Chapter 18: Waste Management

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18.1 Introduction

This chapter presents an assessment of the potential waste arising from the Project. It relates to solid waste, non-aqueous liquid waste, and wastewater generated from treatment of sewage.

The methodology used to assess potential waste impacts differs slightly from that detailed in **Chapter 3 Impact Assessment Methodology** due to the unique nature of waste when considered as a Project impact. Unlike many other impact categories, waste is a product of the Project and impacts from waste will depend on the ability of facilities and management systems to store, transport, treat and dispose of waste in a safe and environmentally sound manner. There are a number of applicable legislative requirements and standards that exist which must be adhered to, as well as a range of potential waste management mitigations and practices that can be applied.

This chapter describes the legal and regulatory framework applicable to the Project based on wastes anticipated to be generated by Project activities (see **Chapter 5 Project Description**). In light of this, available waste facilities capable of receiving anticipated Project wastes are identified (Section 18.2).

The waste impact assessment section (Section 18.4) identifies the type and volume of wastes anticipated and describes the potential impacts arising from the management of wastes (e.g. impacts on human health and the environment from releases of waste to air, water or land; potential nuisance to humans and fauna). It is recognised that impacts can arise throughout the waste management process and therefore the generation, storage, collection and transport, reuse, recycling, recovery, treatment and disposal of waste are considered. In contrast to other chapters, pre-mitigation significance of impacts is not assessed in this chapter because it is not realistic to consider any situation in which management or mitigation would not be carried out; legislation dictates requirements for waste storage, management and disposal, and these are therefore considered part of the Project design.

The legal requirements for waste management and mitigation measures for the Project (e.g. waste minimisation) are described and the residual impacts are then assessed (Section 18.5). Mitigation measures that will be adopted to manage anticipated wastes so as to minimise their environmental impact and ensure compliance with relevant local, national and international regulations are provided. These approaches represent standard Good International Industry Practice (GIIP) for the various waste streams under consideration and make use of existing local facilities as far as practicable. The assessed significance of the residual impacts for each waste stream takes into account the identified mitigation measures.

The Project Environmental and Social Management Plan (ESMP) (described in **Chapter 22 Environmental and Social Management**) describes how the mitigation measures detailed within this chapter shall be practically applied to the construction and operation of the Project.

18.1.1 Applicable Legislation, Standards, and Guidelines

Chapter 2 Policy, Regulatory and Administrative Framework describes the framework of legislation, standards and guidelines relevant to the ESIA; those of particular relevance to waste management are summarised below.

18.1.1.1 International Legislation

There are four international conventions associated with waste management that are relevant in the context of this ESIA Report. Table 18.1 highlights the most relevant parts of these conventions in relation to waste management aspects of the Project.

Table 18.1 Summary of International Waste Management Requirements

Name	Relevance
Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention), 1972 (Ref. 18.1). (Russia is a Party to the London Convention)	The objective of the London Convention is to control pollution of the sea caused by dumping activities and to encourage supplementary regional agreements. As such, it covers the deliberate disposal at sea of wastes or other matter from vessels, aircraft and platforms. Under these requirements, Parties are to establish authorities responsible for issuing permits, keeping records and monitoring the condition of the seas. Furthermore, Parties are to promote measures which prevent pollution from hydrocarbons, additional matter transported other than for dumping, wastes generated during operation of ships, etc. and matter originating from exploration of the sea bed. Annexes I and II of the London Convention list matter which is defined as prohibited or restricted with regards to dumping.
Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (Basel Convention), 1992 (Ref. 18.2). (Russia is a Party to the Basel Convention)	The Basel Convention regulates transboundary movements of hazardous wastes and provides obligations upon its Parties to ensure that such wastes are managed and disposed of in an environmentally sound manner. The main principles of the Convention are as follows: • Transboundary movements of hazardous wastes should be reduced to a minimum, which is consistent with their environmentally sound management; • Hazardous wastes should be treated and disposed of as close as possible to their source of origin; and • Hazardous waste generation should be reduced and minimised at source. Annexes I–VIII of the Basel Convention provide lists of waste categories requiring special consideration or controls, including disposal operations. Annex I outlines a list of waste categories to be controlled, Annex II details waste categories requiring special consideration and Annex III provides a list of important hazardous characteristics.

Continued…

Name	Relevance
Convention on Persistent Organic Pollutants (Stockholm Convention) (Ref. 18.3) (Russia has signed and ratified the Stockholm Convention)	The Convention seeks to ensure the limitation of pollution by persistent organic pollutants (POPs). It defines the substances in question, whilst leaving open the possibility of adding new ones, and also defines the rules governing the production, importing and exporting of those substances.
International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 (MARPOL 73/78 Convention) Annex I – VI (Ref. 18.4). (Russia has acceded to Annexes I to VI of the MARPOL Convention)	The Convention covers the prevention of pollution of the marine environment by ships from operational or accidental causes. With regards to waste management, the Convention defines conditions for waste disposal in the marine environment by ship, particularly in determined "special areas" such as the Black Sea. Annex I includes regulations for the Prevention of Pollution by Oil and is mandatory. Annex II includes regulations for the Control of Pollution by Noxious Liquid Substances in Bulk. Annex III includes regulations for the Prevention of Pollution by Harmful Substances Carried by Sea in Packed Form. Of particular relevance to waste management aspects of the Project are Annex IV and Annex V. Annex IV includes regulations for the Prevention of Pollution by Sewage from Ships. Annex V includes regulations for the Prevention of Pollution by Garbage from Ships. Annex VI includes regulations for the Prevention of Air Pollution from Ships.
Convention on the Protection of the Black Sea Against Pollution (Bucharest Convention), 1992 (Russia has signed and ratified the Bucharest Convention)	The Convention provides a basic framework of agreement and three specific Protocols, which are: (1) the control of land-based sources of pollution; (2) control of dumping of waste; and (3) joint action in the case of accidents (such as oil spills). Discharges from ships are managed accordance with MARPOL and are as such compliant with the Bucharest Convention. The "Protocol on the Protection of the Black Sea Marine Environment Against Pollution by Dumping" does not apply to any of the wastes generated by the project in the Russian EEZ since the project activities in these waters do not comprise dumping as defined in the Convention.

Complete.

Of these international conventions, the most relevant to the Project is MARPOL 73/78 Convention, which governs management of waste on board vessels. The Black Sea is a Special Area under MARPOL Annexes I and V. Amendments to Annex V entered into force on 1 January 2013, and the revised Annex V prohibits the discharge of all garbage into the sea, except as provided otherwise. An overview of the revised MARPOL Annex V discharge provisions (as relevant to the Project) is presented in Table 18.2 below.

Under MARPOL Annex I, any discharge of oil from a ship exceeding 400 gross registered tonnage (GRT) is prohibited within any Special Area, as defined by the Annex, except when:

- The ship is proceeding en route;
- The oily mixture is processed through an oil filtering equipment meeting the relevant MARPOL requirements;

- The oil content of the effluent without dilution does not exceed 15 parts per million;
- The oily mixture does not originate from cargo pump room bilges on oil tankers; and
- The oily mixture, in case of oil tankers, is not mixed with oil cargo residue.

The Black Sea is a Special Area under MARPOL Annex I. This effectively prohibits the discharge of oily sludge and slops, and requires oily bilge water to be treated through an oily water separator (OWS) prior to discharge.

Annex IV of the MARPOL 73/78 Convention provides regulations for the prevention of pollution by sewage from ships. MARPOL Annex IV defines "sewage" as:

- Drainage and other wastes from any form of toilets and urinals;
- Drainage from medical premises (dispensary, sick bay, etc.) via wash basins, wash tubs and scuppers located in such premises;
- Drainage from spaces containing living animals; or
- Other waste waters when mixed with the drainages defined above.

The discharge of sewage into the sea is prohibited, except when:

- The ship is discharging comminuted and disinfected sewage at a distance of more than 3 nautical miles from the nearest land, or sewage which is not comminuted or disinfected at a distance of more than 12 nautical miles from the nearest land, provided that in any case, the sewage that has been stored in holding tanks shall not be discharged instantaneously but at a moderate rate when the ship is en route and proceeding at not less than 4 knots; or
- The ship has in operation an approved sewage treatment and (additionally) the effluent shall not produce visible floating solids nor cause discoloration of the surrounding water.

Annex V of the MARPOL 73/78 Convention provides regulations for the prevention of pollution by garbage from ships and limits the disposal, be it continuous or periodic, of food, domestic and operational waste into the sea. Annex V completely prohibits the disposal of plastics anywhere into the sea and places strict restrictions upon discharges into designated Special Areas. The Black Sea is a Special Area under Annex V.

Table 18.2 Relevant Requirements for Disposal of Garbage under MARPOL Annex V

Type of Waste	Ships within Special Areas
Food waste comminuted or ground	Discharge permitted provided vessel is ≥12 nautical miles (NM) from the nearest land and en route
Food waste not comminuted or ground	Discharge prohibited
Cargo residues a not contained in wash water	Discharge prohibited

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Type of Waste	Ships within Special Areas
Cargo residues[a] contained in wash water	Discharge only permitted in specific circumstances[b] and ≥12 NM from the nearest land and en route
Cleaning agents and additives contained in cargo hold wash water	Discharge only permitted in specific circumstances[b] and ≥12 NM from the nearest land and en route
Cleaning agents and additives contained in deck and external surface wash water	Discharge permitted
All other garbage including plastics, domestic waste, cooking oil, incinerator ashes, operational wastes and fishing gear	Discharge prohibited
Mixed garbage	When garbage is mixed with or contaminated by other substances prohibited from discharging or having different discharge requirements, the more stringent requirements shall apply

[a] These substances must not be harmful to the marine environment.

[b] According to regulation 6.1.2 of MARPOL Convention Annex V, the discharge shall only be allowed if: (a) both the port of departure and the next port of destination are within the special area and the ship will not transit outside the special area between these ports (regulation 6.1.2.2); and (b) if no adequate reception facilities are available at those ports (regulation 6.1.2.3).

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18.1.1.2 International Standards and Guidelines

In addition to the international legislation outlined above, the Project is aligned with the IFC EHS Guidelines and Performance Standards (PS). Table 18.3 summarises the IFC EHS Guidelines and PS that require consideration in relation to waste management aspects of the Project.

Table 18.3 IFC Guidelines and Performance Standards Relevant to Waste Management

Name	Relevance
IFC (2007) General EHS Guidelines: Environmental (Ref. 18.5).	The IFC EHS Guidelines are technical reference documents that provide general and industry-specific examples of Good International Industry Practice (GIIP). The Guidelines cover a wide range of technical subjects, including hazardous and non-hazardous waste management. Section 1.5 Hazardous Waste Management states that: *"Projects which manufacture, handle, use, or store hazardous materials should establish management programs that are commensurate with the potential risks present. The main objectives of projects involving hazardous materials should be the protection of the workforce and the prevention and control of releases and accidents. These objectives should be addressed by integrating prevention and control measures, management actions, and procedures into day-to-day business activities."* Section 1.6 Waste Management states that: *"Facilities that generate and store wastes should practice the following:* *establishing waste management priorities at the outset of activities based on an understanding of potential Environmental, Health, and Safety (EHS) risks and impacts and considering waste generation and its consequences;* *establishing a waste management hierarchy that considers prevention, reduction, reuse, recovery, recycling, removal and finally disposal of wastes;* *avoiding or minimizing the generation waste materials, as far as practicable;* *where waste generation cannot be avoided but has been minimized, recovering and reusing waste;* *where waste cannot be recovered or reused, treating, destroying, and disposing of it in an environmentally sound manner."*

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Name	Relevance
IFC PS3: Resource Efficiency and Pollution Prevention (1 Jan 12) (Ref. 18.6).	The IFC provides eight Performance Standards that offer guidance regarding the identification of risks and impacts associated with projects, and which aim to reduce, avoid or mitigate these risks and impacts. Of relevance to waste management is Performance Standard 3: Resource Efficiency and Pollution Prevention. The aim of this standard is to minimise or avoid adverse impacts on human health and the environment, promote sustainable use of resources and reduce greenhouse gas emissions. Performance Standard 3 states that the client will avoid generation of hazardous and non-hazardous materials, but where waste cannot be avoided, waste arisings will be reduced, recovered or reused before subjecting the materials to treatment and disposal in an environmental sound manner. Waste disposal should be at sites operating to acceptable standards and, where this is not the case, consideration should be given to alternative disposal options, including the development of facilities on site. The use and production of hazardous waste should be avoided as far as is possible and, where this is not practicable, material will be controlled and minimised.
IFC PS3 Guidance Note: Resource Efficiency and Pollution Prevention (01 Jan 2012) (Ref. 18.7).	To aid in the interpretation of IFC Performance Standards, Guidance Notes relevant to each standard are also provided. Guidance Note 3 corresponds to Performance Standard 3 and outlines further details regarding the management of hazardous and non-hazardous wastes. With regard to hazardous waste, Guidance Note 3 lists International Conventions the client should refer to when reviewing components of materials and hazardous waste; these conventions are listed in the Bibliography of Guidance Note 3.

Complete.

18.1.1.3 National Waste Management Legislation

In addition to international legislation and standards, the Project will also be undertaken in accordance with relevant national waste management legislation and requirements. A list of national legislation relevant to waste management aspects of the Project is provided in Table 18.4.

As part of the Russian regulatory approvals process, the Project proponent is required to estimate the types and quantities of waste to be produced by the Project. Following initial approvals, it is necessary to prepare a list of waste types and limits which is submitted to the regulatory authorities, and following their approval a certificate will then be issued which specifies the Waste Generation Standards and Waste Disposal Limits for the Project.

Waste producers are obligated to keep proper records of the wastes generated, treated, and handed over to other parties, fill out government statistical reports, and pay an Adverse Environmental Impact Fee based on the approved waste types and quantities. Penalty fees are payable in the event that waste quantities exceed those approved prior to project commencement.

Table 18.4 Summary of National Waste Management Legislation

Legislation	Date / Reference Number	Relevance to the Project
Federal Law 'On Production and Domestic Wastes' (Ref. 18.8).	24 Mar 1998, No. 89-FZ	Federal Law No. 89-FZ outlines the legal basis for the management of production and consumption wastes for the purpose of preventing negative impacts upon human health and the environment. The law establishes environmental requirements and monitoring of waste management activities, economic regulations related to waste and discusses issues regarding waste ownership (i.e. the proprietor of waste). In addition, the law is supported by various secondary laws regarding the implementation of waste management requirements. The main principles of Federal Law No. 89-FZ include the following: Specifically designated federal executive authorities for waste management; Identification of the proprietor of waste; Licensing of hazardous waste management activities; Determining categories of hazardous waste; Certification procedures for hazardous waste; and Determining the basis for state inventory of hazardous waste. The law also discusses the distribution of waste management roles between federal executive bodies and corresponding bodies at the regional and municipal level.
Federal Law 'On Licensing Activities' (Ref. 18.9).	8 Aug 2001, No. 128-FZ	Federal Law No. 128-FZ determines the types of waste activities that are subject to licensing. It includes general provisions concerning issue of licenses, validity of licenses, etc.

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Legislation	Date / Reference Number	Relevance to the Project
Federal Law 'On the Protection of the Environment' (Ref. 18.10).	30 Dec 2008, No. 309-FZ	Federal Law No. 309-FZ includes a list of features used to categorise industrial facilities as hazardous industrial facilities. This list outlines properties of hazardous substances that may be received, used, processed, produced, stored, transported or destroyed by a hazardous industrial facility, as well as toxic substances and environmentally hazardous substances. Operational conditions of equipment employed at hazardous industrial facilities in relation to pressure and water-heating temperatures are also discussed. The list further summarises transport mechanisms (i.e. stationary lifting mechanisms, escalators, cableways or funicular railways), production of molten ferrous and non-ferrous metals and alloys and conduction of mining, mineral-enrichment and underground operations used by hazardous industrial facilities.
Government Enactment 'On the adoption of procedure for development and adoption of environmental standards for emission and discharge of polluting substances into the environment, limits for natural resources' use and waste disposal' (Ref. 18.11).	3 Aug 1992, No. 545	Environmental standards for emission and discharge of polluting substances into the natural environment, the maximum use of natural resources and waste disposal limits are set for specific enterprises, institutions, organisations and the Ministry of Natural Resources and Environment of the Russian Federation by the Health and Welfare supervisory authorities, in accordance with their competence. Documents specifying the normative values are developed by specific enterprises, institutions and organisations. The adopted procedure therein lost force to the extent it is applicable to development and adoption of limits for waste disposal.

Continued…

Legislation	Date / Reference Number	Relevance to the Project
Government Enactment 'On adoption of procedure for defining payment and its limits for environmental pollution, waste disposal and other harmful impacts' (Ref. 18.12).	28 Aug 1992, No. 632	The adopted procedure applies to enterprises, institutions, organisations, foreign legal and physical entities that perform any kinds of activities in the territory of the Russian Federation related to the nature of use. It stipulates charging for emission and discharge of pollutants into the atmosphere and surface or subsurface water bodies, waste disposal and other harmful impacts. Basic standard fee rates are set for impacts within permissible or tentatively agreed norms. They are specific to every type of pollutant, waste or harmful impact and are related to the degree of their hazard for the natural environment and human health.
Government Enactment 'On the state registration of potentially hazardous chemical and biological substances' (Ref. 18.13).	12 Nov 1992, No. 869	The State Registration of Potentially Hazardous Chemical and Biological Substances applies to potentially hazardous chemical and biological substances of natural and artificial origin produced in the territory of the Russian Federation and purchased abroad for national economy and household use. The purpose of the State Registration is to protect human health and the environment from harmful impacts associated with these substances. In addition, it discusses the prevention of adverse consequences resulting from their application.

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Legislation	Date / Reference Number	Relevance to the Project
Government Enactment 'On amendments to administrative regulations by the federal service for environmental, technological and nuclear supervision for execution of the state function of issuing permits for emissions, discharges of polluting substances into the environment adopted by Order of the Ministry of Natural Resources and Environment of the Russian Federation' (Ref. 18.14).	25 Feb 2010, No. 173	The adopted procedure establishes requirements for the preparation and submission of documents regarding maximum permissible disposal levels for specific kinds of wastes in line with the environmental situation of the territory where these sites are located.
Ministerial Order 'On the adoption of criteria for waste identification by class of environmental hazard' (Ref. 18.15).	15 Jun 2001, No. 511	Criteria for waste identification by class of environmental hazard are intended for individual project owners and legal entities and define which activities cause the generation of environmentally hazardous wastes. In addition, the Criteria also confirm identification of these wastes as a certain class of environmental hazard. Class hazard are determined by the degree of potential adverse environmental impact (direct or indirect) in accordance with the Criteria presented within this documentation.
Ministerial Order 'On the adoption of hazardous waste passport or datasheet' (Ref. 18.16).	2 Dec 2002, No. 785	This order denotes hazardous waste documentation and instruction on completion of waste management forms.

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Legislation	Date / Reference Number	Relevance to the Project
Ministerial Order 'On the adoption of the Federal Classificatory Catalogue of Wastes' (Ref. 18.17).	2 Dec 2002, No. 786	The Order approves the Federal Waste Classification Catalogue, including waste hazard class. Waste is classified using a 13-digit code, with each digit relating to a specific property of the waste; the last digit is used for coding waste hazard classes.
Ministerial Order 'Supplements to the Federal Waste Classificatory Catalogue' (Ref. 18.18).	30 Jul 2003, No.663	Updates Ministerial Order No. 786 dated 2 Dec 2002 on the adoption of the Federal Classificatory Catalogue of Wastes.
Ministerial Order 'On the procedures for development and adoption of standards for waste generation and limits of their disposal' (Ref. 18.19).	25 Feb 2010, No. 50	This Order establishes requirements for preparation and submission of documents for the adoption of the maximum permissible levels of a specific kind of wastes.
Ministerial Order 'On the adoption of statistical instruments for organising the monitoring of domestic waste production' (Ref. 18.20)	28 Jan 2011, No. 17	The Order comprises of the adoption of the annual State Statistical Monitoring Form No. 2 – TP (Wastes) "Information on generation, use, neutralisation, transportation and disposal of production and domestic wastes". The Ministry of Natural Resources and Environment requires waste data collection, data aggregating and storage, which is collected in accordance with this form.
Ministerial Order 'On the adoption of accounting procedures in relation to waste management' (Ref. 18.21)	1 Sep 2011, No. 721	The accounting procedure in relation to waste management establishes requirements to be carried out by legal entities and individual company owners in relation to generated, used, neutralised, transferred from third parties or received from third parties and disposed wastes. The procedure does not apply to accounting in relation to radioactive, biological, medicinal wastes, harmful emissions to harmful discharge into water bodies.

Continued…

Legislation	Date / Reference Number	Relevance to the Project
Order 'On the adoption of methodological instructive regulations for development of projects for waste generation and disposal limits' (Ref. 18.22)	19 Oct 2007, No. 703	These methodical instructive regulations are intended for individual project owners and legal entities that perform activities related to waste management. They are also relevant for territorial branches of the Federal service for environmental, technological and nuclear supervision that make a decision on adoption of waste generation and disposal limits. The regulations determine a unified approach to development and general requirements to the contents and execution of projects for waste generation and disposal limits but do not apply to radioactive waste.
Book of per-unit indicators of production and consumption wastes' generation (Ref. 18.23)	21 Jun 1999	The Book of per-unit indicators of production and domestic wastes' generation includes statistical-average and industry-average values of per-unit indicators of the main production wastes' generation and per-unit indicators of the most common production and domestic wastes' generation. The Book is intended for use by the federal, regional, and local authorities as a reference guide for execution of environmental control, checking reliability of data presented in documents prepared by enterprises for establishing waste generation and disposal limits. The Book may be used by any legal entities for control over internal production wastes' generation, and justification of limits for wastes' disposal. Data on per-unit indicators presented therein are recommended to be applied as standards, because many of the values are defined as statistical-average and industry-average with neutralisation of differences between production facilities by the management level and the quality of raw materials processed.
Methodological recommendations for assessment of volumes of domestic and production wastes' generation (NITsPURO) (Ref. 18.24).	25 Jun 2003	The Methodological recommendations set forth possible methods for assessment of volumes of domestic and production wastes' generation, a formula of evaluation of the most common wastes and the main reference data for such evaluation. The Methodological recommendations may be used as a reference guide by commercial entities during preparation of waste generation and disposal limits. The presented recommendations do not exclude a possibility to use other methods and other information sources for these purposes.

Continued…

Legislation	Date / Reference Number	Relevance to the Project
Guidelines and procedures for charging environmental pollution payment (Ref. 18.25)	26 Jan 1993	The Guidelines and procedures specify application of the basic norms of payment for emissions, discharges of polluting substances into the natural environment, waste disposal, coefficients with regard to environmental factors and payment indexation rates in connection with price level changes and setting the maximum size of payment for environmental pollution, waste disposal and other adverse impacts. Adopted as per Resolution by the Government of the Russian Federation of August 28, 1992 No. 632 and put into effect since January 1, 1993. Payment for pollution of the natural environment is charged from users (production facilities, institutions, organisations and other legal entities regardless of their business legal structures and forms of incorporation), which exercise the right to perform production-commercial activities in the territory of the Russian Federation.

Complete.

18.1.1.4 Russian Federal Waste Classification Catalogue

In accordance with Federal Law, Russia classifies waste based on its origin, physical state, hazardous properties and class of environmental hazard, in accordance with criteria established by the Federal Executive Authority responsible for regulating environmental protection.

In Russia, the Ministry of Natural Resources and Environment (MNRE) is responsible for monitoring and enforcing waste classification, as well as managing waste management activities including data collection and reporting. The MNRE has developed and approved criteria for classifying waste according to the Federal Waste Classification Catalogue (FWCC), approved by Decree Order No. 786 and No.663 (see Table 18.4).

The FWCC provides each class of waste with a thirteen digit code. The thirteenth digit in the code indicates the class of hazard to the environment. There are five hazard classes, whereby Hazard Class I wastes are deemed the most hazardous and Hazard Class V wastes are considered to be practically non-hazardous. Hazard Class 0 relates to wastes for which the class of hazard has not been established.

Wastes categorised as Hazard Classes I to IV require a license to be granted by the MNRE for the proposed waste management activity. Table 18.5 provides example waste streams for each of the five Hazard Classes, in accordance with the FWCC.

Table 18.5 Russian Hazardous Waste Classification System

Hazard Class	Hazard Description	Waste Stream Examples	International Definition
0	Hazard Class not identified	N/A	N/A
I	Extremely hazardous	Exhausted and waste mercury-vapour lamps, luminescent mercury-containing tubes, activated carbon contaminated with mercury sulphide, etc.	Hazardous
II	High hazard	Sulphuric battery acid, intact lead batteries with undrained battery acid, halogenated solvents, concentrated acids and alkalines, etc.	Hazardous
III	Medium hazard	Unsorted lead batteries with drained battery acid, ethylene glycol wastes, ethylene glycol residues, wastewater treatment sediments, filter and absorption waste mass, waste industrial oils, pipeline slurry, bilge water, waste filters (transmission and motor), non-halogenated solvents, etc.	Hazardous

Continued…

Hazard Class	Hazard Description	Waste Stream Examples	International Definition
IV	Low hazard	Cleaning material contaminated with oil, sand contaminated with oil, bitumen coating waste, solid asphalt, construction debris, welding slag, paint materials, medical wastes, ashes and slag from heat waste treatment, drilling waste, operational ship waste (domestic trash), etc.	Hazardous or Non-hazardous (depending on composition)
V	Practically non-hazardous	Unsorted ferrous steel scrap, unsorted aluminium scrap, unsorted kitchen and catering food waste, concrete products (grit), building grit, uncontaminated packaging waste (i.e. paper, cardboard and plastic), glass cullet waste (excluding cathode ray tubes and luminescent lamps), non-treated wood waste, uncontaminated soil, construction debris etc.	Hazardous or Non-hazardous (depending on composition)

Complete.

If wastes are generated that are classed according to the FWCC as Hazard Class "0" (i.e. Hazard Class not identified) then identification of the Hazard Class is based on the document 'Criteria for Classifying Hazardous Waste as Hazardous to the Environment', approved by Order of the MNRE of Russia No.11. The Hazard Classes for such wastes are determined by the 'Calculation of the Class of Hazard 2.1' (c) INTEGRAL 2001-2003 software.

18.1.1.5 Regional and Local Waste Management Legislation

There are no regional or local waste management regulations which are relevant to this assessment.

18.2 Baseline Conditions

The Strategic Action Plan (SAP) for the Environmental Protection and Rehabilitation of the Black Sea (adopted in Sofia, Bulgaria, 17 April 2009) (Ref. 18.26) includes a number of provisions related to waste management.

Waste management itself is not one of the priority transboundary problems identified in the SAP, although oil pollution is recognised as an aspect of chemical pollution, which is one of the four priority problems.

The SAP presents Ecosystem Quality Objectives (EcoQOs), which are statements that reflect how stakeholders would like the state of the Black Sea to be over the long term, based on a resolution of priority problems identified in the Transboundary Diagnostic Analysis. Each EcoQO is assigned a number of management targets that address the immediate, underlying and root causes of the concern areas. For regional level interventions, the Black Sea coastal states and

the international partners shall work collectively to take the required steps to fulfil those interventions. National level supporting interventions will be the responsibility of individual states.

Several of these management targets relates to waste management:

- Target (18): Amend national waste strategies and/or national coastal zone management plans with the aim of coastal and marine litter minimisation;
- Target (19): Develop regional and national marine litter monitoring and assessment methodologies on the basis of common research approaches, evaluation criteria and reporting requirements;
- Target 20: Promote / develop investment projects within national strategies / local plans to engineer, construct and install new solid waste recycling facilities, landfill sites and incineration plants, complying with BAT regulations;
- Target (60): Provide adequate port reception facilities for ship-generated wastes according to MARPOL 73/78, Annex I, IV, V;
- Target (61): Establish a harmonised fee / cost recovery system on ship-generated waste;
- Target (62): Develop systems for the identification of illegal pollution sources from vessels and off-shore installations; and
- Target (63): Develop / establish a harmonised enforcement system in cases of illegal discharges from vessels and off-shore installations, including technical means and fines.

The SAP presents indicators for each target, although a status update has not been published by the Black Sea Commission.

18.2.1.1 Existing Waste Management Arrangements

Table 18.6 outlines some of the existing waste management facilities in the vicinity of the Project (including waste types and capacity). The EPC contractor carrying out the works for the Project will be likely to use one or more of these facilities.

Site visits to two key waste facilities were undertaken in 2013 by South Stream Transport. Representatives visited the ECOBIO Waste Treatment Facility, near Krymsk, and the Alfa Landfill Facility, near Anapa, on the 18 April 2013, to evaluate these facilities for their suitability to manage Project wastes. South Stream Transport's observations are summarised in Table 18.6 below and have been used as part of the assessment in Section 18.4.

Table 18.6 Waste Management Facilities in the Vicinity of the Project

Name	Location	Types of Waste which the Facility is Licensed to Accept	Licenced capacity	Site Observations
Alfa Landfill Facility	Anapa, Krasnodar	Class IV and V: Non-hazardous soils, welding electrodes, crushed stone, used sands, plastic containers, cardboard, tree stumps	140,000 tonnes per year.	The landfill does not appear to be an engineered landfill and has no obvious means of leachate or gas management, or any effective lining or capping systems. The landfill is planned to close in 2016 (a closure plan is reported to be in place) by which time a new engineered landfill is planned to be in operation: the location for this new landfill has yet to be confirmed.
Research & Production Enterprise EcoBio LLC	Nizhnebakansky, Krasnodar	Class III: Oily sludges, used oils, oily rags, sand contaminated with oils, oily residues from separators Class IV: Waste drilling sludge, waste drilling fluid, slurry from treatment plants, oily spent carbon filters	Facility has confirmed capacity to accept up to 100,000 tonnes of waste drilling sludge as well as smaller quantities of other oil-contaminated wastes.	The site is located in a former quarry and is licenced to backfill the quarry with bioremediated class III waste – drilling cuttings or polluted soil. The site has 3 main treatment cells, and a number of disposal areas. The treatment cells are concrete lined, and are sequentially filled with contaminated material which undergoes bioremediation prior to final disposal. The site is securely fenced, internal access roads are in good condition, and an environmental monitoring regime is in place. Site observations indicate that the facility is likely to be operating in accordance with good international industry practice.

Continued…

Name	Location	Types of Waste which the Facility is Licensed to Accept	Licenced capacity	Site Observations
ACh Enppi SIRIUS	Temryuk, Krasnodar	Class I: mercury lamps, fluorescent tubes containing mercury waste and marriage Class II hazards: Lead-acid accumulators waste, intact with no drained electrolyte Class III: Oily sludges, used oils, oily filters, oily rags, sand contaminated with oils, oily residues from separators Class IV: Waste drilling sludge, waste drilling fluid, slurry from treatment plants, oily spent carbon filters	Licence does not specify capacity – facility has confirmed capacity to accept up to 100,000 tonnes of waste drilling sludge.	Facility not visited.
Mercury Safety Agency LLC	Abinskiy District, Krasnodar	Class I: Mercury containing lamps and tubes Class III: Oily sludges, used oils, oily filters, oily rags, sand contaminated with oils, oily residues from separators Class IV: Contaminated textiles (waste protective clothing), leather work footwear, waste drilling sludge, waste drilling fluid, waste paint resources Class V: Non-hazardous soils, plastic containers	Licence does not specify capacity.	Facility not visited.

Complete.

Existing Port Waste Management Facilities

Existing waste management facilities at Temryuk and Novorossiysk Ports will be used for the management of wastes generated by the Project's offshore activities.

The Ports of Temryuk and Novorossiysk have arrangements in place with port waste management companies to provide waste reception facilities for vessels using the port, and these contractors include:

- Marine Consulting LLC;
- Mortrans-Service NHB LLC;
- SPC Crocus LLC; and
- Krymskvtorsyryo LLC.

The contractor managing the vessels used for the Project will arrange with one or more of these port waste management companies to receive vessel waste, depending on which port is used, and the port waste management company will be responsible for the onward transportation and management of the vessel waste, using the existing regional disposal and treatment facilities as described in Table 18.3. Further inspection of the waste management facilities will be undertaken prior to completion of waste management contracts, i.e. to confirm that sufficient capacities are available to manage Project wastes legally and safely, in accordance with the requirements set out in Section 18.5 and the suite of Construction and Operational Phase Management Plans (refer to **Chapter 22 Environmental and Social Management**).

18.3 Methodology and Assessment Criteria

In contrast to other environmental and social technical disciplines in this ESIA Report, this chapter describes the estimated waste arisings, but does not assess the significance of these impacts in the absence of mitigation, since waste storage, management and disposal is considered part of the Project design, and as such it is not realistic to consider any situation in which no mitigation would be carried out. The mitigation section therefore describes the measures that will be adopted to manage the wastes generated by the project (including identifying potentially suitable facilities), and the significance of residual impacts following mitigation is then assessed.

Impact magnitudes for the residual impacts following mitigation are assessed based on:

- The hazardous properties (physical, chemical and biological) of the relevant waste stream; and
- The availability of suitable waste management facilities, taking into consideration: (a) the volume of waste produced, (b) the capacity of the identified waste management facilities for managing the waste in compliance with relevant guidelines, and (c) the degree of certainty in the availability of these facilities.

Table 18.7 presents a matrix that compares waste type and the availability of suitable waste management facilities, to determine impact magnitude (negligible, low, moderate, and high).

Table 18.7 Magnitude of Waste Impacts

Waste Management Option	Type of Waste		
	Inert	Non-hazardous	Hazardous
Suitable facilities or outlets available with sufficient capacity to manage the quantities of wastes generated	Negligible	Negligible	Low
Suitable facilities or outlets available but capacity to accept waste from project may be constrained due to size of facility or distance from site	Low	Moderate	Moderate
Facilities are unavailable or unsuitable; or means of management is uncertain.	Moderate	Moderate	High

Since receptor sensitivity was assumed to be constant, the rankings (negligible, low, moderate, and high) delivered by the impact magnitude matrix in Table 18.7 also reflect "impact significance"; the definitions of significance detailed in **Chapter 3 Impact Assessment Methodology** are therefore applicable.

The definition of hazardous waste includes any wastes specifically designated as hazardous within applicable legislative requirements (e.g. hazardous wastes listed under the Russian Federal Waste Classification Catalogue (FWCC)). For the purposes of this ESIA Report, hazardous wastes are also defined in terms of the International Finance Corporation (IFC) General Environmental, Health and Safety (EHS) Guidelines for Waste Management (Ref. 18.7), i.e. wastes that share the properties of a hazardous material (e.g. ignitability, corrosivity, reactivity, or toxicity), or other physical, chemical, or biological characteristics that may pose a potential risk to human health or the environment if improperly managed. Inert waste is not defined in the FWCC but is recognised in IFC guidelines and is defined in the EU Landfill Directive such that *"waste is considered inert if:*

1. *It does not undergo any significant physical, chemical or biological transformations;*
2. *It does not dissolve, burn or otherwise physically or chemically react, biodegrade or adversely affect other matter with which it comes into contact in a way likely to give rise to environmental pollution or harm to human health; and*
3. *Its total leachability and pollutant content and the ecotoxicity of its leachate are insignificant and, in particular, do not endanger the quality of any surface water or groundwater."*

In practice, inert waste typically comprises surplus excavated soil and rock, and waste construction materials such as brick and concrete.

Table 18.8 below presents a comparison of the FWCC hazardous waste classifications against IFC and EU classifications of hazardous, non-hazardous and inert waste.

Table 18.8 Comparison of FWCC Hazard Codes with IFC and EU Classifications

FWCC Hazard Class	Example of Waste Types	Equivalent IFC or EU category
Hazard Class I (extremely hazardous)	Exhausted and waste mercury-vapour lamps, luminescent mercury-containing tubes, activated carbon contaminated with mercury sulphide, etc.	Hazardous
Hazard Class II (highly hazardous)	Sulphuric battery acid, intact lead batteries with undrained battery acid, halogenated solvents, concentrated acids and alkalines, etc.	Hazardous
Hazard Class III (moderately hazardous)	Unsorted lead batteries with drained battery acid, ethylene glycol wastes, ethylene glycol residues, wastewater treatment sediments, filter and absorption waste mass, waste industrial oils, pipeline slurry, bilge water, waste filters (transmission and motor), non-halogenated solvents, etc.	Hazardous (but includes some non-hazardous categories, e.g. many wastewater sludges)
Hazard Class IV (low hazard)	Cleaning material contaminated with oil, sand contaminated with oil, bitumen coating waste, solid asphalt, construction debris, welding slag, paint materials, medical wastes, ashes and slag from heat waste treatment, drilling waste, operational ship waste (domestic trash), etc.	Non-hazardous (but includes some hazardous categories, e.g. medical wastes)
Hazard Class V (slight hazard)	Unsorted ferrous steel scrap, unsorted aluminium scrap, unsorted kitchen and catering food waste, concrete products (grit), building grit, uncontaminated packaging waste (i.e. paper, cardboard and plastic of lost useful quality), glass cullet waste (excluding cathode ray tubes and luminescent lamps), non-treated wood waste, uncontaminated soil, construction debris of lost useful quality, etc.	Non-hazardous or inert

Suitable facilities are those which are licensed by the relevant regulatory authorities and (in the case of hazardous waste sites) are operating in accordance with GIIP [1]. The operational capabilities and licensing status of these facilities will be confirmed.

No specific waste study area was defined for the purpose of this chapter. Rather the assessment considered waste arising within the established Project Area boundaries and Associated Activities defined in **Chapter 1 Introduction** of this ESIA Report.

18.4 Project Wastes

The Project has the potential to give rise to a number of wastes during the Construction and Pre-Commissioning, Operational and Decommissioning phases.

The potential impacts arising from the management of wastes include:

- Impacts on human health and on ecological receptors from releases of waste to air, water or land; and
- Nuisance, including litter, odour, dust and vermin.

Impacts can arise throughout the waste management supply chain and therefore the generation, storage, collection and transport, reuse, recycling, recovery, treatment and disposal of waste are all taken into account when assessing impacts.

The impacts of wastes associated with the decommissioning phase of the Project have not been assessed in detail as the available waste facilities and disposal technologies are likely to change significantly over the 50 year life of the Project. For the decommissioning phase, the assessment is limited to identifying the types and approximate quantity of waste generated.

18.4.1 Wastes Arising from the Project

Generally, wastes can be categorised into three main types in terms of their basic properties:

- Inert waste - e.g. surplus excavated soil and rock, rubble and bricks;
- Non-hazardous waste - e.g. food waste, packaging waste and other general wastes from construction, businesses, industry and households; and
- Hazardous waste - e.g. oils, certain types of healthcare waste, batteries and other waste exhibiting hazardous properties.

Waste is considered to be inert if it does not undergo any significant physical, chemical or biological transformations; and does not dissolve, burn or otherwise physically or chemically react, biodegrade or adversely affect other matter with which it comes into contact in a way

[1] In these cases, it is assumed that residual impacts due to releases from these facilities are addressed as part of the facilities pre-existing licensing regime and are therefore not assessed within this ESIA.

likely to give rise to environmental pollution or harm to human health[2]. Certain categories of municipal, industrial and construction waste (e.g. brick rubble) may be considered inert.

Individual jurisdictions typically have more detailed waste classification schemes. Table 18.8 above provides more specific details on the classification of waste based on the Russian FWCC.

The main types of waste expected to arise from the Construction and Pre-Commissioning Phase and Operational Phase of the Project are described below.

18.4.1.1 Construction and Pre-Commissioning

Onshore

The main landfall or onshore Pipeline Construction and Pre-Commissioning Phase works to be undertaken as part of the Project will comprise:

- Clearance and bulk earthworks associated with establishment of the Pipeline construction corridor;
- Trenching and installation of the Pipeline;
- Establishment of the microtunnels;
- Construction and installation of temporary construction sites;
- Construction of the landfall facilities; and
- Types and quantities of waste likely to be produced have been calculated and are presented (using the Russian FWCC codes) in Table 18.9. Further details are provided in the following paragraphs.

Waste from Workforce

Municipal waste will be primarily generated by construction workers operating across all of the identified activities and will be a function of the size of workforce. It will be generated from office operations and site welfare facilities (e.g. canteens, etc.). It is assumed that there will be no accommodation camps, and hence waste will only be generated by the workforce during the course of the working day.

This waste will comprise the following:

- Paper and cardboard;
- Glass;
- Biodegradable kitchen and canteen waste;
- Plastics;
- Metals (e.g. drinks cans); and

[2] Article 2(e) of the EU Landfill Directive (1999/31/EC)

- General mixed waste.

In addition to the above, the Russian National EIA has calculated figures for the amount of waste textiles (i.e. protective clothing) and worn footwear that is anticipated to be produced during the onshore Construction and Pre-Commissioning Phase.

Waste from Construction Activities

Non-hazardous construction waste is likely to consist primarily of:

- Waste from vegetation clearance along the Pipeline construction corridor and landfill facility;
- Surplus excavated spoil from the Pipeline construction corridor and landfill facility;
- Material excavated from the microtunnelling operations;
- Packaging (paper, plastic, metal and wood) from construction materials received at the construction sites;
- Welding waste and metal swarf resulting from jointing of pipeline sections;
- Surplus, damaged and out-of-specification construction materials, including concrete and other inert materials; and
- Empty gas bottles and canisters.

During ground preparation works, excavated spoil will be generated by a number of construction activities. The preparation of the site for the construction of the landfall facilities, for example, will require extensive earthworks. A portion of excavated material will be reused (e.g. to prepare the development platform) and therefore will not be considered waste requiring disposal. Approximately 250,000 m3 (or 375,000 tonnes) of spoil is considered unusable and will be exported from the site.

A number of onshore temporary facilities will be required (e.g. for storage of pipe, equipment and materials; spoil storage areas; parking space; mess and welfare facilities, etc.). It is estimated that approximately 59 ha of land will be required for these facilities. The establishment of these temporary construction areas will involve the stripping of topsoil. Some areas of the construction corridor may also be benched or graded to eliminate irregularities, large stones, tree stumps and other features. The majority of this material will be temporarily stored and re-used for reinstatement.

The landfall section of the Project will use a combination of open-cut and trenchless techniques (i.e. microtunnelling) for pipeline construction. It will not be possible to return all the originally excavated trench spoil (due to the volume of space taken up by the installed pipelines and removal of rock or other unsuitable backfill material) and the surplus will either be disposed of or incorporated into landscaping activities.

The surplus excavation spoil from construction of the microtunnels and entry shafts will require incorporation into the works or off-site disposal.

Other construction wastes will include waste metal (e.g. from damaged pipe sections or as swarf from preparation of joints) and welding stubs. Waste cardboard packaging will mainly be generated from the cardboard packaging used for delivering welding electrodes.

Following completion of pre-commissioning tests, temporary construction areas will be restored. This will include the removal of temporary roads and hardstanding (e.g. macadam base used in the temporary access roads) and a certain amount of uncontaminated waste sand and crushed stone will be produced.

Hazardous Waste

Hazardous wastes include those identified as either potentially harmful to human health or the environment, typically with the potential to lead to long term contamination. It is likely that the majority of these wastes will arise during the operation of construction vehicles, plant and equipment, and utilisation of potentially hazardous raw materials. The following hazardous wastes may be produced as a result of construction activities.

- Hazardous waste from maintenance of construction plant, including:
    - Oil filters;
    - Hydraulic oil;
    - Anti-freeze; and
    - Batteries.
- Sludge from cleaning out refuelling tanks;
- Packaging with residues of hazardous substances (e.g. paints, solvents or coatings);
- Fluorescent tubes;
- Oily residues or spent filters from surface water treatment system; and
- Clinical wastes from first aid facilities or on-site clinics.

A number of onshore temporary facilities will be required throughout the Construction and Pre-Commissioning Phase. These areas will be lit using various types of lighting and will most likely include the use of fluorescent tubes. Fluorescent tubes are categorised as extremely hazardous (Class I) by the FWCC.

The treatment of surface water runoff from the construction sites will give rise to a number of wastes (e.g. sludge or spent filters) potentially contaminated with oil that will require disposal.

Table 18.9 Estimated Types and Volumes of Waste during Onshore Construction and Pre-Commissioning Activities

Description of Waste Type	Source	FWCC code	FWCC Hazard Class	Equivalent EWC Code (* = hazardous)	Quantity (tonnes)
Fluorescent tubes and other mercury-containing lamps	Lighting of construction sites and industrial premises	353 301 00 13 01 1	1	20 01 21*	<1
Oily wastes, including: - waste oils, filters, oily rags, spill response waste, etc.	Maintenance of mobile plant, cleaning of diesel tanks, spill cleaning material, etc.	546 015 01 04 03 3 541 002 05 02 03 3 920 000 00 00 00 0 549 027 01 01 03 3 314 023 03 04 03 3 546 002 00 06 03 3	3	13 02 05* 13 01 10* 16 01 07*	1 – 10
Waste protective clothing and worn work footwear	Staff clothing and footwear replacement	582 000 00 00 00 0 147 006 01 13 00 4	4	20 03 01	1 - 10
Waste drilling sludge	Microtunnelling operations	314 000 00 00 00 0	4	17 05 04 (inert)	98,000
Waste paint resources	Onshore pipeline	555 000 00 00 00 0	4	15 01 10*	<1
Sludge from wastewater treatment	Solids from treatment of surface water run-off and settlement of wash waters	943 000 00 00 00 0	4	13 05 01*	100 - 1000
Mixed municipal waste	Mixed waste from welfare, mess and office facilities	912 004 00 01 00 4	4	20 03 01	1 - 10

Continued...

Description of Waste Type	Source	FWCC code	FWCC Hazard Class	Equivalent EWC Code (* = hazardous)	Quantity (tonnes)
Scrap metal	Cutting of pipelines, etc.	351 301 00 01 99 5	5	17 04 07	10 - 100
Uncontaminated soil	Surplus excavated material	314 011 00 08 99 5	5	17 05 04 (inert)	375,000
Welding waste	Waste from pipe welding	351 216 01 01 99 5	5	12 01 13	<1
Crushed stone	Earthworks, removal of temporary construction areas and hardstanding etc.	314 009 02 01 99 5	5	17 05 04 (inert)	30,400
Uncontaminated sand	Earthworks, removal of temporary construction areas and hardstanding	314 023 01 01 99 5	5	17 05 04 (inert)	26,600
Plastic	Waste from mess and office facilities	571 018 00 13 00 5	5	15 01 02	1 - 10
Cardboard	Waste card packaging from construction materials	187 102 02 01 00 5	5	15 01 01	<1
Tree stumps	Preparatory works	173 001 02 01 00 5	5	02 01 07	10 - 100
Waste (slurry) from cesspools and domestic sewage	Chemical toilets and cess pits for workforce	951 000 00 00 00 0	4	19 08 05	100 - 1000

Complete.

Nearshore and Offshore Sections

The main activities which have the potential to generate waste within the nearshore and offshore sections during the Construction and Pre-Commissioning Phase are:

- Activities of pipe-lay vessels and regular deliveries of construction materials;
- Activities of dredging vessels and support craft;
- Assembly (mounting / joining / pulling) of the pipelines; and
- Activities of the crew involved in the operation of Project vessels and workers associated with the maintenance of the vessels.

Types and quantities of waste likely to be produced have been calculated and are summarised (using the Russian FWCC codes) in Table 18.10. Further details are provided in the following paragraphs.

Waste from Workforce

Municipal waste will be generated by construction workers and crew of all vessels and is categorised as 'garbage' under MARPOL Annex V. This type of waste will include general mixed waste, food waste and recyclable waste.

The workforce and crew aboard vessels will also generate sewage, which is regulated under MARPOL Annex IV.

Waste from Construction Activities

Dredging will generate a certain amount of dredged spoil. From the microtunnel exit point, the pipelines will be buried in trenches to a depth of approximately 2.5 to 3 m for a distance of approximately 170 m. The excavated material will be temporarily stored before being dredged back up and used as backfill following pipeline installation, and hence is not considered waste.

In addition to the above, there will be a requirement for some levelling and flattening of the seabed in the offshore section, prior to installation of the Pipeline. The resulting dredged material (estimated as 42,500 m^3) will require disposal at a designated offshore disposal area.

Pipeline assembling activities will generate wastes associated with the jointing and installation of pipeline sections including stubs of welding electrodes, spent polishing bodies and metal swarf.

The construction materials and equipment used may require the disposal of associated packaging elements, typically a mixture of paper and cardboard, wood and plastic waste. Due to the scale of equipment used in the pipe-laying, some packaging waste items may be relatively large in dimension.

Hazardous Waste

A number of hazardous wastes may potentially be generated as a result of the nearshore and offshore Construction and Pre-Commissioning works, including:

- Waste oils and batteries from maintenance of construction plant;
- Oily waste generated during normal operation of the vessels undertaking the works (e.g. oily sludges and bilge oil);
- Waste fluorescent tubes and other lamps containing mercury from construction vessels; and
- Packaging with residues of hazardous substances.

Clinical wastes may also be generated from medical facilities on-board the vessels.

Oily wastes will be generated by vessels as a result of fuel filtering, collection of oily slops from machinery spaces, and from oily bilge water. Oily wastes generated by vessels are controlled under MARPOL Annex I. The discharge of any oily sludge or slops is prohibited. Bilge water may be discharged following treatment by an oily water separation (OWS) system, provided such discharge is in compliance with the requirements of MARPOL Annex I and Russian regulations. In practice, the requirement under MARPOL Annex I for vessels to be "proceeding en route" when they discharge treated bilge water may preclude pipe lay vessels from treating and discharging any bilge water, since they will be almost stationary whilst pipe laying. The oily residue following treatment of bilge water through an OWS will be managed in the same waste as oily sludge or slops.

Order No.20 of the Russian Federal Fishery Agency (dated 18 January 2010) mandates that discharges into Russian territorial waters must not lead to the limit 0.05 mg/L oil content being exceeded at the control point (which is typically 500 m from the point of discharge). Vessel OWS are generally designed to meet the MARPOL discharge requirements of 15 parts per million of oil (approximately equivalent to 12 mg/L) and it is unlikely that the discharge from a vessel's OWS would result in non-compliance at the control point, due to the effect of dilution in the receiving water. There is therefore unlikely to be any constraints on the discharge of treated bilgewater over and above those outlined in MARPOL Annex I.

Discharge of hydro-testing and pipeline cleaning waters (during the Pre-Commissioning Phase) are discussed in **Chapter 8 Soils, Groundwater and Surface Water**. This process will require the use of monoethylene glycol (MEG) as a drying agent. Waste MEG will be collected and stored in tanks on support vessels prior to onshore disposal.

Table 18.10 Estimated Types and Volumes of Waste during Offshore Construction and Pre-Commissioning Activities

Description of Waste Type	Source	FWCC Code	Hazard Class	Equivalent EWC Code (* = hazardous)	Quantity (tonnes)
Fluorescent tubes and other mercury-containing lamps	Lighting on board vessels (MARPOL Annex V waste)	353 301 00 13 01 1	1	12 01 01	<1
MARPOL Annex I oily wastes	Vessel operation, bilge water separation, etc.	546 002 00 06 03 3 546 003 00 04 03 3	3	13 04 03* 13 07 01*	100 - 1000
Mixed municipal waste	Mixed waste from welfare, mess and office facilities (MARPOL Annex V waste)	912 004 00 01 00 4	4	20 03 01	100 - 1000
Ash, slag and dust from on-board incineration	Fuel or waste burning (MARPOL Annex V waste)	313 000 00 00 00 0	4	19 01 12	100 - 1000
Medical waste	Staff medical treatment (MARPOL Annex V waste)	971 000 00 00 00 0	4	18 01 03*	<1
Glass scrap (excluding fluorescent tubes)	Waste from mess and office facilities (MARPOL Annex V waste)	314 008 02 01 99 5	5	15 01 07	100 - 1000

Continued...

Description of Waste Type	Source	FWCC Code	Hazard Class	Equivalent EWC Code (* = hazardous)	Quantity (tonnes)
Uncontaminated soil	Surplus excavated material (offshore)	314 011 00 08 99 5	5	17 05 06	55,250 (based on volume of 42,500 m3 with density of 1.3 t/m3)
Plastic	Waste from mess and office facilities (MARPOL Annex V waste)	571 018 00 13 00 5	5	15 01 02	1 - 10
Scrap metal	Cutting of pipelines, etc. (MARPOL Annex V waste)	351 301 00 01 99 5	5	12 01 01	13,000
Waste textiles	Staff clothing and footwear, etc. (MARPOL Annex V waste)	581 011 08 01 99 5	5	20 03 01	10 - 100
Biodegradable kitchen waste	Source-separated waste from mess facilities (MARPOL Annex V waste)	912 010 01 00 00 5	5	20 01 08	100 - 1000
Waste MEG	Hydro-testing and drying of Pipeline	590 000 00 00 00 0	3	16 01 14*	134
Sewage	Sewage generated by vessel crews and offshore construction workers (MARPOL Annex IV waste)	951 000 00 00 00 0	4	Not applicable	5,000 – 10,000

Complete.

18.4.1.2 Operational Phase

In comparison to the Construction and Pre-Commissioning Phase, it is anticipated that the Operational Phase of the Project will generate much smaller volumes of waste. As the Pipeline will carry dry gas, there is not expected to be any accumulation of scale or need for frequent cleaning.

Types and quantities of waste likely to be produced have been calculated and are presented (using the Russian FWCC codes) in Table 18.11. Further details are provided below.

Onshore

No waste will be routinely produced at the Landfall Facilities during normal operating conditions; they will be unmanned.

A very small amount of waste will be produced by staff undertaking maintenance activities (inspections, surveys, etc.). The Pipeline Right of Way (RoW) will be kept clear of deep-rooting trees by periodic inspection and clearance. This is not anticipated to give rise to any wastes that would require off-site management or disposal.

A small number of fluorescent tubes will require replacing each year at the Landfall Facilities during the Operational Phase of the Project. The treatment of surface water runoff from the permanent Landfall Facilities will give rise to a number of wastes (e.g. sludge or spent filters) potentially contaminated with oil that will require disposal.

Waste filters and waste lubricating oil will also be produced as a result of the routine maintenance of plant and machinery (but very low volumes are expected).

Nearshore and Offshore Sections

Normal operation of the Pipeline will not generate waste in the nearshore and offshore sections. Surveys will be carried out of critical areas on an annual basis using Remotely Operated Vehicles (ROV), and of the whole Pipeline every five years. These surveys will be carried out from vessels and the survey duration is expected to be five days for annual surveys and up to 30 days for the five-year surveys. The survey vessels will generate relatively small quantities of MARPOL Annex V (garbage) and MARPOL Annex I (oily waste).

In the event of emergency pipeline repair, vessels will need to be mobilised and welding may be required. The types of waste would be similar to those generated during construction, but since the frequency and severity of pipeline repair cannot be estimated, there is no information on the quantities of waste arising. Since the probability of failure is expected to be low, the likelihood of significant quantities of repair waste being generated is also expected to be low.

Table 18.11 Estimated Types and Volumes of Waste during Operational Phase (Onshore and Offshore)

Description of Waste Type	Source	FWCC code	Hazard Class	Equivalent EWC Code (* = hazardous)	Quantity (tpa)
Fluorescent tubes and other mercury-containing lamps	Lighting of landfall facilities and onboard vessels	353 301 00 13 01 1	1	20 01 21*	< 1
Oily wastes, including: -waste oils, filters, oily rags, spill response waste, etc.	Maintenance of mobile plant, spill cleaning material, etc.	541 002 05 02 03 3 549 027 01 01 03 3 314 023 03 04 03 3 546 002 00 06 03 3	3	13 01 10* 13 02 05*	< 1
Mixed municipal waste	Mixed waste from welfare, mess and office facilities	912 004 00 01 00 4	4	20 03 01	10 - 100
Waste paint resources	Onshore pipeline	555 000 00 00 00 0	4	15 01 10*	< 1
Sludge from wastewater treatment	Solids from treatment of surface water run-off and settlement of wash waters	943 000 00 00 00 0	4	13 05 01*	10 - 100
MARPOL Annex I oily wastes	Vessel operation, bilge water separation, etc.	546 002 00 06 03 3 546 003 00 04 03 3	3	13 04 03* 13 07 01*	10 - 100
Medical waste	Staff medical treatment	971 000 00 00 00 0	4	18 01 03*	< 1

Continued...

Description of Waste Type	Source	FWCC code	Hazard Class	Equivalent EWC Code (* = hazardous)	Quantity (tpa)
Biodegradable kitchen waste	Source-separated waste from mess facilities	912 010 01 00 00 5	5	20 01 08	< 1
Plastic	Waste from mess and office facilities	571 018 00 13 00 5	5	15 01 02	< 1
Glass scrap (excluding fluorescent tubes)	Waste from mess and office facilities	314 008 02 01 99 5	5	15 01 07	1 - 10
Sewage	Sewage generated by vessel crews and offshore construction workers (MARPOL Annex IV waste)	951 000 00 00 00 0	4	Not applicable	10 – 100

Complete.

18.4.1.3 Decommissioning

The expected service lifetime of the South Stream Offshore Pipeline is 50 years. Decommissioning of the Pipeline will be undertaken in accordance with the legislation prevailing at that time, in liaison with the relevant regulatory authorities.

Within the South Stream Offshore Pipeline timeframe of 50 years there may be changes to statutory decommissioning requirements, as well as advances in technology and knowledge. South Stream Transport will therefore utilise GIIP during all decommissioning activities.

The actual method used for decommissioning will not be determined until closer to the time of decommissioning, and in particular, no decision has been made on whether the subsea pipelines will be removed, or whether they will be decommissioned in situ (i.e. flushed, filled with water, sealed and left in position).

The main waste materials generated by decommissioning will be inert crushed stone (from demolition of structures and removal of hardstanding) and metal (from pipes and ancillary equipment). Depending on the techniques used, small quantities of waste associated with maintenance of the plant used for decommissioning may also be generated.

Table 18.12 Estimated Types and Volumes of Waste during Decommissioning Activities

Description of Waste Type	Source	FWCC Code	Hazard Class	Equivalent EWC Code (* = hazardous)	Quantity (tonnes)
Scrap metal	Removal of pipelines and associated equipment	351 301 00 01 99 5	5	12 01 01	Approximately 670,000 tonnes
Crushed stone	Demolition rubble from removal and crushing of concrete structures	314 009 02 01 99 5	5	17 05 04 (inert)	Approximately 30,000 tonnes
Mixed municipal waste	Mixed waste from welfare, mess and office facilities	912 004 00 01 00 4	4	20 03 01	1 - 10
Oily wastes, including: - waste oils, filters, oily rags, spill response waste, etc.	Maintenance of mobile plant, cleaning of diesel tanks, spill cleaning material, etc.	546 015 01 04 03 3 541 002 05 02 03 3 920 000 00 00 00 0 549 027 01 01 03 3 314 023 03 04 03 3 546 002 00 06 03 3	3	13 02 05* 13 01 10* 16 01 07*	1 – 10

18.5 Mitigation Measures

18.5.1 General Approach to Waste Management

The general approach to managing solid waste will be described in the integrated Waste Management Plan (WMP) drawn up by contractors. This provides guidance on:

- Waste minimisation and prevention;
- Identification and segregation of waste materials at source;
- Recycling and reuse of suitable materials; and
- Treatment and disposal of specific waste streams.

The integrated WMP will refer to vessel-specific Waste Management Plans which will include provisions for segregating waste on board, having secure areas for storage of hazardous waste and recycling or reuse where practicable.

The structure of the waste management elements of integrated WMP should follow the outline provided in Table 18.13.

Table 18.13 Recommended Contents of the Integrated Waste Management Plan (WMP)

Section	Content
Introduction	Background
	Plan Objectives
	Limitations of the WMP
	Layout of the WMP
Project Description	Project Details
	Nature of Project
	Location
Management Arrangements	Roles and Responsibilities
	WMP Distribution
	Instruction and Training
	Performance Indicators

Continued…

Section	Content
Waste Management Arrangements	Forecast Waste Arisings
	Record of Decisions Taken Regarding Waste Management
	Opportunities for Increasing Recycled Content
	Opportunities for Waste Minimisation
	Waste Storage and Segregation Arrangements
	Waste Management Arrangements
	Monitoring Arrangements

Complete.

All wastes will be managed in accordance with the applicable regulations and statutory obligations.

18.5.2 General Mitigation Measures

The general approach to mitigating impacts will be to use existing licensed facilities which comply with Russian regulations and the requirements of the IFC EHS Guidelines and Performance Standards. Prior to the start of construction works, contracts will be arranged with licensed organisations for the transport, reuse, recycling, treatment and final disposal of waste.

Pursuant to Article 19 of Federal Law № 89-FZ of 24 June 1998 ("On Production and Consumption Wastes"), waste producers are obligated to keep proper records of the wastes generated, treated, and handed over to other parties.

Waste recordkeeping shall be conducted in the locations where the wastes are generated, used, and treated, and also when transferring the wastes for recovery during the construction period. A designated Waste Control Officer will be responsible for keeping records on the wastes generated. The Waste Control Officer shall record this information, in the manner required by Order № 721 of 01 September 2011 ("On Approval of the Waste Management Recordkeeping Procedure"), in specially created tables that are used as the primary means of tracking waste transfer. The results presented in the tables will be used to fill out government statistical reports (№2-TP Wastes), and must also be used in the Adverse Environmental Impact Fee Calculations.

All personnel will receive a briefing on the waste management rules and principles whilst working onsite.

Temporary waste storage sites will meet the following requirements:

- Ensure that impacts on the environment are avoided or minimised as far as practicable;
- Ensure that there is no risk to human health as a result of hazardous waste;

- Prevent the loss of properties of recycled waste as a result of improper collection and storage;
- Minimise the risk of fire from stored waste;
- Prevent littering;
- Undertake a waste inventory and monitor waste management; and
- Ensure ease of waste disposal.

Appropriate skips, containers, bags and storage areas will be provided including the separate storage of hazardous and non-hazardous wastes and for the segregation, where viable, of materials suitable for reuse or recycling such as metals and plastics.

Transportation of waste will be carried out in compliance with environmental safety regulations, ensuring protection of the environment when handling loading and unloading operations and transportation. The Project will comply with the following requirements regarding transportation of wastes:

- Transportation of hazard Class IV or V wastes to industrial waste landfill will be carried out by specialised transport vehicles;
- Operations associated with loading, transportation and unloading of waste are mechanised where practicable, in order to avoid possible losses en route and environmental pollution;
- Each type of waste is subject to separate transportation so that wastes will not be mixed during transportation;
- All vehicles delivering waste will be accompanied by a consignment note which will be signed by the responsible person; and
- Once the waste has been delivered, the transport vehicles and containers that were used will be cleaned in a specially designated location.

The frequency of waste collections destined for the permanent disposal facilities (landfill) or recycling facilities will be determined by the following factors:

- Frequency of waste accumulation;
- Availability and capacity of the vessel (container) on site for temporary storage of waste; and
- Type and hazard class of the waste stream and its compatibility with other waste streams during storage and transportation.

18.5.3 Specific Mitigation Measures

The specific mitigation measures that will be adopted to ensure responsible management of the wastes arising from the Project are described below and summarised in Table 18.14.

18.5.3.1 Onshore

Waste from Workforce

All wastes arising will be stored, collected and transported off site in appropriate bins and containers. Only appropriately licensed companies will be employed for the transportation, recycling and disposal of waste. All waste will be managed using existing local facilities which are suitably licensed under Russian regulations.

During operation, the small quantities of waste generated will typically be transported back to the base office of the staff involved, from where it will be managed using local waste collection and disposal companies.

Waste from Construction Activities

Construction waste will be segregated at source and collected by suitably licensed local waste management contractors for recycling or disposal using existing local facilities which are suitably licensed under Russian Federation regulations.

It is considered that a portion of the waste generated within the Construction Phase has an opportunity to be reused or recycled. Examples include:

- Recycling of inert wastes, excavated materials and surplus concrete and concrete products into aggregates for use within the development, such as in parking areas or access roads;
- Recycling of metal off-cuts, surplus and damaged parts, including pipework, re-bar, cabling etc.; and
- Reuse, recycling or recovery of packaging wastes including wood, cardboard, paper and some plastics.

Where possible, contractors will be encouraged to reduce waste arisings and identify opportunities for reuse and recycling.

The location of waste storage areas will consider the nature of the materials to be stored within, the likelihood of disturbance through accidents, and control actions available in case of emergency (e.g. fire, flood).

General construction wastes will be managed with a local waste management contractor as per the local waste management market. The waste management contractor will be approved by Russian regulatory authorities to transport, reuse, recycle, treat and/or dispose of waste types that are generated. Appropriate skips, containers, bags and storage areas will be provided including the separate storage of hazardous and non-hazardous wastes and for the segregation, where viable, of materials suitable for reuse or recycling such as metals, plastics and paper and card.

As far as possible, surplus excavated spoil will be used for landscaping purposes within the construction corridor or will be used for site engineering or restoration purposes at a local landfill site, or as inert backfill at identified quarries.

Hazardous Waste

Hazardous materials, such as waste oils and oily wastes, will be contained in appropriate closed containers and drums. Liquid wastes will be stored in an area of secondary containment, designed to capture any waste that may leak from the containers, with a volume equal to at least 110% of the volume of the largest storage container. Hazardous wastes will be collected for treatment by a suitably licensed waste collector and treated at a facility which complies with the relevant local regulations and GIIP.

Waste fluorescent tubes will be stored separately in a designated container which is resistant to chemical degradation and prohibits accumulation of water. Transportation of such waste will be undertaken in accordance with strict guidelines to ensure integrity and eliminate the possibility of contamination of the environment. Waste fluorescent tubes will not be stored outdoors, in cardboard boxes, or on the ground, and will be removed at least every three months regardless of the amount accumulated.

Any small quantities of medical waste generated will be temporarily stored in fit-for-purpose containers in a closed room with restricted access for the staff until transport off site by an approved and licensed contractor to a dedicated clinical waste management facility.

18.5.3.2 Offshore

Waste from Workforce and Construction Activities

Offshore waste during both construction and operation will be managed in accordance with the requirements of MARPOL 73/78.

With respect to MARPOL Annex V waste, there will be no discharge of any garbage within 12 nautical miles of the coast. Outside this 12 nautical mile limit, food waste may be comminuted or ground prior to discharge, providing vessels are en route. MARPOL Annex V does not give any minimum speed as part of the definition of "en route".

Garbage will be stored on vessels in suitable containers, clearly marked to indicate the type of waste within. Any garbage requiring transfer either to support vessels or for onshore disposal will be located in order to provide ease of access for loading and unloading. Once the waste has been transferred to shore, it will be collected by the port authorities or their nominated contractors using the existing port waste reception facilities.

Alternatively, if equipped, vessels may make use of on-board garbage incineration units, provided these are type approved in accordance with the IMO "Standard Specification for Shipboard Incinerators" and comply with the requirements of Regulation 16 of MARPOL Annex VI and the Standard Specification for On-board Ship Incinerators, adopted by the Marine Environment Protection Committee on 25 September 1997 (Ref. 18.27). On vessels capable of incineration the following solid wastes may be incinerated: domestic waste (excluding glass); operating wastes (e.g. oily sludges); textiles; and uncontaminated plastic containers. Solid wastes that will not be incinerated include mercury vapour lamps and mercury-containing fluorescent tubes, glass and scrap metal.

There will be no inappropriate mixing of waste types (e.g. domestic waste with hazard Class 1 or 2 waste) and containers will be not overfilled. Where feasible, recyclable garbage (e.g. glass and plastics) will be separated at source, separately stored and collected for recycling by the port waste reception contractors. Domestic waste containing a high biodegradable fraction will not be stored for more than one week (reduced to two days in the summer).

Where waste is transferred to other ships, specific procedures will govern methods employed for preparing material and ensuring accidental discharge, spillages or leaks do not occur. Consignment notes detailing the quantity and type of waste transferred between ships will be kept.

Project vessels shall carry a Garbage Management Plan which will include written procedures for collection, storage, processing and disposal of waste, including the use of any relevant equipment fitted onboard. The Garbage Management Plan will designate the person responsible for carrying out the Plan. Vessels over 400 gross tonnage or carrying more than 15 passengers shall also maintain a Garbage Book.

For the purposes of complying with MARPOL 73/78, construction waste arising on board the vessels will be managed as MARPOL Annex V waste, with discharge at sea strictly prohibited. All waste (predominantly welding and packaging waste) will be retained on board, source-separated where practicable, and collected by the port authorities or their nominated contractors using the existing port waste reception facilities. Any hazardous waste generated during offshore construction (other than MARPOL Annex I Oily Waste, described separately below) will be stored, collected and managed separately in accordance with Russian regulations.

The Project will generate dredged spoil from offshore trenching and profiling. Dredged spoil in the nearshore zone (i.e. from microtunnelling activities) will be temporarily stored in designated offshore storage areas. This material will be subsequently re-dredged and used for trench backfill following pipe installation. A certain amount of offshore dredged material (estimated volume of 42,500 m^3) will be disposed of at an existing underwater disposal site (no. 923, located on the Russian continental slope).

In the event that any dredge spoil is identified as contaminated or requires disposal on land, the spoil will be treated as construction waste and appropriately stored, transported and disposed of. However, baseline studies undertaken to date do not indicate that this is likely.

Sewage from vessels will be managed in accordance with MARPOL Annex IV. Discharge of sewage will only take place when:

- The ship is discharging comminuted and disinfected sewage at a distance of more than 3 nautical miles from the nearest land, or sewage which is not comminuted or disinfected at a distance of more than 12 nautical miles from the nearest land, provided that in any case, the sewage that has been stored in holding tanks shall not be discharged instantaneously but at a moderate rate when the ship is en route and proceeding at not less than 4 knots; or
- The ship has in operation an approved sewage treatment and the effluent does not produce visible floating solids nor cause discoloration of the surrounding water.

Hazardous Waste

Under MARPOL Annex I, vessels are permitted to discharge bilge water which has been treated using an Oily Water Separater (OWS) such that it has oil content below 15 ppm, provided the vessel is proceeding en route. "En route" for the purposes of MARPOL Annex I is defined as meaning *"… that the ship is underway at sea on a course or courses, including deviation from the shortest direct route, which as far as practicable for navigation purposes, will cause any discharge to be spread over as great an area of the sea as is reasonable and practicable".* Vessels which are stationary (i.e. not en route) will be required to retain bilge water on board for subsequent discharge to dedicated collection vessels; or treatment and discharge once they are proceeding en route; or discharge to port waste reception facilities.

Oily sludge will be collected and stored in dedicated sludge tanks. Oily sludge (and residues from bilge water OWS systems) will be treated by incineration in the case of those vessels having MARPOL-compliant incinerators. In all other cases, oily wastes will be retained on board for subsequent discharge to dedicated collection vessels or port waste reception facilities.

Vessels will maintain an Oil Record Book and Oil Pollution Emergency Plan in accordance with MARPOL Annex I.

MEG from the hydrotest and dewatering operation of the nearshore section will be collected and stored on board vessels and transported to a suitable facility onshore for recycling. Depending on whether MEG will be transported on board the vessel in packaged form or in bulk (i.e. whether it will be stored in demountable tanks on a regular vessel, or in internal tanks in chemical tanker), it may be regulated by either MARPOL Annex III (Regulations for the Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form) or Annex II (Regulations for the Prevention of Pollution by Noxious Liquid Substances in Bulk), and the vessel will comply with the relevant provisions.

MEG is categorised as a potential marine pollutant under the International Maritime Organisation's International Maritime Dangerous Goods (IMDG) Code and as such must be suitably packaged and labeled in accordance with MARPOL Annex III. Under MARPOL Annex II, MEG is classified as a Category Y pollutant.

18.5.3.3 Summary

Table 18.14 summarises the management measures proposed for the various waste types anticipated to be generated by the Project and facilities which may be used for the intermediate storage, treatment and/or disposal of the wastes.

Due to the long period of time before decommissioning is programmed to start, it is not possible to identify specific management routes and facilities for decommissioning waste. However, the great majority of decommissioning waste will be inert rubble or metal.

Table 18.14 Mitigation and Management Measures

Description of Waste Type	FWCC code	Potential Management Route	Potential Facilities
Construction and Pre-Commissioning Phase			
Onshore			
Fluorescent tubes and other mercury-containing lamps	353 301 00 13 01 1	Disposal at hazardous waste facility	Mercury Safety Agency and Ach Enppi Sirius
Oily wastes, including: - waste oils, filters, oily rags, spill response waste, etc.	546 015 01 04 03 3	Reuse where possible (e.g. waste oil) or disposal at suitable waste facility	EkoBio, Mercury Safety Agency and Ach Enppi Sirius
	541 002 05 02 03 3		
	920 000 00 00 00 0		
	549 027 01 01 03 3		
	314 023 03 04 03 3		
	546 002 00 06 03 3		
Waste protective clothing and worn work footwear	582 000 00 00 00 0	Disposal at suitable waste facility	Mercury Safety Agency and Promehkologiya
	147 006 01 13 00 4		
Waste drilling sludge	314 000 00 00 00 0	Disposal at suitable waste facility; Research & Production	EkoBio, Mercury Safety Agency and Ach Enppi Sirius
Waste paint resources	555 000 00 00 00 0	Disposal at suitable waste facility	Mercury Safety Agency
Sludge from wastewater treatment	943 000 00 00 00 0	Disposal at suitable waste facility	EkoBio and ACh Enppi Sirius
Mixed municipal waste	912 004 00 01 00 4	Disposal at suitable waste facility	Alfa Landfill
Scrap metal	351 301 00 01 99 5	Reuse	Krymskvtorsyryo and Novorossiisk-metal

Continued…

Description of Waste Type	FWCC code	Potential Management Route	Potential Facilities
Uncontaminated soil	314 011 00 08 99 5	Reuse on site for landscaping, etc. where possible; potential reuse off site as inert backfill or restoration cover	Alfa Landfill or quarry
Welding waste	351 216 01 01 99 5	Disposal at suitable waste facility	Alfa Landfill
Crushed stone	314 009 02 01 99 5	Reuse off site as inert backfill or restoration cover	Alfa Landfill or quarry
Uncontaminated sand	314 023 01 01 99 5	Reuse off site as inert backfill or restoration cover	Alfa Landfill or quarry
Plastic	571 018 00 13 00 5	Recycled or reused where practicable, otherwise disposal at suitable waste management facility	Mercury Safety Agency and Alfa Landfill
Cardboard	187 102 02 01 00 5	Disposal at suitable waste facility	Mercury Safety Agency and Alfa Landfill
Tree stumps	173 001 02 01 00 5	Disposal at suitable waste facility	Mercury Safety Agency and Alfa Landfill
Waste (slurry) from cesspools and domestic sewage	951 000 00 00 00 0	Treatment by licenced contractor	ACh Enppi Sirius
Offshore			
Fluorescent tubes and other mercury-containing lamps	353 301 00 13 01 1	Transferred to vessel waste reception facilities for disposal at hazardous waste facility	Marine Consulting LLC
MARPOL Annex I oily wastes	546 002 00 06 03 3 546 003 00 04 03 3	Incinerated onboard or transferred to vessel waste reception facilities for disposal at suitable waste facility	Mortrans-Service NHB LLC, SPC Crocus LLC and ACh Enppi SIRIUS

Continued…

Description of Waste Type	FWCC code	Potential Management Route	Potential Facilities
Mixed municipal waste	912 004 00 01 00 4	Incinerated onboard or transferred to vessel waste reception facilities for disposal at suitable waste facility	Marine Consulting LLC and Mortrans-Service NHB LLC
Ash, slag and dust from on-board incineration	313 000 00 00 00 0	Transferred to vessel waste reception facilities for disposal at suitable waste facility	Marine Consulting LLC and Mortrans-Service NHB LLC
Medical waste	971 000 00 00 00 0	Incinerated onboard or transferred to vessel waste reception facilities for disposal at suitable waste facility	Mercury Safety Agency LLC
Glass scrap (excluding fluorescent tubes)	314 008 02 01 99 5	Transferred to vessel waste reception facilities for disposal at suitable waste facility	Marine Consulting LLC and Mortrans-Service NHB LLC
Uncontaminated sediment	314 011 00 08 99 5	Transferred to existing permitted underwater disposal sites	Disposal Site 933
Plastic	571 018 00 13 00 5	Incinerated onboard or transferred to vessel waste reception facilities for disposal at suitable waste facility	Marine Consulting LLC and Mortrans-Service NHB LLC
Scrap metal	351 301 00 01 99 5	Source segregated for reuse where possible and transferred to vessel waste reception facilities	Novorosmetall LLC and Krymskvtorsyryo LLC
Waste textiles	581 011 08 01 99 5	Incinerated onboard or transferred to vessel waste reception facilities for disposal at suitable waste facility	Marine Consulting LLC and Mortrans-Service-NHB LLC

Continued…

Description of Waste Type	FWCC code	Potential Management Route	Potential Facilities
Biodegradable kitchen waste	912 010 01 00 00 5	Incinerated onboard or macerated and discharged at sea where this can be done in compliance with MARPOL regulations, otherwise transferred to vessel waste reception facilities for disposal at suitable waste facility	Marine Consulting LLC and Mortrans-Service NHB LLC
Waste MEG	590 000 00 00 00 0	Transferred to vessel waste reception facilities for disposal at suitable hazardous waste facility	Kubanekoprodukt LLC
Sewage	951 000 00 00 00 0	Discharged to sea following treatment or transferred to port reception facilities, in accordance with MARPOL Annex IV	n/a
Operational Phase (Onshore and Offshore)			
Fluorescent tubes and other mercury-containing lamps	353 301 00 13 01 1	Disposal at hazardous waste facility	Mercury Safety Agency LLC / Marine Consulting LLC
Oily wastes, including: - waste oils, filters, oily rags, spill response waste, etc.	541 002 05 02 03 3 549 027 01 01 03 3 314 023 03 04 03 3 546 002 00 06 03 3	Reuse where possible (e.g. waste oil) or disposal at suitable waste facility	EkoBio, Mercury Safety Agency and Ach Enppi Sirius
Mixed municipal waste	912 004 00 01 00 4	Onshore: disposal at suitable waste facility	Alfa Landfill
		Offshore: incinerated onboard or transferred to vessel waste reception facilities for disposal at suitable waste facility	Marine Consulting LLC and Mortrans-Service NHB LLC
Waste paint resources	555 000 00 00 00 0	Disposal at suitable waste facility	Mercury Safety Agency

Continued…

Description of Waste Type	FWCC code	Potential Management Route	Potential Facilities
Sludge from wastewater treatment	943 000 00 00 00 0	Disposal at suitable waste facility	Research & Production Enterprise EcoBio LLC
MARPOL Annex I oily wastes	546 002 00 06 03 3 546 003 00 04 03 3	Incinerated onboard or transferred to vessel waste reception facilities for disposal at suitable waste facility	Mortrans-Service NHB LLC, SPC Crocus LLC and ACh Enppi SIRIUS
Medical waste	971 000 00 00 00 0	Incinerated onboard or transferred to vessel waste reception facilities for disposal at suitable waste facility	
Biodegradable kitchen waste	912 010 01 00 00 5	Incinerated onboard or macerated and discharged at sea where this can be done in compliance with MARPOL regulations, otherwise transferred to vessel waste reception facilities for disposal at suitable waste facility	Marine Consulting LLC and Mortrans-Service NHB LLC
Plastic	571 018 00 13 00 5	Incinerated onboard or transferred to vessel waste reception facilities for disposal at suitable waste facility	Marine Consulting LLC and Mortrans-Service NHB LLC
Glass scrap (excluding fluorescent tubes)	314 008 02 01 99 5	Transferred to vessel waste reception facilities for disposal at suitable waste facility	Marine Consulting LLC and Mortrans-Service NHB LLC

Complete.

18.5.4 Monitoring

South Stream Transport will develop a detailed overarching Environmental and Social Monitoring Programme that will detail the monitoring requirements. As part of this ESMP, the quantities of waste generated by the project and the means of management of these wastes will be monitored on a regular basis. Monitoring will also be carried out to ensure compliance with Russian regulations, as described in Section 18.5.2 above, and MARPOL requirements for

maintenance of Oil and Garbage Record Books as required under MARPOL Annex I and V respectively.

Monitoring records will be maintained which will include, as a minimum, the following information:

- Types and quantities of waste generated;
- Types and quantities of waste leaving Project sites or vessels for recycling, recovery or disposal;
- Details of vehicles or vessels transporting waste from the sites;
- Location of treatment or disposal facilities to which the waste is transported; and
- Records of any spillages or unplanned releases, or any enforcement actions.

18.5.5 Assessment of Residual Impact Significance

Table 18.15 indicates the assessed residual impact significance of each waste stream assuming management measures as described are implemented.

The main regional landfill site (Alfa landfill) is not designed or operated as an engineered landfill in accordance with GIIP, and hence this has been identified as being a potentially unsuitable facility. However, the wastes that require landfill disposal are non-hazardous and relatively small in quantity (typically less than 1000 tonnes per waste stream). Alfa landfill is due to be replaced once it ceases operation in 2016, and thereafter the replacement landfill would be used by the Project, which is expected to be an engineered facility (although its location is yet to be confirmed by the local government). In the event that any Project wastes are deposited at Alfa landfill, the impacts are not expected to be significant since the wastes are non-hazardous, and those wastes arising from the Project would form only a very small proportion of the overall waste disposed of at Alfa, such that they would not significantly increase any existing environmental impacts associated with the site.

The overall quantities of waste requiring management are relatively small in comparison with the capacity of the receiving facilities. Any impacts from accidental release during temporary storage or transport of hazardous wastes will be minimised by implementing an integrated WMP.

Table 18.15 Evaluation of Mitigation Measures

Description of Waste Type	Potential Facilities	Waste Category	Facility Assessment	Residual Impact
Construction and Pre-Commissioning Phase				
Onshore				
Fluorescent tubes and other mercury-containing lamps	Mercury Safety Agency and Ach Enppi Sirius	Hazardous	Suitable facilities with sufficient capacity	Low
Oily wastes, including: - waste oils, filters, oily rags, spill response waste, etc.	EkoBio and Mercury Safety Agency and Ach Enppi Sirius	Hazardous	Suitable facilities with sufficient capacity	Low
Waste protective clothing and worn work footwear	Mercury Safety Agency and Promehkologiya	Non-hazardous	Suitable facilities with sufficient capacity	Negligible
Waste drilling sludge	EkoBio and Mercury Safety Agency and Ach Enppi Sirius	Inert	Suitable facilities with sufficient capacity	Negligible
Waste paint resources	Mercury Safety Agency	Hazardous	Suitable facilities with sufficient capacity	Low
Sludge from wastewater treatment	EkoBio and ACh Enppi Sirius	Hazardous	Suitable facilities with sufficient capacity	Low
Mixed municipal waste	Alfa Landfill	Non-hazardous	Facilities are potentially unsuitable.	Moderate*
Scrap metal	Krymskvtorsyryo and Novorossiisk-metal	Non-hazardous	Suitable facilities with sufficient capacity	Negligible
Uncontaminated soil	Alfa Landfill or quarry	Inert	Suitable facilities but capacity may be constrained	Low
Welding waste	Alfa Landfill	Non-hazardous	Facilities are potentially unsuitable.	Moderate*

Continued…

Description of Waste Type	Potential Facilities	Waste Category	Facility Assessment	Residual Impact
Crushed stone	Alfa Landfill or quarry	Inert	Suitable facilities but capacity may be constrained	Low
Uncontaminated sand	Alfa Landfill or quarry	Inert	Suitable facilities but capacity may be constrained	Low
Plastic	Mercury Safety Agency and Alfa Landfill	Non-hazardous	Facilities are potentially unsuitable.	Moderate*
Cardboard	Mercury Safety Agency and Alfa Landfill	Non-hazardous	Facilities are potentially unsuitable.	Moderate*
Tree stumps	Mercury Safety Agency and Alfa Landfill	Non-hazardous	Facilities are potentially unsuitable.	Moderate*
Waste (slurry) from cesspools and domestic sewage	ACh Enppi Sirius	Non-hazardous	Suitable facilities with sufficient capacity	Negligible
Offshore				
Fluorescent tubes and other mercury-containing lamps	Marine Consulting LLC	Hazardous	Suitable facilities with sufficient capacity	Low
MARPOL Annex I oily wastes	Mortrans-Service NHB LLC and SPC Crocus LLC	Hazardous	Suitable facilities with sufficient capacity	Low
Mixed municipal waste	Marine Consulting LLC and Mortrans-Service NHB LLC	Non-hazardous	Suitable facilities with sufficient capacity	Negligible
Ash, slag and dust from on-board incineration	Marine Consulting LLC and Mortrans-Service NHB LLC	Non-hazardous	Suitable facilities with sufficient capacity	Negligible
Medical waste	Mercury Safety Agency LLC	Hazardous	Suitable facilities with sufficient capacity	Low

Continued…

Description of Waste Type	Potential Facilities	Waste Category	Facility Assessment	Residual Impact
Glass scrap (excluding fluorescent tubes)	Marine Consulting LLC and Mortrans-Service NHB LLC	Non-hazardous	Suitable facilities with sufficient capacity	Negligible
Uncontaminated sediment	Disposal Site 933	Inert	Suitable facilities with sufficient capacity	Negligible
Plastic	Marine Consulting LLC and Mortrans-Service NHB LLC	Non-hazardous	Suitable facilities with sufficient capacity	Negligible
Scrap metal	Novorosmetall LLC and Krymskvtorsyryo LLC	Non-hazardous	Suitable facilities with sufficient capacity	Negligible
Waste textiles	Marine Consulting LLC and Mortrans-Service-NHB LLC	Non-hazardous	Suitable facilities with sufficient capacity	Negligible
Biodegradable kitchen waste	Marine Consulting LLC and Mortrans-Service NHB LLC	Non-hazardous	Suitable facilities with sufficient capacity	Negligible
Waste MEG	Kubanekoprodukt LLC	Hazardous	Suitable facilities with sufficient capacity	Low
Sewage	n/a	Non-hazardous	Suitable facilities with sufficient capacity	Negligible
Operational Phase (Onshore and Offshore)				
Fluorescent tubes and other mercury-containing lamps	Mercury Safety Agency and Marine Consulting LLC	Hazardous	Suitable facilities with sufficient capacity	Low
Oily wastes, including: - waste oils, filters, oily rags, spill response waste, etc.	EkoBio, Mercury Safety Agency and Ach Enppi Sirius	Hazardous	Suitable facilities with sufficient capacity	Low

Continued…

Description of Waste Type	Potential Facilities	Waste Category	Facility Assessment	Residual Impact
Mixed municipal waste	Onshore: Alfa Landfill	Non-hazardous	Facilities are potentially unsuitable.	Moderate*
	Offshore: Marine Consulting LLC and Mortrans-Service NHB LLC	Non-hazardous	Suitable facilities with sufficient capacity	Negligible
Waste paint resources	Mercury Safety Agency	Hazardous	Suitable facilities with sufficient capacity	Low
Sludge from wastewater treatment	EkoBio	Non-hazardous	Suitable facilities with sufficient capacity	Negligible
MARPOL Annex I oily wastes	Mortrans-Service NHB LLC and SPC Crocus LLC	Hazardous	Suitable facilities with sufficient capacity	Low
Medical waste	Mercury Safety Agency LLC	Hazardous	Suitable facilities with sufficient capacity	Low
Biodegradable kitchen waste	Marine Consulting LLC and Mortrans-Service NHB LLC	Non-hazardous	Suitable facilities with sufficient capacity	Negligible
Plastic	Marine Consulting LLC and Mortrans-Service NHB LLC	Non-hazardous	Suitable facilities with sufficient capacity	Negligible
Glass scrap (excluding fluorescent tubes)	Marine Consulting LLC and Mortrans-Service NHB LLC	Non-hazardous	Suitable facilities with sufficient capacity	Negligible

* The current status of Alfa Landfill is discussed in Table 18.6 and the potential use of this facility for non-hazardous wastes is discussed in Section 18.8 below.

Complete.

18.6 Unplanned Events

Procedures for dealing with unplanned events will be set out in the Project Emergency Preparedness and Response Plan (see **Chapter 22 Environmental and Social Management**). The mitigation measures described in this chapter (including the procedures for temporary storage and transportation of waste) have been developed with the intention of mitigating the likelihood of any unplanned release of wastes; for example, releases due to

inadequate storage arrangements at the site, or spillages during loading and unloading of wastes, and the Project Emergency Preparedness and Response Plan will include contingency arrangements in the unlikely event of releases (e.g. provision of spill kits).

18.7 Cumulative Impacts

There are four known developments in the region which are all onshore. The Russkaya compressor station (CS) is considered to be the most significant of these which may add pressure on waste storage and disposal facilities in the area. However, providing all wastes are disposed of in accordance with legislative requirements at waste facilities operating in accordance with permitted conditions and GIIP, the Project will not generate significant cumulative impacts. The quantities of hazardous and non-hazardous waste arisings from the Project are small when compared to total regional arisings and therefore no significant cumulative impact is expected. Although large quantities of uncontaminated soil and rock will be generated, this is not expected to give rise to significant cumulative impacts since it will be used for backfill or restoration purposes at quarry or landfill sites in the region; and since the material is inert, it is unlikely to give rise to significant environmental impacts.

Cumulative impacts are considered and assessed in **Chapter 20 Cumulative Impact Assessment**.

18.8 Conclusions

The assessment of waste management impacts arising from the Project has identified the waste streams that are anticipated to be produced during the Construction and Pre-Commissioning Phase and the Operational Phase and identified the availability and suitability of existing waste management facilities to manage those wastes. Mitigation measures have been recommended in order to minimise the impacts as far as possible, including the preparation and implementation of an integrated WMP by contractors.

Moderate impacts are estimated in the event that the existing Alfa landfill are to be used for disposal of non-hazardous wastes from the Project. It is expected that this landfill will be closed and a replacement engineered facility may be available by 2016. Even in the absence of such a facility, the relatively small amounts of non-hazardous waste requiring landfill means that the impacts of using Alfa Landfill would not be significant.

Provided that all of the mitigation measures described above are correctly implemented, the overall waste management impacts from the development are expected to be **Not Significant**.

References

Number	Reference
Ref. 18.1	Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention), 1972.
Ref. 18.2	Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (Basel Convention), 1992.
Ref. 18.3	Convention on Persistent Organic Pollutants (Stockholm Convention).
Ref. 18.4	International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 (MARPOL 73/78 Convention) Annex I – VI.
Ref. 18.5	IFC (2007): General EHS Guidelines: Environmental.
Ref. 18.6	IFC PS3: Resource Efficiency and Pollution Prevention, 1 Jan 2012.
Ref. 18.7	IFC PS3 Guidance Note: Resource Efficiency and Pollution Prevention, 1 Jan 2012.
Ref. 18.8	Federal Law 'On Production and Domestic Wastes'. 24 June 1998, No. 89-FZ.
Ref. 18.9	Federal Law 'On Licensing Activities'. 08 Aug 2001, No. 128-FZ
Ref. 18.10	Federal Law 'On the Protection of the Environment'. 30 Dec 2008, No. 309-FZ
Ref. 18.11	Government Enactment 'On the adoption of procedure for development and adoption of environmental standards for emission and discharge of polluting substances into the environment, limits for natural resources' use and waste disposal'. 03 Aug 1992, No. 545
Ref. 18.12	Government Enactment 'On adoption of procedure for defining payment and its limits for environmental pollution, waste disposal and other harmful impacts'. 28 Aug 1992, No. 632
Ref. 18.13	Government Enactment 'On the state registration of potentially hazardous chemical and biological substances'. 12 Nov 1992, No. 869
Ref. 18.14	Government Enactment 'On amendments to administrative regulations by the federal service for environmental, technological and nuclear supervision for execution of the state function of issuing permits for emissions, discharges of polluting substances into the environment adopted by Order of the Ministry of Natural Resources and Environment of the Russian Federation'. 25 Feb 2010, No. 173
Ref. 18.15	Ministerial Order 'On the adoption of criteria for waste identification by class of environmental hazard'. 15 June 2001, No. 511
Ref. 18.16	Ministerial Order 'On the adoption of hazardous waste passport/datasheet'. 02 Dec 2002, No. 785

Number	Reference
Ref. 18.17	Ministerial Order 'On the adoption of the Federal Classificatory Catalogue of Wastes'. 02 Dec 2002, No. 786
Ref. 18.18	Ministerial Order 'Supplements to the Federal Waste Classificatory Catalogue'. 30 July 2003, No.663
Ref. 18.19	Ministerial Order 'On the procedures for development and adoption of standards for waste generation and limits of their disposal'. 25 Feb 2010, No. 50
Ref. 18.20	Ministerial Order 'On the adoption of statistical instruments for organising the monitoring of domestic waste production'. 28 Jan 2011, No. 17
Ref. 18.21	Ministerial Order 'On the adoption of accounting procedures in relation to waste management'. 01 Sep 2011, No. 721
Ref. 18.22	Order 'On the adoption of methodical instructive regulations for development of projects for waste generation and disposal limits' 19 Oct 2007, No. 703
Ref. 18.23	Book of per-unit indicators of production and consumption wastes' generation.
Ref. 18.24	Methodological recommendations for assessment of volumes of domestic and production wastes' generation (NITsPURO)
Ref. 18.25	Guidelines and procedures for charging environmental pollution payment. 26 Jan 1993, No 632.
Ref. 18.26	Strategic Action Plan for the Environmental Protection and Rehabilitation of the Black Sea (2009). Accessed from http://www.blacksea-commission.org/_bssap2009.asp. Accessed on 14 March 2013.
Ref. 18.27	Resolution Marine Environment Protection Committee (MEPC) 76(40) adopted on 25 September 1997: Standard Specification for On-board Ship Incinerators.