and areas allocated for fishing facilities and the airport (PurGeoCom LLC, 2017-2019).

The offshore part of the surveys was performed by FSUE PINRO (2012) for the Ob Estuary basin within the licensed area, by Eco-Express-Service LLC (2013) for the berth facilities construction site, by research and production company NPF DIEM (2014) for two alternative sites of the Complex location, by Inzhgeo LLC (2017) for the designed area of the Complex facilities location, by Fertoing LLC (2017) for dredging and dumping sites, by AANII FSBI (2017) for a large section of the water area to include the Complex and Port facilities and stretching forth upstream for about 15 km, and by JSC IEPI (2020) – for the Project’s potential area of influence and adjacent water areas in the Ob Estuary.

<sup>12</sup> Data sources: Wetlands of Russia - WWF, Russian Program Wetlands International. Official website at <http://www.fesk.ru/>  
 Wetlands of Russia. Vol.3. Wetlands Included in the List of Potential Ramsar Convention Sites. - M. :Wetlands International Global Series No. 3 , 2000.490 p.  
 Map of urban planning zoning of the inter-settlement territory / Rules for land use and development of the inter-settlement territories of Tazovskiy District – Department of Communications, Construction and Housing Policy of the the YNAO Tazovskiy District Administration. 2015.  
 Key Ornithological Areas of Russia. Vol. 2. Key Ornithological Areas of International Importance in West Siberia - M.: Russian Bird Conservation Union, 2006. 334 p.  
 Specially Protected Natural Areas of Russia: Current State and Development Prospects. Compiled by: Krever V.G., Stishov M.S., Onufrenya I.A. – WWF of Russia, 2009.  
 Russian Bird Conservation Union. Official website at <http://www.rbcu.ru/>

## 5.2 Socio-Economic Conditions

The project is implemented in the area of traditional residence and customary economic activities of indigenous small-numbered peoples of the North (ISPN). More than half of the Tazovskiy District population are ethnic Nenets who are engaged in reindeer herding, fishing, and other customary nature uses.

The area of the designed location of the Project and associated facilities is at a considerable distance from permanent residential localities. The nearest (at least 170 km from the Complex and at least 120 km from the license area boundaries) relatively large settlements are Gyda and Antipayuta. The population numbers of the settlements are 3,747 and 2,768 (as of 01.01.2020), respectively.



**Figure 11: Reindeer herders' camp within the license area: a Nenets chum and traditional reindeer harness (Photo materials of PurGeoCom LLC , 2015)**

Small villages Tadebya-Yakha and Yuribey are located somewhat closer, in 70 and 115 km, respectively. About 50 people live in each of the villages and about 50-150 more migrate in the surroundings. The vast majority of the inhabitants of the above settlements and nomadic camps are indigenous people (Nenets).

The territory of the Salmanovskiy (Utrenniy) license area is used by indigenous communities. At the time of the ESHIA process, private reindeer herding farms (families) and one company, the MUE Antipayutinskiy State Farm, were engaged in the customary economic activity within the LA. In total, around 65 families or more than 300 people migrate in the area of the field. The total livestock in their possession is estimated at more than 23 thousand reindeer. The main types of Nenets' customary activities are reindeer herding and fishing; less important are hunting and wild crops harvesting. The herders' camps (Figure 11) are not permanently tied up to the terrain and are arranged depending on the particular migration settings such as a season, grazing conditions, terrain, nature of the snow cover, etc.

## 6. ASSESSMENT OF THE PROJECT'S AREA OF INFLUENCE

In the context of the Arctic LNG 2 Project, the key specific features of assessment of the parameters of the area of influence are:

- partial overlapping with the offshore sector of the Yamal LNG Project's area of influence, to which, since 2015, impact management and monitoring practice that meets the requirements of international financial institutions has been applicable;
- high degree of uncertainty of a number of Project-related cumulative impacts (e.g. impacts on marine mammals) that calls for the coordination of monitoring programs with third parties; and
- linking social impact of the Project more to its recipients, the most vulnerable of which are the nomadic communities of Tazovskiy District, rather than to the territories.

The acquisition of the land and adjacent water areas meant for the designed structures is the focal point of the area of influence of the planned activity. The Project's area of influence should also include the entire Salmanovskiy (Utrenniy) subsoil section (license area, LA) since the restrictions with respect to third parties apply to it. About 400 ha of the total area of the water section in use fall to its internal part limited by ice protection structures.

Zones with special conditions of use of territories (ZOUIT) of standard width will be established around the Project facilities.

A Sanitary Protection Zone (SPZ) is the most typical and Project-specific form of ZOUIT.

According to the sanitary classification of industrial facilities, the LNG & SGC Complex, well pads, gas treatment plants, a methanol storage facility and a number of other FIELD facilities fall within Class I with the SPZ regulatory size 1,000 m.

Less the land acquisition for the facilities per se, the total area of all sanitary protection zones, considering that some of them overlap and with account for the SPZ of the airport land facilities, is estimated at approximately 12,000 ha of the lands of Tazovskiy Municipal District, i.e. no more than 5% of the license area.

Isolines that correspond to the propagation of a pollutant at the 0.05 maximum permissible concentration (MPC) from emission sources are used on the next level of assessment for the external boundary of the area of influence whose centre is the land allotment, the used section of the water area, sanitary protection zones, and other ZOUIT.

The total area of all areas of influence that meet this criterion is estimated at approximately 190,000 ha, which is about half the area of the LA (Figure 12). On land, impact of the Project and the airport on the ambient air quality will not go beyond the LA boundaries, yet it will extend for 10-20 km beyond it over the Ob Estuary waters. Impact of a pollutant in concentration of 0.05 MPC does not affect human health; it is used as a criterion of the input to the general state of the ambient air.

Other impacts of the planned activity on the components of local ecosystems are not expected to extend beyond the designated boundaries.

Impact of the associated facility Utrenniy Airport will not extend for outside of the license area. Other associated facilities and activities of the Project are confined to the water area of the Ob Estuary: hydraulic structures, underwater engineering works, as well as navigation in the access channel connecting the navigation channel of the Ob Estuary with the Terminal.

In the water area of the Ob Estuary, the value of the impact of the Project and related underwater engineering works will depend on the propagation of pollutants and physical impacts (warming effect, turbulence, agitation of bottom sediments, underwater noise, etc.) mainly in the direction of basic currents.

Some effects can manifest themselves not only downstream, but also upstream the water sections of the planned activity. These are washing-out and accumulation processes and changes in the ice regime and water circulation.

According to the available forecasts, the maximum propagation of suspended matter caused by dredging will occur during underwater soil dumping. In such a case, suspended matter with concentrations exceeding 0.25 mg/l may spread over up to 25 km both in the northern and southern direction from the underwater dumping site; whereas the existing natural concentrations of suspended solids (before Project implementation) in the estuary waters exhibit variations within a range of 6–9 mg/l.

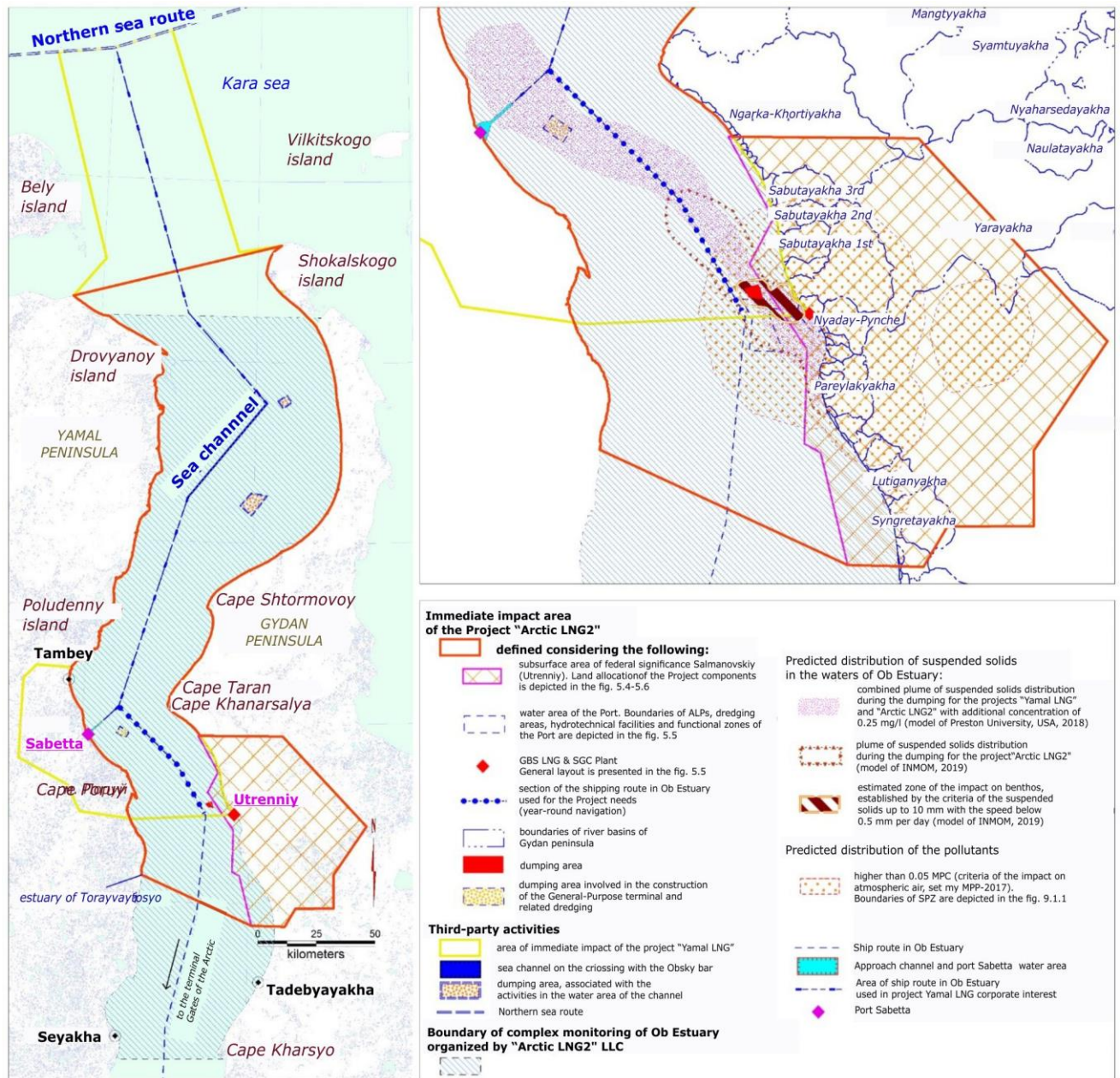


Figure 12: Project's area of influence

Cumulative effects, originating from parallel implementation of the planned activity and third parties' activities, which are foreseen at this Project stage, will be impacts on the ambient air quality and on the aquatic environment of the Ob Estuary.

The Project envisages the use of marine transport both during construction of its components and during their operation. Therefore, one of the cumulative impact sources may be an increase in the load on navigation waterways and Port infrastructure caused by the Project.

The footprint of the Project's area of influence suggested by the Consultant, taking in account all of the above, is shown in Figure 11. Onshore, it corresponds to the boundaries of the Salmanovskiy (Utrenniy) LA since neither of the foreseeable significant impacts will go beyond them; in the Project's offshore area of influence it is not limited by the Ob Estuary basin and can affect a relatively small portion of the outer shelf zone of the Kara Sea, viz. the Ob-Yenisei shallow part, in the area of the Shokalskiy island. The

northern boundary of the Project's area of influence is defined as the longest distance of spreads of the turbidity plumes from dredging and dumping operations performed by the federal enterprise for the implementation of several projects. Furthermore, it approximates the northern boundary of the planned area of comprehensive marine environmental monitoring in 2020.

About 80% of the offshore footprint overlaps with the area of influence of Yamal LNG, the largest integrated project in the region for natural gas production, liquefaction and shipment, which comprises the Yuzhno-Tambeiskoye gas condensate field, LNG plant, seaport and Sabetta airport, alongside with associated facilities such as the sea channel at the intersection with the Ob Bar and sea vessels, including tanker and icebreaker fleets, which are determinant for the channel's dimensions.

## 7. STAKEHOLDER ENGAGEMENT

### 7.1 Stakeholder Engagement Plan

Stakeholder engagement is the priority activity for

- identifying potential adverse and beneficial impacts of the Project and their management; and
- organizing the Project construction process so that it causes minimum disturbance for the communities in the social area of influence.<sup>13</sup>

Company's engagement with the public, including representatives of local indigenous communities, was initiated before the start of the Project design with the aim of early identification of all stakeholders which may be affected by the planned activity, building of a constructive and continuous dialogue with them, the widest possible dissemination of information about the Project, and collection and review of information on stakeholder Project-related expectations.

The basic document regulating this process is the Stakeholder Engagement Plan (SEP) prepared by the Consultant with consideration of the requirements of international financial institutions and corporate standards of the Company.

The SEP provides for

- identifying the parties affected by the Project and organizing their engagement with respect to the preparation and disclosure of the ESHIA materials;
- disclosing the ESHIA materials to include the Nontechnical Summary and SEP;
- collecting and reviewing opinions and comments submitted by stakeholders within the set timeframe; and
- adjusting the ESHIA materials based on the received feedback.

Stakeholders are individuals, groups of individuals or other parties which are directly or indirectly affected by the Project construction and operation activities, as well as parties which are directly interested in the implementation of the planned activity or can influence it, either positively or negatively.

In accordance with the IFC standards, when identifying the parties, the Consultant divided them into the affected parties and other stakeholders. Among the affected parties are communities of Tazovskiy Municipal District (including nomadic) potentially affected by direct and indirect impacts of the Project, as well as local agricultural enterprises and a number of healthcare institutions. Furthermore, within this category were identified vulnerable groups whose representatives may experience more serious adverse consequences caused by the impacts. In particular, higher vulnerability is characteristic of the nomadic population of the district who preserve a traditionally high dependence on the natural environment and its resources.

Other stakeholders may be regional public authorities, local self-government authorities, NGOs, academic community, design and commercial companies, trade unions, mass media, etc. More detailed information on stakeholders is provided in the Stakeholder Engagement Plan, and Chapters 4, 8 and 10 of the ESHIA.

The SEP is a living document to be regularly updated throughout the entire lifecycle of the Project.

### 7.2 Previous Stakeholder Engagement Stages

Main stakeholder engagement activities earlier conducted by the Company include:

- **Public consultations** in the form of public hearings and opinion polls/surveys of tundra communities carried out in conformity to the Russian law;
- **Public consultations in the framework of the 2018 ESHIA process for the Complex:** disclosure of the ESHIA materials for the Complex, including the SEP, Scoping Report, etc. at meetings with key stakeholders, at presentations, and by publishing relevant documents.

More detailed information can be found in the SEP and in Chapter 4 of the ESHIA.

<sup>13</sup> Areas and communities which may experience positive and negative impacts of the planned (deigned) and associated activities.

### 7.3 Current and Future Stakeholder Engagement Activities

Current and future stakeholder engagement activities are defined in the SEP and include:

- Engagement in the course of preparing materials for environmental, social and health impact assessment of the Project in accordance with the international standards, including
  - disclosure of the ESHIA, SEP, and NTS (this document) materials;
  - holding meetings with stakeholders (face-to-face meetings are only possible provided the favourable epidemiological situation in YNAO);
  - disclosure of final versions of the ESHIA, SEP and Nontechnical Summary with consideration of the comments and suggestions submitted by stakeholders;
- Engagement in the framework of the Indigenous Peoples Development Plan (IPDP)<sup>14</sup>. This document to be developed at further stages of the planned activity will regulate interaction of the Company with indigenous communities. In addition, as part of the IPDP activities, the Company will continue the process of obtaining Free Prior Informed Consent (FPIC) of indigenous people affected by the Project. The need for the FPIC is stipulated by the IFC standards<sup>15</sup>; and
- Stakeholder engagement at all stages of the Project lifecycle.

### 7.4 Grievance Mechanism

A Grievance Mechanism developed as part of the SEP is meant for collection and review of information received from stakeholders and for effective response to such information. Stakeholders may submit grievances and queries as follows:

By email: [vopros@arcticspg.ru](mailto:vopros@arcticspg.ru)

To the address of the dedicated division of the Arctic LNG 2 LLC branch in **Moscow**

**Correspondence address:** 119415, Moscow, 22 Akademika Pilyugina St., office of Arctic LNG 2 LLC;  
**Registered office address:** 629305, Russian Federation, Yamal-Nenets Autonomous Okrug, Novy Urengoy, 5 Yubileinaya St., 2<sup>nd</sup> floor, office 162'.

In the Information Centre in **Tazovskiy District:**

**Address:** 629350, YNAO, Tazovskiy District, Tazovskiy tsp., 44 Pristanskaya St., 1<sup>st</sup> floor, room 1, office of Arctic LNG 2 LLC;  
**Business hours:** weekdays from 10 am. to 12 pm. and from 3 pm. to 5 pm.;  
**Contact:** Mikhail Lapsuy

In the Information Centre at the Arctic LNG 2 LLC dedicated division **Salmanovskiy Gazokondensatniy Promysel** (Salmanovskoye Oil and Gas Condensate Field):

**Address:** ABK VZhK-300, Salmanovskiy Gazokondensatniy Promysel, Tazovskiy District, YNAO  
**Business hours:** weekdays from 10 am. to 12 pm. and from 3 pm. to 5 pm.  
**Contact:** GCPS Manager/ GCPS Deputy Manager  
**Phone:** +7 (495) 488-6280, 50-007

In the Information Centre at the **Arctic LNG 2 LLC dedicated division in Belokamenka, Murmansk Region:**

**Address:** Murmansk region, s. Belokamenka, Centre for Construction of Large-Capacity Offshore Structures, building 5.1.3.  
**Business hours:** weekdays from 10 am. to 12 pm. and from 3 pm. to 5 pm.  
**Contact:** Head of the GBS Construction Department  
**Phone:** +7 (8152) 99-80-00, 29326

<sup>14</sup> The exact title of the document will be determined in the course of its development.

<sup>15</sup> There is no generally accepted definition of the FPIC concept. However, it suggests bona fide negotiations between the Company/Project Operator and the affected indigenous communities leading to an agreement that will be documented in one or another form.

## 8. ENVIRONMENTAL IMPACTS

### 8.1 Impact on Air

Pollutant air emissions will occur during the construction, operation, decommissioning and demolishing of the Project facilities. Each phase and facility will have different emission sources, and the emission composition and amount will vary accordingly.

LNG plants and terminals in Canada, Norway and the Yamal region of YNAO (Russia), similar in terms of technology and location, are indicative of a low level of ambient air quality impact and are consistent with the best national and international standards in this area. On the whole, this confirms the general perception of LNG plants as facilities with a relatively low potential for air pollution mostly caused by high power consumption and concomitant greenhouse gas emission.

The ambient air quality during operation of the Arctic LNG 2 Project facilities will depend on emission from stationary sources on the process trains and Onshore Facilities of the GBS LNG & SGC Complex and the Salmanovskoye (Utrenneye) OGCF setup facilities, primarily CGTP-1, 2 and PGPT-3. The contribution of stationary sources of emission from the Utrenniy Terminal and Utrenniy Airport will be relatively small.

Distribution of the emission sources over a relatively large area, at a distance of at least 2 km from each other, creates conducive conditions for pollutants emission dispersion.

At the operation phase, emission from stationary sources of the GBS LNG & SGC Complex will amount to about 11,700 tons per year and 7,100 tons per year from facilities of the Salmanovskoye (Utrenneye) OGCF. The priority pollutants determining the ambient air quality in the area of influence of the Complex and FIELD facilities are nitrogen oxides (NO<sub>x</sub>) and carbon monoxide (CO).

Environmental impact assessment of pollutant air emissions during the operation period was carried out by calculating ambient air pollution.

The dispersion computing results showed that neither of the pollutant concentration indicators in the area of influence of the Complex and Salmanovskoye (Utrenneye) OGCF facilities would exceed maximum permissible concentrations (MPC) established for the air in residential areas. The highest estimated ground-level concentration is 0.57 MPC for NO<sub>2</sub> and the calculated NO<sub>2</sub> concentration on the TAC boundary is 0.26 MPC.

To assess the conformity of pollutant emissions to the regulatory standards, the Company will carry out operational environmental monitoring of emission sources. It will be complemented by collecting information on the ambient air quality on the regulatory SPZ boundary and in temporary accommodation camps in the framework of operational environmental monitoring.

Given the nature of pollutant emissions at the Project operation phase and in the absence of camps for the rotational personnel accommodation within the sanitary protection zones (SPZ), as well as after implementation of a complex of air protection measures, residual impact of emission on the ambient air quality at the operation phase can be assessed to be of **low** significance.

### 8.2 Harmful Physical Impacts

Harmful physical impacts can occur throughout the lifecycle of the Project facilities and will have various duration, scale and range. The most significant physical impacts will be noise and vibration, whereas impacts of electromagnetic fields and radioactivity are negligible and, therefore, have been excluded from the ESHIA analysis.

The highest intensity and largest extent of noise and vibration are traditionally associated with construction due to the inherent high concentration of special machinery and vehicles, operation of drilling and piling rigs, portable generators and other machinery with significantly higher levels of noise compared to stationary equipment.

In relation to the Complex, total impact of construction on sensitive recipients of the Ob Estuary and the Gydan Peninsula will be minimised through implementing the bulk of operations at remote shipyards and other construction sites. Meanwhile, construction of the Port and FIELD facilities, as well as related offshore



operations, are recognised as the most significant factor of physical impacts on the land and water areas adjacent to their sources.

Given the openness of the construction area of the Project facilities and the temporary exceedance of the Project standards, which is likely to occur in some cases, negative impact of noise on workers at the construction phase can be assessed as moderate. High acoustic levels do not spread over a long range, therefore, a low negative impact on rotational camps, reindeer herder camps, and local fauna is foreseen.

Underwater noise which affects sensitive marine fauna is considered as a special category of physical impacts. Its main sources will be offshore operation of various floating craft and underwater engineering works such as dredging, dumping, etc.

Injurious impact on marine mammals caused by acoustic effects will be spatially limited by immediate proximity to the dredging site. The width of the Ob Estuary in the Project's area is more than 40 km and provides sufficient room for animals far from the site. Hence, there is actually no likelihood of injurious exposure. In the event that such impacts occur, these will be of moderate significance and low risk.

A risk of fish injury or death associated with noise from underwater dredging is extremely low. It is pinpointed that, even if exposed to such powerful noise sources as air guns used during seismic surveys, fish exhibit the sensitivity to the impact at the level of behavioral reactions and injury occurs at a close (first meters) distance from the acoustic source. Thus, it is expected that fish will avoid the area of operations.

Piling is characterised by higher noise than dredging and, as a result, will be audible to marine mammals and fish at greater distances. There is currently no documented evidence of injurious effects on marine mammals caused by piling. In the context of the Project, this is actually unbelievable due to the large width of the Ob Estuary. In the event of the above impacts, these will be of moderate significance and low risk. Injurious exposure caused by piling is not excluded and is assumed to occur at around 100 m, therefore, noise impact on fish is assessed as moderate.

Overall harmful physical impact of the planned offshore operations on fish fauna and marine mammals can be tentatively assessed as **moderate**. The significance of sonar impacts of underwater engineering works is assessed as **low** owing to the absence of an immediate threat to the prevalence/abundance of marine mammals, low probability of their behavioral changes and damage, relatively short duration of the construction phase, recorded absence of feeding grounds of marine mammals near the Complex and Port, and long-term operation of the berth facilities in this area.

The main noise sources at the phase of Project facilities operation will be process equipment, Port machinery, and motor and air transport.

For the operation period, a zone of acoustic discomfort was calculated for noise sources at basic Project facilities, viz. the Complex and the facilities of the Salmanovskoye (Utrenneye) OGCF setup and the Terminal. The calculation results showed that noise levels in the temporary accommodation camp area would not exceed the regulatory indicators in the daytime and at night; noise levels will be 47-49 dBA at night and 49-54 dBA in the daytime.

Subzone 7 (an SPZ analogue) was defined for the Utrenniy Airport with consideration of levels of electromagnetic radiation from airfield equipment, pollutant emissions from stationary sources and aircraft, and noise levels. The boundaries of the seventh subzone footprint are calculated from the size of the footprint with account for the equivalent level of aircraft noise in the daytime, equal to 55 dBA, generated by aircraft during their movement by the standard (established) flight routes for takeoffs, landings and maneuvering in the area of the Utrenniy Airport. Residential areas and other regulated territories are not exposed to increased impact of aircraft noise during their flight.

To sum up, the impact of noise on personnel, temporary accommodation camps, reindeer herder camps (including reindeer fawning grounds) and local fauna at the Project facilities operation phase is assessed as **low**.

### 8.3 Impact on Surface Water Bodies

#### *Impact on surface waterbodies of the Gydan Peninsula*

Main impacts of construction on surface water bodies in the area of the Salmanovskoye (Utrenneye) OGCF at the construction phase are related to potential transport of suspended matter and pollutants by surface runoff and to a number of construction activities in water protection zones of the rivers, streams and lakes, disturbance of the hydrology and morphological structure of riverbeds and lake basins during construction of crossings over water barriers. and sand quarrying. There is also a likelihood of chemical contamination of the water bodies resulting from discharge of undertreated wastewater to water bodies or emergency spills of hazardous chemicals in the catchment area.

The Project provides for a set of measures aimed at prevention of adverse impact on surface water bodies, including: strict adherence to the operational rules for water protection zones of water bodies, regular cleaning of the territory, use of pallets and setup of secondary protection (dyking) at hazardous material storage and waste accumulation sites, keeping construction equipment in working order, etc. Embedding of drainage systems for surface runoff into road embankments will prevent excessive moistening and waterlogging of adjoining areas.

After taking the proposed environmental protection measures and considering the local and short-term nature of most activities, the residual impact significance can be considered **low**.

Main impacts of Complex and associated facilities operation on inland water bodies include the water intake from surface water sources, discharge of sanitary and utility wastewater and storm/melt water, and emergency pollution of natural water.

The planned water abstraction amounts to meet the Project facilities demand for drinking, sanitary and utility water both during construction and during operation make up a small portion of the maximum permissible amount of the water resource withdrawal in the Project implementation area which is established for the water basin with allowance for its ecosystem preservation.



**Figure 13: Valley of the Nyadajpyngchyo River 2. Nyan't lake**

All wastewater generated during the operation phase will go to the wastewater treatment plant of the Project. Sanitary wastewater and storm and melt water, after treatment to meet the most stringent standards established for discharge to fishery water bodies, will be discharged to the Nyadajpyngchyo River. The treated process wastewater will be pumped into the absorbing geological stratum. As part of operational environmental control and monitoring, the Company will conduct regular monitoring of the water quality in the river at the site of treated effluent discharge, as well as upstream and downstream.

Given that the designed WWTP allows for wastewater treatment to fishery standards before its discharge to the Nyadajpyngchyo River and that process wastewater generated at the Project facilities will be pumped into the absorbing stratum, impact on surface waters can be assessed as **local, long-term, and low**.

*Impact on the marine environment of the Ob Estuary**Dredging in the Complex and Port water area*

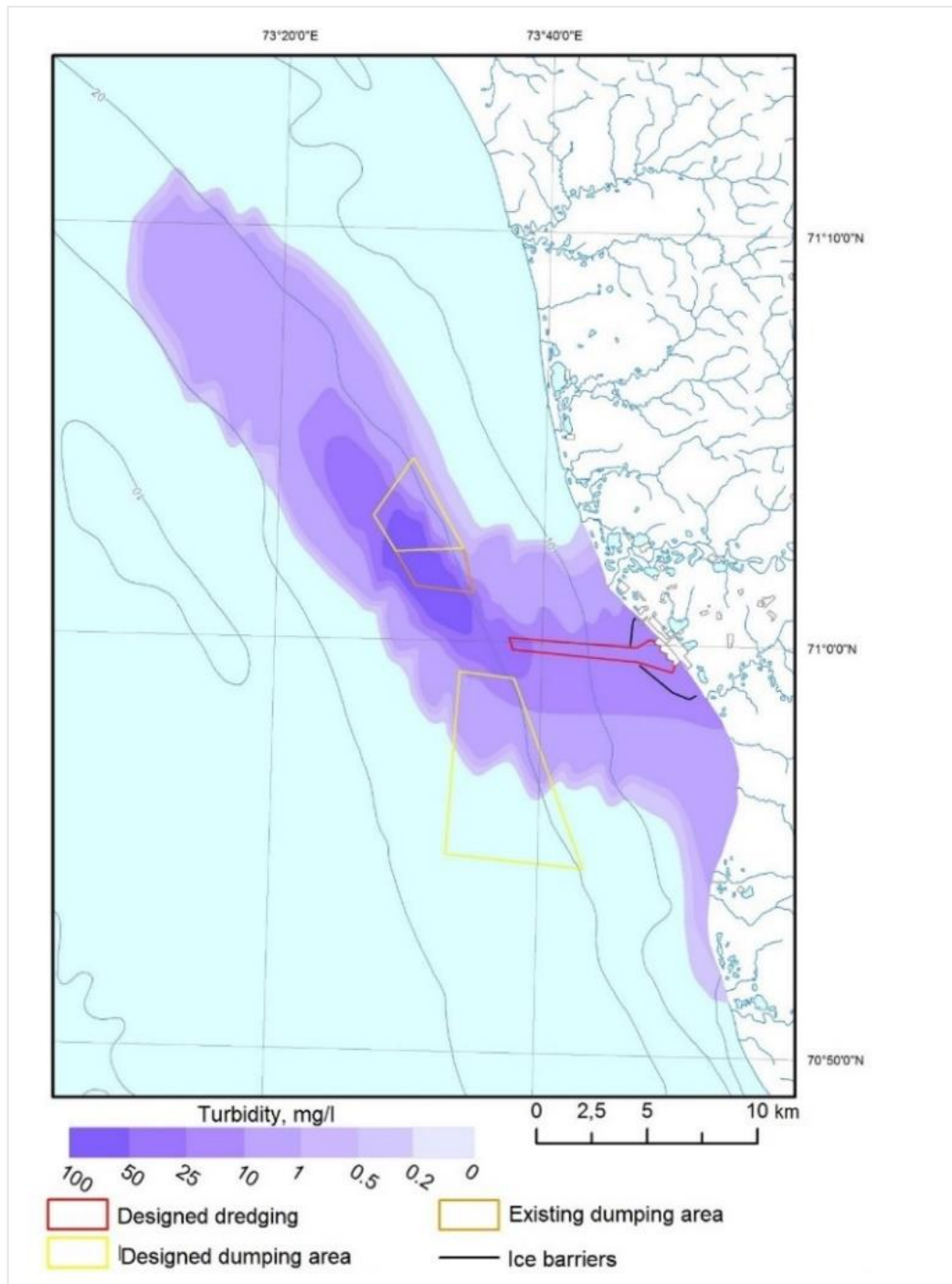
Construction plans for the GBS LNG & SGC Complex and the Port in the coastal area of the Ob Estuary provide for dredging operations for the access channel to the seaport and preparation of the internal basin of the Port. Those will be the main impacts on the marine environment, as re-suspended sediment will affect the water quality both in the soil excavation area and in the dumping area and develop new deposits on the seabed.

Dredging operations will generate a cloud of suspended sediment which will move in the direction that depends not only on the prevailing direction of flow from the Ob River toward the Arctic Ocean, but also on the tidal circulation and wind-induced effects which at times cause water mass to flow in the direction opposite to the main flow.

The following was determined on the basis of the simulation of suspended particles distribution for the Port water area and the soil dumping site:

- Maximum turbidity values are predicted at the first three stages of underwater technical works, within which the largest volumes of soil excavation are planned during the dredging of the water area of the existing berths, the construction of the quay and access channel.
- On the first two phases of the operations, significant concentrations of suspended matter (more than 10 mg/l) may be detected at distances up to 10-15 km.
- After construction of the ice barriers which will to a large extent block suspended matter transport from the protected water area, a smaller amount of suspended matter will migrate to the Estuary.

The plume of suspended matter from dumping (generating underwater dump fills) for the needs of the planned activity will propagate much further – as far as 20-25 km downstream of the Ob River with main plume zone deviating from the coast and as far as 10-15 km upstream moving mostly along the coastline (Figure 14).



**Figure 14: Turbidity zone of (mg/l) in the water area caused by maximal soil dumping**  
 (Source: IEPI JSC, 2020)

In terms of the temporal scale, this impact is assessed to be long-term, especially considering construction phasing and maintenance dredging requirements. Given the size of the pollution plume and duration of dredging activities and that the northern part of the Ob Estuary is not utilised for household needs by other users, impact of dredging activities on seawater is assessed as **moderate**.

Change in salinity under the influence of hydraulic structures

Impact of construction of the Port's hydraulic structures, primarily the ice barriers and the access channel, on seawater can be caused by the salt water penetration through the access channel into the central and southern parts of the Ob Estuary followed by development of stagnant zones and a general change in salinity. The results of the simulation of salinity changes under the influence of planned hydraulic structures showed that local changes in salinity were expected in the protected water area of the Port and westward,

in the area of the access channel. A negative salinity anomaly develops on the surface due to the freshwater penetration from the south. In the near-bottom layer, on the contrary, there is a pronounced positive salinity anomaly where salinity in the presence of the hydraulic structures and access channel, through which saltwater inflows, can increase by 30–35% relative to the salinity values in natural conditions. Under the influence of tidal movements and constant currents, the elevated salinity strip gradually spreads over along the coast to 15–20 km distances.

The positive salinity anomaly reaches its maximum values in the winter season, when, due to the decrease in river freshwater runoff, the saltwater inflow from of the Kara Sea, including through the access channel, is more intensive. However, in the summer season, when river flow enhances, saltwater is washed out and salinity restores its natural levels. Therefore, by the theoretical results, seasonal changes in salinity are local and do not lead to development of the stagnant zones with increased salinity owing to self-regulation that occurs in the summer-autumn period when salinity gets back to the natural values.

#### Wastewater discharge

A basic principle of design of the GBS LNG & SGC Complex and associated facilities is that all wastewater, including fugitive storm and melt water runoff from the sites located in the water protection zone of the Ob Estuary, is sewered to the wastewater treatment plant incorporated in the structure of the Salmanovskoye (Utrenneye) OGCF. Stormwater from the Utrenniy Terminal sites will go to the local treatment facilities via the stormwater drainage system and after treatment to the fishery standards will be discharged to the Ob Estuary. The quality of effluents and water quality in the water area of the Ob Estuary in the discharge area will be monitored during industrial environmental control and monitoring.

Both during construction and during operation of the Complex and the Port facilities, apart from the stationary structures and technical sites, wastewater will be generated by floating craft operations which is why each vessel involved in the operations will be equipped with dedicated tanks for collection of polluted sanitary, bilge and other wastewater and adequate procedures will be established for their subsequent management.

All solid waste generated at the vessels will be collected in dedicated tanks and containers and afterwards transferred to remote facilities of licensed contractors. Waste generated by the GBS will be also accumulated in dedicated tanks and containers and then removed to the waste landfill of the FIELD or to remote disposal sites of licensed contractors. Waste discharge to the Ob Estuary or onto the relief is completely ruled out.

Provided waste management practices at the vessels and GBS are compliant with the statutory requirements and conditions for liquid and solid waste accumulation and disposal, potential adverse impact of this factor on the marine environment in the Ob Estuary can be assessed as **low**.

#### Ice management system

To minimise a risk of accidents due to ice conditions during fleet operations, the FEED design of the Port facilities provides for an ice management system (IMS): discharge of heated sea water to the internal basin to prevent it from freezing during the period of steady negative air temperatures. As the chemical composition of water used in the system remains unchanged, the local increase of recipient water temperature and induced turbulence in the areas of water intake and discharge will be the only impacts. Given the seasonal pattern of IMS operation significance of its integral impact on the water environment of the Ob Estuary is considered to be **low**.

#### Emergency oil spills

Oil spills at the Complex and the Port facilities located in the water area and on the shoreside of the Ob Estuary are possible both during the construction and during the operation phase. The highest risk of potential spills on sea is associated with storage, handling and transportation of hydrocarbons (including condensate, diesel fuel and kerosene) at the Complex, in the Port, and on vessels.

A special division will be established at the Onshore Facilities that will be responsible for detection, prevention, identification and elimination of spills in the Ob Estuary. The division will have at its disposal necessary spill response equipment (sorbent and guard booms, oil recovery vessels, etc.). In the case of compliance with statutory requirements on establishing relevant services and developing spill prevention

measures, alongside with measures of prompt response to the spill containment and removal, the residual impact on the marine environment can be assessed as **moderate**.

#### 8.4 Impact on Soil and Geology

One of the specific physical and geographical features of the discussed area is the spatiotemporal conjugation of soil formation and exogenesis processes which is why impacts on the topsoil, terrain and exogenous processes, as well as on the geological environment, require an aggregated forecast, development of a single set of response measures, and a common monitoring program.

Due to the compact footprint of the FIELD, Complex and Port facilities, their impact on the geological environment and soil cover will largely remain local and will not extend beyond the allocated land plots and adjacent areas (water areas inclusive, in case of exogenous processes).

##### *Subsoil and its use conditions*

Under the Arctic LNG Project, production of hydrocarbons, gravel and earth construction materials will irreversibly change the subsoil state, while the conditions for subsequent subsoil use in these land and water areas will become more complicated due to numerous engineering facilities set in the geological environment. Although the license area does not fall within the earthquake category, field development can trigger local geodynamic processes, primarily, a slow stable subsidence of the land surface and seabed above the developed subsoil zone, which is most common for the region.

The subsidence, judging from the analogue facilities, may occur down to dozens of centimeters or, which is less likely, a few first meters during the entire field development period. This may cause local accidents at the Project facilities and change the direction and intensity of exogenous processes in the adjacent areas; however, it will not have a significant impact on the land use conditions. The areas of a higher geodynamic risk will be confined to the intersections of disjunctive disturbances, especially to those in proximity to well pads. No strong earthquakes caused by induced seismicity are anticipated. Surface deformations and individual structures immediately at the site of Project facilities will be subject to geotechnical monitoring.

##### *Exogenous geological processes*

The designed area of the Project location features a variety of manifestations and high activity of exogenous geological processes (EGP, refer to Figure 15) having average areal prevalence over 75% in natural settings. Terrain stability tends to decreasing from the interstream inland areas to the bottom surfaces of the Ob Estuary. Relatively stable components of the coastal area, specific of complex geomorphology, are laid lake-bog assemblages which may be primarily exposed to the shore destruction and water regime modification due to the construction. Alternatively, slopes of the 2nd marine terrace, which are prone to gravitational, erosion and deflation, cryogenic and other exogenous processes, are highly sensitive to the technogenesis. Stability of the coastal slope terrain, draining and valley network is assumed as low either, though, unlike stable equilibrium characteristic of undisturbed slopes of the Gydanskiy peninsula marine terraces, here is observed constantly ongoing terrain recovery facilitated by ice gouging, bottom and side erosion, and water accumulation.



**Figure 15: Terrain and manifestations of exogenous geological processes at the site of the designed Complex location**

(Left to right, top down: a – drain; b –sandy beach swells of laida; c - waterlogged mouth of a nameless stream within the laida; d - waterlogged shore of the lake within the first marine terrace; e - thermokarst occurrence (depression in the left bottom corner) and heaving (knoll in the right upper corner) within the first marine terrace; f – drain hollow; g, h, i - erosion slope of the second marine terrace with detachment cracks and deflation). Photo materials of TsGEI LLC (2017).

Onshore, the planned activity will mostly have direct physical and mechanical impacts on the geological environment contributing to the secondary activation of EGP, the most dangerous of which are the cryogenesis, underflooding and waterlogging, erosion-accumulative processes, deflation, and eolian accumulation. Also, settling of slopes, suffusion, and other engineering processes in the footprint of the created earth structures and dugouts will develop locally. Apart from that, construction and subsequent operation of the designed facilities will assist the thermal regime of soils, and, since the subject area is associated with the cryolithozone, heat effect will inevitably change not only the conditions of seasonal soil freezing and thawing, but also will contribute to the permafrost degradation and is likely to provoke the EGP activation outside the land allocation area. Implementation of the measures proposed by the Consultant will minimise the above adverse processes.

Underwater engineering works and artificial structures to be created in the Ob Estuary waters and coastal area will redistribute ice and wave loads, modify water circulation and sediment balance to inevitably result in restructuring the underwater terrain.

In general, the significance of impacts associated with the activation of hazardous exogenous geological processes is assessed by the Consultant as **high**; however, the measures suggested in the ESHIA will reduce it to **moderate** for the coastal area and **low** for the continental land. In particular, the engineering preparation of the coastal area will prevent or minimise the impact of related processes such as flooding and ice formation, thermal abrasion and other forms of coastal destruction, and water accumulation. For assessing the relevant trends and early prevention of accidents, it is necessary to monitor the morphological and dynamic conditions in accordance with the Consultant's proposal.

## Soil

In the area of the Complex and associated facilities, of higher environmental importance are functions of the soil cover such as maintaining the fragile state of local ecosystems, including productive lichen pastures, conserving thermal insulation of permafrost, regulating the water regime in the seasonally thawed layer, and maintaining terrain stability. Alongside with that, soils of the subject area are a natural depositing medium for pollutants and microorganisms, including causative agents of dangerous diseases.

Due to highly active exogenous geological processes, the area of the planned activity is characterised by difficult thin soils (psammozems / Arenosols, alluvial / Fluvisols, refer to Figure 16) with no economic value. Loss of the soils will be followed by their fast, within a few years or decades, restoration on the sections free from buildings and pavement. Mature clearly profiled soils (podzolized brown soil / Spodic Cryosols, gleyzem / Gleysols) and relatively powerful organogenic horizons (peat-gleyezems / Histic Gleysols, peat oligotrophic / Histosols, peat-cryozem / Histic Turbic Cryosols) were forming during hundreds and first thousands of years, yet they have retained a high sensitivity to technological impacts and it will be actually impossible to fully restore their profile after physical and mechanical damage.



**Figure 16: Soils abundant in the area of the Complex and within its sanitary protection zone**

**(Left to right: psammozem (Tidalic Protic Arenosols), gleezem (Dystric Fluvic Spodic Histic Gleysols), peaty cryozem (Histic Reductaquic Turbic Cryosols), peat bog soil (Dystric Cryic Histosols), podzolised brown soil (Spodic Histic Cryosols). (Source: TsGEI LLC (2017))**

To this end, given the above functions of the local soils, the key soil management recommendation is to take utmost care to preserve them in the undisturbed state. As regards those areas to be inevitably disturbed, though they are buildings-free, the Consultant advises land remediation and monitoring. The significance of the integral impact of the planned activity on the soil cover is assessed as **moderate**; efficient remediation of the disturbed lands based on the Consultant's proposals will reduce it to **low**.

## Groundwater

Groundwater in the area of the FIELD, Complex and Port facilities neither will be used for economic activities nor have a high sensitivity to the technogenesis. Their first horizon from the surface is ubiquitously represented by fresh, free-flowing, above-permafrost waters of the seasonally thawed layer undergoing annual variations of the phase state. Alongside with hydrogenous non-through talik waters confined to recent alluvial, marine and biogenic sediments and hydrologically related to surface water bodies responsible for their origin, these horizons have no protection from the influx of pollutants carried by surface runoff and in fact act as a transit medium.

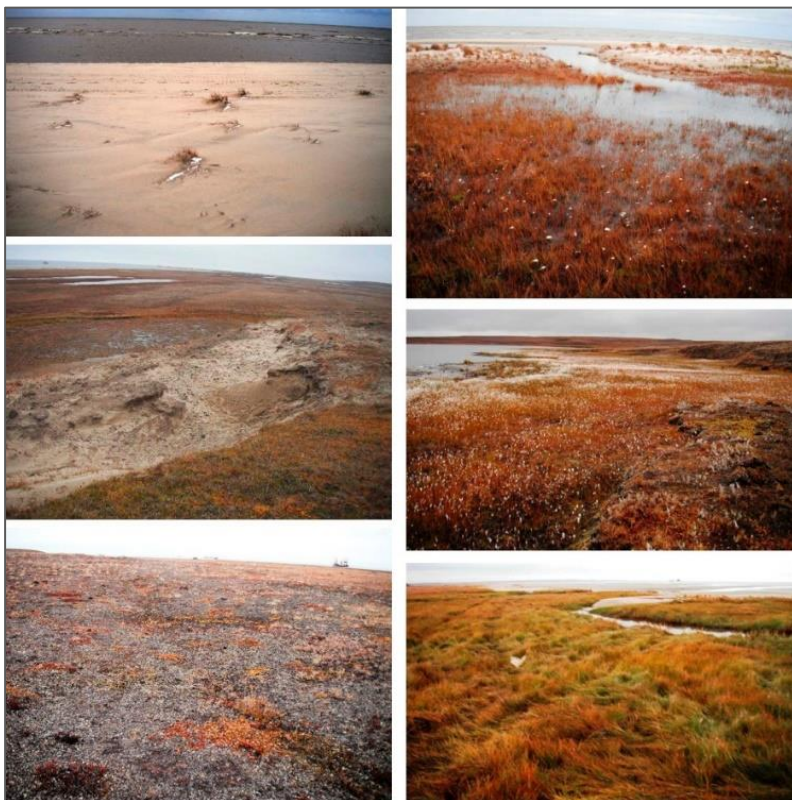


A particular hydrogeological feature of the area of the Complex's onshore structures is cryopegs found within its boundary. These are intra-permafrost overcooled brines occurring at a 10-20 m depth whose occurrence on the surface is a factor of proneness to accidents due to pressure levels, high corrosivity and negative temperature of these waters. It is foreseen that the impact of the planned activity on above-permafrost water will be significant, though local and most pronounced during the construction period. Cryopegs are most likely to occur during this period. The findings of the conducted surveys do not allow accurate prediction of their occurrence, so the situation calls for developing and implementing an appropriate action plan.

The integral significance of the Project's impacts on groundwater within its area may be assessed as **low**. Direct impact on deeper aquifers will be the injection of a portion of treated wastewater into geological strata. The Consultant considers a risk of environmental effects of such activity to be low; nonetheless, there is a need for monitoring of the state of wastewater reservoir formations and injection well sites with regard to the absence of crossflows, upward water movement, and other unpredictable changes in the geological environment of the respective areas.

## 8.5 Impact on Biodiversity

*Terrestrial ecosystems* of the Gydan Peninsula within the Salmanovskiy (Utrenniy) LA constitute a natural and locally modified habitat. The former is represented within the license area mainly by northern hypoarctic tundra communities. Grass-moss-lichen, sedge and cottongrass-moss tundras typical for the Gydan Peninsula are abundant in the license area (Figure 17).



**Figure 17: Natural habitat vegetation in the Salmanovskiy (Utrenniy) license area (left, top down: sandy beach swells, pioneer tundra groups of marine terrace slopes, willowy sedge-lichen tundra of the main surface of the terraces), as well as within the designed sanitary protection zone (right: cottongrass-sedge-hypnum and related variants of bogs of the sea coast, lake basins and the floodplain complex of watercourses). Source: TsGEI LLC, 2017.**

Flora in the license area is relatively poor; 124 species of vascular plants, 75 genera and 28 families were identified in the area (Figure 18). In terms of the species composition, it is similar to other flora of the northern hypoarctic tundra subzone of the Yamal-Gydan region. Species of the arctic and arctoalpine type make the largest contribution to the flora structure (48%); boreal types are less abundant. All flora species are native and the facts of biological invasions to the flora have not been detected so far. Over 20 plant species within the licensed area are included in the YNAO Red List, which is predictable for this

geographic range. Local environmental monitoring identified four species of vascular plants protected on the regional level, having status III "rare species": Vogul brome (*Bromopsis vogulica*), tundra wood rush (*Luzula tundricola*), tufted saxifrage (*Saxifraga cespitosa*), and Jacob's ladder (*Polemonium*) (Figure 19).

Rare communities, limited in area and associated with specific rare environmental conditions, include spaced mixed herb-grass meadows on coastal sandy cliffs. These rare plant communities are formed in a narrow range of environmental conditions, occupy extremely small areas, contain rare and protected plant species included in the Red List of Yamal-Nenets Okrug, and have high aesthetic value due to a large number of brightly flowering species (Figure 20).



Figure 18: Tundra plant species in the license area. Left, top down: Mt. Washington dryad (*Dryas octopetala* subsp. *subincisa*); Tilesius' sawwort (*Saussurea tilesii*) – a species found on the Gydan Peninsula on the western boundary of the habitat range. Right, top down: a perennial cushion plant – Arctic sandwort (*Minuartia arctica*); a species typical for tundra bogs and disturbed areas – Scheuchzer's (white) cottongrass (*Eriophorum scheuchzerii*). Source: IEPI JSC, 2019.



Figure 19: Protected species growing in the license area. Left, top down: Jacob's ladder (*Polemonium boreale*), polar sandwort (*Eremogone polaris*). Right, top down: Vogul brome (*Bromopsis vogulica*), snow buttercup (*Ranunculus nivalis*). Source: IEPI JSC, 2019.



**Figure 20: Colourful tundra meadows with dryads and boreal carnations (*Dianthus repens*) on steep slopes of the Ob Estuary. Photo materials: IEPI JSC, 2019.**

Fauna of terrestrial vertebrates of the Salmanovskiy (Utrenniy) license area is typical for northern hypoarctic tundra. Here, 80 species of birds nest and occur on migrations; 7 species of mammals are found in the area. Over the period of the engineering surveys and environmental monitoring within the LA, representatives of four species of terrestrial vertebrates included in the Red Lists of the Russian Federation and Yamal-Nenets Autonomous Okrug were encountered: Bewick's swan (*Cygnus bewickii*), peregrin falcon (*Falco peregrinus*), snowy owl (*Nyctea scandiaca*), and lesser white-fronted goose (*Anser erythropus*). All these bird species nest in this territory, but only one of them is present here year-round (snowy owl) (Figure 21).

Within the land and water areas affected by the Project, engineering surveys and environmental monitoring of 2012-2019 confirmed the absence of ecosystems that would meet the criteria for the critical habitat set out in IFC Performance Standard 6. Areas that may potentially include critical habitats are located no less than 25 and 70 km from the boundaries of the licensed area and the Project facilities, respectively. They are confined to regulated specially protected areas of federal (Gydan National Park) and regional significance (Yamal Wildlife Reserve (Yamalsky Zakasnik)), wetlands of international significance (Ramsar), and key ornithological areas of global importance. Furthermore, it is worth noting a relatively high environmental and biological value of ecosystems of the Yuribey River Valley located 25 km south of the licensed area boundaries and 80 km southeast of the Port and the GBS LNG & SGC Complex. Scientific publications indicate the need for their conservation.



**Figure 21: Rare and protected bird species found in the license area: snowy owl (*Nyctea scandiaca*), on the left; Bewick's swan (*Cygnus bewickii*), on the right. Photo materials: IEPI JSC, 2019.**

The modified environment is comprised of disturbed tundra areas adjacent to the exploratory wells of the late 20th century and the constructed sites of the Salmanovskoye (Utrenneye) OGCF facilities, as well as of the areas immediately adjoining them within a radius of 50 m which were modified and degraded as a result of exogenous geological processes activated by plant communities. Upon Project completion, a ratio of the natural and modified environment will be 98.5% to 1.5%, respectively, which evidences to the preferential physical conservation of natural habitats in the Project's area of influence.

**Marine ecosystems of the Ob Estuary.** Owing to the substantial contribution of the Ob River to water balance of the Arctic Ocean and the association of natural habitats and migration routes of numerous rare and threatened species with its lower reaches, the entire Ob Estuary has been included in the list of Ecologically and Biologically Significant Marine Areas (EBSA) of the Convention on Biological Diversity (Rio de Janeiro, 1992). Also, it is one of the topmost fishery regions of Russia having the largest and most productive population of muksun (*Coregonus muksun*), broad whitefish (*C. nasus*), omul/Arctic cisco (*C. autumnalis*), etc., and a habitat of Red-List Siberian sturgeon (*Acipenser baerii*) caterorised as “endangered” in the Red List of the International Union for Conservation of Nature and Natural Resources (IUCN).

Hydrobiological communities of the Project implementation area are formed in the conditions of low salinity and its significant seasonal and interannual fluctuations. Diatoms algae are formative for the phytoplankton community of the water area. Zooplankton in the Project water area has a rather diverse taxonomic composition where more abundant are copepods, rotifers and daphnids. The species of these groups belong both to freshwater and to brackish-water dwelling species although they may inhabit even considerably desalinated waters. The water area is characteristic of a low diversity of zoobenthos species, their irregular distribution and significant spatial variability of abundance and biomass rates.

Low indices of the macrozoobenthos diversity originate from the complex thermohaline structure of the hydrological pattern of the water area: freshwater species common for the southward part of the Ob Estuary and marine species characteristic of the seaward part are either absent or hardly survive in the environmental pessimum which is why euryhaline species predominate here. It should be highlighted that all zoobenthos representatives characteristic of the local bottom habitats are a valuable nutritive base for fish.



The species list of ichthyofauna of the Ob and Taz Estuaries of the Kara Sea comprises up to 55 fish species and some 36 of them dwell in the Project area (Figure 22). The area features a predominantly low fish fauna density and irregular distribution over the water area. Prevailing species in the catch are nadromous Arctic omul (*Coregonus autumnalis*), semi-anadromous species Arctic rainbow smelt (*Osmerus mordax dentex*) and sardine cisco (*Coregonus sardinella*), and bottom four-horned sculpin (*Triglopsis quodricornis*).

**Figure 22: Ichthyofauna of the Project water area. Top down: broad whitefish, cisco, nelma, navaga, and Arctic omul**

**Source: NPF “DIEM” LLC (2014)**

Fauna of seabirds and marine mammals of the Ob Estuary in the Project area is relatively poor. Lacking rocky cliffs and the low flooded shoreside limit the space for rockeries of auks. In the water area of the Project, the most common are Siberian gulls (*Larus fuscus heuglini*) and glaucous gulls (*Larus hyperboreus*), black-throated/Arctic loons (*Gavia arctica*), and numerous diving long-tailed ducks (*Clangula hyemalis*). Among marine mammals, seals (*Phocidae*) are common but not numerous; these are bearded seal (*Erignathus barbatus*) and ringed seal (*Phoca hispida*) (Figure 23). Beluga, a toothed whale from the family of narwhals, sporadically visits the Ob Estuary, including the Project area. Two more species, a walrus (*Odobenus rosmarus, Atlantic subspecies*) and polar bear (*Ursus maritimus*), are encountered occasionally and as individual animals because the Project implementation area is located beyond their main habitat ranges.



**Figure 23: Marine mammals in the water area of the designed Complex. Left to right: ringed seal (*Phoca hispida*) and bearded seal (*Erignathus barbatus*)**

**Photo materials of EkoExpressServis LLC (2013) and NPF "DIEM" LLC (2014)**

Within the Ob Estuary water area affected by the Project, engineering surveys and environmental monitoring of 2012-2019 confirmed the lack of ecosystems meeting the critical habitat criteria. A contribution of the water area to maintaining the commercial, rare and endangered fish species numbers is minimal compared to the confluence zone of the Ob and Taz Estuaries located southward (defined as an Arctic water area of high conservation value "Ob-Taz Area of the Kara Sea"). It is nominated for the status of a fish conservation zone (FCZ) due to the high concentration of fish of many species in wintering and spawning periods, including Siberian sturgeon. The planned activity will take place 120-140 km downstream of the particular water area of high conservation value, which minimises the likelihood of direct impacts on this zone.

The predicted integral significance of the planned activity impact on various biodiversity components of the **terrestrial** and **aquatic** ecosystems and related ecosystem services is assessed by the Consultant as **moderate** and **high**, respectively, and can be reduced to **low** and **moderate** by efficient measures focused on preventing, minimising and compensating for anticipated damage. This complies with IFC Performance Standard 6, according to which mitigation measures should aim at achieving no net cumulative biodiversity loss in land and water areas with natural habitats. It calls for undertaking additional measures for residual impact minimisation and loss compensation where damage to the biological resource is inevitable.

Measures to prevent and mitigate effects on the biota include, inter alia, engineering arrangements such as fish protection screens at water intakes, bird protection structures on overhead HVTLs, wildlife corridors for communications crossing, soft start for underwater engineering operations, etc.

Most importantly is to establish and carry out systemic comprehensive monitoring of biological diversity of the terrestrial and marine environments. Monitoring should include special studies to fill in the gaps in existing data on biota and to provide scientific grounds for impact assessment of key groups of organisms.

Alongside with that, according to IFC Performance Standard 6, in land and water areas with natural habitats, the mitigation measures should be designed to achieve no net cumulative loss of biodiversity where feasible. The release of young fish into the surface water bodies of the region is already underway and is planned for the future as a measure to compensate for harm to the biological resource. To minimise the Project-related impact on terrestrial ecosystems, it is recommended to initiate and conduct research for elaborating optimal methods of land reclamation and plant communities restoration with their implementation to follow. Since no optimal approaches to disturbed land reclamation in the Arctic have been so far developed, scientifically grounded remediation and restoration of natural communities will be an additional measure to exclude cumulative loss of biodiversity.

## 8.6 Waste Management

Construction, operation and decommissioning of the Complex and associated facilities will generate waste of hazard classes I-V. Waste management operations, including collection, temporary accumulation, transportation, treatment, neutralisation and disposal, will have various adverse environmental impacts.

Most of **construction**, particularly of the process trains, will be carried out at remote sites, so waste management at this Project phase is beyond the ESHIA scope. Given the scarcity of waste disposal and recycling facilities in Yamal-Nenets Autonomous Okrug and, in fact, a lack of the such in the Project implementation area, the selected approach, i.e. using production capacities of existing shipyards and other industrial sites in Russia and elsewhere, appears to be the best choice in terms of efficient and environmentally safe management of construction waste generated by the Complex.

The selected technological solutions for management of drilling waste that will be generated in large quantities during construction of producing wells rule out discharge of drilling waste to the environment

before its neutralisation and recycling. Construction materials obtained after drilling waste neutralisation and recycling can be used immediately at the Project facilities for filling roads, embankments, and engineering preparation and technical remediation of the sites.

Waste from the Project facilities will be transferred to a licensed specialty contractor selected on a competitive basis as the single solid waste management operator under the Project for temporary waste storage, treatment, utilization, neutralisation or disposal. Part of III-IV hazard class wastes will be treated, neutralized and disposed of at the Company's MSCIW (municipal solid, construction and industrial waste) Landfill as part of the Salmanovskoye (Utrenneye) OGCF Facilities Setup (after its commissioning). Apart from that, the single operator will be responsible for management of the removal of waste not subject to thermal destruction/incineration from the Salmanovskoye (Utrenneye) OGCF by sea transport and for conclusion of agreements with other contractors operating outside the Project area.

At the stage of construction of the Terminal and associated facilities prior to commissioning of the MSCIW Landfill, waste will be accumulated at a temporary storage site specially set up within the designed Landfill and removed for neutralisation, recycling and disposal at facilities outside the Project area by licensed specialty companies.

After commissioning of the MSCIW Landfill as part of the Salmanovskoye (Utrenneye) OGCF Facilities Setup, waste of hazard classes III-V generated by the Project and associated facilities will be delivered to the Landfill for incineration and landfilling. Waste of high hazard classes and waste categorised as secondary resource will accumulate at the temporary waste storage site at the Landfill until there is a suitable transportation batch and transported by specialty contractors for neutralisation, recycling and disposal at licensed facilities outside the Project area.

The Landfill throughout its operation period will be used for disposal of industrial, construction and municipal solid waste of hazard classes V, IV, and partly III, generated by the Project and associated facilities, as well as for thermal destruction/incineration of waste of appropriate categories and temporary storage of all waste that cannot be accepted for thermal destruction for the period of accumulation of a suitable transportation batch, but not more than 11 months, before its removal to remote facilities of external companies.

Construction of the Landfill will utilise best available technologies of industrial and municipal waste disposal, as well as of thermal destruction. Waste disposal facilities will be constructed stepwise due to the fact that design documentation for the Project facilities took in account the maximum possible amount of generated waste and actual amount of waste to be passed over for neutralisation and disposal at the Landfill may appear considerably less. Residual impact on the captive landfill capacity is assessed to be low. And, if necessary, there remains the possibility of additional designing and construction of new facilities for industrial and municipal waste disposal, as well as of the removal of waste from the Project area to remote facilities for treatment, recycling and disposal.

**At the operation phase**, Project and the associated facilities operations generating main streams of industrial waste will be replacement of filter elements and heat transfer agents on the process plants of the GBS LNG & SGC Complex, cleaning of pipelines and tanks, collection of de-icing liquid from aircraft treatment in the Utrenniy Airport, maintenance and repair of basic and auxiliary equipment and motor vehicles of the Complex, FIELD, Terminal and Airport, and thermal destruction of waste in thermal treatment chambers/ incinerators. Low hazard municipal waste (MSW) and industrial waste, similar to the municipal, and silt and sediment from the wastewater treatment plant will be generated in larger amounts. By analogy to the construction phase, the most hazardous waste from Project operation will be handed over to external contractors, and the rest (hazard classes V, IV and partly III) will be neutralised and disposed at the MSCIW Landfill.

As most of waste generated by construction and operation of the Project facilities is of low hazard, its management is expected to exert moderate impact on the environment. In case of compliance with waste management sanitary rules and regulations and implementation of the organisational measures suggested by the Consultant, the residual impact of waste on human health and environment components will be from **low to insignificant**.

After **decommissioning** of the Project and associated facilities, follow up dismantling of buildings and structures will generate a significant amount of waste usually assigned to low hazard classes. Upon

completion of the Project as a whole, including buildings and structures demolishing, remediation of the land plots and their return to traditional use, the area under the Landfill and its sanitary protection zone will remain the only subject of operational environmental monitoring, including after the Landfill stops accepting waste.

## 8.7 Climate Change Risk Assessment and Project Adaptation

Risk assessment for the Project in the context of climate change was carried out in consistency with Equator Principles IV and the Recommendations of the Task Force on Climate-Related Financial Disclosure (TCFD) for two risk categories: physical risks that is change of the climate parameters in the global and regional context and risks of the transition period that is consideration of the global trend – transiting to low carbon economy. Such risks, alongside with potential development opportunities, need to be identified and assessed in a timely manner to determine appropriate management measures and design solutions to minimise the consequences and increase sustainability of the technology-intensive and complex Project in the medium and long term.

Assessment of the current situation and climate change trends was carried out using an array of data on the main parameters of climate conditions in the region and available publications with the analysis of the past and future long-term climate change trends. Global climate change and its manifestations in the territory of the Russian Federation have been ascertained by various studies and are expressed in the form of the dynamics of extreme weather events and long-term changes: an increase in average annual temperatures of the surface air layer, minimum and maximum extreme temperatures, and intensity of dangerous hydrometeorological phenomena. These manifestations of climate change in turn involve a number of consequences such as a slow increase in the seasonally thawed layer, gradual and focal decrease in the bearing capacity of permafrost, decrease in the duration of use of winter roads, decrease in the sea ice area along the Northern Sea Route, etc.

As established for the Project, the expected rise of average annual temperatures and increase in the number and intensity of extreme events fall within the scope of factors of **moderate** physical risk in the long term. Should such risks occur, among their probable direct consequences to be the most significant for the Project in the long term may be expected a decrease in the bearing capacity of permafrost and extreme physical climatic effects on the facilities (irregular and “stressful” loads, drastic temperature drops, etc.) which can cause deformation, loss of sustainability and integrity damage of structures and infrastructure. Such risks are minimized by design solutions that would take in account these factors and provide for an increased safety margin in the bearing capacity of the foundations and structures, and by proper choice of construction materials. The design provides for undertaking these adaptation measures which will allow mitigating the risk to a **low** level.

In the harsh Arctic conditions, an increase in the extremes or intensity of any meteorological event will have a cumulative and aggravating effect on health of Project and other companies’ personnel. The physical risk and significance of this impact is assessed from **medium to high**; however, consideration of current weather conditions when choosing overalls and PPE, developing outdoor work schedules (during construction), selecting the heat supply mode (during operation), as well as in developing and implementing response procedures in case of hazardous meteorological events will all contribute to reduction of the significance of impact on health of Project personnel to a low level.

In connection with the scientifically proven relationship between anthropogenic greenhouse gas emission and existing climate change, the global community faces a challenge of a rather fast GHG emission reduction and switchover to low carbon economy. In order to ensure the GHG emission reduction, at the end of 2015, the UN Framework Convention on Climate Change prepared the Paris Agreement for regulation of measures for reduction of the carbon dioxide concentration in the atmosphere since 2020. The agreement was signed in 2016 by the majority of countries, including the Russian Federation.

If the transition to low carbon economy begins ubiquitously in the nearest future, it will be relatively gradual and organizations will be able to prepare for it and develop their transition strategies and mitigation measures. This approach reduces the likelihood of the most unfavourable climate change scenarios, i.e. minimises physical risks. In general, it is planned to abandon the use of fossil fuels for generation of all energy types in the long term; therefore, it is expected that the transition period will primarily affect

companies that rely on production, processing and industrial use of coal, oil and natural gas (in terms of reducing the sensitivity to the change).

Among the transition period risks are taxes on greenhouse gas emission, potential regulation and distribution of gas raw material and product amounts, rise in insurance costs, change in consumer behavior regarding energy and services consumption, decrease in LNG demand due to a preference for other products and other energy sources with lower GHG emission, etc. To minimise these risks, the Company can undertake a number of actions, including

- financial modelling for the investment performance evaluation and costs planning with account for possible GHG emission taxation, higher insurance cost, and lower demand;
- timely monitoring of changes in statutory requirements, starting from the drafting stage;
- strategic planning and efficient GHG emission control during all periods of the Project implementation (using all appropriate tools);
- selection of advanced, resource- and energy-efficient technologies (done at the design stage);
- high performance production management; and
- regular preparation, verification and publication of open GHG emission reporting.

## 8.8 Greenhouse Gas Emission

Arctic LNG 2 LLC is aware of possible implications of climate change in the global context, and especially in the Arctic region, and the need for target actions to minimise and effectively control greenhouse gas (GHG) emissions. To estimate GHG emissions, an approach was used based on the currently available and internationally recognised IPCC guidance and reference documents, and industry guidance documents. Preference was given to international calculation methodologies that do not contradict Russian regulatory documents.

By the assessment, GHG emission of the Project at the construction phase is expected to be 253.68 thousand tons of CO<sub>2</sub> equivalent for the overall construction period, and at the operation phase (since 2026) it will not exceed 5.67 million tons of CO<sub>2</sub> eq. pa.

As annual greenhouse gas emission of the Project exceeds the mandatory reporting threshold of 50 thousand tons of CO<sub>2</sub> equivalent per year established by the Resolution of the RF Government of April 22 2015 No. 716-r and the threshold of 25 thousand tons of CO<sub>2</sub> equivalent per year established by the IFC Performance Standards, it is necessary to annually carry out assessment of actual direct and fugitive GHG emissions of the Project. In addition, exceeding the threshold of 100 thousand tons of CO<sub>2</sub> eq. pa means the need for the public domain publication of annual GHG emission reports of the Project in the framework of Volume 1 and Volume 2 at the operation phase.

To this end, the Project will provide for annual reporting on the actual amount of greenhouse gas emissions and make the reports available to the relevant government authorities and credit institutions. Also, international financial institutions require that annual reports on GHG emission during Project operation are published and made available to all stakeholders.

After commissioning of the Project facilities, it is necessary to clarify the actual GHG emission volume, taking in account the measurement or accounting results. It is expected that actual GHG emissions of the Project may differ downwards from those calculated since the calculation used predicted input data cited in design documentation and high load values of capacities with allowance for the concept of conservatism.

As the Project is a new construction, a concept of maximum possible energy and resource efficiency was underlying for facilities and structures designing. Spatial and technological solutions and equipment were selected in terms of best available technologies and optimisation of production and auxiliary processes, as well as of logistics solutions. Therefore, implementation of the design solutions ensures that direct and fugitive GHG emissions are minimised due to the choice of the most efficient methods of heat and electricity generation and rational use, as well as by reducing possible leaks of natural gas and gas condensate in the technological process and during transportation.

To ensure implementation of the designed resource- and energy-efficient solutions, the Project will perform architectural supervision and construction control during construction and commissioning, monitoring of



technological parameters during the transition period to fully-featured operation, and monitoring of the fulfillment of environmental and social management plans as regards air emission.

For sustainable high performance of GHG emission management during the operation phase, it is necessary to carry out, in due time, scheduled preventive maintenance of equipment, monitor and control emissions, update the inventory of sources and the GHG emission register, annually evaluate absolute and specific indicators of GHG emissions of the Project, and, as may be feasible, implement additional appropriate energy saving solutions in accordance with the best available practices internationally.

## 8.9 Potential Transboundary Impact

The environmental and social impact assessment has not revealed any potential for the occurrence of significant impacts from the planned activity that may go beyond the national border:

- Most of the impacts will remain local and will not extend beyond several tens of kilometers from the sources.
- Assessment of contingencies has not identified risks of the impact expansion outside the territory of the Russian Federation and its territorial waters; if assume that the calculated SGC spill amount is maximum (with end-to-end failure of the tank wall sealing), in the absence of prompt spill response measures, thin condensate films are likely to propagate for 100 km northward and southward by the Ob Estuary.
- Transboundary effects for populations of migratory species of birds and marine mammals whose habitat ranges extend beyond the borders of the Russian Federation are not expected.
- The potential for transboundary impacts associated with the invasive species transfer due to maritime traffic is assessed to be low.
- Potential transboundary effects may occur due to maritime operations along the Northern Sea Route, including transportation of construction materials and LNG/condensate which are not considered under this ESHIA. Most notable of such effects may be accidental leaks of fuel, LNG and condensate during shipping although the probability of their occurrence is assessed as low or negligible. In normal operational conditions, transboundary impacts from maritime operations are not expected.
- Project's contribution to regional and global pollution of air and the World Ocean on the average is assessed as **negligible**, whereas this impact should not be fully neglected and needs accounting, including in terms of greenhouse gas emission.

## 8.10 Cumulative Impact

According to the IFC standards, impact assessment of the planned activity should account for possible overlapping of the subject impacts with impacts from third parties' activities whose areas of influence partially or fully coincide in space/time and have common recipients. The significance of such impacts, referred to as **cumulative**, is assessed on the basis of impact-related concerns of the academic community and/or of affected parties to the planned activity. In addition, the assessment takes into consideration only those environmental/social recipients, regarding which the project itself is considered to be a source of potentially significant impacts.

Following the review of the research results focused on the problematic of the Gydan Peninsula and the Ob Estuary, the results of public consultations with regard to various facilities of the Arctic LNG 2 Project, as well as of consultations with stakeholders under the process of the 2018 ESHIA for the Complex and the current 2020 ESHIA, the Consultant compiled a preliminary list of issues of concern to the local indigenous community of Tazovskiy Municipal District which, in addition, are proactively discussed by the Russian academic community, including in the context of future comprehensive development of the Gydan Peninsula, the Ob Estuary and relevant subsoil areas:

- adverse changes in the geological environment caused by extraction of hydrocarbons (including the activation of geodynamic processes above the field drilled out area);
- adverse impacts of air emissions of pollutants and, in particular from flare units, on the quality of the ambient air of the Gydan tundra;
- transformation of the thermohaline structure of the Ob Estuary as a result of the expansion and operation of the sea channel crossing the Ob Bar;

- increased turbidity of the Ob Estuary waters and surface water bodies of the Gydan Peninsula as a result of dredging, development of underwater dumping sites, and quarrying of soil construction materials (accompanied by the increased concentration of suspended matter in water and the bottom sediment accumulation rate in the plume zones);
- chemical contamination of surface water bodies as a result of emergency spills of process liquids and wastewater discharge;
- modification of the species composition and abundance of hydrobionts (primarily ichthyofauna and species that constitute the fish nutrient base) in the areas of customary ISPN fishery as a result of a set of impacts of the planned activity;
- adverse changes in the environment caused by various modalities of industrial and municipal waste management (temporary accumulation, transportation, disposal) resulting from noncompliance with the relevant regulatory requirements and design solutions;
- alienation and fragmentation of terrestrial vertebrate habitats, as well as of agricultural lands (reindeer grazing areas), and, hence, the decline in natural biodiversity and reindeer numbers;
- decline in productivity of grazing areas (including due to the reindeer moss degradation) and, as a result, the decrease in reindeer numbers;
- adverse acoustic impact of the designed facilities at their construction and operation phases;
- creation of conditions conducive for the degradation of permafrost, activation of exogenous geological processes and, as a consequence, disturbance of the topsoil and vegetation cover with the increased risk of anthrax epizootic; and
- increase in the human morbidity as an integral effect of the above adverse impacts.

The list of impacts may be clarified and supplemented, as necessary, following the results of consultations with the stakeholders and comments on the disclosed documents in the course of the 2020 ESHIA process. All listed impacts are discussed in detail in the ESHIA materials considered in the selection of environmental and social components (ESC) for reviewing within the cumulative impact assessment.

The IFC requirements for assessing the significance of cumulative impacts take in account the chronology of the third parties' activities whose impacts are split into:

- ***past/existing***: in this case, these are maritime operations in the Ob Estuary, including operation of the sea channel at the intersection with the Ob Bar under Yamal LNG and New Port Projects; the existing fields on the Gydan Peninsula; *and*
- ***planned (projected)*** and ***future (expected)***: implementation of new LNG projects of NOVATEK such as Obskiy LNG, Arctic LNG 1 and/or the expansion of the Arctic LNG 2 and Arctic LNG 3 Projects and development of new deposits on the Gydan Peninsula, primarily, the Geofizicheskoye, Gydanskoye, Soletsko-Khanaveiskoye, Trekhbugornoye, and Shtormovoye and in the Ob-Taz Estuaries, and reconstruction of the sea channel in the north of the Ob Estuary.

The ESIA analyzed the potential for overlapping impacts of the Arctic LNG 2 Project with impacts from third parties and assessed the significance of potential cumulative impacts and the expected contribution of the Project to these impacts.

As a result, it was determined that the most significant are:

- cumulative impacts on the water area of the Ob Estuary, fish fauna and marine mammals caused by predicted overlapping of Project's impacts with the impacts of underwater engineering operations and offshore operations of third parties and navigation activities under ongoing and planned projects;
- cumulative impacts on natural habitats of terrestrial vertebrates (alienation, fragmentation, degradation) and on the customary activity of reindeer herders (acquisition of sections of grazing areas, changing herding routes, limiting access to some sections of fishery water bodies) from future development of neighbour deposits such as Geofizicheskoye, Gydanskoye, Soletsko-Khanaveiskoye, and Trekhbugornoye).

## 9. SOCIAL AND HEALTH IMPACT

### 9.1 Social and Health Impact

The ESHIA considered possible impacts of the Project on the social environment and community health. Information on the key impacts is given below.

#### *Impact on Community Health and Safety*

Construction and operation of the Project may have impact on the indigenous population migrating within the Salmanovskiy (Utrenniy) LA. Such impacts can originate from operating construction sites or production facilities and their machinery and equipment. Also, risks maybe associated with the onsite presence of hazardous substances and materials. Apart from those, motor traffic on public roads may cause health and safety exposure of residents of Tazovskiy Municipal District at large.

The nomadic population may be exposed to so-called stress impact. It may be related to a number of sources of disturbance, including traffic, the limitation of customary economic activities within the license area, the appearance of construction personnel, etc.

Nether of the significant health impacts such as noise, vibration and air emissions is expected due to the remote location of permanent residences of indigenous people from the Project facilities.

The significance of the above potential impacts is assessed as **moderate** or **high**. To mitigate them, the Consultant proposed corrective measures that would help reduce their level to **low** or **moderate**.

#### *Impact on Economy and Employment*

Beneficial impacts on economy and employment may relate to the creation of new jobs and potential engagement of local companies that will be able to render services and perform work under the Project. However, it should be noted that those impacts will be of limited nature. In addition, beneficial effects are expected due to taxes paid by the Company and implementation of socio-economic programs.

The MUP Antipayutinskiy State Farm, a local agricultural company, will enjoy a beneficial impact owing to the use of its land on rental basis and payment of appropriate compensation. However, the State Farm may appear exposed to an adverse impact associated with the FIELD facilities blocking or restricting the use of reindeer herd migration routes. The significance of this impact is assessed as **moderate**. To reduce it, appropriate measures were proposed, including, inter alia, the installation of crossings over gas pipelines, utility lines and other linear facilities. As a result of these, the impact significance can reduce to **low**.

The assessment process includes impact on the aquatic biological resource of the Ob Estuary and thus on the possibility of commercial fishing in its waters. The implications of this impact for commercial fishery are low probable. The impact level is considered to be low and its overall significance is assessed as **low**. Implementation of the measures proposed in the ESHIA will reduce the residual impact significance to **negligible**.

#### *Impact on Labour Relations*

It is expected that the risk of adverse impact on physical health and psychological well-being will be higher for visiting workers who are not adapted to local climatic conditions. In general, the impact will be negative and may include hypoxemia (oxygen deficiency), psychological disorders, a risk of hypothermia, a shortage of UV exposure, etc.

Higher risks of injury at the construction and operation phases may relate to falls from height, working in confined space, lifting objects, motion of construction machinery and vehicles, and other factors.

By analogy to similar projects, large personnel numbers may be involved in construction and operation of the Arctic LNG 2 Project. It will call for construction of a large temporary accommodation camp. In the absence of adequate measures to ensure proper residential properties management, conflicts may arise between various groups of workers, unauthorised contacts of workers with nomadic people, etc.

With adequate measures lacking, the involvement of large personnel numbers of contractor and subcontractor companies may lead to violations of employees' labour rights, for example, untimely or unfair remuneration and lack of access to the Grievance Mechanism.

The significance of labour impacts at the construction and operation phases can be **high**. To mitigate them, it was recommended that a number of activities are carried out which will help reduce residual impacts to **negligible - moderate** levels depending on the particular aspect.

#### *Impact of the Immigration Flow*

Construction and operation of the Project will generate the influx of significant workforce numbers. The total Project personnel number at the peak period of construction may be as high as 15,000. This can lead to the increased load on medical facilities, conflicts between workers and local residents, as well as the spread of infectious diseases. The significance of such impacts is assessed as **moderate** or **high** depending on the particular aspect. Ramboll provided a list of recommended activities that will help reduce residual impact to a **low** or **moderate** level.

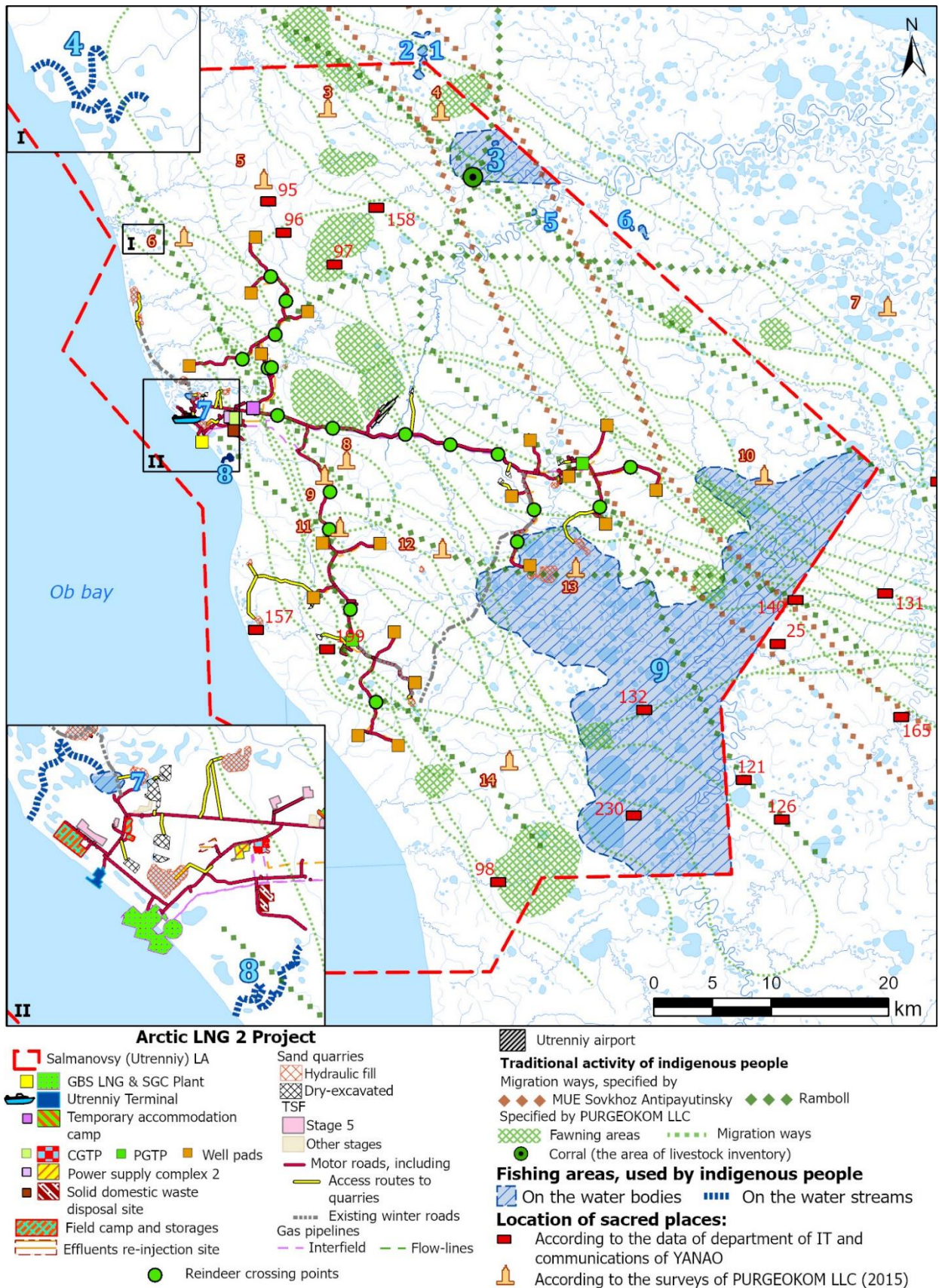


Figure 24: Reindeer herding routes, customary fishing grounds and sacred sites of ISPN within the Salmanovskiy (Utrenniy) LA (Source: PURGEOKOM LLC, 2015, with additions and clarifications of the Consultant).

### *Impact on Land Use Conditions*

Construction and operation of the Project may lead to blocking and/or restricting the use of some sections of the reindeer herder migration routes within the Salmanovskiy (Utrenniy) license area (Figure 24). In addition, the planned activity may affect the quality of grazing lands, as well as reindeer fawning sites. The significance of potential impact on reindeer herding is **high**.

The planned activity will exert impact on the customary fishing conditions of the indigenous community. Implementation of the Project may, to a greater or lesser extent, affect three customary fishing areas known at the time of the report preparation (Figure 24). Furthermore, due to construction of the Project facilities (including FIELD facilities), access to these and other areas of customary fishing within the Salmanovskiy (Utrenniy) LA may be limited. In terms of these factors and the lack of inland water bodies suitable for customary fishing in the license area, the significance of the impact on customary fishery is assessed as **high**.



**Figure 25: Consultations with the herders regarding the reindeer crossing locations**

**(Photo materials of the Consultant, April 2018)**

The indigenous community may use the Project implementation area for hunting and gathering of wild crops although these play a secondary role in the traditional economy of nomadic Nenets. No special areas dedicated to hunting and wild crop harvesting have been identified – indigenous people are engaged in these activities on reindeer herding routes. Potential impacts on hunting and gathering of wild crops can be expressed in the loss or limitation of access to some areas, similar to those described above for reindeer herding. The overall significance of this impact without account for mitigation measures is assessed as **high**.

The ESHIA suggests a number of measures to minimise the above potential impacts on customary economic activities of indigenous people. The key measures include developing an Indigenous Peoples Development Plan<sup>16</sup> and setting up reindeer crossings at the points of the intersection of reindeer herding routes with roads and engineering communication corridors. The crossings will also facilitate access to the sites of other customary nature uses such as fishing, hunting and wild crop harvesting, as well as to the sacred sites.

Also, an important role belongs to continued consultations with the local indigenous community and their representatives with the aim to further coordinate the crossing locations (Figure 25) and clarify their requirements for ensuring access and the right of passage through the territory they use on the basis of traditional law.

After the adoption of the proposed measures, the significance of residual impacts on the possibility of engaging in reindeer herding and fishing is assessed as **moderate**, on the possibility of hunting and gathering wild plants – as **negligible**.

### *Impact on Cultural Heritage Sites*

The surveys within the Salmanovskiy (Utrenniy) LA have identified two cultural heritage sites. These are medieval encampments Khaltsyneysalya-1 and Khaltsyneysalya-2. Archaeological rescue field operations in the form of excavations of Khaltsyneysalya-1 were carried out with a view to preserve information on the site. After that, the site was removed from the list of identified cultural heritage sites. The second site is situated at a distance of 700 m and more from the Project facilities. It is low probable that the planned activity will affect it.

However, there is a likelihood of discovering new archaeological sites when construction is underway and, therefore, there is a risk of their physical loss or damage. Given the low impact magnitude and high recipient

<sup>16</sup> The exact title of the document will be determined in the course of its development.

sensitivity the significance of the potential impact of the Project on archaeological sites is assessed as **moderate**.

In addition to that, there is a likelihood of chance finds of cultural value within the field area. The significance of the potential impact on such finds is defined as **moderate**. To mitigate this impact, a number of measures have been identified, including developing a chance find management procedure. Given that these measures are implemented the impact significance can be reduced to a **negligible** level.

Within the license area boundaries there are about 20 known sacred sites of the indigenous population. Five of them are located at a distance from 130 to 1,300 m from the Project facilities. Apart from those, there possibly are other sacred sites within the license area. The details were not available at the time of the ESHIA development. In particular, these may be burial grounds of indigenous peoples (Figure 26). The significance of the potential impact of the Project on sacred and burial sites and access to them is assessed as **high**. To minimise it, the ESHIA proposes a number of measures. Given that the proposed measures are taken the residual impact significance can be reduced to **negligible - moderate**.



**Figure 26: Sacred site (left) and traditional burial (right) within the license area**

**(Source: PURGEOCOM LLC, 2015)**

It is expected that the planned activity will not have significant impact on intangible cultural heritage (lifestyle, traditions and customs of the indigenous community) provided the measures set out in the ESHIA are implemented.

## 10. ENVIRONMENTAL AND SOCIAL MANAGEMENT

"Arctic LNG 2" LLC is a modern dynamically progressing company that uses best available practices in environmental and social management of the founder companies (NOVATEK PJSC, Total, Mitsui, CNPC subsidiaries, etc.) alongside with advanced approaches set out in the international standards in the area of management systems.

From the moment of its foundation, the Company has been developing the environmental and social management system covering activities in occupational health and safety, industrial safety, environmental protection (HSE) and social responsibility. Its underlying principles are:

- priority of human life and health, prevention of all types of accidents and minimisation of adverse environmental impacts;
- rational use of natural resources and materials;
- compliance with statutory regulations and requirements applicable to the scope of the Company;
- carrying out activities so that to ensure safe work conditions for all employees of the Company;
- engagement with the local community and representatives of indigenous peoples; and
- dissemination of the Company philosophy and requirements for activities of contractors and subcontractors.

By the end of 2020, it is planned to integrate the environmental management and health and safety management systems and certify the integrated management system against compliance with the requirements of ISO 14001:2015 and ISO 45001:2018. This integrated management system (IMS) will apply to all activities carried out by the Company in the framework of the Project, as well as to all dedicated divisions.

Also, "Arctic LNG 2" LLC is efficient in management of relations with contractors in terms of requirements for contractors in the HSE area and ensuring their compliance. The Company has developed the Contractor Management Standard that sets out general HSE requirements for contractor companies that work in the Company's territory, starting from the selection stage. Depending on the type of work, various requirements are placed on the contractors to ensure that the contractor activities conform to applicable Russian and international standards. Contractor companies are subject to operational and comprehensive target audits, and inspections.

The corporate management procedures of PJSC NOVATEK and the planned improvement of the Company's HSE management system will ensure a sufficient level of impact and risk control in the area of environmental and social protection and health and safety. Furthermore, designing of management and monitoring procedures for the Project will take in account both the specific features of the Project area identified during the ESHIA and the previously received environmental and social recommendations of the Lenders' Independent Consultant.

To this end, "Arctic LNG 2" LLC will develop and implement special procedures and management plans designed to ensure systematic comprehensive management of environmental and social aspects of the Project and to provide for measures and actions aimed at improving its environmental and social performance and mitigating potential adverse environmental and social risks and impacts. These will be implemented throughout the entire duration of the planned activity and will apply to both the Project operator and to the contractors under its control.

### *Environmental and Social Action Plan*

Following the results of consideration of the ESHIA materials for the Project, the Lenders' Independent Consultant on environmental and social issues will determine the consistency of the Project activities being implemented and planned for implementation with the requirements of international credit institutions and, as may be necessary, prepare an Action Plan in the environmental and social sphere. The Action Plan is developed with a view to highlight the most important target activities, criteria for their implementation and appointing responsible parties for the successful resolution of the most sensitive environmental and social issues during the Project implementation, and is an integral part to the loan agreement. As the Project is implemented, the Action Plan is periodically reviewed and updated.



### *Environmental and Social Management Plan (ESMP)*

The Environmental and Social Management Plan (ESMP) is a guidance document that sets out company's approaches and procedures for management and monitoring of environmental and social aspects. For the focal areas of the activity demanding special attention, particularly in the framework of large-scale projects such as Arctic LNG 2, it may be supplemented, if necessary, with thematic plans and environmental and social management procedures, e.g. for waste or biodiversity conservation management, management of temporary accommodation facilities for the workforce, etc.

The Environmental and Social Management Plan(s) will single out systemic environmental and social requirements for the Project, alongside with measures and methods to ensure compliance with these requirements during its implementation, as well as an approach to monitoring and control. Given the dynamic nature of the Project the Environmental and Social Management Plan(s) will be designed to ensure a prompt response to changing circumstances alongside with high performance of construction and operation processes of the Project.

## 11. CONCLUSIONS

The Consultant's analysis of the environmental and social effects of construction and operation of the Arctic LNG 2 Project facilities shows that implementation of the planned activity, provided that the Operator fulfills the declared obligations and environmental and socially oriented measures recommended by the Consultant, will have no irreversible adverse impact of high significance on the natural and socioeconomic environment and community health on a scale that would extend beyond the boundaries of directly used land and water areas with the associated zones of restricted nature use.

The impacts during Project facilities construction will mainly occur locally, at working sites, and will be short-term. The simulation results for hydrodynamic processes in the Ob Estuary waters show that the impacts related to construction of the Port will also be local and will not lead to irreversible changes in the marine environment.

At the operation phase of the Project facilities, the greatest distribution and environmental significance will be common for the impacts associated with air emission of pollutants, including of greenhouse gases. Impacts on flora and fauna and on soils and grounds are localised and confined primarily to the places of the Project facilities siting. Implementation of measures aimed at preventing, minimising and damage compensating will reduce the impact significance to low for terrestrial ecosystems and soils and to moderate for aquatic ecosystems.

The Project implementation area is distinguished with a high risk of activation of dangerous exogenous processes, including flooding and waterlogging, changes in the thermal regime of soils, and permafrost degradation. Implementation of the measures provided for in design documentation will minimise these negative processes.

Social impact of the planned activity may chiefly affect customary land use conditions and safety of the indigenous community. First of all, this relates to the feasibility of reindeer herding and fishing practices of indigenous people. Certain impact can also be exerted on sacred sites and burial grounds of indigenous people and access to them. In addition, due to the significant numbers of Project personnel and severe climate, there is a likelihood of risks in the area of labour relations and work conditions. The ESIA proposes measures to minimise these and other impacts and risks and reduce their significance. Key positive impacts of the Project on the social sphere include tax deductions, creation of additional jobs and activities for organizations, as well as the implementation of socio-economic programs of Arctic LNG 2 LLC.